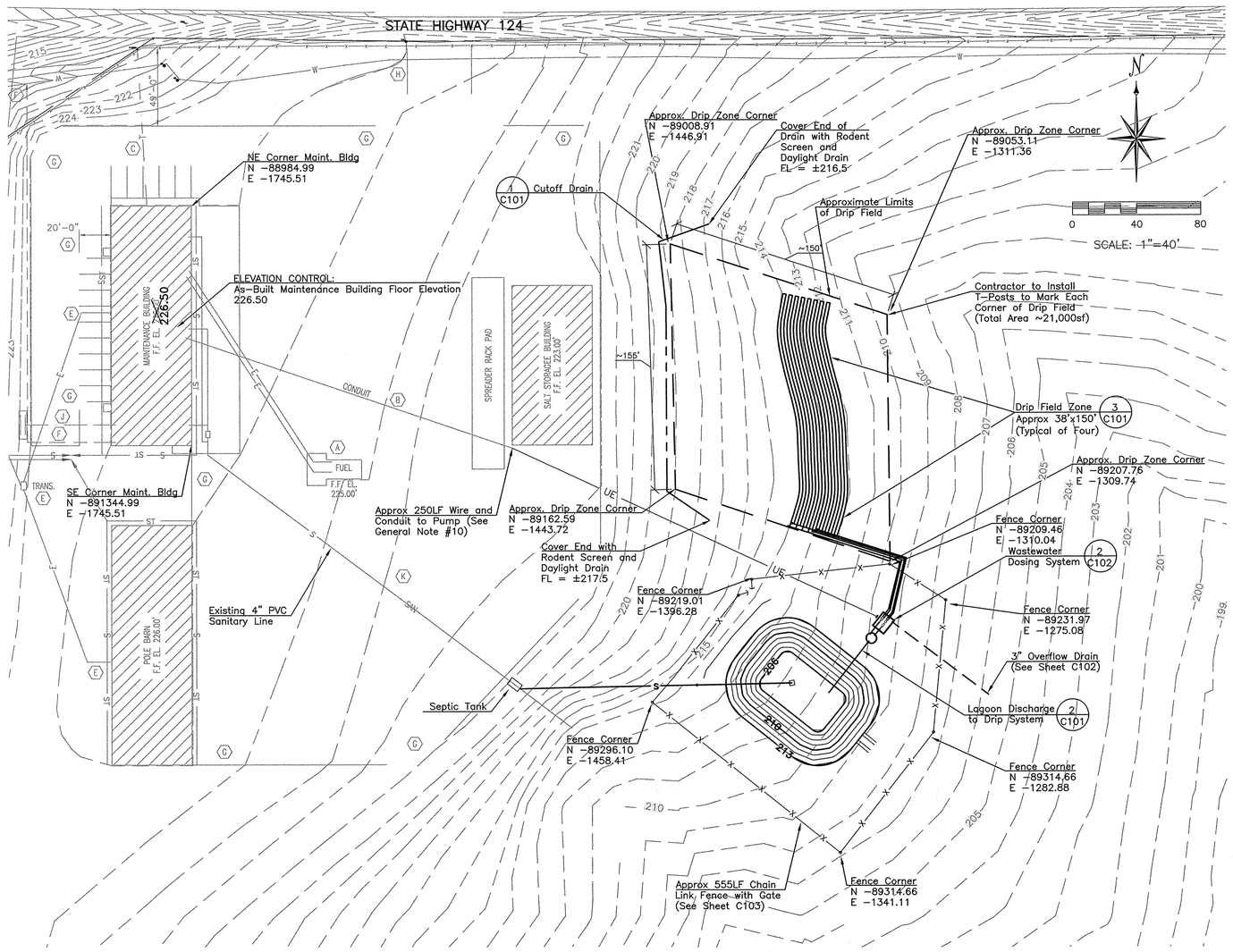
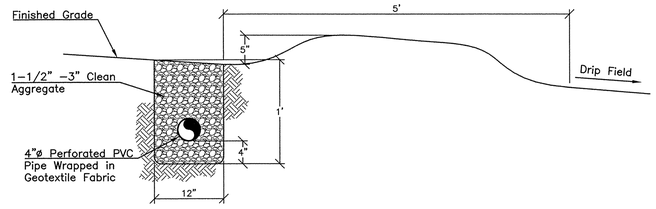


