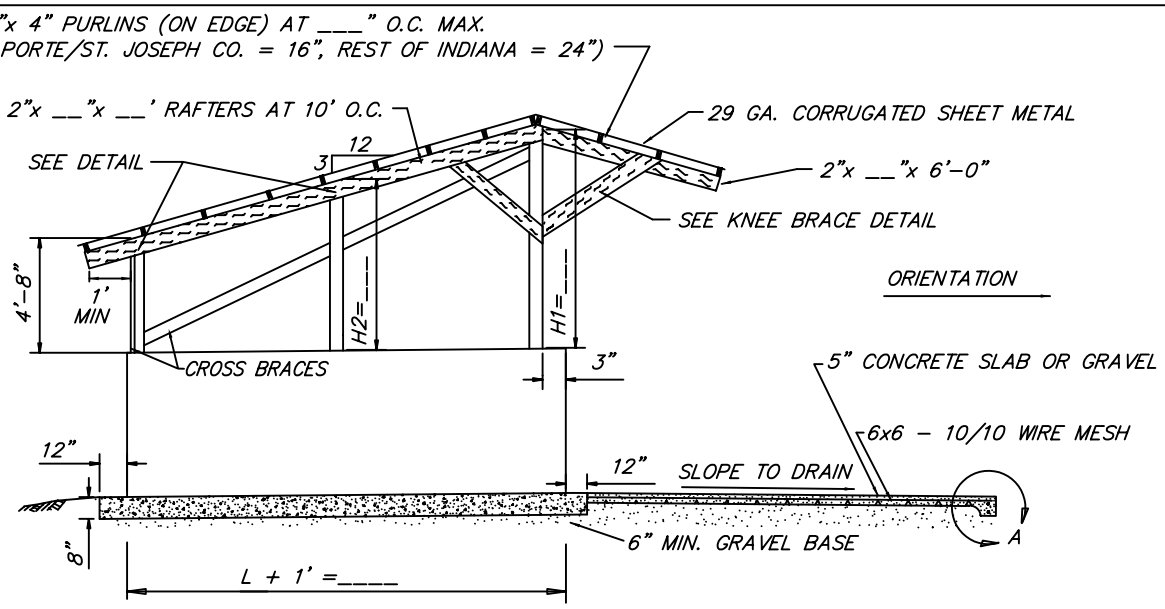
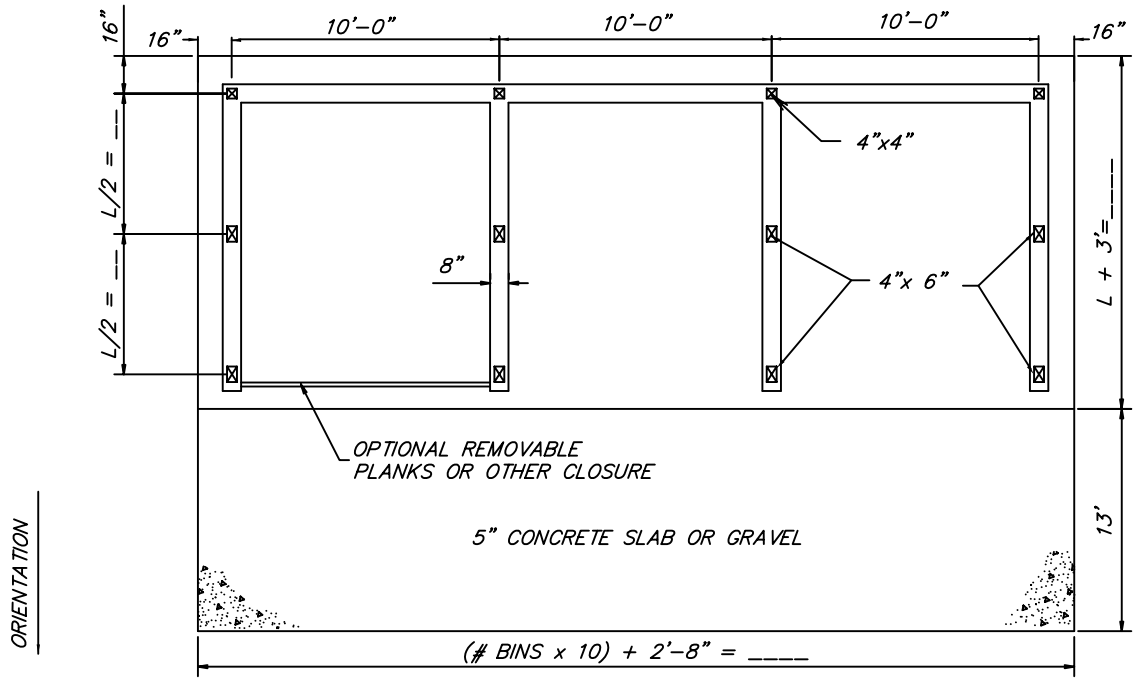
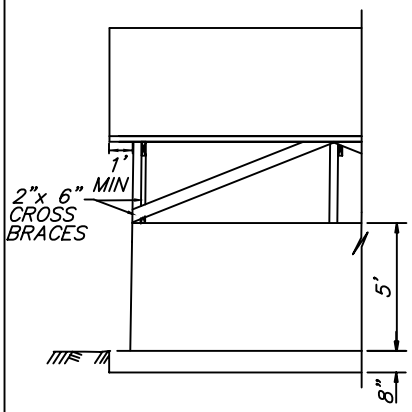


