

Appendix C

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APPENDIX C

Cost Estimates

Cost estimates were developed for each remedial alternative to compare costs within plus 50 percent to minus 30 percent accuracy. Cost estimates are based on generic cost units, vendor information, conventional cost-estimating guides, and prior similar estimates as modified by site specific information. No allowances for inflation have been included. Estimated costs for each site-specific remedial alternative are presented in Table C-1.

Site-specific information was utilized in developing the costs for the remedial alternatives. Areas and volumes of the impacted media were used for calculations involving treatment volumes, remediation system sizing, confirmation sampling, etc. Excavated volumes and areas for the Inboard Area sites are presented in Table C-2.

TABLE C-1
Base Realignment and Closure Property Remedial Alternative Costs

Site	Alternative	Cost
Former Sewage Treatment Plant	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$61,217
	Excavation with Onsite Disposal	\$17,752
Building 26	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$23,610
	Excavation with Onsite Disposal	\$9,696
Building 35/39	Area No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$17,384
	Excavation with Onsite Disposal	\$9,947
Building 41 Area	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$297,018
	Excavation with Onsite Disposal	\$25,024
Building 82/87/92/94 Area and Building 86	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$1,298,674
	Excavation with Onsite Disposal	\$68,254
Perimeter Drainage Ditch	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$4,502,006
	Excavation with Onsite Disposal	\$214,879

TABLE C-1
Base Realignment and Closure Property Remedial Alternative Costs

Site	Alternative	Cost
Perimeter Drainage Ditch Spoils Pile A	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$55,892
	Excavation with Onsite Disposal	\$9,350
Perimeter Drainage Ditch Spoils Pile B	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$123,374
	Excavation with Onsite Disposal	\$11,817
Perimeter Drainage Ditch Spoils Pile D	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$60,244
	Excavation with Onsite Disposal	\$9,144
Perimeter Drainage Ditch Spoils Pile E	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$56,507
	Excavation with Onsite Disposal	\$7,697
Perimeter Drainage Ditch Spoils Pile F	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$182,305
	Excavation with Onsite Disposal	\$17,729
Perimeter Drainage Ditch Spoils Pile G	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$68,213
	Excavation with Onsite Disposal	\$9,436
Perimeter Drainage Ditch Spoils Pile I	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$41,202
	Excavation with Onsite Disposal	\$8,814
Perimeter Drainage Ditch Spoils Pile J	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$16,915
	Excavation with Onsite Disposal	\$7,559
Perimeter Drainage Ditch Spoils Pile K	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$32,852
	Excavation with Onsite Disposal	\$8,142
Perimeter Drainage Ditch Spoils Pile L	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$9,811
	Excavation with Onsite Disposal	\$8,611

TABLE C-1
Base Realignment and Closure Property Remedial Alternative Costs

Site	Alternative	Cost
Perimeter Drainage Ditch Spoils Pile M	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$126,722
	Excavation with Onsite Disposal	\$11,806
Perimeter Drainage Ditch Spoils Pile N	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$72,078
	Excavation with Onsite Disposal	\$9,942
Onshore Fuel Line – 54 Inch Line	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$625,306
	Excavation with Onsite Disposal	\$17,623
Onshore Fuel Line – Hangar Segment	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$701,748
	Excavation with Onsite Disposal	\$52,976
Onshore Fuel Line – Northern Segment	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$571,294
	Excavation with Onsite Disposal	\$29,346
Northwest Runway Area	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$76,566
	Excavation with Onsite Disposal	\$9,872
Revetment 1	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$211,033
	Excavation with Onsite Disposal	\$19,348
Revetment 2	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$142,096
	Excavation with Onsite Disposal	\$14,226
Revetment 3	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$160,424
	Excavation with Onsite Disposal	\$16,240
Revetment 4	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$227,718
	Excavation with Onsite Disposal	\$19,959

