

US EPA ARCHIVE DOCUMENT

Appendix A
Phosphate Treatment Cost Evaluation

Appendix A Cost Evaluation

Phosphate Treatment of Residential Properties at the Omaha Lead Site, Omaha, Nebraska

Assumptions for Cost Evaluation
September, 2008

This evaluation presents the costs to implement a phosphate treatment remedial action at the Omaha Lead Site in Omaha, Nebraska. The evaluation contains the cost breakdown of the tasks and procedures required to implement the remedial action.

Following is an outline of the basic project assumptions; phosphate treatment procedures; miscellaneous cost impact issues, and other considerations that directly and indirectly affect the remediation process and impact the cost estimate:

A. Basic Project Assumptions:

1. Unit residential treatment area of 7,890 square feet (sf) [property area equivalent to 25% of nominal survey acreage of a typical property at 10,890 sf, minus 3,000 sf for improvements, landscaping, and other areas = 7,890 sf]
2. Contractors for project shall function as follows:
 - a. Prime Contractor
 - Mobilization to property
 - Property assessment
 - Property area preparation (prior to treatment process)
 - Install protective barrier/erosion control
 - Roto-tilling #1 (to depth of about 15 cm)
 - Initial Application of Chemicals (Phosphoric Acid and Potassium Chloride)
 - Roto-tilling #2
 - Application of addt'l 5g Phosphate (P) Kg soil
 - Roto-tilling #3
 - Lime stabilization of soil / pH adjustment
 - Soil preparation for sod placement (see subcontractor below)
 - Re-install lawn features
 - Remove protective barrier/erosion control
 - Demobilization from property
 - b. Subcontractor(s)
 - Lawn Service Subcontractor
 - Lay sod (following application of chemical agents by Prime Contractor, and soil preparation for sod placement)
 - Replacement of damaged plantings / shrubs, etc

3. 85% Phosphoric Acid (PA) is applied at rate of 10 U.S. gallons per 86.1113 sf. (37.8 Liters per 8 sq. meters); (note: per *Harcros Chemicals, Inc.*, PA is typically purchased by the pound at a weight of 13-14 lbs of raw acid/gallon; use 13.2 lbs/gal. PA is incorporated into the soil at approx. 6” depth during roto-tilling operations.

Volume of PA required per property:

$$7,890 \text{ sf /property} \times 10 \text{ gal} / 86.1113 \text{ sf} = \underline{916.256} \text{ gal PA} / \text{property}$$

Weight of PA required per property:

$$\underline{916.256} \text{ gal PA} / \text{property} \times 13.2 \text{ lbs} / \text{gal} = 12,095 \text{ lbs} / \text{property}$$

4. Potassium Chloride (KCl) (fertilizer grade) is applied at a rate of 335 lbs / 7,890 sf property (1.66 kilograms per 8 sq. meters). The KCl shall be applied in conjunction with the application of the Phosphoric Acid.
5. Lime is applied at a rate of 1837 lbs / 7,890 sf property (9.1 kilograms per 8 sq. meters). The Lime will be applied and incorporated in the soil by roto-tilling and grading for drainage, and compaction to 85% Proctor. Lime incorporation occurs after a period between 3 to 10 days following the application of the PA and KCl.

B. Listing of Chemical Treatment Procedures:

- | | |
|---------|--|
| Step 1 | Property Assessment (e.g., identify buried utility locations) |
| Step 2 | Property preparation (prior to treatment process) |
| Step 3 | Install protective barrier/ erosion controls around property |
| Step 4 | Roto-tilling #1 of soil |
| Step 5 | Apply Phosphoric Acid chemical |
| Step 6 | Apply Potassium Chloride chemical |
| Step 7 | Roto-tilling #2 of soil |
| Step 8 | Apply Application of addt'l 5g Phosphate (P) Kg soil |
| Step 9 | Roto-tilling #3 of soil |
| Step 10 | Incorporate Lime into soil (incl Rototilling #4) |
| Step 11 | Fine Grade / compaction of disturbed soil to prepare for sod placement |
| Step 12 | Placement of Sod |
| Step 13 | 30 day watering period to establish sod (provide cost allowance to owner) |
| Step 14 | Re-install lawn features |
| Step 15 | Replacement of damaged plantings / shrubs, etc. (note: provide cost allowance) |
| Step 16 | Remove protective barrier/erosion controls |

C. Direct-Indirect cost impacts and considerations:

1. All properties are considered to be residential.
2. Costs of chemicals and sod placement are based on delivery to Omaha, NE.
3. The location of buried utilities issues (i.e., cable T.V., sprinkler systems, underground electrical) are a concern. An allowance for locating the utilities has been included in the estimate.
4. Costs associated with pet control issues are not addressed in this estimate.

