

**DATE:** July 23, 2019 Physical Reference # 1272105

**TO:** Aaron Johnson  
Superior Region Engineer

**FROM:** Ken Filpus  
Ishpeming TSC Operations Engineer

**SUBJECT:** **The Scoping Report for:**  
**PR # 1272105:** County Road 107 from 1 mile east of South Boundary Road to  
0.6 west of South Boundary Road in Carp Lake Township, Ontonagon County.

This report looks at different options to address shoreline erosion along County Road 107 adjacent to Lake Superior. This area has experienced increased shoreline erosion due to unusually high-water levels in Lake Superior. The erosion has caused damaged to the road shoulders at times and threatens the integrity of the entire roadway especially if water levels continue to rise. A meeting and field review was held on January 31<sup>st</sup> to discuss different solutions to address the shoreline erosion. The meeting was attended by the Michigan Department of Natural Resources (MDNR), Michigan Department of Transportation (MDOT), Michigan Department of Environmental Quality (MDEQ), US Army Corp of Engineers (USACE), and the Ontonagon County Road Commission (OCRC). The following is a list of cost estimates for a long-term solution to the shoreline erosion:

**Cost Estimates:**

**Option 1 Riprap Slope (Riprap 1 mile east of S. Boundary Road to 0.6 mile west)**

- Construction: \$5,131,000
- ROW: \$0
- PE: \$546,000
- CE: \$448,000
- Total: \$6,125,000
- The inflation costs were estimated based on 2021 construction. This cost would have to increase if construction was done in a later year.

**Option 2 Riprap Slope Placed in 2 Phases**

**Phase 1**

- Construction: \$4,401,500
- ROW: \$0
- PE: \$469,000
- CE: \$383,700
- Total: \$5,254,200

- The inflation costs were estimated based on 2021 construction. This cost would have to increase if construction was done in a later year.

**Phase 2**

- Construction: \$1,032,100
- ROW: \$0
- PE: \$110,000
- CE: \$90,000
- Total: \$1,232,100
- The inflation costs were estimated based on 2023 construction. This cost would have to increase if construction was done in a later year.
- **The total cost of Option 2 is \$6,486,300**

**Option 3 Major Realignment (Up to 1600 feet south of the existing alignment)**

- Construction: \$8,533,700
- ROW: \$180,000
- PE: \$1,688,100
- CE: \$1,181,700
- Total: \$11,583,500
- The inflation costs were estimated based on 2021 construction. This cost would have to increase if construction was done in a later year.

**Option 4 Minor Realignment (Up to 150 feet south of the existing alignment)**

- Construction: \$7,138,600
- ROW: \$30,000
- PE: \$1,249,900
- CE: \$972,100
- Total: \$9,390,600
- The inflation costs were estimated based on 2021 construction. This cost would have to increase if construction was done in a later year.

**Option 5 Minor Realignment (6 to 10 feet south of the existing alignment)**

- Construction: \$8,282,800
- ROW: \$30,000
- PE: \$1,127,300
- CE: \$1,127,300
- Total: \$10,567,400
- The inflation costs were estimated based on 2021 construction. This cost would have to increase if construction was done in a later year.

**Option 6 Major Realignment west of S. Boundary Rd (Riprap slope east of S. Boundary Rd)**

- Construction: \$6,368,000
- ROW: \$30,000
- PE: \$1,239,500
- CE: \$867,600
- Total: \$8,505,100
- The inflation costs were estimated based on 2021 construction. This cost would have to increase if construction was done in a later year.

**Option 7 Major Realignment east of S. Boundary Rd (Riprap slope west of S. Boundary Rd)**

- Construction: \$6,843,300
- ROW: \$180,000
- PE: \$1,360,600
- CE: \$952,400
- Total: \$9,336,300
- The inflation costs were estimated based on 2021 construction. This cost would have to increase if construction was done in a later year.



**Option 1 Detail Summary****Description**

- The total length of this option is 1.6 miles. This option would restore the existing slope by placing embankment at a 1 on 1 slope. The embankment would be covered with a heavy geotextile liner and then armored with riprap rocks weighing 1.5 tons to 2.5 tons individually. Some smaller rock could be included in the riprap mix to fill voids. The riprap would be placed at a 1 on 2 slope with a minimum 14-foot width at the base and a 3-foot width at the top of the slope. The riprap would be embedded two feet into the existing ground surface. Special riprap armored slopes have historically performed well where state highways are adjacent to the Great Lakes. This fix is based on previous riprap armoring projects. A typical cross section of this fix, location map, and detailed cost estimate is attached.

**Geometrics:**

- With Option 1 the main consideration for geometrics is clear zone width. The OCRC did not have traffic counts for this road. Based on the last construction project in 2003 the average daily traffic was 200 west of South Boundary Road and 975 east of South Boundary Road. With a 55-mph design speed the clear zone is 12' minimum with a 1 on 6 slope west of South Boundary Road and 16' minimum east of South Boundary Road. A 16' clear zone was estimated although some guardrail was included in the estimate for areas where the clear zone width may not be achievable.

**Bridges**

- Two Hundred Fifty feet of sheet piling was estimated east and west of the Union River Bridge for additional armoring of this structure. Based on soil borings from the old bridge plans, bedrock is approximately 30 feet deep near this structure.

**Environmental:**

- The riprap work will require permits from both the MDEQ and USACE. The USACE would possibly allow some filling into Lake Superior to preserve the integrity of the road. USACE will require documentation of events that caused erosion in order to issue a permit for filling into the lake. Some excavation would be allowed in Lake Superior. As part of the permit process the fill and excavation above and below the ordinary high-water mark will need to be estimated.
- May need an NPDES Notice of Coverage.
- Turbidity curtain would not be required for this work. The area receives regular disturbances of the soils due to wave action.

**Real Estate**

- No additional right of way would be needed for this option.

**Maintaining Traffic:**

- Part width construction could be done with traffic maintained using flag control.





Search Google Maps



Option 1 Area

End Riprap Slope 1  
mile east of South  
Boundary Road

Begin Riprap Slope  
0.6 miles west of  
South Boundary  
Road

Place sheet piling  
250 feet each side  
of Union River  
Bridge

Union River

State Park Visitor  
Center

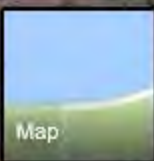
South Boundary  
Road

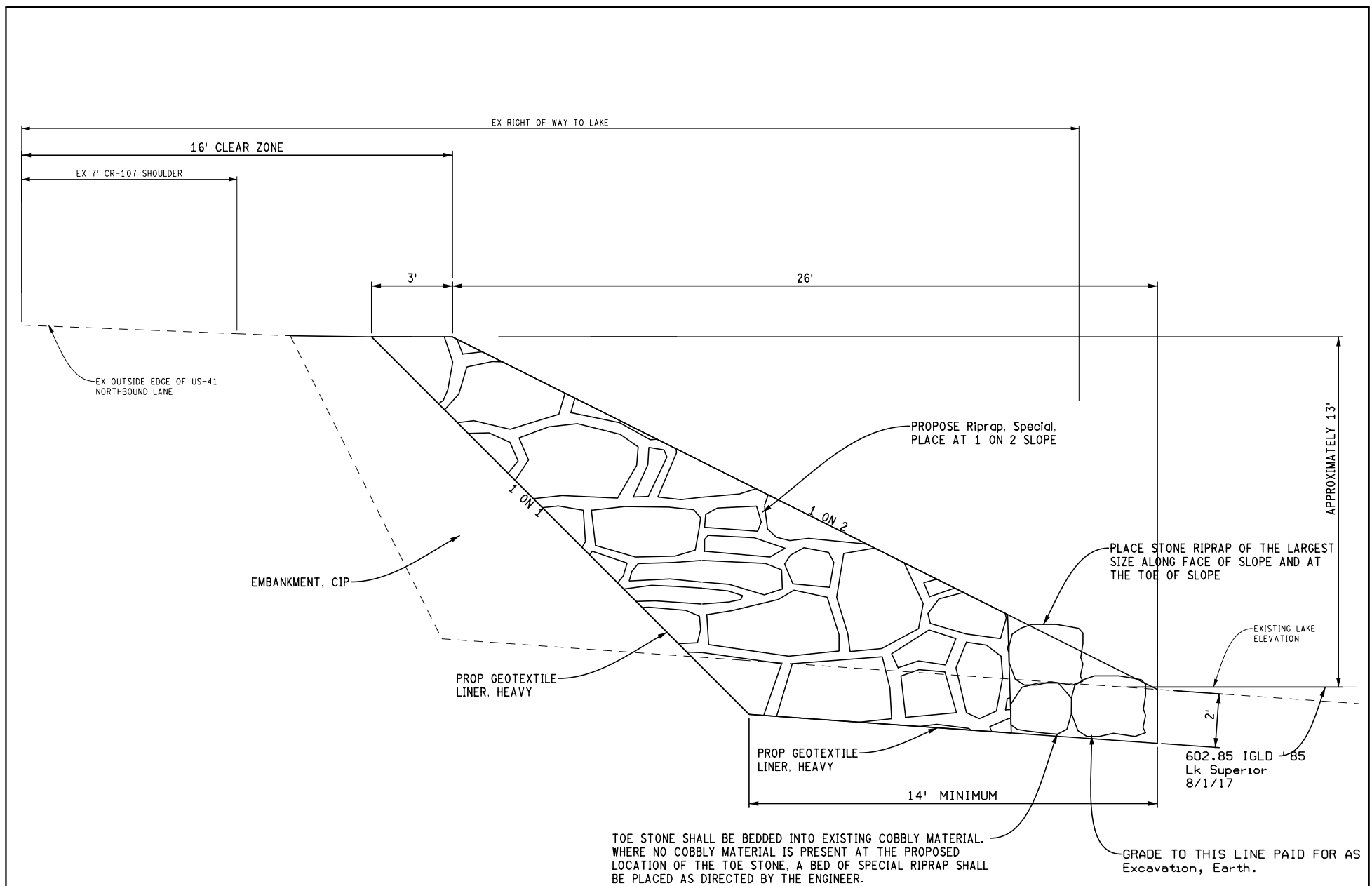


3D



Google

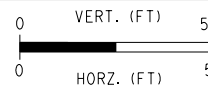




**TYPICAL CROSS SECTION**  
**FOR CONSTRUCTING RIPRAP-SPECIAL**  
**AT A 1 ON 2 SLOPE**



FILE:



DATE: 08/01/17

DESIGN UNIT: ISHPERING

TSC: ISHPERING

CS: 07013

JN:

DRAWING SHEET

SECT 1

# STANDARD SCOPING WORKSHEET

County Road 107 1.6 miles of Riprap Option 1

DATE: 2/5/2018  
DATE REVISED: 7/2/2019  
BY: Ken Filpus  
CHECKED BY:

ROUTE: County Road 107  
CONTROL SECT:  
PR Number:  
JOB NUMBER:

P.O.B. STATION 8+85.00 MP 0  
P.O.E. 93+33.00 0.000  
LENGTH OF JOB 8448 Feet 1.600 Miles

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Guardrail, Type B	8070000	3000.00	Ft	\$16.00	\$48,000.00
2	Guardrail Approach Terminal, Type 1B	8070040	8.00	Ea	\$1,700.00	\$13,600.00
3	Guardrail Reflector	8070080	60.00	Ea	\$5.00	\$300.00
<b>SUBTOTAL SAFETY</b>						<b>\$61,900.00</b>

## MAINLINE PAVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing	2010001	0.00	Acre	\$5,800.00	\$0.00
2	Embankment, CIP	2050010	22,276	Cyd	\$3.50	\$77,967.56
3	Excavation, Earth	2050016	10,169	Cyd	\$6.70	\$68,131.56
4	Subbase, CIP	3010002	0	Cyd	\$9.50	\$0.00
5	Aggregate Base, 8 inch	3020020	778	Syd	\$5.60	\$4,355.56
6	Shoulder, CI II	3070121	60	Ton	\$18.00	\$1,080.00
7	Approach, CI I	3070001	0	Ton	\$20.00	\$0.00
8	Approach, CI II	3070021	0	Ton	\$20.00	\$0.00
9	HMA, LVSP	5010703	150	Ton	\$60.00	\$9,000.00
<b>SUBTOTAL MAINLINE PVT</b>						<b>\$160,534.67</b>

## NONMOTORIZED

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2			0		\$0.00	\$0.00
3			0		\$0.00	\$0.00
4			0		\$0.00	\$0.00
<b>SUBTOTAL NONMOTORIZED</b>						<b>\$0.00</b>

## GEOMETRIC IMPROVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00



3					\$0.00	\$0.00
<b>SUBTOTAL GEOMETRIC IMPROVEMENT</b>						<b>\$0.00</b>

#### VERTICAL/HORIZONTAL ALIGNMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL VERT/HORIZ ALIGNMENT</b>						<b>\$0.00</b>

#### BRIDGE REPAIR, WIDENING

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Steel Sheet Piling Permanent	7040001	20000	Sft	\$25.00	\$500,000.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL BRIDGE REPAIR, WIDENING</b>						<b>\$500,000.00</b>

#### DRAINAGE

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0	Ft	\$0.00	\$0.00
2			0	Ea	\$0.00	\$0.00
3			0	Ft	\$0.00	\$0.00
<b>SUBTOTAL DRAINAGE</b>						<b>\$0.00</b>

#### JOINT REPAIR/PAVEMENT PATCHING

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL JOINT REPAIR/PAVEMENT PATCHING</b>						<b>\$0.00</b>

#### MAINTAINING TRAFFIC

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Traffic Regulator Control		1	LS	\$18,800.00	\$18,800.00
2	Minor Traf Devices		1	LS	\$75,000.00	\$75,000.00
3	Sign, Type B, Prismatic, Temp, Furn		1200	Sft	\$4.25	\$5,100.00
4	Sign, Type B, Prismatic, Temp, Oper		1200	Sft	\$0.75	\$900.00
5	Plastic Drum, High Intensity, Furn		140	Ea	\$25.00	\$3,500.00
6	Plastic Drum, High Intensity, Oper		140	Ea	\$5.00	\$700.00
7	Lighted Arrow, Type C, Furn		4	Ea	\$385.00	\$1,540.00
8	Lighted Arrow, Type C, Oper		4	Ea	\$75.00	\$300.00
9	Barricade, Type III, Lighted, Furn		20	Ea	\$125.00	\$2,500.00
10	Barricade, Type III, Lighted, Oper		20	Ea	\$10.00	\$200.00
11	Dust Palliative, Applied	8120100	75	Ton	\$220.00	\$16,500.00
12	Pavt Mrkg, Type NR, Paint, 4 inch, Yellow	8120231	1400	Ft	\$0.64	\$896.00
13	Pavt Mrkg, Type NR, Tape, 4 inch, Yellow	8120230	5800	Ft	\$0.50	\$2,900.00
<b>SUBTOTAL MAINTAINING TRAFFIC</b>						<b>\$128,836.00</b>

#### PERMANENT TRAFFIC CONTROL DEVICES

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2			0		\$0.00	\$0.00

3		0		\$0.00	\$0.00
<b>SUBTOTAL PERMANENT TRAFFIC CONTROL DEVICES</b>					<b>\$0.00</b>

#### ENVIRONMENTAL

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Erosion Control, Silt Fence	2080036	6000	Ft	\$1.60	\$9,600.00
2			0		\$0.00	\$0.00
3			0		\$0.00	\$0.00
<b>SUBTOTAL ENVIRONMENTAL</b>						<b>\$9,600.00</b>

#### MISCELLANEOUS

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Mobilization, Max		1	LS	\$393,000.00	\$393,000.00
2	Contractor Staking, Road Only		1	LS	\$77,000.00	\$77,000.00
3	Contractor Staking Errors and Extras, 1 Person		33	Hr	\$90.00	\$2,970.00
4	Contractor Staking Errors and Extras, 2 Person		13	Hr	\$120.00	\$1,560.00
5	Contractor Staking, Errors and Extras, 3 Person		20	Hr	\$150.00	\$3,000.00
6	Topsoil Surface, Furn, 4 inch	8160062	2,516	Syd	\$2.00	\$5,031.25
7	Topsoil Surface, Salv, 4 inch	8160077	1,239	Syd	\$0.80	\$991.23
8	Seeding, Mixture, THV	8160040	180	Lb	\$2.80	\$504.00
9	Fertilizer, Chemical Nutrient, CL A	8160020	180	Lb	\$1.50	\$270.00
10	Mulch	8160025	3,755	Syd	\$0.20	\$750.93
11	Mulch Anchoring	8160026	3,755	Syd	\$0.11	\$413.01
12	Mulch Blanket	8160027	0	Syd	\$1.00	\$0.00
13	Mulch Blanket, High Velocity	8160028	0	Syd	\$1.50	\$0.00
14	Riprap, Special		92,377	Ton	\$32.00	\$2,956,074.10
15	Protect Corners		12	Ea	\$200.00	\$2,400.00
16	Monument Box		12	Ea	\$300.00	\$3,600.00
17	Monument Preservation		12	Ea	\$350.00	\$4,200.00
<b>SUBTOTAL MISCELLANEOUS</b>						<b>\$3,451,764.53</b>

#### ROW & Utilities

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2			0		\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL ROW</b>						<b>\$0.00</b>

				<b>TOTAL PROJECT</b>	<b>\$4,312,635.20</b>
Current Year	2019	4%	Projected Cost after Inflation		<b>\$4,664,546.23</b>
Construction Year	2021	10%	CONTINGENCY		<b>\$466,454.62</b>
				<b>ROW</b>	<b>\$0.00</b>

	<b>Const Total</b>	<b>\$5,131,000.85</b>
5.50%	PE	\$282,205.05
4.50%	CE	\$230,895.04
93.73%	Ind Proj Costs	\$480,928.71

**Total \$6,125,029.65**

**Option 2 Detail Summary****Description**

- Option 2 is the same as Option 1 except that it would be constructed in two phases. The total length of this option is 1.6 miles. Phase 1 would address areas where the shoreline erosion is less than 20 feet from the road shoulder. The total length of Phase 1 is 1.271 miles. Phase 2 would be done sometime in the future in areas where the shoreline erosion is currently 20 feet to 60 feet from the road shoulder. The total length of Phase 2 is 0.329 miles. It is difficult to determine when Phase 2 would be done. Phase 2 could hold off until shoreline erosion reaches the clear zone of the road (16' with 1 on 6 fill slopes). To estimate inflation 2023 was used for the construction year. Basically, this option looks to address the immediate needs. Some of the Phase 2 areas could become immediate needs soon depending on the water levels of Lake Superior. The typical cross section for this fix is the same as Option 1. A location map and detailed estimate of the phases is attached.



