

**Practice: 316 - Animal Mortality Facility**

**Scenario: #1 - Incineration, < 50 CF Chamber**

**Scenario Description:**

This scenario consists of installing a manufactured Type IV incinerator designed to handle 350 lbs of average daily mortality for the species and size of the operation. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. After determining average daily mortality in lbs, select smallest incinerator that meets capacity. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option is not typically least-cost. In most states a roofed static compost pile with concrete floor and bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods.

Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Typical incinerator installed to handle 150 lbs per day average mortality for a small poultry operation and has an incinerator chamber volume of 44 cubic feet. Included is a concrete slab to set the incinerator on and a fuel tank. Ash materials to be stored in suitable containers until land disposal as per the nutrient management plan or landfilled.

**Scenario Feature Measure:** Incinerator Chamber Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 44

**Scenario Cost:** \$7,733.48

**Scenario Cost/Unit:** \$175.76

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
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	\$2.19	8	\$17.52
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	\$101.38	1	\$101.38
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	\$250.03	4	\$1,000.12
<b>Labor</b>						
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	\$18.84	1	\$18.84
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$20.61	1	\$20.61
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$26.53	4	\$106.12

**Materials**

Incinerator, 200 cubid feet	1624	Poultry and livestock incinerator with an approximate chamber volume of 200 cubic feet. Includes equipment and after burner only.	Each	\$6,025.00	1	\$6,025.00
Fuel Tank, Fixed	1033	Materials	Gallon	\$0.96	285	\$273.60

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$170.29	1	\$170.29
--------------------------------	------	---	------	----------	---	----------

**Practice: 316 - Animal Mortality Facility**

**Scenario: #2 - Incineration 50-100CF chamber**

**Scenario Description:**

This scenario consists of installing a manufactured Type IV incinerator designed to handle 350 to 850 lbs of average daily mortality for the species and size of the operation. Typically very large poultry or medium sized swine operations. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. After determining average daily mortality in lbs, select smallest incinerator that meets capacity. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option is not typically least-cost. In most states a roofed static pile with concrete floor and bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are reduced, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods.

Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival or spreading. In non-attainment areas, certain states may require a higher level of processing such as gasification or different methods. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation.

Typical incinerator installed to handle 700 lbs per day average mortality for a medium poultry or swine operation and has an incinerator chamber volume of 55.8 cubic feet. Included is a concrete slab to set the incinerator on and a diesel fuel tank. Ash materials to be stored in suitable containers until land disposal as per the nutrient management plan or landfilled.

**Scenario Feature Measure:** Incinerator Chamber Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 56

**Scenario Cost:** \$8,533.48

**Scenario Cost/Unit:** \$152.38

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
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	\$250.03	4	\$1,000.12
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	\$101.38	1	\$101.38
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	\$2.19	8	\$17.52
<b>Labor</b>						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$20.61	1	\$20.61
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	\$18.84	1	\$18.84
<b>Materials</b>						
Fuel Tank, Fixed	1033	Materials	Gallon	\$0.96	285	\$273.60

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$26.53	4	\$106.12
Incinerator, 400 cubic feet	1625	Poultry and livestock incinerator with an approximate chamber volume of 400 cubic feet. Includes equipment and after burner only.	Each	\$6,825.00	1	\$6,825.00

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$170.29	1	\$170.29
--------------------------------	------	---	------	----------	---	----------

**Practice: 316 - Animal Mortality Facility**

**Scenario: #3 - Incineration >100 CF Chamber**

**Scenario Description:**

This scenario consists of installing a manufactured Type IV incinerator designed to handle a single 1,200 to 1,500 mortality. Typically a single dairy cow or multiple heifers or swine. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. Select smallest incinerator that has a bin capacity to handle largest individual mortality. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option uses a very small footprint, however, it costs 15-20 gallons of diesel fuel per fill. The usage needs to be significant. At 500 cows with replacements, this option would offset a 4,000 SF concrete pad with another 8,000 to 12,000 SF of grassed area. This option for small dairy operations would not typically be least-cost. In most states either a roofed or unroofed static pile with concrete floor and walls would be considered least cost. Unless regulations require this or severe site limitations exist, consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods.

Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. In non-attainment areas, certain states may require a higher level of processing such as gasification or other approved method. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulations.

