Appendix A

Treatability Study Report Summary (U.S. Army Cold Regions Research and Engineering Laboratory)

(To be provided in future versions of the FS)

Appendix B

Summary of Federal and State Applicable or Relevant and Appropriate Requirements (ARARs)

Summary of Federal and State Applicable or Relevant and Appropriate Requirements (ARARs)
North Ridge Estates (NRE) Site

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chemical	Location	Action
Federal ARARs						
National Historic Preservation Act (NHPA), 16 U.S.C. § 470 40 Code of Federal Regulations (CFR) 6.301(b) 36 CFR 60, 63, 800	Applicable	This statute and implementing regulations require federal agencies to take into account the effect of this response action upon any district, site, building, structure, or object that is included in or eligible for the National Register of Historic Places (generally, 50 years old or older).	If cultural resources on or eligible for the national register are present, it will be necessary to determine if there will be an adverse effect and if so how the effect may be minimized or mitigated, in consultation with the appropriate State Historic Preservation Office.		✓	
Archaeological and Historic Preservation Act 16 U.S.C. § 469 40 CFR 6.301(c) 43 CFR 7	Applicable	This statute and implementing regulations establish requirements for the evaluation and preservation of historical and archaeological data, which may be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program.	The unauthorized removal of archaeological resources from public or Indian lands is prohibited without a permit, and any archaeological investigations at a site must be conducted by a professional archaeologist.		✓	
Fish and Wildlife Coordination Act 16 U.S.C. §§ 661, et seq., 40 CFR 6.302(g) 50 CFR 83	Applicable	This statute and implementing regulations require coordination with federal and state agencies for federally funded projects to ensure that any modification of any stream or other water body affected by any action authorized or funded by the federal agency provides for adequate protection of fish and wildlife resources.	If the remedial action involves activities that affect wildlife and/or non-game fish, federal agencies must first consult with the U.S. Fish and Wildlife Service and the relevant state agency with jurisdiction over wildlife resources.		✓	
Endangered Species Act (ESA), 16 U.S.C. § 1531 40 CFR 6.302(h) 50 CFR 17 and 402	Applicable	This statute and implementing regulations provide that federal activities not jeopardize the continued existence of any threatened or endangered species. ESA Section 7 requires consultation with the U.S. Fish and Wildlife Service to identify the possible presence of protected species and mitigate potential impacts on such species.	If threatened or endangered species are identified within the remedial areas, activities must be designed to conserve the species and their habitat. To date no threatened or endangered species have been identified in the area of the site.		✓	

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chemical	Location	Action
Federal ARARs						
Migratory Bird Treaty Act, 16 U.S.C. §§ 703, et seq. 50 CFR 10.13	Relevant and Appropriate	Makes it unlawful to "hunt, take, capture, kill" or take other various actions adversely affected a broad range of migratory birds, without the prior approval of the Department of the Interior.	The selected remedial actions will be carried out in a manner to avoid adversely affecting migratory bird species, including individual birds or their nests.		✓	
Clean Air Act (CAA) 42 U.S.C. § 7401, et seq. 40 CFR 61, Subpart M	Applicable	National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Asbestos	The selected remedial actions will be carried out in a manner that will comply with all the National Emission Standard for Asbestos as required under NESHAP.	✓		✓
CAA 40 CFR 61.145 (c)	Relevant and Appropriate	This requirement establishes detailed standards and specifications for demolition and renovation. The regulation provides detailed procedures for controlling asbestos release during demolition of a building containing "regulated-asbestos containing material (RACM)".	Applicable to building demolitions that will occur as part of the removal if certain threshold volumes of RACM are disturbed. The dust control portions of the regulations are relevant and appropriate for soil disturbance activities and for asbestos contaminated material that does not meet the strict definition of RACM.			✓
CAA 40 CFR 61.150	Relevant and Appropriate	Standard for waste disposal for manufacturing, fabricating, demolition, renovation and spraying operations. This regulation provides detailed procedures for processing, handling and transporting asbestos containing waste material generated during building demolition and renovation (among other sources).	Applicable to RACM generated by building demolitions that will occur as part of the remedial action. Relevant and appropriate for soil disturbance activities and for asbestos contaminated material that does not meet the strict definition of RACM.			✓
CAA 40 CFR 61.149	Relevant and Appropriate	Detailed procedures and specifications for handling and disposal of asbestos containing waste material generated by an asbestos mill.	Requirements under this regulation are considered relevant and appropriate to the asbestos containing material (ACM) disposal. It is not applicable because the facilities do not meet the regulatory definition of an asbestos mill.			✓
CAA 40 CFR 61.151	Relevant and Appropriate	Standard for inactive waste disposal sites for asbestos mills and manufacturing and fabricating operations. Provides requirements for covering, revegetation and signage at facilities where RACM will be left in place.	Requirements under this regulation are considered relevant and appropriate to asbestos containing soils and/or debris left in place. It is not applicable because the facilities that are part of this remedial do not meet the facility definitions in the regulation.			✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chemical	Location	Action
State of Oregon ARARs						
Air Quality, Oregon Revised Statutes (ORS) 468A General Emission Standards Oregon Administrative Rules (OAR) 340-226-0100	Relevant and Appropriate	This requirement states that highest and best practicable treatment and control of air contaminant emissions must in every case be provided so as to maintain overall air quality at the highest possible levels, and to maintain contaminant concentrations, visibility reduction, odors, soiling and other deleterious factors at the lowest possible levels.	No Comments		✓	
Air Quality, ORS 468A Visible Emissions and Nuisance Requirements OAR 340-208-0200, 0210	Relevant and Appropriate	This requirement establishes detailed standards and specifications which prohibit any handling, transporting or storage of materials, or use of a road, or any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne. These are rules for "special control areas" or other areas where fugitive emissions may cause a nuisance and control measures are practicable.	No Comments		✓	
Air Quality, ORS 468A Noise Control Regulations OAR 340-035-0035	Relevant and Appropriate	Sets noise standards for equipment, facilities, operations or activities including the storage or disposal of waste products.	No Comments		✓	
Air Quality ORS 468A Asbestos Requirements OAR 340-035-0270 OAR 340-035-0280 OAR 340-035-0290	Relevant and Appropriate	This requirement establishes detailed standards and specifications for any situation where a potential for exposure to asbestos fibers exists. Provide standards for asbestos abatement work, friable and nonfriable asbestos disposal requirements.	Substantive requirements may be relevant and appropriate to the removal, handling, and on-site packaging, storing, transport, or disposal of friable/nonfriable asbestos-containing materials		✓	
Oregon Hazardous Waste Management Act, ORS 466.005 ORS 465.225 OAR 340-100-0001	Relevant and Appropriate	Regulations under this act establish a regulatory structure for the generation, transportation, treatment, storage and disposal of hazardous wastes.	At this time, it is not anticipated that material meeting the regulatory definition of hazardous waste will be disturbed or encountered.			✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chemical	Location	Action
State of Oregon ARARs						
Oregon Solid Waste Management, ORS 459 OAR 340-093	Applicable	Governs the management of solid wastes, including the permitting of disposal sites.	This ARAR is applicable to the off-site management of contaminated soils. Substantive requirements would be applicable for management or disposal of any asbestos-containing materials which occurs on-site.			✓
Oregon Solid Waste Management, ORS 459 OAR 340-094	Applicable	Governs the management of solid wastes at municipal solid waste landfills.	Substantive requirements would be applicable for management or disposal of any asbestos-containing materials which occurs on-site.			✓
Oregon Solid Waste Management, ORS 459 OAR 340-095	Applicable	Governs the management of solid wastes at land disposal sites other than municipal solid waste landfills.	Substantive requirements would be applicable for management or disposal of any asbestos-containing materials which occurs on-site.			✓
Underground Storage Tank (UST) Rules ORS 465.200 ORS 465.455 ORS 466.706 ORS 466.835 ORS 466.994 ORS 466.995 OAR 340-130	Applicable	Governs the regulation of USTs to protect the public health, safety, welfare and the environment.	UST possibly still buried at parcel AL/MBK-E (Former OTI gas station)			✓
Oregon Environmental Cleanup Law, ORS 465.200- ORS 465.900 Oregon Hazardous Substance Remedial Action Rules, OAR 340-122	Applicable	Standards for degree of cleanup required. Establishes acceptable risk levels for human health at 1×10^{-6} for individual carcinogens, 1×10^{-5} for multiple carcinogens; and Hazard Index of 1.0 for noncarcinogens. Identifies selection of remedial action by balancing factors: effectiveness, implementability, long term reliability, short term implementation risk, and cost reasonableness. Allows waiver of state and local permits so long as substantive requirements are met.	Substantive requirements may be applicable to remedy selection.	✓		✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chemical	Location	Action
State of Oregon ARARs						
Oregon Occupational Safety and Health Code OAR 437	Relevant and Appropriate	Analogous to the federal Occupational Safety and Health Administration codes and contains health and safety requirement that must be met during implementation of any remedial action. These standards are intended to protect construction and utility workers at the site. Contains health and safety training requirements for on-site workers and permissible exposure limits for conducting work at a site.	Relevant for site remedial actions and for some investigative activities.			✓
Oregon Historical Preservation ORS 97.740 ORS 358.475 ORS 358.612 ORS 358.622 ORS 358.635 ORS 358.680 ORS 358.905 ORS 390.235 OAR 736; Divisions 50 and 51	Applicable	Governs Oregon Historical Preservation. Analogous to Federal Historic Preservation Act (36 CFR; Parts 60 and 61).	No Comments		✓	
Final Guidance, Consideration of Land Use In Environmental Remedial Actions, Oregon Department of Environmental Quality (DEQ), 1998a. July 1998	To Be Considered	How to make a land use determination for use in a risk assessment and in the remedy selection process.	No Comments		✓	✓
DEQ 1998d. Guidance for Identification of Hot Spots. April 1998	To Be Considered	Describes procedures for delineating “hot spots” in water and other environmental media.	No Comments		✓	✓
Final, Guidance for Use of Institutional Controls, DEQ, 1998e. April 1998	To Be Considered	Guidance for selection or approval of institutional controls as part or all of a remedy.	No Comments			✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chemical	Location	Action
State of Oregon ARARs						
Asbestos NESHAP Adequately Wet Guidance 29 CFR 1910.1001 - Asbestos	To Be Considered	Requires owners/operators involved in demolition and renovation activities to control emissions of particulate asbestos to the outside air. The purpose of this document is to provide guidance to asbestos inspectors and the regulated community on how to determine if friable ACM is adequately wet as required by the Asbestos NESHAP. The recommendations made in this guidance are solely recommendations. They are not the exclusive means of complying with the Asbestos NESHAP requirements.	No Comments	✓		✓

Acronyms

ARAR	Applicable or Relevant and Appropriate Requirements
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DEQ	State of Oregon Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
NCRS	Natural Resources Conservation Service
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
OAR	Oregon Administrative Rules
ORS	Oregon Revised Statutes
RACM	regulated-asbestos containing material
RCRA	Resource Conservation and Recovery Act
SHPO	State Historic Preservation Office
U.S.C	United States Code
UST	underground storage tanks

This Page Left Blank Intentionally

Appendix C

Alternative Quantity Calculations

Alternative Screening

Table C-1

Alternative 2: Institutional/Engineered Controls with Monitoring		
Fencing and Signage	Perimeter of Fence	Number of Signs[1&2]
	FT	No.
	21,700	**72**
	Signage over Steam Pipe (Bin C)	**3**
Total	**22,000**	**75**
Number of Private Ownership Parcels		**16**
Number of Receivership Parcels		**29**

Notes:

1. Warning signs placed at intervals of 300 ft or less along fenceline, per standard.
2. No warning signs are posted on private parcel.

Table C-2

Alternative 3: In-Place Containment of All Identified ACM on Private Parcels and Partial In-Place Containment of Identified ACM on Receivership Parcels with Institutional/Engineered Controls and Monitoring						
		Material Quantity Summary				
Parcel Status	Total Area Covered (ACR)	Volume of Cover (CF)	Common Backfill (CF)	Topsoil (CF)	Fence (LF)	Warning Signs (EA)
Bin A	35	3,730,000	2,984,000	746,000	---	---
Bin B	2	165,000	132,000	33,000	---	---
Bin C	**---**	---	---	---	---	---
Other	3	305,000	244,000	61,000	21,700	72
Total	**40**	**4,200,000**	**3,360,000**	**840,000**	**22,000**	**72**

Number of Private Ownership Parcels	**16**
Number of Receivership Parcels	**29**

Table C-3

Alternative 4a: In-Place Containment of All Identified ACM with Institutional Controls and Monitoring						
		Material Quantity Summary				
Parcel Status	Total Area Covered (ACR)	Volume of Cover (CF)	Common Backfill (CF)	Topsoil (CF)	Fence (LF)	Warning Signs (EA)
Bin A	60	6,500,000	5,200,000	1,300,000	---	---
Bin B	2	179,000	143,000	36,000	---	---
Bin C	---	---	---	---	---	---
Other	6	610,000	488,000	122,000	---	---
Total	**68**	**7,289,000**	**5,831,000**	**1,458,000**	**0**	**0**

Number of Private Ownership Parcels	**16**
Number of Receivership Parcels	**29**

Table C-4

Alternative 4b: In-Place Containment of All Identified ACM and In-Place Containment of Soil within Bin A Parcels with Institutional Controls and Monitoring						
		Material Quantity Summary				
Parcel Status	Total Area Covered (ACR)	Volume of Cover (CF)	Common Backfill (CF)	Topsoil (CF)	Fence (LF)	Warning Signs (EA)
Bin A	96	10,445,000	8,356,000	2,089,000	---	---
Bin B	2	179,000	143,000	36,000	---	---
Bin C	---	---	---	---	---	---
Other	6	610,000	488,000	122,000	---	---
Total	**104**	**11,234,000**	**8,987,000**	**2,247,000**	**0**	**0**

Number of Private Ownership Parcels	**16**
Number of Receivership Parcels	**29**

Table C-5

Alternative 5a: Removal of All Identified Surface ACM with Onsite Consolidation/Disposal, Future Incremental Removal of Identified Surface ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos, and Institutional/Engineered Controls with Monitoring								
	Contaminant Inventory and Remedial Material Summary							
		Volume Removed			Cover Material and Engineered Controls			
Parcel Status	Volume Removed (CY)	Surficial ACM Volume Removed (CY)	Incremental Removal Total (CY)	Volume of Cover (CF)	Common Backfill (CF)	Topsoil (CF)	Fence (LF)	Warning Signs (EA)
Bin A	132,285	124,890	7,395	5,037,000	4,021,000	1,016,000	---	---
Bin B	3,510	3,335	175	274,000	238,000	36,000	---	---
Bin C	---	---	---	---	'---	'---	---	---
Other	9,451	8,970	481	210,000	157,000	53,000	6,750	22
Total	**145,000**	**137,000**	**8,000**	**5,521,000**	**4,416,000**	**1,105,000**	**6,750**	**22**

Number of Private Ownership Parcels	**16**
Number of Receivership Parcels	**29**

Table C-6

Alternative 5b: Removal of All Identified ACM with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring									
	Contaminant Inventory and Remedial Material Summary								
		Volume Removed				Cover Material and Engineered Controls			
Parcel Status	Volume Removed (CY)	Surficial ACM Volume Removed (CY)	Buried ACM Volume Removed (CY)	Steam Pipe Removed (CY)	Volume of Cover (CF)	Common Fill (CF)	Topsoil (CF)	Fence (LF)	Warning Signs (EA)
Bin A	181,900	124,900	53,100	3,900	6,902,000	5,661,000	1,241,000	---	---
Bin B	3,800	3,300	500	0	561,000	470,000	91,000	---	---
Bin C	---	---	---	---	---	---	---	---	---
Other	11,100	9,000	1,200	900	254,000	193,000	61,000	6,750	22
Total	**197,000**	**137,200**	**54,800**	**4,800**	**7,717,000**	**6,324,000**	**1,393,000**	**6,750**	**22**

Number of Private Ownership Parcels	**16**
Number of Receivership Parcels	**29**

Table C-7

Alternative 5c: Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring										
	Contaminant Inventory and Remedial Material Summary									
		Volume Removed					Cover Material and Engineered Controls			
Parcel Status	Volume Removed (CY)	Surficial ACM Volume Removed (CY)	Buried ACM Volume Removed (CY)	Steam Pipe Removed (CY)	Bin A Removed (CY)	Volume of Cover (CF)	Common Fill (CF)	Topsoil (CF)	Fence (LF)	Warning Signs (EA)
Bin A	314,400	118,500	50,900	3,700	141,300	11,302,000	9,164,000	2,138,000	---	---
Bin B	3,800	3,300	500	0	0	643,000	551,000	92,000	---	---
Bin C	---	---	---	---	---	---	---	---	---	---
Other	11,100	9,000	1,200	900	0	254,000	193,000	61,000	7,500	25
Total	**330,000**	**130,800**	**52,600**	**4,600**	**141,300**	**12,199,000**	**9,908,000**	**2,291,000**	**7,500**	**25**

Number of Private Ownership Parcels	**16**
Number of Receivership Parcels	**29**

Table C-8

Alternative 6a: Removal of All Identified ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring							
	Contaminant Inventory and Remedial Material Summary						
		Volume Removed				Cover Material	
Parcel Status	Volume Removed (CY)	Surficial ACM Volume Removed (CY)	Buried ACM Volume Removed (CY)	Steam Pipe Removed (CY)	Volume of Cover (CF)	Common Fill (CF)	Topsoil (CF)
Bin A	229,200	157,000	66,800	5,400	5,376,000	4,194,000	1,182,000
Bin B	3,800	3,300	500	0	86,000	64,000	22,000
Bin C	---	---	'---	'---	'---	'---	'---
Other	11,100	9,000	1,200	900	254,000	193,000	61,000
Total	**245,000**	**169,300**	**68,500**	**6,300**	**5,716,000**	**4,451,000**	**1,265,000**
Total Weight (TN) (1.35 TN/CY)	**330,000**	**228,000**	**92,000**	**8,000**			

Number of Private Ownership Parcels	**16**
Number of Receivership Parcels	**29**

Table C-9

Alternative 6b: Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring								
	Contaminant Inventory and Remedial Material Summary							
		Volume Removed					Cover Material	
Parcel Status	Volume Removed (CY)	Surficial ACM Volume Removed (CY)	Buried ACM Volume Removed (CY)	Steam Pipe Removed (CY)	Bin A Removed (CY)	Volume of Cover (CF)	Common Fill (CF)	Topsoil (CF)
Bin A	384,900	157,000	66,800	5,400	155,700	5,376,000	4,194,000	1,182,000
Bin B	3,800	3,300	500	0	0	86,000	64,000	22,000
Bin C	---	---	'---	'---	'---	'---	'---	'---
Other	11,100	9,000	1,200	900	0	254,000	193,000	61,000
Total	**400,000**	**169,300**	**68,500**	**6,300**	**155,700**	**5,716,000**	**4,451,000**	**1,265,000**
Total Weight (TN) (1.35 TN/CY)	**534,500**	**228,000**	**92,000**	**8,000**	**210,000**			

Number of Private Ownership Parcels	**16**
Number of Receivership Parcels	**29**

Table C-10

Alternative 7a: Removal of All Identified ACM with Thermo-Chemical Treatment, Reuse of Treated Material, and Institutional Controls with Monitoring								
	Contaminant Inventory and Remedial Material Summary							
		Volume Removed				Cover Material		
Parcel Status	Volume Removed (CY)	Surficial ACM Volume Removed (CY)	Buried ACM Volume Removed (CY)	Steam Pipe Removed (CY)	Volume of Cover (CF)	Treated Fill (CF)	Common Fill (CF)	Topsoil (CF)
Bin A	229,200	157,000	66,800	5,400	5,188,000	2,594,000	2,002,000	592,000
Bin B	3,800	3,300	500	0	94,000	47,000	35,000	12,000
Bin C	---	---	'---	'---	---	---	---	---
Other	11,100	9,000	1,200	900	448,000	224,000	193,000	31,000
Total	**245,000**	**169,300**	**68,500**	**6,300**	**5,730,000**	**2,865,000**	**2,230,000**	**635,000**
Total Weight (TN) (1.35 TN/CY)	**330,000**	**228,000**	**92,000**	**8,000**				

Number of Private Ownership Parcels	**16**
Number of Receivership Parcels	**29**

Table C-11

Alternative 7b: Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Thermo-Chemical Treatment, Reuse of Treated Material, and Institutional Controls with Monitoring									
		Volume Removed					Cover Material		
Parcel Status	Volume Removed (CF)	Surface Volume Removed (CF)	Buried Volume Removed (CF)	Steam Pipe Removed (CF)	Bin A Removed (CF)	Volume of Cover (CF)	Treated Fill (CF)	Common Fill (CF)	Topsoil (CF)
Bin A	384,900	157,000	66,800	5,400	155,700	8,836,000	4,418,000	3,372,000	1,046,000
Bin B	3,800	3,300	500	0	0	94,000	47,000	35,000	12,000
Bin C	---	---	---	---	---	---	---	---	---
Other	11,100	9,000	1,200	900	0	448,000	224,000	193,000	31,000
Total	**400,000**	**169,300**	**68,500**	**6,300**	**155,700**	**9,378,000**	**4,689,000**	**3,600,000**	**1,089,000**
Total Weight (TN) (1.35 TN/CY)	**534,500**	**228,000**	**92,000**	**8,000**	**210,000**				

Number of Private Ownership Parcels	**16**
Number of Receivership Parcels	**29**

Detailed Analysis of Alternatives

Table C-12

Alternative 2: Institutional/Engineered Controls with Monitoring		
Fencing and Signage	Perimeter of Fence	Number of Signs[1&2]
	FT	No.
	21,700	**72**
	Signage over Steam Pipe (Bin C)	**3**
Total	**21,700**	**75**

Notes:

1. Warning signs placed at intervals of 300 ft or less along fenceline, per standard.
2. No warning signs are posted on private parcel.

Table C-13

Alternative 3: In-Place Containment of All Identified ACM on Private Parcels and Partial In-Place Containment of Identified ACM on Receivership Parcels with Institutional/Engineered Controls and Monitoring						
Parcel IDs			Total Area Covered			Total Volume of Cover
				Common Backfill[2]	Topsoil[3]	
Bin A	Bin B	Bin C	SF	CF	CF	CF
A			63,744	127,488	31,872	159,360
AG			55,270	110,539	27,635	138,174
AI			53,040	106,081	26,520	132,601
AK†			18,338	36,677	9,169	45,846
AL			58,339	116,678	29,169	145,847
	AM†		41,308	82,617	20,654	103,271
	AP		2,772	5,543	1,386	6,929
	AQ†		'---	---	---	0
	AR†		15,798	31,595	7,899	39,494
	AS†		173	346	87	433
		AT†	'---	---	---	0
		AU†	'---	---	---	0
		AV†	'---	---	---	0
		AW†	'---	---	---	0
		AX†	'---	---	---	0
		AY†	'---	---	---	0
		AZ†	'---	---	---	0
B			56,887	113,774	28,444	142,218
		BA†	'---	---	---	0
		BB†	'---	---	---	0
		BC†	'---	---	---	0
		BD†	'---	---	---	0
		BE†	'---	---	---	0
		BF†	'---	---	---	0
		BG†	'---	---	---	0
		BH†	'---	---	---	0
	BI†		'---	---	---	0
	BJ†		'---	---	---	0
	BK†		3,101	6,203	1,551	7,754
	BL		657	1,314	328	1,642
BM†			15,284	30,568	7,642	38,210
BO†			10,312	20,624	5,156	25,780
C			27,844	55,688	13,922	69,610
D			23,749	47,499	11,875	59,374
E			36,863	73,725	18,431	92,157
F†			143,377	286,754	71,688	358,442
G			32,328	64,656	16,164	80,820
H			145,916	291,833	72,958	364,791
L			76,740	153,479	38,370	191,849
M			24,433	48,866	12,216	61,082
MBK-A			40,906	81,812	20,453	102,264
MBK-B			31,549	63,099	15,775	78,873
MBK-C			34,978	69,956	17,489	87,446
MBK-D			50,726	101,453	25,363	126,816
MBK-E			65,054	130,108	32,527	162,635
MBK-F			9,164	18,327	4,582	22,909
MBK-G			25,297	50,594	12,649	63,243
N†			156,395	312,789	78,197	390,987
O			14,330	28,661	7,165	35,826
P†			40,560	81,119	20,280	101,399
Q			37,506	75,013	18,753	93,766
R			34,761	69,521	17,380	86,901
S			46,087	92,174	23,043	115,217
W			25,007	50,014	12,503	62,517
X			18,180	36,360	9,090	45,451
	Y		1,949	3,898	974	4,872
Z			19,021	38,041	9,510	47,551
Cover Material Extending Outside Parcel Areas						
Other			121,914	243,827	60,957	304,784
TOTALS:			**1,679,700**	**3,359,400**	**839,900**	**4,199,200**

Notes:

1. Rip-Rap placed is based on site topography - assumed that any slope greater than 3.5:1 requires rip-rap.
2. Common Backfill depth assumed to be (FT): **2**
3. Topsoil depth assumed to be (FT): **0.5**
4. Partial In-Place Containment **50%**

† - Indicates Private Ownership

Table C-14

Alternative 4a: In-Place Containment of All Identified ACM with Institutional Controls and Monitoring						
Parcel IDs			Total Area Covered			Total Volume of Cover
				Common Backfill[2]	Topsoil[3]	
Bin A	Bin B	Bin C	SF	CF	CF	CF
A			127,488	254,976	63,744	318,720
AG			110,539	221,079	55,270	276,349
AI			106,081	212,161	53,040	265,201
AK†			18,338	36,677	9,169	45,846
AL			116,678	233,355	58,339	291,694
	AM†		41,308	82,617	20,654	103,271
	AP		5,543	11,086	2,772	13,858
	AQ†		---	---	---	0
	AR†		15,798	31,595	7,899	39,494
	AS†		173	346	87	433
		AT†	---	---	---	0
		AU†	---	---	---	0
		AV†	---	---	---	0
		AW†	---	---	---	0
		AX†	---	---	---	0
		AY†	---	---	---	0
		AZ†	---	---	---	0
B			113,774	227,549	56,887	284,436
		BA†	---	---	---	0
		BB†	---	---	---	0
		BC†	---	---	---	0
		BD†	---	---	---	0
		BE†	---	---	---	0
		BF†	---	---	---	0
		BG†	---	---	---	0
		BH†	---	---	---	0
	BI†		---	---	---	0
	BJ†		---	---	---	0
	BK†		3,101	6,203	1,551	7,754
	BL		1,314	2,627	657	3,284
BM†			15,284	30,568	7,642	38,210
BO†			10,312	20,624	5,156	25,780
C			55,688	111,377	27,844	139,221
D			47,499	94,998	23,749	118,747
E			73,725	147,451	36,863	184,313
F†			143,377	286,754	71,688	358,442
G			64,656	129,312	32,328	161,640
H			291,833	583,666	145,916	729,582
L			153,479	306,959	76,740	383,699
M			48,866	97,731	24,433	122,164
MBK-A			81,812	163,623	40,906	204,529
MBK-B			63,099	126,197	31,549	157,746
MBK-C			69,956	139,913	34,978	174,891
MBK-D			101,453	202,906	50,726	253,632
MBK-E			130,108	260,216	65,054	325,271
MBK-F			18,327	36,654	9,164	45,818
MBK-G			50,594	101,189	25,297	126,486
N†			156,395	312,789	78,197	390,987
O			28,661	57,321	14,330	71,651
P†			40,560	81,119	20,280	101,399
Q			75,013	150,025	37,506	187,531
R			69,521	139,042	34,761	173,803
S			92,174	184,347	46,087	230,434
W			50,014	100,028	25,007	125,035
X			36,360	72,721	18,180	90,901
	Y		3,898	7,795	1,949	9,744
Z			38,041	76,082	19,021	95,103
Cover Material Extending Outside Parcel Areas						
Other			243,827	487,654	121,914	609,568
TOTALS:			**2,914,700**	**5,829,400**	**1,457,400**	**7,286,700**

Notes:
1. Rip-Rap placed is based on site topography - assumed that any slope greater than 3.5:1 requires rip-rap.
2. Common Backfill depth assumed to be (FT): **2**
3. Topsoil depth assumed to be (FT): **0.5**
† - Indicates Private Ownership

Table C-15

Alternative 4b: In-Place Containment of All Identified ACM and In-Place Containment of Soil within Bin A Parcels with Institutional Controls and Monitoring						
Parcel IDs			Total Area Covered			Total Volume of Cover
				Common Backfill[2]	Topsoil[3]	
Bin A	Bin B	Bin C	SF	CF	CF	CF
A			240,463	480,926	120,232	601,158
AG			206,343	412,686	103,172	515,858
AI			104,795	209,590	52,398	261,988
AK†			52,009	104,018	26,005	130,023
AL			116,576	233,152	58,288	291,440
	AM†		41,308	82,617	20,654	103,271
	AP		5,543	11,086	2,772	13,858
	AQ†		---	---	---	0
	AR†		15,798	31,595	7,899	39,494
	AS†		173	346	87	433
		AT†	---	---	---	0
		AU†	---	---	---	0
		AV†	---	---	---	0
		AW†	---	---	---	0
		AX†	---	---	---	0
		AY†	---	---	---	0
		AZ†	---	---	---	0
B			244,982	489,964	122,491	612,455
		BA†	---	---	---	0
		BB†	---	---	---	0
		BC†	---	---	---	0
		BD†	---	---	---	0
		BE†	---	---	---	0
		BF†	---	---	---	0
		BG†	---	---	---	0
		BH†	---	---	---	0
	BI†		---	---	---	0
	BJ†		---	---	---	0
	BK†		3,101	6,203	1,551	7,754
	BL		1,314	2,627	657	3,284
BM†			95,936	191,872	47,968	239,840
BO†			36,614	73,228	18,307	91,535
C			99,064	198,128	49,532	247,660
D			99,609	199,218	49,805	249,023
E			128,970	257,940	64,485	322,425
F†			145,698	291,396	72,849	364,245
G			171,137	342,274	85,569	427,843
H			544,704	1,089,408	272,352	1,361,760
L			170,978	341,956	85,489	427,445
M			103,755	207,510	51,878	259,388
MBK-A			81,960	163,920	40,980	204,900
MBK-B			82,837	165,674	41,419	207,093
MBK-C			79,370	158,740	39,685	198,425
MBK-D			126,680	253,360	63,340	316,700
MBK-E			132,122	264,244	66,061	330,305
MBK-F			88,004	176,008	44,002	220,010
MBK-G			95,236	190,472	47,618	238,090
N†			157,961	315,922	78,981	394,903
O			185,518	371,036	92,759	463,795
P†			77,894	155,788	38,947	194,735
Q			75,099	150,198	37,550	187,748
R			70,175	140,350	35,088	175,438
S			92,670	185,340	46,335	231,675
W			98,880	197,760	49,440	247,200
X			91,229	182,458	45,615	228,073
	Y		3,898	7,795	1,949	9,744
Z			80,589	161,178	40,295	201,473
Cover Material Extending Outside Parcel Areas						
Other			243,827	487,654	121,914	609,568
TOTALS:			**4,492,900**	**8,985,700**	**2,246,500**	**11,232,100**

Notes:
1. Rip-Rap placed is based on site topography - assumed that any slope greater than 3.5:1 requires rip-rap.
2. Common Backfill depth assumed to be (FT): **2**
3. Topsoil depth assumed to be (FT): **0.5**
† - Indicates Private Ownership

Table C-16

Alternative 5a: Removal of All Identified Surface ACM with Onsite Consolidation/Disposal, Future Incremental Removal of Identified Surface ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos, and Institutional/Engineered Controls with Monitoring

Parcel IDs			Surface Removal			Incremental Removal - 30-Year Projection			Backfill Volume	
			Area with Surface ACM	Depth of Removal	Volume of Removal	Parcel ID Exposure Area	Exposure Area - Percentage of Site	Incremental Removal - 30-Year Projection	Common Fill	Topsoil
Bin A	Bin B	Bin C	SF	LF	CF	SF	%	CF	CF	CF
A			99,158	2	198,316	108,778	5.6%	389	148,737	49,579
AG			74,936	2	149,872	96,485	4.9%	345	112,404	37,468
AI			Hill Side Consolidation			Hill Side Consolidation			180,421	16,403
AK†			17,892	2	35,784	17,892	0.9%	64	26,838	8,946
AL			Onsite Consolidation Area 2			Onsite Consolidation Area 2			366,763	62,988
	AM†		32,611	2	65,222	37,241	1.9%	133	48,917	16,306
	AP		3,574	2	7,148	3,574	0.2%	13	5,361	1,787
	AQ†		---	---	---	---	---	---	---	---
	AR†		---	---	---	---	---	---	---	---
	AS†		---	---	---	---	---	---	---	---
		AT†	---	---	---	---	---	---	---	---
		AU†	---	---	---	---	---	---	---	---
		AV†	---	---	---	---	---	---	---	---
		AW†	---	---	---	---	---	---	---	---
		AX†	---	---	---	---	---	---	---	---
		AY†	---	---	---	---	---	---	---	---
		AZ†	---	---	---	---	---	---	---	---
B			90,950	2	181,900	95,258	4.9%	340	136,425	45,475
		BA†	---	---	---	---	---	---	---	---
		BB†	---	---	---	---	---	---	---	---
		BC†	---	---	---	---	---	---	---	---
		BD†	---	---	---	---	---	---	---	---
		BE†	---	---	---	---	---	---	---	---
		BF†	---	---	---	---	---	---	---	---
		BG†	---	---	---	---	---	---	---	---
		BH†	---	---	---	---	---	---	---	---
	BI†		---	---	---	---	---	---	---	---
	BJ†		---	---	---	---	---	---	---	---
	BK†		---	---	---	---	---	---	---	---
	BL		Hill Side Consolidation			Hill Side Consolidation			180,421	16,403
BM†			63,744	2	127,488	63,744	3.3%	228	95,616	31,872
BO†			9,077	2	18,154	9,077	0.5%	32	13,616	4,539
C			39,921	2	79,842	55,549	2.8%	198	59,882	19,961
D			40,205	2	80,410	41,432	2.1%	148	60,308	20,103
E			45,846	2	91,692	63,564	3.2%	227	68,769	22,923
F†			116,426	2	232,852	127,608	6.5%	456	174,639	58,213
G			45,646	2	91,292	63,342	3.2%	226	68,469	22,823
H			201,873	2	403,746	257,641	13.1%	920	302,810	100,937
L			120,635	2	241,270	142,387	7.3%	509	180,953	60,318
M			26,022	2	52,044	36,714	1.9%	131	39,033	13,011
MBK-A			Onsite Consolidation Area 1			Onsite Consolidation Area 1			302,883	47,018
MBK-B									302,883	47,018
MBK-C									302,883	47,018
MBK-D			77,989	2	155,978	83,027	4.2%	297	116,984	38,995
MBK-E			Onsite Consolidation Area 2			Onsite Consolidation Area 2			366,763	62,988
MBK-F			10,752	2	21,504	13,447	0.7%	48	16,128	5,376
MBK-G			32,806	2	65,612	45,073	2.3%	161	49,209	16,403
N†			111,425	2	222,850	129,887	6.6%	464	167,138	55,713
O			18,413	2	36,826	19,363	1.0%	69	27,620	9,207
P†			27,294	2	54,588	38,695	2.0%	138	40,941	13,647
Q			22,305	2	44,610	45,067	2.3%	161	33,458	11,153
R			42,821	2	85,642	48,706	2.5%	174	64,232	21,411
S			65,453	2	130,906	88,123	4.5%	315	98,180	32,727
W			17,000	2	34,000	43,276	2.2%	155	25,500	8,500
X			21,884	2	43,768	22,406	1.1%	80	32,826	10,942
	Y		1,640	2	3,281	1,640	0.1%	6	2,461	820
Z			24,831	2	49,662	43,700	2.2%	156	37,247	12,416
Other			104,200	2	208,400	117,127	6.0%	418	156,300	52,100
TOTALS:			**1,607,400**	**2**	**3,214,700**	**1,959,900**	**100%**	**7,000**	**4,414,100**	**1,103,500**

Notes:
1. All calculations assumed the use of Option A
2. Active Landfill Operations for 30 years - Assumed 6 inches per year over consolidation area.

-Location of Onsite Consolidation Areas - No Surface ACM or Incremental Removal

Bin A Parcel Area (SF)	4,177,857
Total Bin A Area Covered (SF)	1,465,304
Total Bin A Area Not Covered (SF)	2,712,553

Table C-16 (continued)

Alternative 5a: ACM Volume Calculations for Incremental Removals				
Total Volume of ACM - 30-Year Linear Removal Rate[1]		Assumed Reduction (50%) in Volume of ACM (ft3)	Percent Volumes	
Removal Per Year	Linear Volume Reduction (ft3)		Percent Volume w.r.t Total Volume	Percent Volume w.r.t Yr. 1 Volume
1 Year	450	225	6.43%	
2 Year	435	217.5	6.21%	96.67%
3 Year	420	210	6.00%	93.33%
4 Year	405	202.5	5.79%	90.00%
5 Year	390	195	5.57%	86.67%
6 Year	375	187.5	5.36%	83.33%
7 Year	360	180	5.14%	80.00%
8 Year	345	172.5	4.93%	76.67%
9 Year	330	165	4.71%	73.33%
10 Year	315	157.5	4.50%	70.00%
11 Year	300	150	4.29%	66.67%
12 Year	285	142.5	4.07%	63.33%
13 Year	270	135	3.86%	60.00%
14 Year	255	127.5	3.64%	56.67%
15 Year	240	120	3.43%	53.33%
16 Year	225	112.5	3.21%	50.00%
17 Year	210	105	3.00%	46.67%
18 Year	195	97.5	2.79%	43.33%
19 Year	180	90	2.57%	40.00%
20 Year	165	82.5	2.36%	36.67%
21 Year	150	75	2.14%	33.33%
22 Year	135	67.5	1.93%	30.00%
23 Year	120	60	1.71%	26.67%
24 Year	105	52.5	1.50%	23.33%
25 Year	90	45	1.29%	20.00%
26 Year	75	37.5	1.07%	16.67%
27 Year	60	30	0.86%	13.33%
28 Year	45	22.5	0.64%	10.00%
29 Year	30	15	0.43%	6.67%
30 Year	15	7.5	0.21%	3.33%
Total	**7,000**	**3,500**	**100.00%**	

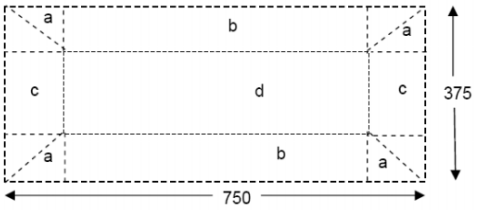
Notes;
1. A starting average of 450 ft3 total surfacial ACM was calculated from historic data from 2002 to 2005.

	Average Volume (CF)	Average Volume (CY)	Average Volume (LCY)
Years through 1 to 10	191.25	8.0	10.0
Years through 11 to 20	116.25	5.0	6.0
Years through 21 to 30	41.25	2.0	3.0

Onsite Consolidation Areas

Consolidation Area 1:

1. Capacity of Each Landfill:



Landfill Capacity - Active

Given:
1. Landfill to be placed in Parcel ID: MBK-A, MBK-B, and MBK-C
2. Footprint of the landfill will be defined by the Parcel boundaries.
Assume:
1. Maximum height of Waste Material: 12.5 ft
2. Maximum slope <20% Current: 8%

Total Capacity
Calculations:
a. Pyramid
V= $1/3b^2h$ b= 150 ft
V= 93,750 ft^3 h= 12.5 ft

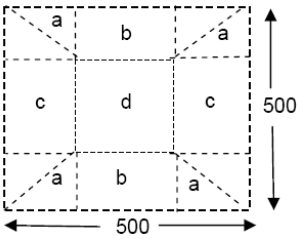
b. Large Wedge X2
V= 1/2bhl * 2 b= 150 ft
V= 843,750 ft^3 h= 12.5 ft
l= 450 ft

c. Small Wedge X2
V= 1/2bhl * 2 b= 150 ft
V= 140,625 ft^3 h= 12.5 ft
l= 75 ft

d. Rectangular Prism
V= bhl b= 75 ft
V= 421,875 ft^3 h= 12.5 ft
l= 450 ft

$V_{capacity1}$= 1,500,000 ft^3

Consolidation Area 2:



Landfill Capacity - Active

Given:
1. Landfill to be placed in Parcel ID: AL and MBK-E
2. Footprint of the landfill will be defined by the Parcel boundaries.
Assume:
1. Maximum height of Waste Material: 20.5 ft
2. Maximum slope <20% Current: 14%

Total Capacity
Calculations:
a. Pyramid
V= $1/3b^2h$ b= 150 ft
V= 153,750 ft^3 h= 20.5 ft

b. Large Wedge X2
V= 1/2bhl * 2 b= 150 ft
V= 615,000 ft^3 h= 20.5 ft
l= 200 ft

c. Small Wedge X2
V= 1/2bhl * 2 b= 150 ft
V= 615,000 ft^3 h= 20.5 ft
l= 200 ft

d. Rectangular Prism
V= bhl b= 200 ft
V= 820,000 ft^3 h= 20.5 ft
l= 200 ft

$V_{capacity2}$= 2,203,750 ft^3

$V_{Capacity1 + Capacity2}$= 3,703,750 ft^3

2. Filling the Landfills:

Volume of Waste - Site

V_{waste} = 3,214,700 ft^3 ***366,475,800 lbs*** ***183,238 tons***

Volume of Common Fill - (Combined Active Landfill)

The Landfill will be filled using the following assumptions:

1. Number of Years to Complete:	2	years
2. Work from April 1 until November 30:	8	months
3. 4 Days off per month in 30 days months:	26	per month
4. Number of working days:	208	days
5. Dump Trucks per day:	22	trucks/day
6. Tons per truck:	20	ton
6. Soil Bulk weight:	114	lbs/ft^3
7. Stock each day (lift) in ft:	2	ft
8. Common Fill cover per day:	*0.5*	*ft*

Tons per day:	440	tons
Lbs per day:	880,951	lbs
Ft3 per day:	7,728	ft^3
Area Needing Fill:	3,864	ft^2
6 inches of fill each day:	1,932	ft^3
Fill 1-Year:	401,838	ft^3
Fill Completion:	803,675	ft^3

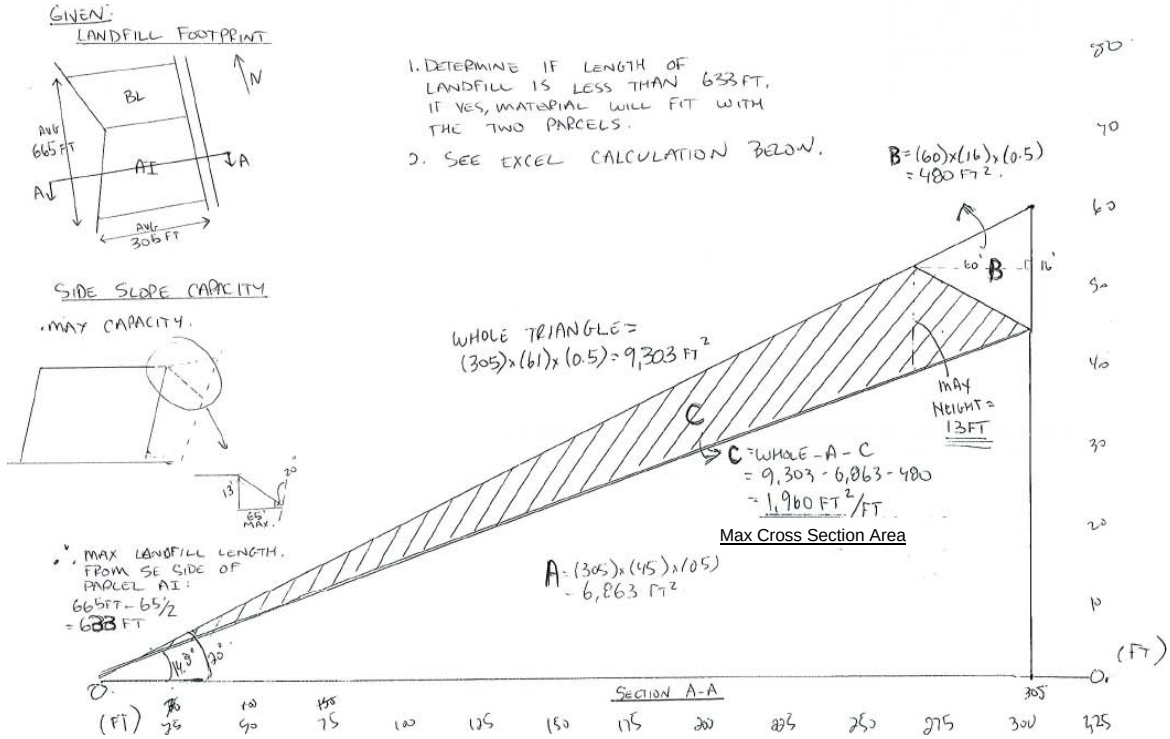
$V_{common\ fill}$= 803,675 ft^3 $V_{CapacityNeeded}$= 4,018,375 ft^3

3. Additional Capacity Using Hill Side Consolidation

V_{hill_needed}=	314,625	ft^3

Given:
1. Landfill to be placed in Parcel ID: BL and AI
2. Footprint of the landfill will be defined by the Parcel boundaries.

