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Electronically Filed in TPUC Docket Room on September 18, 2025 at 3:25 p.m.

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September 18, 2025

VIA ELECTRONIC AND U.S. MAIL:

Hon. David Jones, Chairman
c/o Ectory Lawless, Docket Room Manager
Tennessee Public Utility Commission
502 Deaderick Street, 4th Floor
Nashville, Tennessee 37243
TPUC.DocketRoom@tn.gov

Docket No. 25-00075

Re: ***Petition of Integrated Resource Management, Inc. d/b/a IRM Utility, for a Certificate of Convenience and Necessity***

Dear Chairman Jones:

Please find enclosed the Petition of Integrated Resource Management, Inc., d/b/a IRM Utility, for a Certificate of Convenience and Necessity.

As required, an original and four copies of this filing will be delivered to your office, along with a check for the filing fee in the amount of $25.00. Please contact me if you have any questions concerning this filing or require additional information.

Sincerely,

PHELPS DUNBAR, LLP

/s/ Chuck B. Welch, Jr.
Chuck B. Welch, Jr.

cc: irmutility@gmail.com
joshua.mayorquin@phelps.com
ectory.r.lawless@tn.gov
karen.stachowski@ag.tn.gov

BEFORE THE TENNESSEE PUBLIC UTILITY COMMISSION
NASHVILLE, TENNESSEE

IN RE:	)	
	)	
PETITION OF INTEGRATED	)	**DOCKET NO. 25-00075**
RESOURCE MANAGEMENT, INC.	)	
FOR A CERTIFICATE OF	)	
CONVENIENCE AND NECESSITY	)	

PETITION OF INTEGRATED RESOURCE MANAGEMENT, INC. FOR A CERTIFICATE OF CONVENIENCE AND NECESSITY

Integrated Resource Management, Inc. d/b/a IRM Utility, Inc. ("IRM" or "Petitioner"), by and through counsel, hereby petitions the Tennessee Public Utility Commission (the "Commission" or "TPUC"), pursuant to Tenn. Code Ann. §§ 65-4-101 and 65-4-201 and TPUC Rule 1220-1-1-.03, and respectfully requests that the Commission grant it a Certificate of Public Convenience and Necessity ("CCN") and the accompanying authority to provide wastewater utility services to River Gorge Ranch (the "Development"), a development by Thunder Air, Inc., a Tennessee For-Profit Corporation d/b/a Thunder Enterprises ("Thunder Enterprises" or "Developer"). Petitioner will provide wastewater services to the Development's occupants. The pre-filed testimony of Petitioner's President, Jeffrey Cox, Jr., in support of this Petition, is attached hereto as **Exhibit 1**. Petitioner further provides the following in support of this Petition:

A. INTRODUCTION

1. The full name, address, and contact information for the Applicant is as follows:

IRM Utility, Inc.
c/o Jeffrey Cox, Jr.
3444 Saint Andrews Drive,
White Pine, Tennessee, 37890
(865) 736-4672
irmutility@gmail.com

2. All correspondence, notices, inquiries, questions, and other communications regarding the Petition should be directed to the persons or entities identified in the preceding paragraph, with copies to the following counsel for the Applicant:

Charles B. Welch, Jr.
Phelps Dunbar LLP
414 Union Street, Suite 1105
Nashville, Tennessee 37219
(615) 726-1200
chuck.welch@phelps.com

3. In support of this Application, the following appendix and exhibits are attached:

a. **Appendix A: Minimum Filing Requirements**
b. **Exhibit 1: Pre-filed Testimony of Petitioner's President, Jeffrey Cox**
c. **Exhibit 2: Utility Services Agreement**
d. **Exhibit 3: State Operating Permit Application & Engineering Report**
e. **Exhibit 4: System Plans and Site Map**
f. **Exhibit 5: Wastewater Flows Table**
g. **Exhibit 6: Financial Statement**
h. **Exhibit 7: Pro Forma (Five Years of Operation)**
i. **Exhibit 8: Chart of Accounts**
j. **Exhibit 9: Biography of Jeffrey Cox**
k. **Exhibit 10: Organizational Charts**
l. **Exhibit 11: Letter from Mayor of Marion County**
m. **Exhibit 12: Charter & By-laws of IRM**
n. **Exhibit 13: Business License of IRM**
o. **Exhibit 14: Most Recent Tariff**

B. DESCRIPTION OF THE PETITIONER AND RELEVANT ENTITIES

IRM is incorporated under the laws of the State of Tennessee, with its principal address being 3444 Saint Andrews Drive, Baneberry, Tennessee 37890. As a provider of wastewater utility services, IRM is subject to regulation and supervision by the Commission pursuant to Title 65, Chapter 4 of the Tennessee Code Annotated ("TCA"). IRM is a "Public Utility" as such term is utilized in TCA § 65-4-101(6).

IRM has been engaged in the business of providing wastewater utility services since 2004, when it was granted its first CCN in TPUC Docket No. 03-0467. Presently, IRM provides services

to two hundred seventy-four (274) customers via thirteen (13) wastewater systems in the State of Tennessee.[1] IRM's track record of providing wastewater utility services in Tennessee is well established.

Thunder Enterprises is incorporated under the laws of the State of Tennessee, with its principal address being 10213 Hwy. 156, Guild, Tennessee 37340.

C. DESCRIPTION OF THE TRANSACTION

The Utility Services Agreement (the "Agreement") between IRM and the Developer is attached hereto as **Exhibit 2**. Pursuant to the Agreement, Developer shall construct and install a sewage system for the "Amenity 1 area" of the Development. Once the construction and installation is complete, Developer shall grant to IRM a perpetual easement for the purpose of providing wastewater services to Amenity 1. IRM applied to the Tennessee Department of Environment and Conservation ("TDEC) for a State Operating Permit ("SOP"). Please see **Exhibit 3** for a copy of IRM's SOP application. Issuance of the final SOP will occur after the filing of this Petition, at which point, IRM will promptly supplement this docket.

The final Development will contain approximately 2,200 residences consisting of a combination of full-time occupancy, vacation, and rental units. However, the Amenity 1 area of the Development, which IRM seeks authority to service through this Petition, will consist only of restaurants, venues, commercial shops, a welcome center, twenty-four (24) townhomes, fourteen (14) cabins, and ten (10) duplexes. Half the daily flow will be allocated to the restaurants and venues, with the other half being allocated to residential units.

The Amenity 1 area will be developed in three phases. Phase 1 includes the restaurants,

[1] IRM's service territory includes Compass Pointe (04-027), Cove Creek (08-013), Cove Mountain (02-012), Emory Pointe (04-012), Flat Hollow (06-039), Grand View (05-054), Isha Enclave (19-016), Lost Creek (01-003), Mtn. Shangrila (06-001), Paradise Pointe (22-031), Valley Mart Exxon (03-012), Waterside on Douglas Lake (18-012), and Wild Briar (04-067).

venues, commercial shops, and welcome center, with an estimated completion date in December 2025. Phase 2 includes the cabins, with an estimated completion date in August 2026. Phase 3 includes the townhomes, with an estimated completion date in March 2027. Please see the SOP application and engineering report attached as **Exhibit 3**, the system plans and site map attached as **Exhibit 4**, and the estimated wastewater flows table attached as **Exhibit 5**.

D. IRM UTILITY, INC. POSSESSES THE TECHNICAL, MANAGERIAL AND FINANCIAL EXPERTISE NECESSARY TO PROVIDE UTILITY SERVICES

IRM possesses the technical, financial, and managerial expertise necessary to effectively operate as a public utility services provider in Tennessee. These qualifications are addressed below, as well as in **Appendix A** and the pre-filed testimony of IRM's President, Jeffrey Cox, Jr.

1. Technical Qualifications

IRM has provided onsite wastewater disposal systems in Tennessee since 2004. Currently, IRM possesses thirteen (13) active SOPs through which it serves one hundred fourteen (114) residential customers, one hundred fifty-five (155) rental/vacation residences, two (2) campgrounds, and two (2) special cases. IRM satisfies the requirements necessary to obtain a CCN as specified in Tenn. Comp. Rules & Regs. 1220-04-03-.17. Each requirement is individually addressed in **Appendix A.**

2. Financial Qualifications

Pursuant to the Utility Services Agreement, the Developer is responsible for the costs incurred to construct the system. IRM possesses the requisite financial qualifications to operate the system. Financial statements for the most recent year are attached as **Exhibit 6.** A pro forma income statement for the first five (5) years of operation is attached as **Exhibit 7.** A chart of accounts is attached as **Exhibit 8.** Financial qualifications are further addressed in **Appendix A**.

3. Managerial Qualifications

The biography of IRM's president, Jeffrey Cox, Jr., is attached as **Exhibit 9,** and an organizational chart for IRM's officers and key staff is attached as **Exhibit 10.** IRM's history of providing wastewater services since 2004 further demonstrates that it possesses the managerial and other qualifications necessary to provide wastewater services to the Development.

E. APPROVAL OF THE PETITION IS IN THE PUBLIC INTEREST

IRM submits that approval of this Petition will serve the public interest and enhance the rural community to be served. Currently, Marion County does not intend to provide wastewater services to the Amenity 1 area of the Development. A letter from the Mayor of Marion County acknowledging the same is attached as **Exhibit 11.**

The rates, terms, and conditions of services provided by IRM to its other customers will not be impacted as a result this transaction and the granting of the CCN to the Petitioner. Future adjustments in rates, terms, and conditions, if any, will be undertaken pursuant to the applicable TPUC notice and tariff requirements. IRM's services will continue to satisfy the service standards required by the Commission.

WHEREFORE, Petitioner respectfully requests that the Commission:

1. Grant Petitioner a Certificate of Convenience and Necessity to provide wastewater services to the River Gorge Ranch development; and

2. Grant any and all other relief as the Commission may deem just and proper.

Respectfully submitted,

Charles B. Welch, Jr.

Charles B. Welch, Jr. #005593
Phelps Dunbar LLP
414 Union Street, Suite 1105
Nashville, Tennessee 37219
(615) 726-1200

APPENDIX A

1220-04-13-.17 MINIMUM REQUIREMENTS FOR NEW AND AMENDMENTS TO CERTIFICATE OF CONVENIENCE AND NECESSITY.

(1) Any public wastewater utility requesting a Certificate of Public Convenience and Necessity ("CCN") in accordance with Tenn. Code Ann. §§65-4-201, *et seq*., shall file an application that complies with Rule 1220-01-01-.03 and this rule. Each applicant shall demonstrate to the Commission that it possesses sufficient managerial, financial, and technical capabilities to provide the wastewater services for which it has applied. Each application shall demonstrate that there exists a public need for wastewater service and include the required financial security consistent with Tenn. Code Ann. § 65-4-201, and these rules.

APPLICANT'S RESPONSE: See application and testimony attached as Exhibit 1.

(2) Applications for a new or expanded CCN shall include the following information:

(a) General information about the applicant and the proposed system.

1. The legal corporate name, physical address and mailing address of the applicant.

APPLICANT'S RESPONSE: The legal corporate name, physical address, and mailing address of the applicant, Integrated Resource Management, Inc. ("IRM"), are provided in Section A, Paragraph 1 of the Petition.

2. An organizational chart showing each officer and any other key personnel by name and title.

APPLICANT'S RESPONSE: Please see Exhibit 10 for an organizational chart listing the name and title of IRM's officers and key personnel.

3. A list of owners, members and officers of the wastewater utility:

APPLICANT'S RESPONSE:

Position	Name	Ownership	Address	Phone
President	Jeffrey W. Cox, Jr	70%	3444 Saint Andrews Dr. White Pine, Tennessee 37890	(865) 674-0828
Vice President	Marian J. Cox	30%	3444 Saint Andrews Dr. White Pine, Tennessee 37890	(865) 674-0828
Secretary & Treasurer	Krystal L. Cox	0%	3444 Saint Andrews Dr. White Pine, Tennessee 37890	(865) 674-0828

4. If the applicant has affiliated companies, provide a corporate organization chart showing all affiliate relationships. Describe in detail any transactions, direct or indirect, that occur or are expected to occur between the affiliated entities.

APPLICANT'S RESPONSE: IRM C&C is an affiliate of IRM. The organizational chart for IRM C&C is included in Exhibit 10. A detailed list of transactions between the affiliated entities is included in the Annual Reports.

5. A copy of the applicant's articles of incorporation, partnership agreement, and/or by-laws.

APPLICANT'S RESPONSE: IRM's charter and by-laws are collectively attached as Exhibit 12.

6. A copy of the applicant's license to engage in business within the State of Tennessee registered with the Secretary of State, inclusive of any assumed names of the company.

APPLICANT'S RESPONSE: A copy of IRM's license to engage in business within the State of Tennessee, registered with the Secretary of State, is attached as Exhibit 13.

7. A complete description of the geographic territory to be served by the applicant, including the name and location of development (subdivision) and the number of acres. Include the name of the subdivision or development and the name of the wastewater system as stated in the TDEC permit. In addition, provide a legible map of the area with the proposed service territory clearly and accurately plotted. The map should include:

(i) The location of the wastewater system, i.e., treatment plant, pre-application treatment facilities, collection infrastructure, building(s) for equipment, drip fields, disposal fields and/or wetland cells. Include the physical address of the wastewater system and the associated latitude and longitude coordinates.

(ii) The names of surrounding streets and roads.

(iii) A map to show access roads and names of access roads (if available) and other utilities necessary to provide wastewater service.

(iv) All residences and habitable structures served by the wastewater system.

(v) Any portion of the areas that will not be served when the wastewater system becomes operational. If the wastewater system will be operational in phases, show the phases on the map.

APPLICANT'S RESPONSE: IRM seeks approval to provide water and wastewater services to River Gorge Ranch (the "Development"), a development to be located on Aetna Mountain in the City of Guild, Marion County, Tennessee. Aetna Mountain is part of a chain of plateau-like ridges along the eastern Cumberland Plateau. The area where the development will be located is bounded on the west, north, and east by the Tennessee River (Nickajack Reservoir), and on the southwest by Running Water Creek. Latitude is 35.014214 N, and the Longitude is 85.518694 W.

IRM applied to the Tennessee Department of Environment and Conservation ("TDEC) for a State Operating Permit ("SOP"). Issuance of the final SOP will occur subsequent to the filing of this Petition. IRM will promptly supplement this docket upon issuance. IRM's SOP application requests approval to operate a combination system consisting of a Septic Tank Effluent Pump (STEP) system with pressure sewer and a treatment and disposal system consisting of a septic subsurface disposal system with low pressure pipe (LPP). Please see the SOP application and engineering report attached collectively as Exhibit 3 and the system plans and site map attached collectively as Exhibit 4. There are currently no residences or habitable structures located in the area to be served. Development phases are addressed in Section C of the Petition and the provided system plans and map.

8. A description of the type of proposed wastewater system to be constructed including the design capacity and the maximum potential number of customers the public wastewater utility will service in the proposed service area. Indicate the technology used for the wastewater system (e.g., membrane, sand filter, wetland cell and/or lagoon). The type of system and design capacity should match the type and design capacity of the associated TDEC permit and permit application.

APPLICANT'S RESPONSE: The proposed wastewater system is a combination system as described in the previous response. Please also see the engineering report included in Exhibit 3 and the wastewater flow table attached as Exhibit 5.

9. The estimated dates for the commencement and completion of the construction of the system and the estimated date the wastewater system will be placed into service. If the wastewater system will be constructed or placed into service in phases, provide the anticipated dates for each phase.

APPLICANT'S RESPONSE: The final Development will contain approximately 2,200 residential properties, consisting of a combination of full-time occupancy, vacation homes, and rental/commercial units. However, the Amenity 1 area of the Development, which IRM seeks authority to service through this Petition, will consist only of restaurants, venues, commercial shops, a welcome center, twenty-four (24) townhomes, fourteen (14) cabins, and ten (10) duplexes. Half the daily flow will be allocated to the restaurants and venues, with the other half being allocated to residential units. The Amenity 1 area will be built in phases. Phase 1 includes the restaurants, venues, commercial shops and welcome center, with an estimated completion date in December 2025. Phase 2 includes the cabins, with an estimated completion date in August 2026. Phase 3 includes the townhomes, with an estimated completion date in March 2027. Please see the SOP application and engineering report attached as Exhibit 3, the system plans and site map attached as Exhibit 4, and the estimated wastewater flows table attached as Exhibit 5.

10. If portions of the wastewater system will be built in phases, state how many phases and the number of houses or units to be connected in each phase.

APPLICANT'S RESPONSE: Please see the response to the previous item.

11. Identify the builder or developer that has requested the utility to provide wastewater service. Include name of company, name of primary contact, title, mailing address, email address, and phone number.

APPLICANT'S RESPONSE: The Developer is Thunder Air, Inc. d/b/a Thunder Enterprises, with its principal address being 10213 Hwy. 156, Guild, Tennessee 37340. The Developer has requested that IRM provide wastewater services to the Amenity 1 area of the Development. Clarence Howard is the Developer's authorized agent. Mr. Howard's contact information is as follows:

Name: Clarence Howard
E-mail: clarence@thunderenterprises.com
Telephone: (423) 421-9775

12. Respond completely to all information requests by Commission staff.

APPLICANT'S RESPONSE: The Applicant affirms that it will respond completely to all information requests from the Commission staff.

(b) Evidence that the requisite property rights and public need exists for wastewater services in the proposed service area:

1. A letter(s) from local government(s) and public wastewater utilities in or near the proposed service area stating that they do not provide wastewater service to the proposed service area and that they are unable or unwilling to provide wastewater service to the proposed service area within the ensuing twelve (12) months.

   APPLICANT'S RESPONSE: Please see the letter from the Mayor of Marion County attached as Exhibit 11.

2. As applicable, a copy of any application for a franchise and the franchise agreement issued by a city of county.

   APPLICANT'S RESPONSE: The Development is located in an area that does not require a municipal or county franchise.

3. All contracts or agreements between the builder(s) of the treatment and/or collection system, the utility, and the property and/or subdivision developer that show entitlement or ownership to the land, system specifications, costs for the wastewater system, timeline for the system to be built, and rights to the system once it is completed. Documents presented by the applicant should be signed by all parties and bear marks or stamps, such as those provided by notaries or public officials, as necessary.

   APPLICANT'S RESPONSE: Please see the Utilities Service Agreement between IRM and the Developer, attached as Exhibit 2.

(c) Evidence that the applicant possesses sufficient managerial ability:

1. Biographies of officers and/or key wastewater utility staff that demonstrate managerial ability. Include a list of certifications or professional licenses held by officers or wastewater utility staff with documentation.

   APPLICANT'S RESPONSE: Please see the biography of IRM's President, Jeffrey Cox, Jr., attached as Exhibit 9, and the organizational chart attached as Exhibit 10.

2. Identify all states where the applicant is certified as a wastewater provider and/or the status of certification in states where an application is pending.

   APPLICANT'S RESPONSE: IRM is a certified wastewater provider in Tennessee only.

3. Copies of all contracts related to any pending merger or acquisition of the applicant, corporate parent, or affiliate.

   APPLICANT'S RESPONSE: Neither IRM nor its affiliate is involved in any pending mergers or acquisitions.

4. Proof that the party contracted to install the proposed system and has a valid and current contractor's license by the applicable licensing board of the State of Tennessee.

   APPLICANT'S RESPONSE: See the Utilities Service Agreement between IRM and the Developer attached as Exhibit 2. A copy of IRM's Business License attached as Exhibit 13.

(d) Evidence that the applicant possesses sufficient technical ability:

1. A copy of the application for the State Operating Permit ("SOP") filed with TDEC. Include the letter from TDEC indicating the receipt of a complete application. Include any engineering and/or design reports submitted to TDEC, such as the Design Development Report and the Detailed Soils Investigation Report. If an operating permit has been issued, provide a copy of the permit. The utility shall file a copy of the TDEC permit in the docket file prior to providing service.

   APPLICANT'S RESPONSE: A copy of IRM's application for the SOP, including the letter from TDEC indicating receipt thereof, and the engineering and/or design report submitted to TDEC therewith, are attached collectively as Exhibit 3. Issuance of the final SOP will occur after the filing of this Petition.

2. A copy of the State Operator Certificate for the wastewater system operator of record. If the operator is a contract employee of the utility, provide a copy of the employment contract.

   APPLICANT'S RESPONSE: IRM applied to TDEC for an SOP, but neither a draft certificate nor a final SOP has been issued. IRM's SOP application is attached as Exhibit 3. Issuance of the SOP will occur after the filing of this Petition, at which point, IRM will promptly supplement this docket.

3. The name, address, and telephone number of the technical contact person responsible for and knowledgeable about the applicant's proposed operations in Tennessee.

APPLICANT'S RESPONSE: IRM's President, Jeffrey W. Cox, Jr., is responsible for and knowledgeable of IRM's operations in Tennessee. Mr. Cox's address and telephone number are provided in Section A, Paragraph 1 of this Petition.

4. A list of any complaint(s), notices of violation or administrative action filed with or issued by a regulatory agency. Identify the nature of the complaint, notices of violation, or administrative action, which agency is involved, and how the issue was or is being resolved.

APPLICANT'S RESPONSE: IRM is not aware of any complaints or notices of a violation or administrative action issued by any federal, state, or local regulatory agency against it.

5. A certification from a design engineer that the wastewater system was constructed in accordance with the TDEC-approved construction plans and specifications. The certification shall be filed in the docket file prior to providing service.

APPLICANT'S RESPONSE: The system has not yet been constructed. IRM affirms that it will file the certification in the docket prior to providing service.

(e) Evidence that the applicant possesses sufficient financial capability:

1. Financial statements for the applicant covering the most recent year ended. Include a balance sheet, income statement, and statement of cash flows.

APPLICANT'S RESPONSE: Financial statements for IRM for the most recent fiscal year are included in the Annual Reports. Alternatively, please see Exhibit 6.

2. Pro forma income statements for the wastewater utility for the first three (3) years of operations or for an expanded amended CCN, the first three years after the latest year-end financials. In the calculations of utility revenues show the number of consumers and the rates used in the calculations. Show operation and maintenance expenses by account number and provide the basis and/or assumptions used to arrive at these amounts.

APPLICANT'S RESPONSE: A pro forma income statement for the first five (5) years of operation is attached as Exhibit 7.

3. A chart of accounts for the wastewater utility, following the NARUC Uniform System of Accounts (USA) for wastewater utilities.

APPLICANT'S RESPONSE: A proposed chart of accounts for water and wastewater utilities is included in the Annual Reports. Alternatively, please see Exhibit 8.

4. A list of all plant-in-service account numbers with account names and estimated account balances as of the state of operations.

APPLICANT'S RESPONSE: A list of plant-in-service account numbers and names, along with estimated account balances, are included in the Annual Reports. Alternatively, please see Exhibit 8.

5. The depreciation rates the applicant intends to use for each plant account that will be on the wastewater utility's books. Include the estimated useful life of each account. If no depreciation study has been performed, explain the basis for these rates.

APPLICANT'S RESPONSE: IRM proposes to use the depreciation rates most recently approved by the Commission for IRM.

6. The total estimated detailed cost of construction of the wastewater system to be constructed for the proposed service area. If the wastewater system will be constructed in phases, provide detailed construction cost estimates for each phase. Indicate whether the developer or the applicant will pay for the construction of the system.

APPLICANT'S RESPONSE: The total estimated cost for the construction of the wastewater system is dependent upon time and cost increases. Pursuant to the Utility Services Agreement with the Developer, the cost of constructing the system is the Developer's responsibility. A copy of the Utility Services Agreement is attached as Exhibit 2.

7. Indicate the identity of the owner(s) of the wastewater system once construction is complete. If a party other than the utility pays the cost of construction and transfers ownership of the wastewater system to the applicant, provide a detailed breakdown of the estimated amount of contributed capital that will be recorded on the applicant's financial books.

APPLICANT'S RESPONSE: If the Commission approves the Petition, the Developer will convey a Perpetual Easement to IRM for the purpose of providing wastewater services to the Amenity 1 area of the Development upon completion of the construction and installation of the System. The Developer shall retain ownership of the system.

8. A tariff showing products, services, terms, conditions and proposed rates to be charged for wastewater service. A tariff should include all pass-through fees, including but not limited to, customer deposits, disconnect or reconnect fees, late fees, tap fees, escrow fees, bond fees, franchise fees and taxes.

APPLICANT'S RESPONSE: If the Commission approves the Petition, IRM proposes to adopt the Tariff, including approved rates, currently in effect and on file with the Commission for IRM, which is attached as Exhibit 14.

9. Provide estimates of costs and customers added by month for the first five (5) years based upon the construction build-out schedule for developers in the service area of the proposed wastewater system. For each year, by month, provided an estimated number of customers by customer class anticipated to be served by the wastewater system. Include the utility's basis and assumptions used for this projection. Provide this information in a spreadsheet in Microsoft Excel format with all assumptions clearly documented.

APPLICANT'S RESPONSE: This Petition, if approved, would grant IRM the authority to provide wastewater services to the Amenity 1 area of the Development. The final Development will contain approximately 2,200 residential properties, consisting of a combination of full-time occupancy, vacation homes, and rental/commercial units. However, the Amenity 1 area of the Development, which IRM seeks authority to service through this Petition, will consist only of restaurants, venues, commercial shops, a welcome center, twenty-four (24) townhomes, fourteen (14) cabins, and ten (10) duplexes. Half the daily flow will be allocated to the restaurants and venues, with the other half being allocated to residential units. The Amenity 1 area will be built in phases. Phase 1 includes the restaurants, venues, commercial shops and welcome center, with an estimated completion date in December 2025. Phase 2 includes the cabins, with an estimated completion date in August 2026. Phase 3 includes the townhomes, with an estimated completion date in March 2027. Please see the SOP application and engineering report attached as Exhibit 3, the system plans and site map attached as Exhibit 4, and the estimated wastewater flows table attached as Exhibit 5.

10. Documentation describing bonding requirements imposed by municipal governments for the proposed wastewater system.

APPLICANT'S RESPONSE: The Development is located in an area that does not require a municipal or county bond.

11. Demonstrate that the applicant has acquired a performance bond from the developer or builder of the wastewater system made payable to the Utility to ensure construction of the wastewater system. The performance bond should be for an amount equal to or greater than the cost of the system as provided in contracts between builder, developer and/or utility.

APPLICANT'S RESPONSE: Pursuant to Paragraph 3 of the Utility Services Agreement attached as Exhibit 2, Developer shall provide a cash deposit, letter of credit, or bond in the amount of $1,652,444.89 as surety to ensure completion of the construction of the system serving the development. This amount is equal to the Utility's estimated cost to construct and install the system, plus twenty percent (20%) of such costs.

12. List all funding sources available to the applicant for the wastewater system proposed by the applicant.

APPLICANT'S RESPONSE: Pursuant to Paragraph 3 of the Utility Services Agreement attached as Exhibit 2, Developer shall provide a cash deposit, letter of credit, or bond in the amount of $1,652,444.89 as surety to ensure completion of the construction of the system serving the development. This amount is equal to the Utility's estimated cost to construct and install the system, plus twenty percent (20%) of such costs.

13. Provide information demonstrating compliance with the financial security requirement of Rule 1220-04-13-.07.

APPLICANT'S RESPONSE: Information demonstrating compliance with the financial security requirements of Rule 1220-04-13-.07 is on file with the Commission. The original documents from People's Bank in Clifton, Tennessee, which are on file with the Commission, were submitted on October 31, 2019.

(f) Sworn pre-filed written testimony by the applicant's owner, member, officer or other principal having knowledge of the applicant's operations and the proposed wastewater system. The testimony should, at a minimum, include the following information:

1. Evidence that a public need exists for wastewater services in the proposed service area.

2. A description of the wastewater system and the services to be provided.

3. A statement that the applicant is aware of and will abide by all applicable Tennessee statutes and TPUC Rules.

4. A discussion and demonstration of technical, managerial, and financial capability of the applicant to provide the proposed wastewater service.

5. A statement that the applicant is aware of the requirement of Rule 1220-04-13.09(7) concerning the completion of the construction of the wastewater system within three years of TPUC's written approval of the CCN.

6. A signed affidavit stating that all information submitted concerning the wastewater CCN application is true and correct to the best of the witness' knowledge and belief.

APPLICANT'S RESPONSE: Attached as Exhibit 1 is the sworn, pre-filed direct testimony of IRM's President, Jeffrey W. Cox, Jr. Mr. Cox has knowledge of IRM's operations and the proposed wastewater system. The pre-filed testimony attached as Exhibit 1 contains the following:

1. **Evidence that a public need exists for wastewater services in the proposed service area.**

2. **A description of the wastewater system and the services to be provided.**

3. **A statement that the applicant is aware of and will abide by all applicable Tennessee statutes and TPUC Rules.**

4. **A discussion and demonstration of technical, managerial, and financial capability of the applicant to provide the proposed wastewater service.**

5. **A statement that the applicant is aware of the requirement of Rule 1220-04-13-.09(7) concerning the completion of the construction of the wastewater system within three years of TPUC's written approval of the CCN.**

6. **A signed affidavit stating that all information submitted concerning the wastewater CCN application is true and correct to the best of the witness's knowledge and belief.**

EXHIBITS

EXHIBIT 1:
PRE-FILED DIRECT TESTIMONY OF JEFFREY W. COX, JR.

BEFORE THE TENNESSEE PUBLIC UTILITY COMMISSION
NASHVILLE, TENNESSEE

IN RE:	)	
	)	
PETITION OF INTEGRATED	)	**DOCKET NO._____**
RESOURCE MANAGEMENT, INC.	)	
FOR A CERTIFICATE OF	)	
CONVENIENCE AND NECESSITY	)	

PRE-FILED DIRECT TESTIMONY OF JEFFREY W. COX, JR.

Q1. Please state your name for the record and your position with the Petitioner, Integrated Resource Management, Inc. d/b/a IRM Utility, Inc. ("IRM").

A1. My name is Jeffrey W. Cox, Jr. I am the President of Integrated Resource Management, Inc., d/b/a IRM Utility, Inc.

Q2. Are you presenting testimony on behalf of IRM?

A2. Yes.

Q3. Did you assist and cause the Petition to be filed in this proceeding requesting a Certificate of Convenience and Necessity and accompanying authority for IRM to provide wastewater services to a mixed residential and commercial development in Marion County, Tennessee, known as River Gorge Ranch?

A3. Yes.

Q4. When did IRM receive its first Certificate of Public Convenience and Necessity ("CCN') from the Tennessee Regulatory Authority ("Authority") to operate a sewer system in Tennessee?

A4. IRM received its first CCN on March 16, 2004, in Docket No. 03-0467. That CCN related to Valley Mart Exxon and Cove Creek Real Estate.

Q5. Can you describe the service you will be providing?

A5. Yes. The service will be the same services we have petitioned for in the past. Specifically, we will be providing onsite wastewater disposal services utilizing a standard LPP Subsurface Sewage Disposal System. Although this will be a combined commercial and residential application, the service and the system will be similar to ISHA Enclave, Wild Briar, Grand View, Riverstone Estates, Compass Pointe, and Emory Point, among others.

Q6. How many customers will be served by the proposed system?

A6. The final Development will contain approximately 2,200 residential properties, consisting of a combination of full-time occupancy, vacation homes, and rental/commercial units. However, the Amenity 1 area of the Development, which IRM seeks authority to service through this Petition, will consist only of restaurants, venues, commercial shops, a welcome center, twenty-four (24) townhomes, fourteen (14) cabins, and ten (10) duplexes. Half the daily flow will be allocated to the restaurants and venues, with the other half being allocated to residential units.

Q7. Do you operate any other system in this area?

A7. IRM operates ISHA Enclave in Decatur County, approximately fifty (50) miles from the River Gorge Ranch development.

Q8. Does IRM have the managerial, technical, and financial ability to provide wastewater service in the area referred to in the Petition?

A8. Yes. This project is consistent with IRM's growth plan. In addition, IRM possesses the resources and capabilities necessary to effectively manage the Amenity 1 area of River Gorge Ranch. Moreover, increasing our customer base will improve IRM's financial stability.

Q9. Has IRM contacted other utility service providers in the area to determine if they have potential plans to service the area?

A9. The office of the Marion County Mayor was contacted and confirmed by letter that there are no plans to service this area with a sanitary sewer. Please see Exhibit 11 to the Petition.

Q10. Have you submitted plans to TDEC for approval?

A10. Yes. IRM's SOP application and the engineering report submitted therewith is attached as Exhibit 3 to the Petition. An SOP has not yet been issued. IRM will promptly provide the Commission with a copy of the SOP once issued.

Q11. Is all of the information in the Petition accurate to the best of your knowledge, information, and belief?

A11. Yes, it is.

Q12. Does this conclude your testimony?

A12. Yes.

STATE OF TENNESSEE)
)
COUNTY OF Davidson)

I, Jeffrey W. Cox, Jr., having been first duly sworn, makes oath that the statements contained in the Pre-Filed Direct Testimony are true to the best of my knowledge, information and belief.

Jeffrey W. Cox, Jr.

Sworn to and subscribed before me the 29th day of August 2025.

Notary Public

My commission expires: 1-22-2029

JOSHUA MAYORQUIN
STATE OF TENNESSEE NOTARY PUBLIC
DAVIDSON COUNTY
MY COMMISSION EXPIRES 1-22-2029

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true and exact copy of the foregoing has been sent electronically and by U.S. mail, first class, postage prepaid, to the following:

Tennessee Public Utility Commission
ATTN: Ectory Lawless, Docket Manager
Ectory.lawless@tn.gov
Tpuc.docketroom@tn.gov
502 Deaderick Street, 4th Floor
Nashville, Tennessee 37243

Office of Tennessee Attorney General
Consumer Advocate Division
ATTN: Karen H. Stachowski, Deputy Attorney General
Karen.stachowski@ag.tn.gov
P.O. Box 20207
Nashville, Tennessee 37202

Dated: September 18, 2025.

/s/ Charles B. Welch
Charles B. Welch

EXHIBIT 2:
UTILITY SERVICE AGREEMENT

Integrated Resource Management, Inc.
A Privately Owned Public Utility
P.O. Box 71526
Knoxville, TN 37938
Office: (865)674-0828
Cell: (865)712-4307
Email: IRMUtility@Gmail.com

UTILITY SERVICES AGREEMENT

This Utility Services Agreement (the "Agreement") is made and entered into effective the 25th day of August, 2025, by and between Integrated Resource Management, Inc. d/b/a IRM Utility, Inc., a Tennessee Corporation, with its principal office located at 3444 Saint Andrews Drive, White Pine, Tennessee, 37890 (the "Utility") and Thunder Air Inc. d/b/a Thunder Enterprises, with its principal office located at 10213 Hwy 156, Guild, TN 37340 (the "Developer"), (collectively, the "Parties").

Recitals:

1. Developer is the record owner of River Gorge Ranch (the "Development") recorded in the Registered of Deeds Office in Marion County, Tennessee; and

2. The Utility is a privately owned public utility in the business of providing wastewater and sewer treatment systems to residential and commercial consumers.

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties hereby agree as follows:

1. Developer shall construct and install a sewage collection, treatment, and disposal system (the "System") in the Development serving Future Amenity Center and certain Lots as shown on the River Gorge Ranch Phase I Final Plat, recorded in Book 6, Page 365, in the Register of Deeds for Marion County, Tennessee. Upon the completion of the construction and installation of the System and acceptance by the Utility, the Developer shall convey title of the treatment system and a Perpetual Utility Easement to the underlying real property on which the treatment system is installed to the Utility. Further, the Developer shall deliver a Perpetual Utility Easement for the purpose of allowing access necessary to provide wastewater services to the Development. Developer and Utility enter into this Agreement for the purpose of establishing the terms and conditions for construction, installation,

operation, and maintenance of the System. Upon the execution of this Agreement, and prior to consideration by the Tennessee Public Utilities Commission ("TPUC") of the IRM Petition for a Certificate of Public Convenience and Necessity, the Developer shall provide financial security in the form of a cash deposit, letter of credit, or bond, in an escrow account ("Escrow Account") an amount sufficient to ensure payment of all costs for the construction of the System, including without limitation all regulatory, licensing, and conveyance fees (the "Costs"). If a cash deposit is used for the security, the cash shall be deposited in an Escrow Account which shall be opened in the name of a third-party chosen by agreement of the Parties and shall be administered in accordance with the terms of a written escrow agreement.

2. The Developer shall construct and install the System to serve the Development in accordance with drawings, plans, and specifications selected and approved by the Developer and the Utility's engineers or representatives. Approvals will not be unreasonably withheld, conditioned, or delayed. The replacement, repair, maintenance, and operation and non-routine maintenance of the System installed to serve the Development shall be the responsibility of the Utility after the construction of the System is completed, approved, and accepted for operation by the Utility with the exception of defective parts or installation as noted below in Section 9.

3. The Developer shall provide a cash deposit, letter of credit, or bond in the amount of $ 1,652,444.89 ("Deposit"), as surety, to ensure completion of the construction of the system to serve the Development. Cash funds shall be deposited into the Escrow Account, under the control of a third-party escrow company. The Developer shall pay any and all expenses associated with setting up the third-party escrow company and terms of such will be subject to approval by the Utility. The Deposit is equal to the Utility's estimated cost to construct and install the System plus twenty percent (20%) of such costs. All remaining amounts of the Deposit are refundable to the Developer, if not needed to complete the construction of the System. All parties shall instruct the third-party escrow company to release the entire Deposit back to the Developer if Utility or construction subcontractor does not receive the required appropriate regulatory authorization. The estimated Costs are attached hereto as **Appendix I** to this Agreement and shall include an "Overrun Deposit" amount equal to twenty percent (20%) of the estimated Costs which shall be refunded to Developer to the extent the overrun deposit is not used for completion of the System.

4. Unless other satisfactory arrangements are agreed upon by the Parties, the Developer shall pay Utility a non-refundable amount equal to $35,000 for the expenses incurred by the Utility during construction.

5. Construction of the System shall be subject to the supervision and reasonable approval of Utility. The Utility shall have a right of inspection throughout the progress of the construction and installation work. The Utility will coordinate with the

construction subcontractor not to backfill soils over or cover any pipe, fittings, or connections until first inspected and approved by Utility. Utility will be responsible for documenting the locations of the various components of the System. If any digging or drilling is required of other contractors during or after the construction of the System, then Utility shall stake out, mark and locate the components to avoid accidental damage. If a contractor damages the System because a component was not accurately located by Utility, then Utility shall repair at its own expense. If another subcontractor of Developer damages the System due to the negligence of that contractor, then Developer shall be responsible for all costs to repair the damage.

6. The Utility shall petition the Tennessee Public Utilities Commission ("TPUC") for a Certificate of Public Convenience and Necessity ("CCN") authorizing the utility to provide the services to the Development. All cost associated with the petition for a CCN, including reasonable attorney fees, shall be paid by the Developer. The Developer shall apply and provide for the payment of any fees necessary for a state operating permit to be issued in the name of the Utility by the Tennessee Department of Environment and Conservation ("TDEC"). In the event the CCN is not issued by TPUC or the state operating permit is not issued by TDEC, despite the good faith, commercially reasonable efforts of the Utility, the Utility will have no further obligations under this Agreement.

7. Unless other satisfactory arrangements are agreed upon by the Parties, the contractor the Developer engages to build the System shall have the duty within a reasonable time to repair, all breaks, leaks, or defects in the System that are a result of the installation or the System and which occur within one (1) year from the date the System is accepted by the Utility. In the event the contractor fails to make such repairs, then the Utility shall be authorized to make such repairs at the sole cost and expense of the Developer.

8. Developer will facilitate and execute Restrictive Covenants and Bylaws of the Development providing that a service agreement or contract between lot owners and Utility will be required by each lot owner to establish wastewater service. The service agreements or contracts to be entered into between the lot owner and the Utility shall include, without limitation, a recitation that the Utility will charge a security deposit of $60.00; and a bi-annual sewer access fee charged against unimproved lots in an amount to be determined and established by its tariffs. The service agreement or contract shall be in a form substantially similar in all its material terms to Exhibit A, attached hereto and incorporated by reference. Unimproved Lot shall be defined as a lot which has been sold to a lot owner or is available for sale to a lot owner and has access to an active sewer tap.

9. Upon the issuance of the CCN to the Utility by TPUC and the state operating permit by TDEC, the Developer will turn over any and all funds collected from third parties for the purpose of operating the System, including but not limited to the security deposits collected from the homeowners.

10. The Developer hereby represents and warrants that at the time the Utility approves the System for operation, all materials and labor attributable to the System shall be paid in full at the time of the completion of construction and installation of the System and that the System shall be free from any and all liens and encumbrances.

11. The Developer hereby represents and warrants that the System will be in material conformance to the plans and specifications approved by the Utility.

12. Upon the Utility's approval of the proper construction of the System, the issuance of the final permits CCN to the Utility by TPUC and the issuance of the final state operating permit by TDEC, the Developer shall convey a perpetual utility easement, in favor of the Utility, as contemplated by this Agreement (see Section 1).

13. The Developer hereby represents and warrants it has the right, title, and interest to convey and shall convey the treatment system and a perpetual utility easement to the underlying real property on which the treatment System is installed to the Utility upon approval of the CCN by the Tennessee Public Utility Commission and the issuance of the state operating permit by TDEC. Notwithstanding anything to the contrary in this Agreement, the Developer will have no obligation to transfer the System or any easements contemplated by this Agreement if the Utility does not obtain the necessary approvals and permits to operate the System as contemplated by the Parties.

14. If any part of this Agreement for any reason shall be declared invalid or unenforceable, such decision shall not affect the validity or enforceability of any remaining provision, which shall remain in full force and effect; provided, however, that in the event a part of this Agreement is declared invalid and the invalidity or enforceability of such part has the effect of materially altering the obligations of any Party under this Agreement, the Parties agree, promptly upon such declaration being made, to negotiate in good faith to amend this Agreement so as to put such Party in a position substantially similar to the position such Party was in prior to such declaration.

15. The Utility shall not have any right to assign this Agreement or any of its respective rights or obligations under this Agreement to any third party. The Utility shall have no right to assign, transfer, convey, pledge, or hypothecate the permits or any interest thereto without any necessary approval of TDEC, and the prior written agreement of the assignee to be bound by the terms and conditions of this Agreement. Developer shall have the right to assign this Agreement or any of its respective rights and obligations under this Agreement to (a) an affiliated party of the Developer without the consent of Utility or (b) any third party after the satisfactory construction of the System and acceptance by the Utility. An affiliated party shall be defined as any of Developer's divisions or business segments,

together with its predecessors, successors, assigns, parents, subsidiaries, members, partners, shareholders, owners, officers, directors, employees and agents, and any person acting or purporting to act on their respective behalf.

16. The terms and conditions of this Agreement and the performance thereof shall be interpreted in accordance with and governed by the laws of the State of Tennessee; irrespective of its conflicts of law principles. Any claim, dispute, or other matter in question arising out of or relating to this Agreement or the breach thereof, except for claims which have been waived in writing and signed by the parties, pursuant to this Agreement, shall be governed by the laws of Tennessee and all actions shall be instituted and litigated in the State of Tennessee in the Hamilton County courts, and the Parties hereto submit to the jurisdiction of said courts. In any litigation, the prevailing party shall be entitled to recover its reasonable attorneys' fees from the other party.

17. This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior oral or written agreements or understandings of the parties with regard to the subject matter hereof. No interpretation, change, termination, or waiver of any provision hereof shall be binding upon a Party unless in writing and executed by both Parties. No modification, waiver, termination, recession, discharge, or cancellation of any right or claim under this Agreement shall affect the right of any Party hereto to enforce any other claim or right hereunder.

18. This Agreement may be executed in counterparts, each of which will be deemed to be an original, but all of which, taken together, will constitute one and the same Agreement.

19. This Agreement shall not be amended or modified except in writing signed by the Parties hereto.

IN WITNESS hereto the Parties have entered into this Agreement effective as of the day and date first above written.

INTEGRATED RESOURCE MANAGEMENT, INC.

By: _____
Jeffrey W. Cox, Jr., its President

Thunder Air Inc.

By: _____
Clarence Howard, its Authorized Agent

EXHIBIT 3:
State Operating Permit
Application
&
Engineering Report

Tennessee Department of Environment and Conservation
Division of Water Pollution Control
401 Church Street, 6th Floor L & C Annex
Nashville, TN 37243-1534
(615) 532-0625

APPLICATION FOR A STATE OPERATION PERMIT (SOP)

Type of application: ☒ New Permit ☐ Permit Reissuance ☐ Permit Modification

Permittee Identification: (Name of city, town, industry, corporation, individual, etc., applying, according to the provisions of Tennessee Code Annotated Section 69-3-108 and Regulations of the Tennessee Water Quality Control Board.)	
Permittee Name (applicant):	**Integrated Resource Management, Inc. (IRM Utility, Inc.)**
Permittee Address:	**3444 St. Andrews Dr.** **Baneberry, TN 37890**

Official Contact: **Jeffrey W. Cox, Jr.**	Title or Position: **President**		
Mailing Address: **PO BOX 71526**	City: Knoxville	State: **TN**	Zip: **37938**
Phone number(s): **865-674-0828**	E-mail: **IRMutility@gmail.com**		

Optional Contact: **Marian Cox**	Title or Position: **Vice President**		
Address: **3444 St. Andrews Dr.**	City: **Baneberry**	State: **TN**	Zip: **37890**
Phone number(s): **865-712-5997**	E-mail: **MarianJCox2@gmail.com**		

Application Certification (must be signed in accordance with the requirements of Rule 1200-4-5-.05)

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 gathered and evaluated 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, including the possibility of fine and imprisonment for knowing violations.

Name and title; print or type	Signature	Date
J. Bill Cox, Jr. President		9-5-2024

Permit Number: SOP-_____

Facility Identification:		**Existing Permit No.**
Facility Name:	Amenity 1 Sewer System River Gorge Ranch	County: Marion
Facility Address or Location:	10213 Hwy. 156 Guild, TN 37340	Latitude: 35.014214 N Longitude: 85.518694 W

Name and distance to nearest receiving waters: Running Water Creek, 0.6 mi. southwest

If any other State or Federal Water/Wastewater Permits have been obtained for this site, list their permit numbers:

Name of company or governmental entity that will operate the permitted system: IRM Utility, Inc.

Operator address: PO Box 71526, Knoxville, TN 37938

Has the owner/operator filed for a Certificate of Convenience & Necessity (CCN), or an amended CCN, with the Tennessee Regulatory Authority (TRA) (may be required for collection systems and land application treatment systems)? [X] Yes [ ] No [ ] N/A

If the applicant listed above does not yet own the facility/site or if the applicant will not be the operator, explain how and when the ownership will be transferred or describe the contractual arrangement and renewal terms of the contract for operations. Ownership will be transferred from Thunder Enterprises to IRM Utility, Inc. by contract following completion of construction.

Complete the following information explaining the entity type, number of design units, and daily design wastewater flow:

Entity Type	Number of Design Units		Flow (gpd)
[ ] City, town or county	No. of connections:		
[ ] Subdivision	No. of homes:	Avg. No. bedrooms per home:	
[ ] School	No. of students:	Size of cafeteria(s): No. of showers:	
[ ] Apartment	No. of units:	No. units with Washer/Dryer hookups: No. units without W/D hookups:	
[ ] Commercial Business	No. of employees:	Type of business:	
[ ] Industry	No. of employees:	Product(s) manufactured:	
[ ] Resort	No. of units:		
[ ] Camp	No. of hookups:		
[ ] RV Park	No. of hookups:	No. of dump stations:	
[ ] Car Wash	No. of bays:		
[X] Other	See Section 8.0 of attached supplemental information		

Describe the type and frequency of activities that result in wastewater generation.
Residential, rental cabins, restaurants, and small commercial - daily

Permit Number: SOP-_____

Engineering Report (required for collection systems and/or land application treatment systems):	☐ N/A
☐ Prepared in accordance with Rule 0400-40-05-.03 and Section 1.2 of the State of Tennessee Design Criteria for Sewage Works ☒ Attached, or ☐ Previously submitted and entitled: Approved? ☐ Yes. Date: ☐ No Operation and Maintenance Inspection Schedule Submitted: Approved? ☐ Yes. Date: ☐ No	

Wastewater Collection System:	☐ N/A
System type (i.e., gravity, low pressure, vacuum, combination, etc.): Combination	
System Description: See Section 6.0 of attached supplemental information	
Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.): Storage, duplicate units, and standby power	
In the event of a system failure describe means of operator notification: Cellular telemetry	
List the **emergency** contact(s) (name/phone): Bill Cox (see page 1)	
For low-pressure systems, who is responsible for maintenance of STEP/STEG tanks and pumps or grinder pumps (list all contact information)? IRM Utility, Inc.	
Approximate length of sewer (excluding private service lateral): See Section 6.0	
Number/hp of lift stations: See Section 6.0 / Number/hp of lift pumps /	
Number/volume of low pressure and or grinder pump tanks / Number/volume septic tanks See Section 6.0 /	
Attach a schematic of the collection system. ☒ Attached	
If this is a satellite sewer and you are tying in to another sewer system complete the following section, listing tie-in points to the sewer system and their location (attach additional sheets as necessary):	

Tie-in Point	Latitude (xx.xxxx°)	Longitude (xx.xxxx°)

Permit Number: SOP-_____

Land Application Treatment System:	☐ N/A
Type of Land Application Treatment System: ☐ Drip ☐ Spray ☒ Other, explain: LPP	
Type of treatment facility preceding land application (recirculating media filters, lagoons, other, etc.): Septic tanks	
Attach a treatment schematic. ☐ Attached	
Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.): Storage, duplicate units, standby power	
For New or Modified Projects: Name of Developer for the project: Thunder Enterprises	
Developer address and phone number: 10213 Hwy. 156, Guild, TN 37340 888-777-5758	
For land application, list: Proposed acreage involved: 7.2 +/- 0.275 gpd/SF Inches/week gpd/sq.ft loading rate to be applied:	
Is wastewater disinfection proposed?	
☐ Yes Describe land application area access:	
☒ No Describe how access to the land application area will be restricted:	

Attach required additional Engineering Report Information (see website for more information)

☒ Topographic map (1:24,000 scale presented at a six inch by six inch minimum size) showing the location of the project including quadrangle(s) name(s) GPS coordinates, and latitude and longitude in decimal degrees should also be included.

☒ Scaled layout of facility showing the following: lots, buildings, etc. being served, the wastewater collection system routes, the pretreatment system location, the proposed land application area(s), roads, property boundaries, and sensitive areas such as streams, lakes, springs, wells, wellhead protection areas, sinkholes and wetlands.

☒ Soils information for the proposed land disposal area in the form of a Water Resources Soils Map per Chapter 16 and 17 State of Tennessee Design Criteria for Sewage Work. The soils information should include soil depth (borings to a minimum of 4 feet or refusal) and soil profile description for each soil mapped.

☒ Topographic map of the area where the wastewater is to be land applied with no greater than ten foot contours presented at a minimum size of 24 inches by 24 inches.

☐ Describe alternative application methods based on the following priority rating: (1) connection to a municipal/public sewer system, (2) connection to a conventional subsurface disposal system as regulated by the Division of Groundwater Protection, and/or (3) land application.

Permit Number: SOP-_____

For Drip Dispersal Systems Only: Unless otherwise determined by the Department, sewage treatment effluent wells, i.e, large capacity treatment/drip dispersal systems after approval of the SOP Application, will be issued an UIC tracking number and will be authorized as Permit by Rule per UIC Rule 0400-45-06-.14(2) and upon issue of a State Operating Permit and Sewage System Construction Approval by the Department. Describe the following:	☐ N/A
The area of review (AOR) for each Drip Dispersal System shall, unless otherwise specified by the Department, consist of the area lying within a one mile radius or an area defined by using calculations under 0400-45-06-.09 of the Drip Dispersal System site or facility, and shall include, but not be limited to general surface geographic features, general subsurface geology, and general demographic and cultural features within the area. Attach to this part of the application a general characterization of the AOR, including the following: (This can be in narrative form)	
☒ A general description of all past and present groundwater uses as well as the general groundwater flow direction and general water quality.	
☒ A general description of the population and cultural development within the AOR (i.e. agricultural, commercial, residential or mixed)	
☒ Nature of injected fluid to include physical, chemical, biological or radiological characteristics.	
☒ If groundwater is used for drinking water within the area of review, then identify and locate on a topographic map all groundwater withdrawal points within the AOR, which supply public or private drinking water systems. Or supply map showing general location of publicly supplied water for the area (this can be obtained from the water provider)	
☐ If the proposed system is located within a wellhead protection area or source water protection area designated by Rule 0400-45-01-.34, show the boundary of the protection area on the facility site plan.	
☒ Description of system, Volume of injected fluid in gallons per day based upon design flow, including any monitoring wells	
☒ Nature and type of system, including installed dimensions of wells and construction materials	

Pump and Haul:	☒ N/A
Reason system cannot be served by public sewer:	
Distance to the nearest manhole where public sewer service is available:	
When sewer service will be available:	
Volume of holding tank: gal.	
Tennessee licensed septage hauler (attach copy of agreement):	
Facility accepting the septage (attach copy of acceptance letter):	
Latitude and Longitude (in decimal degrees) of approved manhole for discharge of septage:	
Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.):	

Permit Number: SOP-_____

Holding Ponds (for non-domestic wastewater only):	☒ N/A
Pond use: ☐ Recirculation ☐ Sedimentation ☐ Cooling ☐ Other (describe):	
Describe pond use and operation:	
If the pond(s) are existing pond(s), what was the previous use?	
Have you prepared a plan to dispose of rainfall in excess of evaporation? ☐ Yes ☐ No	
If so, describe disposal plan:	
Is the pond ever dewatered? ☐ Yes ☐ No	
If so, describe the purpose for dewatering and procedures for disposal of wastewater and/or sludge:	
Is(are) the pond(s) aerated? ☐ Yes ☐ No	
Volume of pond(s): gal. Dimensions:	
Is the pond lined (Note if this is a new pond system it must be lined for SOP coverage. Otherwise, you must apply for an Underground Injection Control permit.)? ☐ Yes ☐ No	
Describe the liner material (if soil liner is used give the compaction specifications):	
Is there an emergency overflow structure? ☐ Yes ☐ No	
If so, provide a design drawing of structure.	
Are monitoring wells or lysimeters installed near or around the pond(s)? ☐ Yes ☐ No	
If so, provide location information and describe monitoring protocols (attach additional sheets as necessary):	

Permit Number: SOP-_____

Mobile Wash Operations: ☒ N/A

☐ Individual Operator ☐ Fleet Operation Operator

Indicate the type of equipment, vehicle, or structure to be washed during normal operations (check all that apply):

☐ Cars
☐ Trucks
☐ Trailers (Interior washing of dump-trailers, or tanks, is prohibited.)
☐ Other (describe):
☐ Parking Lot(s): sq. ft.
☐ Windows: sq. ft.
☐ Structures (describe):

Wash operations take place at (check all that apply):

☐ Car sales lot(s)
☐ Private industry lot(s)
☐ County(ies), list:
☐ Public parking lot(s)
☐ Private property(ies)
☐ Statewide

Wash equipment description:

☐ Truck mounted
☐ Rinse tank size(s) (gal.):
☐ Collection tank size(s) (gal.):
☐ Trailer mounted
☐ Mixed tanks size(s) (gal.):
Number of tanks per vehicle:

Pressure washer: psi (rated) gpm (rated)
☐ gas powered ☐ electric

Vacuum system manufacturer/model: Vacuum system capacity: inches Hg

Describe any other method or system used to contain and collect wastewater:

List the public sewer system where you are permitted or have written permission to discharge waste wash water (include a copy of the permit or permission letter):

Are chemicals pre-mixed, prior to arriving at wash location? ☐ Yes ☐ No

Describe all soaps, detergents, or other chemicals used in the wash operation (attach additional sheets as necessary):

Chemical name:	Manufacturer:	Primary CAS No. or Product No.

APPLICATION FOR A STATE OPERATION PERMIT (SOP)
INSTRUCTIONS

Purpose of this form A completed SOP application must be submitted to obtain SOP coverage. This permit is required to operate a sewage, industrial waste or other waste collection and/or treatment system that does not have a point source discharge to any surface or subsurface waters. This form must be submitted at least 180 days before starting any new activity, before an existing permit expires, or when renewing a permit.

Complete the form Type or print clearly, using black or blue ink; not markers or pencil. Answer each item or enter "N/A," for not applicable. If you need additional space, attach a separate piece of paper to the SOP application. Applicants may be required to submit engineering reports, plans and specifications. Contact the division for the applicable items, or refer to Appendix 1-D of the state Design Criteria for Sewage Works for more information. **The application will be considered incomplete without supplying all of the required information, Engineering Reports, and an original signature.**

Permittee Identification/Facility Identification Describe and locate the project, use the legal or official name of the facility or site. Provide the latitude and longitude (expressed in decimal degrees) of the center of the site, which can be located on USGS quadrangle maps. The quadrangle maps can be obtained at 1-800-USA-MAPS, or at the Census Bureau world wide web site: http://www.census.gov/cgi-bin/gazetteer. Attach a copy of a portion of a 7.5 minute quad map, showing location of site, with boundaries at least one mile outside the site boundaries. If business is mobile give the owner of operations' home, or business office address, and list all current areas of operation by city and county.

Wastewater Collection System These types of systems require engineering reports, refer to Appendix 1-D of the state Design Criteria for Sewage Works for more information.

Land Application Treatment System These types of systems require engineering reports, refer to Appendix 1-D of the state Design Criteria for Sewage Works for more information. Public access to the treatment area must be restricted, if disinfection is not part of the treatment. Applicants completing this section of the application must also complete the Wastewater Collection System section.

Pump and Haul These types of systems may require engineering reports, refer to Appendix 1-D of the state Design Criteria for Sewage Works for more information.

Holding Ponds Given that annual rainfall onto open ponds exceeds annual evaporation (in Tennessee), the permittee must develop a written plan (to be retained on site and be available to the division upon request) that addresses how excess rainfall will be disposed of in compliance with the no discharge requirement of this permit. Treatment ponds are not to be used for stormwater treatment or storage. All new and existing point source industrial stormwater discharges associated with industrial activity require coverage under the

Tennessee industrial stormwater multi-sector general permit TMSP, refer to the website for more information. Describe the system for re-routing surface runoff away from ponds in the rainfall disposal plan.

Mobile Wash Operations Indicate whether the operation is run by an individual or a corporation with a fleet of vehicles equipped to wash and collect waste waters. If a corporation, indicate the home office as the "Official Contact". Indicate if operations take place at specific sites and list those counties that apply. Note that this permit covers operations for all of Tennessee. Operations indicated as "statewide" generally apply as a fleet type operation and each office location shall be individually permitted. Equipment may be truck or trailer-mounted, or both, indicate all that applies. Soaps, detergents, and other chemicals used should be non-toxic and biodegradable. All "chemically enhanced" (soaps, detergents, and other chemicals) waste-wash waters must be collected for proper disposal. If no chemically enhanced washwaters are used, clear-wash waters may travel by sheet flow to a gravel or grassy area where there is no opportunity to enter waters of the state. There should be no discharge to a storm water inlet, ditch, conveyance, stream, etc. If you are unsure of your wash area drainage, contact the area Environmental Field Office (EFO) prior to setting up your wash operation.

Fees Refer to the TDEC-DWR Environmental Protection Fund Fee Rule 0400-40-11-.02. Links to publications are available on Department of Environment and Conservation, Division of Water Resources webpage and the webpage for the Tennessee Secretary of State.

Submitting the form and obtaining more information Note that this form must be signed by the chief executive officer, owner, or highest ranking elected official. For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC). Submit a complete application electronically to water.permits@tn.gov (preferred) or to the appropriate EFO for the county(ies) where the facility is located, addressed to **Attention: DWR, Permit Section.** Please keep a copy for your records.

EFO	Street Address	Zip Code	EFO	Street Address	Zip Code
Memphis	8383 Wolf Lake Drive, Bartlett	38133	Cookeville	1221 South Willow Ave.	38506
Jackson	1625 Hollywood Dr	38305-4316	Chattanooga	1301 Riverfront Parkway Suite 206	37402
Nashville	711 R S Gass Boulevard	37243	Knoxville	3711 Middlebrook Pike	37921
Columbia	1421 Hampshire Pike	38401	Johnson City	2305 Silverdale Road	37601

Upon receipt of the required items, the division conducts a review of the material, and the applicant is notified of any deficiencies. When all the deficiencies have been corrected, the division makes a determination of whether to publish a draft permit. When a draft permit is generated, a public notice is issued and published in a local newspaper. The draft permit is then reviewed by the applicant, and division field staff. The general public also has an opportunity to review the permit. Based on public response, a public hearing may be held. After considering public comments and a final review, the permit may be issued. The entire process normally takes from five (5) to nine (9) months. Permits are normally valid for five (5) years, except those for pump and haul systems, which are generally valid for one (1) year.

The division has the right to inspect a facility when deemed necessary. In addition, the division has the right to revoke or suspend any permit for violation of permit conditions or any other provisions of the Tennessee Water Quality Control Act and other water pollution control rules.

The division is responsible for regulating any activity, which involves a potential discharge in order to protect waters of the State from pollution and to maintain the highest possible standards in water quality.



Thunder Enterprises

ENGINEERING REPORT
AMENITY 1 SEWER SYSTEM
RIVER GORGE RANCH

TDEC Project No. 24.026

September 2024
(Revised March 2025)
(Revised June 2025)
(Revised September 2025)

CTIENGINEERS

ENGINEERING REPORT
AMENITY 1 SEWER SYSTEM
RIVER GORGE RANCH

TDEC Project No. 24.026

Thunder Enterprises



Prepared by:
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September 2024
(Revised March 2025)
(Revised June 2025)
(Revised September 2025)
CTI Project No. C24009

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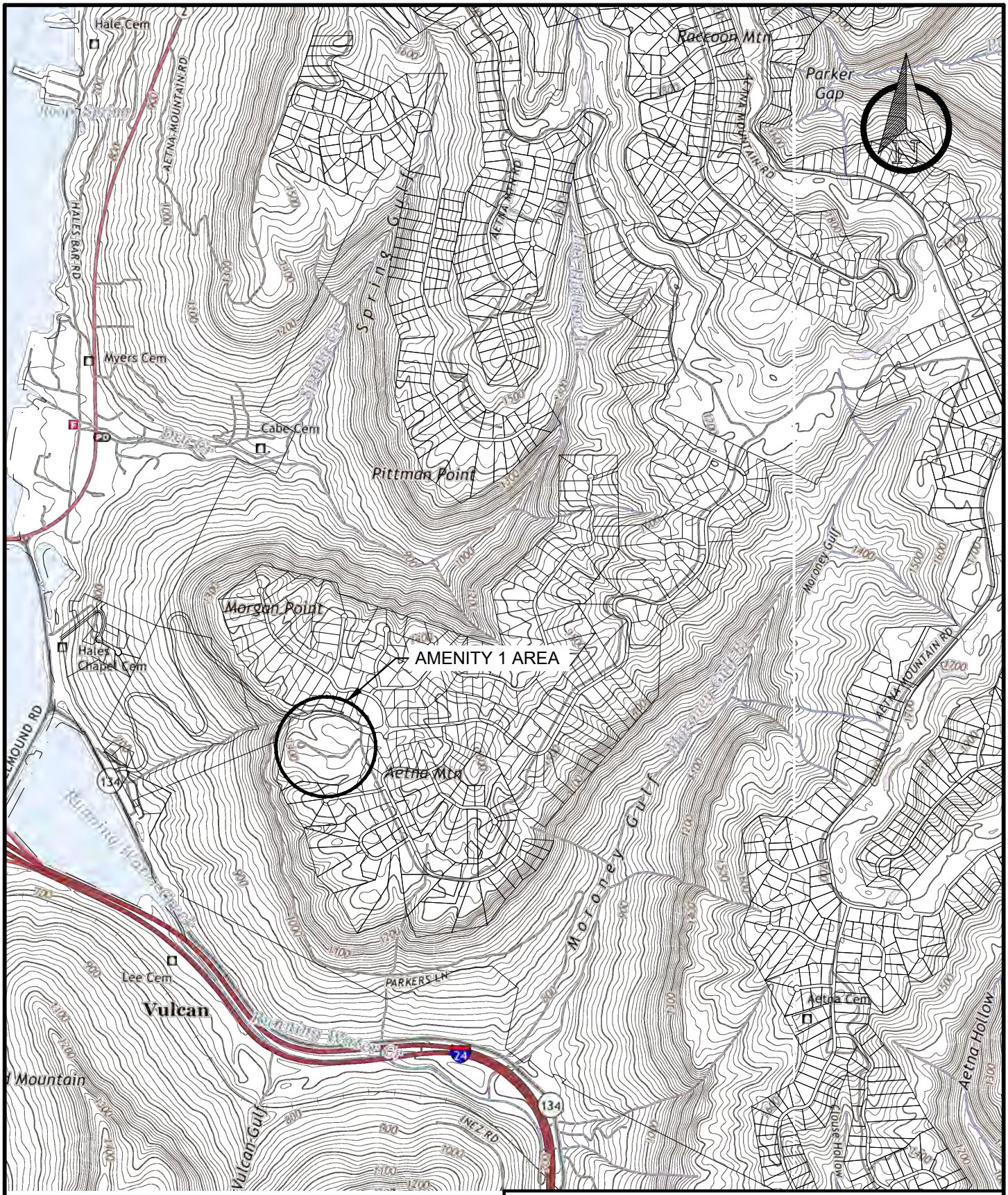
Appendix A	Amenity 1 Architectural Layout Plan
Appendix B	Typical Septic/STEP Tank Drawings
Appendix C	Typical STEP Pump Data Sheets
Appendix D	Hydraulic Model Network Drawing and Output Tables
Appendix E	Typical Low-Head Effluent Pump Data Sheets
Appendix F	Typical Dosing Pump Tank Drawings
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1.0 | INTRODUCTION AND NEED FOR THE PROJECT

The project involves provision of a sewer collection system and treatment and disposal system for the proposed Amenity 1 area atop Aetna Mountain at River Gorge Ranch in Marion County, Tennessee. This area includes cabins, townhomes, restaurants, commercial shops, and a pool as amenities for a proposed 2,200-home residential development on the mountain. The location of the Amenity 1 area is shown on the map in **Figure 1**. An expanded architectural layout of the Amenity 1 area is included in **Appendix A**. A large scale map showing the developed area in relation to nearby possible land disposal areas is shown in **Figure 2**.

The residential lots in the development, which range in size from 1.5 to 2 acres, will be served by individual, on-site septic disposal systems. However, the Amenity 1 area has higher density development and higher wastewater flows such that individual, on-site systems are not feasible.

CTI PROJECT: C23041-01, DRAWING: C23041-01 C23041 SEWER FIGURES (811652v9/2/6/24 10:09AM), LAYOUT: FIG. 1



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0 1000 2000 4000 FEET

RIVER GORGE RANCH SEWER STUDY

FIGURE 1

LOCATION MAP

THUNDER ENTERPRISES | C23041-01

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 FIGURES (832755v4/8/27/24 1:43PM), LAYOUT: FIG 3 (2)

CABINS (14)

RESTAURANTS AND SHOPS

DUPLEXES (5)

TOWNHOMES (44)

DISPOSAL AREAS

DISPOSAL AREAS

DOSING PUMP STATION

0 150 300 600

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RIVER GORGE RANCH SEWER SYSTEM

FIGURE 2

OVERALL PLAN

THUNDER ENTERPRISES | C24009-01

2.0 | GENERAL DESCRIPTION

Description of Area

Aetna Mountain is part of a chain of plateau-like ridges that form the eastern fringe of the Cumberland Plateau. That portion on which the proposed development is located is bounded on the west, north, and east by the Tennessee River (Nickajack Reservoir) and on the southwest by Running Water Creek. Ground elevations on the mountain reach 1,900 feet MSL, some 1,300 feet above the river (pool elevation of 634). The Amenity 1 area is located at an elevation of approximately 1,440 feet MSL.

The mountaintop is drained by small, unnamed tributaries which make their way down the sides of the mountain to the river and Running Water Creek.

The portion of the Tennessee River (Nickajack Reservoir) upstream of the Hwy. 41 bridge bounded by Prentice Cooper State Forest and/or Tennessee River Gorge Trust is classified as Exceptional Tennessee Water.

The upper portion of the mountain (above the escarpment) is composed of shale, siltstone, and sandstone of the Raccoon Mountain Formation. There are isolated seams of coal on the mountain accessible through strip mining.

Utilities

The residential development atop the mountain, including the Amenity 1 area, will be served with public water by Tennessee American Water via a 16-inch transmission main from the southeast. The residential and commercial areas at the base of the mountain on the west and southwest sides, including the unincorporated communities of Guild, Ladds, and Whiteside, are served with public water by the Town of Jasper. The residential area at the base of the mountain on the east side comprising the unincorporated community of Riverside, does not currently have public water, although public water will soon be extended to that area, fed through the proposed River Gorge Ranch development.

There are no existing public sewer utilities in the vicinity of any of these areas. The Hales Bar Marina and Resort, located adjacent to the river below the west end of the mountain, features a marina, cabins, and a camping area served by a septic system with on-site low pressure pipe (LPP) disposal.

Because the properties in the Amenity 1 area may be owned by different owners, the collection system would be considered a public sewer system. Consequently, a state operating permit (SOP) will be required, and the owner/operator of the sewer system must be a municipality, a utility district, an authority, or a privately-owned public utility company with a certificate of convenience and necessity (CCN) from the Tennessee Public Utility Commission.

Wastewater Flows

Estimated wastewater flows from the Amenity 1 area are summarized in **Table 1**, based on a full occupancy condition, which while possible, would occur very infrequently.

Table 1: Estimated Wastewater Flows
Amenity 1 Center Complex
River Gorge Ranch

Source	2-Person Bedrooms	Restaurant Seats	Assembly Capacity	Toilet Fixtures	Persons	Generation Rate (gpd/person)	Generation Rate (gpd /1,000 SF)	Total Flow (gpd)	Notes
Cabins:									
1-bedroom (7)	7				14	75		1,050	1
2-bedroom (7)	14				28	75		2,100	1
Duplex Residences									
2-bedroom (10)					30	100		3,000	2
Townhome Residences:									
3-bedroom (44)					132	100		13,200	2
Amenity Building:									
Main area				5			125	625	
Catering		50			100	7		700	
Pool					50	10		500	
Restaurant:									
Lounge/Bar		83			332	5		1,660	3
Main restaurant A		463			1,852	9		16,668	3
Venue restaurant B		254			254	12		3,048	4
Commercial Buildings				12			125	1,500	
Miscellaneous Allowance								1,000	
Total Daily Flow								**45,051**	
Notes:									
(1) Assuming 2 persons per bedroom. Fully occupied.									
(2) Assuming 3 persons per residence. Fully occupied.									
(3) Assuming 4 turns per day.									
(4) Single-serving event.									

The majority of the flow arises from the townhomes and the restaurants.

Not included in the above flow estimate is the wastewater generated in the microbrewery, which will be collected separately and periodically hauled away.

The owner has indicated that there will be no roll-away or hide-away beds allowed in the cabins, so the cabin occupancy will be based on bedrooms. There are no laundry facilities in the cabins.

Selected System Approach

In the Preliminary Engineering Report, a gravity sewer system with pump stations was evaluated against a Septic Tank Effluent Pump (STEP) system with pressure sewers. The STEP system was determined to be the most cost-effective and appropriate, given the topography and locations of improvements. There will be a small gravity sewer subsystem to serve a portion of the townhomes. With respect to treatment and disposal, a septic subsurface disposal system employing low pressure pipe (LPP) was evaluated against a modular aerobic treatment system with drip disposal, and a modular aerobic treatment system with land application (spray irrigation). The most cost-effective approach was the LPP septic disposal system.

3.0 | COLLECTION SYSTEM

As noted earlier, the collection system will be a pressure sewer system (STEP) system, except for a portion of the townhomes, which will be gravity. In general a STEP tank or tanks will be provided at each cabin, at each townhome building containing two townhomes (for those with STEP collection), at each of the restaurants, and at each commercial building. General plan layouts of the collection system are shown in **Figures 3 and 4**.

STEP Tanks

STEP tanks will be constructed of precast concrete and will meet the minimum design and construction standards established by TDEC. Cut sheets of typical tanks from Barger & Sons Precast are included in **Appendix B**.

Where feasible, tank size was based on 2.5 times the total daily design flow for full occupancy, or 1,000 gallons, whichever is greater. Tank size was rounded to the nearest commercially-available precast concrete tanks size. This tank sizing criteria results in much larger tanks that are required by the TDEC rules for septic disposal systems. The formula for septic tank volume for other than residential sources is V = 1,125 + 0.75Q, where V is the septic tank volume in gallons and Q is the design sewage flow in gallons per day.

Where multiple tanks in series are involved, the first tank is a single compartment tank. Approximately two-thirds of the total required volume is in the first tank, and one-third of the total volume is in the second. STEP tank sizes are summarized in **Table 2** below.

Source and Number of STEP Tanks	Total Daily Flow (gpd)	Minimum Septic Volume (gal.)	STEP Tank Size (gal.)	STEP Pump Configuration	Nominal Pump Capacity (gpm)
Cabins					
One bedroom (7 each)	150	750	1,000	Simplex	10
Two bedroom (7 each)	300	750	1,000	Simplex	10
Duplexes					
2-Unit Pairs (5 each)	600	1,500	1,500	Simplex (5)	20
Townhomes					
2-Unit Pairs (12 each)	600	1,500	1,500	Simplex (5)	20
Gravity Collection (1)	6,000	5,625	15,000 (1)	Duplex (6)	30
Welcome Center/Pool (1)	1,825	2,494	5,000	Simplex (5)	20
Commercial Shops (1)	1,500	2,250	4,000	Simplex (5)	20
Restaurants					
Main Venue (1)	16,668	13,626	35,000 (3)	Duplex (6)	30
Event Venue (1)	3,048	3,411	7,500 (4)	Duplex (6)	30
Lounge/Bar (1)	1,660	2,370	4,000	Simplex (5)	20
(1) Will consist of 10,000-gallon tank followed by 5,000-gallon tank in series. Pumps will be installed in second tank.					
(2) Pool filter backwash, estimated at 1,000 gpd, will be pumped directly into sewer system downstream of STEP connection.					
(3) Will consist of 20,000-galon tank followed by 15,000-gallon tank in series. Pumps will be installed in second tank.					
(4) Will consist of 5,000-gallon tank followed by 2,500-gallon tank in series. Pumps will be installed in second tank.					
(5) One pump vault with two pumps.					
(6) Two pump vaults, each with two pumps.					

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 FIGURES (832755v5)8/27/24 5:03PM), LAYOUT: FIG 3

CABINS

CO

LINE B

2" SDR 21 PVC
PRESSURE SEWER

1 1/2" SDR 21 PVC
PRESSURE SEWER

4" SDR 21 FORCE MAIN
(SEE LINE A PLAN AND
PROFILE)

DIRT ROAD

2" SDR 21 PVC
PRESSURE SEWER

LINE A

4" SDR 26 FORCE MAIN
(SEE LINE A PLAN AND
PROFILE)

NEW GREASE TANKS
(BY OTHERS)

MAIN
RESTAURANT

3" SDR 21 PVC
PRESSURE SEWER

6" SDR 26 PVC
GRAVITY SEWER

BREWERY WASTE LINE
(BY OTHERS)

LINE D

CATERING / GREASE
TANK

VENUE
RESTAURANT

3" SDR 21 PVC
PRESSURE SEWER

6" SDR 26 PVC
GRAVITY SEWER

5,000 GAL SEPTIC TANK
AND 2,500 GAL PUMP
TANK (H20 RATED)

2" SDR 21 PVC
PRESSURE SEWER

COMMERCIAL

LINE E

3" SDR 21 PVC
PRESSURE SEWER

HOLDING TANK FOR
BREWERY WASTE
(BY OTHERS)

MATCHLINE SEE FIGURE 4

0 40 80 160 Feet

GENERAL LEGEND

1400	EXISTING CONTOUR
1400	PROPOSED CONTOUR
	DIRECTION OF NEW SEWER FLOW
	NEW PRESSURE SEWER

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RIVER GORGE RANCH SEWER SYSTEM

FIGURE 3
AMENITY STEP SEWER PLAN (NORTH)

THUNDER ENTERPRISES | C24009-01

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 FIGURES (832755v5)8/27/24 5:03PM), LAYOUT: FIG 4

MATCHLINE SEE FIGURE 3

10,000 GAL SEPTIC TANK AND 5,000 GAL PUMP TANK

8" SDR 26 GRAVITY SEWER (SEE GRAVITY LINE A PLAN AND PROFILE

2" SDR 21 PVC PRESSURE SEWER

12' WIDE ACCESS ROAD

3" SDR 21 PVC PRESSURE SEWER

LINE F

LINE E

CO

1 1/2" SDR 21 PVC PRESSURE SEWER

TOWNHOMES

AIR RELEASE VALVE

0 40 80 160 Feet

GENERAL LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- DIRECTION OF NEW SEWER FLOW
- NEW PRESSURE SEWER
- NEW GRAVITY SEWER

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RIVER GORGE RANCH SEWER SYSTEM

FIGURE 4
AMENITY STEP SEWER PLAN (SOUTH)

THUNDER ENTERPRISES | C24009-01

STEP Pumps

STEP pumps will be standard 4-inch, stainless steel, single-phase, turbine effluent pumps as manufactured by Orenco or Zoeller. Pumps were selected based on the desired flows and the associated heads from the results of the hydraulic sewer modeling (described in next section below). Using pump information from Orenco, the following tentative pump selections were used:

Simplex, 10 gpm - PVA1005, 0.5 hp, 115 V, with 1/4-inch flow control (cabins)

Simplex 20 gpm – P2005, 0.5 hp, 115 V (commercial sources, townhomes, and duplexes)

Duplex, 30 gpm – PF3007, 0.75 hp, 230 V (restaurants and townhome gravity sewer)

Pumps will be installed in filtered, fiberglass pump vaults inside the tanks. Filter pore size will be 1/8-inch to protect the pumps. Pumps will be float switch operated. Typical pump cut sheets with curves are contained in **Appendix C**.

STEP Pressure Sewers

Pressure sewers will be constructed of Class 200, SDR 21, D2241, PVC pressure pipe with push-on joints. In addition to the main restaurant STEP connection and the townhome subsystem STEP connection, there are a total of 40 other STEP connections in the system. It was assumed that any six of the other 40 connections would be operating at any given time, in addition to the two largest connections just mentioned.

The pressure sewer system was modeled using SewerGEMS software. Pump curves from the preceding section were input at the respective connections along with ground elevations from the grading plans. Minimum pipe sizes used in the model were as follows:

Service line (10 gpm simplex) – 1.25 inch

Service line (20 gpm simplex) – 1.5-inch

Service line (30 gpm duplex) - 2-inch

Pressure sewer mains - 2-inch min.

Minimum allowable pipe-full velocity at the operating scenarios was 0.5 fps. Pump flow rates from the model were checked to verify that they stayed within the normal operating ranges of the pump curves. Input pipe network map and output tables from the model are contained in **Appendix D.**

Gravity Collection (Townhouse Subsystem)

A gravity collection subsystem consisting of 8-inch, SDR 26, D3034 PVC sewer pipe will be used for 20 townhouse units constructed on sloping ground below the road because there is no access to STEP tanks and pumps that would be otherwise be installed downslope from the units to catch daylight basements. The total daily flow from these units, as noted above, is estimated to be 6,000 gpd at full occupancy. The peak design flow rate in the gravity sewers would be 4 times this, or 24,000 gpd flow rate. The minimum slope for 8-inch sewers by the traditional method is 0.40 percent. The minimum slope by the tractive force method (Smin = 0.000848*Qmin^-0.5707) is shown in the following **Table 3**.

Reach (1)	Units Served	Qmin (gpd) (2)	Qmin (cfs)	Smin
1	20	11,250	0.01741	0.0086
2	20	11,250	0.01741	0.0091
3	18	10,125	0.01567	0.0103
4	16	9,000	0.01393	0.0125
5	12	6,750	0.01044	0.0115
6	12	6,750	0.01044	0.0115
7	12	6,750	0.01044	0.0115
8	10	5,625	0.00870	0.0127
9	8	4,500	0.00696	0.0144
10	4	2,250	0.00348	0.0214
(1) From downstream to upstream.				
(2) Qmin is based on condition of one-fourth of the served units empty with peak one-hour flow rate equal to 2.5 times the estimated daily flow from the occupied units.				

4.0 | EFFLUENT DISPOSAL SYSTEM

The septic effluent disposal system will be a low pressure pipe (LPP) system, consisting of dosing tanks, dosing supply lines, distributor valves, and LPP trenches. Since the wastewater conveyed to the dosing tanks consists of filtered septic tank effluent, duplicate septic tanks are not required. However, subsurface septic disposal system rules limit system size to 3,000 gpd each, so the disposal system will be divided into 16 subsystems. A general plan layout of the disposal system is shown on **Figures 5 and 6**.

Effluent Flow Distribution Pumps

Peak effluent flow in the 4-inch force main from the Amenity 1 area is estimated to be 192 gpm (276,500 gpd). This flow needs to be distributed equally to the four dosing tanks (described below). In order to accomplish this, the force main will discharge into a 6-foot square, precast, flow distribution sump equipped with four, nominal 70 gpm, 0.75 hp, submersible, low-head effluent pumps operated on float switches. Pump capacity is based on handling the peak flow with one pump out of service. Each pump will be installed on a lift-out rail system, and at least one spare pump will be kept on hand. A 2-inch magnetic flowmeter will be provided in the discharge line of each pump to measure and totalize flow. The four pumps will operate simultaneously, ensuring equal flow to the four dosing tanks.

The head calculations for the flow distribution pumps are as follows:

Nominal Flow:	70 gpm
Pipe:	2-inch, SCH 40 PVC (ID = 2.047 in.)
Velocity:	6.83 fps (velocity head = 0.724 ft.)
Pipe Length:	20 ft.
Pipe Friction:	2.05 ft. (Hazen-Williams C = 130)
Valve/Fittings K:	3.5
Valve/Fitting Loss:	2.53 ft.
Wetwell WS Elev.	1430
Discharge Elev.	1432.5
Static Head:	2.5 ft.
Total Head:	2.05 + 2.53 + 2.5 = 7.08 ft.

Initial selections include the Goulds WE Series Model 3885 and the Zoeller Model 140. Pump data sheets with curves are included in **Appendix E**. Flow will be adjusted using the discharge valves and flow meters to 70 gpm each.

Effluent Flow Distribution Wetwell

A 6-ft. by 6 ft. square precast concrete wetwell is proposed. The wetwell should be sized so that the cycle time for each pump will not be less than 5 minutes or the average cycle time will not be more than 30 minutes. The cycle time is calculated based on the following equation:

$$t = \frac{V}{Q} + \frac{V}{q-Q}$$

Where:

V = Drawdown volume (Gallons).
q = Pump discharge rate (gpm).
Q = Inflow rate into the wetwell (gpm).
t = Minimum time in minutes of one pumping cycle, time to fill + time to run (start to start).

