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February 3, 2020

VIA HAND DELIVERY

Hon. Robin L. Morrison, Chairman
c/o Ectory Lawless, Docket Room Manager
Tennessee Public Utilities Commission
502 Deaderick Street, 4th Floor
Nashville, TN 37243

RE: Joint Petition of Tennessee-American Water Company and Thunder Air, Inc. D/B/A Jasper Highlands Development, Inc. for the Approval of an Asset Purchase Agreement and for the Issuance of a Certification of Convenience and Necessity; Docket No. 20-00011

Dear Chairman Morrison:

Attached for filing please find the *Joint Petition of Tennessee-American Water Company and Thunder Air, Inc. D/B/A Jasper Highlands Development, Inc. for the Approval of an Asset Purchase Agreement and for the Issuance of a Certification of Convenience and Necessity*, including exhibits and pre-filed testimony.

As required, an original and thirteen (13) hard copies of the Petition and supporting documentation will follow. We have also enclosed a check in the amount of $25.00 for the required filing fee. Please note that Exhibits DB-3, DB-4, DB-5, GS-3, GS-4, and GS-5 to the pre-filed testimony are being submitted **UNDER SEAL** as **CONFIDENTIAL and PROPRIETARY**. Both a public version and a nonpublic, **CONFIDENTIAL** version of Exhibits DB-3, DB-4, DB-5, GS-3, GS-4, and GS-5 are attached.

For the reasons set forth within the Petition, the parties are requesting that this matter be considered on an expedited basis.

An extra copy of this cover letter will also follow to be filed-stamped for our records. Should you have any questions concerning this filing or require additional information, please do not hesitate to let me know.

Very truly yours,

BUTLER SNOW LLP

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BEFORE THE TENNESSEE PUBLIC UTILITY COMMISSION
NASHVILLE, TENNESSEE

JOINT PETITION OF TENNESSEE-AMERICAN WATER COMPANY, AND THUNDER AIR, INC. D/B/A JASPER HIGHLANDS DEVELOPMENT, INC. FOR APPROVAL OF AN ASSET PURCHASE AGREEMENT AND FOR THE ISSUANCE OF A CERTIFICATE OF CONVENIENCE AND NECESSITY	)	**DOCKET NO. 20-_00011_**

EXPEDITED JOINT PETITION OF TENNESSEE-AMERICAN WATER COMPANY AND THUNDER AIR, INC. D/B/A JASPER HIGHLANDS DEVELOPMENT, INC. FOR APPROVAL OF AN ASSET PURCHASE AGREEMENT AND FOR THE ISSUANCE OF A CERTIFICATE OF CONVENIENCE AND NECESSITY

Pursuant to Tenn. Code Ann. §§ 65-4-201 and 65-4-107, Tennessee-American Water Company ("TAWC," "Tennessee-American" or "Company") and Thunder Air, Inc. d/b/a Jasper Highlands Development, Inc. ("Thunder Air Inc."), hereinafter collectively the Parties, submit this Joint Petition seeking both the approval of the acquisition of the water system owned by Thunder Air Inc. by TAWC and a Certificate of Convenience and Necessity, with its accompanying privilege and franchise, to own and operate the water system owned by Thunder Air Inc. and to serve the entire Thunder Air Inc. development, as more clearly defined in Section I of this Joint Petition.[1] As set forth below, the Asset Purchase Agreement is necessary and proper for the public convenience and properly conserves the public interest. Therefore, the issuance of a Certificate of

[1] A copy of the Asset Purchase Agreement (the "Purchase Agreement") between TAWC and Thunder Air, Inc. d/b/a Jasper Highlands Development, Inc. is attached as **Exhibit A** to this Joint Petition. As set forth in this Joint Petition and in the Pre-filed Testimony of Thunder Air Inc. Witness Dane Bradshaw, the System is operated by the Jasper Highlands Property Owners Association, which is both aware of and supportive of this Joint Petition. To the extent any schedules to the Asset Purchase Agreement are updated, these updated schedules will be filed with the Commission.

Convenience and Necessity to TAWC will serve the public interest as well. For the reasons and support that follow, TAWC and Thunder Air Inc. jointly request that the Tennessee Public Utility Commission ("TPUC" or "Commission") approve this Joint Petition.

Under the terms of the Purchase Agreement, a condition precedent to the closing of the sale of Thunder Air Inc.'s water system is TAWC obtaining a Certificate of Convenience and Necessity, along with acceptable accounting, ratemaking and regulatory approvals, from the Commission. Due to the impending closing of the transaction, coupled with the public interest, the Parties hereby request that this Joint Petition be considered on an **expedited** basis.

I. THE PARTIES

1. Thunder Air, Inc. d/b/a Jasper Highlands Development, Inc., a Tennessee corporation, owns approximately 9,000 acres atop Jasper Mountain in Marion County, Tennessee. Moreover, Thunder Air Inc. owns a water system that provides water services to customers within its growing development in Kimball, Tennessee. The location of the development and this water system is generally shown on the map attached hereto as **Exhibit B** (collectively the "System"). The development and the System are located about twenty (20) miles from TAWC's Whitwell operations.

2. As the build-out and further development of Thunder Air Inc. continues, more customers will be served by the System, as may be expanded from time to time to accommodate additional customers within the Thunder Air Inc. development.

3. TAWC is a Tennessee corporation authorized to conduct a public utility business in the State of Tennessee and provides residential, commercial, industrial and municipal water service, including public and private fire protection service, to the City of Chattanooga, Tennessee and surrounding areas, including certain areas in Georgia. In addition to Whitwell, Tennessee-

American currently provides water services for Powell's Crossroads and Suck Creek in Marion County. TAWC provides water service to approximately 80,670 customers.

4. Pursuant to Chapter 4 of Title 65 of the Tennessee Code Annotated, TAWC is subject to regulation by the Commission.

5. TAWC's principal place of business is located at 109 Wiehl Street, Chattanooga, TN 37403.

6. All correspondence and communication with respect to this Joint Petition should be sent to the following:

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Tennessee-American Water Company
2300 Richmond Road
Lexington, KY 40502
(859) 268-6309 (Office Telephone)
Elaine.K.Chambers@amwater.com

Melvin J. Malone
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II. DESCRIPTION OF THE TRANSACTIONS

7. As set forth in the Purchase Agreement, Thunder Air Inc. has determined that it is in the best interest of both Thunder Air, Inc. and those served by the System for TAWC to acquire the System. Therefore, Thunder Air Inc. desires to sell all of the assets that constitute or are used in furtherance of the System to TAWC.

8. After approval of this Petition, it is anticipated that TAWC and Thunder Air Inc. will close the acquisition transaction set forth in the Purchase Agreement, under which TAWC

has agreed to purchase from Thunder Air Inc. the assets of the System. Under the terms of the Purchase Agreement, the Purchase Price is the sum of Two Million Three Hundred Ninety-Eight Thousand and 00/100 Dollars ($2,398,200.00), subject to, among other things, the results of the inspection of Thunder Air Inc.'s Assets relating to the System by TAWC.[2] The Purchase Price is further addressed in the Pre-Filed Direct Testimony of TAWC Witness Elaine K. Chambers.

9. The current rates of Thunder Air Inc.'s water customers were established by the Jasper Highlands Property Owners' Association, Inc. ("JHPOA"). JHPOA is a Tennessee nonprofit corporation. The provision of water services by Thunder Air Inc. is consistent with Tenn. Code Ann. § 65-4-101(6)(B)(i). In further support of the Joint Petition, attached as **Collective Exhibit C** are the following: (1) Lease between JHPOA and Thunder Air Inc.; (2) Management Agreement between JHPOA and Thunder Air Inc.; (3) the Consent of JHPOA to the acquisition; (4) a certified copy of JHPOA's charter, along with JHPOA's Certificate of Existence/Authorization and its most recently submitted Tennessee Corporation Annual Report Form; and (5) the water rates established September 1, 2016, for Jasper Highlands Water System.[3]

10. Assuming approval of the Joint Petition, the rates for the customers of the System shall are addressed in both Article 6, Section 6.1(j) of the Purchase Agreement and the Pre-filed Direct Testimony of TAWC Witness Elaine K. Chambers.

11. The expenses and revenues of the System will be kept separate and distinct from the operation of TAWC's Chattanooga system.

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[2] The Excluded Assets are set forth in Schedule 1.4 to the Purchase Agreement.

The capitalized terms used in this Joint Petition shall have the meaning set forth within the Purchase Agreement and all documents executed in connection with the Purchase Agreement.

[3] Any other contracts between Thunder Air Inc. and JHPOA are attached hereto as **Collective Exhibit E.**

12. The acquisition of the System will not adversely impact the rates of current TAWC ratepayers.

13. As part of the consideration for the purchase of the System, and as set forth in the Purchase Agreement, the Assets of the System includes all of the assets, properties and rights of Thunder Air Inc. that are held or used in connection with the System, except for Excluded Assets.[4]

14. The necessary revisions to the tariffs of TAWC relative to the System are attached hereto as **Exhibit D**.

15. As part of the consideration for the purchase of the System, and as set forth in the Purchase Agreement, the Assets of the System include, but are not limited to, all interests in real estate, infrastructure, treatment facilities, easements, rights-of-way, franchises, licenses or rights owned by Thunder Air Inc. and relating to the System. The following supporting documentation will be submitted to the Commission within thirty (30) days of closing: (1) copies of all recorded warranty deeds for the real property being transferred to TAWC; (2) copies of the Bill of Sale for all tangible and intangible personal property being transferred to TAWC;[5] (3) copies of all easements and any other transferable property rights being transferred to TAWC; and (4) copies of any schedules attached to the Purchase Agreement that need to be either updated or completed.

16. Additional supporting information provided with and in support of the Joint Petition include the following: (1) **Exhibit F**, a copy of the signed plat recorded with the city or county government for the Jasper Highlands Development, which includes "as built" drawings of Phases I and II of the System as they currently exists; (2) **Exhibit G**, a copy of the "as-built" drawings of Phase III of the System as it currently exists; (3) **Exhibit H**, a copy of the water purchase agreement between Thunder Air Inc. and South Pittsburgh Water Board of Water Works

[4] The Assets are further defined in Article I of the Purchase Agreement.
[5] An unexecuted copy of the Bill of Sale is attached hereto as **Exhibit L.**

and Sewers; (4) **Exhibit I**, the System's operation and maintenance plan pursuant to Tenn. Code Ann. § 68-221-707(c)[6]; (5) (6) **Exhibit J,** TDEC's approval of the construction of the System; and (7) **Exhibit K**, all Sanitary Surveys by TDEC.

17. As set forth earlier herein, pursuant to the Purchase Agreement, consummation of the transaction, with its underlying obligations, is expressly conditioned upon Commission approval.

18. The current customers of the System are aware of the proposed transaction. *See* **Exhibit C.** The current customers of the System will also be notified of this Joint Petition pursuant to the Commission's notice requirements. The System customers will be provided, among other things, a summary of any proposed changes, along with the Commission's date for the Hearing on the merits.

III. TAWC's TECHNICAL, MANAGERIAL AND FINANCIAL ABILITY

19. TAWC has a proud 132-year history of providing safe, reliable drinking water to its customers.

20. TAWC is a wholly-owned subsidiary of American Water Works Company, Inc., which is the largest water holding company in the United States, providing water and wastewater services to fifteen (15) million people in more than thirty (30) states.

21. As noted earlier herein, TAWC is regulated by the Commission. As such, the Commission is intimately familiar with the technical, managerial and financial ability of TAWC. Further, the official records of the Commission support TAWC's technical, managerial and financial ability to provide services within the areas served by the System.

[6] The Public Water System Identification number assigned by TDEC to the System is PWSID #0008286. The certified operator of the System is Jarvis Garth, his license number is 9294 and his renewal number is 95001.

22. The pre-filed testimony in support of this Joint Petition also demonstrates TAWC's technical, managerial and financial ability.

23. TAWC is familiar with and will adhere to all applicable Commission policies, rules and orders governing the provision of water service pursuant to the acquisition that is the subject of this Joint Petition.

IV. PROPOSED REGULATORY TREATMENT

24. Given TAWC's unwavering commitment to provide safe, reliable drinking water to the System's customers, TAWC deserves full rate base recognition of its investment in the System, as well as the following proposed adjustments:

a. TAWC proposes to utilize the financial statements, records and reports provided by Thunder Air Inc. and its accountant to support the original cost value of utility plant in service ("UPIS") as of the Closing Date.

b. TAWC proposes to adopt the current TPUC-approved TAWC depreciation rates for Thunder Air Inc. upon Closing.

c. TAWC proposes no UPAA with this transaction.

d. In conducting the necessary due diligence and prudency evaluation with respect to the System, which preliminary reviews benefit both shareholders and current ratepayers, and in properly documenting the transactions, TAWC has necessarily incurred reasonable acquisition expenses, including some by external parties, which, under the circumstances presented, are appropriate for recovery. Upon Closing, the System's customers will benefit substantially from the transactions. TAWC proposes that these necessary and reasonable expenses be recovered through the recording of a regulatory asset to be amortized over ten (10) years.

25. As the Commission well knows based upon its own experiences, the ever-growing pressures of needed capital investments mount more and more, causing smaller utilities to confront substantial, and oftentimes insurmountable, difficulties. In order for better positioned utilities, such as TAWC, to provide the necessary resources and expertise to offer the opportunity for

improved services, and to promote the public interest in such circumstances, fair and balanced regulatory treatment is essential.

26. Upon closing, TAWC seeks to apply all other rates and fees as authorized and applied to all other customers to the customers of Thunder Air Inc. as well. This will include late fees, service activation fees, returned check fees, disconnection fees, the Capital Recovery Riders as approved by the TPUC, and the PCOP Rider as appropriate. This is further set forth in the Pre-Filed Testimony of TAWC Witness Elaine K. Chambers.

V. THE PUBLIC INTEREST

27. Thunder Air Inc. believes it is in the best interests of the customers of the System for TAWC to acquire the System from Thunder Air Inc. with the result that TAWC will be the exclusive provider of water within the service area of the System and the entire Jasper Highlands development, necessarily including any Thunder Air Inc. build-out.[7]

28. Water utilities are the most capital intensive in the utility industry. In properly maintaining and supporting a water system, the owner and operator thereof is confronted with, among other things, increasing costs and mounting capital expenditures. Aging infrastructure and technological advances must be consistently and appropriately studied and addressed. TAWC has the capability and resources to ensure that the System is appropriately maintained and upgraded in the days ahead as conditions warrant.

29. TAWC has a proud 132 year history of providing safe, reliable drinking water to its customers. This transaction will benefit the current and future customers of the System through the professional management, long-term planning, and sustained investment by TAWC.

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[7] As set forth in Addendum B to the Acquisition Agreement, the applicable bona fide customer distance for expanding water service to new customers will be one hundred (100) feet, as opposed to forty-five (45) feet contained within TAWC's tariff.

30. The representations and agreements described in the Purchase Agreement reflect the determination by the Parties involved that going forward TAWC, rather than Thunder Air Inc., is best suited to provide service to customers of the System and to the entire Thunder Air Inc. development, including making future capital improvements necessary to maintain the efficiency and quality of the System.

31. The Purchase Agreement and the requested regulatory treatment and approvals are necessary and proper for the public convenience and properly conserve, promote and protect the public interest.

32. The issuance of a Certificate of Convenience and Necessity to TAWC serves the public interest.

VI. CONFIDENTIAL INFORMATION AND PROTECTIVE ORDER

Also attached for entry by the Commission in this matter is a proposed Protective Order, which is necessary to facilitate the production of various information related to this Joint Petition. *See* **Exhibit M.**

VII. CONCLUSION

For the foregoing reasons, the Parties, TAWC and Thunder Air Inc., respectfully requests the Commission to approve TAWC's acquisition of the System and to grant it a Certificate of Public Convenience and Necessity on an expedited basis, authorizing it to provide water service in the proposed service area.

WHEREFORE, the Parties hereby request that the Commission:

(1) Approve both the Purchase Agreement, attached hereto as **Exhibit A** as necessary and proper for the public convenience and properly conserving, promoting and protecting the public interest;

(2) Issue a Certificate of Convenience and Necessity to TAWC, which will permit TAWC to serve all of the current and future water customers in the entire Thunder Air Inc. development, as this will serve and promote the public interest;

(3) As proposed in the Joint Petition, the Purchase Agreement and the Pre-filed Direct Testimony of the Parties, approve accounting and rate base treatments that reflect the Purchase Price, plus the acquisition and transactions costs in future rate base determinations will be consistent with the value of the Purchase Price plus acquisition and transactions costs;

(4) Grant such approvals as may be necessary to consummate the acquisition of the System by TAWC and permit the operation thereof by TAWC on the terms described in the Purchase Agreement and this Joint Petition, including all necessary licenses, permits and franchises to provide water and related services in the Thunder Air Inc. development;

(5) Consistent with the Joint Petition, authorize TAWC to apply the rules, regulations, rates and charges generally applicable to TAWC's Chattanooga operations, as the same may be changed from time to time, to service to be provided by TAWC in the proposed service areas;

(6) Authorize TAWC to apply its existing depreciation accrual rates to the System, along with the other regulatory treatment expressly proposed herein by TAWC;

(7) Approve the encumbering of the properties comprising the System with the lien of TAWC's Mortgage Indenture;

(8) Grant all such approvals and authorizations that are necessary to consummate the Purchase Agreement and to provide service to all customers acquired as a result of the referenced transactions, including the ability to serve those customers in accordance with the rules, regulations, rates and charges set forth in TAWC's tariff on file with the Commission; and,

(9) Grant such other relief as may be required, and all on an expedited basis.

Respectfully submitted,

BUTLER SNOW LLP

By:_____

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Counsel for Thunder Air, Inc. d/b/a Jasper Highlands Development, Inc.

EXHIBIT A

ASSET PURCHASE AGREEMENT

BETWEEN THE

THUNDER AIR, INC., D/B/A JASPER HIGHLANDS DEVELOPMENT, INC.

AND

TENNESSEE-AMERICAN WATER COMPANY

_____, 2020

ASSET PURCHASE AGREEMENT

THIS ASSET PURCHASE Agreement ("**Agreement**"), dated as of the ___ day of _____, 2020 (the "**Effective Date**") by and between the **THUNDER AIR, INC.,** a Tennessee corporation **d/b/a Jasper Highlands Development, Inc.** ("**Seller**"), and **TENNESSEE-AMERICAN WATER COMPANY**, a Tennessee public utility corporation ("**TAWC**").

RECITALS

A. Seller owns, maintains and operates a water supply system which provides water services to customers located within that certain residential development known as Jasper Highlands Subdivision (the "**Subdivision**") and which is primarily located in Marion County, Tennessee (the "**Water System**").

B. Seller has developed Phase 1, Phase 2 and Phase 3 of the Subdivision and there are currently One Hundred Thirty-nine (139) active customers served by the Water System.

C. TAWC is a regulated public utility that furnishes water services to the public in multiple counties throughout Tennessee.

D. Seller desires to sell, and TAWC desires to purchase the Water System, as well as substantially all assets, properties and rights of Seller owned and used in connection with the Water System, upon the terms and conditions set forth herein.

NOW, THEREFORE, in consideration of the recitals and the covenants, representations, warranties and agreements herein contained, and intending to be legally bound hereby, the parties hereto agree as follows:

ARTICLE 1

THE TRANSACTION

1.1 Sale and Purchase of Assets. Subject to the terms, representations and conditions set forth in this Agreement, TAWC shall purchase from Seller, and Seller shall sell, assign, transfer, grant, convey and deliver to TAWC at Closing (hereinafter defined), the Assets. The term "**Assets**" means all of the assets, properties and rights of Seller (whether tangible, intangible, real, personal or mixed) that are held or used in connection with the Water System, except for the Excluded Assets. The Assets shall be sold free and clear of all mortgages, liens, pledges, security interests, charges, claims, restrictions and encumbrances of any and all nature (collectively, the "**Encumbrances**").

1.2 Assets Further Defined.

The Assets shall, without limitation to the definition stated above, include the following, other than the Excluded Assets:

(a) the Assigned Contracts (as defined in **Section 5.1(c)**);

(b) all interests in real estate (excepting public streets and public right-of-ways), water sources, wells, mains, pipes, pipelines, manholes, pumps, facilities, meters, tanks, storage facilities, valves, hydrants, water treatment facilities, water system network and related appurtenances, structures, improvements, fixtures, rights-of-way, rights, uses, franchises, licenses and easements owned by Seller and relating to the Water System, or in which Seller has an interest, and all hereditaments, tenements and appurtenances belonging, appertaining or relating thereto;

(c) all machinery, equipment, tools, keys and locks, leasehold improvements, goods, and other tangible personal property relating to the System owned by Seller, or in which Seller has an interest;

(d) all lubricants, spare parts, fuel, chemicals, raw materials, and other supplies and inventories ("**Supplies**") owned by the Seller, or in which the Seller has an interest, relating to the System;

(e) all rights to warranties received from the suppliers of any machinery, equipment, facilities or Supplies, and related claims, credits, and rights of recovery with respect thereto;

(f) all rights of Seller under any written or oral contract, easement, license, agreement, lease, plan, instrument, registration, permit, certificate, or other authorization or approval of any nature, or other document, commitment, arrangement, undertaking, practice or authorization, relating to the Water System;

(g) all Permits of or held by the Seller (to the extent transferable to TAWC under applicable law) and all pending applications therefore, renewals thereof or exemptions therefrom, including but not limited to those listed in **Schedule 4.1(q)**;

(h) all rights and choses in action of Seller arising out of occurrences before or after the Closing relating to the Assets, including any rights of Seller under any warranties or insurance claims related to the Assets;

(i) all of the intangible rights and property of Seller utilized by Seller in the operation of the System; and

(j) all information, files, records, data, plans, contracts and recorded knowledge relating to the Assets, including customer and supplier lists and property records, related to the foregoing.

1.3 Retained Liabilities.

(a) Except as explicitly provided in **Section 1.3(b)** below, TAWC shall not assume and shall not be liable for any liabilities or obligations of Seller of any nature whatsoever (including any obligations related to the Assets or operation of the Water System), whether express or implied, fixed or contingent, known or unknown at the time of Closing. Except as explicitly provided in **Section 1.3(b)** below, all of Seller's liabilities and obligations, whether incurred in connection with the operation of the Water System, ownership of the Assets or otherwise, shall remain the sole responsibility of, and shall be retained, paid, performed and discharged solely by Seller. Without limiting the foregoing, Seller shall be and shall remain liable for all obligations and liabilities relating to (i) employees of Seller (including those who worked on the Water System) and any employee benefits related thereto (including any pension benefits), (ii) all taxes on the business of Seller, (iii) accounts payable of the Seller, and (iv) failure to comply with any Environmental Laws or any Permits for the Assets or operation of the Water System on or before the Closing Date.

(b) Following the Closing, TAWC shall assume only those contractual liabilities arising after the Closing Date under the Assigned Contracts (specifically excluding any liability under the Assigned Contracts arising out of or relating to a breach or other circumstances that occurred on or prior to the Closing Date), including maintenance and repairs related to the Water System.

1.4 Excluded Assets. Notwithstanding anything to the contrary contained in this Agreement, the Assets shall not include any of the following:

(a) The portion of the water pipes extending from each customer's water meter to the customer's residence (the "**Customer Service Lines**");

(b) Any and all piping and fixtures internal to each individual customer's structure (whether residential, commercial, industrial or other types);

(c) Seller's cash on hand on the date of Closing and Seller's account receivables related to the Water System for services rendered through the close of business on the Closing Date;

(d) All rights of Seller under this Agreement and related Bill of Sale and Assignment of Contracts Agreement as it pertains to the transfer and sale herein contemplated; and

(e) the specific assets, properties and rights of Seller set forth on **Schedule 1.4**.

1.5 Accounts Receivable. Accounts receivable for services related to the System rendered through the close of business on the Closing Date shall be excluded assets as per **Section 1.4**, and accounts receivable for services related to the Water System rendered thereafter shall belong to TAWC.

ARTICLE 2

PURCHASE PRICE

2.1 Purchase Price for the Assets. Subject to the terms and conditions of this Agreement, the purchase price (the "**Purchase Price**") for the Assets shall be **Two Million Three Hundred Ninety-eight Thousand Two Hundred and 00/100 Dollars ($2,398,200.00).**, of which the sum of One Million Five Hundred Thousand and 00/100 Dollars ($1,500,000.00) shall be payable directly to Seller on the Closing Date by wire transfer or by corporate check, at the Seller's discretion (the "**Closing Payment**").. Any payments made in advance by Seller's water customers for post-Closing service will be apportioned at Closing. TAWC shall receive a credit toward the Closing Payment (starting with credit toward any cash payment required from TAWC) at Closing for the prorated amount of such advance payments for the period of the payment that is intended to follow Closing.

2.2 Post-Closing Payments.

(a) Subject to the terms and conditions of this Agreement, One Thousand Eight Hundred and 00/100 Dollars ($1,800.00) of the Purchase Price shall be made to the Seller post-Closing pursuant to this **Section 2.2(a)**. TAWC will pay Seller a one-time post-Closing payment of One Thousand Eight Hundred and 00/100 Dollars ($1,800.00) for each new customer added to the Water System within ten (10) years of the Closing Date (defined below). Payments made by TAWC pursuant to this **Section 2.2(a)** will be made (a) only after each such respective new customer has been served by the Water System for twelve (12) consecutive months and (b) once annually to Seller on a date agreed to by Seller and TAWC. TAWC and Seller further agree that payments made by TAWC pursuant to this **Section 2.2(a)** shall not exceed the lesser of Eight Hundred Ninety-eight Thousand Two Hindered and 00/100 Dollars ($898,200.00) or payment for Four Hundred Ninety-nine (499) new customers added to the Water System.

(b) TAWC and Seller further agree that Seller shall not be responsible for costs associated with adding customers to the Water System after the Closing Date, and which such customers being added are located within Phases 1, 2 and 3 of the Subdivision.

ARTICLE 3

THE CLOSING

3.1 Closing. Subject to the terms and conditions of this Agreement, the closing of the sale and purchase of the Assets ("**Closing**") shall take place at a location and time of day agreed upon by the parties, commencing, on or before the later to occur of: (a) within thirty (30) days following the date on which all of the conditions set forth in Articles 6, 7 and 8 of this Agreement have been met (or waived), or (b) or at such later date as is agreed upon by the parties. The date of the Closing is referred to herein as the "**Closing Date**".

3.2 Deliveries and Proceedings at Closing.

(a) Subject to the terms and conditions of this Agreement, at the Closing, Seller shall deliver or cause to be delivered to TAWC:

(i) Bills of Sale and instruments of assignment duly executed by Seller as necessary to transfer all of the Assets comprising tangible personal property to TAWC in a form acceptable to TAWC, including an assignment of contracts agreement covering the assignment and assumption of the Assigned Contracts in substantially the form of **Exhibit A** ("**Assignment of Contracts Agreement**");

(ii) A copy of each permit, license, easement, land-right and other necessary authority for the operation of the Water System and the Assets, in each case validly issued in the name of the Seller, and showing in full force and effect;

(iii) The consents to transfer all Assigned Contracts, leases, intellectual property, Permits and other Assets requiring such consents to be transferred to TAWC, with all such transfers on terms and conditions acceptable to TAWC;

(iv) All written consents (of third parties or otherwise) and governmental approvals necessary to ensure that TAWC will continue to have the same full rights with respect to the Assets that Seller had immediately prior to the Closing;

(v) an assignment of all of the Assets that are intangible personal property in a form reasonably acceptable to TAWC;

(vi) Evidence satisfactory to TAWC of the transfer of all utilities with respect to the Water System from Seller to TAWC in accordance with **Section 6.1(c)** below;

(vii) All such general warranty deeds, bills of sale, and other instruments of transfer and conveyance in order to sell, transfer, assign, convey and deliver title to the real estate and easements that are necessary for or used in connection with the operation of the Water System to TAWC, duly executed and acknowledged by Seller and in recordable form, each sufficient to convey the title and rights of access to the Assets;

(viii) Such other deeds, bills of sale, assignments, certificates of title, documents and other instruments of transfer and conveyance as may reasonably be requested by TAWC, each in form and substance reasonably satisfactory to TAWC;

(ix) a certificate as to the accuracy of Seller's representations and warranties as of the Effective Date of this Agreement and as of Closing in accordance with **Section 8.1(b)** and as to its compliance with and performance of its covenants and obligations to be performed or complied with at or before Closing in accordance with **Section 6.1**;

(x) a certificate of the Secretary of Seller, dated as of the Closing, certifying: (a) that attached are true copies of the duly adopted resolutions of the

Seller's governing body authorizing the execution of this Agreement and the sale of all Assets; and (b) the incumbency, signatures and authority of the governing body members of Seller executing this Agreement or any agreement contemplated hereby on behalf of Seller;

(xi) As applicable, a payoff letter from each lender (whether institutional or otherwise) from which Seller has incurred indebtedness or borrowed money that is outstanding, and a release of all Encumbrances relating to the Assets (along with Form UCC3 Financing Statements effectuating a termination of all outstanding financing statements covering the Assets) executed, filed and/or recorded by the holder of or parties to each such Encumbrance, if any, in each case in substance and form reasonably satisfactory to TAWC and its counsel;

(xii) The certificates and other documents required to be delivered by Seller under this Agreement as set forth in **Section 8.1** hereof;

(xiii) The Opinion of Seller's counsel as set forth in **Section 8.1(g)** hereof; and

(xiv) All such other agreements, documents and instruments of conveyance required by this Agreement or as shall, in the reasonable opinion of TAWC and its counsel, be necessary to transfer the Assets to TAWC in accordance with this Agreement, and where necessary, in recordable form.

(b) Subject to the terms and conditions of this Agreement, at the Closing, TAWC shall deliver or cause to be delivered to Seller:

(i) The Closing Payment;

(ii) Certified copies of the resolutions duly adopted by TAWC's Board of Directors authorizing the execution, delivery and performance of this Agreement; and

(iii) The certificates and other documents required to be delivered by TAWC under this Agreement as set forth in **Section 8.2** hereof.

ARTICLE 4

REPRESENTATIONS AND WARRANTIES OF SELLER

4.1 Seller's Representations. Seller hereby represents and warrants to TAWC as follows:

(a) Organization; Legal Authority. The Seller is a corporation duly organized, validly existing, and in good standing under the laws of the State of Tennessee, and Seller has the full power and lawful authority to transfer to TAWC the rights, title and interest in and to the Assets.

(b) Assets Ownership. Seller has clear, good, and marketable right and title to, or a valid leasehold interest in, all of the assets, property and facilities comprising the Assets, free and clear of all Encumbrances. **Schedule 4.1(b)** denotes all Assets that are subject to a leasehold interest (i.e., not owned by Seller). None of the Assets are leased or on loan by Seller to any third party. The Assets constitute all of the assets, property and facilities that, together with the rights granted or conveyed under the transaction documents, are necessary for the operation of the Water System, the business thereof, and the Assets as conducted as of the date hereof. Upon the Closing, TAWC shall continue to be vested with good title or a valid leasehold interest in the Water System and all of the Assets.

(c) Financial Statements. The Seller's Financial Statements that have been made available to TAWC by Seller have been prepared by Seller on a consistent basis and certified as being true and correct. The Financial Statements were prepared from the books and records of Seller, are true, correct and complete and present fairly in all material respects the financial condition, operating results and cash flows of Seller as of the dates and during the periods indicated therein (subject in the case of the Unaudited Financial Statements to normal year-end adjustments and the absence of footnotes).

(d) Due Authorization; Valid and Binding; No Encumbrances. Seller has the full power and lawful authority to enter into this Agreement and all related agreements and to consummate and perform the transactions contemplated hereby and thereby. Seller has duly and validly authorized the execution and delivery of this Agreement (which has been duly executed and delivered) and all related documents and agreements to which Seller is a party by all necessary proceedings, and this Agreement and all related documents and agreements constitute the valid and binding obligations of Seller enforceable against it in accordance with its terms. No filings or registrations with, notifications to, or authorizations, consents or approvals of, a governmental authority or third party are required to be obtained or made by Seller in connection with the execution, delivery or performance by Seller of this Agreement, all related agreements, or the consummation by Seller of the transactions contemplated herein or therein. Neither the contemplated transactions, nor this Agreement will result in the creation of any Encumbrance against any of the Assets.

(e) Current Operations. Seller has all requisite power and authority and all agreements, contracts, commitments, leases, certificates, licenses, Permits, regulatory authorizations and other instruments required to conduct the operation of the Water System as it has been and is now being conducted and to own and operate the Assets.

(f) Approvals or Violations. **Schedule 4.1(f)** sets forth a list of each consent, waiver, authorization, approval or Permit of any governmental authority or other person, and each declaration, notice to, or registration with any governmental authority, required to be obtained, given or made by Seller in connection with the execution and delivery of this Agreement and each related agreement, and the performance by Seller of its obligations under this Agreement and all related agreements and the transactions contemplated hereunder and thereunder. Except for those items set forth on **Schedule 4.1(f)**, this Agreement does not require any further approvals of any other party, does not violate any law, ordinance or regulation, does not conflict with any order or decree, and does not conflict with or result in a breach of any contract, lease or Permit to which Seller is a party or is otherwise bound or affected, or by which the Assets may be bound or affected.

The execution and delivery of this Agreement and all related documents and agreements, and the consummation of the transactions contemplated hereby and thereby, do not and will not violate, conflict with or result in the breach of any term, condition or provision of Seller's articles of incorporation, bylaws or other governing documents, or any instrument, contract, lease, agreement, Permit, certificate or other document to which Seller is a party or is otherwise bound or affected, or by which the Assets may be bound or affected.

(g) Accounts Receivable. All accounts receivable being retained by Seller under **Section 1.5** (whether billed or unbilled) (collectively, the "**Retained Accounts Receivable**"), are valid, genuine and existing and arose (or will have arisen on or prior to Closing) from bona fide sales of products or services actually made in the ordinary course of business on or prior to the Closing Date. All products and services with regard to the Retained Accounts Receivable have been provided by Seller (and no further obligations exist), and no offset, agreement for deduction, free goods, discount or deferred price or quantity adjustment has been made with respect to any Retained Accounts Receivable (or with respect to TAWC's accounts receivable for the period after Closing).

(h) Free Service; Customer List; Prepayments. Seller has not entered into any agreements or other understandings for the provision of free or otherwise subsidized or discounted services to any parties. The data contained in the customer records provided to TAWC under **Section 6.1(i)** is true and accurate in all material respects. Seller has not received payments made in advance by any third party (including Seller's water customers) for future service (including service after the Closing) with regard to the Water System or the Assets.

(i) Undisclosed Liabilities. Except as set forth in **Schedule 4.1(i)**, there are no material liabilities or obligations of Seller, either accrued, absolute, liquidated or unliquidated, contingent or otherwise, relating to the Assets that would be required to be set forth on a balance sheet prepared under GAAP applicable to municipalities, other than liabilities incurred in the ordinary course. There is no basis for any claim against Seller, the Water System or any of the Assets for any such liability or obligation, and there is no basis for any such liability or obligation to become the liability or obligation of TAWC from and after the Closing.

(j) Intentionally Omitted.

(k) Contracts. **Schedule 4.1(k)** contains a true, complete and accurate list of all agreements (including all verbal agreements), contracts, leases (including any leasehold interests constituting part of the Assets as described in **Section 4.1(b)**), licenses, commitments, arrangements and instruments related to the Assets to which Seller is a party or the Assets are otherwise subject or bound, along with all amendments and addenda related thereto (collectively, the "**Contracts**"). **Schedule 4.1(k)** also identifies with an asterisk any Contract which requires consent to, or prohibits, assignment of the Contract. All Contracts are in full force and effect and are valid and enforceable in accordance with their terms, and to the best of Seller's knowledge, the parties thereto are in material compliance with the provisions thereof, and there exists no event or condition which with the giving of notice or lapse of time, or both, would constitute a default thereunder. Seller has received, or will receive prior to the Closing, the written consent of each party to the Assigned Contracts designated on **Schedule 4.1(k)** as requiring consent to the assignment, or otherwise complied with Seller's obligations under **Section 6.1(b)** hereof. Seller

has delivered to TAWC correct and complete copies of those Contracts requested by TAWC, as well as copies of the requisite assignments for each of the Assigned Contracts which effectuates the transfer of the Assigned Contracts to TAWC as of the Closing Date. Except as disclosed on **Schedule 4.1(k)(i)**, Seller is not a party to any contract or subject to any arrangement for future payment of refunds under any extension agreement, customer deposit agreement or similar arrangement (including any prepaid tap fee) with respect to the Assets or the Water System.

(l) Adequacy of Property Rights; Real Property and Easements.

(i) Seller possesses all property rights necessary to operate the Assets, and Seller owns and has good and marketable title to the real property, free and clear of all options, leases, covenants, conditions, easements, agreements, claims, and other encumbrances of every kind, and there exists no restriction on the use or transfer of such property. As it relates to the Assets, **Schedule 4.1(l)(i)** contains a complete and accurate list of the real property owned by Seller and a complete and accurate list of each lease of real property to which Seller is a party (as the lessor, lessee or otherwise). Seller's current use and occupancy of the real property and its operation of the Water System thereon does not violate any easement, covenant, condition, restriction or similar provision in any instrument of record or other unrecorded agreement affecting such real property. To the best of Seller's knowledge, all leases, licenses, rights of way, and easements related in any manner to the Assets and properties comprising the Assets and all other instruments, documents and agreements pursuant to which Seller has obtained the right to use any real property in connection with the Assets are in good standing, valid and effective in accordance with their respective terms, and with respect thereto, there is no existing material default or event that could constitute a material default. The real property is properly classified under applicable zoning laws, ordinances, and regulations for the current and continued operation of the Water System on the real property. No proceeding that could adversely affect the zoning classification of the real property is pending or threatened. At and after the Closing, TAWC shall have the right to maintain and use the real property, including the space, facilities and appurtenances outside of building lines, whether on, over or under the ground, and to conduct such activities thereon as maintained, used or conducted by Seller on the date hereof, and such right is not subject to revocation. Seller has made available to TAWC copies of all title reports, surveys, title policies and appraisals in Seller's possession relating to the real property.

(ii) Set forth on **Schedule 4.1(l)(ii)** hereto is a true, correct and complete list of all easements and rights of way relating to the real property and the Assets. All of such easements and rights of way are valid and will be transferred to TAWC and remain in full force as of the Closing and thereafter. Seller has not received any notice of violation of any easements, covenants, restrictions or similar instruments and there is no basis for the issuance of any such notice or the taking of any action for such violation. At and after

the Closing, TAWC shall have all rights, easements and agreements necessary for the use and maintenance of water, sewer or other utility pipelines, poles, wires, conduits or other like facilities, and appurtenances thereto, over, across and under the real property to operate and maintain the Water System.

(iii) There are no outstanding options, rights of first refusal or rights of first offer to purchase any of the real property or any portion thereof or interest therein, except as otherwise set forth on **Schedule 4.1(l)(iii)**.

(iv) All improvements located on, and the use presently being made of, the real property comply with all applicable zoning and building codes, ordinances and regulations and all applicable fire, environmental, occupational safety and health standards and similar standards established by applicable law, and the same use thereof by TAWC following Closing will not result in any violation of any such code, ordinance, regulation or standard. No improvements encroach on any land that is not included in the real property or on any easements affecting such real property, or violate any building lines or set-back lines, and there are no encroachments onto the real property, or any portion thereof, that would interfere with the use or occupancy of such real property or the continued operation of the Water System as currently conducted.

(v) There is no unpaid tax, levy or assessment against the real property (except for encumbrances relating to assessments not yet due and payable), nor is there pending or threatened any condemnation proceeding against the real property or any portion thereof. **Schedule 4.1(l)(v)** contains a list of all impending taxes, levies and assessments that are due and owing after the Closing Date.

(vi) Except as set forth in **Schedule 4.1(l)(vi)**, there is no condition affecting the real property or the improvements located thereon that requires repair or correction to restore the same to reasonable operating condition.

(m) Litigation. Except as disclosed on **Schedule 4.1(m)**, there is no action, suit, claim or litigation, arbitration, proceeding, judgment, injunction, audit or legal, administrative or governmental investigation pending (including any citations, notices, summons or orders), and none are known to be threatened against, pertaining to or affecting the Water System or any of the Assets (including any such actions, litigation and other claims against Seller) before any court, arbitrator or governmental authority (including any governmental agency board or instrumentality), nor is there any order, writ, injunction or decree of any court, arbitrator or governmental authority, in existence against, pertaining to or affecting the Seller (including it commissioners, directors or officers), the Water System or any of the Assets. Except as noted in **Schedule 4.1(m)**, all matters disclosed in **Schedule 4.1(m)** are fully covered by Seller's insurance. There are no known laws, ordinances, regulations or official orders now in effect or pending that could reasonably be expected to have a material adverse effect on the Water System or the ownership, condition or operation of the Water System or the Assets. There are no actions, suits,

claims, proceedings or investigations pending or, to the knowledge of the Seller, threatened against the Seller, and the Seller is not subject to any outstanding judgment, order or decree of any court or governmental body, which would in either case, reasonably be expected to prevent or materially interfere with or delay the Seller's ability to perform its obligations under this Agreement.

(n) Tax Matters.

(i) Seller has timely and properly filed all tax returns that it was required to file. All such tax returns were complete and correct in all material respects and were prepared in compliance with all applicable laws. All taxes owed by Seller have been paid. Seller is not the beneficiary of any extensions of time within which to file any tax return. There are no Encumbrances on any of the Assets that arose in connection with any failure (or alleged failure) to pay any tax.

(ii) To the best of Seller's knowledge, seller has withheld and paid all taxes required to have been withheld and paid in connection with any amounts paid or owing to any employee, independent contractor, supplier, vendor, creditor, or other third party. Forms W-2 and 1099 required with respect thereto have been properly completed and timely filed.

(iii) There are no audits or examinations of any tax returns pending or threatened that relate to Seller's operation of the Water System or the Assets. Seller is not a party to any action or proceeding by any governmental authority for the assessment or collection of taxes relating to the operation of the Water System, nor has such event been asserted or threatened. There is no waiver or tolling of any statute of limitations in effect with respect to any tax returns relating to Seller's operation of the Water System or the Assets.

(o) No Material Adverse Conditions; Insurance. To the best of Seller's knowledge, there are no facts, circumstances or conditions existing or threatened that would have, or would be reasonably be expected to have, a material adverse effect on the condition, properties, assets, indebtedness, liabilities, commitments, operations or prospects of the Water System or the Assets. Seller maintains and has maintained appropriate insurance necessary for the full protection of all of the Assets, the Water System, and all related operations, products and services. All such policies are in full force and effect and Seller will use commercially reasonable efforts to cause such policies to be outstanding and in full force and effect as of Closing and immediately following the execution of this Agreement and the consummation of the contemplated transactions. There are no pending claims or proceedings arising out of, based upon or with respect to any of such policies of insurance and, to Seller's knowledge, no basis for any such claims or proceedings exists. Seller is not in default with respect to any provisions contained in any such insurance policies, and no insurance provider is in default with respect to such insurance policies.

(p) Compliance with Law. To the best of Seller's knowledge, except as disclosed on **Schedule 4.1(p)**, Seller is and has been in material compliance with all laws, ordinances, and governmental rules and regulations, whether civil or criminal, of any federal, state, local or foreign governmental authority applicable to the operation of the Water System and the Assets, including

any Environmental Laws (defined below) and employee labor, pension and benefits laws, to which Seller, the Water System or the Assets are subject, and has not failed to obtain, or to adhere to the requirements of, any certificate, license, Permit or other governmental authorization necessary for the operation of the Water System and the Assets, nor has Seller committed any violation of law or any provision of its governing documents applicable to the Water System or the Assets. Except as disclosed on **Schedule 4.1(p)**, Seller has not received, and has no reason to believe that it will receive, notice of any violation of law.

(q) Adequacy of Permits. Set forth in **Schedule 4.1(q)** is a complete and correct list of all permits, licenses, franchises, registrations, certificates, consents, orders, adjudications, variances, waivers, privileges, approvals and other authorizations, including any authorizations issued, granted, approved or allowed by or obtained from, or required to be obtained from, any governmental authority, including any environmental permits, operating permits and approvals (collectively, the "**Permits**") held by Seller in the continuing operation of the Water System and for the Assets. Such Permits constitute all those necessary for the continuing operation of the Water System and for the Assets, and are all valid and subsisting and in full force and effect. To the best of Seller's knowledge, no fact or circumstance exists that is reasonably likely to cause any such Permit to be revoked or materially altered subsequent to the execution of this Agreement and the Closing Date, and neither the execution of this Agreement, nor the Closing do or will constitute or result in a default under or violation of any such Permit. Seller likewise has obtained and continues to possess all Permits required under, by or pursuant to Environmental Laws (defined below), has filed such timely and complete renewal applications as may be required prior to the Closing Date, and also has complied with all reporting and record keeping requirements under Environmental Laws (defined below).

(r) Environmental Matters.

(i) To the best of Seller's knowledge, there are no past or present events, conditions, circumstances, activities, practices, incidents, actions or plans pertaining or relating to the Assets or the Water System that may materially impede or prevent compliance with Environmental Laws, and Seller is, and at all times has been, in full compliance with and has not been, and is not in violation of or liable under any applicable Environmental Law. Seller has no basis to expect, nor has it received any actual or threatened order, notice or other communication from any governmental authority or other person of any actual or potential violation or failure to comply with any Environmental Law or of any actual or threatened obligation to undertake or bear the cost of any environmental, health and safety liabilities with respect to real property or any other properties or assets (whether real, personal or mixed) in which Seller has or has had an interest or with respect to the real property or any other real property at or to which hazardous materials were generated, manufactured, refined, transferred, imported, used or processed by Seller or any other person for whose conduct it is or may be held responsible, or from which hazardous materials have been transported, treated, stored, handled, transferred, disposed, recycled or received.

(ii) There are no pending or threatened claims, liens, encumbrances or other restrictions of any nature, resulting from any environmental, health and safety liabilities or arising under or pursuant to any Environmental Law with respect to or affecting the Seller's real property or any other properties and assets (whether real, personal or mixed) in which Seller has or had an interest. Neither Seller nor any other Person for whose conduct it is or may be held to be responsible has any material environmental, health and safety liabilities with respect to the Seller's real property or with respect to any other properties and assets (whether real, personal or mixed) in which Seller (or any predecessor) has or has had an interest or at any property geologically or hydrologically adjoining the real property or any such other property or assets.

(iii) To the best of Seller's knowledge, there are no hazardous materials, except those used in connection with the ordinary course operation of the Water System and which are used in accordance with and in compliance with all Environmental Laws, present on or in the environment at the real property or at any geologically or hydrologically adjoining property, including any hazardous materials contained in barrels, above or underground storage tanks, landfills, land deposits, dumps, equipment (whether moveable or fixed) or other containers, either temporary or permanent and deposited or located in land, water, sumps or any other part of the real property or such adjoining property or incorporated into any structure therein or thereon. Neither Seller, nor any other person for whose conduct it is or may be held to be responsible has permitted or conducted, or is aware of, any hazardous activity conducted with respect to the real property or any other properties or assets (whether real, personal or mixed) in which Seller has or has had an interest except in material compliance with all applicable Environmental Laws. To the best of Seller's knowledge, there has been no release or threat of release, of any hazardous materials at or from the real property or from or by any other properties and assets (whether real, personal or mixed) in which Seller has or has had an interest (e.g., other properties that may impact or affect the Assets or the Water System), or any geologically or hydrologically adjoining property, whether by Seller or any other person.

(iv) Except as set forth in **Schedule 4.1(r)(iv)**, none of the following exists at the Water System or on the real property that is part of the Assets: (1) underground storage tanks; (2) asbestos-containing material in any form; (3) materials or equipment containing polychlorinated biphenyl; (4) groundwater monitoring wells; or (5) landfills, surface impoundments, or disposal areas.

(v) Seller has delivered to TAWC true and complete copies and results of any reports, studies, analyses, tests or monitoring possessed or initiated by Seller or its predecessors pertaining to hazardous materials or hazardous activities in, on or under the real property, or concerning compliance by Seller, its predecessors, or any other person for whose conduct Seller is or

may be held to be responsible, with Environmental Laws, said reports, studies, analyses, tests and monitoring to include without limitation, any and all Phase I environmental reports now or hereafter in the possession or control of Seller.

(vi) Seller has been and is in compliance with all orders, decrees, judgments and notices issued against the Seller under or in connection with all Environmental Laws.

(vii) As used in this Agreement, the term "**Environmental Laws**" shall include all federal, state, and local environmental laws and regulations, including, but not limited to the Clean Water Act ("**CWA**"), also known as the Federal Water Pollution Control Act ("**FWPCA**"), 33 U.S.C. § 1251 et seq., the Toxic Substances Control Act ("**TSCA**"), 15 U.S.C. § 2601 et seq., the Federal Insecticide, Fungicide and Rodenticide Act ("**FIFRA**"), 7 U.S.C. §§ 136 et. seq., the Safe Drinking Water Act ("**SDWA**"), 42 U.S.C. §§ 300 (f) et seq., the Surface Mining Control and Reclamation Act ("**SMCRA**"), 30 U.S.C. §§ 1201 et seq., the Comprehensive Environmental Response, Compensation and Liability Act ("**CERCLA**"), 42 U.S.C. § 9601 et seq., the Superfund Amendment and Reauthorization Act of 1986 ("**SARA**"), Public Law 99-499, 100 Stat., 1613, the Resource Conservation and Recovery Act ("**RCRA**"), 42 U.S.C. 6901, the Atomic Energy Act ("**AEA**"), Act of August 30, 1954, Ch. 1073,68 Stat. 919 (codified as amended in scattered sections of 5 U.S.C. and 42 U.S.C.), Emergency Planning and Community Right to Know Act ("**EPCRA**"), 42 U.S.C. §§ 11001 et seq., Hazardous Materials Transportation Act ("**HMTA**"), 49 U.S.C. §§ 5101 et seq.. Any reference to a legislative act or regulation shall be deemed to include all amendments thereto and all regulations, orders, decrees, judgments, opinions directives or notices issued thereunder.

(s) Brokers. Seller has not employed any investment banker, broker or finder or incurred any liability for any investment banking fees, brokerage fees, commissions or finders' fees or any similar other fees or commissions in connection with the transactions contemplated by this Agreement for which TAWC has or could have any liability.

(t) Customer Advances. Set forth in **Schedule 4.1(t)** is a complete and accurate list of all unexpired customer advances for construction held by Seller as of the date of this Agreement and extension deposit agreements (or similar agreements) to which Seller is a party (each an "**Extension Deposit Agreement**"), and which contain unexpired obligations of Seller to provide for the payment of periodic refunds to parties making advances for the construction of facilities for water service. Seller will provide to TAWC within fifteen (15) days of the execution of this Agreement (to be updated at Closing), accurate and complete copies of each such customer advances and Extension Deposit Agreement. All records of Seller relating to each Extension Deposit Agreement are complete and accurate in all material respects and, together with the relevant Extension Deposit Agreement, represents all the information reasonably required to determine Seller's obligations to each party to the Extension Deposit Agreements; and there are no disputes or disagreements with any party to an Extension Deposit Agreement relating to the

amount due under that agreement or the method of calculating that amount. **Schedule 4.1(t)** may be updated at Closing only with the mutual consent of the parties.

(u) Interconnection and Supply Agreements. **Schedule 4.1(u)** contains a true, complete and accurate list of all agreements (including all verbal agreements and intermunicipal agreements), contracts, leases, licenses, commitments, arrangements and instruments related to the purchase and supply of water for use in the Water System (each individually an "**ICSU Agreement**" and collectively, the "**ICSU Agreements**"). **Schedule 4.1(u)** also identifies with an asterisk any ICSU Agreement which requires consent to, or prohibits, assignment of the ICSU Agreement. All ICSU Agreements are in full force and effect and are valid and enforceable in accordance with their terms, and to the best of Seller's knowledge, the parties thereto are in material compliance with the provisions thereof, and there exists no event or condition which with the giving of notice or lapse of time, or both, would constitute a default thereunder. Seller has received, or will receive prior to the Closing, the written consent of each party to the Assigned Contracts designated on **Schedule 4.1(u)** as requiring consent to the assignment, or otherwise complied with Seller's obligations under **Section 6.1(b)** hereof. Seller has delivered to TAWC correct and complete copies of all ICSU Agreements, as well as copies of the requisite assignments for each of the Assigned Contracts which effectuates the transfer of the Assigned Contracts to TAWC as of the Closing Date.

ARTICLE 5

REPRESENTATIONS AND WARRANTIES OF TAWC

5.1 TAWC's Representations. TAWC hereby represents and warrants to Seller as follows:

(a) Organization. TAWC is a public utility corporation duly organized, validly existing and subsisting under the laws of the State of Tennessee.

(b) Due Authorization; Valid and Binding. TAWC has the full power and lawful authority to execute this Agreement and, to consummate and perform the transactions contemplated hereby, and TAWC has duly and validly authorized the execution of this Agreement by all necessary proceedings. This Agreement constitutes the valid and binding obligations of TAWC.

(c) Assigned Contracts. TAWC has disclosed on **Schedule 5.1(c)** those Contracts which TAWC has agreed to assume ("**Assigned Contracts**"), subject to receiving all necessary consents to assignment in accordance with the terms of **Section 8.1(i)**. TAWC may update **Schedule 5.1(c)** between the date hereof and up to twenty (20) days before Closing to include any of the Contracts.

(d) Financial Wherewithal. TAWC has sufficient funds on hand to pay the amounts due pursuant to this Agreement.

(e) Absence of Litigation. There are no actions, suits, proceedings or investigations pending or, to the knowledge of TAWC, threatened against TAWC, and TAWC is not subject to any outstanding judgment, order or decree of any court or governmental body, which would in

either case, reasonably be expected to prevent or materially interfere with or delay TAWC's ability to perform its obligations under this Agreement.

(f) Brokers. TAWC has not employed any investment banker, broker or finder or incurred any liability for any investment banking fees, brokerage fees, commissions or finders' fees or any similar other fees or commissions in connection with the transactions contemplated by this Agreement for which the Seller has or could have any liability.

ARTICLE 6

COVENANTS

6.1 Covenants of Seller. From and after the date of this Agreement, Seller covenants and agrees that:

(a) Non-Solicitation. Unless and until such time as this Agreement is terminated pursuant to **Article 10**, Seller shall not, and will cause each employee, officer, governing body, and agent not to, directly or indirectly: (i) submit, solicit, initiate, encourage or discuss any proposal or offer from any Person (defined herein) relating to any sale of all or any portion of the Assets or a sublease or assignment of any lease or any similar transaction involving Seller and the Water System or the Assets; (ii) enter into any agreement or commitment related to any such transaction; or (iii) furnish any information with respect to or assist or participate in or facilitate in any other manner any effort or attempt by any Person to do or seek any of the foregoing. Seller shall notify TAWC immediately if any Person makes any proposal, offer, inquiry or contact with respect to any of the foregoing. As used in this Agreement, **"Person"** shall mean any individual, corporation (including any non-profit corporation), general or limited partnership, limited liability company, joint venture, estate, trust, association, organization, labor union or other entity or governmental authority.

(b) Conduct of Business. Between the date of this Agreement and the Closing Date, Seller shall carry on the operation and management of the Water System, the business and the Assets in the ordinary course of business, consistent with past practice and procedures, and in compliance with all laws, not introduce any materially new method of management or operation, use reasonable best efforts to preserve the Water System, the business and the Assets, conserve the goodwill and relationships of its customers, suppliers, governmental authorities and others having business relations with it, maintain in full force and effect all policies of insurance now in effect for the benefit of Seller, maintain supplies at a level that is sufficient to operate the Water System in accordance with past practice and procedures, maintain the Assets in substantially the condition currently existing, normal wear and tear excepted, and comply in all material respects with the Permits. Without limiting the foregoing, Seller shall not sell, lease, dispose, retire, distribute, create or assume any lien, or encumber any of the Assets, or construct, purchase or acquire any new assets, properties or rights relating to the Water System or Assets, or enter into a commitment or contract to do any of the foregoing (other than the purchase and use of supplies and maintenance of the Water System and the Assets in the ordinary course of business and consistent with past practices and procedures), without the prior written consent of TAWC.

(c) Contracts and Commitments. Except normal and usual commitments for the purchase of materials and supplies consistent with past practice and procedures, no contract or commitment shall be entered into by or on behalf of Seller relating to the Water System or the Assets that would place an Encumbrance thereon or materially affect the operation of the Water System, the business or the Assets after Closing, except for those commitments approved or ratified in writing by TAWC. Seller shall use reasonable commercial efforts to obtain, prior to Closing, the written consent of each party to the Assigned Contracts designated on **Schedule 4.1(k)** and **Schedule 4.1(u)** as requiring consent to the assignment. Notwithstanding any other provision of this Agreement, to the extent that any consent necessary for the assignment from Seller to TAWC of the Assigned Contracts is not obtained, or cannot be obtained, prior to the Closing Date, Seller shall use its commercially reasonable efforts to secure an arrangement reasonably satisfactory to TAWC intended to provide for TAWC following the Closing all of the material benefits of Seller under such Assigned Contracts; provided, that nothing in this **Section 6.1(c)** shall constitute a waiver of the condition set forth in **Section 8.1(i)**; and provided, further, that TAWC shall not be obligated to assume, and shall not be liable under, any Assigned Contract for which Seller has not obtained all necessary consents, or otherwise secured an alternative arrangement satisfactory to TAWC (in its sole discretion) as provided above. Seller shall transfer all of the utilities used or necessary for the Water System from Seller to TAWC effective as of the Closing Date, and Seller shall be responsible to pay all bills and fees for these utilities for the period prior to and including the Closing Date. TAWC shall provide any necessary information reasonably required by Seller to effectuate this transfer.

(d) Release of Encumbrances. Seller shall take all action necessary to cause the release, cancellation and discharge of any and all Encumbrances, so that as of the Closing Date, the Assets will be free and clear of any and all such Encumbrances. Seller also agrees not to create any new Encumbrances on the Water System or Assets from and after the date of this Agreement without the prior written consent of TAWC.

(e) Material Events and Circumstance. Seller shall promptly inform TAWC in writing of any specific event or circumstance of which Seller is aware, or of which Seller receives notice, that has or is reasonably likely to have, individually or in the aggregate, taken together with the other events or circumstances, a material adverse effect on the Water System or the Assets.

(f) Supplemental Information.

(i) Seller shall provide TAWC, within fifteen (15) days of execution or the date of receipt thereof, a copy of (a) each of the Contracts entered into by Seller after the date hereof and prior to Closing relating to the Water System or the Assets; (b) a copy of any written notice of assessments for public improvements against any of the Assets received after the date hereof and prior to Closing; (c) any writs of summons or complaints filed against Seller or its representatives for any and all claims relating to the Water System or the Assets; and (d) a copy of the filing of any condemnation, eminent domain or similar proceeding affecting all or any portion of the Water System or the Assets received after the date hereof, but prior to the Closing.

(ii) Seller shall notify TAWC within fifteen (15) days of the receipt of any notice of violation.

(g) Regulatory Consents. Seller shall at all times, use its best efforts to and diligently pursue all approvals, authorizations, consents and Permits required to be obtained to consummate the transaction contemplated by this Agreement. Seller shall (i) as promptly as practicable, make or cause to be made such filing and submissions under the laws, rules and regulations applicable to it as may be required for Seller to sell the Assets pursuant to the terms of this Agreement; and (ii) keep TAWC apprised of the status of any filing or submission to any such governmental or regulatory agency.

(h) Access. Seller shall provide TAWC and its representatives free and full access to and right to inspect, during normal business hours and upon prior written notice, all of the premises, properties, assets, records, Permits, contracts and other documents relating to the Assets and shall permit TAWC to consult with its officers, employees and other representatives for purposes of making such investigation of the Assets as TAWC shall desire to make, provided that no investigation shall unreasonably interfere with the Seller's operation of the Water System.

(i) Customer List. Within [thirty (30) days] of execution of this Agreement, Seller shall provide TAWC an accurate and complete listing of all customers of the Water System. This customer list shall provide the customer names, service addresses, billing addresses, and meter sizes and serial numbers in meter reading route sequence and shall denote those customers from which Seller has received notice to cancel or intend to cancel their account with Seller (or TAWC after Closing). This customer list shall be true and correct as of the date such list is provided to TAWC and shall be updated at Closing and provided to TAWC at Closing so as to be true and correct as of the Closing Date.

(j) Rates. Prior to the Closing, Seller shall reduce the water rate that is in effect as of the Effective Date by the amount of TAWC then-current cumulative Capital Recovery Riders surcharge, which is estimated to be approximately [_____ and __/100 per centum (____%)]. Subsequent to the Closing, the rates shall be subject to any changes, increases or decreases, permitted, approved and/or ordered by the Tennessee Public Utility Commission, including those related to TAWC's Capital Recovery Riders and its Production Costs and Other Pass-Throughs Rider.

(k) Customer Advances. Prior to the Closing Date, Seller shall complete the construction of all mains and facilities for which Seller has received customer advances and return all unexpended customer advances to the appropriate depositor. Provided, however, that for projects acceptable to and approved in writing by TAWC, Seller may pay over to TAWC the unexpended, customer advances, and TAWC shall assume all of the responsibility of Seller as to those unexpired customer advances and shall be bound by the terms and conditions contained in the Extension Deposit Agreements. TAWC shall not assume any responsibility for any unexpired customer advances received by Seller, or for any Extension Deposit Agreements to which Seller becomes a party, except as specifically agreed to in writing.

(l) Updating of Information. Between the date of this Agreement and the Closing Date, Seller will deliver revised or supplementary Schedules to this Agreement, containing

accurate information as of the Closing Date, in order to enable TAWC to confirm the accuracy of Seller's representations and warranties and otherwise effectuate the provisions of this Agreement. The receipt by TAWC of any revised or supplementary Schedules to this Agreement shall in no way prejudice TAWC's right to terminate this Agreement based upon the failure of any condition to be satisfied under **Section 8.1** hereof or seek indemnification under **Section 9.1**. Seller will promptly inform TAWC, in writing, of the occurrence or failure of any action or event that would violate Seller's representations and warranties under this Agreement or render them inaccurate as of the date hereof or the Closing Date or that would constitute a breach of any covenant of Seller under this Agreement or a failure of any condition to the obligations of either Seller or TAWC under this Agreement.

(m) Retention of Records. Seller shall preserve any books and records relating to the Water System and the business that are not delivered to TAWC hereunder for a period no less than seven (7) years after the Closing Date (or such longer period as shall be required by applicable law), and Seller shall make available such books and records for review and copying to TAWC and its authorized representatives following the Closing at TAWC's expense upon reasonable notice during normal business hours. During such period, Seller shall permit, to the extent permitted by applicable law and upon request of TAWC, TAWC and any of its agents, representatives, advisors or consultants reasonable access to all properties, books, contracts and records of Seller related to the Water System and employees of or servicing the business for information related to periods up to and including the Closing.

(n) Municipal Ordinances. To the extent that the Water System is located within municipalities that have ordinances or laws that require properties to connect to and remain connected to the Water System, Seller shall use reasonable commercial efforts to cause such municipalities to maintain such ordinances or laws so long as the Assets, or modifications, renewals, replacements thereto, exist within the municipal boundaries of such municipalities.

6.2 Title Information. Within thirty (30) days following the execution of this Agreement, Seller shall deliver to TAWC true, correct and complete copies of all existing title policies, surveys, leases, deeds, instruments and agreements in Seller's possession relating to title to the real estate and easements constituting any part of the Assets, as well as any amendments thereto through to Closing. Thereafter, TAWC and Seller shall conduct an abstract of such title information to determine whether Seller has sufficient real estate rights and continuous rights-of-way to permit TAWC, upon Closing, to operate a continuous water system, including lines, facilities fittings and appurtenances necessary to operate such water system, and that such rights are represented by legal instruments in appropriate form, duly recorded. Upon notification by TAWC that such legal rights for the Water System are not sufficient for the operation of the Water System, Seller shall, at its sole expense, secure such additional legal rights as TAWC may request. Title to the real property constituting the Assets shall be insurable by a title company of TAWC's choosing (in its sole discretion), at regular rates, as a good and marketable title, free and clear of all liens and Encumbrances and exceptions to coverage, except for any permitted liens, pursuant to an owner's policy of title insurance on the American Land Title Association's ("**ALTA**") Owner's Form 2006 (the "**Title Policy**").

6.3 Dual Meter Readings. On or about the Closing Date, TAWC and Seller shall take a dual meter reading for each customer of the Water System, which shall be used for (i) Seller to

issue a final invoice to customers covering the period on and before the Closing Date, and (ii) TAWC to obtain its initial meter reading for future invoices covering the period after the Closing Date. The parties shall coordinate in good faith and agree upon these meter readings at such time, which shall be used for such invoices and all accounts receivable being retained by Seller (per **Section 1.5**).

6.4 Further Assurances. Each party to this Agreement shall cooperate and deliver such instruments and take such action as may be reasonably requested by the other party in order to carry out the provisions and purposes of this Agreement and the transactions contemplated hereby. After the Closing, each party shall take such other actions and execute such other documents, agreements, instruments, certifications, and further assurances as Seller or TAWC, as the case may be, may reasonably require in order to make effective the transactions contemplated hereby (including to transfer to TAWC or to put TAWC more fully in possession of any of the Assets).

6.5 Cooperation. Subject to the terms and conditions of this Agreement, the parties shall cooperate fully with each other and their respective counsel and accountants in connection with, and take or cause to be taken and do or cause to be done, any actions required to be taken under applicable law to make effective the contemplated transactions as promptly as practicable. Prior to the Closing, the parties shall proceed expeditiously and in good faith to make such filings and take such other actions as may be reasonably necessary to satisfy the conditions to Closing set forth herein. Any and all filing fees in respect of such filings shall be paid by Seller, with the exception of those fees implemented by TPUC (as defined below in **Section 7.1**), which shall be paid by TAWC. On or after the Closing Date, the parties shall, on request, cooperate with one another by furnishing any additional information, executing and delivering any additional documents and instruments, including contract assignments not obtained prior to Closing, and doing any and all such other things as may be reasonably required by the parties or their counsel to consummate or otherwise implement the transactions contemplated by this Agreement. Seller hereby agrees to cooperate with TAWC to ensure a proper transition of all customers with respect to billing and customer service activities, including assisting TAWC to place all customer information in a format reasonably requested by TAWC.

6.6 Water System Growth. With Seller's planned continued development of the Subdivision, the parties hereto recognize and agree that future expansions and growth of the Water System within the Subdivision, including the extension of any main(s) and related facilities in the Subdivision, shall need to transfer to TAWC for proper operation of the Water System. To facilitate the expansion and growth of the Water System within the Subdivision, TAWC and Seller covenant and agree (a) that each shall negotiate and execute an Acquisition Agreement in form and substance acceptable to TAWC to transfer to TAWC the ownership of and the responsibility for continued operation, maintenance, repair and replacement of such main(s) and appurtenant facilities constructed and installed by Seller (the "**Acquisition Agreement**") and (b) any extension deposit agreement(s) (or similar agreement) entered into by Seller or TAWC for the development and expansion of the Water System in the Subdivision will be in form and substance acceptable to TAWC (the **"Developer Extension Deposit Agreement**"). The proposed forms of Acquisition Agreement and Developer Extension Deposit Agreement are attached hereto as **Exhibit B** and **Exhibit C.** The Acquisition Agreement and Developer Extension Deposit Agreement will each require the review and approval of TPUC (as defined below in **Section 7.1**).

6.7 Condition of Property. Except as otherwise set forth in this Agreement, Buyer acknowledges that the Assets are bought "as-is" and there are no express or implied warranties of any kind with respect to the condition of the Assets, including warranties of merchantability or fitness for a particular purpose.

ARTICLE 7

TENNESSEE PUBLIC UTILITY COMMISSION APPROVAL

7.1 Tennessee TPUC Approval. The obligation of TAWC to consummate the transactions contemplated by this Agreement are conditioned upon TAWC receiving the approvals of the Tennessee Public Utility Commission ("**TPUC**"). TAWC covenants and agrees to initiate, and use commercially reasonable efforts to prosecute the necessary proceedings to obtain the approval of TPUC for: (a) this Agreement and the transactions contemplated hereby which require approval by the TPUC, including the transfer by sale of the Assets to TAWC and the Assignment of Contracts Agreement; (b) the right of TAWC to provide water service to the public primarily in the service area presently being served by Seller's Water System; (c) a tariff, on such terms and conditions which are acceptable to TAWC, and which set the forth the rates, rules and regulations for water service for the service area presently being served by Seller's Water System; and (d) any other approval as may be appropriate to consummate the transactions contemplated by this Agreement. Seller, by this Agreement, covenants and agrees to provide such information, documents and assistance as may be reasonably requested by TAWC in connection with any such proceedings and to otherwise cooperate in the initiation and prosecution of any such proceeding.

ARTICLE 8

CONDITIONS PRECEDENT

8.1 Conditions Precedent to TAWC's Obligations. The obligation of TAWC to consummate the transactions contemplated hereby are subject to the satisfaction, on or prior to the Closing, of each of the following conditions (any one or more of which may be waived in writing in whole or in part by TAWC in its sole discretion):

(a) Consents and Approvals. Seller shall have obtained the written, final and un-appealable approvals, authorizations and consents (including consents for Permit transfers) that are required to consummate the transactions contemplated by this Agreement and for TAWC to operate the Water System and the Assets after the Closing, including the approval of every regulatory agency of federal, state or local government that may be required in TAWC's opinion, each in form and substance (including with respect to the terms and conditions contained in any such approval) acceptable to TAWC in its sole and absolute discretion, and all waiting periods under existing laws, and all extensions thereof, the passing of which is necessary to consummate the contemplated transactions and finalize a Closing, shall have expired.

(b) Representations and Warranties. Seller's representations and warranties set forth in this Agreement or in any Schedule, list, certificate or document delivered pursuant to this Agreement shall be true, correct and accurate as of the date made and at and as of the time of the Closing with the same force and effect as though such representations and warranties were made

at and as of the Closing Date (without giving effect to any supplement to the Schedules), and TAWC shall have received from a proper representative of Seller a certificate to such effect, in form and substance reasonably satisfactory to TAWC.

(c) Performance of Covenants and Agreements. Seller shall have performed and complied with in all material respects all covenants, agreements and conditions required by this Agreement to be performed or complied with by it prior to or at the Closing, and TAWC shall have received from a proper representative of Seller a certificate to such effect, in form and substance reasonably satisfactory to TAWC.

(d) Adverse Change. There shall not have been a material adverse change, occurrence or casualty, financial or otherwise, to the Water System or the Assets (including a material loss of customers or Contracts), whether covered by insurance or not.

(e) Release of Liens. All necessary action shall have been taken to cause the release, cancellation and discharge of any and all of the Encumbrances so that as of the Closing, the Assets shall be free and clear of any and all Encumbrances, and Seller shall have provided TAWC with such opinions, instruments or documents as TAWC may reasonably request, and in form and substance satisfactory to TAWC, evidencing the release, cancellation and discharge of any and all Encumbrances and that the Assets are not subject to any liens or Encumbrances.

(f) Bulk Water Supply Agreement. On or before Closing, TAWC shall have negotiated and executed a bulk water supply agreement (the "**Bulk Water Agreement**") with the Town of South Pittsburg, Tennessee on terms and conditions agreeable to TAWC.

(g) Opinion of Counsel. Seller shall have delivered to TAWC a written Opinion of Seller's counsel, dated as of the Closing Date and addressed to TAWC, in the form set forth in **Schedule 8.1(g)**.

(h) Certificate of Secretary. Seller shall have delivered to TAWC a certificate of the Secretary of Seller, dated as of the Closing Date, containing such exhibits and confirmations and as required in **Section 3.2(a)(x)**.

(i) Contractual Consent. Seller shall have obtained written approvals, authorizations and consents of transfer to all Assigned Contracts and Permits, to the extent specifically required by the terms of such Assigned Contracts and Permits.

(j) Certification of Financial Information. Seller shall have delivered to TAWC a certificate, in substantially the form set forth in **Schedule 8.1(j)**, executed by its authorized representative in the form and substance satisfactory to TAWC, listing (i) the amount of its net outstanding long-term debt or notes, if any, related to the Water System (ii) all unexpired customer advances for construction and unexpired contributions in aid of construction as of the Closing Date, and (iii) and any and all additions or retirements to the Water System during the period from the date of execution of this Agreement to the Closing Date, together with the cost thereof.

(k) Closing Deliveries. Seller shall have delivered all documents required to be delivered by it pursuant to **Section 3.2(a)**.

(l) Proceedings. No provision of any law or order shall be in effect, and no proceeding by any person shall be threatened or pending before any governmental authority, or before any arbitrator, that would: (i) prevent consummation of the contemplated transactions; (ii) have a likelihood of causing the contemplated transactions to be rescinded following consummation; (iii) adversely affect the right of TAWC to own any of the Assets or operate the Water System; or (iv) adversely affect the Water System's prospects or the value or condition of any of the Assets or the Water System.

(m) Due Diligence. TAWC shall have completed and be satisfied, in its sole and absolute discretion, with the results of its due diligence review of the Water System, the Assets and Seller, including with the results of any environmental assessment performed with respect to any real property or the Assets or chain of title search, all material contracts and operating Permits and licenses of the Water System, and the Seller's operations, contracts, employment practices, compliance, accounting and other items as TAWC deems necessary, as each of the foregoing items relate to the Water System or the Assets.

(n) Authorization of Contemplated Transactions. TAWC shall have obtained all necessary corporate approvals to consummate the contemplated transactions, including the approval of its Board of Directors.

(o) TPUC Approval. The TPUC shall have entered an order (or orders) providing the approvals set forth in **Section 7.1** and **Section 8.1(f)** and approval of the refund payable from TAWC to Seller as set forth in **Schedule 8.1(o)**, and such order(s) shall not be subject to appeal, challenge, supersedeas or injunction.

8.2 Conditions Precedent to Seller's Obligations. The obligation of Seller to consummate the transactions contemplated hereby are subject to the satisfaction, on or prior to the Closing, of each of the following conditions (any one or more of which may be waived in writing in whole or in part by Seller in its sole discretion):

(a) Representations and Warranties. TAWC's representations and warranties contained in this Agreement or in any Schedule, list, certificate or document delivered pursuant this Agreement shall be true, correct and accurate as of the date made and at and as of the time of the Closing, with the same force and effect as though such representations and warranties were made at and as of the Closing Date (without giving effect to any supplement to the Schedules), and Seller shall have received from an officer of TAWC a certificate to such effect, in form and substance reasonably satisfactory to Seller.

(b) Performance of Agreements. TAWC shall have performed and complied, in all material respects, with all covenants, agreements and conditions required by this Agreement to be performed or complied with by it prior to or at the Closing, and Seller shall have received from an officer of TAWC a certificate to such effect, in form and substance reasonably satisfactory to Seller.

(c) Closing Deliveries. TAWC shall have delivered the Closing Payment and all documents required to be delivered by it pursuant to **Section 3.2(b)**.

ARTICLE 9

INDEMNIFICATION

9.1 Indemnification By Seller. Seller shall fully pay, protect, defend, indemnify and hold harmless TAWC and its affiliates and their respective officers, directors and agents and representatives ("**TAWC Indemnified Parties**") from any and all Damages arising out of, resulting from, relating to or caused by: (i) a misrepresentation, inaccuracy in or breach of (or any claim by any third party alleging or constituting a misrepresentation, inaccuracy in, or breach of) any representation or warranty of, or any failure to perform or nonfulfillment of any provision or covenant contained in this Agreement or any other transaction document, by Seller; (ii) any and all liabilities of Seller of any nature (including the retained liabilities in **Section 1.3(a)**), whether due or to become due, whether accrued, absolute, contingent or otherwise, whether accruing prior to or after the Closing Date, or arising out of any transaction entered into, any state of facts existing or any event occurring on or prior to such date, and any Encumbrance affecting the Assets or the Water System that arose on or prior to the Closing Date; (iii) assessments, charges and other similar claims due or owing, directly or indirectly, by Seller or otherwise as a result of or on account of the Assets or the Water System at any time on or prior to the Closing Date; (iv) claims made by any third party relating to the ownership and/or operation of any of the Assets or the Water System on or prior to the Closing Date; (v) any proceeding now existing or hereafter arising and relating to the Assets or the Water System and arising from events or matters occurring on or prior to the Closing Date, regardless of when realized; (vi) all assets, properties and rights of Seller excluded from the Assets; (vii) any and all liabilities relating to the employees, agents and independent contractors of Seller who performed services for Seller or related to the Water System or the Assets, regardless of whether such liabilities arose from events occurring prior to or after the Closing; (viii) the failure to comply with the provisions of any so-called bulk transfer or bulk sale law of any jurisdiction in connection with the sale of the Water System and the Assets to TAWC, and (ix) transaction costs and expenses incurred by or on behalf of Seller in connection with this Agreement or the contemplated transactions.

As used in this Agreement, the term "**Damages**" means all losses, damages, assessments, judgments, awards, fines, penalties, taxes, interest, costs and expenses (including actual, reasonable out-of-pocket third party costs, fees and expenses of legal counsel and reasonable out-of-pocket third party costs, fees and expenses of investigation).

9.2 Indemnification by Seller for Environmental Matters. In addition to the provisions of **Section 9.1**, Seller hereby unconditionally, irrevocably and absolutely agrees to fully pay, protect, defend, indemnify and hold harmless the TAWC Indemnified Persons, and will pay to the TAWC Indemnified Persons the amount of any Damages (including costs of cleanup, containment or other remediation) arising, directly or indirectly, from or in connection with:

(a) Any environmental, health and safety liabilities arising out of or relating to: (i) (A) the ownership, operation or condition at any time on or prior to the Closing Date of the Assets or any other properties (whether real, personal or mixed and whether tangible or intangible) in which Seller has or had an interest; or (B) any hazardous materials or other contaminants that were present on or in the Assets or any other properties at any time on or prior to the Closing Date; or (ii) (A) any hazardous materials or other contaminants, wherever located, that were, or were allegedly,

generated, transported, stored, treated, released or otherwise handled by Seller or by any other Person for whose conduct it is or may be held responsible at any time on or prior to the Closing Date; or (B) any hazardous activities that were, or were allegedly, conducted by Seller or by any other Person for whose conduct it is or may be held responsible on or prior to the Closing Date; or

(b) Any bodily injury (including illness, disability and death), personal injury, property damage (including trespass, nuisance, wrongful eviction and deprivation of the use of real property) or other damage of or to any Person, including any employee or former employee of Seller or any other Person for whose conduct it is or may be held responsible, in any way arising from or allegedly arising from any hazardous activity conducted or allegedly conducted with respect to the Assets or the real property by Seller prior to the Closing Date, or from hazardous material that was: (i) present or suspected to be present on or before the Closing Date on or at the real property (or present or suspected to be present on any other property, if such hazardous material emanated or allegedly emanated from any of the real property and was present or suspected to be present on any of the real property on or prior to the Closing Date); or (ii) released or allegedly released by Seller or any other Person for whose conduct it is or may be held responsible, at any time on or prior to the Closing Date.

(c) TAWC shall control any cleanup, any related proceeding and any other proceeding with respect to which indemnity may be sought under this **Section 9.2**.

9.3 Indemnification By TAWC. TAWC agrees to indemnify, defend and hold harmless Seller and its affiliates and their respective officers, directors and agents at all times after the date of this Agreement, from, against and in respect of any and all Damages resulting from (i) a misrepresentation, an inaccuracy in or breach of (or any claim by any third party alleging or constituting a misrepresentation, an inaccuracy in, or breach of) any representation or warranty of, or any failure to perform or nonfulfillment of any provision or covenant contained in this Agreement or any other transaction document, by TAWC, (ii) any claim or proceeding relating to the Assets or the Water System and arising from events or matters occurring after the Closing Date, and (iii) any and all liabilities of any nature related to TAWC's operation of the Water System and the Assets and occurring after the Closing Date, including obligations to maintain and repair the Water System after the Closing Date.

9.4 Survival of Representations and Warranties. All representations, warranties, covenants and agreements made by the parties in this Agreement or in any agreement, document, statement or certificate furnished hereunder or in connection with the negotiation, execution and performance of this Agreement shall survive the Closing. Notwithstanding any investigation or audit conducted before or after the Closing Date, or the decision of any party to complete the Closing, each party shall be entitled to rely upon the representations, warranties, covenants and agreements set forth herein and therein. Notwithstanding anything contained herein or elsewhere to the contrary, all "material" and "material adverse effect" or similar materiality type qualifications contained in the representations and warranties set forth in this Agreement shall be ignored and not given any effect for purposes of the indemnification provisions hereof, including for purposes of determining the amount of any Damages.

9.5 Notice of Claim. If either party seeks indemnification on behalf of an indemnified person, such party seeking indemnification (the "**Indemnified Party**") shall give reasonably

prompt written notice to the indemnifying party (the "**Indemnifying Party**") specifying the facts constituting the basis for such claim and the amount, to the extent known, of the claim asserted; provided, however, that the right of a person or entity to be indemnified hereunder shall not be adversely affected by a failure to give such notice unless, and then only to the extent that, an Indemnifying Party is actually irrevocably and materially prejudiced thereby. Subject to the terms hereof, the Indemnifying Party shall pay the amount of any valid claim not more than ten (10) days after the Indemnified Party provides notice to the Indemnifying Party of such amount.

ARTICLE 10

TERMINATION

10.1 Termination. This Agreement may be terminated at any time prior to the Closing only (a) by mutual written consent of Seller and TAWC; (b) by TAWC upon written notice to the Seller, if the Closing shall not have occurred on or prior to three hundred sixty-five (365) days from the Effective Date; provided, however, that the right to terminate this Agreement under this **Section 10.1** shall not be available if a breach by TAWC under this Agreement has caused or resulted in the failure of the Closing to occur on or before such date; (c) by TAWC, if TAWC is not in material breach of any of its representations, warranties, covenants and agreements under this Agreement and there has been a breach of a representation, warranty, covenant or agreement contained in this Agreement on the part of Seller and Seller has not cured such breach within fifteen (15) business days after receipt of notice of such breach (provided, however, that, no cure period shall be required for a breach which by its nature cannot be cured); (d) by TAWC, if, at any time before Closing, TAWC is not satisfied (in its sole and absolute discretion) with the results of its due diligence review of the Water System and the Assets or the prospects of obtaining all regulatory consents and approvals; (e) if the Tennessee Department of Environment and Protection ("**TNDEC**") prohibits the purchase of Seller's Assets for environmental reasons or if TNDEC imposes different water quality requirements on Buyer as a condition to purchasing Seller's Assets; (f) if TAWC has not obtained the executed Bulk Water Agreement; (g) by Seller, if Seller is not in material breach of any of its representations, warranties, covenants and agreements under this Agreement and there has been a material breach of any representation, warranty, covenant or agreement contained in this Agreement on the part of TAWC and TAWC has not cured such breach within fifteen (15) business days after receipt of notice of such breach (provided, however, that, no cure period shall be required for a breach which by its nature cannot be cured); or (h) by Seller or TAWC upon written notice to the other, if any court of competent jurisdiction or other competent governmental entity shall have issued a statute, rule, regulation, order, decree or injunction or taken any other action permanently restraining, enjoining or otherwise prohibiting the contemplated transactions, and such statute, rule, regulation, order, decree or injunction or other action shall have become final and non-appealable.

10.2 Effect of Termination. The right of each party to terminate this Agreement under **Section 10.1** is in addition to any other rights such party may have under this Agreement or otherwise, and the exercise of a right of termination will not be an election of remedies. If this Agreement is terminated pursuant to **Section 10.1**, all further obligations of the parties under this Agreement will terminate, except that the obligations set forth in this **Section 10.1** ("**Effect of Termination**") and **Article 11** ("**Miscellaneous**") will survive; provided, however, that if this Agreement is terminated by a party because of the breach of the Agreement by another party or

because one or more of the conditions to the terminating party's obligations under this Agreement is not satisfied as a result of the other party's failure to comply with its obligations under this Agreement, the terminating party's right to pursue all legal remedies will survive such termination unimpaired.

ARTICLE 11

MISCELLANEOUS

11.1 Contents of Agreement. Parties in Interest. This Agreement sets forth the entire understanding of the parties hereto with respect to the transactions contemplated hereby. It shall not be amended or modified except by written instrument duly executed by each of the parties hereto. Any and all previous agreements and understandings between or among any or all of the parties regarding the subject matter hereof, whether written or oral, are superseded by this Agreement.

11.2 Binding Effect. All of the terms and provisions of this Agreement shall be binding upon, inure to the benefit of, and be enforceable by the legal representatives, successors and assigns of Seller or TAWC.

11.3 Waiver. Any term or provision of this Agreement may be waived at any time by the party or parties entitled to the benefit thereof by a written instrument executed by such party or parties.

11.4 Transfer Taxes. Any transfer taxes imposed on the conveyance or transfer of any real property pursuant to this Agreement shall be split equally by TAWC and Seller (i.e., each pay 50% of such taxes).

11.5 Notices. Any notice, request, demand, waiver, consent, approval or other communication that is required or permitted hereunder shall be in writing and shall be deemed given only if delivered personally, by facsimile (if followed by overnight courier on the same date) or sent by nationally recognized overnight courier, as follows:

If to TAWC:

Tennessee-American Water Company
109 Wiehl Street
Chattanooga, Tennessee 37403
Attention: President
Fax: [_____]

With a required copy to:

Tennessee-American Water Company
109 Wiehl Street
Chattanooga, Tennessee 37403
Attention: General Counsel

If to Seller:

Thunder Air, Inc.
d/b/a Jasper Highlands Development, Inc.,
John Thornton, Owner
P.O. Box 4737
Chattanooga, Tennessee 37405

or to such other address as the addressee may have specified in a written notice duly given to the sender as provided herein. Such notice, request, demand, waiver, consent, approval or other communication will be deemed to have been given as of the date so delivered.

11.6 Law to Govern. This Agreement shall be governed by and interpreted and enforced in accordance with the laws of the State of Tennessee without giving effect to any conflicts of law's provisions. In the event of any litigation or claim regarding breach of this Agreement, the Circuit Court of Hamilton County, Tennessee would have sole venue and jurisdiction. As to any matter relating to any required regulatory approval of this Agreement, the parties agree that the TPUC has jurisdiction to govern all matters involving the transactions contemplated by this Agreement and all such agreements, documents and instruments related to or required pursuant to this Agreement and the provision of water service by TAWC to the residents serviced by the Water System.

11.7 No Benefit to Others. The representations, warranties, covenants and agreements contained in this Agreement are for the sole benefit of the parties hereto, and their legal representatives, successors and assigns, and they shall not be construed as conferring any rights on any other persons.

11.8 Interpretation. All section headings contained in this Agreement are for convenience of reference only, do not form a part of this Agreement, and shall not affect in any way the meaning or interpretation of this Agreement. Words used herein, regardless of the number and gender specifically used, shall be deemed and construed to include any other number, singular or plural, and any other gender, masculine, feminine or neuter, as the context requires. Unless otherwise indicated, the words "including", "includes", "included" and "include", when used, are deemed to be followed by the words "without limitation."

11.9 Schedules. All Schedules referred to herein are intended to be and hereby are specifically made a part of this Agreement.

11.10 Severability. Any provision of this Agreement that is invalid or unenforceable in any jurisdiction or under any circumstance shall be ineffective to the extent of such invalidity or unenforceability without invalidating or rendering unenforceable the remaining provisions hereof, and any such invalidity or unenforceability in any jurisdiction or under any circumstance shall not invalidate or render unenforceable such provision in any other jurisdiction or under any other circumstance, unless, in either event, the involved or unenforceable provision causes this Agreement to fail of its essential purpose.

11.11 Counterparts. This Agreement may be executed by facsimile, electronically or by exchange of documents in PDF format, and in several counterparts, each of which shall be deemed an original instrument and all of which together shall constitute a single agreement. Any signature page to any counterpart may be detached from such counterpart without impairing the legal effect of the signatures thereon and thereafter attached to another counterpart identical thereto except having attached to it additional signature pages.

11.12 Risk of Loss. Seller assumes risk of loss in connection with the Assets prior to Closing, including risk of loss from fire and other casualty. In the event of any loss or damage to any of the Assets, TAWC at its option, prior to or at Closing shall have the right to (i) request that the damaged asset be replaced or restored to substantially the same condition of the asset as of the date of this Agreement; (ii) request an adjustment to the Purchase Price as can be agreed upon by the parties, or (iii) request the insurance proceeds of the Seller and/or other moneys to enable TAWC to make a proper restoration of the damaged asset.

11.13 Environmental Assessment. Without limiting the parties rights and obligations under this Agreement (including **Sections 6.1(h), 8.1(l)** and **10.1(d)**), after the date of this Agreement and until the Closing Date, TAWC shall have the reasonable right to enter upon the property and facilities constituting the Water System, after making reasonable prior arrangement with Seller, for the purposes of conducting an environmental assessment of the Water System. TAWC shall notify Seller in writing if the environmental assessment reveals the presence of oil or petroleum products or any hazardous or toxic wastes or materials or storage of fuel tanks or any other environmental hazard or contamination. Within fifteen (15) days of the date of such notice, Seller shall advise TAWC in writing as to whether Seller can cure the environmental hazard or contamination and, if so, what remediation actions Seller will take to cure. In connection with such environmental assessment, TAWC shall have the right, in TAWC's sole discretion, to terminate this Agreement upon written notice to Seller.

11.14 Specific Performance and Injunctive Relief; Remedies. The parties hereto recognize that if either of them fails to perform, observe or discharge any of their respective obligations under this Agreement, a remedy at law may not provide adequate relief to the other party. Therefore, in addition to any other remedy provided for in this Agreement or under applicable law, a party hereto may demand specific performance of this Agreement, and such party shall be entitled to temporary and permanent injunctive relief, in a court of competent jurisdiction at any time if the other party fails to comply with any of the provisions of this Agreement applicable to such party. To the extent permitted by applicable law, the parties hereby irrevocably waive any defense based on the adequacy of a remedy at law that might be asserted as a bar to such party's remedy of specific performance or injunctive relief. Except as otherwise provided herein, all rights and remedies of the parties under this Agreement are cumulative and without prejudice to any other rights or remedies under law. Nothing contained herein shall be construed as limiting the parties' rights to redress for fraud.

[SIGNATURES TO FOLLOW]

IN WITNESS WHEREOF, intending to be legally bound, the parties hereto have duly executed this Agreement on the date first written.

SELLER:

THUNDER AIR, INC.,
a Tennessee corporation d/b/a Jasper Highlands Development, Inc.

By:_____
Name: _____
Title: _____

TAWC:

TENNESSEE-AMERICAN WATER COMPANY,
a Tennessee public utility corporation

By: _____
Name: Darlene Williams
Title: President

List of Exhibits

Exhibit A – Assignment of Contracts Agreement

Exhibit B – Acquisition Agreement

Exhibit C – Proposed form of Extension Deposit Agreement

List of Schedules

Schedule 1.4 – List of Excluded Assets

Schedule 4.1(b) – Assets Subject to Leasehold Interest

Schedule 4.1(f) – Required Approvals

Schedule 4.1(i) – Undisclosed Liabilities

Schedule 4.1(k) – List of Contracts

Schedule 4.1(k)(i) – Refund Arrangements

Schedule 4.1(l)(i) –Rights in Real Property and Leases

Schedule 4.1(l)(ii) – Easements and Rights of Way

Schedule 4.1(l)(iii) – Options and Rights of First Refusal

Schedule 4.1(l)(v) – Taxes and Assessments

Schedule 4.1(l)(vi) – Necessary Repairs to Real Property

Schedule 4.1(m) – Litigation

Schedule 4.1(p) – Violations of Law

Schedule 4.1(q) – Permits

Schedule 4.1(r)(iv) – Environmental Conditions

Schedule 4.1(t) – Current Extension Deposit Agreements

Schedule 4.1(u) – ICSU Agreements

Schedule 5.1(c) – Assigned Contracts

Schedule 8.1(g) – Opinion of Seller's Counsel

Schedule 8.1(j) – Certification of Financial Information

Section 8.1(o) –Refund payable to Seller

EXHIBIT A

Assignment of Contracts Agreement

Not applicable.
51454249.v1

EXHIBIT B

ACQUISITION AGREEMENT

THIS ACQUISITION AGREEMENT made this _____ day of _____ _____, 20____, by and between TENNESSEE-AMERICAN WATER ("TAW") and THUNDER AIR, INC. d/b/a JASPER HIGHLANDS DEVELOPMENT, INC. ("Developer").

WHEREAS, Developer has undertaken to improve and develop certain real property situated in Marion County, Tennessee (the "Development") known as _____; and

WHEREAS, TAW purchased Developer's water system serving certain portions of the Development pursuant to the Asset Purchase Agreement dated _____, which is incorporated herein by reference (including all definitions); and

WHEREAS, in the furtherance of additional expansion of the Development following the Closing of the Asset Purchase Agreement, Developer has inquired of and been advised by TAW that in order for water service to be made available to the Development, an extension of TAW distribution main(s) acquired pursuant to the Asset Purchase Agreement will be required; and

WHEREAS, Developer has requested that it be permitted to construct and install the necessary main extension and appurtenant facilities and, at the conclusion of such construction, transfer ownership of the extended main and facilities to TAW; and

WHEREAS, TAW has orally advised Developer that it would consent to Developer's desire, provided that the proposed main extension and facilities were made pursuant to plans and specification approved by TAW and all applicable governmental agencies and authorities; and

WHEREAS, TAW and Developer mutually desire to set forth in writing the terms and conditions pursuant to which the said main extension and related facilities are to be constructed and transferred to TAW;

NOW, THEREFORE, in consideration of the premises, the mutual promises contained in the agreement and other good and valuable considerations, the receipt and sufficiency of all of which are hereby acknowledged, the parties to this agreement agrees as follows:

I. CONSTRUCTION OF FACILITIES

A. Developer shall construct and install, solely at Developer's cost and expense, the extended water main (s) and appurtenant facilities more fully described on Addendum A hereto. All of the main(s) and facilities on Addendum A hereto are hereinafter referred to collectively as the "Facilities". The Facilities shall be constructed and installed by a TAW approved contractor pursuant to plans, specifications and standards approved by TAW and Developer, and any applicable governmental agencies of authorities, including the

appropriate State Department of Health. Execution and delivery of this agreement by Developer is an acknowledgment of possession of, familiarity with, and acceptance of the specifications and standards of TAW and all applicable governmental agencies and authorities. A copy of the current specifications and standards of TAW are attached hereto as Addendum D; however, said specifications and standards are subject to change in the normal course of TAW's business.

B. TAW shall have the right, but not the obligation, to inspect the Facilities, at its expense, during construction and prior to acquisition by TAW.

C. TAW shall be under no obligation to acquire or take possession of any of the Facilities which do not, in the sole judgment and discretion of TAW, meet all of TAW's specifications and standards and all applicable governmental specifications and standards.

II. TRANSFER OF TITLE TO FACILITIES

Upon completion of construction of the Facilities by Developer in accordance with the terms and conditions described in Section I of this agreement, TAW agrees to accept title to the Facilities and thereafter to own, operate, maintain, repair and replace such Facilities as part of TAW's water system. Upon acceptance of the Facilities by TAW, Developer agrees to convey the same to TAW, together with all necessary and appropriate rights of way and easements, by apt and proper deed and/or bill of sale, free and clear of all liens and encumbrances. Concurrently with the delivery of title to the Facilities, Developer shall also provide to TAW the following:

A. an "as built" drawing(s) of the Facilities; and

B. a release of liens duly executed by any and all contractors, subcontractors and material suppliers releasing any and all claims and liens which any of them have, or might have, against Developer, TAW or the Facilities, by reason of the labor, materials and equipment furnished in connection with the installation of the Facilities.

Developer agrees to remedy any defects in work done or materials used in the construction of the Facilities for a period of one year from the delivery of title to the Facilities to TAW.

It is expressly agreed and understood that Developer shall concurrently with the signing of this agreement pay all estimated costs and expenses to install the Facilities, including but not limited to the cost of construction, engineering, inspection and administration and permits and licenses.

The Developer shall, prior to signing of this agreement, provide an estimate of the Facilities construction cost, attached as Addendum C, and promptly following completion of construction, provide TAW with full and complete records of the actual cost to Developer of the Facilities

III. REFUND PAYABLE BY TAW TO DEVELOPER

Developer shall be entitled to receive refunds as set forth in Addendum B to this agreement of up to, but not exceeding, the total cost to Developer of constructing and installing the Facilities as provided herein, with said refunds to be made in the amounts and under the circumstances provided in the then applicable rules of TAW contained in TAW's tariffs filed from time to time with the Tennessee Public Utility Commission. For purposes of interpretation of the aforesaid rules, which currently speak in terms of "Deposits", the aforesaid total cost to Developer of the Facilities that are to be transferred to TAW shall be deemed to be a "Deposit" or "Deposits" within the meaning of said rules. An example of how the 100' refund process would work is attached as Addendum E.

IV. OWNERSHIP AND OPERATION OF FACILITIES AFTER ACQUISITION BY TAW

Upon acquisition of TAW of title to the Facilities as provided herein, TAW shall have the absolute right to extend any portion of the Facilities in, on or to other lands, avenues, streets, alleys or places and to connect other mains and services thereto, and Developer shall not, by reason thereof, be entitled to any payments or compensation, nor any refund (except as may be required by the terms of section IV hereof), and the Facilities shall be and remain in all respects the entire and sole property of TAW.

V. FURTHER AGREEMENTS BETWEEN DEVELOPER AND TAW

In addition to any and all other agreements and undertakings set forth in this agreement, TAW and Developer mutually agree that all persons receiving water service through, or as a result of, the Facilities shall be customers of TAW, shall sign individual contracts or applications for water service with TAW and shall be billed at the rates and charges of TAW as approved from time to time by the Tennessee Public Utility Commission.

VI. INDEMNIFICATION

A. Developer agrees to indemnify and hold harmless TAW and its affiliated companies, agents and employees from and against all claims, damages, losses and expenses, including attorney's fees, arising out of or resulting from the performance of the work in connection with the Facilities, provided that any such claim, damage, loss or expense (a) attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting there from, (b) is caused in whole or in part by any negligent act or omission of Developer or any contractor or subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by the negligence of party indemnified hereunder; and (c) arises within one (1) year of transfer of record title to TAW of that portion of the Facilities giving rise to the claim, or upon which the injury, damage or loss occurred.

B. TAW agrees to indemnify and hold harmless Developer and its affiliated companies, agents and employees from and against all claims, damages, losses and expenses, including attorney's fees, arising out of or resulting from the performance of

the work in connection with the Facilities after TAW takes over the Facilities.

C. Any provision of this Agreement in respect to indemnifications which are prohibited or unenforceable by law in the State of Tennessee shall be ineffective and to the extent of such prohibition of unenforceability, shall not invalidate the remaining provisions of this Agreement.

IN WITNESS WHEREOF, Tennessee-American Water has caused its name to be signed hereto by Valoria Armstrong, President, thereunto duly authorized and Thunder Air, Inc., d/b/a Jasper Highlands Development, Inc. has caused its name to be signed thereto by John C. Thornton, Sr., its President, thereunto duly authorized.

WITNESS:

_____

TENNESSEE-AMERICAN WATER

By: _____
Darlene Williams, President

WITNESS:

_____

THUNDER AIR, INC. d/b/a JASPER HIGHLANDS DEVELOPMENT, INC.

By: _____
John C. Thornton, Sr., President

ADDENDUM A

The water main (s) and appurtenant facilities ("the Facilities") to be constructed and installed by Developer pursuant to the acquisition agreement between TAW and Developer dated the _____ day of _____, 20____, to which the Addendum is attached, are shown on the attached drawings, are listed as follows:

Drawings prepared by: _____

Name of project: _____

Site Utility Water Line: _____

Drawings dated: _____

ADDENDUM B

TAW hereby agrees to pay to the DEVELOPER, during the period of ten (10) years from the date of this Agreement for the extended mains and all appurtenances thereto, for each additional Bona Fide Customer for which a service line has been connected to the extended main in question, an amount equal to the Unit Cost Per Foot of Main multiplied by one hundred (100) provided however, the total of such payments under this Addendum shall not exceed the total of the amount determined under paragraph III of Acquisition Agreement, without interest. For the purpose of this Addendum, the term "Unit Cost Per Foot of Main" shall mean the qualified cost of the project divided by feet of pipe installed. For purposes of this Addendum, a Bona Fide Customer is any person who has signed a water service agreement with TAW and is purchasing water pursuant to said water service agreement.

WITNESS: TENNESSEE-AMERICAN WATER

_____ By: _____
Darlene Williams, President

WITNESS: DEVELOPER

_____ By: _____
Owner

ADDENDUM C

ESTIMATE OR ACTUAL
(circle one)

DATE:	
PROJECT:	
OWNER:	
CONTRACTOR:	

Item Description	Quantity	Unit	Unit Price	Total
6" Water Line (DIP)				
8" Water Line (DIP)				
12" Water Line (DIP)				
6" Gate Valve (O.R.) & Box				
8" Gate Valve (O.R.) & Box				
12" Gate Valve (O.R.) & Box				
Fire Hydrant w/fittings & 6" Gate (O.L.)				
Blow Off Assembly (2")				
Service Laterals				
Air Release Valve Assembly				

TOTAL COST:

THIS FORM COMPLETED BY:

ADDENDUM D

TAW Specifications and Standards

SECTION 1000

SUMMARY OF WORK

PART 1: GENERAL

1.01 WORK UNDER THIS CONTRACT

CONTRACTOR shall furnish all labor, materials (except as herein noted), equipment and means to construct the pipeline(s) and other Work as described in the Contract Documents and shown on the Drawings. The Work includes, but is not limited to, the following:

A. Pavement removal, including saw cutting, as required.

B. Construction and maintenance of bridges and other structures as required for traffic control.

C. Furnishing of flagmen, traffic warning and control as required.

D. Sheeting, bracing and support of adjoining ground where necessary.

E. Furnish and install thrust blocking and rodding as required.

F. Handling drainage and groundwater removal

G. Guarding the site.

H. Unloading, loading, hauling, distributing, laying and testing the pipe and appurtenances.

I. Rearranging sewer lateral and other pipes and ducts where necessary.

J. Excavation and backfilling of trenches and pits.

K. Restoration of paved surfaces, and curbing.

L. Removal of surplus excavated material.

M. Performance of pressure and leakage tests.

N. Disinfection of pipeline.

O. Site cleaning.

P. Maintenance of street or other surfaces for the required period of time.

Q. Ground restoration and planting.

R. Submit schedules, shop drawings and as-built records.

The above general outline of principal features does not in any way limit the responsibility of the CONTRACTOR to perform all Work and furnish the required materials, equipment, labor and means as shown or required by the Contract Documents.

Materials, equipment, labor, etc., obviously a part of the Work and necessary for the proper operation and installation of same, although not specifically indicated in the Contract Documents, shall be provided as if called for in detail without additional cost to the OWNER.

1.02 WORK BY OWNER

OWNER will perform certain items of Work related to this project as follows:

A. Operate all valves necessary to shut-off and reactivate its pipeline.

B. Mark locations of existing services, valves, etc.

C. Other work, if any, as described in the Specifications Special Conditions.

1.03 MATERIALS FURNISHED BY OWNER

Materials to be furnished by the OWNER and installed by the CONTRACTOR are listed in the Specifications Special Conditions.

1.04 LOCATIONS

Work is to be performed on OWNER's property and/or public rights-of-ways or easements shown on the drawings and described in the Specifications Special Conditions. Work shall be performed by the CONTRACTOR within these limits.

It is the obligation and responsibility of the CONTRACTOR to determine the exact limitations of the rights-of-way and/or easements and any conditions limiting or affecting the use thereof by the OWNER and/or the CONTRACTOR. All agreements respecting rights-of-way and the easements are available for the CONTRACTOR's inspection at the OWNER's office. The CONTRACTOR agrees to indemnify and hold harmless the OWNER against any claims made by any property owner, including, without limiting the generality hereof, any claim that the CONTRACTOR has failed to keep his work, equipment, materials, or workmen within the limits authorized by the right-of-way and/or easement or any claim that the CONTRACTOR

has failed to comply with any condition or requirement, or agreement respecting the right-of-way and/or easement.

Some of the locations shown or described in the Contract Documents, such as tie-ins, are approximate and the CONTRACTOR shall be responsible for locating the exact locations.

PART 2: PRODUCTS

2.01 GENERAL

Specifications for the materials and equipment to be provided by the CONTRACTOR are detailed in the respective Specification Sections.

PART 3: EXECUTION

3.01 FIELD SURVEY WORK

OWNER will provide reference points and CONTRACTOR will be responsible for the laying out of the Work in accordance with Paragraph 4.4 of the General conditions.

