



July 24, 2019

Lincoln County Landfill
5291 Crouse Road
Crouse, North Carolina 28033

Attention: Mr. Mark Bivins
Solid Waste Manager

Reference: **Financial Assurance Estimate of Probable Cost (2019)**
Lincoln County Landfill
S&ME Project No: 7335-19-051
NC Engineering License No. F-0176

Dear Mr. Bivins:

S&ME, Inc. (S&ME) has prepared an estimate for financial assurance for the Lincoln County Landfill in Crouse, North Carolina for the year 2019. This work was conducted in general accordance with the scope of work provided in our June 5, 2019 proposal (S&ME proposal number 73-1900062).

1.1 BACKGROUND

North Carolina Solid Waste Management Rules identified under 15A NCAC 13B (commonly referred to as the .1600 rules) outline requirements for financial assurance under Rule .1628. These rules require that landfill owners and operators submit detailed cost estimates for closure and post-closure care. These rules specifically require that the estimate be provided in current dollars for the cost of hiring a third party to close the largest area open at any time during the C&D and MSW landfill active life. These rules also require that the estimate be provided for care of the facility over a thirty-year post-closure period. In addition, the North Carolina Department of Environmental Quality (NCDEQ) requires that an estimate be provided for financial assurance sufficient to cover potential assessment and corrective action for municipal solid waste (MSW) landfills.

1.2 FINANCIAL ASSURANCE

S&ME prepared this estimate of probable cost for closure, post-closure care, and corrective action. We based this estimate on the 2018 estimate with appropriate changes to market values anticipated at the time of this report based on our recent experience with landfill construction and maintenance projects, and our understanding of the rules and requirements in effect.

MSW Landfill

The estimate of probable cost for closure and post-closure care for the MSW landfill is summarized in Table 1 attached. All Tables are located in Appendix I. The detailed estimate of probable closure cost is summarized in Table 2. The detailed estimate of post-closure care is summarized in Table 3.



The estimate is based on the following assumptions:

- the current MSW landfill footprint that would require closure consists of Phases I, II, III, and IV;
- the Phase I through IV area requiring closure is 40 acres;
- the cover system will consist of from top to bottom:
 - a 6-inch thick vegetative layer;
 - a 18-inch thick earthen barrier layer;
 - a geocomposite drainage layer;
 - a 40 mil thick linear low density polyethylene (LLDPE) geomembrane;
 - a geosynthetic clay liner (GCL); and
 - a 12-inch thick interim cover soil/cover foundation layer.
- an active gas collection and control system will be installed;
- a 30-year post closure maintenance period; and
- quarterly observations and an annual certification by a registered professional engineer during the post-closure care period.

Post closure groundwater monitoring is incorporated into the cost for corrective action provided below.

C&D Landfill

The estimate of probable cost for closure and post-closure care for the C&D landfill is summarized in Table 4 attached. The detailed estimate of probable closure cost is summarized in Table 5. The detailed estimate of post-closure care is summarized in Table 6.

The estimate is based on the following assumptions:

- the Phase II area requiring closure is 7.5 acres;
- the cover system will consist of from top to bottom:
 - a 18-inch thick erosion layer; and
 - a 18-inch thick low-permeability barrier;
- a passive gas venting system will be installed;
- a 30-year post closure maintenance period; and
- quarterly observations and an annual certification by a registered professional engineer during the post-closure care period.

Corrective Action

The estimate of probable cost for potential assessment and corrective action is summarized in Table 7 attached. The detailed estimate for potential assessment and corrective action is summarized in Table 8.

The estimate was prepared using an assumed scenario of a release at the Municipal Solid Waste (MSW) landfill. The selected remedy assumed was natural attenuation with a monitoring period of 30 years. The cost estimate has been separated into fifteen tasks that correspond with the "Draft Financial Assurance Cost Estimate Summary for Potential Assessment and Corrective Action for Municipal Solid Waste Landfills" list of rule based items. Assumptions made as to the number of wells installed and sampled are included in the cost estimate under the respective task.



1.3 REVISIONS FROM PRIOR ESTIMATE

S&ME has revised the estimate of probable cost since the prior estimate provided to Lincoln County in 2018. Based on our experience since the 2018 estimate, we have made revisions that in our opinion are more representative of existing conditions, the current market price, and NCDEQ expectations.

1.4 CLOSURE

S&ME appreciates the continued opportunity to be of service to Lincoln County. Please contact us at your convenience should you have questions or comments.

Sincerely,

S&ME, Inc.

