Dixieland Utility LLC
PO Box 9299
Fayetteville, AR 72703
Office 479-527-9880
Direct 479-530-5926

July 23, 2014

Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

Attention: Water Division Permits Branch

RE: Permit Number 4811-WR-2, AFIN 04-00899

Enclosed is the renewal application of the referenced treatment facility. Included with this package are the following documents:

- Permit Transfer Form
- Permit Application
- Disclosure Statement
- WMP and Operations and Maintenance Manual
- Engineered plans of the systems
- Dixieland Utility Certificate of Good Standing
- Deed of ownership for the facility
- Benton County Judgment ordering the establishment of the Sewer Improvement District for the facility

Please feel free to contact me if there is any further information you need

Regards

Kathryn Bartlett
Managing Member
Dixieland Utility

PERMIT TRANSFER FORM

III. OWNERSHIP CHANGE AGREEMENT

Please note you must complete this Section (III.) only if the permit has a new owner or a new ownership.

Please specify the closing date for this transaction: 10/10/2012

Current Permittee (Seller): Greenfield Capital Development

Signature of Responsible Corporate Officer: Kmbartlett
Title of Responsible Corporate Officer: Mg Member
Printed Name of Responsible Corporate Officer: Kathryn Bartlett
Date: 6/30/2014

New Permittee (Buyer): Dixieland Utility LLC

Signature of Responsible Corporate Officer: Kmbartlett
Title of Responsible Corporate Officer: Mg Member
Printed Name of Responsible Corporate Officer: Kathryn Bartlett
Date: 6/30/2014

Disclosure Statement:
Disclosure Statement must be submitted for new permittee. **Disclosure Statement is not required for Stormwater Permits.**

Is Disclosure Statement enclosed: ☒ Yes ☐ No

Financial Assurance:
Please note that if Financial Assurance is required for the current permittee then the new permittee may have to provide new Financial Assurance before the permit maybe transferred..

Land Use Contract:
For **land application permits** you must submit a new land use contracts for all the sites permitted under the current permit for land application. The new land use contract must be signed by the new permittee and land owner.

IV. CERTIFICATION OF NEW PERMITTEE

"I certify that the cognizant official designated in this Permit Transfer Form (Section II) is qualified to act as a duly authorized representative under the provisions of 40 CFR Part 122.22(b). If no cognizant official has been designated, I understand that the Department will accept reports signed by the applicant. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

In addition, I certify that there will be no operational changes that warrant a permit modification. (Please note that if there are changes that warrant a permit modification, then you must submit a complete application, updated plans, design calculations and specifications, and the permit modification fee along with this Ownership Change Form. The transfer may be made effective prior to permit modification.)

Typed or Printed Name: Kathryn Bartlett Title: Mg Member
Signature: Kmbartlett Date: 6/30/2014

Arkansas Department of Environmental Quality
No-Discharge Section Permit Application
Subsurface Disposal System

Permit No.: (Office Use Only)	AFIN: (Office Use Only)	SIC Code:	NAICS Code:

1. Permit Action and Type *(Please check one of the following)*:

Operator Type: ☐ Corporation (State of Incorporation: _____) ☑ Limited Liability Company (State of LLC: AR)
☐ Partnership ☐ Sole Proprietorship/Private ☐ Public Entity (Type: _____)

☐ New Permit ☑ Renewal ☐ Modification of Permit, Describe: _____

☐ Carwash/Truck Wash ☐ Domestic Septic System ☑ Drip Irrigation System ☐ Laundromat

☐ Slaughter House ☐ Other _____

2. Permittee Legal Name and Mailing Address: *(Must Match Arkansas's Secretary of State)*

Owner Name: Dixieland Utility LLC (479)		
Address: PO Box 9299	Phone Number: 527-9880	
City: Fayetteville	State: AR	Zip Code: 72703
Contact Person: *(Mr. / Mrs. / Ms.)* Kathryn Bartlett	Email: kathy@aquatechsys.com	
Title: Mg Member	Phone Number: 479 527 9880	Cell Number: 479 530-5926

3. Facility Location *(physical address is required; NO P.O. BOX)*:

Facility Name: Villages of Cross Creek		
Address *(911 Address)*: 3302 Maint N Dixieland	Phone Number: 479 633-0003	
City: Little Flock	State: AR	Zip Code:
1/4 Sec.:	Section:	Township:	Range:
Latitude: 36 Deg 21 Min 53.31 Sec.	Longitude 94 Deg 8 Min 35.45 Sec.	Source Datum:
County: Benton	Nearest Town: Little Flock	
Nearest Stream: Brush Creek Tributary	Distance: 2000 (ft)	Stream Segment: 4K

4. Consultant Information:

Name: Charles Presley	Consulting Firm: Presley Brannon Engineering	
Email: cjpresemadisoncounty.net	Phone Number:	
Address: PO Box 607	Cell Number: (479) 409-6550	
City: Huntsville	State: AR	Zip Code: 72740

Please read the following carefully and sign below.

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, which may include fines and/or imprisonment.

SIGNATORY REQUIREMENTS:

The information contained in this form must be certified by a **responsible official** as defined below:

Corporation: principal officer at least the level of vice president (must be an officer or register agent with the secretary of state)
Partnership: a general partner
Sole Proprietorship: the proprietor/owner
Municipal, state, federal, or other public facility: principal executive officer, or ranking elected official

Responsible Official: Kathy Barthett Title: mg member

Responsible Telephone: 479 527 9880 Email: Kathy@aquatechsys.com

Responsible Signature: KBarthett Date: 6/30/14

Cognizant Official is an individual that is given signature authority from the Responsible Official

Cognizant Official: Ken Gregory Title: operator

Cognizant Telephone: 479 790 3813 Email: Ken@aquatechsys.com

Cognizant Signature: _____ Date: 6/30/14

PERMIT REQUIREMENT VERIFICATION (Please check the following to verify the completion of permit requirements.)

Yes	No	
☑	☐	Submittal of Complete Application Does the Owner name match the Secretary of State (Corporation or Limited Liability Company)? Does the Responsible Official match the Secretary of State?
☑	☐	Submittal of Waste Management Plan Stamped & Signed by an Arkansas Registered PE/ ADH Designated Representative Are maps and site description included?
☐	☐	Submittal of Operation/Maintenance Plan (nonmunicipal wastewater treatment systems) Is the cost estimate included?
☐	☐	Submittal of Disclosure Statement (completed and executed) Not required for public entity
☐	☐	Submittal of Land use Contract/Deed/Lease
☐	☐	Arkansas Department of Health notification letter (letter transmitting documents to ADH) (New permits or modified permits)
☐	☐	Provide Certificate of Good Standings with the Arkansas Secretary of State (If foreign corporation, provide Certificate of Good Standings from the state of Origin)

PERMIT TRANSFER FORM

Please select one of the following options:

A. Permittee (legal name) change B. Facility name change C. Responsible official name change

☒ A ☐ B ☐ C ☐ A & B ☐ A & C ☐ B & C ☐ A & B & C

PERMIT NUMBER: _____

I. CURRENT PERMITTEE INFORMATION

Permittee (legal name): Greenfield Capital Development

Facility Name: Villages of Cross Creek Apartment

Responsible Official Name (see Section IV below): Kathryn Bartlett

Is the permittee identified above, the owner of the facility? ☐ Yes ☒ No

If you mark No, please list the name of the owner: Dixieland Utility LLC

II. NEW PERMITTEE INFORMATION

Permittee (legal name): Dixieland Utility LLC

Facility Name (if different from Permittee Name): Villages of Cross Creek Apartments

Is the permittee identified above, the owner of the facility? ☒ Yes ☐ No

If you mark No, please list the name of the owner: _____

Responsible Official Name (see Section IV below): Kathryn Bartlett

Official Title of Responsible Officer: Managing Member

E-mail: kathy@aquatechsys.com

Permittee Address: PO Box 9299

Permittee City: Fayetteville

Permittee State: AR Zip: 72703

Permittee Telephone No.: 479-527-9880

Owner Type:

☐ STATE ☐ PARTNERSHIP

☐ FEDERAL ☐ CORPORATION*

☒ SOLE PROPRIETORSHIP - LLC

Is the new permittee registered with the Arkansas Secretary of State? ☒ Yes ☐ No

If yes, please provide the full name of corporation if different than the legal permittee name listed above. _____

Facility Mailing Address: PO Box 9299 Facility City: Fayetteville

_____ Facility State: AR Zip: 72703

Facility Contact Person Name: Tom Bartlett Contact Person Title: Mg Member

Telephone Number: 479-527-9880 Fax Number: 479-527-9830 E-mail: tom.bartlett53@gmail.com

Invoice Contact Person: Kathy Bartlett City: Fayetteville

Invoice Mailing Address: PO Box 9299 State: AR Zip: 72703

Invoice Mailing Address: _____ Telephone: 479-527-9880

Cognizant Official Name: Tom Bartlett Cognizant Official Title: Mg Member

Telephone Number: 479-527-9880 Fax Number: 479-527-9830 E-mail: tom.bartlett53@gmail.com

Print Form

INSTRUCTIONS FOR DISCLOSURE STATEMENT

Arkansas Code Annotated Section 8-1-106 requires that all applicants for the issuance, or transfer of any permit, license, certification or operational authority issued by the Arkansas Department of Environmental Quality (ADEQ) file a disclosure statement with their applications. The filing of a disclosure statement is mandatory. No application can be considered complete without one.

Disclosure statement means a written statement by the applicant that contains:

- **The full name and business address of the applicant and all affiliated persons;**
- **The full name and business address of any legal entity in which the applicant holds a debt or equity interest of at least five percent (5%) or that is a parent company or subsidiary of the applicant, and a description of the ongoing organizational relationships as they may impact operations within the state;**
- **A description of the experience and credentials of the applicant, including any past or present permits, licenses, certifications, or operational authorizations relating to environmental regulation;**
- **A listing and explanation of any civil or criminal legal actions by government agencies involving environmental protection laws or regulations against the applicant and affiliated persons in the ten (10) years immediately preceding the filing of the application, including administrative enforcement actions resulting in the imposition of sanctions, permit or license revocations or denials issued by any state or federal authority, actions that have resulted in a finding or a settlement of a violation, and actions that are pending;**
- **A listing of any federal environmental agency and any other environmental agency outside this state that has or has had regulatory responsibility over the applicant; and**
- **Any other information the Director of the Arkansas Department of Environmental Quality may require that relates to the competency, reliability, or responsibility of the applicant and affiliated persons.**

Exemptions:

The following persons or entities are not required to file a disclosure statement:

- **Governmental entities, consisting only of subdivisions or agencies of the federal government, agencies of the state government, counties, municipalities, or duly authorized regional solid waste authorities as defined by § 8-6-702. (This exemption shall not extend to improvement districts or any other subdivision of government which is not specifically instituted by an act of the General Assembly.)**
- **Applicants for a general permit to be issued by the department pursuant to its authority to implement the National Pollutant Discharge Elimination System for storm water discharge.**
- **If the applicant is a publicly held company required to file periodic reports under the Securities and Exchange Act of 1934 or a wholly owned subsidiary of a publicly held company, the applicant shall not be required to submit a disclosure statement, but shall submit the most recent annual and quarterly reports required by the Securities and Exchange Commission which provide information regarding legal proceedings in which the applicant has been involved. The applicant shall submit such other information as the director may require that relates to the competency, reliability, or responsibility of the applicant and affiliated persons.**

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY
DISCLOSURE STATEMENT

Instructions for the Completion of this Document:

A. Individuals, firms or other legal entities with no changes to an ADEQ Disclosure Statement, complete items 1 through 5 and 18.

B. Individuals who never submitted an ADEQ Disclosure Statement, complete items 1 through 4, 6, 7, and 16 through 18.

C. Firms or other legal entities who never submitted an ADEQ Disclosure Statement, complete 1 through 4, and 6 through 18.

Mail to:
ADEQ
DISCLOSURE STATEMENT
[*List Proper Division(s)*]
5301 Northshore Drive
North Little Rock, AR 72118-5317

Hand Deliver to:
ADEQ
DISCLOSURE STATEMENT
[*List Proper Division (s)*]
5301 Northshore Drive
North Little Rock, AR 72118-5317

1. APPLICANT: (Full Name) Dixieland Utility LLC

2. MAILING ADDRESS (Number and Street, P.O.Box Or Rural Route) : PO Box 9299

3. CITY, STATE, AND ZIPCODE: Fayetteville, AR 72703

4. (check all that apply.)

☐ Individual ☑ Corporate or Other Entity LLC

☑ Permit ☐ License ☐ Certification ☐ Operational Authority

☑ New Application ☐ Modification ☐ Renewal Application (If no changes from previous disclosure statement, complete number 5 and 18.)

☐ Air ☑ Water ☐ Hazardous Waste ☐ Regulated Storage Tank ☐ Mining ☐ Solid Waste

☐ Environmental Preservation and Technical Service

5. Declaration of No Changes:
The violation history, experience and credentials, involvement in current or pending environmental lawsuits, civil and criminal, have not changed since the last Disclosure Statement I filed with ADEQ on _____

_____

Signature of Individual or Authorized Representative of Firm or Legal Entity
(Also complete #18.)

6. Describe the experience and credentials of the Applicant, including the receipt of any past or present permits, licenses, certifications or operational authorization relating to environmental regulation. (Attach additional pages, if necessary.)

operation of other WWTP drip disposal systems
4811-WR-1 & WR-2
4815-W & 4815-WR-1
4957-W & 4957-WR-1
4837-W & WR-1 & WR-2
4908-W & 4908-WR-1

Note: these facilities are ones which we are under contract to operate

7. List and explain all civil or criminal legal actions by government agencies involving environmental protection laws or regulations against the Applicant * in the last ten (10) years including:

1. Administrative enforcement actions resulting in the imposition of sanctions;
2. Permit or license revocations or denials issued by any state or federal authority;
3. Actions that have resulted in a finding or a settlement of a violation; and
4. Pending actions.

(Attach additional pages, if necessary.)

* Firms or other legal entities shall also include this information for all persons and legal entities identified in sections 8-16 of this Disclosure Statement.

8. List all officers of the Applicant. (Add additional pages, if necessary.)

NAME: Tom Bartlett TITLE: Mg Member
STREET: 4516 Mesa St
CITY, STATE, ZIP: Fayetteville, AR 72704

NAME: Kathy Bartlett TITLE: Mg Member
STREET: 4516 Mesa St
CITY, STATE, ZIP: Fayetteville, AR 72704

NAME: TITLE:
STREET:
CITY, STATE, ZIP:

9. List all directors of the Applicant. (Add additional pages, if necessary.)

NAME: TITLE:
STREET:
CITY, STATE, ZIP:

NAME: TITLE:
STREET:
CITY, STATE, ZIP:

NAME: TITLE:
STREET:
CITY, STATE, ZIP:

10. List all partners of the Applicant. (Add additional pages, if necessary.)

NAME: TITLE:
STREET:
CITY, STATE, ZIP:

NAME: TITLE:
STREET:
CITY, STATE, ZIP:

NAME: TITLE:
STREET:
CITY, STATE, ZIP:

11. List all persons employed by the Applicant in a supervisory capacity or with authority over operations of the facility subject to this application.

NAME: Ken Gregory TITLE: Operator
STREET:
CITY, STATE, ZIP:

NAME: TITLE:
STREET:
CITY, STATE, ZIP:

NAME: TITLE:
STREET:
CITY, STATE, ZIP:

12. List all persons or legal entities, who own or control more than five percent (5%) of the Applicant's debt or equity.

NAME: _____ TITLE: _____
STREET: _____
CITY, STATE, ZIP: _____

N/A

NAME: _____ TITLE: _____
STREET: _____
CITY, STATE, ZIP: _____

NAME: _____ TITLE: _____
STREET: _____
CITY, STATE, ZIP: _____

13. List all legal entities, in which the Applicant holds a debt or equity interest of more than five percent (5%).

NAME: _____ TITLE: _____
STREET: _____
CITY, STATE, ZIP: _____

N/A

NAME: _____ TITLE: _____
STREET: _____
CITY, STATE, ZIP: _____

NAME: _____ TITLE: _____
STREET: _____
CITY, STATE, ZIP: _____

14. List any parent company of the Applicant. Describe the parent company's ongoing organizational relationship with the Applicant.

NAME: _____
STREET: _____
CITY, STATE, ZIP: _____

N/A

Organizational Relationship:

15. List any subsidiary of the Applicant. Describe the subsidiary's ongoing organizational relationship with the Applicant.

NAME: _____
STREET: _____
CITY, STATE, ZIP: _____

N/A

Organizational Relationship:

16. List any person who is not now in compliance or has a history of noncompliance with the environmental laws or regulations of this state or any other jurisdiction and who through relationship by blood or marriage or through any other relationship could be reasonably expected to significantly influence the Applicant in a manner which could adversely affect the environment.

NAME: _____ TITLE: _____

STREET: _____

CITY, STATE, ZIP: _____

N/A

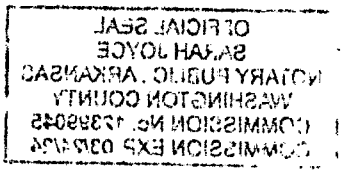
NAME: _____ TITLE: _____

STREET: _____

CITY, STATE, ZIP: _____

17. List all federal environmental agencies and any other environmental agencies outside this state that have or have had regulatory responsibility over the Applicant.

N/A



18. VERIFICATION AND ACKNOWLEDGEMENT

The Applicant agrees to provide any other information the director of the Arkansas Department of Environmental Quality may require at any time to comply with the provisions of the Disclosure Law and any regulations promulgated thereto. The Applicant further agrees to provide the Arkansas Department of Environmental Quality with any changes, modifications, deletions, additions or amendments to any part of this Disclosure Statement as they occur by filing an amended Disclosure Statement.

DELIBERATE FALSIFICATION OR OMISSION OF RELEVANT INFORMATION FROM DISCLOSURE STATEMENTS SHALL BE GROUNDS FOR CIVIL OR CRIMINAL ENFORCEMENT ACTION OR ADMINISTRATIVE DENIAL OF A PERMIT, LICENSE, CERTIFICATION OR OPERATIONAL AUTHORIZATION.

State of Arkansas

County of Washington

I, Kathryn Bartlett, **swear and affirm that the information contained in this Disclosure Statement is true and correct to the best of my knowledge, information and belief.**

APPLICANT SIGNATURE: K Bartlett

COMPANY TITLE: Managing member

DATE: 7/23/14

SUBSCRIBED AND SWORN TO BEFORE ME THIS 23rd **DAY OF** July **20** 14

Sarah Joyce

NOTARY PUBLIC

MY COMMISSION EXPIRES:

03/24/24

OFFICIAL SEAL
SARAH JOYCE
NOTARY PUBLIC . ARKANSAS
WASHINGTON COUNTY
COMMISSION No. 12399045
COMMISSION EXP. 03/24/24

Arkansas Secretary of State
Mark Martin

State Capitol Building ♦ Little Rock, Arkansas 72201-1094 ♦ 501-682-3409

Certificate of Good Standing

I, Mark Martin, Secretary of State of the State of Arkansas, and as such, keeper of the records of domestic and foreign corporations, do hereby certify that the records of this office show

DIXIELAND UTILITY, LLC

authorized to transact business in the State of Arkansas as a Limited Liability Company, filed Articles of Organization in this office June 27, 2012.

Our records reflect that said entity, having complied with all statutory requirements in the State of Arkansas, is qualified to transact business in this State.

In Testimony Whereof, I have hereunto set my hand and affixed my official Seal. Done at my office in the City of Little Rock, this 23rd day of July 2014.

Mark Martin
Secretary of State

Online Certificate Authorization Code: 766ce15e9382287

To verify the Authorization Code, visit sos.arkansas.gov

Brenda DeShields-Circuit Clerk
Benton County, AR
Book/Pg: 2012/41151
Term/Cashier: CASH2/Rozalia J. McCabe
10/10/2012 10:22AM
Tran: 209190
Total Fees: $30.00

Book 2012 Page 41151
Recorded in the Above
DEED Book & Page
10/10/2012

THIS INSTRUMENT PREPARED BY GREENFIELD CAPITAL DEVELOPMENT LLC.

AND AFTER RECORDING, RETURN TO:

Dixieland Utility, LLC

PO Box 9299

Fayetteville, AR 72703

QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS:

That Greenfield Capital Development, LLC, Grantor, for Ten Dollars ($10.00) and other valuable consideration to me in hand paid by Dixieland Utility, LLC, does hereby grant, bargain, sell and quitclaim deed unto Dixieland Utility, LLC and unto its successors and assigns forever, all of its right, title, interest, equity and estate in and to the following lands situate in the County of Benton, State of Arkansas:

PARCEL I - Tract 2 as set forth in the Plat entitled "Tract Split for CC-THP-Little Flock, L.L.C. and Benton County Water District No. 1, Little Flock, Benton County , Arkansas" of record at Plat Book 2007, Page 201 in the Circuit Clerk's Office of Benton County, Arkansas and being part of the same property conveyed to CC-THP-Little Flock, L.L.C. by Warranty Deed of record at Book 2004, Page 48262 in the Circuit Clerk's Office in Benton County, Arkansas, and being more fully described as Parcel I on "Exhibit A" attached hereto:

AND

PARCEL II – The parcel of property located to the North and West of Tract 2 in the Plat entitled "Tract Split for CC-THP-Little Flock, L.L.C. and Benton County Water District No. 1, Little Flock, Benton County, Arkansas" of record at Plat Book 2007, Page 201 in the Circuit Clerk's Office of Benton County, Arkansas and being all the same property conveyed to CC-THP-Little Flock, L.L.C. by Warranty Deed of record at Book 2004, Page 48258 in the Circuit Clerk's Office in Benton County, Arkansas , and being more fully described as Parcel II "Exhibit A" attached hereto.

Book 2012 Page 41152
Recorded in the Above
DEED Book & Page
10/10/2012

To have and to hold unto Dixieland Utility, LLC, and unto its successors and assigns forever, with all appurtenances thereunto belonging.

WITNESS my hand and seal on this 10 th day of October, 2012.

Greenfield Capital Development, LLC

Kathryn J Bartlett

Kathryn J Bartlett

ACKNOWLEDGEMENT

STATE OF ARKANSAS)

) ss.

COUNTY OF WASHINGTON)

On this day personally appeared before the undersigned, a Notary Public within and for the County AND State aforesaid, dully qualified, commissioned and acting, the within named Kathryn J Bartlett to me personally well known, who stated that she a Managing Member of Greenfield Capital Development LLC, and stated and acknowledged that she was duly authorized in her capacity to execute the foregoing instrument for and in the name and behalf of Greenfield Capital Development, LLC and further stated and acknowledged that she had so signed, executed and delivered said foregoing instrument in consideration, uses and purposes therein mentioned and set forth.

WITNESS my hand and seal as such notary public this 10th day of October, 2012

OFFICIAL SEAL
JUDY A. LEYBA
NOTARY PUBLIC . ARKANSAS
WASHINGTON COUNTY
COMMISSION EXP. 08/15/2014

Judy A. Leyba

Notary Public

Book 2012 Page 41153
Recorded in the Above
DEED Book & Page
10/10/2012

I certify under penalty of false swearing that at least the legally correct amount of documentary stamps have been placed on this instrument.