By installing an automatic alternator in the pump control circuit, the wetwell volume can be cut in half. This will start and run the pumps alternately, which has the effect of making "t" for the wetwell half of the effective "t" for the pumps and motors.

Therefore:

$$t/2 = \frac{V}{Q} + \frac{V}{q - Q} \quad \text{or} \quad t = 2 \times \left[\frac{V}{Q} + \frac{V}{q - Q}\right]$$

Given/Assumptions:

- Wetwell Size = 6 ft. by 6 ft.
- Operating Height = (EL. 1432.0 ft. – EL. 1430.0 ft.) = 2.0 feet.
- Drawdown Volume = 6 x 6 x 2.0 x 7.48 = 539.6 gallons
- Net Drawdown Volume = Wetwell volume – Submerged pump motor volume – Discharge pipe volume = 539.6 – 10 = 529.6 gallons.
- q = 4 x 70 gpm = 280 gpm (all four pumps running simultaneously)

Maximum Cycle Time (At Average Daily Base Flow Rate)

The average daily flow rate entering the Pump Station wetwell is estimated to be approximately 31.2 GPM (45,000 gpd/1,440 min./day). The cycle time for each pump with both pumps alternately pumping through the force main is calculated below:

$$t = 2 \times \left[\frac{529.6}{31.2} + \frac{529.6}{280 - 31.2}\right]$$

$$t = 2 \times [17.0 + 2.1]$$
$$= 2 \times 19.1 = 38.2 \text{ minutes } \textit{(<30 minutes)}$$
$$= 19.1 \text{ minutes per pump.}$$

The maximum cycle time is slightly over the goal, but since the pumped liquid is settled septic effluent, solids deposition is not an issue.

Minimum Cycle Time

The shortest operating cycle time occurs when the inflow rate equals one-half the pump discharge rate and both pumps are alternately conveying flows downstream through the new force main.

Therefore:

When Q = q/2, then:

$$t/2 = \frac{V}{q/2} + \frac{V}{q - (q/2)} \quad \text{or} \quad t = 2 \times \left[\frac{V}{q/2} + \frac{V}{q - (q/2)}\right]$$

$$t = 2 \times \left[\frac{529.6}{280/2} + \frac{529.6}{280 - 280/2}\right]$$

$$t = 2 \times [3.78 + 3.78]$$
$$= 2 \times 7.56 \text{ minutes per pump cycle}$$
$$= 15.1 \text{ minutes per pump } \textit{(>5 minutes)}$$

The pump station is being provided with an emergency standby generator, so emergency storage is not required.

Assuming the water table could be as high as top of rock (3 feet below grade), the wetwell needs to be checked for flotation. The weight of the concrete wetwell is calculated to be 21,161 pounds. The weight of the displaced water is 18,345 pounds, so the empty wetwell is not buoyant, even neglecting wall friction to resist uplift.

Dosing Tanks

A total of four precast concrete dosing tanks will be provided at the disposal area, each with a capacity of 15,000 gallons. Each tank will in turn serve four subsystems, and will have four effluent pumps. Standby pump assemblies will be kept on site. A distributor box will be provided to distribute incoming flow equally to the four tanks. Typical cut sheets on the tanks from Barger & Sons Precast are provided in **Appendix F**.

Dosing tank size, where multiple pumps are provided, is the total of the water below the static level, plus the dosing volume, plus one-half of the daily flow. From a practical standpoint, this will result in a dosing tank capacity roughly equal to the total daily flow. For 15,000 dosing tanks, the following calculations apply:

Inside dimensions: 312" L x 132 W x 97" H (bottom to invert of inlet)
Maximum operating water depth = 94"
Minimum water depth = 45"
Volume at minimum depth = 312"x132"x45"/1,728 = 1,144 CF = 8,557 gal.
Dosing volume = 703 gal/zone/2 doses/day x four pumps = 1,404 gal./dose
Daily flow per tank = 45,000 gpd/4 tanks = 11,250 gpd./tank
Minimum tank volume = 8,022 + 1,404 + 11,250/2 = 15,051 gal.; use15,000 gal.

As with the pump station wetwell, the dosing pump tanks need to be checked for flotation. It is assumed that the water table could be as high as the surface of rock (three feet below grade), The weight of the concrete dosing tank is calculated to be 116,880 pounds. This, together with the weight of 2 feet of soil cover (77,760 pounds), yields a total weight of 194,640 pounds. The weight of the displaced water is 190,450 pounds, so the empty dosing tank is not buoyant, even neglecting wall friction to resist uplift

Dosing Pumps

Dosing pumps will be standard 4-inch, stainless steel, single-phase, 230V, turbine effluent pumps as manufactured by Orenco or Zoeller. Pump selections are included in **Table 4** (in a later section) and include the following series of pumps, based on information from Orenco.

For heads up to 75 feet - PF5010, 1.0 hp, 50 gpm

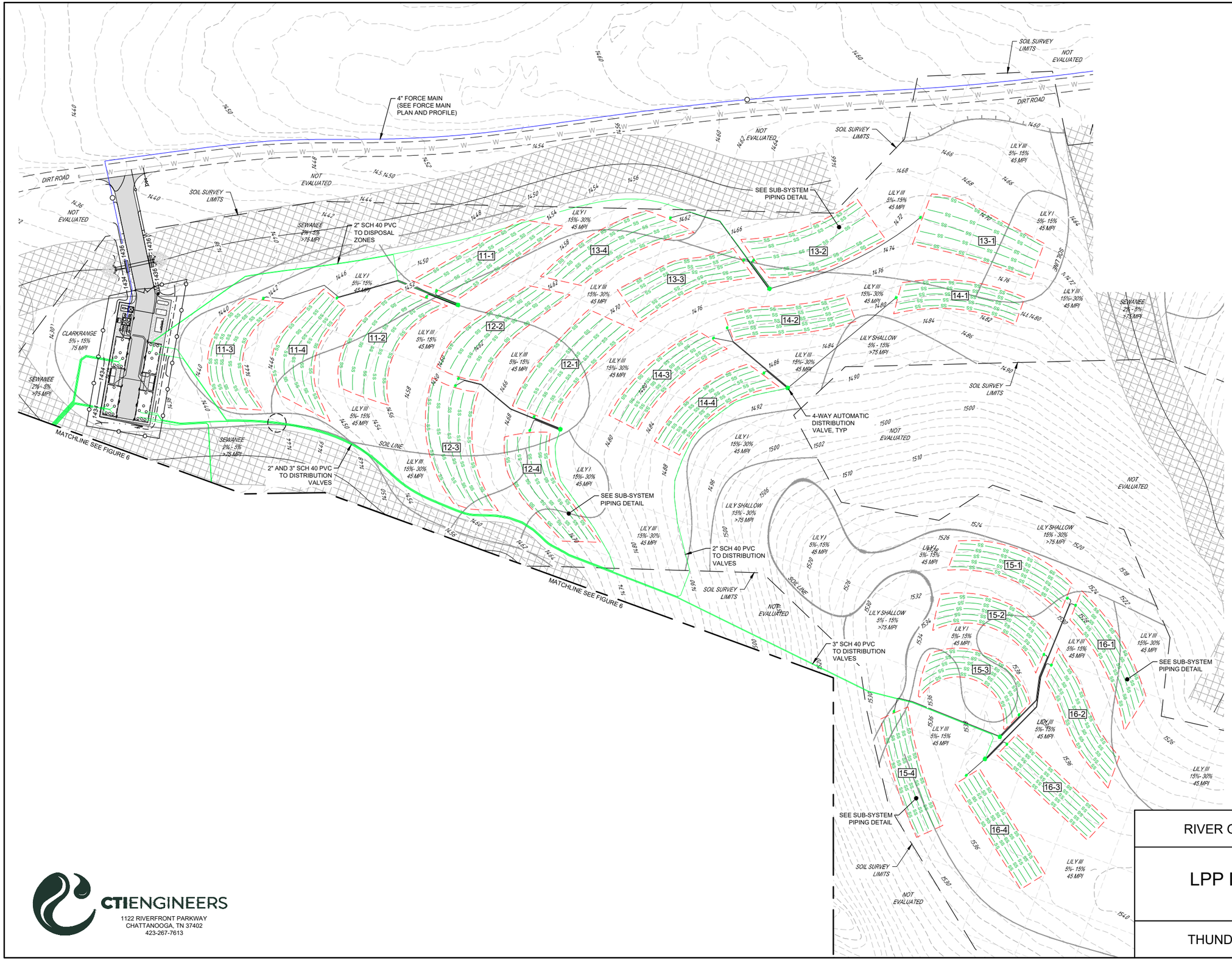
For heads between 75 feet and 110 feet - PF5015, 1.5 hp, 50 gpm

For heads exceeding 110 feet – PF5030, 3.0 hp, 50 gpm

Pumps will be installed in filtered, fiberglass pump vaults inside the tanks. Filter pore size will be 1/8-inch to protect the pumps and the LPP orifices. Typical pump cut sheets with curves are contained in **Appendix G.** Pump discharge head will be adjusted using discharge control valves to achieve the desired dosing flow rate per pump, based on the applicable pump curve.

A PLC control panel will be provided at the dosing pump station to sequence the dosing pumps and keep track of pump run times. The PLC panel will also record and totalize flows to the dosing tanks from the effluent flow distribution pumps.

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 PROPOSED BASE 2.6.25 (845231v13/3/12/25 10:35AM), LAYOUT: FIG 5



GENERAL LEGEND

1400	EXISTING CONTOUR
1400	PROPOSED CONTOUR
	LPP ZONE
	DISTRIBUTION PIPE
SS	LPP SYSTEM
	PRESSURE SEWER

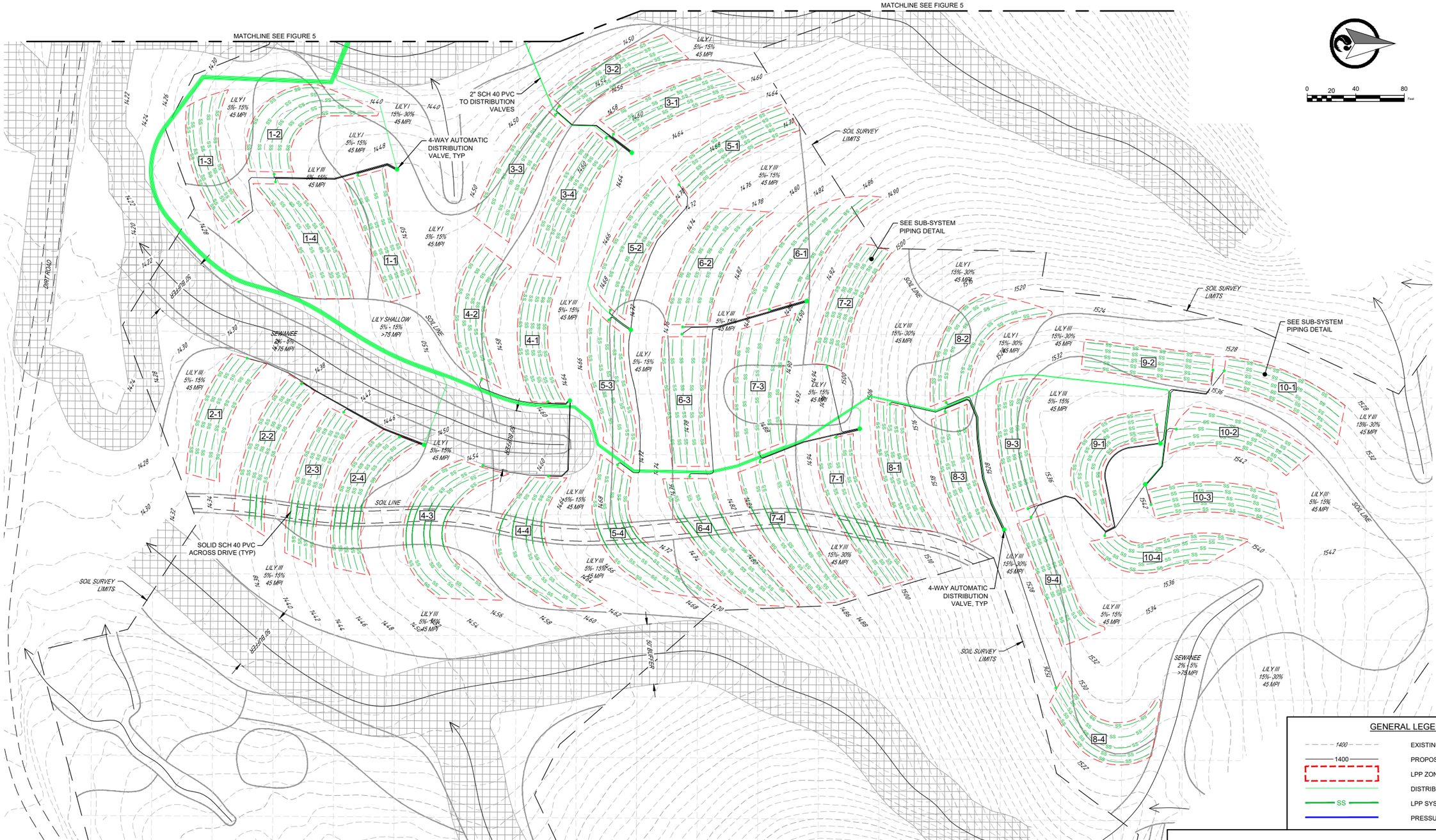
CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

RIVER GORGE RANCH SEWER SYSTEM

FIGURE 5
LPP DISPOSAL AREA PLAN (1 OF 2)

THUNDER ENTERPRISES | C24009-01

CTI PROJECT: C23041-01, DRAWING: C23041-01_C23041 PROPOSED BASE 2.6.25 (845231v13/3/12/25 10:35AM), LAYOUT: FIG 6



GENERAL LEGEND

1400	EXISTING CONTOUR
1400	PROPOSED CONTOUR
	LPP ZONE
	DISTRIBUTION PIPE
SS	LPP SYSTEM
	PRESSURE SEWER

CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

RIVER GORGE RANCH SEWER SYSTEM

FIGURE 6
LPP DISPOSAL AREA PLAN (2 OF 2)

THUNDER ENTERPRISES | C24009-01

LLP Dispersal System

The potential dispersal area was subjected to extra high intensity soil mapping by David Myers Soil Consultants in November 2023. A copy of the signed soil map is contained in **Appendix H**. A majority of the soils in the proposed dispersal area are Lily III soils having depths to the restrictive layer of 36 inches or more and with slopes varying from 5 to 15 percent. There are isolated, included pockets of Lily I soils having depths of 24 to 30 inches to the restrictive layer, and Lily Shallow soils with a depth of 20 inches. The Lily soils feature percolation rates of 45 minutes per inch. Along drainage ways there are Sewanee soils having shallow depths and low percolation rates (> 75 mpi).

The disposal zones have been laid out primarily in Lily III soils, with smaller area of Lily I soils. Since the Lily I soil depths range from 24 to 30 inches, and since at least 30 inches is needed for the LPP system, it is proposed to apply up to 6 inches of additional soil in those areas of Lily I soils that will be used for disposal areas in order to achieve the needed depth. Soil for the additional depth will come from topsoil excavated from adjacent Lily I and Lily Shallow areas. The additional soil will be incorporated into the native soil during dry weather by plowing or tilling so as to avoid a sharp interface. Soil amendment areas will be limited to less than 20 percent slopes.

The disposal area is vegetated with various sized trees (mostly pines) up to 14 inches in diameter. Site preparation will include removing vegetation, ground litter, and trees smaller than 3 inches using a forest mulcher. Trees 3-inches and larger will be cut off to ground level. Stumps will be ground out only where necessary for lateral installation. Only lightweight, tracked equipment will be allowed in the LPP zones. Downslope rain runoff will be periodically intercepted and diverted away from the LPP disposal zones.

The application rate for a soil with a 45 mpi percolation rate is 0.275 gpd/SF. For a total daily design flow of 45,000 gpd, a dispersal area of 163,636 SF is required. Assuming parallel LPP trenches installed on 5-foot centers, a total of 32,727 linear feet of lateral lines is required, or 2,046 linear feet per subsystem (for 16 subsystems). Each subsystem is further divided into 4 zones having 512 feet per zone, or 5 parallel laterals at 102.5 feet each.

The linear hydraulic loading per running foot of LPP trench for septic effluent is limited to 3.2 gpd/linear foot for a fine loam soil with a medium block structure, 12 to 24 inches of infiltration distance, and slopes exceeding 10 percent. The actual application rate is 5 SF x 0.275 gpd/SF for a one foot long section of trench, or 1.38 gpd/linear foot. So, the proposed linear loading rate is acceptable.

Lateral piping will be 1.5-inch SCH 40 PVC with solvent welded joints and snap-on orifice shields to protect the orifices from the crushed stone trench media. The proposed hole size is 3/16-inch, which at a design head pressure of 3 feet, will have an orifice flow rate of 0.72 gpm per hole. For a lateral length of 102.5 feet, and deducting 5 feet for end distances, 14 holes spaced at 7.5 feet on center (13 spaces at 7.5 feet = 97.5 feet) would have a total flow rate of 10.08 gpm per lateral, or 50.4 gpm for a five-lateral zone. The ground slopes at an average of 15 percent in the disposal areas, resulting in a difference in elevation between the top and bottom laterals in a zone of about 3 feet. To overcome the slight difference in elevation head between laterals in a zone, a globe valve will be provided on the supply end of each lateral pipe to distribute the effluent equally. During installation, flow in the zone will be checked to obtain a 3-foot head in each lateral, as measured at the end-of-lateral turn-up. Lateral valves will be adjusted, as necessary.

Each subsystem will have four, five-lateral zones. Effluent will be pumped to the subsystem through a 2-inch SCH 40 PVC supply line by a 50 gpm effluent pump located at the dosing tanks. A 4-port automatic distributor valve will be provided at the top of each subsystem to distribute follow in an alternating fashion to the four included zones.

Each subsystem will handle 45,000/16 = 2,812 gallons per day, and each zone would handle 2,182/4 = 703 gallons per day. If each zone were to be dosed twice a day, the pump run time per cycle at 50 gpm would be 7.0 minutes. For each subsystem, the pump will operate up to 8 cycles per day (4 zones times two doses per zone per day) for a maximum daily runtime of 8 x 7.0 = 56 minutes/day per pump at the design flow.

Subsystem Supply Piping

Supply piping between the dosing tanks and dispersal subsystems will be 2-inch and 3-inch, SCH 40 PVC pipe with solvent-welded joints. Using a target flow of 50 gpm, a Hazen-Williams C value of 130, a pipe ID of 2.047 inches, and a water surface elevation of 1427 feet in the dosing tanks, the pump heads for the 16 subsystems are summarized in **Table 4**. The table also includes pump selections for each subsystem based on the design flow and head.

Subsystem Zone Piping

Subsystem zone piping between the automatic distributing valve and the four disposal zones will be made up of a combination of 1.5-inch and 2-inch diameter, SCH 40 PVC pipe. The length of 1.5-inch and 2-inch pipe in the subsystem zone piping will be adjusted for each zone such that the head seen at the automatic distributing valve is the same for all four zones. The calculations for all 16 subsystems are rather tedious and have to take into account differences in elevation and pipe lengths. These are summarized in **Table 5.** The head in each subsystem calculated at the automatic distributing valve is an input to **Table 4**, which calculates head on the supply piping for the 16 subsystems.

Slope Buffer Determination

Buffers may be needed on steep slopes to prevent hydraulic overloading from a series of parallel, contiguous application zones down the slope. The general guideline is to consider slope buffers where the horizontal distance between upper and lower laterals exceeds 50 feet, or where the elevation drop between upper and lower laterals exceeds 6 feet.

Each zone has five parallel laterals spaced 5 feet apart, so the distance between the upper and lower laterals is 20 feet. The elevation difference between the upper and lower laterals within the zone will not exceed 6 feet for slopes less than 30 percent.

Recommendations for slope buffers were provided by the soil scientist. Within a subsystem, a minimum 20 foot buffer is being provided between the lower lateral of an upslope zone and the upper lateral of the next downslope zone. Between different subsystems, a minimum 25 foot buffer is being provided between the lower lateral of an upslope subsystem zone and the upper lateral of the next downslope subsystem zone.

Standby Disposal Areas

Standby disposal areas amounting to 100 percent of the required primary disposal area are shown in **Figure 7**. A total of 7.2 acres is required for the primary system, including allowances for zone layout and buffers between subsystems. The standby areas have been laid out to provide at least this amount of acreage in Lily III and Lily I soils.

System Reliability

A standby generator will be provided at the flow distribution/dosing pump station. The generator will be a 75 KW, 240-volt, single-phase generator fueled by LP gas. A 1,000-gallon LP tank will be installed for fuel.

The dosing pump control panel will be furnished with a cellular telemetry unit to notify operations and maintenance personnel in the event of a problem.

All STEP pump control panels will have a receptacle for connection to a 240-volt, single-phase, portable standby generator. A suitable, trailer-mounted, standby generator will be provided as part of the scope of work.

Spare pumps of each size and type and spare pump vault filter elements will be kept on site in the maintenance building. Likewise, spare automatic distributing valves, air valves, and hydrosplitters will also be kept on hand.

TABLE 4
DOSING SUPPLY PUMP HEAD CALCULATIONS

Subsystem	Auto.Distr. Valve Elev., ft.	Dosing Tank WS Elev., ft.	Static Head, ft.	LPP Zone Feed Head, ft.	Supply Line Dia., in.	Supply Line Length, ft.	Pump Flow, gpm	Pipe Friction Loss, ft.	Velocity ft./sec.	V^2/2g	Dosing Pump Val Total K	Fittings Total K	Valves/ Fittings Loss, ft.	Auto.Dist. Valve Loss, ft.	Total Friction Loss, ft.	Total Pump Head, ft.	Orenco Pump Model
1	1451	1427	24	8.5	2.047	180	51	10.196	4.972	0.384	10	4	5.375	15.0	30.571	63.071	PF5010
2	1451	1427	24	7.8	2.047	699	51	39.594	4.972	0.384	10	4	5.375	15.0	59.969	91.769	PF5015
3	1463	1427	36	7.6	2.047	241	51	13.651	4.972	0.384	10	4	5.375	15.0	34.026	77.626	PF5015
4	1464	1427	37	11.3	3.042	708	51	5.836	2.251	0.079	10	4	1.102	15.0	21.938	70.238	PF5010
5	1472	1427	45	14.9	2.047	399	51	22.601	4.972	0.384	10	4	5.375	15.0	42.976	102.876	PF5015
6	1490	1427	63	10.7	3.042	1037	51	8.548	2.251	0.079	10	4	1.102	15.0	24.650	98.350	PF5015
7	1504	1427	77	6.7	3.042	1046	51	8.622	2.251	0.079	10	4	1.102	15.0	24.724	108.424	PF5030
8	1529	1427	102	14.1	3.042	1238	51	10.205	2.251	0.079	10	4	1.102	15.0	26.307	142.407	PF5030
9	1541	1427	114	12.1	3.042	1332	51	10.980	2.251	0.079	10	4	1.102	15.0	27.082	153.182	PF5030
10	1544	1427	117	8.7	3.042	1362	51	11.227	2.251	0.079	10	4	1.102	15.0	27.329	153.029	PF5030
11	1457	1427	30	9.1	2.047	588	51	33.307	4.972	0.384	10	4	5.375	15.0	53.681	92.781	PF5015
12	1474	1427	47	9.4	3.042	598	51	4.929	2.251	0.079	10	4	1.102	15.0	21.031	77.431	PF5015
13	1475	1427	48	14.9	2.047	316	51	17.900	4.972	0.384	10	4	5.375	15.0	38.274	101.174	PF5015
14	1490	1427	63	8.4	3.042	758	51	6.248	2.251	0.079	10	4	1.102	15.0	22.350	93.750	PF5015
15	1538	1427	111	10.5	3.042	814	51	6.710	2.251	0.079	10	4	1.102	15.0	22.812	144.312	PF5030
16	1538.5	1427	111.5	9.9	3.042	822	51	6.776	2.251	0.079	10	4	1.102	15.0	22.878	144.278	PF5030

Assumptions:

1. Supply pipe: SCH 40 PVC.
2. LPP zone feed head from Table 5.
3. Pipe friction calculated using Hazen-Williams equation with C = 130.

TABLE 5

LPP ZONE FEED HEAD CALCULATIONS

Subsystem	Zone	AutoDistr. Valve Elev.,ft.	Upper Lateral Elev., ft.	Static Head, ft.	Design Lateral Head, ft.	Dosing Pump Flow, gpm	Feed Line Length, ft.		Pipe Friction Losss, ft.		1.5 in. V^2/2g	1.5 in. Fittings Total K	1.5 in. Fitting Loss, ft.	2 in. V^2/2g	2 in. Fittings Total K	2 in. Fitting Loss, ft.	Globe Valve Loss, ft.	Total Friction Loss, ft.	Zone Feed Head, ft.
							1.5 in.	2 in.	1.5 in.	2 in.									
1	1	1451	1450	-1	3.5	51	0	31	0.000	1.756	1.054	0	0.000	0.384	3	1.152	3	5.908	8.408
	2	1451	1442	-9	3.5	51	25	76	4.841	4.305	1.054	1	1.054	0.384	2	0.768	3	13.969	8.469
	3	1451	1434	-17	3.5	51	53	108	10.263	6.118	1.054	1	1.054	0.384	4	1.536	3	21.971	8.471
	4	1451	1442	-9	3.5	51	25	76	4.841	4.305	1.054	1	1.054	0.384	2	0.768	3	13.969	8.469
2	1	1451	1434	-17	3.5	51	53	110	10.263	6.231	1.054	1	1.054	0.384	2	0.768	3	21.316	7.816
	2	1451	1439	-12	3.5	51	37	77	7.165	4.362	1.054	1	1.054	0.384	2	0.768	3	16.349	7.849
	3	1451	1444	-7	3.5	51	20	46	3.873	2.606	1.054	1	1.054	0.384	2	0.768	3	11.301	7.801
	4	1451	1450	-1	3.5	51	0	21	0.000	1.190	1.054	0	0.000	0.384	3	1.152	3	5.342	7.842
3	1	1463	1462	-1	3.5	51	0	15	0.000	0.850	1.054	0	0.000	0.384	3	1.152	3	5.002	7.502
	2	1463	1455	-8	3.5	51	21	50	4.066	2.832	1.054	1	1.054	0.384	3	1.152	3	12.105	7.605
	3	1463	1456	-7	3.5	51	15	52	2.905	2.945	1.054	1	1.054	0.384	3	1.152	3	11.057	7.557
	4	1463	1462	-1	3.5	51	0	18	0.000	1.020	1.054	0	0.000	0.384	3	1.152	3	5.172	7.672
4	1	1464	1463	-1	3.5	51	20	0	3.873	0.000	1.054	1	1.054	0.384	2	0.768	3	8.695	11.195
	2	1464	1457	-7	3.5	51	38	46	7.358	2.606	1.054	1	1.054	0.384	2	0.768	3	14.787	11.287
	3	1464	1457	-7	3.5	51	16	114	3.098	6.457	1.054	1	1.054	0.384	3	1.152	3	14.762	11.262
	4	1464	1463	-1	3.5	51	0	76	0.000	4.305	1.054	0	0.000	0.384	4	1.536	3	8.841	11.341
5	1	1472	1471	-1	3.5	51	0	135	0.000	7.647	1.054	0	0.000	0.384	4	1.536	3	12.183	14.683
	2	1472	1471	-1	3.5	51	25	0	4.841	0.000	1.054	1	1.054	0.384	2	0.768	3	9.664	12.164
	3	1472	1471	-1	3.5	51	22	0	4.260	0.000	1.054	1	1.054	0.384	2	0.768	3	9.083	11.583
	4	1472	1471	-1	3.5	51	0	140	0.000	7.930	1.054	0	0.000	0.384	4	1.536	3	12.466	14.966
6	1	1490	1489	-1	3.5	51	17	19	3.292	1.076	1.054	1	1.054	0.384	2	0.768	2	8.191	10.691
	2	1490	1480	-10	3.5	51	54	50	10.457	2.832	1.054	1	1.054	0.384	2	0.768	2	17.111	10.611
	3	1490	1480	-10	3.5	51	53	54	10.263	3.059	1.054	1	1.054	0.384	2	0.768	2	17.144	10.644
	4	1490	1480	-10	3.5	51	0	223	0.000	12.632	1.054	0	0.000	0.384	4	1.536	3	17.168	10.668
7	1	1504	1502	-2	3.5	51	0	22	0.000	1.246	1.054	0	0.000	0.384	3	1.152	3	5.398	6.898
	2	1504	1499	-5	3.5	51	0	70	0.000	3.965	1.054	0	0.000	0.384	3	1.152	3	8.117	6.617
	3	1504	1490	-14	3.5	51	53	36	10.263	2.039	1.054	1	1.054	0.384	2	0.768	3	17.125	6.625
	4	1504	1490	-14	3.5	51	54	34	10.457	1.926	1.054	1	1.054	0.384	2	0.768	3	17.205	6.705
8	1	1529	1514	-15	3.5	70	1	181	0.348	18.419	1.986	1	1.986	0.723	2.5	1.809	3	25.562	14.062
	2	1529	1525	-4	3.5	51	15	121	2.905	6.854	1.054	1	1.054	0.384	2	0.768	3	14.581	14.081
	3	1529	1525	-4	3.5	51	15	120	2.905	6.797	1.054	1	1.054	0.384	2	0.768	3	14.524	14.024
	4	1529	1528	-1	3.5	51	0	137	0.000	7.760	1.054	0	0.000	0.384	2	0.768	3	11.528	14.028

Assumptions:

1 Zone piping: SCH 40 PVC, 1.5 inch pipe has ID of 1.590 in; 2-in. pipe has ID of 2.047 in.

2. Nominal pump flow is 51 gpm.

3. Pipe friction calculated using Hazen-Williams formula with C = 130.

4. Hydrosplitter loss is calculated one-fifth of same size distributing valve loss.

TABLE 5 (continued)
LPP ZONE FEED HEAD CALCULATIONS

Subsystem	Zone	AutoDistr. Valve Elev.,ft.	Upper Lateral Elev., ft.	Static Head, ft.	Design Lateral Head, ft.	Dosing Pump Flow, gpm	Feed Line Length, ft.		Pipe Friction Losss, ft.		1.5 in. V^2/2g	1.5 in. Fittings Total K	1.5 in. Fitting Loss, ft.	2 in. V^2/2g	2 in. Fittings Total K	2 in. Fitting Loss, ft.	Globe Valve Loss, ft.	Total Friction Loss, ft.	Zone Feed Head, ft.
							1.5 in.	2 in.	1.5 in.	2 in.									
9	1	1541	1540	-1	3.5	51	15	0	2.905	0.000	1.054	1	1.054	0.384	2	0.768	3	7.727	10.227
	2	1541	1534	-7	3.5	51	33	63	6.390	3.569	1.054	1	1.054	0.384	4	1.536	3	15.549	12.049
	3	1541	1534	-7	3.5	51	0	187	0.000	10.592	1.054	0	0.000	0.384	5	1.920	3	15.513	12.013
	4	1541	1534	-7	3.5	51	0	189	0.000	10.706	1.054	0	0.000	0.384	5	1.920	3	15.626	12.126
10	1	1544	1535	-9	3.5	51	6	130	1.162	7.364	1.054	1	1.054	0.384	4	1.536	3	14.116	8.616
	2	1544	1541.5	-2.5	3.5	51	0	59	0.000	3.342	1.054	0	0.000	0.384	3.5	1.344	3	7.686	8.686
	3	1544	1543	-1	3.5	51	2	16	0.387	0.906	1.054	1	1.054	0.384	2	0.768	3	6.116	8.616
	4	1544	1540	-4	3.5	51	7	48	1.355	2.719	1.054	1	1.054	0.384	2.5	0.960	3	9.089	8.589
11	1	1457	1456	-1	3.5	51	2	23	0.387	1.303	1.054	1	1.054	0.384	2	0.768	3	6.513	9.013
	2	1457	1456	-1	3.5	51	0.5	29.5	0.097	1.671	1.054	1	1.054	0.384	2	0.768	3	6.590	9.090
	3	1457	1444	-13	3.5	51	24	157	4.647	8.893	1.054	1	1.054	0.384	2.5	0.960	3	18.555	9.055
	4	1457	1450	-7	3.5	51	6	105	1.162	5.948	1.054	1	1.054	0.384	3.5	1.344	3	12.508	9.008
12	1	1474	1473	-1	3.5	51	5	20	0.968	1.133	1.054	1	1.054	0.384	2	0.768	3	6.924	9.424
	2	1474	1464	-10	3.5	51	37	62	7.165	3.512	1.054	1	1.054	0.384	3	1.152	3	15.883	9.383
	3	1474	1464	-10	3.5	51	34	71	6.584	4.022	1.054	1	1.054	0.384	3	1.152	3	15.812	9.312
	4	1474	1473	-1	3.5	51	0.5	34.5	0.097	1.954	1.054	1	1.054	0.384	2	0.768	3	6.874	9.374
13	1	1475	1474	-1	3.5	51	0	147	0.000	8.327	1.054	0	0.000	0.384	3	1.152	3	12.479	14.979
	2	1475	1473	-2	3.5	51	23	0	4.454	0.000	1.054	1	1.054	0.384	2	0.768	3	9.276	10.776
	3	1475	1473	-2	3.5	51	29	0	5.616	0.000	1.054	1	1.054	0.384	2	0.768	3	10.438	11.938
	4	1475	1464	-11	3.5	51	80	31	15.491	1.756	1.054	1	1.054	0.384	3	1.152	3	22.454	14.954
14	1	1490	1483	-7	3.5	51	1	121	0.194	6.854	1.054	1	1.054	0.384	2	0.768	3	11.870	8.370
	2	1490	1483	-7	3.5	51	18	59	3.486	3.342	1.054	1	1.054	0.384	2.5	0.960	3	11.842	8.342
	3	1490	1482	-8	3.5	51	24	57	4.647	3.229	1.054	1	1.054	0.384	2.5	0.960	3	12.891	8.391
	4	1490	1489	-1	3.5	51	0	28	0.000	1.586	1.054	0	0.000	0.384	3	1.152	3	5.738	8.238
15	1	1538	1530	-8	3.5	51	14	127	2.711	7.194	1.054	1	1.054	0.384	2.5	0.960	3	14.919	10.419
	2	1538	1534.5	-3.5	3.5	51	4	84	0.775	4.758	1.054	1	1.054	0.384	2.5	0.960	3	10.547	10.547
	3	1538	1537	-1	3.5	51	12	14	2.324	0.793	1.054	1	1.054	0.384	2	0.768	3	7.939	10.439
	4	1538	1534	-4	3.5	51	0.5	106.5	0.097	6.033	1.054	1	1.054	0.384	2	0.768	3	10.952	10.452
16	1	1538.5	1529	-9.5	3.5	51	12	151	2.324	8.553	1.054	1	1.054	0.384	2.5	0.960	3	15.892	9.892
	2	1538.5	1534.5	-4	3.5	51	0	107	0.000	6.061	1.054	0	0.000	0.384	3.5	1.344	3	10.405	9.905
	3	1538.5	1538.5	0	3.5	51	1	24	0.194	1.359	1.054	1	1.054	0.384	2	0.768	3	6.376	9.876
	4	1538.5	1538.5	0	3.5	51	3	19	0.581	1.076	1.054	1	1.054	0.384	2	0.768	3	6.480	9.980

Assumptions:

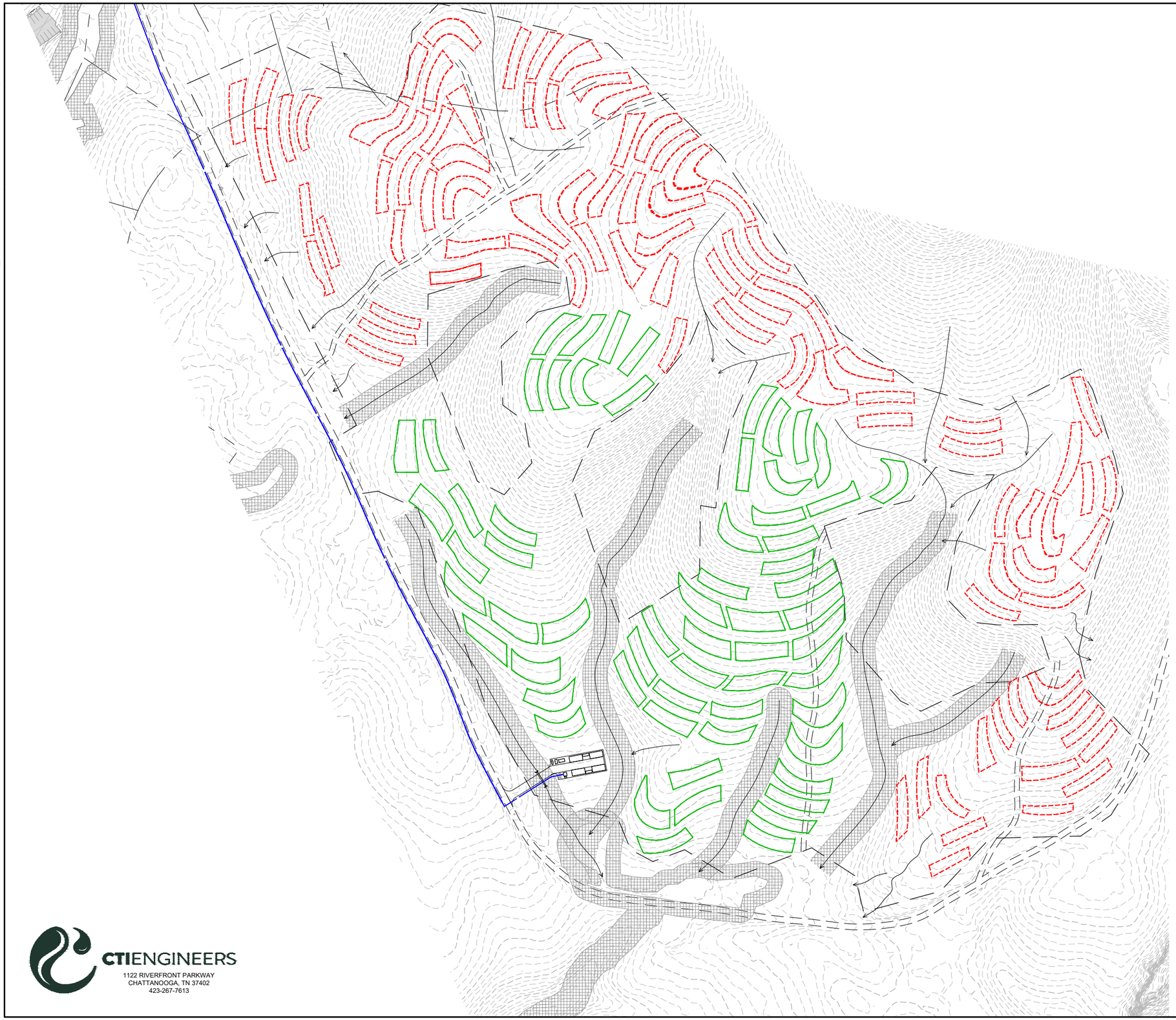
1 Zone piping: SCH 40 PVC, 1.5 inch pipe has ID of 1.590 in; 2-in. pipe has ID of 2.047 in.

2. Nominal pump flow is 51 gpm.

3. Pipe friction calculated using Hazen-Williams formula with C = 130.

4. Hydrosplitter loss is calculated one-fifth of same size distributing valve loss.

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 FIGURES (832755v6/9/13/24 12:50PM), LAYOUT: FIG 7



0 100 200 400 Feet

GENERAL LEGEND

- 1400 — EXISTING CONTOUR
- 1400 — PROPOSED CONTOUR
- LPP ZONE
- LPP ZONE (STAND-BY)
- PRESSURE SEWER

RIVER GORGE RANCH SEWER SYSTEM

FIGURE 7

STAND-BY DISPOSAL AREA MAP

THUNDER ENTERPRISES | C24009-01

CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

5.0 IMPLEMENTATION

Ownership and Operation

Since the system will be classified as a public sewer system, it will be turned over to a privately-owned public utility following completion of construction. The public utility will own, operate, and maintain the sewer system. Tentatively, IRM Utility, Inc. out of Knoxville, Tennessee has been selected as the privately-owned public utility for the system.

Permitting

Several permits will be needed form TDEC for the sewer system, as follows:

Septic Subsurface Disposal System Permit (for large, alternative system).

Class V Underground Injection Control Permit.

State Operating Permit.

In addition, the disturbed area must be covered by a general stormwater permit for construction activities. The general permit and SWPPP for the other, on-going, land-disturbing activities at the development will be amended by the site civil engineer, AD Engineering out of Chattanooga, Tennessee, to include the sewer lines and LPP disposal area. Erosion and sediment control details will be included in the final plans for the sewer system.

No permits for pipeline crossings of regulated streams will be required for the sewer system. There are two crossings over regulated streams in the fill above the culverts of existing and proposed road crossings. Likewise, there are no encroachments in delineated wetlands by the sewer system. Stream and wetlands determinations for the development, including the disposal area, have been performed by Davey Resource Group out of Nashville, Tennessee.



APPENDIX A
AMENITY 1 ARCHITECTURAL LAYOUT PLAN



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Primary Amenity Site

SCALE: 1"=60'-0"

0 6' 30' 60' 120' 240'

All plans are conceptual. These are not final and are subject to change at Developer's sole discretion

RIVER GORGE RANCH

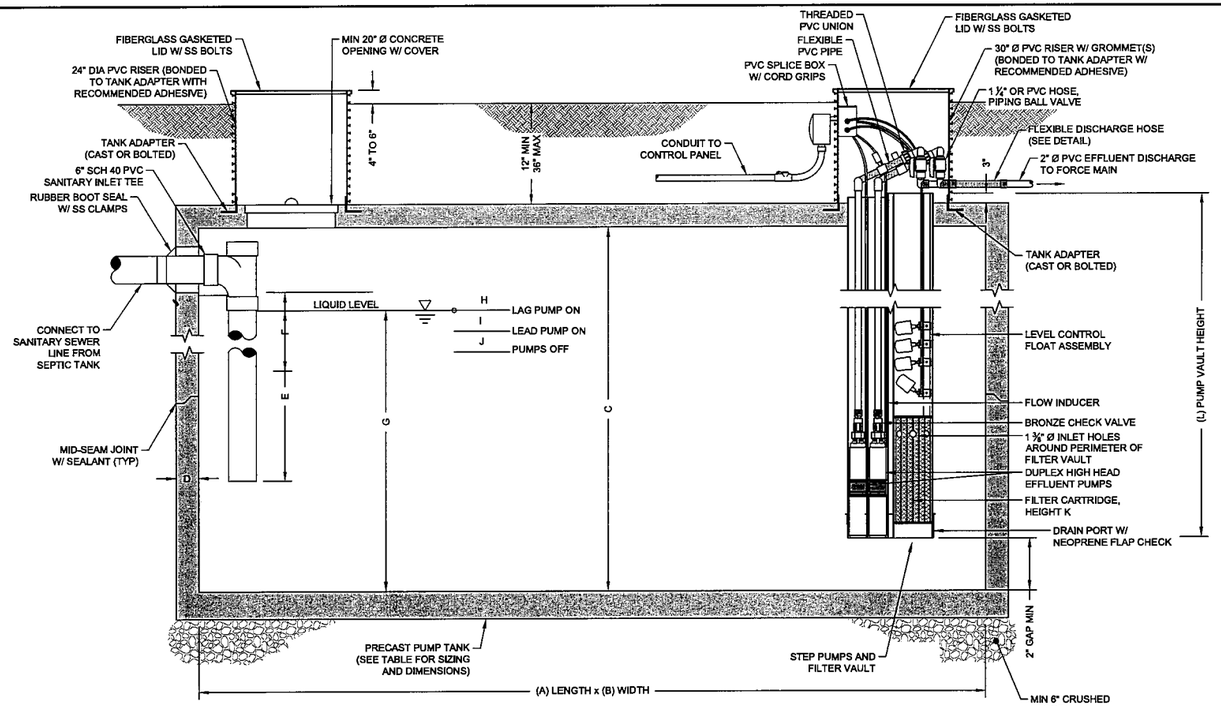
Master Plan

Kimley»Horn

Expect More. Experience Better.



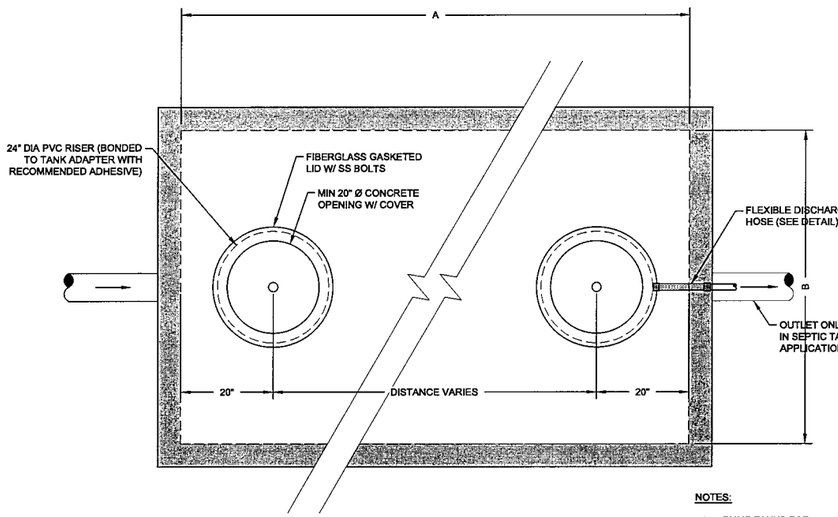
APPENDIX B
TYPICAL SEPTIC/STEP TANK DRAWINGS



TYPICAL STEP PUMP TANK (FOLLOWING SEPTIC TANK)

NOT TO SCALE

NOTE: REFER TO TABLE A FOR CORRESPONDING TANK SIZE AND DIMENSIONS

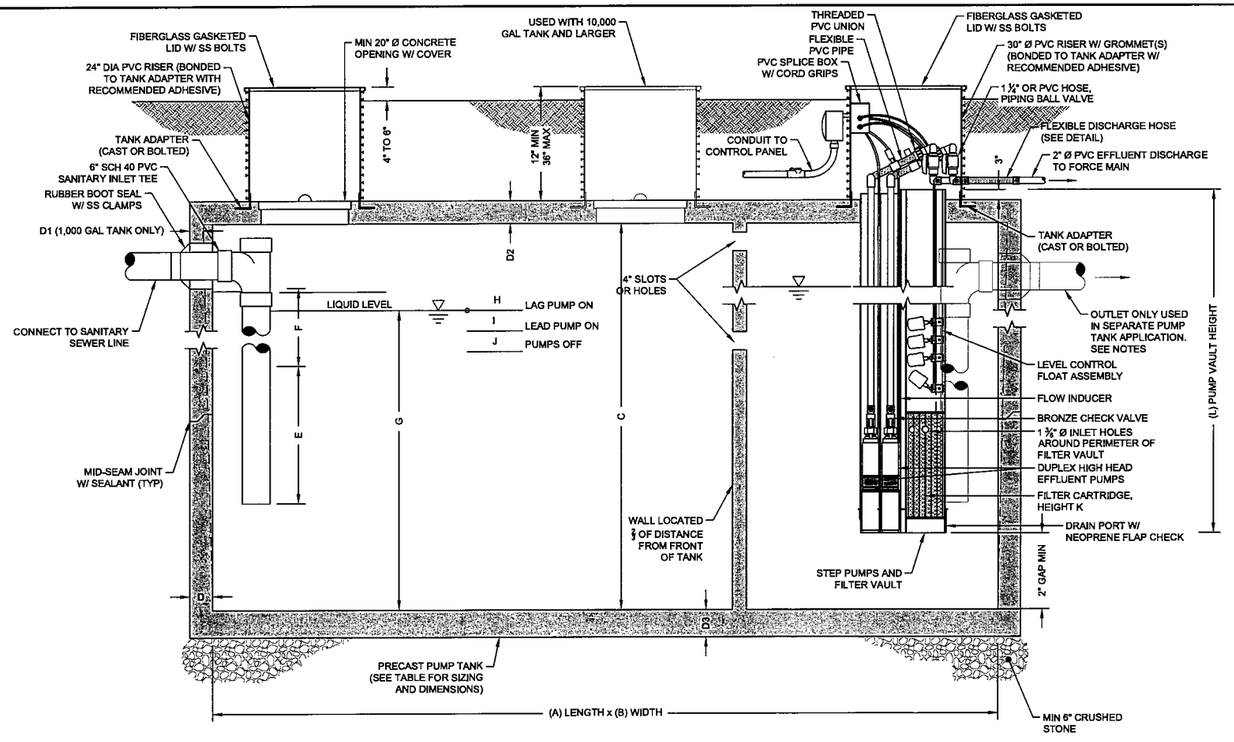


TYPICAL TANK PLAN

NOT TO SCALE

NOTES:

1. PUMP TANKS FOR TOWNHOME GRAVITY SUBSYSTEM AND FOR MAIN RESTAURANT HAVE TWO PUMP VAULT OPENINGS
2. SEPTIC TANKS FOR TOWNHOME GRAVITY SUBSYSTEM AND MAIN RESTAURANT DO NOT HAVE PUMPS



TYPICAL STEP / SEPTIC TANK

NOT TO SCALE

NOTE: REFER TO TABLE B FOR CORRESPONDING TANK SIZE AND DIMENSIONS

TABLE A

STEP PUMP TANK DEMENSION TABLE

TANK SIZE	DIMENSIONS (IN)											
	A	B	C	D	E	F	G	H	I	J	K	L
2500	170	68	60.5	5	18	3	51	3	3	3	24	68
5000	170	68	110.5	5	24	3	99	3	3	3	24	68
15,000	312	132	109	6	36	3	94	3	3	3	36	84

TABLE B

STEP / SEPTIC TANK DEMENSION TABLE

TANK SIZE	DIMENSIONS (IN)														
	A	B	C	D	D1	D2	D3	E	F	G	H	I	J	K	L
1000	110	50	52	5	3	6	4	18	3	42	0	3	3	18	57
1500	136	64	52	4		6	4	18	3	42	3	3	3	24	57
4000	170	68	91.5	5		5	5	24	3	80	3	3	3	24	68
5000	170	68	110.5	5		5	5	36	3	98	3	3	3	24	68
8000	234	96	95	6		6	6	24	3	82	3	3	3	36	68
10,000	240	96	112	6		8	8	36	3	99	3	3	3	36	84
20,000	312	132	120	8		8	6	36	3	105	3	3	3	36	84
25,000	312	132	152	8		8	6	48	3	137	3	3	3	36	84

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REVISIONS

NO.	DESCRIPTIONS	DATE	BY	APPD

DESIGN	DRAWN	CHECKED	APPROVED
ZWR	WEP	GMC	JRB

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

STEP PUMP / SEPTIC TANK DETAILS

CTI ENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

FOR REVIEW

JOB NO. C23041

ISSUE DATE 8/7/2023

DRAWING NO. C21

CTI PROJECT: C23041-01; DRAWING: C23041-01_C23041 TANK DETAILS (829361v12/7/19/24 3:36PM); LAYOUT: C21

DATE OF PRINT: 7/19/2024 4:14 PM



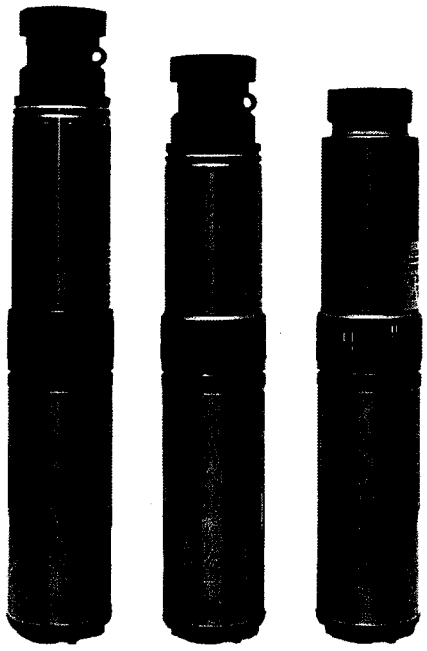
APPENDIX C
TYPICAL STEP PUMP DATA SHEETS

Orenco® PVA-Series Pumps

Applications

Orenco's Submersible Effluent Pumps are used to transport screened effluent (with low TSS counts) from septic tanks or separate dosing tanks.

Orenco's PVA-Series 4in (100mm) Submersible Effluent Pumps are designed to be used in a variety of Orenco pumping packages, typically with an Orenco Biotube® ProPak™ Pump Package. PVA-Series pumps are only available for sale in a limited number of Orenco pumping packages.



Orenco PVA100511, PVA300511, and PVA500511 pumps

General

PVA-Series pumps are constructed of lightweight, corrosion-resistant stainless steel and engineered plastics. The liquid end is cleanable in the field with common tools. These pumps meet UL requirements and are CSA certified to US and Canadian safety standards for effluent pumps.

To specify this pump for your installation, require the following:

- Run-dry capability
- 1/8in (3mm) bypass orifice for motor cooling and to prevent air binding
- 1/8in (3mm) mesh intake screen to limit solids
- Composite Franklin Electric motors are rated for continuous use, hermetically sealed motor housing for moisture-free windings, and Kingsbury-type thrust bearing for thrust absorption
- Thermal overload protection trips at 203-221°F (95-105°C)
- 16AWG, 3-conductor Type SOOW 600V motor cable (suitable for Class I, Division 1 and Division 2 applications)
- Five year warranty from date of manufacture on liquid end against defects in materials or workmanship

Standard Models

PVA100511, PVA300511, PVA500511

Product Code Diagram

PVA ☐ 05 1 1 - ☐

- ☐ = CLK = ClickTight™ compatible
- 1 = Voltage, nameplate: 1 = 115
- 1 = Frequency: 1 = 1-phase 60Hz
- 05 = Horsepower (kW): 05 = 1/2hp (0.37)
- ☐ = Nominal flow, gpm (L/sec): 10 = 10 (0.6), 30 = 30 (1.9), 50 = 50 (3.2)
- PVA = Pump, Value Alternative Series

C US
LR80980
LR2053896

Powered by Franklin Electric

Specifications

Pump Model	Design gpm (L/sec)	Horsepower (kW)	Phase	Nameplate voltage	Actual voltage	Design flow amps	Max amps	Discharge size and material[1]	Length in (mm)	Min. liquid level in (mm)	Weight lb (kg)	Rated cycles per day
PVA100511[4]	10 (0.6)	0.50 (0.37)	1	115	120	12.4	12.5	1¼in GFP[2]	22.0 (559)	16 (406)	23 (10.4)	300
PVA300511[4]	30 (1.9)	0.50 (0.37)	1	115	120	11.9	12.1	1¼in GFP[2]	20.5 (521)	20 (508)	21 (9.5)	300
PVA500511[4]	50 (3.2)	0.50 (0.37)	1	115	120	12.1	12.2	2in SS[3]	19.5 (495)	24 (610)	24 (10.9)	300

1. *Discharge is receptacle style NPT threaded, US nominal size, to accommodate Orenco discharge hose and valve assemblies. Consult your Orenco distributor about fittings to connect discharge assemblies to metric-sized piping.*
2. *GFP = Glass-filled polypropylene*
3. *SS = Stainless steel*
4. *ClickTight™ compatible*

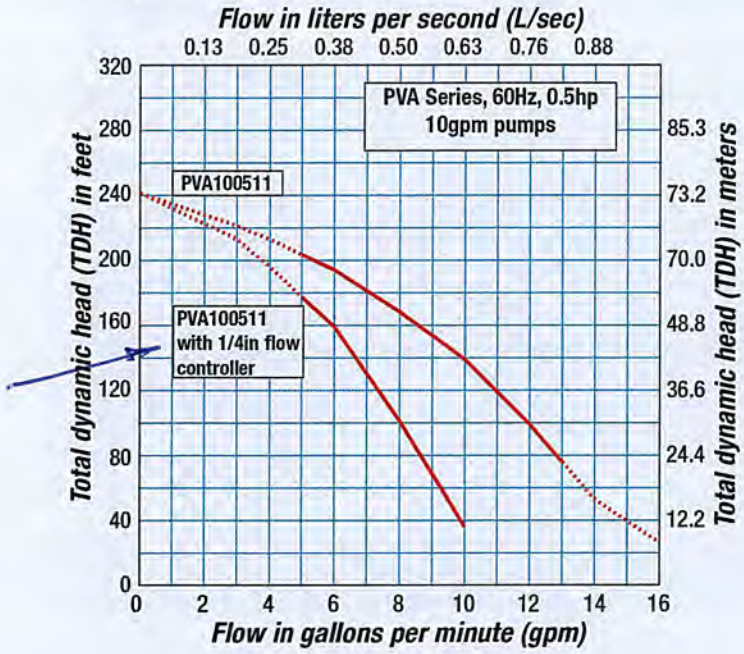
Materials of Construction

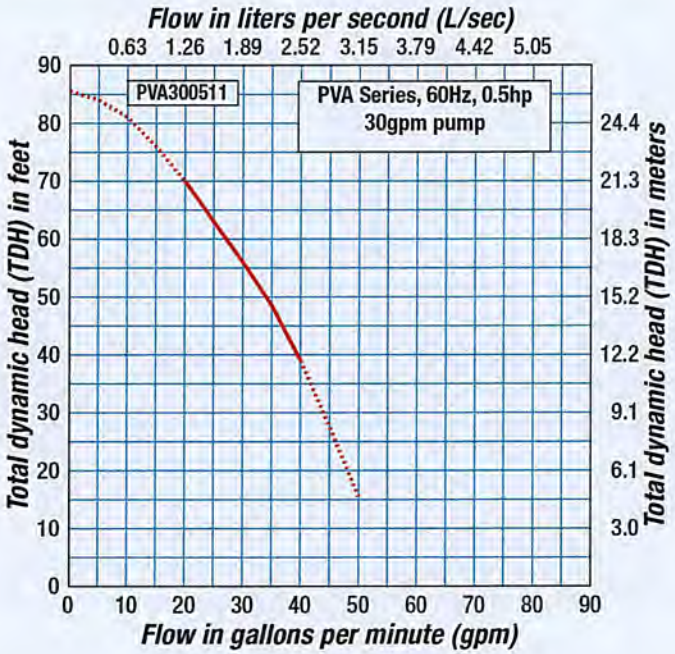
Discharge	Glass-filled polypropylene (PVA100511 and PVA300511), stainless steel (PVA500511)
Diffusers	Glass-filled PPO (SABIC's NORYL™ GFN3 resin)
Discharge bearing	Engineered thermoplastic (PEEK)
Impellers	Celanese's Celcon® acetal copolymer (PVA100511), Noryl GFN3 (PVA300511 and PVA500511)
Intake screen	Polyethylene
Suction connection	Glass-filled polypropylene (PVA100511), stainless steel (PVA300511 and PVA500511)
Drive shaft	7/16in hexagonal stainless steel, 300 series
Coupling	Sintered stainless steel, 300 series
Shell	Stainless steel, 300 series
Cable	10ft (3.1m) 16/3 Type SOOW 600V motor cable (not compatible with Franklin Electric Super Stainless motors)
Motor	Franklin Electric composite motor filled with deionized water and propylene glycol for constant lubrication. Stainless steel shell.

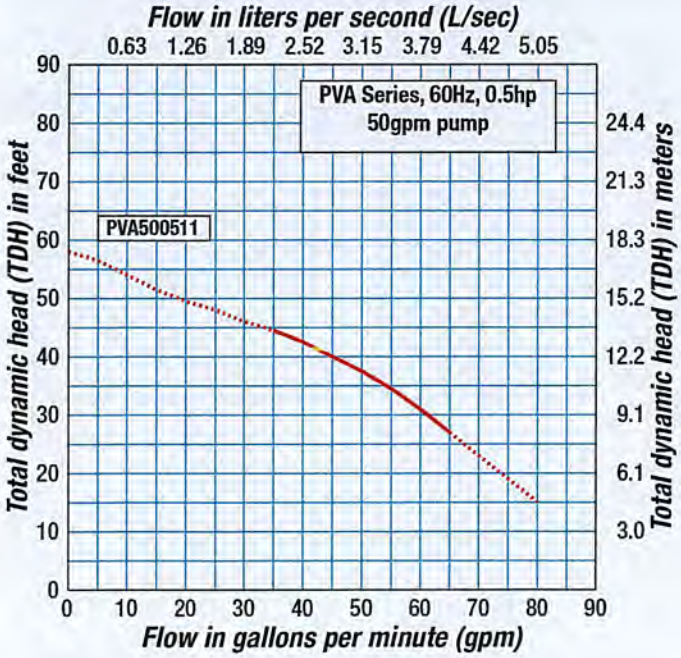
Using a Pump Curve

A pump curve helps you determine the best pump for your system. Pump curves show the relationship between flow (gpm or L/sec) and pressure (total dynamic head or TDH), providing a graphical representation of a pump's optimal performance range. Pumps perform best at their nominal flow rate – the value, measured in gpm, expressed by the first two numerals in an Orenco pump nomenclature. These graphs use solid lines to show the optimal pump operation range. Dashed lines indicate flow rates outside of the optimal range for each pump. For the most accurate pump specifications, use Orenco's PumpSelect™ software.

Pump Curves







Orenco WATER *Technical Data Sheet*

P-Series Submersible Effluent Pumps: Single-Phase, 60Hz, 4in (100mm)

Applications

Orenco's Submersible Effluent Pumps are used to transport screened effluent (with low TSS counts) from septic tanks or separate dosing tanks.

Orenco's P-Series 4in (100mm) Submersible Effluent Pumps are designed to be used in a variety of Orenco pumping packages, typically with a Biotube® ProPak™ pumping package. P-Series pumps are only available for sale in a limited number of Orenco pumping packages.



Orenco P-Series Submersible Effluent Pump

Features

P-Series pumps are constructed of lightweight, corrosion-resistant stainless steel and engineered plastics. The liquid end is cleanable in the field with common tools. These pumps meet UL requirements and are CSA certified to US and Canadian safety standards for effluent pumps.

To specify this pump for your installation, require the following:

- Run-dry capability
- 1/8in (3mm) bypass orifice for motor cooling and to prevent air binding
- Pentek XE Series motor is UL, CSA approved and NSF/ANSI 61 certified
- Built-in thermal overload protection
- 16AWG, 3-conductor Type SOOW 600V motor cable (suitable for Class I, Division 1 and Division 2 applications)
- 36 month warranty from date of manufacture on liquid end against defects in materials or workmanship

Standard Models

P100511, P200511, P300511

Product Code Diagram

P ☐ 05 1 1 - ☐

- ☐ = CLK = ClickTight™ compatible
- 1 = Voltage, nameplate: 115
- 1 = Frequency: single-phase 60 Hz
- 05 = Horsepower (kW): ½ (0.37)
- ☐ = Nominal flow, gpm (L/sec): 10 = 10 (0.6), 20 = 20 (1.3), 30 = 30 (1.9)
- P = Pump, P-Series

All product and performance assertions are based on proper design, installation, operation, and maintenance according to Orenco's current published documentation.

Specifications

Pump Model	Design gpm (L/sec)	Horsepower (kW)	Phase	Nameplate voltage	Actual voltage	Design flow amps	Max amps	Discharge size and material	Length in (mm)	Min. liquid level in (mm)	Weight lb (kg)	Rated cycles per day
P100511[1,2,3]	10 (0.6)	0.5 (0.37)	1	115	120	10.15	12	1¼in FRT	21.50 (546)	18 (457)	25 (11.3)	300
P200511[1,2,3]	20 (1.3)	0.5 (0.37)	1	115	120	11.65	12	1¼in FRT	22.25 (565)	20 (508)	24 (10.9)	300
P300511[1,2,3]	30 (1.9)	0.5 (0.37)	1	115	120	10.64	12	1¼in. FRT	22.50 (571)	22 (559)	27 (12.2)	300

1 Discharge is female NPT threaded, US nominal size, to accommodate Orenco discharge hose and valve assemblies. Consult your Orenco Distributor about fittings to connect discharge assemblies to metric-sized piping.

2 FRT = Fiberglass-reinforced thermoplastic

3 ClickTight™ compatible

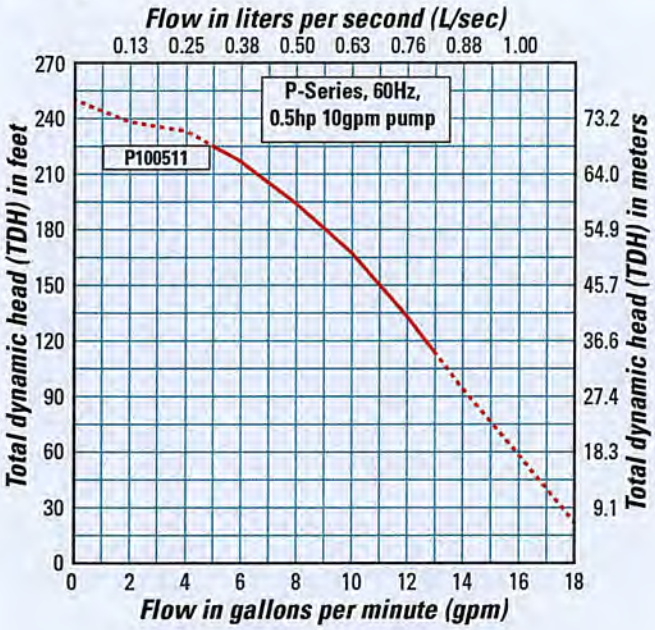
Materials of Construction

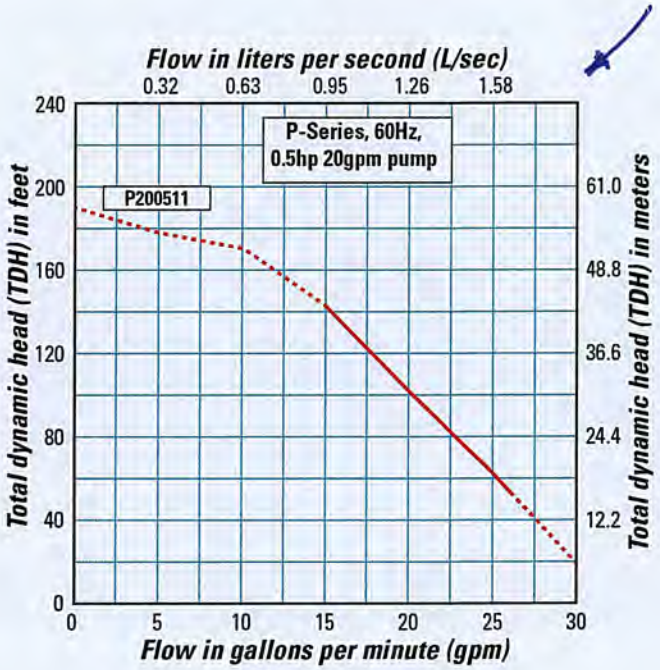
Cable	10ft (3m) 16/3 Type SOOW 600V motor cable
Coupling	Stainless steel, 300 series
Diffusers	Engineered composite
Discharge	Fiberglass-reinforced thermoplastic
Discharge bearing	Nylatron®
Drive shaft	Stainless steel, 300 series
Impellers	Engineered composite
Intake	Engineered composite
Intake screen	Polypropylene
Motor	Laser-welded 304L stainless steel construction. Pentek XE Series motor incorporates encapsulated epoxy stator design and professional-grade Class F insulation to provide long life in harsh environments. Each motor is 100% factory pressure tested and run tested.
Shell	Stainless steel

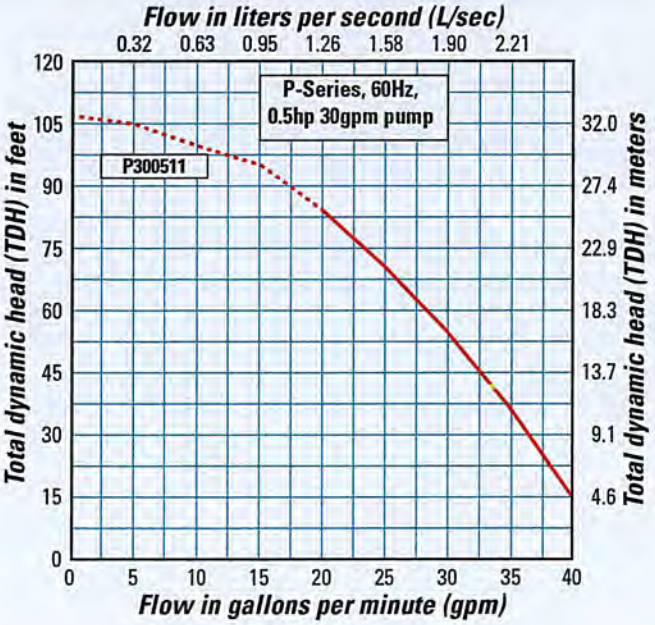
Using a Pump Curve

A pump curve helps you determine the best pump for your system. Pump curves show the relationship between flow (gpm or L/sec) and pressure (total dynamic head or TDH), providing a graphical representation of a pump's optimal performance range. Pumps perform best at their nominal flow rate — the value, measured in gpm, expressed by the first two numerals in an Orenco pump's product code. The graphs on the following page use solid lines to show the optimal pump operation range. Dashed lines indicate flow rates outside of the optimal range for each pump. For the most accurate pump specifications, use Orenco's PumpSelect™ software.

Pump Curves







Orenco® PF-Series 60Hz, 1-Phase Pumps

Applications

Orenco's 60Hz, 1-phase, 4in (100mm) Submersible Effluent Pumps are designed to transport screened effluent (with low TSS counts) from septic or dosing tanks. These pumps are engineered using lightweight, corrosion-resistant stainless steel and polymers, and are field serviceable and repairable with common tools. They're also CSA and UL certified to US and Canadian safety standards for effluent pumps.

PF-Series pumps are used in a variety of applications, including pressurized drainfields, packed-bed filters, mounds, aerobic units, effluent irrigation, liquid-only (effluent) sewers, wetlands, lagoons, and more. These pumps are designed to be used with a Biotube® pump vault or after a secondary treatment system.



C US
LR80980
LR2053896

Powered by **Franklin Electric**

General

To specify this pump for your installation, require the following:

- Minimum 24-hour run-dry capability (liquid end) with no deterioration in pump life or performance*
- 1/8in (3mm) bypass orifice to ensure flow recirculation for motor cooling and to prevent air binding
- 1/8in (3mm) mesh intake screen to limit solids
- Liquid-end repair kit availability for better long-term cost to own
- TRI-SEAL™ floating impeller design on 10, 20, and 30gpm (0.6, 1.3, and 1.9L/sec) models; floating stack design on 50 and 75gpm (3.2 and 4.7L/sec) models
- Franklin Electric Super Stainless motors are rated for continuous use and frequent cycling, with surge arrestors, hermetically sealed motor housing for moisture-free windings, and Kingsbury-type thrust bearing for thrust absorption
- Thermal overload protection trips at 203-221˚F (95-105˚C) for 1-phase motors through 1.5hp (1.12kW)
- Type SOOW 600V motor cable (model PF751512 uses 14 AWG, SJOOW, 300V cord)

** Not applicable for 5hp (3.73kW) models*

Standard Models

See Specifications on page 2 for a list of standard pumps. For a complete list of available pumps, call Orenco.

Product Code Diagram

PF □ □ □ □ □ - □ - □

- Pump, PF-Series
- Nominal flow, gpm (L/sec): 10 = 10 (0.6) 20 = 20 (1.3) 30 = 30 (1.9) 50 = 50 (3.2) 75 = 75 (4.7)
- Horsepower (kW): 05 = 1/2hp (0.37) 07 = 3/4hp (0.56) 10 = 1hp (0.75) 15 = 1 1/2hp (1.12) 20 = 2hp (1.50) 30 = 3hp (2.24) 50 = 5hp (3.73)
- Frequency: 1 = 1-phase, 60Hz
- Voltage, nameplate: 1 = 115* 2 = 230
- Check valve: Blank = no internal check valve CV = internal check valve†
- Cord length, ft (m):‡ Blank = 10 (3) 20 = 20 (6) 30 = 30 (9) 50 = 50 (15)
- CLK = ClickTight™ compatible

* 1/2hp (0.37kW) only
† Available for 10gpm (0.6L/sec), 1/2hp (0.37kW)
‡ Note: 20ft cords are available only for pumps through 1 1/2hp

All product and performance assertions are based on proper design, installation, operation, and maintenance according to Orenco's current published documentation.

Specifications

Pump Model	Design gpm (L/sec)	Horsepower (kW)	Phase	Nameplate voltage	Actual voltage	Design flow amps	Max amps	Discharge size and material[1]	Length in (mm)	Min. liquid level in (mm)[2]	Weight lb (kg)[3]	Rated cycles per day
PF100511[9]	10 (0.6)	0.50 (0.37)	1	115	120	12.7	12.7	1¼in GFP	23.0 (584)	16 (406)	26 (12)	300
PF100511CV[9]	10 (0.6)	0.50 (0.37)	1	115	120	12.7	12.7	1¼in GFP	23.0 (584)	16 (406)	26 (12)	300
PF100512[9]	10 (0.6)	0.50 (0.37)	1	230	240	6.3	6.3	1¼in GFP	23.0 (584)	16 (406)	26 (12)	300
PF100712[4,5,9]	10 (0.6)	0.75 (0.56)	1	230	240	8.3	8.3	1¼in GFP	25.9 (658)	17 (432)	30 (14)	300
PF101012[5,6,9]	10 (0.6)	1.00 (0.75)	1	230	240	9.6	9.6	1¼in GFP	27.9 (709)	18 (457)	33 (15)	100
PF200511[9]	20 (1.3)	0.50 (0.37)	1	115	120	12.3	12.5	1¼in GFP	22.3 (566)	18 (457)	25 (11)	300
PF200512[9]	20 (1.3)	0.50 (0.37)	1	230	240	6.4	6.5	1¼in GFP	22.5 (572)	18 (457)	26 (12)	300
PF201012[4,5,9]	20 (1.3)	1.00 (0.75)	1	230	240	10.5	10.5	1¼in GFP	28.4 (721)	20 (508)	33 (15)	100
PF201512[4,5]	20 (1.3)	1.50 (1.12)	1	230	240	12.4	12.6	1¼in GFP	34.0 (864)	24 (610)	41 (19)	100
PF300511[9]	30 (1.9)	0.50 (0.37)	1	115	120	11.8	11.8	1¼in GFP	21.3 (541)	20 (508)	28 (13)	300
PF300512[9]	30 (1.9)	0.50 (0.37)	1	230	240	6.2	6.2	1¼in GFP	21.3 (541)	20 (508)	25 (11)	300
PF300712[9]	30 (1.9)	0.75 (0.56)	1	230	240	8.5	8.5	1¼in GFP	24.8 (630)	21 (533)	29 (13)	300
PF301012[4,9]	30 (1.9)	1.00 (0.75)	1	230	240	10.4	10.4	1¼in GFP	27.0 (686)	22 (559)	32 (15)	100
PF301512[4,5]	30 (1.9)	1.50 (1.12)	1	230	240	12.6	12.6	1¼in GFP	32.8 (833)	24 (610)	40 (18)	100
PF302012[5,6,7]	30 (1.9)	2.00 (1.49)	1	230	240	11.0	11.0	1¼in SS	35.5 (902)	26 (660)	44 (20)	100
PF303012[5,6,7,8]	30 (1.9)	3.00 (2.23)	1	230	240	16.8	16.8	1¼in SS	44.5 (1130)	33 (838)	54 (24)	100
PF305012[5,6,7,8]	30 (1.9)	5.00 (3.73)	1	230	240	25.6	25.8	1¼in SS	66.5 (1689)	53 (1346)	82 (37)	100
PF500511[9]	50 (3.2)	0.50 (0.37)	1	115	120	12.1	12.1	2in SS	20.3 (516)	24 (610)	27 (12)	300
PF500512[9]	50 (3.2)	0.50 (0.37)	1	230	240	6.2	6.2	2in SS	20.3 (516)	24 (610)	27 (12)	300
PF500712[9]	50 (3.2)	0.75 (0.56)	1	230	240	8.5	8.5	2in SS	23.7 (602)	25 (635)	31 (14)	300
PF501012[9]	50 (3.2)	1.00 (0.75)	1	230	240	10.1	10.1	2in SS	27.0 (686)	26 (660)	35 (16)	100
PF501512[4]	50 (3.2)	1.50 (1.12)	1	230	240	12.5	12.6	2in SS	32.5 (826)	30 (762)	41 (19)	100
PF503012[4,5,7,8]	50 (3.2)	3.00 (2.23)	1	230	240	17.7	17.7	2in SS	52.0 (1321)	37 (940)	55 (25)	100
PF505012[5,6,7,8]	50 (3.2)	5.00 (3.73)	1	230	240	26.2	26.4	2in SS	77.0 (1956)	55 (1397)	64 (29)	100
PF751012[9]	75 (4.7)	1.00 (0.75)	1	230	240	9.9	10.0	2in SS	27.0 (686)	27 (686)	34 (15)	100
PF751512	75 (4.7)	1.50 (1.12)	1	230	240	12.1	12.3	2in SS	33.4 (848)	30 (762)	44 (20)	100

1. GFP = glass-filled polypropylene; SS = stainless steel. The 1 1/4in NPT GFP discharge is 2 7/8in octagonal across flats; the 1 1/4in NPT SS discharge is 2 1/8in octagonal across flats; and the 2in NPT SS discharge is 2 7/8in hexagonal across flats. Discharge is NPT threaded receptacle-style port, US nominal size, to accommodate Orenco discharge hose and valve assemblies. Consult your Orenco distributor about fittings to connect hose and valve assemblies to metric-sized piping.

2. Minimum liquid level is for single pumps when installed in an Orenco Biotube Pump Vault or Universal Flow Inducer. In other applications, minimum liquid level should be top of pump. Consult Orenco for more information.

3. Weight includes carton and 10ft (3m) cord.

4. High-pressure discharge assembly required.

5. Do not use cam-lock option (0) on discharge assembly.

6. Custom discharge assembly required for these pumps. Contact Orenco.

7. Capacitor pack (sold separately or installed in a custom control panel) required for this pump. Contact Orenco.

8. Torque locks are available for all pumps, and they are supplied with 3hp and 5hp pumps.

9. ClickTight™ compatible.

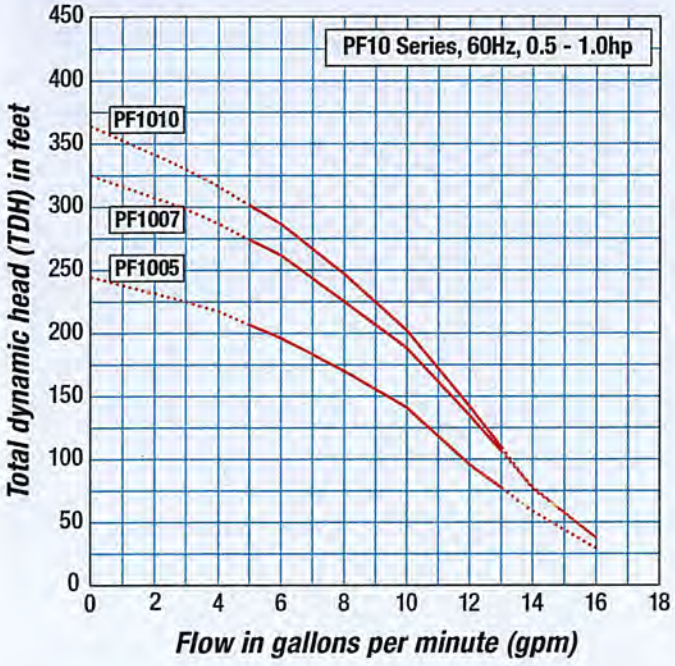
Materials of Construction

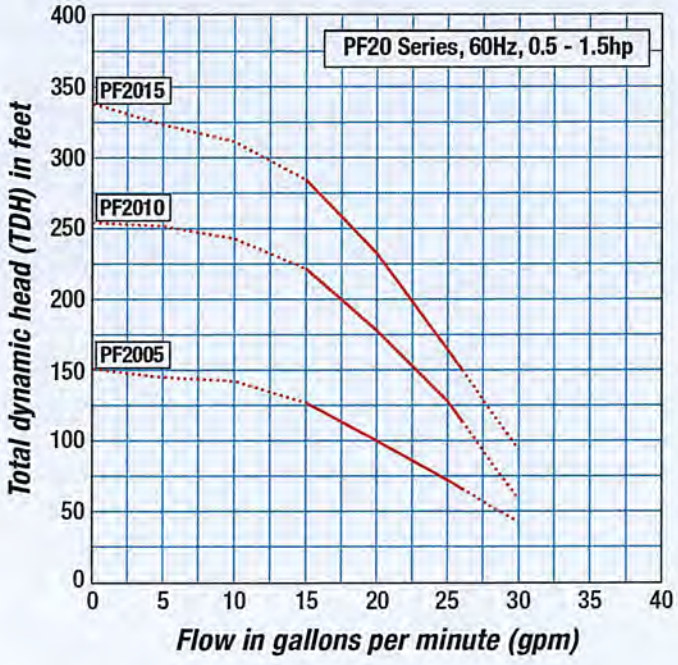
Discharge	Glass-filled polypropylene or stainless steel
Discharge bearing	Engineered thermoplastic (PEEK)
Diffusers	Glass-filled PPO (SABIC's NORYL™ GFN3 resin)
Impellers	Celanese's Celcon® acetal copolymer on 10, 20, and 30gpm models; 50gpm impellers are NORYL GFN3 resin
Intake screen	Polypropylene
Suction connection	Stainless steel
Drive shaft	7/16in hexagonal stainless steel, 300 series
Coupling	Sintered stainless steel, 300 series
Shell	Stainless steel, 300 series
Motor	Franklin Electric motor filled with deionized water and propylene glycol for constant lubrication. Stainless steel shell.

Using a Pump Curve

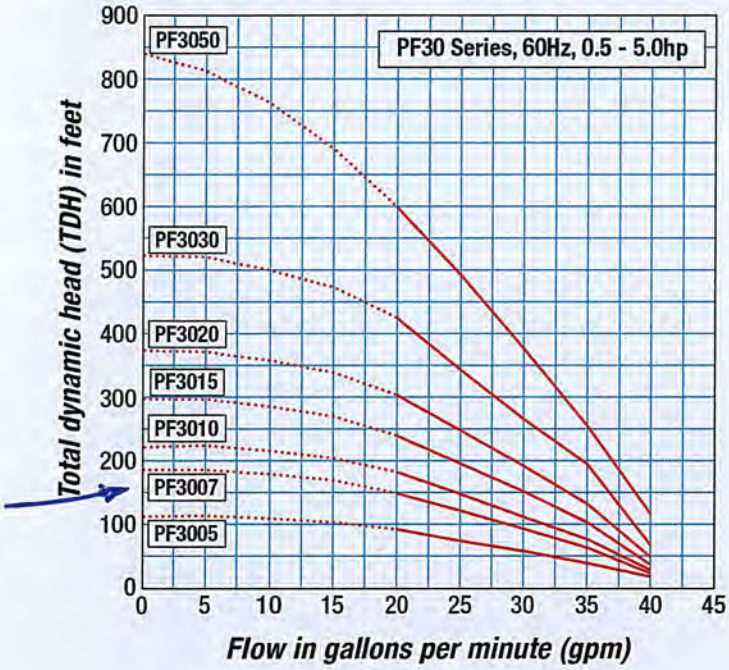
A pump curve helps you determine the best pump for your system. Pump curves show the relationship between flow (gpm or L/sec) and pressure (total dynamic head or TDH), providing a graphical representation of a pump's optimal performance range. Pumps perform best at their nominal flow rate – the value, measured in gpm, expressed by the first two numerals in an Orenco pump nomenclature. These graphs use solid lines to show the optimal pump operation range. Dashed lines indicate flow rates outside of the optimal range for each pump. For the most accurate pump specifications, use Orenco's PumpSelect™ software.