5. HAZWOPER - OSHA Compliant Training costs are considered requirements for all personnel and included in the analysis.
6. Assumed Daily Log / Journaling tasks for remediation program inherent to all activities.
7. Cost evaluation does not provide for allowances where property conditions may exist in which owner has invested substantial resource into lawn care / maintenance, etc.
8. When soil is roto-tilled, it may bulk in volume approx. 15%, and require re-compaction prior to sod placement. (See Steps 5 through 10 of treatment procedures.)
10. Analysis assumes erosion control barrier will be required in addition to the protective barrier.
11. Analysis does not provide for Testing /Sampling following remediation procedures.
12. A cost allowance is made for areas of properties that may require some re-sodding at future date. For purpose of the cost evaluation, the basis is 10% of total residential properties requiring 5% sod re-placement.
13. No cost allowance is made for temporary displacement of individuals / pets / livestock, etc., during the remedial process.
14. Prime and Subs will need to mob / demob to each residential property. An allowance for mob / demob of equipment and personnel and documentation procedures is provided in the analysis.
15. Costs do not include oversight by agency personnel.
16. It is assumed contractor personnel shall be required to wear protective clothing during all chemical applications and presence on the property prior to sod placement. Respirators will be required during application of the phosphoric acid. (See item 5 above)
17. Analysis does not include costs associated with obtaining access to properties, characterization costs, or post-treatment evaluation costs.
18. Costs relating to damage of property features (i.e., sidewalks, drives, ornaments) are not included.
19. A cost allowance for watering the sod for 30 days is provided for in the estimate.
20. Costs associated with limitations and encumbrances to property access are not included.
21. Risks associated with the acidic and caustic nature of applied chemicals are not addressed. Risks may include ecological impacts and associated costs due to stormwater runoff which discharges into streams and air-borne particulates which become in contact with property features (i.e., housing, automobiles, and other property features.)

22. Risks, concerns, and issues which are associated with stormwater runoff discharged onto adjoining properties are not evaluated in this analysis.
23. A 10% contingency is added to the estimated phosphate treatment cost to allow for unforeseen conditions and circumstances relating to remedial operations.
24. Contractor delivery capability of chemicals in residential areas is an issue due to the limited size requirements of delivery vehicles and limited roadway features typically found in residential areas. Associated risks / costs impacts due to delivery of chemicals to a property are not included.
25. Availability and costs of the chemicals are affected by seasonal demands supplies on manufactures from agri-business, or other industries.
26. Due to the extensive gross chemical quantities required for a remediation program of residential properties, a controlled storage and staging facility of chemicals will be required for the OLS program. The facility would warehouse and allow for breakdown of delivered products into manageable and effective units. It would be required for the facility to adequately shelter the products from the elements and meet public safety needs. Sufficient personnel and equipment would be required to manage and maintain operations at the storage and staging facility. Although the specific requirements for the facility are not known, an allowance has been included in the analysis.
27. Davis-Bacon wage rates are used as basis of labor costs, from DB General decision NE20080001, dated 08/08/2008. Equipment costs are abstracted from 2007 MCACSES MII Region 5 Equipment database, then escalated to 2008 costs.
28. Costs are in current 2008 U.S. dollars (as of September 2008).

D. Following pricing information provided by:

1. Commodity chemical pricing:

Harcros Chemicals, Inc
Omaha, Nebraska
 9000 F. Street
 Omaha, NE 68127
 Attn: Mr. Don Woolsey
 Phone: (402) 331-4525

Note: Commodity chemical pricing from Harcros is intended only to reflect market conditions as of the date indicated below. The product supply and demand affect product price accordingly.

	Cost / Unit of Measure	Cost / Unit of Measure
Phosphoric Acid	<u>\$0.24 / lb (Apr2007)</u>	<u>\$1.18 / lb (Sep2008)</u>
	(Harcros Chemicals)	(Harcros Chemicals)

(Product cost includes delivery to Omaha, NE, and is based on delivery by 45,000 gallon tanker truck. As stated per *Harcros Chemicals, Inc.*, PA is typically purchased based on a weight of 13 to 14 lbs of 75% tech grade acid / gallon; use **13.2** lbs/gallon to determine total pounds required per property. It is noted the cost / lb of has increase by over 400% since Apr2007)

Potassium Chloride (Potash) (Fertilizer Grade)	Cost / Unit of Measure	Cost / Unit of Measure
	<u>\$0.19 / lb (Apr2007)</u> (Harcros Chemicals)	<u>\$0.57 / lb (Sep2008)</u> (Harcros Chemicals)

(Product cost includes delivery to Omaha, NE, and is based on 44,000 lb truck delivery of 50 lb bag dry product, on 2000 lb pallets)

Lime	Cost / Unit of Measure	Cost / Unit of Measure
	<u>\$0.18 / lb (Apr2007)</u> (Harcros Chemicals)	<u>\$0.15 / lb (Sep2008)</u> (Home Depot)

(Product cost includes delivery of hydrated lime to Omaha, NE, and is based on 44,000 lb truck delivery of 50 lb bag dry product, on 2000 lb pallets).