GRANTEE / AGENT

"Exhibit A"

PARCEL I

A part of the Southeast Quarter (SE1/4) of the Northwest Quarter (NW1/4) of Section 35, Township 20 North (T-20-N), Range 30 West (R-30-W) of the Fifth Principal Meridian, Benton County, Arkansas and being described as follows :
Commencing at a found aluminum cap set in concrete for the Southwest Corner of the SE1/4 of the NW1/4 of Section 35, T-20-N, R-30-W; thence North 02 degrees, 35 minutes, 03 seconds East 906.77 feet to an existing fence corner post marking the SW Corner of the North Twelve and One-Half Acres of the said SE1/4 of the NW1/4; thence along the South Boundary Line of the North Twelve and One-Half Acres, South 87 degrees, 14 minutes, 40 seconds East 140.08 feet to a set iron pin, said iron pin also being the TRUE POINT OF BEGINNING; thence South 73 degrees, 30 minutes, 57 seconds East 56.85 feet to a set iron pin; thence South 79 degrees, 18 minutes, 13 seconds East 30.42 feet to a set iron pin; thence South 00 degrees, 10 minutes, 28 seconds West 35.01 feet to an existing chain link fence corner; thence along the chain link fence line, South 88 degrees, 04 minutes, 20 seconds East 43.67 feet to an existing chain link fence corner; thence along the existing chain link fence line, North 11 degrees, 18 minutes, 49 seconds East 9.47 feet to the Southwest Corner of an existing 840 square foot brick building; thence along the outside building line of the 840 square foot brick building, North 00 degrees, 16 minutes, 39 seconds East 26.23 feet to the Northwest Corner of said brick building; thence along the outside building line of the 840 square foot brick building, North 89 degrees, 59 minutes, 47 seconds East 32.04 feet to the Northeast Corner of the said brick building; thence along the outside building line of the 840 square foot brick building, South 00 degrees, 12 minutes, 05 seconds West 26.18 feet to the Southeast Corner of said brick building; thence along the outside building line of the 840 square foot brick building, South 89 degrees, 16 minutes, 29 seconds West 14.53 feet to an existing chain link fence corner; thence leaving the building line of the 840 square foot building and along the existing chain link fence line, South 00 degrees, 05 minutes, 23 seconds East 44.73 feet to an existing chain link fence corner; thence along the existing chain link fence line, South 89 degrees, 54 minutes, 43 seconds East 136.53 feet to a set iron pin; thence South 00 degrees, 00 minutes, 22 seconds East 86.63 feet to a set iron pin; thence South 88 degrees, 58 minutes, 32 seconds East 202.55 feet to a set iron pin; thence South 82 degrees, 40 minutes, 36 seconds East 38.61 feet to a set iron pin; thence South 81 degrees, 02 minutes, 42 seconds East 51.72 feet to a set iron pin; thence South 79 degrees, 26 minutes, 00 seconds East 55.11 feet to a set iron pin; thence North 10 degrees, 04 minutes, 01 seconds West 181.36 feet to an iron pin set on the South Boundary Line of the North 12.5 acres of the SE1/4 of the NW1/4 of said Section 35; thence along the South Boundary Line of the North 12.5 acres of the said SE1/4 of the NW1/4, North 87 degrees, 14 minutes, 40 seconds West 599.03 feet to the TRUE POINT OF BEGINNING, containing 1.585 acres and being subject to a drainage easement being described as follows:
Commencing at a found aluminum cap set in concrete for the SW Corner of the SE1/4 of the NW1/4 of Section 35, T-20-N, R-30-W; thence North 02 degrees, 35 minutes, 03 seconds East 906.77 feet and South 87 degrees, 14 minutes, 40 seconds East 604.31 feet to the TRUE POINT OF BEGINNING of the drainage easement; thence South 87 degrees, 14 minutes, 40 seconds East 134.80 feet; thence South 10 degrees, 04 minutes, 01 seconds East 24.01 feet; thence North 87 degrees, 14 minutes, 57 seconds West 106.20 feet; thence South 19 degrees, 17 minutes, 21 seconds East 91.25 feet; thence South 69 degrees, 17 minutes, 10 seconds East 103.51 feet; thence South 10 degrees, 04 minutes, 01 seconds East 29.10 feet; thence North 69 degrees, 17 minutes, 10 seconds West 130.06 feet; thence North 19 degrees, 17 minutes, 22 seconds West 122.42 feet; thence North 10 degrees, 22 minutes, 21 seconds West 15.11 feet to the TRUE POINT OF BEGINNING, containing 0.20 acres.

PARCEL II

A Part of the NE 1/4 of the NW 1/4 and a part of the SE 1/4 of the NW 1/4 of Section 35, Township 20 North, Range 30 West of the Fifth Principal Meridian, Benton County, Arkansas, and being described as follows:
Commencing at the Northwest corner of the SE 1/4 of the NW 1/4, said point being a set iron pin and also being the true point of beginning; thence along the West boundary line of the NE 1/4 of the NW 1/4 of Section 35, North 02 degrees 35 minutes 03 seconds East 185.07 feet to a set iron pin; thence leaving the said West boundary line of the NE 1/4 of the NW 1/4 South 87 Degrees, 14 minutes, 40 seconds east 200.00 feet to a set iron pin; thence South 02 degrees 35 minutes 03 seconds West 598.95 feet to a set iron pin on the South boundary line of the north 12.5 acres of the SE 1/4 of the NW 1/4 of Section 35; thence along the South boundary line of the said North 12.5 acres, North 87 degrees 14 minutes 40 seconds West 200.00 feet to an existing fence corner post; thence along the west boundary line of the SE 1/4 of the NW 1/4 of Section 35, North 02 degrees 35 minutes 03 seconds East 413.88 feet to the true point of beginning.

Book 2012 Page 41154
Recorded in the Above
DEED Book & Page
10/10/2012

Benton County, AR
I certify this instrument was filed on
10/10/2012 10:23AM
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2012 at pages 41151 - 41154
Brenda DeShields-Circuit Clerk

IN THE COUNTY COURT OF BENTON COUNTY, ARKANSAS

IN RE: Benton County, Arkansas Suburban Sewer District No. 1 – Villages of Cross Creek Project

CC-2012-01

JUDGMENT AND ORDER ESTABLISHING BENTON COUNTY, ARKANSAS SUBURBAN SEWER DISTRICT NO. 1 – VILLAGES OF CROSS CREEK PROJECT

On this 9th day of May 2012, pursuant to a petition for the formation and establishment of Benton County, Arkansas Suburban Sewer District No. 1 – Villages of Cross Creek Project, which has been presented to this Court for approval, the Court, based upon the testimony, pleadings, statements of counsel and the entire record of this matter, does hereby enter its judgment and order establishing Benton County, Arkansas Suburban Sewer District No. 1 – Villages of Cross Creek Project (the "District").

In support of this judgment and order, the Court does hereby find:

1. CC-THP-Little Flock, L.L.C., an Arkansas limited liability company, and Greenfield Capital Development, LLC, an Arkansas limited liability company, (the "Record Owners") are all of the record owners of all of the real property to be located in the proposed District. Tom Bartlett, Kathy Bartlett, and Larry Sisson (collectively, the "Petitioner"), representing the Record Owners, filed a petition praying that a suburban sewer district be established pursuant to Ark. Code Ann. § 14-249-101 *et seq.* (the "Suburban Sewer District Law") for the purposes therein set out.

2. The County Court of Benton County has heard all of the parties desiring to be heard and has ascertained that said petition was signed by all of the record owners of real property in the proposed District. Upon making this determination, the County Court of Benton County, Arkansas, has the authority and duty to create and establish such a suburban sewer district.

3. The County Court of Benton County deems it in the best interest of owners of real property within the proposed District that the proposed District shall become a suburban sewer district under the terms of Ark. Code Ann. §§ 14-249-101 *et seq.* and 14-121-101 *et seq.*

4. Matt Phelps, with APEC Engineering, having been recommended to serve as engineer for the proposed District, is an engineer and is a suitable, satisfactory, and appropriate person to be named as the engineer of the District.

5. Mr. Phelps has already completed a survey which ascertains the limits of the proposed District. Mr. Phelps has already been paid by the Petitioner for his work in preparation of such survey.

6. Tom Bartlett, Kathy Bartlett, and Larry Sisson, having been recommended as the commissioners of the proposed District, are persons of integrity and good business agility and are appropriate persons to be named as commissioners of the District.

7. The purposes of the proposed District appear to be lawful and proper purposes for a suburban sewer district.

IT IS THEREFORE ORDERED, ADJUDGED, AND DECREED:

A. A suburban sewer district is hereby established and named "Benton County, Arkansas Suburban Sewer District No. 1," embracing the property in the County of Benton, State of Arkansas, described in the attached **Exhibit A.**

B. The purposes for which the District is formed are for any or all of the following purposes: purchasing, accepting as a gift, constructing or maintaining wastewater systems, sewers or grading; or for more than one of these purposes and doing all things reasonably incidental to the accomplishment of any of the foregoing; or doing all things now or hereinafter permitted under applicable law, including without limitation those things set forth in the Suburban Sewer District Law.

C. The costs incurred by the District in pursuit of the purposes herein authorized and as authorized by Arkansas law shall be assessed upon the real property within the District according to the benefits received.

D. Matt Phelps is hereby appointed as engineer of the District, with all of the rights and duties afforded under the Suburban Sewer District Law.

E. The survey of the proposed District having already been completed and the expense of said survey having already been paid for by the Petitioners, the bond required by Ark. Code Ann. § 14-121-101(a) is hereby waived. No bond to pay of the expense of the survey of the proposed District is required.

F. The survey having already been completed, the bond required by Ark. Code Ann. § 14-121-101(b) is hereby waived. Mr. Phelps is not required to file a bond for the faithful discharge of his duties.

G. Tom Bartlett, Kathy Bartlett, and Larry Sisson are hereby appointed as commissioners of the District, with all of the rights and duties afforded under the Suburban Sewer District Law.

H. The purposes of the District should be accomplished in the manner and of the materials that the commissioners of the District shall deem to be in the best interests of the District, including, but not limited to, the employment of contractors, engineers, attorneys, assessors, and other assistance as deemed appropriate by the commissioners of the District.

I. The District shall not cease to exist upon the construction or acquisition of the planned improvements, but shall continue to exist for the purposes of operating, maintaining, and preserving the improvements, replacing equipment, paying salaries and costs, and performing any and all other functions or services authorized by law.

J. The District may be dissolved by the commissioners of the District when its obligations are paid and the ownership, operation, and maintenance of the improvements,

together with the appurtenances thereto, are assumed by a municipality or other entity deemed appropriate by the commissioners of the District; or the continuation of the District is no longer considered necessary by the commissioners of the District for any other reason.

THE HONORABLE ROBERT CLINARD
COUNTY JUDGE, BENTON COUNTY,
ARKANSAS

PREPARED BY:

QUATTLEBAUM, GROOMS,
TULL, AND BURROW PLLC
4100 Corporate Center Drive, Suite 310
Springdale, Arkansas 72762
Telephone: (479) 444-5200
Fax: (479) 444-6647
Email: jjoyce@qgtb.com

By: _____
Jeb H. Joyce, Ark. Bar No. 97244

Attorneys for the Petitioner

EXHIBIT A

[LEGAL DESCRIPTION OF REAL PROPERTY WITHIN THE PROPOSED DISTRICT]
A part of the Southeast Quarter (SE 1/4) of the Northwest Quarter (NW 1/4) of Section 35, Township 20 North (T-20-N), Range 30 West (R-30-W) of the Fifth Principal Meridian, Benton County, Arkansas and being described as follows:
Commencing at a found aluminum cap set in concrete for the Southwest Corner of the SE ¼ of the NW ¼ of Section 35, T-20-N, R-30-W, said point being the TRUE POINT OF BEGINNING; thence North 02 degrees, 35 minutes, 03 seconds East 906.77 feet to an existing fence corner post marking the SW Corner of the North Twelve and One-Half Acres of the said SE ¼ of the NW ¼; thence along the South Boundary Line of the North Twelve and One-Half Acres, South 87 degrees, 14 minutes, 40 seconds East 140.06 feet to a set iron pin; thence South 73 degrees, 30 minutes, 57 seconds East 56.85 feet to a set iron pin; thence South 79 degrees, 18 minutes, 13 seconds East 30.42 feet to a set iron pin; thence South 00 degrees, 10 minutes, 28 seconds West 35.01 feet to an existing chain link fence corner; thence along the chain link fence line, South 88 degrees, 04 minutes, 20 seconds East 43.67 feet to an existing chain link fence corner; thence along the existing chain link fence line, North 11 degrees, 18 minutes, 49 seconds East 9.47 feet to the Southwest Corner of an existing 840 square foot brick building; thence along the outside building line of the 840 square foot building, North 00 degrees, 16 minutes, 39 seconds East 26.23 feet to the Northwest Corner of said brick building; thence along the outside building line of the 840 square foot brick building, North 89 degrees, 59 minutes, 47 seconds East 32.04 feet to the Northeast Corner of the said brick building; thence along the outside building line of the 840 square foot brick building, South 00 degrees, 12 minutes, 05 seconds West 26.18 feet to the Southeast Corner of said brick building; thence along the outside building line of the 840 square foot brick building, South 59 degrees, 16 minutes, 29 seconds West 14.53 feet to an existing chain link fence corner; thence leaving the building line of the 840 square foot building and along the existing chain link fence line, South 00 degrees, 05 minutes, 23 seconds East 44.73 feet to an existing chain link fence corner; thence along the existing chain link fence line, South 89 degrees, 54 minutes, 43 seconds East 136.53 feet to a set iron pin; thence South 00 degrees, 00 minutes, 22 seconds East 86.63 feet to a set iron pin; thence South 86 degrees, 56 minutes; 32 seconds East, 202.55 feet to a set iron pin; thence South 82 degrees, 40 minutes, 36 seconds East 38.61 feet to a set iron pin; thence South 81 degrees, 02 minutes, 42 seconds East 51.72 feet to a set iron pin; thence South 79 degrees, 26 minutes, 00 seconds East 55.11 feet to a set iron pin; thence North 10 degrees, 04 minutes, 01 seconds West 181.38 feet to an iron pin set on the South Boundary Line of the North 12.5 acres of the SE ¼ of the NW ¼ of said Section 35; thence along the South Boundary Line of the North 12.5 acres of the said SE ¼ of the NW ¼, South 87 degrees, 14 minutes, 40 seconds East 584.12 feet to found cotton spindle in the roadway of Dixieland Road marking the SE Corner of the North Twelve and One-Half Acres of the said SE ¼ of the NW 1/4 ; thence along the roadway of Dixieland Road, South 02 degrees, 27 minutes, 11 seconds West 289.53 feet to a found cotton spindle; thence leaving the roadway of Dixieland Road, North 87 degrees, 10 minutes, 49 seconds West 435.60 feet to a found number 5 rebar pin; thence South 02 degrees, 27 minutes, 11 seconds West 200.00 feet to a found number 5 rebar pin; thence South 87 degrees, 10 minutes, 49 seconds East, 80.80 feet to a found number 5 rebar pin; thence South 02 degrees, 27 minutes, 11 seconds West 210.00 feet to a found number 5 rebar pin; thence North 87 degrees, 10 minutes 47 seconds West 249.54 feet to

a found number 4 rebar pin; thence South 02 degrees, 14 minutes, 13 seconds West 206.75 feet to a found number 4 rebar pin; thence North 87 degrees, 10 minutes, 46 seconds West 701.57 feet to the TRUE POINT OF BEGINNING, containing 19.205 acres and being subject to the right-of-way of Dixieland Road along the East side thereof and to all other easements and right-of-ways of record that a complete title search may reveal and to all easements and right-of-ways by prescriptive actions of others, if any.

-AND-

PARCEL I

A part of the Southeast Quarter (SE1/4) of the Northwest Quarter (NW1/4) of Section 35, Township 20 North (T-20-N), Range 30 West (R-30-W) of the Fifth Principal Meridian, Benton County, Arkansas and being described as follows :

Commencing at a found aluminum cap set in concrete for the Southwest Corner of the SE1/4 of the NW1/4 of Section 35, T-20-N, R-30-W; thence North 02 degrees, 35 minutes, 03 seconds East 906.77 feet to an existing fence corner post marking the SW Corner of the North Twelve and One-Half Acres of the said SE1/4 of the NW1/4; thence along the South Boundary Line of the North Twelve and One-Half Acres, South 87 degrees, 14 minutes, 40 seconds East 140.08 feet to a set iron pin, said iron pin also being the TRUE POINT OF BEGINNING; thence South 73 degrees, 30 minutes, 57 seconds East 56.85 feet to a set iron pin; thence South 79 degrees, 18 minutes, 13 seconds East 30.42 feet to a set iron pin; thence South 00 degrees, 10 minutes, 28 seconds West 35.01 feet to an existing chain link fence corner; thence along the chain link fence line, South 88 degrees, 04 minutes, 20 seconds East 43.67 feet to an existing chain link fence corner; thence along the existing chain link fence line, North 11 degrees, 18 minutes, 49 seconds East 9.47 feet to the Southwest Corner of an existing 840 square foot brick building; thence along the outside building line of the 840 square foot brick building, North 00 degrees, 16 minutes, 36 seconds East 26.25 feet to the Northwest Corner of said brick building; thence along the outside building line of the 840 square foot brick building, North 89 degrees, 39 minutes, 47 seconds East 32.04 feet to the Northeast Corner of the said brick building; thence along the outside building line of the 840 square foot brick building, South 00 degrees, 12 minutes, 05 seconds West 25.18 feet to the Southeast Corner of said brick building; thence along the outside building line of the 840 square foot brick building, South 89 degrees, 16 minutes, 29 seconds West 14.53 feet to an existing chain link fence corner; thence leaving the building line of the 840 square foot building and along the existing chain link fence line, South 00 degrees, 05 minutes, 23 seconds East 44.73 feet to an existing chain link fence corner; thence along the existing chain link fence line, South 89 degrees, 54 minutes, 43 seconds East 136.53 feet to a set iron pin; thence South 00 degrees, 00 minutes, 22 seconds East 66.63 feet to a set iron pin; thence South 88 degrees, 58 minutes, 32 seconds East 202.55 feet to a set iron pin; thence South 88 degrees, 36 seconds East 38.61 feet to a set iron pin; thence South 81 degrees, 02 minutes, 42 seconds East 51.72 feet to a set iron pin; thence South 79 degrees, 26 minutes, 00 seconds East 55.11 feet to a set iron pin; thence North 10 degrees, 04 minutes, 01 seconds West 181.38 feet to an iron pin set on the South Boundary Line of the North 12.5 acres of the SE1/4 of the NW1/4 of said Section 35; thence along the South Boundary Line of the North 12.5 acres of the said SE1/4 of the NW1/4, North 87 degrees, 14 minutes, 40 seconds West 599.03 feet to the TRUE POINT OF BEGINNING, containing 1.685 acres and being subject to a drainage easement being described as follows:

Commencing at a found aluminum cap set in concrete for the SW Corner of the SE1/4 of the NW1/4 of Section 35, T-20-N, R-30-W; thence North 02 degrees, 35 minutes, 03 seconds East 906.77 feet and South 87 degrees, 14 minutes, 40 seconds East 604.31 feet to the TRUE POINT OF BEGINNING of the drainage easement; thence South 87 degrees, 14 minutes, 40 seconds East 134.80 feet; thence South 10 degrees, 04 minutes, 01 seconds East 24.01 feet; thence North 87 degrees, 14 minutes, 57 seconds West 106.20 feet; thence South 19 degrees, 17 minutes, 21 seconds East 91.28 feet; thence South 69 degrees, 17 minutes, 10 seconds East 103.51 feet; thence South 10 degrees, 04 minutes, 01 seconds East 29.10 feet; thence North 69 degrees, 17 minutes, 10 seconds West 130.06 feet; thence North 19 degrees, 17 minutes, 22 seconds West 122.42 feet; thence North 10 degrees, 22 minutes, 21 seconds West 15.11 feet to the TRUE POINT OF BEGINNING, containing 0.20 acres.

PARCEL II

A Part of the NE 1/4 of the NW 1/4 and a part of the SE 1/4 of the NW 1/4 of Section 35, Township 20 North, Range 30 West of the Fifth Principal Meridian, Benton County, Arkansas, and being described as follows:

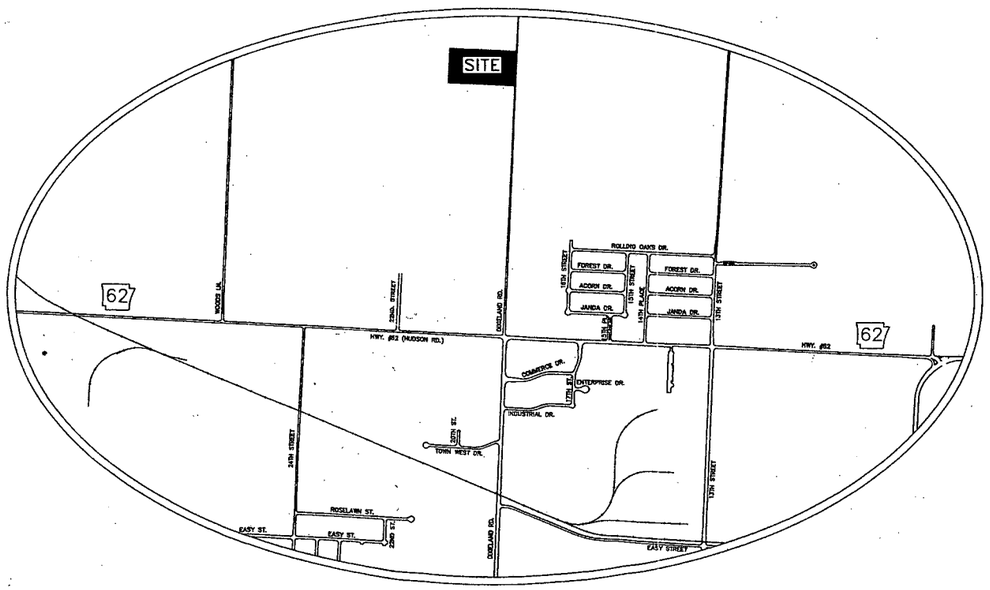
Commencing at the Northwest corner of the SE 1/4 of the NW 1/4, said point being a set iron pin and also being the true point of beginning; thence along the West boundary line of the NE 1/4 of the NW 1/4 of Section 35, North 02 degrees 35 minutes 03 seconds East 185.07 feet to a set iron pin; thence leaving the said West boundary line of the NE 1/4 of the NW 1/4 South 87 Degrees, 14 minutes, 40 seconds east 200.00 feet to a set iron pin; thence South 02 degrees 35 minutes 03 seconds West 598.95 feet to a set iron pin on the South boundary line of the north 12.5 acres of the SE 1/4 of the NW 1/4 of Section 35; thence along the South boundary line of the said North 12.5 acres, North 87 degrees 14 minutes 40 seconds West 200.00 feet to an existing fence corner post; thence along the west boundary line of the SE 1/4 of the NW 1/4 of Section 35, North 02 degrees 35 minutes 03 seconds East 413.88 feet to the true point of beginning.

WASTEWATER TREATMENT PLANS

DIXIELAND APARTMENTS

DIXIELAND RD.

LITTLE FLOCK, ARKANSAS



VICINITY MAP
NTS

INDEX OF SITE DEVELOPMENT PLANS

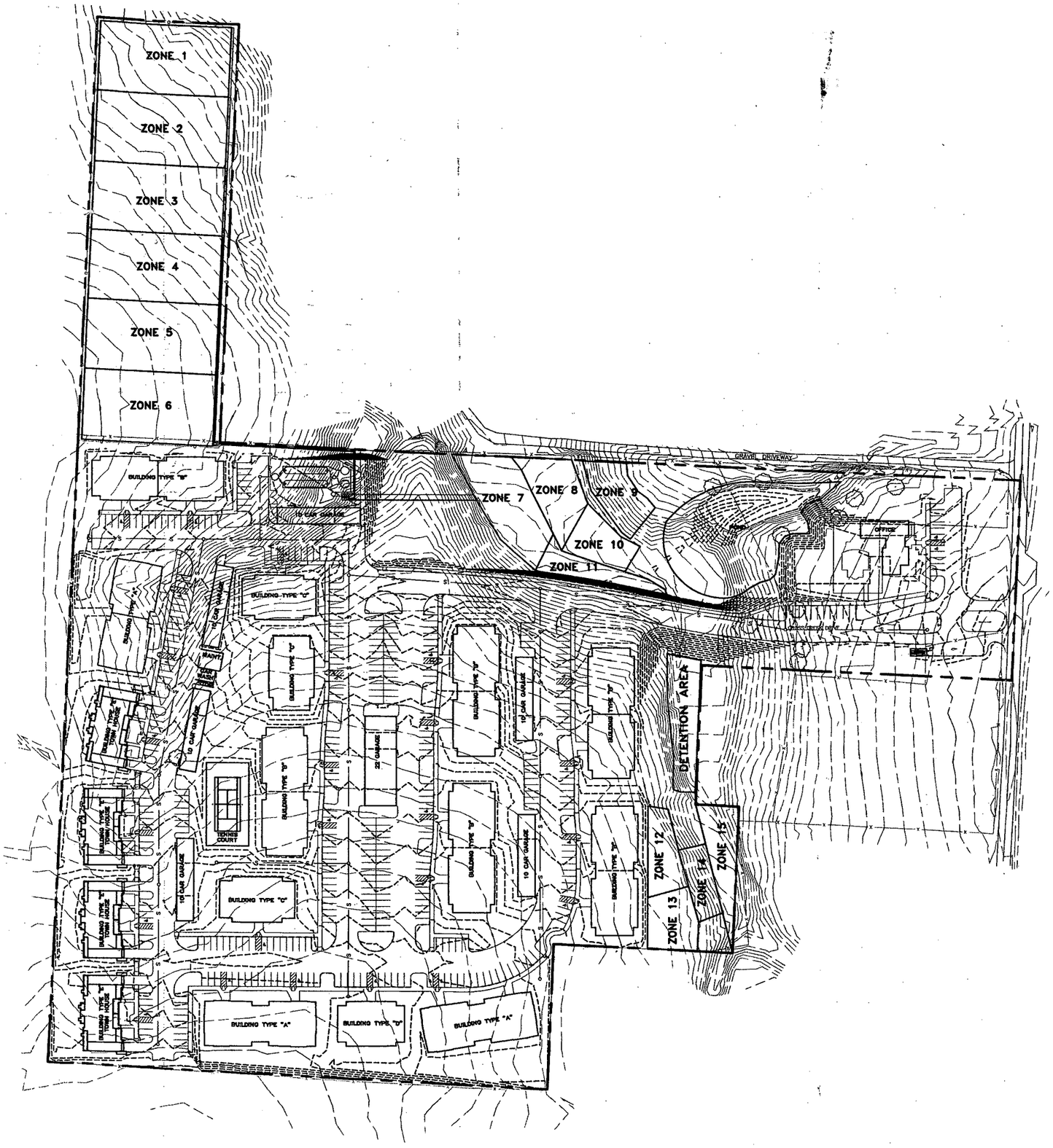
PREPARED BY

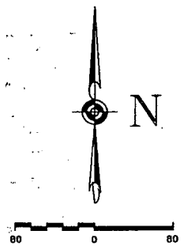
RURAL ENGINEERING SERVICES, INC.
CONSULTING ENGINEERS
FAYETTEVILLE, ARKANSAS

CALL BEFORE YOU DIG
1-800-482-8998
ARKANSAS ONE CALL SYSTEM

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 6424
MARK ALAN GROSS

04080 DIXIELAND APARTMENTS





SCALE: 1" = 80'

