

Table G1: Preliminary Cost Estimate for Site 1, Alternative A

Remeander into historic channels

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$8,663	\$8,660	10% of project cost
Control of Water	LS	1	\$2,987	\$2,990	4% of primary item cost
Erosion Control	LS	1	\$4,481	\$4,480	6% of primary item cost
Clearing and Grubbing	ACRE	0.1	\$7,000	\$520	
Select Tree Removal (>6")	EA	6	\$400	\$2,400	
Excavate/Salvage Soil	CY	477	\$15	\$7,160	
Grading	SY	358	\$6	\$2,150	
Topsoil Import	CY	60	\$33	\$1,970	
Root Wads	EA	3	\$750	\$2,250	
Rock Vanes	EA	2	\$2,000	\$4,000	
Plant Trees	EA	6	\$250	\$1,500	
Plant Shrubs	EA	25	\$50	\$1,250	
Replace Bridge	EA	1	\$50,000	\$50,000	
Seeding and Mulch	ACRE	0.1	\$5,600	\$410	
Erosion Control Blanket	SY	358	\$3	\$1,070	
Damage Repair	LS	1	\$1,494	\$1,490	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$2,987	\$2,990	4% of primary item cost
Total				\$ 95,290	
Contingency (30%)				\$ 28,590	
Subtotal				\$ 123,900	
Design, Permitting, and Administration (30%)				\$ 28,590	
Total w/ Contingency & Engineering				\$ 152,500	

30-yr and Annualized Cost analysis

Category:	Remeander	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 450	10% of damage repair and maintenance
End of life span maintenance	\$ 15,250	10% of original project cost
Future Capital Cost	\$ 370,200	
Future annual maintenance	\$ 21,410	
Future end of life span cost	\$ 27,540	
Total Future Worth	\$ 419,200	
Annualized Cost	\$ 8,800	

Table G2: Preliminary Cost Estimate for Site 1, Alternative B

Stabilize erosion areas with hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,729	\$1,730	10% of project cost
Control of Water	LS	1	\$596	\$600	4% of primary item cost
Erosion Control	LS	1	\$894	\$890	6% of primary item cost
Clearing and Grubbing	ACRE	0.1	\$7,000	\$460	
Select Tree Removal (>6")	EA	3	\$400	\$1,200	
Grading	SY	316	\$6	\$1,890	
Furnish and Install Fieldstone Riprap	TON	74	\$100	\$7,360	
Topsoil Import	CY	26	\$33	\$870	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.1	\$8,000	\$520	
Erosion Control Blanket	SY	284	\$3	\$850	
Damage Repair	LS	1	\$298	\$300	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$596	\$600	4% of primary item cost
Total				\$ 19,020	
Contingency (30%)				\$ 5,710	
Subtotal				\$ 24,700	
Design, Permitting, and Administration (30%)				\$ 5,710	
Total w/ Contingency & Engineering				\$ 30,400	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 230	25% of damage repair and maintenance
End of life span maintenance	\$ 15,200	50% of original project cost
Future Capital Cost	\$ 73,800	
Future annual maintenance	\$ 10,940	
Future end of life span cost	\$ 27,450	
Total Future Worth	\$ 112,200	
Annualized Cost	\$ 2,400	

Table G3: Preliminary Cost Estimate for Site 1, Alternative C

Stabilize erosion areas with root wads, log vanes, and vegetation

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,411	\$1,410	10% of project cost
Control of Water	LS	1	\$486	\$490	4% of primary item cost
Erosion Control	LS	1	\$730	\$730	6% of primary item cost
Clearing and Grubbing	ACRE	0.1	\$7,000	\$460	
Select Tree Removal (>6")	EA	3	\$400	\$1,200	
Grading	SY	89	\$6	\$530	
Root Wads	EA	3	\$750	\$2,250	
Log Vanes	EA	3	\$1,200	\$3,600	
Plant Trees	EA	3	\$250	\$750	
Plant Shrubs	EA	40	\$50	\$2,000	
Seeding and Mulch	ACRE	0.1	\$8,000	\$520	
Erosion Control Blanket	SY	284	\$3	\$850	
Damage Repair	LS	1	\$243	\$240	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$486	\$490	4% of primary item cost
Total				\$ 15,520	
Contingency (30%)				\$ 4,660	
Subtotal				\$ 20,200	
Design, Permitting, and Administration (30%)				\$ 4,660	
Total w/ Contingency & Engineering				\$ 24,800	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 180	25% of damage repair and maintenance
End of life span maintenance	\$ 6,200	25% of original project cost
Future Capital Cost	\$ 60,200	
Future annual maintenance	\$ 8,560	
Future end of life span cost	\$ 11,200	
Total Future Worth	\$ 80,000	
Annualized Cost	\$ 1,700	

Table G4: Preliminary Cost Estimate for Site 2, Alternative A

Remeander into historic channels

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$3,692	\$3,690	10% of project cost
Control of Water	LS	1	\$1,273	\$1,270	4% of primary item cost
Erosion Control	LS	1	\$1,910	\$1,910	6% of primary item cost
Clearing and Grubbing	ACRE	0.1	\$7,000	\$670	
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Excavate/Salvage Soil	CY	616	\$15	\$9,240	
Grading	SY	462	\$6	\$2,770	
Root Wads	EA	4	\$750	\$3,000	
Rock Boulder Vane	EA	3	\$2,000	\$6,000	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.1	\$8,000	\$760	
Erosion Control Blanket	SY	462	\$3	\$1,390	
Damage Repair	LS	1	\$637	\$640	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$1,273	\$1,270	4% of primary item cost
Total				\$ 40,610	
Contingency (30%)				\$ 12,180	
Subtotal				\$ 52,800	
Design, Permitting, and Administration (30%)				\$ 12,180	
Total w/ Contingency & Engineering				\$ 65,000	

30-yr and Annualized Cost analysis

Category:	Remeander	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 190	10% of damage repair and maintenance
End of life span maintenance	\$ 6,500	10% of original project cost
Future Capital Cost	\$ 157,800	
Future annual maintenance	\$ 9,040	
Future end of life span cost	\$ 11,740	
Total Future Worth	\$ 178,600	
Annualized Cost	\$ 3,800	

Table G5: Preliminary Cost Estimate for Site 2, Alternative B

Stabilize erosion areas with hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$2,269	\$2,270	10% of project cost
Control of Water	LS	1	\$783	\$780	4% of primary item cost
Erosion Control	LS	1	\$1,174	\$1,170	6% of primary item cost
Clearing and Grubbing	ACRE	0.1	\$7,000	\$530	
Select Tree Removal (>6")	EA	8	\$400	\$3,200	
Grading	SY	364	\$6	\$2,190	
Furnish and Install Fieldstone Riprap	TON	85	\$100	\$8,500	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.1	\$8,000	\$600	
Erosion Control Blanket	SY	182	\$3	\$550	
Damage Repair	LS	1	\$391	\$390	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$783	\$780	4% of primary item cost
Total				\$ 24,960	
Contingency (30%)				\$ 7,490	
Subtotal				\$ 32,450	
Design, Permitting, and Administration (30%)				\$ 7,490	
Total w/ Contingency & Engineering				\$ 39,900	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 290	25% of damage repair and maintenance
End of life span maintenance	\$ 19,950	50% of original project cost
Future Capital Cost	\$ 96,800	
Future annual maintenance	\$ 13,800	
Future end of life span cost	\$ 36,030	
Total Future Worth	\$ 146,600	
Annualized Cost	\$ 3,100	

Table G6: Preliminary Cost Estimate for Site 2, Alternative C

Stabilize erosion areas with root wads, log vanes, and vegetation

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,099	\$1,100	10% of project cost
Control of Water	LS	1	\$379	\$380	4% of primary item cost
Erosion Control	LS	1	\$568	\$570	6% of primary item cost
Clearing and Grubbing	ACRE	0.1	\$7,000	\$530	
Select Tree Removal (>6")	EA	4	\$400	\$1,600	
Grading	SY	44	\$6	\$270	
Root Wads	EA	3	\$750	\$2,250	
Log Vanes	EA	2	\$1,200	\$2,400	
Plant Trees	EA	4	\$250	\$1,000	
Plant Shrubs	EA	15	\$50	\$750	
Seeding and Mulch	ACRE	0.1	\$8,000	\$600	
Erosion Control Blanket	SY	22	\$3	\$70	
Damage Repair	LS	1	\$189	\$190	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$379	\$380	4% of primary item cost
Total				\$ 12,090	
Contingency (30%)				\$ 3,630	
Subtotal				\$ 15,720	
Design, Permitting, and Administration (30%)				\$ 3,630	
Total w/ Contingency & Engineering				\$ 19,400	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (year)	20	1 number of major maint. events
Expected annual maintenance	\$ 140	25% of damage repair and maintenance
End of life span maintenance	\$ 4,850	25% of original project cost
Future Capital Cost	\$ 47,100	
Future annual maintenance	\$ 6,660	
Future end of life span cost	\$ 8,760	
Total Future Worth	\$ 62,500	
Annualized Cost	\$ 1,300	