END VIEW



FLOOR PLAN



PARTIAL REAR ELEVATION

NOTES:

1 – CCA TREATMENT (0.4 LBS/CU FT) ON ALL LUMBER EXCEPT RAFTERS, PURLINS, & KNEE BRACES/GUSSETS.

2 – ATTACH PURLINS TO RAFTERS WITH MANUFACTURED FRAMING ANCHORS. PURLIN JOINTS SHALL OVERLAP ABOVE RAFTERS.

NOT TO SCALE

COOPERATOR _____
_____ COUNTY SWCD, INDIANA
LOCATION_____
_____

SWINE COMPOSTING FACILITY

5' REINFORCED CONCRETE STRUCTURE
GENERAL LAYOUT
INDIANA

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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IN-ENG-61 (1 OF 5)

STEEL SCHEDULE

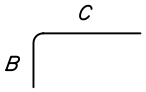
MARK	SIZE	QUANTITY	LENGTH	TYPE	B	C	TOTAL LENGTH
F1	5	a=___	f=____	1	---	---	
F2	5	b=___	g=____	1	---	---	
W1	4	5	h=____	1	---	---	
W2	4	c=___	i=____	21	2-4	e=___	
W3	5	k=___	4-9	1	---	---	
W4	5	k=___	4-4	21	1-9	2-7	
*S1	4	2	j=____	1	---	---	
*S2	4	4	12-6	1	---	---	

* FOR OPTIONAL CONCRETE SLAB

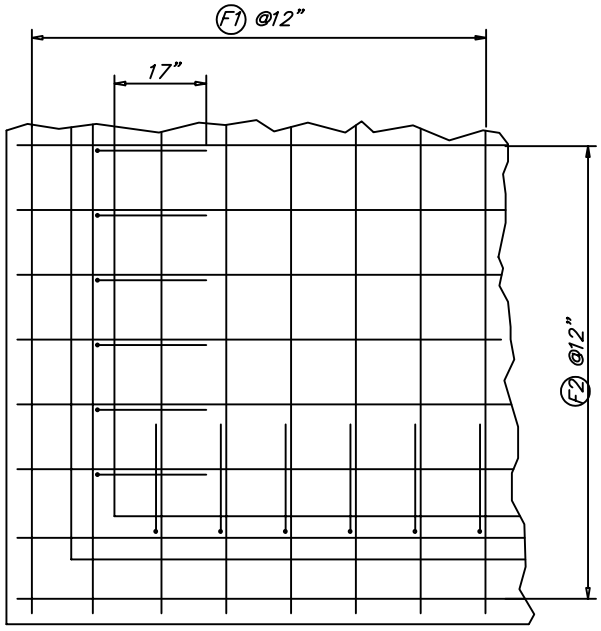
CALCULATIONS
a = (#bins x 10) + 3
b = L + 3
c = 5x(#bins + 1)
d = (#bins + 1)x(L + 1)
e = L + 3"
f = L + 2.5
g = (#bins x 10) + 2
h = #bins x 10
i = e + 2'-4"
j = 10 x #bins + 2
k = d + h + 1

