

Appendix F

Construction Cost Estimates

TABLE A-1**Estimate of Probable Construction Costs***Merrifield Road Red River Bridge Feasibility Study***Element: Cole Creek Drainway (Stand Alone)**

Item	Unit	Est. Unit Price	Option 1-A South Alignment Bridge at 840.0		Option 1-B South Alignment Bridge at 820.5		Option 2-A North Alignment Bridge at 845.0		Option 2-B North Alignment Bridge at 820.5	
			Qty.	Cost	Qty.	Cost	Qty.	Cost	Qty.	Cost
Excavation	C.Y.	\$ 2.00	381000	\$ 762,000	381000	\$ 762,000	473000	\$ 946,000	473000	\$ 946,000
Common Fill - Twp Road	C.Y.	\$ 2.00	19000	\$ 38,000	0	\$ -	5400	\$ 10,800	0	\$ -
Common Fill - Merrifield	C.Y.	\$ 2.00	78260	\$ 156,520	78260	\$ 156,520	78260	\$ 156,520	78260	\$ 156,520
Common Fill - On Site Waste	C.Y.	\$ 1.50	200000	\$ 300,000	200000	\$ 300,000	200000	\$ 300,000	200000	\$ 300,000
Wasted Fill - Off Site	C.Y.	\$ 3.00	83740	\$ 251,220	102740	\$ 308,220	189340	\$ 568,020	194740	\$ 584,220
Bridge: Precast Beam ¹	S.F.	\$ 95.00	15050	\$ 1,429,750	6475	\$ 615,125	15050	\$ 1,429,750	6475	\$ 615,125
12x7 Box Culvert	L.F.	\$ 1,000.00	600	\$ 600,000	600	\$ 600,000	600	\$ 600,000	600	\$ 600,000
Box End Treatment	EA	\$ 10,000.00	2	\$ 20,000	2	\$ 20,000	2	\$ 20,000	2	\$ 20,000
Hydraulic Drop Structure	EA	\$ 500,000.00	1	\$ 500,000	1	\$ 500,000	1	\$ 500,000	1	\$ 500,000
9" Concrete Pavement	S.Y.	\$ 40.00	3225	\$ 129,000	3225	\$ 129,000	3225	\$ 129,000	3225	\$ 129,000
24" Aggregate Base (Class V)	C.Y.	\$ 15.00	2150	\$ 32,250	2150	\$ 32,250	2150	\$ 32,250	2150	\$ 32,250
Geotextile Fabric	S.Y.	\$ 1.50	3225	\$ 4,838	3225	\$ 4,838	3225	\$ 4,838	3225	\$ 4,838
Turf Establishment	S.Y.	\$ 0.50	30000	\$ 15,000	30000	\$ 15,000	30000	\$ 15,000	30000	\$ 15,000
Contingency (15%)				\$ 635,787		\$ 516,443		\$ 706,827		\$ 585,443
ESTIMATED ELEMENT TOTAL				\$ 4,874,364		\$ 3,959,395		\$ 5,419,004		\$ 4,488,395

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes

1. Bridge at 820.5 estimated 185 feet, bridge at 845.0 estimated 430 feet, both with a width of 35 feet
2. All estimates are shown in Y2004 US\$

TABLE A-2

Estimate of Probable Construction Costs

Merrifield Road Red River Bridge Feasibility Study

Element: Merrifield Bridge at 840.0 feet (Stand Alone)

