

LAW OFFICES

WITHERS, BRANT, IGOE & MULLENNIX, P.C.

A PROFESSIONAL CORPORATION

TWO SOUTH MAIN STREET

LIBERTY, MISSOURI 64068

(816) 781-4788

FAX (816) 792-2807

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CONN WITHERS (1907-1993)

JEROME E. BRANT

VINCENT F. IGOE, JR.

RONALD C. MULLENNIX

JOHN M. CROSSETT

THOMAS C. CAPPS

MARK E. KELLY*

WARD K. BROWN

RODNEY A. AMES

LEIGH A. GOUCHER*

KIRK J. MCCABE *

MICHAEL S. LAWSON

TROY L. DIETRICH

GARRETT L. GRIFFIN

March 10, 2005

FILED

MAR 14 2005

Missouri Public
Service Commission

³ * ALSO ADMITTED IN KANSAS

Mr. Dale Hardy Roberts
Secretary/Chief Regulatory Law Judge
Missouri Public Service Commission
PO Box 360
Jefferson City, Missouri 65102

Re: Central Rivers Wastewater Utility, Inc./Berkshire Glen Subdivision

Dear Mr. Roberts:

Enclosed for filing on behalf of Central Rivers Wastewater Utility, Inc., please find an original and fourteen (14) copies of an Application for Certificate of Convenience for Wastewater's treatment system for the above-referenced subdivision. Please see that this filing is brought to the attention of the appropriate Commission personnel.

If there are any questions regarding the filing, please direct them to the undersigned. I thank you in advance for your attention to and cooperation in this matter.

Sincerely,

Mark E. Kelly

MEK/adb

Enclosures

cc: Mr. Mark Geisinger

FILED³

MAR 14 2005

Missouri Public
Service Commission

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the matter of the application of Central Rivers)
Wastewater Utility, Inc. a certificate of)
convenience and necessity authorizing it to)
construct, install, own, operate, control, manage)
and maintain sewer system for the public, located)
on an unincorporated area in Clay County, Missouri.)

Case No. _____

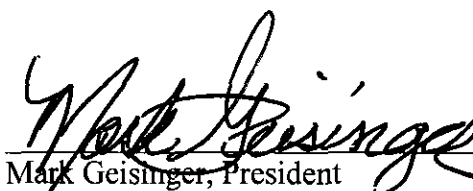
AFFIDAVIT

STATE OF MISSOURI)
) ss.
COUNTY OF CLAY)

Mark Geisinger, of lawful age, being duly sworn upon his oath, states as follows:

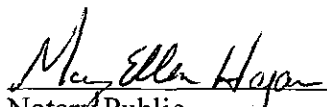
1. I am the president of Central Rivers Wastewater Utility, Inc.
2. That I have reviewed the Application for an unincorporated area of Clay County, Missouri, commonly known as the Berkshire Glen Subdivision, and the same is true and correct to the best of my knowledge.

Further affiant saith not.


Mark Geisinger, President

Subscribed and sworn to before me, a Notary Public, this 28th day of February, 2005.

NOTARY PUBLIC - NOTARY SEAL
STATE OF MISSOURI
MARY ELLEN HAGAN
CLAY COUNTY
MY COMMISSION EXPIRES: 3/27/07


Notary Public

My Commission Expires:

March 27, 2007

FILED³

MAR 14 2005

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

Missouri Public
Service Commission

In the matter of the application of Central
Rivers Wastewater Utility, Inc., a certificate
of convenience and necessity authorizing it
to construct, install, own, operate, control,
manage and maintain sewer system for the
public, located on an unincorporated area in
Clay County, Missouri.

Case No. _____

APPLICATION

Comes now Central Rivers Wastewater Utility, Inc. (Applicant), pursuant to Section 393.170, RSMo. (1986), and 4 CSR 240-2.060(2) and, for its application for a certificate of convenience and necessity authorizing it to construct, install, own, operate, control, manage and maintain a sewer system for the public in an unincorporated area of Clay County, Missouri, states to the Missouri Public Service Commission (Commission) as follows:

1. Applicant is a Missouri corporation duly organized and existing under the laws of the State of Missouri with its principal office and place of business located at 501 West 92 Hwy., Kearney, MO 64060. A certified copy of its certificate of incorporation and articles of incorporation were filed with the Commission under previous application, namely for Case No. SA-98-530. By this Application, Applicant proposes to provide sewer service to the public as a public utility pursuant to the jurisdiction, regulation and supervision of the Commission.

2. Correspondence, communications, orders and decisions regarding this matter should be addressed to:

Mark Geisinger
501 W. 92 Hwy.
P.O. Box 528
Kearney, MO 64060
Telephone No. (816) 903-1454
Facsimile No. (816) 903-1499

With copies to:

Withers, Brant, Igoe & Mullenix, P.C.
Attn: Mark Kelly
2 South Main Street
Liberty, MO 64068
Telephone No. (816) 781-4788
Fax No. (816) 792-2807

3. By this application, Applicant seeks permission, approval and a certificate of public convenience and necessity authorizing it to construct, install, own, operate, control, manage and maintain a sewer system for the public, generally described as a 30 acre subdivision West of Interstate 35 and North of NE 120th Street in an unincorporated area of Clay County, Missouri, as set forth on the map attached to this application as Exhibit 1 and legally described by metes and bounds attached to this application as Exhibit 2.
4. Marked as Exhibit 3A-3C, attached hereto and made a part of hereof for all purposes, is a feasibility study containing:

- a) A narrative. (Exhibit 3A)
 - b) An overall plan for the existing STEP system and recirculation sand filter wastewater treatment system. (Exhibit 3B)
 - c) Estimated operational cost of the facilities in the area proposed to be served including the proposed rates, charges, revenues and expenses for the estimated number of customers in the proposed area. (Exhibit 3C)
5. There are currently 30 lots in Berkshire Glen subdivision in the proposed service area. There are six known residents. The owner of said subdivision is The Terra Group, LLC. A representative of this company is Louis Freeman.

The six known residents are as follows:

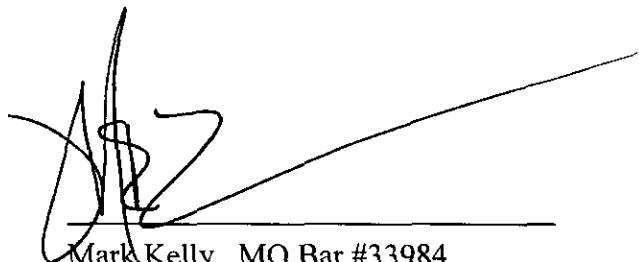
Joe & Kim Flanagan	14024 NE 121 st St. Kearney, MO 64060	816-628-3569
Todd & Jeanne Hinnenkamp	14015 NE 123 rd St. Kearney, MO 64060	816-628-0276
Terry Bush	14024 NE 123 rd St. Kearney, MO 64060	816-781-3179
Freeman Custom Homes	14025 NE 123 rd St. Kearney, MO 64060	816-628-4771
Amy Henry	14204 NE 123 rd St. Kearney, MO 64060	816-628-4092
Freeman Custom Homes	14214 Marie Circle Kearney, MO 64060	816-628-4771
6. There are no municipalities located within the proposed areas. Applicant has complied with all known legal requirements of the Clay County Commission to operate in said county.
7. Said sewer system will meet all requirements of the Commission and the Department of Natural Resources. A copy of the operating permit from the Department of Natural Resources will be forwarded to the Commission as soon as it is available. Application for the operating permit has been made to the Missouri Department of Natural Resources. DNR is withholding granting of the operating permit until the Company has obtained the certificate of convenience and necessity from the PSC.

8. There are no other public utilities or governmental bodies operating or rendering sewer service to the public within the area proposed to be served.
9. The area proposed to be served is rapidly being developed into a subdivision by a developer. The majority of the soils in the subdivisions are not suited for long term use of on-site disposal systems. Therefore, a public need exists for adequate sewer service within the area proposed to be served and the public convenience and necessity will be promoted by the granting of the authority herein requested. A central collection and treatment system that is operated and maintained in a safe and orderly manner is the best suited wastewater system for these subdivisions and for the Citizens of Missouri in general.
10. The granting of this application is in the public interest because it will present an opportunity for the public in the area proposed to be served to obtain and utilize sewer service which is otherwise unavailable, and make the area more attractive to develop, with the corresponding benefits of temporary and permanent jobs and, in general, better livelihood for citizens of Clay County and the State of Missouri.

WHEREFORE, Applicant respectfully requests that the Commission issue its order:

- (a) Granting Applicant permission, approval and a certificate of convenience and necessity authorizing it to construct, install, own, operate, control, manage and maintain a sewer utility system for the public in an unincorporated area in Clay County, Missouri, as more particularly described herein;
- (b) Granting such further relief as the commission deems appropriate.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'Mark Kelly', is written over a horizontal line. The signature is stylized with a large 'M' and 'K'.

Mark Kelly MO Bar #33984
Withers, Brant, Igoe & Mullennix, P.C.
2 South Main Street
Liberty, MO 64068
Telephone No. (816) 781-4788
Facsimile No. (816) 792-2807

ATTORNEY FOR CENTRAL RIVERS
WASTEWATER UTILITY, INC.

FILED AND CERTIFICATE OF
INCORPORATION ISSUED

DEC 15 1997

HONORABLE REBECCA MCDOWELL COOK
SECRETARY OF STATE
STATE OF MISSOURI
P.O. BOX 778
JEFFERSON CITY, MISSOURI 65102

Rebecca McDowell Cook
SECRETARY OF STATE

ARTICLES OF INCORPORATION

The undersigned natural persons of the age of eighteen(18), or more, for the purpose of forming a Corporation under The General and Business Corporation Law of Missouri, adopt the following Articles of Incorporation:

ARTICLE I

The name of the Corporation: **CENTRAL RIVERS WASTEWATER UTILITY, INC.**

ARTICLE II

The purpose of the Corporation is to engage in any lawful act or activity for which a corporation may be organized under the General and Business Corporation Law of the State of Missouri other than the banking business, the trust company business or the practice of a profession permitted to be incorporated by the State of Missouri Corporations Code.

ARTICLE III

The street address of the Corporation's initial registered office in this State is: 205 S. Spartan Drive, Richmond, MO 64085, and the name of its initial registered agent at such address is Mark E. Geisinger.

ARTICLE IV

The total number of shares of which the Corporation shall have the authority to issue are thirty thousand (30,000), all of which will be common stock and the par value of each share shall be \$1.00 per share..

ARTICLE V

The provisions for the regulations of the internal affairs of the Corporation shall be as set forth in the bylaws.

ARTICLE VI

Shareholders shall not have any preemptive rights to additional shares.

ARTICLE VII

The duration of the Corporation shall be perpetual.

ARTICLE VIII

The name and place of residence of each Incorporator is as follows:

Mark E. Geisinger, 10021 Rock Falls Road, Orrick, MO 64077

Jack C. Chalmers, 3608 NE Basswood, Lee's Summit, MO 64064

Kevin B. Hawthorne, 12920 West 105th Terrace, Overland Park, KS 66215

ARTICLE IX

The number of directors constituting the initial Board of Directors of the Corporation is three (3)

ARTICLE X

The Board of Directors may repeal or amend the By-Laws of this corporation, and may adopt new or additional By-Laws.

IN WITNESS THEREOF, the undersigned incorporator has executed these Articles of Incorporation on this, the 12 day of December, 1997

Mark C. Eisinger

Ken Hawthorne

Jack C. Chalmers

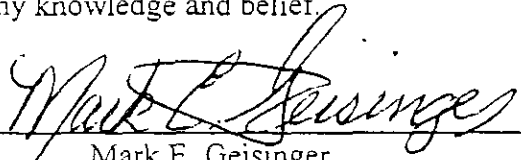
FILED AND CERTIFICATE OF
INCORPORATION ISSUED
DEC 15 1997

Rebecca McDonald
SECRETARY OF STATE

AFFIDAVIT

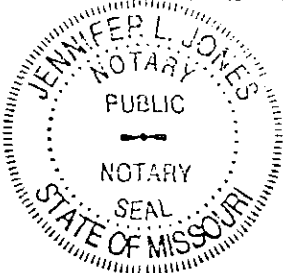
State of Missouri)
) ss
County of Boone)

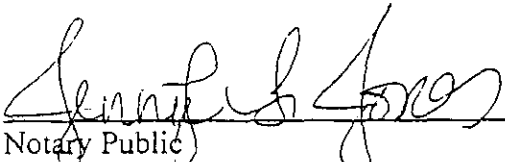
I, Mark E. Geisinger, of lawful age, being first duly sworn upon my oath, state that I am the President of Central Rivers Wastewater Utility, Inc. and that the facts set forth in the foregoing Application are true to the best of my knowledge and belief.