STEEL TYPES

TYPE "1"

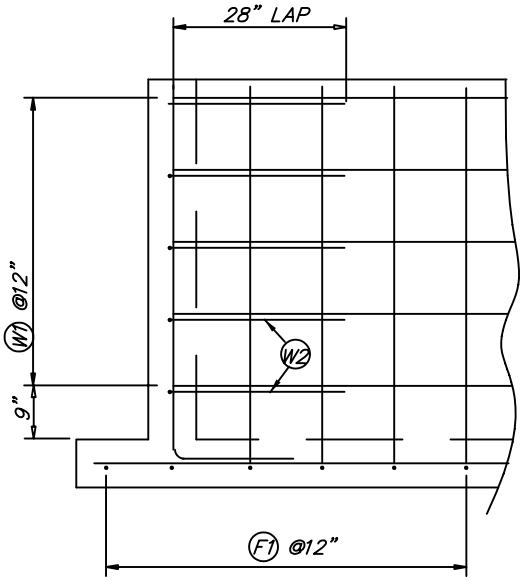


TYPE "21"



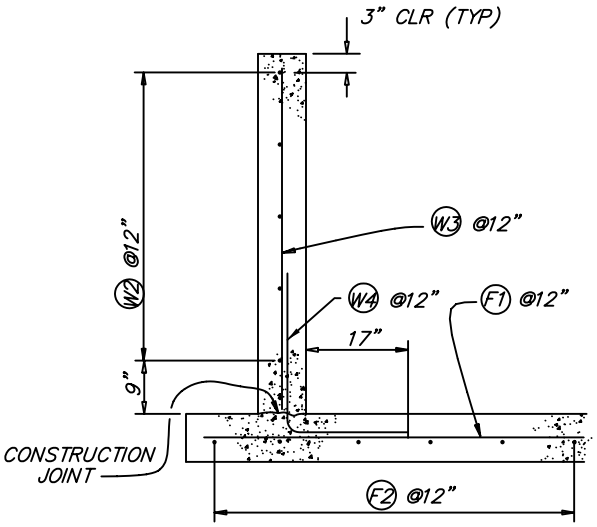
CORNER DETAIL

(PLAN VIEW OF FLOOR SLAB)



REAR WALL DETAIL

(ELEVATION VIEW)

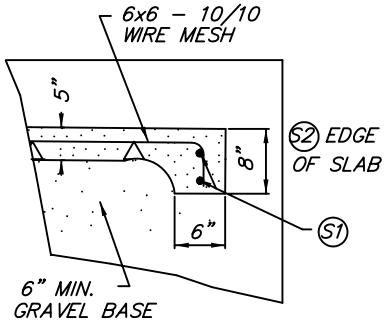


TYPICAL SECTION OF WALL

(CORNER DETAILS NOT SHOWN)

NOTES:

1. ALL EXPOSED CONCRETE EDGES AND CORNERS SHALL BE ROUNDED OR CHAMFERED 1".
2. BAR SPACING IS MEASURED FROM CENTER TO CENTER.
3. UNLESS OTHERWISE MARKED, ALL STEEL SHALL BE IN CENTER OF CONCRETE.
4. UNLESS OTHERWISE MARKED, SPLICES SHALL BE AS FOLLOWS:
   - HORIZ. BARS IN WALL: 28"
   - ALL OTHER BARS:
     #4 - 22"
     #5 - 27"



DETAIL A

(REQUIRED ON ALL OUTER EDGES OF CONCRETE SLAB)

