

Practice: 410 - Grade Stabilization Structure

Scenario # 1 Embankment, 4"-6" Pipe

Missouri

Scenario Description:

An earthen embankment dam with a principal spillway pipe (PVC or Steel) of 6 inches or less with antiseep collars. To stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 5,000 cubic yards (including core trench backfill), and 100 feet of pipe 6" PVC pipe with a canopy inlet. A small, non-lined plunge pool protects the outlet channel. Disturbed areas and earthfill surfaces are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as: Fence (382), Grassed Waterway (412), will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Cubic Yards of Earthfill

Scenario Typical Size:	5000	Cubic Yard	Tot Unit Cost	\$3.68
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Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Steel, Plate, 1/8"	50	Square Foot	\$4.22	\$211.00
Materials	Pipe, PVC, 6", SCH 40	100	Foot	\$5.31	\$531.00
Equip./Install.	Dozer, 200 HP	78	Hour	\$160.69	\$12,533.82
Equip./Install.	Dozer, 140 HP	8	Hour	\$105.67	\$845.36
Equip./Install.	Earthfill, Manually Compacted	20	Cubic yard	\$4.83	\$96.60
Equip./Install.	Scraper, pull, 7 CY	78	Hour	\$15.39	\$1,200.42
Labor	Equipment Operators, Heavy	86	Hour	\$27.22	\$2,340.92
Labor	General Labor	10	Hour	\$21.56	\$215.60
Mobilization	Mobilization, medium equipment	2	Each	\$200.43	\$400.86

Total Cost: \$18,375.58

Payment types:

PayType	Unit Payment	PayType	Unit Payment
EQUIP	\$2.76	EQUIP-HU	\$3.31
EQUIP-NOI	\$2.76	EQUIP-HUNOI	\$3.31
EQUIP-MRBI	\$2.76	EQUIP-HUMRBI	\$3.31
EQUIP-CCPI	\$2.76	EQUIP-HUCCPI	\$3.31

Practice: 410 - Grade Stabilization Structure

Scenario # 2 Embankment, 8"-12" Pipe

Missouri

Scenario Description:

An earthen embankment dam with a principal spillway pipe (PVC or Steel) of 8" to 12" with antiseep collars. To stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 8000 cubic yards(including core trench backfill), and 100 feet of pipe 10" PVC pipe with a canopy inlet. A small, non-lined plunge pool protects the outlet channel. Disturbed areas and earthfill surfaces are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as: Fence (382), Grassed Waterway (412) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Cubic Yards of Earthfill

Scenario Typical Size:

8000	Cubic Yard	Tot Unit Cost	\$3.85
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Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, PVC, 10", SCH 80	100	Foot	\$16.37	\$1,637.00
Materials	Steel, Plate, ½"	72	Square Foot	\$4.22	\$303.84
Equip./Install.	Earthfill, Manually Compacted	29	Cubic yard	\$4.83	\$140.07
Equip./Install.	Dozer, 200 HP	124	Hour	\$160.69	\$19,925.56
Equip./Install.	Hydraulic Excavator, 1 CY	8	Hour	\$96.78	\$774.24
Equip./Install.	Dozer, 140 HP	12	Hour	\$105.67	\$1,268.04
Equip./Install.	Scraper, pull, 7 CY	124	Hour	\$15.39	\$1,908.36
Labor	General Labor	16	Hour	\$21.56	\$344.96
Labor	Equipment Operators, Heavy	144	Hour	\$27.22	\$3,919.68
Mobilization	Mobilization, medium equipment	3	Each	\$200.43	\$601.29

Total Cost: \$30,823.04

Payment types:

PayType	Unit Payment	PayType	Unit Payment
EQIP	\$2.89	EQIP-HU	\$3.47
EQIP-NOI	\$2.89	EQIP-HUNOI	\$3.47
EQIP-MRBI	\$2.89	EQIP-HUMRBI	\$3.47
EQIP-CCPI	\$2.89	EQIP-HUCCPI	\$3.47