3.02 COORDINATION

CONTRACTOR will be required to coordinate his work, to phase the construction operations, and provide, install and maintain any temporary connections necessary to prevent interference to operation of OWNER's facilities. Any construction work requiring the shutdown of facilities must be scheduled and performed only at such times as shall be authorized by the OWNER. Such Work must be completed during the specific periods authorized by the OWNER. It may be necessary that Work will be performed during several shutdown periods and/or during periods of premium time payment to accomplish the desired construction. All costs to perform the CONTRACTOR's Work, including premium time payments, shall be borne by the CONTRACTOR and are included in the Contract Price.

3.03 REGULATORY REQUIREMENTS

When the Work is to be done in a state right-of-way and a state inspector is assigned to the Project during the construction of the Work, the CONTRACTOR will make necessary arrangements for obtaining and pay all costs in connection with the inspector in accordance with Paragraph 13.5 of the General Conditions.

SECTION 1010

DRAWING INDEX

PART 1: GENERAL

1.01 DRAWINGS

The following drawings, dated _____, 20__, and prepared by _____, accompany this Specification and are a part thereof. Drawings are the property of the OWNER and shall not be used for any purpose other than that intended by the Specifications.

Sheet	Title

SECTION 1075

BASIS OF PAYMENT

PART 1: GENERAL

1.01 SCOPE

Work to be performed under this Contract shall be paid for in accordance with Price Schedule - A, of the Bid. When authorized by OWNER, additional work will be paid for in accordance with the unit prices of Price Schedule - B, of the Bid. The cost of labor, equipment, materials or work called for in the Specifications, shown on the Drawings, or necessary for a complete and satisfactory installation, but which are not specifically mentioned in this Section shall be included in the appropriate pay item by the CONTRACTOR at no additional expense to the OWNER.

1.02 PAYMENT ITEMS

A. Price Schedule - A

The prices shown in Price Schedule A of the Bid include all costs to construct the pipeline(s) under this Contract. The quantities shown on Price Schedule A are not guaranteed and final payment will be made on the in place measurement of the length(s) of pipeline(s) installed.

1. Pipe Installation (Item No. A-1)

CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures for the construction of the pipeline(s). The minimum width and depth of the pipe trench shall be in accordance with the requirements of Specification Section 2210.

All costs to complete the pipeline installation are included in the unit price per lineal foot of pipeline, regardless of whether the CONTRACTOR uses sloped sides or shoring and sheeting when excavating the pipe trench. The unit price for each pipeline is the sum of all costs to complete the Work as described in Specification Section 1000.1.01, divided by the estimated length of the pipeline as shown in the Bid.

When fire hydrants, wet connections, air release valves, air vents, blow-off assemblies, stream crossings and casing installations are required for the Project, these items will be paid for at the unit prices to Item Nos. A-2 to A-8 inclusive as shown in the Bid.

2. Fire Hydrant Installation (Item No. A-2)

Payment will be made at the Contract unit price for each fire hydrant installation. The unit price shall include all costs to install any materials furnished by OWNER as well as Contractor furnished material. Also included in the unit price shall be all costs to furnish and install reaction blocking, crushed stone and to perform all excavation and backfill for the fire hydrant service from the main to and including the hydrant.

3. Wet Connection Installation (Item No. A-3)

Payment will be made at the Contract unit price for each wet connection required. The unit price shall include all costs for furnishing, testing and installing the tapping sleeve or saddle and tapping valve. When OWNER furnishes the tapping sleeves, saddle and tapping valve the unit price shall be for testing and installation costs only.

4. Air Release Valves, Air Vents and Blow-off Assemblies (Item Nos. A-4, A-5 and A-6)

Payment will be made at the Contract unit price for each air release valve, air vent and blow-off assembly. The unit price shall include all labor, materials, (except where materials are furnished by OWNER) tools, excavation and backfilling, furnishing and installing manhole frames and covers, ladders, painting; the furnishing, installing and testing of all piping, valves, air valves, fittings, small piping and piping appurtenances and all incidental work required to construct each structure complete as shown on the Drawings, as specified and necessary to make a complete and satisfactory installation.

5. Stream Crossing (Item No. A-7)

Payment will be made at the Contract unit price for the crossing pipe furnished (except where furnished by the OWNER) and installed, complete in place as shown on the Drawings. The Contract unit price shall include all pipe, fittings, specials, anchors, joint harnesses, etc., as shown on the Drawings, required by these Specifications and necessary to make a complete and satisfactory installation. In addition, the Contract unit price shall include all excavation, embankment and backfill construction of reaction backings and concrete encasements, providing an approved means for holding the pipe in place, constructing cofferdams, stone backfill, etc.

6. Casing Installation (Item No. A-8)

Payment will be made at the Contract unit price for the casing installation complete in place as shown on the drawings. The Contract unit price shall include all casing pipe, water pipe, and fittings (except where furnished by OWNER), strapping, skids, specials, anchors, harnesses, etc. as required by these specifications or as necessary for a complete and satisfactory installation. In addition the Contract unit price shall include all excavation (soil or rock), dewatering, jacking, drilling or boring (rock or soil), backfilling, brick and mortar installation, sheeting, bracing, shoring, temporary construction, safety measures, etc. all as necessary for a complete and satisfactory installation.

B. Price Schedule - B

1. General Excavation (Item No. B-1)

When authorized by the OWNER, the CONTRACTOR shall perform additional general excavation to the limits designated by the ENGINEER. The measurement for all additional general excavation will be by the cubic yard of material removed from its original natural state to the lines and grades designated by the ENGINEER.

2. Rock Excavation - Within Pipe Trench (Item No. B-2)

When rock occurs within the pipe trench, the CONTRACTOR shall remove the rock to the limits of the pipe trench. The measurement for the rock excavation will be by the cubic yard of material removed. The unit prices for the Rock Excavation - Within Pipe Trench (Bid Item No. B-2) reflects a deduction of equivalent volume and cost for the trench excavation included in Bid Item NO. A-1 but not performed by the CONTRACTOR. The unit prices also include all costs to haul and dispose the rock at an approved dump site.

3. Rock Excavation - Beyond Limits of Planned Pipe Trench (Item No. B-3)

When authorized by the OWNER, the CONTRACTOR shall remove rock beyond the limits of the planned pipe trench to the limits designated by the ENGINEER. The measurement for the rock excavation will be by the cubic yard of material removed. The unit prices include all costs to remove, haul and dispose of the rock at an approved dump site.

4. Excavation of Unsuitable Material Below Planned Pipe Trench Subgrade (Item No. B-4)

CONTRACTOR shall notify ENGINEER whenever the material below the pipe trench subgrade may be unsuitable. Determination as to the suitability of the material and the necessity for its removal is within the sole discretion of the ENGINEER.

The measurement for the excavation of unsuitable material will be by the cubic yard of material removed below the planned pipe trench subgrade. The unit prices include all costs to excavate, haul and dispose the unsuitable material at an approved dump site.

5. Backfill With Common Fill - Type A (Item No. B-5)

When authorized by the OWNER, the CONTRACTOR shall furnish, place and compact additional Common Fill - Type A at the locations and to the limits designated by the ENGINEER. The measurement for backfill with Common Fill - Type A shall be the in place measurement of cubic yards of material furnished, placed and compacted.

6. Backfill With Common Fill - Type B (Item No. B-6)

Same as for Item No. B-5, except the backfill material will be Type B.

7. Backfill with Bedding Material (Item No. B-7)

Same as for Item No. B-5, except the backfill material will be the bedding material defined in Specification Section 2210.2.03.

8. Filter Fabric (Item No. B-8)

When authorized by the OWNER, the CONTRACTOR shall furnish and install the filter fabric as described in Specification Section 2210.2.04 where directed by the ENGINEER. Payment will be made at the unit price per square yard of the installed contact surface of the filter fabric with the trench bottom and sides.

9. Polyethylene Encasement (Item No. B-9)

When authorized by OWNER, the CONTRACTOR shall furnish and install polyethylene encasement to the limits designated by the ENGINEER. Payment will be made at the unit price per linear foot of pipe covered by the polyethylene encasement.

10. Bituminous Pavement With Crushed Stone Base (Item No. B-10)

When authorized by the OWNER, the CONTRACTOR shall furnish and install additional bituminous pavement with crushed stone base at the locations and to the limits designated by the ENGINEER. Payment will be made at the unit price per square yard of bituminous pavement with crushed stone base measured in place.

11. Bituminous Pavement With Concrete Base (Item No. B-11)

Same as for Item No. B-10, except the pavement will be a bituminous pavement with concrete base.

12. Concrete Pavement

When authorized by OWNER, the CONTRACTOR shall construct an 8" thick 3000 psi compressive strength concrete pavement in the locations and to the limits designed by the ENGINEER. Payment will be at the unit price per square yard of concrete pavement measured in place.

13. Steel Pipe Bollard

When authorized by OWNER, CONTRACTOR shall install and paint, steel pipe bollards in locations designated by the ENGINEER all in accordance with Specification Section 15180 - Fire Hydrants, and Sketch 61-300-13.

14. Valve Marking Post

When authorized by OWNER, CONTRACTOR shall install and paint valve marking posts at locations designated by the ENGINEER in accordance with Specification Section 15000 and Sketch 61-300-14.

SECTION 1300

SUBMITTALS

PART 1: GENERAL

1.01 CONSTRUCTION SCHEDULE

CONTRACTOR shall prepare and submit detailed progress schedules, schedule of values and shop drawing and sample submittal schedules to the ENGINEER for approval in accordance with Paragraphs 2.6 and 2.9 of the General Conditions. The schedule shall be in bar graph form showing material delivery schedules and starting and completion dates for all phases of construction.

If, in the opinion of the ENGINEER, the CONTRACTOR falls behind the progress schedule, the CONTRACTOR shall take such steps as may be necessary to improve his progress, which may require him to increase the number of shifts, and/or overtime operations, days of work, and/or the amount of construction planned, and to submit for approval such supplementary schedule or schedules as necessary to demonstrate the manner in which the agreed rate to progress will be regained, all without additional cost to the OWNER.

1.02 CASH FLOW SCHEDULE

In addition to the Construction Schedule required above, the CONTRACTOR shall also submit to the ENGINEER, for approval, a Cash Flow Schedule. The Cash Flow Schedule shall show the amounts of money by months, which will be required to reimburse the CONTRACTOR for Work performed during each month of the Contract Time. The sum of all the monthly cash requirements shall equal the total price of the Contract. The monthly cash requirements shall be proportioned with the aid of the Construction Schedule.

The approved Cash Flow Schedule will be used by the OWNER to program funds for progress payments to the CONTRACTOR. Monthly payments will be made to the CONTRACTOR in accordance with the Contract Agreement, but at no time will the aggregate amount of payments exceed the accumulated amount of payments for the same period of the Cash Flow Schedule.

1.03 SHOP DRAWINGS

The CONTRACTOR shall promptly supply to the ENGINEER for approval, shop drawings with details and schedules for all items as noted in the Drawings and/or Specifications and/or required by the ENGINEER.

Seven (7) copies of all drawings, schedules and brochures shall be submitted for approval. Black line prints, blue line prints or reproducible transparencies are required. Blueprints (white lines on a blue background) are not acceptable. Each submittal shall have the job name on it.

Submittals smaller than 8-1/2 by 11 inches shall be secured to paper 8-1/2 by 11 inches.

1.04 SAMPLES

When required by the ENGINEER or where noted in other Sections of these Specifications, samples of materials shall be submitted for approval.

1.05 PRE-CONSTRUCTION PHOTOGRAPHS

Prior to commencement of work the CONTRACTOR shall submit to ENGINEER photographs of the work areas and material storage areas. Photographs shall be taken along the center line of the proposed pipe trench and should capture all existing features of the sites such as mail boxes, curbing, lawns, driveways, signs, culverts, etc. As many photographs as is necessary shall be taken but as a minimum one photograph for every 50-feet of pipe trench is required. Each photograph shall have the date taken, a description, and sequential number (to follow pipe route) recorded on the back.

SECTION 1500

TEMPORARY FACILITIES

PART 1: GENERAL

1.01 WATER SUPPLY

If reasonably available, water for the purpose of this Contract will be supplied to the CONTRACTOR by the OWNER. The water will be furnished at no cost to the CONTRACTOR. The CONTRACTOR shall furnish and install all necessary meters, temporary piping and valves in connection with such water supply.

OWNER reserves the right to impose such limitations upon the CONTRACTOR's use of temporary water as the OWNER, in its sole discretion, determines may be necessary to assure it of its continued ability to meet the demands of its customers and the volumes and pressures required for fire protection. Any water required by the CONTRACTOR in excess of the quantities the OWNER provides to the CONTRACTOR must be furnished by the CONTRACTOR at his own cost.

1.02 TEMPORARY HEAT

The CONTRACTOR shall provide, when required, approved type heating apparatus with the necessary fuel in order to protect and/or dry out the work. The stored materials and finished work shall be protected at all times from damage by the elements.

1.03 ELECTRICAL SUPPLY

The CONTRACTOR shall pay all fees, obtain necessary permits and have meters installed for power and light as may be required for the prosecution of his work. Energy charges shall be paid by the CONTRACTOR.

1.04 SANITARY FACILITIES

The CONTRACTOR shall provide suitable temporary facilities and enclosures for the use of workmen and shall maintain same in a sanitary condition and remove same when directed by the OWNER.

CONTRACTOR is advised that OWNER is in the business of providing potable water and the CONTRACTOR's sanitary arrangements shall not endanger the OWNER's facilities.

SECTION 1570

TRAFFIC REGULATION

PART 1: GENERAL

1.01 SCOPE OF WORK

CONTRACTOR shall furnish and install all traffic barricades, markers, signs, controls and provide flagmen, traffic police and other facilities required by the Federal, State and local government authorities and the ENGINEER to protect general public and maintain the existing roads, streets and highways.

Competent uniformed traffic directors shall be employed at every location where the CONTRACTOR'S equipment is working immediately adjacent to, or is entering, leaving or crossing, active traffic lanes. The traffic directors shall be employed continuously for the full time such conditions exist.

Special attention shall be given for the protection of pedestrians and, in particular, children going to and coming from school. Ingress and egress shall be maintained for all properties abutting the pipeline.

The CONTRACTOR shall notify the State and local police, ambulance services and fire departments of daily traffic diversions.

The OWNER or ENGINEER make no warranty or representation that the CONTRACTOR will be permitted to divert or barricade traffic and the CONTRACTOR shall be fully responsible to complete all obligations of the Contract regardless of any restrictions which may be imposed by Federal, State or local authorities.

1.02 MAINTAINING TRAFFIC

A. Traffic Diversion

Whenever it is necessary to divert traffic from its normal channel into another channel, such diversion shall be clearly marked by cones, drums, barricades or temporary guard rail. If the markers are left in place at night, suitable lights shall be provided and maintained.

B. One Way Traffic

Whenever one way traffic is established, at least two (2) flagmen shall be provided.

C. Street Closing

When permitted by Federal, State or local authorities having jurisdiction, the CONTRACTOR may close streets to through traffic for minimum periods of time. CONTRACTOR must notify and secure the permission of the local police and fire departments and such other public authorities and, if required by any law, ordinance or regulation, the occupants of all premises bordering the streets. CONTRACTOR must give all occupants reasonable notice with respect to the closing of any street, in whole or in part, even when not required by any law, ordinance, or regulation. CONTRACTOR shall so schedule his work that the time the street is closed is kept to a minimum and shall, whenever possible, make suitable preparations for access by local residents, school buses, and mail delivery vehicles. CONTRACTOR shall provide access for police, fire, ambulance and emergency vehicles at all times. Fire hydrants and other public utility valves shall be kept accessible at all times by the CONTRACTOR.

1.03 TRAFFIC SIGNALS AND CONTROLS

The installation and operation of all traffic signals and traffic control devices shall conform to the requirements of Federal, State and local government highway departments.

To protect persons from injury and to avoid property damage, adequate barricades including flasher and reflectorized construction signs and guards as required shall be placed and maintained during the progress of the construction work and until it is safe for traffic and pedestrians to use the trenched area.

When the CONTRACTOR is permitted to close a street or road to traffic, the CONTRACTOR shall furnish, erect, maintain and remove barricades, suitable and sufficient red lights, and other lights or reflecting material at the limits of the project, where side streets intersect, and at other points of public access to the project. The CONTRACTOR shall furnish, erect and maintain advance warning signs and barricades on side streets at the first street intersection beyond the one closed by construction indicating "Street Closed, One Block Ahead". The CONTRACTOR shall furnish, erect, maintain and remove detour marking signs on temporary routes.

1.04 TRENCH AND STORED MATERIAL MARKINGS

Before completion of each day's work, in traveled areas, the pipe trench shall be completely backfilled and tamped, and the necessary temporary paving installed. 3/4-inch stone will be used in sidewalk and walkway areas and blacktop in driveways. These areas are not to be left open, impassable or unsafe through the night. In the event that the pipe trench cannot be completely backfilled and tamped, temporary bridges and crossings shall be used to accommodate through traffic and the general public. The job site will be left in a neat and satisfactory condition at the end of each day. The requirements of this Section are in addition to any requirements of Federal, State or local laws, rules, regulations or ordinances or any requirements found elsewhere

in the Contract Documents.

Equipment and material stored on the street shall be marked at all times. At night any such material or equipment stored between the side ditches, or between lines 5 feet behind any raised curbs, shall be clearly outlined with light or other dependable warning devices that are approved by the ENGINEER. In addition, the CONTRACTOR shall provide any other lights, barricades, etc., that may be needed for the protection of pedestrian traffic.

1.05 OTHER REQUIREMENTS

If the regulation of traffic and controls are not being provided in accordance with this Section 1570, and the public is inconvenienced or its safety is being endangered, in the judgement of the ENGINEER, the OWNER may take such steps as it deems advisable to provide such services and all costs in providing such services will be deducted from any payment which may be due or may thereafter become due the CONTRACTOR.

SECTION 1600

MATERIAL AND EQUIPMENT

PART 1: GENERAL

1.01 PROTECTION OF MATERIAL AND EQUIPMENT

The CONTRACTOR shall be responsible for the safe storage of all material furnished to or by him until it has been incorporated in the completed project and accepted by the ENGINEER. The CONTRACTOR shall bear the risk of loss and/or damage to the materials and Work until the Work is finally accepted by the ENGINEER.

The interior of all pipe and accessories shall be kept free from dirt and foreign matter at all times.

After valves and hydrants have been inspected, the CONTRACTOR shall properly store them prior to use. In order to prevent entry of foreign material that could cause damage to the seating surfaces, the valves and hydrants shall be stored in a fully closed position unless recommended otherwise by the manufacturer. Resilient seated valves shall be stored in accordance with the manufacturer's recommendations. This may include storage with protective covers for rubber seats and in a marginally open condition. Valves and hydrants should be stored indoors.

If valves must be stored outdoors, the CONTRACTOR shall protect the operating mechanism, such as gears, motor, actuators and cylinders, from weather elements. Valve ports and flanges must be protected from the weather and foreign materials. If valves are subject to freezing temperatures, all water must be removed from the valve interior and the valve closed tightly before storage, unless specifically recommended otherwise by the manufacturer. Failure to do so may result in a cracked valve casting. Valves shall be stored on pallets with the discs in a vertical position to prevent rainwater from accumulating on top of the disc, seeping into the valve body cavity and freezing and cracking the casting.

PART 2: PRODUCTS

2.01 GENERAL

Unless otherwise specifically provided for in these specifications, all equipment, materials and articles incorporated in the Work shall be new, in current production and the best grade obtainable consistent with general construction usage.

Materials specified by reference to the number or symbol of a specific standard, such as a Commercial Standard, Federal Specification or other similar standard, shall comply with the supplement in effect on the date of the Specifications, except as limited to type, class or grade, or modified by these Specifications.

The CONTRACTOR shall submit to ENGINEER samples of materials for approval when requested and/or directed.

PART 3: EXECUTION

3.01 COORDINATION OF DIMENSIONS

The CONTRACTOR shall verify and make necessary corrections to construction dimensions so all specified materials can be installed and will function within the intent of the Contract Drawings and Specifications. The CONTRACTOR will promptly notify the ENGINEER of all necessary corrections required.

3.02 SAFETY AND HEALTH REQUIREMENTS

All material, equipment, fixtures and devices furnished shall comply with the requirements and standards of all Federal, State and local laws, ordinances and codes governing safety and health.

3.03 RESPONSIBILITY FOR MATERIAL AND EQUIPMENT

When received from the Carrier and at time of unloading, the CONTRACTOR shall inspect all pipe and accessories for loss or damage. No shipment of material shall be accepted by the CONTRACTOR unless loss or damage has been described on the Bill of Lading by the Carrier's agent. Any discrepancies between the Bill of Lading and the physical material shall be noted on the Bill of Lading. All demurrage charges on carloads or truckloads of pipe or other material shall be paid by the CONTRACTOR.

The CONTRACTOR shall be responsible for all material furnished by him. All such material which is defective in manufacture or has been damaged in transit or has been damaged after delivery shall be replaced by the CONTRACTOR at his expense.

The CONTRACTOR's responsibility for material furnished by the OWNER shall begin upon CONTRACTOR's acceptance at the point of delivery to him. All such material shall be examined, and material defective in manufacture and/or otherwise damaged shall be rejected by the CONTRACTOR at the time and place of delivery to him and replaced by the OWNER. Once Accepted by the CONTRACTOR, at the point of delivery to him, all defective and/or damaged material discovered prior to final acceptance of the Work shall be removed by the CONTRACTOR and he shall install, at his own expense, the material replaced. In such case the CONTRACTOR shall furnish all labor, equipment and material incidental to replacement and

necessary for the completion of the Work to the satisfaction of the ENGINEER. The CONTRACTOR will be reimbursed for the cost of replacing defective materials furnished by the OWNER and accepted by the CONTRACTOR if, but only if, the CONTRACTOR submits proof satisfactory to the ENGINEER and to the manufacturer and/or supplier from whom the OWNER purchased the material that the defect was latent and could not have been discovered by the CONTRACTOR.

SECTION 1700

PROJECT CLOSEOUT

PART 1: GENERAL

1.01 CLEANING UP

The CONTRACTOR shall periodically, or as directed during the progress of the Work, remove and properly dispose of the resultant dirt and debris and keep the premises reasonably clear. Upon completion of the Work, he shall remove all temporary construction facilities and unused materials provided for the Work and put the premises in a neat and clean condition and do all cleaning required by the Specifications. Trash and combustible materials shall not be allowed to accumulate in construction locations.

1.02 GUARANTEES AND WARRANTIES

The CONTRACTOR expressly warrants that all workmanship and materials performed or furnished under this Contract will conform to the Specifications, Drawings, samples and other applicable descriptions furnished or adopted by the CONTRACTOR and with all applicable laws, provisions and requirements of the Contract Documents. The CONTRACTOR shall remedy any defects due to faulty materials or workmanship which shall appear within a period of one year from the date of acceptance of the Work hereunder and pay for any damage to other Work resulting therefrom. The OWNER shall give notice of observed defects with reasonable promptness. The CONTRACTOR's warranty hereunder is in addition to, and not in limitation of, any obligations found elsewhere in the Contract Documents, any special guarantees provided by the CONTRACTOR, and any obligations imposed by law.

In addition to the above requirements, the CONTRACTOR shall assign material and equipment guarantees and warranties from all manufacturers and suppliers to the OWNER and deliver copies of such guarantees and warranties and the assignments thereof to the OWNER in order to assure the OWNER of the full benefit of such guarantees and warranties.

1.03 RESTORATION

The CONTRACTOR shall restore and/or replace paving, curbing, sidewalks, gutters, shrubbery, fences, sod or other disturbed surfaces and structures to a condition equal to that before the Work began and to the satisfaction of the ENGINEER and shall furnish all labor and materials incidental thereto. In restoring improved surfaces, new pavement is required. No permanent bituminous top paving shall be placed within twenty (20) days, or other specified time frame required by law, after the backfilling shall have been completed, except by order of the ENGINEER. Temporary paving will be installed prior to the placement of permanent surfaces when required by the ENGINEER or by any federal, state or local governing body having

jurisdiction over the site where the work is being performed. In any event, all permanent bituminous top paving shall be placed within forty five (45) days or other specified time required by law, after the backfill has been completed unless otherwise ordered by the ENGINEER.

1.04 MAINTENANCE OF SURFACES

Following the certification of completion by the ENGINEER, the CONTRACTOR shall, unless otherwise stipulated by the ENGINEER, maintain the surfaces of paved and unpaved trenches and adjacent curbs and gutters, sidewalks, fencing, sod and other disturbed surfaces for a period of one (1) year thereafter or as required by state, county or local authorities. All material and labor required for the maintenance of the trench surfaces and structures shall be supplied by the CONTRACTOR, and the work shall be done in a manner satisfactory to the ENGINEER.

SECTION 2020

DEWATERING

PART 1: GENERAL

1.01 GENERAL

The dewatering of all areas where work must be performed under this Contract is the responsibility of the CONTRACTOR and no additional sum will be allowed for any dewatering operation, overtime, equipment rental or any other expense incurred due to the occurrence of ground water, surface water or water from possible leakage of existing buildings, structures and piping in the vicinity of the CONTRACTOR'S operations.

Should water be encountered, the CONTRACTOR shall furnish and operate suitable pumping equipment of such capacity adequate to dewater the trench. The trench shall be sufficiently dewatered so that the laying and joining of the pipe is made in the dry. The CONTRACTOR shall convey all trench water to a natural drainage channel or storm sewer without causing any property damage and in strict accordance with state and/or local requirements.

Disposal of silt and debris which accumulates during construction shall be performed in strict accordance with state and/or local requirements.

1.02 PERMITS

The CONTRACTOR shall be responsible for obtaining and paying for any permits required for dewatering and disposal.

SECTION 2025

EXISTING UTILITIES AND STRUCTURES

PART 1: GENERAL

1.01 SCOPE OF WORK

Certain information regarding the reputed presence, size, character, and location of existing Underground Facilities such as pipes, drains, sewers, electrical lines, telephone lines, cable TV lines, gas lines, and water lines has been shown on the Contract Drawings and/or provided herein. This information with respect to Underground Facilities is provided by the OWNER in accordance with conditions described in paragraphs 4.3.1, 4.3.1.1, 4.3.1.2 and 4.3.2 of the General Conditions.

1.02 NOTIFICATION OF UTILITIES

CONTRACTOR shall notify all utility companies that construction of the work under this Contract will pass through the areas where their services exist. Notification to the utilities must be made in a sufficient amount of time in advance (min. 72 hours) prior to start of any construction work in the affected areas.

PART 2: PRODUCTS

2.01 MATERIALS

Materials for temporary support, adequate protection, and maintenance for all underground and surface utility structures, drains, sewers and other obstructions encountered in the progress of the work shall be furnished by the CONTRACTOR at his own expense.

PART 3: EXECUTION

3.01 OBSTRUCTIONS BY OTHER UTILITY STRUCTURES

Where the grade or alignment of the pipe is obstructed by existing utility structures such as conduits, ducts, pipes, branch connections to main sewers, or drains, the obstruction shall be permanently supported, relocated, removed or reconstructed by the CONTRACTOR in cooperation with the owners of such utility structures. Before proceeding the CONTRACTOR must reach an agreement with the ENGINEER on method to avoid obstruction.

No deviation shall be made from the required line or depth except with the consent of the ENGINEER.

3.02 REPAIRS

Existing pipes or conduits crossing the trench, or otherwise exposed, shall be adequately braced and supported to prevent trench settlement from disrupting the line or grade of the pipe or conduit, all in accordance with the directions of the ENGINEER. Utility services broken or damaged shall be repaired at once to avoid inconvenience to customers. Storm sewers shall not be interrupted overnight. Temporary arrangements, as approved by the ENGINEER, may be used until any damaged items can be permanently repaired. All items damaged or destroyed by construction and subsequently repaired must be properly maintained by the CONTRACTOR.

Attached to this section are Sketch Nos. 61-300-1SK and 61-300-2SK providing the requirements for repair or replacement of sanitary or storm drains removed or damaged during installation of the water main.

3.03 RELOCATION

Where it is necessary to relocate an existing utility or structure, the work shall be done in such a manner as is necessary to restore it to a condition equal to that of the original facility. No such relocation shall be done until approval is received from the owner of the utility or structure being changed.

3.04 SEPARATION OF WATER MAINS, SANITARY SEWER AND STORM SEWERS

A. General

The following factors should be considered in providing adequate separation:

(1) Materials and type of joints for water and sewer pipes,

(2) Soil conditions,

(3) Service and branch connections into the water main and sewer line,

(4) Compensating variations in horizontal and vertical separations,

(5) Space for repair and alterations of water and sewer pipes,

(6) Off-setting of pipes around manholes.

B. Parallel Installation

Water mains shall be laid at least 10 feet horizontally from any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a 10 foot separation, the State Environmental Protection Agency

may allow deviation on a case-by-case basis, if supported by data from the ENGINEER. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

C. Crossings

Whenever water mains must cross building drains, storm drains, or sanitary sewers, the water main shall be laid at such an elevation that the bottom of the water main is 18 inches above the top of the drain or sewer. This vertical separation shall be maintained for the portion of the water main located within 10 feet horizontally of any sewer or drain it crosses. The 10 feet is to be measured as a perpendicular distance from the drain or sewer line to the water line.

D. Exception

When it is impossible to obtain the proper horizontal and vertical separation as stipulated above the ENGINEER is to be notified. If directed by the ENGINEER both the water main and sewer line shall be constructed of cast iron, ductile iron, galvanized steel or protected steel pipe having mechanical joints. Other types of joints of equal or greater integrity may be used at the discretion of the ENGINEER after consultation with the State Environmental Protection Agency. Thermoplastic pipe may be used provided mechanical or solvent weld pipe joints are used. These shall be pressure-tested to assure water tightness before backfilling. Where water mains must cross under a sewer, additional protection shall be provided by:

(1) A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water line,

(2) Adequate structural support for the sewers to prevent excessive deflection of the joints and the settling on and breaking of the water line,

(3) That the length of the water line be centered at the point of the crossing so that the joints shall be equidistant and as far as possible from the sewer.

Through the ENGINEER the State Environmental Protection Agency shall be consulted when any of the above conditions cannot be met to discuss the use of double casing or concrete encasement of sewer and/or water lines as possible alternatives.

SECTION 2105

CLEARING AND GRUBBING

PART 1: GENERAL

1.01 PROTECTION

Existing trees, shrubs and bushes outside the clearing limits shall be protected from damage during the life of this Contract.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

Comply with State and local code requirements when disposing of trees, shrubs and all other materials removed under this Section.

1.03 PAYMENT

All costs to obtain a suitable disposal area, hauling to the disposal area and dumping at the disposal area shall be borne by the CONTRACTOR.

PART 2: PRODUCTS

2.01 MATERIALS AND EQUIPMENT

Provide all materials and equipment required to complete all clearing and grubbing in accordance with this Section.

PART 3: EXECUTION

3.01 CLEARING AND GRUBBING

Clear and grub the minimum area to provide space for construction operations.

Trees, down timber, shrubs, bushes, vines, roots, stumps, undergrowth, rubbish, paving materials, debris and all other objectionable materials shall be removed within the limits of clearing and grubbing.

3.02 DISPOSAL

Burning of logs, stumps, roots, cuttings and other material on the site will not be permitted.

All materials obtained as a result of the clearing and grubbing operations shall be disposed of in accordance with the requirements of the applicable governing agencies.

Chipping of brush materials will be permitted, but the resultant chips must be disposed of at an approved location.

SECTION 2210

TRENCHING, BACKFILLING AND COMPACTING

PART 1: GENERAL

1.01 SUBMITTALS

All materials to be used for backfill, including common fill and bedding materials, shall be approved by ENGINEER prior to placing the materials in the pipe trench. All backfill and bedding materials whether obtained from the trench excavation or from an off-site source must be tested as directed by the ENGINEER.

Samples of the materials shall be submitted to an approved testing agency for analysis. The test results and report stating that the materials meet the requirements of these Specifications and the Specifications of Federal, State and local authorities (where applicable) shall be submitted to the ENGINEER for approval prior to placing the materials in the pipe trench.

1.02 PROFILES AND TOPOGRAPHY

Contours, topography and profiles of the ground shown on the Drawings are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation.

The CONTRACTOR shall accept the construction site with conditions the same as existed at the time of bidding.

PART 2: PRODUCTS

2.01 GENERAL

See Sketch No. 61-300-3 SK at the end of this section for the locations of trench backfill and bedding materials.

2.02 FILL MATERIAL

Material for backfilling shall be earth materials entirely free from vegetation, trash, lumber, frozen, soft or organic materials. No stones or rock larger than the sizes listed below will be permitted in the backfill:

Common Fill-Type A: No stones or rocks larger than 1-inch
Common Fill-Type B: No stones or rocks larger than 4-inches
Common fill material may be obtained from the trench excavation provided it has been

tested in accordance with the requirements of Section 2210.1.01 above and approved by the ENGINEER. If approved material obtained from the trench excavation is insufficient to complete the backfill, the CONTRACTOR shall obtain the necessary approved common fill materials from an off-site source.

2.03 BEDDING MATERIAL

Materials used for bedding and the haunch around the pipe shall be a course to fine sandy material with maximum stone size of 1-inch. The material shall conform to ASTM D2487 "Standard Method for Classification of Soils for Engineering Purposes" using the "Unified Soil Classification System", except where a higher standard is required elsewhere in the Contract Documents or by rules or regulations of Federal, State or local governmental bodies having jurisdiction over the site of the Work.

The material shall meet a Class II designation. Soil types GW, GP, SW and SP, non-cohesive, well graded and containing some fines are included in this Class. Where voids, finer grained soils or movement may allow migration of this material, a filter fabric as directed by the ENGINEER will be used in the trench bottom and sides before the select fill bedding is placed.

Bedding material may be obtained from the trench excavation provided it has been tested in accordance with the requirements of Section 2210.1.01 above and approved by the ENGINEER. If the approved material obtained from the trench excavation is insufficient to complete the bedding, the CONTRACTOR shall obtain the necessary tested and approved bedding materials from an off-site source.

2.04 FILTER FABRIC

Filter fabric shall be non-woven, synthetic fiber material with sieve design to not permit the select material in the pipe bedding and haunching to migrate into the surrounding soils. The material shall have a minimum thickness of 15 mils, tensile strength of 130 lbs., elongation at break of 62% and trapezoidal tear strength of 70 lbs.

PART 3: EXECUTION

3.01 CONSTRUCTION EQUIPMENT

Where mains are located in or adjacent to pavements, all backfilling and materials handling equipment shall have rubber tires. Crawler equipment shall be permitted when there is no danger of damaging pavement. It is the CONTRACTOR's responsibility, to repair, at his expense, any damages due to the use of any equipment to complete the work.

3.02 NOISE, DUST AND ODOR CONTROL

The CONTRACTOR'S construction activities shall be conducted so as to eliminate all unnecessary noise, dust and odors.

3.03 PROTECTION OF TREES

Special care shall be taken to avoid damage to trees and their root system. Machine excavation shall not be used when, in the opinion of the ENGINEER, it would endanger the tree. In general, where the line of trench falls within the limits of the limb spread, headers are required across the trench to protect the tree. The operation of all equipment, particularly when employing booms, the storage of materials, and the disposition of excavation shall be conducted in a manner which will not injure trees, trunks, branches or their roots unless such trees are designated for removal.

3.04 TRENCH SUPPORT

Unsupported open cut excavation for mains will not be permitted where trenching may cause danger to life, unnecessary damage to street pavement, trees, structures, poles, utilities, or other private or public property. During the progress of the work, whenever and wherever it is necessary, the CONTRACTOR shall, at his expense, support the sides of the excavation by adequate and suitable sheeting, shoring, bracing or other approved means. Such trench support materials and equipment shall be maintained and remain in place until backfilling operations have progressed to the point where the supports may be withdrawn without endangering property.

3.05 TRENCH EXCAVATION AND BOTTOM PREPARATION

A. General Excavation

General excavation shall consist of the satisfactory removal and disposal of all materials taken from within the limits of the Work contracted, meaning the material lying between the original ground line and the finished ground line as shown on the Drawings regardless of whether the original ground line is exposed to air or is covered by water. Excavation below existing ground line to enable any required construction or removals is included. It is distinctly understood that any reference to earth, rock, silt, debris or other materials on the Drawings or in the Specifications is solely for the OWNER's information and shall not be taken as an indication of classified excavation or the quantity of earth, rock, silt, debris or other material encountered.

All excavation shall be made to the lines and grades indicated on the Drawings or established in the field by the ENGINEER.

Excess excavated materials and excavated materials unsuitable for backfilling shall be properly disposed of by the CONTRACTOR clear of the site. The CONTRACTOR shall furnish to ENGINEER satisfactory evidence that an appropriate disposal site will be used.

B. Rock Excavation

The Contract includes a unit price for rock excavation, the excavation shall include the removal, hauling, stockpiling and/or proper disposal of all material required to be excavated which requires systematic blasting, barring and wedging for removal, boulders or loose rock of one cubic yard or more in volume, and material which cannot be loosened or broken down by ripping in a single pass with a hydraulic ripper or other devices and equipment designed to remove rock. No payment will be made for rock removal unless the CONTRACTOR gives prompt notice to the ENGINEER upon encountering such material and prior to its removal. The ENGINEER's determination as to whether the material meets the definition or rock and ENGINEER's measurement of the volume of rock removal for which the CONTRACTOR is entitled to payment will be final and conclusive.

C. Blasting Rock

The CONTRACTOR must notify ENGINEER, in advance, of his intention to use blasting. The ENGINEER will require evidence that the proposed blasting will comply fully with Laws or Regulations.

No blasting of rock shall be done where limited or prohibited by any Federal, State or local laws or regulations or in violation of any limitation or restriction contained in any right-of-way or wherever specifically prohibited in any Drawing or other Contract Document; nor will any such blasting be done within forty (40) feet of any pipe or structure without specific permission from the ENGINEER. Blasts shall be properly covered and the pipe or structure properly protected. Warning shall be given to all persons in the vicinity. Blasting shall be at the risk of the CONTRACTOR who shall be liable for all damages to persons or property. Necessary permits shall be secured and paid for by the CONTRACTOR. It is the CONTRACTOR'S responsibility to perform whatever pre-blast surveys and investigations may be required by the circumstances and/or by Federal, State or local laws.

D. Trench Width

Widths of trenches shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:

Earth

Minimum:	Outside diameter of the pipe barrel plus 8 inches, i.e., 4 inches each side.
Maximum:	Nominal pipe diameter plus 24 inches.

Rock

	Nominal Pipe Diameter	
	12 inches or less	16 inches or larger
Minimum:	Outside diameter of the pipe barrel plus 16 inches, i.e., 8 inches each side.	Outside diameter of the pipe barrel plus 24 inches, i.e., 12 inches each side.
Maximum:	Nominal pipe diameter plus 24 inches.	

E. Excessive Trench Width

If, for any reason the trench width exceeds the maximum trench width defined in Paragraph D, "Trench Width", the CONTRACTOR shall provide additional bedding and backfill material as specified in Sections 2210.2.02 and 2210.2.03 to fill the additional width of trench, at no cost to the OWNER.

F. Trench Depth

(1) General. All trenches shall provide for a minimum of 36 inches of cover over the top of the pipe barrel to the top of the finished grade of the roadway unless otherwise authorized by the ENGINEER.

(2) Earth. The trench shall be excavated to the depth required, so as to provide a uniform and continuous bearing and support for the pipe barrel on solid and undisturbed ground at every point between joints, except that it will be permissible to disturb the finished trench bottom over a maximum length of 18 inches near the middle of each length of pipe by the withdrawal of pipe slings or other lifting tackle. When required, bell holes shall be provided. The finished trench bottom shall be accurately prepared by means of hand tools.

(3) Rock. Where excavation is made in rock or boulders, the trench shall be excavated 8 inches below the pipe barrel for pipe 12 inches in diameter or less, and 12 inches below the pipe barrel for 16 inch diameter pipe and larger. All loose material shall be removed from the trench bottom. After preparation of the trench bottom, a pipe bed shall be prepared using bedding material as specified in Section 2210.1.03.

(4) Unsuitable Bottom. When unsuitable material is found below subgrade, as

determined by the ENGINEER, CONTRACTOR shall remove the material to a depth determined by the ENGINEER, and provide compacted bedding material as specified in Section 2210.2.03 to backfill the trench in the area where unsuitable material has been excavated.

3.06 TRENCH BACKFILLING

A. Backfill to Centerline of Pipe Barrel

All trench excavation shall be backfilled immediately after pipe is laid. Compacted bedding material as described in Section 2210.2.03 shall be used to backfill the trench from the bottom of the pipe barrel to the centerline of the pipe barrel. The material shall be placed in uniform 6 inch loose layers and each layer compacted so as to eliminate the possibility of settlement, pipe misalignment or damage of joints.

B. Backfill to 12 inches over Pipe Barrel

From the centerline of the pipe barrel to an elevation of 12 inches over the top of the pipe barrel, Common Fill-Type A, as described in Section 2210.2.02, shall be used as backfill material. Care shall be taken to avoid injuring or moving the pipe.

C. Remaining Trench Backfill

From 12 inches above the pipe barrel to the surface, Common Fill-Type B, as described in Section 2210.2.02, shall be used as backfill material. No material shall be used for backfilling that contains frozen earth, rock, large stones, boulders, or other unsuitable material. The CONTRACTOR may use mechanical equipment to place the backfill. This shall be done in such a manner that the material does not free fall, but shall be so placed that it will flow onto the previously placed material. The CONTRACTOR shall consolidate the backfill in such a manner as will insure the minimum possible settlement and the least interference with traffic. No compacting of the backfill with mechanical equipment, such as wheeled vehicles, will be permitted unless sufficient cover is provided over the pipe to prevent damage to the pipe.

D. Surface Conditions

The trench surface shall be regularly attended to during the course of the Contract. The CONTRACTOR shall take prompt corrective measures to correct any settlement or wash-out. The trench surface shall be maintained in a safe condition and shall not interfere with natural drainage.

E. Deficiency of Backfill

Any material required for backfilling the trenches or for filling depressions caused by settlement or wash-out shall be supplied and placed by the CONTRACTOR at his expense.

3.07 TRENCH MAINTENANCE

The CONTRACTOR shall be responsible for the condition of the trenches for a period of one (1) year from the date of the final acceptance of the CONTRACTOR'S work, or as required by state, county or local authorities, and any materials required for filling depressions caused by settlement or washout shall be supplied and placed by the CONTRACTOR at his expense.

SECTION 2220

CASING INSTALLATION

PART 1: GENERAL

1.01 GENERAL REQUIREMENTS

The installation of casing pipe shall conform to these Specifications and any Federal, State or local Highway requirements or any Railroad requirements which may be more restrictive.

1.02 SUBMITTALS

Details of proposed jacking or boring pits shall be submitted to the ENGINEER showing locations and dimensions and details of sheeting and shoring required.

1.03 RELATED WORK

Excavation, backfilling and compaction for jacking and receiving pits and for open cut installation shall conform to the requirements set forth in Section 2210.

Installation of casing in open cut excavation shall conform to the requirements of Section 15110.

PART 2: PRODUCTS

2.01 MATERIAL

Casing pipe shall be bare wall steel pipe with a minimum yield strength of 35,000 psi with a minimum wall thickness as listed below:

	Highway Crossings	**Railroad Crossings**
Casing Outside Diameter Inches	Casing Wall Thickness Inches	Casing Wall Thickness Inches
8.625	0.250	0.250
10.750	0.250	0.250
12.750	0.250	0.250
14	0.250	0.281
16	0.250	0.281
18	0.250	0.312
20	0.312	0.344

	Highway Crossings	Railroad Crossings
Casing Outside Diameter Inches	Casing Wall Thickness Inches	Casing Wall Thickness Inches
24	0.312	0.406
30	0.375	0.469
36	0.500	0.532
42	0.500	0.563
48	0.625	0.625
54	0.625	0.688
60	0.625	0.750
66	0.625	0.813
72	0.750	0.875

Smooth wall steel plates with a nominal diameter of over 54 inches shall not be permitted.

The inside diameter of the casing pipe shall be at least two (2) inches greater than the outside diameter of the carrier pipe joints or couplings for carrier pipe less than six (6) inches in diameter; and at least four (4) inches greater than the outside diameter of the carrier pipe joints or couplings for carrier pipe six (6) inches and over in diameter.

PART 3: EXECUTION

3.01 ALIGNMENT AND GRADE

Pipelines shall be located, where practicable, to cross roadways or tracks at approximately right angles thereto but preferably at not less than 45 degrees and shall not be placed within culverts nor under bridges where there is likelihood of restricting the area required for the purposes for which the bridges or culverts were built, or of endangering the foundations. The casing pipe shall be installed on an even grade for its entire length and shall slope to one end.

3.02 WELDING

Steel casing sections shall be connected by welding. Welding shall conform to AWWA C206.

3.03 PROTECTION AT ENDS OF CASING

Casings shall have both ends blocked up in such a way as to prevent the entrance of foreign material, but allowing leakage to pass in the event of a carrier break.

3.04 DEPTH OF INSTALLATION

Casing pipe depth shall be in accordance with highway or railroad requirements. The minimum cover shall be three (3) feet.

3.05 CASING INSULATORS

The carrier pipe and casing shall be separated by an insulator. The insulator shall be timber skids as shown on Sketch 61-300-4 or steel casing insulators models C18/C12 with compatible runners (based on pipe diameter) manufactured by Pipeline Seal and Insulator, Inc. (PSI) of Houston, Texas. The insulator spacing shall be installed to support the weight of the pipe and contents. As a minimum, an insulator shall be placed a maximum of one foot from each side of a joint.

3.06 INSTALLATION

Refer to Sketch No. 61-300-4 at the end of this section for a typical casing installation detail.

Casing pipes shall be installed by one of the following methods:

A. Jacking

This method shall be in accordance with the current American Railway Engineering Association Specifications, Chapter 1, Part 4, "Jacking Culvert Pipe Through Fills", except that steel pipe shall be used with welded joints. This operation shall be conducted without hand mining ahead of the pipe and without the use of any type of boring, auguring or drilling equipment.

Bracing and backstops shall be so designed and jacks of sufficient rating used so that the jacking can progress without stoppage (except for adding lengths of pipe).

B. Drilling

This method employs the use of an oil field type rock roller bit or a plate bit made up of individual roller cutter units which is solidly welded to the pipe casing being installed and which is turned as it is advanced. The pipe is turned for its entire length from the drilling machine to the head to give the bit the necessary cutting action against the ground being drilled. A high density slurry (oil field drilling mud) is injected through a supply line to the head which acts as a cutter lubricant. This slurry is injected at the rear of the cutter units to prevent any jetting action ahead of the pipe. The drilling machine runs on a set of steel rails and is advanced (thus advancing the pipe) by a set of hydraulic jacks. The method is the same whether earth or rock is

being drilled. Methods of a similar nature shall be submitted to the ENGINEER for approval.

C. Boring

This method consists of pushing the pipe into the fill with a boring auger rotating within the pipe to remove the soil. When augers or similar devices are used for pipe emplacement, the front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger and cutting head from leading the pipe so that there will be no unsupported excavation ahead of the pipe. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than one-half inch. The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft or poor material.

If an obstruction is encountered during installation to stop the forward action of the pipe, and it becomes evident that it is impossible to advance the pipe, operations will cease and the pipe shall be abandoned in place and filled completely with grout.

Bored or jacked installations shall have a bore hole essentially the same as the outside diameter of the pipe. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than 1 inch, grouting shall be employed to fill such voids.

SECTION 2230

STREAM CROSSING

PART 1: GENERAL

1.01 SCOPE

The CONTRACTOR shall furnish all labor, materials, and equipment necessary to install the stream crossings as shown on the plans and described herein.

It is the intent of this Section to install the stream crossings in such a manner as to protect the mains from erosion and to restore, as much as practicable, the stream banks and bottom to their original condition.

The main will be protected from erosion by concrete encasement around the pipe and by a sufficient depth of compacted backfill as shown on Sketch No. 61-300-5SK included at the end of this Section.

1.02 PROFILES AND TOPOGRAPHY

Contours, topography and profiles of the ground shown on the Drawings are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation.

The CONTRACTOR shall accept the site with conditions the same as existed at the time of bidding.

1.03 RELATED WOR

Excavation, backfilling and compaction procedures shall conform to Section 2210.

Concrete placement shall conform to Section 3300.

PART 2: PRODUCTS

2.01 MATERIALS

Excavation, fill and concrete materials shall be as specified in Related Work Sections.

PART 3: EXECUTION

3.01 STREAM BANK RESTORATION

The stream banks will be restored by backfilling the main trench with mechanically compacted backfill of earth approved by the ENGINEER or with rip rap approved by the ENGINEER to the original ground surface. The limits of compaction shall extend from the top of bank to top of bank on each side of the crossing as determined by the ENGINEER and as shown on the sketches.

Immediately following the completion of a stream crossing, straw bales or silt-fence shall be placed along the stream bank on each side within two (2) feet of the edge of water and of sufficient length to extend beyond the limits of the excavated trench width. Straw bales or silt-fence shall remain in place until after the stream banks have been fine graded, fertilized and seeded, and until such time as the seeding has sufficiently grown to protect the stream banks from erosion.

3.02 STREAM BOTTOM RESTORATION

The stream bottom trench will be backfilled with mechanically compacted earth or approved rip rap.

3.03 CONSTRUCTION PROCEDURE

The CONTRACTOR shall use either of the following methods to install the stream crossings.

A. Method 1. The CONTRACTOR shall construct an earth embankment from the stream bank to a point beyond the centerline of the stream. The slopes of the earth embankment shall be protected from erosion by covering them with 6 mil polyethylene sheeting. The sheeting shall extend from the stream bottom to an elevation two (2) feet above the water level. The main shall then be installed in a trench excavated through the embankment. The embankment and material and any excess trench excavation shall be removed to an off-site disposal area when the pipe is installed to a point beyond the centerline of the stream.

The same procedure shall be used to install the remainder of the stream crossing.

B. Method 2. The CONTRACTOR shall construct a cofferdam of sand bags or inflatable bags from the stream bank to a point beyond the centerline of the stream. The main shall then be installed in a trench within the cofferdam. Any excess trench excavation shall be removed to an off-site disposal area. The cofferdam shall then be removed when the pipe is installed to a point beyond the centerline of the stream.

The same procedure shall be used to install the remainder of the stream crossing.

At the sole discretion of the ENGINEER, alternate methods in lieu of those described in the above options may be permitted. The CONTRACTOR shall adequately describe any proposed alternate method and submit the same to the ENGINEER and all Federal, State and local authorities having jurisdiction of the stream for their review and approval.

SECTION 2540

EROSION AND SEDIMENTATION CONTROL

PART 1: GENERAL

1.01 SCOPE OF WORK

Work to be performed under this Section refers to temporary and permanent vegetation covers, mulching and baling at the construction site and all areas disturbed during construction, including borrow areas. In addition to the requirements of these Specifications, the CONTRACTOR will comply with all local Conservation District laws, rules and regulations and all other Federal, State and local requirements for erosion and sedimentation control.

1.02 STANDARDS

The CONTRACTOR shall comply with the highest erosion and sedimentation control standards, whether Conservation District, Federal, State or local. If the CONTRACTOR is in doubt as to the applicable standard, he shall notify the ENGINEER and comply with the ENGINEER'S directions.

PART 2: PRODUCTS

2.01 MATERIALS - GENERAL

All materials such as seeds, mulch and bales shall conform to the Specifications of the Conservation District and all other applicable Federal, State and local requirements.

PART 3: EXECUTION

3.01 GENERAL

Prior to construction, diversion ditches with catch basins and drains shall be constructed at the lowest area of the sites in question. All run-off water will be directed to these locations.

The settled water from the catch basins shall be drained to the natural local drains. The catch basins shall be cleaned regularly. The area shall be seeded with appropriate seed in the required amount per acre and mulched after final grading.

Permanent vegetation cover, mulching and baling shall be in accordance with the Conservation District specifications and all other applicable Federal, State and local requirements.

SECTION 2610

PAVING AND SURFACING

PART 1: GENERAL

1.01 DESCRIPTION

The CONTRACTOR shall provide all labor, tools, material and equipment to replace pavement, curbs, drives and walks that have been damaged or disturbed during the course of the work, all as specified herein, as directed by the ENGINEER, or as required by local, state or federal regulations. Placement will be at least equal to the type of pavement, curb, drive, or walk which existed before the work began and to the satisfaction of the ENGINEER.

During the entire period of construction of the project, all streets, curbs, drives and walks shall be kept in usable and safe condition for public use. Before final acceptance, and after trench settlement has been corrected to the satisfaction of the ENGINEER, pavement, curbs, drives and walks designated by the ENGINEER shall be replaced with the type of replacement specified herein.

The CONTRACTOR, where directed by the ENGINEER, shall furnish all labor, tools, material, and equipment necessary to spread and roll and/or tamp temporary bituminous pavement, complete, in place, and shall maintain the same all as specified or directed.

PART 2: PRODUCTS

2.01 MATERIALS

Materials of construction for paving, curbing, and surfacing shall be furnished in accordance with applicable Federal, State and local standards. If there are no applicable standards, the CONTRACTOR shall use materials which will produce a result at least equal to the type which existed before the work began and to the satisfaction of the ENGINEER.

PART 3: EXECUTION

3.01 INSTALLATION

Where necessary to disturb the existing pavement, the pavement will be saw or line cut, as required by local, State or Federal regulations, and the edges of the face of the old pavement or base shall be left vertical. Ragged edges shall be trimmed so as to provide a substantially straight line juncture between the old and new surfaces.

The pavement replacement shall be so placed as to conform in grade to the existing streets, drives or sidewalks.

The type of pavement replacement shall be as shown on the pavement replacement details in accordance with applicable Federal, State or local standards. If there are no such applicable standards, replacement will be made to the satisfaction of the ENGINEER.

Over trenches where temporary pavement is ordered, the CONTRACTOR shall roll and tamp in place a 2" thick minimum course of bituminous material. Over those trenches where temporary pavement has been placed to the surface of the adjacent pavement, such temporary pavement shall be removed prior to the placing of the permanent pavement and the cost shall be included in the contract price. The finished temporary surface shall be flush with the adjacent undisturbed surface and the CONTRACTOR shall maintain the temporary bituminous surface until the temporary surface is replaced.

Before the completion of each day's work, in traveled areas, the pipe trench shall be paved with 6" of stabilized base unless another method of pavement restoration is required by the authorized governing body. Final paving shall be placed over the stabilized base and overlapping each side of the trench a minimum of 6" and feathered to meet the existing pavement unless another method of pavement restoration is required by the authorized governing body. Final pavement shall not be placed within 20 days after the backfilling has been completed and shall be placed no longer than 45 days after the backfilling has been completed, unless otherwise ordered by the ENGINEER.

3.02 MAINTENANCE

Following the certification of completion by the ENGINEER, the CONTRACTOR shall maintain the surfaces of curbs and gutters, paved surfaces and sidewalks for a period of one year thereafter, or for such greater period as may be required by Federal, State or local authorities. All material and labor required for such maintenance shall be supplied by the CONTRACTOR, and the work shall be done in a manner satisfactory to the OWNER at no additional cost to the OWNER.

SECTION 2820

LAWN RESTORATION

PART 1: GENERAL

1.01 DESCRIPTION

The CONTRACTOR shall restore and replace shrubbery, fencing, sod or other disturbed surfaces or structures to conditions equal to that before the work began and to the satisfaction of the ENGINEER.

PART 2: PRODUCTS

2.01 TOPSOIL

Topsoil shall not contain more than 40 percent clay in that portion passing a No. 10 sieve and shall contain not less than 5 percent or more than 20 percent organic matter as determined by loss on ignition of samples oven-dried to constant weight at 212? Fahrenheit.

2.02 FERTILIZER

Fertilizer shall be lawn or turf grade 12-12-12.

2.03 SEED

A. Lawn Areas

All areas to be seeded which are lawn areas, whether residential, commercial or office areas, where lawns are, or have been regularly maintained, shall be seeded with the following mixture or a mixture as required by the Soil Conservation District or other governing authority. (Percentages are by weight.)

40 percent Kentucky Bluegrass (Poa pratensis)

40 percent Creeping Red Fescue (Festuca rubra)

20 percent Annual Ryegrass (Lolium multiflorum)

Where sod is required, the sod shall be green, freshly cut and of good quality with grass free from all noxious weeds. It shall contain all the dense root system of the grass and shall not be less than 1?" thick.

B. All other Areas

All other areas shall be seeded with the following mixture:

90 percent Perennial Ryegrass (Lolium perenne)

10 percent Alsike Clover (Trifolium hybridum)

2.04 MULCH

Mulch shall be straw reasonably free of weed seed and any foreign materials which may affect plant growth. Other materials may be used if approved by the ENGINEER.

2.05 ASPHALT EMULSION

Emulsion shall be non-toxic to plants and shall conform to AASHTO M140 or AASHTO M208.

PART 3: EXECUTION

3.01 PREPARATION OF SEED BED

A. Topsoil Areas

If suitable topsoil is available as part of the excavated material it shall be removed, stored, and used to backfill the top 4 inches of the excavation. All grass, weeds, roots, sticks, stones, and other debris are to be removed and the topsoil carefully brought to the finished grade by raking.

B. Non-Topsoil Areas

In lawn areas, as described in Part 2.03, Paragraph A of this Section, where there is a deficiency of suitable topsoil, the CONTRACTOR shall furnish 4 inches of topsoil to be used as a seed bed.

In areas not considered lawn areas, and where approved by the ENGINEER, the trench backfill may be used as a seed bed. After the backfill has been given a reasonable time to settle, it shall be graded off to the finished grade and harrowed to a depth of 3 inches. All grass, weeds, roots, sticks, stones and other debris are to be removed and the soil carefully brought to the finished grade by raking.

3.02 FERTILIZING

Fertilizer shall be uniformly applied to all areas to be seeded at the rate of 1 pound per 100 square feet in topsoil or 2 pounds per 100 square feet in non-topsoil. The fertilizer shall be thoroughly disked, harrowed or raked into the soil to a depth of not less than 2 inches. Immediately before sowing the seed, the CONTRACTOR shall rework the surface until it is a fine, pulverized, smooth seed bed, varying not more than 1 inch in 10 feet.

3.03 SEEDING

Immediately after the preparation and fertilization of the seed bed, the seed shall be thoroughly mixed and then evenly sown over the prepared areas at the rate of 3 pounds per 1,000 square feet. Seed shall be sown dry or hydraulically. After sowing, the area shall be raked, dragged, or otherwise treated to cover the seed to a depth of approximately 1/4".

Areas with slopes greater than 10% shall be sodded.

3.04 MULCHING

Within 48 hours after any given area is seeded, mulching material shall be evenly placed over all seeded areas at the rate of approximately 2 tons per acre, when seeding is performed between the dates of March 15 and October 15 of the same year, and at the approximate rate of 3 tons per acre when seeding is performed between the dates of October 15 and March 15 of the succeeding year.

3.05 EMULSION

Mulching materials shall be kept in place with asphalt emulsion applied at a minimum rate of 60 gallons per ton of mulch or by methods as are approved or may be otherwise required to prevent displacement of material. Mulching which is displaced shall be replaced at once but only after the seeding or other work which preceded the mulching and which work was damaged as a result of displacement of mulching material has been acceptably repaired.

3.06 MAINTENANCE

All seeded and sodded areas shall be carefully maintained, tended and watered by the CONTRACTOR as necessary to secure a good turf. Settled areas shall be filled, graded and reseeded or resodded. The CONTRACTOR shall be responsible for the condition of the seeded and sodded areas for a period of one year from the date of final completion.

SECTION 3300

CAST-IN-PLACE CONCRETE

PART 1: GENERAL

1.01 SCOPE OF WORK

Concrete for thrust blocking, manhole bases, pipe encasement, curbs, sidewalks and pavement shall be provided in accordance with this Section.

PART 2: PRODUCTS

2.01 MATERIALS

A. Portland Cement shall be Type I or Type III and conform to "Specification for Portland Cement" ASTM C-150.

B. Air-Entraining Agent for approved manufacture shall be added in accordance with manufacturer's directions to the normal Portland cement to entrain 4 1/2 percent air ± 1 percent with all other ingredients and strength as specified. Air-entraining admixtures shall conform to "Specifications for Air-Entraining Admixtures for Concrete" ASTM C-260.

C. Concrete Aggregates shall conform to "Specifications for Concrete Aggregates" ASTM C-33. Coarse aggregates shall be a maximum of 1 1/2 inches in size in footings and plain concrete. Pea gravel shall be used for sections 3 inches or less in thickness.

D. Water used in mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalies, organic materials or other deleterious substances. In effect, the water used shall be potable water.

E. Reinforcing Bars shall be billet steel grade (60,000 psi minimum yield) and conforming to the requirements of ASTM A-615, Grade 60. Reinforcing bars shall be new stock, free from rust, scale or other coating tending to destroy or reduce bond.

F. Welded Wire Mesh shall conform to "Specifications for Welded Steel Wire Fabric for Concrete Reinforcements" ASTM A-185.

G. Premolded Expansion Joint Material shall be provided where shown on the Drawings or directed by the WATER COMPANY. This non-extruding compressible joint material shall conform with the requirements of "Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction", ASTM D-1751.

2.02 CONCRETE MIXES

Ready-mixed concrete shall conform to "Specifications for Ready-Mixed Concrete", ASTM C-94.

All concrete mixes shall be capable of producing a dense durable concrete. The compressive strength of the concrete shall be able to attain the following minimum strengths within 28 days:

2,500 psi - sidewalks, curbs and pipe encasement

3,000 psi - thrust blocking, manhole bases and road pavement

Water/cement ratio for the concrete shall not exceed a maximum as shown in Table 4.4 of the ACI Standard 318 latest edition, Building Code Requirements For Reinforced Concrete, when strength data from field experience or trial mixtures are not available. A workable concrete with minimum slump of 3 inches and a maximum slump of 5 inches shall be produced not exceeding the water/ cement ratio.

PART 3: EXECUTION

3.01 FORMWORK

All forms shall be built mortartight and of sufficient rigidity to prevent distortion due to the pressure of the concrete and other loads incident to the construction operations. Forms shall be constructed and maintained so as to prevent warping and the opening of joints.

The forms shall be substantial and unyielding and shall be so designed that the finished concrete will conform to the proper dimensions and contours. The design of the forms shall take into account the effect of vibration of concrete as it is placed.

3.02 PLACING REINFORCING STEEL

All steel reinforcement shall be accurately placed in the positions shown on the plans and firmly held during the placing and setting of concrete. When placed in the work, it shall be free from dirt, detrimental rust, loose scale, paint, oil or other foreign material. Bars shall be tied at all intersections except where spacing is less than one foot in each direction when alternate intersections shall be tied.

Distances from the forms shall be maintained by means of stays, blocks, ties, hangers or other approved supports. Continuous high chairs will not be permitted.

All reinforcement shall be furnished in full lengths indicated on the plans. Splicing of bars, except where shown on the plans, will not be permitted without the approval of the

ENGINEER. Splices shall be staggered as far as possible. Unless otherwise shown on the plans, bars shall be lapped 36 diameters to make the splice.

Welded wire mesh shall be lapped at least 1 1/2 meshes plus end extension of wires but not less than twelve (12) inches in structural slabs. Welded wire mesh shall be lapped at least 1/2 mesh plus end extension of wires but not less than six (6) inches in slabs on the ground.

3.03 CONVEYING AND PLACING CONCRETE

Concrete shall be conveyed from mixer to the forms as rapidly as practical by approved methods which will prevent segregation and loss of ingredients.

All concrete shall be placed in the dry. Formwork shall be cleaned of dirt and construction debris, water drained and snow and ice removed. After the forms have been inspected, the concrete shall be deposited in approximately horizontal layers to avoid flowing along the forms. All concrete shall be deposited continuously or in layers of a thickness such that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the sections: a monolithic structure, the component parts of which are securely bonded together, shall be produced. During placing, the concrete shall be compacted by suitable means and shall be worked around the reinforcement and embedded fixtures and into corners and angles of forms, care being taken to avoid overworking which may result in segregation.

Concrete shall not be dropped into forms from a height greater than 5 feet. In depositing from a greater height, a spout shall be used, or the forms shall be provided with openings to limit the height of drop. When special methods of placing are used, the approval of the ENGINEER shall be obtained.

Concrete shall be directed through chutes to prevent it from striking reinforcement or sides of the form above the level of placement. Avoid segregation and coating of the surfaces with paste which may dry before concrete reaches its level.

If pumping of concrete is chosen by the CONTRACTOR as a method of placing concrete, the CONTRACTOR shall submit a concrete mix design to the ENGINEER for approval prior to placing any concrete by pumping.

3.04 THRUST BLOCKING

See the Specifications Special Conditions for the number and sizes of thrust blocking.

Blocking shall be constructed back against the vertical face of undisturbed earth or sheeting left in place. The concrete shall be prevented from enclosing more than half the circumference of the pipe and shall be kept away from joints or bolts in the piping.

Thrust blocking for hydrants shall be placed to allow the hydrant to drain.

3.05 PLACING CONCRETE IN COLD WEATHER

No concrete shall be placed when the atmospheric temperature is below 35°F. without written consent of the ENGINEER. When directed by the ENGINEER, the CONTRACTOR shall enclose the structure in such a way that the concrete and air within the enclosure can be kept above 60°F. for a period of seven (7) days after placing the concrete.

If high early strength cement is used, these periods may be reduced, as directed by the ENGINEER.

The CONTRACTOR shall supply such heating apparatus as stoves, salamanders or steam equipment and the necessary fuel. When dry heat is used, means of maintaining atmospheric moisture shall be provided. All aggregates and mixing water shall be heated to a temperature of at least 70° but not more than 60° at the time of placing in the forms. In case of extremely low temperatures, the ENGINEER may, at their discretion, raise the minimum limiting temperatures for water, aggregates and mixed concrete.

SECTION 3450

PRECAST CONCRETE MANHOLE

PART 1: GENERAL

1.01 SCOPE

The CONTRACTOR shall furnish all labor, materials, tools and equipment necessary and shall do all work required to install manholes as indicated on the Drawings and as herein specified.

1.02 SUBMITTALS

The CONTRACTOR shall submit shop drawings or manufacturer's literature to the ENGINEER for approval.

PART 2: PRODUCTS

2.01 MANHOLE SECTIONS

Manhole riser sections shall be designed, manufactured, tested, finished and marked in accordance with the Drawings and ASTM C478, "Precast Reinforced Concrete Manhole Sections".

2.02 BRICK

Brick used to bring manhole to grade shall comply with ASTM C62, Grade SW.

2.03 LADDER RUNGS

Aluminum ladder rungs shall be provided in accordance with OSHA regulations. Rungs shall have a minimum diameter of 1-inch and 10-inch clear tread width and be of the drop front design. Rungs shall be tar coated where embedded in concrete.

2.04 FRAME AND COVER

Manhole frame with vented lid shall be Neenah Foundry Company's R-1752 Series Heavy Duty.

PART 3: EXECUTION

3.01 HANDLING

All precast manhole components shall be lifted and moved by use of suitable lifting slings and plugs that will not damage the precast manhole lip.

All damage to precast sections shall be thoroughly repaired in the presence of the ENGINEER. Repair and patching of minor breaks shall be done by chipping and scarifying the defective area before application of grout. Sufficient time shall be allowed for curing before the precast sections are put together. Concrete cast-in-place bases shall be specially formed and keyed to accommodate the bottom precast section.

3.02 INSTALLATION

Manhole bases shall rest upon and be uniformly supported by a 6-inch mat of compacted crushed stone or gravel placed over a base of sound, level, undisturbed earth.

Before placing concrete base, the downstream and upstream pipes shall be set to proper grade so the pipe ends will be flush with the inside of the manhole.

Pipes entering precast sections of manholes shall be set securely in the precast opening and grouted at the correct line and grade. There shall be at least a one-half inch clearance between the outside of the pipe and the manhole opening to insure proper grouting. The pipe and base shall be thoroughly cleaned before the grout is applied.

The top of all precast manholes may be brought to proper grade for receiving manhole frames by using not more than three courses of brick.

The masonry walls shall be parged on the inside and outside with a one-half inch coat of Portland cement mortar.

SECTION 15000

PIPING - GENERAL PROVISIONS

PART 1: GENERAL

1.01 DRAWINGS

Dimensions shown on Contract Drawings are approximate only. CONTRACTOR shall verify all piping geometry in the field and shall be responsible for insuring proper alignment and fit of all piping consistent with the intent of the Contract Drawings. Field layout drawings shall be submitted as required for approval.

1.02 RELATED WORK

See Specification Section 1600.3.03-Responsibility for Material and Equipment.

PART 2: PRODUCTS

2.01 CONTRACTOR'S RESPONSIBILITY FOR MATERIAL

The CONTRACTOR shall carefully examine all material for defects. Material which is known, or thought, to be defective shall not be installed.

The ENGINEER reserves the right to inspect all material and to reject all defective material shipped to the job site or stored on the site. Failure of the ENGINEER to detect damaged material shall not relieve the CONTRACTOR from his total responsibility for the completed work if it leaks or breaks after installation. Lay all defective material aside for final inspection by the ENGINEER to determine if corrective repairs may be made, or if the material is to be rejected. The ENGINEER shall determine the extent of the repairs.

CONTRACTOR to classify defective pipe prior to ENGINEER's inspection as follows:

1. Damage to interior and/or exterior paint seal coats.
2. Damage to interior cement-mortar lining.
3. Insufficient cement-mortar lining thickness.
4. Poor quality interior paint seal coat.
5. Pipe out of round.
6. Damaged pipe barrel area to a point where pipe class thickness is reduced.
7. Denting or gouges in plain end of pipe.

The CONTRACTOR shall be responsible for all material, equipment, fixtures and devices furnished and such materials, equipment, fixtures and devices shall comply with the

requirements and standards of all Federal, State and local laws, ordinances, codes, rules and regulations governing safety and health.

The CONTRACTOR shall be solely responsible for the safe storage of all material furnished to or by him until it has been incorporated in the completed project and accepted by the ENGINEER.

Pipe, fittings, valves, hydrants and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe. Handling of this material is to be in accordance with AWWA C600-87.

Keep fittings and valves drained and stored before installation in a manner protecting them from damage due to freezing of trapped water in accordance with Section 01600.

PART 3: EXECUTION

3.01 INSTALLATION - GENERAL REQUIREMENTS

All pipe shall be laid and maintained to the required lines and depths. Fittings, valves and hydrants shall be at the required locations with joints centered, spigots home and all valve and hydrant stems plumb and otherwise in strict accordance with the Specifications.

All buried steel lugs, rods, brackets and flanged joint bolts and nuts shall be given one (1) coat of Koppers #50 coal tar coating prior to backfilling and polyethylene encased if the specifications require polyethylene encasement of pipe.

No deviation shall be made from the required alignment, depth or grade except with the written consent of the ENGINEER.

All pipe shall be laid to the depth specified. The depth shall be measured from the final surface grade to the top of the pipe barrel. The minimum pipe cover shall be as shown on the Drawings or as specified in the Specifications Special Conditions.

Do not lay pipe in a wet trench, on subgrade containing frost, and when trench conditions are unsuitable for such work. If all efforts fail to obtain a stable dry trench bottom and the ENGINEER determines that the trench bottom is unsuitable for trench foundation, he will order in writing the kind of stabilization to be constructed.

Thoroughly clean the pipes and fittings before they are installed and this material shall be kept clean until the acceptance of the completed work. Lay pipe with the bell ends facing in the direction of laying, unless otherwise shown on the Drawings, or directed by the ENGINEER. Exercise care to insure that each length abuts against the next in such manner that no shoulder or unevenness of any kind occurs in the pipe line.

No wedging or blocking is permitted in laying pipe unless by written order of ENGINEER.

Before joints are made, bed each section of pipe the full length of the barrel with recesses excavated so pipe invert forms continuous grade with invert of pipe previously laid. Do not bring succeeding pipe into position until the preceding length is embedded and securely in place.

Dig bell holes sufficiently large to permit proper joint making and to insure pipe is firmly bedded full length of its barrel.

Walking or working on completed pipeline, except as necessary in tamping and backfilling, is not permitted until trench is backfilled one-foot deep over top of pipes.

Take up and relay pipe that is out of alignment or grade, or pipe having disturbed joints after laying.

Take up and replace with new, such in-place pipe sections found to be defective. Replacement work at CONTRACTOR's expense.

Take necessary precautions to prevent the floating of the pipeline by the accumulation of water in the trench, or the collapse of the pipeline from any cause. Should floating or collapse occur, restoration will be at the CONTRACTOR's expense.

Bedding materials and concrete work for the pipe bedding and thrust restraint shall be as specified previously in Division 2 and 3 respectively.

Take every precaution to prevent foreign material from entering the pipe while it is being placed. During laying operations, do not place debris, tools, clothing, or other materials in the pipe.

Close all openings in the pipeline with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods.

Place enough backfill over the center sections of the pipe to prevent floating.

Carry out the cutting of pipe only with equipment specifically designed for that purpose such as an abrasive wheel, rotary wheel cutter, a guillotine pipe saw or a milling wheel saw. The use of chisels or hand saws will not be permitted. Cut ends and rough edges should be ground smooth and for push-on connections, the cut end should be beveled slightly.

In distributing material at the site of the Work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench.

If the pipe is to be strung out, it shall be done so in a straight line or in a line conforming

to the curvature of the street. Each length of pipe shall be adequately blocked to prevent movement. Stockpiled pipe shall be adequately blocked to prevent movement. No pipe, material, or any other object shall be placed on private property, obstruct walkways or driveways, or in any manner interfere with the normal flow of traffic.

In the case of prestressed concrete, gray and ductile iron pipe, special care shall be exercised, during handling temporary storage or construction to avoid damage to the bells, spigots or flanged ends. If damaged pipe cannot be repaired to the ENGINEER's satisfaction, it shall be replaced at the CONTRACTOR's expense.

The CONTRACTOR shall remove all existing pipe, fittings, valves, pipe supports and blocking and all other items necessary to provide space for making connections to existing pipe and installing all piping which is to be done under this Contract.

The CONTRACTOR shall be responsible for maintaining the minimum required distance between the water line and other utility lines in strict accordance with all Federal, State and local requirements and all right-of-way limitations.

If polyethylene encasement is required by the Drawing or Specification Special Conditions, see Section 15130 or 15131 as applicable, for material and installation requirements.

Maximum allowable deflection at the joints for push-on joint pipe shall be as follows providing manufacturer's recommendations are not more stringent:

Size of Pipe	Deflection Angle	Maximum Deflection (18-ft. Length)	(20-ft. Length)
Thru 12"	2 ½°	9 ½"	10 ½"
14"-36"	1 ½°	5 ½"	6"
42"-48"	1°	3 ¼"	4"

In case the curve is too sharp for the allowable deflection, short lengths of pipe may be used upon approval of the ENGINEER and at no additional cost to the OWNER.

When shown on the Drawings or required by the Specification Special Conditions the CONTRACTOR shall furnish air relief valve assemblies in accordance with Sketch 61-300-8 which is attached to this Section.

Particular care shall be exercised to that no high points are established where air can accumulate. In the event that unforeseen field conditions necessitate a change in the pipe profile and, in the opinion of the ENGINEER, the resulting change requires the installation of an air release valve and manhole, install the same as extra Work to the Contract. If the CONTRACTOR requests a change in the pipe profile solely for ease of construction, and the requested change requires the installation of an air release valve and manhole as determined by the ENGINEER,

then the cost of furnishing and installing the air release valve and manhole will be at the expense of the CONTRACTOR. See Sketch 61-300-8 and 61-300-8A included at the end of this Section for details of an air release valve assembly.

3.02 CONSTRUCTION METHODS TO AVOID CONTAMINATION

Heavy particulates generally contain bacteria and prevent even very high chlorine concentrations from contacting and killing such organisms. It is essential that the procedures of this section be observed to assure that a water main and its appurtenances are thoroughly clean for the final disinfection by chlorination.

Precautions shall be taken to protect the interiors of pipes, fittings, and valves against contamination. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material. All openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods. Rodent-proof plugs may be used where it is determined that watertight plugs are not practical and where thorough cleaning will be performed.

Delay in placement of delivered pipe invites contamination. The more closely the rate of delivery is correlated to the rate of pipe laying, the less likelihood of contamination.

Joints of all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.

Yarning or packing material shall consist of molded or tubular rubber rings, or rope of treated paper or other approved materials. Materials such as jute, asbestos or hemp shall not be used. Packing material shall be handled in a manner that avoids contamination.

No contaminated material or any material capable of supporting prolific growth of microorganisms shall be used for sealing joints. Sealing material or gaskets shall be handled in a manner that avoids contamination. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. It shall be delivered to the job in closed containers and shall be kept clean.

If dirt enters the pipe, and in the opinion of the ENGINEER the dirt will not be removed by the flushing operation, the interior of the pipe shall be cleaned by mechanical means and then shall be swabbed with a 1% hypochlorite disinfecting solution. Cleaning with the use of a pig, swab or "go-devil" should be undertaken only when the ENGINEER has specified such and has determined that such operation will not force mud or debris into pipe joint spaces.

It if it not possible to keep the pipe and fittings dry during installation, every effort shall be made to assure that any of the water that may enter the pipe joint spaces contains an available chlorine concentration of approximately 25 mg/L. This may be accomplished by adding calcium hypochlorite granules or tablets to each length of pipe before it is lowered into a wet trench, or by

treating the trench water with hypochlorite tablets.

If the main is flooded during construction, it shall be cleared of the flood water by draining and flushing with potable water until the main is clean. The section exposed to the flood water shall then be filled with a chlorinated potable water that, at the end of a 24 hour holding period, will have a free chlorine residual of not less than 25 mg/L. The chlorinated water may then be drained or flushed from the main. After construction is completed, the main shall be disinfected using the continuous feed or slug method.

3.03 VALVE INSTALLATION

Prior to installation, inspect valves for direction of opening, freedom of operation, tightness of pressure containing bolting, cleanliness of valve ports and especially seating surfaces, handling damage and cracks. Correct defective valves or hold for inspection by the ENGINEER.

Set and join to the pipe in the manner specified in Section 3.01. Provide valves 12-inch and larger with special support, such as crushed stone or concrete pads, so that the pipe will not be required to support the weight of the valve. Set truly vertical.

Provide all valves with a valve box. Set the top of the valve box neatly to the grade of the surface of the existing ground, unless directed otherwise by the ENGINEER. Do not transfer shock or stress to the valve, and center and plumb the box over the wrench nut of the valve. Do not use valves to bring misaligned pipe into alignment during installation. Support pipe in such manner as to prevent stress on the valve. See Sketch 61-300-6 at the end of this Section for a typical valve box installation detail.

When authorized by the OWNER provide valve marking posts at locations designated by the ENGINEER all in accordance with Sketch 61-300-14 included at the end of this section. Payment will be made per post in accordance with supplemental unit price schedule.

3.04 THRUST RESTRAINT

Provide all plugs, caps, tees, and bends (both horizontal and vertical) with concrete reaction backings and/or restrained joint pipe as detailed on the Drawings, or specified in the Specification Special Conditions.

Place concrete reaction backing between undisturbed solid ground and the fitting to be anchored. Concrete reaction backing to be installed in accordance with Specification Section 3300. The backing unless otherwise shown or directed, shall be located as to contain the resultant thrust force and so that the pipe and fitting joints will be accessible for repair.

Temporary thrust restraint at temporary caps or plugs shall be the responsibility of the CONTRACTOR. Submit details of temporary restraint to the ENGINEER for approval.

At connections with existing water mains where there is a limit on the time the water main may be removed from service, use metal harnesses of anchor clamps, tie rods and straps; mechanical joints utilizing set-screw retainer glands; or restrained push-on joints. Metal harnessing may not be used by the CONTRACTOR in lieu of concrete backing without the approval of the ENGINEER. Submit details of the proposed installation to the ENGINEER for approval. For pipe up to 12 inches in size, use a minimum of two 3/4-inch tie rods. For pipe 16-inch in size, four 3/4-inch tie rods are required and for 20-24 inches pipe, six 3/4-inch tie rods are required. For larger pipe sizes, consult the ENGINEER. Install retainer glands in accordance with the instructions of the particular manufacturer furnishing the glands.

Material for metal harnessing and tie-rods shall be ASTM A-36 or A-307 as a minimum requirement.

Protection of Metal Harnessing: Protect ties rods, clamps and other metal components against corrosion by hand application of a bituminous coating or by encasement of the entire assembly with 8-mil thick, loose polyethylene film in accordance with AWWA C105. Grease all tie rods prior to installing polyethylene.

3.05 TYPICAL INSTALLATION DETAILS

The below listed Sketch numbers are attached to this Specification Section and are referenced throughout the Specifications.

Sketch No.	Description	Issue Date
61-300-6	Typical Valve Box Installation	12/90
61-300-7	Typical Fire Hydrant Assembly	12/90
61-300-8	Typical Air Release Valve-Deep Bury	12/90
61-300-8A	Typical Air Blow-Off Detail-Shallow Bury	12/90
61-300-9	Typical Air Blow-Off Detail	12/90
61-300-10	Typical Service Line Detail	12/90
61-300-11	Optional Arrangement, For 1-1/2" and 2" Service Lines	12/90
61-300-13	Steel Pipe Bollard Detail	12/90
61-300-14	Valve Marking Post Detail	12/90

SECTION 15020

DISINFECTING PIPELINES

PART 1: GENERAL

1.01 SCOPE OF WORK

The CONTRACTOR shall flush and disinfect all pipelines installed under this Contract.

1.02 WORK BY OWNER

The OWNER will furnish water for testing, flushing and disinfecting pipelines. The OWNER will also perform bacteriological testing.

1.03 PROTECTION

Due to the toxicity of chlorine fumes, men performing work under this Section shall be equipped with all safety equipment and shall be attended by other personnel who are in the vicinity where work is to be performed.

The forward of AWWA Standards B300-87 and B301-87 contain information and additional reference material regarding the safe handling of hypochlorites and liquid chlorine. The CONTRACTOR shall familiarize himself with this information prior to performing any disinfection work.

1.04 RELATED WORK

Pipeline installation precautions to avoid contamination are described in Specification Section 15000.

PART 2: PRODUCTS

2.01 MATERIALS AND EQUIPMENT

CONTRACTOR shall furnish chlorine liquid and injection equipment and/or calcium hypochlorite (HTH) as needed to complete the disinfection of all pipelines.

Liquid chlorine contains 100% available chlorine and is packaged in steel containers usually of 100 lb, 150 lb, or 1 ton net chlorine weight. Liquid chlorine is to be furnished in accordance with AWWA B301-87.

Calcium hypochlorite is available in granular form or in approximately 5-g tablets, and

contains approximately 65% available chlorine by weight. The material should be stored in a cool, dry, and dark environment to minimize its deterioration.

Calcium hypochlorite is to be furnished in accordance with AWWA B300-87.

PART 3: EXECUTION

3.01 PREPARATION

With the exception of the tablet method, all pipelines shall be pressure and leak tested, flushed, and cleaned of debris and dirt prior to application of the disinfectant. The tablet method requires the pipeline to be kept completely clean and dry during construction.

3.02 APPLICATION OF DISINFECTANT

Methods to be used for disinfection are those detailed in ANSI/AWWA C-651-86 (water mains).

3.03 WATER MAINS

Three (3) methods of chlorination are described below. Information in the forward of AWWA Standard C651 will be helpful in determining the best method to be used.

A. Tablet Method

The tablet method consists of placing calcium hypochlorite granules and tablets in the water main as it is being installed and then filling the main with potable water when installation is completed.

NOTE: This method may be used only if the pipes and appurtenances are kept clean and dry during construction.

Placing of calcium hypochlorite granules. During construction, calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500 foot intervals. The quantity of granules shall be as shown in Table 1.

WARNING: This procedure must not be used on solvent welded plastic or on screwed joint steel pipe because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

Placing of calcium hypochlorite tablets. During construction, 5-g calcium hypochlorite tablets shall be placed in each section of pipe and also one such tablet shall be placed in each hydrant, hydrant branch and other appurtenances. The number of 5-g

tablets required for each pipe section shall be 0.0012d L rounded to the next higher integer, where D is the inside pipe diameter in inches and L is the length of the pipe section in feet. Table 2 shows the number of tablets required for commonly used sizes of pipe. They shall be attached by a food grade adhesive such as *Permatex Form-A Gasket No. 2 and *Permatex clear RTV Silicone adhesive or equal. There shall be no adhesive on the tablet except on the broad side attached to the surface of the pipe. Attach all the tablets inside and at the top of the main, with approximately equal numbers of tablets at each end of a given pipe length. If the tablets are attached before the pipe section is placed in the trench, their position shall be marked on the section so it can be readily determined that the pipe is installed with the tablets at the top.

Filling and contact. When installation has been completed, the main shall be filled with water at a rate such that water within the main will flow at a velocity no greater than 1 fps. Precautions shall be taken to assure that air pockets are eliminated. This water shall remain in the pipe for at least 24 hours. If the water temperature is less than 5?C (41?F), the water shall remain in the pipe for at least 48 hours. Valves shall be positioned so that the strong chlorine solution in the main being treated will not flow into water mains in active service.

TABLE 1

Ounces of Calcium Hypochlorite Granules to be placed at beginning of Main and at each 500-foot Intervals

Pipe Diameter	Calcium Hypochlorite Granules
4	0.5
6	1.0
8	2.0
12	4.0
16 and larger	8.0

TABLE 2

Number of 5-g Hypochlorite Tablets Required for Dose of 25 mg/L[a]

Pipe Diameter Inches	Length of Pipe Section, ft. 13 or less	18	20	30	40
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

* A product of the Permatex Co., Brooklyn, New York and Kansas City, Kansas.

[a] Based on 3.25g available chlorine per tablet, any portion of tablet rounded to next higher number.

B. Continuous Feed Method

The continuous feed method consists of placing calcium hypochlorite granules in the main during construction (optional), completely filling the main to remove all air pockets, flushing the completed main to remove particulates, and filling the main with potable water chlorinated so that after a 24-hour holding period in the main there will be a free chlorine residual of not less than 10 mg/L.

Placing calcium hypochlorite granules. The purpose of this procedure is to provide a strong chlorine concentration in the first flow of flushing water that flows down the main. This procedure is recommended particularly where the type of pipe is such that this first flow of water will flow into annular spaces at pipe joints.

Preliminary flushing. Prior to being chlorinated, the main shall be filled to eliminate air pockets and shall be flushed to remove particulates. The flushing velocity in the main shall be not less than 2.5 fps unless the ENGINEER determines that conditions do not permit the required flow to be discharged to waste. Table 3 shows the rates of flow required to produce a velocity of 2.5 fps in pipes of various sizes.

NOTE: Flushing is no substitute for preventive measures during construction. Certain contaminants such as caked deposits resist flushing at any feasible velocity.

TABLE 3

Required Flow and Openings to Flush Pipelines
(40 psi Residual Pressure in Water Main)

Pipe Diameter In.	Flow Required To Produce Velocity in Main (gpm)	Size of Tap on Main[b] In.	Hydrant Outlets	
			Number	Size
4	100	15/16	1	2 ½
6	220	1 3/8	1	2 ½
8	390	1 7/8	1	2 ½
10	610	2 5/16	1	2 ½
12	880	2 13/16	1	2 ½
16	1565	3 5/8	2	2 ½

[a] With a 40 psi pressure in the main with the hydrant flowing to atmosphere, a 2 1/2-inch hydrant outlet will discharge approximately 1000 gpm and a 4 1/2-inch hydrant nozzle will discharge approximately 2500 gpm.

[b] Size of tap on main, with no significant length of discharge piping.

In mains of 24-inches or larger diameter, an acceptable alternative to flushing is to broom-sweep the main, carefully removing all sweepings prior to chlorinating the main.

Chlorinating the Main.

(1) Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate into the newly laid water main. In the absence of a meter, the rate may be approximated by means such as placing a pitot gauge in the discharge or measuring the time to fill a container of known volume.

(2) At a point not more than 10 feet downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 25 mg/L free chlorine. To assure that this concentration is provided, measure the chlorine concentration at regular intervals in accordance with the procedures described in the current edition of the AWWA Standard Methods.

Table 4 gives the amount of chlorine required for each 100 feet of pipe of various diameters. Solutions of 1 percent chlorine may be prepared with calcium hypochlorite. The solution requires 1 lb. of calcium hypochlorite in 8 gallons of water.

TABLE 4

Chlorine Required to Produce 25mg/L
Concentration in 100 feet of Pipe by Diameter

Pipe Diameter in.	100 Percent Chlorine lb.	1 Percent Chlorine Solutions gal.
4	.013	.16
6	.030	.36
8	.054	.65
10	.085	1.02
12	.120	1.44
16	.217	2.60

(3) During the application of chlorine, valves shall be positioned so that the strong chlorine solution in the main being treated will not flow into water mains in active service. Chlorine application shall not cease until the entire main is filled with heavily chlorinated water. The chlorinated water shall be retained in the main for at least 24 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24-hour period, the treated water in all portions of the main shall have a residual of not less than 10 mg/L free chlorine.

(4) The preferred equipment for applying liquid chlorine is a solution feed vacuum-operated chlorinator to mix the chlorine gas in solution water, in combination with a booster pump for injecting the chlorine gas solution water into the main to be disinfected. It is recommended that direct feed chlorinators not be used. (A direct feed chlorinator is one which operates solely from the pressure in the chlorine cylinder.) Hypochlorite solution may be applied to the water main with a gasoline or electrically powered chemical feed pump designed for feeding chlorine solutions. Feed lines shall be of such material and strength as to withstand safely the corrosion caused by the concentrated chlorine solutions and the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the solution is applied to the main.

C. Slug Method

The slug method consists of placing calcium hypochlorite granules in the main during construction, completely filling the main to eliminate all air pockets, flushing the main to remove particulates, and slowly flowing through the main a slug of water dosed with chlorine to a concentration of 100 mg/L in order that all parts of the main and its appurtenances will be exposed to the highly chlorinated water for a period of not less than 3 hours.

The flushing is to be performed in accordance with the flushing procedure described in Section B. Continuous Feed Method.

Chlorinating the main. At a point not more than 10 feet downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 100 mg/L free chlorine. To assure that this concentration is provided, the chlorine concentration should be measured at regular intervals. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or "slug" of chlorinated water that will, as it moves through the main, expose all interior surfaces to a concentration of approximately 100 mg/L for at least 3 hours.

The free chlorine residual shall be measured in the slug as it moves through the main. If at any time it drops below 50 mg/L the flow shall be stopped, chlorination equipment shall be relocated at the head of the slug, and as flow is resumed, chlorine shall be applied to restore the free chlorine in the slug to not less than 100 mg/L.

As the chlorinated water flows past fittings and valves, related valves and hydrants shall be operated so as to disinfect appurtenances and pipe branches.

3.04 DISPOSAL OF HEAVILY CHLORINATED WATER

After the applicable retention period, heavily chlorinated water should not remain in contact with pipe for more than 48 hours. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system or is acceptable for domestic use. CONTRACTOR shall contact the local sewer department to arrange for disposal of the heavily chlorinated water to the sanitary sewer.

The chlorine residual of water being disposed shall be neutralized by treating with one of the chemicals listed in Table 5. If a sanitary sewer system is unavailable for disposal of the chlorinated water an alternative disposal site must be selected.

The proposed alternative disposal site to which the chlorinated water is to be discharged shall be inspected and approved by the ENGINEER. A reducing agent shall be applied to the chlorinated water to be wasted to completely neutralize the chlorine residual remaining in the water. (See Table 5 for neutralizing chemicals). Where necessary, federal, state and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

TABLE 5

Pounds of Chemicals Required to Neutralize Various Residual Chlorine Concentrations in 100,000 gallons of Water

Residual Chlorine Concentration mg/L	Sulfur Dioxide (SO_2)	Sodium Bisulfate ($NaHSO_3$)	Sodium Sulfite ($NaSO_3$)	Sodium Thiosulfate ($Na_2S_2O_3.5H_2O$)
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

3.05 BACTERIOLOGICAL TESTING

After final flushing and before the water main is placed in service, a sample or samples will be collected from the end of the line by the CONTRACTOR and be tested by the OWNER for bacteriological quality in accordance with Standard Methods of the Examination of Water and Wastewater. At least one sample will be collected from the new main and one from each branch. In the case of mains greater than 2500 feet, samples will be collected along the length of the line when possible as well as at its end.

Bacteriological tests must show complete absence of coliforms. If tests show presence of coliform CONTRACTOR will be required to perform additional flushing and disinfection of the pipeline until such time acceptable tests are obtained, all at no cost to the OWNER. The CONTRACTOR will not be charged for the additional testing performed by the OWNER.

SECTION 15025

CLEANING PIPELINES

PART 1: GENERAL

1.01 SCOPE OF WORK

When required by the Specification Special Conditions or when it is determined that normal flushing will not sufficiently remove dirt and debris introduced during construction the CONTRACTOR shall clean the required pipelines installed under these Contract Documents. The cleaning shall use foam pigs, swabs or "go-devils" as described herein.

1.02 GENERAL

After the installation of water mains normal flushing often proves inadequate to remove all the entrapped air, loose debris and other objects that may have been left in the main during installation. Therefore, after the installation of water mains it may be necessary to use polyurethane foam pigs and/or polyurethane hard foam swabs to remove all foreign matter from the pipeline (i.e. "pig" the pipeline).

Cleaning per the requirements of this section shall be performed prior to testing and disinfection of the main.

1.03 RELATED WORK

See Specification Section 15000.3.02-Construction Methods to Avoid Contamination.
See Specification Section 15020.3.01-Preparation (prior to disinfecting pipelines).

1.04 PROTECTION DURING FLUSHING AND CLEANING

The CONTRACTOR shall assure that an adequate amount of flushing water at sufficiently high pressures exists and that disposal of the water can be done safely. Do not flush a large main supplied by a single smaller one as the volume available is usually inadequate for flushing.

Prior to flushing, or cleaning, the CONTRACTOR shall notify OWNER, ENGINEER and the following:

a. Fire Department
b. Other utilities, such as gas, electric and telephone companies, who may have underground facilities in the area.
c. Customers who may be inconvenienced by reduced pressure or dirty water.

Isolate the section to be flushed from the system. Close valves slowly to prevent water

hammer.

Open the fire hydrant or blow-off valve slowly until the desired flow rate is obtained. When flushing from a dry barrel fire hydrant, use the gate valve upstream of the hydrant for throttling purposes. Open the hydrant valve fully to prevent water from escaping into the ground through the fire hydrant barrel drain.

Minimize worker injury risks by following adequate safety precautions. A safety program should include the education and training of workers in accident prevention, emergency response, and first aid techniques. Prepare specific safety rules for your equipment operators, excavation crews and main flushing and cleaning crews.

Many of the valves to be operated during flushing operations may be in or close to traffic in the street. When operating these valves warn or detour nearby traffic with the use of signs or flags. Place vehicles with warning lights to protect workers. One member should watch for traffic while the other operates the valve. Wear brightly colored safety vests at all times.

An energy dissipator will avoid damage to property and the flooding of streets. Attach an energy dissipator directly to a fire hydrant, blow-off assembly, fire hose or vehicle. An energy dissipator connected to a fire hose, while providing the ability to control the direction of flow, requires means of securing its position. Do not allow crew members to hold energy dissipators in place. Dissipators will move violently if not held securely. Use the flushing crew vehicle to secure the position of an energy dissipator.

The heavy flow of water may create traffic problems. If this is unavoidable, place traffic signs well ahead of the flushing site. Keep children away from the flow of flushing water.

The safety considerations just discussed also apply to main cleaning. If excavation is required during main cleaning operations, crews will most likely be working in the street as will crews operating valves during cleaning operations. Ensure that traffic is diverted safely around the immediate working areas by using traffic signs and a flag person. Wear brightly colored safety vests and hard hats near excavation areas at all times.

PART 2: PRODUCTS

2.01 MATERIALS AND EQUIPMENT

CONTRACTOR shall furnish the foam cleaning plugs, labor and equipment as needed to pig all pipelines, and shall furnish all materials required for the expulsion of air and other debris from pipelines.

As the cleaning described in this section pertains to new water mains, the use of pipe cleaning plugs which utilize Bristles, wire brushes, carbide abrasives, steel studs or any other Type abrasive is not permitted unless specifically approved by the ENGINEER.

The CONTRACTOR is to consult a manufacturer of pipe cleaning plugs, such as Knapp Polly Pig (Houston, Texas), to determine the type and size of cleaning plug best suited for the application. Two types of plugs shall be considered and are described as follows:

A. Swabs

Swabs used for cleaning mains shall be made of polyurethane foam. This foam has a density of 1 to 2 lb./cu. ft. Swabs shall be purchased from commercial manufacturers of swabs for pipes. Both soft and hard grade foam swabs are available. New mains are typically cleaned with hard foam swabs.

B. Pigs

The other type of cleaning plug available is called a pig. Pigs, if used, shall be commercially manufactured for the specific purpose of cleaning pipes. They shall be made of polyurethane foam weighing 2 to 15 lb./cu.ft. Pigs are bullet shaped and come in various grades of flexibility and roughness.

C. Sizing of Plugs

Use swabs cut into cubes and cylinders slightly larger than the size of the pipe to be cleaned. Cubes one inch larger in dimension than the nominal diameter of the pipe being cleaned have worked well for cleaning pipes up to 12-inches in diameter.

For mains greater than 12-inches in diameter, the swab diameter must be considered individually for each operation. For new mains, swabs 3-inches larger than the pipe diameter have worked well. Swabs for the larger mains are usually 1-1/2 times the diameter in length.

Use pigs typically 1/4 -inch to 1/2-inch larger in diameter than the pipe to be cleaned.

Consult suppliers for the proper size of plug to use on the specific job.

PART 3: EXECUTION

3.01 PLUG INSTALLATION AND REMOVAL

In general, the CONTRACTOR shall furnish all equipment, material, and labor to satisfactorily expose cleaning wyes, or other entry or exit points. Remove cleaning wye covers, etc., as required by the ENGINEER and to insert the plugs into the mains.

If approved by the ENGINEER, stripped fire hydrants, air valves and blow-offs may serve as

entry and exit points for smaller sized mains. The ENGINEER will examine these appurtenances and the connecting laterals to ensure that adequate openings exist through which a plug may be launched.

If these appurtenances are used, a special launcher to ease the insertion and launching of the plug is required. If available a pressurized water source such as a fire hydrant can be used to launch the plug. If water from the system is not available nearby, use a water truck with pump.

If hydrants are used as entry and exit points, the CONTRACTOR shall, under ENGINEER supervision, remove the internal mechanisms and plug the drains. Insert the plug and replace the cap with a special flange with a 2-1/2-inch fitting. Connect the 2-1/2-inch fitting with a pressure gauge and valve to a pressurized water source. After the last valve isolating the section to be cleaned is closed, open the hydrant supply valve. Propel the swab or pig into the main by opening the exit valve.

In mains greater than 8-inches, Wyes shall be used at the entry and exit points. Fabricate the wye section one size larger than the main to ease the insertion and extraction of the plug. The use of wyes, as with the previously mentioned appurtenances, requires an outside source of pressurized water for launching. Cap the wye with a flange with a 2 to 6 inch fitting for connecting with the pressurized water source.

Many pigs, since they are less flexible than swabs, are harder to insert into a pipe. Other methods acceptable to insert pigs include:

1. winching with a double sling,
2. winching with a rope attached to the pig,
3. compression with a banding machine prior to insertion, and
4. the use of a specially designed tapered steel pipe which is removed after use.

During swab or pig installation, leave as much water as possible in the main to be cleaned. The water suspends the material being removed from the pipe and minimizes the chance of the material forming a solid plug. Water in the pipe also keeps the swab or pig from traveling through the pipe at excessive rates. If swabs or pigs travel too fast they will remove less material. The swab or pig will also wear more rapidly in such a case.

At the exit point or blow-off, install a wye long enough to house the swab or pig. Attach temporary piping to the end cap to allow the drainage of the water.

Where expulsion of the cleaning plugs is required through a dead end main, the CONTRACTOR shall prevent backflow of purged water into the main after passage of the cleaning plug. This can be accomplished by installing mechanical joint bends and pipe joints to provide a riser out of the trench. Additional excavation of the trench may serve the same purpose and is acceptable.

3.02 PRE-CLEANING PROCEDURES

Preplan and prepare for the ENGINEER's review, a written cleaning plan.

Suggested procedures prior to cleaning include the following:

1. Identify mains to be cleaned on a map. Mark the location of the entry, water supply and exit points, any blow-offs to be used, main gates to be closed, and the path of the swab or pig.
2. Under the ENGINEER's supervision, inspect and operate all valves and hydrants to be used in the cleaning operation. Ensure that all operate correctly and that a tight shutdown is possible.
3. Check location and type of hydrants, launch and exit location, and blow-offs to be used. Make blow-off tap connections if necessary.
4. The OWNER will notify customers served by the main to be cleaned that their water will be off for a specified period on the day of the cleaning.
5. The OWNER will identify customers who may require temporary services during the main cleaning operation. The CONTRACTOR shall provide the temporary connections.
6. Determine the number and size of plugs to be used.

3.03 CLEANING PROCEDURE

After approval by the ENGINEER of the CONTRACTOR's cleaning plan the following cleaning procedures as applicable shall be performed by the CONTRACTOR:

A. Swab Cleaning Procedures

1. Open the water supply upstream of the swab. Throttle the flow in the main at the discharge (plug exit) point so that the swab passes through the main at a speed of 2 to 4 fps. At this velocity, swabs will effectively clean pipes for distances of up to 4000 feet before disintegrating to a size smaller than the main. Use pitot gauges at the exist hydrant or blow-off to estimate the flow rate in the main.
2. Note the time of entry of the swab into the main and estimate its time or arrival at the exit point. If the swab does not reach the exit point in the estimated time plus ten minutes, then a blockage has probably occurred. Reverse the flow in the main and note the time required for the swab to reach the original entry point. From the return travel time, approximate the location of the blockage. The ENGINEER may require a swab to which a transmitter has been attached to be used to accurately locate a blockage.
3. Once the first swab has been recovered, typically, make two to three runs of four to five swabs each depending on how quickly flushing water clears.

Continue operations until the water behind the swabs emerging at the exit clears up within one minute. Account for all swabs inserted into the main.

4. After the last swab has been recovered, flush the main to remove swab particles. This may require up to an hour or flushing.

B. Pig Cleaning Procedures

1. Remove all air valves along the line. This will provide pressure relief should the pig suddenly stop and assure that no air is trapped in the main.
2. If the pig is inserted directly into the main, set it in motion by opening the upstream gate valve and a downstream fire hydrant or blow-off valve (usually the valve on the capped end at the exit point). If the pig is launched from a wye, fire hydrant, or other appurtenance, use an external pressurized water source to inject the pig into the main as described in Section 3.01.
3. Once the pig is in motion in the main, control it's speed by throttling the discharge at a downstream fire hydrant or blow-off. Operate pigs typically at 1 fps. This slow speed will help prevent pressure surges when the pig passes through undersized valves, enters smaller pipes, or turns through tees or crosses. Speeds of up to 2 fps. can be used on straight runs with no restrictions or sharp turns.
4. Make sufficient passes of the pig to obtain thorough cleaning. Two pigs may be used in tandem to save time and water. Sufficient cleaning is established when the water discharging after the pig becomes clear within one minute.

3.04 POST CLEANING PROCEDURE

After successful completion of cleaning the main shall be tested, flushed and disinfected in accordance with applicable sections of these Specifications.

SECTION 15030

PRESSURE AND LEAKAGE TESTS

PART 1: GENERAL

1.01 SCOPE OF WORK

The CONTRACTOR shall test all piping, valves and appurtenances installed under these Contract Documents. Testing shall be performed concurrent with installation. Unless otherwise approved by the ENGINEER no more than 1000 feet of pipe shall be installed without being tested.

1.02 SUBMITTALS

The CONTRACTOR shall prepare and submit to the ENGINEER schedules and procedures for testing of all parts of the water main installed in accordance with these Contract Documents. The schedule shall be submitted seven days prior to any testing.

PART 2: PRODUCTS

2.01 EQUIPMENT

The pump, pipe connections, and all necessary apparatus for the pressure and leakage tests, except gauges and metering devices, shall be furnished by the CONTRACTOR. The OWNER will furnish gauges and metering devices for the tests, but the CONTRACTOR shall make all excavations and backfills, and furnish all necessary assistance for conducting the tests.

PART 3: EXECUTION

3.01 GENERAL

After the pipe has been laid, thrust backing cured (min. 5 days) and the trench completely or partially backfilled, the entire pipeline, or any section thereof, shall be subjected to hydrostatic pressure and leak tests in accordance with ANSI/AWWA C600-87, Section 4 - Hydrostatic Testing.

