

4.0 Improvement Options Development and Funding Mechanisms

Based on the technical analysis and the process described in Section 3, possible improvement options for the NFFR were evaluated. A comprehensive set of options were documented for initial consideration in the preliminary stages of the corridor study. The options were then placed in a screening criteria matrix to facilitate a comparison of the options.

4.1 Main Issues

A list of main issues in the corridor that could be improved included:

- Dust mitigation
- Impacts on wildlife
- Roadway surface conditions, including washboard and potholes
- Maintenance
- Excessive travel speeds
- Roadway safety, namely a crash rate higher than state-wide average
- Emergency services delay
- Maintaining wilderness character of the area

Dust mitigation

On the gravel sections of the road, the existing traffic generates a great deal of dust. This was a common concern with stakeholders and the public. Vehicles traveling at higher speeds result in dusty conditions, which are suspected to contribute to an increase in accidents. Dusty conditions decrease visibility considerably; however dust was never specifically cited as a contributing factor in recorded accident logs. There is also concern from the public that dust from the roadways has potential to affect fish and aquatic habitat, via airborne deposition, or through direct water runoff from the road or nearby dusty vegetation.

Impacts on wildlife

There is little road kill or other crash data involving wildlife available. MDT only removes carcasses from the paved portion of the corridor study area. The degree of kills may not be adequately captured by MDT figures, and conflicting information from stakeholders has been provided on possible kill figures. The team noted that more specific information is needed.

The team agreed that further investigation would be needed to assess whether wildlife is a factor in crashes within corridor. MDT has counted 14 large animal kills over a period of 10 years on the paved portion of the roadway. The maintenance staff only deals with kills within the right-of-way (ROW); therefore, car/animal crashes not resulting in an animal casualty within the ROW may be under-reported. For example, an accident that occurs between a vehicle and animal may result in an injured animal that is able to leave the ROW.

Whether this corridor's wildlife kill differs substantially from statewide data is unknown. Additional coordination between MDT Environmental staff and USFWS staff would be necessary. Paving was an issue in the 1980's, resulting in a Section 7 "Jeopardy" ruling based on wildlife concerns.

If the road is paved, animal-vehicle collisions could increase. One way to mitigate this would be to provide wildlife crossing structures as part of any pavement options. The advantage is that since the land is Forest Service land, there is no private development that would be affected.

Fencing could channelize wildlife to crossing structures in areas where animals currently do cross, such as migration routes, to be most effective. This would require specific identification of where the best crossings would be located. Placing structures at one mile intervals could cost up to \$13 million, which could be prohibitive. Without supporting data to quantify the need and location, this expenditure cannot be defended at this time.

Roadway Surface Conditions

Due to repeated grading cycles, roadway surface materials on the gravel portion of the road have been pushed to the side of the original travel ways, increasing the width of the road. Some areas of the once 36 foot road are reported to now be as great as 44 feet wide. Potholes and wash boarding are common near the end of a grading cycle.

Maintenance

Gravel roadways require a considerable amount of maintenance, including dust control, grading, pothole repairs, and plowing. Due to the small tax base in the corridor study area, Flathead County has concerns about their financial ability to maintain the gravel section of the road. The Roads and Bridges Department spends more on maintenance than is being received in revenue, this is shown in Appendix C, Technical Report, page 98.

Speed

Motorists driving in excess of the posted speed limit of 35 mph in the gravel sections, with an advisory speed of 20 mph during dusty conditions, contribute to the dusty conditions and result in an increase in accidents. Data on tickets issued for speeding per month, or other pertinent enforcement data, is not recorded by the Sheriff's office and is therefore not available.

Roadway Safety

There is a relatively high accident rate within the corridor, as described in Section 2.6. A comparison of accident statistics to average county and/or state accident rates was requested. Average Annual Daily Traffic (AADT) comparisons to county and/or state figures, as available; and an analysis of state-wide AADT were also requested to provide perspective. Narrowing the roadway was raised as an option, but would not resolve the material migration that occurs over time.

Emergency Services

Stakeholders and several public meeting attendees expressed concern about the elapsed time it takes for emergency services to reach their location. One suggested improvement option considers implementing a volunteer fire fighting service. Although this management approach has some merit and may provide some benefit, its implementation is outside the scope of this study.

Maintain the Existing Character of the Area

Many members of the public at the April 20, 2010 meeting and interviewed stakeholders expressed the desire to preserve the existing character of the North Fork valley. These sentiments are more formally expressed in the GNP Management Plan that identifies primitive wilderness as the management strategy for the North Fork section of GNP.

4.2 Potential Improvement Options

All potential improvement options itemized in the improvement options meeting were reviewed and discussed amongst meeting attendees. The options were collated into categories based on similarity. Each option is listed in Table 4.1 and then described on the following pages.