TABLE C-1
Base Realignment and Closure Property Remedial Alternative Costs

Site	Alternative	Cost
Revetment 6	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$112,184
	Excavation with Onsite Disposal	\$1,227
Revetment 7	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$55,992
	Excavation with Onsite Disposal	\$814
Revetment 11	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$21,516
	Excavation with Onsite Disposal	\$8,561
Revetment 12	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$14,006
	Excavation with Onsite Disposal	\$10,887
Revetment 13	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$142,596
	Excavation with Onsite Disposal	\$14,246
Revetment 14	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$164,622
	Excavation with Onsite Disposal	\$17,080
Revetment 15	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$94,973
	Excavation with Onsite Disposal	\$11,246
Revetment 16	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$162,415
	Excavation with Onsite Disposal	\$16,312
Revetment 19	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$242,280
	Excavation with Onsite Disposal	\$21,806
Revetment 20	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$170,446
	Excavation with Onsite Disposal	\$17,866

TABLE C-1
Base Realignment and Closure Property Remedial Alternative Costs

Site	Alternative	Cost
Revetment 21	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$167,867
	Excavation with Onsite Disposal	\$16,486
Revetment 22	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$156,872
	Excavation with Onsite Disposal	\$18,686
Revetment 23	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$226,934
	Excavation with Onsite Disposal	\$16,347
Revetment 25	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$164,373
	Excavation with Onsite Disposal	\$17,070
Revetment 26	No Further Action	
	Institutional Controls	
	Excavation with Offsite Disposal	\$156,810
	Excavation with Onsite Disposal	\$17,424

TABLE C-2
Base Realignment and Closure Property Excavation Areas and Volumes

Site	Chemical of Concern	Area (square feet)	Volume (cubic yard)
Former Sewage Treatment Plant	Pesticides	6,980	259
Building 26	Petroleum hydrocarbons	1,250	46
Building 35/39	Area Pesticides	674	25
Building 41	Area Petroleum hydrocarbons	24,480	907
Building 82/87/92/94 Area and Building 86	Polynuclear aromatic hydrocarbons (PAH)		
	Metals PAHs (Building 86)	110,780	4,103
Perimeter Drainage Ditch	Metals Pesticides	386,000	14,296
Perimeter Drainage Ditch Spoils Pile A	Metals Pesticides	4,172	155
Perimeter Drainage Ditch Spoils Pile B	Metals Pesticides	57,674	2,136

TABLE C-2
Base Realignment and Closure Property Excavation Areas and Volumes

Site	Chemical of Concern	Area (square feet)	Volume (cubic yard)
Perimeter Drainage Ditch Spoils Pile D	Pesticides	4,609	171
Spoils Pile E	Pesticides	4,273	158
Perimeter Drainage Ditch Spoils Pile F	Metals Pesticides SVOC PAHs	14,822	549
Perimeter Drainage Ditch Spoils Pile G	Pesticides	5,302	196
Perimeter Drainage Ditch Spoils Pile I	Metals Pesticides	2,905	108
Perimeter Drainage Ditch Spoils Pile J	Pesticides	833	31
Perimeter Drainage Ditch Spoils Pile K	Pesticides	2,222	82
Perimeter Drainage Ditch Spoils Pile L	Metals Pesticides	100	4
Perimeter Drainage Ditch Spoils Pile M	Pesticides	10,354	383
Perimeter Drainage Ditch Spoils Pile N	Metals Pesticides	5,590	207
Onshore Fuel Line – 54 Inch Line	Petroleum hydrocarbons	54,700	2,026
Onshore Fuel Line – Hangar Segment	Petroleum hydrocarbons PAHs	58,039	2,150
Onshore Fuel Line – Northern Segment	Petroleum hydrocarbons	48,780	1,807
Northwest Runway Area Revetment 1	Metals	6,000	222
Revetment 2	Metals PAHs	17,259	639
Revetment 3	Metals PAHs	11,490	426
Revetment 4	Metals PAHs	12,985	481
Revetment 6	Metals PAHs	18,721	693
Revetment 7	Petroleum hydrocarbons PAHs	10,000	370
Revetment 11	Metals PAHs	4,967	184
Revetment 12	Metals	856	33
Revetment 13	Metals PAHs	250	10
Revetment 14	Metals PAHs	11,544	428
Revetment 15	Petroleum hydrocarbons	13,274	492
Revetment 16	Metals	7,526	279
	Metals	13,154	487

