Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

No.	Description	Cost
	Design Costs	
	Pre-Design Investigation (Allowance)	$200,000
	Remedial Design (Allowance)	$400,000
		$600,000
	EXCAVATION COSTS	
	General Requirements	**Cost**
1	General Conditions	$264,000
2	Permits (Allowance)	$20,000
3	Safety and Health Requirements	$62,000
4	Temporary Facilities and Utilities	$26,000
5	Security	$51,000
6	Surveying	$21,000
7	Erosion Control	$19,000
8	Decontamination	$31,000
	Site Preparation	
9	Site Preparation (allowance)	$20,000
	Excavation and Sampling	
9	Shoring (Allowance)	$100,000
10	Excavation	$24,000
11	Waste Characterization Sampling	$3,000
12	**Transportation and Disposal**	$358,000
13	**Amended Backfill and Restoration**	$102,000
	Closure Documents	
14	RA Report and As-Built Drawings (Allowance)	$50,000
	ELECTROKINETICS-ENHANCED ISCO	
15	Bench-scale study and Pilot Study (Allowance)	$85,000
	Injection of ISCO and distribution by electrokinetics	$692,000
	VAPOR MITIGATION	
16	Vapor Mitigation	$12,520
	CLEAN OUT	
17	Cleanout of storm sewer and sump, cementing-in of sump (Allowance)	$15,000

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

No.	Description	Cost
	Subtotal RA Costs	**$1,955,520**
	Bond (1.5%)	$30,000
	General Contractor Markup (profit, insurance etc) 20%	$391,104
	Contingency 20%	$391,104
	TOTAL REMEDIAL ACTION COSTS	**$2,767,728**
	LONG-TERM MONITORING	
18	Present worth of annual Long term monitoring (yr 1 - 30)	**$534,000**
	PROJECT CAPITAL COST	
	DESIGN COSTS	$600,000
	TOTAL RA COSTS	$3,301,728
	TOTAL PROJECT CAPITAL COST	**$3,902,000**

Note: The project cost presented herein represents only feasibility study level, and is thus subject to change pending the results of the pre-design investigation, which is intended to collect sufficient data to assist in the development of remedial design and associated detailed cost estimate. Expected accuracy range of the cost estimate is -30% to +50%.

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 2

0001 - General Conditions

General conditions to include the project-dedicated site supervisory staff, development of work plans, site photographs/videos, project signs, insurance, mobilization/demobilization, and costs not covered elsewhere.

Estimate assumes that following the remedial design, the RA Contractor will mobilize to the site and complete the remedial action including the site preparation, excavation/removal, off-site transportation and disposal, backfill and compaction, final grading, and site restoration prior to project end.

Project Schedule

Assume the following project schedule:

Pre-Construction Work Plans and Meetings (RA Work)	3	weeks		
Field Trailer Compound Establishment	0.5	weeks		
Site Preparation (Decon areas, stockpile areas, clearing)	1.5	weeks		
Shoring	3.0	weeks		
Remedial Excavation	2.0	weeks		
Tranportation and Disposal (T & D)	0.8	weeks		
Backfill and Compaction (concurrent to T & D)	0.2	weeks		
Final Site Restoration and Demob	2.0	weeks		
Total Construction Duration	10	weeks		
	2.32	months		
Project Closeout	0.75	months		
Total Project Duration	**3.8**	**months**	**17**	**weeks**

General Condition Costs

A) Site Supervisory Staff (10 hours per week)

Project Manager	$160	per hour	
Project Engineer	$110	per hour	
Procurement staff (20 hours per week)	$95	per hour	
Total for office support	**$63,000**		

Assume the following Site Supervisory Staff for duration of construction (see labor/equipment backup page for rates):

Site Superintendent	$100	per hour	
Construction Foreman	$80	per hour	
Environmental Technician (QC)	$85	per hour	
Pickup Truck #1	$13	per hour	
Pickup Truck #2	$13	per hour	
per diem for superintendant and QC engineer	$0	per day	
	$291	per hour	
	$50,440	per month	
Total Site Supervisory Staff for Construction Duration			**$117,000**

B) Work Plan Preparation

Estimated # of Pre-Construction Work Plans Required:	1	work plans	
Estimated # of Engineer Hours Required per Work Plan:	80	hours	
Professional Engineer	$110	per hour	
Project Manager	$160	per hour	
Total Work Plan Preparation Cost:			**$21,600**

C) Mobilization/Demobilization Fees

Assume 10 large pieces of equipment to be used throughout remedial action.
Per MEANS 01-54-36.50-0100 Mobilization, 50-mile round trip
Total Mobilization/Demobilization Cost: **$12,000**

D) Project Insurance

Per MEANS 01-31-13.30-0020 Builder's Risk Insurance, 0.24% of job cost. Allow $50,000 based on project size.
Estimated Project Insurance Cost: **$50,000**

TOTAL GENERAL CONDITION COST: **$264,000**

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 2			
03 - Safety and Health Requirements			
Safety and Health Requirements to include the Site Health and Safety Officer, personnel protective equipment and supplies, and additional safety and air monitoring equipment/testing.			
Total Construction Duration:	10	weeks	
	50	work days	
A) Site Health and Safety Officer			
Full time SHSO During Construction			
Industrial Hygienist (SHSO)	$125	per hour	
			$50,000
B) PPE Costs			
Assume PPE required for 10 people per work day for duration of demolition and construction.			
Estimate $20 per day per worker for PPE and incidental safety equipment/testing.			$10,000
C) Additional Safety and Air Monitoring Equipment			
Add 20% to PPE Costs for additional safety and air monitoring equipment:			$2,000
TOTAL SAFETY AND HEALTH REQUIREMENTS COST:			**$62,000**

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 2

04 - Temporary Facilities

Temporary Facilities to include the field trailers, utilities, cleaning services, and office equipment and supplies.

A) Field Trailers

Assume 1 project trailer required.

The trailer compound will be mobilized at project start and will be used for entire project duration (not just the construction).

Total Duration for Field Portion of Project: 10 weeks

MEANS 01-52-13.20-0550 Field Trailer Rental, 50' x 12', furnished	$405
MEANS 01-52-13.20-0700 Add for Air Conditioning	$46
	$451
Field Trailer Rental Cost per Trailer :	$2,000
Installation of Utility Connections (allowance):	$10,000
Total Field Trailer Rental Cost for trailer:	**$12,000**

B) Utilities and Cleaning Services for Field Trailers

Assume following utilities per month per trailer:

Electricity	$600	per month per trailer
Phone/Internet	$80	per month per trailer
Water	$40	per month per trailer
Sewer	$30	per month per trailer
Cleaning Services	$50	per month per trailer
	$800	per month per trailer

Total Utilities and Cleaning Services for 1 trailer: $8,000

C) Miscellaneous Office Supplies

Item	QTY	UOM	Unit Cost	Extended Cost
Computers	2	each	$2,000	$4,000
Fax Machines	1	each	$300	$300
Printers	1	each	$500	$500
Office Supplies	3	months	$300	$900

Total Miscellaneous Office Equipment/Supplies: $6,000

TOTAL COST FOR TEMPORARY FACILITIES: $26,000

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 2

05 - Security

Assume for duration of construction requires 16-hour security guard for weekdays and 24-hour security guard for weekends.

Total Field Duration:	10	weeks
	1,274	hours

A) Security Guard

Security Guard	$40	per hour

Total Security Guard Cost: **$51,000**

TOTAL COST FOR SITE SECURITY: **$51,000**

06 - Surveying

Assume surveying will be required for the following tasks/durations:

Existing Conditions Survey prior to Site Preparation	0.2	weeks
Excavation and Backfill Period (for depth verification, quantity measurement, waste char. samples, final grading)	2.2	weeks
Total Surveying Duration:	2.4	weeks
	12	work days

Survey Cost

Assume full-time 2-person survey team for the surveying work:

Surveyor #1	$80	per hour
Surveyor #2	$80	per hour
	$160	per hour
	$1,280	per day
As-built Drawing Preparation	$5,000	LS

TOTAL COST FOR SURVEYING: **$21,000**

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 2

07 - Erosion Control

Total Field Duration: 10 weeks

A) Installation and Maintenance of Erosion Control Devices

Assume 2 laborers for 4 hours per week to install, maintain, and remove erosion control devices throughout construction:

Laborer (Foreman)	$100	per hour
Laborer	$55	per hour
	$155	per hour

Total Cost for Erosion Control Installation: **$7,000**

B) Erosion Control Devices/Materials

MEANS 31-25-13.10-1100 Silt Fence, 3' high, adverse conditions	$0.96 per LF
MEANS 31-25-13.10-1250 Hay Bales, stacked	$6.60 per LF
	$7.56 per LF

Assume silt fence and hay bales installed around outer site perimeter (assume 340 feet x 275 feet area)

Perimeter of excavation area	1230 LF
add 25% for material replacement	1537.5 LF

Total Cost for Erosion Control Devices/Materials: **$12,000**

TOTAL COST FOR EROSION CONTROL: **$19,000**

08 - Decontamination

Assume decontamination pad required during construction duration only.

