START

0038255

15

N-SPRINGS ERA ALTERNATIVES

Alternative: Sheet pile wall w/ grouted interlocks

Capitol Cost: (installed)

Sheet pile wall, subcontractor installed	$4,263,000
Testing (including engineering)	$25,000
Engineering @ 10%	$426,000
Project Management @ 11%	$469,000
SUB-TOTAL:	$5,183,000
Contingency @ 30%	$1,554,900
TOTAL Capital Cost	$6,737,900

O & M Cost: (annual)

Operating Labor	$0
Maintenance	$0
Electric Power	$0
Annual O & M Cost	$0
Present Worth, Annaul O&M 10 Yrs @ 10%	$0
PRESENT WORTH	$6,737,900

NOTE:

Waterloo Groundwater Control Technologies, Inc. and RCI Environmental, Inc., submitted a budget quote of $21/SF for installation of a grouted interlock sheet pile wall. This compares to the government estimate of $30.50/SF. Using the $21/SF quoted cost, the installed cost would equal to $2,940,000, and a Total Present Worth cost of $4,657,000. The $21/SF seems low, especially if a Pile Driving Subcontractor is used.

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HNFD: N-Springs Shtpl Wall w/Grt
Rough budget estimate for sheet
pile wall, 50' deep w/ grouted
interlocks

Designed By:
Estimated By: Clendenon

Prepared By: USACE NPW Cost Engr Branch

Preparation Date: 04/24/94
Effective Date of Pricing: 03/22/94
Est Construction Time: 180 Days

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	QUANTITY UOM	CONTRACT	S & A	CONTG	TOTAL COST	UNIT COST	NOTES
1 Sheetpile Wall, 50' D, w/ Grout		4,262,940	0	0	4,262,940		
TOTAL HNFD: N-Springs Shtpl Wall w/Grt	140000.00 SF	4,262,940	0	0	4,262,940	30.45	

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	QUANTITY UOM	CONTRACT	S & A	CONTG	TOTAL COST	UNIT COST	NOTES
1 Sheetpile Wall, 50' D, w/ Grout							
1-01 Mob, DeMob, & Prepwork		12,100	0	0	12,100		
1-02 Site Work		4,250,840	0	0	4,250,840		
TOTAL Sheetpile Wall, 50' D, w/ Grout		4,262,940	0	0	4,262,940		
TOTAL HNFD: N-Springs Shtpl Wall w/Grt	140000.00 SF	4,262,940	0	0	4,262,940	30.45	

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	QUANTITY UOM	DIRECT	FOOH	HOOH	PROF	BOND	B&O TAX	TOTAL COST	UNIT COST
1 Sheetpile Wall, 50' D, w/ Grout		3,220,410	483,060	185,170	311,090	21,000	42,210	4,262,940	
TOTAL HNFD: N-Springs Shtpl Wall w/Grt	140000.00 SF	3,220,410	483,060	185,170	311,090	21,000	42,210	4,262,940	30.45

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	QUANTITY UOM	DIRECT	FOOH	HOOH	PROF	BOND	B&O TAX	TOTAL COST	UNIT COST
1 Sheetpile Wall, 50' D, w/ Grout									
1-01 Mob, DeMob, & Prepwork		9,140	1,370	530	880	60	120	12,100	
1-02 Site Work		3,211,270	481,690	184,650	310,210	20,940	42,090	4,250,840	
TOTAL Sheetpile Wall, 50' D, w/ Grout		3,220,410	483,060	185,170	311,090	21,000	42,210	4,262,940	
TOTAL HNFD: N-Springs Shtpl Wall w/Grt	140000.00 SF	3,220,410	483,060	185,170	311,090	21,000	42,210	4,262,940	30.45