Table 4.1 – Potential Improvement Options

Improvement Options	
1	No-action
2	Maintenance
2a	Additional grading of current road
2b	Guardrail Installation
3	Stabilization Treatments
3a	Bentonite
3b	Magnesium chloride/ calcium chloride
3c	Lignin
3d	Black oil
3e	EnviroKleen
3f	RoadOyl
3g	SoilSement
3h	Dead wood and vegetable oil
3i	Soybean oil byproduct
4	Improve Gravel Surfacing
4a	New gravel lift
4b	Double shot/bitumen
4c	Driving Surface Aggregate (DSA)
5	Speed Enforcement/reduction Strategies
5a	Speed indicator signs (solar)
5b	Speed dips
5c	Narrow the gravel roadway
5d	Police car with dummy
5e	Additional signage (safety or speed limit)
5f	Fund additional law enforcement
5g	Educational effort to reduce speeds
6	Bituminous Surface Treatment/Asphalt Concrete Pavement
6a	Full pavement - complete 36' width
6b	Full pavement - 24' top, 11' travel ways
6c	Millings/asphalt (with chip seal)
6d	Foamed asphalt mix (with double shot)

3. Stabilization Treatment

Stabilization and dust control treatments are all done in conjunction with grading for maximum effectiveness. Stabilization treatments are types of additives which are used to “stabilize” the roadway by application or incorporating the additive in the surface gravel of the roadway to bind dust particles to create a more solid or durable driving surface. These treatments would only be eligible for federal funding if used in conjunction with new crushed surface, otherwise they are considered maintenance and are not eligible for federal funding. Members of the public raised questions about possible health concerns that could result from dust suppression treatments. If any of these types of treatments are selected as an improvement option, there would further investigation of the pros and cons of the various types of treatments.

- **Bentonite** – This is naturally occurring clay that binds to the dust particles in gravel roads to reduce dust. It works best with limestone type gravels. Bentonite is added to the roadway aggregate when placed, rather than yearly, and then treated with another dust suppressant for best results. This option would require a new gravel lift to be placed at the same time.
- **Magnesium Chloride (MgCl)** – MgCl is the chemical most commonly used by Flathead County and MDT for dust suppression. It is placed once a year in springtime when grading the road. *Calcium chloride (CaCl)* is not used often in Montana, but is very similar to MgCl.
- **Lignin** – This polymer, derived from wood, can be used to suppress dust by spraying on top, or mixed with the top few inches of road surface to stabilize and thus reduce dust. It is neutral to the environment. Local cost information was not available for Lignin.
- **Black Oil** – This asphalt emulsion does not last as long as MgCl, and its price varies greatly with asphalt prices. In 2009, Flathead County estimated it would cost \$4,000-8,000 per mile to apply. In 2010, Montana Dust Control Company estimated that it was roughly the same cost to apply as MgCl. Top Seal, originally listed as a separate option, is the same as Black Oil.
- **EnviroKleen** – This polymer or resin binder is used to stabilize the road surface. It binds dust particles to prevent them from escaping, and can be used in any temperature. It is three times more expensive than the other treatment options.
- **RoadOyl** – This pine resin emulsion is used to stabilize the road surface. Traffic on this treatment will compact the surface into a smooth pavement-like finish. It can react with strong organic oxidizing materials, strong acids and strong bases, and slightly darkens the surface when dry. It is best used where there are a lot of rock, but few fines to bind the road together, but also works well where there are a lot of fines.
- **SoilSement** – This acrylic polymer emulsion is used to stabilize the road surface. Applied as a diluted solution, it has residual benefits each year. Applications are designed to last three to six months. It is categorized as environmentally safe, non-toxic, non-corrosive, non-flammable and does not pollute groundwater. It dries clear and is best used anywhere there are a lot of fines to bind the road together.
- **Dead Wood and Vegetable Oil** – This was suggested as a creative use of the dead wood along NFFR and the low cost of vegetable oils. This option was not considered as it is not a tested road treatment.
- **Soybean Oil By-Product** – This has been used with success in Minnesota. While more expensive than CaCl, it lasts an entire summer and uses sustainable sources. It is environmentally friendly, and should biodegrade in 28 days. The treatment itself remains

effective after the chemical biodegrades. Conflicting information about the applicability to dust control on roadways resulted in elimination of this option from further consideration.

4. Improve Gravel Surfacing

The following three options are considered to still be gravel road surfacing and would be maintained by Flathead County if implemented.

New Gravel Lift (6 inches) – A new 26 foot wide gravel lift would improve the roadway surface conditions, such as potholing and wash boarding. Maintenance of the new lift would include grading twice a year on the normal county maintenance schedule.

Double Shot – Two chip seals would be applied on top of the gravel road, which would seal the top to both reduce dust and improve the roadway surface conditions. Reconstruction of the gravel base prior to the first application and grading is recommended to eliminate any soft spots, poor gravel, or other conditions that would reduce the life of the treatment. If the gravel corridor is inspected and determined to be in good condition, the treatment would cost considerably less. Double Shot would be reapplied every 5 years.

Driving Surface Aggregate (DSA) – DSA is an all-rock gravel which has been used with success by WFL in Lava Beds National Monument, California. Advantages include reduced maintenance cycles, no chemicals and reduced dust. Maintenance includes grading, about half as often as a typical gravel road. A pre-paver depth of 8 inches is compacted to either a 4.5 or six inch surface. Surface life is extended with greater compacted depth. Compared to other gravel roads, DSA produces considerably less dust. Dust control treatments can still be applied if desired. Information about DSA is included in Appendix C.