A) Construct Decontamination Pad

Allowance for Construction of Decontamination Pad: **$15,000**

B) Decon Pad Operations

Assume

Laborer (Foreman)	$100	per hour
Laborer	$55	per hour
	$155	per hour

2 hours per day, 5 days a week

Total Cost for Decon Pad Operations: **$16,000**

TOTAL COST FOR DECONTAMINATION: **$31,000**

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description:	FS Cost Estimate for Alternative 2				
10 - Excavation and Dewatering					
	A) Total Excavation/Removal Volume				
	Excavation Area			2,500	square feet
	Excavation Depth			14	feet
	Excavation Volume			1,296	CY
	Contaminated Depth Interval			0 to 14	feet bgs
	Contaminated zone vertical thickness			14	feet
	Contaminated material volume			1,296	CY
	Asphalt Debris Volume (assume 6" thick)			50	CY
	Soil - Total			1,296	Bank Cubic Yards (BCY)
	Debris			50	BCY
	B) Excavation Duration				
	Assume 100 SY/day production rate for pavement demolition				
	Assumed excavation production rate	200	CY/day		
	Pavement demolition period, workdays	3	days		
	Excavation Period, workdays				7 DAYS
	Total Demo & Excavation Period, workdays				10 DAYS
	Total Demo & Excavation Period, work hours (8 hours per day)				78 HOURS
	Total Demo & Excavation Period, work weeks				2.0 WEEKS
	Total Excavation Costs			$7,400	
	(Per RS Means 31.23.1646.6080)				
	D) Dewatering Costs				
	Dewatering System weekly rental allowance			$8,000	
	(assume air stripper treatment with all associated equipment and carbon polish treatment)				
	Water storage and disposal (allowance)			$8,000	
	Total dewatering cost			$16,000	
	(during excavation and backfill periods only)				
	TOTAL EXCAVATION COST			**$24,000**	

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 2			
11 - Waste Characterization Sampling			
To check whether TCLP requirements are met:			
1 sample per 500 CY of total volume - soil, concrete and non-concrete debris			
A) Estimated # of Waste Characterization Samples			
Total # of samples:	3 samples		
B) Laboratory Analysis Fees			
Waste Characterization Analytical Cost per sample			**$600**
Total Laboratory Analysis Costs:			**$1,800**
C) Waste Characterization Sample Collection			
Assume 1 hour per sample for an environmental technician to collect each sample			
Environmental Technician	$85 per hour		**$255**
D) Sample Packaging and Shipping Costs			
Assume shipping cost is 5% of analytical cost:			**$90**
TOTAL WASTE-CHARACTERIZATION SAMPLING:		**$3,000**	

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 2

12 - Transportation and Disposal

A) Transportation and Disposal Costs

a) Quantity Calculation at time of FS based on existing data (see Figure 1)

b) Add 25% additional volume to account for bulking between bank and loose cubic yards for soil.

c) Assumes 1.6 tons per CY soil density, 2 tons per CY for debris.

Waste Category	In-place Quantity (BCY)	Quantity after Excavation (LCY)	Quantity (tons)	Disposal Type
Hazardous Waste - Soil (assumed 10% of total soil)	130	170	300	Subtitle C Landfill
Non-Hazardous Waste - Soil (assumed 90% of total soil)	1,167	1,460	1,900	Subtitle D Landfill
Subtotal Waste Volume	**1,297**	**1,630**	**2,200**	

Waste Category	Quantity (LCY)	Quantity (tons)	Transportation Unit Costs (per ton)	Disposal Unit Costs (per ton)	Extended Costs
Hazardous Waste - Soil	170	300	$131	$85	$64,800
Non-Hazardous Waste - Soil	1,460	1,900	$75	$64	$264,100
Hazardous Waste - Debris (assumed 10% of total debris)	5	10	$195	$150	$3,450
Non-Hazardous Waste - Debris	45	90	$80	$95	$15,750
Subtotal T&D Cost	**1,630**	**2,200**			**$348,100**

B) Labor and equipment costs for loading the truck for offsite disposal

Assume 20 trucks per day for offsite shipment (each truckload is 25 CY)

Time for loading the material for offsite disposal			4 days
Excavator, Hydraulic, 2 CY	$100	per hour	
Equip. Op. Heavy	$80	per hour	
Laborer (Semi-Skilled)	$55	per hour	
Laborer (Semi-Skilled)	$55	per hour	
Total rate per day	$2,320	per day	
Total Cost	**$9,300**		

Total Transportation and Disposal Costs **$358,000**

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 2				
13 - Backfill and Restoration				
Total Excavation Volume		1,296	BCY	
(Bulking factor 0.25)		1,620	Loose Cubic Yards (LCY)	
Backfill & Restoration Duration				
Assume backfill has a production rate of 2150 CY/day per 31.23.2314.5210				
Total Backfill Period, workdays				1 DAYS
Total Backfill Period, work hours (8 hours per day)				8 HOURS
Total Backfill Period, work weeks				0.2 WEEKS
Total Backfill Period, months				0.05 MONTHS
Total Asphalt Restoration Period (concurrent to building construction), days				2 DAYS
A) Backfill Labor/Equipment Costs				
Backfill Labor & Equipment Unit Rate		$1.45	per LCY	
(RS Means 31.23.2314.5210)				
Amendment mixing labor & equipment (allowance)		$1.00	per LCY	
Total Backfill Labor and Equipment Cost	**$4,000**			
B) Backfill Material Costs				
Backfill Material Costs:				
Common Fill Unit Cost (RS Means 31.23.2316.0035)		$32	per CY	
Fresh Backfill Material Quantity (with 0.25 bulking factor)			1,620 LCY	
Backfill hauling unit cost		$13.55	per LCY	
(RS Means 31.23.2320.9114)				
Total backfill hauling costs		$21,956		
Oxygen-releasing Amendment Cost		$3.00	lb	
Amendment ratio (estimate)		2	lbs amendment per cubic yard	
Total amendment costs		$9,722		
Backfill Material Cost		$61,574		
Total Backfill Material Costs:	**$83,600**			
C) Backfill Material Testing				
Requires one sample for every 5,000 cubic yards imported to the site, analyzed for full parameters				
including sieve analyses, moisture content, chemical compounds, and Ra-226				
Assume $1500 per sample analysis fee				
# of Backfill Material Samples Required:			1 samples	
Backfill Testing Cost:	**$1,500**			
D) Soil Density Testing				
Assume $500 per visit by soil density testing technician, 2 visits per week, during backfill operations				
# of Backfill Visits Required:			1 visits	
Soil Density Testing Cost:	**$500**			
E) Asphalt Restoration Costs				
Area of asphalt restoration	2,500	square feet		
Unit costs for asphaltic concrete paving at parking lots and driveways				$4.77 per SF
(RS Means 32.12.1614.1180)				
Asphalt Restoration Costs	**$12,000**			
TOTAL BACKFILL AND RESTORATION COST:	**$102,000**			

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: Individual Cost Item Backup for Alternative 2

	Quantity	Unit	Unit Cost		Extended Cost
EK-ISCO					
Construction Management & Operations - General Conditions					
Timeperiods are calculated in 5b below					
Construction time period	3	weeks			
Operations Timeperiod	30	weeks			
Pre-Mobilization Work Plans					
Project Manager	20	hr	$160	0	$3,200
Environmental Engineer	60	hr	$110	=	$6,600
Scientist	60	hr	$110	=	$6,600
Admin Clerk	10	hr	$75	=	$750
Permit Applications					
Project Manager	20	hr	$160	=	$3,200
Environmental Engineer	80	hr	$110	=	$8,800
Scientist	80	hr	$110	=	$8,800
Subcontractor Procurement					
Assume procurement of driller, IDW, laboratory, remediation subcontractors					
Project Manager	60	hr	$160	=	$9,600
Environmental Engineer	40	hr	$110	=	$4,400
Geologist	30	hr	$110		$3,300
Scientist	30	hr	$110	=	$3,300
Procurement specialist	50	hr	$100	=	$5,000
During Construction					
Project Manager (10 hrs/wk)	34	hr	$160	=	$5,376
Engineer (16 hrs/wk)	54	hr	$110	=	$5,914
Site Superintendent (70 hrs/wk)	34	hr	$80	=	$2,688
Site Trucks (2 per work days)	3	week	$250	=	$840
Per Diem (2 people per work days)	7	day	$323	=	$2,171
Health and Safety Engineer (16 hrs/wk)	54	hr	$125	=	$6,720
Admin Clerk (assume 4 hrs/wk)	13	hr	$75	=	$1,008
Subcontract management (10 hrs/week)	34	hr	$75	=	$2,520
Meetings	2	LS	$500	=	$1,000
Weekly calls	3	per	$500	=	$1,680
One trailer with utilities	1	LS	$30,000	=	$30,000
During Operations					
Project Manager (2 hrs/wk)	61	hr	$160	=	$9,756
Engineer (5 hrs/wk)	152	hr	$110	=	$16,768
Site Superintendent (16 hrs/wk)	488	hr	$80	=	$39,024
Site Truck	30	week	$250	=	$7,622
Per Diem (2 d/wk)	61	day	$323	=	$19,695
Health and Safety Engineer (2 hrs/wk)	61	hr	$125	=	$7,622
Admin Clerk (assume 1 hrs/wk)	30	hr	$75	=	$2,287
Subcontract management (2 hrs/week)	61	hr	$75	=	$4,573
Meetings	6	LS	$500	=	$3,000
Weekly calls	30	per	$500	=	$15,244
One trailer with utilities	1	LS	$30,000	=	$30,000
Total for Construction and Operations Managemen					**$280,000**