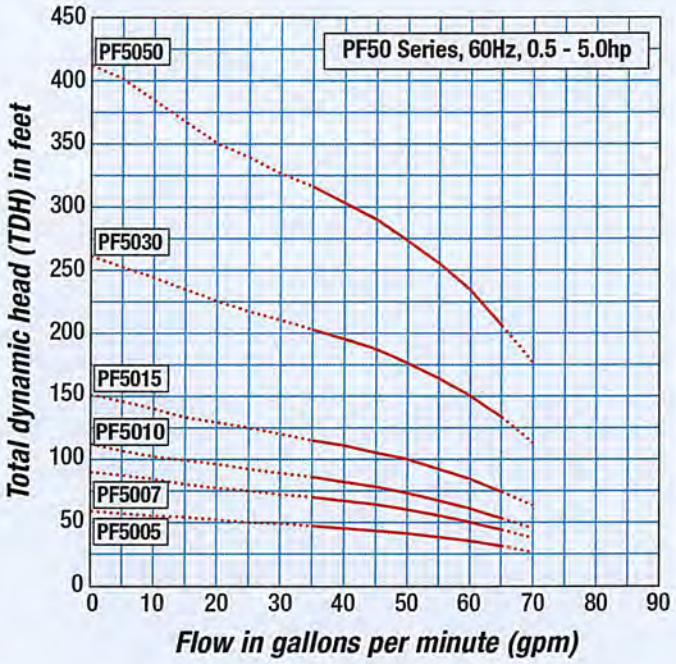
Pump Curves

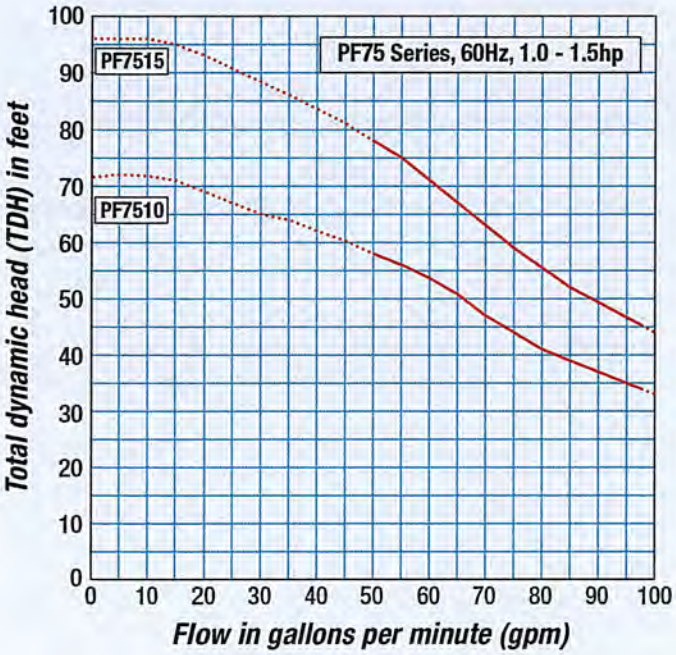




Pump Curves, cont.









APPENDIX D
HYDRAULIC MODEL NETWORK DRAWING AND OUTPUT TABLES

RIVER GORGE RANCH SUBDIVISION
SEWERGEMS MODEL SIMULATION RESULTS
SCENARIO 1
PUMPS

DATE: 08/20/2024

LABEL	ELEV. GROUND (FT.)	ELEV. INVERT (FT.)	PUMP DEFINITION	PUMP FLOW (GPM)	PUMP HEAD (FT.)	HGL (UPSTREAM) (FT.)	HGL (DOWNSTREAM) (FT.)
LINE E							
PMP-4	1,438.00	1,429.00	ORENCO P200511	23.92	73.93	1427.97	1501.89
PMP-10	1,436.50	1,428.50	ORENCO P200511	23.46	77.92	1427.47	1505.39
PMP-16	1,436.50	1,428.50	ORENCO P200511	23.81	74.86	1427.47	1502.33
PMP-19	1,436.00	1428.00	ORENCO P200511	24.07	72.63	1426.97	1499.60
LINE B							
PMP-41	1,443.00	1,434.00	ORENCO PVA100511 0.25" RESTRICTOR	9.47	54.03	1432.99	1487.02
PMP-44	1,442.00	1,432.00	ORENCO PVA100511 0.25" RESTRICTOR	9.35	57.83	1430.99	1488.83
PMP-47	1,441.00	1,433.00	ORENCO PVA100511 0.25" RESTRICTOR	9.35	57.95	1431.99	1489.95
PMP-51	1,424.00	1,416.00	ORENCO PVA100511 0.25" RESTRICTOR	9.12	65.12	1424.99	1490.12

RIVER GORGE RANCH SUBDIVISION
SEWERGEMS MODEL SIMULATION RESULTS
SCENARIO 1
PIPES

DATE: 08/20/2024

Label	Start Node	Stop Node	Length (User Defined) (ft)	Diameter (in)	Flow (gal/min)	Velocity (ft/s)	Hazen-Williams C
CP-2	PMP-2	PJ-2	75	1.7	0	0	130
CP-4	PMP-4	PJ-4	80	1.7	23.92	3.3	130
CP-6	PMP-6	PJ-6	130	1.7	0	0	130
CP-8	PMP-8	PJ-8	75	1.7	0	0	130
CP-10	PMP-10	PJ-10	90	1.7	23.46	3.24	130
CP-12	PMP-12	PJ-12	81	1.7	0	0	130
CP-16	PMP-16	PJ-16	67	1.7	23.81	3.29	130
CP-17	PMP-17	PJ-17	90	1.7	0	0	130
CP-18	PMP-18	PJ-18	90	1.7	0	0	130
CP-19	PMP-19	PJ-19	97	1.7	24.07	3.32	130
CP-20	PMP-20	PJ-20	97	1.7	0	0	130
CP-21	PMP-21	PJ-22	50	1.7	0	0	130
CP-23	PMP-23	PJ-25	75	1.7	0	0	130
CP-24(1)	PMP-24(1)	PJ-52	32	2.1	0	0	130
CP-24(2)	PJ-52	PJ-26	503	3.1	0	0	130
CP-24(3)	PMP-24(2)	PJ-52	32	2.1	0	0	130
CP-25(1)	PJ-72	PJ-27	41	2.1	0	0	130
CP-25(2)	PMP-25(1)	PJ-72	1	1.7	0	0	130
CP-25(3)	PMP-25(2)	PJ-72	1	1.7	0	0	130
CP-26	PMP-26	PJ-27	105	1.7	0	0	130
CP-27	PMP-27	PJ-28	80	1.7	0.01	0	130
CP-28	PMP-28	PJ-29	80	1.7	0.01	0	130
CP-29	PMP-29	PJ-30	80	1.7	0.01	0	130
CP-30	PMP-30	PJ-31	80	1.7	0.01	0	130
CP-31	PMP-31	PJ-32	80	1.7	0.01	0	130
CP-37	PMP-37	PJ-46	70	1.7	0	0	130

CP-38	PMP-38	PJ-45	61	1.7	0	0	130
CP-39	PMP-39	PJ-44	45	1.7	0	0	130
CP-40	PMP-40	PJ-43	43	1.7	0	0	130
CP-41	PMP-41	PJ-42	62	1.7	9.47	1.31	130
CP-42	PMP-42	PJ-41	35	1.7	0	0	130
CP-43	PMP-43	PJ-40	63	1.7	0	0	130
CP-44	PMP-44	PJ-39	34	1.7	9.35	1.29	130
CP-45	PMP-45	PJ-38	63	1.7	0	0	130
CP-46	PMP-46	PJ-37	34	1.7	0	0	130
CP-47	PMP-47	PJ-36	60	1.7	9.35	1.29	130
CP-48	PMP-48	PJ-35	34	1.7	0	0	130
CP-49	PMP-49	PJ-34	30	1.7	0	0	130
CP-50(1)	PJ-73	PJ-74	247	2.1	0	0	130
CP-50(2)	PMP-50(1)	PJ-73	28	2.1	0	0	130
CP-50(3)	PMP-50(2)	PJ-73	28	2.1	0	0	130
CP-51	PMP-51	PJ-33	30	1.7	9.12	1.26	130
P-2	PJ-0	PJ-23	20	3.1	47.38	1.96	130
P-3	PJ-23	PJ-22	83	3.1	47.38	1.96	130
P-4	PJ-22	PJ-21	89	3.1	47.38	1.96	130
P-5	PJ-21	PJ-24	475	3.1	95.26	3.93	130
P-6	PJ-24	PJ-28	85	4.1	95.26	2.35	130
P-7	PJ-28	PJ-29	92	4.1	95.25	2.35	130
P-8	PJ-29	PJ-30	102	4.1	95.25	2.35	130
P-9	PJ-30	PJ-31	76	4.1	95.24	2.35	130
P-10	PJ-31	PJ-32	83	4.1	95.23	2.35	130
P-11	PJ-32	PJ-47	62	4.1	95.23	2.35	130
P-12	PJ-47	PJ-46	118	2.1	37.28	3.34	130
P-13	PJ-46	PJ-45	94	2.1	37.28	3.34	130
P-14	PJ-45	PJ-44	36	2.1	37.28	3.34	130
P-15	PJ-44	PJ-43	66	2.1	37.28	3.34	130
P-16	PJ-43	PJ-42	7	2.1	37.28	3.34	130
P-17	PJ-42	PJ-41	62	2.1	27.81	2.49	130
P-18	PJ-41	PJ-40	27	2.1	27.81	2.49	130

P-19	PJ-40	PJ-39	43	2.1	27.81	2.49	130
P-20	PJ-39	PJ-38	53	2.1	18.46	1.65	130
P-21	PJ-38	PJ-37	14	2.1	18.46	1.65	130
P-22	PJ-37	PJ-36	72	2.1	18.46	1.65	130
P-23	PJ-36	PJ-35	5	2.1	9.12	0.82	130
P-24	PJ-35	PJ-34	77	2.1	9.12	0.82	130
P-25	PJ-33	PJ-34	103	2.1	-9.12	0.81	130
P-26	PJ-1	PJ-2	100	2.1	47.38	4.25	130
P-27	PJ-2	PJ-3	25	2.1	47.38	4.25	130
P-28	PJ-3	PJ-4	15	2.1	47.38	4.25	130
P-29	PJ-4	PJ-5	5	2.1	23.46	2.1	130
P-30	PJ-5	PJ-6	130	2.1	23.46	2.1	130
P-31	PJ-6	PJ-7	35	2.1	23.46	2.1	130
P-32	PJ-7	PJ-8	10	2.1	23.46	2.1	130
P-33	PJ-8	PJ-9	45	2.1	23.46	2.1	130
P-34	PJ-9	PJ-10	75	2.1	23.46	2.1	130
P-35	PJ-10	PJ-11	50	2.1	0	0	130
P-36	PJ-11	PJ-12	10	2.1	0	0	130
P-37	PJ-16	PJ-17	25	2.1	23.81	2.13	130
P-38	PJ-17	PJ-18	180	2.1	23.81	2.13	130
P-39	PJ-18	PJ-19	130	2.1	23.81	2.13	130
P-40	PJ-19	PJ-20	15	2.1	47.88	4.29	130
P-41	PJ-25	PJ-24	215	3.1	0	0	130
P-42	PJ-25	PJ-26	90	3.1	0	0	130
P-43	PJ-26	PJ-27	135	2.1	0	0	130
P-44	PJ-20	PJ-74	75	2.1	47.88	4.29	130
P-45	PJ-74	PJ-21	110	3.1	47.88	1.98	130
P-46	PJ-47	PJ-48	162	4	132.51	3.39	130
P-47	PJ-48	PJ-49	107	4	132.51	3.39	130
P-48	PJ-49	PJ-50	334	4	132.51	3.39	130
P-49	PJ-50	PJ-51	72	4	132.51	3.39	130
P-50	PJ-51	PJ-52	58	4	132.51	3.39	130
P-51	PJ-52	PJ-53	58	4	132.51	3.39	130

P-52	PJ-53	PJ-54	84	4	132.51	3.39	130
P-53	PJ-54	PJ-55	56	4	132.51	3.39	130
P-54	PJ-55	PJ-56	120	4	132.51	3.39	130
P-55	PJ-56	PJ-57	40	4	132.51	3.39	130
P-56	PJ-57	PJ-58	50	4	132.51	3.39	130
P-57	PJ-58	PJ-59	151	4	132.51	3.39	130
P-58	PJ-59	PJ-60	54	4	132.51	3.39	130
P-59	PJ-60	PJ-61	42	4	132.51	3.39	130
P-60	PJ-61	PJ-62	44	4	132.51	3.39	130
P-61	PJ-62	AV-6	101	4	132.51	3.39	130
P-62	AV-6	PJ-63	19	4	132.51	3.39	130
P-63	PJ-63	PJ-64	78	4	132.51	3.39	130
P-64	PJ-64	PJ-65	34	4	132.51	3.39	130
P-65	PJ-65	PJ-66	74	4	132.51	3.39	130
P-66	PJ-66	PJ-67	91	4	132.51	3.39	130
P-67	PJ-67	PJ-68	109	4	132.51	3.39	130
P-68	PJ-68	PJ-69	58	4	132.51	3.39	130
P-69	PJ-69	PJ-70	64	4	132.51	3.39	130
P-70	PJ-70	PJ-71	41	4	132.51	3.39	130
P-71	PJ-71	O-1	136	4	132.51	3.39	130
P-72	PJ-1	PJ-0	76	3.1	47.38	1.96	130

RIVER GORGE RANCH SUBDIVISION
SEWERGEMS MODEL SIMULATION RESULTS
SCENARIO 1
JUNCTIONS

DATE: 08/20/2024

Label	Elevation (Ground) (ft)	Elevation (ft)	Hydraulic Grade (ft)	Pressure Head (ft)
PJ-0	1434.00	1431.00	1493.22	62.22
PJ-1	1436.00	1433.00	1493.68	60.68
PJ-2	1435.50	1432.50	1497.69	65.19
PJ-3	1435.00	1432.00	1498.70	66.70
PJ-4	1436.00	1433.00	1499.30	66.30
PJ-5	1435.00	1432.00	1499.35	67.35
PJ-6	1434.00	1431.00	1500.77	69.77
PJ-7	1433.25	1430.25	1501.15	70.90
PJ-8	1433.25	1430.25	1501.26	71.01
PJ-9	1432.25	1429.25	1501.75	72.50
PJ-10	1432.50	1429.50	1502.57	73.07
PJ-11	1432.75	1429.75	1502.57	72.82
PJ-12	1432.75	1429.75	1502.57	72.82
PJ-16	1434.50	1431.50	1500.18	68.68
PJ-17	1434.50	1431.50	1499.90	68.40
PJ-18	1435.50	1432.50	1497.88	65.38
PJ-19	1430.00	1427.00	1496.42	69.42
PJ-20	1429.50	1426.50	1495.81	69.31
PJ-21	1428.00	1425.00	1492.06	67.06
PJ-22	1432.00	1429.00	1492.60	63.60
PJ-23	1434.00	1431.00	1493.10	62.10
PJ-24	1442.00	1439.00	1481.55	42.55
PJ-25	1438.00	1435.00	1481.55	46.55
PJ-26	1436.00	1433.00	1481.55	48.55
PJ-27	1434.00	1431.00	1481.55	50.55
PJ-28	1441.52	1438.52	1481.01	42.49

PJ-29	1441.00	1438.00	1480.43	42.43
PJ-30	1440.43	1437.43	1479.79	42.36
PJ-31	1440	1,437.00	1,479.31	42.31
PJ-32	1441	1,438.14	1,478.79	40.65
PJ-33	1436	1,433.00	1,489.95	56.95
PJ-34	1436	1,433.00	1,489.76	56.76
PJ-35	1440	1,437.00	1,489.62	52.62
PJ-36	1441	1,438.00	1,489.61	51.61
PJ-37	1444	1,441.00	1,489.10	48.10
PJ-38	1444	1,441.00	1,489.00	48.00
PJ-39	1444	1,440.75	1,488.63	47.88
PJ-40	1444	1,441.00	1,487.99	46.99
PJ-41	1445	1,441.50	1,487.59	46.09
PJ-42	1443	1,439.50	1,486.66	47.16
PJ-43	1443	1,440.00	1,486.48	46.48
PJ-44	1445	1,442.00	1,484.78	42.78
PJ-45	1445	1,442.00	1,483.85	41.85
PJ-46	1443	1,440.00	1,481.43	41.43
PJ-47	1442	1,439.00	1,478.40	39.40
PJ-48	1440	1,437.00	1,476.35	39.35
PJ-49	1441	1,437.50	1,474.99	37.49
PJ-50	1448	1,445.00	1,470.76	25.76
PJ-51	1450	1,447.00	1,469.85	22.85
PJ-52	1436	1,428.30	1,481.55	53.25
PJ-52	1452	1,449.00	1,469.12	20.12
PJ-53	1454	1,451.00	1,468.39	17.39
PJ-54	1456	1,453.00	1,467.33	14.33
PJ-55	1458	1,455.00	1,466.62	11.62
PJ-56	1459	1,456.00	1,465.10	9.10
PJ-57	1459	1,456.00	1,464.59	8.59
PJ-58	1456	1,453.00	1,463.96	10.96
PJ-59	1456	1,453.00	1,462.04	9.04
PJ-60	1458	1,455.00	1,461.36	6.36

PJ-61	1460	1,457.00	1,460.84	3.84
PJ-62	1462	1,459.00	1,460.28	1.28
PJ-63	1462	1,459.00	1,435.02	-23.98
PJ-64	1458	1,455.00	1,434.03	-20.97
PJ-65	1456	1,453.00	1,433.60	-19.40
PJ-66	1454	1,451.00	1,432.67	-18.33
PJ-67	1452	1,449.00	1,431.52	-17.48
PJ-68	1448	1,445.00	1,430.13	-14.87
PJ-69	1444	1,441.00	1,429.39	-11.61
PJ-70	1440	1,437.00	1,428.58	-8.42
PJ-71	1438	1,435.00	1,428.06	-6.94
PJ-72	1432	1,425.08	1,481.55	56.46
PJ-73	1403	1,395.45	1,492.74	97.29
PJ-74	1429	1,426.05	1,492.74	66.68

RIVER GORGE RANCH SUBDIVISION
SEWERGEMS MODEL SIMULATION RESULTS
SCENARIO 2
PUMPS

DATE: 08/20/2024

LABEL	ELEV. GROUND (FT.)	ELEV. INVERT (FT.)	PUMP DEFINITION	PUMP FLOW (GPM)	PUMP HEAD (FT.)	HGL (UPSTREAM) (FT.)	HGL (DOWNSTREAM) (FT.)
PMP-2	1,437.50	1,429.50	ORENCO P200511	21.53	93.89	1428.47	1522.37
PMP-8	1,436.25	1,428.25	ORENCO P200511	21.13	97.05	1427.22	1524.28
PMP-17	1,437.50	1429.50	ORENCO P200511	21.51	93.99	1428.47	1522.47
PMP-24(1)	1,436.00	1428.00	ORENCO PF3007	31.59	84.76	1426.95	1511.71
PMP-25(1)	1,432.00	1,424.00	ORENCO PF3007	30.81	89.87	1422.95	1512.82
PMP-28	1,444.00	1,435.00	ORENCO P200511	24.07	72.65	1433.97	1506.62
PMP-41	1,443.00	1,434.00	ORENCO PVA100511 0.25" RESTRICTOR	9.05	67.19	1432.99	1500.18
PMP-49	1,434.00	1,426.00	ORENCO PVA100511 0.25" RESTRICTOR	8.78	75.63	1424.99	1500.63
PMP-50(1)	1,400.00	1392.00	ORENCO PF3007	24.10	128.52	1390.99	1519.50

RIVER GORGE RANCH SUBDIVISION
SEWERGEMS MODEL SIMULATION RESULTS
SCENARIO 2
PIPES

DATE: 08/20/2024

Label	Start Node	Stop Node	Length (User Defined) (ft)	Diameter (in)	Flow (gal/min)	Velocity (ft/s)	Hazen-Williams C
CP-2	PMP-2	PJ-2	75	1.7	21.53	2.97	130
CP-4	PMP-4	PJ-4	80	1.7	0	0	130
CP-6	PMP-6	PJ-6	130	1.7	0	0	130
CP-8	PMP-8	PJ-8	75	1.7	21.13	2.92	130
CP-10	PMP-10	PJ-10	90	1.7	0	0	130
CP-12	PMP-12	PJ-12	81	1.7	0	0	130
CP-16	PMP-16	PJ-16	67	1.7	0	0	130
CP-17	PMP-17	PJ-17	90	1.7	21.51	2.97	130
CP-18	PMP-18	PJ-18	90	1.7	0	0	130
CP-19	PMP-19	PJ-19	97	1.7	0	0	130
CP-20	PMP-20	PJ-20	97	1.7	0	0	130
CP-21	PMP-21	PJ-22	50	1.7	0	0	130
CP-23	PMP-23	PJ-25	75	1.7	0	0	130
CP-24(1)	PMP-24(1)	PJ-52	32	2.1	31.59	2.79	130
CP-24(2)	PJ-52	PJ-26	503	3.1	31.59	1.3	130
CP-24(3)	PMP-24(2)	PJ-52	32	2.1	0	0	130
CP-25(1)	PJ-72	PJ-27	41	2.1	30.81	2.73	130
CP-25(2)	PMP-25(1)	PJ-72	1	1.7	30.81	4.25	130
CP-25(3)	PMP-25(2)	PJ-72	1	1.7	0	0	130
CP-26	PMP-26	PJ-27	105	1.7	0	0	130
CP-27	PMP-27	PJ-28	80	1.7	0.01	0	130
CP-28	PMP-28	PJ-29	80	1.7	24.07	3.32	130
CP-29	PMP-29	PJ-30	80	1.7	0.01	0	130
CP-30	PMP-30	PJ-31	80	1.7	0.01	0	130
CP-31	PMP-31	PJ-32	80	1.7	0.01	0	130
CP-37	PMP-37	PJ-46	70	1.7	0	0	130

CP-38	PMP-38	PJ-45	61	1.7	0	0	130
CP-39	PMP-39	PJ-44	45	1.7	0	0	130
CP-40	PMP-40	PJ-43	43	1.7	0	0	130
CP-41	PMP-41	PJ-42	62	1.7	9.05	1.25	130
CP-42	PMP-42	PJ-41	35	1.7	0	0	130
CP-43	PMP-43	PJ-40	63	1.7	0	0	130
CP-44	PMP-44	PJ-39	34	1.7	0	0	130
CP-45	PMP-45	PJ-38	63	1.7	0	0	130
CP-46	PMP-46	PJ-37	34	1.7	0	0	130
CP-47	PMP-47	PJ-36	60	1.7	0	0	130
CP-48	PMP-48	PJ-35	34	1.7	0	0	130
CP-49	PMP-49	PJ-34	30	1.7	8.78	1.21	130
CP-50(1)	PJ-73	PJ-74	247	2.1	24.1	2.16	130
CP-50(2)	PMP-50(1)	PJ-73	28	2.1	24.1	2.16	130
CP-50(3)	PMP-50(2)	PJ-73	28	2.1	0	0	130
CP-51	PMP-51	PJ-33	30	1.7	0	0	130
P-2	PJ-0	PJ-23	20	3.1	42.65	1.76	130
P-3	PJ-23	PJ-22	83	3.1	42.65	1.76	130
P-4	PJ-22	PJ-21	89	3.1	42.65	1.76	130
P-5	PJ-21	PJ-24	475	3.1	88.26	3.64	130
P-6	PJ-24	PJ-28	85	4.1	150.66	3.71	130
P-7	PJ-28	PJ-29	92	4.1	150.65	3.71	130
P-8	PJ-29	PJ-30	102	4.1	174.72	4.3	130
P-9	PJ-30	PJ-31	76	4.1	174.71	4.3	130
P-10	PJ-31	PJ-32	83	4.1	174.7	4.3	130
P-11	PJ-32	PJ-47	62	4.1	174.7	4.3	130
P-12	PJ-47	PJ-46	118	2.1	17.83	1.6	130
P-13	PJ-46	PJ-45	94	2.1	17.83	1.6	130
P-14	PJ-45	PJ-44	36	2.1	17.83	1.6	130
P-15	PJ-44	PJ-43	66	2.1	17.83	1.6	130
P-16	PJ-43	PJ-42	7	2.1	17.83	1.6	130
P-17	PJ-42	PJ-41	62	2.1	8.78	0.79	130
P-18	PJ-41	PJ-40	27	2.1	8.78	0.79	130

P-19	PJ-40	PJ-39	43	2.1	8.78	0.79	130
P-20	PJ-39	PJ-38	53	2.1	8.78	0.79	130
P-21	PJ-38	PJ-37	14	2.1	8.78	0.79	130
P-22	PJ-37	PJ-36	72	2.1	8.78	0.79	130
P-23	PJ-36	PJ-35	5	2.1	8.78	0.79	130
P-24	PJ-35	PJ-34	77	2.1	8.78	0.79	130
P-25	PJ-33	PJ-34	103	2.1	0	0	130
P-26	PJ-1	PJ-2	100	2.1	42.65	3.82	130
P-27	PJ-2	PJ-3	25	2.1	21.12	1.89	130
P-28	PJ-3	PJ-4	15	2.1	21.12	1.89	130
P-29	PJ-4	PJ-5	5	2.1	21.12	1.89	130
P-30	PJ-5	PJ-6	130	2.1	21.12	1.89	130
P-31	PJ-6	PJ-7	35	2.1	21.12	1.89	130
P-32	PJ-7	PJ-8	10	2.1	21.12	1.89	130
P-33	PJ-8	PJ-9	45	2.1	0	0	130
P-34	PJ-9	PJ-10	75	2.1	0	0	130
P-35	PJ-10	PJ-11	50	2.1	0	0	130
P-36	PJ-11	PJ-12	10	2.1	0	0	130
P-37	PJ-16	PJ-17	25	2.1	0	0	130
P-38	PJ-17	PJ-18	180	2.1	21.51	1.93	130
P-39	PJ-18	PJ-19	130	2.1	21.51	1.93	130
P-40	PJ-19	PJ-20	15	2.1	21.51	1.93	130
P-41	PJ-25	PJ-24	215	3.1	62.4	2.58	130
P-42	PJ-25	PJ-26	90	3.1	62.4	2.58	130
P-43	PJ-26	PJ-27	135	2.1	30.81	2.73	130
P-44	PJ-20	PJ-74	75	2.1	21.51	1.93	130
P-45	PJ-74	PJ-21	110	3.1	45.61	1.88	130
P-46	PJ-47	PJ-48	162	4	192.52	4.92	130
P-47	PJ-48	PJ-49	107	4	192.52	4.92	130
P-48	PJ-49	PJ-50	334	4	192.52	4.92	130
P-49	PJ-50	PJ-51	72	4	192.52	4.92	130
P-50	PJ-51	PJ-52	58	4	192.52	4.92	130
P-51	PJ-52	PJ-53	58	4	192.52	4.92	130

P-52	PJ-53	PJ-54	84	4	192.52	4.92	130
P-53	PJ-54	PJ-55	56	4	192.52	4.92	130
P-54	PJ-55	PJ-56	120	4	192.52	4.92	130
P-55	PJ-56	PJ-57	40	4	192.52	4.92	130
P-56	PJ-57	PJ-58	50	4	192.52	4.92	130
P-57	PJ-58	PJ-59	151	4	192.52	4.92	130
P-58	PJ-59	PJ-60	54	4	192.52	4.92	130
P-59	PJ-60	PJ-61	42	4	192.52	4.92	130
P-60	PJ-61	PJ-62	44	4	192.52	4.92	130
P-61	PJ-62	AV-6	101	4	192.52	4.92	130
P-62	AV-6	PJ-63	19	4	192.52	4.92	130
P-63	PJ-63	PJ-64	78	4	192.52	4.92	130
P-64	PJ-64	PJ-65	34	4	192.52	4.92	130
P-65	PJ-65	PJ-66	74	4	192.52	4.92	130
P-66	PJ-66	PJ-67	91	4	192.52	4.92	130
P-67	PJ-67	PJ-68	109	4	192.52	4.92	130
P-68	PJ-68	PJ-69	58	4	192.52	4.92	130
P-69	PJ-69	PJ-70	64	4	192.52	4.92	130
P-70	PJ-70	PJ-71	41	4	192.52	4.92	130
P-71	PJ-71	O-1	136	4	192.52	4.92	130
P-72	PJ-1	PJ-0	76	3.1	42.65	1.76	130

RIVER GORGE RANCH SUBDIVISION
SEWERGEMS MODEL SIMULATION RESULTS
SCENARIO 2
JUNCTIONS

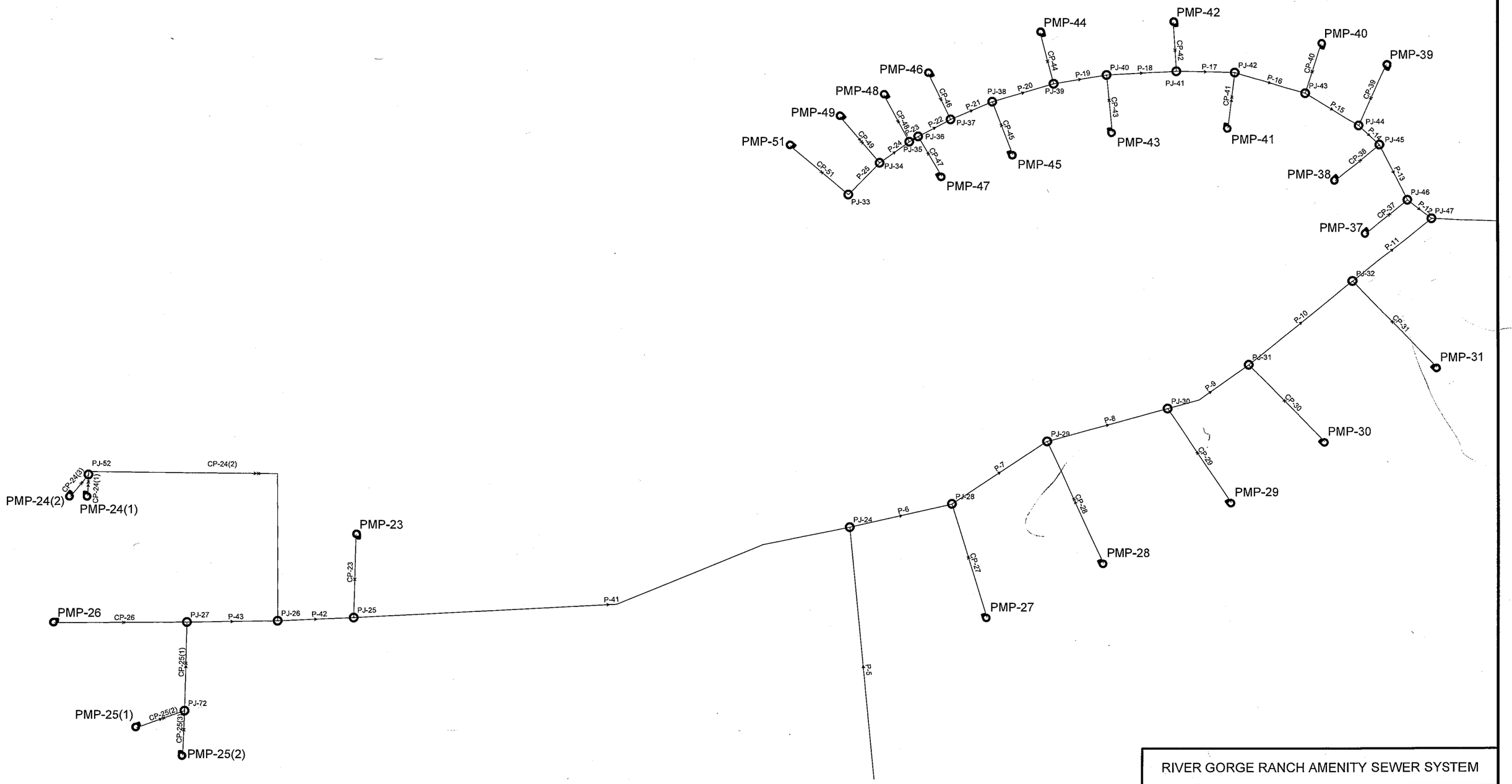
DATE: 08/20/2024

Label	Elevation (Ground) (ft)	Elevation (ft)	Hydraulic Grade (ft)	Pressure Head (ft)
PJ-0	1434.00	1431.00	1516.69	85.69
PJ-1	1436.00	1433.00	1517.07	84.07
PJ-2	1435.50	1432.50	1520.37	87.87
PJ-3	1435.00	1432.00	1520.59	88.59
PJ-4	1436.00	1433.00	1520.73	87.73
PJ-5	1435.00	1432.00	1520.77	88.77
PJ-6	1434.00	1431.00	1521.94	90.94
PJ-7	1433.25	1430.25	1522.26	92.01
PJ-8	1433.25	1430.25	1522.34	92.09
PJ-9	1432.25	1429.25	1522.34	93.09
PJ-10	1432.50	1429.50	1522.34	92.84
PJ-11	1432.75	1429.75	1522.34	92.59
PJ-12	1432.75	1429.75	1522.34	92.59
PJ-16	1434.50	1431.50	1520.07	88.57
PJ-17	1434.50	1431.50	1520.07	88.57
PJ-18	1435.50	1432.50	1518.40	85.90
PJ-19	1430.00	1427.00	1517.19	90.19
PJ-20	1429.50	1426.50	1517.05	90.55
PJ-21	1428.00	1425.00	1515.73	90.73
PJ-22	1432.00	1429.00	1516.17	87.17
PJ-23	1434.00	1431.00	1516.59	85.59
PJ-24	1442.00	1439.00	1506.60	67.60
PJ-25	1438.00	1435.00	1508.78	73.78
PJ-26	1436.00	1433.00	1509.69	76.69
PJ-27	1434.00	1431.00	1512.05	81.05
PJ-28	1441.52	1438.52	1505.35	66.83

PJ-29	1441.00	1438.00	1503.99	65.99
PJ-30	1440.43	1437.43	1502.03	64.60
PJ-31	1440	1,437.00	1,500.55	63.55
PJ-32	1441	1,438.14	1,498.95	60.81
PJ-33	1436	1,433.00	1,500.48	67.48
PJ-34	1436	1,433.00	1,500.48	67.48
PJ-35	1440	1,437.00	1,500.34	63.34
PJ-36	1441	1,438.00	1,500.33	62.33
PJ-37	1444	1,441.00	1,500.20	59.20
PJ-38	1444	1,441.00	1,500.18	59.18
PJ-39	1444	1,440.75	1,500.08	59.33
PJ-40	1444	1,441.00	1,500.01	59.01
PJ-41	1445	1,441.50	1,499.96	58.46
PJ-42	1443	1,439.50	1,499.85	60.35
PJ-43	1443	1,440.00	1,499.81	59.81
PJ-44	1445	1,442.00	1,499.37	57.37
PJ-45	1445	1,442.00	1,499.14	57.14
PJ-46	1443	1,440.00	1,498.52	58.52
PJ-47	1442	1,439.00	1,497.74	58.74
PJ-48	1440	1,437.00	1,493.65	56.65
PJ-49	1441	1,437.50	1,490.94	53.44
PJ-50	1448	1,445.00	1,482.49	37.49
PJ-51	1450	1,447.00	1,480.68	33.68
PJ-52	1436	1,428.30	1,511.13	82.83
PJ-52	1452	1,449.00	1,479.22	30.22
PJ-53	1454	1,451.00	1,477.75	26.75
PJ-54	1456	1,453.00	1,475.63	22.63
PJ-55	1458	1,455.00	1,474.22	19.22
PJ-56	1459	1,456.00	1,471.18	15.18
PJ-57	1459	1,456.00	1,470.17	14.17
PJ-58	1456	1,453.00	1,468.91	15.91
PJ-59	1456	1,453.00	1,465.07	12.07
PJ-60	1458	1,455.00	1,463.72	8.72

PJ-61	1460	1,457.00	1,462.67	5.67
PJ-62	1462	1,459.00	1,461.56	2.56
PJ-63	1462	1,459.00	1,443.68	-15.32
PJ-64	1458	1,455.00	1,441.71	-13.29
PJ-65	1456	1,453.00	1,440.85	-12.15
PJ-66	1454	1,451.00	1,438.98	-12.02
PJ-67	1452	1,449.00	1,436.68	-12.32
PJ-68	1448	1,445.00	1,433.91	-11.09
PJ-69	1444	1,441.00	1,432.43	-8.57
PJ-70	1440	1,437.00	1,430.81	-6.19
PJ-71	1438	1,435.00	1,429.78	-5.22
PJ-72	1432	1,425.08	1,512.77	87.69
PJ-73	1403	1,395.45	1,519.19	123.74
PJ-74	1429	1,426.05	1,516.35	90.30

CTI PROJECT: —, DRAWING: ProjectNotFound CTI-2017 22x34 (6744404v3)8/20/24 2:41PM), LAYOUT: FIG. D-1



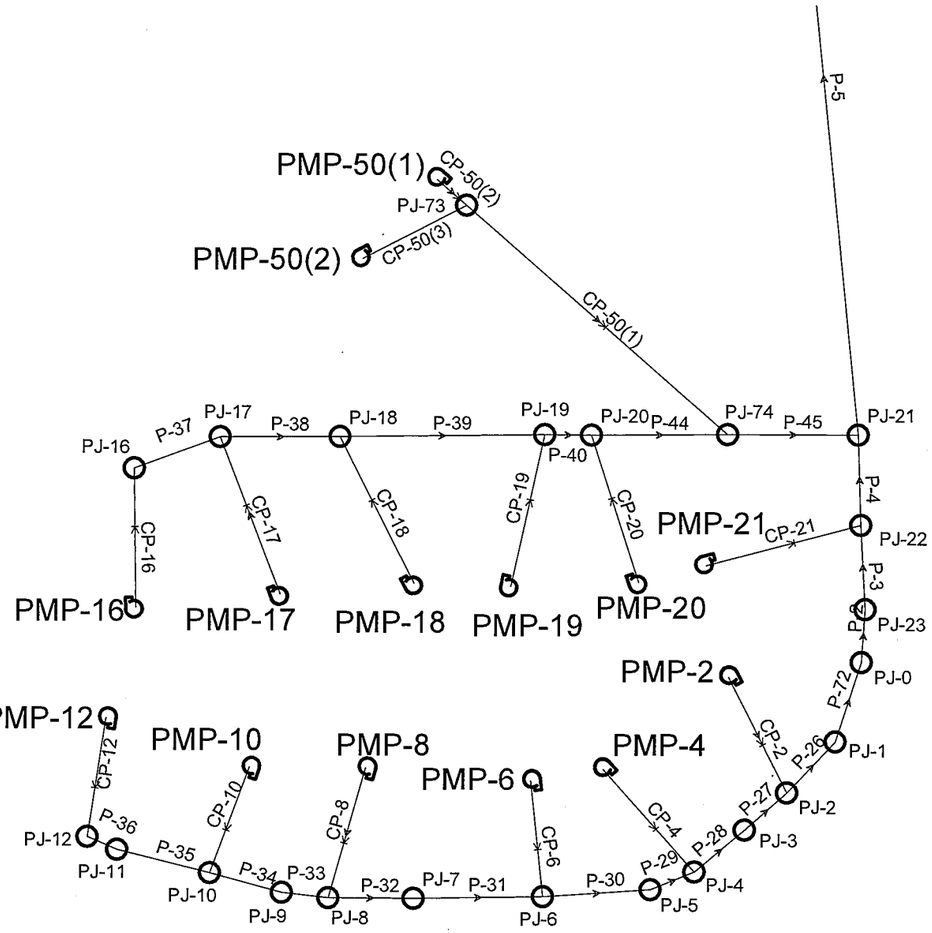
CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

RIVER GORGE RANCH AMENITY SEWER SYSTEM

FIGURE D - 1
SEWER GEMS MODEL
MAP

THUNDER ENTERPRISES | 07/24

CTI PROJECT: —, DRAWING: ProjectNotFound CTI-2017 22x34 (6744DN-3/8/20/24 2:41PM), LAYOUT: FIG. D-2



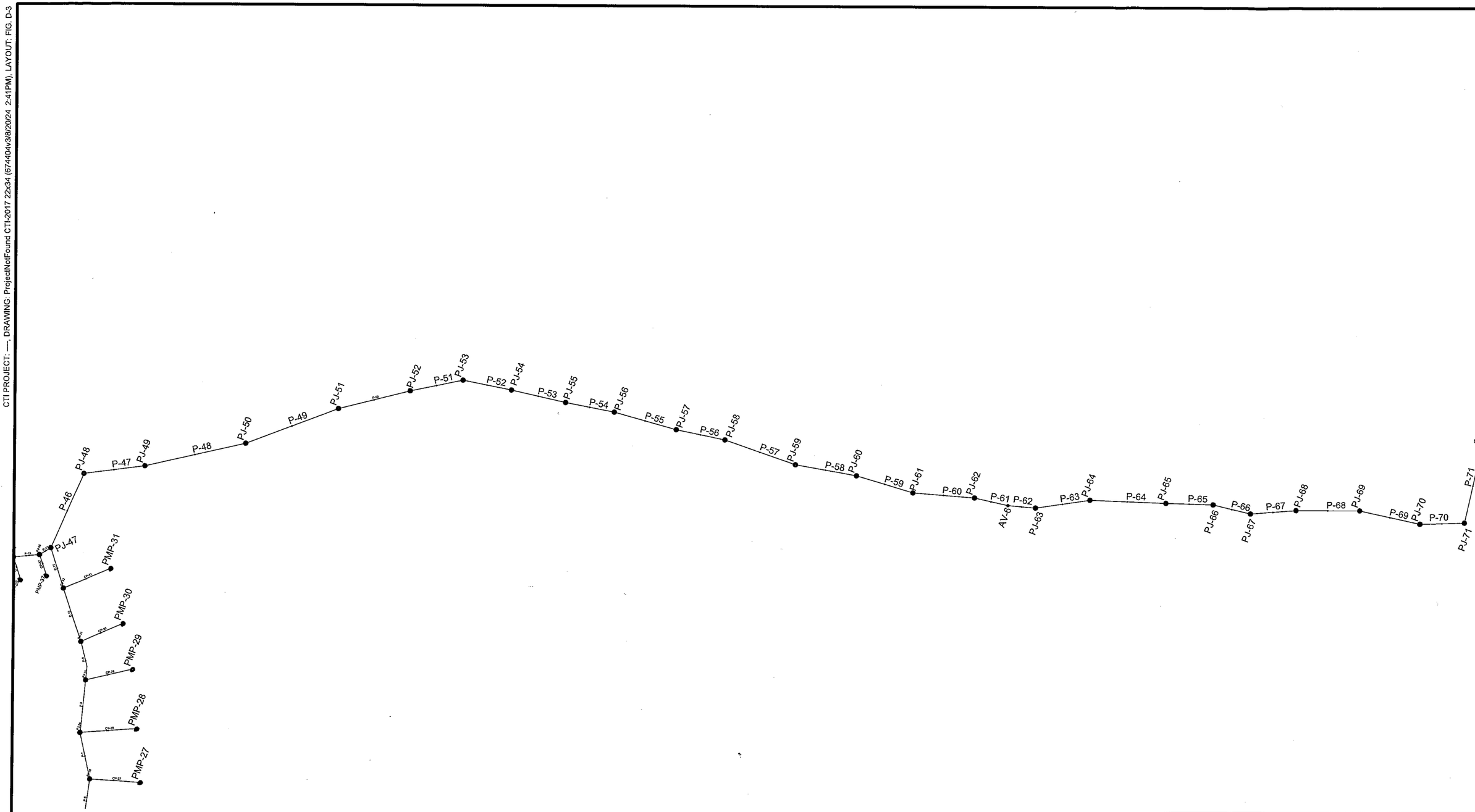
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423-267-7613

RIVER GORGE RANCH AMENITY SEWER SYSTEM

FIGURE D - 2
SEWER GEMS MODEL
MAP

THUNDER ENTERPRISES | 07/24

CTI PROJECT: —, DRAWING: ProjectNotFound CTI-2017 22x34 (67440dv3/8/20/24 2:41PM), LAYOUT: FIG. D-3



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423-267-7613

RIVER GORGE RANCH AMENITY SEWER SYSTEM

FIGURE D - 3
SEWER GEMS MODEL
MAP

THUNDER ENTERPRISES | 07/24



APPENDIX E
TYPICAL LOW-HEAD EFFLUENT PUMP DATA SHEETS

xylem
Let's Solve Water

3885 (WE) Series

CAST IRON EFFLUENT PUMP



BUILT IN THE USA
ENGINEERED, ASSEMBLED & TESTED

3885 (WE) Series Effluent Pumps are built with durable cast iron housing, casing and semi-open impeller for long-lasting performance. The pumps feature a 2" NPT discharge, and can handle solids up to 3/4". The premium mechanical seal helps to reduce maintenance requirements and the oil-filled motor dome provides superior cooling. This "Complete. Reliable. Blue." pump is ideal for effluent systems in residential and light commercial applications.

APPLICATIONS

- Homes
- Farms
- Trailer courts
- Motels
- Schools
- Hospitals
- Small business
- Effluent systems

FEATURES

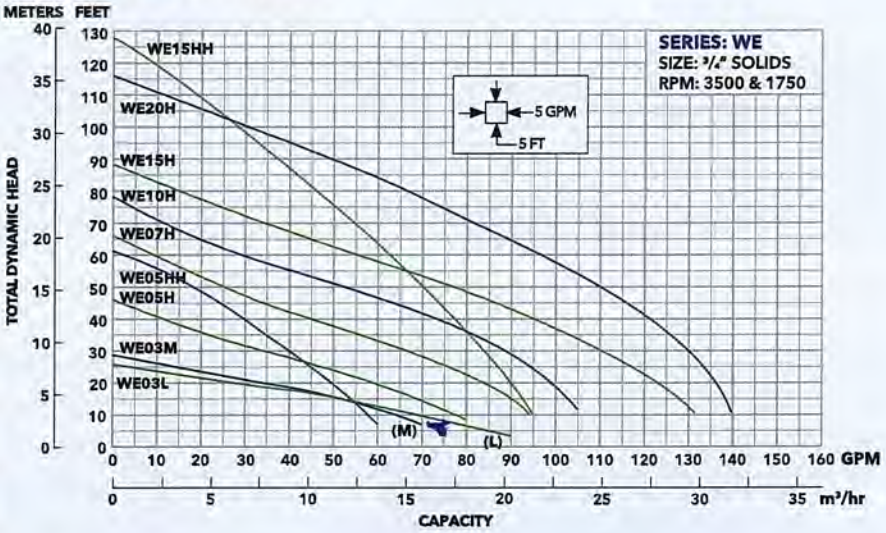
- Cast iron, semi-open, non-clog impeller with pump-out vanes, balanced for smooth operation (silicon bronze impeller available as an option)
- Cast iron volute type casing for maximum efficiency
- Silicon carbide mechanical seal design provides superior protection against sand and abrasive damage
- Long lasting & corrosion resistant stainless steel hardware and threaded shaft
- Locknut on all models to guard against component damage on accidental reverse rotation
- Capable of running dry without damage to components
- Designed for continuous operation when fully submerged
- 3 year warranty (4 year GPDA)

GOULDS WATER TECHNOLOGY
a xylem brand

PRODUCT SPECIFICATIONS

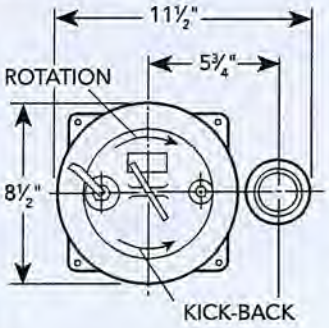
Order Number	HP	Phase	Volts	RPM	Maximum Amps
WE0311L	0.33	1	115	1750	10.7
WE0318L			208		6.8
WE0312L			230		4.9
WE0311M			115		10.7
WE0318M			208		6.8
WE0312M			230		4.9
WE0511H	0.5	1	115	3450	14.5
WE0518H			208		8.1
WE0512H			230		7.3
WE0538H		3	200		4.9
WE0532H			230		3.3
WE0534H			460		1.7
WE0537H			575		1.4
WE0511HH		1	115		14.5
WE0518HH			208		8.1
WE0512HH			230		7.3
WE0538HH		3	200		4.9
WE0532HH			230		3.6
WE0534HH			460		1.8
WE0537HH			575		1.5
WE0718H	0.75	1	208		11.0
WE0712H			230		10.0
WE0738H		3	200		6.2
WE0732H			230		5.4
WE0734H			460		2.7
WE0737H			575		2.2
WE1018H	1	1	208		14.0
WE1012H			230		12.5
WE1038H		3	200		8.1
WE1032H			230		7.0
WE1034H			460		3.5
WE1037H			575		2.8
WE1518H	1.5	1	208		17.5
WE1512H			230		15.7
WE1538H		3	200		10.6
WE1532H			230		9.2
WE1534H			460		4.6
WE1537H			575		3.7
WE1518HH		1	208		17.5
WE1512HH			230		15.7
WE1538HH		3	200		10.6
WE1532HH			230		9.2
WE1534HH			460		4.6
WE1537HH			575		3.7
WE2012H	2	1	230		18.0
WE2038H		3	200		12.0
WE2032H			230		11.6
WE2034H			460		5.8
WE2037H			575		4.7

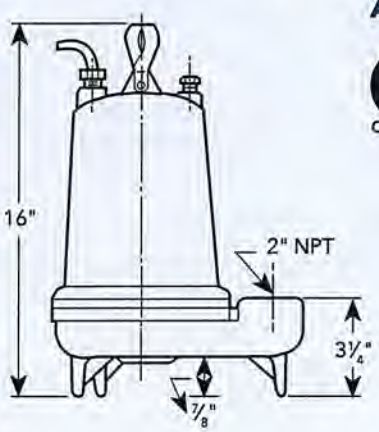
PERFORMANCE CURVES



DIMENSIONS

(All dimensions are in inches. Do not use for construction purposes.)





MATERIALS OF CONSTRUCTION

Part Name	Material
Impeller	Cast Iron*
Casing & Motor Dome	Cast Iron
Motor Adapter	Cast Iron
Mechanical Seal	Silicon Carbide/Silicon Carbide/BUNA
Cord	STOW or SJTOW
Fasteners	Stainless Steel
Handle	Stainless Steel

* Silicon bronze impeller available as an option.

AGENCY LISTINGS

Tested to UL778 CAN 22.2 by CSA International (Canadian Standards Association)

Learn more about 3885 Series pumps

Learn more about "Core 4" Control Panels

xylem
Let's Solve Water

Xylem Inc.
2881 East Bayard Street Ext., Suite A
Seneca Falls, NY 13148
Phone: (866) 325-4210 • Fax: (888) 322-5877
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ZOELLER®
PUMP COMPANY
zoellerpumps.com

Trusted. Tested. Tough.®



MODEL 140
Effluent Pumps

Effluent or dewatering submersible pump for septic tank, low pressure pipe (LPP), and enhanced flow STEP systems

FAMILY OWNED
AMERICAN PROUD™

Zoeller Family of Water Solutions™

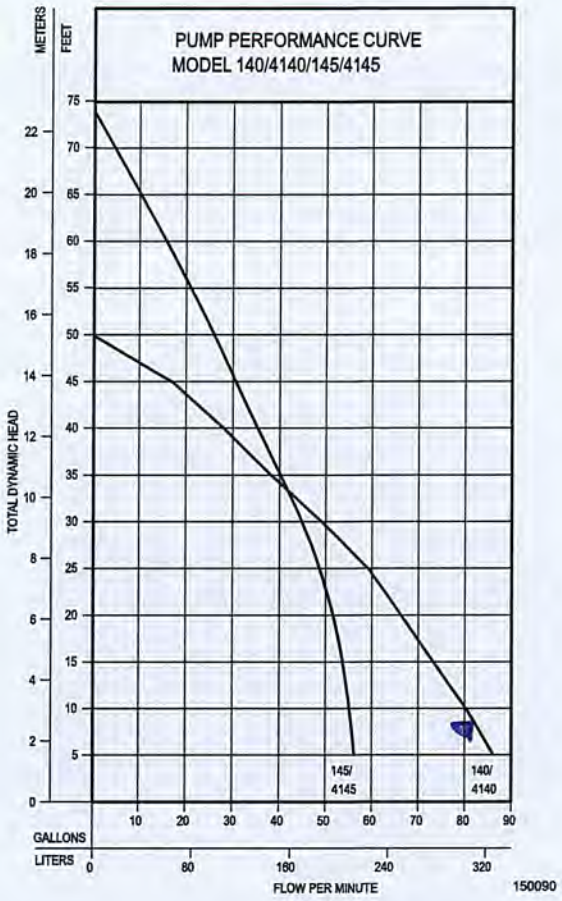
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Features:

- Model 140: Non-clogging, engineered thermoplastic, vortex impeller; passes 1/2" (13 mm) spherical solids
- Model 145: Engineered thermoplastic, single vane impeller; passes 3/4" (19 mm) spherical solids
- 1-1/2" NPT vertical discharge
- Upper sleeve and lower ball bearing running in bath of oil
- Operates at 130 °F (54 °C) in effluent or dewatering applications
- Carbon/ceramic mechanical shaft seals
- Available in single and double shaft seal designs

Consult factory for special applications.

100% factory tested



PRODUCT SPECIFICATIONS

MOTOR	Horse Power	3/4 - 1
	Voltage	115 or 230
	Phase	1 Ph
	Hertz	60 Hz
	RPM	3450
	Type	Permanent split capacitor
	Insulation	Class B
	Amps	6.0 - 13.0
PUMP	Operation	Automatic or nonautomatic
	Discharge Size	1-1/2" NPT
	Solids Handling	1/2" (12 mm), 3/4" (19 mm) spherical solids
	Cord Length	20' (6 m)
	Cord Type	UL listed, neoprene cord
	Max. Head	50' (15.2 m) or 74' (22.6 m)
	Max. Flow Rate	86 GPM (326 LPM) or 61 GPM (232 LPM)
	Max. Operating Temp.	130 °F (54 °C)
	Cooling	Oil filled
	Motor Protection	Auto reset thermal overload
MATERIALS	Cap	Cast iron
	Motor Housing	Cast iron
	Pump Housing	Cast iron
	Base	Cast iron
	Upper Bearing	Sleeve bearing
	Lower Bearing	Ball bearing
	Mechanical Seals	Carbon and ceramic
	Impeller Type	Single vane (145) or non-clogging vortex (140)
	Impeller	Engineered thermoplastic
	Hardware	Stainless steel
	Motor Shaft	JIS S45C steel
	Gasket	Neoprene

TOTAL DYNAMIC HEAD/FLOW PER MINUTE EFFLUENT AND DEWATERING

MODEL		140/4140		145/4145	
Feet	Meters	Gal.	Liters	Gal.	Liters
5	1.5	86	326	56	212
10	3.0	80	303	55	208
15	4.6	73	276	53	200
20	6.1	66	250	51	193
25	7.6	59	223	48	182
30	9.1	49	185	45	170
40	12.2	28	106	35	132
50	15.2	–	–	26	98
60	18.3	–	–	16	61
Shut-off Head:		50 ft.(15.2m)		74 ft.(22.6m)	

FM3158
0224
Supersedes
0123

⚠ CAUTION All installation of controls, protection devices and wiring should be done by a qualified licensed electrician. All electrical and safety codes should be followed including the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

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PENTAIR MYERS

DATA SHEET

EFFLUENT PUMPS

ME SERIES

The Myers ME Series Effluent Pumps are designed specifically for effluent pressure distribution mounds, trenches and high-flow drainage applications. Heavy-duty construction with finest corrosion-resistant materials for years of extended service in the harshest environments. Available in single and double-seal models; thermoplastic and bronze impeller models.

APPLICATIONS

Effluent removal, sump drainage, water transfer, and flood control.



Tested & Certified to UL778 and CSA 108.
3 Year Warranty

FEATURES

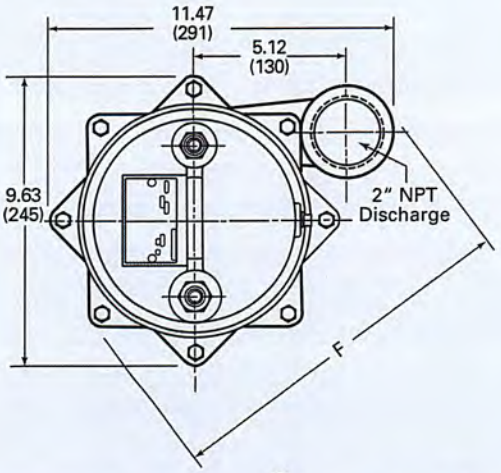
- **Cast Iron Tough:** All cast-iron housing and volute case resists the most extreme corrosive environments.
- **High Efficiency Dosing:** Engineered thermoplastic or bronze (optional) two-vane impeller provides ideal performance for efficient dosing.
- **Jam Proof:** Enclosed impeller design eliminates jamming between impeller and volute.
- **Powerful Torque:** High-torque, permanent split capacitor (PSC) motor; no starting switches or relays to wear out.
- **Runs Cooler:** Rugged, oil-filled motor for bearing lubrication and maximum heat dissipation.
- **Leak Protection:** Optional leak probe senses water leakage past seal (dual seal motors only).
- **Thermal Protection:** Heat sensor overload protection with automatic reset when motor cools to a safe operating temperature (single phase only).

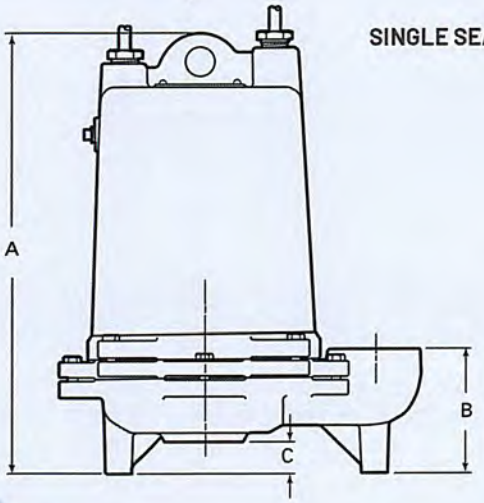
SPECIFICATIONS

- **Capacities:** Up to 120 GPM (454 LPM)
- **Shut-Off Head:** Up to 95' (28.9 m)
- **Max. Spherical Solids:** 3/4" (19 mm)
- **Liquids Handling:** Domestic effluent and drain water
- **Motor/Electrical Data:** 1/2 HP, 115V, 1Ø; 1/2 to 1-1/2 HP, 230V, 1Ø; 208/230/460/575V, 3Ø; oil-filled, permanent split capacitor type, 1Ø, 3450 RPM, 60Hz
- **Acceptable pH Range:** 6-9
- **Specific Gravity:** .9-1.1
- **Viscosity:** 28-35 SSU
- **Discharge NPT:** 2"
- **Housing:** Cast iron
- **Volute Case:** Cast iron
- **Impeller:** Thermoplastic, or bronze (optional)
- **Minimum Sump Diameter:** Simplex: 24" (61.0 cm) Duplex: 36" (91.4 cm)
- **Power Cord:** 20'

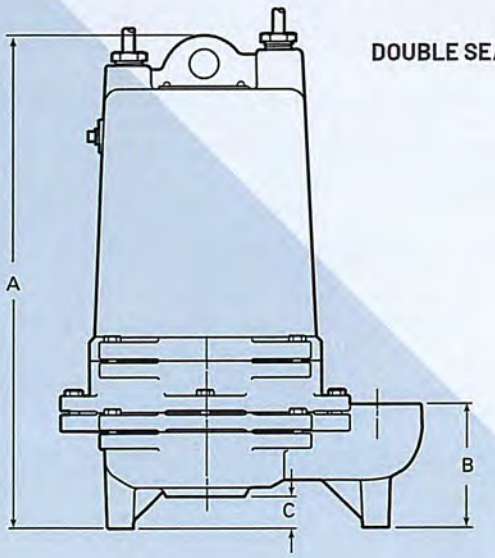
M9023SSE (08-01-23)

DIMENSIONS



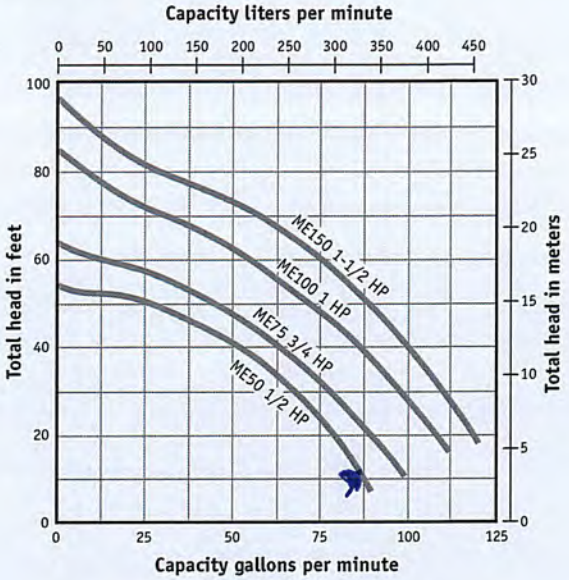


SINGLE SEAL



DOUBLE SEAL

PUMP PERFORMANCE



CATALOG NUMBER	INCHES (MILLIMETERS)			
	A	B	C	F
ME50S	16.8 (427)	4.09 (104)	1.03 (26)	12.13(308)
ME50D	18.6 (472)	4.09 (104)	1.03 (26)	12.13 (308)
ME75S, ME100S, ME150S	16.8 (427)	4.0 (102)	1.06 (27)	12.5 (318)
ME75D, ME100D, ME150D	18.6 (472)	4.0 (102)	1.06 (27)	12.5 (318)

ORDERING INFORMATION

CATALOG NUMBER	HP	VOLTS	PHASE	DISCHARGE NPT	SWITCH TYPE	APPROX. CORD LENGTH	WT. LBS
Single Seal							
ME50S-11	1/2	115	1	2"	Manual	20'	73
ME50S-01	1/2	200	1	2"	Manual	20'	73
ME50S-21	1/2	230	1	2"	Manual	20'	74
ME50S-03	1/2	200	3	2"	Manual	20'	74
ME50S-23	1/2	230	3	2"	Manual	20'	74
ME50S-43	1/2	460	3	2"	Manual	20'	74
ME50S-53	1/2	575	3	2"	Manual	20'	74
ME75S-21	3/4	230	1	2"	Manual	20'	81
ME75S-23	3/4	230	3	2"	Manual	20'	81
ME100S-01	1	200	1	2"	Manual	20'	83
ME100S-21	1	230	1	2"	Manual	20'	83
ME100S-03	1	200	3	2"	Manual	20'	83
ME100S-23	1	230	3	2"	Manual	20'	83
ME100S-43	1	460	3	2"	Manual	20'	83
ME100S-53	1	575	3	2"	Manual	20'	83
ME150S-01	1-1/2	200	1	2"	Manual	20'	84
ME150S-21	1-1/2	230	1	2"	Manual	20'	84
ME150S-03	1-1/2	200	3	2"	Manual	20'	85
ME150S-23	1-1/2	230	3	2"	Manual	20'	85
ME150S-43	1-1/2	460	3	2"	Manual	20'	85
ME150S-53	1-1/2	575	3	2"	Manual	20'	85
Double Seal							
ME50D-11	1/2	115	1	2"	Manual	20'	88
ME50D-01	1/2	200	1	2"	Manual	20'	88
ME50D-21	1/2	230	1	2"	Manual	20'	88
ME50D-03	1/2	200	3	2"	Manual	20'	88
ME50D-23	1/2	230	3	2"	Manual	20'	88
ME50D-43	1/2	460	3	2"	Manual	20'	88
ME50D-53	1/2	575	3	2"	Manual	20'	88
ME75D-01	3/4	200	1	2"	Manual	20'	95
ME75D-21	3/4	230	1	2"	Manual	20'	95
ME75D-03	3/4	200	3	2"	Manual	20'	95
ME75D-23	3/4	230	3	2"	Manual	20'	95
ME75D-43	3/4	460	3	2"	Manual	20'	95
ME75D-53	3/4	575	3	2"	Manual	20'	95
ME100D-01	1	200	1	2"	Manual	20'	97
ME100D-21	1	230	1	2"	Manual	20'	97
ME100D-03	1	200	3	2"	Manual	20'	97
ME100D-43	1	460	3	2"	Manual	20'	97
ME150D-01	1-1/2	200	1	2"	Manual	20'	98
ME150D-43	1-1/2	460	3	2"	Manual	20'	98

PENTAIR

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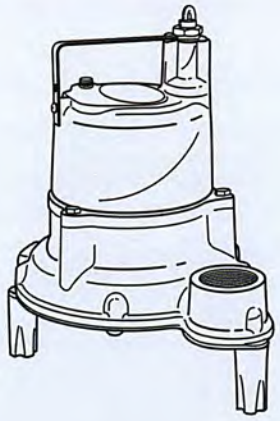
HYDROMATIC®

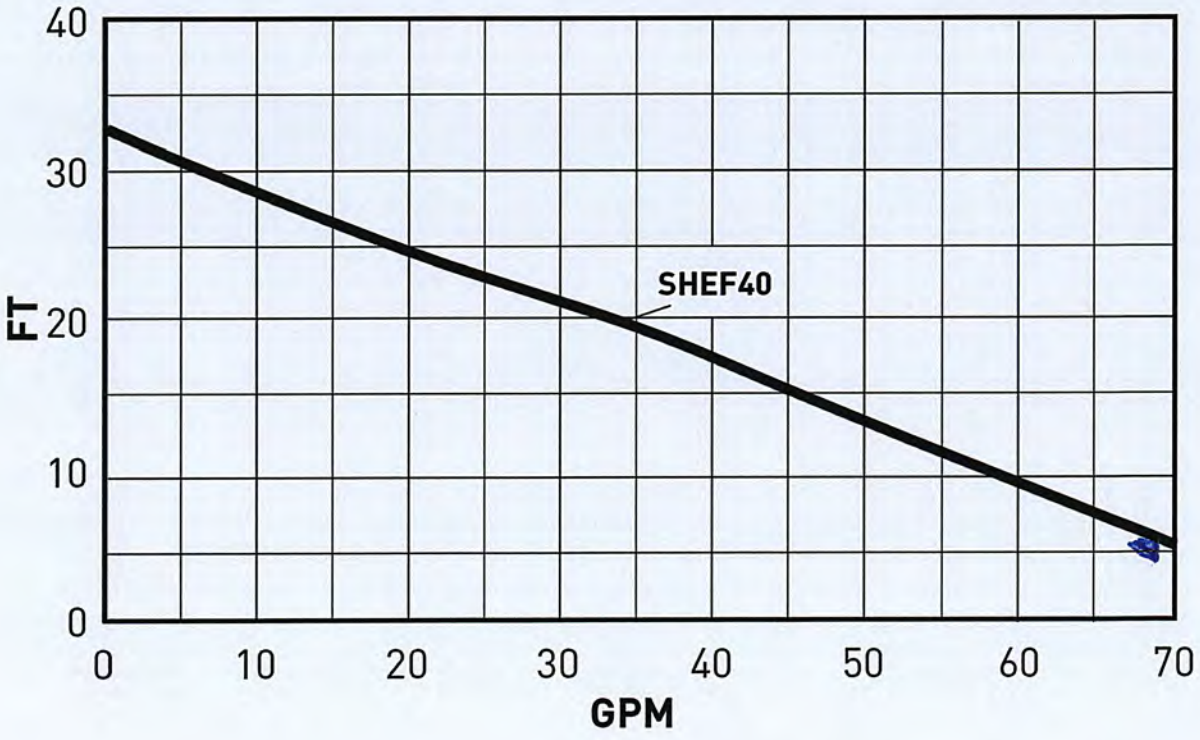
SHEF40

SUBMERSIBLE HIGH HEAD EFFLUENT

PERFORMANCE DATA

Wholesale Products Page: 6680-1
Dated: April 2002
Supersedes: January 2001
RPM: **1550** Discharge: **1 ½"** Solids: **¾"**





The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

PENTAIR

Conditions of Service:

GPM:_____ **TDH:**_____

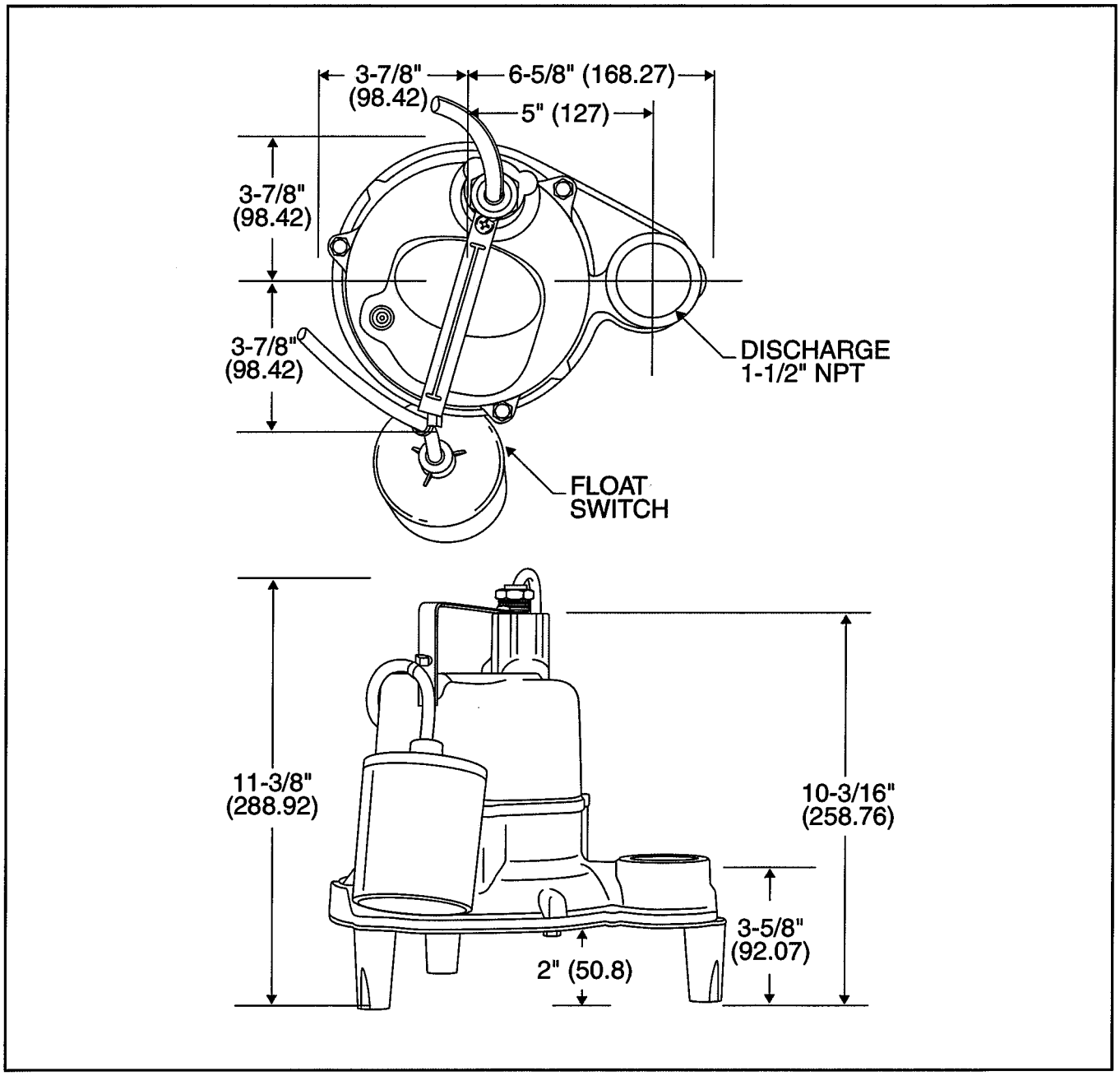
HYDROMATIC®

DIMENSIONAL DATA

SHEF40

SUBMERSIBLE HIGH HEAD EFFLUENT

Wholesale Products Page: 6680-2
Dated: January 2001



All dimensions in inches. Metric for international use. Component dimensions may vary ± 1/8 inch. Dimensional data not for construction purpose unless certified. Dimensions and weights are approximate. On/Off level adjustable. We reserve the right to make revisions to our product (s) and the product (s) specifications without notice.

HYDROMATIC®

ELECTRICAL DATA

SHEF40

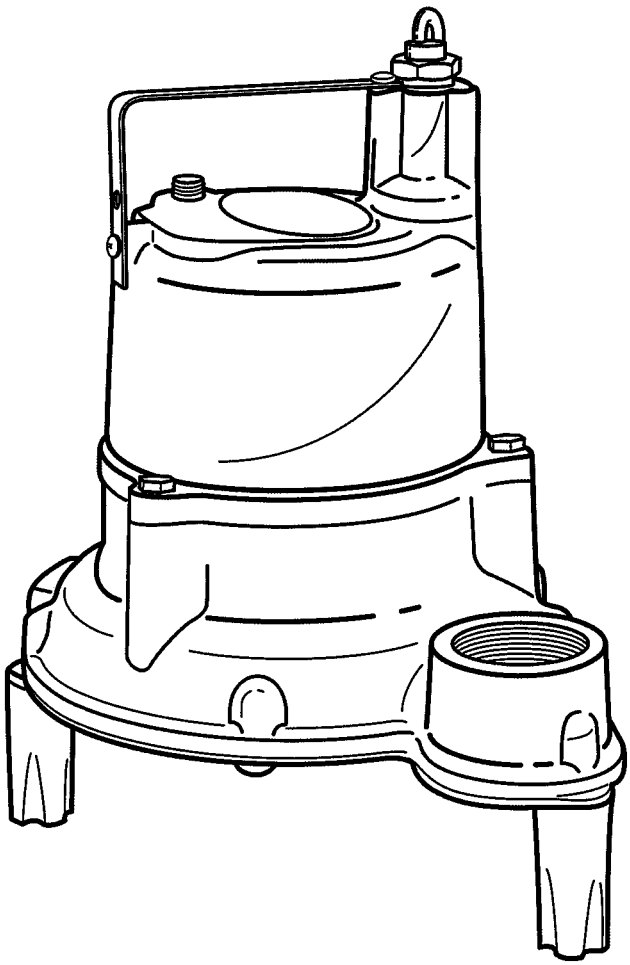
SUBMERSIBLE HIGH HEAD EFFLUENT

Dated: January 2001

MODEL: SHEF40

R.P.M.	1550
MOTOR TYPE	SHADED POLE WITH THERMAL OVERLOAD, OIL FILLED
MOTOR PROTECTION	AUTOMATIC RESET / OVERLOAD PROTECTED

HP	VOLTAGE	PHASE	NEC CODE	SERVICE FACTOR	FULL LOAD AMPS
4	115	1	-	1	12.0
	230				6.5



PENTAIR

HYDROMATIC®

TECHNICAL DATA

SHEF40

SUBMERSIBLE HIGH HEAD EFFLUENT

MODEL: SHEF40

Physical Data

DISCHARGE SIZE	1 ½" NPT
SOLIDS SIZE	¾"
IMPELLER TYPE	VORTEX
CABLE LENGTH	10' STANDARD 20' OPTIONAL
PAINT	PAINTED AFTER ASSEMBLY, DARK GREEN, WATER REDUCIBLE ENAMEL, ONE COAT, AIR DRIED.

Temperature

MAXIMUM LIQUID	140°F
MAXIMUM STATOR	-
OIL FLASH POINT	-

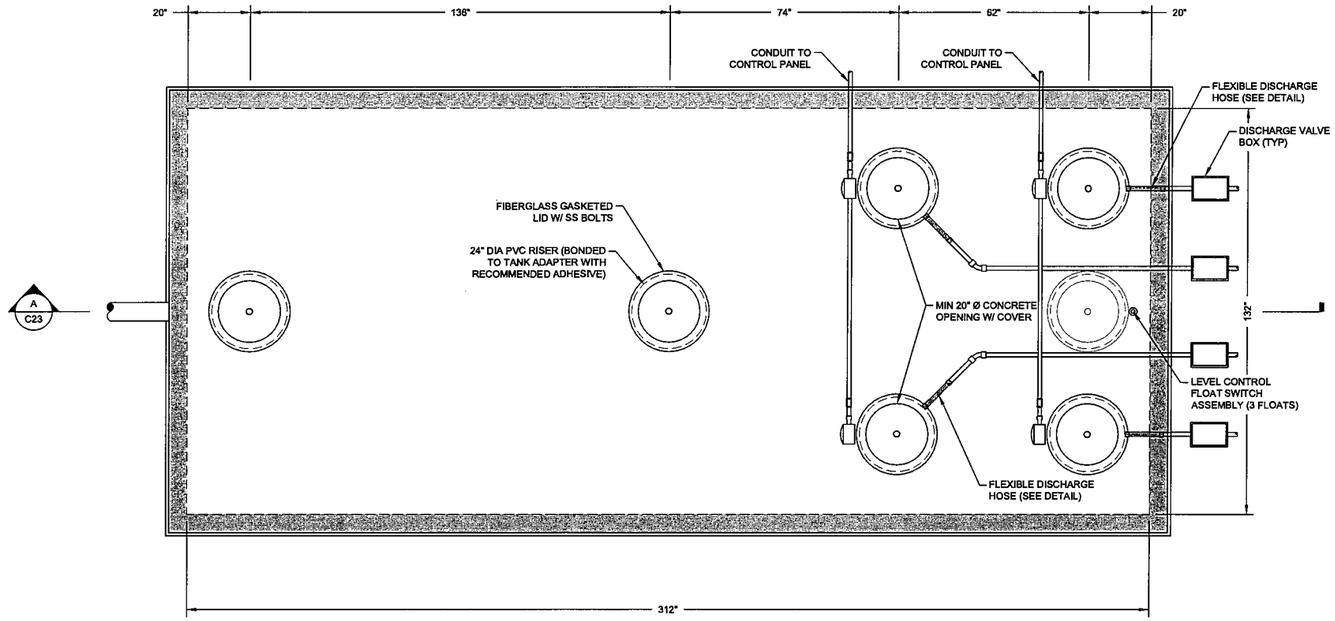
Technical Data

POWER CORD TYPE		SJTW
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON
	CASING	CAST IRON
	IMPELLER	THERMOPLASTIC
	MOTOR SHAFT	STEEL
	HARDWARE	STAINLESS STEEL
	"O" RINGS	BUNA-N
MECHANICAL SEALS Standard:		CARBON / CERAMIC
UPPER BEARING		N/A
LOWER BEARING		SINGLE ROW-BALL



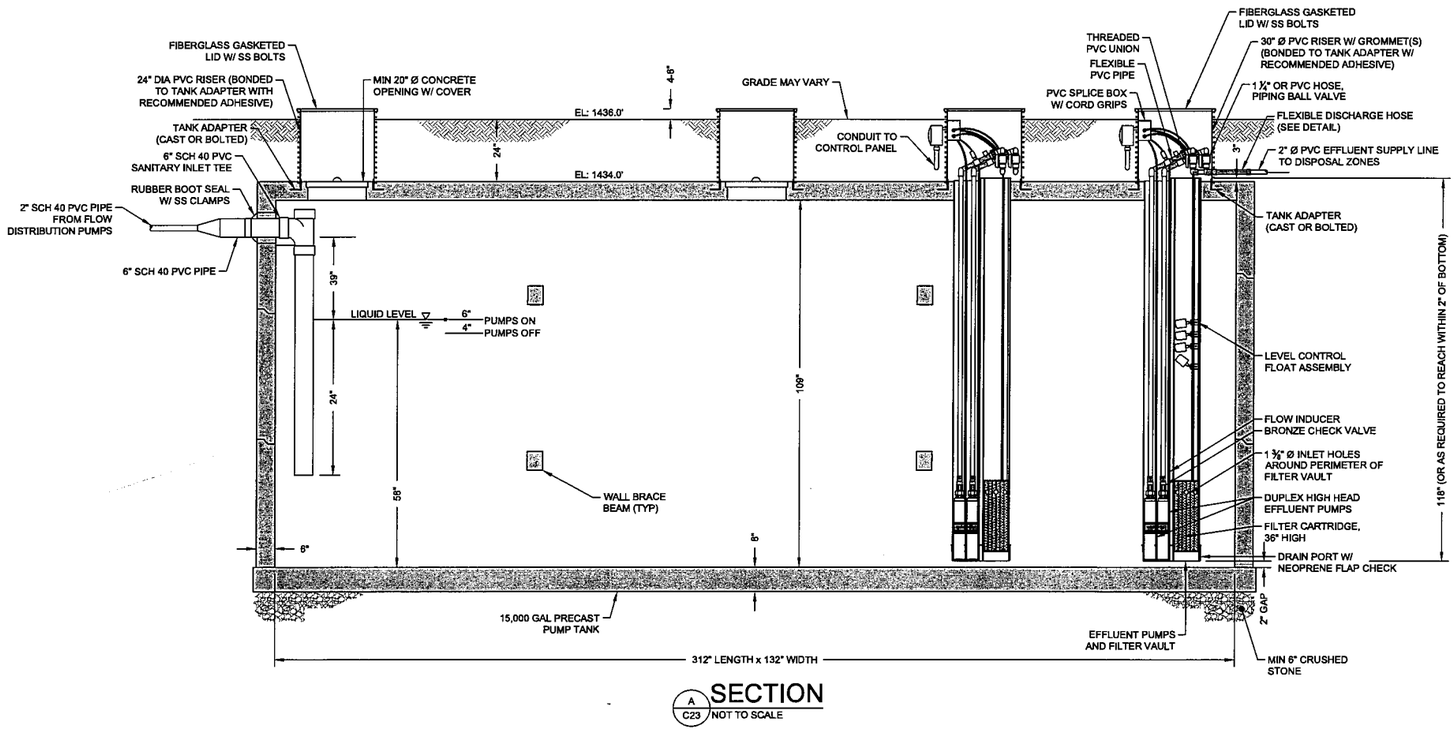
APPENDIX F
TYPICAL DOSING PUMP TANK DRAWINGS

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 TANK DETAILS (629361v12/7/19/24 4:20PM), LAYOUT: C23



15,000 GAL DOSING TANK PLAN (TYP OF 4)

NOT TO SCALE



A C23 SECTION

NOT TO SCALE

GENERAL NOTES ON SEPTIC AND DOSING TANKS:

1. PRECAST CONCRETE TANKS SHALL BE FROM A NPCA-CERTIFIED MANUFACTURER WHOSE TANKS HAVE BEEN APPROVED BY TDEC. TANKS SHALL BE FROM BARGER & SONS PRECAST, OR EQUAL.
2. INSTALL TANKS LEVEL AND PLUMB IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS AND AS SHOWN ON THE DRAWINGS. SOIL COVER OVER TANK SHALL BE NOT LESS THAN 12 INCHES NOR MORE THAN 36 INCHES.
3. TANKS SHALL BE INSTALLED ON UNIFORM CRUSHED STONE BEDDING AT LEAST 6 INCHES THICK. WHERE ROCK IS ENCOUNTERED IN TANK BOTTOM, OVER-EXCAVATE ENTIRE BOTTOM AREA AT LEAST 12 ADDITIONAL INCHES AND BRING BACK UP WITH COMPACTED CRUSHED ROCK. TOP 6-INCH LAYER OF CRUSHED ROCK SHALL BE #57 STONE.
4. BACKFILL TANKS USING SUITABLE SOIL FREE FROM LARGE ROOTS OR LARGE (GREATER THAN 2-INCH) ROCKS. COMPACT IN 8-INCH THICK LIFTS. UNTIL TANKS CAN BE BACKFILLED, PROTECT TANKS FROM WATER ACCUMULATING IN TANK PITS (WHICH CAN CAUSE FLOTATION).
5. ACCESS RISERS SHALL BE RIBBED PVC AND SHALL EXTEND ABOVE FINISHED GRADE APPROXIMATELY 4 TO 6 INCHES. ATTACH RISERS TO TOPS OF TANKS USING SUITABLE ADAPTOR RINGS. PROVIDE SECURED, GASKETED FRP LIDS HAVING STAINLESS STEEL HARDWARE.
6. PROTECT NON-TRAFFIC RATED TANKS FROM VEHICULAR TRAFFIC USING FENCES, BOLLARDS, OR OTHER SUITABLE FIXED BARRIERS.
7. TANKS SHALL BE FILLED WITH CLEAN WATER AND TESTED FOR LEAKAGE FOLLOWING INSTALLATION.
8. FOR SEPTIC/DOSING TANKS INSTALLED IN SERIES, THE INLET OF THE SECOND TANK SHALL BE SET 1 TO 2 INCHES BELOW THE OUTLET OF THE FIRST TANK.