Mark E. Geisinger

Subscribed and sworn before me this 19th day of April, 1998.





Notary Public

My Commission expires:

JENNIFER L. JONES
Notary Public - Notary Seal
STATE OF MISSOURI
County of Boone
My Commission Expires June 24, 2001

NOTARY'S AFFIDAVIT

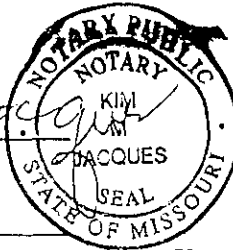
State of Missouri
County of Clay

THIS IS TO CERTIFY that on this date, 12/8/97, before me, a Notary Public, personally appeared Mark E. Geisinger, Jack C. Chalmers, and Kevin B. Hawthorne, who, being by me first duly sworn, declared that they are the persons who signed the foregoing document as incorporators and that the statements therein contained are true:

I hereunto set my hand and affix my official seal on this 8th day of December, 1997.

Notary Public: Kim M. Jacques

My commission expires: 10/18/99



KIM M. JACQUES
NOTARY PUBLIC - STATE OF MISSOURI
CLAY COUNTY
MY COMMISSION EXP. OCT. 18, 1999

FILED AND CERTIFICATE OF
INCORPORATION ISSUED

DEC 15 1997

Rebecca McDowell Cook
SECRETARY OF STATE

STATE OF MISSOURI



Rebecca McDowell Cook
Secretary of State

CORPORATION DIVISION
 CERTIFICATE OF INCORPORATION

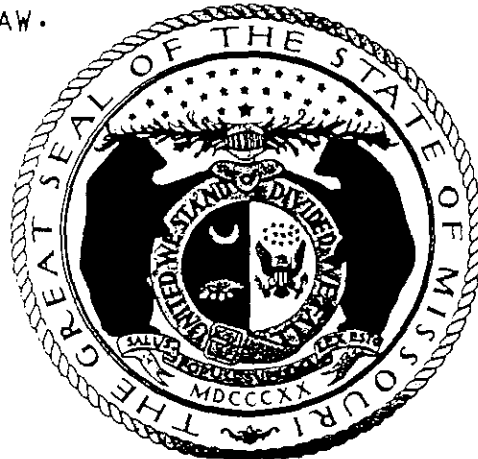
WHEREAS, DUPLICATE ORIGINALS OF ARTICLES OF INCORPORATION OF
 CENTRAL RIVERS WASTEWATER UTILITY, INC.

HAVE BEEN RECEIVED AND FILED IN THE OFFICE OF THE SECRETARY OF
 STATE, WHICH ARTICLES, IN ALL RESPECTS, COMPLY WITH THE
 REQUIREMENTS OF GENERAL AND BUSINESS CORPORATION LAW;

NOW, THEREFORE, I, REBECCA McDOWELL COOK, SECRETARY OF STATE
 OF THE STATE OF MISSOURI, BY VIRTUE OF THE AUTHORITY VESTED IN
 ME BY LAW, DO HEREBY CERTIFY AND DECLARE THIS ENTITY A BODY
 CORPORATE, DULY ORGANIZED THIS DATE AND THAT IT IS ENTITLED TO
 ALL RIGHTS AND PRIVILEGES GRANTED CORPORATIONS ORGANIZED UNDER
 THE GENERAL AND BUSINESS CORPORATION LAW.

IN TESTIMONY WHEREOF, I HAVE SET MY
 HAND AND IMPRINTED THE GREAT SEAL OF
 THE STATE OF MISSOURI, ON THIS, THE
 15TH DAY OF DECEMBER, 1997.

Rebecca McDowell Cook
 Secretary of State



\$58.00

STATE OF MISSOURI



Rebecca McDowell Cook
Secretary of State

CORPORATION DIVISION
CERTIFICATE OF CORPORATE RECORDS

CENTRAL RIVERS WASTEWATER UTILITY, INC.

I, REBECCA MCDOWELL COOK, SECRETARY OF STATE OF THE STATE OF MISSOURI AND KEEPER OF THE GREAT SEAL THEREOF, DO HEREBY CERTIFY THAT THE ANNEXED PAGES CONTAIN A FULL, TRUE AND COMPLETE COPY OF THE ORIGINAL DOCUMENTS ON FILE AND OF RECORD IN THIS OFFICE.

IN TESTIMONY WHEREOF, I HAVE SET MY HAND AND IMPRINTED THE GREAT SEAL OF THE STATE OF MISSOURI, ON THIS, THE 5TH DAY OF JANUARY, 1998.

Rebecca McDowell Cook
Secretary of State

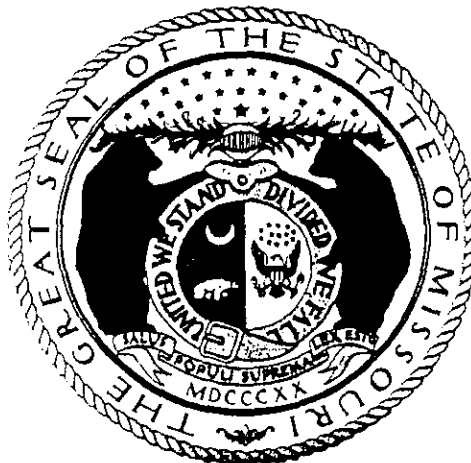


Exhibit # 1

Exhibit 1

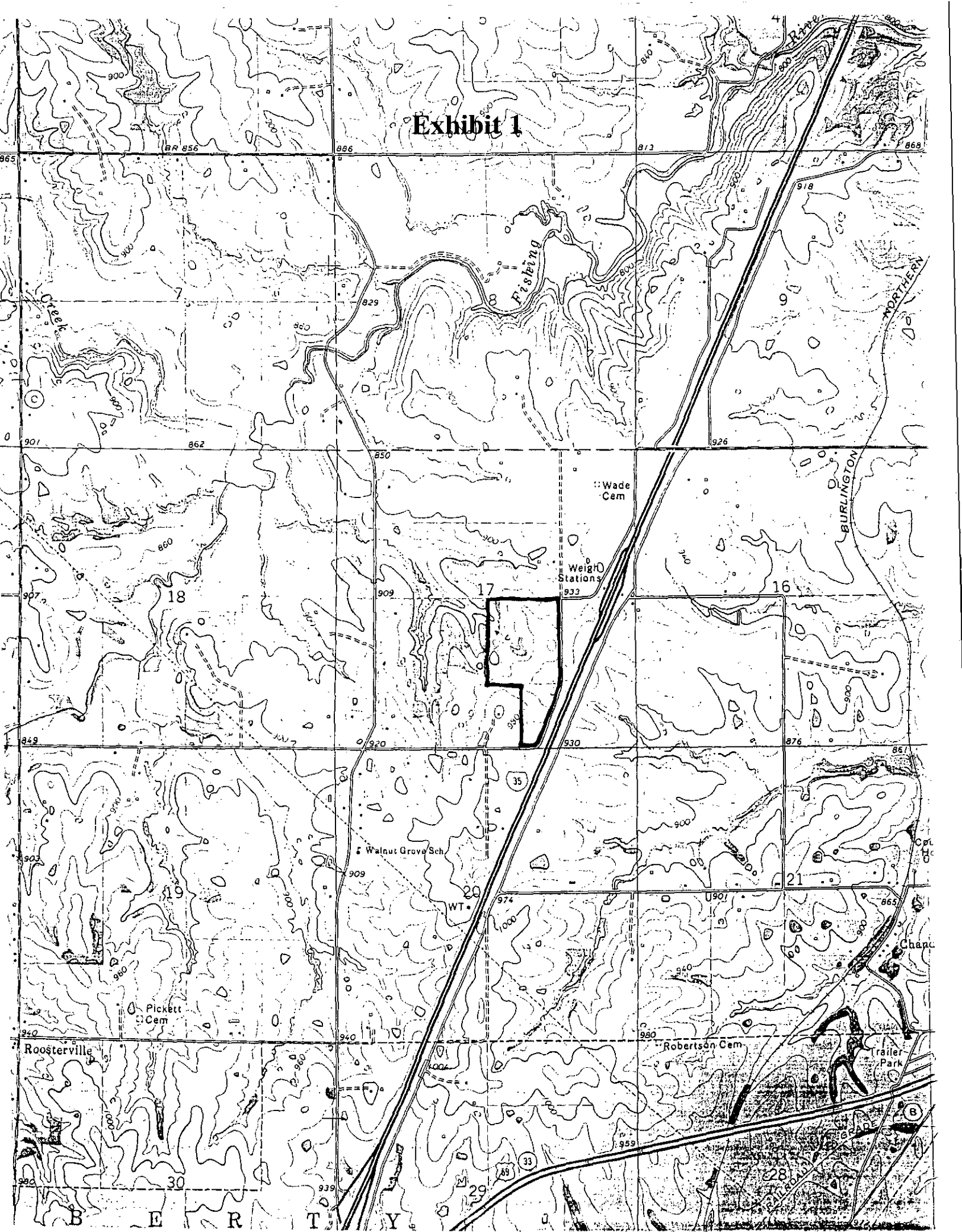


Exhibit 2

LEGAL DESCRIPTION:

All that part of the West Half of the Southeast Quarter of Section 17, Township 52, Range 31, Clay County, Missouri, described as follows: Beginning at the Northwest corner of said Southeast Quarter of said Section 17, thence North 89 degrees 31 minutes 56 seconds East along the North line of the Southeast Quarter of said Section 17, a distance of 1303.01 feet, to the Northeast Corner of the West Half of the Southeast Quarter of said Section 17; thence South 00 degrees 08 minutes 01 seconds West, along the East line of the West Half of the Southeast Quarter of said Section 17, a distance of 1549.77 feet; thence South 89 degrees 51 minutes 59 seconds East, a distance of 40.00 feet; thence South 84 degrees 28 minutes 06 seconds West, a distance of 647.99 feet; thence North 00 degrees 24 minutes 48 seconds West, a distance of 214.98 feet; thence South 89 degrees 35 minutes 12 seconds West, a distance of 31.02 feet; thence Westerly along a curve to the right, being tangent to the last described course, and having a radius of 330.00 feet, an arc distance of 72.60 feet; thence Westerly along a reverse curve to the left, having a radius of 71.00 feet, an arc distance of 43.07 feet; thence Westerly and Northerly along a reverse curve to the right, having a radius of 60.00 feet, an arc distance of 105.63 feet; thence South 78 degrees 18 minutes 19 seconds West, a distance of 400.46 feet, to the Easterly line of Walnut Hills Estates a subdivision of land in Clay County, Missouri; thence North 03 degrees 05 minutes 31 seconds East along said line, a distance of 7.99 feet, to the West line of said Southeast Quarter of said Section 17, also being the Easterly line of said Walnut Hills Estates; thence North 00 degrees 15 minutes 35 seconds East along the West line of said Southeast Quarter of said Section 17, also being the Easterly line of said Walnut Hills Estates, a distance of 1227.27 feet to the Point of Beginning. Said tract of land contains 38.89 Acres more or less.

DEDICATION: The undersigned proprietors of the tract of land described hereon have caused the same to be subdivided in the manner as shown on the accompanying plat which subdivision shall hereafter be known as "BERKSHIRE GLEN FIRST PLAT".