Assume:
1. Maximum height of Waste Material: 13 FT
2. Maximum slope 20%



Calculation:
Length of Landfill = V_{hill_needed}/Max Cross Sectional Area ***Max Cross Area=*** 1960 ft2

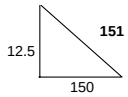
Length = ***161 ft*** ***OK (<633 ft)***

4. Covering the Landfills:

Volume of Fill - (Inactive Landfill)

Consolidation Area 1:
Inactive landfill cover - 2.0 feet common fill, 6 inches composite (for vegetation)

Surface Area (a) Sides: 8
b= **151**
h= 150
SA= 0.5(b*h)
90,312 ft^2



Surface Area (b) Sides: 2
l= 450
h= **151**
SA= h*l
135,468 ft^2

Surface Area (c) Sides: 2
l= 75
h= **151**
SA= h*l
22,578 ft^2

Surface Area (d) Sides: 1
l= 75
h= 450
SA= h*l
33,750 ft^2

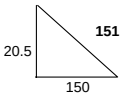
V_{Common}=	***564,216***	***ft^3***	*Common Fill Final Cover :*	*2 ft*
$V_{Topsoil}$=	***141,054***	***ft^3***	*Topsoil Fill Final Cover =*	*0.5 ft*

Note:
The final cover will increase the final elevation of the landfill 15 ft

Volume of Fill - (Inactive Landfill)

Consolidation Area 2:
Inactive landfill cover - 2.0 feet common fill, 6 inches composite (for vegetation)

Surface Area (a) Sides: 8
b= **151**
h= 150
SA= 0.5(b*h)
90,837 ft^2



Surface Area (b) Sides: 2
l= 200
h= **151**
SA= h*l
60,558 ft^2

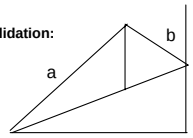
Surface Area (c) Sides: 2
l= 200
h= **151**
SA= h*l
60,558 ft^2

Surface Area (d) Sides: 1
l= 200
h= 200
SA= h*l
40,000 ft^2

V_{Common}=	***503,904***	***ft^3***	*Common Fill Final Cove*	*2 ft*
$V_{Topsoil}$=	***125,976***	***ft^3***	*Topsoil Fill Final Cover :*	*0.5 ft*

Note:
The final cover will increase the final elevation of the landfill to 23 ft

3. Hill Side Consolidation:



Surface Area (a) Sides: 1 l = length of hypotenuse
l= **311**
w= 161
SA= l*w
49,929 ft^2

Surface Area (b) Sides: 1
l= **61**
w= 161
SA= l*w
9,717 ft^2

+ 10% of Total Extra for Side Cover

V_{Common} =	***131,221 ft^3***	*Common Fill Final Cover =*	*2 ft*
$V_{Topsoil}$ =	***32,805 ft^3***	*Topsoil Fill Final Cover =*	*0.5 ft*

Note:
The final cover will increase the final elevation of the landfill 15.5 ft

Total Surface Area: 593,706 ft2

5. Summary of Materials and Landfill Final Height

Summary of Materials	
Material Summary	Volume
Total Excavated Soil:	3,214,700 ft^3
Total Common Fill (Active Landfills):	803,675 ft^3
Total Common Fill (Inactive Landfills):	1,199,341 ft^3
Total Common Fill:	2,003,016 ft^3
Total Topsoil/Mulch (Inactive Landfills):	299,835 ft^3

Landfill Final Height	
Consolidation Area	Height
Consolidation Area 1	15 ft
Consolidation Area 2	23 ft
Hill Side Consolidation	15.5 ft

Alternative 5b: Removal of All Identified ACM with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Parcel IDs			Surficial ID	Burial ID	Total Area Excavated[4]			Excavation Depth			Volume Removed[4]			Total Volume Removed[4]	Backfill Volume[7]	
					Surficial ACM Area[3]	Buried ACM Area	Pipe Insulation ACM[5,6]	Surficial ACM Area	Buried ACM Area	Pipe Insulation ACM[5]	Surficial ACM Volume	Buried ACM Volume	Pipe Insulation ACM[5]		Common Fill	Topsoil
Bin A	Bin B	Bin C			SF	SF	SF	FT	FT	FT	CF	CF	CF	CF	CF	CF
A*			SA-15	---	98,740	---	---	2.0	---	---	197,480	--	---	197,480	148,110	49,370
			SA-42	---	418	---	---	2.0	---	---	836	--	---	836	627	209
			SA-43	---	0	---	---	2.0	---	---	0	--	---	0	0	0
			---	BA-46**	---	9,620	---	---	4.8	---	---	46,839	---	46,839	41,909	4,930
			---	---	---	---	824	---	---	4.0	---	---	4,385	4,385	3,837	548
AG*			SA-1a	---	52,644	---	---	2.0	---	---	105,288	--	---	105,288	78,966	26,322
			SA-1b	---	88	---	---	2.0	---	---	177	--	---	177	133	44
			SA-1c	---	224	---	---	2.0	---	---	449	--	---	449	337	112
			SA-1d	---	4,652	---	---	2.0	---	---	9,304	--	---	9,304	6,978	2,326
			SA-4	---	17,328	---	---	2.0	---	---	34,656	--	---	34,656	25,992	8,664
			---	BA-1[1]	---	3,030	---	---	2.4	---	---	7,274	---	7,274	5,759	1,515
			---	BA-2	---	18,518	---	---	2.4	---	---	44,444	---	44,444	35,185	9,259
			---	---	---	---	316	---	---	4.0	---	---	1,681	1,681	1,471	210
AI*			SA-5	---	Hill Side Consolidation			Hill Side Consolidation			Hill Side Consolidation			0	412,460	62,020
			---	BA-6												
AK†			SA-40	---	17,892	---	---	2.0	---	---	35,784	--	---	35,784	26,838	8,946
AL*			SA-5	---	Onsite Consolidation Area 2			Onsite Consolidation Area 2			Onsite Consolidation Area 2			0	418,139	63,439
			---	BA-5**												
	AM†		SA-41	---	32,611	---	---	2.0	---	---	65,222	--	---	65,222	48,917	16,306
			---	BA-48	---	4,630	---	---	2.0	---	---	9,260	---	9,260	0	9,260
	AP*		SA-1a	---	2,157	---	---	2.0	---	---	4,315	--	---	4,315	3,236	1,079
			SA-1b	---	1,395	---	---	2.0	---	---	2,790	--	---	2,790	2,093	698
			SA-45	---	22	---	---	2.0	---	---	44	--	---	44	33	11
	AQ†		---	---	---	---	---	---	---	---	---	--	---	0	---	---
	AR†		---	---	---	---	---	---	---	---	---	--	---	0	---	---
	AS†		---	---	---	---	---	---	---	---	---	--	---	0	---	---
		AT†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
			---	---	---***	---	---	---	---	---	---	--	---	0	---	---
		AU†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
			---	---	---***	---	---	---	---	---	---	--	---	0	---	---
		AV†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
			---	---	---***	---	---	---	---	---	---	--	---	0	---	---
		AW†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
		AX†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
		AY†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
		AZ†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
B*			SA-12a	---	19,410	---	---	2.0	---	---	38,820	--	---	38,820	29,115	9,705
			SA-15	---	31,402	---	---	2.0	---	---	62,804	--	---	62,804	47,103	15,701
			SA-17	---	873	---	---	2.0	---	---	1,746	--	---	1,746	1,310	437
			SA-18	---	3,659	---	---	2.0	---	---	7,318	--	---	7,318	5,489	1,830
			SA-19	---	35,606	---	---	2.0	---	---	71,213	--	---	71,213	53,410	17,803
			---	BA-23	---	2,430	---	---	2.0	---	---	4,860	---	4,860	3,645	1,215
			---	BA-24	---	1,879	---	---	2.0	---	---	3,758	---	3,758	2,819	940
			---	---	---	---	0.4	---	---	4.0	---	---	3	3	2	0
		BA†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
		BB†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
			---	---	---***	---	---	---	---	---	---	--	---	0	---	---
		BC†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
		BD†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
		BE†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
		BF†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
		BG†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
		BH†	---	---	---	---	---	---	---	---	---	--	---	0	---	---
	BI†		---	---	---	---	---	---	---	---	---	--	---	0	---	---
	BJ†		---	---	---	---	---	---	---	---	---	--	---	0	---	---
	BK†		---	---	---	---	---	---	---	---	---	--	---	0	---	---
	BL*		---	---	Hill Side Consolidation			Hill Side Consolidation			Hill Side Consolidation			0	412,460	62,020
BM†			SA-37	---	13,743	---	---	2.0	---	---	27,486	--	---	27,486	20,615	6,872
			SA-38	---	50,001	---	---	2.0	---	---	100,002	--	---	100,002	75,002	25,001
BO†			SA-39	---	9,077	---	---	2.0	---	---	18,154	--	---	18,154	13,616	4,539
C*			SA-9a	---	34,774	---	---	2.0	---	---	69,548	--	---	69,548	52,161	17,387
			SA-9b	---	5,147	---	---	2.0	---	---	10,295	--	---	10,295	7,721	2,574
			---	BA-10a**	---	7,771	---	---	8.7	---	---	69,028	---	69,028	65,045	3,983
			---	BA-10b	---	4,108	---	---	2.0	---	---	8,217	---	8,217	6,163	2,054
			---	BA-10c	---	3,748	---	---	2.0	---	---	7,497	---	7,497	5,623	1,874
			---	---	---	---	273	---	---	4.0	---	---	1,455	1,455	1,273	182
D*			SA-9a	---	38,913	---	---	2.0	---	---	77,827	--	---	77,827	58,370	19,457
			SA-9b	---	1,292	---	---	2.0	---	---	2,584	--	---	2,584	1,938	646
			---	BA-9	---	1,227	---	---	2.0	---	---	2,454	---	2,454	1,841	614
			---	---	---	---	665	---	---	4.0	---	---	3,539	3,539	3,097	442
E*			SA-9a	---	41,195	---	---	2.0	---	---	82,390	--	---	82,390	61,793	20,598
			SA-10	---	4,621	---	---	2.0	---	---	9,242	--	---	9,242	6,932	2,311
			SA-44	---	30	---	---	2.0	---	---	60	--	---	60	45	15
			---	BA-11	---	1,929	---	---	2.0	---	---	3,859	---	3,859	2,894	965
			---	BA-12	---	13,843	---	---	2.0	---	---	27,686	---	27,686	20,765	6,922
			---	BA-13	---	1,947	---	---	2.0	---	---	3,894	---	3,894	2,921	974
			---	---	---	---	206	---	---	4.0	---	---	1,093	1,093	957	137
F†			SA-11	---	53,811	---	---	2.0	---	---	107,623	--	---	107,623	80,717	26,906
			SA-12a	---	37,483	---	---	2.0	---	---	74,966	--	---	74,966	56,225	18,742
			SA-12b	---	25,132	---	---	2.0	---	---	50,264	--	---	50,264	37,698	12,566
			---	BA-14	---	1,670	---	---	2.0	---	---	3,341	---	3,341	2,506	835
			---	BA-15a**	---	448	---	---	8.0	---	---	3,674	---	3,674	3,444	230
			---	BA-15**	---	3,722	---	---	8.0	---	---	30,519	---	30,519	28,612	1,907
			---	BA-16	---	2,846	---	---	2.5	---	---	7,117	---	7,117	5,694	1,423
			---	BA-17	---	831	---	---	2.0	---	---	1,663	---	1,663	1,247	416
			---	BA-18	---	1,664	---	---	2.0	---	---	3,328	---	3,328	2,496	832
			---	---	---	---	57	---	---	4.0	---	---	306	306	268	38
G*			SA-11	---	2,641	---	---	2.0	---	---	5,282	--	---	5,282	3,962	1,321
			SA-12a	---	43,005	---	---	2.0	---	---	86,010	--	---	86,010	64,508	21,503
			---	BA-19	---	1,600	---	---	2.0	---	---	3,201	---	3,201	2,401	800
			---	BA-20a**	---	13,653	---	---	9.0	---	---	125,952	---	125,952	118,955	6,997
			---	BA-20b**	---	2,442	---	---	9.0	---	---	22,531	---	22,531	21,279	1,252
			---	---	---	---	161	---	---	4.0	---	---	858	858	751	107
H*			SA-12a	---	20,533	---	---	2.0	---	---	41,067	--	---	41,067	30,800	10,267
			SA-13	---	12,650	---	---	2.0	---	---	25,300	--	---	25,300	18,975	6,325
			SA-14	---	58,649	---	---	2.0	---	---	117,299	--	---	117,299	87,974	29,325
			SA-15	---	52,756	---	---	2.0	---	---	105,513	--	---	105,513	79,135	26,378
			SA-16	---	57,284	---	---	2.0	---	---	114,569	--	---	114,569	85,927	28,642
			---	BA-20b**	---	3,731	---	---	9.0	---	---	34,417	---	34,417	32,505	1,912
			---	BA-21**	---	36,786	---	---	6.5	---	---	246,031	---	246,031	227,178	18,853
			---	BA-22	---	15,251	---	---	2.0	---	---	30,503	---	30,503	22,877	7,626
L*			SA-21a	---	105,859	---	---	2.0	---	---	211,719	--	---	211,719	158,789	52,930
			SA-34	---	14,776	---	---	2.0	---	---	29,552	--	---	29,552	22,164	7,388
			---	BA-40	---	1,685	---	---	2.0	---	---	3,370	---	3,370	2,528	843
			---	BA-41	---	2,686	---	---	2.0	---	---	5,373	---	5,373	4,030	1,343
			---	BA-42	---	2,244	---	---	2.0	---	---	4,489	---	4,489	3,367	1,122
			---	BA-43a	---	12,475	---	---	3.5	---	---	43,662	---	43,662	37,425	6,237
			---	BA-43b	---	2,662	---	---	3.5	---	---	9,316	---	9,316	7,985	1,331
			---	---	---	---	2,080	---	---	4.0	---	---	11,067	11,067	9,684	1,383
M*			SA-25a	---	914	---	---	2.0	---	---	1,828	--	---	1,828	1,371	457
			SA-30	---	474	---	---	2.0	---	---	948	--	---	948	711	237
			SA-32	---	24,634	---	---	2.0	---	---	49,269	--	---	49,269	36,952	12,317
			---	BA-36	---	9,044	---	---	2.0	---	---	18,088	---	18,088	13,566	4,522
			---	---	---***	---	1,648	---	---	6.0	---	---	13,151	13,151	12,055	1,096
			---	---	---	---	441	---	---	4.0	---	---	2,346	2,346	2,053	293
MBK-A*			SA-21a	---	Onsite Consolidation Area 1			Onsite Consolidation Area 1			Onsite Consolidation Area 1			0	352,454	47,018
			SA-21b	---												
			---	BA-30												
MBK-B*			SA-21a	---	Onsite Consolidation Area 1			Onsite Consolidation Area 1			Onsite Consolidation Area 1			0	352,454	47,018
			SA-21c	---												
			---	BA-30												
MBK-C*			SA-21a	---	Onsite Consolidation Area 1			Onsite Consolidation Area 1			Onsite Consolidation Area 1			0	352,454	47,018
			SA-21d	---												
			SA-23	---												
			---	BA-30												

Alternative 5b: Removal of All Identified ACM with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Parcel IDs			Surficial ID	Burial ID	Total Area Excavated[4]			Excavation Depth			Volume Removed[4]			Total Volume Removed[4]	Backfill Volume[7]	
					Surficial ACM Area[3]	Buried ACM Area	Pipe Insulation ACM[5,6]	Surficial ACM Area	Buried ACM Area	Pipe Insulation ACM[5]	Surficial ACM Volume	Buried ACM Volume	Pipe Insulation ACM[5]		Common Fill	Topsoil
Bin A	Bin B	Bin C			SF	SF	SF	FT	FT	FT	CF	CF	CF	CF	CF	CF
MBK-D*			SA-21a	---	62,322	---	---	2.0	---	---	124,644	--	---	124,644	93,483	31,161
			SA-35	---	15,667	---	---	2.0	---	---	31,334	--	---	31,334	23,501	7,834
			---	BA-26	---	581	---	---	2.0	---	---	1,162	---	1,162	872	291
			---	BA-44**	---	814	---	---	9.0	---	---	7,510	---	7,510	7,093	417
			---	BA-45	---	3,644	---	---	2.0	---	---	7,288	---	7,288	5,466	1,822
			---	---	---	---	2,533	---	---	4.0	---	---	13,476	13,476	11,791	1,684
MBK-E*			SA-5	---	Onsite Consolidation Area 2			Onsite Consolidation Area 2			Onsite Consolidation Area 2			0	418,139	63,439
			---	BA-3												
			---	BA-4												
MBK-F*			SA-8	---	10,752	---	---	2.0	---	---	21,504	--	---	21,504	16,128	5,376
			---	BA-7	---	2,012	---	---	3.5	---	---	7,042	---	7,042	6,036	1,006
			---	BA-8	---	683	---	---	2.0	---	---	1,367	---	1,367	1,025	342
			---	---	---	---	336	---	---	4.0	---	---	1,790	1,790	1,566	224
MBK-G*			SA-15	---	11,949	---	---	2.0	---	---	23,898	--	---	23,898	17,924	5,975
			SA-36a	---	5,555	---	---	2.0	---	---	11,110	--	---	11,110	8,333	2,778
			SA-36b	---	1,635	---	---	2.0	---	---	3,270	--	---	3,270	2,453	818
			SA-36c	---	13,667	---	---	2.0	---	---	27,334	--	---	27,334	20,501	6,834
			---	BA-47a**	---	1,010	---	---	10.0	---	---	10,357	---	10,357	9,839	518
			---	BA-47**	---	11,257	---	---	6.0	---	---	69,232	---	69,232	63,462	5,769
N†			SA-31	---	60,906	---	---	2.0	---	---	121,812	--	---	121,812	91,359	30,453
			SA-32	---	50,519	---	---	2.0	---	---	101,038	--	---	101,038	75,779	25,260
			---	BA-37	---	1,077	---	---	2.0	---	---	2,155	---	2,155	1,616	539
			---	BA-38	---	2,116	---	---	2.0	---	---	4,232	---	4,232	3,174	1,058
			---	BA-39	---	15,269	---	---	2.0	---	---	30,539	---	30,539	22,904	7,635
			---	---	---	---	1,050	---	---	4.0	---	---	5,586	5,586	4,888	698
O*			SA-32	---	959	---	---	2.0	---	---	1,918	--	---	1,918	1,439	480
			SA-33a	---	13,703	---	---	2.0	---	---	27,406	--	---	27,406	20,555	6,852
			SA-33b	---	3,751	---	---	2.0	---	---	7,502	--	---	7,502	5,627	1,876
			---	---	---***	---	950	---	---	6.0	---	---	7,581	7,581	6,949	632
P†			SA-21a	---	27,294	---	---	2.0	---	---	54,588	--	---	54,588	40,941	13,647
			---	BA-28	---	7,096	---	---	2.0	---	---	14,193	---	14,193	10,645	3,548
			---	BA-29	---	4,305	---	---	2.0	---	---	8,611	---	8,611	6,458	2,153
			---	---	---	---	613	---	---	4.0	---	---	3,262	3,262	2,855	408
Q*			SA-22	---	3,476	---	---	2.0	---	---	6,953	--	---	6,953	5,215	1,738
			SA-23	---	11,184	---	---	2.0	---	---	22,368	--	---	22,368	16,776	5,592
			SA-31	---	7,645	---	---	2.0	---	---	15,291	--	---	15,291	11,468	3,823
			---	BA-30	---	6,646	---	---	2.0	---	---	13,292	---	13,292	9,969	3,323
			---	BA-31	---	14,004	---	---	2.0	---	---	28,008	---	28,008	21,006	7,002
			---	BA-32	---	645	---	---	2.0	---	---	1,290	---	1,290	968	323
			---	BA-33	---	1,467	---	---	2.0	---	---	2,935	---	2,935	2,201	734
			---	---	---	---	133	---	---	4.0	---	---	706	706	618	88
R*			SA-23	---	6,724	---	---	2.0	---	---	13,449	--	---	13,449	10,087	3,362
			SA-24	---	34,733	---	---	2.0	---	---	69,466	--	---	69,466	52,100	17,367
			SA-25a	---	399	---	---	2.0	---	---	798	--	---	798	599	200
			SA-31	---	965	---	---	2.0	---	---	1,930	--	---	1,930	1,448	483
			---	BA-31	---	4,779	---	---	2.0	---	---	9,558	---	9,558	7,169	2,390
			---	BA-34	---	1,106	---	---	2.0	---	---	2,213	---	2,213	1,660	553
			---	---	---	---	180	---	---	4.0	---	---	958	958	838	120
S*			SA-20a	---	35,378	---	---	2.0	---	---	70,757	--	---	70,757	53,068	17,689
			SA-20b	---	1,642	---	---	2.0	---	---	3,284	--	---	3,284	2,463	821
			SA-21a	---	28,433	---	---	2.0	---	---	56,867	--	---	56,867	42,650	14,217
			---	BA-25	---	2,195	---	---	2.0	---	---	4,390	---	4,390	3,293	1,098
			---	BA-26	---	11,805	---	---	2.0	---	---	23,611	---	23,611	17,708	5,903
			---	BA-27	---	8,670	---	---	2.2	---	---	18,785	---	18,785	14,450	4,335
			---	---	---	---	226	---	---	4.0	---	---	1,201	1,201	1,051	150
W*			SA-25a	---	4,086	---	---	2.0	---	---	8,172	--	---	8,172	6,129	2,043
			SA-25b	---	2,426	---	---	2.0	---	---	4,853	--	---	4,853	3,640	1,213
			SA-29	---	8,829	---	---	2.0	---	---	17,658	--	---	17,658	13,244	4,415
			SA-30	---	824	---	---	2.0	---	---	1,648	--	---	1,648	1,236	412
			SA-32	---	835	---	---	2.0	---	---	1,670	--	---	1,670	1,253	418
			---	BA-35a**	---	9,843	---	---	4.4	---	---	44,514	---	44,514	39,469	5,045
			---	BA-35b	---	16,433	---	---	2.0	---	---	32,866	---	32,866	24,650	8,217
			---	---	---	---	1,297	---	---	4.0	---	---	6,903	6,903	6,040	863
X*			SA-27	---	668	---	---	2.0	---	---	1,336	--	---	1,336	1,002	334
			SA-28a	---	18,663	---	---	2.0	---	---	37,326	--	---	37,326	27,995	9,332
			SA-28b	---	2,553	---	---	2.0	---	---	5,106	--	---	5,106	3,830	1,277
			---	---	---***	---	522	---	---	6.0	---	---	4,163	4,163	3,816	347
	Y*		SA-1b	---	47	---	---	2.0	---	---	95	--	---	95	71	24
			SA-1c	---	977	---	---	2.0	---	---	1,955	--	---	1,955	1,466	489
			SA-3	---	616	---	---	2.0	---	---	1,232	--	---	1,232	924	308
Z*			SA-24	---	8,971	---	---	2.0	---	---	17,942	--	---	17,942	13,457	4,486
			SA-25a	---	15,259	---	---	2.0	---	---	30,519	--	---	30,519	22,889	7,630
			SA-26	---	601	---	---	2.0	---	---	1,203	--	---	1,203	902	301
			---	BA-35a**	---	14,206	---	---	4.4	---	---	64,245	---	64,245	56,964	7,281
			---	BA-35b	---	4,663	---	---	2.0	---	---	9,326	---	9,326	6,995	2,332
			---	---	---	---	658	---	---	4.0	---	---	3,502	3,502	3,064	438
Surficial & Burial ACM Extending Outside Parcel Areas																
			SA-1a	---	16	---	---	2.0	---	---	32	--	---	32	24	8
			SA-2	---	193	---	---	2.0	---	---	386	--	---	386	290	97
			SA-5	---	3,939	---	---	2.0	---	---	7,879	--	---	7,879	5,909	1,970
			SA-6	---	111	---	---	2.0	---	---	223	--	---	223	167	56
			SA-7	---	2,179	---	---	2.0	---	---	4,358	--	---	4,358	3,269	1,090
			SA-8	---	2,371	---	---	2.0	---	---	4,742	--	---	4,742	3,557	1,186
			SA-9a	---	9,263	---	---	2.0	---	---	18,527	--	---	18,527	13,895	4,632
			SA-10	---	146	---	---	2.0	---	---	293	--	---	293	220	73
			SA-11	---	2,267	---	---	2.0	---	---	4,535	--	---	4,535	3,401	1,134
			SA-12a	---	12,431	---	---	2.0	---	---	24,863	--	---	24,863	18,647	6,216
			SA-12b	---	37	---	---	2.0	---	---	75	--	---	75	56	19
			SA-15	---	9,393	---	---	2.0	---	---	18,787	--	---	18,787	14,090	4,697
			SA-16	---	52	---	---	2.0	---	---	104	--	---	104	78	26
			SA-20a	---	8,883	---	---	2.0	---	---	17,766	--	---	17,766	13,325	4,442
			SA-21a	---	8,899	---	---	2.0	---	---	17,799	--	---	17,799	13,349	4,450
			SA-23	---	2,634	---	---	2.0	---	---	5,268	--	---	5,268	3,951	1,317
			SA-24	---	1,000	---	---	2.0	---	---	2,000	--	---	2,000	1,500	500
			SA-25a	---	14	---	---	2.0	---	---	28	--	---	28	21	7
			SA-28a	---	262	---	---	2.0	---	---	525	--	---	525	394	131
			SA-28b	---	378	---	---	2.0	---	---	756	--	---	756	567	189
			SA-30	---	15	---	---	2.0	---	---	31	--	---	31	23	8
			SA-32	---	106	---	---	2.0	---	---	213	--	---	213	160	53
			SA-34	---	1,022	---	---	2.0	---	---	2,045	--	---	2,045	1,534	511
			SA-35	---	4,256	---	---	2.0	---	---	8,513	--	---	8,513	6,385	2,128
			SA-36a	---	20,036	---	---	2.0	---	---	40,072	--	---	40,072	30,054	10,018
			SA-36c	---	7,647	---	---	2.0	---	---	15,295	--	---	15,295	11,471	3,824
			SA-39	---	967	---	---	2.0	---	---	1,934	--	---	1,934	1,451	484
			SA-40	---	3,797	---	---	2.0	---	---	7,594	--	---	7,594	5,696	1,899
			SA-41	---	1,884	---	---	2.0	---	---	3,769	--	---	3,769	2,827	942
			---	BA-6	---	2,433	---	---	2.0	---	---	4,866	---	4,866	3,650	1,217
			---	BA-25	---	3,127	---	---	2.0	---	---	6,254	---	6,254	4,691	1,564
			---	BA-26	---	7,032	---	---	2.0	---	---	14,065	---	14,065	10,549	3,516
			---	---	---	---	3,146	---	---	4.0	---	---	16,738	16,738	14,646	2,092
				---	---***	---	336	---	---	6.0	---	---	2,681	2,681	2,458	223
Total					**1,607,400**	**349,100**	**18,700**				**3,214,700**	**1,279,600**	**108,500**	**4,602,700**	**6,322,300**	**1,391,000**

Notes:
1. Depth of buried ACM debris at BA-1 assumed to be same as at BA-2. Both BA-1 and BA-2 are under parcel AG.
2. See Section 4.1.8.2 of RI for ACM volumes at BA-21 (under parcel H).
3. Surface ACM Area is accounted with the Buried ACM Area when there is an overlap in excavation.
4. All volumes and areas are rounded up to the nearest whole number
5. Steam pipe was observed at depths ranging from 2 to 6 feet bgs and assume 3 feet wide excavation
6. Excavation of steam pipe within Surficial ACM and Buried ACM areas considered negligible.
7. Topsoil depth is 6 inches; Common Backfill depth varies with excavation depth.
* Indicates properties no longer occupied
** Burial area depth is greater than 4 feet - assume a 2.5% increase in soil excavation for sloping.
*** All pipe excavation - assume a 33% increase in soil excavation for sloping.
† Indicates that property is privately owned.
-Location of Onsite Consolidation Area - No Removal Activity

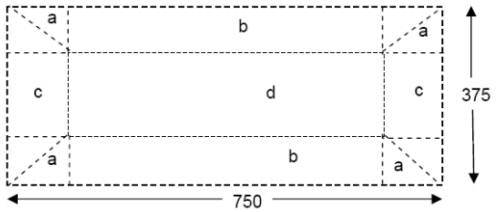
Bin A Parcel Area (SF)	4,177,857
Total Bin A Area Covered (SF)	1,812,291
Total Bin A Area Not Covered (SF)	2,365,566

Table C-19

Onsite Consolidation Areas

Consolidation Area 1:

1. Capacity of Each Landfill:



Landfill Capacity - Active

Given:

1. Landfill to be placed in Parcel ID: MBK-A, MBK-B, and MBK-C

2. Footprint of the landfill will be defined by the Parcel boundaries.

Assume:

1. Maximum height of Waste Material: 12.5 ft
2. Maximum slope <20% Current: 8%

Total Capacity

Calculations:

a. Pyramid

V= $1/3b^2h$ b= 150 ft
V= 93,750 ft3 h= 12.5 ft

b. Large Wedge X2

V= 1/2bhl * 2 b= 150 ft
V= 843,750 ft3 h= 12.5 ft
l= 450 ft

c. Small Wedge X2

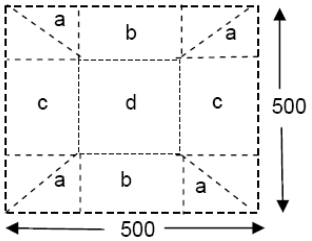
V= 1/2bhl * 2 b= 150 ft
V= 140,625 ft3 h= 12.5 ft
l= 75 ft

d. Rectangular Prism

V= bhl b= 75 ft
V= 421,875 ft3 h= 12.5 ft
l= 450 ft

$V_{CapacityCon1}$= 1,500,000 ft3

Consolidation Area 2:



Landfill Capacity - Active

Given:

1. Landfill to be placed in Parcel ID: AL and MBK-E

2. Footprint of the landfill will be defined by the Parcel boundaries.

Assume:

1. Maximum height of Waste Material: 28.5 ft
2. Maximum slope <20% Current: 19%

Total Capacity

Calculations:

a. Pyramid

V= $1/3b^2h$ b= 150 ft
V= 213,750 ft3 h= 28.5 ft

b. Large Wedge X2

V= 1/2bhl * 2 b= 150 ft
V= 855,000 ft3 h= 28.5 ft
l= 200 ft

c. Small Wedge X2

V= 1/2bhl * 2 b= 150 ft
V= 855,000 ft3 h= 28.5 ft
l= 200 ft

d. Rectangular Prism

V= bhl b= 200 ft
V= 1,140,000 ft3 h= 28.5 ft
l= 200 ft

$V_{CapacityCon2}$= 3,063,750 ft3

$V_{Con1 + Con2}$= 4,563,750 ft3

2. Filling the Landfills:

Volume of Waste - Site

V_{waste}= 4,602,700 ft3 ***524,707,800 lbs*** ***262,354 tons***

Volume of Common Fill - (Combined Active Landfill)

The Landfill will be filled using the following assumptions:

1. Number of Years to Complete: 3 years
2. Work from April 1 until November 30: 8 months
3. 4 Days off per month in 30 days months: 26 per month
4. Number of working days: 208 days
5. Dump Trucks per day: 21 trucks/day
6. Tons per truck: 20 ton
6. Soil Bulk weight: 114 lbs/ft3
7. Stock each day (lift) in ft: 2 ft
8. Common Fill cover per day: 0.5 ft

Tons waste per day: 420 tons
Lbs waste per day: 840,878 lbs
Ft^3 waste per day: 7,376 ft3
Area Waste Needing Fill: 3,688 ft2
6 inches of fill each day: 1,844 ft3
Fill 1-Year: 383,558 ft3
Fill Completion: 1,150,675 ft3

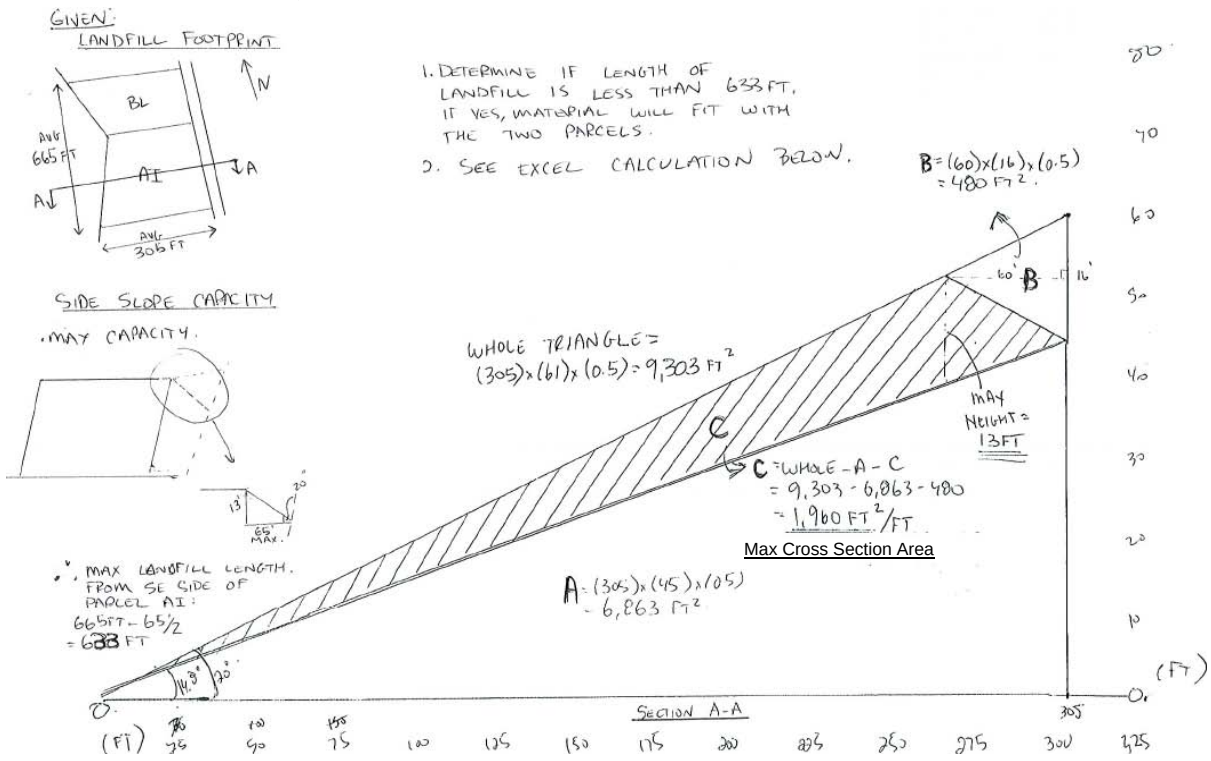
$V_{common\ fill}$= 1,150,675 ft^3 $V_{CapacityNeeded}$= 5,753,375 ft^3

3. Additional Capacity Using Hill Side Consolidation

V_{hill_needed} =	***1,189,625***	***ft³***

Given:
1. Landfill to be placed in Parcel ID: BL and AI
2. Footprint of the landfill will be defined by the Parcel boundaries.

Assume:
1. Maximum height of Waste Material: 13 FT
2. Maximum slope 20%



Calculation:
Length of Landfill = V_{hill_needed}/Max Cross Sectional Area ***Max Cross Area=*** 1960 ft2

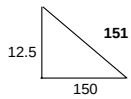
Length = ***607 ft*** ***OK (<633 ft)***

4. Covering the Landfills:

Volume of Fill - (Inactive Landfill)

Consolidation Area 1:
Inactive landfill cover - 2.0 feet common fill, 6 inches composite (for vegetation)

Surface Area (a) Sides: 8
b= **151**
h= 150
SA= 0.5(b*h)
90,312 ft2



Surface Area (b) Sides: 2
l= 450
h= **151**
SA= h*l
135,468 ft2

Surface Area (c) Sides: 2
l= 75
h= **151**
SA= h*l
22,578 ft2

Surface Area (d) Sides: 1
l= 75
h= 450
SA= h*l
33,750 ft2

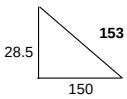
V_{Common} =	***564,216 ft3***	*Common Fill Final Cover =*	*2 ft*
$V_{Topsoil}$ =	***141,054 ft3***	*Topsoil Fill Final Cover =*	*0.5 ft*

Note:
The final cover will increase the final elevation of the landfill t 15 ft

Volume of Fill - (Inactive Landfill)

Consolidation Area 2:
Inactive landfill cover - 2.0 feet common fill, 6 inches composite (for vegetation)

Surface Area (a) Sides: 8
b= **153**
h= 150
SA= 0.5(b*h)
91,610 ft2



Surface Area (b) Sides: 2
l= 200
h= **153**
SA= h*l
61,073 ft2

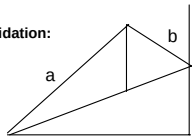
Surface Area (c) Sides: 2
l= 200
h= **153**
SA= h*l
61,073 ft2

Surface Area (d) Sides: 1
l= 200
h= 200
SA= h*l
40,000 ft2

V_{Common} =	***507,514 ft3***	*Common Fill Final Cove*	*2 ft*
$V_{Topsoil}$ =	***126,878 ft3***	*Topsoil Fill Final Cover =*	*0.5 ft*

Note:
The final cover will increase the final elevation of the landfill to: 31 ft

3. Hill Side Consolidation:



Surface Area (a) Sides: 1 l = length of hypotenuse
l= **311**
w= 607
SA= l*w
188,786 ft^2

Surface Area (b) Sides: 1
l= **61**
w= 607
SA= l*w
36,739 ft^2

+ 10% of Total Extra for Side Cover

V_{Common} = 496,157 ft^3	*Common Fill Final Cover =*	*2 ft*
$V_{Topsoil}$ = 124,039 ft^3	*Topsoil Fill Final Cover =*	*0.5 ft*

Note:
The final cover will increase the final elevation of the landfill t 15.5 ft

Total Surface Area= 761,390 ft2

5. Summary of Materials

Summary of Materials		
Material Summary	Volume	
Total Excavated Soil:	4,602,700	ft3
Total Common Fill (Active Landfills):	1,150,675	ft3
Total Common Fill (Inactive Landfills):	1,567,886	ft3
Total Common Fill:	2,718,561	ft3
Total Topsoil/Mulch (Inactive Landfills):	391,972	ft3

Landfill Final Height	
Consolidation Area	Height
Consolidation Area 1	15 ft
Consolidation Area 2	31 ft
Hill Side Consolidatior	15.5 ft

Alternative 5c: Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Parcel IDs			Surficial ID	Burial ID	Total Area Excavated[4]					Excavation Depth				Volume Removed[4]				Total Volume Removed[4]	Backfill Volume[7]	
					Total Parcel Area	Surficial ACM Area[3]	Buried ACM Area	Pipe Insulation ACM[5,6]	Remaining Area Under Bin A	Surficial ACM Area	Buried ACM Area	Pipe Insulation ACM[5]	Remaining Area Under Bin A	Surficial ACM Volume	Buried ACM Volume	Pipe Insulation ACM[5]	Remaining Area Under Bin A		Common Fill	Topsoil
Bin A	Bin B	Bin C			SF	SF	SF	SF	SF	FT	FT	FT	FT	CF	CF	CF	CF	CF	CF	CF
A*			SA-15	---	240,463	98,740	---	---	---	2	---	---	---	197,480	--	---	---	197,480	148,110	49,370
			SA-42	---		418	---	---	---	2	---	---	---	836	--	---	---	836	627	209
			SA-43	---		0	---	---	---	2	---	---	---	0	--	---	---	0	0	0
			---	BA-46**		---	9,620	---	---	---	4.8	---	---	---	46,839	---	---	46,839	41,908	4,930
			---	---		---	---	824	---	---	---	4	---	---	---	4,384	---	4,384	3,836	548
						---	---	---	130,861	---	---	---	2.0	---	---	---	261,721	261,721	196,291	65,430
AG*			SA-1a	---	206,343	Onsite Consolidation Area 2				Onsite Consolidation Area 2				Onsite Consolidation Area 2				0	564,649	80,880
			SA-1b	---																
			SA-1c	---																
			SA-1d	---																
			SA-4	---																
			---	BA-1[1]																
			---	BA-2																
			---	---																
AI*			SA-5	---	104,795	Hill Side Consolidation				Hill Side Consolidation				Hill Side Consolidation				0	493,938	63,202
			---	BA-6																
AK†			SA-40	---	52,009	17,892	---	---	---	2	---	---	---	35,784	--	---	---	35,784	26,838	8,946
						---	---	---	34,117	---	---	---	2.0	---	---	---	68,234	68,234	51,176	17,059
AL*			SA-5	---	116,576	Onsite Consolidation Area 2				Onsite Consolidation Area 2				Onsite Consolidation Area 2				0	564,968	80,880
			---	BA-5**																
	AM†		SA-41	---	160,425	32,611	---	---	---	2	---	---	---	65,222	--	---	---	65,222	48,917	16,306
			---	BA-48		---	4,630	---	---	---	2	---	---	---	9,260	---	---	9,260	0	9,260
	AP*		SA-1a	---	121,917	2,157	---	---	---	2	---	---	---	4,314	--	---	---	4,314	3,236	1,079
			SA-1b	---		1,395	---	---	---	2	---	---	---	2,789	--	---	---	2,789	2,092	697
			SA-45	---		22	---	---	---	2	---	---	---	44	--	---	---	44	33	11
	AQ†		---	---	111,195	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	AR†		---	---	507,189	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	AS†		---	---	240,029	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AT†	---	---	25,508	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
			---	---		---***	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AU†	---	---	25,827	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
			---	---		---***	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AV†	---	---	19,952	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
			---	---		---***	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AW†	---	---	18,762	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AX†	---	---	17,275	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AY†	---	---	17,250	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AZ†	---	---	18,517	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
B*			SA-12a	---	244,982	19,410	---	---	---	2	---	---	---	38,820	--	---	---	38,820	29,115	9,705
			SA-15	---		31,402	---	---	---	2	---	---	---	62,804	--	---	---	62,804	47,103	15,701
			SA-17	---		873	---	---	---	2	---	---	---	1,746	--	---	---	1,746	1,310	437
			SA-18	---		3,659	---	---	---	2	---	---	---	7,318	--	---	---	7,318	5,489	1,830
			SA-19	---		35,606	---	---	---	2	---	---	---	71,212	--	---	---	71,212	53,409	17,803
			---	BA-23		---	2,430	---	---	---	2	---	---	---	4,859	---	---	4,859	3,645	1,215
			---	BA-24		---	1,879	---	---	---	2	---	---	---	3,757	---	---	3,757	2,818	939
			---	---		---	---	0.4	---	---	---	4	---	---	---	2	---	2	2	0
						---	---	---	149,723	---	---	---	2.0	---	---	---	299,446	299,446	224,585	74,862
		BA†	---	---	34,059	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BB†	---	---	20,112	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
			---	---		---***	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BC†	---	---	29,744	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BD†	---	---	198,086	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BE†	---	---	35,882	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BF†	---	---	123,750	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BG†	---	---	68,289	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BH†	---	---	310,093	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	BI†		---	---	65,449	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	BJ†		---	---	44,403	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	BK†		---	---	224,527	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	BL*		---	---	78,513	Hill Side Consolidation				Hill Side Consolidation				Hill Side Consolidation				0	493,938	63,202
BM†			SA-37	---	95,936	13,743	---	---	---	2	---	---	---	27,486	--	---	---	27,486	20,615	6,872
			SA-38	---		50,001	---	---	---	2	---	---	---	100,002	--	---	---	100,002	75,002	25,001
						---	---	---	32,192	---	---	---	2.0	---	---	---	64,384	64,384	48,288	16,096
BO†			SA-39	---	36,614	9,077	---	---	---	2	---	---	---	18,154	--	---	---	18,154	13,616	4,539
						---	---	---	27,537	---	---	---	2.0	---	---	---	55,074	55,074	41,306	13,769
C*			SA-9a	---	99,064	34,774	---	---	---	2	---	---	---	69,548	--	---	---	69,548	52,161	17,387
			SA-9b	---		5,147	---	---	---	2	---	---	---	10,294	--	---	---	10,294	7,721	2,574
			---	BA-10a**		---	7,771	---	---	---	8.7	---	---	---	69,027	---	---	69,027	65,044	3,983
			---	BA-10b		---	4,108	---	---	---	2	---	---	---	8,217	---	---	8,217	6,163	2,054
			---	BA-10c		---	3,748	---	---	---	2	---	---	---	7,496	---	---	7,496	5,622	1,874
			---	---		---	---	273	---	---	---	4	---	---	---	1,455	---	1,455	1,273	182
						---	---	---	43,242	---	---	---	2.0	---	---	---	86,484	86,484	64,863	21,621
D*			SA-9a	---	99,609	38,913	---	---	---	2	---	---	---	77,827	--	---	---	77,827	58,370	19,457
			SA-9b	---		1,292	---	---	---	2	---	---	---	2,584	--	---	---	2,584	1,938	646
			---	BA-9		---	1,227	---	---	---	2	---	---	---	2,453	---	---	2,453	1,840	613
			---	---		---	---	665	---	---	---	4	---	---	---	3,538	---	3,538	3,096	442
						---	---	---	57,512	---	---	---	2.0	---	---	---	115,024	115,024	86,268	28,756
E*			SA-9a	---	128,970	41,195	---	---	---	2	---	---	---	82,390	--	---	---	82,390	61,792	20,597
			SA-10	---		4,621	---	---	---	2	---	---	---	9,241	--	---	---	9,241	6,931	2,310
			SA-44	---		30	---	---	---	2	---	---	---	60	--	---	---	60	45	15
			---	BA-11		---	1,929	---	---	---	2	---	---	---	3,858	---	---	3,858	2,894	965
			---	BA-12		---	13,843	---	---	---	2	---	---	---	27,685	---	---	27,685	20,764	6,921
			---	BA-13		---	1,947	---	---	---	2	---	---	---	3,893	---	---	3,893	2,920	973
			---	---		---	---	206	---	---	---	4	---	---	---	1,093	---	1,093	957	137
						---	---	---	65,201	---	---	---	2.0	---	---	---	130,401	130,401	97,801	32,600
F†			SA-11	---	145,698	53,811	---	---	---	2	---	---	---	107,623	--	---	---	107,623	80,717	26,906
			SA-12a	---		37,483	---	---	---	2	---	---	---	74,966	--	---	---	74,966	56,225	18,742
			SA-12b	---		25,132	---	---	---	2	---	---	---	50,264	--	---	---	50,264	37,698	12,566
			---	BA-14		---	1,670	---	---	---	2	---	---	---	3,341	---	---	3,341	2,506	835
			---	BA-15a**		---	448	---	---	---	8	---	---	---	3,674	---	---	3,674	3,444	230
			---	BA-15**		---	3,722	---	---	---	8	---	---	---	30,519	---	---	30,519	28,612	1,907
			---	BA-16		---	2,846	---	---	---	2.5	---	---	---	7,116	---	---	7,116	5,693	1,423
			---	BA-17		---	831	---	---	---	2	---	---	---	1,662	---	---	1,662	1,247	416
			---	BA-18		---	1,664	---	---	---	2	---	---	---	3,327	---	---	3,327	2,495	832
			---	---		---	---	57	---	---	---	4	---	---	---	305	---	305	267	38
						---	---	---	18,033	---	---	---	2.0	---	---	---	36,065	36,065	27,049	9,016
G*			SA-11	---	171,137	2,641	---	---	---	2	---	---	---	5,282	--	---	---	5,282	3,962	1,321
			SA-12a	---		43,005	---	---	---	2	---	---	---	86,010	--	---	---	86,010	64,507	21,502
			---	BA-19		---	1,600	---	---	---	2	---	---	---	3,200	---	---	3,200	2,400	800
			---	BA-20a**		---	13,653	---	---	---	9	---	---	---	125,952	---	---	125,952	118,955	6,997
			---	BA-20b**		---	2,442	---	---	---	9	---	---	---	22,530	---	---	22,530	21,278	1,252
			---	---		---	---	161	---	---	---	4	---	---	---	857	---	857	750	107
						---	---	---	107,634	---	---	---	2.0	---	---	---	215,269	215,269	161,452	53,817
H*			SA-12a	---	544,704	20,533	---	---	---	2	---	---	---	41,066	--	---	---	41,066	30,800	10,267
			SA-13	---		12,650	---	---	---	2	---	---	---	25,300	--	---	---	25,300	18,975	6,325
			SA-14	---		58,649	---	---	---	2	---	---	---	117,299	--	---	---	117,299	87,974	29,325
			SA-15	---		52,756	---	---	---	2	---	---	---	105,512	--	---	---	105,512	79,134	26,378
			SA-16	---		57,284	---	---	---	2	---	---	---	114,568	--	---	---	114,568	85,926	28,642
			---	BA-20b**		---	3,731	---	---	---	9	---	---	---	34,417	---	---	34,417	32,505	1,912
			---	BA-21[2**]		---	36,786	---	---	---	6.5	---	---	---	246,031	---	---	246,031	227,178	18,853
			---	BA-22		---	15,251	---	---	---	2	---	---	---	30,503	---	---	30,503	22,877	7,626
						---	---	---	287,063	---	---	---	2.0	---	---	---	574,125	574,125	430,594	143,531
L*			SA-21a	---	170,978	105,859	---	---	---	2	---	---	---	211,718	--	---	---	211,718	158,789	52,930
			SA-34	---		14,776	---	---	---	2	---	---	---	29,552	--	---	---	29,552	22,164	7,388
			---	BA-40		---	1,685	---	---	---	2	---	---	---	3,370	---	---	3,370	2,527	842
			---	BA-41		---	2,686	---	---	---	2	---	---	---	5,373	---	---	5,373	4,030	1,343
			---	BA-42		---	2,244	---	---	---	2	---	---	---	4,488	---	---	4,488	3,366	1,122
			---	BA-43a		---	12,475	---	---	---	3.5	---	---	---	43,661	---	---	43,661	37,424	6,237
			---	BA-43b		---	2,662	---	---	---	3.5	---	---	---	9,316	---	---	9,316	7,985	1,331
			---	---		---	---	2,080	---	---	---	4	---	---	---	11,066	---	11,066	9,683	1,383
						---	---	---	26,511	---	---	---	2.0	---	---	---	53,022	53,022	39,767	13,256
M*			SA-25a	---	103,755	914	---	---	---	2	---	---	---	1,828	--	---	---	1,828	1,371	457
			SA-30	---		474	---	---	---	2	---	---	---	948	--	---	---	948	711	237
			SA-32	---		24,634	---	---	---	2	---	---	---	49,269	--	---	---	49,269	36,951	12,317
			---	BA-36		---	9,044	---	---	---	2	---	---	---	18,087	---	---	18,087	13,566	4,522
			---	---		---***	---	1,648	---	---	---	6	---	---	---	13,150	---	13,150	12,054	1,096
			---	---		---	---	441	---	---	---	4	---	---	---	2,346	---	2,346	2,053	293
						---	---	---	66,600	---	---	---	2.0	---	---	---	133,200	133,200	99,900	33,300
MBK-A*			SA-21a	---	81,960	Onsite Consolidation Area 1				Onsite Consolidation Area 1				Onsite Consolidation Area 1				0	429,200	47,018
			SA-21b	---																
			---	BA-30																
MBK-B*			SA-21a	---	82,837	Onsite Consolidation Area 1				Onsite Consolidation Area 1				Onsite Consolidation Area 1				0	429,200	47,018
			SA-21c	---																
			---	BA-30																
MBK-C*			SA-21a	---	79,370	Onsite Consolidation Area 1				Onsite Consolidation Area 1				Onsite Consolidation Area 1				0	429,519	47,018
			SA-21d	---																
			SA-23	---																
			---	BA-30																