5. Speed Enforcement/Reduction Strategies

Speed Indicator Signs (Solar) – These signs detect and display a vehicle's current speed and flash or give some other indication when the roadway user has exceeded the speed limit. The average lifespan of a solar sign is 10 to 15 years. The signs are mountable on a standard or existing sign post, as well as available in a portable trailer version. Specific locations would need to be studied and identified for appropriate placement of speed indicator signs.

Speed Dips – Speed humps were removed from consideration as they impede snow removal. Speed dips would have to be heavily justified for funding to be found for them. Based on Flathead County policy, speed dips were also removed from further consideration because they impede maintenance on gravel roads, particularly grading.

Narrow the Gravel Roadway – Narrowing the roadway to 24 feet wide would tend to slow down roadway users. The gravel has been reported to reach widths much wider than the originally constructed gravel roadway and users tend to drive faster on wider roads.

Police Car with Dummy – This technique is used in rural Utah with success, particularly in Kane County. A lifelike dummy is placed in a police car, which is parked along the corridor and moved bi-weekly. The dummy costs about \$1,800 and the car can be the oldest car in the Sheriff's fleet.

Additional Signage (Safety or Speed Limit) – There is one speed limit sign at the beginning of the gravel section of road to the south (approx RP 12.4), and one at the north end near Camas Road. Additional speed limit signage may assist in reminding drivers of vehicles to slow down, and warning signs may be strategically placed to reduce accidents. Specific locations would need to be studied and identified for appropriate placement of warning signs.

Fund Additional Law Enforcement – There is currently one "dust cop" who covers Flathead County and can ticket vehicles that are speeding and creating excessive dust. An average cost

for another law enforcement officer is approximately \$97,000 per year, which includes any benefits and overhead costs for an additional employee (Dupont, 2010).

Education to Reduce Speeds – This option could be similar to educational efforts used by state and local governments to reduce drunk driving or driving without seat belts. Education would not likely reach many of the non-local roadway users, thus the cost/effectiveness ratio is difficult to assess.

6. Bituminous Surface Treatment/Asphalt Concrete Pavement

These improvement options are not additive to the “no-action”, which is the normal maintenance (annual grading) that would usually occur. A variety of full roadway surface rehabilitation options were considered. The various options were narrowed down to four options. All options would pave the existing alignment, which was redesigned in 1987 to meet a 40-50 mph design criteria. No realignment would be considered. The geotechnical analysis recommended a preliminary pavement section of 3 inches asphalt surfacing and 3 inches crushed aggregate on top of the existing gravel base. Construction to full pavement (36 foot or 24 foot) options would result in maintenance of the NFFR shifting from county to MDT.

Full Pavement of Corridor, Complete 36 ft Width – This would be a typical commercial-mix pavement, with 12 foot lanes and 6 foot shoulders, and a chip seal on top. The lifespan of the pavement would be 20 years, and maintenance would follow a pavement preservation plan which would typically include crack sealing every 2 years and a chip seal every 5-7 years. MDT typically chip seals a pavement the same year or the year after placement, which drastically reduces raveling and degradation of the road.

Full Pavement of Corridor, 24 ft Width – This is the same as previous options, but would have 11 foot lanes and one foot paved shoulders before the gravel side slopes. This option would decrease the amount of pavement which would need to be maintained, while still reducing dust. The narrower road may also reduce speeds in the same way that narrowing the gravel road might.

Asphalt Millings (with Chip Seal) – This would be asphalt milled from other roadways, placed on the road to 26 feet wide, then compacted and topped with a chip seal, instead of a completely new asphalt pavement. The advantages are that millings can be obtained from any roadway project, because they are state property, which reduces cost. The cost of hauling to MDT stockpile would be covered by the project funds for the project being milled, and so only costs for hauling from the stockpile to the site would be needed. Some disadvantages are that availability is an unknown factor; the NFFR would likely be improved incrementally, which may affect funding.

Foamed Asphalt Mix (with Double Shot) – This is an asphalt pavement which is considered a “warm mix.” That means that the plant making the mix runs cooler, thus saving money, and the pavement does not release volatiles into the air when being placed, like typical “hot mix” does. This option was for a 26 foot wide road, with a double-shot on top. Another advantage is that foamed asphalt is easier to compact, so contractors save money on compaction. To-date, warm mix has met all of the MDT specifications. Foamed asphalt warm mix has been used extensively in the Midwest on secondary roads.

Potential Mitigation for Wildlife Impacts

An additional suggestion was to include wildlife crossing structures with each of the paving options to help mitigate vehicle-wildlife crashes. These structures would include off-roadway fencing to direct wildlife towards the crossing. The cost of such structures was not included for these options, due to the lack of wildlife kill data and difficulty quantifying where and how many structures would be needed. A single structure would likely cost on the order of \$500,000.

Placing structures as far apart as a mile could add up to \$13 million to any projected costs, which could be cost-prohibitive.