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

	Quantity	Unit	Unit Cost		Extended Cost
Drilling costs					
Treatment area	3,200	SF			
Radius of Influence	7.0	ft			
Number of electrodes	21	electrodes			
Total depth of electrodes	14	ft bgs			
Injection wells	13	wells			
Total number of 4.25 inch borings	34	borings			
Number of Drill Rigs	1	rigs			
Installations per rig per day	2	points per day			
Days for drilling	17	days			
weeks for drilling	3	weeks			
Boring total	470	ft	$75	=	$ 35,280
Drilling mob	1	each	$5,000	=	$ 5,000
Drill cuttings per drilled foot	0.744	gal/ft			
Drill cuttings waste	350	gal		=	$ -
Barrels of waste	9	barrels	$250	=	$ 2,187
TOTAL DRILLING COSTS					**$ 43,000**
Power Costs for System Operation					
Average electrical power input per electrode	0.22	kW			
Total electrical power input	4.62	kW			
ISCO distribution velocity under EK	3	cm/d			
Time needed to distribute Radius of Influence	71	days			
Number of Distribution rounds	3	rounds			
Total treatment time	213	days			
Design remediation energy	23663	kWh	$0.14	=	$ 3,313
TOTAL ENERGY COSTS					**$ 4,000**
EK Subcontractor costs					
Design, workplan, permits	$40,000	LS			$ 40,000
Permits and Utility Connection to controller	$25,000	LS			$ 25,000
Mobilization and Materials	21	electrodes	$3,000	=	$ 63,000
Subsurface Installation	21	electrodes	$1,500	=	$ 31,500
System operation - control unit and labor (2 days per week	61	days	$1,200		$ 73,171
Demobilization and Final Report	$50,000	LS			$50,000
Well Abandonment					
Well abandonment (grouting)	470	ft	$30	=	$ 14,112
Wells abandoned per day	8	wells			
Days for abandonment	4	days			
Weeks for abandonment	1	weeks			
TOTAL SUBCONTRACTOR COSTS					**$ 297,000**
			EK System Operations		**$624,000**

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

OXIDANT DEMAND
Assume 1000 ppb isocontour defines treatment volume
Assume treatment thickness of 3'
Assume stoichometry for oxidation is 7 gram of oxidant per gram of contaminant
Assume average K_{oc} for contaminants is 40 L/kg
Assume soil oxidant demand to be 1 g/kg

Area to be treated			3,200	SF			
Thickness of Aquifer to be treated			5	LF			
Volume of Aquifer to be treated			16,000	CF		593	CY
Soil Dry Bulk Density			1.6	g/cm3			
Fraction Organic Carbon			0.001				
Soil dry mass			543,667	kg			
Porosity			0.25				
Treatment zone pore volume			4,000	CF			
Contaminant dissolved concentration			20	mg/L			
Dissolved phase oxidant demand			15,857	g			
Sorbed phase oxidant demand			3,045	g			
Soil oxidant demand			543,667	g			
Total oxidant demand for one injection			**562,569**	**g**		**1,239**	**lb**
Assume two more injections are needed							
Total oxidant demand for the project			**1,687,706**	**g**		**3,717**	**lb**
Cost of oxidant	$4.00	per lb x	3,717.4	lb	= $	14,870	
TOTAL COST FOR OXIDANT					**$**	**14,870**	

INJECTION ESTIMATES
Assume gravity feed of Permanganate into injection wells

	Unit Cost	Quantity	Unit		
Injection Contractor					
Mobilization/demobilization	$10,000	1	per event	$	10,000
Installation contractor rate	$1,500	15	per day	$	22,500
Gravity feed equipment	$20,000	1	LS	$	20,000
TOTAL CHEMICAL INJECTION OPERATION COST				**$**	**52,500**

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Individual Cost Item Backup for Alternative 2

	Quantity	Unit	Unit Cost		Extended Cost
Vapor Mitigation Systems					
Project Management	20	hr	$160	=	$ 3,200
Offsite engineer	12	hr	$110	=	$ 1,320
Office support	1	LS	$2,000	=	$ 2,000
System installation	1	ea	$4,000	=	$ 4,000
Onsite engineering oversight	2	day	$1,000	=	$ 2,000
TOTAL FOR VAPOR MITIGATION SYSTEM					**$ 12,520**

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: Individual Cost Item Backup for Alternative 2

	Quantity	Unit	Unit Cost		Extended Cost
Long Term Monitoring					
Number of indoor air samples	3	samples			
Monitoring Wells to sample	8	wells			
Number of samplers	1	sampler			
Number of 12 hour workdays	5	days			
Sampling Project Planning (e.g., Staffing, Lab Procurement, Obtaining Equipment)					
Project Manager	16	hr	$160	=	$2,560
Geologist	40	hr	$110	=	$4,400
Procurement Specialist	20	hr	$100	=	$2,000
Field Sampling Labor					
Mob/demob	40	hr	$110	=	$4,400
Sampling	60	hr	$110	=	$6,600
Travel Expense and per Diem					
Van and car rental	5	day	$95	=	$475
Sampling Equipment, Shipping, Consumable Supplies					
Equipment & PPE	1	ea	$3,500	=	$3,500
Shipping	5	day	$200	=	$1,000
Misc	5	day	$75	=	$375
Sampling Analysis					
VOCs (vapor)	4	ea	$220	=	$880
VOCs (groundwater)	15	ea	$80	=	$1,200
Data Validation					
Assume samples validated @ 1 hr per sample					
Samples management/validation	19	hr	$110	=	$2,090
Sampling Report					
Project Manager	16	hr	$160	=	$2,560
Environmental Engineer	40	hr	$110	=	$4,400
Geologist	40	hr	$110	=	$4,400
Admin Clerk	16	hr	$75	=	$1,200
TOTAL GROUNDWATER SAMPLING COST PER EVENT				**$**	**43,000**

Appendix H
Cost Estimate for Alternative 2
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: Individual Cost Item Backup for Alternative 2

PRESENT WORTH CALCULATIONS

Assume discount rate is 7%:

This is a recurring cost every year for n years.

This is a problem of the form find (P given A, i, n) or (P/A,i,n)

P = Present Worth

A= Annual amount

i = interest rate

$$P = A \times \frac{(1+i)^n - 1}{i(1+i)^n}$$

A. Long Term Monitoring - year 1- 30

Multiplier is (P/A) for five years minus (P/A) for year 1)

n = 30

i = 7%

The multiplier for $(P/A)_2$ = **12.409**

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

No.	Description	Cost
	Design Costs	
	Pre-Design Investigation (Allowance)	$200,000
	Remedial Design (Allowance)	$300,000
		$500,000
	EXCAVATION COSTS	
	General Requirements	**Cost**
1	General Conditions	$264,000
2	Permits (Allowance)	$20,000
3	Safety and Health Requirements	$62,000
4	Temporary Facilities and Utilities	$26,000
5	Security	$51,000
6	Surveying	$21,000
7	Erosion Control	$19,000
8	Decontamination	$31,000
	Site Preparation	
9	Site Preparation (allowance)	$20,000
	Excavation and Sampling	
9	Shoring (Allowance)	$100,000
10	Excavation	$28,000
11	Waste Characterization Sampling	$3,000
12	**Transportation and Disposal**	$358,000
13	**Amended Backfill and Restoration**	$102,000
	Closure Documents	
14	RA Report and As-Built Drawings (Allowance)	$50,000
	VAPOR MITIGATION	
15	Vapor Mitigation System Install	$12,520
	CLEANOUT	
16	Cleanout sump and storm drain; cement-in sump (Allowance)	$15,000
	Subtotal RA Costs	**$1,182,520**
	Bond (1.5%)	$18,000
	General Contractor Markup (profit, insurance etc) 20%	$236,504
	Contingency 20%	$236,504
	TOTAL REMEDIAL ACTION COSTS	**$1,673,528**

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

No.	Description	Cost
	LONG-TERM MONITORING	
17	Present worth of annual Long term monitoring (yr 1 - 30)	**$560,000**
	PROJECT CAPITAL COST	
	DESIGN COSTS	$500,000
	TOTAL RA COSTS	$2,233,528
	TOTAL PROJECT CAPITAL COST	**$2,734,000**

Note: The project cost presented herein represents only feasibility study level, and is thus subject to change pending the results of the pre-design investigation, which is intended to collect sufficient data to assist in the development of remedial design and associated detailed cost estimate. Expected accuracy range of the cost estimate is -30% to +50%.