Phase 1 is all the areas labeled "C"  
Phase 2 is all the "B" areas and portions of the "A" areas



0'  
Start

"A"

1527'

"B"

2172'

"C"

3967'  
S.  
Boundary  
Rd

"C"

4532'  
Union River

State Park Visitor  
Center

South Boundary  
Road

8092'

8542

"C"

9333'  
End

"A"

Typical Cross Sections:  
"A" = 60'+ wide foreslope  
"B" = 20' - 60' wide foreslope  
"C" = 0' - 20' wide foreslope



# STANDARD SCOPING WORKSHEET

County Road 107 Phase 1 of Riprap Option 2

DATE: 2/6/2018  
DATE REVISED: 7/5/2019  
BY: Ken Filpus  
CHECKED BY:

ROUTE: County Road 107  
CONTROL SECT:  
PR Number:  
JOB NUMBER:

	STATION	MP	
P.O.B.	21+72.00	0	
P.O.E.	80+92.00	0.000	
LENGTH OF JOB	5920 Feet	1.121 Miles	

	STATION	MP	
P.O.B.	85+42.00	0	
P.O.E.	93+33.00	0.000	
LENGTH OF JOB	791 Feet	0.150 Miles	
Total Length	6711	1.271	

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Guardrail, Type B	8070000	3000.00	Ft	\$16.00	\$48,000.00
2	Guardrail Approach Terminal, Type 1B	8070040	8.00	Ea	\$1,700.00	\$13,600.00
3	Guardrail Reflector	8070080	60.00	Ea	\$5.00	\$300.00
<b>SUBTOTAL SAFETY</b>						<b>\$61,900.00</b>

## MAINLINE PAVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing	2010001	0.00	Acre	\$5,800.00	\$0.00
2	Embankment, CIP	2050010	17,902	Cyd	\$3.50	\$62,656.22
3	Excavation, Earth	2050016	8,078	Cyd	\$6.70	\$54,122.97
4	Subbase, CIP	3010002	0	Cyd	\$9.50	\$0.00
5	Aggregate Base, 8 inch	3020020	778	Syd	\$5.60	\$4,355.56
6	Shoulder, CI II	3070121	60	Ton	\$18.00	\$1,080.00
7	Approach, CI I	3070001	0	Ton	\$20.00	\$0.00
8	Approach, CI II	3070021	0	Ton	\$20.00	\$0.00
9	HMA, LVSP	5010703	150	Ton	\$60.00	\$9,000.00
<b>SUBTOTAL MAINLINE PVT</b>						<b>\$131,214.75</b>

## NONMOTORIZED

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2			0		\$0.00	\$0.00
3			0		\$0.00	\$0.00
4			0		\$0.00	\$0.00
<b>SUBTOTAL NONMOTORIZED</b>						<b>\$0.00</b>



## GEOMETRIC IMPROVEMENT

<b>SUBTOTAL GEOMETRIC IMPROVEMENT</b>	<b>\$0.00</b>
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## VERTICAL/HORIZONTAL ALIGNMENT

SUBTOTAL VERT/HORIZ ALIGNMENT	\$0.00
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## BRIDGE REPAIR, WIDENING

<b>SUBTOTAL BRIDGE REPAIR, WIDENING</b>	<b>\$500,000.00</b>
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## DRAINAGE

<b>SUBTOTAL DRAINAGE</b>	<b>\$0.00</b>
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## JOINT REPAIR/PAVEMENT PATCHING

<b>SUBTOTAL JOINT REPAIR/PAVEMENT PATCHING</b>	<b>\$0.00</b>
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## MAINTAINING TRAFFIC

<b>SUBTOTAL MAINTAINING TRAFFIC</b>	<b>\$221,336.00</b>
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# **PERMANENT TRAFFIC CONTROL DEVICES**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2			0		\$0.00	\$0.00
3			0		\$0.00	\$0.00
<b>SUBTOTAL PERMANENT TRAFFIC CONTROL DEVICES</b>						<b>\$0.00</b>

# **ENVIRONMENTAL**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Erosion Control, Silt Fence	2080036	6000	Ft	\$1.60	\$9,600.00
2			0		\$0.00	\$0.00
3			0		\$0.00	\$0.00
<b>SUBTOTAL ENVIRONMENTAL</b>						<b>\$9,600.00</b>

# **MISCELLANEOUS**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Mobilization, Max		1	LS	\$338,000.00	\$338,000.00
2	Contractor Staking, Road Only		1	LS	\$66,100.00	\$66,100.00
3	Contractor Staking Errors and Extras, 1 Person		28	Hr	\$90.00	\$2,520.00
4	Contractor Staking Errors and Extras, 2 Person		12	Hr	\$120.00	\$1,440.00
5	Contractor Staking, Errors and Extras, 3 Person		17	Hr	\$150.00	\$2,550.00
6	Topsoil Surface, Furn, 4 inch	8160062	1,998	Syd	\$2.00	\$3,996.77
7	Topsoil Surface, Salv, 4 inch	8160077	984	Syd	\$0.80	\$787.42
8	Seeding, Mixture, THV	8160040	140	Lb	\$2.80	\$392.00
9	Fertilizer, Chemical Nutrient, CL A	8160020	150	Lb	\$1.50	\$225.00
10	Mulch	8160025	2,983	Syd	\$0.20	\$596.53
11	Mulch Anchoring	8160026	2,983	Syd	\$0.11	\$328.09
12	Mulch Blanket	8160027	0	Syd	\$1.00	\$0.00
13	Mulch Blanket, High Velocity	8160028	0	Syd	\$1.50	\$0.00
14	Riprap, Special		73,384	Ton	\$32.00	\$2,348,273.35
15	Protect Corners		12	Ea	\$200.00	\$2,400.00
16	Monument Box		12	Ea	\$300.00	\$3,600.00
17	Monument Preservation		12	Ea	\$350.00	\$4,200.00
<b>SUBTOTAL MISCELLANEOUS</b>						<b>\$2,775,409.18</b>

# **ROW & Utilities**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2			0		\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL ROW</b>						<b>\$0.00</b>

				<b>TOTAL PROJECT</b>	<b>\$3,699,459.93</b>
Current Year	2018	4%	Projected Cost after Inflation		<b>\$4,001,335.86</b>
Construction Year	2020	10%	CONTINGENCY		<b>\$400,133.59</b>
				<b>ROW</b>	<b>\$0.00</b>
				<b>Const Total</b>	<b>\$4,401,469.44</b>
				5.50% PE	\$242,080.82
				4.50% CE	\$198,066.12
				93.73% Ind Proj Costs	\$412,549.73
				<b>Total</b>	<b>\$5,254,166.12</b>

# STANDARD SCOPING WORKSHEET

County Road 107 Phase 2 of Riprap Option 2

DATE: 2/6/2018  
 DATE REVISED: 7/5/2019  
 BY: Ken Filpus  
 CHECKED BY:

ROUTE: County Road 107  
 CONTROL SECT:  
 PR Number:  
 JOB NUMBER:

	STATION	MP	
P.O.B.	8+85.00	0	
P.O.E.	21+72.00	0.000	
LENGTH OF JOB	1287 Feet	0.244 Miles	

	STATION	MP	
P.O.B.	80+92.00	0	
P.O.E.	85+42.00	0.000	
LENGTH OF JOB	450 Feet	0.085 Miles	
Total Length	1737	0.329	

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0.00		\$0.00	\$0.00
2			0.00		\$0.00	\$0.00
3			0.00		\$0.00	\$0.00
<b>SUBTOTAL SAFETY</b>						<b>\$0.00</b>

## MAINLINE PAVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing	2010001	0.00	Acre	\$5,800.00	\$0.00
2	Embankment, CIP	2050010	5,375	Cyd	\$3.50	\$18,811.33
3	Excavation, Earth	2050016	2,091	Cyd	\$6.70	\$14,008.58
4	Subbase, CIP	3010002	0	Cyd	\$9.50	\$0.00
5	Aggregate Base, 8 inch	3020020	0	Syd	\$5.60	\$0.00
6	Shoulder, CI II	3070121	0	Ton	\$18.00	\$0.00
7	Approach, CI I	3070001	0	Ton	\$20.00	\$0.00
8	Approach, CI II	3070021	0	Ton	\$20.00	\$0.00
9	HMA, LVSP	5010703	0	Ton	\$60.00	\$0.00
<b>SUBTOTAL MAINLINE PVT</b>						<b>\$32,819.92</b>

## NONMOTORIZED

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2			0		\$0.00	\$0.00
3			0		\$0.00	\$0.00
4			0		\$0.00	\$0.00
<b>SUBTOTAL NONMOTORIZED</b>						<b>\$0.00</b>

## GEOMETRIC IMPROVEMENT

<b>SUBTOTAL GEOMETRIC IMPROVEMENT</b>	<b>\$0.00</b>
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## VERTICAL/HORIZONTAL ALIGNMENT

SUBTOTAL VERT/HORIZ ALIGNMENT	\$0.00
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## BRIDGE REPAIR, WIDENING

<b>SUBTOTAL BRIDGE REPAIR, WIDENING</b>	<b>\$0.00</b>
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## DRAINAGE

<b>SUBTOTAL DRAINAGE</b>	<b>\$0.00</b>
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## JOINT REPAIR/PAVEMENT PATCHING

<b>SUBTOTAL JOINT REPAIR/PAVEMENT PATCHING</b>	<b>\$0.00</b>
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## MAINTAINING TRAFFIC

<b>SUBTOTAL MAINTAINING TRAFFIC</b>	<b>\$50,136.00</b>
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### PERMANENT TRAFFIC CONTROL DEVICES

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Pavt Mrkg, Waterborne, 4 inch, Yellow	8110232	0	Ft	\$0.11	\$0.00
2	Pavt Mrkg, Waterborne, 4 inch, White	8110231	0	Ft	\$0.11	\$0.00
3			0		\$0.00	\$0.00
<b>SUBTOTAL PERMANENT TRAFFIC CONTROL DEVICES</b>						<b>\$0.00</b>

### ENVIRONMENTAL

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Erosion Control, Silt Fence	2080036	6000	Ft	\$1.60	\$9,600.00
2			0		\$0.00	\$0.00
3			0		\$0.00	\$0.00
<b>SUBTOTAL ENVIRONMENTAL</b>						<b>\$9,600.00</b>

### MISCELLANEOUS

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Mobilization, Max		1	LS	\$74,000.00	\$74,000.00
2	Contractor Staking, Road Only		1	LS	\$14,300.00	\$14,300.00
3	Contractor Staking Errors and Extras, 1 Person		6	Hr	\$90.00	\$540.00
4	Contractor Staking Errors and Extras, 2 Person		3	Hr	\$120.00	\$360.00
5	Contractor Staking, Errors and Extras, 3 Person		4	Hr	\$150.00	\$600.00
6	Topsoil Surface, Furn, 4 inch	8160062	517	Syd	\$2.00	\$1,034.48
7	Topsoil Surface, Salv, 4 inch	8160077	255	Syd	\$0.80	\$203.81
8	Seeding, Mixture, THV	8160040	40	Lb	\$2.80	\$112.00
9	Fertilizer, Chemical Nutrient, CL A	8160020	40	Lb	\$1.50	\$60.00
10	Mulch	8160025	772	Syd	\$0.20	\$154.40
11	Mulch Anchoring	8160026	772	Syd	\$0.11	\$84.92
12	Mulch Blanket	8160027	0	Syd	\$1.00	\$0.00
13	Mulch Blanket, High Velocity	8160028	0	Syd	\$1.50	\$0.00
14	Riprap, Special		18,994	Ton	\$32.00	\$607,800.75
15	Protect Corners		12	Ea	\$200.00	\$2,400.00
16	Monument Box		12	Ea	\$300.00	\$3,600.00
17	Monument Preservation		12	Ea	\$350.00	\$4,200.00
<b>SUBTOTAL MISCELLANEOUS</b>						<b>\$709,450.35</b>

### ROW & Utilities

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2			0		\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL ROW</b>						<b>\$0.00</b>

			<b>TOTAL PROJECT</b>	<b>\$802,006.27</b>
Current Year	2019	4% Projected Cost after Inflation		<b>\$938,233.90</b>
Construction Year	2023	10% CONTINGENCY		<b>\$93,823.39</b>
			<b>ROW</b>	<b>\$0.00</b>
			<b>Const Total</b>	<b>\$1,032,057.29</b>
			5.50% PE	\$56,763.15
			4.50% CE	\$46,442.58
			93.73% Ind Proj Costs	\$96,734.73
			<b>Total</b>	<b>\$1,231,997.75</b>

**Option 3 Detail Summary****Description**

- The total length of this Option 3 is 2.272 miles which would include reconstruction and realignment. The realignment would begin 4000 feet west of South Boundary Road and end 6000 feet east of South Boundary Road. This option would eliminate the need for any riprap to be placed along the shoreline. Typical cross sections, realignment plan, and detailed cost estimate are attached. Realignment options were considered as a comparison to the cost of placing riprap along the shoreline.

**Mainline Pavement:**

- The pavement design was estimated based on a previous project (Job Numbers 80207A, 80211A, & 83746A) done on County Road 107 in 2006. This project pavement design included 3.5 inches HMA over a crush and shaped base. The proposed pavement design will be 3.5 inches of HMA, 8-inch aggregate base, and 18-inch subbase.

**Soils:**

- The USDA Natural Resources Conservation Service Web Soil Survey was referenced for soil data. Based on the survey there are some areas of somewhat poorly drained soils with a high ground water table. In these areas subgrade undercutting was estimate along with deeper ditches. Where the proposed alignment crosses wetland adjacent to a watercourse some peat excavation and swamp backfill was also estimated.

**Geometrics:**

- Lane and shoulder widths were based on a previous project (JN 80207A, 80211A, 83746A) done on County Road 107 in 2006. Lane widths were increased from 10 feet to 11 feet to meet reconstruction guidelines. Paved shoulders are 6 feet wide to match existing paved shoulder widths. This location used enhancement funding in 2006 to construct 6-foot-wide paved shoulders for non-motorized use.
- The horizontal alignment was developed to meet a 55-mph design speed.

**Drainage**

- Ditches were estimated at a 4-foot depth and 4-foot width except the depth was increased to 6 feet where there is a high groundwater table.
- The project will require the placement of several culverts ranging in size between 18 inches and 36 inches. The project will also require two 12 foot by 7 foot box culverts and one 6 foot by 6 foot box culvert based on the existing drainage.

**Bridge**

- With this alignment option a new bridge will need to be constructed over the Union River. The estimated cost of this bridge was based on the cost of a bridge constructed in 2017 on M-94 at the East Branch of the Chocoley River in Marquette County. Detailed soil information is not available at this time. The estimate assumes typical foundation requirements using foundation piles.

**Environmental:**

- Because of the increased distance from Lake Superior this option will likely not require USACE permits.
- May need an NPDES Notice of Coverage.
- MDEQ permits will be required for stream crossings and wetland and floodplain impacts.
- Wetland mitigation will likely require a 2 to 1 ratio. A 10 to 1 ratio is required to mitigate through the purchasing of wetland for preservation. This option will likely have significant wetland impacts. Wetland mitigation costs were included in the estimate.
- Wetland areas could not be identified due to the presence of snow cover. The wetland impacts are a rough estimate with areas estimated at the stream/river crossings.

**Real Estate**

- There would be right of way impacts with this option.
- The alignment was developed mainly to be relocated onto state park property. Property acquisition from the park was assumed to be zero based on mutual benefit.
- There is a gas station that would likely be a total take with this option.
- There are a few privately owned parcels within the realignment area. Access to parcels will be changed from the north side of the parcels to the south side of the parcels.

**Maintaining Traffic:**

- Part width construction could be done with traffic maintained using flag control at the tie in points. Most of the project could be constructed with minimal traffic control.

**Permanent Traffic Control Devices:**

- Permanent signing and pavement marking quantities were included in the estimate.

**Utility Impacts:**

- About 1500 feet of watermain relocation was included in the estimate for minor relocations near the tie in points. The existing watermain is located a minimum 50 feet south of the CR 107 centerline. Due to this distance full relocation of the watermain was not included in the estimate. The watermain will likely require replacement before it is impacted by erosion.
- There could be some private utility impacts to telephone and electric. It was assumed that these utilities would require relocation at their cost.

**Snowmobile Trail Impacts:**

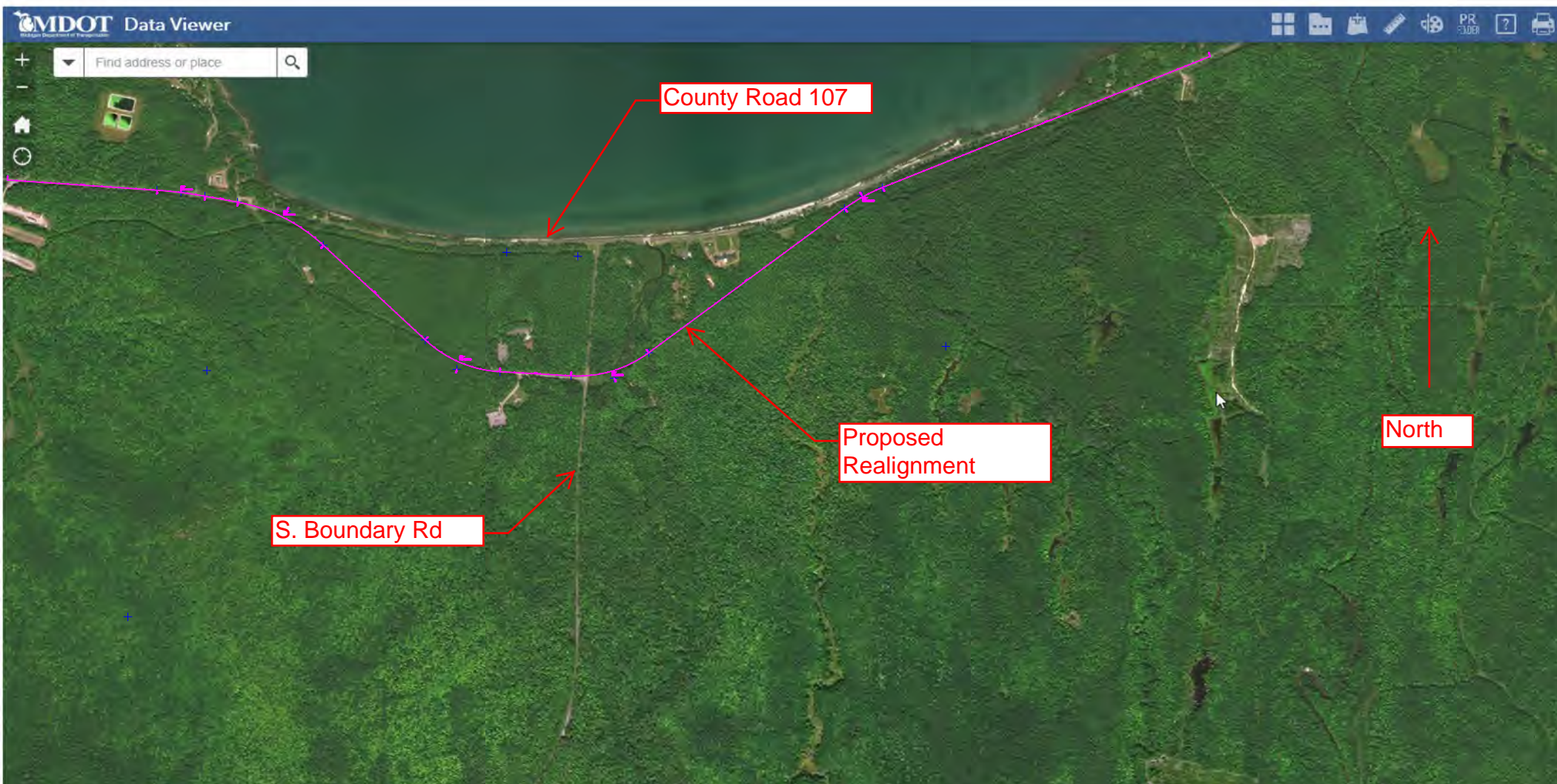
- About 3000 feet of snowmobile trail relocation was included in the estimate. Existing snowmobile trail bridges could be relocated at minimal cost.



