Karen Blue (adpce.ad)

To: Greg Banic (adpce.ad)
Subject: RE: Tucker Solid Waste Processing Revised Application

From: Zach White [mailto:zwhite@pmico.com]
Sent: Wednesday, October 12, 2022 11:52 AM
To: Greg Banic (adpce.ad)
Cc: Cole Glover
Subject: Tucker Solid Waste Processing Revised Application

AFIN: 35-00112
PMT#: 0318-SC
Received
By Karen Blue at 1:36 pm, Oct 14, 2022
DOC ID#: 82843
TO: AC>FILE <KMB

Greg,

Attached is the revised application for the Tucker composting facility.

If you have any questions, please don't hesitate to reach out to either me or Cole.

Respectfully,

Zach

Zachary White
Project Biologist
3512 S Shackleford Rd Little Rock, AR 72205
Office: (501) 221-7122
Cell: (501)804-8240
www.pmico.com

May 17, 2022

Mr. Dillon Daniels
Engineer, Office of Land Resources
Division of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118 - 5317

RE: Revised Permit Application of a Type O Composting Facility Arkansas Department of Corrections – Tucker Unit AFIN: 35-00112

Dear Mr. Daniels,

On behalf of the Arkansas Department of Corrections – Tucker Unit, transmitted with this letter is a revised Solid Waste Processing Facility Permit Application Package addressing DEQ comments received October 11, 2021. The package includes the following documents:

- Solid Waste Processing Facility Application Form
- Application Drawing Set
  - Map of delineated wetlands included in Drawing 8
- Operating Plan
  - Food waste totals received per day has been updated.
  - Contingency plans have been updated in Section 4.0
- Composter Operating Manual
- Facility Closure Plan
- Vicinity Map
- Land Use Aerial
- Engineer's Opinion of Closure Costs
- Proof of Land Ownership
- Southeast Arkansas Solid Waste Management Board Approval Letter

If you have any questions or comments, please do not hesitate to contact Brad Wingfield at 501-221-7122 or bwingfield@pmico.com. We appreciate your time with this project, and look forward to receiving feedback.

Sincerely,
PMI

Brad Wingfield, P.E
Principal – Engineering Division

SOLID WASTE PROCESSING FACILITY APPLICATION FORM

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY
SOLID WASTE MANAGEMENT DIVISION
5301 NORTHSHORE DRIVE
NORTH LITTLE ROCK, AR 72118

Act 237 of the 1971 Arkansas General Assembly, as amended, makes it unlawful to construct, install, alter, modify, use or operate any solid waste processing facility without a permit. Section 22.303 of Regulation 22, Solid Waste Management, requires that applicants for new solid waste processing facilities prepare and submit an application on forms prepared by the Department and the form is to include certain information.

I. FACILITY TYPE

(Check the one that applies)

_____Yard Waste Composting Facility (Y)

___X___Organic Waste Composting Facility (O)

_____Mixed Solid Waste Composting Facility (S)

_____Solid Waste Transfer Station (TS)

_____Solid Waste Recovery Facility (WRF)

_____Construction and Demolition Recycling Facility (CDRF)

Facility is: ___X___New _____Existing

II. FACILITY IDENTIFICATION

Facility Name: Tucker Unit Site Manager: Allen Gibson

Facility Location: Tucker, AR

Street Address: 2400 State Farm Rd.

City: Tucker State: AR Zip: 72168

County: Jefferson Telephone Number: 501-842-2519 Fax Number: 501-842-3958

Longitude: 91°54'23.69"W Latitude: 34°26'15.94"N

Section/Township/Range: S19/T3S/R8W

III. APPLICANT IDENTIFICATION

Name of Applicant: Arkansas Department of Corrections

Address of Applicant: 7800 Correction Circle

City: Pine Bluff State: AR Zip: 71603

Applicant Telephone Number: 870-267-6625 Fax Number: 870-267-6619

Is the applicant the Facility Owner? [x] Yes ☐ No If no, please fill out Section IV.

IV. OWNER IDENTIFICATION

Name of Facility Owner: Arkansas Department of Corrections

Address of Facility Owner: 7800 Correction Circle

City: Pine Bluff State: AR Zip: 71603

Facility Owner Telephone Number: 870-267-6625 Fax Number: 870-267-6619

V. SITE INFORMATION

Legal description:

(Continue on additional sheets if required)

Directions to the site: Travel south on US-165 toward England. Turn left onto E Fordyce Street, and travel east approximately 0.7 miles. Turn right onto Pine Bluff Hwy, and travel south approximately 7.4 miles. Turn left onto State Farm Road, and travel east approximately 2.5 miles. The facility will be south of the road.

Location of property referenced to known landmarks describing access roads to site: The facility is south of State Farm Road.

Describe site and area drainage: Site topography is relatively flat. Drainage is to stormwater collection system and into Wabbaseka Bayou.

For Transfer Stations and Solid Waste Recovery Facilities:

Houses/Dwellings/Places of Business within 1/4 mile of site & method used to determine: N/A

Water supplies within 1/4 mile of site & method used to determine: N/A

For Composting Facilities:

Houses/Dwellings/Places of Business within ½ mile of site & method used to determine: Inmate housing and facility staff housing is located within ½ mile of the facility. Online Imagery.

Water supplies within ½ mile of site & method used to determine: None; Online satellite imagery and measuring tools provided by the Department of Interior, U.S. Geological Survey, Arkansas Water Science Center. See S9 "Water Supplies Map"

Describe the nature and type of waste the facility will process: The facility will process food waste from the correctional unit. The facility will not be open to the public.

VI. FACILITY INFORMATION

Describe facility service area: The facility will only process food waste from the Tucker Unit.

Identify the average weight and volume of the material that this facility will receive or process:

0.75 tons / day	Cubic yards or tons received per day
274 tons / year	Cubic yards or tons received per year
N/A	Cubic yards or tons per day residual (if applicable)

Provide a brief description of the disposition of transferred/processed material, and, if applicable, how any residual material will be disposed: De-watered food waste from the correctional unit kitchen is loaded into the in-vessel composter once a day. Wood chips/shavings/pellets are added to the composter at the same time. The material stays in the vessel for 6-10 days before being discharged, dry, into a storage bay.

Identify the average and maximum time that waste is anticipated to be stored on site: 6-10 days

VII. APPLICATION CONTENTS

Permit Drawings *(Identify below each design drawing or document included with this application)*

Drawing Number	Title	Date	Revision Number
A1.01	Tucker Unit – Composting Facility	Dec. 30, 2020	1

VIII. REQUIRED ATTACHMENTS

- A disclosure statement, if required;
- A 7.5 minute quadrangle map showing the location of the facility property including processing facility
- boundaries, area dwellings and water supplies;
- Documentation on whether the selected site is in conformance with the applicable airport safety, floodplain, wetlands, and separation distances location restrictions;
- Assurance in the form of a deed, lease, option, license, or other document that the permit applicant has the legal authority to enter the lands for purposes of performing site investigations and studies, and authority to process solid waste upon issuance of a permit;
- Local authority approval if required by Section 22.203-22.205;
- Location of the site in an appropriate scale on a city or county map;
- Notification to regional solid waste management district and to local city or county with jurisdiction over the proposed site if required by Section 22.204 and Certificate of Need from the Regional Solid Waste Management District for Transfer Stations or Solid Waste Recovery Facilities (see 22.205);
- See Reg. 22, Chapter 8 for composting rules and requirements.

ADDITIONAL REQUIRED ATTACHMENTS

COMPOSTING FACILITIES:

- Application fee as required by Regulation 9 of the Department;
- A map or aerial photograph indicating land use and zoning within ½ mile of the facility and showing all residences, structures, surface waters, public and private water supply sources, access roads, airports, and other existing and proposed man-made features relating to the project;
- A site plan prepared by a registered professional engineer showing proposed composting areas, location of existing and proposed access roads, site topography, existing and proposed drainage characteristics including any run-on and run-off control systems;
- A design narrative and calculations prepared by a registered professional engineer;
- Operating Plan or Narrative that addresses the criteria in Section 22.804 of Regulation 22;
- A geotechnical report describing site conditions to a depth of 10 feet (Type O & S);
- Closure plan;
- Any other information requested by the Department.

TRANSFER STATIONS, SOLID WASTE RECOVERY & CD RECYCLING FACILITIES:

- Application fee as required by Regulation 9 of the Department;
- A map or aerial photograph indicating land use and zoning within 1/4 mile of the facility and showing all residences, structures, surface waters, public and private water supply sources, access roads, airports, and other existing and proposed man-made features relating to the project;
- A site plan showing storage areas for incoming solid waste, location of existing and proposed access roads, site topography, existing and proposed drainage characteristics including any run-on and run-off control systems;
- A design narrative or specifications describing the facility design;
- Operating Plan or Narrative that addresses the criteria in Section 22.904 or 22.1004 as applicable of Regulation 22;
- Closure Plan;
- Any other information requested by the Department;
- See Reg. 22, Chapter 9 for transfer stations/solid waste recovery facilities for rules and requirements; See Chapter 10 for CDRF rules and requirements.

IX. CERTIFICATION

To the best of my knowledge and belief, I certify the information provided in this application is true and accurate:

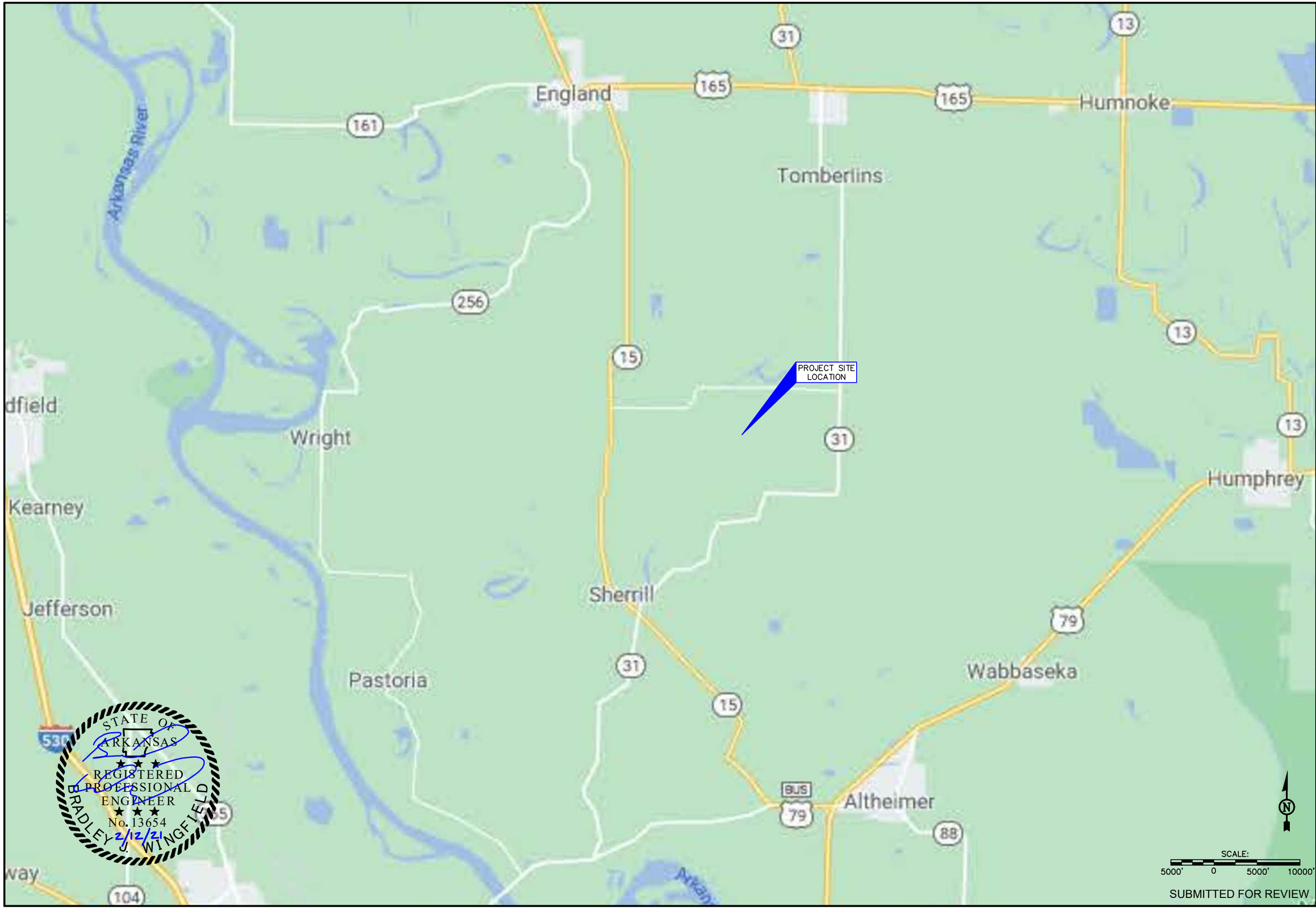
APPLICANT

Signature & Title	Printed Name	Date
DOC Assistant Director	**Richard Cooper**	5/3/2021

ENGINEER/CONSULTANT

Signature & Title	Printed Name	Date
	Brad Wingfield, P.E.	5/18/2021

CONFIDENTIALITY: *This application shall be available for public inspection, provided, however, that the Department shall not disclose, except to authorized persons, any information which the Director determines is entitled by law to protection as trade secrets without the consent of the applicant. Trade secrets shall not include the name and address of the applicant, nor any information necessary, as determined by the Director, for the public to evaluate the hazards associated with the proposed operation, nor any other information required by law to be available to the public.*



STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 13654
BRADLEY J. WINGFIELD
2/12/21

SUBMITTED FOR REVIEW

SHEET TITLE: SITE LOCATION MAP

PROJECT TITLE:
COMPOST FACILITY
TUCKER UNIT
ARKANSAS DEPARTMENT OF CORRECTIONS

REVISIONS:

NO:	DATE:	DESCRIPTION:	BY:

CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3612 SOUTH SHACKLEFORD RD
LITTLE ROCK, ARKANSAS 72205
PH: (501) 221-7122 FX: (501) 221-7775

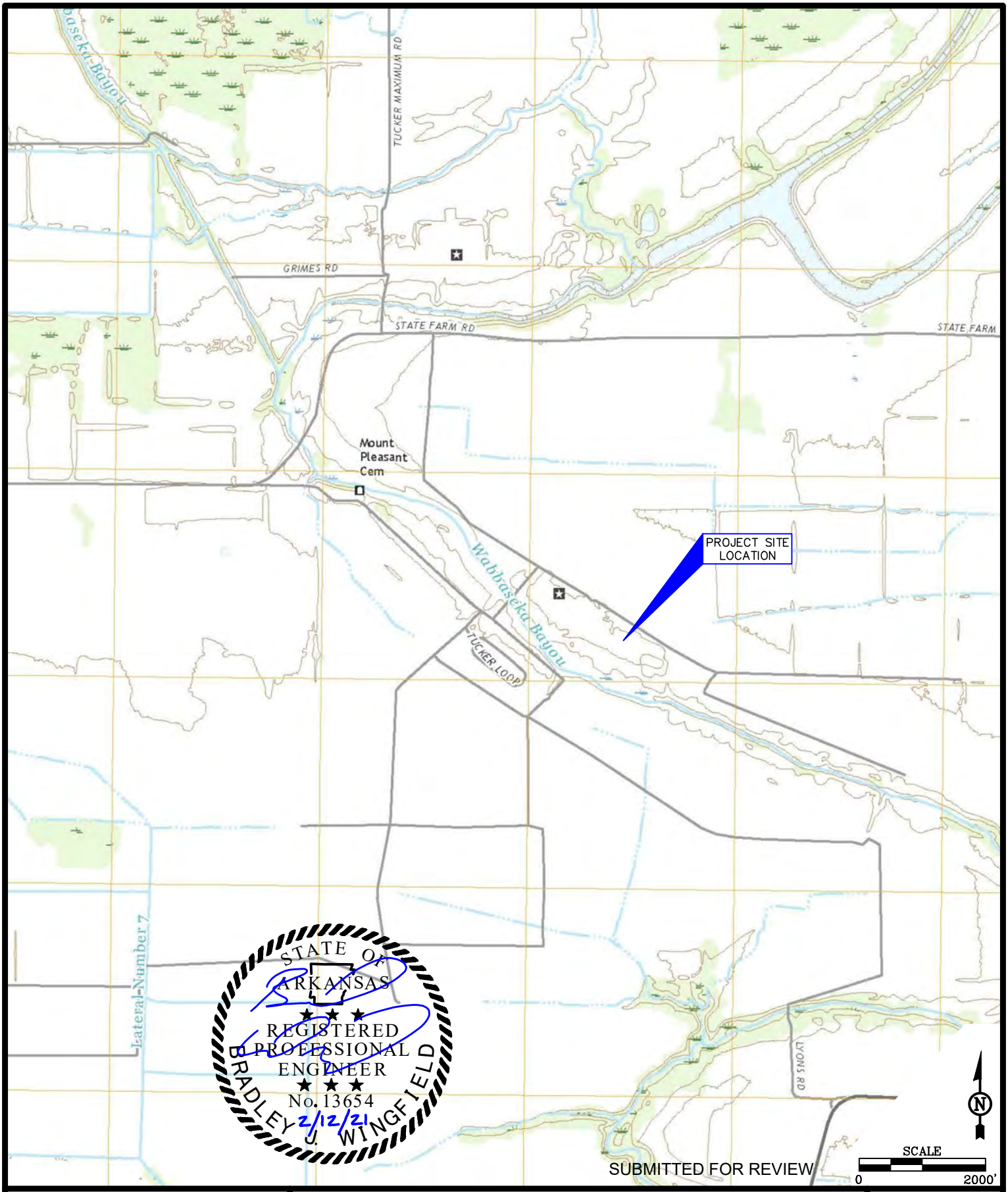
PMI

DESIGNED BY:	BW	DATE:	FEB. 10, 2021
DRAWN BY:	CG	SCALE:	1" = 5000'
CHECKED BY:	BW		

FILE: E:\ENTY-12162 - ADC COMPOSTING SITES\TUCKER ADEQ PERMIT APP\DRAWINGS\TUCKER PERMIT DRAWINGS.DWG

JOB NUMBER:
ENTY-12162

SHEET NUMBER:
1



STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 13654
BRADLEY J. WINGFIELD
2/12/21

SUBMITTED FOR REVIEW

CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3512 South Shackleford Road
Little Rock, Arkansas 72205
(501) 221-7122 fx: (501) 221-7775

VICINITY MAP

COMPOST FACILITY
TUCKER UNIT
ARKANSAS DEPARTMENT OF CORRECTIONS

JOB NUMBER: ENTY-12162

SHEET NO.: 2

SUBMITTED:	BW	DRAWN:	CG	CHECKED:	BW	DATE:	FEB. 10, 2021

FILE: E:\ENTY-12162 - ADC COMPOSTING SITES\TUCKER ADEQ PERMIT APP\DRAWINGS\TUCKER PERMIT DRAWINGS.DWG

NOTES:
1. NO WELLHEADS EXIST WITHIN ½ MILE OF THE COMPOST FACILITY.
2. ADJACENT LANDS ARE AGRICULTURAL.
3. SITE MEETS LOCAL & FAA AIRSPACE REQUIREMENTS.
4. ENTIRE SITE IS WITHIN ZONE A FLOODPLAIN. FLOODPLAIN DEVELOPMENT PERMIT HAS BEEN APPLIED FOR AND RECIEVED.

TUCKER UNIT CORRECTIONAL FACILITY

VARIOUS MAINTENANCE BUILDINGS AND YARDS

TUCKER UNIT WASTEWATER TREATMENT FACILITY AND LAGOONS

COMPOST FACILITY (SEE DETAIL DRAWINGS)

½ MILE RADIUS

CORRECTIONAL FACILITY RESIDENCES

WABBASEKA BAYOU

N

SCALE:
600' 0 600' 1200'

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 13654
BRADLEY J. WINGFIELD
2/12/21

SUBMITTED FOR REVIEW

SHEET TITLE: LAND USE AERIAL

PROJECT TITLE:
COMPOST FACILITY
TUCKER UNIT
ARKANSAS DEPARTMENT OF CORRECTIONS

REVISIONS:

NO:	DATE:	DESCRIPTION:	BY:

CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3512 SOUTH SHACKLEFORD RD
LITTLE ROCK ARKANSAS 72205
PH. (501) 221-7122 FX (501) 221-7775

DESIGNED BY:	BW	DATE:	FEB. 10, 2021
DRAWN BY:	BW	SCALE:	1" = 600'
CHECKED BY:	BW		

FILE: E:\ENTY-12162 - ADC COMPOSTING SITES\TUCKER AIED PERMIT APP\DRAWINGS\TUCKER PERMIT DRAWINGS.DWG

JOB NUMBER:
ENTY-12162

SHEET NUMBER:
3

LEGEND:

ACCESS ROAD

EXISTING DRAINAGE DITCH

SURFACE GRADIENT

BAG CHIP STORAGE

GRAVEL DRIVE

COMPOST FACILITY

COMPOST STORAGE

N

SCALE:
50' 0 50' 100'

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 13654
BRADLEY J. WINGFIELD
2/12/21

SUBMITTED FOR REVIEW

SHEET TITLE: COMPOST FACILITY SITE LAYOUT

PROJECT TITLE:
COMPOST FACILITY
TUCKER UNIT
ARKANSAS DEPARTMENT OF CORRECTIONS

REVISIONS:

NO:	DATE:	DESCRIPTION:	BY:

CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3512 SOUTH SHACKLEFORD RD
LITTLE ROCK, ARKANSAS 72205
PH. (501) 221-7122 FX (501) 221-7775

DESIGNED BY:	BW	DATE:	FEB. 10, 2021
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CHECKED BY:	BW		

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JOB NUMBER:
ENTY-12162

SHEET NUMBER:
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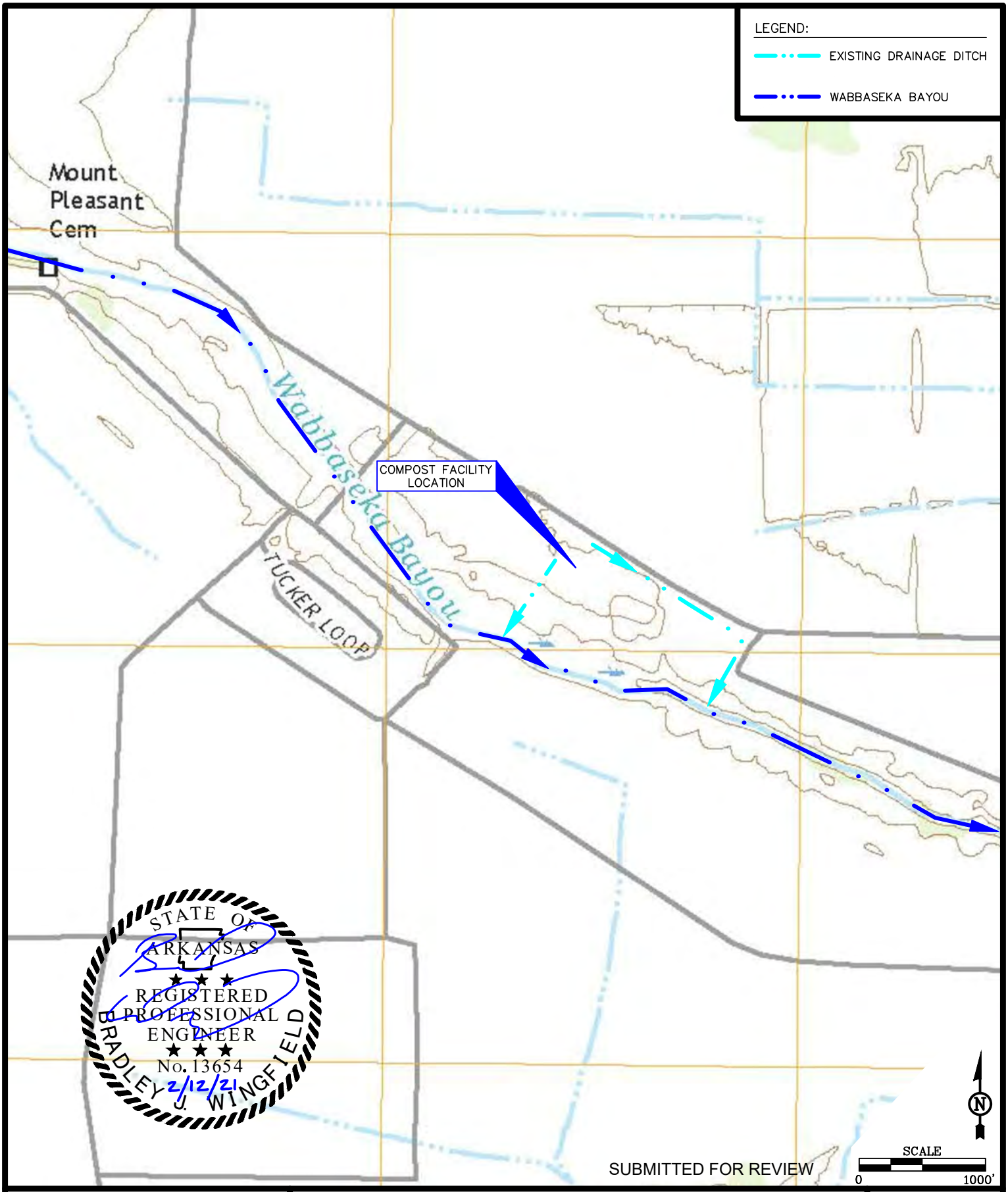


CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3512 South Shackleford Road
Little Rock, Arkansas 72205
(501) 221-7122 fx: (501) 221-7775