Table G7: Preliminary Cost Estimate for Site 3, Alternative A

Narrow channel for approx. 800'

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$3,496	\$3,500	10% of project cost
Control of Water	LS	1	\$1,205	\$1,210	4% of primary item cost
Erosion Control	LS	1	\$1,808	\$1,810	6% of primary item cost
Clearing and Grubbing	ACRE	0.3	\$7,000	\$1,930	
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Excavate/Salvage Soil	CY	667	\$15	\$10,000	
Grading	SY	667	\$6	\$4,000	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.3	\$8,000	\$2,200	
Erosion Control Blanket	SY	1333	\$3	\$4,000	
Damage Repair	LS	1	\$603	\$600	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$1,205	\$1,210	4% of primary item cost
Total				\$ 38,460	
Contingency (30%)				\$ 11,540	
Subtotal				\$ 50,000	
Design, Permitting, and Administration (30%)				\$ 11,540	
Total w/ Contingency & Engineering				\$ 61,500	

30-yr and Annualized Cost analysis

Category:	General grading	
Estimated life span (year)	30	1 number of major maint. events
Expected annual maintenance	\$ 180	10% of damage repair and maintenance
End of life span maintenance	\$ 6,150	10% of original project cost
Future Capital Cost	\$ 149,300	
Future annual maintenance	\$ 8,560	
Future end of life span cost	\$ 11,110	
Total Future Worth	\$ 169,000	
Annualized Cost	\$ 3,600	

Table G8: Preliminary Cost Estimate for Site 3, Alternative B

Install log vanes within reach

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$2,301	\$2,300	10% of project cost
Control of Water	LS	1	\$794	\$790	4% of primary item cost
Erosion Control	LS	1	\$1,190	\$1,190	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$160	
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Log Vanes	EA	10	\$1,200	\$12,000	
Grading	SY	111	\$6	\$670	
Plant Shrubs	EA	50	\$50	\$2,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$180	
Erosion Control Blanket	SY	111	\$3	\$330	
Damage Repair	LS	1	\$397	\$400	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$794	\$790	4% of primary item cost
			Total	\$ 25,310	
			Contingency (30%)	\$ 7,590	
			Subtotal	\$ 32,900	
			Design, Permitting, and Administration (30%)	\$ 7,590	
			Total w/ Contingency & Engineering	\$ 40,500	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 300	25% of damage repair and maintenance
End of life span maintenance	\$ 10,130	25% of original project cost
Future Capital Cost	\$ 98,300	
Future annual maintenance	\$ 14,270	
Future end of life span cost	\$ 18,300	
Total Future Worth	\$ 130,900	
Annualized Cost	\$ 2,800	

Table G9: Preliminary Cost Estimate for Site 3, Alternative C

Upper bank vegetation

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,425	\$1,430	10% of project cost
Erosion Control	LS	1	\$764	\$760	6% of primary item cost
Clearing and Grubbing	ACRE	0.1	\$7,000	\$960	
Topsoil Import	CY	73	\$33	\$2,420	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	100	\$50	\$5,000	
Seeding and Mulch	ACRE	0.1	\$8,000	\$1,100	
Erosion Control Blanket	SY	667	\$3	\$2,000	
Damage Repair	LS	1	\$255	\$250	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$509	\$510	4% of primary item cost
Total				\$ 15,680	
Contingency (30%)				\$ 4,700	
Subtotal				\$ 20,400	
Design, Permitting, and Administration (30%)				\$ 4,700	
Total w/ Contingency & Engineering				\$ 25,100	

30-yr and Annualized Cost analysis

Category:	Veg. only	
Estimated life span (years)	10	3 number of major maint. events
Expected annual maintenance	\$ 380	50% of damage repair and maintenance
End of life span maintenance	\$ 6,280	25% of original project cost
Future Capital Cost	\$ 60,900	
Future annual maintenance	\$ 18,080	
Future end of life span cost	\$ 35,030	
Total Future Worth	\$ 114,000	
Annualized Cost	\$ 2,400	

Table G10: Preliminary Cost Estimate for Site 4, Alternative A

Establish vegetated buffer

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,349	\$1,350	10% of project cost
Erosion Control	LS	1	\$637	\$640	6% of primary item cost
Clearing and Grubbing	ACRE	0.2	\$7,000	\$1,290	
Topsoil Import	CY	49	\$33	\$1,610	
Plant Shrubs	EA	125	\$50	\$6,250	
Seeding and Mulch	ACRE	0.2	\$8,000	\$1,470	
Temporary fencing	LF	800	\$2	\$1,600	
Damage Repair	LS	1	\$212	\$210	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$425	\$420	4% of primary item cost
Total				\$ 14,840	
Contingency (30%)				\$ 4,450	
Subtotal				\$ 19,300	
Design, Permitting, and Administration (30%)				\$ 4,450	
Total w/ Contingency & Engineering				\$ 23,700	

30-yr and Annualized Cost analysis

Category:	Veg. only	
Estimated life span (years)	10	3 number of major maint. events
Expected annual maintenance	\$ 320	50% of damage repair and maintenance
End of life span maintenance	\$ 5,930	25% of original project cost
Future Capital Cost	\$ 57,500	
Future annual maintenance	\$ 15,220	
Future end of life span cost	\$ 33,070	
Total Future Worth	\$ 105,800	
Annualized Cost	\$ 2,200	

Table G11: Preliminary Cost Estimate for Site 4, Alternative B

Realign disc golf course

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$4,592	\$4,590	10% of project cost
Erosion Control	LS	1	\$2,460	\$2,460	6% of primary item cost
Clearing and Grubbing	ACRE	0.7	\$7,000	\$4,820	
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Move Pin	EA	4	\$2,500	\$10,000	
Move Tee Box	EA	4	\$500	\$2,000	
Remove Old Tee Box	EA	4	\$500	\$2,000	
Topsoil Import	CY	111	\$33	\$3,670	
Plant Trees	EA	20	\$250	\$5,000	
Plant Shrubs	EA	80	\$50	\$4,000	
Seeding and Mulch	ACRE	0.7	\$8,000	\$5,510	
Damage Repair	LS	1	\$820	\$820	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$1,640	\$1,640	4% of primary item cost
Total				\$ 50,510	
Contingency (30%)				\$ 15,150	
Subtotal				\$ 65,700	
Design, Permitting, and Administration (30%)				\$ 15,150	
Total w/ Contingency & Engineering				\$ 80,800	

30-yr and Annualized Cost analysis

Category:	General grading	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 250	10% of damage repair and maintenance
End of life span maintenance	\$ 8,080	10% of original project cost
Future Capital Cost	\$ 196,100	
Future annual maintenance	\$ 11,890	
Future end of life span cost	\$ 14,590	
Total Future Worth	\$ 222,600	
Annualized Cost	\$ 4,700	

Table G12: Preliminary Cost Estimate for Site 5, Alternative A

Stabilize steep, eroding bank with hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$988	\$990	10% of project cost
Control of Water	LS	1	\$341	\$340	4% of primary item cost
Erosion Control	LS	1	\$511	\$510	6% of primary item cost
Clearing and Grubbing	ACRE	0.01	\$7,000	\$80	
Select Tree Removal (>6")	EA	3	\$400	\$1,200	
Grading	SY	56	\$6	\$330	
Furnish and Install Fieldstone Riprap	TON	26	\$100	\$2,590	
Topsoil Import	CY	9	\$33	\$310	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	50	\$50	\$2,500	
Seeding and Mulch	ACRE	0.01	\$8,000	\$90	
Erosion Control Blanket	SY	56	\$3	\$170	
Damage Repair	LS	1	\$170	\$170	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$341	\$340	4% of primary item cost
Total				\$ 10,870	
Contingency (30%)				\$ 3,260	
Subtotal				\$ 14,100	
Design, Permitting, and Administration (30%)				\$ 3,260	
Total w/ Contingency & Engineering				\$ 17,400	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 130	25% of damage repair and maintenance
End of life span maintenance	\$ 8,700	50% of original project cost
Future Capital Cost	\$ 42,200	
Future annual maintenance	\$ 6,180	
Future end of life span cost	\$ 15,710	
Total Future Worth	\$ 64,100	
Annualized Cost	\$ 1,300	