Typical incinerator installed to handle a whole 1350 lb dairy cow on a 1,000 cow operation and has an incinerator chamber volume of 119.6 cubic feet. Included is a concrete slab to set the incinerator on and a fuel tank. Ash materials to be stored in suitable containers, a waste storage pit until land disposal as per the nutrient management plan or landfilled. Proper incineration will require between 15 and 25 gallons of diesel fuel per usage.

**Scenario Feature Measure:** Incineration Chamber Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 120

**Scenario Cost:** \$10,508.48

**Scenario Cost/Unit:** \$87.57

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
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	\$101.38	1	\$101.38
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	\$250.03	4	\$1,000.12
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	\$2.19	8	\$17.52
<b>Labor</b>						
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	\$18.84	1	\$18.84

**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$20.61	1	\$20.61
----------------------------	-----	---	------	---------	---	---------

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$26.53	4	\$106.12
Incinerator, 600 cubic feet	1626	Poultry and livestock incinerator with an approximate chamber volume of 600 cubic feet. Includes equipment and after burner only.	Each	\$8,800.00	1	\$8,800.00
Fuel Tank, Fixed	1033	Materials	Gallon	\$0.96	285	\$273.60

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$170.29	1	\$170.29
--------------------------------	------	---	------	----------	---	----------

**Practice: 316 - Animal Mortality Facility**

**Scenario: #4 - Small Animal Type**

**Scenario Description:**

This scenario will address animal mortalities for small animal types (less than 10 pound average weight -i.e. broilers and birth to weaning swine). It was developed for various types of animal mortality facilities as listed below (which is not an exhaustive list):

- Static Bin: Consisting of a group of small bins (concrete or wood walls) on a concrete pad to compost mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application.
- In-vessel Rotary Drum. A commercially manufactured horizontal rotary drum to compost animal mortalities mixed with a carbon material (i.e. sawdust or wood chips). A secondary composting storage area is required to finish materials.
- In-vessel Grinding Batch. A commercially manufactured grinding batch composter with a minimum capacity of 1,000 lbs per batch. A secondary composting storage area is required to finish materials.
- Forced Air Composting Bins: Consisting of a group of small bins with an aeration and leachate collection system.

(This scenario does not address incinerators.)

The least cost scenario is based on a static bin system with wood walls. The roofed portion of the facility is addressed with Roofs and Covers (367). Approach apron is addressed with Heavy Use Area Protection (561). Size of facility is based on daily mortality and sizing procedures accepted in particular state. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Organic sites will require more frequent replacement of lumber (if used).

Potential Associated Practices: Roofs and Cover ( 367 ), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation.

The typical mortality facility is based on a wood wall static bin composting facility with the primary bins on one side and secondary bins along the backside. A typical livestock operation consists of a 88,000 broiler operation with 6 flocks per year. Average bird weight is 4 pounds with an average mortality rate of 5%. The average daily mortality is 289 lb/day which requires a minimum primary bin volume of 646 ft<sup>3</sup>. The secondary bin volume is the same as the primary bin. The facility will be installed on a 12' X 24' concrete pad with 6 bins (3 primary and 3 secondary bins) with a total bin capacity of 1,440 cubic feet. Bin dimensions are 5' Height x 8' Width x 6' Length. Bin wall consists of a 1' concrete curb and 4' of treated lumber. Site preparation includes topsoil removal, installing 4" of gravel, setting posts, installing concrete slab (5"), installing wooden walls and retaining planks. Piles turned to go through a second heat cycle prior to final land application.

**Scenario Feature Measure:** Total Bin Capacity

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 1,440

**Scenario Cost:** \$6,380.74

**Scenario Cost/Unit:** \$4.43

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Equipment/Installation</i>						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place 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	\$250.03	4.5	\$1,125.14
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$38.08	4	\$152.32

**Equipment/Installation**

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	\$2.19	5.5	\$12.05
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	\$397.05	1.5	\$595.58
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	\$122.67	2	\$245.34
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hour	\$8.07	4	\$32.28

**Labor**

Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$26.52	80	\$2,121.60
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$20.61	4	\$82.44

**Materials**

Lumber, planks, posts and timbers, treated	1609	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.13	360	\$406.80
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.73	1440	\$1,051.20
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$26.53	4	\$106.12

**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	\$116.22	2	\$232.44
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$170.29	1	\$170.29
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	\$47.15	1	\$47.15