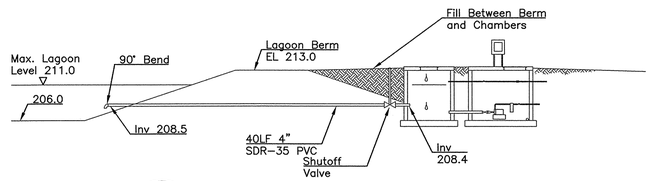


1 / C101 CROSS SECTION OF CUTOFF DRAIN

N.T.S.

Note:

1. Construct drain and berm to divert surface runoff around drip field.

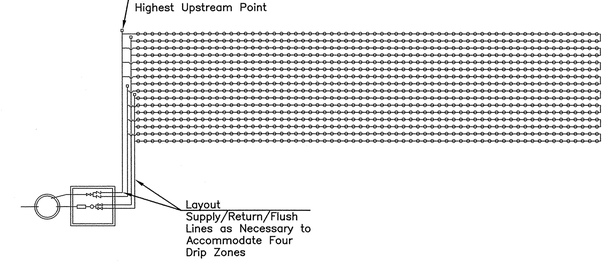


2 / C101 LAGOON DISCHARGE TO DRIP SYSTEM

N.T.S.

Note:

1. See Sheet C102 for additional details for drip system.



3 / C101 SCHEMATIC OF DRIP FIELD

N.T.S.

Notes:

1. The layout for two zones is shown above. System design calls for four zones total.
2. See General Note #3 regarding drip field installation.
3. See 2/C102 for wastewater dosing structure details.
4. Dimensions are approximately 38'x150' per zone (18 rows at 142' long), typical of four zones.

GENERAL NOTES:

1. Refer To The Original Contract Documents For General Notes Regarding Site Layout, Construction, Plumbing, and Electrical.
2. Boone County Requires That On−Site Wastewater System Installers Be Certified. Assure That The Installer Is in Compliance With This Regulation.
3. Basis Of Design: 10 Employees At 15 Gal/Day Per Employee = 150 gpd
   Truck Wash Bay Allowance: 100 Gal/Vehicle x 2.6 Veh/Day @ 15 Min/Veh = 260 gpd
   Maintenance Building: 17.8 gpm (Based On Fixture Units) for 5% Of One 8−Hour Shift = 427 gpd
   Total Anticipated Daily Flow = 837 gpd. Work Days = 5.5 Per Week
   Yearly Flow = 52 Weeks x 5.5 Days/Week x 837 gpd = 239,380 Gallons
   Evapotranspiration/Wettest Year In Ten Balance Adds 69,690 Gallons
   Total To Be Irrigated = 309,070 Gallons/Year
4. Total System Area Required is 309,070 gal/yr by 24" application rate = 20,660 ft² or 0.47 Acres. Drip Lines Shall Be ½" Diameter, With Pressure Compensating Emitters (Netafim or Approved Equal) at 2' Spacing Along Drip Lines. Lay Drip Lines Along Ground Contours at 2' Spacing (See Field Schematic) at Depth Not Less Than 12" Nor Greater Than 18". Emitters Shall Provide a Constant Flow Rate of 0.6 Gal/Hour, Over a Pressure Range of 20 to 60 psi.
5. Supply and Return Lines Shall be 1−¼" Diameter PVC. Place Lines to Produce Four Dosing Zones Per the Field Schematic. Upper End of Each Supply and Return Line Shall be Fitted With a Vacuum Release to Allow Line Draining.
6. Pump Shall Provide a Flow of 35 gpm at Total Dynamic Head of 72 Feet. A Disc Filtration System Shall be Provided Following the Pump Discharge and Before the Zone Control Valves.
7. Auto and Manual Modes for Pump and Valve Controls Shall Include Timed Operation of Drip Field Zones as Follows:
   A. The Pump Shall be Activated and the Zone 1 Control Valve Opened. Pump Run Time Shall be 7 Minutes 6 Seconds, After Which the Zone 1 Valve Shall be Closed and the Pump Shut Off.
   B. After 45 Minutes From the Start of Zone 1 Operation, the Pump Shall Again be Activated and the Zone 2 Control Valve Opened. Pump Run Time Shall be 7 Minutes 6 Seconds, After Which the Zone 2 Valve Shall be Closed and the Pump Shut Down.
   C. Operation Shall Continue as Above, Alternating Between Zones 1, 2, 3, and 4.
   D. Every 6th Cycle for Each Zone Shall Include Activation of the Flush Valve to Allow Line Flushing at Minimum 2 fps.
8. Earthwork: The Lagoon Dimensions and Layout Shown Here Are Intended to Result In a Balanced Cut/Fill Grading Scenario. Any Excess Sub−Grade or Topsoil Material Shall be Spoiled on the Outside Slopes of the Lagoon to Make Them Flatter.
9. Final Grade, Seed, And Mulch All Disturbed Areas Except Gravel Cutoff Drain And Interior Of Lagoon Below Normal Water Elevation.
10. The Electrical Connection for the Wastewater Pump Shall be Made at the Existing Breaker Box at the Salt Storage Shed. Wiring From the Shed to the Pump Shall be installed in Conduit and Adequately Sized to Accommodate the Resulting Voltage Drop (10 ga. or as Recommended by Manufacturer). See Note B Regarding Conduit Installation on Sheet 2 of the Original Plans, and the General Electrical Notes on Sheet 15 Regarding Installation.
11. Contractor to Pre−Fill Lagoon to a Depth of 2 feet (Approx 25,000 gallons) with Potable Water Prior to Use.