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REVISIONS

NO.	DESCRIPTIONS	DATE	BY	APPD

DESIGN ZWR | DRAWN WEP | CHECKED GMC | APPROVED JRB

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

15,000 GAL PUMP /SEPTIC TANK
PLAN AND SECTION

CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-287-7613

FOR REVIEW

JOB NO. C23041
ISSUE DATE 8/7/2023
DRAWING NO. C23

DATE OF PRINT: 7/19/2024 4:21 PM



APPENDIX G
TYPICAL EFFLUENT DOSING PUMP DATA SHEETS

APPENDIX G

DOSING PUMP SELECTION

Table 4 in the report shows the TDH calculations for the dosing pumps for the 16 disposal subsystems. There are 4 zones in each subsystem. The head on all 4 zones has been adjusted through piping configuration so that the dosing head on all 4 zones is equal, regardless of the location of the zones with respect to the location of the automatic distribution valve. Calculations for this are included in Table 5 in the report. Basically, these adjustments have been accomplished through varying lengths of 1.5-inch and 2-inch feed piping between the automatic distribution valve and the feed manifold of each zones. The automatic discharge valve has 1.5-inch connections, and the zone feed manifold is 2-inch. The resulting feed head for each subsystem is included in the Table 4 pump head calculations.

For example, the feed head on all 4 zones for Subsystem 1 has been adjusted through varying lengths of 1.5-inch and 2-inch feed line to achieve a uniform feed head of 8.5 feet at the outlet of the automatic distribution valve, as shown in Table 5. This zone feed head is entered into the TDH calculation for Subsystem 1 in Table 4 in the report.

Table 4 also shows the pump selections, based on Orenco PF Series effluent pumps designed for nominal 50 gpm flows. There are three pumps being used. These are shown below, along with the pump design points:

PF5010 - 1 hp, 51 gpm at 73 feet curve operating point
- Subsystem 1 - 51 gpm at 63.1 ft. TDH
- Subsystem 4 - 51 gpm at 70.2 ft. TDH

PF5015 - 1.5 hp, 51 gpm at 99 feet curve operating point
- Subsystem 2 - 51 gpm at 91.8 ft. TDH
- Subsystem 3 - 51 gpm at 77.6 ft. TDH
- Subsystem 5 - 51 gpm at 102.9 ft. TDH
- Subsystem 6 - 51 gpm at 98.4 ft. TDH
- Subsystem 11 - 51 gpm at 92.8 ft. TDH
- Subsystem 12 - 51 gpm at 77.4 ft. TDH
- Subsystem 13 - 51 gpm at 101.2 ft. TDH
- Subsystem 14 - 51 gpm at 93.8 ft. TDH

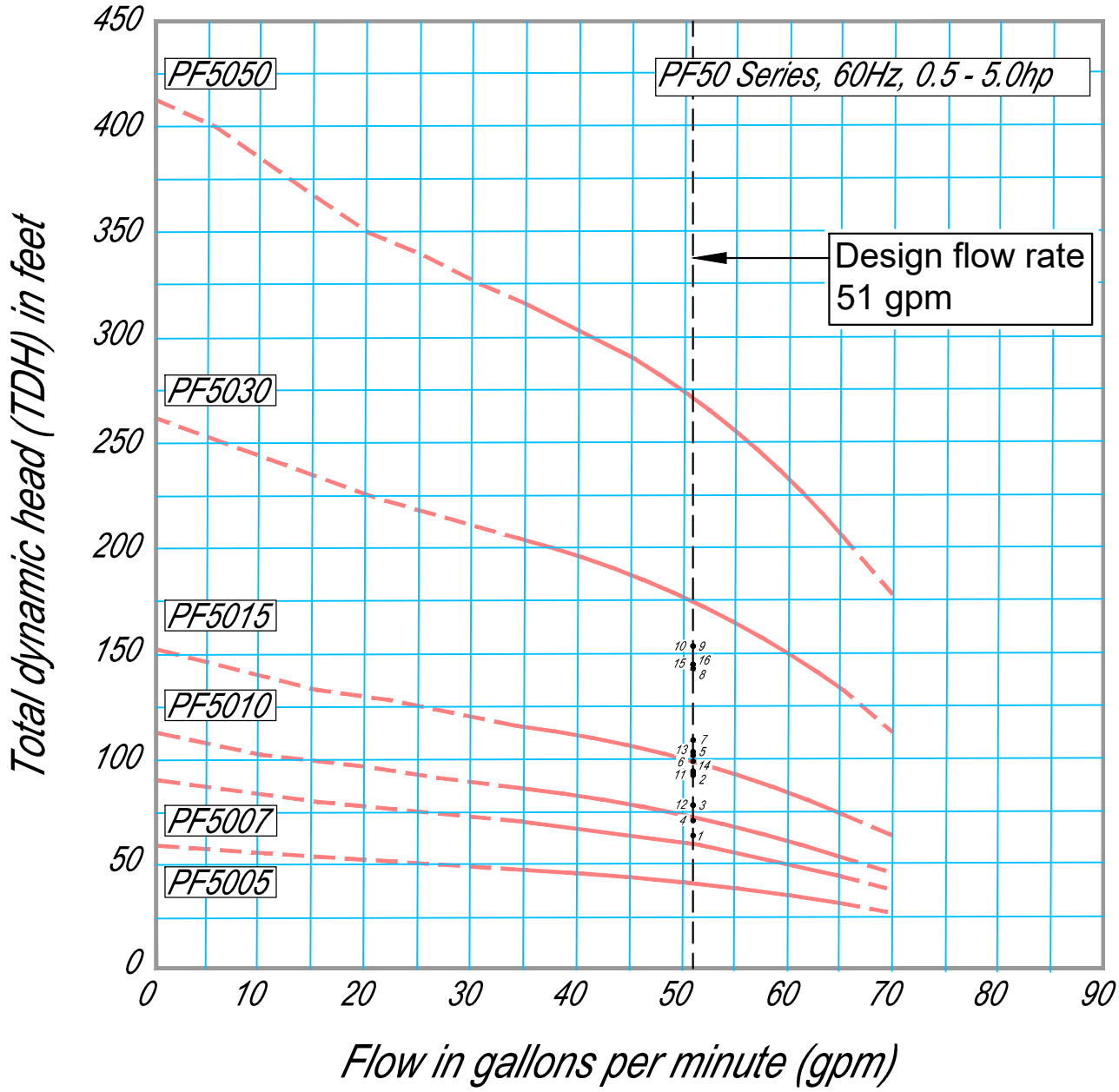
PF5030 - 3 hp, 51 gpm at 174 feet curve operating point
- Subsystem 7 - 51 gpm at 108.4 ft. TDH
- Subsystem 8 - 51 gpm at 142.4 ft. TDH
- Subsystem 9 - 51 gpm at 153.2 ft. TDH
- Subsystem 10 - 51 gpm at 153.0 ft. TDH
- Subsystem 15 - 51 gpm at 144.3 ft. TDH
- Subsystem 16 - 51 gpm at 144.3 ft. TDH

With only a couple of exceptions, the design TDH heads for the subsystems are below the operating curve heads produced by the respective pumps. In such cases, the dosing pumps will need to be throttled using the pump discharge valves to achieve the pump discharge head on the operating curve associated with the design flow rate (51 gpm), so that the pumps do not run out their curves and produce excessive flow. A threaded port is provided in each discharge valve box to facilitate temporary attachment of a pressure gauge.

For example, Subsystem 2 has a design point of 51 gpm at 91.8 ft. TDH. The unthrottled PF5015 pump will produce 5 to 6 gpm more flow at this head. So, the pump discharge valve will be used to artificially increase discharge head at the pump to 99 ft., which is the head associated with 51 gpm on the pump operating curve.

In two cases (Subsystems 5 and 13), the dosing pump design point is very slightly above the pump operating curve for the desired flow rate. This may have a 1 to 2 gpm effect on pump flow, but it avoids excessive throttling, should these subsystems be moved to the next higher pump.

CTI PROJECT: C23041-01, DRAWING: C23041-01 APPENDIX G PUMP CURVE (863837v3/9/9/25 11:53AM), LAYOUT: CTI 8.5x11 P



CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

RIVER GORGE RANCH SEWER SYSTEM

APPENDIX G

PUMP CURVES

THUNDER ENTERPRISES	C24009-01

Orenco® PF-Series 60Hz, 1-Phase Pumps

Applications

Orenco's 60Hz, 1-phase, 4in (100mm) Submersible Effluent Pumps are designed to transport screened effluent (with low TSS counts) from septic or dosing tanks. These pumps are engineered using lightweight, corrosion-resistant stainless steel and polymers, and are field serviceable and repairable with common tools. They're also CSA and UL certified to US and Canadian safety standards for effluent pumps.

PF-Series pumps are used in a variety of applications, including pressurized drainfields, packed-bed filters, mounds, aerobic units, effluent irrigation, liquid-only (effluent) sewers, wetlands, lagoons, and more. These pumps are designed to be used with a Biotube® pump vault or after a secondary treatment system.



C US
LR80980
LR2053896

Powered by **Franklin Electric**

General

To specify this pump for your installation, require the following:

- Minimum 24-hour run-dry capability (liquid end) with no deterioration in pump life or performance*
- 1/8in (3mm) bypass orifice to ensure flow recirculation for motor cooling and to prevent air binding
- 1/8in (3mm) mesh intake screen to limit solids
- Liquid-end repair kit availability for better long-term cost to own
- TRI-SEAL™ floating impeller design on 10, 20, and 30gpm (0.6, 1.3, and 1.9L/sec) models; floating stack design on 50 and 75gpm (3.2 and 4.7L/sec) models
- Franklin Electric Super Stainless motors are rated for continuous use and frequent cycling, with surge arrestors, hermetically sealed motor housing for moisture-free windings, and Kingsbury-type thrust bearing for thrust absorption
- Thermal overload protection trips at 203-221°F (95-105°C) for 1-phase motors through 1.5hp (1.12kW)
- Type SOOW 600V motor cable (model PF751512 uses 14 AWG, SJOOW, 300V cord)

** Not applicable for 5hp (3.73kW) models*

Standard Models

See Specifications on page 2 for a list of standard pumps. For a complete list of available pumps, call Orenco.

Product Code Diagram

PF □ □ □ □ □ - □ - □

- Pump, PF-Series
- Nominal flow, gpm (L/sec): 10 = 10 (0.6) 20 = 20 (1.3) 30 = 30 (1.9) 50 = 50 (3.2) 75 = 75 (4.7)
- Horsepower (kW): 05 = 1/2hp (0.37) 07 = 3/4hp (0.56) 10 = 1hp (0.75) 15 = 1 1/2hp (1.12) 20 = 2hp (1.50) 30 = 3hp (2.24) 50 = 5hp (3.73)
- Frequency: 1 = 1-phase, 60Hz
- Voltage, nameplate: 1 = 115* 2 = 230
- Check valve: Blank = no internal check valve CV = internal check valve†
- Cord length, ft (m):‡ Blank = 10 (3) 20 = 20 (6) 30 = 30 (9) 50 = 50 (15)
- CLK = ClickTight™ compatible

* 1/2hp (0.37kW) only
† Available for 10gpm (0.6L/sec), 1/2hp (0.37kW)
‡ Note: 20ft cords are available only for pumps through 1 1/2hp

All product and performance assertions are based on proper design, installation, operation, and maintenance according to Orenco's current published documentation.

Specifications

Pump Model	Design gpm (L/sec)	Horsepower (kW)	Phase	Nameplate voltage	Actual voltage	Design flow amps	Max amps	Discharge size and material[1]	Length in (mm)	Min. liquid level in (mm)[2]	Weight lb (kg)[3]	Rated cycles per day
PF100511 [9]	10 (0.6)	0.50 (0.37)	1	115	120	12.7	12.7	1¼in GFP	23.0 (584)	16 (406)	26 (12)	300
PF100511CV [9]	10 (0.6)	0.50 (0.37)	1	115	120	12.7	12.7	1¼in GFP	23.0 (584)	16 (406)	26 (12)	300
PF100512 [9]	10 (0.6)	0.50 (0.37)	1	230	240	6.3	6.3	1¼in GFP	23.0 (584)	16 (406)	26 (12)	300
PF100712 [4,5,9]	10 (0.6)	0.75 (0.56)	1	230	240	8.3	8.3	1¼in GFP	25.9 (658)	17 (432)	30 (14)	300
PF101012 [5,6,9]	10 (0.6)	1.00 (0.75)	1	230	240	9.6	9.6	1¼in GFP	27.9 (709)	18 (457)	33 (15)	100
PF200511 [9]	20 (1.3)	0.50 (0.37)	1	115	120	12.3	12.5	1¼in GFP	22.3 (566)	18 (457)	25 (11)	300
PF200512 [9]	20 (1.3)	0.50 (0.37)	1	230	240	6.4	6.5	1¼in GFP	22.5 (572)	18 (457)	26 (12)	300
PF201012 [4,5,9]	20 (1.3)	1.00 (0.75)	1	230	240	10.5	10.5	1¼in GFP	28.4 (721)	20 (508)	33 (15)	100
PF201512 [4,5]	20 (1.3)	1.50 (1.12)	1	230	240	12.4	12.6	1¼in GFP	34.0 (864)	24 (610)	41 (19)	100
PF300511 [9]	30 (1.9)	0.50 (0.37)	1	115	120	11.8	11.8	1¼in GFP	21.3 (541)	20 (508)	28 (13)	300
PF300512 [9]	30 (1.9)	0.50 (0.37)	1	230	240	6.2	6.2	1¼in GFP	21.3 (541)	20 (508)	25 (11)	300
PF300712 [9]	30 (1.9)	0.75 (0.56)	1	230	240	8.5	8.5	1¼in GFP	24.8 (630)	21 (533)	29 (13)	300
PF301012 [4,9]	30 (1.9)	1.00 (0.75)	1	230	240	10.4	10.4	1¼in GFP	27.0 (686)	22 (559)	32 (15)	100
PF301512 [4,5]	30 (1.9)	1.50 (1.12)	1	230	240	12.6	12.6	1¼in GFP	32.8 (833)	24 (610)	40 (18)	100
PF302012 [5,6,7]	30 (1.9)	2.00 (1.49)	1	230	240	11.0	11.0	1¼in SS	35.5 (902)	26 (660)	44 (20)	100
PF303012 [5,6,7,8]	30 (1.9)	3.00 (2.23)	1	230	240	16.8	16.8	1¼in SS	44.5 (1130)	33 (838)	54 (24)	100
PF305012 [5,6,7,8]	30 (1.9)	5.00 (3.73)	1	230	240	25.6	25.8	1¼in SS	66.5 (1689)	53 (1346)	82 (37)	100
PF500511 [9]	50 (3.2)	0.50 (0.37)	1	115	120	12.1	12.1	2in SS	20.3 (516)	24 (610)	27 (12)	300
PF500512 [9]	50 (3.2)	0.50 (0.37)	1	230	240	6.2	6.2	2in SS	20.3 (516)	24 (610)	27 (12)	300
PF500712 [9]	50 (3.2)	0.75 (0.56)	1	230	240	8.5	8.5	2in SS	23.7 (602)	25 (635)	31 (14)	300
PF501012 [9]	50 (3.2)	1.00 (0.75)	1	230	240	10.1	10.1	2in SS	27.0 (686)	26 (660)	35 (16)	100
PF501512 [4]	50 (3.2)	1.50 (1.12)	1	230	240	12.5	12.6	2in SS	32.5 (826)	30 (762)	41 (19)	100
PF503012 [4,5,7,8]	50 (3.2)	3.00 (2.23)	1	230	240	17.7	17.7	2in SS	52.0 (1321)	37 (940)	55 (25)	100
PF505012 [5,6,7,8]	50 (3.2)	5.00 (3.73)	1	230	240	26.2	26.4	2in SS	77.0 (1956)	55 (1397)	64 (29)	100
PF751012 [9]	75 (4.7)	1.00 (0.75)	1	230	240	9.9	10.0	2in SS	27.0 (686)	27 (686)	34 (15)	100
PF751512	75 (4.7)	1.50 (1.12)	1	230	240	12.1	12.3	2in SS	33.4 (848)	30 (762)	44 (20)	100

1. GFP = glass-filled polypropylene; SS = stainless steel. The 1 1/4in NPT GFP discharge is 2 7/8in octagonal across flats; the 1 1/4in NPT SS discharge is 2 1/8in octagonal across flats; and the 2in NPT SS discharge is 2 7/8in hexagonal across flats. Discharge is NPT threaded receptacle-style port, US nominal size, to accommodate Orenco discharge hose and valve assemblies. Consult your Orenco distributor about fittings to connect hose and valve assemblies to metric-sized piping.

2. Minimum liquid level is for single pumps when installed in an Orenco Biotube Pump Vault or Universal Flow Inducer. In other applications, minimum liquid level should be top of pump. Consult Orenco for more information.

3. Weight includes carton and 10ft (3m) cord.

4. High-pressure discharge assembly required.

5. Do not use cam-lock option (Q) on discharge assembly.

6. Custom discharge assembly required for these pumps. Contact Orenco.

7. Capacitor pack (sold separately or installed in a custom control panel) required for this pump. Contact Orenco.

8. Torque locks are available for all pumps, and they are supplied with 3hp and 5hp pumps.

9. ClickTight™ compatible.

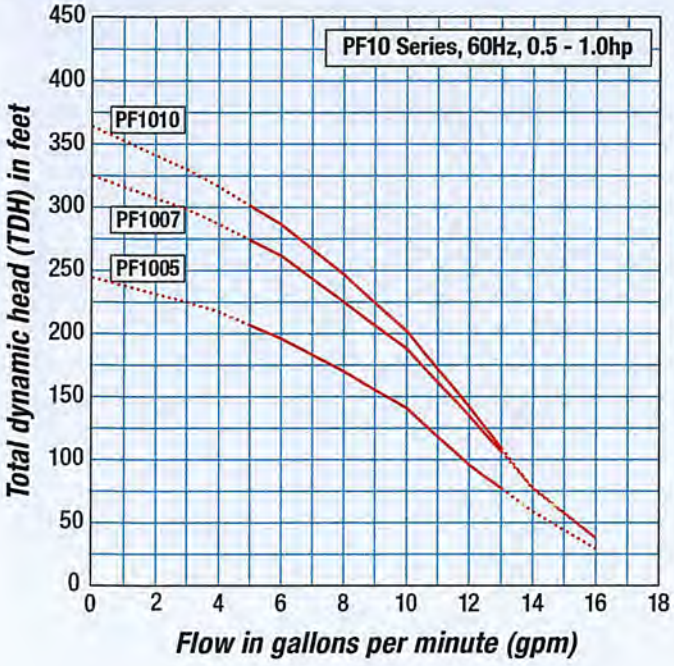
Materials of Construction

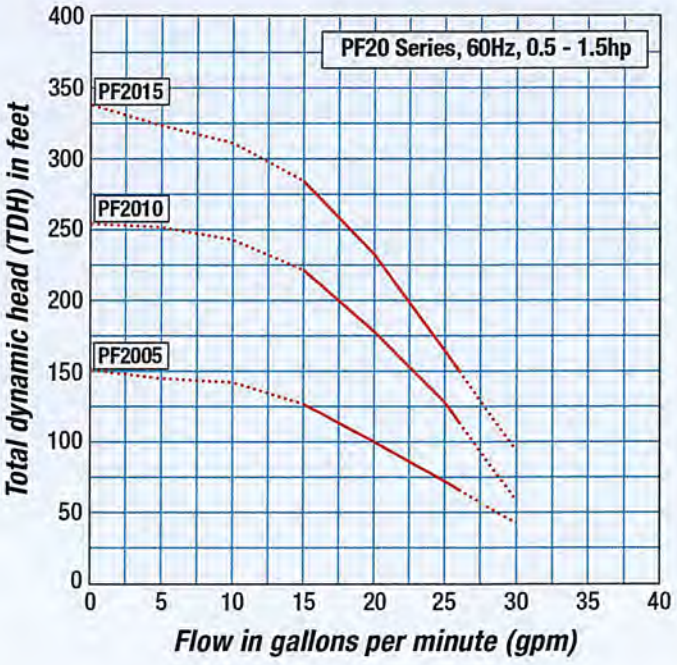
Discharge	Glass-filled polypropylene or stainless steel
Discharge bearing	Engineered thermoplastic (PEEK)
Diffusers	Glass-filled PPO (SABIC's NORYL™ GFN3 resin)
Impellers	Celanese's Celcon® acetal copolymer on 10, 20, and 30gpm models; 50gpm impellers are NORYL GFN3 resin
Intake screen	Polypropylene
Suction connection	Stainless steel
Drive shaft	7/16in hexagonal stainless steel, 300 series
Coupling	Sintered stainless steel, 300 series
Shell	Stainless steel, 300 series
Motor	Franklin Electric motor filled with deionized water and propylene glycol for constant lubrication. Stainless steel shell.

Using a Pump Curve

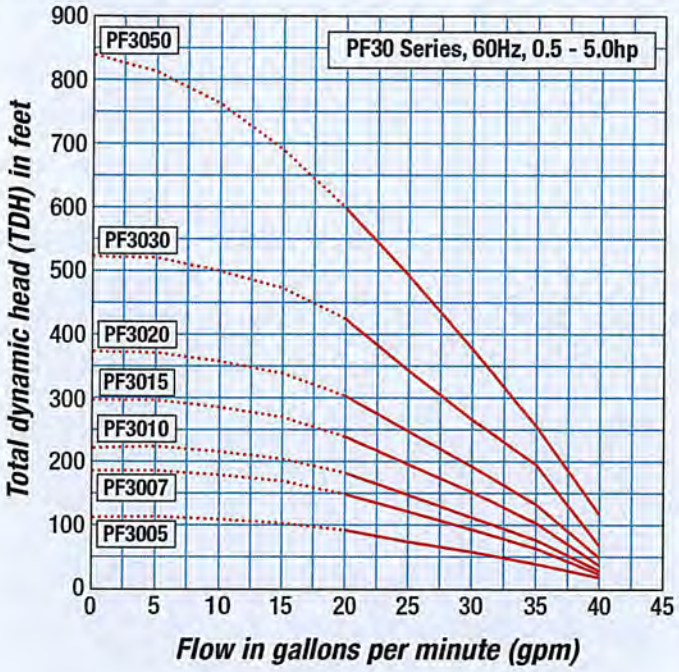
A pump curve helps you determine the best pump for your system. Pump curves show the relationship between flow (gpm or L/sec) and pressure (total dynamic head or TDH), providing a graphical representation of a pump's optimal performance range. Pumps perform best at their nominal flow rate – the value, measured in gpm, expressed by the first two numerals in an Orenco pump nomenclature. These graphs use solid lines to show the optimal pump operation range. Dashed lines indicate flow rates outside of the optimal range for each pump. For the most accurate pump specifications, use Orenco's PumpSelect™ software.

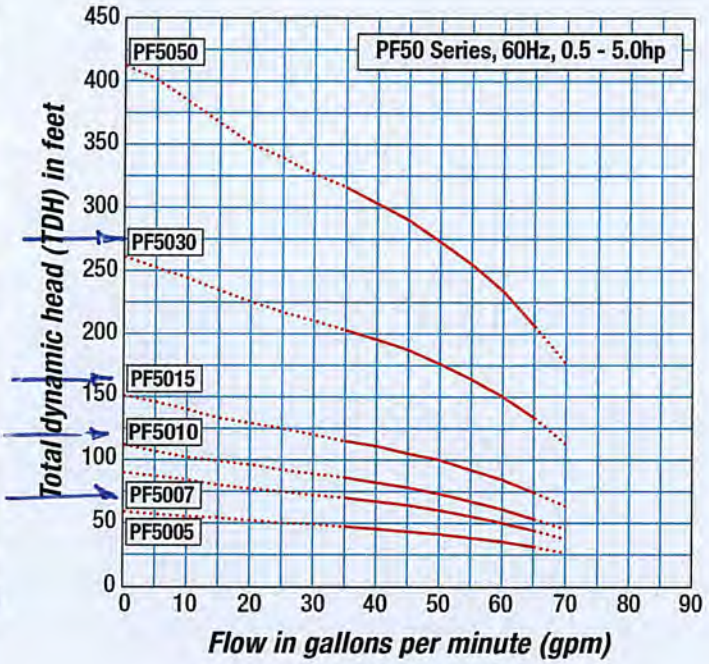
Pump Curves

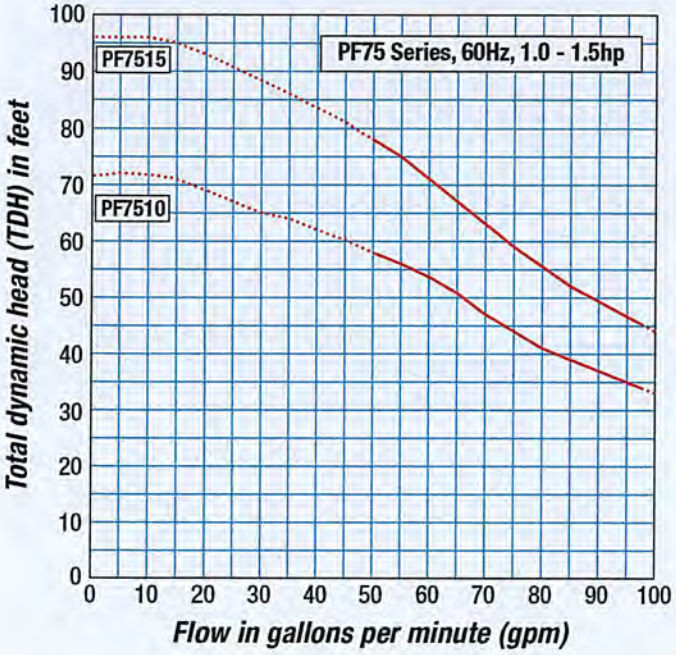




Pump Curves, cont.









APPENDIX H
EXTRA HIGH INTENSITY SOIL MAP

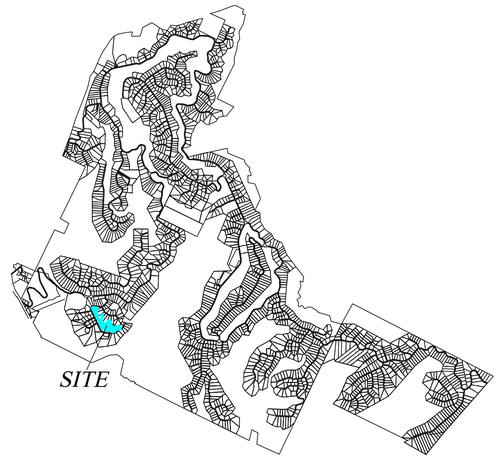
Client: Thunder Enterprises
Location: River Gorge Ranch
Restaurant, Cabins, and Amenities
County: Marion

Extra-High Intensity Soil Map
Prepared By: David Myers Soil Consultant
David Myers November 19, 2023

LICENSED PROFESSIONAL DAVID MYERS 1998 TENNESSEE L.I.C.S. SOIL SCIENTIST

SOILS LEGEND:	SLOPE CLASSES:
Clarkrange	5–15%
Cut & Fill	5–15%, 15–30%
Gullied Land	2–5%
Lily I, III	5–15%, 15–30%
Lily Shallow	5–15%, 15–30%
Sewanee	2–5%





Map Legend
- Auger Hole
- Soil Boundary
- Soil Limits
- Drainage >12 inches
- Gully/Ditch (recommend 15' setback)
- Roadbed
- Cut Bank

Notes:
1. This soil report is an accurate High Intensity soil evaluation in accordance with TDEC standards.
2. Soil auger locations shown on this map were plotted by use of a Global Positioning System (Trimble).
3. Any cutting, filling, or compaction will void this soil map.
4. Signature of the soil consultant does not constitute approval of this soil map by the Division of Water Resources.
5. This soil map is to evaluate the site for a subsurface sewage disposal system only. This soil map complies with the standards established in the TN Onsite Wastewater Manual, the Soil Survey Manual, and the Soil Taxonomy. No other warranties are made or implied.
6. The information contained in this report is based on the professional opinion and judgment of David Myers Soil Consultants, LLC. The soil scientist has no control over the permitting, design, installation, or maintenance of septic systems. Therefore, the soil scientist does not guarantee the performance of any septic system installed on this property.

Soil Name and Depths (inches)	Estimated Absorption Rate (mpi)	Depth to Restricting Layer (inches)	Soil Notes, Improvement Practices, Percolation Status
Clarkrange 0–24 24–48	75 (WD)* >75	Pan >24	These Clarkrange soils have a fragipan at a depth of 24 inches. They require an interceptor drain to divert subsurface water away from the septic absorption field.
Cut & Fill 0–48	>75	–	
Gullied Land 0–48	>75	–	These areas have numerous gullies ranging from 1 to 2 feet deep.
Lily I 0–24 24–48	45 >75	24–30	Sandstone bedrock in these Lily I soils encountered between a depth of 24–30 inches.
Lily III 0–36 36–48	45 >75	≥36	Sandstone bedrock in these Lily III soils encountered below a depth of 36 inches.
Lily Shallow 0–48	>75	20–24	Sandstone bedrock in these Lily Shallow soils encountered between a depth of 20–24 inches.
Sewanee 0–48	>75	<24	These areas are located in drainageways and have excess wetness and/or flooding.

(WD)* = With Interceptor Drain

Interceptor Drain Notes:
1.) A suitable, positive outlet is required.
2.) The location of the interceptor drain may need to be designed by a surveyor or engineer.
3.) The interceptor drain should be installed at a depth of 42 inches upslope from the disposal area.
4.) The minimum recommended distance between interceptor drains and the disposal area, and intermittent stream channels is 15 feet.
5.) Clarkrange soils without an interceptor drain will have an estimated absorption rate greater than 75 MPI.

David Myers Soil Consultants, LLC
P.O. Box 5088
Cleveland, TN 37312
Cell: (423) 716-2577
Email: davidmsoil@yahoo.com
www.davidmyerssoilconsultants.com

0 100' 200' 300'
1" = 100'

Client: Thunder Enterprises
Location: River Gorge Ranch
Restaurant, Cabins, and Amenities
County: Marion

Extra-High Intensity Soil Map
Prepared By: David Myers Soil Consultant
November 19, 2023
Updated 9/18/24 & 2/14/25

LICENSED PROFESSIONAL SOIL SCIENTIST
DAVID MYERS
TENNESSEE LIC. # 00

SOILS LEGEND:	SLOPE CLASSES:
Clarkrange	5–15%
Cut & Fill	5–15%, 15–30%
Gullied Land	2–5%
Lily I, III	5–15%, 15–30%
Lily Shallow	5–15%, 15–30%
Sewanee	2–5%


Lily Shallow 15–30% >75 MPI
Not Evaluated
Lily I 5–15% 45 MPI
Lily III 5–15% 45 MPI
Lily III 15–30% 45 MPI
Lily I 15–30% 45 MPI
Lily II 5–15% 40 MPI
Lily III 15–30% 40 MPI
Lily I 5–15% 40 MPI
Lily I 15–30% 40 MPI
Lily III 15–30% 40 MPI
Lily III 5–15% 40 MPI
Lily III 15–30% 40 MPI
Lily III 15–30% 45 MPI
Lily III 5–15% 45 MPI
Lily I 5–15% 45 MPI
Lily I 15–30% 45 MPI
Lily III 15–30% 45 MPI
Lily III 5–15

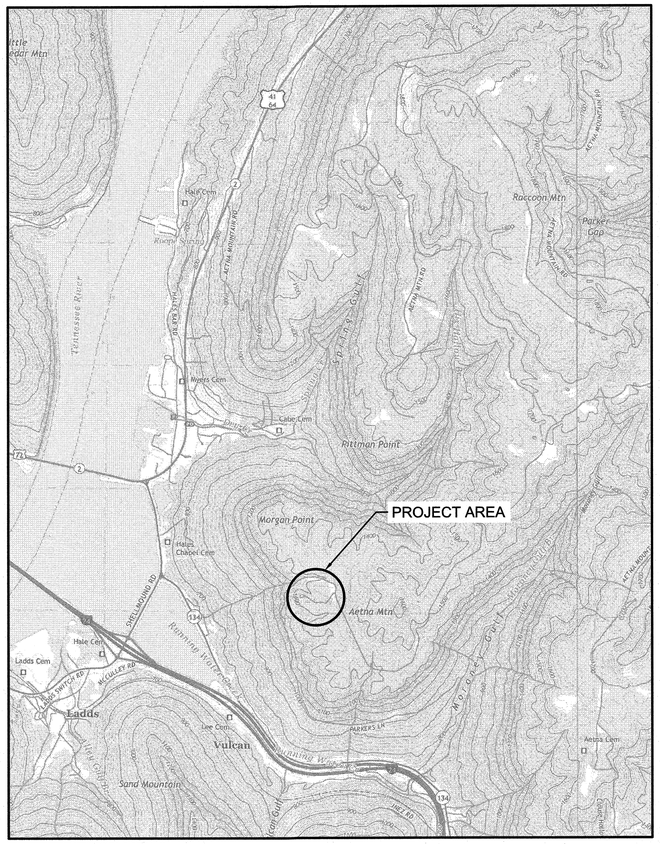
EXHIBIT 4:
SYSTEM PLANS
AND
SITE MAP

CTI PROJECT: C23041-01 (Thunder Enterprises) River Gorge Ranch Sewer System, DRAWING: 0_C23041 G001.00 (827258x11/8/12/24, 4:24PM), LAYOUT: G001

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM
MARION COUNTY, TENNESSEE

DRAWING INDEX

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PRESSURE SEWER PLAN (SHEET 2 OF 2)	C3
FORCE MAIN LINE A PLAN AND PROFILE (SHEET 1 OF 3)	C4
FORCE MAIN LINE A PLAN AND PROFILE (SHEET 2 OF 3)	C5
FORCE MAIN LINE A PLAN AND PROFILE (SHEET 3 OF 3)	C6
FORCE MAIN LINE B PLAN AND PROFILE	C7
FORCE MAIN LINE C PLAN AND PROFILE	C8
FORCE MAIN LINE D PLAN AND PROFILE (SHEET 1 OF 2)	C9
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EROSION & SEDIMENT CONTROL PLAN PHASES 1-3 (LPP SYSTEM)	C4.10 - C4.12



LOCATION MAP
SCALE: 1"= 2000'

APPROVED BY THUNDER ENTERPRISES

03-13-2025

CLARENCE HOWARD
SR VP OF CONSTRUCTION
DATE

CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

3/12/25

GARY COSBY, PE
TENNESSEE LICENSE NO. 13025
DATE

GARY M. COSBY
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 13025
STATE OF TENNESSEE

CTI PROJECT NUMBER: C24009
ISSUE DATE: 03/12/2025

811
Know what's below.
Call before you dig.

DATE OF PRINT: 3/5/2025 10:17 AM

C24009 (THUNDER ENTERPRISES RIVER GORGE AMENITY 1 SEWER SYSTEM)

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 PROPOSED BASE 2.6.25 (845231x11/3/4)25 5:24PM), LAYOUT: C1

SHEET C3

SHEET C4

SHEET C12

SHEET C2

SHEET C13

SHEET C5

SHEET C6

LPP DISPOSAL AREA
(SEE OVERALL LPP DISPOSAL
AREA SITE PLAN)

LPP DOSING STATION
(SEE DOSING STATION
SITE PLAN)

LPP DISPOSAL AREA
(SEE OVERALL LPP DISPOSAL
AREA SITE PLAN)

0 75 150 300
Feet

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REVISIONS

NO.	DESCRIPTIONS	DATE	BY	APP'D

DESIGN	GMC
DRAWN	ZWR
CHECKED	JRB
APPROVED	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

OVERALL SITE PLAN

CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

GARY M. GOLDEN
REGISTERED ENGINEER
AGRICULTURE
No. 130255
STATE OF TENNESSEE

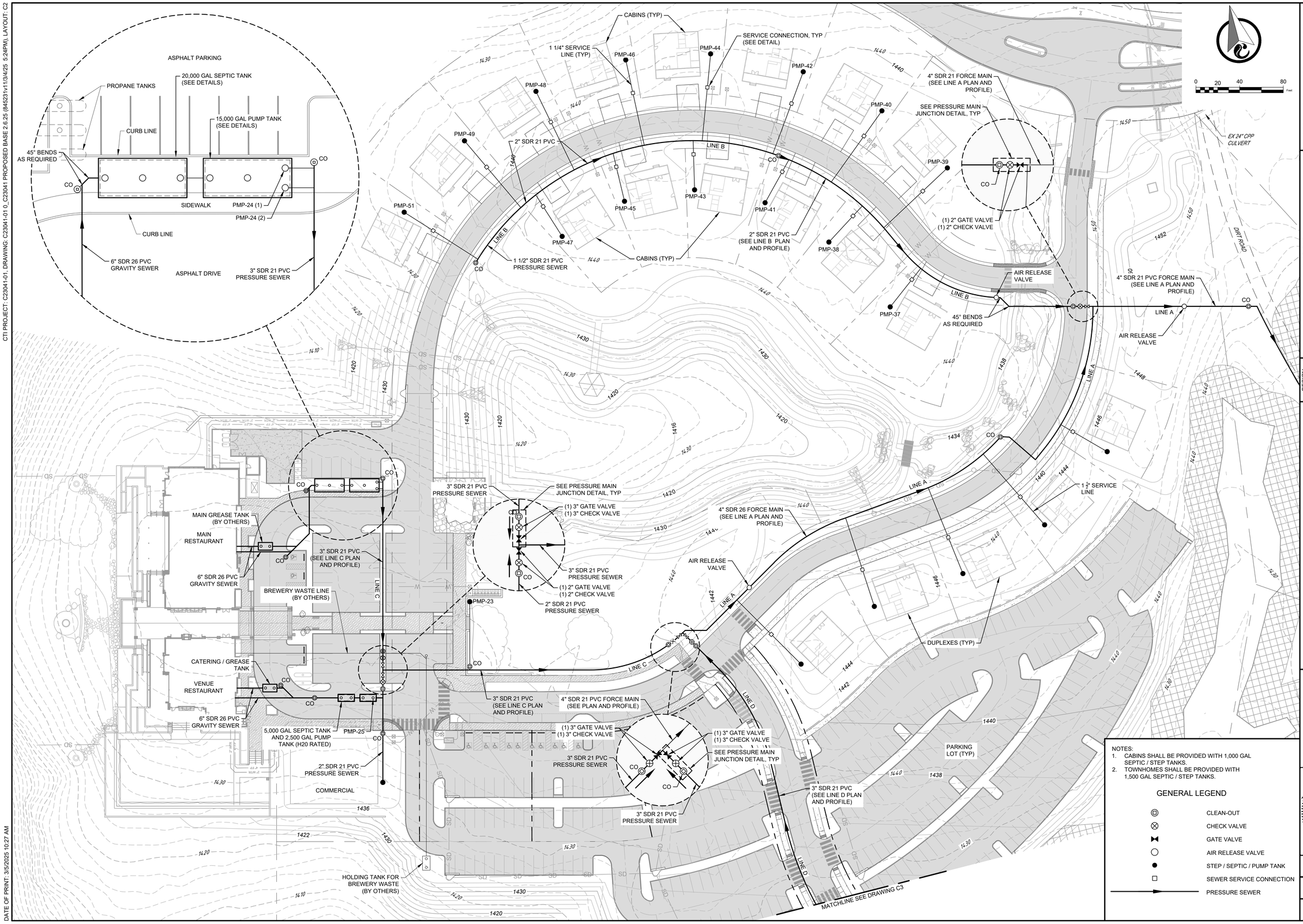
JOB NO.
C24009

ISSUE DATE
03/12/2025

DRAWING NO.
C1

DATE OF PRINT: 3/5/2025 10:27 AM

CTI PROJECT: C23041-01, DRAWING C23041-01 0_C23041 PROPOSED BASE 2.6.25 (84523)1v1 1/3/4/25 5:24PM), LAYOUT: C2



NOTES:
1. CABINS SHALL BE PROVIDED WITH 1,000 GAL SEPTIC / STEP TANKS.
2. TOWNHOMES SHALL BE PROVIDED WITH 1,500 GAL SEPTIC / STEP TANKS.

GENERAL LEGEND

- CLEAN-OUT
- CHECK VALVE
- GATE VALVE
- AIR RELEASE VALVE
- STEP / Sseptic / PUMP TANK
- SEWER SERVICE CONNECTION
- PRESSURE SEWER

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REVISIONS				
NO.	DESCRIPTIONS	DATE	BY	APPD

DESIGN	GMC
DRAWN	ZWR
CHECKED	JRB
APPROVED	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

PRESSURE SEWER PLAN
(SHEET 1 OF 2)

CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

GARY M. GORDON — REGISTERED ENGINEER — AGRICULTURE COMMERCE — 130422 — STATE OF TENNESSEE

JOB NO.	C24009
ISSUE DATE	03/12/2025
DRAWING NO.	C2

DATE OF PRINT: 3/5/2025 10:27 AM

CTI PROJECT: C23041-01, DRAWING C23041-01 0_C23041 PROPOSED BASE 2.6.25 (845231v1 1/3/4/25 5:24PM), LAYOUT: C3



NOTES:
1. CABINS SHALL BE PROVIDED WITH 1,000 GAL SEPTIC / STEP TANKS.
2. TOWNHOMES SHALL BE PROVIDED WITH 1,500 GAL SEPTIC / STEP TANKS.

GENERAL LEGEND

- CLEAN-OUT
- CHECK VALVE
- GATE VALVE
- AIR RELEASE VALVE
- STEP / SEPTIC / PUMP TANK
- SEWER SERVICE CONNECTION
- PRESSURE SEWER

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CHECKED	JRB
APPROVED	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

PRESSURE SEWER PLAN (SHEET 2 OF 2)

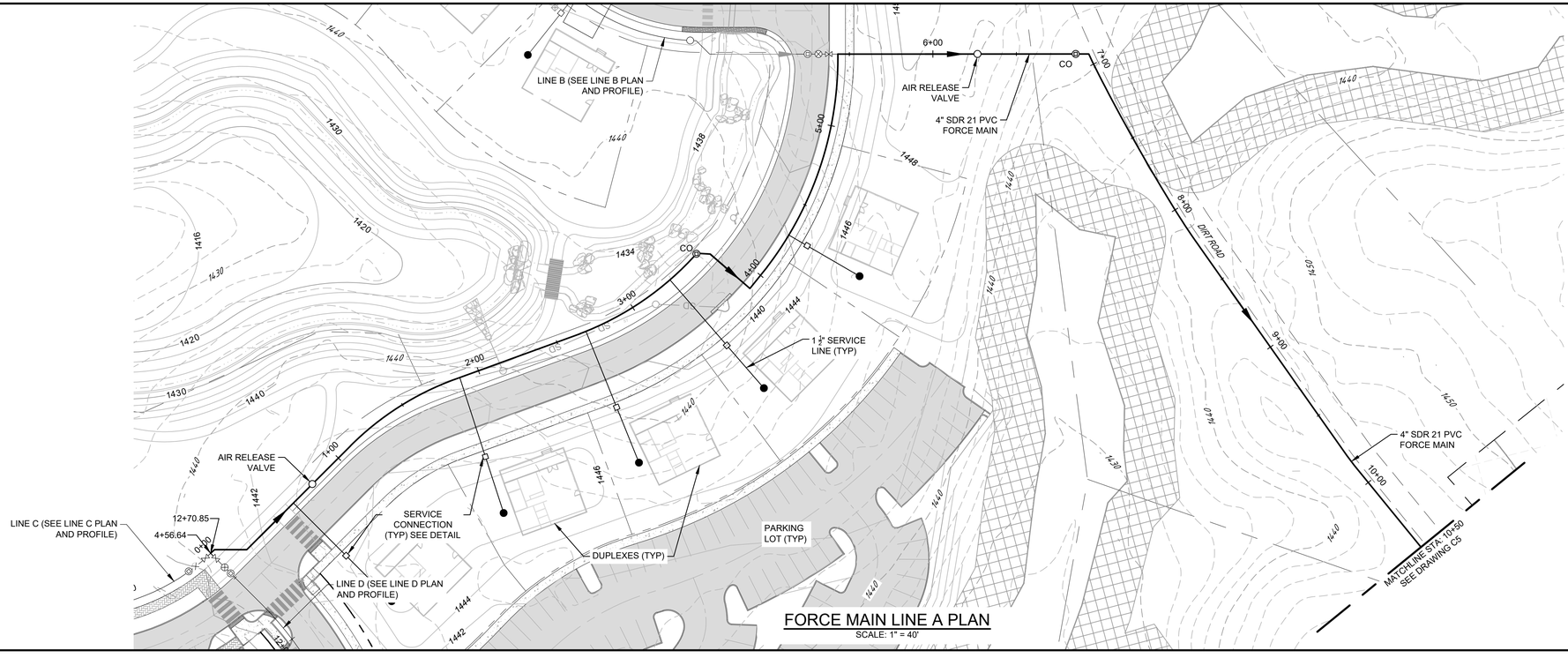
CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

GREGORY M. GRAHAM
REGISTERED ENGINEER
AGRICULTURE
TENNESSEE
13025
STATE OF TENNESSEE

JOB NO.	C24009
ISSUE DATE	03/12/2025
DRAWING NO.	C3

DATE OF PRINT: 3/5/2025 10:27 AM

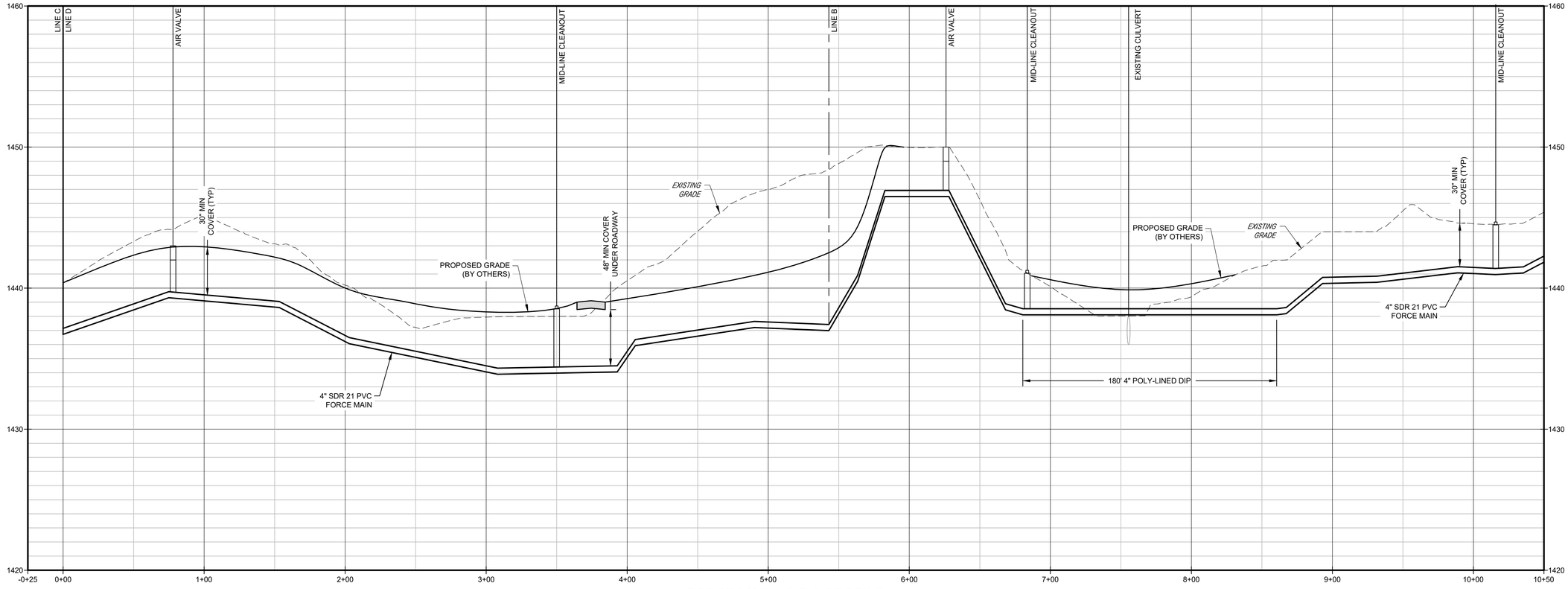
CTI PROJECT: C23041-01, DRAWING C23041-01 0_C23041 PROPOSED BASE 2.6.25 (84523\v11\3/4/25 5:24PM), LAYOUT: C4



FORCE MAIN LINE A PLAN
SCALE: 1" = 40'

GENERAL LEGEND

- CLEAN-OUT
- CHECK VALVE
- GATE VALVE
- AIR RELEASE VALVE
- PRESSURE SEWER
- STEP / SEPTIC / PUMP TANK



FORCE MAIN LINE A PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

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GMC	ZWR	JRB	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

FORCE MAIN LINE A PLAN AND PROFILE
(SHEET 1 OF 3)

CTIENGINEERS
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CHATTANOOGA, TN 37402
423-267-7613

GREGORY M. GRAHAM
REGISTERED PROFESSIONAL ENGINEER
AGRICULTURE
COMMERCE
13025
STATE OF TENNESSEE

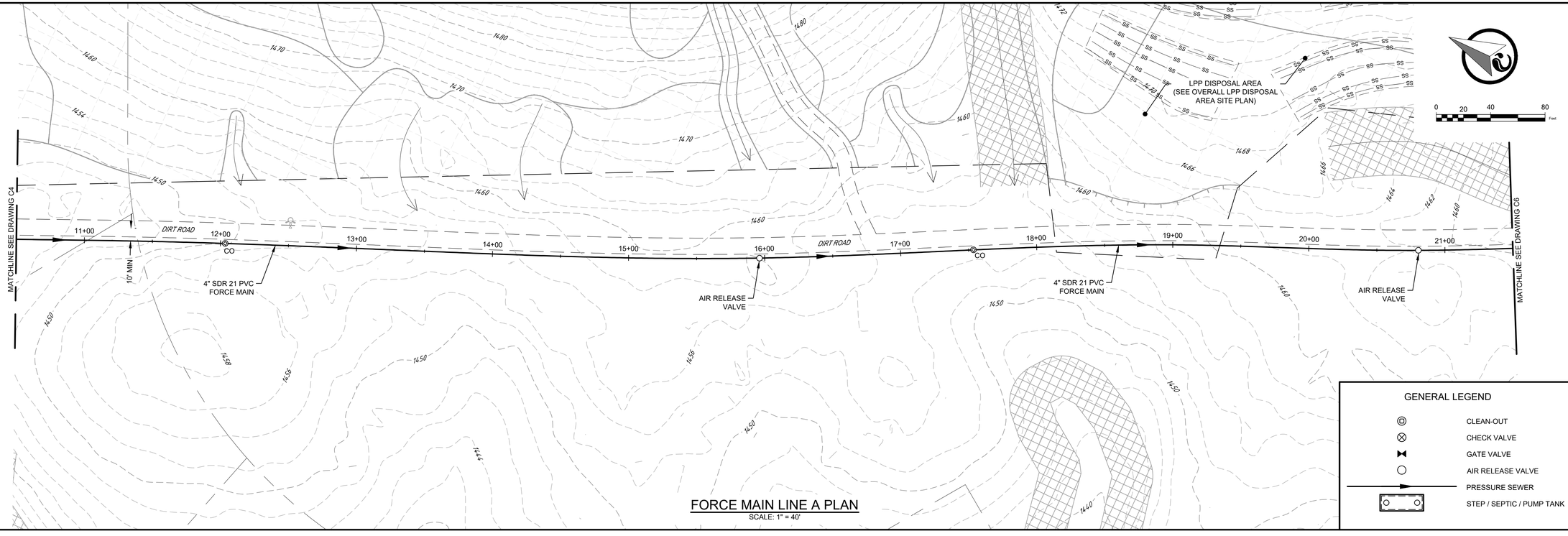
JOB NO.
C24009

ISSUE DATE
03/12/2025

DRAWING NO.
C4

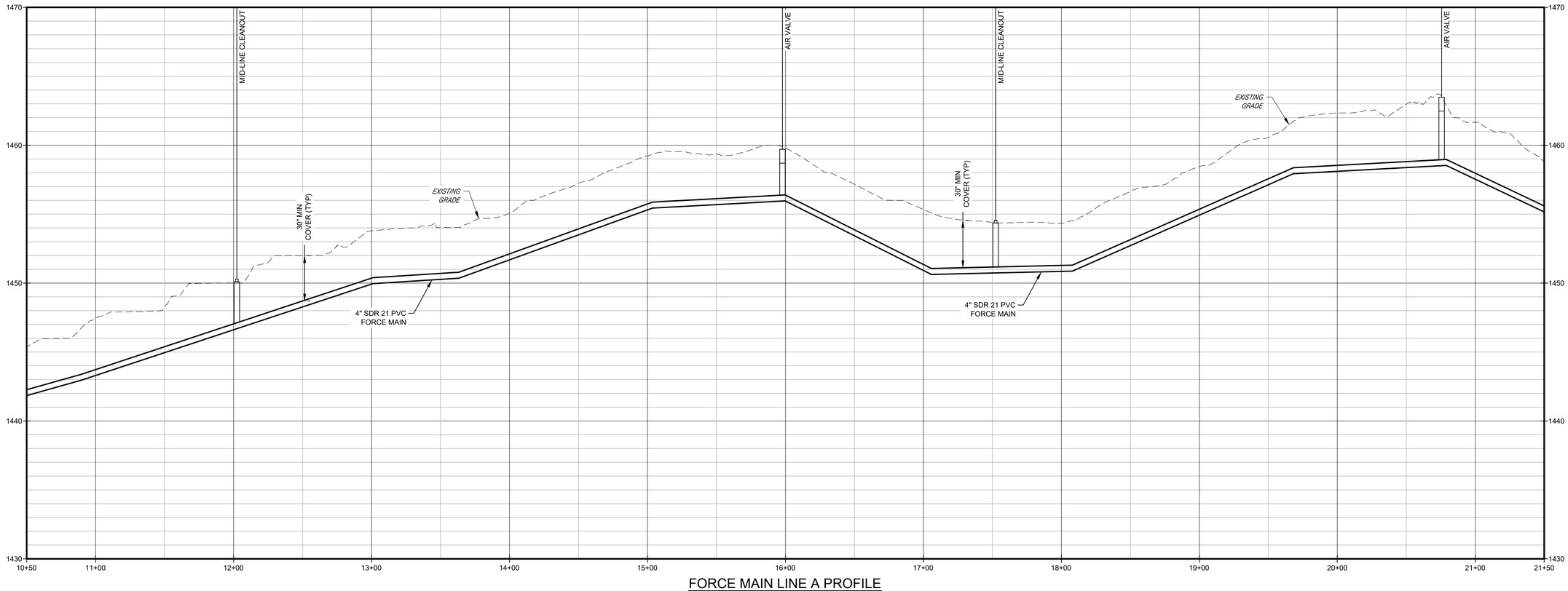
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CTI PROJECT: C23041-01, DRAWING: C23041-01 D_C23041 PROPOSED BASE 2.6.25 (84523\v11\3/4/25 5:24PM), LAYOUT: C5



FORCE MAIN LINE A PLAN
SCALE: 1" = 40'

GENERAL LEGEND
- CLEAN-OUT
- CHECK VALVE
- GATE VALVE
- AIR RELEASE VALVE
- PRESSURE SEWER
- STEP / SEPTIC / PUMP TANK



FORCE MAIN LINE A PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

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THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

FORCE MAIN LINE A PLAN AND PROFILE
(SHEET 2 OF 3)

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423-267-7613

GREGORY M. GRAHAM — REGISTERED PROFESSIONAL ENGINEER — AGRICULTURE — CIVIL — 130255 — STATE OF TENNESSEE

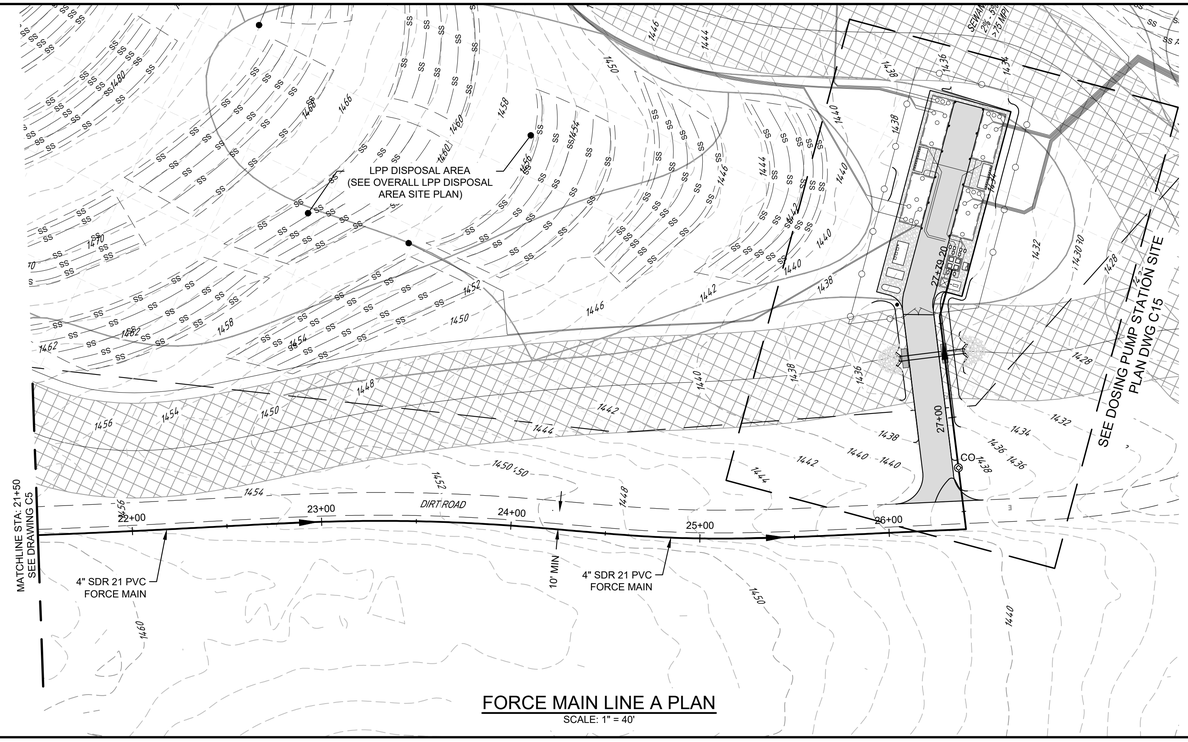
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C24009

ISSUE DATE
03/12/2025

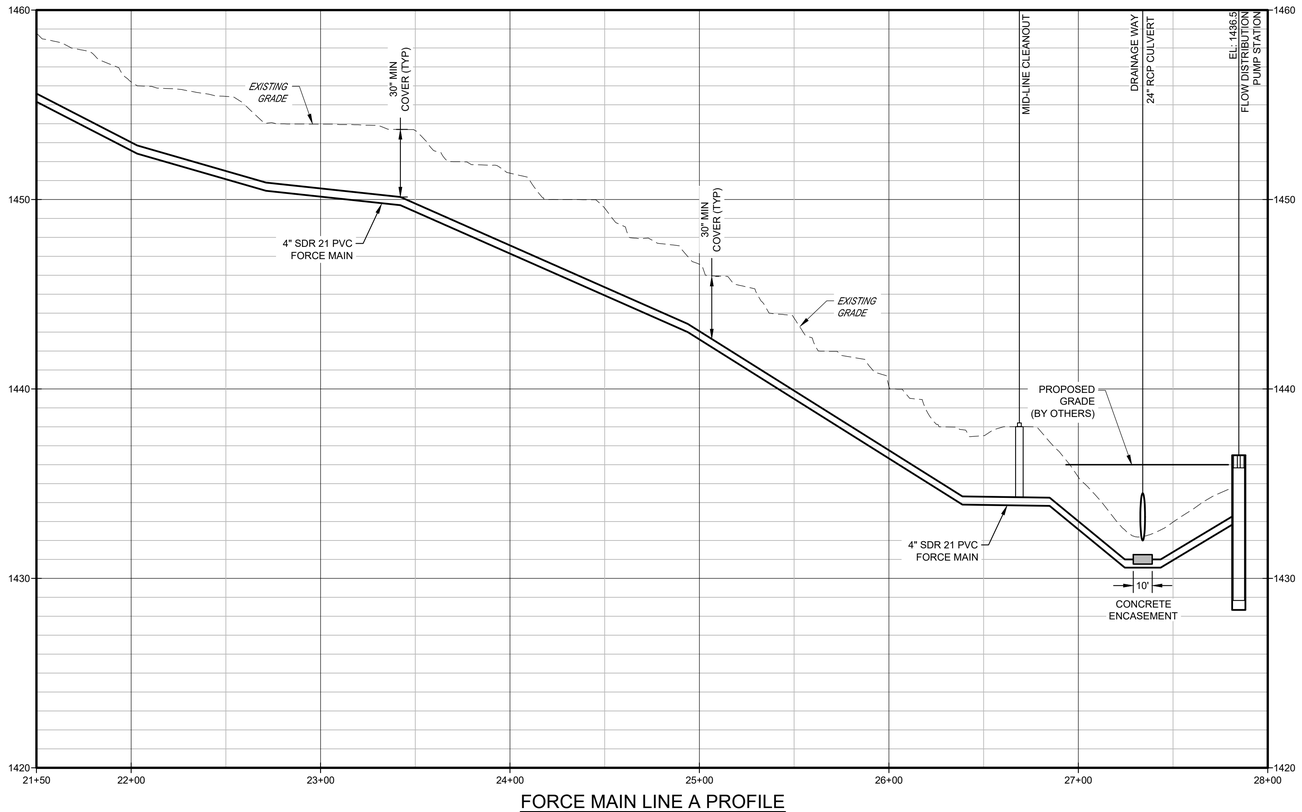
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DATE OF PRINT: 3/5/2025 10:29 AM

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FORCE MAIN LINE A PLAN
SCALE: 1" = 40'



FORCE MAIN LINE A PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

0 20 40 80 Feet

GENERAL LEGEND
- CLEAN-OUT
- CHECK VALVE
- GATE VALVE
- AIR RELEASE VALVE
- PRESSURE SEWER
- STEP / SEPTIC / PUMP TANK

REVISIONS				
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DESIGN	GMC
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APPROVED	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

FORCE MAIN LINE A PLAN AND PROFILE
(SHEET 3 OF 3)

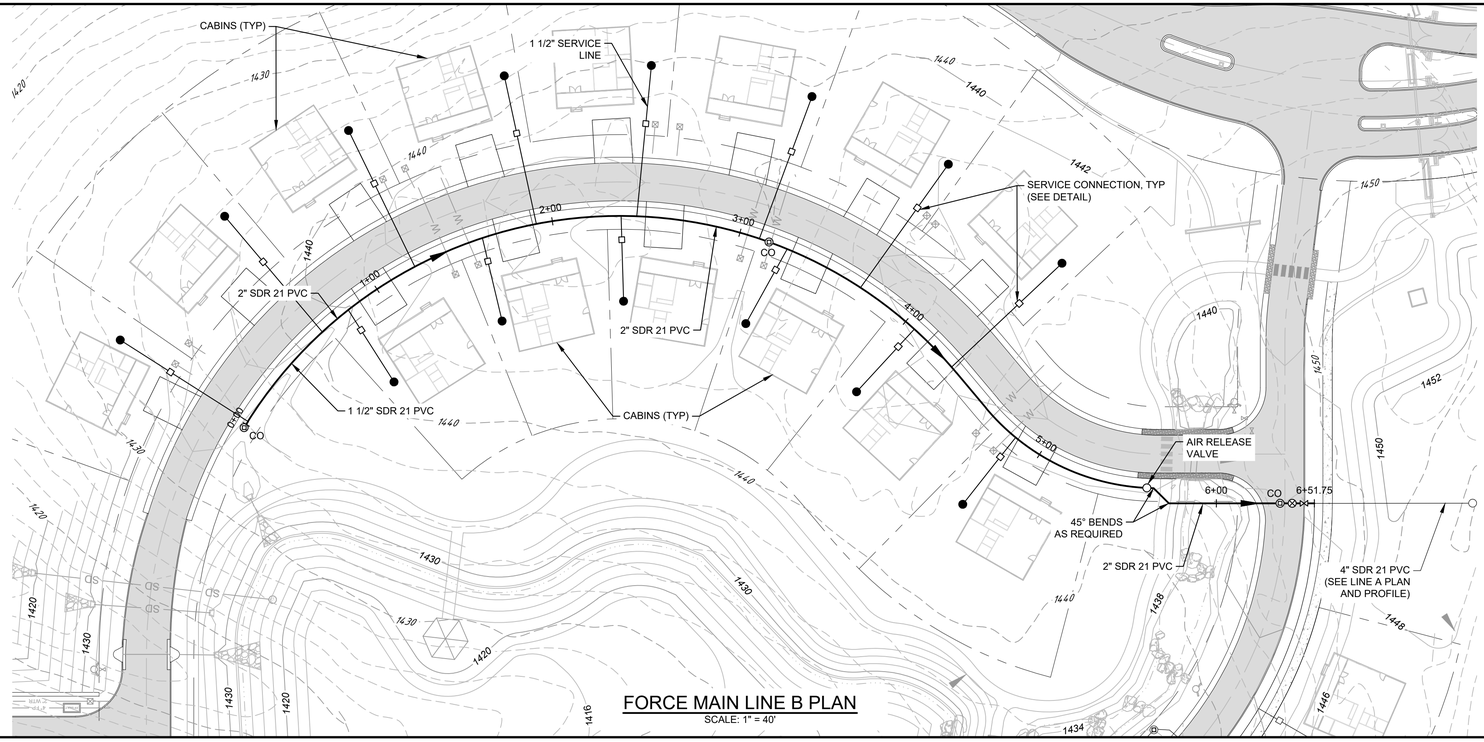
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GREGORY M. GRAY — REGISTERED PROFESSIONAL ENGINEER — AGRICULTURE CHEMICAL — COMMERCIAL — 130258 — STATE OF TENNESSEE

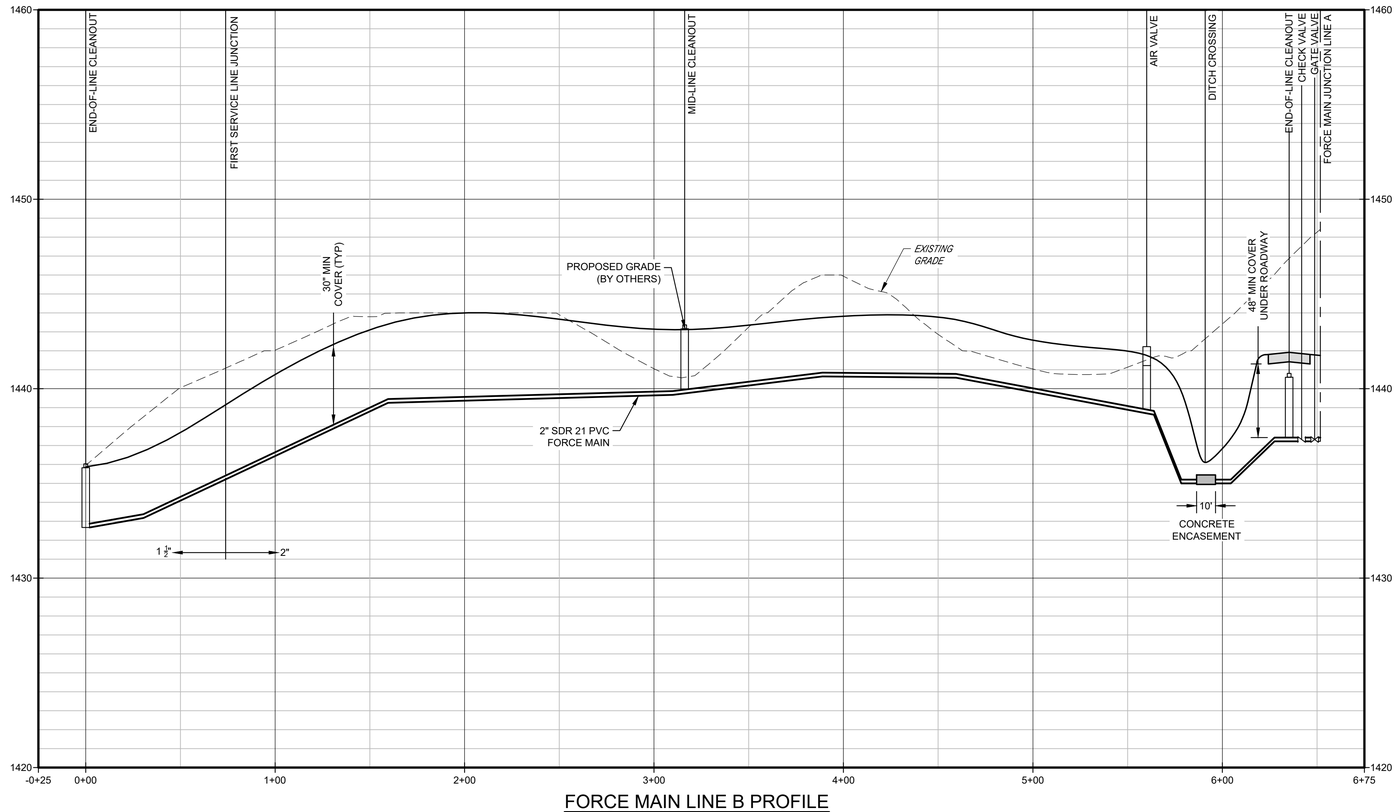
JOB NO.	C24009
ISSUE DATE	03/12/2025
DRAWING NO.	C6

DATE OF PRINT: 3/5/2025 10:33 AM

CTI PROJECT: C23041-01, DRAWING C23041-01 0_C23041 PROPOSED BASE 2.6.25 (8/4323\v1\1/3/4/25 5:24PM), LAYOUT: C7



FORCE MAIN LINE B PLAN
SCALE: 1" = 40'



FORCE MAIN LINE B PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

GENERAL LEGEND

- CLEAN-OUT
- CHECK VALVE
- GATE VALVE
- AIR RELEASE VALVE
- PRESSURE SEWER
- STEP / SEPTIC / PUMP TANK

0 20 40 80 Feet

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NO.	DESCRIPTIONS	DATE	BY	APP'D

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CHECKED JRB
APPROVED GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

FORCE MAIN LINE B PLAN AND PROFILE

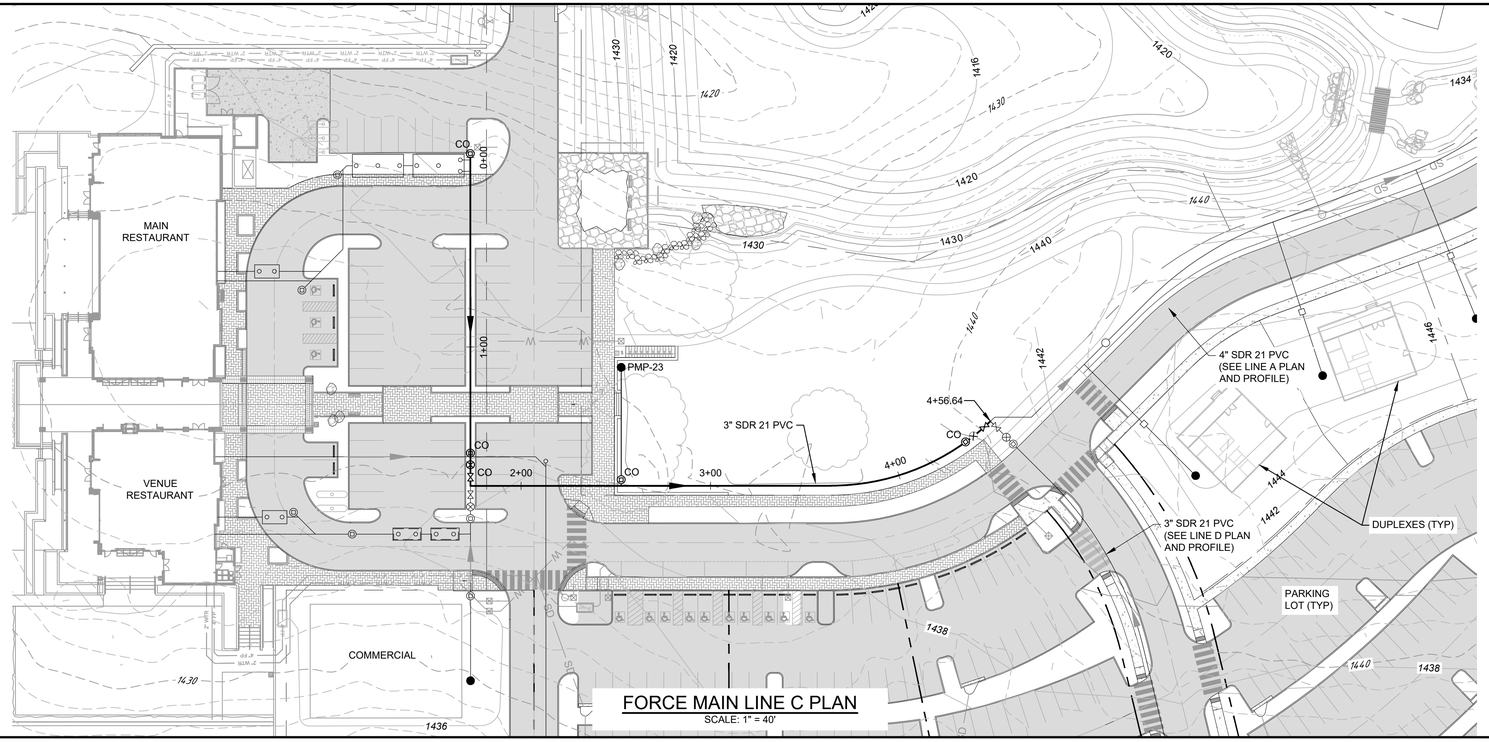
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CHATTANOOGA, TN 37402
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GREGORY M. GRAHAM
REGISTERED PROFESSIONAL ENGINEER
AGRICULTURE
COMMERCE
130125
STATE OF TENNESSEE

JOB NO. C24009
ISSUE DATE 03/12/2025
DRAWING NO. C7

DATE OF PRINT: 3/5/2025 10:37 AM

CTI PROJECT: C23041-01, DRAWING C23041-01 0_C23041 PROPOSED BASE 2.6.25 (84523\1\1/3/4/25 5:24PM), LAYOUT: C8



FORCE MAIN LINE C PLAN
SCALE: 1" = 40'

0 20 40 80 Feet

GENERAL LEGEND

- CLEAN-OUT
- CHECK VALVE
- GATE VALVE
- AIR RELEASE VALVE
- PRESSURE SEWER
- STEP / SEPTIC / PUMP TANK



FORCE MAIN LINE C PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

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THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

FORCE MAIN LINE C PLAN AND PROFILE

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1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

GREGORY M. GRAY — REGISTERED ENGINEER — AGRICULTURE — CIVIL — STATE OF TENNESSEE — 130251

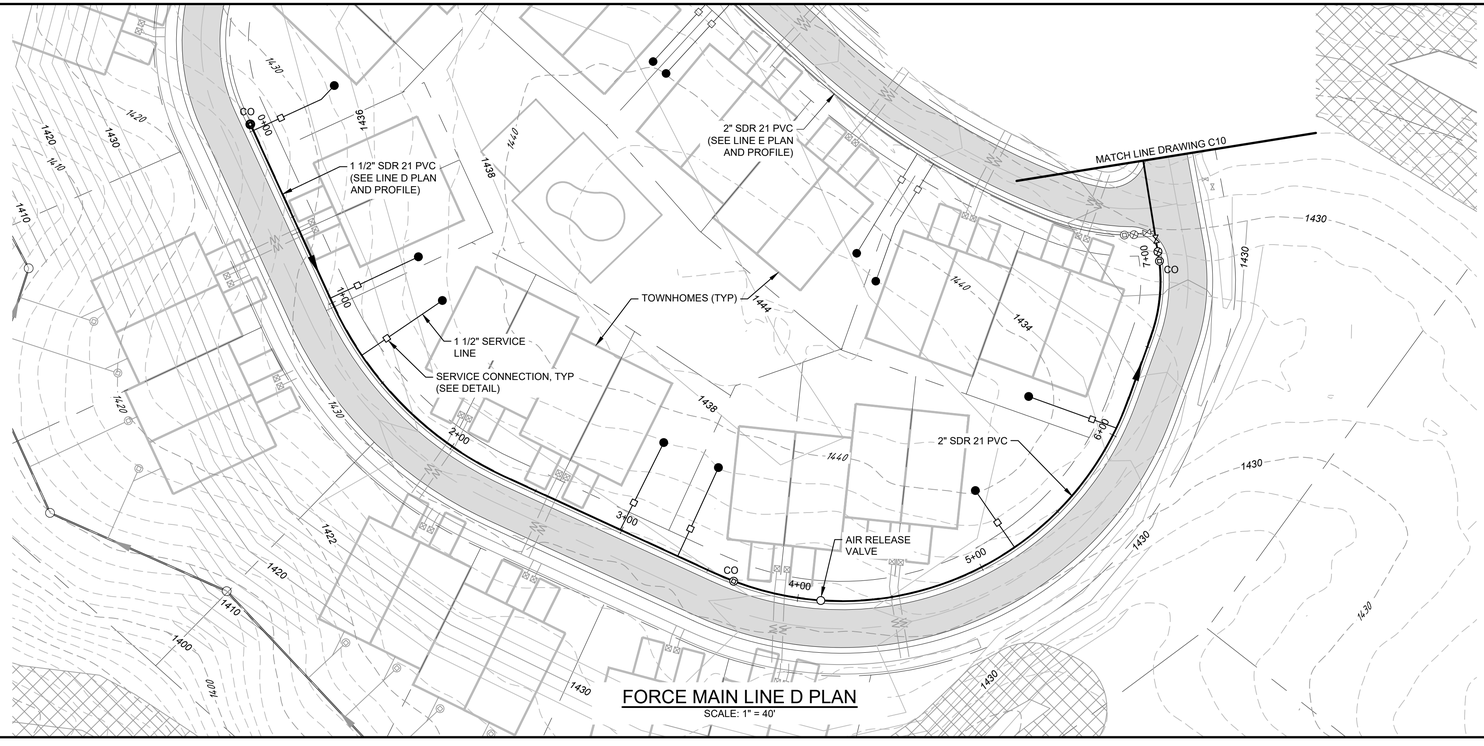
JOB NO.
C24009

ISSUE DATE
03/12/2025

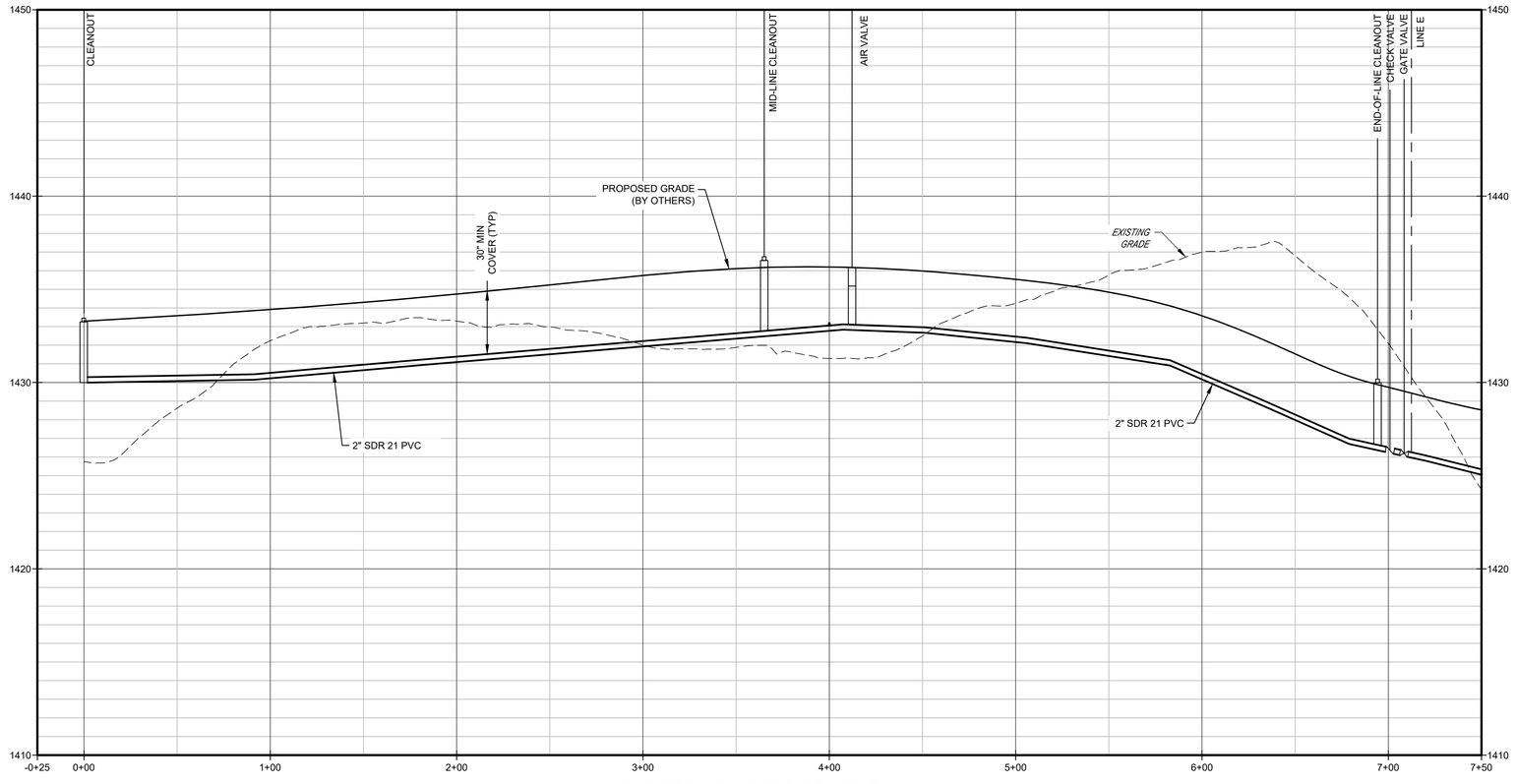
DRAWING NO.
C8

DATE OF PRINT: 3/5/2025 10:38 AM

CTI PROJECT: C23041-01, DRAWING C23041-01 D_C23041 PROPOSED BASE 2.6.25 (84523\1v11/3/4/25 5:24PM), LAYOUT: C9



FORCE MAIN LINE D PLAN
SCALE: 1" = 40'