DRIP ZONES		
ZONE #	FLOW (GPD)	ACTIVE/RESERVE
1	3700	ACTIVE
2	3700	ACTIVE
3	3700	ACTIVE
4	3700	ACTIVE
5	3700	ACTIVE
6	3700	ACTIVE
7	4290	ACTIVE
8	2990	ACTIVE
9	2090	RESERVE
10	2000	RESERVE
11	4230	ACTIVE
12	3150	RESERVE
13	1199	RESERVE
14	2637	RESERVE
15	2310	RESERVE

REVISIONS

NO.	DATE	DESCRIPTION

DEVELOPER:

WOOD DEVELOPMENT GROUP
13631 KING STREET
SUITE 1222
OVERLAND PARK, KANSAS 66221
913-681-7942

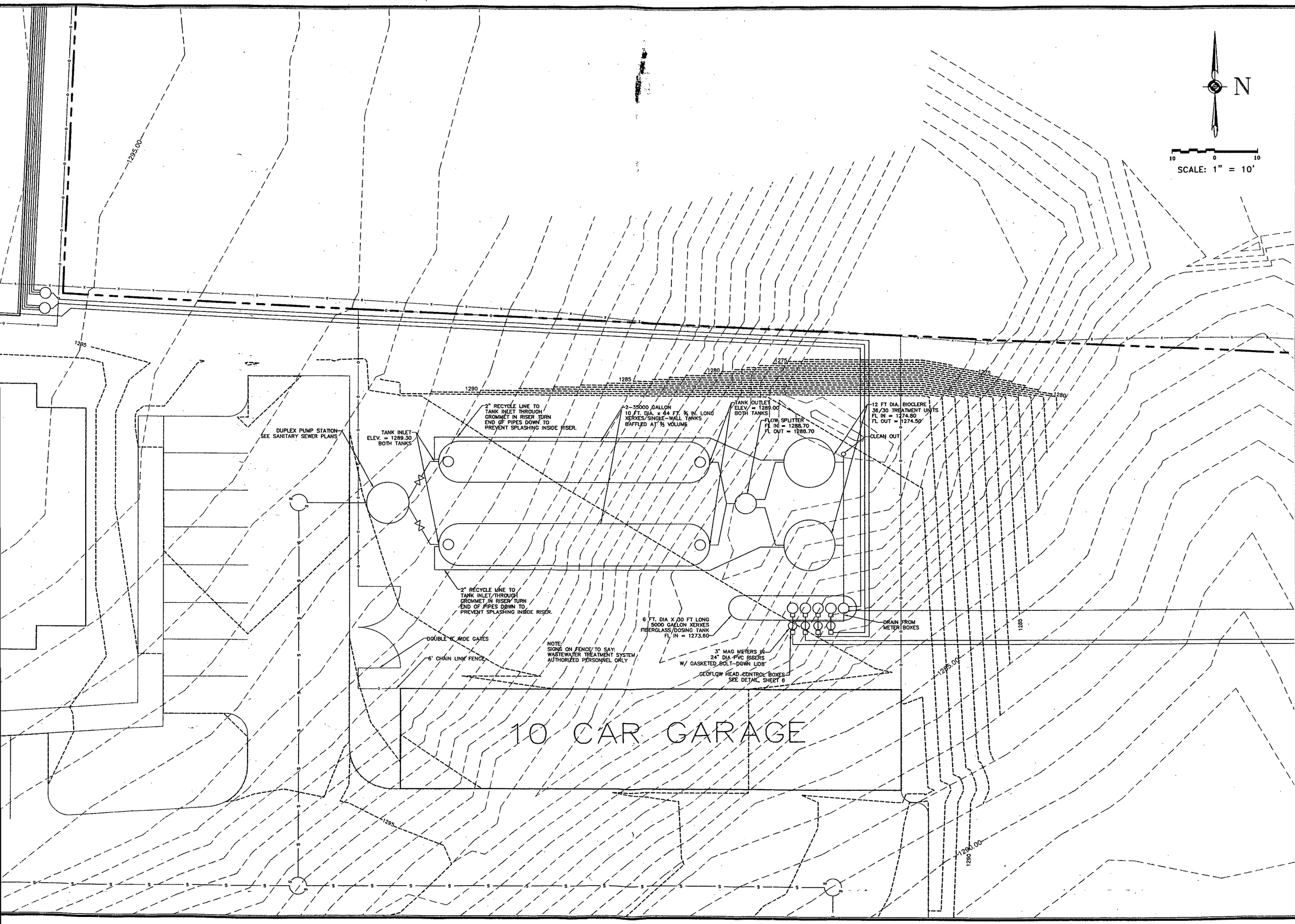
SHEET: SITE PLAN

PROJECT: DIXIELAND APARTMENTS
DIXIELAND ROAD
LITTLE FLOCK, ARKANSAS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 6424
MARK ALAN GROSS

RURAL ENGINEERING SERVICES, INC.
CONSULTING ENGINEERS
FAYETTEVILLE, ARKANSAS

DWG: 04080_MASTER-S
DATE: MAY 25, 2004
SCALE: VARIES
SHEET 2 OF 7



REVISIONS		
NO.	DATE	DESCRIPTION

DEVELOPER:

WOOD DEVELOPMENT GROUP
13631 KING STREET
SUITE 1222
OVERLAND PARK, KANSAS 66221
913-681-7942

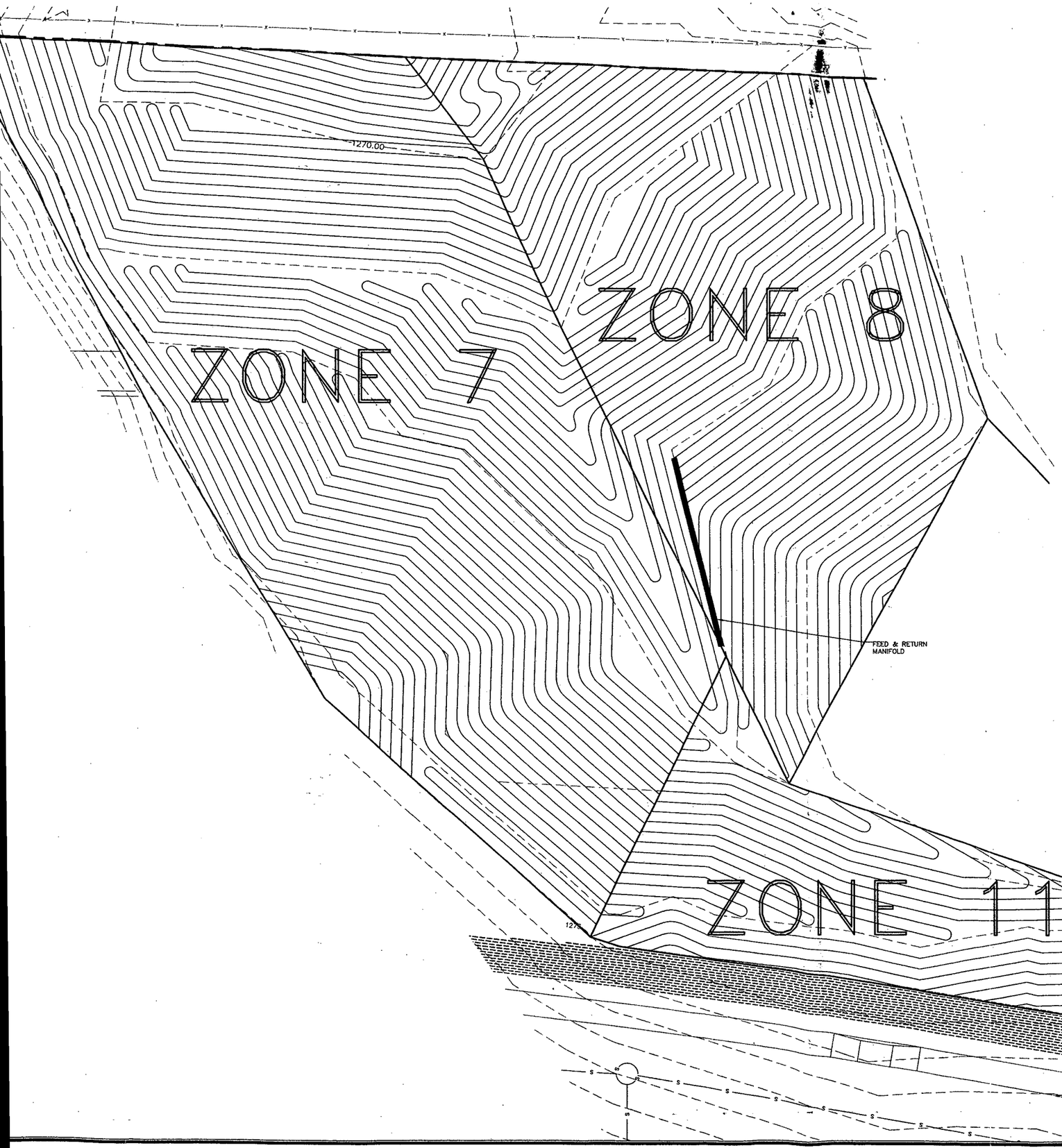
SHEET: TREATMENT AREA

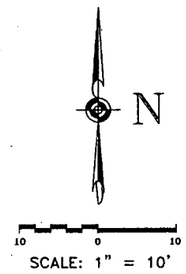
PROJECT: DIXIELAND APARTMENTS
DIXIELAND ROAD
LITTLE FLOCK, ARKANSAS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 6424
MARK ALAN GROSS

RURAL ENGINEERING SERVICES, INC.
CONSULTING ENGINEERS
FAYETTEVILLE, ARKANSAS

DWG: 04080_MASTER-TA
DATE: MAY 25, 2004
SCALE: VARIES
SHEET 3 OF 7

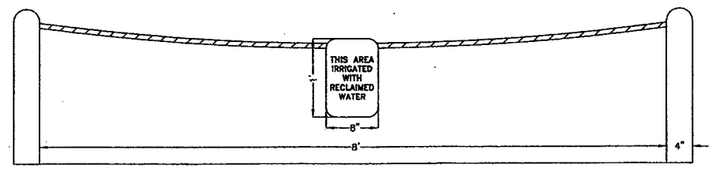




SCALE: 1" = 10'

NOTES:
1. HEAVY EQUIPMENT MUST BE KEPT OFF ALL DRIP DISPERSAL AREAS. FAILURE TO PRESERVE THE AREAS WILL RESULT IN THE SOIL TO BE RENDERED UNUSABLE FOR DRIP DISPERSAL.

2. ALL DRIP FIELDS SHALL HAVE CABLE AND POST FENCE AROUND THE PERIMETER.



FENCE DETAIL
NTS

REVISIONS

NO.	DATE	DESCRIPTION

DEVELOPER:

WOOD DEVELOPMENT GROUP
13631 KING STREET
SUITE 1222
OVERLAND PARK, KANSAS 66221
913-681-7942

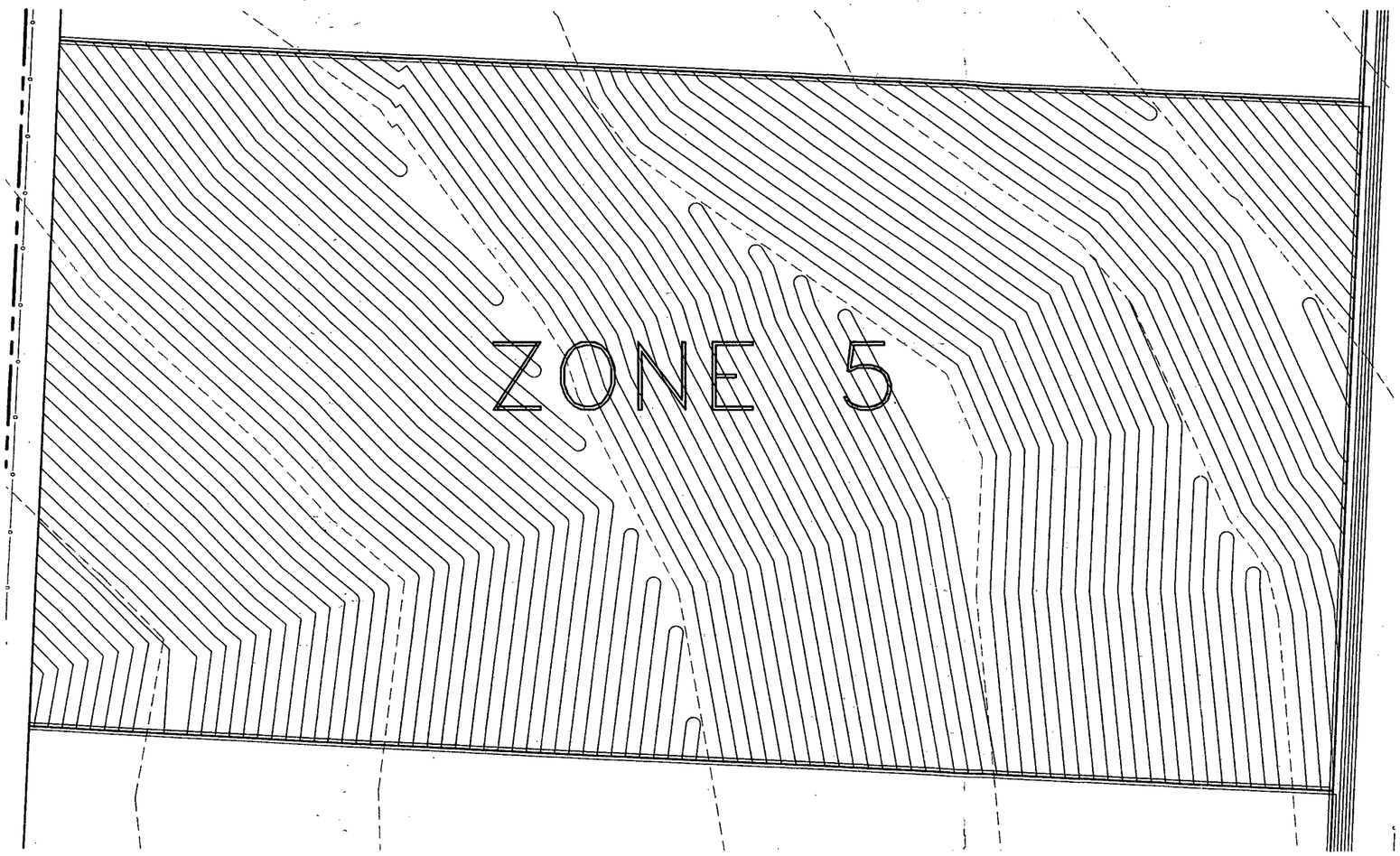
SHEET: DRIP FIELDS

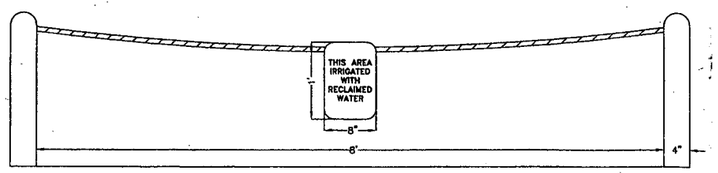
PROJECT: DIXIELAND APARTMENTS
DIXIELAND ROAD
LITTLE ROCK, ARKANSAS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 6424
MARK ALAN GROSS

RURAL ENGINEERING SERVICES, INC.
CONSULTING ENGINEERS
FAYETTEVILLE, ARKANSAS

DWG: 04080_MASTER-DF
DATE: MAY 25, 2004
SCALE: VARIES
SHEET 4 OF 7





FENCE DETAIL
NTS

SCALE: 1" = 10'

NOTES:
1. HEAVY EQUIPMENT MUST BE KEPT OFF ALL DRIP DISPERSAL AREAS. FAILURE TO PRESERVE THE AREAS WILL RESULT IN THE SOIL TO BE RENDERED UNUSABLE FOR DRIP DISPERSAL.

2. ALL DRIP FIELDS SHALL HAVE CABLE AND POST FENCE AROUND THE PERIMETER.

REVISIONS		
NO.	DATE	DESCRIPTION

DEVELOPER:

WOOD DEVELOPMENT GROUP
13631 KING STREET
SUITE 1222
OVERLAND PARK, KANSAS 66221
913-681-7942

SHEET: DRIP FIELDS

PROJECT: DIXIELAND APARTMENTS
DIXIELAND ROAD
LITTLE ROCK, ARKANSAS

STATE OF ARKANSAS
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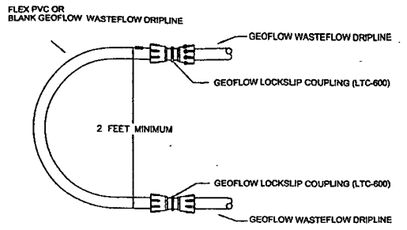
No. 6424
MARK ALAN GROSS

RURAL ENGINEERING SERVICES, INC.
CONSULTING ENGINEERS
FAYETTEVILLE, ARKANSAS

DWG: 04080_MASTER-DF
DATE: MAY 25, 2004
SCALE: VARIES
SHEET 5 OF 7

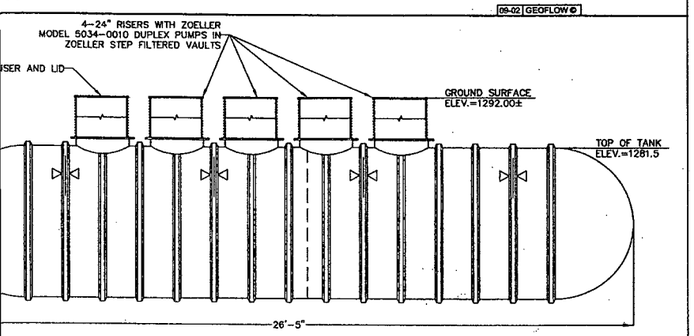


NOTE: IF USING FLEX PVC LOOP, CONNECTIONS SHALL BE GEOFLOW LOCKSLIP ADAPTER (LTSLIP-600) TO PVC COUPLING

507LS B GEOFLOW SECTION **LOCKSLIP COUPLING LOOP**

Not To Scale

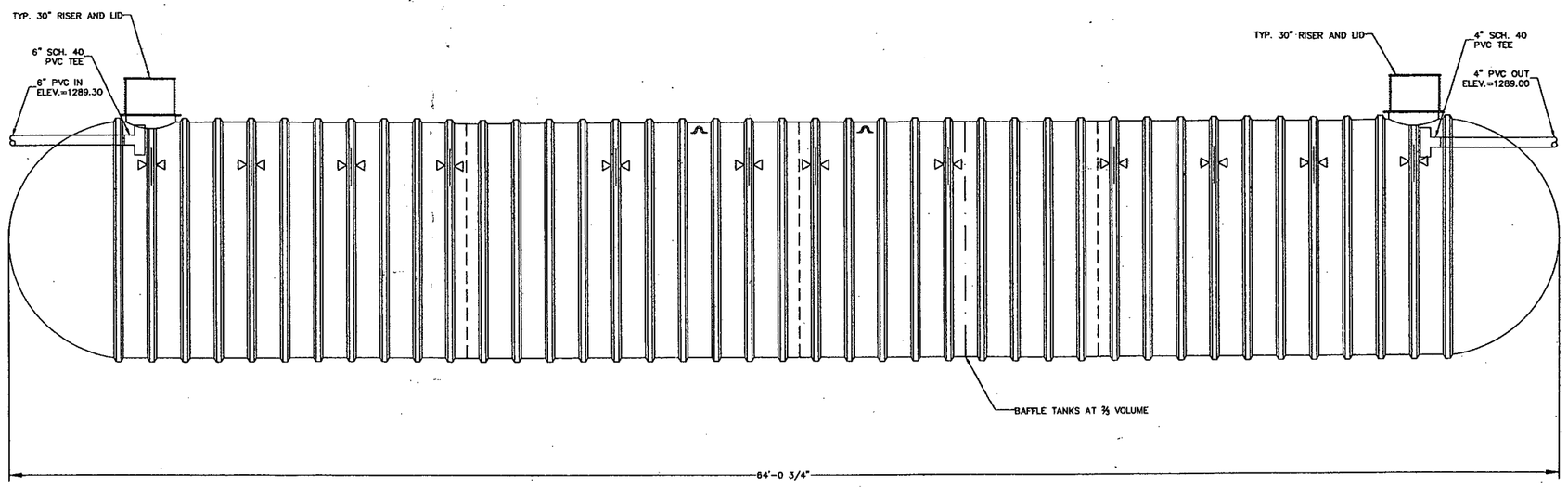
09-02 GEOFLOW ©



XERXES® CORPORATION

TITLE 6' DIA. SINGLE-WALL CAP. 5,000 GALLONS

DATE 5/02 DR. NO. S10-968

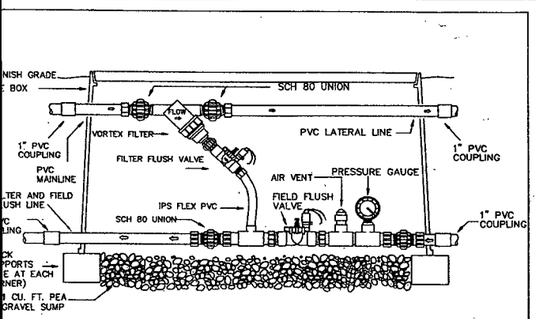


XERXES® CORPORATION

TITLE 10' DIA. SINGLE-WALL CAP. 35,000 GALLONS

DATE 5/02 DR. NO. S10-985

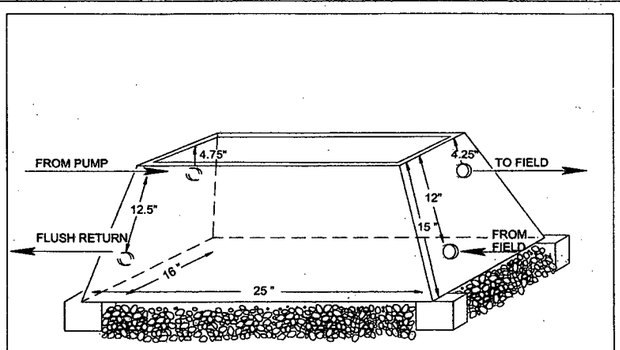
STRAP LOCATION ⋈ HOLD DOWN STRAP LOCATION



OFLOW SIMPLE WASTEFLOW HEADWORKS BOX - AUTOMATIC SCHEMATIC

Not To Scale

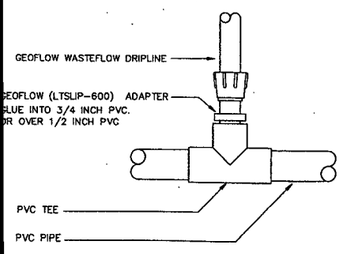
09-02 GEOFLOW ©



577 GEOFLOW SIMPLE WASTEFLOW HEADWORKS BOX - DIMENSIONS 1" AND 3/4" MODELS

Not To Scale

09-02 GEOFLOW ©

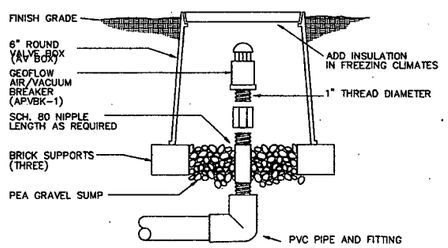


OFLOW MANIFOLD CONNECTION (PVC TO ADAPTER)

TION

Not To Scale

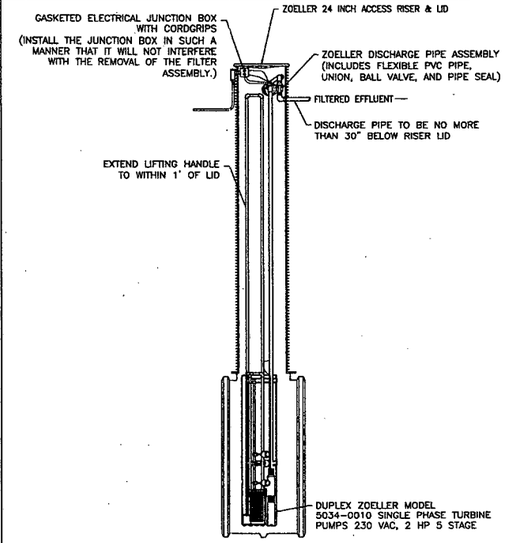
09-02 GEOFLOW ©

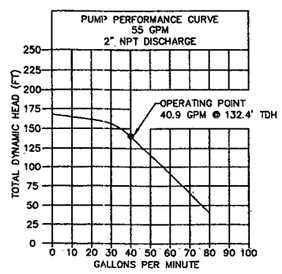


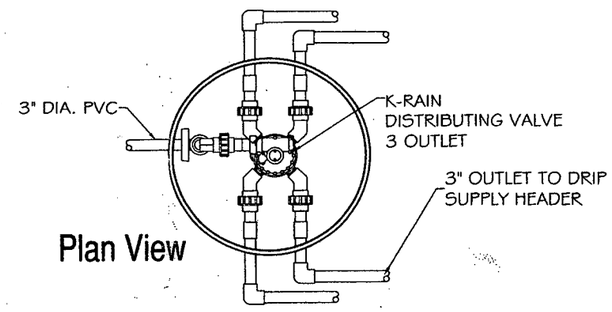
522 GEOFLOW SECTION 1" AIR/VACUUM BREAKER (PLUMBED TO PVC)