TABLE C-2
Base Realignment and Closure Property Excavation Areas and Volumes

Site	Chemical of Concern	Area (square feet)	Volume (cubic yard)
Revetment 19	Metals Petroleum hydrocarbons PAHs	19,842	735
Revetment 20	Metals PAHs	13,746	509
Revetment 21	Metals Petroleum hydrocarbons PAHs	13,630	505
Revetment 22	Petroleum hydrocarbons PAHs	12,458	461
Revetment 23	Metals	20,570	762
Revetment 25	Metals Petroleum hydrocarbons	13,269	491
Revetment 26	Metals Petroleum hydrocarbons	12,549	465

1. EXCAVATION

EQUIPMENT (including operator):	<u>\$\$/HOUR</u>
1 - CATERPILLAR 315 EXCAVATOR	\$181
2 - CATERPILLAR 966D LOADERS	<u>\$260</u>
TOTAL	\$441
EXCAVATION RATE IN CUBIC YARDS PER HOUR =	180
LOADER RATE IN CUBIC YARDS PER HOUR (EACH) =	100
COST PER CUBIC YARD =	\$2.31
MOBILIZATION/DEMOBILIZATION =	\$1,500

2. ONSITE TRANSPORTATION

Assume: 2 mile haul distance (one way)
 swell factor = 25%
 use 40 cubic yard truck
 50 minutes/hour

1. Loose measure = 2 loaders @ 100 cy/hour * 1.25 = 250 cy/hour / 60 minutes =	4.17	cy/min	
2. Time to load a 40 cy truck 40 cy / 4.17 cy/min =	9.6	minutes	
3. Truck unload =	2	minutes	
4. Spot truck =	1	minutes	
5. Travel cycle (RT) =	15	minutes	
6. Fixed cycle = 1.0 min + 2.0 min + 9.6 min =	12.6	minutes	
50 min/hour / (12.6 min + 15 min)	1.81	loads per hour	
1.81 loads/hour * 40 cy/truck	72.46	cy output	
Equipment (including operator): 1 - 40 CY TRUCK	TOTAL	\$131	
Cost per cubic yard = \$131/72.46 cubic yards	\$1.81		

Assume: 1 mile haul distance (one way)
 swell factor = 25%
 use 40 cubic yard truck
 50 minutes/hour

1. Loose measure = 2 loaders @ 100 cy/hour * 1.25 = 250 cy/hour / 60 minutes =	4.17	cy/min	
2. Time to load a 40 cy truck 40 cy / 4.17 cy/min =	9.6	minutes	
3. Truck unload =	2	minutes	
4. Spot truck =	1	minutes	
5. Travel cycle (RT) =	7.5	minutes	
6. Fixed cycle = 1.0 min + 2.0 min + 9.6 min =	12.6	minutes	
50 min/hour / (12.6 min + 7.5 min) =	2.49	loads/hour	
2.49 loads/hour * 40 cy/truck =	99.50	cy output	
Equipment (including operator): 1 - 40 cubic yard truck	TOTAL	\$131	
Cost per cubic yard = \$131/99.5 cubic yards	\$1.32		