Revisions: No. | Date | Description | Initials

THOMAS WELLS E−17004 PROFESSIONAL ENGINEER STATE OF MISSOURI 8/31/2010

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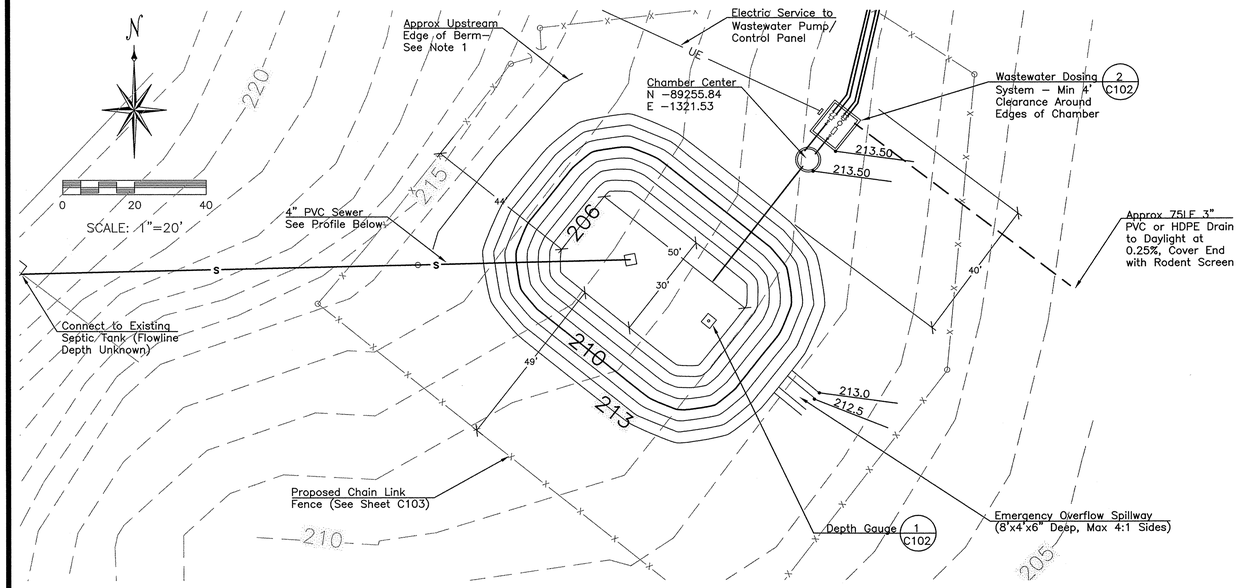
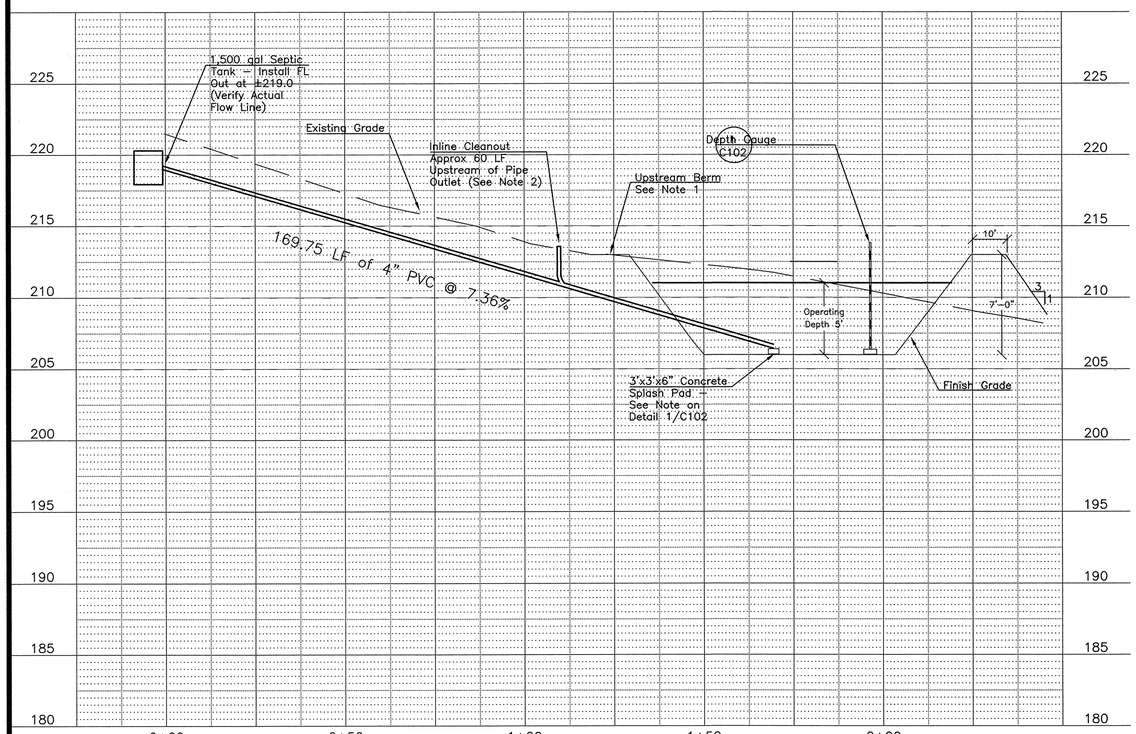
MO Survey Corp. No. 2001020438 Exp. 12-31-2009

Missouri Department of Transportation
New Hallsville Maintenance Facility
Onsite Wastewater Treatment
System Layout and Design Criteria

Client Proj #	0000
THHinc Proj #	4748
Engineer:	CMF
Designer:	CMF/TPW
Drafter:	GRK
Plotted:	8/31/2010

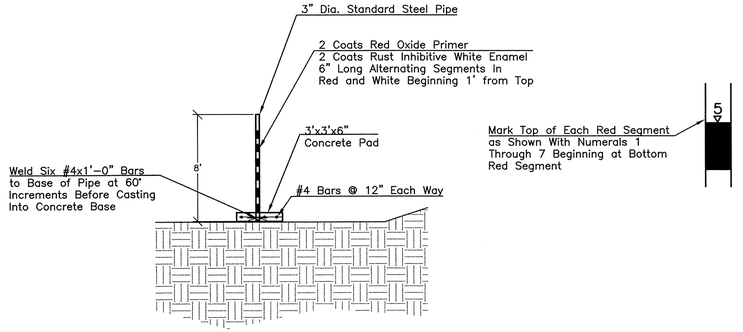
DWG. C101
SHT. 1 OF 3





Notes:

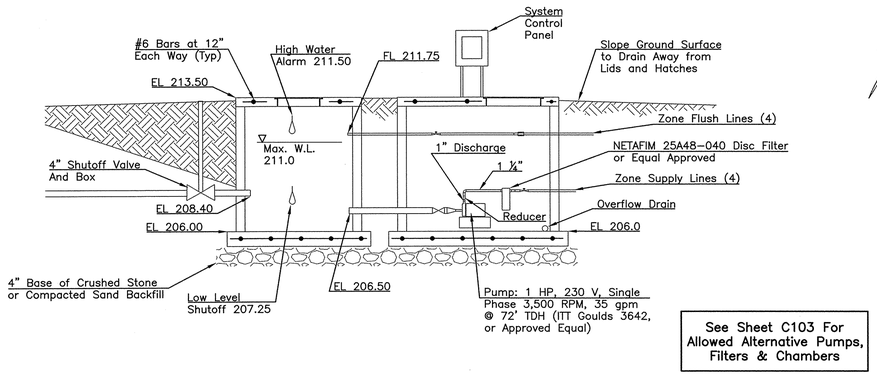
1. Upstream Berm to be at Least 6" Higher Than Adjacent Ground, or a 6" Deep by 3' Wide Diversion Channel Shall be Constructed to Prevent Surface Water Runoff From Entering the Lagoon. Seed and Mulch Either Structure.
2. Cleanout Details Listed on Sheet 13 of Original Plans.
3. Lagoon Subgrade Material to be Compacted to 90% Standard Proctor. All Disturbed Areas Including Outside Slopes, Top of Berm, and Inside Slopes Above Normal Operating Depth to be Covered With 6" of Topsoil, Seeded, and Mulched.
4. Inside and Outside Slopes of Lagoon Shall Have a Maximum Slope of 3:1, with a Minimum Top of Berm Width of 10'.



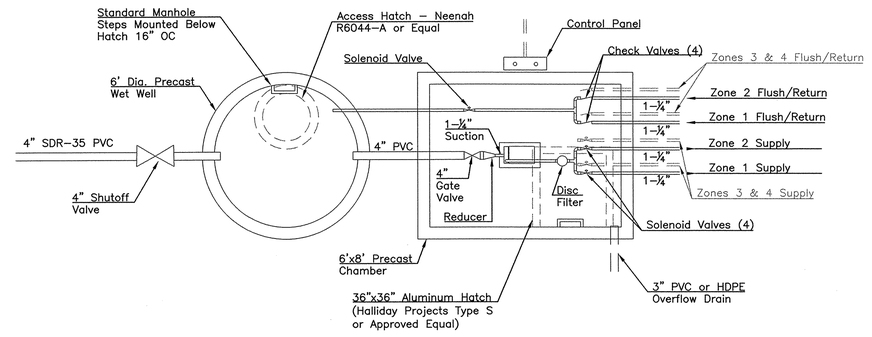
1 C102 DEPTH GAUGE
N.T.S.

Note:

1. Use Reinforcing Bars Described Above for Concrete Splash Pad at Pipe Outlet.



See Sheet C103 For Allowed Alternative Pumps, Filters & Chambers



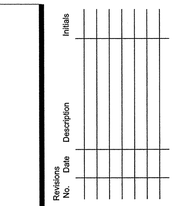
2 C102 WASTEWATER DOSING SYSTEM
N.T.S.

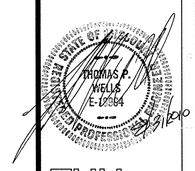
Note:

1. Flush/Return and Supply lines for Zones 3 and 4 may be installed below or to the side of the other lines, as needed to fit inside the chamber. Add/adjust valve setup for those lines as needed.