The CONTRACTOR may, at his option, completely backfill the trench or partially backfill the trench over the center portion of each pipe section to be tested. The ENGINEER may however direct the CONTRACTOR to completely backfill the trench if local traffic or safety conditions require such action.

The pipeline will be subjected to a hydrostatic pressure of no less than 100 psi above the normal operating pressure for operating pressures that do not exceed 200 psi. For operating pressures

in excess of 200 psi, the pipeline will be subjected to a hydrostatic pressure that is 1.5 times the normal operating pressure, but no more than the design rating of the pipe.

After installation of a tapping sleeve and valve but prior to making the tap into the main the tapping sleeve and valve assembly shall be tested. The required test pressure shall be determined in the same manor as for pipe but no pressure drop will be allowed during the test. Test pressure must be maintained for 15 minutes for acceptance.

3.02 FILLING AND TESTING

Each segregated section of pipeline will be slowly filled with water insuring that all air is expelled. Extreme care must be taken to insure all air is expelled from the pipeline during the filling of pipe with water. The line shall stand full of water for twenty-four hours prior to testing to allow all air to escape. If necessary, tap the main at points of highest elevation so that air can be expelled as the pipe is filled with water. After successful completion of filling and air expulsion, but prior to testing, the corporation stops shall be removed and the taps tightly plugged.

The specified test pressure, measured at the point of lowest elevation, will then be applied by means of a pump connected to the pipe in a manner satisfactory to the ENGINEER. If the elevation of the high point of the pipeline being tested is such that the pressure during testing will be below 85% of the required test pressure the ENGINEER will require a separate test to be performed on this section of pipeline. In lieu of a separate test the test pressure measured at the lowest elevation may be increased, within the pressure rating of the pipeline material, such that resulting pressure at the highest point exceeds 85% of the required test pressure. The test pressure will not vary by more than $\pm$ 5 psi and the test will be of at least two-hour duration.

A leakage test will be conducted concurrently with the pressure test. Leakage is defined as the quantity of the water measured as make-up water (volumetrically in a container or meter) that must be supplied into the newly laid pipeline to maintain pressure within 5 psi of the test pressure after the air in the pipeline has been expelled and the pipe filled with water.

No pipeline installation will be accepted by the ENGINEER if the leakage is greater than that shown in the following table:

Allowable Leakage per 1000 ft. of Pipeline*---gph

	Nominal Pipe Diameter---in.										
Avg. Test Pressure psi	4	6	8	12	16	20	24	30	36	42	48
100	0.30	0.45	0.60	0.90	1.20	1.50	1.80	2.25	2.70	3.15	3.60
125	0.34	0.50	0.67	1.01	1.34	1.68	2.01	2.52	3.02	3.53	4.03
150	0.37	0.55	0.74	1.10	1.47	1.84	2.21	2.76	3.31	3.86	4.41
175	0.40	0.59	0.80	1.19	1.59	1.98	2.38	2.98	3.58	4.17	4.77
200	0.43	0.64	0.85	1.28	1.70	2.12	2.55	3.19	3.82	4.46	5.09
225	0.45	0.68	0.90	1.35	1.80	2.25	2.70	3.38	4.05	4.73	5.41
250	0.47	0.71	0.95	1.42	1.90	2.37	2.85	3.56	4.27	4.99	5.70
275	0.50	0.75	1.00	1.49	1.99	2.49	2.99	3.73	4.48	5.23	5.98
300	0.52	0.78	1.04	1.56	2.08	2.60	3.12	3.90	4.68	5.46	6.24
350	0.56	0.84	1.12	1.69	2.25	2.81	3.37	4.21	5.06	5.90	6.74
400	0.60	0.90	1.20	1.80	2.40	3.00	3.60	4.50	5.41	6.31	7.21
450	0.64	0.95	1.27	1.91	2.55	3.18	3.82	4.78	5.73	6.69	7.64

*If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

The table has been generated from the formula: $L=\frac{SD(P)1/2}{133,200}$

where L is the allowable leakage in gallons per hour, S equals the length of pipe in feet, D is the nominal pipe diameter in inches and P is the test pressure in PSIG.

Should any test disclose damaged or defective materials or leakage greater than that permitted, the CONTRACTOR shall at his own expense, locate and repair and/or replace defective materials. The tests shall be repeated until the leakage is within the permitted allowance and is satisfactory to the ENGINEER.

SECTION 15105

DUCTILE IRON PIPE AND FITTINGS
(OWNER Furnished)

PART 1: GENERAL

1.01 COORDINATION OF WORK

Connection to existing pipelines may require shutdown of OWNER facilities. Construction work and connections shall be closely coordinated with the OWNER through the ENGINEER. The ENGINEER, in consult with the OWNER, may select the time, including Saturdays, Sundays, or holidays, which, in the opinion of the ENGINEER, will cause the least inconvenience to the ENGINEER and/or its customers, for connection to existing pipelines, and the CONTRACTOR will perform such connections at such times as may be directed by the OWNER at the Contract prices and no claim for premium time or additional costs will be made by the CONTRACTOR.

1.02 RELATED WORK

Piping - General Provisions - Section 15000

PART 2: PRODUCTS

2.01 PIPE MATERIAL

OWNER will furnish and CONTRACTOR shall install all ductile iron pipe and fittings. Materials to be furnished by OWNER are included in Section SSC-1000.1.03 of the Specifications Special Conditions.

Research has documented that certain pipe materials (such as polyvinyl chloride, polyethylene, and polybutylene) and certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this section have been selected based on the non-expectation of encountering petroleum products or organic solvents. If during the course of pipeline installation the CONTRACTOR identifies, or suspects, the presence of petroleum products or any unknown chemical substance the ENGINEER is to be notified immediately. Installation of any further piping in the area of suspected contamination shall be stopped until direction is provided by the ENGINEER.

PART 3: EXECUTION

3.01 INSTALLATION

The provisions specified in Section 15000 shall be strictly followed in addition to the following requirements:

A. Push-On Joints

The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the gasket and the spigot end. With the spigot end centered in the bell, the spigot end is pushed home.

B. Mechanical Joints

All components shall be cleaned and lubricated with soapy water prior to assembly. Slip the follower gland and gasket over the pipe plain end making sure the small side of the gasket and lip of the gland face the bell socket. Insert the plain end into socket. Push gasket into position with fingers, gasket should be evenly seated. Slide gland into position, insert bolts and tighten nuts by hand. Bolts are then tightened alternately (across from one another) to the following normal torques:

Range of Torque

Bolt Size	In Foot-Pounds
5/8"	40 – 60
¾"	60 – 90
1"	70 – 100
1?"	90 – 120

C. Restrained Joints

(1) Ball and Socket

Assemble and install the ball and socket joint according to the manufacturer's recommendations. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener.

(2) Push-On

Assemble and install the push-on joint according to the manufacturer's recommendations. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener.

During "pushing home" of any style piping timber shall be placed between the jacking device (backhoe bucket, pipe jack, etc.) and the pipe being driven home.

SECTION 15106

DUCTILE IRON PIPE AND FITTINGS
(CONTRACTOR Furnished)

PART 1: GENERAL

1.01 COORDINATION OF WORK

Connection to existing pipelines may require shutdown of OWNER facilities. Construction work and connections shall be closely coordinated with the OWNER through the ENGINEER. The ENGINEER, in consult with the OWNER, may select the time, including Saturdays, Sundays, or holidays, which, in the opinion of the ENGINEER, will cause the least inconvenience to the OWNER and/or its customers, for connection to existing pipelines, and the CONTRACTOR will perform such connections at such times as may be directed by the ENGINEER at the Contract prices and no claim for premium time or additional costs will be made by the CONTRACTOR.

1.02 RELATED WORK

Piping - General Provisions - Section 15000

1.03 SUBMITTALS

Shop drawings and manufacturer's literature for all CONTRACTOR supplied materials shall be promptly submitted to the ENGINEER for approval in accordance with Section 1300.

PART 2: PRODUCTS

Research has documented that certain pipe materials (such as polyvinyl chloride, polyethylene, and polybutylene) and certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this section have been selected based on the non-expectation of encountering petroleum products or organic solvents. If during the course of pipeline installation the CONTRACTOR identifies, or suspects, the presence of petroleum products or any unknown chemical substance the ENGINEER is to be notified immediately. Installation of any further piping in the area of suspected contamination shall be stopped until direction is provided by the ENGINEER.

2.01 PIPE MATERIAL

A. General

Ductile iron pipe shall conform to the latest specifications as adopted by the American National Standards Institute, Inc., (ANSI) and the American Water Works

Association (AWWA). Specifically, ductile iron pipe shall conform to ANSI/AWWA C151/A21.51.

The pipe shall be coated outside with a bituminous coating in accordance with ANSI/AWWA C151/A21.51. The pipe interior shall be cement mortar lined and seal coated in compliance with the latest revision of ANSI/AWWA C104/A21.4. The cement mortar lining shall be double thickness.

B. Pipe Class

The class of pipe to be furnished shall be in accordance with Table 1 and the below listed notes.

TABLE 1

RATED WORKING PRESSURE AND MAXIMUM DEPTH OF COVER FOR DUCTILE IRON PIPE MANUFACTURED IN ACCORDANCE WITH ANSI/AWWA C151/A21.51

Pipe Size In.	Thick.. Class	Nominal Thick In.	Rated Water Working Pressure, Psi+	Laying Condition Type 1	Type 2	Type 3	Type 4	Type 5
				Maximum Depth of Cover, Feet				
6	50	0.25	350	32	38	44	56	75
8	50	0.27	350	25	30	36	46	64
12	50	0.31	350	17	22	27	36	64
16	50	0.34	350	13	17	21	30	47
20	50	0.36	300	10	14	18	27	38
24	50	0.38	250	8	12	17	23	31

NOTES:

1. Larger pipe sizes up to 54-inch can be installed as Class 50 with cover up to nine (9) feet and an operating pressure of 200 psi. When trench depths exceed fifteen (15) feet for pipe sizes of 16-inch or larger, Class 51 pipe should be used.

2. The thickness of Class 50 ductile iron pipe is adequate to support 3/4 and 1-inch corporations. For the installation of equipment requiring a larger tap (i.e., air relief valves or larger corporations) a full saddle is required due to limited wall thickness.

3. There are special conditions where a larger wall thickness is required. At treatment plant or booster station sites where frequent excavation can be anticipated in the vicinity of pipe, Class 54 pipe shall be installed to minimize external damage to the pipe from trenching equipment. Class 56 pipe is

required where the pipeline is laid on a river channel bottom to prevent external damage to the pipe and minimize the potential for costly pipe replacement.

C. Testing

Each length of pipe shall be subjected to a hydrostatic proof test as required by ANSI/AWWA C151/A21.51.

D. Joints

1. Mechanical and Push-On

Mechanical and push-on joints including accessories shall conform to ANSI/AWWA C111/A21.11.

2. Flanged

Flanged joints shall conform to ANSI/AWWA C110/A21.10 or ANSI B16.1 for fittings and ANSI/AWWA C115/A21.15 for pipe. Flanged joints shall not be used in underground installations except within structures.

All flanged joints shall be furnished with 1/8-inch thick, red rubber or styrene butadiene rubber gaskets. The bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in American Standard for Wrench Head Bolts and Nuts and Wrench Openings (ANSI B18.2). For bolts of 1-3/4-inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A107.

2.02 FITTINGS

A. Ductile Iron Fittings

Standard fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10. Compact ductile iron fittings shall meet the requirements of ANSI/AWWA C153/A21.53.

1. Working Pressures

Fittings shall be suitable for the following working pressures unless otherwise noted:

Size	Pressure Pounds per Square Inch Compact Ductile Iron	Standard Ductile Iron
3" – 24"	350	350
30" – 48"	350	250

2. Coating and Lining

The fittings shall be coated with a bituminous coating in accordance with ANSI/AWWA C110/A21.10 and lined inside with cement mortar and seal coated in accordance with ANSI/AWWA C104/A21.4. The cement mortar lining shall be double thickness.

B. Joints

1. Mechanical and Push-On

Mechanical and push-on joints including accessories shall conform to ANSI/AWWA C111/A21.11.

2. Flanged

Flanged joints shall meet the requirements of ANSI/AWWA C115/A21.15 or ANSI B16.1. Flanged joints shall not be used in underground installations except within structures.

All flanged joints shall be furnished with a minimum 1/8-inch, thick red rubber or styrene butadiene rubber gasket. The bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. For bolts of 1-3/4-inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A107.

3. Restrained

When restrained joints are required, for pipe and fittings, they shall be of the boltless push-on type which provides joint restraint independent of the joint seal. Restrained system shall be suitable for the following working pressures:

Size	Pressure Pounds per Square Inch
4" – 12"	250
14" – 24"	350
30" – 50"	250

PART 3: EXECUTION

3.01 INSTALLATION

The provisions specified in Section 15000 shall be strictly followed in addition to the following requirements:

A. Push-On Joints

The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the gasket and the spigot end. With the spigot end centered in the bell, the spigot end is pushed home.

B. Mechanical Joints

All components shall be cleaned and lubricated with soapy water prior to assembly. Slip the follower gland and gasket over the pipe plain end making sure the small side of the gasket and lip of the gland face the bell socket. Insert the plain end into socket. Push gasket into position with fingers, gasket should be evenly seated. Slide gland into position, insert bolts and tighten must by hand. Bolts are then tightened alternately (across from one another) to the following normal torques:

Bolt Size	Range of Torque In Foot-Pounds
5/8"	40 – 60
¾"	60 – 90
1"	70 – 100
1 ¼"	90 - 120

C. Restrained Joints

1. Ball and Socket

Assemble and install the ball and socket joint according to the manufacturer's recommendations. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener.

2. Push-On

Assemble and install the push-on joint according to the manufacturer's recommendations. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener.

During "pushing home" of any style piping timber shall be placed between the jacking device (backhoe bucket, pipe jack, etc.) and the pipe being driven home.

SECTION 15110

STEEL PIPE AND FITTINGS
(CONTRACTOR Furnished)

PART 1: GENERAL

1.01 COORDINATION OF WORK

Connection to existing pipelines may require shutdown of OWNER facilities. Construction work and connections shall be closely coordinated with the OWNER through the ENGINEER. The ENGINEER, in consult with the OWNER, may select the time, including Saturdays, Sundays or holidays, which, in the opinion of the ENGINEER, will cause the least inconvenience to the OWNER and/or its customers, for connection to existing pipelines, and the CONTRACTOR will perform such connection at such times as may be directed by the ENGINEER at the Contract prices and no claim for premium time or additional costs will be made by the CONTRACTOR.

1.02 RELATED WORK

Piping - General Provisions - Section 15000

1.03 SUBMITTALS

Shop drawings and manufacturer's literature for all CONTRACTOR supplied materials shall be promptly submitted to the ENGINEER for approval in accordance with Section 1300.

PART 2: PRODUCTS

2.01 PIPE MATERIAL

All steel pipe shall be either fabricated pipe or mill pipe manufactured in accordance with AWWA C200 and the following:

Pipe up to and including, 24-inch diameter shall be mill type pipe conforming to ASTM Specification A53, Grade B, seamless or fabricated pipe using ASTM A283, Grade C steel. Pipe larger than 24-inches shall be fabricated pipe using ASTM, A283, Grade C steel with straight longitudinal welded seams.

The diameter specified shall be the nominal inside diameter for pipe sizes up to 12-inches and the nominal outside diameter for pipe larger than 12-inches.

Wall thicknesses for steel pipe and fittings shall be minimum .375 inches for pipe sizes up to eight (8) inches. For pipe diameters larger than eight (8) inches the minimum wall thickness shall be

.5 inches. Heavier wall thickness, if required, will be specified in the Specification Special Conditions.

Steel fittings to be furnished shall conform to AWWA Standard C208.

Flanges shall be Class D, slip-on type in accordance with AWWA Standard C207. Flanges shall be flat faced with O.D. and drilling in accordance with ANSI Standard B16.1.

Field welding of pipe shall be in accordance with AWWA Standard C206.

Interior of all steel pipe and fittings shall be cement mortar lined in accordance with AWWA Standard C205. Field welded joints shall be lined in accordance with the Appendix to AWWA Standard C205. All lining shall be sealed with a bituminous seal coat approved for use with potable water.

Pipe and fittings shall be provided with water stops where shown on the Drawings or as required to prevent leakage around the pipe fittings at penetrations between wet and dry areas.

The exterior of all buried steel pipe and fittings shall receive shop applied prime coat and coal tar enamel protective coating in accordance with AWWA Standard C203. Fusion-bonded epoxy coating in accordance with AWWA Standard C213 is also acceptable.

PART 3: EXECUTION

3.01 INSTALLATION

General provisions provided in Specification Section 15000 shall be strictly followed in addition to the following:

Pipe joints shall be where shown on the Drawings except where field conditions dictate changes and such changes are approved by the ENGINEER. The CONTRACTOR shall be responsible for insuring proper alignment and fit of all steel piping.

The cutting of pipe for installing valves or fittings shall be done in a neat and workmanlike manner without damage to the pipe or lining. The end shall be smooth and at right angle to the axis of the pipe or properly beveled for the weld joint as required. Flame cutting of metal pipe shall not be permitted. All pipe cutting shall be at the CONTRACTOR's expense.

All required field welding of steel pipe shall be performed in accordance with AWWA Standard C206.

SECTION 15115

CONCRETE PIPE AND FITTINGS
(CONTRACTOR Furnished)

PART 1: GENERAL

1.01 COORDINATION OF WORK

Connection to existing pipelines may require shutdown of OWNER facilities. Construction work and connections shall be closely coordinated with the OWNER through the ENGINEER. The ENGINEER, in consult with the OWNER, may select the time, including Saturdays, Sundays or holidays, which, in the opinion of the ENGINEER, will cause the least inconvenience to the OWNER and/or its customers, for connection to existing pipelines, and the CONTRACTOR will perform such connections at such times as may be directed by the ENGINEER at the Contract prices and no claim for premium time or additional costs will be made by the CONTRACTOR.

1.02 RELATED WORK

Piping - General Provisions - Section 15000

1.03 SUBMITTALS

Shop drawings and manufacturer's literature for all CONTRACTOR supplied materials shall be promptly submitted to the ENGINEER for approval in accordance with Section 1300.

PART 2: PRODUCTS

Research has documented that certain pipe materials (such as polyvinyl chloride, polyethylene, and polybutylene) and certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this section have been selected based on the non-expectation of encountering petroleum products or organic solvents. If during the course of pipeline installation the CONTRACTOR identifies, or suspects, the presence of petroleum products or any unknown chemical substance the ENGINEER is to be notified immediately. Installation of any further piping in the area of suspected contamination shall be stopped until direction is provided by the ENGINEER.

2.01 PIPE MATERIALS

A. Prestressed Concrete Pressure Pipe, Steel Cylinder Type

Prestressed concrete pressure pipe shall conform to the latest specifications as adopted by the American Water Works Association (AWWA). Specifically, prestressed

concrete pressure pipe, steel cylinder type shall conform to AWWA C300, latest issue, except as modified herein.

The pipe shall be designed to meet the following requirements:

1. External Load

Depth of cover - 2-1/2 feet to 10 feet, whichever depth produces the greatest load in conjunction with live load.

Trench width - nominal pipe diameter plus 24 inches.

Soil density - 120 pounds per cubic foot.

Ku - 0.130

Laying condition - Type 2, per AWWA Standard C600.

Live load - per ANSI/AWWA Standard C151/A21.51, (H-20, one truck, plus 1.5 impact).

If the depth of cover exceeds 10 feet, it will be so indicated on the Drawings and the pipe manufacturer shall design the pipe as required in these areas.

2. Internal Pressures

Working pressure - as per the Specification Special Conditions.

If not provided use 250 PSIG.

Surge pressure allowance - 100 psi.

3. Combined Loading

Concrete pipe shall be designed in accordance with AWWA C300, latest revision, using the "Cubic Parabola Design Method" outlined in Appendix A and as follows:

(a) The combination of design pressure and earth loading will fall under the Design-Curve.

(b) The combination of design pressure plus the specified surge pressure, and earth loading shall fall under the Transient-Capacity Curve.

(c) The combination of design pressure and earth loading plus line loading shall fall within the Transient-Capacity Curve.

B. Design Calculations

The CONTRACTOR shall submit design calculations to the ENGINEER for the most severe loading conditions for each size and class of pipe. If requested by the ENGINEER, the CONTRACTOR shall submit calculations to support the design of any particular piece or pieces of pipe anywhere in the project as part of his Bid Price for the Contract and at no additional cost to the OWNER.

The design calculations shall be presented in a neat, readable form, with all fixtures, values and units included to facilitate ease of checking. Calculations shall include, but not be limited to, the following:

1. pipe size
2. cylinder thickness and area
3. cylinder yield point and ultimate strength (ASTM Designation)
4. wire diameter or gauge
5. wire area
6. wire size
7. wire spacing
8. wire wrapping force
9. ultimate strength of wire
10. internal pressure at zero core compression (P_o)
11. elastic limit pressure (P_L)
12. burst strength (PBurst)
13. 3-edge bearing load to produce incipient cracking
14. 9/10 of the three-edge bearing loading producing .001 inch crack in the core with no internal pressure (W_o)
15. ultimate 3-edge load
16. resultant concrete compression
17. gross wrapping stress in wire
18. compressive strength of core concrete at time of wrapping
19. core thickness
20. outside coating thickness
21. plottings related to design curves for Cubic Parabola Design Method for combined load conditions

C. Testing

The design of each size and class of pipe shall be checked by hydrostatic tests conducted on representative pipe in the manufacturer's shop to obtain the following actual test strengths:

1. The pressure to produce a surface crack in the coating of the barrel 0.001 inches wide by 12 inches long shall be at least 0.8 P_o for lined cylinder pipe or P_o for embedded cylinder pipe.
2. The ultimate pressure to produce burst shall be at least P_b.

The design of each size and class of concrete cylinder pipe shall be verified by tests conducted on representative specimens. The tests described in this paragraph are for proof of design only and it is not necessary that such tests be made on pipe manufactured specifically for this Contract. Certified reports covering tests made on other pipe of the same size, class, and design as specified herein and manufactured from materials or equivalent type and quality may be accepted as adequate proof of design.

D. Joints

Joints for concrete pipe and fittings shall be of the rubber gasket type meeting the requirements of AWWA Specification C300 with exposed portions of the joint rings after casting, being protected with a metallic coating having a minimum thickness of 0.004 inches. Joint lubricant shall be as recommended by the pipe manufacturer. Rubber gaskets shall meet the physical requirements of the appropriate ASTM Specifications.

2.02 FITTINGS

Fittings for reinforced concrete pipe, steel cylinder type, prestressed shall be designed so as to be compatible with the pipe, and so as to provide at least equal resistance to internal and external loads of the pipe. Design criteria, joints, coatings and linings shall be as specified for the pipe. Fittings shall conform to the requirements of AWWA C300, latest revision. The CONTRACTOR shall furnish adaptor units from concrete pipe to iron pipe or valves where necessary for proper connection.

The CONTRACTOR shall stock, without additional compensation, a number of bevel adaptors and short lengths of pipe at the job site to be used for diverting the main past obstructions or to make any changes in the line and grade of the main due to omissions on the laying schedule or tabulated layout.

He also shall provide, without additional compensation, bevel pipe, outlet connections on straight pipe, closure-pieces, and other accessories required as required to satisfactorily install the new main as shown on the plans.

2.03 COATING

Pipe and fittings shall have an exterior mortar coating as specified in AWWA C301, latest revision.

PART 3: EXECUTION

3.01 INSTALLATION

General provisions provided in Section 15000 shall be strictly followed in addition to the following:

Before assembling a joint, the spigot end of the pipe shall be thoroughly cleaned. The inside of the bell end of the pipe and the gasket shall be cleaned and lubricated with vegetable soap. The gasket is then placed around the spigot end so it is properly seated in the circumferential groove to maintain uniform tension in the gasket all around the pipe. The spigot end is then aligned with the bell end of the pipe and carefully entered into the bell.

The joint shall be checked to determine if the gasket is in the proper position. The joints of pipe 24 inches or larger shall be checked from the inside of the pipe. Before the spigot is thrust completely, home, steel spacers are inserted in the seat of the bell to leave a half inch clearance. A feeler gauge is then entered into the recess to check the position of the gasket. If the gasket cannot be felt all around the pipe, the spigot shall be removed. If the gasket is not damaged, it may be reused, but both the gasket and the joint shall be relubricated. After it has been determined the gasket is in its proper position, the joint spacers are removed and the pipe pushed or pulled completely home. The joints of pipe smaller than 24 inches may be checked from the outside of the pipe by inserting a feeler gauge into the flare of the bell to assure that no portion of the gasket is protruding.

After the joint is assembled, a cloth band is placed around the joint recess and wired or strapped in position to provide a means of pouring grout in the recess. A grout composed of one part cement and three parts sand is poured into the joint recess beneath the band. Measures should be taken to assure the entire recess around the pipe is completely filled.

If welding of prestressed concrete pipe joints is required by the ENGINEER, the welding shall be done in accordance with American Water Works Service Company drawing no. 61-300-12SK titled, "Specifications for Welding Prestressed Concrete Pipe Joints". This drawing is included at the end of this Section.

SECTION 15120

POLYVINYL CHLORIDE (PVC) PIPE
(OWNER Furnished)

PART 1: GENERAL

1.01 COORDINATION OF WORK

Connection to existing pipelines may require shutdown of OWNER facilities. Construction work and connections shall be closely coordinated with the OWNER through the ENGINEER. The ENGINEER, in consult with the OWNER, may select the time, including Saturdays, Sundays or holidays, which, in the opinion of the ENGINEER, will cause the least inconvenience to the OWNER and/or its customers, for connection to existing pipelines, and the CONTRACTOR will perform such connections at such times as may be directed by the ENGINEER at the Contract prices and no claim for premium time or additional costs will be made by the CONTRACTOR.

1.02 RELATED WORK

Piping General Provisions - Section 15000

PART 2: PRODUCTS

Research has documented that certain pipe materials (such as polyvinyl chloride, polyethylene, and polybutylene) and certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this section have been selected based on the non-expectation of encountering petroleum products or organic solvents. If during the course of pipeline installation the CONTRACTOR identifies, or suspects, the presence of petroleum products or any unknown chemical substance the ENGINEER is to be notified immediately. Installation of any further piping in the area of suspected contamination shall be stopped until direction is provided by the ENGINEER.

2.01 PIPE MATERIALS

OWNER will furnish and CONTRACTOR shall install all PVC pipe and jointing materials. Materials to be furnished by OWNER are included in Section SSC-1000.1.03 of the Specifications Special Conditions.

PART 3: EXECUTION

3.01 INSTALLATION

The general provisions specified in Section 15000 shall be strictly followed in addition to the following:

A. Pipe Joint Assembly

The assembly of joints should be performed as recommended by the pipe manufacturer. The elastomeric gaskets may be supplied separately in cartons or positioned in the bell joint or coupling at the factory. When gaskets are color coded, be sure to consult the pipe manufacturer or his literature for the significance. In all cases, clean the gasket, the bell or coupling interior, especially the groove area (except when gasket is permanently installed) and the spigot area with a rag, brush or paper towel to remove any dirt or foreign material before the assembling. Inspect the gasket, pipe spigot bevel, gasket groove, and sealing surfaces for damage or deformation. When gaskets are separate, use only gaskets which are designed for and supplied with the pipe. Insert them as recommended by the manufacturer.

Lubricant should be applied as specified by the pipe manufacturer. Bacterial growth, damage to the gaskets or the pipe, may be promoted by use of non-approved lubricants. Use only lubricant supplied by the pipe manufacturer.

After lubrication, the pipe is ready to be joined. Good alignment of the pipe is essential for ease of assembly. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Do not swing or "stab" the joint; that is, do not suspend the pipe and swing it into the bell. The spigot end of the pipe is marked by the manufacturer to indicate the proper depth of insertion.

Solvent cemented joints where approved by the ENGINEER should be made in accordance with manufacturer's recommendations or in accordance with ASTM D2855, "Standard Recommended Practice for Making Solvent Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings".

To join field-cut pipe, it is necessary to first prepare the pipe end. A square cut is essential for proper assembly. The pipe shall be marked around its entire circumference prior to cutting to assure a square cut. Use a factory-finished beveled end as a guide for proper bevel angle, and depth of bevel plus the distance to the insertion reference mark. The end shall be beveled using a pipe beveling tool or a wood rasp which will cut the correct taper. A portable sander or abrasive disc may also be used to bevel the pipe end. Round off any sharp edges on the leading edge of the bevel with a pocket knife or a file.

SECTION 15121

POLYVINYL CHLORIDE (PVC) PIPE (CONTRACTOR Furnished)

PART 1: GENERAL

1.01 SCOPE

This Section covers PVC pressure pipe in diameters 4 inches through 12 inches.

1.02 COORDINATION OF WORK

Connection to existing pipelines may require shutdown of OWNER facilities. Construction work and connections shall be closely coordinated with the OWNER through the ENGINEER. The ENGINEER, in consult with the OWNER, may select the time, including Saturdays, Sundays or holidays, which, in the opinion of the ENGINEER, will cause the least inconvenience to the OWNER and/or its customers, for connection to existing pipelines, and the CONTRACTOR will perform such connections at such times as may be directed by the ENGINEER at the Contract prices and no claim for premium time or additional costs will be made by the CONTRACTOR.

1.03 SUBMITTALS

Shop drawings and manufacturer's literature for all CONTRACTOR supplied materials shall be promptly submitted to the OWNER for approval in accordance with Section 1300.

1.04 RELATED WORK

Piping General Provisions - Section 15000

PART 2: PRODUCTS

Research has documented that certain pipe materials (such as polyvinyl chloride, polyethylene, and polybutylene) and certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this section have been selected based on the non-expectation of encountering petroleum products or organic solvents. If during the course of pipeline installation the CONTRACTOR identifies, or suspects, the presence of petroleum products or any unknown chemical substance the ENGINEER is to be notified immediately. Installation of any further piping in the area of suspected contamination shall be stopped until direction is provided by the ENGINEER.

2.01 PIPE MATERIALS

PVC pipe shall conform to the latest edition of American Water Works Association (AWWA) Standard C900 with elastomeric gasket couplings in accordance with this Standard. The use of solvent cement connections shall not be allowed unless approved by the ENGINEER

Pipe shall be furnished with cast iron pipe equivalent outside diameter and the Pressure Class shall be 100, 150 or 200 psi. depending on the system design pressure and laying conditions.

PART 3: EXECUTION

3.01 INSTALLATION

The general provisions provided in Specification Section 15000 shall be strictly followed in addition to the following:

A. Pipe Joint Assembly

The assembly of joints should be performed as recommended by the pipe manufacturer. The elastomeric gaskets may be supplied separately in cartons or positioned in the bell joint or coupling at the factory. When gaskets are color coded, be sure to consult the pipe manufacturer or his literature for the significance. In all cases, clean the gasket, the bell or coupling interior, especially the groove area (except when gasket is permanently installed) and the spigot area with a rag, brush or paper towel to remove any dirt or foreign material before the assembling. Inspect the gasket, pipe spigot bevel, gasket groove, and sealing surfaces for damage or deformation. When gaskets are separate, use only gaskets which are designed for and supplied with the pipe. Insert them as recommended by the manufacturer.

Lubricant should be applied as specified by the pipe manufacturer. Bacterial growth, damage to the gaskets or the pipe, may be promoted by use of non-approved lubricants. Use only lubricant supplied by the pipe manufacturer.

After lubrication, the pipe is ready to be joined. Good alignment of the pipe is essential for ease of assembly. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Do not swing or "stab" the joint; that is, do not suspend the pipe and swing it into the bell. The spigot end of the pipe is marked by the manufacturer to indicate the proper depth of insertion.

Solvent cemented joints where approved by the ENGINEER should be made in accordance with manufacturer's recommendations or in accordance with ASTM D2855, "Standard Recommended Practice for Making Solvent Cemented Joints with Polyvinyl Chloride PVC Pipe and Fittings".

To join field-cut pipe, it is necessary to first prepare the pipe end. A square cut is

essential for proper assembly. The pipe shall be marked around its entire circumference prior to cutting to assure a square cut. Use a factory-finished beveled end as a guide for proper bevel angle, and depth of bevel plus the distance to the insertion reference mark. The end shall be beveled using a pipe beveling tool or a wood rasp which will cut the correct taper. A portable sander or abrasive disc may also be used to bevel the pipe end. Round off any sharp edges on the leading edge of the bevel with a pocket knife or a file.

SECTION 15130

PIPING SPECIALTIES
(OWNER Furnished)

PART 1: GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

See Specification Section 15000 - Piping - General Provisions. See sketches included at the end of Section 15000 for installation details for piping specialties.

PART 2: PRODUCTS

2.01 MATERIALS FURNISHED BY OWNER

OWNER will furnish and CONTRACTOR shall install the piping specialties included in Section SSC-1000.1.03 of the Specifications Special Conditions. Piping specialties in general include:

a. Gate valves
b. Butterfly valves
c. Tapping valves
d. Tapping sleeves
e. Valve boxes
f. Polyethylene encasement
g. Air release valves
h. Corporation and curb stops

PART 3: EXECUTION

3.01 INSTALLATION

General provisions provided in Section 15000 shall be strictly followed in addition to the following:

a. Polyethylene Encasement

Piping shall be encased in polyethylene to prevent contact with surrounding backfill and bedding material in areas shown or designated by the ENGINEER. Polyethylene material shall be installed in accordance with ANSI/AWWA C105/A21.5 Standards.

Polyethylene material will deteriorate rapidly when exposed to direct sunlight. Store all polyethylene encasement out of the sunlight. If during the installation period it is anticipated that the polyethylene encasement will be exposed to sunlight for more than two weeks (i.e., an open trench) Type C (black) polyethylene material must be used.

Service taps for polyethylene encased pipe shall follow the procedure described in AWWA Standard C600-87 Section 7.1.

b. Valve Boxes

Valve boxes shall be supported so that no load can be transmitted from the valve box to the valve. See Sketch No. 61-300-6 at the end of Section 15000. Tops shall be set at established grade.

c. Valves

Valves shall be set at the required locations with joints centered, spigots home and valve stems plumb unless otherwise directed by the OWNER.

d. Tapping Sleeves and Valves

Pressure testing of tapping sleeve and valve assemblies is required prior to making the tap. Refer to Specification Section 15030 for special requirements.

e. Air Release Valve Assembles

See Sketch 61-300-8 SK in Section 15000 for a typical air release valve assembly.

f. Air Blow-off

See Sketch 61-300-9 SK in Section 15000 for a typical air blow-off detail.

SECTION 15131

PIPING SPECIALTIES
(CONTRACTOR Furnished)

PART 1: GENERAL

1.01 SCOPE

This Section covers furnishing and installation of miscellaneous piping specialties as shown on the Drawings or in the Specification Special Conditions or as required to fulfill the intent of the project.

PART 2: PRODUCTS

2.01 POLYETHYLENE ENCASEMENT

Polyethylene encasement shall conform to ANSI/AWWA C105/A21.5 Standards.

Polyethylene material will deteriorate rapidly when exposed to direct sunlight. Store all polyethylene encasement out of the sunlight. If during the installation period it is anticipated that the polyethylene encasement will be exposed to sunlight for more than two weeks (i.e., an open trench) Type C (black) polyethylene material must be used.

2.02 VALVE BOXES

All valves shall be provided with valve boxes. Valve boxes shall be of the standard, adjustable, cast iron extension type, three piece, 5-1/4-inch shaft, screw type, and of such length as necessary to extend from valve to finished grade. The valve box shall be hot coated inside and out with coal tar or asphaltic compound.

Valve boxes shall be manufactured by one of the following approved manufacturers"

Bingham & Taylor, Mueller, Handley Industries, A.Y. McDonald, Quality Water Products, or Clay and Bailey.

Valve box bases shall conform to the following:

Valve Size	Base
4" and smaller	Round, 8" in height, 10 7/8" diameter at bottom
6" and 8"	Round, 11" in height, 14 3/8" diameter at bottom
10" and larger	Oval, 11" in height, 15" x 11 1/8" diameter at bottom

2.03 RODS, BOLTS, LUGS AND BRACKETS

All steel rods, bolts, lugs and brackets shall be ASTM A36 or A-307 carbon steel as a minimum requirement. After field installation all steel surfaces shall have one coat of Koppers #50 coal tar coating applied before backfill.

2.04 RETAINING GLANDS

All retaining glands shall be ductile iron with ductile iron set screws. Pressure ratings for use with ductile iron pipe shall be 150 psi.

PART 3: EXECUTION

3.01 INSTALLATION

See pipe installation specifications for general installation.

Piping shall be encased in polyethylene to prevent contact with surrounding backfill and bedding material in areas shown or designated by the ENGINEER. Polyethylene material shall be installed in accordance with ANSI/AWWA C105/A21.5 Standards.

Service taps for polyethylene encased pipe shall following the procedure described in AWWA Standard C600-87 Section 7.1.

Valve boxes shall be supported so that no load can be transmitted from the valve box to the valve. See sketch at the end of this Section. Tops shall be set at established grade.

Valves shall be set at the required locations with joints centered, spigots home and valve stems plumb unless otherwise directed by the OWNER.

Tapping sleeve and valve assemblies require pressure testing prior to making the tap. Refer to Specification Section 15030 for specific requirements.

SECTION 15150

GATE VALVES
(CONTRACTOR Furnished)

PART 1: GENERAL

1.01 SCOPE

The CONTRACTOR shall furnish, install and test all gate valves shown on the drawings and/or in the Specification Special Conditions.

1.02 SUBMITTALS

Shop drawings and manufacturer's literature shall be submitted to the ENGINEER for approval in accordance with Section 1300.

1.03 RELATED WORK

Specification Section 15000 - Piping - General Provisions.

PART 2: PRODUCTS

2.01 SMALL GATE VALVES

All gate valves, 3 inches through 12 inches, shall be iron body, resilient-seated, nut-operated, non-rising stem, gate valves suitable for buried service. The valves shall be designed for an operating pressure of 200 psi and test pressures to 400 psi. Valves shall be designed to operate in the vertical position. Valves shall comply fully with AWWA Standard C509. Valve ends shall be mechanical joint in accordance with AWWA C111. Stem seals shall be double O ring stem seals. Square operating nuts conforming to AWWA C509 shall be used. Valves shall open (left or right) in accordance with the OWNER's standard.

2.02 LARGE GATE VALVES

Gate valves larger than 12-inches NPS shall be iron body, double disc, parallel seats, bronze mounted, rubber "O" ring packing seals, and conforming to ANSI/AWWA C500 Standard. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. All valves furnished shall open (left or right) in accordance with the OWNER standard.

Testing of valves shall be in accordance with AWWA C500 Section 28. Certified copies of all tests shall be provided prior to shipment. The ENGINEER reserves the right to observe all tests.

Valves shall have mechanical joint ends unless otherwise designated on the plans or approved

by the ENGINEER.

All valves shall be designed for a working pressure of 150 pounds per square inch (psi) and 300 psi test pressure unless otherwise noted on the plans or directed by the ENGINEER. The CONTRACTOR shall make all valves tight under their working pressures after they have been placed and before the main is placed in operation. Any defective parts shall be replaced at the CONTRACTOR's expense.

Acceptable manufacturers: Mueller Company, Decatur, Illinois, Waterous Company, St. Paul, Minnesota, McWane Cast Iron Pipe Co. (Clow and M&H Divisions only) Birmingham, Alabama, United States Pipe and Foundry, Burlington, New Jersey and Stockham Valves and Fittings, Birmingham, Alabama.

PART 3: EXECUTION

3.01 INSTALLATION

Installation requirements contained in Specification Section 15000 shall be strictly followed.

SECTION 15155

BUTTERFLY VALVES
(CONTRACTOR Furnished)

PART 1: GENERAL

1.01 SCOPE

The CONTRACTOR shall furnish all butterfly valves shown on the drawings and/or the Specification Special Conditions.

1.02 RELATED WORK

Specification Section 15000 - Piping - General Provisions.

1.03 SUBMITTALS

Shop drawings and manufacturer's literature shall be submitted to the ENGINEER for approval in accordance with Section 1300.

PART 2: PRODUCTS

2.01 VALVES

Rubber-seated butterfly valves shall be installed as shown on the Contract Drawings and shall be furnished to conform with Class 150B of the ANSI/AWWA C504 Standard and the following specifications. All valves furnished shall open (left or right) in accordance with the OWNER standard.

Valve bodies shall be cast iron or ductile iron with mechanical joint ends. Mechanical joint ends shall conform with ANSI/AWWA C111/A21.11 standards.

Valve shafts shall consist of one-piece units extending through the discs of 18-8 stainless Type 303 or 304. Shaft diameter shall be in accordance with Table 3 of ANSI/AWWA C504 standard.

Valve discs shall be Ni-Resist, Type 1, or cast iron with stainless steel edges.

Valve seats shall be hycar or natural rubber mounted in the valve body.

Valve bearings shall be nylon or teflon.

Manual buried operators shall be either worm gear or traveling nut type and shall be furnished with 2-inch AWWA nuts and extension shafts. Input required at nuts to produce specified output torque shall be less than 150 ft.-lb. Operators shall be designed to withstand an input at the nut of 300 ft.-lb. without damage to any operator components. Operator output torque shall be equal to or greater than that specified in Table 4 of C504 for the valve class specified in the schedule.

Acceptable manufacturers: Henry Pratt Company, Aurora, Illinois and McWane Cast Iron Pipe Co. (Clow and M&H Divisions only) Birmingham, Alabama.

PART 3: EXECUTION

3.01 SETTING VALVES

Installation requirements in Specification Section 15000 shall be strictly followed.

SECTION 15170

TAPPING SLEEVES, SADDLES AND VALVES (CONTRACTOR Furnished)

PART 1: GENERAL

1.01 SCOPE

The CONTRACTOR shall furnish, install and test all tapping sleeves and valves and tapping saddles as shown on the drawings and/or in the Specification Special Conditions.

1.02 RELATED WORK

Specification Section 15000 - Piping - General Provisions

1.03 SUBMITTALS

Shop drawings and manufacturer's literature shall be submitted to the ENGINEER for approval in accordance with Section 1300.

PART 2: PRODUCTS

2.01 GENERAL

All tapping sleeves, saddles and valves shall be designed for a working pressure of 200 psig for 12-inch and smaller and 150 psig for sizes larger than 12-inch. Test pressure shall be twice the working pressure.

2.02 TAPPING SLEEVES AND VALVES

The CONTRACTOR shall verify the type of existing pipe and the outside diameter of the pipe on which the tapping sleeve is to be installed.

Tapping sleeves shall be ductile iron or cast-iron dual compression type. The sleeves shall be made in two halves which can be assembled and bolted around the main.

The horizontal tapping valve shall conform to the applicable requirements of AWWA C509. The tapping valves shall have flanged inlets with mechanical joint outlets, enclosed bevel gears, bypass valve, rollers, tracks and scrapers.

Acceptable manufacturers: Mueller, McWane, U.S. Pipe and Waterous.

2.03 TAPPING SADDLES

Tapping saddles shall consist of ductile iron outlet castings, attached to the pipeline with high strength steel straps. Castings shall be sealed to pipeline with O-ring seals. Saddles shall have ANSI A21.10 flanged outlets counterbored for use with tapping valves and tapping equipment.

PART 3: EXECUTION

3.01 INSTALLATION

General provisions provided in Specification Section 15000 shall be strictly followed. Installation of the tapping sleeves, tapping saddle, and tapping valve is to be in accordance with the manufacturers instructions. The tapping procedure is to be in accordance with the tapping machine manufacturer's instructions.

3.02 PRELIMINARY TESTING

After installation of the tapping sleeve and valve assembly but prior to making the tap the assembly shall be pressure tested hydrostatically in accordance with Specification Section 15030. The test shall be made with the valve open using a tapped mechanical joint cap. No leakage is acceptable. The test pressure shall be maintained for 15 minutes minimum.

SECTION 15180

FIRE HYDRANTS
(OWNER Furnished)

PART 1: GENERAL

1.01 SCOPE

The CONTRACTOR shall furnish all labor, material, tools and equipment required to install fire hydrants at the location shown on the plans, or where designated by the ENGINEER. The OWNER will furnish the fire hydrants which will be available at the OWNER'S storage yard.

PART 2: PRODUCTS

2.01 MATERIAL

Fire hydrants will be furnished by the OWNER.

PART 3: EXECUTION

3.01 INSPECTION PRIOR TO INSTALLATION

Fire hydrants shall be inspected at time of delivery to the CONTRACTOR. Each hydrant shall be cycled to full open and full closed positions to ensure that no internal damage or breakage has occurred during shipment and handling. All external bolts shall be checked for proper tightness.

After inspection, the hydrant valves shall be closed and the outlet nozzle caps replaced to prevent the entry of foreign matter. Stored hydrants shall be protected from weather elements with the inlets facing downward.

3.02 INSTALLATION

Hydrants shall be located as shown on the plans or as directed by the ENGINEER. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. When placed behind the curb, the hydrant barrel shall be set so that no portion of the pumper or hose nozzle cap will be less than eighteen to twenty-four inches, depending on local requirements, from the gutter face of the curb. All hydrants shall stand plumb with the pumper nozzle facing the curb. Hydrants having two hose nozzles 90? apart shall be set with each nozzle facing the curb at an angle of 45?. Hydrants shall be set to the established grade, with nozzles at least eighteen inches above the ground as shown or as directed by the ENGINEER.

Unless otherwise shown each hydrant shall be connected to the main with a six inch branch connection controlled by an independent six inch gate valve.

When hydrant installations have a greater than normal exposure to damage due to vehicular traffic (parking lot installations, unusual driving situation, etc.) the ENGINEER may authorize hydrant protection using steel pipe bollards, hydrants requiring such protection are to be designated by the ENGINEER and installed by CONTRACTOR in accordance with Sketch No. 61-300-13 included in Section 15000 of these specifications. Bollards shall be located as necessary adjacent to the hydrant and in such a manner as not to interfere with the ability to connect hoses or operate the hydrant. Additionally, the bottom of the bollard and encasement shall be located above the hydrant supply piping and valve to prevent the possibility of damage to the piping should the bollard be displaced during vehicular contact. Payment for bollards shall be per the supplemental unit price schedule.

Unless otherwise directed by the ENGINEER, a drainage pit two feet in diameter and two feet deep shall be excavated below each hydrant. The pit shall be filled and compacted with coarse gravel or broken stone mixed with coarse sand, under and around the base of the hydrant to a level 6 inches above the waste opening. No hydrant drainage pit shall be connected to a sewer.

The drainage pit shall be lined and covered with geotextile fabric and the fabric shall completely isolate the gravel or stone so that no fill material or adjacent earth comes in contact with pit material.

In situations where the ground water table is above the drain opening of the hydrant barrel the ENGINEER is to be notified. Then, if directed by ENGINEER, the drain opening shall be plugged using a method acceptable to the hydrant manufacturer. In this situation the drainage pit is not required but special marking on the hydrant acceptable to the OWNER is required to indicate the drain opening has been plugged. Prior to project acceptance if CONTRACTOR operates a hydrant having a plugged drain connection, CONTRACTOR is required to pump the barrel dry after each use.

A reaction or thrust backing shall be provided at the base of each hydrant and shall not obstruct the drainage outlet of the hydrant. The size and shape of concrete thrust backing and the number and size of tie rods shall be approved by the ENGINEER. The material to be used for thrust backing shall be as specified in Section 3300. Requirements for tie rods is specified in Section 15000.

Please refer to Sketch No. 61-300-7 in Section 15000 for a typical fire hydrant assembly detail.

3.03 TESTING

After installation and before backfilling (and after pressure testing the water main, if it has been installed) test the hydrant as follows:

A. Pressure Test

1. Open the hydrant fully and fill with water; close all outlets.
2. To prevent caps from being blow off dry-barrel hydrants and to prevent other possible damage, vent air from the hydrant by leaving one of the caps slightly loose as the hydrant is being filled. After all air has escaped, tighten the cap before proceeding.
3. Apply line pressure.
4. Check for leakage at flanges, nozzles and operating stem.
5. If leakage is noted, repair or replace components or complete hydrant until no leaks are evident.

B. Drainage Test for Dry-Barrel Hydrants

1. Following the pressure test, close hydrant.
2. Remove one nozzle cap and place pylon or hand over nozzle opening.
3. Drainage rate should be sufficiently rapid to create a noticeable suction.
4. After backfilling, operate the hydrant to flush out any foreign material.
5. Tighten nozzle caps, them back them off slightly so that they will not be excessively tight; leave tight enough to prevent removal by hand.

SECTION 15190

AIR RELEASE AND BLOW-OFF OUTLETS (CONTRACTOR Furnished)

PART 1: GENERAL

1.01 SCOPE

The CONTRACTOR shall furnish and install air release and blow-off outlets at the locations shown on the Drawings or as directed by the ENGINEER. The details of the outlets shall be as shown on Sketches 61-300-8, 61-300-8A and 61-300-9 included at the end of Section 15000.

1.02 SUBMITTALS

Shop drawings and manufacturer's literature for equipment to be supplied shall be submitted to the ENGINEER for approval in accordance with Section 1300.

1.03 RELATED WORK

Specification Section 15000 - Piping - General Provisions.
Specification Section 3450 - Precast Concrete Manhole.

PART 2: PRODUCTS

2.01 COMBINATION AIR/VACUUM RELEASE VALVES

The CONTRACTOR shall provide APCO Model No. 145C as manufactured by Valve and Primer Corporation, Schaumburg, Illinois. Bodies shall be case iron with stainless steel floats.

2.02 CURB BOXES

Curb boxes shall be the standard, cast iron, sliding or screw type, 1" or 2-1/2" as required, complete with lid and head bolt. Boxes shall be adjustable from 18 inches to 66 inches.

Acceptable manufacturers: Bingham & Taylor, Mueller, Handley Industries, Clay and Baily, A.Y. McDonald, Quality Water Products.

2.03 COPPER PIPE

Copper pipe shall be Type L or Type K, as specified, meeting the requirements of ASTM Standard B88.

2.04 CORPORATION STOPS

Corporation stops shall be of the brass ball valve type manufactured in accordance with AWWA Standard C800. The inlet connection shall have standard AWWA tapered threads unless otherwise required by the ENGINEER. The outlet connection shall be a flared copper connection end. The sizes shall range from 1/2" to 2" and shall match the size of specified copper pipe material.

Acceptable manufacturers and model numbers are:

Ford Meter Box Company - FB400 thru FB1600
Mueller - H-15000 Series
A.Y. McDonald - 4701 Series

2.05 CURB STOPS

Curb stops shall be bronze body construction, ball valves, with Double O-ring stem seals. Curb stops shall conform with AWWA Standard C800. End connections shall be suitable for flared copper connection. If required by the ENGINEER valves shall be furnished with square gate valve operating nuts. Sizes shall be from 3/4" to 2" and shall match the service line size.

Acceptable manufacturers and model numbers:

Ford Meter Box Company - B Series
Mueller - H15000 Series
A.Y. McDonald - 6000 Series

2.06 MISCELLANEOUS SERVICE LINE FITTINGS

Miscellaneous service line fittings such as couplings, adaptors, saddles, bends, plugs, etc. shall conform to AWWA Specification C800.

Acceptable manufacturers: Ford Meter Box, Mueller, and A.Y. McDonald.

PART 3: EXECUTION

3.01 INSTALLATION

See Specification Section 15000 for Sketches 61-300-8, 61-300-8A and 61-300-9 showing typical installation details for air/vacuum release valve assemblies and air blow-off assemblies respectively.

3.02 INSTALLATION OF CORPORATION STOPS

Tapping of all water mains shall be performed by experienced craftsmen familiar with installation of water service lines.

All taps shall be made with a suitable tapping machine (Mueller, Ford, Hays or Dresser type) using the proper combined drill and tap. Hand held drilling equipment is not acceptable.

Corporation stops shall be inspected for damaged threads and proper operation of the ball valve prior to installation.

Should the water main wall thickness or material (plastic, concrete or A-C pipeline material) be unsuitable for direct tapping a tapping saddle shall be used.

Proper installation of the corporation stop should allow between 2 and 3 threads to extend beyond the inside wall of the main. If necessary a test tap shall be made with the boring bar marked to the proper depth. The corporation shall not be threaded completely into the pipe such that it becomes shouldered with the main. Lubricants of any type shall not be used when installing the corporation.

Taps made to polyethylene encased water main shall be made using the procedure outlined in AWWA C600-87 Section 7.1.

3.03 INSTALLATION OF LINE AND FITTINGS

Copper pipe shall be installed between the tap connection and the curb stop or air release valve location making only gradual changes in grade or alignment as required. Sharp bends (greater than 15°) in any direction are not allowed unless approved by the ENGINEER.

Curb stops shall be installed with the operating nut in the vertical position and the curb box centered over the nut. Curb boxes are to be installed and adjusted to be flush with finished grade. Curb boxes shall have lids installed and locked.

Excavation, backfilling and surface restoration shall be completed in accordance with Division 2 of these Specifications.

After completion of copper pipe installation but prior to backfilling the corporation stop shall be opened slowly to fill the line. When the line is full and all air has been removed completely open the corporation. All piping, fittings and taps shall be visually checked for leaks.

SECTION 15200

SERVICE LINES
(CONTRACTOR Furnished)

PART 1: GENERAL

1.01 SCOPE

Where shown on the drawings and/or Specification Special Conditions the CONTRACTOR shall furnish and install service lines originating at the water main and terminating at a curb stop connection. This section does not include service lines or meter installations beyond the curb stop. Refer to Sketch No. 61-300-10 contained in Section 15000 for a typical service line installation.

1.02 RELATED WORK

Specification Section 15000 - Piping - General Provisions.

PART 2: PRODUCTS

2.01 COPPER SERVICE LINE MATERIAL

Copper pipe shall be Type L or Type K, as specified, meeting the requirements of ASTM Standard B88. Pipe size (3/4", 1", 1-1/2", 2") and type to be determined by the ENGINEER.

2.02 POLYETHYLENE SERVICE LINE MATERIAL

Polyethylene service line material shall be Class 160 (SDR-7), ultra high molecular weight, conforming to AWWA Standard C901. Pipe sizes to be 3/4", 1", 1-1/2" and 2", copper tube size (CTS) or iron pipe size (IPS) as per ENGINEER's requirements.

Acceptable manufacturers: Orangeburg Industries, Continental Industries.

2.03 CURB BOXES

Curb boxes shall be standard, 1" or 2-1/2", cast iron, sliding or screw type, complete with lid and head bolt, adjustable from 18-inches to 66-inches. Size to be determined by ENGINEER.

Acceptable manufacturers: Bingham & Taylor, Mueller, Handley Industries, Clay & Baily, A.Y. McDonald, Quality Water Products.

2.04 CORPORATION STOPS

Corporation stops shall be of the brass, ball valve type manufactured in accordance with AWWA Standard C800. The inlet connection shall have standard AWWA tapered threads unless otherwise required by the ENGINEER. The outlet connection shall be flared copper connection end or pack joint for polyethylene pipe as required. The sizes shall range from 1/2" to 2" and shall match the size of specified service line material.

Acceptable manufacturers and model numbers are:

Ford Meter Box Company - FB400 thru FB1600
Mueller - H-15000 Series
A.Y. McDonald - 4701 Series

2.05 CURB STOPS

Curb stops shall be bronze body construction, ball valves, with Double O-ring stem seals. Curb stops shall conform with AWWA Standard C800. End connections shall be suitable for flared copper connection or pack joint for polyethylene pipe as required. If required by the ENGINEER valves shall be furnished with square gate valve operating nuts. Sizes shall be from 3/4" to 2" and shall match the service line size.

Acceptable manufacturers and model numbers:

Ford Meter Box Company - B Series
Mueller - H-15000 Series
A.Y. McDonald - 6000 Series

2.06 MISCELLANEOUS SERVICE LINE FITTINGS

Miscellaneous service line fittings such as couplings, adaptors, saddles, bends, plugs, etc. shall conform to AWWA Specification C800.

Acceptable manufacturers: Ford Meter Box, Mueller, and A.Y. McDonald.

2.07 POLYETHYLENE ENCASEMENT

Copper service line material (pipe, valves, stops, etc.) installed on mains with polyethylene encasement or other type protective wrap shall be encased in polyethylene. Encasement material and installation shall be per Specification Section 15131 and ANSI/AWWA Standard C105/A21.5.

PART 3: EXECUTION

3.01 INSTALLATION OF CORPORATION STOPS

Tapping of all water mains shall be performed by experienced craftsmen familiar with installation of water service lines.

All taps shall be made with a suitable tapping machine (Mueller, Ford, Hays or Dresser type) using the proper combined drill and tap. hand held drilling equipment is not acceptable.

Corporation stops shall be inspected for damaged threads and proper operation of the ball valve prior to installation.

The main may be tapped at the horizontal centerline ±45° as shown on Sketch No. 61-300-10 in Section 15000.

Should the water main wall thickness or material (plastic, concrete or A-C pipeline material) be unsuitable for direct tapping a tapping saddle shall be used.

Proper installation of the corporation stop should allow between 2 and 3 threads to extend beyond the inside wall of the main. If necessary a test tap shall be made with the boring bar marked to the proper depth. The corporation shall not be threaded completely into the pipe such that it becomes shouldered with the main. Lubricants of any type shall not be used when installing the corporation.

Taps made to polyethylene encased water main shall be made using the procedure outlined in AWWA C600-87, Section 7.1.

3.02 INSTALLATION OF SERVICE LINE AND FITTINGS

Service lines shall be installed between the tap connection and the curb stop location making only gradual changes in grade or alignment as required. Sharp bends (greater than 15°) in any direction are not allowed unless approved by the ENGINEER. 1 ½" and 2" service lines may be installed using three (3) 1-inch corporation stops and a 3-branch connection. This is in lieu of installing a 1 ½" or 2" corporation stop. Included in Section 15000 is Sketch No. 61-300-11 which is to be followed for this type of installation.

All plastic service line connections shall use insert stiffeners of the appropriate length and size.

Curb stops shall be installed with the operating nut in the vertical position and the curb box centered over the nut. Curb boxes are to be installed plum and adjusted to be flush with finished grade. Curb boxes shall have lids installed and locked.

Excavation, backfilling and surface restoration shall be completed in accordance with Division 2 of these Specifications.

After completion of service line installation but prior to backfilling the corporation stop shall by opened slowly to fill the line. When the line is full and all air has been removed completely open the corporation and close the curb stop. All piping, fittings, and taps shall be visually checked for leaks.

SECTION 15205

SERVICE LINES
(OWNER Furnished)

PART 1: GENERAL

1.01 SCOPE

Where shown on the drawings and/or Specification Special Conditions the OWNER shall furnish and the CONTRACTOR shall install service lines originating at the water main and terminating at a curb stop connection. This section does not include service lines or meter installations beyond the curb stop. Refer to Sketch No. 61-300-10 contained in Section 15000 for a typical service line installation.

1.02 RELATED WORK

Specification Section 15000 - Piping - General Provisions.

PART 2: PRODUCTS

Service line material shall be furnished by the OWNER for installation by the CONTRACTOR. Refer to Section SSC-1000.1.03 for material to be furnished by the OWNER.

PART 3: EXECUTION

3.01 INSTALLATION OF CORPORATION STOPS

Tapping of all water mains shall be performed by experienced craftsmen familiar with installation of water service lines.

All taps shall be made with a suitable tapping machine (Mueller, Ford, Hays, or Dresser type) using the proper combined drill and tap. Hand held drilling equipment is not acceptable.

Corporation stops shall be inspected for damaged threads and proper operation of the ball valve prior to installation.

The main may be tapped at the horizontal centerline ±45° as shown on Sketch No. 61-300-10 included in Section 15000.

Should the water main wall thickness or material (plastic, concrete or A-C pipeline material) be unsuitable for direct tapping a tapping saddle shall be used.

Proper installation of the corporations top should allow between 2 and 3 threads to extend beyond the inside wall of the main. If necessary a test tap shall be made with the boring bar marked to the proper depth. The corporation shall not be threaded completely into the pipe such that it becomes shouldered with the main. Lubricants of any type shall not be used when installing the corporation.

Taps made to polyethylene encased water main shall be made using the procedure outlined in AWWA C600-87, Section 7.1.

3.02 INSTALLATION OF SERVICE LINE AND FITTINGS

Service lines shall be installed between the tap connection and the curb stop location making only gradual changes in grade or alignment as required. Sharp bends (greater than 15°) in any direction are not allowed unless approved by the ENGINEER. 1 ½" and 2" service lines may be installed using three (3) 1-inch corporation stops and a 3-branch connection. This is in lieu of installing a 1 ½" or 2" corporation stop. Included in Section 15000 is Sketch No. 61-300-11 which is to be followed for this type of installation.

All plastic service line connections shall use insert stiffeners of the appropriate length and size.

Curb stops shall be installed with the operating nut in the vertical position and the curb box centered over the nut. Curb boxes are to be installed plum and adjusted to be flush with finished grade. Curb boxes shall have lids installed and locked.

Excavation, backfilling and surface restoration shall be completed in accordance with Division 2 of these Specifications.

After completion of service line installation but prior to backfilling the corporation stop shall be opened slowly to fill the line. When the line is full and all air has been removed, completely open the corporation and close the curb stop. All piping, fittings and taps shall be visually checked for leaks.

SECTION 15120

POLYVINYL CHLORIDE (PVC) PIPE
(OWNER Furnished)

PART 1: GENERAL

1.01 COORDINATION OF WORK

Connection to existing pipelines may require shutdown of OWNER facilities. Construction work and connections shall be closely coordinated with the OWNER through the ENGINEER. The ENGINEER, in consult with the OWNER, may select the time, including Saturdays, Sundays or holidays, which, in the opinion of the ENGINEER, will cause the least inconvenience to the OWNER and/or its customers, for connection to existing pipelines, and the CONTRACTOR will perform such connections at such times as may be directed by the ENGINEER at the Contract prices and no claim for premium time or additional costs will be made by the CONTRACTOR.

1.02 RELATED WORK

Piping General Provisions - Section 15000

PART 2: PRODUCTS

Research has documented that certain pipe materials (such as polyvinyl chloride, polyethylene, and polybutylene) and certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this section have been selected based on the non-expectation of encountering petroleum products or organic solvents. If during the course of pipeline installation the CONTRACTOR identifies, or suspects, the presence of petroleum products or any unknown chemical substance the ENGINEER is to be notified immediately. Installation of any further piping in the area of suspected contamination shall be stopped until direction is provided by the ENGINEER.

2.01 PIPE MATERIALS

OWNER will furnish and CONTRACTOR shall install all PVC pipe and jointing materials. Materials to be furnished by OWNER are included in Section SSC-1000.1.03 of the Specifications Special Conditions.

PART 3: EXECUTION

3.01 INSTALLATION

The general provisions specified in Section 15000 shall be strictly followed in addition to the following:

A. Pipe Joint Assembly

The assembly of joints should be performed as recommended by the pipe manufacturer. The elastomeric gaskets may be supplied separately in cartons or positioned in the bell joint or coupling at the factory. When gaskets are color coded, be sure to consult the pipe manufacturer or his literature for the significance. In all cases, clean the gasket, the bell or coupling interior, especially the groove area (except when gasket is permanently installed) and the spigot area with a rag, brush or paper towel to remove any dirt or foreign material before the assembling. Inspect the gasket, pipe spigot bevel, gasket groove, and sealing surfaces for damage or deformation. When gaskets are separate, use only gaskets which are designed for and supplied with the pipe. Insert them as recommended by the manufacturer.

Lubricant should be applied as specified by the pipe manufacturer. Bacterial growth, damage to the gaskets or the pipe, may be promoted by use of non-approved lubricants. Use only lubricant supplied by the pipe manufacturer.

After lubrication, the pipe is ready to be joined. Good alignment of the pipe is essential for ease of assembly. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Do not swing or "stab" the joint; that is, do not suspend the pipe and swing it into the bell. The spigot end of the pipe is marked by the manufacturer to indicate the proper depth of insertion.

Solvent cemented joints where approved by the ENGINEER should be made in accordance with manufacturer's recommendations or in accordance with ASTM D2855, "Standard Recommended Practice for Making Solvent Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings".

To join field-cut pipe, it is necessary to first prepare the pipe end. A square cut is essential for proper assembly. The pipe shall be marked around its entire circumference prior to cutting to assure a square cut. Use a factory-finished beveled end as a guide for proper bevel angle, and depth of bevel plus the distance to the insertion reference mark. The end shall be beveled using a pipe beveling tool or a wood rasp which will cut the correct taper. A portable sander or abrasive disc may also be used to bevel the pipe end. Round off any sharp edges on the leading edge of the bevel with a pocket knife or a file.

SECTION 15121

POLYVINYL CHLORIDE (PVC) PIPE
(CONTRACTOR Furnished)

PART 1: GENERAL

1.01 SCOPE

This Section covers PVC pressure pipe in diameters 4 inches through 12 inches.

1.02 COORDINATION OF WORK

Connection to existing pipelines may require shutdown of OWNER facilities. Construction work and connections shall be closely coordinated with the OWNER through the ENGINEER. The ENGINEER, in consult with the OWNER, may select the time, including Saturdays, Sundays or holidays, which, in the opinion of the ENGINEER, will cause the least inconvenience to the OWNER and/or its customers, for connection to existing pipelines, and the CONTRACTOR will perform such connections at such times as may be directed by the ENGINEER at the Contract prices and no claim for premium time or additional costs will be made by the CONTRACTOR.

1.03 SUBMITTALS

Shop drawings and manufacturer's literature for all CONTRACTOR supplied materials shall be promptly submitted to the OWNER for approval in accordance with Section 1300.

1.04 RELATED WORK

Piping General Provisions - Section 15000

PART 2: PRODUCTS

Research has documented that certain pipe materials (such as polyvinyl chloride, polyethylene, and polybutylene) and certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this section have been selected based on the non-expectation of encountering petroleum products or organic solvents. If during the course of pipeline installation the CONTRACTOR identifies, or suspects, the presence of petroleum products or any unknown chemical substance the ENGINEER is to be notified immediately. Installation of any further piping in the area of suspected contamination shall be stopped until direction is provided by the ENGINEER.

2.01 PIPE MATERIALS

PVC pipe shall conform to the latest edition of American Water Works Association (AWWA) Standard C900 with elastomeric gasket couplings in accordance with this Standard. The use of solvent cement connections shall not be allowed unless approved by the ENGINEER

Pipe shall be furnished with cast iron pipe equivalent outside diameter and the Pressure Class shall be 100, 150 or 200 psi. depending on the system design pressure and laying conditions.

PART 3: EXECUTION

3.01 INSTALLATION

The general provisions provided in Specification Section 15000 shall be strictly followed in addition to the following:

A. Pipe Joint Assembly

The assembly of joints should be performed as recommended by the pipe manufacturer. The elastomeric gaskets may be supplied separately in cartons or positioned in the bell joint or coupling at the factory. When gaskets are color coded, be sure to consult the pipe manufacturer or his literature for the significance. In all cases, clean the gasket, the bell or coupling interior, especially the groove area (except when gasket is permanently installed) and the spigot area with a rag, brush or paper towel to remove any dirt or foreign material before the assembling. Inspect the gasket, pipe spigot bevel, gasket groove, and sealing surfaces for damage or deformation. When gaskets are separate, use only gaskets which are designed for and supplied with the pipe. Insert them as recommended by the manufacturer.

Lubricant should be applied as specified by the pipe manufacturer. Bacterial growth, damage to the gaskets or the pipe, may be promoted by use of non-approved lubricants. Use only lubricant supplied by the pipe manufacturer.

After lubrication, the pipe is ready to be joined. Good alignment of the pipe is essential for ease of assembly. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Do not swing or "stab" the joint; that is, do not suspend the pipe and swing it into the bell. The spigot end of the pipe is marked by the manufacturer to indicate the proper depth of insertion.

Solvent cemented joints where approved by the ENGINEER should be made in accordance with manufacturer's recommendations or in accordance with ASTM D2855, "Standard Recommended Practice for Making Solvent Cemented Joints with Polyvinyl Chloride PVC Pipe and Fittings".

To join field-cut pipe, it is necessary to first prepare the pipe end. A square cut is essential for proper assembly. The pipe shall be marked around its entire circumference prior to cutting to assure a square cut. Use a factory-finished beveled end as a guide for proper bevel angle, and depth of bevel plus the distance to the insertion reference mark. The end shall be beveled using a pipe beveling tool or a wood rasp which will cut the correct taper. A portable sander or abrasive disc may also be used to bevel the pipe end. Round off any sharp edges on the leading edge of the bevel with a pocket knife or a file.

ADDENDUM E

100' Refund Process Example

TENNESSEE AMERICAN WATER JOB COST/DEPOSIT RECORD ADDENDUM E

ASSET W.O.	ADV. MAIN	ADV. LAT.
D26-0201-P-0519		

DEPOSITOR: ABC Devloper
ADDRESS: 42 Wallaby Way
Sydney Australia

JOB NAME: Developer Extension

TOTAL JOB COST

			$100,000.00 ESTIMATED	$90,000.00 ACTUAL	$10,000.00 VARIANCE
A. COST OF MAIN			$ 95,000.00	$ 85,000.00	$ 10,000.00
B. COST OF SERVICE LATERALS			$ -		$ -
C. FOOTAGE OF MAIN			1000	1000	0
D. UNIT COST OF MAIN, LATERALS (A+B/C)			$ 95.00	$ 85.00	$ 10.00
E. NUMBER OF UPFRONT CREDITS			0	0	
F. UPFRONT CREDIT RATE (100XD)	MAIN	100	$ 9,500.00	$ 8,500.00	$ 1,000.00
G. UPFRONT CREDIT AMOUNT (EXF)			$ -	$ -	$ -
H. DEPOSIT FOR MAINS - REFUNDABLE	YES		$ 95,000.00	$ 85,000.00	$ 10,000.00
ACCOUNT #72801100					
I. DEPOSIT FOR SERVICES - REFUNDABLE	YES		$ -	$ -	$ -
ACCOUNT #72801000					
J. DEPOSIT FOR FIRE HYDRANTS - REFUNDABLE	NO		$ 5,000.00	$ 5,000.00	$ -
ACCOUNT #72802100					
K. TOTAL JOB COST			$ 100,000.00	$ 90,000.00	$ 10,000.00 **
L. TOTAL DEPOSIT (H+I+J)			$ 100,000.00	$ 90,000.00	$ 10,000.00
M. CLERK,DATE					
N. SUPERVISOR, DATE					

** DUE CUSTOMER DISBURSEMENT $10,000.00
BILL CUSTOMER M.I.

APPROVED BY:

TOTAL REFUNDABLE AMOUNT (H+I)		MAIN %	LATERALS %	
$85,000.00		100.00%	0.00%	
	Total Per Refund	$8,500.00	$0.00	$8,500.00

EXHIBIT C

EXTENSION DEPOSIT AGREEMENT

THIS AGREEMENT made and entered into this _____ day of _____, 20_____, by and between the TENNESSEE-AMERICAN WATER, hereinafter called the "TAW" and _____ hereinafter called the "DEPOSITOR."

WHEREAS, the DEPOSITOR desires an extension of the water distribution mains of TAW as hereinafter described.

W I T N E S S E T H:

FIRST: TAW contracts and agrees to lay the water main (s) as shown in red on the diagram which is hereto attached and made a part hereof, which main (s) and described and located as follows:

Install

SECOND: It is expressly understood and agreed that if TAW shall be delayed or prevented from installing the water main (s) hereinabove described because of its failure to secure pipe or other necessary construction materials, or for any other causes beyond its control, such failure or delay in performance shall be excused; provided, however, that if such failure or delay in performance shall extend for a period of more than one (1) year from the date hereof, the DEPOSITOR shall have the right to cancel and terminate this Agreement on thirty (30) days' written notice to TAW and thereafter both parties shall be relieved of all duties and obligations arising hereunder. The right to cancel and terminate this Agreement by the DEPOSITOR shall not be revoked, however, if TAW has received the necessary pipe and construction materials and the DEPOSITOR has made the deposit as hereinafter required, in which event TAW shall have the obligation to prosecute diligently the work of installing the water main (s) hereinabove described until said work is completed.

THIRD: The DEPOSITOR hereby agrees to deposit with TAW, upon receipt of written notice from TAW that it is prepared and able to go forward with the work provided in Paragraph FIRST hereof, an amount equal to (a) the estimated number of feet of pipe to be installed multiplied by the estimated Unit Cost Per Foot of Main, plus the estimated cost of all

other facilities (excluding public fire hydrants, hydrant laterals, service lines and meters) which TAW shall have determined are required to render adequate service, less (b) a credit equal to the amount produced by multiplying the estimated Unit Cost Per Foot of Main by one hundred (100) and by multiplying this result by the number of Bona Fide Prospective Customers whose premises abut said extension and will be directly connected thereto.

FOURTH: Upon completion of the installation of the water main (s) described in Paragraph FIRST above, or as soon thereafter as may be practicable, TAW shall furnish to the DEPOSITOR a statement of actual cost. In the event that such statement of cost is less than the original estimate of cost, TAW shall promptly return to the DEPOSITOR the difference between such amounts. In the event that such statement of cost exceeds the original estimate of cost, the DEPOSITOR shall promptly make a further deposit with TAW in an amount equal to the difference between such amounts. It is the intent of this paragraph that the DEPOSITOR shall deposit the actual cost to TAW, less the credit provided for in Paragraph THIRD above.

FIFTH: TAW hereby agrees to refund to the DEPOSITOR, during the period of ten (10) years from the actual date of the original deposit hereunder, for each additional Bona Fide Customer for which a service line has been connected to the extension in question an amount equal to the completed actual Unit Cost Per Foot of Main used in calculating the final deposit multiplied by one hundred (100).

SIXTH: The ownership of the water main (s) installed hereunder shall at all times be and remain in TAW, its successors and assigns.

SEVENTH: This Agreement shall be valid and binding on TAW only when executed by its President or a Vice President.

EIGHTH: This Agreement shall be binding upon the heirs, executors, administrators, successors, and assigns of the respective parties.

NINTH: Any notice given hereunder shall be deemed sufficient if in writing and sent by registered mail to TAW at: 109 Wiehl Street, Chattanooga, TN 37403 and the DEPOSITOR at: _____.

TENTH: This Agreement is entered into pursuant to the legally established Rules and Regulation of TAW, and the words, phrases, and terms hereof are to be understood and interpreted in conformity with said Rules and Regulations, which are hereby incorporated herein by reference.

Executed in triplicate by the parties hereto on the date first above written,

WITNESS:

TENNESSEE AMERICAN WATER

_____

By: _____

Darlene Williams, President

WITNESS:

DEPOSITOR

_____

By: _____

Owner

SUPPLEMENTAL MEMORANDUM

This Supplemental Memorandum is executed by the parties hereto under and pursuant to the provisions of paragraph THIRD of an Extension Deposit Agreement in writing between the parties entered into on the _____ day of _____20___, for the installation by TAW of a certain water main (s) described therein in the paragraph FIRST. It is therefore agreed and stipulated:

The estimated cost of the extension is _____ Dollars.

Credit is allowed for _____ Bona Fide Prospective Customers at the rate of _____ Dollars each for a total amount of _____ _____Dollars in accordance with paragraph THIRD (b) of the Extension Deposit Agreement.

The amount of deposit received from the DEPOSITOR (S) is _____ _____ _____ Dollars.

The Supplemental Memorandum shall be attached to the original Extension Deposit Agreement.

Dated

_____
Date of Deposit

WITNESS: TENNESSEE-AMERICAN WATER

_____ By: _____
Darlene Williams, President

WITNESS: DEPOSITOR

_____ By: _____
Owner

EXTENSION DEPOSIT AGREEMENT BETWEEN

TENNESSEE-AMERICAN WATER

AND

_____

DATED

_____

Covering installation of:

_____

WBS# _____

Schedule 1.4
List of Excluded Assets

The Excluded Assets are listed in Section 1.4. There are no additional Excluded Assets to list on this schedule.

Schedule 4.1(b)
Assets Subject to Leasehold Interest

None.

Schedule 4.1(f)
Required Approvals

None.

Schedule 4.1(i)
Undisclosed Liabilities

None.

Schedule 4.1(k)
List of Contracts

Seller has no contracts to transfer or disclose to Buyer.

Schedule 4.1(k)(i)
Refund Arrangements

None.

Schedule 4.1(l)(i)
Rights in Real Property and Leases

Owned Real Property

1. Upper Pump Station: Approximately 0.25 acres located at the southeast corner of Jasper Highlands lot 223 (Out of Tax Map No. 118-009)

2. Lower Pump Station: Approximately 1.64 acres located at Timber Ridge Estate lot 23 (Tax Map No. 133E B 023)

Leased Real Property

None.

Schedule 4.1(l)(ii)
Easements and Rights of Way

1. Water Tank –Approximately 0.21 acre easement for water tank at NE corner of Jasper Highland (Phase 1-B) lot 118; further described as follows:

Commencing at ½" Rebar and Cap at the North East corner of Lot 118, Jasper Highlands Subdivision Phase 1-B of record in Plat Book 5 Page 811, Registers Office Marion Count Tennessee; thence with a tie line N13°54'26"E a distance of 4902.94' to a point, said point being located S23°57'37"E a distance of 29.40' from the Southernmost corner of the chain link fence surrounding the existing water tank, said point being the point of beginning of the hereinafter described tract; thence parallel and 20' outside the existing chain link fence the following chord bearings and distances: N66°49'13"W a distance of 54.12' to a point; thence N32°31'19"W a distance of 60.85' to a point; thence N26°58'14"E a distance of 64.25' to a point; thence S67°25'48"E a distance of 92.71' to a point; thence S18°53'59"W a distance of 99.66' to a point, said point being the point of beginning and having an area of .21 Acres.

2. Easements and Right-of-Ways for all water lines and other water-related assets.

Schedule 4.1(l)(iii)
Options and Rights of First Refusal

None.

Schedule 4.1(l)(v)
Taxes and Assessments

None.

Schedule 4.1(l)(vi)
Necessary Repairs to Real Property

None.

Schedule 4.1(m)
Litigation

Seller has no litigation to disclose to Buyer.

Schedule 4.1(p)
Violations of Law

None.

Schedule 4.1(q)
Permits

Tennessee Department of Environment and Conservation PWSID #0008286

Schedule 4.1(r)(iv)
Environmental Conditions

None.

Schedule 4.1(t)
Current Extension Deposit Agreements

None.

Schedule 4.1(u)
ICSU Agreements

None.

Schedule 5.1(c)
Assigned Contracts

None.

Schedule 8.1(g)
Opinion of Seller's Counsel

This schedule will be completed to Buyer's satisfaction prior to closing.

Schedule 8.1(j)
Certification of Financial Information

This schedule will be completed to Buyer's satisfaction prior to closing.

Schedule 8.1(o)
Refund payable to Seller

This schedule will be completed to Buyer's satisfaction prior to closing.

EXHIBIT B

TENNESSEE
AMERICAN WATER

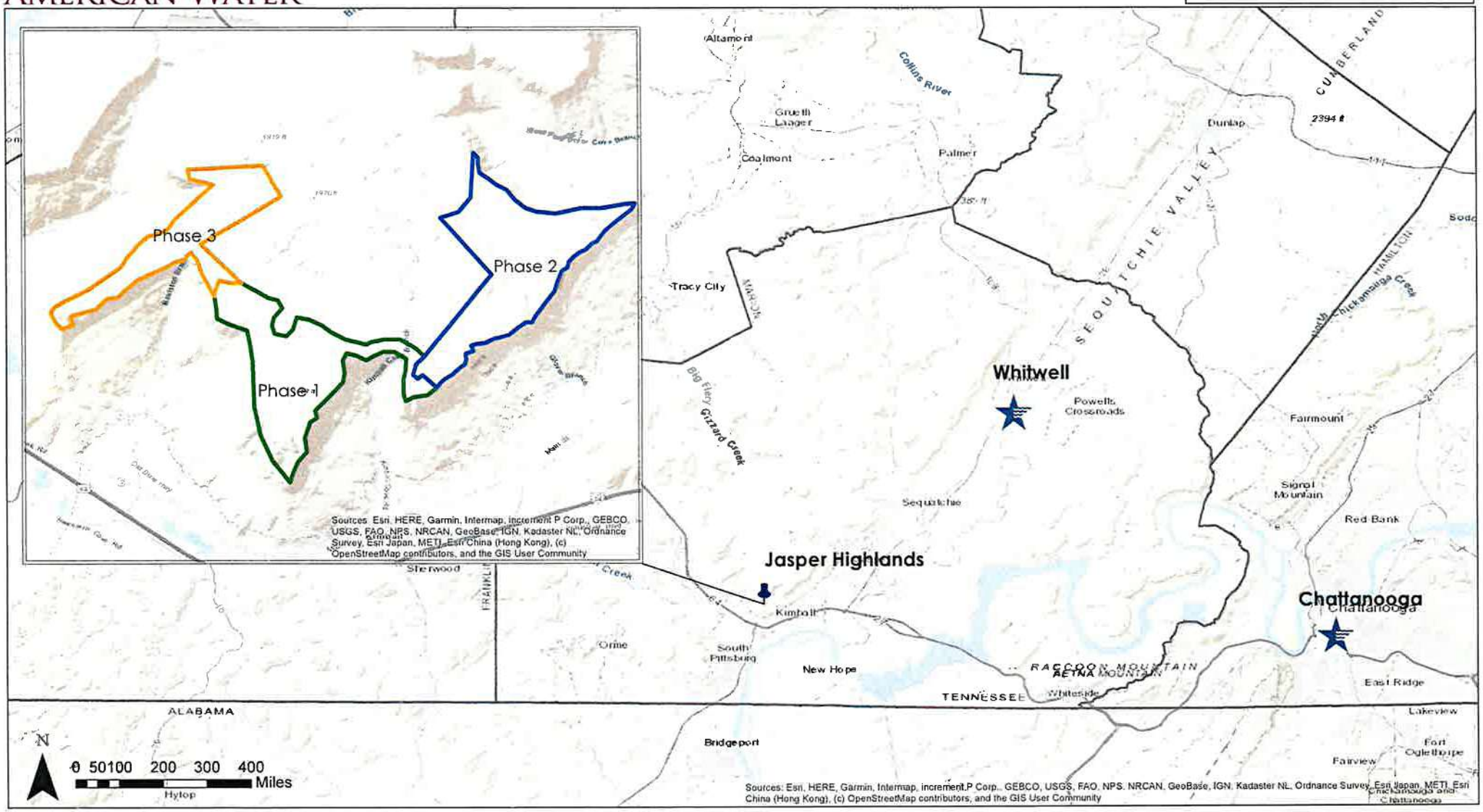


EXHIBIT C

LEASE

THIS LEASE, made as of the 1st day of January, 2015, by and between **Thunder Air, Inc., d/b/a Jasper Highlands Development, Inc.**, a Tennessee corporation, hereinafter called the "Lessor", and **Jasper Highlands Property Owners' Association, Inc.**, a Tennessee not-for-profit corporation, hereinafter called the "Lessee".

W I T N E S S E T H:

WHEREAS, the Lessee has agreed to purchase water from South Pittsburg Board of Water Works and Sewers ("Water Board") for use of the Jasper Highlands subdivision in Marion County, Tennessee; and

WHEREAS, the water will be conveyed by piping, a pump house and other equipment installed and owned by Lessor to the lots of individual property owners (the "Equipment"); and

WHEREAS, the Lessee desires to lease the Equipment upon the terms and conditions hereinafter set forth;

NOW, THEREFORE, in consideration of the promises and the agreements contained herein, the parties agree as follows:

1. Lease. Lessor hereby leases to Lessee all piping, machinery, equipment and other property described in the attached Schedule A (the "Equipment").

2. Term. The term of this lease shall continue until the Lessee is deeded all common elements and piping infrastructure for one dollar ($1.00).

3. Rent. The rent for the Equipment shall be one dollar ($1.00) per year.

4. Use. Lessee shall use the Equipment in a careful and proper manner and shall comply with and conform to all national, state, municipal, and other laws, ordinances and regulations in anywise relating to the possession, use or maintenance of the Equipment, including all requirements of the Water Board.

5. Repairs. Lessee, at its own cost and expense, shall keep the Equipment in good repair, condition and working order and shall furnish any and all parts, mechanisms and devices required to keep the Equipment in good mechanical and working order.

6. Loss and Damage. Lessee hereby assumes and shall bear the entire risk of loss and damage to the Equipment from any and every cause whatsoever. Lessee shall keep the Equipment insured against all risks of loss or damage by fire and theft. The Lessee may effect such coverages under its blanket policies.

7. Taxes. Lessee shall keep the Equipment free and clear of all levies, liens and encumbrances, other than those being contested in good faith, and shall pay when due all license fees, registration fees, assessments, charges and taxes (municipal, state and federal) which may now or hereafter be imposed upon the ownership, leasing, renting, sale, possession or use of the Equipment, excluding, however, all taxes on or measured by Lessor's income.

8. Lessor's Payment. In case of failure of Lessee to procure or maintain said insurance or to pay said fees, assessments, charges and taxes, Lessor shall have the right, but shall not be obligated, to effect such insurance or pay said fees, assessments, charges and taxes, as the case may be. In that event, the cost thereof shall be repayable to Lessor with the next installment of rent.

9. Default. If Lessee, with regard to any item or items of Equipment, fails to observe, keep or perform any provision of this lease required to be observed, kept or performed by Lessee, and if Lessee fails to remedy, cure or remove such failure in payment or such other failure in observing, keeping or performing the provisions of this lease within thirty (30) days after receipt of written notice thereof from Lessor, Lessor shall have the right to take possession of any or all items of Equipment, without demand or notice, without any court order or other process of law. This remedy shall be in addition to, and not in lieu of, any other legal or equitable remedy of the Lessor.

10. Assignment. Without the prior written consent of Lessor, which may be withheld in Lessor=s sole discretion, Lessee shall not (a) assign, transfer, pledge or hypothecate this lease, the Equipment, or any part thereof, or any interest therein; or (b) sublet or lend the Equipment, or any part thereof, or permit the Equipment, or any part thereof, to be used by anyone other than Lessee or Lessee's employees.

11. Entire Agreement. This instrument constitutes the entire agreement between Lessor and Lessee, and it shall not be amended, altered or changed except by a written agreement signed by the parties hereto.

12. Notices. Service of all notices under this agreement shall be sufficient if given personally or mailed via certified mail to the party involved at its respective address hereinafter set forth or at such address as such party may provide in writing from time to time. Any such notice mailed to such address shall be effective when deposited in the United States mail, duly addressed and with postage prepaid.

Thunder Air, Inc.
P.O. Box 4737
Chattanooga, TN 37405

Jasper Highlands Property Owners' Association, Inc.
P.O. Box 4737
Chattanooga, TN 37405

13. Titles. The titles to the paragraphs of this lease are solely for the convenience of the parties and are not an aid in the interpretation of the instrument.

IN WITNESS WHEREOF, the parties hereto have executed these presents the day and year first above written.

THUNDER AIR, INC.

By: _____
Its: Chairman

JASPER HIGHLANDS PROPERTY OWNERS' ASSOCIATION, INC.

By: _____
Its: Chairman

SCHEDULE A

1. Meter and Meter Vault across Timber Ridge Road and adjacent to the large tank owned by the Water Board.
2. Pump Station 1, located adjacent to Meter and Vault
3. Ductile piping connecting Pump Station 1 and Pump Station 2
4. 8,000 gallon underground tank, located adjacent to Pump Station 2
5. Pump Station 2
6. All piping connecting pump station 2 to the inhabited subdivision within the road right-of-way, including ductile pipe, and PVC pipe of various sizes.
7. Any equipment added in the future to further support the water system
8. Lease does not include water lines from Lot Owners' homes to the main lines in the road right-of-way. These lines are owned and paid for by the Lot Owners, and are the responsibility of Lot Owners to maintain.

MANAGEMENT AGREEMENT

THIS AGREEMENT made and entered into on this 1st of January, 2015, by and between **Thunder Air, Inc., d/b/a Jasper Highlands Development, Inc.**, a Tennessee corporation, hereinafter called "Thunder", and **Jasper Highlands Property Owners' Association, Inc.**, a Tennessee not-for-profit corporation, hereinafter called the "Association".

WITNESSETH:

WHEREAS, the Association, through its agent Thunder, has agreed to purchase water from South Pittsburg Board of Water Works and Sewers ("Water Board") for use of the Jasper Highlands subdivision in Marion County, Tennessee; and

WHEREAS, the water will be conveyed by piping, a pump house and other equipment owned by Thunder and leased by the Association (the "Water Equipment") to piping connecting the lots of individual property owners in the Association; and

WHEREAS, the Association desires to contract with Thunder to furnish billing services to lot owners and maintenance and repairs to the Water Equipment, and Thunder is willing to perform such services upon the terms and conditions hereinafter set forth;

NOW, THEREFORE, in consideration of the promises and the agreements contained herein, the Association and Thunder, intending to be legally bound, agree as follows:

1. Duties of Thunder. The Association hereby retains Thunder to furnish certain services with respect to the Water Equipment listed on the attached Schedule A, including billing and collection of water charges and assessments from property owners, handling payment of bills to the Water Board, supervision of maintenance and repairs to the Water Equipment, and supervision of improvements to the Water Equipment requested by the Association. Thunder shall make such reports as requested by the Association regarding the Water Equipment and perform such additional duties agreed to by the parties.

2. Compensation. The Association agrees to pay Thunder fees for management services in accordance with the attached Schedule B. In addition, Thunder shall be reimbursed for all expenses incurred by it in performing its duties hereunder.

3. Term of Agreement. The term of this Agreement shall continue on a year to year basis until the Association takes title to all Water Equipment and common elements, unless one party terminates on six (6) months' written notice prior to the end of the year. Failure by either party to substantially perform its duties and obligations under this Agreement for a continuous period of thirty (30) days after written notice of default specifying the default complained of, shall be grounds for the other party's cancellation of this Agreement.

4. Hold Harmless. Association agrees to indemnify, defend, and hold harmless Thunder and its officers, directors, and employees for errors in judgment or any acts or omissions in connection therewith, provided, however, that nothing herein contained will be

construed to protect Thunder against liability to the Association by reason of willful misconduct, bad faith, gross negligence, or negligence in the performance of its duties or by reason of its reckless disregard of its obligations and duties under this Agreement, and Thunder agrees to indemnify and hold the Association harmless from any cost, expense, or loss occasioned by or arising out of such conduct of Thunder.

5. Miscellaneous.

A. The Association claims exemption from qualifying as a water utility district under the provisions of Tenn. Code Ann. § 65-4-101(6)(B)(i). If the exemption is lost, the Association shall be responsible for any compliance.

B. In the event legal action is instituted to enforce this Agreement, the prevailing party shall be entitled to reasonable attorney's fees and actual costs incurred in connection with such action.

C. Thunder is an independent contractor and is not and shall not be deemed as employee of the Association for any purpose and as such has no authority to bind the Association.

D. This Agreement reflects the entire agreement of the parties hereto and is intended to be the complete and exclusive statement of the terms hereof. It may not be added to or changed orally and may not be modified or rescinded except in writing and approved by the parties.

E. This Agreement, the relative rights and obligations of the parties hereunder, and all performance hereunder shall be governed by and construed in accordance with the laws of the State of Tennessee.

F. All notices given hereunder shall be in writing or if oral shall be confirmed in writing and shall be deemed given when delivered to the parties at the following addresses:

Thunder: Thunder Air, Inc.
P.O. Box 4737
Chattanooga, TN 37405

Association: Jasper Highlands Property Owners' Association, Inc.
P.O. Box 4737
Chattanooga, TN 37405

G. This Agreement may not be assigned without the prior written approval of the non-assigning party. This Agreement shall inure to the benefit of, and be binding upon the parties, their successors, and assigns.

H. Thunder makes no warranty or representation to the Association and its members

as to the supply of water, water quality, or the Association's exempt status.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first above written.

THUNDER AIR, INC.

By: _____
Its: Chairman

JASPER HIGHLANDS PROPERTY OWNERS' ASSOCIATION, INC.

By: _____
Its: Chairman

Schedule A

1. Process payment of bills from Sequachee Valley Electric Co-Operative to the Association for electric service to Pump Station #1 and Pump Station #2
2. Process payment of bills from the Water Board to the Association for water service to Jasper Highlands Subdivision
3. Take monthly readings of all Lot Owner water meters
4. Process all billing to Lot Owners for use of water service
5. Provide connection of all Lot Owners' meters on the Jasper Highlands Water System, upon request, including provision of all standard parts and labor for meter installation
6. Determine all rates and fees to be paid by Lot Owners using the water service
7. Remit all sales tax to the Tennessee Department of Revenue as required by Tennessee State Law
8. Enforce guidelines and requirements for proper use of water system, including proper use of backflow prevention systems and cross-connection prevention systems
9. Provide customer service, including availability by telephone during normal business hours, to Lot Owners using the water service
10. Supervise any necessary maintenance and repairs to the Water Equipment
11. Supervise any improvements to the Water Equipment requested by the Association
12. Make all reports regarding the Water Equipment as requested by the Association

Schedule B

1. All expenses incurred by Thunder in connection with this Management Agreement
2. 100% of meter fees billed by the Association
3. 15% of total billing collected from Lot Owners for water service before sales tax

CONSENT

THIS CONSENT is made and entered into as of the 26th day of November, 2019, by and between Thunder Air, Inc., a Tennessee corporation ("Thunder") and Jasper Highlands Property Owners' Association, Inc., a Tennessee nonprofit corporation ("JHPOA").

RECITALS

1. JHPOA operates a water system for the exclusive use of the residents of the Jasper Highlands development in Marion County, Tennessee, having been unable to obtain water services directly from the South Pittsburg Board of Water Works and Sewers.

2. Thunder owns the infrastructure of the water system, which provides water services to customers in the Jasper Highlands, and is responsible for managing the water system under an agreement with JHPOA;

3. JHPOA holds the customer information for the water system and handles the billing for water services;

4. Thunder desires to sell the water system and Tennessee American Water Company ("TAWC") desires to purchase the water system and take over management of the system with JHPOA's responsibilities terminated;

5. JHPOA desires to consent to the transfer of the water system to TAWC.

NOW THEREFORE, in consideration of the mutual promises and conditions stated herein, the parties agree as follows:

1. Recitals. The foregoing recitals are herein fully incorporated by reference the same as if fully incorporated herein.

2. Agreement. JHPOA consents to the transfer of the water system. The parties agree to terminate the management arrangement regarding the water system. At the closing of the transfer, JHPOA will deliver all information in its possession regarding the water system to TAWC, including but not limited to, customer addresses and account information.

3. Governing Law. This Consent shall be governed by the laws of the State of Tennessee.

4. Counterparts. This Consent may be executed in two (2) or more counterparts, each of which shall be deemed to be an original. Execution and delivery of this Consent by delivery of a facsimile or .pdf copy bearing the facsimile or .pdf signature of a party shall constitute a valid and binding execution and delivery of this Consent by such party.

IN WITNESS WHEREOF, the parties have executed this Consent as of the date first above written.

THUNDER AIR, INC.

By: _____
Its: President

JASPER HIGHLANDS PROPERTY OWNERS' ASSOCIATION, INC.

By: _____
Its: President

Tre Hargett
Secretary of State

Division of Business Services
Department of State
State of Tennessee
312 Rosa L. Parks AVE, 6th FL
Nashville, TN 37243-1102

CFS
STE B
992 DAVIDSON DR
NASHVILLE, TN 37205-1051

Request Type: Certified Copies
Request #: 340698

Issuance Date: 12/02/2019
Copies Requested: 1

Document Receipt

Receipt # : 005127780 Filing Fee: $20.00

Payment-Account - #71708 CAPITAL FILING SERVICE, INC , NASHVILLE, TN $20.00

I, Tre Hargett, Secretary of State of the State of Tennessee, do hereby certify that **JASPER HIGHLANDS PROPERTY OWNERS' ASSOCIATION, INC,** Control # 685272 was formed or qualified to do business in the State of Tennessee on 05/02/2012. JASPER HIGHLANDS PROPERTY OWNERS' ASSOCIATION, INC has a home jurisdiction of TENNESSEE and is currently in an Active status. The attached documents are true and correct copies and were filed in this office on the date(s) indicated below.

Tre Hargett
Secretary of State

Processed By: Stephanie Booker

The attached document(s) was/were filed in this office on the date(s) indicated below:

Reference #	Date Filed	Filing Description
7051-0190	05/02/2012	Initial Filing
A0161-0820	03/13/2013	2012 Annual Report (Due 04/01/2013)
A0217-0645	02/26/2014	2013 Annual Report (Due 04/01/2014)
B0065-4488	03/10/2015	2014 Annual Report (Due 04/01/2015)
B0228-5697	03/31/2016	2015 Annual Report (Due 04/01/2016)
B0373-5232	03/30/2017	2016 Annual Report (Due 04/01/2017)
B0488-2193	01/26/2018	2017 Annual Report (Due 04/01/2018)
B0667-6557	03/08/2019	2018 Annual Report (Due 04/01/2019)

CHARTER

OF

JASPER HIGHLANDS PROPERTY OWNERS' ASSOCIATION, INC.

The undersigned natural person having the capacity to contract and acting as the Incorporator of corporation under the Tennessee Nonprofit Corporation Act, T.C.A. §48-51-101, et seq., adopts the following Charter for the Corporation:

1. **NAME:** The name of the Corporation is:

JASPER HIGHLANDS PROPERTY OWNERS' ASSOCIATION, INC.

2. **PRINCIPAL OFFICE:** The address of the principal office of the Corporation in the State of Tennessee shall be 210 Battle Creek Road, South Pittsburg, Marion County, Tennessee, 37380. The mailing address of the Corporation is Post Office Box 4737, Chattanooga, Hamilton County, Tennessee, 37405.

3. **REGISTERED AGENT:** The initial registered agent for service of process for the Corporation is Mr. Dane Bradshaw, 210 Battle Creek Road, South Pittsburg, Marion County, Tennessee 37380.

4. **MUTUAL BENEFIT CORPORATION:** The Corporation is a not for profit mutual benefit Corporation.

5. **PERPETUAL:** The existence of the Corporation is perpetual.

6. **INCORPORATOR:** The name and address of the Incorporator is:

John H. Cameron, Jr.
28 Courthouse Square, Ste. 100
Post Office Box 759
Jasper, Marion County, Tennessee 37347

7. **MEMBERS:** The Corporation shall have members. Every member or entity who is a record owner of a lot in Jasper Highlands Subdivision located in Marion County,

Received by Tennessee Secretary of State Tre Hargett, 05/02/2012, 12:32:31, 70051.019

Tennessee ("Jasper Highlands") pursuant to Declaration of Covenants, Conditions, and Restrictions of Jasper Highlands ("Declarant") as amended from time to time, may be a member for so long as the member shall continue to be a record owner. Persons or entities who hold an interest merely as security for the performance of an obligation are not members of the Corporation. Membership shall be appetent to and may not be separated from ownership of any lot which is subject to assessment by the Corporation.

8. **PURPOSE:** The Corporation is organized for the purpose of carrying on one or more of the exempt functions of an owner's association for which a not for profit corporation may be organized under the Tennessee Non-Profit Corporation Act, including but not limited or restricted in any way through a Board of Directors the business activities, management, maintenance, care and preservation of Jasper Highlands.

Further purposes of the Corporation include the promotion of the health, safety, and welfare of the Owners of Jasper Highlands and in addition thereto the power to:

(a) Fix, levy and collect payment of all charges and assessments including such licenses, taxes or other governmental charges as may be levied or imposed against the Corporation.

(b) Have and exercise any and all powers, rights and privileges which a Corporation organized under the provisions of the Tennessee Non-Profit Corporation Act relating to not for profit corporations may now or hereafter have or exercise.

9. **LIMITATION OF LIABILITY:** To the fullest extent permitted by the Tennessee Non-Profit Corporation Act and the laws of the State of Tennessee, no present or future Director of the Corporation (or his/her estate, heirs, and personal representatives) shall be liable to the Corporation or its members for monetary damages for any breach of

Received by Tennessee Secretary of State Tre Hargett, 05/07/2012, 12:32:32, 00510.019

fiduciary duty as a Director of the Corporation.

10. **LIABILITY OF DIRECTOR:** Any liability of a Director (or his/her estate, heirs, or personal representatives) shall be further eliminated or limited to the fullest extent allowed by the laws of the State of Tennessee as may hereinafter be adopted or amended.

11. **DISSOLUTION:** The Corporation may be dissolved only if such dissolution if approved by the affirmative vote of at least two-thirds percent (2/3%) of the members. Upon dissolution of the Corporation, other than incident of a merger or consolidation, the assets of the Corporation, if any, shall be dedicated and conveyed to one (1) or more appropriate public agency on the express condition that such assets shall be devoted to purposes as nearly as practical to the same as those to which they were required to be devoted by the Corporation. In the event that such dedication is not accepted then in such assets shall be conveyed to a non-profit corporation, non-profit association, non-profit trust or other non-profit organization on the express condition that such assets shall be devoted to purposes as nearly practical as those which are required to be devoted by the Corporation.

12. **EARNINGS:** No part of the net earnings of the Corporation shall inure to the benefit of or be distributable to any of its members, directors, officers, or other private persons except through acquisition, construction, management, maintenance or care of the Corporation's profit or through the rebate of excess membership dues, fees or assessments. Notwithstanding this provisions reasonable compensation may be paid for services rendered to or for the Corporation affecting one (1) or more of its purposes.

13. **AMENDMENTS:** Amendment to this Charter shall require the affirmative vote of at least two-thirds percent (2/3%) of the members.

Received by Tennessee Secretary of State Hargett, 05/02/2017, 12:32:32, 1051.019

14. **EFFECTIVE DATE:** This document is to be effective upon the filing by the Secretary of State.

DATED: April 30, 2012.

John H. Cameron, Jr., Incorporator

Received by Tennessee Secretary of State Tre Hargett, 05/02/2012, 12:32:34, 7051.0193

Tre Hargett
Secretary of State

Division of Business Services
Department of State
State of Tennessee
312 Rosa L. Parks AVE, 6th FL
Nashville, TN 37243-1102

BUTLER SNOW LLP
SUITE 1600
150 3RD AVENUE SOUTH
NASHVILLE, TN 37201

December 2, 2019

Request Type: Certificate of Existence/Authorization
Request #: 0340533

Issuance Date: 12/02/2019
Copies Requested: 1

Document Receipt

Receipt # : 005126249	Filing Fee: $20.00
Payment-Credit Card - State Payment Center - CC #: 3770486922	$20.00

Regarding:	JASPER HIGHLANDS PROPERTY OWNERS' ASSOCIATION, INC		
Filing Type:	Nonprofit Corporation - Domestic	Control # :	685272
Formation/Qualification Date:	05/02/2012	Date Formed:	05/02/2012
Status:	Active	Formation Locale:	TENNESSEE
Duration Term:	Perpetual	Inactive Date:	
Business County:	MARION COUNTY		

CERTIFICATE OF EXISTENCE

I, Tre Hargett, Secretary of State of the State of Tennessee, do hereby certify that effective as of the issuance date noted above

JASPER HIGHLANDS PROPERTY OWNERS' ASSOCIATION, INC

* is a Corporation duly incorporated under the law of this State with a date of incorporation and duration as given above;

* has paid all fees, interest, taxes and penalties owed to this State (as reflected in the records of the Secretary of State and the Department of Revenue) which affect the existence/authorization of the business;

* has filed the most recent annual report required with this office;

* has appointed a registered agent and registered office in this State;

* has not filed Articles of Dissolution or Articles of Termination. A decree of judicial dissolution has not been filed.

Tre Hargett
Secretary of State

Processed By: Cert Web User

Verification #: 036585931

06606280

Tennessee Corporation Annual Report Form

AR Filing #: 06606280
FILED: Mar 8, 2019 12:18PM

File online at: https://TNBear.TN.gov/

Due on/Before: 04/01/2019 Reporting Year: 2018

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 #: 3752028039

SOS Control Number: 685272
Nonprofit Corporation - Domestic Date Formed: 05/02/2012 Formation Locale: TENNESSEE

(1) Name and Mailing Address:
JASPER HIGHLANDS PROPERTY OWNERS' ASSOCIATION
104 BATTLECREEK RD
SOUTH PITTSBURG, TN 37380-6308

(2) Principal Office Address:
104 BATTLECREEK RD
SOUTH PITTSBURG, TN 37380-6308

(3) Registered Agent (RA) and Registered Office (RO) Address:
WILLIAM H HORTON
STE 306
735 BROAD ST
CHATTANOOGA, TN 37402-2915

Agent Changed: No
Agent County: MARION COUNTY

(4) Name and business address (with zip code) of the President, Secretary and other principal officers.