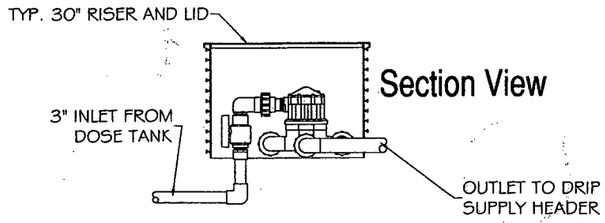
Not To Scale

09-02 GEOFLOW ©









Distributing Valve Detail

nts

REVISIONS

NO.	DATE	DESCRIPTION

DEVELOPER:

WOOD DEVELOPMENT GROUP
13631 KING STREET
SUITE 1222
OVERLAND PARK, KANSAS 66221
913-681-7942

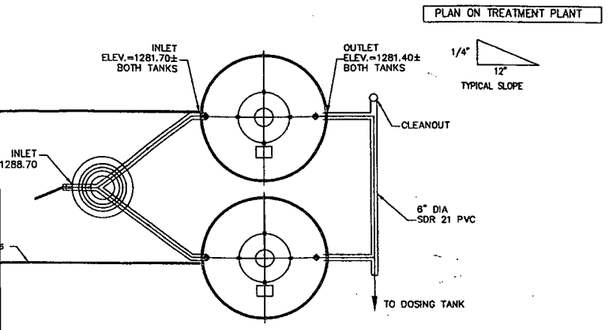
SHEET: DETAILS

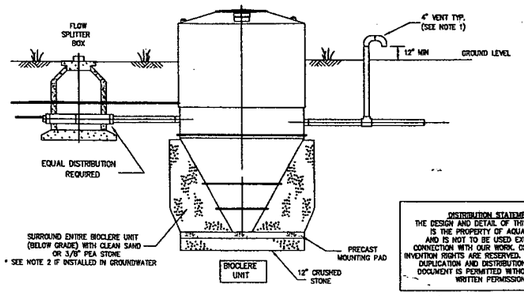
PROJECT: DIXIELAND APARTMENTS
DIXIELAND ROAD
LITTLE ROCK, ARKANSAS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 6424
MARK ALAN GROSS

RURAL ENGINEERING SERVICES, INC.
CONSULTING ENGINEERS
FAYETTEVILLE, ARKANSAS

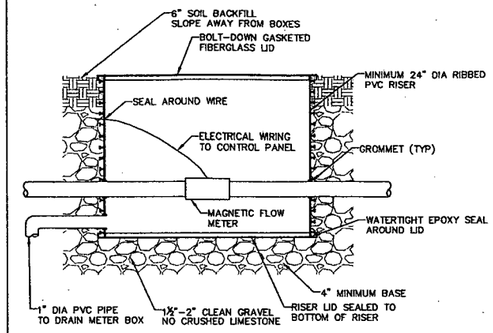
DWG: 04080_MASTER-D
DATE: MAY 25, 2004
SCALE: VARIES
SHEET 8 OF 7

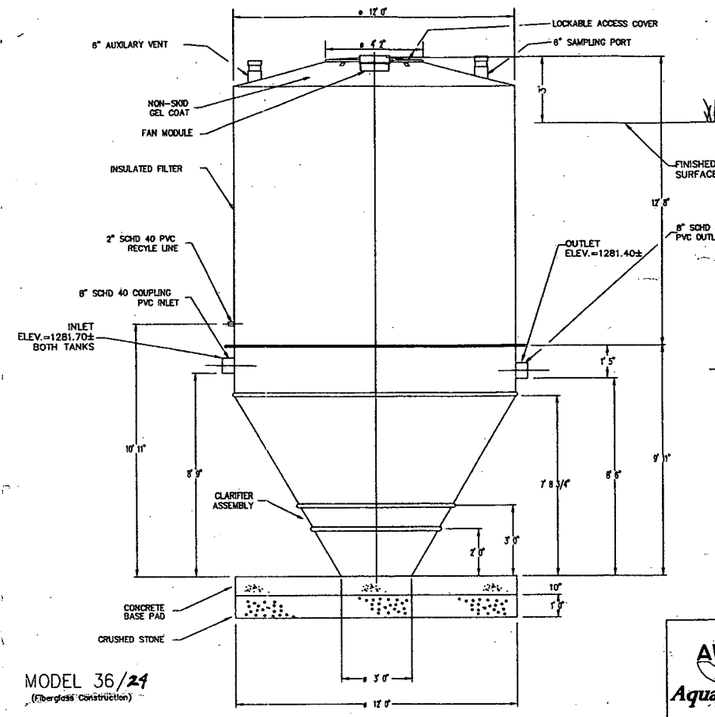




Aquapoint
241 DUCHAINE BLVD.
P.O. BOX 50120
NEW BEDFORD, MA 02745
(508) 998-7577 FAX (508) 998-7177

TITLE:	TYPICAL GROUND INSTALLATION
DRAWING NO.:	UK.1265-13
REVISION:	A
DATE:	8/29/01
DWN BY:	P.WILLEY
SCALE:	NTS SIZE: B / A3
SHEET #	1 of 1





MODEL 36/24
(Fiberglass Construction)

NOTES:
1. VENT MAY BE RUN UP THE SIDE OF BUILDING.

SHIPPING WEIGHTS
WEIGHT DRY WITH MEDIA = 8500 lbs (FRP)
WEIGHT DRY WITH NO MEDIA = 6000 lbs (FRP)

Aquapoint
241 DUCHAINE BLVD.
P.O. BOX 50120
NEW BEDFORD, MA 02745
(508) 998-7577 FAX (508) 998-7177

TITLE:	BIOCLERE 12' DIA BIOFILTER GENERAL ARRANGEMENT
DRAWING NO.:	UK.1263-4
REVISION:	C
DATE:	01/18/01
DWN BY:	P.Wiley
SCALE:	NTS SIZE: B
SHEET #	1 of 1

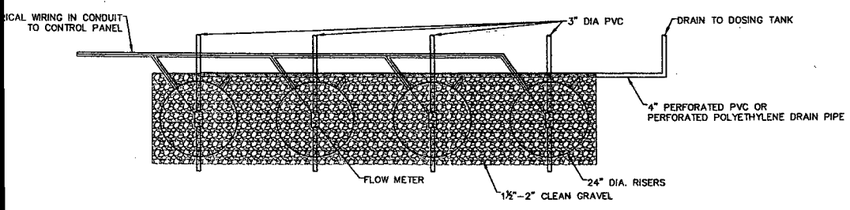
REVISIONS

NO.	DATE	DESCRIPTION

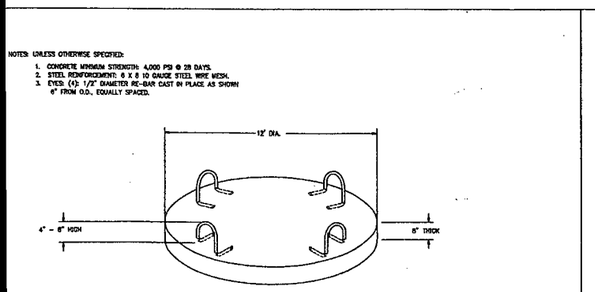
DEVELOPER:
WOOD DEVELOPMENT GROUP
13631 KING STREET
SUITE 1222
OVERLAND PARK, KANSAS 66221
913-681-7942

SHEET: DETAILS

PROJECT: DIXIELAND APARTMENTS
DIXIELAND ROAD
LITTLE ROCK, ARKANSAS



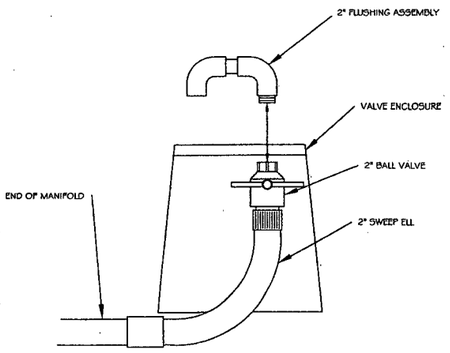
FLOW METER PLAN VIEW
NTS



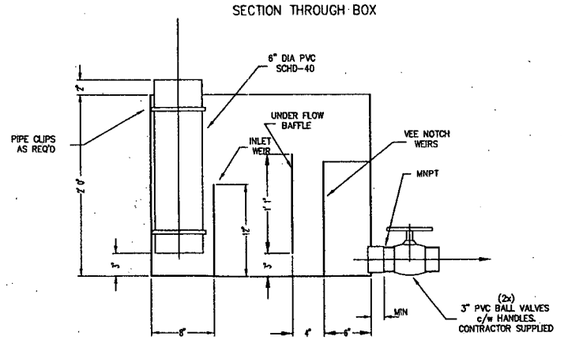
PRECAST MOUNTING PAD
FOR BIOCLERE MODEL 36/30 (12' DIAMETER)

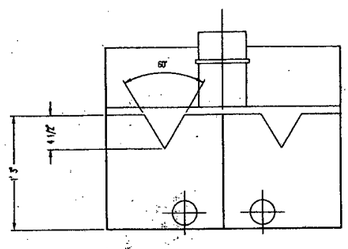
Aquapoint
241 DUCHAINE BLVD.
P.O. BOX 50120
NEW BEDFORD, MA 02745
(508) 998-7577 FAX (508) 998-7177

TITLE:	PRECAST MOUNTING PAD MODEL 30
DRAWING NO.:	PMM/BIO30 - 12'
REVISION:	
DATE:	11/16/01
DWN BY:	P.WILLEY
SCALE:	N.T.S. SIZE: B/A3
SHEET #	1 of 1



Drip Manifold Cleanout
nts





NOTES.
INTERNAL WALLS & WEIR PLATES TO BE 1/4" THICK FIBERGLASS.
EXTERNAL WALLS TO BE 1/4" MIN THICK FIBERGLASS.

FLOW (gpm) = 647.6 x (Ha.5)
[H = HEIGHT OF FLOW ABOVE VEE NOTCH (ft)]

SPLITTER BOX TO BE INSTALLED IN A 4' DIA MANHOLE WITH ACCESS TO GRADE.

FIBERGLASS SPLITTER BOX
MANUFACTURING DETAILS

split 6_2 way

Aquapoint
241 DUCHAINE BLVD.
P.O. BOX 50120
NEW BEDFORD, MA 02745
(508) 998-7577 FAX (508) 998-7177

TITLE:	SPLITTER BOX DETAILS
DRAWING NO.:	BS.1279-4
REVISION:	A
DATE:	23 Sept 2002
DWN BY:	P.WILLEY
SCALE:	NTS SIZE: B
SHEET #	1 of 1

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 6424
MARK ALAN GROSS

RURAL ENGINEERING SERVICES, INC.
CONSULTING ENGINEERS
FAYETTEVILLE, ARKANSAS

DWG:	04080_MASTER-D2
DATE:	MAY 25, 2004
SCALE:	VARIES
SHEET	7 OF 7

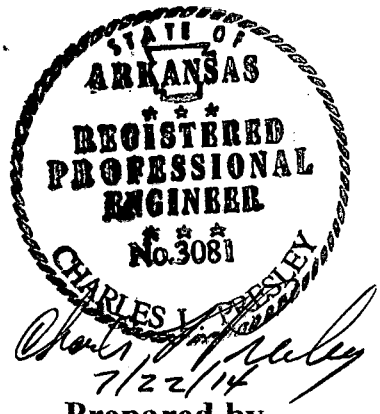
Engineering Report

For

Dixieland Apartments
Wastewater Treatment
And
Dispersal System

WMP and Operations and Maintenance

June 4, 2004



Prepared by

Rural Engineering Services, Inc.

Prepared for

TESCO Investments, Inc.

EGIS ENGINEERING, INC.

314 SOUTH MAIN
BENTONVILLE, AR 72712-5903
WWW.EGIS-ENV.COM

(479) 271-9252
(479) 271-8627 (FAX)
DGILBERT@EGIS-ENV.COM

March 8, 2010

Marcus Tilley
Arkansas Department of Environmental Quality
5301 North Shore Drive
North Little Rock, AR 72118

RE: Request for Minor Modification - Dixieland Apartments Treatment Plant
Operated by Benton County Water District #1 PWA
Permit 4811-WR-1

Dear Mr. Tilley:

As we discussed by telephone, the District wishes to make what we believe to be a minor modification to the wastewater plant located at the Dixieland Apartments in Little Flock, Arkansas. As constructed, the return lines from the discharge field empty into the dosing tank. During flushing of the field lines, any residual sludge flushed from the lines winds up in the dosing tank. This causes eventual sludge buildup in the dosing tank, which is undesirable.

We have discussed this issue with the District and with the manufacturer, and believe that the best solution is to redirect the return lines as shown on the attached drawing. Under this proposal, the return lines would discharge into effluent tank #2, where raw effluent is stored prior to entering the BioClere reactor. Any sludge flushed from the field lines would thus end up in the effluent tank rather than in the finishing tank, where it would be reprocessed. This configuration would provide for retreatment of the sludge, and reduce sludge accumulation in the dosing tank. The end result would be better treatment and more efficient plant operation.

We appreciate your consideration of and, should you find this proposal satisfactory, your approval of the proposed change. Please feel free to call with any questions, suggestions, or comments.

Sincerely,
EGIS Engineering, Inc.

David A. Gilbert, P. E.
Project Manager

C: Edwin Cooper, BCWD #1
File

500 GAL. PROPANE TANK ON CONC. PAD

TWO 35,000 GAL. XERXES FIBERGLASS SINGLE-WALL TANK. 10' DIA. X 60.06' LONG

ELECTRIC TRANSFORMERS

3-RETURN LINES

3-DISCHARGE LINES

15' BUILDING SETBACK LINE

ATE LVES

MAINT. BLD. FFE 1293.67

PROPANE GAS REGULATOR

TWO 12' DIA. BIOCLERE 36/30 TREATMENT UNIT

APPROXIMATE LOCATION OF BURIED PIPES

FLOW SPLITTER TANK

4" PVC

6" VENT

8" CLEAN-OUT

SECURITY CHAIN LINK FENCE

TANK 1

THREE WATER METERS TO MEASURE RETURN FLOW

3" PVC

6" VENT

THREE WATER METERS TO MEASURE EFFLUENT DISCHARGE

8" WYE CONNECTION

RISER SECTION

GEOFLOW HEAD CONTROL BOXES

TANK 2

8" PVC

4" PVC

5000 GAL. XERXES FIBERGLASS DOSING TANK 6' DIA. X 30' LONG

FLOW

CONCRETE SIDEWALK

2" RETURN LINE FROM BIOCLERE UNIT

TERMINATE NEW LINE INSIDE RISER (SEE DETAIL)

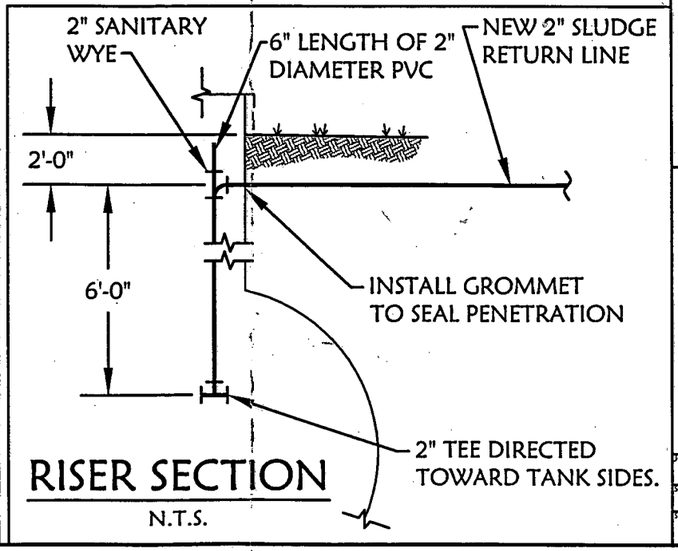
10 CAR GARAGE

INSTALL 2" PVC SLUDGE RETURN LINE

EXISTING SEWER MANHOLE
TOP RIM ELEV. = 1294.95
FL OUT ELEV. = 1283.75
FL IN (EAST) = 1284.15
FL IN (WEST) = 1284.20

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 8525
DAVID A. GILBERT
3.8.2010

CERTIFICATE OF AUTHORIZATION
EGIS ENGINEERING, INC.
No. 852
ARKANSAS - ENGINEER



RISER SECTION
N.T.S.

NO.	DATE	APPROVD	REVISIONS DESCRIPTION

EGIS ENGINEERING, INC.
314 S. Main Street
Bentonville, AR 72712
(479) 271-9252 Fax: (479) 271-8627

DIXIELAND WASTEWATER TREATMENT PLANT IMPROVEMENTS
BENTON COUNTY WATER DISTRICT #1
AVOCA, ARKANSAS

SITE PLAN

JOB NUMBER	DATE
3184	MARCH 2010
SCALE: 1" = 30'	APPROVED BY: D.A.G.
SHEET: 1 OF 1	REV.

Project Description:

The project is proposed as 102 apartments developed over and approximately 23 acre site. The apartments will be served by public water provided by Benton County Water District #1, Avoca, AR. The project plan has been developed with coordination with Wayne Allen, Manager of the Water District.

The wastewater system will consist of gravity collection sewer, designed by Shoemaker Haaland Engineers of Keokuk, Iowa. The wastewater treatment system will consist of two large settling tanks followed by a package trickling filter system with sludge collection and recycle to the primary tanks. The wastewater dispersal system will consist of a dosing tank to provide storage prior to dosing the treated wastewater into subsurface drip irrigation located on the property.

Design Basis:

The wastewater flow estimates were provided by Wayne Allen of Benton County Water District #1. Mr. Allen collected water usage records from other apartments in the Water District, and doubled the actual usage rates for the existing apartments. The per-unit usage (twice the per-unit usage for the existing apartments) was multiplied by the number of units in the Dixieland project to estimate the total daily wastewater flow for Dixieland Apartments.

The waster usage estimate is shown as Appendix A, and the calculation is shown below.

Per Unit water usage provided by Benton County Public Water District #1 for an existing apartment complex = 88.7 gallons per day per unit

Doubled rate = 166 gallons per day per unit.

Estimate for Dixieland Apartments = 192 units X 166 gallons per day per unit = 31,872 gallons per day.

This is considered a conservatively high estimate (twice the measured rate for existing apartments).

The treatment technology is a fixed-film, or attached growth process which can typically provide treatment when the system is hydraulically and organically under loaded.

Treatment System Components:

The treatment system consists of two large settling tanks, with each tank sized for 35,000 gallons nominal capacity. The tanks are followed by a flow splitter provided by

AquaPoint, the manufacturer of the BioClere treatment process. The flow splitter is followed by two model 36/30 BioClere treatment units in parallel. The treatment units have media for a fixed film process, and are constructed with an integral clarifier under the media for sludge (biomass) collection and recycle. The biomass is recirculated to the primary settling tanks by pumps within the BioClere unit that are provided as an integral part of the BioClere package. The treatment units are followed by a 5000 gallon dosing tank with 8 turbine pumps (4 duplex pump packages) sized to dose the treated wastewater to subsurface drip irrigation tubing. The wastewater will be dispersed into the soil for final dispersal.

Settling Tanks

The settling tanks are sized for 48 hours of wastewater flow. Forty-eight hours of daily flow is 63,744 gallons per day, however since the tanks are manufactured in set sizes, two- 35,000 gallon tanks will be used. This will provide 70,000 gallons of storage or approximately 53 hours of storage at the estimated average daily flow. The settling tanks will be fiberglass tanks manufactured under IAPMO standards and tested prior to installation. Ballast for the tanks will be constructed as concrete deadmen holding the tanks against buoyant forces b y the use of straps over the tanks and onto the deadmen. The tanks are to be manufactured by Xerxes Corporation of Minneapolis, MN

Treatment Unit

The treatment unit will be a package trickling filter system known as BioClere, manufactured by AquaPoint, Inc. of New Bedford, MA. The flow splitter device to provide equal distribution between the two parallel BioClere units will also be provided by AquaPoint. The treatment units and the flow splitter are sized by AquaPoint, Inc. to treat a total of 35,000 gallons per day for each of the treatment units. The treatment system plans have been reviewed by an AquaPoint engineer to ensure that the design complies with the manufacturer's application requirements. The manufacturer has been informed of the burial depth of the units as well as the depth of the seasonal water table as determined by Glen Laurent, Professional Soil Classifier.

Dosing Tank and Pumps

The dosing tank is sized for 5000 gallons or approximately 4 hours of the total daily flow. Pumps from the dosing tank were sized by determining the flow required to dose the largest zones. Two cases were examined – the zone with the highest static head requirement, and the zone with the highest friction head requirement. The pumps were sized to provide flow and head to meet both situations. The pump sizing is shown in Appendix B, and is based upon the irrigation tubing manufacturer's suggested sizing criteria. Pumps will be duplexed, and each set of zones will be served by a duplex pump package in the dosing tank. Pumps are Zoeller model 5034-0010, 2 HP, 5-Stage, 230VAC pumps capable of approximately 45 gpm at 158 feet of head. The pumps,

floats, junction boxes, and pump vaults are to be as manufactured by the Zoeller Company, Louisville, KY.

Each duplex pump system will be followed by a magnetic flow meter (mag meter) capable of measureing and recording (totalizing) flows of approximately 45 gpm. The mag meter will be connected to a totalizing display in the control panel for the drip irrigation system.

Drip Irrigation System

Area requirements for the drip zones were determined by having the soil mapped by Glen Laurent, Arkansas Professional Soil Classifier # 21. Mr. Laurent determined the soil loading rates for drip irrigation in each of the areas, and his loading rates for the original areas set aside by the developers were submitted to Mr. Roy Davis of the Arkansas Department of Health for confirmation. After detailed design calculations and area sizing was performed, it was determined that the original area planned for drip irrigation would not provide enough irrigation area for 150% of the total daily flow. An additional 2.75 acres to the north of the property was purchased, and Mr. Laurent mapped that area. Both soil loading rate reports are provided as Appendices C and D of this report.

The loading rate to the area to the north of the property – zones 1 – 6 was determined by Taking the average of the loading rates determined for each pit. The individual loading rates for the pits ranged from 0.157 to 0.253, with an average of 0.194. Considering that the flow estimates for this project were derived from doubling actual flow rates from similar projects, it is not unreasonable to use a loading rate of 0.20 for all of the zones in the northern drip fields (zones 1 through 6). Also, a total area has been set aside to provide a 50% reserve area for drip irrigation.

The drip irrigation system is planned as zones of subsurface tubing manufactured by GeoFlow, Inc. of Sausalito, CA. drip tubing will be Wasteflow, drip irrigation tubing with pressure compensated emitters spaced 24 inches on center. Tubing will be placed as nearly on contour as possible with no more than one foot of elevation difference between the beginning and the end of each run. The laterals are sized for 3-inch PVC in order to minimize friction head loss. Each zone will be served by a supply lateral and a return lateral having sufficient diameters to provide the pressure and flows for dosing and flushing based upon the manufacturer's sizing guidelines and software. The Geoflow sizing charts and calculations are included as Appendix B of this report.

The drip irrigation system includes a head control box (Geoflow, Inc.) to screen (filter) the treated wastewater to a minimum of 100 microns. The head control box includes the screen filter, solenoids to provide a field flush and a screen filter flush, and piping, wiring, and fittings required to complete the head control box in its enclosure.

The drip irrigation system will also include mechanical zone valves to allow the pumps to supply treated wastewater to each of the zones based upon timed dosing.

Electrical/Electronic Controls

The BioClere wastewater treatment unit will include the electrical controls in a minimum of a NEMA 3R enclosure. The controls for the BioClere units will only control the functions of the BioClere unit.

The controls for the dosing tank, drip irrigation head control box, and displays for the mag meters will be enclosed in a separate enclosure meeting the minimum requirements of NEMA 3R. The controls for the dosing pumps will be set up to be programmable to provide scheduled doses ranging from 3 minutes to 60 minutes in a continuous range, and on a schedule ranging from every 15 minutes up to every 4 hours within a continuously selectable range.

The control panel enclosure will also include elapsed time meters and cycle counters for each pump. The panel will also include a display to show the total flow through each of the mag meters.

Appendix A

Water Usage Estimates
From
Benton County Water District #1

Benton County Water District # 1

P.O. Box 127 Avoca, AR 72711 Phone 1-479-636-0002 Fax 1-479-7676

Estimated Flow For Dixieland Apartments

	Estimated Monthly Flow per Unit	Number of Apartments	Monthly Flow	Daily Apartment Flow	Peak Factor	Estimated Daily Flow
Per Month	5,000	192	960,000	32,000	1.5	48,000
					1.25	40,000
Per Day	166.67		Per Minute	22.22		

Existing 16 Unit Apartment Complex located on Rustic Drive

	Actual Avg. Monthly Flow per Unit	Number of Apartments	Actual Avg. Monthly Flow	Daily Apartment Flow	Peak Factor	Daily Flow
Per Month	2,660	16	42,567	1,419	1.5	2,128
	=30				1.25	1,774
	=88.7gpd/unit					
Per Day	=89		Per Minute	0.99		

all 16 units or 88.7 gal/day·unit

gallons/month·unit

gallons/day·unit

Mark,
The above information on the 16 unit apartment complex are actual flows. The average monthly usage is based on a 10 month average. 11 months ago we installed a compound meter which measures both high flow and low flow, I feel the numbers are accurate.