LEGAL DESCRIPTION:

All that part of the Southeast Quarter of Section 17, Township 52, Range 31, Clay County, Missouri, described as follows: Commencing at the Southwest Corner of the Southeast Quarter of said Section 17; thence North 89 degrees 33 minutes 47 seconds East along the South line of Section 17, a distance of 560.19 feet to the Point of Beginning of the tract of land herein to be described; thence North 03 degrees 05 minutes 31 seconds East, a distance of 307.06 feet; thence South 86 degrees 54 minutes 29 seconds East, a distance of 398.99 feet, to a point on the Westerly Right-of-way line of Interstate #35; thence South 22 degrees 35 minutes 08 seconds West along the Westerly Right-of-way line of Interstate #35, a distance of 306.24 feet, to the South line of the Southeast Quarter of said Section 17; thence South 89 degrees 33 minutes 47 seconds West along said South line of the Southeast Quarter of said Section 17, a distance of 298.56 feet to the Point of Beginning. Said tract of land contains 2.37 acres more or less.

DEDICATION: The undersigned proprietors of the tract of land described hereon have caused the same to be subdivided in the manner as shown on the accompanying plat which subdivision shall hereafter be known as "BERKSHIRE GLEN - TRACT A".

LEGAL DESCRIPTION:

All that part of the Southeast Quarter of Section 17, Township 52, Range 31, Clay County, Missouri, described as follows: Commencing at the Northwest corner of the Southeast Quarter of said Section 17; thence South 00 degrees 13 minutes 35 seconds West along the West line of the Southeast Quarter of said Section 17, also being the Westerly line of BERKSHIRE GLEN FIRST PLAT and the Easterly line of WALNUT HILLS ESTATES, subdivisions of land in Clay County, Missouri, a distance of 1,227.27 feet; thence continuing along said plat lines South 03 degrees 05 minutes 31 seconds West, a distance of 7.99 feet to the Point of Beginning of the tract of land herein to be described, said point also being the Southwest corner of Lot 5 of said Berkshire Glen First Plat; thence North 78 degrees 18 minutes 19 seconds East along the Southerly line of said Lot 5, a distance of 400.46 feet to the Southerly corner of said Lot 3, said point also being on the Southerly right-of-way line of Northeast 121st Street; thence Easterly along said right-of-way line along a curve to the left having an initial tangent bearing of South 11 degrees 41 minutes 41 seconds East and a radius of 60.00 feet, an arc distance of 105.63 feet; thence continuing along said right-of-way line along a reverse curve to the right having a radius of 71.00 feet, an arc distance of 43.07 feet; thence continuing along said right-of-way line along a reverse curve to the left having a radius of 330.00 feet, an arc distance of 72.60 feet; thence continuing along said right-of-way line North 89 degrees 33 minutes 12 seconds East, a distance of 31.02 feet to the Northwestern corner of Lot 4 of said Berkshire Glen First Plat; thence South 00 degrees 24 minutes 48 seconds East along the Westerly line of said Lot 4, a distance of 214.98 feet to the Southwesterly corner of said Lot 4; thence North 84 degrees 28 minutes 06 seconds East along the Southerly line of said Lot 4, its Easterly prolongation and the Southerly line of Lot 3 of said Berkshire Glen First Plat, a distance of 647.99 feet to the Southeast corner of said Lot 3, said point also being on the Westerly right-of-way line of Hills Road; thence South 89 degrees 51 minutes 59 seconds East along the Southerly line of said Berkshire Glen First Plat, a distance of 40.00 feet to the East line of the West Half of the Southeast Quarter of said Section 17; thence South 00 degrees 08 minutes 01 seconds West along the East line of the West Half of the Southeast Quarter of said Section 17, a distance of 185.84 feet to the Westerly right-of-way line of Interstate No. 35; thence South 53 degrees 32 minutes 58 seconds West along said right-of-way line, a distance of 27.04 feet; thence continuing along said right-of-way line South 19 degrees 09 minutes 07 seconds West, a distance of 791.35 feet; thence continuing along said right-of-way line South 36 degrees 37 minutes 18 seconds West, a distance of 103.08 feet to the Northerly line of BERKSHIRE GLEN TRACT A, a subdivision of land in Clay County, Missouri; thence North 86 degrees 54 minutes 29 seconds West along the Northerly line of said Berkshire Glen Tract A, a distance of 400.18 feet to the Northwest corner of said Berkshire Glen Tract A, said point also being on the Easterly line of MCHENRY ESTATES, a subdivision of land in Clay County, Missouri; thence North 03 degrees 05 minutes 31 seconds East, a distance of 840.19 feet to the Northeast corner of said McHenry Estates; thence South 89 degrees 35 minutes 12 seconds West along the Northerly line of said McHenry Estates, a distance of 635.19 feet to the Northwest corner of said McHenry Estates, said point also being on the Easterly line of said Walnut Hills Estates; thence North 03 degrees 05 minutes 31 seconds East along the Easterly line of said Walnut Hills Estates, a distance of 258.86 feet to the Point of Beginning. Said tract contains 18.81 Acres, more or less.

DEDICATION: The undersigned proprietors of the tract of land described hereon have caused the same to be subdivided in the manner as shown on the accompanying plat which subdivision shall hereafter be known as "BERKSHIRE GLEN SECOND PLAT".

FEASIBILITY STUDY

For

WASTEWATER COLLECTION AND TREATMENT SYSTEM

at

BERKSHIRE GLEN SUBDIVISION

CLAY COUNTY, MISSOURI

by

CENTRAL RIVERS WASTEWATER UTILITY, INC

501 W. 92 Hwy.

P.O. Box 528

Kearney, MO 64060

Background

The rural areas of the rapidly developing Kansas City metropolitan region have been growing as more and more people find that the area offers many benefits and high quality of life. As this metropolitan area has developed and grown, wastewater treatment for these developments has become a primary concern. Due to soils that are not well suited for on-site wastewater disposal systems and higher density, central wastewater collection and treatment that is well operated and maintained has become a growing need. However, economic factors make a single large scale central collection and treatment facility in outlying subdivisions and communities impractical. Sound technological advances in how wastewater is collected and treated lead to a more practical approach. Cluster type treatment and collections systems, each serving a single subdivision or small group of subdivisions can be economically installed and economically maintained and can provide high quality wastewater treatment. Quality installation, operation and maintenance are essential for this type of system to consistently produce safe and effective wastewater treatment. Therefore, operation and maintenance should be handled by professionals that are well trained and have financial incentives to provide safe wastewater treatment facilities. The operation and maintenance authority should also be well regulated to ensure that the public good is served. A Missouri Public Service regulated private utility company is very well suited for this approach.

Central Rivers Wastewater Utility, Inc., upon final approval of its Tariff currently under review by the Missouri Public Service Commission, will maintain and operate central wastewater collection and treatment facilities in Ray County, Missouri (Case No. SA-98-530), Clay County, Missouri (Case No. SA-2000-105), Clay County, Missouri (Case No. SA-2000-248), Clay County, Missouri (Case No. SA-2001-304), Clay County, Missouri (Case No. SA-2004-0470). Central Rivers Wastewater Utility, Inc. is also planning to provide wastewater treatment and collection system operation and maintenance for a new subdivision currently being developed in Clay County, Missouri, known as Berkshire Glen Subdivision.

Purpose of serving Berkshire Glen Subdivision

Due to experience Central Rivers Wastewater Utility, Inc. is well suited to provide an operation and maintenance authority for these subdivisions. The company can provide a dependable wastewater collection and treatment service for these subdivisions at a reasonable cost while at the same time provide a financial incentive to the owners of the company.

Financing

Costs to provide engineering documents necessary to obtain a Missouri Department of Natural Resources Construction will be paid by the subdivision developer. The developer has paid to install the collection system's main collection lines. The developer has also paid for initial costs for the installation of the wastewater treatment facility.

A contract between the subdivision developer and the utility in which the developer has agreed to fund the difference between revenue collected through rates and the required revenue has been signed and agreed upon by both parties. The developer has obtained an Irrevocable Letter of Credit from a reputable bank that the utility company will draw upon if the developer, for any reason, is unable or unwilling to pay the agreed upon difference. This agreement ensures that utility company will have sufficient revenue to operate the wastewater collection and treatment system in the initial stages of the development.

Plan

A map of the area is attached to the company's application. On the map is a layout of the collection system and treatment plant location. Wastewater from the homes will initially be collected in 1,500 gallon septic tanks located near the residence. The effluent will be screened and pumped into a force main that eventually will tie into the treatment facility. A second phase of the treatment plant is planned to be installed when sewage flows require. The treatment plant has been constructed to meet Department of Natural Resources administered regulations and will be expanded as necessary to continue to do so.

Customers

There are currently six customers within Berkshire Glen Subdivision.

The six known residents are as follows:

Joe & Kim Flanagan	14024 NE 121 st St. Kearney, MO 64060	816-628-3569
Todd & Jeanne Hinnenkamp	14015 NE 123 rd St. Kearney, MO 64060	816-628-0276
Terry Bush	14024 NE 123 rd St. Kearney, MO 64060	816-781-3179
Freeman Custom Homes	14025 NE 123 rd St. Kearney, MO 64060	816-628-4771
Amy Henry	14204 NE 123 rd St. Kearney, MO 64060	816-628-4092
Freeman Custom Homes	14214 Marie Circle Kearney, MO 64060	816-628-4771

The newly constructed homes will each have an individual 1,500 gallon watertight septic tank located near the residence but within an easement granted to the utility company. The subdivisions plans are to have approximately 30 homes when completely developed. All of the customers will be single family residences. It is anticipated that at least 60% of the customers will be connected within 5 years.

System Construction

The collection system has been constructed and is existing. The first phase recirculating sand filter has been constructed and is existing. Plans prepared by a professional engineer registered in the State of Missouri are on file at the Missouri Department of Natural Resources.

Operation

The management of the company will be furnished by the owner, Mr. Mark Geisinger. The company will contract with Utility Construction & Management, LLC for service calls and treatment plant operation and maintenance of this facility. Billing will be done on a contract basis.

The utility company will keep in stock a new pump and controls for the residential pumping installation as well as repairable parts. One pump of each make will be kept for each fifty customers it has on the force main sewer system. The company will inspect the customer's pumping facilities once per year to assure that they are functioning properly. All maintenance will be provided by the utility company. The company will also replace the customer's pump and controls, as well as repairable parts, when necessary as part of the rate structure provided the customer does not purposefully or willfully cause intentional harm to the system through negligence or sabotage.

Tariff and Rules

The company's Tariff will be amended to include a service area that includes this subdivision. The rules governing the customers' responsibilities and the company's responsibilities will be those filed with its Tariff and approved by the Missouri Public Service Commission.

The base single family wastewater rate will likely be \$32.00/month. This rate is consistent with other similar wastewater collection and treatment facilities and reasonable for the area.

Conclusion

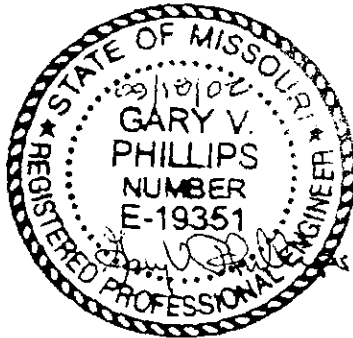
The proposed services by Central Rivers Wastewater Utility, Inc. for this for this area and the style of homes to be constructed. The agreement between the developer and the company satisfies the financial obligation the company will need to remain viable until several customers are connected. By providing this service the developer is better able to market the lots in the subdivision and the County and subdivision are benefited by increased temporary and permanent jobs and better and safer overall living conditions for the residents.

Exhibit 3E

ENGINEERING REPORT
FOR
SANITARY SEWER SYSTEM
TO SERVE
BERKSHIRE GLEN SUBDIVISION
CLAY COUNTY, MISSOURI

FOR
CENTRAL RIVERS WASTEWATER UTILITY, INC.
P.O. BOX 528
211 PLATTE CLAY WAY
KEARNEY, MO 64060

BY



GARY V. PHILLIPS, PE

WHITEHEAD CONSULTANTS, INC.
114 NORTH MAIN STREET
PO BOX 461
CLINTON, MISSOURI 64735
660 885 8311

LOCATION

Berkshire Glen is a proposed 30-lot residential subdivision development located on the West side of Interstate 35 and North of N.E. 120th Street in Clay County, Missouri.

EXISTING CONDITIONS

There are presently no central sewage treatment systems in the area. The closest treatment plant with collection lines is approximately 2 miles to the Northeast in Kearney. There does not appear to be any limiting conditions for the use of a recirculating sand filter sewage treatment system to serve the subdivision.

