

Practice: 634 - Waste Transfer

Scenario: #2 - Wastewater catch basin, less than 1000 gal.

Scenario Description:

Installation for a wastewater collection system that includes materials and structures to collect liquids of a design volume less than 1000 gallons such as silage leachate, lot runoff and other contaminated liquid effluent. This may include curbs, screens, precast manholes, sumps or catch basins. The wastewater will be transferred from the collection basin to a waste storage facility.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Solid/Liquid Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling.

This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

Before Situation:

Inadequate waste management system able to collect wastewater from an operation that may contaminate surface or groundwater resources.

After Situation:

This practice scenario is suitable where the estimated design volume for wastewater transfer is less than 1000 gallons of contaminated liquid that may flow from silage bunkers or animal production facilities. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and/or gutters to collect liquids. With the installation of a precast manhole with lid or catch basin with grate. The cost includes excavation, placement of bedding as needed, placement of structure and backfill with construction of concrete inlet collection area. Transfer pump if needed must be contracted under pumping plant, 533.

Scenario Feature Measure: Collection volume installed

Scenario Unit: Gallon

Scenario Typical Size: 1,000

Scenario Cost: \$5,610.60

Scenario Cost/Unit: \$5.61

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$405.75	2	\$811.50
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$188.63	4	\$754.52
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$56.68	8	\$453.44
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$68.02	4	\$272.08
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$55.27	4	\$221.08
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$16.09	2	\$32.18
Labor						
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	\$22.43	8	\$179.44
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.06	4	\$88.24

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	\$27.84	12	\$334.08
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Materials

Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$17.04	5	\$85.20
Catch Basin, concrete, 60" dia.	1754	Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only.	Each	\$1,942.38	1	\$1,942.38

Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$175.51	1	\$175.51
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$260.95	1	\$260.95

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Scenario: #4 - Concrete Channel, no footers

Scenario Description:

Installation of a concrete channel that consists of a slab with curb for the entire length of the channel to enable the facility manager to direct liquid waste to a collection basin and/or waste storage facility.

Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Solid/Liquid Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling.

Before Situation:

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

After Situation:

Typical installation of a 12 foot wide 100' long concrete channel that consists of a 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick for the entire length. The purpose is to transfer liquids or manure slurry from one area to a collection basin or waste storage facility.

Scenario Feature Measure: Bottom surface area of concrete channel

Scenario Unit: Square Foot

Scenario Typical Size: 1,200

Scenario Cost: \$8,706.59

Scenario Cost/Unit: \$7.26

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$405.75	9	\$3,651.75
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$68.02	8	\$544.16
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$188.63	19	\$3,583.97
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	\$27.84	8	\$222.72
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$17.04	26	\$443.04
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$260.95	1	\$260.95

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Scenario: #6 - Manure Flush System

Scenario Description:

Installation of a manure flush system that includes materials and structures to flush waste from a concrete surface into a collection basin or a waste storage facility. The system includes flush water tank, piping and valves. The animal waste will be transferred by a flush cycle released from the flush tank to rinse the concrete surface and carry the waste to a collection basin, into a pipe or to a waste storage facility.

Associated practices may include: 313 Waste Storage Facility for storage structures; PS 632, Solid/Liquid Waste Separation Facility; 590 Nutrient Management for waste application; PS 633, Waste Recycling.

This scenario addresses the potential for surface water and groundwater quality degradation from animal waste.

Before Situation:

An animal production facility does not have an efficient method for collecting and transferring the animal waste produced. A source of sufficient water or wastewater resources are available to design a flush system to clean the production floor and collect the waste materials deposited.

After Situation:

This practice scenario is suitable only where the water or wastewater supplies are available for operating a flush system to collect the animal waste deposited on the concrete surfaces. The design flush volume for the flush system is less than 1000 gallons and requires no more than 50 feet of a 6 inch diameter pressure pipe for the flush pipe. The scenario includes materials and installation of a flush tank, piping and valves to manage the flush flow, concrete flush lane, concrete curbs or gutters to transfer the flow to a collection basin. The liquids then flow from the basin to the waste storage pond, an estimated length of 200 feet and requires an 8 inch diameter low pressure pipeline with an open outlet to the waste storage pond. The cost includes excavation, placement of bedding aggregate as needed, forming and placement of structures, conveyance pipeline with valves and structural backfill. Pump must be contracted under pumping plant, PS 533.

Scenario Feature Measure: 1000 Gallons of flush water

Scenario Unit: Gallon

Scenario Typical Size: 1,000

Scenario Cost: \$4,413.08

Scenario Cost/Unit: \$4.41

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$56.68	8	\$453.44
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$16.09	4	\$64.36
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$405.75	3	\$1,217.25
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$188.63	4	\$754.52
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.06	8	\$176.48
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	\$22.43	16	\$358.88
Materials						
Tank, Poly enclosed Storage, 300-1000 gal	1074	Water storage tanks. Includes materials and shipping only.	Gallon	\$0.87	1000	\$870.00

Materials

Pipe, PVC, 6", SCH 40	980	Materials: - 6" - PVC - SCH 40 - ASTM D1785	Foot	\$6.43	40	\$257.20
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$260.95	1	\$260.95
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Scenario: #7 - Wastewater Recycle System for Flush System, Pipes only

Scenario Description:

Installation of the pipe and appurtenances for a manure and wastewater flush system that provides the structures to utilize recycled wastewater to flush waste from a concrete surface into a catch basin or a waste storage facility.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Solid/Liquid Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling.