4.3 Cost Comparison

A cost comparison for the improvement options was made based on a horizon cost of 20 years. Twenty years was selected, as options such as full pavement of a roadway has a usable life of 20 to 30 years. Other options such as Magnesium Chloride must be re-applied seasonally. Table 4.2 lists these cost estimates.



Table 4.2 – Estimated Costs

Treatment	Initial Cost	Maintenance Cost per year of life	Maintenance Frequency	20-year Lifecycle Cost (in 2010 dollars)	Notes
No-Action (current)	\$ -	\$ 101,900	2x / yr	\$ 2,037,000	this price only includes grading + MgCl applications
Maintenance					
Grading	\$ 29,100	\$ 29,100	4x / yr	\$ 582,000	Maintenance is approx. \$7,275 per grading event
Guardrail installation	\$ 96,300	\$ 10,000	ongoing	\$ 296,300	Total maintenance cost varies widely
Stabilization Treatments (+ 1 Grading)					
Bentonite	\$ 78,600	\$ 78,600	1x/yr	\$ 1,862,400	Applied once in conjunction with a new gravel lift
Magnesium chloride	\$ 87,300	\$ 87,300	1x/yr	\$ 2,037,000	
Calcium chloride	\$ 87,300	\$ 87,300	1x/yr	\$ 2,037,000	MgCl more effective than CaCl, approx. same price
Lignin	\$ -	\$ -	1x/yr	\$ 291,000	Unable to obtain a local cost estimate
Black oil	\$ 87,300	\$ 87,300	1x/yr	\$ 2,037,000	
EnviroKleen	\$ 460,900	\$ 460,900	1x/yr	\$ 9,509,900	Can apply in freezing temps, otherwise the same as RoadOyl
RoadOyl	\$ 165,900	\$ 165,900	1x/yr	\$ 3,609,800	Better than SoilSement for roads with very few fine particles
SoilSement	\$ 165,900	\$ 165,900	1x/yr	\$ 3,609,800	
Soybean Byproduct (MN DOT used this)	\$ 239,700	\$ 239,700	1x/yr?	\$ 5,084,800	Some conflicting information about applicability & frequency
Improve Gravel Surfacing					
New 6" gravel lift	\$ 1,229,200	\$ 14,600	2x / yr	\$ 1,520,200	26 ft top
Double Shot (2 chip seals) ¹	\$ 5,592,800	\$ 71,000	5 yrs	\$ 7,013,200	Reapplication of double shot every 5 years
Driving Surface Aggregate (DSA)	\$ 529,100	\$ 7,300	1x/yr or less	\$ 674,600	Haul distance will increase costs slightly
Speed Reduction Strategies					
Speed indicator signs (solar)	\$ 30,000	\$ 30,000	10 yrs+	\$ 60,000	Lifespan approx. 15 years if well maintained
Speed dips	\$ -	\$ -	0	\$ -	County policy not to install speed dips
Narrow the gravel roadway to 24 ft	\$ 150,500	\$ 9,700	2x / yr	\$ 344,500	
Police car with dummy	\$ 7,800	\$ 6,000	bimonthly+	\$ 127,800	Includes moving car bimonthly, cycling to a new car each year
Additional signage (safety or speed limit)	\$ 1,300	\$ 1,300	10 yrs+	\$ 3,900	Replace signs every 10 yrs (or more)
Fund additional law enforcement	\$ 97,000	\$ 97,000	1 yr	\$ 1,940,000	Includes benefits and overhead costs
Education to Reduce Speeds	\$ 50,000	\$ 50,000	ongoing	\$ 1,000,000	Estimated cost of ongoing educational effort
Bituminous Surface Treatment/ Asphalt Concrete Pavement ¹					
Full pavement, complete 36' width	\$ 15,241,900	\$ 221,300	2-5 yrs	\$ 19,666,900	
Full pavement, 24' top, 11' travel ways	\$ 10,161,300	\$ 106,500	2-5 yrs	\$ 12,291,800	
Millings/asphalt (with chip seal)	\$ 5,268,000	\$ 106,500	2-5 yrs	\$ 7,398,600	Haul costs and incremental availability will greatly affect costs. This estimated price includes no haul costs.
Foamed asphalt mix (with Double Shot)	\$ 7,254,000	\$ 106,500	2-5 yrs	\$ 9,384,600	

¹ Assumed all BST options reconstructed to gravel to account for potentially poor base course

Note: The above improvement options do not account for any mitigation costs, wildlife or any other potential mitigation requirement costs. Also, options from Maintenance to Speed Reduction Strategies would need to be added to the "No-action" cost to truly illustrate the total possible expenditures.

4.4 Screening Matrix

Screening Criteria

A draft version of the screening matrix was considered at the the initial improvement option meeting on June 3, 2010. The following criteria were either removed or modified as described below.

Public Support – Support of options is anticipated to be very divided, and thus difficult to quantify whether the option is “supported” or not. Public support was removed from the screening matrix criteria to be more equitable to all those that have expressed issues and concerns about the roadway. This acknowledges that there is equally strong support on both sides of the issues and concerns.