FORCE MAIN LINE D PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

GENERAL LEGEND

- CLEAN-OUT
- CHECK VALVE
- GATE VALVE
- AIR RELEASE VALVE
- PRESSURE SEWER
- STEP / SEPTIC / PUMP TANK

0 20 40 80 Feet

REVISIONS

NO.	DESCRIPTIONS	DATE	BY	APP'D

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THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

FORCE MAIN LINE D PLAN AND PROFILE
(SHEET 1 OF 2)

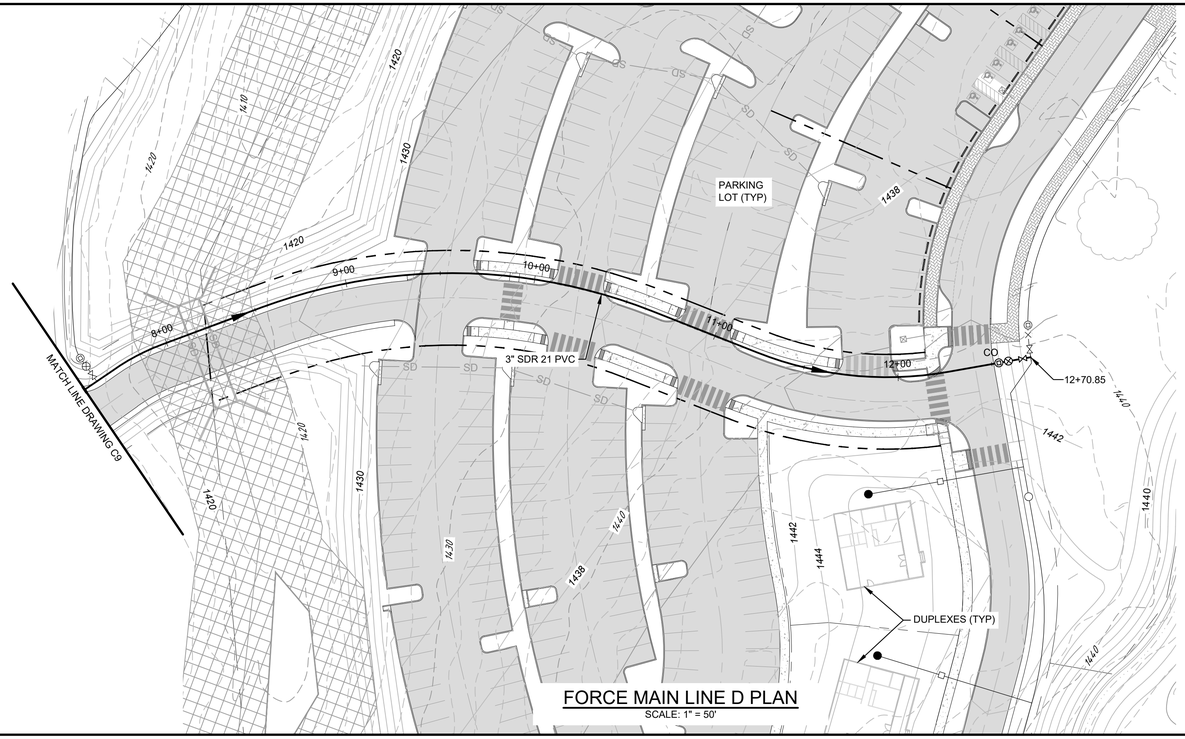
CTIENGINEERS
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CHATTANOOGA, TN 37402
423-267-7613

GREGORY M. CRAWLEY — REGISTERED ENGINEER — AGRICULTURE — CIVIL — STRUCTURAL — 130258 — STATE OF TENNESSEE

JOB NO. C24009
ISSUE DATE 03/12/2025
DRAWING NO. C9

DATE OF PRINT: 3/5/2025 10:39 AM

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 PROPOSED BASE 2 6.25 (845231\v11\3/4/25 5:24PM), LAYOUT: C10

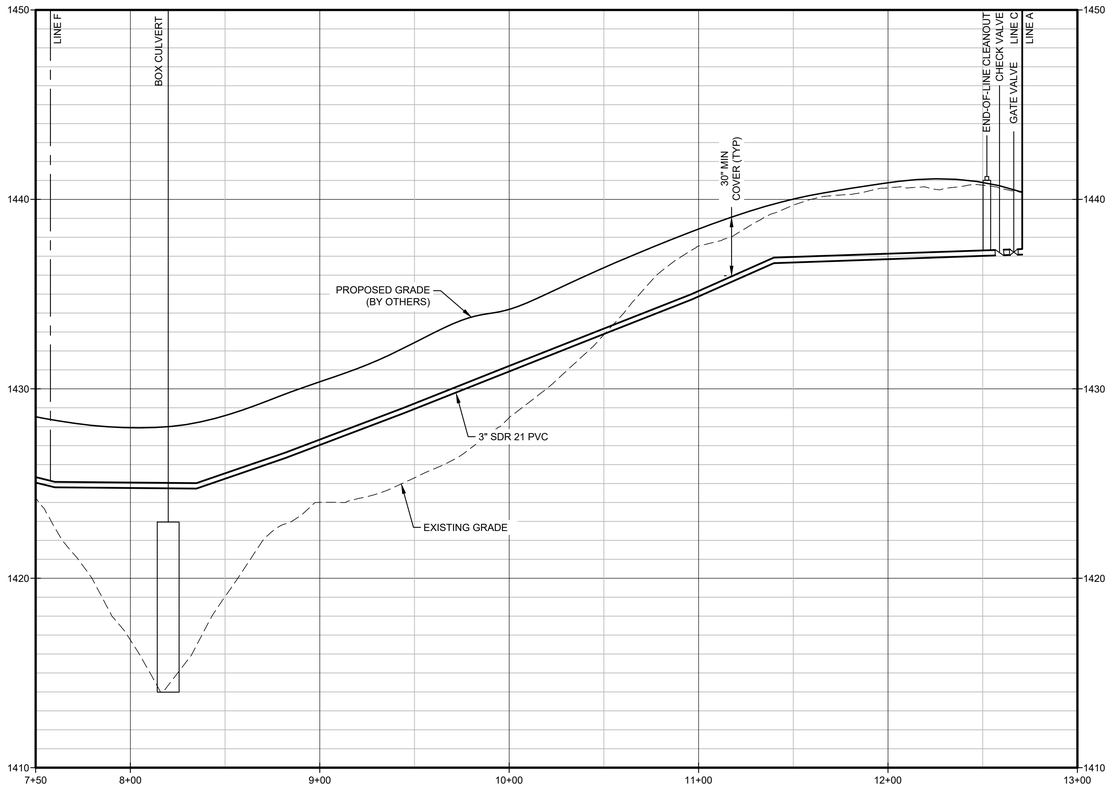


FORCE MAIN LINE D PLAN
SCALE: 1" = 50'



GENERAL LEGEND

- CLEAN-OUT
- CHECK VALVE
- GATE VALVE
- AIR RELEASE VALVE
- PRESSURE SEWER
- STEP / SEPTIC / PUMP TANK



FORCE MAIN LINE D PROFILE
HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'

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GMC	ZWR	JRB	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

FORCE MAIN LINE D PLAN AND PROFILE
(SHEET 2 OF 2)

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423-267-7613

GREGORY M. GRAY
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
13025
STATE OF TENNESSEE

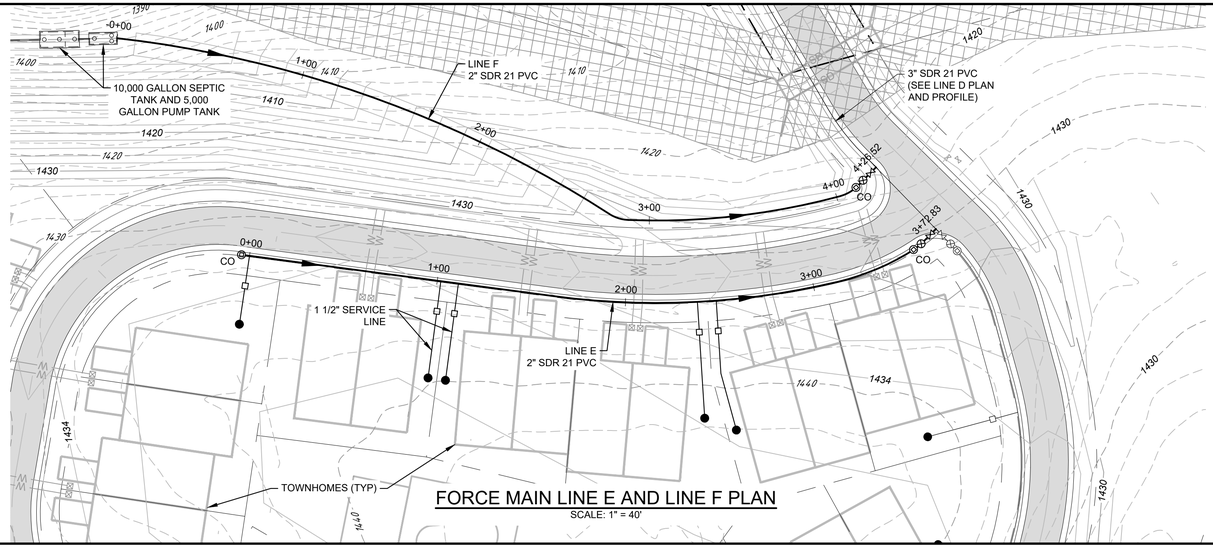
JOB NO.
C24009

ISSUE DATE
03/12/2025

DRAWING NO.
C10

DATE OF PRINT: 3/5/2025 10:40 AM

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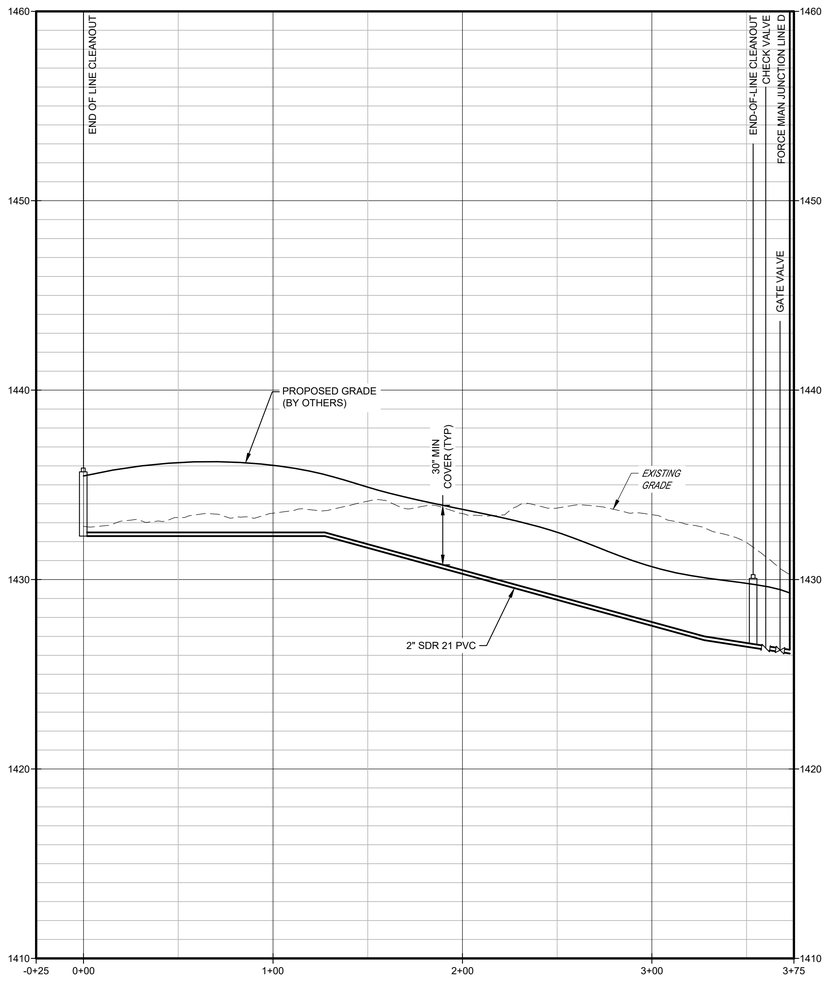


FORCE MAIN LINE E AND LINE F PLAN
SCALE: 1" = 40'

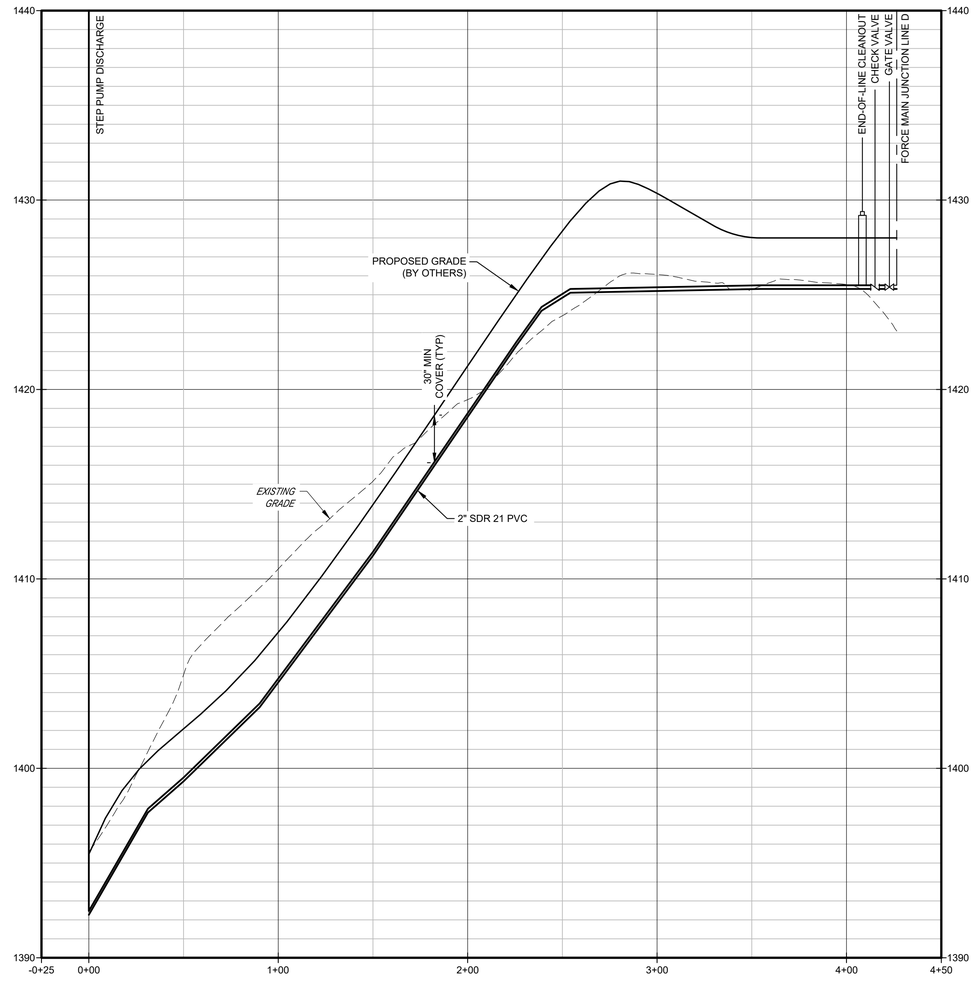
0 20 40 80 Feet

GENERAL LEGEND

- CLEAN-OUT
- CHECK VALVE
- GATE VALVE
- AIR RELEASE VALVE
- PRESSURE SEWER
- STEP / SEPTIC / PUMP TANK



FORCE MAIN LINE E PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



FORCE MAIN LINE F PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

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DESIGN	DRAWN	CHECKED	APPROVED
GMC	ZWR	JRB	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

FORCE MAIN LINE E AND F
PLAN AND PROFILE

CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

GREGORY M. GOLDEN — REGISTERED ENGINEER — AGRICULTURE — No. 130125 — STATE OF TENNESSEE

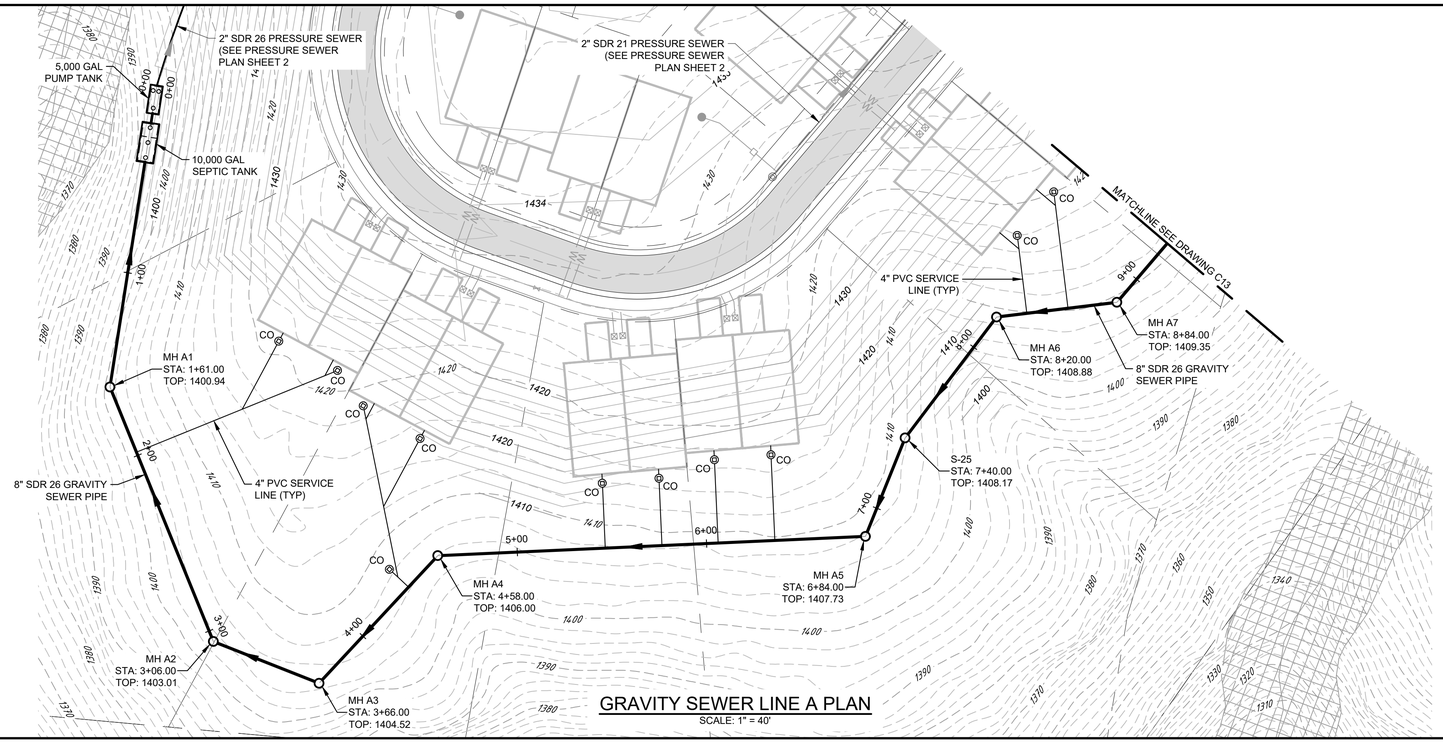
JOB NO.
C24009

ISSUE DATE
03/12/2025

DRAWING NO.
C11

DATE OF PRINT: 3/5/2025 10:42 AM

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 PROPOSED BASE 2 6.25 (845231\v11\3/4/25 5:24PM), LAYOUT: C12

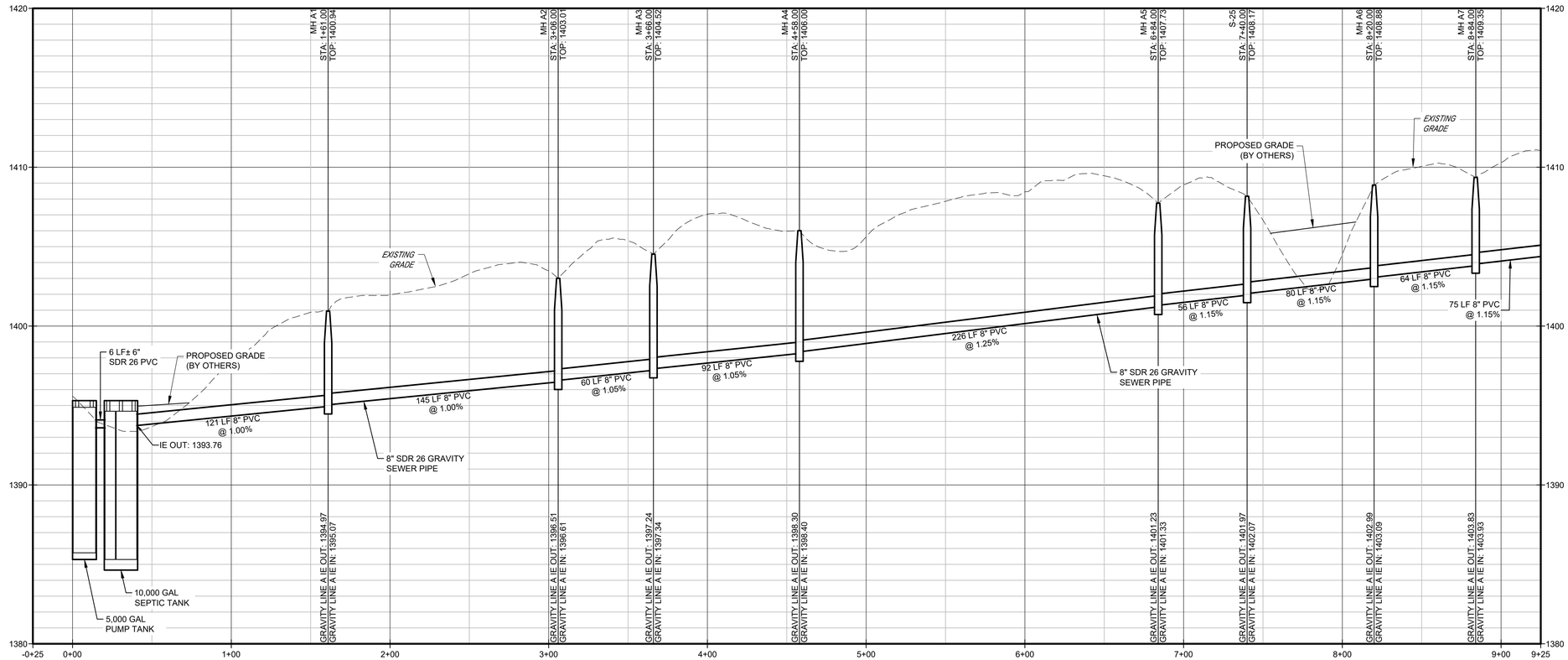


GRAVITY SEWER LINE A PLAN
SCALE: 1" = 40'

0 20 40 80 Feet

GENERAL LEGEND

- CLEAN-OUT
- SERVICE LINE
- GRAVITY SEWER
- MANHOLE
- STEP / SEPTIC / PUMP TANK



GRAVITY SEWER LINE A PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

NO.	DESCRIPTIONS	DATE	BY	APP'D

REVISIONS

DESIGN GMC | DRAWN ZWR | CHECKED JRB | APPROVED GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

GRAVITY LINE A PLAN AND PROFILE
(SHEET 1 OF 2)

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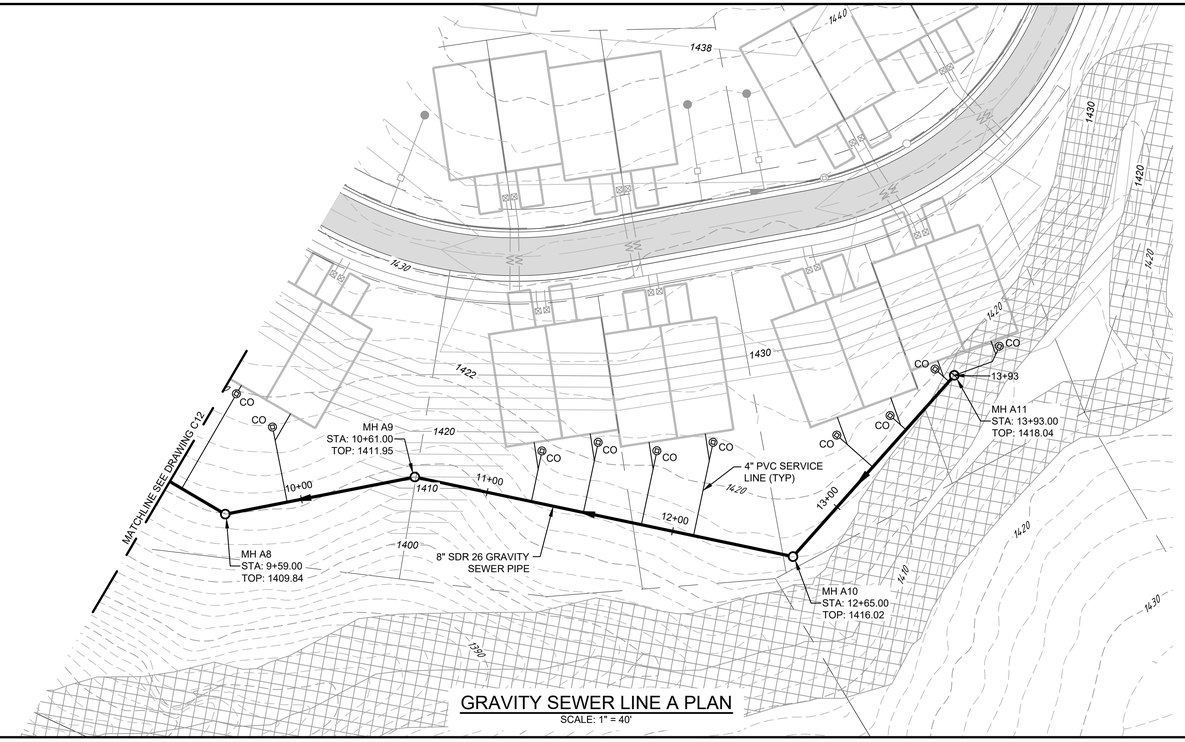
GREGORY M. CORLEY
REGISTERED PROFESSIONAL ENGINEER
AGRICULTURE
No. 130425
STATE OF TENNESSEE

JOB NO. C24009
ISSUE DATE 03/12/2025
DRAWING NO. C12

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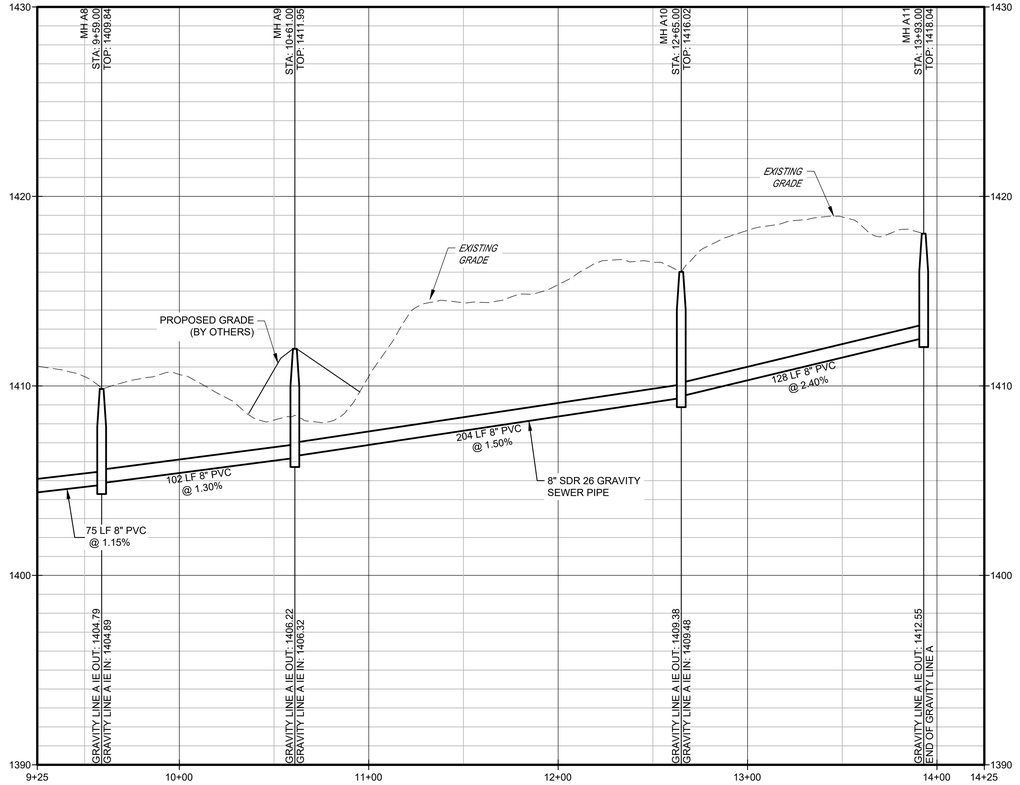
CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 PROPOSED BASE 2 6.25 (845231\v11\3/4/25 5:24PM), LAYOUT: C13



GRAVITY SEWER LINE A PLAN
SCALE: 1" = 40'

0 20 40 80 Feet

GENERAL LEGEND
- CLEAN-OUT
- SERVICE LINE
- GRAVITY SEWER
- MANHOLE
- STEP / SEPTIC / PUMP TANK



GRAVITY SEWER LINE A PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

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REVISIONS

NO.	DESCRIPTIONS	DATE	BY	APP'D

DESIGN	DRAWN	CHECKED	APPROVED
GMC	ZWR	JRB	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

GRAVITY SEWER LINE A PLAN AND PROFILE
(SHEET 2 OF 2)

CTIENGINEERS
1122 RIVERFRONT PARKWAY
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GARY M. CORDELL — REGISTERED ENGINEER — 130925 — STATE OF TENNESSEE

JOB NO.
C24009

ISSUE DATE
03/12/2025

DRAWING NO.
C13

DATE OF PRINT: 3/5/2025 10:43 AM

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 PROPOSED BASE 2.6.25 (84523'x'14/3/12/25 11:04AM), LAYOUT: C14



GENERAL NOTES ON LPP DISPOSAL AREAS

1. THE CONTRACTOR INSTALLING THE SEPTIC SYSTEM MUST BE APPROVED BY TDEC FOR SUCH WORK.
2. INSTALL EROSION AND SEDIMENT CONTROLS PRIOR TO BEGINNING LAND DISTURBING ACTIVITIES.
3. MARK BOUNDARIES OF DRAINAGE-WAY BUFFERS PRIOR TO STARTING CONSTRUCTION. CLEARING OR CONSTRUCTION ACTIVITIES ARE NOT ALLOWED IN THE BUFFER ZONES, EXCEPT FOR PIPE CROSSINGS, WHICH SHALL BE DONE PERPENDICULAR TO THE DRAINAGE-WAY.
4. ESTABLISH MEANS (SWALES, DITCHES, ETC) TO DIVERT DOWN-SLOPE RUNOFF AWAY FROM DISPOSAL ZONES AS SHOWN ON THE DRAWINGS.
5. UNDER NO CIRCUMSTANCES WILL CONSTRUCTION WORK BE ALLOWED IN THE DISPOSAL AREAS WHEN SOILS ARE TOO WET. SOIL WETNESS WILL BE DETERMINED BY A SOIL SCIENTIST OR OTHER ENVIRONMENTAL PROFESSIONAL.
6. CONSTRUCTION EQUIPMENT USED IN THE DISPOSAL AREAS SHALL BE TRACKED, LIGHTWEIGHT EQUIPMENT TO AVOID SOIL COMPACTION. VEHICULAR TRAFFIC ACROSS DISPOSAL AREAS, PARTICULARLY WHEEL TRAFFIC, IS NOT ALLOWED.
7. REMOVE ALL VEGETATION FROM THE DISPOSAL AREAS. FOR TREES 3-INCHES AND LARGER, CUT THE TREES FLUSH WITH THE GROUND, OR CUT AND GRIND THE STUMPS DOWN, AND REMOVE THE CUT TREES.
8. USING GPS SURVEY EQUIPMENT, LOCATE AND MARK THE CORNERS OF THE SUBSYSTEMS AND INCLUDED DISPOSAL ZONES.
9. EXCAVATE LPP LATERAL TRENCHES LEVEL AND ON CONTOUR. CENTER-TO-CENTER SPACING OF ADJACENT LATERAL TRENCHES SHALL NOT BE LESS THAN 5 FEET.
10. FOLLOWING INSTALLATION OF LPP PIPING, TESTING, BALANCING, AND MEDIA INSTALLATION (AS DESCRIBED BELOW), BACKFILL THE TRENCHES USING SIDE-CAST MATERIAL FROM LATERAL TRENCH EXCAVATION. REMOVE LARGE ROOTS AND LARGE STONES (LARGER THAN 2 INCHES) FROM BACKFILL PRIOR TO PLACEMENT. TAKE CARE NOT TO DISTURB STONE ENVELOPE OR PIPING. LIGHTLY COMPACT BACKFILL USING ONE PASS OF A TURF TIRE WHEEL OF A GARDEN TRACTOR. SPREAD AND SMOOTH OUT ANY EXCESS EXCAVATED BACKFILL. DRESS TOP OF BACKFILL IN TRENCHES LEVEL WITH ADJACENT GRADE.
11. SEED AND MULCH ALL DISTURBED AREAS FOLLOWING CONSTRUCTION. WEATHER PERMITTING, SEEDING AND MULCHING SHALL FOLLOW COMPLETION OF CONSTRUCTION IN EACH DISPOSAL SUBSYSTEM BY NO MORE THAN 30 DAYS. SEED SHALL BE AS SPECIFIED IN THE SPECIFICATIONS. MAINTAIN SEEDING UNTIL PERMANENT VEGETATION IS ESTABLISHED.
12. FOLLOWING COMPLETION OF CONSTRUCTION IN A SUBSYSTEM, INSTALL PERMANENT CORNER MARKER POSTS AT THE CORNERS OF EACH DISPOSAL ZONE AS SHOWN ON THE DRAWINGS. ATTACH METAL TAGS TO POSTS HAVING ENGRAVED NUMBERS TO IDENTIFY THE SUBSYSTEM AND ZONE.

NOTES ON PIPING INSTALLATION

1. ALL SUPPLY LINES AND LPP LATERALS SHALL CONSIST OF SCH 40 PVC PIPE WITH SOLVENT WELDED JOINTS. UNLESS OTHERWISE NOTED ON THE DRAWINGS, SUPPLY LINES SHALL BE 2-INCH DIAMETER; LATERALS SHALL BE 1.5-INCH DIAMETER. TEMPORARILY TAPE OFF OR CAP OPEN ENDS OF PIPING DURING CONSTRUCTION TO PREVENT ENTRY OF DIRT AND MUD. PRESSURE TEST SUPPLY PIPING USING CLEAN WATER FOLLOWING INSTALLATION. CORRECT ANY LEAKS. FOLLOWING PRESSURE TESTING, FLUSH SUPPLY PIPING WITH CLEAN WATER UNTIL WATER RUNS CLEAR.
2. ASSEMBLE LPP LATERAL PIPING AND DRILL HOLES IN PIPING OF THE SIZE AND SPACING AS SHOWN ON THE DRAWINGS. EVERY FIFTH HOLE SHALL BE DRILLED ON THE OPPOSITE SIDE OF THE PIPE FOR USE AS VENT HOLES. AFTER DRILLING HOLES, PULL MANDREL THROUGH PIPE TO REMOVE INSIDE BURRS. INSTALL SNAP-ON GRAVEL SHIELDS OVER HOLES.
3. TEMPORARILY SUPPORT LPP PIPING IN TRENCH 6-INCHES OFF THE BOTTOM OF THE TRENCH WITH THE HOLES FACING DOWN (EXCEPT FOR VENT HOLES). SUPPORT SPACING SHALL NOT EXCEED 6 FEET, OR AS NECESSARY TO PREVENT EXCESSIVE DEFLECTION.
4. ATTACH A SHORT SECTION OF FLEXIBLE HOSE TO THE END TURN-UP OF EACH LATERAL. TURN ON THE ASSOCIATED SUPPLY PUMP AND FLUSH EACH LINE IN SEQUENCE, USING THE INLET VALVES.
5. REMOVE THE HOSES, AND INSTALL TEMPORARY 1/2-INCH PVC RISERS APPROXIMATELY 3.5 FEET LONG ON THE END TURN-UPS IN THE ZONE. TURN ON SUPPLY PUMP FOR THE ZONE AND, USING THE VALVE AT THE INLET TO EACH LATERAL, ADJUST THE HEAD IN THE LATERAL TO 3 FEET MEASURED AT THE END TURN-UP. CHECK PIPING FOR ANY LEAKS, AND MAKE SURE THAT WATER FREELY FLOWS FROM ALL OF THE HOLES. REPAIR ANY LEAKS. FOLLOWING BALANCING, REMOVE THE TEMPORARY RISER EXTENSIONS AND CAP THE TURN-UPS.
6. INSTALL CRUSHED STONE MEDIA UNDER AND AROUND PIPE TO A DEPTH OF 2-INCHES OVER PIPE (TOTAL OF AT LEAST 9 INCHES OF MEDIA DEPTH). INSTALL CLAY DAMS AT THE INTERVALS INDICATED ON THE DRAWINGS. BE CAREFUL NOT TO BLOCK OFF HOLE WITH GRAVEL SHIELDS DURING INSTALLATION. COVER STONE MEDIA WITH FILTER FABRIC OR 30-POUND ASPHALT-IMPREGNATED BUILDING PAPER.
7. BACKFILL TRENCHES IN THE ZONE AS DESCRIBED ABOVE BEFORE NEXT RAIN EVENT.

NOTES ON LILY I DISPOSAL AREA MODIFICATION

1. IN AREAS OF LILY I SOIL AS SHOWN ON THE DRAWINGS, WHICH HAVE LESS THAN 30 INCHES OF SOIL DEPTH OVER THE UNDERLYING LIMITING LAYER, IT WILL BE NECESSARY TO MODIFY THE AREA BY INCORPORATION OF ADDITIONAL COVER SOIL IN ORDER TO PROVIDE AT LEAST 30 INCHES OF SOIL DEPTH. ADDITIONAL SOIL COVER SHALL NOT EXCEED 6 INCHES AND SHALL BE PLACED AS DESCRIBED BELOW TO AVOID A SHARP INTERFACE BETWEEN NATIVE AND IMPORTED SOIL. AS NOTED ABOVE, NO WORK SHALL BE DONE WHEN SOIL IS CONSIDERED TOO WET.
2. IMPORTED SOIL SHALL BE TOPSOIL, FREE FROM LARGE ROOTS AND LARGE ROCKS, BORROWED FROM NEARBY LILY SOIL AREAS, PARTICULARLY LILY SHALLOW SOILS, WHICH ARE OTHERWISE UNSUITABLE FOR LPP CONSTRUCTION. NO SOIL SHALL BE BORROWED FROM DESIGNATED DRAINAGEWAY BUFFER ZONES.
3. PLOW THE DISPOSAL AREAS TO BE MODIFIED ON CONTOUR (PERPENDICULAR TO SLOPE) TO A DEPTH OF AT LEAST 4 INCHES. STOCKPILE SOIL AROUND SIDES OF AREAS TO BE MODIFIED, AND MOVE THE FILL INTO PLACE USING A SMALL TRACKED DOZER OR TRACKED LOADER. EVENLY SPREAD UP TO 6 INCHES OF IMPORTED SOIL (AMOUNT AS NECESSARY TO ACHIEVE REQUIRED OVERALL DEPTH), AND SMOOTH THE AREA OUT WITH A BLADE TO ELIMINATE LARGE CLUMPS OR DEPRESSIONS.
4. MARK LOCATIONS OF TRENCHES, EXCAVATE THE LATERAL TRENCHES, AND INSTALL LPP PIPING AS DESCRIBED IN THE PRECEDING SECTIONS.
5. LILY 1 SOIL MODIFICATION IS LIMITED TO SLOPES OF LESS OF LESS THAN 20 PERCENT.

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DESIGN	DRAWN	CHECKED	APPROVED
GMC	ZWR	JRB	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

OVERALL LPP DISPOSAL SITE PLAN

CTIENGINEERS
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423-267-7613

GREGORY M. GRAHAM
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AGRICULTURE
SUMMER CO.
13025
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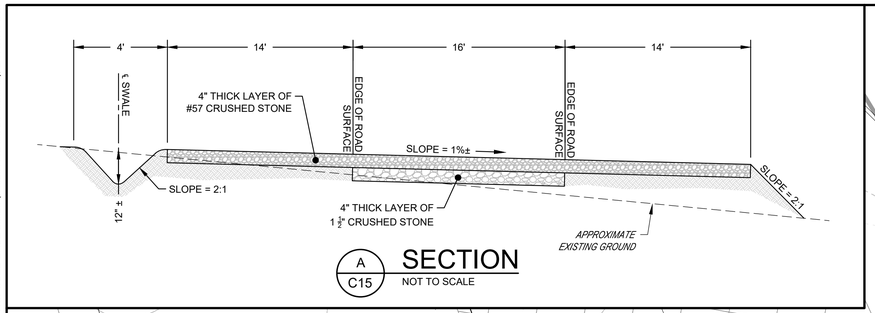
JOB NO.
C24009

ISSUE DATE
03/12/2025

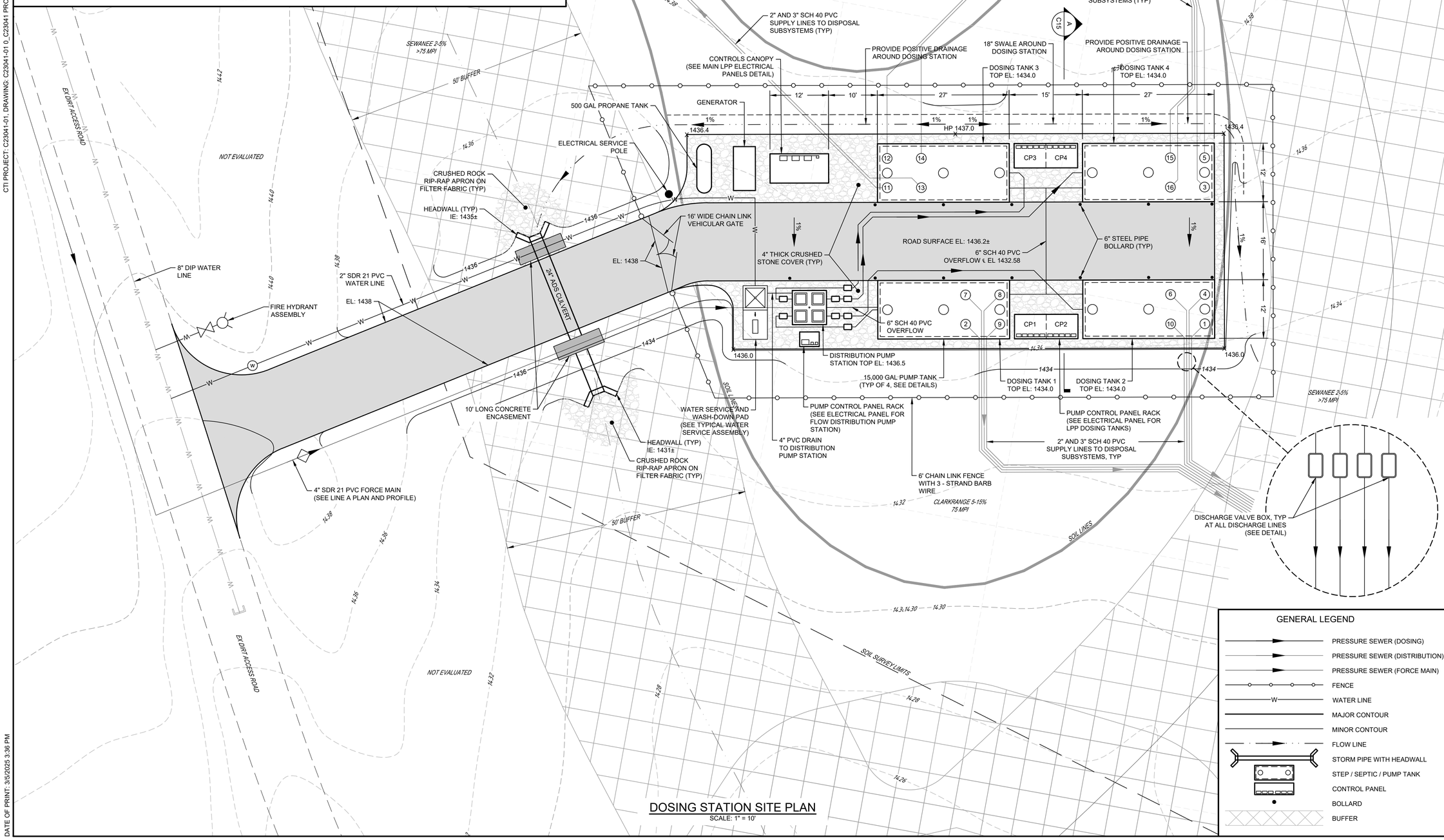
DRAWING NO.
C14

DATE OF PRINT: 3/14/2025 9:16 AM

CTI PROJECT: C23041-01, DRAWING: C23041-01_C23041 PROPOSED BASE 2 6.25 (845231 v12/3/25 3:28PM), LAYOUT: C15



A / C15 SECTION
NOT TO SCALE



DOSING STATION SITE PLAN
SCALE: 1" = 10'

GENERAL LEGEND

- PRESSURE SEWER (DOSING)
- PRESSURE SEWER (DISTRIBUTION)
- PRESSURE SEWER (FORCE MAIN)
- FENCE
- WATER LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- FLOW LINE
- STORM PIPE WITH HEADWALL
- STEP / SEPTIC / PUMP TANK
- CONTROL PANEL
- BOLLARD
- BUFFER

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NO.	DESCRIPTIONS	DATE	BY	APP'D

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CHECKED JRB
APPROVED GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

DOSING STATION SITE PLAN

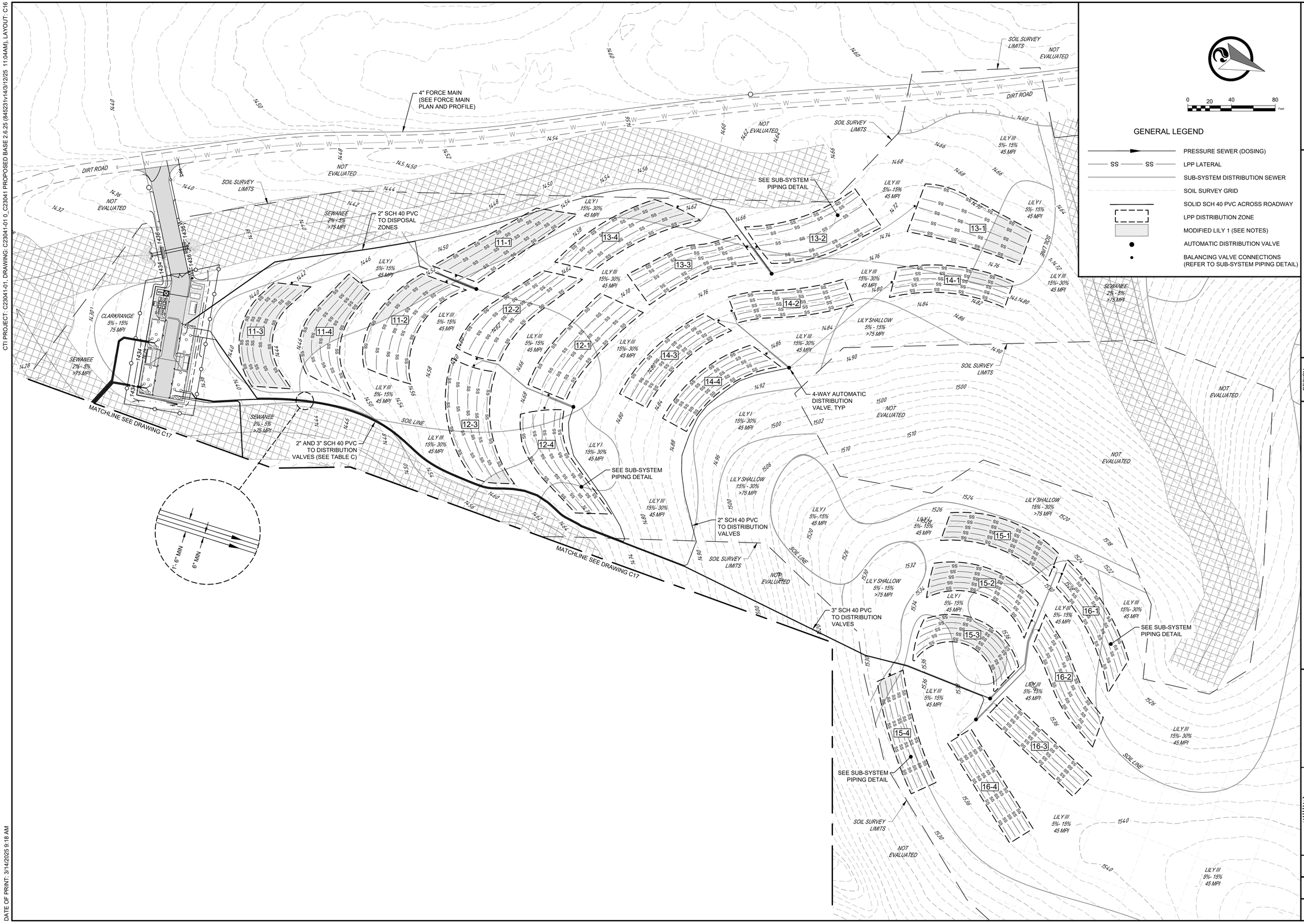
CTIENGINEERS
1122 RIVERFRONT PARKWAY
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423-267-7613

GARY M. GRAHAM — REGISTERED ENGINEER — AGRICULTURE COMMERCE — No. 130422 — STATE OF TENNESSEE

JOB NO. C24009
ISSUE DATE 03/12/2025
DRAWING NO. C15

DATE OF PRINT: 3/5/2025 3:36 PM

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 PROPOSED BASE 2.6.25 (84523)1x1413!1225 11:04AM), LAYOUT: C16



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APPROVED	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

SUB-SYSTEM DISTRIBUTION FIELD
(SHEET 1 OF 2)

CTIENGINEERS
1122 RIVERFRONT PARKWAY
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GARY M. CORDELL
REGISTERED PROFESSIONAL ENGINEER
No. 130925
STATE OF TENNESSEE

JOB NO.
C24009

ISSUE DATE
03/12/2025

DRAWING NO.
C16

DATE OF PRINT: 3/14/2025 9:18 AM

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 PROPOSED BASE 2.6.25 (84523)1v14/3/1225 11:04AM), LAYOUT: C17

DATE OF PRINT: 3/14/2025 9:18 AM



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GMC	ZWR	JRB	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

SUB-SYSTEM DISTRIBUTION FIELD (SHEET 2 OF 2)

CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

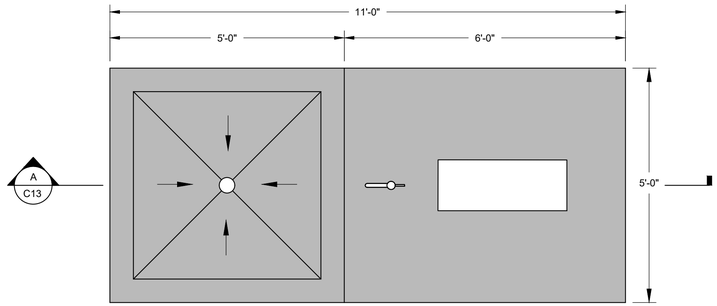
GARY M. MCCOY
REGISTERED PROFESSIONAL ENGINEER
AGRICULTURE
COMMERCE
No. 130423
STATE OF TENNESSEE

JOB NO.
C24009

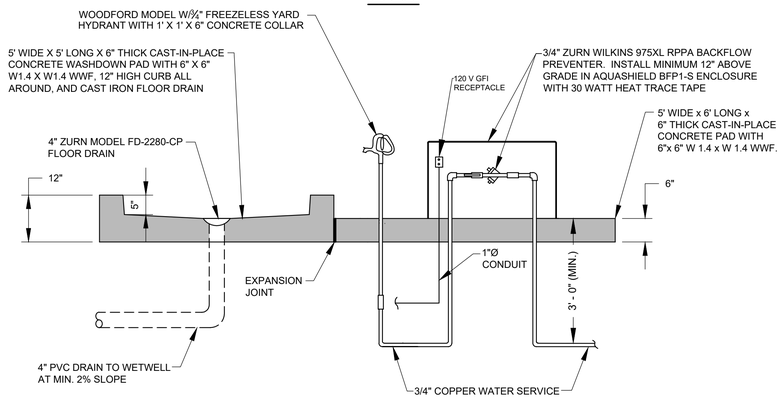
ISSUE DATE
03/12/2025

DRAWING NO.
C17

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 DETAILS (827271v30/9/30/24 2:43PM), LAYOUT: C18



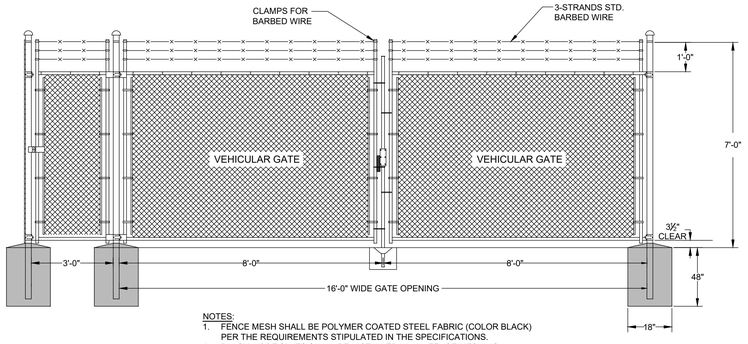
PLAN



SECTION A / C13

TYPICAL PUMP STATION WATER SERVICE ASSEMBLY AND PUMP WASHDOWN PAD DETAILS

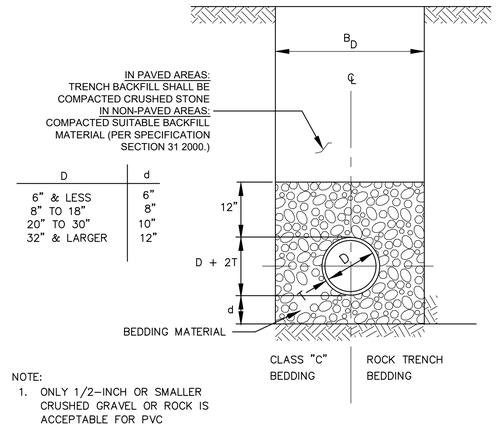
NOT TO SCALE



NOTES:
1. FENCE MESH SHALL BE POLYMER COATED STEEL FABRIC (COLOR BLACK) PER THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS.
2. BLACK HDPE SLATS SHALL BE INSTALLED IN ALL FENCE MESHING.

PUMP STATION GATE DETAIL

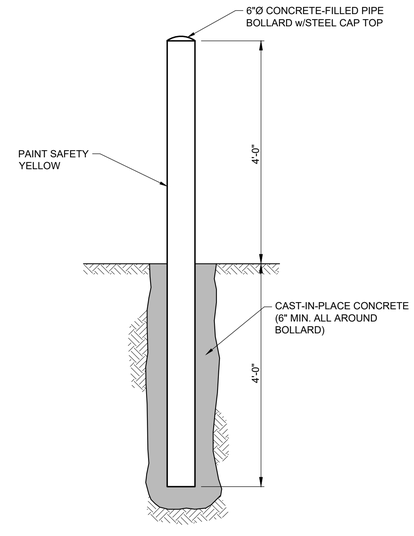
NOT TO SCALE



NOTE:
1. ONLY 1/2–INCH OR SMALLER CRUSHED GRAVEL OR ROCK IS ACCEPTABLE FOR PVC BEDDING.

BEDDING FOR STORM SEWER

NOT TO SCALE



BOLLARD DETAIL

NOT TO SCALE

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NO.	DESCRIPTIONS	DATE	BY	APP'D

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THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

MISCELLANEOUS DETAILS

CTI ENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

GARY M. GORDON REGISTERED ENGINEER 130925 STATE OF TENNESSEE

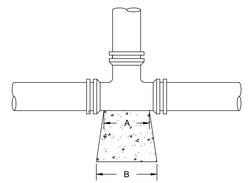
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ISSUE DATE 03/12/2025

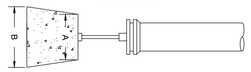
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DATE OF PRINT: 3/5/2025 10:45 AM

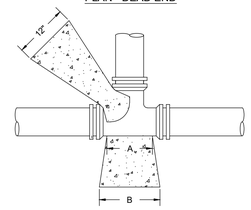
CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041_MISC DETAILS (829224w10/8/12/24 4:18PM), LAYOUT: C19



PLAN - TEE

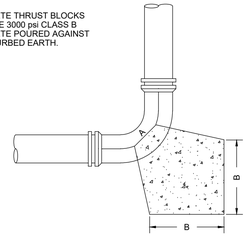


PLAN - DEAD END

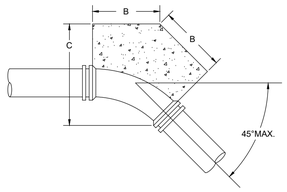


PLAN - UNBALANCED TEE

- CONCRETE THRUST BLOCKS SHALL BE 3000 psi CLASS B CONCRETE POURED AGAINST UNDISTURBED EARTH.



PLAN - TYPICAL HORIZONTAL BEND



PLAN - TYPICAL VERTICAL BEND

SIZE OF PIPE	TEE			DEAD END			90° BEND & UNBAL. TEE			45° BEND			22 1/2° BEND			11 1/4° BEND		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1-1/2" to 4"	12"	24"	12"	4"	10"	11"	9"	12"	12"	9"	12"	12"	9"	7"	12"	6"	12"	4"
6"	12"	30"	18"	5"	15"	17"	12"	15"	24"	9"	12"	18"	9"	10"	12"	9"	12"	6"
8"	18"	36"	24"	7"	20"	21"	12"	24"	24"	9"	18"	20"	9"	12"	16"	9"	12"	8"
10"	21"	48"	27"	9"	24"	28"	16"	26"	36"	9"	24"	21"	9"	15"	18"	9"	12"	12"
12"	48"	56"	18"	11"	30"	31"	18"	36"	36"	12"	30"	24"	12"	18"	21"	12"	14"	15"
16"	54"	66"	18"	12"	36"	36"	21"	42"	42"	12"	51"	24"	12"	28"	24"	12"	16"	16"

NOTE:

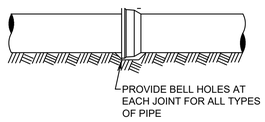
TABLE DIMENSIONS ARE BASED ON SOIL RESISTANCE FOR UNDISTURBED SAND-GRAVEL CEMENTED WITH CLAY. FOR OTHER SOIL CONDITIONS, THE DIMENSIONS SHALL BE INCREASED BY THE FOLLOWING FACTORS:

SAND	2
SAND & GRAVEL	1.33
SHALE	0.4

SOFT CLAY, PEAT, AND MUCK SHALL USE RESTRAINED JOINTS

CONCRETE THRUST BLOCK

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY
SD-FM-1



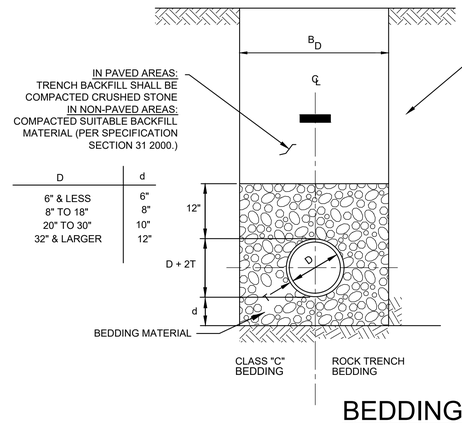
PROVIDE BELL HOLES AT EACH JOINT FOR ALL TYPES OF PIPE

UNIFORM PIPE SUPPORT DETAIL

NOT TO SCALE

IN PAVED AREAS:
TRENCH BACKFILL SHALL BE COMPACTED CRUSHED STONE
IN NON-PAVED AREAS:
COMPACTED SUITABLE BACKFILL MATERIAL (PER SPECIFICATION SECTION 31 2000.)

D	d
6" & LESS	6"
8" TO 18"	8"
20" TO 30"	10"
32" & LARGER	12"



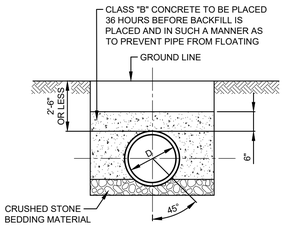
QUANTITY FOR CLASS B AND ROCK TRENCH BEDDING ARE THE QUANTITIES IN EXCESS OF THOSE REQUIRED FOR CLASS C BEDDING.

PIPE SIZE (IN.)	TRENCH WIDTH "B" IN (FT.)	TRENCH VOL. PER FT. OF DEPTH *	CLASS "C" BEDDING FOR CONC. & D.I.		CLASS "B" BEDDING	QTY. (CY) OF ROCK TRENCH BEDDING	
			QTY. (CY)	"S" IN(IN.)	QTY. (CY)	CONC. & D.I.	PVC,ETC.
6	2.00	.074	0.025	4-1/4	0.018	0.025	.037
8	2.33	.086	0.030	4-1/2	0.025	0.030	.043
10	2.50	.093	0.036	5-0	0.027	0.049	.062
12	2.67	.099	0.039	5-1/4	0.034	0.054	.066
15	3.00	.111	0.046	5-3/4	0.043	0.063	.074
18	3.25	.120	0.053	6-1/4	0.054	0.069	.080
24	3.83	.142	0.072	7-1/2	0.085	0.108	.118
30	4.42	.164	0.098	9-0	0.118	0.121	.137
36	5.67	.210	0.148	10-1/2	0.199	0.194	-
42	6.25	.231	0.184	12-0	0.248	0.209	-
48	6.83	.253	0.223	13-1/2	0.302	0.223	-
54	7.42	.275	0.266	15-0	0.361	0.236	-
60	8.00	.296	0.312	16-1/2	0.424	0.247	-
66	8.58	.318	0.362	18-0	0.491	0.258	-
72	9.17	.340	0.416	19-1/2	0.563	0.268	-
78	9.75	.361	0.458	20-1/2	0.655	0.291	-
84	10.33	.383	0.510	21-3/4	0.744	0.315	-
96	11.50	.426	0.604	23-3/4	0.958	0.365	-

* ALL VOLUMES IN CUBIC YARDS/LINEAR FOOT.
** QUANTITIES AND DIMENSIONS FOR 6" SERVICE LINE SHALL APPLY TO 4" SERVICE LINE ALSO.

BEDDING FOR GRAVITY SEWER

NOT TO SCALE



TYPICAL SECTION CONCRETE PROTECTION

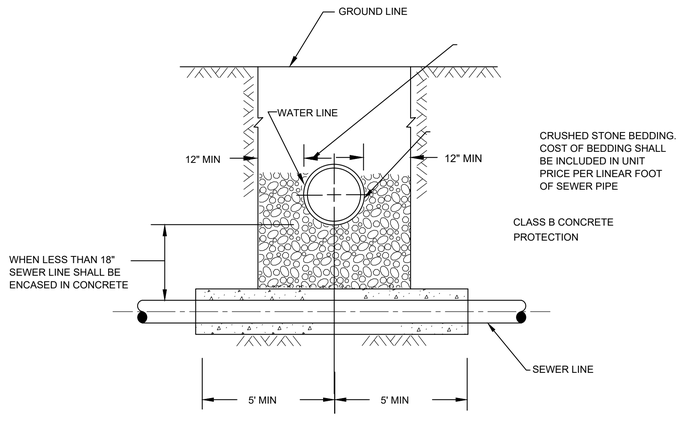
NOT TO SCALE

GENERAL NOTES

1. PRIOR TO STARTING CONSTRUCTION, CONTRACTOR SHALL ENSURE THAT ALL REQUIRED PERMITS, EASEMENTS AND APPROVALS HAVE BEEN OBTAINED. COPIES TO BE SUBMITTED AT PRECONSTRUCTION MEETING.
2. ALL DIMENSIONS AND GRADES SHOWN ON THE PLANS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR SHALL NOTIFY PROJECT ENGINEER IF ANY DISCREPANCIES EXIST PRIOR TO PROCEEDING WITH CONSTRUCTION.
3. ANY CHANGES OR ALTERATIONS MADE TO THESE CONSTRUCTION DRAWINGS WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER VOIDS THE SEAL SHOWN HEREON, AND ANY LIABILITY ASSOCIATED WITH THE PROJECT.
4. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR WILL NOTIFY ALL UTILITIES WITHIN AND ADJACENT TO THE PROJECT SITE TO IDENTIFY ANY POSSIBLE CONSTRUCTION CONFLICTS. THE ACCURACY OF THE LOCATIONS OF THE EXISTING SUBSURFACE UTILITY STRUCTURES SHOWN ON THE PLANS IS NOT GUARANTEED, NOR IS IT GUARANTEED THAT ALL SUBSURFACE STRUCTURES ARE SHOWN.

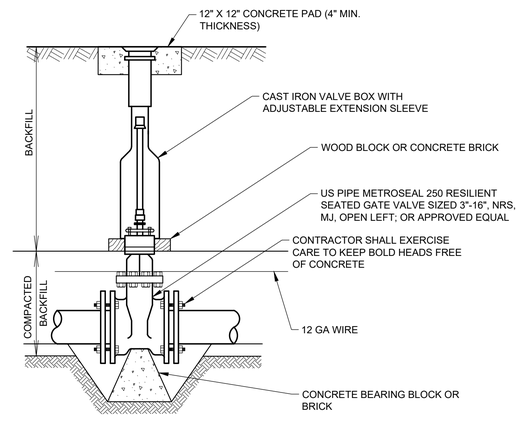
SANITARY SEWER NOTES

1. ALL PROPOSED SANITARY SEWER LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS.
2. SEWERS MUST BE CONSTRUCTED BY A LICENSED MUNICIPAL UTILITY CONTRACTOR (CLASSIFIED MU).
3. THE CONTRACTOR SHALL NOTIFY PARK RANGER 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
4. SITE GRADING SHALL BE IN PLACE AND COMPACTED PRIOR TO SEWER CONSTRUCTION.
5. WHERE WATER PIPING CROSSES THE SANITARY SEWER LINE, THE WATER SERVICE WITHIN 10 FEET OF THE POINT OF CROSSING SHALL BE AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER LINE, OR THE SEWER LINE SHALL BE ENCASED IN CLASS B CONCRETE.
6. ALL LATERALS AND PRESSURE LINES SHALL BE MARKED WITH MAGNETIC TAPE.
7. THE ENGINEER MUST MONITOR THE INSTALLATION AND CONSTRUCTION OF THE SYSTEM AND UPON COMPLETION OF THE PROJECT, "AS BUILT" DRAWINGS MUST BE PREPARED AND SUBMITTED TO THE ENGINEER FOR CERTIFICATION THAT IT WAS INSTALLED TO DESIGN SPECIFICATIONS. DRAWINGS MUST ENCOMPASS ALL COMPONENTS OF THE PROJECT AS WELL AS INVERT ELEVATIONS AT CLEANOUTS.



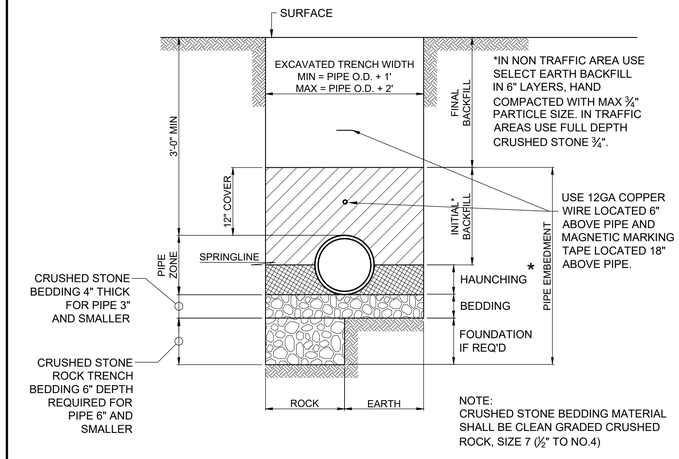
ENCASEMENT AT UTILITY CROSSING DETAIL

NOT TO SCALE



GATE VALVE INSTALLATION DETAIL (3-INCH AND LARGER)

NOT TO SCALE



NOTE:
CRUSHED STONE BEDDING MATERIAL SHALL BE CLEAN GRADED CRUSHED ROCK, SIZE 7 (½" TO NO.4)

PVC PRESSURE PIPE INSTALLATION DETAIL

NOT TO SCALE

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REVISIONS			
NO.	DESCRIPTIONS	DATE	BY	APP'D

DESIGN	GMC
DRAWN	ZWR
CHECKED	JRB
APPROVED	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

GENERAL SEWER DETAILS

CTIENGINEERS
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GREGORY M. GARDNER
REGISTERED ENGINEER
AGRICULTURE
SUMMERTOWN
13025
STATE OF TENNESSEE

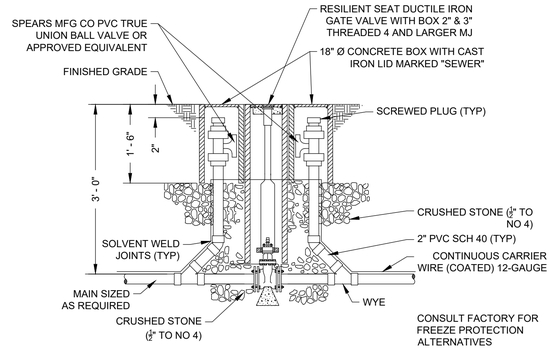
JOB NO.	C24009
ISSUE DATE	03/12/2025
DRAWING NO.	C19

DATE OF PRINT: 3/5/2025 10:46 AM

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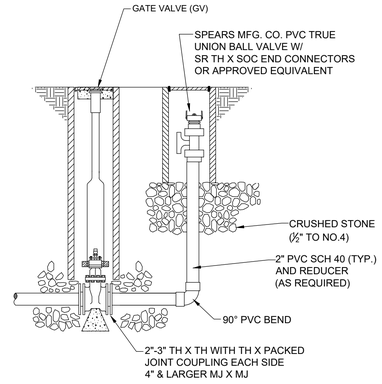
NOTES ON PRESSURE PIPING:

1. BACKFILLING, COMPACTING, GRADING, AND SITE-CLEANUP SHALL OCCUR DAILY AS PIPE INSTALLATION PROGRESSES.
2. ANY DISCREPANCIES AND/OR CONFLICTS SHOWN ON THE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PROCEEDING ANY FURTHER WITH CONSTRUCTION ACTIVITIES.
3. ALL LOCAL, STATE, AND FEDERAL EROSION CONTROL REQUIREMENTS SHALL BE FOLLOWED DURING CONSTRUCTION. ALL NECESSARY MEASURES TO CONTROL EROSION AND TO MINIMIZE THE AMOUNT OF SEDIMENT LEAVING THE SITE THROUGHOUT THE CONSTRUCTION PERIOD SHALL BE TAKEN. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE IN PLACE BEFORE EARTH MOVING OPERATIONS BEGIN.
4. SERVICE CONNECTIONS AND COMBINATION AIR/VACUUM VALVES SHALL BE FIELD LOCATED. SERVICE CONNECTION BOXES SHALL BE INSTALLED ON THE DOWNSLOPE END OF THE PROPERTY.V AIR/VACUUM VALVES SHALL BE LOCATED AT THE HIGH POINTS ALONG THE FORCE MAIN, AT THE DOWNSTREAM END OF THE HIGH POINT SEGMENTS. AN ODOR CONTROL SOIL BED SHALL BE INSTALLED IN THE VICINITY OF EACH AIR/VACUUM VALVE.
5. THE CROWN OF THE PRESSURE SEWER/FORCE MAIN SHALL BE INSTALLED AT A MINIMUM DEPTH OF 3-FEET BELOW THE EXISTING SURFACE UNLESS OTHERWISE NOTED. PRESSURE SEWERS IN ROAD WAYS SHALL BE AT LEAST 4 FEET DEEP. IN ORDER TO INSTALL THE AIR/VACUUM VALVES, ADDITIONAL DEPTH WILL BE REQUIRED AT THE VALVE LOCATIONS AS WELL AS ALONG THE LINE SEGMENTS LEADING UP TO THAT HIGH POINT.
6. ALL UTILITY COMPANIES THAT HAVE INSTALLED FACILITIES WITHIN THE PROPERTY BOUNDARIES OF THE PROJECT SHALL BE NOTIFIED PRIOR TO THE CONSTRUCTION OF THE FORCE MAIN. THOSE UTILITIES SHALL BE LOCATED AND PROTECTED FROM DAMAGE DURING CONSTRUCTION.
7. WHERE THE PRESSURE SEWER/FORCE MAIN CROSSES WATER LINES, A MINIMUM 18-INCH SEPARATION BETWEEN THE FORCE MAIN AND THE WATER LINE SHALL BE MAINTAINED. THE SANITARY FORCE MAIN SHALL CROSS UNDER THE WATER LINE. WHERE THE PRESSURE SEWER/FORCE MAIN PARALLELS A WATER LINE, MAINTAIN A MINIMUM 10 FOOT HORIZONTAL SEPARATION UNLESS OTHERWISE SHOWN.
8. THE PRESSURE SEWER/FORCE MAIN SHALL BE CONSTRUCTED OF SDR-17 CLASS 250 PVC PIPE. INSTALL A CONTINUOUS 12-GAUGE COATED WIRE ALONG THE ENTIRE LENGTH OF THE FORCE MAIN (6"ABOVE THE PIPE) FOR FUTURE LOCATING PURPOSES IN ADDITION TO MARKING TAPE 12" ABOVE LINE.
9. SERVICE CONNECTION AND CLEANOUT BOXES SHALL BE CARSON INDUSTRIES MS SERIES OR APPROVED EQUIVALENT WITH "SEWER" ENGRAVED ON THE LID. FURNISH IN SIZES SHOWN.
10. PROVIDE THRUST RESTRAINT AT ALL FITTINGS AND DEAD ENDS. CONTRACTOR MAY USE CONCRETE THRUST BLOCKS OR MECHANICALLY RESTRAINED JOINTS.
11. PROVIDE SPEARS MANUFACTURING COMPANY TRUE UNION BALL AND CHECK VALVES OR APPROVED EQUIVALENT ON SERVICE LINES AND FLUSH-OUT CONNECTIONS. ALL OTHER VALVES SHALL BE METAL (BRONZE OR IRON) VALVES.
12. FOR PRESSURE SEWERS AND FORCE MAINS 3-INCHES OR LARGER, USE MECHANICAL JOINT FITTINGS, RESILIENT WEDGE GATE VALVES AND OUTSIDE WEIGHT AND LEVER CHECK VALVES.



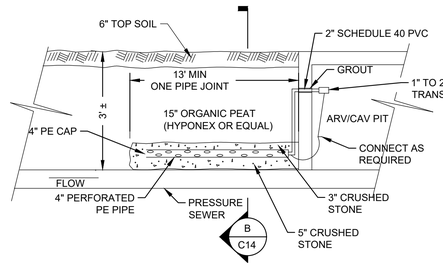
MID-LINE CLEANOUT DETAIL

NOT TO SCALE



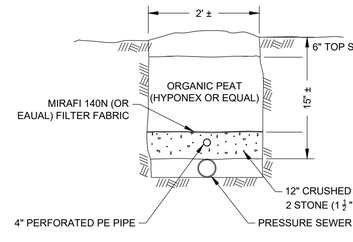
END-OF-LINE CLEANOUT DETAIL

NOT TO SCALE



ODOR CONTROL SOIL BED

(TO BE CONNECTED TO AIR RELEASE OR COMBINATION AIR VALVES)
NOT TO SCALE

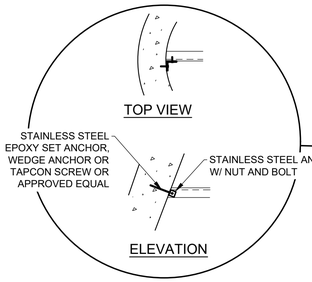


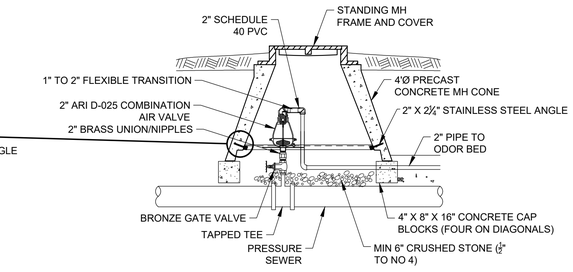
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C14

SECTION

NOT TO SCALE

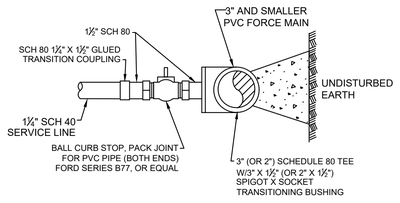
NOTES:
1. PLACE DOWN STREAM OF AIR/VACUUM VALVE
2. LOCATE ENTIRELY WITHIN RIGHT-OF-WAY

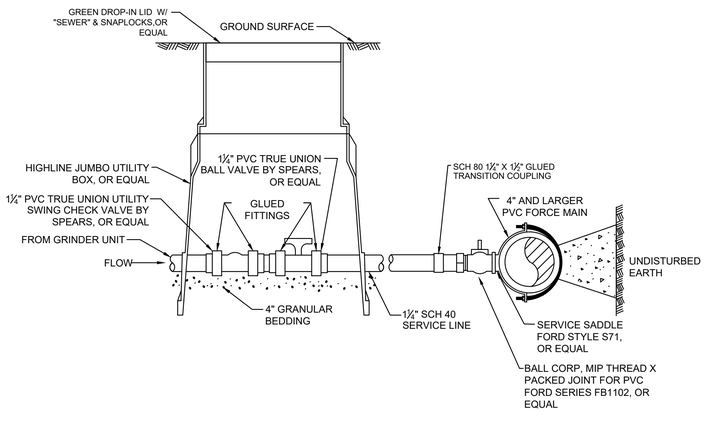




2" ARI D-025 COMBINATION AIR VALVE

NOT TO SCALE

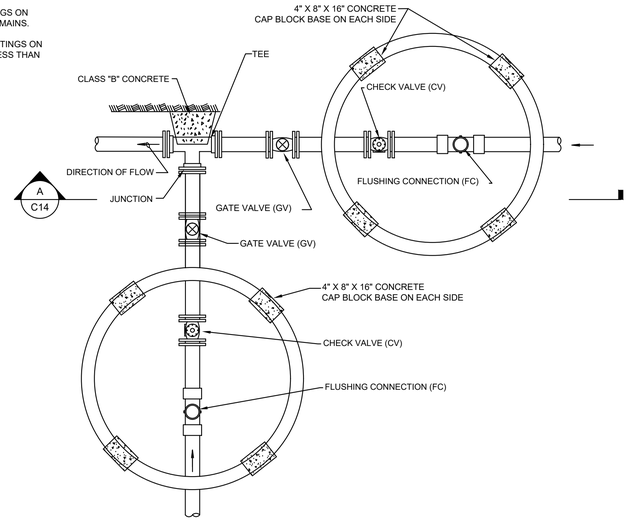




SERVICE CONNECTION DETAIL

NOT TO SCALE

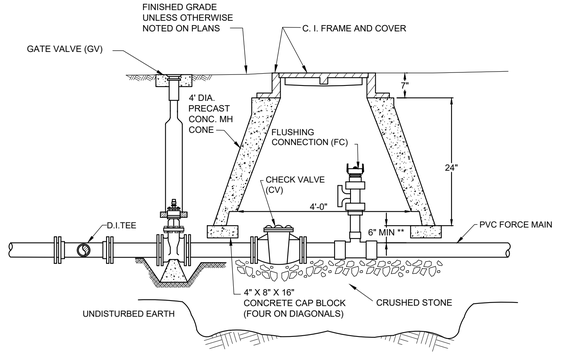
NOTES:
1. USE DUCTILE IRON M.J. FITTINGS ON ALL 4-INCH AND LARGER PVC MAINS.
2. USE SCHEDULE 40, GLUED FITTINGS ON ALL PVC MAINS AND PIPING LESS THAN 4-INCH.



PLAN

NOTES:
1. FOR 3-INCH AND SMALLER PIPING, LOCATE BOTH VALVES INSIDE MANHOLE.