Jasmine Tayouga

Jasmine Tayouga
Associate Project Manager

Christopher J.L. Stahl, P.E.
Principal Engineer/Area Manager II

Attachments

Tables 1 - 8

Attachments

Attachment I – Tables 1 - 8

TABLE 1 - Estimate of Probable Cost Summary (2019 Dollars)**Final Closure/ Post Closure/Corrective Action****Lincoln County MSW Landfill Phases I, II, III, and IV****S&ME Project No. 7335-19-051**

ACTION	COST ESTIMATE
FINAL CLOSURE	\$7,328,000
POST-CLOSURE	\$3,131,000

TOTAL (2019 DOLLARS) \$10,459,000

TABLE 2 - Final Closure Estimate of Probable Cost

Lincoln County MSW Landfill Phases I, II, III, and IV

S&ME Project No. 7335-19-051

Total Area (Phase I, II, III, and IV)	40 Acres	1,742,400 SF
Area to be Capped (Phase I, II, III, and IV)	40 Acres	1,742,400 SF

Item	Quantity	Unit	Cost/Unit	Total Cost
Final Cover System				
Vegetative Layer (6 inch thick)	32,267	CY	\$ 9.00	\$ 290,403
Earthen Barrier Layer (18 inch thick)	96,800	CY	\$ 6.50	\$ 629,200
Geosynthetic Clay Liner	1,742,400	SF	\$ 0.65	\$ 1,132,560
Geocomposite Drainage Layer	1,742,400	SF	\$ 0.70	\$ 1,219,680
Geomembrane (Textured 40-Mil LLDPE)	1,742,400	SF	\$ 0.60	\$ 1,045,440
				\$ 4,317,283

Sedimentation and Erosion Control Devices				
Grass Lined Ditches	14,573	LF	\$ 6.00	\$ 87,438
Down-Piping	1,887	LF	\$ 65.00	\$ 122,655
Silt Fence	1,600	LF	\$ 3.50	\$ 5,600
Outlet Protection Aprons	4	EA	\$ 3,500.00	\$ 14,000
Drop Inlets	14	EA	\$ 5,500.00	\$ 77,000
				\$ 306,693

Gas Controls - Active Gas Venting System				
Methane Enclosed Flare System	1	EA	\$ 162,250.00	\$ 162,250
Methane Blower Building and Controls	1	EA	\$ 108,000.00	\$ 108,000
Methane Pipe Network, Valves, Condensate Sump, Wells Installed	40	Acres	\$ 21,700.00	\$ 868,000
				\$ 1,138,250

Final Landscaping				
Seeding / Fertilizing / Mulching	40	Acres	\$ 2,500.00	\$ 100,000
				\$ 100,000

SUBTOTAL (2019 DOLLARS) \$ 5,862,226

Contractor Mobilization/Demobilization (5% of Subtotal)	1	LS	\$ 293,111
			\$ 293,111

Engineering - Permitting, Design & Construction CQA (10% of Subtotal)	1	LS	\$ 586,223
			\$ 586,223

Contingency (10% of Subtotal)	1	LS	\$ 586,223
			\$ 586,223

TOTAL COST (2019 DOLLARS) \$ 7,327,783

TABLE 3 - Post-Closure Estimate of Probable Cost

Lincoln County MSW Landfill Phases I, II, and III

S&ME Project No. 7335-19-051

Total Area (Phase I, II, III, IV)	40 Acres	1,742,400 SF		
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Item	Quantity	Unit	Cost/Unit	Total Cost
Leachate Collection & Treatment	29,180	GAL	\$ 0.026	\$ 759

Maintenance (Preventative & Corrective)				
Leachate Collection Removal and Treatment Systems - Annual Cleaning	1	LS	\$ 4,100.00	\$ 4,100
Operate Gas Removal System	1	LS	\$ 3,100.00	\$ 3,100
Wells (Methane & Groundwater)	1	LS	\$ 510.00	\$ 510
Final Cover Maintenance	40	Acre	\$ 1,550.00	\$ 62,000
Miscellaneous (Fencing, Gates, Signs, Roads, Storm Water Structures)	1	LS	\$ 2,000.00	\$ 2,000
				\$ 71,710

Permit Fees	1	LS	\$ 2,500.00	\$ 2,500
				\$ 2,500

Administration / Inspections / Record Keeping				
Project Engineer Labor	96	HRS	\$ 130.00	\$ 12,480
Technician Labor	64	HRS	\$ 75.00	\$ 4,800
Clerical Labor	48	HRS	\$ 44.00	\$ 2,112
				\$ 19,392

ANNUAL COST (2019 DOLLARS) \$ 94,361

Leachate and Gas Collection System Abandonment (One Time Cost)				
Abandon LCS Tanks	1	LS	\$ 150,000.00	\$ 150,000
Abandon Gas Collection Control System	1	LS	\$ 150,000.00	\$ 150,000
				\$ 300,000

TOTAL COST - 30 YEARS (2019 DOLLARS) \$ 3,130,820

TABLE 4 - Estimate of Probable Cost Summary (2019 Dollars)

Final Closure/ Post Closure
Lincoln County C&D Landfill Phase II
S&ME Project No. 7335-19-051