Improves Safety of Roadway – This was changed to a yes/no criteria, because either the proposed improvement to the roadway will improve the safety of the roadway, or it will not.

Agrees with Land Use and Management Plans – MDT is not in the position of managing or implementing land planning. These issues need to be addressed by local, county, USFS, and National Park Service land use plans. The group suggested that this criteria could be addressed as secondary or higher criteria for those improvement options that are advanced. The criterion was included in the matrix for alternatives for the purpose of aiding future alternative development of any improvement option.

Jeopardy Biological Opinion – The 1980’s USFWS Section 7 Jeopardy biological opinion determining that a federal action is likely to jeopardize the continued existence of a listed species in the wild by reducing the reproduction, numbers, or distribution of the species was not included. The issues of possible growth inducement and/or cumulative impacts relative to each improvement option were questioned. This criterion was not included at this level of the study, but reflected in the “Impact to Wildlife” rating.

Based on these changes to the initial screening matrix a secondary, more in-depth screening matrix was prepared.

Additional Screening Criteria

During the June 3 meeting, each improvement option in the matrix was reviewed by the group to determine if it was placed in the correct group. Any changes suggested by the group were incorporated by the consultant and sent out for further review by the meeting participants.

Improvement options were assigned yes/no values when an impact would yield a discreet result on the criteria. The group assigned low, medium and high quantifiers for screening criteria that were best described with varying assigned levels. There was a request to define stabilization treatment options, and to add the duration of life and the cost per lineal foot. The group was then given the opportunity to review the updated matrix. The subsequent iterations of the matrix were reviewed several times, and the final matrix is shown in Table 4.3.



Table 4.3 – Final Screening Matrix

Option		Screening Criteria								Outcome
No.	Description	Helps with dust control (Y/N)	Estimated Cost - 20 Year (L/M/H)	Impact to Environment (L/M/H)	Impact to Wildlife (L/M/H)	Potential to increase vehicle speeds (Y/N)	Improves Roadway Safety (Y/N)	Potential to Increase Traffic (Y/N)	Agrees with Land Use & Management Plans (Y/N)	Advance for further consideration? (Y/N)
1	No-action	N	L	L	L	N	N	N	Y	Y
2	Maintenance									
2a	Additional Grading of Current Road	N	L	L	L	N	Y	N	Y	Y
2b	Guardrail installation	N	L	L	L	N	Y	N	Y	N
3	Stabilization Treatment ¹									
3a	Bentonite	Y	M	M	M	Y	Y	N	Y	Y
3b	Magnesium chloride/ calcium chloride	Y	M	M	M	Y	Y	N	Y	Y
3c	Lignin	Y	M	L	L	Y	Y	N	Y	Y
3d	Black oil	Y	M	M	M	Y	Y	N	Y	N
3e	EnviroKleen	Y	M	unknown	unknown	Y	Y	N	Y	N
3f	RoadOyl	Y	M	unknown	unknown	Y	Y	N	Y	Y
3g	SoilSement	Y	M	M	M	Y	Y	N	Y	Y
3h	Dead wood and vegetable oil	N	M	L	L	Y	Y	N	?	N
3i	Soybean Oil Byproduct	Y	M	L	L	N	Y	N	Y	N
4	Improve Gravel Surfacing									
4a	New gravel lift	N	M	L	L	Y	Y	N	Y	N
4b	Double Shot/Bitumen	Y	M	L	L	Y	Y	N	Y	N
4c	Driving Surface Aggregate (DSA)	Y	M	L ²	L	Y	Y	N	Y	Y
5	Speed enforcement/reduction strategies									
5a	Speed indicator signs (solar)	Y	L	L	L	N	Y	N	Y	Y
5b	Speed dips	Y	L	L	L	N	Y	N	Y	N
5c	Narrow the gravel roadway	Y	M	L	L	N	Y	N	Y	N
5d	Police car with dummy	Y	L	L	L	N	Y	N	Y	Y
5e	Additional signage (safety or speed limit)	Y	L	L	L	N	Y	N	Y	Y
5f	Fund add'l law enforcement	Y	M	L	L	N	Y	N	Y	Y
5g	Educational Effort to Reduce Speeds	Y	M	L	L	N	Y	N	Y	Y
6	Bituminous Surface Treatment/Asphalt Concrete Pavement									
6a	Full pavement - complete 36' width	Y	H	H	H	Y	Y	Y	N	N
6b	Full pavement - 24' top, 11' travel ways	Y	H	H	H	Y	Y	Y	N	Y
6c	Millings/asphalt (with chip seal)	Y	M	M	M	Y	Y	Y	N	Y
6d	Foamed asphalt mix (with double shot)	Y	H	M	M	Y	Y	Y	N	Y

1 - Stabilization treatments are all done in conjunction with grading for maximum effectiveness.

2 - Will have less dust and sediment than existing condition, but still will have some impacts.



Additional improvement options were added to the screening matrix during the month of June. The new improvement options were analyzed using the same screening criteria as the original list of options and a cost estimate was made for all of the options. Due to limited funding mechanisms and source for implementation of the possible improvement options (see Funding Sources section below), many options were not advanced for further consideration. The final version of the matrix table is shown in Table 4.4.