PROPOSED IMPROVEMENTS

The recirculating sand filter system is designed to treat 50 lots with an expected density of 3.7 people per lot and 75 gallons of sewage per person per day. The proposed subdivision has only 30 lots. A 20-lot subdivision adjoining this development may want to add centralized sewage collection in the future. The proposed treatment system will not have to be increased in size at a later date if the adjoining subdivision wants to tie in.

Each lot will have a septic treatment effluent pump (STEP) in a septic tank that will pump to a 2" low pressure main. The effluent will be pumped through the main to a minimum 13,875-gallon recirculation tank. The septic tanks on the lots will be sized according to the number of bedrooms of the proposed house as shown on the detail sheet C7.

The pretreated sewage in the recirculation tank will be filtered and pumped to the sand filter bed where it will be distributed and dosed on the filter media. The filtered effluent will flow out to a splitter valve that will discharge 20% and recirculate 80% back to the recirculation tank. The dosing pumps will be controlled by float switches and timers to ensure that the filter media is dosed adequately to maintain a biomat within the media. At times of low flow 100% of the effluent will be recirculated.

All components of the treatment system will be sized to treat all 50 lots. The pumps in the recirculation tank will be set to dose the filter bed for the 30 lots until they need to be adjusted for all 50 lots.

CALCULATIONS

Design flow = 50 lots x 75 gallons per day x 3.7 persons per lot = 13,875 gpd

Filter bed area = 13,875 gpd / 5 gallons per sq.ft. = 2,775 sq.ft. (minimum)

Using a filter area of 44' x 64' = 2,816 sq ft

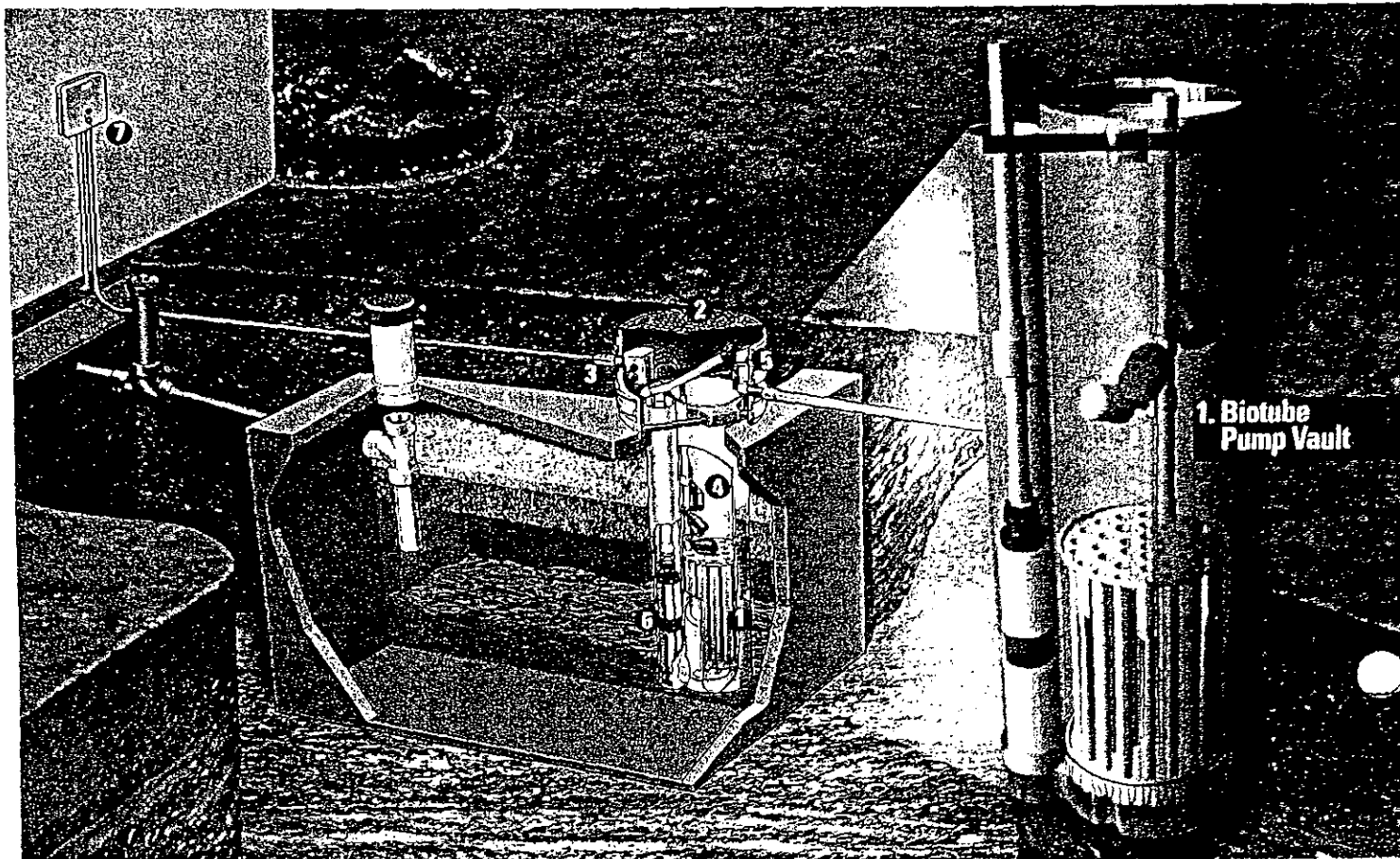
Pump size needed = number of orifices x 0.43 gpm = 22 orifices / line x 4 lines / zone x 0.43 gpm = 37.84 gpm

Total dynamic head per tables = 29.3 ft

Calculation Charts and the pump curve for the pump selected is included with this report. The same pump will be used in the septic tanks as the recirculation tank.

Detailed specifications for the STEP system components and sand filter are included with this report.

ProSTEP™ Effluent Pumping System



Proven Technology

With more than 40,000 in service, OSI's ProSTEP Effluent Pumping System is a proven, cost-effective solution to the problem of effluent transport in wastewater collection and treatment systems.

Wastewater systems worldwide are benefitting from the reduction of solids provided by OSI's filter technology. In both septic and dosing tanks, OSI's patented Biotube Vault Technology filters solids so that only liquid from the "clear zone" between a tank's scum and sludge layers is pumped. This reduces biological loading and clogging of downstream components.

A Reliable, Money Saving System

OSI's ProSTEP Effluent Pumping Systems are superior in quality and outlast conventional effluent pumping systems. Constructed of stainless steel, thermoplastic, and fiberglass, they're corrosion-resistant, durable and lightweight.

Because ProSTEP systems are pre-assembled with compatible components, installation is quick and reliability is ensured. Maintenance records from thousands of systems prove that ProSTEP saves money on installation and maintenance. Service time averages less than 30 minutes every 5 years.

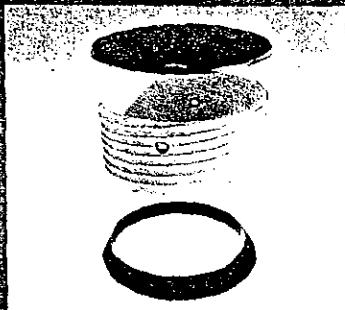
A Revolutionary Pump Vault

- The patented* Biotube design has up to 20 times the filtering capacity of other pump vaults.
- Vertically oriented inlet ports protect the filter cartridge from solids.
- Compatible with any tank opening. Easy access design allows cartridge removal without pulling the pump or vault.
- Holster-style float bracket allows quick removal of float assembly.

*Covered by U.S. patents 4,439,323 and 5,492,635
Foreign patents pending

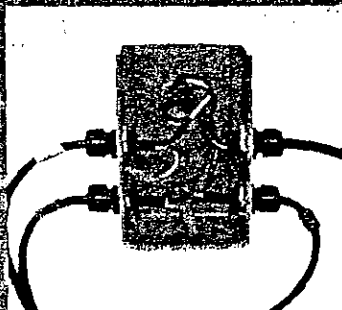
A Complete Package

Each ProSTEP Effluent Pumping System is a complete package, with seven basic components, ready to install. No need to shop for parts and pieces. In-tank equipment comes pre-assembled and drops neatly into any septic or dosing tank.



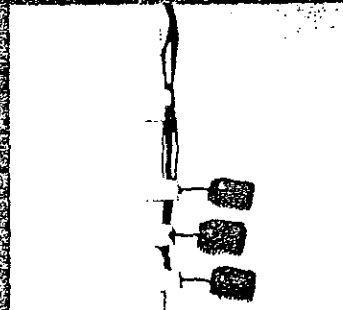
2. Riser, Lid, and Accessories

- Allows easy access to tank
- Attractive, non-skid lids
- Strong and lightweight
- Tamper-resistant



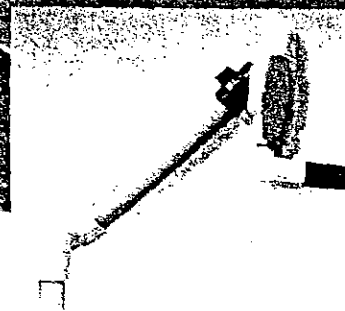
3. Splice Box

- Meets NEC requirements
- Corrosion-proof
- Protects splices
- Provides easy access for inspection and servicing



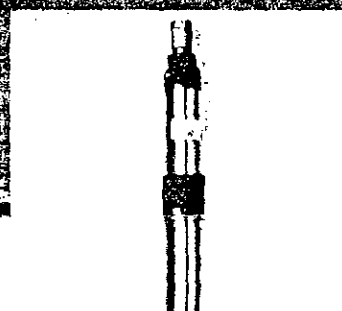
4. Level Control Float Assembly

- Quick release stem
- Unique adjustable float collars
- Pilot duty or motor-rated switches
- Arrangements for any pumping situation



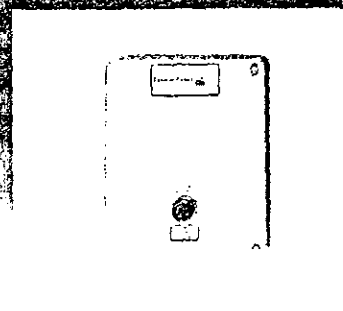
5. Discharge Assembly

- Intelligently designed with quick disconnect unions, ball valves, and flexible hose and fittings
- Provides easy access for maintenance and servicing of the pump system
- Unique flexible design eliminates "hard plumbing"
- Configurations available for deep installations, cold weather, and other special situations



6. Effluent Pump

- Multi-stage effluent pump with non-corroding stainless steel construction
- UL and/or CSA listing for wastewater applications
- 25+ year life--3 to 4 times longer than conventional effluent pumps
- Lightweight (about 25 pounds)
- Wide range of models available



7. Control Panel

- UL listed
- Standard configurations to meet NEC Class I, Division 1 or 2 requirements
- Engineered specifically for wastewater applications with the highest quality components
- Corrosion-proof NEMA 4X rated enclosures
- Programmed dosing and data telemetry for improved system operation and monitoring