ACTION	COST ESTIMATE
FINAL CLOSURE	\$672,000
POST-CLOSURE	\$920,000
	<hr/> TOTAL (2019 DOLLARS) \$1,592,000

TABLE 5 - Final Closure Estimate of Probable Cost

Lincoln County C&D Landfill Phase II

S&ME Project No. 7335-19-051

Total Area (Phase II)	7.5 Acres	326,700 SF
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Item	Quantity	Unit	Cost/Unit	Total Cost
Final Cover System				
Excavating & Screening On-Site Material (Low Permeability Only)	18,150	CY	\$ 4.40	\$ 79,860.00
Borrow Area Clearing & Grubbing	1.15	Acres	\$ 2,793.00	\$ 3,211.95
Borrow Area Silt Fence	500	LF	\$ 3.50	\$ 1,750.00
18" Low Permeability Layer	18,150	CY	\$ 6.50	\$ 117,975.00
18" Erosion Layer	18,150	CY	\$ 7.50	\$ 136,125.00
Access Road	5,914	Sq. Yd	\$ 23.00	\$ 136,022.00
Gas Vent Materials (HDPE Pipe, 57 Stone, Geotextile, GCDL)	8	Pcs	\$ 1,565.00	\$ 12,520.00
Gas Vent Installation	8	Pcs	\$ 809.00	\$ 6,472.00
Surveying	1	LS	\$ 4,000.00	\$ 4,000.00
				\$ 497,935.95

Sediment & Erosion Control Measures				
Silt Fence	1,470	LF	\$ 3.50	\$ 5,145.00
Drop Inlet Catch Basin (2.5' x 2.5' x 2.0')	4	Pcs	\$ 5,500.00	\$ 22,000.00
12" Smooth-Lined Corrugated HDPE Pipe	174	LF	\$ 38.00	\$ 6,612.00
15" Smooth-Lined Corrugated HDPE Pipe	227	LF	\$ 45.00	\$ 10,215.00
18" Smooth-Lined Corrugated HDPE Pipe	220	LF	\$ 50.00	\$ 11,000.00
21" Smooth-Lined Corrugated HDPE Pipe	160	LF	\$ 59.00	\$ 9,440.00
Rip-Rap & Geotextile (Outlet Protection)	1	LS	\$ 2,500.00	\$ 2,500.00
				\$ 66,912.00

Final Landscaping				
Seeding/Fertilizing/Mulching	7.5	Acres	\$ 2,500.00	\$ 18,750.00
				\$ 18,750.00

SUBTOTAL (2019 DOLLARS) \$ 583,598

Contractor Mobilization/Demobilization (5% of Subtotal)				
Contractor Mobilization/Demobilization	1	LS	-	\$ 29,179.90
				\$ 29,179.90

Engineering - Permitting, Design & Construction CQA (10% of Subtotal)				
	1	LS	-	\$ 58,359.80
				\$ 58,359.80

Administration				
Announcements/Deeds/Fees	1	LS	\$ 1,100.00	\$ 1,100.00
				\$ 1,100.00

Total Cost (2019 Dollars): \$ 672,238

TABLE 6 - Post-Closure Care Estimate of Probable Cost**Lincoln County C&D Landfill Phase II****S&ME Project No. 7335-19-051**

Total Area (Phase II)	7.5 Acres	326,700 SF
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Item	Quantity	Unit	Cost/Unit	Total Cost
Monitoring/Reporting				
Groundwater Monitoring (4 wells semi-annually)	8	Sample	\$ 280.00	\$ 2,240.00
Semi-Annual Reporting (Groundwater Reports)	2	Event	\$ 2,200.00	\$ 4,400.00
\$ 6,640.00				
Maintenance (Preventive & Corrective)				
Wells (4 Groundwater Wells)	4	Well	\$ 510.00	\$ 2,040.00
Final Cover Maintenance	7.5	Acre	\$ 1,550.00	\$ 11,625.00
\$ 13,665.00				
Administration				
Annual Certification	1	LS	\$ 5,200.00	\$ 5,200.00
Monthly Administration	12	LS	\$ 430.00	\$ 5,160.00
\$ 10,360.00				

Total Annual Cost (2019 Dollars): \$ 30,665**Total Cost Over 30 years (2019 Dollars): \$ 919,950**

TABLE 7**Corrective Action Estimate of Probable Cost Summary (2019 Dollars)****Lincoln County Landfill****S&ME Project No. 7335-19-051****Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.**