Title	Name	Business Address	City, State, Zip
Secretary	Melissa Moss	104 BATTLECREEK RD	SOUTH PITTSBURG, TN 37380
Treasurer	John E Henegar	104 BATTLECREEK RD	SOUTH PITTSBURG, TN 37380
President	Christopher D Bradshaw	104 BATTLECREEK RD	SOUTH PITTSBURG, TN 37380-

(5) Board of Directors names and business address (with zip code). ___ None, or listed below.

Name	Business Address	City, State, Zip
Christopher D Bradshaw	104 BATTLECREEK RD	SOUTH PITTSBURG, TN 37380
Clarence L Howard	104 BATTLECREEK RD	SOUTH PITTSBURG, TN 37380
John C Thornton	104 BATTLECREEK RD	SOUTH PITTSBURG, TN 37380-6308

(6) This section applies to non-profit corporations ONLY.

A. Our records reflect that your non-profit corporation is a public benefit or a mutual benefit corporation as indicated. If blank or incorrect, please check appropriately: ___Public _X_Mutual

B. If a Tennessee religious corporation, please check here if blank: ___Religious

(7) Signature: Electronic (8) Date: 03/08/2019

(9) Type/Print Name: JOHN E HENEGAR (10) Title: TREASURER

B0667-6557 03/08/2019 12:18 PM Received by Tennessee Secretary of State Tre Hargett

Water Service Data

Water rates in effect since 9/1/16:

a. Minimum (2,500 gallons) $2.70/100, $67.50
b. Next 2,500 gallons $1.70/100
c. Next 2,500 gallons $1.51/100
d. Use over 7,500 gallons $1.35/100
e. Plus applicable sales tax

EXHIBIT D

CLASSIFICATION OF SERVICE

APPLICABILITY

For all residential, commercial, and other public authority customers of Jasper Highlands development in Kimball, TN.

VOLUMETRIC RATES:

Cost per 100 Gallons

Monthly Use	Jasper Highlands General Water Service	
First 2,500 gallons	$67.50	(N)
Next 2,500 gallons	$1.70 per 100 gallons	(N)
Next 2,500 gallons	$1.51 per 100 gallons	(N)
Above 7,500 gallons	$1.35 per 100 gallons	(N)

(N) Indicates New rate

ISSUED: January 31, 2020 **EFFECTIVE:**

BY: Darlene L. Williams

Darlene L. Williams, President
109 Wiehl Street
Chattanooga, Tennessee 37403

CLASSIFICATION OF SERVICE

RESIDENTIAL

1. Schedule of Rate and Charges Available For:

a) The General Water Service Tariff is available for public water supply service in all
(N,C) territory served by the Company except that area served by the Lookout Mountain System, Elder Mountain, territory served in Lakeview and other unincorporated areas in Georgia, east of Rossville, Suck Creek and other unincorporated areas of Marion County served by Suck Creek Utility District, the City of Whitwell, TN and the area of Jasper Highlands in Kimball, TN.

b) The Lookout Mountain Tariff is available for public water supply service in the territory served by the Company's Lookout Mountain High Service Area in the town of Lookout Mountain, Tennessee, Lookout Mountain, Georgia, and Elder Mountain, Tennessee.

(C) c) The Lakeview Tariff is available for public water supply service in the territory served by the Company in Lakeview and other unincorporated areas of Georgia, east of Rossville as indicated on the Service Area Map: TPUC No. 19 Pages 13 and 14.

d) The Suck Creek Tariff is available for public water supply service in the territory served by the Company in Suck Creek and other unincorporated areas of Marion County formerly served by Suck Creek Utility District.

(E) e) The Lone Oak Tariff is available for public water supply service in the territory served by the Lone Oak Utility District.

(N) f) The Whitwell Tariff is available for public water supply in the City of Whitwell, TN.

(N) g) The Jasper Highlands Tariff is available for public water supply in the Jasper Highlands development in Kimball, TN

(C) Change in text
(E) Eliminated
(N) New text

CLASSIFICATION OF SERVICE

OTHER PUBLIC AUTHORITY

1. Schedule of Rate and Charges Available For:

(N,C) a) The General Water Service Tariff is available for public water supply service in all territory served by the Company except that area served by the Lookout Mountain System, Elder Mountain, territory served in Lakeview and other unincorporated areas in Georgia, east of Rossville, the City of Whitwell, TN and the area of Jasper Highlands in Kimball, TN.

b) The Lookout Mountain Tariff is available for public water supply service in the territory served by the Company's Lookout Mountain High Service Area in the town of Lookout Mountain, Tennessee, Lookout Mountain, Georgia, and Elder Mountain, Tennessee.

(C) c) The Lakeview Tariff is available for public water supply service in the territory served by the Company in Lakeview and other unincorporated areas of Georgia, east of Rossville as indicated on the Service Area Map: TPUC No. 19 Pages 13 and 14.

(N) d) The Whitwell Tariff is available for public water supply in the City of Whitwell, TN.

(N) e) The Jasper Highlands Tariff is available for public water supply in the Jasper Highlands development in Kimball, TN.

(C) Change in text
(N) New text

CLASSIFICATION OF SERVICE

COMMERCIAL

1. Schedule of Rate and Charges Available For:

(N,C) a) The General Water Service Tariff is available for public water supply service in all territory served by the Company except that area served by the Lookout Mountain System, Elder Mountain, territory served in Lakeview and other unincorporated areas in Georgia, east of Rossville, Suck Creek and other unincorporated areas of Marion County served by Suck Creek Utility District, the City of Whitwell, TN and the Jasper Highlands in Kimball, TN.

b) The Lookout Mountain Tariff is available for public water supply service in the territory served by the Company's Lookout Mountain High Service Area in the town of Lookout Mountain, Tennessee, Lookout Mountain, Georgia, and Elder Mountain, Tennessee.

(C) c) The Lakeview Tariff is available for public water supply service in the territory served by the Company in Lakeview and other unincorporated areas of Georgia, east of Rossville as indicated on the Service Area Map: TPUC No. 19 Pages 13 and 14.

d) The Suck Creek Tariff is available for public water supply service in the territory served by the Company in Suck Creek and other unincorporated areas of Marion County formerly served by Suck Creek Utility District.

(E) e) The Lone Oak Tariff is available for public water supply service in the territory served by the Lone Oak Utility District.

(N) f) The Whitwell Tariff is available for public water supply in the City of Whitwell, TN.

(N) g) The Jasper Highlands Tariff is available for public water supply in the Jasper Highlands development in Kimball, TN.

(C) Change in text
(E) Eliminated
(N) New text

EXHIBIT E

BK/PG: 459/377-402
Page 1 of 26
18000461
26 PGS:AL-AMENDMENT
ANGELA BATCH: 66954 02/07/2018 - 01:36 PM
VALUE 0.00
MORTGAGE TAX 0.00
TRANSFER TAX 0.00
RECORDING FEE 130.00
ARCHIVE FEE 0.00
DP FEE 2.00
REGISTER'S FEE 0.00
TOTAL AMOUNT 132.00
STATE OF TENNESSEE, MARION COUNTY
DEBBIE PITTMAN
REGISTER OF DEEDS

This instrument prepared by:
Horton, Ballard & Pemerton, PLLC
735 Broad Street, Suite 306
Chattanooga, TN 37402

AMENDED AND RESTATED DECLARATION OF PROTECTIVE COVENANTS, CONDITIONS AND RESTRICTIONS FOR JASPER HIGHLANDS

THIS AMENDED AND RESTATED DECLARATION OF COVENANTS, CONDITIONS, AND RESTRICTIONS FOR JASPER HIGHLANDS RESIDENTIAL PROPERTIES ("Declaration") is made as of the date set forth on the signature page hereof by Thunder Air, Inc., successor to Thunder Development, Inc., a Tennessee corporation. ("Declarant").

Declarant, having full power and authority, as set forth in this Declaration and all prior declarations, does hereby amend, restate and supersede in its entirety the prior Declaration of Protective Covenants, Conditions and Restrictions recorded at Book 439, Page 202 in the Register's Office of Marion County, Tennessee, as amended by Amendment recorded in Book 440, Page 1256 and Second Amendment recorded in Book 466, Page 85 in the Register's Office of Marion County.

1. Purpose. Declarant is the owner of certain real property located In Marion County, Tennessee, which property is more particularly described in Exhibit A, hereinafter ("Property"). The Property contains significant scenic and natural value, and Declarant is adopting this Declaration to preserve and maintain the natural character and value of the property for the benefit of all owners of the Property or any part thereof.

2. Declaration. Declarant hereby declares that the Property and any part thereof, shall be owned, sold, conveyed, encumbered, leased, used, occupied and developed subject to the following Protective Covenants, Conditions and Restrictions, hereinafter referred to as the ("Covenants"). The Covenants shall run with the Property and any subdivided Tract thereof, and shall be binding upon all parties having or acquiring any legal or equitable interest in or title to the Property or any Tract, and shall inure to the benefit of every owner of any part of the Property or any Tract.

3. Definitions. The following terms and phrases used in these Covenants shall be defined as follows:

a. "Approved Builder" means a Tennessee licensed builder selected by an Owner that is not a Preferred Builder but has been approved on a one-time basis for a specific construction project and has met all requirements set out by Declarant and the ARB.

b. "Affiliate" of an entity means any other entity that directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with, such entity. The term "control" (including the terms "controlled by" and "under common control with") means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of an entity, whether through the ownership of voting securities, by contract or otherwise.

c. "Architectural Review Board" (hereinafter "ARB" or "JHARB") shall mean the governing body elected or appointed in accordance with the Charter and Bylaws of the Association and charged with the stipulated responsibilities contained herein. During the Development Period, as herein defined, the ARB shall consist of three (3) members appointed by Declarant or a licensed architect retained by Declarant.

d. "Association" means, Jasper Highlands Property Owner's Association, Inc., a Tennessee non-profit corporation.

e. "Board" means, the Board of Directors of the Association as the same may from time to time be constituted.

f. "Bylaws" means, the duly adopted bylaws of the Association, as the same may from time to time be amended.

g. "Charter" means, the Charter of the Association, as the same may from time to time be amended.

h. "Common Services" means, the roadway maintenance for the Shared Access Roads, utility line maintenance and repair services for utility lines located in the rights of way of such roads or upon the Common Spaces.

i. "Common Space(s)" means, that certain real property and appurtenances owned by Declarant or the Association, now or hereafter, and designated for the non-exclusive use of the Members of the Association in good standing, and their respective guests and invitees.

j. "Covenants" shall have the meaning given that term In Section 2.

k. "Declarant" means, Thunder Air, Inc., a Tennessee corporation, and its successors and assigns under an instrument specifically designating such successor or assign as a successor Declarant under this Declaration.

l. "Declaration" means, these Covenants, Conditions and Restrictions.

m. "Development" means, the entire subdivision of Property, Including all Common Spaces, being commonly known and referred to as "Jasper Highlands".

n. "Development Period" means, the period between the effective date of the original Declaration of record in the Register's Office of Marion County, Tennessee, and the date on which title to all of the Estate Tracts shall have been conveyed by Declarant to an Owner, which shall be unaffiliated with Declarant, and the Common Space(s) and Shared Access Road(s) have been conveyed by the Declarant to the Association, or at such earlier time as determined by the Declarant.

o. "Estate Tract(s)" means, any subdivided lot, parcel or tract of the Property platted as a single family residential tract and illustrated in Exhibit B. The total number of Estate Tracts may be modified from time to time as provided herein.

p. "Member" shall have the meaning given that term in Section 4.1.

q. "Mortgage" means any security device encumbering any tract or all or any portion of the Property, and as used herein the term "mortgage" shall include a deed of trust.

r. "Mortgagee" means, the record owner of a beneficial interest under a Mortgage.

s. "Owner" means, the record owner of any Tract, including a contract purchaser, but excluding anyone having an interest in a Tract as security for the performance of an obligation. Owner shall not include Declarant for assessments under Section 6.

t. "Plat" means, a final subdivision plat for all or any portion of the Property, approved by the county Planning Commission and recorded in the county Register's Office.

u. "Preferred Builder" means a Tennessee licensed builder which has met the program requirements of the Declarant and has demonstrated prior skill in constructing custom homes.

v. "Principal Residence" means, the single family residential structure constructed on any Estate Tract, which is the principal use of such Estate Tract, and to which other authorized structures on such Estate Tract are accessory.

w. "Property" shall have the meaning given that term in Section 1.

x. "Recreation Trail Easements" means, the portion of the Tracts designated as "Recreation Trails" by Declarant, which shall be used solely for equestrian use, mountain bike riding, recreational walking, running, or hiking, subject to the rules, restrictions and limitations imposed from time to time by the Association. Recreation Trail Easements shall not be used by motorized vehicles, except such trails, if any, designed for ATV use by Declarant.

y. "Setbacks" means, the portion of a Tract from any boundary or Tract property line, publicly owned road, Shared Access Road, upon which no construction may take place.

z. "Shared Access Road(s)" means, the private roadways reflected on the Plat currently utilized for ingress and egress to the boundaries of the Estate Tracts and the roadway which provides access to and from State Highway 156.

aa. "Tract(s)" means, any subdivided lot parcel or tract of the Property.

PROPERTY OWNER'S ASSOCIATION

4. The Association. The Association has been formed as a non-profit Tennessee corporation by the filing of the Charter. Its affairs shall be governed by the Charter and Bylaws. The Association shall assume and perform all functions and obligations imposed on it under this Declaration. The Association shall have all powers necessary to effectuate these purposes.

4.1 Membership. Every Tract owner shall be a member of the Association ("Member"). Membership in the Association shall be appurtenant to each Tract, and shall not be subject to severance from the ownership of such Tract. If there shall be joint ownership of a Tract, such joint owners shall together hold a single Membership.

4.2 Voting. Each Member shall have one vote to cast upon any matter to be decided by a vote of the Members. If a corporation owns a Tract or if there is more than one person or entity owning a Tract the vote of such Member shall be cast as determined by the owner or owners of such Tract. In the event of any dispute among such owner or joint owners of a Tract the Board shall have the right to disqualify such Member from voting on an issue unless or until the joint owners of such Tract have reached agreement as to such Member's vote. Notwithstanding any term or provision herein to the contrary, there shall be no more than one (1) vote per Tract. If any Member is delinquent in paying any assessments or other charges levied on his or her Tract, that Member's vote will not be counted. In addition, a Member's vote shall not count if the Declarant has not been paid in full for the Tract.

4.3 Association on Board of Directors. The Association is a Tennessee non-profit corporation, formed to administer and enforce the provisions of this Declaration. The Board shall consist of three (3) directors or members, or such additional number as may be approved by the Members in accordance with the Bylaws, except that the initial Board and its successors serving during the Development Period shall be appointed by the Declarant. All duties, responsibilities and functions of the Board shall be governed by the Bylaws of the Association.

4.4 Authority of Board. The Board shall have full power and authority to manage the business and affairs of the Association, as more fully set forth In the Charter and Bylaws, and to enforce the provisions of this Declaration.

4.5 Meetings. The Members and the Board shall hold annual meetings as set forth in the Bylaws. Additional regular or special meetings of the Members and/or the Board may be held in accordance with the provisions of the Bylaws of the Association. All procedural matters pertaining to all such meetings, including notice thereof, quorums, and provisions for voting in person or by proxy shall comply with the Bylaws.

4.6 Duties of Association. The Association shall, in addition to such obligations, duties and functions as are assigned to it by other provisions of this Declaration, have the obligations, duties and functions to do and perform each of the following for the benefit of the Members;

(a) The Association shall be obligated to and shall provide for the best quality care, operation, management, maintenance, repair and replacement of all easements established or provided for some or all Owners, and of any and all Shared Access Roads and drainage easements and drainage pipes or facilities within the same which may be established or provided.

(b) The Association shall be obligated to and shall obtain and keep in full force and effect at all times, broad form comprehensive liability insurance coverage, covering both public liability and automobile liability, with limits of not less than $1,000,000.00 per occurrence and not less than $2,000,000.00 in aggregate with property damage limits of not less than $500,000.00 for each accident. All insurance may contain such deductible provisions as the Board shall decide. All insurance shall name the Association as primary insured and Declarant as additional insured and shall, to the extent reasonable possible, cover each Owner without any such Owner necessarily being specifically named therein. The Association shall provide Declarant, upon request, with certificates evidencing such insurance and copies of the

insurance policies. The Association may also carry other types of insurance or any other higher limits in the discretion of the Board.

(c) Unless provided by a municipal, county or other governmental body and unless the cost thereof is assessed against the Owners by such body, the Association shall have the right, but not the obligation, to provide or contract for refuse disposal services.

(d) The Association shall perform such other acts as may be reasonably necessary to enforce any of the provisions of this Declaration or the Association rules.

(e) The Association shall indemnify Declarant, its agents, employees and Members of the Board, and hold each of them harmless from all liability, loss, cost, damage and expense, including attorneys' fees, and costs of investigation arising with respect to any operations of the Association or otherwise; provided, however, that the Association shall not be required to indemnify or hold such parties harmless for their acts of gross negligence or willful and wanton misconduct.

4.7 Powers of Association. The Association shall have all of the powers of a non-profit corporation organized under the laws of the state of Tennessee subject only to such limitations upon the exercise of such powers as are expressly set forth in the Charter, Bylaws or this Declaration. The Association shall have the power to do any and all lawful things which may be authorized, required or permitted to be done hereunder, or by the Charter, and to do and perform any acts which may be incidental to the exercise of any of its express powers, including the following:

(a) To levy assessments, charges, fines and penalties on the Owners, and to enforce the payment of the same, all in accordance with the provisions of this Declaration and the Charter, Bylaws, rules and regulations of the Association and impose restrictions on use of Common Elements as addressed herein.

(b) To employ the services of any person or firm as manager, together with employees, to manage, conduct and perform the business, obligations and duties of the Association, as may be directed by the Board and to enter into contracts for such purposes. To obtain, and pay for, legal, accounting, engineering, management and other professional services as may be necessary or desirable.

(c) On its own behalf, or on behalf of any Owner or Owners who consent thereto, to commence and maintain actions and suits in law and in equity to restrain any breach or threatened breach of this Declaration and to enforce, by mandatory injunction or otherwise, all of the provisions of this Declaration.

(d) To obtain, maintain and pay for such insurance policies or bonds, whether or not required by any provision of the Declaration, as the Association shall deem to be appropriate for the protection or benefit of the Owners, their tenants or guests.

(e) To contract and pay for, or otherwise provide for, the repair, maintenance, replacement or refinishing of any Shared Access Roads, drives or other paved areas upon any portion of the Property.

(f) To incur and service debt(s) necessary to accomplish the objectives specifically set forth in this document, so long as it is approved by the Association as defined herein.

(g) To take steps to restrict or abate any activity on the Property that would constitute a nuisance under applicable law.

5. Violations, Enforcement, Liens and Costs. At all times during the Development Period, the limitations and requirements for land use and development, set forth In these Covenants shall be enforceable by the Board or the ARB, In addition, government or officials of Marion County, Tennessee, as applicable, and the State of Tennessee, shall have the authority to enforce any pertinent provisions of code, regulation, or statute. Every Owner hereby consents to the entry of an injunction against the Owner's tenants or guests, to terminate and restrain any violation of these Covenants. Any Owner who uses or allows the Owner's Tract to be used or developed In violation of these Covenants further agrees to pay all costs incurred by the Board or Declarant or other Owner(s) in enforcing these Covenants, including reasonable attorneys' fees. This does not preclude the authority of the ARB to assess fines or penalties, or to seek and enforce injunctive rights to cease the activity.

6. Assessments.

6.1 Operating Fund. The Association, acting by and through the Board or its designee, shall collect and deposit to any account in the name of the Association all moneys paid to it by way of assessment or otherwise and from which the Association shall make disbursements in performing the functions which the Association performs under this Declaration.

6.2 Maintenance Assessment. Not later than thirty (30) days prior to the commencement of each calendar year, the Association shall estimate the costs and expenses to be incurred by it during the upcoming year In performing its functions, including utility charges, maintenance expenses for the Common Space, amenities, utilities and Shared Access Roads, expenses of enforcement of this Declaration, and professional fees. In so estimating, the Association shall take into consideration the anticipated balance in the operating fund as of the start of such year and the estimated receipts of all assessments, charges, fees and other payments to be collected during the year.

The net estimate, as determined by the Association shall be assessed on a pro-rata basis against all Owners of Tracts.

6.3 Supplemental Assessment. If at any time and from time to time during any year it shall appear that the assessment is or will be inadequate for any reason, including nonpayment by any Owner of the Owner's respective share, the Association may levy a further proportional assessment to all Owners in the amount of such actual or estimated inadequacy. Any supplemental assessments shall be due on terms designated by the Board.

6.4 Payment of Maintenance Assessment. Assessments shall be paid in such manner and on such dates as the Board may establish and in an amount set by the Board, with the said amount being no less than $720 per year, modifiable as deemed necessary. The Board may require advance payment of assessments at closing of the transfer of title to a Tract and impose special requirements for Owners with a history of delinquent payment. If the Board so elects, assessments may be paid in two or more installments. Unless the Board otherwise provides, the Maintenance Assessment shall be

due and payable in advance on the first day of each fiscal year. If any Owner is delinquent in paying any assessments or other charges levied on his or her Tract the Board may require the outstanding balance on all assessments to be paid in full immediately. In addition, the Declarant shall not be deemed responsible for assessments on any Tracts that have not been sold.

6.5 Special Assessments. The Association may also levy a special assessment against any Owner where, as a direct result of such Owner's acts or failure or refusal to act or otherwise to comply with the Covenants or any rules prescribed by the Board, moneys were or will have to be expended by the Association in enforcing the Covenants or rules prescribed by the Board. Such special assessment shall be in the amount to be expended or so expended theretofore and shall be due and payable to the Association when levied and shall include without limitation, engineers', architects', attorneys' and accountants' fees where reasonably incurred by the Association.

6.6 Obligation of Payment. Each assessment (maintenance, supplemental, or special) shall be a separate, distinct and personal debt and obligation of the Owner against whom it is assessed, at the time the assessment is made, and each Owner of any Tract, by acceptance of a deed therefore, whether or not it be so expressed in such deed, is deemed to covenant and agree to timely pay the same to the Association. If the Owner does not pay such assessment, or any installment thereof, when due, the Owner shall be deemed in default, and the amount of the assessment not paid, plus interest at one and one half percent (1 ½%) per month not to exceed, however, the highest rate permitted under Tennessee law plus costs, including reasonable attorneys' fees, shall be and become a lien upon the Tract of such Owner, effective upon and as of the recordation by the Association of a notice of default. Such lien may also include a provision for future assessments, as they become due. The notice of default shall set forth the amount of the delinquent assessment and other charges, a description of the Tract against which the same has been assessed and the name of the record holder thereof. Such lien shall be prior to all other liens filed except that it shall be subordinate to the lien of any previously flied Mortgage on the affected Tract, and the sale or transfer thereof In foreclosure of such Mortgage, whether by Judicial proceedings or pursuant to a power of sale, or the conveyance to the Mortgagee in lieu of foreclosure, shall terminate any lien for nonpayment of assessments which became due prior to such sale, transfer or conveyance, but no such sale, transfer or conveyance shall relieve the delinquent Owner from their personal liability for unpaid assessments then due, nor relieve the purchaser or transferee of the sold Tract from liability for assessments which thereafter become due. Such lien may be foreclosed by the Association in like manner as a Mortgage, including foreclosure by advertisement and sale as provided by Statutes, and the Association shall have the power to bid at any foreclosure sale and to acquire and thereafter hold title to the affected Tract. The foregoing remedies shall be in addition to any other remedies provided by law for the enforcement of such assessment obligation. Upon payment of any delinquent assessment, and any interest and charges in connection with which such notice of default, the Association shall cause to be filed a further notice stating the satisfaction and the release of the lien thereof.

6.7 Estoppel Certificate. On request by any proposed purchaser, Mortgagee or transferee of a Tract, the Association shall execute, acknowledge and deliver a certificate stating the amount of the assessment secured by any lien upon such Tract, or that there is no outstanding assessment, as the case may be. Such certificate shall be conclusive upon the Association and the Owners in favor of all persons who rely thereon in good faith as of the amount of such indebtedness

or the absence of any indebtedness as to the date of the certificate. The Association may charge a reasonable fee for the issuance of such certificate.

6.8 No Exemption. No Owner may exempt themselves from liability for assessments, nor release their Tract from the liens therefore, by waivers of the use and enjoyment of the property and facilities promoted by such assessments or by abandonment of the Owner's Tract.

7. Easements.

7.1 Easement for Utilities. There is hereby reserved to the Declarant and the Association, their respective successors and assigns, a non-exclusive right to create easements and rights of-way in, over, under and on the Property or Tract or any part thereof for the purpose of ingress and egress, and construction and location of utilities servicing any Tract and the improvements thereon. Each Owner shall have a right of reasonable access to the Property for the purpose of maintaining, replacing and enlarging utility services as required, provided that the use of such right of access shall be exercised in such manner so as not to unreasonably interfere with the use and enjoyment of the Property or any Tract; and provided further that a utility installation providing service to all or a portion of the Property shall not be altered, modified or changed in such a manner as to impair or interfere with the availability of service of such utilities to its users.

7.2 Drainage Easement. There is hereby reserved to the Association the right to create non-exclusive easements for drainage of surface waters from portions of the Property across other portions of the Property. Such drainage shall conform to a development plan as approved by the Board. Drainage shall be limited to reasonable amounts of water and shall be so designed and constructed so as not to materially interfere with the development, use and enjoyment of the portions of the Property onto which such water drains. The drainage as established shall not be altered, modified or changed as to any part of the Property without the consent of the Owners who will be affected by any such alteration, modification or change.

7.3 Use of Roads. Each Owner shall have a non-exclusive easement appurtenant to their Tract of ingress and egress over and on all Shared Access Roads. Each Owner may delegate their right under such non-exclusive easement for the benefit of their family, tenants, servants, employees, agents, guests and invitees, and any transferee by way of lease assignment or contract for purchase of the property to which such non-exclusive easement is appurtenant. Each Owner shall be responsible for a pro-rata share of the maintenance costs, based upon the total number of Tracts, for all Shared Access Roads.

7.4 Recreation Trail Easements. Subject to (i) the rules, regulations and limitations promulgated from time to time by the Association, (ii) existing easements and reservations of rights affecting the Property, and (Iii) the requirements of any applicable law, each Member shall have a right and non-exclusive easement of use and enjoyment of those portions of the Property designated as Recreation Trail Easements. The exact location of the Recreation Trail Easements shall be set forth as reservations in the deeds to the various Tracts. The right and easement to use the Recreation Trail Easements shall be appurtenant to and shall pass with the title to every Tract, subject to the following limitations:

(a) The right of the Association to limit the time that such Easements can be used, the manner and scope of such use, and the number of guests that have access thereto and to adopt such rules regulating the use and enjoyment of the same from time to time.

(b) The right of the Association to suspend the right to use the Recreation Trail Easements by a Member (i) for any period during which any assessment against such Member's Tract remains delinquent, and (ii) for a period not to exceed thirty (30) days after notice and hearing as may be provided for in the Bylaws for any infraction of the Association's rules.

7.5 Delegation of Use. An Owner may delegate to any occupant of such Owner's Tract the same right to the use and enjoyment of such facilities and any privilege appurtenant to such Tract, the right of the Association is acknowledged to limit the number of guests, and to adopt rules regulating the use and enjoyment of Common Space, is hereby acknowledged by each Owner, Shareholders and immediate family members of any shareholder shall have the right to utilize any Common Space, Recreation Trail Easements and access to same.

7.6 Easements of Enjoyment for Common Space. Every Member is vested a right and non-exclusive easement of use and enjoyment in and to the Common Space and such easement shall be appurtenant to and shall pass with the title to every such Tract so privileged, subject to the following limitations:

(a) The right of the Association hereunder to limit the number of guests, and to adopt rules regulating the use and enjoyment of Common Space.

(b) The right of the Association to suspend the right to use of such Common Space by a Member for any period during which any assessment against their Tract remains delinquent.

(c) The right of the Declarant during the Development Period by its own actions or acting through the Association to suspend a Member's right to use the Common Space if the Member is delinquent in payment of any fees or other amounts owed to the Declarant or its Affiliates, including Jasper Highlands Homes and JHH LLC.

(d) The right of Declarant or its successor as owner of the Common Space to dedicate or transfer all or any part of a Common Space to any public agency, authority, or utility for such purposes and subject to such conditions as may be agreed to by the Members.

Certain facilities and areas within the Properties may be open for use and enjoyment of the public. Such facilities and areas may include, by way of example: greenbelts, trails and paths, parks, and other neighborhood spots conducive to gathering and interaction, roads, sidewalks, and medians. Declarant may designate such facilities and areas as open to the public at the time Declarant makes such facilities and areas a part of the Area of Common Responsibility or the Board may so designate at any time thereafter. Use of facilities and areas in excess of 25 persons is permissible only with the approval of the Declarant and/or the Board, following the submission of a written request sent to the Declarant and/or Board and said use must be sponsored by a property owner. The Declarant and/or Board may deny said request

and restrict use for any or no reason at its sole discretion. Additional fees may be assessed in cases of 25 or more persons using the facilities.

7.7 Easement for Adjacent Body of Water: Each Owner whose Tract adjoins a lake or pond shall have a non-exclusive easement appurtenant to their Tract for use of the entire body of water. Any dock or pier constructed for an Owner must be constructed within the boundary of the Owner's Tract.

7.8 Prohibited Land Use(s): No Lot(s), Parcel(s) or Tract(s) or any portion thereof shall or can be used for or as a roadway, driveway or access point to or from any other property(ies), including but not limited to any property(ies) adjoining Jasper Highlands. Any driveway, roadway or access point shall be for said Lot(s), Parcel(s) or Tract(s) only and strictly for ingress and egress to said Lot(s), Parcel(s) or Tract(s) but not otherwise. Use of said driveway, roadway or access point for any other purpose(s) is strictly prohibited.

GENERAL DEVELOPMENT STANDARDS

8. General Development Standards. Development of any Tract shall conform to the following standards:

8.1 Provisions In Addition to County Land Use Regulations. Conformity with any and all applicable land use regulations of Marion County and the State of Tennessee, as applicable to the Tracts, shall be required in addition to the requirements of these Covenants.

8.2 Setbacks. Minimum building setbacks for all Tracts shall be the minimum distance required by county subdivision regulations or as shown here, whichever is greater:

- Front Yard 40 feet from the Property Line
- Side Yard 15 feet from the Property Line
- Rear Yard 15 feet from the Property Line

8.3 Maintenance. Each Tract and all improvements thereon shall be maintained in a clean, safe and slightly condition. Boats, tractors, vehicles (other than automobiles), garden or maintenance equipment, and the like shall be kept at all times, except when in actual use, out of view from neighboring Tracts, Common Spaces and Shared Access Roads. Refuse, garbage and trash shall be kept at all times, prior to proper disposal in a landfill, in a covered container, and any such container shall be kept within an enclosed structure or appropriately screened from view. Dumping within the Development is prohibited. Owners shall be required mow lawns four (4) times a year March-November; edge beds; prune; control weeds, pests and diseases; remove dead trees, plants and trash apply supplemental water; repair irrigation systems; replace mulch; and other necessary maintenance measures to sustain the landscape in a neat, orderly, vigorous and healthy condition. Grass areas may not exceed 6" in height between lawn cuts, Owners shall promptly remove all dead trees, except from areas required to remain natural. Any Pesticides, Weed Control chemicals, or similar treatments shall be environmentally friendly products and shall be non-toxic. Lot maintenance can be provided through Declarant upon request with fees to be determined.

8.4 Signs and Flags. No signs or advertising devices shall be erected or maintained on any Tract, without ARB's approval, both for content and design. Notwithstanding the foregoing, Declarant may place signs of any nature, type, and size at any location within the Development. One of the following flags may be displayed from a single pole mounted to a residence: United States flag, Tennessee flag, flag of a branch of the U.S. armed forces, or flag of a university or sports team. Free standing flag poles are not permitted. All displays of flags must be in compliance with applicable law.

8.5 Utilities. Utility lines have been or will be installed, either overhead or underground, in or adjacent to the Shared Access Roads to service the Estate Tracts. Connections from improvements on Estate Tracts to the utility lines shall be completed at the Estate Tract owner's expense, and shall be constructed underground.

8.6 Water System. Water shall be provided by individual private well as approved and stated in the original plat recorded in the Register's Office of Marion County. If, at any time In the future, an approved water supply system becomes available along the Shared Access Roads, all Tracts shall be required to connect to the water supply system, regardless of whether a well is currently in use, and shall be subject to the obligation of payment of a dry tap fee and such other requirements from the water utility providing such water supply, and to such other and further requirements, assessments or fees, including connection fees, as may be promulgated or mandated, from time to time by said utility or Declarant.

8.7 Sewage Disposal. Every structure with plumbing facilities shall be connected to a private septic disposal system, at the sole expense of the Tract owner, which shall conform to all regulations of the State of Tennessee, Marion County, as applicable, or any other regulatory agency. No outdoor toilets shall be permitted, except during construction. When permitted, outdoor toilets shall be serviced regularly and shall be removed upon installation of serviceable facilities within the Principal Residence or any other structure on the Tract. If, at any time in the future, an approved sewer system becomes available along the Shared Access Roads, all Tracts shall be required to connect to the sewer system, regardless of whether a septic tank Is currently in use, and shall be subject to the obligation of all payments and such other requirements from the sewer system providing such supply, and to such other and further requirements, assessments or fees, Including connection fees, as may be promulgated or mandated, from time to time by said utility or Declarant.

8.8 Noxious or Offensive Activities; Nuisance. No noxious, immoral, illegal or offensive activity shall be permitted on any Tract, nor shall anything be done which may be or may become a nuisance to the other Owners under applicable law. No light shall be emitted from any Tract which is unreasonably bright or causes unreasonable glare for any adjacent Owner. No unreasonably loud or annoying noises or noxious or offensive odors shall be emitted beyond the boundary lines of any Tract. Owners shall keep barking dogs within authorized structures, and shall prevent such animals from causing annoyance to neighboring Owners.

8.9 Mineral Activities Prohibited. No mineral exploration or extraction activities shall be permitted by any Owner, including the removal of gravel, except that grading and excavation shall be permitted for construction and landscaping purposes, subject to State and County regulations.

8.10 Satellite Dishes. A satellite dish, with a diameter of not greater than thirty six (36) inches shall be permitted on any Tract, provided that any satellite dish is not visible from any Shared Access Road, Common Space or adjoining Tract.

8.11 Garage Loading. A variety of garage loading conditions are permitted to accommodate the topography and to create variety along the streetscapes. Subject to setbacks and design standard, the following types of garage loading are permitted with the approval of the JHARB:

- Front Entry (not allowed unless specifically approved by the JHARB)
- Court Entry: standard (1-3 car)
- Side Entry: Standard (1-3 car)
- Side Entry: Split (4 car)

8.12 Debris. No burning of trash, leaves, or other debris shall be permitted on any Tract at any time, Including but not limited to the construction phase of any structure without a burn permit from the proper authorities. Any and all burning shall be at the risk of the Tract owner and shall be performed so as to not cause a nuisance to any adjoining Tract. All piles of debris must be cleared off a Tract or burned within thirty (30) days.

8.13 Parking. All Tract owners shall provide sufficient area for off-street parking. Parking shall not be allowed on any shared Access Road or Common Area, except in locations designated for parking by Declarant. Shared Access Roads, Common Spaces and easements shall not be blocked or obstructed at any time.

8.14 Pets. No poultry or livestock shall be maintained on any Tract. Cats, aquarium fish, birds, or other domestic animals which are kept and maintained indoors shall be permitted on any Tract, and any number of dogs may be kept on any Tract provided that no dog shall be allowed to chase, harass or harm wildlife or people. No boarding or commercial breeding shall be permitted on any Tract. Horses are allowed on specific home sites at the Developer's choosing as some home sites are more suitable for equestrian activities than others given the terrain of Tract may vary. If approved and permitted by the Developer, the Owner(s) may have up to three (3) horses on an approved equestrian home site. The Declarant reserves the right to modify this section at any time, to grant variances, and to impose such fines and take such actions the Declarant deems necessary in its discretion to enforce this section, including impounding and prohibiting any pet from the development.

8.15 Mobile Homes, Campers, Motorized Dirt Bikes, "ATVs/' Off Road Vehicles, Golf Carts. Mobile homes, campers, and motorized dirt bikes are not permitted within the development. ATVs or other off road vehicles may be used in the Declarant's discretion for Declarant's operational purposes and for access to areas outside of the residential property by members of the Jasper Highlands Hunt Club. Golf Carts and/or "mule" vehicles may be used for transportation throughout the development. The Declarant reserves the right to modify this section at any time and impose such fines and take such actions it deems necessary to enforce this section, including impounding and prohibiting any vehicle from the development.

8.16 Firearms and Hunting. No hunting with guns or shooting of guns shall be allowed within the development. Hunting opportunities may be available outside of the residential property at the Declarant's discretion. Declarant and Association shall be indemnified and held harmless from any claims arising from the use of firearms.

8.17 Limits of Clearing. No live trees or shrubs having a diameter greater than six (6) inches shall be removed prior to Declarant's approval. Excessive removal of trees will be deemed a nuisance to the community.

8.18 Authorized Use. Only single family residential usage shall be permitted, together with the keeping of domestic pets subject to the limitations set forth herein. Rental of a Principal Residence shall be permitted under these Covenants provided that such rental is for thirty (30) days or more and the Owner shall be required to evict any tenant that becomes a nuisance to the community.

8.19 Prohibited Uses. No commercial, industrial or other non-single family residential use whatsoever shall be permitted on any Estate Tract with the exception of model spec houses. Notwithstanding the foregoing, the Declarant shall have the right to designate certain Estate Tracts for commercial use. No temporary structures, such as trailers, tents, shacks or other similar buildings shall be permitted on any Estate Tract.

ESTATE TRACT DEVELOPMENT STANDARDS

9. Estate Tract Development. The development and use of Estate Tracts shall conform to the following standards and regulations in addition to the General Development Standards outlined in Section 8.

9.1 Design Review and Approval Process. In order to preserve the natural beauty and aesthetics of the Development, and to protect the values of all properties, all construction on and development of Estate Tracts shall require design review and approval from the ARB prior to commencing construction to assure any such contemplated work is compliant with these Covenants.

9.1.1 Building Permit Required. No building, structure, road, fence, or improvement of any kind shall be erected, sited, altered, added to, reconstructed or permitted to remain on any Estate Tract, and no construction or other site development activities shall be commenced until a building permit has been issued by the proper county authorities, as applicable, and approval has been issued by the ARB, as defined herein.

9.1.2 Design Guidelines. The ARB shall have the authority to adopt design guidelines to carry out the purpose and intent of this Declaration to insure that incompatible development does not occur ("Guidelines"). All Estate Tract use and development shall conform to any Guidelines adopted by the ARB, in addition to the provisions of this Declaration.

9.1.3 Plan Review Submittals.

(a) Two complete sets of plans and specifications for any Estate Tract improvement or alteration, or other site development, including landscaping, shall be submitted to the ARB. The plans shall include a site plan indicating the location of the Principal Residence and the location of any proposed improvements or other ancillary structures within

the Estate Tract and proposed landscaping. All plans for any building or structure must be signed by a licensed architect. If the architect does not specialize in landscape design, Owners are encouraged to retain a landscape architect or designer. Professional quality landscape plans are required to be submitted to the ARB.

(b) Lot grading plans shall be required and must be sealed by a licensed professional engineer. Storm Water Intrusion Protection Plans (SWIPP attachments) must be sealed by a licensed professional engineer and accompany the site plan.

(c) All surveys required by the Guidelines must be performed by a registered land surveyor.

(d) Sufficient information shall be submitted to demonstrate compliance with all of the requirements hereof.

(e) A review fee of Five Hundred Dollars ($500.00) (as adjusted in the reasonable discretion of the ARB from time to time, provided such adjustment shall be applied to all Owners on a non-discriminatory basis) shall be paid to the ARB for the processing and review of all plans and specifications.

9.1.4 ARB Review. The ARB or the ARB's consultant, a Tennessee licensed architect, shall review the plans and specifications within thirty (30) days from the submission thereof, and determine if the proposed use conforms to the requirements of these Covenants and the Guidelines. The Board shall retain one set of plans and specifications and return the other set to the Owner with comments and/or ARB approval certification.

9.1.5 Performance Deposit. Upon approval as outlined In Section 9.1.4 above, but prior to commencement of construction, a check in the amount of Four Hundred Dollars ($400.00) shall be presented and made payable to The Jasper Highlands Property Owner's Association, Inc. as a construction Performance Deposit. Such deposit to be released upon satisfactory completion of approved construction and landscaping. Violations of these Covenants may result in fines or assessments which may be deducted or assessed against the Performance Deposit.

9.2 Design and Building Professionals. All homes and additions to homes must be constructed by a Preferred Builder or an Approved Builder. Jasper Highlands has selected a group of Preferred Builders and design professionals to assist the lot owners with their home design and construction. These professionals have proven skills in designing and building custom homes of all types, and were selected not only due to their abilities and reputation, but for their commitment to what Jasper Highlands is to be—a natural, diverse mountain community with high quality custom homes. A list of these professionals can be provided upon request.

Should the Owner choose to bring their own architect and/or builder to the project, the Owner must ensure the builder completes the process to become an Approved Builder, including approval of the ARB, prior to entering into a construction contract with the builder.

The Declarant reserves the right to impose fees on Preferred Builders and Approved Builders to ensure the integrity of the development and ongoing requirements to be a Preferred or Approved Builder, including, but not limited to, architectural review, marketing, and refundable performance deposits, and such fees shall be payable to Declarant even

after the end of the Development Period. The Declarant also reserves the right to issue fines to builders that endanger the safety and well-being of the development and to ban any contractor from working within the development at any time. All architects, engineers, land surveyors, and building contractors must be licensed to perform work in the State of Tennessee, and contractors must not exceed their maximum dollar limits as imposed by the Board for Licensing Contractors for the State of Tennessee.

9.3 Authorized Structures. No building or structure shall be constructed on any Estate Tract except one single family residence and two of the following: guest house, pole barn, or detached garage. The total number of structures on an Estate Tract shall not exceed a total of three (3) excluding dog houses. Any additional structures will require a variance from the ARB. No additional structures shall be constructed prior to the primary residence breaking ground. Multiple structures can be under construction simultaneously so long as the primary residence is being built.

9.4 Construction. Used materials designed for architectural detailing on the outside of structures may be permitted by the ARB, in the ARB's sole discretion. All construction shall be completed within twelve (12) months from the commencement date of construction, unless the Board approves an extension, which shall not exceed six (6) months in length.

9.5 Height, Size and Floor Area Limitations. No building shall be greater than thirty five (35) feet in height. Building height shall be measured from existing grade to the highest point of the roof. The principal residential structure, exclusive of the garage, shall have a minimum heated floor area of 1,450 square feet for single level principal residential structures and 1,850 square feet for multiple level principal residential structures. Notwithstanding the foregoing, the Declarant in its discretion may allow principal residential structures of 1,000 square feet for single level principal residential structures and 1,400 square feet for multiple level principal residential structures on select Tracts in Phase 4A of the Development.

9.6 Pools and Spas. Pools and spas shall be shown on the appropriate design documents and submitted as part of Final Design Review. The location, design, materials, and colors of pools and spas are subject to approval of the JHARB. Owners considering the construction of a swimming pool are encouraged to retain a geotechnical engineer. Compliance with building and safety codes are the responsibility of the Owner.

9.6.1 In-Ground Pools and Spas.

(a) Location. In-ground pools and spas shall be located within the Maximum Buildable Area in rear yards or in the court area of Structures designed with a central courtyard or atrium. Subject to easements, the location of the deck area surrounding in-ground pools or spas must be approved by the JHARB.

(b) Elevation Off Grade. The elevation of In-ground pool or spa decks shall not be greater than three feet (3') above the finish grade at the outside edges of the deck.

(c) Pool Equipment. All pumps, filtration, and other equipment must be buffered from the Street adjoining properties, property amenity areas, or common areas. Unless other alternatives are available and approved by the JHARB, any such equipment shall be screen by a service wall or be located below grade in an equipment vault.

9.6.2 Portable Spas. Portable spas may be permitted so long as the framing, color, location, and screening are approved by the JHARB.

9.6.3 Pool and Spa Protection. Pools must be enclosed on exposed sides by fencing, and portable or In-ground spas must be enclosed by fencing or a protective cover with a locking device.

9.7 Fences. Boundary fences around the exterior Estate Tract lines of any Estate Tract shall be permitted upon approval by the ARB. Materials and construction of fences shall in all cases be of like construction and finish to those present adjacent to the Shared Use Roads. All fences shall be constructed so that the finished side faces outward from the Interior of the Estate Tract. Estate Tracts may be cross fenced or partially cross fenced only once, so as to preserve the beauty and continuity of the development, these are the only fences permitted on any Estate Tract, except for:

(a) Fences around a tennis court or swimming pool, the permitted size and construction type of which shall be approved by the ARB;

(b) Fences enclosing a dog run, the size, construction and location of which shall be approved by the ARB;

(c) Underground electronic fences to restrain and control pets shall be permitted within the boundaries on any Estate Tract; and

9.8 Mailboxes. Mailbox design and installation specifications shall be approved by the ARB. The ARB reserves the right to specify a standardized type, size, and style for mailboxes within the Development, but a mailbox is not mandatory for a residence, as Members may obtain a post office box. All mailboxes shall conform to United States Postal Service requirements.

OTHER PROVISIONS

10. Amendment. These Covenants may be amended (i) unilaterally by Declarant at any time during the Development Period, and (ii) thereafter, with the written consent of two thirds (2/3) of the Members, except for any provisions of an amendment which shall also require the written consent of any governmental authority.

11. Variance. A variance from the requirements of the development standards and restrictions set forth in this Declaration may be permitted in the sole discretion of the ARB, Board or the Declarant; such permitted variances shall be made in writing.

12. Duration of Covenants. All of the Covenants set forth herein shall continue and remain in full force and effect at all times against the Property and the owners and purchasers of any portion thereof, subject to the right of amendment as set forth in Section 11 hereof. If required by law, these Covenants shall be deemed to remain in full force and effect for

twenty (20) year periods, and shall be automatically renewed for additional consecutive twenty (20) year periods unless all of the Tract owners of the Property subject to these Covenants otherwise agree in writing.

13. Severability. Any decision by a court of competent jurisdiction invalidating any part, paragraph or section of these Covenants shall be limited to the part, paragraph or section affected by the decision of the court, and the remaining parts, paragraphs, sections and the Covenants therein shall remain in full force and effect.

14. Acceptance of Covenants. Every purchaser of a Tract within the Property shall be bound by and subject to all of the provisions of this Declaration and any future amendment.

15. Common Space. The Association agrees to accept title to the Common Space(s) and Shared Access Road(s) transferred to it by the Declarant, all costs and expenses of such conveyance of the Common Space(s) and Shared Access Road(s) by Declarant to the Association shall be paid by the Association.

(a) When conveyed, the Association accepts the Common Space(s) and Shared Access Road(s) "As Is" and without any representation or warranty, express or Implied, in fact or by law with respect thereto, or with respect to the improvements, including, but not limited to, representations or warranties of merchantability or fitness for the ordinary, or any particular purpose, and without any representations or warranties regarding future repairs, or regarding the condition, construction, accuracy, completeness, design, or adequacy of the size or capacity in relation to the utilization, date of completion or the future economic performance or operations of such Common Space(s) or Shared Access Road(s).

(b) The Owners, Members and Association hereby release Declarant and related parties (and their respective owners, employees, agents and representatives) from any claims the Owners, Members or Association could have, whether known or unknown, and warrant that no claims shall be made by the Association or any Owner or Member relating to the condition or completeness of the Common Space(s), Shared Access Road(s), or otherwise, or for Incidental or consequential damages arising there from.

16. Fire Service. Fire service for the community is provided by the Jasper Highlands Volunteer Fire Department, and the current schedule of fees is on file with the Association. Payment of the fire service fee imposed by the Jasper Highlands Volunteer Fire Department is mandatory for all Owners and may be enforced by the Association.

17. Miscellaneous.

(a) Additional property may, in the Declarant's sole discretion, be brought within the plan of this Declaration by a supplemental declaration, which may contain supplementary and complementary covenants and restrictions applying to such additional property. The Declarant shall not be obligated to bring any additional property within the plan of this Declaration, and no implied restrictions or implied negative reciprocal easements or covenants shall be created, inferred or implied as to any additional property not encompassed within the plat of record In Register's Office, Marion County, Tennessee. Declarant, in its sole discretion, may, at any time, assign or otherwise transfer its rights and obligations under this Declaration.

(b) No Estate Tract shall be used to provide ingress or egress to or from another lot or tract or parcel of property in the Development unless such lots back up to each other, provided, however, that the Declarant reserves the right to allow owners of property outside said platted property to use the utility easements reserved herein by the Declarant to obtain utilities, which grant of easements by the Declarant shall be at the Declarant's sole discretion and under such terms and conditions as the Declarant deems appropriate. No Tract shall be used to provide utility service to property outside of the subdivision without the express written consent of the Declarant.

(c) Each grantee of Declarant, or a subsequent grantee, by the acceptance of a deed of conveyance for a lot in the subdivision, accepts the same subject to all restrictions, conditions, covenants, reservations, easements and the jurisdiction, rights and powers of Declarant, created or reserved by this Declaration, or by plats or deed restrictions heretofore recorded, and all easements, rights, benefits and privileges of every character hereby granted, created, reserved or declared and all impositions and obligations hereby imposed shall run with the land and bind every Owner of any interest therein, and inure to the benefit of such Owner in like manner as though the provisions of this Declaration were recited and stipulated at length and in each and every deed of conveyance.

(d) So long as the Declarant is an Owner of one or more Tracts, Declarant may, in its sole discretion, combine, merge or re-subdivide Tracts. Once an Estate Tract is conveyed by the Declarant or owner to a non-related third party transferee, said Estate Tract shall not be combined, merged or re-subdivided in any fashion, except as follows: (1) an Owner may combine, merge, or resubdivide a Tract with the prior written consent of the Declarant or ARB; (2) Owners of multiple adjacent Tracts may combine the Tracts into a single Tract, but such Tract may not later be subdivided into multiple Tracts; and (3) Owners of multiple adjacent Tracts may realign the boundaries of the Tracts upon the prior written consent of the Declarant, provided that the Owner may not create an additional Tract and the Owner must comply with applicable governmental regulations.

[Signature on following page]

IN WITNESS WHEREOF, Declarant has executed this Declaration effective the 7th day of February, 2018.

Thunder Air, Inc.
a Tennessee Corporation

By: _____
Dan Bradshaw, President

STATE OF TENNESSEE
COUNTY OF HAMILTON

Before me, a Notary Public of the State and County aforesaid, personally appeared Dane Bradshaw, with whom I am personally acquainted or proved to me on the basis of satisfactory evidence, and who, upon oath, acknowledged himself to be the President of Thunder Air, Inc., the within-named corporation, and that he as such official, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the corporation by himself as such officer.

WITNESS my hand and official seal, this 7th day of February, 2018.

_____
Notary Public

My Commission Expires: 01/12/2019

MAGGIE K. LEWIS
STATE OF TENNESSEE NOTARY PUBLIC
COUNTY OF HAMILTON
MY COMMISSION EXPIRES: JANUARY 12, 2019

This Instrument Prepared By:
HORTON, BALLARD & PEMERTON, PLLC
CHATTANOOGA, TN

Exhibit A
Description of Property

Tract 1 (Phase 1A/1B)

Beginning at a metal fence post found, the northwest corner of Ferris Kelly Robinson Et Al of record in Deed Book 326 Page 1318; thence with the north line of Robinson S 89°1 721° B 919.66' to a point in the west right of way of a proposed 50' roadway; thence crossing said proposed road S 89°1 7'2 1" B 50.74' to a point; thence Leaving said proposed road; S 89°1 7'21" £ 404.23' to a metal fence post; thence with the top of the bluff of Kings Point and on around to Kimball Point, said top of the bluff also being the western and northern line of Robinson, the following chord bearings and distances; N 76°56'09" £ 199.90'; N 22°50'IS" £236.74'; N 1200511211 W 454.93'; N I 7005u161 £ 420.47'; N 21°0809" B 196.69'; N 29°28t9" £200.41'; N 40°42'29" £ 150.72'; N 44°S2'28" £ 84.65'; N 04°27'05 W 73.80'; N 61045120u W 233.72'; N 23016i57h1 B 76.18'; S 62017(5711 B 109.71'; N 22°29'SS" £ 114.78'; N 60°36'27" B 156.13'; N 19040(110 £50.37' ; N 02°05'43" B 114.77'; N 27°54'2&'£ 63.93'; N 17°46'ZS" W 40.90'; N 39°3217" B 265.19'; S 53°59'IG" B 37.27'; N 29°38'IO" £62.02'; N 20059(2611 £ 195.36'; N 57046l02 651.28'; N 29056(240657.78 N 13°5S'll"£ 54.96'; N 42°1905" £ 114.93'; N 48027(28(1 B 165.49'; N 35°S636" 652.91'; N 38°50'37 £287.25'; N 420461580 B 40.77'; N 34°4W59" W 69.89'; N 05°00'46" W 33.64'; N 42°3W048 £82.01'; N 42°34'36" W 80.15'; N 36°5 1'33" B 59.49'; N 56°1 1'45" W 25.95'; N 14°05'I 7" £22.98'; N 04040154k B 36.87'; N 63°28'I I" W 47.12'; N 3901 1155h1 £84.81';.N 47010(160 W 43.92'; N 02°58'I 5" W 128.55'; N 27°34'57' B 57.20'; N 53°41'38" W 56.76'; N 05°SYIO" W 77.82'; N 18°84'59" £94.88'; N 31°30'I0' £64.33'; N 25°00'43' £ 176.22'; N 04°4&37" £52.10'; N 24°57'03" W 32.62'; N 45°15'54, £ 60.89'; S 880381150 B 42.24'; S 70°27'28" £ 150.00'; S 70°27'28 £ 27.57'; S 610391240 B 81.39'; S 68°47'54" £47.19'; S 6604715411£ 150.00'S 68°47'54" £54.60' N 8l°5Y56" B 161.06'; S 510261011 B 74.64';S 8805613&t £ 85.52'; N 66000(160 B 53.46'; N 55°09'14" B 128 95'; N 64°29'52" £219 85'; N 88°31'28" £177.88'; N 5805615111 £ 148.11'; S 85°0117" £ 150.00'; S 89023(250 £83.76'; S 70°5V141' £ 134.59'; S 58°58'IS" £47.95'; S 70°30'25 £36.55'; S 70°50'25" £ 137.80'; S 50°52'SO" £202.86'; N 520331020 B 21A8'; S 87°58'OS" B 101 02'; S 39°10'S&' W 145.04'; S 17°00'19" W 419 17'; S 17°00'19"W 87.54'; S 06°37'43" W 66.02'; S 23°59'I8" W 193.48'; S 23°59'IS" W 34.63'; S 06°15'OG" W 205.02'; S 00°30'40 W 26.02'; S 1801611411 £ 2122'; N 75°22'24' £44.03'; S 25°35'23" W 215.64'; S 51°10'12° £247.27'; N 88°39'42" £40.21'; S 62°27'42" W 94.95'; N 84°58'48° W 150.23'; S 08°37'43" £48.47'; S 09°41'55" W 52.16'; N 81055(4911 £62.92'; S 86°33'33" £ 120.45'; 5 1 9°3I '35" W 164.27'; S 24°55'60" £ 182.93'; 5 5 1°28'34" W 68.38'; S 73°12'I 7" W 106.77'; S 26°14'19" W 66.75'; S 48°16'43" £40.96'; N 5205313011 £40.17'; S 17°04'26" £ 5&47';N 71°08135" £ 50.69'; N 560281580 £262.80'; N 17°02'26 E 60.12'; N 39°36'24" E 47.09'; N 7301 3'33" 13273.78'; N 39°22'07" 1349.70", S 84°55'39" 1351.84'; N 73°42'13 1364.16'; N 41°39'IS" 13 183.23'; N 69°14'25" 13216.16'; N 54°$ V5011 E 139.16'N 3Q°52'SI" 1356.54'; N 380481461113 189.18'; N 3g043159u 13 107.66'; N 42°52'33" 1393.04'; N 49056b0&I 1395.56'; thence leaving said top of bluff and with a severance line N 4 I°44'54" W456.01' to a point in the eastern right of way of a proposed road; thence N 41°44'64" W50.63' to a point in the western right of way of said proposed road; thence continuing with said severance line the following calls, N 40°23'33" W 221.48'$ 39°1 1'S 1" W 366.04';N 90°00'OO"W 105.56'; N 01°1O'42" W 120.40'; N 02°42'I

7" £122.21'; N 09°26'OO" 13227.48' N 09°24'OS" 13287.64'; N 40°20'19 13273.97'; N 34°20'23" £255.16'; N 31°14'55" W 548.94'; S 67°19'42" W 280.75'; N 87°02'25" W 370.07'; S 08°50'ZS" 1366.73';S 8801 5'02" W 15&81'; N 70°19'IS"W 234.13'; N 69°10'60" W 231.83'; N 74°ODIO" W 283.20'; S 66043150t1 W 343.57'; S 43°51'58°W 239.76'; S 63052(3611 W 113.94 to a point in the eastern right of way of a proposed road; thence N 60°34'22° W 50.03' to a point in the western right of way of a proposed road; thence continuing with said severance line the following calls, N 43°32139" W 215.00' ;N 41o32b05h1 W 257.30'; N 60°42'33" W 194.03'; N 7403015211 W 186.89'; N 88°36'48" W 303.81'; S 16°26'SG" W 236.03'; N 84°02'43" W175.62'; N 49°00'02 W 320.16'; N 46°17'19" W 237.70'; N 3303 P34° W 257.86'; N480 14t22LI W 312.11' to a point in the eastern right of way of a proposed road; thence along said eastern right of way the following calls, S 16°22'33" W 167.81' to the beginning of a curve to the right having a RADIUS of 323.74' and a ARC Length of 36.94' and being subtended by a CHORD BEARING of S I 9°38'42" W and a CHORD DISTANCE of 36.92' to a point in the northern right of way of a proposed road; thence crossing said proposed right of way S 22°01'I 5"W 50.00' to a point in the southern right of way of a proposed road; thence crossing said right of way N 81°44'SO" W 51.48' to a point in the western right of way of a proposed road; thence leaving said right of way N 67°58'45" W 261.92' to a point; thence S 22°08'I 3" W 197.17' to a point in the northern right of way of a proposed road; thence crossing said right of way S 18°21 '5711 w 50.11' to a point in the southern right of way of said proposed right of way; thence leaving said right of way and with a severance line the following calls, S 1405914511 W 219.38'; N 74°02'lO" W 36.03'
S 2l55l20 W 299.49' to a point in the northern right of way of a proposed road; thence crossing said right of way S 21°04'IG" W 53.99' to a point in the proposed south right of way; thence leaving said right of way and continuing on with a severance line the following calls S 15°26'34" E 201.29';S 88°54'SG" W 478.01'; N 60°10'SO" W 304.04'; N 4005 5'22" W 257.73'; N 16°4424" W 173.04'; N 75°3l)47 E 377.80' to the beginning of a curve to the left said curve having a radius of 225.00' and a arc length of 94.60' and being subtended by a chord which beat's N 49°1 7l491 W for 93.9 1';thence N 6102013211 W 124.18' to the beginning of curve to left said curve having a radius of 175.00' and a arc length of 103.91' and being subtended by a chord which bears N 7802 P09" W for 102.39'; thence continuing with said severance line the following calls S 84°2T40° W 458.59'; N 35°4Y26" W 57.76'; N 8401910111 E 140.48'; N 12054185K £467.87'; N 89°32'49" \V 211.72'; N 59033157n W 65.56'; N 79042140 W 128.55'; N 260211289W 184.99'; N 41°04'47" E 67.49'; N 62dl012311 E 196.88'; N 25°44'32" E 159.02'; N 18005h139 W 205.11'; N 03°541 0" E 144.54' N 69°49'I5 W 124.58
N 64°56'08" W 298.69'; S 77°22'IG"W 53.84'; N 70°50'SS" W 438.13'; N 60°45'31" W 152.41'; S 68°4P02" W 469.43'; S 74°l4'20" W 213.78'; S 170O012 W 292.20'
S 52°21'Ol" W 388.36'; S 29°57'lO" E 355.51'; S 37°09'l6 E 354.47'; S 24047*00113355.34 S 630571000 £51.54'; S 63°57'OO" £256.33'; S 52°10'35" £205.13'
S 52010,359 E 250.47'; S gg°2Q59" B 236.26'; S 04°26'14" W 44.59'; S 04026140 W 152.37'; S 04°26'14" W 88.60'; S 180241210 £64.62'; S 19024*2V1 B 154.41'
S 19021h14 B 274.26'; S 17°5W24" E 168.79'; S 17°59'24 B 292.15'; S 19°04'07" W 141,64'; 5 0901 31570 £ 275.00'; 5 11°36'38"W 377.11'; S 11036'58"W 159.92'
S 10°39'56" W 112.1 1'; 5 10°39'32W 336.70'; S 10°39'3211W 163.20'; S 10°39'3211W 1784.79'; 5 350161460£ 203.79'; S 35°16'46" £407.57' to a point In the north line of a Proposed 50' access road, and the beginning of a curve to the right, said curve having a radius of 525.00' and a arc length of 61.47' and being subtended by a chord which bears S 55°57'46" B for 61.44'; thence continuing along said proposed right of way. 5 82056*3111 B 96.45' to the beginning of a curve to right, said curve having a radius of 175.00' and a arc length of 34.77' and being subtended by a chord which bears S 4Ø054l57n B for 34.72'; thence S 41°13'24" B

45.90′ to the beginning of a curve to the left said curve having a radius of 625.14′ and a arc length of 57.43′, said curve being subtended by a chord which bears S 42°5619" B for 37.43′; thence S 45°09′33° B 347.56′ to the beginning of a curve to the right, said curve having a radius of 525.00′ and a arc length of 97,11′, said curve being subtended by a chord bearing S 3951l37l £ for 96.97′; thence S 34°33′41" B 202.59′ to the beginning of a curve to the Left, said curve having a radius of 275.00′ and a arc length of 110.50′ and being subtended by a chord which bears S 400041231 B for 109.76′ thence leaving said proposed access road tight of way and with a severance line the following calls1 S 57°35′05" B 152.22′; N 35°56′40" W 167.63′; N 21°17′14" W 777.99′; S 55°44′45" E 300.44′; S 34°25′OS" B 111.01 to the Point of Beginning, containing 560.89 acres, more or less.

Tract 2 (Phase 2)

Commencing at the most northeastern corner of Thunder Development, Inc. of record in Deed Book 433 Page 187, Registers Office of Marion County; thence running a tie line S 31°14'55" E a distance of 548.94 feet to the Point of Beginning of the hereinafter described tract; thence with a severance line of Tango November, LLC, of record in Deed Book 397 Page 69, Registers Office of Marion County, N 37°19'49" E a distance of 3053.96′ to a point; thence N 45°09'28" W a distance of 2058.20′ to a point; thence N 56°46'02" E a distance of 875.90′ to a point; thence N 34°26'01" E a distance of 1176.29′ to a point; thence N 14°02'25" E a distance of 1907.24′ to a point on the top of the escarpment of the West Fork Of Pryor Cove; thence with said escarpment the following chord bearings and distances, S 52°21'47" E a distance of 97.03′, S 61°41'11" E a distance of 186.94′, N 48°32'27" E a distance of 25.12′, N 73°52'10" E a distance of 36.27′, S 44°27'34" E a distance of 145.94′, S 04°44'22" E a distance of 186.01′,S 27°45'17" E a distance of 76.99′, S 50°09'05" E a distance of 119.65′, S 20°33'16" E a distance of 273.34′, S 45°40'00" E a distance of 200.32′, S 64°48'51" E a distance of 127.25′, N 70°19'00" E a distance of 167.77′ to a metal fence post; thence continuing along said escarpment the following chord bearings and distances; S 53°51'02" E a distance of 64.63′, S 27°34'51" E a distance of 288.26′, S 87°54'58" E a distance of 99.35′, N 74°02'16" E a distance of 57.78′, S 35°24'28" E a distance of 82.27′, S 62°40'39" E a distance of 61.95′, S 85°09'18" E a distance of 233.49′, N 46°56'39" E a distance of 268.31′, N 82°57'29" E a distance of 180.33′,S 85°56'39" E a distance of 336.51′, N 51°49'49" E a distance of 76.79′, S 89°54'16" E a distance of 219.34′,N 61°24'24" E a distance of 147.29′,N 49°57'04" E a distance of 146.43′,N 86°53'49" E a distance of 132.15′,N 74°48'51" E a distance of 71.73′, S 89°46'00" E a distance of 77.82′, S 86°14'29" E a distance of 92.85′, N 67°20'51" E a distance of 162.55′, S 17°05'15" E a distance of 134.24′, N 57°27'45" E a distance of 41.54′, N 74°31'48" E a distance of 132.48′, S 48°19'52" E a distance of 87.39′, S 62°03'37" E a distance of 141.63′, S 01°46'56" W a distance of 214.57 to a metal fence post; thence continuing along said escarpment the following chord bearings and distances, N 42°43'04" E a distance of 65.35′, N 08°38'12" E a distance of 22.99′, N 54°45'01" E a distance of 40.30′,N 34°04'22" W a distance of 9.05′,N 50°00'09" E a distance of 21.07′, N 37°24'39" E a distance of 32.00′, N 62°04'28" E a distance of 321.99′,N 69°26'24" E a distance of 130.69′,N 74°56'16" E a distance of 137.29′,N 75°39'21" E a distance of 504.28′, S 86°51'45" E 8 a distance of 85.29′, N 90°00'00" E a distance of 9.38′ to a metal fence post; thence along the top of the escarpment of Fullerton Bluff the following chord bearings and distances, S 21°16'20" W a distance of 107.69′, S 60°10'57" W a distance of 48.86′,S 26°09'55" W a distance of 85.88′,S 53°38'52" W a distance of 213.69′, S 42°06'56" W a distance of 309.71′,S 36°54'01" W a distance of 37.26′, S 44°46'00" W a distance of 77.49′,S 49°14'36" W a distance of 321.08′, S 44°19'40" W a distance of 617.05′, S 35°21'32" W a distance of 305.08′, S 43°15'37" W a distance of 281.56′, S 48°59'57" W a distance of 265.36′,N 49°13'21" W a distance of 32.56′, S 28°43'13" W a distance of 103.81′, S 43°11'13" W a distance of 298.45′,S 72°52'08" W a distance of 61.86′, S 51°18'47" W a distance of 82.83′,S 23°20'42" W a

distance of 81.31', S 08°46'20" W a distance of 114.90', S 45°20'21" W a distance of 231.74', S 33°10'00" W a distance of 217.68', S 37°41'15" W a distance of 192.16',S 25°46'15" W a distance of 28.16', N 62°17'38" W a distance of 24.89',S 41°05'02" W a distance of 214.99',S 01°11'11" W a distance of 70.30',S 31°05'10" E a distance of 97.96',S 12°13'14" W a distance of 112.50'S 38°13'02" E a distance of 23.72', S 22°14'15" W a distance of 273.58', S 37°11'51" W a distance of 367.31',S 23°28'28" W a distance of 151.60',S 37°37'50" W a distance of 359.97',S 33°31'38" W 439.34', S 11°00'49" W a distance of 140.94',S 32°27'49" W a distance of 357.44', S 32°27'49" W a distance of 82.94',S 18°25'46" W a distance of 79.08', S 44°26'10" W a distance of 46.55',N 22°03'24" W a distance of 14.00',N 31°47'53" E a distance of 41.10',S 51°33'33" W a distance of 43.76', S 62°28'27" W a distance of 22.06',S 88°42'57" W a distance of 32.28',N 51°53'09" W a distance of 108.13',S 51°16'34" W a distance of 705.01', S 72°03'49" W a distance of 329.1',N 72°55'25" W a distance of 182.67',S 27°57'41" W a distance of 102.88', S 47°39'27" W a distance of 63.92',S 55°23'22" W a distance of 15.00', S 02°12'01" W a distance of 50.22',S 49°00'43" W a distance of 94.53',N 36°23'17" W a distance of 51.71',N 52°28'29" W a distance of 81.28', S 77°11'19" W a distance of 72.91',S 05°49'26" E a distance of 228.70', S 65°08'17" W a distance of 112.79',N 87°29'29" W a distance of 73.17',S 66°01'43" W a distance of 119.39',N 63°48'06" W a distance of 100.42',S 55°10'02" W a distance of 76.64',S 04°47'57" W a distance of 76.49',S 25°58'08" E a distance of 155.09',S 60°21'16" W a distance of 80.25',N 73°50'50" W a distance of 66.39',N 88°30'03" W a distance of 66.21', S 19°55'40" W a distance of 262.24',S 41°40'37" W a distance of 73.32',S 38°03'08" W a distance of 79.25',S 34°00'54" W a distance of 82.30',S 08°25'14" W a distance of 216.93',S 31°09'04" W a distance of 127.76',S 44°01'47" W a distance of 109.60',S 41°13'55" W a distance of 228.91',S 39°05'58" W a distance of 96.68', S 21°15'21" W a distance of 79.64',S 49°50'50" W a distance of 89.71',S 61°33'43" W a distance of 116.24',S 59°32'25" W a distance of 65.07' to a point; thence leaving said escarpment and with the northeastern line of Thunder Development, Inc., the following calls, N 41°44'54" W a distance of 456.01' to a point in the eastern right of way of a proposed road; thence N 41°44'54" W a distance of 50.63' to a point in the western right of way of a proposed road; thence continuing with Thunder Development, Inc. the following calls, N 40°23'33" W a distance of 221.45', S 39°11'31" W a distance of 366.04', N 90°00'00" W a distance of 105.56', N 01°10'42" W a distance of 120.40', N 02°42'17" E a distance of 122.21',N 09°26'00" E a distance of 227.48'N 09°24'09" E a distance of 287.64', N 40°20'19" E a distance of 273.97',N 34°20'23" E a distance of 255.16' to the Point of Beginning, Containing 528 acres, more or less.

Tract 3 (Phase 3A)

Beginning at the North West corner of Thunder Development, Inc. of record in Deed Book 433 Page 187, Registers Office of Marion County, Tennessee; thence along the escarpment of Raulston Cove S 74°14'20" W a distance of 92.61'; thence N 25°57'50" W a distance of 137.10'; thence N 34°16'37" E a distance of 232.14'; thence N 67°36'36" W a distance of 57.85'; thence N 38°43'49" W a distance of 60.93'; thence N 08°59'09" W a distance of 129.90'; thence N 78°12'17" W a distance of 235.12'; thence N 05°47'14" W a distance of 144.53'; thence N 74°43'25" W a distance of 124.89'; thence N 27°49'35" W a distance of 92.68'; thence N 32°48'54" W a distance of 129.02'; thence N 05°22'25" W a distance of 119.30'; thence S 83°53'19" E a distance of 49.57'; thence N 21°56'35" E a distance of 20.43'; thence N 39°17'56" E a distance of 102.45'; thence N 19°11'46" E a distance of 108.68'; thence N 68°17'21" W a distance of 130.31'; thence N 34°17'57" W a distance of 53.31'; thence N 23°26'18" W a distance of 58.34'; thence S 68°13'49" W a distance of 87.33'; thence S 81°59'33" W a distance of 67.12'; thence S 84°51'00" W a distance of 177.78'; thence S 50°48'04" W a distance of 119.98'; thence N 82°44'49" W a distance of 131.97'; thence S 32°05'42" W a distance of 88.88'; thence S 80°02'43" W a distance of 145.44'; thence S 24°09'33" W a distance of 111.33'; thence S 62°32'43" W a distance of 139.98'; thence S 85°59'03" W a distance of 212.68'; thence S 46°53'38" W a distance of 112.09'; thence S 76°08'17" W a distance of 165.87'; thence S 54°03'45" W a distance of 255.78'; thence S 38°45'36" W a distance of 144.37'; thence S 16°59'52" W a

distance of 75.52'; thence S 80°26'02" W a distance of 155.44'; thence S 39°26'27" W a distance of 120.16'; thence S 28°44'41" W a distance of 132.79'; thence S 49°56'51" W a distance of 202.71'; thence S 77°18'22" W a distance of 131.85'; thence S 26°23'27" W a distance of 181.04'; thence S 54°14'11" W a distance of 63.99'; thence S 38°30'26" W a distance of 128.41'; thence S 86°09'34" W a distance of 94.09'; thence S 39°09'32" W a distance of 123.69'; thence N 64°48'45" W a distance of 148.55'; thence S 42°44'21" W a distance of 91.93'; thence S 67°21'46" W a distance of 272.30'; thence S 33°21'44" W a distance of 59.94'; thence S 64°21'32" W a distance of 142.77'; thence S 31°44'28" W a distance of 313.07'; thence S 58°58'19" W a distance of 227.10'; thence S 27°50'50" W a distance of 264.46'; thence S 38°13'23" W a distance of 153.72'; thence N 74°04'24" W a distance of 127.98'; thence S 29°13'59" W a distance of 159.29'; thence S 84°05'48" W a distance of 86.61'; thence S 16°07'49" W a distance of 145.08'; thence S 78°23'07" W a distance of 78.01'; thence S 35°11'41" W a distance of 272.15'; thence S 56°54'03" W a distance of 53.91'; thence leaving said escarpment and around Roberts Point S 15°02'55" W a distance of 335.40'; thence N 69°55'42" W a distance of 136.80'; thence N 25°01'42" W a distance of 1048.61' to a point on the escarpment of Kelly Cove; thence along the East side of said escarpment N 09°41'53" W a distance of 338.28'; thence N 20°23'26" E a distance of 289.73'; thence N 53°33'42" E a distance of 262.73'; thence N 64°14'23" E a distance of 166.27'; thence S 80°12'36" E a distance of 330.76'; thence N 53°35'11" E a distance of 710.83'; thence N 42°29'27" E a distance of 322.53'; thence N 75°22'07" E a distance of 115.22'; thence N 15°55'25" E a distance of 60.35'; thence N 40°40'40" E a distance of 162.07'; thence N 74°28'07" E a distance of 149.47'; thence N 38°04'04" E a distance of 179.42'; thence N 13°45'29" E a distance of 79.67'; thence N 37°47'14" E a distance of 105.18'; thence N 79°52'17" E a distance of 72.13'; thence N 39°04'12" E a distance of 117.47'; thence N 49°55'06" E a distance of 293.99'; thence S 54°37'41" E a distance of 143.75'; thence N 54°33'23" E a distance of 112.45'; thence N 31°10'33" E a distance of 572.81'; thence N 52°26'39" E a distance of 151.97'; thence N 14°52'46" E a distance of 315.35'; thence N 68°42'25" E a distance of 134.68'; thence N 34°39'12" E a distance of 158.75'; thence N 11°00'30" W a distance of 37.77'; thence N 22°14'58" E a distance of 69.42'; thence N 49°22'22" E a distance of 248.47'; thence N 19°59'57" E a distance of 110.48'; thence N 80°13'20" E a distance of 32.29'; thence S 45°48'52" E a distance of 110.93'; thence N 88°38'59" E a distance of 116.34'; thence N 60°59'16" E a distance of 431.32'; thence N 12°18'02" E a distance of 87.55'; thence N 62°48'14" E a distance of 87.58'; thence N 46°33'41" E a distance of 100.49'; thence N 72°03'18" E a distance of 103.65'; thence N 42°07'31" E a distance of 115.88'; thence N 17°14'15" E a distance of 160.65'; thence N 37°40'42" E a distance of 34.97'; thence N 57°32'11" E a distance of 162.69'; thence N 33°33'21" E a distance of 268.27'; thence N 48°44'04" E a distance of 215.36'; thence N 30°16'05" E a distance of 102.97'; thence N 11°47'09" W a distance of 137.03'; thence N 24°51'09" E a distance of 153.96'; thence N 57°46'10" E a distance of 265.18'; thence N 58°32'32" E a distance of 29.43'; thence N 38°30'49" E a distance of 298.88'; thence N 60°18'28" E a distance of 130.30'; thence N 62°00'06" E a distance of 121.31'; thence N 35°33'03" E a distance of 110.53'; thence N 06°32'07" E a distance of 61.55'; thence N 77°01'50" W a distance of 103.99'; thence N 67°15'31" W a distance of 116.81'; thence S 88°41'12" W a distance of 144.22'; thence N 72°13'07" W a distance of 259.77'; thence N 85°50'06" W a distance of 335.95'; thence N 76°34'30" W a distance of 183.79'; thence leaving said escarpment along a severance line with Tango November LLC. of record in Deed Book 397 Page 69, Registers Office of Marion County, Tennessee N 13°25'30" E a distance of 550.00'; thence S 80°35'00" E a distance of 3033.17'; thence S 21°44'05" E a distance of 1457.24'; thence S 60°17'37" W a distance of 3771.86'; thence S 53°21'31" E a distance of 2263.19'; thence S 33°09'15" E a distance of 215.42'; thence S 22°04'17" E a distance of 323.68' to a point in the northern line of Thunder Development, Inc. ; thence along the northern line of Thunder Development, Inc., N 64°56'08" W a distance of 298.69'; thence S 77°22'16" W a distance of 53.84'; thence N 70°50'58" W a distance of 438.18'; thence N 60°45'31" W a distance of 152.41'; thence S 65°41'02" W a distance of 469.43'; thence S 74°14'20" W a distance of 213.78' to the Point of Beginning and containing 393 acres, more or less.

Tract 4 (Phase 4A)

Beginning at a ½" Rebar & Cap #2900 (Old) located on the Southern boundary of the Right of Way for Raulston Falls Road, said Rebar & Cap being the Northernmost corner of Lot 257 in Phase 3-A of Jasper Highlands Subdivision of record in Plat Book 5/Page 1138 in the Register's Office of Marion County, Tennessee (ROMCT); thence leaving said R.O.W. and traveling along the northern boundary of Phase 3-A for the following calls: thence S13°04'42"W for 185.70' to a ½" Rebar & Cap #2900 (Old); thence S29°41'16"W for 82.59' to a ½" Rebar & Cap #2900 (Old); thence S21°57'18"W for 65.10' to a ½" Rebar & Cap #2900 (Old); thence S70°16'25"W for 39.16' to a ½" Rebar & Cap #2900 (Old); thence S37°43'30"W for 157.58' to a ½" Rebar & Cap #2900 (Old); thence S44°05'33"W for 81.51' to a ½" Rebar & Cap #2900 (Old); thence S57°52'35"W for 78.13' to a ½" Rebar & Cap #2900 (Old); thence S73°47'49"W for 108.28' to a ½" Rebar & Cap #2900 (Old); thence S82°36'30"W for 146.79' to a ½" Rebar & Cap #2900 (Old); thence N72°44'11"W for 89.09' to a ½" Rebar & Cap #2900 (Old); thence N88°45'22"W for 86.98' to a ½" Rebar & Cap #2900 (Old); thence S77°32'55"W for 183.93' to a ½" Rebar & Cap #2900 (Old); thence N79°01'52"W for 129.02' to a ½" Rebar & Cap #2900 (Old); thence N23°22'44"W for 90.52' to a ½" Rebar & Cap #2900 (Old); thence N63°27'37"W for 105.66' to a ½" Rebar & Cap #2900 (Old); thence N47°53'38"W for 53.51' to a ½" Rebar & Cap #2900 (Old); thence N75°23'40"W for 89.87' to a ½" Rebar & Cap #2900 (Old); thence S73°49'40"W for 61.02' to a ½" Rebar & Cap #2900 (Old); thence S81°04'40"W for 46.44' to a ½" Rebar & Cap #2900 (Old); thence N75°41'33"W for 72.04' to a ½" Rebar & Cap #2900 (Old); thence N81°02'13"W for 42.85' to a ½" Rebar & Cap #2900 (Old); thence N38°41'26"W for 33.26' to a ½" Rebar & Cap #2900 (Old); thence N08°08'20"W for 47.21' to a ½" Rebar & Cap #2900 (Old); thence N15°36'33"W for 33.12' to a ½" Rebar & Cap #2900 (Old); thence N76°45'05"W for 24.70' to a Bolt & Cap #2900 (New) located on the top of the East escarpment of Kelly Cove; thence leaving the Northern boundary of the aforementioned Phase 3-A and following along the top of the East escarpment of Kelly Cove for the following calls: thence N07°33'39"E for 30.91' to a Bolt & Cap #2900 (New); thence N25°00'49"W for 32.50' to a Bolt & Cap #2900 (New); thence N69°05'59"W for 101.66' to a Bolt & Cap #2900 (New); thence N63°14'13"W for 136.37' to a Bolt & Cap #2900 (New); thence S85°02'58"W for 112.26' to a Bolt & Cap #2900 (New); thence N72°53'34"W for 297.47' to a Bolt & Cap #2900 (New); thence N80°15'21"W for 212.61' to a Bolt & Cap #2900 (New); thence S71°34'36"W for 44.86' to a Bolt & Cap #2900 (New); thence N83°49'26"W for 221.99' to a Bolt & Cap #2900 (New); thence N54°07'36"W for 353.44' to a Bolt & Cap #2900 (New); thence N37°57'20"W for 203.36' to a Bolt & Cap #2900 (New); thence N75°06'32"W for 124.37' to a Bolt & Cap #2900 (New); thence N01°50'15"W for 325.48' to a Bolt & Cap #2900 (New); thence N36°17'26"W for 141.34' to a Bolt & Cap #2900 (New); thence N06°53'53"W for 138.40' to a Bolt & Cap #2900 (New); thence N23°09'37"W for 195.68' to a Bolt & Cap #2900 (New); thence N11°53'46"W for 335.09' to a Bolt & Cap #2900 (New); thence N15°41'07"E for 265.13' to a Bolt & Cap #2900 (New); thence N02°40'09"W for 296.72' to a Bolt & Cap #2900 (New); thence N33°10'57"E for 106.84' to a Bolt & Cap #2900 (New); thence N47°34'41"W for 83.00' to a Bolt & Cap #2900 (New); thence N06°19'47"W for 350.99' to a Bolt & Cap #2900 (New); thence N54°42'34"W for 97.92' to a Bolt & Cap #2900 (New); thence N08°38'52"E for 129.67' to a Bolt & Cap #2900 (New); thence N41°28'32"E for 89.03' to a Bolt & Cap #2900 (New); thence N24°01'29"W for 535.02' to a Bolt & Cap #2900 (New); thence N23°03'48"E for 1079.34' to a Bolt & Cap #2900 (New); thence N04°24'17"W for 299.05' to a Bolt & Cap #2900 (New); thence N28°56'38"E for 163.13' to a Bolt & Cap #2900 (New); thence N67°32'28"E for 288.29' to a Bolt & Cap #2900 (New); thence N26°59'12"W for 177.21' to a Bolt & Cap #2900 (New); thence N68°42'19"W for 409.00' to a Bolt & Cap #2900 (New); thence N37°51'32"W for 194.67' to a Bolt & Cap #2900 (New); thence following along the top of the West escarpment of Kelly Cove for the following calls: thence S78°07'44"W for 131.09' to a Bolt & Cap #2900 (New); thence S34°26'40"W for 568.43' to a Bolt & Cap #2900 (New); thence S26°29'23"W for 210.11' to a Bolt & Cap #2900 (New); thence S55°53'34"W for 726.64' to a Bolt & Cap #2900 (New); thence S39°52'20"W for 419.52' to a Bolt & Cap #2900 (New); thence S18°03'04"W for 287.24' to a Bolt & Cap #2900 (New); thence S57°15'58"W for 236.25' to a Bolt & Cap #2900 (New); thence S08°15'02"W for 173.25' to a Bolt & Cap #2900 (New); thence S59°23'21"W for 127.56' to a Bolt & Cap #2900 (New); thence S25°13'37"W for 277.84' to a Bolt & Cap #2900 (New); thence S60°40'58"W for 143.08' to a Bolt & Cap #2900 (New); thence S14°49'07"E for 117.73' to a Bolt & Cap #2900 (New);

thence S30°15'37"W for 168.79' to a Bolt & Cap #2900 (New); thence leaving the top of the aforementioned West escarpment of Kelly Cove and traveling along a severance line for the following calls: N35°01'15"W for 615.69' to a ½" Rebar & Cap #2900 (New); thence N17°04'35"W for 571.51' to a ½" Rebar & Cap #2900 (New); thence N07°29'07"W for 519.68' to a ½" Rebar & Cap #2900 (New); thence N01°21'22"W for 379.95' to a ½" Rebar & Cap #2900 (New); thence N58°14'09"E for 154.82' to a point; thence along a curve to the left having a radius of 225.00' and an arc length of 136.03' and being subtended by a 133.97' chord bearing N40°54'59"E to a ½" Rebar & Cap #2900 (New); thence N23°35'49"E for 237.06' to a ½" Rebar & Cap #2900 (New); thence S66°24'11"E for 290.54' to a ½" Rebar & Cap #2900 (New); thence N49°51'12"E for 217.92' to a ½" Rebar & Cap #2900 (New) located on the Southwestern boundary of T Mountain Acquisitions, LLC of record in Deed Book 486/Page 598 (ROMCT); thence following along the T Mountain boundary for the following calls: S40°08'48"E for 241.06' to a ½" Rebar & Cap #2900 (New); thence N50°31'13"E for 1587.85' to a ½" Rebar & Cap #2900 (New); thence N74°02'51"E for 966.27' to a ½" Rebar & Cap #2900 (New); thence S48°22'16"E for 870.99' to a ½" Rebar & Cap #2900 (New); thence S03°51'49"E for 933.36' to a ½" Rebar & Cap #2900 (New); thence S02°24'01"W for 4068.06' to a ½" Rebar & Cap #2900 (New); thence S80°35'05"E for 3033.17' to a ½" Rebar & Cap #2900 (New); thence S21°41'15"E for 39.78' to a ½" Rebar & Cap #2900 (Old) located on the boundary of the aforementioned T Mountain Acquisitions, LLC, said ½" Rebar & Cap being the Northernmost corner of Lot 306 in Phase 3-A of Jasper Highlands Subdivision as shown on Plat Book 5/Page 1261; thence leaving the T Mountain Acquisitions, LLC boundary and following the Northern boundary of Phase 3-A for the following calls: S25°33'12"W for 77.55' to a ½" Rebar & Cap #2900 (Old); thence S37°21'44"W for 101.44' to a ½" Rebar & Cap #2900 (Old) located on the Northern boundary of the R.O.W. for Raulston Falls Road as shown on Plat Book 5/Page 1138; thence following along the Northern boundary of said R.O.W. N36°06'25"W for 123.30' to a point; thence continuing with the R.O.W. along a curve to the left having a radius of 275.00' and an arc length 253.87' and being subtended by a 244.95' chord bearing N62°33'13"W to a point located on the Northern boundary of the R.O.W.; thence crossing said R.O.W. perpendicularly S00°59'59"W for 50.00' to a point located on the Southern boundary of the same R.O.W.; thence following along the Southern boundary of the aforementioned R.O.W. along a curve to the right having a radius of 311.56' and an arc length of 25.34' and being subtended by a 25.33' chord bearing S85°46'25"E to a ½" Rebar & Cap #2900 (Old) located on the Southern boundary of the R.O.W. of Raulston Falls Road, said Rebar & Cap being the Point of Beginning, containing 237.25 acres more or less.

EXHIBIT F

Jasper Highlands Subdivision, Phase 1-A

A Mountain Top Community

CERTIFICATE BY PLANNING COMMISSION ON APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the Subdivision Regulation for Marion County Tennessee, with the exception of such variances, if any, as may be noted on this plat, and that all required improvements have either been completed or covered by an approved bank letter of credit, cashier's check, cash deposit or wire transfer large enough to complete the required improvements in case of default, and that This plat has been approved for recording in the office of the county register

6-5-12 Roy Bracket
Date Planning Commission Secretary

CERTIFICATE OF OWNERSHIP AND DEDICATION

I (we) hereby certify that I am (we are) the owners of the property shown and described hereon, and that I (we) hereby adopt this plat of subdivision with my (our) free consent, establish the minimum building setback lines, and hereby dedicate to the public use forever all the streets as shown on this plat

10-11-11 John S. Thornton
Date Owner

Date Owner

Date Owner

CERTIFICATION OF ROAD STATUS (PRIVATE ROAD)

It is hereby certified that the private road shown on this plat has been designed in an acceptable manner in accordance to required specifications in the Marion County Subdivision Regulations. The government of Marion County will not accept any responsibility for the construction or maintenance of this private road

10-11-11 John S. Thornton
Date Owner

Date Owner

CERTIFICATE OF REGISTERED SURVEYOR

It is hereby certified that this plat is true and correct and was prepared from an actual survey of the property by me or under my supervision, and that all monuments shown hereon actually exist or are marked as "future", and their location size, type and material are correctly shown

10/6/11 Clarence L. Howard R.L.S
Date

CERTIFICATION OF APPROVAL OF STREETS AND DRAINAGE SYSTEM (FOR ROADS NOT COMPLETED AT TIME OF FINAL PLAT)

I hereby certify that the streets and drainage facilities for the _____ subdivision have been designed in an acceptable manner in accordance to required specifications and a bank letter of credit, cashier's check, cash deposits or wire transfer in the amount of $_____(150% of the total value of all road and drainage improvements installed) has been posted to cover the construction of streets and drainage

6-5-12 Neil Walker
Date Marion County Road Commissioner

CERTIFICATE FOR ELECTRICITY

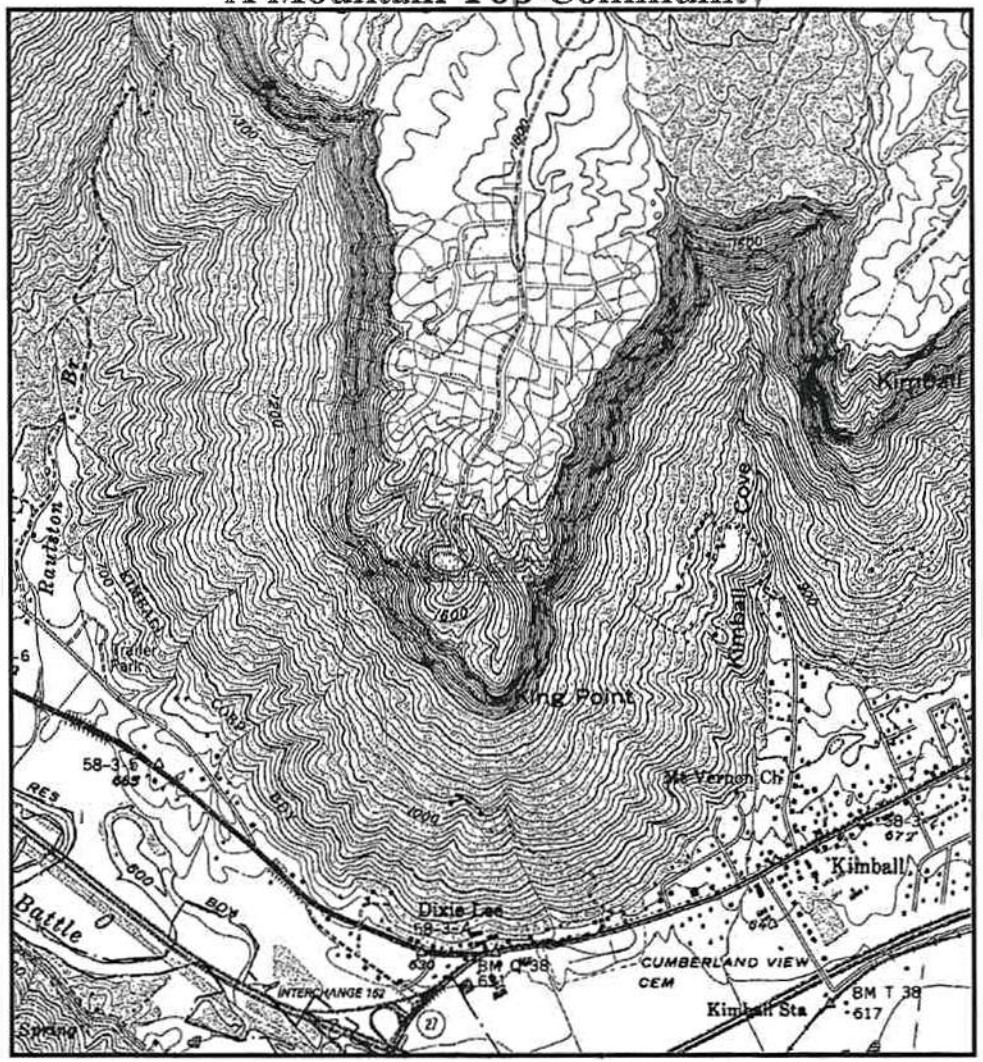
I hereby certify that this subdivision plat shows adequate easements for power lines(see notes for easement utilities) Power is available to all lots shown on this plat, based on SVEC's line extension policies

10-26-11 Danny Kimbrell
Date Electric Power Official

CERTIFICATION OF E-911 APPROVAL

I hereby certify that I have reviewed this plat and find that it conforms to the county's E-911 requirements, including appropriate road names/numbers

10-2-2011 Tonya Shaw Evans
Date Marion County E-911 Representative



CERTIFICATE OF APPROVAL OF SUBSURFACE SEWAGE DISPOSAL SYSTEM
Marion County Division of Groundwater Protection Certificate of Sewage Disposal

Approval is hereby granted for lots _____ defined as _____ County, Tennessee, as being suitable for subsurface sewage disposal (SSD) with the listed or attached restrictions

See individual lots for restrictions

Prior to any construction of a structure, permanent or mobile, the plans for the exact house/structure location must be approved and a SSD system permit issued by the Division of Groundwater Protection. Water taps, water lines, underground utilities and driveways should be located at side property lines unless otherwise noted. Any cutting, filling or alterations of the soil conditions may void this approval

Sissy Steele
Environmental Specialist
Div of Groundwater Protection

10/10/11
Date

BK/PG. 5/695-704
12002054

10 PGS AL - PLAT	
SAN ERA HATCH 43252	
VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	150.00
ARCHIVE FEE	0.00
DP FEE	2.00
REGISTERS FEE	0.00
TOTAL AMOUNT	152.00

STATE OF TENNESSEE, MARION COUNTY
WINFRED HAGGARD
REGISTER OF DEEDS

CLARENCE L. HOWARD JR
REGISTERED LAND SURVEYOR
No. 2207
CONCORD
TENNESSEE
10/6/11

I hereby certify that this is a category II survey and the ratio of precision of the unadjusted survey is greater than 1:10,000 as shown hereon

Clarence L. Howard Jr.
TN R.L.S #2207
AL P.L.S # 25838

Notes
1 Area Subdivided: 291.28 Acres
2 Zoning: None
3 All Lot Lines Have 15' Drainage & Utility Easements
4 Area does Not Lie Within The 100 Year Flood Hazard Zone As Per FEMA Map Panel 47115C0210C, Dated: 02-01-2007
5 Water By: Individual Wells
6 Sewer By: Individual Septic Systems
7 Owner/Thunder Development Inc. (John Thornton, President) 210 Bellbrook Road Kimball, Tn 37347 423-424-1085
8 Setbacks: 40' Front, 15' Side, 15' Rear, 20' Curve
9 This Plat Subdivides Property Of Record In DB 397 PG 69 & DB 397 PG 84, DB 400 PG 986, DB 433 PG 1000 & Tax Map 109 Parcel 1.00/Tax Map 94 Parcel 1.00 & Tax Map 118 Parcel 7.01
10 All platted roads have 50' R.O.W.'s and are private
11 Calls along the top of bluff are chord bearings and distances

B&H Surveying Services
PO Box 446, Jasper, TN 37347
423-942-0022
bandhsurveying@hotmail.com

Grid North
N
W B&H E
S
TN SPC (NAD 83)

Surveyor's Notes
1 This survey was performed without the benefit of a title report and is subject to any state of facts that an up to date title report might reveal
2 This survey is not transferable to additional institutions or owners and is invalid without an original seal and signature
3 No interior improvements were located other than those shown above
4 This survey was done by or under the direct supervision of the surveyor signing and sealing thereon
5 This survey was based upon the analysis of the deeds of record with evidence found existing on the ground and located, renders the professional opinion of the surveyor as to the location of the boundaries and conditions being represented
6 Monuments either found or placed as depicted existed as described on the date of the survey shown thereon

Thunder Development Inc
210 Bellbrook Road, Kimball, TN 37347
423-424-1085



THUNDER ENTERPRISES

Final Plat For:

Jasper Highlands Subdivision (Phase 1-A)

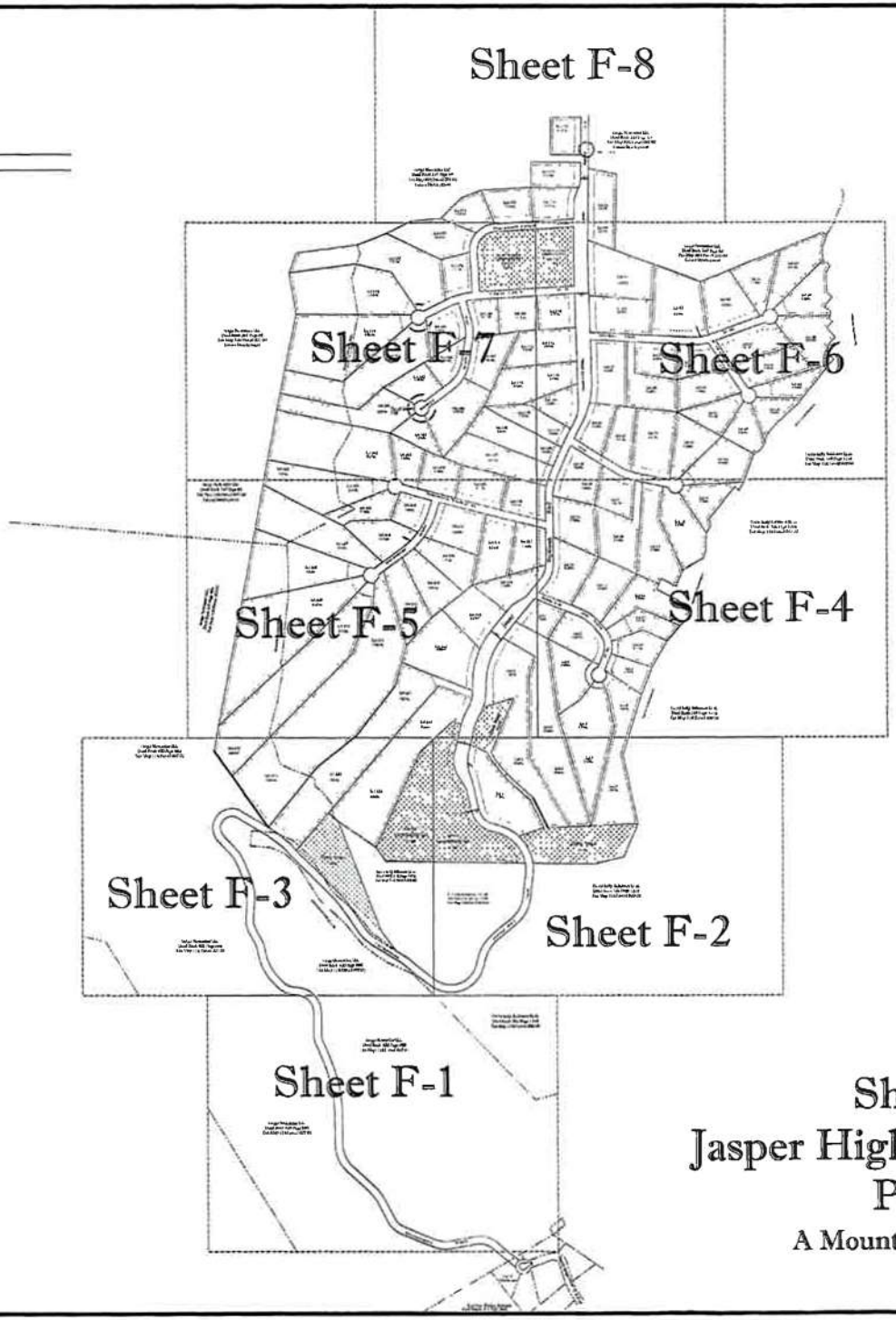
Second Civil District
Marion County, Tennessee

Scale	Date	Drawing No
1" = 100'	09-26-11	111B-11 Final

LEGEND

These standard symbols will be found in the drawing.

- Fire Hydrant
- Light Pole
- Hacked & Painted Tree
- 1/2" Rebar & Cap
- Power Pole
- Sewer Manhole
- Boundary Line



Suitable Soils Area
As Scaled From Soil
Scientist's Maps.

Note*
The number of bedrooms on individual lots may be increased based on placement of drive way, utilities and the footprint of the proposed house.

Grid North
TN SPC NAD 83

Sheet Index
Jasper Highlands Subdivision
Phase 1-A
A Mountain Top Community

Sheet F-1
Jasper Highlands Subdivision
Phase 1-A

A Mountain Top Community

Ferris Kelly Robinson Et. al.
Deed Book 326 Page 1318
Tax Map 118 Parcel 009.00

Tango November LLC.
Deed Book 400 Page 986
Tax Map 118 Parcel 007.01

Tango November LLC.
Deed Book 400 Page 986
Tax Map 118 Parcel 007.01

Grid North
TN SPC NAD 83

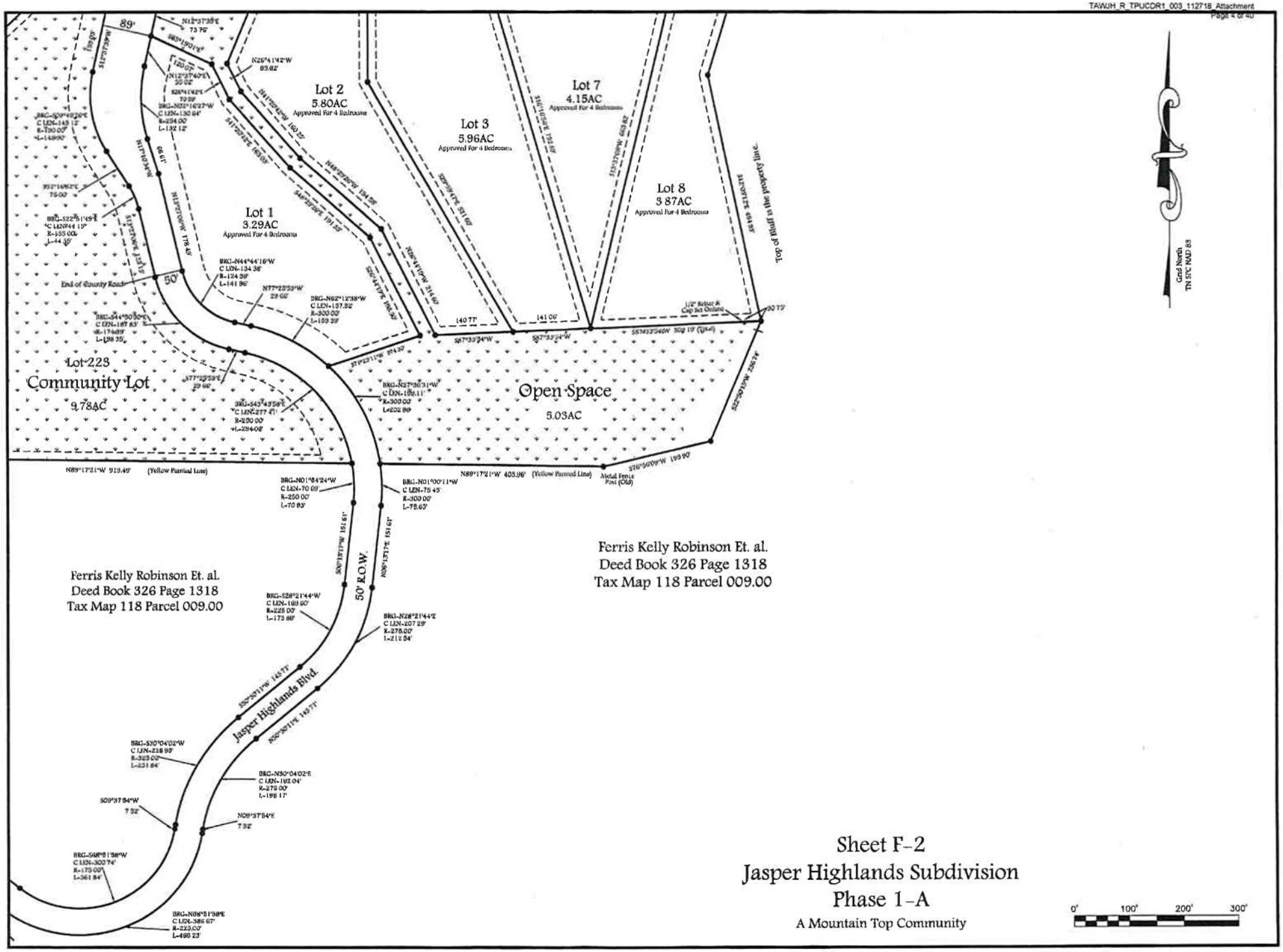
Lot 15
PB 4 PG 360

Timber Ridge Drive 50' R.O.W.

