

## **APPENDIX E**

### **Cost Summary Details for On-Site Facilities: High-Bay Warehouses and Waste Processing Facilities**

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# Cost Summary Details for On-Site Facilities: High-Bay Warehouses and Waste-Processing Facilities

This appendix contains the cost summary details for the high-bay warehouse and waste processing facilities to be used in MWL Alternative V.a, Complete Excavation with Aboveground Retrievable Storage (ARS). These cost details were developed using the *PACES* (Parametric Construction Cost Estimating System) program.

*PACES* is a PC-based budgeting and cost estimating system that prepares parametric cost estimates for new facility construction, renovation, and life cycle cost, and is better suited than *RACER* (see Appendix F) for these types of estimates. *PACES* uses an integrated system of architectural and engineering parameters, construction criteria and methodologies, and worldwide knowledge bases priced against current cost data. It has been used to estimate costs for over \$20 billion of completed construction for public agencies and private owners since 1982. It has been independently validated on over \$4 billion worth of completed construction over the past 15 years.

The proposed ARS facility for MWL Alternative V.a, shown in Figure E-1, will cover an area of 104.6 acres and will contain seven high bay warehouses and a support facility office. The storage facility will include four unclassified soil and waste storage warehouses, each with an area of 569,999 ft<sup>2</sup>; two classified soil storage warehouses, each with an area of 477,803 ft<sup>2</sup>; one classified waste storage warehouse with an area of 103,459 ft<sup>2</sup>; and a storage facility office with an area of 5,286 ft<sup>2</sup>. Cost details for this storage facility are presented in this appendix.

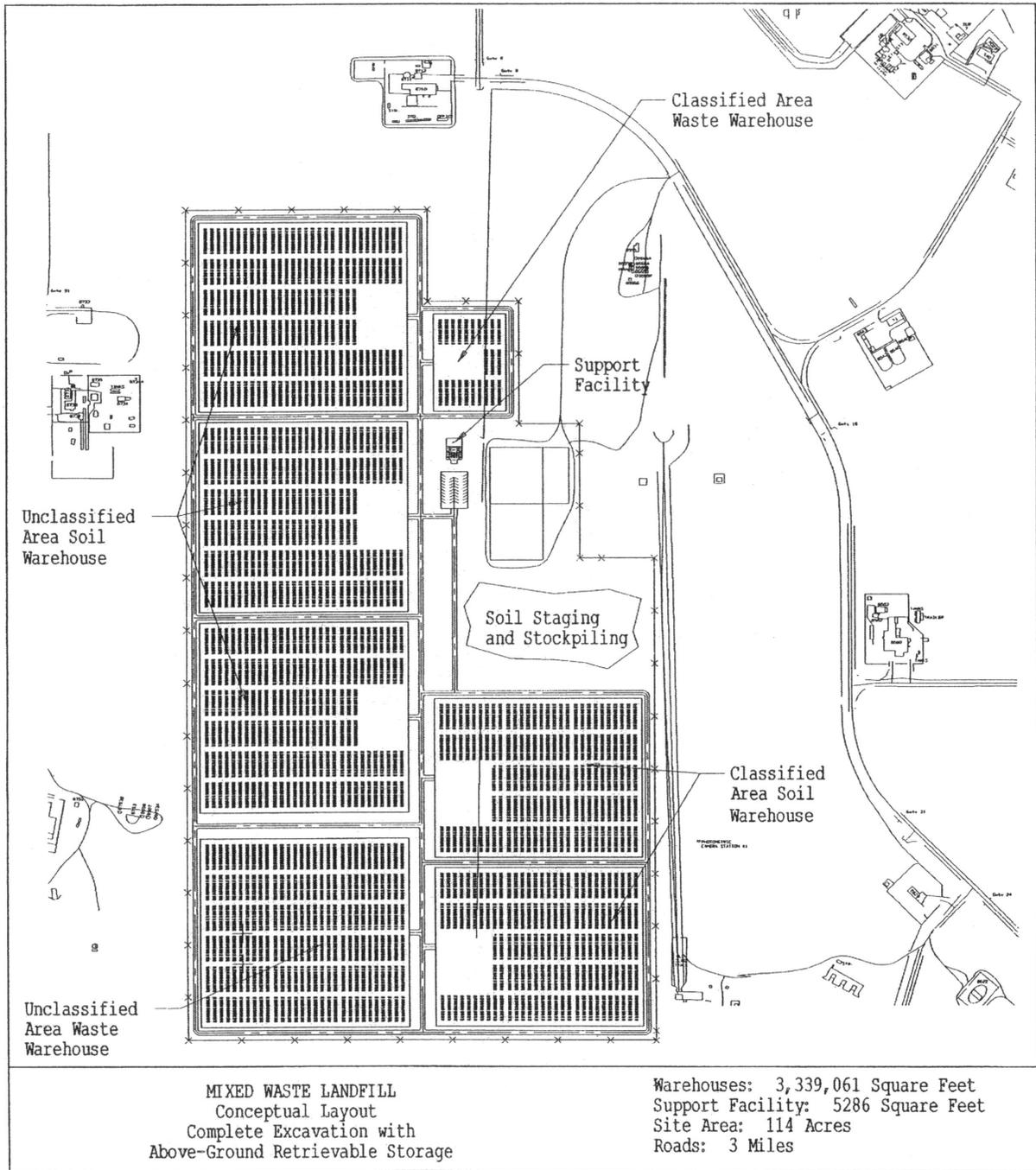
High bay warehouses are required for all excavation scenarios, including those scenarios with planned off-site disposal of waste. High bay warehouses are needed to meet waste characterization, segregation, storage, and security requirements. The number of warehouses required for each excavation scenario was determined based on

- the quantity of soil and waste to be excavated
- whether or not excavated soils are returned to the excavation, and
- the disposal scenario (ARS versus off-site disposal).