TASK	RULE	DESCRIPTION	ESTIMATED COST
TASK 1	15A NCAC 13B .1634	Appendix II Background Sampling of Groundwater Monitoring Network (4 events per sampling location)	\$ 83,530.00
TASK 2	15A NCAC 13B .1634	Installation of at least two wells (deep and shallow) at the compliance boundary	\$ 20,980.00
TASK 3	15A NCAC 13B .1634	Appendix II Sampling of Original Well Network and Compliance Boundary Wells Annually (First Semi-Annual Monitoring Event)	\$ 28,040.00
TASK 4	15A NCAC 13B .1634	Appendix I and II Detects Sampling of Original Well Network and Compliance Boundary Wells Annually (Second Semi-Annual Monitoring Event)	\$ 21,970.00
TASK 5	15A NCAC 13B .1634	Installation of additional monitoring wells to characterize the nature and extent (N&E) of the plume	\$ 65,010.00
TASK 6	15A NCAC 13B .1634	Appendix II Background Sampling of N&E Monitoring Network (4 events per sampling location)	\$ 48,950.00
TASK 7	15A NCAC 13B .1634	Appendix II Sampling of N&E Well Network Annually (First Semi-Annual Monitoring Event)	\$ 17,000.00
TASK 8	15A NCAC 13B .1634	Appendix I and II Detects Sampling of N&E Well Network Annually (Second Semi-Annual Monitoring Event)	\$ 14,460.00
TASK 9	15A NCAC 13B .1635	Assessment of Corrective Measures (Report, Public Notice, Public Meeting)	\$ 43,520.00
TASK 10	15A NCAC 13B .1636	Selection of Remedy	\$ 21,200.00
TASK 11	15A NCAC 13B .1636 and .1637	Corrective Action Plan Submittal, Approval, and Implementation	\$ 1,624,220.00
TASK 12	15A NCAC 13B .1636 and .1637	Installation of Additional Monitoring Wells to Monitor Effectiveness of Selected Remedy	\$ 41,160.00
TASK 13	15A NCAC 13B .1636 and .1637	Maintenance and Repair of Additional Monitoring Wells	\$ 7,500.00
TASK 14	15A NCAC 13B .1636 and .1637	Sampling and Analysis of Additional Monitoring Wells	\$ -
TASK 15	15A NCAC 13B .1637	Corrective Action Remedy is Complete	\$ 12,850.00

ESTIMATE OF PROBABLE COST FOR CORRECTIVE ACTION	\$ 2,050,390
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TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.

20 MSW Well Locations, 3 Days to Sample								\$ 83,527
Field Work (4 events)								
Technician Time (2 techs)								\$ 18,000.00
Mileage								\$ 696.00
Water Level Probe								\$ 360.00
pH/Temperature/Conductivity Meter								\$ 480.00
Gator Rental								\$ 1,680.00
Disposable Teflon Bailers								\$ 1,750.00
Disposables (Tubing, Gloves, Ropes etc)								\$ 600.00
								\$ 23,566.00
Analytical (4 events)								
Appendix II - Volatiles								\$ 6,955.20
Appendix II - Semi Volatiles								\$ 15,640.00
Appendix II - Pesticides/PCB								\$ 8,280.00
Appendix II - Herbicides								\$ 9,200.00
Appendix II - Metals								\$ 8,280.00
Appendix II - CN								\$ 3,220.00
Appendix II - Sulfide								\$ 1,380.00
								\$ 52,955.20
Reporting (1 event)								
Senior Professional (P5)								\$ 330.00
Registered Professional (P4)								\$ 1,056.00
Project Professional (P3)								\$ 4,600.00
CAD Operator								\$ 760.00
Administration								\$ 260.00
								\$ 7,006.00
TASK 1 TOTAL								\$ 83,527

TABLE 8**Corrective Action Estimate of Probable Cost (2019 Dollars)****Lincoln County Landfill****S&ME Project No. 7335-19-051****Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.**

TASK 2							
15A NCAC 13B .1634							
Installation of at least two wells (deep and shallow) at the compliance boundary							
Drilling Services (3 days)							
Drill Rig Mobilization	1	each	at	\$ 500.00	per each	\$ 500.00	
Soil Test Boring (0-50 ft depth) 4.25 ID Augers	50	feet	at	\$ 12.50	per foot	\$ 625.00	
Auger Boring (0-50 ft depth) 4.25 ID Augers	50	feet	at	\$ 8.00	per foot	\$ 400.00	
Rock Coring - Set up, per hole	1	each	at	\$ 175.00	per each	\$ 175.00	
Installation of Temporary NW Casing	50	feet	at	\$ 6.00	per foot	\$ 300.00	
NQ Coring	25	feet	at	\$ 47.00	per foot	\$ 1,175.00	
Installation of Type II Monitor Well, 2-inch	125	feet	at	\$ 26.25	per foot	\$ 3,281.25	
Above Grade Protective Casing, 2-inch wells	2	each	at	\$ 178.50	per each	\$ 357.00	
Steam Cleaner	2	days	at	\$ 131.25	per day	\$ 262.50	
Grout Plant	1	day	at	\$ 105.00	per day	\$ 105.00	
Water Trailer	3	days	at	\$ 78.75	per day	\$ 236.25	
Non-drilling time (water hauling, decon, etc.)	4	hours	at	\$ 110.00	per hour	\$ 440.00	
						\$ 7,857.00	
Drilling Oversight (3 days)							
Project Professional (P3)	30	hours	at	\$ 115.00	per hour	\$ 3,450.00	
Mileage	300	miles	at	\$ 0.58	per mile	\$ 174.00	
Water Level Meter	3	days	at	\$ 30.00	per day	\$ 90.00	
						\$ 3,714.00	
Well Development and Slug Testing (2 days)							
Project Professional (P3)	20	hours	at	\$ 115.00	per hour	\$ 2,300.00	
Mileage	200	miles	at	\$ 0.58	per mile	\$ 116.00	
Water Level Meter	2	days	at	\$ 30.00	per day	\$ 60.00	
Pressure Transducer and Data Logger	1	day	at	\$ 50.00	per day	\$ 50.00	
Battery Operated Well Pump	2	days	at	\$ 25.00	per day	\$ 50.00	
						\$ 2,576.00	
Soil Laboratory Classification (for porosity estimates)							
Atterberg Limits	1	each	at	\$ 90.00	per each	\$ 90.00	
Grain Size with Hydrometer	1	each	at	\$ 130.00	per each	\$ 130.00	
Specific Gravity	1	each	at	\$ 70.00	per each	\$ 70.00	
						\$ 290.00	