**Engineering Costs:**

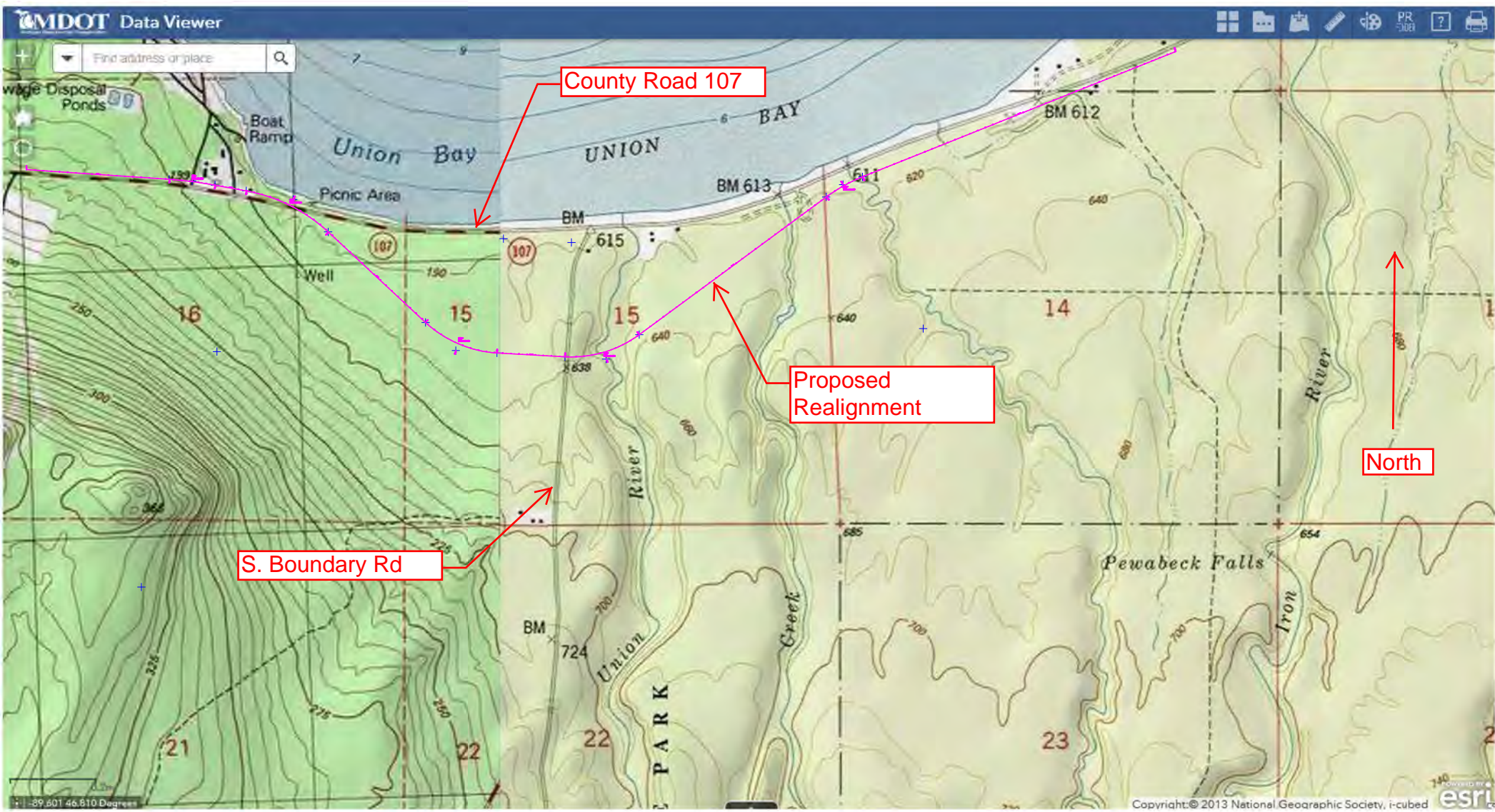
- Engineering costs will be significantly higher for this option due to the following needs:
  - Locating and designing large wetland mitigation site
  - Extensive soil investigation due to the possibility of poor soils
  - Multiple hydraulic analyses for river and stream crossings
  - Floodplain analysis
  - Structural and foundation designs for a bridge and three box culverts.
  - Major roadway realignment

# County Road 107 Realignment Option 3





### County Road 107 Realignment Option 3



# STANDARD SCOPING WORKSHEET

## County Road 107 Realignment Estimate Option 3

DATE: 2/2/2018  
 DATE REVISED: 7/5/2019  
 BY: Ken Filpus  
 CHECKED BY:

ROUTE: County Road 107  
 CONTROL SECT:  
 PR Number:  
 JOB NUMBER:

P.O.B. STATION 37+00.00 MP 0  
 P.O.E. 157+00.00 0.000  
 LENGTH OF JOB 12000 Feet 0.000 Miles

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Guardrail, Type B	8070000	2000.00	Ft	\$16.00	\$32,000.00
2	Guardrail Approach Terminal, Type 1B	8070040	4.00	Ea	\$1,700.00	\$6,800.00
3	Guardrail Reflector	8070080	40.00	Ea	\$5.00	\$200.00
<b>SUBTOTAL SAFETY</b>						<b>\$39,000.00</b>

## MAINLINE PAVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing	2010001	31.50	Acre	\$5,800.00	\$182,700.00
2	Embankment, CIP	2050010	19,963	Cyd	\$3.50	\$69,870.37
3	Excavation, Earth	2050016	43,252	Cyd	\$6.70	\$289,787.41
4	Excavation, Peat	2050017	16,037	Cyd	\$7.50	\$120,277.78
5	Backfill, Swamp	2050001	20,815	Cyd	\$10.00	\$208,148.15
6	Subgrade Undercutting, Type II	2050041	20,267	Cyd	\$13.00	\$263,466.67
7	Subbase, CIP	3010002	25,815	Cyd	\$9.00	\$232,333.33
8	Aggregate Base, 8 inch	3020020	48,000	Syd	\$6.50	\$312,000.00
9	Shoulder, CI II	3070121	1210	Ton	\$18.00	\$21,780.00
10	Approach, CI I	3070001	1528	Ton	\$20.00	\$30,550.67
11	Approach, CI II	3070021	200	Ton	\$20.00	\$4,000.00
12	HMA, LVSP	5010703	9,640	Ton	\$66.50	\$641,060.00
13	HMA Approach	5010061	764	Ton	\$120.00	\$91,652.00
14	HMA Surface, Rem	5010005	37,778	Syd	\$2.25	\$85,000.00
15	Obliterate Old Road	2070001	100	Sta	\$400.00	\$40,000.00
16	Curb and Gutter, Conc, Det B2	8020016	300	Ft	\$24.00	\$7,200.00
<b>SUBTOTAL MAINLINE PVT</b>						<b>\$2,599,826.37</b>

## NONMOTORIZED

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing for Snowmobile Trail		1.956015	Acre	\$5,800.00	\$11,344.89
2	Excavation for Snowmobile Trail		3155.704	Cyd	\$6.70	\$21,143.21
3	Embankment for Snowmobile Trail		2479.481	Cyd	\$3.50	\$8,678.19
4	Shoulder, CI II for Snowmobile Trail		1785.227	Ton	\$18.00	\$32,134.08

**SUBTOTAL NONMOTORIZED      \$73,300.37**

**GEOMETRIC IMPROVEMENT**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL GEOMETRIC IMPROVEMENT      \$0.00**

**VERTICAL/HORIZONTAL ALIGNMENT**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL VERT/HORIZ ALIGNMENT      \$0.00**

**BRIDGE REPAIR, WIDENING**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Union River Bridge Replacement		1	Lsum	\$1,840,000.00	\$1,840,000.00
2	Based on M-94 East Branch Chocolay				\$0.00	\$0.00
3	River Bridge Construction Cost				\$0.00	\$0.00

**SUBTOTAL BRIDGE REPAIR, WIDENING      \$1,840,000.00**

**DRAINAGE**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Culv, CI A, 36 inch	4010136	136	Ft	\$95.00	\$12,920.00
2	Culv, Slp End Sect, 1 on 4, 36 inch, Transv	4010930	4	Ea	\$1,700.00	\$6,800.00
3	Culv, CI A, 24 inch	4010134	528	Ft	\$65.00	\$34,320.00
4	Culv, Slp End Sect, 1 on 4, 24 inch, Transv	4010924	16	Ea	\$540.00	\$8,640.00
5	Culv, CI A, 18 inch	4010133	120	Ft	\$53.00	\$6,360.00
6	Culv, Slp End Sect, 1 on 4, 18 inch, Transv	4010012	4	Ea	\$407.00	\$1,628.00
7	Culv, Precast Conc Box, 12 foot by 7 foot	4060148	144	Ft	\$1,650.00	\$237,600.00
8	Culv Wingwalls for 12 foot by 7 foot box culv		4	Ea	\$30,000.00	\$120,000.00
9	Culv, Precast Conc Box, 6 foot by 6 foot	4060108	72	Ft	\$1,450.00	\$104,400.00
10	Culv Wingwalls for 6 foot by 6 foot box culv		2	Ea	\$25,000.00	\$50,000.00
11	Dr Marker Post	4011109	24	Ea	\$20.00	\$480.00
12	Video Taping Sewer and Culv Pipe	4021275	784	Ft	\$2.00	\$1,568.00

**SUBTOTAL DRAINAGE      \$584,716.00**

**JOINT REPAIR/PAVEMENT PATCHING**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL JOINT REPAIR/PAVEMENT PATCHING      \$0.00**

**MAINTAINING TRAFFIC**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Traffic Regulator Control		1	LS	\$30,000.00	\$30,000.00
2	Minor Traf Devices		1	LS	\$119,300.00	\$119,300.00
3	Sign, Type B, Prismatic, Temp, Furn		1200	Sft	\$4.25	\$5,100.00
4	Sign, Type B, Prismatic, Temp, Oper		1200	Sft	\$0.75	\$900.00

5	Plastic Drum, High Intensity, Furn		180	Ea	\$25.00	\$4,500.00
6	Plastic Drum, High Intensity, Oper		180	Ea	\$5.00	\$900.00
7	Lighted Arrow, Type C, Furn		4	Ea	\$385.00	\$1,540.00
8	Lighted Arrow, Type C, Oper		4	Ea	\$75.00	\$300.00
9	Barricade, Type III, Lighted, Furn		20	Ea	\$125.00	\$2,500.00
10	Barricade, Type III, Lighted, Oper		20	Ea	\$10.00	\$200.00
11	Dust Palliative, Applied	8120100	75	Ton	\$220.00	\$16,500.00
12	Pavt Mrkg, Type NR, Paint, 4 inch, Yellow	8120231	1400	Ft	\$0.64	\$896.00
13	Pavt Mrkg, Type NR, Tape, 4 inch, Yellow	8120230	5800	Ft	\$0.50	\$2,900.00
<b>SUBTOTAL MAINTAINING TRAFFIC</b>						<b>\$185,536.00</b>

#### PERMANENT TRAFFIC CONTROL DEVICES

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Pavt Mrkg, Waterborne, 4 inch, Yellow	8110232	24,000	Ft	\$0.11	\$2,640.00
2	Pavt Mrkg, Waterborne, 4 inch, White	8110231	24,000	Ft	\$0.11	\$2,640.00
3	Post, Steel, 3 lb	8100371	1,350	Ft	\$4.00	\$5,400.00
4	Sign, Type IIIA	8100404	211	Sft	\$15.00	\$3,165.00
5	Sign, Type IIIB	8100405	320	Sft	\$15.00	\$4,800.00
6			0		\$0.00	\$0.00
<b>SUBTOTAL PERMANENT TRAFFIC CONTROL DEVICES</b>						<b>\$18,645.00</b>

#### ENVIRONMENTAL

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Erosion Control, Silt Fence	2080036	6000	Ft	\$1.60	\$9,600.00
2	Erosion Control, Check Dam, Stone	2080012	250	Ft	\$17.50	\$4,375.00
3	Erosion Control, Sediment Trap	2080034	12	Ea	\$150.00	\$1,800.00
4	Ero Con, Maint, Sediment Removal	2080026	15	Cyd	\$20.00	\$300.00
			0		\$0.00	\$0.00
<b>SUBTOTAL ENVIRONMENTAL</b>						<b>\$16,075.00</b>

#### MISCELLANEOUS

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Mobilization, Max		1	LS	\$625,000.00	\$625,000.00
2	Contractor Staking, Road Only		1	LS	\$122,300.00	\$122,300.00
3	Contractor Staking Errors and Extras, 1 Person		51	Hr	\$90.00	\$4,590.00
4	Contractor Staking Errors and Extras, 2 Person		21	Hr	\$120.00	\$2,520.00
5	Contractor Staking, Errors and Extras, 3 Person		31	Hr	\$150.00	\$4,650.00
6	Topsoil Surface, Furn, 4 inch	8160062	52,320	Syd	\$2.00	\$104,639.11
7	Topsoil Surface, Salv, 4 inch	8160077	25,769	Syd	\$0.80	\$20,615.47
8	Seeding, Mixture, THV	8160040	3,550	Lb	\$2.80	\$9,940.00
9	Fertilizer, Chemical Nutrient, CL A	8160020	3,680	Lb	\$1.50	\$5,520.00
10	Mulch	8160025	56,689	Syd	\$0.20	\$11,337.78
11	Mulch Anchoring	8160026	56,689	Syd	\$0.11	\$6,235.78
12	Mulch Blanket	8160027	10,700	Syd	\$1.00	\$10,700.00
13	Mulch Blanket, High Velocity	8160028	10,700	Syd	\$1.50	\$16,050.00
14	Ditch, Plain Cobble	8140005	1,200	Syd	\$32.00	\$38,400.00
15	Riprap, Plain	8130010	400	Syd	\$25.00	\$10,000.00
16	Protect Corners		12	Ea	\$200.00	\$2,400.00
17	Monument Box		12	Ea	\$300.00	\$3,600.00
18	Monument Preservation		12	Ea	\$350.00	\$4,200.00
<b>SUBTOTAL MISCELLANEOUS</b>						<b>\$1,002,698.13</b>

#### ROW & Utilities

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
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1	Wetland Mitigation		9.366391	Acres	\$40,000.00	\$374,655.65
2	Water Main, DI, 8 inch, Tr Det F	8230155	1500	Ft	\$70.00	\$105,000.00
3	Water Main, DI, 6 inch, Tr Det F	8230150	60	Ft	\$70.00	\$4,200.00
4	Gate Valve and Box, 8 inch	8230052	3	Ea	\$1,600.00	\$4,800.00
5	Fire Hydrant	8230040	3	Ea	\$4,100.00	\$12,300.00
6				LS	\$0.00	\$0.00

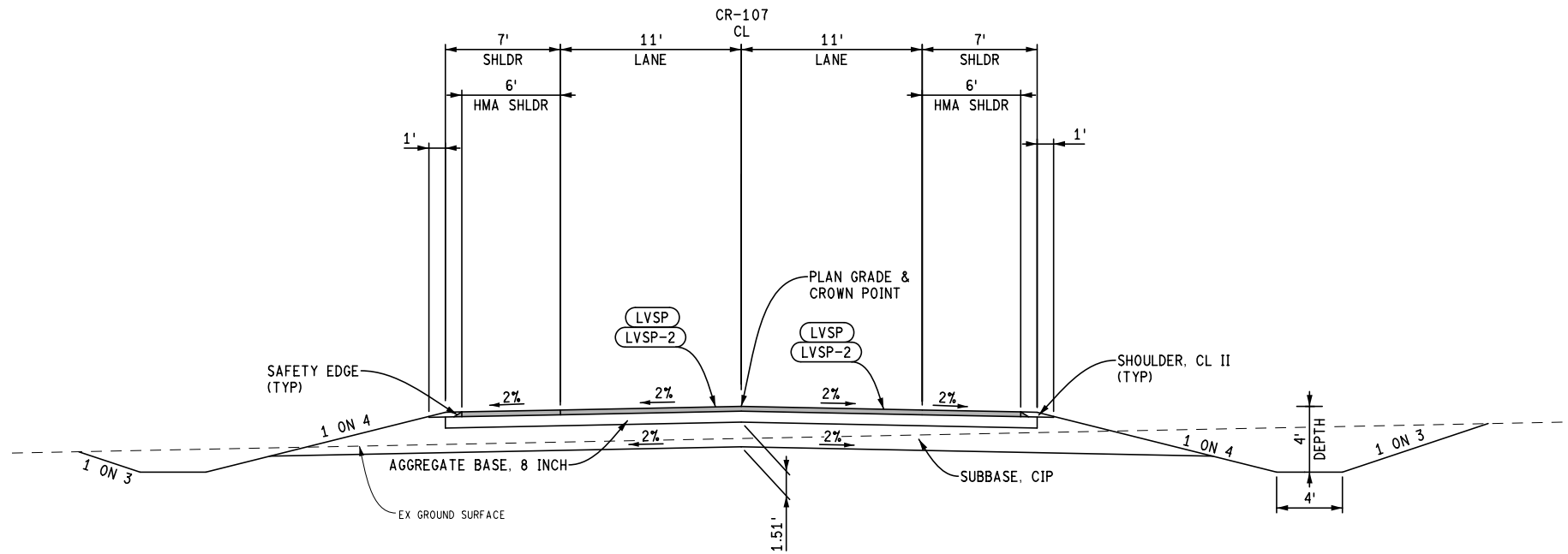
**SUBTOTAL ROW**

**\$500,955.65**

			TOTAL PROJECT	<b>\$6,860,752.52</b>
Current Year	2019	4%	Projected Cost after Inflation	<b>\$7,420,589.92</b>
Construction Year	2021	15%	CONTINGENCY	<b>\$1,113,088.49</b>
			<b>ROW</b>	<b>\$180,000.00</b>

	<b>Const Total</b>	<b>\$8,713,678.41</b>
10.00%	PE	\$871,367.84
7.00%	CE	\$609,957.49
93.73%	Ind Proj Costs	\$1,388,446.23