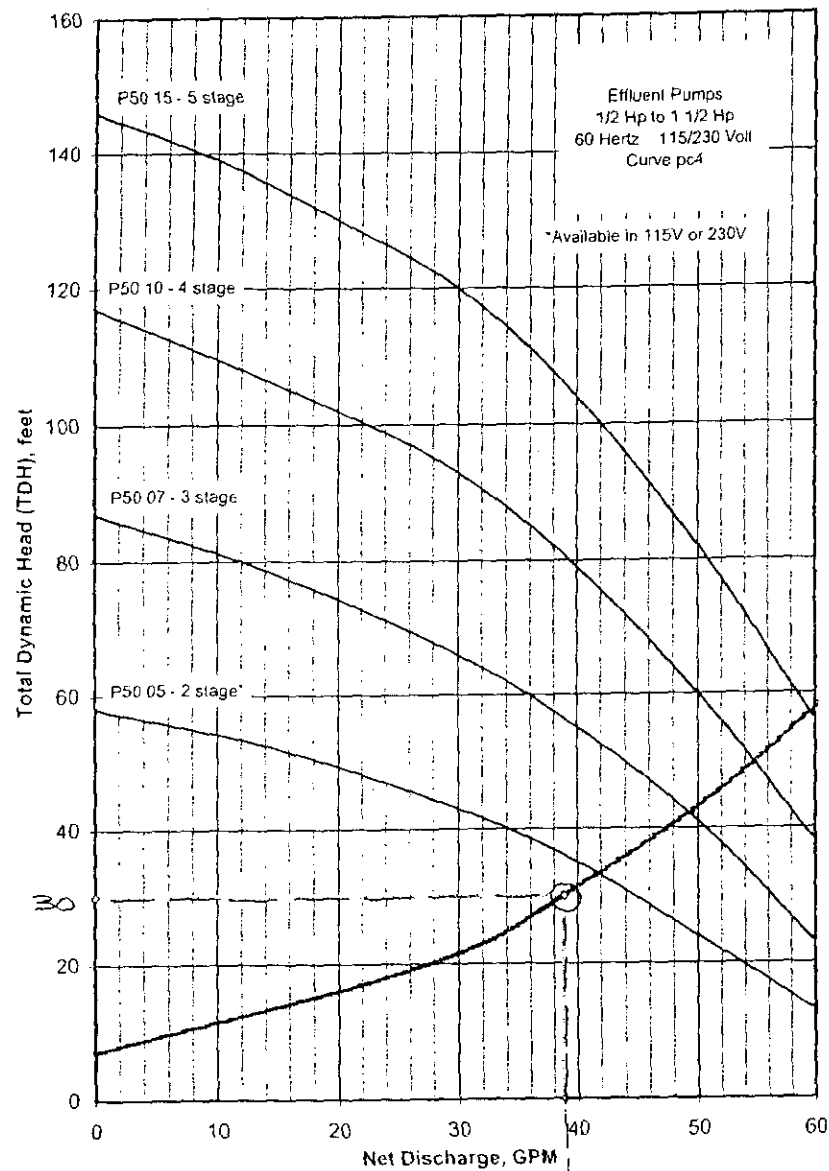
Pump Selection for Pressurized System

Orifice Size	0.125 inches
Residual Head at Last Orifice	5.00 feet
Lateral Length	44 feet
Total Number of Laterals per Cell	16
Orifice Spacing	2.00 feet
Distributing Valve Model (# of Zones)	6404
Lift to Manifold	7 feet
Discharge Assembly Size	1.50
Transport Line Size	1.50 inches
Pipe Class/Schedule	40
Transport Length	30 feet
Manifold Size	1.50 inches
Pipe Class/Schedule	40
Manifold Length	6.00 feet
Lateral Size	1.00 inches
Pipe Class/Schedule	40
Flow Meter	none

Calculation

Minimum Flow Rate per Orifice	0.43 gpm
Number of Orifices per Zone	88
Total Actual Flow Rate	38.8 gpm
Number of Laterals per Zone	4
Total Dynamic Head:	
Lift to Manifold	7.0 feet
Residual Head at Last Orifice	5.0 feet
Frictional Head Losses:	
Head Loss in Transport Pipe	2.6 feet
Head Loss through Discharge Assembly	4.5 feet
Head Loss in Distribution Header	0.1 feet
Head Loss in Laterals	0.9 feet
'Add-on' Friction Losses	0.0 feet
Head Loss through Distributing Valve	9.9 feet
Head Loss through Flow Meter	0.0 feet

Size Pump for:
TOTAL FLOW RATE 38.8 gpm
 @
TOTAL DYNAMIC HEAD 30.0 feet



Calculation

Minimum Flow Rate per Orifice	0.43 gpm
Number of Orifices per Zone	88
Total Actual Flow Rate	38.8 gpm
Number of Laterals per Zone	4
Total Dynamic Head:	
Lift to Manifold	7.0 feet
Residual Head at Last Orifice	5.0 feet

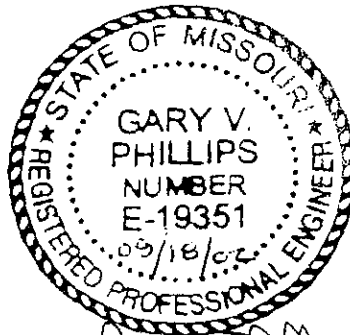
Frictional Head Losses:

Head Loss in Transport Pipe	2.6 feet
Head Loss through Discharge Assembly	4.5 feet
Head Loss in Distribution Header	0.1 feet
Head Loss in Laterals	0.9 feet
'Add-on' Friction Losses	0.0 feet
Head Loss through Distributing Valve	9.9 feet
Head Loss through Flow Meter	0.0 feet None Used

Size Pump for:

TOTAL FLOW RATE	38.8 gpm
	@
TOTAL DYNAMIC HEAD	30.0 feet

GENERAL SPECIFICATIONS
FOR
SEPTIC TANK EFFLUENT PUMPING SYSTEM
AT
BERKSHIRE GLEN SUBDIVISION
KEARNEY, MISSOURI
BY



Gary V. Phillips

JULY, 2002

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114 NORTH MAIN STREET
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CLINTON, MISSOURI 64735
PHONE 660 885 8311
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NOTE: All brand names and models of products called out in the following specifications are for reference. Other brands or models may be used if they are approved as equal in quality and performance as the specified brand. The engineer may request written evidence that such product conforms in all respects to the specified requirements. Where the specified requirements involve conformance to recognized codes or standards, the contractor shall furnish evidence of such conformance in the form of test or inspection reports. Failure to provide complete data will be cause for rejection of the product.

A. ONSITE INTERCEPTOR TANKS

1. General:

- a. The manufacturer shall provide the structural design and certification to the engineer for review. The design shall be in accordance with accepted engineering practice. Precast concrete or fiberglass tanks shall have been designed by a registered engineer and approved by state or local regulatory agencies or authorities. To achieve effective performance and minimize pump-out occurrences, residential interceptor tanks shall have a nominal liquid capacity of 1000 gallons for up to 2 bedrooms, 1500 gallons for 3 bedrooms, 2000 gallons for 4 bedrooms, and, for more than 4 bedrooms, the sizing shall be determined based on an occupancy assessment and shall be in accord with Figure 1.

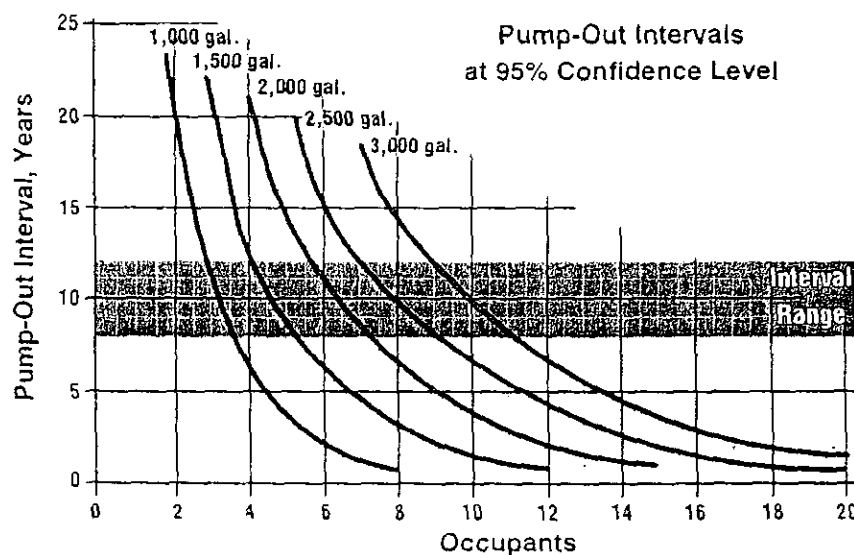


Figure 1. Interceptor Tank Pump-Out Intervals

Average flow (Q_a) is based upon typical weekly discharges. Wastewater flows for single-family dwellings typically range from 40 to 60 gallons per capita per day (gpcd); 50 gpcd is a commonly used design parameter and is the value used in calculations herein. The number of individuals (capita) is assumed to average three per dwelling. Typical occupancies and flow relationships are shown in Table 1.

Table 1: Relationship between Number of Bedrooms, Occupancies, and Flow

Bedrooms	Q_p^a gpd/DU	Occupants ^b capita	Q_c gpcd	Q_a gpd/DU
1	200	2	55	110
2	300	3	50	150
3	375	4	50	200
4	450	5	45	225

a. Peak day bedroom flows (Q_p) are based on typical administrative rules.

b. Occupancy is based on typical usage of two occupants for the first bedroom and one occupant per additional bedroom.

b. Loading Criteria:

- There shall be 130 lbs./cu.ft. for minimum weight of saturated backfill, or 100 lbs./cu.ft. for unsaturated backfill (400 lbs./sq.ft.minimum).
- Minimum lateral loading shall be 62.4 lbs./cu.ft. Lateral loading shall be determined from ground surface.
- The tank shall also support a concentrated wheel load of 2500 lbs.

There are four (4) typical loading conditions that should be analyzed:

- 1) 4 ft. Bury + Full Exterior Hydrostatic Load
- 2) 4 ft. Bury + Full Exterior Hydrostatic Load + 2500 lb. Wheel Load.
- 3) 1 ft. Bury + 2500 lb. Wheel Load.
- 4) Tank Full, Interior Hydrostatic Load and Unsupported by Soil.
Load Case 4 represents the tank full of liquid at 62.4 lbs/cu.ft. This condition addresses seam and haunch stress-strain relationships that occur during watertightness testing, as well as poor soil bedding conditions that provide inadequate support.

- c. Tanks requiring deep burial (>48") or subject to truck or heavy traffic loading require special consideration. (A minimum soil cover of 12" shall be used, unless specified otherwise by manufacturer.)

- d. *All tanks shall be structurally sound and watertight* and shall be guaranteed in writing by the tank manufacturer for a period of two years from the date of final acceptance. Manufacturer's signed guarantee shall accompany bids. The tank guarantee/warranty shall be furnished at the time of submittal. Tank warranty shall not be limited liability to replacement cost of the tanks. The septic tank shall be capable of withstanding long-term hydrostatic loading, in addition to the soil loading, due to a water table maintained at ground surface.
- e. Tanks shall be manufactured and furnished with access openings 20" in diameter and of the configuration shown on the manufacturer's drawings. Modification of completed tanks will not be permitted.
- f. Inlet plumbing shall include an inlet tee that penetrates 18" into the liquid from the inlet flow line. (The depth may vary depending on the tank's height; in all cases, though, the inlet should extend to a level below the bottom of the maximum scum depth.) The inlet plumbing shall allow for natural ventilation back through the building sewer and vent stack.
- g. Tanks shall be capable of successfully withstanding an aboveground static hydraulic test and shall be individually tested.
- h. All tanks shall be installed in strict accordance with the manufacturer's recommended installation instructions.

2. Concrete Tanks:

- a. Walls, bottom and top of reinforced concrete tanks shall be designed across the shortest dimension using one-way slab analysis. Stresses in each face of monolithically constructed tanks may be determined by analyzing the tank cross-section as a continuous fixed frame.
- b. The walls and bottom slab shall be poured monolithically; alternatively, water stops may be provided.
- c. Reinforcing steel shall be ASTM A-615 Grade 60, $f_y = 60,000$ psi. Details and placement shall be in accordance with ACI 315 and ACI 318.
- d. Concrete shall be ready-mix with cement conforming to ASTM C150, Type II. It shall have a cement content of not less than six (6) sacks per cubic yard and maximum aggregate size of 3/4". Water/cement ratio shall be kept low ($0.35 \pm$), and concrete shall achieve a minimum compressive strength of 4000 psi in 28 days. The Contractor shall submit a concrete mix design to the Engineer for review and approval. Three (3) concrete sample cylinders shall be taken and tested for each tank manufactured until the manufacturer and Engineer are satisfied that the minimum compression strength is being obtained. To ensure compliance, the manufacturer shall then make

and set three (3) sample cylinders for a minimum of 20% of the remaining tanks at the discretion of the Engineer. If the minimum compressive strength is not being obtained, the manufacturer shall be required to make and test sample cylinders for each tank manufactured. Calcium chloride will not be allowed in the mix design. The cost of testing cylinders shall be the tank manufacturer's responsibility. The tank manufacturer may supply a Swiss hammer for compressive testing in the field in lieu of sample cylinders.