Table G13: Preliminary Cost Estimate for Site 5, Alternative B

Vegetate steep, eroding bank with VRSS

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,957	\$1,960	10% of project cost
Control of Water	LS	1	\$712	\$710	4% of primary item cost
Erosion Control	LS	1	\$1,067	\$1,070	6% of primary item cost
Clearing and Grubbing	ACRE	0.01	\$7,000	\$80	
Select Tree Removal (>6")	EA	2	\$400	\$800	
Grading	SY	56	\$6	\$330	
Furnish and Install Fieldstone Riprap	TON	26	\$100	\$2,590	
VRSS	LF	150	\$45	\$6,750	
Topsoil Import	CY	28	\$33	\$920	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	50	\$50	\$2,500	
Seeding and Mulch	ACRE	0.01	\$8,000	\$90	
Erosion Control Blanket	SY	56	\$3	\$170	
Damage Repair	LS	1	\$310	\$310	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$2,000	\$2,000	
Total				\$ 21,530	
Contingency (30%)				\$ 6,460	
Subtotal				\$ 28,000	
Design, Permitting, and Administration (30%)				\$ 6,460	
Total w/ Contingency & Engineering				\$ 34,500	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 580	25% of damage repair and maintenance
End of life span maintenance	\$ 8,630	25% of original project cost
Future Capital Cost	\$ 83,700	
Future annual maintenance	\$ 27,590	
Future end of life span cost	\$ 15,590	
Total Future Worth	\$ 126,900	
Annualized Cost	\$ 2,700	

Table G14: Preliminary Cost Estimate for Site 6, Alternative A

Stabilize bridge abutments with riprap and log vanes

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$680	\$680	10% of project cost
Control of Water	LS	1	\$272	\$270	4% of primary item cost
Erosion Control	LS	1	\$408	\$410	6% of primary item cost
Clearing and Grubbing	ACRE	0.005	\$7,000	\$30	
Select Tree Removal (>6")	EA	2	\$400	\$800	
Grading	SY	44	\$6	\$270	
Furnish and Install Fieldstone Riprap	TON	21	\$100	\$2,070	
Log Vanes	EA	2	\$1,200	\$2,400	
Topsoil Import	CY	4	\$33	\$120	
Plant Trees	EA	2	\$250	\$500	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.005	\$8,000	\$40	
Erosion Control Blanket	SY	22	\$3	\$70	
Damage Repair	LS	1	\$136	\$140	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$272	\$270	4% of primary item cost
Total				\$ 8,570	
Contingency (30%)				\$ 2,570	
Subtotal				\$ 11,100	
Design, Permitting, and Administration (30%)				\$ 2,570	
Total w/ Contingency & Engineering				\$ 13,700	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 100	25% of damage repair and maintenance
End of life span maintenance	\$ 6,850	50% of original project cost
Future Capital Cost	\$ 33,300	
Future annual maintenance	\$ 4,760	
Future end of life span cost	\$ 12,370	
Total Future Worth	\$ 50,400	
Annualized Cost	\$ 1,100	

Table G15: Preliminary Cost Estimate for Site 6, Alternative B

Stabilize bridge abutments with riprap only

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$699	\$700	10% of project cost
Control of Water	LS	1	\$280	\$280	4% of primary item cost
Erosion Control	LS	1	\$419	\$420	6% of primary item cost
Clearing and Grubbing	ACRE	0.005	\$7,000	\$30	
Select Tree Removal (>6")	EA	4	\$400	\$1,600	
Grading	SY	67	\$6	\$400	
Furnish and Install Fieldstone Riprap	TON	31	\$100	\$3,110	
Topsoil Import	CY	7	\$33	\$240	
Plant Trees	EA	4	\$250	\$1,000	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.005	\$8,000	\$40	
Erosion Control Blanket	SY	22	\$3	\$70	
Damage Repair	LS	1	\$140	\$140	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$280	\$280	4% of primary item cost
Total				\$ 8,810	
Contingency (30%)				\$ 2,640	
Subtotal				\$ 11,500	
Design, Permitting, and Administration (30%)				\$ 2,640	
Total w/ Contingency & Engineering				\$ 14,100	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 110	25% of damage repair and maintenance
End of life span maintenance	\$ 7,050	50% of original project cost
Future Capital Cost	\$ 34,200	
Future annual maintenance	\$ 5,230	
Future end of life span cost	\$ 12,730	
Total Future Worth	\$ 52,200	
Annualized Cost	\$ 1,100	

Table G16: Preliminary Cost Estimate for Site 7, Alternative A

Stabilize bridge abutments with riprap and log vanes

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$680	\$680	10% of project cost
Control of Water	LS	1	\$272	\$270	4% of primary item cost
Erosion Control	LS	1	\$408	\$410	6% of primary item cost
Clearing and Grubbing	ACRE	0.005	\$7,000	\$30	
Select Tree Removal (>6")	EA	2	\$400	\$800	
Grading	SY	44	\$6	\$270	
Furnish and Install Fieldstone Riprap	TON	21	\$100	\$2,070	
Log Vanes	EA	2	\$1,200	\$2,400	
Topsoil Import	CY	4	\$33	\$120	
Plant Trees	EA	2	\$250	\$500	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.005	\$8,000	\$40	
Erosion Control Blanket	SY	22	\$3	\$70	
Damage Repair	LS	1	\$136	\$140	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$272	\$270	4% of primary item cost
Total				\$ 8,570	
Contingency (30%)				\$ 2,570	
Subtotal				\$ 11,100	
Design, Permitting, and Administration (30%)				\$ 2,570	
Total w/ Contingency & Engineering				\$ 13,700	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 100	25% of damage repair and maintenance
End of life span maintenance	\$ 6,850	50% of original project cost
Future Capital Cost	\$ 33,300	
Future annual maintenance	\$ 4,760	
Future end of life span cost	\$ 12,370	
Total Future Worth	\$ 50,400	
Annualized Cost	\$ 1,100	

Table G17: Preliminary Cost Estimate for Site 7, Alternative B

Stabilize bridge abutments with riprap only

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$699	\$700	10% of project cost
Control of Water	LS	1	\$280	\$280	4% of primary item cost
Erosion Control	LS	1	\$419	\$420	6% of primary item cost
Clearing and Grubbing	ACRE	0.005	\$7,000	\$30	
Select Tree Removal (>6")	EA	4	\$400	\$1,600	
Grading	SY	67	\$6	\$400	
Furnish and Install Fieldstone Riprap	TON	31	\$100	\$3,110	
Topsoil Import	CY	7	\$33	\$240	
Plant Trees	EA	4	\$250	\$1,000	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.005	\$8,000	\$40	
Erosion Control Blanket	SY	22	\$3	\$70	
Damage Repair	LS	1	\$140	\$140	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$280	\$280	4% of primary item cost
Total				\$ 8,810	
Contingency (30%)				\$ 2,640	
Subtotal				\$ 11,500	
Design, Permitting, and Administration (30%)				\$ 2,640	
Total w/ Contingency & Engineering				\$ 14,100	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 110	25% of damage repair and maintenance
End of life span maintenance	\$ 7,050	50% of original project cost
Future Capital Cost	\$ 34,200	
Future annual maintenance	\$ 5,230	
Future end of life span cost	\$ 12,730	
Total Future Worth	\$ 52,200	
Annualized Cost	\$ 1,100	