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 3

0001 - General Conditions

General conditions to include the project-dedicated site supervisory staff, development of work plans, site photographs/videos, project signs, insurance, mobilization/demobilization, and costs not covered elsewhere.

Estimate assumes that following the remedial design, the RA Contractor will mobilize to the site and complete the remedial action including the site preparation, excavation/removal, off-site transportation and disposal, backfill and compaction, final grading, and site restoration prior to project end.

Project Schedule

Assume the following project schedule:

Pre-Construction Work Plans and Meetings (RA Work)	3	weeks		
Field Trailer Compound Establishment	0.5	weeks		
Site Preparation (Decon areas, stockpile areas, clearing)	1.5	weeks		
Shoring	3.0	weeks		
Remedial Excavation	2.0	weeks		
Tranportation and Disposal (T & D)	0.80	weeks		
Backfill and Compaction (concurrent to T & D)	0.20	weeks		
Final Site Restoration and Demob	2	weeks		
Total Construction Duration	10	weeks		
	2.32	months		
Project Closeout	0.75	months		
Total Project Duration	**3.8**	**months**	**17**	**weeks**

General Condition Costs

A) Site Supervisory Staff (10 hours per week)

Project Manager	$160	per hour	
Project Engineer	$110	per hour	
Procurement staff (20 hours per week)	$95	per hour	
Total for office support	**$63,000**		

Assume the following Site Supervisory Staff for duration of construction (see labor/equipment backup page for rates):

Site Superintendent	$100	per hour	
Construction Foreman	$80	per hour	
Environmental Technician (QC)	$85	per hour	
Pickup Truck #1	$13	per hour	
Pickup Truck #2	$13	per hour	
per diem for superintendant and QC engineer	$0	per day	
	$291	per hour	
	$50,440	per month	
Total Site Supervisory Staff for Construction Duration			**$117,000**

B) Work Plan Preparation

Estimated # of Pre-Construction Work Plans Required:	1	work plans	
Estimated # of Engineer Hours Required per Work Plan:	80	hours	
Professional Engineer	$110	per hour	
Project Manager	$160	per hour	
Total Work Plan Preparation Cost:			**$21,600**

C) Mobilization/Demobilization Fees

Assume 10 large pieces of equipment to be used throughout remedial action.
Per MEANS 01-54-36.50-0100 Mobilization, 50-mile round trip
Total Mobilization/Demobilization Cost: **$12,000**

D) Project Insurance

Per MEANS 01-31-13.30-0020 Builder's Risk Insurance, 0.24% of job cost. Allow $50,000 based on project size.
Estimated Project Insurance Cost: **$50,000**

TOTAL GENERAL CONDITION COST: **$264,000**

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 3

03 - Safety and Health Requirements

Safety and Health Requirements to include the Site Health and Safety Officer, personnel protective equipment and supplies, and additional safety and air monitoring equipment/testing.

Total Construction Duration:	10	weeks	
	50	work days	
A) Site Health and Safety Officer			
Full time SHSO During Construction			
Industrial Hygienist (SHSO)	$125	per hour	
			$50,000
B) PPE Costs			
Assume PPE required for 10 people per work day for duration of demolition and construction.			
Estimate $20 per day per worker for PPE and incidental safety equipment/testing.			$10,000
C) Additional Safety and Air Monitoring Equipment			
Add 20% to PPE Costs for additional safety and air monitoring equipment:			$2,000
TOTAL SAFETY AND HEALTH REQUIREMENTS COST:			**$62,000**

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 3

04 - Temporary Facilities

Temporary Facilities to include the field trailers, utilities, cleaning services, and office equipment and supplies.

A) Field Trailers

Assume 1 project trailer required.

The trailer compound will be mobilized at project start and will be used for entire project duration (not just the construction).

Total Duration for Field Portion of Project: 10 weeks

MEANS 01-52-13.20-0550 Field Trailer Rental, 50' x 12', furnished	$405
MEANS 01-52-13.20-0700 Add for Air Conditioning	$46
	$451
Field Trailer Rental Cost per Trailer :	$2,000
Installation of Utility Connections (allowance):	$10,000
Total Field Trailer Rental Cost for 1 trailer:	**$12,000**

B) Utilities and Cleaning Services for Field Trailers

Assume following utilities per month per trailer:

Electricity	$600	per month per trailer
Phone/Internet	$80	per month per trailer
Water	$40	per month per trailer
Sewer	$30	per month per trailer
Cleaning Services	$50	per month per trailer
	$800	per month per trailer

Total Utilities and Cleaning Services for 1 trailer: $8,000

C) Miscellaneous Office Supplies

Item	QTY	UOM	Unit Cost	Extended Cost
Computers	2	each	$2,000	$4,000
Fax Machines	1	each	$300	$300
Printers	1	each	$500	$500
Office Supplies	3	months	$300	$900

Total Miscellaneous Office Equipment/Supplies: $6,000

TOTAL COST FOR TEMPORARY FACILITIES: $26,000

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 3

05 - Security

Assume for duration of construction requires 16-hour security guard for weekdays and 24-hour security guard for weekends.

Total Field Duration:	10	weeks
	1,274	hours

A) Security Guard

Security Guard	$40	per hour

Total Security Guard Cost: **$51,000**

TOTAL COST FOR SITE SECURITY: **$51,000**

06 - Surveying

Assume surveying will be required for the following tasks/durations:

Existing Conditions Survey prior to Site Preparation	0.2	weeks
Excavation and Backfill Period (for depth verification, quantity measurement, waste char. samples, final grading)	2	weeks
Total Surveying Duration:	2	weeks
	12	work days

Survey Cost

Assume full-time 2-person survey team for the surveying work:

Surveyor #1	$80	per hour
Surveyor #2	$80	per hour
	$160	per hour
	$1,280	per day
As-built Drawing Preparation	$5,000	LS

TOTAL COST FOR SURVEYING: **$21,000**

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 3					
07 - Erosion Control					
Total Field Duration:		10	weeks		
A) Installation and Maintenance of Erosion Control Devices					
Assume 2 laborers for 4 hours per week to install, maintain, and remove erosion control devices throughout construction:					
Laborer (Foreman)	$100	per hour			
Laborer	$55	per hour			
	$155	per hour			
Total Cost for Erosion Control Installation:				**$7,000**	
B) Erosion Control Devices/Materials					
MEANS 31-25-13.10-1100 Silt Fence, 3' high, adverse conditions				$0.96	per LF
MEANS 31-25-13.10-1250 Hay Bales, stacked				$6.60	per LF
				$7.56	per LF
Assume silt fence and hay bales installed around outer site perimeter (assume 340 feet x 275 feet area)					
Perimeter of excavation area		1230	LF		
add 25% for material replacement		1537.5	LF		
Total Cost for Erosion Control Devices/Materials:				**$12,000**	
TOTAL COST FOR EROSION CONTROL:				**$19,000**	
08 - Decontamination					
Assume decontamination pad required during construction duration only.					
A) Construct Decontamination Pad					
Allowance for Construction of Decontamination Pad:				**$15,000**	
B) Decon Pad Operations					
Assume					
Laborer (Foreman)	$100	per hour			
Laborer	$55	per hour			
	$155	per hour			
		2 hours per day, 5 days a week			
Total Cost for Decon Pad Operations:				**$16,000**	
TOTAL COST FOR DECONTAMINATION:				**$31,000**	