STORMWATER DRAINAGE MAP

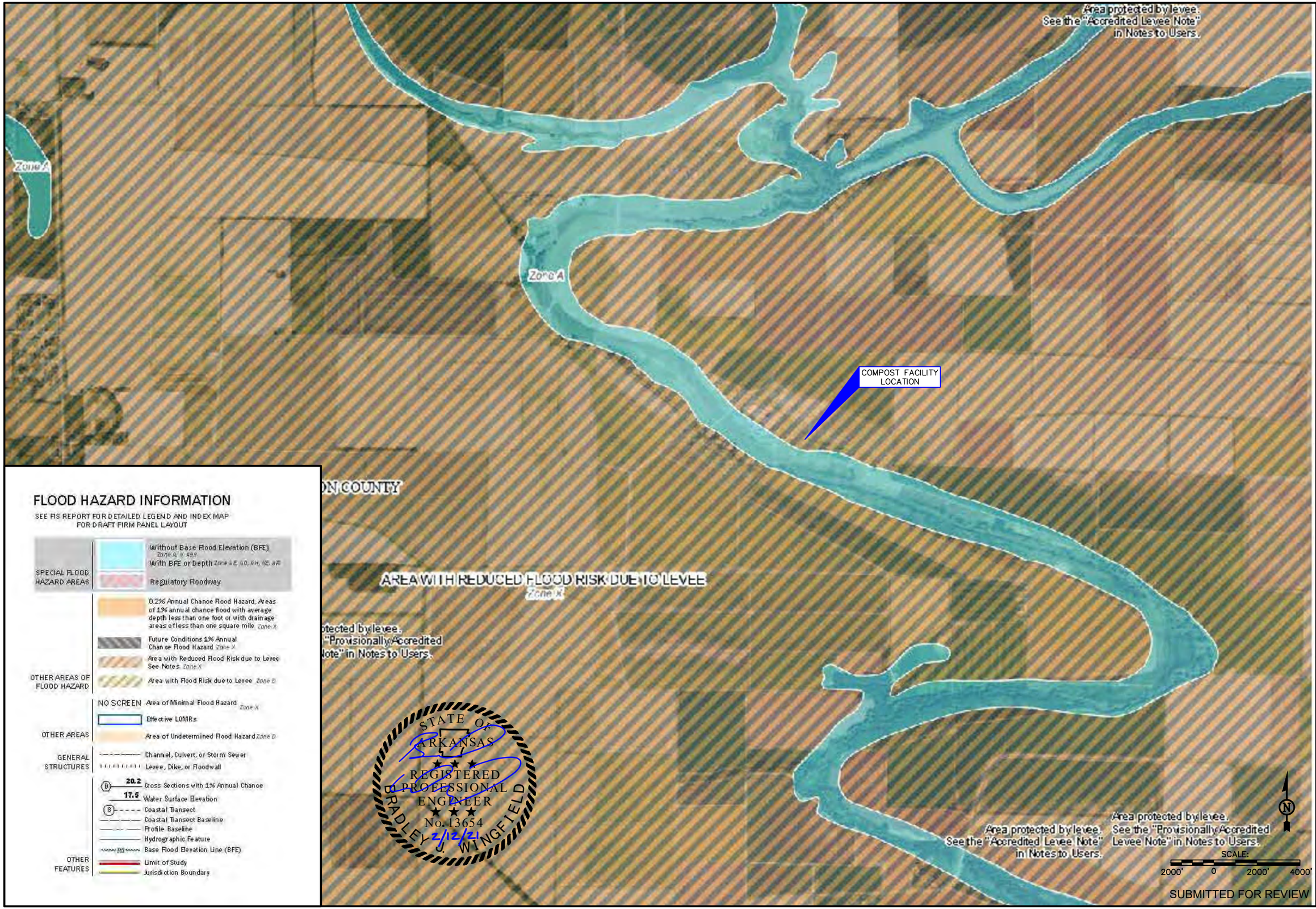
COMPOST FACILITY
TUCKER UNIT
ARKANSAS DEPARTMENT OF CORRECTIONS

JOB NUMBER: ENTY-12162

SHEET NO.: 5

SUBMITTED:	BW	DRAWN:	CG	CHECKED:	BW	DATE:	FEB. 11, 2021

FILE: E:\ENTY-12162 - ADC COMPOSTING SITES\TUCKER ADEQ PERMIT APP\DRAWINGS\TUCKER PERMIT DRAWINGS.DWG



FEMA FLOOD MAP

SHEET TITLE:

COMPOST FACILITY
TUCKER UNIT
ARKANSAS DEPARTMENT OF CORRECTIONS

PROJECT TITLE:

NO:	DATE:	DESCRIPTION:	BY:

REVISIONS:

CIVIL ENGINEERING AND
ENVIRONMENTAL SERVICES
3512 SOUTH SHACKLEFORD RD
LITTLE ROCK, ARKANSAS 72205
PH: (501) 221-7122 FX: (501) 221-7775

DESIGNED BY:	BW	DATE:	FEB. 11, 2021
DRAWN BY:	CG	SCALE:	1" = 2000'
CHECKED BY:	BW		

P:\2_ENTY-12162 - ADC COMPOSTING SITES\TUCKER ADCD PERMIT APP\DRAWINGS\TUCKER PERMIT DRAWINGS.DWG

JOB NUMBER:
ENTY-12162

SHEET NUMBER:
6

TUCKER UNIT CORRECTIONAL FACILITY

COMPOST FACILITY

100 FOOT RADIUS CENTERED AT THE COMPOST FACILITY

50 FOOT RADIUS CENTERED AT THE COMPOST FACILITY

200 FOOT RADIUS CENTERED AT THE COMPOST FACILITY

APPROXIMATE PROPERTY BOUNDARY

3.94 MILES

WABBASEKA BAYOU

SHUDY LANDING STRIP AIRPORT

NOTES:
1. THE SHUDY LANDING STRIP AIRPORT IS THE CLOSEST AIRPORT RUNWAY TO TUCKER UNIT CORRECTIONAL FACILITY.
2. THE SHUDY LANDING STRIP AIRPORT'S RUNWAY IS USED PISTON-TYPE AIRCRAFTS ONLY.

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 13654
BRADLEY J. WINGFIELD
2/12/21

SCALE:
2000' 0 2000' 4000'

SUBMITTED FOR REVIEW

SHEET TITLE: AERIAL VICINITY MAP

PROJECT TITLE: COMPOST FACILITY
TUCKER UNIT
ARKANSAS DEPARTMENT OF CORRECTIONS

REVISIONS:

NO:	DATE:	DESCRIPTION:	BY:

CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3512 SOUTH SHACKLEFORD RD
LITTLE ROCK, ARKANSAS 72205
PH. (501) 221-7122 FX (501) 221-7775

DESIGNED BY:	BW	DATE:	FEB. 12, 2021
DRAWN BY:	CC	SCALE:	1" = 2000'
CHECKED BY:	BW		

FILE: E:\ENTY-12162 - ADC COMPOSTING SITE\TUCKER ARCH FORMAT APP\DRAWINGS\TUCKER FORMAT DRAWINGS.DWG

JOB NUMBER: ENTY-12162

SHEET NUMBER: 7

TUCKER CORRECTIONAL UNIT
COMPOST FACILITY

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 13654
BRADLEY J. WINGFIELD
2/12/21

SCALE:
2000' 0 2000' 4000'

SUBMITTED FOR REVIEW

SHEET TITLE: WETLAND DELINEATION MAP

PROJECT TITLE:
COMPOST FACILITY
TUCKER UNIT
ARKANSAS DEPARTMENT OF CORRECTIONS

REVISIONS:

NO:	DATE:	DESCRIPTION:	BY:

CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3512 SOUTH SHACKLEFORD RD
LITTLE ROCK, ARKANSAS 72205
PH: (501) 221-7122 FX: (501) 221-7775

DESIGNED BY: BW
DRAWN BY: CG
CHECKED BY: BW
DATE: MAR. 25, 2022
SCALE: 1" = 250'

FILE: L:\ENTERITY\ENTY-12162 - ADC COMPOSTING SITES\TUCKER ADEQ PERMIT APP\DRAWINGS\TUCKER PERMIT DRAWINGS.DWG

JOB NUMBER:
ENTY-12162

SHEET NUMBER:
8

SHEET TITLE: WATER SUPPLIES MAP

PROJECT TITLE: COMPOST FACILITY
TUCKER UNIT
ARKANSAS DEPARTMENT OF CORRECTIONS

REVISIONS:

NO:	DATE:	DESCRIPTION:	BY:

CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3512 SOUTH SHACKLEFORD RD
LITTLE ROCK, ARKANSAS 72205
PH: (501) 221-7122 FX: (501) 221-7775

DESIGNED BY:	BW	DATE:	FEB. 12, 2021
DRAWN BY:	CG	SCALE:	1" = 1200'
CHECKED BY:	BW		

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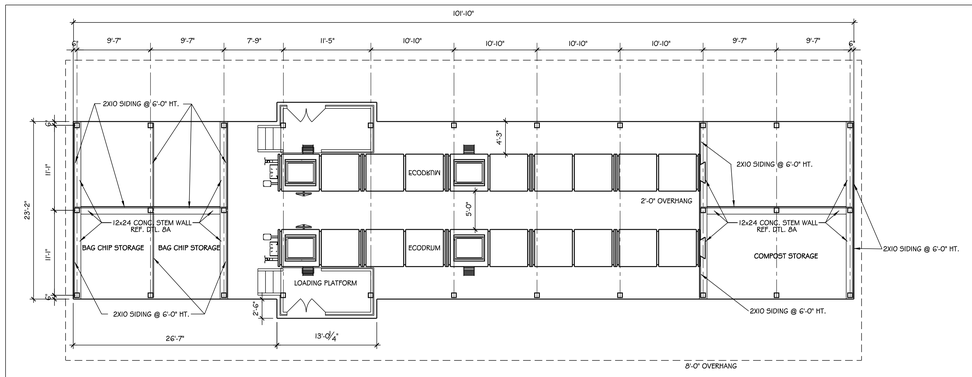
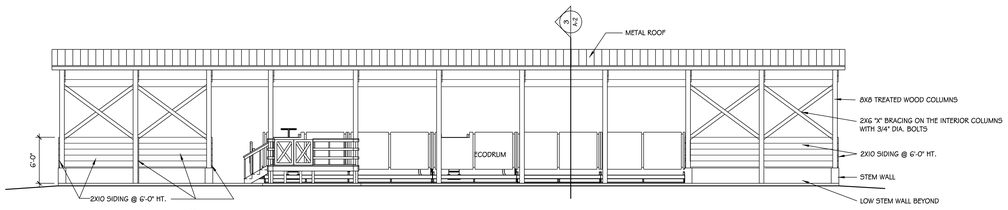
JOB NUMBER: ENTY-12162

SHEET NUMBER: 9



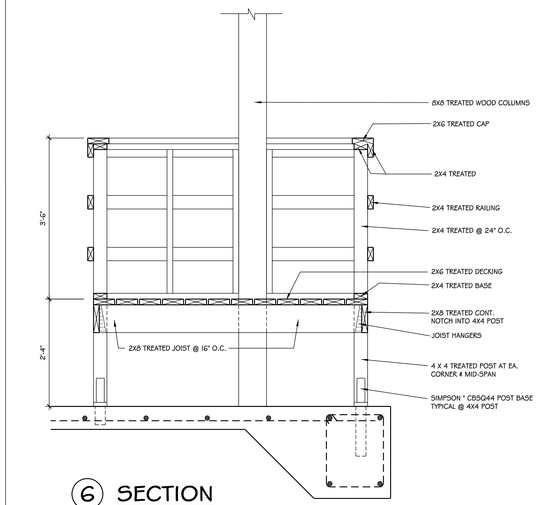
1 ECODRUM COMPOSTING PLAN

SCALE 1/8" = 1'-0"



4 FRONT ELEVATION

SCALE 1/8" = 1'-0"

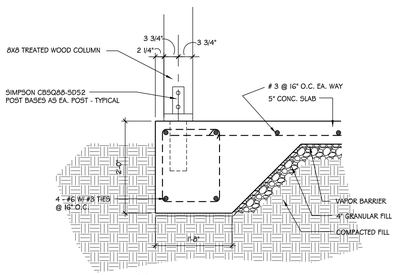


6 SECTION

SCALE 3/4" = 1'-0"

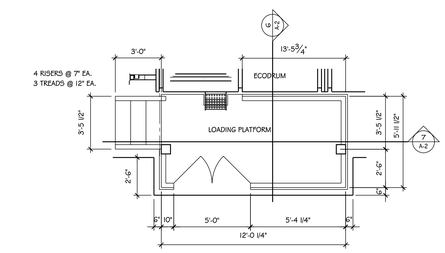
GENERAL NOTES:

1. ALL WOOD TO BE TREATED.
2. USE HOT DIPPED GLAVANIZED FINISH FOR ALL CONNECTIONS WHERE METAL IS USED. (BASE CONNECTIONS, TRUSS CONNECTIONS ETC.)



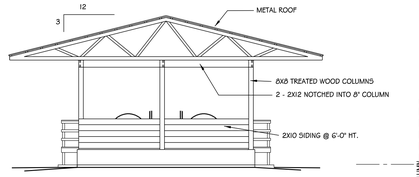
8 FOUNDATION DETAIL

SCALE 3/4" = 1'-0"



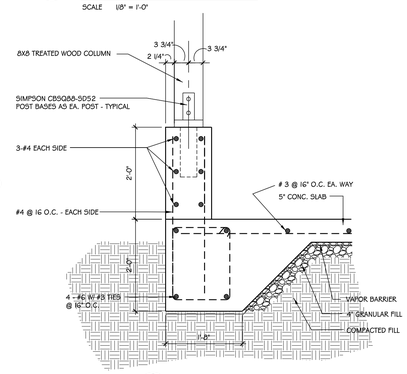
2 ENLARGED PLATFORM

SCALE 1/4" = 1'-0"



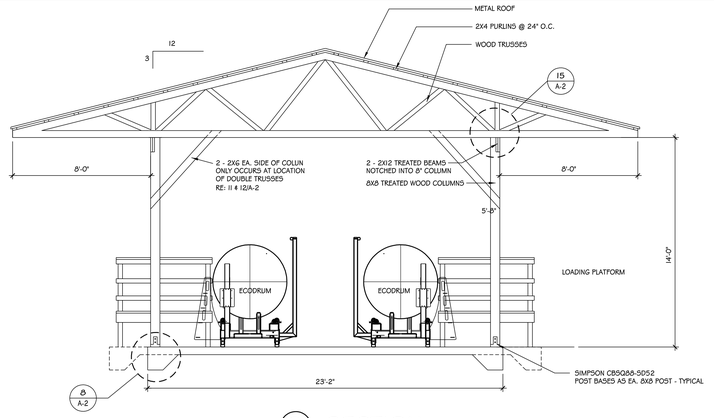
5 SIDE ELEVATION

SCALE 1/8" = 1'-0"



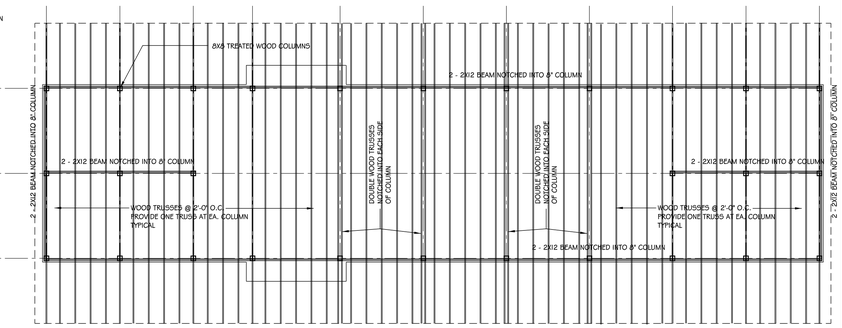
8a FOUNDATION DETAIL

SCALE 3/4" = 1'-0"



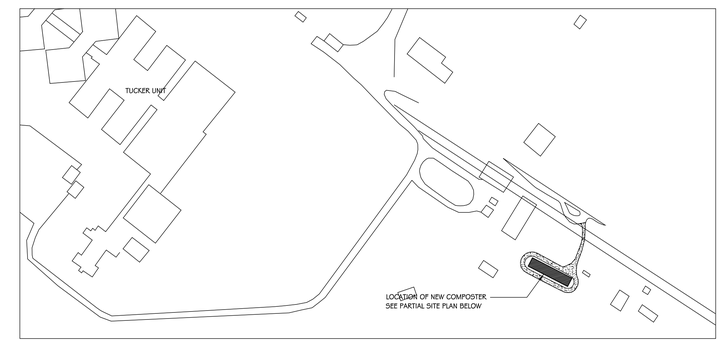
3 SECTION

SCALE 1/4" = 1'-0"

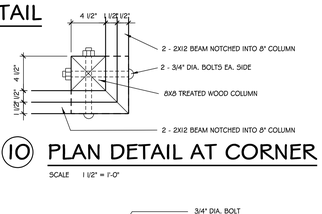


14 FRAMING PLAN

SCALE 1/8" = 1'-0"

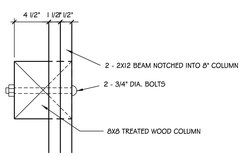


KEY PLAN



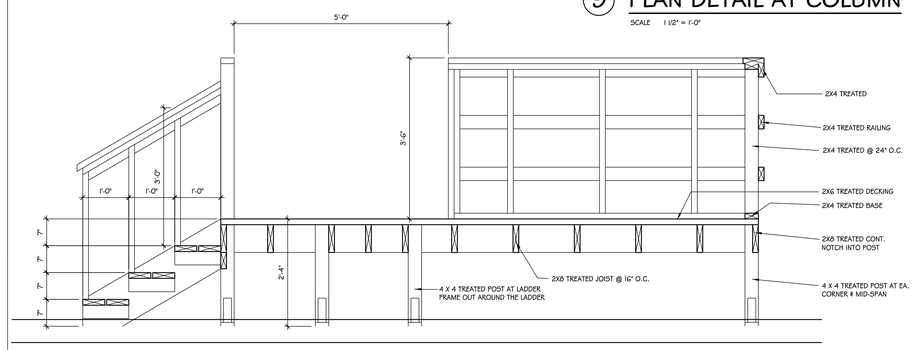
10 PLAN DETAIL AT CORNER

SCALE 1 1/2" = 1'-0"



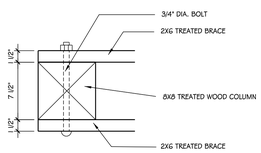
9 PLAN DETAIL AT COLUMN

SCALE 1 1/2" = 1'-0"



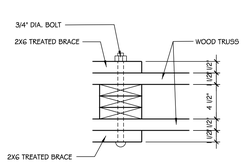
7 SECTION

SCALE 3/4" = 1'-0"



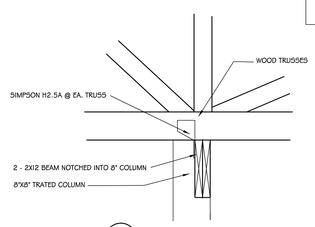
11 PLAN DETAIL AT BRACE

SCALE 1 1/2" = 1'-0"



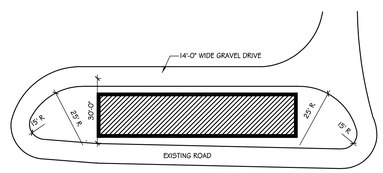
12 PLAN DETAIL AT BRACE

SCALE 1 1/2" = 1'-0"

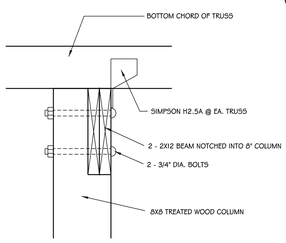


15 SECTION

SCALE 1" = 1'-0"



PARTIAL SITE PLAN



13 SECTION @ BEAM & COLUMN

SCALE 1 1/2" = 1'-0"

WDD ARCHITECTS
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energy.integrity.

ENERGY PROJECT
ARKANSAS DEPARTMENT OF CORRECTIONS
TUCKER UNIT
2501 STATE FARM ROAD, TUCKER, AR

JOB NO.	19-040
DESIGN	J.D.B.
DATE	Dec. 30, 2020
SHEET NO.	A1.01

PRELIMINARY

CORPORATE REGISTRATION — PETTIT & PETTIT CONSULTING ENGINEERS, INC. — ARKANSAS ENGINEER — NO. 78

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Cast-in-place concrete work, complete, unless otherwise specified, including formwork, reinforcing steel, mix design, placement procedures, and finishes. Furnish reinforcing steel bars for masonry work and tie bars after they are in place.

1.2 SUBMITTALS:

A. Product Data: Submit manufacturer's product data for reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, and other as requested by Engineer.

B. Shop Drawings: Submit, prior to installation, shop drawings of reinforcing steel, including bar cutting lists, typical bar bend diagrams, construction of forms including jointing, reveals, location and pattern of form tie placement, and construction joint schedule with details.

C. Design Mix: Prior to placement of concrete, submit concrete mix designs proposed by the concrete supplier, for class of concrete, including recent test results substantiating the quality of concrete produced by each mix.

D. Reports: Weekly reports of all compression, slump, and air content tests from the testing laboratory.

E. Samples: Submit samples of concrete stain and sealer in color selected by Engineer for approval.

1.3 QUALITY ASSURANCE:

A. Codes And Standards: Comply with the provisions of the following codes, specifications and standards, except where more stringent requirements are indicated or specified, and except as accepted or directed by Engineer during unusual climatic conditions.

1. ACI 301 "Specifications for Structural Concrete for Buildings."
2. ACI 318 "Building Code Requirements for Reinforced Concrete."
3. CRSI "Manual of Standard Practice."

B. Local Codes and Ordinances: Wherever provisions of the International Building Code 2018 (IBC) or the local current ordinances are more stringent than the above specifications and standards, the local codes and ordinances shall govern.

C. Concrete Testing Service: Engage a testing laboratory acceptable to Owner and Engineer to perform material evaluation tests and to design concrete mixes.

1. Tests, including retesting of rejected materials for installed work, shall be paid for by the Contractor. Testing requirements are specified in FIELD SAMPLING AND TESTING paragraph.

PART 2 - PRODUCTS

2.1 FORM MATERIALS:

A. Forms For Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces.

B. Forms For Unexposed Finish Concrete: Use plywood, lumber, metal, or other acceptable material. If lumber is used, it must be dressed on at least 2 edges and 2 sides for a tight fit.

C. Form Coatings: Commercial formulation form coating compound with maximum VOC of 350 mg/l that will not bond with, stain, nor adversely affect concrete surfaces, will not impair subsequent treatments of concrete surfaces.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units that will leave no metal closer than 1-1/2" to exposed surface.

1. Provide ties that, when removed, will leave holes not larger than 1" diameter in concrete surface.

2.2 REINFORCING MATERIALS:

A. Reinforcing Bars: ASTM A 615(S1), Grade 60, deformed billet steel bars of grades indicated on drawings, free from loose rust, scale and other coatings that may reduce bond.

B. Mesh or Fabric Reinforcement: ASTM A 185, welded wire fabric, of sizes and types as indicated on drawings. Use flat sheets.

C. Supports For Reinforcement: Bolsters, chairs, spacers, and other devices necessary for properly spacing, supporting, and fastening reinforcement in place.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs that are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).
3. For footings, support reinforcing steel with wire, metal chairs, bolsters or other approved device; do not use bricks, rocks or stones.

2.3 CONCRETE MATERIALS:

A. Portland Cement: ASTM C 150, Type I.

B. Concrete Aggregates: ASTM C 33, and as specified. Provide aggregates from a single source for exposed concrete.

1. Fine Aggregate: Clean, sharp, natural or manufactured sand, free from loam, clay, lumps, or other deleterious substances.
2. Coarse Aggregate: Clean, uncoated, processed, locally available aggregate, containing no clay, mud, loam or foreign matter; maximum size of 1-1/2" at foundations and 1" at slabs.

C. Water: Clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or reinforcing.

D. Admixtures:

1. Air Entrained Admixture: ASTM C 260; compatible with other required admixtures.
2. Other Admixtures: Do not use other admixtures unless accepted by Engineer; added chlorides will not be accepted.

E. Miscellaneous Materials:

1. Connectors: Provide metal connectors required for placement in cast-in-place concrete, for the attachment of structural and non-structural members.
2. Vapor Barrier: Refer to Specification Section 07 26 16, UNDERSLAB VAPOR RETARDER for information pertaining to the Vapor Barrier.
3. Expansion Joint Filler: ASTM D 1751, non-extruding premoulded material, 1/2" thick, unless otherwise noted, composed of fiberboard impregnated with asphalt, except use ASTM D 1752, Type II, resin-bound cork for walks and other exposed areas.

4. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
5. Moisture-Retaining Cover: One of the following, complying with ASTM C 171; waterproof paper, polyethylene film, polyethylene-coated burlap.
6. Liquid Membrane-Forming Curing Compound: ASTM C 309, Type I, Class A. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal. Conspec "Cure & Seal", L & M "L & M "Dress & Seal", Sonneborn "Kure-N-Seal", Euclid "Eurocure", Master Builders "Masterkure", W.R. Meadows "Sealtight CS-309", or approved equal.
7. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.

    a. Non-Metallic Shrinkage-Resistant Grout: Conspec "100 Non-Shrink Grout (Non-Metallic)", Euclid "Euco N.S.", L & M "Crystex", Master Builders "Masterflow 713", W. R. Meadows "Sealtight CG-86 Grout", or approved equal.

8. Bonding Agent: Polyvinyl acetate or acrylic base.

    a. Polyvinyl Acetate (Interior Only): Euclid "Euco Weld", L & M "Everweld", or approved equal.
    b. Acrylic or Styrene Butadiene: Euclid "SBR Latex", L & M "Everbond", Conspec "Strongbond", Master Builders "Acryl-Set", Sonneborn "Sonocrete", or approved equal.

9. Epoxy Adhesive: ASTM C 881, two component materials suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit project requirements.

    a. Conspec "Spec-Bond 100", Euclid "Euco Epoxy System #452 or #620", L & M "Epabond", Master Builders "Concresive Standard Liquid", or approved equal.

10. Concrete Sealer: Sonneborn "Son-No-Mar", Euclid "Eucopoxy I", L & M "Super Seal #35", W.R. Meadows "Sealtight Acrylic Concrete Sealer", or approved equal.
11. Concrete Stain: L.M. Scofield is specified. Equivalent products from Southern Color & Chemical are acceptable, or approved equal.

    a. Concrete Stain: Lithochrome Chemstain, in color as selected by Engineer.
    b. Color Sealer: Colorcure Concrete Sealer, color matched to concrete stain color.