Alternative 5c: Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Parcel IDs			Surficial ID	Burial ID	Total Area Excavated[4]					Excavation Depth				Volume Removed[4]				Total Volume Removed[4]	Backfill Volume[7]	
					Total Parcel Area	Surficial ACM Area[3]	Buried ACM Area	Pipe Insulation ACM[5,6]	Remaining Area Under Bin A	Surficial ACM Area	Buried ACM Area	Pipe Insulation ACM[5]	Remaining Area Under Bin A	Surficial ACM Volume	Buried ACM Volume	Pipe Insulation ACM[5]	Remaining Area Under Bin A		Common Fill	Topsoil
Bin A	Bin B	Bin C			SF	SF	SF	SF	SF	FT	FT	FT	FT	CF	CF	CF	CF	CF	CF	CF
MBK-D*			SA-21a	---	126,680	62,322	---	---	---	2	---	---	---	124,644	--	---	---	124,644	93,483	31,161
			SA-35	---		15,667	---	---	---	2	---	---	---	31,333	--	---	---	31,333	23,500	7,833
			---	BA-26		---	581	---	---	---	2	---	---	---	1,161	---	---	1,161	871	290
			---	BA-44**		---	814	---	---	---	9	---	---	---	7,509	---	---	7,509	7,092	417
			---	BA-45		---	3,644	---	---	---	2	---	---	---	7,288	---	---	7,288	5,466	1,822
			---	---		---	---	2,533	---	---	---	4	---	---	---	13,474	---	13,474	11,790	1,684
						---	---	---	41,120	---	---	---	2.0	---	---	---	82,240	82,240	61,680	20,560
MBK-E*			SA-5	---	132,122	Onsite Consolidation Area 2				Onsite Consolidation Area 2				Onsite Consolidation Area 2				0	564,968	80,880
			---	BA-3																
			---	BA-4																
MBK-F*			SA-8	---	88,004	10,752	---	---	---	2	---	---	---	21,504	--	---	---	21,504	16,128	5,376
			---	BA-7		---	2,012	---	---	---	3.5	---	---	---	7,041	---	---	7,041	6,035	1,006
			---	BA-8		---	683	---	---	---	2	---	---	---	1,367	---	---	1,367	1,025	342
			---	---		---	---	336	---	---	---	4	---	---	---	1,790	---	1,790	1,566	224
						---	---	---	74,221	---	---	---	2.0	---	---	---	148,441	148,441	111,331	37,110
MBK-G*			SA-15	---	95,236	11,949	---	---	---	2	---	---	---	23,898	--	---	---	23,898	17,924	5,975
			SA-36a	---		5,555	---	---	---	2	---	---	---	11,110	--	---	---	11,110	8,332	2,777
			SA-36b	---		1,635	---	---	---	2	---	---	---	3,270	--	---	---	3,270	2,453	818
			SA-36c	---		13,667	---	---	---	2	---	---	---	27,334	--	---	---	27,334	20,501	6,834
			---	BA-47a**		---	1,010	---	---	---	10	---	---	---	10,356	---	---	10,356	9,839	518
			---	BA-47**		---	11,257	---	---	---	6	---	---	---	69,231	---	---	69,231	63,462	5,769
						---	---	---	50,163	---	---	---	2.0	---	---	---	100,325	100,325	75,244	25,081
N†			SA-31	---	157,961	60,906	---	---	---	2	---	---	---	121,812	--	---	---	121,812	91,359	30,453
			SA-32	---		50,519	---	---	---	2	---	---	---	101,038	--	---	---	101,038	75,779	25,260
			---	BA-37		---	1,077	---	---	---	2	---	---	---	2,155	---	---	2,155	1,616	539
			---	BA-38		---	2,116	---	---	---	2	---	---	---	4,231	---	---	4,231	3,173	1,058
			---	BA-39		---	15,269	---	---	---	2	---	---	---	30,538	---	---	30,538	22,904	7,635
			---	---		---	---	1,050	---	---	---	4	---	---	---	5,585	---	5,585	4,887	698
						---	---	---	27,024	---	---	---	2.0	---	---	---	54,048	54,048	40,536	13,512
O*			SA-32	---	185,518	959	---	---	---	2	---	---	---	1,918	--	---	---	1,918	1,439	480
			SA-33a	---		13,703	---	---	---	2	---	---	---	27,406	--	---	---	27,406	20,555	6,852
			SA-33b	---		3,751	---	---	---	2	---	---	---	7,502	--	---	---	7,502	5,627	1,876
			---	---		---***	---	950	---	---	---	6	---	---	---	7,580	---	7,580	6,948	632
						---	---	---	166,155	---	---	---	2.0	---	---	---	332,310	332,310	249,233	83,078
P†			SA-21a	---	77,894	27,294	---	---	---	2	---	---	---	54,587	--	---	---	54,587	40,941	13,647
			---	BA-28		---	7,096	---	---	---	2	---	---	---	14,192	---	---	14,192	10,644	3,548
			---	BA-29		---	4,305	---	---	---	2	---	---	---	8,611	---	---	8,611	6,458	2,153
			---	---		---	---	613	---	---	---	4	---	---	---	3,262	---	3,262	2,854	408
						---	---	---	38,586	---	---	---	2.0	---	---	---	77,171	77,171	57,879	19,293
Q*			SA-22	---	75,099	3,476	---	---	---	2	---	---	---	6,953	--	---	---	6,953	5,214	1,738
			SA-23	---		11,184	---	---	---	2	---	---	---	22,367	--	---	---	22,367	16,776	5,592
			SA-31	---		7,645	---	---	---	2	---	---	---	15,290	--	---	---	15,290	11,468	3,823
			---	BA-30		---	6,646	---	---	---	2	---	---	---	13,292	---	---	13,292	9,969	3,323
			---	BA-31		---	14,004	---	---	---	2	---	---	---	28,008	---	---	28,008	21,006	7,002
			---	BA-32		---	645	---	---	---	2	---	---	---	1,290	---	---	1,290	967	322
			---	BA-33		---	1,467	---	---	---	2	---	---	---	2,935	---	---	2,935	2,201	734
			---	---		---	---	133	---	---	---	4	---	---	---	706	---	706	618	88
						---	---	---	29,899	---	---	---	2.0	---	---	---	59,798	59,798	44,848	14,949
R*			SA-23	---	70,175	6,724	---	---	---	2	---	---	---	13,449	--	---	---	13,449	10,087	3,362
			SA-24	---		34,733	---	---	---	2	---	---	---	69,466	--	---	---	69,466	52,099	17,366
			SA-25a	---		399	---	---	---	2	---	---	---	798	--	---	---	798	599	200
			SA-31	---		965	---	---	---	2	---	---	---	1,930	--	---	---	1,930	1,448	483
			---	BA-31		---	4,779	---	---	---	2	---	---	---	9,558	---	---	9,558	7,168	2,389
			---	BA-34		---	1,106	---	---	---	2	---	---	---	2,212	---	---	2,212	1,659	553
			---	---		---	---	180	---	---	---	4	---	---	---	957	---	957	837	120
						---	---	---	21,289	---	---	---	2.0	---	---	---	42,578	42,578	31,933	10,644
S*			SA-20a	---	92,670	35,378	---	---	---	2	---	---	---	70,757	--	---	---	70,757	53,067	17,689
			SA-20b	---		1,642	---	---	---	2	---	---	---	3,284	--	---	---	3,284	2,463	821
			SA-21a	---		28,433	---	---	---	2	---	---	---	56,866	--	---	---	56,866	42,650	14,217
			---	BA-25		---	2,195	---	---	---	2	---	---	---	4,389	---	---	4,389	3,292	1,097
			---	BA-26		---	11,805	---	---	---	2	---	---	---	23,611	---	---	23,611	17,708	5,903
			---	BA-27		---	8,670	---	---	---	2.2	---	---	---	18,785	---	---	18,785	14,450	4,335
			---	---		---	---	226	---	---	---	4	---	---	---	1,200	---	1,200	1,050	150
						---	---	---	4,321	---	---	---	2.0	---	---	---	8,643	8,643	6,482	2,161
W*			SA-25a	---	98,880	4,086	---	---	---	2	---	---	---	8,171	--	---	---	8,171	6,128	2,043
			SA-25b	---		2,426	---	---	---	2	---	---	---	4,853	--	---	---	4,853	3,639	1,213
			SA-29	---		8,829	---	---	---	2	---	---	---	17,658	--	---	---	17,658	13,244	4,415
			SA-30	---		824	---	---	---	2	---	---	---	1,648	--	---	---	1,648	1,236	412
			SA-32	---		835	---	---	---	2	---	---	---	1,670	--	---	---	1,670	1,253	418
			---	BA-35a**		---	9,843	---	---	---	4.4	---	---	---	44,513	---	---	44,513	39,468	5,045
			---	BA-35b		---	16,433	---	---	---	2	---	---	---	32,866	---	---	32,866	24,649	8,216
			---	---		---	---	1,297	---	---	---	4	---	---	---	6,902	---	6,902	6,039	863
						---	---	---	54,307	---	---	---	2.0	---	---	---	108,614	108,614	81,460	27,153
X*			SA-27	---	91,229	668	---	---	---	2	---	---	---	1,336	--	---	---	1,336	1,002	334
			SA-28a	---		18,663	---	---	---	2	---	---	---	37,326	--	---	---	37,326	27,995	9,332
			SA-28b	---		2,553	---	---	---	2	---	---	---	5,106	--	---	---	5,106	3,830	1,277
			---	---		---***	---	522	---	---	---	6	---	---	---	4,163	---	4,163	3,816	347
						---	---	---	68,823	---	---	---	2.0	---	---	---	137,647	137,647	103,235	34,412
	Y*		SA-1b	---	137,170	47	---	---	---	2	---	---	---	94	--	---	---	94	71	24
			SA-1c	---		977	---	---	---	2	---	---	---	1,955	--	---	---	1,955	1,466	489
			SA-3	---		616	---	---	---	2	---	---	---	1,232	--	---	---	1,232	924	308
Z*			SA-24	---	80,589	8,971	---	---	---	2	---	---	---	17,942	--	---	---	17,942	13,457	4,486
			SA-25a	---		15,259	---	---	---	2	---	---	---	30,518	--	---	---	30,518	22,889	7,630
			SA-26	---		601	---	---	---	2	---	---	---	1,202	--	---	---	1,202	902	301
			---	BA-35a**		---	14,206	---	---	---	4.4	---	---	---	64,244	---	---	64,244	56,964	7,281
			---	BA-35b		---	4,663	---	---	---	2	---	---	---	9,326	---	---	9,326	6,994	2,331
			---	---		---	---	658	---	---	---	4	---	---	---	3,501	---	3,501	3,063	438
						---	---	---	36,231	---	---	---	2.0	---	---	---	72,461	72,461	54,346	18,115
Surficial & Burial ACM Extending Outside Parcel Areas																				
			SA-1a	---		16	---	---	---	2	---	---	---	32	--	---	---	32	24	8
			SA-2	---		193	---	---	---	2	---	---	---	386	--	---	---	386	289	96
			SA-5	---		3,939	---	---	---	2	---	---	---	7,879	--	---	---	7,879	5,909	1,970
			SA-6	---		111	---	---	---	2	---	---	---	223	--	---	---	223	167	56
			SA-7	---		2,179	---	---	---	2	---	---	---	4,357	--	---	---	4,357	3,268	1,089
			SA-8	---		2,371	---	---	---	2	---	---	---	4,742	--	---	---	4,742	3,556	1,185
			SA-9a	---		9,263	---	---	---	2	---	---	---	18,527	--	---	---	18,527	13,895	4,632
			SA-10	---		146	---	---	---	2	---	---	---	292	--	---	---	292	219	73
			SA-11	---		2,267	---	---	---	2	---	---	---	4,535	--	---	---	4,535	3,401	1,134
			SA-12a	---		12,431	---	---	---	2	---	---	---	24,863	--	---	---	24,863	18,647	6,216
			SA-12b	---		37	---	---	---	2	---	---	---	74	--	---	---	74	56	19
			SA-15	---		9,393	---	---	---	2	---	---	---	18,786	--	---	---	18,786	14,090	4,697
			SA-16	---		52	---	---	---	2	---	---	---	104	--	---	---	104	78	26
			SA-20a	---		8,883	---	---	---	2	---	---	---	17,765	--	---	---	17,765	13,324	4,441
			SA-21a	---		8,899	---	---	---	2	---	---	---	17,799	--	---	---	17,799	13,349	4,450
			SA-23	---		2,634	---	---	---	2	---	---	---	5,268	--	---	---	5,268	3,951	1,317
			SA-24	---		1,000	---	---	---	2	---	---	---	2,000	--	---	---	2,000	1,500	500
			SA-25a	---		14	---	---	---	2	---	---	---	28	--	---	---	28	21	7
			SA-28a	---		262	---	---	---	2	---	---	---	524	--	---	---	524	393	131
			SA-28b	---		378	---	---	---	2	---	---	---	756	--	---	---	756	567	189
			SA-30	---		15	---	---	---	2	---	---	---	30	--	---	---	30	23	8
			SA-32	---		106	---	---	---	2	---	---	---	213	--	---	---	213	159	53
			SA-34	---		1,022	---	---	---	2	---	---	---	2,044	--	---	---	2,044	1,533	511
			SA-35	---		4,256	---	---	---	2	---	---	---	8,512	--	---	---	8,512	6,384	2,128
			SA-36a	---		20,036	---	---	---	2	---	---	---	40,072	--	---	---	40,072	30,054	10,018
			SA-36c	---		7,647	---	---	---	2	---	---	---	15,294	--	---	---	15,294	11,471	3,824
			SA-39	---		967	---	---	---	2	---	---	---	1,934	--	---	---	1,934	1,450	483
			SA-40	---		3,797	---	---	---	2	---	---	---	7,593	--	---	---	7,593	5,695	1,898
			SA-41	---		1,884	---	---	---	2	---	---	---	3,769	--	---	---	3,769	2,827	942
			---	BA-6		---	2,433	---	---	---	2	---	---	---	4,865	---	---	4,865	3,649	1,216
			---	BA-25		---	3,127	---	---	---	2	---	---	---	6,253	---	---	6,253	4,690	1,563
			---	BA-26		---	7,032	---	---	---	2	---	---	---	14,065	---	---	14,065	10,548	3,516
			---	---		---	---	3,146	---	---	---	4.0	---	---	---	16,737	---	16,737	14,645	2,092
				---		---***	---	336	---	---	---	6	---	---	---	2,681	---	2,681	2,458	223
Total						**1,532,400**	**327,500**	**18,400**	**1,658,400**					**3,064,800**	**1,227,900**	**106,800**	**3,316,800**	**7,716,100**	**9,906,800**	**2,289,900**

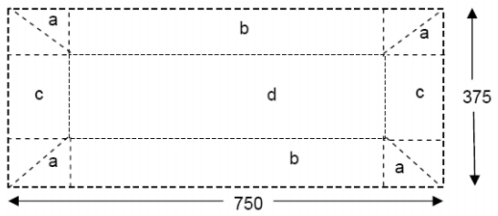
Notes:
1. Depth of buried ACM debris at BA-1 assumed to be same as at BA-2. Both BA-1 and BA-2 are under parcel AG.
2. See Section 4.1.8.2 of RI for ACM volumes at BA-21 (under parcel H).
3. Surface ACM Area is accounted with the Buried ACM Area when there is an overlap in excavation.
4. All volumes and areas are rounded up to the nearest whole number
5. Steam pipe was observed at depths ranging from 2 to 6 feet bgs and assume 3 feet wide excavation
6. Excavation of steam pipe within Surficial ACM and Buried ACM areas considered negligible.
7. Topsoil depth is 6 inches; Common Backfill depth varies with excavation depth.
* Indicates parcels no longer occupied
** Burial area depth is greater than 4 feet - assume a 2.5% increase in soil excavation for sloping.
*** All pipe excavation - assume a 33% increase in soil excavation for sloping.
† Indicates that parcel is privately owned.
-Location of Onsite Consolidation Area - No Removal Activity

Table C-21

Onsite Consolidation Areas

Consolidation Area 1:

1. Coveracity of Each Landfill:



Landfill Capacity - Active

Given:

1. Landfill to be placed in Parcel ID: MBK-A, MBK-B, and MBK-C

2. Footprint of the landfill will be defined by the Parcel boundaries.

Assume:

1. Maximum height of Waste Material: 12.5 ft
2. Maximum slope <20% Current: 8%

Total Coveracity

Calculations:

a. Pyramid

V= $1/3b^2h$ b= 150 ft
V= 93,750 ft3 h= 12.5 ft

b. Large Wedge X2

V= 1/2bhl * 2 b= 150 ft
V= 843,750 ft3 h= 12.5 ft
l= 450 ft

c. Small Wedge X2

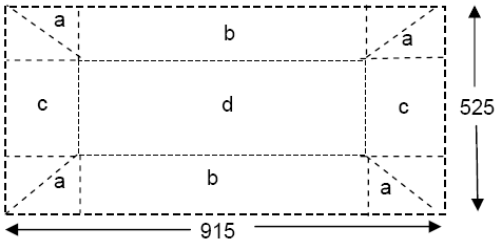
V= 1/2bhl * 2 b= 150 ft
V= 140,625 ft3 h= 12.5 ft
l= 75 ft

d. Rectangular Prism

V= bhl b= 75 ft
V= 421,875 ft3 h= 12.5 ft
l= 450 ft

$V_{Capacity1}$= 1,500,000 ft3

Consolidation Area 2:



Landfill Capacity - Active

Given:

1. Landfill to be placed in Parcel ID: AL, MBK-E, and AG

2. Footprint of the landfill will be defined by the Parcel boundaries.

Assume:

1. Maximum height of Waste Material: 25.5 ft
2. Maximum slope <20% Current: 17%

Total Coveracity

Calculations:

a. Pyramid

V= $1/3b^2h$ b= 150 ft
V= 191,250 ft3 h= 25.5 ft

b. Large Wedge X2

V= 1/2bhl * 2 b= 150 ft
V= 2,352,375 ft3 h= 25.5 ft
l= 615 ft

c. Small Wedge X2

V= 1/2bhl * 2 b= 150 ft
V= 860,625 ft3 h= 25.5 ft
l= 225 ft

d. Rectangular Prism

V= bhl b= 225 ft
V= 3,528,563 ft3 h= 25.5 ft
l= 615 ft

$V_{Capacity2}$= 6,932,813 ft3

$V_{Capacity1} + V_{Capacity2}$= 8,432,813 ft3

2. Filling the Landfills:

Volume of Waste - Site

V_{waste}= 7,716,100 ft3 ***879,635,400 lbs*** ***439,818 tons***

Volume of Common Fill - (Combined Active Landfill)

The Landfill will be filled using the following assumptions:

1. Number of Years to Complete: 3 years
2. Work from April 1 until November 30: 8 months
3. 4 Days off per month in 30 days months: 26 per month
4. Number of working days: 208 days
5. Dump Trucks per day: 35 trucks/day
6. Tons per truck: 20 ton
6. Soil Bulk weight: 114 lbs/ft3
7. Stock each day (lift) in ft: 2 ft
8. Common Fill cover per day: 0.5 ft

Tons per day: 705 tons
Lbs per day: 1,409,672 lbs
Ft3 per day: 12,366 ft3
Area Needing Fill: 6,183 ft2
6 inches of fill each day: 3,091 ft3
Fill 1-Year: 643,008 ft3
Fill Completion: 1,929,025 ft3

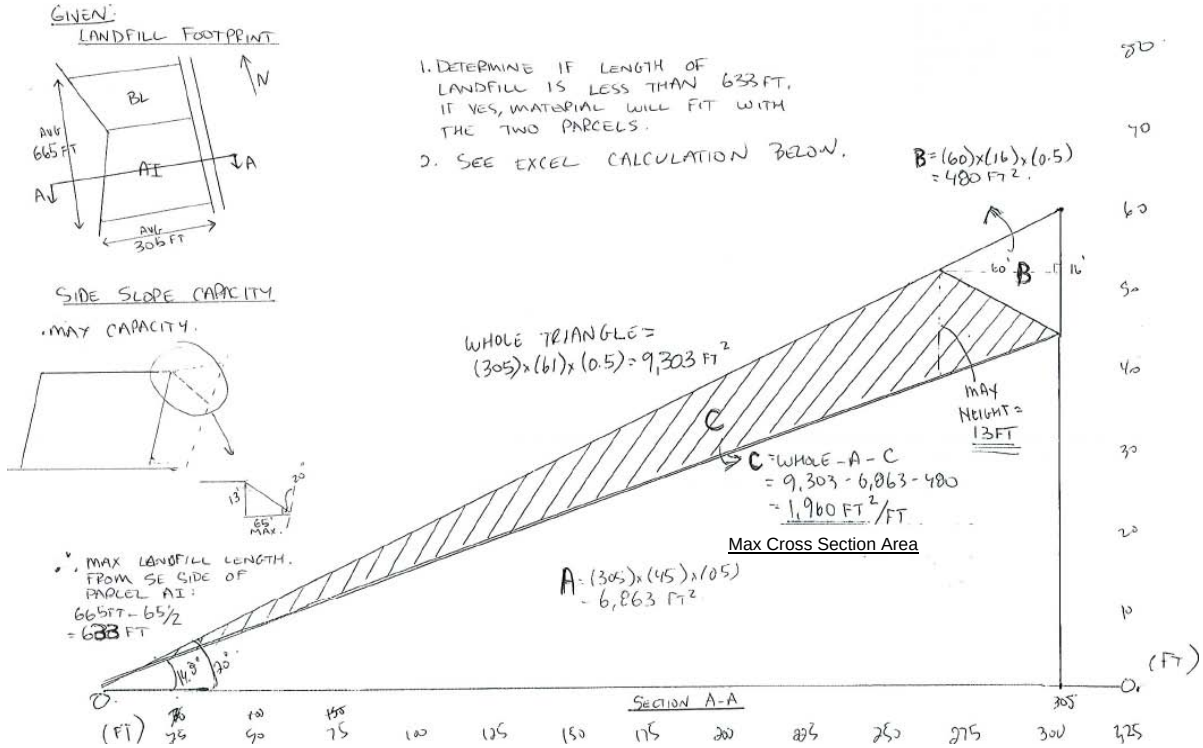
$V_{common\ fill}$= 1,929,025 ft3 $V_{CapacityNeeded}$= 9,645,125 ft3

3. Additional Capacity Using Hill Side Consolidation

V_{hill_needed} =	***1,212,313***	***ft³***

Given:
1. Landfill to be placed in Parcel ID: BL and AI
2. Footprint of the landfill will be defined by the Parcel boundaries.

Assume:
1. Maximum height of Waste Material: 13 FT
2. Maximum slope 20%



Calculation:
Length of Landfill = V_{hill_needed}/Max Cross Sectional Area ***Max Cross Area=*** 1960 ft2

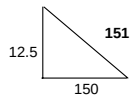
Length = ***619 ft*** ***OK (<633 ft)***

4. Covering the Landfills:

Volume of Fill - (Inactive Landfill)

Consolidation Area 1:
Inactive landfill cover - 2.0 feet common fill, 6 inches composite (for vegetation)

Surface Area (a) Sides: 8
b= **151**
h= 150
SA= 0.5(b*h)
90,312 ft2



Surface Area (b) Sides: 2
l= 450
h= **151**
SA= h*l
135,468 ft2

Surface Area (c) Sides: 2
l= 75
h= **151**
SA= h*l
22,578 ft2

Surface Area (d) Sides: 1
l= 75
h= 450
SA= h*l
33,750 ft2

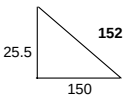
V_{Common} =	***564,216 ft3***	*Common Fill Final Cover =*	*2 ft*
$V_{Topsoil}$ =	***141,054 ft3***	*Topsoil Fill Final Cover =*	*0.5 ft*

Note:
The final cover will increase the final elevation of the landfill t 15 ft

Volume of Fill - (Inactive Landfill)

Consolidation Area 2:
Inactive landfill cover - 2.0 feet common fill, 6 inches composite (for vegetation)

Surface Area (a) Sides: 8
b= **152**
h= 150
SA= 0.5(b*h)
91,291 ft2



Surface Area (b) Sides: 2
l= 615
h= **152**
SA= h*l
187,147 ft2

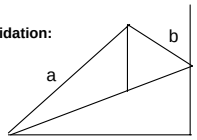
Surface Area (c) Sides: 2
l= 225
h= **152**
SA= h*l
68,468 ft2

Surface Area (d) Sides: 1
l= 225
h= 615
SA= h*l
138,375 ft2

V_{Common} =	***970,563 ft3***	*Common Fill Final Cove*	*2 ft*
$V_{Topsoil}$ =	***242,641 ft3***	*Topsoil Fill Final Cover =*	*0.5 ft*

Note:
The final cover will increase the final elevation of the landfill to: 28 ft

3. Hill Side Consolidation:



Surface Area (a) Sides: 1 l = length of hypotenuse

l= **311**

w= 619

SA= l*w

192,387 ft^2

ft^2

Surface Area (b) Sides: 1

l= **61**

w= 619

SA= l*w

37,440 ft^2

+ 10% of Total Extra for Side Cover

V_{Common} =	***505,619***	***ft^3***
$V_{Topsoil}$ =	***126,405***	***ft^3***

Common Fill Final Cover = *2 ft*

Topsoil Fill Final Cover = *0.5 ft*

Note:

The final cover will increase the final elevation of the landfill t 15.5 ft

Total Surface Area= 997,216 ft2

5. Summary of Materials

Summary of Materials		
Material Summary	Volume	
Total Excavated Soil:	7,716,100	ft3
Total Common Fill (Active Landfills):	1,929,025	ft3
Total Common Fill (Inactive Landfills):	2,040,398	ft3
Total Common Fill:	3,969,423	ft3
Total Topsoil/Mulch (Inactive Landfills):	510,099	ft3

Landfill Final Height		
Consolidation Area	Height	
Consolidation Area 1	15	ft
Consolidation Area 2	28	ft
Hill Side Consolidatio	15.5	ft

Alternative 6a: Removal of All Identified ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Parcel IDs			Surficial ID	Burial ID	Total Area Excavated[4]				Excavation Depth			Volume Removed[4]			Total Volume Removed[4]	Backfill Volume[7]	
					Total Parcel Area	Surficial ACM Area[3]	Buried ACM Area	Pipe Insulation ACM[5,6]	Surficial ACM Area	Buried ACM Area	Pipe Insulation ACM[5]	Surficial ACM Volume	Buried ACM Volume	Pipe Insulation ACM[5]		Common Fill	Topsoil
Bin A	Bin B	Bin C			SF	SF	SF	SF	FT	FT	FT	CF	CF	CF	CF	CF	CF
A*			SA-15	---	240,463	98,740	---	---	2	---	---	197,480	--	---	197,480	148,110	49,370
			SA-42	---		418	---	---	2	---	---	836	--	---	836	627	209
			SA-43	---		0	---	---	2	---	---	0	--	---	0	0	0
			---	BA-46**		---	9,620	---	---	4.8	---	---	46,839	---	46,839	41,908	4,931
			---	---		---	---	824	---	---	4	---	---	4,384	4,384	3,836	548
AG*			SA-1a	---	206,343	52,644	---	---	2	---	---	105,288	--	---	105,288	78,966	26,322
			SA-1b	---		88	---	---	2	---	---	177	--	---	177	133	44
			SA-1c	---		224	---	---	2	---	---	449	--	---	449	336	112
			SA-1d	---		4,652	---	---	2	---	---	9,304	--	---	9,304	6,978	2,326
			SA-4	---		17,328	---	---	2	---	---	34,656	--	---	34,656	25,992	8,664
			---	BA-1[1]		---	3,030	---	---	2.4	---	---	7,273	---	7,273	5,758	1,515
			---	BA-2		---	18,518	---	---	2.4	---	---	44,444	---	44,444	35,185	9,259
			---	---		---	---	316	---	---	4	---	---	1,681	1,681	1,471	210
AI*			SA-5	---	104,795	98,040	---	---	2	---	---	196,080	--	---	196,080	147,060	49,020
			---	BA-6		---	7,124	---	---	2	---	---	14,249	---	14,249	10,687	3,562
AK†			SA-40	---	52,009	17,892	---	---	2	---	---	35,784	--	---	35,784	26,838	8,946
AL*			SA-5	---	116,576	112,095	---	---	2	---	---	224,190	--	---	224,190	168,143	56,048
			---	BA-5**		---	4,081	---	---	4	---	---	16,732	---	16,732	14,641	2,092
			---	---		---	---	978	---	---	2	---	---	2,601	2,601	1,951	650
	AM†		SA-41	---	160,425	32,611	---	---	2	---	---	65,222	--	---	65,222	48,917	16,306
			---	BA-48		---	4,630	---	---	2	---	---	9,260	---	9,260	6,945	2,315
	AP*		SA-1a	---	121,917	2,157	---	---	2	---	---	4,314	--	---	4,314	3,236	1,079
			SA-1b	---		1,395	---	---	2	---	---	2,789	--	---	2,789	2,092	697
			SA-45	---		22	---	---	2	---	---	44	--	---	44	33	11
	AQ†		---	---	111,195	---	---	---	---	---	---	---	--	---	0	---	---
	AR†		---	---	507,189	---	---	---	---	---	---	---	--	---	0	---	---
	AS†		---	---	240,029	---	---	---	---	---	---	---	--	---	0	---	---
		AT†	---	---	25,508	---	---	---	---	---	---	---	--	---	0	---	---
			---	---		---***	---	---	---	---	---	---	--	---	0	---	---
		AU†	---	---	25,827	---	---	---	---	---	---	---	--	---	0	---	---
			---	---		---***	---	---	---	---	---	---	--	---	0	---	---
		AV†	---	---	19,952	---	---	---	---	---	---	---	--	---	0	---	---
			---	---		---***	---	---	---	---	---	---	--	---	0	---	---
		AW†	---	---	18,762	---	---	---	---	---	---	---	--	---	0	---	---
		AX†	---	---	17,275	---	---	---	---	---	---	---	--	---	0	---	---
		AY†	---	---	17,250	---	---	---	---	---	---	---	--	---	0	---	---
		AZ†	---	---	18,517	---	---	---	---	---	---	---	--	---	0	---	---
B*			SA-12a	---	244,982	19,410	---	---	2	---	---	38,820	--	---	38,820	29,115	9,705
			SA-15	---		31,402	---	---	2	---	---	62,804	--	---	62,804	47,103	15,701
			SA-17	---		873	---	---	2	---	---	1,746	--	---	1,746	1,310	437
			SA-18	---		3,659	---	---	2	---	---	7,318	--	---	7,318	5,489	1,830
			SA-19	---		35,606	---	---	2	---	---	71,212	--	---	71,212	53,409	17,803
			---	BA-23		---	2,430	---	---	2	---	---	4,859	---	4,859	3,645	1,215
			---	BA-24		---	1,879	---	---	2	---	---	3,757	---	3,757	2,818	939
			---	---		---	---	0.4	---	---	4	---	---	2	2	2	0
		BA†	---	---	34,059	---	---	---	---	---	---	---	--	---	0	---	---
		BB†	---	---	20,112	---	---	---	---	---	---	---	--	---	0	---	---
			---	---		---***	---	---	---	---	---	---	---	---	0	---	---
		BC†	---	---	29,744	---	---	---	---	---	---	---	--	---	0	---	---
		BD†	---	---	198,086	---	---	---	---	---	---	---	--	---	0	---	---
		BE†	---	---	35,882	---	---	---	---	---	---	---	--	---	0	---	---
		BF†	---	---	123,750	---	---	---	---	---	---	---	--	---	0	---	---
		BG†	---	---	68,289	---	---	---	---	---	---	---	--	---	0	---	---
		BH†	---	---	310,093	---	---	---	---	---	---	---	--	---	0	---	---
	BI†		---	---	65,449	---	---	---	---	---	---	---	--	---	0	---	---
	BJ†		---	---	44,403	---	---	---	---	---	---	---	--	---	0	---	---
	BK†		---	---	224,527	---	---	---	---	---	---	---	--	---	0	---	---
	BL*		---	---	78,513	---	---	---	---	---	---	---	--	---	0	---	---
BM†			SA-37	---	95,936	13,743	---	---	2	---	---	27,486	--	---	27,486	20,615	6,872
			SA-38	---		50,001	---	---	2	---	---	100,002	--	---	100,002	75,002	25,001
BO†			SA-39	---	36,614	9,077	---	---	2	---	---	18,154	--	---	18,154	13,616	4,539
C*			SA-9a	---	99,064	34,774	---	---	2	---	---	69,548	--	---	69,548	52,161	17,387
			SA-9b	---		5,147	---	---	2	---	---	10,294	--	---	10,294	7,721	2,574
			---	BA-10a**		---	7,771	---	---	8.7	---	---	69,027	---	69,027	65,044	3,983
			---	BA-10b		---	4,108	---	---	2	---	---	8,217	---	8,217	6,163	2,054
			---	BA-10c		---	3,748	---	---	2	---	---	7,496	---	7,496	5,622	1,874
			---	---		---	---	273	---	---	4	---	---	1,455	1,455	1,273	182
D*			SA-9a	---	99,609	38,913	---	---	2	---	---	77,827	--	---	77,827	58,370	19,457
			SA-9b	---		1,292	---	---	2	---	---	2,584	--	---	2,584	1,938	646
			---	BA-9		---	1,227	---	---	2	---	---	2,453	---	2,453	1,840	613
			---	---		---	---	665	---	---	4	---	---	3,538	3,538	3,096	442
E*			SA-9a	---	128,970	41,195	---	---	2	---	---	82,390	--	---	82,390	61,792	20,597
			SA-10	---		4,621	---	---	2	---	---	9,241	--	---	9,241	6,931	2,310
			SA-44	---		30	---	---	2	---	---	60	--	---	60	45	15
			---	BA-11		---	1,929	---	---	2	---	---	3,858	---	3,858	2,894	965
			---	BA-12		---	13,843	---	---	2	---	---	27,685	---	27,685	20,764	6,921
			---	BA-13		---	1,947	---	---	2	---	---	3,893	---	3,893	2,920	973
			---	---		---	---	206	---	---	4	---	---	1,093	1,093	957	137
F†			SA-11	---	145,698	53,811	---	---	2	---	---	107,623	--	---	107,623	80,717	26,906
			SA-12a	---		37,483	---	---	2	---	---	74,966	--	---	74,966	56,225	18,742
			SA-12b	---		25,132	---	---	2	---	---	50,264	--	---	50,264	37,698	12,566
			---	BA-14		---	1,670	---	---	2	---	---	3,341	---	3,341	2,506	835
			---	BA-15a**		---	448	---	---	8	---	---	3,674	---	3,674	3,444	230
			---	BA-15**		---	3,722	---	---	8	---	---	30,519	---	30,519	28,612	1,907
			---	BA-16		---	2,846	---	---	2.5	---	---	7,116	---	7,116	5,693	1,423
			---	BA-17		---	831	---	---	2	---	---	1,662	---	1,662	1,247	416
			---	BA-18		---	1,664	---	---	2	---	---	3,327	---	3,327	2,495	832
			---	---		---	---	57	---	---	4	---	---	305	305	267	38
G*			SA-11	---	171,137	2,641	---	---	2	---	---	5,282	--	---	5,282	3,962	1,321
			SA-12a	---		43,005	---	---	2	---	---	86,010	--	---	86,010	64,507	21,502
			---	BA-19		---	1,600	---	---	2	---	---	3,200	---	3,200	2,400	800
			---	BA-20a**		---	13,653	---	---	9	---	---	125,952	---	125,952	118,955	6,997
			---	BA-20b**		---	2,442	---	---	9	---	---	22,530	---	22,530	21,278	1,252
			---	---		---	---	161	---	---	4	---	---	857	857	750	107
H*			SA-12a	---	544,704	20,533	---	---	2	---	---	41,066	--	---	41,066	30,800	10,267
			SA-13	---		12,650	---	---	2	---	---	25,300	--	---	25,300	18,975	6,325
			SA-14	---		58,649	---	---	2	---	---	117,299	--	---	117,299	87,974	29,325
			SA-15	---		52,756	---	---	2	---	---	105,512	--	---	105,512	79,134	26,378
			SA-16	---		57,284	---	---	2	---	---	114,568	--	---	114,568	85,926	28,642
			---	BA-20b**		---	3,731	---	---	9	---	---	34,417	---	34,417	32,505	1,912
			---	BA-21[2]**		---	36,786	---	---	6.5	---	---	246,031	---	246,031	227,178	18,853
			---	BA-22		---	15,251	---	---	2	---	---	30,503	---	30,503	22,877	7,626
L*			SA-21a	---	170,978	105,859	---	---	2	---	---	211,718	---	---	211,718	158,789	52,930
			SA-34	---		14,776	---	---	2	---	---	29,552	---	---	29,552	22,164	7,388
			---	BA-40		---	1,685	---	---	2	---	---	3,370	---	3,370	2,527	842
			---	BA-41		---	2,686	---	---	2	---	---	5,373	---	5,373	4,030	1,343
			---	BA-42		---	2,244	---	---	2	---	---	4,488	---	4,488	3,366	1,122
			---	BA-43a		---	12,475	---	---	3.5	---	---	43,661	---	43,661	37,424	6,237
			---	BA-43b		---	2,662	---	---	3.5	---	---	9,316	---	9,316	7,985	1,331
			---	---		---	---	2,080	---	---	4	---	---	11,066	11,066	9,683	1,383
M*			SA-25a	---	103,755	914	---	---	2	---	---	1,828	---	---	1,828	1,371	457
			SA-30	---		474	---	---	2	---	---	948	---	---	948	711	237
			SA-32	---		24,634	---	---	2	---	---	49,269	---	---	49,269	36,951	12,317
			---	BA-36		---	9,044	---	---	2	---	---	18,087	---	18,087	13,566	4,522
			---	---		---***	---	1,648	---	---	6	---	---	13,150	13,150	12,054	1,096
			---	---		---	---	441	---	---	4	---	---	2,346	2,346	2,053	293
MBK-A*			SA-21a	---	81,960	17,115	---	---	2	---	---	34,230	---	---	34,230	25,673	8,558
			SA-21b	---		743	---	---	2	---	---	1,486	---	---	1,486	1,115	372
			---	BA-30		---	48,641	---	---	2	---	---	97,282	---	97,282	72,962	24,321
			---	---		---	---	1,337	---	---	4	---	---	7,113	7,113	6,224	889
MBK-B*			SA-21a	---	82,837	14,918	---	---	2	---	---	29,836	---	---	29,836	22,377	7,459
			SA-21c	---		847	---	---	2	---	---	1,694	---	---	1,694	1,271	424
			---	BA-30		---	43,764	---	---	2	---	---	87,528	---	87,528	65,646	21,882
			---	---		---	---	1,425	---	---	4	---	---	7,581	7,581	6,633	948
MBK-C*			SA-21a	---	79,370	1,663	---	---	2	---	---	3,326	---	---	3,326	2,495	832
			SA-21d	---		0	---	---	2	---	---	0	---	---	0	0	0
			SA-23	---		1,667	---	---	2	---	---	3,334	---	---	3,334	2,501	834
			---	BA-30		---	50,396	---	---	2	---	---	100,792	---	100,792	75,594	25,198
			---	---		---	---	2,206	---	---	4	---	---	11,736	11,736	10,269	1,467
MBK-D*			SA-21a	---	126,680	62,322	---	---	2	---	---	124,644	--	---	124,644	93,483	31,161
			SA-35	---		15,667	---	---	2	---	---	31,333	--	---	31,333	23,500	7,833
			---	BA-26		---	581	---	---	2	---	---	1,161	---	1,161	871	290
			---	BA-44**		---	814	---	---	9	---	---	7,509	---	7,509	7,092	417
			---	BA-45		---	3,644	---	---	2	---	---	7,288	---	7,288	5,466	1,822
			---	---		---	---	2,533	---	---	4	---	---	13,474	13,474	11,790	1,684
MBK-E*			SA-5	---	132,122	129,312	---	---	2	---	---	258,624	---	---	258,624	193,968	64,656
			---	BA-3		---	1,017	---	---	2	---	---	2,034	---	2,034	1,526	509
			---	BA-4		---	1,472	---	---	2	---	---	2,944	---	2,944	2,208	736
			---	---		---	---	1,194	---	---	4	---	---	6,352	6,352	5,558	794
MBK-F*			SA-8	---	88,004	10,752	---	---	2	---	---	21,504	--	---	21,504	16,128	5,376
			---	BA-7		---	2,012	---	---	3.5	---	---	7,041	---	7,041	6,035	1,006
			---	BA-8		---	683	---	---	2	---	---	1,367	---	1,367	1,025	342
			---	---		---	---	336	---	---	4	---	---	1,790	1,790	1,566	224
MBK-G*			SA-15	---	95,236	11,949	---	---	2	---	---	23,898	--	---	23,898	17,924	5,975
			SA-36a	---		5,555	---	---	2	---	---	11,110	--	---	11,110	8,332	2,777
			SA-36b	---		1,635	---	---	2	---	---	3,270	--	---	3,270	2,453	818
			SA-36c	---		13,667	---	---	2	---	---	27,334	--	---	27,334	20,501	6,834
			---	BA-47a**		---	1,010	---	---	10	---	---	10,356	---	10,356	9,839	518
			---	BA-47**		---	11,257	---	---	6	---	---	69,231	---	69,231	63,462	5,769
N†			SA-31	---	157,961	60,906	---	---	2	---	---	121,812	--	---	121,812	91,359	30,453
			SA-32	---		50,519	---	---	2	---	---	101,038	--	---	101,038	75,779	25,260
			---	BA-37		---	1,077	---	---	2	---	---	2,155	---	2,155	1,616	539
			---	BA-38		---	2,116	---	---	2	---	---	4,231	---	4,231	3,173	1,058
			---	BA-39		---	15,269	---	---	2	---	---	30,538	---	30,538	22,904	7,635
			---	---		---	---	1,050	---	---	4	---	---	5,585	5,585	4,887	698
O*			SA-32	---	185,518	959	---	---	2	---	---	1,918	--	---	1,918	1,439	480
			SA-33a	---		13,703	---	---	2	---	---	27,406	--	---	27,406	20,555	6,852
			SA-33b	---		3,751	---	---	2	---	---	7,502	--	---	7,502	5,627	1,876
			---	---		---***	---	950	---	---	6	---	---	7,580	7,580	6,948	632
P†			SA-21a	---	77,894	27,294	---	---	2	---	---	54,587	--	---	54,587	40,941	13,647
			---	BA-28		---	7,096	---	---	2	---	---	14,192	---	14,192	10,644	3,548
			---	BA-29		---	4,305	---	---	2	---	---	8,611	---	8,611	6,458	2,153
			---	---		---	---	613	---	---	4	---	---	3,262	3,262	2,854	408

Table C-22 (continued)

Alternative 6a: Removal of All Identified ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Parcel IDs			Surficial ID	Burial ID	Total Area Excavated[4]				Excavation Depth			Volume Removed[4]			Total Volume Removed[4]	Backfill Volume[7]	
					Total Parcel Area	Surficial ACM Area[3]	Buried ACM Area	Pipe Insulation ACM[5,6]	Surficial ACM Area	Buried ACM Area	Pipe Insulation ACM[5]	Surficial ACM Volume	Buried ACM Volume	Pipe Insulation ACM[5]		Common Fill	Topsoil
Bin A	Bin B	Bin C			SF	SF	SF	SF	FT	FT	FT	CF	CF	CF	CF	CF	CF
Q*			SA-22	---	75,099	3,476	---	---	2	---	---	6,953	--	---	6,953	5,214	1,738
			SA-23	---		11,184	---	---	2	---	---	22,367	--	---	22,367	16,776	5,592
			SA-31	---		7,645	---	---	2	---	---	15,290	--	---	15,290	11,468	3,823
			---	BA-30		---	6,646	---	---	2	---	---	13,292	---	13,292	9,969	3,323
			---	BA-31		---	14,004	---	---	2	---	---	28,008	---	28,008	21,006	7,002
			---	BA-32		---	645	---	---	2	---	---	1,290	---	1,290	967	322
			---	BA-33		---	1,467	---	---	2	---	---	2,935	---	2,935	2,201	734
			---	---		---	---	133	---	---	4	---	---	706	706	618	88
R*			SA-23	---	70,175	6,724	---	---	2	---	---	13,449	--	---	13,449	10,087	3,362
			SA-24	---		34,733	---	---	2	---	---	69,466	--	---	69,466	52,099	17,366
			SA-25a	---		399	---	---	2	---	---	798	--	---	798	599	200
			SA-31	---		965	---	---	2	---	---	1,930	--	---	1,930	1,448	483
			---	BA-31		---	4,779	---	---	2	---	---	9,558	---	9,558	7,168	2,389
			---	BA-34		---	1,106	---	---	2	---	---	2,212	---	2,212	1,659	553
			---	---		---	---	180	---	---	4	---	---	957	957	837	120
S*			SA-20a	---	92,670	35,378	---	---	2	---	---	70,757	--	---	70,757	53,067	17,689
			SA-20b	---		1,642	---	---	2	---	---	3,284	--	---	3,284	2,463	821
			SA-21a	---		28,433	---	---	2	---	---	56,866	--	---	56,866	42,650	14,217
			---	BA-25		---	2,195	---	---	2	---	---	4,389	---	4,389	3,292	1,097
			---	BA-26		---	11,805	---	---	2	---	---	23,611	---	23,611	17,708	5,903
			---	BA-27		---	8,670	---	---	2.2	---	---	18,785	---	18,785	14,450	4,335
			---	---		---	---	226	---	---	4	---	---	1,200	1,200	1,050	150
W*			SA-25a	---	98,880	4,086	---	---	2	---	---	8,171	--	---	8,171	6,128	2,043
			SA-25b	---		2,426	---	---	2	---	---	4,853	--	---	4,853	3,639	1,213
			SA-29	---		8,829	---	---	2	---	---	17,658	--	---	17,658	13,244	4,415
			SA-30	---		824	---	---	2	---	---	1,648	--	---	1,648	1,236	412
			SA-32	---		835	---	---	2	---	---	1,670	--	---	1,670	1,253	418
			---	BA-35a**		---	9,843	---	---	4.4	---	---	44,513	---	44,513	39,468	5,045
			---	BA-35b		---	16,433	---	---	2	---	---	32,866	---	32,866	24,649	8,216
			---	---		---	---	1,297	---	---	4	---	---	6,902	6,902	6,039	863
X*			SA-27	---	91,229	668	---	---	2	---	---	1,336	--	---	1,336	1,002	334
			SA-28a	---		18,663	---	---	2	---	---	37,326	--	---	37,326	27,995	9,332
			SA-28b	---		2,553	---	---	2	---	---	5,106	--	---	5,106	3,830	1,277
			---	---		---***	---	522	---	---	6	---	---	4,163	4,163	3,816	347
	Y*		SA-1b	---	137,170	47	---	---	2	---	---	94	--	---	94	71	24
			SA-1c	---		977	---	---	2	---	---	1,955	--	---	1,955	1,466	489
			SA-3	---		616	---	---	2	---	---	1,232	--	---	1,232	924	308
Z*			SA-24	---	80,589	8,971	---	---	2	---	---	17,942	--	---	17,942	13,457	4,486
			SA-25a	---		15,259	---	---	2	---	---	30,518	--	---	30,518	22,889	7,630
			SA-26	---		601	---	---	2	---	---	1,202	--	---	1,202	902	301
			---	BA-35a**		---	14,206	---	---	4.4	---	---	64,244	---	64,244	56,964	7,281
			---	BA-35b		---	4,663	---	---	2	---	---	9,326	---	9,326	6,994	2,331
			---	---		---	---	658	---	---	4	---	---	3,501	3,501	3,063	438
Surficial & Burial ACM Extending Outside Parcel Areas																	
			SA-1a	---		16	---	---	2	---	---	32	--	---	32	24	8
			SA-2	---		193	---	---	2	---	---	386	--	---	386	289	96
			SA-5	---		3,939	---	---	2	---	---	7,879	--	---	7,879	5,909	1,970
			SA-6	---		111	---	---	2	---	---	223	--	---	223	167	56
			SA-7	---		2,179	---	---	2	---	---	4,357	--	---	4,357	3,268	1,089
			SA-8	---		2,371	---	---	2	---	---	4,742	--	---	4,742	3,556	1,185
			SA-9a	---		9,263	---	---	2	---	---	18,527	--	---	18,527	13,895	4,632
			SA-10	---		146	---	---	2	---	---	292	--	---	292	219	73
			SA-11	---		2,267	---	---	2	---	---	4,535	--	---	4,535	3,401	1,134
			SA-12a	---		12,431	---	---	2	---	---	24,863	--	---	24,863	18,647	6,216
			SA-12b	---		37	---	---	2	---	---	74	--	---	74	56	19
			SA-15	---		9,393	---	---	2	---	---	18,786	--	---	18,786	14,090	4,697
			SA-16	---		52	---	---	2	---	---	104	--	---	104	78	26
			SA-20a	---		8,883	---	---	2	---	---	17,765	--	---	17,765	13,324	4,441
			SA-21a	---		8,899	---	---	2	---	---	17,799	--	---	17,799	13,349	4,450
			SA-23	---		2,634	---	---	2	---	---	5,268	--	---	5,268	3,951	1,317
			SA-24	---		1,000	---	---	2	---	---	2,000	--	---	2,000	1,500	500
			SA-25a	---		14	---	---	2	---	---	28	--	---	28	21	7
			SA-28a	---		262	---	---	2	---	---	524	--	---	524	393	131
			SA-28b	---		378	---	---	2	---	---	756	--	---	756	567	189
			SA-30	---		15	---	---	2	---	---	30	--	---	30	23	8
			SA-32	---		106	---	---	2	---	---	213	--	---	213	159	53
			SA-34	---		1,022	---	---	2	---	---	2,044	--	---	2,044	1,533	511
			SA-35	---		4,256	---	---	2	---	---	8,512	--	---	8,512	6,384	2,128
			SA-36a	---		20,036	---	---	2	---	---	40,072	--	---	40,072	30,054	10,018
			SA-36c	---		7,647	---	---	2	---	---	15,294	--	---	15,294	11,471	3,824
			SA-39	---		967	---	---	2	---	---	1,934	--	---	1,934	1,450	483
			SA-40	---		3,797	---	---	2	---	---	7,593	--	---	7,593	5,695	1,898
			SA-41	---		1,884	---	---	2	---	---	3,769	--	---	3,769	2,827	942
			---	BA-6		---	2,433	---	---	2	---	---	4,865	---	4,865	3,649	1,216
			---	BA-25		---	3,127	---	---	2	---	---	6,253	---	6,253	4,690	1,563
			---	BA-26		---	7,032	---	---	2	---	---	14,065	---	14,065	10,548	3,516
			---	---		---	---	3,146	---	---	4	---	---	16,737	16,737	14,645	2,092
				---		---***	---	336	---	---	6	---	---	2,681	2,681	2,458	223
Total						**1,983,800**	**505,600**	**25,800**				**3,967,500**	**1,601,100**	**143,800**	**5,712,400**	**4,449,100**	**1,263,300**

Notes:

1. Depth of buried ACM debris at BA-1 assumed to be same as at BA-2. Both BA-1 and BA-2 are under parcel AG.
2. See Section 4.1.8.2 of RI for ACM volumes at BA-21 (under parcel H).
3. Surface ACM Area is accounted with the Buried ACM Area when there is an overlap in excavation.
4. All volumes and areas are rounded up to the nearest whole number
5. Steam pipe was observed at depths ranging from 2 to 6 feet bgs and assume 3 feet wide excavation
6. Excavation of steam pipe within Surficial ACM and Buried ACM areas considered negligable.
7. Topsoil depth is 6 inches; Common Fill depth varies with excavtion depth.

* Indicates parcels no longer occupied

** Burial area depth is greater than 4 feet - assume a 2.5% increase in soil excavation for sloping.

*** All pipe excavation - assume a 33% increase in soil excavation for sloping.

† Indicates that parcel is privately owned.