Table G18: Preliminary Cost Estimate for Site 8, Alternative A

Stabilize bridge abutments with riprap and log vanes

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$680	\$680	10% of project cost
Control of Water	LS	1	\$272	\$270	4% of primary item cost
Erosion Control	LS	1	\$408	\$410	6% of primary item cost
Clearing and Grubbing	ACRE	0.005	\$7,000	\$30	
Select Tree Removal (>6")	EA	2	\$400	\$800	
Grading	SY	44	\$6	\$270	
Furnish and Install Fieldstone Riprap	TON	21	\$100	\$2,070	
Log Vanes	EA	2	\$1,200	\$2,400	
Topsoil Import	CY	4	\$33	\$120	
Plant Trees	EA	2	\$250	\$500	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.005	\$8,000	\$40	
Erosion Control Blanket	SY	22	\$3	\$70	
Damage Repair	LS	1	\$136	\$140	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$272	\$270	4% of primary item cost
Total				\$ 8,570	
Contingency (30%)				\$ 2,570	
Subtotal				\$ 11,100	
Design, Permitting, and Administration (30%)				\$ 2,570	
Total w/ Contingency & Engineering				\$ 13,700	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 100	25% of damage repair and maintenance
End of life span maintenance	\$ 6,850	50% of original project cost
Future Capital Cost	\$ 33,300	
Future annual maintenance	\$ 4,760	
Future end of life span cost	\$ 12,370	
Total Future Worth	\$ 50,400	
Annualized Cost	\$ 1,100	

Table G19: Preliminary Cost Estimate for Site 8, Alternative B

Stabilize bridge abutments with riprap only

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$699	\$700	10% of project cost
Control of Water	LS	1	\$280	\$280	4% of primary item cost
Erosion Control	LS	1	\$419	\$420	6% of primary item cost
Clearing and Grubbing	ACRE	0.005	\$7,000	\$30	
Select Tree Removal (>6")	EA	4	\$400	\$1,600	
Grading	SY	67	\$6	\$400	
Furnish and Install Fieldstone Riprap	TON	31	\$100	\$3,110	
Topsoil Import	CY	7	\$33	\$240	
Plant Trees	EA	4	\$250	\$1,000	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.005	\$8,000	\$40	
Erosion Control Blanket	SY	22	\$3	\$70	
Damage Repair	LS	1	\$140	\$140	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$280	\$280	4% of primary item cost
Total				\$ 8,810	
Contingency (30%)				\$ 2,640	
Subtotal				\$ 11,500	
Design, Permitting, and Administration (30%)				\$ 2,640	
Total w/ Contingency & Engineering				\$ 14,100	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 110	25% of damage repair and maintenance
End of life span maintenance	\$ 7,050	50% of original project cost
Future Capital Cost	\$ 34,200	
Future annual maintenance	\$ 5,230	
Future end of life span cost	\$ 12,730	
Total Future Worth	\$ 52,200	
Annualized Cost	\$ 1,100	

Table G20: Preliminary Cost Estimate for Site 9, Alternative A

Stabilize bridge abutments with riprap and log vanes

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$680	\$680	10% of project cost
Control of Water	LS	1	\$272	\$270	4% of primary item cost
Erosion Control	LS	1	\$408	\$410	6% of primary item cost
Clearing and Grubbing	ACRE	0.005	\$7,000	\$30	
Select Tree Removal (>6")	EA	2	\$400	\$800	
Grading	SY	44	\$6	\$270	
Furnish and Install Fieldstone Riprap	TON	21	\$100	\$2,070	
Log Vanes	EA	2	\$1,200	\$2,400	
Topsoil Import	CY	4	\$33	\$120	
Plant Trees	EA	2	\$250	\$500	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.005	\$8,000	\$40	
Erosion Control Blanket	SY	22	\$3	\$70	
Damage Repair	LS	1	\$136	\$140	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$272	\$270	4% of primary item cost
Total				\$ 8,570	
Contingency (30%)				\$ 2,570	
Subtotal				\$ 11,100	
Design, Permitting, and Administration (30%)				\$ 2,570	
Total w/ Contingency & Engineering				\$ 13,700	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 100	25% of damage repair and maintenance
End of life span maintenance	\$ 6,850	50% of original project cost
Future Capital Cost	\$ 33,300	
Future annual maintenance	\$ 4,760	
Future end of life span cost	\$ 12,370	
Total Future Worth	\$ 50,400	
Annualized Cost	\$ 1,100	

Table G21: Preliminary Cost Estimate for Site 9, Alternative B

Stabilize bridge abutments with riprap only

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$699	\$700	10% of project cost
Control of Water	LS	1	\$280	\$280	4% of primary item cost
Erosion Control	LS	1	\$419	\$420	6% of primary item cost
Clearing and Grubbing	ACRE	0.005	\$7,000	\$30	
Select Tree Removal (>6")	EA	4	\$400	\$1,600	
Grading	SY	67	\$6	\$400	
Furnish and Install Fieldstone Riprap	TON	31	\$100	\$3,110	
Topsoil Import	CY	7	\$33	\$240	
Plant Trees	EA	4	\$250	\$1,000	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.005	\$8,000	\$40	
Erosion Control Blanket	SY	22	\$3	\$70	
Damage Repair	LS	1	\$140	\$140	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$280	\$280	4% of primary item cost
Total				\$ 8,810	
Contingency (30%)				\$ 2,640	
Subtotal				\$ 11,500	
Design, Permitting, and Administration (30%)				\$ 2,640	
Total w/ Contingency & Engineering				\$ 14,100	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 110	25% of damage repair and maintenance
End of life span maintenance	\$ 7,050	50% of original project cost
Future Capital Cost	\$ 34,200	
Future annual maintenance	\$ 5,230	
Future end of life span cost	\$ 12,730	
Total Future Worth	\$ 52,200	
Annualized Cost	\$ 1,100	

Table G22: Preliminary Cost Estimate for Site 10, Alternative A

Raise Stream Bed in Fernbrook Lane North Culvert

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$593	\$590	10% of project cost
Control of Water	LS	1	\$1,000	\$1,000	
Erosion Control	LS	1	\$274	\$270	6% of primary item cost
Raise Stream Bed in Culvert	TON	26	\$136	\$3,530	
Seeding and Mulch	ACRE	0.05	\$8,000	\$370	
Erosion Control Blanket	SY	222	\$3	\$670	
Damage Repair	LS	1	\$91	\$90	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$183	\$180	4% of primary item cost
Total				\$ 6,700	
Contingency (30%)				\$ 2,010	
Subtotal				\$ 8,700	
Design, Permitting, and Administration (30%)				\$ 2,010	
Total w/ Contingency & Engineering				\$ 10,700	

30-yr and Annualized Cost analysis

Category:	Culvert bed	
Estimated life span (years)	15	2 number of major maint. events
Expected annual maintenance	\$ 20	25% of damage repair and maintenance
End of life span maintenance	\$ 5,350	50% of original project cost
Future Capital Cost	\$ 26,000	
Future annual maintenance	\$ 950	
Future end of life span cost	\$ 21,320	
Total Future Worth	\$ 48,300	
Annualized Cost	\$ 1,000	

Table G23: Preliminary Cost Estimate for Site 10, Alternative B

Create Meanders in Open Area to Add 70' of Stream Length

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$7,417	\$7,420	10% of project cost
Control of Water	LS	1	\$2,557	\$2,560	4% of primary item cost
Erosion Control	LS	1	\$3,836	\$3,840	6% of primary item cost
Clearing and Grubbing	ACRE	0.2	\$7,000	\$1,290	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Excavate/Salvage Soil	CY	1185	\$15	\$17,780	
Grading	SY	889	\$6	\$5,330	
Topsoil Import	CY	148	\$33	\$4,890	
Root Wads	EA	15	\$750	\$11,250	
Rock Boulder Vane	EA	3	\$2,000	\$6,000	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	200	\$50	\$10,000	
Seeding and Mulch	ACRE	0.2	\$8,000	\$1,470	
Erosion Control Blanket	SY	889	\$3	\$2,670	
Damage Repair	LS	1	\$1,279	\$1,280	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$2,557	\$2,560	4% of primary item cost
Total				\$ 81,590	
Contingency (30%)				\$ 24,480	
Subtotal				\$ 106,100	
Design, Permitting, and Administration (30%)				\$ 24,480	
Total w/ Contingency & Engineering				\$ 130,600	

30-yr and Annualized Cost analysis

Category:	Remeander	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 380	10% of damage repair and maintenance
End of life span maintenance	\$ 13,060	10% of original project cost
Future Capital Cost	\$ 317,000	
Future annual maintenance	\$ 18,080	
Future end of life span cost	\$ 23,590	
Total Future Worth	\$ 358,700	
Annualized Cost	\$ 7,500	