Appendix B

Drip Field Pump Sizing

GEOFLOW Spreadsheets

Highest

Geoflow Subsurface Dripline Dispersal: Field Calculation

Job Description:	
Contact:	
Prepared by:	
Date:	June 23rd, 2003

Please fill in the shaded areas and drop down menus below:

Note. This worksheet can be found in Geoflow's Design and Installation Manual

Worksheet - Field Design

		Dispersal Field as Single Zone	Dispersal Field as Multiple Zones	
Number of Zones		1	1	zone(s)
A)	Quantity of effluent to be disposed per day	3,700	3,700	gallons / day
B)	Hydraulic loading rate	0.2	0.2	gallons / sq.ft. / day
C)	Determine total area required	18,500	18,500	square ft.
D)	Choose spacing between WASTEFLOW lines	2	2	ft.
D)	Choose spacing between WASTEFLOW emitters	2 ft.	2	ft.
E)	Total linear ft.	9,250	9,250	each
F)	Total number of emitters	4,625	4,625	each
G)	Select Wasteflow dripline	Wasteflow PC - 1/2gph	Wasteflow PC 1/2 gph	dripline
H)	Pressure at the beginning of the dripfield	25 psi	25	psi
I)	Feet of Head at the beginning of the dripfield	57.75	57.75	ft.
J)	What is the flow rate per emitter in gph?	0.53	0.53	gallons per hour
K)	Total flow for the area (gph)	2,451	2,451	gallons per hour
	Total flow for the area (gpm)	40.85	40.85	gallons per minute
L)	Select pipe diameters for manifolds and submains	3	2	inch
M)	Select Vortex Filter (item no.)	AP4E-150-3 (1.5in./3hole)	AP4E-150-3 (1.5in./3hole)	
N)	Maximum length of each WASTEFLOW line. For additional technical flow, pressure and flushing data please refer to Geoflow's Design Manual and WASTEFLOW hydraulics worksheet.	478	478	ft.

Check below to choose quantity and length of daily doses

Dosing			
Number of doses per day/zone:	12	5	
Pump run time per dose/zone (minutes):	7.55	18.11	minutes
Pump run time per day/zone (hours):	1.51	1.51	hours / day
Pump run time per day/all zones (hours):	1.51	1.51	hours

Geoflow Subsurface Dispersal: Pump Size Calculation

Job Description:	0
Contact:	0
Prepared by:	0
Date:	June 23rd, 2003

Please fill in the shaded areas below:
Information automatically inserted is from the multiple zone column in 'Worksheet 1-Field Design
Note. This worksheet can be found in Geoflow's Design and Installation Manual

Worksheet - Pump Sizing

O)	Minimum pump capacity	40.85 gpm	
P)	Header pipe size	3 inch	
Q)	Pressure loss in 100 ft. of pipe	1.42 psi	
R)	Friction head in 100 ft. of pipe	3.28 ft.	
S)	Static head		
	i) Height from pump to tank outlet	6 ft.	
	ii) Elevation increase or decrease	15 ft.	
T)	Total static head	**21 *ft.***	
U)	Friction head		
	i) Equivalent length of fittings	100 ft.	
	ii) Distance from pump to field	640 ft.	
	iii) Total equivalent length of pipe	740 ft.	
	iv) Total effective feet	24.27348 ft.	
	v) Head required at dripfield	57.75 ft.	
	vi) Headloss through filter or Headwork	25.41 ft.	11 psi
	vii) Head loss through zone valves	3.927 ft.	1.7 psi
V)	Total friction Head	**111.36048**	
W)	**Total dynamic head**	**132.36 ft.**	
X)	**Minimum pump capacity**	**40.85 gpm**	
Y)	Choose the pump	***	

*** Note a few States + counties require additional flow for flushing. Please check your local regu

If you need assistance designing for this additional flow, please

a. See Geoflow flushing worksheet or

b. Contact Geoflow at 800-828-3388.

Lowest - Furthest

Geoflow Subsurface Dripline Dispersal: Field Calculation

Job Description:	
Contact:	
Prepared by:	
Date:	June 23rd, 2003

Please fill in the shaded areas and drop down menus below:

Note. This worksheet can be found in Geoflow's Design and Installation Manual

Worksheet - Field Design

		Dispersal Field as Single Zone	Dispersal Field as Multiple Zones	
Number of Zones		1	1	zone(s)
A)	Quantity of effluent to be disposed per day	3,700	3,700	gallons / day
B)	Hydraulic loading rate	0.2	0.2	gallons / sq.ft. / day
C)	Determine total area required	18,500	18,500	square ft.
D)	Choose spacing between WASTEFLOW lines	2	2	ft.
D)	Choose spacing between WASTEFLOW emitters	2 ft.	2	ft.
E)	Total linear ft.	9,250	9,250	each
F)	Total number of emitters	4,625	4,625	each
G)	Select Wasteflow dripline	Wasteflow PC - 1/2gph	Wasteflow PC 1/2 gph	dripline
H)	Pressure at the beginning of the dripfield	25 psi	25	psi
I)	Feet of Head at the beginning of the dripfield	57.75	57.75	ft.
J)	What is the flow rate per emitter in gph?	0.53	0.53	gallons per hour
K)	Total flow for the area (gph)	2,451	2,451	gallons per hour
	Total flow for the area (gpm)	40.85	40.85	gallons per minute
L)	Select pipe diameters for manifolds and submains	3	2	inch
M)	Select Vortex Filter (item no.)	AP4E-150-3 (1.5in./3hole)	AP4E-150-3 (1.5in./3hole)	
N)	Maximum length of each WASTEFLOW line. For additional technical flow, pressure and flushing data please refer to Geoflow's Design Manual and WASTEFLOW hydraulics worksheet.	478	478	ft.

Check below to choose quantity and length of daily doses

Dosing			
Number of doses per day/zone:	12	5	
Pump run time per dose/zone (minutes):	7.55	18.11	minutes
Pump run time per day/zone (hours):	1.51	1.51	hours / day
Pump run time per day/all zones (hours):	1.51	1.51	hours

Geoflow Subsurface Dispersal: Pump Size Calculation

Job Description:	0
Contact:	0
Prepared by:	0
Date:	June 23rd, 2003

Please fill in the shaded areas below:
Information automatically inserted is from the multiple zone column in 'Worksheet 1-Field Design
Note. This worksheet can be found in Geoflow's Design and Installation Manual

Worksheet - Pump Sizing

O)	Minimum pump capacity	40.85 gpm	
P)	Header pipe size	2 inch	
Q)	Pressure loss in 100 ft. of pipe	1.42 psi	
R)	Friction head in 100 ft. of pipe	3.28 ft.	
S)	Static head		
	i) Height from pump to tank outlet	6 ft.	
	ii) Elevation increase or decrease	6 ft.	
T)	Total static head	**12 *ft.***	
U)	Friction head		
	i) Equivalent length of fittings	100 ft.	
	ii) Distance from pump to field	1040 ft.	
	iii) Total equivalent length of pipe	1140 ft.	
	iv) Total effective feet	37.39428 ft.	
	v) Head required at dripfield	57.75 ft.	
	vi) Headloss through filter or Headwork	25.41 ft.	11 psi
	vii) Head loss through zone valves	3.927 ft.	1.7 psi
V)	Total friction Head	**124.48128**	
W)	**Total dynamic head**	**136.48 ft.**	
X)	**Minimum pump capacity**	**40.85 gpm**	
Y)	Choose the pump	***	

*** Note a few States + counties require additional flow for flushing. Please check your local regu
If you need assistance designing for this additional flow, please

a. See Geoflow flushing worksheet or
b. Contact Geoflow at 800-828-3388.

Appendix C

Soil Investigation Report

For the South Part of the Project

Original Land Purchase

DIXIELAND APARTMENTS

LITTLE FLOCK, ARKANSAS

SOIL INVESTIGATION REPORT

WITH SOIL LOADING RATES FOR DRIP DISPERSAL SYSTEMS

Glen D. Laurent P.S.C.
206 S. Melody St.
Lowell, Arkansas 72745
(479) 601-3844

Soil Investigation Report for
Dixieland Apartments, Little Flock, Arkansas

By Glen D. Laurent
Professional Soil Classifier
Designated Representative

This report was made to provide information about the soils in the Dixieland Apartments Project area. The information includes a description of the soils and their location and a summary of the soil loading rates for Drip Dispersal Systems.

The Soils were described using guidelines from the National Cooperative Soil Survey.

The Soil Loading Rates were assigned using:

1. The Arkansas Department of Health publication, "Guidelines for the Design and Construction of Drip Dispersal Systems",version 1 (10-28-03).
2. Geoflow Design and Installation Manual – 2000B

If the loading rates using the ADH guidelines exceeded the manufactures (Geoflow) loading rates for a soil type then the loading rates for the more restrictive soil type was used.

SUMMARY

DIXIELAND APARTMENTS
SOIL LOADING RATES FOR DRIP DISPERSAL

SOIL PIT NO.	GAL/FT SQ/DAY
1	0.205
2	0.400
3	0.219
4	0.400
5	0.400
6	0.700
7	0.700
8	0.636
9	0.595
10	0.400
11	0.513
12	0.253
13	0.198
14	0.219
15	0.615
16	0.615
17	0.700

NOTE: This is pliminary data that has not been reviewed or approved by the Arkansas Dept of Health

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 1

PROFILE DESCRIPTION
April 1, 2004

A 0 to 10 inches; dark brown (10YR 3/3) gravelly silt loam; weak medium subangular blocky structure; friable; 15 percent by volume chert fragments 1 to 3 inches in diameter; clear smooth boundary.

Bt1 10 to 21 inches; strong brown (7.5YR 4/6) very gravelly silt loam; weak medium subangular blocky structure; friable; patchy clay films; 40 percent by volume chert fragments 1 to 6 inches in diameter; clear wavy boundary.

Bt2 21 to 34 inches; reddish brown (2.5YR 4/4) extremely cobbly silt loam; moderate medium subangular blocky structure; friable; common clay films; common medium prominent strong brown (7.5YR 4/6) and yellowish brown (10YR 5/4) iron depletions; 75 percent by volume chert fragments 1 to 8 inches in diameter; clear wavy boundary.

Bt3 34 to 50 inches; dark red (2.5YR 3/6) extremely gravelly silty clay (<49 % clay); moderate medium subangular blocky structure; firm; common yellowish red (5YR 4/6) clay films; 60 percent by volume chert fragments 1 to 6 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 50 inches – Moderate

Seasonal Water Table
21 inches - Brief Duration
34 inches – Moderate Duration
30 inches – Adjusted Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.205 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 2

PROFILE DESCRIPTION
April 1, 2004

A 0 to 10 inches; dark brown (10YR 3/3) gravelly silt loam; weak medium subangular blocky structure; friable; 25 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt1 10 to 16 inches; yellowish red (5YR 4/6) gravelly silt loam; weak medium subangular blocky structure; friable; patchy clay films; 30 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt2 16 to 25 inches; red (2.5YR 4/6) gravelly silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 30 percent by volume chert fragments 1 to 3 inches in diameter; clear smooth boundary.

Bt3 25 to 42 inches; dark red (2.5YR 3/6) very gravelly silty clay loam (<35 % clay); moderate medium subangular blocky structure; friable; common clay films; 30 percent by volume soft chert 1 to 6 inches in diameter that can be cut with a spade, 10 percent by volume hard chert fragments 1 to 4 inches in diameter; gradual smooth boundary.

Bt4 42 to 60 inches; dark red (2.5YR 3/6) very gravelly silty clay (> 35 % clay); moderate medium subangular blocky structure; firm; many shiny clay films; 55 percent by volume hard chert fragments 1 to 4 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 60 inches – Moderate

Seasonal Water Table
No seasonal water table observed

Soil Loading Rates for Drip Dispersal Systems
0.400 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 3

PROFILE DESCRIPTION
April 1, 2004

A 0 to 8 inches; very dark grayish brown (10YR 3/2) very gravelly silt loam; weak medium subangular blocky structure; friable; 40 percent by volume chert fragments 1 to 6 inches in diameter; gradual smooth boundary.

Bt1 8 to 24 inches; strong brown (7.5YR 4/6) very cobbly silt loam; weak medium subangular blocky structure; friable; patchy clay films; 55 percent by volume chert fragments 3 to 6 inches in diameter; clear smooth boundary.

2Bt2 24 to 32 inches; red (2.5YR 4/6) very cobbly silty clay loam (> 35% clay); moderate medium subangular blocky structure; firm; common clay films; 45 percent by volume chert fragments 3 to 8 inches in diameter; gradual smooth boundary.

Bt3 32 to 50 inches; red (2.5YR 4/6) very gravelly silty clay loam (>35 % clay); moderate medium subangular blocky structure; firm; common clay films; common medium distinct yellowish red (5YR 4/6) iron depletions; 40 percent by volume chert fragments 1 to 6 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 50 inches – Moderate

Seasonal Water Table
32 inches – Moderate duration

Soil Loading Rates for Drip Dispersal Systems
0.219 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 4

PROFILE DESCRIPTION
April 1, 2004

A 0 to 9 inches; dark brown (10YR 3/3) gravelly silt loam; weak medium subangular blocky structure; friable; 25 percent by volume chert fragments 1 to 3 inches in diameter; clear smooth boundary.

Bt1 9 to 22 inches; dark red (2.5YR 3/6) very gravelly silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 45 percent by volume chert fragments 1 to 6 inches in diameter; gradual smooth boundary.

Bt2 22 to 33 inches; red (2.5YR 4/6) gravelly silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 30 percent by volume chert fragments 1 to 6 inches in diameter; gradual smooth boundary.

Bt3 33 to 60 inches; red (2.5YR 4/6) gravelly silty clay loam; moderate medium subangular blocky structure; friable; common shiny clay films; 10 % soft rock structure with some horizontal bedding; few pale brown (10YR 6/3) iron depletions around chert fragments; 30 percent by volume chert fragments 1 to 6 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 60 inches – Moderate

Seasonal Water Table
33 inches – Brief Duration

Soil Loading Rates for Drip dispersal Systems
0.400 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 5

PROFILE DESCRIPTION
April 2, 2004

A 0 to 15 inches; dark brown (10YR 3/3) silt loam; moderate medium subangular blocky structure; friable; 10 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt1 15 to 26 inches; dark yellowish brown (10YR 3/6) very gravelly silt loam; moderate medium subangular blocky structure; friable; patchy clay films; 40 percent by volume chert fragments 1 to 4 inches in diameter; gradual smooth boundary.

Bt2 26 to 48 inches; brown (7.5YR 4/4) very gravelly silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 45 percent by volume chert fragments 1 to 3 inches in diameter

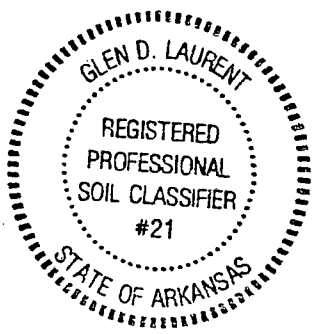
SYSTEM SIZING

Hydraulic Conductivity
0 to 48 inches – Moderate

Seasonal Water Table
No seasonal water observed

Soil Loading Rates for Drip Dispersal Systems
0.400 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative



DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 6

PROFILE DESCRIPTION
April 2, 2004

A 0 to 9 inches; dark yellowish brown (10YR 3/4) silt loam; weak medium subangular blocky structure; friable; 5 percent by volume rounded chert fragments 1 to 3 inches in diameter; clear smooth boundary.

A2 9 to 20 inches; dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure; friable; 7 percent by volume rounded chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt1 20 to 31 inches; dark brown (7.5YR 3/3) gravelly silt loam; weak medium subangular blocky structure; friable; common clay films; 15 percent by volume rounded chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt2 31 to 48 inches; dark yellowish brown (10YR 3/6) very gravelly silt loam; weak medium subangular blocky structure; friable; patchy clay films; 45 percent by volume rounded chert fragments 1 to 3 inches in diameter

SYSTEM SIZING

Hydraulic Conductivity
0 to 48 inches – Moderate

Seasonal Water Table
No seasonal water observed

Soil Loading Rates for Drip Dispersal Systems
0..700 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 7

PROFILE DESCRIPTION
March 30, 2004

A 0 to 9 inches; dark yellowish brown (10YR 3/4) silt loam; weak medium subangular blocky structure; friable; 5 percent by volume rounded chert fragments 1 to 3 inches in diameter; clear smooth boundary.

Ab 9 to 22 inches; dark brown (10YR 3/3) very gravelly silt loam; weak medium subangular blocky structure; friable; 40 percent by volume rounded chert fragments 1 to 3 inches in diameter; clear smooth boundary.

Bt1 22 to 34 inches; dark brown (7.5YR 3/4) very gravelly silt loam; weak medium subangular blocky structure; friable; common clay films; 45 percent by volume rounded chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt2 34 to 52 inches; reddish brown (5YR 4/4) extremely gravelly silt loam; weak medium subangular blocky structure; friable; common clay films; 65 percent by volume rounded chert fragments 1 to 3 inches in diameter

SYSTEM SIZING

Hydraulic Conductivity
0 to 52inches – Moderate

Seasonal Water Table
No seasonal water observed

Soil Loading Rates for Drip dispersal Systems
0.700 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 8

PROFILE DESCRIPTION
April 2, 2004

A 0 to 9 inches; dark yellowish brown (10YR 3/4) silt loam; weak medium subangular blocky structure; friable; 1 percent by volume rounded chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

A2 9 to 18 inches; dark yellowish brown (10YR 3/4) silt loam; weak medium subangular blocky structure; friable; 10 percent by volume rounded chert fragments 1/4 to 1 inch in diameter; clear smooth boundary.

Ab 18 to 31 inches; dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure; friable; 10 percent by volume rounded chert fragments 1/4 to 1 inch in diameter; gradual smooth boundary.

Bt1 31 to 48 inches; dark yellowish brown (10YR 4/4) very gravelly silt loam; weak medium subangular blocky structure; friable; common dark yellowish brown (10YR 3 /4) clay films; 35 percent by volume rounded chert fragments 1/4 to 3 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 48 inches – Moderate

Seasonal Water Table
31 inches – Brief Duration

Soil Loading Rates for Drip Dispersal Systems
0.636 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 9

PROFILE DESCRIPTION
April 2, 2004

A 0 to 12 inches; dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure; friable; 5 percent by volume rounded chert fragments 1 to 3 inches in diameter; clear smooth boundary.

Ab 12 to 29 inches; very dark grayish brown (10YR 3/2) very gravelly silt loam; weak medium subangular blocky structure; friable; 45 percent by volume rounded chert fragments 1 to 3 inches in diameter; clear smooth boundary.

Bt1 29 to 36 inches; dark yellowish brown (10YR 4/4) gravelly silt loam; weak medium subangular blocky structure; friable; patchy clay films; common medium faint dark yellowish brown (10YR 3 /4) iron concentrations; 30 percent by volume rounded chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt2 36 to 48 inches; dark yellowish brown (10YR 4/6) very gravelly silt loam; weak medium subangular blocky structure; friable; common clay films; common medium distinct dark yellowish brown (10YR 3 /4) iron concentrations; 45 percent by volume rounded chert fragments 1 to 6 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 48inches – Moderate

Seasonal Water Table
29 inches – Brief Duration

Soil Loading Rates for drip Dispersal Systems
0.595 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 10

PROFILE DESCRIPTION
April 2, 2004

A 0 to 8 inches; dark brown (10YR 3/3) gravelly silt loam; weak medium subangular blocky structure; friable; 25 percent by volume chert fragments 1 to 3 inches in diameter; clear smooth boundary.

E 8 to 14 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; 10 percent by volume chert fragments 1 to 3 inches in diameter; clear smooth boundary.

Bt1 14 to 24 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 10 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt2 24 to 41 inches; reddish brown (2.5YR 4/4) gravelly silty clay loam; moderate medium subangular blocky structure; firm; common shiny clay films; 25 percent by volume chert fragments 1 to 4 inches in diameter; gradual smooth boundary.

Bt3 41 to 48 inches; dark red (2.5YR 3/6) silty clay loam; moderate medium subangular blocky structure; firm; common shiny clay films; common black Mn stains on ped faces.

SYSTEM SIZING

Hydraulic Conductivity
0 to 48 inches – Moderate

Seasonal Water Table
41 inches – Brief Duration

Soil Loading Rates for Drip Dispersal Systems
0.400 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 11

PROFILE DESCRIPTION
April 2, 2004

A 0 to 7 inches; dark brown (10YR 3/3) gravelly silt loam; weak medium subangular blocky structure; friable; 20 percent by volume chert fragments 1 to 3 inches in diameter; clear smooth boundary.

A2 7 to 18 inches; dark yellowish brown (10YR 4/4) very gravelly silt loam; weak medium subangular blocky structure; friable; 35 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt1 18 to 25 inches; yellowish brown (10YR 5/4) very gravelly silt loam; weak medium subangular blocky structure; friable; patchy clay films; 40 percent by volume chert fragments 1 to 4 inches in diameter; gradual smooth boundary.

Bt2 25 to 35 inches; yellowish red (5YR 4/6) very gravelly silt loam; weak medium subangular blocky structure; friable; common clay films; common medium distinct red (2.5YR 4/6) iron concentrations; 45 percent by volume chert fragments 1 to 4 inches in diameter; clear wavy boundary.

2Bt3 35 to 42 inches; dark red (2.5YR 3/6) very gravelly silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium distinct yellowish red (5YR 4/6) and prominent light yellowish brown (10YR 6/4) iron depletions; 50 percent by volume chert fragments 1 to 6 inches in diameter.

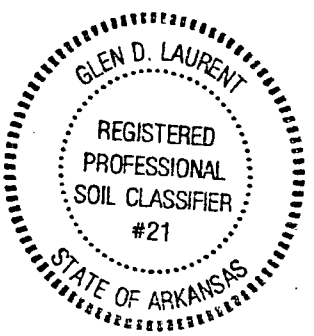
SYSTEM SIZING

Hydraulic Conductivity
0 to 42 inches – Moderate

Seasonal Water Table
25 inches – Brief Duration

Soil Loading Rates for Drip Dispersal Systems
0.513 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative



DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 12

PROFILE DESCRIPTION
April 2, 2004

A 0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; 3 percent by volume chert fragments 1 to 3 inches in diameter; clear smooth boundary.

Ab 7 to 16 inches; dark yellowish brown (10YR 3/4) silt loam; weak medium subangular blocky structure; friable; 3 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt1 16 to 27 inches; dark yellowish brown (10YR 4/6) silt loam; moderate medium subangular blocky structure; friable; common clay films; 5 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt2 27 to 37 inches; yellowish brown (10YR 5/6) very gravelly silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 35 percent by volume chert fragments 1 to 3 inches in diameter; gradual wavy boundary.

2Bt3 37 to 42 inches; dark red (2.5YR 3/6) very gravelly silty clay loam; moderate medium subangular blocky structure; friable; common clay films; common medium prominent yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) iron depletions; 40 percent by volume chert fragments 1 to 3 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 42 inches – Moderate

Seasonal Water Table
37 inches – Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.253 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

GLEN D. LAURENT
REGISTERED
PROFESSIONAL
SOIL CLASSIFIER
#21
STATE OF ARKANSAS

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 13

PROFILE DESCRIPTION
April 2, 2004

A 0 to 9 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; 10 percent by volume chert fragments 1 to 3 inches in diameter; clear smooth boundary.

E 9 to 23 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak medium subangular blocky structure; friable; 30 percent by volume chert fragments 1 to 3 inches in diameter; gradual wavy boundary.

Bt1 23 to 32 inches; yellowish red (5YR 4/6) gravelly silty clay loam; weak medium subangular blocky structure; friable; common clay films; 40 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt2 32 to 44 inches; red (2.5YR 4/6) very gravelly silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium prominent pale brown (10YR 6/3) and light brownish gray (10YR 6/2) iron depletions; 40 percent by volume chert fragments 1 to 3 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 42 inches – Moderate

Seasonal Water Table
23 inches – Brief Duration
32 inches – Moderate Duration
29 inches – Adjusted Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.198 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 14

PROFILE DESCRIPTION
April 2, 2004

A 0 to 9 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; 1 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt1 9 to 18 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; patchy clay films; 1 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt2 18 to 32 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 1 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

2Bt3 32 to 46 inches; yellowish red (5YR 4/6) very gravelly silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium prominent pale brown (10YR 6/3) and light brownish gray (10YR 6/2) iron depletions and common medium distinct reddish brown (2.5YR 4/4) iron concentrations; 55 percent by volume chert fragments 1 to 3 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 46 inches – Moderate

Seasonal Water Table

32 inches – Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.219 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 15

PROFILE DESCRIPTION
April 2, 2004

A 0 to 15 inches; dark yellowish brown (10YR 3/4) silt loam; weak medium subangular blocky structure; friable; 2 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt1 15 to 30 inches; brown (7.5YR 4/4) very gravelly silt loam; weak medium subangular blocky structure; friable; common clay films; 45 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt2 30 to 34 inches; brown (7.5YR 4/4) very gravelly silt loam; moderate medium subangular blocky structure; firm; common clay films; common medium distinct light yellowish brown (10YR 6/4) 45 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

2Bt3 34 to 48 inches; red (2.5YR 4/6) very gravelly silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium prominent brown (7.5YR 5/4) iron depletions; 55 percent by volume chert fragments 1 to 3 inches in diameter.