Bin A Parcel Area (SF)	4,177,857
Total Bin A Area Covered (SF)	2,352,326
Total Bin A Area Not Covered (SF)	1,825,531

Table C-23

Alternative 6b: Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Parcel IDs			Surficial ID	Burial ID	Total Area Excavated[4]					Excavation Depth				Volume Removed[4]				Total Volume Removed[4]	Backfill Volume[7]	
					Total Parcel Area	Surficial ACM Area[3]	Buried ACM Area	Pipe Insulation ACM[5,6]	Remaining Area Under Bin A	Surficial ACM Area	Buried ACM Area	Pipe Insulation ACM[5]	Remaining Area Under Bin A	Surficial ACM Volume	Buried ACM Volume	Pipe Insulation ACM[5]	Remaining Area Under Bin A		Common Fill	Topsoil
Bin A	Bin B	Bin C			SF	SF	SF	SF	SF	FT	FT	FT	FT	CF	CF	CF	CF	CF	CF	CF
A*			SA-15	---	240,463	98,740	---	---	---	2	---	---	---	197,480	---	---	---	197,480	148,110	49,370
			SA-42	---		418	---	---	---	2	---	---	---	836	---	---	---	836	627	209
			SA-43	---		0	---	---	---	2	---	---	---	0	---	---	---	0	0	0
			---	BA-46**		---	9,620	---	---	---	4.8	---	---	---	46,839	---	---	46,839	41,908	4,930
			---	---		---	---	824	---	---	---	4	---	---	---	4,384	---	4,384	3,836	548
						---	---	---	130,861	---	---	---	2	---	---	---	261,721	261,721	196,291	65,430
AG*			SA-1a	---	206,343	52,644	---	---	---	2	---	---	---	105,288	---	---	---	105,288	78,966	26,322
			SA-1b	---		88	---	---	---	2	---	---	---	177	---	---	---	177	133	44
			SA-1c	---		224	---	---	---	2	---	---	---	449	---	---	---	449	336	112
			SA-1d	---		4,652	---	---	---	2	---	---	---	9,304	---	---	---	9,304	6,978	2,326
			SA-4	---		17,328	---	---	---	2	---	---	---	34,656	---	---	---	34,656	25,992	8,664
			---	BA-1[1]		---	3,030	---	---	---	2.4	---	---	---	7,273	---	---	7,273	5,758	1,515
			---	BA-2		---	18,518	---	---	---	2.4	---	---	---	44,444	---	---	44,444	35,185	9,259
			---	---		---	---	316	---	---	---	4	---	---	---	1,681	---	1,681	1,471	210
						---	---	---	109,542	---	---	---	2	---	---	---	219,084	219,084	164,313	54,771
AI*			SA-5	---	104,795	98,040	---	---	---	2	---	---	---	196,080	---	---	---	196,080	147,060	49,020
			---	BA-6		---	7,124	---	---	---	2	---	---	---	14,249	---	---	14,249	10,687	3,562
						---	---	---	0	---	---	---	2	---	---	---	0	0	0	0
AK†			SA-40	---	52,009	17,892	---	---	---	2	---	---	---	35,784	---	---	---	35,784	26,838	8,946
						---	---	---	34,117	---	---	---	2	---	---	---	68,234	68,234	51,176	17,059
AL*			SA-5	---	116,576	112,095	---	---	---	2	---	---	---	224,190	---	---	---	224,190	168,143	56,048
			---	BA-5**		---	4,081	---	---	---	4	---	---	---	16,732	---	---	16,732	14,641	2,092
			---	---		---	---	978	---	---	---	2	---	---	---	2,601	---	2,601	1,951	650
			---	---		---	---	---	0	---	---	---	2	---	---	---	0	0	0	0
	AM†		SA-41	---	160,425	32,611	---	---	---	2	---	---	---	65,222	---	---	---	65,222	48,917	16,306
			---	BA-48		---	4,630	---	---	---	2	---	---	---	9,260	---	---	9,260	6,945	2,315
	AP*		SA-1a	---	121,917	2,157	---	---	---	2	---	---	---	4,314	---	---	---	4,314	3,236	1,079
			SA-1b	---		1,395	---	---	---	2	---	---	---	2,789	---	---	---	2,789	2,092	697
			SA-45	---		22	---	---	---	2	---	---	---	44	---	---	---	44	33	11
	AQ†		---	---	111,195	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	AR†		---	---	507,189	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	AS†		---	---	240,029	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AT†	---	---	25,508	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
			---	---		---***	---	---	---	---	---	---	---	---	---	---	---	0	---	---
		AU†	---	---	25,827	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
			---	---		---***	---	---	---	---	---	---	---	---	---	---	---	0	---	---
		AV†	---	---	19,952	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
			---	---		---***	---	---	---	---	---	---	---	---	---	---	---	0	---	---
		AW†	---	---	18,762	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AX†	---	---	17,275	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AY†	---	---	17,250	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		AZ†	---	---	18,517	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
B*			SA-12a	---	244,982	19,410	---	---	---	2	---	---	---	38,820	---	---	---	38,820	29,115	9,705
			SA-15	---		31,402	---	---	---	2	---	---	---	62,804	---	---	---	62,804	47,103	15,701
			SA-17	---		873	---	---	---	2	---	---	---	1,746	---	---	---	1,746	1,310	437
			SA-18	---		3,659	---	---	---	2	---	---	---	7,318	---	---	---	7,318	5,489	1,830
			SA-19	---		35,606	---	---	---	2	---	---	---	71,212	---	---	---	71,212	53,409	17,803
			---	BA-23		---	2,430	---	---	---	2	---	---	---	4,859	---	---	4,859	3,645	1,215
			---	BA-24		---	1,879	---	---	---	2	---	---	---	3,757	---	---	3,757	2,818	939
			---	---		---	---	0.4	---	---	---	4	---	---	---	2	---	2	2	0
						---	---	---	149,723	---	---	---	2	---	---	---	299,446	299,446	224,585	74,862
		BA†	---	---	34,059	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BB†	---	---	20,112	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
			---	---		---***	---	---	---	---	---	---	---	---	---	---	---	0	---	---
		BC†	---	---	29,744	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BD†	---	---	198,086	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BE†	---	---	35,882	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BF†	---	---	123,750	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BG†	---	---	68,289	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
		BH†	---	---	310,093	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	BI†		---	---	65,449	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	BJ†		---	---	44,403	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	BK†		---	---	224,527	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
	BL*		---	---	78,513	---	---	---	---	---	---	---	---	---	--	---	---	0	---	---
BM†			SA-37	---	95,936	13,743	---	---	---	2	---	---	---	27,486	---	---	---	27,486	20,615	6,872
			SA-38	---		50,001	---	---	---	2	---	---	---	100,002	---	---	---	100,002	75,002	25,001
						---	---	---	32,192	---	---	---	2	---	---	---	64,384	64,384	48,288	16,096
BO†			SA-39	---	36,614	9,077	---	---	---	2	---	---	---	18,154	---	---	---	18,154	13,616	4,539
						---	---	---	27,537	---	---	---	2	---	---	---	55,074	55,074	41,306	13,769
C*			SA-9a	---	99,064	34,774	---	---	---	2	---	---	---	69,548	---	---	---	69,548	52,161	17,387
			SA-9b	---		5,147	---	---	---	2	---	---	---	10,294	---	---	---	10,294	7,721	2,574
			---	BA-10a**		---	7,771	---	---	---	8.7	---	---	---	69,027	---	---	69,027	65,044	3,983
			---	BA-10b		---	4,108	---	---	---	2	---	---	---	8,217	---	---	8,217	6,163	2,054
			---	BA-10c		---	3,748	---	---	---	2	---	---	---	7,496	---	---	7,496	5,622	1,874
			---	---		---	---	273	---	---	---	4	---	---	---	1,455	---	1,455	1,273	182
						---	---	---	43,242	---	---	---	2	---	---	---	86,484	86,484	64,863	21,621
D*			SA-9a	---	99,609	38,913	---	---	---	2	---	---	---	77,827	---	---	---	77,827	58,370	19,457
			SA-9b	---		1,292	---	---	---	2	---	---	---	2,584	---	---	---	2,584	1,938	646
			---	BA-9		---	1,227	---	---	---	2	---	---	---	2,453	---	---	2,453	1,840	613
			---	---		---	---	665	---	---	---	4	---	---	---	3,538	---	3,538	3,096	442
						---	---	---	57,512	---	---	---	2	---	---	---	115,024	115,024	86,268	28,756
E*			SA-9a	---	128,970	41,195	---	---	---	2	---	---	---	82,390	---	---	---	82,390	61,792	20,597
			SA-10	---		4,621	---	---	---	2	---	---	---	9,241	---	---	---	9,241	6,931	2,310
			SA-44	---		30	---	---	---	2	---	---	---	60	---	---	---	60	45	15
			---	BA-11		---	1,929	---	---	---	2	---	---	---	3,858	---	---	3,858	2,894	965
			---	BA-12		---	13,843	---	---	---	2	---	---	---	27,685	---	---	27,685	20,764	6,921
			---	BA-13		---	1,947	---	---	---	2	---	---	---	3,893	---	---	3,893	2,920	973
			---	---		---	---	206	---	---	---	4	---	---	---	1,093	---	1,093	957	137
						---	---	---	65,201	---	---	---	2	---	---	---	130,401	130,401	97,801	32,600
F†			SA-11	---	145,698	53,811	---	---	---	2	---	---	---	107,623	---	---	---	107,623	80,717	26,906
			SA-12a	---		37,483	---	---	---	2	---	---	---	74,966	---	---	---	74,966	56,225	18,742
			SA-12b	---		25,132	---	---	---	2	---	---	---	50,264	---	---	---	50,264	37,698	12,566
			---	BA-14		---	1,670	---	---	---	2	---	---	---	3,341	---	---	3,341	2,506	835
			---	BA-15a**		---	448	---	---	---	8	---	---	---	3,674	---	---	3,674	3,444	230
			---	BA-15**		---	3,722	---	---	---	8	---	---	---	30,519	---	---	30,519	28,612	1,907
			---	BA-16		---	2,846	---	---	---	2.5	---	---	---	7,116	---	---	7,116	5,693	1,423
			---	BA-17		---	831	---	---	---	2	---	---	---	1,662	---	---	1,662	1,247	416
			---	BA-18		---	1,664	---	---	---	2	---	---	---	3,327	---	---	3,327	2,495	832
			---	---		---	---	57	---	---	---	4	---	---	---	305	---	305	267	38
						---	---	---	18,033	---	---	---	2	---	---	---	36,065	36,065	27,049	9,016
G*			SA-11	---	171,137	2,641	---	---	---	2	---	---	---	5,282	---	---	---	5,282	3,962	1,321
			SA-12a	---		43,005	---	---	---	2	---	---	---	86,010	---	---	---	86,010	64,507	21,502
			---	BA-19		---	1,600	---	---	---	2	---	---	---	3,200	---	---	3,200	2,400	800
			---	BA-20a**		---	13,653	---	---	---	9	---	---	---	125,952	---	---	125,952	118,955	6,997
			---	BA-20b**		---	2,442	---	---	---	9	---	---	---	22,530	---	---	22,530	21,278	1,252
			---	---		---	---	161	---	---	---	4	---	---	---	857	---	857	750	107
						---	---	---	107,634	---	---	---	2	---	---	---	215,269	215,269	161,452	53,817
H*			SA-12a	---	544,704	20,533	---	---	---	2	---	---	---	41,066	---	---	---	41,066	30,800	10,267
			SA-13	---		12,650	---	---	---	2	---	---	---	25,300	---	---	---	25,300	18,975	6,325
			SA-14	---		58,649	---	---	---	2	---	---	---	117,299	---	---	---	117,299	87,974	29,325
			SA-15	---		52,756	---	---	---	2	---	---	---	105,512	---	---	---	105,512	79,134	26,378
			SA-16	---		57,284	---	---	---	2	---	---	---	114,568	---	---	---	114,568	85,926	28,642
			---	BA-20b**		---	3,731	---	---	---	9	---	---	---	34,417	---	---	34,417	32,505	1,912
			---	BA-21[2]**		---	36,786	---	---	---	6.5	---	---	---	246,031	---	---	246,031	227,178	18,853
			---	BA-22		---	15,251	---	---	---	2	---	---	---	30,503	---	---	30,503	22,877	7,626
						---	---	---	287,063	---	---	---	2	---	---	---	574,125	574,125	430,594	143,531
L*			SA-21a	---	170,978	105,859	---	---	---	2	---	---	---	211,718	---	---	---	211,718	158,789	52,930
			SA-34	---		14,776	---	---	---	2	---	---	---	29,552	---	---	---	29,552	22,164	7,388
			---	BA-40		---	1,685	---	---	---	2	---	---	---	3,370	---	---	3,370	2,527	842
			---	BA-41		---	2,686	---	---	---	2	---	---	---	5,373	---	---	5,373	4,030	1,343
			---	BA-42		---	2,244	---	---	---	2	---	---	---	4,488	---	---	4,488	3,366	1,122
			---	BA-43a		---	12,475	---	---	---	3.5	---	---	---	43,661	---	---	43,661	37,424	6,237
			---	BA-43b		---	2,662	---	---	---	3.5	---	---	---	9,316	---	---	9,316	7,985	1,331
			---	---		---	---	2,080	---	---	---	4	---	---	---	11,066	---	11,066	9,683	1,383
						---	---	---	26,511	---	---	---	2	---	---	---	53,022	53,022	39,767	13,256
M*			SA-25a	---	103,755	914	---	---	---	2	---	---	---	1,828	---	---	---	1,828	1,371	457
			SA-30	---		474	---	---	---	2	---	---	---	948	---	---	---	948	711	237
			SA-32	---		24,634	---	---	---	2	---	---	---	49,269	---	---	---	49,269	36,951	12,317
			---	BA-36		---	9,044	---	---	---	2	---	---	---	18,087	---	---	18,087	13,566	4,522
			---	---		---***	---	1,648	---	---	---	6	---	---	---	13,150	---	13,150	12,054	1,096
			---	---		---	---	441	---	---	---	4	---	---	---	2,346	---	2,346	2,053	293
						---	---	---	66,600	---	---	---	2	---	---	---	133,200	133,200	99,900	33,300
MBK-A*			SA-21a	---	81,960	17,115	---	---	---	2	---	---	---	34,230	---	---	---	34,230	25,673	8,558
			SA-21b	---		743	---	---	---	2	---	---	---	1,486	---	---	---	1,486	1,115	372
			---	BA-30		---	48,641	---	---	---	2	---	---	---	97,282	---	---	97,282	72,962	24,321
			---	---		---	---	1,337	---	---	---	4	---	---	---	7,113	---	7,113	6,224	889
			---	---		---	---	---	14,124	---	---	---	2	---	---	---	28,248	28,248	21,186	7,062
MBK-B*			SA-21a	---	82,837	14,918	---	---	---	2	---	---	---	29,836	---	---	---	29,836	22,377	7,459
			SA-21c	---		847	---	---	---	2	---	---	---	1,694	---	---	---	1,694	1,271	424
			---	BA-30		---	43,764	---	---	---	2	---	---	---	87,528	---	---	87,528	65,646	21,882
			---	---		---	---	1,425	---	---	---	4	---	---	---	7,581	---	7,581	6,633	948
			---	---		---	---	---	21,883	---	---	---	2	---	---	---	43,766	43,766	32,825	10,942
MBK-C*			SA-21a	---	79,370	1,663	---	---	---	2	---	---	---	3,326	---	---	---	3,326	2,495	832
			SA-21d	---		0	---	---	---	2	---	---	---	0	---	---	---	0	0	0
			SA-23	---		1,667	---	---	---	2	---	---	---	3,334	---	---	---	3,334	2,501	834
			---	BA-30		---	50,396	---	---	---	2	---	---	---	100,792	---	---	100,792	75,594	25,198
			---	---		---	---	2,206	---	---	---	4	---	---	---	11,736	---	11,736	10,269	1,467
			---	---		---	---	---	23,438	---	---	---	2	---	---	---	46,876	46,876	35,157	11,719
MBK-D*			SA-21a	---	126,680	62,322	---	---	---	2	---	---	---	124,644	---	---	---	124,644	93,483	31,161
			SA-35	---		15,667	---	---	---	2	---	---	---	31,333	---	---	---	31,333	23,500	7,833
			---	BA-26		---	581	---	---	---	2	---	---	---	1,161	---	---	1,161	871	290
			---	BA-44**		---	814	---	---	---	9	---	---	---	7,509	---	---	7,509	7,092	417
			---	BA-45		---	3,644	---	---	---	2	---	---	---	7,288	---	---	7,288	5,466	1,822
			---	---		---	---	2,533	---	---	---	4	---	---	---	13,474	---	13,474	11,790	1,684
						---	---	---	41,120	---	---	---	2	---	---	---	82,240	82,240	61,680	20,560

Alternative 6b: Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Parcel IDs			Surficial ID	Burial ID	Total Area Excavated[4]					Excavation Depth				Volume Removed[4]				Total Volume Removed[4]	Backfill Volume[7]	
					Total Parcel Area	Surficial ACM Area[3]	Buried ACM Area	Pipe Insulation ACM[5,6]	Remaining Area Under Bin A	Surficial ACM Area	Buried ACM Area	Pipe Insulation ACM[5]	Remaining Area Under Bin A	Surficial ACM Volume	Buried ACM Volume	Pipe Insulation ACM[5]	Remaining Area Under Bin A		Common Fill	Topsoil
Bin A	Bin B	Bin C			SF	SF	SF	SF	SF	FT	FT	FT	FT	CF	CF	CF	CF	CF	CF	CF
MBK-E*			SA-5	---	132,122	129,312	---	---	---	2	---	---	---	258,624	---	---	---	258,624	193,968	64,656
			---	BA-3		---	1,017	---	---	---	2	---	---	---	2,034	---	---	2,034	1,526	509
			---	BA-4		---	1,472	---	---	---	2	---	---	---	2,944	---	---	2,944	2,208	736
			---	---		---	---	1,194	---	---	---	4	---	---	---	6,352	---	6,352	5,558	794
			---	---		---	---	---	0	---	---	---	2	---	---	---	0	0	0	0
MBK-F*			SA-8	---	88,004	10,752	---	---	---	2	---	---	---	21,504	---	---	---	21,504	16,128	5,376
			---	BA-7		---	2,012	---	---	---	3.5	---	---	---	7,041	---	---	7,041	6,035	1,006
			---	BA-8		---	683	---	---	---	2	---	---	---	1,367	---	---	1,367	1,025	342
			---	---		---	---	336	---	---	---	4	---	---	---	1,790	---	1,790	1,566	224
						---	---	---	74,221	---	---	---	2	---	---	---	148,441	148,441	111,331	37,110
MBK-G*			SA-15	---	95,236	11,949	---	---	---	2	---	---	---	23,898	---	---	---	23,898	17,924	5,975
			SA-36a	---		5,555	---	---	---	2	---	---	---	11,110	---	---	---	11,110	8,332	2,777
			SA-36b	---		1,635	---	---	---	2	---	---	---	3,270	---	---	---	3,270	2,453	818
			SA-36c	---		13,667	---	---	---	2	---	---	---	27,334	---	---	---	27,334	20,501	6,834
			---	BA-47a**		---	1,010	---	---	---	10	---	---	---	10,356	---	---	10,356	9,839	518
			---	BA-47**		---	11,257	---	---	---	6	---	---	---	69,231	---	---	69,231	63,462	5,769
						---	---	---	50,163	---	---	---	2	---	---	---	100,325	100,325	75,244	25,081
N†			SA-31	---	157,961	60,906	---	---	---	2	---	---	---	121,812	---	---	---	121,812	91,359	30,453
			SA-32	---		50,519	---	---	---	2	---	---	---	101,038	---	---	---	101,038	75,779	25,260
			---	BA-37		---	1,077	---	---	---	2	---	---	---	2,155	---	---	2,155	1,616	539
			---	BA-38		---	2,116	---	---	---	2	---	---	---	4,231	---	---	4,231	3,173	1,058
			---	BA-39		---	15,269	---	---	---	2	---	---	---	30,538	---	---	30,538	22,904	7,635
			---	---		---	---	1,050	---	---	---	4	---	---	---	5,585	---	5,585	4,887	698
						---	---	---	27,024	---	---	---	2	---	---	---	54,048	54,048	40,536	13,512
O*			SA-32	---	185,518	959	---	---	---	2	---	---	---	1,918	---	---	---	1,918	1,439	480
			SA-33a	---		13,703	---	---	---	2	---	---	---	27,406	---	---	---	27,406	20,555	6,852
			SA-33b	---		3,751	---	---	---	2	---	---	---	7,502	---	---	---	7,502	5,627	1,876
			---	---		---***	---	950	---	---	---	6	---	---	---	7,580	---	7,580	6,948	632
						---	---	---	166,155	---	---	---	2	---	---	---	332,310	332,310	249,233	83,078
P†			SA-21a	---	77,894	27,294	---	---	---	2	---	---	---	54,587	---	---	---	54,587	40,941	13,647
			---	BA-28		---	7,096	---	---	---	2	---	---	---	14,192	---	---	14,192	10,644	3,548
			---	BA-29		---	4,305	---	---	---	2	---	---	---	8,611	---	---	8,611	6,458	2,153
			---	---		---	---	613	---	---	---	4	---	---	---	3,262	---	3,262	2,854	408
						---	---	---	38,586	---	---	---	2	---	---	---	77,171	77,171	57,879	19,293
Q*			SA-22	---	75,099	3,476	---	---	---	2	---	---	---	6,953	---	---	---	6,953	5,214	1,738
			SA-23	---		11,184	---	---	---	2	---	---	---	22,367	---	---	---	22,367	16,776	5,592
			SA-31	---		7,645	---	---	---	2	---	---	---	15,290	---	---	---	15,290	11,468	3,823
			---	BA-30		---	6,646	---	---	---	2	---	---	---	13,292	---	---	13,292	9,969	3,323
			---	BA-31		---	14,004	---	---	---	2	---	---	---	28,008	---	---	28,008	21,006	7,002
			---	BA-32		---	645	---	---	---	2	---	---	---	1,290	---	---	1,290	967	322
			---	BA-33		---	1,467	---	---	---	2	---	---	---	2,935	---	---	2,935	2,201	734
			---	---		---	---	133	---	---	---	4	---	---	---	706	---	706	618	88
						---	---	---	29,899	---	---	---	2	---	---	---	59,798	59,798	44,848	14,949
R*			SA-23	---	70,175	6,724	---	---	---	2	---	---	---	13,449	---	---	---	13,449	10,087	3,362
			SA-24	---		34,733	---	---	---	2	---	---	---	69,466	---	---	---	69,466	52,099	17,366
			SA-25a	---		399	---	---	---	2	---	---	---	798	---	---	---	798	599	200
			SA-31	---		965	---	---	---	2	---	---	---	1,930	---	---	---	1,930	1,448	483
			---	BA-31		---	4,779	---	---	---	2	---	---	---	9,558	---	---	9,558	7,168	2,389
			---	BA-34		---	1,106	---	---	---	2	---	---	---	2,212	---	---	2,212	1,659	553
			---	---		---	---	180	---	---	---	4	---	---	---	957	---	957	837	120
						---	---	---	21,289	---	---	---	2	---	---	---	42,578	42,578	31,933	10,644
S*			SA-20a	---	92,670	35,378	---	---	---	2	---	---	---	70,757	---	---	---	70,757	53,067	17,689
			SA-20b	---		1,642	---	---	---	2	---	---	---	3,284	---	---	---	3,284	2,463	821
			SA-21a	---		28,433	---	---	---	2	---	---	---	56,866	---	---	---	56,866	42,650	14,217
			---	BA-25		---	2,195	---	---	---	2	---	---	---	4,389	---	---	4,389	3,292	1,097
			---	BA-26		---	11,805	---	---	---	2	---	---	---	23,611	---	---	23,611	17,708	5,903
			---	BA-27		---	8,670	---	---	---	2.2	---	---	---	18,785	---	---	18,785	14,450	4,335
			---	---		---	---	226	---	---	---	4	---	---	---	1,200	---	1,200	1,050	150
						---	---	---	4,321	---	---	---	2	---	---	---	8,643	8,643	6,482	2,161
W*			SA-25a	---	98,880	4,086	---	---	---	2	---	---	---	8,171	---	---	---	8,171	6,128	2,043
			SA-25b	---		2,426	---	---	---	2	---	---	---	4,853	---	---	---	4,853	3,639	1,213
			SA-29	---		8,829	---	---	---	2	---	---	---	17,658	---	---	---	17,658	13,244	4,415
			SA-30	---		824	---	---	---	2	---	---	---	1,648	---	---	---	1,648	1,236	412
			SA-32	---		835	---	---	---	2	---	---	---	1,670	---	---	---	1,670	1,253	418
			---	BA-35a**		---	9,843	---	---	---	4.4	---	---	---	44,513	---	---	44,513	39,468	5,045
			---	BA-35b		---	16,433	---	---	---	2	---	---	---	32,866	---	---	32,866	24,649	8,216
			---	---		---	---	1,297	---	---	---	4	---	---	---	6,902	---	6,902	6,039	863
						---	---	---	54,307	---	---	---	2	---	---	---	108,614	108,614	81,460	27,153
X*			SA-27	---	91,229	668	---	---	---	2	---	---	---	1,336	---	---	---	1,336	1,002	334
			SA-28a	---		18,663	---	---	---	2	---	---	---	37,326	---	---	---	37,326	27,995	9,332
			SA-28b	---		2,553	---	---	---	2	---	---	---	5,106	---	---	---	5,106	3,830	1,277
			---	---		---***	---	522	---	---	---	6	---	---	---	4,163	---	4,163	3,816	347
						---	---	---	68,823	---	---	---	2	---	---	---	137,647	137,647	103,235	34,412
	Y*		SA-1b	---	137,170	47	---	---	---	2	---	---	---	94	---	---	---	94	71	24
			SA-1c	---		977	---	---	---	2	---	---	---	1,955	---	---	---	1,955	1,466	489
			SA-3	---		616	---	---	---	2	---	---	---	1,232	---	---	---	1,232	924	308
Z*			SA-24	---	80,589	8,971	---	---	---	2	---	---	---	17,942	---	---	---	17,942	13,457	4,486
			SA-25a	---		15,259	---	---	---	2	---	---	---	30,518	---	---	---	30,518	22,889	7,630
			SA-26	---		601	---	---	---	2	---	---	---	1,202	---	---	---	1,202	902	301
			---	BA-35a**		---	14,206	---	---	---	4.4	---	---	---	64,244	---	---	64,244	56,964	7,281
			---	BA-35b		---	4,663	---	---	---	2	---	---	---	9,326	---	---	9,326	6,994	2,331
			---	---		---	---	658	---	---	---	4	---	---	---	3,501	---	3,501	3,063	438
						---	---	---	36,231	---	---	---	2	---	---	---	72,461	72,461	54,346	18,115
Surficial & Burial ACM Extending Outside Parcel Areas																				
			SA-1a	---		16	---	---	---	2	---	---	---	32	---	---	---	32	24	8
			SA-2	---		193	---	---	---	2	---	---	---	386	---	---	---	386	289	96
			SA-5	---		3,939	---	---	---	2	---	---	---	7,879	---	---	---	7,879	5,909	1,970
			SA-6	---		111	---	---	---	2	---	---	---	223	---	---	---	223	167	56
			SA-7	---		2,179	---	---	---	2	---	---	---	4,357	---	---	---	4,357	3,268	1,089
			SA-8	---		2,371	---	---	---	2	---	---	---	4,742	---	---	---	4,742	3,556	1,185
			SA-9a	---		9,263	---	---	---	2	---	---	---	18,527	---	---	---	18,527	13,895	4,632
			SA-10	---		146	---	---	---	2	---	---	---	292	---	---	---	292	219	73
			SA-11	---		2,267	---	---	---	2	---	---	---	4,535	---	---	---	4,535	3,401	1,134
			SA-12a	---		12,431	---	---	---	2	---	---	---	24,863	---	---	---	24,863	18,647	6,216
			SA-12b	---		37	---	---	---	2	---	---	---	74	---	---	---	74	56	19
			SA-15	---		9,393	---	---	---	2	---	---	---	18,786	---	---	---	18,786	14,090	4,697
			SA-16	---		52	---	---	---	2	---	---	---	104	---	---	---	104	78	26
			SA-20a	---		8,883	---	---	---	2	---	---	---	17,765	---	---	---	17,765	13,324	4,441
			SA-21a	---		8,899	---	---	---	2	---	---	---	17,799	---	---	---	17,799	13,349	4,450
			SA-23	---		2,634	---	---	---	2	---	---	---	5,268	---	---	---	5,268	3,951	1,317
			SA-24	---		1,000	---	---	---	2	---	---	---	2,000	---	---	---	2,000	1,500	500
			SA-25a	---		14	---	---	---	2	---	---	---	28	---	---	---	28	21	7
			SA-28a	---		262	---	---	---	2	---	---	---	524	---	---	---	524	393	131
			SA-28b	---		378	---	---	---	2	---	---	---	756	---	---	---	756	567	189
			SA-30	---		15	---	---	---	2	---	---	---	30	---	---	---	30	23	8
			SA-32	---		106	---	---	---	2	---	---	---	213	---	---	---	213	159	53
			SA-34	---		1,022	---	---	---	2	---	---	---	2,044	---	---	---	2,044	1,533	511
			SA-35	---		4,256	---	---	---	2	---	---	---	8,512	---	---	---	8,512	6,384	2,128
			SA-36a	---		20,036	---	---	---	2	---	---	---	40,072	---	---	---	40,072	30,054	10,018
			SA-36c	---		7,647	---	---	---	2	---	---	---	15,294	---	---	---	15,294	11,471	3,824
			SA-39	---		967	---	---	---	2	---	---	---	1,934	---	---	---	1,934	1,450	483
			SA-40	---		3,797	---	---	---	2	---	---	---	7,593	---	---	---	7,593	5,695	1,898
			SA-41	---		1,884	---	---	---	2	---	---	---	3,769	---	---	---	3,769	2,827	942
			---	BA-6		---	2,433	---	---	---	2	---	---	---	4,865	---	---	4,865	3,649	1,216
			---	BA-25		---	3,127	---	---	---	2	---	---	---	6,253	---	---	6,253	4,690	1,563
			---	BA-26		---	7,032	---	---	---	2	---	---	---	14,065	---	---	14,065	10,548	3,516
			---	---		---	---	3,146	---	---	---	4	---	---	---	16,737	---	16,737	14,645	2,092
				---		---***	---	336	---	---	---	6	---	---	---	2,681	---	2,681	2,458	223
Total						**1,983,800**	**505,600**	**25,800**	**1,827,400**					**3,967,500**	**1,601,100**	**143,800**	**3,654,800**	**9,367,100**	**7,190,100**	**2,177,000**

Notes:
1. Depth of buried ACM debris at BA-1 assumed to be same as at BA-2. Both BA-1 and BA-2 are under parcel AG.
2. See Section 4.1.8.2 of RI for ACM volumes at BA-21 (under parcel H).
3. Surface ACM Area is accounted with the Buried ACM Area when there is an overlap in excavation.
4. All volumes and areas are rounded up to the nearest whole number
5. Steam pipe was observed at depths ranging from 2 to 6 feet bgs and assume 3 feet wide excavation
6. Excavation of steam pipe within Surficial ACM and Buried ACM areas considered negligible.
7. Topsoil depth is 6 inches; Common Fill depth varies with excavation depth.
* Indicates parcels no longer occupied
** Burial area depth is greater than 4 feet - assume a 2.5% increase in soil excavation for sloping.
*** All pipe excavation - assume a 33% increase in soil excavation for sloping.
† Indicates that parcel is privately owned.

Appendix D

Screening of Alternatives

The evaluations of each alternative using the three screening criteria are presented in the following Appendix D. The common justifications have been indicated using gray text to allow the reader to focus on the differences between alternatives.

Alternative 1
No Action

Exhibit D-1. Effectiveness Screening - Alternative 1

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ Source areas of asbestos-containing materials (ACM) are left unaddressed. ■ Unaddressed ACM allows continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) if disturbed. ■ ACM migrating to the surface and liberating asbestos fibers after disturbance would potentially represent an inhalation exposure risk to human receptors.
Compliance with ARARs	■ No further action is taken to address ACM sources and contaminated air exceeding chemical-specific ARARs; thus this criterion is not met.
Short-term effectiveness (during the remedial construction and implementation period)	■ No further remedial action would be undertaken to address ACM sources; thus, none of these criteria are met.
Long-term effectiveness and permanence (following remedial construction)	
Reduction of toxicity, mobility, or volume through treatment	
Overall Rating	❶

Table D-2. Implementability Screening - Alternative 1

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ No further remedial action would be undertaken to address ACM or Bin A soils; thus, ability to meet these criteria is high.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	
Ability to obtain approvals from other agencies	■ ACM and Bin A soils would be left unaddressed. No remedial action would be undertaken to address the ACM sources; thus, there is no need to obtain approvals from other regulatory agencies.
Availability and capacity of treatment, storage, and disposal services	■ ACM source areas are left unaddressed. No remedial action would be undertaken to address source areas; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ Technical equipment and specialists are available for monitoring; thus the ability to meet this criterion is high.
Overall Rating	❺

Table D-3. Cost Screening – Alternative 1

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$	$160,000

Alternative 2
Institutional/Engineered Controls with Monitoring

Table D-4. Effectiveness Screening - Alternative 2

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ Identified ACM is addressed through institutional and engineered controls on receivership controlled parcels. ■ Identified ACM is addressed through institutional controls on privately owned parcels; engineered controls would not be widely implemented on privately owned parcels. ■ If disturbed, surface ACM and Bin A soils could potentially allow continued release and migration of asbestos fibers. ■ Disturbed fibers would potentially represent an inhalation exposure risk to human receptors. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ Institutional/engineered controls do not physically address contaminant sources and contaminated air exceeding chemical-specific ARARs. ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Surface disturbance of ACM could pose short-term risks to workers. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Engineered controls would restrict access and hence quickly protect workers and the community for receivership-controlled parcels; however they do not address short-term exposure to ACM on privately-owned parcels.
Long-term effectiveness and permanence (following remedial construction)	■ Long-term effectiveness is not entirely ensured since ACM and Bin A soils potentially posing a risk are left exposed on site. ■ Exposure to ACM and/or asbestos fibers may occur on privately-owned parcels since limited or no engineered controls would be put in place to restrict access to ACM. ■ If disturbed, surface ACM could allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air). ■ Monitoring is the primary remedial component for ensuring protection of human health on privately-owned parcels. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately-owned parcels.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative does not treat ACM or soils impacted by asbestos fibers.
Overall Rating	❷

Table D-5. Implementability Screening - Alternative 2

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Implementation of engineered controls and monitoring is relatively straightforward. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately owned parcels due to various degrees of contamination, types of ownership and levels of occupancy.

Table D-5. Implementability Screening - Alternative 2 (continued)

Implementability Criteria	Evaluation Summary
Ability to obtain approvals from other agencies	■ Regulatory approvals for engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable for privately owned parcels; however, some difficulties may be encountered with regard to types of restrictions implemented.
Availability and capacity of treatment, storage, and disposal services	■ This alternative does not call for any treatment, storage and disposal services; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
Overall Rating	❹

Table D-6. Cost Screening – Alternative 2

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$	$2,140,000

Alternative 3

In-Place Containment of All Identified ACM on Private Parcels and Partial In-Place Containment of Identified ACM on Receivership Parcels with Institutional/Engineered Controls and Monitoring

Table D-7. Effectiveness Screening - Alternative 3

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ A portion of identified ACM on receivership controlled parcels is addressed through institutional and engineered controls to restrict access and use. ■ A portion of identified ACM on receivership controlled parcels and all identified ACM on privately-owned parcels is addressed through in-place containment (covers) coupled with institutional controls to protect the covers. ■ If disturbed, uncovered ACM and Bin A soils could potentially allow continued release and migration of asbestos fibers. ■ Disturbed fibers would potentially represent an inhalation exposure risk to human receptors.. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ ACM contained in-place with soil covers would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Uncovered areas of ACM would not physically address contaminant sources and contaminated air exceeding chemical-specific ARARs. ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Surface disturbance of ACM could pose short-term risks to workers. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Engineered controls would restrict access and hence quickly protect workers and the community for receivership-controlled parcels; however they do not address short-term exposure to ACM on privately owned parcels. ■ Temporary relocation of residents from privately owned parcels may be required during construction.
Long-term effectiveness and permanence (following remedial construction)	■ Long-term effectiveness is not entirely ensured since ACM and Bin A soils potentially posing a risk are left exposed on site. ■ If disturbed, ACM within fenced portions of the receivership controlled parcels and Bin A soils outside of fenced areas could allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air). ■ Long-term effectiveness and permanence for covered areas is dependent on continued integrity of the covers and adherence to institutional controls; this is less certain on privately-owned parcels. ■ Uncovered areas could allow continued release and migration of asbestos fibers. ■ O&M activities are periodically required to repair damage or erosion to the covers and engineered controls. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately owned parcels. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative does not treat ACM or soils impacted by asbestos fibers.
Overall Rating	❸

Table D-8. Implementability Screening - Alternative 3

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Construction of covers and implementation of engineered controls and monitoring is relatively straightforward. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Inspection, maintenance, and replacement of the cover systems on receivership controlled parcels are relatively easy to implement; however it may be more difficult for privately owned parcels. ■ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately owned parcels due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to obtain approvals from other agencies	■ Regulatory approval for in-place containment of ACM using covers should be obtainable. ■ Development of offsite borrow sources for cover materials would require coordination and approval from the affected agency. ■ Regulatory approvals for institutional/engineered controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
Availability and capacity of treatment, storage, and disposal services	■ This alternative does not call for any treatment, storage and disposal services; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for cover construction are available. ■ Suitable cover construction materials would be required from offsite sources. ■ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring..
Overall Rating	❸

Table D-9. Cost Screening – Alternative 3

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$$	$9,910,000

Alternative 4a

In-Place Containment of All Identified ACM with Institutional Controls and Monitoring

Table D-10. Effectiveness Screening - Alternative 4a

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ All identified ACM on receivership controlled parcels and all identified ACM on privately-owned parcels is addressed through in-place containment (covers) coupled with institutional controls to protect the covers. ■ If disturbed, Bin A soils could potentially allow continued release and migration of asbestos fibers. ■ Disturbed fibers would potentially represent an inhalation exposure risk to human receptors. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ ACM contained in-place with soil covers would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Uncovered areas of Bin A soils would not physically address contaminant sources and contaminated air exceeding chemical-specific ARARs ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Surface disturbance of ACM could pose short-term risks to workers. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation.. ■ Temporary relocation of residents from privately owned parcels may be required during construction..
Long-term effectiveness and permanence (following remedial construction)	■ Long-term effectiveness is not entirely ensured since Bin A soils potentially posing a risk are left exposed on site. ■ Uncovered areas of Bin A soils could allow continued release and migration of asbestos fibers. ■ O&M activities are periodically required to repair damage or erosion to the covers. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately owned parcels. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative does not treat ACM or soils impacted by asbestos fibers.
Overall Rating	❸

Table D-11. Implementability Screening - Alternative 4a

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Construction of covers and implementation of monitoring is relatively straightforward. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Inspection, maintenance, and replacement of the cover systems on receivership controlled parcels are relatively easy to implement; however it may be more difficult for privately owned parcels. ■ Implementation of monitoring is easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately owned parcels due to various degrees of contamination, types of ownership and levels of occupancy
Ability to obtain approvals from other agencies	■ Regulatory approval for in-place containment of ACM using covers should be obtainable. ■ Development of offsite borrow sources for cover materials would require coordination and approval from the affected agency. ■ Regulatory approvals for monitoring and engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
Availability and capacity of treatment, storage, and disposal services	■ This alternative does not call for any treatment, storage and disposal services; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for cover construction are available. ■ Suitable cover construction materials would be required from offsite sources. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
Overall Rating	❸

Table D-12. Cost Screening - Alternative 4a

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$$	$14,050,000

Alternative 4b

In-Place Containment of All Identified ACM and In-Place Containment of Soil within Bin A Parcels with Institutional Controls and Monitoring

Table D-13. Effectiveness Screening - Alternative 4b

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ All identified ACM and Bin A soils on receivership controlled parcels and privately owned parcels is addressed through in-place containment (covers) coupled with institutional controls to protect the covers. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ ACM contained in-place with soil covers would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs.. ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Surface disturbance of ACM could pose short-term risks to workers. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation ■ There would be additional impacts to the community under this alternative, as additional truck traffic for cover soils would be required to address Bin A soils. ■ Temporary relocation of residents from privately owned parcels may be required during construction.
Long-term effectiveness and permanence (following remedial construction)	■ .O&M activities are periodically required to repair damage or erosion to the covers. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately owned parcels. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative does not treat ACM or soils impacted by asbestos fibers.
Overall Rating	❸

Table D-14. Implementability Screening - Alternative 4b

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Construction of covers and implementation of monitoring is relatively straightforward. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy. ■ The logistics of using large numbers of heavy equipment at the site for this alternative would be difficult to manage. ■ A large volume of suitable cover soils would be required as compared to Alternative 4a. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Inspection, maintenance, and replacement of the cover systems on receivership controlled parcels are relatively easy to implement; however it may be more difficult for privately owned parcels ■ Implementation of monitoring is easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy
Ability to obtain approvals from other agencies	■ Regulatory approval for in-place containment of ACM using covers should be obtainable. ■ Development of offsite borrow sources for cover materials would require coordination and approval from the affected agency. ■ Regulatory approvals for monitoring and engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels..
Availability and capacity of treatment, storage, and disposal services	■ This alternative does not call for any treatment, storage and disposal services; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor and equipment for cover construction are available ■ Suitable cover construction materials would be required from offsite sources. ■ A large volume of suitable cover construction material would be required as compared to Alternative 4a. ■ Materials, equipment and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
Overall Rating	❷

Table D-15. Cost Screening - Alternative 4b

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$$$	$19,290,000

Alternative 5a

Removal of All Identified Surface ACM with Onsite Consolidation/Disposal, Future Incremental Removal of Identified Surface ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos, and Institutional/Engineered Controls with Monitoring

Table D-16. Effectiveness Screening - Alternative 5a

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ All identified surface ACM on receivership controlled parcels and privately owned parcels is initially addressed through removal and consolidation at onsite disposal locations. ■ ACM exposed in the future due to free-thaw cycles would be periodically removed through surface inspections and pickup and would be disposed of offsite at permitted disposal facilities authorized for asbestos. ■ Institutional controls and engineered controls would be used to restrict access to the onsite disposal locations. ■ ACM would continue to migrate during freeze-thaw cycles and exposures could occur prior to periodic removals being completed. ■ If disturbed, Bin A soils could potentially allow continued release and migration of asbestos fibers. ■ Disturbed fibers would potentially represent an inhalation exposure risk to human receptors. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ ACM removed and consolidated at onsite disposal locations would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Bin A soils would not be physically addressed; thus there may be the potential for contaminant sources and contaminated air exceeding chemical-specific ARARs. ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Removal and relocation of surface ACM could pose short-term risks to workers. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Temporary relocation of residents from privately owned parcels may be required during construction.
Long-term effectiveness and permanence (following remedial construction)	■ Long-term effectiveness and permanence for parcels containing ACM is addressed through initial surface removal of ACM with onsite consolidation and disposal and backfilling with clean soil followed by periodic incremental removal and offsite disposal of ACM that migrates to the surface during freeze-thaw cycles. ■ Long-term effectiveness is not entirely ensured since subsurface ACM and Bin A soils potentially posing a risk are left exposed on site. ■ ACM would continue to migrate to the surface during freeze-thaw cycles, although the volume of ACM should decrease over time. ■ Unaddressed areas of subsurface ACM and Bin A soils could allow continued release and migration of asbestos fibers. ■ O&M activities are periodically required to repair damage or erosion to the covers at the onsite disposal locations. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately owned parcels. ■ Monitoring and periodic risk evaluation updates would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative does not treat ACM or soils impacted by asbestos fibers.
Overall Rating	❸

Table D-17. Implementability Screening - Alternative 5a

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Removal and consolidation of all identified surface ACM at authorized onsite disposal locations and backfilling excavations with clean soil is relatively straightforward. ■ Excavation and backfilling around homes or structures, subsurface utilities, and roads may be challenging at specific locations. ■ Construction of the onsite disposal facilities will require coordination during the removal of ACM from parcels. ■ Incremental removals are likely to be needed for a long period of time. ■ Incremental removals should be straightforward, although difficulties may exist for implementation on privately-owned parcels. ■ Offsite disposal of ACM removed during periodic inspection at permitted disposal facilities is relatively straightforward. ■ Removed ACM requires transportation to offsite disposal facilities in specialized enclosed trucks. ■ Special management procedures may be required for disposal at the permitted facilities. ■ Construction of engineered controls around onsite disposal locations and implementation of monitoring is relatively straightforward. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Periodic monitoring, risk evaluation updates, and incremental removal of ACM across the site would be a continuous process. ■ Inspection, maintenance, and replacement of the cover systems over the onsite disposal facilities are relatively easy to implement. ■ Implementation of monitoring is easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy
Ability to obtain approvals from other agencies	■ Regulatory approval needed for removals and to construct onsite disposal facilities should be obtainable. ■ Development of offsite borrow sources for backfill would require coordination and approval from the affected agency. ■ Regulatory approvals for incremental removal events should be obtainable, although difficulties may exist with the privately-owned parcels. ■ Regulatory and facility approval for offsite disposal at permitted disposal facilities should be obtainable. ■ Regulatory approvals for monitoring and engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
Availability and capacity of treatment, storage, and disposal services	■ Permitted disposal facilities authorized for asbestos are available within the State of Oregon; however most are somewhat distant from the site. ■ The offsite permitted disposal facilities should have sufficient capacity to accept ACM for disposal; the volume of ACM for offsite disposal in this alternative should be relatively small.

Table D-17. Implementability Screening - Alternative 5a

Implementability Criteria	Evaluation Summary
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable backfill materials would be required from offsite sources. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
Overall Rating	❸

Table D-18. Cost Screening - Alternative 5a

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$$$	$18,650,000

Alternative 5b

Removal of All Identified ACM with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Table D-19. Effectiveness Screening - Alternative 5b

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ All identified ACM (surface and subsurface) on receivership controlled parcels and privately owned parcels is addressed through removal and consolidation at onsite disposal locations. ■ Institutional controls and engineered controls would be used to restrict access to the onsite disposal locations. ■ If disturbed, Bin A soils could potentially allow continued release and migration of asbestos fibers. ■ Disturbed fibers would potentially represent an inhalation exposure risk to human receptors. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ ACM removed and consolidated at onsite disposal locations would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Bin A soils would not be physically addressed; thus there may be the potential for contaminant sources and contaminated air exceeding chemical-specific ARARs ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Removal and relocation of surface and subsurface ACM could pose short-term risks to workers. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Temporary relocation of residents from privately owned parcels may be required during construction.
Long-term effectiveness and permanence (following remedial construction)	■ Long-term effectiveness and permanence for parcels containing ACM is addressed through removal of ACM with onsite consolidation and disposal and backfilling with clean soil. ■ Long-term effectiveness is not entirely ensured since Bin A soils potentially posing a risk are left exposed on site. ■ Unaddressed areas of Bin A soils could allow continued release and migration of asbestos fibers. ■ O&M activities are periodically required to repair damage or erosion to the covers at the onsite disposal locations. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately owned parcels. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative does not treat ACM or soils impacted by asbestos fibers.
Overall Rating	❸

Table D-20. Implementability Screening - Alternative 5b

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Removal and consolidation of all identified ACM at authorized onsite disposal locations and backfilling excavations with clean soil is relatively straightforward. ■ Excavation and backfilling around homes or structures, subsurface utilities, and roads may be challenging at specific locations. ■ Construction of the onsite disposal facilities will require coordination during the removal of ACM from parcels. ■ Construction of engineered controls around onsite disposal locations and implementation of monitoring is relatively straightforward. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Inspection, maintenance, and replacement of the cover systems over the onsite disposal facilities are relatively easy to implement. ■ Implementation of monitoring is easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy
Ability to obtain approvals from other agencies	■ Regulatory approval needed for removals and to construct onsite disposal facilities should be obtainable. ■ Development of offsite borrow sources for backfill would require coordination and approval from the affected agency. ■ Regulatory approvals for monitoring and engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
Availability and capacity of treatment, storage, and disposal services	■ This alternative does not call for any treatment, storage and disposal services; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately- owned parcels for implementing the remedial action may not be currently available, but can be obtained.. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable cover construction and backfill materials would be required from offsite sources. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
Overall Rating	❸

Table D-21. Cost Screening - Alternative 5b

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$$$	$22,540,000

Alternative 5c

Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Table D-22. Effectiveness Screening - Alternative 5c

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ All identified ACM (surface and subsurface) and Bin A soils on receivership controlled parcels and privately owned parcels are addressed through removal and consolidation at onsite disposal locations. ■ Institutional controls and engineered controls would be used to restrict access to the onsite disposal locations. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ ACM and Bin A soils removed and consolidated at onsite disposal locations would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Removal and relocation of surface and subsurface ACM could pose short-term risks to workers. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ There would be additional impacts to the community under this alternative, as additional truck traffic for backfill soils would be required to address Bin A removal areas. ■ Temporary relocation of residents from privately owned parcels may be required during construction.
Long-term effectiveness and permanence (following remedial construction)	■ Long-term effectiveness and permanence for parcels containing ACM and Bin A soils is addressed through removal of ACM and Bin A soils with onsite consolidation and disposal and backfilling with clean soil. ■ O&M activities are periodically required to repair damage or erosion to the covers at the onsite disposal locations. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately owned parcels. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative does not treat ACM or soils impacted by asbestos fibers.
Overall Rating	❹

Table D-23. Implementability Screening - Alternative 5c

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Removal and consolidation of all identified ACM and Bin A soils at authorized onsite disposal locations and backfilling excavations with clean soil is relatively straightforward. ■ The logistics of using large numbers of heavy equipment at the site for this alternative would be difficult to manage. ■ Large volumes of ACM and Bin A soils require consolidation for onsite disposal as compared to Alternative 5b. ■ Excavation and backfilling around homes or structures, subsurface utilities, and roads may be challenging at specific locations. ■ Construction of the onsite disposal facilities will require coordination during the removal of ACM from parcels. ■ Construction of engineered controls around onsite disposal locations and implementation of monitoring is relatively straightforward. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Inspection, maintenance, and replacement of the cover systems over the onsite disposal facilities are relatively easy to implement. ■ Implementation of monitoring is easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy
Ability to obtain approvals from other agencies	■ Regulatory approval needed for removals and to construct onsite disposal facilities should be obtainable. ■ Development of offsite borrow sources for backfill would require coordination and approval from the affected agency. ■ Regulatory approvals for monitoring and engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels
Availability and capacity of treatment, storage, and disposal services	■ This alternative does not call for any treatment, storage and disposal services; thus, this criterion is not applicable.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained.. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable cover construction and backfill materials would be required from offsite sources. ■ A large volume of suitable cover construction and backfill materials would be required as compared to Alternative 5b. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
Overall Rating	❷

Table D-24. Cost Screening - Alternative 5c

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$$$$	$35,870,000

Alternative 6a

Removal of All Identified ACM and Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Table D-25. Effectiveness Screening - Alternative 6a

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ All identified ACM (surface and subsurface) on receivership controlled parcels and privately owned parcels is addressed through removal and offsite disposal at permitted facilities authorized for asbestos. ■ If disturbed, Bin A soils could potentially allow continued release and migration of asbestos fibers. ■ Disturbed fibers would potentially represent an inhalation exposure risk to human receptors. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ ACM removed and disposed of offsite would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Bin A soils would not be physically addressed; thus there may be the potential for contaminant sources and contaminated air exceeding chemical-specific ARARs ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Removal and offsite disposal of surface and subsurface ACM could pose short-term risks to workers. ■ There would be additional impacts to the community under this alternative, as additional truck traffic would be required for offsite disposal of ACM as well as transport of backfill soils. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Temporary relocation of residents from privately owned parcels may be required during construction.
Long-term effectiveness and permanence (following remedial construction)	■ Long-term effectiveness and permanence for parcels containing ACM is addressed through removal of ACM with offsite disposal at permitted facilities and backfilling with clean soil. ■ Long-term effectiveness is not entirely ensured since Bin A soils potentially posing a risk are left exposed on site. ■ Unaddressed areas of Bin A soils could allow continued release and migration of asbestos fibers. ■ O&M activities are periodically required to repair damage or erosion to the covers at the onsite disposal locations. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately owned parcels. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative does not treat ACM or soils impacted by asbestos fibers.
Overall Rating	❹

Table D-26. Implementability Screening - Alternative 6a

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Removal and offsite disposal of all identified ACM at permitted disposal facilities and backfilling excavations with clean soil is relatively straightforward. ■ Removed ACM requires transportation to offsite disposal facilities in specialized enclosed trucks. ■ Special management procedures may be required for disposal at the permitted facilities. ■ Excavation and backfilling around homes or structures, subsurface utilities, and roads may be challenging at specific locations. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Implementation of monitoring is easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately owned parcels due to various degrees of contamination, types of ownership and levels of occupancy
Ability to obtain approvals from other agencies	■ Regulatory approval needed to remove and transport ACM and associated soils should be obtainable. ■ Regulatory and facility approval for offsite disposal at permitted disposal facilities should be obtainable. ■ Development of offsite borrow sources for backfill would require coordination and approval from the affected agency. ■ Regulatory approvals for monitoring should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
Availability and capacity of treatment, storage, and disposal services	■ Permitted disposal facilities authorized for asbestos are available within the State of Oregon; however most are somewhat distant from the site. ■ Many of the permitted disposal facilities may not have sufficient capacity to accept all of the ACM; use of multiple permitted disposal facilities may be required.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable backfill materials would be required from offsite sources. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
Overall Rating	❷

Table D-27. Cost Screening - Alternative 6a

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$$$$	$46,870,000

Alternative 6b

Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Table D-28. Effectiveness Screening - Alternative 6b

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ All identified ACM (surface and subsurface) and Bin A soils on receivership controlled parcels and privately owned parcels is addressed through removal and offsite disposal at permitted facilities authorized for asbestos. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ ACM and Bin A soils removed and disposed of offsite would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Removal and relocation of surface and subsurface ACM could pose short-term risks to workers. ■ There would be additional impacts to the community under this alternative, as additional truck traffic would be required for offsite disposal of ACM and Bin A soils as well as transport of backfill soils. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Temporary relocation of residents from privately owned parcels may be required during construction.
Long-term effectiveness and permanence (following remedial construction)	■ Long-term effectiveness and permanence for parcels containing ACM and Bin A soils is addressed through removal of ACM and Bin A soils with offsite disposal and backfilling with clean soil. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately owned parcels. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative does not treat ACM or soils impacted by asbestos fibers.
Overall Rating	❹