**Total \$11,583,449.97**

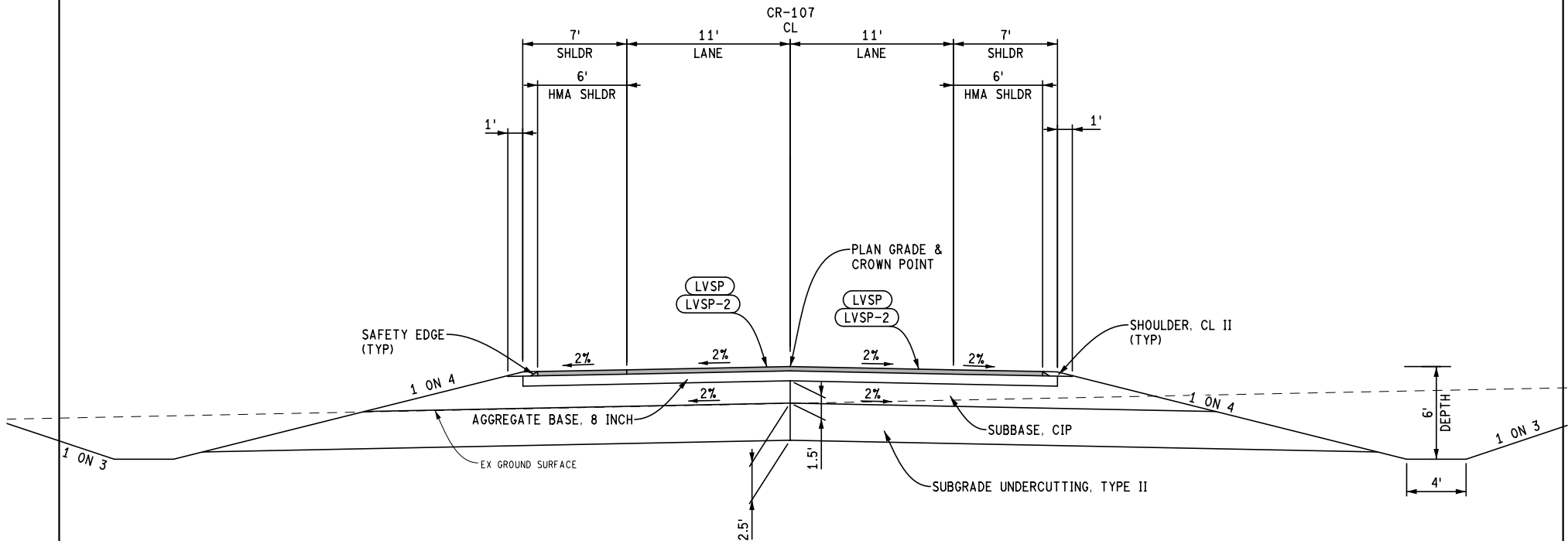


HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE LBS PER SYD	PERFORMANCE GRADE	REMARKS
LVSP	HMA LVSP	165	58-34	TOP COURSE (AWI=220)
LVSP-2	HMA LVSP	220	58-34	LEVELING COURSE
	* BOND COAT	0.05-0.15 GAL		

\*FOR INFORMATION ONLY

FILE:	NO SCALE	DATE: 05/24/17	CS:	COUNTY ROAD 407	DRAWING	SHEET
		DESIGN UNIT: ISHPMEMING	JN:	TYPICAL CROSS SECTION	TYP	SECT 1
		TSC: ISHPMEMING		REALIGNMENT		



NO SCALE

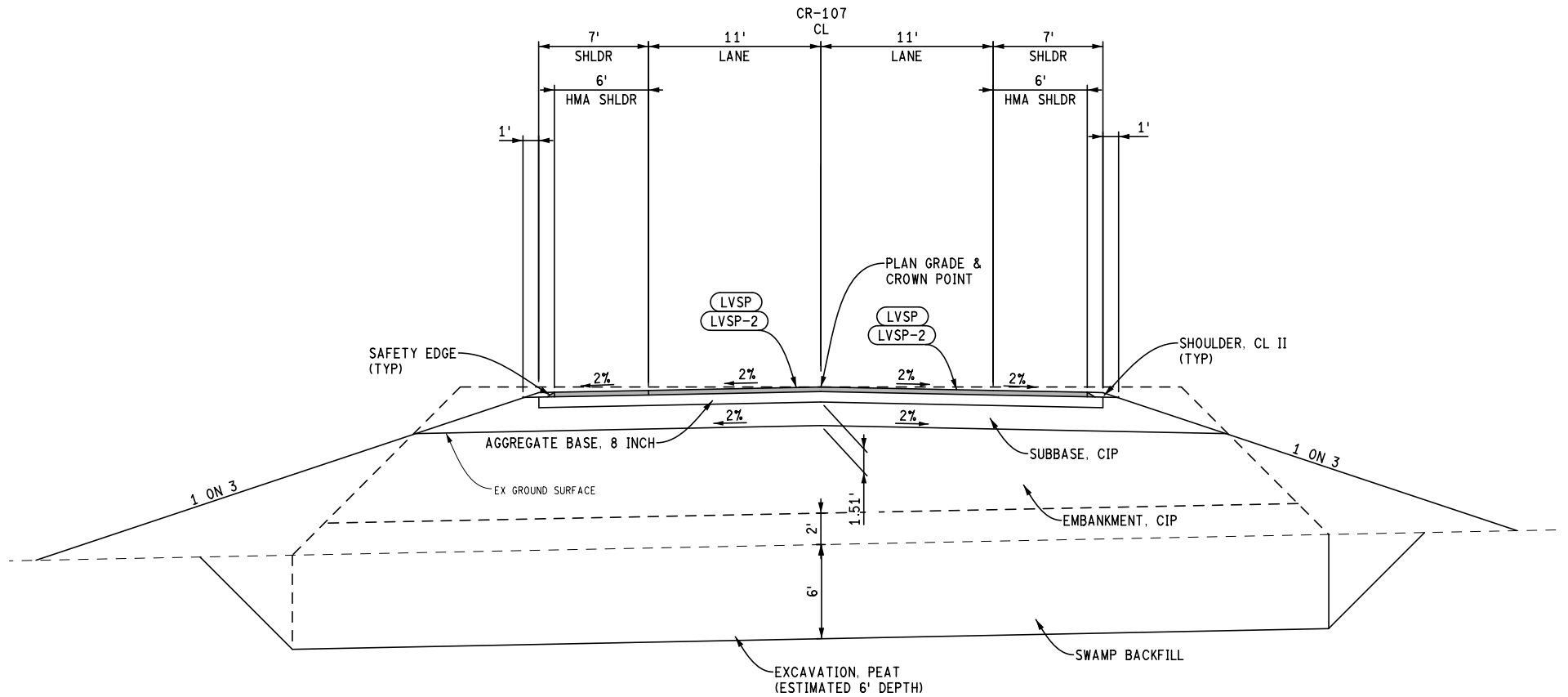
DATE: 05/24/17  
DESIGN UNIT: ISHPERING  
TSC: ISHPERING

CS:  
JN:

COUNTY ROAD 407  
TYPICAL CROSS SECTION  
REALIGNMENT

DRAWING SHEET  
TYP SECT 1

FILE:



HMA APPLICATION ESTIMATE				
IDENT NO.	ITEM	RATE LBS PER SYD	PERFORMANCE GRADE	REMARKS
LVSP	HMA LVSP	165	58-34	TOP COURSE (AWI=220)
LVSP-2	HMA LVSP	220	58-34	LEVELING COURSE
	* BOND COAT	0.05-0.15 GAL		

\*FOR INFORMATION ONLY

	NO SCALE	DATE: 05/24/17	CS:	COUNTY ROAD 407	DRAWING	SHEET
		DESIGN UNIT: ISHPEMING	JN:	TYPICAL CROSS SECTION	TYP	SECT 1
FILE:		TSC: ISHPEMING		REALIGNMENT		

**Option 4 Detail Summary****Description**

- The total length of this option is 1.856 miles which would include reconstruction and realignment. The realignment would begin 4300 feet west and end 200 feet west of South Boundary Road. The realignment would begin again 700 feet east and end 6400 feet east of South Boundary Road. About 900 feet of existing road alignment would be preserved near the Union River and South Boundary Road. This option would require the need for riprap along 2500 feet of roadway adjacent to the Lake Superior shoreline. Typical cross sections are similar to Option 3. An alignment and detailed cost estimate for Option 4 is attached. It is possible over time this Option could require more riprap to be placed for armoring of the slopes between the road and the lake because the road will be moving south 150 feet or less.

**Mainline Pavement:**

- The pavement design was estimated based on a previous project (Job Numbers 80207A, 80211A, & 83746A) done on County Road 107 in 2006. This project pavement design included 3.5 inches HMA over a crush and shaped base. The proposed pavement design will be 3.5 inches of HMA, 8-inch aggregate base, and 18-inch subbase.

**Soils:**

- The USDA Natural Resources Conservation Service Web Soil Survey was referenced for soil data. Based on the survey there are some areas of somewhat poorly drained soils with a high ground water table. In these areas subgrade undercutting was estimated along with deeper ditches. Where the proposed alignment crosses wetland adjacent to a watercourse some peat excavation and swamp backfill was also estimated.

**Geometrics:**

- Lane and shoulder widths were based on a previous project (JN 80207A, 80211A, 83746A) done on County Road 107 in 2006. Lane widths were increased from 10 feet to 11 feet to meet reconstruction guidelines. Paved shoulders are 6 feet wide to match existing paved shoulder widths. This location used enhancement funding in 2006 to construct 6-foot-wide shoulders for non-motorized use.
- The horizontal alignment was developed to meet a 55-mph design speed.

**Drainage**

- Ditches were estimated at a 4-foot depth and 4-foot width except the depth was increased to 6 feet where there is a high groundwater table.
- The project will require the placement of several culverts ranging in size between 18 inches and 36 inches. The project will also require two 12 foot by 7 foot box culverts and one 6 foot by 6 foot box culvert based on the existing drainage.

**Bridge**

- With this alignment option a new bridge would not be required at the Union River.
- Two Hundred Fifty feet of sheet piling was estimated east and west of the Union River Bridge for additional armoring of this structure. Based on soil borings from the old bridge plans, bedrock is approximately 30 feet deep near this structure.

**Environmental:**

- Because of the shorter distance from Lake Superior this option will likely require USACE permits. The riprap work will require permits from both the MDEQ and USACE. The USACE would possibly allow some filling into Lake Superior to preserve the integrity of the road. USACE will require documentation of events that caused erosion in order to issue a permit for filling into the lake. Some excavation would be allowed in Lake Superior. As part of the permit process the fill and excavation above and below the ordinary high-water mark will need to be estimated.
- May need an NPDES Notice of Coverage.
- USACE and MDEQ permits will be required for stream crossings and wetland impacts.
- Wetland mitigation will likely require a 4 to 1 ratio based on USACE jurisdiction. This option will likely have significant wetland impacts. Wetland mitigation costs were included in the estimate.
- Wetland areas could not be identified due to the presence of snow cover. The wetland impacts are a rough estimate with areas estimated at the stream/river crossings.

**Real Estate**

- There would be right of way impacts with this option.
- The alignment was developed mainly to be relocated onto state park property except for some privately owned parcels east of South Boundary Road. Property acquisition from the park was assumed to be zero based on mutual benefit.
- Approximately 1.5 acres of property acquisition was estimated.

**Maintaining Traffic:**

- Part width construction could be done with traffic maintained using flag control at the tie in points. Most of the project could be constructed with minimal traffic control.

**Permanent Traffic Control Devices:**

- Permanent signing and pavement marking quantities were included in the estimate.

**Snowmobile Trail Impacts:**

- About 6600 feet of snowmobile trail relocation was included in the estimate. Existing snowmobile trail bridges could be relocated at minimal cost.



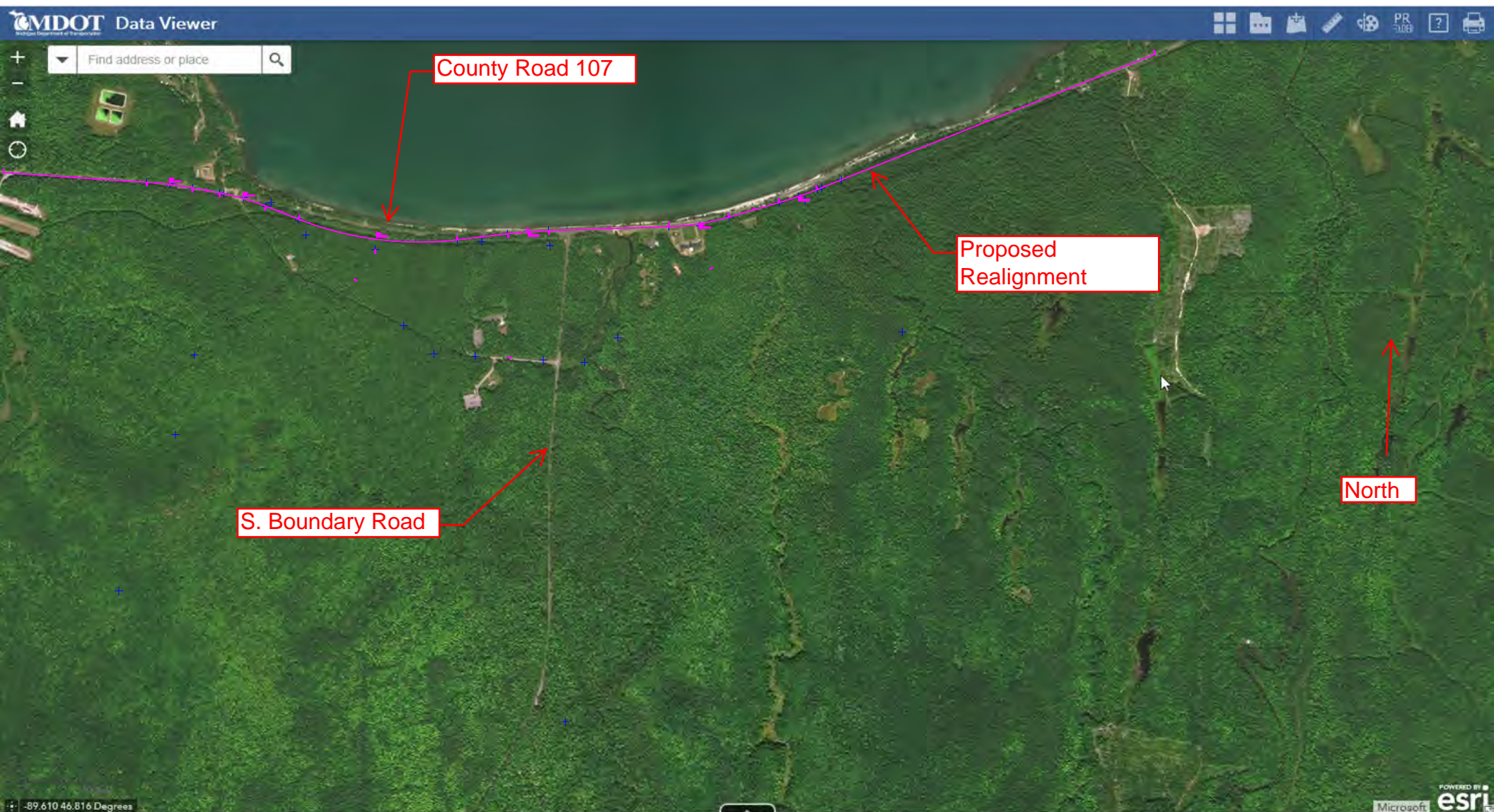
**Utility Impacts:**

- About 3000 feet of watermain relocation was included in the estimate.
- There could be some private utility impacts to telephone and electric. It was assumed that these utilities would require relocation at their cost.

**Engineering Costs:**

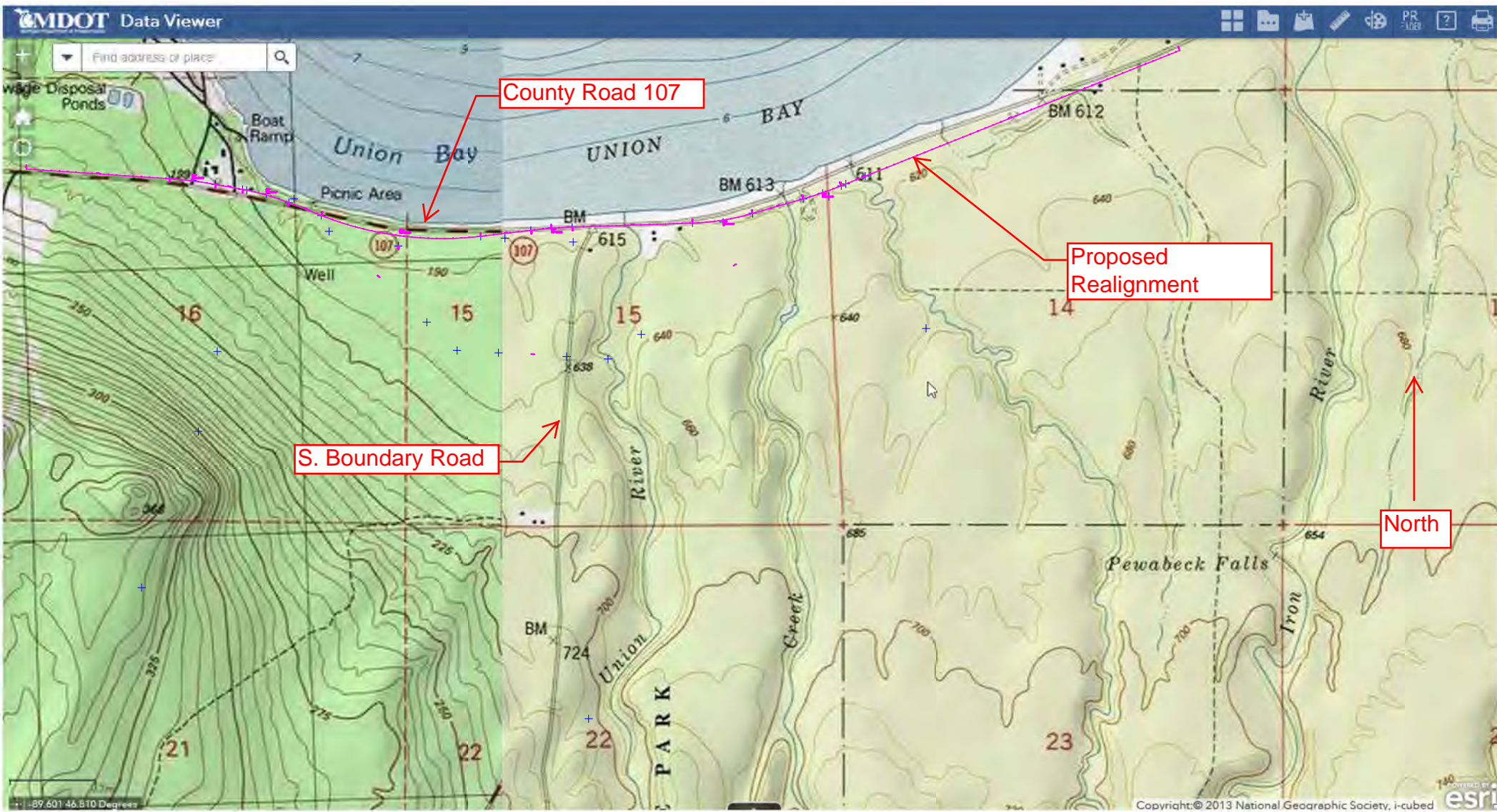
- Engineering costs will be significantly higher than option 1 and 2 but less than option 3 due to the following needs:
  - Locating and designing large wetland mitigation site
  - Extensive soil investigation due to the possibility of poor soils
  - Multiple hydraulic analyses for stream crossings
  - Structural and foundation designs for three box culverts.
  - Major roadway realignment

## County Road 107 Realignment Option 4





# County Road 107 Realignment Option 4



# STANDARD SCOPING WORKSHEET

## County Road 107 Realignment Estimate Option 4

DATE: 2/2/2018  
 DATE REVISED: 7/5/2019  
 BY: Ken Filpus  
 CHECKED BY:

ROUTE: County Road 107  
 CONTROL SECT:  
 PR Number:  
 JOB NUMBER:

	STATION	MP	
P.O.B.	37+00.00	0	
P.O.E.	79+00.00	0.000	
LENGTH OF JOB	4200 Feet	0.000	Miles

	STATION	MP	
P.O.B.	88+00.00	0	
P.O.E.	144+00.00	0.000	
LENGTH OF JOB	5600 Feet	0.000	Miles
Total Length	9800 Feet		

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Guardrail, Type B	8070000	2000.00	Ft	\$16.00	\$32,000.00
2	Guardrail Approach Terminal, Type 1B	8070040	4.00	Ea	\$1,700.00	\$6,800.00
3	Guardrail Reflector	8070080	40.00	Ea	\$5.00	\$200.00
<b>SUBTOTAL SAFETY</b>						<b>\$39,000.00</b>

## MAINLINE PAVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing	2010001	22.50	Acre	\$5,800.00	\$130,500.00
2	Embankment, CIP	2050010	14,133	Cyd	\$3.50	\$49,466.67
3	Excavation, Earth	2050016	33,022	Cyd	\$6.70	\$221,248.89
4	Excavation, Peat	2050017	6,415	Cyd	\$7.50	\$48,111.11
5	Backfill, Swamp	2050001	8,326	Cyd	\$10.00	\$83,259.26
6	Subgrade Undercutting, Type II	2050041	2,533	Cyd	\$13.00	\$32,933.33
7	Subbase, CIP	3010002	28,933	Cyd	\$9.00	\$260,400.00
8	Aggregate Base, 8 inch	3020020	39,200	Syd	\$6.50	\$254,800.00
9	Shoulder, CI II	3070121	990	Ton	\$18.00	\$17,820.00
10	Approach, CI I	3070001	117	Ton	\$20.00	\$2,346.67
11	Approach, CI II	3070021	100	Ton	\$20.00	\$2,000.00
12	HMA, LVSP	5010703	7,880	Ton	\$66.50	\$524,020.00
13	HMA Approach	5010061	59	Ton	\$120.00	\$7,040.00
14	HMA Surface, Rem	5010005	30,978	Syd	\$2.25	\$69,700.00
15	Obliterate Old Road	2070001	82	Sta	\$400.00	\$32,800.00
14	Curb and Gutter, Conc, Det B2	8020016	150	Ft	\$24.00	\$3,600.00
<b>SUBTOTAL MAINLINE PVT</b>						<b>\$1,740,045.93</b>

## NONMOTORIZED

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing for Snowmobile Trail		4.242424	Acre	\$5,800.00	\$24,606.06
2	Excavation for Snowmobile Trail		6844.444	Cyd	\$6.70	\$45,857.78
3	Embankment for Snowmobile Trail		5377.778	Cyd	\$3.50	\$18,822.22
	Shoulder, CI II for Snowmobile Trail		3872	Ton	\$18.00	\$69,696.00
4					\$0.00	\$0.00
<b>SUBTOTAL NONMOTORIZED</b>						<b>\$158,982.06</b>

#### GEOMETRIC IMPROVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL GEOMETRIC IMPROVEMENT</b>						<b>\$0.00</b>

#### VERTICAL/HORIZONTAL ALIGNMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL VERT/HORIZ ALIGNMENT</b>						<b>\$0.00</b>

#### BRIDGE REPAIR, WIDENING

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Steel Sheet Piling Permanent	7040001	20000	Sft	\$25.00	\$500,000.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL BRIDGE REPAIR, WIDENING</b>						<b>\$500,000.00</b>

#### DRAINAGE

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Culv, CI A, 36 inch	4010136	136	Ft	\$95.00	\$12,920.00
2	Culv, Slp End Sect, 1 on 4, 36 inch, Transv	4010930	4	Ea	\$1,700.00	\$6,800.00
3	Culv, CI A, 24 inch	4010134	528	Ft	\$65.00	\$34,320.00
4	Culv, Slp End Sect, 1 on 4, 24 inch, Transv	4010924	16	Ea	\$540.00	\$8,640.00
5	Culv, CI A, 18 inch	4010133	120	Ft	\$53.00	\$6,360.00
6	Culv, Slp End Sect, 1 on 4, 18 inch, Transv	4010012	4	Ea	\$407.00	\$1,628.00
7	Culv, Precast Conc Box, 12 foot by 7 foot	4060148	144	Ft	\$1,650.00	\$237,600.00
8	Culv Wingwalls for 12 foot by 7 foot box culv		4	Ea	\$30,000.00	\$120,000.00
9	Culv, Precast Conc Box, 6 foot by 6 foot	4060108	72	Ft	\$1,450.00	\$104,400.00
10	Culv Wingwalls for 6 foot by 6 foot box culv		2	Ea	\$25,000.00	\$50,000.00
11	Dr Marker Post	4011109	24	Ea	\$20.00	\$480.00
12	Video Taping Sewer and Culv Pipe	4021275	784	Ft	\$2.00	\$1,568.00
<b>SUBTOTAL DRAINAGE</b>						<b>\$584,716.00</b>

#### JOINT REPAIR/PAVEMENT PATCHING

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL JOINT REPAIR/PAVEMENT PATCHING</b>						<b>\$0.00</b>

#### MAINTAINING TRAFFIC

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Traffic Regulator Control		1	LS	\$25,000.00	\$25,000.00
2	Minor Traf Devices		1	LS	\$100,000.00	\$100,000.00
3	Sign, Type B, Prismatic, Temp, Furn		1200	Sft	\$4.25	\$5,100.00
4	Sign, Type B, Prismatic, Temp, Oper		1200	Sft	\$0.75	\$900.00
5	Plastic Drum, High Intensity, Furn		160	Ea	\$25.00	\$4,000.00
6	Plastic Drum, High Intensity, Oper		160	Ea	\$5.00	\$800.00
7	Lighted Arrow, Type C, Furn		4	Ea	\$385.00	\$1,540.00
8	Lighted Arrow, Type C, Oper		4	Ea	\$75.00	\$300.00
9	Barricade, Type III, Lighted, Furn		20	Ea	\$125.00	\$2,500.00
10	Barricade, Type III, Lighted, Oper		20	Ea	\$10.00	\$200.00
11	Dust Palliative, Applied	8120100	75	Ton	\$220.00	\$16,500.00
12	Pavt Mrkg, Type NR, Paint, 4 inch, Yellow	8120231	1400	Ft	\$0.64	\$896.00
13	Pavt Mrkg, Type NR, Tape, 4 inch, Yellow	8120230	5800	Ft	\$0.50	\$2,900.00
<b>SUBTOTAL MAINTAINING TRAFFIC</b>						<b>\$160,636.00</b>

#### PERMANENT TRAFFIC CONTROL DEVICES

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Pavt Mrkg, Waterborne, 4 inch, Yellow	8110232	21,400	Ft	\$0.11	\$2,354.00
2	Pavt Mrkg, Waterborne, 4 inch, White	8110231	21,400	Ft	\$0.11	\$2,354.00
3	Post, Steel, 3 lb	8100371	1,350	Ft	\$4.00	\$5,400.00
4	Sign, Type IIIA	8100404	211	Sft	\$15.00	\$3,165.00
5	Sign, Type IIIB	8100405	320	Sft	\$15.00	\$4,800.00
6			0		\$0.00	\$0.00
<b>SUBTOTAL PERMANENT TRAFFIC CONTROL DEVICES</b>						<b>\$18,073.00</b>

#### ENVIRONMENTAL

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Erosion Control, Silt Fence	2080036	6000	Ft	\$1.60	\$9,600.00
2	Erosion Control, Check Dam, Stone	2080012	250	Ft	\$17.50	\$4,375.00
3	Erosion Control, Sediment Trap	2080034	12	Ea	\$150.00	\$1,800.00
4	Ero Con, Maint, Sediment Removal	2080026	15	Cyd	\$20.00	\$300.00
			0		\$0.00	\$0.00
<b>SUBTOTAL ENVIRONMENTAL</b>						<b>\$16,075.00</b>

#### MISCELLANEOUS

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Mobilization, Max		1	LS	\$523,000.00	\$523,000.00
2	Contractor Staking, Road Only		1	LS	\$102,400.00	\$102,400.00
3	Contractor Staking Errors and Extras, 1 Person		43	Hr	\$90.00	\$3,870.00
4	Contractor Staking Errors and Extras, 2 Person		18	Hr	\$120.00	\$2,160.00
5	Contractor Staking, Errors and Extras, 3 Person		26	Hr	\$150.00	\$3,900.00
6	Topsoil Surface, Furn, 4 inch	8160062	36,776	Syd	\$2.00	\$73,551.11
7	Topsoil Surface, Salv, 4 inch	8160077	18,113	Syd	\$0.80	\$14,490.67
8	Seeding, Mixture, THV	8160040	2,500	Lb	\$2.80	\$7,000.00
9	Fertilizer, Chemical Nutrient, CL A	8160020	2,590	Lb	\$1.50	\$3,885.00
10	Mulch	8160025	33,489	Syd	\$0.20	\$6,697.78
11	Mulch Anchoring	8160026	33,489	Syd	\$0.11	\$3,683.78
12	Mulch Blanket	8160027	10,700	Syd	\$1.00	\$10,700.00
13	Mulch Blanket, High Velocity	8160028	10,700	Syd	\$1.50	\$16,050.00
14	Ditch, Plain Cobble	8140005	1,200	Syd	\$32.00	\$38,400.00
15	Riprap, Plain	8130010	400	Syd	\$25.00	\$10,000.00
	Riprap, Special		27,407	Ton	\$32.00	\$877,037.04
16	Protect Corners		12	Ea	\$200.00	\$2,400.00

17	Monument Box		12	Ea	\$300.00	\$3,600.00
18	Monument Preservation		12	Ea	\$350.00	\$4,200.00
<b>SUBTOTAL MISCELLANEOUS</b>						<b>\$1,707,025.37</b>

#### ROW & Utilities

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Wetland Mitigation		14.04959	Acres	\$40,000.00	\$561,983.47
2	Water Main, DI, 8 inch, Tr Det F	8230155	3000	Ft	\$70.00	\$210,000.00
3	Water Main, DI, 6 inch, Tr Det F	8230150	120	Ft	\$70.00	\$8,400.00
4	Gate Valve and Box, 8 inch	8230052	6	Ea	\$1,600.00	\$9,600.00
5	Fire Hydrant	8230040	6	Ea	\$4,100.00	\$24,600.00
6				LS	\$0.00	\$0.00
<b>SUBTOTAL ROW</b>						<b>\$814,583.47</b>

				<b>TOTAL PROJECT</b>	<b>\$5,739,136.83</b>
Current Year	2019	4%	Projected Cost after Inflation		<b>\$6,207,450.39</b>
Construction Year	2021	15%	CONTINGENCY		<b>\$931,117.56</b>
				<b>ROW</b>	<b>\$30,000.00</b>

		<b>Const Total</b>	<b>\$7,168,567.95</b>
9.00%	PE		\$645,171.12
7.00%	CE		\$501,799.76
93.73%	Ind Proj Costs		\$1,075,055.80

**Total \$9,390,594.62**

## **Option 5 Detail Summary**

### **Description**

- The total length of this option is 1.913 miles which would include reconstruction and realignment. The realignment would begin 4300 feet west and end 200 feet west of South Boundary Road. The realignment would begin again 700 feet east and end 6400 feet east of South Boundary Road. About 900 feet of existing road alignment would be preserved near the Union River and South Boundary Road. This option would require the need for riprap along 1.6 miles of roadway adjacent to the Lake Superior shoreline. Typical cross section of this option and detailed cost estimate is included. This option will move the road 6 to 10 feet to the south to provide for a clear zone between the highway and the riprap slope with less need to fill into Lake Superior. There will be no widening at the Union River Bridge.

### **Mainline Pavement:**

- The pavement design was estimated based on a previous project (Job Numbers 80207A, 80211A, & 83746A) done on County Road 107 in 2006. This project pavement design included 3.5 inches HMA over a crush and shaped base. The proposed pavement design will be 3.5 inches of HMA, 8-inch aggregate base, and 18-inch subbase.

### **Soils:**

- The USDA Natural Resources Conservation Service Web Soil Survey was referenced for soil data. Based on the survey there are some areas of somewhat poorly drained soils with a high ground water table. In these areas subgrade undercutting was estimated. Where the proposed alignment crosses wetland adjacent to a watercourse some peat excavation and swamp backfill was also estimated.

### **Geometrics:**

- Lane and shoulder widths were based on a previous project (JN 80207A, 80211A, 83746A) done on County Road 107 in 2006. Lane widths are 10 feet to match existing lane widths. Paved shoulders are 6 feet wide to match existing paved shoulder widths. This location used enhancement funding in 2006 to construct 6-foot-wide shoulders for non-motorized use.
- The horizontal alignment was developed to meet a 55-mph design speed.

### **Drainage**

- Ditches were estimated at a 4-foot depth and 4-foot width.
- The project will require the extension of several culverts ranging in size between 18 inches and 36 inches. It was assumed that the box culverts would likely require full replacement instead of extension to meet possible hydraulic capacity requirements. The project will also require two 12 foot by 7 foot box culverts and one 6 foot by 6 foot box culvert based on the existing drainage.



**Bridge**

- With this alignment option a new bridge would not be required at the Union River.
- Two Hundred Fifty feet of sheet piling was estimated east and west of the Union River Bridge for additional armoring of this structure. Based on soil borings from the old bridge plans, bedrock is approximately 30 feet deep near this structure.

**Environmental:**

- Because of the shorter distance from Lake Superior this option will likely require USACE permits. The riprap work will require permits from both the MDEQ and USACE. The USACE would possibly allow some filling into Lake Superior to preserve the integrity of the road. USACE will require documentation of events that caused erosion in order to issue a permit for filling into the lake. Some excavation would be allowed in Lake Superior. As part of the permit process the fill and excavation above and below the ordinary high-water mark will need to be estimated.
- May need an NPDES Notice of Coverage.
- USACE and MDEQ permits will be required for stream crossings and wetland impacts.
- Wetland mitigation will likely require a 4 to 1 ratio based on USACE jurisdiction. This option will likely have significant wetland impacts. Wetland mitigation costs were included in the estimate.
- Wetland areas could not be identified due to the presence of snow cover. The wetland impacts are a rough estimate with areas estimated at the stream/river crossings.

**Real Estate**

- There would likely be some minor right of way impacts with this option.
- Property acquisition from the park was assumed to be zero based on mutual benefit.
- Approximately 1.0 acres of property acquisition was estimated.

**Maintaining Traffic:**

- Part width construction could be done with traffic maintained using flag control.

**Permanent Traffic Control Devices:**

- Permanent signing and pavement marking quantities were included in the estimate.

**Snowmobile Trail Impacts:**

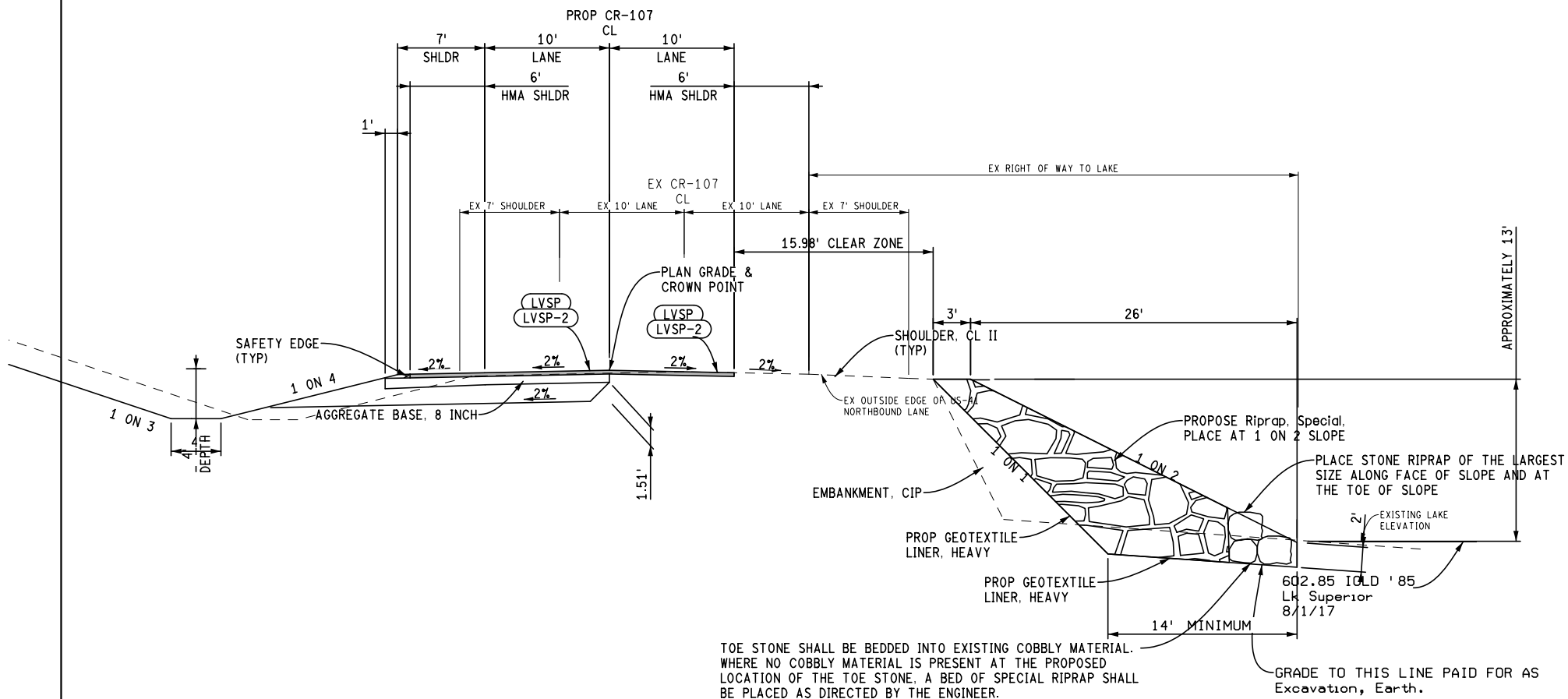
- About 6600 feet of snowmobile trail relocation was included in the estimate. Existing snowmobile trail bridges could be relocated at minimal cost.

**Utility Impacts:**

- About 1500 feet of watermain relocation was included in the estimate.
- There could be some private utility impacts to telephone and electric. It was assumed that these utilities would require relocation at their cost.