Item	Unit	Est. Unit Price	Option 1		Option 2		Option 3		Options 1-3 B	
			North Alignment		Central Alignment		South Alignment		Curved Connection to County 58 ³	
			Qty.	Cost	Qty.	Cost	Qty.	Cost	Qty.	Cost
Common Fill - ND Side	C.Y.	\$ 5.00	320000	\$ 1,600,000	320000	\$ 1,600,000	280000	\$ 1,400,000	0	\$ -
Common Fill - MN Side	C.Y.	\$ 5.00	130000	\$ 650,000	210000	\$ 1,050,000	230000	\$ 1,150,000	28000	\$ 140,000
Bridge: Precast Concrete ¹	S.F.	\$ 120.00	49600	\$ 5,952,000	49600	\$ 5,952,000	57350	\$ 6,882,000	0	\$ -
Bridge: Cole Creek ⁴	S.F.	\$ 120.00	18600	\$ 2,232,000	18600	\$ 2,232,000	18600	\$ 2,232,000	0	\$ -
9" Concrete Pavement	S.Y.	\$ 40.00	38667	\$ 1,546,667	37111	\$ 1,484,444	37022	\$ 1,480,889	5133	\$ 205,333
24" Aggregate Base (Class V)	C.Y.	\$ 15.00	25907	\$ 388,600	24864	\$ 372,967	24805	\$ 372,073	3439	\$ 51,590
Geotextile Fabric	S.Y.	\$ 1.50	38667	\$ 58,000	37111	\$ 55,667	37022	\$ 55,533	5133	\$ 7,700
Turf Establishment	S.Y.	\$ 0.50	214815	\$ 107,407	206173	\$ 103,086	205679	\$ 102,840	28519	\$ 14,259
Contingency (15%)				\$ 1,880,201		\$ 1,927,525		\$ 2,051,300		\$ 62,832
ESTIMATED ELEMENT TOTAL				\$ 14,414,875		\$ 14,777,689		\$ 15,726,635		\$ 481,715

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes

1. Bridge based on length of 800 feet for Options 1 & 2 and 925 feet for Option 3
2. All estimates are shown in Y2004 US\$
3. Costs to be added to any Option if the curved connection is selected
4. Cole Creek bridge assumed to be identical in cross section to Red River Bridge with similar treatments

TABLE A-3

Estimate of Probable Construction Costs

Merrifield Road Red River Bridge Feasibility Study

Element: Merrifield Bridge at 845.0 feet (Stand Alone)

Item	Unit	Est. Unit Price	Option 1		Option 2		Option 3		Options 1-3 B Curved Connection to County 58 ³	
			North Alignment Qty.	Cost	Central Alignment Qty.	Cost	South Alignment Qty.	Cost	Qty.	Cost
Common Fill - ND Side	C.Y.	\$ 5.00	448000	\$ 2,240,000	448000	\$ 2,240,000	392000	\$ 1,960,000	0	\$ -
Common Fill - MN Side	C.Y.	\$ 5.00	182000	\$ 910,000	294000	\$ 1,470,000	322000	\$ 1,610,000	39200	\$ 196,000
Bridge: Precast Concrete ¹	S.F.	\$ 120.00	49600	\$ 5,952,000	49600	\$ 5,952,000	57350	\$ 6,882,000	0	\$ -
Bridge: Cole Creek ⁴	S.F.	\$ 120.00	18600	\$ 2,232,000	18600	\$ 2,232,000	18600	\$ 2,232,000		
9" Concrete Pavement	S.Y.	\$ 40.00	38667	\$ 1,546,667	37111	\$ 1,484,444	37022	\$ 1,480,889	5133	\$ 205,333
24" Aggregate Base (Class V)	C.Y.	\$ 15.00	25907	\$ 388,600	24864	\$ 372,967	24805	\$ 372,073	3439	\$ 51,590
Geotextile Fabric	S.Y.	\$ 1.50	38667	\$ 58,000	37111	\$ 55,667	37022	\$ 55,533	5133	\$ 7,700
Turf Establishment	S.Y.	\$ 0.50	429630	\$ 214,815	412346	\$ 206,173	411358	\$ 205,679	57037	\$ 28,519
Contingency (15%)				\$ 2,031,312		\$ 2,101,988		\$ 2,219,726		\$ 73,371
ESTIMATED ELEMENT TOTAL				\$ 15,573,394		\$ 16,115,238		\$ 17,017,901		\$ 562,513

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes

1. Bridge based on length of 800 feet for Options 1 & 2 and 925 feet for Option 3
2. All estimates are shown in Y2004 US\$
3. Costs to be added to any Option if the curved connection is selected, does not include raise of County 58 to 845.0
4. Cole Creek bridge assumed to be identical in cross section to Red River Bridge with similar treatments

