

**Practice: 521A - Pond Sealing or Lining, Flexible Membrane**

**Scenario: #1 - Flexible Membrane Liner less than 15K Square Feet**

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Total quantity of synthetic liner <= 15,000 square feet. Cost includes all labor, materials and equipment to install a 40 mil LLDPE, HDPE, EDPM, etc. membrane liner, 8 oz non-woven geotextile underlayment, excavation and backfill of anchor trench, specialist to weld seams and install "boots". Quantity is inside surface area of the earthen waste storage facility plus an additional 10' around the inside top of berm to accommodate the anchor trench. Associated practices include 378- Pond, 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, etc. Leak detection system shall be paid for under 353 - Monitoring Well and 606 - Subsurface Drain.

**Before Situation:**

In-place soils exhibit seepage rates in excess of acceptable limits. Ref. AWMFH Appendix 10D.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Scenario Feature Measure: Surface area of Liner Material (including anchorage)**

**Scenario Unit: Square Foot**

**Scenario Typical Size: 10,000**

**Scenario Cost: \$22,144.85**

**Scenario Cost/Unit: \$2.21**

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.51	1111	\$2,788.61
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.75	53	\$304.75
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$117.15	30	\$3,514.50
Roller, static, smooth, self propelled	1392	Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor.	Hour	\$22.83	8	\$182.64
<b>Labor</b>						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$101.60	24	\$2,438.40
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$24.48	60	\$1,468.80
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$40.82	15	\$612.30
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$33.69	38	\$1,280.22
<b>Materials</b>						
Manhole, 4' x 12'	2290	Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only.	Each	\$1,994.25	1	\$1,994.25
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$5.90	1111	\$6,554.90
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$262.64	3	\$787.92

**Mobilization**

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$72.52	3	\$217.56
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**Practice: 521A - Pond Sealing or Lining, Flexible Membrane**

**Scenario: #2 - Flexible Membrane Liner greater than 15K Square Feet**

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Total quantity of synthetic liner > 15,000 square feet. Cost includes all labor, materials and equipment to install a 40 mil LLDPE, HDPE, EDPM, etc. membrane liner, 8 oz non-woven geotextile underlayment, excavation and backfill of anchor trench, specialist to weld seams and install "boots". Quantity is inside surface area of the earthen waste storage facility plus an additional 10' around the inside top of berm to accommodate the anchor trench. Associated practices include 378- Pond, 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, etc. Leak detection system shall be paid for under 353 - Monitoring Well and 606 - Subsurface Drain.

**Before Situation:**

In-place soils exhibit seepage rates in excess of acceptable limits. Ref. AWMFH Appendix 10D.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Scenario Feature Measure: Surface area of Liner Material (including anchorage)**

**Scenario Unit: Square Foot**

**Scenario Typical Size: 22,500**

**Scenario Cost: \$37,126.78**

**Scenario Cost/Unit: \$1.65**

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.75	83	\$477.25
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$117.15	40	\$4,686.00
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.51	2500	\$6,275.00
Roller, static, smooth, self propelled	1392	Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor.	Hour	\$22.83	10	\$228.30
<b>Labor</b>						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$40.82	20	\$816.40
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$101.60	32	\$3,251.20
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$24.48	80	\$1,958.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$33.69	50	\$1,684.50
<b>Materials</b>						
Manhole, 4' x 12'	2290	Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only.	Each	\$1,994.25	1	\$1,994.25
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$5.90	2500	\$14,750.00
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$262.64	3	\$787.92

**Mobilization**

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$72.52	3	\$217.56
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