12. Waterstop: Cetco (Volclay) Waterstop RX.

2.4 PROPORTIONING OF MIXES:

A. Concrete minimum ultimate strength at 28 days; refer to structural drawings.

B. Mix Designs:

1. Prepare design mixes for each type of concrete, in accordance with ACI 301 and ACI 318.
2. Proportion design mixes by weight for class of concrete required, complying with ACI 211.

C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as approved by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and approved by Engineer before using in work.

D. Provide test results from the concrete supplier for proposed design mix, to establish the following:

1. Gross weight and yield per cu. yd of trial mixtures.
2. Measured slump.
3. Measured air content.
4. Compressive strength developed at 7 days and 28 days, from not less than 3 test cylinders cast for each 7- and 28-day test, and for each design mix.

E. Submit written reports to Engineer for design mixes at least 15 calendar days prior to the start of work.

2.5 ADMIXTURES

A. Use air-entrained admixtures in strict compliance with manufacturer's directions at all concrete exposed to weather.

2.6 SLUMP LIMITS: 4" to +1".

2.7 BATCHING AND MIXING

A. Concrete may be ready-mixed or job-mixed at the Contractor's option, in accordance with the governing building code and with the referenced ACI 318. No hand mixing allowed.

B. Job-Site Mixing:

1. Mix materials for concrete in appropriate drum-type batch machine mixer. For mixers of one cu. yd. or smaller capacity, continue mixing at least 1-

1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd. or fraction thereof.

2. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

C. Ready-Mix Concrete:

1. Comply with requirements of ASTM C 94, and as specified.
2. When air temperature is between 85°F and 90°F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORM WORK:

A. Coordinate installation of joint materials, vapor barrier/retarder, and other related materials with placement of forms and reinforcing steel.

B. Design, erect, support, brace, and maintain formwork to support vertical and lateral loads, and static and dynamic loads that might be applied until such loads can be supported by the concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment elevations, and position.

C. Construct forms in accordance with ACI 347, to sizes, shapes, lines and dimensions indicated, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, molding, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

D. Fabricate forms for easy removal without hammering or prying against the concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.

E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous location.

F. Chamfer exposed corners and edges 3/4" unless otherwise indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

G. Preparation of Form Surfaces: Coat the contact surfaces of forms with a form-coating compound where applicable before reinforcement is placed.

H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such ties. Accurately place and securely support items built in to form.

I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms after concrete placement, if required, to eliminate mortar leaks.

3.2 VAPOR BARRIER INSTALLATION:

A. Following leveling and tamping of granular base for slabs-on-grade, place vapor barrier in position with longest dimension parallel with direction of pour.

B. Lap joints 6" and seal with manufacturers recommended mastic or pressure sensitive tape.

3.3 PLACING REINFORCEMENT:

A. Comply with the Concrete Reinforcing Steel Institute (CRSI) recommended practice for "Placing Reinforcing Bars" for details and methods of reinforcement placement and supports, and as herein specified.

1. Avoid cutting or puncturing vapor barriers during reinforcement placement and concreting operations.

B. Clean reinforcement of loose rust, mill scale, dirt, and other materials or coatings which reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers as required.

D. Place reinforcement to obtain minimum coverages indicated, or if not indicated, in compliance with CRSI. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Do not place bars more than 2" beyond the last leg of continuous support. Do not use supports to hold runways for conveying equipment.

F. Install mesh welded wire fabric reinforcement in as long lengths as practicable, lapping pieces at least one mesh plus 2" but in no case less than 8". Lace splices with wire. Offset end laps to prevent continuous laps in either direction. Lift mesh to middle third of slab by use of hooks.

3.4 JOINTS AND INSERTS:

A. Joints: Provide construction and expansion joints. Locate and install joints, which are not shown on the drawings, so as not to impair the strength and appearance of structure. Submit joint schedule and details to Engineer.

1. Waterstops: Provide waterstops in construction joints as indicated. Install to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.

B. Inserts: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, concrete. Properly locate embedded items in cooperation with other trades, and secure in position before concrete is poured. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.

3.5 PREPARATION OF FORM SURFACES

A. Coat contact surfaces of forms with an approved nonresidual, low-VOC, form-coating compound before reinforcement is placed. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.6 CONCRETE PLACEMENT:

A. Comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as herein specified.

B. Pre-Placement Inspection: Before placing concrete, clean and inspect formwork, reinforcing steel, and items to be embedded or cast-in. Notify other crafts in ample time to permit the installation of their work, and cooperate with them in setting such work, as required. Make sure soil treatment for termite control has been applied to cushion fill before vapor barrier and concrete are installed. Coordinate the installation of joint materials and vapor barriers with placement of forms and reinforcing steel.

C. Notify Engineer 48 hours before placing any concrete.

D. Conveying: Convey concrete from the mixer to the place of final deposit by methods which will prevent the separation or loss of materials. Provide equipment for chuting, pumping, and pneumatically conveying concrete of proper size and design as to insure a practically continuous flow of concrete at the point of delivery and without segregation of the materials. Keep open troughs and chutes clean and free from coatings of hardened concrete. Do not allow concrete to drop freely more than 10 feet. All equipment and methods used for conveying are subject to the approval of Engineer.

E. Depositing: Deposit concrete continuously or in layers of such thickness that no concrete will be placed on hardened concrete so as to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete near or in its final location to avoid segregation due to rehandling or flowing, and displacement of the reinforcement.

F. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

G. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps and hollows. Do not disturb slab surfaces prior to beginning finishing operations.
3. Maintain reinforcing in proper position during concrete placement.

H. Cold Weather Placing: Comply with the requirements of ACI 306 and as follows:

1. Protect concrete work from physical damage and reduced strength that could be caused by frost, freezing actions, and low temperatures.
2. When air temperature has fallen to or is expected to fall below 40`F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50`F and not more than 80`F at point of placement.

    a. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
    b. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators unless otherwise accepted for mix designs.

I. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with the requirements of ACI 305 and as follows:

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90`F. Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
3. When acceptable to Engineer, and when required by high temperatures, low humidity, or other adverse placing conditions, use an approved water-reducing retarding admixture.

3.7 FINISH OF FORMED SURFACES:

A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a

minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 SLAB FINISHES:

A. Float Finish:

1. Apply float finish to slab surfaces to receive trowel finish and other finishes specified.
2. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(f) 18 (floor flatness) and F(l) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to uniform, smooth, granular texture.

B. Trowel Finish:

1. Apply where exposed-to-view, and where slab surfaces are to be covered with tile, paint, resilient flooring, carpet, or other thin film finish coating system.
2. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(f) 20 (floor flatness) and F(l) 17 (floor levelness) measured according to ASTM E 1155. Grind smooth surface defects which would telegraph through applied floor covering.

C. Trowel And Fine Broom Finish: Where tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.

D. Non-Slip Broom Finish: Apply at exterior concrete steps, ramps, walks, and mowing strips, and as indicated.

E. Concrete Sealer: Comply with manufacturer's instructions.

F. Concrete Stain: Comply with manufacturer's instructions.

3.9 CONCRETE CURING AND PROTECTION:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures; maintain concrete above 50°F. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less that 7 days. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

B. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as specified.

1. Provide moisture curing by keeping concrete surface continuously wet by covering with water, by water-fog spray, or by covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
2. Provide moisture-cover curing by covering concrete surface with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Provide curing and sealing compound on interior slabs left exposed; and to exterior slabs, walks, and curbs, as follows:

    a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
    b. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

C. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in

place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor toppings, and other flat surfaces by application of appropriate curing compound. Final cure concrete surfaces to receive finish flooring by moisture-retaining cover, unless otherwise directed.

3.10 REMOVAL OF FORMS:

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of work, may be removed after cumulatively curing at not less than 50°F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may be removed after 14 days if concrete has attained at least 75% of design minimum compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

3.11 REUSE OF FORM:

A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated or otherwise damaged form material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces except as acceptable to Engineer.

3.12 MISCELLANEOUS ITEMS:

A. Filling In: Fill in holes and openings left in concrete for the passage of work by other trades after their work is in place. Mix, place, and cure concrete to blend with in-place construction. Provide all other miscellaneous concrete filling required to complete work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to hard, dense finish and corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations. Set anchor bolts for machines and equipment to template at correct

elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

3.13 CONCRETE SURFACE REPAIRS:

A. Repair and patch defective areas with cement mortar of the same type and class as the original concrete, immediately after removal of forms. Cut out honeycomb, rock pockets, voids over 1/2" diameter, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface, before placing cement mortar in the same manner as adjacent concrete. Proprietary patching compounds may be used when acceptable to Engineer.

1. Smooth, Exposed-To-View Surfaces: Blend cements so that, when dry, patching mortar will match color of surrounding concrete. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
2. Concealed Formed Surfaces: Repair defects that adversely affect the durability of the concrete. If defects cannot be repaired remove and replace the concrete.
3. Other repair methods may be used, subject to acceptance by Engineer.

3.14 FIELD SAMPLING AND TESTING:

A. The following samples and tests will be performed by an independent testing laboratory approved by Owner and Engineer. Refer to paragraph 1.4 C. for responsibility for payment of tests.

B. Samples:

1. Field samples shall be made and cured in accordance with ASTM C 31, for each concrete strength, at the rate of 4 test cylinders and one slump test for each 50 cubic yards of concrete from each day's pour. In accordance with ASTM C 173 Volumetric Method, or ASTM C 231 Pressure Method, make air content check for each set of test cylinders. Air content and slump shall be checked and recorded at both truck discharge and point of placement for pumped concrete from the first load each day.
2. Test cylinders as follows: One at 7 days, two at 28 days, and reserve the remaining for testing after a longer period as required by Engineer, if the 28 day tests do not meet the required strength.
3. The taking of samples from small pours of 10 cubic yards or less may be omitted at the discretion of the Engineer.
4. Additionally, test slump every 25 cu. yds, recording location for report.
5. When early form removal is requested, field cure cylinders tested at 7 or less days to determine sufficient strength.

C. Testing:

1. Where average strength of any group of 3 cylinders falls below the minimum compressive strength or if individual cylinder falls more than 500 psi below minimum compressive strength specified, the Engineer shall have the right to require that test specimens be cut from the structure. Specimens shall be selected by Engineer from location in structure represented by test specimen or specimens which failed.
2. Specimens shall be secured, prepared, and tested in accordance with ASTM C 42, within a period of 60 days after placing concrete.
3. Concrete shall be considered to meet the strength requirement of this specification if it meets the strength requirements of paragraph 5.6.4 of ACI 318.
4. Should laboratory analysis indicate that the proper concrete mix has not been used by the Contractor, all such concrete poured using the improper mix shall be subject to rejection.
5. The cost of cutting specimens from the structure, patching the resulting holes, and making the laboratory analysis shall be borne by the Contractor.
6. The holes from which the cored samples are taken shall be packed solid with no slump concrete proportioned in accordance with the ACI 211 "Recommended Practice for Selecting Proportions of No-Slump Concrete". The patching concrete shall have the same design strength as the specified concrete.
7. If any of the specimens cut from the structure fail to meet the requirements outlined in paragraph 5.6.4 of ACI 318, the Engineer shall have the right to require any and all defective concrete to be replaced, and all costs resulting therefrom shall be borne by the Contractor.

D. Contractor Sampling: In addition to the slump tests specified above, the contractor shall keep a cone (mold) and rod apparatus on the job site for random testing of batches. When concrete does not meet the specified slump requirements, and when directed by the Engineer, immediately perform a slump test in accordance with ASTM C 143. Concrete not meeting the slump requirements shall be removed from the job site.

3.15 PROTECTION:

A. No wheeling, working, or walking on finished surfaces will be allowed for 16 hours after the concrete is placed.

B. Provide plywood or other acceptable protective cover at all traffic areas throughout the job.

C. Protect exposed concrete floors, steps, and walks from paint and other materials or equipment which may mar or damage these surfaces.

3.16 CLEAN-UP

A. Do not allow debris to accumulate. Clean up all concrete and cement materials, equipment and debris upon completion of any portion of the concrete work, and upon completion of entire cast-in-place concrete work.

END OF SECTION

UNDER-SLAB GAS BARRIER / VAPOR RETARDER
(Class A)

PART 1 – GENERAL

1.1 SUMMARY
- A. Products Supplied Under This Section
  1. Gas Barrier / Vapor Retarder, Seam Tape, and Pipe Boots

1.2 REFERENCES
- A. American Society for Testing and Materials (ASTM)
  1. ASTM E 1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil Or Granular Fill Under Concrete Slabs
  2. ASTM E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs
  3. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials
  4. ASTM E 1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
  5. ASTM D 1434 Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting
- B. Radon Diffusion Coefficient K124/02/95
- C. American Concrete Institute (ACI)
  1. ACI 302.1R-6 & 7 Section 3.2.3 Vapor Retarder

1.3 SUBMITTALS
- A. Testing/Specifications
  1. Laboratory test results showing compliance with ASTM & ACI Standards.
  2. Manufacturer's samples, literature.
  3. Manufacturer's installation instructions for placement and seaming.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Provide a Gas Barrier / Vapor Retarder that meets the following:

1. ASTM E-1745 Standard for Plastic Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs
   a) Must meet all Class "A" criteria.

2. ASTM D 1434 Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting
   a) Methane Permeance:
   1.7×10^{-10} m²/d·atm or 0.32 GTR ml/m²•D•ATM

3. K124/02/95 Radon Diffusion Coefficient: $< 1.1 \times 10^{-13}$ m²/s

- Absolute Barrier Y30 BAC or Y40 BAC by Raven Industries, 800-635-3456 or approved equal

Other Manufacturer accepted meeting the above specification:

- GSE Environmental, GSE Ultraflex LLDPE 40 mil

2.2 ACCESSORIES

A. Seam Tape
   1. VaporBond Plus Tape by Raven Industries, 800-635-3456 or other 4” wide gas barrier tape approved by the gas barrier / vapor retarder manufacturer.
   2. VaporBoot Tape by Raven Industries, 800-635-3456 or 2” wide stretchable butyl rubber tape.
   3. Butyl Seal Tape by Raven Industries, 800-635-3456 or approved equal 2” wide double-sided reinforced butyl rubber seaming tape.

B. Pipe Boots
   1. Raven VaporBoot Plus pipe boots or other manufacturer’s supplied pipe boot system.

PART 3 – EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by architect
   1. Level and tamp or roll aggregate, sand or tamped earth base.

3.2 INSTALLATION

A. Install Gas Barrier / Vapor Retarder:
   1. Installation shall be in accordance with manufacturer’s instructions and ASTM E 1643. (Instructions on architectural or structural drawings should be reviewed and followed.)

      A. Unroll vapor barrier with the longest dimension parallel with the direction of the pour and pull open all folds to full width.
      B. Lap vapor barriers over footings and seal to the vertical foundation walls with 2-Sided Raven Butyl Seal tape.
      C. Overlap joints a minimum of 12 inches and seal in-between overlap with 2-Sided Butyl Seal tape then center the 4” wide gas barrier tape approved by gas barrier / vapor retarder manufacturer over the seal overlap.
      D. Seal around sewer pipes, support columns or any other penetration with pipe boots creating a monolithic membrane between the surface of the slab and moisture sources below as well as at the slab perimeter.
      E. When gas barrier is used as a part of an active control system for radon gas and other VOCs, a ventilation system will be required. When installed as a passive system it is still recommended to include a ventilation system that could be converted to an active system later.
      F. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 12 inches and taping all four sides with 4” wide gas barrier tape approved by vapor retarder / gas barrier manufacturer.

OPERATING PLAN

TUCKER UNIT
Compost Facility
2400 State Farm Road
Tucker, AR 72168

March 8, 2022

TUCKER UNIT

COMPOST FACILITY

TUCKER, ARKANSAS

OPERATING PLAN

MARCH 2022

TUCKER UNIT
Compost Facility
2400 State Farm Road
Tucker, AR 72168

Prepared by:

PMI
3512 South Shackleford
Little Rock, Arkansas 72205
501-221-7122

1.0 SITE INFORMATION

The Tucker Unit (Tucker) Compost Facility is located at 2400 State Farm Road near Tucker, Jefferson County, Arkansas, Section 19, T-3-S, R-8-W approximate latitude 34° 26' 15.94" N and longitude 91° 54' 23.69" W, see Vicinity Map, Sheet 2. The Tucker compost facility is located within the highly secure Tucker Unit complex. The Tucker Unit's property is continuously monitored by Tucker staff and video surveillance.

The Tucker compost facility is equipped with two composters that receive organic waste from the correctional facility. The organic waste is composted in the Ecodrum composters for use in a variety of applications.

The Tucker compost facility and storage areas are sheltered under a metal roof that slopes north and south. The metal roof prevents rainfall from coming into direct contact with the compost facility and storage areas. There are two drainage ditches located northeast and southwest of the compost facility. Stormwater north of the facility flows east past the compost facility, and then southwest until reaching Wabbaseka Bayou. Stormwater south of the facility flows southwest into a Wabbaseka Bayou. Both drainage ditches flow southeast. The stormwater continues flowing southeast until reaching South Alligator Bayou. Because all stormwater is diverted away from, and/or around the facility, the facility does not restrict the flow of the base flood, reduce water storage capacity of the floodplain, or result in washout of solid waste.

2.0 OPERATING PLAN

Principal of Operation

The Tri-Form Poly Inc. Ecodrum™ Composter is an ecologically friendly system for converting organics into composting material to reduce or eliminate pathogens so the compost can be used in a variety of applications.

The Ecodrum™ Composter consists of a large plastic drum that rotates to mix the content as it

turns. Two and up to five sections can be used to form the ecodrum. The ecodrums of the composters at Tucker are made up of five sections each. Turning the drum introduces oxygen into the mixture to support the aerobic activity in the material and mixes the contents to insure composting throughout.

Vanes and projections on the inside surface of the drum move the material through the drum as it rotates. Rubber rolls on 2 shafts on each side of the bottom of the frame rotate the drum. Both shafts are driven through an electric motor, speed reducing gearbox and roller chain drive system.

Each composter is equipped with a loading door for placing food waste and bulking material (wood chips) into the drum. Larger units are also designed with a re-bulking door on the second or third segment of the composter. Each door is equipped with 3 over-center latches with retainers to secure the doors when closed. Temperature probes are located in the bottom of the drum to monitor the temperature of the composting mixture. A temperature of 131° F for at least 3 continuous days per recommendation from U.S. Composting Council is required to reduce or eliminate all potential pathogens.

The anticipated food waste quantity delivered to the compost facility is 1,500 lbs per day. The food waste is generated in the kitchen where it is sorted immediately following food preparation. The sorted food waste is then disposed of in the EARU facility's dumpster. The food waste is transported from the dumpster, in barrels, to the compost facility where it is directly inserted into the composters. Food waste will not be stored at the compost facility, and shall be transported to the compost facility as necessary. Incoming food waste will be measured by barrels delivered per day, and the average weight of each barrel depending on the food items cooked. If the composters are inoperable, the food waste will remain in the facility's dumpster, and transported to a DEQ permitted landfill.

The discharge (rear) end of the drum is designed with a cone which allows the operator to collect the discharge and prevent the discharge from covering the end of the composter. Any discharge covering the end of the composters will be removed immediately, and added to the compost storage bay.

The composters discharge the compost into the compost storage bay. Upon discharge, the compost may immediately be used for land application. The compost storage bay has a maximum capacity of 23 cubic yards, and should never exceed this capacity. Only the compost storage bay is permitted to hold discharged compost. The discharged compost should only be transported from the compost storage bay for land application. A front end loader will be used to remove the finished product from the compost storage bay for land application. The front end loader and the composter are the only mechanical equipment needed for the composting process.

The composter's in-vessel design eliminates odor, noise, dust, vectors, littler, and leachate discharge during the composting process. Moisture is controlled by the addition of wood chips as necessary. The composter design does not generate residuals. Of the total volume of the 1,500 lbs of food waste per day, plus bulking agent, approximately 60% of the original volume results in a finished compost product due to condensing during the compost process. The compost storage bay within the compost facility rest upon a concrete slab that is enclosed by 6-foot-tall, wood siding, walls and a metal roof to prevent any leachate from escaping the storage areas.

Each unit is equipped with a snorkel tube and suction fan to draw air through the composter on a regular basis to provide fresh oxygen into the system to support the aerobic process.

All controls are located on a pedestal on the left front corner in a control box. Both the timing, frequency and length of operation of the suction fan and drum rotation can be set in the control box. A ladder(s) is provided to assist the operator to access the loading and re-bulking doors. Rollers at the center of the front section of the drum turn in a groove to hold the entire drum assembly in position during operation.

Operation, control, and maintenance of the compost facility is the responsibility of the operator. The operator must be on site during all hours of operation. The compost facility's operator must be a licensed operator in accordance with APC&EC Regulation No. 27. The compost facility operating hours will be for one hour after each meal provided by Tucker. The permit applicant is responsible for operation, control, and maintenance of the compost facility. The permit applicant

will ensure that Tucker staff follows the operation guidelines set by the manufacturer starting with the Pre-Operation Checklist. Bulking agents will be added to the composter at the recipe ratios suggested by the manufacturer and the rotations per day will be set for 1-10 times per day for the Ecodrum 560. Based on the weight of the organic material and amount of bulking in the drum, the duration of air pulses will be set between 2-10 minutes. The composter is equipped with a control panel for adjustment of controls. Detailed operational procedures can be found in Section 4.13 of the accompanying manufacturer O&M document.

The composters are rated for a maximum capacity of 750 lbs per day per unit of compostable material at 131°F.

3.0 COMPOST MATERIAL QUALITY ASSURANCE / QUALITY CONTROL

Tucker will maintain the compost material according to DEQ Regulation 22 Chapter 8. Specifically, Tucker will test the compost material following the requirements of Reg. 22.807(c), Table 2, see below.

Table 2 Compost Quality Verification

PARAMETER	UNIT	LIMIT	TEST METHOD
Soluble salts – electrical conductivity	mmhos/cm	N/A	NCR Publication 221, Method 14; or EPA 9050A.
Pathogens	PFRP	N/A	EPA, 40 CFR ' 503 Appendix B(B)(1).
Fecal coliform	MPN/g	1000	Standard Methods 9221 E. or 9222 D.
Salmonella	MPN/4g	3 or less	Standard Methods 9260 D.
pH	s.u.	5.5-8.5	NCR Publication 221, Method 14; or EPA 9045.
Arsenic	mg/kg	41	AOAC 975.03b(b) and EPA dry wt. 6010A or 7061A; or EPA 3050 and 6010A or 7061A.
Cadmium	mg/kg	39	AOAC 975.03B(b) and EPA dry wt. 6010A or 7130; or EPA 3050 and 6010A or 7130.
Chromium	mg/kg	1200	AOAC 975.03B(b) and EPA dry wt. 6010A or 7190; or EPA 3050 and 6010A or 7190.
Copper	mg/kg dry wt.	1500	AOAC 975.03B(b) and EPA 6010A or 7210; or EPA 3050 and 6010A or 7210.

Lead	mg/kg dry wt.	300	AOAC 975.03B(b) and EPA 6010A or 7420 or 7421; or EPA 3050 and 6010A or 7420 or 7421.
Mercury	mg/kg dry wt.	17	AOAC 971.21; or EPA 7471A.
Molybdenum	mg/kg dry wt.	54	AOAC 975.03B(b) and EPA 6010A or 7480 or 7481; or AOAC 985.01 and EPA 6010A or 7480 or 7481; or EPA 3050 and 6010A or 7480 or 7481.
Nickel	mg/kg dry wt.	420	AOAC 975.03(b) and EPA 6010A or 7520; or EPA 3050 and 6010A or 7520.
Selenium	mg/kg dry wt.	36	AOAC 975.03B(b) and EPA 7740 or 7741A; or EPA 3050 and 7740 or 7741A.
Zinc	mg/kg	2800	AOAC 975.03B(b) and EPA 6010A or 7950; or EPA 3050 and EPA 6010A or 7950.

Compost material will be sampled and tested annually.

4.0 CONTINGENCY OPERATIONS

In the event of a power outage, natural disaster or fire, Tucker will stop the compost operation and dispose of raw materials to a permitted landfill. Tucker will dispose of raw compost material waste at either the Jefferson County Class 1 Landfill, Chicot County Class 1 Landfill, or Union County Class 1 Landfill. In the event of a fire, the compost facility will be equipped with a fire extinguisher.

5.0 REPORTING AND RECORD KEEPING

Tucker will follow the requirements of DEQ Reg. 22.808 (b) (c) for reporting and record keeping of generated compost. Tucker will follow the requirements listed below:

1. Compost analysis results which include the name of the testing laboratory;
2. Quantity, type and source of incoming waste;
3. Quantity and types of recovered recyclables, as appropriate;

4. Quantity of compost produced;
5. Quantity of compost sold/distributed, and markets;
6. Quantity of disposed residue, date and location of disposal;
7. Daily temperature readings and retention times during PFRP;
8. Leachate management records and summaries;
9. Monitoring results of stormwater runoff and/or site discharges as required by facility NPDES permits;
10. Application documents, permits, design drawings, operating plans, modifications, Department correspondence;
11. Annual reports and data for compiling annual reports.

5.1 ANNUAL REPORT

Tucker will submit an annual report to DEQ, summarizing the results of the requirements listed above, covering the period of January through December. The annual report will be submitted to DEQ by March 31 of each year covering the previous year.

OPERATING GUIDELINES

entegrity
energy. integrity.

FACILITY OPERATING GUIDELINES

Guidelines should be posted at the entrance to the facility

1. The composting facility is not open to the public.
2. Only food waste material from the correctional facility is to be composted.
3. No outside organic material will be accepted.
4. The composting facility has no posted operating hours and will only be loaded under supervision by Arkansas Department of Corrections staff.
5. The composter should be operated in accordance with this operating procedure.
6. If wet compost exits the Ecodrum composter, the wet material should immediately be added back to the front of the drum.