TABLE A-4

Estimate of Probable Construction Costs

Merrifield Road Red River Bridge Feasibility Study

Element: Merrifield Bridge at 840.0 feet with Drainway South Alignment at 820.5 Crossing (1-B)

Item	Unit	Est. Unit Price	Option 1		Option 2		Option 3		Options 1-3 B	
			North Alignment		Central Alignment		South Alignment		Curved Connection to County 58 ³	
			Qty.	Cost	Qty.	Cost	Qty.	Cost	Qty.	Cost
Excavation	C.Y.	\$ 2.00	381000	\$ 762,000	381000	\$ 762,000	381000	\$ 762,000	0	\$ -
Common Fill - ND Side	C.Y.	\$ 3.00	320000	\$ 960,000	320000	\$ 960,000	280000	\$ 840,000	0	\$ -
Common Fill - MN Side	C.Y.	\$ 4.00	130000	\$ 520,000	210000	\$ 840,000	230000	\$ 920,000	28000	\$ 112,000
Bridge: Precast Concrete ¹	S.F.	\$ 120.00	49600	\$ 5,952,000	49600	\$ 5,952,000	57350	\$ 6,882,000	0	\$ -
Bridge: Precast Beam ⁴	S.F.	\$ 95.00	6475	\$ 615,125	6475	\$ 615,125	6475	\$ 615,125	0	\$ -
12x 7 Box Culvert	L.F.	\$ 1,000.00	600	\$ 600,000	600	\$ 600,000	600	\$ 600,000	0	\$ -
Box Ends	EA	\$ 10,000.00	2	\$ 20,000	2	\$ 20,000	2	\$ 20,000	0	\$ -
Hydraulic Drop Structure	EA	\$ 500,000.00	1	\$ 500,000	1	\$ 500,000	1	\$ 500,000	0	\$ -
9" Concrete Pavement	S.Y.	\$ 40.00	38667	\$ 1,546,667	37111	\$ 1,484,444	37022	\$ 1,480,889	5133	\$ 205,333
24"Aggregate Base (Class V)	C.Y.	\$ 15.00	25907	\$ 388,600	24864	\$ 372,967	24805	\$ 372,073	3439	\$ 51,590
Geotextile Fabric	S.Y.	\$ 1.50	38667	\$ 58,000	37111	\$ 55,667	37022	\$ 55,533	5133	\$ 7,700
Turf Establishment	S.Y.	\$ 0.50	429630	\$ 214,815	412346	\$ 206,173	411358	\$ 205,679	57037	\$ 28,519
Contingency (15%)				\$ 1,820,581		\$ 1,855,256		\$ 1,987,995		\$ 60,771
ESTIMATED ELEMENT TOTAL				\$ 13,957,787		\$ 14,223,632		\$ 15,241,295		\$ 465,913

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes

1. Bridge based on length of 800 feet for Options 1 & 2 and 925 feet for Option 3
2. All estimates are shown in Y2004 US\$
3. Costs to be added to any Option if the curved connection is selected, does not include raise of County 58 to 845.0
4. Bridge estimated at 185 feet in length and 35 feet in width

TABLE A-5

Estimate of Probable Construction Costs

Merrifield Road Red River Bridge Feasibility Study

Element: Merrifield Bridge at 845.0 feet with Drainway South Alignment at 820.5 Crossing (1-B)