Harcros Chemicals Inc is a major distributor and producer of industrial chemicals. Privately held since a management buy-out in 2001, the Company began business in 1917 as Thompson-Hayward Chemicals, and in 1961 was purchased by North American Philips. In 1981, Harrisons and Crosfield plc purchased the bulk of the business from Philips, subsequently changing the name to Harcros Chemicals Inc.

The core business of Harcros is the distribution of industrial chemicals, with twenty-eight branches in twenty states, including the cities of Omaha, NE., and Kansas City, KS.)

Updated ROM / budgetary cost information for chemicals provided by Harcros in September 2008 (from April 2007) is reflected above. Per D. Woolsey, substantial cost increases along with significant reductions in availability have occurred with all phosphors related products. 2008 estimated pricing for "Lime" was obtained from Home Depot, Inc.

2. Other Pricing:

Protective Barrier (Safety Fence)

Home Depot, Inc.

\$17.00 / 50-ft roll = approx. \$0.35 per LF

Sod (Lawn Service)

Midwest Landscaping; Omaha, NE (402-339-5151) \$0.20-\$0.24 / SF

Interstate Grass Pad: Omaha, NE (402-331-6577) \$0.27 / SF

Sod City: Omaha, NE (402-331-6577) \$0.23 / SF

[Use avg.....\$0.25 / SF installed = \$250.00 / MSF installed]

(note: sod providers noted above are currently supporting present remediation processes in Omaha, NE.)

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DATE: September 11, 2008

CLIENT: Environmental Protection Agency
 PROJECT: Phosphate Treatment of Residential Properties at the Omaha Lead Site
 LOCATION: Omaha, Nebraska

Prepared By: M. Ledbetter / G. Hicks

Checked By: D. Sanders

PROJECT NO. 044746.01.12

SHEET 1 OF 10

TOTAL SUMMARY OF ESTIMATED TREATMENT COSTS:

Item	Unit	Total Labor	Total Equip	Total Material	Subcontract	Total Contract
PROJECT COSTS (INCL <small>(incl PT&I and Sales Tax , Prime Overhead, Profit)</small>)	LS	\$ 2,948	\$ 4,852	\$ 21,807	\$ 2,433	\$ 32,039
SUBTOTALS		\$ 2,948	\$ 4,852	\$ 21,807		\$ 32,039
CONSTRUCTION BOND	1%	---	---	---	x	\$ 320
ESTIMATED TREATMENT COST =						\$ 32,360
TREATMENT CONTINGENCY @	10%	---		---		\$ 3,236
Total estimated Phosphate Treatment costs for .25 acre Property =						\$ 35,596
<div style="border: 1px solid black; width: 100px; height: 20px; margin: 0 auto;"></div>						

CLIENT: Environmental Protection Agency
PROJECT: Phosphate Treatment of Residential Properties at the Omaha Lead Site
LOCATION: Omaha, Nebraska

Prepared By: M. Ledbetter / G. Hicks
Checked By: D. Sanders

PROJECT NO. 044746.01.12

SHEET 2 OF 10

COST ANALYSIS - PRIME CONTRACTOR SUMMARY

NOTES:

1. COSTS ARE BASED ON 3,747 TOTAL NUMBER OF SAMPLE PROPERTIES REMEDIATED.
2. THIS SUMMARY REFLECTS ESTIMATED TOTAL TREATMENT COSTS IN 2008 DOLLARS.
3. COSTS ARE PRIMARILY DERIVED OR ABSTRACTED FROM MCACES MII UPB COST DATA, AND/OR PRICING INFORMATION PROVIDED BY VENDOR / SUPPLIERS.
4. TREATMENT COSTS HAVE BEEN ADJUSTED TO REFLECT "AREA COST FACTOR" IMPACTS BASED ON DAVIS-BACON HEAVY CONSTRUCTION WAGE RATES
LABOR COSTS INCLUDE BASE RATES AND FRINGES.
5. ~~AS APPLIED TO THE OMAHA, NE, DOUGLAS COUNTY AREA.~~
ESTIMATE PRESUMES CONSTRUCTION WILL BE WITH A SELF-PERFORMING PRIME CONTRACTOR AND ONE SUBCONTRACTOR.
6. ESTIMATE ASSUMES PRIME CONTRACTOR AND SUBCONTRACTOR WILL BE "LOCAL" TO OMAHA, NE, AND SHALL HAVE MINIMAL MOB & DEMOB COSTS.
7. THE TREATMENT CONTINGENCY PERCENTAGE ASSIGNED IS BASED ON LEVEL OF UNFORESEEN CONDITIONS IMPACTING REMEDIATION.
THE CONTINGENCY ALLOWS FOR UNEXPECTED COSTS IN LABOR, MATERIAL, SITE CONDITION IMPACTS, ETC., WHICH MAY RESULT IN ADDITIONAL COSTS
THE CONTINGENCY IS ADDED TO THE ESTIMATED TOTAL TREATMENT COST OF THE PROJECT.