- e. Tanks may be protected by applying a heavy cement-base waterproof coating (Thoroseal® or approved equal), on both inside and outside surfaces, in compliance with Council of American Building Officials (CABO) report #NRB-168; 6181; however, the tank should be watertight without the addition of seal coatings.
- f. Form release used on tank molds shall be Nox Crete™ or approved equal. Diesel or other petroleum products are not acceptable.
- g. Tanks shall not be moved from the manufacturing site to the job site until the tank has cured for seven (7) days or has reached two-thirds of the design strength.
- h. Tanks shall be manufactured and furnished with access openings of the size and configuration to accommodate individual packaged pump systems. For 24" diameter access risers, the tank manufacturer shall cast in place a flanged tank adapter to facilitate the bonding of a 24" diameter access riser. The flanged tank adapter shall be made of 1/4" thick ABS and shall have an outside diameter of 27" and an inside diameter of 22-3/4". The flanged adapter shall be Orenco Systems®, Inc. Model PRTA24 or engineer-approved equal. The adapter must have an overall height of no less than 3" to allow 1-1/2" exposed for sufficient bonding area once the adapter is installed in the tank. For 21" and 30" diameter access risers, either a grooved tank adapter plate (Model RRFTA or RRFTA30) or a flanged tank adapter (Model FRTA30) may be installed in the tank. The adapter shall be manufactured of fiberglass or ABS and shall accommodate either a 21" or 30" diameter access riser.
- i. The septic tank and the top slab shall be sealed with a preformed flexible plastic gasket. The flexible plastic gasket shall be equal to the flexible butyl resin sealant congeal CS-102 or CS-202 as manufactured by Concrete Sealants, Inc. of New Carlisle, Ohio, and shall conform to federal specification SS-S-00210(2iOA) and AASHTO M-198.
- j. In order to demonstrate watertightness, tanks shall be tested twice prior to acceptance. Inlets to the septic tank will be watertight pipe seal Cast-A-Seal™ (Manufactured by Press-Seal Gasket Corporation) or approved equal. Each tank shall be tested at the factory, prior to shipping, by filling with water to the soffit and letting stand. After 24 hours, the tank shall be refilled to the

soffit and the exfiltration rate shall be determined by measuring the water loss during the next two (2) hours. Any leakage shall be cause for rejection. After installation is completed, each tank shall be filled with water to a point 2" into the access riser and retested as previously described (the field test period may be reduced to not less than two (2) hours). Backfill of a depth equal to the water height in the riser must be in place over the tank to prevent damage due to hydrostatic uplift. No tank will be accepted if there is any leakage over the two (2) hour period.

3. Fiberglass Tanks:

a. Method of Calculations:

- 1) Fiberglass tanks shall be analyzed using finite element analysis for buried structures.
- 2) Calculations shall address the following:
 - strength
 - buckling
 - deflection of 5% of the tank diameter, based on service load (including long-term deflection lag)
 - buoyancy
- 3) Performance testing

Material Properties and Laminates

The laminates considered in this analysis shall be of general-purpose ortho-polyester resin with E-type fiberglass reinforcement or higher grade. The thicknesses for different regions of the tanks shall be described and shown in shop drawings for each individual tank.

The laminate properties listed here, along with the minimum thicknesses as described herein, are considered typical design values that must be maintained during the manufacturing of the tanks.

Typical primary strength properties are listed below:

Tensile Modulus (psi)	1,000,000
Ultimate Tensile strength (psi)	10,000
Ultimate Compressive strength (psi)	21,000
Ultimate Flexural strength (psi)	18,000
Ultimate Shear In-Plane (psi)	7,800

- b. In lieu of calculations for fiberglass tanks, the supplier may elect in-situ performance testing.

- c. In-situ testing of each tank model shall include use of strain gauge and deflection gauge. The tank will be subjected to external forces equal to twice the actual load.
- d. Maximum initial deflection based on test loading shall not exceed 3% of the tank diameter.
- e. Performance testing will be evaluated by a Registered Professional Engineer (P.E.). The Engineer will have the sole responsibility to determine the maximum external loading on any of the tank models.
- f. The tank shall be constructed with a glass fiber and resin content specified by the manufacturer and with no exposed glass fibers. Any permanent metal part shall be 300 series stainless steel.
- g. Inspections may be made by the engineer in the supplier's yard, within the plant, upon delivery and again after installation. The minimum wall thickness shall be 3/16". If the wall thickness is suspected to be less than 3/16" or if delamination is suspected within any portion of the tank, the engineer may drill a 1/4" diameter hole through the tank wall for inspection purposes. If the required minimum 3/16" thickness is not found, repair if feasible shall be the responsibility of the contractor. If repair is judged not feasible, the tank shall be rejected. If twenty percent (20%) or more of the tanks are rejected for any of the aforementioned reasons, each tank under this bid will become suspect of substandard quality and subject to rejection by the engineer. If the required minimum 3/16" thickness is found and no delamination is present, the repair of the inspection holes shall be the responsibility of the engineer.
- h. The engineer shall specify the minimum weight of each tank model that will be allowed. The manufacturer will permanently mark the weight of each tank on the top near the access hole.
- i. The minimum tank weight shall be specified by the manufacturer's engineer (e.g., 350 lbs for 1000-gallon tanks, 400 lbs for 1500-gallon tanks $\pm$).
- j. Holes specified for the tank shall be provided by the manufacturer. Resin or other appropriate sealant shall be properly applied to all cut or ground edges so that no glass fibers are exposed and all voids are filled.
- k. Orenco Systems' EPDM gaskets, or approved equal, shall be used at the inlet to join the tank wall and the inlet piping. ABS or Schedule 40 PVC pipe and fittings shall be used at the inlets.
- l. Inlet plumbing shall include an inlet tee that penetrates 18" into the liquid from the inlet flow line. (The depth may vary depending on the tank's height; in all cases, though, the inlet should extend to a level below the bottom of the maximum scum depth). The inlet plumbing shall allow for natural ventilation back through the building sewer and vent stack.

- m. Water testing shall be performed on each tank and shall be witnessed by the engineer. Every tank shall be assembled by the manufacturer and filled with water to the brim of the access opening for a minimum of two (2) hours. The tank shall show no leakage from section seams, pinholes or other imperfections. Any leakage is cause for rejection.
- n. When leakage occurs, if the tank is not rejected by the engineer, an additional water test shall be made on the tank after repairs have been completed, upon request by the engineer. The manufacturer shall be responsible for making all corrective measures in production or assembly necessary to ensure a completely watertight tank.
- o. After installation of tank with riser is completed, each tank shall be filled with water to a point 2" into the access riser and the water loss measured after a two-hour period. Every tank test shall be witnessed by the engineer. Any leakage shall be cause for rejection. Backfill of a depth equal to the water height in the riser must be in place over the tank to prevent damage due to hydrostatic uplift.
- p. Each tank shall be marked in the uppermost surface above or near the outlet and include a permit or identification number, weight of tank, type of tank, and date of manufacture.
- q. Installation shall be in accordance with the manufacturer's recommendations, or as shown on the Contract Plans, whichever is more stringent--no variations.

B. RISERS & LIDS:

1. Risers:

Risers shall be required for access to internal vaults and access into the septic tanks for septage pumping. All risers shall be constructed watertight. The risers shall be attached to the tanks such that a watertight seal is provided. Risers shall extend 3" above original grade to allow for settlement and to ensure positive drainage away from the access. Risers for inspection ports shall be a minimum of 18" in nominal diameter. Risers containing pumping assemblies or electrical splice boxes shall be a minimum of 24" in diameter and shall be of sufficient diameter to allow removal of internal vaults without removing splice boxes, etc. Risers shall be a minimum of 30" in nominal diameter when the depth of bury is 36" or greater. All other risers shall be a minimum of 24" in nominal diameter and shall vary in height depending on the depth of bury on the various tanks. Adhesive required to adhere the PVC or fiberglass risers to either fiberglass or ABS tank adapter shall be either a two-part epoxy, Model MA320 or approved equal, or a single component adhesive Model ADH100 or approved

equal. To ensure product compatibility, risers, lids, and attachment components shall be supplied by a single manufacturer.

2. Inlet Risers:

Inlet risers (required only on two-compartment tanks and tanks with greater than 1500-gallon capacity) shall be ribbed PVC as manufactured by Orenco Systems®, Inc. or engineer-approved equal. The material shall be PVC as per ASTM D-1784 and tested in accordance with AASHTO M304M-89. The risers shall be constructed of non-corrosive material and designed to be buried in soil. Risers shall have a minimum stiffness of 10 psi, when tested according to ASTM D2412. Risers shall be capable of withstanding a truck wheel load (36 square inches) of 2500 pounds for 60 minutes with a maximum vertical deflection of 1/2". Risers shall extend to 2" above the ground surface to allow for settlement and shall have a minimum nominal diameter of 18".

3. Outlet Risers:

Outlet risers shall be ribbed PVC as manufactured by Orenco Systems®, Inc. or engineer-approved equal. The material shall be PVC as per ASTM D-1784 and tested in accordance with AASHTO M304M-89. The risers shall be constructed of non-corrosive material and designed to be buried in soil. Risers shall have a minimum stiffness of 10 psi, when tested according to ASTM D2412. Risers shall be capable of withstanding a truck wheel load (36 square inches) of 2500 pounds for 60 minutes with a maximum vertical deflection of 1/2". Risers shall be at least 12" high, shall have a minimum nominal diameter of 24" for simplex pumping applications or 30" when used in a duplex pumping application and shall be factory-equipped with the following:

- a. Electrical and Discharge Grommets: when applicable, Orenco Systems' EPDM grommets shall be installed by the manufacturer for discharge piping, vent piping, and/or the electrical conduit to assure a watertight seal. The grommets shall be installed at the factory by the manufacturer of the access risers.
- b. Adhesive: When bonding to concrete or fiberglass grooves, a two-part epoxy, one pint required per 18" or 24" diameter riser and one quart required per 30" diameter riser, Model ADHP10 or ADHQ10, or approved equal shall be used. When bonding to a flanged riser tank adapter, either a two-part epoxy, Model MA320 or approved equal, or a single component adhesive Model ADH100 or approved equal shall be used.

4. Riser-To-Tank Attachment:

Risers shall be attached to tanks with one of the following attachment systems, or approved equal:

(1) Orenco Systems®, Inc. Model RUBDKIT attachment kit; (2) Orenco Systems®, Inc. Model PRTA24 tank adapter used with Model PRTA24BDKIT bolt down kit, and Model MA320 or ADH100 adhesives; (3) Orenco Systems®, Inc. Model RRFTA tank adapter used with Model RRFTABDKIT bolt down kit and Model ADHP10 adhesive; (4) Orenco Systems®, Inc. Model FRTA30 tank adapter used with Model FRTA30BDKIT bolt down kit and Model ADH100 adhesive. All attachment components shall be constructed of waterproof, non-corrosive materials, such as PVC, ABS, fiberglass, or stainless steel. Adhesives and sealants shall be waterproof, corrosion resistant and approved for the intended application. The riser-to-tank connection shall be watertight and structurally sound. The riser-to-tank connection shall be capable of withstanding a vertical uplift of 5000 pounds to prevent riser separation due to tank settlement, frost heave, or accidental vehicle traffic over the tank.

5. Lids:

One lid shall be furnished with each access riser. Lids shall be Orenco Systems®, Inc. Model FL18G-4BU, FL21G, FL24-4B, FL24G-4BU, or FL30G or engineer-approved equal, as appropriate, fiberglass with green non-skid finish, and provided with stainless steel bolts, and wrench.

Manufacturer shall provide evidence that lids have been used successfully in continuous field service for a minimum of five years to demonstrate long-term integrity and suitability for the application.

Lids shall be waterproof, corrosion resistant and UV resistant. Lids shall be flat, with no noticeable upward dome. A crown or dome of no more than 1/8" is allowable. Lids shall not allow water to pond on them. Lids shall have a green non-skid finish. Self-lubricating plastics, such as polyethylene, shall not be considered non-skid without addition of a non-skid coating. Lids shall form a watertight seal with the top of riser. Lids shall be capable of withstanding a truck wheel load (36 square inches) of 2500 pounds for 60 minutes with a maximum vertical deflection of 1-1/2". Lids shall be provided with tamper-resistant stainless steel fasteners and a tool for fastener removal.