ADC
Arkansas Department of Correction

SITE: _____

MONTH: _____

ECODRUM COMPOSTER QC LOG SHEET

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DATE	ORGANICS LBS	BULKING LBS	TEMPERATURE °F			MOISTURE %	NOTES	OPERATOR
			FRONT	REAR	OUTSIDE			
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
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21								
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27								
28								
29								
30								
31								

NOTES:
1. Temp: Front temperature probe should read >131°F; not to exceed 160°F
2. Moisture: Moisture should test between 50-60% at the second door or exit
3. Capacity: Do not overfill the Ecodrum, to allow enough room for air flow

Tri-Form Poly Inc.

ecodrum™

ECODRUM™ COMPOSTER

COMPUTER CONTROL

OPERATOR'S MANUAL

TABLE OF CONTENTS

1 INTRODUCTION

Congratulations on your choice of a Tri-Form Poly Inc. Ecodrum™ Composter and welcome to Tri-Form Poly Inc.'s quality line of composting equipment. This equipment is designed and manufactured to meet the needs of a discriminating buyer in the industry for composting of organic material.

Safe, efficient and trouble free operation of your new Ecodrum™ Composter requires that you, and anyone else who will be operating or maintaining the Ecodrum™ Composter, read, understand and practice ALL of the Safety, Operation, Maintenance and Trouble Shooting recommendations contained within this Operator's Manual.

This manual applies to Ecodrum™ Composters controlled by a computer system manufactured by Tri-Form Poly Inc. Certain options may be available to specifically tailor the Ecodrum™ Composter to your operation and may not be included in this manual. Please contact the manufacturer regarding additional information about these options. Use the Table of Contents and Index as a guide to find specific information.

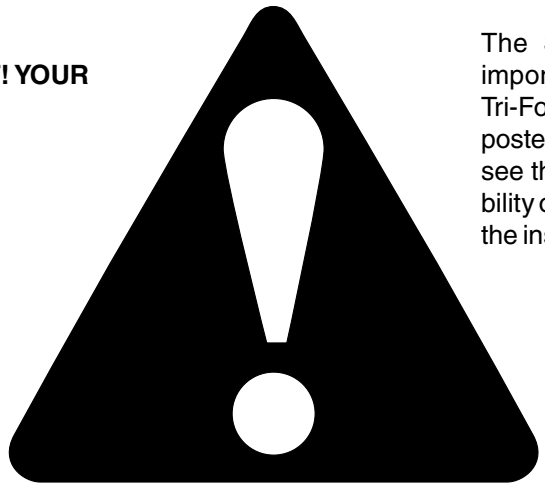
Keep this manual handy for frequent reference and so that it will be passed on to new operators or owners. Call your Ecodrum™ Composter dealer if you need assistance, information or additional copies of this manual.

MACHINE ORIENTATION - The snorkel is on the front and the discharge is on the rear. The controls are on the left side of the frame.

2 SAFETY

SAFETY ALERT SYMBOL

This Safety Alert symbol means
ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



The Safety Alert symbol identifies important safety messages on the Tri-Form Poly Inc. Ecodrum™ Composter and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Why is SAFETY important to you?

3 Big Reasons

Accidents Disable and Kill
Accidents Cost
Accidents Can Be Avoided

SIGNAL WORDS:

Note the use of the signal words **DANGER, WARNING** and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guide-lines:

SI NO LEE INGLES, PIDA AYUDA A AIGUIEN QUE SI LO LEA PARA QUE LE TRADUZCA LAS MIDIDAS DE SEGURIDAD.

DANGER - Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.

WARNING - Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION - Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

If you have any questions not answered in this manual or require additional copies or the manual is damaged, please contact your dealer or Tri-Form Poly, Inc. • Phone: (204) 746-6401 • Fax: (204) 746-8404 •132 Charles Ave. W, Morris, MB R0G 1K0 • Email: info@triformpoly.com • http://www.ecodrumcomposter.com

SAFETY

YOU are responsible for the **SAFE** operation and maintenance of your Tri-Form Poly Inc. Ecodrum™ Composter. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the Composter be familiar with the operating and maintenance procedures and related **SAFETY** information contained in this manual. This manual will take you step-by-step through your working day and alerts you to all good safety practices while operating the Composter.

Remember, **YOU** are the key to safety. Good safety practices not only protect you but, also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this machine is familiar with the procedures recommended and follows safety precautions. Remember, most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

- Ecodrum™ Composter owners must give operating instructions to operators or employees before allowing them to operate the machine, and at least annually thereafter.

- The most important safety device on this equipment is a SAFE operator. It is the operator's responsibility to read and understand ALL Safety and Operating instructions in the manual and to follow these. Most accidents can be avoided.

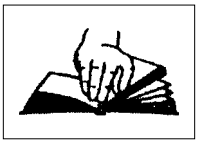
- A person who has not read and understood all operating and safety instructions is not qualified to operate this machine. An untrained operator exposes himself and bystanders to possible serious injury or death.

- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.

- Think SAFETY! Work SAFELY!

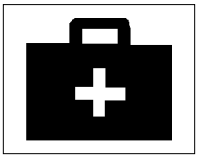
2.1 GENERAL SAFETY

1. Read and understand the Operator's Manual and all safety signs before supplying power, operating, maintaining or adjusting the Composter.

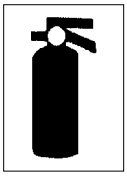


2. Only trained, competent persons shall operate the Composter. An untrained operator is not qualified to operate this machine.

3. Provide a first-aid kit for use in case of an accident. Store in a highly visible place.



4. Provide a fire extinguisher for use in case of an accident. Store in a highly visible place.



5. Install and properly secure all guards and shields before operating.

6. Wear appropriate protective gear. This list includes but is not limited to:

   - Protective shoes with slip resistant soles
   - Protective glasses or face shield
   - Rubber gloves
   - Hearing protection
   - Respirator
   - Protective clothing

7. Turn machine OFF, shut down and lockout power supply and wait for all moving parts to stop be-fore adding animal mortality, servicing, adjusting, maintaining, repairing or cleaning. (Safety lockout devices are available through your Tri-Form Poly Inc. dealer parts department).

8. Always wear the appropriate safety gear to protect yourself including but not limited to face shield, protective clothing, respirator and rub-ber gloves. Do not take chances with the safety of yourself or others.

9. Know the emergency medical center number for your area.

10. Review safety related items with all operators annually.

2.2 EQUIPMENT SAFETY GUIDELINES

1. Safety of the operator and bystanders is one of the main concerns in designing and developing a machine. However, every year many accidents oc-cur which could have been avoided by a few sec-onds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following pre-cautions in this section. To avoid personal injury or death, study the following precautions and insist those working with you, or for you, follow them.

2. In order to provide a better view, certain photo-graphs or illustrations in this manual may show an assembly with a safety shield removed. However, equipment should never be operated in this con-dition. Keep all shields in place. If shield removal becomes necessary for repairs, replace the shield prior to use.

3. Replace any safety sign or instruction sign that is not readable or is missing. Location of such safety signs is indicated in this manual.

4. Never use alcoholic beverages or drugs which can hinder alertness or coordination while oper-ating this equipment. Consult your doctor about operating this machine while taking prescription medications.

5. **Under no circumstances should young chil-dren be allowed to work with this equipment. Do not allow persons to operate or assemble this unit until they have read this manual and have developed a thorough understanding of the safety precautions and of how it works.** Review the safety instructions with all users annually.

6. The operator should be a responsible, properly trained and physically able person familiar with machinery and trained in this equipment's operations.

7. Never exceed the limits of a piece of machinery. If its ability to do a job, or to do so safely, is in ques-tion - **DON'T TRY IT.**

8. Do not modify the equipment in any way. Unauthorized modification result in serious injury or death and may impair the function and life of the equipment.

9. In addition to the design and configuration of this implement, including Safety Signs and Safety Equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of the machine. Refer also to Safety Messages and operation instruction in each of the appropriate sections of the auxiliary equipment and machine Manuals. Pay close attention to the Safety Signs affixed to the auxiliary equipment and the machine.

2.3 STORAGE SAFETY

1. Store the Ecodrum™ Composter on a firm level surface.

2. If required, make sure the unit is firmly blocked up.

3. Make certain that all door latches are secured with their lock pins before storing.

4. Store away from areas of human activity.

5. Do not allow children to play on or around the stored Ecodrum™ Composter.

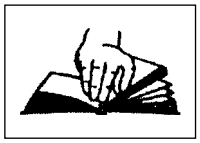
6. Unplug power cord and lock out power by turning off master control panel and padlocking the door shut to prevent electrocution or unauthorized start up of the Ecodrum™ Composter.

2.4 SAFETY TRAINING

1. Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by a single careless act of an operator or bystander.

2. In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of this equipment.

3. It has been said, "The best safety feature is an informed, careful operator." We ask you to be that kind of an operator. It is the operator's responsibility to read and understand ALL Safety and Operating instructions in the manual and to follow these. Accidents can be avoided.



4. **Working with unfamiliar equipment can lead to careless injuries. Read this manual, and the manual for your auxiliary equipment, before assembly or operating, to acquaint yourself with the machines. If this machine is used by any person other than yourself. It is the machine owner's responsibility to make certain that the operator, prior to operating:**

   a. Reads and understands the operator's manuals.

   b. Is instructed in safe and proper use.

5. Know your controls and how to stop the Composter and any other auxiliary equipment quickly in an emergency. Read this manual and the one provided with your other equipment.

6. Train all new personnel and review instructions frequently with existing workers. Be certain only a properly trained and physically able person will operate the machinery. A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death. If the elderly are assisting with work, their physical limitations need to be recognized and accommodated.

2.5 SAFETY SIGNS

1. Keep safety signs clean and legible at all times.

2. Replace safety signs that are missing or have become illegible.

3. Replaced parts that displayed a safety sign should also display the current sign.

4. Safety signs are available from your authorized Distributor or Dealer Parts Department or the factory.

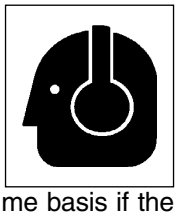
How to Install Safety Signs:

- Be sure that the installation area is clean and dry.
- Be sure temperature is above 50°F (10°C).
- Determine exact position before you remove the backing paper. (See Section 3).
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.

2.6 PREPARATION

1. Never operate the Composter and auxiliary equipment until you have read and completely understand this manual, the auxiliary equipment Operator's Manual, and each of the Safety Messages found on the safety signs on the Composter and auxiliary equipment.

2. 
Personal protection equipment including hard hat, face shield or protective glasses, safety shoes, and rubber gloves are recommended during assembly, installation, operation, adjustment, maintaining, repairing, or moving the machine. Do not allow long hair, loose fitting clothing or jewelery to be around equipment.

3. 
PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS! Motors or equipment attached can often be noisy enough to cause permanent, partial hearing loss. We recommend that you wear hearing protection on a full-time basis if the noise in the Operator's position exceeds 80db. Noise over 85db on a long-term basis can cause severe hearing loss. Noise over 90db adjacent to the Operator over a long-term basis may cause permanent, total hearing loss. **NOTE:** Hearing loss from loud noise (from tractors, chain saws, radios, and other such sources close to the ear) is cumulative over a lifetime without hope of natural recovery.

4. Clear working area of debris, trash or hidden obstacles that might be hooked or snagged, causing injury, damage or tripping.

5. Operate only in daylight or good artificial light.

6. Be sure machine is properly anchored, adjusted and in good operating condition.

7. Ensure that all safety shielding and safety signs are properly installed and in good condition.

8. Before starting, give the machine a "once over" for any loose bolts, worn parts, cracks, leaks and make necessary repairs. Always follow maintenance instructions.

2.7 INSTALLATION SAFETY

1. Disconnect and remove all mechanical locks, anchor chains and any other transport devices that would hinder or prohibit the normal functioning of the Ecodrum™ Composter upon start up. Serious damage to the machine and/or personal injury to the operator and bystanders may result from attempting to operate the machine while mechanical locking devices are still attached.

2. Position the machine on firm, level ground before operating.

3. Level the frame before using or loading.

4. Have at least one extra person available to assist when elevating, moving or connecting to other equipment.

5. Make certain that sufficient amperage, at the proper voltage and frequency (60Hz) is available by following ANSI/NFPA 70 Wiring Standard before connecting power. If you are uncertain, have a licensed electrician provide power to the machine.

6. Have a licensed electrician provide 240 V single phase 20 amp power to the Composter.

2.8 LOCK-OUT TAG-OUT SAFETY

1. Establish a formal Lock-Out Tag-Out program for your operation.

2. Train all operators and service personnel before allowing them to work around the Composter.

3. Provide tags at the work site and a sign-up sheet to record tag out details.

2.9 OPERATING SAFETY

1. Read and understand the Operator's Manual and all safety signs before operating, maintaining, adjusting or repairing the Composter.

2. Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Tri-Form Poly Inc. dealer parts department) and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.

3. Wear appropriate Personal Protective Equipment (PPE).

4. Always wear the appropriate safety gear to protect yourself including but not limited to face shield, protective clothing, respirator and rub-ber gloves. Do not take chances with the safety of yourself or others.

5. Install and properly secure all guards and shields before operating.

6. Keep hands, feet, hair and clothing away from all moving parts.

7. Clear the area of bystanders, especially small chil-dren, before starting.

8. Make sure all control switches are in the off posi-tion before connecting power supply.

9. Before supplying electrical power to the machine, be sure that you have adequate amperage at the proper phase and voltage to run it. If you do not know or are unsure, consult a licensed electrician.

10. Keep the working area clean and dry.

11. Review safety instructions annually.

2.10 MAINTENANCE SAFETY

1. Read and understand all the information contained in the Operator's Manual regarding operating, ser-vicing, adjusting, maintaining and repairing.

2. Turn machine OFF, shut down and lock out pow-er supply (safety lockout devices are available through your Tri-Form Poly Inc. dealer parts de-partment) and wait for all moving parts to stop be-fore servicing, adjusting, maintaining or repairing.

3. Follow good shop practices:

   - Keep service area clean and dry.
   - Be sure electrical outlets and tools are properly grounded.
   - Use adequate light for the job at hand.

4. Make sure all guards and doors are in place and properly secured when operating Composter.

5. Do not work on Composter electrical system unless the power cord is un-plugged or the power supply is locked out. Lock-out tag-out power source before performing any maintenance work.

6. Always wear the appropriate safety gear to protect yourself including but not limited to face shield, protective clothing, respirator and rub-ber gloves. Do not take chances with the safety of yourself or others.

2.11 ELECTRICAL SAFETY

1. Have only a qualified licensed electrician supply power to the machine by following ANSI/NFPA 70 Wiring Standard.

2. Make certain that the Ecodrum™ Composter is properly grounded at the power source.

3. Make certain that all electrical switches are in the OFF position before plugging the Composter in.

4. Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Tri-Form Poly Inc. dealer parts department) and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.

5. Disconnect power before resetting any motor or breaker overload.

6. Replace any damaged electrical plugs, cords, switches and components immediately.

7. Do not work on Ecodrum™ Composter electrical system unless the power cord is unplugged or the power supply is locked-out tagged-out.

2.12 BIO-SECURITY

1. Review and follow all bio-security protection protocols specified by local, state/provincial and federal laws and regulations.

2. Follow all instructions for bio-security protection provided by U.S. Composting Council and EPA regulation 3:19 that specifies composting material temperature must be maintained above 131° F for 3 continuous days to eliminate all pathogens, weed seeds and viruses.

3. Refer to information from U.S. Composting Council and EPA if you have questions about the bio-security of your application.

4. Always wear appropriate Personal Protective Equipment (PPE) whenever operating or servicing composter.

2.13 COMPOSTING SAFETY

1. Review operating, environmental and composting safety with personnel frequently to remind them of required procedures.

2. Always wear appropriate Personal Protective Equipment (PPE) whenever operating or servicing composter. This list includes but is not limited to:

   - Hard hat
   - Face shield or goggles
   - Rubber gloves
   - Fluid repellent coveralls
   - Slip resistant safety shoes
   - Respirator or breathing protection

3. Do not allow personnel with a compromised immune system to be around or work on the composter.

4. Pathogens can create animal mortality that can be transferred to humans.

5. Do not contact animal mortality, fluids or odors to prevent any transfer.

6. Noxious odors and smells such as ammonia may be present on composting sites. Personnel that are sensitive to these odors should stay away from the operation.

7. Always maintain compost material temperature above 131° F for at least 3 continuous days per recommendations from U.S. Composting Council to reduce or eliminate all pathogens, weed seeds and viruses.

2.14 EMPLOYEE SIGN-OFF FORM

Tri-Form Poly Inc. follows the general Safety Standards specified by the American Society of Agricultural and Biological Engineers (ASABE) and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining a Tri-Form Poly Inc. built machine must read and clearly understand ALL Safety, Operating and Maintenance information presented in this manual.

Do not operate or allow anyone else to operate this equipment until such information has been reviewed. Annually review this information before the season start-up.

Make these periodic reviews of SAFETY and OPERATION a standard practice for all of your equipment. We feel that an untrained operator is unqualified to operate this machine.

A sign-off sheet is provided for your record keeping to show that all personnel who will be working with the equipment have read and understand the information in the Operator's Manual and have been instructed in the operation of the equipment.

SIGN-OFF FORM

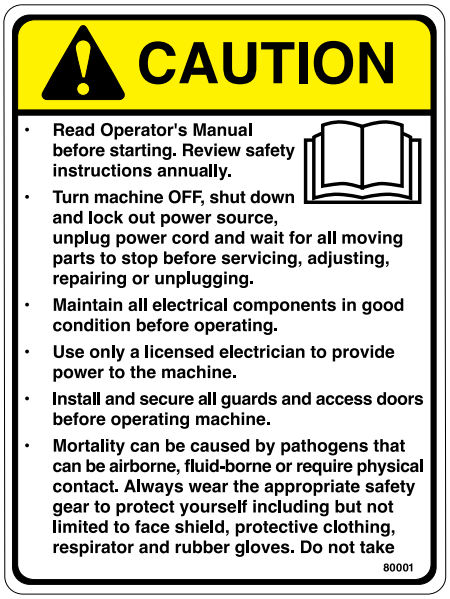
DATE	EMPLOYEE'S SIGNATURE	EMPLOYER'S SIGNATURE

3 SAFETY SIGN LOCATIONS

The types of safety signs and locations on the equipment are shown in the illustrations that follow. Good safety requires that you familiarize yourself with the various Safety Signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

A



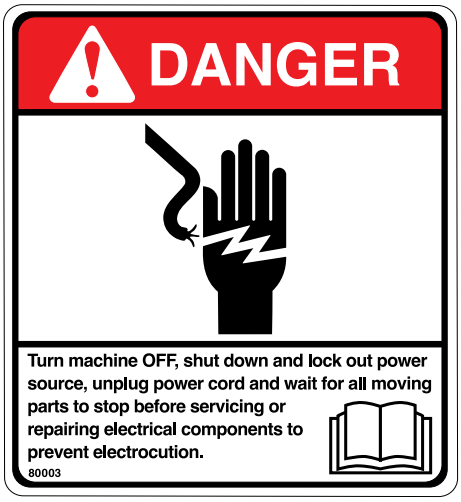
B

REMEMBER - If Safety Signs have been damaged, removed, become illegible or parts replaced without safety signs, new signs must be applied. New safety signs are available from your authorized dealer.

The types of safety signs and locations on the equipment are shown in the illustrations that follow. Good safety requires that you familiarize yourself with the various Safety Signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

C



D

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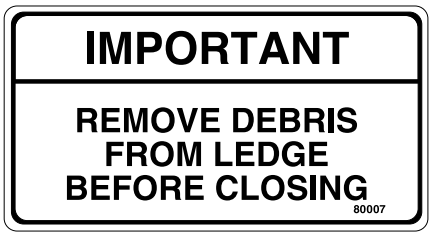
- Think SAFETY! Work SAFELY!

E

F



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- Think SAFETY! Work SAFELY!

REMEMBER - If Safety Signs have been damaged, removed, become illegible or parts replaced without safety signs, new signs must be applied. New safety signs are available from your authorized dealer.

4 OPERATION

OPERATING SAFETY

- Read and understand the Operator's Manual and all safety signs before operating, maintain-ing, adjusting or repairing the Composter.
- Turn machine OFF, shut down and lock out power supply (safety lockout devices are avail-able through your Tri-Form Poly Inc. dealer parts department) and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.
- Wear appropriate Personal Protective Equipment (PPE).
- Always wear the appropriate safety gear to protect yourself including but not limited to face shield, protective clothing, respirator and rubber gloves. Do not take chances with the safety of yourself or others.
- Install and properly secure all guards and shields before operating.
- Keep hands, feet, hair and clothing away from all moving parts.
- Clear the area of bystanders, especially small children, before starting.
- Make sure all control switches are in the off position before connecting power supply.
- Before supplying electrical power to the machine, be sure that you have adequate amperage at the proper phase and voltage to run it. If you do not know or are unsure, consult a licensed electrician.
- Keep the working area clean and dry.
- Review safety instructions annually.

4.1 TO THE NEW OPERATOR OR OWNER

The Ecodrum™ Composter is designed to transform organic material and carbon material into compost with reduced levels of pathogens, weed seeds and virus-es. Be familiar with the machine before starting.

It is the responsibility of the owner or operator to read this manual and to train all other operators before they start working with the machine. In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, and prudence of personnel involved in the operation, transport, maintenance and storage of equipment or in the use and maintenance of facilities.

Follow all safety instructions exactly. Safety is everyone's business. By following recommended procedures, a safe working environment is provided for the operator, bystanders and the area around the worksite. Untrained operators are not qualified to operate the machine.

Many features incorporated into this machine are the result of suggestions made by customers like you. Read this manual carefully to learn how to operate the machine safely and how to set it to provide maximum efficiency. By following the operating instructions in conjunction with a good maintenance program, your Ecodrum™ Composter will provide many years of trouble-free service.

4.2 MACHINE COMPONENTS

Principal of Operation

The Tri-Form Poly Inc. Ecodrum™ Composter is an ecologically friendly system for converting organics into composting material to reduce or eliminate pathogens so the compost can be used in a variety of applications.

The Ecodrum™ Composter consists of a large plastic drum that rotates to mix the content as it turns. Two and up to 5 sections can be used to form the ecodrum. Turning the drum introduces oxygen into the mixture to support the aerobic in the material and mixes the contents to insure composting throughout. Vanes and projections on the inside surface of the drum move the material through the drum as it rotates. Rubber rolls on 2 shafts on each side of the bottom of the frame rotate the drum. Both shaft are driven through an electric motor, speed reducing gearbox and roller chain drive system.

Each composter is equipped with a loading door for placing animal mortality and bulking material into the drum. Larger units are also designed with a re-bulking door on the second or third segment of the composter. Each door is equipped with 3 over-center latches with retainers to secure the doors when closed.

Temperature probes are located in the bottom of the drum to monitor the temperature of the composting mixture. A temperature of 131° F for at least 3 continuous days per recommendation from U.S. Composting Council is required to reduce or eliminate all potential pathogens.

The discharge (rear) end of the drum is designed with a cone which allows the operator to collect the discharge and prevent the discharge from covering the end of the composter.

Each unit is equipped with a snorkel tube and suction fan to draw air through the composter on a regular basis to provide fresh oxygen into the system to support the aerobic process.

All controls are located on a pedestal on the left front corner in a control box. Both the timing, frequency and length of operation of the suction fan and drum rotation can be set in the control box. A ladder(s) is provided to assist the operator to access the loading and re-bulking doors.

Rollers at the centre of the front section of the drum turn in a groove to hold the entire drum assembly in position during operation.

A Drum Section
B Snorkel
C Suction Blower
D Suction Motor
E Roller Drive Motor
F Roller Drive Gearbox
G Roller Drive System
H Control Pedestal
J Control Box
K Roll Drive
L Drum Stabilizer Roller
M Door Open Support
N Loading Door
O Re-Bulking Door
P Door Access Ladder
Q Temperature Gauge
R Discharge Cone
S Compost Discharge
T Ecodrum™ Facilities

FIG. 1 MACHINE COMPONENTS


M
K
F
E


J


A
Q
K


J


T
A
A
J
G
C


A
R
S
S


T
O
N
A
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A
P
K
S

4.3 MACHINE BREAK-IN

Although there are no operational restrictions on the Ecodrum™ Composter when used for the first time, it is recommended that the following mechanical items be checked:

A. Read Ecodrum™ Composter and auxiliary equipment manuals before starting.

B. After 100 hours (break-in):

1. Change oil in gearbox using ISO 320 gear oil.

C. After operating for 1 week:

1. Retorque all fasteners.
2. Check that all electrical connections are tight and cords are routed out of the way or protected.
3. Check the alignment and tension of the roller drive system. Realign or tighten as required.
4. Check all drive sprockets to make sure none has moved. Re-align and tighten any sprocket that has moved.
5. Check the alignment and sealing of all snorkel air system junctions. Realign or tighten as required.
6. Check the integrity of the door(s) and latches plus compost removal systems. Realign, tighten or re-seal as required.
7. Remove hose from air exhaust system and clean it and the snorkel.

D. After 4 weeks:

1. Repeat steps 1 through 7 of Section B.
2. Then go to the regular servicing and maintenance schedule as defined in the Maintenance Section.

4.4 PRE-OPERATION CHECKLIST

Safe and efficient operation of your new Ecodrum™ Composter requires that each operator reads and follows all safety precautions and operating procedures contained in this section. Performing the following pre-operation checklist is important for personal safety as well as for continued mechanical soundness and longevity of your new Tri-Form Poly Inc. Ecodrum™ Composter. The checklist should be performed before operating the Ecodrum™ Composter and prior to each operation thereafter.

1. Lubricate the machine according to the schedule prescribed in the "Maintenance Section".

2. Insure that proper protective gear is in good repair and available for use by each operator. Make certain that each operator uses the protective gear. Protective gear includes but, is not limited to:

- Hard hat
- Rubber gloves
- Safety glasses or face shield
- Full length protective clothing
- Steel toed boots with slip resistant soles.
- Hearing protection
- Respirator

3. Insure that all safety guards and shields are in good repair and securely in place.

4. Check that the roller drive system is properly aligned and tensioned. Adjust if necessary as outlined in the "Maintenance Section".