	<u>\$\$/CY</u>	<u>\$\$/CY</u>	<u>\$\$/CY</u>
3. OFFSITE TRANSPORTATION AND DISPOSAL	Class I	Class II	Class III
Disposal Costs (assume 1.3 tons/cy) =	\$405	\$150	\$150
County tax at 10%	\$41	\$15	\$15
Transportation Costs =	\$56	\$14	\$5
Cost per cubic yard =	\$502	\$179	\$170
Waste Profile Fee (One time cost)	\$300	\$300	\$300
Import of Backfill Material			\$10.00
Includes material and delivery to site			

4. REGRADING

Equipment (including operator):	<u>\$\$/HOUR</u>
1 - 14-gal motor grader	\$98
2 - 633D scrapers @ \$320.00 each	\$640
1 - 4000 gallon water truck	\$47
1 - 825C roller dozer	<u>\$165</u>
TOTAL	\$950
Regrading rate in cubic yards per hour =	265
Cost per cubic yard =	\$3.58
Mobilization/Demobilization	\$2,230

5. POST-EXCAVATION CONFIRMATION SAMPLING PROGRAM

Analytical costs per sample

Method	Method No	Cost
VOCs (Combo)	8010/8020	\$235
Pesticides	8080	\$210
TPH as Gasoline/JP-4	8015M	\$105
TPH as Diesel	8015M	\$115
PAHs	8270	\$210
Total Metals	6010/7000	\$240

Labor for sampling (per sample location)

Assume chargeout rate for 2-Sampling Technicians @ \$52 per hour
 Assume 2 hours/sample location for sampling, shipping

2 hour/sample location x 2 men x \$52/hour = \$208

Rental equipment for sampling (per sample location)

Assume rental of sampling equipment, shipping, etc. @ \$250 per day
 Assume 2 hours per sample location for sampling, etc.

(2 hours/sample location) / (8 hours/day) x \$250/day = \$63

Labor for data validation (per sample)

Assume 1 hour/sample
 Assume chargeout rate for 1-Validation Chemist @ \$55 per hour

1 hour/sample x \$55/hour = \$55

6. CAPPING

A. VEGETATIVE COVER OPTION

1. Vegetative cover construction materials

Vegetative cover of native grasses (per square foot) (includes seed, fertilizer, and mulch)	\$0.025
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2. Construction of vegetative cover

Equipment (w/operator)	\$190 each	<u>\$\$/HOUR</u>
2 - Caterpillar D8L Bulldozers @		\$380
1 - Caterpillar 825C Roller Dozer @		\$104
1 - 4000 gal water truck		<u>\$63</u>
TOTAL		\$547

Construction rate in cubic yards per hour	210
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Cost per cubic yard =	\$2.60
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Mobilization/Demobilization	\$1,090
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CAPITAL COSTS:

B. ENGINEERED CAP OPTION

1. Engineered cap construction materials

Vegetative cover of native grasses (per square foot) (includes seed, fertilizer, and mulch)	\$0.025
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2. Construction of engineered cap

Equipment (w/operator)	\$190 each	<u>\$\$/HOUR</u>
2 - Caterpillar D8L Bulldozers @		\$380
1 - Caterpillar 825C Roller Dozer @	\$104 each	\$208
1 - 4000 gal water truck		<u>\$63</u>
TOTAL		\$651

Construction rate in cubic yards per hour	210
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Cost per cubic yard =	\$3.10
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Mobilization/Demobilization	\$1,090
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3. Installation of gas vent and monitoring wells

Equipment and materials:	<u>\$\$/FOOT</u>
Well installation/construction	\$49

Labor:	<u> </u>
Well Site Geologist @ \$55/hour and 40 feet/day	\$11

TOTAL	\$60
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7. PREPARATION OF CONSOLIDATION SITE

Assume: Design of a Class II non-municipal solid waste landfill.
 Landfill liner: liner requirements for a Class II landfill includes a leachate collection and removal system and a 2-foot thick clay liner compacted to 90 percent. A synthetic liner may also be used if it is less costly.
 Water quality monitoring for detection of releases.
 Closure cover system: 2 feet of a foundation layer (consists of general fill material), low hydraulic conductivity layer (1×10^{-6} permeability or less), and a 1-foot erosion resistance layer (i.e., vegetative layer).
 Preparation of a closure and post-closure maintenance plan.
 Post-closure maintenance (including cover-integrity monitoring, cover maintenance, leak search, vegetative maintenance, leachate collection, and removal system operation).