**Engineering Costs:**

- Engineering costs will be significantly higher than option 1 and 2 but less than option 3 and 4 due to the following needs:
  - Locating and designing wetland mitigation site
  - Extensive soil investigation due to the possibility of poor soils
  - Multiple hydraulic analyses for stream crossings
  - Structural and foundation designs for three box culverts.
  - Minor roadway realignment



TYPICAL CROSS SECTION  
FOR CONSTRUCTING RIPRAP-SPECIAL  
AT A 1 ON 2 SLOPE

FILE:	NO SCALE	DATE: 05/24/17	CS:	COUNTY ROAD 407	DRAWING	SHEET
		DESIGN UNIT: ISHPMEMING	JN:	TYPICAL CROSS SECTION	TYP	SECT 1
		TSC: ISHPMEMING		REALIGNMENT		

# STANDARD SCOPING WORKSHEET

## County Road 107 Realignment Estimate Option 5

DATE: 2/2/2018  
 DATE REVISED: 7/5/2019  
 BY: Ken Filpus  
 CHECKED BY:

ROUTE: County Road 107  
 CONTROL SECT:  
 PR Number:  
 JOB NUMBER:

	STATION	MP	
P.O.B.	37+00.00	0	
P.O.E.	79+00.00	0.000	
LENGTH OF JOB	4200 Feet	0.000	Miles

	STATION	MP	
P.O.B.	88+00.00	0	
P.O.E.	144+00.00	0.000	
LENGTH OF JOB	5600 Feet	0.000	Miles
Total Length	9800 Feet		

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Guardrail, Type B	8070000	2000.00	Ft	\$16.00	\$32,000.00
2	Guardrail Approach Terminal, Type 1B	8070040	4.00	Ea	\$1,700.00	\$6,800.00
3	Guardrail Reflector	8070080	40.00	Ea	\$5.00	\$200.00
<b>SUBTOTAL SAFETY</b>						<b>\$39,000.00</b>

## MAINLINE PAVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing	2010001	4.70	Acre	\$5,800.00	\$27,260.00
2	Embankment, CIP	2050010	19,626	Cyd	\$3.50	\$68,692.04
3	Excavation, Earth	2050016	39,353	Cyd	\$6.70	\$263,662.37
4	Excavation, Peat	2050017	3,215	Cyd	\$7.50	\$24,111.11
5	Backfill, Swamp	2050001	4,163	Cyd	\$10.00	\$41,629.63
6	Subgrade Undercutting, Type II	2050041	2,533	Cyd	\$13.00	\$32,933.33
7	Subbase, CIP	3010002	13,467	Cyd	\$9.00	\$121,200.00
8	Aggregate Base, 8 inch	3020020	20,200	Syd	\$6.50	\$131,300.00
9	Shoulder, CI II	3070121	510	Ton	\$18.00	\$9,180.00
10	Approach, CI I	3070001	117	Ton	\$20.00	\$2,346.67
11	Approach, CI II	3070021	100	Ton	\$20.00	\$2,000.00
12	HMA, LVSP	5010703	5,840	Ton	\$66.50	\$388,360.00
13	HMA Approach	5010061	59	Ton	\$120.00	\$7,040.00
14	Cold Milling HMA Surface		11,222	Syd	\$2.00	\$22,444.44
14	Curb and Gutter, Conc, Det B2	8020016	150	Ft	\$24.00	\$3,600.00
<b>SUBTOTAL MAINLINE PVT</b>						<b>\$1,145,759.59</b>

## NONMOTORIZED

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
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1	Clearing for Snowmobile Trail		4.242424	Acre	\$5,800.00	\$24,606.06
2	Excavation for Snowmobile Trail		6844.444	Cyd	\$6.70	\$45,857.78
3	Embankment for Snowmobile Trail		5377.778	Cyd	\$3.50	\$18,822.22
4	Shoulder, CI II for Snowmobile Trail		3872	Ton	\$18.00	\$69,696.00
5					\$0.00	\$0.00

**SUBTOTAL NONMOTORIZED      \$158,982.06**

#### GEOMETRIC IMPROVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL GEOMETRIC IMPROVEMENT      \$0.00**

#### VERTICAL/HORIZONTAL ALIGNMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL VERT/HORIZ ALIGNMENT      \$0.00**

#### BRIDGE REPAIR, WIDENING

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Steel Sheet Piling Permanent	7040001	20000	Sft	\$25.00	\$500,000.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL BRIDGE REPAIR, WIDENING      \$500,000.00**

#### DRAINAGE

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Culv, CI A, 36 inch	4010136	48	Ft	\$95.00	\$4,560.00
2	Culv, Slp End Sect, 1 on 4, 36 inch, Transv	4010930	2	Ea	\$1,700.00	\$3,400.00
3	Culv, CI A, 24 inch	4010134	192	Ft	\$65.00	\$12,480.00
4	Culv, Slp End Sect, 1 on 4, 24 inch, Transv	4010924	8	Ea	\$540.00	\$4,320.00
5	Culv, CI A, 18 inch	4010133	48	Ft	\$53.00	\$2,544.00
6	Culv, Slp End Sect, 1 on 4, 18 inch, Transv	4010012	2	Ea	\$407.00	\$814.00
7	Culv, Precast Conc Box, 12 foot by 7 foot	4060148	144	Ft	\$1,650.00	\$237,600.00
8	Culv Wingwalls for 12 foot by 7 foot box culv		4	Ea	\$30,000.00	\$120,000.00
9	Culv, Precast Conc Box, 6 foot by 6 foot	4060108	72	Ft	\$1,450.00	\$104,400.00
10	Culv Wingwalls for 6 foot by 6 foot box culv		2	Ea	\$25,000.00	\$50,000.00
11	Dr Marker Post	4011109	12	Ea	\$20.00	\$240.00
12	Video Taping Sewer and Culv Pipe	4021275	288	Ft	\$2.00	\$576.00

**SUBTOTAL DRAINAGE      \$540,934.00**

#### JOINT REPAIR/PAVEMENT PATCHING

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL JOINT REPAIR/PAVEMENT PATCHING      \$0.00**

#### MAINTAINING TRAFFIC

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Traffic Regulator Control		1	LS	\$28,900.00	\$28,900.00
2	Minor Traf Devices		1	LS	\$115,800.00	\$115,800.00
3	Sign, Type B, Prismatic, Temp, Furn		1200	Sft	\$4.25	\$5,100.00
4	Sign, Type B, Prismatic, Temp, Oper		1200	Sft	\$0.75	\$900.00
5	Plastic Drum, High Intensity, Furn		160	Ea	\$25.00	\$4,000.00
6	Plastic Drum, High Intensity, Oper		160	Ea	\$5.00	\$800.00
7	Lighted Arrow, Type C, Furn		4	Ea	\$385.00	\$1,540.00
8	Lighted Arrow, Type C, Oper		4	Ea	\$75.00	\$300.00
9	Barricade, Type III, Lighted, Furn		20	Ea	\$125.00	\$2,500.00
10	Barricade, Type III, Lighted, Oper		20	Ea	\$10.00	\$200.00
11	Dust Palliative, Applied	8120100	75	Ton	\$220.00	\$16,500.00
12	Pavt Mrkg, Type NR, Paint, 4 inch, Yellow	8120231	1400	Ft	\$0.64	\$896.00
13	Pavt Mrkg, Type NR, Tape, 4 inch, Yellow	8120230	5800	Ft	\$0.50	\$2,900.00
<b>SUBTOTAL MAINTAINING TRAFFIC</b>						<b>\$180,336.00</b>

#### PERMANENT TRAFFIC CONTROL DEVICES

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Pavt Mrkg, Waterborne, 4 inch, Yellow	8110232	21,400	Ft	\$0.11	\$2,354.00
2	Pavt Mrkg, Waterborne, 4 inch, White	8110231	21,400	Ft	\$0.11	\$2,354.00
3	Post, Steel, 3 lb	8100371	1,350	Ft	\$4.00	\$5,400.00
4	Sign, Type IIIA	8100404	211	Sft	\$15.00	\$3,165.00
5	Sign, Type IIIB	8100405	320	Sft	\$15.00	\$4,800.00
6			0		\$0.00	\$0.00
<b>SUBTOTAL PERMANENT TRAFFIC CONTROL DEVICES</b>						<b>\$18,073.00</b>

#### ENVIRONMENTAL

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Erosion Control, Silt Fence	2080036	6000	Ft	\$1.60	\$9,600.00
2	Erosion Control, Check Dam, Stone	2080012	250	Ft	\$17.50	\$4,375.00
3	Erosion Control, Sediment Trap	2080034	12	Ea	\$150.00	\$1,800.00
4	Ero Con, Maint, Sediment Removal	2080026	15	Cyd	\$20.00	\$300.00
			0		\$0.00	\$0.00
<b>SUBTOTAL ENVIRONMENTAL</b>						<b>\$16,075.00</b>

#### MISCELLANEOUS

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Mobilization, Max		1	LS	\$607,000.00	\$607,000.00
2	Contractor Staking, Road Only		1	LS	\$118,700.00	\$118,700.00
3	Contractor Staking Errors and Extras, 1 Person		50	Hr	\$90.00	\$4,500.00
4	Contractor Staking Errors and Extras, 2 Person		20	Hr	\$120.00	\$2,400.00
5	Contractor Staking, Errors and Extras, 3 Person		30	Hr	\$150.00	\$4,500.00
6	Topsoil Surface, Furn, 4 inch	8160062	30,076	Syd	\$2.00	\$60,151.11
7	Topsoil Surface, Salv, 4 inch	8160077	14,813	Syd	\$0.80	\$11,850.67
8	Seeding, Mixture, THV	8160040	2,050	Lb	\$2.80	\$5,740.00
9	Fertilizer, Chemical Nutrient, CL A	8160020	2,120	Lb	\$1.50	\$3,180.00
10	Mulch	8160025	44,889	Syd	\$0.20	\$8,977.78
11	Mulch Anchoring	8160026	44,889	Syd	\$0.11	\$4,937.78
12	Mulch Blanket	8160027	0	Syd	\$1.00	\$0.00
13	Mulch Blanket, High Velocity	8160028	0	Syd	\$1.50	\$0.00
14	Ditch, Plain Cobble	8140005	1,200	Syd	\$32.00	\$38,400.00
15	Riprap, Plain	8130010	400	Syd	\$25.00	\$10,000.00
16	Riprap, Special		92,615	Ton	\$32.00	\$2,963,683.56
17	Protect Corners		12	Ea	\$200.00	\$2,400.00
18	Monument Box		12	Ea	\$300.00	\$3,600.00

19	Monument Preservation		12	Ea	\$350.00	\$4,200.00
<b>SUBTOTAL MISCELLANEOUS</b>						<b>\$3,854,220.89</b>

#### ROW & Utilities

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Wetland Mitigation		1.983471	Acres	\$40,000.00	\$79,338.84
2	Water Main, DI, 8 inch, Tr Det F	8230155	1500	Ft	\$70.00	\$105,000.00
3	Water Main, DI, 6 inch, Tr Det F	8230150	60	Ft	\$70.00	\$4,200.00
4	Gate Valve and Box, 8 inch	8230052	3	Ea	\$1,600.00	\$4,800.00
5	Fire Hydrant	8230040	3	Ea	\$4,100.00	\$12,300.00
6				LS	\$0.00	\$0.00

**SUBTOTAL ROW \$205,638.84**

				<b>TOTAL PROJECT</b>	<b>\$6,659,019.39</b>
Current Year	2019	4%	Projected Cost after Inflation		<b>\$7,202,395.37</b>
Construction Year	2021	15%	CONTINGENCY		<b>\$1,080,359.31</b>
				<b>ROW</b>	<b>\$30,000.00</b>

	<b>Const Total</b>	<b>\$8,312,754.67</b>
7.00%	PE	\$581,892.83
7.00%	CE	\$581,892.83
93.73%	Ind Proj Costs	\$1,090,816.29

**Total \$10,567,356.62**



**Option 6 Detail Summary****Description**

- The total length of Option 6 is 2.00 miles which would include reconstruction and realignment west of South Boundary Road. The realignment would begin 4900 feet west of South Boundary Road and end 300 feet east of South Boundary Road. This option would require the need for 5600 feet of riprap to be placed along the shoreline. The riprap would be placed along the shoreline beginning 100 feet west of South Boundary Road and ending 5500 feet east of South Boundary Road. The realignment plan and detailed cost estimate are attached.

**Mainline Pavement:**

- The pavement design was estimated based on a previous project (Job Numbers 80207A, 80211A, & 83746A) done on County Road 107 in 2006. This project pavement design included 3.5 inches HMA over a crush and shaped base. The proposed pavement design will be 3.5 inches of HMA, 8-inch aggregate base, and 18-inch subbase.

**Soils:**

- The USDA Natural Resources Conservation Service Web Soil Survey was referenced for soil data. Based on the survey there are some areas of somewhat poorly drained soils with a high ground water table. In these areas subgrade undercutting was estimate along with deeper ditches. Where the proposed alignment crosses wetland adjacent to a watercourse some peat excavation and swamp backfill was also estimated.

**Geometrics:**

- Lane and shoulder widths were based on a previous project (JN 80207A, 80211A, 83746A) done on County Road 107 in 2006. Lane widths were increased from 10 feet to 11 feet to meet reconstruction guidelines. Paved shoulders are 6 feet wide to match existing paved shoulder widths. This location used enhancement funding in 2006 to construct 6-foot-wide paved shoulders for non-motorized use.
- The horizontal alignment was developed to meet a 55-mph design speed.

**Drainage**

- Ditches were estimated at a 4-foot depth and 4-foot width except the depth was increased to 6 feet where there is a high groundwater table.
- The project will require the placement of several culverts ranging in size between 18 inches and 36 inches. The project will also require one 6 foot by 6 foot box culvert based on the existing drainage.

**Bridge**

- With this alignment option a new bridge would not be required at the Union River.
- Two Hundred Fifty feet of sheet piling was estimated east and west of the Union River Bridge for additional armoring of this structure. Based on soil borings from the old bridge plans, bedrock is approximately 30 feet deep near this structure.

**Environmental:**

- The riprap work will require permits from both the MDEQ and USACE. The USACE would possibly allow some filling into Lake Superior to preserve the integrity of the road. USACE will require documentation of events that caused erosion in order to issue a permit for filling into the lake. Some excavation would be allowed in Lake Superior. As part of the permit process the fill and excavation above and below the ordinary high-water mark will need to be estimated.
- May need an NPDES Notice of Coverage.
- Turbidity curtain would not be required for this work. The area receives regular disturbances of the soils due to wave action.
- MDEQ permits will be required for stream crossings and wetland and floodplain impacts.
- Wetland mitigation will likely require a 2 to 1 ratio. A 10 to 1 ratio is required to mitigate through the purchasing of wetland for preservation. This option will likely have wetland impacts. Wetland mitigation costs were included in the estimate.
- Wetland areas could not be identified due to the presence of snow cover. The wetland impacts are a rough estimate with areas estimated at the stream/river crossings.

**Real Estate**

- There would be right of way impacts with this option.
- The alignment was developed mainly to be relocated onto state park property. Property acquisition from the park was assumed to be zero based on mutual benefit.

**Maintaining Traffic:**

- Part width construction could be done with traffic maintained using flag control at the tie in points. Most of the project could be constructed with minimal traffic control.

**Permanent Traffic Control Devices:**

- Permanent signing and pavement marking quantities were included in the estimate.

**Utility Impacts:**

- About 600 feet of watermain relocation was included in the estimate for minor relocations near the tie in points. The existing watermain is located a minimum 50 feet south of the CR 107 centerline. Due to this distance full relocation of the watermain was not included in the estimate. The watermain will likely require replacement before it is impacted by erosion.
- There could be some private utility impacts to telephone and electric. It was assumed that these utilities would require relocation at their cost.

**Snowmobile Trail Impacts:**

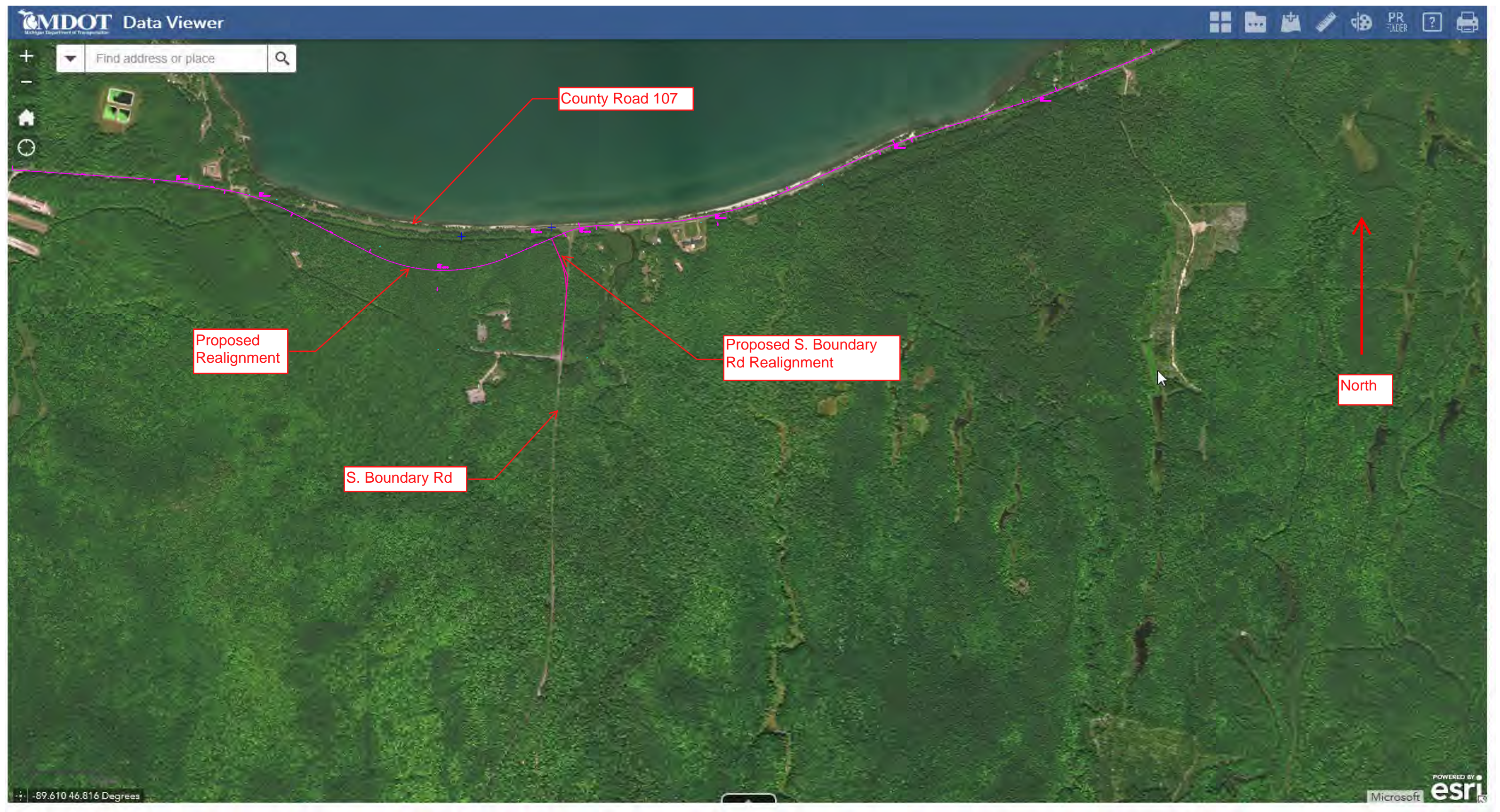
- About 800 feet of snowmobile trail relocation was included in the estimate. Existing snowmobile trail bridges could be relocated at minimal cost.