COOPERATOR _____

_____ COUNTY SWCD, INDIANA

LOCATION_____

_____

SWINE COMPOSTING FACILITY

5' REINFORCED CONCRETE STRUCTURE
CONCRETE DETAILS
INDIANA

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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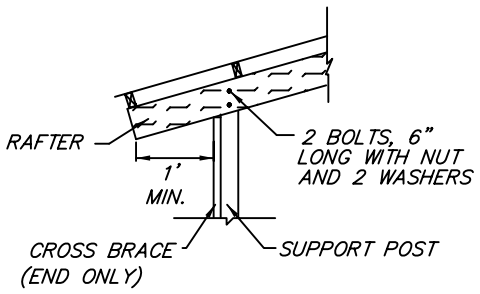
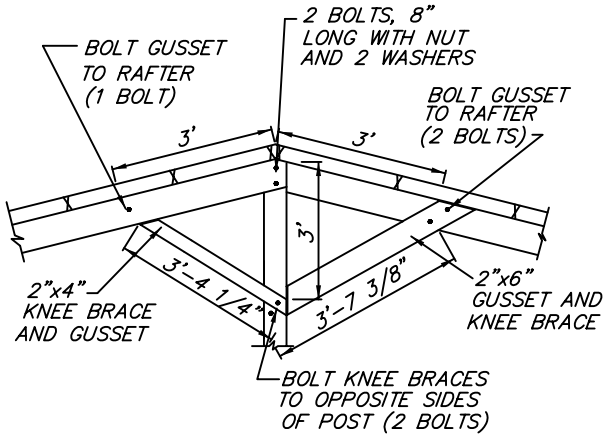
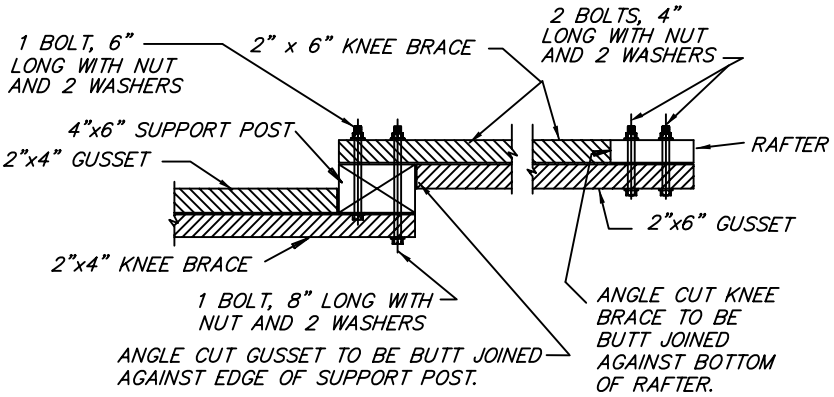