A. Excavation (including operator)	\$119,594
1 - Caterpillar 315 Excavator	\$181
2 - Caterpillar 966D Loaders	\$260
	<hr/>
	\$441
Excavation rate in cubic yards per hour =	180
Loader rate in cubic yards per hour =	100
Cost per cubic yard =	\$2.31
Mobilization/Demobilization =	\$1,500
Volume of soils (cubic yards) =	51,123
B. Geotextile Layer	\$6,720
Assume area of consolidation site in square yards	40,000
Cost per square yard =	\$0.08
Assume 4 days to install geotextile layer	4
Assume 2 men x 4 days x 8 hours/day x \$55/hour =	\$3,520
C. Labor for Writing Closure Plan	
Assume 3 man-weeks for maintenance plan	
Assume changeout rate for 2 - Engineers @ \$55/hr =	\$110
3 man-weeks x 40 hrs/week x 2 Engineers x \$55/hr =	\$13,200

SUB TOTAL CAPITAL COSTS	\$126,314
15% BID CONTINGENCY	\$18,947
15% SCOPE CONTINGENCY	\$18,947
15% PERMITTING COSTS	\$18,947
TOTAL CAPITAL COSTS	\$183,155

8. CAPPING OF THE CONSOLIDATION SITE

Capital Costs:

ENGINEERED CAP

1. Cap Materials

A. Vegetative Cover (material and installation)	\$1,000
Area in square feet	40,000
Cost per square foot	\$0.025

B. Top Soil (available from local source)	
Layer thickness of 1 foot	\$164,534
Volume of top soil in cubic yards	40,000
Excavation cost per cubic yard	\$2.31
Transportation cost per cubic yard	\$1.81

C. Impermeable Layer	
Layer thickness of 1 foot	\$164,534
Volume of top soil in cubic yards	40,000
Excavation cost per cubic yard	\$2.31
Transportation cost per cubic yard	\$1.81

2. Cap Construction **\$249,090**

Cap construction includes re-working the soils to provide adequate foundation and placement of cap materials	
Volume of cap (cubic yards)	80,000
Construction cost per cubic yard	\$3.10

3. Mobilization/Demobilization of Equipment = **\$1,090**

INSTALLATION OF GAS VENT AND MONITORING WELLS **\$4,800**

Assume number of vent wells	4
Assume average vent well depth (linear feet)	20
Cost per linear foot	\$60

SUB TOTAL CAPITAL COSTS	\$585,048
15% BID CONTINGENCY	\$87,757
15% SCOPE CONTINGENCY	\$87,757
15% PERMITTING COSTS	\$87,757
TOTAL CAPITAL COSTS	\$848,320

OPERATION AND MAINTENANCE COSTS (COSTS PER YEAR)

A. SAMPLING OF EXISTING GROUNDWATER WELLS

Assume 1.5 samples/well each sampling event (includes QA samples)

Assume Year 1-5: 4 samples/year

Assume Year 6-30: 2 samples/year

Assume sampling a total of 2 existing groundwater monitoring wells

Assume each sampling event includes:

Method	Method No.	Cost/sample
VOCs	8010/8020	\$242
Total Lead	7420	\$65
SWAT Metals	6010/7000	\$164
Pesticides	608	\$212
TPH as Gasoline/JP-4	8015M	\$175
TPH as Diesel	8015M	\$175
PAHs	8310	\$180

Year 1-5: 4 sample events/year x 1.5 samples/well x 2 wells x \$1213/sample event = 14,556

Year 6-30: 2 sample events/year x 1.5 samples/well x 2 wells x \$1213/sample event = 7,278

B. LABOR (FOR GROUNDWATER WELL SAMPLING)

Assume chargeout rate for 2 - Sampling Technicians @ \$44 hour

Assume 2 hour/well/sampling event for sampling, shipping etc.