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description:	FS Cost Estimate for Alternative 3				
10 - Excavation and Dewatering					
	A) Total Excavation/Removal Volume (Based on Figure 1)				
	Excavation Area		2,500	square feet	
	Excavation Depth		14	feet	
	Excavation Volume		1,296	CY	
	Contaminated Depth Interval		0 to 14	feet bgs	
	Contaminated zone vertical thickness		14	feet	
	Contaminated material volume		1,296	CY	
	Asphalt Debris Volume (assume 6" thick)		50	CY	
	Soil - Total		1,296	Bank Cubic Yards (BCY)	
	Debris		50	BCY	
	B) Excavation Duration				
	Assume 100 SY/day production rate for pavement demolition				
	Assumed excavation product rate	200	CY/day		
	Pavement demolition period, workdays	3	days		
	Excavation Period, workdays				7 DAYS
	Total Demo & Excavation Period, workdays				10 DAYS
	Total Demo & Excavation Period, work hours (8 hours per day)				78 HOURS
	Total Demo & Excavation Period, work weeks				2.0 WEEKS
	Total Excavation Costs		$7,400		
	(Per RS Means 31.23.1646.6080)				
	D) Dewatering Costs				
	Dewatering System weekly rental allowance		$8,000		
	(assume air stripper treatment with all associated equipment and carbon polish treatment)				
	Utilities & Carbon Usage Costs (weekly allowance)		$1,000		
	Total dewatering cost		$20,000		
	(during excavation and backfill periods only)				
	TOTAL EXCAVATION COST		**$28,000**		

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 3			
11 - Waste Characterization Sampling			
To check whether TCLP requirements are met:			
1 sample per 500 CY of total volume - soil, concrete and non-concrete debris			
A) Estimated # of Waste Characterization Samples			
Total # of samples:	3 samples		
B) Laboratory Analysis Fees			
Waste Characterization Analytical Cost per sample		**$600**	
Total Laboratory Analysis Costs:		**$1,800**	
C) Waste Characterization Sample Collection			
Assume 1 hour per sample for an environmental technician to collect each sample			
Environmental Technician	$85 per hour	**$255**	
D) Sample Packaging and Shipping Costs			
Assume shipping cost is 5% of analytical cost:		**$90**	
TOTAL WASTE-CHARACTERIZATION SAMPLING:		**$3,000**	

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 3

12 - Transportation and Disposal

A) Transportation and Disposal Costs

a) Quantity Calculation at time of FS based on existing data (see Figure 1)

b) Add 25% additional volume to account for bulking between bank and loose cubic yards for soil.

c) Assumes 1.6 tons per CY soil density, 2 tons per CY for debris.

Waste Category	In-place Quantity (BCY)	Quantity after Excavation (LCY)	Quantity (tons)	Disposal Type
Hazardous Waste - Soil (assumed 10% of total soil)	130	170	300	Subtitle C Landfill
Non-Hazardous Waste - Soil (assumed 90% of total soil)	1,167	1,460	1,900	Subtitle D Landfill
Subtotal Waste Volume	**1,297**	**1,630**	**2,200**	

Waste Category	Quantity (LCY)	Quantity (tons)	Transportation Unit Costs (per ton)	Disposal Unit Costs (per ton)	Extended Costs
Hazardous Waste - Soil (vendor quote)	170	300	$131	$85	$64,800
Non-Hazardous Waste - Soil (vendor quote)	1,460	1,900	$75	$64	$264,100
Hazardous Waste - Debris (assumed 10% of total debris)	5	10	$195	$150	$3,450
Non-Hazardous Waste - Debris	45	90	$80	$95	$15,750
Subtotal T&D Cost	**1,630**	**2,200**			**$348,100**

B) Labor and equipment costs for loading the truck for offsite disposal

Assume 20 trucks per day for offsite shipment (each truckload is 25 CY)

Time for loading the material for offsite disposal			4 days
Excavator, Hydraulic, 2 CY	$100	per hour	
Equip. Op. Heavy	$80	per hour	
Laborer (Semi-Skilled)	$55	per hour	
Laborer (Semi-Skilled)	$55	per hour	
Total rate per day	$2,320	per day	
Total Cost	**$9,300**		

Total Transportation and Disposal Costs **$358,000**

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 3

13 - Backfill and Restoration

Total Excavation Volume	1,296 BCY		
(Bulking factor 0.25)	1,620 Loose Cubic Yards (LCY)		
Backfill & Restoration Duration			
Assume backfill has a production rate of 2150 CY/day per 31.23.2314.5210			
Total Backfill Period, workdays			1 DAYS
Total Backfill Period, work hours (8 hours per day)			8 HOURS
Total Backfill Period, work weeks			0.2 WEEKS
Total Backfill Period, months			0.05 MONTHS
Total Asphalt Restoration Period (concurrent to building construction), days			2 DAYS
A) Backfill Labor/Equipment Costs			
Backfill Labor & Equipment Unit Rate	$1.45 per LCY		
(RS Means 31.23.2314.5210)			
Amendment mixing labor & equipment (allowance)	$1.00 per LCY		
Total Backfill Labor and Equipment Cost	**$4,000**		
B) Backfill Material Costs			
Backfill Material Costs:			
Common Fill Unit Cost (RS Means 31.23.2316.0035)	$32 per CY		
Fresh Backfill Material Quantity (with 0.25 bulking factor)		1,620 LCY	
Backfill hauling unit cost	$13.55 per LCY		
(RS Means 31.23.2320.9114)			
Total backfill hauling costs	$21,956		
Oxygen-releasing Amendment Cost	$3.00 lb		
Amendment ratio (estimate)	2 lbs amendment per cubic yard		
Total amendment costs	$9,722		
Backfill Material Cost	$61,574.07		
Total Backfill Material Costs:	**$83,600**		
C) Backfill Material Testing			
Requires one sample for every 5,000 cubic yards imported to the site, analyzed for full parameters			
including sieve analyses, moisture content, chemical compounds, and Ra-226			
Assume $1500 per sample analysis fee			
# of Backfill Material Samples Required:		1 samples	
Backfill Testing Cost:	**$1,500**		
D) Soil Density Testing			
Assume $500 per visit by soil density testing technician, 2 visits per week, during backfill operations			
# of Backfill Visits Required:		1 visits	
Soil Density Testing Cost:	**$500**		
E) Asphalt Restoration Costs			
Area of asphalt restoration	2,500 square feet		
Unit costs for asphaltic concrete paving at parking lots and driveways			$4.77 per SF
(RS Means 32.12.1614.1180)			
Asphalt Restoration Costs	**$12,000**		
TOTAL BACKFILL AND RESTORATION COST:	**$102,000**		

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Individual Cost Item Backup for Alternative 3

	Quantity	Unit	Unit Cost		Extended Cost
Vapor Mitigation Systems					
Project Management	20	hr	$160	=	$ 3,200
Offsite engineer	12	hr	$110	=	$ 1,320
Office support	1	LS	$2,000	=	$ 2,000
System installation	1	ea	$4,000	=	$ 4,000
Onsite engineering oversight	2	day	$1,000	=	$ 2,000
TOTAL FOR VAPOR MITIGATION SYSTEM					**$ 12,520**

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: Individual Cost Item Backup for Alternative 2

	Quantity	Unit	Unit Cost		Extended Cost
Long Term Monitoring					
Number of indoor air samples	3	samples			
Monitoring Wells to sample	10	wells			
Number of samplers	1	sampler			
Number of 12 hour workdays	6	days			
Sampling Project Planning (e.g., Staffing, Lab Procurement, Obtaining Equipment)					
Project Manager	16	hr	$160	=	$2,560
Geologist	40	hr	$110	=	$4,400
Procurement Specialist	20	hr	$100	=	$2,000
Field Sampling Labor					
Mob/demob	40	hr	$110	=	$4,400
Sampling	72	hr	$110	=	$7,920
Travel Expense and per Diem					
Van and car rental	6	day	$95	=	$570
Sampling Equipment, Shipping, Consumable Supplies					
Equipment & PPE	1	ea	$3,500	=	$3,500
Shipping	6	day	$200	=	$1,200
Misc	6	day	$75	=	$450
Sampling Analysis					
VOCs (indoor air)	4	ea	$220	=	$880
VOCs (groundwater)	18	ea	$80	=	$1,440
Data Validation					
Assume samples validated @ 1 hr per sample					
Samples management/validation	22	hr	$110	=	$2,420
Sampling Report					
Project Manager	16	hr	$160	=	$2,560
Environmental Engineer	40	hr	$110	=	$4,400
Geologist	40	hr	$110	=	$4,400
Admin Clerk	16	hr	$75	=	$1,200
TOTAL SAMPLING COST PER EVENT					**$ 45,000**

Appendix H
Cost Estimate for Alternative 3
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: Individual Cost Item Backup for Alternative 3

PRESENT WORTH CALCULATIONS

Assume discount rate is 7%:

This is a recurring cost every year for n years.