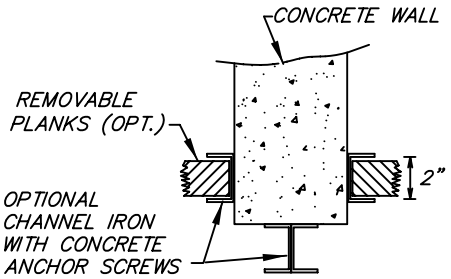
END/MIDDLE POST DETAIL



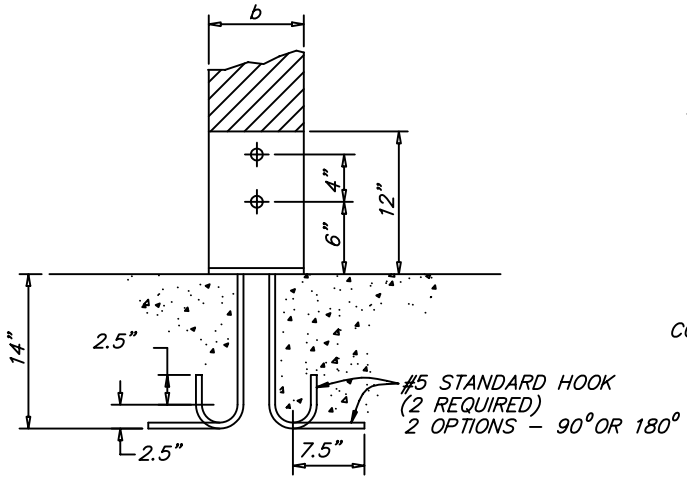
KNEE BRACE DETAIL



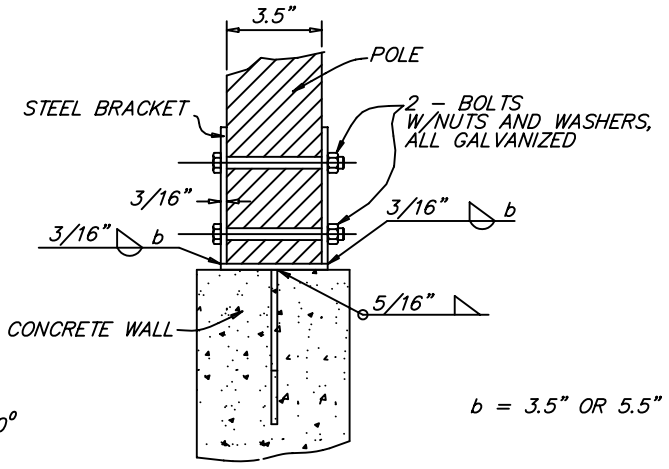
PLAN VIEW – KNEE BRACE



DETAIL B



SIDE VIEW



CROSS SECTION

NOT TO SCALE

ANCHORAGE AT BASE OF POLES

(A COMMERCIAL EMBEDMENT ANCHOR MAY BE USED WITH PRIOR APPROVAL FROM THE ENGINEER.)

NOTES:

1. ALL BOLTS SHALL BE 5/8" DIAMETER WITH WASHERS AT BOTH ENDS, EXCEPT 3/4" BOLTS SHALL BE USED IN LAPORTE AND ST. JOSEPH COUNTIES.
2. ALL 16d NAILS SHALL BE RING SHANKED.
3. NAIL GUSSET AND KNEE BRACE TOGETHER.
4. PAINT BRACKET WITH 2 COATS OF ZINC–RICH GALVANIZING PAINT.
5. FABRICATE AND INSTALL BRACKET TO FIT TIGHTLY AGAINST POLE.
6. NUTS MUST BE KEPT SNUG THROUGHOUT THE LIFE OF THE STRUCTURE OR SERIOUS DAMANGE COULD RESULT.

COOPERATOR _____
_____ COUNTY SWCD, INDIANA
LOCATION_____
_____

SWINE COMPOSTING FACILITY

5' REINFORCED CONCRETE STRUCTURE
POST AND RAFTER DETAILS
INDIANA

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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IN–ENG–61 (3 OF 5)

TOTAL BIN VOLUME (CU. FT.)					
NUMBER OF BINS	BIN LENGTH, L (FT)				
	10	11	12	13	14
3	1400	1540	1680	1820	1960
6	2800	3080	3360	3640	3920
1 STORAGE	467	513	560	607	653

TABLE A: BIN VOLUMES

REQUIRED CONCRETE VOLUME, (CU. YD.)					
NUMBER OF BINS	BIN LENGTH, L (FT)				
	10	11	12	13	14
3	20	21	22	24	25
3 + 1	26	27	29	31	32
6	37	40	42	44	47
6 + 1	43	46	48	51	54

TABLE C: CONCRETE VOLUMES

	BIN LENGTH, L (FT)				
	10	11	12	13	14
RAFTERS					
SIZE, NOMINAL	2x6	2x6	2x6	2x8	2x8
NOMINAL LENGTH, R	12'	14'	14'	16'	16'
POST HEIGHTS					
FRONT, H1	7'-2"	7'-5"	7'-8"	7'-11"	8'-2"
MIDDLE, H2	5'-11"	6'-0"	6'-2"	6'-4"	6'-5"
LAPORTE/ST. JOSEPH COUNTY REQUIREMENTS					
RAFTER SIZE, NOMINAL	2x6	2x8	2x8	2x8	2x10
ALL BOLTS SHALL BE 3/4" DIAMETER.					