Assume Year 1-5: 4 sample events/year

Assume Year 6-30: 2 sample events/year

Year 1-5: 2 hours/well x 2 wells x 4 sample events/year x \$44/hour x 2 men = 1,408

Year 6-30: 2 hours/well x 2 wells x 2 sample events/year x \$44/hour x 2 men = 704

C. RENTAL OF EQUIPMENT FOR GROUNDWATER WELL SAMPLING

Assume rental of sampling equipment, shipping, etc. @ \$250 day

Assume 2 existing groundwater wells

Assume 2 hours per well for sampling, etc.

Assume Year 1-5: 4 sample events/year

Assume Year 6-30: 2 sample events/year

Year 1-5: (4 sample events/year x 2 wells x 2 hours/well/8 hours/day) x \$250/day = 32,000

Year 6-30: (2 sample events/year x 2 wells x 2 hours/well/8 hours/day) x \$250/day = 16,000

D. LABOR (FOR DATA ANALYSIS AND VALIDATION OF GROUNDWATER DATA)

Assume 1 man/week per sampling event

Assume chargeout rate for 1 - Validation Chemist @ \$55 hour

Assume Year 1-5: 4 sample events/year

Assume Year 6-30: 2 sample events/year

Year 1-5: 4 sample events/year x \$55/hour x 40 hours/sample event = 8,800

Year 6-30: 2 sample events/year x \$55/hour x 40 hours/sample event = 4,400

E. SAMPLING OF LANDFILL GAS VENT WELLS

Assume 1 sample per well each sampling event

Assume Year 1-5: 4 sample events/year

Assume Year 6-30: 2 sample events/year

Assume sampling a total of 5 wells

Assume chargeout rate for 2 - Sampling Technicians

\$44 hour

Assume 2 hours per well per sampling event for sampling and calibration

Year 1-5: 4 sample events/year x 1 sample/well x 5 wells x 2 hours/well x \$44/hour x 2 men =

3,520

Year 6-30: 2 sample events/year x 1 sample/well x 5 wells x 2 hours/well x \$44/hour x 2 men =

1,760

F. RENTAL OF EQUIPMENT FOR GAS WELL SAMPLING

Assume rental of Foxboro OVA and associated equipment @

\$275 day

Assume 3 days rental per sample event

Assume Year 1-5: 4 sample events/year

Assume Year 6-30: 2 sample events/year

Year 1-5: 3 days/sample event x 4 sample events/year x \$275/day =

3,300

Year 6-30: 3 days/sample event x 2 sample events/year x \$275/day =

1,650

G. MAINTENANCE OF CAP

Assume vegetation every 5 years

\$2,000

Revegetate cap in year 5, 10, 15, 20, 25, and 30

Assume area in square feet

80,000

Cost per square foot

\$0.025

H. CAP REPAIRS

Assume 1 repair every 5 years

\$2,790

Repair cap in year 5, 10, 15, 20, 25, and 30

Assume each repair consists of reworking 10% of the cap soils (cubic yards)

900

Cost per cubic yard

\$3.10

I. MISCELLANEOUS

Year 1-5: Miscellaneous services @ 10% of O&M costs =

\$6,837

Year 6-30: Miscellaneous services @ 10% of O&M costs =

\$3,493

Total O&M Costs

Year 1-5

\$75,211

Year 6-30

\$38,425

9. ASPHALT/CONCRETE REMOVAL

1 - Backhoe	\$150
Excavation rate in cubic yards per hour =	120
Cost per cubic yard =	\$0.80
Mobilization/Demobilization =	\$800
Offsite transportation and disposal Class III (per ton) =	\$170