SPECIFIC TO ANY GIVEN PROPERTY.

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DATE: September 11, 2008

CLIENT: Environmental Protection Agency
 PROJECT: Phosphate Treatment of Residential Properties at the Omaha Lead Site
 LOCATION: Omaha, Nebraska

BASIS FOR ESTIMATE
 _____ CODE A (No Design Complete)
 _____ CODE B (Preliminary Design)
 _____ CODE C (Final Design)
 X OTHER (Specify)

PROJECT NO. 044746.01.12

ESTIMATORS: M. LEDBETTER / G. HICKS

COST ANALYSIS - PRIME CONTRACTOR SUMMARY

SHEET 3 OF 10

PRIME CONTRACTOR SUMMARY	Quantity		Labor Cost		Equipment Cost		Material Cost		PRIME CONTRACTOR TOTAL COSTS	ACCUMLATIVE TOTAL COSTS
	No. Units	Unit Meas	Per Unit	Total Labor	Per Unit	Total Equip	Per Unit	Total Material		
TOTAL BARE COSTS (SEE PRIME / SUB WORKSHEETS)										
				\$ 1,780.43		\$ 3,486.54		\$ 15,343.45		
Labor , Equipment & Materials Adjustments due to hazardous site conditions			10%	\$ 178.04	10%	\$ 348.65	5%	\$ 767.17		
Total Bare Costs				\$ 1,958.47		\$ 3,835.19		\$ 16,110.62		
Payroll Taxes and Insurance (PT&I) ; and Sales Tax (on material only)			19%	\$ 372.11	0%	\$ -	7%	\$ 1,127.74		
SUBTOTAL				\$ 2,330.58		\$ 3,835.19		\$ 17,238.37		
TOTAL DIRECT COST				\$ 2,330.58		\$3,835.19		\$ 17,238.37		
OVERHEAD @			15%	\$ 349.59	15%	\$575.28	15%	\$ 2,585.75		
SUBTOTAL				\$ 2,680.17		\$ 4,410.47		\$ 19,824.12		
PROFIT			10%	\$ 268.02	10%	\$ 441.05	10%	\$ 1,982.41		
SUBTOTAL				\$ 2,948.19		\$ 4,851.51		\$ 21,806.53	\$ 29,606.23	\$ 29,606.23
TOTAL SUBCONTRACTOR COSTS									\$ 2,211.89	
PRIME CONTRACTOR MARGIN ON SUBS									\$ 221.19	
									\$ 2,433.08	\$ 2,433.08
TOTAL PRIME CONTRACTOR										\$ 32,039.31

Notes:

1. Costs shown on these pages of the analysis are reflected as cost to the owner.
2. Costs do not include CONSTRUCTION BOND.
3. Costs within the Prime Contractor Summary do not include any CONTINGENCIES affiliated with the remedial program.

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DATE: September 11, 2008

CLIENT: Environmental Protection Agency
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LOCATION: Omaha, Nebraska

BASIS FOR ESTIMATE

- CODE A (No Design Complete)
- CODE B (Preliminary Design)
- CODE C (Final Design)
- OTHER (Specify)