Table G24: Preliminary Cost Estimate for Site 10, Alternative C

Raise channel bed using cross vanes/constructed riffles

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,906	\$1,910	10% of project cost
Control of Water	LS	1	\$657	\$660	4% of primary item cost
Erosion Control	LS	1	\$985	\$990	6% of primary item cost
Rock Boulder Cross-Vane	EA	4	\$4,000	\$16,000	
Seeding and Mulch	ACRE	0.02	\$8,000	\$150	
Erosion Control Blanket	SY	89	\$3	\$270	
Damage Repair	LS	1	\$328	\$330	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$657	\$660	4% of primary item cost
Total				\$ 20,970	
Contingency (30%)				\$ 6,290	
Subtotal				\$ 27,300	
Design, Permitting, and Administration (30%)				\$ 6,290	
Total w/ Contingency & Engineering				\$ 33,600	

30-yr and Annualized Cost analysis

Category:	Rock vanes	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 250	25% of damage repair and maintenance
End of life span maintenance	\$ 16,800	50% of original project cost
Future Capital Cost	\$ 81,600	
Future annual maintenance	\$ 11,890	
Future end of life span cost	\$ 30,340	
Total Future Worth	\$ 123,800	
Annualized Cost	\$ 2,600	

Table G25: Preliminary Cost Estimate for Site 10, Alternative D

Lower Adjacent Floodplain

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$7,008	\$7,010	10% of project cost
Control of Water	LS	1	\$2,416	\$2,420	4% of primary item cost
Erosion Control	LS	1	\$3,625	\$3,620	6% of primary item cost
Clearing and Grubbing	ACRE	0.5	\$7,000	\$3,210	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Excavation/Dispose of Soil	CY	741	\$30	\$22,220	
Grading	SY	2222	\$6	\$13,330	
Excavate/Salvage Soil	CY	370	\$15	\$5,560	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	50	\$50	\$2,500	
Seeding and Mulch	ACRE	0.5	\$8,000	\$3,670	
Erosion Control Blanket	SY	2222	\$3	\$6,670	
Damage Repair	LS	1	\$1,208	\$1,210	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$2,416	\$2,420	4% of primary item cost
Total				\$ 77,090	
Contingency (30%)				\$ 23,130	
Subtotal				\$ 100,200	
Design, Permitting, and Administration (30%)				\$ 23,130	
Total w/ Contingency & Engineering				\$ 123,400	

30-yr and Annualized Cost analysis

Category:	General grading	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 360	10% of damage repair and maintenance
End of life span maintenance	\$ 12,340	10% of original project cost
Future Capital Cost	\$ 299,500	
Future annual maintenance	\$ 17,130	
Future end of life span cost	\$ 22,290	
Total Future Worth	\$ 338,900	
Annualized Cost	\$ 7,100	

Table G26: Preliminary Cost Estimate for Site 11, Alternative A

Stabilize eroding banks with hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,025	\$1,030	10% of project cost
Control of Water	LS	1	\$354	\$350	4% of primary item cost
Erosion Control	LS	1	\$530	\$530	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$140	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Grading	SY	100	\$6	\$600	
Furnish and Install Fieldstone Riprap	TON	23	\$100	\$2,330	
Topsoil Import	CY	17	\$33	\$550	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$170	
Erosion Control Blanket	SY	100	\$3	\$300	
Damage Repair	LS	1	\$177	\$180	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$354	\$350	4% of primary item cost
Total				\$ 11,280	
Contingency (30%)				\$ 3,380	
Subtotal				\$ 14,700	
Design, Permitting, and Administration (30%)				\$ 3,380	
Total w/ Contingency & Engineering				\$ 18,000	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 130	25% of damage repair and maintenance
End of life span maintenance	\$ 9,000	50% of original project cost
Future Capital Cost	\$ 43,700	
Future annual maintenance	\$ 6,180	
Future end of life span cost	\$ 16,260	
Total Future Worth	\$ 66,100	
Annualized Cost	\$ 1,400	

Table G27: Preliminary Cost Estimate for Site 11, Alternative B

Stabilize banks with root wads

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,063	\$1,060	10% of project cost
Control of Water	LS	1	\$366	\$370	4% of primary item cost
Erosion Control	LS	1	\$550	\$550	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$140	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Grading	SY	50	\$6	\$300	
Root Wads	EA	4	\$750	\$3,000	
Topsoil Import	CY	17	\$33	\$550	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$5,600	\$120	
Erosion Control Blanket	SY	100	\$3	\$300	
Damage Repair	LS	1	\$183	\$180	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$366	\$370	4% of primary item cost
Total				\$ 11,690	
Contingency (30%)				\$ 3,510	
Subtotal				\$ 15,200	
Design, Permitting, and Administration (30%)				\$ 3,510	
Total w/ Contingency & Engineering				\$ 18,700	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 140	25% of damage repair and maintenance
End of life span maintenance	\$ 4,680	25% of original project cost
Future Capital Cost	\$ 45,400	
Future annual maintenance	\$ 6,660	
Future end of life span cost	\$ 8,450	
Total Future Worth	\$ 60,500	
Annualized Cost	\$ 1,300	

Table G28: Preliminary Cost Estimate for Site 12, Alternative A

Stabilize eroding banks with hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,025	\$1,030	10% of project cost
Control of Water	LS	1	\$354	\$350	4% of primary item cost
Erosion Control	LS	1	\$530	\$530	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$140	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Grading	SY	100	\$6	\$600	
Furnish and Install Fieldstone Riprap	TON	23	\$100	\$2,330	
Topsoil Import	CY	17	\$33	\$550	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$170	
Erosion Control Blanket	SY	100	\$3	\$300	
Damage Repair	LS	1	\$177	\$180	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$354	\$350	4% of primary item cost
Total				\$ 11,280	
Contingency (30%)				\$ 3,380	
Subtotal				\$ 14,700	
Design, Permitting, and Administration (30%)				\$ 3,380	
Total w/ Contingency & Engineering				\$ 18,000	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 130	25% of damage repair and maintenance
End of life span maintenance	\$ 9,000	50% of original project cost
Future Capital Cost	\$ 43,700	
Future annual maintenance	\$ 6,180	
Future end of life span cost	\$ 16,260	
Total Future Worth	\$ 66,100	
Annualized Cost	\$ 1,400	

Table G29: Preliminary Cost Estimate for Site 12, Alternative B

Stabilize banks with root wads

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,063	\$1,060	10% of project cost
Control of Water	LS	1	\$366	\$370	4% of primary item cost
Erosion Control	LS	1	\$550	\$550	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$140	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Grading	SY	50	\$6	\$300	
Root Wads	EA	4	\$750	\$3,000	
Topsoil Import	CY	17	\$33	\$550	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$5,600	\$120	
Erosion Control Blanket	SY	100	\$3	\$300	
Damage Repair	LS	1	\$183	\$180	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$366	\$370	4% of primary item cost
Total				\$ 11,690	
Contingency (30%)				\$ 3,510	
Subtotal				\$ 15,200	
Design, Permitting, and Administration (30%)				\$ 3,510	
Total w/ Contingency & Engineering				\$ 18,700	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 140	25% of damage repair and maintenance
End of life span maintenance	\$ 4,680	25% of original project cost
Future Capital Cost	\$ 45,400	
Future annual maintenance	\$ 6,660	
Future end of life span cost	\$ 8,450	
Total Future Worth	\$ 60,500	
Annualized Cost	\$ 1,300	

Table G30: Preliminary Cost Estimate for Site 13, Alternative A

Stabilize eroding banks with hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,025	\$1,030	10% of project cost
Control of Water	LS	1	\$354	\$350	4% of primary item cost
Erosion Control	LS	1	\$530	\$530	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$140	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Grading	SY	100	\$6	\$600	
Furnish and Install Fieldstone Riprap	TON	23	\$100	\$2,330	
Topsoil Import	CY	17	\$33	\$550	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$170	
Erosion Control Blanket	SY	100	\$3	\$300	
Damage Repair	LS	1	\$177	\$180	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$354	\$350	4% of primary item cost
Total				\$ 11,280	
Contingency (30%)				\$ 3,380	
Subtotal				\$ 14,700	
Design, Permitting, and Administration (30%)				\$ 3,380	
Total w/ Contingency & Engineering				\$ 18,000	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 130	25% of damage repair and maintenance
End of life span maintenance	\$ 9,000	50% of original project cost
Future Capital Cost	\$ 43,700	
Future annual maintenance	\$ 6,180	
Future end of life span cost	\$ 16,260	
Total Future Worth	\$ 66,100	
Annualized Cost	\$ 1,400	