Table D-29. Implementability Screening - Alternative 6b

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Removal and offsite disposal of all identified ACM and Bin A soils at permitted disposal facilities and backfilling excavations with clean soil is relatively straightforward. ■ Removed ACM requires transportation to offsite disposal facilities in specialized enclosed trucks. ■ Special management procedures may be required for disposal at the permitted facilities. ■ The logistics of using large numbers of heavy equipment at the site for this alternative would be difficult to manage. ■ Large volumes of ACM and Bin A soils require offsite disposal as compared to Alternative 6a. ■ Excavation and backfilling around homes or structures, subsurface utilities, and roads may be challenging at specific locations. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Implementation of monitoring is easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy
Ability to obtain approvals from other agencies	■ Regulatory approval needed to remove and transport ACM and associated soils should be obtainable. ■ Regulatory and facility approval for offsite disposal at permitted disposal facilities should be obtainable. ■ Development of offsite borrow sources for backfill would require coordination and approval from the affected agency. ■ Regulatory approvals for monitoring should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
Availability and capacity of treatment, storage, and disposal services	■ Permitted disposal facilities authorized for asbestos are available within the State of Oregon; however most are somewhat distant from the site. ■ Many of the permitted disposal facilities may not have sufficient capacity to accept all of the ACM and Bin A soils; use of multiple permitted disposal facilities will likely be required.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable backfill materials would be required from offsite sources. ■ A large volume of suitable backfill materials would be required as compared to Alternative 6a. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
Overall Rating	❷

Table D-30. Cost Screening - Alternative 6b

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$$$$$	$72,160,000

Alternative 7a

Removal of All Identified ACM with Thermo-Chemical Treatment, Reuse of Treated Material, and Institutional Controls with Monitoring

Table D-31. Effectiveness Screening - Alternative 7a

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ All identified ACM (surface and subsurface) on receivership controlled parcels and privately owned parcels is addressed through removal and offsite treatment at a permitted thermo-chemical treatment facility. ■ ACM is converted to an inert form that does not pose human health risks. ■ If disturbed, Bin A soils could potentially allow continued release and migration of asbestos fibers. ■ Disturbed fibers would potentially represent an inhalation exposure risk to human receptors. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ ACM removed and treated offsite would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Bin A soils would not be physically addressed; thus there may be the potential for contaminant sources and contaminated air exceeding chemical-specific ARARs. ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Removal and offsite treatment of surface and subsurface ACM could pose short-term risks to workers. ■ There would be additional impacts to the community under this alternative, as additional truck traffic would be required for offsite treatment of ACM as well as transport of treated material and backfill soils. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Temporary relocation of residents from privately owned parcels may be required during construction.
Long-term effectiveness and permanence (following remedial construction)	■ Long-term effectiveness and permanence for parcels containing ACM is addressed through removal of ACM with offsite treatment at a permitted thermo-chemical treatment facility and backfilling with inert treated material and clean soil. ■ While studies provided by ARI indicate that the treatment process completely converts ACM to an inert form, the treatment process is relatively new and there is not extensive data indicating whether the treatment process has long-term effectiveness and permanence. ■ Long-term effectiveness is not entirely ensured since Bin A soils potentially posing a risk are left exposed on site. ■ Unaddressed areas of Bin A soils could allow continued release and migration of asbestos fibers. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately owned parcels. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative involves treatment, which transforms ACM to an amorphous inert form; thus, toxicity and mobility of asbestos fibers is eliminated. ■ Significant volume reduction of ACM is achieved through treatment, while volume reduction of associated soils is limited.
Overall Rating	❹

Table D-32. Implementability Screening - Alternative 7a

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Removal and offsite treatment of all identified ACM at a permitted thermo-chemical treatment facility and backfilling excavations with clean soil is relatively straightforward. ■ Removed ACM requires transportation to the offsite treatment facility in specialized enclosed trucks. ■ The treatment process (TCCT) is a patented technology and is commercially available but not widespread. ■ The treatment process may require size reduction of larger ACM. ■ Excavation and backfilling around homes or structures, subsurface utilities, and roads may be challenging at specific locations. ■ Implementation of monitoring is relatively straightforward. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Implementation of monitoring is easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately owned parcels due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to obtain approvals from other agencies	■ This technology is permitted and regulated in Washington State, so the required regulatory approval should be obtainable. ■ Regulatory approval needed to remove and transport ACM and associated soils should be obtainable. ■ Regulatory approval for use of treated material as backfill material my be problematic, depending on DEQ classification of the treated material. ■ Development of offsite borrow sources for backfill would require coordination and approval from the affected agency. ■ Regulatory approvals for monitoring should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
Availability and capacity of treatment, storage, and disposal services	■ The treatment process (TCCT) is a patented technology and is commercially available but not widespread. ■ The treatment capacity of depends upon the size of the offsite treatment facility; in general the capacity is relatively small compared to the volume of ACM generated from the site.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately- owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable backfill materials would be required from offsite sources. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists for implementation of thermo-chemical treatment are fairly limited in the United States. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
Overall Rating	❶

Table D-33. Cost Screening - Alternative 7a

Evaluation Factors for Cost	Overall Rating	Approx. Cost (Dollars)
Present Value Cost	$$$$$	$236,180,000

Alternative 7b

Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Thermo-Chemical Treatment, Reuse of Treated Material, and Institutional Controls with Monitoring

Table D-34. Effectiveness Screening - Alternative 7b

Effectiveness Criteria	Evaluation Summary
Overall protection of human health and the environment	■ All identified ACM (surface and subsurface) and Bin A soils on receivership controlled parcels and privately owned parcels is addressed through removal and offsite treatment at a permitted thermo-chemical treatment facility. ■ ACM is converted to an inert form that does not pose human health risks. ■ Monitoring would be performed to ensure protectiveness of the remedy.
Compliance with ARARs	■ ACM and Bin A soils removed and treated offsite would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Location- and action-specific ARARs for the remedy would be addressed during implementation.
Short-term effectiveness (during the remedial construction and imple-mentation period)	■ Removal and offsite treatment of surface and subsurface ACM could pose short-term risks to workers. ■ Additional short-term risks to workers would be posed during size reduction of ACM to facilitate treatment. ■ There would be additional impacts to the community under this alternative, as additional truck traffic would be required for offsite treatment of ACM and Bin A soils as well as transport of treated material and backfill soils. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Temporary relocation of residents from privately owned parcels may be required during construction.
Long-term effectiveness and permanence (following remedial construction)	■ Long-term effectiveness and permanence for parcels containing ACM and Bin A soils is addressed through removal of ACM and Bin A soils with offsite treatment at a permitted thermo-chemical treatment facility and backfilling with inert treated material and clean soil. ■ While studies provided by ARI indicate that the treatment process completely converts ACM to an inert form, the treatment process is relatively new and there is not extensive data indicating whether the treatment process has long-term effectiveness and permanence. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately-owned parcels. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Reduction of toxicity, mobility, or volume through treatment	■ This alternative involves treatment, which transforms ACM to an amorphous inert form; thus, toxicity and mobility of asbestos fibers is eliminated. ■ Significant volume reduction of ACM is achieved through treatment, while volume reduction of associated soils is limited; there is a greater overall reduction in volume than Alternative 7a because Bin A soils are also being treated under this alternative.
Overall Rating	❹

Table D-35. Implementability Screening - Alternative 7b

Implementability Criteria	Evaluation Summary
Ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete	■ Removal and offsite treatment of all identified ACM and Bin A soils at a permitted thermo-chemical treatment facility and backfilling excavations with clean soil is relatively straightforward. ■ Removed ACM requires transportation to the offsite treatment facility in specialized enclosed trucks. ■ Large volumes of ACM and Bin A soils require offsite treatment as compared to Alternative 7a. ■ The treatment process (TCCT) is a patented technology and is commercially available but not widespread. ■ The treatment process may require size reduction of larger ACM. ■ The logistics of using large numbers of heavy equipment at the site for this alternative would be difficult to manage. ■ Excavation and backfilling around homes or structures, subsurface utilities, and roads may be challenging at specific locations. ■ Implementation of monitoring is relatively straightforward. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.
Ability to operate, maintain, replace, and monitor technical components after the remedial action is complete	■ Implementation of monitoring is easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately owned parcels due to various degrees of contamination, types of ownership and levels of occupancy
Ability to obtain approvals from other agencies	■ This technology is permitted and regulated in Washington State, so the required regulatory approval should be obtainable. ■ Regulatory approval needed to remove and transport ACM and associated soils should be obtainable. ■ Regulatory approval for use of treated material as backfill material my be problematic, depending on DEQ classification of the treated material. ■ Development of offsite borrow sources for backfill would require coordination and approval from the affected agency. ■ Regulatory approvals for monitoring should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
Availability and capacity of treatment, storage, and disposal services	■ The treatment process (TCCT) is a patented technology and is commercially available but not widespread. ■ The treatment capacity of depends upon the size of the offsite treatment facility; in general the capacity is relatively small compared to the volume of ACM and Bin A soils generated from the site.
Availability of property, specific materials and equipment, and technical specialists required for a remedial action	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable backfill materials would be required from offsite sources. ■ A large volume of suitable backfill materials would be required as compared to Alternative 7a. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists for implementation of thermo-chemical treatment are fairly limited in the United States. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
Overall Rating	❶

Table D-36. Cost Screening - Alternative 7b

Evaluation Factors for Cost	Overall Rating	Cost (Dollars)
Present Value Cost	$$$$$	$369,820,000

Appendix E

Alternative Screening Cost Information

The cost spreadsheets included in this appendix were developed in accordance with EPA 540-R-00-002 (OSWER 9355.0-75) July 2000.

These costs should be used to compare alternative relative costs. Costs for project management, remedial design, and construction management were determined as percentages of capital cost per the guidance. Costs for these work items may not reflect costs for implementation. These costs are determined based on specific client requirements during implementation.

Present Value Analyses

TABLE SPV-ADRFT

PRESENT VALUE ANALYSIS

Annual Discount Rate Factors Table

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Discount Rate (Percent): 7.0

Year	Discount Factor[1,2]	Year	Discount Factor[1,2]
0	1.0000	26	0.1722
1	0.9346	27	0.1609
2	0.8734	28	0.1504
3	0.8163	29	0.1406
4	0.7629	30	0.1314
5	0.7130	31	0.1228
6	0.6663	32	0.1147
7	0.6227	33	0.1072
8	0.5820	34	0.1002
9	0.5439	35	0.0937
10	0.5083	36	0.0875
11	0.4751	37	0.0818
12	0.4440	38	0.0765
13	0.4150	39	0.0715
14	0.3878	40	0.0668
15	0.3624	41	0.0624
16	0.3387	42	0.0583
17	0.3166	43	0.0545
18	0.2959	44	0.0509
19	0.2765	45	0.0476
20	0.2584	46	0.0445
21	0.2415	47	0.0416
22	0.2257	48	0.0389
23	0.2109	49	0.0363
24	0.1971	50	0.0339
25	0.1842		

Notes:

[1] Annual discount factors were calculated using the formulas and guidance presented in Section 4.0 "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

[2] The real discount rate of 7.0% was obtained from "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000, Page 4-5.

TABLE SPV-1

PRESENT VALUE ANALYSIS

Alternative 1
No Action

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs[2]	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	1.0000	$0
1	$0	$0	$0	0.9346	$0
2	$0	$0	$0	0.8734	$0
3	$0	$0	$0	0.8163	$0
4	$0	$0	$0	0.7629	$0
5	$0	$75,000	$75,000	0.7130	$53,475
6	$0	$0	$0	0.6663	$0
7	$0	$0	$0	0.6227	$0
8	$0	$0	$0	0.5820	$0
9	$0	$0	$0	0.5439	$0
10	$0	$75,000	$75,000	0.5083	$38,123
11	$0	$0	$0	0.4751	$0
12	$0	$0	$0	0.4440	$0
13	$0	$0	$0	0.4150	$0
14	$0	$0	$0	0.3878	$0
15	$0	$75,000	$75,000	0.3624	$27,180
16	$0	$0	$0	0.3387	$0
17	$0	$0	$0	0.3166	$0
18	$0	$0	$0	0.2959	$0
19	$0	$0	$0	0.2765	$0
20	$0	$75,000	$75,000	0.2584	$19,380
21	$0	$0	$0	0.2415	$0
22	$0	$0	$0	0.2257	$0
23	$0	$0	$0	0.2109	$0
24	$0	$0	$0	0.1971	$0
25	$0	$75,000	$75,000	0.1842	$13,815
26	$0	$0	$0	0.1722	$0
27	$0	$0	$0	0.1609	$0
28	$0	$0	$0	0.1504	$0
29	$0	$0	$0	0.1406	$0
30	$0	$75,000	$75,000	0.1314	$9,855
TOTALS:	$0	$450,000	$450,000		$161,828
TOTAL PRESENT VALUE OF ALTERNATIVE 1[5]					**$160,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-1.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for c
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present va

TABLE SPV-2

PRESENT VALUE ANALYSIS

Alternative 2
Institutional/Engineered Controls with Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	1.0000	$0
1	$1,692,000	$0	$0	$1,692,000	0.9346	$1,581,343
2	$0	$0	$0	$0	0.8734	$0
3	$0	$0	$0	$0	0.8163	$0
4	$0	$0	$0	$0	0.7629	$0
5	$0	$0	$0	$0	0.7130	$0
6	$0	$219,000	$75,000	$294,000	0.6663	$195,892
7	$0	$0	$0	$0	0.6227	$0
8	$0	$0	$0	$0	0.5820	$0
9	$0	$0	$0	$0	0.5439	$0
10	$0	$0	$0	$0	0.5083	$0
11	$0	$219,000	$75,000	$294,000	0.4751	$139,679
12	$0	$0	$0	$0	0.4440	$0
13	$0	$0	$0	$0	0.4150	$0
14	$0	$0	$0	$0	0.3878	$0
15	$0	$0	$0	$0	0.3624	$0
16	$0	$219,000	$75,000	$294,000	0.3387	$99,578
17	$0	$0	$0	$0	0.3166	$0
18	$0	$0	$0	$0	0.2959	$0
19	$0	$0	$0	$0	0.2765	$0
20	$0	$0	$0	$0	0.2584	$0
21	$0	$219,000	$75,000	$294,000	0.2415	$71,001
22	$0	$0	$0	$0	0.2257	$0
23	$0	$0	$0	$0	0.2109	$0
24	$0	$0	$0	$0	0.1971	$0
25	$0	$0	$0	$0	0.1842	$0
26	$0	$219,000	$75,000	$294,000	0.1722	$50,627
27	$0	$0	$0	$0	0.1609	$0
28	$0	$0	$0	$0	0.1504	$0
29	$0	$0	$0	$0	0.1406	$0
30	$0	$0	$0	$0	0.1314	$0
TOTALS:	$1,692,000	$1,095,000	$375,000	**$3,162,000**		$2,138,120
TOTAL PRESENT VALUE OF ALTERNATIVE 2[5]						**$2,140,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-2.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE SPV-3

PRESENT VALUE ANALYSIS

Alternative 3

In-Place Containment of All Identified ACM on Private Parcels and Partial In-Place Containment of Identified ACM on Receivership Parcels with Institutional/Engineered Controls and Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Capital Costs (Earthwork)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	$0	1.0000	$0
1	$1,227,000	$8,040,000	$0	$0	$9,267,000	0.9346	$8,660,938
2	$0	$0	$219,000	$0	$219,000	0.8734	$191,275
3	$0	$0	$219,000	$0	$219,000	0.8163	$178,770
4	$0	$0	$219,000	$0	$219,000	0.7629	$167,075
5	$0	$0	$219,000	$0	$219,000	0.7130	$156,147
6	$0	$0	$219,000	$75,000	$294,000	0.6663	$195,892
7	$0	$0	$0	$0	$0	0.6227	$0
8	$0	$0	$0	$0	$0	0.5820	$0
9	$0	$0	$0	$0	$0	0.5439	$0
10	$0	$0	$0	$0	$0	0.5083	$0
11	$0	$0	$219,000	$75,000	$294,000	0.4751	$139,679
12	$0	$0	$0	$0	$0	0.4440	$0
13	$0	$0	$0	$0	$0	0.4150	$0
14	$0	$0	$0	$0	$0	0.3878	$0
15	$0	$0	$0	$0	$0	0.3624	$0
16	$0	$0	$219,000	$75,000	$294,000	0.3387	$99,578
17	$0	$0	$0	$0	$0	0.3166	$0
18	$0	$0	$0	$0	$0	0.2959	$0
19	$0	$0	$0	$0	$0	0.2765	$0
20	$0	$0	$0	$0	$0	0.2584	$0
21	$0	$0	$219,000	$75,000	$294,000	0.2415	$71,001
22	$0	$0	$0	$0	$0	0.2257	$0
23	$0	$0	$0	$0	$0	0.2109	$0
24	$0	$0	$0	$0	$0	0.1971	$0
25	$0	$0	$0	$0	$0	0.1842	$0
26	$0	$0	$219,000	$75,000	$294,000	0.1722	$50,627
27	$0	$0	$0	$0	$0	0.1609	$0
28	$0	$0	$0	$0	$0	0.1504	$0
29	$0	$0	$0	$0	$0	0.1406	$0
30	$0	$0	$0	$0	$0	0.1314	$0
TOTALS:	$1,227,000	$8,040,000	$1,971,000	$375,000	$11,613,000		$9,910,982
TOTAL PRESENT VALUE OF ALTERNATIVE 3[5]							**$9,910,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-3.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE SPV-4a

PRESENT VALUE ANALYSIS

Alternative 4a

In-Place Containment of All Identified ACM with Institutional Controls and Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Capital Costs (Earthwork)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	$0	1.0000	$0
1	$761,000	$6,732,000	$0	$0	$7,493,000	0.9346	$7,002,958
2	$0	$6,732,000	$0	$0	$6,732,000	0.8734	$5,879,729
3	$0	$0	$219,000	$0	$219,000	0.8163	$178,770
4	$0	$0	$219,000	$0	$219,000	0.7629	$167,075
5	$0	$0	$219,000	$0	$219,000	0.7130	$156,147
6	$0	$0	$219,000	$0	$219,000	0.6663	$145,920
7	$0	$0	$219,000	$75,000	$294,000	0.6227	$183,074
8	$0	$0	$0	$0	$0	0.5820	$0
9	$0	$0	$0	$0	$0	0.5439	$0
10	$0	$0	$0	$0	$0	0.5083	$0
11	$0	$0	$0	$0	$0	0.4751	$0
12	$0	$0	$219,000	$75,000	$294,000	0.4440	$130,536
13	$0	$0	$0	$0	$0	0.4150	$0
14	$0	$0	$0	$0	$0	0.3878	$0
15	$0	$0	$0	$0	$0	0.3624	$0
16	$0	$0	$0	$0	$0	0.3387	$0
17	$0	$0	$219,000	$75,000	$294,000	0.3166	$93,080
18	$0	$0	$0	$0	$0	0.2959	$0
19	$0	$0	$0	$0	$0	0.2765	$0
20	$0	$0	$0	$0	$0	0.2584	$0
21	$0	$0	$0	$0	$0	0.2415	$0
22	$0	$0	$219,000	$75,000	$294,000	0.2257	$66,356
23	$0	$0	$0	$0	$0	0.2109	$0
24	$0	$0	$0	$0	$0	0.1971	$0
25	$0	$0	$0	$0	$0	0.1842	$0
26	$0	$0	$0	$0	$0	0.1722	$0
27	$0	$0	$219,000	$75,000	$294,000	0.1609	$47,305
28	$0	$0	$0	$0	$0	0.1504	$0
29	$0	$0	$0	$0	$0	0.1406	$0
30	$0	$0	$0	$0	$0	0.1314	$0
TOTALS:	$761,000	$13,464,000	$1,971,000	$375,000	$16,571,000		$14,050,950
TOTAL PRESENT VALUE OF ALTERNATIVE 4a[5]							**$14,050,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-4a.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE SPV-4b

PRESENT VALUE ANALYSIS

Alternative 4b

In-Place Containment of All Identified ACM and In-Place Containment of Soil within Bin A Parcels with Institutional Controls and Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Capital Costs (Earthwork)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	$0	1.0000	$0
1	$761,000	$6,864,000	$0	$0	$7,625,000	0.9346	$7,126,325
2	$0	$6,864,000	$0	$0	$6,864,000	0.8734	$5,995,018
3	$0	$6,864,000	$0	$0	$6,864,000	0.8163	$5,603,083
4	$0	$0	$101,000	$0	$101,000	0.7629	$77,053
5	$0	$0	$101,000	$0	$101,000	0.7130	$72,013
6	$0	$0	$101,000	$0	$101,000	0.6663	$67,296
7	$0	$0	$101,000	$0	$101,000	0.6227	$62,893
8	$0	$0	$101,000	$75,000	$176,000	0.5820	$102,432
9	$0	$0	$0	$0	$0	0.5439	$0
10	$0	$0	$0	$0	$0	0.5083	$0
11	$0	$0	$0	$0	$0	0.4751	$0
12	$0	$0	$0	$0	$0	0.4440	$0
13	$0	$0	$101,000	$75,000	$176,000	0.4150	$73,040
14	$0	$0	$0	$0	$0	0.3878	$0
15	$0	$0	$0	$0	$0	0.3624	$0
16	$0	$0	$0	$0	$0	0.3387	$0
17	$0	$0	$0	$0	$0	0.3166	$0
18	$0	$0	$101,000	$75,000	$176,000	0.2959	$52,078
19	$0	$0	$0	$0	$0	0.2765	$0
20	$0	$0	$0	$0	$0	0.2584	$0
21	$0	$0	$0	$0	$0	0.2415	$0
22	$0	$0	$0	$0	$0	0.2257	$0
23	$0	$0	$101,000	$75,000	$176,000	0.2109	$37,118
24	$0	$0	$0	$0	$0	0.1971	$0
25	$0	$0	$0	$0	$0	0.1842	$0
26	$0	$0	$0	$0	$0	0.1722	$0
27	$0	$0	$0	$0	$0	0.1609	$0
28	$0	$0	$101,000	$75,000	$176,000	0.1504	$26,470
29	$0	$0	$0	$0	$0	0.1406	$0
30	$0	$0	$0	$0	$0	0.1314	$0
TOTALS:	$761,000	$20,592,000	$909,000	$375,000	$22,637,000		$19,294,819
TOTAL PRESENT VALUE OF ALTERNATIVE 4b[5]							**$19,290,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-4b.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE SPV-5a

PRESENT VALUE ANALYSIS

Alternative 5a

Removal of All Identified Surface ACM with Onsite Consolidation/Disposal, Future Incremental Removal of Identified Surface ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos, and Institutional/Engineered Controls with Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Capital Costs (Earthwork and Incremental Removal)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	$0	1.0000	$0
1	$1,047,000	$8,282,000	$0	$0	$9,329,000	0.9346	$8,718,883
2	$0	$8,282,000	$0	$0	$8,282,000	0.8734	$7,233,499
3	$0	$144,000	$219,000	$0	$363,000	0.8163	$296,317
4	$0	$144,000	$219,000	$0	$363,000	0.7629	$276,933
5	$0	$144,000	$219,000	$0	$363,000	0.7130	$258,819
6	$0	$144,000	$219,000	$0	$363,000	0.6663	$241,867
7	$0	$144,000	$219,000	$75,000	$438,000	0.6227	$272,743
8	$0	$144,000	$0	$0	$144,000	0.5820	$83,808
9	$0	$144,000	$0	$0	$144,000	0.5439	$78,322
10	$0	$144,000	$0	$0	$144,000	0.5083	$73,195
11	$0	$144,000	$0	$0	$144,000	0.4751	$68,414
12	$0	$144,000	$219,000	$75,000	$438,000	0.4440	$194,472
13	$0	$144,000	$0	$0	$144,000	0.4150	$59,760
14	$0	$144,000	$0	$0	$144,000	0.3878	$55,843
15	$0	$144,000	$0	$0	$144,000	0.3624	$52,186
16	$0	$144,000	$0	$0	$144,000	0.3387	$48,773
17	$0	$144,000	$219,000	$75,000	$438,000	0.3166	$138,671
18	$0	$144,000	$0	$0	$144,000	0.2959	$42,610
19	$0	$144,000	$0	$0	$144,000	0.2765	$39,816
20	$0	$144,000	$0	$0	$144,000	0.2584	$37,210
21	$0	$144,000	$0	$0	$144,000	0.2415	$34,776
22	$0	$144,000	$219,000	$75,000	$438,000	0.2257	$98,857
23	$0	$144,000	$0	$0	$144,000	0.2109	$30,370
24	$0	$144,000	$0	$0	$144,000	0.1971	$28,382
25	$0	$144,000	$0	$0	$144,000	0.1842	$26,525
26	$0	$144,000	$0	$0	$144,000	0.1722	$24,797
27	$0	$144,000	$219,000	$75,000	$438,000	0.1609	$70,474
28	$0	$144,000	$0	$0	$144,000	0.1504	$21,658
29	$0	$144,000	$0	$0	$144,000	0.1406	$20,246
30	$0	$144,000	$0	$0	$144,000	0.1314	$18,922
TOTALS:	$1,047,000	$20,596,000	$1,971,000	$375,000	$23,989,000		$18,647,148
TOTAL PRESENT VALUE OF ALTERNATIVE 5a[5]							**$18,650,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-5a.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE SPV-5b

PRESENT VALUE ANALYSIS

Alternative 5b

Removal of All Identified ACM with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Capital Costs (Earthwork)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	$0	1.0000	$0
1	$1,047,000	$7,801,333	$0	$0	$8,848,333	0.9346	$8,269,652
2	$0	$7,801,333	$0	$0	$7,801,333	0.8734	$6,813,685
3	$0	$7,801,333	$0	$0	$7,801,333	0.8163	$6,368,228
4	$0	$0	$219,000	$0	$219,000	0.7629	$167,075
5	$0	$0	$219,000	$0	$219,000	0.7130	$156,147
6	$0	$0	$219,000	$0	$219,000	0.6663	$145,920
7	$0	$0	$219,000	$0	$219,000	0.6227	$136,371
8	$0	$0	$219,000	$75,000	$294,000	0.5820	$171,108
9	$0	$0	$0	$0	$0	0.5439	$0
10	$0	$0	$0	$0	$0	0.5083	$0
11	$0	$0	$0	$0	$0	0.4751	$0
12	$0	$0	$0	$0	$0	0.4440	$0
13	$0	$0	$219,000	$75,000	$294,000	0.4150	$122,010
14	$0	$0	$0	$0	$0	0.3878	$0
15	$0	$0	$0	$0	$0	0.3624	$0
16	$0	$0	$0	$0	$0	0.3387	$0
17	$0	$0	$0	$0	$0	0.3166	$0
18	$0	$0	$219,000	$75,000	$294,000	0.2959	$86,995
19	$0	$0	$0	$0	$0	0.2765	$0
20	$0	$0	$0	$0	$0	0.2584	$0
21	$0	$0	$0	$0	$0	0.2415	$0
22	$0	$0	$0	$0	$0	0.2257	$0
23	$0	$0	$219,000	$75,000	$294,000	0.2109	$62,005
24	$0	$0	$0	$0	$0	0.1971	$0
25	$0	$0	$0	$0	$0	0.1842	$0
26	$0	$0	$0	$0	$0	0.1722	$0
27	$0	$0	$0	$0	$0	0.1609	$0
28	$0	$0	$219,000	$75,000	$294,000	0.1504	$44,218
29	$0	$0	$0	$0	$0	0.1406	$0
30	$0	$0	$0	$0	$0	0.1314	$0
TOTALS:	$1,047,000	$23,404,000	$1,971,000	$375,000	$26,797,000		$22,543,414
TOTAL PRESENT VALUE OF ALTERNATIVE 5b[5]							**$22,540,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-5b.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE SPV-5c

PRESENT VALUE ANALYSIS

Alternative 5c

Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Capital Costs (Earthwork)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	$0	1.0000	$0
1	$1,079,000	$13,068,000	$0	$0	$14,147,000	0.9346	$13,221,786
2	$0	$13,068,000	$0	$0	$13,068,000	0.8734	$11,413,591
3	$0	$13,068,000	$0	$0	$13,068,000	0.8163	$10,667,408
4	$0	$0	$101,000	$0	$101,000	0.7629	$77,053
5	$0	$0	$101,000	$0	$101,000	0.7130	$72,013
6	$0	$0	$101,000	$0	$101,000	0.6663	$67,296
7	$0	$0	$101,000	$0	$101,000	0.6227	$62,893
8	$0	$0	$101,000	$75,000	$176,000	0.5820	$102,432
9	$0	$0	$0	$0	$0	0.5439	$0
10	$0	$0	$0	$0	$0	0.5083	$0
11	$0	$0	$0	$0	$0	0.4751	$0
12	$0	$0	$0	$0	$0	0.4440	$0
13	$0	$0	$101,000	$75,000	$176,000	0.4150	$73,040
14	$0	$0	$0	$0	$0	0.3878	$0
15	$0	$0	$0	$0	$0	0.3624	$0
16	$0	$0	$0	$0	$0	0.3387	$0
17	$0	$0	$0	$0	$0	0.3166	$0
18	$0	$0	$101,000	$75,000	$176,000	0.2959	$52,078
19	$0	$0	$0	$0	$0	0.2765	$0
20	$0	$0	$0	$0	$0	0.2584	$0
21	$0	$0	$0	$0	$0	0.2415	$0
22	$0	$0	$0	$0	$0	0.2257	$0
23	$0	$0	$101,000	$75,000	$176,000	0.2109	$37,118
24	$0	$0	$0	$0	$0	0.1971	$0
25	$0	$0	$0	$0	$0	0.1842	$0
26	$0	$0	$0	$0	$0	0.1722	$0
27	$0	$0	$0	$0	$0	0.1609	$0
28	$0	$0	$101,000	$75,000	$176,000	0.1504	$26,470
29	$0	$0	$0	$0	$0	0.1406	$0
30	$0	$0	$0	$0	$0	0.1314	$0
TOTALS:	$1,079,000	$39,204,000	$909,000	$375,000	$41,567,000		$35,873,178
TOTAL PRESENT VALUE OF ALTERNATIVE 5c[5]							**$35,870,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-5c.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE SPV-6a

PRESENT VALUE ANALYSIS

Alternative 6a

Removal of All Identified ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Capital Costs (Earthwork)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	$0	1.0000	$0
1	$761,000	$13,327,500	$0	$0	$14,088,500	0.9346	$13,167,112
2	$0	$13,327,500	$0	$0	$13,327,500	0.8734	$11,640,239
3	$0	$13,327,500	$0	$0	$13,327,500	0.8163	$10,879,238
4	$0	$13,327,500	$0	$0	$13,327,500	0.7629	$10,167,550
5	$0	$0	$219,000	$0	$219,000	0.7130	$156,147
6	$0	$0	$219,000	$0	$219,000	0.6663	$145,920
7	$0	$0	$219,000	$0	$219,000	0.6227	$136,371
8	$0	$0	$219,000	$0	$219,000	0.5820	$127,458
9	$0	$0	$219,000	$75,000	$294,000	0.5439	$159,907
10	$0	$0	$0	$0	$0	0.5083	$0
11	$0	$0	$0	$0	$0	0.4751	$0
12	$0	$0	$0	$0	$0	0.4440	$0
13	$0	$0	$0	$0	$0	0.4150	$0
14	$0	$0	$219,000	$75,000	$294,000	0.3878	$114,013
15	$0	$0	$0	$0	$0	0.3624	$0
16	$0	$0	$0	$0	$0	0.3387	$0
17	$0	$0	$0	$0	$0	0.3166	$0
18	$0	$0	$0	$0	$0	0.2959	$0
19	$0	$0	$219,000	$75,000	$294,000	0.2765	$81,291
20	$0	$0	$0	$0	$0	0.2584	$0
21	$0	$0	$0	$0	$0	0.2415	$0
22	$0	$0	$0	$0	$0	0.2257	$0
23	$0	$0	$0	$0	$0	0.2109	$0
24	$0	$0	$219,000	$75,000	$294,000	0.1971	$57,947
25	$0	$0	$0	$0	$0	0.1842	$0
26	$0	$0	$0	$0	$0	0.1722	$0
27	$0	$0	$0	$0	$0	0.1609	$0
28	$0	$0	$0	$0	$0	0.1504	$0
29	$0	$0	$219,000	$75,000	$294,000	0.1406	$41,336
30	$0	$0	$0	$0	$0	0.1314	$0
TOTALS:	$761,000	$53,310,000	$1,971,000	$375,000	$56,417,000		$46,874,529
TOTAL PRESENT VALUE OF ALTERNATIVE 6a[5]							**$46,870,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-6a.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE SPV-6b

PRESENT VALUE ANALYSIS

Alternative 6b

Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Capital Costs (Earthwork)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	$0	1.0000	$0
1	$761,000	$17,304,200	$0	$0	$18,065,200	0.9346	$16,883,736
2	$0	$17,304,200	$0	$0	$17,304,200	0.8734	$15,113,488
3	$0	$17,304,200	$0	$0	$17,304,200	0.8163	$14,125,418
4	$0	$17,304,200	$0	$0	$17,304,200	0.7629	$13,201,374
5	$0	$17,304,200	$0	$0	$17,304,200	0.7130	$12,337,895
6	$0	$0	$101,000	$0	$101,000	0.6663	$67,296
7	$0	$0	$101,000	$0	$101,000	0.6227	$62,893
8	$0	$0	$101,000	$0	$101,000	0.5820	$58,782
9	$0	$0	$101,000	$0	$101,000	0.5439	$54,934
10	$0	$0	$101,000	$75,000	$176,000	0.5083	$89,461
11	$0	$0	$0	$0	$0	0.4751	$0
12	$0	$0	$0	$0	$0	0.4440	$0
13	$0	$0	$0	$0	$0	0.4150	$0
14	$0	$0	$0	$0	$0	0.3878	$0
15	$0	$0	$101,000	$75,000	$176,000	0.3624	$63,782
16	$0	$0	$0	$0	$0	0.3387	$0
17	$0	$0	$0	$0	$0	0.3166	$0
18	$0	$0	$0	$0	$0	0.2959	$0
19	$0	$0	$0	$0	$0	0.2765	$0
20	$0	$0	$101,000	$75,000	$176,000	0.2584	$45,478
21	$0	$0	$0	$0	$0	0.2415	$0
22	$0	$0	$0	$0	$0	0.2257	$0
23	$0	$0	$0	$0	$0	0.2109	$0
24	$0	$0	$0	$0	$0	0.1971	$0
25	$0	$0	$101,000	$75,000	$176,000	0.1842	$32,419
26	$0	$0	$0	$0	$0	0.1722	$0
27	$0	$0	$0	$0	$0	0.1609	$0
28	$0	$0	$0	$0	$0	0.1504	$0
29	$0	$0	$0	$0	$0	0.1406	$0
30	$0	$0	$101,000	$75,000	$176,000	0.1314	$23,126
TOTALS:	$761,000	$86,521,000	$909,000	$375,000	$88,566,000		$72,160,082
TOTAL PRESENT VALUE OF ALTERNATIVE 6b[5]							**$72,160,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-6b.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE SPV-7a

PRESENT VALUE ANALYSIS

Alternative 7a

Removal of All Identified ACM with Thermo-Chemical Treatment, Reuse of Treated Material, and Institutional Controls with Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Capital Costs (Earthwork)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	$0	1.0000	$0
1	$761,000	$57,195,000	$0	$0	$57,956,000	0.9346	$54,165,678
2	$0	$57,195,000	$0	$0	$57,195,000	0.8734	$49,954,113
3	$0	$57,195,000	$0	$0	$57,195,000	0.8163	$46,688,279
4	$0	$57,195,000	$0	$0	$57,195,000	0.7629	$43,634,066
5	$0	$57,195,000	$0	$0	$57,195,000	0.7130	$40,780,035
6	$0	$0	$219,000	$0	$219,000	0.6663	$145,920
7	$0	$0	$219,000	$0	$219,000	0.6227	$136,371
8	$0	$0	$219,000	$0	$219,000	0.5820	$127,458
9	$0	$0	$219,000	$0	$219,000	0.5439	$119,114
10	$0	$0	$219,000	$75,000	$294,000	0.5083	$149,440
11	$0	$0	$0	$0	$0	0.4751	$0
12	$0	$0	$0	$0	$0	0.4440	$0
13	$0	$0	$0	$0	$0	0.4150	$0
14	$0	$0	$0	$0	$0	0.3878	$0
15	$0	$0	$219,000	$75,000	$294,000	0.3624	$106,546
16	$0	$0	$0	$0	$0	0.3387	$0
17	$0	$0	$0	$0	$0	0.3166	$0
18	$0	$0	$0	$0	$0	0.2959	$0
19	$0	$0	$0	$0	$0	0.2765	$0
20	$0	$0	$219,000	$75,000	$294,000	0.2584	$75,970
21	$0	$0	$0	$0	$0	0.2415	$0
22	$0	$0	$0	$0	$0	0.2257	$0
23	$0	$0	$0	$0	$0	0.2109	$0
24	$0	$0	$0	$0	$0	0.1971	$0
25	$0	$0	$219,000	$75,000	$294,000	0.1842	$54,155
26	$0	$0	$0	$0	$0	0.1722	$0
27	$0	$0	$0	$0	$0	0.1609	$0
28	$0	$0	$0	$0	$0	0.1504	$0
29	$0	$0	$0	$0	$0	0.1406	$0
30	$0	$0	$219,000	$75,000	$294,000	0.1314	$38,632
TOTALS:	$761,000	$285,975,000	$1,971,000	$375,000	$289,082,000		$236,175,777
TOTAL PRESENT VALUE OF ALTERNATIVE 7a[5]							**$236,180,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-7a.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

TABLE SPV-7b

PRESENT VALUE ANALYSIS

Alternative 7b

Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Thermo-Chemical Treatment, Reuse of Treated Material, and Institutional Controls with Monitoring

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008

Year[1]	Capital Costs (Institutional and Engineered Controls)[2]	Capital Costs (Earthwork)[2]	Periodic Costs (Monitoring)	Periodic Costs (Five-Year Site Reviews)	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$0	$0	$0	$0	$0	1.0000	$0
1	$761,000	$77,345,333	$0	$0	$78,106,333	0.9346	$72,998,179
2	$0	$77,345,333	$0	$0	$77,345,333	0.8734	$67,553,414
3	$0	$77,345,333	$0	$0	$77,345,333	0.8163	$63,136,996
4	$0	$77,345,333	$0	$0	$77,345,333	0.7629	$59,006,755
5	$0	$77,345,333	$0	$0	$77,345,333	0.7130	$55,147,223
6	$0	$77,345,333	$0	$0	$77,345,333	0.6663	$51,535,196
7	$0	$0	$101,000	$0	$101,000	0.6227	$62,893
8	$0	$0	$101,000	$0	$101,000	0.5820	$58,782
9	$0	$0	$101,000	$0	$101,000	0.5439	$54,934
10	$0	$0	$101,000	$0	$101,000	0.5083	$51,338
11	$0	$0	$101,000	$75,000	$176,000	0.4751	$83,618
12	$0	$0	$0	$0	$0	0.4440	$0
13	$0	$0	$0	$0	$0	0.4150	$0
14	$0	$0	$0	$0	$0	0.3878	$0
15	$0	$0	$0	$0	$0	0.3624	$0
16	$0	$0	$101,000	$75,000	$176,000	0.3387	$59,611
17	$0	$0	$0	$0	$0	0.3166	$0
18	$0	$0	$0	$0	$0	0.2959	$0
19	$0	$0	$0	$0	$0	0.2765	$0
20	$0	$0	$0	$0	$0	0.2584	$0
21	$0	$0	$101,000	$75,000	$176,000	0.2415	$42,504
22	$0	$0	$0	$0	$0	0.2257	$0
23	$0	$0	$0	$0	$0	0.2109	$0
24	$0	$0	$0	$0	$0	0.1971	$0
25	$0	$0	$0	$0	$0	0.1842	$0
26	$0	$0	$101,000	$75,000	$176,000	0.1722	$30,307
27	$0	$0	$0	$0	$0	0.1609	$0
28	$0	$0	$0	$0	$0	0.1504	$0
29	$0	$0	$0	$0	$0	0.1406	$0
30	$0	$0	$0	$0	$0	0.1314	$0
TOTALS:	$761,000	$464,072,000	$808,000	$300,000	$465,941,000		$369,821,750
TOTAL PRESENT VALUE OF ALTERNATIVE 7b[5]							**$369,820,000**

Notes:
[1] Duration is assumed to be 30 years for present value analysis.
[2] Capital costs, for purposes of this analysis, are assumed to be distributed as indicated on Table SCS-7b.
[3] Total annual expenditure is the total cost per year with no discounting.
[4] Present value is the total cost per year including a 7.0% discount factor for that year. See Table SPV-ADRIFT for details.
[5] Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.

Screening Cost Estimate Summaries

TABLE SCS-1

Alternative 1
No Action

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

5-YEAR SITE REVIEW PERIODIC COSTS (Years 5, 10, 15, 20, 25 and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Notes:
Refer to Table SCS-Notes for cost sources and explanation for various unit costs.
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
EA Each
LS Lump Sum
QTY Quantity

TABLE SCS-2

Alternative **2**
Institutional/Engineered Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
Engineered Controls	22,000	FT	$25	$550,000	Includes fencing and warning signage around the site boundary
SUBTOTAL				$1,000,000	
Contingency (Scope and Bid)	20%			$200,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$1,200,000	
Project Management	6%			$72,000	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$144,000	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$96,000	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$180,000	Middle value of the recommended range was used.
TOTAL				$1,692,000	
TOTAL CAPITAL COST				**$1,692,000**	Total capital cost is rounded to the nearest $1,000.

MONITORING COSTS (Years 6, 11, 16, 21, and 26)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$1,100	$148,500	Includes ABS, 3 scenarios per parcel, 45 parcels
SUBTOTAL				$148,500	
Contingency (Scope and Bid)	20%			$29,700	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$178,200	
Project Management	8%			$14,256	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$26,730	Middle value of the recommended range was used.
TOTAL				$219,186	
TOTAL PERIODIC COST				**$219,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-2

Alternative **2**
Institutional/Engineered Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

5-YEAR SITE REVIEW PERIODIC COSTS (Years 6, 11, 16, 21, and 26)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
ABS Activity Based Sampling
EA Each
FT Feet
LS Lump Sum
QTY Quantity

TABLE SCS-3

Alternative 3

In-Place Containment of All Identified ACM on Private Parcels and Partial In-Place Containment of Identified ACM on Receivership Parcels with Institutional/Engineered Controls and Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
Engineered Controls	11,000	FT	$25	$275,000	Includes fencing and warning signage around the site boundary, 50% of the total boundary length.
SUBTOTAL				$725,000	
Contingency (Scope and Bid)	20%			$145,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$870,000	
Project Management	6%			$52,200	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$104,400	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$69,600	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$130,500	Middle value of the recommended range was used.
TOTAL				$1,226,700	
TOTAL CAPITAL COST				**$1,227,000**	Total capital cost is rounded to the nearest $1,000.

EARTHWORK CAPITAL COSTS: (Assumed to be Incurred During Year 1

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
In-Place Containment	40	ACR	$125,000	$5,000,000	Includes site clearing, mob/demob, in-place containment and revegetation
SUBTOTAL				$5,000,000	
Contingency (Scope and Bid)	20%			$1,000,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$6,000,000	
Project Management	5%			$300,000	Percentage from Exhibit 5-8 was used.
Remedial Design	8%			$480,000	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$360,000	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$900,000	Middle value of the recommended range was used.
TOTAL				$8,040,000	
TOTAL CAPITAL COST				**$8,040,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-3

Alternative 3

In-Place Containment of All Identified ACM on Private Parcels and Partial In-Place Containment of Identified ACM on Receivership Parcels with Institutional/Engineered Controls and Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

MONITORING COSTS (Years 2, 3, 4, 5, 6, 11, 16, 21, and 26)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$1,100	$148,500	Includes ABS, 3 scenarios per parcel, 45 parcels
SUBTOTAL				$148,500	
Contingency (Scope and Bid)	20%			$29,700	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$178,200	
Project Management	8%			$14,256	The high end of the recommended range was used.
Technical Support	15%			$26,730	Middle value of the recommended range was used.
TOTAL				$219,186	
TOTAL PERIODIC COST				**$219,000**	Total capital cost is rounded to the nearest $1,000.

5-YEAR SITE REVIEW PERIODIC COSTS (Years 6, 11, 16, 21, and 26)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	The high end of the recommended range was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
ABS Activity Based Sampling
ACR Acre
EA Each
FT Feet
LS Lump Sum
QTY Quantity

TABLE SCS-4a

Alternative **4a**
In-Place Containment of All Identified ACM with Institutional Controls and Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
SUBTOTAL				$450,000	
Contingency (Scope and Bid)	20%			$90,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$540,000	
Project Management	6%			$32,400	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$64,800	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$43,200	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$81,000	Middle value of the recommended range was used.
TOTAL				$761,400	
TOTAL CAPITAL COST				**$761,000**	Total capital cost is rounded to the nearest $1,000.

EARTHWORK CAPITAL COSTS: (Assumed to be Incurred During Year 1 and 2

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
In-Place Containment	68	ACR	$125,000	$8,500,000	Includes site clearing, mob/demob, in-place containment and revegetation
SUBTOTAL				$8,500,000	
Contingency (Scope and Bid)	20%			$1,700,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$10,200,000	
Project Management	5%			$510,000	Percentage from Exhibit 5-8 was used.
Remedial Design	6%			$612,000	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$612,000	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$1,530,000	Middle value of the recommended range was used.
TOTAL				$13,464,000	
TOTAL CAPITAL COST				**$13,464,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-4a

Alternative **4a**
In-Place Containment of All Identified ACM with Institutional Controls and Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

MONITORING COSTS (Years 3, 4, 5, 6, 7, 12, 17, 22, and 27)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$1,100	$148,500	Includes ABS, 3 scenarios per parcel, 45 parcels
SUBTOTAL				$148,500	
Contingency (Scope and Bid)	20%			$29,700	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$178,200	
Project Management	8%			$14,256	The high end of the recommended range was used.
Technical Support	15%			$26,730	Middle value of the recommended range was used.
TOTAL				$219,186	
TOTAL PERIODIC COST				**$219,000**	Total capital cost is rounded to the nearest $1,000.

5-YEAR SITE REVIEW PERIODIC COSTS (Years 7, 12, 17, 22, and 27)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	The high end of the recommended range was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
ABS Activity Based Sampling
ACR Acre
EA Each
FT Feet
LS Lump Sum
QTY Quantity

TABLE SCS-4b

Alternative **4b**
In-Place Containment of All Identified ACM and In-Place Containment of Soil within Bin A Parcels with Institutional Controls and Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
SUBTOTAL				$450,000	
Contingency (Scope and Bid)	20%			$90,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$540,000	
Project Management	6%			$32,400	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$64,800	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$43,200	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$81,000	Middle value of the recommended range was used.
TOTAL				$761,400	
TOTAL CAPITAL COST				**$761,000**	Total capital cost is rounded to the nearest $1,000.

EARTHWORK CAPITAL COSTS: (Assumed to be Incurred During Year 1, 2 and 3

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
In-Place Containment	104	ACR	$125,000	$13,000,000	Includes site clearing, mob/demob, in-place containment and revegetation
SUBTOTAL				$13,000,000	
Contingency (Scope and Bid)	20%			$2,600,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$15,600,000	
Project Management	5%			$780,000	Percentage from Exhibit 5-8 was used.
Remedial Design	6%			$936,000	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$936,000	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$2,340,000	Middle value of the recommended range was used.
TOTAL				$20,592,000	
TOTAL CAPITAL COST				**$20,592,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-4b

Alternative **4b**
In-Place Containment of All Identified ACM and In-Place Containment of Soil within Bin A Parcels with Institutional Controls and Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

MONITORING COSTS (Years 4, 5, 6, 7, 8, 13, 18, 23, and 28)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$500	$67,500	Includes inspection and monitoring other than ABS, 45 parcels
SUBTOTAL				$67,500	
Contingency (Scope and Bid)	20%			$13,500	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$81,000	
Project Management	10%			$8,100	The high end of the recommended range was used.
Technical Support	15%			$12,150	Middle value of the recommended range was used.
TOTAL				$101,250	
TOTAL PERIODIC COST				**$101,000**	Total capital cost is rounded to the nearest $1,000.

5-YEAR SITE REVIEW PERIODIC COSTS (Years 8, 13, 18, 23, and 28)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	The high end of the recommended range was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
ABS Activity Based Sampling
ACR Acre
EA Each
FT Feet
LS Lump Sum
QTY Quantity

TABLE SCS-5a

Alternative **5a**

Removal of All Identified Surface ACM with Onsite Consolidation/Disposal, Future Incremental Removal of Identified Surface ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos, and Institutional/Engineered Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
Engineered Controls	6,750	FT	$25	$168,750	Includes fencing and warning signage around the onsite consolidation/disposal areas, perimeter length of 7 parcels.
SUBTOTAL				$618,750	
Contingency (Scope and Bid)	20%			$123,750	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$742,500	
Project Management	6%			$44,550	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$89,100	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$59,400	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$111,375	Middle value of the recommended range was used.
TOTAL				$1,046,925	
TOTAL CAPITAL COST				**$1,047,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-5a

Alternative **5a**

Removal of All Identified Surface ACM with Onsite Consolidation/Disposal, Future Incremental Removal of Identified Surface ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos, and Institutional/Engineered Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

EARTHWORK CAPITAL COSTS: (Assumed to be Incurred During Year 1 and 2)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Surface Removal, Transport and Disposal	137,000	CY	$75	$10,275,000	Includes site clearing, mob/demob, surface removal and onsite consolidation/disposal
SUBTOTAL				$10,275,000	
Contingency (Scope and Bid)	20%			$2,055,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$12,330,000	
Project Management	5%			$616,500	Percentage from Exhibit 5-8 was used.
Remedial Design	6%			$739,800	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$739,800	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$1,849,500	Middle value of the recommended range was used.
TOTAL				$16,275,600	
TOTAL CAPITAL COST				**$16,276,000**	Total capital cost is rounded to the nearest $1,000.