10. STRUCTURE SUPPORT

Import of backfill material (includes material and delivery) = \$10 cubic yards

Grading

Equipment (including operator):

1 - Excavator

1 - Roller Dozer

\$\$/Hour

\$181

\$165

Total

\$346

Rate in cubic yards per hour =

265

Cost per cubic yard =

\$1.31

Mobilization/Demobilization =

\$1,300

Former Sewage Treatment Plant - Excavation with Offsite Disposal

Capital Costs

1. Pre-design investigation borings	\$750
Assume number of borings =	5
Assume average depth (linear feet) =	10
Cost per linear foot =	\$15
2. Excavation with Offbase Disposal	\$44,596
A. Excavation of Soils	\$2,097
Volume of Soils (cubic yards)	259
Excavation Costs per Cubic Yard	\$2.31
Mobilization/Demobilization of Equipment	\$1,500
B. Post Excavation Confirmation Sampling Program	\$4,337
Number of Confirmation Samples	8
Number of QA Samples	1
Sampling Cost per Sample Location (labor and equipment)	\$208
Data Validation Labor per Sample	\$55
Sample Analysis (per sample, includes 15% for CLP)	\$242
Pesticides 8080	\$210
C. Offbase Disposal to a Class II Hazardous Waste Landfill	\$33,420
Volume of Soil--25% swell factor (cubic yards)	185
Transportation and Disposal Costs per Cubic Yard	\$179
Waste Profile Fee (One time cost)	\$300
D. Grading of Excavation Site (ditch will remain operational)	\$2,892
Volume of Soil--25% swell factor (cubic yards)	185
Grading Cost per Cubic Yard	\$3.58
Mobilization/Demobilization of Equipment	\$2,230

E. Imported Backfill	\$1,850
Cost per cubic yard =	\$10
Volume of soil (cubic yards) =	\$185

SUBTOTAL CAPITAL COSTS	\$45,346
15% BID CONTINGENCY	\$6,802
15% SCOPE CONTINGENCY	\$6,802
5% PERMITTING COSTS	\$2,267
TOTAL CAPITAL COSTS	\$61,217

O&M Costs

No O&M costs are associated with this alternative.

Former Sewage Treatment Plant - Excavation with Onsite Disposal

Capital Costs

1. Pre-design investigation borings		\$750
Assume number of borings =	5	
Assume average depth (linear feet) =	10	
Cost per linear foot =		\$15
2. Excavation with Onbase Disposal		\$12,399
A. Excavation of Sediments		\$2,097
Volume of Sediments (cubic yards)	259	
Excavation Costs per Cubic Yard		\$2.31
Mobilization/Demobilization of Equipment		\$1,500
B. Post Excavation Confirmation Sampling Program		\$4,337
Number of Confirmation Samples	8	
Number of QA Samples	1	
Sampling Cost per Sample Location (labor and equipment)		\$208
Data Validation Labor per Sample		\$55
Sample Analysis (per sample, includes 15% for CLP)		\$242
Pesticides	8080	\$210
C. Onbase Disposal		\$726
Volume of Soil--25% swell factor (cubic yards)	324	
Transportation and Disposal Costs per Cubic Yard		\$1.32
Mobilization/Demobilization of Equipment		\$300
D. Grading of Excavation Site		\$3,389
Volume of Soil--25% swell factor (cubic yards)	324	
Grading Cost per Cubic Yard		\$3.58
Mobilization/Demobilization of Equipment		\$2,230

E. Imported Backfill	\$1,850
Cost per cubic yard =	\$10
Volume of soil (cubic yards) =	\$185

SUBTOTAL CAPITAL COSTS	\$13,149
15% BID CONTINGENCY	\$1,972
15% SCOPE CONTINGENCY	\$1,972
5% PERMITTING COSTS	\$657
TOTAL CAPITAL COSTS	\$17,752

O&M Costs

No O&M costs are associated with this alternative.