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	DIRECT	FOOH	HOOH	PROF	BOND	B&O TAX	TOTAL COST	UNIT COST
AA Single 50' Deep, Contractor								
PD Piling Subcontractor	2,465,560	246,560	135,610	227,820	0	0	3,075,540	21.97
Subtotal Subcontract Work	2,465,560	246,560	135,610	227,820	0	0	3,075,540	21.97
Indirect on Subcontracts	3,075,540	461,330	176,840	297,100	20,050	40,310	4,071,170	29.08
Indirect on Own Work	144,870	21,730	8,330	13,990	940	1,900	191,760	1.37
AA Single 50' Deep, Contractor	3,220,410	483,060	185,170	311,090	21,000	42,210	4,262,940	30.45

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1-01. Mob, DeMob, & Prepwork	QUANTY	UOM	CREW ID	OUTPUT	MHRS	LABR	EQUIP	MAT	OTHER	TOTAL COST	UNIT COST
1. Sheetpile Wall, 50' D, w/ Grout											
2,800 LF, 50' deep, single sheet pile wall, with grouting at interlocks.											
1-01. Mob, DeMob, & Prepwork											
1-01 01. Mob & Prepwork											
USR AA < > Misc equip allowance					0.00	0.00	75.00	0.00	0.00	75.00	
	10.00	EA		0.00	0	0	750	0	0	750	75.00
USR AA < > Prepwork allowance					0.00	2500.00	50.00	107.80	0.00	2657.80	
	1.00	LS		0.00	0	2,500	50	108	0	2,658	2657.80
CIV AA <01505 1401 > Mob, Crane, 25-50 Ton, Mech, Trk Mtd, 100' boom, 100-mi Rad					0.00	0.00	625.00	0.00	0.00	625.00	
	2.00	EA	N/A	0.00	0	0	1,250	0	0	1,250	625.00
CIV AA <01505 6115 > Mob, Dozer, Crawler, 176-225 HP w/blade, Incl Setup, 100-mi Rad					0.00	0.00	700.00	0.00	0.00	700.00	
	1.00	EA	N/A	0.00	0	0	700	0	0	700	700.00
CIV AA <01505 7113 > Mob, Truck, 0-10,000 GVW, w/ 8'x 10' Flat Bed, 100-mi Rad					0.00	0.00	55.00	0.00	0.00	55.00	
	1.00	EA	N/A	0.00	0	0	55	0	0	55	55.00
CIV AA <01505 5202 > Mob, Motor Grader, 126-150 HP, Art. Fr, Pwr Shift, 100-mi Rad					0.00	0.00	475.00	0.00	0.00	475.00	
	1.00	EA	N/A	0.00	0	0	475	0	0	475	475.00
CIV AA <01505 8102 > Mob, Air Comp, 251- 800 CFM, Quiet, Portable, 100-mi Rad					0.00	0.00	125.00	0.00	0.00	125.00	
	2.00	EA	N/A	0.00	0	0	250	0	0	250	125.00
TOTAL Mob & Prepwork					0	2,500	3,530	108	0	6,138	
TOTAL DeMob Allowance					0	0	3,000	0	0	3,000	
TOTAL Mob, DeMob, & Prepwork					0	2,500	6,530	108	0	9,138	

