

**Practice:** 527 - Karst Sinkhole Treatment

**Scenario:** #1 - Linear Opening

**Scenario Description:** Installing a sinkhole protection cap on a sinkhole with a linear opening. The area around a sinkhole may be unstable and slippage or subsidence may occur. Sinkholes present fall hazards to people and livestock. Sinkholes are direct conduits to groundwater. Nutrient or chemical laden runoff may flow directly into sinkholes polluting groundwater. Sinkholes are routinely used for debris disposal areas by landowners. Associated practices: Critical Area Planting (342), Fence (382), Vertical Drain (630), Obstruction Removal (500) & Filter Strips (393). Unit is linear foot of opening.

**Before Situation:** Open sinkhole poses threat to people, livestock, & wildlife. Absence of buffer allows nutrients and chemicals to flow into the open sinkhole untreated. Trash & Debris have accumulated in the sinkhole from years of use as a debris disposal areas. Typical Sinkhole treated is 25 feet in length and 10 feet in top width, depth varies.

**After Situation:** Debris removed and properly disposed of off site. The open crevice is filled with porous material so as not to disrupt the hydrology of the karst system while filtering runoff and increasing safety. Typical Sinkhole treated is 25 feet length and 10 feet top width, depth varies.

**Scenario Feature Measure:** Linear foot of opening

**Scenario Unit:** Foot

**Scenario Typical Size:** 25

**Total Scenario Cost:** \$6,167.51

**Scenario Cost/Unit:** \$246.70

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$58.85	4	\$235.38
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yard	\$3.06	50	\$152.77
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$1.97	95	\$187.18
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.20	80	\$175.70
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	\$101.21	8	\$809.71

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$35.19	30	\$1,055.63
Pipe, PVC, Schedule 80, Perforated	1408	Materials: 12" Diameter schedule 80 perforated pvc pipe - ASTM D1785	Foot	\$43.76	20	\$875.15
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$53.03	15	\$795.44
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	\$122.89	10	\$1,228.90

**Labor**

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	\$27.99	12	\$335.82
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	\$22.04	4	\$88.17

**Mobilization**

Mobilization, medium	1139	Equipment with 70-150 HP or typical weights between 14,000 and	Each	\$227.64	1	\$227.64
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equipment		30,000 pounds.				
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**Practice:** 527 - Karst Sinkhole Treatment

**Scenario:** #2 - Circular Opening

**Scenario Description:** Installing a sinkhole protection cap on a circular sinkhole with a vertical opening. The area around a sinkhole may be unstable and slippage or subsidence may occur. Sinkholes present fall hazards to people and livestock. Sinkholes are direct conduits to groundwater. Nutrient or chemical laden runoff may flow directly into sinkholes polluting groundwater. Sinkholes are routinely used for debris disposal areas by landowners. Associated practices: Critical Area Planting (342), Fence (382), Vertical Drain (630), Obstruction Removal (500) & Filter Strips (393). Units are square foot.

**Before Situation:** Open sinkhole poses threat to people, livestock, & wildlife. Absence of buffer allows nutrients and chemicals to flow into the open sinkhole untreated. Trash & Debris have accumulated in the sinkhole from years of use as a disposal area. Typical Sinkhole treated is 30 feet in diameter and 8 feet in depth.

**After Situation:** Debris removed and properly disposed of off site. The sinkhole is filled with porous material so as not to disrupt the hydrology of the karst system while filtering runoff and increasing safety.

**Scenario Feature Measure:** Square foot of opening

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 706

**Total Scenario Cost:** \$6,128.83

**Scenario Cost/Unit:** \$8.68

**Cost Details**

Component Name	Id	Description	Unit	Cost	Qty	Total
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**Equipment Installation**

Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$58.85	4	\$235.38
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yard	\$3.06	70	\$213.88
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$1.97	130	\$256.15
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.20	140	\$307.47
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	\$101.21	10	\$1,012.14

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$35.19	36	\$1,266.76
Pipe, PVC, Schedule 80, Perforated	1408	Materials: 12" Diameter schedule 80 perforated pvc pipe - ASTM D1785	Foot	\$43.76	10	\$437.58
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$53.03	18	\$954.53
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	\$122.89	6	\$737.34

**Labor**

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	\$27.99	14	\$391.79
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	\$22.04	4	\$88.17

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$227.64	1	\$227.64
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