** PROVIDE 6" MINIMUM CLEARANCE BETWEEN TOP OF PIPE AND BOTTOM OF MANHOLE. NOTCH BY REMOVING SECTIONS OF "TONGUE AND GROOVE" TO ACCOMODATE CLEARANCE.



SECTION

PRESSURE MAIN JUNCTION DETAIL

NOT TO SCALE

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REVISIONS				
NO.	DESCRIPTIONS	DATE	BY	APP'D

DESIGN	GMC
DRAWN	ZWR
CHECKED	JRB
APPROVED	GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

GENERAL PRESSURE SEWER DETAILS

CTI ENGINEERS
1122 RIVERFRONT PARKWAY
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423-267-7613

GARY M. CONLEY — REGISTERED ENGINEER — AGRICULTURE COMMERCE — 130426 — STATE OF TENNESSEE

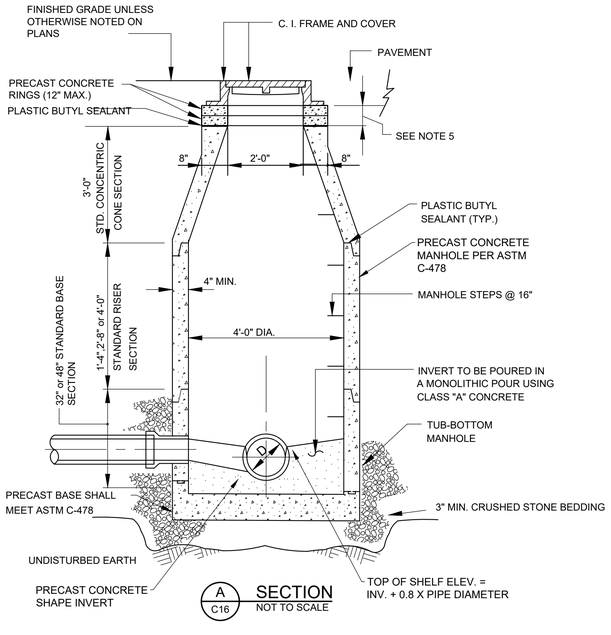
JOB NO.
C24009

ISSUE DATE
03/12/2025

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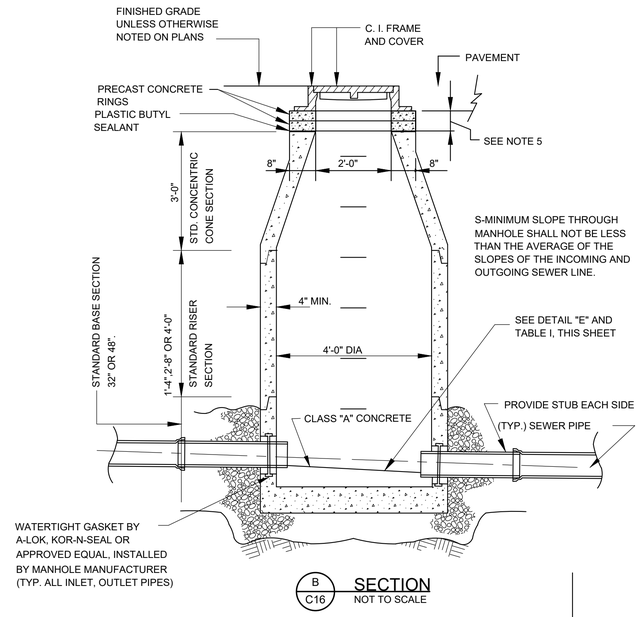
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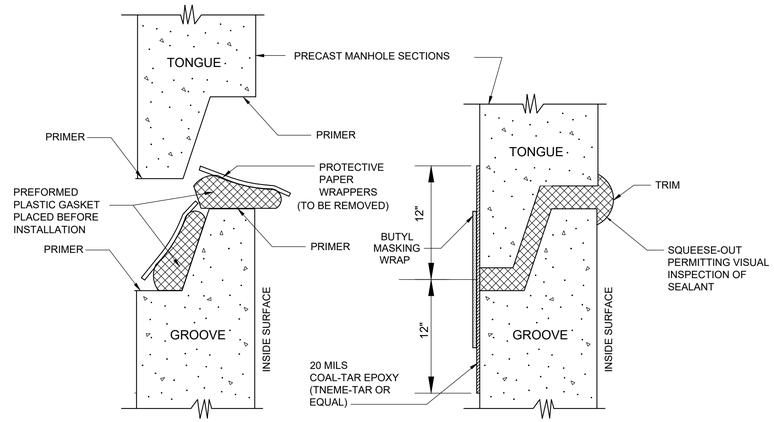


A C16 SECTION
NOT TO SCALE

REFER TO CITY STD DETAIL M001

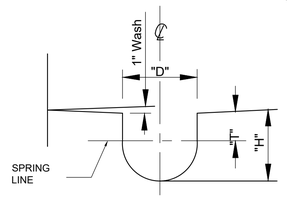


B C16 SECTION
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JOINT AND GASKET FOR PRECAST MANHOLE SECTIONS

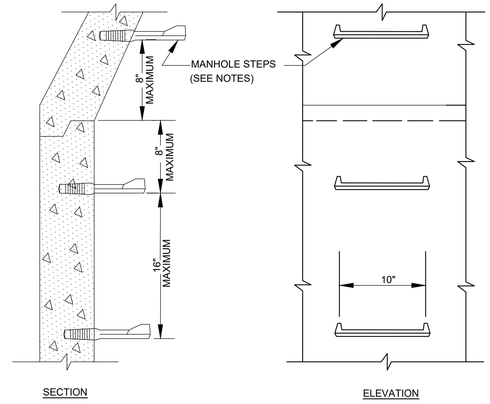
NOT TO SCALE



DETAIL E
NOT TO SCALE

NOTE:
"H" & "T" dimensions apply at both the upstream & downstream edge of M.H.

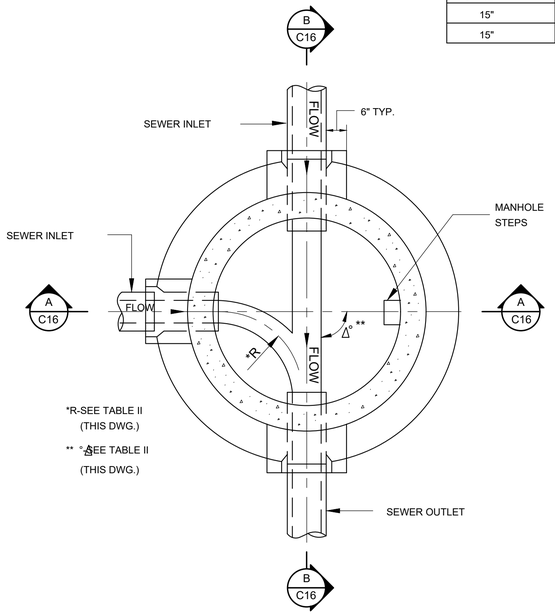
TABLE I		
"D" Inside Dia. pipe	"T" Vertical Tangent	"H" Height of Wa. Table
8"	2 1/2"	6 1/2"
10"	3"	8"
12"	3 1/2"	9 1/2"



MANHOLE STEPS

NOT TO SCALE

TABLE II GOVERNING DIMENSIONS FOR MANHOLES			
D-PIPE SIZE	△ ANGLE	BASE DIAMETER	"R" *
8" - 12"	0° TO 90°	4'	1' - 6"
15"	0° TO 60°	4'	1' - 10"
15"	60° TO 90°	4'	1' - 10"

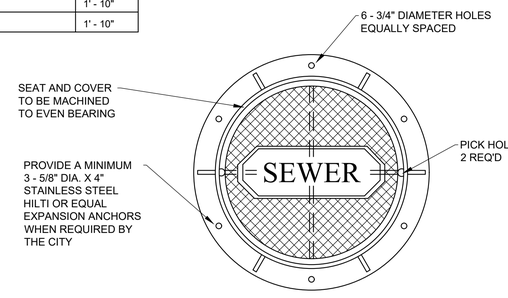


SECTIONAL PLAN

STANDARD PRECAST 4'-0" DIAMETER MANHOLE

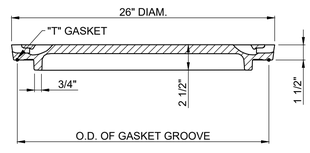
NOT TO SCALE

NOTE: 5'-0" & 6'-0" DIAMETER MANHOLES MAY BE SIMILAR DESIGN IF APPROVED BY THE ENGINEER.



STANDARD COVER & FRAME
APPROXIMATE WEIGHTS:
WEIGHT OF FRAME 180 LBS
WEIGHT OF COVER 135 LBS

PLAN



STANDARD COVER

NOTE: PROVIDE WATERTIGHT BOLT DOWN TYPE COVER SECURED WITH A MINIMUM OF 4 STANDARD STAINLESS STEEL BOLTS FOR COVER ATTACHMENT AND "T" GASKET INSTALLED IN FRAME, WHERE INDICATED ON PLANS.

MANHOLE FRAME AND COVER

NOT TO SCALE

GENERAL NOTES:

1. WHERE LATERAL SEWERS ARE SHOWN FOR FUTURE CONSTRUCTION, INSTALL A PLUGGED STUB OR DROP CONNECTION WITH PLUGGED STUB AS CALLED FOR ON PLAN AND PROFILE DRAWINGS.
2. MANHOLE STEPS SHALL BE ACHESON FOUNDRY CO. NO. A-1984-D (STEEL REINFORCED RUBBER) OR EQUAL. PROVIDE INDIVIDUAL STEPS, MORTARED OR CAST INTO WALLS AND CONICAL TOPS OF ALL MANHOLES AND SIMILAR STRUCTURES. ALIGN STEPS SO AS TO FORM A CONTINUOUS LADDER WITH STEPS EQUALLY SPACED VERTICALLY, NO MORE THAN 16 INCHES APART, USING STEPS HAVING A MINIMUM LENGTH OF 10-INCHES AND WHICH PROJECT A MINIMUM CLEAR DISTANCE OF FOUR INCHES FROM THE WALL. STEPS, FASTENINGS AND INSTALLATION MUST BE CAPABLE OF SUPPORTING A SINGLE CONCENTRATED LOAD OF 300 POUNDS. USE DESIGNS BASED ON IMPOSED LOADS BEING CONCENTRATED AT SUCH POINTS AS WILL CAUSE MAXIMUM STRESSES IN THE STRUCTURAL ELEMENT BEING CONSIDERED. CONSTRUCT INDIVIDUAL STEPS AS ONE PIECE, FERROUS CASTING OR PLASTIC COATED STEEL MEETING REQUIREMENTS OF ASTM C 478, D 2146 AND A 615 GRADE 60.
3. RISER SECTIONS SHALL BE SET SO THAT STEPS ALIGN VERTICALLY.
4. FOR BRINGING MANHOLE FRAME AND COVER TO GRADE, USE PRECAST CONCRETE OR CAST IRON RINGS.
5. PLASTIC BUTYL SEALANT TO BE FURNISHED AND INSTALLED BETWEEN MANHOLE CONE AND FRAME AND LEVELING RINGS COST TO BE INCLUDED IN THE UNIT PRICE BID FOR MANHOLES 0.0' TO 6.0' DEEP. NO SEPARATE PAYMENT ALLOWED. PROVIDE PIPE JOINTS AT OUTSIDE FACE OF MANHOLES AS SHOWN.
6. ALL MANHOLES SHALL USE STANDARD CONCENTRIC OR ECCENTRIC CONES.
7. ALL MANHOLES SHALL BE VACUUM TESTED AFTER INSTALLATION.
8. FOR CONNECTIONS TO EXISTING MANHOLES, CORE CUT HOLE AND PROVIDE WATERTIGHT RUBBER LOCKING BOOT AS APPROVED BY THE CITY.
9. PROVIDE WATERTIGHT BOOT SLEEVE OF HIGH QUALITY SYNTHETIC RUBBER. TERMINATE THE SLEEVE AT ONE END IN A SUBSTANTIAL SERRATED FLANGE OF THE SAME MATERIAL AND CAST INTO THE WALL OF THE MANHOLE BASE TO FORM A WATER STOP. EMBED THE FLANGE IN THE WALL NO LESS THAN 4-INCHES AROUND THE ENTIRE PIPE. FIT THE OTHER END OF THE SLEEVE AROUND THE OUTSIDE OF THE PIPE AND SECURE TO THE PIPE BY MEANS OF A STAINLESS STEEL STRAP CLAMP, DRAW BOLT AND NUT. FURNISH SYNTHETIC RUBBER SUITABLE FOR USE IN SEWAGE SERVICE.

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THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

GRAVITY SEWER DETAILS

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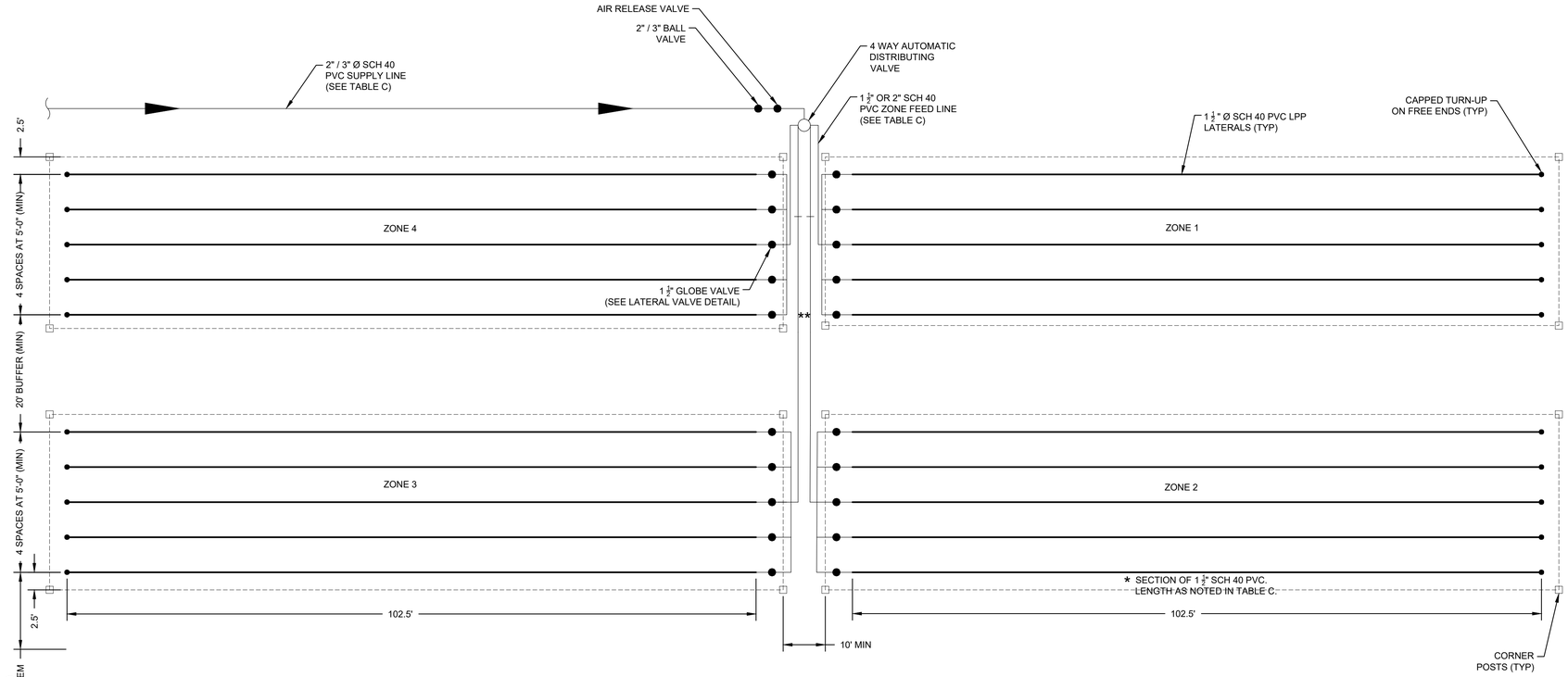
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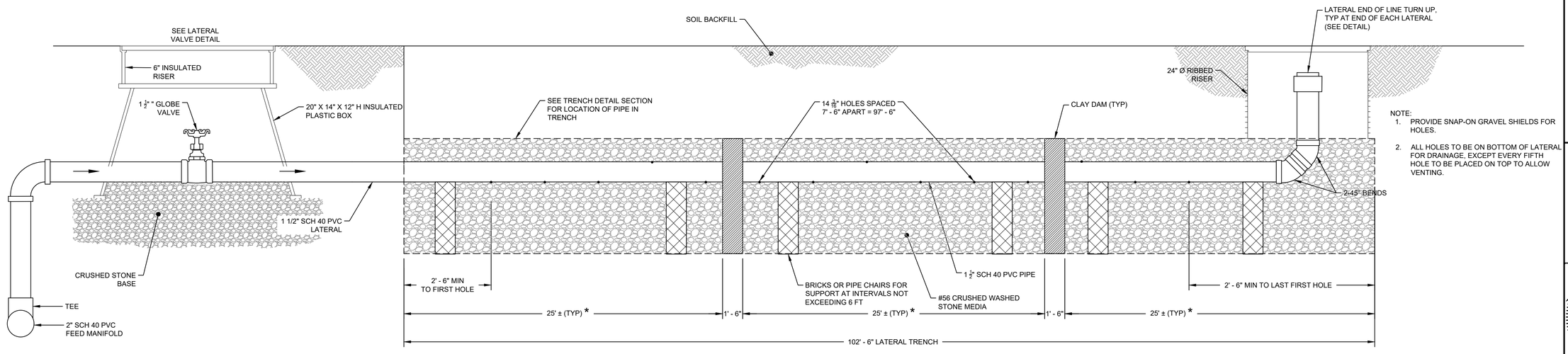


SUBSYSTEM PIPING PLAN (TYP OF 16)

SCALE: 1" = 20'

TABLE C - SUBSYSTEM HEADS AND ZONE LINE LENGTHS							
	PUMP	PUMP	SUPPLY	LENGTH OF 1.5-INCH ZONE FEED LINE			
SUBSYSTEM	HEAD (FT.)	MODEL	SIZE (IN.)	ZONE 1	ZONE 2	ZONE 3	ZONE 4
1	63.071	PF5010	2	0	25	53	25
2	91.769	PF5015	2	53	37	20	0
3	77.626	PF5015	2	0	21	15	0
4	108.779	PF5015	2	20	38	16	0
5	102.876	PF5015	2	0	25	22	0
6	98.35	PF5015	3	17	54	53	0
7	108.424	PF5015	3	0	0	53	54
8	142.407	PF5030	3	1	15	15	0
9	153.182	PF5030	3	15	33	0	0
10	153.029	PF5030	3	6	0	2	7
11	92.781	PF5015	2	2	0.5	24	6
12	110.648	PF5015	2	5	37	34	0.5
13	101.174	PF5015	2	0	23	29	80
14	93.75	PF5015	3	1	18	24	0
15	144.312	PF5030	3	14	4	12	0.5
16	144.278	PF5030	3	12	0	1	3

NOTES:
1. PUMP HEADS CALCULATED AT NOMINAL 51 GPM.
2. PUMP SELECTIONS BASED ON ORENCO SYSTEMS PUMPS.
3. ZONE FEED LINES SHALL BE 2" DIAMETER EXCEPT AS NOTED HEREIN



NOTE:
1. PROVIDE SNAP-ON GRAVEL SHIELDS FOR HOLES.
2. ALL HOLES TO BE ON BOTTOM OF LATERAL FOR DRAINAGE, EXCEPT EVERY FIFTH HOLE TO BE PLACED ON TOP TO ALLOW VENTING.

SECTION ALONG LPP LATERAL (TYP)

NOT TO SCALE

* ADJUST SPACING TO AVOID HOLES

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THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

SUBSYSTEM PIPING DETAIL AND SECTION

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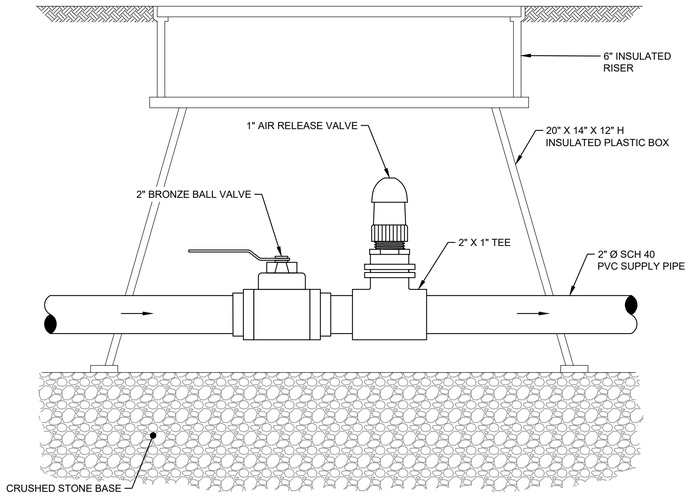
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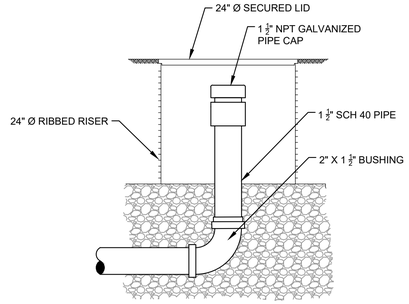
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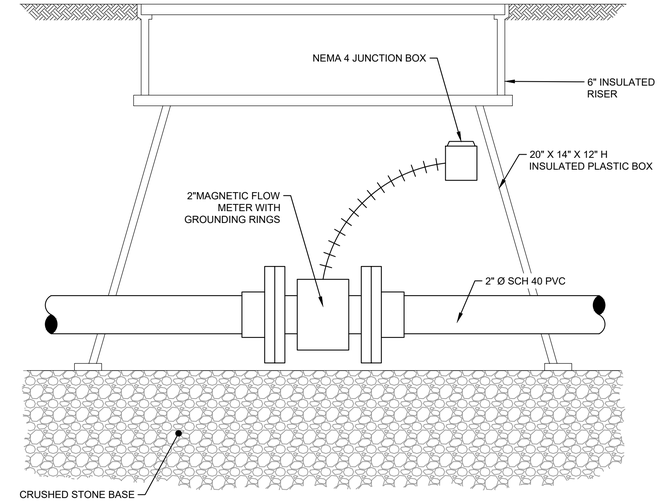
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SUPPLY LINE VALVE DETAIL
NOT TO SCALE



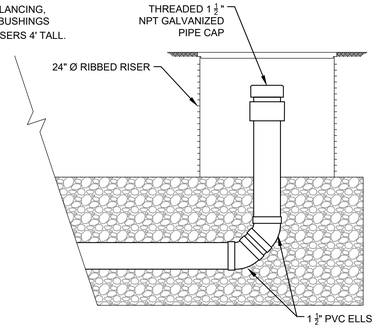
SUPPLY LINE TURN-UP DETAIL
NOT TO SCALE



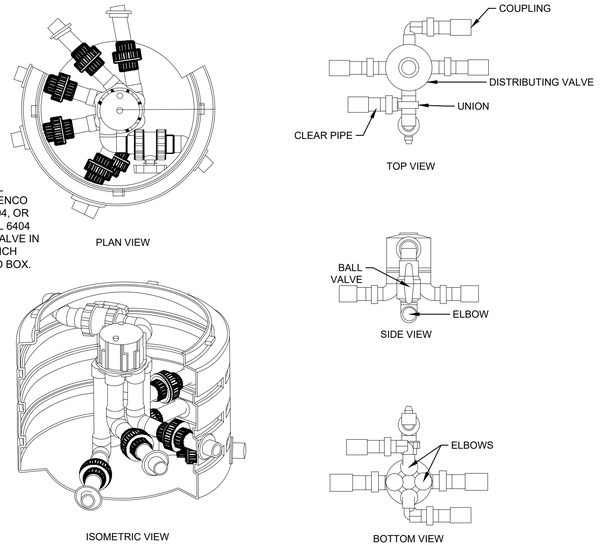
MAGNETIC FLOW METER DETAIL
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NOTE:

ZONE FOR INITIAL BALANCING, PROVIDE REDUCING BUSHINGS AND ¾" SCH 40 PVC RISERS 4' TALL.



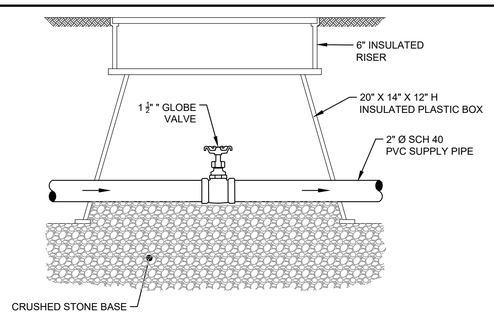
LATERAL END-OF-LINE TURN-UP DETAIL
NOT TO SCALE



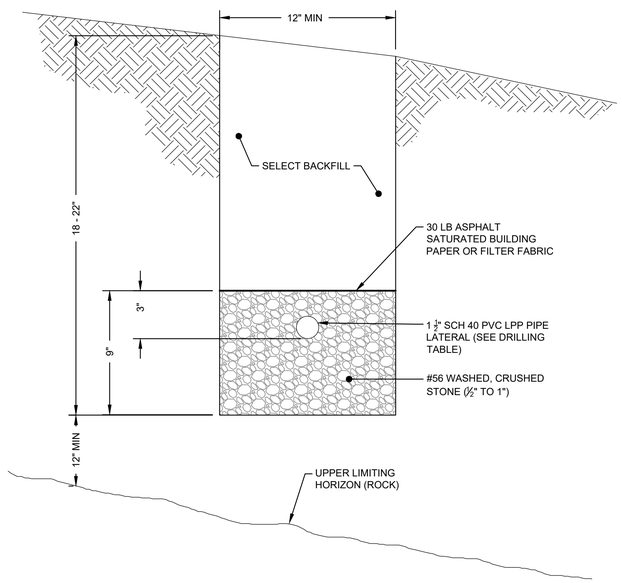
NOTE:

1. QUANICS MODEL PDS-DV-450, ORENCO MODEL NO. V6404, OR ZOELLER MODEL 6404 DISTRIBUTION VALVE IN 26-INCH BY 18-INCH PREFABRICATED BOX.

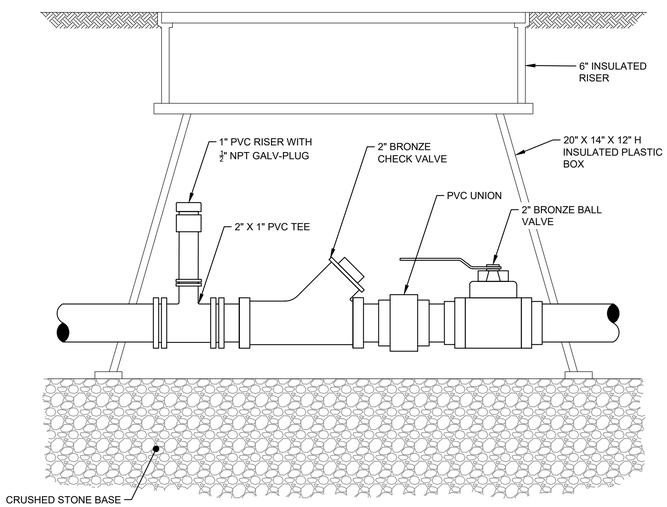
DISTRIBUTING VALVE DETAIL
NOT TO SCALE



LATERAL FEED VALVE DETAIL
NOT TO SCALE



LPP LATERAL TRENCH DETAIL
NOT TO SCALE



DISCHARGE VAVLE BOX DETAIL
NOT TO SCALE

GENERAL NOTES:

1. CONTRACTOR SHALL BE PROPERLY LICENSED FOR THE INSTALLATION OF THE SEPTIC TANK AND DRAIN FIELD.
2. INSTALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO STARTING CONSTRUCTION.
3. CLEAR ALL TREES 3"Ø AND SMALLER, TREES LARGER THAN 3" SHALL BE CUT, REMOVED, AND GROUND DOWN TO GROUND LEVEL.
4. LAY OUT ALL LATERAL LINES ON CONTOUR.
5. LATERALS SHALL BE A MINIMUM OF 25' FROM THE TOP EDGE OF DRAINAGE DITCHES.
6. LATERALS SHALL BE CONSTRUCTED AT MINIMUM 5 FEET CENTER TO CENTER. LATERALS MAY BE SHIFTED SLIGHTLY TO MISS LARGE TREE ROOTS WHERE NECESSARY AS LONG AS THE TRENCH BOTTOM ELEVATION IS MAINTAINED THROUGHOUT THE LATERAL.
7. ALL SOLID PVC PIPING SHALL BE SCHEDULE 40 PVC WITH GLUED JOINTS.
8. CARE SHALL BE TAKEN TO MINIMIZE DISTURBANCE TO DISPOSAL AREAS WITH HEAVY EQUIPMENT.
9. MULCH AND SEED ALL DISTURBED AREAS AFTER CONSTRUCTION.

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THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

SUBSYSTEM PIPING DETAILS

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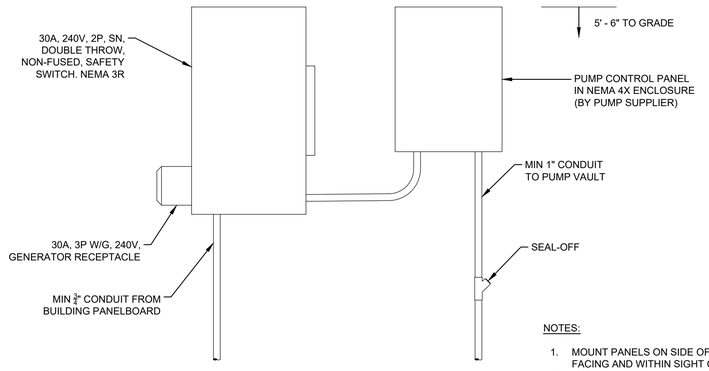
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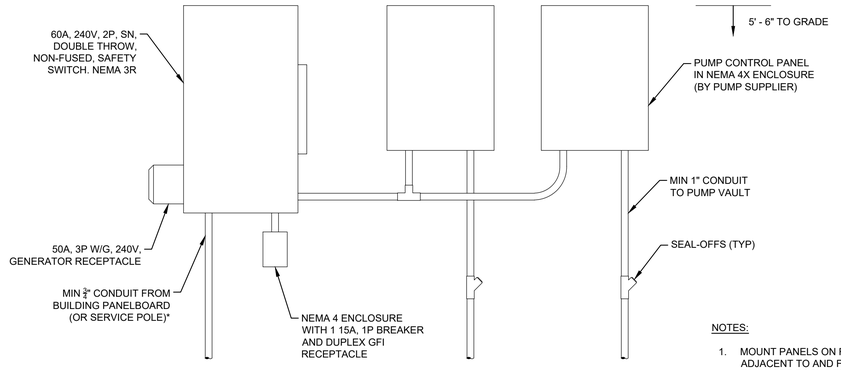


NOTES:

1. MOUNT PANELS ON SIDE OF BUILDING FACING AND WITHIN SIGHT OF PUMP VAULT
2. FOR VENUE RESTAURANT, MOUNT PANELS ON FREE-STANDING RACK FACING AND WITHIN SIGHT OF PUMP TANK. SEE RACK DETAIL
3. SEE TABLE FOR BRANCH CIRCUIT CAPACITY AND WIRE SIZE
4. MAINTAIN MIN 3' CLEARANCE IN FRONT OF PANELS

ELECTRICAL SERVICE FOR STEP TANKS WITH SINGLE PUMP VAULT (TYP)

NOT TO SCALE



MAIN DISTRIBUTION PANEL SCHEDULE

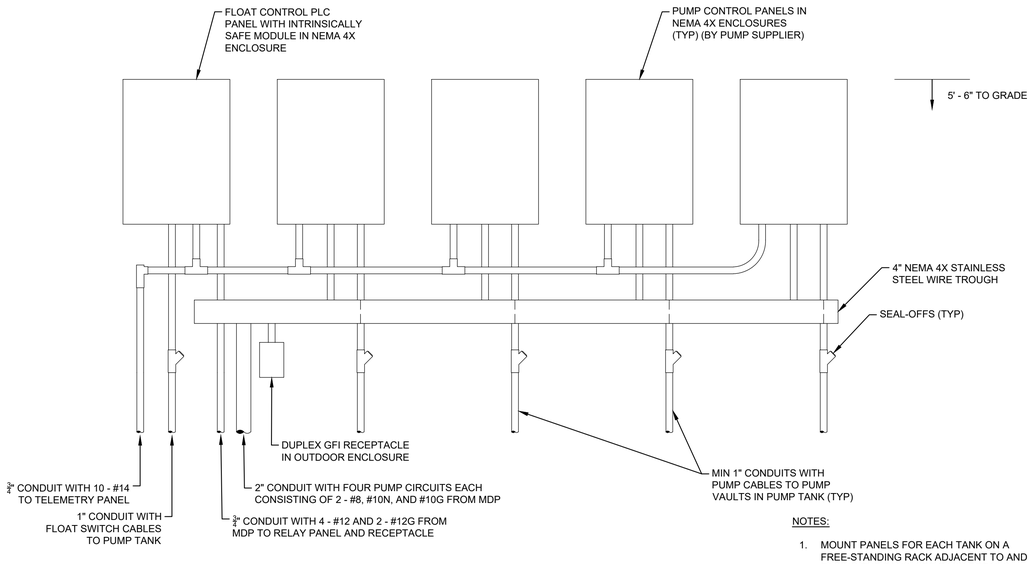
1 - 2P, 300A, MAIN BREAKER
16 - 2P, 40A, DOSING PUMP PANELS
1 - 2P, 60A, FLOW DISTRIBUTION PUMP PANEL
1 - 1P, 15A, TELEMETRY PANEL
4 - 1P, 20A, PLC RELAY PANELS
1 - 1P, 15A, LIGHT POLE
1 - 1P, 15A, HOTBOX HEATER
1 - 1P, 20A, GENERATOR BLOCK HEATER
1 - 1P, 15A, GENERATOR BATTERY CHARGER

NOTES:

1. MOUNT PANELS ON FREE-STANDING RACK ADJACENT TO AND FACING STEP PUMP TANK. SEE RACK DETAIL
2. SEE TABLE FOR BRANCH CIRCUIT CAPACITY AND WIRE SIZE
3. MAINTAIN MIN 3' CLEARANCE IN FRONT OF PANELS
4. (*) SERVICE POLE IS REQUIRED FOR TOWNHOME GRAVITY STEP TANK

ELECTRICAL SERVICE FOR STEP PUMP TANKS WITH TWO PUMP VAULTS (TYP)

NOT TO SCALE

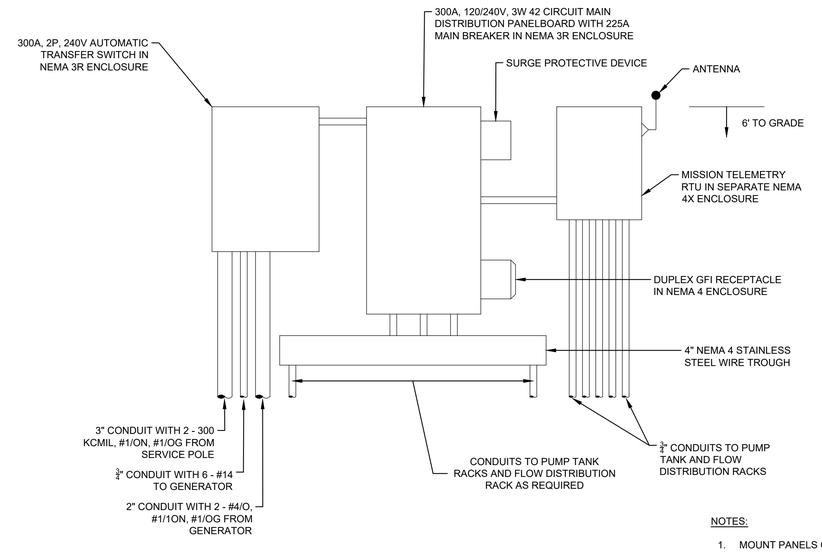


NOTES:

1. MOUNT PANELS FOR EACH TANK ON A FREE-STANDING RACK ADJACENT TO AND FACING THE TANK. SEE RACK DETAILS
2. MAINTAIN MIN 3' CLEARANCE IN FRONT OF PANELS

ELECTRICAL PANELS FOR LPP DOSING TANKS (TYPICAL OF FOUR)

NOT TO SCALE



NOTES:

1. MOUNT PANELS ON FREE-STANDING RACK. SEE RACK DETAILS
2. MAINTAIN MIN 3' CLEARANCE IN FRONT OF PANELS

MAIN LPP AREA ELECTRICAL PANELS

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THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

ELECTRICAL DETAILS
(SHEET 1 OF 2)

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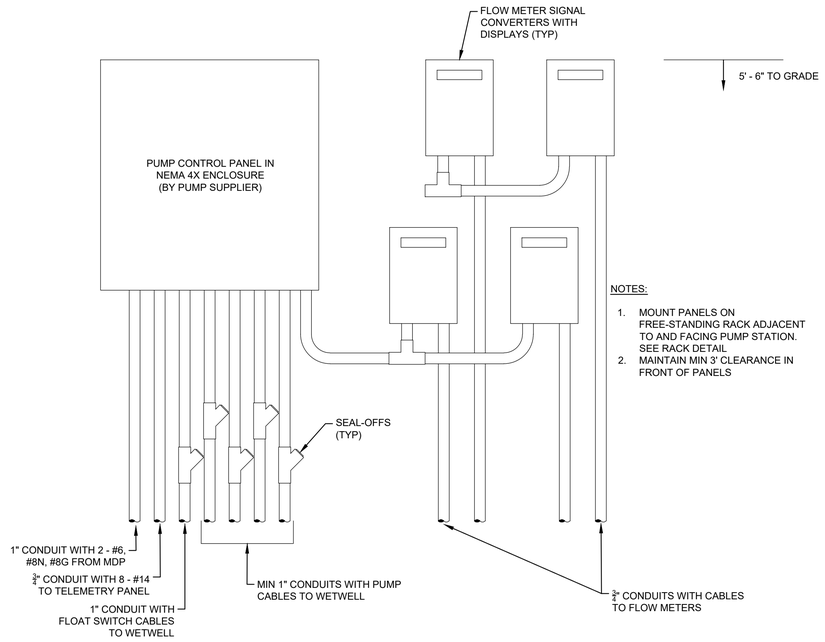
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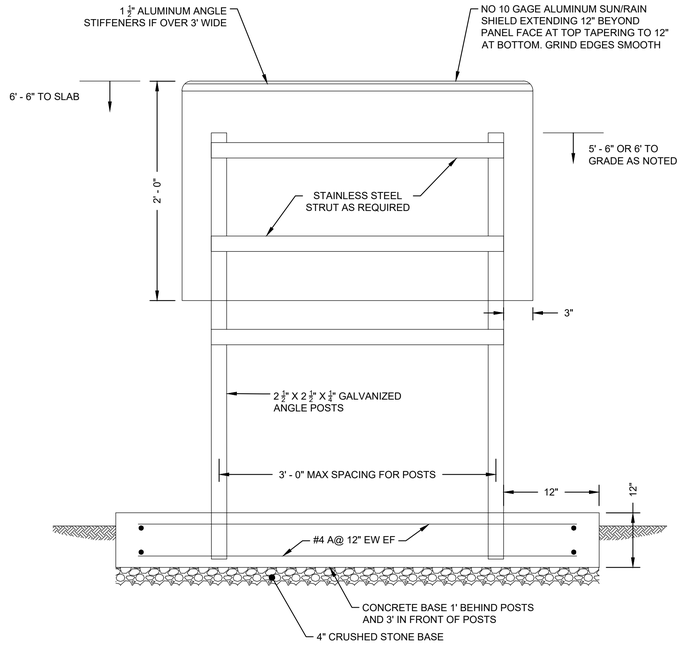
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ELECTRICAL PANEL FOR FLOW DISTRIBUTION PUMP STATION

NOT TO SCALE



TYPICAL RACK DETAIL

NOT TO SCALE

GENERAL ELECTRICAL NOTES:

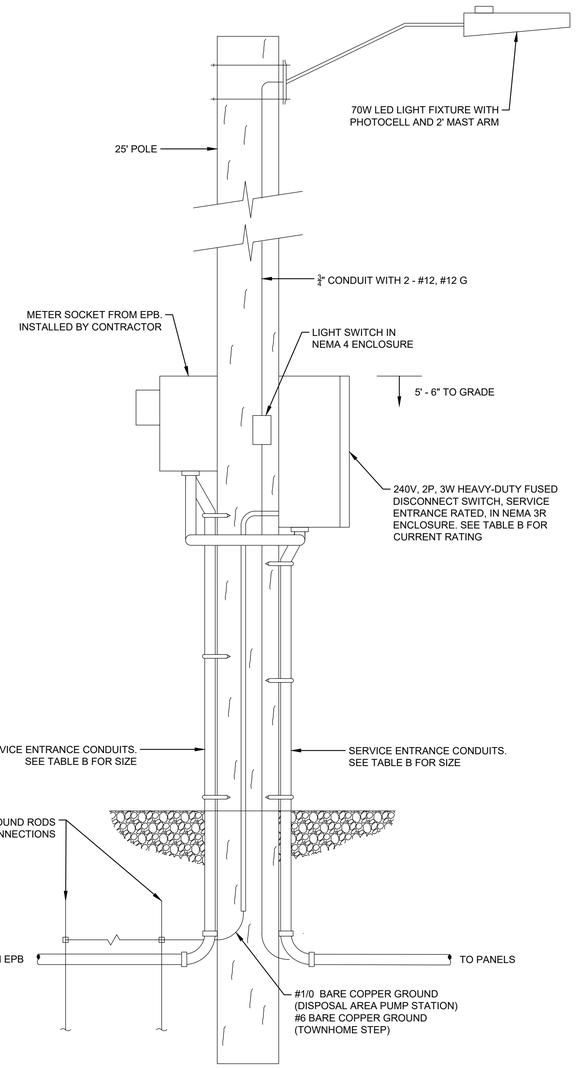
1. ELECTRICAL CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING PERMIT, COORDINATING INSPECTIONS, AND PAYING COSTS FOR OBTAINING SERVICE FRO ELECTRICAL POWER BOARD.
2. ALL ELECTRICAL WORK SHALL COMPLY WITH NEC AND APPLICABLE LOCAL AND STATE CODES.
3. ALL ELECTRICAL EQUIPMENT AND MATERIALS SHALL BE UL LISTED.
4. POWER WIRING SHALL BE STRANDED COPPER WITH 600V INSULATION, THWN-2.
5. ALL STRUT, MOUNTING HARDWARE, AND FASTENERS SHALL BE STAINLESS STEEL.
6. WIRING SHALL BE RUN IN CONDUIT. BURIED CONDUIT SHALL BE SCH 40 PVC CONDUIT, CONCRETE ENCASED. EXPOSED CONDUIT SHALL BE RIGID GALVANIZED STEEL.
7. PROVIDE SEAL-OFFS ON CONDUITS LEAVING HAZARDOUS LOCATIONS.

TABLE A - STEP PUMP ELECTRICAL INFORMATION

PUMP	PUMP HP	BRANCH CIRCUIT RATING (AMPS)	BREAKER OR FUSE SIZE (AMPS)	BRANCH CIRCUIT CONDUCTORS	INDIVIDUAL PUMP CONDUCTORS	FLOAT SWITCH CONDUCTORS
SIMPLEX, 10 GPM SINGLE VAULT	0.5	20	20	2-#12, #12 N, #12 G	2-#12, #12 G	6-#14
DUPLEX 20 GPM SINGLE VAULT	0.5	30	30	2-#10, #10 N, #10 G	2-#12, #12 G	8-#14
DUPLEX, 20 GPM DOUBLE VAULT	0.5	40	40	2-#8, #10 N, #10 G	2-#12, #12 G	8-#14
DUPLEX 30 GPM DOUBLE VAULT	0.75	50	50	2-#6, #8 N, #8 G	2-#12, #12 G	8-#14

TABLE B - SERVICE ENTRANCE INFORMATION

LOCATION	SWITCH RATING	FUSE SIZE	CONDUCTORS
DISPOSAL AREA DOSING PUMP STATION	400 A	300A	2 - 300 KCMIL, #1/0 N, #1/0 G
TOWNHOME GRAVITY STEP TANK	50 A	50A	2 - #6, #8N, #8G, 1"C



SERVICE POLE DETAIL

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APPROVED GMC

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RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

ELECTRICAL DETAILS (SHEET 2 OF 2)

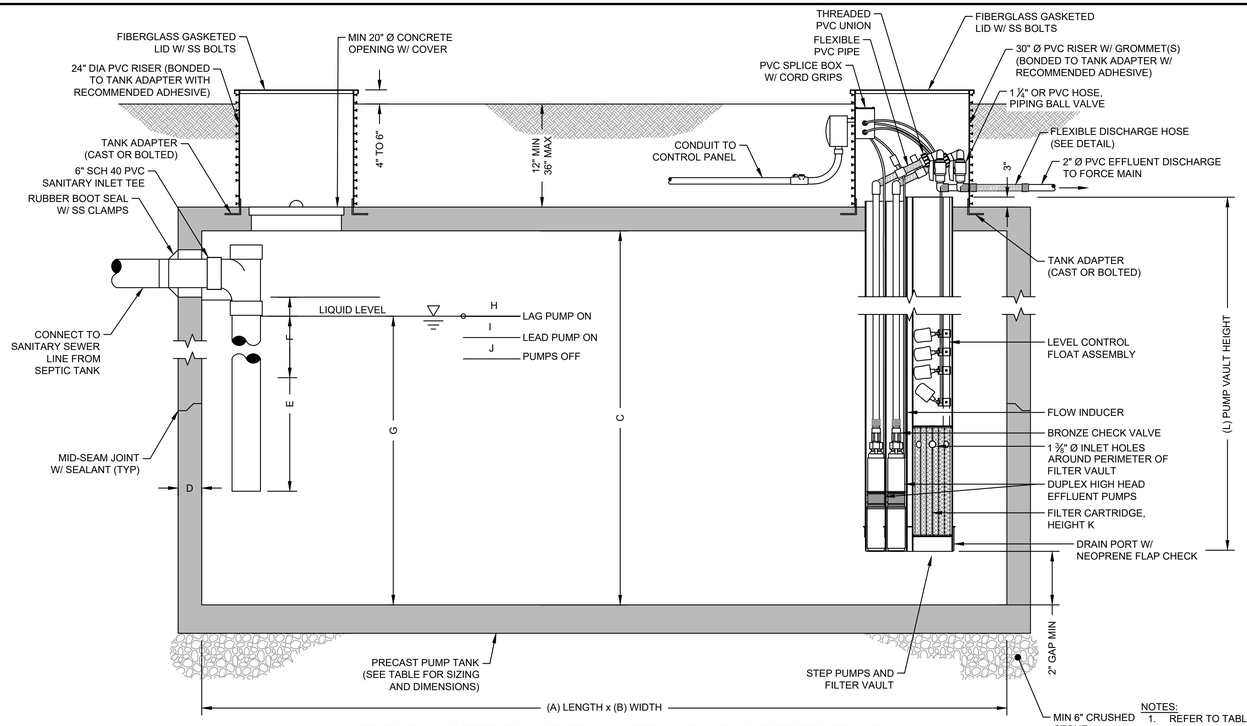
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DRAWING NO. C25

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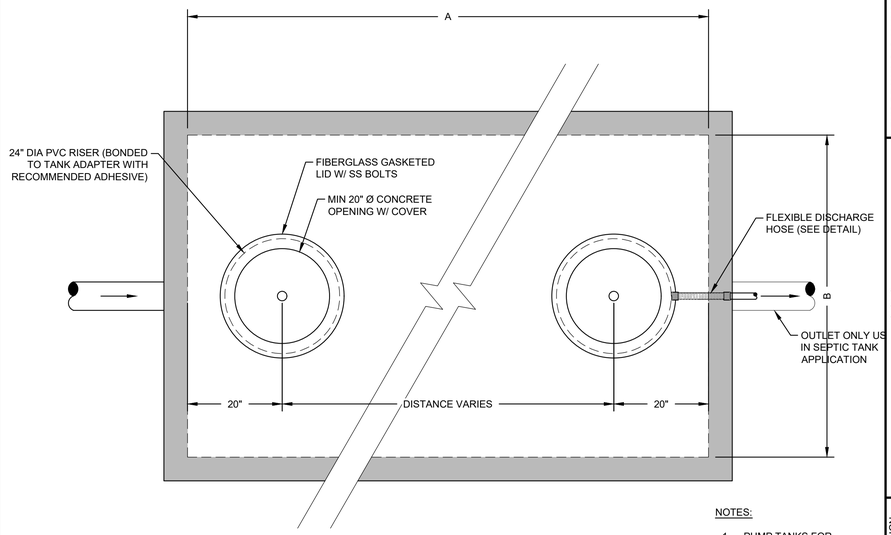
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TYPICAL STEP PUMP TANK (FOLLOWING SEPTIC TANK)

NOT TO SCALE

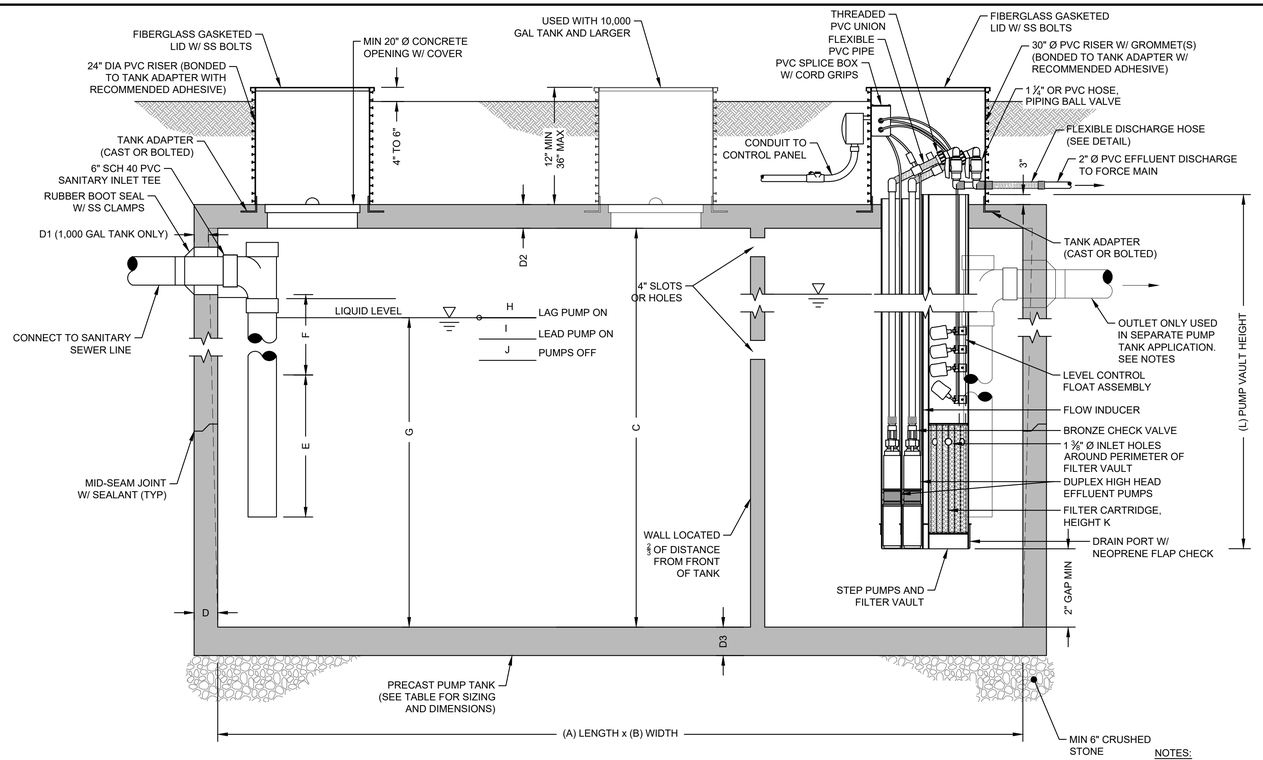
NOTES:
1. REFER TO TABLE A FOR CORRESPONDING TANK SIZE AND DIMENSIONS
2. SEE DRAWING C28 FOR GENERATOR TANK NOTES



TYPICAL TANK PLAN

NOT TO SCALE

NOTES:
1. PUMP TANKS FOR TOWNHOME GRAVITY SUBSYSTEM AND FOR MAIN RESTAURANT HAVE TWO PUMP VAULT OPENINGS
2. SEPTIC TANKS FOR TOWNHOME GRAVITY SUBSYSTEM AND MAIN RESTAURANT DO NOT HAVE PUMPS



TYPICAL STEP / SEPTIC TANK

NOT TO SCALE

NOTES:
1. REFER TO TABLE B FOR CORRESPONDING TANK SIZE AND DIMENSIONS
2. SEE DRAWING C28 FOR GENERATOR TANK NOTES.

TABLE A

STEP PUMP TANK DEMENSION TABLE

TANK SIZE	DIMENSIONS (IN)											
	A	B	C	D	E	F	G	H	I	J	K	L
2500	170	68	60.5	5	18	3	51	3	3	3	24	68
5000	170	68	110.5	5	24	3	99	3	3	3	24	68
15,000	312	132	109	6	36	3	94	3	3	3	36	84

TABLE B

STEP / SEPTIC TANK DEMENSION TABLE

TANK SIZE	DIMENSIONS (IN)														
	A	B	C	D	D1	D2	D3	E	F	G	H	I	J	K	L
1000	110	50	52	5	3	6	4	18	3	42	0	3	3	18	57
1500	136	64	52	4		6	4	18	3	42	3	3	3	24	57
4000	170	68	91.5	5		5	5	24	3	80	3	3	3	24	68
5000	170	68	110.5	5		5	5	36	3	98	3	3	3	24	68
8000	234	96	95	6		6	6	24	3	82	3	3	3	36	68
10,000	240	96	112	6		8	8	36	3	99	3	3	3	36	84
20,000	312	132	120	8		8	6	36	3	105	3	3	3	36	84
25,000	312	132	152	8		8	6	48	3	137	3	3	3	36	84

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NO.	DESCRIPTIONS	DATE	BY	APP'D

DESIGN GMC
DRAWN ZWR
CHECKED JRB
APPROVED GMC

THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

STEP PUMP / SEPTIC TANK DETAILS

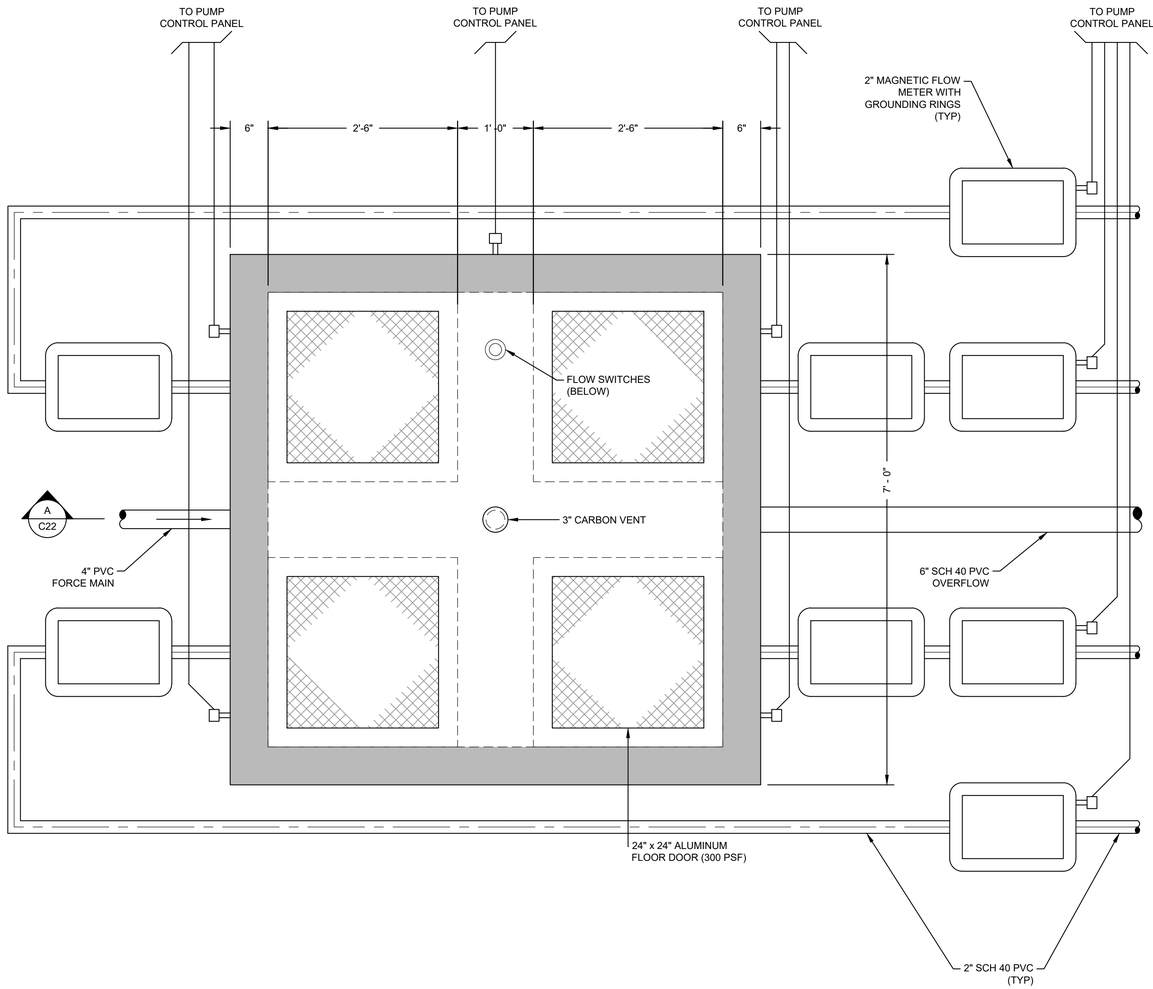
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1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

GARY M. GOLDEN — REGISTERED PROFESSIONAL ENGINEER — AGRICULTURE — No. 130255 — STATE OF TENNESSEE

JOB NO. C24009
ISSUE DATE 03/12/2025
DRAWING NO. C26

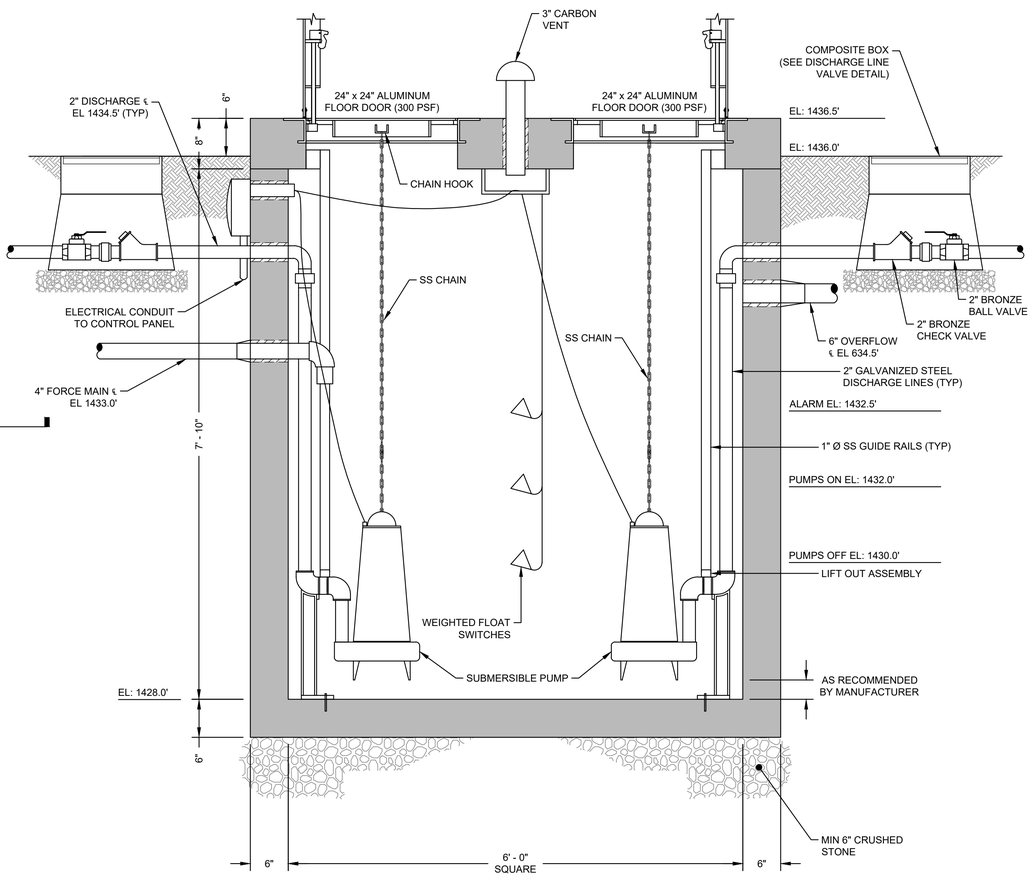
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CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 TANK DETAILS (829361v17/9/30/24 3:34PM), LAYOUT: C27



DOSING TANK FLOW DISTRIBUTION PUMP STATION

NOT TO SCALE



A C22 SECTION

NOT TO SCALE

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THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

DOSING PUMP STATION DETAILS

CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

GARY M. COGAN — REGISTERED SEWER ENGINEER — AGRICULTURE COMMERCE — 130425 — STATE OF TENNESSEE

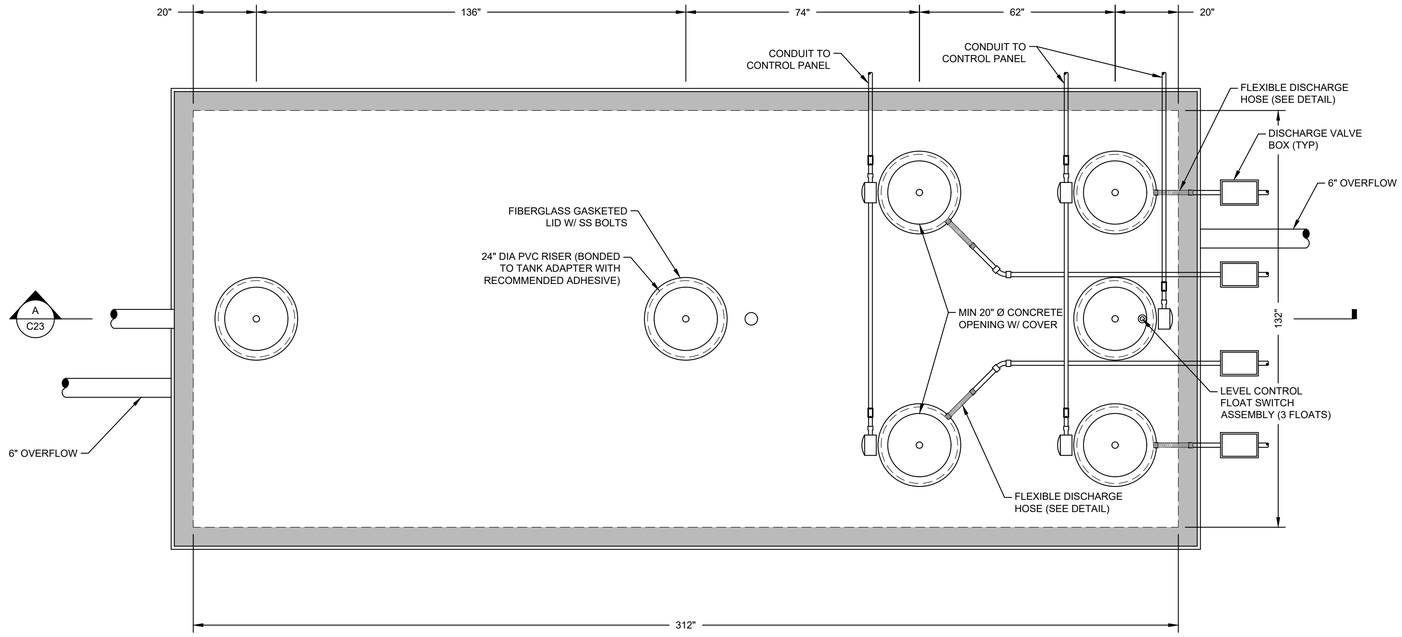
JOB NO.
C24009

ISSUE DATE
03/12/2025

DRAWING NO.
C27

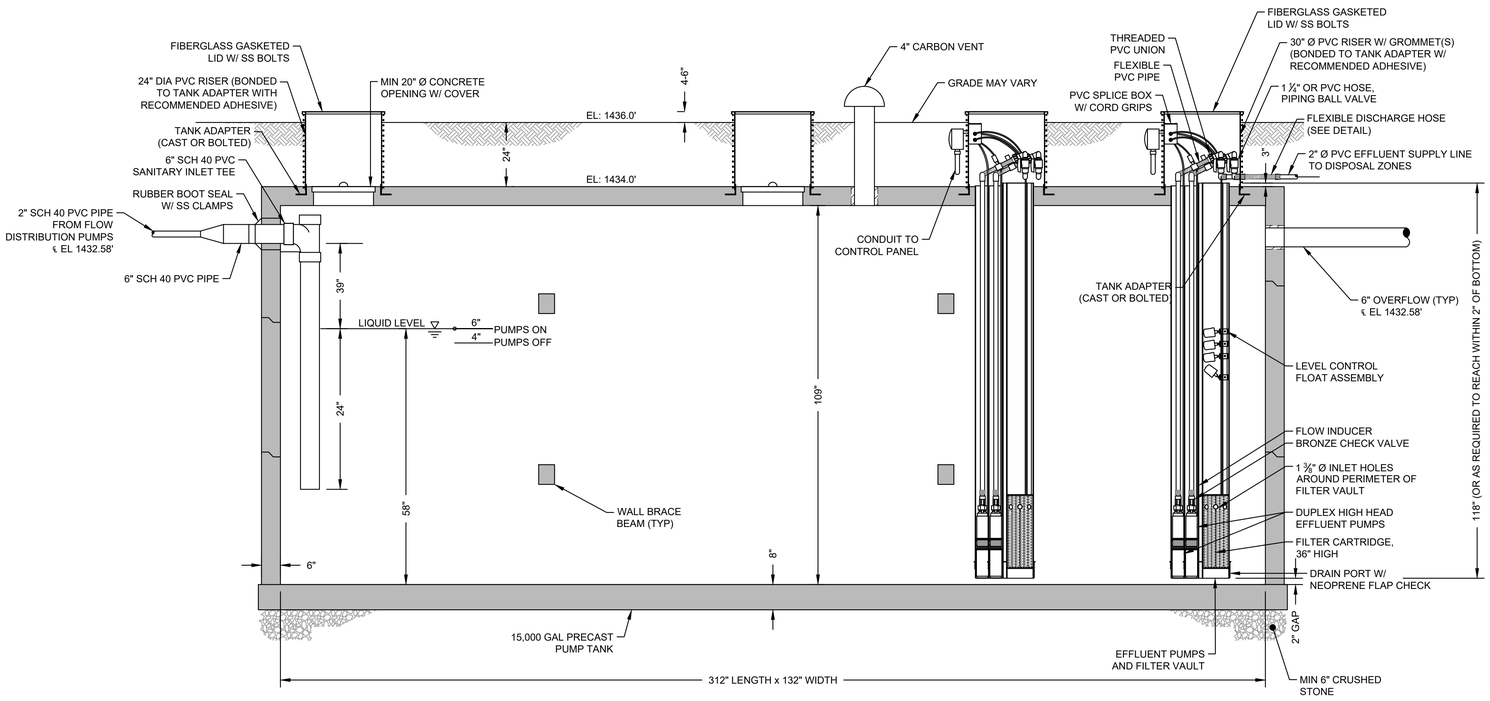
DATE OF PRINT: 3/5/2025 10:49 AM

CTI PROJECT: C23041-01, DRAWING: C23041-01 0_C23041 TANK DETAILS (829361v17/9/30/24 3:34PM), LAYOUT: C28



15,000 GAL DOSING TANK PLAN (TYP OF 4)

NOT TO SCALE



A C23 SECTION

NOT TO SCALE

GENERAL NOTES ON SEPTIC AND DOSING TANKS:

1. PRECAST CONCRETE TANKS SHALL BE FROM A NPCA-CERTIFIED MANUFACTURER WHOSE TANKS HAVE BEEN APPROVED BY TDEC. TANKS SHALL BE FROM BARGER & SONS PRECAST, OR EQUAL.
2. INSTALL TANKS LEVEL AND PLUMB IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS AND AS SHOWN ON THE DRAWINGS. SOIL COVER OVER TANK SHALL BE NOT LESS THAN 12 INCHES NOR MORE THAN 36 INCHES.
3. TANKS SHALL BE INSTALLED ON UNIFORM CRUSHED STONE BEDDING AT LEAST 6 INCHES THICK. WHERE ROCK IS ENCOUNTERED IN TANK BOTTOM, OVER-EXCAVATE ENTIRE BOTTOM AREA AT LEAST 12 ADDITIONAL INCHES AND BRING BACK UP WITH COMPACTED CRUSHED ROCK. TOP 6-INCH LAYER OF CRUSHED ROCK SHALL BE #57 STONE.
4. BACKFILL TANKS USING SUITABLE SOIL FREE FROM LARGE ROOTS OR LARGE (GREATER THAN 2-INCH) ROCKS. COMPACT IN 8-INCH THICK LIFTS. UNTIL TANKS CAN BE BACKFILLED, PROTECT TANKS FROM WATER ACCUMULATING IN TANK PITS (WHICH CAN CAUSE FLOTATION).
5. ACCESS RISERS SHALL BE RIBBED PVC AND SHALL EXTEND ABOVE FINISHED GRADE APPROXIMATELY 4 TO 6 INCHES. ATTACH RISERS TO TOPS OF TANKS USING SUITABLE ADAPTOR RINGS. PROVIDE SECURED, GASKETED FRP LIDS HAVING STAINLESS STEEL HARDWARE.
6. PROTECT NON-TRAFFIC RATED TANKS FROM VEHICULAR TRAFFIC USING FENCES, BOLLARDS, OR OTHER SUITABLE FIXED BARRIERS.
7. TANKS SHALL BE FILLED WITH CLEAN WATER AND TESTED FOR LEAKAGE FOR 24 HOURS FOLLOWING INSTALLATION.
8. FOR SEPTIC/DOSING TANKS INSTALLED IN SERIES, THE INLET OF THE SECOND TANK SHALL BE SET 1 TO 2 INCHES BELOW THE OUTLET OF THE FIRST TANK.
9. SEE SITE PLAN FOR LOCATIONS OF OVERFLOW LINES, IF APPLICABLE.
10. PIPE PENETRATIONS SHALL BE CORED AND SEALED USING RUBBER BOOT SEALS.
11. WITHOUT BACKFILL COVER, TANKS CAN FLOAT IF TANK PITS ARE ALLOWED TO FILL WITH WATER. EITHER KEEP TANK PIT DEWATERED, OR FILL TANK WITH WATER PRIOR TO INSTALLING SOIL COVER.

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NO.	DESCRIPTIONS	DATE	BY	APP'D

DESIGN	DRAWN	CHECKED	APPROVED
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THUNDER ENTERPRISES, LLC
RIVER GORGE RANCH DEVELOPMENT
AMENITY I SEWER SYSTEM

15,000 GAL PUMP /SEPTIC TANK
PLAN AND SECTION

CTIENGINEERS
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

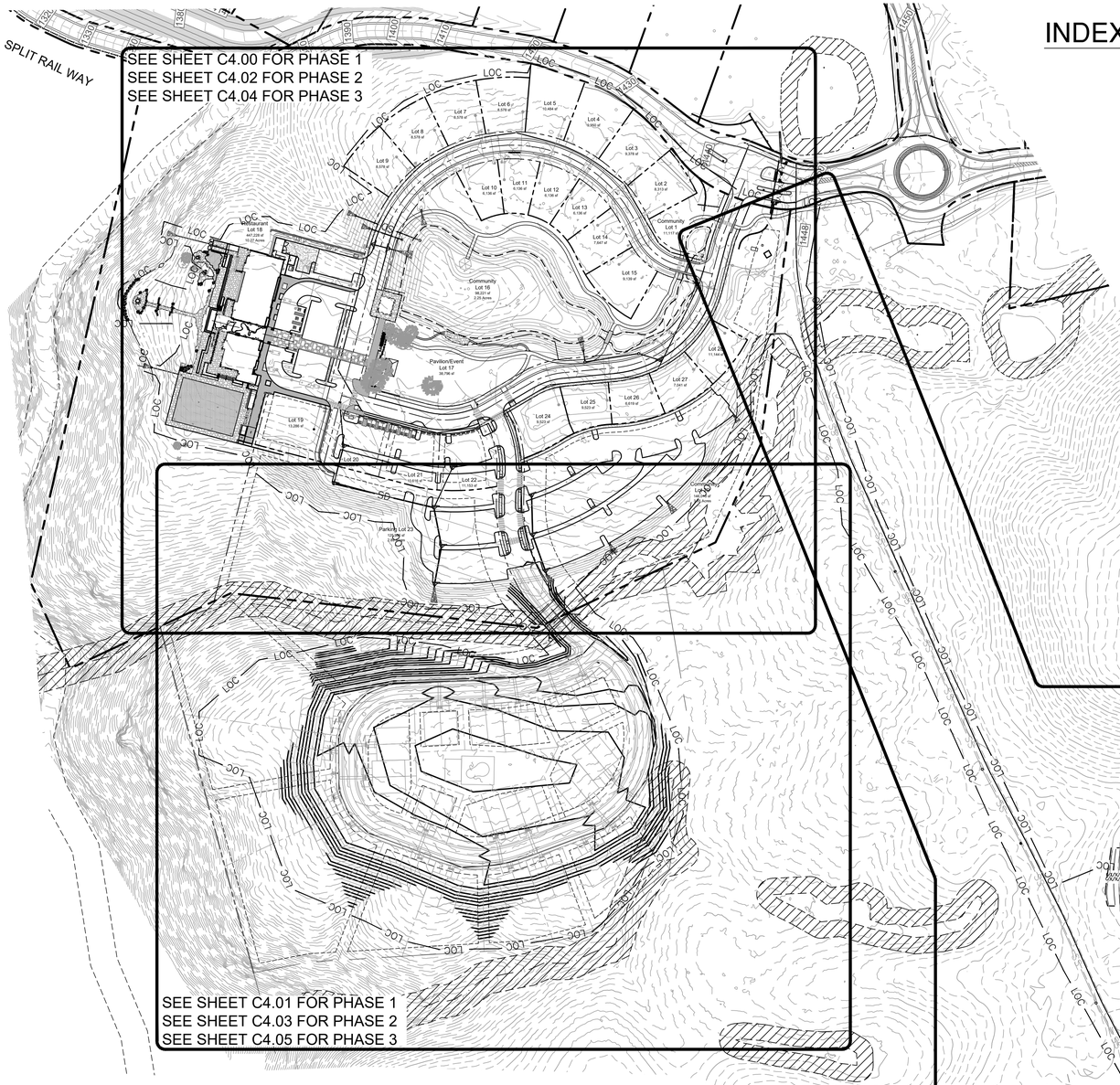
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No. 130225
STATE OF TENNESSEE

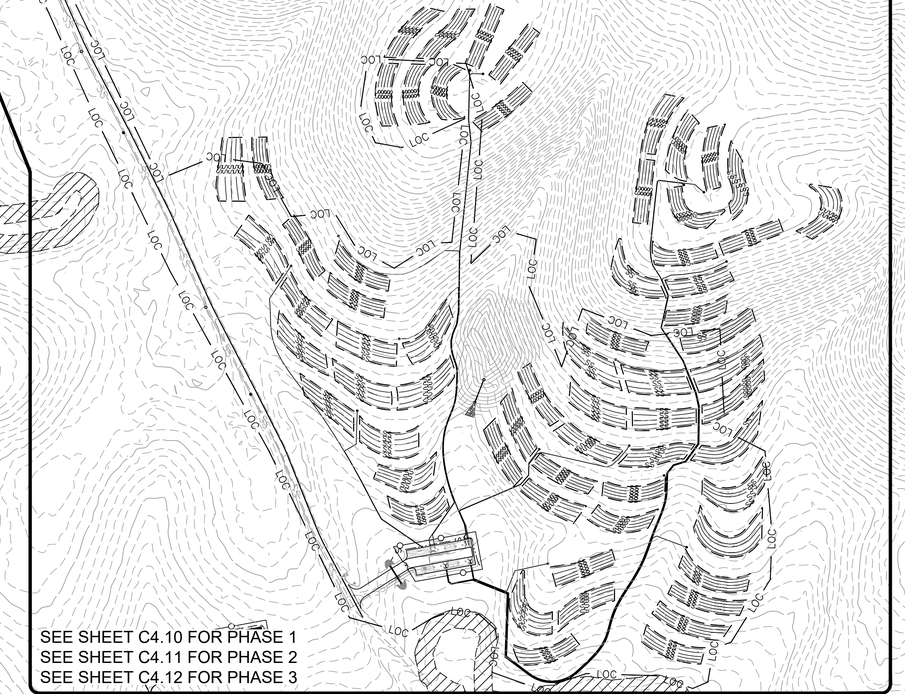
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INDEX OF EROSION & SEDIMENT CONTROL SHEETS

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C4.00	EROSION & SEDIMENT CONTROL PLAN PHASE 1 (NORTHERN)
C4.01	EROSION & SEDIMENT CONTROL PLAN PHASE 1 (SOUTHERN)
C4.02	EROSION & SEDIMENT CONTROL PLAN PHASE 2 (NORTHERN)
C4.03	EROSION & SEDIMENT CONTROL PLAN PHASE 2 (SOUTHERN)
C4.04	EROSION & SEDIMENT CONTROL PLAN PHASE 3 (NORTHERN)
C4.05	EROSION & SEDIMENT CONTROL PLAN PHASE 3 (SOUTHERN)
C4.06	EROSION & SEDIMENT CONTROL DETAILS
C4.07	EROSION & SEDIMENT CONTROL DETAILS
C4.08	EROSION & SEDIMENT CONTROL DETAILS
C4.10	EROSION & SEDIMENT CONTROL PLAN PHASE 1 (LPP SYSTEM)
C4.11	EROSION & SEDIMENT CONTROL PLAN PHASE 2 (LPP SYSTEM)
C4.12	EROSION & SEDIMENT CONTROL PLAN PHASE 3 (LPP SYSTEM)

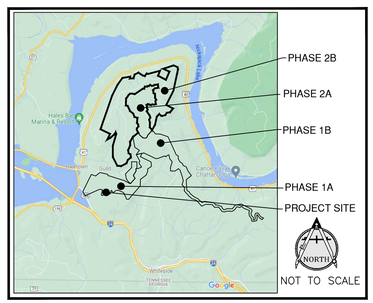
TN EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CRS	CONSTRUCTION ROAD STABILIZATION		
SB	SEDIMENT BASIN	PS	PERMANENT SEEDING
CD	CHECK DAM*	TS	TEMPORARY SEEDING
CE	CONSTRUCTION EXIT	MU	MULCHING
FR	FILTER RING*	MA	MATTING
SK	FLOATING SKIMMER	CW	CONCRETE TRUCK WASH OUT
IP	INLET PROTECTION	S	SWALE
OP	OUTLET PROTECTION	520	EXISTING CONTOUR (MSL)
SF	SILT FENCE*	1520	NEW CONTOUR (MSL)

* Silt Sock of equivalent effectiveness may be used in lieu of Silt Fence, Filter Ring,and Check Dams

EROSION CONTROL DETAILS AND CHARTS ARE SHOWN ON SHEET C4.06, 4.07 AND C4.08

"THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES."

CONTRACTOR TO DIRECT THE MAXIMUM AMOUNT OF STORMWATER RUN-OFF PRACTICAL TO THE SEDIMENT BASINS DURING ALL PHASES OF CONSTRUCTION



SITE LOCATION MAP

FLOODZONE NOTE

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY DOES NOT LIE IN THE 100-YEAR FLOOD HAZARD AREA AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 47115C0250D, DATED JANUARY 6, 2012.

NORTH

GRAPHIC SCALE

120 0 60 120 240

1 inch = 120 ft.

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

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PREPARED BY

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THUNDER ENTERPRISES
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GUILD, TN 37340

No.	ISSUANCE AND REVISION DESCRIPTIONS	DATE	BY
1	HARDSCAPE PLAN REVISIONS	10/08/2024	MCH
2	HARDSCAPE PLAN REVISIONS	02/26/2025	MCH
3	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT

RIVER GORGE RANCH

AMENITY 1

COREY HOWARD — TENNESSEE — LICENSED PROFESSIONAL ENGINEER — 120.1.0 — 03/14/25

SCALE	1"=120'
DRAWN BY	TJF
DESIGNED BY	MCH
REVIEWED BY	JCW
DATE	08/09/24
PROJECT NO.	118723022

TITLE

OVERALL EROSION & SEDIMENT CONTROL PLAN

SHEET NUMBER

C3.95

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TN EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CRS	CONSTRUCTION ROAD STABILIZATION		
SB	SEDIMENT BASIN	PS	PERMANENT SEEDING
CD	CHECK DAM*	TS	TEMPORARY SEEDING
CE	CONSTRUCTION EXIT	MU	MULCHING
FR	FILTER RING*	MA	MATTING
SK	FLOATING SKIMMER	CW	CONCRETE TRUCK WASH OUT
IP	INLET PROTECTION	S	SWALE
OP	OUTLET PROTECTION	520	EXISTING CONTOUR (MSL)
SF	SILT FENCE*	520	NEW CONTOUR (MSL)

* Silt Sock of equivalent effectiveness may be used in lieu of Silt Fence, Filter Ring,and Check Dams

EROSION CONTROL DETAILS AND CHARTS ARE SHOWN ON SHEET C4.06, 4.07 AND C4.08

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CONTRACTOR TO DIRECT THE MAXIMUM AMOUNT OF STORMWATER RUN-OFF PRACTICAL TO THE SEDIMENT BASINS DURING ALL PHASES OF CONSTRUCTION

NORTH

GRAPHIC SCALE

50 0 25 50 100

1 inch = 50 ft.