REMOVAL CAPITAL COSTS: (Assumed to be Incurred Every Year)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Incremental Removal	1	YR	$75,000	$75,000	Includes site clearing, mob/demob, containment and revegetation
SUBTOTAL				$75,000	
Contingency (Scope and Bid)	20%			$15,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$90,000	
Project Management	10%			$9,000	Percentage from Exhibit 5-8 was used.
Remedial Design	20%			$18,000	Percentage from Exhibit 5-8 was used.
Construction Management	15%			$13,500	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$13,500	Middle value of the recommended range was used.
TOTAL				$144,000	
TOTAL CAPITAL COST				**$144,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-5a

Alternative **5a**

Removal of All Identified Surface ACM with Onsite Consolidation/Disposal, Future Incremental Removal of Identified Surface ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos, and Institutional/Engineered Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

MONITORING COSTS (Years 3, 4, 5, 6, 7, 12, 17, 22, and 27)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$1,100	$148,500	Includes ABS, 3 scenarios per parcel, 45 parcels
SUBTOTAL				$148,500	
Contingency (Scope and Bid)	20%			$29,700	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$178,200	
Project Management	8%			$14,256	The high end of the recommended range was used.
Technical Support	15%			$26,730	Middle value of the recommended range was used.
TOTAL				$219,186	
TOTAL PERIODIC COST				**$219,000**	Total capital cost is rounded to the nearest $1,000.

5-YEAR SITE REVIEW PERIODIC COSTS (Years 7, 12, 17, 22, and 27)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	The high end of the recommended range was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
ABS Activity Based Sampling
ACR Acre
CY Cubic Yard
EA Each
FT Feet
LS Lump Sum
QTY Quantity

TABLE SCS-5b

Alternative **5b**

Removal of All Identified ACM with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
Engineered Controls	6,750	FT	$25	$168,750	Includes fencing and warning signage around the onsite consolidation/disposal areas, perimeter length of 7 parcels.
SUBTOTAL				$618,750	
Contingency (Scope and Bid)	20%			$123,750	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$742,500	
Project Management	6%			$44,550	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$89,100	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$59,400	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$111,375	Middle value of the recommended range was used.
TOTAL				$1,046,925	
TOTAL CAPITAL COST				**$1,047,000**	Total capital cost is rounded to the nearest $1,000.

EARTHWORK CAPITAL COSTS: (Assumed to be Incurred During Year 1, 2, and 3

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Removal, Transport and Disposal	197,000	CY	$75	$14,775,000	Includes site clearing, mob/demob, identified ACM removal and onsite consolidation/disposal
SUBTOTAL				$14,775,000	
Contingency (Scope and Bid)	20%			$2,955,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$17,730,000	
Project Management	5%			$886,500	Percentage from Exhibit 5-8 was used.
Remedial Design	6%			$1,063,800	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$1,063,800	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$2,659,500	Middle value of the recommended range was used.
TOTAL				$23,403,600	
TOTAL CAPITAL COST				**$23,404,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-5b

Alternative **5b**

Removal of All Identified ACM with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

MONITORING COSTS (Years 4, 5, 6, 7, 8, 13, 18, 23, and 28)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$1,100	$148,500	Includes ABS, 3 scenarios per parcel, 45 parcels
SUBTOTAL				$148,500	
Contingency (Scope and Bid)	20%			$29,700	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$178,200	
Project Management	8%			$14,256	The high end of the recommended range was used.
Technical Support	15%			$26,730	Middle value of the recommended range was used.
TOTAL				$219,186	
TOTAL PERIODIC COST				**$219,000**	Total capital cost is rounded to the nearest $1,000.

5-YEAR SITE REVIEW PERIODIC COSTS (Years 8, 13, 18, 23, and 28)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	The high end of the recommended range was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
ABS Activity Based Sampling
ACR Acre
CY Cubic Yard
EA Each
FT Feet
LS Lump Sum
QTY Quantity

TABLE SCS-5c

Alternative **5c**
Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
Engineered Controls	7,500	FT	$25	$187,500	Includes fencing and warning signage around the onsite consolidation/disposal areas, perimeter length of 8 parcels.
SUBTOTAL				$637,500	
Contingency (Scope and Bid)	20%			$127,500	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$765,000	
Project Management	6%			$45,900	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$91,800	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$61,200	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$114,750	Middle value of the recommended range was used.
TOTAL				$1,078,650	
TOTAL CAPITAL COST				**$1,079,000**	Total capital cost is rounded to the nearest $1,000.

EARTHWORK CAPITAL COSTS: (Assumed to be Incurred During Year 1, 2, and 3

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Removal, Transport and Disposal	330,000	CY	$75	$24,750,000	Includes site clearing, mob/demob, identified ACM and Bin A soils removal and onsite consolidation/disposal
SUBTOTAL				$24,750,000	
Contingency (Scope and Bid)	20%			$4,950,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$29,700,000	
Project Management	5%			$1,485,000	Percentage from Exhibit 5-8 was used.
Remedial Design	6%			$1,782,000	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$1,782,000	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$4,455,000	Middle value of the recommended range was used.
TOTAL				$39,204,000	
TOTAL CAPITAL COST				**$39,204,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-5c

Alternative **5c**
Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

MONITORING COSTS (Years 4, 5, 6, 7, 8, 13, 18, 23, and 28)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$500	$67,500	Includes inspection and monitoring other than ABS, 45 parcels
SUBTOTAL				$67,500	
Contingency (Scope and Bid)	20%			$13,500	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$81,000	
Project Management	10%			$8,100	The high end of the recommended range was used.
Technical Support	15%			$12,150	Middle value of the recommended range was used.
TOTAL				$101,250	
TOTAL PERIODIC COST				**$101,000**	Total capital cost is rounded to the nearest $1,000.

5-YEAR SITE REVIEW PERIODIC COSTS (Years 8, 13, 18, 23, and 28)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	The high end of the recommended range was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Notes:
Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.

Abbreviations:
ABS Activity Based Sampling
ACR Acre
CY Cubic Yard
EA Each
FT Feet
LS Lump Sum
QTY Quantity

TABLE SCS-6a

Alternative **6a**
Removal of All Identified ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
SUBTOTAL				$450,000	
Contingency (Scope and Bid)	20%			$90,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$540,000	
Project Management	6%			$32,400	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$64,800	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$43,200	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$81,000	Middle value of the recommended range was used.
TOTAL				$761,400	
TOTAL CAPITAL COST				**$761,000**	Total capital cost is rounded to the nearest $1,000.

EARTHWORK CAPITAL COSTS: (Assumed to be Incurred During Year 1, 2, 3, and 4

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Removal, Transport	245,000	CY	$35	$8,575,000	Includes site clearing, mob/demob, removal and waste transportation
Disposal	330,000	TN	$76	$25,080,000	Includes waste disposal at offsite permitted disposal facility
SUBTOTAL				$33,655,000	
Contingency (Scope and Bid)	20%			$6,731,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$40,386,000	
Project Management	5%			$2,019,300	Percentage from Exhibit 5-8 was used.
Remedial Design	6%			$2,423,160	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$2,423,160	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$6,057,900	Middle value of the recommended range was used.
TOTAL				$53,309,520	
TOTAL CAPITAL COST				**$53,310,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-6a

Alternative **6a**
Removal of All Identified ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

MONITORING COSTS (Years 5, 6, 7, 8, 9, 14, 19, 24, and 29)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$1,100	$148,500	Includes ABS, 3 scenarios per parcel, 45 parcels
SUBTOTAL				$148,500	
Contingency (Scope and Bid)	20%			$29,700	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$178,200	
Project Management	8%			$14,256	The high end of the recommended range was used.
Technical Support	15%			$26,730	Middle value of the recommended range was used.
TOTAL				$219,186	
TOTAL PERIODIC COST				**$219,000**	Total capital cost is rounded to the nearest $1,000.

5-YEAR SITE REVIEW PERIODIC COSTS (Years 9, 14, 19, 24, and 29)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	The high end of the recommended range was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Abbreviations:

ABS	Activity Based Sampling
ACR	Acre
CY	Cubic Yard
EA	Each
FT	Feet
LS	Lump Sum
QTY	Quantity
TN	Ton

TABLE SCS-6b

Alternative **6b**

Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
SUBTOTAL				$450,000	
Contingency (Scope and Bid)	20%			$90,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$540,000	
Project Management	6%			$32,400	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$64,800	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$43,200	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$81,000	Middle value of the recommended range was used.
TOTAL				$761,400	
TOTAL CAPITAL COST				**$761,000**	Total capital cost is rounded to the nearest $1,000.

EARTHWORK CAPITAL COSTS: (Assumed to be Incurred During Year 1, 2, 3, 4 and 5

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Removal, Transport	400,000	CY	$35	$14,000,000	Includes site clearing, mob/demob, removal and waste transportation
Disposal	534,500	TN	$76	$40,622,000	Includes waste disposal at offsite permitted disposal facility
SUBTOTAL				$54,622,000	
Contingency (Scope and Bid)	20%			$10,924,400	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$65,546,400	
Project Management	5%			$3,277,320	Percentage from Exhibit 5-8 was used.
Remedial Design	6%			$3,932,784	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$3,932,784	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$9,831,960	Middle value of the recommended range was used.
TOTAL				$86,521,248	
TOTAL CAPITAL COST				**$86,521,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-6b

Alternative **6b**

Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

MONITORING COSTS (Years 6, 7, 8 9, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$500	$67,500	Includes inspection and monitoring other than ABS, 45 parcels
SUBTOTAL				$67,500	
Contingency (Scope and Bid)	20%			$13,500	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$81,000	
Project Management	10%			$8,100	The high end of the recommended range was used.
Technical Support	15%			$12,150	Middle value of the recommended range was used.
TOTAL				$101,250	
TOTAL PERIODIC COST				**$101,000**	Total capital cost is rounded to the nearest $1,000.

5-YEAR SITE REVIEW PERIODIC COSTS (Years 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	The high end of the recommended range was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Abbreviations:

ABS Activity Based Sampling
ACR Acre
CY Cubic Yard
EA Each
FT Feet
LS Lump Sum
QTY Quantity
TN Ton

TABLE SCS-7a

Alternative **7a**
Removal of All Identified ACM with Thermo-Chemical Treatment, Reuse of Treated Material, and Institutional Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
SUBTOTAL				$450,000	
Contingency (Scope and Bid)	20%			$90,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$540,000	
Project Management	6%			$32,400	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$64,800	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$43,200	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$81,000	Middle value of the recommended range was used.
TOTAL				$761,400	
TOTAL CAPITAL COST				**$761,000**	Total capital cost is rounded to the nearest $1,000.

EARTHWORK CAPITAL COSTS: (Assumed to be Incurred During Year 1, 2, 3, 4, and 5

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Removal, Transport	212,000	CY	$120	$25,440,000	Includes site clearing, mob/demob, removal and waste transportation
Treatment	330,000	TN	$470	$155,100,000	Includes waste Treatment by Thermo-Chemical Process
SUBTOTAL				$180,540,000	
Contingency (Scope and Bid)	20%			$36,108,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$216,648,000	
Project Management	5%			$10,832,400	Percentage from Exhibit 5-8 was used.
Remedial Design	6%			$12,998,880	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$12,998,880	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$32,497,200	Middle value of the recommended range was used.
TOTAL				$285,975,360	
TOTAL CAPITAL COST				**$285,975,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-7a

Alternative **7a**
Removal of All Identified ACM with Thermo-Chemical Treatment, Reuse of Treated Material, and Institutional Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

MONITORING COSTS (Years 6, 7, 8, 9, 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$1,100	$148,500	Includes ABS, 3 scenarios per parcel, 45 parcels
SUBTOTAL				$148,500	
Contingency (Scope and Bid)	20%			$29,700	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$178,200	
Project Management	8%			$14,256	The high end of the recommended range was used.
Technical Support	15%			$26,730	Middle value of the recommended range was used.
TOTAL				$219,186	
TOTAL PERIODIC COST				**$219,000**	Total capital cost is rounded to the nearest $1,000.

5-YEAR SITE REVIEW PERIODIC COSTS (Years 10, 15, 20, 25, and 30)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	The high end of the recommended range was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Abbreviations:

ABS	Activity Based Sampling
ACR	Acre
CY	Cubic Yard
EA	Each
FT	Feet
LS	Lump Sum
QTY	Quantity
TN	Ton

TABLE SCS-7b

Alternative **7b**
Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Thermo-Chemical Treatment, Reuse of Treated Material, and Institutional Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

INSTITUTIONAL AND ENGINEERED CONTROLS CAPITAL COSTS: (Assumed to be Incurred During Year 1

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Institutional Controls	45	EA	$10,000	$450,000	Institutional controls for private and receivership parcels, 45 parcels
SUBTOTAL				$450,000	
Contingency (Scope and Bid)	20%			$90,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$540,000	
Project Management	6%			$32,400	Percentage from Exhibit 5-8 was used.
Remedial Design	12%			$64,800	Percentage from Exhibit 5-8 was used.
Construction Management	8%			$43,200	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$81,000	Middle value of the recommended range was used.
TOTAL				$761,400	
TOTAL CAPITAL COST				**$761,000**	Total capital cost is rounded to the nearest $1,000.

EARTHWORK CAPITAL COSTS: (Assumed to be Incurred During Year 1, 2, 3, 4, 5, and 6

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Removal, Transport	348,000	CY	$120	$41,760,000	Includes site clearing, mob/demob, removal and waste transportation
Treatment	534,500	TN	$470	$251,215,000	Includes waste Treatment by Thermo-Chemical Process
SUBTOTAL				$292,975,000	
Contingency (Scope and Bid)	20%			$58,595,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$351,570,000	
Project Management	5%			$17,578,500	Percentage from Exhibit 5-8 was used.
Remedial Design	6%			$21,094,200	Percentage from Exhibit 5-8 was used.
Construction Management	6%			$21,094,200	Percentage from Exhibit 5-8 was used.
Technical Support	15%			$52,735,500	Middle value of the recommended range was used.
TOTAL				$464,072,400	
TOTAL CAPITAL COST				**$464,072,000**	Total capital cost is rounded to the nearest $1,000.

TABLE SCS-7b

Alternative **7b**
Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Thermo-Chemical Treatment, Reuse of Treated Material, and Institutional Controls with Monitoring

SCREENING COST ESTIMATE SUMMARY

Site: North Ridge Estates
Location: Klamath County, Oregon
Phase: Final Draft Feasibility Study
Base Year: 2008
Date: May 1, 2008

MONITORING COSTS (Years 7, 8, 9, 10, 11, 16, 21, and 26)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
Monitoring (1 event per 5-year period)	135	EA	$500	$67,500	Includes inspection and monitoring other than ABS, 45 parcels
SUBTOTAL				$67,500	
Contingency (Scope and Bid)	20%			$13,500	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$81,000	
Project Management	10%			$8,100	The high end of the recommended range was used.
Technical Support	15%			$12,150	Middle value of the recommended range was used.
TOTAL				$101,250	
TOTAL PERIODIC COST				**$101,000**	Total capital cost is rounded to the nearest $1,000.

5-YEAR SITE REVIEW PERIODIC COSTS (Years 11, 16, 21, and 26)

DESCRIPTION	QTY	UNIT(S)	UNIT COST	TOTAL	NOTES
5-Year Site Review	1	LS	$50,000	$50,000	Includes 5-year site inspection and review report
SUBTOTAL				$50,000	
Contingency (Scope and Bid)	20%			$10,000	10% Scope, 10% Bid (Low end of the recommended range).
SUBTOTAL				$60,000	
Project Management	10%			$6,000	The high end of the recommended range was used.
Technical Support	15%			$9,000	Middle value of the recommended range was used.
TOTAL				$75,000	
TOTAL PERIODIC COST				**$75,000**	Total capital cost is rounded to the nearest $1,000.

Abbreviations:

ABS	Activity Based Sampling
ACR	Acre
CY	Cubic Yard
EA	Each
FT	Feet
LS	Lump Sum
QTY	Quantity
TN	Ton

Appendix F

Summary of Institutional Controls
and
Monitoring Protocol for Retained Alternatives

Summary of Institutional Controls

Appendix F
Summary of Institutional Controls Applicable to the North Ridge Estates Site

Institutional controls for the site would consist primarily of governmental controls and proprietary controls, and potentially informational notices. The following paragraphs provide detailed descriptions for these specific legal and administrative instruments that could be used in implementation of an alternative for the site that requires the use of institutional controls to ensure protectiveness.

Governmental controls impose land or resource restrictions under the authority of an existing unit of government. Such controls may include use or changes in local zoning, permits, codes, or regulations. The site is located in Klamath County, Oregon. Klamath County has demonstrated legal authority to pass ordinances respecting the use and development of land. Such authority might also be used to pass ordinances requiring the safe handling or management of soils from the site that are or may be contaminated with ACM. Consistent with Oregon law (ORS Chapter 195), the Klamath County Board of Commissioners maintains jurisdiction over specific local land use decisions with legal authority to approve proposed changes in zoning that may be necessary to accommodate remedial alternatives and ensure the protectiveness of any selected remedy. EPA and DEQ representatives have already met with the County Commissioners and discussed the potential need for changes in zoning to support or protect potential remedies, and have a reasonable basis to believe that specific and reasonable proposals to the County Commissioners would be approved. This reasonable belief is supported by recent experience of the NRE Receiver in seeking and obtaining a desired land use decision from the County Commissioners.

Proprietary controls are various legal instruments based on state law, such as easements or covenants, to prohibit activities that could pose an unacceptable risk or compromise the effectiveness of a remedy. Consistent with State of Oregon property law, land use restrictions may be effected by the use of an Easement and Equitable Servitude. Creation of such legal instruments can be facilitated through use of a standard form developed for such purpose by DEQ. Through such instruments, an owner of property (grantor) may convey to another party (grantee) an easement for access. In the past, DEQ has agreed to serve as a grantee for purposes of effectuating an Equitable Servitude. Grantors may also, simultaneously, accept placement of equitable servitudes upon the property. Such equitable servitudes may include restrictions on land use, such as prohibitions of residential or agricultural use. Equitable servitudes may also prohibit grantors from conduct, such as excavation, that would impair the protectiveness of a constructed remedy, such as a soil cover. An executed Easement and Equitable Servitude will be filed with the county records and is intended to run with the land, so that any future owners will also take the property subject to the conditions of the instrument. Through such instruments, grantees, including DEQ, may hold perpetual rights to enforce the conditions and restrictions of such instrument.

For the site, much of the contaminated property is held by the NRE Receiver designated by Consent Decree No. 03-3021-H0 (U.S. District Court, District of Oregon 2006). Under the Consent Decree, the NRE Receiver is required to manage the properties "in a manner consistent with response actions taken, to be taken, or otherwise required by EPA…." (Consent Decree 11.a). Consistent with that direction, should a developer or other party desire to acquire the receivership controlled parcels at any time, EPA may require the NRE Receiver to convey the NRE Receiver's parcels subject to land use restrictions that are included within response actions selected for the site. As indicated above, such restrictions may be placed upon the NRE Receiver's parcels through use of an Easement and Equitable Servitude, and may prohibit future owners of such properties from disturbing soil covers over ACM buried in place, consolidated and placed within an onsite disposal facility, or otherwise within the area of real property subject to the instrument.

Land use restrictions may also be effected within the site through use of private "Covenants, Conditions, and Restrictions" (CC&Rs) that are recorded with the property deed. CC&Rs are commonly established for new residential subdivisions, and have already been established for residential parcels within the site, setting such requirements as minimum lot size. At the request of EPA, under authority of the Consent Decree, the NRE Receiver could propose to amend the CC&Rs for the NRE subdivision to incorporate selected land use restrictions necessary to protect human health from exposure to remaining asbestos-containing materials. Proposed amendments to the CC&Rs may be facilitated through the NRE Receiver's majority ownership of parcels within the subdivision. Once in place, CC&Rs are typically enforced by homeowners acting through a homeowner's association. Activities of homeowner's association are typically funded through assessment of maintenance fees upon homeowners subject to the CC&Rs. This self-enforcing mechanism may provide enhanced reliability.

Informational notices may also be utilized in order to provide notice of contamination on the property and to discourage uses that could lead to unacceptable exposures to such contamination. In the State of Oregon, informational notices may take the form of a Notice of Environmental Contamination which DEQ may issue unilaterally, consistent with ORS 465.200 et seq. Consistent with ORS 205.130(2), such notices may be presented by DEQ to the county clerk for recording in the county records. With respect to certain parcels within the site, such notices have already been recorded to provide notice of asbestos contamination. Future notices for parcels within the site would be coordinated with Agency for Toxic Substances and Disease Registry (ATSDR) and the Oregon Environmental Health Assessment Program (EHAP).

Institutional controls may be selected and employed individually, or used in concert with other land use controls consistent with the concept of "layering" promoted by EPA (EPA 2000b). Institutional controls may be implemented on a parcel by parcel basis, depending on the risks posed to human health and the environment from ACM and/or associated soils within the particular parcel.

Monitoring Protocol for Retained Alternatives

Alternative: 1

Description: No Action

Detailed Description

Parcel Ownership	Parcel Category	ACM Status	Assumed Land Use	Active General Response Action Components												Monitoring Requirements							
				No Action	Institutional Controls	Engineered Controls		Containment	Removal, Transport and Disposal					Offsite Treatment	House Removal	Inspection and Sampling						5-Yr Site Review	
						Fencing	Posted Warnings	Cover	Removal	Onsite Transport	Offsite Transport	Onsite Disposal	Offsite Disposal			Borrow Sampling	Confirmatory Sampling	Visual ACM Inspections	Soil Sampling during ACM Inspection	Ambient Air Sampling	ABS	5-Yr Site Inspection	Risk Evaluation Update
Private (Currently Developed or Occupied)	Bin A	Identified Subsurface ACM	Residential	✓																		✓	
		Identified Surface ACM		✓																			
		No Identified ACM at Surface/Subsurface		✓																			
	Bin B	Identified Subsurface ACM		✓																		✓	
		Identified Surface ACM		✓																			
		No Identified ACM at Surface/Subsurface		✓																			
	Bin C	No ACM at Surface/Subsurface[1]		✓																		✓	
Private (Currently Undeveloped or Unoccupied)	Bin A	Identified Subsurface ACM																					
		Identified Surface ACM		✓																		✓	
		No Identified ACM at Surface/Subsurface		✓																			
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface		✓																		✓	
	Bin C	No ACM at Surface/Subsurface																					
Receivership	Bin A	Identified Subsurface ACM	Residential	✓																		✓	
		Identified Surface ACM		✓																			
		No Identified ACM at Surface/Subsurface		✓																			
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM		✓																		✓	
		No Identified ACM at Surface/Subsurface		✓																			
	Bin C	No ACM at Surface/Subsurface																					

Note:
A. Shaded rows indicate that the ACM Status does not exist for the corresponding Parcel Ownership and Category.
B. Description of the various monitoring activities are presented in Section 2.5 of the FS.

[1] Although the Bin C classification generally indicates that no ACM has been observed to date, subsurface ACM steam pipe does exist beneath several Bin C parcels on Thicket Court.

No Action	This alternative would discontinue all current remedial activities and no further action would be initiated at the site to address ACM or associated soils or otherwise mitigate the associated risks to human health or the environment.
Institutional Controls	No institutional controls would be implemented.
Fencing	No fencing would be installed at the site.
Posted Warnings	No posted warnings would be installed at the site.
Cover	No soil cover would be installed over the contaminated media.
Removal *Onsite Transport/Disposal* *Offsite Transport/Disposal*	No removal, transport or disposal activities would be carried out to address the onsite ACM and associated soils.
Offsite Treatment	No offsite treatment would be carried out under this alternative.
House Removal	Houses that exist on receivership properties would not be removed for relocation or demolished.
Borrow Sampling	No borrow material sampling would be required under this alternative.
Confirmatory Sampling	Confirmatory sampling would not be required since no removal activities are conducted under this activity.
Visual ACM Inspection	Visual ACM inspection would not be required since no remedial measures would taken under this activity.
Soil Sampling during ACM	Inspection soil sampling would not be conducted under this alternative.
Ambient Air Sampling	No Ambient Air Sampling would be conducted under this alternative.
ABS	No ABS would be conducted under this alternative.
5-Yr Site Inspection	5-yr site inspections would be conducted per NCP requirements.
Risk Evaluation Update	No remedial measures are taken to physically address ACM or impacted soils; thus no risk evaluation updates would be produced.

Alternative: 2

Description: Institutional/Engineered Controls with Monitoring

Detailed Description

Parcel Ownership	Parcel Category	ACM Status	Assumed Land Use	Active General Response Action Components												Monitoring Requirements							
				No Action	Institutional Controls	Engineered Controls		Containment	Removal, Transport and Disposal					Offsite Treatment	House Removal	Inspection and Sampling						5-Yr Site Review	
						Fencing	Posted Warnings	Cover	Removal	Onsite Transport	Offsite Transport	Onsite Disposal	Offsite Disposal			Borrow Sampling	Confirmatory Sampling	Visual ACM Inspections	Soil Sampling during ACM Inspection	Ambient Air Sampling	ABS	5-Yr Site Inspection	Risk Evaluation Update
Private (Currently Developed or Occupied)	Bin A	Identified Subsurface ACM	Residential		✓													✓[1]	✓[1]	✓	✓[1]	✓	✓
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface																					
	Bin B	Identified Subsurface ACM			✓													✓[1]	✓[1]		✓[1]	✓	
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface																					
	Bin C	No ACM at Surface/Subsurface[2]			✓		✓															✓	
Private (Currently Undeveloped or Unoccupied)	Bin A	Identified Subsurface ACM																					
		Identified Surface ACM			✓													✓[1]	✓[1]	✓	✓[1]	✓	✓
		No Identified ACM at Surface/Subsurface																					
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface			✓													✓[1]	✓[1]	✓	✓[1]	✓	✓
	Bin C	No ACM at Surface/Subsurface																					
Receivership	Bin A	Identified Subsurface ACM	Non-Residential		✓	✓	✓								✓					✓		✓	✓
		Identified Surface ACM				✓	✓																
		No Identified ACM at Surface/Subsurface				✓	✓																
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM			✓	✓	✓								✓					✓		✓	✓
		No Identified ACM at Surface/Subsurface				✓	✓																
	Bin C	No ACM at Surface/Subsurface																					

Note:
A. Shaded rows indicate that the ACM Status does not exist for the corresponding Parcel Ownership and Category.
B. Description of the various monitoring activities are presented in Section 2.5 of the FS.

[1] Tiered Approach: (a) Perform visual ACM inspection, if no ACM observed, then; (b) Collect samples for PLM and Stereomicroscopy analysis, if no ACM observed, then; (c) Perform ABS.
[2] Although the Bin C classification generally indicates that no ACM has been observed to date, subsurface ACM steam pipe does exist beneath several Bin C parcels on Thicket Court.

No Action	No action is not a part of this alternative.
Institutional Controls	All Bin A and B parcels (private and receivership) within site boundary and Bin C private parcels with buried steam pipe assumed to be addressed as needed by institutional controls (governmental controls, proprietary contols, and/or informational devices). Other Bin C parcels within site boundary assumed to only be addressed by informational device institutional controls.
Fencing *Posted Warnings*	All Bin A receivership parcels within site boundary and portions of Bin B receivership parcels within site boundary impacted by ACM are assumed to addressed through fencing and posted warnings. Posted warnings would also be installed at Bin C private parcels where buried steam pipe is present.
Cover	No soil cover would be installed over the contaminated media.
Removal *Onsite Transport/Disposal* *Offsite Transport/Disposal*	No removal, transport or disposal activities would be carried out to address the onsite ACM and associated soils.
Offsite Treatment	No offsite treatment would be carried out under this alternative.
House Removal	Houses on private parcels would be left in place. Houses that exist on receivership parcels that are not remediated would be removed for relocation or demolished.
Borrow Sampling	No borrow material sampling would be required under this alternative.
Confirmatory Sampling	Confirmatory sampling would not be required since no removal activities are conducted under this activity.
Visual ACM Inspection	Visual ACM inspection of the site would be performed under this activity. See Note 1.
Soil Sampling during ACM	Inspection soil sampling would be conducted under this alternative. See Note 1.
Ambient Air Sampling	Used for 5-yr site reviews to determine whether exposure risks to asbestos fibers exist within ambient air. 1 sampling event every 5-yr for 6 months, 4 monitoring stations with 2 samples per station per month for the first 5-yr site review and 1 sample per station per month for the subsequent 5-yr site reviews.
ABS	ABS would be performed in non-remediated/non-restricted areas. Performed every other year during the first 5-yrs (year 1, 3, and 5), then once every 5-yrs thereafter. 5 ABS locations, 3 activities per location with 3 air samples (TEM analysis) and 1 soil sample (PLM, Stereomicroscopy analysis).
5-Yr Site Inspection	5-yr site inspection used per NCP to document changes in site conditions that affect protectiveness. 1 inspection event during every 5-yr period. The inspection will also include inspecting all the remedial components. The inspection will also include inspecting all the remedial components.
Risk Evaluation Update	1 update per year during the first 5 years, 1 update every other year thereafter.

Alternative: 3

Description: In-Place Containment of All Identified ACM on Private Parcels and Partial In-Place Containment of Identified ACM on Receivership Parcels with Institutional/Engineered Controls and Monitoring

Detailed Description

Parcel Ownership	Parcel Category	ACM Status	Assumed Land Use	Active General Response Action Components												Monitoring Requirements							
				No Action	Institutional Controls	Engineered Controls		Containment	Removal, Transport and Disposal					Offsite Treatment	House Removal	Inspection and Sampling						5-Yr Site Review	
						Fencing	Posted Warnings	Cover	Removal	Onsite Transport	Offsite Transport	Onsite Disposal	Offsite Disposal			Borrow Sampling	Confirmatory Sampling	Visual ACM Inspections	Soil Sampling during ACM Inspection	Ambient Air Sampling	ABS	5-Yr Site Inspection	Risk Evaluation Update
Private (Currently Developed or Occupied)	Bin A	Identified Subsurface ACM	Residential					✓															
		Identified Surface ACM			✓			✓											✓			✓	
		No Identified ACM at Surface/Subsurface														✓		✓			✓[2]		
	Bin B	Identified Subsurface ACM						✓												✓			✓
		Identified Surface ACM			✓			✓														✓	
		No Identified ACM at Surface/Subsurface																			✓[2]		
	Bin C	No ACM at Surface/Subsurface[3]			✓		✓															✓	
Private (Currently Undeveloped or Unoccupied)	Bin A	Identified Subsurface ACM																					
		Identified Surface ACM			✓			✓								✓			✓	✓		✓	✓
		No Identified ACM at Surface/Subsurface																✓					
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface			✓											✓				✓	✓[2]	✓	✓
	Bin C	No ACM at Surface/Subsurface																					
Receivership	Bin A	Identified Subsurface ACM	Non-Residential			✓	✓	✓[1]															
		Identified Surface ACM			✓	✓	✓	✓[1]							✓	✓				✓		✓	✓
		No Identified ACM at Surface/Subsurface				✓	✓														✓[2]		
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM			✓	✓	✓	✓[1]								✓				✓		✓	✓
		No Identified ACM at Surface/Subsurface				✓	✓								✓						✓[2]		
	Bin C	No ACM at Surface/Subsurface																					

Note:
A. Shaded rows indicate that the ACM Status does not exist for the corresponding Parcel Ownership and Category.
B. Description of the various monitoring activities are presented in Section 2.5 of the FS.

[1] Partial in-place containment of identified ACM in receivership parcels.
[2] ABS would be performed in non-remediated/non-restricted areas.
[3] Although the Bin C classification generally indicates that no ACM has been observed to date, subsurface ACM steam pipe does exist beneath several Bin C parcels on Thicket Court.

No Action	No action is not a part of this alternative.
Institutional Controls	All Bin A and B parcels (private and receivership) within site boundary and Bin C private parcels with buried steam pipe assumed to be addressed as needed by institutional controls (governmental controls, proprietary contols, and/or informational devices). Other Bin C parcels within site boundary assumed to only be addressed by informational device institutional controls.
Fencing *Posted Warnings*	All Bin A receivership parcels within site boundary and portions of Bin B receivership parcels within site boundary impacted by ACM are assumed to addressed through fencing and posted warnings. Posted warnings would also be installed at Bin C private parcels where buried steam pipe is present.
Cover	All identified ACM on private parcels and a portion on receivership parcels would be covered (24" of subsoil and 6" of topsoil) using a clean offsite borrow source.
Removal *Onsite Transport/Disposal* *Offsite Transport/Disposal*	No removal, transport or disposal activities would be carried out to address the onsite ACM and associated soils.
Offsite Treatment	No offsite treatment would be carried out under this alternative.
House Removal	Houses on private parcels would be left in place. Houses that exist on receivership parcels that are not remediated would be removed for relocation or demolished.
Borrow Sampling	Used to determine whether asbestos fibers are present in proposed borrow source. one composite sample (PLM, Stereomicroscopy analysis) for every 10,000 cubic yards of borrow material.
Confirmatory Sampling	Confirmatory sampling would not be required since no removal activities are conducted under this activity.
Visual ACM Inspection	Used to document whether ACM has appeared in Bin A soils on private parcels outside of covered areas. 1 inspection event per year.
Soil Sampling during ACM	Only performed on Bin A soils of private parcels. 1 soil sampling event during every 5-yr period, one composite sample (PLM, Stereomicroscopy analysis) for every 15,000 square feet of uncovered soils for portions of each Bin A parcel within the site boundary.
Ambient Air Sampling	Used for 5-yr site reviews to determine whether exposure risks to asbestos fibers exist within ambient air. 1 sampling event every 5-yr for 6 months, 4 monitoring stations with 2 samples per station per month for the first 5-yr site review and 1 sample per station per month for the subsequent 5-yr site reviews.
ABS	ABS would be performed in non-remediated/non-restricted areas. Performed every other year during the first 5-yrs (year 1, 3, and 5), then once every 5-yrs thereafter. 5 ABS locations, 3 activities per location with 3 air samples (TEM analysis) and 1 soil sample (PLM, Stereomicroscopy analysis).
5-Yr Site Inspection	5-yr site inspection used per NCP to document changes in site conditions that affect protectiveness. 1 inspection event during every 5-yr period. The inspection will also include inspecting all the remedial components.
Risk Evaluation Update	Update to be made once during every 5-yr period.

Alternative: 4a

Description: In-Place Containment of All Identified ACM with Institutional Controls and Monitoring

Detailed Description

Parcel Ownership	Parcel Category	ACM Status	Assumed Land Use	Active General Response Action Components												Monitoring Requirements							
				No Action	Institutional Controls	Engineered Controls		Containment	Removal, Transport and Disposal					Offsite Treatment	House Removal	Inspection and Sampling						5-Yr Site Review	
						Fencing	Posted Warnings	Cover	Removal	Onsite Transport	Offsite Transport	Onsite Disposal	Offsite Disposal			Borrow Sampling	Confirmatory Sampling	Visual ACM Inspections	Soil Sampling during ACM Inspection	Ambient Air Sampling	ABS	5-Yr Site Inspection	Risk Evaluation Update
Private (Currently Developed or Occupied)	Bin A	Identified Subsurface ACM	Residential					✓															
		Identified Surface ACM			✓			✓											✓			✓	
		No Identified ACM at Surface/Subsurface														✓		✓			✓[1]		
	Bin B	Identified Subsurface ACM						✓												✓			✓
		Identified Surface ACM			✓			✓														✓	
		No Identified ACM at Surface/Subsurface																			✓[1]		
	Bin C	No ACM at Surface/Subsurface[2]			✓		✓															✓	
Private (Currently Undeveloped or Unoccupied)	Bin A	Identified Subsurface ACM																					
		Identified Surface ACM			✓			✓								✓			✓	✓		✓	✓
		No Identified ACM at Surface/Subsurface																✓			✓[1]		
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface			✓											✓				✓	✓[1]	✓	✓
	Bin C	No ACM at Surface/Subsurface																					
Receivership	Bin A	Identified Subsurface ACM	Residential					✓															
		Identified Surface ACM			✓			✓								✓				✓		✓	✓
		No Identified ACM at Surface/Subsurface																✓			✓[1]		
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM			✓			✓								✓				✓		✓	✓
		No Identified ACM at Surface/Subsurface																			✓[1]		
	Bin C	No ACM at Surface/Subsurface																					

Note:
A. Shaded rows indicate that the ACM Status does not exist for the corresponding Parcel Ownership and Category.
B. Description of the various monitoring activities are presented in Section 2.5 of the FS.

[1] ABS would be performed in non-remediated/non-restricted areas.
[2] Although the Bin C classification generally indicates that no ACM has been observed to date, subsurface ACM steam pipe does exist beneath several Bin C parcels on Thicket Court.

No Action — No action is not a part of this alternative.

Institutional Controls — All Bin A and B parcels (private and receivership) within site boundary and Bin C private parcels with buried steam pipe assumed to be addressed as needed by institutional controls (governmental controls, proprietary contols, and/or informational devices). Other Bin C parcels within site boundary assumed to only be addressed by informational device institutional controls.

Fencing — No fencing would be installed at the site.

Posted Warnings — Posted warnings would be installed at Bin C private parcels where buried steam pipe is present.

Cover — All identified ACM would be covered (24" of subsoil and 6" of topsoil) using a clean offsite borrow source.

Removal
Onsite Transport/Disposal
Offsite Transport/Disposal — No removal, transport or disposal activities would be carried out to address the onsite ACM and associated soils.

Offsite Treatment — No offsite treatment would be carried out under this alternative.

House Removal — Houses that exist on private and receivership parcels would be left in place.

Borrow Sampling — Used to determine whether asbestos fibers are present in proposed borrow source. one composite sample (PLM, Stereomicroscopy analysis) for every 10,000 cubic yards of borrow material.

Confirmatory Sampling — Confirmatory sampling would not be required since no removal activities are conducted under this activity.

Visual ACM Inspection — Used to document whether ACM has appeared in Bin A soils on private parcels outside of covered areas. 1 inspection event per year.

Soil Sampling during ACM — Only performed on Bin A soils of private parcels. 1 soil sampling event during every 5-yr period, one composite sample (PLM, Stereomicroscopy analysis) for every 15,000 square feet of uncovered soils for portions of each Bin A parcel within the site boundary.

Ambient Air Sampling — Used for 5-yr site reviews to determine whether exposure risks to asbestos fibers exist within ambient air. 1 sampling event every 5-yr for 6 months, 4 monitoring stations with 2 samples per station per month for the first 5-yr site review and 1 sample per station per month for the subsequent 5-yr site reviews.

ABS — ABS would be performed in non-remediated/non-restricted areas. Performed every other year during the first 5-yrs (year 1, 3, and 5), then once every 5-yrs thereafter. 5 ABS locations, 3 activities per location with 3 air samples (TEM analysis) and 1 soil sample (PLM, Stereomicroscopy analysis).

5-Yr Site Inspection — 5-yr site inspection used per NCP to document changes in site conditions that affect protectiveness. 1 inspection event during every 5-yr period. The inspection will also include inspecting all the remedial components.

Risk Evaluation Update — Update to be made once during every 5-yr period.

Alternative: 4b

Description: In-Place Containment of All Identified ACM and In-Place Containment of Soil within Bin A Parcels with Institutional Controls and Monitoring

Detailed Description

Parcel Ownership	Parcel Category	ACM Status	Assumed Land Use	Active General Response Action Components												Monitoring Requirements							
				No Action	Institutional Controls	Engineered Controls		Containment	Removal, Transport and Disposal					Offsite Treatment	House Removal	Inspection and Sampling						5-Yr Site Review	
						Fencing	Posted Warnings	Cover	Removal	Onsite Transport	Offsite Transport	Onsite Disposal	Offsite Disposal			Borrow Sampling	Confirmatory Sampling	Visual ACM Inspections	Soil Sampling during ACM Inspection	Ambient Air Sampling	ABS	5-Yr Site Inspection	Risk Evaluation Update
Private (Currently Developed or Occupied)	Bin A	Identified Subsurface ACM	Residential					✓															
		Identified Surface ACM			✓			✓														✓	
		No Identified ACM at Surface/Subsurface														✓							
	Bin B	Identified Subsurface ACM						✓												✓			
		Identified Surface ACM			✓			✓														✓	
		No Identified ACM at Surface/Subsurface																					
	Bin C	No ACM at Surface/Subsurface[1]			✓		✓															✓	
Private (Currently Undeveloped or Unoccupied)	Bin A	Identified Subsurface ACM																					
		Identified Surface ACM			✓			✓								✓				✓		✓	
		No Identified ACM at Surface/Subsurface																					
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface			✓											✓				✓		✓	
	Bin C	No ACM at Surface/Subsurface																					
Receivership	Bin A	Identified Subsurface ACM	Residential					✓															
		Identified Surface ACM			✓			✓								✓				✓		✓	
		No Identified ACM at Surface/Subsurface																					
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM			✓			✓								✓				✓		✓	
		No Identified ACM at Surface/Subsurface																					
	Bin C	No ACM at Surface/Subsurface																					

Note:
A. Shaded rows indicate that the ACM Status does not exist for the corresponding Parcel Ownership and Category.
B. Description of the various monitoring activities are presented in Section 2.5 of the FS.

[1] Although the Bin C classification generally indicates that no ACM has been observed to date, subsurface ACM steam pipe does exist beneath several Bin C parcels on Thicket Court.

No Action	No action is not a part of this alternative.
Institutional Controls	All Bin A and B parcels (private and receivership) within site boundary and Bin C private parcels with buried steam pipe assumed to be addressed as needed by institutional controls (governmental controls, proprietary contols, and/or informational devices). Other Bin C parcels within site boundary assumed to only be addressed by informational device institutional controls.
Fencing	No fencing would be installed at the site.
Posted Warnings	Posted warnings would be installed at Bin C private parcels where buried steam pipe is present.
Cover	All identified ACM along with soils within Bin A parcels would be covered (24" of subsoil and 6" of topsoil) using a clean offsite borrow source.
Removal	
Onsite Transport/Disposal	No removal, transport or disposal activities would be carried out to address the onsite ACM and associated soils.
Offsite Transport/Disposal	
Offsite Treatment	No offsite treatment would be carried out under this alternative.
House Removal	Houses that exist on private and receivership parcels would be left in place.
Borrow Sampling	Used to determine whether asbestos fibers are present in proposed borrow source. one composite sample (PLM, Stereomicroscopy analysis) for every 10,000 cubic yards of borrow material.
Confirmatory Sampling	Confirmatory sampling would not be required since no removal activities are conducted under this activity.
Visual ACM Inspection	Visual ACM inspection would not be required under this alternative.
Soil Sampling during ACM	Inspection soil sampling would not be conducted under this alternative.
Ambient Air Sampling	Used for 5-yr site reviews to determine whether exposure risks to asbestos fibers exist within ambient air. 1 sampling event every 5-yr for 6 months, 4 monitoring stations with 2 samples per station per month for the first 5-yr site review and 1 sample per station per month for the subsequent 5-yr site reviews.
ABS	No Activity-Based Sampling would be conducted.
5-Yr Site Inspection	5-yr site inspection used per NCP to document changes in site conditions that affect protectiveness. 1 inspection event during every 5-yr period. The inspection will also include inspecting all the remedial components.
Risk Evaluation Update	No update, since remedial measures are taken to physically address ACM or impacted soils.

Alternative: 5a

Description: Removal of All Identified Surface ACM with Onsite Consolidation/Disposal, Future Incremental Removal of Identified Surface ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos, and Institutional/Engineered Controls with Monitoring

Detailed Description

Parcel Ownership	Parcel Category	ACM Status	Assumed Land Use	Active General Response Action Components												Monitoring Requirements							
				No Action	Institutional Controls	Engineered Controls		Containment	Removal, Transport and Disposal					Offsite Treatment	House Removal	Inspection and Sampling						5-Yr Site Review	
						Fencing	Posted Warnings	Cover	Removal	Onsite Transport	Offsite Transport	Onsite Disposal	Offsite Disposal			Borrow Sampling	Confirmatory Sampling	Visual ACM Inspections	Soil Sampling during ACM Inspection	Ambient Air Sampling	ABS	5-Yr Site Inspection	Risk Evaluation Update
Private (Currently Developed or Occupied)	Bin A	Identified Subsurface ACM	Residential															✓					
		Identified Surface ACM			✓				✓	✓	✓	✓	✓					✓	✓			✓	
		No Identified ACM at Surface/Subsurface														✓					✓[1]		✓
	Bin B	Identified Subsurface ACM																✓		✓			
		Identified Surface ACM			✓				✓	✓	✓	✓	✓					✓	✓			✓	
		No Identified ACM at Surface/Subsurface																			✓[1]		
	Bin C	No ACM at Surface/Subsurface[2]			✓		✓															✓	
Private (Currently Undeveloped or Unoccupied)	Bin A	Identified Subsurface ACM																					
		Identified Surface ACM			✓				✓	✓	✓	✓	✓			✓		✓	✓	✓		✓	✓
		No Identified ACM at Surface/Subsurface																			✓[1]		
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface			✓											✓			✓	✓	✓[1]	✓	✓
	Bin C	No ACM at Surface/Subsurface																					
Receivership	Bin A	Identified Subsurface ACM	Residential															✓					
		Identified Surface ACM			✓	✓	✓		✓	✓	✓	✓	✓			✓		✓	✓	✓		✓	✓
		No Identified ACM at Surface/Subsurface																			✓[1]		
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM			✓		✓		✓	✓	✓	✓	✓			✓		✓	✓	✓		✓	✓
		No Identified ACM at Surface/Subsurface																			✓[1]		
	Bin C	No ACM at Surface/Subsurface																					

Note:
A. Shaded rows indicate that the ACM Status does not exist for the corresponding Parcel Ownership and Category.
B. Description of the various monitoring activities are presented in Section 2.5 of the FS.

[1] ABS would be performed in non-remediated/non-restricted areas.
[2] Although the Bin C classification generally indicates that no ACM has been observed to date, subsurface ACM steam pipe does exist beneath several Bin C parcels on Thicket Court.

No Action — No action is not a part of this alternative.

Institutional Controls — All Bin A and B parcels (private and receivership) within site boundary and Bin C private parcels with buried steam pipe assumed to be addressed as needed by institutional controls (governmental controls, proprietary contols, and/or informational devices). Other Bin C parcels within site boundary assumed to only be addressed by informational device institutional controls.

Fencing — Fencing would be installed to restrict access to the onsite disposal facility.

Posted Warnings — Posted warnings would be installed on the fence around the onsite disposal facilities and at Bin C private parcels where buried steam pipe is present.

Cover — No soil cover would be installed over in-place contaminated media; however a soil cover would be installed over the onsite disposal facilities.

Removal — *Initial Removal*: All identified surface ACM at the site would be excavated and then backfilled with clean backfill. *Future Periodic Incremental Removal:* All ACM debris that migrates to the surface would be removed (picked up) to the extent practicable on a periodic basis.

Onsite Transport/Disposal — *Initial Removal:* Onsite transportation would be required for disposal of ACM waste in an onsite disposal facility.

Offsite Transport/Disposal — *Future Periodic Incremental Removal:* All removed ACM would be transported to an offsite permitted disposal facility authorized for asbestos.

Offsite Treatment — No offsite treatment would be carried out under this alternative.

House Removal — Houses that exist on private and receivership parcels would be left in place.

Borrow Sampling — Used to determine whether asbestos fibers are present in proposed borrow source. one composite sample (PLM, Stereomicroscopy analysis) for every 10,000 cubic yards of borrow material.

Confirmatory Sampling — Confirmatory samlping would not be performed under this alternative.

Visual ACM Inspection — Used to document whether ACM has appeared in areas of previously-identified ACM areas. 2 inspection events per year for first 5-yrs, 1 inspection event per year thereafter.

Soil Sampling during ACM — Performed on Bin A and Bin B soils. 1 soil sampling event during every 5-yr period, one composite sample (PLM, Stereomicroscopy analysis) for every 15,000 square feet of uncovered soils for portions of each Bin A parcel within the site boundary.

Ambient Air Sampling — Used for 5-yr site reviews to determine whether exposure risks to asbestos fibers exist within ambient air. 1 sampling event every 5-yr for 6 months, 4 monitoring stations with 2 samples per station per month for the first 5-yr site review and 1 sample per station per month for the subsequent 5-yr site reviews.

ABS — ABS would be performed in non-remediated/non-restricted areas. Performed every other year during the first 5-yrs (year 1, 3, and 5), then once every 5- yrs thereafter. 5 ABS locations, 3 activities per location with 3 air samples (TEM analysis) and 1 soil sample (PLM, Stereomicroscopy analysis).

5-Yr Site Inspection — 5-yr site inspection used per NCP to document changes in site conditions that affect protectiveness. 1 inspection event during every 5-yr period. The inspection will also include inspecting all the remedial components.

Risk Evaluation Update — Update to be made once per year during the first 5-yrs and then 1 addendum every other year thereafter.

Alternative: 5b

Description: Removal of All Identified ACM with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Detailed Description

Parcel Ownership	Parcel Category	ACM Status	Assumed Land Use	Active General Response Action Components												Monitoring Requirements							
				No Action	Institutional Controls	Engineered Controls		Containment	Removal, Transport and Disposal					Offsite Treatment	House Removal	Inspection and Sampling						5-Yr Site Review	
						Fencing	Posted Warnings	Cover	Removal	Onsite Transport	Offsite Transport	Onsite Disposal	Offsite Disposal			Borrow Sampling	Confirmatory Sampling	Visual ACM Inspections	Soil Sampling during ACM Inspection	Ambient Air Sampling	ABS	5-Yr Site Inspection	Risk Evaluation Update
Private (Currently Developed or Occupied)	Bin A	Identified Subsurface ACM	Residential						✓	✓		✓					✓						
		Identified Surface ACM			✓				✓	✓		✓					✓		✓			✓	
		No Identified ACM at Surface/Subsurface														✓		✓			✓[1]		
	Bin B	Identified Subsurface ACM							✓	✓		✓					✓			✓			✓
		Identified Surface ACM			✓				✓	✓		✓					✓					✓	
		No Identified ACM at Surface/Subsurface																			✓[1]		
	Bin C	No ACM at Surface/Subsurface[2]			✓		✓															✓	
Private (Currently Undeveloped or Unoccupied)	Bin A	Identified Subsurface ACM																					
		Identified Surface ACM			✓				✓	✓		✓				✓	✓		✓	✓		✓	✓
		No Identified ACM at Surface/Subsurface																✓			✓[1]		
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface			✓											✓				✓	✓[1]	✓	✓
	Bin C	No ACM at Surface/Subsurface																					
Receivership	Bin A	Identified Subsurface ACM	Residential						✓	✓		✓					✓						
		Identified Surface ACM			✓	✓	✓		✓	✓		✓				✓	✓			✓		✓	✓
		No Identified ACM at Surface/Subsurface																✓			✓[1]		
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM			✓		✓		✓	✓		✓				✓	✓			✓		✓	✓
		No Identified ACM at Surface/Subsurface																			✓[1]		
	Bin C	No ACM at Surface/Subsurface																					

Note:
A. Shaded rows indicate that the ACM Status does not exist for the corresponding Parcel Ownership and Category.
B. Description of the various monitoring activities are presented in Section 2.5 of the FS.

[1] ABS would be performed in non-remediated/non-restricted areas.
[2] Although the Bin C classification generally indicates that no ACM has been observed to date, subsurface ACM steam pipe does exist beneath several Bin C parcels on Thicket Court.

No Action — No action is not a part of this alternative.