Item	Unit	Est. Unit Price	Option 1		Option 2		Option 3		Options 1-3 B	
			North Alignment		Central Alignment		South Alignment		Curved Connection to County 58 ³	
			Qty.	Cost	Qty.	Cost	Qty.	Cost	Qty.	Cost
Excavation	C.Y.	\$ 2.00	381000	\$ 762,000	381000	\$ 762,000	560000	\$ 1,120,000	0	\$ -
Common Fill - ND Side	C.Y.	\$ 3.00	448000	\$ 1,344,000	448000	\$ 1,344,000	392000	\$ 1,176,000	0	\$ -
Common Fill - MN Side	C.Y.	\$ 4.00	182000	\$ 728,000	294000	\$ 1,176,000	322000	\$ 1,288,000	39200	\$ 156,800
Bridge: Precast Concrete ¹	S.F.	\$ 120.00	49600	\$ 5,952,000	49600	\$ 5,952,000	57350	\$ 6,882,000	0	\$ -
Bridge: Precast Beam ⁴	S.F.	\$ 95.00	6475	\$ 615,125	6475	\$ 615,125	6475	\$ 615,125	0	\$ -
12x 7 Box Culvert	L.F.	\$ 1,000.00	600	\$ 600,000	600	\$ 600,000	600	\$ 600,000	0	\$ -
Box Ends	EA	\$ 10,000.00	2	\$ 20,000	2	\$ 20,000	2	\$ 20,000	0	\$ -
Hydraulic Drop Structure	EA	\$ 500,000.00	1	\$ 500,000	1	\$ 500,000	1	\$ 500,000	0	\$ -
9" Concrete Pavement	S.Y.	\$ 40.00	38667	\$ 1,546,667	37111	\$ 1,484,444	37022	\$ 1,480,889	5133	\$ 205,333
24"Aggregate Base (Class V)	C.Y.	\$ 15.00	25907	\$ 388,600	24864	\$ 372,967	24805	\$ 372,073	3439	\$ 51,590
Geotextile Fabric	S.Y.	\$ 1.50	38667	\$ 58,000	37111	\$ 55,667	37022	\$ 55,533	5133	\$ 7,700
Turf Establishment	S.Y.	\$ 0.50	429630	\$ 214,815	412346	\$ 206,173	411358	\$ 205,679	57037	\$ 28,519
Contingency (15%)				\$ 1,909,381		\$ 1,963,256		\$ 2,147,295		\$ 67,491
ESTIMATED ELEMENT TOTAL				\$ 14,638,587		\$ 15,051,632		\$ 16,462,595		\$ 517,433

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes

1. Bridge based on length of 800 feet for Options 1 & 2 and 925 feet for Option 3
2. All estimates are shown in Y2004 US\$
3. Costs to be added to any Option if the curved connection is selected, does not include raise of County 58 to 845.0
4. Bridge estimated at 185 feet in length and 32 feet in width

TABLE A-6

Summary: Estimate of Probable Construction Costs - Stand Alone Projects

Merrifield Road Red River Bridge Feasibility Study

	<u>Option 1A:</u>	<u>Option 1B:</u>	<u>Option 2A:</u>	<u>Option 2B:</u>
<u>Stand Alone Project 1: Cole Creek Diversion</u>	South Alignment & Township Road Crossing at 840.0	South Alignment & Township Road Crossing at 820.5	North Alignment & Township Road Crossing at 840.0	North Alignment & Township Road Crossing at 820.5
Drainage Elements	\$ 2,085,203	\$ 2,150,753	\$ 2,661,123	\$ 2,679,753
Township Road & Bridge	\$ 1,687,913	\$ 707,394	\$ 1,656,633	\$ 707,394
Merrifield Road & Box Culvert	\$ 1,101,249	\$ 1,101,249	\$ 1,101,249	\$ 1,101,249
Subtotal: Project 1	\$ 4,874,364	\$ 3,959,395	\$ 5,419,004	\$ 4,488,395
<u>Stand Alone Project 2: Merrifield Road Bridge Crossing (840.0)</u>	<u>Option 1:</u> North Alignment	<u>Option 2:</u> Central Alignment	<u>Option 3:</u> South Alignment	<u>Options 1-3 Add On:</u> Curved Alignment to CR 58
Bridge over Cole Creek	\$ 2,566,800	\$ 2,566,800	\$ 2,566,800	\$ -
Bridge over Red River	\$ 6,844,800	\$ 6,844,800	\$ 7,914,300	\$ -
Earthwork - ND Side	\$ 1,840,000	\$ 1,840,000	\$ 1,610,000	\$ -
Earthwork - MN Side	\$ 747,500	\$ 1,207,500	\$ 1,322,500	\$ 161,000
Road Construction - ND Side	\$ 1,328,676	\$ 1,328,676	\$ 1,387,821	\$ 192,429
Road Construction - MN Side	\$ 1,087,099	\$ 989,912	\$ 925,214	\$ 128,286
Subtotal: Project 2	\$ 14,414,875	\$ 14,777,689	\$ 15,726,635	\$ 481,715
<u>Stand Alone Project 3: Merrifield Road Bridge Crossing (845.0)</u>	<u>Option 1:</u> North Alignment	<u>Option 2:</u> Central Alignment	<u>Option 3:</u> South Alignment	<u>Options 1-3 Add On:</u> Curved Alignment to CR 58
Bridge over Cole Creek	\$ 2,566,800	\$ 2,566,800	\$ 2,566,800	\$ -
Bridge over Red River	\$ 6,844,800	\$ 6,844,800	\$ 7,914,300	\$ -
Earthwork - ND Side	\$ 2,576,000	\$ 2,576,000	\$ 2,254,000	\$ -
Earthwork - MN Side	\$ 1,046,500	\$ 1,690,500	\$ 1,851,500	\$ 225,400
Road Construction - ND Side	\$ 1,396,612	\$ 1,396,612	\$ 1,458,780	\$ 202,268
Road Construction - MN Side	\$ 1,142,682	\$ 1,040,527	\$ 972,520	\$ 134,845
Subtotal: Project 3	\$ 15,573,394	\$ 16,115,238	\$ 17,017,901	\$ 562,513