Practice: 410 - Grade Stabilization Structure

Scenario # 3 Embankment, >12"

Missouri

Scenario Description:

An earthen embankment dam with a principle spillway pipe greater than 12 inches with anti-seep collars or sand diaphragm. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 11,000 cubic yards (including core trench backfill), 120 feet of 18" Steel pipe with a canopy inlet, and 16 cubic yard sand diaphragm with outlet. Disturbed areas and earthfill surfaces are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as: Fence (382), Grassed Waterway (412) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Cubic Yards of Earthfill

Scenario Typical Size:	11000	Cubic Yard	Tot Unit Cost	\$4.13
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Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 18", Std Wt, USED	120	Foot	\$40.47	\$4,856.40
Materials	Aggregate, Sand, Graded, Washed	16	Cubic yard	\$23.82	\$381.12
Equip./Install.	Dozer, 200 HP	170	Hour	\$160.69	\$27,317.30
Equip./Install.	Dozer, 140 HP	24	Hour	\$105.67	\$2,536.08
Equip./Install.	Hydraulic Excavator, 1 CY	8	Hour	\$96.78	\$774.24
Equip./Install.	Earthfill, Manually Compacted	29	Cubic yard	\$4.83	\$140.07
Equip./Install.	Scraper, pull, 7 CY	170	Hour	\$15.39	\$2,616.30
Labor	Equipment Operators, Heavy	202	Hour	\$27.22	\$5,498.44
Labor	General Labor	30	Hour	\$21.56	\$646.80
Mobilization	Mobilization, very small equipment	1	Each	\$55.50	\$55.50
Mobilization	Mobilization, medium equipment	3	Each	\$200.43	\$601.29

Total Cost: \$45,423.54

Payment types:

PayType	Unit Payment	PayType	Unit Payment
EQIP	\$3.10	EQIP-HU	\$3.72
EQIP-NOI	\$3.10	EQIP-HUNOI	\$3.72
EQIP-MRBI	\$3.10	EQIP-HUMRBI	\$3.72
EQIP-CCPI	\$3.10	EQIP-HUCCPI	\$3.72

Practice: 410 - Grade Stabilization Structure

Scenario # 4 Pipe Drop, Smooth Steel or CMP

Missouri

Scenario Description:

A full flow pipe drop (ie: riser and barrel) grade stabilization structure designed and constructed with a sand diaphragm. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a smooth steel or corrugated metal pipe drop structure with a 36", 12' tall riser and a 100' long 24" barrel (Riser Weir length x Barrel Length = 3ft x 3.14 x 100ft = 942). Disturbed areas and earthfill surfaces are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Riser Weir Length x Barrel Length

Scenario Typical Size:	942	Square Foot	Tot Unit Cost	\$13.20
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Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 36", Std Wt, USED	12	Foot	\$107.25	\$1,287.00
Materials	Pipe, Steel, 24", Std Wt, USED	100	Foot	\$55.10	\$5,510.00
Materials	Steel, Plate, 3/16"	16	Square Foot	\$6.32	\$101.12
Materials	Lumber, planks, posts and timbers, treated	288	Board Foot	\$1.15	\$331.20
Materials	Aggregate, Sand, Graded, Washed	36	Cubic yard	\$23.82	\$857.52
Materials	Steel, Angle, 3" x 3" x 1/4"	10	Foot	\$3.26	\$32.60
Materials	Steel, Plate, 3/8"	3	Square Foot	\$13.76	\$41.28
Equip./Install.	Earthfill, Roller Compacted	600	Cubic yard	\$3.62	\$2,172.00
Equip./Install.	Earthfill, Manually Compacted	100	Cubic yard	\$4.83	\$483.00
Equip./Install.	Hydraulic Excavator, 1 CY	4	Hour	\$96.78	\$387.12
Equip./Install.	Concrete, CIP, slab on grade, reinforced	1.4	Cubic yard	\$253.20	\$354.48
Labor	General Labor	10	Hour	\$21.56	\$215.60
Labor	Equipment Operators, Heavy	4	Hour	\$27.22	\$108.88
Labor	Skilled Labor	11	Hour	\$31.91	\$351.01
Mobilization	Mobilization, medium equipment	1	Each	\$200.43	\$200.43