Timber Ridge Estates
at Book 4 Page 360

Jasper Highlands Blvd
50' R.O.W

0' 100' 200' 300'



Sheet F-2
Jasper Highlands Subdivision
Phase 1-A

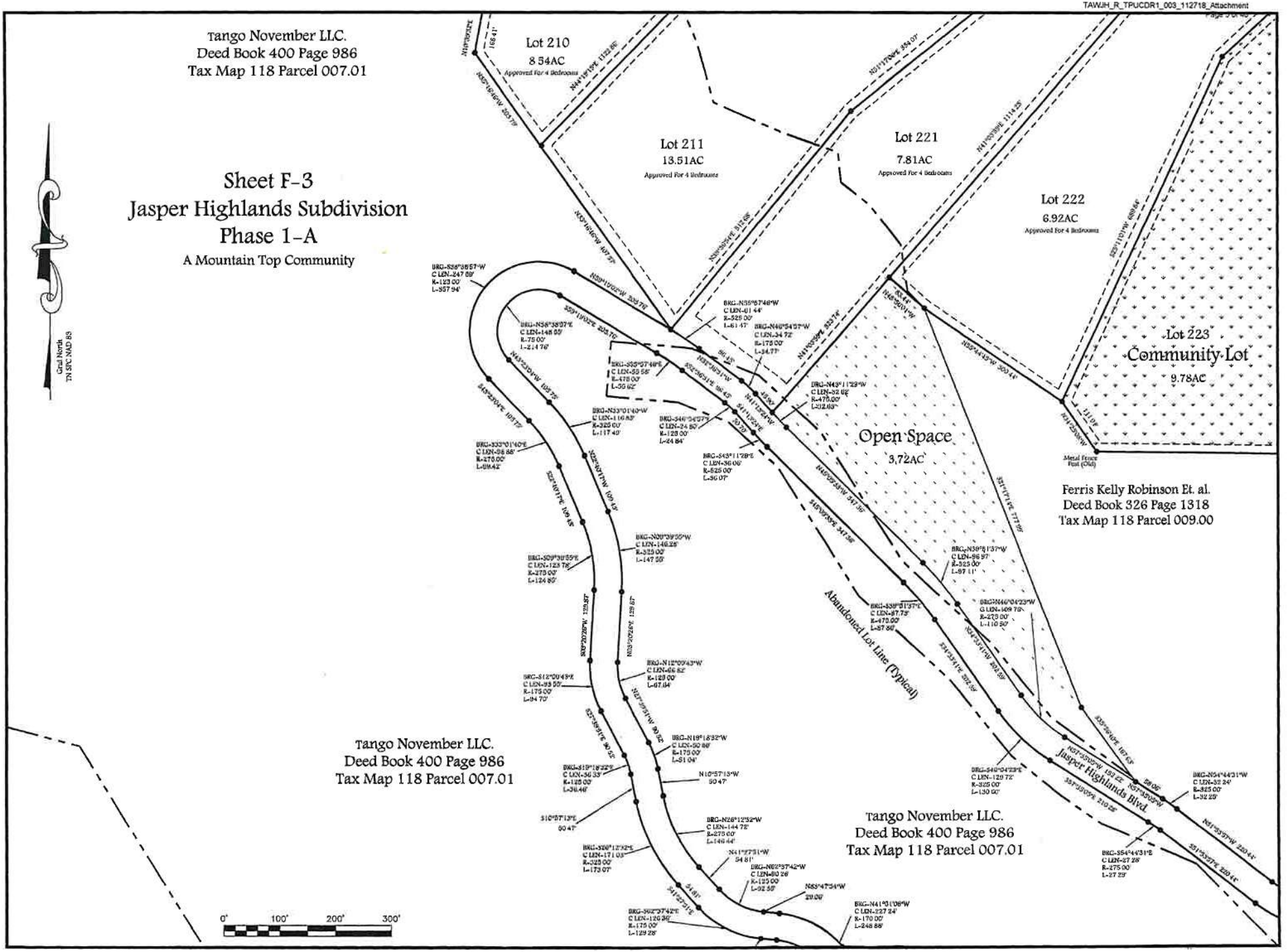
A Mountain Top Community

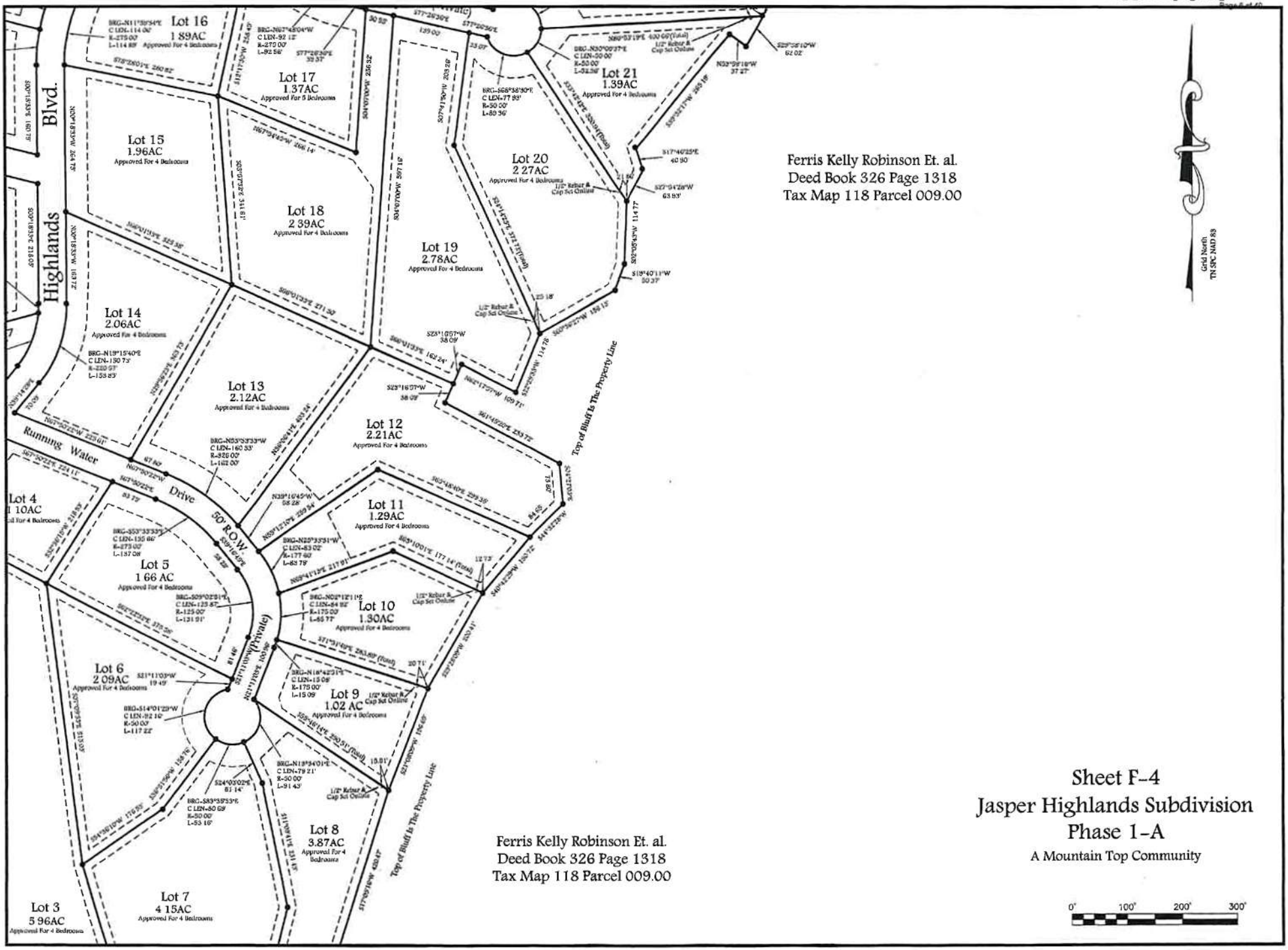
Tango November LLC.
Deed Book 400 Page 986
Tax Map 118 Parcel 007.01

Grid North
TN SPC NAD 83

Sheet F-3
Jasper Highlands Subdivision
Phase 1-A

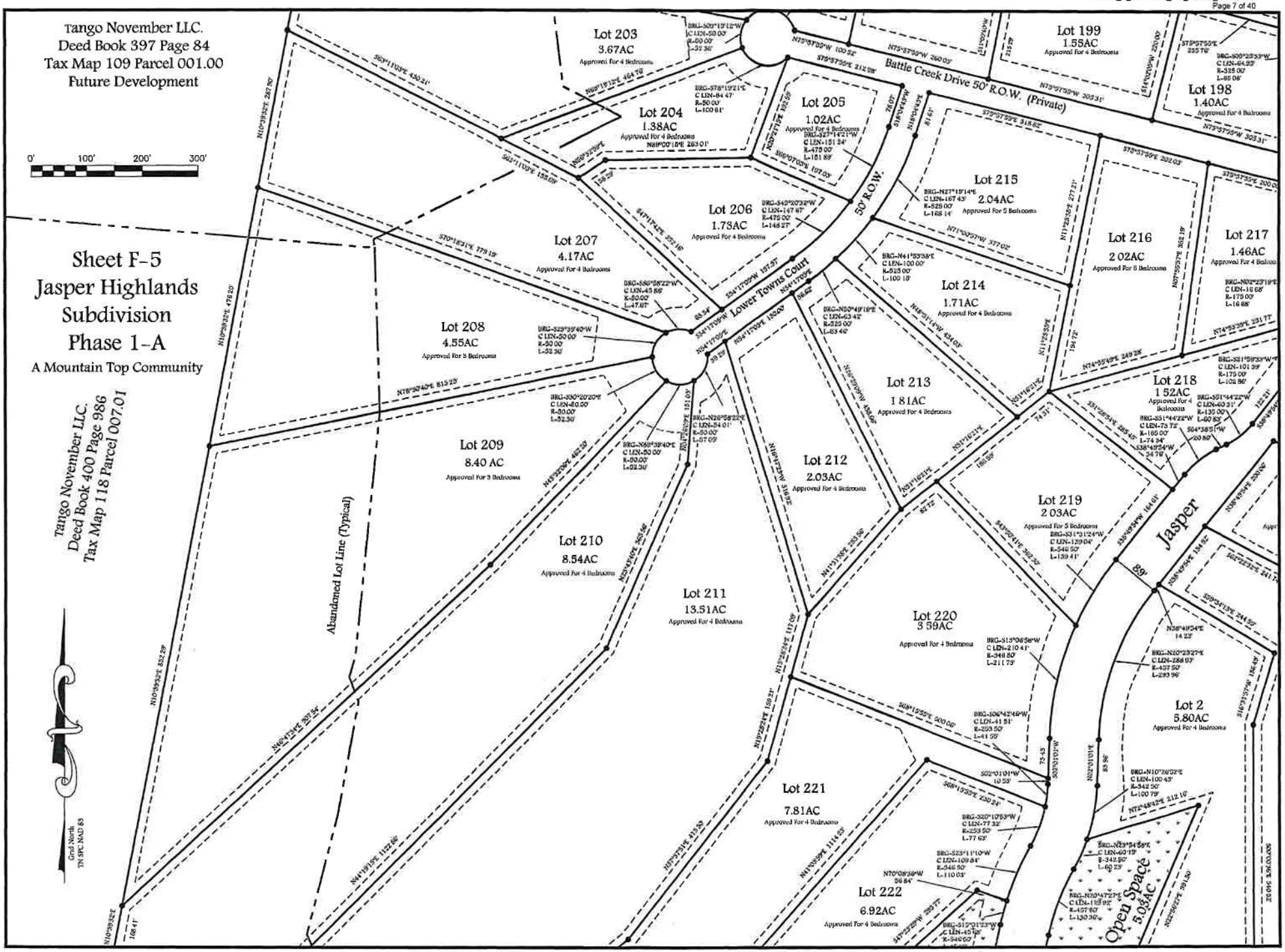
A Mountain Top Community

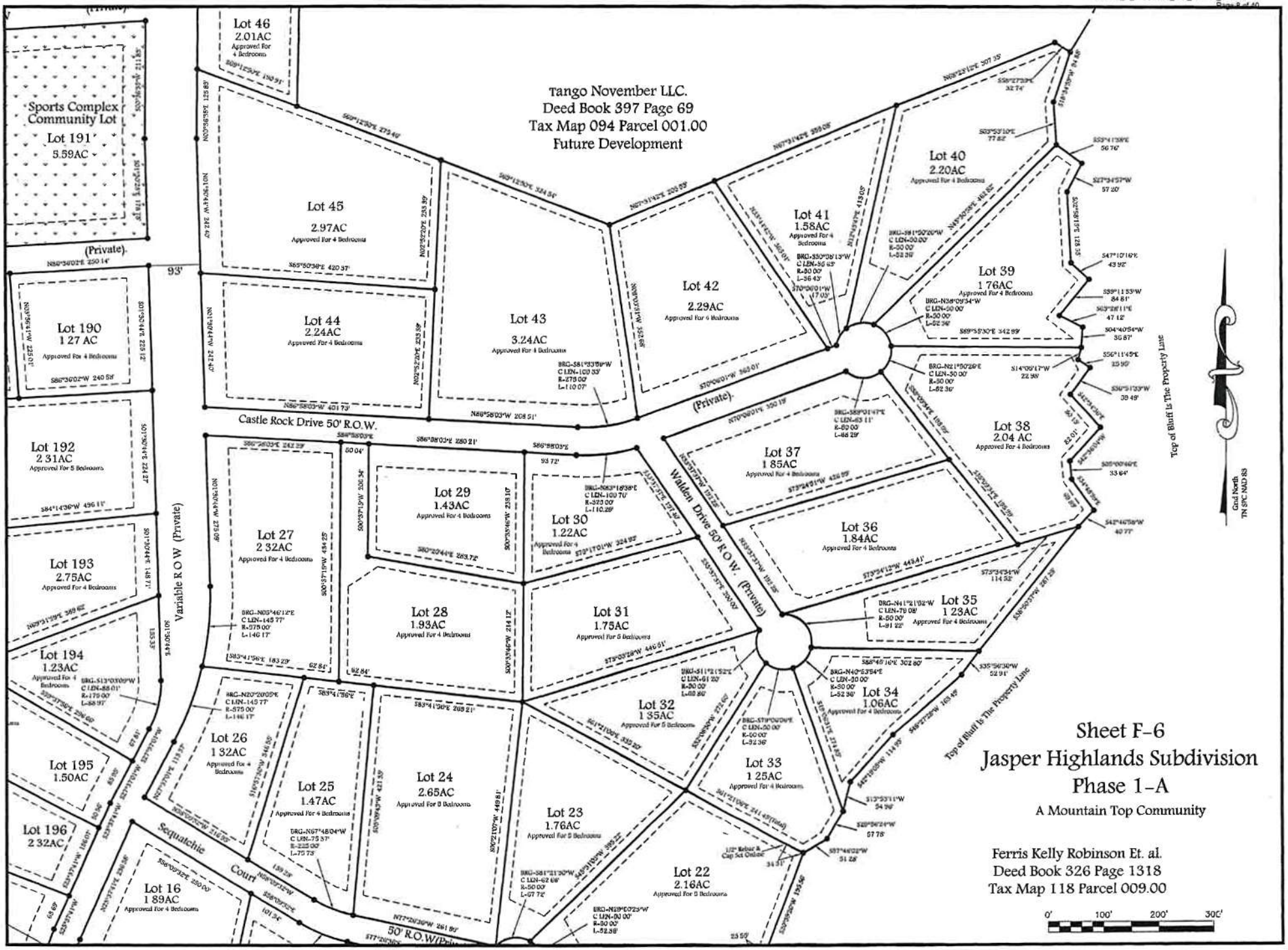


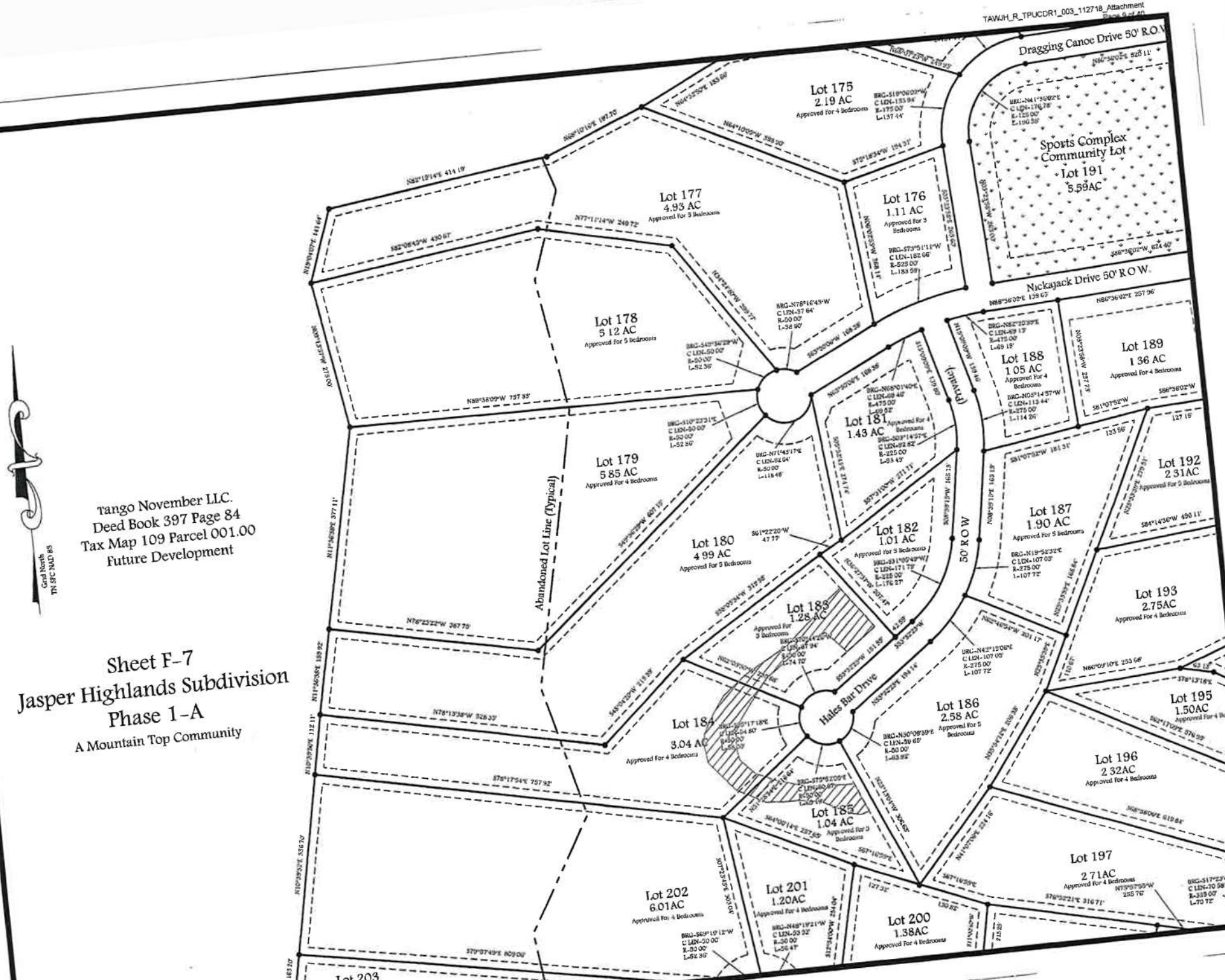


Sheet F-4
Jasper Highlands Subdivision
Phase 1-A

A Mountain Top Community


Tango November LLC.
Deed Book 397 Page 84
Tax Map 109 Parcel 001.00
Future Development
0' 100' 200' 300'
Sheet F-5
Jasper Highlands
Subdivision
Phase 1-A
A Mountain Top Community
Tango November LLC.
Deed Book 400 Page 986
Tax Map 118 Parcel 007.01
Grid North
TN SPC NAD 83
Abandoned Lot Line (Typical)
Battle Creek Drive 50' R.O.W. (Private)
50' R.O.W.
Lower Towns Court
Jasper
89'
Lot 203
3.67AC
Approved For 4 Bedrooms
Lot 204
1.38AC
Approved For 4 Bedrooms
Lot 205
1.02AC
Approved For 4 Bedrooms
Lot 206
1.73AC
Approved For 4 Bedrooms
Lot 207
4.17AC
Approved For 4 Bedrooms
Lot 208
4.55AC
Approved For 5 Bedrooms
Lot 209
8.40 AC
Approved For 5 Bedrooms
Lot 210
8.54AC
Approved For 4 Bedrooms
Lot 211
13.51AC
Approved For 4 Bedrooms
Lot 212
2.03AC
Approved For 4 Bedrooms
Lot 213
1.81AC
Approved For 4 Bedrooms
Lot 214
1.71AC
Approved For 4 Bedrooms
Lot 215
2.04AC
Approved For 5 Bedrooms
Lot 216
2.02AC
Approved For 5 Bedrooms
Lot 217
1.46AC
Approved For 4 Bedrooms
Lot 218
1.52AC
Approved For 4 Bedrooms
Lot 219
2.03AC
Approved For 5 Bedrooms
Lot 220
3.59AC
Approved For 4 Bedrooms
Lot 221
7.81AC
Approved For 4 Bedrooms
Lot 222
6.92AC
Approved For 4 Bedrooms
Lot 198
1.40AC
Approved For 4 Bedrooms
Lot 199
1.55AC
Approved For 4 Bedrooms
Lot 2
5.80AC
Approved For 4 Bedrooms
Open Space
5.03AC


Tango November LLC.
Deed Book 397 Page 69
Tax Map 094 Parcel 001.00
Future Development
Sports Complex Community Lot
Lot 191
5.59AC
Lot 46
2.01AC
Approved For 4 Bedrooms
Lot 45
2.97AC
Approved For 4 Bedrooms
Lot 44
2.24AC
Approved For 4 Bedrooms
Lot 43
3.24AC
Approved For 4 Bedrooms
Lot 42
2.29AC
Approved For 4 Bedrooms
Lot 41
1.58AC
Approved For 4 Bedrooms
Lot 40
2.20AC
Approved For 4 Bedrooms
Lot 39
1.76AC
Approved For 4 Bedrooms
Lot 38
2.04 AC
Approved For 4 Bedrooms
Lot 37
1.85AC
Approved For 4 Bedrooms
Lot 36
1.84AC
Approved For 4 Bedrooms
Lot 35
1.23AC
Approved For 4 Bedrooms
Lot 34
1.06AC
Approved For 4 Bedrooms
Lot 33
1.25AC
Approved For 4 Bedrooms
Lot 32
1.35AC
Approved For 5 Bedrooms
Lot 31
1.75AC
Approved For 5 Bedrooms
Lot 30
1.22AC
Approved For 4 Bedrooms
Lot 29
1.43AC
Approved For 4 Bedrooms
Lot 28
1.93AC
Approved For 4 Bedrooms
Lot 27
2.32AC
Approved For 4 Bedrooms
Lot 26
1.32AC
Approved For 4 Bedrooms
Lot 25
1.47AC
Approved For 4 Bedrooms
Lot 24
2.65AC
Approved For 5 Bedrooms
Lot 23
1.76AC
Approved For 5 Bedrooms
Lot 22
2.16AC
Approved For 5 Bedrooms
Lot 190
1.27 AC
Approved For 4 Bedrooms
Lot 192
2.31AC
Approved For 5 Bedrooms
Lot 193
2.75AC
Approved For 4 Bedrooms
Lot 194
1.23AC
Approved For 4 Bedrooms
Lot 195
1.50AC
Lot 196
2.32AC
Lot 16
1.89AC
Approved For 4 Bedrooms
(Private)
93'
Castle Rock Drive 50' R.O.W.
Variable R.O.W. (Private)
Walden Drive 50' R.O.W. (Private)
Sequatchie Court
50' R.O.W.
Top of Bluff Is The Property Line
Grid North
TN SPC NAD 83
Sheet F-6
Jasper Highlands Subdivision
Phase 1-A
A Mountain Top Community
Ferris Kelly Robinson Et. al.
Deed Book 326 Page 1318
Tax Map 118 Parcel 009.00
0'
100'
200'
300'



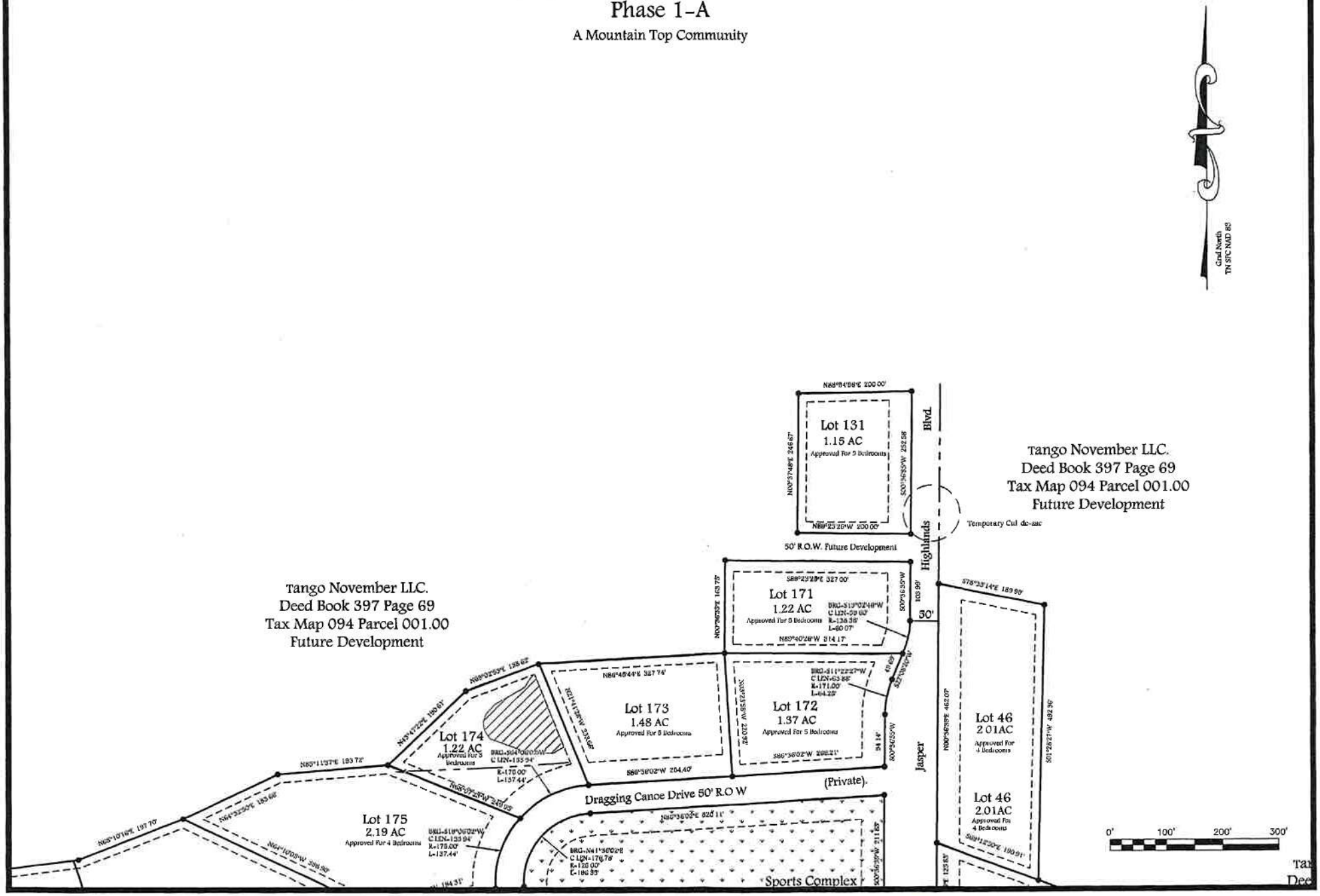
Tango November LLC.
Deed Book 397 Page 84
Tax Map 109 Parcel 001.00
Future Development

Sheet F-7
Jasper Highlands Subdivision
Phase 1-A

A Mountain Top Community

Sheet F-8
Jasper Highlands Subdivision
Phase 1-A

A Mountain Top Community



TAWJH_R_TPUCOR1_003_112718 Attachment
BK/PG: 641/1-620
13003843
16 PGS : AL - PLAT
SANDRA BATCH: 69521
VALUE 0.00
MORTGAGE TAX 0.00
TRANSFER TAX 0.00
RECORDING FEE 130.00
ARCHIVE FEE 2.00
DP FEE 2.00
REGISTER FEE 0.00
TOTAL AMOUNT 152.00
STATE OF TENNESSEE, MARION COUNTY
WINFRED HAGGARD
REGISTER OF DEEDS

Jasper Highlands Subdivision, Phase 1-B

A Mountain Top Community

CERTIFICATE BY PLANNING COMMISSION ON APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the Subdivision Regulation for Marion County, Tennessee, with the exception of such variances, if any, as may be noted on this plat; and that all required improvements have either been completed or covered by an approved bank letter of credit, cashier's check, cash deposit or wire transfer large enough to complete the required improvements in case of default; and that This plat has been approved for recordation in the office of the county register.

10-15-13 Kay Breshett
Date Planning Commission Secretary

CERTIFICATION OF ROAD STATUS (PRIVATE ROAD)

It is hereby certified that the private road shown on this plat has been designed in an acceptable manner in accordance to required specifications in the Marion County Subdivision Regulations. The government of Marion County will not accept any responsibility for the construction or maintenance of this private road.

8-12-13 Clarence L. Howard
Date Owner

Date Owner

CERTIFICATION OF OWNERSHIP AND DEDICATION

I (we) hereby certify that I am (we are) the owners of the property shown and described hereon, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building setback lines, and hereby dedicate to the public use forever all the streets as shown on this plat.

8-12-13 Clarence L. Howard
Date Owner

Date Owner

CERTIFICATION OF APPROVAL OF STREETS AND DRAINAGE SYSTEM
(FOR ROADS NOT COMPLETED AT TIME OF FINAL PLAT)

I hereby certify that the streets and drainage facilities for the _____ subdivision have been designed in an acceptable manner in accordance to required specifications and a bank letter of credit, cashier's check, cash deposits or wire transfer in the amount of $_____(150% of the total value of all road and drainage improvements installed) has been posted to cover the construction of streets and drainage.

10-15-13 Neil Dill
Date Marion County Road Commissioner

CERTIFICATION OF E-911 APPROVAL

I hereby certify that I have reviewed this plat and find that it conforms to the county's E-911 requirements, including appropriate road names/numbers.

8-13-2013 Jerry Lee Crass
Date Marion County E-911 Representative

CERTIFICATE FOR ELECTRICITY

I hereby certify that this plat shows adequate easements for power lines (See Notes For Easement Widths) Power is available to all lots shown on plat based on SVEC's line extension policies.

8-14-13 Randy McClure
Date Electric Power Official

CERTIFICATE OF APPROVAL OF SUBSURFACE SEWAGE DISPOSAL SYSTEM
Marion County Division of Groundwater Protection Certificate of Sewage Disposal

Approval is hereby granted for lots _____ defined as _____ County, Tennessee, as being suitable for subsurface sewage disposal (SSD) with the listed or attached restrictions. See sheet F-8 for restrictions

SEE SHEET F-8

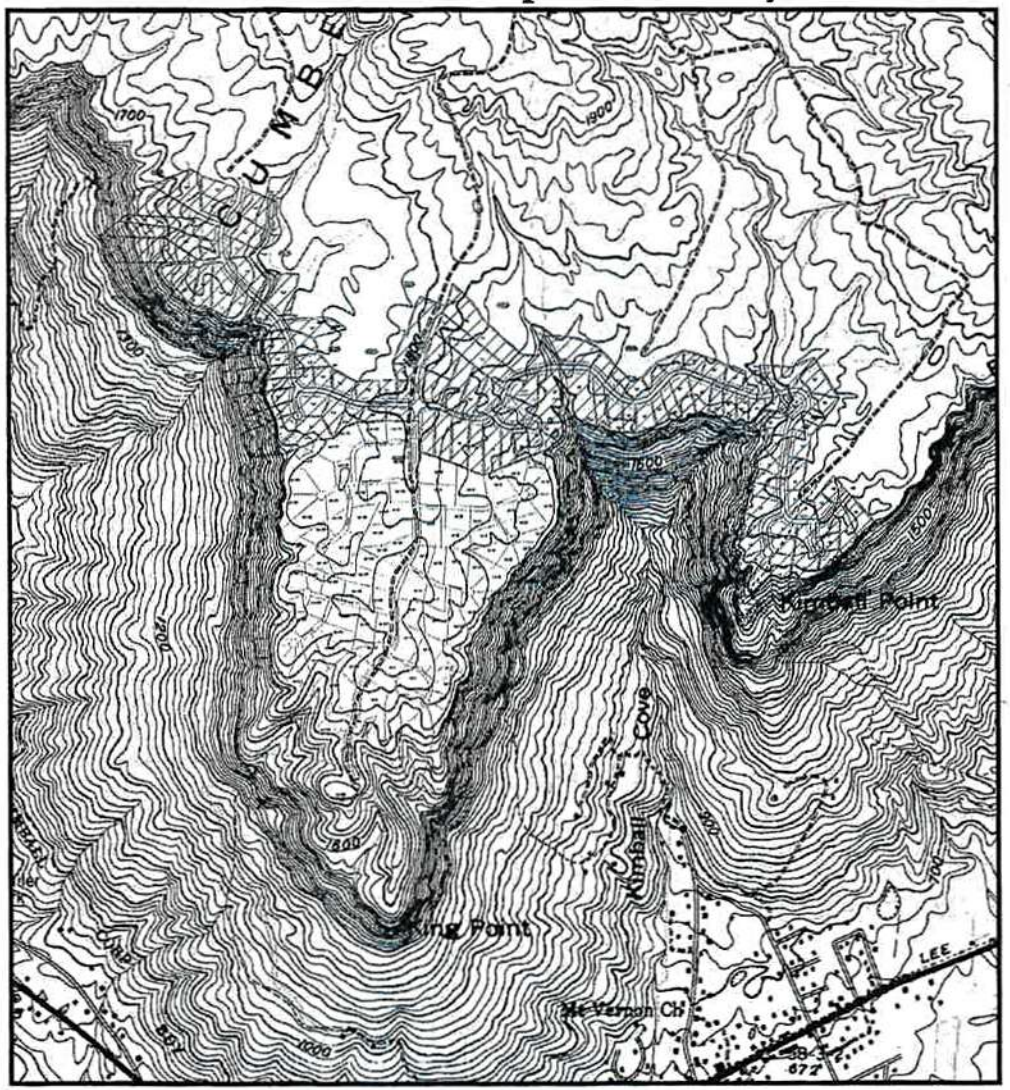
Prior to any construction of a structure, permanent or mobile, the plans for the exact house/structure location must be approved and a SSD system permit issued by the Division of Groundwater Protection. Water taps, water lines, underground utilities and driveways should be located at side property lines unless otherwise noted. Any cutting, filling or alterations of the soil conditions may void this approval.

Dep Smith 9/18/13
Environmental Specialist Date
Div. of Groundwater Protection

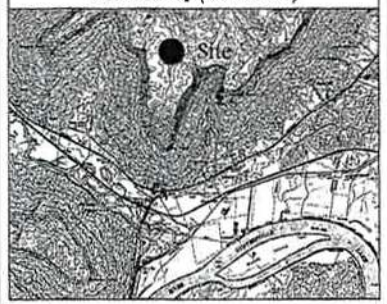
CERTIFICATE OF REGISTERED SURVEYOR

It is hereby certified that this plat is true and correct and was prepared from an actual survey of the property by me or under my supervision; and that all monuments shown hereon actually exist or are marked as "future", and their location, size, type and material are correctly shown.

8-12-13 Clarence L. Howard R.L.S.
Date Clarence L. Howard R.L.S.



Location Map (Not to Scale)



CLARENCE L. HOWARD
REGISTERED LAND SURVEYOR
CERTIFICATE NO. 2207
TENNESSEE NO. 2207

I hereby certify that this is a category II survey and the ratio of precision of the unadjusted survey is greater than 1:10,000 as shown hereon and complies with the minimum technical standards for the State of Tennessee.

Clarence L. Howard Jr.
TN R.L.S. #2207
AL P.L.S. # 22888

Notes:
1. Area Subdivided. 268.06 Acres
2. Zoning: None
3. All Lot Lines Have 10' Drainage & Utility Easements.
4. Area does Not Lie Within The 100 Year Flood Hazard Zone As Per FEMA Map Panel 47115C0208C, Dated. 02-04-2009.
5. Water By: Individual Wells
6. Sewer By: Individual Septic Systems
7. Owner
   Thunder Development Inc., (John Thornton, President)
   210 Battlecreek Road
   Kimball, Tn 37347 423-424-1085
8. Setbacks. 40' Front, 15' Side, 15' Rear, 20' Corner
9. This Plat Subdivides Property Of Record In DB 397 PG 89 & DB 397 PG 84, DB 400 PG 986, DB 433 PG 1090 Tax Map 108 Parcel 1.00,Tax Map 94 Parcel 1.00 & Tax Map 118 Parcel 7.01.
10. All proposed roads have 50' R.O.W's and are private.
11. Calls along the top of bluff are chord bearings and distances.

B&H Surveying Services
PO Box 446, Jasper, TN 37347
423-942-0022
bandhsurveying@hotmail.com

Grid North
N
W B H E
S
TN SPC (NAD 83)

Surveyor's Notes
1. This survey was performed without the benefit of a title report and is subject to any state of facts that an up to date title report might reveal.
2. This survey is not transferable to additional institutions or owners and is invalid without an original seal and signature.
3. No interior improvements were located other than those shown above.
4. This survey was done by or under the direct supervision of the surveyor signing and sealing thereon.
5. This survey was based upon his analysis of the deeds of record with evidence found existing on the ground and located, renders the professional opinion of the surveyor as to the location of the boundaries and conditions being represented.
6. Monuments either found or placed as depicted existed as described on the date of the survey shown thereon.

Thunder Development Inc.
210 Battle Creek Road, Kimball, TN 37347
423-424-1085



THUNDER ENTERPRISES

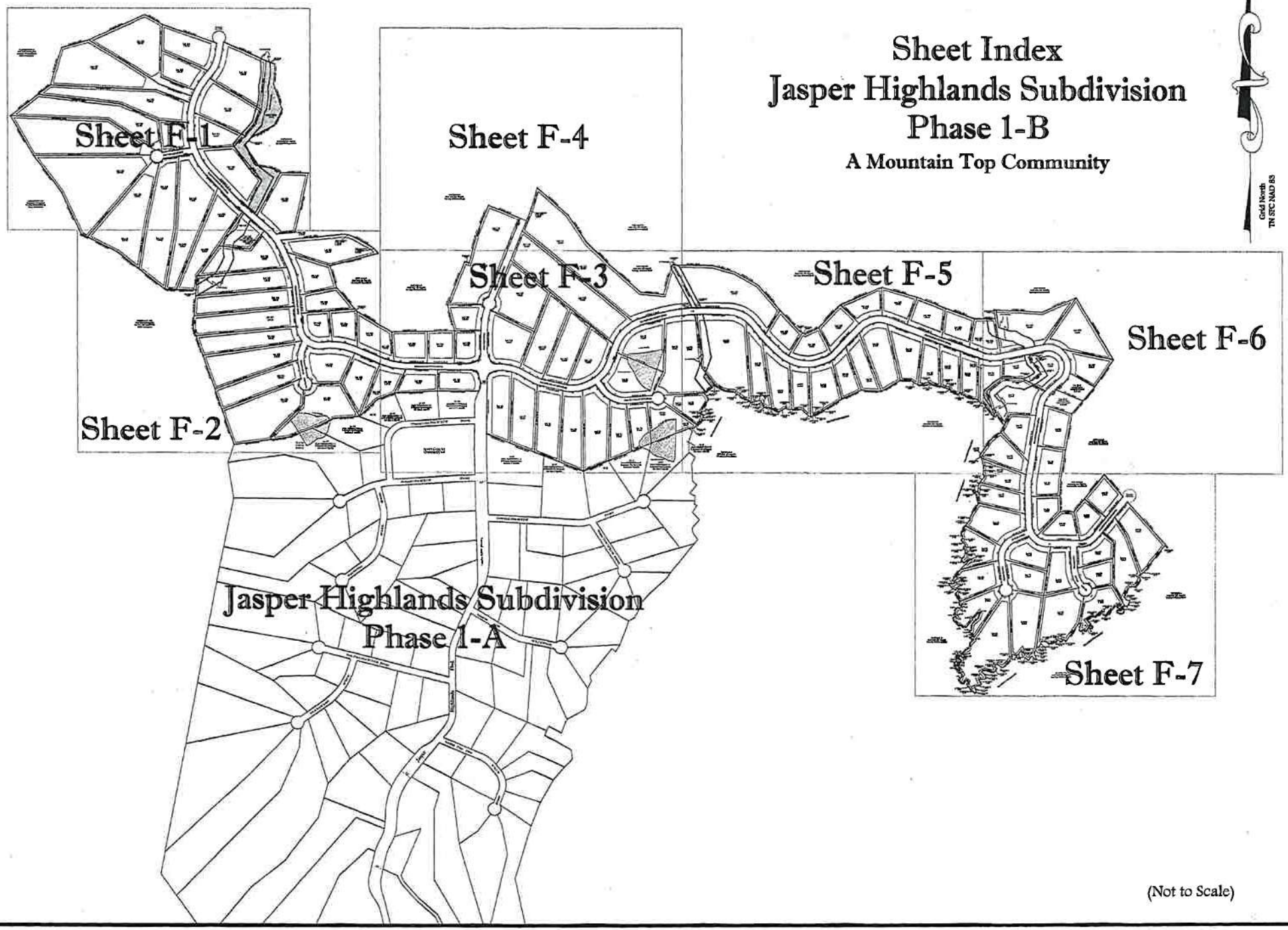
Final Plat For:

Jasper Highlands Subdivision
(Phase 1-B)

Second Civil District
Marion County, Tennessee

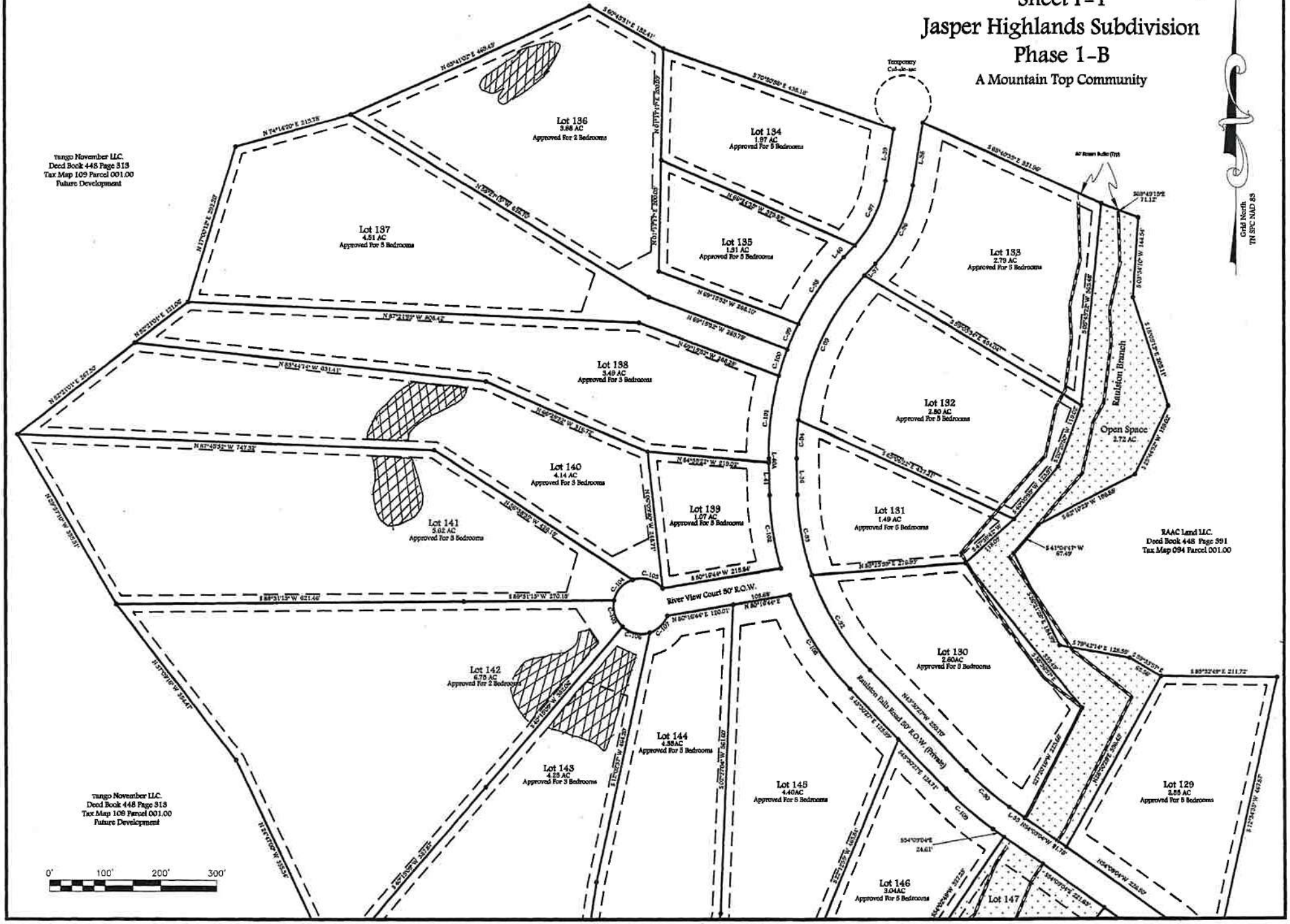
Not to Scale	Date 7-29-2013	Drawing No. 1119-11 1-BFinal

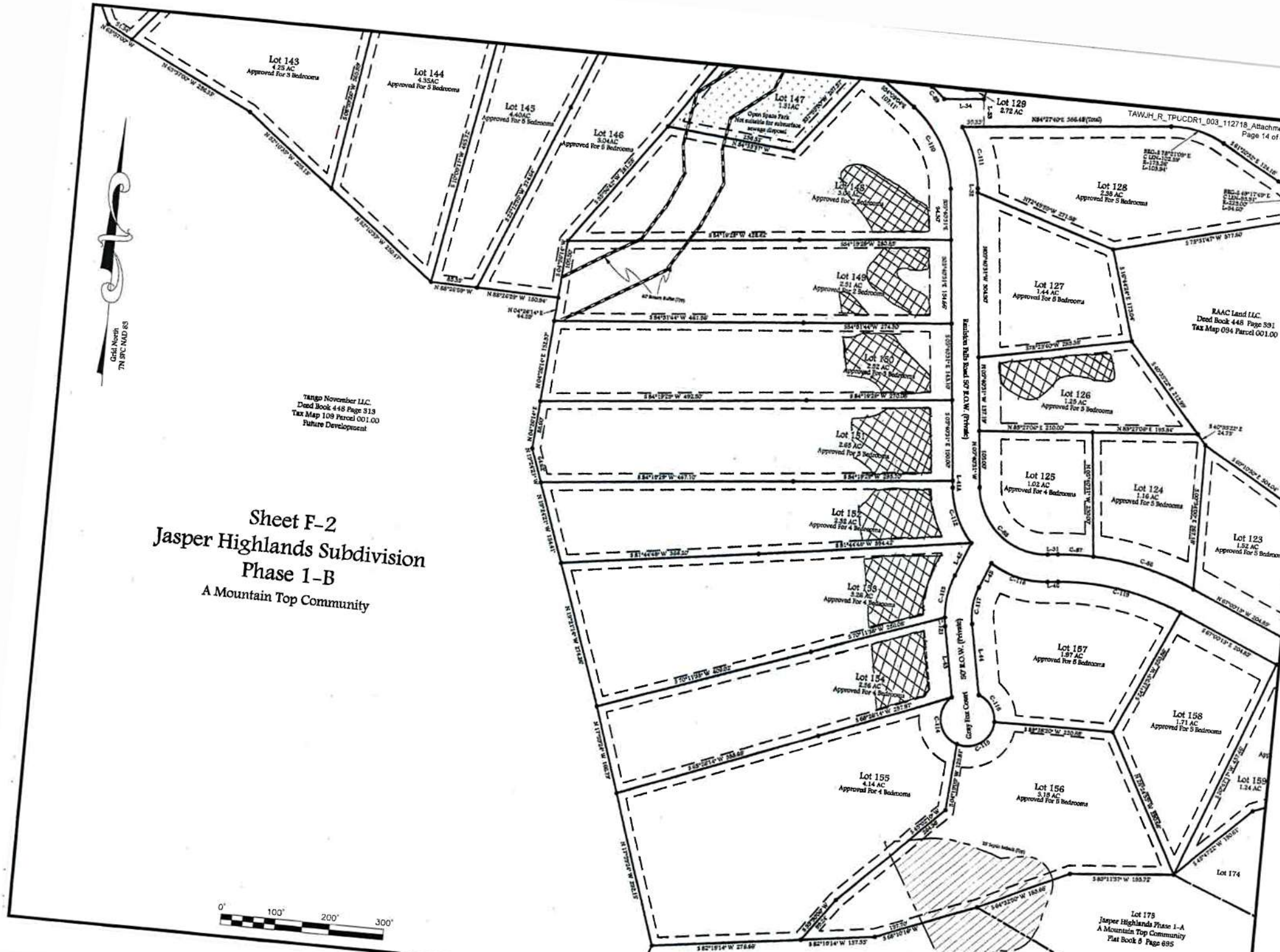
Sheet Index
Jasper Highlands Subdivision
Phase 1-B
A Mountain Top Community



(Not to Scale)

Sheet F-1
Jasper Highlands Subdivision
Phase 1-B
A Mountain Top Community




Sheet F-2
Jasper Highlands Subdivision
Phase 1-B
A Mountain Top Community
Grid North
TN SPC NAD 83
Tango November LLC.
Deed Book 448 Page 313
Tax Map 109 Parcel 001.00
Future Development
Lot 143
4.25 AC
Approved For 5 Bedrooms
Lot 144
4.35AC
Approved For 5 Bedrooms
Lot 145
4.40AC
Approved For 5 Bedrooms
Lot 146
3.04AC
Approved For 5 Bedrooms
Lot 147
1.31AC
Open Space Park
Not suitable for subsurface sewage disposal
Lot 148
3.56 AC
Approved For 5 Bedrooms
Lot 149
2.91 AC
Approved For 5 Bedrooms
Lot 150
2.02 AC
Approved For 5 Bedrooms
Lot 151
2.68 AC
Approved For 5 Bedrooms
Lot 152
2.58 AC
Approved For 4 Bedrooms
Lot 153
3.28 AC
Approved For 4 Bedrooms
Lot 154
2.56 AC
Approved For 4 Bedrooms
Lot 155
4.14 AC
Approved For 4 Bedrooms
Lot 156
3.18 AC
Approved For 5 Bedrooms
Lot 157
1.87 AC
Approved For 5 Bedrooms
Lot 158
1.71 AC
Approved For 5 Bedrooms
Lot 159
1.34 AC
Lot 174
Lot 175
Jasper Highlands Phase 1-A
A Mountain Top Community
Plat Book 5 Page 695
Lot 129
2.72 AC
Lot 128
2.58 AC
Approved For 5 Bedrooms
Lot 127
1.44 AC
Approved For 5 Bedrooms
Lot 126
1.25 AC
Approved For 5 Bedrooms
Lot 125
1.02 AC
Approved For 4 Bedrooms
Lot 124
1.16 AC
Approved For 5 Bedrooms
Lot 123
1.52 AC
Approved For 5 Bedrooms
RAAC Land LLC.
Deed Book 448 Page 331
Tax Map 094 Parcel 001.00
Ramsden Falls Road 50' R.O.W. (Private)
Gray Fox Court
50' R.O.W. (Private)
60' Access Buffer (Typ)
0'
100'
200'
300'

Sheet F-3
Jasper Highlands Subdivision
Phase 1-B
A Mountain Top Community

RAAC Land LLC.
Deed Book 448 Page 391
Tax Map 094 Parcel 001.00

Grid North
TN SPC NAD 83

0' 100' 200' 300'

RAAC Land LLC.
Deed Book 448 Page 391
Tax Map 094 Parcel 001.00

Lot 118
4.34AC
Approved For 5 Bedrooms

Lot 111
5.34AC
Approved For 5 Bedrooms

50' R.O.W. For Future Development

Lot 117
3.08AC
Approved For 5 Bedrooms

Lot 112
5.42AC
Approved For 5 Bedrooms

Lot 119
1.08 AC
Approved For 5 Bedrooms

River Bluffs Drive 50' R.O.W. (Private)

Lot 123
1.52 AC

Lot 122
1.42 AC
Approved For 5 Bedrooms

Lot 121
1.18 AC
Approved For 4 Bedrooms

Lot 120
1.11 AC
Approved For 4 Bedrooms

Jasper Highlands Blvd.

Lot 116
2.41AC
Approved For 5 Bedrooms

Lot 115
2.68AC
Approved For 5 Bedrooms

Lot 114
2.54AC
Approved For 5 Bedrooms

Lot 113
1.88AC
Approved For 5 Bedrooms

Lot 56
4.53AC
Approved For 5 Bedrooms

Lot 55
4.20AC
Approved For 5 Bedrooms

Raulston Falls Road 50' R.O.W. (Private)

Lot 159
1.24 AC
Approved For 5 Bedrooms

Lot 160
1.13 AC
Approved For 5 Bedrooms

Lot 161
1.18 AC
Approved For 5 Bedrooms

50'

River Bluffs Drive 50' R.O.W. (Private)

Misty View Court 50' R.O.W. (Private)

Lot 173
Jasper Highlands Phase 1-A
A Mountain Top Community
Plat Book 5 Page 695

Lot 172
Jasper Highlands Phase 1-A
A Mountain Top Community
Plat Book 5 Page 695

Lot 174
Jasper Highlands Phase 1-A
A Mountain Top Community
Plat Book 5 Page 695

Dragging Canoe Drive 50' R.O.W. (Private)

Lot 46
2.21AC
Approved For 5 Bedrooms

Lot 47
2.41AC
Approved For 5 Bedrooms

Lot 48
2.41AC
Approved For 5 Bedrooms

Lot 49
2.29AC
Approved For 5 Bedrooms

Lot 50
2.64AC
Approved For 4 Bedrooms

Lot 51
1.48AC
Approved For 4 Bedrooms

Lot 52
1.28AC
Approved For
1 Bedroom
Subsection "F"

Lot 53
1.01AC
Approved For 3 Bedrooms

Lot 54
1.04AC

Sports Complex
Community Lot

Lot 43
Jasper Highlands Phase 1-A
A Mountain Top Community
Plat Book 5 Page 695

Lot 42

Lot 41
Jasper Highlands Phase 1-A
A Mountain Top Community
Plat Book 5 Page 695

Lot 40
Jasper Highlands Phase 1-A
A Mountain Top Community
Plat Book 5 Page 695

Sheet F-4
Jasper Highlands Subdivision
Phase 1-B
A Mountain Top Community





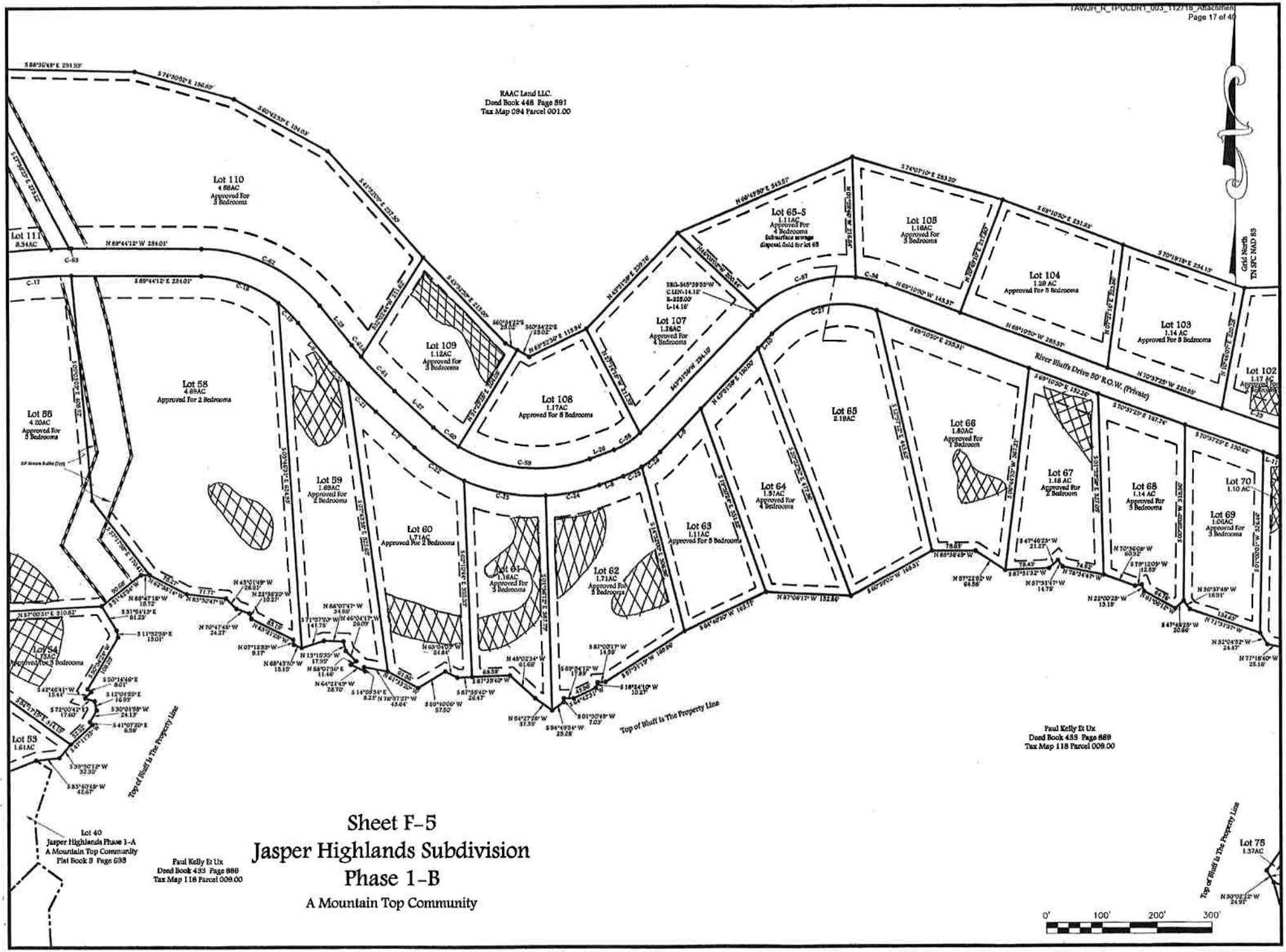
RAAC Land LLC
Deed Book 448 Page 591
Tax Map 094 Parcel 001.00

Lot 118
4.54AC

Lot 112
3.42AC

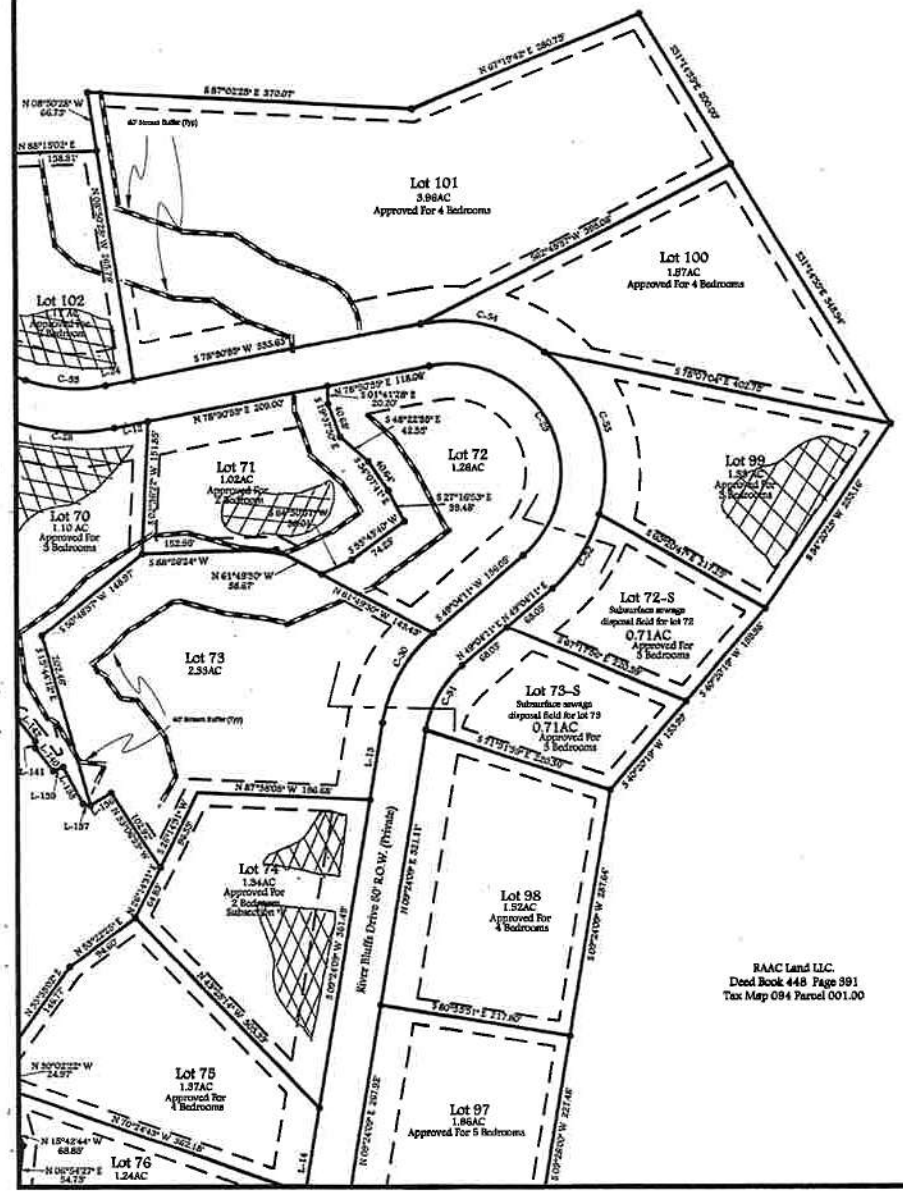
Lot 111
6.54AC

RAAC Land LLC
Deed Book 448 Page 591
Tax Map 094 Parcel 001.00



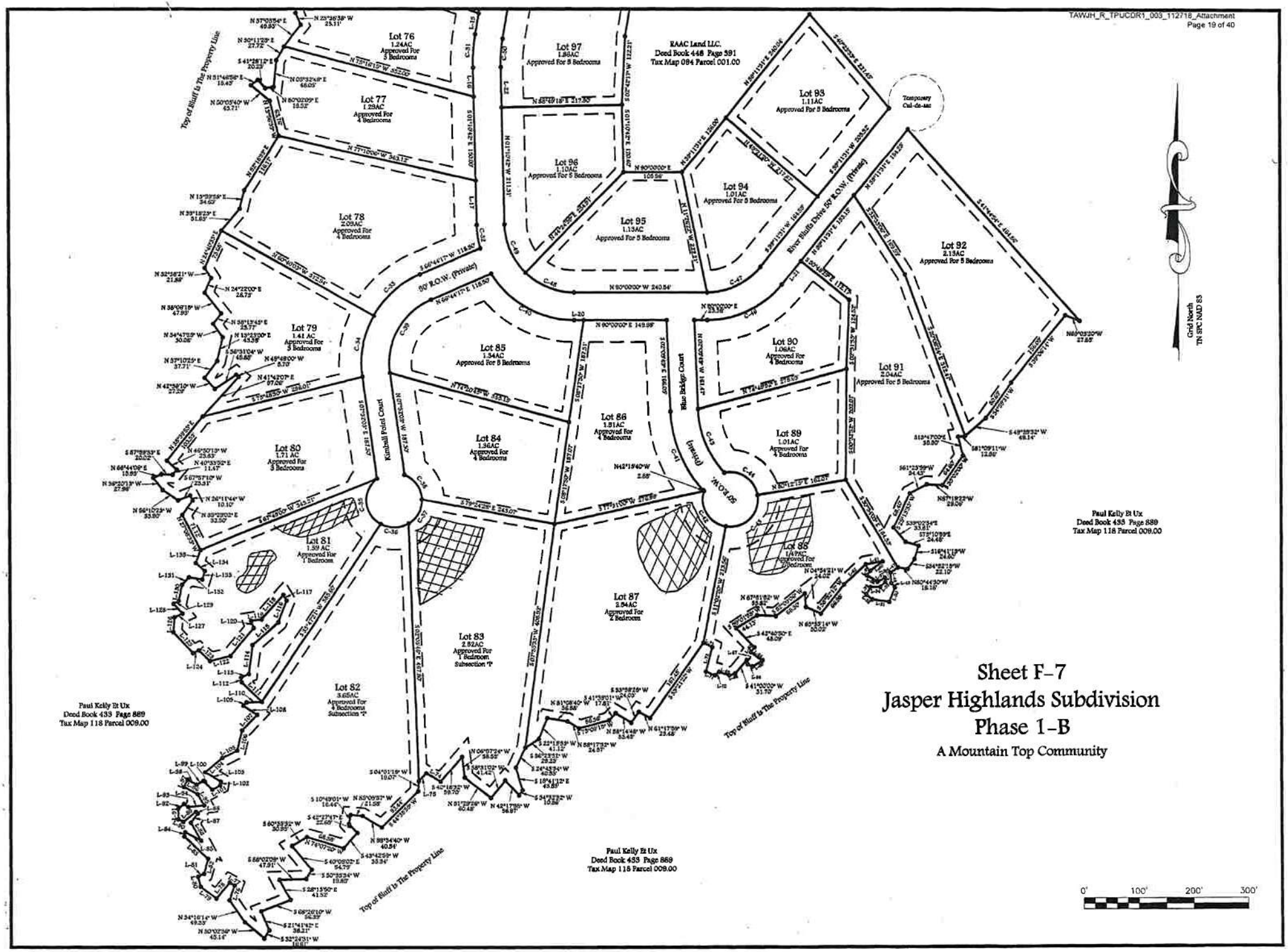
Sheet F-5
Jasper Highlands Subdivision
Phase 1-B
A Mountain Top Community

Sheet F-6
Jasper Highlands Subdivision
Phase 1-A
A Mountain Top Community









Sheet F-7
Jasper Highlands Subdivision
Phase 1-B

A Mountain Top Community

LINE	BEARING	DISTANCE
L-1	S56°54'17"E	80.09'
L-2	S36°36'49"E	66.24'
L-3	N86°02'28"E	39.86'
L-4	N36°30'45"W	66.24'
L-5	N20°18'35"E	46.56'
L-6	S38°30'25"E	91.69'
L-7	S46°53'15"E	95.57'
L-8	N69°57'32"E	46.71'
L-9	N43°51'58"E	107.85'
L-10	N43°51'58"E	36.25'
L-11	S70°57'29"E	26.95'
L-12	N78°50'58"E	39.20'
L-13	S09°24'09"W	88.91'
L-14	S09°24'09"W	100.00'
L-15	S09°24'09"W	36.65'
L-16	S01°10'42"E	51.82'
L-17	S01°10'42"E	81.15'
L-20	N89°00'00"E	17.17'
L-21	N59°11'51"E	84.72'
L-22	N01°10'42"W	71.66'
L-23	S78°50'58"W	68.30'
L-24	S78°50'58"W	52.63'
L-25	N70°57'29"W	123.84'
L-26	S69°57'32"W	46.71'
L-27	N46°53'18"W	85.37'
L-28	N 38°30'29" W	91.69'
L-29	N58°54'17"W	80.09'
L-30	N85°23'29"W	42.15'
L-31	S84°19'29"W	19.24'
L-32	N05°40'51"W	7.50'
L-33	N05°52'20"W	50.28'
L-34	S84°19'01"W	75.45'
L-35	N54°09'04"W	34.77'
L-36	N01°19'39"W	66.69'
L-37	N42°10'32"E	29.11'
L-38	N09°08'17"E	114.07'
L-39	S09°08'17"W	94.10'
L-40	S42°10'32"W	28.11'
L-40A	S01°19'39"E	6.89'
L-41	S01°19'39"E	90.00'
L-41A	S08°40'31"E	12.54'
L-42	S21°38'06"W	66.61'
L-43	S10°48'55"E	132.09'
L-44	N10°48'55"W	132.09'
L-45	N21°38'06"E	30.36'
L-46	N84°19'29"E	19.24'
L-47	S 54°55'32" W	16.32'
L-48	S 05°33'03" E	19.25'
L-49	S 40°42'04" E	9.38'
L-50	S 21°11'18" W	28.35'
L-51	N 81°52'18" W	31.14'
L-52	N 50°02'08" W	14.14'
L-53	N 51°23'58" E	14.84'
L-54	N 89°13'08" E	17.80'
L-55	N 45°00'51" E	12.34'
L-56	N 03°41'46" W	8.22'
L-57	S 89°56'30" W	14.91'
L-58	N 57°54'51" W	25.09'
L-59	N 36°46'19" E	9.97'
L-60	N 53°26'52" E	28.06'
L-61	S 80°40'00" W	31.20'
L-62	S 46°48'19" W	33.41'
L-63	S 36°42'23" W	10.65'
L-64	S 54°03'09" E	25.38'
L-65	S 39°51'06" W	20.34'
L-66	N 67°07'01" W	9.96'
L-67	N 14°09'18" W	7.22'
L-68	S 74°17'37" W	11.51'
L-69	N 71°02'08" W	19.04'
L-70	S 50°31'12" W	10.21'
L-71	N 65°43'27" W	17.56'
L-72	N 14°34'16" E	44.87'
L-73	N 62°13'10" W	17.72'
L-74	N 59°48'18" W	29.96'
L-75	S 43°49'23" W	19.58'
L-76	N 18°55'14" E	28.60'
L-77	N 60°25'17" W	10.34'
L-78	S 39°17'18" W	37.63'
L-79	N 82°50'54" W	36.20'
L-80	N 15°09'05" W	18.70'
L-81	N 81°58'25" E	12.18'
L-82	N 16°01'18" E	28.00'
L-83	N 47°51'22" W	57.21'
L-84	N 09°12'46" E	7.82'
L-85	S 65°23'19" E	31.75'

L-86	N 29°38'48" W	56.54'	
L-87	N 35°35'59" E	20.36'	
L-88	N 38°38'52" W	4.34'	
L-89	S 50°38'46" W	29.54'	
L-90	N 80°53'00" W	10.29'	
L-91	N 00°05'58" E	19.54'	
L-92	N 80°53'58" E	13.08'	
L-93	S 56°53'04" E	9.64'	
L-94	N 82°45'42" E	28.80'	
L-95	N 30°50'16" W	23.01'	
L-96	N 61°26'06" W	27.91'	
L-97	N 26°52'56" E	14.46'	
L-98	S 63°07'28" E	18.46'	
L-99	N 89°54'31" E	14.12'	
L-100	N 43°09'19" W	22.69'	
L-101	N 60°40'47" E	16.47'	
L-102	N 09°43'21" E	7.08'	
L-103	N 86°36'34" W	32.99'	
L-104	N 49°15'27" E	40.81'	
L-106	N 63°23'08" E	30.04'	
L-106	N 13°00'33" E	37.82'	
L-107	N 45°25'32" E	59.62'	
L-108	N 36°06'10" W	29.91'	
L-109	N 43°50'41" E	8.49'	
L-110	N 87°18'33" E	27.88'	
L-111	N 46°02'34" W	30.66'	
L-112	N 06°48'01" W	8.87'	
L-113	N 84°37'02" E	13.80'	
L-114	N 07°26'57" E	62.42'	
L-115	N 48°07'51" E	62.44'	
L-116	N 20°55'08" E	41.44'	
L-117	N 30°41'41" W	11.62'	
L-118	S 41°52'10" W	58.06'	
L-119	S 80°59'07" W	19.36'	
L-120	S 19°10'54" E	13.43'	
L-121	S 39°09'27" W	66.11'	
L-122	S 76°31'51" W	37.82'	
L-123	N 47°06'34" W	27.89'	
L-124	S 63°54'48" W	11.60'	
L-125	N 42°21'43" W	52.07'	
L-126	N 04°14'17" E	25.66'	
L-127	N 66°56'44" E	15.87'	
L-128	N 41°19'47" W	24.16'	
L-129	N 61°37'59" E	10.30'	
L-130	N 12°07'08" E	29.69'	
L-131	N 42°24'14" E	18.08'	
L-132	S 81°24'02" E	24.20'	
L-133	N 16°51'58" E	16.39'	
L-134	N 49°26'07" W	21.20'	
L-135	N 19°26'58" E	23.00'	
L-136	S 58°37'46" W	27.71'	
L-137	N 76°36'38" W	8.86'	
L-138	N 28°28'18" W	47.87'	
L-139	S 66°17'47" W	12.07'	
L-140	N 37°42'53" W	33.28'	
L-141	N 03°19'36" W	7.67'	
L-142	N 38°16'30" W	31.42'	
L-143	S78°39'14"W	11.94	

CURVE	CHORD BEARING	CHORD LENGTH	RADIUS	ARC LENGTH
C-1	N24°58'11"E	51.00'	61.90'	52.56'
C-2	N78°14'54"E	97.30'	166.00'	98.45'
C-3	S81°37'22"E	75.43'	267.70'	73.66'
C-4	S66°15'39"E	73.59'	278.00'	73.81'
C-5	S64°20'11"E	65.25'	325.00'	65.40'
C-6	S74°20'40"E	48.09'	325.00'	48.13'
C-7	N88°56'08"E	140.44	325.00'	141.56'
C-8	N67°07'41"E	106.37'	325.00'	105.85'
C-9	S48°20'02"E	81.42'	225.00'	92.08'
C-10	S77°00'25"E	131.21'	225.00'	133.14'
C-11	N88°01'14"E	84.82'	50.00'	101.26'
C-12	N 00°00'00" E	50.00'	50.00'	52.36'
C-13	S88°01'14"W	88.28'	50.00'	108.17'
C-14	N65°17'09"W	167.98'	175.00'	178.15'
C-15	N34°58'33"E	160.92'	325.00'	162.61'
C-16	N47°57'55"E	253.24'	275.00'	265.43'
C-17	N82°56'15"E	248.67'	975.00'	249.53'
C-18	S70°35'37"E	147.81'	222.07'	150.69'
C-19	S44°56'44"E	80.46'	225.00'	80.87'
C-20	S40°13'46"E	49.80'	825.00'	49.81'
C-21	S44°25'11"E	71.04'	625.00'	71.06'
C-22	S38°27'16"E	108.03'	325.00'	108.53'
C-23	S79°21'48"E	150.00'	325.00'	151.36'
C-24	N78°37'38"E	97.93'	325.00'	98.33'
C-25	N63°51'56"E	37.13'	175.00'	37.22'
C-26	N50°49'11"E	42.37'	175.00'	42.46'
C-27	N 77°20'34" E	193.06'	175.00'	204.50'
C-28	S 65°58'16" E	118.47'	225.00'	119.88'
C-29	S26°02'27"E	241.61'	125.00'	327.75'
C-30	S29°14'10"W	118.75'	175.00'	121.16'
C-31	S04°06'48"W	59.93'	325.00'	60.02'
C-32	S 08°06'49" E	42.26'	175.00'	42.36'
C-33	S 48°08'12" W	111.93'	175.00'	113.53'
C-34	S10°47'02"W	111.93'	175.00'	115.93'
C-35	S 04°30'02" E	83.82'	80.00'	86.84'
C-36	N 56°51'59" E	50.00'	50.00'	52.36'
C-37	N 26°51'59" E	50.00'	50.00'	52.36'
C-38	N 34°50'02" W	55.00'	50.00'	58.24'
C-39	N29°28'07"E	151.51'	125.00'	162.76'
C-40	S60°44'18"E	171.08'	175.00'	176.75'
C-41	N22°11'45"W	134.18'	225.00'	187.33'
C-42	S51°22'29"E	75.64'	50.00'	85.78'
C-43	N 45°08'19" E	81.23'	50.00'	94.81'
C-44	N55°41'52"W	72.57'	50.00'	81.21'
C-45	N22°13'41"W	126.15'	175.02'	127.30'
C-46	N64°38'46"E	150.15'	175.00'	155.18'
C-47	N64°38'46"E	107.25'	125.00'	110.85'
C-48	N67°47'40"W	94.48'	125.00'	96.89'
C-49	S25°23'01"E	94.48'	125.00'	96.89'
C-50	N04°08'45"E	50.71'	275.00'	50.78'
C-51	N28°14'10"E	84.82'	125.00'	86.54'
C-52	S52°26'09"W	100.19'	175.00'	101.81'
C-53	S18°18'08"E	195.99'	175.00'	208.03'
C-54	S76°43'48"E	144.71'	175.00'	149.19'
C-55	S85°53'15"E	92.14'	175.00'	93.24'
C-56	N76°27'08"W	56.86'	225.00'	57.11'
C-57	S71°52'11"W	183.94'	225.00'	191.69'
C-58	S56°54'45"W	86.44'	125.00'	86.95'
C-59	N84°28'47"W	237.17'	275.00'	245.21'
C-60	N52°55'10"W	57.80'	275.00'	57.90'
C-61	N43°40'45"W	86.75'	775.00'	86.79'
C-61A	N 39°29'20" W	26.50'	775.00'	26.86'
C-62	N 64°07'18" W	237.78'	275.00'	245.68'
C-63	S 89°50'24" E	5.70'	1025.00'	5.70'
C-64	S 82°50'00" W	287.78'	1025.00'	288.44'
C-65	S88°56'01"W	75.78'	325.00'	75.95'
C-66	S41°56'45"W	223.81'	325.00'	233.82'
C-67	S59°44'52"W	349.39'	275.00'	378.55'
C-67A	N79°42'02"W	10.69'	275.00'	10.69'
C-68	N76°34'22"W	19.33'	275.00'	19.34'
C-69	N66°33'54"W	75.48'	275.00'	76.73'
C-70	N61°45'04"W	56.03'	325.00'	56.07'
C-71	N77°09'37"W	137.69'	325.00'	138.74'
C-72	N70°58'38"W	42.96'	65.00'	43.78'
C-73	N14°41'38"W	97.60'	185.00'	98.85'
C-74	N09°00'22"E	155.82'	825.00'	155.87'
C-75	N20°37'24"E	88.52'	50.00'	102.89'
C-76	S58°20'30"W	68.28'	50.00'	76.49'
C-77	S22°50'42"E	29.83'	80.00'	30.31'
C-78	S09°06'32"W	169.86'	875.00'	170.59'
C-79	S19°54'22"W	42.96'	65.00'	43.78'
C-78-A	S 48°56'08" W	8.03'	25.00'	8.08'
C-80	S75°16'22"W	97.60'	185.00'	98.85'
C-81	S70°08'58"E	42.96'	65.00'	43.78'
C-81-A	S 40°23'51" E	8.03'	25.00'	8.08'

C-82	S16°38'42"E	86.89'	188.13'	87.69'
C-83	S13°02'46"W	59.60'	105.93'	60.42'
C-84	N83°47'37"W	92.69'	475.00'	92.80'
C-85	N72°58'01"W	92.65'	475.00'	92.80'
C-86	N77°44'37"W	195.67'	525.00'	196.82'
C-87	S87°55'14"W	65.85'	525.00'	65.90'
C-88	N50°40'51"W	176.78'	125.00'	196.35'
C-89	N80°27'14"W	32.24'	250.00'	32.26'
C-90	N48°49'46"W	102.02'	550.00'	102.17'
C-92	N51°19'53"W	200.58'	475.00'	201.89'
C-93	S10°14'26"E	147.21'	475.00'	147.61'
C-94	S02°53'31"W	68.97'	475.00'	70.03'
C-95	S24°38'54"W	286.10'	475.00'	290.61'
C-96	S23°59'24"W	156.38'	275.00'	158.67'
C-97	S25°39'24"W	127.95'	225.00'	128.74'
C-98	S34°08'37"W	146.61'	525.00'	147.09'
C-99	S25°25'25"W	50.05'	525.00'	50.07'
C-100	N17°55'31"E	50.06'	525.00'	50.08'
C-101	S08°55'39"W	150.84'	525.00'	151.36'
C-102	S08°58'05"E	132.99'	525.00'	133.31'
C-103	S75°44'52"E	55.95'	50.00'	59.36'
C-104	N42°14'11"E	50.00'	50.00'	52.36'
C-105	N17°45'49"W	50.00'	50.00'	52.36'
C-106	N77°45'49"W	50.00'	50.00'	52.36'
C-107	S46°15'28"W	43.80'	50.00'	45.34'
C-108	S32°27'16"E	201.31'	525.00'	202.56'
C-109	S48°49'46"E	111.30'	600.00'	111.46'
C-110	S25°54'47"E	164.21'	200.00'	169.21'
C-111	N15°15'13"E	117.39'	250.00'	118.49'
C-112	S25°45'12"E	108.81'	175.00'	110.43'
C-113	N08°09'15"E	81.59'	175.00'	82.35'
C-114	S11°57'39"E	87.51'	50.00'	108.12'
C-115	N83°30'43"E	80.94'	50.00'	94.32'
C-116	N35°40'18"W	57.56'	50.00'	61.34'
C-117	N08°24'35"E	69.85'	125.00'	70.80'
C-118	S77°23'15"E	109.85'	175.00'	111.71'
C-119	S81°20'22"E	235.25'	475.00'	237.70'
C-120	S78°11'49"E	203.83'	525.00'	206.15'
C-121	S05°04'16"E	16.78'	175.00'	16.76'
C-122	S85°36'13"W	59.97'	1025.00'	59.98'

CERTIFICATE OF APPROVAL OF SUBSURFACE SEWAGE DISPOSAL SYSTEM
Marion County Division of Groundwater Protection Certificate of Sewage Disposal

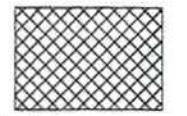
Approval is hereby granted for lots _____ defined as _____ County, Tennessee, as being suitable for subsurface sewage disposal (SSD) with the listed or attached restrictions.

Restrictions. Lots 46-49 (5 Bedrooms)50-51 (4 Bedrooms), 52 (1 Bedroom "Subsection i"), 53-55 (3 Bedrooms), 56(5 Bedrooms), 58-60 (2 Bedrooms), 61-62 (3 Bedrooms), 63(5 Bedrooms), 64 (4 Bedrooms),65-S(4 Bedrooms) (66-67 (1 Bedroom), 67 (2 Bedrooms), 68-69 (3 Bedrooms), 70 (3 Bedrooms), 71(2 Bedrooms), 72-S & 73-S (3Bedrooms), 74 (2 Bedroom "Subsection i"), 75 (4 Bedroom), 76(3 Bedrooms), 77(4 Bedrooms), 78 (4 Bedrooms), 79-80 (3 Bedrooms), 81(1 Bedroom), 82 (4 Bedrooms "Subsection i"), 83 (1 Bedroom "Subsection i"), 84 (4 Bedrooms), 85 (5 Bedrooms), 86 (4 Bedrooms), 87-88 (2 Bedrooms), 89-90 (4 Bedrooms), 91-96 (5 Bedrooms), 97 (5 Bedrooms), 98 (4 Bedrooms), 99 (3 Bedrooms), 100-101 (4 Bedrooms), 102 (2 Bedrooms), 103-104 (5 Bedrooms), 105 (3 Bedrooms), 106-107 (4 Bedrooms), 108(5 Bedrooms, 109-110 (3 Bedrooms), 111-119 (5 Bedrooms), 120-121 (4 Bedrooms), 122-124 (5 Bedrooms), 125 (4 Bedrooms), 126 (3 Bedrooms), 127- 135 (5 Bedrooms), 136 (2 Bedrooms), 137 (5 Bedrooms), 138 (3 Bedrooms), 139(5 Bedrooms), 140-141(5 Bedrooms), 142 (2 Bedrooms), 143 (3 Bedrooms), 144-146(5 Bedrooms), 148(2 Bedrooms),150-151 (3 Bedrooms), 152-155(4 Bedrooms), 156-161(5 Bedrooms). (Also See Individual Lots For Restrictions)

Prior to any construction of a structure, permanent or mobile, the place for the exact house/structure location must be approved and a SSD system permit issued by the Division of Groundwater Protection. Water taps, water lines, underground utilities and driveways should be located at side property lines unless otherwise noted. Any cutting, filling or alterations of the soil conditions may void this approval.

_____ Environmental Specialist
Div. of Groundwater Protection

_____ Date



Suitable Soils Area As Per Soil Scientist Maps

* Lot 57 Was Combined with Lot 56 Due to Inadequate Soils.
*Lot 106 Was Changed To 65-S for soils For Lot 65

BK/PG: 5954/957
15001792
4 PGS:AL-PLAT
DAVID BATCH: 551407 06/11/2015 - 11:00 AM
VALUE 0.00
MORTGAGE TAX 0.00
TRANSFER TAX 0.00
RECORDING FEE 60.00
ARCHIVE FEE 0.00
DP FEE 2.00
REGISTERS FEE 0.00
TOTAL AMOUNT $ 62.00
STATE OF TENNESSEE, MARION COUNTY
DEBBIE PITTMAN
REGISTER OF DEEDS

Jasper Highlands Subdivision, Phase 2-A

A Mountain Top Community

CERTIFICATE BY PLANNING COMMISSION ON APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the Subdivision Regulation for Marion County, Tennessee, with the exception of such variances, if any, as may be noted on this plat; and that all required improvements have either been completed or covered by an approved bank letter of credit, cashier's check, cash deposit or wire transfer large enough to complete the required improvements in case of default; and that This plat has been approved for recording in the office of the county register.

5-14-15 Louise Campbell
Date Planning Commission Secretary

CERTIFICATION OF ROAD STATUS (PRIVATE ROAD)

It is hereby certified that the private road shown on this plat has been designed in an acceptable manner in accordance to required specifications in the Marion County Subdivision Regulations. The government of Marion County will not accept any responsibility for the construction or maintenance of this private road.

4/6/15 _____
Date Owner

_____ _____
Date Owner

CERTIFICATE OF OWNERSHIP AND DEDICATION

I (we) hereby certify that I am (we are) the owners of the property shown and described heron, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building setback lines, and herby dedicate to the public use forever all the streets as shown on this plat.

4/6/15 _____
Date Owner

_____ _____
Date Owner

CERTIFICATION OF APPROVAL OF STREETS AND DRAINAGE SYSTEM (FOR ROADS NOT COMPLETED AT TIME OF FINAL PLAT)

I hereby certify that the streets and drainage facilities for the _____ subdivision have been designed in an acceptable manner in accordance to required specifications and a bank letter of credit, cashier's check, cash deposits or wire transfer in the amount of $_____ (150% of the total value of all road and drainage improvements installed) has been posted to cover the construction of streets and drainage.

5-13-15 _____
Date Marion County Road Commissioner

CERTIFICATION OF E-911 APPROVAL

I hereby certify that I have reviewed this plat and find that it conforms to the county's E-911 requirements, including appropriate road names/numbers.

4-6-2015 _____
Date Marion County E-911 Representative

CERTIFICATE FOR ELECTRICITY

I hereby certify that this plat shows adequate easements for power lines. (See Notes For Easement Widths) Power is available to all lots shown on plat based on SVEC's line extension policies.

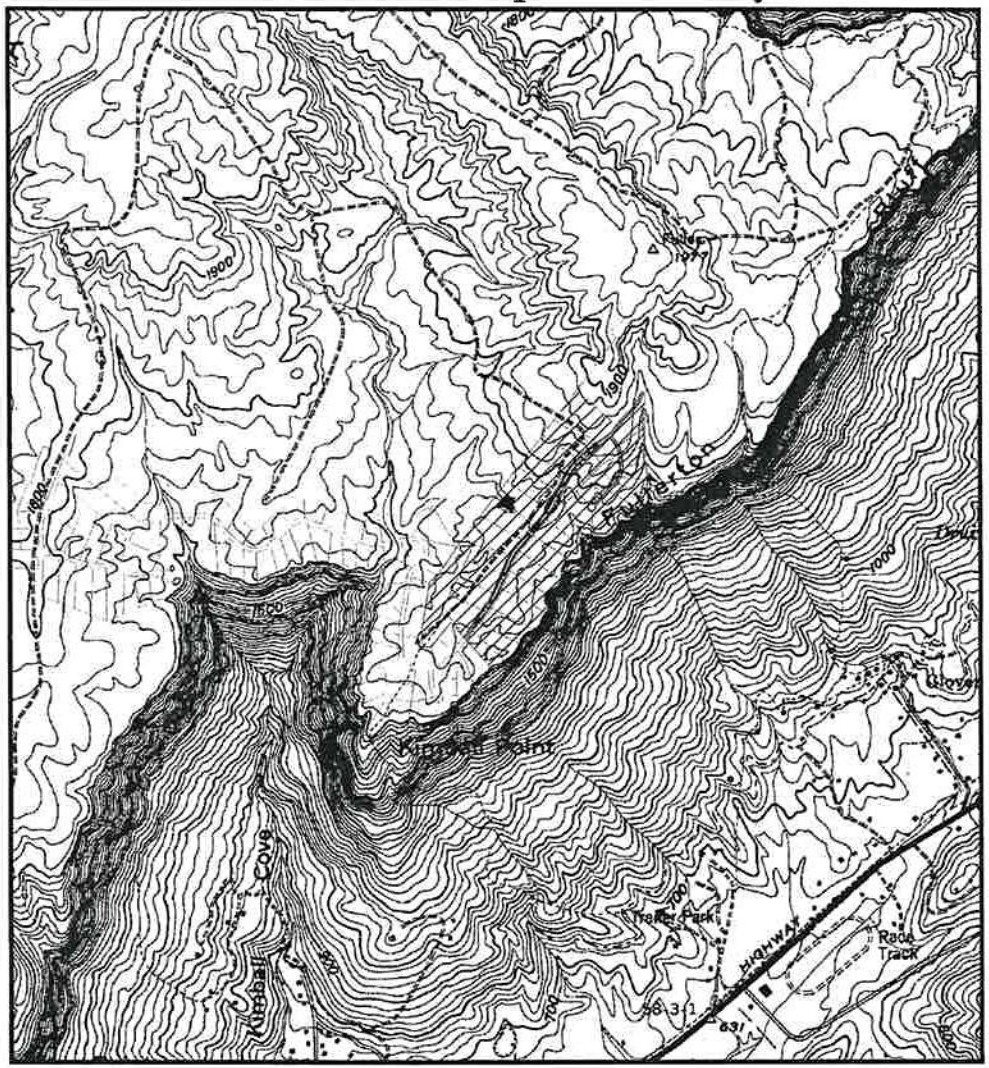
4-6-15 _____
Date Electric Power Official

CERTIFICATE OF APPROVAL OF SUBSURFACE SEWAGE DISPOSAL SYSTEM
Marion County Division of Groundwater Protection Certificate of Sewage Disposal 55

Approval is hereby granted for lots 68-74 defined as _____ County, Tennessee, as being suitable for subsurface sewage disposal (SSD) with the listed or attached restrictions.

Prior to any construction of a structure, permanent or mobile, the plans for the exact house/structure location must be approved and a SSD system permit issued by the Division of Groundwater Protection. Water taps, water lines, underground utilities and driveways should be located at side property lines unless otherwise noted. Any cutting, filling or alterations of the soil conditions may void this approval.

_____ 5/8/15
Environmental Specialist Date
Div. of Groundwater Protection



CERTIFICATE OF REGISTERED SURVEYOR

It is hereby certified that this plat is true and correct and was prepared from an actual survey of the property by me or under my supervision; and that all monuments shown hereon actually exist or are marked as "future", and their location, size, type and material are correctly shown.

4-6-15 _____
Date Clarence L. Howard R.L.S.

Location Map (Not to Scale)



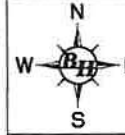
CLARENCE L. HOWARD JR. REGISTERED LAND SURVEYOR AGRICULTURE COMMERCE TENNESSEE NO. 2207

I hereby certify that this is a category U survey and the ratio of precision of the unadjusted survey is greater than 1:10,000 as shown hereon and complies with the minimum technical standards for the State of Tennessee.

_____
Clarence L. Howard Jr.
TN R.L.S. #2207
AL P.L.S. # 25858

*Notes
1. Area Subdivided, 91.03 Acres
2. Zoning, None
3. All lot Lines Have 15' Drainage & Utility Easements.
4. Area does Not Lie Within The 100 Year Flood Hazard Zone As Per FEMA Map Panel 47115C0210D, Dated, 01-06-2012
5. Water By Individual Wells
6. Sewer By Individual Septic Systems
7. Owners
Thunder Development Inc, (John Thornton, President)
210 Battlecreek Road
Kimball, Tn 37347 423-424-1085
8. Setbacks 40' Front, 15' Side, 15' Rear, 20' Corner
9. This Plat Subdivides Property Of Record in Deed Book 448 Page 315, Tax Map 108 Parcel 013.01, Register's Office, Marion County, Tennessee
10. All proposed roads have 50' R.O.W.'s and are private.
11. Calls along the top of bluff are chord bearings and distances.

Grid North



TN SPC (NAD 83)

Surveyor's Notes

1. This survey was performed without the benefit of a title report and is subject to any state of facts that an up to date title report might reveal.
2. This survey is not transferable to additional institutions or owners and is invalid without an original seal and signature.
3. No interior improvements were located other than those shown above.
4. This survey was done by or under the direct supervision of the surveyor signing and sealing thereon.
5. This survey was based upon his analysis of the deeds of record with evidence found existing on the ground and located, renders the professional opinion of the surveyor as to the location of the boundaries and conditions being represented.
6. Monuments either found or placed as depicted existed as described on the date of the survey shown thereon.
7. Equipment used: Topcon GPT 2003 Total Station, Topcon Hi-Per Lite GPS

B&H Surveying Services
PO Box 446, Jasper, TN 37347
423-942-0022
bandhsurveying@hotmail.com

Thunder Development Inc.
210 Battle Creek Road, Kimball, TN 37347
423-424-1085



THUNDER ENTERPRISES

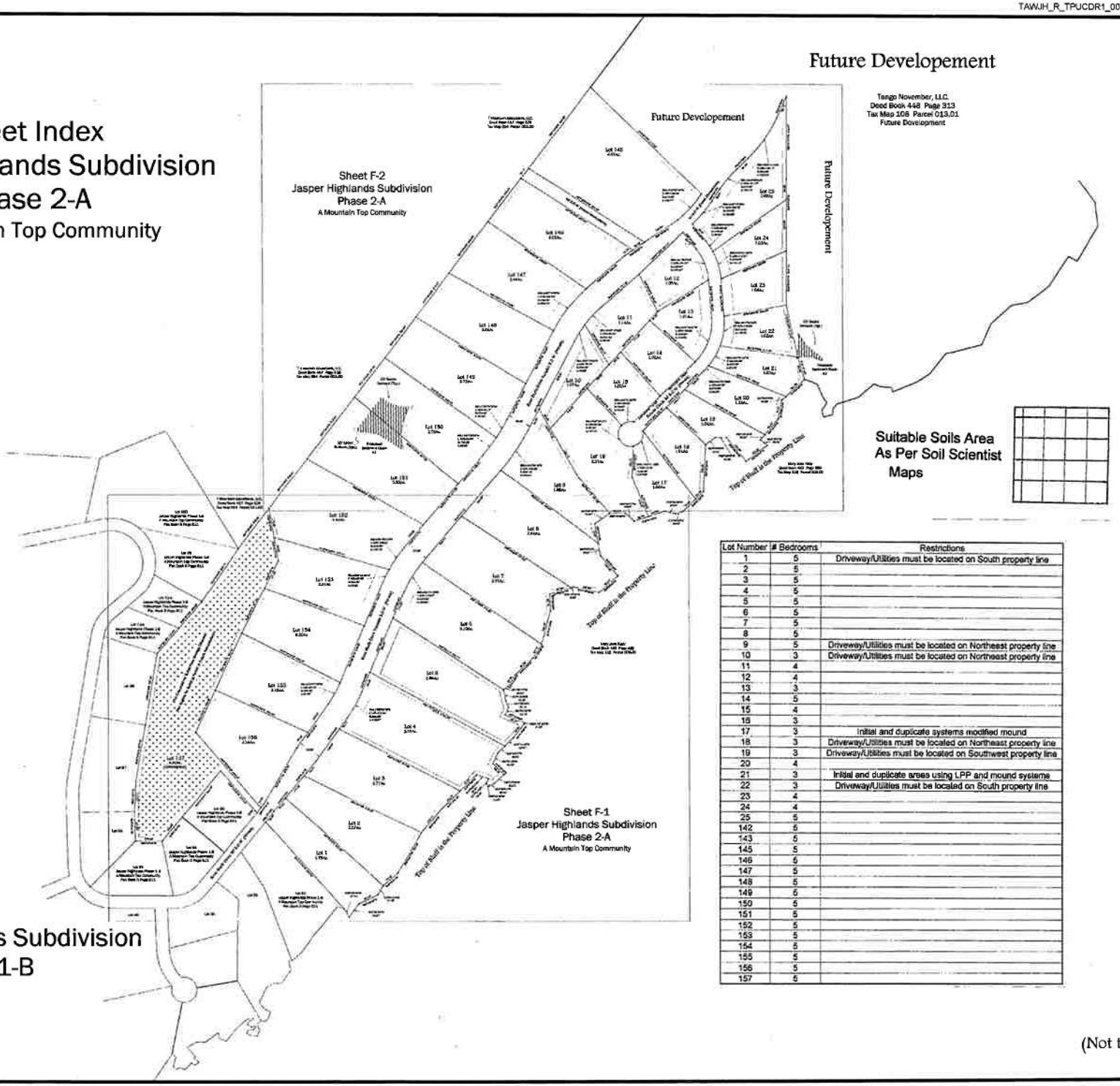
Final Plat For:

Jasper Highlands Subdivision (Phase 2-A)

Second Civil District
Marion County, Tennessee

Not to Scale	Date: 3-17-2015	Drawing No. 1119-11 2-AFinal

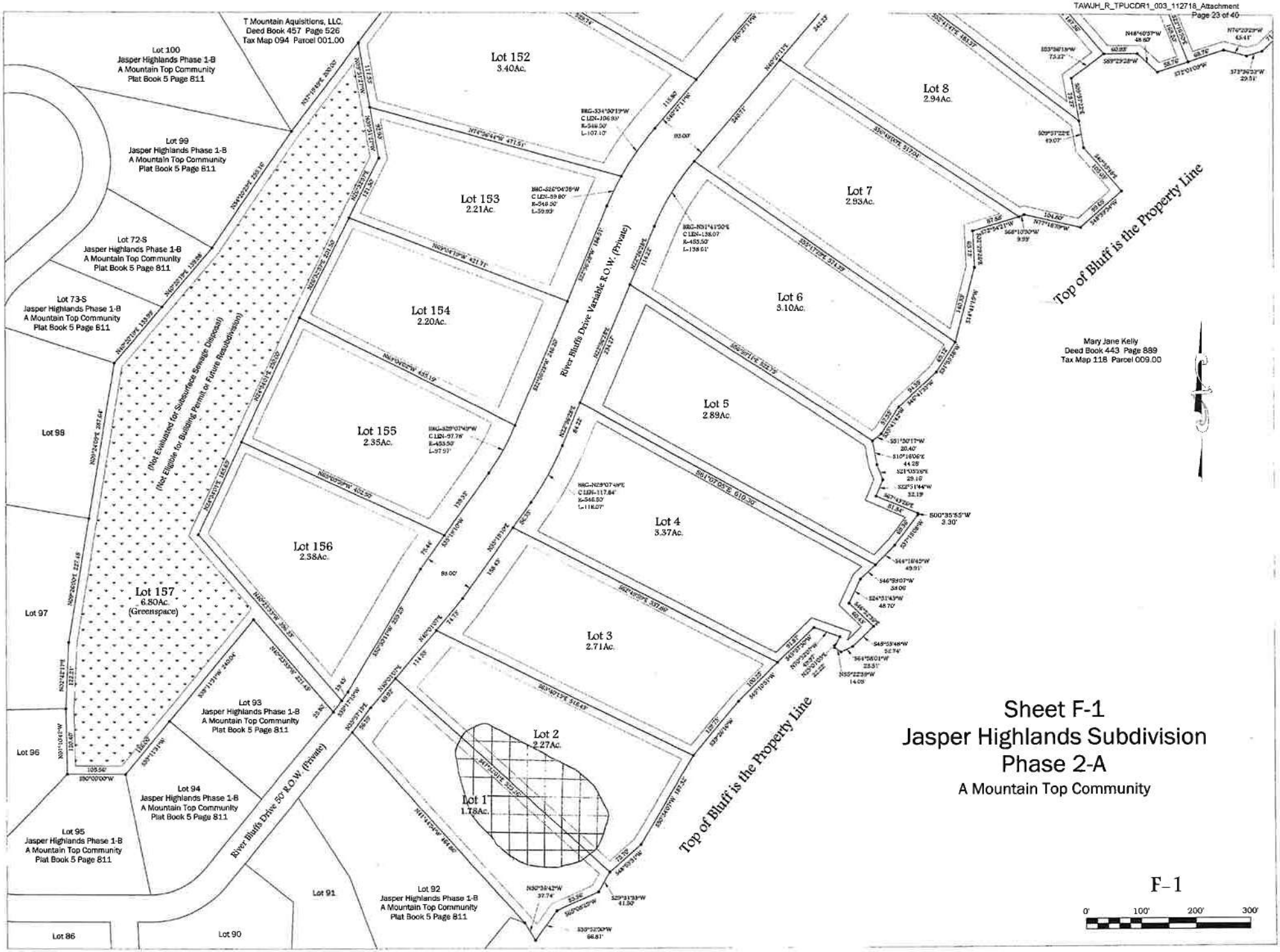
Sheet Index
Jasper Highlands Subdivision
Phase 2-A
A Mountain Top Community



Lot Number	# Bedrooms	Restrictions
1	5	Driveway/Utilities must be located on South property line
2	5	
3	5	
4	5	
5	5	
6	5	
7	5	
8	5	
9	5	Driveway/Utilities must be located on Northeast property line
10	3	Driveway/Utilities must be located on Northeast property line
11	4	
12	4	
13	3	
14	5	
15	4	
16	3	
17	3	Initial and duplicate systems modified mound
18	3	Driveway/Utilities must be located on Northeast property line
19	3	Driveway/Utilities must be located on Southwest property line
20	4	
21	3	Initial and duplicate areas using LPP and mound systems
22	3	Driveway/Utilities must be located on South property line
23	4	
24	4	
25	5	
142	5	
143	5	
145	5	
146	5	
147	5	
148	5	
149	5	
150	5	
151	5	
152	5	
153	5	
154	5	
155	5	
156	5	
157	5	

Jasper Highlands Subdivision
Phase 1-B

(Not to Scale)

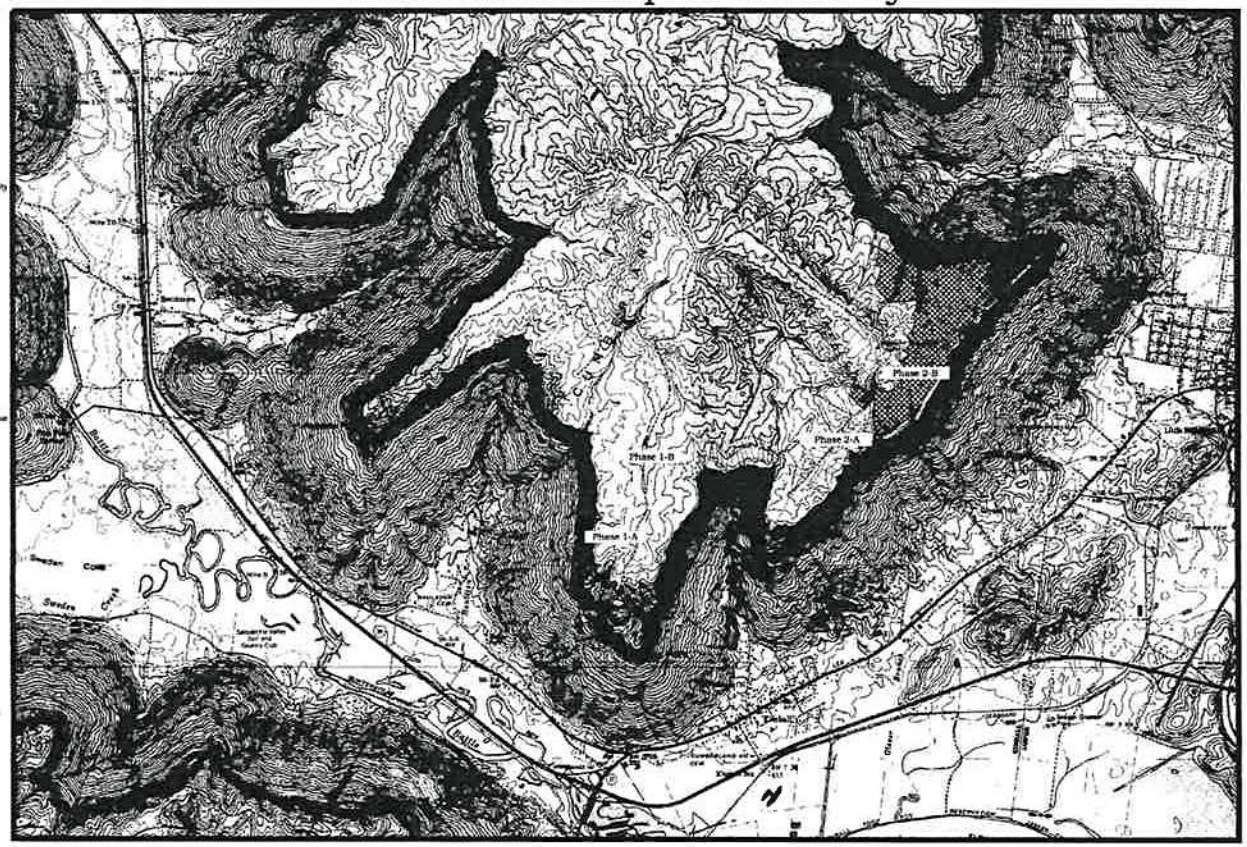

T Mountain Aquisitions, LLC.
Deed Book 457 Page 526
Tax Map 094 Parcel 001.00
Lot 100
Jasper Highlands Phase 1-B
A Mountain Top Community
Plat Book 5 Page 811
Lot 99
Jasper Highlands Phase 1-B
A Mountain Top Community
Plat Book 5 Page 811
Lot 72-S
Jasper Highlands Phase 1-B
A Mountain Top Community
Plat Book 5 Page 811
Lot 73-S
Jasper Highlands Phase 1-B
A Mountain Top Community
Plat Book 5 Page 811
Lot 98
Lot 97
Lot 96
Lot 95
Jasper Highlands Phase 1-B
A Mountain Top Community
Plat Book 5 Page 811
Lot 94
Jasper Highlands Phase 1-B
A Mountain Top Community
Plat Book 5 Page 811
Lot 93
Jasper Highlands Phase 1-B
A Mountain Top Community
Plat Book 5 Page 811
Lot 91
Lot 92
Jasper Highlands Phase 1-B
A Mountain Top Community
Plat Book 5 Page 811
Lot 90
Lot 86
Lot 152
3.40Ac.
Lot 153
2.21Ac.
Lot 154
2.20Ac.
Lot 155
2.35Ac.
Lot 156
2.38Ac.
Lot 157
6.80Ac.
(Greenspace)
(Not Evaluated for Subsurface Sewage Disposal)
(Not Eligible for Building Permit or Future Resubdivision)
Lot 8
2.94Ac.
Lot 7
2.93Ac.
Lot 6
3.10Ac.
Lot 5
2.89Ac.
Lot 4
3.37Ac.
Lot 3
2.71Ac.
Lot 2
2.27Ac.
Lot 1
1.78Ac.
River Bluffs Drive Variable R.O.W. (Private)
River Bluffs Drive 50' R.O.W. (Private)
Top of Bluff is the Property Line
Top of Bluff is the Property Line
Mary Jane Kelly
Deed Book 443 Page 889
Tax Map 118 Parcel 009.00
Sheet F-1
Jasper Highlands Subdivision
Phase 2-A
A Mountain Top Community
F-1
0'
100'
200'
300'

Sheet F-2
Jasper Highlands Subdivision
Phase 2-A
A Mountain Top Community



FAWJH_R_TPUCDR1_003_112716_Attachment
Page 25 of 40

Jasper Highlands Subdivision
Phase 2-B
A Mountain Top Community



CERTIFICATE BY PLANNING COMMISSION ON APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the Subdivision Regulations for Marion County, Tennessee, with the exception of such variances, if any, as may be noted on this plat, and that all required improvements have either been completed or guaranteed by an approved bond, letter of credit, cashier's check, cash deposit or wire transfer lump sum to complete the required improvements in case of default; and that this plat has been approved for recording in the office of the county register.