In addition to the general terrestrial wildlife category for the screening criteria, the USFS asked the study document consider any effects to aquatic species. On separate projects, the public has expressed concern to USFS regarding the potential impact of roadway dust on aquatic habitat. Roadway sediment can be transported directly to streams through water run-off or movement by wind.

As the full list of options were reviewed again by the team, many of the options were eliminated based on the screening criteria. The review of the final version of the screening matrix and cost estimate resulted in the study team recommending the improvement options for further consideration shown in Table 4.4.

Table 4.4 – Improvement Options Advanced For Further Consideration

Improvement Option		Advance for Further Consideration?
1	No-action	Yes
2	Maintenance	
2a	Additional Grading of Current Road	Yes
3	Stabilization Treatments	
3a	Bentonite	Yes
3b	Magnesium Chloride/ Calcium Chloride	Yes
3c	Lignin	Yes
3f	RoadOyl	Yes
3g	SoilSement	Yes
4	Improve Gravel Surfacing	
4c	Driving Surface Aggregate (DSA)	Yes
5	Speed Enforcement/Reduction Strategies	
5a	Speed Indicator Signs (Solar)	Yes
5d	Police Car with Dummy	Yes
5e	Additional Signage (Safety or Speed Limit)	Yes
5f	Fund Additional Law Enforcement	Yes
5g	Educational Effort to Reduce Speeds	Yes
6	Bituminous Surface Treatment/Asphalt Concrete Pavement	
6b	Full Pavement - 24' Top, 11' Travel Ways	Yes
6c	Millings/Asphalt (with Chip Seal)	Yes
6d	Foamed Asphalt Mix (with Double Shot)	Yes

If any of the improvement options are implemented in the future, a more thorough environmental screen could include effects to the watershed. There may also be concerns about any oil or chemical applications that have potential to be transported by water into the North Fork of the

Flathead River and contribute additional cumulative effects to water quality in downstream aquifers or to Flathead Lake.

(Table 4.4 was updated after the July 27, 2010 public meeting. Based on input received, improvement option 3a Bentonite was added back in as an improvement option for future consideration)

4.5 Funding

General Discussion

Surface treatments such as magnesium chloride/calcium chloride are considered maintenance and are not typically eligible for federal funding. Other possible funding sources to be explored include:

- Rural Improvement District funds
- Polebridge toll and/or tax for all roadway users between Columbia Falls and Polebridge
- Parking lot/fee area for recreational users/rafting outfitters
- Flathead National Forest/USFS cost share/funding

The study team explored options for other possible funding sources. Flathead County has not created a Rural Special Improvement District (RSID) within the corridor study area. Typically the Flathead County RSID is used for one-half to 2 mile stretches of roadways that land owners along the roadway agree to fund using tax revenue. The county has mechanisms in place to create an RSID. The land owners adjacent to the NFFR would be responsible to initiate the process and ask the Flathead County Commissioners to approve the district, however, the creation of boundaries for the corridor study area would make this funding mechanism very complicated (Prunty, 2010).

Another possible funding option suggested was the possibility of a toll road. However, the state does not allow toll roads without legislative action, and such legislation is not likely to be supported by locals.

Assessing parking lot fees raised concerns that users, whether local or recreational, would bypass the fee by parking along the shoulder of the gravel roadway in various locations up and down the corridor. This behavior would decrease the safety of the road, and was determined to not be in the best interests of roadway users.

There is no authority or mechanism for the USFS to utilize cost-share or contributed funds on improvement of a county road. Funding mechanisms that include USFS cost-sharing were therefore eliminated from consideration. The FHWA and WFLA funding eligibility was considered early in the improvement options evaluation; clarification specific to USFS funding questions were obtained later in the process.

While there are many potential funding sources, this corridor has limited options for funding. Reasons include: no identified safety problems, no eligible bridges, public opposition, limited growth/development potential, and the general unlikelihood of these sources being available. Some funding is only available for specific types of proposed projects. These sources are described below.

Local Funding Sources

General Fund –This fund provides revenue for most major county functions such as administration of local government and the departments of public services; including police, fire, and parks. Revenues for the fund are generated through the general fund mill levy on real and

personal property and motor vehicles; licenses and permits; state and federal intergovernmental revenues; intergovernmental fund transfers; and charges for services.

Many transportation-related services are supported by this fund, including public services. The Flathead County Road and Bridge departments are responsible for maintaining Flathead County roads including pavement repair, striping, signing, lighting and traffic signal maintenance, and plowing and sanding during the winter. In addition to revenue from the General Fund, a portion is generated from gas tax funds and road maintenance funds. The sheriff's department is responsible for enforcing traffic laws on the Flathead County roadways.

Road Fund – Under 15-70-101, MCA, Montana assesses a tax of \$.27 per gallon on gasoline and diesel fuel used for transportation purposes. The County Road Fund provides for the construction, reconstruction, maintenance, and repair of rural roads outside the corporate limits of cities and towns in Flathead County. Revenue for this fund comes from intergovernmental transfers (i.e. state gas tax apportionment and motor vehicle taxes), and a mill levy assessed against county residents living outside cities and towns.

