

TECHNICAL MEMORANDUM

TO: Mr. Jim Shaver, Administrator, Carnelian-Marine-St. Croix Watershed District

FROM: Todd Shoemaker, P.E., C.F.M.
Ed Matthiesen, P.E.

DATE: December 4, 2013

SUBJECT: Updated Design & Construction Cost Estimates for the 197th Street Ravine Stabilization Project

INTRODUCTION

The Carnelian-Marine-St. Croix Watershed District (CMSCWD) retained Wenck Associates, Inc. (Wenck) to study stabilization methods to repair a severely eroded ravine located adjacent to 197th Street in Scandia, MN (Figure 1). The purpose of this memorandum is to update the cost estimates outlined in our June 2013 feasibility study. Table 1 summarizes the original June 2013 and updated cost estimates (including contingency, engineering design, and construction costs).

Table 1. Estimated costs to stabilize the 197th Ravine.

Stabilization Practice	Feasibility Study (June 2013)	Updated (December 2013)
Rain Garden	\$6,360	\$8,000
Option 1 (existing channel alignment)	\$46,536	\$55,000
Option 2 (197 th St right-of-way alignment)	\$52,836	\$68,250
Secondary Gully	Not estimated	\$10,400
Total = Rain Garden + Option 1 + Secondary Gully	\$52,896*	\$73,400
Total = Rain Garden + Option 2 + Secondary Gully	\$59,196*	\$86,650

*Total does not include cost to stabilize secondary gully.

BACKGROUND

Wenck prepared a feasibility study in June 2013 that recommended stabilization practices and outlined estimated costs for the recommended practices. Since completing the feasibility study, Wenck and CMSCWD have refined some components of the recommended practices to include additional detail that is now included in the updated cost estimates.

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Figure 1. The 197th Street Ravine is located in Scandia, MN between Hwy. 95 and the St. Croix River near Copas.

UPDATED COST ESTIMATES

Wenck updated the feasibility study cost estimates for the following reasons:

- Wenck completed a topographic survey in August. The survey allowed Wenck to update bid quantities since the June 2013 cost estimates were based on LiDAR data.
- Wenck updated the tree inventory concurrent with the August topographic survey. For the feasibility study, trees were located using GPS, which yielded approximate locations due to tree canopy. For the topographic survey, Wenck used a total station to obtain precise tree locations within the proposed work area and access route.
- Wenck completed a conceptual design of Option 2 in September. The outlet concept plan used the new topographic survey data to establish pipe lengths and invert elevations and design of the energy control method at the pipe outlet.
- Recently-bid Wenck projects indicate unit costs may now be increasing after years of decline.
- All of the above information allowed Wenck to include more detailed bid items in the cost estimates.

The updated cost estimates for Option 1, Option 2, and the rain garden are listed in Tables 2-4. (Please refer to the feasibility study for full descriptions of each option and the rain garden.) Table 5 includes a cost estimate to stabilize a secondary gully south of the main ravine that Wenck identified during our field work. A cost estimate for this work was not included in the feasibility study.

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Table 2. Estimated costs to construct the rain garden.

Bid Item	Description	Units	Quantity	Unit Price	Subtotal
1	MOBILIZATION & DEMOBILIZATION	LUMP SUM	1	\$500.00	\$500.00
2	TRAFFIC CONTROL	LUMP SUM	1	\$500.00	\$500.00
3	COMMON EXCAVATION (EV)	CU YD	50	\$20.00	\$1,000.00
4	RAIN GARDEN BEDDING & MULCH	SQ FT	700	\$2.00	\$1,400.00
5	SEED MIXTURE - BWSR U9 W/EROSION CONTROL BLANKET	SQ YD	75	\$5.00	\$375.00
6	PLANTINGS	EACH	50	\$5.00	\$250.00
7	EROSION CONTROL	LUMP SUM	1	\$500.00	\$500.00
SUBTOTAL RAIN GARDEN					\$4,525.00
10% CONTINGENCY					\$452.50
PLANS, SPECS, BIDDING & CONSTRUCTION OBSERVATION COSTS					\$3,000.00
TOTAL RAIN GARDEN					\$8,000.00

Table 3. Estimated costs to construct Option 1.

Bid Item	Description	Units	Quantity	Unit Price	Subtotal
1	MOBILIZATION & DEMOBILIZATION	LUMP SUM	1	\$2,000.00	\$2,000.00
2	TRAFFIC CONTROL	LUMP SUM	1	\$1,000.00	\$1,000.00
3	TREE TRIMMING	TREE	13	\$350.00	\$4,550.00
4	SALVAGE & REINSTALL EXISTING FES	EACH	1	\$500.00	\$500.00
5	COMMON EXCAVATION - ON-SITE (EV)	CU YD	40	\$15.00	\$600.00
6	RAVINE BACKFILL MATERIAL	CU YD	140	\$20.00	\$2,800.00
7	CONSTRUCT DRAINAGE STRUCTURE - 4' DIA MH	EACH	2	\$3,500.00	\$7,000.00
8	CONNECT TO EXISTING STORM SEWER PIPE	EACH	1	\$500.00	\$500.00
9	15" HDPE FUSED-WALL STORM SEWER	LIN FT	105	\$50.00	\$5,250.00
10	24" HDPE STORM SEWER	LIN FT	20	\$75.00	\$1,500.00
11	RANDOM RIPRAP CLASS III - ROCK OVERFLOW STRUCTURE	CU YD	25	\$125.00	\$3,125.00
12	SEED MIXTURE - BWSR U9 W/EROSION CONTROL BLANKET	SQ YD	1000	\$5.00	\$5,000.00
13	PLANTINGS	EACH	100	\$5.00	\$500.00
14	TEMPORARY CONSTRUCTION ENTRANCE	EACH	1	\$1,000.00	\$1,000.00
15	EROSION CONTROL	LUMP SUM	1	\$1,000.00	\$1,000.00
SUBTOTAL OPTION 1					\$36,325.00
10% CONTINGENCY					\$3,632.50
PLANS, SPECS, BIDDING & CONSTRUCTION OBSERVATION COSTS					\$15,000.00
EASEMENT ACQUISITION COST					UNKNOWN
TOTAL OPTION 1					\$55,000.00

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Table 4. Estimated costs to construct Option 2.