This is a problem of the form find (P given A, i, n) or (P/A,i,n)

P = Present Worth

A= Annual amount

i = interest rate

$$P = A \times \frac{(1+i)^n - 1}{i(1+i)^n}$$

A. Long Term Monitoring - year 1- 30

Multiplier is (P/A) for five years minus (P/A) for year 1)

n = 30

i = 7%

The multiplier for $(P/A)_2$ = **12.409**

Appendix H
Cost Estimate for Alternative 4
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Item No.	Individual Cost Item Backup for Alternative 5		
ARCHITECTURE/ENGINEERING COSTS			
	Pre-design Investigation (Allowance)	$	125,000
	Remedial Design (Allowance)	$	125,000
CAPITAL COSTS			
	Cap Installation	$	113,400
	Vapor Mitigation	$	12,520
	Cleanout sump and storm drain; cement in sump (Allowance)	$	15,000
	Subtotal	**$**	**140,920**
	General Contractor Markup (profit, insurance etc) 20%	$	28,000
	Contingency (20%)	$	28,000
	TOTAL CAPITAL COSTS	**$**	**197,000**
OPERATION & MAINTENANCE (O&M) COSTS			
	Cap Maintenance and inspection per annum	$	5,900
	Groundwater and indoor air long-term monitoring	$	45,000
PRESENT WORTH OF 30 YEAR COSTS (with discounting)			
	Architecture/Engineering Costs	$	250,000
	Total Capital Costs	$	197,000
	Present Worth of O&M and Long-Term monitoring Costs	$	632,000
	TOTAL PRESENT WORTH OF 30 YEAR COSTS	**$**	**1,075,000**

Notes:
1. Present worth calculation assumes 7% discount rate after inflation is considered.

Appendix H
Cost Estimate for Alternative 4
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Individual Cost Item Backup for Alternative 5

	Quantity	Unit	Unit Cost		Extended Cost
Cap installation					
Pre-Mobilization Work Planning and Supports	1				
Project Manager	20	hr	$160	=	$3,200
Environmental Engineer	80	hr	$110	=	$8,800
Scientist	0	hr	$110	=	$0
Admin Clerk	24	hr	$75	=	$1,800
Meetings	4	LS	$500	=	$2,000
Assume vapor sampling of 1 building, indoor air and subslab.					
Assum Project Manager		hr	$160	=	$0
Environmental Engineer		hr	$110	=	$0
Scientist	0	hr	$110	=	$0
Subcontractor Procurement					
Project Manager	6	hr	$160	=	$960
Environmental Engineer	32	hr	$110	=	$3,520
Geologist	0	hr	$220		$0
Scientist	0	hr	$110	=	$0
Procurement specialist	40	hr	$110	=	$4,400
During Construction & Operations					
Project Manager (10 hrs/wk)		hr	$160	=	$0
Engineer (16 hrs/wk)		hr	$110	=	$0
Site Superintendent (10 hrs/wk)	24	hr	$100	=	$2,400
Health and Safety Engineer (16 hrs/wk)	0	hr	$125	=	$0
Admin Clerk (assume 4 hrs/wk)	4	hr	$75	=	$300
Subcontract management (10 hrs/week)	0	hr	$75	=	$0
Remedial Action Reports					
Project Manager	6	hr	$160	=	$960
Environmental Engineer	40	hr	$110	=	$4,400
Scientist	0	hr	$110	=	$0
Admin Clerk	0	hr	$75	=	$0
Geologist	16	hr	$110	=	$1,760
Total for Construction Management					**$35,000**
Cap Dimensions					
Area of treatment zone	3,500	ft^2			
Cap thickness	0.5	ft			
Cap volume	1,750	ft^3			
Contractor					
Mob/demob	1	LS	$5,000	= $	5,000
Site preparation	1	LS	$20,000	= $	20,000
Concrete volume	1,750	ft^3	$7.54	= $	13,200
Concrete delivery to site	1	LS	$1,000	= $	1,000
Concrete paving with joints, finishing and curing	389	SY	$91	= $	35,400
TOTAL FOR CAP INSTALLATION				**$**	**74,600**
Insurance and bond (5%)				$	3,800
TOTAL FOR CAPPING				**$**	**113,400**

Appendix H
Cost Estimate for Alternative 4
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Individual Individual Cost Item Backup for Alternative 5

	Quantity	Unit	Unit Cost		Extended Cost
Vapor Mitigation Systems					
Project Management	20	hr	$160	=	$ 3,200
Offsite engineer	12	hr	$110	=	$ 1,320
Office support	1	LS	$2,000	=	$ 2,000
System installation	1	ea	$4,000	=	$ 4,000
Onsite engineering oversight	2	day	$1,000	=	$ 2,000
TOTAL FOR VAPOR MITIGATION SYSTEM					$ 12,520

Appendix H
Cost Estimate for Alternative 4
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Individual Cost Item Backup for Alternative 5

Cap Maintenance

Assume 20% of cap volume is replaced every seven years

Assume procurement of maintenance subcontractors	Quantity	Unit	Unit Cost		Extended Cost
Environmental Engineer	20	hr	$110	=	$ 2,200
Mob/demob	1	LS	$2,000	=	$ 2,000
Site preparation	1	LS	$2,000	=	$ 2,000
Concrete capping material, labor and equipment costs				=	$ 9,920
Insurance and bond (5%)					$ 700
TOTAL FOR MAINTENANCE EVERY SEVEN YEARS					**$ 26,820**

Cap Inspection

Labor					
Inspection	12	hr	$110	=	$1,320
Travel Expense and per Diem					
Van and car rental	1	day	$100	=	$100
Inspection Report					
Project Manager	1	hr	$160	=	$160
Environmental Engineer	3	hr	$110	=	$330
Admin Clerk	1	hr	$75	=	$75
TOTAL FOR ANNUAL CAP INSPECTION					**$ 1,985**

Annualized **$ 5,900**

Appendix H
Cost Estimate for Alternative 4
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: Individual Cost Item Backup for Alternative 2

	Quantity	Unit	Unit Cost		Extended Cost
Long Term Monitoring					
Number of indoor air samples	3	samples			
Monitoring Wells to sample	10	wells			
Number of samplers	1	sampler			
Number of 12 hour workdays	6	days			
Sampling Project Planning (e.g., Staffing, Lab Procurement, Obtaining Equipment)					
Project Manager	16	hr	$160	=	$2,560
Geologist	40	hr	$110	=	$4,400
Procurement Specialist	20	hr	$100	=	$2,000
Field Sampling Labor					
Mob/demob	40	hr	$110	=	$4,400
Sampling	72	hr	$110	=	$7,920
Travel Expense and per Diem					
Van and car rental	6	day	$95	=	$570
Sampling Equipment, Shipping, Consumable Supplies					
Equipment & PPE	1	ea	$3,500	=	$3,500
Shipping	6	day	$200	=	$1,200
Misc	6	day	$75	=	$450
Sampling Analysis					
VOCs (vapor)	4	ea	$220	=	$880
VOCs (groundwater)	18	ea	$80	=	$1,440
Data Validation					
Assume samples validated @ 1 hr per sample					
Samples management/validation	22	hr	$110	=	$2,420
Sampling Report					
Project Manager	16	hr	$160	=	$2,560
Environmental Engineer	40	hr	$110	=	$4,400
Geologist	40	hr	$110	=	$4,400
Admin Clerk	16	hr	$75	=	$1,200
TOTAL GROUNDWATER SAMPLING COST PER EVENT					**$ 45,000**

Appendix H
Cost Estimate for Alternative 4
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: Individual Cost Item Backup for Alternative 5

PRESENT WORTH CALCULATIONS

Assume discount rate is 7%:

P = Present Worth
A= Annual amount
i = interest rate

$$P = A \times \frac{(1+i)^n - 1}{i(1+i)^n}$$

12

1

A. Annual Inspection and Maintenance for year 1 - 30

Multiplier is (P/A) for five years minus (P/A) for year 1)

n = 30
i = 7%

The multiplier for $(P/A)_2$ = **12.409**

Assume vapor sampling of 1 building, indoor air and subslab.
Assume 1 buildings per day.

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

No.	Description	Cost
	Design Costs	
	Pre-Design Investigation (Allowance)	$200,000
	Remedial Design (Allowance)	$300,000
		$500,000
	EXCAVATION COSTS	
	General Requirements	**Cost**
1	General Conditions	$249,000
2	Permits (Allowance)	$20,000
3	Safety and Health Requirements	$56,000
4	Temporary Facilities and Utilities	$26,000
5	Security	$46,000
6	Surveying	$17,000
7	Erosion Control	$18,000
8	Decontamination	$29,000
	Site Preparation	
9	Site Preparation (allowance)	$20,000
	Excavation and Sampling	
9	Shoring (Allowance)	$100,000
10	Excavation	$18,000
11	Waste Characterization Sampling	$2,000
12	**Transportation and Disposal**	$207,000
13	**Amended Backfill and Restoration**	$58,000
	Closure Documents	
14	RA Report and As-Built Drawings (Allowance)	$50,000
	VAPOR MITIGATION	
15	Vapor Mitigation System Install	$12,520
	CLEANOUT	
16	Cleanout sump and storm drain; cement-in sump (Allowance)	$15,000
	Subtotal RA Costs	**$944,000**
	Bond (1.5%)	$15,000
	General Contractor Markup (profit, insurance etc) 20%	$189,000
	Contingency 20%	$189,000
	TOTAL REMEDIAL ACTION COSTS	**$1,337,000**

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

No.	Description	Cost
	LONG-TERM MONITORING	
17	Present worth of annual Long term monitoring (yr 1 - 30)	**$559,000**
	PROJECT CAPITAL COST	
	DESIGN COSTS	$500,000
	TOTAL RA COSTS	$1,896,000
	TOTAL PROJECT CAPITAL COST	**$2,396,000**

Note: The project cost presented herein represents only feasibility study level, and is thus subject to change pending the results of the pre-design investigation, which is intended to collect sufficient data to assist in the development of remedial design and associated detailed cost estimate. Expected accuracy range of the cost estimate is -30% to +50%.