PROJECT NO. 044746.01.12

ESTIMATORS: M. LEDBETTER / G. HICKS

COST ANALYSIS

SHEET 4 OF 10

PRIME CONTRACTOR WORK / TASK ITEM	Quantity		Labor Cost		Equipment Cost		Material Cost			UNIT TOTALS	
	No. Units	Unit Meas	Per Unit	Total Labor	Per Unit	Total Equip	Per Unit	Material Cost	Shipping		Total Material
GENERAL REQUIREMENTS											
Temp Facilities and Controls (mob / demob) ; incl logging/closeout procedures; (Prime - Contractor allowance) say \$20.00 equip mob + \$5.00 logging/closeout procedures = \$25.00 per Property	1	LS	\$ 25.00	\$ 25.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 25.00
Specialized Training (HAZWOPER - OSHA Compliant Training) Allow \$500 for a one week (40 training session) which trains all personnel for duration of entire abatement Personnel requiring training are those involved in all preparation and treatment efforts prior to sod placement Training Costs are distributed over balance of 3,747 properties at the Omaha Lead Site project (Sept 2008). Est. 7 people trained ; \$500 per wk training cost / 7 people = \$71.43 cost per person ; assume \$71.43 / 3,747 prop = approx. \$0.02 course cost / per person / property; training costs paid for training: labor costs paid during training: 40 hrs x [assume 5 persons x \$23.50 avg / hr+ 2 persons x \$22.75 / hr] = \$6520 div. by 3,747 = \$1.74 thus \$1.74 + \$0.02 = \$1.76.....use \$1.76 / property = Avg. HAZWOPER - OSHA Compliant Training cost per Property	1	LS	\$ 1.760	\$ 1.76	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1.76
Controlled Chemical Storage and Staging Facility: Costs associated with a controlled storage and staging facility of chemicals should be incurred for the Omaha Lead Property abatement program. The facility would warehouse and allow for breakdown of delivered products into manageable and effective units. An Estimated amount of \$3,000,000 is required for property / facility acquisition; facility operations over estimated 7 year period; and de-commissioning of facility. Thus, \$3,000,000 / 3,747 properties = \$800.64 cost impact per property; say \$800	1	LS	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 400.00	\$ 400.00	\$ -	\$ 400.00	\$ 800.00
PROPERTY ASSESSMENT											
Prior to remedial procedures and property preparation, evaluate specific needs to prep Property for treatment Incls photos of existing Property conditions prior to construction (allow 1 hour avg time frame; 1 laborer = 1 Mhr); laborer may also be used in Property Area Prep below	1	Mhr	\$ 25.25	\$ 25.25	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 25.25
PROPERTY AREA PREPARATION (prior to treatment process) Following initial assessment temporarily remove / store on-Property any lawn features which will impact an effective treatment process, and to provide protection of such features (allow 4 hours avg time frame; 2 laborers = 8 Mhr)	8	Mhr	\$ 24.31	\$ 194.48	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 194.48
INSTALL PROTECTIVE BARRIER / EROSION CONTROL Install PROTECTIVE BARRIER around perimeter of .25 acre Property Property; allow 400 LF per Property (allow for 2 laborers to install approx. 200 LF per HR at \$24.31 / hr = \$0.243 / LF labor cost Material Costs: 400 LF x say 10 properties only x \$5.00 LF of barrier with EC / [3,747x400] = \$0.013 ; assume \$0.02 / LF material / property	400	LF	\$ 0.243	\$ 97.20	\$ -	\$ -	\$ 0.02	\$ 8.00	\$ -	\$ 8.00	\$ 105.20
ROTOTILLING #1 Rototilling of property prior to application chemicals ; (Crew RT-1)	7.890	MSF	\$ 0.50	\$ 3.98	\$ 0.54	\$ 4.27					\$ 8.25