SYSTEM SIZING

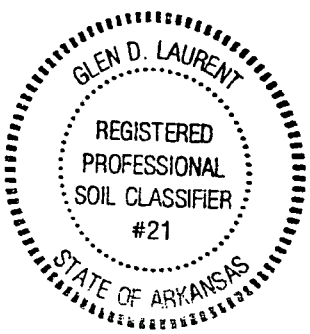
Hydraulic Conductivity
0 to 48 inches – Moderate

Seasonal Water Table

30 inches – Brief Duration

Soil Loading Rates for Drip dispersal Systems
0.615 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative



DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 16

PROFILE DESCRIPTION
April 2, 2004

A 0 to 12 inches; brown (10YR 4/3) gravelly silt loam; weak medium subangular blocky structure; friable; 15 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt1 12 to 30 inches; strong brown (7.5YR 4/6) very gravelly silt loam; moderate medium subangular blocky structure; friable; common clay films; 40 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

2Bt2 30 to 48 inches; red (2.5YR 4/6) extremely gravelly silty clay loam; moderate medium subangular blocky structure; firm; common shiny dark red (2.5YR 3/6) clay films; 70 percent by volume chert fragments 1 to 8 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 48 inches – Moderate

Seasonal Water Table

30 inches – Brief Duration

Soil Loading Rates for Drip dispersal Systems
0.615 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 17

PROFILE DESCRIPTION
April 2, 2004

A 0 to 14 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

Ab 14 to 26 inches; very dark grayish brown (10YR 3/2) gravelly silt loam; weak medium subangular blocky structure; friable; 15 percent by volume rounded chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt1 26 to 36 inches; dark yellowish brown (10YR 3/4) silt loam; moderate medium subangular blocky structure; friable; common clay films; 10 percent by volume rounded chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

Bt2 36 to 45 inches; brown (7.5YR 4/4) gravelly silt loam; moderate medium subangular blocky structure; friable; common clay films; 15 percent by volume rounded chert fragments 1 to 3 inches in diameter

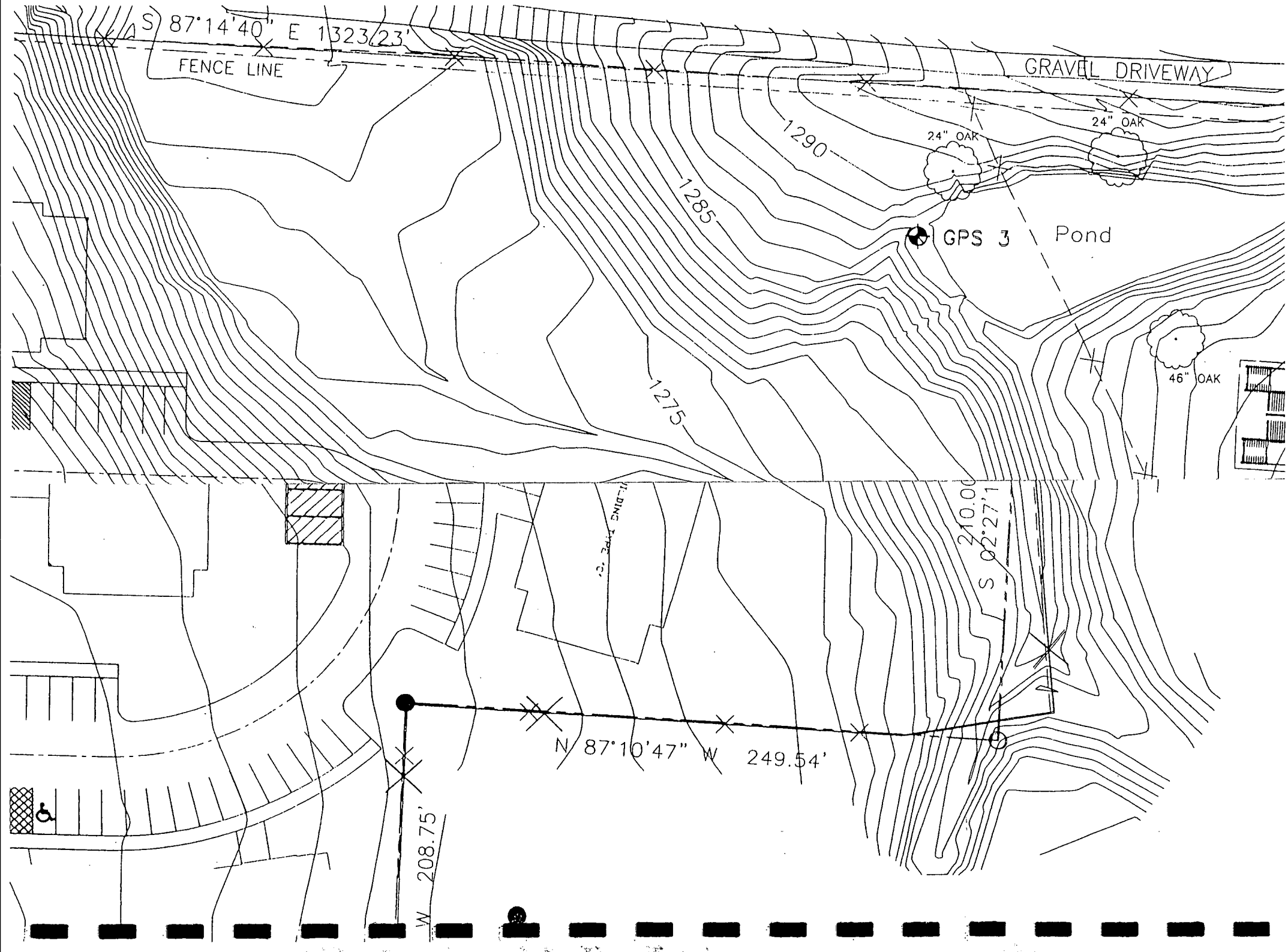
SYSTEM SIZING

Hydraulic Conductivity
0 to 45 inches – Moderate

Seasonal Water Table
No seasonal water observed

Soil Loading Rates for drip Dispersal Systems
0.700 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative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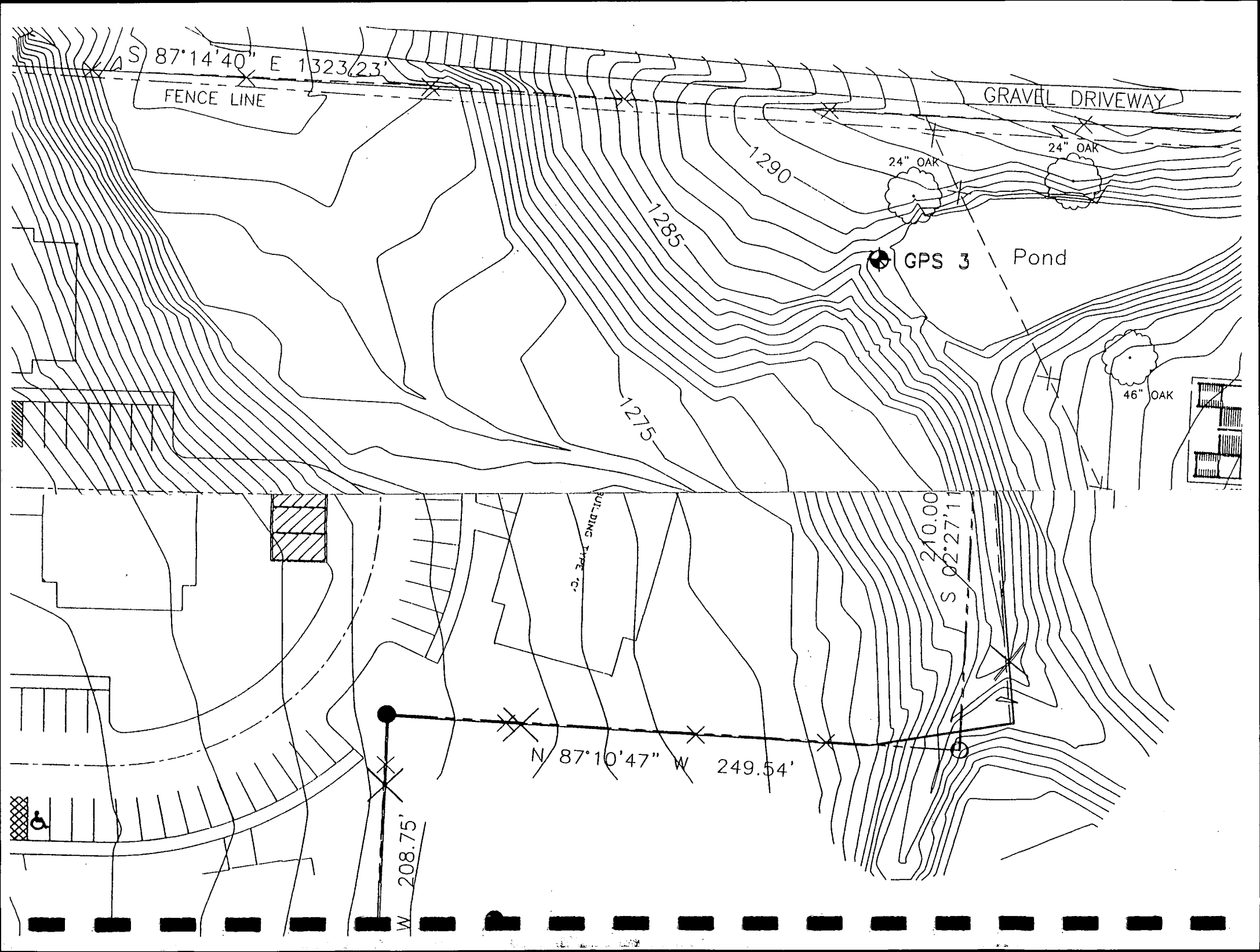
FENCE LINE
GRAVEL DRIVEWAY
24" OAK
24" OAK
1290
1285
1275
GPS 3
Pond
46" OAK
S 02°27'1
210.0
N 87°10'47" W 249.54'
W 208.75'


S 87°14'40" E 1323.23'
FENCE LINE
GRAVEL DRIVEWAY
24" OAK
24" OAK
1290
1285
1275
GPS 3
Pond
46" OAK
S 02°27'11" E 210.00'
N 87°10'47" W 249.54'
W 208.75'

Appendix D

Soil Investigation Report

For the North 2.75 Acres of the Project

Additional Land Purchase

DIXIELAND APARTMENTS

LITTLE FLOCK, ARKANSAS

SOIL INVESTIGATION REPORT NO. 2

WITH SOIL LOADING RATES FOR DRIP DISPERSAL SYSTEMS

Glen D. Laurent P.S.C.
206 S. Melody St.
Lowell, Arkansas 72745
(479) 601-3844

Soil Investigation Report for
Dixieland Apartments, Little Flock, Arkansas

By Glen D. Laurent
Professional Soil Classifier
Designated Representative

This report was made to provide information about the soils in the Dixieland Apartments Project area. The information includes a description of the soils and their location and a summary of the soil loading rates for Drip Dispersal Systems.

The Soils were described using guidelines from the National Cooperative Soil Survey.

The Soil Loading Rates were assigned using:

1. The Arkansas Department of Health publication, "Guidelines for the Design and Construction of Drip Dispersal Systems",version 1 (10-28-03).
2. Geoflow Design and Installation Manual – 2000B

If the loading rates using the ADH guidelines exceeded the manufactures (Geoflow) loading rates for a soil type then the loading rates for the more restrictive soil type was used.

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 18

PROFILE DESCRIPTION
May 17, 2004

A 0 to 8 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

E 8 to 11 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

Bt1 11 to 19 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; gradual smooth boundary.

Bt2 19 to 25 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; clear wavy boundary.

Bt3 25 to 50 inches; dark red (2.5YR 3/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; common medium distinct reddish brown (5YR 4/4) and common medium prominent pale brown (10YR 6/3) and light brownish gray (10YR 6/2) iron depletions.

SYSTEM SIZING

Hydraulic Conductivity
0 to 50 inches – Moderate

Seasonal Water Table
25 inches – Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.171 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 19

PROFILE DESCRIPTION
May 17, 2004

A 0 to 5 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

E 5 to 11 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; gradual smooth boundary.

Bt1 11 to 20 inches; reddish brown (5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; gradual smooth boundary.

Bt2 20 to 34 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; clear wavy boundary.

Bt3 34 to 54 inches; dark red (10R 3/6) silty clay loam; moderate medium and coarse subangular blocky structure; firm; common clay films; common medium prominent strong brown (7.5YR 4/6) and common medium prominent grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) iron depletions.

SYSTEM SIZING

Hydraulic Conductivity
0 to 54 inches – Moderate

Seasonal Water Table
34 inches – Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.232 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 20

PROFILE DESCRIPTION
May 17, 2004

A 0 to 5 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

Bt1 5 to 13 inches; strong brown (7.5YR 4/6) silt loam; moderate medium subangular blocky structure; friable; patchy clay films; gradual smooth boundary.

Bt2 13 to 22 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; gradual smooth boundary.

Bt3 22 to 30 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 1 percent by volume chert fragments 1 to 3 inches in diameter; gradual wavy boundary.

Bt4 30 to 51 inches; dark red (2.5YR 3/6) silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium distinct yellowish red (5YR 4/6) and common medium prominent strong brown (7.5YR 4/6) and light brownish gray (10YR 6/2) iron depletions.

SYSTEM SIZING

Hydraulic Conductivity
0 to 54 inches – Moderate

Seasonal Water Table
30 inches – Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.205 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 21

PROFILE DESCRIPTION
May 17, 2004

A 0 to 6 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

A2 6 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; gradual smooth boundary.

Bt1 16 to 22 inches; strong brown (7.5YR 4/6) silt loam; moderate medium subangular blocky structure; friable; common clay films; gradual wavy boundary.

Bt2 22 to 37 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; clear wavy boundary.

Bt3 37 to 53 inches; dark red (2.5YR 3/6) silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium distinct yellowish red (5YR 4/6) and prominent light brownish gray (10YR 6/2) iron depletions; 15 percent by volume pockets of soft chert that can be cut with a spade.

SYSTEM SIZING

Hydraulic Conductivity
0 to 53 inches – Moderate

Seasonal Water Table
37 inches – Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.253 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 22

PROFILE DESCRIPTION
May 17, 2004

A 0 to 9 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

Bt1 9 to 15 inches; strong brown (7.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; gradual smooth boundary.

Bt2 15 to 23 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; common clay films; clear wavy boundary.

Bt3 23 to 48 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium distinct yellowish red (5YR 4/6) and prominent light brownish gray (10YR 6/2) iron depletions; 1 percent by volume chert fragments 1 to 3 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 48 inches – Moderate

Seasonal Water Table
23 inches – Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.157 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 23

PROFILE DESCRIPTION
May 17, 2004

A 0 to 8 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

E/A 8 to 14 inches; brown (10YR 5/3) silt loam; discrete bodies of brown (10YR 4/3) A material in pockets, root channels and on faces of peds; weak medium subangular blocky structure; friable; clear wavy boundary.

Bt1 14 to 27 inches; dark reddish brown (2.5YR 3/4) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; common black stains on faces of peds; 1 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt2 27 to 48 inches; dark red (2.5YR 3/6) silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium prominent yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) iron depletions; few black stains and few brown (7.5YR 4/4)iron depletions; 1 percent by volume chert fragments 1 to 3 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 48 inches – Moderate

Seasonal Water Table
14 inches – Brief Duration
27 inches – Moderate Duration
23 inches – Adjusted Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.157 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 24

PROFILE DESCRIPTION
May 17, 2004

A 0 to 8 inches; brown (10YR 4/3) gravelly silt loam; weak medium subangular blocky structure; friable; 20 percent by volume chert fragments 1 to 3 inches in diameter; clear smooth boundary.

E 8 to 18 inches; yellowish brown (10YR 5/4) very gravelly silt loam; weak medium subangular blocky structure; friable; 40 percent by volume chert fragments 1 to 4 inches in diameter; clear wavy boundary.

Bt1 18 to 26 inches; yellowish brown (10YR 5/4) very gravelly silt loam; weak medium subangular blocky structure; friable; patchy clay films; common medium distinct pale brown (10YR 6/3) iron depletions; 40 percent by volume chert fragments 1 to 4 inches in diameter; clear wavy boundary.

Bt2 26 to 35 inches; yellowish brown (10YR 5/6) extremely cobbly silt loam; weak coarse subangular blocky structure; firm; patchy clay films; common medium distinct light brownish gray (10YR 6/2) iron depletions on rock faces; 75 percent by volume chert fragments 3 to 10 inches in diameter; clear wavy boundary.

2Bt3 35 to 40 inches; dark red (2.5YR 3/6) extremely cobbly silty clay loam (> 35% clay); moderate medium subangular blocky structure; firm; common clay films; common medium prominent light brown (7.5YR 6/3) iron depletions; 60 percent by volume chert fragments 3 to 10 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 40 inches – Moderate

Seasonal Water Table
18 inches - Brief
26 inches – Moderate Duration
23 inches – Adjusted Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.157 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 25

PROFILE DESCRIPTION
May 17, 2004

A 0 to 6 inches; dark yellowish brown (10YR 3/4) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

A2 6 to 10 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; gradual wavy boundary.

Bt1 10 to 21 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 5 percent by volume chert fragments 1 to 3 inches in diameter; abrupt smooth boundary.

Bt2 21 to 26 inches; yellowish red (5YR 4/6) extremely cobbly silty clay loam; moderate coarse subangular blocky structure; firm; common clay films; 75 percent by volume chert fragments 3 to 10 inches in diameter; gradual smooth boundary.

Bt3 26 to 36 inches; red (2.5YR 4/6) extremely cobbly silty clay loam; moderate coarse subangular blocky structure; firm; common clay films; common medium prominent yellowish brown (10YR 5/4) iron depletions, common medium prominent light brownish gray (10YR 6/2) and grayish brown (10YR 5/2) iron depletions on faces of rocks; 80 percent by volume chert fragments 3 to 10 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 53 inches -- Moderate

Seasonal Water Table
26 inches – Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.178 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 26

PROFILE DESCRIPTION
May 17, 2004

A 0 to 9 inches; dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

Bt1 9 to 17 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; patchy clay films; gradual wavy boundary.

Bt2 17 to 28 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; common clay films; 5 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt3 28 to 45 inches; red (2.5YR 4/6) very gravelly silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium prominent light brownish gray (10YR 6/2) and brown (10YR 5/3) iron depletions; 50 percent by volume chert fragments 1 to 8 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 45 inches – Moderate

Seasonal Water Table
28 inches – Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.191 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 27

PROFILE DESCRIPTION
May 22, 2004

A 0 to 8 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

Bt/A 8 to 20 inches; brown (7.5YR 4/4) silt loam; discrete bodies of brown (10YR 4/3) A material in pockets, root channels and on faces of peds; weak medium subangular blocky structure; friable; patchy clay films; 1 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt2 20 to 28 inches; yellowish red (5YR 4/6) silty clay loam; few discrete bodies of brown (10YR 4/3) A material in root channels; moderate medium subangular blocky structure; friable; common clay films; 2 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt3 28 to 32 inches; strong brown (7.5YR 4/6) very gravelly silty clay loam; moderate medium subangular blocky structure; friable; common clay films; common medium distinct light brownish brown (10YR 6/4) iron depletions and few medium prominent red (2.5YR 4/6) iron concentrations; 40 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt4 32 to 38 inches; red (2.5YR 4/6) extremely gravelly silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium prominent strong brown (7.5YR 4/6) and light brownish gray (10YR 6/2) iron depletions; 65 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt5 38 to 48 inches; dark red (2.5YR 3/6) extremely cobbly silty clay (<49% clay); moderate medium subangular blocky structure; firm; common clay films; common medium prominent strong brown (7.5YR 4/6) and brown (7.5YR 5/3) iron depletions; 65 percent by volume chert fragments 3 to 10 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 48 inches – Moderate

Seasonal Water Table
28 inches - Brief
32 inches – Moderate Duration
31 inches – Adjusted Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.212 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 28

PROFILE DESCRIPTION
May 22, 2004

A 0 to 8 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; clear smooth boundary.

Bt1 8 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; patchy clay films; 1 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt2 18 to 32 inches; strong brown (7.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 1 percent by volume chert fragments 1 to 3 inches in diameter; gradual wavy boundary.

Bt3 32 to 40 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium distinct strong brown (7.5YR 4/6) iron depletions and dark red (2.5YR 3/6) iron concentrations; 2 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt4 40 to 46 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium prominent strong brown (7.5YR 4/6) and light brownish gray (10YR 6/2) iron depletions;10 percent by volume chert fragments 1 to 3 inches in diameter.

SYSTEM SIZING

Hydraulic Conductivity
0 to 46 inches – Moderate

Seasonal Water Table
32 inches - Brief
40 inches – Moderate Duration
37 inches – Adjusted Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.253 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative

DIXIELAND APARTMENTS

Benton County, Arkansas

Soil Pit No. 29

PROFILE DESCRIPTION
May 22, 2004

A 0 to 9 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; 1 percent by volume chert fragments 1 to 3 inches in diameter; gradual smooth boundary.

E 9 to 17 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; 2 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt1 17 to 24 inches; dark yellowish brown (10YR 4/6) gravelly silty clay loam; moderate medium subangular blocky structure; friable; common clay films; 30 percent by volume chert fragments 1 to 3 inches in diameter; gradual wavy boundary.

Bt2 24 to 32 inches; brown (7.5YR 4/4) very gravelly silty clay loam; moderate medium subangular blocky structure; very firm; common clay films; common medium distinct light brownish gray (10YR 6/2) and dark yellowish brown (10YR 4/6) iron depletions; 45 percent by volume chert fragments 1 to 3 inches in diameter; clear wavy boundary.

Bt3 32 to 48 inches; dark red (2.5YR 3/6) gravelly silty clay loam; moderate medium subangular blocky structure; firm; common clay films; common medium prominent dark yellowish brown (10YR 4/6) and brown 7.5YR 4/4) iron depletions; common black stains on ped faces in upper part of horizon.

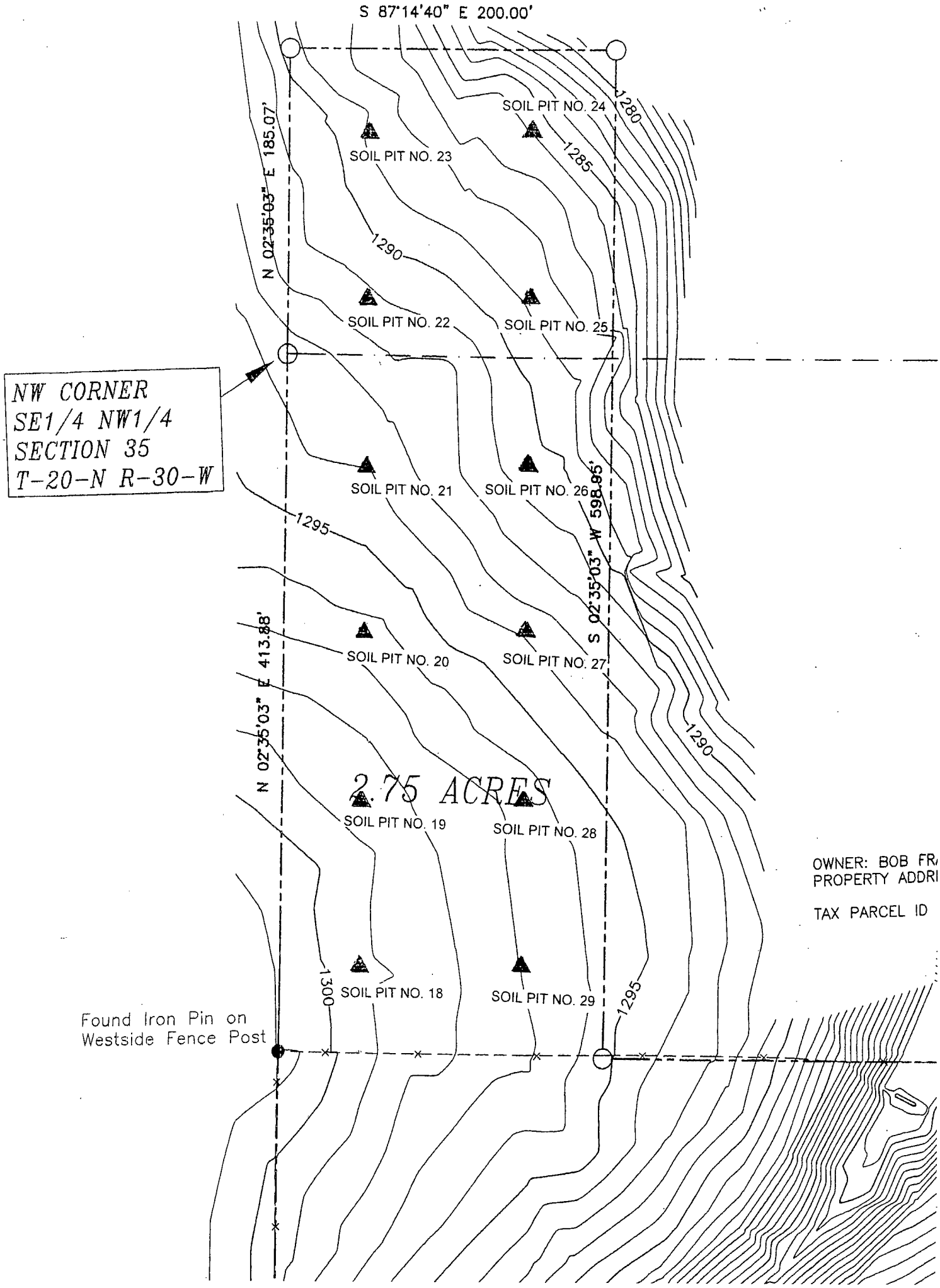
SYSTEM SIZING

Hydraulic Conductivity
0 to 48 inches – Moderate

Seasonal Water Table
24 inches – Moderate Duration

Soil Loading Rates for Drip Dispersal Systems
0.164 GPD/sq ft

Glen D. Laurent
Professional Soil Classifier
Designated Representative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N 02°35'03" E 185.07'
S 02°35'03" W 598.85'
N 02°35'03" E 413.88'
NW CORNER
SE1/4 NW1/4
SECTION 35
T-20-N R-30-W
SOIL PIT NO. 18
SOIL PIT NO. 19
SOIL PIT NO. 20
SOIL PIT NO. 21
SOIL PIT NO. 22
SOIL PIT NO. 23
SOIL PIT NO. 24
SOIL PIT NO. 25
SOIL PIT NO. 26
SOIL PIT NO. 27
SOIL PIT NO. 28
SOIL PIT NO. 29
2.75 ACRES
1280
1285
1290
1295
1300
Found Iron Pin on
Westside Fence Post
OWNER: BOB FR
PROPERTY ADDRI
TAX PARCEL ID

Operations and Maintenance

4.0 START-UP

NOTE: During installation the Bioclere sump(s) should be filled with clean water. Care should be taken to prevent foreign matter/debris from entering the unit(s).