Tamper-resistant fasteners include recessed drives, such as hex, Torx, and square. Fasteners that can be removed with common screwdrivers, such as slotted and Phillips, or fasteners that can be removed with standard tools, such as pliers or crescent wrenches, are not considered tamper-resistant. To prevent a tripping hazard, fasteners shall not extend above the surface of the lid.

Traffic bearing lid: The traffic bearing lid shall be a cast iron frame and cover, part number 6024, 3060, 4036, as manufactured by Sather Manufacturing Co., Inc., or approved equal, which will fit over a standard lid. The cover shall have the word SEWER cast into it.

6. Insulation (if required):

Rigid closed-cell foam insulation of 2" or 4" thickness shall be mechanically attached to the underside of the lid. All fasteners shall be made of corrosion resistant stainless steel. The insulation shall have an R-value of no less than 10 per 2" increment.

7. Riser Installation:

Riser installation shall be accomplished according to the manufacturer's instructions.

D. SEPTIC TANK EFFLUENT PUMPING ASSEMBLIES:

For Single-Family Dwellings

All pumping systems shall be supplied by a reputable manufacturer with at least five years of experience in supplying equipment for effluent sewers. References must be available on request from the engineer. Systems shall be Orenco Systems®, Inc. High-Head Pumping Assemblies or engineer-approved equal, composed of:

1. Risers & Lids:

Same as B, 1 through 7, above.

2. Pump Vault:

Orenco Systems®, Inc. Model PVU57-1819, Universal Biotube® Pump Vault or engineer-approved equal, installed in conformance with the engineer's plans. The filter shall have a minimum effective screen area of no less than 15.5 square feet. (Note: Commercial and multiple-user tanks may require a larger or duplex Biotube® Pump Vault, the sizes of which must be individually determined and spelled out in the specifications.) The Biotube® Pump Vault shall consist of a 12" diameter, 57" deep HDPE vault with eight (8) 2" diameter holes evenly spaced around the perimeter, located appropriately to allow for maximum sludge and scum accumulation before requiring pumping (approximately 70% of minimum liquid level). Housed inside the polyethylene vault shall be the

Biotube® assembly consisting of 1/8" mesh polypropylene tubes. Attached to the vault is a flow inducer to accept one or two high-head effluent pumps.

3. Discharge Hose and Valve Assembly:

Orenco Systems®, Inc. Model HV100BC, 1" diameter, 150 psi PVC ball valve, 150 psi PVC check valve, PVC flex hose with working pressure rating of 100 psi, and Schedule 40 PVC pipe. When pumping downhill, include anti-siphon assembly (Model HVAS100). Six-gpm flow controllers (Model FC) are available, if necessary.

4. Float Switch Assembly (also see Alternate):

Orenco Systems®, Inc. Model MFABT with three switch floats mounted on a PVC stem attached to the filter cartridge. The floats must be adjustable and must be removable without removing the pump vault. The high- and low-level alarms and on/off function shall be preset as shown in the engineer's plans. Each float lead shall be secured with a nylon strain relief bushing at the splice box. The floats shall be UL or CSA listed and shall be rated for a minimum of 5.0A @ 120 VAC.

Alternate: VeriComm™ Remote Telemetry Float Control System

Orenco Systems®, Inc. Model MF3A with three switch floats mounted on a PVC stem attached to the filter cartridge. The floats must be adjustable and must be removable without removing the pump vault. The high- and low-level alarms and on/off function shall be preset as shown in the engineer's plans. Each float lead shall be secured with a nylon strain relief bushing at the splice box. The floats shall be UL or CSA listed and shall be rated for a minimum of 5.0A @ 120 VAC.

5. High-Head Effluent Pump:

Must be approved for use in pump vault as described in D2. For most applications, an Orenco Systems®, Inc. Model P100511, 1/2 hp, 115 VAC, single phase, 60 Hz, two-wire motor, with 10 foot long extra heavy duty (SO) electrical cord with ground. Pump shall be capable of providing a flow rate of 5 gpm against a head of 200 feet, or 10 gpm against a head of 135 feet. When used in conjunction with a flow controller, the pump shall be capable of providing 5 gpm against a head of 160 feet. Pump shall be UL and CSA listed as an effluent pump. Pump shall be provided with a non-prorated five-year warranty. Larger horsepower units are available (3/4 to 1-1/2 hp, 230 VAC).

6. Electrical Splice Box:

Orenco Systems®, Inc. Model SB4, UL approved for wet locations, equipped with four electrical cord grips and a 3/4" outlet fitting. Also included shall be UL listed waterproof butt splice connectors. The use of a UL-approved conduit seal kit shall be required to prevent the passage of gases, vapors, or flames through the conduit.

7. Controls and Alarms (also see Alternate):

Controls and alarms shall be listed per UL 508. Panels shall be repairable in the field without the use of soldering irons or substantial disassembly. Panel shall be Orenco Systems®, Inc. Model S1ROETMCT control panel meeting the following:

Standard Components:

- a. Motor-Start Contactor: 115 VAC: 14 FLA, 3/4 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% of FLA). 230 VAC: 14 FLA, 2 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% FLA).
- b. Toggle Switch: Single-pole, double-throw MOA switch. 20 amps, 1 hp.
- c. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 115 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
- d. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole 115 VAC, double-pole 230 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
- e. Audio Alarm: 80 dB at 24", warble-tone sound.
- f. Visual Alarm: 7/8" diameter red lens, "Push-to-silence." NEMA 4, 1-watt bulb, 115 VAC
- g. Panel Enclosure: Measures 11" high x 9.3" wide x 5.4" deep. NEMA 4X rated. Constructed of UV-resistant fiberglass; hinges and latch are stainless steel. Conduit couplings provided.
- h. S1RO Panel Ratings: 115 VAC, 3/4 hp, 14 amps, single phase, 60 Hz.
- i. S2RO Panel Ratings: 230 VAC, 2 hp, 14 amps, single phase, 60 Hz.
- j. Event Counter: 115 VAC, 6-digit, non-resettable.
- k. Elapsed Time Meter: 115 VAC, 7-digit, non-resettable. Limit of 99,999 hours; accurate to 0.01 hours.

Optional Components:

- l. Pump Run Light: 7/8" green lens. NEMA 4, 1-watt bulb, 115 VAC.
- m. Heater: Anti-condensation heater. Self-adjusting: radiates additional wattage as temperature drops.
- n. Intrinsically Safe Control Relays: 115 VAC. Listed per UL 913, for Class 1 Div. 1, Groups A, B, C, D hazardous locations. Larger enclosure required.
- o. Current Sensor: 115 VAC. Go/no-go operation. Pump fail indicator light on panel. Manual reset switch.

Alternate: VeriComm™ Remote Telemetry Control System

The system will be monitored via remote telemetry, UL-recognized and FCC-approved for the application, and shall contain the following operating modes:

- A "Start-up Mode" during which the system will collect trend data for establishing future operating standards,
- A "Normal Mode" that manages day-to-day functions of the system,
- A "Test Mode" that suspends data collection and communications with the central server so that operators can install and service the system without affecting the panel's trend data and web-based communication.

In addition, the control system shall be capable of the following functions:

- Data Collection and Utilization
 - Logs data of system conditions and events, such as pump run time, pump cycles, alarm conditions, and alert conditions.
- Troubleshooting and Diagnostic Logic
 - Programmed to identify and report suspected failed components (Alarms) and negative trends in operating data (Alerts).
- Advanced Control Logic
 - Advanced control logic will activate in the event of component malfunction to diagnose the system using pre-established trend data and, if necessary, modify the operation of the system until the system can be serviced.
- Communications and Alarm Management
 - The control and monitoring system shall operate such that the telemetry control unit will communicate with a web-based monitoring application for reporting and alarm management.
 - The system shall provide for a minimum of three levels of password-protected security access

and control to ensure only qualified personnel can access and communicate with the panel. The communication protocol shall allow the operator to communicate with the telemetry unit using any modem (Mac or PC) and a web browser, or a simple communication program (e.g. HyperTerminal or Z-Term). Telemetry units requiring proprietary software shall not be considered.

The telemetry unit will provide automatic notification or call-in to the host in the event of:

- Alarms, which signal fault conditions that need to be addressed immediately (e.g. high or low liquid levels, pump failure, failed contactor, etc.);
- Alerts, which signal less critical conditions that require attention, but which will engage the panel's troubleshooting and diagnostic logic and alternative operating modes (e.g. stuck float switch, leaking tank, brownout, high flows, etc.);
- Updates, which include follow-up reminders or all-clear notifications following Alarms/Alerts, as well as scheduled panel reports;
- Manual forced communication, from panel to host to effect an update of queued programming changes.

In addition, the unit shall have the capability of real-time direct connection to the panel via laptop serial port, to allow the operator real-time access to detailed logged data and the ability to change point values.

Standard Components:

- a. Motor-Start Contactor: 115 VAC: 14 FLA, 3/4 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% of FLA). 230 VAC: 14 FLA, 2 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% FLA).
- b. Toggle Switch: Single-pole switch, automatic On, with spring-loaded, momentary, manual On. 20 amps, 1 hp.
- c. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 115 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
- d. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole 115 VAC, double-pole 230 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
- e. Audio Alarm: 80 dB at 24", warble-tone sound.
- f. Visual Alarm: 7/8" diameter red lens, "Push-to-silence." NEMA 4, 1-watt bulb, 115 VAC

- g. Panel Enclosure: Measures 13.5" high x 11.3" wide x 5.6" deep. NEMA 4X rated. Constructed of UV-resistant fiberglass; hinges and latch are stainless steel. Conduit couplings provided.
- h. S1RO Panel Ratings: 115 VAC, 3/4 hp, 14 amps, single phase, 60 Hz.
- i. S2RO Panel Ratings: 230 VAC, 2 hp, 14 amps, single phase, 60 Hz.
- j. Vericom™ Remote Telemetry Unit: ATRTU-100; 36/18 VAC (center tap transformer), 8 digital inputs, 4 analog inputs, 4 digital outputs, on-board modem (2400 baud), LED input and output indicators, battery backup.

Optional Components:

- k. Pump Run Light: 7/8" green lens. NEMA 4, 1-watt bulb, 115 VAC.
- l. Heater: Anti-condensation heater. Self-adjusting: radiates additional wattage as temperature drops.
- m. Intrinsically Safe Control Relays: 115 VAC. Listed per UL 698A, for Class 1 Div. 1, Groups A, B, C, D hazardous locations. Larger enclosure required.
- n. Current Sensor: 115 VAC. Go/no-go operation. Pump fail indicator light on panel. Manual reset switch.
- o. Event Counter: 115 VAC, 6-digit, non-resettable.
- p. Elapsed Time Meter: 115 VAC, 7-digit, non-resettable. Limit of 99,999 hours; accurate to 0.01 hours.

Control panel shall be Orenco Systems®, Inc. VeriComm™ VCOM S_RO or engineer-approved equal.

8. Installation:

All pumping system components shall be installed in accordance with the manufacturer's recommendations, the engineer's plans, and all state and local regulations.

9. Location:

The pump control panel shall be mounted on a post or exterior wall nearest the tank and pump. If mounting to an exterior wall, try to select a garage or outbuilding where the sound of the motor contactor engaging will not be noticed. If a garage or outbuilding wall isn't available, installation should include use of sound-deadening insulation. (Post and panel mounting assemblies are

acceptable.) The control panel shall be located within 50 feet and in sight of the pump motor or shall be provided with a lockable disconnect switch. The panel, when possible, should be mounted in the shade and protected from the weather. The panel should be located at a convenient height (usually about five feet above the ground) and where it will be accessible for maintenance.

E. SEPTIC TANK EFFLUENT PUMPING ASSEMBLIES

For Commercial or Multiple-User Tanks

All pumping systems shall be supplied by a reputable manufacturer with at least five years of experience in supplying equipment for effluent sewers. References must be available on request from the engineer. Systems shall be Orenco Systems®, Inc. High-Head Pumping Assemblies or engineer-approved equal, composed of:

1. Risers & Lids:

Same as B, 1 through 7, above.