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes: 1. Stand Alone projects all include Bridge over Cole Creek at given elevation instead of box culvert

TABLE A-7

Summary: Estimate of Probable Construction Costs - Combined Projects

Merrifield Road Red River Bridge Feasibility Study

Combined Project 1:

Merrifield Road Bridge

Crossing (840.0) w/ S.

Diversion & 820.5

Township Crossing

	<u>Option 1:</u> North Alignment	<u>Option 2:</u> Central Alignment	<u>Option 3:</u> South Alignment	<u>Options 1-3 Add On:</u> Curved Alignment to CR 58
Bridge over Red River	\$ 6,844,800	\$ 6,844,800	\$ 7,914,300	\$ -
Township Road Crossing	\$ 707,394	\$ 707,394	\$ 707,394	\$ -
Diversion (& Merrifield Box)	\$ 2,164,300	\$ 2,164,300	\$ 2,164,300	\$ -
Earthwork - ND Side	\$ 1,104,000	\$ 1,104,000	\$ 966,000	\$ -
Earthwork - MN Side	\$ 598,000	\$ 966,000	\$ 1,058,000	\$ 128,800
Merrifield Road - ND Side	\$ 1,396,612	\$ 1,396,612	\$ 972,520	\$ -
Merrifield Road - MN Side	\$ 1,142,682	\$ 1,040,527	\$ 1,458,780	\$ 337,113
Subtotal: Project 1	\$ 13,957,787	\$ 14,223,632	\$ 15,241,295	\$ 465,913

Combined Project 2:

Merrifield Road Bridge

Crossing (845.0) w/ S.

Diversion & 820.5

Township Crossing

	<u>Option 1:</u> North Alignment	<u>Option 2:</u> Central Alignment	<u>Option 3:</u> South Alignment	<u>Options 1-3 Add On:</u> Curved Alignment to CR 58
Bridge over Red River	\$ 6,844,800	\$ 6,844,800	\$ 7,914,300	\$ -
Township Road Crossing	\$ 707,394	\$ 707,394	\$ 707,394	\$ -
Diversion (& Merrifield Box)	\$ 2,164,300	\$ 2,164,300	\$ 2,576,000	\$ -
Earthwork - ND Side	\$ 1,545,600	\$ 1,545,600	\$ 1,352,400	\$ -
Earthwork - MN Side	\$ 837,200	\$ 1,352,400	\$ 1,481,200	\$ 180,320
Merrifield Road - ND Side	\$ 1,396,612	\$ 1,396,612	\$ 972,520	\$ -
Merrifield Road - MN Side	\$ 1,142,682	\$ 1,040,527	\$ 1,458,780	\$ 337,113
Subtotal: Project 2	\$ 14,638,587	\$ 15,051,632	\$ 16,462,595	\$ 517,433

Source: HDR Engineering, Inc. & CPS, Ltd.

Notes: 1. Stand Alone projects all include Bridge over Cole Creek at given elevation instead of box culvert