COST ANALYSIS

PRIME CONTRACTOR WORK / TASK ITEM	Quantity		Labor Cost		Equipment Cost		Material Cost			UNIT TOTALS	
	No. Units	Unit Meas	Per Unit	Total Labor	Per Unit	Total Equip	Per Unit	Material Cost	Shipping		Total Material
APPLICATION OF CHEMICALS (Phosphoric Acid and Potassium Chloride)											
Spray application of Phosphoric Acid onto soil (1 complete Property = 7890 SF = 7.890 MSF); (Crew SPR-1) Allow 916.256 gal / Property application rate; allow for (2) technicians ; 1 for application; 1 for monitoring tank truck assume 6 hrs total at application rate ; technicians hourly rate assumed at \$24.90 / hr incl / fring. thus for 6 hr treatment process assume: (6 hrs x 2 techs x \$24.90/hr) Use equipment cost approx. equivalent to labor cost, assume \$0.025 / lb equip (Note: material costs per Harcros Chemicals, Inc., Omaha, NE)	12095	LBS	\$ 0.0247	\$ 298.80	\$ 0.250	\$ 3,023.75	\$ 1.18	\$ 14,272.10	\$ -	\$ 14,272.10	\$ 17,594.65
Application of Potassium Chloride [Potash] onto soil (1 complete Property = 7890 SF) (includes both initial after rototilling #1 and secondary application afer rototilling #2) allow 335 LBS / Property application rate; allow for (1) technician ; Material costs per Harcros Chemicals, Inc. assume 2 hrs total at application rate of 167.5 CF per hour; technicians hourly rate assumed at \$24.75 / hr thus for 2 hr treatment process assume: (2 hrs x 1 tech x \$24.75 / hr) / 335 LBS = \$0.148 / LB	335	LBS	\$ 0.148	\$ 49.58	\$ 0.025	\$ 8.38	\$ 0.57	\$ 190.95	\$ -	\$ 190.95	\$ 248.91
Safety wear / protective gear (i.e., TYVEK underwear, gloves, protective face masks) (incl 1 pr coveralls \$4.89; pr gloves @ \$1.99; 1 ea respirator @ \$25.00; protective eyeware @ \$5.00 = 1 set Total cost of 1 set = \$46.88.....assume \$50.00 per person x 3 laborers = \$150.00 / Property (pricing per Northern Safety Company)	3	SETS	\$ -	\$ -	\$ -	\$ -	\$ 50.00	\$ 150.00	\$ -	\$ 150.00	\$ 150.00
Decontamination Shower (ALLOW \$700 / UNIT FOR 10 UNITS; pricing per Northern Safety Company) (\$700 units X 10 ea div. 3,747 Properties = \$1.87 per Property costs.....assume \$1.85; allow 1 Mhr at \$15 for setup / Property; assume (1) technician required for 1 hr to set up unit	1	Ea	\$ 22.75	\$ 22.75	\$ -	\$ -	\$ 1.85	\$ 1.85	\$ -	\$ 1.85	\$ 24.60
ROTOTILLING #2 (follows Phosphoric Acid and Potassium Chloride application- see above)											
Rototilling of property prior to application chemicals ; (Crew RT-1)	7.890	MSF	\$ 0.50	\$ 3.98	\$ 0.54	\$ 4.27					\$ 8.25
ROTOTILLING #3 (follows 5g Phosphate (P) Kg soil application- see above)											
Rototilling of property prior to application chemicals ; (Crew RT-1)	7.890	MSF	\$ 0.50	\$ 3.98	\$ 0.54	\$ 4.27					\$ 8.25
LIME STABILIZATION OF SOIL / PH ADJUSTMENT											
Application of Lime onto soil (1 complete Property Property = 7890 SF = 876.67 SY) Includes Rototilling #4, grade for drainage; and compaction to 85% Proctor; allow 1837 LBS / Property application ; allow 2.0954 LBS / SY application rate; allow for (1) technician assume application rate of 150 SY per hr per hour; 876.67 / 150 SY per hour = 5.84 hrs technicians hourly rate assumed at \$24.75 / hr thus : (5.84 hrs x 2 techs x \$24.75/hr) / 1837 LBS = \$0.1574.....assume \$0.16 / LB labor Material costs per Harcros Chemicals, Inc.	1837	LBS	\$ 0.16	\$ 293.92	\$ 0.015	\$ 27.56	\$ 0.15	\$ 275.55	\$ -	\$ 275.55	\$ 597.03
Costs of Safety wear / protective gear (i.e., Tryvek underwear, gloves, protective face masks) incl above incl above in "APPLICATION OF CHEMICALS"	x	x	x	x	x	x	x	x	x	x	x
Allowance for protection / relocation / repair of impacted buried / underground utilities : assume 4 Mhrs per Property x \$24.75 for each Property = \$99.00 labor assume \$25 avg. equip. cost per each Property. assume \$45 material cost avg per each Property.	1	LS	\$ 99.00	\$ 99.00	\$ 25.00	\$ 25.00	\$ 45.00	\$ 45.00	\$ -	\$ 45.00	\$ 169.00
SOIL PREPARATION FOR SOD PLACEMENT (also see See Lawn Service Subcontractor)											
Costs of compaction of disturbed tilled soil included in "LIME SOIL STABILIZATION" above	x	x	x	x	x	x	x	x	x	x	x
Finish Grading / Fine grading of lawn / treatment area to prepare for sod placement (see Crew FG-1 costs)	7890	SF	\$ 0.03	\$ 266.32	\$ 0.02	\$ 189.03	\$ -	\$ -	\$ -	\$ -	\$ 455.35

COST ANALYSIS

PRIME CONTRACTOR WORK / TASK ITEM	Quantity		Labor Cost		Equipment Cost		Material Cost			UNIT TOTALS		
	No. Units	Unit Meas	Per Unit	Total Labor	Per Unit	Total Equip	Per Unit	Material Cost	Shipping		Total Material	
REINSTALL LAWN FEATURES Following initial assessment temporarily remove / store on-Property any lawn features which will impact an effective treatment process, and to provide protection of such features (allow 2 hours avg time frame with 2 laborers at \$24.31 / hr per laborer = 4 Mhr)	4	Mhr	\$ 24.31	\$ 97.24	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 97.24	
REMOVE PROTECTIVE BARRIER Remove PROTECTIVE BARRIER around perimeter of .25 acre Property Property; allow 400 LF per Property (allow for 2 laborers to install approx. 200 LF per HR at \$24.31 / hr = \$0.243 / LF labor cost NO material costs incl	400	LF	\$ 0.243	\$ 97.20	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 97.20	
DEMOBILIZATION FROM PROPERTY (See "Genral Requirements" above)	x	x	x	x	x	x	x	x	x	x	x	
				\$ 1,780.43			\$ 3,486.54				\$ 15,343.45	\$20,610.42

- Notes:
- Costs shown on page 4 and page 5 of the anaysis are reflected as "direct" costs to the Prime Contractor.
 - Costs shown on are developed for a single Property.