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 5

0001 - General Conditions

General conditions to include the project-dedicated site supervisory staff, development of work plans, site photographs/videos, project signs, insurance, mobilization/demobilization, and costs not covered elsewhere.

Estimate assumes that following the remedial design, the RA Contractor will mobilize to the site and complete the remedial action including the site preparation, excavation/removal, off-site transportation and disposal, backfill and compaction, final grading, and site restoration prior to project end.

Project Schedule

Assume the following project schedule:

Pre-Construction Work Plans and Meetings (RA Work)	3	weeks		
Field Trailer Compound Establishment	0.5	weeks		
Site Preparation (Decon areas, stockpile areas, clearing)	1.5	weeks		
Shoring	3.0	weeks		
Remedial Excavation	1.4	weeks		
Tranportation and Disposal (T & D)	0.40	weeks		
Backfill and Compaction (concurrent to T & D)	0.20	weeks		
Final Site Restoration and Demob	2	weeks		
Total Construction Duration	9	weeks		
	2.08	months		
Project Closeout	0.75	months		
Total Project Duration	**3.5**	**months**	**16**	**weeks**

General Condition Costs

A) Site Supervisory Staff (10 hours per week)

Project Manager	$160	per hour
Project Engineer	$110	per hour
Procurement staff (20 hours per week)	$95	per hour
Total for office support	**$59,000**	

Assume the following Site Supervisory Staff for duration of construction (see labor/equipment backup page for rates):

Site Superintendent	$100	per hour
Construction Foreman	$80	per hour
Environmental Technician (QC)	$85	per hour
Pickup Truck #1	$13	per hour
Pickup Truck #2	$13	per hour
per diem for superintendant and QC engineer	$0	per day
	$291	per hour
	$50,440	per month
Total Site Supervisory Staff for Construction Duration		**$106,000**

B) Work Plan Preparation

Estimated # of Pre-Construction Work Plans Required:		1	work plans
Estimated # of Engineer Hours Required per Work Plan:		80	hours
Professional Engineer	$110	per hour	
Project Manager	$160	per hour	
Total Work Plan Preparation Cost:			**$21,600**

C) Mobilization/Demobilization Fees

Assume 10 large pieces of equipment to be used throughout remedial action.
Per MEANS 01-54-36.50-0100 Mobilization, 50-mile round trip
Total Mobilization/Demobilization Cost: **$12,000**

D) Project Insurance

Per MEANS 01-31-13.30-0020 Builder's Risk Insurance, 0.24% of job cost. Allow $50,000 based on project size.
Estimated Project Insurance Cost: **$50,000**

TOTAL GENERAL CONDITION COST: **$249,000**

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 5

03 - Safety and Health Requirements

Safety and Health Requirements to include the Site Health and Safety Officer, personnel protective equipment and supplies, and additional safety and air monitoring equipment/testing.

Total Construction Duration:	9	weeks	
	45	work days	
A) Site Health and Safety Officer			
Full time SHSO During Construction			
Industrial Hygienist (SHSO)	$125	per hour	
			$45,000
B) PPE Costs			
Assume PPE required for 10 people per work day for duration of demolition and construction.			
Estimate $20 per day per worker for PPE and incidental safety equipment/testing.			$9,000
C) Additional Safety and Air Monitoring Equipment			
Add 20% to PPE Costs for additional safety and air monitoring equipment:			$2,000
TOTAL SAFETY AND HEALTH REQUIREMENTS COST:			**$56,000**

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 5

04 - Temporary Facilities

Temporary Facilities to include the field trailers, utilities, cleaning services, and office equipment and supplies.

A) Field Trailers

Assume 1 project trailer required.

The trailer compound will be mobilized at project start and will be used for entire project duration (not just the construction).

Total Duration for Field Portion of Project: 9 weeks	
MEANS 01-52-13.20-0550 Field Trailer Rental, 50' x 12', furnished	$405
MEANS 01-52-13.20-0700 Add for Air Conditioning	$46
	$451
Field Trailer Rental Cost per Trailer :	$2,000
Installation of Utility Connections (allowance):	$10,000
Total Field Trailer Rental Cost for 1 trailer:	**$12,000**

B) Utilities and Cleaning Services for Field Trailers

Assume following utilities per month per trailer:

Electricity	$600	per month per trailer
Phone/Internet	$80	per month per trailer
Water	$40	per month per trailer
Sewer	$30	per month per trailer
Cleaning Services	$50	per month per trailer
	$800	per month per trailer

Total Utilities and Cleaning Services for 1 trailer:	**$8,000**

C) Miscellaneous Office Supplies

Item	QTY	UOM	Unit Cost	Extended Cost
Computers	2	each	$2,000	$4,000
Fax Machines	1	each	$300	$300
Printers	1	each	$500	$500
Office Supplies	3	months	$300	$900

Total Miscellaneous Office Equipment/Supplies:	**$6,000**

TOTAL COST FOR TEMPORARY FACILITIES:	**$26,000**

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 5

05 - Security

Assume for duration of construction requires 16-hour security guard for weekdays and 24-hour security guard for weekends.

Total Field Duration:	9	weeks
	1,146	hours

A) Security Guard

Security Guard	$40	per hour

Total Security Guard Cost: **$46,000**

TOTAL COST FOR SITE SECURITY: **$46,000**

06 - Surveying

Assume surveying will be required for the following tasks/durations:

Existing Conditions Survey prior to Site Preparation	0.2	weeks
Excavation and Backfill Period (for depth verification, quantity measurement, waste char. samples, final grading)	2	weeks
Total Surveying Duration:	2 weeks	
	9 work days	

Survey Cost

Assume full-time 2-person survey team for the surveying work:

Surveyor #1	$80	per hour
Surveyor #2	$80	per hour
	$160	per hour
	$1,280	per day
As-built Drawing Preparation	$5,000	LS

TOTAL COST FOR SURVEYING: **$17,000**

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 5

07 - Erosion Control

Total Field Duration: 9 weeks

A) Installation and Maintenance of Erosion Control Devices

Assume 2 laborers for 4 hours per week to install, maintain, and remove erosion control devices throughout construction:

Laborer (Foreman)	$100	per hour
Laborer	$55	per hour
	$155	per hour

Total Cost for Erosion Control Installation: **$6,000**

B) Erosion Control Devices/Materials

MEANS 31-25-13.10-1100 Silt Fence, 3' high, adverse conditions	$0.96 per LF
MEANS 31-25-13.10-1250 Hay Bales, stacked	$6.60 per LF
	$7.56 per LF

Assume silt fence and hay bales installed around outer site perimeter (assume 340 feet x 275 feet area)

Perimeter of excavation area	1230 LF
add 25% for material replacement	1537.5 LF

Total Cost for Erosion Control Devices/Materials: **$12,000**

TOTAL COST FOR EROSION CONTROL: **$18,000**

08 - Decontamination

Assume decontamination pad required during construction duration only.