TABLE 8**Corrective Action Estimate of Probable Cost (2019 Dollars)****Lincoln County Landfill****S&ME Project No. 7335-19-051****Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.**

Well Survey						
Project Professional (P3)	2	hours	at	\$ 115.00	per hour	\$ 230.00
Subcontracted Survey Cost	1	each	at	\$ 2,000.00	per each	\$ 2,000.00
						\$ 2,230.00
Boring Logs, Well Logs, and Estimation of Groundwater Flow						
Registered Professional (P4)	4	hours	at	\$ 132.00	per hour	\$ 528.00
Project Professional (P3)	24	hours	at	\$ 115.00	per hour	\$ 2,760.00
CAD Operator	8	hours	at	\$ 95.00	per hour	\$ 760.00
Administration	4	hours	at	\$ 65.00	per hour	\$ 260.00
						\$ 4,308.00
TASK 2 TOTAL					\$	20,975

TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.

TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.

TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.

Assume 6 shallow and 3 deep wells									
Drilling Services (12 days)									
Drill Rig Mobilization	1	each	at	\$	500.00	per	each	\$	500.00
Soil Test Boring (0-50 ft depth) 4.25 ID Augers	300	feet	at	\$	12.50	per	foot	\$	3,750.00
Auger Boring (0-50 ft depth) 4.25 ID Augers	150	feet	at	\$	8.00	per	foot	\$	1,200.00
Rock Coring - Set up, per hole	3	each	at	\$	175.00	per	each	\$	525.00
Installation of Temporary NW Casing	150	feet	at	\$	6.00	per	foot	\$	900.00
NQ Coring	75	feet	at	\$	47.00	per	foot	\$	3,525.00
Installation of Type II Monitor Well, 2-inch	525	feet	at	\$	26.25	per	foot	\$	13,781.25
Above Grade Protective Casing, 2-inch wells	9	each	at	\$	178.50	per	each	\$	1,606.50
Steam Cleaner	12	days	at	\$	131.25	per	day	\$	1,575.00
Grout Plant	4	day	at	\$	105.00	per	day	\$	420.00
Water Trailer	12	days	at	\$	78.75	per	day	\$	945.00
Non-drilling time (water hauling, decon, etc.)	12	hours	at	\$	110.00	per	hour	\$	1,320.00
								\$	30,047.75
Drilling Oversight (12 days)									
Project Professional (P3)	120	hours	at	\$	115.00	per	hour	\$	13,800.00
Mileage	1,200	miles	at	\$	0.58	per	mile	\$	696.00
Water Level Meter	12	days	at	\$	30.00	per	day	\$	360.00
								\$	14,856.00
Well Development and Slug Testing (5 days)									
Project Professional (P3)	50	hours	at	\$	115.00	per	hour	\$	5,750.00
Mileage	500	miles	at	\$	0.58	per	mile	\$	290.00
Water Level Meter	5	days	at	\$	30.00	per	day	\$	150.00
Pressure Transducer and Data Logger	3	day	at	\$	50.00	per	day	\$	150.00
Battery Operated Well Pump	5	days	at	\$	25.00	per	day	\$	125.00
								\$	6,465.00

TABLE 8**Corrective Action Estimate of Probable Cost (2019 Dollars)****Lincoln County Landfill****S&ME Project No. 7335-19-051****Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.**