BLACK & VEATCH

DATE: September 11, 2008

CLIENT: Environmental Protection Agency
 PROJECT: Phosphate Treatment of Residential Properties at the Omaha Lead Site
 LOCATION: Omaha, Nebraska

BASIS FOR ESTIMATE
 _____ CODE A (No Design Complete)
 _____ CODE B (Preliminary Design)
 _____ CODE C (Final Design)
 X OTHER (Specify)

PROJECT NO. 044746.01.12

ESTIMATORS: M. LEDBETTER / G. HICKS

COST ANALYSIS

SHEET 7 OF 10

LAWN SERVICE SUBCONTRACTOR SUMMARY	Quantity		Labor Cost		Equipment Cost		Material Cost		SUBCONTRACTOR TOTAL COSTS
	No. Units	Unit Meas	Per Unit	Total Labor	Per Unit	Total Equip	Per Unit	Total Material	
TOTAL BARE COSTS (See SUBCONTRACTOR WORKSHEET)									
Direct costs for Lawn Service Subcontractor (see sheet 8 of 8)				\$ 51.97		\$ 0.30		\$ 107.59	
Labor , Equipment & Materials Adjustments due to hazardous site conditions			10%	\$ 5.20	10%	\$ 0.03	5%	\$ 5.38	
Total Bare Costs				\$ 57.17		\$ 0.33		\$ 112.97	
Payroll Taxes and Insurance (PT&I) ; and Sales Tax (on material only)			19%	\$ 10.86	0%	\$ -	7%	\$ 7.91	
SUBTOTAL "A" (Replacement of damaged plantings with watering only)				\$ 68.03		\$ 0.33		\$ 120.88	
TOTAL DIRECT COST				\$ 68.03		\$ 0.33		\$ 120.88	
OVERHEAD @			15%	\$ 10.20	15%	\$ 0.05	15%	\$ 18.13	
SUBTOTAL				\$ 78.24		\$ 0.37		\$ 139.01	
PROFIT			10%	\$ 7.82	10%	\$ 0.04	10%	\$ 13.90	
SUBTOTAL "B" (with markup Subtotal "A" above)				\$ 86.06		\$ 0.41		\$ 152.92	\$ 239.39
SUBTOTAL "C" (Sod Placement assume incl markups)				\$ 394.50		\$ 59.18		\$ 1,518.83	\$ 1,972.50
TOTAL LAWN SERVICE SUBCONTRACTOR PER SITE =									\$ 2,211.89

BLACK & VEATCH

CLIENT: Environmental Protection Agency
 PROJECT: Phosphate Treatment of Residential Properties at the Omaha Lead Site
 LOCATION: Omaha, Nebraska

PROJECT NO. 044746.01.12

COST ANALYSIS

DATE: September 11, 2008

BASIS FOR ESTIMATE

CODE A (No Design Complete)
 CODE B (Preliminary Design)
 CODE C (Final Design)
 X OTHER

ESTIMATORS: M. LEDBETTER / G. HICKS

SHEET 8 OF 10

LAWN SERVICE SUBCONTRACTOR TASK ITEM	Quantity		Labor Cost		Equipment Cost		Material Cost			UNIT TOTALS		
	No. Units	Unit Meas	Per Unit	Total Labor	Per Unit	Total Equip	Per Unit	Material Cost	Shipping		Total Material	
LAWN SERVICE												
A. Lay Sod												
(see below for costs of laying sod)												
Allowance for cost of watering by owner to establish sod for a 1 month period (allow \$50.00 / month)												
	1	LS					\$ 50.00	\$ 50.00	\$ -	\$ 50.00	\$ 50.00	
B. Replacement of damaged plantings / shrubs, etc.												
Allowance for replacement of damaged plantings / shrubs, etc.												
(Costs assumed average per each residential property)												
	1	LS	\$ 50.00	\$ 50.00	\$ -	\$ -	\$ 50.00	\$ 50.00	\$ -	\$ 50.00	\$ 100.00	
C. Allowance for Re-sod (followup to initial sod placement)												
Based on total project estimate of 3747 residential sites, assume 10% of Properties require 5% sod re-placment thus 7890 SF Treatment area per Yd x 3747 x 10% x 5% = 147,819 SF re-placement												
147819 SF / (7890 x 3747) SF proj total = .005 %												
.005 x 7890 / 1000 SF = .03945 MSF allowance per Properties site for sod re-placement												
0.03945	MSF		\$ 50.00	\$ 1.97	\$ 7.50	\$ 0.30	\$ 192.50	\$ 7.59	\$ -	\$ 7.59	\$ 9.86	
				\$ 51.97			\$ 0.30				\$ 107.59	\$ 159.86