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1-02. Site Work	QUANTY	UOM	CREW ID	OUTPUT	MHRS	LABR	EQUIP	MAT	OTHER	TOTAL COST	UNIT COST
1-02. Site Work											
1-02 01. Site Prep - Work Platform Assume a work platform will need to be prepared. Platform will be constructed using a D-7 dozer, G-12 grader, and water truck (6K gal). Assume about 15'-20' wide platform, no new fill needed, 5 days to prepare.											
L USR AA <02210 1005 > Rough Grade Small Area w/Dozer Cat D-7, 215 HP. Allow 5 days for dozer to rough grade platform for pile driving and grouting work.	40.00	HR	CODTH	1.00	2.00 80	54.75 2,190	62.82 2,513	0.00 0	0.00 0	117.57 4,703	117.57
L USR AA <02210 2001 > Grade platform	6.00	MSY	COFGA	0.25	8.00 48	219.00 1,314	111.25 668	0.00 0	0.00 0	330.25 1,982	330.25
USR AA <02223 1001 > Compaction/Dust control Water, from river	40.00	HR	COFWK	1.00	1.75 70	49.33 1,973	67.15 2,686	0.00 0	0.00 0	116.47 4,659	116.47
TOTAL Site Prep - Work Platform	2800.00	LF			198	5,477	5,866	0	0	11,343	4.05
1-02 02. Sheetpile wall installation This covers cost for a 50' deep, 2,800 LF sheet pile wall, assume using 38 psf sheet pile, placed by vibratory driver. By placing wall close to river, it is assumed the wall will miss the large cobble/boulder layer associated with the Hanford formation. Assume sheet piling driven by subcontractor.											
B USR PD <02411 1004 > Steel Sheeting, use 38 psf 140,000 SF @ 38 psf = 2,660 Ton Use: $700/ton for material and 15 ton/day production rate (20 ton/day is standard). Using slower rate to account for possible problems with large cobbles or boulders.	2660.00	TON	CPIDV	2.00	4.00 10,640	110.03 365,082	62.27 206,630	754.60 2,503,826	0.00 0	926.90 3,075,538	1156.22
TOTAL Sheetpile wall installation	140000	SF			10,640	365,082	206,630	2,503,826	0	3,075,538	21.97
1-02 03. Grouting of sheet pile wall Grouting will be placed in inter-locks of sheet pile wall, with attapulgite-cement grout. Assumed grouting depth will be 50'.											
B MIL AA <03620 2203 > Nonshrink,Nonmtl Grout Allowance for grouting interlock	75500	LF	ACMAG	250.00	0.02 1,208	0.43 32,586	0.05 3,986	0.27 20,347	0.00 0	0.75 56,919	0.75
USR AA <03711 1001 > Air blasting/cleaning interlock Allowance for cleaning interlocks.	75500	LF	ACMAF	250.00	0.02 1,284	0.47 35,470	0.05 3,511	0.38 28,486	0.00 0	0.89 67,467	0.89

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1-02. Site Work	QUANTY	UOM	CREW ID	OUTPUT	MHRS	LABR	EQUIP	MAT	OTHER	TOTAL COST	UNIT COST
TOTAL Grouting of sheet pile wall	75500	LF			2,492	68,056	7,497	48,833	0	124,386	1.65
TOTAL Site Work					13,330	438,615	219,993	2,552,660	0	3,211,268	
TOTAL Sheetpile Wall, 50' D, w/ Grout					13,330	441,115	226,523	2,552,767	0	3,220,406	
TOTAL HNFD: N-Springs Shtpl Wall w/Grt	1.00	EA			13,330	441,115	226,523	2,552,767	0	3,220,406	3220405.52