Institutional Controls — All Bin A and B parcels (private and receivership) within site boundary and Bin C private parcels with buried steam pipe assumed to be addressed as needed by institutional controls (governmental controls, proprietary contols, and/or informational devices). Other Bin C parcels within site boundary assumed to only be addressed by informational device institutional controls.

Fencing — Fencing would be installed to restrict access to the onsite disposal facility.

Posted Warnings — Posted warnings would be installed on the fence around the onsite disposal facilities and at Bin C private parcels where buried steam pipe is present.

Cover — No soil cover would be installed over in-place contaminated media; however a soil cover would be installed over the onsite disposal facilities.

Removal — All identified surface and subsurface ACM at the site (except Bin C steam pipe) would be excavated and then backfilled with clean backfill.

Onsite Transport/Disposal — All the removed ACM would be transported and disposed of in onsite disposal facilities.

Offsite Transport/Disposal — No offsite transport or disposal would be required under this alternative.

Offsite Treatment — No offsite treatment would be carried out under this alternative.

House Removal — Houses that exist on private and receivership parcels would be left in place.

Borrow Sampling — Used to determine whether asbestos fibers are present in proposed borrow source. one composite sample (PLM, Stereomicroscopy analysis) for every 10,000 cubic yards of borrow material.

Confirmatory Sampling — Used to determine whether ACM and asbestos fibers are present in excavation floor and sidewalls. Assume 1 sampling event at each excavation, one composite sample (PLM, Stereomicroscopy analysis) for every 15,000 square feet of excavation or a minimum of one sample per excavation and four compos (PLM, Stereomicroscopy analysis) per excavation to document sidewall conditions.

Visual ACM Inspection — Used to document whether ACM has appeared in areas of onsite disposal facility and in Bin A soils on private and receivership parcels outside of removal/backfill areas.

Soil Sampling during ACM — Used to determine whether asbestos fibers are present in Bin A soils outside of covered areas. 1 soil sampling event per 5-yr period, one composite sample (PLM, Stereomicroscopy analysis) per 15,000 square feet of uncovered soils fof Bin A parcels.

Ambient Air Sampling — Used for 5-yr site reviews to determine whether exposure risks to asbestos fibers exist within ambient air. 1 sampling event every 5-yr for 6 months, 4 monitoring stations with 2 samples per station per month for the first 5-yr site review and 1 sample per station per month for the subsequent 5-yr site reviews.

ABS — ABS would be performed in non-remediated/non-restricted areas. Performed every other year during the first 5-yrs (year 1, 3, and 5), then once every 5-yrs thereafter. 5 ABS locations, 3 activities per location with 3 air samples (TEM analysis) and 1 soil sample (PLM, Stereomicroscopy analysis).

5-Yr Site Inspection — 5-yr site inspection used per NCP to document changes in site conditions that affect protectiveness. 1 inspection event during every 5-yr period. The inspection will also include inspecting all the remedial components.

Risk Evaluation Update — Update to be made once during every 5-yr period.

Alternative: 5c

Description: Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Detailed Description

Parcel Ownership	Parcel Category	ACM Status	Assumed Land Use	Active General Response Action Components												Monitoring Requirements							
				No Action	Institutional Controls	Engineered Controls		Containment	Removal, Transport and Disposal					Offsite Treatment	House Removal	Inspection and Sampling						5-Yr Site Review	
						Fencing	Posted Warnings	Cover	Removal	Onsite Transport	Offsite Transport	Onsite Disposal	Offsite Disposal			Borrow Sampling	Confirmatory Sampling	Visual ACM Inspections	Soil Sampling during ACM Inspection	Ambient Air Sampling	ABS	5-Yr Site Inspection	Risk Evaluation Update
Private (Currently Developed or Occupied)	Bin A	Identified Subsurface ACM	Residential						✓	✓		✓					✓						
		Identified Surface ACM			✓				✓	✓		✓					✓					✓	
		No Identified ACM at Surface/Subsurface							✓	✓		✓				✓							
	Bin B	Identified Subsurface ACM							✓	✓		✓					✓			✓			
		Identified Surface ACM			✓				✓	✓		✓					✓					✓	
		No Identified ACM at Surface/Subsurface																					
	Bin C	No ACM at Surface/Subsurface			✓		✓															✓	
Private (Currently Undeveloped or Unoccupied)	Bin A	Identified Subsurface ACM																					
		Identified Surface ACM			✓				✓	✓		✓				✓	✓			✓		✓	
		No Identified ACM at Surface/Subsurface							✓	✓		✓											
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface			✓											✓				✓		✓	
	Bin C	No ACM at Surface/Subsurface[1]																					
Receivership	Bin A	Identified Subsurface ACM	Residential						✓	✓		✓					✓						
		Identified Surface ACM			✓	✓	✓		✓	✓		✓				✓	✓			✓		✓	
		No Identified ACM at Surface/Subsurface							✓	✓		✓											
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM			✓		✓		✓	✓		✓				✓	✓			✓		✓	
		No Identified ACM at Surface/Subsurface																					
	Bin C	No ACM at Surface/Subsurface																					

Note:
A. Shaded rows indicate that the ACM Status does not exist for the corresponding Parcel Ownership and Category.
B. Description of the various monitoring activities are presented in Section 2.5 of the FS.

[1] Although the Bin C classification generally indicates that no ACM has been observed to date, subsurface ACM steam pipe does exist beneath several Bin C parcels on Thicket Court.

No Action — No action is not a part of this alternative.

Institutional Controls — All Bin A and B parcels (private and receivership) within site boundary and Bin C private parcels with buried steam pipe assumed to be addressed as needed by institutional controls (governmental controls, proprietary contols, and/or informational devices). Other Bin C parcels within site boundary assumed to only be addressed by informational device institutional controls.

Fencing — Fencing would be installed to restrict access to the onsite disposal facility.

Posted Warnings — Posted warnings would be installed on the fence around the onsite disposal facilities and at Bin C private parcels where buried steam pipe is present.

Cover — No soil cover would be installed over in-place contaminated media; however a soil cover would be installed over the onsite disposal facilities.

Removal — All identified surface and subsurface ACM (except Bin C steam pipe) along with soils within Bin A parcels at the site would be excavated and then backfilled with clean backfill.

Onsite Transport/Disposal — All the removed ACM would be transported and disposed of in onsite disposal facilities.

Offsite Transport/Disposal — No offsite transport or disposal would be required under this alternative.

Offsite Treatment — No offsite treatment would be carried out under this alternative.

House Removal — Houses that exist on private and receivership parcels would be left in place.

Borrow Sampling — Used to determine whether asbestos fibers are present in proposed borrow source. one composite sample (PLM, Stereomicroscopy analysis) for every 10,000 cubic yards of borrow material.

Confirmatory Sampling — Used to determine whether ACM and asbestos fibers are present in excavation floor and sidewalls. Assume 1 sampling event at each excavation, one composite sample (PLM, Stereomicroscopy analysis) for every 15,000 square feet of excavation or a minimum of one sample per excavation and four composite samples (PLM, Stereomicroscopy analysis) per excavation to document sidewall conditions.

Visual ACM Inspection — Visual ACM inspection would not be required under this alternative.

Soil Sampling during ACM — Inspection soil sampling would not be conducted under this alternative.

Ambient Air Sampling — Used for 5-yr site reviews to determine whether exposure risks to asbestos fibers exist within ambient air. 1 sampling event every 5-yr for 6 months, 4 monitoring stations with 2 samples per station per month for the first 5-yr site review and 1 sample per station per month for the subsequent 5-yr site reviews.

ABS — No Activity-Based Sampling would be conducted.

5-Yr Site Inspection — 5-yr site inspection used per NCP to document changes in site conditions that affect protectiveness. 1 inspection event during every 5-yr period. The inspection will also include inspecting all the remedial components.

Risk Evaluation Update — No update, since remedial measures are taken to physically address ACM or impacted soils.

Alternative: 6a

Description: Removal of All Identified ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Detailed Description

Parcel Ownership	Parcel Category	ACM Status	Assumed Land Use	Active General Response Action Components												Monitoring Requirements							
				No Action	Institutional Controls	Engineered Controls		Containment	Removal, Transport and Disposal					Offsite Treatment	House Removal	Inspection and Sampling						5-Yr Site Review	
						Fencing	Posted Warnings	Cover	Removal	Onsite Transport	Offsite Transport	Onsite Disposal	Offsite Disposal			Borrow Sampling	Confirmatory Sampling	Visual ACM Inspections	Soil Sampling during ACM Inspection	Ambient Air Sampling	ABS	5-Yr Site Inspection	Risk Evaluation Update
Private (Currently Developed or Occupied)	Bin A	Identified Subsurface ACM	Residential						✓		✓		✓				✓						
		Identified Surface ACM			✓				✓		✓		✓				✓		✓			✓	
		No Identified ACM at Surface/Subsurface														✓		✓			✓[1]		
	Bin B	Identified Subsurface ACM							✓		✓		✓				✓			✓			✓
		Identified Surface ACM			✓				✓		✓		✓				✓					✓	
		No Identified ACM at Surface/Subsurface																			✓[1]		
	Bin C	No ACM at Surface/Subsurface[2]			✓		✓															✓	
Private (Currently Undeveloped or Unoccupied)	Bin A	Identified Subsurface ACM																					
		Identified Surface ACM			✓				✓		✓		✓			✓	✓		✓	✓		✓	✓
		No Identified ACM at Surface/Subsurface																✓			✓[1]		
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface			✓											✓				✓	✓[1]	✓	✓
	Bin C	No ACM at Surface/Subsurface																					
Receivership	Bin A	Identified Subsurface ACM	Residential						✓		✓		✓				✓						
		Identified Surface ACM			✓				✓		✓		✓			✓	✓			✓		✓	✓
		No Identified ACM at Surface/Subsurface																✓			✓[1]		
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM			✓				✓		✓		✓			✓	✓			✓		✓	✓
		No Identified ACM at Surface/Subsurface																			✓[1]		
	Bin C	No ACM at Surface/Subsurface																					

Note:
A. Shaded rows indicate that the ACM Status does not exist for the corresponding Parcel Ownership and Category.
B. Description of the various monitoring activities are presented in Section 2.5 of the FS.

[1] ABS would be performed in non-remediated/non-restricted areas.
[2] Although the Bin C classification generally indicates that no ACM has been observed to date, subsurface ACM steam pipe does exist beneath several Bin C parcels on Thicket Court.

No Action — No action is not a part of this alternative.

Institutional Controls — All Bin A and B parcels (private and receivership) within site boundary and Bin C private parcels with buried steam pipe assumed to be addressed as needed by institutional controls (governmental controls, proprietary contols, and/or informational devices). Other Bin C parcels within site boundary assumed to only be addressed by informational device institutional controls.

Fencing — No fencing would be installed at the site.

Posted Warnings — Posted warnings would be installed at Bin C private parcels where buried steam pipe is present.

Cover — No soil cover would be installed over the contaminated media.

Removal — All identified surface and subsurface ACM at the site (except Bin C steam pipe) would be excavated and then backfilled with clean backfill.

Onsite Transport/Disposal — No onsite transport or disposal would be required under this alternative.

Offsite Transport/Disposal — All the removed ACM would be transported and disposed of in offsite permitted disposal facilities authorized for asbestos.

Offsite Treatment — No offsite treatment would be carried out under this alternative.

House Removal — Houses that exist on private and receivership parcels would be left in place.

Borrow Sampling — Used to determine whether asbestos fibers are present in proposed borrow source. one composite sample (PLM, Stereomicroscopy analysis) for every 10,000 cubic yards of borrow material.

Confirmatory Sampling — Used to determine whether ACM and asbestos fibers are present in excavation floor and sidewalls. Assume 1 sampling event at each excavation, one composite sample (PLM, Stereomicroscopy analysis) for every 15,000 square feet of excavation or a minimum of one sample per excavation and four composite samples (PLM, Stereomicroscopy analysis) per excavation to document sidewall conditions.

Visual ACM Inspection — Used to document whether ACM has appeared in Bin A soils on private and receivership parcels outside of removal/backfill areas.

Soil Sampling during ACM — Used to determine whether asbestos fibers are present in Bin A soils outside of covered areas. 1 soil sampling event per 5-yr period, one composite sample (PLM, Stereomicroscopy analysis) per 15,000 square feet of uncovered soils fof Bin A parcels.

Ambient Air Sampling — Used for 5-yr site reviews to determine whether exposure risks to asbestos fibers exist within ambient air. 1 sampling event every 5-yr for 6 months, 4 monitoring stations with 2 samples per station per month for the first 5-yr site review and 1 sample per station per month for the subsequent 5-yr site reviews.

ABS — ABS would be performed in non-remediated/non-restricted areas. Performed every other year during the first 5-yrs (year 1, 3, and 5), then once every 5-yrs thereafter. 5 ABS locations, 3 activities per location with 3 air samples (TEM analysis) and 1 soil sample (PLM, Stereomicroscopy analysis).

5-Yr Site Inspection — 5-yr site inspection used per NCP to document changes in site conditions that affect protectiveness. 1 inspection event during every 5-yr period. The inspection will also include inspecting all the remedial components.

Risk Evaluation Update — Update to be made once during every 5-yr period.

Alternative: 6b

Description: **Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring**

Detailed Description

Parcel Ownership	Parcel Category	ACM Status	Assumed Land Use	Active General Response Action Components											Monitoring Requirements							
				No Action	Institutional Controls	Engineered Controls		Containment	Removal, Transport and Disposal					Offsite Treatment	House Removal	Inspection and Sampling						5-Yr Site Review	
						Fencing	Posted Warnings	Cover	Removal	Onsite Transport	Offsite Transport	Onsite Disposal	Offsite Disposal			Borrow Sampling	Confirmatory Sampling	Visual ACM Inspections	Soil Sampling during ACM Inspection	Ambient Air Sampling	ABS	5-Yr Site Inspection	Risk Evaluation Update
Private (Currently Developed or Occupied)	Bin A	Identified Subsurface ACM	Residential						✓		✓		✓				✓						
		Identified Surface ACM			✓				✓		✓		✓				✓					✓	
		No Identified ACM at Surface/Subsurface							✓		✓		✓			✓							
	Bin B	Identified Subsurface ACM							✓		✓		✓				✓			✓			
		Identified Surface ACM			✓				✓		✓		✓				✓					✓	
		No Identified ACM at Surface/Subsurface																					
	Bin C	No ACM at Surface/Subsurface[1]			✓		✓															✓	
Private (Currently Undeveloped or Unoccupied)	Bin A	Identified Subsurface ACM																					
		Identified Surface ACM			✓				✓		✓		✓				✓					✓	
		No Identified ACM at Surface/Subsurface							✓		✓		✓			✓				✓			
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM																					
		No Identified ACM at Surface/Subsurface			✓											✓				✓		✓	
	Bin C	No ACM at Surface/Subsurface																					
Receivership	Bin A	Identified Subsurface ACM	Residential						✓		✓		✓				✓						
		Identified Surface ACM			✓				✓		✓		✓			✓	✓			✓		✓	
		No Identified ACM at Surface/Subsurface							✓		✓		✓										
	Bin B	Identified Subsurface ACM																					
		Identified Surface ACM			✓				✓		✓		✓			✓	✓			✓		✓	
		No Identified ACM at Surface/Subsurface																					
	Bin C	No ACM at Surface/Subsurface																					

Note:
A. Shaded rows indicate that the ACM Status does not exist for the corresponding Parcel Ownership and Category.
B. Description of the various monitoring activities are presented in Section 2.5 of the FS.

[1] Although the Bin C classification generally indicates that no ACM has been observed to date, subsurface ACM steam pipe does exist beneath several Bin C parcels on Thicket Court.

No Action — No action is not a part of this alternative.

Institutional Controls — All Bin A and B parcels (private and receivership) within site boundary and Bin C private parcels with buried steam pipe assumed to be addressed as needed by institutional controls (governmental controls, proprietary contols, and/or informational devices). Other Bin C parcels within site boundary assumed to only be addressed by informational device institutional controls.

Fencing — No fencing would be installed at the site.

Posted Warnings — Posted warnings would be installed at Bin C private parcels where subsurface ACM steam pipe is present.

Cover — No soil cover would be installed over the contaminated media.

Removal — All identified surface and subsurface ACM (except Bin C steam pipe) along with soils within Bin A parcels at the site would be excavated and then backfilled with clean backfill.

Onsite Transport/Disposal — No onsite transport or disposal would be required under this alternative.

Offsite Transport/Disposal — All the removed ACM would be transported and disposed of in offsite permitted disposal facilities authorized for asbestos.

Offsite Treatment — No offsite treatment would be carried out under this alternative.

House Removal — Houses that exist on private and receivership parcels would be left in place.

Borrow Sampling — Used to determine whether asbestos fibers are present in proposed borrow source. one composite sample (PLM, Stereomicroscopy analysis) for every 10,000 cubic yards of borrow material.

Confirmatory Sampling — Used to determine whether ACM and asbestos fibers are present in excavation floor and sidewalls. Assume 1 sampling event at each excavation, one composite sample (PLM, Stereomicroscopy analysis) for every 15,000 square feet of excavation or a minimum of one sample per excavation and four composite samples (PLM, Stereomicroscopy analysis) per excavation to document sidewall conditions.

Visual ACM Inspection — Visual ACM inspection would not be required under this alternative.

Soil Sampling during ACM — Inspection soil sampling would not be conducted under this alternative.

Ambient Air Sampling — Used for 5-yr site reviews to determine whether exposure risks to asbestos fibers exist within ambient air. 1 sampling event every 5-yr for 6 months, 4 monitoring stations with 2 samples per station per month for the first 5-yr site review and 1 sample per station per month for the subsequent 5-yr site reviews.

ABS — No Activity-Based Sampling would be conducted.

5-Yr Site Inspection — 5-yr site inspection used per NCP to document changes in site conditions that affect protectiveness. 1 inspection event during every 5-yr period. The inspection will also include inspecting all the remedial components.

Risk Evaluation Update — No update, since remedial measures are taken to physically address ACM or impacted soils.

Appendix G

Detailed Analysis of Retained Alternatives

The detailed evaluation and analysis of each alternative is assessed using the two threshold criteria and five balancing criteria are presented in the following Appendix G. The common justifications have been indicated using gray text to allow the reader to focus on the differences between alternatives.

Alternative 1
No Action

Table G-1. Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative 1

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site	■ Source areas of asbestos-containing materials (ACM) are left unaddressed. ■ Unaddressed ACM allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) if disturbed. ■ ACM migrating to the surface and liberating asbestos fibers after disturbance would potentially represent an inhalation exposure risk to human receptors. ■ PRAOs are unaddressed.

Table G-2. Evaluation Summary for Compliance with ARARs – Alternative 1

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	■ No further action is taken to address ACM sources and contaminated air exceeding chemical-specific ARARs; thus this criterion is not met.
Compliance with Location-Specific ARARs	■ No further action is taken to address ACM sources and contaminated soil; thus this criterion is not met.
Compliance with Action-Specific ARARs	■ Action-specific ARARs are not triggered since no further remedial measures would be undertaken.

Table G-3. Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative 1

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	■ No further remedial action would be undertaken to address ACM or soils impacted by asbestos fibers; thus this criterion is not met. ■ ACM source areas would be left exposed to human receptors and environment.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site	■ No controls are put in place under the “no action” alternative; thus, the contaminated medium is left uncontrolled. ■ ACM and asbestos fibers could migrate to other media and could pose unacceptable risks to human health.

Table G-4. Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative 1

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment processes, the alternative uses, and materials they will treat	■ This alternative does not treat the ACM or soils impacted by asbestos fibers; thus there is no reduction of toxicity, mobility, or volume of contamination through treatment. ■ The statutory preference for treatment as a principal element of the remedial action is not met.
The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed	
The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment	
The degree to which the treatment is irreversible	
The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action	

Table G-5. Short-Term Effectiveness Evaluation Summary – Alternative 1

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	■ ACM and asbestos fibers in soil pose potential short-term risks at the site, which are unaddressed under this alternative. ■ Continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) could pose a risk to human receptors and the environment.
Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures	■ Workers performing site inspections during 5-year site reviews would potentially be exposed to ACM and asbestos fibers that pose unacceptable risks. ■ These risks can be mitigated through the use of monitoring and personal protective equipment.
Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts	■ No further remedial action would be undertaken, thus, there are no potential adverse impacts resulting from the alternative.
Time until protection is achieved	■ No further remedial action would be undertaken to address ACM or soils impacted by asbestos fibers; thus protection is not achieved under this alternative.

Table G-6. Implementability Evaluation Summary – Alternative 1

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	■ Under this alternative no further remedial action would be undertaken to address ACM or Bin A soils. ■ Site inspections, which are part of Alternative 1 would be performed during 5-year reviews and could be easily implemented with available labor, material and technical resources.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	
	Ease of undertaking additional remedial actions including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions	
	Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure	
Administrative Feasibility	Activities needed to coordinate with other offices and agencies	■ ACM and soils impacted by asbestos fibers would be left unaddressed. ■ No remedial action would be undertaken to address the site; thus, there is no need to obtain approvals from other regulatory agencies.
	The ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions)	■ No offsite remedial activities would be conducted under this alternative.
Availability of Services and Materials	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	■ No further remedial action would be undertaken, thus this criterion is not applicable.
	Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources	■ Technical equipment and specialists are available for conducting inspections during 5-year site reviews.
	Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies	
	Availability of prospective technologies	

Table G-7. Cost Evaluation Summary – Alternative 1

Evaluation Factors for Cost	Approx. Cost (Dollars)
Total Capital Cost	None
Total Annual O&M Cost	None
Total Periodic Cost	$324,000
Total Present Value Cost	$117,000

NA- Not Applicable

Note: Total costs are for the assumed period of evaluation (Years 0 through 30). Costs are rounded to the nearest $1,000.

Alternative 2
Institutional/Engineered Controls with Monitoring

Table G-8. Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative 2

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site	■ Identified ACM is addressed through institutional and engineered controls on receivership controlled parcels, which would restrict future use and human access to these areas of the site. ■ Identified ACM on privately owned parcels is addressed primarily through institutional controls; engineered controls would not be widely implemented on privately-owned parcels and may expose the current residents to ACM or soils impacted by asbestos fibers. ■ Surface ACM including Bin A soils which are left exposed to the environment could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) if disturbed; however, institutional and engineered controls would limit activities that could cause disturbances. ■ ACM migrating to the surface and Bin A soils could potentially release asbestos fibers after disturbance which represents an inhalation exposure risk to human receptors.

Table G-9. Evaluation Summary for Compliance with ARARs – Alternative 2

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	■ This alternative does not physically address ACM sources and contaminated air exceeding chemical-specific ARARs; thus this criterion is not met.
Compliance with Location-Specific ARARs	■ Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	■ Action-specific ARARs for the remedy would be addressed during implementation of the remedial action.

Table G-10. Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative 2

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	■ Identified ACM and soils impacted by asbestos fibers are not contained, treated or removed under this alternative; thus it continues to pose risks to human receptors and the environment. ■ Long-term effectiveness is not entirely ensured since ACM and Bin A soils potentially posing a risk are left exposed on site. ■ Exposure to ACM and/or asbestos fibers may occur on privately-owned parcels, since limited or no engineered controls would be put in place to restrict access to ACM. ■ Surface ACM including Bin A soils could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) if disturbed; however, institutional and engineered controls would limit activities that could cause disturbances. ■ Lack of engineered controls at private parcels may allow current residents to be exposed to ACM or asbestos fibers. Only institutional controls would be implemented. ■ Monitoring is the primary remedial component for ensuring protection of human health on privately-owned parcels.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site.	■ Engineered and/or institutional controls are put in place on receivership controlled and privately owned parcels to address exposure risks to human receptors; however ACM and asbestos fibers are not directly controlled ■ This alternative may not reliably control the risk since ACM posing a risk is left exposed on site and protection to human health and the environment is entirely dependent on human receptor's adherence to engineered controls (fencing and signage) and legal enforcement of institutional controls.

Table G-11. Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative 2

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment processes, the alternative uses, and materials they will treat	■ This alternative does not treat the ACM or soils impacted by asbestos fibers; thus there is no reduction of toxicity, mobility, or volume of contamination through treatment. ■ The statutory preference for treatment as a principal element of the remedial action is not met.
The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed	
The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment	
The degree to which the treatment is irreversible	
The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action	

Table G-12. Short-Term Effectiveness Evaluation Summary – Alternative 2

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	■ This alternative could be quickly implemented and does not physically address ACM or soils impacted by asbestos fibers. ■ Access restriction to ACM or soils impacted by asbestos fibers would protect workers and the community and exposure would be minimal. ■ Residents of privately owned parcels are not fully protected; they could be exposed to ACM during implementation of the remedial action. ■ Short-term risks posed to the community during implementation of the alternative mainly relate to exposure to ACM on privately-owned parcels and trespassers with the fenced areas of the receivership controlled parcels.
Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures	■ Surface disturbance of ACM could pose short-term risks to workers. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Other potential impacts can be from safety hazards during remedial implementation, such as falls, electrical hazards, and mechanical hazards.
Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts	■ There are no significant impacts to the environment during implementation of the remedial action; disturbance of ACM and asbestos fibers during installation of fencing should be minimal. ■ Water- or chemical- based suppression would be used for controlling dust during construction.
Time until protection is achieved	■ Time until protection is achieved for receivership controlled parcels is relatively short (could be implemented within a year). ■ Time until protection is achieved for privately owned parcels should be relatively short but highly dependent on the degree of difficulty encountered during implementation of institutional controls.

Table G-13. Implementability Evaluation Summary – Alternative 2

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	■ Engineered controls could be implemented using available materials, equipment, and labor resources. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.. ■ Monitoring such as inspections and sampling could be implemented with relative ease and available resources. ■ Inspection, maintenance, and replacement of engineered controls and implementation of monitoring are easily implemented. ■ Maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	
	Ease of undertaking additional remedial actions, including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions	

Table G-13. Implementability Evaluation Summary – Alternative 2 (continued)

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility - continued	Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure	■ A comprehensive inspection, monitoring, and maintenance program would be implemented to maintain the integrity of remedial action. ■ Monitoring and maintenance of institutional and engineered controls can be easily implemented using available materials, equipment, and labor resources. ■ Frequent/periodic monitoring and sampling would be conducted to ensure overall protection of human health and environment. ■ Risks of exposure to ACM and asbestos fibers are somewhat high if monitoring fails to detect contamination that poses risks.
Administrative Feasibility	Activities needed to coordinate with other offices and agencies	■ Regulatory approvals for engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable for privately owned parcels; however, some difficulties may be encountered with regard to types of restrictions implemented.
	The ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions)	■ No offsite remedial activities would be conducted under this alternative.
Availability of Services and Materials	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	■ This alternative does not call for any treatment, storage and disposal services; thus, this criterion is not applicable.
	Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
	Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies	
	Availability of prospective technologies	

Table G-14. Cost Evaluation Summary – Alternative 2

Evaluation Factors for Cost	Approx. Cost (Dollars)
Total Capital Cost	$2,118,000
Total Annual O&M Cost	$1,160,000
Total Periodic Cost	$1,503,000
Total Present Value Cost	$3,118,000

Note: Total costs are for the assumed period of evaluation (Years 0 through 30). Costs are rounded to the nearest $1,000

Alternative 3

In-Place Containment of All Identified ACM on Private Parcels and Partial In-Place Containment of Identified ACM on Receivership Parcels with Institutional/Engineered Controls and Monitoring

Table G-15. Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative 3

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site	■ Identified ACM on receivership controlled parcels is addressed through partial in-place containment, institutional and engineered controls, which would restrict future use and human access to these areas of the site. ■ All identified ACM (surficial, buried and buried steam pipes) on privately owned parcels is addressed through in-place containment (soil covers) coupled with institutional controls to protect the soil covers. ■ Uncovered surficial ACM on receivership controlled parcels (Bin A and Bin B parcels) could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) and covered/contained areas if disturbed; however, institutional and engineered controls would limit activities that could cause disturbances. ■ ACM migrating to the surface and Bin A soils could potentially release asbestos fibers after disturbance which represent an inhalation exposure risk to human receptors. ■ Only covered areas/portions of the site where containment of identified ACM is implemented would be protective of future non-residential/residential use. ■ Exposure risks to human receptors from contaminated media or sources are mitigated by periodic monitoring and sampling along with institutional and engineering controls. ■ Monitoring would be performed to ensure protectiveness of the remedy. ■ PRAOs are partially addressed through engineered and institutional controls. PRAOs are met where in-place containment is implemented.

Table G-16. Evaluation Summary for Compliance with ARARs – Alternative 3

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	■ ACM locations contained in-place with soil cover would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Uncovered areas of ACM would not physically address contaminant sources and contaminated air exceeding chemical-specific ARARs; thus this criterion is not met.
Compliance with Location-Specific ARARs	■ Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	■ Action-specific ARARs for the remedy would be addressed during implementation of the remedial action.

Table G-17. Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative 3

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	■ Long-term effectiveness is partially addressed through in-place containment of a percentage of identified ACM and institutional/engineered controls, which would restrict future disturbance to those areas of the site. ■ Most of the contaminated media is left unaddressed. Total surface area of contaminated media that left unaddressed is approximately 40 acres (assumed to be 50% of identified ACM on receivership controlled parcels and 100% of identified ACM on privately-owned parcels). ■ Identified surficial ACM in the uncovered areas could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) if disturbed; however, institutional and engineered controls on the uncovered portions of receivership controlled parcels would limit access. ■ Long-term effectiveness and permanence for soil covered areas is dependent on continued integrity of the covers and adherence to institutional controls; this is less certain on privately-owned parcels. ■ Long-term effectiveness is not entirely ensured since uncovered ACM and Bin A soils potentially posing a risk are left exposed on site. ■ Long-term protection to receptors would be ensured through periodic monitoring, institutional and engineered controls. ■ These contaminated media pose cancer risks to human receptors due to exposure.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site.	■ Long-term protection to receptors would be ensured through periodic monitoring, institutional and engineered controls. ■ Although institutional controls will be implemented, long-term effectiveness especially on private parcels is not entirely ensured since it depends on activities of human receptors. ■ Identified surficial ACM in the uncovered areas could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) if disturbed; however, institutional and engineered controls would limit activities that could cause disturbances. ■ Long-term effectiveness is not entirely ensured since ACM posing a risk is left exposed on site (uncovered areas) and protection to human health and the environment is entirely dependent on human receptor's adherence to engineered controls (fencing and signage) and legal enforcement of institutional controls. ■ O&M activities will be required periodically to repair damage or erosion to the soil covers and fencing/signage to maintain protectiveness of the remedy

Table G-18. Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative 3

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment processes, the alternative uses, and materials they will treat	■ This alternative does not treat the ACM or soils impacted by asbestos fibers; thus there is no reduction of toxicity, mobility, or volume of contamination through treatment. ■ The statutory preference for treatment as a principal element of the remedial action is not met.
The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed	
The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment	
The degree to which the treatment is irreversible	
The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action	

Table G-19. Short-Term Effectiveness Evaluation Summary – Alternative 3

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	■ The alternative involves surface disturbance of the identified ACM areas, which could pose short-term risks to the community living close to the site boundary from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) would be used to address those risks. ■ Work area restrictions (such as exclusion zones) would be implemented during construction to reduce short-term exposure risks to the community. ■ Short-term risks posed to the community during implementation of the alternative mainly relate to trespassers within the site boundaries. ■ Residents of private parcels are not protected; they can be exposed to ACM during implementation of the remedial action. ■ Institutional controls could be quickly implemented along with monitoring to keep a check on asbestos fibers that are released from ACM do not migrate offsite. ■ Engineered controls would restrict access and hence quickly protect the community for receivership-controlled parcels; however they do not address short-term exposure to ACM on privately-owned parcels. ■ Temporary relocation of residents from privately owned parcels may be required during construction. ■ Access restriction to ACM source areas would protect workers and the community and exposure would be minimal.
Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures	■ The alternative involves surface disturbance of the ACM source areas, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and personal protective equipment (PPE) would be used to address those risks. ■ Access restriction to ACM source areas would protect workers and the community and exposure would be minimal. ■ Risks to workers are primarily from exposure to ACM and asbestos fibers that are released from it. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Other potential impacts can be from safety hazards during remedial implementation, such as falls, electrical hazards, and mechanical hazards.
Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts	■ There are no notable impacts to the environment during implementation of the remedial action. ■ Water- or chemical- based suppression would be used for controlling and dust during construction.
Time until protection is achieved	■ The proposed remedial action and engineered/institutional controls can be implemented in approximately less than 1 year

Table G-20. Implementability Evaluation Summary – Alternative 3

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	■ Partial in-place containment (soil covers) of the identified ACM areas on receivership controlled parcels and on privately owned parcels could be easily constructed; however, source control measures, such as dust suppression (water- or chemical-based) and PPE, would be required to protect receptors and the environment from release of asbestos fibers and meet ARARs. ■ Implementation of engineered controls and monitoring can be accomplished using available materials, equipment, and labor resources. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy. ■ Inspections and monitoring including sampling can be implemented with relative ease and available resources.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	■ Partial in-place containment (soil covers) of the identified ACM areas on receivership controlled parcels and on privately owned parcels could be easily constructed. ■ Suitable uncontaminated materials for soil cover system construction are not available on site. Soil cover construction materials would be required from offsite sources which might delay the schedule. ■ Implementation of institutional/engineered controls and monitoring can be accomplished using available materials, equipment, and labor resources. ■ Monitoring and implementation of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy. ■ Access permission at privately owned parcels for implementing the remedial alternative is not available, but can be obtained. This can cause some delays in the schedule.
	Ease of undertaking additional remedial actions, including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions	■ Placing additional soil cover can be implemented with ease if required in the future.
	Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure	■ A comprehensive inspection, monitoring, and maintenance program would be implemented to maintain the integrity of remedial action. ■ Monitoring and maintenance of institutional and engineered controls can be easily implemented using available materials, equipment, and labor resources. ■ Frequent/periodic monitoring and sampling would be conducted to ensure Overall protection of human health and environment.

Table G-20. Implementability Evaluation Summary – Alternative 3 (continued)

Evaluation Factors for Implementability		Evaluation Summary
Administrative Feasibility	Activities needed to coordinate with other offices and agencies	■ Regulatory approval for in-place containment of ACM using covers should be obtainable. ■ Regulatory approvals for institutional/engineered controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
	The ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions)	■ Development of offsite borrow sources for cover materials would require coordination and approval from the affected agency.
Availability of Services and Materials	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	■ This remedial alternative does not require treatment, storage and disposal services; thus, this criterion is not applicable.
	Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for cover construction are available. ■ Suitable cover construction materials would be required from offsite sources. ■ Total volume of suitable soil cover material required is approximately 179,000 cy. ■ Approximately 6,400 truck loads of suitable soil would be required to haul in form a offsite borrow source.. ■ Labor and equipment for soil cover construction are available. ■ Materials, equipment, and labor resources used for institutional/engineered controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
	Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies	
	Availability of prospective technologies	

Table G-21. Cost Evaluation Summary – Alternative 3

Evaluation Factors for Cost	Approx. Cost (Dollars)
Total Capital Cost	$9,719,000
Total Annual O&M Cost	$1,824,000
Total Periodic Cost	$1,284,000
Total Present Value Cost	$10,053,000

Note: Total costs are for the assumed period of evaluation (Years 0 through 30). Costs are rounded to the nearest $1,000

Alternative 4a

In-Place Containment of All Identified ACM with Institutional Controls and Monitoring

Table G-22. Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative 4a

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site	■ All identified ACM on receivership controlled parcels and all identified ACM on privately-owned parcels are addressed through in-place containment (soil covers) and institutional controls, which would restrict future use and human access to those areas of the site. ■ Containment (soil cover) of all identified surface and subsurface ACM would eliminate continued release and migration of asbestos fibers to unimpacted media (primarily soil and air). ■ Properly constructed soil covers over identified ACM would eliminate inhalation exposure risks from asbestos fibers to human receptors. ■ If disturbed, unidentified surface or subsurface ACM and soils within uncovered portions of Bin A and Bin B parcels could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) and covered areas; however, institutional controls would limit activities that could cause disturbances. ■ ACM migrating to the surface through these unidentified surface or subsurface ACM areas can release asbestos fibers if disturbed and can potentially represent an inhalation exposure risk to human receptors. ■ Institutional controls would limit activities that could impact effectiveness of the soil covers. ■ Exposure risks to human receptors from contaminated media or asbestos can be mitigated by periodic inspections and monitoring along with institutional and engineering controls. ■ PRAOs are partially addressed and are met where in-place containment is implemented along with institutional controls.

Table G-23. Evaluation Summary for Compliance with ARARs – Alternative 4a

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	■ ACM contained in-place with soil covers would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Uncovered areas of Bin A soils would not physically address contaminant sources and contaminated air exceeding chemical-specific ARARs.
Compliance with Location-Specific ARARs	■ Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	■ Action-specific ARARs for the remedy would be addressed during implementation of the remedial action.

Table G-24. Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative 4a

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	■ Long-term effectiveness is addressed through in-place containment with soil covers of only all identified ACM area and institutional controls, which would restrict future use and human access to those areas of the site. ■ Long-term effectiveness is not entirely ensured since ACM posing a risk is left onsite (covered) and protection to human health and the environment is partially dependent on human receptor's adherence to legal enforcement of institutional controls. ■ All of the identified contaminated media will be covered in-place (67 acres). Total area that is left uncovered under Bin A where unidentified surface or subsurface ACM can occur is approximately 36 acres. ■ ACM migrating to the surface through unidentified surface or subsurface ACM areas can release asbestos fibers if disturbed and can potentially represent an inhalation exposure risk to human receptors. ■ Long-term effectiveness is not entirely ensured since Bin A soils potentially posing a risk are left exposed on site. ■ Uncovered areas of Bin A soils could potentially allow continued release and migration of asbestos fibers. ■ Identified surface and subsurface ACM would be contained in-place with soil covers to eliminate continued release and migration of asbestos fibers to unimpacted media (primarily soil and air); institutional controls would limit activities that could impact effectiveness of the soil covers. ■ These contaminated media pose cancer risks to human receptors due to exposure.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site.	■ Long-term protection to receptors would be ensured through periodic monitoring, institutional and engineered controls. ■ Although institutional controls will be implemented, long-term effectiveness especially on privately-owned parcels is not entirely ensured since it depends on activities of human receptors. ■ Long-term effectiveness is not entirely ensured since ACM posing a risk is left onsite (covered) and protection to human health and the environment is partially dependent on human receptor's adherence to legal enforcement of institutional controls. ■ Identified surface and subsurface ACM would be contained in-place with soil covers to eliminate continued release and migration of asbestos fibers to unimpacted media (primarily soil and air); institutional controls would limit activities that could impact effectiveness of the soil covers. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy. ■ O&M activities are periodically required to repair damage or erosion to the soil covers to maintain protectiveness of the remedy.

Table G-25. Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative 4a

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment processes, the alternative uses, and materials they will treat	■ This alternative does not treat the ACM or soils impacted by asbestos fibers; thus there is no reduction of toxicity, mobility, or volume of contamination through treatment. ■ The statutory preference for treatment as a principal element of the remedial action is not met.
The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed	
The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment	
The degree to which the treatment is irreversible	
The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action	

Table G-26. Short-Term Effectiveness Evaluation Summary – Alternative 4a

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	■ The alternative involves surface disturbance of all identified ACM areas, which could pose short-term risks to the community living close to the site boundary from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) would be used to address those risks. ■ Work area restrictions (such as exclusion zones) would be implemented during construction to reduce short-term exposure risks to the community. ■ Short-term risks posed to the community during implementation of the alternative mainly relate to trespassers within the site boundaries. ■ Residents of private parcels are not protected; they can be exposed to ACM during implementation of the remedial action. ■ Institutional/engineered controls could be quickly implemented along with monitoring to keep a check on asbestos fibers that are released from ACM do not migrate offsite. ■ Engineered controls would restrict access and hence quickly protect the community for receivership-controlled parcels; however they do not address short-term exposure to ACM on privately-owned parcels. ■ Temporary relocation of residents from privately owned parcels may be required during construction. ■ Access restriction to ACM source areas would protect the community and exposure would be minimal.
Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures	■ The alternative involves surface disturbance of all identified ACM areas, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and personal protective equipment (PPE) would be used to address those risks. ■ Risks to workers are primarily from exposure to ACM and asbestos fibers that are released from it. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Other potential impacts can be from safety hazards during remedial implementation, such as falls, electrical hazards, and mechanical hazards.
Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts	■ There can be some impact to the environment during implementation of the remedial action due to heavy construction equipments and the work involved like excavation, hauling and onsite disposal. ■ Water- or chemical- based suppression would be used for controlling and dust during construction.
Time until protection is achieved	■ The proposed remedial action and institutional controls can be implemented in approximately 2 years

Table G-27. Implementability Evaluation Summary – Alternative 4a

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	■ In-place containment with soil covers of the all identified ACM areas could be easily constructed; however, source control measures, such as dust suppression (water- or chemical-based) and PPE, would be required to protect receptors and the environment from release of asbestos fibers and meet ARARs. ■ Logistics for working with large number of heavy equipment at site is difficult to manage. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy.. ■ Monitoring such as ambient air sampling and ABS can be implemented with relative ease and available resources.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	■ In-place containment of the onsite ACM source areas can be easily constructed. ■ Suitable uncontaminated materials for soil cover system construction are not available on site. Soil cover construction materials would be required from offsite sources which might delay the schedule. ■ Monitoring and implementation of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy. ■ Access permission at privately owned parcels for implementing the remedial alternative is not available, but can be obtained. This can cause some delays in the schedule.
	Ease of undertaking additional remedial actions, including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions	■ Placing additional soil cover can be implemented with ease if required in the future.
	Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure	■ A comprehensive inspection, monitoring, and maintenance program would be implemented to maintain the integrity of remedial action. ■ Inspection, maintenance, and replacement of the soil cover systems can be easily implemented using available materials, equipment, and labor resources. ■ Monitoring and maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy. ■ Frequent/periodic monitoring and sampling would be conducted to ensure overall protection of human health and environment.

Table G-27. Implementability Evaluation Summary – Alternative 4a (continued)

Evaluation Factors for Implementability		Evaluation Summary
Administrative Feasibility	Activities needed to coordinate with other offices and agencies	■ Regulatory approval for in-place containment of ACM using covers should be obtainable. ■ Regulatory approvals for monitoring and engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
	The ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions)	■ Development of offsite borrow sources for cover materials would require coordination and approval from the affected agency.
Availability of Services and Materials	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	■ This remedial action does not require treatment, storage and disposal services; thus, this criterion is not applicable.
	Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for cover construction are available. ■ Suitable cover construction materials would be required from offsite sources. ■ Total volume of suitable soil cover material required is approximately 312,000 cubic yards. ■ Approximately 11,200 truck loads would be required to haul in the suitable material. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
	Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies	
	Availability of prospective technologies	

Table G-28. Cost Evaluation Summary – Alternative 4a

Evaluation Factors for Cost	Approx. Cost (Dollars)
Total Capital Cost	$14,332,000
Total Annual O&M Cost	$2,390,000
Total Periodic Cost	$1,349,000
Total Present Value Cost	$14,454,000

Note: Total costs are for the assumed period of evaluation (Years 0 through 30). Costs are rounded to the nearest $1,000

Alternative 4b

In-Place Containment of All Identified ACM and In-Place Containment of Soil within Bin A Parcels with Institutional Controls and Monitoring

Table G-29. Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative 4b

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site	■ All identified ACM on receivership controlled parcels and all identified ACM on privately-owned parcels along with soils within Bin A parcels are addressed through in-place containment (soil covers) and institutional controls, which would restrict future use and human access to those areas of the site. ■ Containment (soil cover) of all identified surface and subsurface ACM along with soils within Bin A parcels would eliminate continued release and migration of asbestos fibers to unimpacted media (primarily soil and air). ■ Human receptors inside the parcels (covered) would be protected. ■ Properly constructed soil covers over ACM would eliminate inhalation exposure risks from asbestos fibers to human receptors. ■ If disturbed, unidentified surface or subsurface ACM outside the defined boundaries of the site could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) and covered areas; however, institutional controls would limit activities that could cause disturbances. ■ Overall protection to human health and environment is not ensured because of residual ACM that might exist outside the parcels boundaries. These unidentified ACM areas can release asbestos fibers if disturbed and can potentially represent an inhalation exposure risk to human receptors. ■ The site would be protective of future residential use after the remedial alternative is implemented. ■ Institutional controls would limit activities that could impact effectiveness of the soil covers. ■ Exposure risks to human receptors from contaminated media or asbestos can be mitigated by periodic inspections and monitoring along with institutional and engineering controls. ■ PRAOs are addressed under this alternative. ■ ACM posing a risk is left on site and protection to human health and the environment is partially dependent on human receptor's adherence to legal enforcement of institutional controls.

Table G-30. Evaluation Summary for Compliance with ARARs – Alternative 4b

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	■ All identified ACM along with soils within Bin A parcels contained in-place with soil covers would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs.
Compliance with Location-Specific ARARs	■ Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	■ Action-specific ARARs for the remedy would be addressed during implementation of the remedial action.

Table G-31. Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative 4b

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	■ Long-term effectiveness is addressed through in-place containment with soil covers of all identified ACM along with soils within Bin A parcels and institutional controls. ■ Long-term effectiveness is not entirely ensured since ACM posing a risk is left onsite (covered with soil cover) and protection to human health and the environment is partially dependent on human receptor's adherence to legal enforcement of institutional controls. ■ All of the identified contaminated media as well as soils within Bin A parcels will be covered in-place (103 acres). ■ ACM migrating to the surface through unidentified surface or subsurface ACM areas can release asbestos fibers if disturbed and can potentially represent an inhalation exposure risk to human receptors. ■ Long-term effectiveness is not entirely ensured since there might be unidentified ACM within the uncovered Bin B parcels that can pose a risk in the future. ■ Identified surface and subsurface ACM would be contained in-place with a soil covers to eliminate continued release and migration of asbestos fibers to unimpacted media (primarily soil and air); institutional controls would limit activities that could impact effectiveness of the soil covers. ■ These contaminated media pose cancer risks to human receptors due to exposure. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site.	■ Long-term protection to receptors would be ensured through periodic monitoring, institutional and engineered controls. ■ Although institutional controls will be implemented, long-term effectiveness of institutional controls is not ensured, especially on privately-owned parcels. ■ Long-term effectiveness is not entirely ensured since ACM posing a risk is left onsite (covered with soil cover) and protection to human health and the environment is partially dependent on human receptor's adherence to legal enforcement of institutional controls. ■ Identified surface and subsurface ACM would be contained in-place with soil covers to eliminate continued release and migration of asbestos fibers to unimpacted media (primarily soil and air); institutional controls would limit activities that could impact effectiveness of the soil covers. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy. ■ O&M activities are periodically required to repair damage or erosion to the soil covers to maintain protectiveness of the remedy.

Table G-32. Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative 4b

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment processes, the alternative uses, and materials they will treat	■ This alternative does not treat the ACM or soils impacted by asbestos fibers; thus there is no reduction of toxicity, mobility, or volume of contamination through treatment. ■ The statutory preference for treatment as a principal element of the remedial action is not met.
The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed	
The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment	
The degree to which the treatment is irreversible	
The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action	

Table G-33. Short-Term Effectiveness Evaluation Summary – Alternative 4b

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	■ The alternative involves surface disturbance of the ACM areas, which could pose short-term risks to the community living close to the site boundary from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) would be used to address those risks. ■ There would be additional impacts to the community under this alternative, as additional truck traffic for cover soils would be required to address Bin A soils. ■ Work area restrictions (such as exclusion zones) would be implemented during construction to reduce short-term exposure risks to the community. ■ Short-term risks posed to the community during implementation of the alternative mainly relate to trespassers within the site boundaries. ■ Residents of private parcels are not protected; they can be exposed to ACM during implementation of the remedial action. ■ Engineered controls would restrict access and hence quickly protect the community for receivership-controlled parcels; however they do not address short-term exposure to ACM on privately-owned parcels. ■ Temporary relocation of residents from privately owned parcels may be required during construction. ■ Access restriction to ACM source areas would protect the community and exposure would be minimal.
Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures	■ The alternative involves surface disturbance of the ACM areas, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and personal protective equipment (PPE) would be used to address those risks. ■ Risks to workers are primarily from exposure to ACM and asbestos fibers that are released from it. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation ■ Other potential impacts can be from safety hazards during remedial implementation, such as falls, electrical hazards, and mechanical hazards.
Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts	■ There would be additional impacts to the community under this alternative, as additional truck traffic for cover soils would be required to address Bin A soils as well as activities involving excavation, hauling and onsite disposal. ■ Water- or chemical- based suppression would be used for controlling and dust during construction.
Time until protection is achieved	■ The proposed remedial action and institutional controls can be implemented in approximately 3 years

Table G-34. Implementability Evaluation Summary – Alternative 4b

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	■ In-place containment with soil covers of the identified ACM areas could be easily constructed; however, source control measures, such as dust suppression (water- or chemical-based) and PPE, would be required to protect receptors and the environment from release of asbestos fibers and meet ARARs. ■ The logistics of using large numbers of heavy equipment at the site for this alternative would be difficult to manage.. ■ Implementation of institutional controls and monitoring can be accomplished using available materials, equipment, and labor resources. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy. ■ Monitoring such as ambient air sampling and ABS can be implemented with relative ease and available resources.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	■ In-place containment with soil covers of the onsite ACM areas can be easily constructed. ■ Suitable uncontaminated materials for cover system for soil cover construction are not available onsite. Soil cover construction materials would be required from offsite sources which might delay the schedule. ■ Implementation of monitoring is easily implemented. ■ Monitoring and implementation of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy. ■ Access permission at privately owned parcels for implementing the remedial action is not available, but can be obtained. This can cause some delays in the schedule.
	Ease of undertaking additional remedial actions, including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions	■ Placing additional soil cover can be implemented with ease if required in the future.
	Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure	■ A comprehensive inspection, monitoring, and maintenance program would be implemented to maintain the integrity of remedial action. ■ Inspection, maintenance, and replacement of the soil cover systems can be easily implemented using available materials, equipment, and labor resources. ■ Monitoring and maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy. ■ Frequent/periodic monitoring and sampling would be conducted to ensure overall protection of human health and environment.

Table G-34. Implementability Evaluation Summary – Alternative 4b (continued)

Evaluation Factors for Implementability		Evaluation Summary
Administrative Feasibility	Activities needed to coordinate with other offices and agencies	■ Regulatory approval for in-place containment of ACM using covers should be obtainable. ■ Regulatory approvals for monitoring and engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels..
	The ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions)	■ Development of offsite borrow sources for cover materials would require coordination and approval from the affected agency.
Availability of Services and Materials	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	■ This remedial action does not require treatment, storage and disposal services; thus, this criterion is not applicable.
	Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor and equipment for cover construction are available ■ Suitable cover construction materials would be required from offsite sources. ■ A large volume of suitable cover construction material would be required as compared to Alternative 4a, thus more than one offsite source might be required. ■ Total volume of suitable soil cover material required is approximately 480,000 cy. ■ Approximately 17,200 truck loads would be required to haul in the suitable material. ■ Materials, equipment and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring
	Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies	
	Availability of prospective technologies	

Table G-35. Cost Evaluation Summary – Alternative 4b

Evaluation Factors for Cost	Approx. Cost (Dollars)
Total Capital Cost	$22,303,000
Total Annual O&M Cost	$2,415,000
Total Periodic Cost	$771,000
Total Present Value Cost	$20,730,000

Note: Total costs are for the assumed period of evaluation (Years 0 through 30). Costs are rounded to the nearest $1,000.