Soil Laboratory Classification (for porosity estimates)							
Atterberg Limits	6	each	at	\$ 90.00	per each	\$ 540.00	
Grain Size with Hydrometer	6	each	at	\$ 130.00	per each	\$ 780.00	
Specific Gravity	6	each	at	\$ 70.00	per each	\$ 420.00	
						\$ 1,740.00	
Well Survey							
Project Professional (P3)	2	hours	at	\$ 115.00	per hour	\$ 230.00	
Subcontracted Survey Cost	1	each	at	\$ 5,000.00	per each	\$ 5,000.00	
						\$ 5,230.00	
Boring Logs, Well Logs, and Estimation of Groundwater Flow							
Registered Professional (P4)	8	hours	at	\$ 132.00	per hour	\$ 1,056.00	
Project Professional (P3)	40	hours	at	\$ 115.00	per hour	\$ 4,600.00	
CAD Operator	8	hours	at	\$ 95.00	per hour	\$ 760.00	
Administration	4	hours	at	\$ 65.00	per hour	\$ 260.00	
						\$ 6,676.00	
TASK 5 TOTAL						\$ 65,015	

TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.

9 N&E Well Locations, 2 Days to Sample								\$ 48,954.00
Field Work (4 events)								
Technician Time (2 techs)								\$ 12,000.00
Mileage								\$ 464.00
Water Level Probe								\$ 240.00
pH/Temperature/Conductivity Meter								\$ 320.00
Gator Rental								\$ 1,120.00
Disposable Teflon Bailers								\$ 750.00
Disposables (Tubing, Gloves, Ropes etc)								\$ 600.00
								\$ 15,494.00
Analytical (4 events)								
Appendix II - Volatiles								\$ 3,312.00
Appendix II - Semi Volatiles								\$ 7,038.00
Appendix II - Pesticides/PCB								\$ 3,726.00
Appendix II - Herbicides								\$ 4,140.00
Appendix II - Metals								\$ 3,726.00
Appendix II - CN								\$ 1,449.00
Appendix II - Sulfide								\$ 621.00
								\$ 24,012.00
Reporting (1 event)								
Senior Professional (P5)								\$ 660.00
Registered Professional (P4)								\$ 3,168.00
Project Professional (P3)								\$ 4,600.00
CAD Operator								\$ 760.00
Administration								\$ 260.00
								\$ 9,448.00
TASK 6 TOTAL								\$ 48,954.00

TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.

TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.

TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.

ACM Report							
Senior Professional (P5)	10	hours	at	\$ 165.00	per hour	\$	1,650.00
Registered Professional (P4)	120	hours	at	\$ 132.00	per hour	\$	15,840.00
Project Professional (P3)	120	hours	at	\$ 115.00	per hour	\$	13,800.00
CAD Operator	40	hours	at	\$ 95.00	per hour	\$	3,800.00
Administration	8	hours	at	\$ 65.00	per hour	\$	520.00
						\$	35,610.00
Public Notice							
Senior Professional (P5)	1	hour	at	\$ 165.00	per hour	\$	82.50
Registered Professional (P4)	12	hours	at	\$ 132.00	per hour	\$	1,584.00
Administration	4	hours	at	\$ 65.00	per hour	\$	260.00
Estimated Advertisement Costs	1	each	at	\$ 1,500.00	per each	\$	1,500.00
						\$	3,426.50
Public Meeting							
Senior Professional (P5)	8	hours	at	\$ 165.00	per hour	\$	1,320.00
Registered Professional (P4)	24	hours	at	\$ 132.00	per hour	\$	3,168.00
						\$	4,488.00
TASK 9 TOTAL							
						\$	43,525

TABLE 8**Corrective Action Estimate of Probable Cost (2019 Dollars)****Lincoln County Landfill****S&ME Project No. 7335-19-051****Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.**

TASK 10							
15A NCAC 13B .1636							
Selection of Remedy							
Permit Modification Application							
Senior Professional (P5)	4	hours	at	\$ 165.00	per hour	\$ 660.00	
Registered Professional (P4)	40	hours	at	\$ 132.00	per hour	\$ 5,280.00	
Administration	4	hours	at	\$ 65.00	per hour	\$ 260.00	
						\$ 6,200.00	
Permit Modification Fee							
Estimated Fee	1	each	at	\$ 15,000.00	per each	\$ 15,000.00	
						\$ 15,000.00	
TASK 10 TOTAL						\$ 21,200	

TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.