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SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	**** LABOR **** COST	**** EQUIP **** HOURS	**** EQUIP **** COST	TOTAL COST
	ACMAF	2 B-cemtfinr + 1-air Compressor, 375 Cfm			PROD = 100%				CREW HOURS =	302
MIL	A15XX010 E	AIR COMPR, 375 CFM, 100 PSI	1.00	HR	11.21			1.00	11.21	11.21
MIL	B-CEMTFINRF	Cement Finishers	0.25	HR	28.95	0.25	7.24			7.24
MIL	B-CEMTFINRL	Cement Finishers	2.00	HR	28.45	2.00	56.90			56.90
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	25.64	1.00	25.64			25.64
MIL	B-EQOPRLT L	Eq Oper, Light	1.00	HR	27.68	1.00	27.68			27.68
MIL	A20XX002 E	AIR HOSE, 1.0", 50', HARDROCK	1.00	HR	0.42			1.00	0.42	0.42
	TOTAL					4.25	117.46	2.00	11.63	129.09
	ACMAG	2 B-laborer + Grouting Equipment, 5cy/Hr			PROD = 100%				CREW HOURS =	302
MIL	B-CEMTFINRL	Cement Finishers	1.00	HR	28.45	1.00	28.45			28.45
MIL	B-LABORER F	Laborer (Semi-Skilled)	1.00	HR	26.14	1.00	26.14			26.14
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	25.64	1.00	25.64			25.64
MIL	B-EQOPRLT L	Eq Oper, Light	1.00	HR	27.68	1.00	27.68			27.68
MIL	XMIXX020 E	Small Tools	0.18	HR	1.39			0.18	0.25	0.25
MIL	P45CG003 E	PMP,GRT,PLANT,AIR,1-20GPM,100PS	1.00	HR	3.66			1.00	3.66	3.66
MIL	A15XX009 E	AIR COMPR, 250 CFM, 100 PSI	1.00	HR	8.86			1.00	8.86	8.86
MIL	A20XX002 E	AIR HOSE, 1.0", 50', HARDROCK	1.00	HR	0.42			1.00	0.42	0.42
	TOTAL					4.00	107.91	3.18	13.19	121.10
	CODTH	1 B-eqoprmed + 1 Dozer, Cat D-7H, 215 Hp+Laborer			PROD = 100%				CREW HOURS =	40
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	25.64	1.00	25.64			25.64
MIL	B-EQOPRMEDF	Eq Oper, Medium	1.00	HR	29.11	1.00	29.11			29.11
MIL	T10CA013 E	BLADE, UNIVERSAL,HYDR,FOR D7	1.00	HR	5.72			1.00	5.72	5.72
MIL	T15CA013 E	DOZER,CWLR,D-7H,PS,(ADD BLADE)	1.00	HR	57.10			1.00	57.10	57.10
	TOTAL					2.00	54.75	2.00	62.82	117.57
	COFGA	1 B-eqoprmed + 1 Grader, Cat 12g, 135 Hp			PROD = 100%				CREW HOURS =	24
MIL	B-LABORER L	Laborer (Semi-Skilled)	1.00	HR	25.64	1.00	25.64			25.64
MIL	B-EQOPRMEDF	Eq Oper, Medium	1.00	HR	29.11	1.00	29.11			29.11
MIL	G15CA003 E	GRADER,MOTOR,CAT12-G, ARTIC	1.00	HR	27.81			1.00	27.81	27.81
	TOTAL					2.00	54.75	1.00	27.81	82.56
	COFWK	1 B-trkdvrhvl+ 1 Water Wagon,6000 Gal + 6" Pump			PROD = 100%				CREW HOURS =	40
MIL	B-EQOPRLT F	Eq Oper, Light	0.25	HR	28.18	0.25	7.05			7.05
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00	HR	28.44	1.00	28.44			28.44
MIL	B-EQOPRLT L	Eq Oper, Light	0.50	HR	27.68	0.50	13.84			13.84
MIL	P55GR004 E	PUMP,WATER,SUB,6",1950GPM/40'HD	1.00	HR	5.68			1.00	5.68	5.68
MIL	T60K1002 E	TRK,WTR,OFF-HWY, 6000GAL,CAT621	1.00	HR	61.46			1.00	61.46	61.46
	TOTAL					1.75	49.33	2.00	67.15	116.47
	CPIDV	5 B-piledrvr + 1 Vibratory Pile Hammer/40T Crane			PROD = 100%				CREW HOURS =	1330
MIL	B-EQOPRCRHL	Eq Oper, Crane/Shovl	2.00	HR	29.37	2.00	58.74			58.74
MIL	B-EQOPROILL	Eq Oper, Oilers	1.00	HR	26.68	1.00	26.68			26.68
MIL	B-PILEDRVRF	Pile Drivers	1.00	HR	29.66	1.00	29.66			29.66
MIL	B-PILEDRVRA	Pile Drivers	2.00	HR	23.33	2.00	46.66			46.66