4.1 Check that the Bioclere sump is full to the outlet invert and that all plumbing unions are connected.

4.2 At the Bioclere turn the fan module switch to "OFF". (This disconnects the pumps and fan.)

4.3 At the Bioclere controls set the timers as follows:

	ON	OFF
Dosing	3 sec.	3 sec.
Recycle	6 sec.	6 sec.

4.4 Turn alarm switch to "OFF".

4.5 Turn dosing pumps and recycle pump switch to "OFF".

4.6 Turn Bioclere control main power switch "ON". Green power light should be "ON".

4.7 Turn dosing pump #1 to manual. Green light should be on. Turn back off.

4.8 Turn dosing pump #2 to manual. Green light should be on. Turn back off.

4.9 Turn recycle pump to manual. Green light should be on. Turn back off.

4.10 Turn dosing pump switches (both) to normal. Dosing pump timer green light should be steady on, red light should be on 3 seconds, off 3 seconds, etc. Alternating relay lights should switch from red to green every 6 seconds. Each dosing pump green light should be on for 3 seconds, off for 9 seconds. Leave both dosing pump switches normal.

4.11 Turn recycle switch to normal. Recycle green light should be on for 6 seconds then off 6 seconds, etc. Recycle timer green light should be steady on, red light on 6 seconds, off 6 seconds, etc. Leave recycle pump switch on normal.

4.12 Turn alarm switch to "ON". Alarm should sound. Press alarm reset button on bottom of control box, audio alarm should silence, red alarm light should remain illuminated. Turn alarm switch to "OFF", red alarm light should go "OFF".

4.13 Go to Bioclere unit and turn fan module switch to on. Fan should be on steady. Dosing pumps should be on 3 seconds, off 3 seconds. Recycle pump should be on 6 seconds, off 3 seconds. (Observe operation with telltale hole near recycle union at top of central shaft. Leave fan module switch on).

4.14 Return to Bioclere control panel. Turn alarm switch from off to test. Alarm should sound. Turn alarm switch from test to on. Alarm should be silent.

4.15 Turn Bioclere main power switch to off. Set dosing pump and recycle pump timers to settings specified in Section 2.5 "PUMP TIMER SETTINGS".

4.16 Turn Bioclere main power switch to on.

4.17 At Bioclere close and secure fan box and Bioclere lid.

5.0 PLANT SHUTDOWN

5.1 No action need be taken if there is a temporary cessation of flow to the plant for a period of time which does not exceed up to twelve weeks. Leave the plant in operation with power "ON".

5.2 If it is anticipated that cessation of flow the following shut down procedure will apply:

A. On Bioclere control panel turn recycle pump switch to manual position for 2 minutes. Return switch to normal position.
B. Turn the main power switch off.

5.3 Upon resumption of wastewater flow to the plant the Bioclere should be re-started as described in Section 4.

6.0 MAINTENANCE PROCEDURES

6.1 BIOCLERE MAINTENANCE

NOTE: Turn the main power switch to "OFF" before servicing the pump, fan or electrical panel box. The Aquapoint Field Service Report is provided to facilitate Bioclere maintenance and to provide a thorough check of Bioclere components.

Standard Quarterly Maintenance:

1. Check general condition/appearance of unit.
2. Check vent flow, odor.
3. Check general condition of fan box including internal and external wiring, lock, latch, gaskets, etc.
4. Check quiet fan operation.
5. Check condition of cover locks, latches, gaskets.
6. Check and characterize biomass.
7. Check recycle pump operation, timing, effluent clarity and spray pattern.
8. Check dosing pumps operation, timing, effluent clarity and spray pattern.
9. Check general condition of dosing assembly.
10. Check general condition of control box including locks, gaskets, etc.
11. Check control box switches, alarms, timers, etc.
12. Complete and maintain service report file.

6.3 PROCESS CONTROL for CARBONACEOUS BIOCHEMICAL OXYGEN DEMAND ($CBOD_5$) REMOVAL with the BIOCLERE SYSTEM:

Wastewater flows from the primary settling tank into a baffled chamber in the clarifier of the Bioclere. Dosing pumps located in this clarifier intermittently dose the PVC filter media bed with the wastewater.

In the Bioclere trickling filter the organic material in the wastewater is reduced by a population of microorganisms, which attach to the filter media and form a biological slime layer. Aerobic microorganisms accomplish treatment in the outer portion of the slime layer. As the microorganisms multiply the biological film thickens and diffused oxygen and organic substrate are consumed before penetrating the full depth of the slime layer. Consequently the biological film develops aerobic, anoxic and anaerobic zones.

Absent oxygen and a sufficient organic carbon source (CBOD5) the microorganisms near the media surface lose their ability to cling to the media. The wastewater flowing over the media washes the slime layer off the media and a new slime layer begins to form. This process of losing the slime layer is called "sloughing" and it is primarily a function of organic and hydraulic loading on the filter. This natural process allows a properly designed media bed to be self-purging and maintenance free.

The sloughed biomass settles to the bottom of the clarifier as sludge. This secondary sludge is periodically pumped back to the primary tank to enhance the digestion and denitrification processes, which is further discussed in ***Section 6.3.2 below.***

6.3.1 *Bioclere Trickling Filter Dosing Rates:*

The Bioclere uses two alternating dosing pumps to distribute wastewater over the trickling filter. It is critical to periodically clean the nozzles of excess biomass using a bottlebrush to ensure uniform distribution. The Bioclere dosing rates that were set at the time of commissioning are listed in ***Section 2.0*** of this manual. The dosing rates are set so that the flow of water and pollutants (CBOD5 and ammonium) over the biofilm are maximized. This in turn, will maximize the pollutant removal efficiencies and facilitate biomass sloughing through the filter. Therefore, it is **not necessary** to adjust the dosing timers. In fact, the dosing timers should only be adjusted if the Bioclere receives little or no flow for extended periods.

6.3.2 *Bioclere Recirculation Rates:*

Recirculation of sludge and treated effluent is accomplished in each unit using a submersible stainless steel pump controlled by a fully adjustable timer. The biological solids generated in the filter are returned to the sludge storage facility at regular intervals, typically every hour. Therefore, the sludge will not collect in the secondary settling tank and a sludge blanket will not form.

The benefits of sludge and treated effluent re-circulation are numerous and include: 1) removal of biological sludge from the Bioclere so that only the primary tank(s) need periodic pumping, 2) dilution of the influent pollutant concentrations, which results in a thinner and more effective biofilm on the media bed, 3) reduction or near elimination of odors in the primary tanks and the treatment components, 4) dilution of biological inhibitors (cleaning agent, sanitizers, etc.) that may exist in the wastewater, 5) attainment of nitrogen removal through denitrification due to the recirculation of nitrate to the primary tank.

The recirculation rates that were set at the time of commissioning are listed in ***Section 2.0*** of this manual. These rates may need adjusting depending on the 1) actual average daily flow, and 2) actual measured strength of the wastewater (concentrations of influent BOD5, TKN etc.). Please contact AQUAPOINT prior to adjusting the recirculation rates.

In a two stage Bioclere system the first unit is typically set to return only the biological sludge generated in the reduction of CBOD5. The second stage unit is set to run several minutes each hour to return biological sludge and treated effluent in order to maximize treatment efficiency.

6.4 PROCESS CONTROL for NITROGEN REMOVAL with the BIOCLERE SYSTEM (if applicable):

Below is a brief description of how nitrogen removal is accomplished in the Bioclere units. Generally BOD removal occurs in the first stage Bioclere unit and a majority of nitrification in the second stage Bioclere. However, if the actual wastewater flow is less than the design flow, signifigant nitrification will occur in the first stage Bioclere unit.

6.4.1 Nitrification:

Nitrification is the sequential biological oxidation of NH_4-N, first to nitrite (NO_2^--N) by *Nitrosomonas* bacteria then to nitrate (NO_3^--N) by *Nitrobacter* bacteria according to the following overall equation: $2NH_4^+ + 2O_2 \rightarrow NO_3^- + 2H^+ + H_2O$

Oxidation of 1 mg/l of NH_4-N requires approximately 4.6 mg/l of dissolved oxygen and produces acid resulting in the consumption of approximately 7.1 mg alkalinity as $CaCO_3$/mg NH_4-N oxidized. Alkalinity is the inorganic carbon source nitrifying bacteria required to oxidize ammonia. ***Therefore it is critical that alkalinity is monitored on a regular basis to ensure complete nitrification.*** Alkalinity concentrations in the Bioclere effluent must remain above 75 mg/l as CaCO3 to allow nitrification to proceed. If the alkalinity drops below this value, it is likely that nitrification will be inhibited and the effluent will not meet permit requirements. It is best to measure the alkalinity in the Bioclere effluent using a field test kit each time you are onsite to inspect the treatment system. Bioclere effluent can be collected from the final pump chamber or the sampling port that is located on top of the Bioclere unit (see the Bioclere general arrangement drawing located in Appendix A for the sampling port location). The sampling port is a 4" diameter PVC pipe that extends approximately 10' through the trickling filter to the effluent in the clarifier. Effluent can be collected with a bailer.

Alkalinity is generally added in the form of baking soda (sodium bicarbonate). It can be purchased as a powder in 50-pound bags. A solution can be mixed using the alkalinity mixing setup that has been included with the treatment equipment. Solution dosing is accomplished using a variable speed Masterflex chemical feed pump, which is controlled with a timer in the Bioclere control panel. Dosing should be set to run several minutes each hour. For a detailed description of the chemical feed installation and operational requirements refer to the site plans and ***Appendix E*** of this manual. Contact Aquapoint if assistance is required to determine the alkalinity-dosing rate.

Please note that nitrifying bacteria require a stable and consistent environment because of their sensitivity to numerous inhibitory and toxic substances and an array of environmental factors including temperature, pH, dissolved oxygen, and alkalinity. If nitrification is not being achieved then it will be necessary to verify the influent average daily flow, pH, BOD5, TSS, TKN. It may also be necessary to conduct an inventory of the type and quantity of any and all cleaning and process solutions that are used that may impact the microorganisms in the Bioclere units.

6.4.2 Denitrification:

Dissimilating denitrification, the biological reduction of nitrate (NO_3^--N) to nitrite (NO_2^--N) and ultimately nitrogen gas in an anoxic environment (dissolved oxygen <0.5 mg/l), involves the transfer of electrons from a reduced electron donor (organic carbon substrate) to an oxidized electron acceptor (NO_3^--N). It is an important reaction as it restores approximately 3.57 mg alkalinity/mg of NO_3^--N reduced, and partially offsets the effects of nitrification in a combined nitrification/denitrification process. The microorganisms responsible for completing the reaction are facultative heterotrophic aerobes contained in the wastewater that are also responsible for $CBOD_5$ oxidation in the Bioclere.

Denitrification in the Bioclere system is accomplished by periodically recirculating secondary sludge and treated nitrified effluent to the septic tank which provides an anoxic environment. Recirculation typically occurs several minutes every hour via a timer in the control panel. See ***Section 2*** of this manual for Bioclere recycle and dosing rates. For typical residential strength wastewater, recirculation of treated effluent from the Bioclere to the septic tank will achieve <12 mg/l of total nitrogen. This is due to the fact that weight ratios of carbon to

nitrate, measured as **BOD:NO_3-N** in the influent wastewater are usually greater than the generally accepted ratio of **2:4** in which denitrification has been proven to proceed without an external carbon source such as methanol.

However, many commercial applications will require a carbon source such as methanol. If required, a carbon dosing rate of approximately 3:1 (COD carbon source: NO3 in wastewater) is required to complete denitrification.

Carbon is often added in the form of methanol or a 20% methanol solution. However many other organic carbon sources can be used including glucose (sugar), sodium acetate, soda syrup etc. If the carbon source is not purchased in pre-mixed drums, a solution can be made-up using the mixing setup that has been included with the treatment equipment. Carbon dosing is accomplished using a variable speed Masterflex chemical feed pump, which is controlled with a timer in the Bioclere control panel. Dosing should be set to run several minutes each hour. For a detailed description of the chemical feed installation and equipment operational requirements refer to the site plans and ***Appendix E*** of this manual. Contact Aquapoint if assistance is required to determine the carbon-dosing rate.

If the effluent dissolved oxygen concentrations from the anoxic reactor exceed 0.5 mg/l, denitrification may be inhibited. In isolated instances, this has been documented to occur during extreme cold weather periods. If this occurs, the Bioclere fan size can be reduced to compensate for the increased dissolved oxygen levels. If the condition persists, an oxygen scavenging agent can be dosed into the Post Equalization tank to uptake the residual dissolved oxygen. Please contact Aquapoint if this condition is experienced.

How do I know when a carbon source is needed?
You must monitor the nitrate in the septic tank effluent tee with a nitrate field test kit. When nitrate is consistently >3 mg/l in the septic tank effluent, it is necessary to add an organic carbon source to the influent side of the septic tank to achieve denitrification. You should also measure the dissolved oxygen. For denitrification to proceed a dissolved oxygen level of <0.5 mg/l is required in the septic tank effluent.

7.0 TROUBLE SHOOTING

7.1 Before conducting any repair work on the fan or pump, replacing fuses, or doing any work on the panel or fan module:

SWITCH THE MAIN POWER PANEL SWITCH TO "OFF"- and follow applicable "lock out", "tag out" procedures.

FAULT	POSSIBLE CAUSE	CORRECTIVE ACTION
Fan not working	Power failure	Check fuse and replace if necessary.
	Fan motor failure	Check wiring and terminal connections. Replace fan if necessary.
Dosing pump not working	Power failure	Check circuit breaker.
	Pump not submerged	Check that pump is fully submerged.
	Timer control failure.	Check that power switch is "ON". Replace timer if necessary.
	Pump failure	Replace pump.
Excessive build-up of biomass	Plant overload	Check that hydraulic and organic load are within design limits. Contact Aquapoint Inc. if capacity is to be increased.
	High sludge or grease levels in primary tanks.	Check sludge levels in each unit and de-sludge as necessary.
Elevated solids concentration in final effluent.	High sludge level in Bioclere sump.	Check pump and timer control. De-sludge by pumper if necessary.
	Excess shedding of biomass.	investigate and eliminate any source of biofilm poisoning such as disinfectant, household bleach, acids, etc. showing up in waste.
Odorous	Inefficient treatment.	Check that dosing assembly sprinkles evenly over media surface. Clean dosing assembly.
	Inadequate air supply	Check fan and air intake. See "fan not working" above.

FAULT	POSSIBLE CAUSE	REMEDIAL ACTION
	Primary tank clogged.	Check inlet and outlet pipes and sludge level. De-sludge as necessary.

8.0 FINAL EFFLUENT QUALITY PROBLEMS

8.1 HIGH SUSPENDED SOLIDS.

If effluent solids concentrations are exceeded, carry out the following checks:

1. Check operation of recycle pump from telltale near the top of the central shaft.
2. Examine primary settlement tank. If excessive sludge or floating matter in the chamber is discharging to the Bioclere arrange for the primary tank to be de-sludged. (See Section 2.6, 2.7)
3. If the sludge recycle pump has been out of operation for more than 8 weeks, the Bioclere sump should be de-sludged.

8.2 HIGH B.O.D. (BIOCHEMICAL OXYGEN DEMAND)

If effluent levels are exceeded carry out the following checks:

1. Check for signs of excessive sludge in the primary tanks. (See Section 2.6, 2.7)
2. Check that the fan is operating continuously and that the air inlet to the fan is unobstructed. Clean and replace as necessary.
3. Check that the dosing assembly is clean and that the effluent is being distributed evenly to the filter media.
4. Check whether the loading to the plant has increased beyond the design basis. Consult Aquapoint Inc. if loading has increased.
5. Ensure that there are no toxic or concentrated cleansing chemicals being discharged to the plant.

8.3 HIGH NH_3N (AMMONIA-NITROGEN)

Carry out check procedure as for Item 8.2 B.O.D.

For additional assistance contact:

AQUAPOINT
241 Duchaine Blvd.
New Bedford, MA 02745
Tel. 508-998-7577
Fax 508-998-7177

E-mail: aquapoint@aquapoint.com

APPENDIX B

PLC CONTROL PANEL INSTRUCTIONS FOR OPERATION

OF

BIOCLERE

Wastewater Treatment System

BIOCLERE ELECTRICAL INFORMATION

1. **ELECTRICAL SUPPLY REQUIREMENTS:**

Each Bioclere unit requires a separate 230/1/60 supply rated for 30 amps. If two or more units are inside a single enclosure each should have a dedicated supply run to it.

2. **WIRING:**

A licensed electrical contractor is responsible for wiring to meet local, state and federal codes as applicable.

Grounds are provided in both the Bioclere main control panel and fan module which must be wired to earth ground.

All fittings, connections, etc. are to be weatherproof, watertight construction.

#12 wire is sufficient for all motor connections.

In the event more than one system is located in an enclosure, wire numbers are prefixed by AA≅ on the first system, "B" on the second, etc. Aquapoint would recommend care be taken not to mix wires between systems.

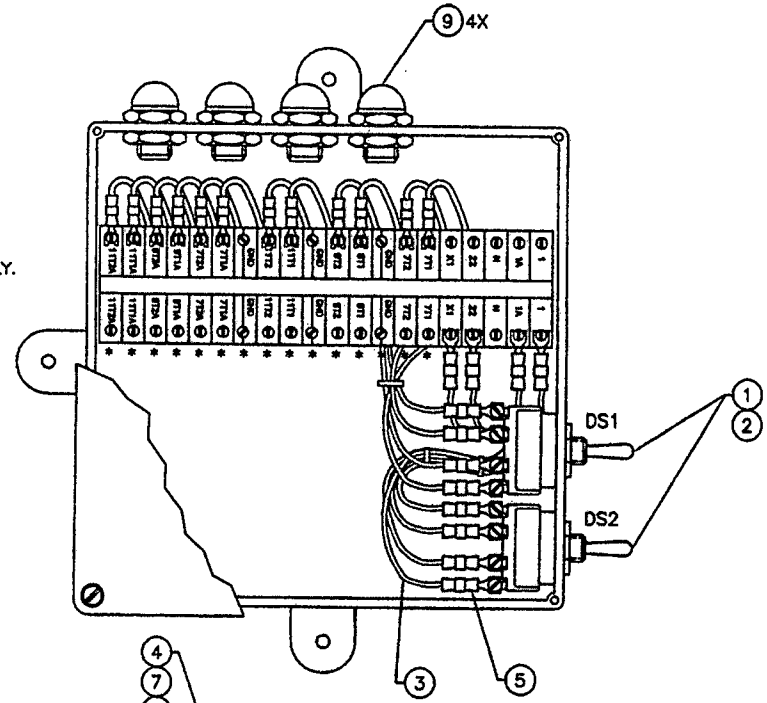
3. **OPERATION:**

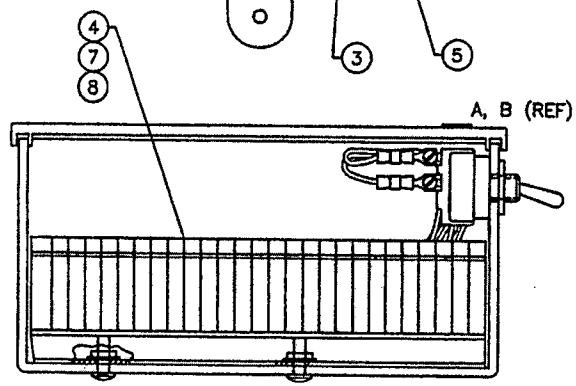
A. Normal Operation: The Bioclere unit will normally operate without any need for supervision. However, from time to time conditions may occur which activate the audible/visual alarms and require correction.

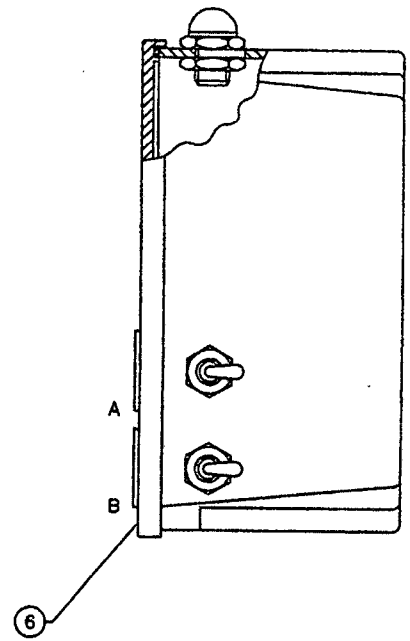
B. Alarms provided: Each Bioclere system has a separate set of alarms which consist of a flasher light on top, and an "ON/OFF/TEST" switch on the front panel. The "ON/OFF/TEST" switch should always be in the "ON" position, otherwise the alarms are disabled. The "TEST" position is for test of the visual/audible alarms. The "OFF" position should only be used during servicing by authorized personnel.

NOTES:

1. "*" INDICATES FIELD CONNECTIONS.
2. ALL "T'S" #12 BLACK
   ALL OTHERS #12 RED
3. INSULATE DS1/DS2 CONNECTIONS
4. JUNCTION BOX ROTATED 90° CLOCKWISE FROM INSTALLATON ORIENTATION IN FAN MODULE ASSEMBLY.