**Practice: 316 - Animal Mortality Facility**

**Scenario: #5 - Medium Animal Type**

**Scenario Description:**

- This scenario will address animal mortalities for small animal types (which generally range in size from 10 to 50 pounds average weight -i.e. turkeys and nursery pigs). It was developed for various types of animal mortality facilities as listed below (which is not an exhaustive list):
- Static Bin: Consisting of a group of small bins (concrete or wood walls) on a concrete pad to compost mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application.
  - In-vessel Rotary Drum. A commercially manufactured horizontal rotary drum to compost animal mortalities mixed with a carbon material (i.e. sawdust or wood chips). A secondary composting storage area is required to finish materials.
  - In-vessel Grinding Batch. A commercially manufactured grinding batch composter with a minimum capacity of 1,000 lbs per batch. A secondary composting storage area is required to finish materials.
  - Forced Air Composting Bins: Consisting of a group of small bins with an aeration and leachate collection system.

(This scenario does not address incinerators.)

The least cost scenario is based on a static bin system with wood walls. The roofed portion of the facility is addressed with Roofs and Covers (367). Approach apron is addressed with Heavy Use Area Protection (561). Size of facility is based on daily mortality and sizing procedures accepted in particular state. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Organic sites will require more frequent replacement of lumber (if used).

Potential Associated Practices: Roofs and Cover ( 367 ), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation.

The typical mortality facility is based on a wood wall static bin composting facility with the primary bins on one side and secondary bins along the backside. A typical livestock operation consists of a 28,000 hen turkey operation with 3 flocks per year. Average bird weight is 20 pounds with an average mortality rate of 7%. The average daily mortality is 322 lb/day which requires a minimum primary bin volume of 1,611 ft3. The secondary bin volume is the same as the primary bin. The facility will be installed on a 20' X 36' concrete pad with 6 bins (3 primary and 3 secondary bins) for a total bin capacity of 3,600 cubic feet. Bin dimensions are 5' Height x 12' Width x 10' Length. Bin wall consists of a 1' concrete curb and 4' of treated lumber. Site preparation includes topsoil removal, installing 4" of gravel, setting posts, installing concrete slab (5"), installing wooden walls and retaining planks. Piles turned to go through a second heat cycle prior to final land application.

**Scenario Feature Measure:** Total Bin Capacity

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 3,600

**Scenario Cost:** \$10,955.92

**Scenario Cost/Unit:** \$3.04

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<i>Equipment/Installation</i>						
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	\$122.67	3	\$368.01
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	\$250.03	11.5	\$2,875.35

**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	\$397.05	2.5	\$992.63
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	\$2.19	13.5	\$29.57
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hour	\$8.07	7	\$56.49
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$38.08	7	\$266.56

**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$20.61	7	\$144.27
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$26.52	120	\$3,182.40

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$26.53	9	\$238.77
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.73	2256	\$1,646.88
Lumber, planks, posts and timbers, treated	1609	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.13	624	\$705.12

**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	\$116.22	2	\$232.44
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	\$47.15	1	\$47.15
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$170.29	1	\$170.29

**Practice: 316 - Animal Mortality Facility**

**Scenario: #6 - Large Animal Type**

**Scenario Description:**

This scenario will address animal mortalities for large animal types (which generally range in size from 50 to 300 average weight -i.e. grower/finishing pigs sheep and goats). It was developed for various types of animal mortality facilities as listed below (which is not an exhaustive list):

- Static Bin: Consisting of a group of small bins (concrete or wood walls) on a concrete pad to compost mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application.
- In-vessel Rotary Drum. A commercially manufactured horizontal rotary drum to compost animal mortalities mixed with a carbon material (i.e. sawdust or wood chips). A secondary composting storage area is required to finish materials.
- In-vessel Grinding Batch. A commercially manufactured grinding batch composter with a minimum capacity of 1,000 lbs per batch. A secondary composting storage area is required to finish materials.
- Forced Air Composting Bins: Consisting of a group of small bins with an aeration and leachate collection system.

(This scenario does not address incinerators.)

The least cost scenario is based on a static bin system with wood walls. The roofed portion of the facility is addressed with Roofs and Covers (367). Approach apron is addressed with Heavy Use Area Protection (561). Size of facility is based on daily mortality and sizing procedures accepted in particular state. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Organic sites will require more frequent replacement of lumber (if used).

Potential Associated Practices: Roofs and Cover ( 367 ), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation.