TABLE B: BIN DESIGN

BILL OF MATERIALS	NUMBER OF BINS			
	3	3+1	6	6+1
CONCRETE FLOOR AND WALLS				
CONCRETE = _____ CU. YDS.				
#4 REINFORCING BAR = _____ LIN. FT.				
#5 REINFORCING BAR = _____ LIN. FT.				
GRAVEL BASE – INDOT #8 STONE, TONS	15	20	29	34
CONCRETE SLAB (OR GRAVEL, SEE BELOW)				
CONCRETE, CU. YD.	7	10	14	16
6 x 6 – 10/10 WIRE MESH, SQ. FT.	427	555	815	945
GRAVEL BASE – INDOT #8 STONE, TONS	12	15	22	26
GRAVEL PAD (IF USED)				
INDOT #53 STONE, TONS	12	15	22	26
CCA TREATED LUMBER, #2 SOUTHERN PINE				
POSTS				
4"x 6"x _____ (H1) – FRONT	4	5	7	8
4"x 6"x _____ (H2) – MIDDLE	4	5	7	8
4"x 4"x 4'-8" – REAR	4	5	7	8
CROSS BRACES				
2"x 6" x 12'-0"	3	4	6	7
2"x 6" x 16'-0"	2	2	2	2
NON–TREATED LUMBER, #2 SOUTHERN PINE				
2"x W=____"x R=____ – RAFTERS	4	5	7	8
2"x W=____"x 6'-0" – OVERHANG RAFTERS	4	5	7	8
2"x 6"x 4'-0" – KNEE BRACE/GUSSET	8	10	14	16
2"x 4"x 4'-0' – KNEE BRACE/GUSSET	8	10	14	16
2"x 4"x 12'-0" – PURLINS = [(R=____+6)/2 * + 2] X (#BINS=____) = _____ BRDS				
ROOFING MATERIAL				
29-GA. CORRUGATED SHEET METAL =(R=___+6) X [2+(10 X #BINS=____)] = _____ SQ. FT.				
BOLTS AND NUTS – 5/8" DIAM. (USE 3/4" IN LAPORTE/ST. JOSEPH COUNTIES)				
4" LENGTH	12	15	21	24
5" LENGTH	24	30	42	48
6" LENGTH	20	25	35	40
8" LENGTH	12	15	21	24
WASHERS	136	170	238	272
FABRICATED POLE ANCHORAGE	12	15	21	24
FRAMING ANCHORS[(R=____ + 6)/2 * + 2] X (# BINS=____ + 1) = _____ ANCHORS				

* FOR LAPORTE/ST. JOSEPH COUNTY, REPLACE 2' WITH 1.3' PURLIN SPACING.

DESIGN INSTRUCTIONS

USING TABLE A, DETERMINE BIN LENGTH (L) AND NUMBER OF BINS REQUIRED FOR CALCULATED COMPOST VOLUME. AN ADDITIONAL BIN MAY BE INCLUDED FOR STORAGE, IF DESIRED.

USING TABLE B, DETERMINE POST HEIGHTS AND RAFTER (R) VALUES.

USING TABLE C, DETERMINE CONCRETE VOLUME.

FILL IN VALUES FROM TABLE B ON LAYOUT SHEET AND BILL OF MATERIALS.

CALCULATE STEEL SCHEDULE VALUES ON STEEL DETAILS SHEET.

CALCULATE QUANTITIES IN BILL OF MATERIALS.

COOPERATOR _____

_____ COUNTY SWCD, INDIANA

LOCATION_____

_____

SWINE COMPOSTING FACILITY

5' REINFORCED CONCRETE STRUCTURE
DESIGN AND BILL OF MATERIALS
INDIANA

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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GENERAL

This plan set shows details for three (3) composting bins. This plan set is to be adapted for _____ bins and _____ extra storage bins.

This composting facility was designed to support a 16 psf wind load for Indiana. A 30 psf dead/snow load for LaPorte and St. Joseph counties and a 20 psf dead/snow load for the rest of Indiana were used.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used.