5. Check the alignment and sealing of all snorkel air system junctions. Realign or tighten as required.

6. Make sure that all electrical switches are in the OFF position before supplying power.

7. Check that all electrical connections are tight and cords are routed out of the way or protected.

8. Be sure the working area is clean and dry to prevent tripping or slipping.

9. Check the integrity of the door(s) and latches plus compost removal systems. Realign, tighten or re-seal as required.

4.5 PRINCIPALS OF COMPOSTING

Composting is the controlled biological decomposition and conversion of solid organic material into a humus-like material called compost. This process is a natural transformation of organic materials into a material with environmentally beneficial applications. Composting is an aerobic process, meaning it requires oxygen. This process uses various microorganisms such as bacteria, fungi, etc to break down the organic compounds into simpler substances.

Composting organics and food waste is a viable process with a beneficial use. It reduces pathogens, diseases and undesirable weed seeds. Properly managing air, moisture and nutrients, the process can transform large quantities of organic material into compost in a relatively short period of time.

There are different types of composting which use different technologies, but the composting principles are all the same. The different types are:

1. Aerated (turned) Windrow Composting.
2. Aerated Static Pile Composting.
3. In-Vessel Composting.
4. Vermicomposting.

There are many benefits to using cured compost in a horticulture application. These benefits include but are not limited to:

1. Increases the soils structure and ability to hold water and nutrients.
2. Can reduce the need for pesticides by increasing the soil's biological activity.
3. Offsets the use of natural resources (e.g., peat moss) for mulch.
4. Diverts valuable organic materials from landfills.
5. Adds organic matter and nutrients to soil, reducing the need for chemical fertilizers.
6. Encourages slow release of nitrogen and lowers the carbon to nitrogen ratio, making nitrogen more available to plants.
7. Kills pathogens and weed seeds.
8. Prevents soil erosion.

FIG. 2 COMPOSTER DISCHARGE

FIG. 3 COMPOSTER

4.6 COMPOSTING REQUIREMENTS

In order to create a satisfactory compost, it is essential to have a favorable carbon to nitrogen ratio, as well as sufficient moisture level and adequate oxygen. Carbon provides both an energy source and the basic building block making up about 50% of the microbial cells (wood chips, shavings, peanut hulls, etc). Nitrogen is a crucial component of proteins, nucleic acids, amino acids, enzymes and co-enzymes necessary for cell growth and function. The ideal ratio of C:N for active composting is 25:1 to 30:1. Ratios of 20:1 up to 40:1 will consistently give good results. A minimum of 5% oxygen concretion within the pore spaces of composting materials is recommended (air contains about 21%).

During composting, the microorganisms consume oxygen while feeding on the organic matter. In addition to providing oxygen, aeration removes heat, water vapor and other gases trapped within the composting materials. The most efficient temperatures for composting are between 130 F and 160 F. At these temperatures, your organic matter will break down quicker and there will be little to no pathogens, diseases, weed seeds and insect larvae in the compost.

Water provides the medium for chemical reactions and for the transportation of nutrients. It also allows microorganisms to move from place to place. Ideally, you are looking for a moisture level between 50-60%. Activity ceases when the moisture level drops below 15% and when moisture levels are above 60%; the water displaces much of the air in the pore spaces of the composting materials, which limits air movement and leads to anaerobic conditions.

Heat accumulation in a compost pile can rise above 160° F due to microbial activity and the insulating qualities of the composting materials. When the temperature reaches this level, many of the microbes die or become dormant. Temperatures should be monitored and heat loss should be accelerated by force aeration.

Wood Chips

Shavings

Peanut Hulls

FIG 4 BULKING MATERIAL (TYPICAL)

4.6.1 IN VESSEL COMPOSTING DEFINITION:

A process in which compostable material is enclosed in a drum, silo, bin, tunnel, reactor or other container for the purpose of producing compost and maintained under uniform conditions of temperature and moisture where air-borne emissions are controlled.

In vessel composters use a forced aeration and / or mechanical agitation to control conditions and promote rapid composting.

4.6.2 IN VESSEL COMPOSTING ADVANTAGES:

1. Composting can be more closely controlled, leading to taster decomposition and more consistent product quality.

2. Effects of weather are minimized.

3. Less manpower is required to operate the system and staff is less exposed to composting material.

4. Can often be done on-site which saves collection costs.

5. Less land area is required.

6. Process air and leachate can be more easily collected and treated.

7. Public acceptance of the facility are better.

8. Can accommodate various types and amounts of organic waste (e.g., odorous bio solids and food).

FIG. 5 ADDING BULKING (TYPICAL)

4.7 SELECTING AND SIZING AN IN-VESSEL COMPOSTER FOR OPERATION

Each application must review the type and size of its operation to select the model of unit appropriate for use. Review each of the following items to establish the model size prior to selecting the model.

4.7.1 MODEL 560 COMPOSTER

The Ecodrum 560 composter is sized to handle a nominal 750 lbs per day of organic material. Bulking agent is then added to the 750 lbs to create the proper compost mixture.

4.8 RECIPE GUIDE

The composter must have the animal mortality and bulking material loaded in the appropriate ratios to obtain consistent and desirable results. Each operator needs to review and follow the recommended recipe for combining animal mortality and bulking material. These recommendations will maintain the ideal mixture for composting.

These 3 main factors that must be monitored:

1. Carbon to nitrogen ratio should be between 20:1 and 40:1. Carbon is represented by bulking material and nitrogen by the animal mortality.

2. Moisture should be below 60% by weight. It is the bulking material that reduces the amount of water and the average moisture level in your compost.

3. Bulking materials should be dry, porous and bulky in texture.

   Bulking material:
   Use dried pine shavings, peanut hulls or other carbon sources as directed by your Ecodrum™ representative. Poultry litter varies and can have up to 50% moisture, so it should never be the bulk of your carbon sources but added in addition if space in the composter is not an issue.

   Always load the bulking material in first followed by the animal mortality.

NOTE

1 bag = 5.5 cubic feet, TSC Store branded pine wood chips.

FIG. 10 COMPOSTER

Wood Chips

Shavings

Peanut Hulls

FIG 11 BULKING MATERIAL (TYPICAL)

TABLE 1

Recipe Ratios:	Oranics	Bulking Agent
Food Waste (volume Ratio)	1 cu. ft.	2 cu. ft.

4. Store extra bulking material next to the composter for convenience when loading.

FIG. 12 STORED (TYPICAL)

4.9 ROTATION GUIDE

The Ecodrum™ is a rotary drum composter and as such operates primarily through timed series of rotations.
There are 2 main reasons that it is important to rotate the Ecodrum:

1. Provides aeration which uniformly supplies oxygen to the bacteria involved in the composting operation.

2. Mixes the material in the drum to ensure complete composting.

FIG. 13 ROTATION DRIVE

Use the following table provides the suggested range of daily rotations for each model.

TABLE 2

Model	Rotations per Day
Model 260	1 - 4 times per day
Model 360	1 - 6 times per day
Model 460	1 - 8 times per day
Model 560	1 - 10 times per day

Some Ecodrum™ models include a re-bulking door in addition the loading door. Mortalities should not be added into this door.

NOTE:

Due to the variables in every composting situation, the purchaser alone is responsible for the operation of the Ecodrum™ according to the US Composting Council standards.

4.10 AIR GUIDE

Each application and model of Ecodrum™ needs to be set according to the weight of the organic material and the amount of bulking in the drum. Set the fans using the following table as a general guide on how much the fans run.

The following table provides the suggested range of hourly air pulses for each model:

TABLE 3

Model	Duration of Air Pulses
Model 260	1 - 4 minutes
Model 360	2 - 6 minutes
Model 460	2 - 10 minutes
Model 560	2 - 10 minutes

NOTE

During winter months or freezing conditions it may be necessary to reduce the length of air pulses to ensure stable temperatures inside the drum.

FIG. 14 AIR HOSE

4.11 CONTROLS

Each Ecodrum™ composter is equipped with a control panel mounted on a pedestal located on the left front corner of the frame. Read and be familiar with the operation of the Omron control system by reviewing its manual.

1. **Computer Control Panel:**

   a. **Display Screen:**
   This panel displays all the screens with the parameters and some of the switches used by the operator to monitor and set the operation of the composter.

   b. **F Switches:**

   - System: Depress this switch to bring up the Home screen on the display.
   - F1: Not used at this time.
   - F2: Not used at this time.
   - F3: Depress this switch to bring up the 'Password' screen to access Fan running times.
   - F4: Not used at this time.

   c. **ON/OFF Switch:**
   This 2 position rotary switch controls the power to the control box. Turn counterclockwise to turn control box off and clockwise to turn on.

   d. **Emergency Stop:**
   This red push-pull switch is the emergency off switch for the composter. Depress this switch to turn the machine off. Use this switch if an emergency arises to stop the unit. Correct emergency before re-starting machine. Twist and pull the switch out to turn the power on again to operate unit.

   e. **Power Present Light:**
   This light is illuminated when there is power to the control box.

FIG. 15 ELECTRONIC CONTROL PANEL

2. **Controller Screen:**
Review this section to understand the location, name and function of each switch on the controller. Go to Start-Up section to see the screen display entries.

   a. **Small:**
   Touch this switch to go to Small mortality set-up screen.

   b. **Medium:**
   Touch this switch to go to Medium mortality.

   c. **Medium/Large:**
   Touch this switch to go to Medium/Large mortality.

   d. **Large:**
   Touch this switch to go to Large mortality.

   e. **Idle:**
   Touch this switch to go to the Idle settings.

   f. **Home:**
   Touch this switch to go to Home screen.

   g. **Manual:**
   Touch this switch to go to the Manual setting screen.

   h. **Cycle Setup:**
   Touch this switch to go to the Cycle Setup screen.

   i. 🔧:
   Touch this (🔧 wrench) switch to go to Maintenance settings screen.

   j. **System:**
   Touch this switch to go to the screen to set time and day.

   k. **F1, F2 and F4:**
   F1, F2 and F4 are not used.

   l. **F3:**
   Touch and hold F3 for 3 seconds to bring up the password screen to get to the Fan Running Time screen.

3. **Temperature Gauge:**
Each drum section can be equipped with a temperature gauge. The drum turns until the temperature probe is in the material at the bottom of the drum. The composting process can only take place when the mixture temperature is kept above 131° F continuously for recommendation from U.S. Composting Council.

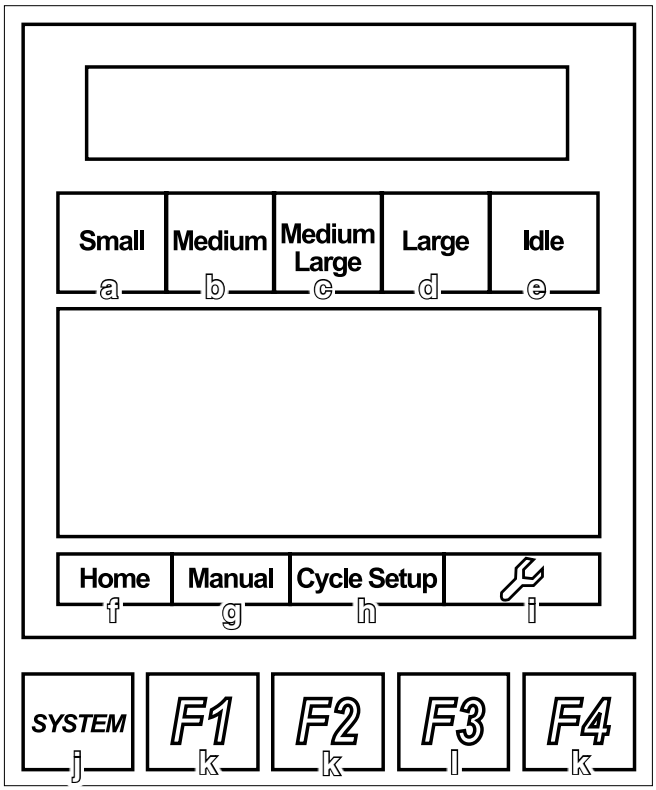


FIG. 16 CONTROLLER SCHEMATIC

FIG. 17 TEMPERATURE GAUGE (TYPICAL)

Generally the second section of each composter is equipped with a temperature gauge. An additional gauge can be installed in sections 3, 4 or 5 to provide more information on the temperature profile in the complete machine.

4.11.1 STARTUP & COMPUTER CONTROL BOX PROGRAMMING

Each operator should read the controller operator's manual to learn how to program controller and how it works. Basically the controller requires that the operator/customer sets the time and date, cycles, start and finish times plus idle times.

Review and follow these steps to program the controller and start using the composter:

1. Review the controller schematic from the previous section to understand the names and functions of the controllers.

FIG. 18 CONTROLLER

2. Turn power on at the master panel to provide power to the controller. The green "Power Present" light will be illuminated.

FIG. 19 POWER PRESENT

3. Turn the system switch to its ON position and wait for the OCS to appear.

On

OCS

FIG. 20 SYSTEM SWITCH

4. Touch the 'System' switch to go to the Home screen.

System

Home

FIG. 21 HOME SCREEN

5. Touch 'Cycle Setup" switch to go to the Networks screen.

FIG. 22 NETWORKS

6. Touch the DOWN cursor key to move down to "Set Time/Date" line.

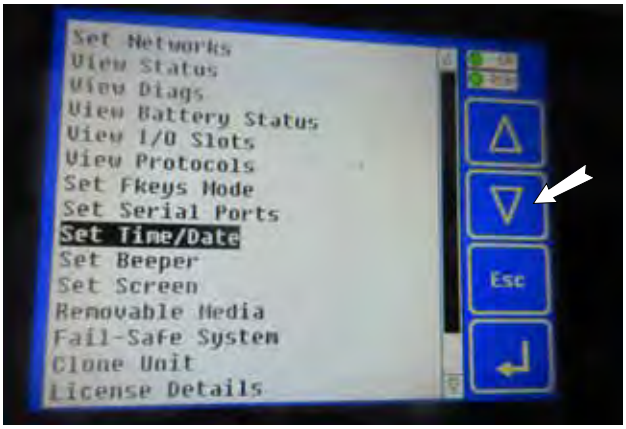


FIG. 23 SET DATE AND TIME

7. Touch ENTER ↵ switch to go to time and date screen.

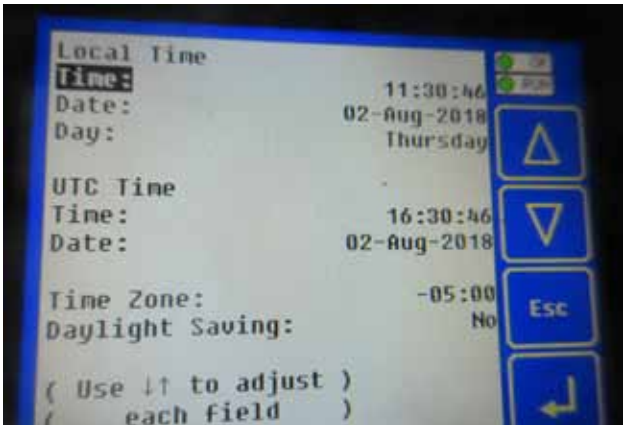


FIG. 24 DATE/TIME SCREEN

8. Touch ENTER ↵ switch to go to the adjusting screen.

Time

Date

FIG. 25 TIME AND DATE

9. Touch ESC to return to HOME screen after the time and date have been set.

FIG. 26 HOME SCREEN

10. Touch the SMALL switch to 'Global Settings' screen.

Fan OFF

11. Touch the FAN OFF switch to turn the Fan ON.

Fan ON

FIG. 27 GLOBAL SETTINGS

12. Touch the "Small" switch to go the the Small Group Settings screen.

FIG. 28 SMALL GROUP SETTINGS SCREEN

13. Touch the DAYS switch to set the number of days. Use the keyboard or cursor buttons to set.

FIG. 29 SETTINGS

14. Touch ENTER to to input days into the memory and return to the Small Group Settings screen.

Screen

15. Touch BATCHES PER DAY switch to go to the adjusting screen. Use the key pad or cursor keys to set.

Adjusting

FIG. 30 BATCHES PER DAY

16. Repeat the adjusting sequence to set Rotations per Batch and Fan Time to go to settings screen. Enter the appropriate data. Touch ENTER to return to Group settings screen.

NOTE

Divide the anticipated growth cycles into 4 sections (by days in each section). Enter the number of days into each of the SMALL, MEDIUM, MEDIUM/LARGE and LARGE group settings. At the end of each cycle, move the system to the next larger group and reprogram system.

As a general guideline, enter 2 batches per day and 2 rotations per batch. Increase these vales if required to improve composting function.

FIG. 31 SMALL SYSTEM SET

17. Touch the FAN TIME (min) switch to go to the fan Time Screen. Use the key pad or cursor keys to add, delete or change the fan times. It is recommended that the fan be set to run no longer than 14 minutes. In this way, the fan cycle will be completed before the drum rotation function starts. The system is designed to lock out the fan when the drum rotation takes place.

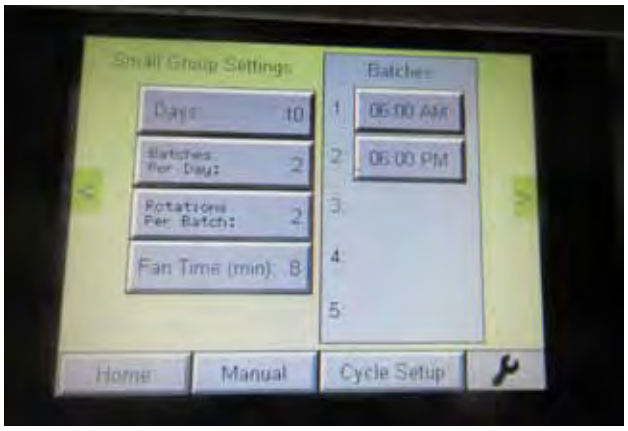
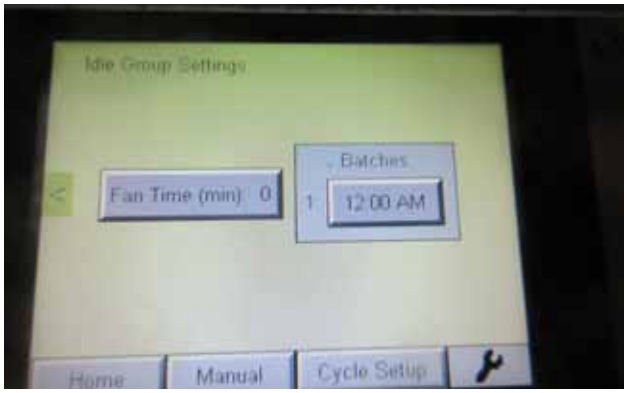


FIG. 32 FAN TIME

18. Touch the cursor key on either side of the group settings screen to change to a different screen or touch HOME to start over.

Medium



Large

FIG. 33 OTHER GROUP SCREENS

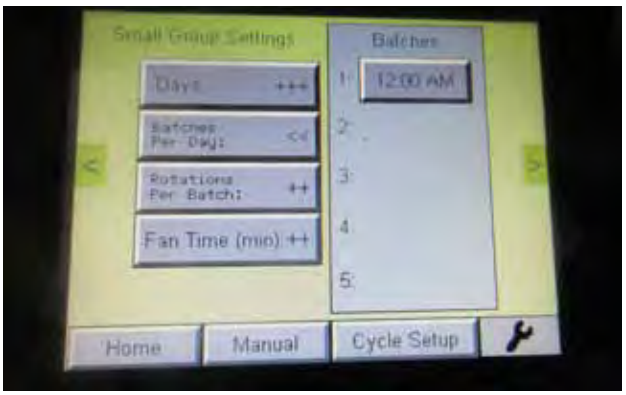
19. Touch the right cursor to reach the "Idle Group Settings" screen.

NOTE

Use this screen to set the fan when the unit is not being used. Typical times include between animal growing cycles when it is desirable to leave bulking in composter to prevent complete reloading when starting again.

Idle Group

20. Touch FAN TIME switch to go to adjusting screen. Use key pad or cursor keys to set time. Touch ENTER to return to Idle Settings screen.



Adjusting

FIG. 34 IDLE SETTINGS

21. Touch Manual Switch to go to Drum Manual Operation.

22. Screen shows drum and fan status and number of rotations per drum.

    a. Touch the appropriate switch to select the number of drum rotations.

    b. Turn fan OFF. Fan should not run when drum is rotating to prevent material from getting into the snorkel tube.

Fan OFF

Fan ON

FIG. 35 MANUAL OPERATION

23. Touch HOME to return to Home screen.

24. Touch and hold F3 for 5 seconds to go to Fan Operating Times System.

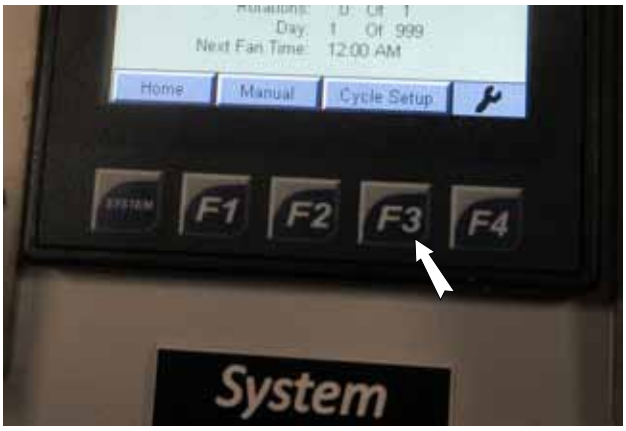


FIG. 36 F3

26. The Password screen will come up.

Password

27. Touch the PASSWORD switch and the adjusting screen will appear.

28. Enter the password TRIFORM with the key pad.

Adjusting

FIG. 37 PASSWORD SCREEN

29. Touch the ENTER key to go to fan timer screen.

30. Touch the line that requires changing to go to the adjusting screen.

NOTE

There are 24 lines to run fan once every hour of each day. The controller comes from the factory set to run for 15 minutes per hour. In most instances, this ets the fan to run too much and needs to be run less.

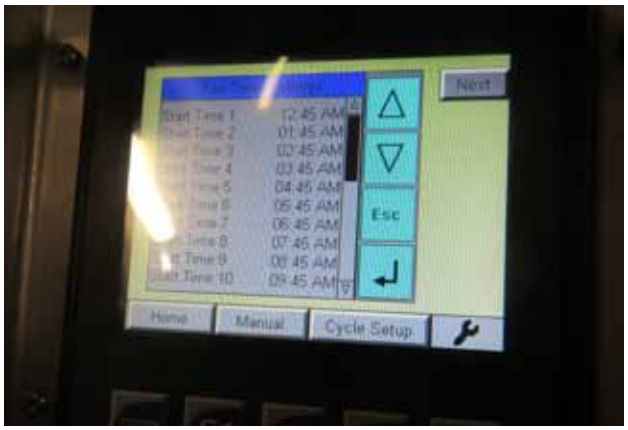


FIG. 38 FAN TIME SCREEN

31. Return to the HOME screen.

32. Contact your Tri-Form representative if you have any more questions about programming the controller.

4.12 COMPOSTER PREPARATION

The machine must be properly prepared and set prior to use. Be sure that the following items have been done.

1. **Electrical:**
   Use only a licensed electrician to provide power to the machine controller and air exhaust system. Be sure to follow all local wiring codes and ANSI/NFPA 70 Wiring Standard. Route the power lines so they do not interfere with the operation and maintenance of the machine. 240 volt, single phase power is required. A 25 amp fuse is recommended in the master panel.

2. **Training:**
   Establish a lock-out policy for your work site and train everyone in how it is implemented. Do not allow anyone to operate the machine or on the work site unless they follow the tag-out policy.

3. **Level Surface:**
   Be sure that the base is supported equally and the frame is on a firm base/surface (concrete is recommended). Mount or lag to a suitable foundation or stand. It is recommended that there be a 2 meter (6 foot) clearance zone on all sides of the machine for cleaning and maintenance procedures.

4. **Compost Material Flow System:**
   Review the need to bring bulking material and animal mortality to the loading and re-bulking doors. Provide a system to bring it to the machine, store it and place in the doors. Also, plan for a system to remove composting material from the discharge. A plywood barrier around the discharge is recommended. It is useful to have one or more storage bins to cure the compost after it is discharged from the composter.

   Keep working area neat and clean to prevent slipping or tripping.

FIG. 39 LEVEL SURFACE (TYPICAL)

Bulking - Loading

Discharge - Common Installation

FIG. 40 MATERIAL FLOW (TYPICAL)

4.13 OPERATION

OPERATING SAFETY

- Read and understand the Operator's Manual and all safety signs before operating, maintain-ing, adjusting or repairing the Composter.
- Turn machine OFF, shut down and lock out power supply (safety lockout devices are avail-able through your Tri-Form Poly Inc. dealer parts department) and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.
- Wear appropriate Personal Protective Equipment (PPE).
- Always wear the appropriate safety gear to protect yourself including but not limited to face shield, protective clothing, respi-rator and rubber gloves. Do not take chances with the safety of yourself or others.
- Install and properly secure all guards and shields before operating.
- Keep hands, feet, hair and clothing away from all moving parts.
- Clear the area of bystanders, especially small children, before starting.
- Make sure all control switches are in the off position before connecting power supply.
- Before supplying electrical power to the machine, be sure that you have adequate amperage at the proper phase and voltage to run it. If you do not know or are unsure, consult a licensed electrician.
- Keep the working area clean and dry.
- Review safety instructions annually.

Follow this procedure when using the Ecodrum™ Composter:

1. Review Section 4.4 to determine the required model of composter for your operation.
2. Review Section 4.6 Machine Preparation and follow all the instructions.
3. Review and follow the pre-operation checklist (See Section 4.4).
4. Review the location and function of all controls (See Section 4.5) and how to program them.
5. Be sure the Ecodrum™ Composter is positioned to allow access for loading, bulking, removing and storing the compost material.

FIG. 41 MACHINE (TYPICAL)

6. Initial setup:

   a. Turn composter off, unplug power cord and lock-out tag-out master power panel.

   b. Bring bulking material and organic material to the ladder assessing the loading door.

   c. Check and verify that all the hinges and latches are working and in good condition.