10/16/15 — Planning Commission Secretary

CERTIFICATION OF ROAD STATUS (PRIVATE ROAD)

It is hereby certified that the private road shown on this plat has been designed in an acceptable manner in accordance to required specifications in the Marion County Subdivision Regulations. The government of Marion County will not accept any responsibility for the construction or maintenance of this private road.

10/16/15 — Owner

Date — Owner

CERTIFICATE OF OWNERSHIP AND DEDICATION

I (we) hereby certify that I am (we are) the owners of the property shown and described hereon, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building setback lines, and hereby dedicate to the public use forever all the streets as shown on this plat

10/16/15 — Owner

Date — Owner

CERTIFICATION OF APPROVAL OF STREETS AND DRAINAGE SYSTEM
(FOR ROADS NOT COMPLETED AT TIME OF FINAL PLAT)

I hereby certify that the streets and drainage facilities for the subdivision have been designed in an acceptable manner in accordance to required specifications and a bank letter of credit, cashier's check, cash deposit or wire transfer in the amount of $ 213,000 of the total value of all road and drainage improvements installed has been posted to cover the construction of streets and drainage.

10/15/15 — Marion County Road Commissioner

CERTIFICATION OF E-911 APPROVAL

I hereby certify that I have reviewed this plat and find that it conforms to the county's E-911 requirements, including appropriate road nomenclature.

10-5-15 — E-911 Representative

CERTIFICATE FOR ELECTRICITY

I hereby certify that this plat shown adequate easements for power lines. (See Notes for Easement Widths) Power is available to all lots shown on plat (based on SVEC line extension policies).

10-6-15 — Electric Power Co.

CERTIFICATE OF APPROVAL OF SUBSURFACE SEWAGE DISPOSAL SYSTEM
Marion County Division of Groundwater Protection Certificate of Sewage Disposal

Approval is hereby granted for lots _____ defined as _____ County, Tennessee, as being suitable for subsurface sewage disposal (SSD) with the listed or attached restrictions.

Prior to any construction of a structure, permanent or mobile, the plans for the exact location/structure location must be approved and a SSD system permit issued by the Division of Groundwater Protection. Water taps, water lines, underground utilities and driveways should be located at side property lines unless otherwise noted. Any cutting, filling or alterations of the soil conditions may void this approval.

Environmental Specialist — 10/14/15 Date

Div. of Groundwater Protection

BK/PG: 5/1045-1053
15003840

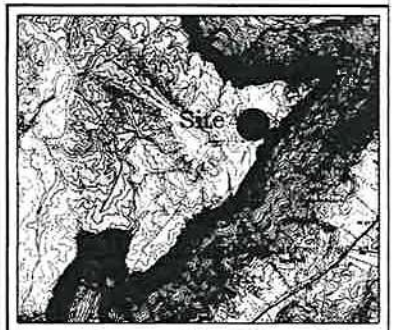
9 POS.SC. PLAT	
ANGELA BAUGH 6/22/	10/16/2015 - 12:41 PM
VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	175.00
ARCHIVE FEE	0.00
DP FEE	2.00
REGISTER'S FEE	0.00
TOTAL AMOUNT	177.00

STATE OF TENNESSEE, MARION COUNTY
DEBBIE PITTMAN
REGISTER OF DEEDS

CERTIFICATE OF REGISTERED SURVEYOR

It is hereby certified that this plat is true and correct and was prepared from an actual survey of the property by me or under my supervision; and that all monuments shown hereon actually exist or are marked as 'future', and their location, size, type and material are correctly shown.

10-06-15 — Date — Clarence L. Howard R.L.S



CLARENCE L. HOWARD
REGISTERED LAND SURVEYOR
AGRICULTURE
ENGINEERING
COMMERCE
TENNESSEE NO. 2207

I hereby certify that this is a category R survey and the ratio of precision of the unadjusted survey is greater than 1:10,000 as shown hereon, and complies with the minimum technical standard for the State of Tennessee

Clarence L. Howard Jr.
TN R.L.S #2207
AL P.L.S. # 25858

Plat Notes

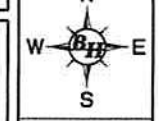
*Notes
1. Area Subdivided: 255.58 Acres
2. Zoning: None
3. All Lot Lines Have 15' Drainage & Utility Easements.
4. Area does Not Lie Within The 100 Year Flood Hazard Zone As Per FEMA Map Panel 47115C0210D, Dated: 01-06-2012.
5. Water By: Individual Wells
6. Sewer By: Individual Septic Systems
7. Owner: Thunder Development Inc. (John Thornton, President) 210 Battlecreek Road Kimball, Tn 37347 423-424-1085
8. Setbacks: 40' Front, 15' Side, 15' Rear, 20' Corner
9. This Plat Subdivides Property Of Record In Deed Book 448 Page 313 Tax Map 108 Parcel 013.01
10. All proposed roads have 50' R.O.W.'s and are private.
11. Contours from Aerial Photography by third parties

Developer
Thunder Development Inc.
210 Battle Creek Road
Kimball, TN 37347
423-424-1085

* The purpose of this note is to grant a variance for paving standards. Which is 8" gravel base with 2" asphalt along all proposed roads in Phase 2-B, which is less than the asphalt requirements at the time.

B&H Surveying Services
PO Box 446, Jasper, TN 37347
423-942-0022
bandhsurveying@hotmail.com

Grid North



TN SPC (Nad 83)

Surveyor's Notes

1. This survey was performed without the benefit of a title report and is subject to any state of facts that an up to date title report might reveal.
2. This survey is not transferable to additional institutions or owners and is invalid without an original seal and signature.
3. No interior improvements were located other than those shown above.
4. This survey was done by or under the direct supervision of the surveyor signing and sealing thereon.
5. This survey was based upon his analysis of the deeds of record with evidence found existing on the ground and located, renders the professional opinion of the surveyor as to the location of the boundaries and conditions being represented.
6. Monuments either found or placed or depicted existed as described on the date of the survey shown thereon.
7. Contour Interval - 2'. Contours provided by Photoscience from aerial topography

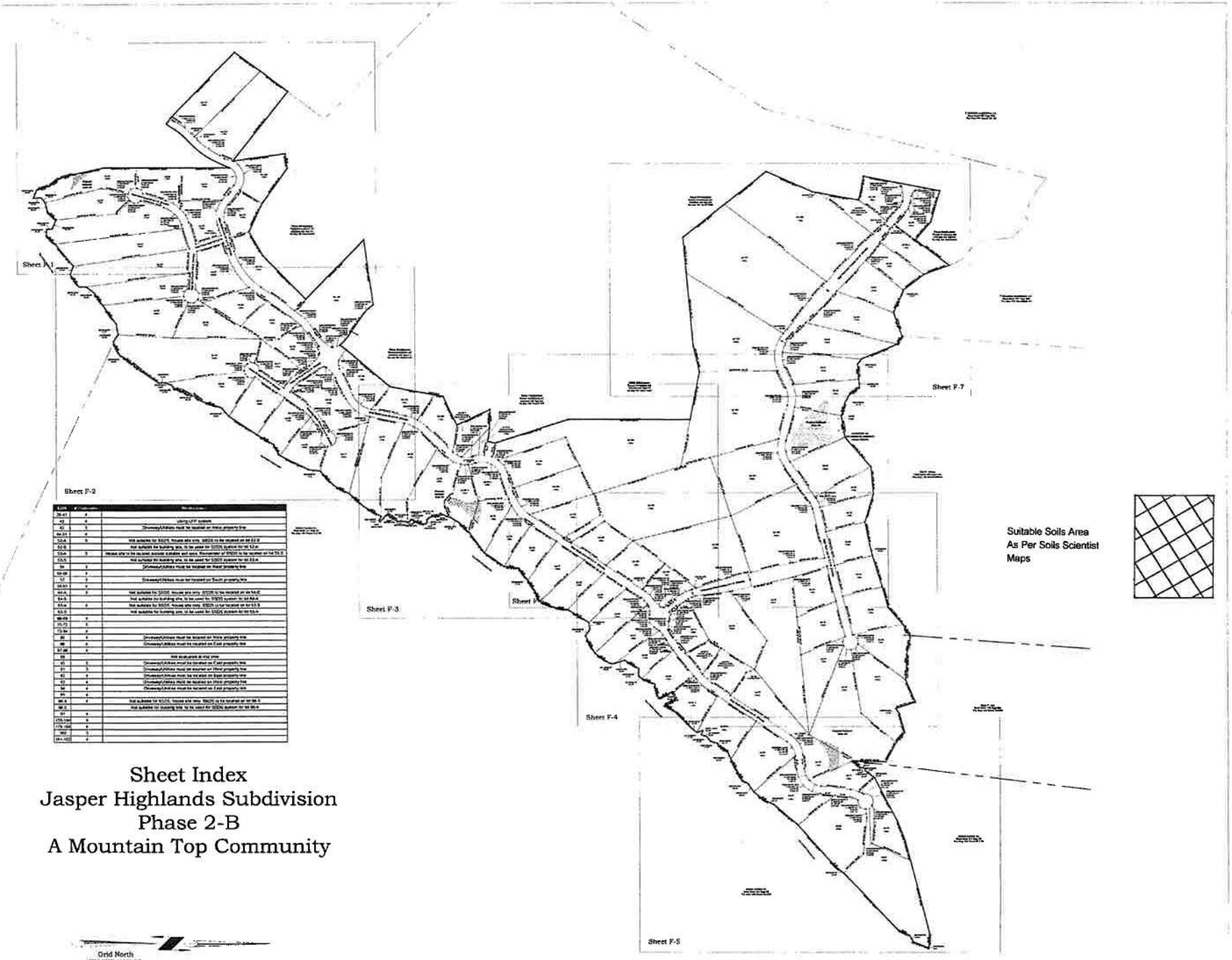


THUNDER ENTERPRISES

Final Plat For:
Jasper Highlands Subdivision
Phase 2-B
A Mountain Top Community
Second Civil District
Marion County, Tennessee

Not to Scale | Date: 09-22-15 | Drawing No. 1341-14

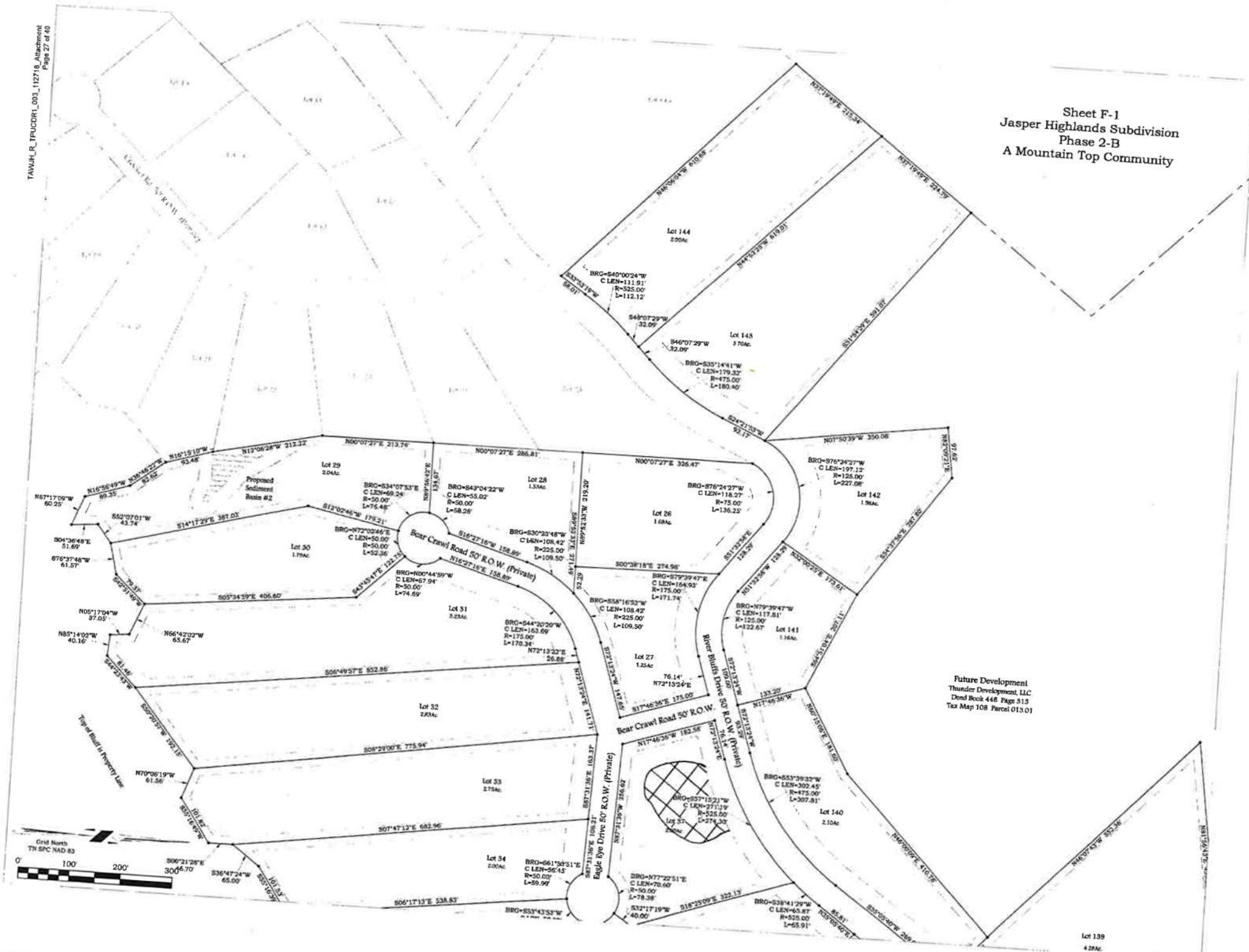
Book 5 Page 1045

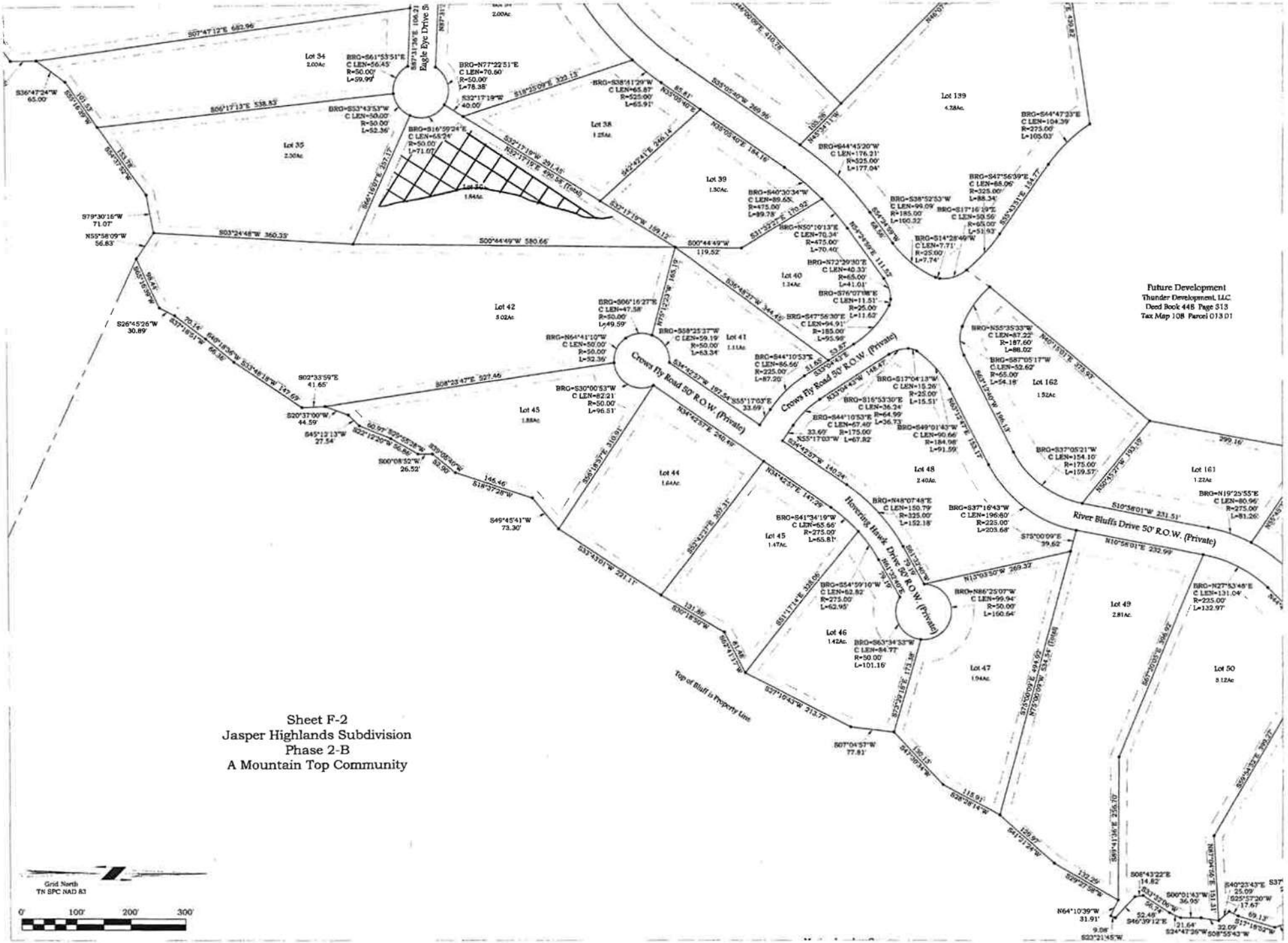


Sheet Index
Jasper Highlands Subdivision
Phase 2-B
A Mountain Top Community

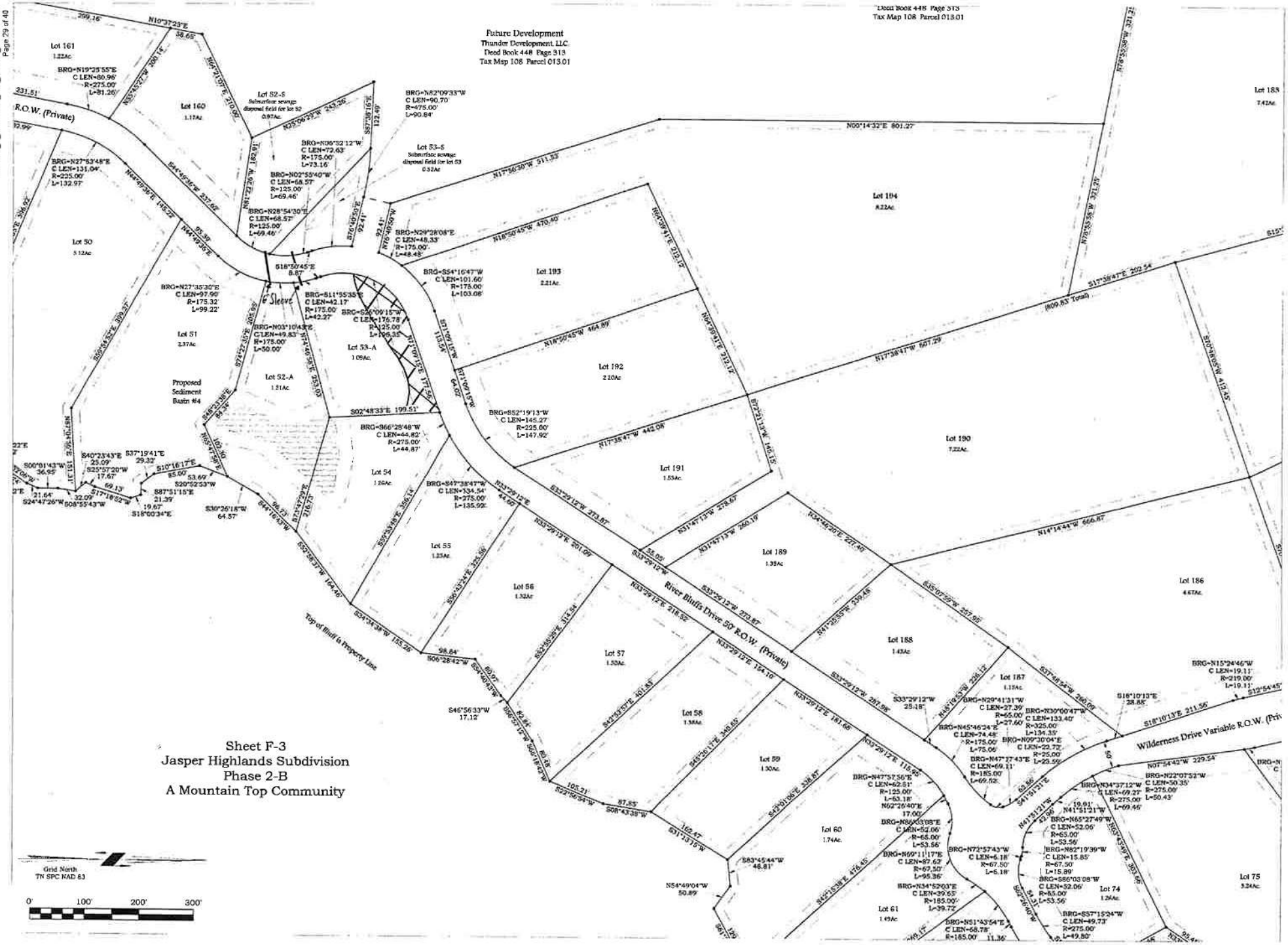
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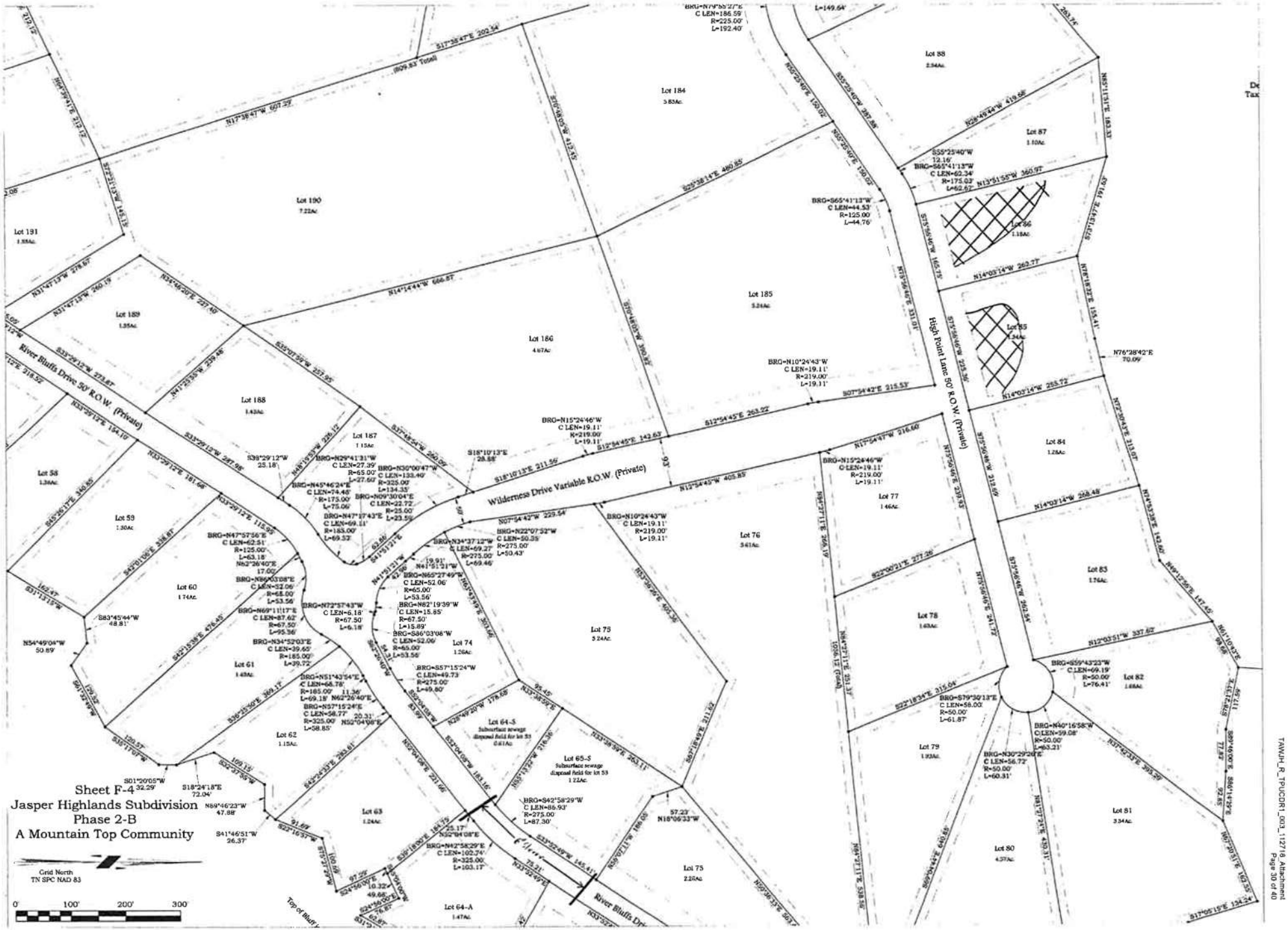
Sheet F-1
Jasper Highlands Subdivision
Phase 2-B
A Mountain Top Community



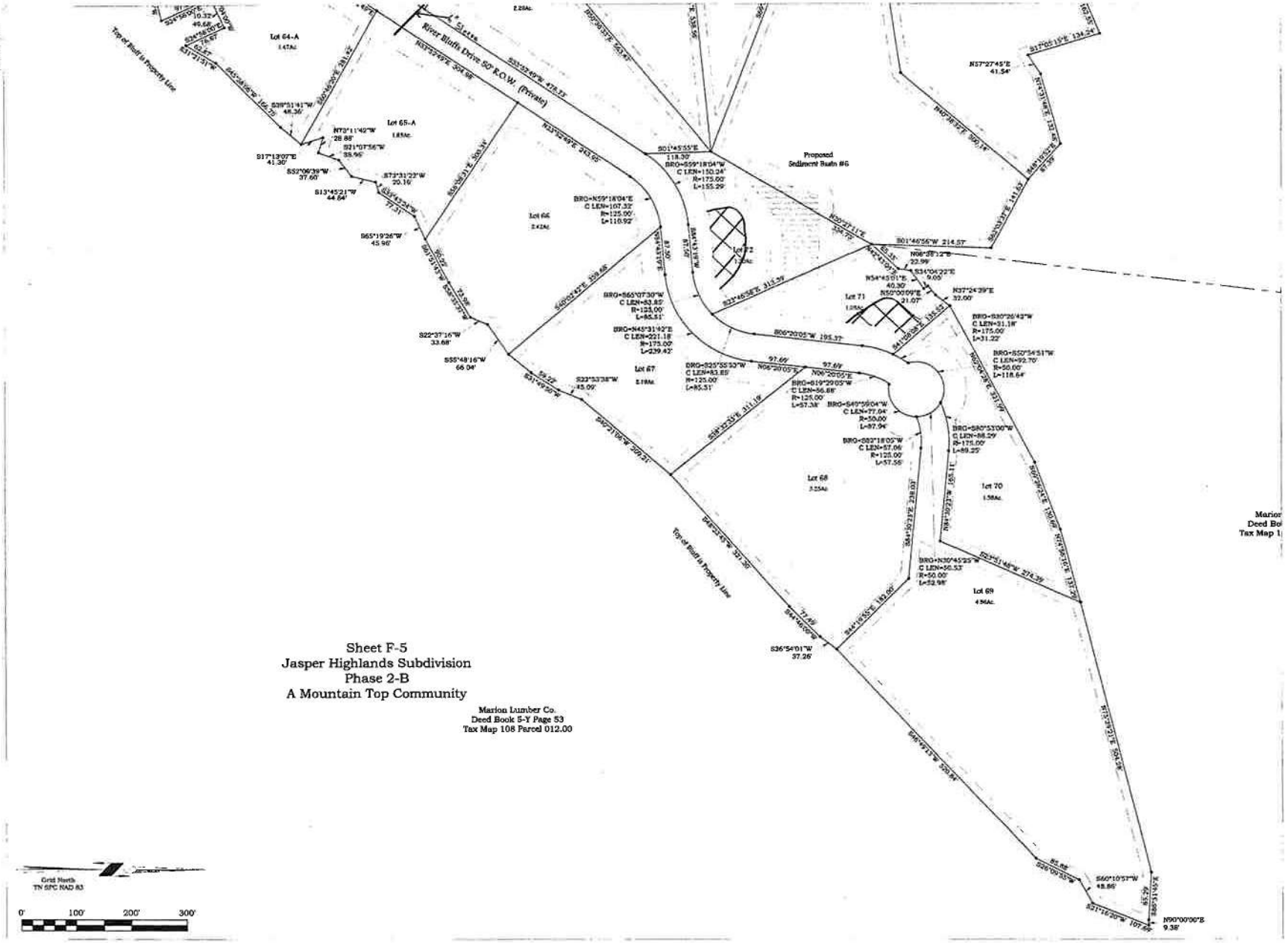


Sheet F-2
Jasper Highlands Subdivision
Phase 2-B
A Mountain Top Community


Future Development
Thunder Development, LLC
Deed Book 448 Page 313
Tax Map 108 Parcel 013.01
Deed Book 448 Page 313
Tax Map 108 Parcel 013.01
Lot 161
1.22Ac.
Lot 160
1.17Ac.
Lot 52-S
Subsurface sewage disposal field for lot 52
0.97Ac.
Lot 53-S
Subsurface sewage disposal field for lot 53
0.52Ac.
Lot 50
5.12Ac.
Lot 51
2.37Ac.
Lot 52-A
1.31Ac.
Lot 53-A
1.09Ac.
Lot 54
1.26Ac.
Lot 55
1.23Ac.
Lot 56
1.32Ac.
Lot 57
1.50Ac.
Lot 58
1.34Ac.
Lot 59
1.30Ac.
Lot 60
1.74Ac.
Lot 61
1.49Ac.
Lot 74
1.26Ac.
Lot 75
3.24Ac.
Lot 183
7.42Ac.
Lot 184
8.22Ac.
Lot 185
2.21Ac.
Lot 192
2.20Ac.
Lot 190
7.22Ac.
Lot 191
1.53Ac.
Lot 189
1.39Ac.
Lot 186
4.67Ac.
Lot 188
1.43Ac.
Lot 187
1.15Ac.
R.O.W. (Private)
6" Sleeve
Proposed Sediment Basin #4
Top of Bluff is Property Line
River Bluffs Drive 50' R.O.W. (Private)
Wilderness Drive Variable R.O.W. (Priv
(809.83' Total)
Sheet F-3
Jasper Highlands Subdivision
Phase 2-B
A Mountain Top Community
Grid North
TN SPC NAD 83
0
100'
200'
300'

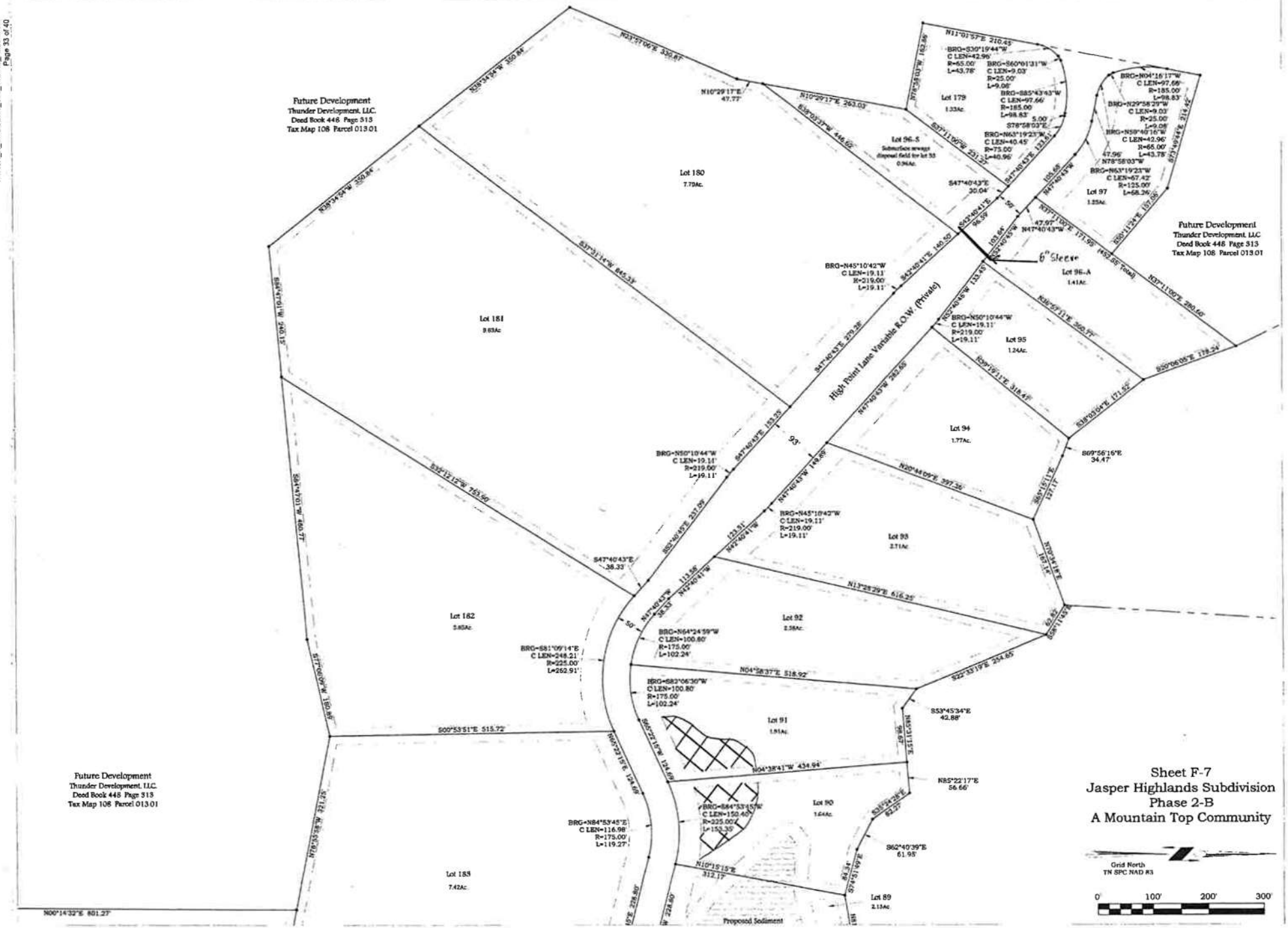

Sheet F-4
Jasper Highlands Subdivision
Phase 2-B
A Mountain Top Community
Grid North
TN SPC NAD 83
0
100'
200'
300'
Wilderness Drive Variable R.O.W. (Private)
River Bluffs Drive 50' R.O.W. (Private)
High Point Lane 50' R.O.W. (Private)
Lot 184
3.83Ac.
Lot 190
7.22Ac.
Lot 191
1.35Ac.
Lot 189
1.35Ac.
Lot 188
1.43Ac.
Lot 186
4.67Ac.
Lot 185
5.24Ac.
Lot 187
1.15Ac.
Lot 58
1.36Ac.
Lot 59
1.30Ac.
Lot 60
1.74Ac.
Lot 61
1.48Ac.
Lot 62
1.15Ac.
Lot 63
1.24Ac.
Lot 64-A
1.47Ac.
Lot 64-S
Subsurface sewage disposal field for lot 53
0.61Ac.
Lot 65-S
Subsurface sewage disposal field for lot 53
1.22Ac.
Lot 74
1.26Ac.
Lot 75
5.24Ac.
Lot 76
5.61Ac.
Lot 77
1.46Ac.
Lot 78
1.63Ac.
Lot 79
1.93Ac.
Lot 80
4.37Ac.
Lot 81
3.34Ac.
Lot 82
1.48Ac.
Lot 83
1.76Ac.
Lot 84
1.28Ac.
Lot 85
1.34Ac.
Lot 86
1.18Ac.
Lot 87
1.10Ac.
Lot 88
2.34Ac.
Lot 75
2.28Ac.
Top of Bluff
River Bluffs Dr.

TAWJH_B_TPUCOR1_003_112718_Attachment1
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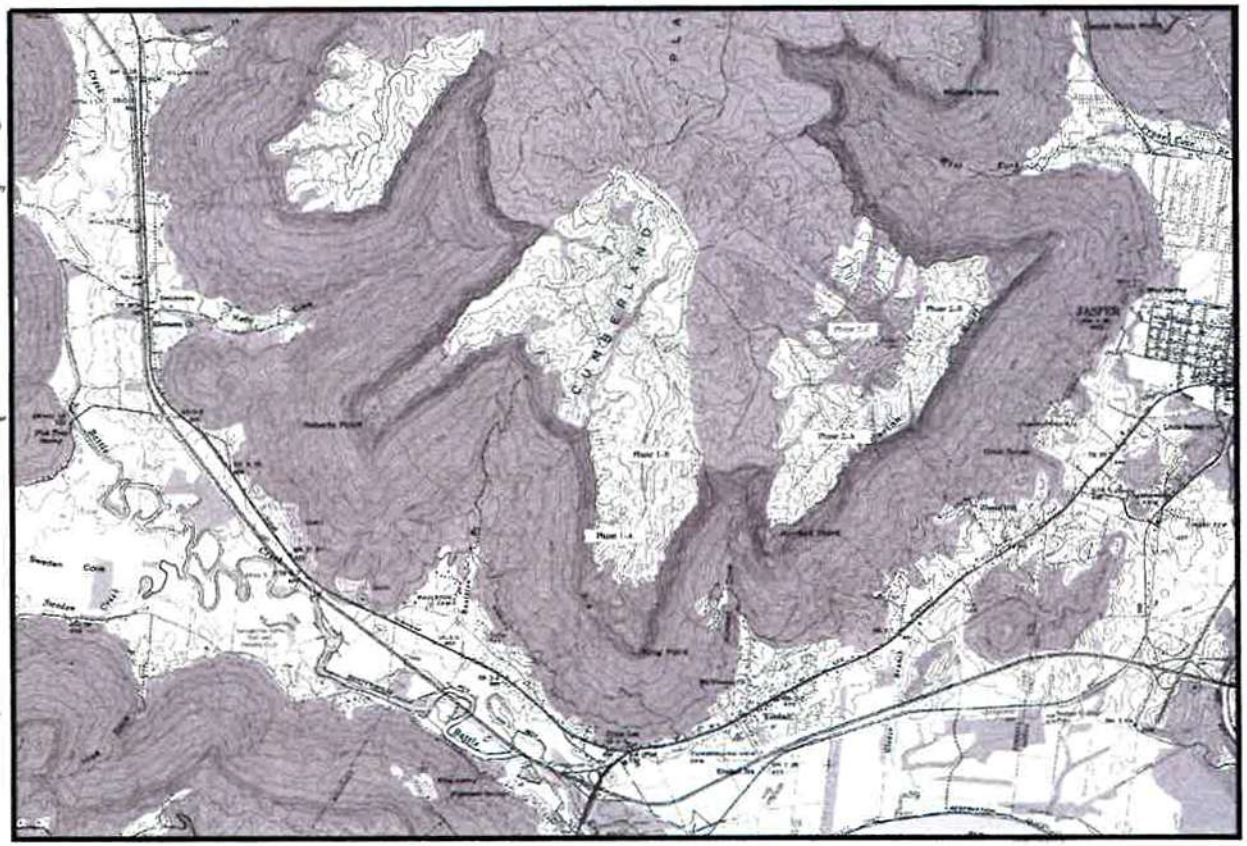
Book 5 Page 1051


Future Development
Thunder Development, LLC
Deed Book 448 Page 313
Tax Map 108 Parcel 013.01
Grid North
TN SPC NAD 83
Lot 183
7.42Ac
Lot 194
8.22Ac
Lot 193
2.21Ac
Lot 192
2.20Ac
Lot 191
1.53Ac
Lot 190
7.22Ac
Lot 189
1.35Ac
Lot 188
1.43Ac
Lot 187
1.18Ac
Lot 186
4.67Ac
Lot 185
9.24Ac
Lot 184
5.85Ac
Lot 90
1.64Ac
Lot 89
2.13Ac
Lot 88
2.54Ac
Lot 87
1.10Ac
Lot 86
1.16Ac
Lot 85
1.34Ac
Lot 84
1.28Ac
Lot 83
1.76Ac
Lot 78
1.85Ac
Lot 77
1.46Ac
Lot 76
3.61Ac
Lot 75
3.24Ac
Lot 74
1.26Ac
Lot 60
1.74Ac
Lot 59
1.30Ac
Lot 58
1.38Ac
Lot 57
1.30Ac
Proposed Sediment Basin #5
Community Lot
Not suitable for subsurface sewage disposal
River Bluffs Drive 50' R.O.W. (Private)
Wilderness Drive Variable R.O.W. (Private)
High Point Lane 50' R.O.W. (Private)
N00°14'32"E 801.27'
(809.83' Totall)
N17°38'47"W 607.79'
S17°38'47"E 202.54'
S15°34'12"E 468.57'
N04°38'41"W 434.94'
N85°22'17"E 56.66'
S62°40'39"E 61.95'
N10°15'15"E 312.17'
S73°34'45"E 238.80'
N73°34'45"W 238.80'
N81°12'07"E 143.83'
S25°24'40"E 83.27'
S73°31'49"E 84.34'
N49°47'31"E 263.74'
N28°48'50"W 397.48'
N28°49'44"W 419.68'
N85°11'35"E 183.35'
S55°25'40"W 287.85'
S55°25'40"E 150.02'
S55°25'40"W 12.16'
S25°38'14"E 480.85'
S10°46'06"W 413.45'
N14°14'44"W 666.87'
N14°03'14"W 262.77'
N14°03'14"W 255.72'
S07°54'42"E 215.53'
S12°54'45"E 263.22'
N12°54'45"W 405.85'
N17°54'47"W 216.60'
S16°10'13"E 211.56'
S16°10'13"E 28.88'
S27°48'54"W 260.05'
S33°29'12"W 273.87'
S33°29'12"W 25.18'
S33°29'12"E 154.19'
S33°29'12"E 218.53'
S33°29'12"E 261.09'
S33°29'12"E 267.96'
S33°29'12"E 181.68'
S33°29'12"E 118.93'
S31°47'13"W 278.87'
S31°47'13"W 360.19'
S17°21'13"W 146.15'
S17°38'47"E 442.08'
S35°07'39"W 257.95'
S41°22'35"W 239.48'
S34°46'26"E 357.46'
S45°19'53"W 256.12'
S45°26'17"E 340.85'
S42°01'06"E 336.87'
S42°19'38"E 476.45'
S08°43'38"W 87.85'
S22°36'04"W 105.31'
S83°45'44"W 48.81'
S54°49'04"W 50.85'
S33°39'26"W 403.36'
S22°00'21"E 277.26'
S25°56'46"W 212.68'
S25°56'46"W 223.36'
S25°56'46"W 165.75'
S25°56'46"W 331.01'
S25°56'46"W 252.54'
S12°03'51"W 3
N76°28'
70.4
N72°00'43"E 215.93'
N76°16'32"E 155.41'
N17°54'47"E 216.19'
N12°54'45"W 405.85'
N14°27'
N10°24'43"W
C LEN=19.11'
R=219.00'
L=19.11'
BRG=N84°53'45"E
C LEN=116.98'
R=175.00'
L=119.27'
BRG=S84°53'45"W
C LEN=150.40'
R=225.00'
L=153.35'
BRG=S79°53'27"W
C LEN=145.12'
R=175.00'
L=149.64'
BRG=N79°55'27"E
C LEN=186.59'
R=225.00'
L=192.40'
BRG=S65°41'13"W
C LEN=62.34'
R=175.03'
L=62.67'
BRG=S65°41'13"W
C LEN=44.53'
R=125.00'
L=44.76'
BRG=N15°24'46"W
C LEN=19.11'
R=219.00'
L=19.11'
BRG=N10°24'43"W
C LEN=19.11'
R=219.00'
L=19.11'
BRG=N29°41'31"W
C LEN=27.39'
R=65.00'
L=27.69'
BRG=N30°00'47"W
C LEN=133.40'
R=325.00'
L=134.35'
BRG=N09°30'04"E
C LEN=22.72'
R=25.00'
L=23.59'
BRG=N45°46'24"E
C LEN=74.48'
R=175.00'
L=75.06'
BRG=N47°17'43"E
C LEN=69.31'
R=185.00'
L=69.52'
BRG=N47°57'56"E
C LEN=62.61'
R=125.00'
L=63.18'
N62°24'40"E
17.00'
BRG=N86°03'08"E
C LEN=52.06'
R=65.00'
L=53.56'
BRG=N60°11'17"E
C LEN=87.62'
R=67.50'
L=95.36'
BRG=N34°52'03"E
C LEN=39.65'
R=185.00'
BRG=N72°57'43"W
C LEN=6.18'
R=67.50'
L=6.18'
BRG=N22°07'52"W
C LEN=50.35'
R=275.00'
L=50.43'
BRG=N34°37'12"W
C LEN=69.27'
R=275.00'
L=69.46'
BRG=N65°27'49"W
C LEN=52.06'
R=65.00'
L=53.56'
BRG=N82°19'39"W
C LEN=15.85'
R=67.50'
L=15.89'
BRG=S86°03'08"W
C LEN=52.06'
R=65.00'
L=53.56'
N41°51'21"W
19.91'
N41°51'21"W
42.96'
S41°51'21"E
62.86'
50'
50'
Sheet F-6
Jasper Highlands Subdivision
Phase 2-B
A Mountain Top Community
0'
100'
200'
300'


Future Development
Thunder Development, LLC.
Deed Book 448 Page 313
Tax Map 108 Parcel 013.01
Lot 180
7.79Ac.
Lot 181
9.63Ac.
Lot 182
5.80Ac.
Lot 183
7.42Ac.
Lot 179
1.33Ac.
Lot 96-5
Subsurface sewage disposal field for lot 55
0.94Ac.
Lot 97
1.25Ac.
Lot 96-A
1.41Ac.
Lot 95
1.24Ac.
Lot 94
1.77Ac.
Lot 93
2.71Ac.
Lot 92
2.58Ac.
Lot 91
1.91Ac.
Lot 90
1.64Ac.
Lot 89
2.13Ac.
High Point Lane Variable R.O.W. (Private)
6" Sleeve
Proposed Sediment
Future Development
Thunder Development, LLC
Deed Book 448 Page 313
Tax Map 108 Parcel 013.01
Future Development
Thunder Development, LLC.
Deed Book 448 Page 313
Tax Map 108 Parcel 013.01
Sheet F-7
Jasper Highlands Subdivision
Phase 2-B
A Mountain Top Community
Grid North
TN SPC NAD 83
0
100'
200'
300'

TAWJH_R_1PUCOR1_003_112718_Attachment Page 34 of 40

Jasper Highlands Subdivision
Phase 2-C
A Mountain Top Community



CERTIFICATE BY PLANNING COMMISSION ON APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the Subdivision Regulations for Marion County, Tennessee, with the exception of such variances, if any, as may be noted on this plat, and that all required improvements have either been completed or covered by an approved bank letter of credit, cashier's check, cash deposit or surety bond large enough to complete the required improvements in case of default, and that this plat has been approved for recording in the office of the Register.

7-28-16 — Planning Commission Secretary

CERTIFICATION OF ROAD STATUS (PRIVATE ROAD)

It is hereby certified that the private road shown on this plat has been designed to an acceptable manner in conformance to required specifications in the Marion County Subdivision Regulations. The government of Marion County will not accept any responsibility for the construction or maintenance of this private road.

5/2/16 — Date — Owner

Date — Owner

CERTIFICATE OF OWNERSHIP AND DEDICATION

I (we) hereby certify that I am (we are) the owners of the property shown and described hereon, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building setback lines, and hereby dedicate to the public use forever all the streets as shown on this plat.

5/2/16 — Date — Owner

Date — Owner

CERTIFICATION OF APPROVAL OF STREETS AND DRAINAGE SYSTEM (FOR ROADS NOT COMPLETED AT TIME OF FINAL PLAT)

I hereby certify that the streets and drainage facilities for the subdivision have been designed in an acceptable manner in accordance to required specifications and a bond, letter of credit, cashiers check, cash deposit or some transfer in the amount of $ [illegible] of the total value of all road and drainage improvements installed has been posted to cover the construction of streets and drainage.

6-6-16 — Date — Marion County Road Commissioner

CERTIFICATION OF E-911 APPROVAL

I hereby certify that I have reviewed this plat and find that it conforms to the County's E-911 requirements, including approved road nomenclature.

6-2-2016 — Date — E-911 Representative

CERTIFICATE FOR ELECTRICITY

I hereby certify that this plat shows adequate easements for power lines. (See Note for Easement of Utility) Power is available to all lots shown on plat based on SVEC's line extension policy.

5-4-16 — Date — Electric Power Official

CERTIFICATE OF APPROVAL OF SUBSURFACE SEWAGE DISPOSAL SYSTEMS
Marion County Division of Groundwater Protection Certificate of Sewage Disposal

Approval is hereby granted for lots _____ defined as _____ County Tennessee, as being suitable for subsurface sewage disposal (SSD) with the listed or attached restrictions.

Prior to any construction of a structure, permanent or mobile, the plans for the exact house/structure location must be approved and a SSD system permit issued by the Division of Groundwater Protection. Water taps, water lines, underground utilities and driveways should be located at side property lines unless otherwise noted. Any cutting, filling or alterations of the soil conditions may void this approval.

7/15/16 — Date — Environmental Specialist, Div. of Groundwater Protection

BK/PG: 5/1113-1119
16002437

7 PGS AL-PLAT	
SEQUENCE BATCH 403844	4/28/2016 - 10:44 AM
VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	105.00
ARCHIVE FEE	0.00
DP FEE	2.00
REGISTER'S FEE	0.00
TOTAL AMOUNT	107.00

STATE OF TENNESSEE, MARION COUNTY
DEBBIE PITTMAN
REGISTER OF DEEDS

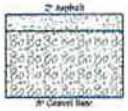
CERTIFICATE OF REGISTERED SURVEYOR

It is hereby certified that this plat is true and correct and was prepared from an actual survey of the property by me or under my supervision; and that all monuments shown hereon actually exist or are marked as 'future', and their location, size, type and material are correctly shown.

4/28/2016 — Date — Brian C. Bradford R.L.S.

I hereby certify that this is a category II survey and the ratio of precision of the unadjusted survey is greater than 1:10,000 as shown hereon and complies with the minimum technical standards for the State of Tennessee.

4/28/2016



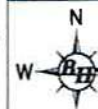
Plat Notes

*Notes
1. Area Subdivided: 183.75 Acres
2. Zoning: None
3. All Lot Lines Have 10' Drainage & Utility Easements.
4. Area does Not Lie Within The 100 Year Flood Hazard Zone As Per FEMA Map Panel 47115C0210D, Dated: 01-06-2012.
5. Water By: Individual Wells
6. Sewer By: Individual Septic Systems
7. Owner: Thunder Development Inc. (John Thornton, President) 210 Battlecreek Road Kimball, Tn 37347 423-424-1005
8. Setbacks: 40' Front, 10' Side, 15' Rear, 20' Corner
9. This Plat Subdivides Property Of Record In Deed Book 448 Page 310 Tax Map 109, Parcel 015.01
10. All proposed roads have 50' R.O.W.'s and are private.
11. Contours from Aerial Photography by third parties

* The purpose of this note is to grant a variance for paving standards. Which is 8" gravel base with 2" asphalt along all proposed roads represented in Phase 2-C within this plat, which is less than the asphalt requirements at this time.

B&H Surveying Services
PO Box 446, Jasper, TN 37347
423-942-0022
BCBradford88@gmail.com

Grid North



TN SPC (Nad 83)

Surveyor's Notes

1. This survey was performed without the benefit of a title report and is subject to any state of facts that an up to date title report might reveal.
2. This survey is not transferable to additional institutions or owners and is invalid without an original seal and signature.
3. No interior improvements were located other than those shown above.
4. This survey was done by or under the direct supervision of the surveyor signing and sealing thereon.
5. This survey was based upon his analysis of the deeds of record with evidence found existing on the ground and located, renders the professional opinions of the surveyor as to the location of the boundaries and conditions being represented.
6. Monuments either found or placed as depicted existed as described on the date of the survey shown thereon.

Developer
Thunder Development Inc. (423-424-1005)
210 Battle Creek Road Kimball, TN 37347



THUNDER ENTERPRISES

Final Plat For:

Jasper Highlands Subdivision
Phase 2-C
A Mountain Top Community
Second Civil District
Marion County, Tennessee

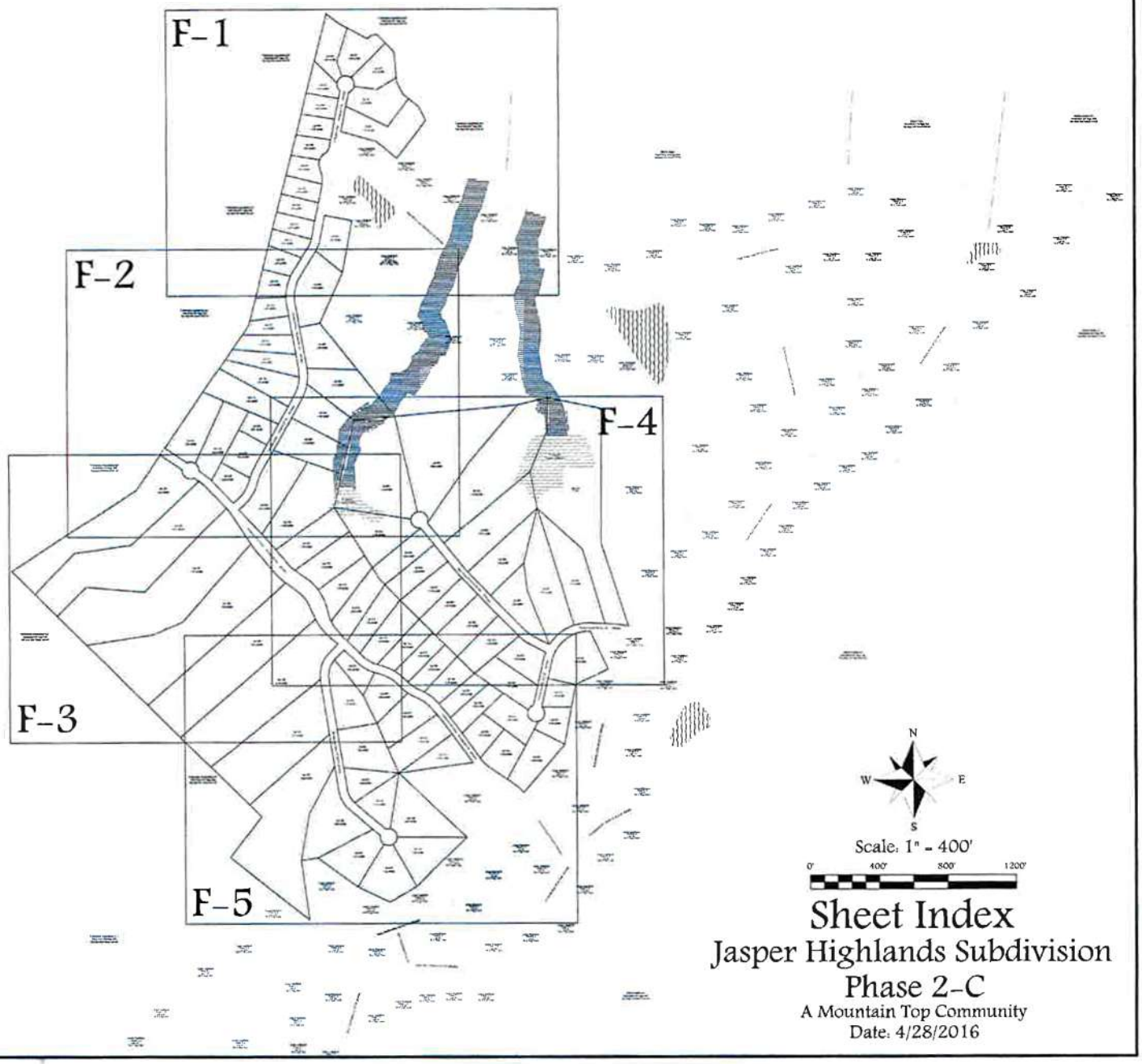
Not to Scale	Date: 4/28/2016	Drawing No. 1341-14

Book 5 Page 1113

TAWJH_R_TPLICDR1_003_112718_Attachment
Page 35 of 40

Lot	# of Units	Restrictions
101	1	Driveway/Utilities must be located adjacent to lot 201
102	1	
102-103	1	Driveway/Utilities must be located within 30' of either property line
103	1	Driveway/Utilities must be located along other property line
104	1	Driveway/Utilities must be located within 30' of either property line
104-105	1	Not suitable SWDS system
105	1	Driveway/Utilities must be located within 30' of either property line
106	1	Driveway/Utilities must be located adjacent to lot 106
107	1	Driveway/Utilities must be located within 30' of either property line
108	1	Driveway/Utilities must be located adjacent to lot 110
109	1	
110	1	Driveway/Utilities must be located adjacent to lot 108
111	1	Driveway/Utilities must be located adjacent to lot 112
112-113	1	Not suitable SWDS system
114	1	Driveway/Utilities must be located adjacent to lot 113
114-115	1	
116	1	
117	1	
118	1	
119	1	Driveway/Utilities must be located adjacent to lot 120
120	1	
121	1	Driveway/Utilities must be located adjacent to lots 121 & 122
122	1	
123	1	
124	1	
125	1	
126	1	
127-128	1	
129	1	
130-131	1	
132-133	1	
134-135	1	
136	1	Driveway/Utilities must be located adjacent to lot 134
140-170	1	
171-172	1	Driveway/Utilities must be located adjacent to other property line
173	1	
174	1	
175	1	
176	1	
177	1	
178	1	
179	1	
180	1	
181	1	
182-183	1	Not suitable SWDS system
184	1	
185-186	1	
187	1	
188	1	
189	1	
190	1	
191	1	
192	1	
193-194	1	
195	1	
196-197	1	
198	1	
199	1	
200	1	
201	1	
202-203	1	
204	1	
205	1	
206-207	1	
208	1	
209	1	
210-211	1	
212	1	Driveway/Utilities must be located adjacent to lot 213
213	1	Not suitable SWDS system
214-217	1	
218	1	Driveway/Utilities must be located adjacent to lot 217
219	1	Driveway/Utilities must be located adjacent to lot 220
220	1	
221-222	1	
223	1	Driveway/Utilities must be located adjacent to lot 224
225	1	
226	1	
227-228	1	
229	1	
230	1	

Suitable soils area as per soil scientist maps.



Sheet Index

Jasper Highlands Subdivision

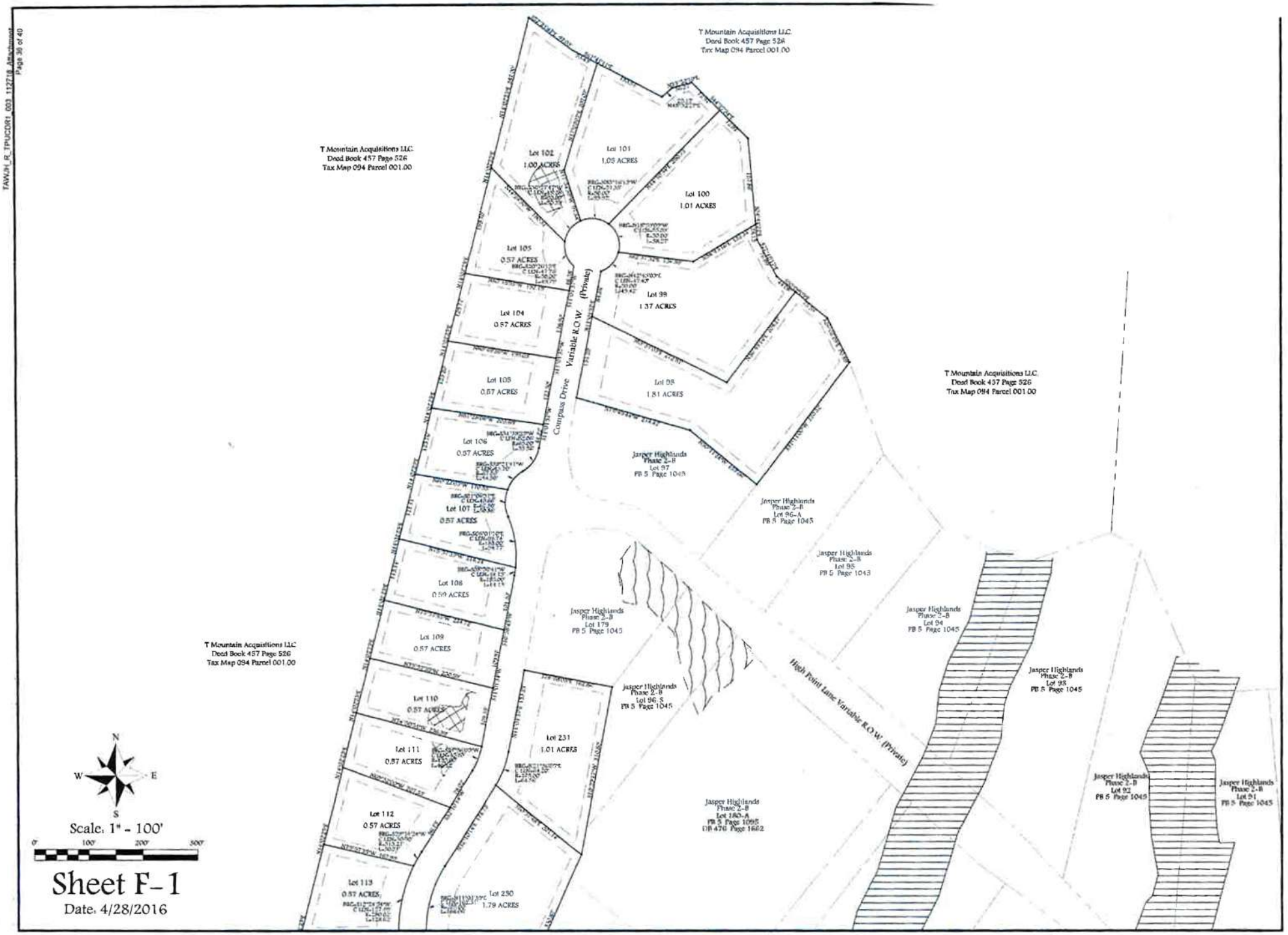
Phase 2-C

A Mountain Top Community

Date: 4/28/2016

Book 5 Page 1114

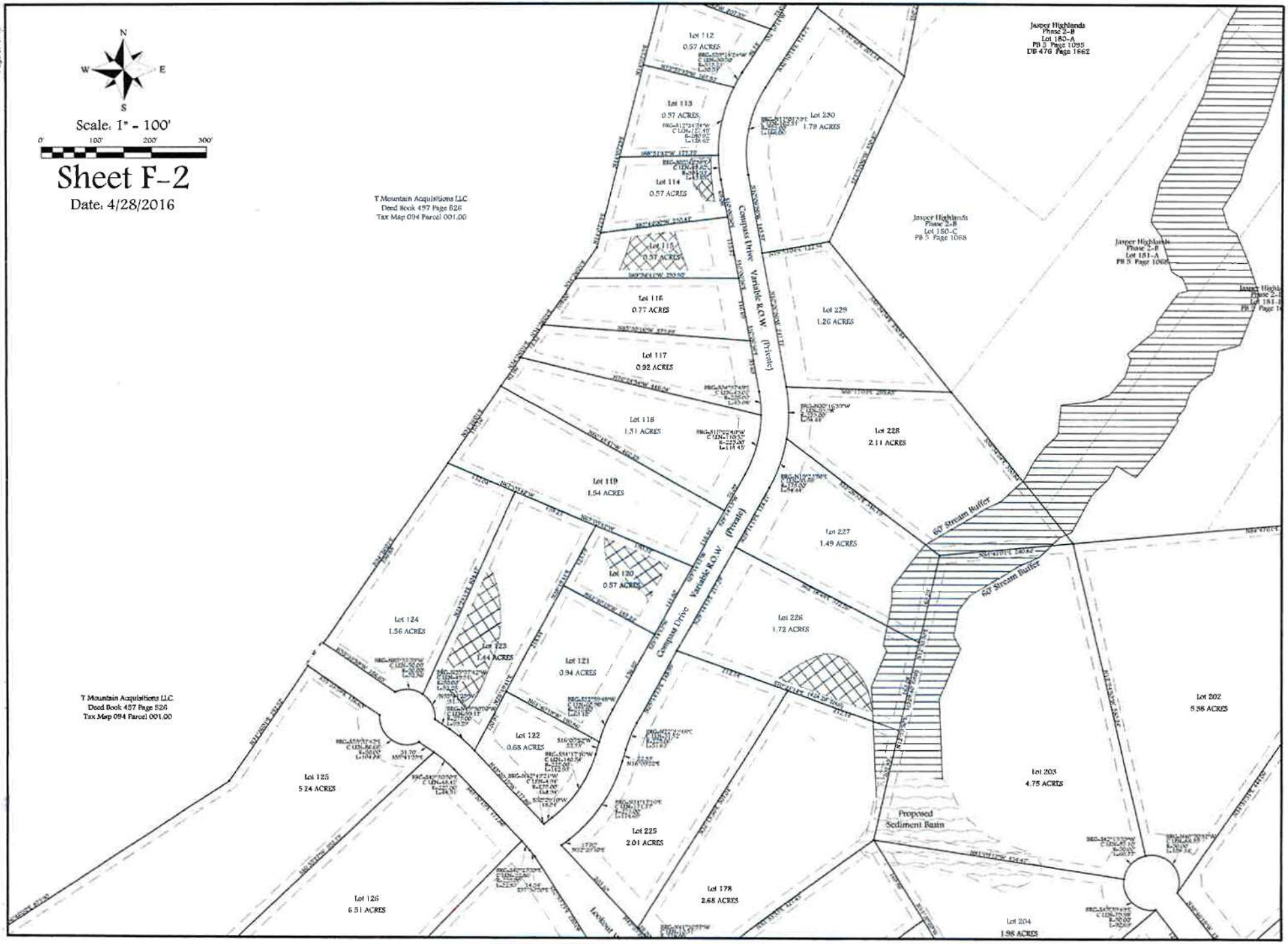
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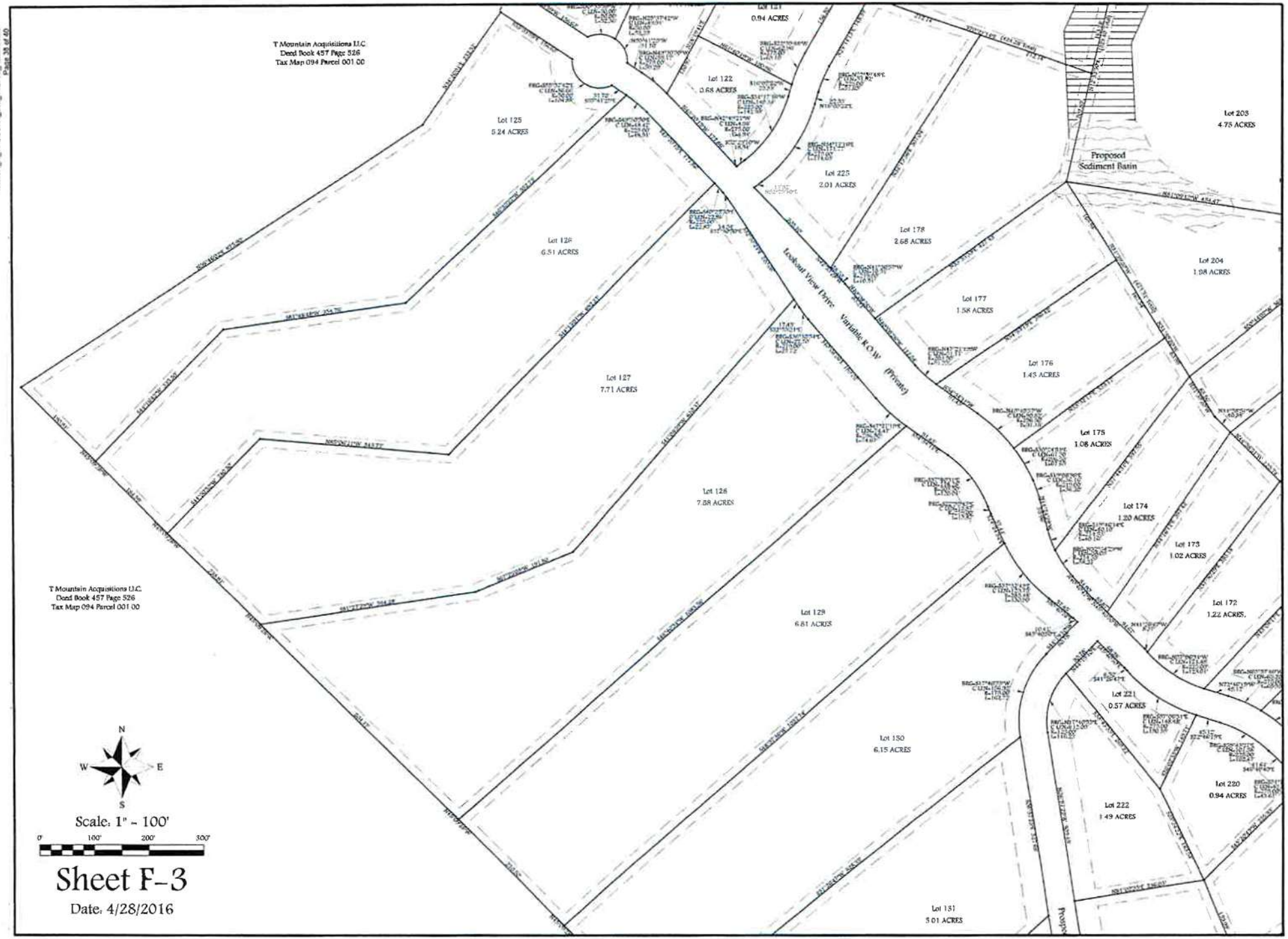
Sheet F-1

Date: 4/28/2016

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N
W
E
S
Scale: 1" = 100'
0'
100'
200'
300'
Sheet F-2
Date: 4/28/2016
T Mountain Acquisitions LLC
Deed Book 457 Page 526
Tax Map 094 Parcel 001.00
T Mountain Acquisitions LLC
Deed Book 457 Page 526
Tax Map 094 Parcel 001.00
Jasper Highlands
Phase 2-B
Lot 180-A
PB 5 Page 1095
DB 476 Page 1662
Jasper Highlands
Phase 2-B
Lot 180-C
PB 5 Page 1068
Jasper Highlands
Phase 2-B
Lot 181-A
PB 5 Page 1068
Compass Drive
Variable R.O.W. (Private)
Lot 112
0.57 ACRES
Lot 113
0.57 ACRES
Lot 114
0.57 ACRES
Lot 115
0.57 ACRES
Lot 116
0.77 ACRES
Lot 117
0.92 ACRES
Lot 118
1.51 ACRES
Lot 119
1.54 ACRES
Lot 120
0.57 ACRES
Lot 121
0.94 ACRES
Lot 122
0.68 ACRES
Lot 123
1.44 ACRES
Lot 124
1.56 ACRES
Lot 125
5.24 ACRES
Lot 126
6.51 ACRES
Lot 178
2.68 ACRES
Lot 225
2.01 ACRES
Lot 226
1.72 ACRES
Lot 227
1.49 ACRES
Lot 228
2.11 ACRES
Lot 229
1.26 ACRES
Lot 230
1.79 ACRES
Lot 202
5.36 ACRES
Lot 203
4.75 ACRES
Lot 204
1.98 ACRES
60' Stream Buffer
60' Stream Buffer
Proposed
Sediment Basin
Lockmont

TAWUH_R_TPUCDR1_003_112710_Attachment Page 39 of 40

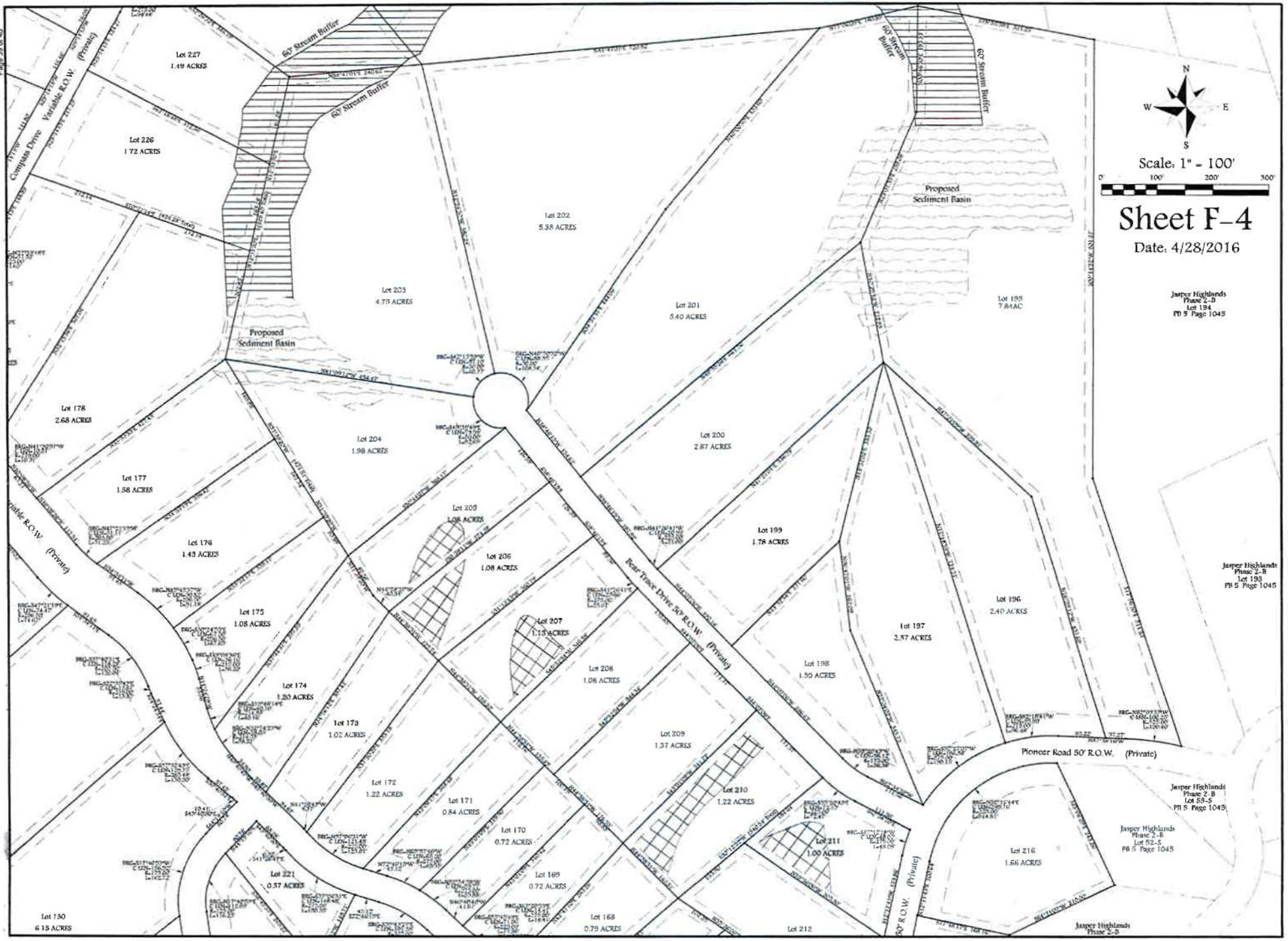


Sheet F-3

Date: 4/28/2016

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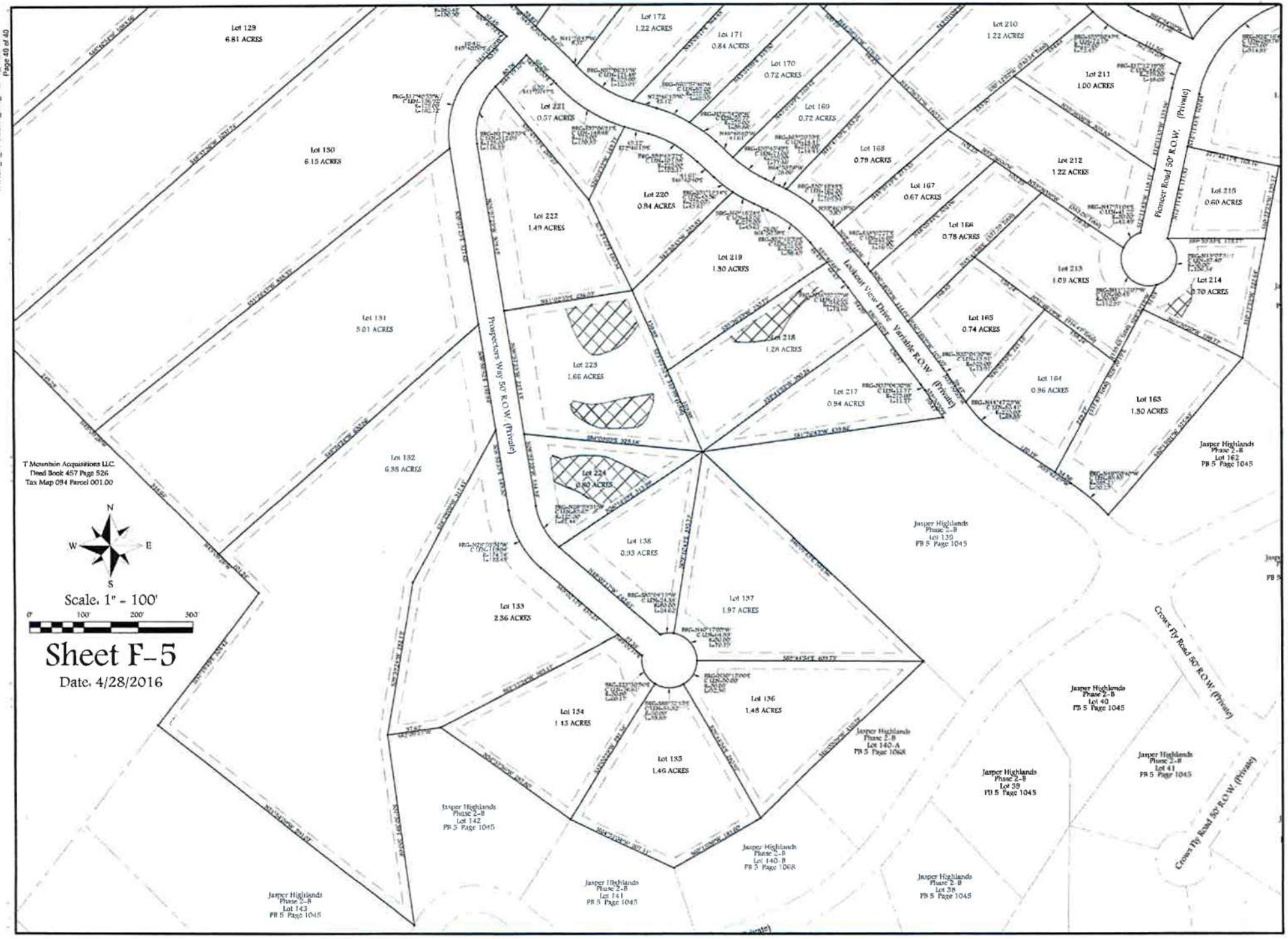
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Sheet F-4

Date: 4/28/2016

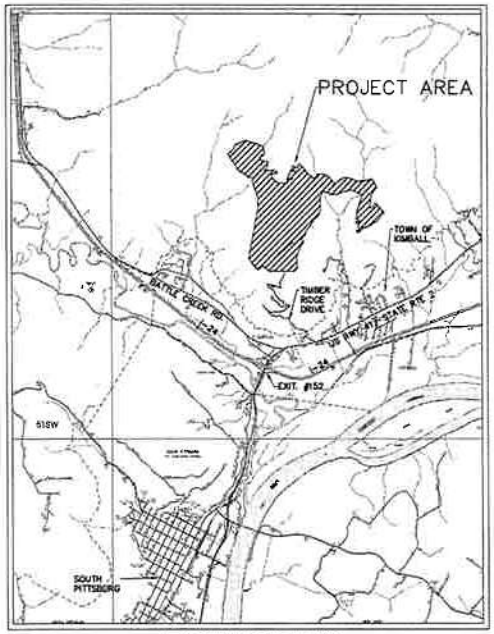
Book 5 Page 1118



Sheet F-5

Date: 4/28/2016

THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM
MARION COUNTY, TENNESSEE



LOCATION MAP
NOT TO SCALE

DRAWING INDEX

TITLE	DRAWING NO.
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GENERAL PIPE, TANK, AND BOOSTER PUMP STATION LAYOUT	3
WATER LINE PLAN SHEETS (1 THROUGH 18)	4 THROUGH 21
PUMP STATION NO.1 SITE PLAN	22
PUMP STATION NO.1 PLAN, SECTIONS, AND DETAILS	23
PUMP STATION NO.2 SITE PLAN	24
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PIPING DETAILS	26
THRUST RESTRAINT DETAILS	27
EROSION, SEDIMENT, AND DRAINAGE CONTROL DETAILS	28
MASTER METER BOX DETAILS	29
WATER STORAGE TANK	30

PREPARED BY:

CTI ENGINEERS, INC.
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7013

Donald D. Tabor, Jr. 12/06/13
DONALD D. TABOR JR., PE DATE
TENNESSEE LICENSE NO. 107695

Jerome D. Hightower 12/06/13
JEROME D. HIGHTOWER, PE DATE
TENNESSEE LICENSE NO. 11411

I CERTIFY THAT THESE PLANS HAVE BEEN REVIEWED AND APPROVED BY THE SOUTH PITTSBURG BOARD OF WATER WORKS AND SEWERS

DONALD E. BLANSETT, MANAGER 11/26/13 DATE

I CERTIFY THAT THESE PLANS HAVE BEEN REVIEWED AND APPROVED BY THUNDER ENTERPRISES

JOHN THORNTON, CHAIRMAN/CEO 11-26-13 DATE

CTI PROJECT NO. C13009

CTI PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING: TITLE SHEET (3556972+22/12/11/13 8:38AM), LAYOUT: CTI
DATE OF PRINT: 12/11/2013 8:53 AM

GENERAL NOTES

GRADING AND EXCAVATION

1. WHEN SPECIFIC GRADING REQUIREMENTS ARE NOT SHOWN ON THE DRAWINGS, GRADE ALL AREAS WITHIN THE LIMITS OF CONSTRUCTION, OR OTHERWISE DISTURBED BY CONSTRUCTION, TO DRAIN AND TO MATCH THE EXISTING, ADJACENT GROUND.
2. ALL NECESSARY STRIPPING OF EXISTING TOPSOIL SHALL BE CONDUCTED ON THE JOBSITE.
3. NEWLY GRADED EARTH AREAS NOT TO BE PAVED, RIP-RAPPED, OR STABILIZED, SHALL BE SEEDED IN ACCORDANCE WITH THE SPECIFICATIONS, PRIOR TO SEEDING, A FOUR INCH LAYER OF TOPSOIL SHALL BE PLACED ON THESE AREAS IN ACCORDANCE WITH SAID SPECIFICATIONS.
4. ALL UNSUITABLE AND/OR SURPLUS EXCAVATED MATERIAL SHALL BE DISPOSED OF PROPERLY.
5. EXCAVATION THROUGH OR ADJACENT TO EXISTING PAVEMENT SHALL BE SAW CUT TO A NEAT LINE.
6. BACKFILLING, COMPACTING, GRADING, AND SITE-CLEANUP SHALL OCCUR DAILY AS PIPE INSTALLATION PROGRESSES.

UTILITIES

7. LOCATIONS AND DEPTHS OF UTILITIES, PUBLIC AND/OR PRIVATE, ARE APPROXIMATE ONLY, AND THE EXACT LOCATIONS SHALL BE DETERMINED IN THE FIELD. IT IS POSSIBLE THAT SOME EXISTING FACILITIES ARE NOT SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING ALL UNDERGROUND UTILITY FACILITIES LOCATED AND MARKED PRIOR TO THE BEGINNING OF CONSTRUCTION.
8. THE CONTRACTOR SHALL NOTIFY ALL AFFECTED UTILITY OWNERS PRIOR TO INTERRUPTING ANY ELECTRICAL, COMMUNICATIONS, GAS, WATER, OR SEWER SERVICES. THE CONTRACTOR SHALL ALSO NOTIFY AFFECTED UTILITY CUSTOMERS AT LEAST 24 HOURS BEFORE INTERRUPTING THE CUSTOMERS' SERVICE. WHERE INDIVIDUAL SERVICES ARE TO BE DISCONTINUED FOR MORE THAN 4 HOURS, THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR PROVIDING TEMPORARY SERVICE SATISFACTORY TO THE AFFECTED CUSTOMER. THE REPAIR OR REPLACEMENT OF UTILITY COMPONENTS SHALL CONFORM TO ALL APPLICABLE REQUIREMENTS OF THE UTILITY OWNER. NO SEPARATE PAYMENT SHALL BE MADE FOR THESE ACTIVITIES, AND COMPENSATION SHALL BE INCLUDED IN THE CONTRACT PRICES FOR OTHER ITEMS.
9. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY PROTECTIVE MEASURES TO SAFEGUARD EXISTING UTILITIES FROM DAMAGE DURING CONSTRUCTION OF THIS PROJECT. SHOULD SPECIAL EQUIPMENT BE REQUIRED TO WORK OVER AND AROUND THE UTILITIES, THE CONTRACTOR SHALL BE REQUIRED TO FURNISH SUCH EQUIPMENT. THE COST OF PROTECTING UTILITIES FROM DAMAGE AND FOR FURNISHING SPECIAL EQUIPMENT SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS OF CONSTRUCTION.
10. ANY EXISTING STORM DRAINAGE PIPING DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED AS RAPIDLY AS POSSIBLE AND THEN BE INSPECTED BY ITS OWNER.
11. IF ANY SANITARY SEWER IS DAMAGED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY OWNER. REPAIR OF THE SEWER SHALL THEN BE ACCORDING TO THE OWNER'S INSTRUCTIONS.

PROJECT SPECIFIC NOTES

12. ALL PROPOSED TEES AND ASSOCIATED APPURTENANCES FOR FUTURE FIRE HYDRANT CONNECTIONS SHALL BE FIELD LOCATED.
13. ALL PROPOSED WATER METERS, SERVICE LINES, AND ASSOCIATED APPURTENANCES SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. ALL METERS SHALL BE INSTALLED WITHIN THE ALOTTED DESIGNATED FIFTEEN FOOT WIDE AREA RESERVED FOR UTILITIES (LOCATED ON THE INDIVIDUAL LOTS ADJACENT TO THE ROAD RIGHT-OF-WAYS).
14. PROPOSED AIR RELEASE VALVES SHALL BE INSTALLED AT THE HIGH POINTS SHOWN ON THE CONTRACT DRAWINGS ALONG THE WATER LINE.
15. MECHANICAL THRUST RESTRAINTS SHALL BE INSTALLED ON ALL FITTINGS WITH A DIAMETER OF 4-INCHES OR GREATER. CONCRETE THRUST BLOCKS SHALL BE INSTALLED ON ALL FITTINGS, WITH A DIAMETER OF 2-INCHES OR LESS.
16. ALL DUCTILE IRON PIPE WITH PUSH ON JOINTS SHALL BE MECHANICALLY RESTRAINED WITH U.S. PIPE FIELD LOK 350 GASKETS (WITH U.S. PIPE TYTON PIPE OR FITTINGS), AMERICAN DUCTILE IRON PIPE FAST GRIP GASKET WITH STANDARD AMERICAN DUCTILE IRON FASTITE PIPE), OR APPROVED EQUAL.
17. ALL DUCTILE IRON PIPE WITH MECHANICAL JOINTS SHALL BE MECHANICALLY RESTRAINED WITH EBAA IRON MEGA-LUG SERIES 1100, UNI-FLANGE SERIES 1400, OR APPROVED EQUAL.
18. ALL STREAM CROSSINGS SHALL BE CONDUCTED IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE APPROVED AQUATIC RESOURCES ALTERATION PLAN (ARAP).