MATERIALS

All lumber shall be #2 construction grade Southern Pine or stronger. CCA treatment of 0.4 pounds per cubic foot shall be applied on all lumber except rafters, purlins, and knee braces.

All concrete shall have an ultimate strength of 4000 pounds per square inch. The concrete shall be proportioned, transported, and placed in accordance with Specifications for Structural Concrete for Buildings – ACI–301–89. The slump shall be 2 to 4 inches and the air content shall be 5 to 8% of the volume of concrete.

Forms shall be mortar tight, unyielding, and shall be constructed so that the finished concrete will conform to the specified dimensions. Metal ties within the forms shall be equipped with a device that permits their removal to a depth of at least 1 inch without injury to the concrete.

The concrete shall be deposited as closely as possible to its final position in the forms and shall be worked into the corners and angles of the forms and around all reinforcement. Immediately after placement, concrete shall be consolidated by vibrating.

Surfaces of all construction joints shall be cleaned by washing and scrubbing with a wire brush or broom.

Forms shall not be removed before 24 hours have elapsed after placement of concrete.

Holes produced by the removal of form ties, etc., shall be filled with dry pack mortar.

Concrete shall be prevented from drying for a curing period of at least 7 days. The slab and footings shall be kept moist for the entire period or until curing compound is applied. The walls shall be thoroughly wetted immediately after forms have been removed and shall be kept wet until patching and repairs are made. After patching and repairs are made, curing compound may be applied in lieu of wetting.

All reinforcing bars shall be Grade 60 steel.

All gravel shall meet INDOT standards for size and gradation as specified on the plans.

MANAGEMENT AND OPERATION

A management program shall be established by the operator to maintain the structural integrity of the facility and to operate it in an environmentally sound manner. Proper management is imperative to achieve the optimal compost action.

The proper carbon to nitrogen ratio shall be maintained by using a mix of 100 cubic feet of sawdust per 1000 pounds of carcass or other mix as specified to maintain a carbon to nitrogen ratio of 20–30 to 1. Ammonium nitrate may be added as needed to reach the optimum CN ratio.

The proper moisture content shall be maintained at 50–60 percent by:
1 – Using damp (but not wet) sawdust.
2 – Adding extra water as needed to reach the optimal moisture content.
3 – Allowing green (wet) sawdust to dry before using in compost mix.

The temperature of the compost shall be monitored and shall reach a minimum of 135 degrees F. The temperature probe must penetrate one third of the distance from the outside of the pile to the center of mass. Compost that does not reach this temperature shall be dismantled, corrected, and rebuilt in order to reach optimal temperature. When the temperature of the compost falls below 105 degrees F, compost shall be turned to a secondary storage bin.

The following items shall be followed during the loading of the facility:

1 – One foot of sawdust shall be placed on the bottom of the bin.

2 – Carcasses shall be placed in layers with at least one foot of sawdust in between each layer.

3 – Carcasses shall be completely covered with at least one foot of sawdust.

4 – Large carcasses shall have one foot of sawdust in between carcasses within a layer.

5 – A minimum of 6 inches of sawdust shall be maintained between the carcasses and the sides of the bins.

Compost shall be loaded in bins in the following manner:

1 – The first bin shall be filled over a two month period.

2 – The second bin shall be filled over the second two month period.

3 – After the second two month period, compost from the first bin shall be turned into the third bin for secondary composting.

4 – Bin #1 shall now be filled again for two months.

5 – After the two month period, compost from Bin #3 shall be removed for final disposal and Bin #2 shall be turned to Bin #3.

6 – Bin #2 shall now be filled again.

This method shall be used for the number of bins as specified in this plan.

The completed compost shall be land applied in accordance with the Nutrient Management Plan. When conditions are not suitable for application, the completed compost shall be stored until conditions are adequate.

COOPERATOR _____
_____ COUNTY SWCD, INDIANA
LOCATION_____
_____

SWINE COMPOSTING FACILITY

5' REINFORCED CONCRETE STRUCTURE
OPERATION AND MAINTENANCE
INDIANA

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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