Hinges

Latches

FIG. 42 DOOR

   d. Open the loading door and rest it against its support.

Open

   e. Cover the bottom of the Ecodrum™ with 12 to 18 inches (300 to 450 mm) of dry wood shavings (or another equivalent bulking material) from the drive end to at least 6 feet (2 m) past the loading door.

   f. Moisten the shavings under the loading door slightly to encourage bacterial growth.

NOTE

This is the only time water should ever be added.

Bulking

FIG. 43 LOADING

g. Add the organic material.

h. Cover the orgaincs with another 6 to 12 inches (150 to 300 mm) of dry wood shavings or equivalent.

i. Clean all the door sealing area to prevent any interference.

j. Close and secure the latches.

IMPORTANT

Damage to the door and hinges can occur if the latches aren't closed and secured with their retainers.

k. It is recommended that the Ecodrum™ be ro-tated only once per day for the first 7 days to allow composting activity to begin.

l. Additional organics may be added during this time.

m. When the operating temperature reaches 131° F or higher, go to the regular operating procedure.

NOTE

For other operating conditions, contact your Ecodrum™ representative for assistance.

FIG. 44 CLOSED

FIG. 45 TEMPERATURE

7. **Starting:**
The composter is designed to operate on its own without an operator in attendance. Both the drum turning and the blower in the air-exhaust system are controlled by the times set by the modules in the control box. After the initial setup loading has been completed and the composting temperature reached, the controller should be placed it's AUTO mode to operate the unit. Be sure to program the drum rotate and air exhaust per the recommenda-tions in the best practices and in consultation with your dealer and Ecodrum™ representative.

8. **Stopping:**

   a. Wait until the composter drum has stopped turning and the loading and re-bulking doors are on top.

   b. Turn the drum rotation and fan switches off.

   c. Unplug the power cord and lock-out tag-out master power panel if performing any service or maintenance work.

9. **Emergency Stopping:**
Turn all switches off and unplug power cord if an emergency occurs. Correct emergency condition before resuming operation.

10. **Loading:**
Material needs to be placed into the composter through either the loading or re-bulking doors at various times. Each application has its own set of conditions that must be satisfied for the composter to operate effectively and efficiently. Better results are obtained when the organics are loaded daily rather than loading them every few days. Loading daily provides the best results.

    When loading follow this procedure:

    a. Allow the drum to turn until the loading and re-bulking doors are on top.

    b. Place the drum control in its off position.

    c. Bring the organics and bulking mate-rial to the composter.

    d. Unlatch and open the loading or re-bulking doors as appropriate.

Machine (Typical)

Control Box

FIG. 46 STARTING/STOPPING

FIG. 47 DRUM CONTROL

e. Place the organics or bulking material in the composter per the recommended bulking ratios defined in section 4.8.

IMPORTANT

Do not deviate from the bulking ratio recommendations to insure complete composting of the organic material.

f. Place half the recommended bulking in the composter.

g. Place the organics into the composter on top of the first half of the bulking material.

h. Place the last half of the bulking material on top of the organics.

i. Close and secure the door(s).

j. Place the drum control into its AUTO mode to resume work.

Loading

Re-Bulking

FIG. 48 DOORS

11. **Temperature Gauges:**
Temperature is a critical indicator of the aerobic reaction in the composter. The desired temperature range is between 131° and 161° F. Each drum section can be equipped with a temperature gauge to allow monitoring the temperature along the full length of the composter.

Outside ambient extremes of hot or cold temperatures requires the operator to monitor the gauges closely.

Refer to the Troubleshooting Section for suggestions when observing temperatures outside of the suggested range.

FIG. 49 TEMPERATURE GAUGES (TYPICAL)

Top

2 Sides

FIG. 50 ENCLOSURES (TYPICAL)

12. **Overloading:**
Although the Ecodrum™ composter is designed with a large capacity, it can be overloaded. Overloading becomes apparent when lumps or clumps appear in the discharge.

Always place the lumps or bumps back into com-poster for additional composting.

A list of items to reduce the chance of overloading include but is not limited to:

a. Reduce the amount of organic material being loaded at any one time to prevent overloading.

b. Increasing the turn cycles/day will also in-crease the composting rate.

c. Maintain the temperature of the mixture be-tween 131° and 160° F continuously for 3 days per recommendation from U.S. Composting Council.

In cases where the size of the operation has in-creased, it may be necessary to increase the size of the composter or add another unit.

FIG. 51 DISCHARGE (TYPICAL)

FIG. 52 TEMPERATURE GAUGE

13. **Information:**
Ecodrum™ composter follows the general guide-lines provided by the US Composting Council Standards. Always refer to these guidelines if you have any questions.

15. **Sampling:**
Maintain the temperature in the composter at 131° F continuously for 3 days per recommendation from U.S. Composting Council to kill all pathogens, weed seeds and viruses. To verify that the pathogens have been eliminated, testing companies are available to evaluate the discharge mixture and send a report verifying that all the pathogens, weed seeds and viruses have been eliminated. A sample print-out is provided in the appendix. Work with your dealer and the Ecodrum™ representative to determine which testing agency is closest to you for the test.

Follow the procedure when taking a sample:

a. Go to the storage bin where the mixture has cooled.

FIG. 53 BINS (TYPICAL)

b. Wearing latex gloves, use the scoop to take an approximately 1 quart sample of the mixture from the centre of the pile.

c. Place the sample in a zip lock bag. Remove the air and zip lock the bag.

d. Place the bag in another zip lock bag. Remove the air from the bag and zip lock the bag.

e. Contact Ecodrum™ for a copy of the Compost Sample Submitted form to go with the sample.

f. Place the sample and form into a USPS Priority Mail small flat rate box for shipping.

FIG. 54 SAMPLING SCOOP (TYPICAL)

Contact your dealer or Ecodrum™ representative if you have any questions about the report.

16. Snorkel:

The air exhaust system is designed with a tube that is mounted inside the composter drum to pull air out of the system and is called the snorkel. A sleeve in the loading end of the drum holds the snorkel tube at an angle to minimize the chance of organics or bulking material falling into the exhaust system. Always mount it at a 30° angle from vertical per the schematic.

Remove the top hose clamp on the tube and use a shop vacuum to remove all the debris from the snorkel. Use a stiff wire to dislodge any debris stuck to the tube. Clean weekly to prevent debris from restricting the air flow through the system.

IMPORTANT

It is the responsibility of the customers to load safely.

FIG. 55 OPEN DOOR (TYPICAL)

Tube

Schematic

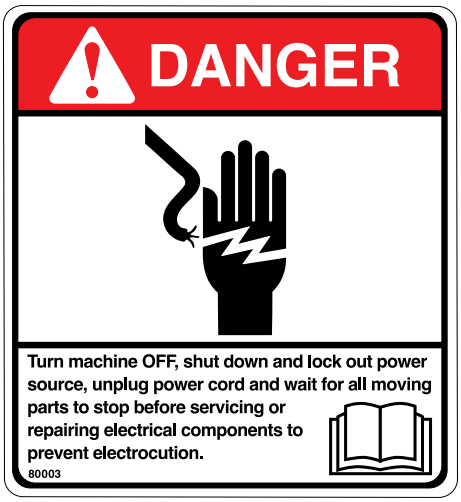
Installed

FIG. 56 SNORKEL

17. **Control Box Fuses (Automatic Version):**
Each control box is designed with fuses to protect their electrical systems from shorts or overloads. Check the integrity of the fuses by pulling their mounting frames forward and down to expose the fuses.

Check the integrity of each fuse and replace with a genuine Ecodrum™ replacement part if blown. Always check the fuse if there is an electrical problem with the unit.

Close fuse mounting frame.



Control Box

Door Open

Fuses Down

FIG. 57 CONTROL BOX FUSES

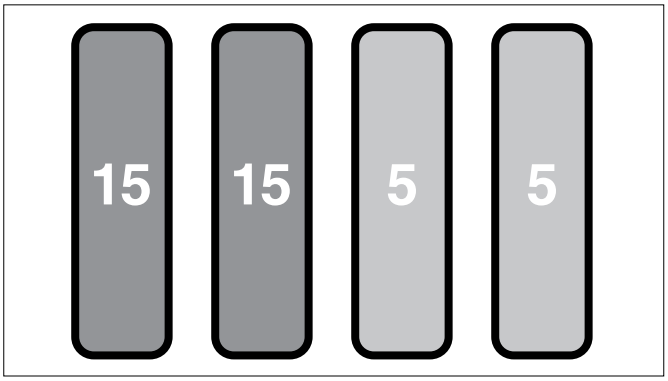
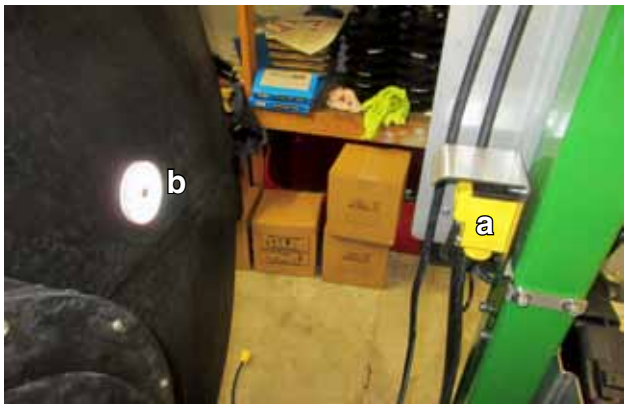


FIG. 58 FUSE SIZES (AMPS)

18. **Drum Position Control:**
Each composter is designed to rotate to mix and aerate the composting material in the drum. These rotations are actuated per the programming in the control boxes. The system is designed to stop at a pre-set point in the rotation that places the door(s) at the top of the drum for loading and bulking.

A photo sensor and reflector are used to determine the position of the drum when the door(s) are on the top. When activated, it will stop the turning or rotating function.

Clean the reflector and photo sensor if they get dirty with window cleaner and maintain the electrical integrity of the system.



a. Photo Sensor b. Reflector

FIG. 59 DRUM POSITION CONTROL

4.14 STORAGE/CLEANING

STORAGE SAFETY

- Store the Ecodrum™ Composter on a firm level surface.
- If required, make sure the unit is firmly blocked up.
- Make certain that all door latches are secured with their lock pins before storing.
- Store away from areas of human activity.
- Do not allow children to play on or around the stored Ecodrum™ Composter.
- Unplug power cord and lock out power by turning off master control panel and padlocking the door shut to prevent electrocution or unauthorized start up of the Ecodrum™ Composter.

4.13.1 PLACING IN STORAGE

The machine should be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent any unnecessary down time at the beginning of the next season. Follow this procedure:

1. Clean the inside of the composter by:
    a. Run composter until all material is discharged.
    b. Load 4 bags of bulking into the loading door and close door.
    c. Set the controls for the drum to continuous run mode.
    d. Run until all clean bulking comes out of the discharge.
2. Turn the power OFF at the master electrical panel and lock out.
3. Unplug and remove power cord from machine.
4. Use a shop vacuum to thoroughly clean the outside of the frame, drum, drives, doors, discharge outlet and air exhaust system.
5. Thoroughly wash the machine using a pressure washer to remove all dirt, mud, debris or residue from the outside of the machine.
6. Inspect the electrical cords, lines, junction boxes and motor. Tighten any loose connections. Replace any cord that is badly cut, nicked or abraded. Replace any damaged components.
7. Check all rotating parts for entangled material. Remove.

FIG. 60 STORED (TYPICAL)

8. Touch up all paint nicks and scratches to prevent rusting.

4.13.2 REMOVING FROM STORAGE

When preparing to use the machine at the start of the season, follow this procedure:

1. **Check**
    a. Electrical systems and components.
    b. Drum, rollers, drive system, air exhaust system, door and rollers.
    c. All hardware. Tighten as required.
2. Replace any defective components.
3. Go through the pre-operation checklist (Section 4.5) before starting.

5 SERVICE AND MAINTENANCE

MAINTENANCE SAFETY

- Read and understand all the information contained in the Operator's Manual regarding operating, servicing, adjusting, maintaining and repairing.
- Turn machine OFF, shut down and lock out power supply (safety lockout devices are available through your Ecodrum™ dealer parts department), relieve hydraulic pressure and wait for all moving parts to stop before servicing, adjusting, maintaining or repairing.
- Make sure all guards and doors are in place and properly secured when operating the Ecodrum™ Composter.
- Follow good shop practices:

- Keep service area clean and dry.
- Be sure electrical outlets and tools are properly grounded.
- Use adequate light for the job at hand.

- Do not work on Ecodrum™ Composter electrical system unless the power cord is unplugged or the power supply is locked out. Lock-out tag-out power source before performing any maintenance work.

5.1 SERVICE

5.1.1 FLUIDS AND LUBRICANTS

1. **Grease:**
   Use an SAE multi-purpose high temperature grease with extreme pressure (EP) performance rating meeting or exceeding the NLGI #2 rating for all requirements.

2. **Gearbox Oil:**
   The gearbox must be filled with ISO 320 gear oil or equivalent for all operating conditions. Oil level should always be above the red dot in the sight glass.

   Gearbox capacity:

Model 260, 360	120 gearbox	2.6 liter	(2.7 US qt)
Model 460, 560	135 gearbox	4.6 liter	(4.8 US qt)

NOTE

Change oil after operating for 100 hours when machine is new. Then change gearbox oil annually.

3. **Roller Chain Lubrication:**
   Use a standard spray lubricant for all operating conditions.

4. **Storing Lubricants:**
   Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contaminants.

5.1.2 GREASING

Refer to Section 5.1.1 for recommended grease. Use the Maintenance Checklist provided to keep a record of all scheduled maintenance.

1. Use only a hand-held grease gun for all greasing. Air powered greasing systems can damage the seals on bearings and lead to early bearing failure.

2. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit. Replace grease fitting cap after greasing.

3. Replace and repair broken fittings immediately.

4. If a fitting will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

5. **Bearings:**
   Only sealed bearings are used on the Composter. Sealed bearings should never be greased more often than every 3 months. Do not over-grease. Do not give bearing more than 2 shots of grease each time it is greased. (Once the bearing seal is broken, the bearing must be greased each day or the bearing will fail.).

5.1.3 SERVICING INTERVALS

Weekly

1. Clean air exhaust hose and snorkel by removing hose clamps.

WARNING

Machine is shown with guards removed or doors opened for illustative purposes only. Do not operate machine without all guards in place and doors closed.

Top Clamp

Bottom Clamp

Tube

Schematic

FIG. 61 AIR EXHAUST SNORKEL SYSTEM (HOSE CLAMPS)

2. Inspect electrical system and all components.

Control Box

Photo Cell

Exhaust Motor

FIG. 62 ELECTRICAL SYSTEM

3. Clean up work area to prevent tripping or slipping.

Door

Left

Right

Discharge

FIG. 63 CLEANING (TYPICAL)

Monthly

1. Check oil level in gearbox. Top up as required.

FIG. 64 SIGHT GLASS (TYPICAL)

2. Grease 1½" bearing on drum rotation drive rolls with 2 shots of grease.

FIG. 65 1½" BEARING (TYPICAL)

3. Check rubberized rollers for unusual surface wear.

NOTE

Call Ecodrum™ representative for help if you have any questions.

Left Side

Right Side

FIG. 66 RUBBERIZED ROLLERS (TYPICAL)

Quarterly or Every Three Months

1. Lubricate guide wheel bearing with 2 shots of grease.

FIG. 67 GUIDE WHEEL (TYPICAL)

2. Oil drive system roller chain by removing end guards and using spray lube.

⚠ WARNING

Machine is shown with guards removed or doors opened for illustative purposes only. Do not operate machine without all guards in place and doors closed.

End Guard (Typical)

Right Side

Left Side

FIG. 68 OILING ROLLER CHAIN

3. Check roller chain tension and alignment.

Tension

Alignment

FIG. 69 ROLLER CHAIN

WARNING

Machine is shown with guards removed or doors opened for illustative purposes only. Do not operate machine without all guards in place and doors closed.

Annually

1. Change gearbox oil.
   a. Sight glass.
   b. Drum plug.
   c. Fill plug.
   d. Fill/breather plug.
   e. Drain plug.

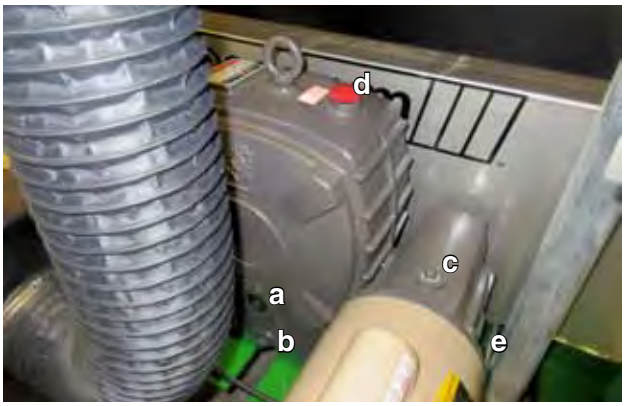


FIG. 70 DRIVE GEARBOX

5.1.4 SERVICE RECORD

See Lubrication and Maintenance sections for details of service. Copy this page to continue record.

ACTION CODE: CL CLEAN G GREASE CK CHECK
CH CHANGE

MAINTENANCE																	
HOURS																	
SERVICED BY																	
Weekly																	
CL Air Exhaust Hose & Snorkel																	
CK Electrical System & All Components																	
CL Work Area																	
Monthly																	
CK Oil Level in Gearbox																	
G 1½" Bearing - Drum Rotation Guide																	
CK Rubberized Rollers																	
Quarterly or Every 3 Months																	
G Guide Wheel Bearing																	
G Drive System Roller Chain																	
CK Roller Chain Tension & Alignment																	
Annually																	
CH Gearbox Oil																	

5.2 MAINTENANCE

By following a careful service and maintenance program on your machine, you will enjoy many years of trouble-free use.

5.2.1 ELECTRICAL SYSTEM INSPECTION

Electricity provides power to the motors driving the machine. To maintain the integrity of the system and provide a safe working environment for the operator, it is important that a daily inspection be done to make sure that all systems and components are in good working condition. To provide a safe working environment, have a licensed electrician provide power to the machine.

When inspecting the electrical system and components, follow this procedure:

1. Place all controls in the OFF or neutral position.

2. Turn power OFF at the master panel and lock-out before starting the inspection.

IMPORTANT

Do not operate the machine unless the master panel is equipped with a lock-out device. Always engage lock-out device before performing any maintenance work. Lock-out devices are available from your dealer or the factory.

3. Inspect all electrical components looking for:

   a. Damaged plugs.

   b. Frayed wires.

   c. Cut or cracked insulation.

4. Replace any damaged components immediately.

5. Be sure all components are grounded.

6. Be sure there is no water or moisture in any junction box or enclosure. Dry the components before turning power on. Be sure that all compartments seal properly when closed.

a. Fan b. Drive c. Control Box

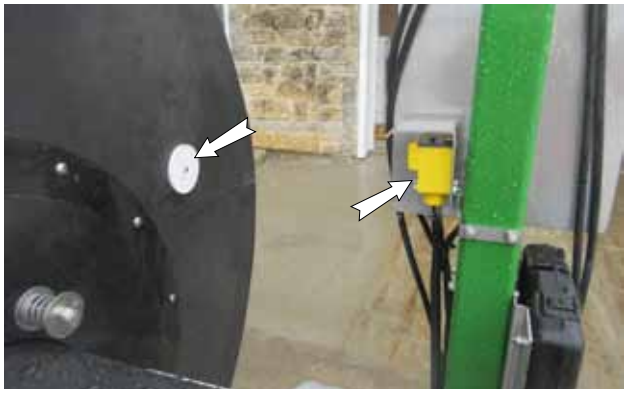


Photo Cell

Door Open

FIG. 71 ELECTRICAL COMPONENTS (TYPICAL)

5.2.2 GEARBOX OIL

Drum rotation is driven by an electric motor through a high reduction ratio gearbox. The gearbox is equipped with a sight glass, drain plug, fill plug and breather. Every month, the oil level should be checked. Annually, the oil should be replaced. Check more frequently if there are leaks around any of the plugs or shaft seals.

When checking oil level or changing oil, follow this procedure:

1. Run the machine until the gearbox is warm. Warm oil will remove more contaminants than cold, stagnant oil.

2 Turn machine OFF, shut down and lockout power supply and wait for all moving parts to stop before servicing, adjusting, maintaining, repairing or cleaning. (Safety lockout devices are available through your Ecodrum™ Composter dealer parts department).

   a. Sight Glass.

   b. Drain plug.

   c. Fill plug.

   d. Fill/breather plug.

   e. Drain plug.

3. **Checking Oil Level:**

   a. Observe the red dot in the sight glass.

   b. When the oil is above or covers the red dot, it is at the correct level.

   c. If required, add oil through the fill or breather plug.

   d. Reinstall and tighten breather or fill plugs.

4. **Changing Oil:**

   a. Place a container under the drain plug.

   b. Remove the drain (2 plugs), fill and breather plugs.

   c. Allow 10 minutes for oil to drain.

   d. Reinstall and tighten drain plugs.

NOTE:
It may be necessary to add teflon tape or pipe sealant to the drain plug threads prior to installation to prevent leakage.

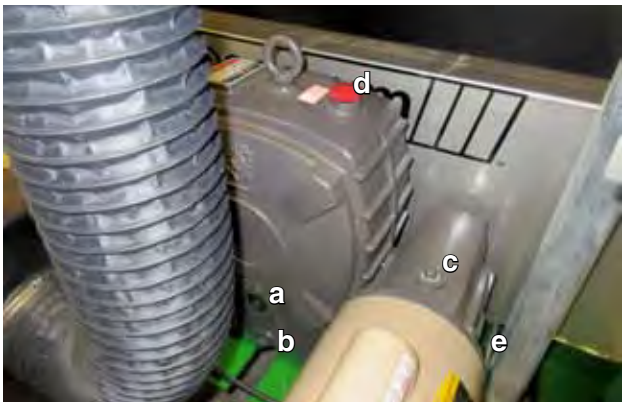


FIG. 72 DRIVE GEARBOX

   e. Add new gear oil. Use the sight glass to determine the correct amount of oil.

   f. Add 2 liters of oil into d and 0.7 liters through c for model 120 gearbox.

   g. Add 4 liters of oil into d and 0.6 liters through c for model 135 gearbox.

   h. Check to make sure the air passage through the breather plug is open.

   i. Reinstall and tighten the fill and breather plugs.

   j. Dispose of the used oil in an environmentally safe manner.

5. **Cleaning Breather:**

   a. Remove breather plug from gearbox.

   b. Inspect vent passage.

   c. If plugged, soak in solvent overnight (plug hole to prevent dirt entering gearbox).

   d. Use a high-pressure air hose to blow debris out of passage. Carefully use a probe to clear the passage if caked in dirt.

   e. Reinstall and tighten breather plug.

IMPORTANT
Always clean the breather if any leaks are noticed around the shaft seal.

5.2.3 DRIVE CHAIN TENSION, ALIGNMENT OR REPLACEMENT

A roller chain is used to transmit power to the rollers that rotate the composting drum. The tension and alignment of the drive chain and sprockets should be checked quarterly to insure proper function. Replace the drive chain when damaged or badly worn. To maintain drive chain, follow this procedure:

1. Place all controls in their OFF or neutral position.

2. Turn the power OFF at the master panel and lock-out.

3. Remove the cover over the chain drive system and lay to one side.

4. **Tension:**
   Chain is tensioned correctly when the center of the long span can be deflected 6 mm (1/4 inch) or 1 link can be rotated 30°. The chain should not skip sprocket teeth during start-up and normal operation.

FIG. 73 DRIVE SYSTEM

5. **Adjusting Tension:**
   Chain tension is adjusted using the idler sprocket position. To adjust chain tension, follow this procedure:

   a. Loosen idler sprocket mounting bolt(s).

   b. Slide the idler sprockets to the appropriate position to set the tension each chain.

   c. Check the sprocket alignment.

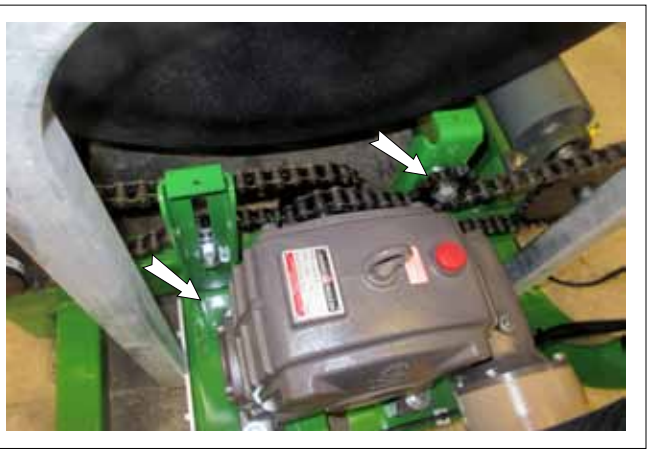


FIG. 74 IDLER SPROCKET

WARNING

Machine is shown with guards removed or doors opened for illustative purposes only. Do not operate machine without all guards in place and doors closed.

   d. Tighten the idler sprocket mounting bolt(s) to their specified torque.

   e. Install and secure guard over chain drive system.

6. **Chain Replacement:**

   a. Move idler sprocket into its loosest position.

   b. Remove chain connector link(s) and chain(s).

   c. Replace chain with genuine Ecodrum™ Composter replacement parts.

   d. Move idler sprockets as required to set chain tension.

   e. Check chain tension during the first 10 hours of operation and reset as required.

   f. Go to regular Service schedule as defined in Section 5.1.3.

7. **Alignment:**
   Always check and maintain sprocket alignment by laying a straight edge across the sprocket faces. Adjust if sprocket faces vary more than 0.7 mm (1/32 inch).

   To adjust sprocket alignment, follow this procedure:

   a. Lay a straight edge across sprocket faces.

   b. Determine which sprocket requires adjustment.