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

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GUILD, TN 37340

No.	ISSUANCE AND REVISION DESCRIPTIONS	DATE	BY
1	HARDSCAPE PLAN REVISIONS	10/08/2024	MCH
2	HARDSCAPE PLAN REVISIONS	02/26/2025	MCH
3	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT
RIVER GORGE RANCH
AMENITY 1

COREY MICHAEL HOWARD — LICENSED PROFESSIONAL ENGINEER — STATE OF TENNESSEE — 03/14/25

SCALE	1"=50'
DRAWN BY	TJF
DESIGNED BY	MCH
REVIEWED BY	JCW
DATE	08/09/24
PROJECT NO.	118723022

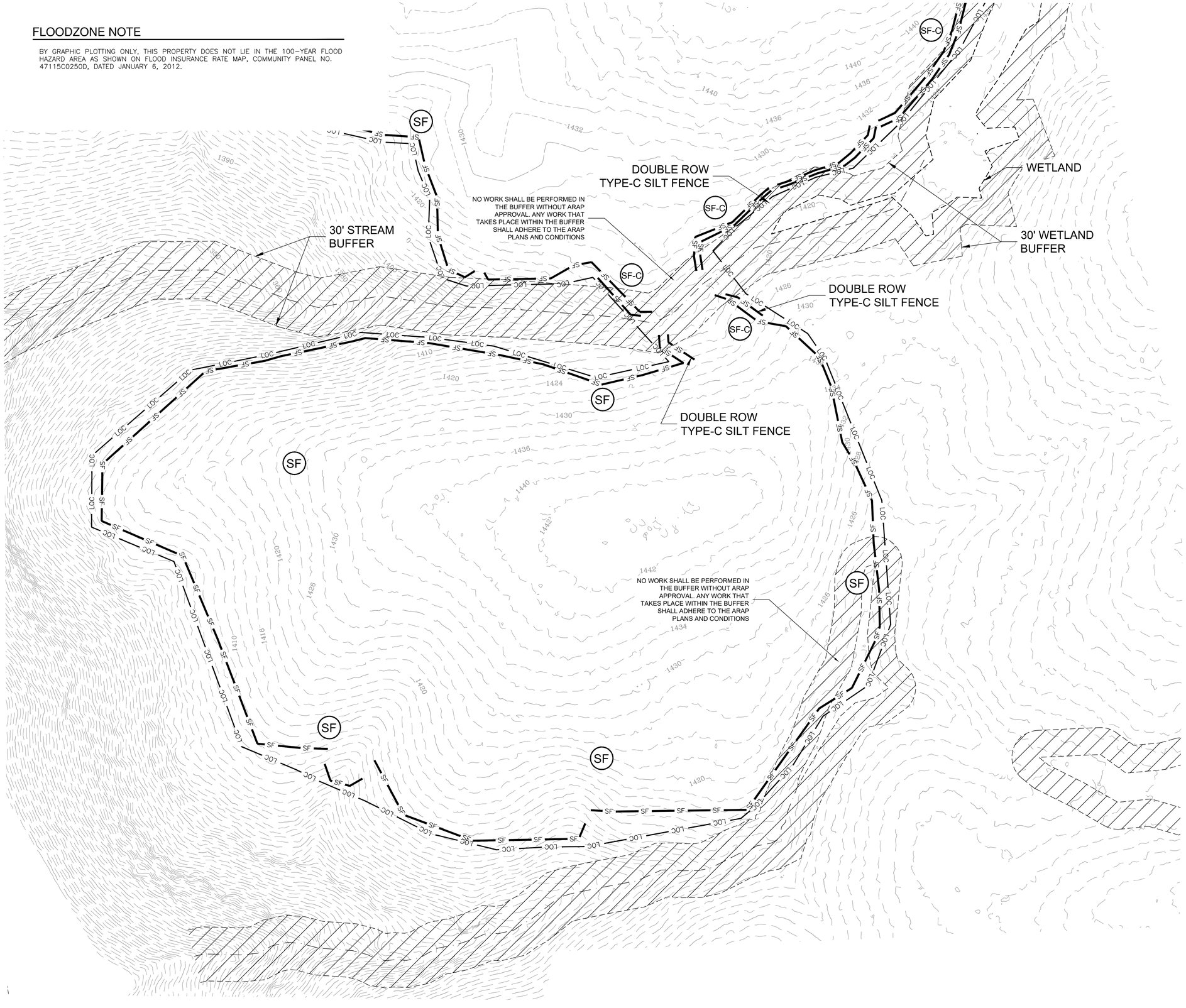
TITLE
EROSION & SEDIMENT CONTROL PLAN PHASE 1 (NORTHERN)

SHEET NUMBER
C4.00

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TN EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CRS	CONSTRUCTION ROAD STABILIZATION		
SB	SEDIMENT BASIN	PS	PERMANENT SEEDING
CD	CHECK DAM*	TS	TEMPORARY SEEDING
CE	CONSTRUCTION EXIT	MU	MULCHING
FR	FILTER RING*	MA	MATTING
SK	FLOATING SKIMMER	CW	CONCRETE TRUCK WASH OUT
IP	INLET PROTECTION	S	SWALE
OP	OUTLET PROTECTION	520	EXISTING CONTOUR (MSL)
SF	SILT FENCE*	520	NEW CONTOUR (MSL)

* Silt Sock of equivalent effectiveness may be used in lieu of Silt Fence, Filter Ring,and Check Dams

EROSION CONTROL DETAILS AND CHARTS ARE SHOWN ON SHEET C4.06, 4.07 AND C4.08

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CONTRACTOR TO DIRECT THE MAXIMUM AMOUNT OF STORMWATER RUN-OFF PRACTICAL TO THE SEDIMENT BASINS DURING ALL PHASES OF CONSTRUCTION

NORTH

GRAPHIC SCALE

50 0 25 50 100

1 inch = 50 ft.

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

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PREPARED BY

Kimley»Horn
537 MARKET ST. SUITE 202
CHATTANOOGA, TN 37402
PHONE 423.266.3501
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PREPARED FOR

THUNDER ENTERPRISES
10213 TN-156
GUILD, TN 37340
PHONE 423.265.0781

No.	ISSUANCE AND REVISION DESCRIPTIONS	DATE	BY
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2	HARDSCAPE PLAN REVISIONS	02/26/2025	MCH
3	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT

RIVER GORGE RANCH
AMENITY 1

COREY J. FREEMAN — LICENSED PROFESSIONAL ENGINEER — AGRICULTURE — COMMERCIAL — STATE OF TENNESSEE — 5/05/2025

SCALE	1"=50'
DRAWN BY	TJF
DESIGNED BY	MCH
REVIEWED BY	JCW
DATE	08/09/24
PROJECT NO.	118723022

TITLE
EROSION & SEDIMENT CONTROL PLAN PHASE 1 (SOUTHERN)

SHEET NUMBER
C4.01

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TN EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CRS	CONSTRUCTION ROAD STABILIZATION		
SB	SEDIMENT BASIN	PS	PERMANENT SEEDING
CD	CHECK DAM*	TS	TEMPORARY SEEDING
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FR	FILTER RING*	MA	MATTING
SK	FLOATING SKIMMER	CW	CONCRETE TRUCK WASH OUT
IP	INLET PROTECTION	S	SWALE
OP	OUTLET PROTECTION	520	EXISTING CONTOUR (MSL)
SF	SILT FENCE*	1520	NEW CONTOUR (MSL)

* Silt Sock of equivalent effectiveness may be used in lieu of Silt Fence, Filter Ring,and Check Dams

EROSION CONTROL DETAILS AND CHARTS ARE SHOWN ON SHEET C4.06, 4.07 AND C4.08

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CONTRACTOR TO DIRECT THE MAXIMUM AMOUNT OF STORMWATER RUN-OFF PRACTICAL TO THE SEDIMENT BASINS DURING ALL PHASES OF CONSTRUCTION

Restaurant
Lot 18
447,228 sf
10.27 Acres

Lot 19
13,286 sf

Lot 20
10,906 sf

Lot 21
10,616 sf

Lot 22
11,153 sf

Parking Lot 23
125,886 sf
2.89 Acres

Pavilion/Event
Lot 17
38,796 sf

Community
Lot 16
98,221 sf
2.25 Acres

SEDIMENT BASIN #P1-9

Lot 15
9,139 sf

Lot 14
7,647 sf

Lot 13
6,136 sf

Lot 12
6,136 sf

Lot 11
6,136 sf

Lot 10
6,136 sf

Lot 9
8,578 sf

Lot 8
8,578 sf

Lot 7
8,578 sf

Lot 6
8,578 sf

Lot 5
10,484 sf

Lot 4
9,950 sf

Lot 3
9,378 sf

Lot 2
8,313 sf

Community
Lot 1
11,117 sf

Lot 28
11,144 sf

Lot 27
7,041 sf

Lot 26
6,619 sf

Lot 25
9,523 sf

Lot 24
9,523 sf

Community
Lot 29
146,010 sf
3.35 Acres

WETLAND

30' WETLAND BUFFER

30' STREAM BUFFER

NO WORK SHALL BE PERFORMED IN THE BUFFER WITHOUT ARAP APPROVAL. ANY WORK THAT TAKES PLACE WITHIN THE BUFFER SHALL ADHERE TO THE ARAP PLANS AND CONDITIONS

FLOODZONE NOTE

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY DOES NOT LIE IN THE 100-YEAR FLOOD HAZARD AREA AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 47115C0250D, DATED JANUARY 6, 2012.

NORTH

GRAPHIC SCALE

50 0 25 50 100

1 inch = 50 ft.

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

811 Know what's **below.** **Call** before you dig.

IT IS THE CONTRACTORS RESPONSIBILITY TO CONTACT UTILITY COMPANIES PRIOR TO ANY CONSTRUCTION AS THE LOCATION OF UTILITIES SHOWN ON THIS PLAT ARE APPROXIMATE AND POSSIBLY INCOMPLETE. THEREFORE CERTIFICATION TO THE LOCATION OF ALL UNDERGROUND UTILITIES ARE WITHHELD.

PREPARED BY
Kimley»Horn
PHONE 423.266.3501
WWW.KIMLEY-HORN.COM
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537 MARKET ST. SUITE 202
CHATTANOOGA, TN 37402

PREPARED FOR
THUNDER ENTERPRISES
PHONE 423.265.0781
102 13 TN-156
GUILD, TN 37340

No.	ISSUANCE AND REVISION DESCRIPTIONS	DATE	BY
1	HARDSCAPE PLAN REVISIONS	10/08/2024	MCH
2	HARDSCAPE PLAN REVISIONS	02/26/2025	MCH
3	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT
RIVER GORGE RANCH
AMENITY 1

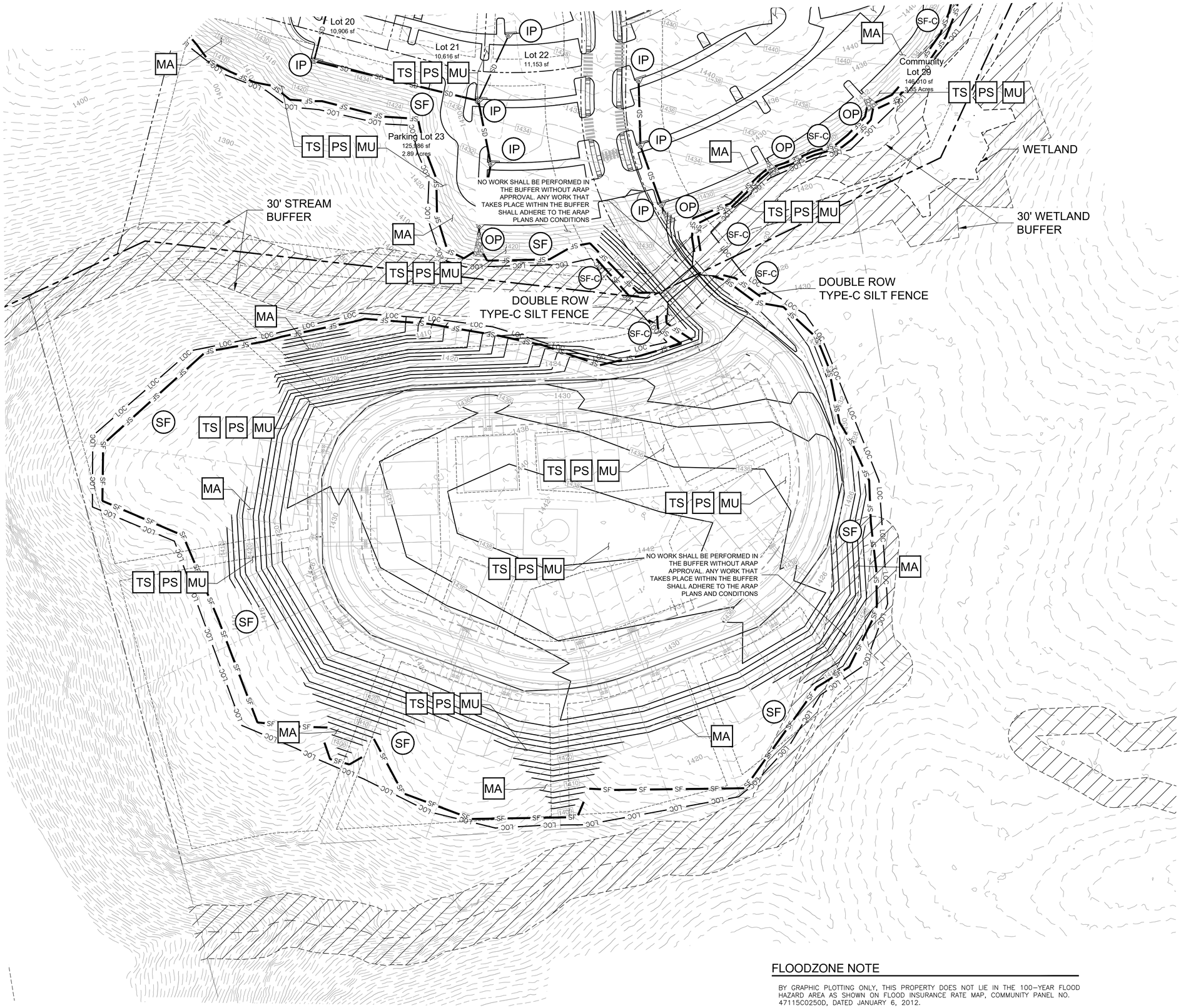
STATE OF TENNESSEE — MICHAEL CHRISTOPHER HOWARD — REGISTERED — CERTIFICATE NO. 140 — ENGINEER — 03/14/2025

SCALE	1"=50'
DRAWN BY	TJF
DESIGNED BY	MCH
REVIEWED BY	JCW
DATE	08/09/24
PROJECT NO.	118723022

TITLE
EROSION & SEDIMENT CONTROL PLAN PHASE 2 (NORTHERN)

SHEET NUMBER
C4.02

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TN EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CRS	CONSTRUCTION ROAD STABILIZATION		
SB	SEDIMENT BASIN	PS	PERMANENT SEEDING
CD	CHECK DAM*	TS	TEMPORARY SEEDING
CE	CONSTRUCTION EXIT	MU	MULCHING
FR	FILTER RING*	MA	MATTING
SK	FLOATING SKIMMER	CW	CONCRETE TRUCK WASH OUT
IP	INLET PROTECTION	S	SWALE
OP	OUTLET PROTECTION	520	EXISTING CONTOUR (MSL)
SF	SILT FENCE*	520	NEW CONTOUR (MSL)

* Silt Sock of equivalent effectiveness may be used in lieu of Silt Fence, Filter Ring,and Check Dams

EROSION CONTROL DETAILS AND CHARTS ARE SHOWN ON SHEET C4.06, 4.07 AND C4.08

"THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES."

CONTRACTOR TO DIRECT THE MAXIMUM AMOUNT OF STORMWATER RUN-OFF PRACTICAL TO THE SEDIMENT BASINS DURING ALL PHASES OF CONSTRUCTION

FLOODZONE NOTE

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY DOES NOT LIE IN THE 100-YEAR FLOOD HAZARD AREA AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 47115C0250D, DATED JANUARY 6, 2012.

NORTH

GRAPHIC SCALE

50 0 25 50 100

1 inch = 50 ft.

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

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PREPARED BY

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PREPARED FOR

THUNDER ENTERPRISES

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102 13 TN-156
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2	HARDSCAPE PLAN REVISIONS	02/26/2025	MCH
3	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT

RIVER GORGE RANCH

AMENITY 1

STATE OF TENNESSEE — DEPARTMENT OF AGRICULTURE — REGISTERED LANDSCAPE ARCHITECT — 03/13/2025

SCALE	1"=50'
DRAWN BY	TJF
DESIGNED BY	MCH
REVIEWED BY	JCW
DATE	08/09/24
PROJECT NO.	118723022

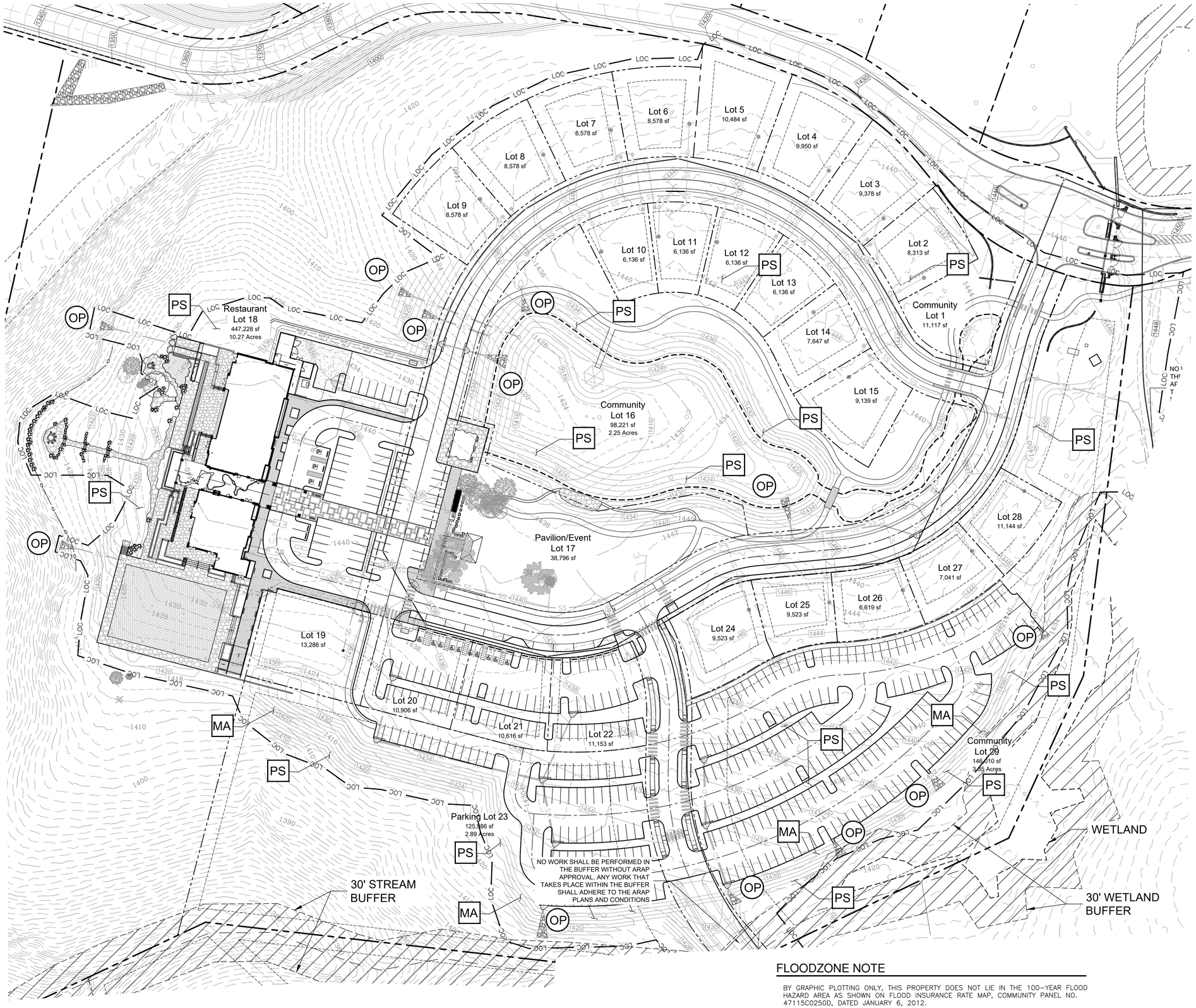
TITLE

EROSION & SEDIMENT CONTROL PLAN PHASE 2 (SOUTHERN)

SHEET NUMBER

C4.03

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TN EROSION CONTROL LEGEND			
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CRS	CONSTRUCTION ROAD STABILIZATION		
SB	SEDIMENT BASIN	PS	PERMANENT SEEDING
CD	CHECK DAM*	TS	TEMPORARY SEEDING
CE	CONSTRUCTION EXIT	MU	MULCHING
FR	FILTER RING*	MA	MATTING
SK	FLOATING SKIMMER	CW	CONCRETE TRUCK WASH OUT
IP	INLET PROTECTION	S	SWALE
OP	OUTLET PROTECTION	520	EXISTING CONTOUR (MSL)
SF	SILT FENCE*	520	NEW CONTOUR (MSL)

* Silt Sock of equivalent effectiveness may be used in lieu of Silt Fence, Filter Ring,and Check Dams

EROSION CONTROL DETAILS AND CHARTS ARE SHOWN ON SHEET C4.06, 4.07 AND C4.08

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FLOODZONE NOTE

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NORTH

GRAPHIC SCALE

50 0 25 50 100

1 inch = 50 ft.

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

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3	EROSION CONTROL CHANGES	03/13/2025	RMH

PREPARED BY

Kimley»Horn

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PREPARED FOR

THUNDER ENTERPRISES

10213 TN-156
GUILD, TN 37340
PHONE 423.265.0781

PROJECT

RIVER GORGE RANCH
AMENITY 1

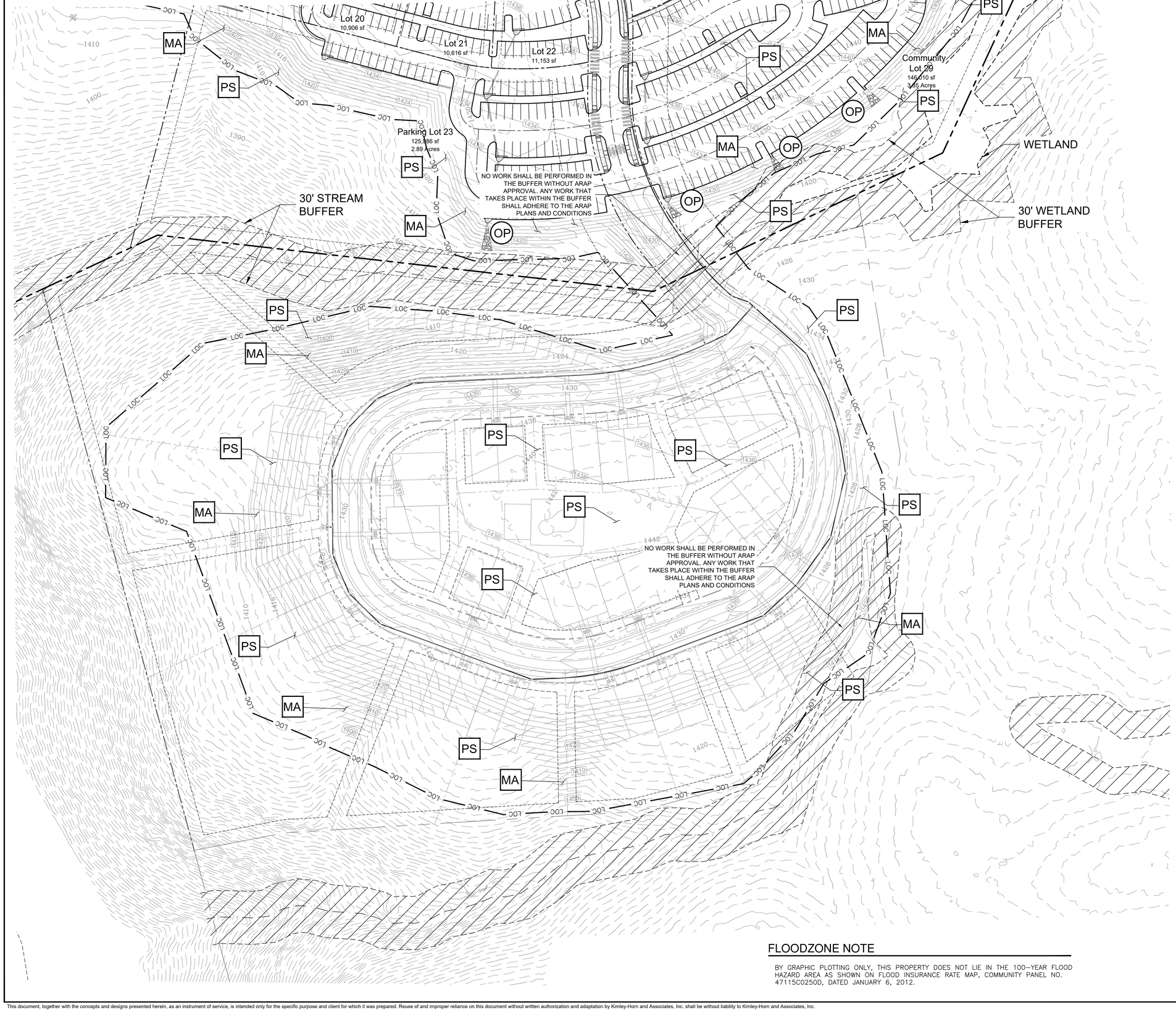
COREY KEITH HOWARD
LICENSED
LANDSCAPE ARCHITECT
AGRICULTURE
COMMERCE
STATE OF TENNESSEE
10/31/2025

SCALE	1"=50'
DRAWN BY	TJF
DESIGNED BY	MCH
REVIEWED BY	JCW
DATE	08/09/24
PROJECT NO.	118723022

TITLE
EROSION & SEDIMENT CONTROL PLAN PHASE 3 (NORTHERN)

SHEET NUMBER
C4.04

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TN EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CRS	CONSTRUCTION ROAD STABILIZATION		
SB	SEDIMENT BASIN	PS	PERMANENT SEEDING
CD	CHECK DAM*	TS	TEMPORARY SEEDING
CE	CONSTRUCTION EXIT	MU	MULCHING
FR	FILTER RING*	MA	MATTING
SK	FLOATING SKIMMER	CW	CONCRETE TRUCK WASH OUT
IP	INLET PROTECTION	S	SWALE
OP	OUTLET PROTECTION	520	EXISTING CONTOUR (MSL)
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* Silt Sock of equivalent effectiveness may be used in lieu of Silt Fence, Filter Ring,and Check Dams

EROSION CONTROL DETAILS AND CHARTS ARE SHOWN ON SHEET C4.06, 4.07 AND C4.08

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NORTH

GRAPHIC SCALE

50 0 25 50 100

1 inch = 50 ft.

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

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PREPARED BY
Kimley»Horn
PHONE 423.266.3501
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537 MARKET ST. SUITE 202
CHATTANOOGA, TN 37402

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10213 TN-156
GUILD, TN 37340
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3	EROSION CONTROL CHANGES	03/13/2025	RMH

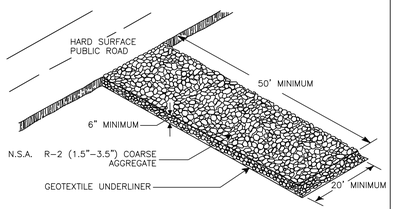
PROJECT
RIVER GORGE RANCH
AMENITY 1

SCALE 1"=50'
DRAWN BY TJF
DESIGNED BY MCH
REVIEWED BY JCW
DATE 08/09/24
PROJECT NO. 118723022

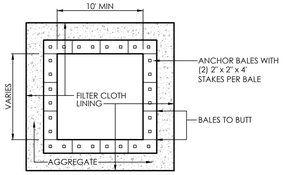
TITLE
EROSION & SEDIMENT CONTROL PLAN PHASE 3 (SOUTHERN)

SHEET NUMBER
C4.05

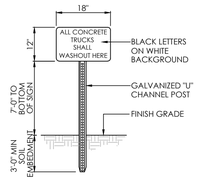
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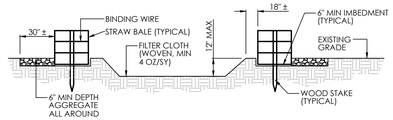
CE ***CRUSHED STONE CONSTRUCTION EXIT***
not to scale



PLAN



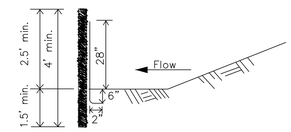
WASHOUT SIGN



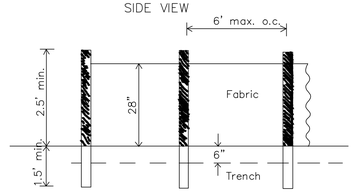
TYPICAL SECTION

NOTES:
1. WASHOUT AREA(S) SHALL BE INSTALLED IN A LOCATION EASILY ACCESSIBLE BY CONCRETE TRUCKS.
2. ONE OR MORE AREAS MAY BE INSTALLED ON THE CONSTRUCTION SITE AND MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
3. REMOVE ACCUMULATION OF SAND AND AGGREGATE WEEKLY AND DISPOSE OF PROPERLY.
4. WASHOUT SIGN SHALL BE PLACED IN A PROMINENT LOCATION AT WASHOUT AREA.

CW ***CONCRETE WASHOUT AREA***
not to scale



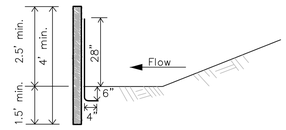
SIDE VIEW



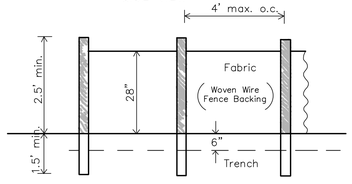
FRONT VIEW

NOTE:
Use 36" D.O.T. approved fabric.
Use wood or steel posts
Filter Sock may be used in lieu of Silt Fence

SF ***SILT FENCE - TYPE A***
not to scale



SIDE VIEW



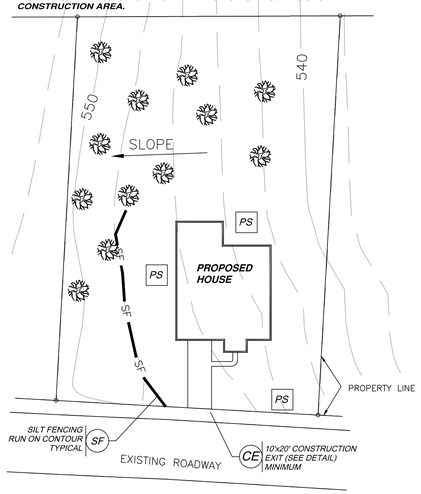
FRONT VIEW

NOTE:
Use 36" D.O.T. approved fabric.
Use wood or steel posts
Silt Soxx may be used in lieu of Silt Fence

SF-C ***SILT FENCE - TYPE C***
not to scale

NOTE:
ADDITIONAL EROSION CONTROL DEVICES SHALL BE USED AS REQUIRED.
GRADING AND CLEARING SHALL BE KEPT TO A MINIMUM.
SILT FENCE SHALL BE PLACED WITH CONTOURS.
EPSC MEASURES SHALL BE IN PLACE AND FUNCTIONAL BEFORE LAND DISTURBANCE ACTIVITIES BEGIN.

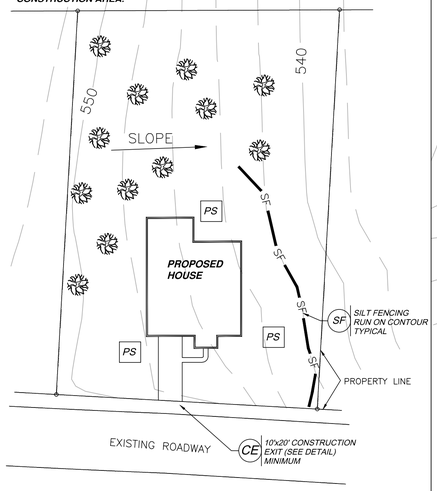
INSTALL SILT FENCING DOWN GRADIENT OF ON-SITE SEPTIC SYSTEM CONSTRUCTION AREA.



EROSION CONTROL FOR INDIVIDUAL LOT
not to scale

NOTE:
ADDITIONAL EROSION CONTROL DEVICES SHALL BE USED AS REQUIRED.
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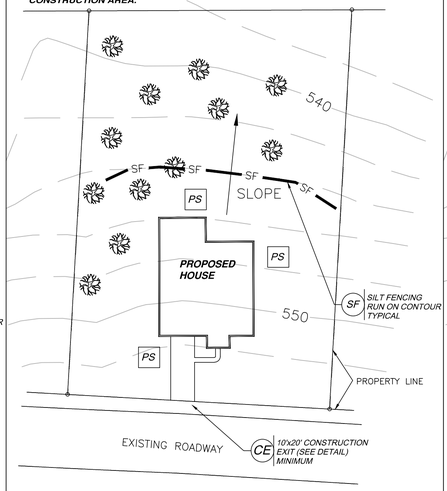
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EROSION CONTROL FOR INDIVIDUAL LOT
not to scale

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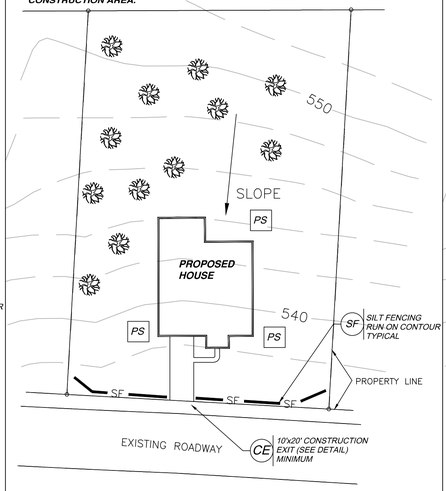
INSTALL SILT FENCING DOWN GRADIENT OF ON-SITE SEPTIC SYSTEM CONSTRUCTION AREA.



EROSION CONTROL FOR INDIVIDUAL LOT
not to scale

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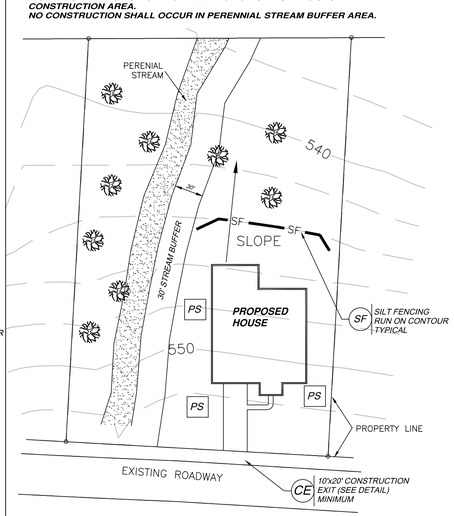
INSTALL SILT FENCING DOWN GRADIENT OF ON-SITE SEPTIC SYSTEM CONSTRUCTION AREA.



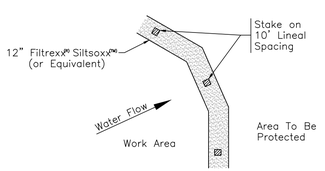
EROSION CONTROL FOR INDIVIDUAL LOT
not to scale

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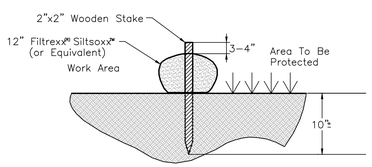
INSTALL SILT FENCING DOWN GRADIENT OF ON-SITE SEPTIC SYSTEM CONSTRUCTION AREA.
NO CONSTRUCTION SHALL OCCUR IN PERENNIAL STREAM BUFFER AREA.



EROSION CONTROL FOR INDIVIDUAL LOT
not to scale



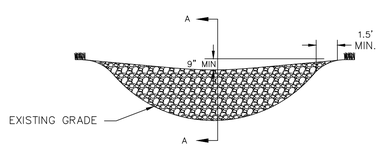
PLAN VIEW



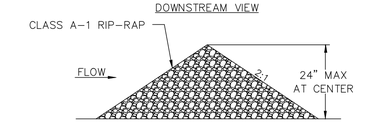
SECTION VIEW

1. ALL MATERIAL TO MEET MANUFACTURER'S SPECIFICATIONS
2. SOCK COMPOST/SOIL/ROCK/SEED FILL TO MEET APPLICATION REQUIREMENTS
3. SILTSOCK DEPICTED IS FOR MINIMUM SLOPES. GREATER SLOPES MAY REQUIRE LARGER SOCKS PER THE ENGINEER.
4. COMPOST MATERIAL TO BE REMOVED FROM SITE AT END OF PROJECT.

FS ***FILTER SOCK***
not to scale

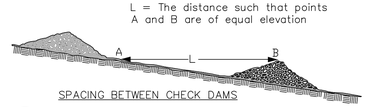


DOWNSTREAM VIEW



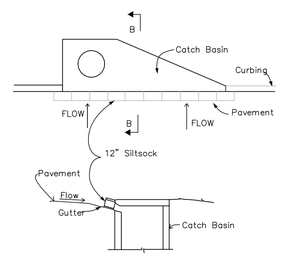
SECTION A-A

L = The distance such that points A and B are of equal elevation



SPACING BETWEEN CHECK DAMS

CD ***CHECK DAM***
not to scale



SECTION B-B

NOTE:
Install siltsock filter as shown if surface flow is directed to the curb inlet prior to or after pavement installation.

IP ***CURB INLET PROTECTION***
not to scale

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

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NO.	ISSUANCE AND REVISION DESCRIPTIONS	DATE	BY
1	HARDSCAPE PLAN REVISIONS	10/08/2024	MCH
2	HARDSCAPE PLAN REVISIONS	02/26/2025	MCH
3	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT
RIVER GORGE RANCH
AMENITY 1

COREY T. HOWARD
LICENSED PROFESSIONAL ENGINEER
STATE OF TENNESSEE
05/14/25

SCALE: AS SHOWN
DRAWN BY: TJF
DESIGNED BY: MCH
REVIEWED BY: JCW
DATE: 08/09/24
PROJECT NO.: 118723022

TITLE
EROSION & SEDIMENT CONTROL DETAILS

SHEET NUMBER
C4.06

TEMPORARY SEEDING FOR LATE WINTER AND EARLY SPRING

SPECIES	RATE (LB/ACRE)
RYE	120

SEEDING DATES
EAST ..... ABOVE 2500 FEET: FEB. 15 - MAY 15
BELOW 2500 FEET: FEB. 1- MAY 1
MIDDLE ..... JAN. 1 - MAY 1
WEST ..... DEC. 1 - APR. 15

SOIL AMENDMENTS
FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LB/ACRE 10-10-10 FERTILIZER.

MULCH
APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL.

MAINTENANCE
REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, REFERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE.

TEMPORARY SEEDING FOR SUMMER

SPECIES	RATE (LB/ACRE)
OATS	60
BROWN TOP MILLET	30

SEEDING DATES
EAST ..... MAY 15 - AUG. 15
MIDDLE ..... MAY 1 - AUG. 15
WEST ..... APR. 15 - AUG. 15

SOIL AMENDMENTS
FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LB/ACRE 10-10-10 FERTILIZER.

MULCH
APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL.

MAINTENANCE
REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, REFERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE.

TEMPORARY SEEDING FOR FALL

SPECIES	RATE (LB/ACRE)
OATS	30
WINTER WHEAT	30

SEEDING DATES
EAST ..... AUG 15 – DEC 15
MIDDLE ..... AUG. 15 – DEC 30
WEST ..... AUG. 15 – DEC 30

SOIL AMENDMENTS
FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LB/ACRE 10-10-10 FERTILIZER.

MULCH
APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL.

MAINTENANCE
REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, REFERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE. IF NECESSARY TO EXTEND TEMPORARY COVER BEYOND JUNE 15, OVERSEED WITH 50 LB/AC CRIMSON CLOVER IN LATE FEBRUARY OR EARLY MARCH.

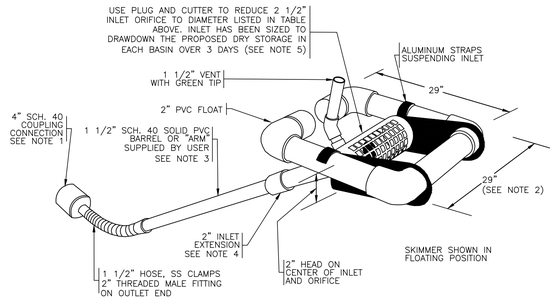
TS **STABILIZATION WITH TEMPORARY VEGETATION**

PEMANENT SEED MIXES USING NATIVES OR NATURALIZED PLANTS AND PLANTING DATES.
*NON-NATIVE BUT DO NOT SPREAD.

ZONE		BEST	MARGINAL	PREFERRED RATE/MIX (LB/AC PLS)
TN REGION III	>2500 FT ELEVATION; STEEP SLOPES	MAR 20 – APR 30	AUG 15 – AUG 30 MAR 1 – MAR 20 APR 20 – JUNE 15	15 BROWNTOP MILLET* (NURSE CROP) 5 PURPLETOP 10 LITTLE BLUESTEM 10 INDIAN GRASS
	<2500 FT ELEVATION; STEEP SLOPES	AUG 15 – SEPT 1 **MAR 1 – APR 1**	SEPT 1 – SEPT 15 APR 1 – JUNE 10	2 BLACK-EYED SUSAN 0.5 MONARDA (BERGAMOT) 4 MARYLAND SENNA
	>2500 FT ELEV.; SHALLOW SOILS	MAR 20 – APR 20	AUG 15 – AUG 30 MAR 5 – MAR 20 APRIL 20 – JUNE 15	15 BROWNTOP MILLET* (NURSE CROP) 4 PURPLETOP 10 LITTLE BLUESTEM 10 BROOMSEDGE
	<2500 FT ELEV.; SHALLOW SOILS	AUG 15 – SEPT 1 **MAR 1 – APR 1**	SEPT 1 – SEPT 15 APR 1 – JUNE 10	2 PARTRIDGE PEA 2 BLACK-EYED SUSAN 0.5 MONARDA (BERGAMOT)
	>2500 FT. ELEV.; MODERATE SLOPES	MAR 20 – APR 20	AUG 15 – AUG 30 MAR 5 – MAR 20 APR 20 – JUNE 15	15 BROWNTOP MILLET* (NURSE CROP) 4 PURPLETOP 10 LITTLE BLUESTEM 10 INDIAN GRASS
	<2500 FT. ELEV.; MODERATE SLOPES	AUG 15 – SEPT 1 **MAR 1 – APR 1**	SEPT 1 – SEPT 15 APR 1 – JUNE 10	2 BLACK-EYED SUSAN 0.5 MONARDA (BERGAMOT) 4 MARYLAND SENNA
	>2500 FT ELEV.; HIGH MAINTENANCE	**MAR 20 – APR 20**	AUG 15 – AUG 30 MAR 5 – MAR 20 APR 20 – JUNE 15	15 BROWNTOP MILLET* (NURSE CROP) 45 RED FESCUE* 45 HARD FESCUE* 25 CHEWING FESCUE*
	<2500 FT ELEV.; HIGH MAINTENANCE	AUG 15 – SEPT 1 **MAR 1 – APR 1**	SEPT 1 – SEPT 15 APR 1 – JUNE 10	

NOTE:
THE BOLDED AND UNDERLINED DATES ARE THE PREFERRED DATES FOR SEEDING. ALSO, HIGH MAINTENANCE AREAS INCLUDE LAWNS AND OTHER GRASSED AREAS THAT WILL BE MAINTAINED FOR AESTHETICS.

PS **STABILIZATION WITH PERMANENT VEGETATION**

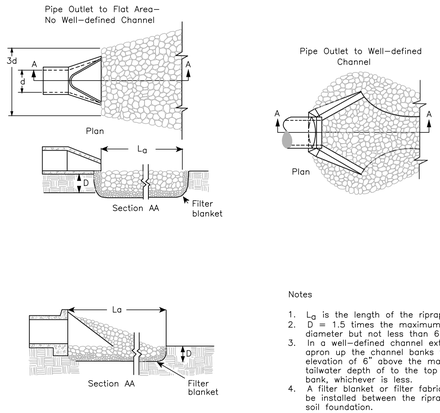


2" FAIRCLOTH SKIMMER (OR APPROVED EQUAL) NOTES

1. SKIMMER CAN BE ATTACHED TO A STRAIGHT 4" SCH 40 PIPE THROUGH THE DAM BUT THE PIPE MAY NEED TO BE ANCHORED TO THE BOTTOM AT THE CONNECTION SO IT IS SECURE. COUPLING CAN BE REMOVED AND HOSE ATTACHED TO OUTLET USING THE THREADED 2" FITTING. TYPICAL METHODS USED: ON A METAL STRUCTURE A STEEL STUBOUT WELDED ON THE SIDE AT THE BOTTOM WITH A 2" THREADED COUPLING OR REDUCERS; ON A CONCRETE STRUCTURE WITH A HOLE OR ORIFICE AT THE BOTTOM, USE A STEEL PLATE WITH A HOLE CUT IN IT AND COUPLING WELDED TO IT THAT WILL FIT OVER THE HOLE IN THE CONCRETE AND BOLTED TO THE STRUCTURE WITH SEALANT; GROUT A 4" PVC PIPE IN A HOLE IN THE CONCRETE TO CONNECT THE SKIMMER.
2. DIMENSIONS ARE APPROXIMATE, NOT INTENDED AS PLANS FOR CONSTRUCTION.
3. BARREL (SOLID, NOT FOAM CORE PIPE) SHOULD BE 1.4 TIMES THE DEPTH OF WATER WITH A MINIMUM LENGTH OF 6'SO THE INLET CAN BE PULLED TO THE SIDE FOR MAINTENANCE. IF MORE THAN 8' LONG WEIGHT MAY HAVE TO BE ADDED TO INLET TO COUNTER THE INCREASED BUOYANCY.
4. INLET TAPERS DOWN FROM 2" MAXIMUM INLET TO A 1 1/2" BARREL AND HOSE. BARREL IS SMALLER TO REDUCE BUOYANCY AND TENDENCY TO LIFT INLET BUT IS SUFFICIENT FOR FLOW THROUGH INLET BECAUSE OF SLOPE. THE INLET ORIFICE CAN BE REDUCED USING THE PLUG AND CUTTER PROVIDED TO CONTROL THE OUTFLOW RATE.
5. INLET IS 5" PIPE BETWEEN THE STRAPS WITH ALUMINUM SCREEN DOOR FOR ACCESS TO THE 2" INLET AND ORIFICE INSIDE.
6. SHIPPED ASSEMBLED. USER GLUES INLET EXTENSION AND BARREL, INSTALLS VENT, CUTS ORIFICE IN PLUG AND ATTACHES TO OUTLET PIPE OR STRUCTURE. INCLUDES FLEXIBLE HOSE, ROPE, ORIFICE CUTTER, ETC.
7. INSPECT SYSTEM REGULARLY TO ENSURE IT IS FUNCTIONING IN A CORRECT MANNER

OUTLET PROTECTION APRON					
PIPE DIAMETER	*APRON LENGTH (La)*	*APRON WIDTH AT HEADWALL (W1)*	*APRON WIDTH DOWNSTREAM (W2)*	*AVERAGE STONE DIAMETER (d50)*	*STONE DEPTH (D)*
12"	7'	3'	10'	2.5"	6"
15"	8'	3.75'	11.75'	3"	7"
18"	9'	4.5'	13.5'	3.5"	8"
24"	13'	6'	19'	5"	11.25"
30"	16'	7.5'	23.5'	6"	13.5"
36"	20'	9'	29'	7"	16"
42"	22'	10.5'	32.5'	8.5"	19.5"
48"	26'	12'	38'	10"	22.5"

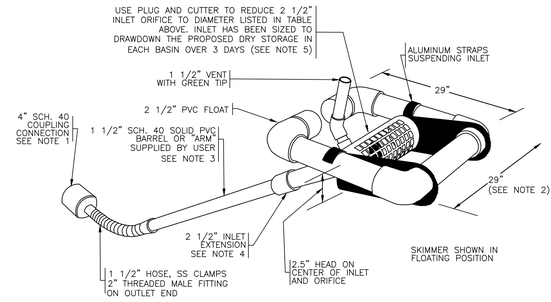
* RIP RAP APRON DESIGN MEETS THE MINIMUM SPECIFICATIONS FOR THE DISCHARGE AS DETERMINED BY THE TENNESSEE EROSION & SEDIMENT CONTROL HANDBOOK



Notes

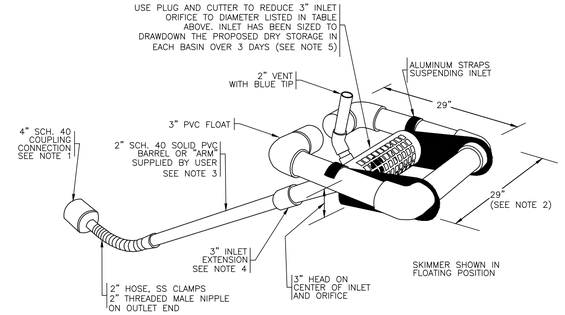
1. L_a is the length of the riprap apron.
2. D = 1.5 times the maximum stone diameter but not less than 6".
3. In a well–defined channel extend the apron up the channel banks to an elevation of 6" above the maximum tailwater depth of to the top of the bank, whichever is less.
4. A filter blanket or filter fabric should be installed between the riprap and soil foundation.

OP **STORM OUTLET PROTECTION**
not to scale



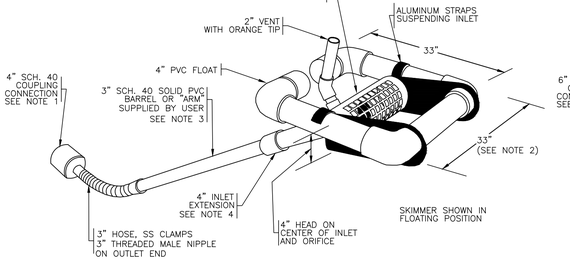
2.5" FAIRCLOTH SKIMMER (OR APPROVED EQUAL) NOTES

1. SKIMMER CAN BE ATTACHED TO A STRAIGHT 4" SCH 40 PIPE THROUGH THE DAM BUT THE PIPE MAY NEED TO BE ANCHORED TO THE BOTTOM AT THE CONNECTION SO IT IS SECURE. COUPLING CAN BE REMOVED AND HOSE ATTACHED TO OUTLET USING THE THREADED 2" FITTING. TYPICAL METHODS USED: ON A METAL STRUCTURE A STEEL STUBOUT WELDED ON THE SIDE AT THE BOTTOM WITH A 2" THREADED COUPLING OR REDUCERS; ON A CONCRETE STRUCTURE WITH A HOLE OR ORIFICE AT THE BOTTOM, USE A STEEL PLATE WITH A HOLE CUT IN IT AND COUPLING WELDED TO IT THAT WILL FIT OVER THE HOLE IN THE CONCRETE AND BOLTED TO THE STRUCTURE WITH SEALANT; GROUT A 4" PVC PIPE IN A HOLE IN THE CONCRETE TO CONNECT THE SKIMMER.
2. DIMENSIONS ARE APPROXIMATE, NOT INTENDED AS PLANS FOR CONSTRUCTION.
3. BARREL (SOLID, NOT FOAM CORE PIPE) SHOULD BE 1.4 TIMES THE DEPTH OF WATER WITH A MINIMUM LENGTH OF 8'SO THE INLET CAN BE PULLED TO THE SIDE FOR MAINTENANCE. IF MORE THAN 8' LONG WEIGHT MAY HAVE TO BE ADDED TO INLET TO COUNTER THE INCREASED BUOYANCY.
4. INLET TAPERS DOWN FROM 2 1/2" MAXIMUM INLET TO A 1 1/2" BARREL AND HOSE. BARREL IS SMALLER TO REDUCE BUOYANCY AND TENDENCY TO LIFT INLET BUT IS SUFFICIENT FOR FLOW THROUGH INLET BECAUSE OF SLOPE. THE INLET ORIFICE CAN BE REDUCED USING THE PLUG AND CUTTER PROVIDED TO CONTROL THE OUTFLOW RATE.
5. INLET IS 6" PIPE BETWEEN THE STRAPS WITH ALUMINUM SCREEN DOOR FOR ACCESS TO THE 2 1/2" INLET AND ORIFICE INSIDE.
6. SHIPPED ASSEMBLED. USER GLUES INLET EXTENSION AND BARREL, INSTALLS VENT, CUTS ORIFICE IN PLUG AND ATTACHES TO OUTLET PIPE OR STRUCTURE. INCLUDES FLEXIBLE HOSE, ROPE, ORIFICE CUTTER, ETC.
7. INSPECT SYSTEM REGULARLY TO ENSURE IT IS FUNCTIONING IN A CORRECT MANNER



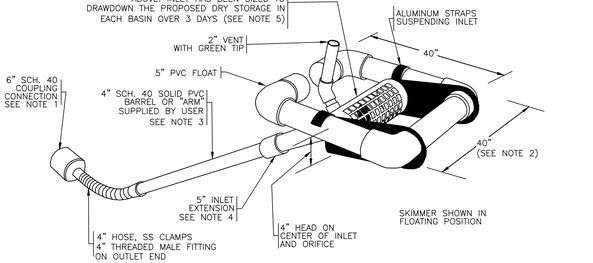
3" FAIRCLOTH SKIMMER (OR APPROVED EQUAL) NOTES

1. COUPLING CAN BE REMOVED AND HOSE ATTACHED TO OUTLET USING THE THREADED 2" NIPPLE. TYPICAL METHODS USED: ON A METAL STRUCTURE A STEEL STUBOUT WELDED ON THE SIDE AT THE BOTTOM WITH A 2" THREADED COUPLING OR REDUCERS; ON A CONCRETE STRUCTURE WITH A HOLE OR ORIFICE AT THE BOTTOM, USE A STEEL PLATE WITH A HOLE CUT IN IT AND COUPLING WELDED TO IT THAT WILL FIT OVER THE HOLE IN THE CONCRETE AND BOLTED TO THE STRUCTURE WITH SEALANT; GROUT A 4" PVC PIPE IN A HOLE IN THE CONCRETE TO CONNECT THE SKIMMER. IT CAN BE ATTACHED TO A STRAIGHT 4" SCH 40 PIPE THROUGH THE DAM BUT THE PIPE NEEDS TO BE ANCHORED TO THE BOTTOM AT THE CONNECTION SO IT IS SECURE.
2. DIMENSIONS ARE APPROXIMATE, NOT INTENDED AS PLANS FOR CONSTRUCTION.
3. BARREL (SOLID, NOT FOAM CORE PIPE) SHOULD BE 1.4 TIMES THE DEPTH OF WATER WITH A MINIMUM LENGTH OF 8'SO THE INLET CAN BE PULLED TO THE SIDE FOR MAINTENANCE. IF MORE THAN 10' LONG WEIGHT MAY HAVE TO BE ADDED TO INLET TO COUNTER THE INCREASED BUOYANCY.
4. INLET TAPERS DOWN FROM A 3" MAXIMUM INLET TO A 2" BARREL AND HOSE. BARREL IS SMALLER TO REDUCE BUOYANCY AND TENDENCY TO LIFT INLET BUT IS SUFFICIENT FOR FLOW THROUGH INLET BECAUSE OF SLOPE. THE INLET ORIFICE CAN BE REDUCED USING THE PLUG AND CUTTER PROVIDED TO CONTROL THE OUTFLOW RATE.
5. INLET IS 6" PIPE BETWEEN THE STRAPS WITH ALUMINUM SCREEN DOOR FOR ACCESS TO THE 3" INLET AND ORIFICE INSIDE.
6. SHIPPED ASSEMBLED. USER GLUES INLET EXTENSION AND BARREL, INSTALLS VENT, CUTS ORIFICE IN PLUG AND ATTACHES TO OUTLET PIPE OR STRUCTURE. INCLUDES FLEXIBLE HOSE, ROPE, ORIFICE CUTTER, ETC.
7. INSPECT SYSTEM REGULARLY TO ENSURE IT IS FUNCTIONING IN A CORRECT MANNER



4" FAIRCLOTH SKIMMER (OR APPROVED EQUAL) NOTES

1. COUPLING CAN BE REMOVED AND HOSE ATTACHED TO OUTLET USING THE THREADED 3" NIPPLE. TYPICAL METHODS USED: ON A METAL STRUCTURE A STEEL STUBOUT WELDED ON THE SIDE AT THE BOTTOM WITH A 3" THREADED COUPLING OR REDUCERS; ON A CONCRETE STRUCTURE WITH A HOLE OR ORIFICE AT THE BOTTOM, USE A STEEL PLATE WITH A HOLE CUT IN IT AND COUPLING WELDED TO IT THAT WILL FIT OVER THE HOLE IN THE CONCRETE AND BOLTED TO THE STRUCTURE WITH SEALANT. IT IS POSSIBLE TO GROUT A 4" PVC PIPE IN A HOLE IN THE CONCRETE TO CONNECT THE SKIMMER BUT THIS IS LESS SECURE THAN OTHER METHODS.
2. DIMENSIONS ARE APPROXIMATE, NOT INTENDED AS PLANS FOR CONSTRUCTION.
3. BARREL (SOLID, NOT FOAM CORE PIPE) SHOULD BE 1.4 TIMES THE DEPTH OF WATER WITH A MINIMUM LENGTH OF 8'SO THE INLET CAN BE PULLED TO THE SIDE FOR MAINTENANCE. IF MORE THAN 10' LONG WEIGHT MAY HAVE TO BE ADDED TO INLET TO COUNTER THE INCREASED BUOYANCY.
4. INLET TAPERS DOWN FROM A 4" MAXIMUM INLET TO A 3" BARREL AND HOSE. BARREL IS SMALLER TO REDUCE BUOYANCY AND TENDENCY TO LIFT INLET BUT IS SUFFICIENT FOR FLOW THROUGH INLET BECAUSE OF SLOPE. THE INLET ORIFICE CAN BE REDUCED USING THE PLUG AND CUTTER PROVIDED TO CONTROL THE OUTFLOW RATE.
5. INLET IS 8" PIPE BETWEEN THE STRAPS WITH SLOTS CUT IN THE INLET AND ALUMINUM SCREEN DOOR (SMALLER THAN SHOWN IN ILLUSTRATION) FOR ACCESS TO THE 4" INLET AND ORIFICE INSIDE.
6. SHIPPED ASSEMBLED. USER GLUES INLET EXTENSION AND BARREL, INSTALLS VENT, CUTS ORIFICE IN PLUG AND ATTACHES TO OUTLET PIPE OR STRUCTURE. INCLUDES FLEXIBLE HOSE, ROPE, ORIFICE CUTTER, ETC.
7. INSPECT SYSTEM REGULARLY TO ENSURE IT IS FUNCTIONING IN A CORRECT MANNER



5" FAIRCLOTH SKIMMER (OR APPROVED EQUAL) NOTES

1. SKIMMER CAN BE ATTACHED TO A STRAIGHT 4" SCH 40 PIPE THROUGH THE DAM BUT THE PIPE MAY NEED TO BE ANCHORED TO THE BOTTOM AT THE CONNECTION SO IT IS SECURE. COUPLING CAN BE REMOVED AND HOSE ATTACHED TO OUTLET USING THE THREADED 4" FITTING. TYPICAL METHODS USED: ON A METAL STRUCTURE A STEEL STUBOUT WELDED ON THE SIDE AT THE BOTTOM WITH A 4" THREADED COUPLING OR REDUCERS; ON A CONCRETE STRUCTURE WITH A HOLE OR ORIFICE AT THE BOTTOM, USE A STEEL PLATE WITH A HOLE CUT IN IT AND COUPLING WELDED TO IT THAT WILL FIT OVER THE HOLE IN THE CONCRETE AND BOLTED TO THE STRUCTURE WITH SEALANT; GROUT A 4" PVC PIPE IN A HOLE IN THE CONCRETE TO CONNECT THE SKIMMER.
2. DIMENSIONS ARE APPROXIMATE, NOT INTENDED AS PLANS FOR CONSTRUCTION.
3. BARREL (SOLID, NOT FOAM CORE PIPE) SHOULD BE 1.4 TIMES THE DEPTH OF WATER WITH A MINIMUM LENGTH OF 8' SO THE INLET CAN BE PULLED TO THE SIDE FOR MAINTENANCE. IF MORE THAN 10' LONG WEIGHT MAY HAVE TO BE ADDED TO INLET TO COUNTER THE INCREASED BUOYANCY.
4. INLET TAPERS DOWN FROM 5" MAXIMUM INLET TO A 4" BARREL AND HOSE. BARREL IS SMALLER TO REDUCE BUOYANCY AND TENDENCY TO LIFT INLET BUT IS SUFFICIENT FOR FLOW THROUGH INLET BECAUSE OF SLOPE. THE INLET ORIFICE CAN BE REDUCED USING THE PLUG AND CUTTER PROVIDED TO CONTROL THE OUTFLOW RATE.
5. INLET IS 8" PIPE BETWEEN THE STRAPS WITH ALUMINUM SCREEN DOOR FOR ACCESS TO THE 5" INLET AND ORIFICE INSIDE.
6. SHIPPED ASSEMBLED. USER GLUES INLET EXTENSION AND BARREL, INSTALLS VENT, CUTS ORIFICE IN PLUG AND ATTACHES TO OUTLET PIPE OR STRUCTURE. INCLUDES FLEXIBLE HOSE, ROPE, ORIFICE CUTTER, ETC.
7. INSPECT SYSTEM REGULARLY TO ENSURE IT IS FUNCTIONING IN A CORRECT MANNER

SK **SKIMMER DETAIL**
not to scale

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

811 Know what's **below.** **Call** before you dig.

IT IS THE CONTRACTORS RESPONSIBILITY TO CONTACT UTILITY COMPANIES PRIOR TO ANY CONSTRUCTION AS THE LOCATION OF UTILITIES SHOWN ON THIS PLAT ARE APPROXIMATE AND POSSIBLY INCOMPLETE. THEREFORE CERTIFICATION TO THE LOCATION OF ALL UNDERGROUND UTILITIES ARE WITHHELD.

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THUNDER ENTERPRISES
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GUILD, TN 37340

NO.	ISSUANCE AND REVISION DESCRIPTIONS	DATE	BY
1	HARDSCAPE PLAN REVISIONS	10/08/2024	MCH
2	HARDSCAPE PLAN REVISIONS	02/26/2025	MCH
3	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT
RIVER GORGE RANCH
AMENITY 1

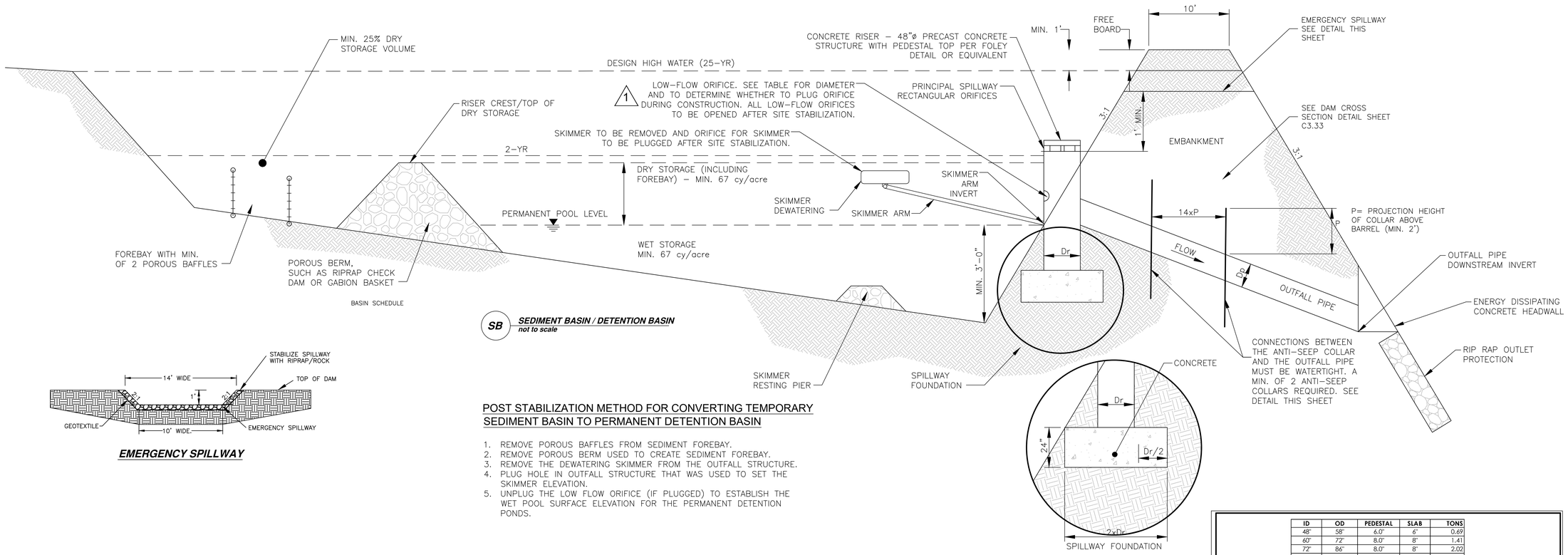


SCALE AS SHOWN
DRAWN BY TJF
DESIGNED BY MCH
REVIEWED BY JCW
DATE 08/09/24
PROJECT NO. 118723022

TITLE
EROSION & SEDIMENT CONTROL DETAILS

SHEET NUMBER
C4.07

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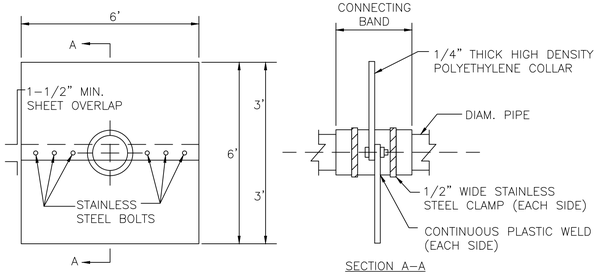
SB ***SEDIMENT BASIN / DETENTION BASIN***
not to scale

EMERGENCY SPILLWAY

POST STABILIZATION METHOD FOR CONVERTING TEMPORARY SEDIMENT BASIN TO PERMANENT DETENTION BASIN

1. REMOVE POROUS BAFFLES FROM SEDIMENT FOREBAY.
2. REMOVE POROUS BERM USED TO CREATE SEDIMENT FOREBAY.
3. REMOVE THE DEWATERING SKIMMER FROM THE OUTFALL STRUCTURE.
4. PLUG HOLE IN OUTFALL STRUCTURE THAT WAS USED TO SET THE SKIMMER ELEVATION.
5. UNPLUG THE LOW FLOW ORIFICE (IF PLUGGED) TO ESTABLISH THE WET POOL SURFACE ELEVATION FOR THE PERMANENT DETENTION PONDS.

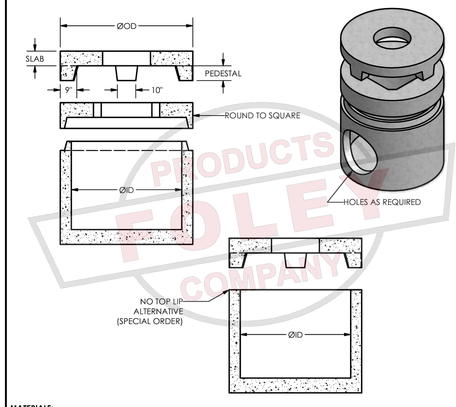
BASIN CONSTRUCTION		
	BASIN #P1-9	BASIN #P1-200
TOP OF EMBANKMENT ELEVATION	1,434.00	1,464.00
EMERGENCY SPILLWAY ELEVATION	1,431.25	1463.00
EMERGENCY SPILLWAY WIDTH	18" Pipe	10'
EMERGENCY SPILLWAY SIDESLOPE	N/A	3H:1V
FOREBAY CREST ELEVATION	1427.50	1462.20
FOREBAY BOTTOM ELEVATION	1,422.00	1,456.00
OUTFALL STRUCTURE AND OUTFALL PIPE CONSTRUCTION		
	BASIN #P1-9	BASIN #P1-10
CONCRETE RISER DIAMETER	4'	4'
PRINCIPAL SPILLWAY ELEVATION (RECTANGULAR ORIFICE)	1429.25	1461.00
PRINCIPAL SPILLWAY DIMENSIONS (W X H) (TIMES THREE (3) SIDES)	3.3' x 0.5'	3.3' x 0.5'
LOW FLOW ORIFICE ELEVATION / WET POOL ELEVATION (POST SITE STABILIZATION)	1427.25	1459.00
LOW FLOW ORIFICE DIAMETER	3"	3"
LOW FLOW ORIFICE PLUGGED OR OPEN DURING CONSTRUCTION	PLUG	PLUG
OUTFALL PIPE DIAMETER	15"	30"
OUTFALL PIPE LENGTH	124'	42'
OUTFALL PIPE UPSTREAM INVERT	1,423.25	1,457.00
OUTFALL PIPE DOWNSTREAM INVERT	1418.29	1455.32
SKIMMER ARM INVERT	1423.25	1,459.50
FLOATING SKIMMER ARM DIAMETER	2.5"	3.0"
FLOATING SKIMMER ORIFICE DIAMETER	2.0"	2.4"
SEDIMENT BASIN DESIGN PARAMETERS		
	BASIN #P1-9	BASIN #P1-10
TOTAL OFFSITE & ONSITE DRAINAGE AREA (AC.)	6.70	10.39
DESIGN STORM (2-YEAR) EVENT DEPTH (IN.)	3.75	3.75
PEAK FLOW FOR THE DESIGN STORM (2-YEAR) STORM EVENT (CFS)	0.11	12.65
PERMANENT POOL LEVEL / WET STORAGE ELEVATION (DURING CONSTRUCTION)	1423.25	1459.50
PERMANENT POOL / WET STORAGE VOLUME (CY) (DURING CONSTRUCTION)	8,519	696
DRY STORAGE ELEVATION	1,427.50	1,462.20
DRY STORAGE VOLUME (CY)	449	696
BOTTOM OF BASIN ELEVATION	1,416.00	1,452.00
FOREBAY VOLUME (CY)	112	174
DESIGN STORM (2-YEAR) ELEVATION (DURING CONSTRUCTION)	1,427.59	1,461.55
25-YEAR, 24-HOUR STORM ELEVATION (DURING CONSTRUCTION)	1,428.33	1,462.98
DESIGN STORM ABOVE WHICH THE BASIN WILL DISCHARGE VIA THE EMERGENCY SPILLWAY (DURING CONSTRUCTION)	100-YR	100-YR
ELEVATION OF THE RECEIVING MEDIUM DOWNSTREAM OF THE OUTFALL	1,418.29	1,455.32



ANTI-SEEP COLLAR

NOTES:
1. SEE SEDIMENT BASIN DETAIL IN THE TENNESSEE EROSION & SEDIMENT CONTROL HANDBOOK FOR LOCATION AND SPACING OF THE ANTISEEP COLLARS.
2. USE NO-SEEP ANTI-SEEP COLLAR OR ENGINEER APPROVED EQUIVALENT. CONTACT DAVID HURN WITH ADS FOR CONNECTION TO HP STORM CULVERTS AT (423) 208-7263. DIMENSIONS SHOWN MAY VARY. COORDINATE AND VERIFY WITH THE MANUFACTURER THE APPROPRIATE SIZE REQUIRED FOR EACH PIPE PRIOR TO ORDERING.

ID	OD	PEDESTAL	SLAB	TONS
48"	58"	6.0"	6"	0.69
60"	72"	8.0"	8"	1.41
72"	86"	8.0"	8"	2.02
84"	98"	7.0"	8"	2.62
96"	114"	7.5"	8"	3.54



MATERIALS:
CONCRETE: 4,000 PSI, TYPE I/II CEMENT
REINFORCEMENT PER ASTM C-478

NOTES:
FLEXIBLE CONNECTORS ARE AVAILABLE

PARTS SHOWN:
Ø60" PEDESTAL TOP
Ø60" ROUND TO SQUARE
Ø60" 4'-0" BASE W/ Ø34" HOLE

PRODUCTS FOLEY COMPANY | **ROUND PRECAST** PEDESTAL TOPS | 1.7

SEE SHEET C6.00 FOR PROJECT NOTES

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

811 Know what's **below.** **Call** before you dig.

IT IS THE CONTRACTORS RESPONSIBILITY TO CONTACT UTILITY COMPANIES PRIOR TO ANY CONSTRUCTION AS THE LOCATION OF UTILITIES SHOWN ON THIS PLAT ARE APPROXIMATE AND POSSIBLY INCOMPLETE. THEREFORE CERTIFICATION TO THE LOCATION OF ALL UNDERGROUND UTILITIES ARE WITHHELD.

PREPARED BY
Kimley»Horn
PHONE 423.266.3501
WWW.KIMLEY-HORN.COM
537 MARKET ST. SUITE 202
CHATTANOOGA, TN 37402
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PREPARED FOR
THUNDER ENTERPRISES
PHONE 423.265.0781
10213 TN-156
GUILD, TN 37340

No.	ISSUANCE AND REVISION DESCRIPTIONS	DATE	BY
1	HARDSCAPE PLAN REVISIONS	10/08/2024	MCH
2	HARDSCAPE PLAN REVISIONS	02/26/2025	MCH
3	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT
RIVER GORGE RANCH
AMENITY 1

COREY HOWARD HODGE — LICENSED PROFESSIONAL ENGINEER — AGRICULTURE — 03/14/2025 — SUMMERSVILLE, GA — STATE OF TENNESSEE

SCALE	AS SHOWN
DRAWN BY	TJF
DESIGNED BY	MCH
REVIEWED BY	JCW
DATE	08/09/24
PROJECT NO.	118723022

TITLE
EROSION & SEDIMENT CONTROL DETAILS

SHEET NUMBER
C4.08

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FLOODZONE NOTE

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY DOES NOT LIE IN THE 100-YEAR FLOOD HAZARD AREA AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 47115C0250D, DATED JANUARY 6, 2012.

TN EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CRS	CONSTRUCTION ROAD STABILIZATION		
SB	SEDIMENT BASIN	PS	PERMANENT SEEDING
CD	CHECK DAM*	TS	TEMPORARY SEEDING
CE	CONSTRUCTION EXIT	MU	MULCHING
FR	FILTER RING*	MA	MATTING
SK	FLOATING SKIMMER	CW	CONCRETE TRUCK WASH OUT
IP	INLET PROTECTION	S	SWALE
OP	OUTLET PROTECTION	520	EXISTING CONTOUR (MSL)
SF	SILT FENCE*	520	NEW CONTOUR (MSL)

* Silt Sock of equivalent effectiveness may be used in lieu of Silt Fence, Filter Ring,and Check Dams

EROSION CONTROL DETAILS AND CHARTS ARE SHOWN ON SHEET C4.50, 4.51 AND C4.52

NO WORK SHALL BE PERFORMED IN THE BUFFER WITHOUT ARAP APPROVAL. ANY WORK THAT TAKES PLACE WITHIN THE BUFFER SHALL ADHERE TO THE ARAP PLANS AND CONDITIONS

30' WETLAND BUFFER

WETLAND

DOUBLE ROW TYPE-C SILT FENCE

30' WETLAND BUFFER

WETLAND

MATCHLINE

DOUBLE ROW TYPE-C SILT FENCE

MATCHLINE

DOUBLE ROW TYPE-C SILT FENCE

30' WETLAND BUFFER

WETLAND

"THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES."

CONTRACTOR TO DIRECT THE MAXIMUM AMOUNT OF STORMWATER RUN-OFF PRACTICAL TO THE SEDIMENT BASINS DURING ALL PHASES OF CONSTRUCTION

NORTH

GRAPHIC SCALE

60 0 30 60 120

1 inch = 60 ft.

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

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PREPARED BY

Kimley»Horn

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CHATTANOOGA, TN 37402

PREPARED FOR

THUNDER ENTERPRISES
10213 TN-156
GUILD, TN 37340
PHONE 423.265.0781

No.	ISSUANCE AND REVISION DESCRIPTIONS	DATE	BY
1	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT

RIVER GORGE RANCH
PHASE 2A

COREY HOWARD
LICENSED PROFESSIONAL ENGINEER
IN AGRICULTURE
03/13/25
COMMISSION EXPIRES: 11/30/2026
STATE OF TENNESSEE

SCALE	1"=60'
DRAWN BY	TJF
DESIGNED BY	MCH
REVIEWED BY	JCW
DATE	09/26/24
PROJECT NO.	118723022

TITLE
PHASE 1 LPP SYSTEM SEDIMENT AND EROSION CONTROL PLAN

SHEET NUMBER
C4.10

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FLOODZONE NOTE

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TN EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CRS	CONSTRUCTION ROAD STABILIZATION		
SB	SEDIMENT BASIN	PS	PERMANENT SEEDING
CD	CHECK DAM*	TS	TEMPORARY SEEDING
CE	CONSTRUCTION EXIT	MU	MULCHING
FR	FILTER RING*	MA	MATTING
SK	FLOATING SKIMMER	CW	CONCRETE TRUCK WASH OUT
IP	INLET PROTECTION	S	SWALE
OP	OUTLET PROTECTION	520	EXISTING CONTOUR (MSL)
SF	SILT FENCE*	1520	NEW CONTOUR (MSL)

* Silt Sock of equivalent effectiveness may be used in lieu of Silt Fence, Filter Ring,and Check Dams

EROSION CONTROL DETAILS AND CHARTS ARE SHOWN ON SHEET C4.50, 4.51 AND C4.52

PREVIOUSLY INSTALLED UNDER PROJECT PHASE 1A

NO WORK SHALL BE PERFORMED IN THE BUFFER WITHOUT ARAP APPROVAL. ANY WORK THAT TAKES PLACE WITHIN THE BUFFER SHALL ADHERE TO THE ARAP PLANS AND CONDITIONS

30' WETLAND BUFFER

WETLAND

DOUBLE ROW TYPE-C SILT FENCE

MATCHLINE

SEDIMENT BASIN #P1-200

"THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES."

CONTRACTOR TO DIRECT THE MAXIMUM AMOUNT OF STORMWATER RUN-OFF PRACTICAL TO THE SEDIMENT BASINS DURING ALL PHASES OF CONSTRUCTION

NORTH

GRAPHIC SCALE

60 0 30 60 120

1 inch = 60 ft.

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

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PREPARED BY

Kimley»Horn

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CHATTANOOGA, TN 37402

PREPARED FOR

THUNDER ENTERPRISES
PHONE 423.265.0781
10213 TN-156
GUILD, TN 37340

No.	ISSUANCE AND REVISION DESCRIPTIONS	DATE	BY
1	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT

RIVER GORGE RANCH
PHASE 2A

COREY KEITH HOWARD
LICENSED PROFESSIONAL ENGINEER
AGRICULTURE
COMMERCIAL
RESIDENTIAL
2025
TENNESSEE

SCALE	1"=60'
DRAWN BY	TJF
DESIGNED BY	MCH
REVIEWED BY	JCW
DATE	09/26/24
PROJECT NO.	118723022

TITLE
PHASE 2 LPP SYSTEM SEDIMENT AND EROSION CONTROL PLAN

SHEET NUMBER
C4.11

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TN EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CRS	CONSTRUCTION ROAD STABILIZATION		
SB	SEDIMENT BASIN	PS	PERMANENT SEEDING
CD	CHECK DAM*	TS	TEMPORARY SEEDING
CE	CONSTRUCTION EXIT	MU	MULCHING
FR	FILTER RING*	MA	MATTING
SK	FLOATING SKIMMER	CW	CONCRETE TRUCK WASH OUT
IP	INLET PROTECTION	S	SWALE
OP	OUTLET PROTECTION	520	EXISTING CONTOUR (MSL)
SF	SILT FENCE*	520	NEW CONTOUR (MSL)

* Silt Sock of equivalent effectiveness may be used in lieu of Silt Fence, Filter Ring,and Check Dams

EROSION CONTROL DETAILS AND CHARTS ARE SHOWN ON SHEET C4.50, 4.51 AND C4.52

PREVIOUSLY INSTALLED UNDER PROJECT PHASE 1A

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30' WETLAND BUFFER

WETLAND

MATCHLINE

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CONTRACTOR TO DIRECT THE MAXIMUM AMOUNT OF STORMWATER RUN-OFF PRACTICAL TO THE SEDIMENT BASINS DURING ALL PHASES OF CONSTRUCTION

NORTH

GRAPHIC SCALE

60 0 30 60 120

1 inch = 60 ft.

24-HOUR CONTACT: CLARENCE HOWARD
THUNDER ENTERPRISES
(423) 421-9775

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PREPARED FOR
THUNDER ENTERPRISES
10213 TN-156
GUILD, TN 37340
PHONE 423.265.0781

No.	ISSUANCE AND REVISION DESCRIPTIONS	DATE	BY
1.	EROSION CONTROL CHANGES	03/13/2025	RMH

PROJECT
RIVER GORGE RANCH
PHASE 2A

COREY C. HODGE
LICENSED PROFESSIONAL ENGINEER
09/26/25
STATE OF TENNESSEE

SCALE	1"=60'
DRAWN BY	TJF
DESIGNED BY	MCH
REVIEWED BY	JCW
DATE	09/26/24
PROJECT NO.	118723022

TITLE
PHASE 3 LPP SYSTEM SEDIMENT AND EROSION CONTROL PLAN

SHEET NUMBER
C4.12

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EXHIBIT 5:
Wastewater Flows
Table

Table 1: Estimated Wastewater Flows
Amenity 1 Center Complex
River Gorge Ranch

Source	2-Person Bedrooms	Restaurant Seats	Assembly Capacity	Toilet Fixtures	Persons	Generation Rate (gpd/person)	Generation Rate (gpd /1,000 SF)	Total Flow (gpd)	Notes
Cabins:									
1-bedroom (7)	7				14	75		1,050	1
2-bedroom (7)	14				28	75		2,100	1
Duplex Residences									
2-bedroom (10)					30	100		3,000	2
Townhome Residences:									
3-bedroom (44)					132	100		13,200	2
Amenity Building:									
Main area				5			125	625	
Catering		50			100	7		700	
Pool					50	10		500	
Restaurant:									
Lounge/Bar		83			332	5		1,660	3
Main restaurant A		463			1,852	9		16,668	3
Venue restaurant B		254			254	12		3,048	4
Commercial Buildings				12			125	1,500	
Miscellaneous Allowance								1,000	
Total Daily Flow								**45,051**	
Notes:									
(1) Assuming 2 persons per bedroom. Fully occupied.									
(2) Assuming 3 persons per residence. Fully occupied.									
(3) Assuming 4 turns per day.									
(4) Single-serving event.									

The majority of the flow arises from the townhomes and the restaurants.

Not included in the above flow estimate is the wastewater generated in the microbrewery, which will be collected separately and periodically hauled away.

The owner has indicated that there will be no roll-away or hide-away beds allowed in the cabins, so the cabin occupancy will be based on bedrooms. There are no laundry facilities in the cabins.