Corrective Action Plan Submittal, Approval, and Implementation								
CAP Report								
Senior Professional (P5)	12	hours	at	\$	165.00	per hour	\$	1,980.00
Registered Professional (P4)	40	hours	at	\$	132.00	per hour	\$	5,280.00
Project Professional (P3)	40	hours	at	\$	115.00	per hour	\$	4,600.00
CAD Operator	8	hours	at	\$	95.00	per hour	\$	760.00
Administration	4	hours	at	\$	65.00	per hour	\$	260.00
							\$	12,880.00
CAP Implementation (Assume MNA)								
Baseline Sampling of MNA Performance Parameters								
(Assume 1 background well, 14 performance wells, and 5 sentinel wells)								
Field Work (4 events, 3 days per event)								
Technician Time (2 techs)	240	hours	at	\$	75.00	per hour	\$	18,000.00
Mileage	1,200	miles	at	\$	0.58	per mile	\$	696.00
Water Level Probe	12	days	at	\$	30.00	per day	\$	360.00
Multi-parameter meter with flow cell (Hydrolab)	12	days	at	\$	125.00	per day	\$	1,500.00
Hydrolab Calibration Consumables	4	each	at	\$	90.00	per each	\$	360.00
Turbidity Meter	12	days	at	\$	35.00	per day	\$	420.00
Gator Rental	4	weeks	at	\$	140.00	per week	\$	560.00
Bladder Pump (including controls)	12	days	at	\$	135.00	per day	\$	1,620.00
Disposable Bladders (pack of 10)	8	each	at	\$	115.00	per each	\$	920.00
Dedicated Tubing (1 time expense)	1	each	at	\$	4,500.00	per each	\$	4,500.00
							\$	28,936.00
Analytical (4 events)								
Nitrate	80	each	at	\$	17.25	per each	\$	1,380.00
Iron	80	each	at	\$	13.80	per each	\$	1,104.00
Sulfate	80	each	at	\$	19.55	per each	\$	1,564.00
Sulfide	80	each	at	\$	17.25	per each	\$	1,380.00
Methane, Ethane, Ethene, CO2	80	each	at	\$	126.50	per each	\$	10,120.00
TOC/BOD/COD	80	each	at	\$	126.50	per each	\$	10,120.00
Alkalinity	80	each	at	\$	17.25	per each	\$	1,380.00
Chloride	80	each	at	\$	17.25	per each	\$	1,380.00
Volatile Fatty Acids	80	each	at	\$	126.50	per each	\$	10,120.00
							\$	38,548.00

TABLE 8**Corrective Action Estimate of Probable Cost (2019 Dollars)****Lincoln County Landfill****S&ME Project No. 7335-19-051****Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.**

Reporting and MNA Screening Model (4 events)							
Senior Professional (P5)	32	hour	at	\$ 165.00	per hour	\$ 5,280.00	
Registered Professional (P4)	160	hours	at	\$ 132.00	per hour	\$ 21,120.00	
Project Professional (P3)	128	hours	at	\$ 115.00	per hour	\$ 14,720.00	
CAD Operator	24	hours	at	\$ 95.00	per hour	\$ 2,280.00	
Administration	16	hours	at	\$ 65.00	per hour	\$ 1,040.00	
						\$ 44,440.00	
MNA Effectiveness Sampling and Reporting							
(Assume 1 background well, 14 performance wells, and 5 sentinel wells to be sampled semi-annually for 30 years)							
Field Work (40 events, 3 days per event)							
Technician Time (2 techs)	3,600	hours	at	\$ 75.00	per hour	\$ 270,000.00	
Mileage	18,000	miles	at	\$ 0.58	per mile	\$ 10,440.00	
Water Level Probe	180	days	at	\$ 30.00	per day	\$ 5,400.00	
Multi-parameter meter with flow cell (Hydrolab)	180	days	at	\$ 125.00	per day	\$ 22,500.00	
Hydrolab Calibration Consumables	60	each	at	\$ 90.00	per each	\$ 5,400.00	
Turbidity Meter	180	days	at	\$ 35.00	per day	\$ 6,300.00	
Gator Rental	60	weeks	at	\$ 140.00	per week	\$ 8,400.00	
Bladder Pump (including controls)	180	days	at	\$ 135.00	per day	\$ 24,300.00	
Disposable Bladders (pack of 10)	120	each	at	\$ 115.00	per each	\$ 13,800.00	
						\$ 366,540.00	
Analytical (40 events)							
Appendix II - Volatiles	1,260	each	at	\$ 82.80	per each	\$ 104,328.00	
Appendix II - Semi Volatiles	1,200	each	at	\$ 195.50	per each	\$ 234,600.00	
Appendix II - Metals	1,200	each	at	\$ 103.50	per each	\$ 124,200.00	
Nitrate	1,200	each	at	\$ 17.25	per each	\$ 20,700.00	
Iron	1,200	each	at	\$ 13.80	per each	\$ 16,560.00	
Sulfate	1,200	each	at	\$ 19.55	per each	\$ 23,460.00	
Sulfide	1,200	each	at	\$ 17.25	per each	\$ 20,700.00	
Methane, Ethane, Ethene, CO2	1,200	each	at	\$ 126.50	per each	\$ 151,800.00	
TOC/BOD/COD	1,200	each	at	\$ 126.50	per each	\$ 151,800.00	
Alkalinity	1,200	each	at	\$ 17.25	per each	\$ 20,700.00	
Chloride	1,200	each	at	\$ 17.25	per each	\$ 20,700.00	
Volatile Fatty Acids	1,200	each	at	\$ 126.50	per each	\$ 151,800.00	
						\$ 1,041,348.00	