Table G31: Preliminary Cost Estimate for Site 13, Alternative B

Stabilize banks with root wads

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,063	\$1,060	10% of project cost
Control of Water	LS	1	\$366	\$370	4% of primary item cost
Erosion Control	LS	1	\$550	\$550	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$140	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Grading	SY	50	\$6	\$300	
Root Wads	EA	4	\$750	\$3,000	
Topsoil Import	CY	17	\$33	\$550	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$5,600	\$120	
Erosion Control Blanket	SY	100	\$3	\$300	
Damage Repair	LS	1	\$183	\$180	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$366	\$370	4% of primary item cost
Total				\$ 11,690	
Contingency (30%)				\$ 3,510	
Subtotal				\$ 15,200	
Design, Permitting, and Administration (30%)				\$ 3,510	
Total w/ Contingency & Engineering				\$ 18,700	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 140	25% of damage repair and maintenance
End of life span maintenance	\$ 4,680	25% of original project cost
Future Capital Cost	\$ 45,400	
Future annual maintenance	\$ 6,660	
Future end of life span cost	\$ 8,450	
Total Future Worth	\$ 60,500	
Annualized Cost	\$ 1,300	

Table G32: Preliminary Cost Estimate for Site 14, Alternative A

Stabilize culvert outfall with hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$668	\$670	10% of project cost
Control of Water	LS	1	\$230	\$230	4% of primary item cost
Erosion Control	LS	1	\$345	\$350	6% of primary item cost
Clearing and Grubbing	ACRE	0.01	\$7,000	\$100	
Select Tree Removal (>6")	EA	2	\$400	\$800	
Grading	SY	67	\$6	\$400	
Furnish and Install Fieldstone Riprap	TON	31	\$100	\$3,110	
Topsoil Import	CY	6	\$33	\$180	
Plant Trees	EA	2	\$250	\$500	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.01	\$8,000	\$60	
Erosion Control Blanket	SY	33	\$3	\$100	
Damage Repair	LS	1	\$115	\$120	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$230	\$230	4% of primary item cost
Total				\$ 7,350	
Contingency (30%)				\$ 2,210	
Subtotal				\$ 9,600	
Design, Permitting, and Administration (30%)				\$ 2,210	
Total w/ Contingency & Engineering				\$ 11,800	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 90	25% of damage repair and maintenance
End of life span maintenance	\$ 5,900	50% of original project cost
Future Capital Cost	\$ 28,600	
Future annual maintenance	\$ 4,280	
Future end of life span cost	\$ 10,660	
Total Future Worth	\$ 43,500	
Annualized Cost	\$ 900	

Table G33: Preliminary Cost Estimate for Site 14, Alternative B

Stabilize culvert outfall with concrete swale

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$831	\$830	10% of project cost
Control of Water	LS	1	\$286	\$290	4% of primary item cost
Erosion Control	LS	1	\$430	\$430	6% of primary item cost
Clearing and Grubbing	ACRE	0.01	\$7,000	\$100	
Select Tree Removal (>6")	EA	2	\$400	\$800	
Grading	SY	67	\$6	\$400	
Install Concrete Swale	SY	50	\$80	\$4,000	
Furnish and Install Fieldstone Riprap	TON	5	\$100	\$520	
Topsoil Import	CY	6	\$33	\$180	
Plant Trees	EA	2	\$250	\$500	
Plant Shrubs	EA	10	\$50	\$500	
Seeding and Mulch	ACRE	0.01	\$8,000	\$60	
Erosion Control Blanket	SY	33	\$3	\$100	
Damage Repair	LS	1	\$143	\$140	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$286	\$290	4% of primary item cost
Total				\$ 8,310	
Contingency (30%)				\$ 2,490	
Subtotal				\$ 10,800	
Design, Permitting, and Administration (30%)				\$ 2,490	
Total w/ Contingency & Engineering				\$ 13,300	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 110	25% of damage repair and maintenance
End of life span maintenance	\$ 6,650	50% of original project cost
Future Capital Cost	\$ 32,300	
Future annual maintenance	\$ 5,230	
Future end of life span cost	\$ 12,010	
Total Future Worth	\$ 49,500	
Annualized Cost	\$ 1,000	

Table G34: Preliminary Cost Estimate for Site 15, Alternative A

Install bank stabilization measures at eroding banks using hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,906	\$1,910	10% of project cost
Control of Water	LS	1	\$657	\$660	4% of primary item cost
Erosion Control	LS	1	\$985	\$990	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$160	
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Grading	SY	111	\$6	\$670	
Furnish and Install Fieldstone Riprap	TON	65	\$100	\$6,480	
Topsoil Import	CY	19	\$33	\$610	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$180	
Erosion Control Blanket	SY	108	\$3	\$320	
Damage Repair	LS	1	\$328	\$330	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$657	\$660	4% of primary item cost
Total				\$ 20,970	
Contingency (30%)				\$ 6,290	
Subtotal				\$ 27,300	
Design, Permitting, and Administration (30%)				\$ 6,290	
Total w/ Contingency & Engineering				\$ 33,600	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 250	25% of damage repair and maintenance
End of life span maintenance	\$ 16,800	50% of original project cost
Future Capital Cost	\$ 81,600	
Future annual maintenance	\$ 11,890	
Future end of life span cost	\$ 30,340	
Total Future Worth	\$ 123,800	
Annualized Cost	\$ 2,600	

Table G35: Preliminary Cost Estimate for Site 15, Alternative B

Install 4 Rock Vanes for Bank Protection

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$2,092	\$2,090	10% of project cost
Control of Water	LS	1	\$584	\$580	4% of primary item cost
Erosion Control	LS	1	\$875	\$880	6% of primary item cost
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Rock Boulder Vane	EA	4	\$2,000	\$8,000	
Seeding and Mulch	ACRE	0.1	\$8,000	\$920	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Erosion Control Blanket	SY	556	\$3	\$1,670	
Damage Repair	LS	1	\$292	\$290	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$584	\$580	4% of primary item cost
Total				\$ 23,010	
Contingency (30%)				\$ 6,900	
Subtotal				\$ 29,900	
Design, Permitting, and Administration (30%)				\$ 6,900	
Total w/ Contingency & Engineering				\$ 36,800	

30-yr and Annualized Cost analysis

Category:	Rock vanes	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 220	25% of damage repair and maintenance
End of life span maintenance	\$ 18,400	50% of original project cost
Future Capital Cost	\$ 89,300	
Future annual maintenance	\$ 10,470	
Future end of life span cost	\$ 33,230	
Total Future Worth	\$ 133,000	
Annualized Cost	\$ 2,800	

Table G36: Preliminary Cost Estimate for Site 15, Alternative C

Install bank stabilization measures at eroding banks using toe wood

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$4,431	\$4,430	10% of project cost
Control of Water	LS	1	\$1,528	\$1,530	4% of primary item cost
Erosion Control	LS	1	\$2,292	\$2,290	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$160	
Select Tree Removal (>6")	EA	15	\$400	\$6,000	
Grading	SY	111	\$6	\$670	
Furnish and Install Toe Wood	LF	100	\$250	\$25,000	
Topsoil Import	CY	19	\$33	\$610	
Plant Trees	EA	15	\$250	\$3,750	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$180	
Erosion Control Blanket	SY	111	\$3	\$330	
Damage Repair	LS	1	\$764	\$760	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$1,528	\$1,530	4% of primary item cost
Total				\$ 48,740	
Contingency (30%)				\$ 14,620	
Subtotal				\$ 63,400	
Design, Permitting, and Administration (30%)				\$ 14,620	
Total w/ Contingency & Engineering				\$ 78,000	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 570	25% of damage repair and maintenance
End of life span maintenance	\$ 19,500	25% of original project cost
Future Capital Cost	\$ 189,300	
Future annual maintenance	\$ 27,120	
Future end of life span cost	\$ 35,220	
Total Future Worth	\$ 251,600	
Annualized Cost	\$ 5,300	