Payment types:

Total Cost: \$12,433.24

<u>PayType</u>	<u>Unit Payment</u>	<u>PayType</u>	<u>Unit Payment</u>
EQIP	\$9.90	EQIP-HU	\$11.88
EQIP-NOI	\$9.90	EQIP-HUNOI	\$11.88
EQIP-MRBI	\$9.90	EQIP-HUMRBI	\$11.88
EQIP-CCPI	\$9.90	EQIP-HUCCPI	\$11.88

Practice: 410 - Grade Stabilization Structure

Scenario # 5 Rock Rip Rap Chute

Missouri

Scenario Description:

A full flow chute structure with rip rap, geotextile fabric, and earthfill/earthmoving. To stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon typical chute designed to handle 90 cfs (20' BW, 5:1 Chute Slope, 5' Drop, 18" rock thickness). Amount of rock required is 86 CY (129 tons). Disturbed areas and earthfill surfaces are protected with permanent vegetative cover. Cost data is applicable to organic and convention agricultural production systems.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Cubic Yards of rip rap installed

Scenario Typical Size:

86	Cubic Yard	Tot Unit Cost	\$62.96
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Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Rock Riprap, graded, angular, material and	129	Ton	\$26.80	\$3,457.20
Equip./Install.	Geotextile, woven	197	Square Yard	\$2.18	\$429.46
Equip./Install.	Hydraulic Excavator, 1 CY	6	Hour	\$96.78	\$580.68
Equip./Install.	Earthfill, Roller Compacted	100	Cubic yard	\$3.62	\$362.00
Labor	Equipment Operators, Heavy	6	Hour	\$27.22	\$163.32
Labor	General Labor	8	Hour	\$21.56	\$172.48
Mobilization	Mobilization, medium equipment	1	Each	\$200.43	\$200.43
Mobilization	Mobilization, General labor	1	Hour	\$21.81	\$21.81
Mobilization	Mobilization, Heavy Equipment Operator	1	Hour	\$26.97	\$26.97

Total Cost: \$5,414.35

Payment types:

PayType	Unit Payment	PayType	Unit Payment
EQIP	\$47.22	EQIP-HU	\$56.66
EQIP-NOI	\$47.22	EQIP-HUNOI	\$56.66
EQIP-MRBI	\$47.22	EQIP-HUMRBI	\$56.66
EQIP-CCPI	\$47.22	EQIP-HUCCPI	\$56.66

Practice: 410 - Grade Stabilization Structure

Scenario # 6 Concrete Drop Structure

Missouri

Scenario Description:

A Straight or Box Drop structure composed of reinforced concrete used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a concrete box drop structure with a drop of 4ft and weir length of 16ft. The unit of payment measurement is cubic yards of concrete placed. Disturbed areas and earthfill surfaces are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Cubic Yard of Concrete

Scenario Typical Size:	12	Cubic Yard	Tot Unit Cost	\$773.67
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Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Rock Riprap, graded, angular, material and	50	Ton	\$26.80	\$1,340.00
Materials	Aggregate, Gravel, Graded	3	Cubic yard	\$24.76	\$74.28
Equip./Install.	Concrete, CIP, formed reinforced	12	Cubic yard	\$402.08	\$4,824.96
Equip./Install.	Geotextile, woven	20	Square Yard	\$2.18	\$43.60
Equip./Install.	Hydraulic Excavator, 2 CY	8	Hour	\$161.94	\$1,295.52
Equip./Install.	Earthfill, Roller Compacted	300	Cubic yard	\$3.62	\$1,086.00
Labor	Equipment Operators, Heavy	8	Hour	\$27.22	\$217.76
Mobilization	Mobilization, large equipment	1	Each	\$374.89	\$374.89
Mobilization	Mobilization, Heavy Equipment Operator	1	Hour	\$26.97	\$26.97