Alternative 5a

Removal of All Identified Surface ACM with Onsite Consolidation/Disposal, Future Incremental Removal of Identified Surface ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos, and Institutional/Engineered Controls with Monitoring

Table G-36. Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative 5a

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site	■ All identified surface ACM on receivership controlled parcels and privately-owned parcels are initially addressed through surface removal, onsite consolidation for disposal, and containment, followed by incremental removals with offsite disposal at a permitted facility. ■ Initial removal of surface ACM would be consolidated at authorized onsite locations and for subsequent removals ACM would be disposed at a offsite permitted facility to eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ ACM exposed in the future due to freeze-thaw cycles would be periodically removed through surface inspections and pickup and would be disposed of offsite at permitted disposal facilities authorized for asbestos ■ ACM would continue to migrate due to freeze-thaw cycles, which could then liberate asbestos fibers and exposure to risk could occur prior to periodic removals being completed if disturbed. ■ Overall protection of human health and environment is ensured through incremental removal, periodic monitoring, engineered and institutional controls. ■ If disturbed, identified subsurface ACM and unidentified surface or subsurface ACM within Bin A and Bin B parcels could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) and covered/contained areas; however, institutional controls would limit activities that could cause disturbances. ■ Properly constructed soil covers over ACM would eliminate inhalation exposure risks from asbestos fibers to human receptors. ■ Institutional and engineered controls would be used to restrict future uses and human access to ACM consolidation areas onsite. ■ Monitoring would be performed to ensure protectiveness of the remedy. ■ PRAOs are partially addressed through identified surface ACM removal and onsite consolidation with engineered and institutional controls. Buried ACM and asbestos steam pipe would still exist onsite.

Table G-37. Evaluation Summary for Compliance with ARARs – Alternative 5a

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	■ ACM removed and consolidated at onsite disposal locations would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Unidentified surface or subsurface ACM and Bin A soils would not be physically addressed; thus there may be the potential for contaminant sources and contaminated air exceeding chemical-specific ARARs.
Compliance with Location-Specific ARARs	■ Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	■ Action-specific ARARs for the remedy would be addressed during implementation of the remedial action.

Table G-38. Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative 5a

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	■ Long-term effectiveness and permanence for parcels containing ACM is addressed through initial surface removal of ACM with onsite consolidation and disposal and backfilling with clean soil followed by periodic incremental removal and offsite disposal of ACM that migrates to the surface during freeze-thaw cycles. ■ Initial removal of surface ACM would be consolidated at authorized onsite locations and for subsequent removals ACM would be disposed at a offsite permitted facility to eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ ACM would continue to migrate due to freeze-thaw cycles, which could then liberate asbestos fibers and exposure to risk could occur prior to periodic removals being completed if disturbed. Although the volume of ACM should decrease over time. ■ Unaddressed areas of subsurface ACM and Bin A soils could allow continued release and migration of asbestos fibers. ■ All of the onsite identified surficial ACM will be removed and consolidated onsite. The total area been removed under this alternative is approximately 37 acres. ■ These contaminated media pose cancer risks to human receptors due to exposure. ■ Long-term protection would be ensured by periodic incremental removal, monitoring and risk assessments of residual ACM that exist onsite. ■ Long-term effectiveness is not entirely ensured since subsurface ACM and Bin A soils potentially posing a risk are left exposed on site and protection to human health and the environment is partially dependent on human receptor's adherence to engineered controls (fencing and signage) and legal enforcement of institutional controls at the authorized onsite disposal locations. ■ Institutional and engineered controls would be used to restrict future uses and human access to ACM consolidation areas onsite that could impact effectiveness of the soil covers.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site.	■ Incremental removal of ACM is a periodic action requiring monitoring of the ACM source areas for new migration of subsurface ACM, especially during colder periods due to freeze-thaw cycles. ■ Long-term effectiveness is not entirely ensured since ACM posing a risk is left on site and protection to human health and the environment is partially dependent on human receptor's adherence to engineered controls (fencing and signage) and legal enforcement of institutional controls at the authorized onsite disposal locations. ■ Long-term protection would be ensured by periodic incremental removal, monitoring and risk assessments of residual ACM that exist onsite. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately-owned parcels. ■ Monitoring and periodic risk evaluation updates would be performed to ensure long-term effectiveness and permanence of the remedy. ■ O&M activities are periodically required to repair damage or erosion to the soil covers and fencing/signage to maintain protectiveness of the remedy.

Table G-39. Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative 5a

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment processes, the alternative uses, and materials they will treat	■ This alternative does not treat the ACM or soils impacted by asbestos fibers; thus there is no reduction of toxicity, mobility, or volume of contamination through treatment. ■ The statutory preference for treatment as a principal element of the remedial action is not met.
The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed	
The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment	
The degree to which the treatment is irreversible	
The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action	

Table G-40. Short-Term Effectiveness Evaluation Summary – Alternative 5a

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	■ The alternative involves surface disturbance of the ACM areas on receivership controlled parcels and privately-owned parcels and onsite consolidation for disposal of ACM, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and PPE would be used to address those risks. ■ Work area restrictions (such as exclusion zones) would be implemented during construction to reduce short-term exposure risks to the community. ■ Short-term risks posed to the community during implementation of the alternative mainly relate to trespassers within the site boundaries. ■ Residents of private parcels are not protected; they can be exposed to ACM during implementation of the remedial action. ■ Engineered controls would restrict access and hence quickly protect the community for receivership-controlled parcels; however they do not address short-term exposure to ACM on privately-owned parcels. ■ Temporary relocation of residents from privately owned parcels may be required during construction. ■ Access restriction to ACM source areas would protect the community and exposure would be minimal.
Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures	■ The alternative involves surface and subsurface disturbance of the ACM source areas, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and personal protective equipment (PPE) would be used to address those risks. ■ Access restriction to ACM source areas would protect workers and exposure would be minimal. ■ Removal and relocation of surface ACM could pose short-term risks to workers. ■ Risks to workers are primarily from exposure to ACM and asbestos fibers that are released from it. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Other potential impacts can be from safety hazards during remedial implementation, such as falls, electrical hazards, and mechanical hazards.
Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts	■ There can be some impact to the environment during implementation of the remedial action due to heavy construction equipment and the work involved like excavation, hauling and onsite disposal. ■ Water- or chemical- based suppression would be used for controlling dust during construction.
Time until protection is achieved	■ The proposed initial removal and engineered/institutional controls can be implemented in approximately 2 years. But the subsequent removals (i.e. periodic incremental removal) are a continuous process which should lessen over time.

Table G-41. Implementability Evaluation Summary – Alternative 5a

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	■ Initial removal of surface ACM would be consolidated at authorized onsite locations and for subsequent incremental ACM removals would be disposed at a offsite permitted facility, this would require continues monitoring of the ACM migrating through surface due to freeze-thaw cycles.. ■ Removal and consolidation of all identified surface ACM at authorized onsite disposal locations and backfilling excavations with clean soil is relatively straightforward. ■ Offsite disposal of ACM removed during periodic inspection at permitted disposal facilities is relatively straightforward. ■ ACM migration from the subsurface that requires incremental removal is likely to continue for a long period of time, although the volume of ACM should decrease over time. ■ Periodic inspection and incremental removal of ACM across the site would be conducted annually or more frequently requiring mobilizations of materials, equipment, and labor. ■ Total volume to be excavated and consolidated is approximately 137,000 cubic yards. ■ Approximately 4,900 truck loads would be required to haul the whole excavated volume of ACM. ■ Special management procedures may be required for disposal at the permitted facilities. ■ Excavation and backfilling around homes or structures, subsurface utilities, and roads may be challenging at specific locations. ■ Logistics for working with large number of heavy equipment at site is difficult to manage. ■ Construction of the onsite disposal facilities will require coordination during the removal of ACM from parcels. ■ Incremental removals should be straightforward, although difficulties may exist for implementation on privately-owned parcels. ■ Inspection, maintenance, and replacement of the soil cover systems, can be easily implemented using available materials, equipment, and labor resources. ■ Construction of engineered controls around onsite disposal locations and implementation of monitoring is relatively straightforward ■ Implementation of engineered controls and monitoring is relatively straightforward and can be accomplished using available materials, equipment, and labor resources. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy. ■ Monitoring such as ambient air sampling, ABS, soil sampling can be implemented with relative ease and available resources.

Table G-41. Implementability Evaluation Summary – Alternative 5a (continued)

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility – (Continued)	Reliability of the technology, focusing on technical problems that will lead to schedule delays	■ Removal and consolidation of all surficial ACM from receivership controlled parcels and privately-owned parcels at authorized onsite locations could be easily constructed. ■ Suitable uncontaminated materials for soil cover system construction at the authorized onsite disposal location and backfilling removal areas are not available onsite. Soil cover construction and backfill materials would be required from offsite sources. ■ Monitoring and implementation of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy ■ Implementation of institutional/engineered controls and monitoring can be accomplished using available materials, equipment, and labor resources. ■ Access permission at privately owned parcels for implementing the remedial action is not available, but can be obtained. This can cause some delays in the schedule.
	Ease of undertaking additional remedial actions, including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions	■ Removal and consolidation of all identified surficial ACM from receivership controlled parcels and privately-owned parcels at authorized onsite locations could be easily constructed.
	Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure	■ A comprehensive inspection, monitoring, and maintenance program would be implemented to maintain the integrity of remedial action. ■ Monitoring and maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy ■ Monitoring and maintenance of engineered controls can be easily implemented using available materials, equipment, and labor resources. ■ Frequent/periodic monitoring and sampling would be conducted to ensure overall protection of human health and environment..
Administrative Feasibility	Activities needed to coordinate with other offices and agencies	■ Regulatory approval needed for removals and to construct onsite disposal facilities should be obtainable. ■ Regulatory approvals for incremental removal events should be obtainable, although difficulties may exist with the privately-owned parcels. ■ Regulatory approvals for monitoring and engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
	The ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions)	■ Development of offsite borrow sources for backfill would require coordination and approval from the affected agency. ■ Regulatory and facility approval for offsite disposal at permitted disposal facilities should be obtainable.

Table G-41. Implementability Evaluation Summary – Alternative 5a (continued)

Evaluation Factors for Implementability		Evaluation Summary
Availability of Services and Materials	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	■ Permitted disposal facilities authorized for asbestos are available within the State of Oregon; however most are somewhat distant from the site. ■ The offsite permitted disposal facilities should have sufficient capacity to accept ACM for disposal; the volume of ACM for offsite disposal in this alternative should be relatively small
	Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable backfill materials would be required from offsite sources. ■ Total volume of suitable soil cover and backfill material required is approximately 236,000 cubic yards. ■ Approximately 8,500 truck loads would be required to haul in the suitable material. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
	Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies	
	Availability of prospective technologies	

Table G-42. Cost Evaluation Summary – Alternative 5a

Evaluation Factors for Cost	Approx. Cost (Dollars)
Total Capital Cost	$15,942,000
Total Annual O&M Cost	$3,489,000
Total Periodic Cost	$1,353,000
Total Present Value Cost	$16,340,000

Note: Total costs are for the assumed period of evaluation (Years 0 through 30). Costs are rounded to the nearest $1,000.

Alternative 5b

Removal of All Identified ACM with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Table G-43. Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative 5b

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site	■ All identified ACM (surface and subsurface) on receivership controlled parcels and privately-owned parcels is addressed through removal and consolidation at onsite disposal locations. ■ This remedial alternative would eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ Overall protection of human health and environment is ensured through periodic monitoring, engineered and institutional controls. ■ If disturbed, unidentified surface or subsurface ACM within Bin A and Bin B parcels which are not removed could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) and covered areas; however, institutional controls would limit activities that could cause disturbances. ■ Properly constructed soil covers over ACM would eliminate inhalation exposure risks from asbestos fibers to human receptors. ■ Institutional controls and engineered controls would be used to restrict access to the onsite disposal locations. ■ Large portions of the site would be remediated to allow unrestricted residential use with limited institutional and engineered controls. ■ Institutional and engineered controls would be used to restrict future uses and human access to consolidation areas of the site. ■ Monitoring would be performed to ensure protectiveness of the remedy. ■ PRAOs are addressed through removal and onsite consolidation with engineered and institutional controls. But there might be some residual or unidentified surface or subsurface ACM with Bin A and Bin B parcels.

Table G-44. Evaluation Summary for Compliance with ARARs – Alternative 5b

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	■ ACM removed and consolidated at onsite disposal locations would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Unidentified surface or subsurface ACM within Bin A parcels would not be physically addressed; thus there may be the potential for contaminant sources and contaminated air exceeding chemical-specific ARARs.
Compliance with Location-Specific ARARs	■ Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	■ Action-specific ARARs for the remedy would be addressed during implementation of the remedial action.

Table G-45. Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative 5b

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	■ Long-term effectiveness would be addressed through removal, onsite consolidation of all identified ACM and onsite disposal, and containment and backfilling with clean soil. Institutional and engineered controls would restrict future uses and human access to the onsite authorized disposal locations. ■ If disturbed, long-term effectiveness is not entirely ensured since there might be unidentified ACM within the Bin A and Bin B parcels that can pose a risk in the future and could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air); however, institutional and engineered controls would limit activities that could cause disturbances. ■ The extent of unidentified surface or subsurface ACM within Bin A parcels which are not removed could potentially allow continued release and migration of asbestos fibers to unimpacted media. ■ All identified contaminated media will be removed and consolidated onsite. The total area been removed under this alternative is approximately 45 acres. ■ Identified surface and subsurface ACM would be contained at authorized onsite locations to eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ Large portions of the site would be remediated to allow residential use with limited institutional/engineered controls. ■ These contaminated media pose cancer risks to human receptors due to exposure.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site.	■ If disturbed, long-term effectiveness is not entirely ensured since there might be unidentified ACM within the Bin A and Bin B parcels that can pose a risk in the future and could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air); however, institutional and engineered controls would limit activities that could cause disturbances. ■ Long-term effectiveness is not entirely ensured since ACM posing a risk is left onsite (onsite consolidation and disposal areas) and protection to human health and the environment is entirely dependent on human receptor's adherence to engineered controls (fencing and signage) and legal enforcement of institutional controls. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately-owned parcels. ■ Long-term protection would be ensured by periodic monitoring of residual ACM that might exist onsite and by institutional and engineered controls. ■ Identified surface and subsurface ACM would be contained at authorized onsite locations to eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy. ■ O&M activities are periodically required to repair damage or erosion to the soil covers and fencing/signage to maintain protectiveness of the remedy.

Table G-46. Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative 5b

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment processes, the alternative uses, and materials they will treat	■ This alternative does not treat the ACM or soils impacted by asbestos fibers; thus there is no reduction of toxicity, mobility, or volume of contamination through treatment. ■ The statutory preference for treatment as a principal element of the remedial action is not met.
The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed	
The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment	
The degree to which the treatment is irreversible	
The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action	

Table G-47. Short-Term Effectiveness Evaluation Summary – Alternative 5b

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	■ The alternative involves surface and subsurface disturbance of all identified ACM areas and onsite consolidation and disposal of ACM, which could pose short-term risks to the community from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and PPE, would be used to address those risks. ■ Work area restrictions (such as exclusion zones) would be implemented during construction to reduce short-term exposure risks to the community. ■ Short-term risks posed to the community during implementation of the alternative mainly relate to trespassers within the site boundaries. ■ Residents of private parcels are not protected; they can be exposed to ACM during implementation of the remedial action. ■ Institutional/engineered controls could be quickly implemented along with monitoring to keep a check on asbestos fibers that are released from ACM do not migrate offsite. ■ Engineered controls would restrict access and hence quickly protect the community for receivership-controlled parcels; however they do not address short-term exposure to ACM on privately-owned parcels. ■ Temporary relocation of residents from privately owned parcels may be required during construction. ■ Access restriction to ACM areas would protect the community and exposure would be minimal.
Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures	■ The alternative involves surface and subsurface disturbance of the ACM source areas, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and personal protective equipment (PPE) would be used to address those risks. ■ Risks to workers are primarily from exposure to ACM and asbestos fibers that are released from it. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Other potential impacts can be from safety hazards during remedial implementation, such as falls, electrical hazards, and mechanical hazards.
Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts	■ There would be additional impacts to the community under this alternative as compared to Alternative 5a, during the implementation of the remedial action due to heavy construction equipments and the work involved like excavation, hauling and onsite disposal. ■ Water- or chemical- based suppression would be used for controlling and dust during construction.
Time until protection is achieved	■ The proposed remedial action and institutional controls can be implemented in approximately 3 years

Table G-48. Implementability Evaluation Summary – Alternative 5b

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	■ Removal and consolidation of all identified ACM for onsite disposal at authorized onsite locations could be easily constructed; however, source control measures, such as dust suppression (water- or chemical-based) and PPE, would be required to protect receptors and the environment from release of asbestos fibers and meet ARARs. ■ Total volume to be excavated and consolidated is approximately 197,000 cy. ■ Approximately 7,100 truck loads would be required to haul the whole excavated volume of ACM waste. ■ Excavation around onsite houses or structures, utilities will be difficult. ■ Logistics for working with large number of heavy equipment at site is difficult to manage. ■ Construction of the onsite disposal facilities will require coordination during the removal of ACM from parcels. ■ Construction of engineered controls around onsite disposal locations and implementation of monitoring is relatively straightforward. ■ Implementation of engineered controls and monitoring can be accomplished using available materials, equipment, and labor resources. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy. ■ Monitoring such as ambient air sampling, ABS, soil sampling can be implemented with relative ease and available resources. ■ Inspection, maintenance, and replacement of the soil cover systems over the onsite disposal facilities are relatively easy to implement.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	■ Removal and consolidation of all identified ACM for onsite disposal at authorized onsite locations could be easily constructed. ■ Suitable uncontaminated materials for soil cover system construction at the authorized onsite disposal location and backfilling removal areas are not available onsite. Soil cover construction and backfill materials would be required from offsite sources. ■ Monitoring and implementation of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy ■ Implementation of institutional/engineered controls can be accomplished with ease using available materials, equipment, and labor resources. ■ Access permission at privately owned parcels for implementing the remedial action is not available, but can be obtained. This can cause some delays in the schedule.

Table G-48. Implementability Evaluation Summary – Alternative 5b (continued)

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility – (Continued)	Ease of undertaking additional remedial actions, including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions	■ Removal and consolidation of all identified ACM at authorized onsite locations could be easily constructed.
	Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure	■ A comprehensive inspection, monitoring, and maintenance program would be implemented to maintain the integrity of remedial action. ■ Monitoring and maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy ■ Monitoring and maintenance of engineered controls can be easily implemented using available materials, equipment, and labor resources. ■ Frequent/periodic monitoring and sampling would be conducted to ensure overall protection of human health and environment.
Administrative Feasibility	Activities needed to coordinate with other offices and agencies	■ Regulatory approval needed for removals and to construct onsite disposal facilities should be obtainable. ■ Regulatory approvals for monitoring and engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
	The ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions)	■ Development of offsite borrow sources for soil covers over the onsite disposal facilities and backfill would require coordination and approval from the affected agency.
Availability of Services and Materials	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	■ This remedial action does not call for any offsite treatment, storage, and disposal services; thus, this criterion is not applicable.
	Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately- owned parcels for implementing the remedial action may not be currently available, but can be obtained.. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable cover construction and backfill materials would be required from offsite sources. ■ Total volume of suitable soil cover and backfill material required is approximately 330,000 cubic yards. ■ Approximately 11,800 truck loads would be required to haul in the suitable material. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
	Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies	
	Availability of prospective technologies	

Table G-49. Cost Evaluation Summary – Alternative 5b

Evaluation Factors for Cost	Approx. Cost (Dollars)
Total Capital Cost	$22,347,000
Total Annual O&M Cost	$2,052,000
Total Periodic Cost	$1,403,000
Total Present Value Cost	$20,878,000

Note: Total costs are for the assumed period of evaluation (Years 0 through 30). Costs are rounded to the nearest $1,000.

Alternative 5c

Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Onsite Consolidation/Disposal and Institutional/Engineered Controls with Monitoring

Table G-50. Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative 5c

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site	■ All identified ACM (surface and subsurface) and Bin A soils on receivership controlled parcels and privately owned parcels are addressed through removal, onsite consolidation/disposal, and containment. ■ All identified surface and subsurface ACM as well as remaining soils within Bin A parcels would be removed and consolidated at authorized onsite disposal locations with soil covers to eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ Overall protection of human health and environment is ensured through periodic monitoring, engineered and institutional controls. ■ Unidentified surface or subsurface ACM within Bin A and Bin B parcels which are not removed could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) and covered/contained areas if disturbed; however, institutional controls would limit activities that could cause disturbances. ■ Properly constructed soil covers over ACM would eliminate inhalation exposure risks from asbestos fibers to human receptors. ■ Large portions of the site would be remediated to allow residential use with limited institutional and engineered controls. ■ Institutional and engineered controls would be used to restrict future uses and human access to consolidation areas in the site. ■ Monitoring would be performed to ensure protectiveness of the remedy ■ PRAOs are addressed through removal and onsite consolidation with engineered and institutional controls. But there might be some residual or unidentified surface or subsurface ACM outside the NRE site boundary.

Table G-51. Evaluation Summary for Compliance with ARARs – Alternative 5c

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	■ Complete removal, consolidation, and containment of ACM and Bin A soils at onsite disposal locations would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs.
Compliance with Location-Specific ARARs	■ Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	■ Action-specific ARARs for the remedy would be addressed during implementation of the remedial action.

Table G-52. Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative 5c

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	■ Long-term effectiveness is addressed through removal, onsite consolidation/disposal, and containment of ACM sources. Institutional and engineered controls would restrict future uses and human access to the authorized disposal locations of the site. ■ Long-term effectiveness is not entirely ensured since ACM posing a risk is left on site and protection to human health and the environment is partially dependent on human receptor's adherence to engineered controls (fencing and signage) and legal enforcement of institutional controls at the authorized onsite disposal locations. ■ All of the onsite identified contaminated media as well as remaining soils within Bin A parcels will be removed and consolidated onsite. The total area been removed under this alternative is approximately 81 acres. ■ Identified surface and subsurface ACM along with remaining soils within Bin A parcels would be removed and contained at authorized onsite locations with soil covers to eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ Large portions of the site would be remediated to allow unrestricted residential use with limited institutional/engineered controls. ■ These contaminated media pose cancer risks to human receptors due to exposure. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site.	■ Long-term effectiveness is not entirely ensured since there might be unidentified ACM outside the NRE site boundary that can pose a risk in the future and could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) if disturbed; however, institutional and engineered controls would limit activities that could cause disturbances. ■ Long-term effectiveness is not entirely ensured since ACM posing a risk is left on site and protection to human health and the environment is partially dependent on human receptor's adherence to engineered controls (fencing and signage) and legal enforcement of institutional controls at the authorized onsite disposal locations. ■ Long-term protection would be ensured by periodic monitoring of residual ACM that might exist onsite and by institutional and engineered controls. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately-owned parcels ■ Identified surface and subsurface ACM would be contained at authorized onsite locations to eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ O&M activities are periodically required to repair damage or erosion to the soil covers and fencing/signage to maintain protectiveness of the remedy.

Table G-53. Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative 5c

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment processes, the alternative uses, and materials they will treat	■ This alternative does not treat the ACM or soils impacted by asbestos fibers; thus there is no reduction of toxicity, mobility, or volume of contamination through treatment. ■ The statutory preference for treatment as a principal element of the remedial action is not met.
The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed	
The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment	
The degree to which the treatment is irreversible	
The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action	

Table G-54. Short-Term Effectiveness Evaluation Summary – Alternative 5c

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	■ The alternative involves surface and subsurface disturbance of all identified ACM areas along with Bin A parcel soils and onsite relocation for consolidation and disposal, which could pose short-term risks to the community from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and PPE, would be used to address those risks. ■ Work area restrictions (such as exclusion zones) would be implemented during construction to reduce short-term exposure risks to the community. ■ Short-term risks posed to the community during implementation of the alternative mainly relate to trespassers within the site boundaries. ■ Residents of private parcels are not protected; they can be exposed to ACM during implementation of the remedial action. ■ Institutional/engineered controls could be quickly implemented along with monitoring to keep a check on asbestos fibers that are released from ACM do not migrate offsite. ■ Engineered controls would restrict access and hence quickly protect the community for receivership-controlled parcels; however they do not address short-term exposure to ACM on privately-owned parcels. ■ Temporary relocation of residents from privately owned parcels may be required during construction. ■ Access restriction to ACM source areas would protect the community and exposure would be minimal.
Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures	■ The alternative involves surface and subsurface disturbance of the ACM source areas, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and personal protective equipment (PPE) would be used to address those risks. ■ Risks to workers are primarily from exposure to ACM and asbestos fibers that are released from it. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Other potential impacts can be from safety hazards during remedial implementation, such as falls, electrical hazards, and mechanical hazards.
Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts	■ There would be additional impacts to the community under this alternative as compared to Alternative 5b, as additional truck traffic for backfill soils would be required to address Bin A removal areas as well as activities involving like excavation, hauling and onsite disposal. ■ Water- or chemical- based suppression would be used for controlling and dust during construction.
Time until protection is achieved	■ The proposed remedial action and institutional controls can be implemented in approximately 3 years

Table G-55. Implementability Evaluation Summary – Alternative 5c

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	■ Removal and consolidation of all identified ACM and remaining soils within Bin A soils for onsite disposal at authorized onsite locations could be easily constructed; however, source control measures, such as dust suppression (water- or chemical-based) and PPE, would be required to protect receptors and the environment from release of asbestos fibers and meet ARARs. ■ Large volume of ACM waste needs to be consolidated for onsite disposal as compared to Alternative 5b. ■ Total volume to be excavated and consolidated is approximately 330,000 cubic yards. ■ Approximately 11,800 truck loads would be required to haul the whole excavated volume of ACM waste. ■ Excavation around onsite houses or structures, utilities will be difficult. ■ Logistics for working with large number of heavy equipment at site is difficult to manage. ■ Construction of the onsite disposal facilities will require coordination during the removal of ACM from parcels. ■ Construction of engineered controls around onsite disposal locations and implementation of monitoring is relatively straightforward. ■ Implementation of engineered controls and monitoring can be accomplished using available materials, equipment, and labor resources. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy. ■ Monitoring such as ambient air sampling and inspections can be implemented with relative ease and available resources. ■ Inspection, maintenance, and replacement of the soil cover systems over the onsite disposal facilities are relatively easy to implement.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	■ Removal and consolidation of all identified ACM and remaining soils within Bin A soils at authorized onsite locations could be easily constructed ■ Suitable uncontaminated materials for soil cover system construction at the authorized onsite disposal location and backfilling removal areas are not available onsite. Soil cover construction and backfill materials would be required from offsite sources. ■ Monitoring and implementation of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy ■ A large volume of suitable soil cover construction material and backfilling material would be required as compared to Alternative 5b, thus multiple offsite source might be required, which might delay the schedule. ■ Implementation of institutional/engineered controls can be accomplished with ease using available materials, equipment, and labor resources. ■ Access permission at private parcels for implementing the remedial action is not available, but can be obtained. This can cause some delays in the schedule.

Table G-55. Implementability Evaluation Summary – Alternative 5c (continued)

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility - continued	Ease of undertaking additional remedial actions, including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions	■ Future removals, consolidation and containment of ACM at authorized locations can be constructed; but some difficulties may be encountered with regard to onsite consolidation.
	Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure	■ A comprehensive inspection, monitoring, and maintenance program would be implemented to maintain the integrity of remedial action. ■ Monitoring and maintenance of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy ■ Monitoring and maintenance of institutional and engineered controls can be easily implemented using available materials, equipment, and labor resources. ■ Frequent/periodic monitoring and sampling would be conducted to ensure overall protection of human health and environment.
Administrative Feasibility	Activities needed to coordinate with other offices and agencies	■ Regulatory approval needed for removals and to construct onsite disposal facilities should be obtainable. ■ Regulatory approvals for monitoring and engineered controls should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels
	The ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions)	■ Development of offsite borrow sources for soil covers over the onsite disposal facilities and backfill would require coordination and approval from the affected agency. ■ Since large volume of suitable soil for covers at the onsite disposal facilities and backfill material would be required, multiple offsite sources would be used and can cause some delays in getting required permits and approvals.
Availability of Services and Materials	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	■ This remedial action does not call for any offsite treatment, storage, and disposal services; thus, this criterion is not applicable.
	Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained.. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable cover construction and backfill materials would be required from offsite sources. ■ A large volume of suitable cover construction and backfill materials would be required as compared to Alternative 5b. ■ Total volume of suitable soil cover and backfill material required is approximately 521,000 cy. ■ Approximately 18,700 truck loads would be required to haul in the suitable material. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
	Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies	
	Availability of prospective technologies	

Table G-56. Cost Evaluation Summary – Alternative 5c

Evaluation Factors for Cost	Approx. Cost (Dollars)
Total Capital Cost	$33,565,000
Total Annual O&M Cost	$2,052,000
Total Periodic Cost	$771,000
Total Present Value Cost	$30,428,000

Note: Total costs are for the assumed period of evaluation (Years 0 through 30). Costs are rounded to the nearest $1,000.

Alternative 6a

Removal of All Identified ACM with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Table G-57. Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative 6a

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site	■ All identified ACM (surface and subsurface) on receivership controlled parcels and privately owned parcels is addressed through removal and offsite disposal at permitted facilities authorized for asbestos. ■ All identified surface and subsurface ACM would be removed and disposed at an offsite permitted facility to eliminate continued release and migration of asbestos fibers to unimpacted media (primarily soil and air). ■ Offsite transportation and disposal of ACM would pose short-term risks to the community and the environment. These risks would be mitigated through dust suppression (water- or chemical-based) and proper ACM packaging and transportation procedures during implementation. ■ If disturbed, Bin A soils could potentially allow continued release and migration of asbestos fibers. ■ Disturbed fibers would potentially represent an inhalation exposure risk to human receptors. ■ Large portions of the site would be remediated to allow residential use with limited institutional controls. ■ Monitoring would be performed to ensure protectiveness of the remedy. ■ PRAOs are addressed through removal and offsite disposal with institutional controls and monitoring. However Bin A soils would remain and may pose residual risks for exposure to asbestos fibers.

Table G-58. Evaluation Summary for Compliance with ARARs – Alternative 6a

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	■ Removal and offsite disposal of ACM would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs. ■ Unidentified surface or subsurface ACM and Bin A soils would not be physically addressed; thus there may be the potential for contaminant sources and contaminated air exceeding chemical-specific ARARs from those locations
Compliance with Location-Specific ARARs	■ Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	■ Action-specific ARARs for the remedy would be addressed during implementation of the remedial action.

Table G-59. Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative 6a

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	■ Long-term effectiveness and permanence for parcels containing ACM is addressed through removal and offsite disposal of all identified ACM and backfilling with clean soil. Institutional controls would restrict future unrestricted use of the site. ■ Long-term effectiveness is not entirely ensured since there might be unidentified ACM within the remaining soils of Bin A and Bin B parcels that can pose a risk in the future. ■ These contaminated media pose cancer risks to human receptors due to exposure. ■ Identified surface and subsurface ACM would be consolidated at an offsite permitted facility authorized for asbestos to eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ All onsite identified contaminated media will be removed and disposed offsite. The total area been removed under this alternative is approximately 58 acres. ■ Institutional controls would limit activities that could cause disturbances. ■ Long-term protection would be ensured by periodic monitoring of residual ACM that might exist onsite. ■ Long-term effectiveness is ensured since the identified ACM posing a risk is contained and managed of at an authorized offsite disposal facility. ■ Large portions of the site would be remediated to allow unrestricted residential use with limited institutional controls.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site.	■ Long-term effectiveness is not entirely ensured since there might be unidentified ACM within the remaining soils of Bin A and Bin B parcels that can pose a risk in the future and could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) if disturbed; however, institutional controls would limit activities that could cause disturbances. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately-owned parcels. ■ Long-term protection would be ensured by periodic monitoring of residual ACM that might exist onsite and by institutional controls. ■ Identified surface and subsurface ACM would be contained at an authorized offsite permitted facility for asbestos to eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy. ■ Minimal O&M activities are periodically required to repair any damages to signage to maintain protectiveness of the remedy and institutional control.

Table G-60. Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative 6a

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment processes, the alternative uses, and materials they will treat	■ This alternative does not treat the ACM or soils impacted by asbestos fibers; thus there is no reduction of toxicity, mobility, or volume of contamination through treatment. ■ The statutory preference for treatment as a principal element of the remedial action is not met.
The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed	
The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment	
The degree to which the treatment is irreversible	
The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action	

Table G-61. Short-Term Effectiveness Evaluation Summary – Alternative 6a

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	■ The alternative involves surface and subsurface disturbance of all identified ACM areas on receivership controlled parcels and privately owned parcels during removal and offsite disposal of ACM, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and PPE, would be used to address those risks. ■ Offsite transportation and disposal of ACM would pose short-term risks to the community and the environment. These risks would be mitigated through source control, such as dust suppression (water- or chemical-based) and proper ACM packaging and transportation procedures, during implementation. ■ Work area restrictions (such as exclusion zones) would be implemented during construction to reduce short-term exposure risks to the community. ■ Short-term risks posed to the community during implementation of the alternative mainly relate to trespassers within the site boundaries. ■ Residents of private parcels are not protected; they can be exposed to ACM during implementation of the remedial action. ■ Engineered controls would restrict access and hence quickly protect the community for receivership-controlled parcels; however they do not address short-term exposure to ACM on privately-owned parcels. ■ Temporary relocation of residents from privately owned parcels may be required during construction. ■ Access restriction to ACM source areas would protect the community and exposure would be minimal.
Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures	■ The alternative involves surface and subsurface disturbance of the ACM areas on receivership controlled parcels and privately owned parcels, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and personal protective equipment (PPE) would be used to address those risks. ■ Removal and offsite disposal of surface and subsurface ACM could pose short-term risks to workers. ■ Risks to workers are primarily from exposure to ACM and asbestos fibers that are released from it. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Other potential impacts can be from safety hazards during remedial implementation, such as falls, electrical hazards, and mechanical hazards.
Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts	■ There would be additional impacts to the community under this alternative, as additional truck traffic would be required for offsite disposal of ACM as well as transport of backfill soils and activities involving excavation, and hauling. ■ Water- or chemical- based suppression would be used for controlling and dust during construction.
Time until protection is achieved	■ The proposed remedial action and institutional controls can be implemented in approximately 4 years

Table G-62. Implementability Evaluation Summary – Alternative 6a

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	■ Removal and offsite disposal of all identified ACM on receivership controlled parcels and privately owned parcels at an offsite permitted facility authorized for asbestos and backfilling excavations with clean soil could be easily implemented; however, source control measures, such as dust suppression (water- or chemical-based) and PPE, would be required to protect receptors and the environment from release of asbestos fibers and meet ARARs. ■ Removed ACM and associated soils require transportation to offsite disposal facilities in specialized enclosed trucks to minimize the exposure risks from asbestos fibers to the community. ■ Large volume of ACM waste needs to be transported offsite for disposal. ■ Special management procedures may be required for disposal at the permitted facilities. ■ Total volume to be excavated and transported offsite for disposal is approximately 244,000 cubic yards. ■ Approximately 8,800 truck loads would be required to haul the whole excavated volume of ACM waste. ■ Excavation and backfilling around homes or structures, subsurface utilities, and roads may be challenging at specific locations. ■ Logistics for working with large number of heavy equipment onsite and offsite transportation is difficult to manage. ■ Implementation of monitoring can be accomplished using available materials, equipment, and labor resources. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy. ■ Monitoring such as ambient air sampling and inspections can be implemented with relative ease and available resources.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	■ Removal and disposal of all identified ACM at an offsite permitted facility authorized for asbestos could be easily implemented ■ Suitable uncontaminated materials for backfilling of removal areas are not available onsite. Backfill materials would be required from offsite sources. ■ A large volume of suitable backfilling material would be required, thus multiple offsite source might be required, which might delay the schedule. ■ Implementation of institutional controls and monitoring can be accomplished using available materials, equipment, and labor resources. ■ Monitoring and implementation of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy ■ Access permission at privately owned parcels for implementing the remedial action is not available, but can be obtained. This can cause some delays in the schedule.
	Ease of undertaking additional remedial actions, including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions	■ Future removals and offsite disposal of ACM can be implemented.

Table G-62. Implementability Evaluation Summary – Alternative 6a (continued)

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility - continued	Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure	■ A comprehensive inspection, monitoring, and maintenance program would be implemented to maintain the integrity of remedial action. ■ Implementation of monitoring is easily implemented. ■ Monitoring and maintenance of institutional controls can be easily implemented using available materials, equipment, and labor resources. ■ Frequent/periodic monitoring and sampling would be conducted to ensure overall protection of human health and environment.
Administrative Feasibility	Activities needed to coordinate with other offices and agencies	■ Regulatory approval needed to remove and transport ACM and associated soils should be obtainable. ■ Regulatory approvals for monitoring should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
	The ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions)	■ Regulatory and facility approval for offsite disposal at permitted disposal facilities should be obtainable. ■ Special management procedures may be required for disposal at the permitted facilities. ■ Development of offsite borrow sources for backfill would require coordination and approval from the affected agency.
Availability of Services and Materials	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	■ Permitted disposal facilities authorized for asbestos are available within the State of Oregon; however most are somewhat distant from the site. ■ Many of the permitted disposal facilities may not have sufficient capacity to accept all of the ACM; use of multiple permitted disposal facilities may be required.
	Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable backfill materials would be required from offsite sources. ■ Total volume of suitable backfill material required is approximately 244,000 cubic yards. ■ Approximately 8,800 truck loads would be required to haul in the suitable backfill material. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
	Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies	
	Availability of prospective technologies	

Table G-63. Cost Evaluation Summary – Alternative 6a

Evaluation Factors for Cost	Approx. Cost (Dollars)
Total Capital Cost	$61,155,000
Total Annual O&M Cost	$286,000
Total Periodic Cost	$1,373,000
Total Present Value Cost	$52,438,000

Note: Total costs are for the assumed period of evaluation (Years 0 through 30). Costs are rounded to the nearest $1,000.

Alternative 6b

Removal of All Identified ACM and Removal of Soil within Bin A Parcels with Offsite Disposal at Permitted Facilities Authorized for Asbestos and Institutional Controls with Monitoring

Table G-64. Evaluation Summary for Overall Protection of Human Health and the Environment – Alternative 6b

Evaluation Factors for Overall Protection of Human Health and the Environment	Evaluation Summary
Adequate protection of human health and the environment (short- and long-term) from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site	■ All identified ACM (surface and subsurface) on receivership controlled parcels and privately owned parcels and remaining soils within Bin A parcels are addressed through removal, and disposal to an offsite permitted facility authorized for accepting asbestos. ■ All identified surface and subsurface ACM as well as soils within Bin A parcels would be removed and disposed at permitted offsite facilities to eliminate continued release and migration of asbestos fibers to unimpacted media (primarily soil and air). ■ Overall protection of human health and environment is ensured through periodic monitoring and institutional controls. ■ Removal and offsite disposal of identified ACM and soils within Bin A parcels would eliminate inhalation exposure risks from asbestos fibers to human receptors. ■ Offsite transportation and disposal of ACM would pose short-term risks to the community and the environment. These risks would be mitigated through source control, such as dust suppression (water- or chemical-based) and proper ACM packaging and transportation procedures, during implementation. ■ If disturbed, unidentified surface or subsurface ACM outside the site boundary could potentially allow continued release and migration of asbestos fibers to unimpacted media (primarily soil and air) and remediated areas ■ Institutional controls would limit activities that could cause disturbances. ■ Large portions of the site would be remediated to allow residential use with limited institutional controls. ■ Monitoring would be performed to ensure protectiveness of the remedy. ■ PRAOs are addressed through removal and offsite disposal with institutional controls.

Table G-65. Evaluation Summary for Compliance with ARARs – Alternative 6b

Evaluation Factors for Compliance with ARARs	Evaluation Summary
Compliance with Chemical-Specific ARARs	■ Complete removal and offsite disposal of all identified ACM and Bin A soils would physically address contaminant sources and discharges to air, thus meeting chemical-specific ARARs.
Compliance with Location-Specific ARARs	■ Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	■ Action-specific ARARs for the remedy would be addressed during implementation of the remedial action.

Table G-66. Evaluation Summary for Long-Term Effectiveness and Permanence – Alternative 6b

Evaluation Factors for Long-Term Effectiveness and Permanence	Evaluation Summary
Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities	■ Long-term effectiveness and permanence for parcels containing ACM and Bin A soils is addressed through removal and offsite disposal of identified ACM sources and remaining soils within Bin A parcels and backfilling with clean soil. ■ All identified contaminated media on receivership controlled parcels and privately owned parcels will be removed along with remaining soils within Bin A parcels and disposed offsite. The total area been removed under this alternative is approximately 100 acres. ■ Institutional controls would limit activities that could cause disturbances. ■ Long-term protection would be ensured by periodic monitoring for residual ACM that might exist onsite. ■ The entire site would be remediated to allow residential use with limited institutional controls.
Adequacy and reliability of controls that are used to manage treatment residuals and untreated waste remaining at the site.	■ Identified surface and subsurface ACM on receivership controlled parcels and privately owned parcels along with remaining soils within Bin A parcels would be contained at an authorized offsite permitted facility for asbestos to eliminate continued release and migration of asbestos fibers to unimpacted media (soil and air). ■ Long-term protection would be ensured by periodic monitoring of residual ACM that might exist onsite and by institutional controls. ■ Long-term effectiveness of institutional controls is not ensured, especially on privately-owned parcels. ■ Monitoring would be performed to ensure long-term effectiveness and permanence of the remedy. ■ Minimal O&M activities are periodically required to repair any damages to signage to maintain protectiveness of the remedy and institutional control.

Table G-67. Evaluation Summary for Reduction of Toxicity, Mobility, or Volume through Treatment – Alternative 6b

Evaluation Factors for Reduction of Toxicity, Mobility, or Volume through Treatment	Evaluation Summary
The treatment processes, the alternative uses, and materials they will treat	■ This alternative does not treat the ACM or soils impacted by asbestos fibers; thus there is no reduction of toxicity, mobility, or volume of contamination through treatment. ■ The statutory preference for treatment as a principal element of the remedial action is not met.
The amount of hazardous substances, pollutants, or contaminants that will be destroyed or treated, including how the principal threat(s) will be addressed	
The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment	
The degree to which the treatment is irreversible	
The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents	
Whether the alternative would satisfy the statutory preference for treatment as a principal element of the remedial action	

Table G-68. Short-Term Effectiveness Evaluation Summary – Alternative 6b

Evaluation Factors for Short-Term Effectiveness	Evaluation Summary
Short-term risks that might be posed to the community during implementation of an alternative	■ The alternative involves surface and subsurface disturbance of the ACM areas on receivership controlled parcels and privately owned parcels during removal and offsite disposal of ACM at permitted offsite facility, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and PPE, would be used to address those risks. ■ Offsite transportation and disposal of ACM at permitted offsite facility would pose short-term risks to the community and the environment. These risks would be mitigated through source control, such as dust suppression (water- or chemical-based) and proper ACM packaging and transportation procedures, during implementation. ■ Work area restrictions (such as exclusion zones) would be implemented during construction to reduce short-term exposure risks to the community. ■ Short-term risks posed to the community during implementation of the alternative mainly relate to trespassers within the site boundaries. ■ Residents of private parcels are not protected; they can be exposed to ACM during implementation of the remedial action. ■ Engineered controls would restrict access and hence quickly protect the community for receivership-controlled parcels; however they do not address short-term exposure to ACM on privately-owned parcels. ■ Temporary relocation of residents from privately owned parcels may be required during construction. ■ Access restriction to ACM source areas would protect the community and exposure would be minimal.
Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures	■ The alternative involves surface and subsurface disturbance of the ACM areas on receivership controlled parcels and privately owned parcels, which could pose short-term risks to workers from inhalation of asbestos fibers. Protective measures, such as dust suppression (water- or chemical-based) and personal protective equipment (PPE) would be used to address those risks. ■ Removal and offsite disposal of surface and subsurface ACM could pose short-term risks to workers. ■ Risks to workers are primarily from exposure to ACM and asbestos fibers that are released from it. ■ Safety measures such as dust suppression, use of PPE, and establishment of work zones would protect workers and the community during implementation. ■ Other potential impacts can be from safety hazards during remedial implementation, such as falls, electrical hazards, and mechanical hazards.
Potential adverse environmental impacts resulting from construction and implementation of an alternative and the reliability of the available mitigation measures during implementation in preventing or reducing the potential impacts	■ There would be additional impacts to the community under this alternative (as compared to Alternative 6a, Alternative 6b has large volumes of ACM waste), as additional truck traffic would be required for offsite disposal of ACM as well as transport of backfill soils and activities involving excavation, and hauling. ■ Water- or chemical- based suppression would be used for controlling and dust during construction.
Time until protection is achieved	■ The proposed remedial action and institutional controls can be implemented in approximately 5 years

Table G-69. Implementability Evaluation Summary – Alternative 6b

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility	Technical difficulties and unknowns associated with the construction and operation of a technology	■ Removal and disposal of all identified ACM on receivership controlled parcels and privately owned parcels and remaining soils within Bin A parcels at an offsite permitted facility authorized for asbestos could be easily implemented; however, source control measures, such as dust suppression (water- or chemical-based) and PPE, would be required to protect receptors and the environment from release of asbestos fibers and meet ARARs. ■ Removed ACM and associated soils from receivership controlled parcels and privately owned parcels along with and remaining soils within Bin A parcels require transportation to offsite permitted facilities in specialized enclosed trucks to minimize the exposure risks from asbestos fibers to the community. ■ Large volume of ACM waste needs to be transported offsite for disposal. ■ Special management procedures may be required for disposal at the permitted facilities. ■ Total volume to be excavated and transported offsite for disposal is approximately 400,000 cubic yards. ■ Approximately 14,300 truck loads would be required to haul the whole excavated volume of ACM. ■ Excavation and backfilling around homes or structures, subsurface utilities, and roads may be challenging at specific locations. ■ Logistics for working with large number of heavy equipment onsite and offsite transportation is difficult to manage. ■ Implementation of monitoring can be accomplished using available materials, equipment, and labor resources. ■ Institutional controls may be more difficult to implement and reliably operate, especially for privately-owned parcels, due to various degrees of contamination, types of ownership and levels of occupancy. ■ Monitoring (inspections and sampling) can be implemented with relative ease and available resources.
	Reliability of the technology, focusing on technical problems that will lead to schedule delays	■ Removal and disposal of all identified ACM at an offsite permitted facility authorized for asbestos could be easily implemented ■ Suitable uncontaminated materials for backfilling of removal areas are not available onsite. Backfill materials would be required from offsite sources. ■ A large volume of suitable backfilling material would be required, thus multiple offsite source would be required, which might delay the schedule. ■ Implementation of institutional controls and monitoring can be accomplished using available materials, equipment, and labor resources. ■ Monitoring and implementation of institutional controls may be more difficult, especially for privately-owned parcels due to various degrees of contamination, types of ownership and levels of occupancy ■ Access permission at private parcels for implementing the remedial action is not available, but can be obtained. This can cause some delays in the schedule.
	Ease of undertaking additional remedial actions, including what, if any, future remedial actions would be needed and the difficulty to implement additional remedial actions	■ Future removals and offsite disposal of ACM can be implemented.

Table G-69. Implementability Evaluation Summary – Alternative 6b (continued)

Evaluation Factors for Implementability		Evaluation Summary
Technical Feasibility - continued	Ability to monitor the effectiveness of the remedy, including an evaluation of risks of exposure should monitoring be insufficient to detect a system failure	■ A comprehensive inspection, monitoring, and maintenance program would be implemented to maintain the integrity of remedial action. ■ Implementation of monitoring is easily implemented. ■ Monitoring and maintenance of institutional controls can be easily implemented using available materials, equipment, and labor resources. ■ Frequent/periodic monitoring and sampling would be conducted to ensure overall protection of human health and environment.
Administrative Feasibility	Activities needed to coordinate with other offices and agencies	■ Regulatory approval needed to remove and transport ACM and associated soils should be obtainable. ■ Regulatory approvals for monitoring should be obtainable. ■ Regulatory approvals for institutional controls should be obtainable; however, some difficulties may be encountered with regard to types of restrictions, especially on privately owned parcels.
	The ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions)	■ Regulatory and facility approval for offsite disposal at permitted disposal facilities should be obtainable. ■ Special management procedures may be required for disposal at the permitted facilities. ■ Development of offsite borrow sources for backfill would require coordination and approval from the affected agency. ■ Since large volume of suitable backfill material would be required, more than one offsite sources might be used and can cause some delays in getting required permits and approvals.
Availability of Services and Materials	Availability of adequate offsite treatment, storage capacity, and disposal capacity and services	■ Permitted disposal facilities authorized for asbestos are available within the State of Oregon; however most are somewhat distant from the site. ■ Many of the permitted disposal facilities may not have sufficient capacity to accept all of the ACM and Bin A soils; use of multiple permitted disposal facilities will likely be required.
	Availability of necessary equipment and specialists and provisions to ensure any necessary additional resources	■ The property for implementing the remedial action has already been obtained. ■ Access permission at privately owned parcels for implementing the remedial action may not be currently available, but can be obtained. ■ Labor, equipment, and materials for ACM removal and clean soil backfilling are available. ■ Suitable backfill materials would be required from offsite sources. ■ A large volume of suitable backfill materials would be required as compared to Alternative 6a. ■ Total volume of suitable backfill material required is approximately 400,000 cubic yards. ■ Approximately 14,300 truck loads would be required to haul in the suitable backfill material. ■ Materials, equipment, and labor resources used for institutional controls and monitoring are easily obtainable. ■ Technical equipment and specialists are available for implementation of institutional controls and monitoring.
	Availability of services and materials plus the potential for obtaining competitive bids, which is particularly important for innovative technologies	
	Availability of prospective technologies	

Table G-70. Cost Evaluation Summary – Alternative 6b

Evaluation Factors for Cost	Approx. Cost (Dollars)
Total Capital Cost	$98,075,000
Total Annual O&M Cost	None
Total Periodic Cost	$771,000
Total Present Value Cost	$80,743,000

Note: Total costs are for the assumed period of evaluation (Years 0 through 30). Costs are rounded to the nearest $1,000.