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SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	**** LABOR **** COST	**** EQUIP **** HOURS	**** EQUIP **** COST	TOTAL COST
MIL	B-PILEDRVRL	Pile Drivers	2.00	HR	29.16	2.00	58.32			58.32
MIL	C80PH004	E CRANE,HYD,TRKMTD, 40T W/106'BOO	1.00	HR	51.28			1.00	51.28	51.28
MIL	XMIXX020	E Small Tools	1.35	HR	1.39			1.35	1.88	1.88
MIL	P30MK003	E PILE HAMMER,VIB,MAX DRIVE 116TO	1.00	HR	71.39			1.00	71.39	71.39
	TOTAL					8.00	220.06	3.35	124.55	344.60

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SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
MIL	B-CEMTFINR	Cement Finishers	28.45	0.0%	0.0%	0.00	0.00	28.45	HR	03/15/94	13.98	982
MIL	B-EQOPRCRN	Equip. Operators, Crane/Shovel	29.37	0.0%	0.0%	0.00	0.00	29.37	HR	03/15/94	21.20	2660
MIL	B-EQOPRLT	Equip. Operators, Light	27.68	0.0%	0.0%	0.00	0.00	27.68	HR	03/15/94	17.02	634
MIL	B-EQOPRMED	Equip. Operators, Medium	28.61	0.0%	0.0%	0.00	0.00	28.61	HR	03/15/94	17.15	64
MIL	B-EQOPROIL	Equip. Operators, Oilers	26.68	0.0%	0.0%	0.00	0.00	26.68	HR	03/15/94	11.00	1330
MIL	B-LABORER	Laborers, (Semi-Skilled)	25.64	0.0%	0.0%	0.00	0.00	25.64	HR	03/15/94	12.86	970
MIL	B-PILEDRVR	Pile Drivers	29.16	0.0%	0.0%	0.00	0.00	29.16	HR	03/15/94	23.05	6650
MIL	B-TRKDVRHV	Truck Drivers, Heavy	28.44	0.0%	0.0%	0.00	0.00	28.44	HR	03/15/94	10.49	40

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** EQUIPMENT BACKUP **

SRC	EQUIP ID	DESCRIPTION	DEPR	CAPT	FUEL	FOG	EQ REP	TR WR	TR REP	** TOTAL ** TOTAL	UOM	HOURS
MIL	A15XX009	AIR COMPR, 250 CFM, 100 PSI	2.07	0.83	2.80	0.7	2.33	0.04	0.01	8.86	HR	302
MIL	A15XX010	AIR COMPR, 375 CFM, 100 PSI	2.67	1.10	3.31	0.9	3.03	0.16	0.02	11.21	HR	302
MIL	A20XX002	AIR HOSE, 1", 50',HARDROCK	0.14	0.02			0.25			0.42	HR	604
MIL	C80PH004	CRANE,HYD,TRK MTD,40T W/106'BOOM	17.04	8.72	6.64	1.7	15.98	1.02	0.15	51.28	HR	1330
MIL	G15CA003	GRADER,MOTOR,CAT12-G, ARTIC	8.89	4.25	3.65	1.2	9.10	0.58	0.09	27.81	HR	24
MIL	P30MK003	PILE HAMMER,VIB,MAX DRIVE 116TON	18.96	5.91	10.33	3.3	32.89			71.39	HR	1330
MIL	P45CG003	PMP,GRT,PLANT,AIR,1-20GPM,100PSI	1.38	0.37		0.1	1.77			3.66	HR	302
MIL	P55GR004	PUMP,WATER,SUB,6",1950GPM/40'HD	0.95	0.38	2.43	1.0	0.84			5.68	HR	40
MIL	T10CA013	BLADE, UNIVERSAL,HYDR,FOR D7	2.31	0.82		0.0	2.51			5.72	HR	40
MIL	T15CA013	DOZER,CWLR,D-7H,PS,(ADD BLADE)	15.18	6.00	6.88	2.4	26.56			57.10	HR	40
MIL	T60KI002	TRK,WTR,OFF-HWY, 6000GAL,CAT621E	17.19	8.05	9.74	3.1	17.48	5.12	0.77	61.46	HR	40
MIL	XMIXX020	Small Tools	0.46	0.17	0.13	0.0	0.57			1.39	HR	1850