The typical mortality facility is based on a wood wall static bin composting facility with the primary bins on one side and secondary bins along the backside. A typical livestock operation consists of a 6,400 finishing pigs with 2.5 litters per year (all in all out system). Average pig weight is 160 pounds with an average mortality rate of 3%. The average daily mortality is 210 lb/day which requires a minimum primary bin volume of 3,320 ft<sup>3</sup>. The secondary bin volume is the same as the primary bin. The facility will be installed on a 20' X 72' concrete pad with 12 bins (6 primary and 6 secondary bins) for a total bin capacity of 7,200 cubic feet. Bin dimensions are 5' Height x 12' Width x 10' Length. Bin wall consists of a 1' concrete curb and 4' of treated lumber. Site preparation includes topsoil removal, installing 4" of gravel, setting posts, installing concrete slab (5"), installing wooden walls and retaining planks. Piles turned to go through a second heat cycle prior to final land application.

**Scenario Feature Measure:** Total Bin Capacity

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 7,200

**Scenario Cost:** \$18,487.83

**Scenario Cost/Unit:** \$2.57

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$38.08	12	\$456.96
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	\$250.03	22.5	\$5,625.68

**Equipment/Installation**

Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hour	\$8.07	12	\$96.84
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	\$2.19	27	\$59.13
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	\$397.05	4	\$1,588.20
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	\$122.67	5.5	\$674.69

**Labor**

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$20.61	12	\$247.32
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$26.52	160	\$4,243.20

**Materials**

Lumber, planks, posts and timbers, treated	1609	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.13	1128	\$1,274.64
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.73	4512	\$3,293.76
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$26.53	18	\$477.54

**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	\$47.15	1	\$47.15
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	\$116.22	2	\$232.44
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$170.29	1	\$170.29

**Practice: 316 - Animal Mortality Facility**

**Scenario: #7 - Extra Large Animal, Static Pile**

**Scenario Description:**

This scenario consists of installing an impervious earthen pad to compost large animal mortalities, typically dairy cow, beef, sow or boar, in a static windrow or single pile. Additional carbon based bulking material is added to facilitate aeration and provide a proper C:N ratio. Piles turned at least once to go into another heat cycle prior to land application. Access is infrequent. This option requires at least 2 more times the area in vegetation for runoff treatment. This may not be an option for sites with limited areas, karst topography, and not isolated from public view. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Any roofed portion of the facility will be addressed with Roofs and Covers (367). Any approach areas will be addressed with Heavy Use Area Protection (561).

Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Diversion (362), Subsurface Drain (606), and Underground Outlet (620)). Vegetative Treatment Area (635), Composting (317), Roofs and Covers (367), Heavy Use Area Protection (561)

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Typical system consists of a 50' x 50' compacted earth surface. Site can handle mortality for a 100 cow dairy with associated heifers and calves. On site soils can be recompact to meet required imperviousness. Include sufficient area for processing equipment access. Use single piles or windrows to minimize runoff. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Site preparation includes removal of top 1.5' and recompacting.

**Scenario Feature Measure:** Pad Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 2,500

**Scenario Cost:** \$1,565.40

**Scenario Cost/Unit:** \$0.63

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.65	140	\$511.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.04	140	\$565.60
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$170.29	1	\$170.29
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$318.51	1	\$318.51

**Practice: 316 - Animal Mortality Facility**

**Scenario: #8 - Extra Large Animal, Static Pile, Geologic Limitations**

**Scenario Description:**

This scenario consists of installing a concrete pad over permeable soils, karst topography, frequently accessed sites or sites with regulatory requirements. Typically associated with large dairy (1,000 cows plus heifers ), beef, boar or sow animal mortality. Area sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material added to allow natural aeration and a proper C:N ratio. Piles typically turned at least once to go into another heat cycle prior to final disposal, typically land application. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Any roofed portion of the facility will be addressed with Roofs and Covers (367). Any approach areas will be addressed with Heavy Use Area Protection (561).

Potential Associated Practices: Fence (382), Critical Area Planting (342), Heavy Use Area Protection (561), Nutrient Management (590), Access Road (560), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before Situation:**

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Typical system consists of a 60'x95' concrete surface to process an average mortality of 175 lb/day. Concrete 5" thick with light reinforcement. Typical layout is 18' wide piles with 8' wide access area is around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing gravel or sand subbase and then concrete.

**Scenario Feature Measure:** Pad Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 5,700

**Scenario Cost:** \$25,550.58

**Scenario Cost/Unit:** \$4.48

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.04	106	\$428.24
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	\$250.03	88	\$22,002.64
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.65	212	\$773.80
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$26.53	70	\$1,857.10
<b>Mobilization</b>						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$318.51	1	\$318.51
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$170.29	1	\$170.29