**Engineering Costs:**

- Engineering costs will be significantly higher for this option due to the following needs:
  - Locating and designing wetland mitigation site
  - Extensive soil investigation due to the possibility of poor soils
  - Multiple hydraulic analyses for stream crossings
  - Structural and foundation designs for a box culvert.
  - Major roadway realignment

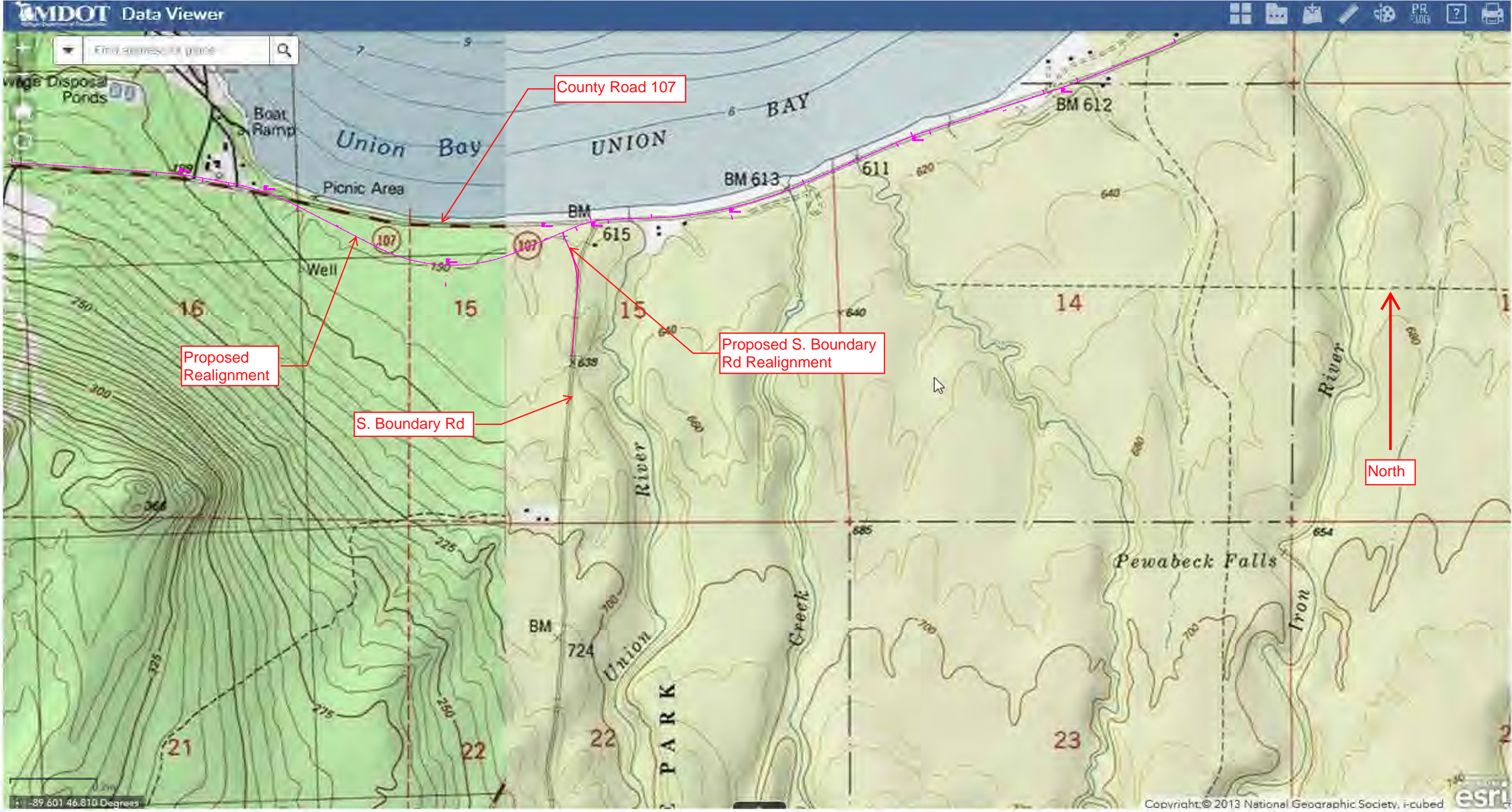


County Road 107 Realignment Option 6





County Road 107 Realignment Option 6





# STANDARD SCOPING WORKSHEET

## County Road 107 Realignment Estimate Option 6

DATE: 7/5/2019  
 DATE REVISED:  
 BY: Ken Filpus  
 CHECKED BY:  
 ROUTE: County Road 107  
 CONTROL SECT:  
 PR Number:  
 JOB NUMBER:

P.O.B. STATION 37+00.00 MP 0  
 P.O.E. 157+00.00 0.000  
 LENGTH OF JOB 12000 Feet 0.000 Miles

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Guardrail, Type B	8070000	2000.00	Ft	\$16.00	\$32,000.00
2	Guardrail Approach Terminal, Type 1B	8070040	4.00	Ea	\$1,700.00	\$6,800.00
3	Guardrail Reflector	8070080	40.00	Ea	\$5.00	\$200.00
<b>SUBTOTAL SAFETY</b>						<b>\$39,000.00</b>

## MAINLINE PAVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing	2010001	13.90	Acre	\$5,800.00	\$80,620.00
2	Embankment, CIP	2050010	26,585	Cyd	\$3.50	\$93,048.15
3	Excavation, Earth	2050016	27,265	Cyd	\$6.70	\$182,674.26
4	Excavation, Peat	2050017	8,019	Cyd	\$7.50	\$60,138.89
5	Backfill, Swamp	2050001	10,407	Cyd	\$10.00	\$104,074.07
6	Subgrade Undercutting, Type II	2050041	8,550	Cyd	\$13.00	\$111,150.00
7	Subbase, CIP	3010002	17,056	Cyd	\$9.00	\$153,500.00
8	Aggregate Base, 8 inch	3020020	20,778	Syd	\$6.50	\$135,055.56
9	Shoulder, CI II	3070121	600	Ton	\$18.00	\$10,800.00
10	Approach, CI I	3070001	1012	Ton	\$20.00	\$20,240.00
11	Approach, CI II	3070021	200	Ton	\$20.00	\$4,000.00
12	HMA, LVSP	5010703	4,530	Ton	\$66.50	\$301,245.00
13	HMA Approach	5010061	389	Ton	\$120.00	\$46,640.00
14	HMA Surface, Rem	5010005	15,867	Syd	\$2.25	\$35,700.00
15	Obliterate Old Road	2070001	42	Sta	\$400.00	\$16,800.00
16	Curb and Gutter, Conc, Det B2	8020016	300	Ft	\$24.00	\$7,200.00
<b>SUBTOTAL MAINLINE PVT</b>						<b>\$1,362,885.93</b>

## NONMOTORIZED

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing for Snowmobile Trail		0.514233	Acre	\$5,800.00	\$2,982.55
2	Excavation for Snowmobile Trail		829.6296	Cyd	\$6.70	\$5,558.52
3	Embankment for Snowmobile Trail		651.8519	Cyd	\$3.50	\$2,281.48
4	Shoulder, CI II for Snowmobile Trail		469.3333	Ton	\$18.00	\$8,448.00

**SUBTOTAL NONMOTORIZED      \$19,270.55**

**GEOMETRIC IMPROVEMENT**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL GEOMETRIC IMPROVEMENT</b>						<b>\$0.00</b>

**VERTICAL/HORIZONTAL ALIGNMENT**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL VERT/HORIZ ALIGNMENT</b>						<b>\$0.00</b>

**BRIDGE REPAIR, WIDENING**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Steel Sheet Piling Permanent	7040001	20000	Sft	\$25.00	\$500,000.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL BRIDGE REPAIR, WIDENING</b>						<b>\$500,000.00</b>

**DRAINAGE**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Culv, CI A, 36 inch	4010136	72	Ft	\$95.00	\$6,840.00
2	Culv, Slp End Sect, 1 on 4, 36 inch, Transv	4010930	2	Ea	\$1,700.00	\$3,400.00
3	Culv, CI A, 24 inch	4010134	144	Ft	\$65.00	\$9,360.00
4	Culv, Slp End Sect, 1 on 4, 24 inch, Transv	4010924	4	Ea	\$540.00	\$2,160.00
5	Culv, CI A, 18 inch	4010133	72	Ft	\$53.00	\$3,816.00
6	Culv, Slp End Sect, 1 on 4, 18 inch, Transv	4010012	2	Ea	\$407.00	\$814.00
7	Culv, Precast Conc Box, 12 foot by 7 foot	4060148	0	Ft	\$1,650.00	\$0.00
8	Culv Wingwalls for 12 foot by 7 foot box culv		0	Ea	\$30,000.00	\$0.00
9	Culv, Precast Conc Box, 6 foot by 6 foot	4060108	72	Ft	\$1,450.00	\$104,400.00
10	Culv Wingwalls for 6 foot by 6 foot box culv		2	Ea	\$25,000.00	\$50,000.00
11	Dr Marker Post	4011109	8	Ea	\$20.00	\$160.00
12	Video Taping Sewer and Culv Pipe	4021275	288	Ft	\$2.00	\$576.00
<b>SUBTOTAL DRAINAGE</b>						<b>\$181,526.00</b>

**JOINT REPAIR/PAVEMENT PATCHING**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00
<b>SUBTOTAL JOINT REPAIR/PAVEMENT PATCHING</b>						<b>\$0.00</b>

**MAINTAINING TRAFFIC**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Traffic Regulator Control		1	LS	\$22,300.00	\$22,300.00
2	Minor Traf Devices		1	LS	\$89,100.00	\$89,100.00
3	Sign, Type B, Prismatic, Temp, Furn		1200	Sft	\$4.25	\$5,100.00
4	Sign, Type B, Prismatic, Temp, Oper		1200	Sft	\$0.75	\$900.00



5	Plastic Drum, High Intensity, Furn		180	Ea	\$25.00	\$4,500.00
6	Plastic Drum, High Intensity, Oper		180	Ea	\$5.00	\$900.00
7	Lighted Arrow, Type C, Furn		4	Ea	\$385.00	\$1,540.00
8	Lighted Arrow, Type C, Oper		4	Ea	\$75.00	\$300.00
9	Barricade, Type III, Lighted, Furn		20	Ea	\$125.00	\$2,500.00
10	Barricade, Type III, Lighted, Oper		20	Ea	\$10.00	\$200.00
11	Dust Palliative, Applied	8120100	75	Ton	\$220.00	\$16,500.00
12	Pavt Mrkg, Type NR, Paint, 4 inch, Yellow	8120231	1400	Ft	\$0.64	\$896.00
13	Pavt Mrkg, Type NR, Tape, 4 inch, Yellow	8120230	5800	Ft	\$0.50	\$2,900.00
<b>SUBTOTAL MAINTAINING TRAFFIC</b>						<b>\$147,636.00</b>

#### PERMANENT TRAFFIC CONTROL DEVICES

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Pavt Mrkg, Waterborne, 4 inch, Yellow	8110232	10,900	Ft	\$0.11	\$1,199.00
2	Pavt Mrkg, Waterborne, 4 inch, White	8110231	10,900	Ft	\$0.11	\$1,199.00
3	Post, Steel, 3 lb	8100371	1,350	Ft	\$4.00	\$5,400.00
4	Sign, Type IIIA	8100404	211	Sft	\$15.00	\$3,165.00
5	Sign, Type IIIB	8100405	320	Sft	\$15.00	\$4,800.00
6			0		\$0.00	\$0.00
<b>SUBTOTAL PERMANENT TRAFFIC CONTROL DEVICES</b>						<b>\$15,763.00</b>

#### ENVIRONMENTAL

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Erosion Control, Silt Fence	2080036	6000	Ft	\$1.60	\$9,600.00
2	Erosion Control, Check Dam, Stone	2080012	250	Ft	\$17.50	\$4,375.00
3	Erosion Control, Sediment Trap	2080034	12	Ea	\$150.00	\$1,800.00
4	Ero Con, Maint, Sediment Removal	2080026	15	Cyd	\$20.00	\$300.00
			0		\$0.00	\$0.00
<b>SUBTOTAL ENVIRONMENTAL</b>						<b>\$16,075.00</b>

#### MISCELLANEOUS

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Mobilization, Max		1	LS	\$467,000.00	\$467,000.00
2	Contractor Staking, Road Only		1	LS	\$91,300.00	\$91,300.00
3	Contractor Staking Errors and Extras, 1 Person		39	Hr	\$90.00	\$3,510.00
4	Contractor Staking Errors and Extras, 2 Person		16	Hr	\$120.00	\$1,920.00
5	Contractor Staking, Errors and Extras, 3 Person		23	Hr	\$150.00	\$3,450.00
6	Topsoil Surface, Furn, 4 inch	8160062	26,543	Syd	\$2.00	\$53,086.33
7	Topsoil Surface, Salv, 4 inch	8160077	13,074	Syd	\$0.80	\$10,458.80
8	Seeding, Mixture, THV	8160040	1,810	Lb	\$2.80	\$5,068.00
9	Fertilizer, Chemical Nutrient, CL A	8160020	1,870	Lb	\$1.50	\$2,805.00
10	Mulch	8160025	18,217	Syd	\$0.20	\$3,643.33
11	Mulch Anchoring	8160026	18,217	Syd	\$0.11	\$2,003.83
12	Mulch Blanket	8160027	10,700	Syd	\$1.00	\$10,700.00
13	Mulch Blanket, High Velocity	8160028	10,700	Syd	\$1.50	\$16,050.00
14	Ditch, Plain Cobble	8140005	600	Syd	\$32.00	\$19,200.00
15	Riprap, Plain	8130010	200	Syd	\$25.00	\$5,000.00
16	Riprap, Special		61,235	Ton	\$32.00	\$1,959,518.81
17	Protect Corners		12	Ea	\$200.00	\$2,400.00
18	Monument Box		12	Ea	\$300.00	\$3,600.00
19	Monument Preservation		12	Ea	\$350.00	\$4,200.00
<b>SUBTOTAL MISCELLANEOUS</b>						<b>\$2,664,914.11</b>

#### ROW & Utilities

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Wetland Mitigation		2.731864	Acres	\$40,000.00	\$109,274.56
2	Water Main, DI, 8 inch, Tr Det F	8230155	600	Ft	\$70.00	\$42,000.00
3	Water Main, DI, 6 inch, Tr Det F	8230150	60	Ft	\$70.00	\$4,200.00
4	Gate Valve and Box, 8 inch	8230052	3	Ea	\$1,600.00	\$4,800.00
5	Fire Hydrant	8230040	3	Ea	\$4,100.00	\$12,300.00
6				LS	\$0.00	\$0.00

**SUBTOTAL ROW**

**\$172,574.56**

			TOTAL PROJECT	<b>\$5,119,645.16</b>
Current Year	2019	4%	Projected Cost after Inflation	<b>\$5,537,408.20</b>
Construction Year	2021	15%	CONTINGENCY	<b>\$830,611.23</b>
			<b>ROW</b>	<b>\$30,000.00</b>

	<b>Const Total</b>	<b>\$6,398,019.43</b>
10.00%	PE	\$639,801.94
7.00%	CE	\$447,861.36
93.73%	Ind Proj Costs	\$1,019,466.81

**Total \$8,505,149.55**

**Option 7 Detail Summary****Description**

- The total length of Option 7 is 1.93 miles which would include reconstruction and realignment east of South Boundary Road. The realignment would begin 825 feet east of South Boundary Road and end 6425 feet east of South Boundary Road. This option would require the need for 5400 feet of riprap to be placed along the shoreline. The riprap would be placed along the shoreline beginning 3775 feet west of South Boundary Road and ending 1625 feet east of South Boundary Road. The realignment plan and detailed cost estimate are attached.

**Mainline Pavement:**

- The pavement design was estimated based on a previous project (Job Numbers 80207A, 80211A, & 83746A) done on County Road 107 in 2006. This project pavement design included 3.5 inches HMA over a crush and shaped base. The proposed pavement design will be 3.5 inches of HMA, 8-inch aggregate base, and 18-inch subbase.

**Soils:**

- The USDA Natural Resources Conservation Service Web Soil Survey was referenced for soil data. Based on the survey there are some areas of somewhat poorly drained soils with a high ground water table. In these areas subgrade undercutting was estimate along with deeper ditches. Where the proposed alignment crosses wetland adjacent to a watercourse some peat excavation and swamp backfill was also estimated.

**Geometrics:**

- Lane and shoulder widths were based on a previous project (JN 80207A, 80211A, 83746A) done on County Road 107 in 2006. Lane widths were increased from 10 feet to 11 feet to meet reconstruction guidelines. Paved shoulders are 6 feet wide to match existing paved shoulder widths. This location used enhancement funding in 2006 to construct 6-foot-wide paved shoulders for non-motorized use.
- The horizontal alignment was developed to meet a 55-mph design speed.

**Drainage**

- Ditches were estimated at a 4-foot depth and 4-foot width except the depth was increased to 6 feet where there is a high groundwater table.
- The project will require the placement of several culverts ranging in size between 18 inches and 36 inches. The project will also require two 12 foot by 7 foot box culverts based on the existing drainage.

**Bridge**

- With this alignment option a new bridge would not be required at the Union River.
- Two Hundred Fifty feet of sheet piling was estimated east and west of the Union River Bridge for additional armoring of this structure. Based on soil borings from the old bridge plans, bedrock is approximately 30 feet deep near this structure.

**Environmental:**

- The riprap work will require permits from both the MDEQ and USACE. The USACE would possibly allow some filling into Lake Superior to preserve the integrity of the road. USACE will require documentation of events that caused erosion in order to issue a permit for filling into the lake. Some excavation would be allowed in Lake Superior. As part of the permit process the fill and excavation above and below the ordinary high-water mark will need to be estimated.
- May need an NPDES Notice of Coverage.
- Turbidity curtain would not be required for this work. The area receives regular disturbances of the soils due to wave action.
- MDEQ permits will be required for stream crossings and wetland and floodplain impacts.
- Wetland mitigation will likely require a 2 to 1 ratio. A 10 to 1 ratio is required to mitigate through the purchasing of wetland for preservation. This option will likely have wetland impacts. Wetland mitigation costs were included in the estimate.
- Wetland areas could not be identified due to the presence of snow cover. The wetland impacts are a rough estimate with areas estimated at the stream/river crossings.

**Real Estate**

- There would be right of way impacts with this option.
- The alignment was developed mainly to be relocated onto state park property. Property acquisition from the park was assumed to be zero based on mutual benefit.
- There is a gas station that would likely be a total take with this option.
- There are a few privately owned parcels within the realignment area. Access to some parcels will be changed from the north side of the parcels to the south side of the parcels.

**Maintaining Traffic:**

- Part width construction could be done with traffic maintained using flag control at the tie in points. Most of the project could be constructed with minimal traffic control.

**Permanent Traffic Control Devices:**

- Permanent signing and pavement marking quantities were included in the estimate.

**Utility Impacts:**

- About 800 feet of watermain relocation was included in the estimate for minor relocations near the tie in points. The existing watermain is located a minimum 50 feet south of the CR 107 centerline. Due to this distance full relocation of the watermain was not included in the estimate. The watermain will likely require replacement before it is impacted by erosion.
- There could be some private utility impacts to telephone and electric. It was assumed that these utilities would require relocation at their cost.