KNOWN UTILITY OWNERS

SOUTH PITTSBURG WATER WORKS
725 WILLOW AVE.
SOUTH PITTSBURG, TN. 37380
PHONE: (423) 837-7184

MARION NATURAL GAS SYSTEM
138 S. CEDAR AVE.
SOUTH PITTSBURG, TN. 37380
PHONE: (423) 837-7184

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

LEGEND

—OHP—	EXISTING OVERHEAD POWER LINES
—R.O.W.—	EXISTING RIGHT OF WAY LINE
	EXISTING PROPERTY LINE
	EXISTING BLUE LINE STREAM
	EXISTING POWER POLE
	PROPOSED BLOW OFF ASSEMBLY
	PROPOSED AIR RELEASE VALVE
	PROPOSED WATER METER
	PROPOSED GATE VALVE
	PROPOSED WATER LINE
—UGE—	PROPOSED UNDERGROUND ELECTRIC LINES

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NO.	REVISIONS DESCRIPTIONS	DATE	BY	APP'D

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DRAWN MWD
CHECKED JDH
APPROVED DDT

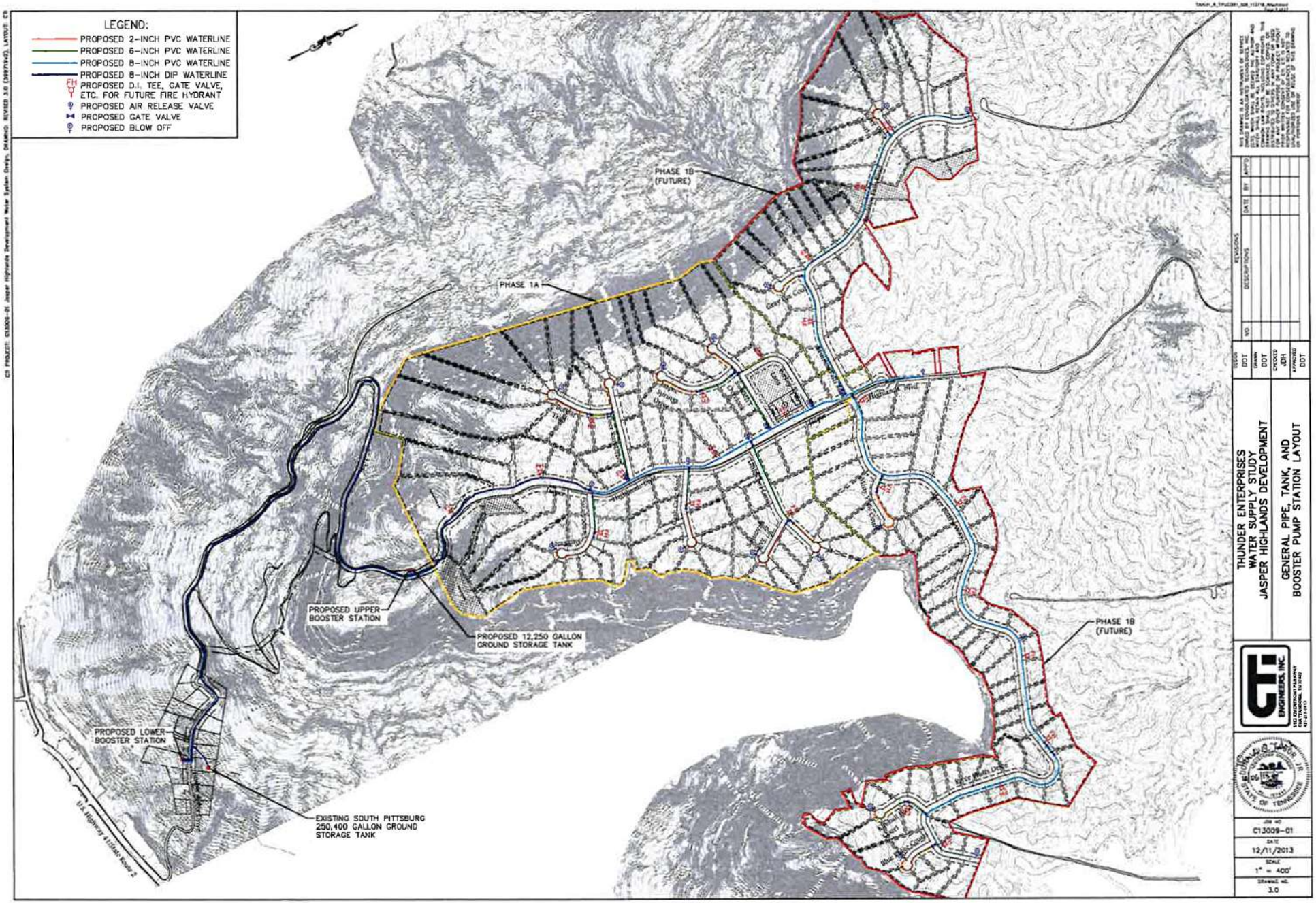
THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

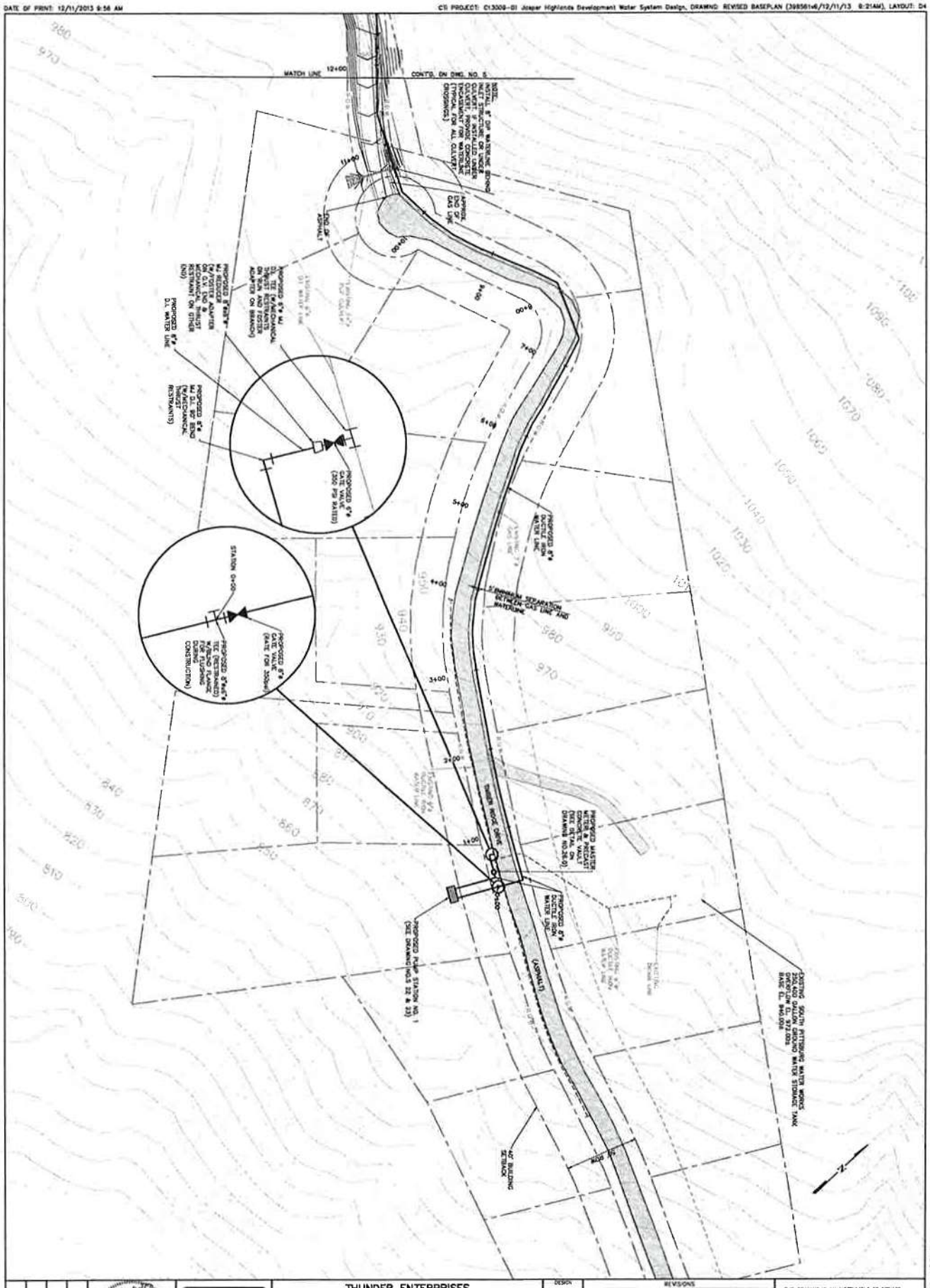
GENERAL NOTES AND LEGEND

CTI ENGINEERS, INC.
3123 BREAKSTONE RAILWAY
CHATTANOOGA, TN 37421
423.877.4555

EDWARD D. TABOR
STATE OF TENNESSEE

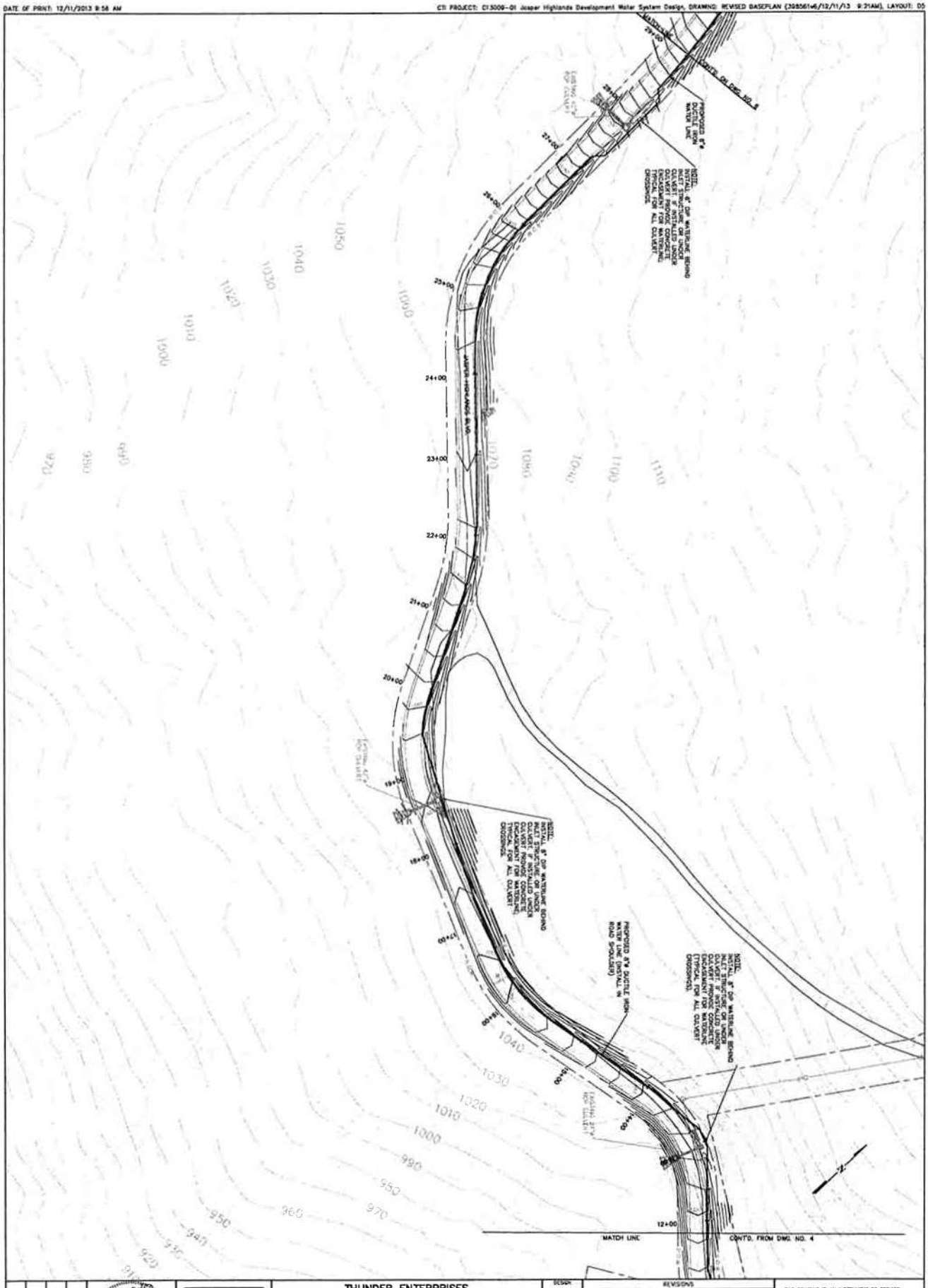
JOB NO. C13009-01
ISSUE DATE 12/06/13
SCALE AS NOTED
DRAWING NO. 2.0


LEGEND:
PROPOSED 2-INCH PVC WATERLINE
PROPOSED 6-INCH PVC WATERLINE
PROPOSED 8-INCH PVC WATERLINE
PROPOSED 8-INCH DIP WATERLINE
PROPOSED D.I. TEE, GATE VALVE, ETC. FOR FUTURE FIRE HYDRANT
PROPOSED AIR RELEASE VALVE
PROPOSED GATE VALVE
PROPOSED BLOW OFF
PHASE 1B (FUTURE)
PHASE 1A
PROPOSED UPPER BOOSTER STATION
PROPOSED 12,250 GALLON GROUND STORAGE TANK
PROPOSED LOWER BOOSTER STATION
EXISTING SOUTH PITTSBURG 250,400 GALLON GROUND STORAGE TANK
U.S. Highway 41/Dixie Route 2
PHASE 1B (FUTURE)
THUNDER ENTERPRISES
WATER SUPPLY STUDY
JASPER HIGHLANDS DEVELOPMENT
GENERAL PIPE, TANK, AND BOOSTER PUMP STATION LAYOUT
ISSUED DOT
DRAWN DOT
CHECKED JDH
APPROVED DOT
NO DESCRIPTIONS DATE BY APP'D
REVISIONS
ENGINEERS, INC
JOB NO C13009-01
DATE 12/11/2013
SCALE 1" = 400'
DRAWING NO. 3.0



4.0	1"=50'	12/06/13	C13009-01	ENGINEERS, INC. 1122 RIDGEFRONT PARKWAY KNOXVILLE, TN 37922 (423)691-9753	THUNDER ENTERPRISES JASPER HIGHLANDS DEVELOPMENT WATER DISTRIBUTION SYSTEM WATER LINE PLAN (SHEET 1 OF 19)	DESIGN DDT DRAWN MWD CHECKED JDH APPROVED DDT	REVISIONS NO. DESCRIPTIONS DATE BY APP'D				

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DRAWING NO.	5.0
DATE	12/06/13
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CHATTANOOGA, TN 37402
423-499-2913

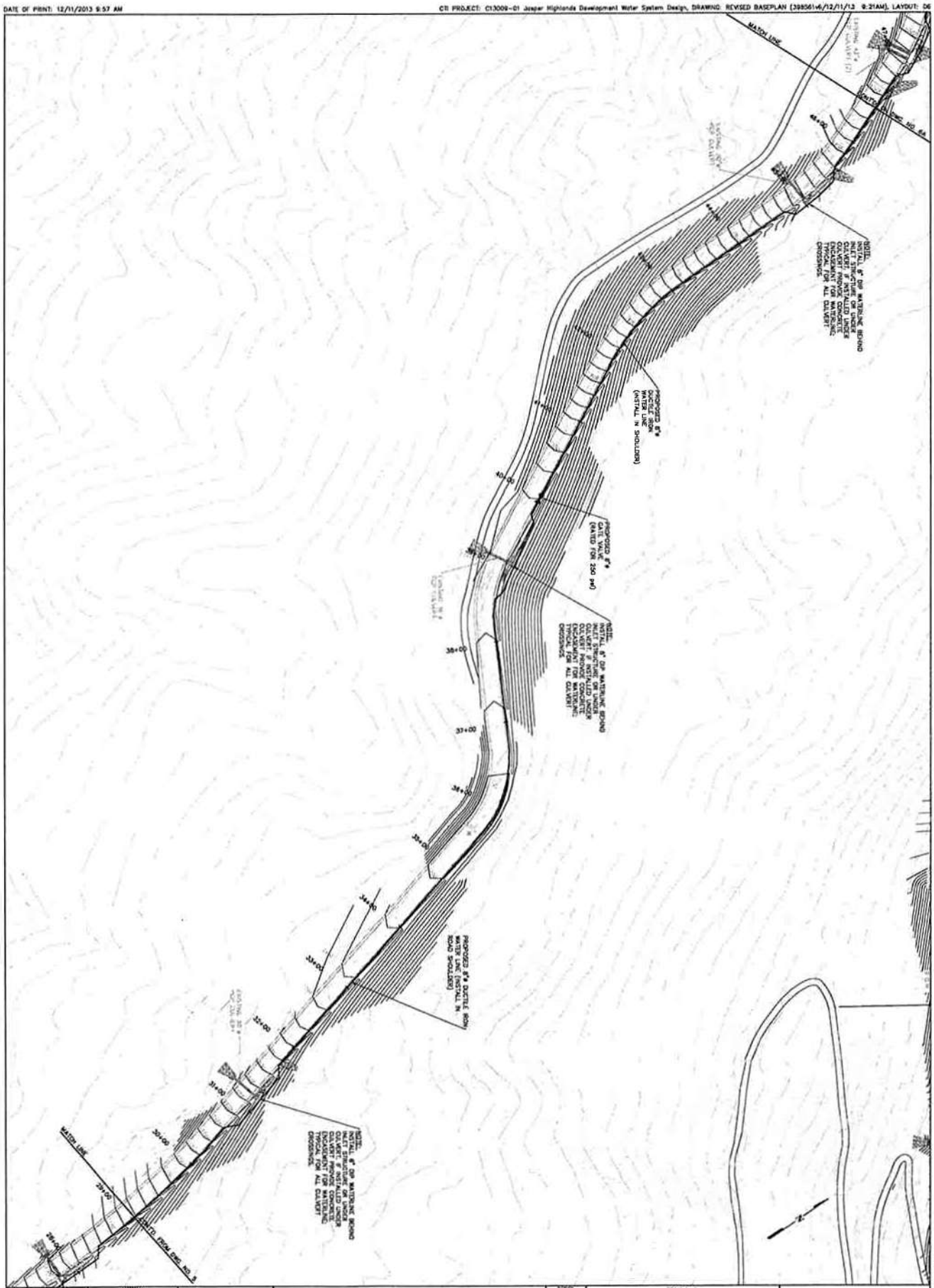
THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

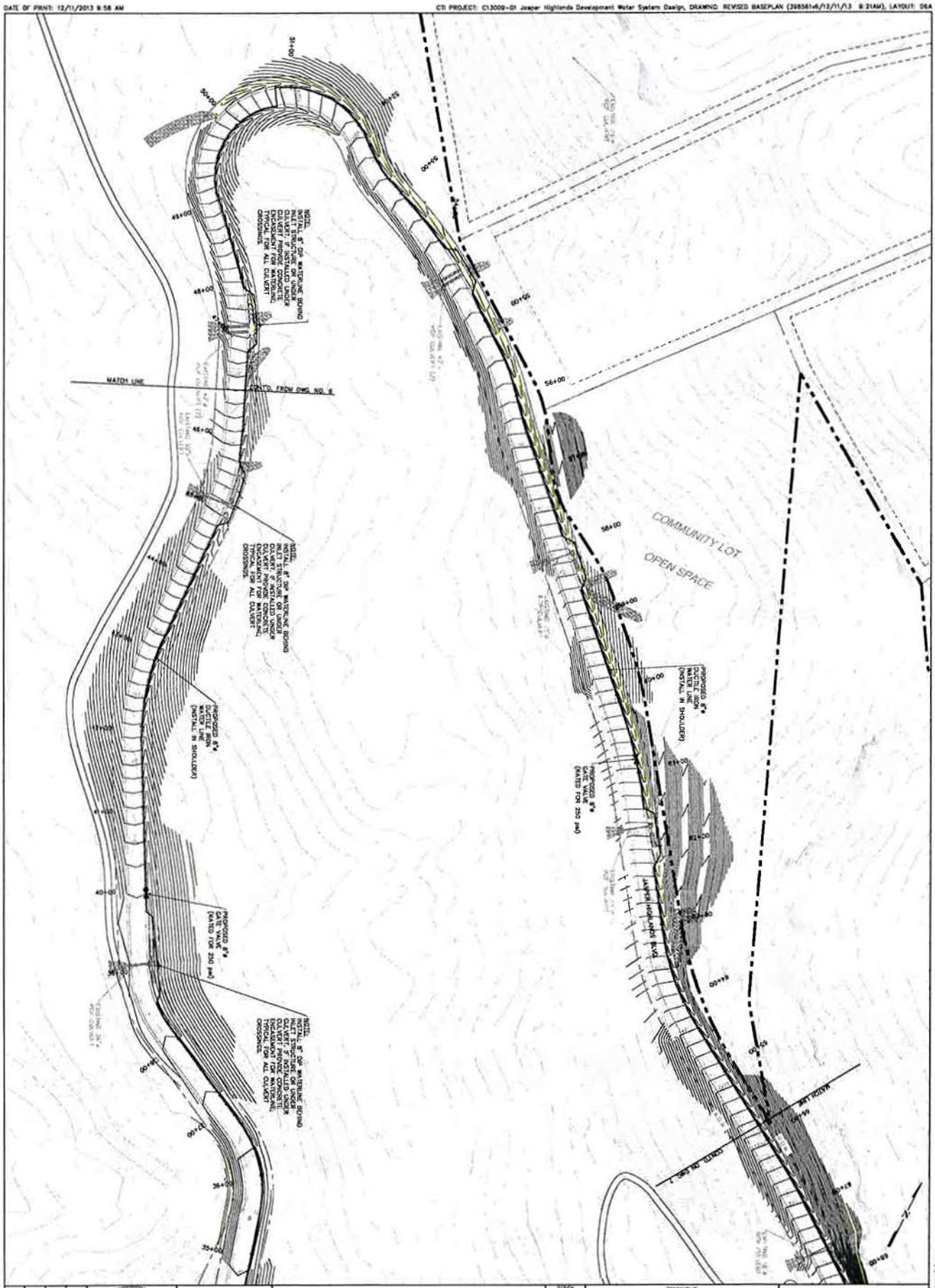
WATER LINE PLAN (SHEET 2 OF 19)

DESIGN	DDT
DRAWN	MWD
CHECKED	JDH
APPROVED	DDT

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MATCH LINE
MATCH LINE
EXISTING 12" DIP WATERLINE
EXISTING 12" DIP WATERLINE
EXISTING 12" DIP WATERL



PROJECT NO.	C13009-01
ISSUE DATE	12/06/13
SCALE	1"=50'
DRAWING NO.	6A.0

ENGINEERS, INC.
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423.267.7913

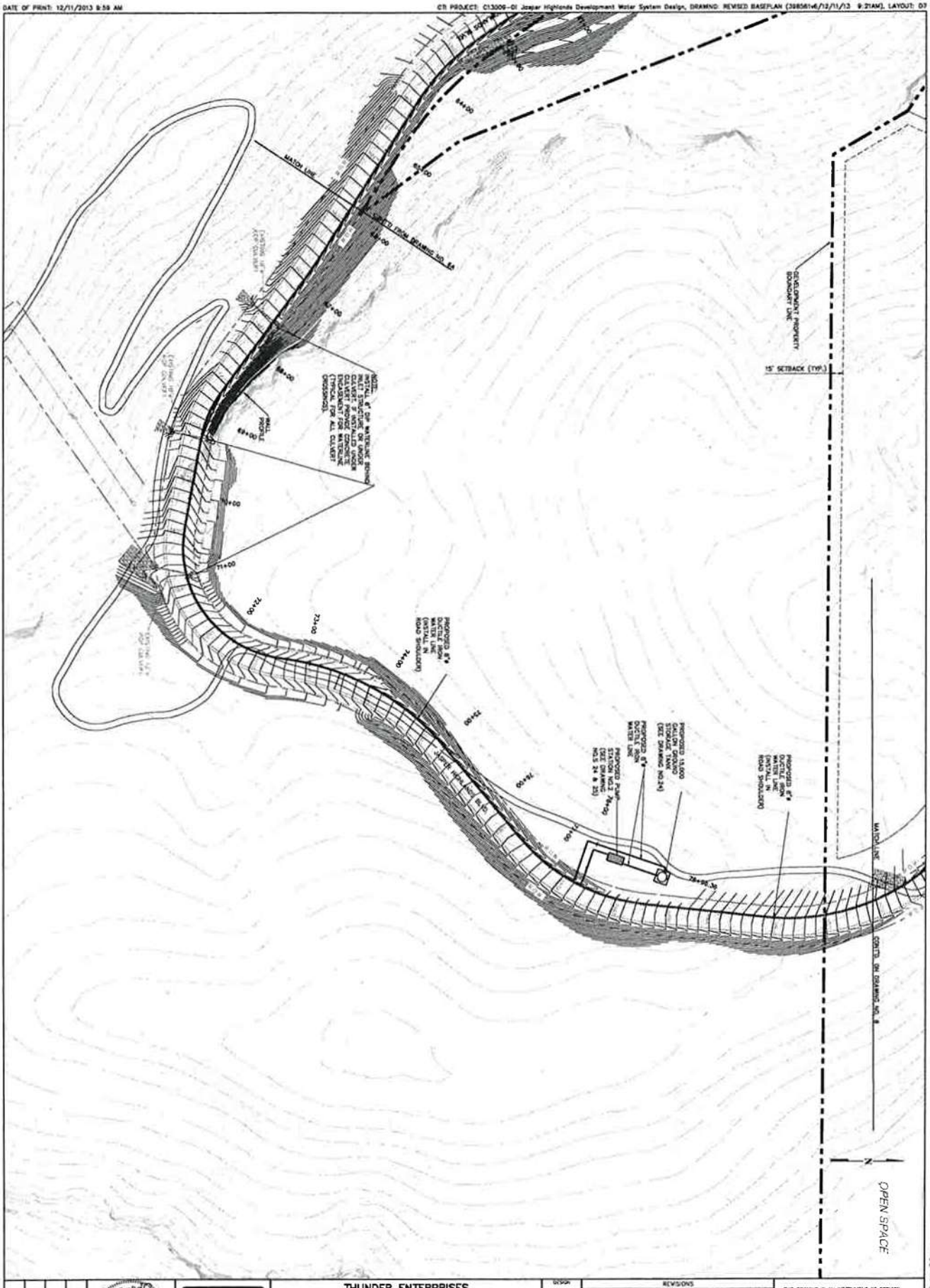
THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 4 OF 19)

DESIGN	DDT
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CHECKED	JDH
APPROVED	DDT

REVISIONS				
NO.	DESCRIPTIONS	DATE	BY	APP'D

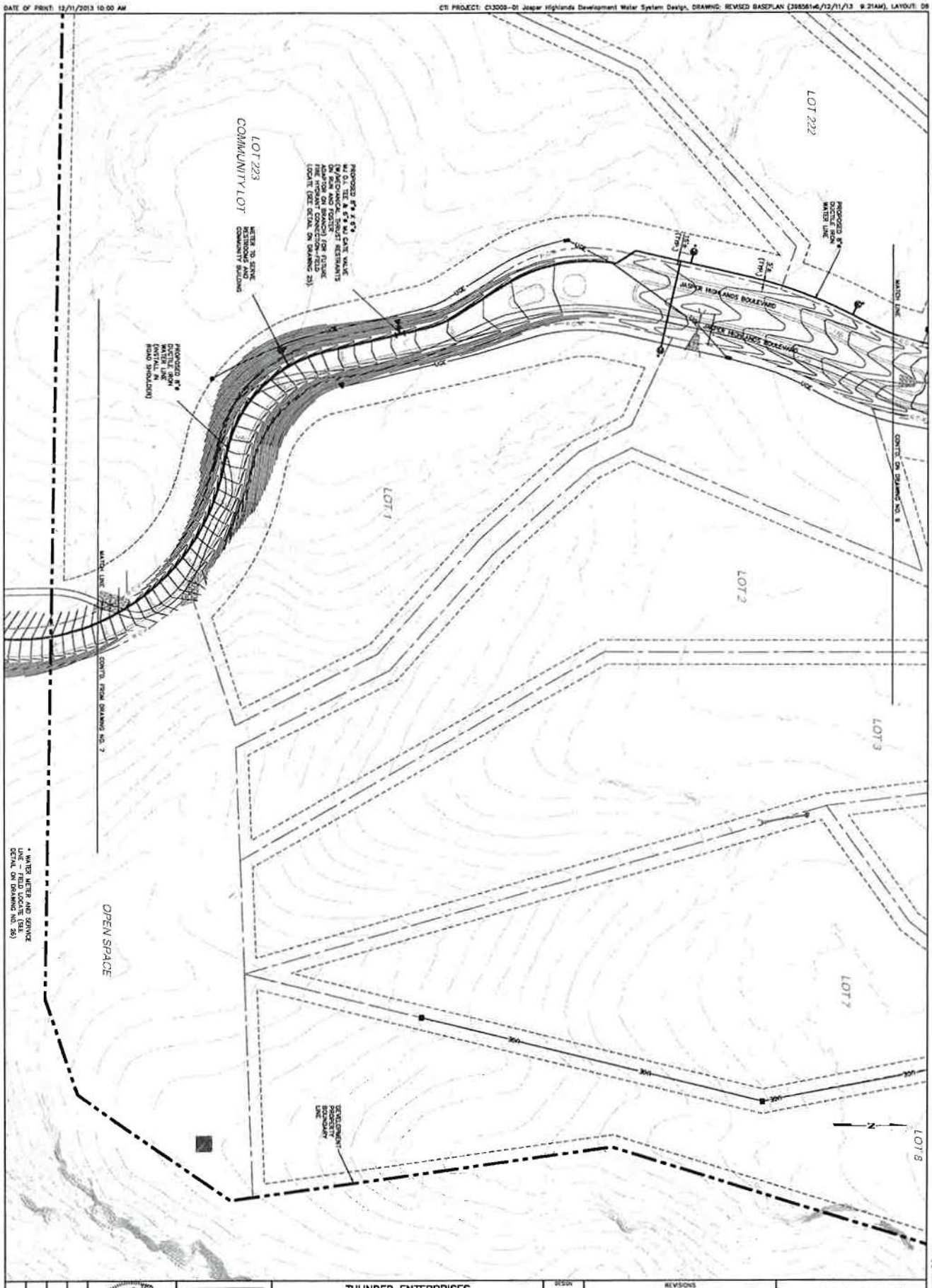
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SHEET NO. 7.0	SCALE: 1"=50'	DATE: 12/06/13	PROJECT NO. C13009-01		THUNDER ENTERPRISES JASPER HIGHLANDS DEVELOPMENT WATER DISTRIBUTION SYSTEM WATER LINE PLAN (SHEET 5 OF 19)	DESIGN: DDT DRAWN: MWD CHECKED: JDH APPROVED: DDT	REVISIONS NO. / DESCRIPTIONS / DATE / BY / APP'D				

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(423)267-7613

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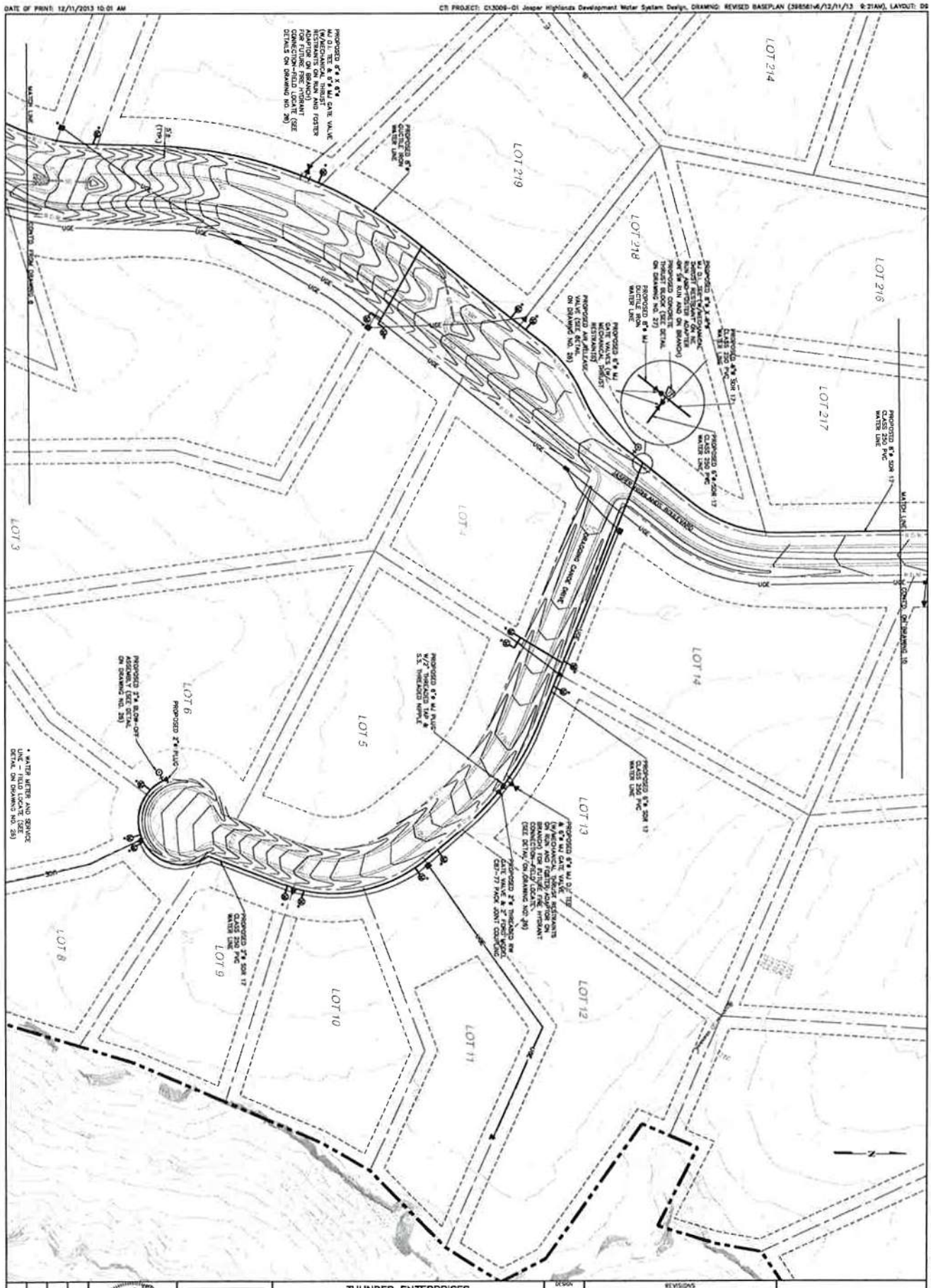


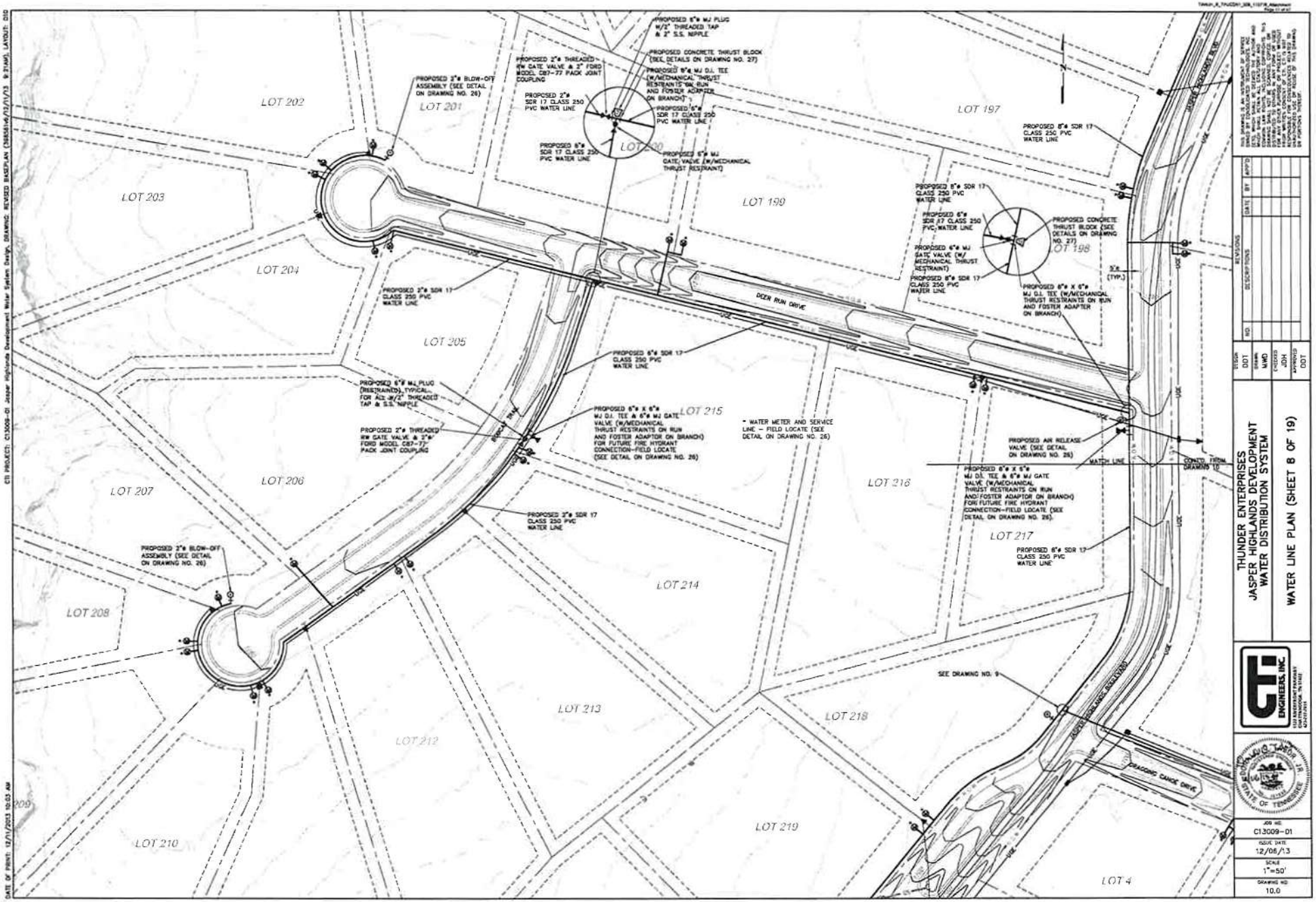
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ISSUE DATE	12/06/13	WATER LINE PLAN (SHEET 6 OF 19)	
SCALE	1"=50'		
DRAWING NO.	8.0		

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LOT 214
LOT 219
LOT 218
LOT 216
LOT 217
LOT 3
LOT 4
LOT 14
LOT 6
LOT 5
LOT 13
LOT 8
LOT 9
LOT 10
LOT 11
LOT 12
PROPOSED 6"x 6"x 6" MJ D.I. TEE & 6" MJ GATE VALVE (W/MECHANICAL THRUST RESTRAINTS) AND FOSTER ADAPTOR ON BRANCH FOR FUTURE FIRE HYDRANT CONNECTION-FIELD LOCATE (SEE DETAILS ON DRAWING NO. 26)
PROPOSED 6" DUCTILE IRON WATER LINE
PROPOSED 6"x 6"x 6" MJ D.I. SERVICE SADDLE (W/MECHANICAL THRUST RESTRAINTS) AND FOSTER ADAPTOR ON RUN AND ON BRANCH)
PROPOSED CONCRETE THRUST BLOCK (SEE DETAIL ON DRAWING NO. 27)
PROPOSED 6" MJ GATE VALVES (W/ MECHANICAL THRUST RESTRAINTS) (SEE DETAIL ON DRAWING NO. 26)
PROPOSED AIR RELEASE VALVE (SEE DETAIL ON DRAWING NO. 28)
PROPOSED 6"x 6"x 6" MJ D.I. SERVICE SADDLE (W/MECHANICAL THRUST RESTRAINTS) AND FOSTER ADAPTOR ON RUN AND ON BRANCH)
PROPOSED 6"x 6"x 6" MJ D.I. SERVICE SADDLE (W/MECHANICAL THRUST RESTRAINTS) AND FOSTER ADAPTOR ON RUN AND ON BRANCH)
PROPOSED 6"x6" MJ D.I. REDUCER
PROPOSED 6"x6" MJ D.I. REDUCER
PROPOSED 6"x6" MJ D.I. REDUCER



C3 PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING: REVISED BASEPLAN (3858sf+6/12/13) 9:31AM, LAYOUT: D10

DATE OF PRINT: 12/11/2013 10:03 AM

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CHECKED JDH
APPROVED DDT

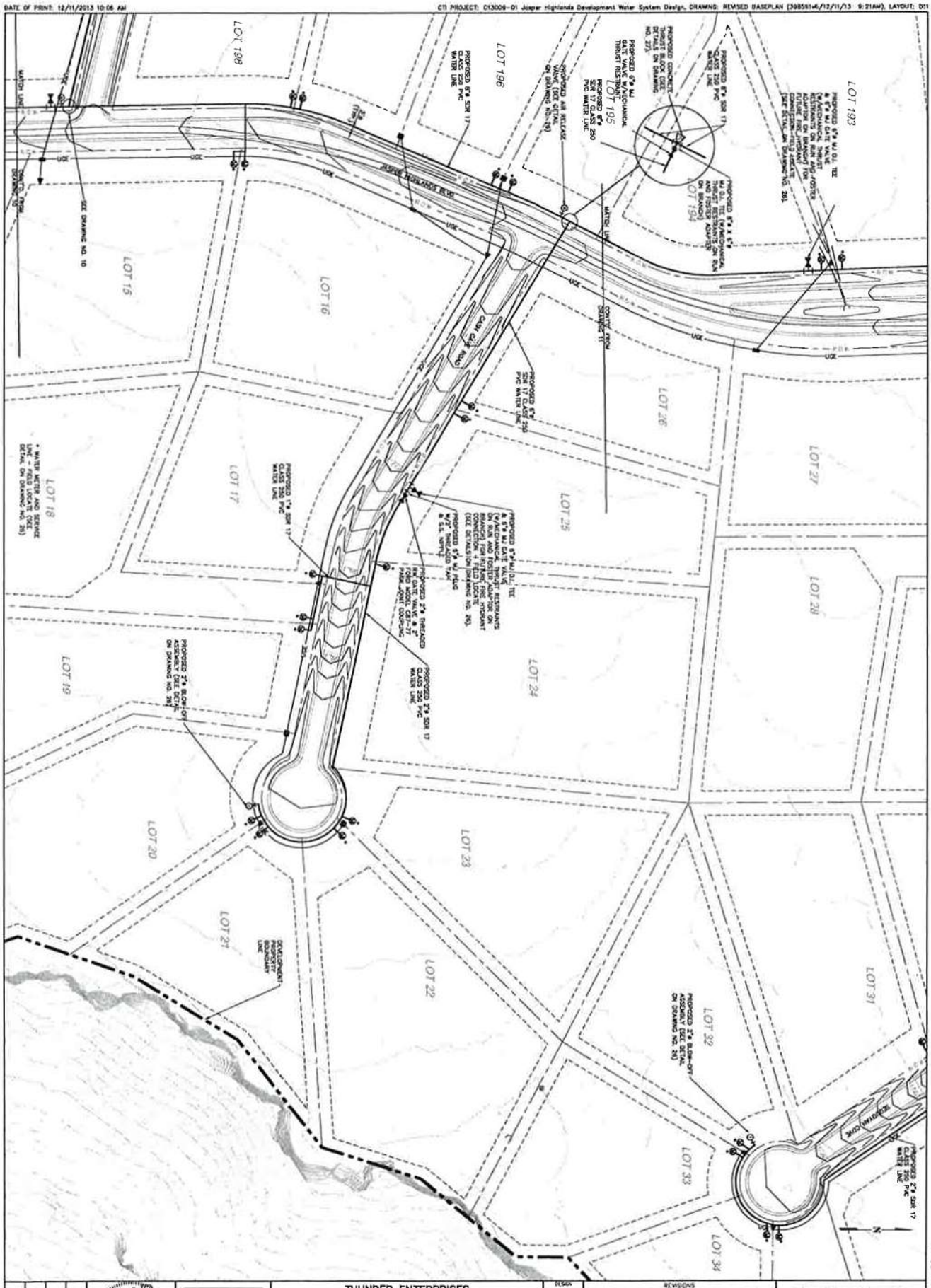
THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 8 OF 19)

CTI ENGINEERS, INC.
550 MISSIONARY PARKWAY
CHATTANOOGA, TN 37421
(423) 892-0662

STATE OF TENNESSEE

JOB NO. C13009-01
ISSUE DATE 12/06/13
SCALE 1"=50'
DRAWING NO. 10.0



DATE OF PRINT: 12/11/2013 10:06 AM

CTI PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING: REVISED BASEPLAN (398581v6/12/11/13 9:21AM), LAYOUT: D11

THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 9 OF 19)

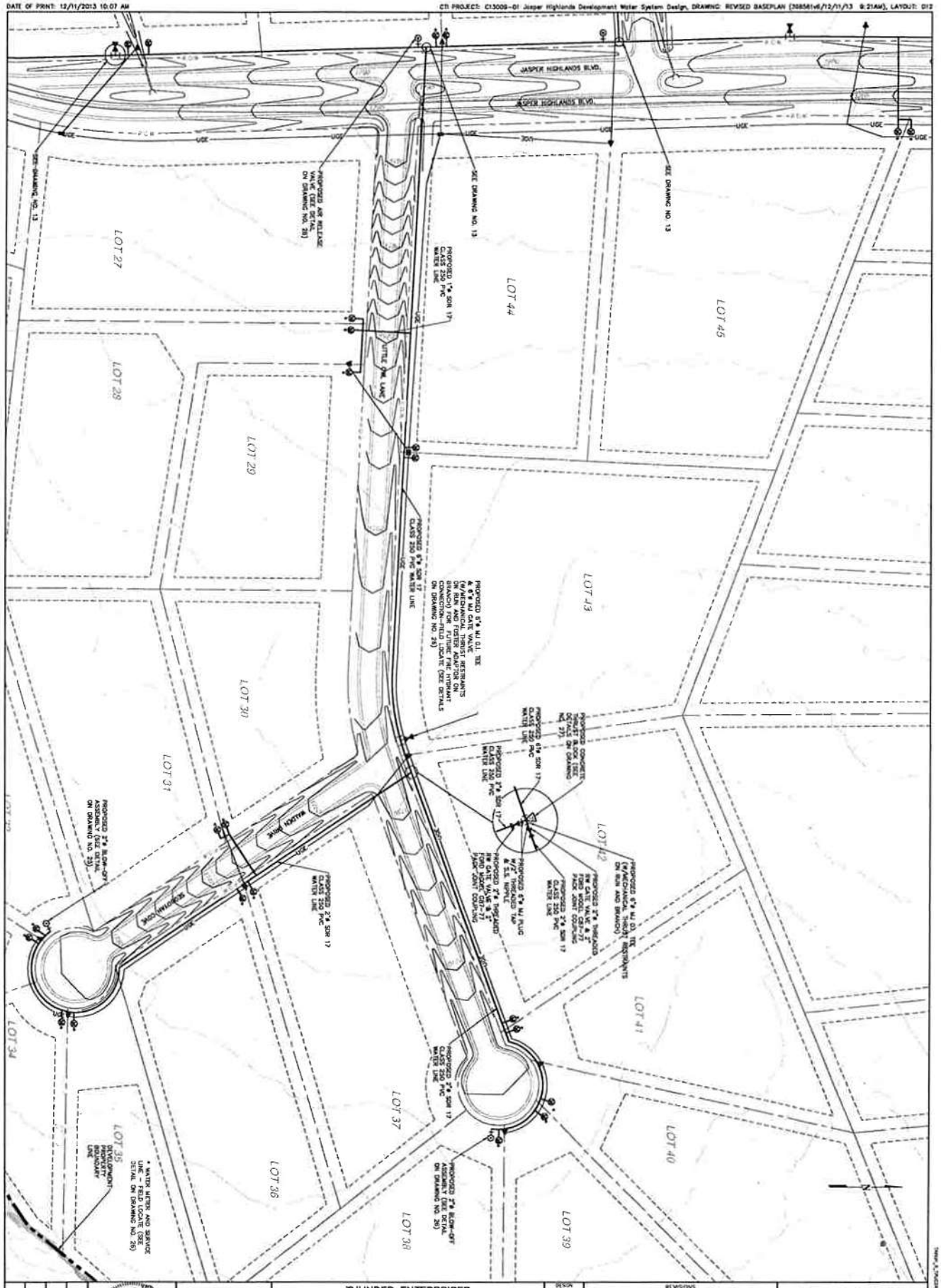
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DRAWN	MWD
CHECKED	JDH
APPROVED	DOT

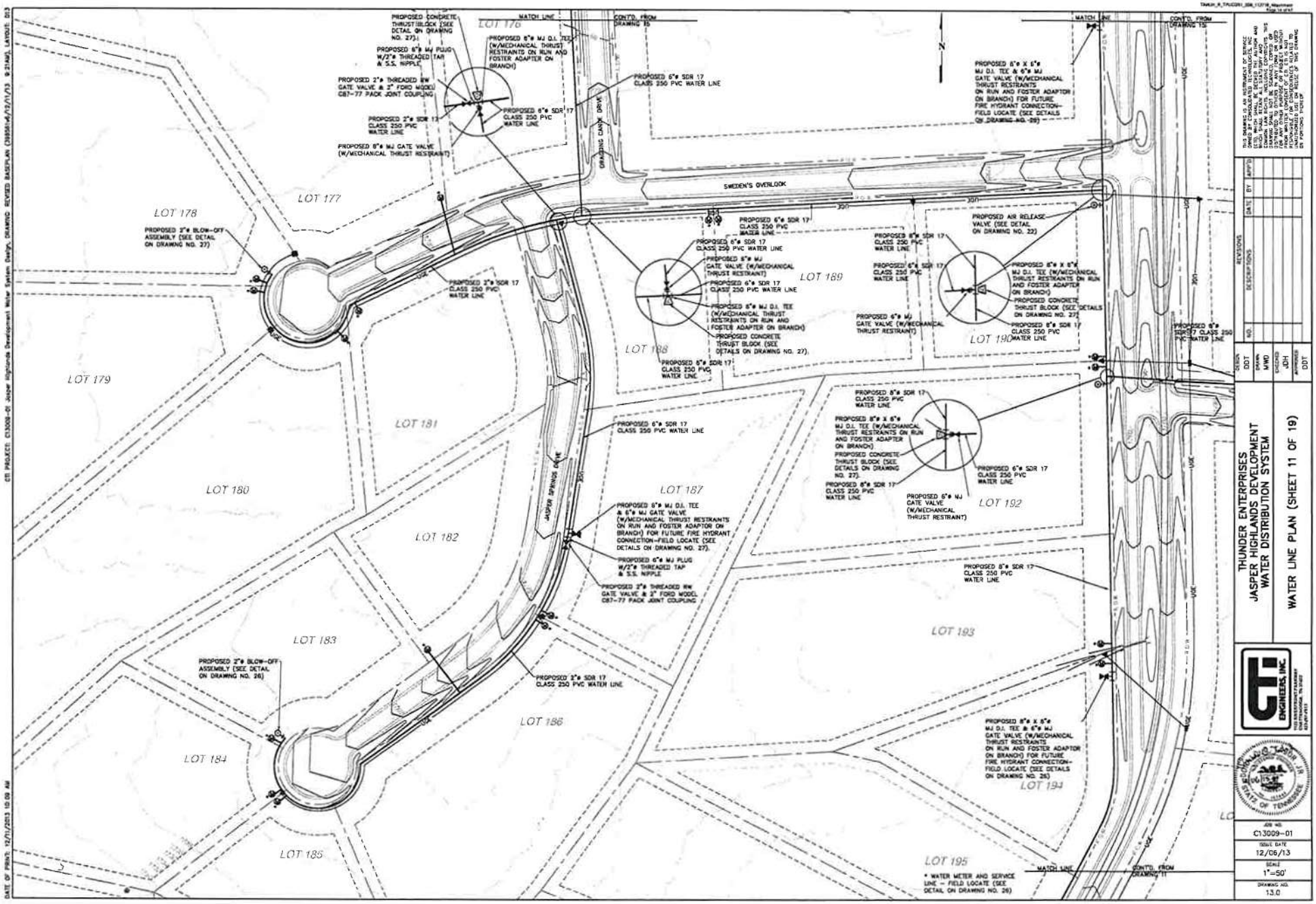
REVISIONS				
NO.	DESCRIPTIONS	DATE	BY	APP'D

JOB NO.	C13009-01
SCALE, 24"X36"	1"=50'
SCALE, 11"X17"	1"=100'
DATE	12/06/13
DRAWING NO.	11.0

CTI ENGINEERS, INC.
1111 ASHLEY POINT PARKWAY
CHATTANOOGA, TN 37421
423.267.7555

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DATE OF PRINT: 12/11/2013 10:07 AM
CTI PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING: REVISED BASEPLAN (3685#1v6/12/11/13 9:21AM), LAYOUT: D12
JASPER HIGHLANDS BLVD.
JASPER HIGHLANDS BLVD.
LOT 27
LOT 28
LOT 29
LOT 30
LOT 31
LOT 34
LOT 35
LOT 36
LOT 37
LOT 38
LOT 39
LOT 40
LOT 41
LOT 42
LOT 43
LOT 44
LOT 45
SEE DRAWING NO. 13
SEE DRAWING NO. 13
SEE DRAWING NO. 13
PROPOSED AIR RELEASE ASSEMBLY (SEE DETAIL ON DRAWING NO. 26)
PROPOSED 1"ø SDR 17 CLASS 250 PVC WATER LINE
LITTLE JOE LANE
PROPOSED 6"ø SDR 17 CLASS 250 PVC WATER LINE
PROPOSED 6"ø MJ D.I. TEE & 6"ø MJ GATE VALVE (FUTURE HYDRANT ASSEMBLY ON RUN AND FOSTER ADAPTOR ON BRANCH) FOR FUTURE FIRE HYDRANT (LOCATION TO BE FIELD LOCATE (SEE DETAILS ON DRAWING NO. 25)
PROPOSED 6"ø SDR 17 CLASS 250 PVC WATER LINE
PROPOSED CONCRETE THRUST BLOCK (SEE DETAILS ON DRAWING NO. 27)
PROPOSED 6"ø SDR 17 CLASS 250 PVC WATER LINE
PROPOSED 6"ø MJ CO. TEE W/MECHANICAL THRUST RESTRAINTS (M/MECHANICAL THRUST RESTRAINTS ON RUN AND BRANCH)
PROPOSED 2"ø THREADED BW GATE VALVE & 2" GALVANIZED PIPE JOINT COUPLING
PROPOSED 2"ø SDR 17 CLASS 250 PVC WATER LINE
PROPOSED 6"ø MJ PLUG W/2" THREADED TAP & S.S. NIPPLE
PROPOSED 2"ø THREADED BW GATE VALVE & 2" GALVANIZED PIPE JOINT COUPLING
PROPOSED 2"ø SDR 17 CLASS 250 PVC WATER LINE
PROPOSED 2"ø BLOW-OFF ASSEMBLY (SEE DETAIL ON DRAWING NO. 25)
PROPOSED 2"ø SDR 17 CLASS 250 PVC WATER LINE
PROPOSED 6"ø SDR 17 CLASS 250 PVC WATER LINE
PROPOSED 2"ø BLOW-OFF ASSEMBLY (SEE DETAIL ON DRAWING NO. 26)
* WATER METER AND SERVICE LINE - FIELD LOCATE (SEE DETAIL ON DRAWING NO. 26)
DEVELOPMENT PROPERTY BOUNDARY LINE
SOUTH DRIVE
NORTH DRIVE
CUL-DE-SAC
CUL-DE-SAC
UGE
UGE
UGE



CT PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING REVISED BASEPLAN (3985616ft/12/1/13 9:21AM), LAYOUT: 013

DATE OF PRINT: 12/1/2013 10:09 AM

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DRAWN	KWD
CHECKED	JDH
APPROVED	DDT

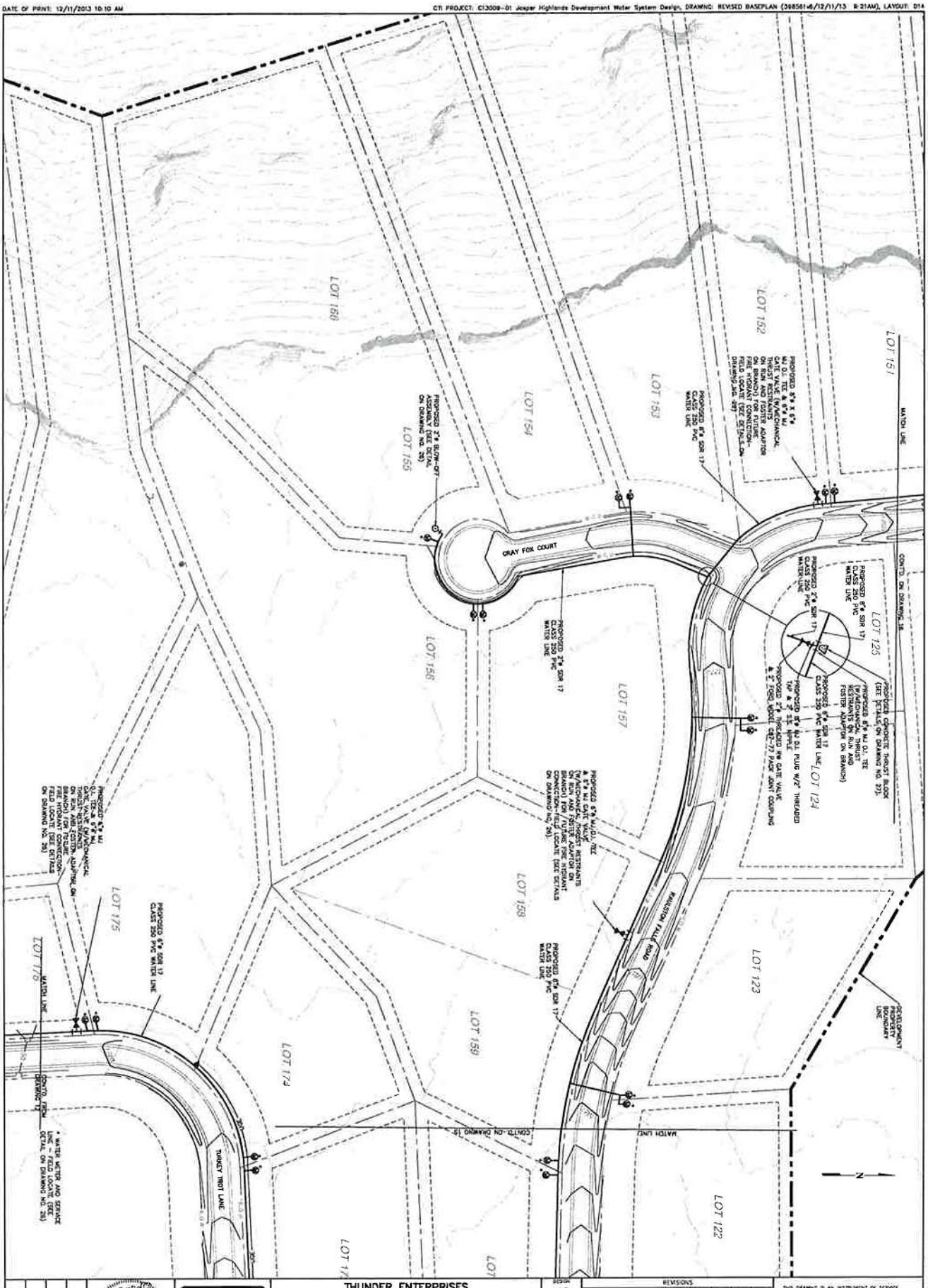
THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 11 OF 19)

CT ENGINEERS, INC.
THIS INSTRUMENT PREPARED BY CT ENGINEERS, INC. 7614 E. KINGSTON PIKE, SUITE 201 KNOXVILLE, TN 37919

REGISTERED ENGINEER
STATE OF TENNESSEE

JOB NO.	C13009-01
ISSUE DATE	12/06/13
SCALE	1"=50'
DRAWING NO.	13.0



JOB NO.	C13009-01
ISSUE DATE	12/06/13
SCALE	1"=50'
DRAWING NO.	14.0

CTI ENGINEERS, INC.
1128 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7512

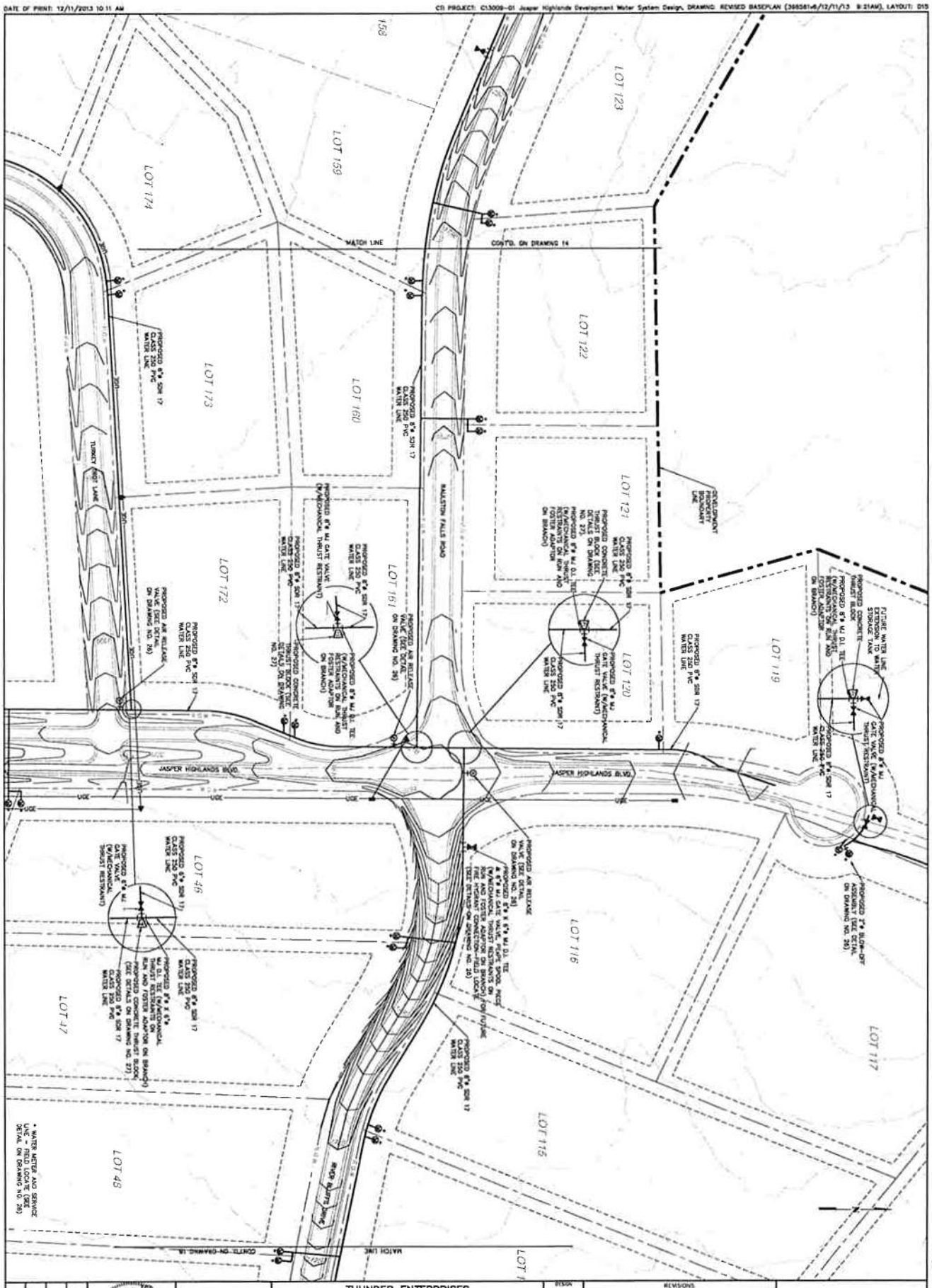
THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 12 OF 19)

DESIGN	DDT
DRAWN	MWD
CHECKED	JDH
APPROVED	DDT

REVISIONS				
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DESIGN	DDT
DRAWN	MWD
CHECKED	JDH
APPROVED	DDT

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JOB NO.	C13009-01
ISSUE DATE	12/06/13
SCALE	1"=50'
DRAWING NO.	15.0

CTI ENGINEERS, INC.
7123 RIVERPOINT PARKWAY
CHATTANOOGA, TN 37405
423-265-0103

THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 13 OF 19)

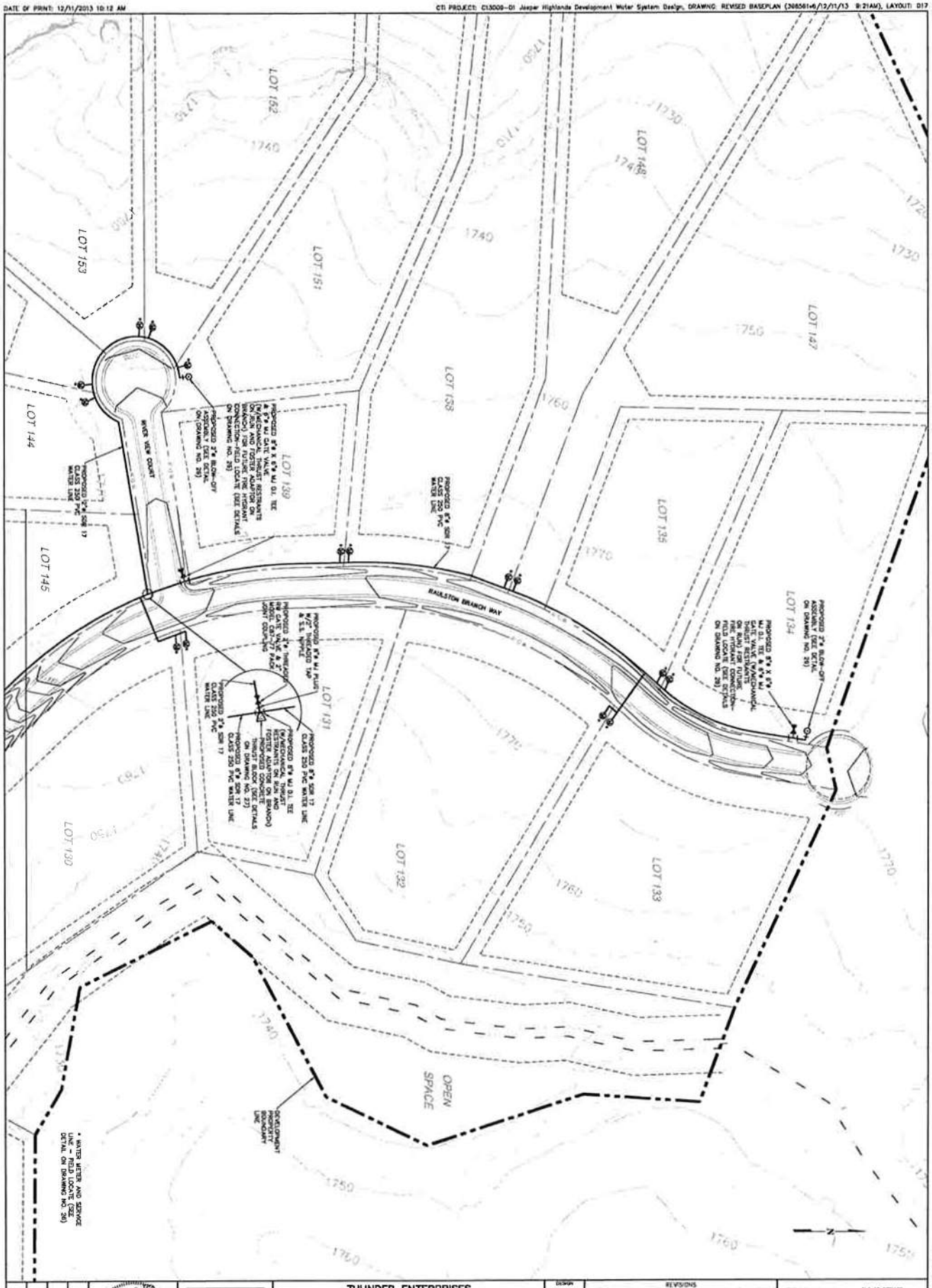


THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT

DESIGN: DDT

REVISIONS				
NO.	DESCRIPTIONS	DATE	BY	APP'D

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* WATER METER AND SERVICE LINE - FIELD LOCATE (SEE DETAIL ON DRAWING NO. 26)

JOB NO.	C13009-01		
SCALE	1"=50'		
ISSUE DATE	12/06/13		
DRAWING NO.	17.0		

ENGINEERS, INC.
1133 RIVERSPRING PARKWAY
KNOXVILLE, TN 37922
423-267-7519

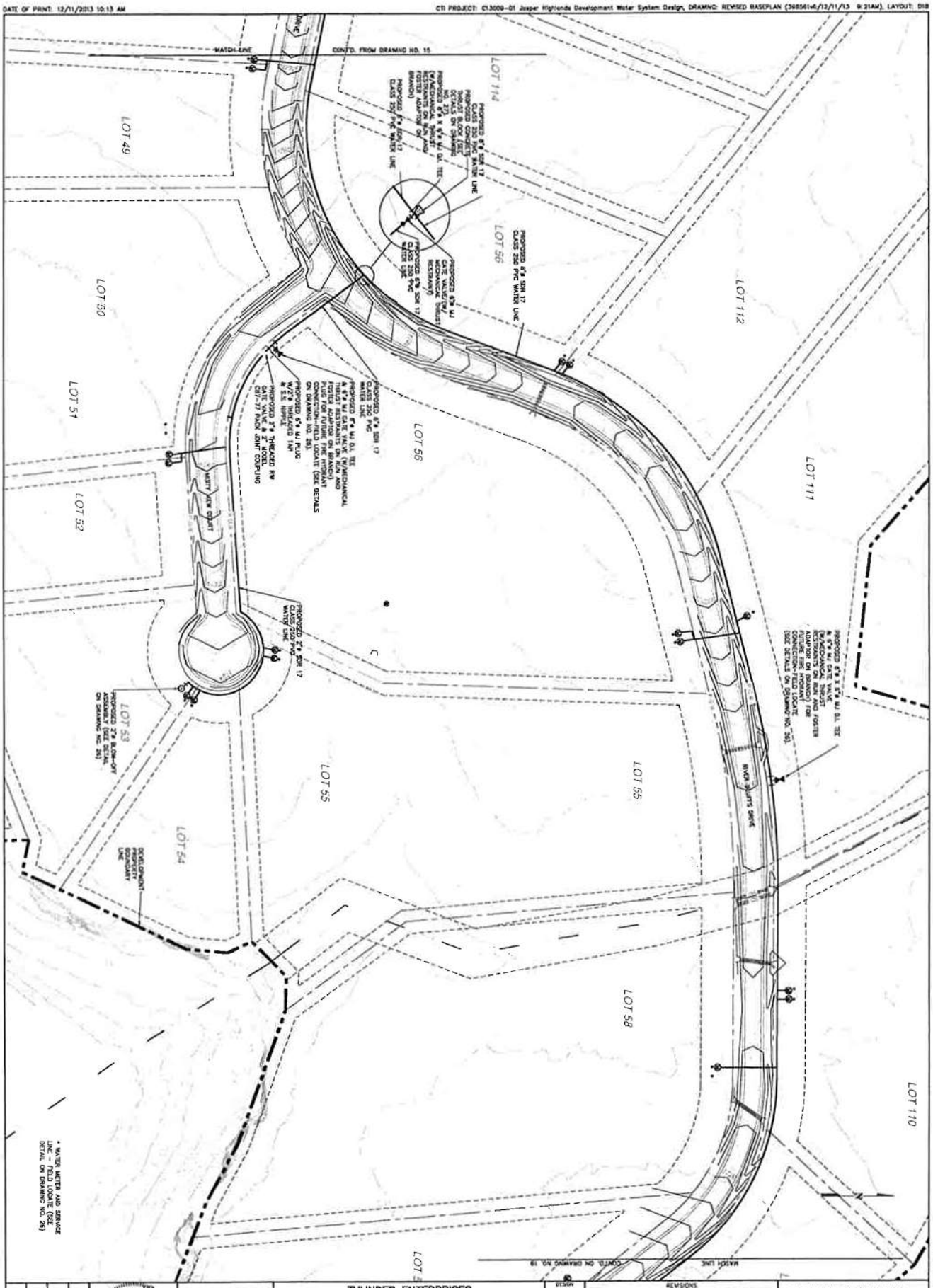
THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 15 OF 19)

DESIGN	DDT
DRAWN	MWD
CHECKED	JDH
APPROVED	DDT

REVISIONS				
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THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 16 OF 19)

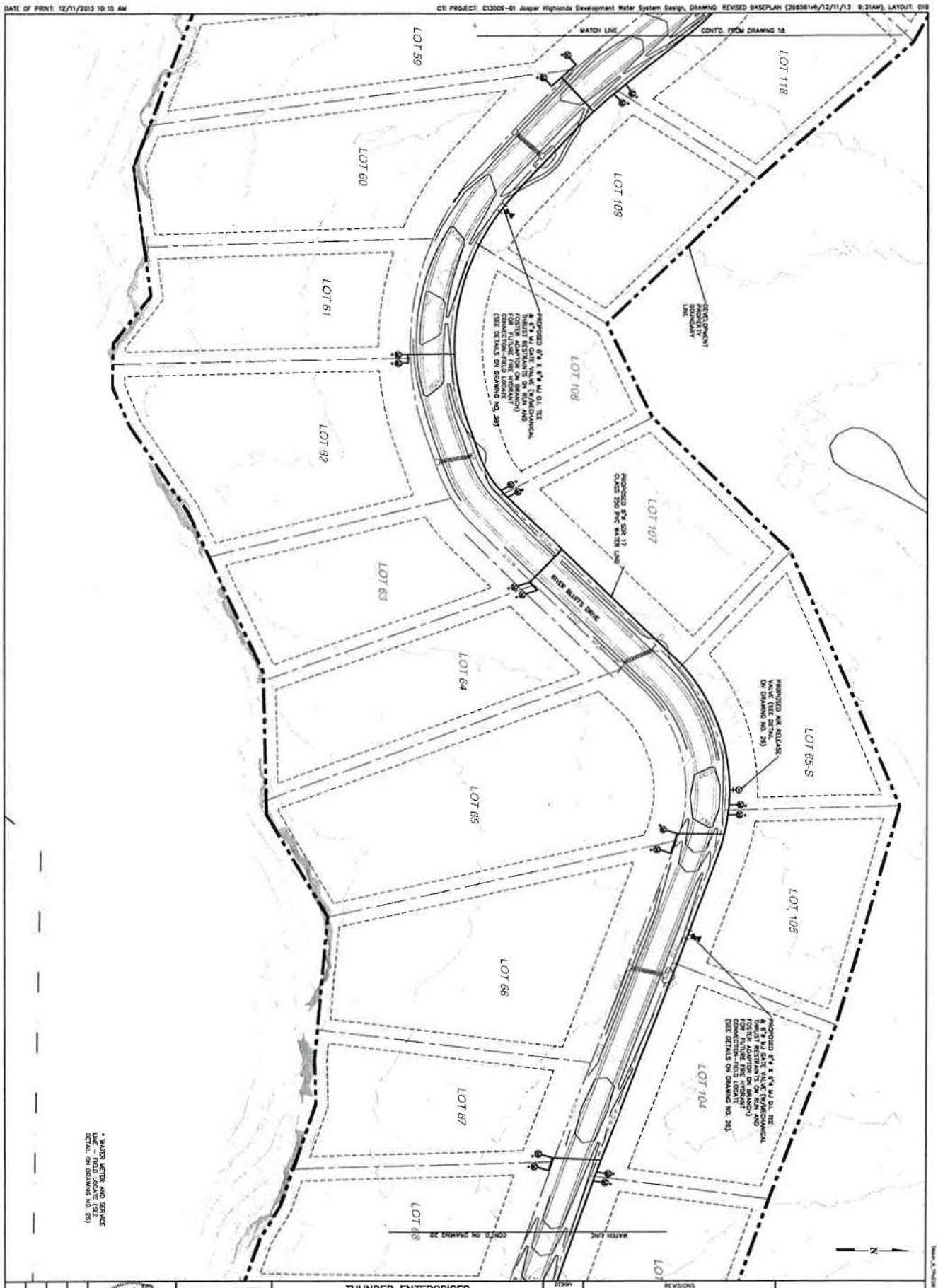
CTI ENGINEERS, INC.
9100 KINGSTON PARKWAY
CHATTANOOGA, TN 37422
423-553-2533

DESIGN	DDT
DRAWN	MWD
CHECKED	JDH
APPROVED	DDT

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NO.	DESCRIPTIONS	DATE	BY	APP'D

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JOB NO.	C13009-01
ISSUE DATE	12/06/13
SCALE	1"=50'
DRAWING NO.	16 OF 19



DATE OF PRINT: 12/11/2013 10:15 AM

CTI PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING: REVISED BASEPLAN (3985614v8/12/11/13 8:21AM), LAYOUT: D19

DRAWING No.	19.0
SCALE	1" = 50'
DATE	12/06/13
JOB No.	C13009-01

ENGINEERS, INC.
1123 ANDERSON PARKWAY
CHATTANOOGA, TN 37405
423/267-1910

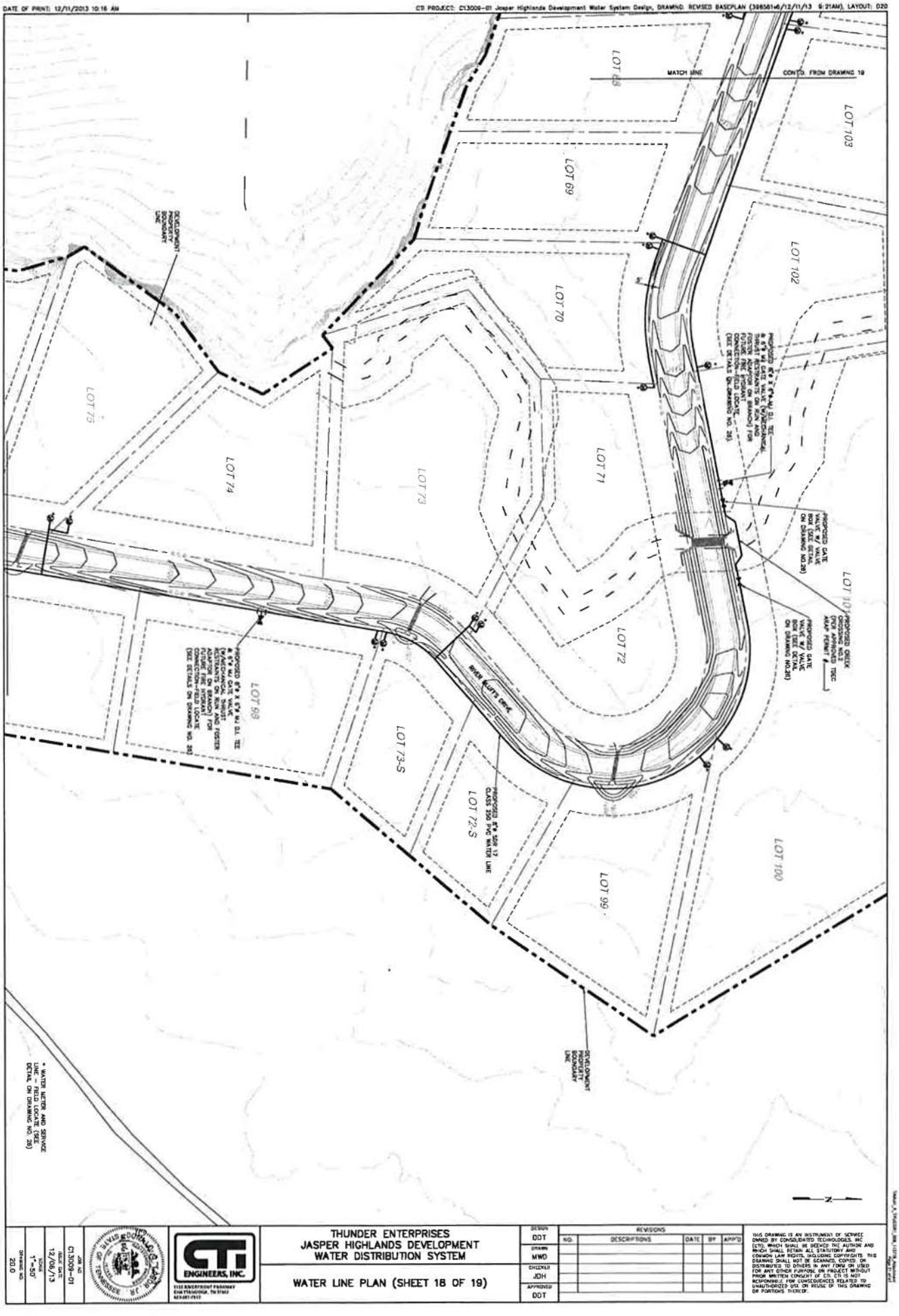
THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 17 OF 19)

DESIGN	DDT
DRAWN	MWD
CHECKED	JDH
APPROVED	DDT

REVISIONS				
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THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 18 OF 19)

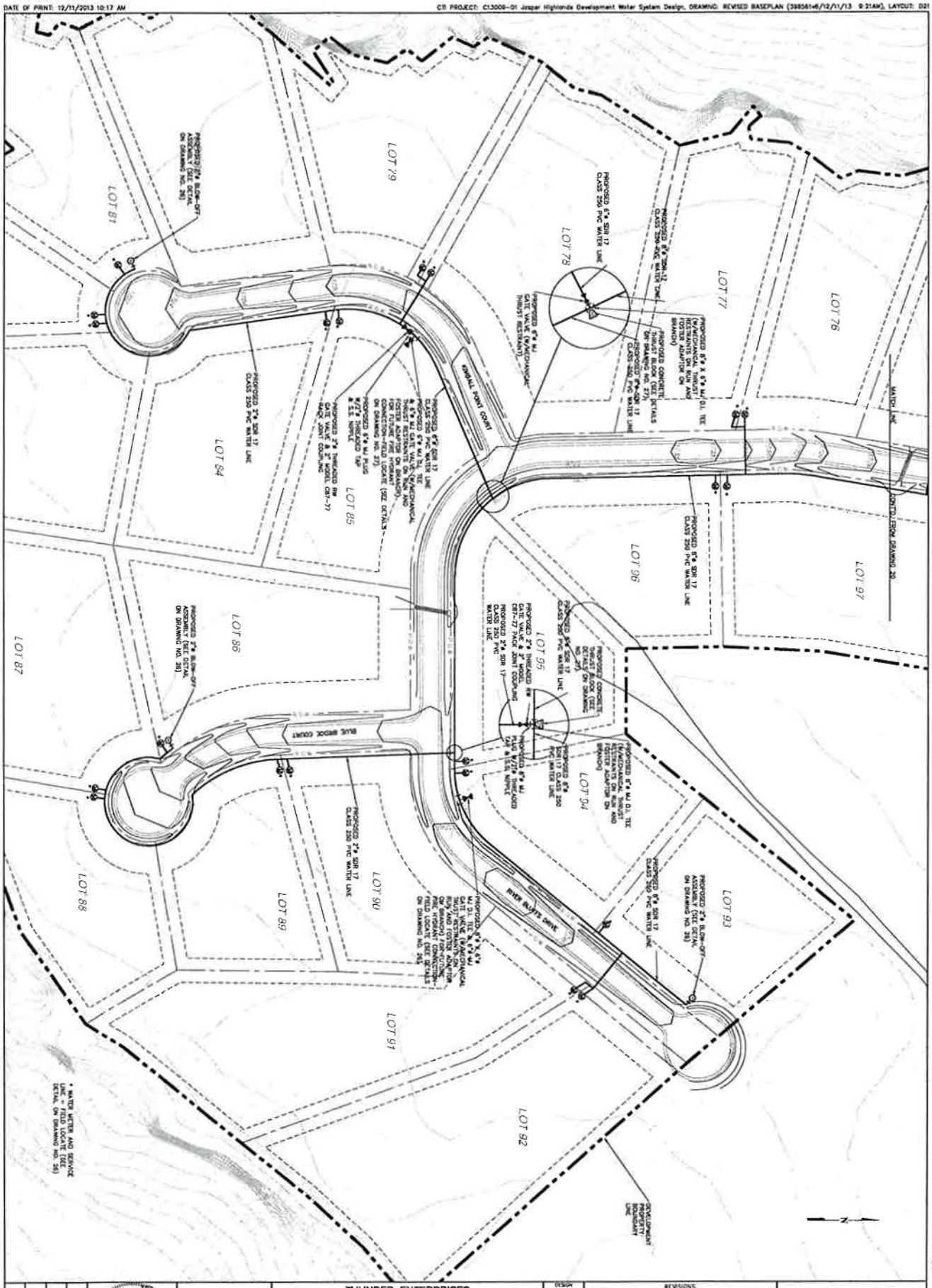
CTI ENGINEERS, INC.
1155 KNOXVILLE PARKWAY
CHATTANOOGA, TN 37421
423-877-7555

DESIGN	DDT
DRAWN	MWD
CHECKED	JDH
APPROVED	DDT

REVISIONS				
NO.	DESCRIPTIONS	DATE	BY	APP'D

JOB NO.	C13009-01
ISSUE DATE	12/06/13
SCALE	1"=50'
DRAWING NO.	20.0

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THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER LINE PLAN (SHEET 19 OF 19)

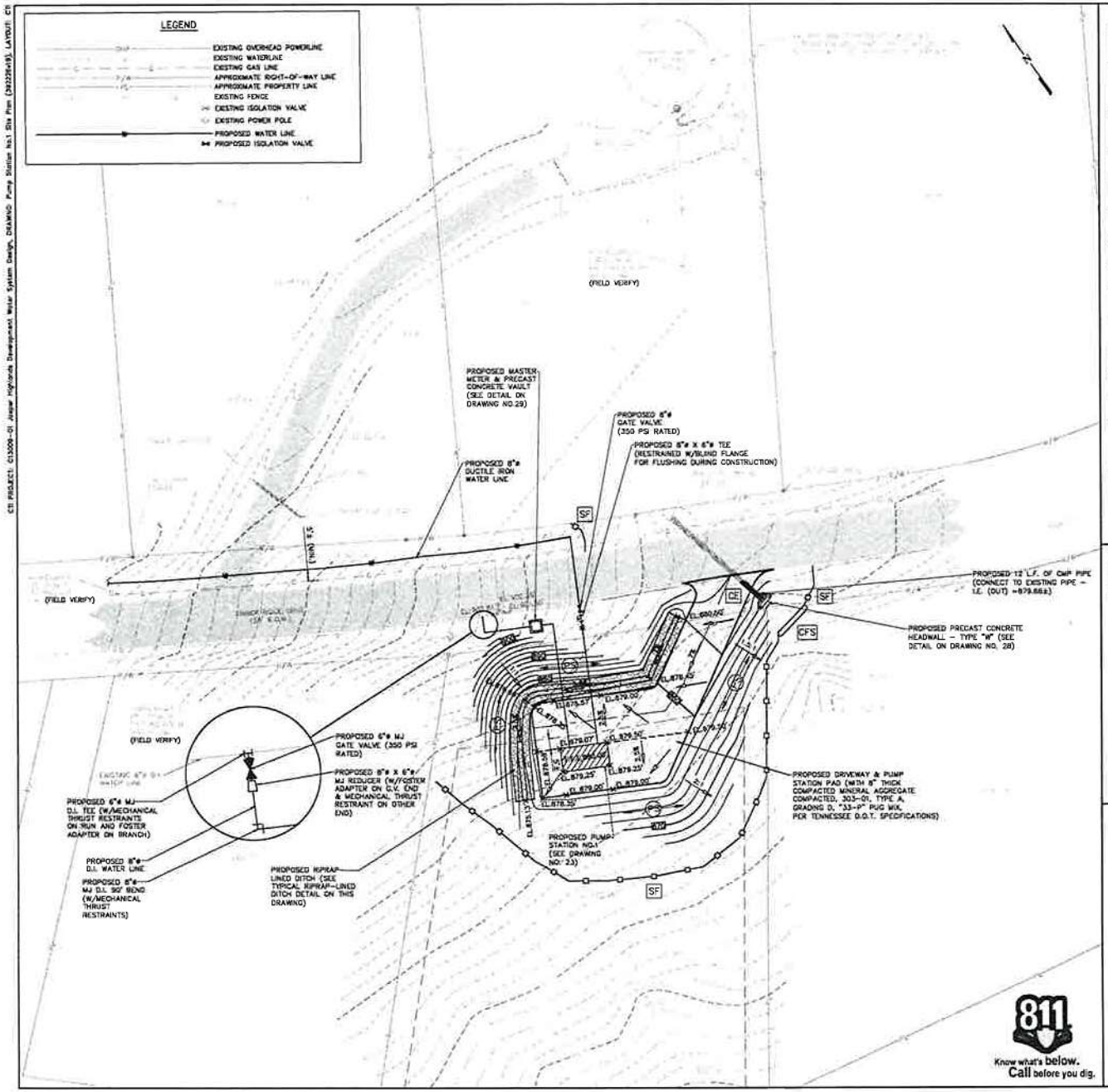
CTI ENGINEERS, INC.
7100 KINGSPOINT PARKWAY
KNOXVILLE, TN 37919
865-251-2100

JOB NO.	C13009-01
ISSUE DATE	12/06/13
SCALE	1"=50'
DRAWING NO.	21.0

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APPROVED	DDT

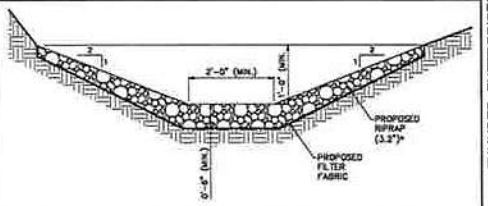
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NOTES

1. THE LOCATION OF THE EXISTING UTILITIES, PIPING, AND STRUCTURES SHOWN ARE APPROXIMATE ONLY. IT IS POSSIBLE THAT SOME EXISTING UTILITIES, PIPING, AND STRUCTURES ARE NOT SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES, PIPING, AND STRUCTURES PRIOR TO BEGINNING CONSTRUCTION.
2. THE CONTRACTOR SHALL BE REQUIRED TO FILE FOR AND OBTAIN LAND DISTURBING ACTIVITY PERMITS FROM ALL GOVERNMENT ENTITIES HAVING JURISDICTION FOR SUCH PROGRAMS IN AREAS TRANSVERSED BY THIS PROJECT. SUCH PERMITS SHALL BE OBTAINED BEFORE STARTING CONSTRUCTION AND SHALL COMPLY WITH ALL EROSION AND SEDIMENT CONTROL REQUIREMENTS DESCRIBED IN THE CONTRACT DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION AND SEDIMENT CONTROLS AS SHOWN ON THE CONTRACT DRAWINGS AND IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS. EROSION AND SEDIMENT CONTROL DETAILS, NOTES, AND EROSION CONTROL CODES AND SYMBOLS ARE INCLUDED ON DRAWING NO.28.
4. EXCAVATION, BACKFILLING, GRADING, COMPACTING, AND SITE-CLEANUP SHALL BE CONDUCTED AS SHOWN ON THIS DRAWING AND IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS.
5. ALL DISTURBED AREAS THAT ARE NOT PAVED OR COVERED WITH STONE SHALL BE GRADED AND SEEDED IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS.
6. ANY DISCREPANCIES AND/OR CONFLICTS SHOWN ON THE DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PROCEEDING ANY FURTHER WITH CONSTRUCTION ACTIVITIES.
7. THE EXISTING CONTOURS AND SPOT ELEVATIONS SHOWN ON THIS DRAWING WERE PROVIDED BY B&H SURVEYING SERVICES AND ARE APPROXIMATE ONLY.
8. THE RIGHT-OF-WAY AND PROPERTY BOUNDARIES SHOWN WERE PROVIDED BY B&H SURVEYING SERVICES.
9. THE NEW WATER LINES SHALL BE CONSTRUCTED OF CLASS 350 DUCTILE IRON PIPE AT THE LOCATIONS SHOWN ON THE CONTRACT DRAWINGS AND IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS.
10. ALL FITTINGS AND VALVES INSTALLED BELOW ELEVATION 1627.0 SHALL HAVE A MAXIMUM PRESSURE RATING OF 350 PSI. ABOVE ELEVATION 1627.0, ALL FITTINGS AND VALVES SHALL HAVE A MAXIMUM PRESSURE RATING OF 250 PSI.
11. ALL BURIED PIPE, FITTINGS, AND VALVES SHALL BE MECHANICALLY RESTRAINED AS NOTED ON CONTRACT DRAWING NO.2.
12. THE NEW PREFABRICATED PUMP STATION SHALL BE INSTALLED AT THE LOCATION SHOWN ON THIS DRAWING.
13. ALL NEWLY INSTALLED PIPE SHALL BE DISINFECTED IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS.
14. A NEW SERVICE POLE WITH NEW METER, DISCONNECTS, ETC. SHALL BE FIELD LOCATED AND INSTALLED AS SHOWN ON THE CONTRACT DRAWINGS. INSTALL THE POLE AND APPURTENANCES IN ACCORDANCE WITH THE DETAILS SHOWN ON THE CONTRACT DRAWINGS. INSTALL THE WIRING AND/OR CABLES FROM THE SERVICE POLE TO THE CONTROL PANEL AS SHOWN ON THE CONTRACT DRAWINGS.
15. A CONSTRUCTION EXIT SHALL BE INSTALLED AND MAINTAINED ALONG THE FIRST 50 FEET (MIN.) LENGTH OF THE NEW DRIVEWAY. A LAYER OF GEOTEXTILE FABRIC SHALL BE REQUIRED TO STABILIZE AND SUPPORT THE AGGREGATE AND SHALL EXTEND THE FULL LENGTH AND WIDTH OF THE CONSTRUCTION EXIT. THE FABRIC SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GEOTEXTILES, AASHTO DESIGNATED M-288, EROSION CONTROL. THE BASE OF THE AREA WHERE THE EXIT IS TO BE INSTALLED SHALL BE UNDERCUT AT LEAST 3 INCHES. PROVIDE CLEAN, WASHED STONE TO A DEPTH OF 8 INCHES. STONE SHOULD VARY IN SIZE FROM 2 TO 4 INCHES. ROCK MUST BE CLEAN ROCK WITH NO FINES.



* NOTE: THE RIPRAP SIZE INDICATED IS THE LARGEST STONE SIZE IN THE MIXTURE (IE. 1.5 X D50, WHERE D50 = MEDIAN RIPRAP SIZE). THE RIPRAP SHALL BE COMPOSED OF A WELL-GRADED MIXTURE DOWN TO THE 1-INCH SIZE PARTICLE, SUCH THAT 50 PERCENT OF THE MIXTURE BY WEIGHT SHALL BE LARGER THAN THE D50 SIZE.

TYPICAL RIPRAP-LINED DITCH DETAIL
NOT TO SCALE

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REVISIONS			
NO.	DESCRIPTIONS	DATE	BY APP'D

DESIGN DDT
DRAWN DDT
CHECKED JDH
APPROVED JDH

THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

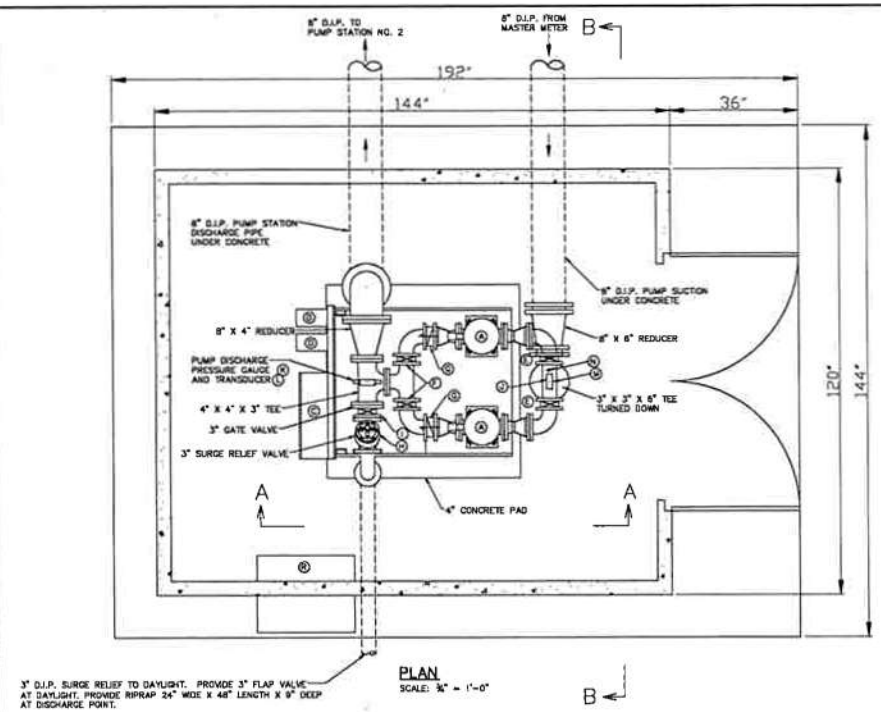
PUMP STATION NO.1 SITE PLAN

CTI ENGINEERS, INC
ENGINEERS/PLANNERS/SURVEYORS
KNOXVILLE, TN

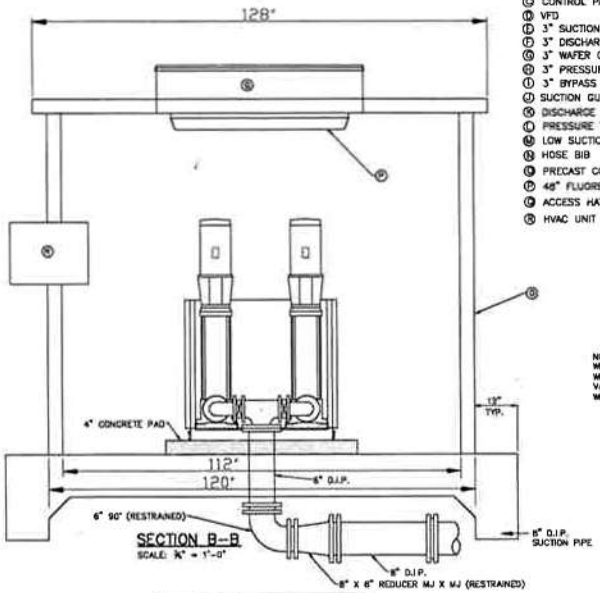
JEROME D. HIGHTOWER
REGISTERED ENGINEER
STATE OF TENNESSEE

JOB NO. C13009-01
DATE 12/06/2013
SCALE 1" = 20'
DRAWING NO. 22.0

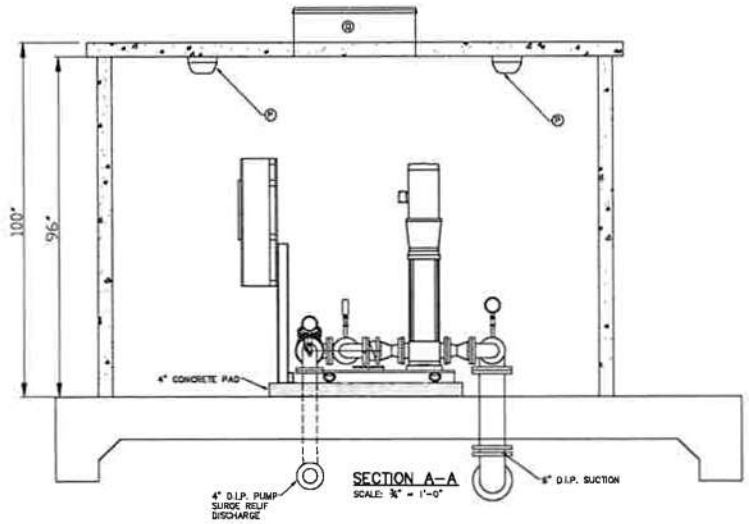
CTI PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING: Pump Station No.1 Site Plan (2012)(Rev15), LAYOUT: C9



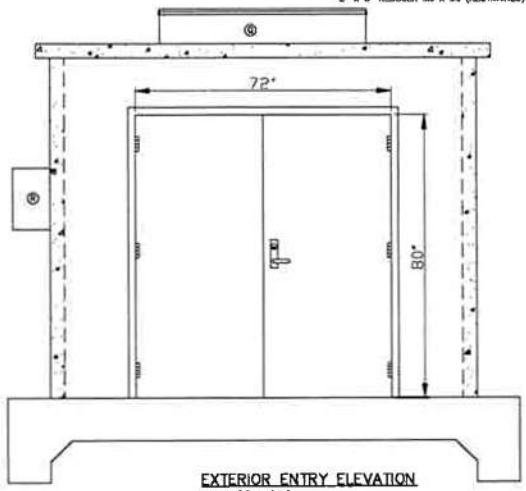
PLAN
SCALE: ¾" = 1'-0"



SECTION B-B
SCALE: ¾" = 1'-0"



SECTION A-A
SCALE: ¾" = 1'-0"



EXTERIOR ENTRY ELEVATION
SCALE: ¾" = 1'-0"

LEGEND

- (A) GOULDS 33SV-8-1, 50 HP PUMP
- (B) EQUIPMENT FRAME
- (C) CONTROL PANEL
- (D) VFD
- (E) 3" SUCTION ISOLATION VALVE
- (F) 3" DISCHARGE ISOLATION VALVE
- (G) 3" WAFER CHECK VALVE
- (H) 3" PRESSURE RELIEF VALVE
- (I) 3" BYPASS ISOLATION VALVE
- (J) SUCTION GUAGE
- (K) DISCHARGE PRESSURE GUAGE
- (L) PRESSURE TRANSDUCER
- (M) LOW SUCTION PRESSURE SWITCH
- (N) HOSE BIB
- (O) PRECAST CONCRETE BUILDING
- (P) 48" FLUORESCENT FIXTURE
- (Q) ACCESS HATCH
- (R) HVAC UNIT

NOTE:
WHEN THE 170gpm RATED PUMPS ARE REPLACED WITH NEW 340gpm PUMPS IN THE FUTURE, ALL 3"ø VALVES, FITTINGS AND PIPING SHALL BE REPLACED WITH NEW 4"ø VALVES, FITTINGS, AND PIPING.

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REVISIONS			
NO	DESCRIPTIONS	DATE	BY (APP'D)

DESIGN	JDH
DRAWN	MWD
CHECKED	CHK
APPROVED	APR

THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

PUMP STATION NO. 1 DETAILS

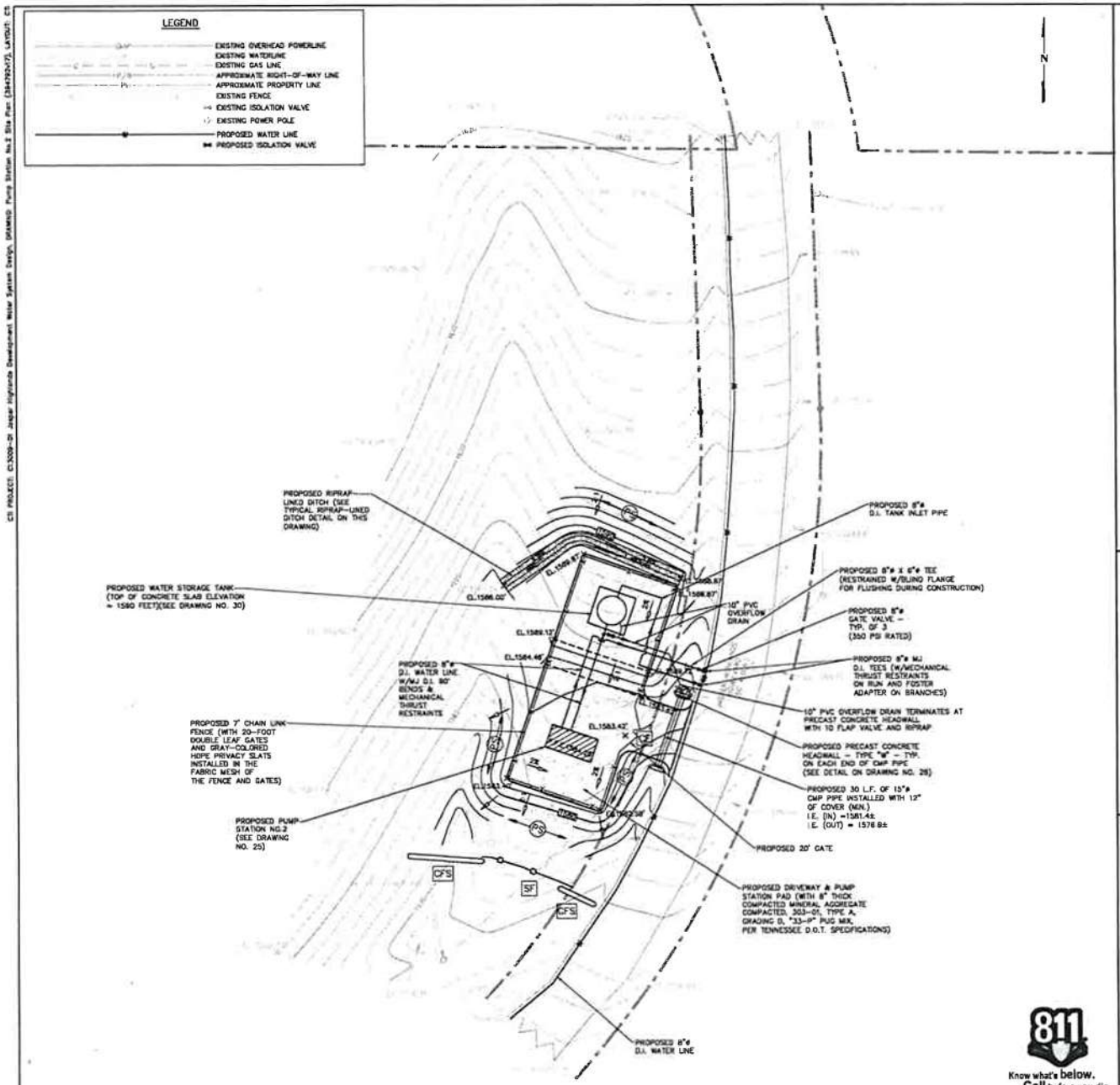
CONSOLIDATED TECHNOLOGIES, INC. ENGINEERS, INC.
7550 RIVERMONT PARKWAY
CHATTANOOGA, TN 37421
(423) 892-0011

CONSOLIDATED TECHNOLOGIES, INC. STATE OF TENNESSEE

JOB NO.	C13009-01
ISSUE DATE	12/06/13
SCALE	AS NOTED
DRAWING NO.	23.0

CT PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING: PUMP STATION NO.1 (3933x2=11/12/13 1:34PM), LAYOUT: ENCLOSURE

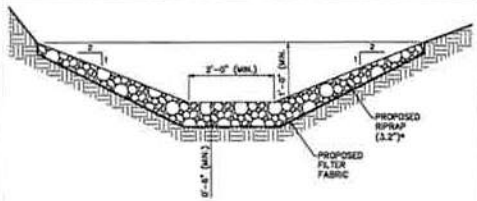
DATE OF PRINT: 12/12/2013 1:38 PM



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

NOTES

1. THE LOCATION OF THE EXISTING UTILITIES, PIPING, AND STRUCTURES SHOWN ARE APPROXIMATE ONLY. IT IS POSSIBLE THAT SOME EXISTING UTILITIES, PIPING, AND STRUCTURES ARE NOT SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES, PIPING, AND STRUCTURES PRIOR TO BEGINNING CONSTRUCTION.
2. THE CONTRACTOR SHALL BE REQUIRED TO FILE FOR AND OBTAIN LAND DISTURBING ACTIVITY PERMITS FROM ALL GOVERNMENT ENTITIES HAVING JURISDICTION FOR SUCH PROGRAMS IN AREAS TRANSVERSED BY THIS PROJECT. SUCH PERMITS SHALL BE OBTAINED BEFORE STARTING CONSTRUCTION AND SHALL COMPLY WITH ALL EROSION AND SEDIMENT CONTROL REQUIREMENTS DESCRIBED IN THE CONTRACT DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION AND SEDIMENT CONTROLS AS SHOWN ON THE CONTRACT DRAWINGS AND IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS. EROSION AND SEDIMENT CONTROL DETAILS, NOTES, AND EROSION CONTROL CODES AND SYMBOLS ARE INCLUDED ON DRAWING NO.28.
4. EXCAVATION, BACKFILLING, GRADING, COMPACTING, AND SITE-CLEANUP SHALL BE CONDUCTED AS SHOWN ON THIS DRAWING AND IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS.
5. ALL DISTURBED AREAS THAT ARE NOT PAVED OR COVERED WITH STONE SHALL BE GRADED AND SEEDED IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS.
6. ANY DISCREPANCIES AND/OR CONFLICTS SHOWN ON THE DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PROCEEDING ANY FURTHER WITH CONSTRUCTION ACTIVITIES.
7. THE EXISTING CONTOURS AND SPOT ELEVATIONS SHOWN ON THIS DRAWING WERE PROVIDED BY B&H SURVEYING SERVICES AND ARE APPROXIMATE ONLY.
8. THE RIGHT-OF-WAY AND PROPERTY BOUNDARIES SHOWN WERE PROVIDED BY B&H SURVEYING SERVICES.
9. THE NEW WATER LINES SHALL BE CONSTRUCTED OF CLASS 350 DUCTILE IRON PIPE AT THE LOCATIONS SHOWN ON THE CONTRACT DRAWINGS AND IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS.
10. ALL FITTINGS AND VALVES INSTALLED BELOW ELEVATION 1627.0 SHALL HAVE A MAXIMUM PRESSURE RATING OF 350 PSI. ABOVE ELEVATION 1627.0, ALL FITTINGS AND VALVES SHALL HAVE A MAXIMUM PRESSURE RATING OF 250 PSI.
11. ALL BURIED PIPE, FITTINGS, AND VALVES SHALL BE MECHANICALLY RESTRAINED AS NOTED ON CONTRACT DRAWING NO.2.
12. THE NEW PREFABRICATED PUMP STATION SHALL BE INSTALLED AT THE LOCATION SHOWN ON THIS DRAWING.
13. ALL NEWLY INSTALLED PIPE SHALL BE DISINFECTED IN ACCORDANCE WITH THE REQUIREMENTS STIPULATED IN THE SPECIFICATIONS.
14. A NEW SERVICE POLE WITH NEW METER, DISCONNECTS, ETC. SHALL BE FIELD LOCATED AND INSTALLED AS SHOWN ON THE CONTRACT DRAWINGS. INSTALL THE POLE AND APPURTENANCES IN ACCORDANCE WITH THE DETAILS SHOWN ON THE CONTRACT DRAWINGS. INSTALL THE WIRING AND/OR CABLES FROM THE SERVICE POLE TO THE CONTROL PANEL AS SHOWN ON THE CONTRACT DRAWINGS.
15. DURING CONSTRUCTION, A CONSTRUCTION EXIT SHALL BE INSTALLED AND MAINTAINED ALONG THE FIRST 50 FEET (MIN.) LENGTH OF THE NEW DRIVEWAY. A LAYER OF GEOTEXTILE FABRIC SHALL BE REQUIRED TO STABILIZE AND SUPPORT THE AGGREGATE AND SHALL EXTEND THE FULL LENGTH AND WIDTH OF THE CONSTRUCTION EXIT. THE FABRIC SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GEOTEXTILES, AASHTO DESIGNATED M-288, EROSION CONTROL. THE BASE OF THE AREA WHERE THE EXIT IS TO BE INSTALLED SHALL BE UNDERCUT AT LEAST 3 INCHES. PROVIDE CLEAN, WASHED STONE TO A DEPTH OF 8 INCHES. STONE SHOULD VARY IN SIZE FROM 2 TO 4 INCHES. ROCK MUST BE CLEAN ROCK WITH NO FINES.



* NOTE: THE RIPRAP SIZE INDICATED IS THE LARGEST STONE SIZE IN THE MIXTURE (IE. 1.5 X D50, WHERE D50 = MEDIAN RIPRAP SIZE). THE RIPRAP SHALL BE COMPOSED OF A WELL-GRADED MIXTURE DOWN TO THE 1-INCH SIZE PARTICLE, SUCH THAT 50 PERCENT OF THE MIXTURE BY WEIGHT SHALL BE LARGER THAN THE D50 SIZE.

TYPICAL RIPRAP-LINED DITCH DETAIL
NOT TO SCALE

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NO.	DESCRIPTIONS	DATE	BY	APP'D
	REVISIONS			

DESIGN	DDT
DRAWN	DDT
CHECKED	JDH
APPROVED	JDH

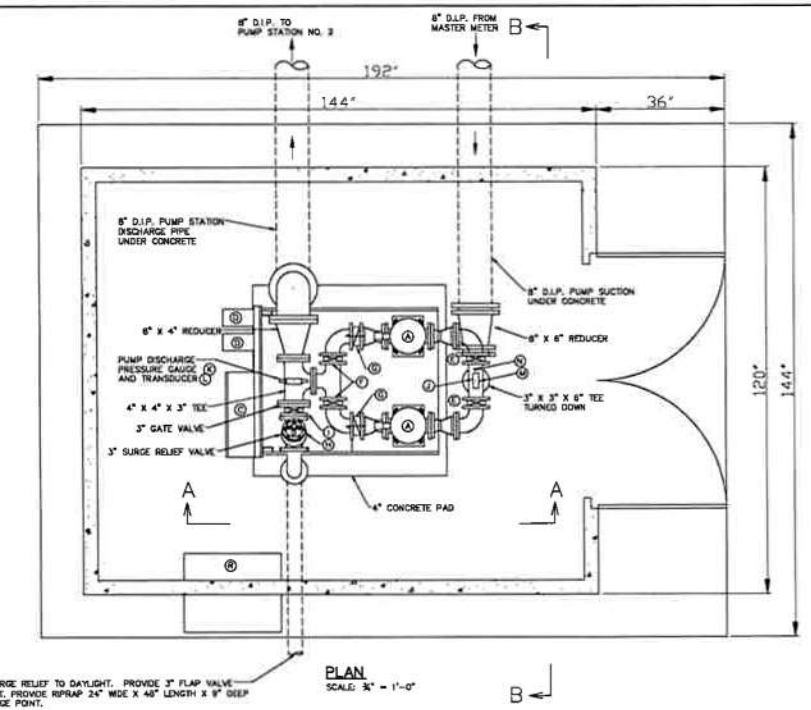
THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

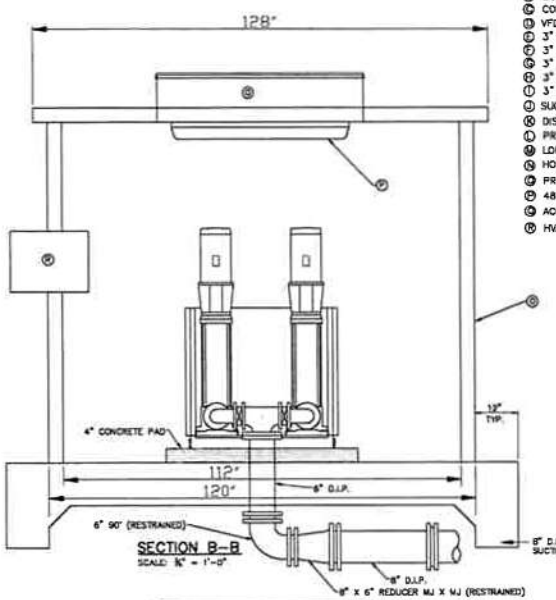
PUMP STATION NO.2 SITE PLAN

CTI ENGINEERS, INC.
7331 ENTERPRISE PARKWAY
CHATTANOOGA, TN 37421

THOMAS D. HIGHTOWER
REGISTERED ENGINEER
STATE OF TENNESSEE

JOB NO.	C13009-01
DATE	12/06/13
SCALE	1" = 20'
DRAWING NO.	24.0



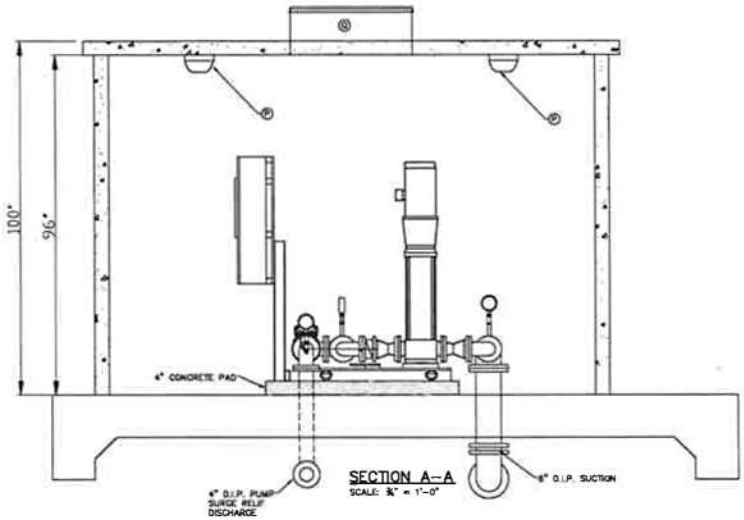


SECTION B–B
SCALE: 3/4" = 1'-0"

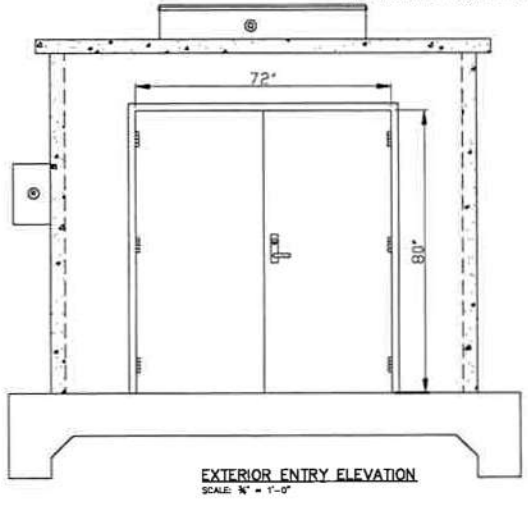
LEGEND

- (A) GOULDS 335V–8–1, 50 HP PUMP
- (B) EQUIPMENT FRAME
- (C) CONTROL PANEL
- (D) VFD
- (E) 3" SUCTION ISOLATION VALVE
- (F) 3" DISCHARGE ISOLATION VALVE
- (G) 3" WAFER CHECK VALVE
- (H) 3" PRESSURE RELIEF VALVE
- (I) 3" BYPASS ISOLATION VALVE
- (J) SUCTION GUAGE
- (K) DISCHARGE PRESSURE GUAGE
- (L) PRESSURE TRANSDUCER
- (M) LOW SUCTION PRESSURE SWITCH
- (N) HOSE BIB
- (O) PRECAST CONCRETE BUILDING
- (P) 48" FLUORESCENT FIXTURE
- (Q) ACCESS HATCH
- (R) HVAC UNIT

NOTE:
WHEN THE 170gpm RATED PUMPS ARE REPLACED WITH NEW 340gpm PUMPS IN THE FUTURE, ALL 3"ø VALVES, FITTINGS AND PIPING SHALL BE REPLACED WITH NEW 4"ø VALVES, FITTINGS, AND PIPING.