A) Construct Decontamination Pad

Allowance for Construction of Decontamination Pad: **$15,000**

B) Decon Pad Operations

Assume

Laborer (Foreman)	$100	per hour
Laborer	$55	per hour
	$155	per hour

2 hours per day, 5 days a week

Total Cost for Decon Pad Operations: **$14,000**

TOTAL COST FOR DECONTAMINATION: **$29,000**

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description:	FS Cost Estimate for Alternative 5				
10 - Excavation and Dewatering					
	A) Total Excavation/Removal Volume (Based on Figure 1)				
	Excavation Area			2,500	square feet
	Excavation Depth			7	feet
	Excavation Volume			648	CY
	Contaminated Depth Interval			0 to 7	feet bgs
	Contaminated zone vertical thickness			7	feet
	Contaminated material volume			648	CY
	Asphalt Debris Volume (assume 6" thick)			50	CY
	Soil - Total			648	Bank Cubic Yards (BCY)
	Debris			50	BCY
	B) Excavation Duration				
	Assume 100 SY/day production rate for pavement demolition				
	Assumed excavation product rate	200	CY/day		
	Pavement demolition period, workdays	3	days		
	Excavation Period, workdays				4 DAYS
	Total Demo & Excavation Period, workdays				7 DAYS
	Total Demo & Excavation Period, work hours (8 hours per day)				54 HOURS
	Total Demo & Excavation Period, work weeks				1.4 WEEKS
	Total Excavation Costs			$3,700	
	(Per RS Means 31.23.1646.6080)				
	C) Dewatering Costs				
	Dewatering System weekly rental allowance			$8,000	
	(assume air stripper treatment with all associated equipment and carbon polish treatment)				
	Utilities & Carbon Usage Costs (weekly allowance)			$1,000	
	Total dewatering cost			$14,000	
	(during excavation and backfill periods only)				
	TOTAL EXCAVATION COST			**$18,000**	

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 5			
11 - Waste Characterization Sampling			
To check whether TCLP requirements are met:			
1 sample per 500 CY of total volume - soil, concrete and non-concrete debris			
A) Estimated # of Waste Characterization Samples			
Total # of samples:	2 samples		
B) Laboratory Analysis Fees			
Waste Characterization Analytical Cost per sample		**$600**	
Total Laboratory Analysis Costs:		**$1,200**	
C) Waste Characterization Sample Collection			
Assume 1 hour per sample for an environmental technician to collect each sample			
Environmental Technician	$85 per hour	**$170**	
D) Sample Packaging and Shipping Costs			
Assume shipping cost is 5% of analytical cost:		**$60**	
TOTAL WASTE-CHARACTERIZATION SAMPLING:		**$2,000**	

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 5

12 - Transportation and Disposal

A) Transportation and Disposal Costs

a) Quantity Calculation at time of FS based on existing data (see Figure 1)

b) Add 25% additional volume to account for bulking between bank and loose cubic yards for soil.

c) Assumes 1.6 tons per CY soil density, 2 tons per CY for debris.

Waste Category	In-place Quantity (BCY)	Quantity after Excavation (LCY)	Quantity (tons)	Disposal Type
Hazardous Waste - Soil (assumed 10% of total soil)	65	90	200	Subtitle C Landfill
Non-Hazardous Waste - Soil (assumed 90% of total soil)	584	730	1,000	Subtitle D Landfill
Subtotal Waste Volume	**649**	**820**	**1,200**	

Waste Category	Quantity (LCY)	Quantity (tons)	Transportation Unit Costs (per ton)	Disposal Unit Costs (per ton)	Extended Costs
Hazardous Waste - Soil (vendor quote)	90	200	$131	$85	$43,200
Non-Hazardous Waste - Soil (vendor quote)	730	1,000	$75	$64	$139,000
Hazardous Waste - Debris (assumed 10% of total debris)	5	10	$195	$150	$3,450
Non-Hazardous Waste - Debris	45	90	$80	$95	$15,750
Subtotal T&D Cost	**820**	**1,200**			**$201,400**

B) Labor and equipment costs for loading the truck for offsite disposal

Assume 20 trucks per day for offsite shipment (each truckload is 25 CY)

Time for loading the material for offsite disposal			2 days
Excavator, Hydraulic, 2 CY	$100	per hour	
Equip. Op. Heavy	$80	per hour	
Laborer (Semi-Skilled)	$55	per hour	
Laborer (Semi-Skilled)	$55	per hour	
Total rate per day	$2,320	per day	
Total Cost	**$4,700**		

Total Transportation and Disposal Costs **$207,000**

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: FS Cost Estimate for Alternative 5				
13 - Backfill and Restoration				
Total Excavation Volume		648	BCY	
(Bulking factor 0.25)		810	Loose Cubic Yards (LCY)	
Backfill & Restoration Duration				
Assume backfill has a production rate of 2150 CY/day per 31.23.2314.5210				
Total Backfill Period, workdays				1 DAYS
Total Backfill Period, work hours (8 hours per day)				8 HOURS
Total Backfill Period, work weeks				0.2 WEEKS
Total Backfill Period, months				0.05 MONTHS
Total Asphalt Restoration Period (concurrent to building construction), days				2 DAYS
A) Backfill Labor/Equipment Costs				
Backfill Labor & Equipment Unit Rate		$1.45	per LCY	
(RS Means 31.23.2314.5210)				
Amendment mixing labor & equipment (allowance)		$1.00	per LCY	
Total Backfill Labor and Equipment Cost	**$2,000**			
B) Backfill Material Costs				
Backfill Material Costs:				
Common Fill Unit Cost (RS Means 31.23.2316.0035)		$32	per CY	
Fresh Backfill Material Quantity (with 0.25 bulking factor)			810 LCY	
Backfill hauling unit cost		$13.55	per LCY	
(RS Means 31.23.2320.9114)				
Total backfill hauling costs		$10,978		
Oxygen-releasing Amendment Cost		$3.00	lb	
Amendment ratio (estimate)		2	lbs amendment per cubic yard	
Total amendment costs		$4,861		
Backfill Material Cost	$30,787.04			
Total Backfill Material Costs:	**$41,800**			
C) Backfill Material Testing				
Requires one sample for every 5,000 cubic yards imported to the site, analyzed for full parameters				
including sieve analyses, moisture content, chemical compounds, and Ra-226				
Assume $1500 per sample analysis fee				
# of Backfill Material Samples Required:			1 samples	
Backfill Testing Cost:	**$1,500**			
D) Soil Density Testing				
Assume $500 per visit by soil density testing technician, 2 visits per week, during backfill operations				
# of Backfill Visits Required:			1 visits	
Soil Density Testing Cost:	**$500**			
E) Asphalt Restoration Costs				
Area of asphalt restoration	2,500	square feet		
Unit costs for asphaltic concrete paving at parking lots and driveways				$4.77 per SF
(RS Means 32.12.1614.1180)				
Asphalt Restoration Costs	**$12,000**			
TOTAL BACKFILL AND RESTORATION COST:	**$58,000**			

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Individual Cost Item Backup for Alternative 5

	Quantity	Unit	Unit Cost		Extended Cost
Vapor Mitigation Systems					
Project Management	20	hr	$160	=	$ 3,200
Offsite engineer	12	hr	$110	=	$ 1,320
Office support	1	LS	$2,000	=	$ 2,000
System installation	1	ea	$4,000	=	$ 4,000
Onsite engineering oversight	2	day	$1,000	=	$ 2,000
TOTAL FOR VAPOR MITIGATION SYSTEM					**$ 12,520**

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: Individual Cost Item Backup for Alternative 2

	Quantity	Unit	Unit Cost		Extended Cost
Long Term Monitoring					
Number of indoor air samples	3	samples			
Monitoring Wells to sample	10	wells			
Number of samplers	1	sampler			
Number of 12 hour workdays	6	days			
Sampling Project Planning (e.g., Staffing, Lab Procurement, Obtaining Equipment)					
Project Manager	16	hr	$160	=	$2,560
Geologist	40	hr	$110	=	$4,400
Procurement Specialist	20	hr	$100	=	$2,000
Field Sampling Labor					
Mob/demob	40	hr	$110	=	$4,400
Sampling	72	hr	$110	=	$7,920
Travel Expense and per Diem					
Van and car rental	6	day	$95	=	$570
Sampling Equipment, Shipping, Consumable Supplies					
Equipment & PPE	1	ea	$3,500	=	$3,500
Shipping	6	day	$200	=	$1,200
Misc	6	day	$75	=	$450
Sampling Analysis					
VOCs (indoor air)	4	ea	$220	=	$880
VOCs (groundwater)	18	ea	$80	=	$1,440
Data Validation					
Assume samples validated @ 1 hr per sample					
Samples management/validation	22	hr	$110	=	$2,420
Sampling Report					
Project Manager	16	hr	$160	=	$2,560
Environmental Engineer	40	hr	$110	=	$4,400
Geologist	40	hr	$110	=	$4,400
Admin Clerk	16	hr	$75	=	$1,200
TOTAL SAMPLING COST PER EVENT					**$ 45,000**

Appendix H
Cost Estimate for Alternative 5
Former Doro Dry Cleaners - Site No. 9-15-238
NYSDEC Work Assignment No. D007621-6

Description: Individual Cost Item Backup for Alternative 3

PRESENT WORTH CALCULATIONS

Assume discount rate is 7%:
This is a recurring cost every year for n years.
This is a problem of the form find (P given A, i, n) or (P/A,i,n)
P = Present Worth
A= Annual amount
i = interest rate

$$P = A \times \frac{(1+i)^n - 1}{i(1+i)^n}$$

A. Long Term Monitoring - year 1- 30

Multiplier is (P/A) for 30 years

n = 30
i = 7%

The multiplier for $(P/A)_2$ = **12.409**