**Snowmobile Trail Impacts:**

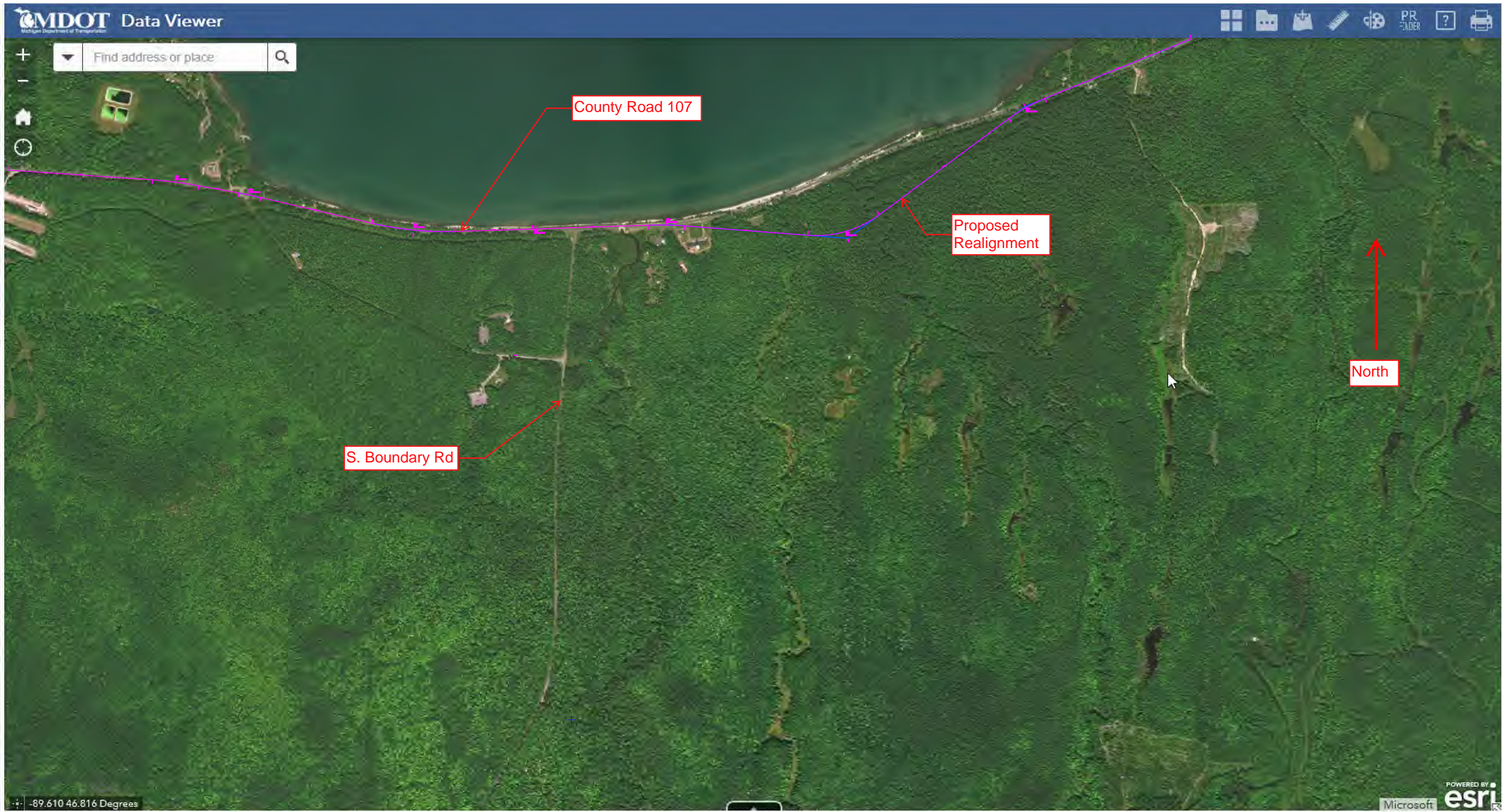
- About 1000 feet of snowmobile trail relocation was included in the estimate. Existing snowmobile trail bridges could be relocated at minimal cost.

**Engineering Costs:**

- Engineering costs will be significantly higher for this option due to the following needs:
  - Locating and designing wetland mitigation site
  - Extensive soil investigation due to the possibility of poor soils
  - Multiple hydraulic analyses for stream crossings
  - Structural and foundation designs for two box culverts.
  - Major roadway realignment

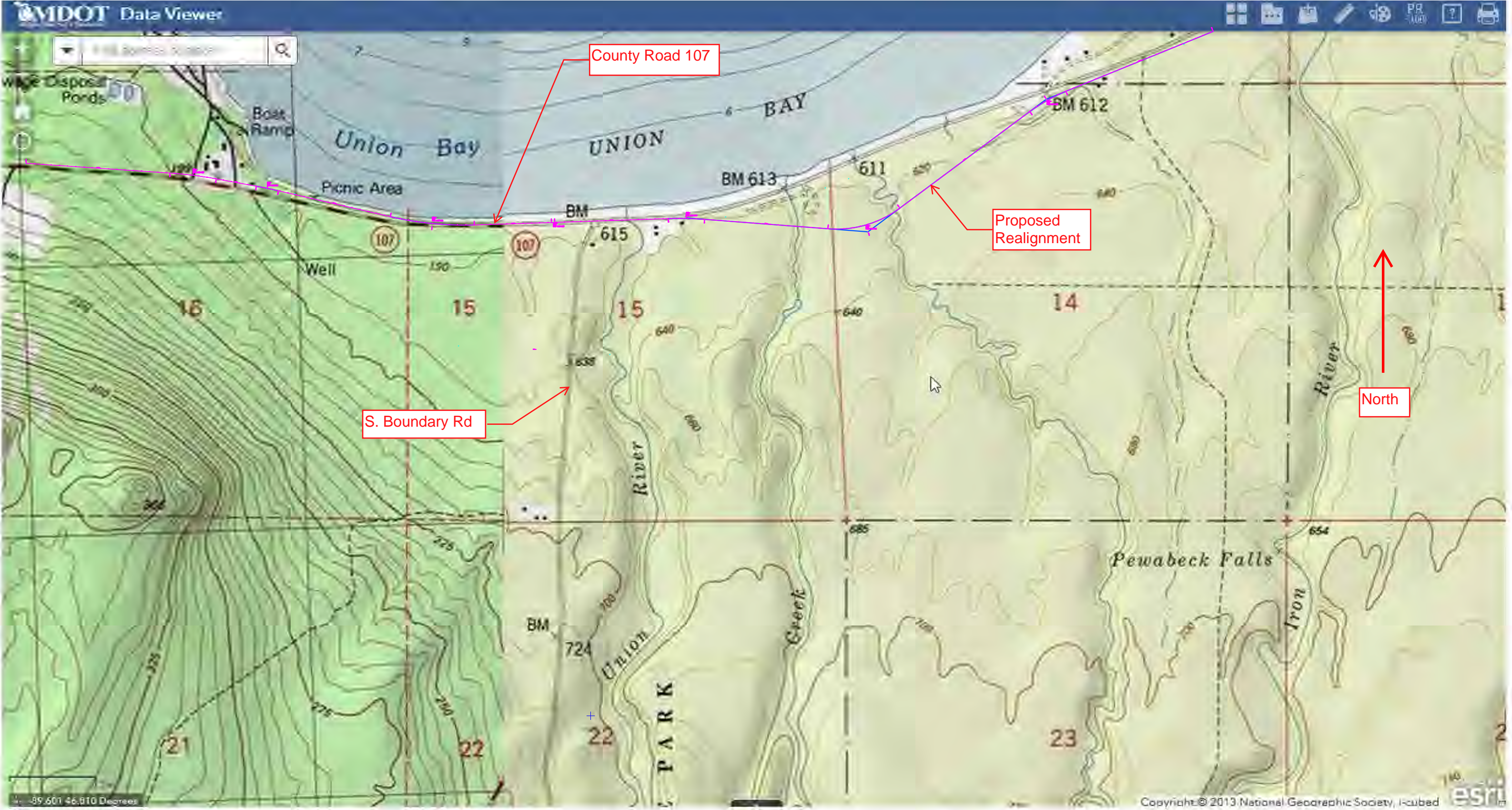


County Road 107 Realignment Option 7





County Road 107 Realignment Option 7





# STANDARD SCOPING WORKSHEET

## County Road 107 Realignment Estimate Option 7

DATE: 7/5/2019  
 DATE REVISED:  
 BY: Ken Filpus  
 CHECKED BY:  
 ROUTE: County Road 107  
 CONTROL SECT:  
 PR Number:  
 JOB NUMBER:

P.O.B. STATION 37+00.00 MP 0  
 P.O.E. 145+00.00 0.000  
 LENGTH OF JOB 10800 Feet 0.000 Miles

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Guardrail, Type B	8070000	2000.00	Ft	\$16.00	\$32,000.00
2	Guardrail Approach Terminal, Type 1B	8070040	4.00	Ea	\$1,700.00	\$6,800.00
3	Guardrail Reflector	8070080	40.00	Ea	\$5.00	\$200.00
<b>SUBTOTAL SAFETY</b>						<b>\$39,000.00</b>

## MAINLINE PAVEMENT

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing	2010001	10.60	Acre	\$5,800.00	\$61,480.00
2	Embankment, CIP	2050010	29,578	Cyd	\$3.50	\$103,522.22
3	Excavation, Earth	2050016	26,359	Cyd	\$6.70	\$176,607.04
4	Excavation, Peat	2050017	11,226	Cyd	\$7.50	\$84,194.44
5	Backfill, Swamp	2050001	14,570	Cyd	\$10.00	\$145,703.70
6	Subgrade Undercutting, Type II	2050041	9,500	Cyd	\$13.00	\$123,500.00
7	Subbase, CIP	3010002	16,707	Cyd	\$9.00	\$150,366.67
8	Aggregate Base, 8 inch	3020020	23,578	Syd	\$6.50	\$153,255.56
9	Shoulder, CI II	3070121	640	Ton	\$18.00	\$11,520.00
10	Approach, CI I	3070001	616	Ton	\$20.00	\$12,320.00
11	Approach, CI II	3070021	200	Ton	\$20.00	\$4,000.00
12	HMA, LVSP	5010703	4,840	Ton	\$66.50	\$321,860.00
13	HMA Approach	5010061	257	Ton	\$120.00	\$30,800.00
14	HMA Surface, Rem	5010005	17,756	Syd	\$2.25	\$39,950.00
15	Obliterate Old Road	2070001	47	Sta	\$400.00	\$18,800.00
16	Curb and Gutter, Conc, Det B2	8020016	300	Ft	\$24.00	\$7,200.00
<b>SUBTOTAL MAINLINE PVT</b>						<b>\$1,445,079.63</b>

## NONMOTORIZED

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Clearing for Snowmobile Trail		0.642792	Acre	\$5,800.00	\$3,728.19
2	Excavation for Snowmobile Trail		1037.037	Cyd	\$6.70	\$6,948.15
3	Embankment for Snowmobile Trail		814.8148	Cyd	\$3.50	\$2,851.85
4	Shoulder, CI II for Snowmobile Trail		586.6667	Ton	\$18.00	\$10,560.00

**SUBTOTAL NONMOTORIZED      \$24,088.19**

**GEOMETRIC IMPROVEMENT**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL GEOMETRIC IMPROVEMENT      \$0.00**

**VERTICAL/HORIZONTAL ALIGNMENT**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1			0		\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL VERT/HORIZ ALIGNMENT      \$0.00**

**BRIDGE REPAIR, WIDENING**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Steel Sheet Piling Permanent	7040001	20000	Sft	\$25.00	\$500,000.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL BRIDGE REPAIR, WIDENING      \$500,000.00**

**DRAINAGE**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Culv, CI A, 36 inch	4010136	64	Ft	\$95.00	\$6,080.00
2	Culv, Slp End Sect, 1 on 4, 36 inch, Transv	4010930	2	Ea	\$1,700.00	\$3,400.00
3	Culv, CI A, 24 inch	4010134	392	Ft	\$65.00	\$25,480.00
4	Culv, Slp End Sect, 1 on 4, 24 inch, Transv	4010924	12	Ea	\$540.00	\$6,480.00
5	Culv, CI A, 18 inch	4010133	64	Ft	\$53.00	\$3,392.00
6	Culv, Slp End Sect, 1 on 4, 18 inch, Transv	4010012	2	Ea	\$407.00	\$814.00
7	Culv, Precast Conc Box, 12 foot by 7 foot	4060148	144	Ft	\$1,650.00	\$237,600.00
8	Culv Wingwalls for 12 foot by 7 foot box culv		4	Ea	\$30,000.00	\$120,000.00
9	Culv, Precast Conc Box, 6 foot by 6 foot	4060108	0	Ft	\$1,450.00	\$0.00
10	Culv Wingwalls for 6 foot by 6 foot box culv		0	Ea	\$25,000.00	\$0.00
11	Dr Marker Post	4011109	16	Ea	\$20.00	\$320.00
12	Video Taping Sewer and Culv Pipe	4021275	520	Ft	\$2.00	\$1,040.00

**SUBTOTAL DRAINAGE      \$404,606.00**

**JOINT REPAIR/PAVEMENT PATCHING**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1					\$0.00	\$0.00
2					\$0.00	\$0.00
3					\$0.00	\$0.00

**SUBTOTAL JOINT REPAIR/PAVEMENT PATCHING      \$0.00**

**MAINTAINING TRAFFIC**

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Traffic Regulator Control		1	LS	\$24,000.00	\$24,000.00
2	Minor Traf Devices		1	LS	\$95,700.00	\$95,700.00
3	Sign, Type B, Prismatic, Temp, Furn		1200	Sft	\$4.25	\$5,100.00
4	Sign, Type B, Prismatic, Temp, Oper		1200	Sft	\$0.75	\$900.00

5	Plastic Drum, High Intensity, Furn		180	Ea	\$25.00	\$4,500.00
6	Plastic Drum, High Intensity, Oper		180	Ea	\$5.00	\$900.00
7	Lighted Arrow, Type C, Furn		4	Ea	\$385.00	\$1,540.00
8	Lighted Arrow, Type C, Oper		4	Ea	\$75.00	\$300.00
9	Barricade, Type III, Lighted, Furn		20	Ea	\$125.00	\$2,500.00
10	Barricade, Type III, Lighted, Oper		20	Ea	\$10.00	\$200.00
11	Dust Palliative, Applied	8120100	75	Ton	\$220.00	\$16,500.00
12	Pavt Mrkg, Type NR, Paint, 4 inch, Yellow	8120231	1400	Ft	\$0.64	\$896.00
13	Pavt Mrkg, Type NR, Tape, 4 inch, Yellow	8120230	5800	Ft	\$0.50	\$2,900.00
<b>SUBTOTAL MAINTAINING TRAFFIC</b>						<b>\$155,936.00</b>

#### PERMANENT TRAFFIC CONTROL DEVICES

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Pavt Mrkg, Waterborne, 4 inch, Yellow	8110232	11,650	Ft	\$0.11	\$1,281.50
2	Pavt Mrkg, Waterborne, 4 inch, White	8110231	11,650	Ft	\$0.11	\$1,281.50
3	Post, Steel, 3 lb	8100371	1,350	Ft	\$4.00	\$5,400.00
4	Sign, Type IIIA	8100404	211	Sft	\$15.00	\$3,165.00
5	Sign, Type IIIB	8100405	320	Sft	\$15.00	\$4,800.00
6			0		\$0.00	\$0.00
<b>SUBTOTAL PERMANENT TRAFFIC CONTROL DEVICES</b>						<b>\$15,928.00</b>

#### ENVIRONMENTAL

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Erosion Control, Silt Fence	2080036	6000	Ft	\$1.60	\$9,600.00
2	Erosion Control, Check Dam, Stone	2080012	250	Ft	\$17.50	\$4,375.00
3	Erosion Control, Sediment Trap	2080034	12	Ea	\$150.00	\$1,800.00
4	Ero Con, Maint, Sediment Removal	2080026	15	Cyd	\$20.00	\$300.00
			0		\$0.00	\$0.00
<b>SUBTOTAL ENVIRONMENTAL</b>						<b>\$16,075.00</b>

#### MISCELLANEOUS

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Mobilization, Max		1	LS	\$501,000.00	\$501,000.00
2	Contractor Staking, Road Only		1	LS	\$98,100.00	\$98,100.00
3	Contractor Staking Errors and Extras, 1 Person		41	Hr	\$90.00	\$3,690.00
4	Contractor Staking Errors and Extras, 2 Person		17	Hr	\$120.00	\$2,040.00
5	Contractor Staking, Errors and Extras, 3 Person		25	Hr	\$150.00	\$3,750.00
6	Topsoil Surface, Furn, 4 inch	8160062	26,584	Syd	\$2.00	\$53,168.22
7	Topsoil Surface, Salv, 4 inch	8160077	13,094	Syd	\$0.80	\$10,474.93
8	Seeding, Mixture, THV	8160040	1,810	Lb	\$2.80	\$5,068.00
9	Fertilizer, Chemical Nutrient, CL A	8160020	1,870	Lb	\$1.50	\$2,805.00
10	Mulch	8160025	18,278	Syd	\$0.20	\$3,655.56
11	Mulch Anchoring	8160026	18,278	Syd	\$0.11	\$2,010.56
12	Mulch Blanket	8160027	10,700	Syd	\$1.00	\$10,700.00
13	Mulch Blanket, High Velocity	8160028	10,700	Syd	\$1.50	\$16,050.00
14	Ditch, Plain Cobble	8140005	600	Syd	\$32.00	\$19,200.00
15	Riprap, Plain	8130010	200	Syd	\$25.00	\$5,000.00
16	Riprap, Special		59,048	Ton	\$32.00	\$1,889,536.00
17	Protect Corners		12	Ea	\$200.00	\$2,400.00
18	Monument Box		12	Ea	\$300.00	\$3,600.00
19	Monument Preservation		12	Ea	\$350.00	\$4,200.00
<b>SUBTOTAL MISCELLANEOUS</b>						<b>\$2,636,448.27</b>

#### ROW & Utilities

	PAY ITEM DESCRIPTION	ITEM #	QUANTITY	UNIT	EST. PRICE	\$ EXTENSION
1	Wetland Mitigation		4.683196	Acres	\$40,000.00	\$187,327.82
2	Water Main, DI, 8 inch, Tr Det F	8230155	800	Ft	\$70.00	\$56,000.00
3	Water Main, DI, 6 inch, Tr Det F	8230150	60	Ft	\$70.00	\$4,200.00
4	Gate Valve and Box, 8 inch	8230052	3	Ea	\$1,600.00	\$4,800.00
5	Fire Hydrant	8230040	3	Ea	\$4,100.00	\$12,300.00
6				LS	\$0.00	\$0.00

**SUBTOTAL ROW**

**\$264,627.82**

			TOTAL PROJECT	<b>\$5,501,788.91</b>
Current Year	2019	4%	Projected Cost after Inflation	<b>\$5,950,734.89</b>
Construction Year	2021	15%	CONTINGENCY	<b>\$892,610.23</b>
			<b>ROW</b>	<b>\$180,000.00</b>

	<b>Const Total</b>	<b>\$7,023,345.12</b>
10.00%	PE	\$702,334.51
7.00%	CE	\$491,634.16
93.73%	Ind Proj Costs	\$1,119,106.83

**Total \$9,336,420.62**