EXHIBIT 6:
FINANCIAL STATEMENTS

Balance Sheet

INTEGRATED RESOURCE MANAGEMENT, INC

As of December 31, 2024

DISTRIBUTION ACCOUNT	TOTAL
Assets	
Current Assets	
Bank Accounts	
131 Operating Accounts	0
131.03 NFB - Douglas Land Reserve Acct	254,118.95
131.04 1st HorizonPrimary Check (7405)	782.54
131.05 1st Horizon 2nd Acct (5221)	951.85
Total for 131 Operating Accounts	**$255,853.34**
132 Special Deposit	0
132.06 1st Horizon Escrow 4321	61,359.84
132.07 1st Horizon Sec Deposit 4251	1,971.55
Total for 132 Special Deposit	**$63,331.39**
Total for Bank Accounts	**$319,184.73**
Accounts Receivable	
141 Customer Account Receivables	
Total for Accounts Receivable	**0**
Other Current Assets	
186 Misc Deferred Debits	0
186.20 Prepaid Bonding Cost	
Total for 186 Misc Deferred Debits	**0**
255.00 Loan to/from IRM C & C	
Total for Other Current Assets	**0**
Total for Current Assets	**$319,184.73**
Fixed Assets	
101T Utility Plant in Service	0
108T Accumulated Depreciation	-596,102.14
351T Organization	0
351.00T Organization Enterprise	66,553.00
351.07T Organization Wild Briar	575.00
351.10T Organization Mtn Shangrilla	400.00
351.11T Organization - Mtn Reflections	
351.12T Organization - Lost Creek	550.00
351.13T Organization - Bird's Breek	
351.14T Organization - Ahley Meadows	
351.99T Organization - Accum Amortiz	

Balance Sheet

INTEGRATED RESOURCE MANAGEMENT, INC

As of December 31, 2024

DISTRIBUTION ACCOUNT	TOTAL
Total for 351T Organization	**$68,078.00**
353T Land & Land Rights	0
353.00T Land Enterprise	30,763.00
353.04T Land - Emory Point	55,600.00
353.05T Land - Compass Point	940.00
353.07T Land - Wild Briar	2,100.00
Total for 353T Land & Land Rights	**$89,403.00**
363T Customer Service	0
363.04T Customer Service - Emory Point	45,000.00
Total for 363T Customer Service	**$45,000.00**
364T Flow Measuring Devices	0
364.00T Flow Measure - Enterprise	444.91
364.04T Flow Measure - Emory Point	1,402.14
364.05T Flow Measure - Compass Point	398.87
364.07T Flow Measure - Wild Briar	219.67
364.09T Flow Measure - STerling Springs	1,200.00
Total for 364T Flow Measuring Devices	**$3,665.59**
380T Treatment & Disposal Equip	0
380.04T Emory Point	210,000.00
380.05T Compass Point	130,000.00
380.09T Sterling Springs	380,000.00
380.10T Treatment & Disposal Equip - Other	170,000.00
Total for 380T Treatment & Disposal Equip	**$890,000.00**
389T Plant & Misc	0
389.00T Enterprise	1,126.48
389.01T Hardware & Software	8,802.00
Total for 389T Plant & Misc	**$9,928.48**
Total for 101T Utility Plant in Service	**$509,972.93**
Total for Fixed Assets	**$509,972.93**
Other Assets	
Total for Assets	**$829,157.66**

Balance Sheet

INTEGRATED RESOURCE MANAGEMENT, INC

As of December 31, 2024

DISTRIBUTION ACCOUNT	TOTAL
Liabilities and Equity	
Liabilities	
Current Liabilities	
Accounts Payable	
231 Accounts Payable	0
231.10 A/P Aquatics Resources	
Total for 231 Accounts Payable	**0**
Total for Accounts Payable	**0**
Credit Cards	
131.09 IRM VIsa Payable	17,539.63
Total for Credit Cards	**$17,539.63**
Other Current Liabilities	
195.00 Loan from J Cox	
234 Due to IRM C&C	65,905.89
235.03 Customer Deposits - Dougls Land	254,118.95
235 Customer Deposits	$1,893.67
235.05 Customer Deposits	
235.10 Escrow Depsoits	
Total for 235 Customer Deposits	**$1,893.67**
Total for Other Current Liabilities	**$321,918.51**
Total for Current Liabilities	**$339,458.14**
Long-term Liabilities	
232 Notes Payable	0
232.10 US Bank	
Total for 232 Notes Payable	**0**
271 Contribution in Aid of Const.	1,106,075.00
272 Accum Amort. of Contributions	-596,102.07
Total for Long-term Liabilities	**$509,972.93**
Total for Liabilities	**$849,431.07**
Equity	
215 Retained Earnings	3,943.01
Net Income	-25,216.42
201 Common Stock	1,000.00
216 Opening Balance Equity	
Total for Equity	**-$20,273.41**
Total for Liabilities and Equity	**$829,157.66**

Statement of Cash Flows

INTEGRATED RESOURCE MANAGEMENT, INC

January 1-December 31, 2024

FULL NAME	TOTAL
OPERATING ACTIVITIES	
Net Income	-25,216.42
Adjustments to reconcile Net Income to Net Cash provided by operations:	
131.09 IRM VIsa Payable	6,125.51
234 Due to IRM C&C	37,804.17
235.03 Customer Deposits - Dougls Land	1.00
235 Customer Deposits	-180.00
Total for Adjustments to reconcile Net Income to Net Cash provided by operations:	**$43,750.68**
Net cash provided by operating activities	**$18,534.26**
INVESTING ACTIVITIES	
108T Utility Plant in Service:Accumulated Depreciation	35,998.00
Net cash provided by investing activities	**$35,998.00**
FINANCING ACTIVITIES	
272 Accum Amort. of Contributions	-35,998.00
Net cash provided by financing activities	**-$35,998.00**
NET CASH INCREASE FOR PERIOD	**$18,534.26**
Cash at beginning of period	**$300,650.47**
CASH AT END OF PERIOD	**$319,184.73**

Profit and Loss

INTEGRATED RESOURCE MANAGEMENT, INC

January 1-December 31, 2024

DISTRIBUTION ACCOUNT	TOTAL
Income	
400 Operating Revenue	0
212 Commercial Revenues	0
521.5 Commercial with Food	2,480.25
521.6 Commercial without Food	313,450.30
Total for 212 Commercial Revenues	**$315,930.55**
521.1 Residential Revenues	$1,489.76
5211.04 Emory Pointe	17,397.14
5211.05 Compass Pointe	6,104.23
5211.07 Wild Briar	1,562.00
5211.09 Grand View	7,560.50
5211.15 Flat Hollow	4,215.63
5212.01 Cove Mountain Realty	4,002.96
5212.02 Valley Mart Exxon	5,647.47
5212.03 Lot 23 River Club	1,584.00
5212.17 Lost Creek Campground	12,369.60
5212.18 Mountain Shangrila	-244.01
5221.20 Cove Creek	7,421.76
5221.21 Riverstone Estates	23,199.44
5221.22 Waterside on Douglas Lake	33,960.52
5221.23 ISHA	40,498.38
5221.24 Paradise Pointe	1,040.00
Total for 521.1 Residential Revenues	**$167,809.38**
Total for 400 Operating Revenue	**$483,739.93**
Total for Income	**$483,739.93**
Cost of Goods Sold	
Gross Profit	**$483,739.93**
Expenses	
60200 Automobile Expense	161.60
61700 Computer and Internet Expenses	266.14
700 Operating Expenses	0
427 Interest Exp	16.75
60400 Bank Service Charges	2,607.71
63400 Interest Expense	2,237.93
64900 Office Supplies	821.67

Profit and Loss

INTEGRATED RESOURCE MANAGEMENT, INC

January 1-December 31, 2024

DISTRIBUTION ACCOUNT	TOTAL
66700 Professional Fees	900.00
68400 Travel Expense	253.02
715 Purchase Power	0
715.01 ISHA	510.57
715.04 Emory Pointe	650.67
715.05 Compass Pointe	624.06
715.07 Wild Briar	1,736.00
715.09 Grand View	2,541.00
715.10 MT SHANGRILA WAY	1,714.00
715.11 FLAT HOLLOW	616.14
715.12 RIVERSTONE	0
715.12A MARINA WAY	229.26
715.12B ADAM LOOP	267.29
715.12C JENNIFER LANE	295.54
Total for 715.12 RIVERSTONE	**$792.09**
715.13 Paradise Pointe	288.61
Total for 715 Purchase Power	**$9,473.14**
720 Material & Supplies	0
720.001 Office Supplies	2,317.81
720.00 Office	26.21
Total for 720 Material & Supplies	**$2,344.02**
730 Contractual Services - Billing	4,280.53
731 Contractual Services - Profess	0
731.91 Professional Services	350.00
731.92 Legal Services	23,016.72
731.93 Accounting	11,070.00
731.94 Consulting	
731.95 Billing Services	4,679.19
Total for 731 Contractual Services - Profess	**$39,115.91**
736 Contractual SErvices - Other	0
736.01 Contract Services - IRM C&C	148,200.00
736.02 Computer Repairs	7,054.87
Total for 736 Contractual SErvices - Other	**$155,254.87**
740 Rents	42,150.00
755 Insurance Expense	207.00

Profit and Loss

INTEGRATED RESOURCE MANAGEMENT, INC

January 1-December 31, 2024

DISTRIBUTION ACCOUNT	TOTAL
775 Miscellaneous	0
775.10 Travel/Meals/Entertainment	148.56
775.11 Travel	53.87
775.13 Entertainment	4.95
775.15 Telephone Exp	3,650.86
775.18 Maintenance Exp - Routine	176,825.40
775.19 Maintenance Exp - Non Rountine	48,092.23
775.20 Pumping Expense	2,925.00
775.23 Monitoring	9,900.00
775.24 Technical Assistance	8,770.00
775.25 Bank Service Charge	2,088.38
775.38 Penalties	84.25
775.45 Office Machine Maintenance	3,760.00
775.55 Licenses & Permits	$8,054.50
775.551 Annual Report	1,984.86
Total for 775.55 Licenses & Permits	**$10,039.36**
775.87 F & E Tax	2,000.00
Total for 775 Miscellaneous	**$268,342.86**
776 Propert Tax	296.00
778 City / County Business Tax	876.00
Total for 700 Operating Expenses	**$529,177.41**
Total for Expenses	**$529,605.15**
Net Operating Income	**-$45,865.22**
Other Income	
403 Interest Income	190.09
Riverstone Sale	20,458.71
Total for Other Income	**$20,648.80**
Other Expenses	
Net Other Income	**$20,648.80**
Net Income	**-$25,216.42**

EXHIBIT 7:
FIVE-YEAR PRO FORMA

River Gorge Ranch - Projected Income Statement

IRM Utility - September 2025

	2026	2027	2028	2029	2030
Access Fees					
Access Fee Revenues	$ -	$ -	$ 3,815.00	$ 5,940.00	$ 5,550.00
Operating Revenues					
Service Revenue	$ 87,256.00	$ 87,954.00	$ 90,765.00	$ 103,073.00	$ 113,110.00
Other Revenue	-	-	-	-	-
TOTAL REVENUES	**$ 87,256.00**	**$ 87,954.00**	**$ 90,765.00**	**$ 103,073.00**	**$ 113,110.00**
Operating Expenses					
Administrative	$ 700.00	$ 750.00	$ 800.00	$ 900.00	$ 1,000.00
Maintenance/Repair Expenses	$ 4,600.00	$ 4,800.00	$ 5,300.00	$ 5,600.00	$ 5,900.00
Transportation Expense	$ 500.00	$ 550.00	$ 600.00	$ 650.00	$ 700.00
Monthly Operating Reports/Testing Costs	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ 6,000.00
Electric	$ 400.00	$ 420.00	$ 470.00	$ 500.00	$ 530.00
Water	$ 50.00	$ 50.00	$ 60.00	$ 70.00	$ 70.00
Total Operation & Maintenance Expenses	**$ 12,250.00**	**$ 12,570.00**	**$ 13,230.00**	**$ 13,720.00**	**$ 14,200.00**
Annual Depreciation Expense	$ 65,000.00	$ 65,000.00	$ 75,000.00	$ 85,000.00	$ 85,000.00
Property Tax	$ 1,200.00	$ 1,200.00	$ 1,200.00	$ 1,200.00	$ 1,200.00
Telemetry	$ 1,500.00	$ 1,500.00	$ 1,500.00	$ 1,500.00	$ 1,500.00
Regulatory Fees	$ 500.00	$ 500.00	$ 500.00	$ 500.00	$ 500.00
Total Expenses	**$ 80,450.00**	**$ 80,770.00**	**$ 91,430.00**	**$ 101,920.00**	**$ 102,400.00**
Net Operating Income	**$ 6,806.00**	**$ 7,184.00**	**$ 3,150.00**	**$ 7,093.00**	**$ 16,260.00**

EXHIBIT 8:
CHART OF ACCOUNTS

Account List

INTEGRATED RESOURCE MANAGEMENT, INC

ACCOUNT #	FULL NAME	TYPE	DETAIL TYPE	DESCRIPTION	TOTAL BALANCE
231	Accounts Payable	Accounts payable (A/P)	Accounts Payable (A/P)		0.00
231.10	Accounts Payable:A/P Aquatics Resources	Accounts payable (A/P)	Accounts Payable (A/P)		0.00
231.20	Accounts Payable:A/P US Bank	Accounts payable (A/P)	Accounts Payable (A/P)		
141	Customer Account Receivables	Accounts receivable (A/R)	Accounts Receivable (A/R)	Accts Receivable	0.00
131	Operating Accounts	Bank	Checking	Cash on Hand	264,801.40
131.05	Operating Accounts:1st Horizon 2nd Acct (5221)	Bank	Checking		10,770.48
131.04	Operating Accounts:1st HorizonPrimary Check (7405)	Bank	Checking		-88.03
131.03	Operating Accounts:NFB - Douglas Land Reserve Acct	Bank	Checking		254,118.95
132	Special Deposit	Bank	Checking	Trust Account	99,769.14
132.06	Special Deposit:1st Horizon Escrow 4321	Bank	Checking		97,795.00
132.07	Special Deposit:1st Horizon Sec Deposit 4251	Bank	Checking		1,974.14
50000	Cost of Goods Sold	Cost of Goods Sold	Supplies & Materials - COGS	Costs of items purchased and then sold to customers	
	Cost of Goods Sold-1	Cost of Goods Sold	Supplies & Materials - COGS		
131.09	IRM VIsa Payable	Credit Card	Credit Card		-19,912.50
201	Common Stock	Equity	Owner's Equity	Value of corporate stock	-1,000.00
216	Opening Balance Equity	Equity	Opening Balance Equity	Opening balances during setup post to this account. The balance of this account should be zero after	0.00
215	Retained Earnings	Equity	Retained Earnings	Undistributed earnings of the business	
407	Amortization Exp	Expenses	Other Miscellaneous Service Cost	Amortization	
406	Amort. of Utiltiy Plant Acq	Expenses	Other Miscellaneous Service Cost	Amortization	
60200	Automobile Expense	Expenses	Other Miscellaneous Service Cost	Fuel, oil, repairs, and other automobile maintenance for business autos	
61700	Computer and Internet Expenses	Expenses	Other Miscellaneous Service Cost	Computer supplies, off-the-shelf software, online fees, and other computer or internet related expen	
738.03	Inspection Fees (DL) - IRM C &	Expenses	Other Miscellaneous Service Cost		
421	Non Utility Income	Expenses	Other Miscellaneous Service Cost	Non Income Income (CCN)	
421.05	Non Utility Income:Compass Pointe	Expenses	Other Miscellaneous Service Cost	Compass Pointe NU Income	
421.051	Non Utility Income:Compass Pointe:Compass Pointe - Other	Expenses	Other Miscellaneous Service Cost		
421.97	Non Utility Income:Cost of Goods Sold	Expenses	Other Miscellaneous Service Cost	Cost of Goods Sold	
421.04	Non Utility Income:Emory Point	Expenses	Other Miscellaneous Service Cost	Non Utility Income Emory Point	
421.08	Non Utility Income:Lackey Creek	Expenses	Other Miscellaneous Service Cost		
421.06	Non Utility Income:Lash Brooke	Expenses	Other Miscellaneous Service Cost	Lash Brooke NU Income	
421.12	Non Utility Income:Lost Creek Campground	Expenses	Other Miscellaneous Service Cost		
421.03	Non Utility Income:Lot #23 River Club	Expenses	Other Miscellaneous Service Cost	Riverclub, Lot 23 NU Income	
421.99	Non Utility Income:Sales	Expenses	Other Miscellaneous Service Cost	Sales	
421.98	Non Utility Income:Services	Expenses	Other Miscellaneous Service Cost	Services	
421.09	Non Utility Income:Sterling Springs	Expenses	Other Miscellaneous Service Cost		
421.07	Non Utility Income:Wild Briar	Expenses	Other Miscellaneous Service Cost		
700	Operating Expenses	Expenses	Other Miscellaneous Service Cost		
60000	Operating Expenses:Advertising and Promotion	Expenses	Other Miscellaneous Service Cost	Advertising, marketing, graphic design, and other promotional expenses	
770	Operating Expenses:Bad Debt Expense	Expenses	Other Miscellaneous Service Cost		
60400	Operating Expenses:Bank Service Charges	Expenses	Other Miscellaneous Service Cost	Bank account service fees, bad check charges and other bank fees	
718	Operating Expenses:Chemicals	Expenses	Other Miscellaneous Service Cost		
778	Operating Expenses:City / County Business Tax	Expenses	Other Miscellaneous		

Account List

INTEGRATED RESOURCE MANAGEMENT, INC

ACCOUNT #	FULL NAME	TYPE	DETAIL TYPE	DESCRIPTION	TOTAL BALANCE
			Service Cost		
730	Operating Expenses:Contractual Services - Billing	Expenses	Other Miscellaneous Service Cost		
736	Operating Expenses:Contractual SErvices - Other	Expenses	Other Miscellaneous Service Cost		
736.02	Operating Expenses:Contractual SErvices - Other:Computer Repairs	Expenses	Other Miscellaneous Service Cost		
736.03	Operating Expenses:Contractual SErvices - Other:Contract Services Douglas Land	Expenses	Other Miscellaneous Service Cost		
736.01	Operating Expenses:Contractual SErvices - Other:Contract Services - IRM C&C	Expenses	Other Miscellaneous Service Cost		
731	Operating Expenses:Contractual Services - Profess	Expenses	Other Miscellaneous Service Cost		
731.93	Operating Expenses:Contractual Services - Profess:Accounting	Expenses	Other Miscellaneous Service Cost		
731.95	Operating Expenses:Contractual Services - Profess:Billing Services	Expenses	Other Miscellaneous Service Cost		
731.94	Operating Expenses:Contractual Services - Profess:Consulting	Expenses	Other Miscellaneous Service Cost		
731.96	Operating Expenses:Contractual Services - Profess:Engineering Services	Expenses	Other Miscellaneous Service Cost		
731.92	Operating Expenses:Contractual Services - Profess:Legal Services	Expenses	Other Miscellaneous Service Cost		
731.91	Operating Expenses:Contractual Services - Profess:Professional Services	Expenses	Other Miscellaneous Service Cost		
735	Operating Expenses:Contractual Services - Testing	Expenses	Other Miscellaneous Service Cost		
704	Operating Expenses:Employee Pension & Benefits	Expenses	Other Miscellaneous Service Cost		
716	Operating Expenses:Fuel for Power Production	Expenses	Other Miscellaneous Service Cost		
755	Operating Expenses:Insurance Expense	Expenses	Other Miscellaneous Service Cost		

Account List

INTEGRATED RESOURCE MANAGEMENT, INC

ACCOUNT #	FULL NAME	TYPE	DETAIL TYPE	DESCRIPTION	TOTAL BALANCE
755.10	Operating Expenses:Insurance Expense:Business Ins Policy	Expenses	Other Miscellaneous Service Cost		
427	Operating Expenses:Interest Exp	Expenses	Other Miscellaneous Service Cost	Interest Exp	
63400	Operating Expenses:Interest Expense	Expenses	Other Miscellaneous Service Cost	Interest payments on business loans, credit card balances, or other business debt	
427.1	Operating Expenses:Interest Exp:Loan Interest	Expenses	Other Miscellaneous Service Cost	Loan Interest	
720	Operating Expenses:Material & Supplies	Expenses	Other Miscellaneous Service Cost		
720.01	Operating Expenses:Material & Supplies:CM	Expenses	Other Miscellaneous Service Cost		
720.003	Operating Expenses:Material & Supplies:Job Materials Douglas Land	Expenses	Other Miscellaneous Service Cost		
720.00	Operating Expenses:Material & Supplies:Office	Expenses	Other Miscellaneous Service Cost		
720.001	Operating Expenses:Material & Supplies:Office Supplies	Expenses	Other Miscellaneous Service Cost		
720.02	Operating Expenses:Material & Supplies:Valley Mart Exxon	Expenses	Other Miscellaneous Service Cost		
64300	Operating Expenses:Meals and Entertainment	Expenses	Other Miscellaneous Service Cost	Business meals and entertainment expenses, including travel-related meals (may have limited deductib	
775	Operating Expenses:Miscellaneous	Expenses	Other Miscellaneous Service Cost		
775.84	Operating Expenses:Miscellaneous:Advertising/Promotional	Expenses	Other Miscellaneous Service Cost		
775.25	Operating Expenses:Miscellaneous:Bank Service Charge	Expenses	Other Miscellaneous Service Cost		
775.251	Operating Expenses:Miscellaneous:Bank Service Charge:Bank NSF Charages	Expenses	Other Miscellaneous Service Cost		
775.81	Operating Expenses:Miscellaneous:Cash Exp ATM	Expenses	Other Miscellaneous Service Cost		
775.80	Operating Expenses:Miscellaneous:Certificate of Deposit	Expenses	Other Miscellaneous Service Cost		
775.30	Operating Expenses:Miscellaneous:Chartiable Contributions	Expenses	Other Miscellaneous Service Cost		
775.35	Operating Expenses:Miscellaneous:Dues and Subscriptions	Expenses	Other Miscellaneous Service Cost		
775.13	Operating Expenses:Miscellaneous:Entertainment	Expenses	Other Miscellaneous Service Cost		
775.131	Operating Expenses:Miscellaneous:Entertainment:Travel & Entertainment	Expenses	Other Miscellaneous Service Cost		
775.87	Operating Expenses:Miscellaneous:F & E Tax	Expenses	Other Miscellaneous Service Cost		
775.26	Operating Expenses:Miscellaneous:Inspection Fees Expense	Expenses	Other Miscellaneous Service Cost		
775.55	Operating Expenses:Miscellaneous:Licenses & Permits	Expenses	Other Miscellaneous Service Cost		
775.551	Operating Expenses:Miscellaneous:Licenses & Permits:Annual Report	Expenses	Other Miscellaneous Service Cost		
775.552	Operating Expenses:Miscellaneous:Licenses & Permits:TN Secretary of State	Expenses	Other Miscellaneous Service Cost		
775.19	Operating Expenses:Miscellaneous:Maintenance Exp - Non Rountine	Expenses	Other Miscellaneous Service Cost		
775.18	Operating Expenses:Miscellaneous:Maintenance Exp - Routine	Expenses	Other Miscellaneous Service Cost		
775.82	Operating Expenses:Miscellaneous:Markup	Expenses	Other Miscellaneous Service Cost		
775.12	Operating Expenses:Miscellaneous:Meals	Expenses	Other Miscellaneous Service Cost		
775.121	Operating Expenses:Miscellaneous:Meals:Meals 2	Expenses	Other Miscellaneous Service Cost		
775.23	Operating Expenses:Miscellaneous:Monitoring	Expenses	Other Business Expenses		
775.45	Operating Expenses:Miscellaneous:Office Machine Maintenance	Expenses	Other Miscellaneous Service Cost		
775.38	Operating Expenses:Miscellaneous:Penalties	Expenses	Other Miscellaneous Service Cost		
775.40	Operating Expenses:Miscellaneous:Postage & Delivery	Expenses	Other Miscellaneous Service Cost		
775.50	Operating Expenses:Miscellaneous:Printing & Reproduction	Expenses	Other Miscellaneous Service Cost		
775.20	Operating Expenses:Miscellaneous:Pumping	Expenses	Other Miscellaneous		

Account List

INTEGRATED RESOURCE MANAGEMENT, INC

ACCOUNT #	FULL NAME	TYPE	DETAIL TYPE	DESCRIPTION	TOTAL BALANCE
	Expense		Service Cost		
775.21	Operating Expenses:Miscellaneous:Pumping Expense:Pumping - CM	Expenses	Other Miscellaneous Service Cost		
775.22	Operating Expenses:Miscellaneous:Pumping Expense:Pumping - VME	Expenses	Other Miscellaneous Service Cost		
775.83	Operating Expenses:Miscellaneous:Reimbursed Exp	Expenses	Other Miscellaneous Service Cost		
775.24	Operating Expenses:Miscellaneous:Technical Assistance	Expenses	Other Business Expenses		
775.15	Operating Expenses:Miscellaneous:Telephone Exp	Expenses	Other Miscellaneous Service Cost		
775.151	Operating Expenses:Miscellaneous:Telephone Exp:Long Distance	Expenses	Other Miscellaneous Service Cost		
775.85	Operating Expenses:Miscellaneous:Training	Expenses	Other Miscellaneous Service Cost		
775.11	Operating Expenses:Miscellaneous:Travel	Expenses	Other Miscellaneous Service Cost		
775.10	Operating Expenses:Miscellaneous:Travel/Meals/Entertainment	Expenses	Other Miscellaneous Service Cost		
775.111	Operating Expenses:Miscellaneous:Travel:Travel 2	Expenses	Other Miscellaneous Service Cost		
64900	Operating Expenses:Office Supplies	Expenses	Other Miscellaneous Service Cost	Office supplies expense	
775.90	Operating Expenses:Other Miscellaneous Exp	Expenses	Other Miscellaneous Service Cost		
775.94	Operating Expenses:Other Miscellaneous Exp:Miscellaneous 2	Expenses	Other Miscellaneous Service Cost		
775.91	Operating Expenses:Other Miscellaneous Exp:Miscellaneous Exp	Expenses	Other Miscellaneous Service Cost		
775.93	Operating Expenses:Other Miscellaneous Exp:Miscellaneous Exp 1	Expenses	Other Miscellaneous Service Cost		
775.95	Operating Expenses:Other Miscellaneous Exp:Miscellaneous Exp 3	Expenses	Other Miscellaneous Service Cost		
775.92	Operating Expenses:Other Miscellaneous Exp:Miscellaneous - Sub	Expenses	Other Miscellaneous Service Cost		
775.97	Operating Expenses:Other Miscellaneous Exp:Other Exp	Expenses	Other Miscellaneous Service Cost		
775.99	Operating Expenses:Other Miscellaneous Exp:Uncatergorized Expenses	Expenses	Other Miscellaneous Service Cost		
66700	Operating Expenses:Professional Fees	Expenses	Other Miscellaneous Service Cost	Payments to accounting professionals and attorneys for accounting or legal services	

Account List

INTEGRATED RESOURCE MANAGEMENT, INC

ACCOUNT #	FULL NAME	TYPE	DETAIL TYPE	DESCRIPTION	TOTAL BALANCE
776	Operating Expenses:Propert Tax	Expenses	Other Miscellaneous Service Cost		
776.02	Operating Expenses:Propert Tax:Blount County	Expenses	Other Miscellaneous Service Cost		
776.01	Operating Expenses:Propert Tax:Dectur County	Expenses	Other Miscellaneous Service Cost		
710	Operating Expenses:Purchased Wastewater Treatment	Expenses	Other Miscellaneous Service Cost		
715	Operating Expenses:Purchase Power	Expenses	Other Miscellaneous Service Cost		
715.05	Operating Expenses:Purchase Power:Compass Pointe	Expenses	Other Miscellaneous Service Cost		
715.04	Operating Expenses:Purchase Power:Emory Pointe	Expenses	Other Miscellaneous Service Cost		
715.11	Operating Expenses:Purchase Power:FLAT HOLLOW	Expenses	Other Miscellaneous Service Cost	FLAT HOLLOW ELECTRIC	
715.09	Operating Expenses:Purchase Power:Grand View	Expenses	Other Miscellaneous Service Cost		
715.01	Operating Expenses:Purchase Power:ISHA	Expenses	Other Miscellaneous Service Cost		
715.10	Operating Expenses:Purchase Power:MT SHANGRILA WAY	Expenses	Other Miscellaneous Service Cost	SHAGRILA ELECTRIC	
715.13	Operating Expenses:Purchase Power:Paradise Pointe	Expenses	Other Miscellaneous Service Cost		
715.12	Operating Expenses:Purchase Power:RIVERSTONE	Expenses	Other Miscellaneous Service Cost		
715.12B	Operating Expenses:Purchase Power:RIVERSTONE:ADAM LOOP	Expenses	Other Miscellaneous Service Cost		
715.12C	Operating Expenses:Purchase Power:RIVERSTONE:JENNIFER LANE	Expenses	Other Miscellaneous Service Cost		
715.12A	Operating Expenses:Purchase Power:RIVERSTONE:MARINA WAY	Expenses	Other Miscellaneous Service Cost		
715.14	Operating Expenses:Purchase Power:Waterside at Douglas	Expenses	Other Miscellaneous Service Cost		
715.07	Operating Expenses:Purchase Power:Wild Briar	Expenses	Other Miscellaneous Service Cost		
765	Operating Expenses:Regulatory CommissionExp	Expenses	Other Miscellaneous Service Cost		
740	Operating Expenses:Rents	Expenses	Other Miscellaneous Service Cost		
701	Operating Expenses:Salaries & Wages - Employees	Expenses	Other Miscellaneous Service Cost		
703	Operating Expenses:Salaries & Wages - Officers	Expenses	Other Miscellaneous Service Cost		
711	Operating Expenses:Sludge Removal Exp	Expenses	Other Miscellaneous Service Cost		
711.02	Operating Expenses:Sludge Removal Exp:VAlley Mart Exxon	Expenses	Other Miscellaneous Service Cost		
777.00	Operating Expenses:Small Equipment	Expenses	Other Miscellaneous Service Cost		
750	Operating Expenses:Transportation Expense	Expenses	Other Miscellaneous Service Cost		
750.2	Operating Expenses:Transportation Expense:Auto Maintenace	Expenses	Other Miscellaneous Service Cost		
68400	Operating Expenses:Travel Expense	Expenses	Other Miscellaneous Service Cost	Business-related travel expenses including airline tickets, taxi fares, hotel and other travel expen	
	Purchases	Expenses	Supplies & Materials		
	Unapplied Cash Bill Payment Expense	Expenses	Unapplied Cash Bill Payment Expense		
	Uncategorized Expense	Expenses	Other Miscellaneous Service Cost		
68600	Utilities	Expenses	Other Miscellaneous Service Cost	Water, electricity, garbage, and other basic utilities expenses	
101T	Utility Plant in Service	Fixed Assets	Other fixed assets		509,972.93
108T	Utility Plant in Service:Accumulated Depreciation	Fixed Assets	Other fixed assets	Accumulated depreciation on equipment, buildings and improvements	-596,102.14
363T	Utility Plant in Service:Customer Service	Fixed Assets	Other fixed assets		45,000.00
363.04T	Utility Plant in Service:Customer Service:Customer Service - Emory Point	Fixed Assets	Other fixed assets		45,000.00
364T	Utility Plant in Service:Flow Measuring Devices	Fixed Assets	Other fixed assets	Flow Measure Devices	3,665.59
364.05T	Utility Plant in Service:Flow Measuring Devices:Flow	Fixed	Other fixed assets		398.87

Account List

INTEGRATED RESOURCE MANAGEMENT, INC

ACCOUNT #	FULL NAME	TYPE	DETAIL TYPE	DESCRIPTION	TOTAL BALANCE
	Measure - Compass Point	Assets			
364.04T	Utility Plant in Service:Flow Measuring Devices:Flow Measure - Emory Point	Fixed Assets	Other fixed assets		1,402.14
364.00T	Utility Plant in Service:Flow Measuring Devices:Flow Measure - Enterprise	Fixed Assets	Other fixed assets		444.91
364.15T	Utility Plant in Service:Flow Measuring Devices:Flow Measure - Flat Hollow	Fixed Assets	Other fixed assets		
364.09T	Utility Plant in Service:Flow Measuring Devices:Flow Measure - STerling Springs	Fixed Assets	Other fixed assets		1,200.00
364.07T	Utility Plant in Service:Flow Measuring Devices:Flow Measure - Wild Briar	Fixed Assets	Other fixed assets		219.67
353T	Utility Plant in Service:Land & Land Rights	Fixed Assets	Other fixed assets	Land	89,403.00
353.05T	Utility Plant in Service:Land & Land Rights:Land - Compass Point	Fixed Assets	Other fixed assets		940.00
353.01T	Utility Plant in Service:Land & Land Rights:Land - Cove Mountain	Fixed Assets	Other fixed assets		
353.04T	Utility Plant in Service:Land & Land Rights:Land - Emory Point	Fixed Assets	Other fixed assets		55,600.00
353.00T	Utility Plant in Service:Land & Land Rights:Land Enterprise	Fixed Assets	Other fixed assets	Land	30,763.00
353.15T	Utility Plant in Service:Land & Land Rights:Land - Flat Hollow	Fixed Assets	Other fixed assets		
353.02T	Utility Plant in Service:Land & Land Rights:Land - Valley Mart Exxon	Fixed Assets	Other fixed assets		
353.07T	Utility Plant in Service:Land & Land Rights:Land - Wild Briar	Fixed Assets	Other fixed assets		2,100.00
351T	Utility Plant in Service:Organization	Fixed Assets	Other fixed assets	Utility Plants	68,078.00
351.05T	Utility Plant in Service:Organization:Orgainzaiton - Compass Pointe	Fixed Assets	Other fixed assets		
351.01T	Utility Plant in Service:Organization:Orgainzation - Cove Mountain	Fixed Assets	Other fixed assets		
351.03T	Utility Plant in Service:Organization:Orgaization - River Club	Fixed Assets	Other fixed assets		
351.04T	Utility Plant in Service:Organization:Organization 0 Emory Point	Fixed Assets	Other fixed assets		
351.99T	Utility Plant in Service:Organization:Organization - Accum Amortiz	Fixed Assets	Other fixed assets	Accumulated Amortization of Organization Cost	0.00

Account List

INTEGRATED RESOURCE MANAGEMENT, INC

ACCOUNT #	FULL NAME	TYPE	DETAIL TYPE	DESCRIPTION	TOTAL BALANCE
351.14T	Utility Plant in Service:Organization:Organization - Ahley Meadows	Fixed Assets	Other fixed assets		0.00
351.13T	Utility Plant in Service:Organization:Organization - Bird's Breek	Fixed Assets	Other fixed assets		0.00
351.00T	Utility Plant in Service:Organization:Organization Enterprise	Fixed Assets	Other fixed assets		66,553.00
351.15T	Utility Plant in Service:Organization:Organization - Flat Hollow	Fixed Assets	Other fixed assets		
351.08T	Utility Plant in Service:Organization:Organization - Lackey Creek	Fixed Assets	Other fixed assets		
351.06T	Utility Plant in Service:Organization:Organization - Lash Brook	Fixed Assets	Other fixed assets		
351.12T	Utility Plant in Service:Organization:Organization - Lost Creek	Fixed Assets	Other fixed assets		550.00
351.11T	Utility Plant in Service:Organization:Organization - Mtn Reflections	Fixed Assets	Other fixed assets		0.00
351.10T	Utility Plant in Service:Organization:Organization Mtn Shangrilla	Fixed Assets	Other fixed assets		400.00
351.09T	Utility Plant in Service:Organization:Organization - Sterling Springs	Fixed Assets	Other fixed assets		
351.02T	Utility Plant in Service:Organization:Organization-Valley Mart Exxon	Fixed Assets	Other fixed assets		
351.07T	Utility Plant in Service:Organization:Organization Wild Briar	Fixed Assets	Other fixed assets		575.00
389T	Utility Plant in Service:Plant & Misc	Fixed Assets	Other fixed assets		9,928.48
389.00T	Utility Plant in Service:Plant & Misc:Enterprise	Fixed Assets	Other fixed assets		1,126.48
389.01T	Utility Plant in Service:Plant & Misc:Hardware & Software	Fixed Assets	Other fixed assets		8,802.00
380T	Utility Plant in Service:Treatment & Disposal Equip	Fixed Assets	Other fixed assets		890,000.00
380.05T	Utility Plant in Service:Treatment & Disposal Equip:Compass Point	Fixed Assets	Other fixed assets		130,000.00
380.04T	Utility Plant in Service:Treatment & Disposal Equip:Emory Point	Fixed Assets	Other fixed assets		210,000.00
380.15T	Utility Plant in Service:Treatment & Disposal Equip:Flat Hollow	Fixed Assets	Other fixed assets		
380.09T	Utility Plant in Service:Treatment & Disposal Equip:Sterling Springs	Fixed Assets	Other fixed assets		380,000.00
380.10T	Utility Plant in Service:Treatment & Disposal Equip:Treatment & Disposal Equip - Other	Fixed Assets	Other fixed assets		170,000.00
	Billable Expense Income	Income	Service/Fee Income		
	Billable Expense Income-1	Income	Service/Fee Income		
	Douglas Land Development Inc	Income	Service/Fee Income		
401	Inspection Fees	Income	Service/Fee Income		
	Markup-1	Income	Service/Fee Income		
400	Operating Revenue	Income	Service/Fee Income	Wastewater REvenue - Monthly	
212	Operating Revenue:Commercial Revenues	Income	Service/Fee Income		
521.7	Operating Revenue:Commercial Revenues:Campgrounds	Income	Service/Fee Income		
521.8	Operating Revenue:Commercial Revenues:Combined Service	Income	Service/Fee Income		
521.2	Operating Revenue:Commercial Revenues:Commercial Revenue -	Income	Service/Fee Income		
521.5	Operating Revenue:Commercial Revenues:Commercial with Food	Income	Service/Fee Income		
521.6	Operating Revenue:Commercial Revenues:Commercial without Food	Income	Service/Fee Income		
212.011	Operating Revenue:Commercial Revenues:Cove Mtn Late Fees	Income	Service/Fee Income		
523.00D	Operating Revenue:Douglas Land Development Inc	Income	Service/Fee Income		
5215.00	Operating Revenue:Operating Revenue - Timing Adj	Income	Service/Fee Income		
521.1	Operating Revenue:Residential Revenues	Income	Service/Fee Income		

Account List

INTEGRATED RESOURCE MANAGEMENT, INC

ACCOUNT #	FULL NAME	TYPE	DETAIL TYPE	DESCRIPTION	TOTAL BALANCE
5211.19	Operating Revenue:Residential Revenues:Ashley Meadows	Income	Service/Fee Income		
5211.05	Operating Revenue:Residential Revenues:Compass Pointe	Income	Service/Fee Income		
5221.20	Operating Revenue:Residential Revenues:Cove Creek	Income	Service/Fee Income		
5212.01	Operating Revenue:Residential Revenues:Cove Mountain Realty	Income	Service/Fee Income		
5211.04	Operating Revenue:Residential Revenues:Emory Pointe	Income	Service/Fee Income		
5211.15	Operating Revenue:Residential Revenues:Flat Hollow	Income	Service/Fee Income		
5211.09	Operating Revenue:Residential Revenues:Grand View	Income	Service/Fee Income		
5221.23	Operating Revenue:Residential Revenues:ISHA	Income	Service/Fee Income		
5211.08	Operating Revenue:Residential Revenues:Lackey Creek	Income	Service/Fee Income		
5211.06	Operating Revenue:Residential Revenues:Lash Brooke	Income	Service/Fee Income		
5212.17	Operating Revenue:Residential Revenues:Lost Creek Campground	Income	Service/Fee Income		
5212.03	Operating Revenue:Residential Revenues:Lot 23 River Club	Income	Service/Fee Income		
5212.18	Operating Revenue:Residential Revenues:Mountain Shangrila	Income	Service/Fee Income		
5221.24	Operating Revenue:Residential Revenues:Paradise Pointe	Income	Service/Fee Income		
5221.21	Operating Revenue:Residential Revenues:Riverstone Estates	Income	Service/Fee Income		
5212.02	Operating Revenue:Residential Revenues:Valley Mart Exxon	Income	Service/Fee Income		
5221.22	Operating Revenue:Residential Revenues:Waterside on Douglas Lake	Income	Service/Fee Income		
5211.07	Operating Revenue:Residential Revenues:Wild Briar	Income	Service/Fee Income		
	REFUND	Income	Service/Fee Income		
402.00	Returned checks	Income	Service/Fee Income		

Account List

INTEGRATED RESOURCE MANAGEMENT, INC

ACCOUNT #	FULL NAME	TYPE	DETAIL TYPE	DESCRIPTION	TOTAL BALANCE
	Sales of Product Income	Income	Sales of Product Income		
	Uncategorized Income	Income	Service/Fee Income		
	Uncategorized Income-1	Income	Service/Fee Income		
	Uncategorized Income-1 (293)	Income	Service/Fee Income		
	Uncategorized Income-2	Income	Service/Fee Income		
272	Accum Amort. of Contributions	Long Term Liabilities	Other Long Term Liabilities		596,102.07
271	Contribution in Aid of Const.	Long Term Liabilities	Other Long Term Liabilities		-1,106,075.00
232	Notes Payable	Long Term Liabilities	Other Long Term Liabilities		0.00
232.14	Notes Payable:Loan Aganist CD	Long Term Liabilities	Other Long Term Liabilities		
232.11	Notes Payable:Loan from S/H (J Cox)	Long Term Liabilities	Other Long Term Liabilities		
232.12	Notes Payable:Loan - S. Williams	Long Term Liabilities	Other Long Term Liabilities		
232.13	Notes Payable:Loan - T Petty	Long Term Liabilities	Other Long Term Liabilities		
232.10	Notes Payable:US Bank	Long Term Liabilities	Other Long Term Liabilities		0.00
12100	Inventory Asset	Other Current Assets	Other Current Assets	Costs of inventory purchased for resale	
	Inventory Asset-1	Other Current Assets	Inventory		
255.00	Loan to/from IRM C & C	Other Current Assets	Other Current Assets		0.00
186	Misc Deferred Debits	Other Current Assets	Other Current Assets	Prepaid Expense	0.00
186.20	Misc Deferred Debits:Prepaid Bonding Cost	Other Current Assets	Other Current Assets	Prepaid Expense	0.00
186.10	Misc Deferred Debits:Prepaid Income Tax	Other Current Assets	Other Current Assets	Prepaid Expense	
	Uncategorized Asset	Other Current Assets	Other Current Assets		
12000	Undeposited Funds	Other Current Assets	Undeposited Funds	Funds received, but not yet deposited to a bank account	
236	Accured Taxes	Other Current Liabilities	Other Current Liabilities		0.00
236.20	Accured Taxes:Income Tax Payable	Other Current Liabilities	Other Current Liabilities		
236.10	Accured Taxes:Sales Tax Payable	Other Current Liabilities	Other Current Liabilities		0.00
235	Customer Deposits	Other Current Liabilities	Other Current Liabilities		-1,893.67
235.05	Customer Deposits:Customer Deposits	Other Current Liabilities	Other Current Liabilities		0.00
235.03	Customer Deposits - Dougls Land	Other Current Liabilities	Other Current Liabilities		-254,118.95
235.10	Customer Deposits:Escrow Depsoits	Other Current Liabilities	Other Current Liabilities		0.00
234	Due to IRM C&C	Other Current Liabilities	Other Current Liabilities		-65,905.89
195.00	Loan from J Cox	Other Current Liabilities	Other Current Liabilities		0.00
24000	Payroll Liabilities	Other Current Liabilities	Payroll Tax Payable	Unpaid payroll liabilities. Amounts withheld or accrued, but not yet paid	
80000	Ask My Accountant	Other Expense	Other Miscellaneous Expense	Transactions to be discussed with accountant, consultant, or tax preparer	
	Reconciliation Discrepancies	Other Expense	Other Miscellaneous Expense		
403	Interest Income	Other Income	Other Miscellaneous Income		
	Riverstone Sale	Other Income	Dividend Income		
TOTAL					**$2,002,358.07**

EXHIBIT 9:
BIOGRAPHY OF JEFFREY W. COX, JR.

Jeffrey William (Bill) Cox, Jr.

4842 Stoneyhurst Ln.
Knoxville, Tennessee 37918

Degree: BA Philosophy
The University of Tennessee
2001 – 2006

Pre-graduate experience 2000-2005:

Worked officially (part time) with Jeffrey Cox Sr. of Environmental Soil Consulting and IRM Utility, Inc., from 2001 until graduating in 2006. This included soil mapping for on-site wastewater systems as well as preliminary work for wastewater treatment plants and building various other wastewater disposal systems (conventional, LPP, Mounds, etc.)

2006 - Present: Full time employee of IRM-C&C Company.

Title: President of Integrated Resource Management, Inc.
President of IRM-C&C Company
Forman and Technical Director of Operations

Responsibilities include:

- Routine maintenance of On-Site wastewater treatment plants and Septic Tank Effluent Pumping systems ("STEP") systems,
- Servicing alarm calls for treatment plants and STEP systems,
- Wastewater sampling for monitoring and MOR reporting,
- Construction of wastewater treatment plants and STEP systems,
- Construction of LPP wastewater disposal systems and inspections of subcontractors,
- General duties include: Invoicing, client relations, consulting with builders and new customers.
- Record keeping for routine and non-routine maintenance. Preparation of Regulatory Reports and Permitting.

Permits and Licenses:

- Conventional and LPP builder's permit Statewide and Contract Counties
- Collection Systems Operator I [CSI]: I.D. # 3505
- Approved TDEC Alternate Treatment System Provider
- BNS certificate

Continuing Education:

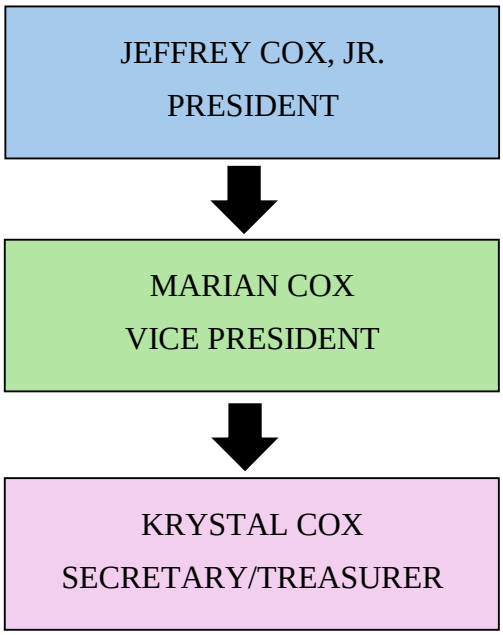
- Maintaining a Continuing Education Courses as Required by Certifications. This training involved a broad spectrum of all aspects of safety, ethics, treatment processes, collection system concepts, and mechanical processes pertinent to the industry.

Associations Membership:

- Past Board Member and Member of the Tennessee On-site Wastewater Association
- Member of the National On-site Wastewater Recycling Association

EXHIBIT 10:
ORGANIZATIONAL CHARTS AND KEY EMPLOYEES

IRM UTILITY


JEFFREY COX, JR.
PRESIDENT
MARIAN COX
VICE PRESIDENT
KRYSTAL COX
SECRETARY/TREASURER

IRM Utility Key Employees 2025

Jeffrey (Billy) Cox, Jr. – President

Wastewater Operator License ID: #3505
Conventional and LPP builder's permit Statewide and Contract Counties.
Employed full time with IRM C&C since 2006 assisting with construction and maintenance of on-site wastewater systems and lift stations across the State of Tennessee.

Marian J. Cox – Vice President

Full time secretary and business office manager since company's inception in 2003.
Assisted CPAs from several offices over the years to comply with State and Local Government rules and regulations.

Krystal L. Cox – Secretary/Treasurer

Employed by IRM C&C in 2009 and became a full-time employee in 2016. Elected Treasurer in 2022.
Current business office manager at new location in Knox County with over 15 years' experience.

Jessica W. Waugh – Administrative Assistant

Jessi joined IRM in 2025 as Administrative Assistant with 9 years of human resources and recruiting experience in healthcare, education, and vacation rental property management industries. This experience consisted of job duties such as data tracking, project management and high-volume customer service-related experience. For five years, she was an Administrative Assistant to the Chief Human Resources Officer at Northeast State Community College which consisted of job duties such as scheduling and calendar management, meeting minutes, travel planning, event planning and budget tracking.

IRM Utility incorporates outside help to manage day to day operations at its locations which is typical of on-site utility operations. IRM has secured relationships with several outside sources for assistance with non-routine maintenance issues. However, typically the utility strives to utilize its own supporting company's resources/manpower and equipment to quickly and efficiently solve any issues that may arise. IRM intends on acquiring operator's licenses for several current employees in the coming year.

10833848

Tennessee Corporation Annual Report Form

AR Filing #: 10833848
FILED: Jan 28, 2025 12:14PM

File online at: https://TNBear.TN.gov/

Due on/Before: 04/01/2025 Reporting Year: 2024

Annual Report Filing Fee Due:
$20 if no changes are made in block 3 to the registered agent/office, or
$40 if any changes are made in block 3 to the registered agent/office

This Annual Report has been successfully paid for and filed. Please keep this report for your records.

Payment-Credit Card - State Payment Center - CC #: 3890749824

SOS Control Number: 237604
For-profit Corporation - Domestic Date Formed: 02/20/1991 Formation Locale: TENNESSEE

(1) Name and Mailing Address:
INTEGRATED RESOURCE MANAGEMENT, INC.
PO BOX 71526
KNOXVILLE, TN 37938-1526

(2) Principal Office Address:
3444 SAINT ANDREWS DR
BANEBERRY, TN 37890-4924

(3) Registered Agent (RA) and Registered Office (RO) Address:
JEFFREY W COX JR
3444 SAINT ANDREWS DR
BANEBERRY, TN 37890-4924

Agent Changed: No
Agent County: JEFFERSON COUNTY

(4) Name and business address (with zip code) of the principal officers.

Title	Name	Business Address	City, State, Zip
Secretary Treasurer	Krystal L Cox	3444 SAINT ANDREWS DR	BANEBERRY, TN 37890-4924
Vice President	Marian J Cox	3444 SAINT ANDREWS DRIVE	BANEBERRY, TN 37890
President	Jeffrey W Cox, Jr.	3444 SAINT ANDREWS DRIVE	BANEBERRY, TN 37890

(5) Board of Directors names and business address (with zip code). ___ None, pursuant to T.C.A. §48-18-101(c), or listed below.

Name	Business Address	City, State, Zip
Marian J Cox	3444 Saint Andrews Drive	Baneberry, TN 37890
Jeffrey W Cox, Jr.	3444 Saint Andrews Drive	Baneberry, TN 37890
Krystal L Cox	3444 SAINT ANDREWS DR	BANEBERRY, TN 37890-4924

(6) Signature: Electronic
(7) Date: 01/28/2025
(8) Type/Print Name: marian j cox
(9) Title: vice president

B1675-0979 01/28/2025 12:14 PM Received by Tennessee Secretary of State Tre Hargett

IRM C&C

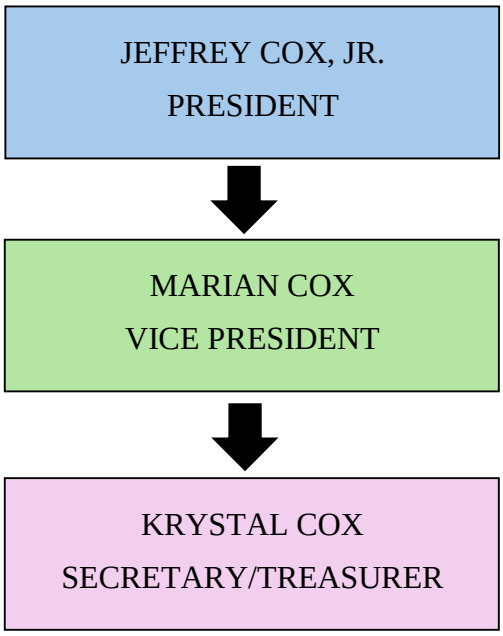

JEFFREY COX, JR.
PRESIDENT
MARIAN COX
VICE PRESIDENT
KRYSTAL COX
SECRETARY/TREASURER

EXHIBIT 11:
LETTER FROM MARION COUNTY MAYOR

DAVID JACKSON

COUNTY MAYOR, MARION COUNTY
P.O. BOX 789
JASPER, TENNESSEE 37347
(423) 942-2552
FAX (423) 942-1327
djackson@marioncountytn.net

April 24, 2025

Mr. Bill Cox:

President IRM Utility

Marion County doesn't own any utilities in the county, all utilities are owned by the cities. The River Gorge Ranch development will not be served by any government owned sewer system.

The closest sewer system to RGR is owned by the Town of Jasper, but their sewer line ends about 7 miles from the entrance to RGR. Another issue to get sewer to RGR is having to cross the Tennessee River.

If you have any other questions, please feel free to contact me. My email address is djackson@marioncountytn.net .

Thank You,

Mayor Jackson

Marion County Mayor

EXHIBIT 12:
IRM UTILITY CHARTER
&
BY-LAWS

2088 0527

RECEIVED
STATE OF TENNESSEE
1991 FEB 20 PM 2:20
BRYAN
SECRETARY OF STATE

STATE OF TENNESSEE
CHARTER
OF
INTEGRATED RESOURCE MANAGEMENT, INC.

The undersigned person, in order to form a corporation pursuant to the Tennessee Business Corporation Act hereby adopts the following charter for the above listed corporation:

1. The name of the corporation is Integrated Resource Management, Inc.

2. The number of shares of stock that the corporation is authorized to issue is Two Thousand (2,000) Shares.

3. (a) The complete street address of the corporation's initial registered office in Tennessee, including County, is

3444 St. Andrews Drive
Baneberry, Jefferson County, Tennessee 37890

(b) The name of the initial registered agent, to be located at the address listed in 3(a), is

Jeffrey W. Cox, Sr.

4. The name and complete address, including County, of each incorporator is

Martin Funderlic
5000 Western Avenue #2912
Knoxville, Knox County, Tennessee 37921

5. The complete address of the corporation's principal office, including County, is

3444 St. Andrews Drive
Baneberry, Jefferson County, Tennessee 37890

6. All stock issued is common no par stock.

7. The corporation is for profit.

8. The names of the initial Directors are

Jeffrey W. Cox, Sr.
Martin Funderlic

9. No director may be sued by the Corporation or its Shareholders for breach of his or her fiduciary duty to the Corporation, provided, however, that this provision shall not absolve a director from a breach of his or her duty of loyalty, for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, or for distributions in violation of T.C.A. §48-18-304.

Martin Funderlic
Incorporator's Signature

MARTIN FUNDERLIC
Incorporator's Name, Typed or Printed

1-21-91
Date of Signature

CLAIBORNE, DAVIS, BUUCK & HURLEY
SUITE 300
713 MARKET STREET
KNOXVILLE, TN
37902-2388
(615) 971-4040

Secretary of State
Division of Business Services
312 Eighth Avenue North
6th Floor, William R. Snodgrass Tower
Nashville, Tennessee 37243

ISSUANCE DATE: 09/23/2002
REQUEST NUMBER: 02266122
TELEPHONE CONTACT: (615) 741-6488

COPY

CHARTER/QUALIFICATION DATE: 02/20/1991
STATUS: ACTIVE
CORPORATE EXPIRATION DATE: PERPETUAL
CONTROL NUMBER: 0237604
JURISDICTION: TENNESSEE

TO:
INTEGRATED RESOURCE MANAGEMENT, INC.
AT: JEFFREY W. COX
3444 SAINT ANDREWS D
BANEBERRY, TN 37890

REQUESTED BY:
INTEGRATED RESOURCE MANAGEMENT, INC.
AT: JEFFREY W. COX
3444 SAINT ANDREWS D
BANEBERRY, TN 37890

CERTIFICATE OF EXISTENCE

I, RILEY C DARNELL, SECRETARY OF STATE OF THE STATE OF TENNESSEE DO HEREBY CERTIFY THAT

"INTEGRATED RESOURCE MANAGEMENT, INC."

IS A CORPORATION DULY INCORPORATED UNDER THE LAW OF THIS STATE WITH DATE OF INCORPORATION AND DURATION AS GIVEN ABOVE;
THAT ALL FEES, TAXES, AND PENALTIES OWED TO THIS STATE WHICH AFFECT THE EXISTENCE OF THE CORPORATION HAVE BEEN PAID;
THAT THE MOST RECENT CORPORATION ANNUAL REPORT REQUIRED HAS BEEN FILED WITH THIS OFFICE; AND
THAT ARTICLES OF DISSOLUTION HAVE NOT BEEN FILED; AND
THAT ARTICLES OF TERMINATION OF CORPORATE EXISTENCE HAVE NOT BEEN FILED

FOR: REQUEST FOR CERTIFICATE ON DATE: 09/23/02

	FEES	
RECEIVED:	$20.00	$0.00
TOTAL PAYMENT RECEIVED:		$20.00

FROM:
INTEGRATED RESOURCE MANAGEMENT, INC.
PO BOX 642
WHITE PINE, TN 37890-0642

RECEIPT NUMBER: 00003147616
ACCOUNT NUMBER: 00406005

Riley C Darnell

RILEY C. DARNELL
SECRETARY OF STATE

SS-4458

MINUTES OF ANNUAL MEETING

of

BOARD OF DIRECTORS

of

INTEGRATED RESOURCE MANAGEMENT

The 2024 annual Meeting of the Board of Directors of the Corporation immediately followed the annual meeting of shareholders on March 12, 2024.

Present were JEFFREY W. COX, JR. and MARIAN J. COX; being all of the Directors of the Corporation. Also present was KRYSTAL L. COX.

The meeting was called to order by JEFFREY W. COX, JR. It was moved, seconded and unanimously carried that JEFFREY W. COX, JR. act as Chairman and KRYSTAL L. COX act as Secretary.

The Chairman noted that it was in order to consider electing officers for the ensuing year. Upon nominations duly made and seconded, the following were unanimously elected as officers of the Corporation, to serve for the ensuing year and until their successors are elected and qualify:

President: JEFFREY W. COX, JR.

Vice President: MARIAN J. COX

Secretary: KRYSTAL L. COX

The Chairman noted that it was in order to appoint a Registered Agent of the corporation for the ensuing year. Upon nomination duly made and seconded, MARIAN J. COX was appointed as Registered Agent to serve until her replacement is duly appointed.

The Chairman noted that it was in order to appoint bank signatories for the corporation. Upon nomination duly made and seconded, JEFFREY W. COX, JR., MARIAN J. COX and KRYSTAL L. COX were appointed as bank signatories to serve until their replacements were duly appointed.

There being no further business to come before the meeting, upon motion duly made, seconded and unanimously carried, it was adjourned.

Krystal Cox
KRYSTAL L. COX, SECRETARY

ATTEST:

Board of Directors

JEFFREY W. COX, JR.

Marian J Cox
MARIAN J. COX

MINUTES OF ANNUAL MEETING OF SHAREHOLDERS

OF

INTEGRATED RESOURCE MANAGEMENT

The 2024 annual Meeting of Shareholders of the above-captioned Corporation was held on March 12, 2024.

There were present the following shareholders:

Names of Shareholders	No. of Shares
MARIAN J. COX.	2000

The meeting was called to order by JEFFREY W. COX, JR.. It was moved, seconded and unanimously carried that JEFFREY W. COX, JR. act as Chairman and that KRYSTAL L. COX act as Secretary.

The Chairman then stated that all of the outstanding shares of the Corporation were represented.

The President presented his annual report and, after discussion, the report was accepted and ordered filed with the Secretary.

The Chairman noted that it was in order to consider electing a Board of Directors for the ensuing year. Upon nominations duly made, seconded and unanimously carried, the following persons were elected as Directors of the Corporation, to serve for a period of one year and until such time as their successors are elected and qualify: JEFFREY W. COX, JR. and MARIAN J. COX.

There being no further business to come before the meeting, upon motion duly made, seconded and unanimously carried, it was adjourned.

KRYSTAL L. COX, SECRETARY

SHAREHOLDERS:

JEFFREY W. COX, JR.

MARIAN J. COX

MINUTES OF ANNUAL MEETING

of

BOARD OF DIRECTORS

of

INTEGRATED RESOURCE MANAGEMENT

The 2024 annual Meeting of the Board of Directors of the Corporation immediately followed the annual meeting of shareholders on March 12, 2024.

Present were JEFFREY W. COX, JR. and MARIAN J. COX; being all of the Directors of the Corporation. Also present was KRYSTAL L. COX.

The meeting was called to order by JEFFREY W. COX, JR. It was moved, seconded and unanimously carried that JEFFREY W. COX, JR. act as Chairman and KRYSTAL L. COX act as Secretary.

The Chairman noted that it was in order to consider electing officers for the ensuing year. Upon nominations duly made and seconded, the following were unanimously elected as officers of the Corporation, to serve for the ensuing year and until their successors are elected and qualify:

President: JEFFREY W. COX, JR.

Vice President: MARIAN J. COX

Secretary: KRYSTAL L. COX

The Chairman noted that it was in order to appoint a Registered Agent of the corporation for the ensuing year. Upon nomination duly made and seconded, MARIAN J. COX was appointed as Registered Agent to serve until her replacement is duly appointed.

The Chairman noted that it was in order to appoint bank signatories for the corporation. Upon nomination duly made and seconded, JEFFREY W. COX, JR., MARIAN J. COX and KRYSTAL L. COX were appointed as bank signatories to serve until their replacements were duly appointed.

There being no further business to come before the meeting, upon motion duly made, seconded and unanimously carried, it was adjourned.

Krystal Cox
KRYSTAL L. COX, SECRETARY

ATTEST:

Board of Directors

JEFFREY W. COX, JR.

MARIAN J. COX

STOCK POWER

KNOW ALL MEN BY THESE PRESENTS,

For value received, the ESTATE OF JEFFREY W. COX, SR. (the "Stockholder"), on this March 21, 2024, hereby sells, assigns and transfers unto JEFFREY W. COX, JR. 1400 shares of the Common Stock, par value $0.00 per share, of INTEGRATED RESOURCE MANAGEMENT, INC. (the "Company") standing in the name of JEFFREY W. COX, SR. on the books of the Company represented by Certificate No. 1 and the Stockholder hereby irrevocably constitutes and appoints the Company's Secretary to transfer said stock on the books of the Company with full power of substitution in the premises.

NOTICE: The signature to this assignment must correspond with the name as written upon the face of the certificate, in every particular, without alteration or enlargement, or any change whatever

ESTATE OF JEFFREY W. COX, SR., Stockholder

Marian J. Cox, Executor

STOCK POWER

KNOW ALL MEN BY THESE PRESENTS,

For value received, the ESTATE OF JEFFREY W. COX, SR. (the "Stockholder"), on this March 21, 2024, hereby sells, assigns and transfers unto MARIAN J. COX, 600 shares of the Common Stock, par value $0.00 per share, of INTEGRATED RESOURCE MANAGEMENT, INC. (the "Company") standing in the name of JEFFREY W. COX, SR. on the books of the Company represented by Certificate No. 1 and the Stockholder hereby irrevocably constitutes and appoints the Company's Secretary to transfer said stock on the books of the Company with full power of substitution in the premises.

NOTICE: The signature to this assignment must correspond with the name as written upon the face of the Certificate, in every particular, without alteration or enlargement, or any change whatever

ESTATE OF JEFFREY W. COX, SR., Stockholder

Marian J. Cox, Executor

EXHIBIT 13:
BUSINESS LICENSE

FRANK C. HERNDON, JEFFERSON COUNTY CLERK

LICENSE
0539682

STANDARD BUSINESS TAX LICENSE

WK04 Drawer: 12 Site: 1
Work Date: 05/02/2022

DETACH THIS PORTION FOR CONFIDENTIAL FILE

FRANK C. HERNDON
JEFFERSON COUNTY CLERK

PO BOX 710
DANDRIDGE, TN 37725

LICENSE
0539682

STANDARD BUSINESS TAX LICENSE

Mailing	Location
9460 IRM UTILITY, INC 3444 ST ANDREWS DR WHITE PINE, TN 37890	IRM UTILITY, INC 3444 SAINT ANDREWS DR WHITE PINE, TN 37890

JEFFREY W COX SR

LOCAL ACCOUNT NUMBER	9460
STATE ACCOUNT NUMBER	1001092661
TRANSACTION NUMBER	
CLASS	03
SALES TAX NUMBER	

ISSUE DATE	05/02/22
TAX PERIOD	1/1/2021 - 12/31/2021
PAYMENT DUE BY	4/15/2023
EXPIRATION DATE	05/15/2023

TO AVOID PENALTY, INTEREST, AND POTENTIAL ENFORCED COLLECTION ACTION, BUSINESS TAX RETURNS AND PAYMENTS MUST BE REMITTED TO THE TENNESSEE DEPARTMENT OF REVENUE AT LEAST 30 DAYS PRIOR TO THE EXPIRATION DATE OF THIS LICENSE.

IF PAID BY CHECK, THIS LICENSE VALID ONLY AFTER CHECK IS PAID.

THIS LICENSE DOES NOT PERMIT OPERATION UNLESS PROPERLY ZONED, AND/OR IN COMPLIANCE WITH ALL OTHER APPLICABLE LAWS/RULES.

Frank C Herndon

WK04 Drawer:12 Site:1

-- POST AT LOCATION OF BUSINESS --
IF BUSINESS CLOSES, MOVES, OR CHANGES OWNERS, NOTIFY THIS OFFICE

EXHIBIT 14:
MOST RECENT REVISED TARIFF

Integrated Resource Management, Inc.

Wastewater Service Tariff

Wastewater Utility Service

TABLE OF CONTENTS

Section No.	Name	Section Page(s)	
1	Title Page	1	
	Table of Contents	2	
	Check Sheet	3	
	Symbol Key	4	
	Tariff Format	5	
	Definitions	6-7	
2	Rules and Regulations	1-7	
3	Residential Sewer Service Territories	1	
4	Residential Rates	1	T
5	Commercial Sewer Service Territories	1	
6	Commercial Rate Without Food Service	1-1.1	
	Commercial Rate Campgrounds	1.2	
	Commercial Rate With Food Service	2-2.1	
	Commercial Rate Combined Services or High Strength Waste	2.2-2.3	
7	Developer Service Territories	1	N
8	Developer Service Rates	1	N
*	Sewer Subscription Agreement	Attachment No.1	
**	List of Required Practices	Attachment No. 2	

Wastewater Utility Service

CHECK SHEET

The sheets of this tariff are effective as of the date shown at the bottom of the respective sheet. Original and revised sheets as listed herein comprise all changes from the original tariff and are currently in effect as of the date listed on the bottom of this sheet.

SECTION	SHEET	REVISION	
1	1	1st Revised*	T
1	2	2nd Revised*	T
1	3	6th Revised*	T
1	4	Original	
1	5	Original	
1	6	Original	
1	7	First Revised	
2	1	Original	
2	2	First Revised	
2	3	3rd Revised*	T
2	4	Original	
2	5	Original	
2	6	Original	
2	7	3rd Revised*	T
3	1	4th Revised*	T
4	1	3rd Revised*	T
5	1	4th Revised*	T
6	1	3rd Revised*	T
6	1.1	1st Revised*	T
6	1.2	1st Revised*	T
6	2	3rd Revised*	T
6	2.1	1st Revised*	T
6	2.2	1st Revised*	T
6	2.3	Original	
7	1	Original*	N
8	1	Original*	N

RULES AND REGULATIONS (CONTINUED)

Changes in Ownership, Tenancy, or Services:

A new application and agreement must be made and approved by the Company on any change in ownership of property, in tenancy, or in the services as described in the application. In the event a new owner or tenant fails to submit a new application, the company shall have the right to discontinue service until a new application is made and approved.

Security Deposits:

Each new Customer, before connection or reconnection of the service, will be required to make a refundable deposit to secure payment of sewage service bills in the amount of $60.00. Interest will be paid on deposits held by the Company at the then current interest rate earned on Elite Checking Account deposits held by US Bank and published at http://www.usbank.com or .05% whichever is greater. Deposits will be held by the Company as long as required to insure payment of bill.

Sewer System Access Fee:

A Sewer System Access Fee will be charged in advance for the upcoming year. The owner of each property parcel which is provided a tap or the availability of a tap, when the sewer system is built, will be required to pay a sewer system access fee of $216.18 per year. This fee will be billed and payable semi-annually. Owners of record as of June 1 will be billed for one-half of the total access fee or $108.09 in June, and owners of record as of December 1 will be billed for one-half of the total access fee or $108.09 in December. As each Customer connects to the sewer and signs up for service, they will be credited on a pro-rated basis until that time. Thereafter the fee will not be charged. Any access fees not used within the paid year will be credited to the monthly billing for permanent service.

RULES AND REGULATIONS (CONTINUED)

Public Contact:

Bill Cox T
3444 Saint Andrews Drive
White Pine, Tennessee 37890
Phone: 865-674-0828

Tennessee Public Utility Commission Regulations: T

The Company, in its operation, shall conform to all applicable rules and regulations promulgated by the Tennessee Public Utility Commission. The Commission may be contacted by telephone at: 1-800- 342-8359. T

Wastewater Utility Service

RESIDENTIAL SEWER SERVICE TERRITORIES

Service Territory	County	TPUC Docket No.	Rate Class	
Emory Pointe	Roane	04-00101	Rate Class 1	
Wild Pear Shores	Jefferson	04-00153	Rate Class 1	
Compass Pointe	Blount	04-00266	Rate Class 1	
Wild Briar Ridge★	Sevier	05-00056	Rate Class 1	
Sterling Springs★	Sevier	05-00055	Rate Class 1	
Mountain Shangrila★	Sevier	06-00156	Rate Class 1	
Flat Hollow★	Campbell	07-00009	Rate Class 1	
				T
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Waterside (Douglas Lake)	Jefferson	18-00063	Rate Class 1	N
ISHA Enclave	Warren	20-00038	Rate Class 1	N

★Combined residential and commercial territories.

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RESIDENTIAL RATES SHEET EXPLANATION

Rate per month..... $74.96 | **I**

Effective October 22, 2007, $10.13 of the residential rate will be placed in the Company's escrow account. | **T**

Fees: Non-payment—5% of total bill
Disconnection—$10.00
Reconnection—$15.00 | **M/ I**
Returned Check (NSF)—$20.00
Access Fees—$216.18 per year billed in two equal installments (*See* Rules and Regulations for explanation).
Financial Security Surcharge -- $2.87/ month or $34.44 total for 2014/2015 until true-up

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COMMERCIAL SEWER SERVICE TERRITORIES

Service Territory	County	TPUC Docket No.	
Cove Mountain Realty	Sevier	03-00467	
Valley Mart Exxon	Sevier	03-00467	
Lot 23—The River Club	Knox	04-00152	
Wild Briar Ridge★	Sevier	05-00056	
Sterling Springs★	Sevier	05-00055	
Lost Creek Campground	Union	07-00010	
Mountain Shangrila★	Sevier	06-00156	
Flat Hollow★	Campbell	07-00009	
Cove Creek	Sevier	10-00122	T

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★These Service Territories contain a mix of both commercial and residential properties.

Wastewater Utility Service

COMMERCIAL RATE (WITH OUT FOOD SERVICE)

This rate is designed for systems that treat wastewater with typical domestic waste quality characteristics. Any facility that is operated as a business or rental property will be considered commercial. Examples are applications such as an office building, insurance office, transient rental properties, motels without food services, or auto sales office.

Overnight/Transient Rental Properties:
The sewer bill will be charged on a monthly basis. The customer will be billed on the Bedroom Counts listed below in the Overnight Rental column and not by water use. These units have bedroom counts but typically sleep and/or are occupied by more persons than a typical residential bedroom count. Effluent production from these units has a higher degree of foreign material, grease, and items not permitted in the Biological Systems Manual. There is considerably higher maintenance on the Septic Tank Effluent Pumping System with filter cleaning, pumping, pump replacement, emergency calls, etc.

The customer will provide a system that will treat the expected design flow and typical domestic waste quality characteristics. These systems special conditions such as high treatment requirement or high peak flows may make other systems than addressed in this initial petition necessary. IRM Utility, Inc. will need to petition for rates on a case by case basis for such systems.

Billing rates are based on design flow as required. The monthly charges in the table below will apply based on the expected design flow.

Overnight Rental	Expected Design Flow	Service Charge	Escrow Charge	Total Charge
3 bedrooms or less	300 gallons or less	$125.66	$21.64	$147.30
4 bedrooms	301 to 400 gallons	$160.79	$25.97	$186.76
5 bedrooms	401 to 500 gallons	$194.57	$30.29	$224.86
6 bedrooms	501 to 600 gallons	$228.34	$34.62	$262.96
7 bedrooms	601 to 700 gallons	$268.88	$38.95	$307.83
8 bedrooms	701 to 800 gallons	$309.41	$43.28	$352.69
9 bedrooms	801 to 900 gallons	$349.95	$47.60	$397.55
10 bedrooms	901 to 1,000 gallons	$390.48	$51.93	$442.41
11 bedrooms	1,001 to 1,100 gallons	$433.04	$55.97	$489.01
12 bedrooms	1,101 to 1,200 gallons	$475.61	$60.00	$535.61
13 bedrooms	1,201 to 1,300 gallons	$518.17	$64.05	$582.22
14 bedrooms	1,301 to 1,400 gallons	$560.73	$68.09	$628.82
15 bedrooms	1,401 to 1,500 gallons	$602.95	$72.13	$675.08
16 bedrooms	1,501 to 1,600 gallons	$645.18	$76.14	$721.32

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Wastewater Utility Service

COMMERCIAL RATE (WITH OUT FOOD SERVICE)—Continued

17 bedrooms	1,601 to 1,700 gallons	$687.40	$80.20	$767.60	
18 bedrooms	1,701 to 1,800 gallons	$729.62	$84.24	$813.86	I
19 bedrooms	1,801 to 1,900 gallons	$771.85	$88.28	$860.13	
20 bedrooms	1,901 to 2,000 gallons	$814.07	$92.32	$906.39	

For design daily flows over 2,000 gallons, the monthly charge on all system configurations will be the 1,901 to 2,000 gallon rates plus an additional monthly charge of $344.54 per 1,000 gallons or prorated portion thereof. I

Additional surcharges will apply when customers exceed their expected design flows. For any month that a customer's water meter reading exceeds the expected design flow, the following surcharges will apply:

Excess Water Usage Surcharge	
1 gallon to 1,000 gallons above expected design flow	$175.00
1,001 gallons to 2,000 gallons above expected design flow	$200.00
Over 2,000 gallons above expected design flow	$200.00/1000 gals

If the water meter readings exceed the design flow or analysis indicates that effluent characteristics are not as indicated by the customer's design engineer, the monthly charge will be revised to reflect the increased usage and any capital costs associated with increasing the capacity of the system or upgrading the treatment for the greater loading will be paid by the customer.

Fees: Nonpayment – 5% Disconnection - $10.00 Reconnection - $15.00 Returned Check - $20.00 – Financial Security Surcharge $2.87 per Month.

Wastewater Utility Service

COMMERCIAL RATE (CAMPGROUNDS)

This rate is designed for systems serving commercial campgrounds with expected daily design flows of 5,000 gallons per day.

Rate per month.....$1,044.11 | I

Effective October 22, 2007, $199.64 of the commercial campground rate will be placed in the Company's escrow account.

Additional surcharges will apply when customers exceed their expected design flows. For any month that a customer's water meter reading exceeds the expected design flow, the following surcharges will apply:

Excess Water Usage Surcharge	
1 gallon to 1,000 gallons above expected design flow	$175.00
1,001 gallons to 2,000 gallons above expected design flow	$200.00
Over 2,000 gallons above expected design flow	$200.00/1000 gals

If the water meter readings exceed the design flow or analysis indicates that effluent characteristics are not as indicated by the customer's design engineer, the monthly charge will be revised to reflect the increased usage and any capital costs associated with increasing the capacity of the system or upgrading the treatment for the greater loading will be paid by the customer.

Fees: Nonpayment – 5% Disconnection - $10.00 Reconnection - $15.00 Returned Check - $20.00 – Financial Security Surcharge $2.87 per Month.

Wastewater Utility Service

COMMERCIAL RATE (WITH FOOD SERVICE)

This rate is designed for systems that treat wastewater with high strength waste or require special maintenance schedules. Examples are applications such as restaurants, snack bars, cafeterias, food processing or catering, other commercial application that does not produce typical domestic waste quality characteristics.

The sewer bill will be charged on a monthly basis. The customer will provide a system that has an expected design flow and quality characteristics. Special conditions such as high treatment requirement or high flows may make other systems than addressed in this initial petition necessary. IRM Utility, Inc. will need to petition for rates on a case by case basis for such systems.

Billing rates are based on design flow as required. The monthly charges in the table below shall apply based on the expected design flow.

Expected Design Flow	Service Charge	Escrow Charge	Total Charge
300 gallons or less	$ 152.57	$ 28.85	$ 181.42
301 to 400 gallons	$ 195.23	$ 34.04	$ 229.27
401 to 500 gallons	$ 236.24	$ 39.24	$ 275.48
501 to 600 gallons	$ 277.26	$ 44.43	$ 321.69
601 to 700 gallons	$ 326.48	$ 49.62	$ 376.10
701 to 800 gallons	$ 375.69	$ 54.82	$ 430.51
801 to 900 gallons	$ 424.91	$ 60.01	$ 484.92
901 to 1000 gallons	$ 474.12	$ 65.20	$ 539.32
1001 to 1100 gallons	$ 525.80	$ 70.11	$ 595.91
1101 to 1200 gallons	$ 577.48	$ 75.01	$ 652.49
1201 to 1300 gallons	$ 629.16	$ 79.91	$ 709.07
1301 to 1400 gallons	$ 680.83	$ 84.82	$ 765.65
1401 to 1500 gallons	$ 732.11	$ 89.72	$ 821.83
1501 to 1600 gallons	$ 783.37	$ 94.63	$ 878.00
1601 to 1700 gallons	$ 834.63	$ 99.53	$ 934.16
1701 to 1800 gallons	$ 885.91	$ 104.44	$ 990.35
1801 to 1900 gallons	$ 937.17	$ 109.34	$ 1,046.51
1901 to 2000 gallons	$ 988.45	$ 114.25	$ 1,102.70

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Wastewater Utility Service

COMMERCIAL RATE (WITH FOOD SERVICE)—Continued

For design daily flows over 2,000 gallons, the monthly charge on all system configurations will be the 1,901 to 2,000 gallon rates plus and additional $418.86 per 1,000 gallons or prorated portion thereof. I

Additional surcharges will apply when customers exceed their expected design flows. For any month that a customer's water meter reading exceeds the expected design flow, the following surcharges will apply:

Excess Water Usage Surcharge	
1 gallon to 1,000 gallons above expected design flow	$210.00
1,001 gallons to 2,000 gallons above expected design flow	$220.00
Over 2,000 gallons above expected design flow	$220.00/1000 gals

If the water meter readings exceed the design flow or analysis indicates that effluent characteristics are not as indicated by the customer's design engineer, the monthly charge will be revised to reflect the increased usage and any capital costs associated with increasing the capacity of the system or upgrading the treatment for the greater loading will be paid by the customer.

Fees: Nonpayment – 5% Disconnection - $10.00 Reconnection - $15.00 Returned Check - $20.00 – Financial Security Surcharge $2.87 per Month.

Wastewater Utility Service

COMMERCIAL RATE (COMBINED SERVICES or HIGH STRENGTH WASTE)

This rate is designed for systems that treat wastewater with high strength waste or require special maintenance schedules.

Combined Services: This rate service is for facilities that may have more than one wastewater flow that is made up of different types of effluent discharge quality. Each independent use that contributes to the wastewater production will be characterized. Rates will be evaluated based on equipment needed for treatment and the level of management required for treatment. Examples are a facility with offices, food service, locker/shower rooms, swimming pools, buildings with laundry facilities, distilleries, breweries, medical or dental offices, car washes, recreational vehicle campgrounds, truck and/or auto plazas or any other commercial application that does not produce typical domestic waste quality characteristics.

High Strength Waste: This rate service is for facilities that produce wastes that require treatment of unique effluents. High Strength Waste can be described as effluents that have high Chemical Oxygen Demand (COD), High Biochemical Oxygen Demand (BOD), High Nitrogen components such as Ammonia, Nitrates, high Total Suspended Solids (TSS), heavy metals, or other factors that affect treatment plant configurations. Rates will be evaluated based on equipment needed for treatment and the level of management required for treatment. Examples are distilleries, breweries, medical or dental offices, car washes, truck and/or auto plazas, industrial or industrial pretreatment applications, or any other commercial application that does not produce typical domestic waste quality characteristics.

The sewer bill will be charged on a monthly basis. The customer will provide a system that has an expected design flow and quality characteristics. Special conditions such as high treatment requirement or high flows may make other systems than addressed in this initial petition necessary. IRM Utility, Inc. will need to petition for rates on a case by case basis for such systems.

The monthly charges in the following rate schedule shall apply:

Combined Services or High Strength Customer	Service Charge	Escrow Charge	Total Charge	
Sterling Springs HOA (700 GPD)	$208.77	$50.49	$259.26	T
Valley Mart Exxon (2,000 GPD)	$421.22	$114.25	$535.47	
Cove Mountain Realty (2,000 GPD)	$394.20	$41.83	$436.03	N
River Club (1,000 GPD)	$808.18	$193.86	$1,002.04	N

Wastewater Utility Service

DEVELOPER SERVICE RATES

On April 30, 2016, Integrated Resource Management Company, Inc. entered into a contract agreement for specific lots within the Wild Briar Ridge subdivision in Sevierville, TN.[1] The Wild Briar Subdivision customers that are subject to specific developer rates are detailed below. N

DEVELOPER SERVICE TERRITORIES

Street Address	Lot No.	No. Of Bedrooms
1965 Blackthorn Trail Sevierville, TN 37876	14	15
1985 Blackthorn Trail Sevierville, TN 37876	17	15
1981 Blackthorn Trail Sevierville, TN 37876	16 (Pool)	1 - 3
2006 Thistle Thorn Trail Sevierville, TN 37876	33	18
Wild Briar Trail Sevierville, TN 37876	39 (Pool)	18

N

[1] This agreement was set forth in TPUC Docket No. 16-00048 and was set to establish the rates, terms, and conditions for Wild Briar's use of the System, and to provide a volume discount. Most of these lots have been sold from the original developer and are now subject to the rates, terms, and conditions of service to individual lot owners as provided by IRM's tariffs.

Wastewater Utility Service

DEVELOPER SERVICE RATES

Street Address	Lot No.	No. Of Bedrooms	Service Rate	Escrow Charge	Total Charge
1965 Blackthorn Trail Sevierville, TN 37876	14	15	$506.24	$41.63	$547.87
1985 Blackthorn Trail Sevierville, TN 37876	17	15	$506.24	$41.63	$547.87
1981 Blackthorn Trail Sevierville, TN 37876	16 (Pool)	1 - 3	$63.86	$5.25	$69.11
2006 Thistle Thorn Trail Sevierville, TN 37876	33	18	$620.18	$51.00	$671.18
Wild Briar Trail Sevierville, TN 37876	39 (Pool)	18	$620.18	$51.00	$671.18

N

Fees: Nonpayment – 5% Disconnection - $10.00 Reconnection - $15.00 Returned Check - $20.00 – Financial Security Surcharge $2.87 per Month N