For state fiscal year 2011, Flathead County's allocation is approximately \$473,400 in state fuel tax funds. The amount varies annually, but the current level provides a reasonable base for projection throughout the planning period.

Special Revenue Funds – Special revenue funds may be used by the county to budget and distribute revenues legally restricted to a specific purpose. Several such funds that benefit the transportation system are discussed briefly below.

- **Capital Improvements Fund** – This fund is used to finance major capital improvements to county infrastructure. Revenues are generated by loans from other county funds, and must be repaid within ten years. Major road construction projects are eligible for this type of financing.
- **Rural Improvement District (RID) Revolving Fund** – This fund is used to administer and distribute monies for specified RID projects. Revenue for this fund is generated primarily through a mill levy and through motor vehicle taxes and fees. A mill levy is assessed only when delinquent bond payments dictate such an action. These funds are placed in a trust account for specific projects. This funding source would not be available for county funding of any roadway improvements on the NFFR (Prunty, 2010).
- **Special Bond Funds** – A fund of this type may be established by the county on an as-needed basis for a particularly expensive project. The voters must approve authorization for a special bond fund. The county is not currently using this mechanism.

Private Funding Sources and Alternatives

Private financing of highway improvements, in the form of right of way donations and cash contributions, has been successful for many years. In recent years, the private sector has recognized that better access and improved facilities can be profitable due to increases in land values and commercial development possibilities. Several forms of private financing for transportation improvements used in other parts of the United States are described in this section.

Development Financing – The developer provides the land for a transportation project and in return, local government provides the capital, construction, and necessary traffic control. Such a financing measure can be made voluntary or mandatory for developers.

Cost Sharing – The private sector pays some of the operating and capital costs for constructing transportation facilities required by development actions.

Transportation Corporations – These private entities are non profit, tax exempt organizations under the control of state or local government. They are created to stimulate private financing of highway improvements.

Road Districts – These are areas created by a petition of affected landowners, which allow for the issuance of bonds for financing local transportation projects.

Private Donations – The private donation of money, property, or services to mitigate identified development impacts is the most common type of private transportation funding. Private donations are very effective in areas where financial conditions do not permit a local government to implement a transportation improvement itself.

General Obligation (G.O.) Bonds – The sale of general obligation bonds could be used to finance a specific set of major highway improvements. A G.O. bond sale, subject to voter approval, would provide the financing initially required for major improvements to the transportation system. The advantage of this funding method is that when the bond is retired, the obligation of the taxpaying public is also retired. State statutes limiting the level of bonded indebtedness for cities and counties restrict the use of G.O. bonds. The present property tax situation in Montana, and recent adverse citizen responses to proposed tax increases by local government, would suggest that the public may not be receptive to the use of this funding alternative.

Development Exactions/Impact Fees – Impact Fees are increasingly being considered as a potential method for financing infrastructure needs. Presently, the only communities utilizing impact fees are the City of Bozeman, the City of Missoula, and Gallatin County. Developer exactions and fees allow growth to pay for itself. The developers of new properties should be required to provide at least a portion of the added transportation system capacity necessitated by their development, or to make some cash contribution to the agency responsible for implementing the needed system improvements.

Establishment of an equitable fee structure would be required to assess developers based upon the level of impact to the transportation system expected from each project. Such a fee structure could be based upon the number of additional vehicle trips generated, or upon a fundamental measure such as square footage of floor space. Once the mechanism is in place, all new development would be reviewed by the local government and fees assessed accordingly.

Tax Increment Financing (TIF) – Increment financing has been used in many municipalities to generate revenue for public improvement projects. As improvements are made within the district, and as property values increase, the incremental increases in property tax revenue are earmarked for this fund. The fund is then used for improvements within the district. Expenditures of revenue generated by this method are subject to certain spending restrictions and must be spent within the district. Tax increment districts could be established to accomplish transportation improvements in other areas of the community where property values may be expected to increase.

Multi Jurisdictional Service District – This funding option was authorized in 1985 by the State Legislature. This procedure requires the establishment of a special district, somewhat like an SID or RSID, which has the flexibility to extend across city and county boundaries. Through this mechanism, an urban transportation district could be established to fund a specific highway improvement that crosses municipal boundaries (e.g., corporate limits, urban limits, or county line). This type of fund is structured similar to an SID with bonds backed by local government issued to cover the cost of a proposed improvement. Revenue to pay for the bonds would be raised through assessments against property owners in the service district.

Local Improvement District – This funding option is only applicable to counties wishing to establish a local improvement district for road improvements. While similar to an RSID, this funding option has the benefit of allowing counties to initiate a local improvement district through a more streamlined process than that associated with the development of an RSID.

Federal Funding Sources

As part of the state-designated Secondary Highway System the most prevalent source of funding for improvements along the NFFR is Surface Transportation Program – Secondary (STPS) funds.