2. Pump Vault:

Orenco Systems®, Inc. Model PVU57-1819, Universal Biotube® Pump Vault or engineer-approved equal, installed in conformance with the engineer's plans. The filter shall have a minimum effective screen area of no less than 15.5 square feet. (Note: Commercial and multiple-user tanks may require a larger or duplex Biotube® Pump Vault, the sizes of which must be individually determined and spelled out in the specifications.) The Biotube® Pump Vault shall consist of a 12" diameter, 57" deep HDPE vault with eight (8) 2" diameter holes evenly spaced around the perimeter, located appropriately to allow for maximum sludge and scum accumulation before requiring pumping (approximately 70% of minimum liquid level). Housed inside the polyethylene vault shall be the Biotube® assembly consisting of 1/8" mesh polypropylene tubes. Attached to the vault is a flow inducer to accept one or two high-head effluent pumps.

3. Discharge Hose and Valve Assemblies:

Orenco Systems®, Inc. Model HV125BC, 1-1/4" diameter, 150 psi PVC ball valve, 150 psi PVC check valve, PVC flex hose with working pressure rating of 80 psi, and Schedule 40 PVC pipe.

When pumping downhill, include anti-siphon assembly (Model HVAS125). Six-gpm flow controllers (Model FC) are available, if necessary. Larger diameter models are available if necessary.

4. Float Switch Assembly (also see Alternate):

Orenco Systems®, Inc. Model MF4A with four switch floats mounted on a PVC stem attached to the filter cartridge. The floats must be adjustable and must be removable without removing the pump vault. The high- and low-level alarms and on/off functions shall be preset as shown in the engineer's plans. Each float lead shall be secured with a nylon strain relief bushing at the splice box. The floats shall be UL or CSA listed and shall be rated for a minimum of 5.0A @ 120 VAC.

5. High-Head Effluent Pumps:

For most applications, an Orenco Systems®, Inc. Model P200511, 1/2 hp, 115 VAC, single phase, 60 Hz, two-wire motor, with 10 foot long extra heavy duty (SO) electrical cord with ground. Pump shall be capable of providing a flow rate of 20 gpm against a head of 105 feet. Pump shall be UL and CSA listed as an effluent pump. Pump shall be provided with a non-prorated five-year warranty. Larger horsepower units are available (3/4 to 1-1/2 hp, 230 VAC).

6. Electrical Splice Boxes:

Orenco Systems®, Inc. Models SB6, UL approved for wet locations, equipped with six electrical cord grips and a 1" outlet fitting. Also included shall be UL listed waterproof butt splice connectors. Substitute Model SB4, equipped with four electrical cord grips and a 3/4" outlet fitting and Model SBX-D for Class 1, Division 1 applications.

7. Controls and Alarms (also see Alternate):

Shall be listed per UL 508 or UL 698A for Class 1, Division 1. Panels shall be repairable in the field without the use of soldering irons or substantial disassembly. Panel shall be Orenco Systems®, Inc. Model MVP-DAX1RO or MVP-DAX2RO control panel meeting the following:

Standard Components:

- a. Programmable Logic Unit: 115/230 VAC programmable logic unit with built-in LCD screen and programming keys. Provides control functions and timing for panel operation.

- b. Motor-Start Contactor: 115 VAC: 14 FLA, 3/4 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% of FLA). 230 VAC: 14 FLA, 2 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% FLA).
- c. Toggle Switch: Single-pole, double-throw MOA switch. 20 amps, 1 hp.
- d. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 115 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
- e. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole 115 VAC, double-pole 230 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
- f. Audio Alarm: 80 dB at 24", warble-tone sound.
- g. Visual Alarm: 7/8" diameter red lens, "Push-to-silence." NEMA 4, 1-watt bulb, 115 VAC.
- h. Panel Enclosure: Measures 13.5" high x 11.3" wide x 5.6" deep. NEMA 4X rated. Constructed of UV-resistant fiberglass; hinges and latch are stainless steel. Conduit couplings provided.
- i. MVP-DAX1RO Panel Ratings: 115 VAC, 3/4 hp, 14 amps, single phase, 60 Hz.
- j. MVP-DAX2RO Panel Ratings: 230 VAC, 2 hp, 14 amps, single phase, 60 Hz.
- k. Event Counter: 115 VAC, 6-digit, non-resettable.
- l. Elapsed Time Meter: 115 VAC, 7-digit, non-resettable. Limit of 99,999 hours; accurate to 0.01 hours.

Optional Components:

- m. Pump Run Light: 7/8" green lens. NEMA 4, 1-watt bulb, 115 VAC.
- n. Heater: Anti-condensation heater. Self-adjusting: radiates additional wattage as temperature drops.
- o. Intrinsically Safe Control Relays: 115 VAC. Listed per UL 913, for Class 1 Div. 1, Groups A, B, C, D hazardous locations. Larger enclosure required.
- p. Current Sensor: 115 VAC. Go/no-go operation. Pump fail indicator light on panel. Manual reset switch

Alternate: VeriComm™ Remote Telemetry Control System

The system will be monitored via remote telemetry, UL-recognized and FCC-approved for the application, and shall contain the following operating modes:

- A "Start-up Mode" during which the system will collect trend data for establishing future operating standards,
- A "Normal Mode" that manages day-to-day functions of the system,
- A "Test Mode" that suspends data collection and communications with the central server so that operators can install and service the system without affecting the panel's trend data and web-based communication.

In addition, the control system shall be capable of the following functions:

- Data Collection and Utilization
Logs data of system conditions and events, such as pump run time, pump cycles, alarm conditions, and alert conditions.
- Troubleshooting and Diagnostic Logic
Programmed to identify and report suspected failed components (Alarms) and negative trends in operating data (Alerts).
- Advanced Control Logic
Advanced control logic will activate in the event of component malfunction to diagnose the system using pre-established trend data and, if necessary, modify the operation of the system until the system can be serviced.
- Communications and Alarm Management
The control and monitoring system shall operate such that the telemetry control unit will communicate with a web-based monitoring application for reporting and alarm management. The system shall provide for a minimum of three levels of password-protected security access and control to ensure only qualified personnel can access and communicate with the panel. The communication protocol shall allow the operator to communicate with the telemetry unit using any modem (Mac or PC) and a web browser, or a simple communication program (e.g. HyperTerminal or Z-Term). Telemetry units requiring proprietary software shall not be considered.

The telemetry unit will provide automatic notification or call-in to the host in the event of:

- Alarms, which signal fault conditions that need to be addressed immediately (e.g. high or low liquid levels, pump failure, failed contactor, etc.);

- Alerts, which signal less critical conditions that require attention, but which will engage the panel's troubleshooting and diagnostic logic and alternative operating modes (e.g. stuck float switch, leaking tank, brownout, high flows, etc.);
- Updates, which include follow-up reminders or all-clear notifications following Alarms/Alerts, as well as scheduled panel reports;
- Manual forced communication, from panel to host to effect an update of queued programming changes.

In addition, the unit shall have the capability of real-time direct connection to the panel via laptop serial port, to allow the operator real-time access to detailed logged data and the ability to change point values.

Standard Components:

- a. Motor-Start Contactor: 115 VAC: 14 FLA, 3/4 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% of FLA). 230 VAC: 14 FLA, 2 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% FLA).
- b. Toggle Switch: Single-pole switch, automatic On, with spring-loaded, momentary, manual On. 20 amps, 1 hp.
- c. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 115 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
- d. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole 115 VAC, double-pole 230 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
- e. Audio Alarm: 80 dB at 24", warble-tone sound.
- f. Visual Alarm: 7/8" diameter red lens, "Push-to-silence." NEMA 4, 1-watt bulb, 115 VAC
- g. Panel Enclosure: Measures 15.5" high x 13.3" wide x 6.7" deep. NEMA 4X rated. Constructed of UV-resistant fiberglass; hinges and latch are stainless steel. Conduit couplings provided.
- h. VCOM DAX1RO Panel Ratings: 115 VAC, 3/4 hp, 14 amps, single phase, 60 Hz.
- i. VCOM DAX2RO Panel Ratings: 230 VAC, 2 hp, 14 amps, single phase, 60 Hz.
- j. Vericom™ Remote Telemetry Unit: ATRTU-100; 36/18 VAC (center tap transformer), 8 digital inputs, 4 analog inputs, 4 digital outputs, on-board modem (2400 baud), LED input and output indicators, battery backup.

Optional Components:

- k. Pump Run Light: 7/8" green lens. NEMA 4, 1-watt bulb, 115 VAC.
- l. Heater: Anti-condensation heater. Self-adjusting: radiates additional wattage as temperature drops.
- m. Intrinsically Safe Control Relays: 115 VAC. Listed per UL 698A, for Class 1 Div. 1, Groups A, B, C, D hazardous locations. Larger enclosure required.
- n. Current Sensor: 115 VAC. Go/no-go operation. Pump fail indicator light on panel. Manual reset switch.
- o. Event Counter: 115 VAC, 6-digit, non-resettable.
- p. Elapsed Time Meter: 115 VAC, 7-digit, non-resettable. Limit of 99,999 hours; accurate to 0.01 hours.

Control panel shall be Orenco Systems®, Inc. VeriComm™ VCOM DAX_RO or engineer-approved equal.

8. Installation:

All pumping system components shall be installed in accordance with the manufacturer's recommendations, the engineer's plans, and all state and local regulations.

9. Location:

The pump control panel shall be mounted on a post or exterior wall nearest the tank and pump. If mounting to an exterior wall, try to select a garage or outbuilding where the sound of the motor contactor engaging will not be noticed. If a garage or outbuilding wall isn't available, installation should include use of sound-deadening insulation. (Post and panel mounting assemblies are acceptable.) The control panel shall be located within 50 feet and in sight of the pump motor or shall be provided with a lockable disconnect switch. The panel, when possible, should be mounted in the shade and protected from the weather. The panel should be located at a convenient height (usually about five feet above the ground) and where it will be accessible for maintenance.

STARK & COMPANY, P.C.

CERTIFIED PUBLIC ACCOUNTANTS

January 21, 2005

Mr. Mark E. Geisinger, President
Central Rivers Wastewater Utility, Inc.
P. O. Box 528
Kearney, Missouri 64060

Re: Financial projection – Berkshire Glen Subdivision

Dear Mr. Geisinger:

You have requested that I prepare an analysis of the financial impact of adding a proposed certificated area known as Berkshire Glen Subdivision (Berkshire) to Central Rivers Wastewater Utility, Inc.'s (Central Rivers) operations. Your office staff has cooperated with me in determining the number of lots involved and projected revenue (at current rates).

Berkshire consists of 30 lots, of which 6 lots are currently being serviced by Central Rivers. Of the remaining 24, it is expected that 10 more will become customers in each of the years 2005 and 2006, and the last 4 in 2007.

Expenses for Berkshire have been garnered directly from Central Rivers' 2003 Missouri Public Service Commission (MoPSC) Annual Report. Adjustments to normalize expenses were made to account for items that I discussed with Mr. Martin Hummel of the MoPSC in a telephone conversation on October 4, 2004. Such expenses were then divided by the average number of customers for the year 2003 to arrive at a per customer cost. An additional three percent (3%) for each year was added to account for inflation.

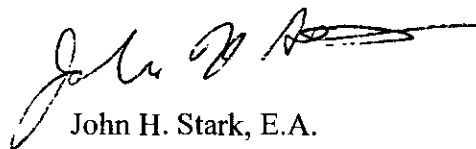
Therefore, a financial analysis of Berkshire is as follows:

	<u>2005</u>	<u>2006</u>	<u>2007</u>
Revenues	\$ 4,224	\$ 8,064	\$ 11,520
Less Expenses:			
Office rent and billing supplies	616	1,211	1,779
Insurance	752	1,478	2,171
Outside services	1,722	3,384	4,970
Taxes	198	390	572
Utilities	<u>599</u>	<u>1,177</u>	<u>1,730</u>
Total Expenses	<u>3,887</u>	<u>7,640</u>	<u>11,222</u>
Net income before taxes	\$ 337	\$ 424	\$ 298

The above schedule is intended for MoPSC use only and should not be used for any other purpose. As with any projection, there will usually be differences between projected and actual results because events and circumstances frequently do not occur as expected, and those differences may be material. The schedule indicates that Central Rivers' plan is financially sound and will not adversely affect its present customers or the customers in the proposed area.

If you have any questions or comments regarding the above, please feel free to call upon me.

Sincerely yours,



John H. Stark, E.A.