Costs for these storage facilities were determined by summing the costs for the individual warehouse components required for each excavation scenario (Table E-1). These costs are included in Table 3-3 of the CMS. Conceptual layouts for each high bay warehouse facility are shown in Figures 3-1 through 3-7 of the text.

Assumptions used to estimate warehouse requirements and costs for each excavation scenario include the following.

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**Figure E-1 Proposed Aboveground Retrievable Storage Facility for Complete Excavation (MWL Alternative V.a)**

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**Table E-1**  
**Cost Breakdowns for High Bay Warehouse Facilities Required for Each Excavation Scenario**

Alternative	Description	Number of Warehouses Required					Total Direct Cost <sup>c</sup> (\$)
		Unclassified Soil Storage Warehouse	Unclassified Waste Storage Warehouse	Classified Soil Storage Warehouse	Classified Waste Storage Warehouse	Storage Facility Office <sup>b</sup>	
		<b>Direct Cost of Each Warehouse<sup>a</sup>:</b>	<b>\$20,778,390</b>	<b>\$21,114,374</b>	<b>\$17,563,199</b>	<b>\$5,080,123</b>	
V.a	Complete Excavation with Aboveground Retrievable Storage - Option A	3	1	2	1	1.00	\$125,561,091
	Complete Excavation with Aboveground Retrievable Storage - Option B	0	2	0	1	0.43	\$48,822,638
V.b	Complete Excavation with Off-Site Disposal - Option A	0	2	0	1	0.43	\$48,822,638
	Complete Excavation with Off-Site Disposal - Option B	0	2	0	1	0.43	\$48,822,638
V.c	Partial Excavation with Aboveground Retrievable Storage - Option A	0	0	2	1	0.43	\$41,720,288
	Partial Excavation with Aboveground Retrievable Storage - Option B	0	0	1	1	0.29	\$24,059,274
V.d	Partial Excavation with Off-Site Disposal - Option A	0	0	1	0	0.14	\$18,881,336
	Partial Excavation with Off-Site Disposal - Option B	0	0	1	0	0.14	\$18,881,336
V.e	Future Excavation	0	0	1	1	0.29	\$24,059,274

<sup>a</sup>Direct cost of each warehouse was estimated using the PACER software package.

<sup>b</sup>Size (and cost) of the storage facility office was adjusted depending on the number of total warehouses required. This column represents the relative size of the storage facility office.

<sup>c</sup>Total direct costs for all high bay warehouse facilities were calculated by multiplying the number of high bay warehouses required by the cost of each warehouse, adding the cost of site preparation work ( \$1,220,322) and the cost of the storage facility office.

- Materials excavated from MWL pits and trenches are segregated into two components: soil and waste.
- Excavated materials are segregated into low-level radioactive waste and mixed waste. Excavated soil is considered low-level radioactive waste. Waste contained in pits and trenches is considered mixed waste.
- Volume estimates for the excavated soil and waste are based on the depths of the excavation: 30 ft for the classified area; 20 ft for the unclassified area; and the surface expression of each pit or trench based on geophysical signature. The side-slope of the excavation is 3:1. The volume ratio of cut soil to bank soil is 1.3 to 1. Volume estimates for excavated materials are summarized in Table E-2. Supporting details regarding waste volume and cost are presented in Appendix F.

**Table E-2**  
**Volume Estimates for Complete Excavation**

Excavated Material	Unclassified Area	Classified Area
Soil	59,700 yd <sup>3</sup>	32,147 yd <sup>3</sup>
Waste	20,861 yd <sup>3</sup>	2,626 yd <sup>3</sup>

- Under Excavation Option A, excavated soils are either stored in the ARS facility or disposed of off-site. Under Excavation Option B, all excavated soils are returned to the excavation as fill.
- Waste containerization and shipping must meet Nevada Test Site and EnviroCare of Utah waste acceptance criteria.
- Soils will be stored in 7 ft by 4 ft by 2 ft ("742") steel containers which will be filled to full capacity (2 yd<sup>3</sup>). Waste from the pits and trenches will be stored in 7 ft by 4 ft by 4 ft ("744") steel containers which will be filled to 70 percent of full capacity (2.9 yd<sup>3</sup>).
- SNL/NM waste management requirements will limit stacking of 742 containers to 3 high and stacking of the 744 containers to 2 high. Fourteen ft of aisle space is required for forklift access in all high bay warehouses and three ft of walking space is required between all containers for inspections.
- Distances used to develop cost estimates for the high bay warehouse facilities include 1500 ft to a central alarm station; 500 ft to a sewer tie; 1000 ft to clean water; and 1500 ft to power.

Cost worksheets for high-bay warehouses proposed for ARS are presented below.