This scenario addresses the potential for surface water and groundwater quality degradation from animal waste.

Before Situation:

An animal production facility does not have an efficient method for collecting and transferring the animal waste produced. Wastewater however is available in a sufficient quantity to provide a flush cycle to clean the production floor and collect the waste materials deposited.

After Situation:

This practice scenario is suitable where wastewater can be recycled for a flush system. Supplemental piping is needed to install the recycled flush water as a means to collect the animal waste deposited on the concrete production surfaces. The pipe design for the flush volume requires 300 feet of 3 inch diameter pipe for pressure flow. The cost includes excavation, placement of bedding as needed, conveyance pipelines with valves and pipe backfill to transport water to the flush tank. Pumps must be contracted under pumping plant, PS 533.

Scenario Feature Measure: Flush - pipes

Scenario Unit: Feet

Scenario Typical Size: 300

Scenario Cost: \$2,728.73

Scenario Cost/Unit: \$9.10

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$56.68	12	\$680.16
Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.22	300	\$366.00
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.06	12	\$264.72
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	\$22.43	8	\$179.44
Materials						
Pipe, PVC, 3", SCH 40	977	Materials: - 3" - PVC - SCH 40 - ASTM D1785	Foot	\$2.73	300	\$819.00
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$24.39	10	\$243.90
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$175.51	1	\$175.51

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Scenario: #8 - 8 inch PVC pipeline, gravity or low pressure flow

Scenario Description:

Gravity or low pressure flow pipeline used to transfer manure or wastewater according to the CNMP. This practice includes the pipe plus clean-out risers and fittings, trench excavation and backfill, labor and equipment for installation. Typical installation applies to soils with no special bedding requirements.

This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Solid/Liquid Waste Separation Facility; 590 Nutrient Management for waste application; 633, Waste Recycling; 635, Vegetated Treatment Area.

Before Situation:

There is a need to transport manure or wastewater within a waste management system.

After Situation:

Install a 100 foot long 8 inch diameter PVC gasketed IPS pipe to transfer the manure wastewater. This scenario includes the pipe, inlet conditions, trench excavation, and backfill. The site should be evaluated by the designing engineer to make sure the design will function.

The transfer pipeline will deliver the manure slurry according to the CNMP, thereby protecting water quality resources.

Scenario Feature Measure: Length of pipe installed

Scenario Unit: Feet

Scenario Typical Size: 100

Scenario Cost: \$1,492.77

Scenario Cost/Unit: \$14.93

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
	1143				1	
Equipment/Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.08	8	\$40.64
Trenching, Earth, loam, 24" x 48"	54	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$2.77	100	\$277.00
Labor						
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	\$22.43	16	\$358.88
Materials						
Pipe, PVC, 8", SDR 35	994	Materials: - 8" - PVC - SDR 35 - ASTM D3034	Foot	\$6.53	125	\$816.25

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Scenario: #10 - PVC Pressure Distribution Pipeline.

Scenario Description:

Pressure flow pipeline used to transfer manure wastewater by pumping from the waste storage pond to the field where it is to be applied according to the CNMP.

The pressure pipe moves the water by pumping from the intake riser location, through a buried mainline with outlet risers. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water.

Associated practices may include: 313 Waste Storage Facility for storage structures; 533, Pumping Plant; 632, Solid/Liquid Waste Separation Facility; 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

Before Situation:

There is a need to transport manure or wastewater within a waste management system. The pressure distribution pipeline is utilized in the land application aspect of the operation.

After Situation:

Install a 2000 foot long 8 inch diameter PVC gasketed IPS pipe that has an SDR of 21 and is water tight under pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pressure and flow for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.

The transfer pipeline will deliver the manure slurry to the fields for agronomic nutrient utilization according to the CNMP, thereby protecting water quality resources.

Scenario Feature Measure: Length of pipe installed

Scenario Unit: Feet

Scenario Typical Size: 2,000

Scenario Cost: \$31,211.40

Scenario Cost/Unit: \$15.61

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
	1143				1	
Equipment/Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.08	180	\$914.40
Trenching, Earth, loam, 24" x 48"	54	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$2.77	2000	\$5,540.00
Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$128.42	4	\$513.68
Labor						
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	\$22.43	80	\$1,794.40
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	\$37.40	20	\$748.00
Materials						

Materials

Plug Valve, 8"	2101	8" diameter plug valve. Materials only.	Each	\$1,640.78	1	\$1,640.78
Valve, Air Vacuum Release, Continuous	1106	Materials for <2" Automatic Air/Vacuum Relief Valve (3 - Way Air Vac)	Each	\$148.50	3	\$445.50
Pipe, PVC, 8", SDR 26	991	Materials: - 8" - PVC - SDR 26 160 psi - ASTM D2241	Foot	\$8.68	2000	\$17,360.00
Valve, sprinkler hydrant irrigation valve with riser, metal, 8" x 4" x 42"	2104	Irrigation hydrant valve assembly including saddle tee, coated metal riser and integral valve installed on a 8" dia. pipeline, 4" dia. X 42" long riser. Materials only.	Each	\$298.51	7	\$2,089.57
Valve, Pressure Relief	1042	Materials for <2" Pressure Relief Valve	Each	\$165.07	1	\$165.07