Table G37: Preliminary Cost Estimate for Site 16, Alternative A

Install bank stabilization measures at eroding banks using hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,906	\$1,910	10% of project cost
Control of Water	LS	1	\$657	\$660	4% of primary item cost
Erosion Control	LS	1	\$985	\$990	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$160	
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Grading	SY	111	\$6	\$670	
Furnish and Install Fieldstone Riprap	TON	65	\$100	\$6,480	
Topsoil Import	CY	19	\$33	\$610	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$180	
Erosion Control Blanket	SY	108	\$3	\$320	
Damage Repair	LS	1	\$328	\$330	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$657	\$660	4% of primary item cost
Total				\$ 20,970	
Contingency (30%)				\$ 6,290	
Subtotal				\$ 27,300	
Design, Permitting, and Administration (30%)				\$ 6,290	
Total w/ Contingency & Engineering				\$ 33,600	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 250	25% of damage repair and maintenance
End of life span maintenance	\$ 16,800	50% of original project cost
Future Capital Cost	\$ 81,600	
Future annual maintenance	\$ 11,890	
Future end of life span cost	\$ 30,340	
Total Future Worth	\$ 123,800	
Annualized Cost	\$ 2,600	

Table G38: Preliminary Cost Estimate for Site 16, Alternative B

Install 4 Rock Vanes for Bank Protection

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$2,092	\$2,090	10% of project cost
Control of Water	LS	1	\$584	\$580	4% of primary item cost
Erosion Control	LS	1	\$875	\$880	6% of primary item cost
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Rock Boulder Vane	EA	4	\$2,000	\$8,000	
Seeding and Mulch	ACRE	0.1	\$8,000	\$920	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Erosion Control Blanket	SY	556	\$3	\$1,670	
Damage Repair	LS	1	\$292	\$290	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$584	\$580	4% of primary item cost
Total				\$ 23,010	
Contingency (30%)				\$ 6,900	
Subtotal				\$ 29,900	
Design, Permitting, and Administration (30%)				\$ 6,900	
Total w/ Contingency & Engineering				\$ 36,800	

30-yr and Annualized Cost analysis

Category:	Rock vanes	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 220	25% of damage repair and maintenance
End of life span maintenance	\$ 18,400	50% of original project cost
Future Capital Cost	\$ 89,300	
Future annual maintenance	\$ 10,470	
Future end of life span cost	\$ 33,230	
Total Future Worth	\$ 133,000	
Annualized Cost	\$ 2,800	

Table G39: Preliminary Cost Estimate for Site 16, Alternative C

Install bank stabilization measures at eroding banks using toe wood

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$4,431	\$4,430	10% of project cost
Control of Water	LS	1	\$1,528	\$1,530	4% of primary item cost
Erosion Control	LS	1	\$2,292	\$2,290	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$160	
Select Tree Removal (>6")	EA	15	\$400	\$6,000	
Grading	SY	111	\$6	\$670	
Furnish and Install Toe Wood	LF	100	\$250	\$25,000	
Topsoil Import	CY	19	\$33	\$610	
Plant Trees	EA	15	\$250	\$3,750	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$180	
Erosion Control Blanket	SY	111	\$3	\$330	
Damage Repair	LS	1	\$764	\$760	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$1,528	\$1,530	4% of primary item cost
Total				\$ 48,740	
Contingency (30%)				\$ 14,620	
Subtotal				\$ 63,400	
Design, Permitting, and Administration (30%)				\$ 14,620	
Total w/ Contingency & Engineering				\$ 78,000	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 570	25% of damage repair and maintenance
End of life span maintenance	\$ 19,500	25% of original project cost
Future Capital Cost	\$ 189,300	
Future annual maintenance	\$ 27,120	
Future end of life span cost	\$ 35,220	
Total Future Worth	\$ 251,600	
Annualized Cost	\$ 5,300	

Table G40: Preliminary Cost Estimate for Site 17, Alternative A

Install bank stabilization measures at eroding banks using hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,906	\$1,910	10% of project cost
Control of Water	LS	1	\$657	\$660	4% of primary item cost
Erosion Control	LS	1	\$985	\$990	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$160	
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Grading	SY	111	\$6	\$670	
Furnish and Install Fieldstone Riprap	TON	65	\$100	\$6,480	
Topsoil Import	CY	19	\$33	\$610	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$180	
Erosion Control Blanket	SY	108	\$3	\$320	
Damage Repair	LS	1	\$328	\$330	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$657	\$660	4% of primary item cost
Total				\$ 20,970	
Contingency (30%)				\$ 6,290	
Subtotal				\$ 27,300	
Design, Permitting, and Administration (30%)				\$ 6,290	
Total w/ Contingency & Engineering				\$ 33,600	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 250	25% of damage repair and maintenance
End of life span maintenance	\$ 16,800	50% of original project cost
Future Capital Cost	\$ 81,600	
Future annual maintenance	\$ 11,890	
Future end of life span cost	\$ 30,340	
Total Future Worth	\$ 123,800	
Annualized Cost	\$ 2,600	

Table G41: Preliminary Cost Estimate for Site 17, Alternative B

Install 4 Rock Vanes for Bank Protection

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$2,092	\$2,090	10% of project cost
Control of Water	LS	1	\$584	\$580	4% of primary item cost
Erosion Control	LS	1	\$875	\$880	6% of primary item cost
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Rock Boulder Vane	EA	4	\$2,000	\$8,000	
Seeding and Mulch	ACRE	0.1	\$8,000	\$920	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Erosion Control Blanket	SY	556	\$3	\$1,670	
Damage Repair	LS	1	\$292	\$290	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$584	\$580	4% of primary item cost
Total				\$ 23,010	
Contingency (30%)				\$ 6,900	
Subtotal				\$ 29,900	
Design, Permitting, and Administration (30%)				\$ 6,900	
Total w/ Contingency & Engineering				\$ 36,800	

30-yr and Annualized Cost analysis

Category:	Rock vanes	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 220	25% of damage repair and maintenance
End of life span maintenance	\$ 18,400	50% of original project cost
Future Capital Cost	\$ 89,300	
Future annual maintenance	\$ 10,470	
Future end of life span cost	\$ 33,230	
Total Future Worth	\$ 133,000	
Annualized Cost	\$ 2,800	

Table G42: Preliminary Cost Estimate for Site 17, Alternative C

Install bank stabilization measures at eroding banks using toe wood

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$4,431	\$4,430	10% of project cost
Control of Water	LS	1	\$1,528	\$1,530	4% of primary item cost
Erosion Control	LS	1	\$2,292	\$2,290	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$160	
Select Tree Removal (>6")	EA	15	\$400	\$6,000	
Grading	SY	111	\$6	\$670	
Furnish and Install Toe Wood	LF	100	\$250	\$25,000	
Topsoil Import	CY	19	\$33	\$610	
Plant Trees	EA	15	\$250	\$3,750	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$180	
Erosion Control Blanket	SY	111	\$3	\$330	
Damage Repair	LS	1	\$764	\$760	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$1,528	\$1,530	4% of primary item cost
Total				\$ 48,740	
Contingency (30%)				\$ 14,620	
Subtotal				\$ 63,400	
Design, Permitting, and Administration (30%)				\$ 14,620	
Total w/ Contingency & Engineering				\$ 78,000	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 570	25% of damage repair and maintenance
End of life span maintenance	\$ 19,500	25% of original project cost
Future Capital Cost	\$ 189,300	
Future annual maintenance	\$ 27,120	
Future end of life span cost	\$ 35,220	
Total Future Worth	\$ 251,600	
Annualized Cost	\$ 5,300	

Table G43: Preliminary Cost Estimate for Site 18, Alternative A

Remove Large Woody Debris

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$338	\$340	10% of project cost
Select Tree Removal (>6")	EA	3	\$500	\$1,500	
Seeding and Mulch	ACRE	0.1	\$10,000	\$690	
Erosion Control Blanket	SY	333	\$3	\$1,000	
Damage Repair	LS	1	\$64	\$60	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$128	\$130	4% of primary item cost
Total				\$ 3,720	
Contingency (30%)				\$ 1,120	
Subtotal				\$ 4,800	
Design, Permitting, and Administration (30%)				\$ 1,120	
Total w/ Contingency & Engineering				\$ 6,000	

30-yr and Annualized Cost analysis

Category:	Debris Removal	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ -	0% of damage repair and maintenance
End of life span maintenance	\$ 1,500	25% of original project cost
Future Capital Cost	\$ 14,600	
Future annual maintenance	\$ -	
Future end of life span cost	\$ 2,710	
Total Future Worth	\$ 17,300	
Annualized Cost	\$ 400	