Total Cost: \$9,283.98

Payment types:

PayType	Unit Payment	PayType	Unit Payment
EQIP	\$580.25	EQIP-HU	\$696.30
EQIP-NOI	\$580.25	EQIP-HUNOI	\$696.30
EQIP-MRBI	\$580.25	EQIP-HUMRBI	\$696.30
EQIP-CCPI	\$580.25	EQIP-HUCCPI	\$696.30

Practice: 410 - Grade Stabilization Structure

Scenario # 7 Concrete Block Chute

Missouri

Scenario Description:

A full flow chute structure with concrete blocks, geotextile fabric, and earthfill/earthmoving. To stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon typical chute designed to handle 65 cfs (10' BW, 5' Drop). 518 Concrete blocks required. Disturbed areas and earthfill surfaces are protected with permanent vegetative cover.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Square feet of concrete block lined area

Scenario Typical Size:	460	Square Foot	Tot Unit Cost	\$9.18
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Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Block, concrete	518	Each	\$1.64	\$849.52
Materials	Aggregate, Sand, Graded, Washed	9	Cubic yard	\$23.82	\$214.38
Equip./Install.	Geotextile, woven	52	Square Yard	\$2.18	\$113.36
Equip./Install.	Hydraulic Excavator, 1 CY	6	Hour	\$96.78	\$580.68
Equip./Install.	Earthfill, Roller Compacted	300	Cubic yard	\$3.62	\$1,086.00
Labor	Equipment Operators, Heavy	6	Hour	\$27.22	\$163.32
Labor	General Labor	45	Hour	\$21.56	\$970.20
Mobilization	Mobilization, medium equipment	1	Each	\$200.43	\$200.43
Mobilization	Mobilization, General labor	2	Hour	\$21.81	\$43.62

Total Cost: \$4,221.51

Payment types:

PayType	Unit Payment	PayType	Unit Payment
EQIP	\$6.88	EQIP-HU	\$8.26
EQIP-NOI	\$6.88	EQIP-HUNOI	\$8.26
EQIP-MRBI	\$6.88	EQIP-HUMRBI	\$8.26
EQIP-CCPI	\$6.88	EQIP-HUCCPI	\$8.26

Practice: 410 - Grade Stabilization Structure

Scenario # 8 Side Inlet

Missouri

Scenario Description:

A side inlet drain structure. To stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Typical length of pipe is 30 feet. Disturbed areas and earthfill surfaces are protected with permanent vegetative cover.

Before Practice Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Practice Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Grassed Waterway (412) will use the corresponding Standard(s) as appropriate.

Scenario Feature Measure:

Length of Pipe installed

Scenario Typical Size:	30	Foot	Tot Unit Cost	\$66.56
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Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 18", Std Wt, USED	30	Foot	\$40.47	\$1,214.10
Equip./Install.	Hydraulic Excavator, 1 CY	4	Hour	\$96.78	\$387.12
Labor	Equipment Operators, Heavy	4	Hour	\$27.22	\$108.88
Labor	General Labor	4	Hour	\$21.56	\$86.24
Mobilization	Mobilization, medium equipment	1	Each	\$200.43	\$200.43

Total Cost: \$1,996.77

Payment types:

PayType	Unit Payment	PayType	Unit Payment
EQIP	\$49.92	EQIP-HU	\$59.90
EQIP-NOI	\$49.92	EQIP-HUNOI	\$59.90
EQIP-MRBI	\$49.92	EQIP-HUMRBI	\$59.90
EQIP-CCPI	\$49.92	EQIP-HUCCPI	\$59.90