Revisions

No.	Date	Description	Initials





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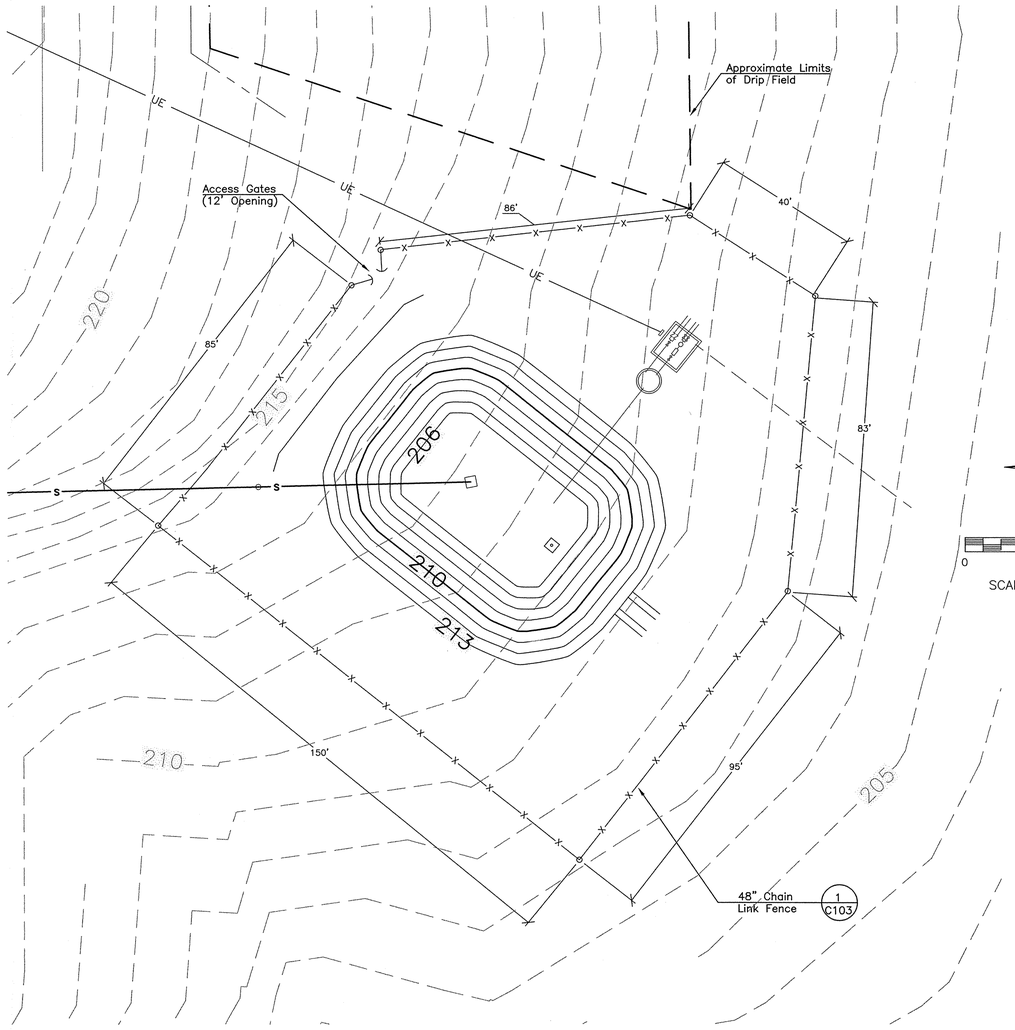
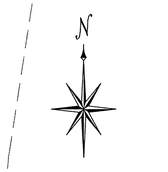
Missouri Department of Transportation
New Hallsville Maintenance Facility
Onsite Wastewater Treatment

Lagoon Plan/Profile/Detail

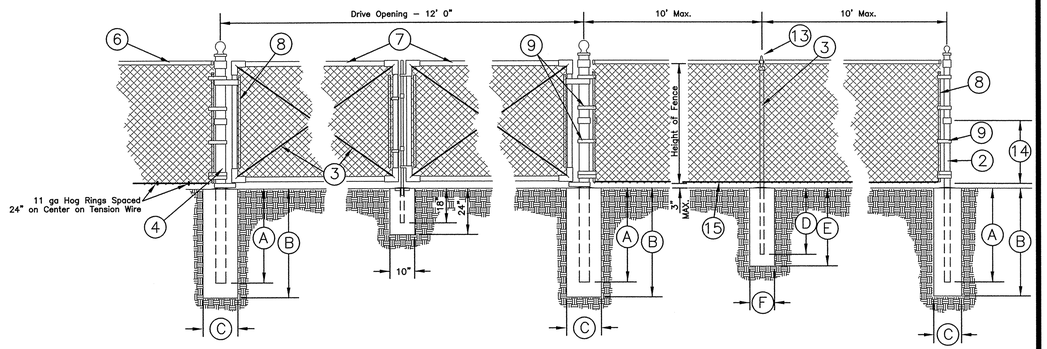
Client Proj #	0000
THHinc Proj #	4748
Engineer:	CMF
Designer:	CMF/TPW
Drafter:	GRK
Plotted:	8/31/2010