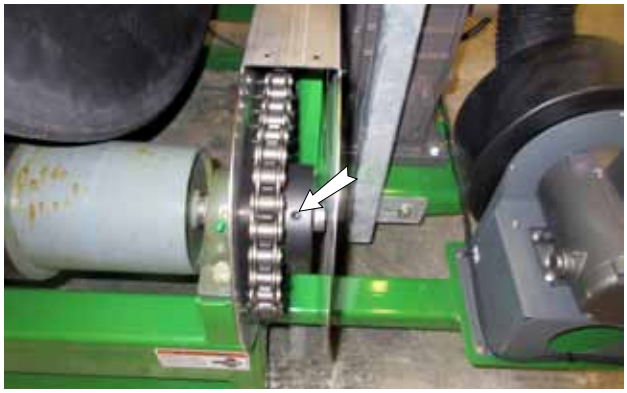
   c. Loosen sprocket hub set screw.

   d. Tap sprocket into the required position.

   e. Tighten sprocket hub set screw.

   f. Recheck alignment and readjust as needed.

Alignment



Right Sprocket Set Screw

Left Sprocket Set Screw

FIG. 75 SPROCKET ALIGNMENT (TYPICAL)

5.2.4 ROLLER CHAIN OILING

It is recommended that the roller chains in the drum turning drive system be oiled quarterly to obtain the expected performance and life. Time and the elements can affect the condition of the chain and shorten its life unless it is oiled on a regular basis.
To oil the chain, follow this procedure:

1. Place all the controls in their off position.

2. Remove the end covers of the chain drive system.

3. Turn the power on and place the drum control in its MANUAL mode.

4. Operate the system in the manual mode.

5. Use spray lube to lubricate the chain as the drive turns.

WARNING

Machine is shown with guards removed or doors opened for illustative purposes only. Do not operate machine without all guards in place and doors closed.

6. Turn the power off when lubricant has been applied to the entire length of each chain.

7. Install and secure the end covers.

8. Tighten fasteners to their specified torque.

9. Place control system back into its AUTO mode and resume work.

Cover Installed (Typical)

Right End

Left End

FIG. 76 CHAIN OILING

6 TROUBLE SHOOTING

The Tri-Form Poly Inc. Ecodrum™ Composter uses a large rotating drum to transform organic material into a compostable mixture. It is a simple system that works well with minimal maintenance.

In the following section, we have listed many of the causes and solutions to the problems that you may encounter.

If you encounter a problem that is difficult to solve, even after having read through this trouble shooting section, please contact your local Ecodrum™ Composter dealer, distributor or the factory. Before you call, please have this Operator's Manual and the serial number from your machine ready.

PROBLEM	CAUSE	SOLUTION
Machine will not start/run.	No power.	Plug in power cord.
		Turn power on at master panel.
	Blown fuse.	Replace fuse in control box or master panel.
Lumps of material in discharge.	Moisture level too high.	Add bulking material in loading or re-bulking door.
		Increase bulking ratio for additional composting.
	Overloading composter.	Recycle material back through composter.
	Temperature too low.	Protect from cold ambient temperatures.
		Moisture level too high inside Ecodrum • Add bulking material. • Increase bulking ratio.
		Low oxygen level in compost. • Increase airflow. • Remove obstructions in air exhaust system.
Flies and maggots around composter.	Moisture level too high.	Add bulking material.
	Debris around composter.	Remove compost from discharge area.
		Keep work area clean.
Ammonia smell.	High nitrogen levels.	Add bulking material.
		Increase bulking ratio.
Drum does not stop rotating.	Dirty photo cell and reflector.	Clean photo cell and reflector.
	Burnt out photo cell.	Replace photo cell.
Temperature too low.	Material too wet.	Snorkel plugged. Clean snorkel system.
		Fan not working. Check fan system. Repair or replace as required.
Low temperature.	Cold ambient.	Reduce air flow through machine.
		Provide protection from temperature and wind by building a shed or enclosure around composter.

PROBLEM	CAUSE	SOLUTION
Low temperature.	High ambient.	Reduce airflow through machine.
		Reduce effect of shed or enclosure.
Cold composter temperature with cold ambient.	Composter temperature below 131° F.	Reduce airflow through machine.
		Provide protection from temperature and wind by building a shed or enclosure around composter.
Cold composter with high ambient temperature.	Composter temperature below 131° F.	Reduce airflow through machine.
		Reduce effect of shed or enclosure.
Hot composter with cold ambient.	Composter temperature above 161° F.	Increase airflow through machine.
		Reduce effect of shed or enclosure.
Hot composter with hot ambient.	Composter temperature above 161° F.	Increase airflow through machine.
		Provide protection from temperature and wind by building a shed or enclosure around composter.

7 INSTALLATION

The installation of the Ecodrum™ composter requires some advance planning and preparation to insure proper and efficient operation and results. Select an area where an enclosure can be constructed if required to minimize any weather effects from wind, rain and other elements - this is particularly important for colder climates as the compost temperature needs to be above at 131° F continuously for 3 days per recommendation from U.S. Composting Council for composting to occur. There are a wide variety of configurations acceptable for the composter. Review your specific application with your dealer and Ecodrum™ representative to establish the installation appropriate to fit your needs.

Review these items when preparing a location for the composter:

1. **Location:**
   Select an area with at least 5 feet of open space between the composter and any adjacent buildings or equipment. This space or clearance is required to provide access to all sides of the frame for loading, servicing or cleaning the machine.
   Also select the area where a shelter or enclosure can be added if appropriate. Shelters are appropriate for protection from cold weather, wind, rain and direct sun (hot temperatures).

   Space or clearance is also recommended on the loading side for equipment to bring both animal mortality and bulking to the loading and re-bulking doors. Space is also recommended at the discharge end that will allow for a loader or skid steer to remove the discharge and move it to storage bins for final composting and cool down.

   Position at storage bins next to the discharge to allow for discharge and curing. Refer to local regulations for use of composted materials.

Composter

Discharge

Storage

FIG. 77 LOCATION

2. **Foundation and Base:**
The base must be level and firm. Concrete is recommended to prevent any uneven support to the frame. Concrete is also very helpful in wet inclem-ent weather conditions.

Concrete provides a good base for both personnel and equipment under all environmen-tal conditions. A good foundation provides a good base when loading organic material or bulking at any time.

FIG. 78 CONCRETE BASE (TYPICAL)

3. **Shelves:**
Although steps are provided to access the loading and rebulking doors, positioning shelves or a table next to the ladder(s) to support organic material or bulking material when placing in the composter is very helpful.

Positioning a hoist, crane or loader to assist in lift-ing heavy organic material is recommended. Do not take chances with the safety and well-being of personnel with heavy weights and off-balance access.

Adjacent

Separate

FIG. 79 SHELVES (TYPICAL)

4. **Discharge:**
   Each discharge is equipped with a cone to move the compost away from the drum as it leaves the composter. It is recommended to place a piece of cut-out plywood around the cone to reduce the chance of compost falling back on the machine. The plywood also allows for the use of a loader or skid steer to remove compost from the discharge and move it to a storage bin.

FIG. 80 DISCHARGE CONE

5. **Storage Bins:**
   It is useful to have storage bins located close to the composter discharge area to minimize transport times.

Single Bin

3 Bins

FIG. 81 STORAGE BINS (TYPICAL)

6. **Power:**
Composter are designed to require single phase 240 volt power at 20 amps. Position the composter with access to this type of electrical service. Always have a licensed electrician provide power to your unit with fuses in the master power panel and a lockable power panel to prevent unauthorized operation.

FIG. 82 POWER PLUG (TYPICAL)

7. **Wind Direction:**
The exhaust fan is designed to pull dry air through the drum to control the moisture level in the mixture. Position composter to minimize the effect of ambient wind. Protect discharge if required.

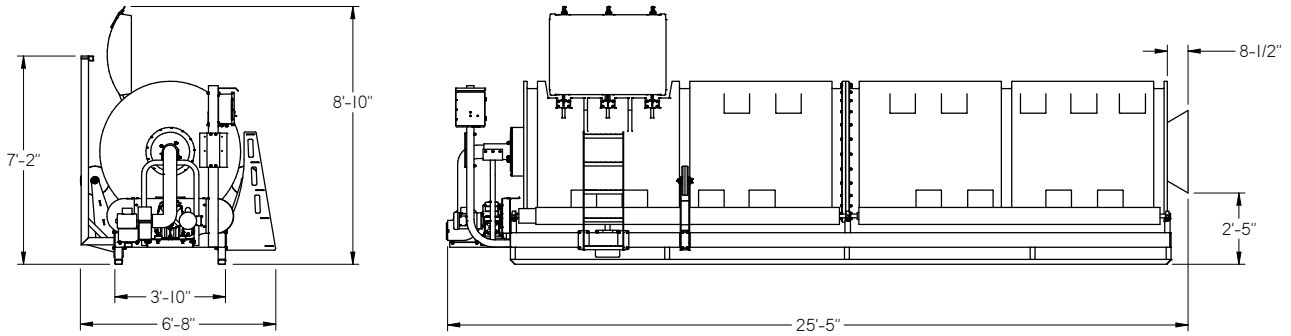
FIG. 83 DISCHARGE

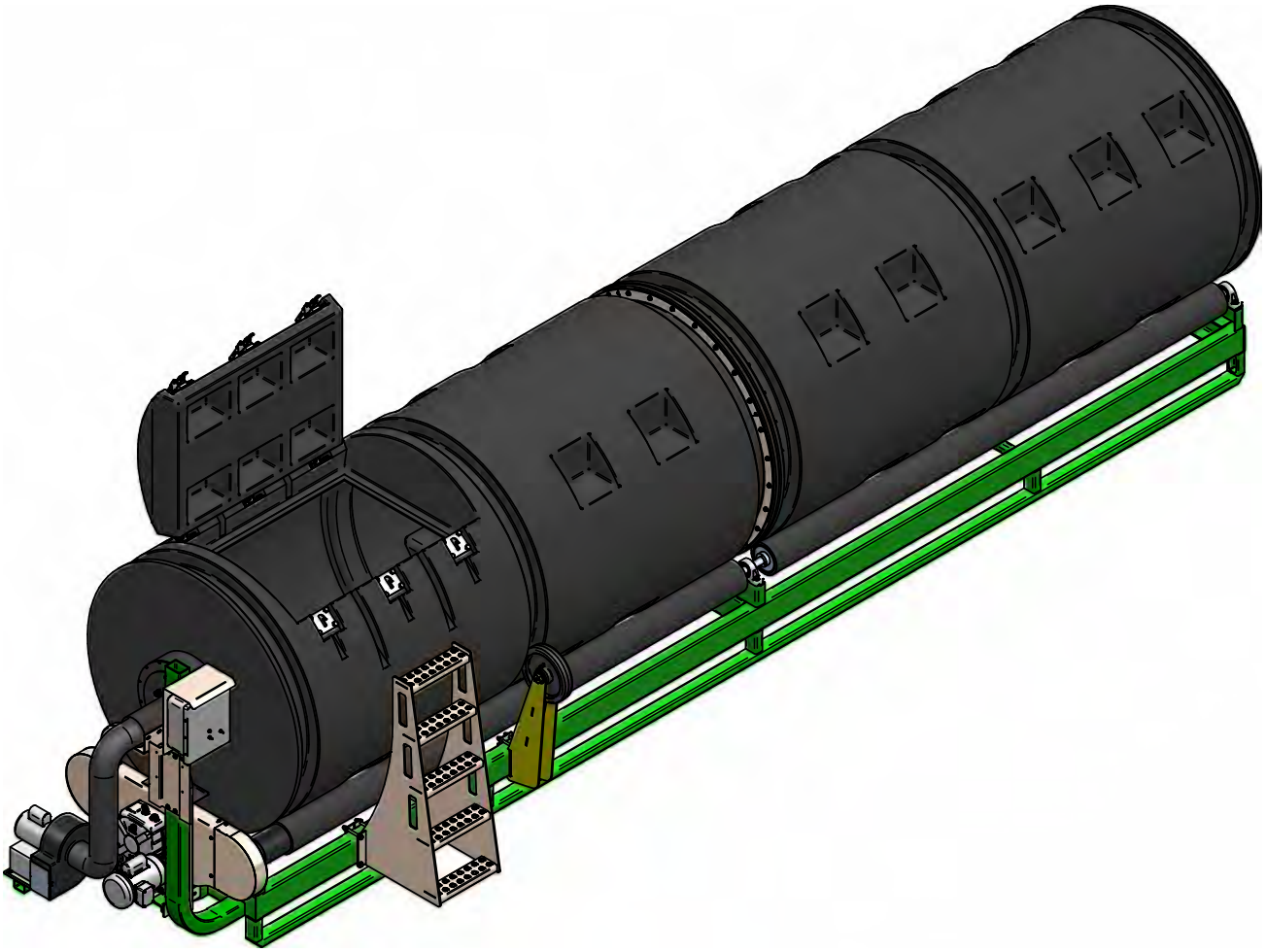
8 SPECIFICATIONS

8.1 MECHANICAL

Model	Length	Width	Height	Weight	Power Volts/ Amps
260	25' 5"	6' 8"	8' 10"	5000 lbs.	220/20
360	36' 6"	6' 8"	8' 10"	7000 lbs.	220/20
460	46' 9"	6' 8"	8' 10"	8500 lbs.	220/20
560	57' 11"	6' 8"	8' 10"	11000 lbs.	220/20

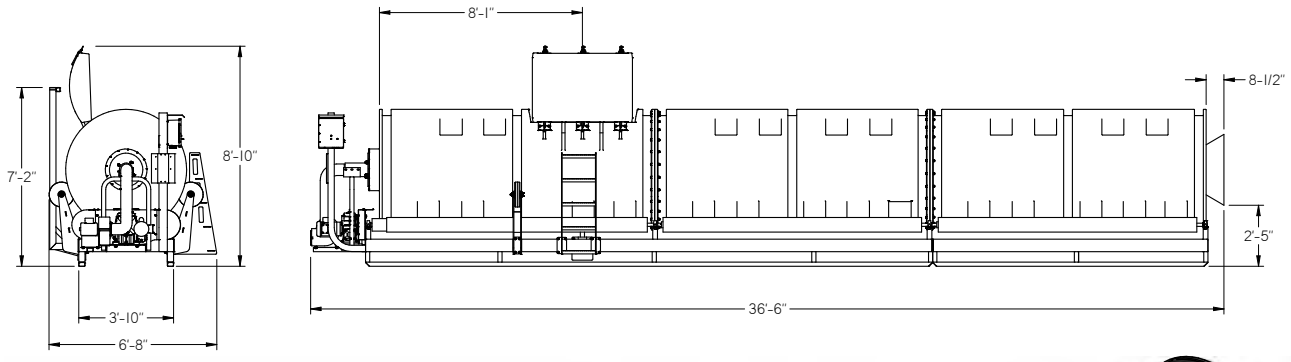
Model 260

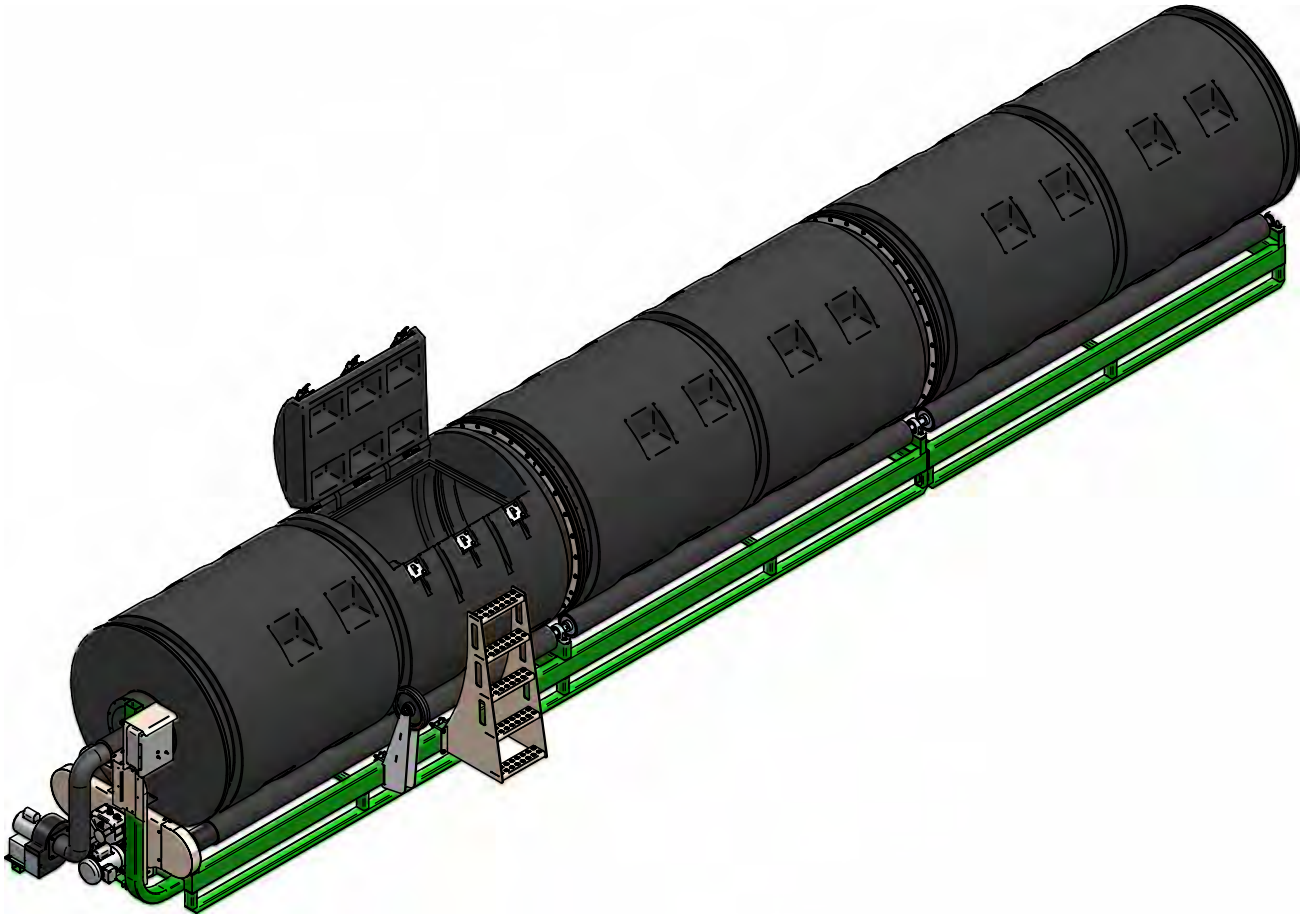




SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

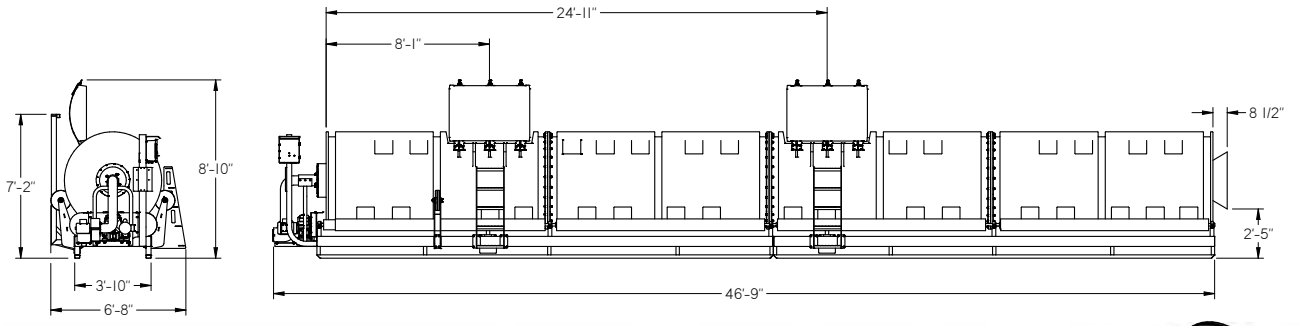
Model 360

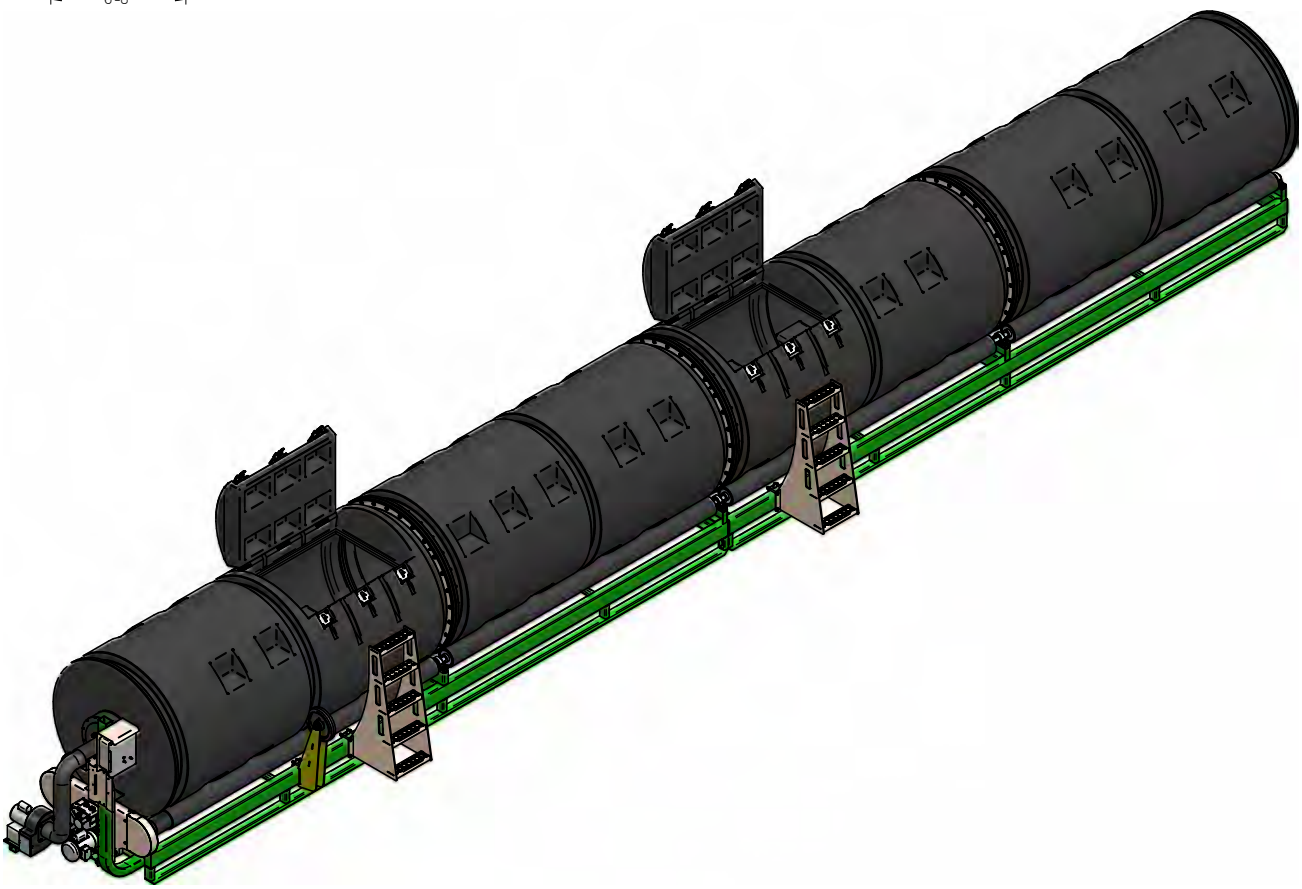




SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

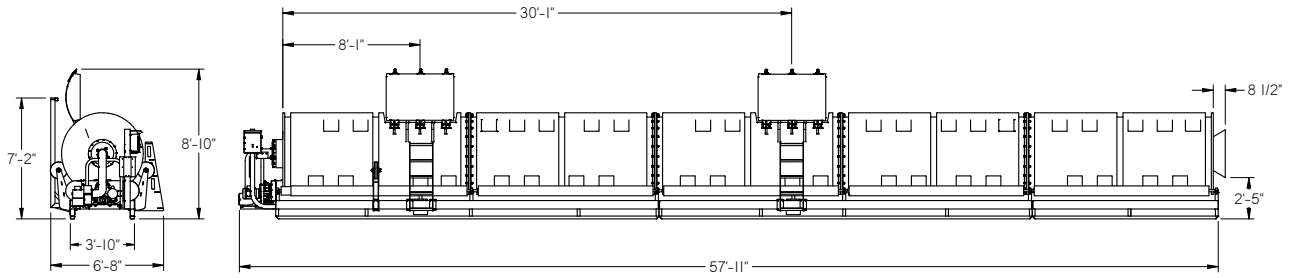
Model 460

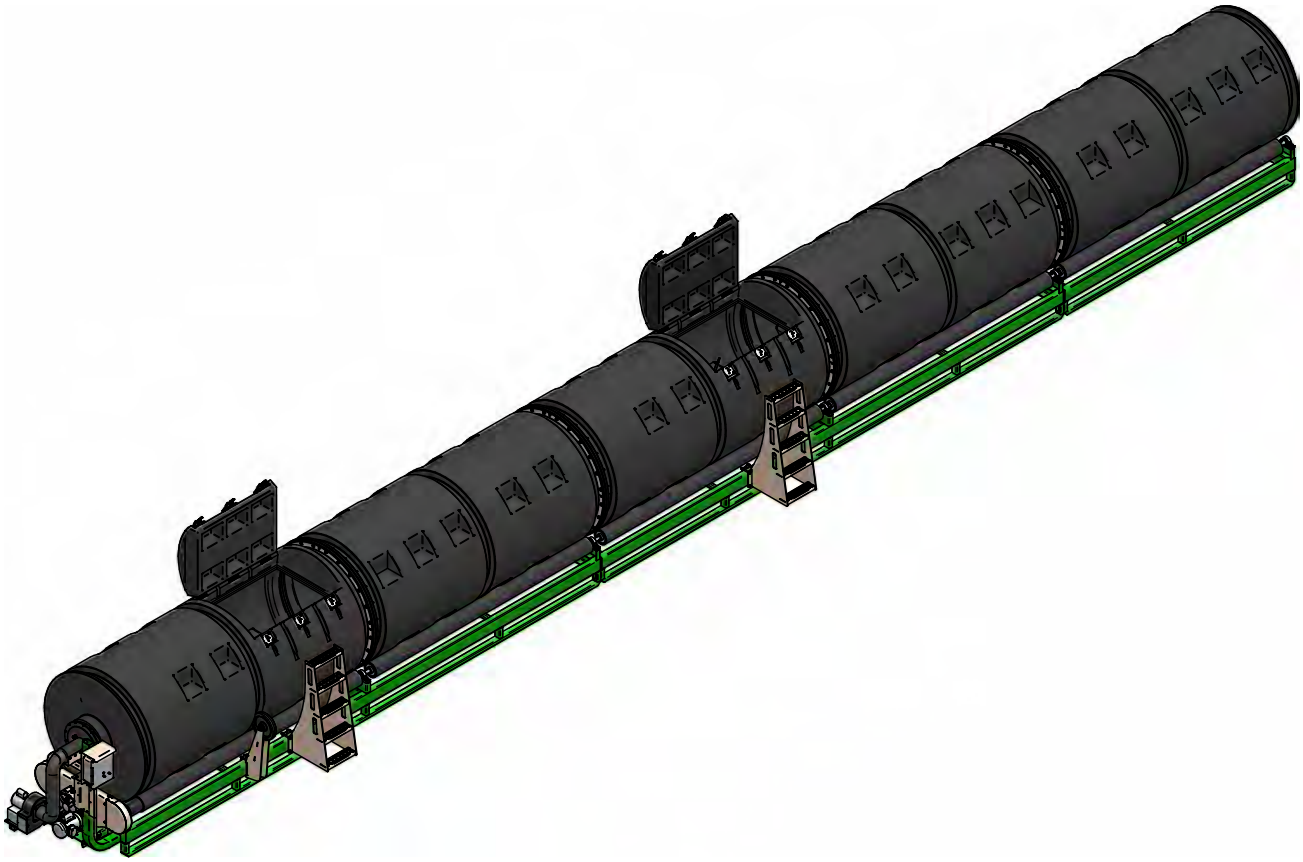




SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Model 560





SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

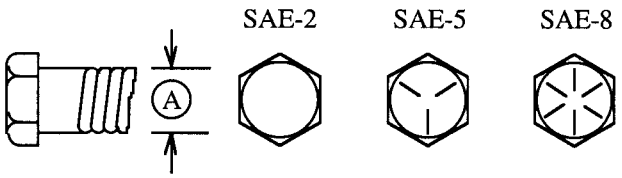
8.2 BOLT TORQUE

CHECKING BOLT TORQUE

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt.