TABLE 8**Corrective Action Estimate of Probable Cost (2019 Dollars)****Lincoln County Landfill****S&ME Project No. 7335-19-051****Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.**

Corrective Action Evaluation Report (6 reports, 1 report every 5 years)							
Senior Professional (P5)	60	hour	at	\$ 165.00	per hour	\$	9,900.00
Registered Professional (P4)	360	hours	at	\$ 132.00	per hours	\$	47,520.00
Project Professional (P3)	240	hours	at	\$ 115.00	per hours	\$	27,600.00
CAD Operator	48	hours	at	\$ 95.00	per hours	\$	4,560.00
Administration	30	hours	at	\$ 65.00	per hours	\$	1,950.00
						\$	91,530.00
TASK 11 TOTAL						\$	1,624,222

TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.

Installation of 3 Performance Wells and 3 Sentinel Wells									
Drilling Services (7 days)									
Drill Rig Mobilization									
Soil Test Boring (0-50 ft depth)	1	each	at	\$	500.00	per	each	\$	500.00
4.25 ID Augers	300	feet	at	\$	12.50	per	foot	\$	3,750.00
Installation of Type II Monitor Well, 2-inch	300	feet	at	\$	26.25	per	foot	\$	7,875.00
Above Grade Protective Casing, 2-inch wells	6	each	at	\$	178.50	per	each	\$	1,071.00
Steam Cleaner	7	days	at	\$	131.25	per	day	\$	918.75
Grout Plant	3	day	at	\$	105.00	per	day	\$	315.00
Non-drilling time (water hauling, decon, etc.)	7	hours	at	\$	110.00	per	hour	\$	770.00
								\$	15,199.75
Drilling Oversight (7 days)									
Project Professional (P3)	70	hours	at	\$	115.00	per	hour	\$	8,050.00
Mileage	700	miles	at	\$	0.58	per	mile	\$	406.00
Water Level Meter	7	days	at	\$	30.00	per	day	\$	210.00
								\$	8,666.00
Well Development and Slug Testing (4 days)									
Project Professional (P3)	40	hours	at	\$	115.00	per	hour	\$	4,600.00
Mileage	400	miles	at	\$	0.58	per	mile	\$	232.00
Water Level Meter	4	days	at	\$	30.00	per	day	\$	120.00
Pressure Transducer and Data Logger	2	days	at	\$	50.00	per	day	\$	100.00
Battery Operated Well Pump	4	days	at	\$	25.00	per	day	\$	100.00
								\$	5,152.00
Soil Laboratory Classification (for porosity estimates)									
Atterberg Limits	6	each	at	\$	90.00	per	each	\$	540.00
Grain Size with Hydrometer	6	each	at	\$	130.00	per	each	\$	780.00
Specific Gravity	6	each	at	\$	70.00	per	each	\$	420.00
								\$	1,740.00
Well Survey									
Project Professional (P3)	2	hours	at	\$	115.00	per	hour	\$	230.00
Subcontracted Survey Cost	1	each	at	\$	3,500.00	per	each	\$	3,500.00
								\$	3,730.00

TABLE 8**Corrective Action Estimate of Probable Cost (2019 Dollars)****Lincoln County Landfill****S&ME Project No. 7335-19-051****Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.**

Boring Logs, Well Logs, and Estimation of Groundwater Flow						
Registered Professional (P4)	8	hours	at	\$ 132.00	per hour	\$ 1,056.00
Project Professional (P3)	40	hours	at	\$ 115.00	per hour	\$ 4,600.00
CAD Operator	8	hours	at	\$ 95.00	per hour	\$ 760.00
Administration	4	hours	at	\$ 65.00	per hour	\$ 260.00
						\$ 6,676.00
TASK 12 TOTAL					\$	41,164

TABLE 8**Corrective Action Estimate of Probable Cost (2019 Dollars)****Lincoln County Landfill****S&ME Project No. 7335-19-051****Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.**

TASK 13						
15A NCAC 13B .1636 and .1637						
Maintenance and Repair of Additional Monitoring Wells						
<u>Assume Repair of 5 Protective Covers</u>						
Drilling Services						
Repair of Protective Cover (Lump Sum)	5	each	at	\$ 1,500.00	per each	\$ 7,500.00
						\$ 7,500.00
TASK 13 TOTAL					\$	7,500

TABLE 8**Corrective Action Estimate of Probable Cost (2019 Dollars)****Lincoln County Landfill****S&ME Project No. 7335-19-051****Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.**

TASK 14		
15A NCAC 13B .1636 and .1637		
Sampling and Analysis of Additional Monitoring Wells		
This item is included in Task 11		
TASK 14 TOTAL	\$	-

TABLE 8

Corrective Action Estimate of Probable Cost (2019 Dollars)

Lincoln County Landfill

S&ME Project No. 7335-19-051

Assumed Scenario: Release at MSW Landfill, Monitored Natural Attenuation as Selected Remedy.