ITEM NO.	QTY	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	DEVICE DESCRIPTION
9	4		1/2" NPT, PVC	CONNECTORS, STRAIN RELIEF	
8	1 SET			DIN RAIL, W/ HARDWARE	
7	1	ENTRELEC	113067.17	TERMINALS, END SECTION	
6	1	CARLON	E989N	JUNCTION BOX, 8x8x4	
5	16			TERMINALS, RING, 12 AWG	
4	20	ENTRELEC	0115201 25	TERMINALS, FORKED CONNECTORS	
3	AR			12 AWG, WIRE	
2	2	EATON	30-5632-4	NAMEPLATES, ON/OFF	
1	2	EATON	7690K8 4PST	TOGGLE SWITCHES, 10A/250V	DS1, DS2

PARTS LIST

ITEM NO.	QTY	SIZE	PLATE COLOR	LETTER COLOR	LETTER SIZE	ENGRAVED LETTERING FIRST LINE / SECOND LINE
B	1	2.375" X .875"	WHITE	BLACK	1/4"	"DS2" ON/OFF
A	1	2.375" X .875"	WHITE	BLACK	1/4"	"DS1" ON/OFF

ENGRAVING SCHEDULE

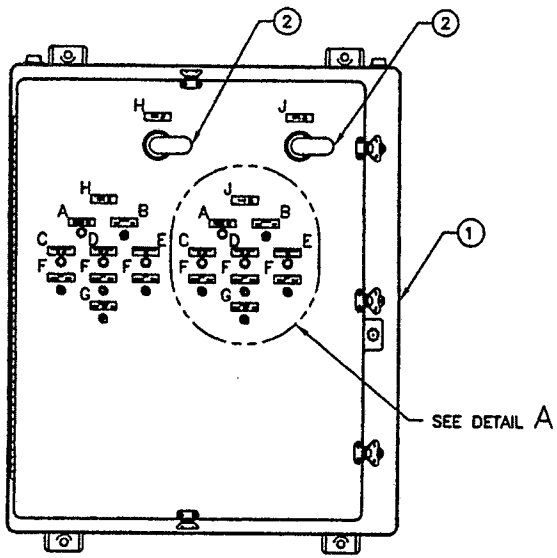
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES
TOLERANCES: ANGULAR ±, FRACTIONS ±, 2 PLACE DIM ±, 3 PLACE DIM ±
MATERIAL
NEXT ASSY | USED ON
APPLICATION

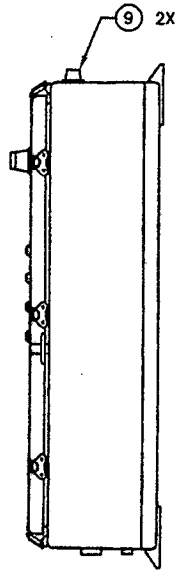
AWT AQUAPOINT

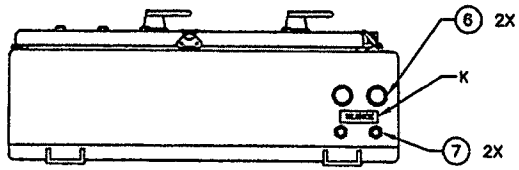
AWT/AQUAPOINT
241 DUCHAINE BLVD.
P.O. BOX 50120
NEW BEDFORD, MA 02745
(508) 998-7877
FAX (508) 998-7177

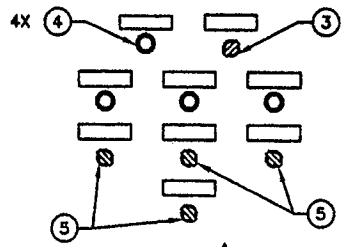
DATE	11-07-01
DRN BY	A. BARBATO
CHKR	A. BARBATO
ENG APPR	POA
APPVD	

TITLE: JUNCTION BOX ASSY, 38 SERIES
SIZE B | REVISIONS | DRAWING NO.: AWT2041
SCALE: 1:1 | SHEET 1 OF 1









DETAIL A

TYPICAL 2 PLACES

ITEM NO.	QTY	SIZE	PLATE COLOR	LETTER COLOR	ENGRAVED LETTERING FIRST LINE / SECOND LINE
K	1	1.75" X .50"	BLACK	WHITE	SILENCE
J	1	1.75" X .50"	BLACK	WHITE	TANK #2
H	1	1.75" X .50"	BLACK	WHITE	TANK #1
G	1	1.75" X .50"	BLACK	WHITE	ALARM / TEST OFF ON
F	1	1.75" X .50"	BLACK	WHITE	OFF / NORM MAN
E	1	1.75" X .50"	BLACK	WHITE	RECYCLE PUMP / ON
D	1	1.75" X .50"	BLACK	WHITE	DOSING PUMP / #2 ON
C	1	1.75" X .50"	BLACK	WHITE	DOSING PUMP / #1 ON
B	1	1.75" X .50"	BLACK	WHITE	PUMP / OFF ON
A	1	1.75" X .50"	BLACK	WHITE	POWER ON

ENGRAVING SCHEDULE

ITEM NO.	QTY	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	DEVICE DESCRIPTION
29	A/R			WIRE DUCT	
28	A/R			DIN RAIL	
27	1	ENTRELEC	103 002.26	TERMINAL BLOCK END STOP	
26	1	ENTRELEC	118 368.16	TERMINAL BLOCK END SECTION	
25	16	ENTRELEC	168 518.07	TOP MOUNTED PREASSEMBLE 4 POLE JUMPER BAR	
24	4	ENTRELEC	0165 113 16	GROUND TERMINAL	
23	28	ENTRELEC	0115 116 07	OTHER TERMINALS, UP TO #10 AWG WIRE	
22	4	ENTRELEC	0115 118 11	MAIN POWER TERMINAL BLOCK, UP TO #8 AWG WIRE	
21	6	DIVERSIFIELD	CMO-0100-20	CURRENT SENSOR	CS1, CS2, CS3
20	8	IDEC	RHIBUAC120	1 POLE, RELAY, 120V AC	AR1, CR1, CR2, CR3
19	10	IDEC	RH2BULAC120	2 POLE, RELAY, 120V AC	BYCR, PFR, LLCR CAR, ASR
18	6	AEG	LS0710A0-120V	4 POLE, RELAY, 120V AC	DP1C, DP2C, DP3C
17	2	TIMEMARK	2810120	ALTERNATING RELAY	ALT
16	2	IDEC	RTE-P11-AC120V	ANALOG TIMER, ON/OFF DELAY	AT/ALARM
15	2	ABB	S272 K6A	DOUBLE POLE CIRCUIT BREAKER	RP1CB
14	4	ABB	S272 K4A	DOUBLE POLE CIRCUIT BREAKER	DP1CB, DP2CB
13	2	POTTER & BRAUMFIELD	W28-XQ1A-0.5	FAN	FCB1
12	2	POTTER & BRAUMFIELD	W28-XQ1A-3	CONTACTOR	CCB1
11	4	SYRELEC	CDR2U AC110V	REPEAT CYCLE TIMERS	1T, 2T
10	2	MICRON	B150M87713RR	TRANSFORMER	
9	2	GOULD SHAWMUT	30322R 600V-30A	FUSE BLOCK	
8	2	CUTLER-HAMMER	10250TI8IN CIN 120V	ALARM, RED LIGHT	
7	2	EATON	8442K4	MOMENTARY ALARM SILENCE BUTTON	
6	2	MALLORY	SC110	AUDIBLE ALARM	
5	8	IDEC	ASW320	2NO, 3-SELECTOR SWITCH	AUTO/OFF/HAND
4	8	IDEC	APW199-G-120V	GREEN OPERATING LIGHTS	
3	2	IDEC	ASW210	2NO, 2-SELECTOR SWITCH	ON / OFF
2	2	ABB	OESA-CF30CC6	FUSE DISCONNECT SWITCH HANDLE	ON / OFF
1	1	ROBROY	N302471HWT	FIBERGLASS ENCLOSURE, HDSB-4X	

PARTS LIST

ITEM NO.	QTY	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	DEVICE DESCRIPTION
34	6	IDEC	SH4B-05	4 POLE RELAY SOCKET	
33	4	IDEC	SR3P-05	11 PIN OCTAL SOCKET FOR SYRELEC TIMER	
32	4	IDEC	SR2P-06	8 PIN OCTAL SOCKET FOR IDEC TIMER	
31	10	IDEC	SH2B-05	2 POLE RELAY SOCKET	
30	8	IDEC	SH1B-05	1 POLE RELAY SOCKET	

PARTS LIST -CONTINUED-

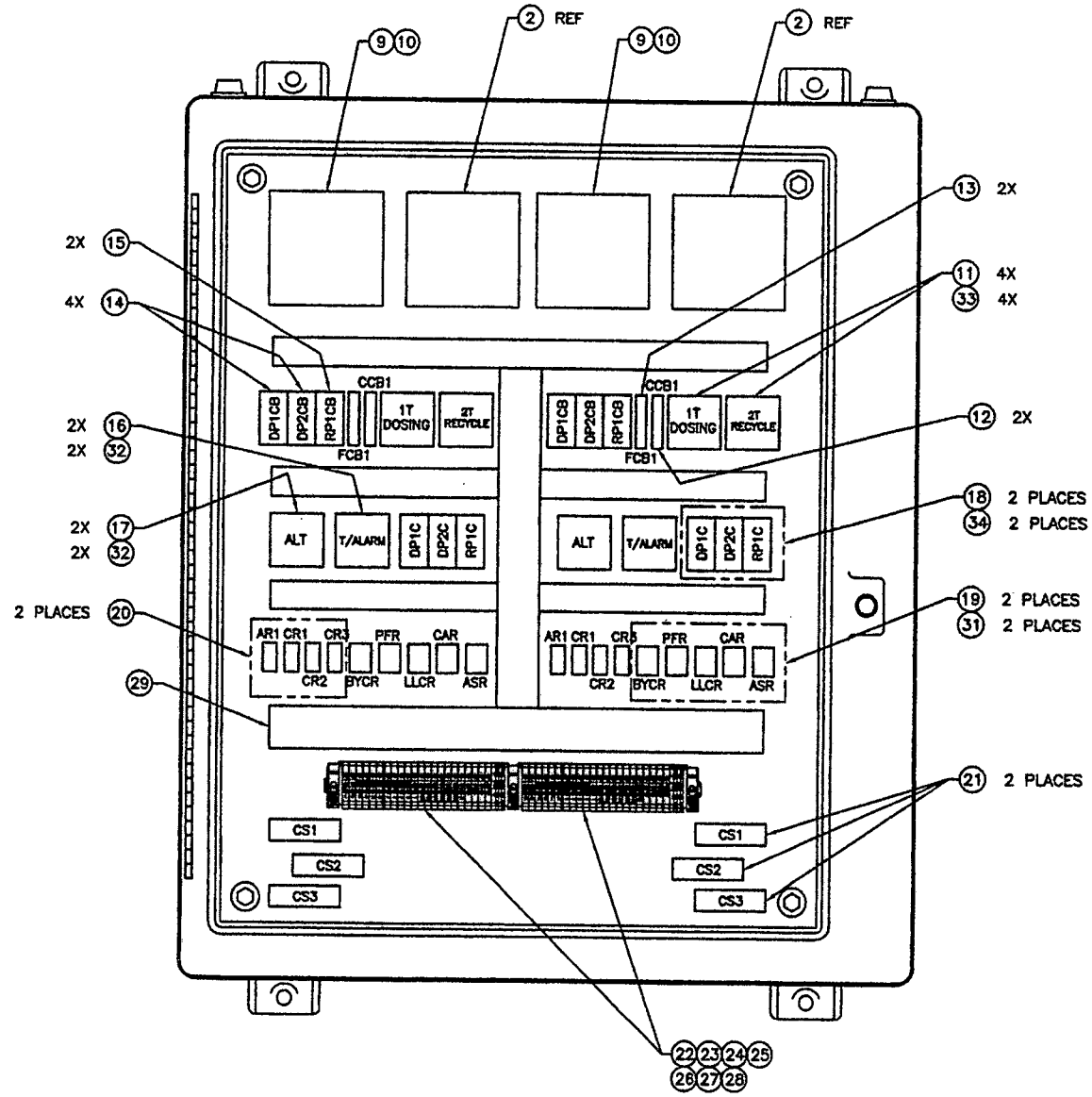
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
ANGLES ±
FRACTIONS ±
2 PLACE DEC ±
3 PLACE DEC ±
MATERIAL
NEXT ASSY | USED ON
APPLICATION

AQUAPOINT

AWT/AQUAPOINT
244 DUCHAINE BLVD.
P.O. BOX 50120
NEW BEDFORD, MA 02745
(508) 998-7577
FAX (508) 998-7177

DRN 02-17-98
APPD
CHKD
ENGR
APPD

TITLE CONTROL PANEL - MODEL 38
SIZE D | REVISIONS | DRAWING NO. AWT3037
SCALE 1/4 | 3037_ProtMax.DWG | SHEET # 1 OF 3



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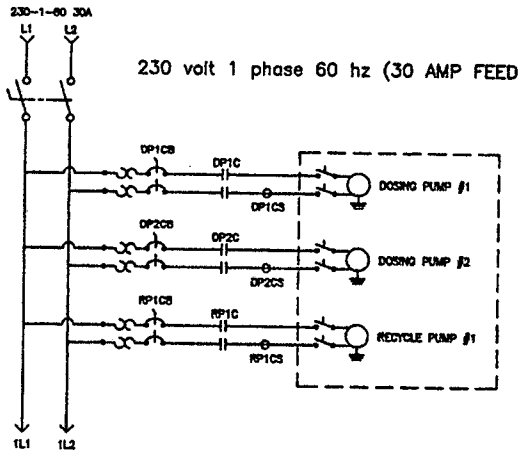
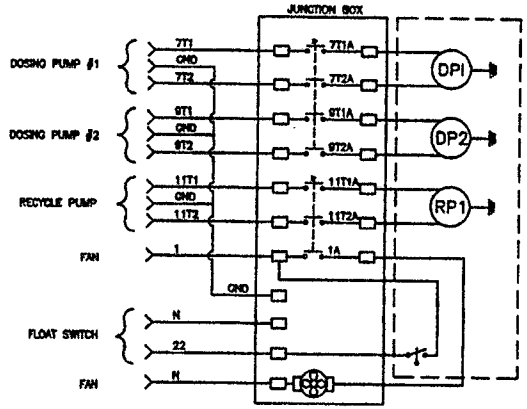
AWT3037

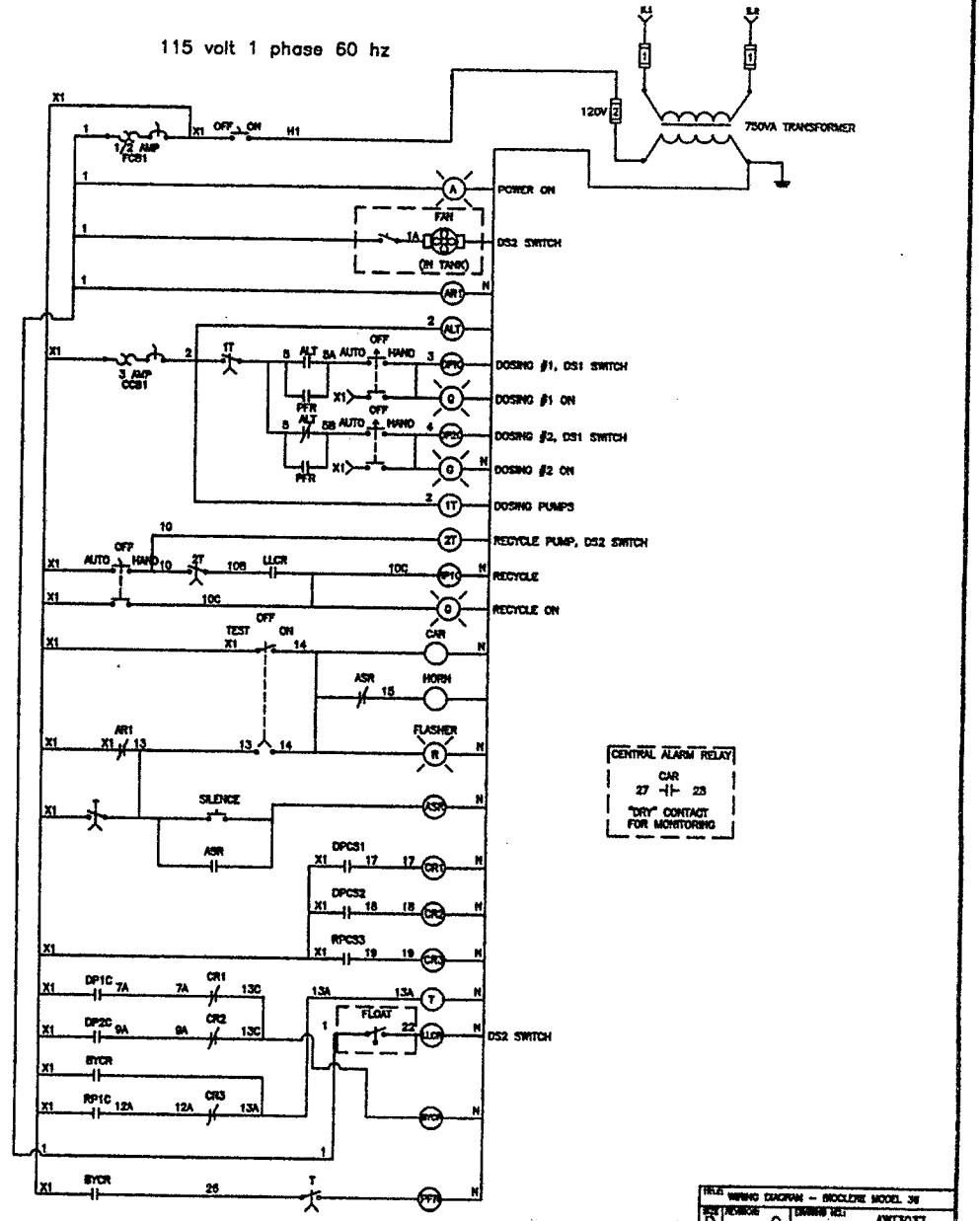


REPEAT FOR TANK #2



FIELD WIRING DIAGRAM

115 volt 1 phase 60 hz



CENTRAL ALARM RELAY
CAR
27 28
"DRY" CONTACT FOR MONITORING

TITLE: WIRING DIAGRAM - BIOCLERE MODEL 36		
SIZE: D	REVISION: C	DRAWING NO.: AWT3037
SCALE: NONE	FILE: 3037_X_panCONN	SHEET #: 2 OF 2

ALARM CONDITIONS/TROUBLESHOOTING

NOTE: This is not intended to be an exhaustive list, rather, an aid to solving problems that may occur.

Causes of alarms may be isolated by determining if a breaker has tripped, a fuse has blown, and if any AR contact is opened under power. Below is a list of alarm relays with the components that are effected.

ALARM RELAY	DEVICES AFFECTED	ACTION/REMEDY
AR1*	"POWER ON" light fan in tank F1 C.B.	Check fan for overload/blockage. Replace C.B.
AR2	Dosing pump timer ALT, 1C, 2C	Determine cause of overload. Replace C.B.
AR3	#1 dosing pump, #1 dosing pump light breaker tripped	Check pump, determine cause of overload, reset breaker.
AR4	#2 dosing pump, #2 dosing pump light breaker tripped	Check pump, determine cause of overload, reset breaker.
AR5	Recycle pump, recycle pump light breaker tripped	Check pump, determine cause of overload, reset breaker.
CR1*	#1 dosing pump	Check pump/wiring.
CR2*	#2 dosing pump	Check pump/wiring.
CR3*	Recycle pump	Check pump/wiring.

NOTE:

1. AR1 operate (drop out) when power is interrupted or when fuse/CB is tripped. CR1-CR3 operate (drop out) when CSR relays do not sense proper motor load when motor should be running.
2. All pertain to Model 22, 24 and 30 series Bioclere units.
3. * pertain to Model 36 series Bioclere units only.

SYSTEM MAINTENANCE

The best way to assure years of trouble free life from your system is to continuously monitor the system and to perform regular maintenance functions. For large systems or systems with a BOD > 30 mg/l automation of maintenance is essential. For smaller systems with a BOD < 30 mg/l inspection and maintenance should be performed every six months.

Routine and Preventative Maintenance

1) Clean the filter cartridge. This may be done with a pressure hose. The screen filter cartridge should be cleaned from the outside inwards, while the discs in the disc filter cartridge should be separated and then cleaned. If bacteria buildup is a problem, we advise first trying lye, and if the problem persists, soak the filter cartridge in a chlorine bath - a mixture of 50% bleach and 50% water.
2) Open the field flush valve and flush the field for 3-5 minutes by activating the pump in "manual" position. Close the flush valve. On automatic solenoid valves the manual bleed lever should always be in the closed position and the dial on top should be free spinning. This allows it to open when pulsed electrically. Clockwise rotation closes valve.
3) With the pump in the "manual" position, check the pressure in the drip field by using a pressure gauge on the schrader valve located on the air vents and by reading the pressure gauge located in the Wasteflow Headworks box. The pressure should be the same as shown on the initial installation records. On systems with manual flush valves, close the field flush valve completely and then open the valve slightly until there is a 1-2 psi drop or design pressure is reached. This will allow the field to drain after each dose to prevent the manifold lines from freezing.
4) Remove the lids on the vacuum breaker and check for proper operation. If water is seen leaking from the top of the vacuum breaker, remove the cap of the vacuum breaker and press down on the ball to allow any debris to be flushed out. Be careful not to come in contact with the effluent.
5) Turn off the pump and reset the controller for auto mode.
6) Periodically remove and clean the air vents, field flush and filter flush valves.
7) Visually check and report the condition of the drip field, including any noticeable wetness.
8) Treatment and distribution tanks are to be inspected routinely and maintained when necessary in accordance with their approvals.
9) Record the elapsed time meter, pump counter, override counter, high-level alarm and power failures. This information can be obtained from the controller.

Trouble Shooting Guide:

Symptom: High water alarm activates periodically (1-2 times/week). During other times the water level in the pump chamber is at a normal level.

Possible cause: Peak water usage (frequently laundry day) is causing a temporary high water condition to occur.

Remedy: Set timer to activate the pump more frequently. Be sure to not exceed the total design flow. To avoid this, reduce the duration of each dose.

Remedy: Provide a larger pump tank to accommodate the peak flow periods.

Symptom: High water alarm activates during or shortly after periods of heavy rainfall.

Possible cause: Infiltration of ground/surface water into system.

Remedy: Identify sources of infiltration, such as tank seams, pipe connections, risers, etc. Repair as required.

Symptom: High water alarm activates intermittently, including times when it is not raining or when laundry is not being done.

Possible cause: A toilet or other plumbing fixture may be leaking sporadically but not continuously. Check water meter readings for 1-2 weeks to determine if water usage is unusually high for the number of occupants and their lifestyle. Also determine if water usage is within design range.

Remedy: Identify and repair fixture.

Symptom: High water alarm activates continuously on a new installation (less than 3 months of operation). Inspection of the filter indicates it is plugged with a gray colored growth. Water usage is normal. being done.

Possible cause: Slow start-up of treatment plant resulting in the presence of nutrient in the effluent sufficient to cause a biological growth on the filter. This is typical of lightly loaded treatment plants that receive a high percentage of gray water (i.e., from showers and laundry),

Remedy: Remove and clean filter cartridge in a bleach solution. Add a gallon of household bleach to pump tank to oxidize organics. Contact treatment plant manufacturer for advice on speeding up the treatment process possibly by "seeding" the plant with fresh activated sludge from another treatment plant.

Symptom: Water surfaces continuously at one or more isolated spots, each one foot or more in diameter.

Possible cause: Damaged drip line or a loose connection is allowing water be discharged under pressure and therefore at a much greater volume than intended.

Remedy: Dig up drip line. Activate pump and locate leak. Repair as required.

Possible cause: If water is at base of slope, can be caused by low-head drainage.

Remedy: Install check valves and airvents in the manifolds to redistribute water in the system after pump is turned off. This is not advised for freezing climates where manifold drainage is required.

Symptom: A portion of the drip field closest to the feed manifold is saturated while the rest of the field is dry.

Possible cause: Insufficient pump pressure. A pressure check at the return manifold indicates pressure of less than 10 psi.

Remedy: Check filter and pump intake to insure they are not plugged. If they are, clean as require.

Remedy: Leaks in the system may be resulting in loss of pressure. Check for water leaks in connections and fittings or wet spots in the field. Also check air vents to insure they are closing properly. Repair as necessary.

Remedy: Pump is worn or improperly sized. Pressure at feed manifold in less than 15 psi. Verify pressure requirements of system and provide a new or larger pump. As an alternate approach, the drip field may need to be divided into two or more zones.

Possible cause: The duration of each dose is of insufficient length to allow the drip field to become pressurized before the pump shuts off (or runs for only a brief time before turning off).

Remedy: Increase the pump run time and decrease the frequency of doses. Always calculate (or observe during field operation) how long the system takes to fully pressurize and add this time to the design dosing duration.

Symptom: High water alarm begins to activate continuously after a long period (1-2 years) of normal operation. Inspection of the filter indicates it is plugged with a heavy accumulation of sludge.

Possible cause: A buildup of solids in the pump tank due to carryover from the treatment plant.

Remedy: Replace the filter cartridge with a clean cartridge. Check the pump tank and if an accumulation of solids is noted, pump the solids out of the pump tank. Also, check the operation of the treatment plant to insure it is operating properly.

Symptom: Water surfaces at several spots in drip field during dosing periods. Installation is recent, less than 6 months of usage and the soil is a moderate to heavy clay. Possibly, the installation was completed using a non-vibratory plow.

Possible cause: Smearing of the soil may have occurred during installation of drip line. Also, the "cut" resulting from the installation allows an easy path for the water to surface during dosing.

Remedy: In most cases the sod will compact naturally around the drip line and the surfacing will diminish and ultimately cease. To help, reduce the duration of each dose and increase the number of doses/day. Also, it will help to seed the area to encourage the development of a good root zone.

Symptom: Entire area of drip field is wet, soft and spongy. It appears to be totally saturated with water. Situation occurs during dry season when there is little rainfall.

Possible cause: Water being discharged to drip field exceeds design. Excess water may be a result of infiltration, plumbing leaks or excessive water usage.

Remedy: Check water meter, elapsed time meter, pump counter, override counter or high level alarm counter to determine if water usage is in excess of design. Check for leaks or infiltration. Repair leaks as required. Reduce water usage by installing water saving fixture.

Remedy: If water usage cannot be reduced, enlarge drip field as required.

Possible cause: Area of drip field was inadequately sized and is too small.

Remedy: Provide additional soil analysis to verify sizing and enlarge as required.

Valve Troubleshooting

Symptom: Valve will not open manually

Check water supply and any possible master or gate valves to insure they are open.
Check that the valve is installed with the arrow pointing in the downstream direction
Check that the flow control is fully open, counterclockwise.
Turn off the water supply. Remove the solenoid and check for debris blocking the exhaust port.
Turn off the water supply. Remove the cover. Inspect the diaphragm for damage and replace if necessary.

Symptom: Valve will not open electrically

Check voltage at controller for 24 VAC station.
Check voltage across the solenoid lead wires for minimum 21 VAC.
Make sure handle on top of valve is free spinning. Not all the way open or all the way closed.
If the valve still does not operate, electrically replace the solenoid.

Symptom: Valve will not close

Insure the manual bleed lever is in the closed position.
Check for leaks around the flow control, solenoid or between valve cover and body.
Turn off the water supply. Remove the solenoid and check for debris or damage to the exhaust port.
Turn off the water supply. Remove valve cover and inspect for debris under diaphragm or debris in diaphragm ports.

Symptom: Slow leak

Check for dirt or gravel embedded in the diaphragm seat.
Check actuator and exhaust fitting for proper seating.

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