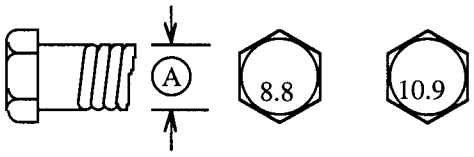
ENGLISH TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque*					
	SAE 2		SAE 5		SAE 8	
	(N.m.)	(lb-ft)	(N.m.)	(lb-ft)	(N.m.)	(lb-ft)
1/4"	8	6	12	9	17	12
5/16"	13	10	25	19	36	27
3/8"	27	20	45	33	63	45
7/16"	41	30	72	53	100	75
1/2"	61	45	110	80	155	115
9/16"	95	60	155	115	220	165
5/8"	128	95	215	160	305	220
3/4"	225	165	390	290	540	400
7/8"	230	170	570	420	880	650
1"	345	225	850	630	1320	970



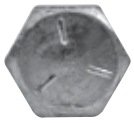
METRIC TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque*			
	8.8	10.9		
	(N.m.)	(lb-ft)	(N.m.)	(lb-ft)
M3	.5	.4	1.8	1.3
M4	3	2.2	4.5	3.3
M5	6	4	9	7
M6	10	7	15	11
M8	25	18	35	26
M10	50	37	70	52
M12	90	66	125	92
M14	140	103	200	148
M16	225	166	310	229
M20	435	321	610	450
M24	750	553	1050	774
M30	1495	1103	2100	1550
M36	2600	1917	3675	2710



Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

* Torque value for bolts and capscrews are identified by their head markings.



SUGGESTED ASSEMBLY TORQUE VALUES

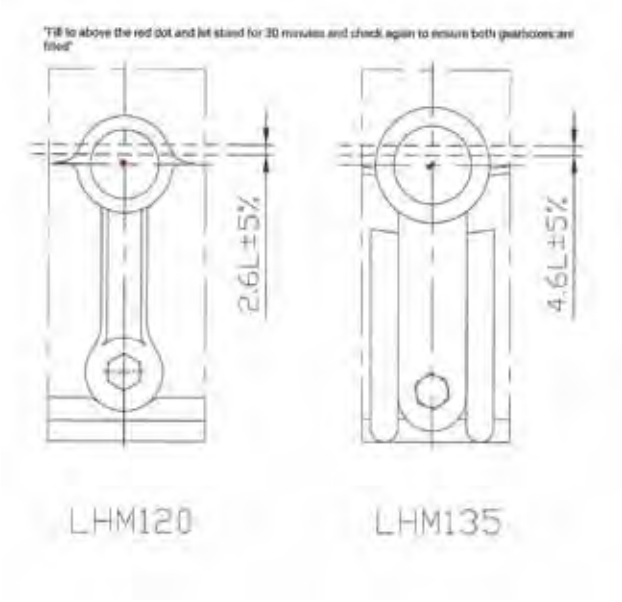
	USS/SAE GRADE 5					USS/ SAE GRADE 8				
Diameter & Threads Per Inch	Tensile Strength Min. PSI	Proof Load LB	Clamp Load LB	Torque Dry FT LB	Lubricated FT LB	Tensile Strength Min. PSI	Proof Load LB	Clamp Load LB	Torque Dry FT LB	Lubricated FT LB
1/4-20	120,000	2,700	2,020	8	6.3	150,000	3,800	2,850	12	9
1/4-28	120,000	3,100	2,320	10	7.2	150,000	4,350	3,250	14	10
5/16-18	120,000	4,450	3,340	17	13	150,000	6,300	4,700	24	18
5/16-24	120,000	4,900	3,700	19	14	150,000	6,950	5,200	27	20
3/8-16	120,000	6,600	4,950	30	23	150,000	9,300	6,980	45	35
3/8-24	120,000	7,450	5,600	35	25	150,000	10,500	7,900	50	35
7/16-14	120,000	9,050	6,780	50	35	150,000	12,800	9,550	70	50
7/16 20	120,000	10,100	7,570	55	40	150,000	14,200	10,650	80	60
1/2-13	120,000	12,100	9,050	75	55	150,000	17,000	12,750	110	80
1/2-20	120,000	13,600	10,200	85	65	150,000	19,200	14,400	120	90
9/16-12	120,000	15,500	11,600	110	80	150,000	21,800	16,350	150	110
9/16-18	120,000	17,300	12,950	120	90	150,000	24,400	18,250	170	130
5/8-11	120,000	19,200	14,400	150	110	150,000	27,100	20,350	210	160
5/8-18	120,000	21,800	16,350	170	130	150,000	30,700	23,000	240	180
3/4-10	120,000	28,400	21,300	260	200	150,000	40,100	30,100	380	280
3/4-16	120,000	31,700	23,780	300	220	150,000	44,800	33,500	420	310
7/8-9	120,000	39,300	29,450	430	320	150,000	55,400	41,600	600	450
7/8 14	120,000	43,300	32,450	470	350	150,000	61,100	45,800	670	500
1-8	120,000	51,500	38,600	640	480	150,000	72,700	54,500	910	680
1-14	120,000	57,700	43,300	720	540	150,000	81,500	61,100	1,020	760

When using anti-seize, reduce the lubed chart reading by 20% to properly torque. Always lubricate and use lubed torque values.

NOTES:
The above recommended assembly torques are offered as a guide only. Torque specifications, especially for critical joints, should be determined under actual assembly conditions due to the many variables involved which are difficult to predict and do affect the torque-tension relationship.
The above recommended clamp loads are based on 75% of the minimum specified proof loads for each grade and size.

Torques for Grades 5 and 8 were calculated based on the following relationship:
T = R D P
Where:T = Torque (ft lb)
D = Nominal Diameter (in)
P = Clamp Load (lb)
R = Tightening Coefficient
The value of R is assumed to be equal to .20 for dry, unplated conditions and equal to .15 for lubricated, including plated, conditions. Actual values of R can vary between .05 and .35 for commonly encountered conditions.

8.3 GEARBOX SPECIFICATIONS



9 INDEX

TRI-FORM POLY INC.

132 Charles Ave. W,
Morris, MB R0G 1K0

Phone: 204-746-6401
Fax: 204-746-8404

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REVISED AUGUST 2018

PART NUMBER: 80102

Tri-Form Poly

January 11, 2019

Re: Ecodrum™ loading rates

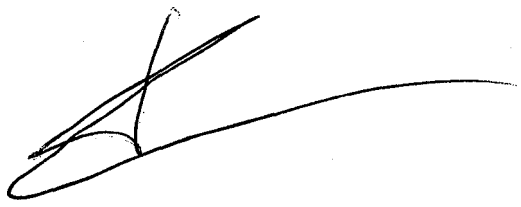
To whom it may concern,

The Ecodrum™ model 560 is rated for at least 750lb per day of compostable material at 131°F.

As composting is a biological process, the actual capacity of any Ecodrum model may be affected positively or negatively by factors such as material to be composted, bulking material, moisture levels and the C:N ratio.

Please don't hesitate to contact us at anytime.

Regards,



Timothy Epp

Ecodrum™ in-vessel composter
e tepp@triformpoly.com
m 204 955 7913

FACILITY CLOSURE PLAN

TUCKER UNIT
Compost Facility
2400 State Farm Road
Tucker, AR 72168

March 10, 2022

TUCKER UNIT

COMPOST FACILITY
TUCKER, ARKANSAS

FACILITY CLOSURE PLAN

MARCH 2022

TUCKER UNIT
Compost Facility
2400 State Farm Road
Tucker, AR 72168

Prepared by:

PMI
3512 South Shackleford
Little Rock, Arkansas 72205
501-221-7122

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1.0 SITE INFORMATION

The Tucker Unit (Tucker) Compost Facility is located at 2400 State Farm Road near Tucker, Jefferson County, Arkansas, Section 19, T-3-S, R-8-W approximate latitude 34° 26' 15.94" N and longitude 91° 54' 23.69" W, see Vicinity Map, Sheet 1. The Tucker compost facility is located within the highly secure Tucker Unit complex.

The Tucker compost facility receives organic waste from the correctional facility. The organic waste is composted in the Ecodrum composters for use in a variety of applications.

This Closure Plan addresses the requirements for an in-place closure of the compost facility at Tucker. The closure plan is a basis for determining an estimate of the cost to close the facility in-place.

The Closure Plan addresses the requirements set forth by Arkansas Department of Environmental Quality (ADEQ).

The closure cost estimate provides an estimate of the items and cost of items to properly close facility. The Closure Plan addresses the steps planned to close the various components of the compost facility.

2.0 CLOSURE PLAN

2.1 Tucker Compost Facility Closure and Notification Requirements

The subsections below describe the requirements established by ADEQ to properly close the Tucker compost facility.

ADEQ will be notified at least 60 days prior to any planned closure activities at Tucker compost facility.

2.1.1 Estimated Closure Cost

ADEQ requires the estimated closure cost to be calculated assuming that ADEQ must retain a third party contractor to perform the closure activities and the composters are at their maximum capacity at the time of closure. This should represent a worst case scenario for the closure cost. The total estimated closure of, not only the composters, but the ancillary components related to the composters. The estimated closure cost includes the following items:

1. Closure of the composters;
2. Closure of the loading platform;

The cost estimate will be updated annually by September 15th based on the proposed operation and capacity of Tucker compost facility through October 1st of the following year. The Engineer's Opinion of Closure Costs is presented in Appendix A.

2.1.2 Recordkeeping and Reporting Requirements

A copy of the approved Tucker Compost Facility Closure Plan will be maintained at the facility. Tucker will maintain records of Tucker compost facility until ADEQ authorizes destruction of the records. Tucker will maintain a record of changes or revisions to the facility. Tucker will provide initial and updated closure cost estimates to ADEQ Solid Waste Division as requested.

2.2 Closure Procedures

The closure of Tucker compost facility will be accomplished by removing the composters. The general scope of work associated with the closure of the facility is as follows:

- Notify ADEQ of plans to close the facility;
- Remove and dispose of any solid waste;
- Remove and dispose of any composted waste;

- Remove and dispose of composters
- Remove and dispose of miscellaneous equipment and appurtenances that are not to be abandoned in-place;

* Waste solids and other solid wastes associated with the closure will be disposed of in a Class 1 landfill.

Closure procedures will be monitored and documented in accordance with good engineering practices. Final closure of the site will be complete when all wastes have been removed and disposed, permitted components have been closed in accordance with this plan and final closure certification has been submitted to ADEQ. The closure certification will include documentation of disposal of all wastes.

2.3 Closure Schedule

ADEQ will be notified of the closure of Tucker compost facility. Closure will begin within sixty (60) days following the notification to ADEQ. Table I is an estimated schedule (in work days) of the closure of the composters assuming the composters are at a maximum capacity at the time of closure.

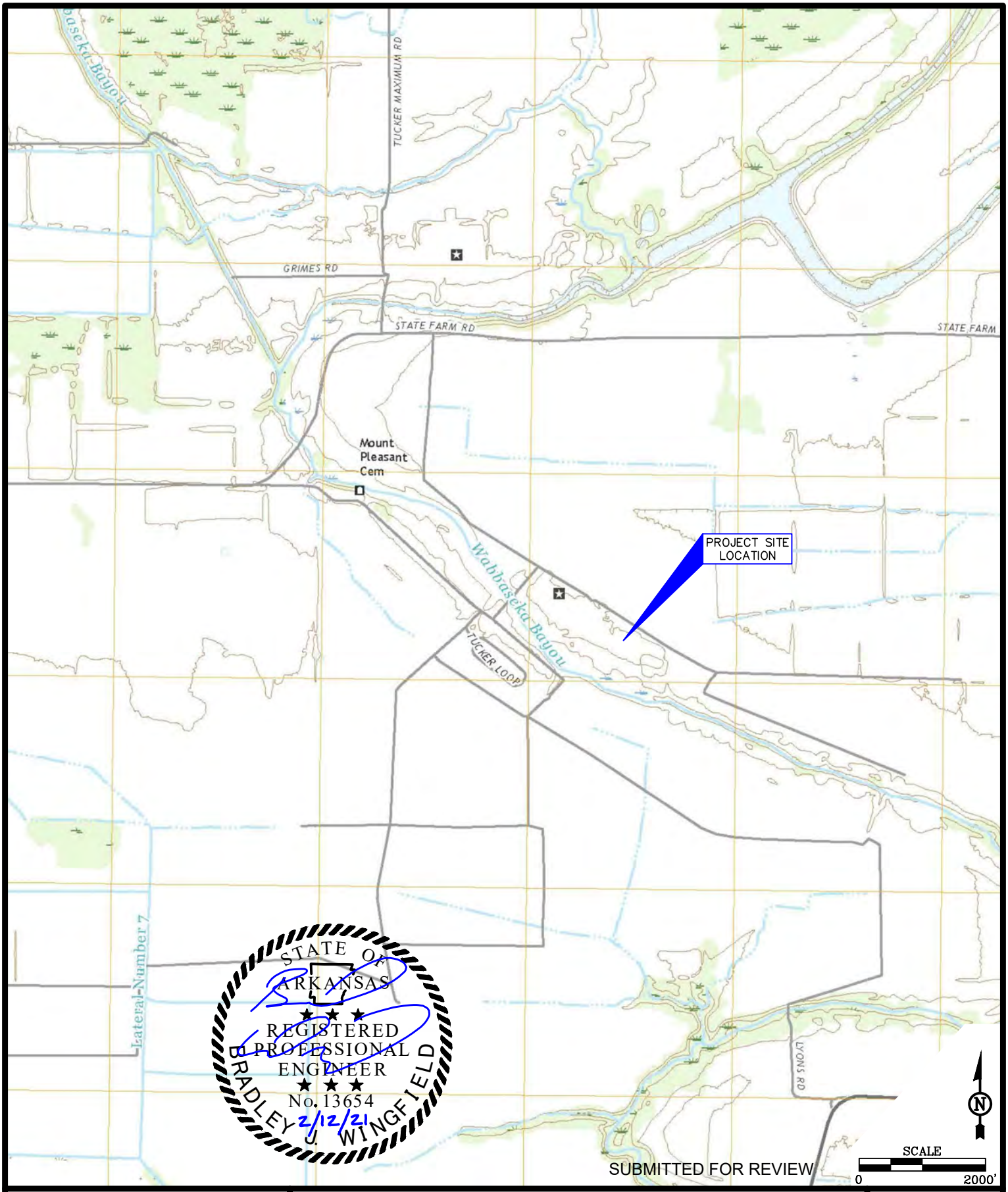
TABLE I

Tucker Unit Compost Facility
Closure Schedule

Closure Activity/Tasks	Number of Work Days to Complete
• Removal and disposal of solid waste	1
• Removal and disposal of compost	1
• Removal and disposal of composters	5
• Removal and disposal of miscellaneous appurtenances	1
• **Estimated Total Time to Complete Closure**	**8**

The closure of Tucker compost facility will require approximately 8 working days assuming maximum volume at the time of closure.

DRAWINGS



STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 13654
BRADLEY J. WINGFIELD
2/12/21

SUBMITTED FOR REVIEW

CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES
3512 South Shackleford Road
Little Rock, Arkansas 72205
(501) 221-7122 fx: (501) 221-7775

VICINITY MAP

COMPOST FACILITY
TUCKER UNIT
ARKANSAS DEPARTMENT OF CORRECTIONS

JOB NUMBER: ENTY-12162

SHEET NO.: 2

SUBMITTED:	BW	DRAWN:	CG	CHECKED:	BW	DATE:	FEB. 10, 2021

FILE: E:\ENTY-12162 - ADC COMPOSTING SITES\TUCKER ADEQ PERMIT APP\DRAWINGS\TUCKER PERMIT DRAWINGS.DWG

APPENDIX A

Engineer's Opinion of Closure Costs

Tucker Unit
3/10/2022
Preliminary Estimate of Cost
by PMI, Little Rock, AR

Item	Item Description	Units	Estimated Quantity	APC&EC Reg. 22 Factor of Safety	Unit Cost	Total Cost
1	Removal & Disposal of Solid Waste	TON	0.75	1.5	$150.00	$168.75
2	Removal & Disposal of Compost	CY	23	1.5	$50.00	$1,725.00
3	Removal and Disposal of Composter	LS	2	N/A	$5,000.00	$10,000.00
4	Removal and Disposal of Miscellaneous/Appurtenances	LS	1	N/A	$500.00	$500.00

Subtotal =	$12,393.75
Contingency (10%) =	$1,239.38
Estimated Construction Total=	$13,633.13

RPID: 511 **Parcel:** 001-00469-000 **Jefferson County Rural Property Record Card - 2021** **Card:** 1 **of** 1

Ownership Description

Name: STATE FARM
ATTN ARK DEPT OF CORR A/P
PO BOX 6408

PINE BLUFF AR 71611-6408

Subd.: 30819 SEC 19 TWP 3 S RNG 08 W
S-T-R: 19-03-08 **Acres:** 756.38
T.D.: 020 2 DOLLARWAY-RURAL
Location: 2400 STATE FARM (TUCKER UNIT MH PK) RD
Legal: ALL 756.38 ACRES

Type: EG Ex.Gov
Taxable: EX Exempt
Neigh: 30819
Owner: 439951
Status: **Tax Status:** EG
Block: **Lot:**
City: RURAL
Map:
Old PID:

Assessment Summary

Year	2000	%	1999	%
Land				
Bldgs				
Total				

Trend	Street	Utilities	Topography	Landscaping
.. Improving	.. Concrete	.. No Water	.. High	.. Excellent
.. Static	.. Asphalt	.. No Sewer	.. Low	.. Good
.. Declining	.. ChatSeal	.. No Gas	.. Rough	.. Average
.. New	.. Gravel	.. No Electric	.. Flat	.. Poor
.. Old	.. Dirt	.. No Telephone	.. Sloping	.. None

Building Permit Record

Date	Amount	Purpose	Note
3/19/2014			4/9/2015 LRW PU NEW SWMH ON LOT 19 2015 AS IMP
9/26/2012			6/27/13 LRW NO MH ON CARD 13 T.O MH'S GONE FROM
5/3/2012			6/27/13 LRW NO MH ON CARD 13 T.O MH'S GONE FROM

Review Record

Date	By	Reason	Land	Buildings	Total
6/29/2018	SDH	RA			
4/23/2015	LRW				
4/9/2015 LRW PU NEW SWMH ON LOT 19 2015 AS IMP ONLY BILLY OTTINGER SEE 001-00469-094; ALSO					
7/1/2013	SDH	RA			
6/25/2008	RCP	RA			
5/24/2000		RV			
1/1/1996					

Ownership Record

Date	Book	Page/Inst#	Amount	Type	Grantee
1/1/1910	000	0000			STATE FARM

Land Record

RURAL\30819\001-00469-000-01-2016

Use	Location	Symbol	Soil	Acres	Rate	O	Adj	%	Value	NC	HS
CU			19	129.805	6000.00				778,830		
E			01	201.012	.00						
E			02	124.087	.00						
E			04	285.819	.00						
E			12	1.274	.00						
T			01	3.636	70.00				255		
T			12	10.747	125.00				1,343		

Total: 780,450

RPID: 511 **Parcel:** 001-00469-000 **Jefferson County Rural Property Record Card - 2021** **Card:** 1 **of** 1

Occupancy	Construction	1st Flr	Total Liv	Grade	Age	YC	YR	Cond	Replace	Rem %	Physical	Functional	External	Actual	NC	HS
MobileH	ONE FrameStd	840	840	5	10			A	14,560	69	10,047			10,047		
OB/YI Total Contributory Value (RCN x Accrued Depreciation x Market Adjustment + Flatted Items + Other Additives)														100		
Total														10,150 V		

Ext Wall
- Low Cost
- Ý Standard
- Comb M/F
- MasonVen
- Other

Foundation
- Open Pier
- Closed Pier
- Slab
- Other

Floor Struct
- Wood SubF
- Elev Slab
- Slab Grade
- Other

Insulation
- Floor
- Wall
- Ceiling

Heat/Cool
- None
- Hot Air/F
- F/W Furn
- Central
- Elec Base
- Elec Ceil
- Other

Floor Cover
- None
- Softwood
- HW Sheath
- HW Parq
- Linoleum
- CarpetTile
- Cer Tile
- Stone
- Other

Basement
- Unfinished
- Finished
- Fin Part

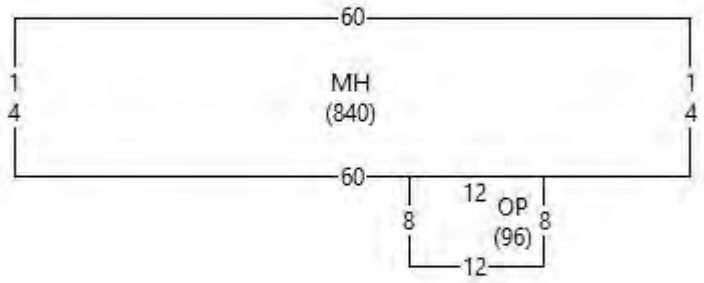
Roof Type
- Hip
- Mansard
- Gambrel
- Arched
- Gable
- Flat
- Dormer
- Shed
- Other

Roof Cover
- Asp Shing
- Fib Shing
- Wd Shing
- Wd Shakes
- Clay/Slate
- Roll Metal
- Other

Plumbing
Full
Half
Extra

Fireplaces
Type
Count

Sketch Area



AACU14*60 ABR35CR12*8

4/15/2015: SITS ON LOT 17 "FEMA TRLR #T127" ; WHITE/BLUE SHUTTERS

Outbuildings and Yard Improvements

Item	Type	Qty1	Qty2	UM	QR	Age	Rate	Grade	Rem %	Value	NC	HS
WD							100.00 F	1.000		100		
Total										100		

Building Computation

Base Price		16.25
+/- Grade	1.000	
Story Hgt Factor	1.000	
Grade Adj Factor	1.000	
Composite Factor		1.000
Adj Price per SF		16.25
Total Base SF		840
Base Value		13,650

Adjustments to Base

Item	S.F./Qty	Rate	Total
Foundation			
Floor Structure			
Ins Floor			
Ins Wall			
Ins Ceiling			
Heat & Cool			
Floor Cover			
Roof Cover			
Plumbing			
Fireplace			
Basement			

Base Structure and Additive Items

Item	Area	Rate	Factor	REL	Total	NC	HS
A MH	840	16.25	1.000		13,650		
B OP	96	11.86	.799		910		

Total of Above	14,560
Market Adjustment	1.000
Total Structure RCN	14,560

Inspected: LNT 10/5/2017 Contact: PI
Revisited: LRW 6/27/2013 Int.Est?:
Entered: LNT 10/5/2017 Sk. File:
Printed: 1/24/2022 Status:

SOUTHEAST ARKANSAS
SOLID WASTE MANAGEMENT BOARD

Brad Wingfield, P.E.
Principal – Engineering Division
PMI | 3512 S. Shackleford Rd. | Little Rock, AR 72205

After reviewing the documents and plans for the Compost Operating Plan submitted by you for the Tucker Prison, located at 2400 State Farm Road, England, AR 72046. The Southeast Arkansas Regional Solid Waste Management Board agrees to all of the parameters and guidelines set forth In the operating plan and desires to see this project move forward and has no reservations or the requirement for any further information.

Sincerely

Shane Knight

Director of Solid Waste & Recycling
Southeast Arkansas Economic Development District, Inc.
P.O. Box 6806
Pine Bluff, AR 71611
870.536.1971 (Office)
501.317.0276 (Cell)
870.536.7718 (Fax)