LAWN SERVICE SUBCONTRACTOR TASK ITEM	Quantity		Labor Cost		Equipment Cost		Material Cost			UNIT TOTALS		
	No. Units	Unit Meas	Per Unit	Total Labor	Per Unit	Total Equip	Per Unit	Material Cost	Shipping		Total Material	
LAWN SERVICE												
D. Lay Sod (following the applications of chemical treatments to Properties)												
Lay new sod in lawn areas disturbed by treatment process (assume level ground, over 6 MSF)												
(per current pricing data from Omaha area sod projects, use approx. \$0.25 per SF as avg. price installed)												
(note: pricing shown is considered a subcontracted price, assume markups included)												
7.890	MSF		\$ 50.00	\$ 394.50	\$ 7.50	\$ 59.18	\$ 192.50	\$ 1,518.83	\$ -	\$ 1,518.83	\$ 1,972.50	
SUBTOTAL "C" (Sod Placement ; assume incl markups)				\$ 394.50			\$ 59.18				\$ 1,518.83	\$ 1,972.50

Notes:

- Costs shown above are reflected as "direct" costs to the Subcontractor.
- Costs shown on are developed for a single Properties location.
- Costs for laying sod are based on installed pricing data from current contractors in Omaha area involved in the present remedial program.
- MSF = 1000 Square Feet

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Prepared I.M. Ledbetter / G. Hicks

Checked E.D. Sanders

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SHEET 9 OF 10

CREW COSTS:

Grp#		2008 Davis-Bacon			
		Base Hr Rate	Fringes	Harzardous	TOTAL
1	General Laborer	\$16.76	\$6.55	\$1.00	\$24.31
2	Supervisor Est	\$17.50	\$6.75	\$1.00	\$25.25
3	Chemical Technician Est	\$17.20	\$6.70	\$1.00	\$24.90
4	Power Equip Oper 1	\$19.90	\$7.45	\$1.00	\$28.35

Note: Base Rates based on DB Gen Decision NE20080001, dated 08 / 08 / 2008

Topsoil Removal Crew (Crew TS-1)

hr.	Item	LABOR 2008 Davis-Bacon Hr. Rate (incl Fringes)	2007 MII UPB Daily (btwn diff-severe)	EQUIP 2008 (esc. by 1.03) Daily	Esc. Rate / HR
1	Power Equip Oper	\$28.35			
0.5	Labor (at \$24.31 / hr)	\$12.16			
1	Dozer, 80 hp		\$300	\$309.00	
		\$40.51		\$309.00	\$38.63

Productivity: 200 CY per 8 hr day 25 CY per hr

Hourly cost per UOM: CY \$1.62 \$1.55

Rototilling Crew (Crew RT-1)

hr.	Item	LABOR 2008 Davis-Bacon Hr. Rate (incl Fringes)	2007 MII UPB Daily (btwn diff-severe)	EQUIP 2008 (esc. by 1.03) Daily	Esc. Rate / HR
1	Power Equip Oper	\$28.35			
1	Backhoe Ldr w/ attachment		\$212	\$243.80	
		\$28.35		\$243.80	\$30.48

Productivity: 450 MSF per 8 hr day 56.25 MSF per hr

Hourly cost per UOM: MSF \$0.50 \$0.54

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CREW COSTS (con't):

Chem Spray Application Crew (Crew SPR-1)

hr.	Item	LABOR	2007 MII UPB Daily (btwn diff-severe)	EQUIP	Esc. Rate / HR
		2008 Davis-Bacon Hr. Rate (incl Fringes)		2008 (esc. by 1.03) Daily	
2	Chemical Technician	\$49.80			
		\$49.80		\$0.00	\$0.00

Allow 916.256 gal / Property application rate; allow for (2) technicians ; 1 for application; 1 for monitoring tank truck
 assume 6 hrs total application rate (1 complete Property = 7890 SF = 7.890 MSF)
 say 12095 lbs / property of Phosphoric Acid application (applied in 6 hr period)

Productivity: LBS per 6 hr period
 LBS per 8 hr period LBS per hr

Hourly cost per UOM: MSF Say equals labor cost =

Finish Grading / Fine grading of lawn / treatment area to prepare for sod placement (Crew FG-1)

hr.	Item	LABOR	2007 MII UPB Daily (abstracted)	EQUIP	Esc. Rate / HR
		2008 Davis-Bacon Hr. Rate (incl Fringes)		2008 (esc. by 1.03) Daily	
1	Power Equip Oper	\$28.35			
0.5	Labor (at \$21.21 / hr)	\$12.16			
1	Tractor w/ rake attachments		\$200.00	\$230.00	
		\$40.51		\$230.00	\$28.75

Productivity: SF per 8 hr day SF per hr

Hourly cost per UOM: MSF