Secondary Highway System (STPS) – The federal and state funds available under this program are used to finance transportation projects on the state-designated Secondary Highway System. The Secondary Highway System is defined under 60-2-125, MCA as those highways that have been functionally classified by the MDT as either minor arterials or major collectors. These highways have been selected by the Montana Transportation Commission in cooperation with the county commissioners to be placed on the secondary highway system. Of the total received, 86.58% is federal and 13.42% is state funds from the State Special Revenue Account. Eligible activities include reconstruction, rehabilitation, and miscellaneous improvements.

However, there are currently no federal funds obligated to this corridor study area from any federal or state source. This roadway is not currently on the priority list of projects in the Missoula District for the Secondary Roads Program - Capital Construction Program.

If this roadway is prioritized in the future then there is potential for use of secondary funds that are distributed state-wide (MCA 60-3-206) to each of the five financial districts, based on a formula which takes into account the land area, population, road mileage and bridge square footage. For the total funds available, a minimum of 65 percent are allocated for capital construction projects. The remainder of the funds may be used by MDT for secondary highway system pavement preservation. MDT and county commissions determine Secondary capital construction priorities for each district with final project approval by the Montana Transportation Commission. By state law the individual counties in a district and the state vote on Secondary funding priorities presented to the Montana Transportation Commission. The Counties and MDT take the input from citizens, small cities, and tribal governments during the selection process. Projects are led through a competitive bidding process.

Public Lands Highways (PLH)

Discretionary – The PLH Discretionary Program provides funding for projects on highways that are within, adjacent to, or provide access to federal public lands. As a discretionary program, the project selection authority rests with the Secretary of Transportation. However, this program has been earmarked by Congress under SAFETEA-LU. There are no matching fund requirements.

Forest Highway – The Forest Highway Program provides funding to projects on routes that have been officially designated as Forest Highways. Projects are selected through a cooperative process involving FHWA, the USFS and MDT. Projects are developed by FHWA's Western Federal Lands Office. There are no matching fund requirements.

On-System Highway Bridge Replacement and Rehabilitation Program (HBRRP) – HBRRP funds are federally apportioned to Montana and allocated to two programs by the Montana Transportation Commission, On System and Off System Bridge programs. Projects eligible for funding under the On-System program include all highway bridges on the state system. In general, projects are funded with 86.58 percent federal funds and 13.42 percent state funds. The bridges are eligible for rehabilitation or replacement.

In addition, painting and seismic retrofitting are also eligible under this program. MDT's Bridge Bureau assigns a priority for replacement or rehabilitation of structurally deficient and functionally obsolete structures based upon sufficiency ratings assigned to each bridge. The Montana Transportation Commission approves projects which are awarded through a competitive bidding process.

The only bridge on this study corridor crosses Big Creek at RP 20.15. According to MDT's Bridge Management System the structure is in good condition with a sufficiency rating of 91.1. Because this bridge is owned and maintained by the USFS and is in good condition, it is not a priority or eligible for funding through this program.

Highway Safety Improvement Program (HSIP) – HSIP is a new core funding program established by SAFETEA-LU. HSIP funds are federally apportioned to Montana and allocated to safety improvement projects identified in the strategic highway safety improvement plan by the Montana Transportation Commission. Projects described in the state strategic highway safety plan must correct or improve hazardous road location or feature, or address a highway safety problem. The Montana Transportation Commission approves and awards the projects which are awarded through a competitive bidding process. Generally, the federal share for the HSIP projects is 90% and the state is responsible for 10 percent. Funding priorities for this program are identified by MDT Safety Management Section.

There are two programs that receive HSIP funding: the Highway – Rail Crossing Program, which is not a consideration for the NFFR since there are no rail crossings along this corridor and the High Risk Rural Roads Program.

High Risk Rural Roads Program (HRRRP) – Funds are set aside from the Highway Safety Improvement Program funds apportioned to Montana for construction and operational improvements on high-risk rural roads. These funds are allocated to HRRRP projects by the Commission. If Montana certifies that it has met all of the needs on high risk rural roads, these set aside funds may be used on any safety improvement project under the HSIP. Montana's set aside requirement for HRRRP is approximately \$700,000 per year. Availability of funds through this program for the NFFR is limited due to other projects already prioritized within this program.

State Funding Sources

State Funded Construction (SFC) – The State Funded Construction Program is limited, and is funded entirely with state funds from the Highway State Special Revenue Account. It provides funding for projects that are not eligible for federal funds.

This program funds projects to preserve the condition and extend the service life of highways. Funding through this program is limited and consequently typically used on highways maintained by the state.

Other Funding Sources – Other sources of funding may be available in addition to those listed. Funds would need to be pursued by local entities.

Funding Conclusion

The analysis of funding opportunities indicates that the citizens of Flathead County must work with officials at the county to prioritize any improvements they desire, whether for the corridor study area of the NFFR, or for other roadways in the county. Once improvements are prioritized, then funding can be identified and then potential improvements in the form of projects can be considered. MDT and Flathead County, along with USFS, WFL and FHWA can all work together to determine what, if any improvement options can be implemented for the NFFR corridor study area in the future.