DWG. C102
SHT. 2 OF 3

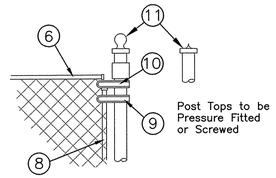




SCALE: 1"=20'



TYPE A FENCE



END, CORNER AND GATE POSTS

LEGEND

1. Fabric – 9 ga. Galvanized
2. End, Corner, or Pull Post – 2 7/8" ø
3. Line Post – 2 3/8" ø
4. Gate Post – 4" ø
5. Brace
6. Top Rail – 1 5/8" ø
7. Gate Frame
8. Stretcher Bar – 3/16"x 3/4" PL.
9. Stretcher Bar Band
10. End or Corner Clamp
11. Post Tops – Other Than Line Post
12. Fabric Ties
13. Line Post Tops
14. 1/2 Fabric Ht. or as Recommended by Mfgr.
15. Tension Wire – 7 ga

MINIMUM POST ANCHORAGE

DESCRIPTION		HEIGHT OF FENCE
		48"
(2) End, Corner, & Pull Post	(A)	20"
	(B) x (C)	36" x 12"
(3) Line Post	(D)	16"
	(E) x (F)	30" x 8"

1 / C103 TYPE "A" CHAIN LINK FENCE N.T.S.

NOTES:

1. Fabric shall be attached to posts at 12 inch maximum spacing and to rails and tie wires at 24 inch maximum spacing using 9 ga wire.
2. All posts shown have provisions to securely hold the bottom tesnion wire in position and allow for removal and replacement of a post without damaging the top tension wire.

GENERAL NOTES:

1. Refer To The Original Contract Documents For General Notes Regarding Site Layout, Construction, Plumbing, and Electrical.
2. Refer to Section 02830 for Specifications Regarding Chain Link Fencing.
3. Add Fencing as Shown to Provide Full Enclosure of Lagoon Area. Provide Sign on Each Side of Fence with Lettering "Wastewater Treatment System – Do Not Enter"
4. Posts are Typically not Depicted Here. Refer to Specification 02830 for sizing and spacing.
5. Provide Minimum Width of 10' Between Toe of Berm Slopes and Fence.

Alternate Pumps, Filters & Chambers:

1. Alternate Submersible pump:
   - A. Zoeller 5033–0008 Submersible Turbine Pump or equal, delivering a flow of 35 gpm against a Total Dynamic Head of 75 feet. Pump power cord shall be of sufficient length to reach the control panel without splicing, leaving at least 3 feet of extra conductor. The pump shall be installed in a concrete or fiberglass wet well.
   - B. If the submersible pump option is used, a separate dry chamber shall still be provided to house the solenoid and check valves serving the fields. This will provide unhindered maintenance access to the valves.
2. Alternate filter equipment:
   - A. Sim/Tech A–1 vault filter system or equal, with multiple vertical perforated stand pipe tubes covered with filter fabric sleeves, with filtrate directed to a central discharge. A stop tube shall be supplied to halt flow to any individual stand tube and allow filter sleeve removal, cleaning and replacement without interrupting the operation of the other tubes. Supply all necessary connections and supports for installation in a filter manhole or chamber upstream of the pump chamber.
   - B. If this submerged filter option is used, the field flush return line discharge shall be directed to the filter chamber.
3. Alternate fiberglass chambers:
   - A. The use of prefabricated fiberglass chambers is approved.
   - B. If fiberglass chambers are used, floatation protection provisions shall be submitted with the chamber shop drawings, and floatation protection shall be installed per approved shop drawings.

Initials | Description | Revisions No. Date

STATE OF MISSOURI THOMAS P. WELLS E-19964 REGISTERED PROFESSIONAL ENGINEER 8/31/2010

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Exp. 12-31-2009

Missouri Department of Transportation
New Hallsville Maintenance Facility
Onsite Wastewater Treatment

Fence Layout and Details

Client Proj #	0000
THHinc Proj #	4748
Engineer:	CMF
Designer:	CMF
Drafter:	GRK
Plotted:	8/31/2010

DWG. C103
SHT. 3 OF 3