Table G44: Preliminary Cost Estimate for Site 19, Alternative A

Remove Large Woody Debris

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$338	\$340	10% of project cost
Select Tree Removal (>6")	EA	3	\$500	\$1,500	
Seeding and Mulch	ACRE	0.1	\$10,000	\$690	
Erosion Control Blanket	SY	333	\$3	\$1,000	
Damage Repair	LS	1	\$64	\$60	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$128	\$130	4% of primary item cost
Total				\$ 3,720	
Contingency (30%)				\$ 1,120	
Subtotal				\$ 4,800	
Design, Permitting, and Administration (30%)				\$ 1,120	
Total w/ Contingency & Engineering				\$ 6,000	

30-yr and Annualized Cost analysis

Category:	Debris Removal	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ -	0% of damage repair and maintenance
End of life span maintenance	\$ 1,500	25% of original project cost
Future Capital Cost	\$ 14,600	
Future annual maintenance	\$ -	
Future end of life span cost	\$ 2,710	
Total Future Worth	\$ 17,300	
Annualized Cost	\$ 400	

Table G45: Preliminary Cost Estimate for Site 20, Alternative A

Stabilize with hard armor

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$2,716	\$2,720	10% of project cost
Control of Water	LS	1	\$936	\$940	4% of primary item cost
Erosion Control	LS	1	\$1,405	\$1,400	6% of primary item cost
Clearing and Grubbing	ACRE	0.05	\$7,000	\$320	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Grading	SY	222	\$6	\$1,330	
Furnish and Install Fieldstone Riprap	TON	162	\$100	\$16,200	
Topsoil Import	CY	19	\$33	\$610	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	20	\$50	\$1,000	
Seeding and Mulch	ACRE	0.05	\$8,000	\$370	
Erosion Control Blanket	SY	111	\$3	\$330	
Damage Repair	LS	1	\$468	\$470	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$936	\$940	4% of primary item cost
Total				\$ 29,880	
Contingency (30%)				\$ 8,960	
Subtotal				\$ 38,800	
Design, Permitting, and Administration (30%)				\$ 8,960	
Total w/ Contingency & Engineering				\$ 47,800	

30-yr and Annualized Cost analysis

Category:	Hard armor	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 350	25% of damage repair and maintenance
End of life span maintenance	\$ 23,900	50% of original project cost
Future Capital Cost	\$ 116,000	
Future annual maintenance	\$ 16,650	
Future end of life span cost	\$ 43,170	
Total Future Worth	\$ 175,800	
Annualized Cost	\$ 3,700	

Table G46: Preliminary Cost Estimate for Site 20, Alternative B

Stabilize with toe wood and grading to broaden meander

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$8,184	\$8,180	10% of project cost
Control of Water	LS	1	\$2,822	\$2,820	4% of primary item cost
Erosion Control	LS	1	\$4,234	\$4,230	6% of primary item cost
Clearing and Grubbing	ACRE	0.1	\$7,000	\$960	
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Excavate/Salvage Soil	CY	889	\$15	\$13,330	
Grading	SY	667	\$6	\$4,000	
Topsoil Import	CY	111	\$33	\$3,670	
Furnish and Install Toe Wood	LF	150	\$250	\$37,500	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.1	\$8,000	\$1,100	
Erosion Control Blanket	SY	667	\$3	\$2,000	
Damage Repair	LS	1	\$1,411	\$1,410	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$2,822	\$2,820	4% of primary item cost
Total				\$ 90,020	
Contingency (30%)				\$ 27,010	
Subtotal				\$ 117,000	
Design, Permitting, and Administration (30%)				\$ 27,010	
Total w/ Contingency & Engineering				\$ 144,000	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 1,060	25% of damage repair and maintenance
End of life span maintenance	\$ 36,000	25% of original project cost
Future Capital Cost	\$ 349,500	
Future annual maintenance	\$ 50,430	
Future end of life span cost	\$ 65,020	
Total Future Worth	\$ 465,000	
Annualized Cost	\$ 9,800	

Table G47: Preliminary Cost Estimate for Site 20, Alternative C

Controlled overflow, install grade control structure downstream

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$2,840	\$2,840	10% of project cost
Control of Water	LS	1	\$979	\$980	4% of primary item cost
Erosion Control	LS	1	\$1,469	\$1,470	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$160	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Grading	SY	333	\$6	\$2,000	
Furnish and Install Fieldstone Riprap	TON	156	\$100	\$15,560	
Plant Trees	EA	5	\$250	\$1,250	
Plant Shrubs	EA	20	\$50	\$1,000	
Rock Boulder Vane	EA	1	\$2,000	\$2,000	
Seeding and Mulch	ACRE	0.02	\$8,000	\$180	
Erosion Control Blanket	SY	111	\$3	\$330	
Damage Repair	LS	1	\$490	\$490	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$979	\$980	4% of primary item cost
Total				\$ 31,240	
Contingency (30%)				\$ 9,370	
Subtotal				\$ 40,600	
Design, Permitting, and Administration (30%)				\$ 9,370	
Total w/ Contingency & Engineering				\$ 50,000	

30-yr and Annualized Cost analysis

Category:	Rock vanes	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 370	25% of damage repair and maintenance
End of life span maintenance	\$ 25,000	50% of original project cost
Future Capital Cost	\$ 121,400	
Future annual maintenance	\$ 17,600	
Future end of life span cost	\$ 45,150	
Total Future Worth	\$ 184,200	
Annualized Cost	\$ 3,900	

Table G48: Preliminary Cost Estimate for Site 21, Alternative A

Narrow Channel for Approx. 80'

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,514	\$1,510	10% of project cost
Control of Water	LS	1	\$522	\$520	4% of primary item cost
Erosion Control	LS	1	\$784	\$780	6% of primary item cost
Clearing and Grubbing	ACRE	0.04	\$7,000	\$260	
Select Tree Removal (>6")	EA	10	\$400	\$4,000	
Common Fill Import	CY	119	\$25	\$2,960	
Grading	SY	89	\$6	\$530	
Topsoil Import	CY	15	\$33	\$490	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.04	\$8,000	\$290	
Erosion Control Blanket	SY	178	\$3	\$530	
Damage Repair	LS	1	\$261	\$260	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$522	\$520	4% of primary item cost
Total				\$ 16,650	
Contingency (30%)				\$ 5,000	
Subtotal				\$ 21,700	
Design, Permitting, and Administration (30%)				\$ 5,000	
Total w/ Contingency & Engineering				\$ 26,700	

30-yr and Annualized Cost analysis

Category:	General grading	
Estimated life span (years)	30	1 number of major maint. events
Expected annual maintenance	\$ 80	10% of damage repair and maintenance
End of life span maintenance	\$ 2,670	10% of original project cost
Future Capital Cost	\$ 64,800	
Future annual maintenance	\$ 3,810	
Future end of life span cost	\$ 4,820	
Total Future Worth	\$ 73,400	
Annualized Cost	\$ 1,500	

Table G49: Preliminary Cost Estimate for Site 21, Alternative B

Install log vanes within reach

Item Description	Unit	Estimated Quantity	Unit Price	Extension	Notes
Mobilization	LS	1	\$1,221	\$1,220	10% of project cost
Control of Water	LS	1	\$421	\$420	4% of primary item cost
Erosion Control	LS	1	\$632	\$630	6% of primary item cost
Clearing and Grubbing	ACRE	0.02	\$7,000	\$130	
Select Tree Removal (>6")	EA	5	\$400	\$2,000	
Log Vanes	EA	3	\$1,200	\$3,600	
Grading	SY	33	\$6	\$200	
Topsoil Import	CY	6	\$33	\$180	
Plant Trees	EA	10	\$250	\$2,500	
Plant Shrubs	EA	30	\$50	\$1,500	
Seeding and Mulch	ACRE	0.02	\$8,000	\$150	
Erosion Control Blanket	SY	89	\$3	\$270	
Damage Repair	LS	1	\$211	\$210	2% of primary item cost
One-Year Establishment Maintenance Period	LS	1	\$421	\$420	4% of primary item cost
Total				\$ 13,430	
Contingency (30%)				\$ 4,030	
Subtotal				\$ 17,460	
Design, Permitting, and Administration (30%)				\$ 4,030	
Total w/ Contingency & Engineering				\$ 21,500	

30-yr and Annualized Cost analysis

Category:	Bioengineering	
Estimated life span (years)	20	1 number of major maint. events
Expected annual maintenance	\$ 160	25% of damage repair and maintenance
End of life span maintenance	\$ 5,380	25% of original project cost
Future Capital Cost	\$ 52,200	
Future annual maintenance	\$ 7,610	
Future end of life span cost	\$ 9,720	
Total Future Worth	\$ 69,500	
Annualized Cost	\$ 1,500	