Bid Item	Description	Units	Quantity	Unit Price	Subtotal
1	MOBILIZATION & DEMOBILIZATION	LUMP SUM	1	\$2,000.00	\$2,000.00
2	TRAFFIC CONTROL	LUMP SUM	1	\$1,000.00	\$1,000.00
3	TREE TRIMMING	TREE	26	\$350.00	\$9,100.00
4	REMOVE STORM SEWER PIPE	LIN FT	40	\$10.00	\$400.00
5	SALVAGE & REINSTALL EXISTING FES	EACH	1	\$500.00	\$500.00
6	COMMON EXCAVATION - ON-SITE (EV)	CU YD	40	\$15.00	\$600.00
7	RAVINE BACKFILL MATERIAL	CU YD	140	\$20.00	\$2,800.00
8	CONSTRUCT DRAINAGE STRUCTURE - 4' DIA MH	EACH	2	\$3,500.00	\$7,000.00
9	CONNECT TO EXISTING STORM SEWER PIPE	EACH	1	\$500.00	\$500.00
10	15" HDPE FUSED-WALL STORM SEWER	LIN FT	140	\$50.00	\$7,000.00
11	24" HDPE STORM SEWER	LIN FT	20	\$75.00	\$1,500.00
12	RANDOM RIPRAP CLASS III - ROCK OVERFLOW STRUCTURE	CU YD	40	\$125.00	\$5,000.00
13	SEED MIXTURE - BWSR U9 W/EROSION CONTROL BLANKET	SQ YD	1500	\$5.00	\$7,500.00
14	PLANTINGS	EACH	200	\$5.00	\$1,000.00
15	TEMPORARY CONSTRUCTION ENTRANCE	EACH	1	\$1,000.00	\$1,000.00
16	EROSION CONTROL	LUMP SUM	1	\$1,500.00	\$1,500.00
				SUBTOTAL OPTION 2	\$48,400.00
				10% CONTINGENCY	\$4,840.00
				PLANS, SPECS, BIDDING & CONSTRUCTION OBSERVATION COSTS	\$15,000.00
				EASEMENT ACQUISITION COST	\$0.00
				TOTAL OPTION 2	\$68,250.00

Table 5. Estimated costs to stabilize the "secondary gully".

Bid Item	Description	Units	Quantity	Unit Price	Subtotal
1	MOBILIZATION & DEMOBILIZATION	LUMP SUM	1	\$500.00	\$500.00
2	TRAFFIC CONTROL	LUMP SUM	1	\$500.00	\$500.00
3	TREE TRIMMING	TREE	6	\$350.00	\$2,100.00
4	RAVINE BACKFILL MATERIAL	CU YD	110	\$20.00	\$2,200.00
5	RANDOM RIPRAP CLASS III - ROCK OVERFLOW STRUCTURE	CU YD	10	\$125.00	\$1,250.00
6	SEED MIXTURE - BWSR U9 W/EROSION CONTROL BLANKET	SQ YD	250	\$5.00	\$1,250.00
7	PLANTINGS	EACH	50	\$5.00	\$250.00
8	EROSION CONTROL	LUMP SUM	1	\$500.00	\$500.00
				SUBTOTAL ALTERNATE	\$8,550.00
				10% CONTINGENCY	\$855.00
				PLANS, SPECS, BIDDING & CONSTRUCTION OBSERVATION COSTS	\$1,000.00
				EASEMENT ACQUISITION COST	UNKNOWN
				TOTAL ALTERNATE	\$10,400.00

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RECOMMENDATIONS

Wenck completed a feasibility study in June 2013 that recommended two stabilization options (Options 1 and 2) for the 197th Street Ravine and installation of a rain garden near the top of the ravine. Due to additional information collected since June, Wenck has updated the cost estimates for the ravine options, rain garden, and a secondary gully south of the main ravine. A comparison of the estimated costs is presented in Table 6. Since bid prices vary depending on many factors, CMSCWD could consider the two cost estimates as a range. For example, the total estimated cost to construct the rain garden, Option 1 and the secondary gully is between \$52,896 and \$73,400. The additional cost of Option 2 is between \$6,300 and \$13,250.

Table 6. Estimated costs to stabilize the 197th Ravine.

Stabilization Practice	Feasibility Study (June 2013)	Updated (December 2013)
Rain Garden	\$6,360	\$8,000
Option 1 (existing channel alignment)	\$46,536	\$55,000
Option 2 (197 th St right-of-way alignment)	\$52,836	\$68,250
Secondary Gully	Not estimated	\$10,400
Total = Rain Garden + Option 1 + Secondary Gully	\$52,896*	\$73,400
Total = Rain Garden + Option 2 + Secondary Gully	\$59,196*	\$86,650

*Total does not include cost to stabilize secondary gully.

Despite the increased cost, Wenck continues to recommend CMSCWD proceed with final design of the rain garden and Option 2 because the new pipe and overflow channel are relocated into the 197th Street right-of-way. Regarding the secondary gully, it does not appear to be a significant source of sedimentation since eroded sediment from it has not reached the downstream wetland or the St. Croix River, but it may be a problem waiting to happen. Therefore, Wenck recommends including the secondary gully in the project or bidding it as an "alternate" that could be constructed if bid prices are favorable.