SECTION A–A
SCALE: 3/4" = 1'-0"



EXTERIOR ENTRY ELEVATION
SCALE: 3/4" = 1'-0"

NO	DESCRIPTIONS	DATE	BY	APP'D

REVISIONS

DESIGN JDH
DRAWN MWD
CHECKED CHK
APPROVED APR

THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

PUMP STATION NO. 2 DETAILS

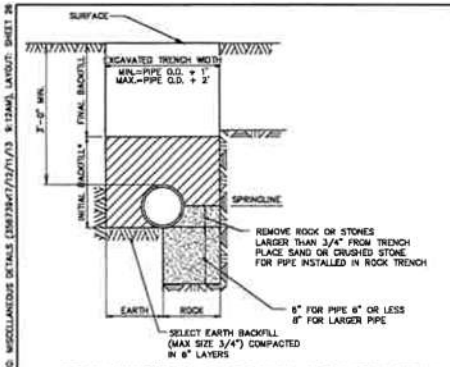
CT ENGINEERS, INC
102 INDEPENDENCE POINT
CHATTANOOGA, TN 37421
423.267.7613

JOB NO. C13009–01
ISSUE DATE 12/06/13
SCALE AS NOTED
DRAWING NO. 25.0

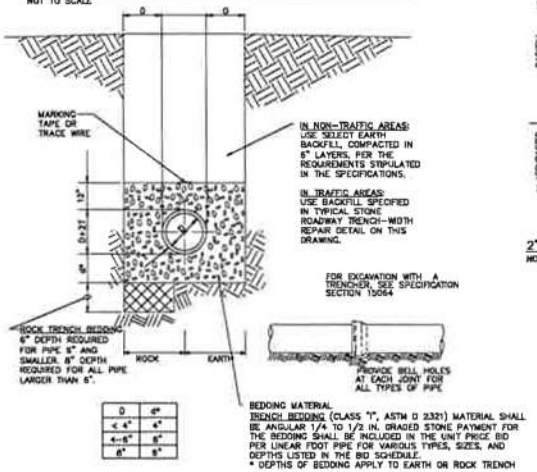
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JEROME D. HIGHTOWER
REGISTERED ENGINEER
STATE OF TENNESSEE

CTI PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING: PUMP STATION NO.2 (3981854), 12/12/13 1:48PM, LAYOUT: ENCLOSURE
DATE OF PRINT: 12/12/2013 1:47 PM



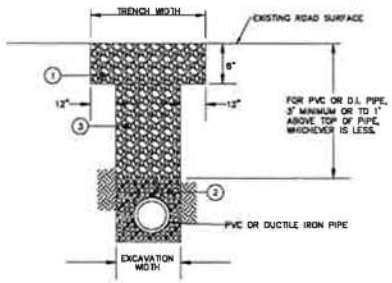
TYPICAL DUCTILE IRON PIPE TRENCH INSTALLATION DETAIL
NOT TO SCALE



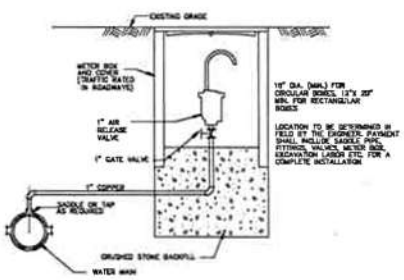
O	d*
< 4"	4"
4"-8"	8"
8"	8"

TYPICAL PVC PIPE TRENCH AND BEDDING INSTALLATION DETAIL
NOT TO SCALE

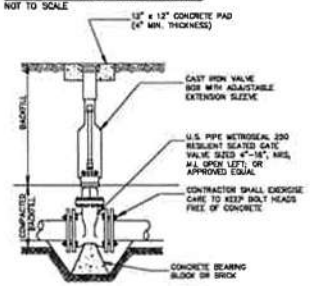
1. COMPACTED MINERAL AGGREGATE BASE. THE THICKNESS SHALL BE THE GREATER OF 8" OR THE EXISTING DEPTH OF BASE MATERIAL. THE MINERAL AGGREGATE SHALL BE COMPACTED 303-01, TYPE A, GRADING D ("35-0"), PER TENNESSEE D.O.T. SPECIFICATIONS.
2. BEDDING MATERIAL – SEE PIPE TYPE APPROPRIATE DETAIL ON THIS DRAWING.
3. COMPACTED MINERAL AGGREGATE BACKFILL, CLEAN GRADED CRUSHED STONE, SIZE 7 (#5 TO NO. 4)



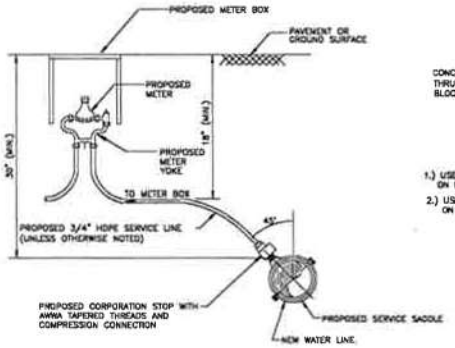
TYPICAL STONE ROADWAY TRENCH-WIDTH REPAIR DETAIL
NOT TO SCALE



1" AIR RELEASE VALVE DETAIL
NOT TO SCALE

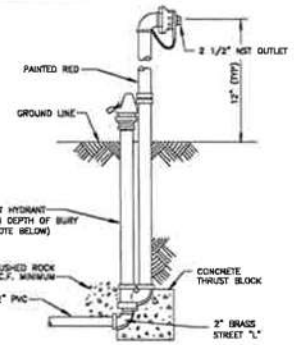


2"-16" GATE VALVE INSTALLATION DETAIL
NOT TO SCALE

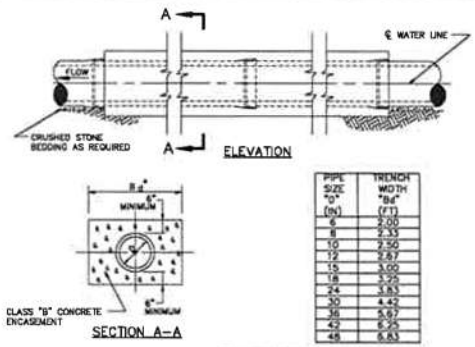


REFER TO THE PLAN DRAWINGS FOR THE PROXIMATION OF THE PROPOSED WATER LINES.

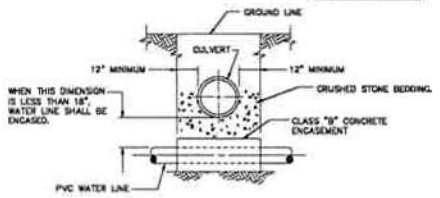
SERVICE CONNECTION DETAIL
NOT TO SCALE



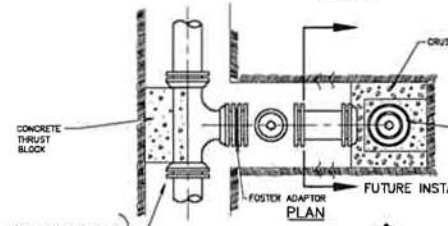
2" BLOW-OFF DETAIL
NOT TO SCALE

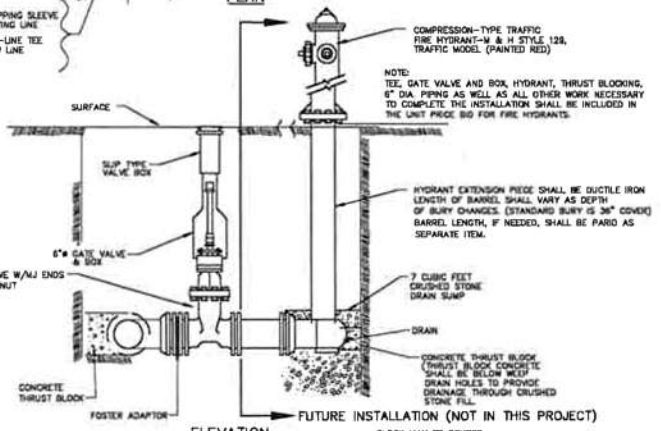


PIPE SIZE "D" (IN)	TRENCH WIDTH "BW" (FT)
6	2.00
8	2.33
10	2.50
12	2.67
15	3.00
18	3.25
24	3.83
30	4.42
36	5.00
42	5.58
48	6.83



TYPICAL CONCRETE ENCASEMENT DETAIL
NOT TO SCALE





FIRE HYDRANT INSTALLATION
NOT TO SCALE

THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

PIPING DETAILS

REVISIONS						
NO	DESCRIPTION	DATE	BY	APP'D		

DESIGN	DDT
DRAWN	MWD
CHECKED	JDH
APPROVED	DDT

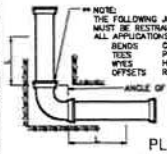
CTI ENGINEERS, INC.

JOB NO. C13009-01
ISSUE DATE 12/06/13
SCALE AS NOTED
DRAWING NO. 26.0

CTI PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING MISCELLANEOUS DETAILS (2587394\21\13\11\13 9:12AM), LAYOUT: SHEET 26

DATE OF PRINT: 12/11/2013 10:20 AM

FOR DUCTILE IRON PIPE



** MECHANICAL JOINTS SHALL BE RESTRAINED WITH EBAA MEGA-A-LUG SERIES 1100, UNI-FLANGE SERIES 1400, OR APPROVED EQUAL.

PUSH-ON JOINTS SHALL BE RESTRAINED WITH EBBA MEGA-A-LUG SERIES 1700, U.S. PIPE FIELD LOK 350 GASKET (WITH U.S. PIPE TYTON PIPE OR FITTINGS), AMERICAN DUCTILE IRON PIPE'S FAST GRIP GASKET (WITH STANDARD AMERICAN DUCTILE IRON FASTITE PIPE), OR APPROVED EQUAL.

PLAN RESTRAINED JOINT DETAIL
NOT TO SCALE

* L = MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (FEET)

NOM. PIPE SIZE (IN.)	TEST PRESSURE = 250 psi: ELBOWS (DEGREES) 11¼	22½	45	90	REDUCERS	TEES, VALVES, DEAD-ENDS
6	4	8	19	43	34	87
8	6	11	25	57	38	87

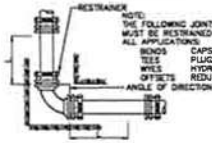
NOM. PIPE SIZE (IN.)	TEST PRESSURE = 300 psi: ELBOWS (DEGREES) 11¼	22½	45	90	REDUCERS	TEES, VALVES, DEAD-ENDS
6	5	10	23	49	42	97
8	7	13	29	65	44	81

NOM. PIPE SIZE (IN.)	TEST PRESSURE = 350 psi: ELBOWS (DEGREES) 11¼	22½	45	90	REDUCERS	TEES, VALVES, DEAD-ENDS
6	6	13	29	57	48	70
8	8	15	34	74	52	98

COMMENTS AND ASSUMPTIONS:
The tabulated values shown were generated using the EBAA Iron, Inc. computer program.
Soil Type-Horiz. Case
Mh Granular = For Elbows
ML = For Reducers, Tees, Valves, and Dead-ends.
Trench Type: 3 (Pipe bedded in 4-inch minimum loose soil. Backfill lightly consolidated to top of pipe).
Depth of cover to top of pipe:3 feet
Safety Factor:1.5
The values shown for the Reducers were based on a reduction from the nominal pipe size to a pipe one-size smaller.

* Restrain one joint beyond the minimum length for all lengths over 10 feet.

FOR P.V.C. PIPE



PLAN RESTRAINED JOINT DETAIL
NOT TO SCALE

* MECHANICAL JOINTS SHALL BE RESTRAINED WITH ONE OF THE FOLLOWING, OR AN APPROVED EQUIVALENT.
C900 (3"-12") AND C905 (14"- 24") PIPE – EBAA SERIES 2000PV OR UNI-FLANGE SERIES 1500-DA
ASTM D2241 IPS OD PIPE – EBAA SERIES 2000PV OR UNI-FLANGE SERIES 1500-SA

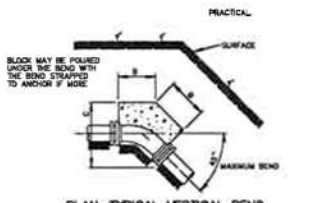
PUSH-ON JOINTS SHALL BE RESTRAINED WITH ONE OF THE FOLLOWING, OR AN APPROVED EQUIVALENT:
C900 (3"-12") PIPE – EBAA SERIES 1600 OR UNI-FLANGE 1390-C
C905 (14"-24") PIPE -EBAA SERIES 2800 OR UNI-FLANGE 1390-C
ASTM D2241 IPS OD PIPE – EBAA SERIES 8500 OR UNI-FLANGE 1390-S

L = MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (FEET) *

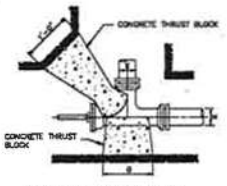
NOM. PIPE SIZE (IN.)	TEST PRESSURE = 200 psi: ELBOWS (DEGREES) 11¼	22½	45	90	REDUCERS	TEES, VALVES, DEAD-ENDS
6	3	8	19	46	51	88
8	6	12	25	61	54	128

COMMENTS AND ASSUMPTIONS:
The tabulated values shown were generated using the EBAA Iron, Inc. computer program.
Soil Type-Horiz. Case
Mh Granular = For Elbows
ML = For Reducers, Tees, Valves, and Dead-ends.
Trench Type: 3 (Pipe bedded in 4-inch minimum loose soil. Backfill lightly consolidated to top of pipe).
Depth of cover to top of pipe:3 feet
Safety Factor:1.5
The values shown for the Reducers were based on a reduction from the nominal pipe size to a pipe one-size smaller.

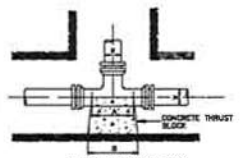
* Restrain one joint beyond the minimum length for all lengths over 10 feet.



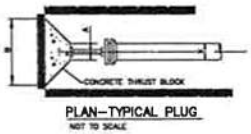
PLAN–TYPICAL VERTICAL BEND
NOT TO SCALE



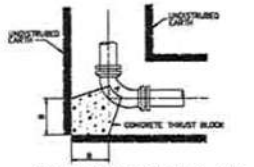
PLAN–UNBALANCED TEE
NOT TO SCALE



PLAN–TYPICAL TEE
NOT TO SCALE



PLAN–TYPICAL PLUG
NOT TO SCALE



PLAN–TYPICAL HORIZONTAL BEND
NOT TO SCALE

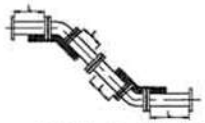
MECHANICALLY RESTRAINED JOINTS GENERAL NOTES:

1. THE RESTRAINED LENGTHS SHOWN IN THE TABLE ASSUME A WORST CASE SOIL CONDITION FOR EACH BEDDING CONDITION AND DESIGN PRESSURE.
2. INSTALL THRUST RESTRAINTS IN STRICT CONFORMANCE WITH MANUFACTURERS INSTRUCTIONS AND RECOMMENDATIONS.
3. PIPE JOINTS WITHIN CASING PIPES WILL BE RESTRAINED BUT PIPE LENGTHS WITHIN CASING PIPES WILL NOT BE CONSIDERED IN THE TOTAL LENGTH OF RESTRAINED PIPE.
4. "L" IN THE TABLE INDICATES THE MINIMUM LENGTH (IN FEET) TO BE RESTRAINED ON EACH SIDE OF THE RESPECTIVE FITTING LISTED.
5. THE FOLLOWING ARE THE PROCEDURES FOR DETERMINING THE MINIMUM RESTRAINED LENGTHS WHEN INSTALLING BENDS AND FITTINGS.
   A. WHERE HORIZONTAL NON-ENCROACHING BENDS ARE ENCOUNTERED, USE "L" AS SHOWN IN THE TABLES.
   B. WHERE HORIZONTAL RESTRAINED LENGTHS ENCROACH, RESTRAIN ALL JOINTS BETWEEN BENDS (OR FITTINGS) AND MULTIPLY "L" BY 1.5 FOR NEW RESTRAINED LENGTH OPPOSITE THE FULLY RESTRAINED SECTION OF PIPING.
   C. WHERE VERTICAL UP BENDS ARE ENCOUNTERED, USE "L" AS SHOWN IN TABLES.
   D. WHERE VERTICAL DOWN BENDS ARE ENCOUNTERED, MULTIPLY "L" BY 1.5 FOR NEW RESTRAINED LENGTH.
   E. WHERE VERTICAL BENDS ENCROACH, RESTRAIN ALL JOINTS BETWEEN BENDS. FOR VERTICAL UP BENDS, MULTIPLY "L" BY 1.5 AND FOR VERTICAL DOWN BENDS, MULTIPLY "L" BY 2.25 FOR NEW RESTRAINED LENGTHS OPPOSITE THE FULLY RESTRAINED SECTION OF PIPE.
6. THE RESTRAINED LENGTHS SHOWN FOR REDUCERS ARE BASED ON A REDUCTION OF ONE SIZE DOWN (I.E. 8 TO 6, 4 TO 3, ETC.). IF A REDUCTION GREATER THAN ONE SIZE DOWN IS NECESSARY, SEE THE ENGINEER FOR THE REQUIRED RESTRAINED LENGTH.

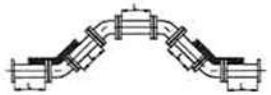
ENCROACHING: WHERE FITTINGS ARE INSTALLED AT LOCATIONS CLOSE ENOUGH TO ONE ANOTHER WHERE THE CALCULATED MINIMUM RESTRAINED LENGTHS OVERLAP.

NON ENCROACHING: WHERE FITTINGS ARE INSTALLED AT LOCATIONS WHERE THE CALCULATED MINIMUM RESTRAINED LENGTHS DO NOT OVERLAP.

VERTICAL DOWN (NON-ENCROACHING)
N.T.S.

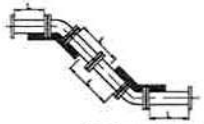


VERTICAL UP (NON-ENCROACHING)
N.T.S.

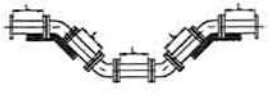


COMBINED VERTICAL OBJECT (OVER OBJECT)
N.T.S.

VERTICAL DOWN (ENCROACHING)
N.T.S.



VERTICAL UP (ENCROACHING)
N.T.S.



COMBINED VERTICAL OBJECT (UNDER OBJECT)
N.T.S.

MECHANICALLY RESTRAINED JOINT DETAIL
NOT TO SCALE

TYPICAL CONCRETE TRUST BLOCK DETAIL
NOT TO SCALE

PIPE SIZE	A	B	DEPTH C
11.25° BEND			
6"	1'-0"	1'-0"	1'-0"
8"	1'-0"	1'-0"	1'-0"
10"	1'-0"	1'-0"	1'-0"
12"	1'-0"	1'-0"	1'-0"
16"	1'-0"	1'-0"	1'-0"
20"	1'-0"	1'-0"	1'-0"
24"	1'-0"	1'-0"	1'-0"
DEAD END			
6"	1'-0"	1'-0"	1'-0"
8"	1'-0"	1'-0"	1'-0"
10"	1'-0"	1'-0"	1'-0"
12"	1'-0"	1'-0"	1'-0"
16"	1'-0"	1'-0"	1'-0"
20"	1'-0"	1'-0"	1'-0"
24"	1'-0"	1'-0"	1'-0"

PIPE SIZE	A	B	DEPTH C
22.5° BEND OR VERTICAL BEND			
6"	1'-0"	1'-0"	1'-0"
8"	1'-0"	1'-0"	1'-0"
10"	1'-0"	1'-0"	1'-0"
12"	1'-0"	1'-0"	1'-0"
16"	1'-0"	1'-0"	1'-0"
20"	1'-0"	1'-0"	1'-0"
24"	1'-0"	1'-0"	1'-0"
45° BEND			
6"	1'-0"	1'-0"	1'-0"
8"	1'-0"	1'-0"	1'-0"
10"	1'-0"	1'-0"	1'-0"
12"	1'-0"	1'-0"	1'-0"
16"	1'-0"	1'-0"	1'-0"
20"	1'-0"	1'-0"	1'-0"
24"	1'-0"	1'-0"	1'-0"
90° BEND			
6"	1'-0"	1'-0"	1'-0"
8"	1'-0"	1'-0"	1'-0"
10"	1'-0"	1'-0"	1'-0"
12"	1'-0"	1'-0"	1'-0"
16"	1'-0"	1'-0"	1'-0"
20"	1'-0"	1'-0"	1'-0"
24"	1'-0"	1'-0"	1'-0"

TABLE OF DIMENSIONS FOR HORIZONTAL & VERTICAL BENDS

NOTE : ALL CONCRETE FOR THRUST BLOCKS SHALL BE READY-MIXED 3000 psi (MINIMUM) CLASS "B". MIX DESIGN SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO USE. THRUST BLOCKS BASED ON 2125 psi & 3000lb/SQ.FT. RESISTANCE TYPICAL FOR UNDISTURBED SAND AND GRAVEL COMPACTED WITH CLAY. FOR OTHER SOILS THE BEARING FACE OF THE THRUST BLOCKS SHALL BE INCREASED BY THE FOLLOWING FACTORS:

SAND & GRAVEL 1.33

SOFT CLAY, MUCK AND PEAT SHALL USE RESTRAINED JOINTS IN LIEU OF THRUST BLOCKS.

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NO.	DESCRIPTIONS	DATE	BY	APVD

DESIGN: DDT
DRAWN: MWD
CHECKED: JDH
APPROVED: DDT

THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

THRUST RESTRAINT DETAILS

CTI ENGINEERS, INC.
(423) 899-5898 FAX (423) 899-4547
2 Vantage Way, Suite B100, Nashville, TN 37228

EDWARD D. DEBUSK
REGISTERED PROFESSIONAL ENGINEER
STATE OF TENNESSEE

JOB NO.
C13009-01
ISSUE DATE
12/06/13
SCALE
AS NOTED
DRAWING NO.
27.0

DATE OF PRINT: 12/1/2013 10:21 AM
CTI PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING: MISCELLANEOUS DETAILS (3387394\12/12/11/13 8:13AM), LAYOUT: SHEET 27

EROSION AND SEDIMENT CONTROL NOTES:

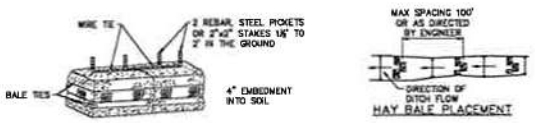
1. THE CONTRACTOR SHALL ADHERE TO ALL LOCAL, STATE, AND FEDERAL EROSION CONTROL REQUIREMENTS THROUGHOUT THE CONSTRUCTION PERIOD.
2. BALED STRAW EROSION CHECK DAMS AND SILT FENCING SHALL BE USED ALONG THE TOE OF SLOPE OF FILL SLOPES, IN DITCHES, AND IN OTHER AREAS WHERE EROSION IS A PROBLEM AND SILT-LADEN RUNOFF MAY ENTER A STREAM OR AN ADJACENT PROPERTY.
3. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE INSTALLED BEFORE EARTH MOVING OPERATIONS BEGIN AND SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
4. THE CONTRACTOR WILL BE RESPONSIBLE FOR PAYMENT OF ANY FINES LEVIED AGAINST PROPERTY OWNERS AS A RESULT OF INADEQUATE EROSION AND SEDIMENT CONTROL.
5. SEEDING AND MULCHING SHALL BE CONDUCTED IN ACCORDANCE WITH THE SPECIFICATIONS ON ALL NEWLY GRADED EARTHEN AREAS THAT ARE NOT COVERED BY STRUCTURES, PAVEMENT, CONCRETE, ETC

EROSION/POLLUTION CONTROL

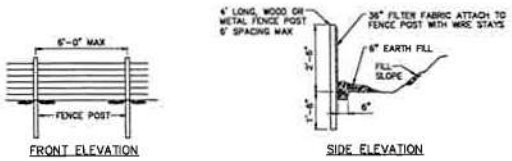
6. ALL LOCAL, STATE, AND FEDERAL EROSION CONTROL REQUIREMENTS SHALL BE FOLLOWED DURING CONSTRUCTION. THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO CONTROL EROSION AND WATER POLLUTION THROUGHOUT THE CONSTRUCTION PERIOD. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE IN PLACE BEFORE EARTH MOVING OPERATIONS BEGIN. CLEARING AND GRUBBING SHALL BE HELD TO A MINIMUM WIDTH NECESSARY TO ACCOMMODATE CONSTRUCTION. EMBANKMENTS AND EXCAVATED AREAS SHALL BE PROMPTLY STABILIZED TO MINIMIZE EROSION. BALED STRAW EROSION CHECKS AND SILT FENCE SHALL BE USED ALONG THE TOE OF FILL SLOPES, IN DITCHES, AND IN OTHER AREAS WHERE EROSION IS A PROBLEM AND SILT-LADEN RUNOFF MAY ENTER A STREAM OR ADJACENT PROPERTY.
7. ANY STOCKPILED SOIL OR FILL MATERIAL SHALL BE LOCATED AND TREATED IN A MANNER TO PREVENT SILT ENTERING STREAMS. NO EXCAVATED MATERIAL SHALL BE DISCHARGED INTO DITCHES. THE CONTRACTOR SHALL DISPOSE OF ALL EXCESS EXCAVATED MATERIAL IN A LOCATION, APPROVED BY THE OWNER, ABOVE THE NORMAL HIGH WATER ELEVATION.
8. THE CONTRACTOR IS RESPONSIBLE FOR ADHERING TO ALL EROSION CONTROL PROVISIONS AS SET FORTH IN THE EROSION & SEDIMENT CONTROL HANDBOOK AVAILABLE FROM THE TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION.
9. THE CONTRACTOR SHALL MAINTAIN THE EROSION CONTROL MEASURES THROUGHOUT THE LENGTH OF THE CONTRACT AS REQUIRED.
10. THE CONTRACTOR SHALL PROVIDE TEMPORARY EROSION AND WATER CONTROL MEASURES (SUCH AS BERMS, SEDIMENT BASINS, SLOPE DRAINS, HAY BALES, AND SILT FENCES) AS DIRECTED BY THE OWNER.

EROSION & SEDIMENT CONTROL CODES & SYMBOLS LEGEND

CODE	PRACTICE	SYMBOL	DESCRIPTION
SF	SILT FENCE		A SILT FENCE IS A TEMPORARY SEDIMENT BARRIER MADE OF WOVEN, SYNTHETIC FILTRATION FABRIC SUPPORTED BY STEEL OR WOOD POSTS.
CE	CONSTRUCTION EXIT		A STONE STABILIZED PAD LOCATED AT ANY POINT WHERE TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE TO A PUBLIC RIGHT-OF-WAY, STREET, ETC. WHERE THERE IS A TRANSITION FROM BARE SOIL TO A PAVED AREA.
RR	RIPRAP		A REVETMENT OF LOOSE ROCK OR SIMILAR MATERIAL INSTALLED ON A CUT OR A FILL SLOPE OR A CHANNEL SIDE SLOPE TO PROTECT THE SLOPE FROM EROSION.
HB	HAY OR STRAW BALES		A TEMPORARY SEDIMENT BARRIER INSTALLED TO PREVENT SEDIMENT CARRIED BY SHEET FLOW FROM LEAVING THE SITE AND ENTERING NATURAL DRAINAGE WAYS OR STORM DRAINAGE SYSTEMS.
PS	PERMANENT SEEDING	PS	SEEDING IS USED TO CONTROL RUNOFF AND EROSION ON DISTURBED AREAS BY ESTABLISHING VEGETATIVE COVER FROM SEED.
CFS	COMPOST FILTER SOCKS		A COMPOST FILTER SOCK IS A TYPE OF CONTAINED COMPOST FILTER BERM. IT IS A MESH TUBE FILLED WITH COMPOSTED MATERIAL THAT IS PLACED PERPENDICULAR TO SHEET-FLOW RUNOFF TO CONTROL EROSION AND RETAIN SEDIMENT IN DISTURBED AREAS.
			EXISTING FLOW/SURFACE RUNOFF DIRECTION



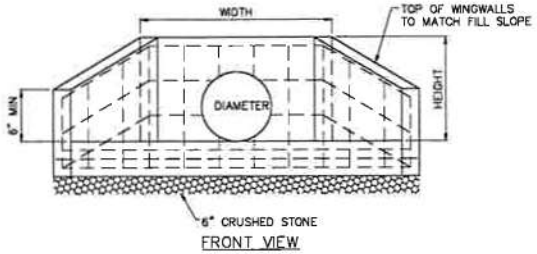
EROSION CONTROL HAY BALES



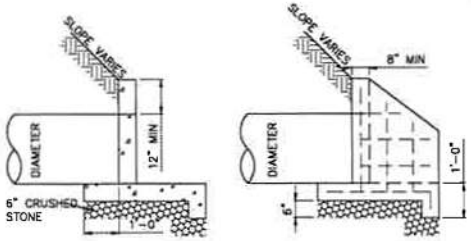
TYPE A TYPICAL SILT FENCE

EROSION AND SEDIMENT CONTROL DETAILS

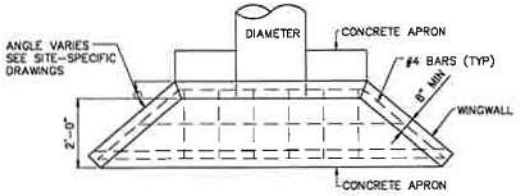
N.T.S.



FRONT VIEW



CROSS SECTION



PLAN

PIPE SIZE CHART *				
DIAMETER	15"	18"	24"	30"
HEIGHT	2'-9"	3'-0"	3'-6"	4'-0"
WIDTH	4'-3"	4'-6"	5'-0"	5'-6"

* ALL DIMENSIONS SHOWN ARE MINIMUMS

NOTES

1. IF CONDITIONS REQUIRE ANY VARIATION IN THE SIZE OF A WINGWALL, IT MUST FIRST BE APPROVED BY THE GOVERNMENTAL ENGINEER BEFORE CONSTRUCTION BEGINS.
2. ALL REINFORCING STEEL SHALL HAVE A 2" (MINIMUM) CONCRETE COVER.
3. SEE PIPE SIZE CHART FOR DIMENSIONS ASSOCIATED WITH PIPE DIAMETERS.
4. A 1" CHAMFER SHALL BE USED ON EACH EXPOSED EDGE AND CORNER.
5. #4 BARS (TYPICAL) SHALL BE @ 1'-0" C.C. EACH WAY IN THE CENTER OF SLABS AND WALLS.

PRECAST CONCRETE HEADWALL (TYPE "W") DETAILS

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NO	DESCRIPTIONS	DATE	BY	APP'D
	REVISIONS			

DESIGN DDT
DRAWN MWD
CHECKED JDH
APPROVED DDT

THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

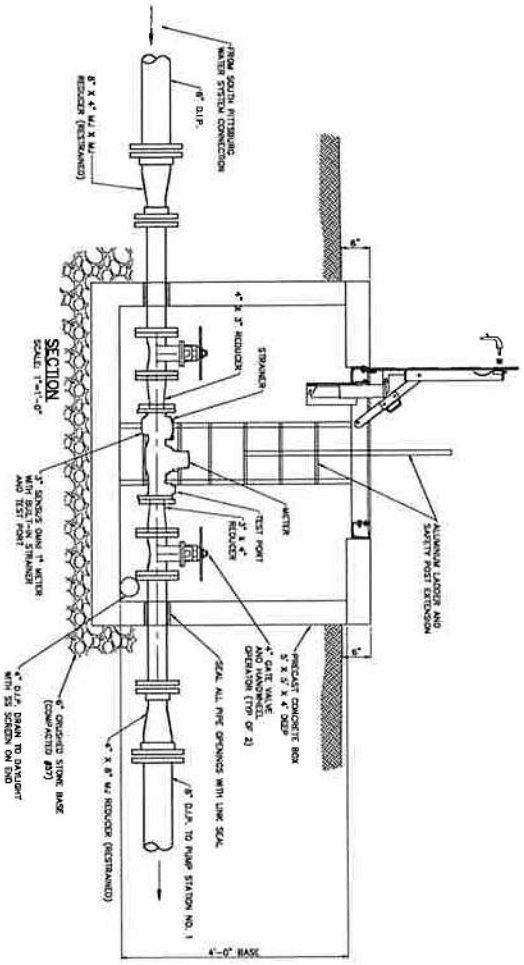
EROSION, SEDIMENT, AND DRAINAGE CONTROL DETAILS

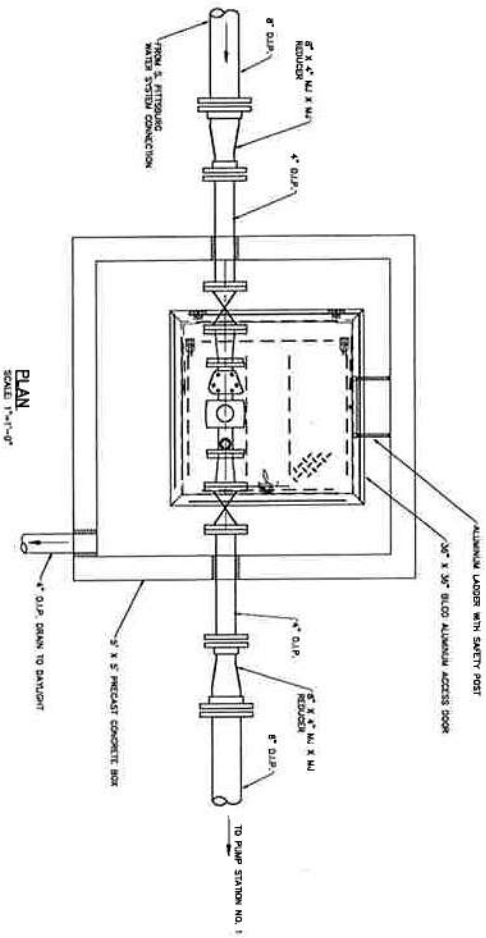
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JOB NO. C13009-01
ISSUE DATE 12/06/13
SCALE AS NOTED
DRAWING NO. 28.0

CTI PROJECT: C13009-01 Jasper Highlands Development Water System Design, DRAWING: MISCELLANEOUS DETAILS (336739+17/12/11/13 @ 12AM), LAYOUT: SHEET 28

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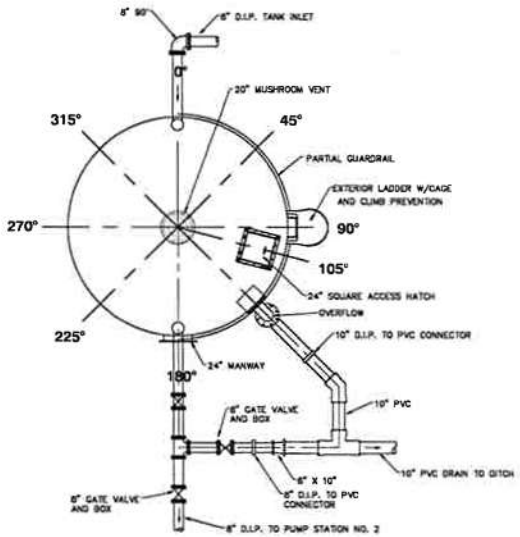
THUNDER ENTERPRISES JASPER HIGHLANDS DEVELOPMENT WATER DISTRIBUTION SYSTEM	DESIGN	JDH	
	DRAWN	MWD	
MASTER METER BOX DETAILS	CHECKED	CHK	
	APPROVED	APR	

REVISIONS				
NO.	DESCRIPTIONS	DATE	BY	APP'D

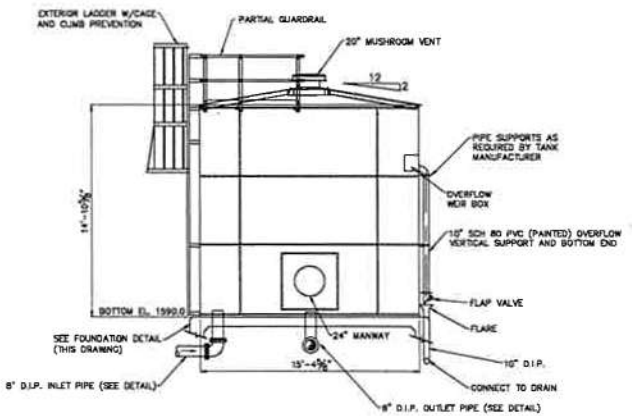
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423-267-7513

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DRAWING NO.	29.0



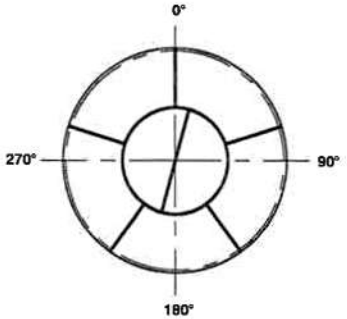
PLAN VIEW



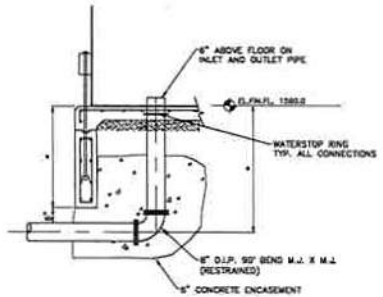
ELEVATION

APPURTENANCES ROTATED FOR CLARITY ONLY
SEE PLAN VIEW FOR CORRECT ORIENTATION

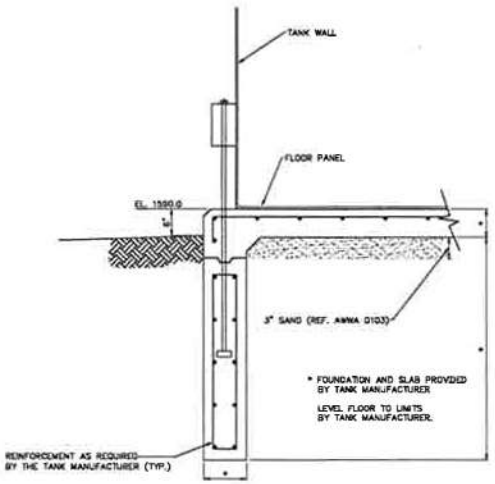
NOTE: THE CAPACITY OF THE WATER STORAGE TANK SHOWN IS 20,000 GALLONS. BIDS WILL ALSO BE REQUESTED FOR A 15,000 GALLON TANK.



FLOOR LAYOUT



TYPICAL INLET, OUTLET CONNECTION
NOT TO SCALE



TANK FOUNDATION DETAIL
NOT TO SCALE

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REVISIONS			
NO.	DESCRIPTIONS	DATE	BY	APP'D

DESIGN JDH
drawn MWD
ENGAGED DDT
APPROVED JDH

THUNDER ENTERPRISES
JASPER HIGHLANDS DEVELOPMENT
WATER DISTRIBUTION SYSTEM

WATER STORAGE TANK

C.T. ENGINEERS, INC.

JOHN D. HIGHER
REGISTERED ENGINEER
STATE OF TENNESSEE

JOB NO. CT3009-01
ISSUE DATE 11/14/2013
SCALE AS NOTED
DRAWING NO. 30.0

CT PROJECT: CT3009-01 Jasper Highlands Development Water System Design, DRAWING BOLTED STEEL STORAGE TANK (287376x2/12/11/13 8:28AM) LAYOUT1 CT
DATE OF PRINT: 12/1/2013 9:31 AM

JASPER HIGHLANDS WATER DISTRIBUTION SYSTEM EXPANSION PHASE II

LOCATION MAP



AERIAL PHOTO



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C001 SITE DETAILS
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C300 SEDIMENT AND EROSION CONTROL NOTES + DETAILS

REVISIONS

WATER LINE EXTENSION PHASE II

at

JASPER HIGHLANDS SUBDIVISION

for

THUNDER ENTERPRISES

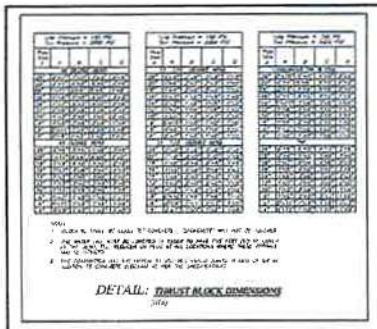
104 BATTLECREEK ROAD
KIMBALL, TN 37348
Phone 423-837-9979
Fax 423-295-4920

March Adams & Associates

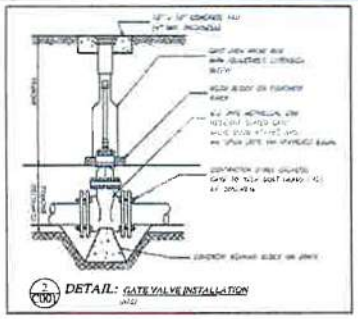
310 Delta Ave
P.O. Box 3068
Chattanooga, Tennessee 37404
TN LIC#0004477

Revisions	date
CHECKED	JP
JOB No.	15318
DATE	05.22.2015

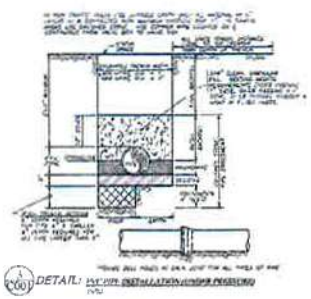
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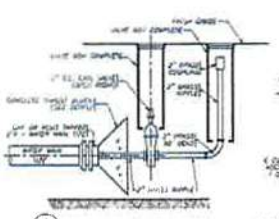
DETAIL: THRUST BLOCK DIMENSIONS



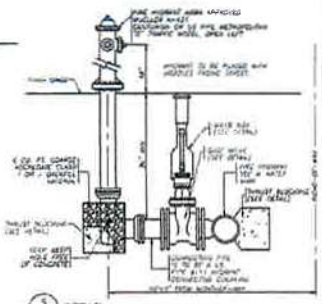
DETAIL: GATE VALVE INSTALLATION



DETAIL: HYDRANT INSTALLATION (OTHER THAN DRIVEWAY)

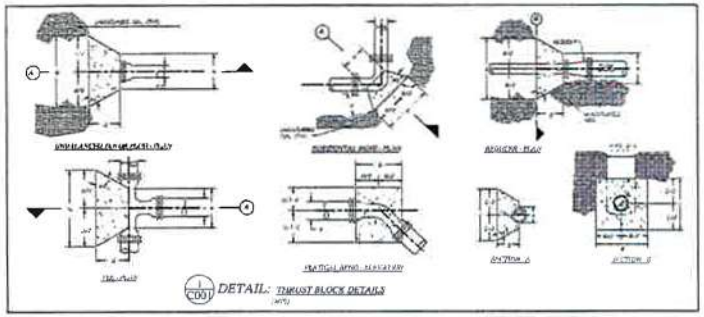


DETAIL: 1" BLOW-OFF ASSEMBLY

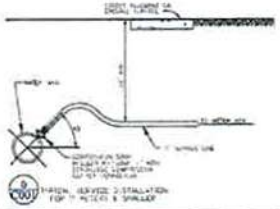


DETAIL: FIRE HYDRANT ASSEMBLY

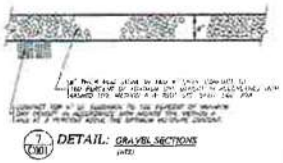
REVISIONS



DETAIL: THRUST BLOCK DETAILS



DETAIL: TYPICAL SERVICE INSTALLATION FOR 1" METERS & SPRINKLER



DETAIL: GRAVEL SECTIONS

WATER LINE EXTENSION PHASE II

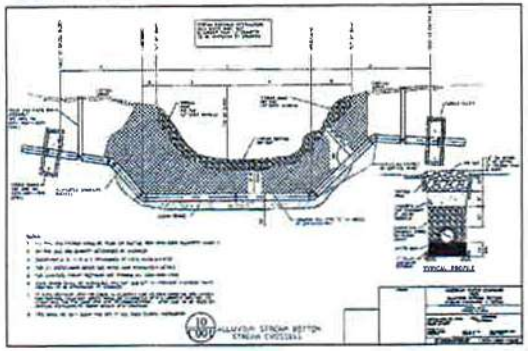
at

JASPER HIGHLANDS SUBDIVISION

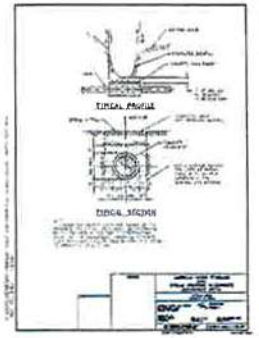
for

THUNDER ENTERPRISES

101 SATTLEGREEN ROAD
KNOXVILL, TN 37380
Phone: 423-421-2976
Fax: 423-288-4300



TYPICAL PROFILE

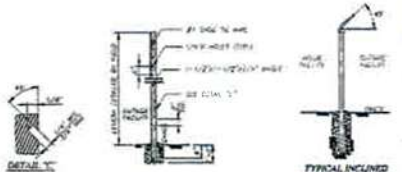


TYPICAL SECTION



STREAM CROSSING WITH CONCRETE ENCASEMENT

March Adams & Associates

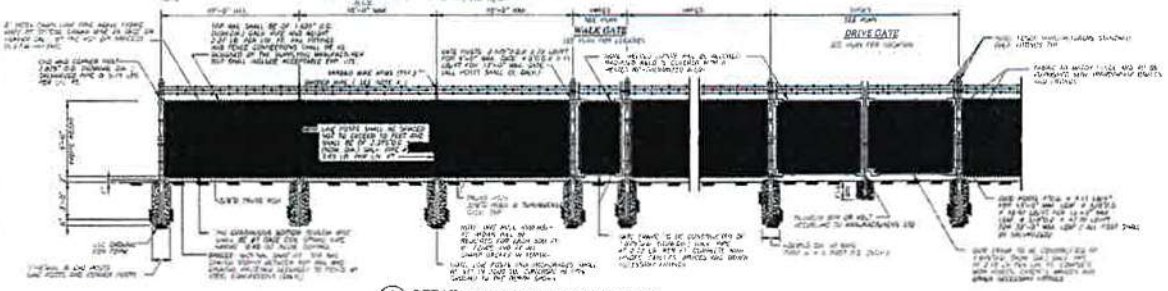


DETAIL "C"

DETAIL "B"

TYPICAL INCLINED NON-CLIMBABLE EXTENSION ARMS

NOTES



WALK GATE

DRIVE GATE

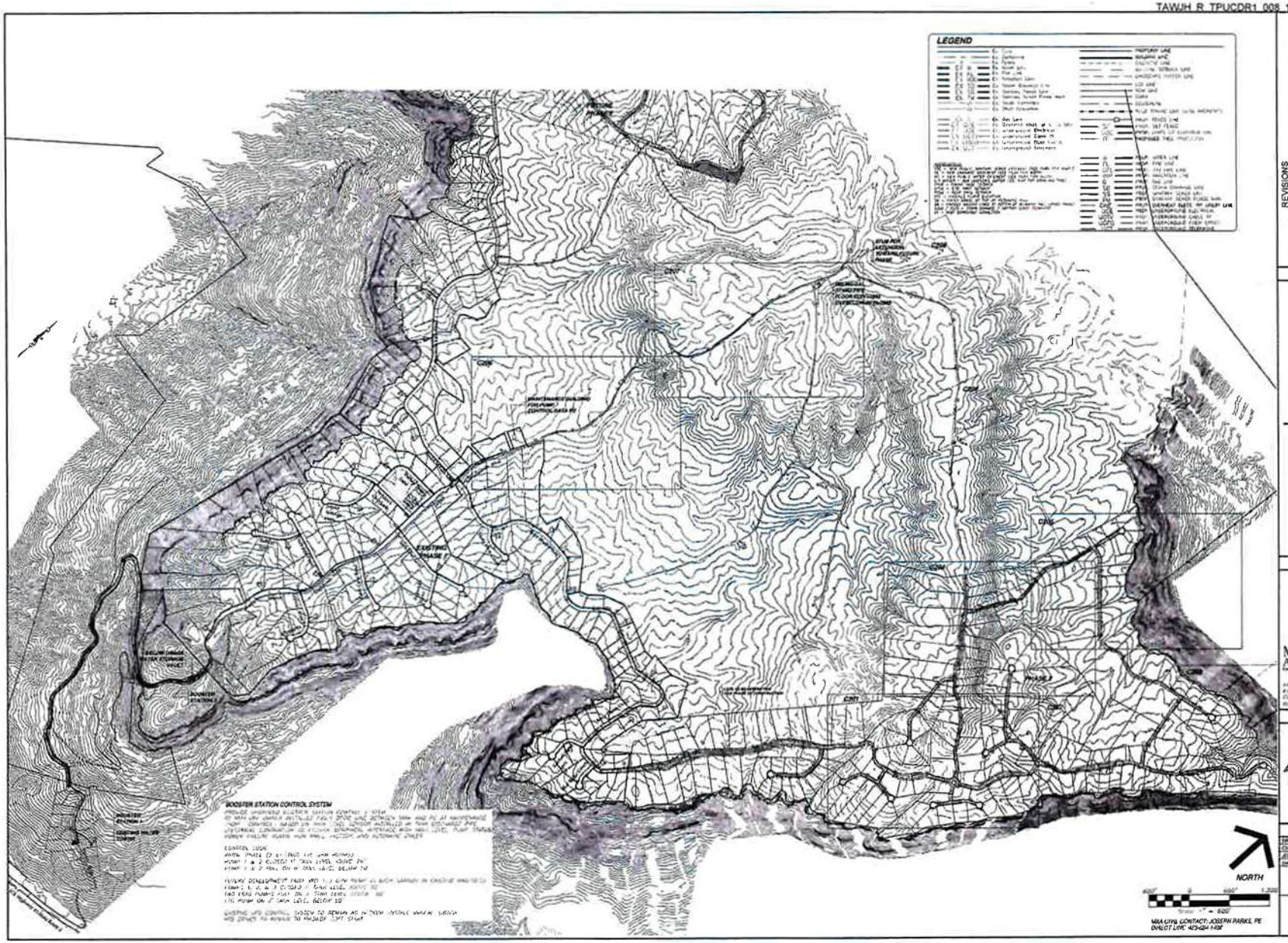
DETAIL: TYPICAL SECURITY FENCE INSTALLATION

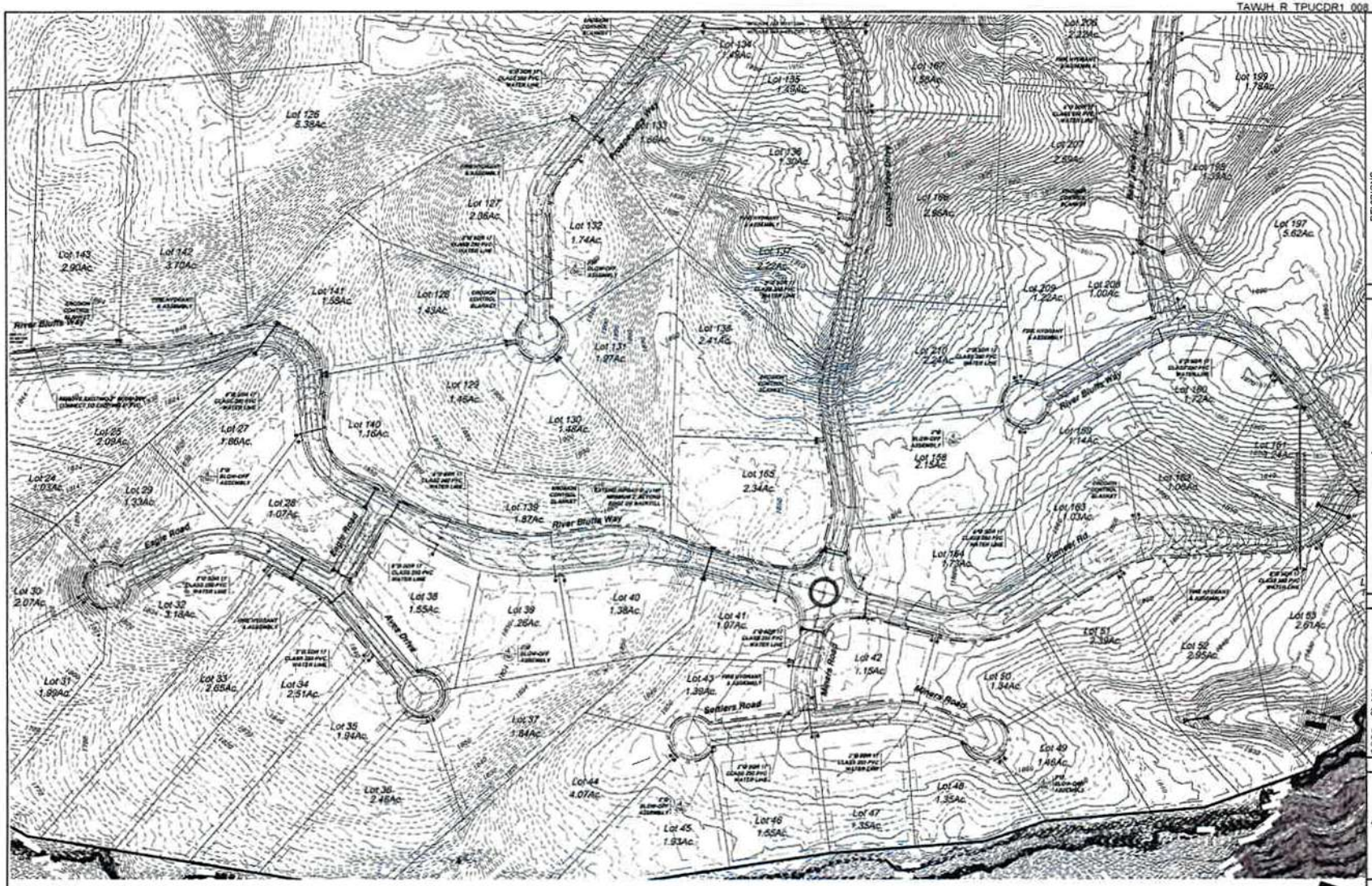
WATER DISTRIBUTION SYSTEM NOTES

DESIGNED
DRAWN
CHECKED
APPROVED
DATE 05-24-2016

C001

SITE DETAILS


LEGEND
BOOSTER STATION CONTROL SYSTEM
NORTH
REVISIONS
WATER LINE EXTENSION PHASE II
at
JASPER HIGHLANDS SUBDIVISION
for
THUNDER ENTERPRISES
March Adams & Associates
C200
OVERALL SITE PHASE II



REVISIONS

WATER LINE EXTENSION PHASE II

at

JASPER HIGHLANDS SUBDIVISION

for

THUNDER ENTERPRISES

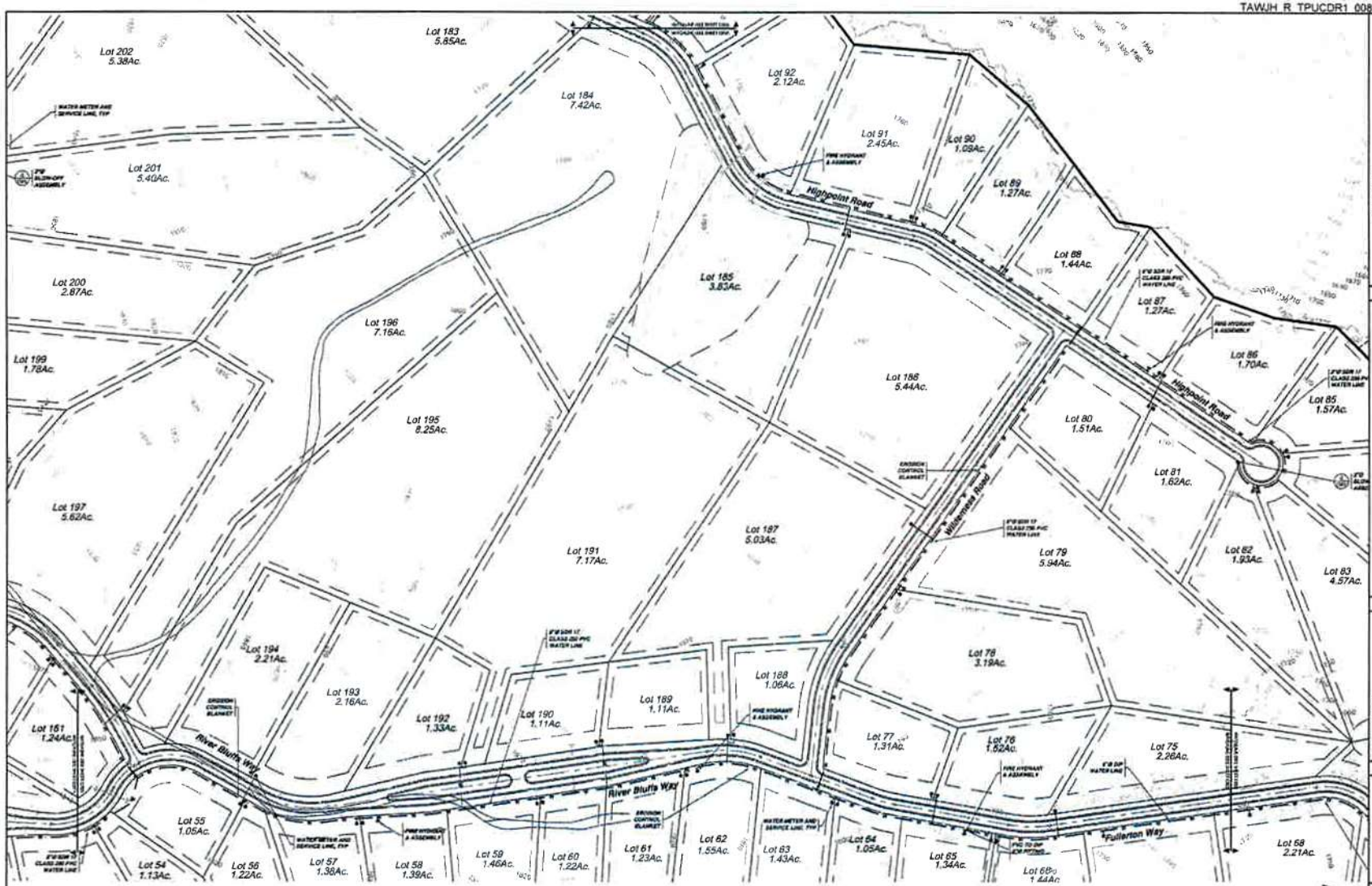
March Adams & Associates
Consulting Engineers

DRAWN	SH
CHECKED	JF
JOB NO.	17218
DATE	10-24-2018

C201

SITE WATER

MA CIVIL CONTACT: JOSEPH FAIRCE, PE
DIRECT LINE: 423-521-1162



REVISIONS

WATER LINE EXTENSION PHASE II

at

JASPER HIGHLANDS SUBDIVISION

for

THUNDER ENTERPRISES

104 BATTLECREEK ROAD
JASPER, TN 37347
Phone (423)-421-9878
Fax 423-256-4588

March Adams & Associates
Consulting Engineers
310 Broad Ave
P.O. Box 1450
Chattanooga, Tennessee 37401
PH (423)265-0675

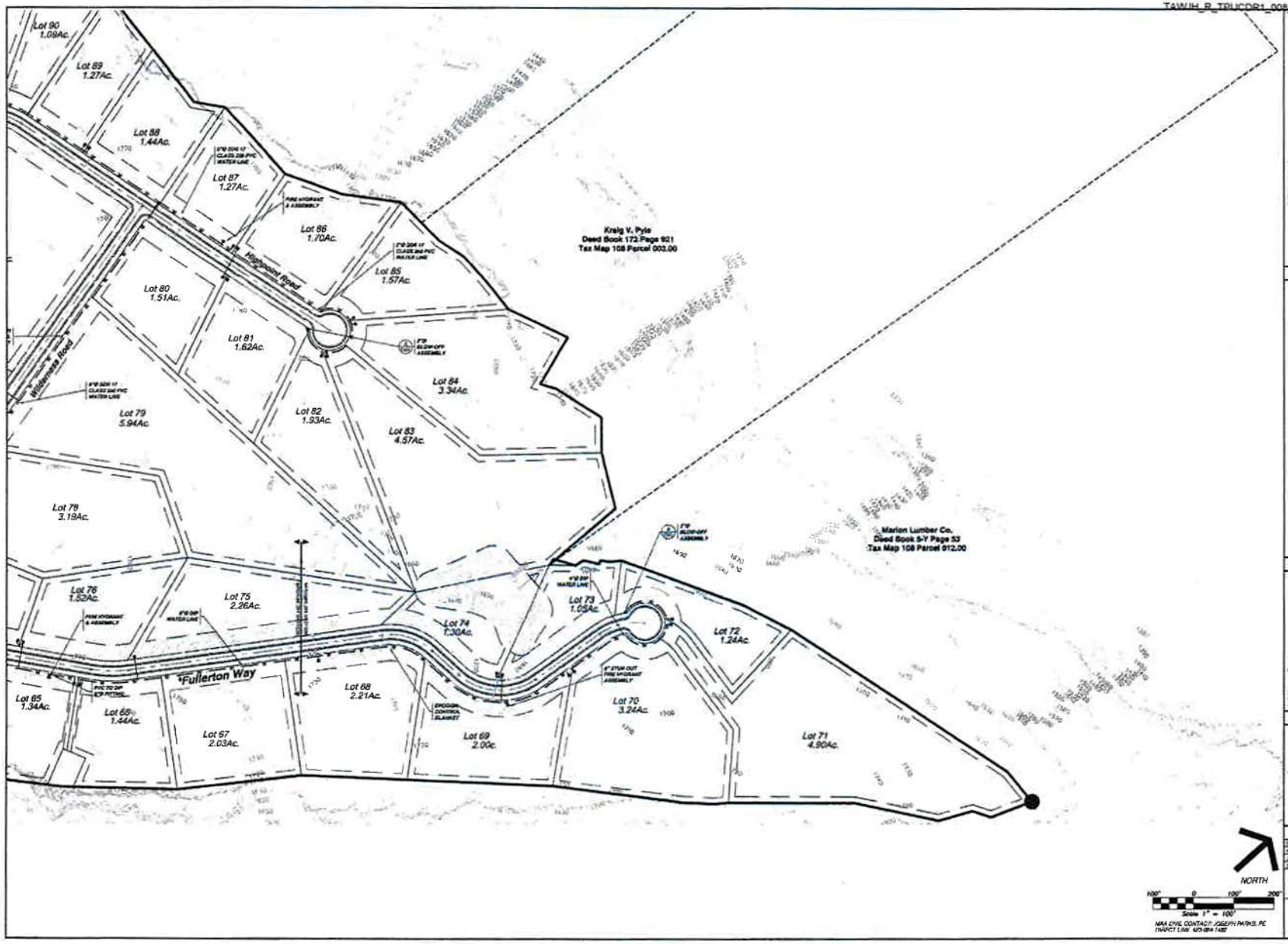
MA&A CIVIL CONTACT: JOSEPH PARKS, PE
DIRECT LINE 423-664-1482

DRAWN: MM
CHECKED: JP
JOB No.: 18018
DATE: 09/24/2018

C202

SITE WATER

I:\2018\18016_Jasper Highlands\Civil\Dwgs\18016 CE Base Photo (1).dwg, 9/27/2018 12:37:56 PM, jparks



REVISIONS

WATER LINE
EXTENSION
PHASE II

of

JASPER HIGHLANDS
SUBDIVISION

for

THUNDER ENTERPRISES

184 BATTLEFIELD ROAD
RINGGOLD, TN 37382
Phone 423-421-2975
Fax 423-228-4290

March Adams &
Associates

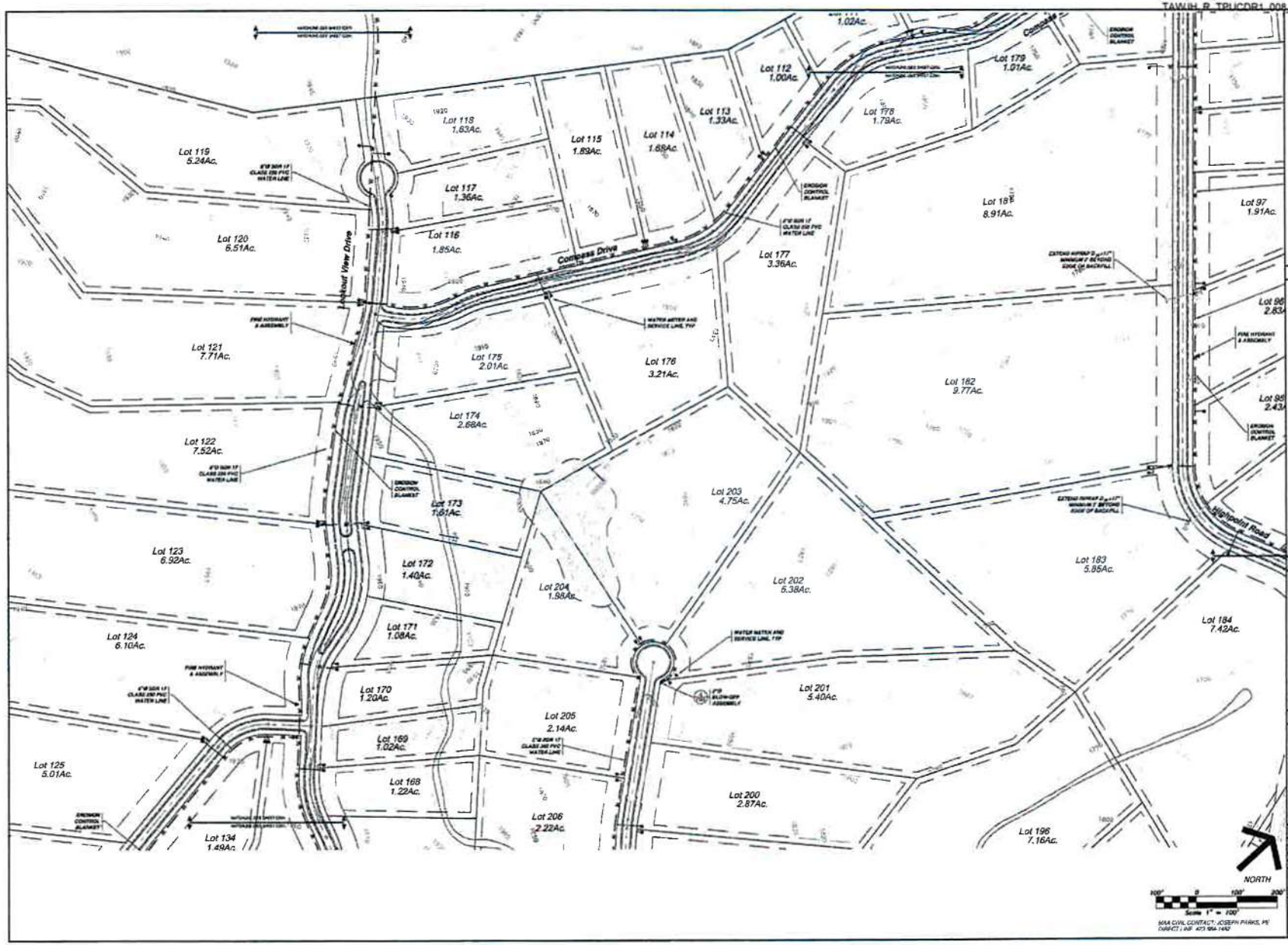
NORTH

Scale 1" = 100'

MA CIVIL CONTACT: JOSEPH PATRIS, PE
DIRECT LINE: 423-664-1482

C203

SITE
WATER



REVISIONS

WATER LINE EXTENSION PHASE II

at

JASPER HIGHLANDS SUBDIVISION

for

THUNDER ENTERPRISES

March Adams & Associates

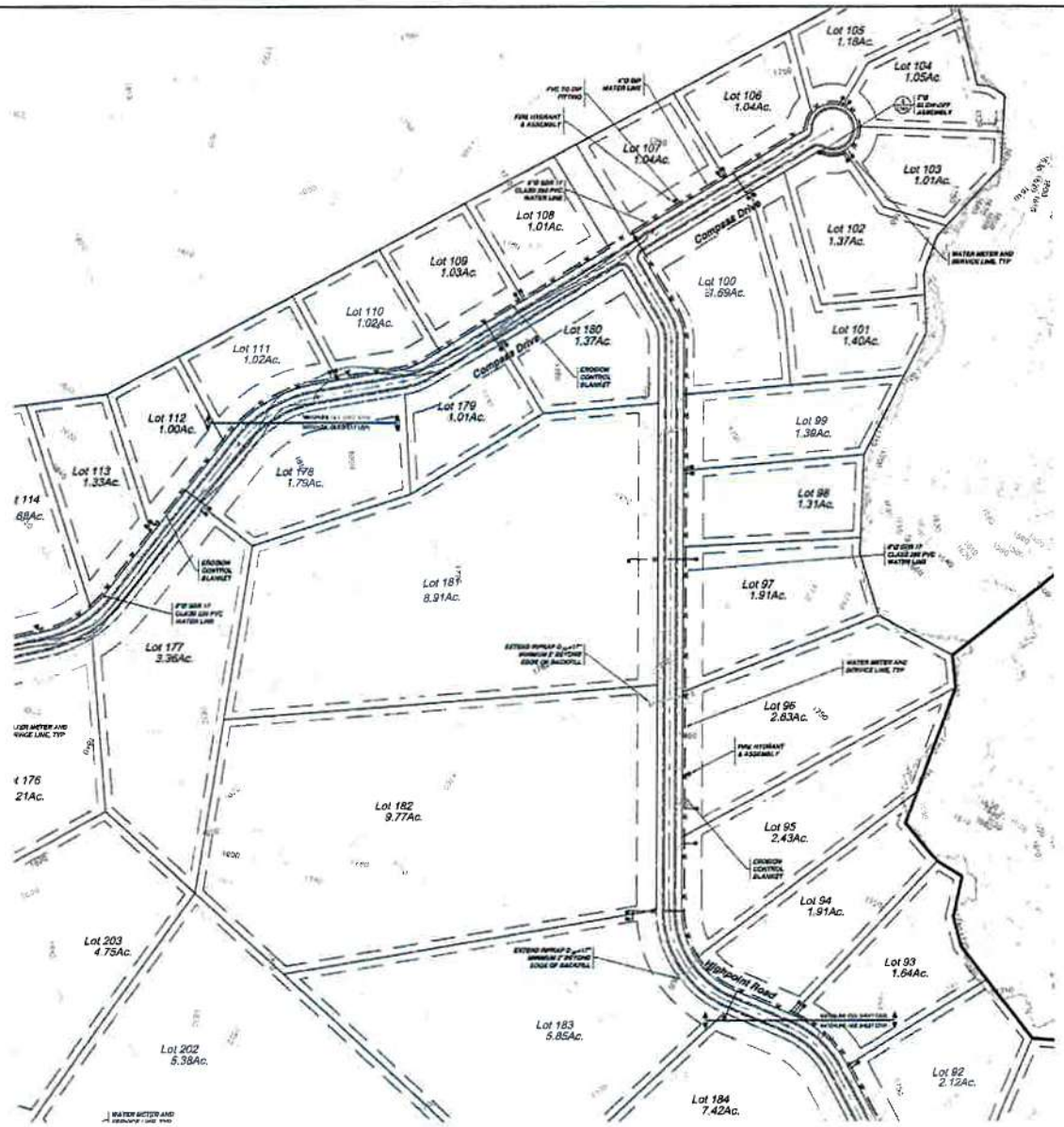
DRAWN	KRI
CHECKED	JP
JOB No.	15348
DATE	07-24-2015

C204

SITE WATER

MA CIVIL CONTACT: JOSEPH PARKS, PE
DIRECT | 423.954.1442

T:\2015\15348_Jasper Highlands Ph II Water Ext\CAD\Dwg\15348 CE Base Phase II.dwg, 10/7/2015 12:21:56 PM, parks



REVISIONS

WATER LINE
EXTENSION
PHASE II
at
JASPER HIGHLANDS
SUBDIVISION

for

THUNDER ENTERPRISES

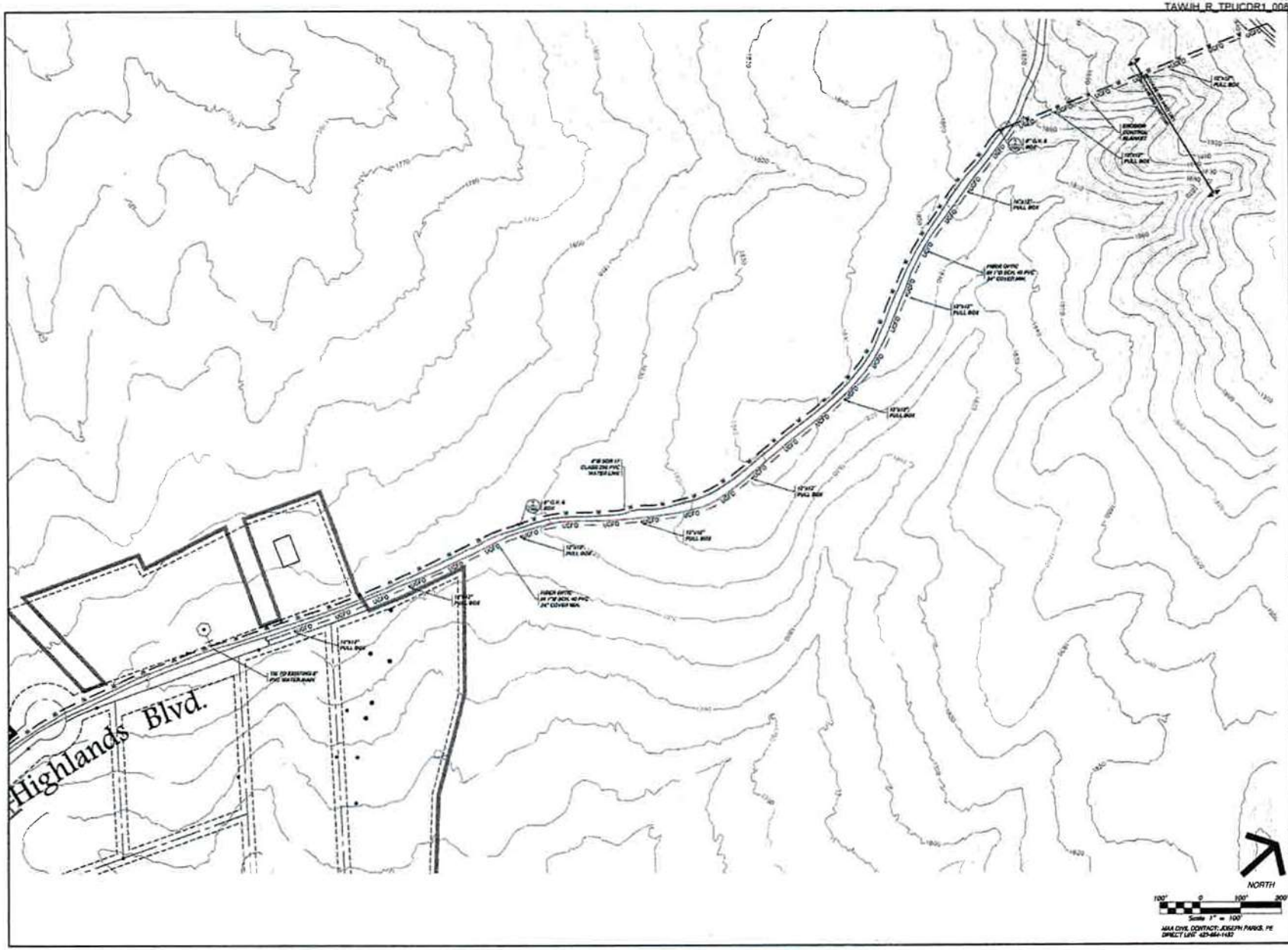
104 BATTLECREEK ROAD
KNOXVILLE, TN 37920
Phone 423-427-9975
Fax 423-278-4300

March Adams &
Associates

C205

SITE
WATER

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REVISIONS

WATER LINE
EXTENSION
PHASE II

at

JASPER HIGHLANDS
SUBDIVISION

for

THUNDER ENTERPRISES

104 BATTLECREEK ROAD
KIMBALL, TN 37350
Phone 423-421-5875
Fax 423-328-4200

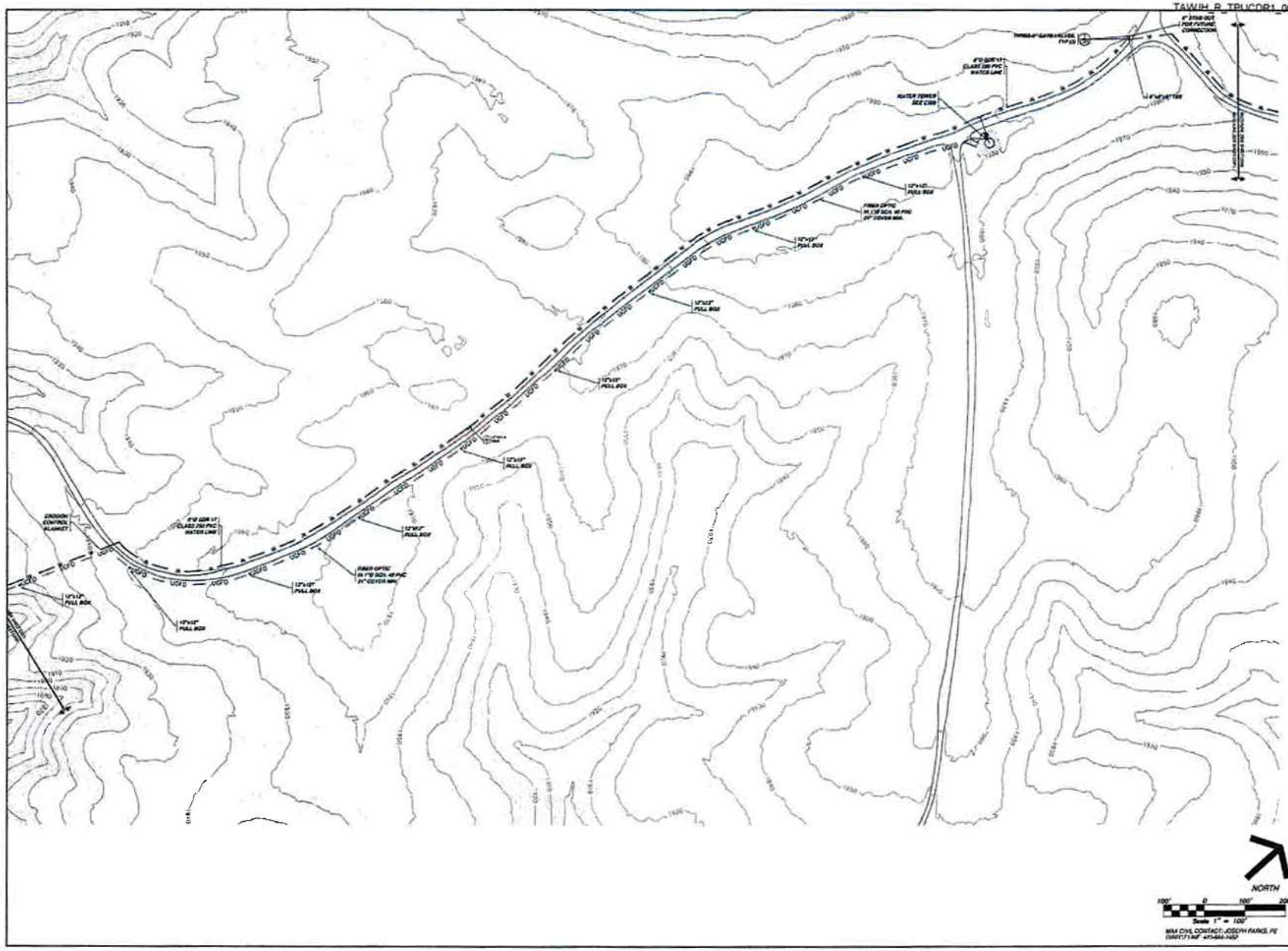
March Adams &
Associates
Consulting Engineers

MA&A CONTACT: JOSEPH PARKS, PE
DIRECT LINE: 423-664-1432

DESIGNED	BWI
DRAWN	JP
JOB No.	0316
DATE	05-24-2018

C206

OFFSITE
WATER



REVISIONS

WATER LINE
EXTENSION
PHASE II

at

JASPER HIGHLANDS
SUBDIVISION

for

THUNDER ENTERPRISES

124 BATTLECREEK ROAD
KIMBALL, TN 37350
Phone: 423-421-9973
Fax: 423-228-4500

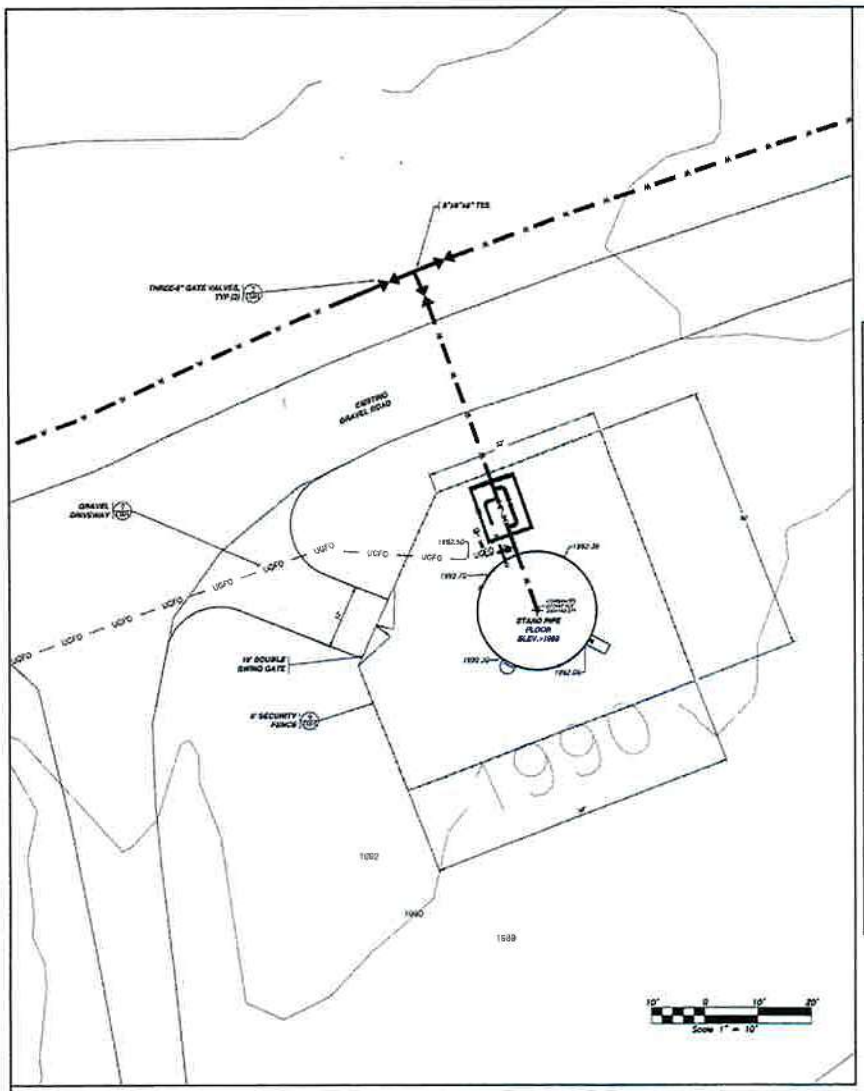
March Adams &
Associates

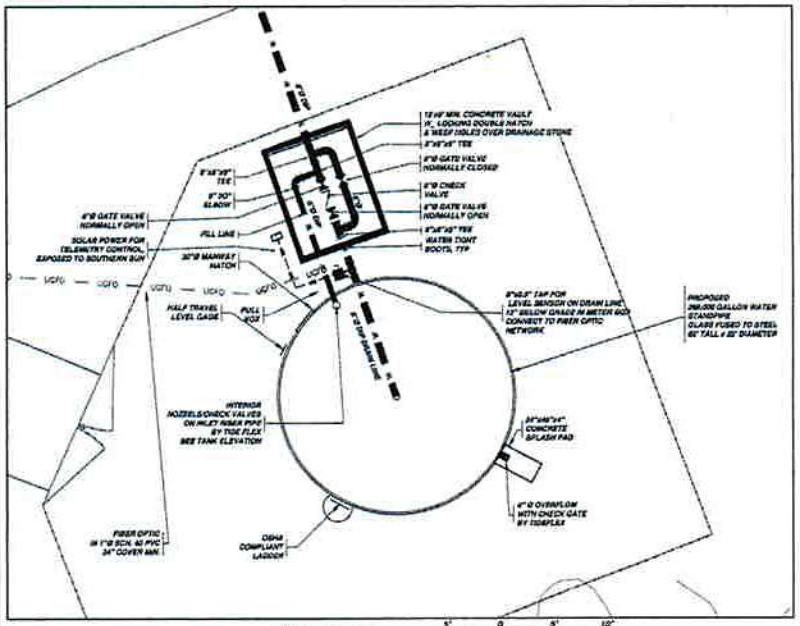
DESIGN
CHECKED
JOB No.
DATE

C207

OFFSITE
WATER

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VAULT AND TANK DETAIL
SEE SHEET C211 FOR TANK ELEVATION

NORTH

MA&A CIVIL CONTACT: JOSEPH PARKS, PE
DIRECT LINE: 423-664-1402

REVISIONS

WATER LINE EXTENSION PHASE II

at

JASPER HIGHLANDS SUBDIVISION

for

THUNDER ENTERPRISES

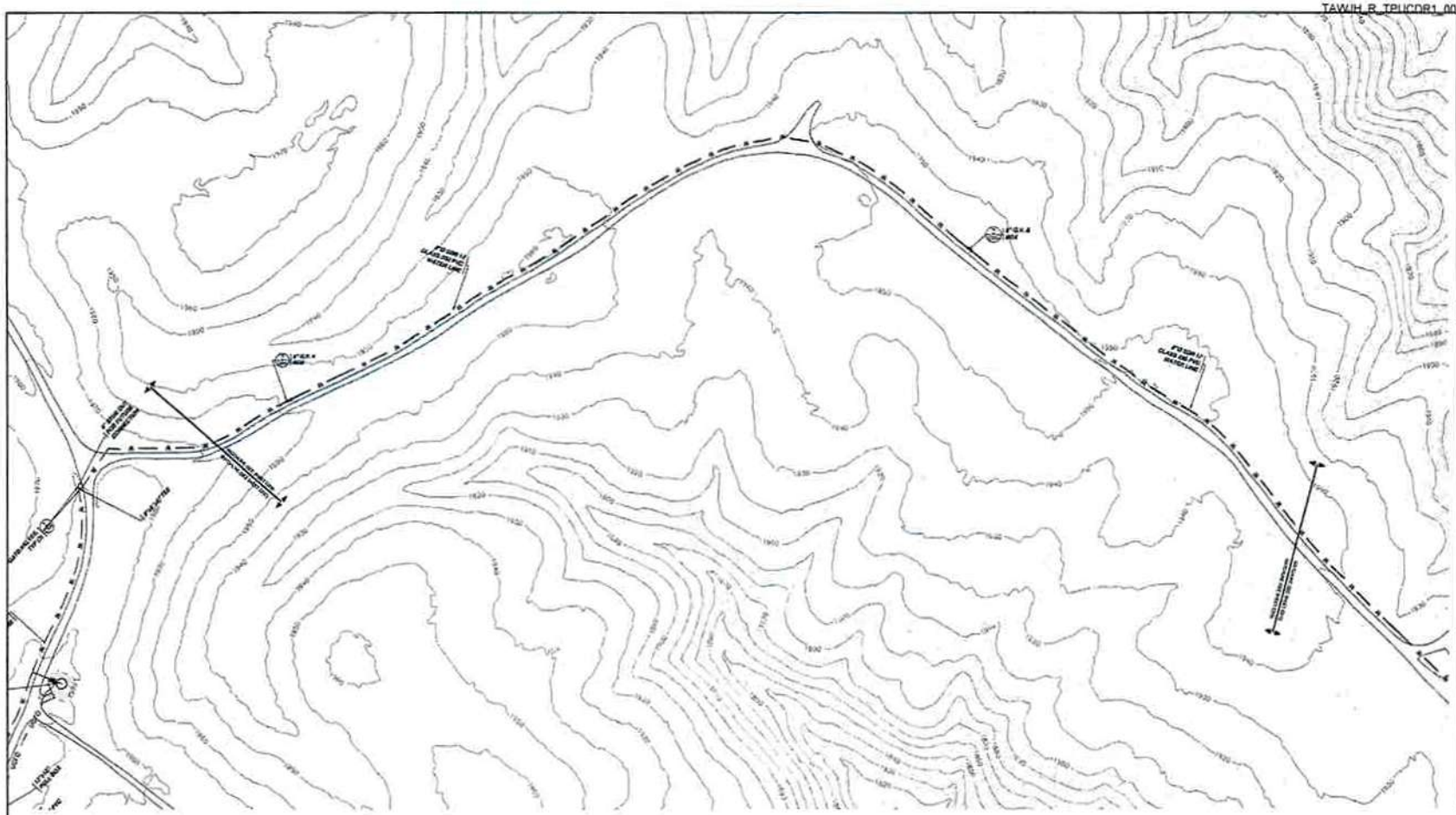
104 BATTLECREEK ROAD
KIMBALL, TN 37345
Phone: 423-421-9575
Fax: 423-228-4500

March Adams & Associates
Consulting Engineers

DRAWN	BM
CHECKED	JP
JOB No.	17010
DATE	09.24.2018

C208

TANK AREA PLAN



REVISIONS

WATER LINE
EXTENSION
PHASE II
at
JASPER HIGHLANDS
SUBDIVISION

for

THUNDER ENTERPRISES

104 BATTLECREEK ROAD
KIMBALL, TN 37350
Phone: 423-421-9975
Fax 423-326-4500

March Adams &
Associates

NORTH

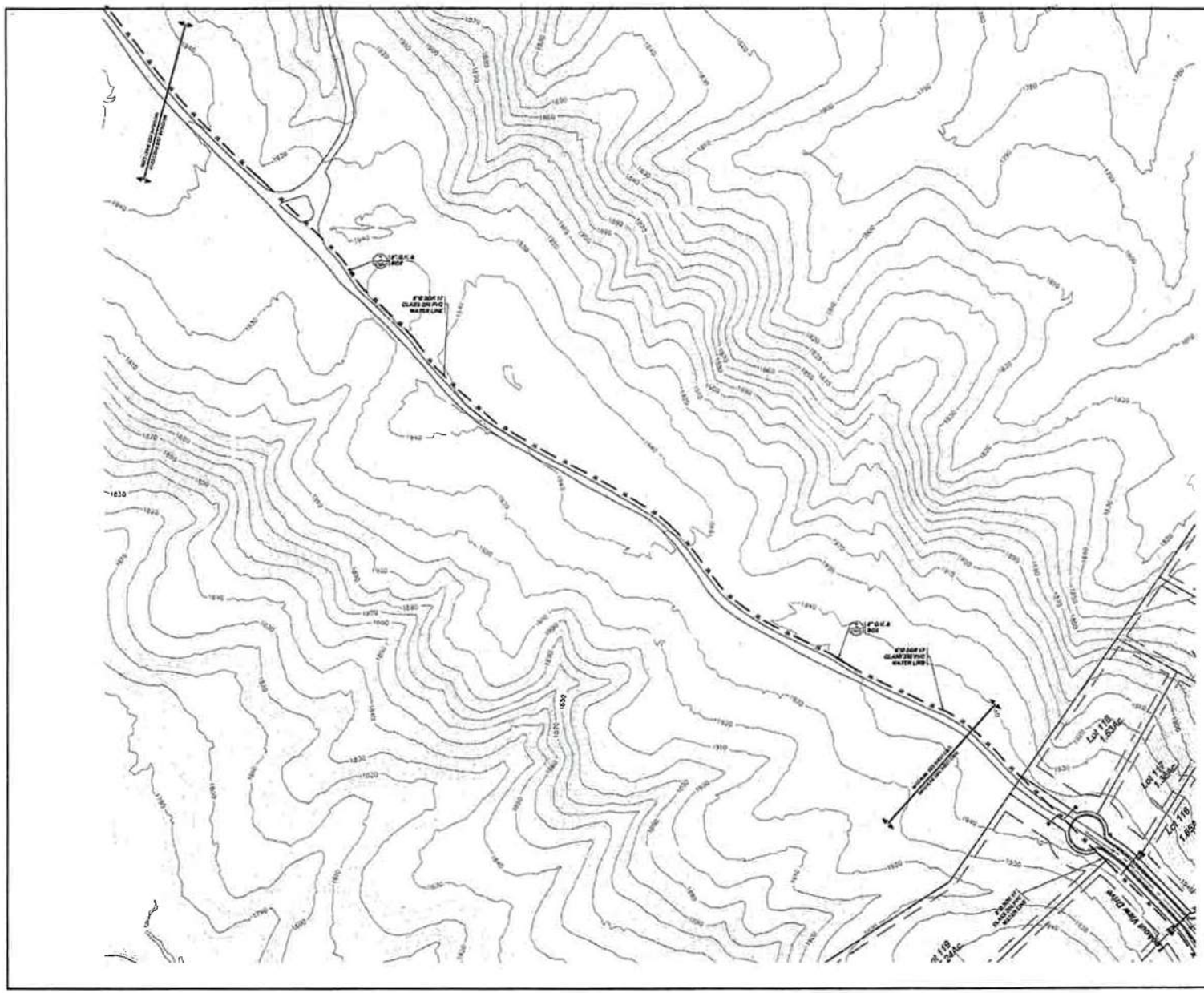
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NAM CIVIL CONTACT: JOSEPH PARKS, PE
DIRECT LINE: 423-664-1482

Drawn	BWI
CHECKED	JP
JOB NO	15218
DATE	05.24.2018

C209

OFFSITE WATER



REVISIONS

WATER LINE
EXTENSION
PHASE II

at

JASPER HIGHLANDS
SUBDIVISION

for

THUNDER ENTERPRISES

104 BATTLEGREEN ROAD
KIMBALL, TN 37350
Phone 423-421-9975
Fax 423-228-4300

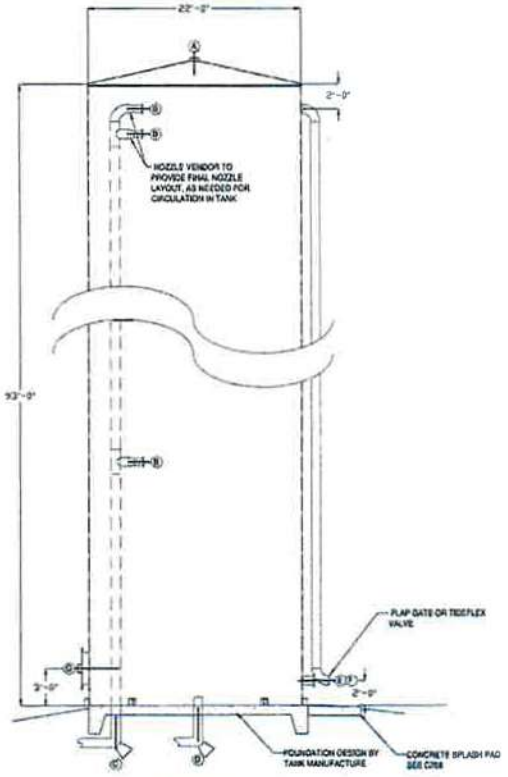
March Adams &
Associates

DRAWN	
CHECKED	
JOB No.	
DATE	

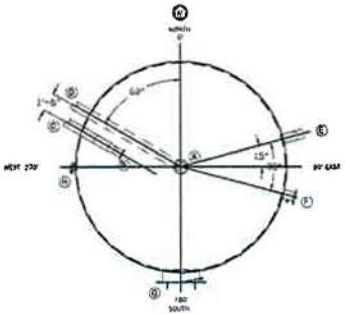
C210

OFF SITE
WATER

NOZZLE SCHEDULE			
MK	SIZE	QTY	SERVICE
A	16"	1	BREATHER VENT
B	4"	PER VENDOR	TIDEFLEX MIXING SYSTEM
C	8"	1	INLET
D	8"	1	OUTLET
E	8"	1	OVERFLOW
F	8"	1	DRAIN, WITH SAMPLING PORT NOZZLE
G	30"	1	MANWAY
H		1	MAN TRAVEL LEVEL GAGE
J			
K			
L			
M			



ELEVATION



PLAN VIEW

GENERAL NOTES:

1. TANK CAPACITY TO BE 250,000 GALLONS FOR POTABLE WATER SERVICE. INITIAL NORMAL STORAGE WILL BE LOWER
2. MAXIMUM INLET FLOW 500 GPM, MAXIMUM OUT FLOW 800 GPM
3. MANUFACTURER TO PROVIDE STAMPED SHOP DRAWINGS ACCORDING TO ALL LOCAL AND NATIONAL CODES AND STANDARDS.
4. ROOF ACCESS SAFETY CAGE LADDER IS NOT SHOWN AND IS TO BE PROVIDED WITH THE TANK
5. ALL PIPE SUPPORTS BOTH INTERNAL AND EXTERNAL BY MANUFACTURER
6. TANK SUPPORT ANCHORS AND FOUNDATION BY TANK MANUFACTURER.

REVISIONS

WATER LINE EXTENSION PHASE II

at

JASPER HIGHLANDS SUBDIVISION

for

THUNDER ENTERPRISES

104 BATTLECREEK ROAD
KIMBALL, TN 37350
Phone 423-421-9975
Fax 423-208-4500

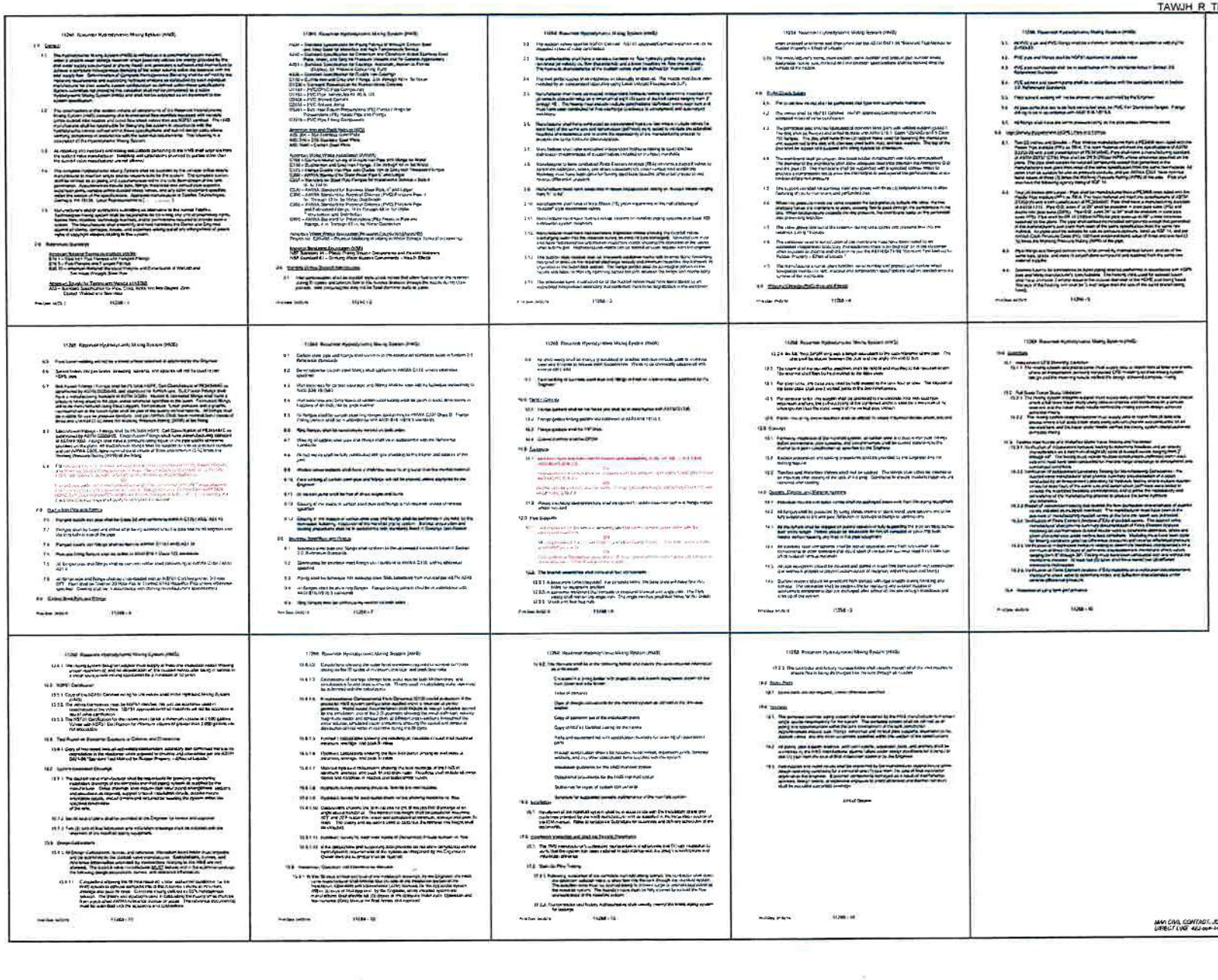
March Adams & Associates

DESIGNED	SBH
CHECKED	JP
JOB No.	15316
DATE	5.24.2016

C220

TANK ELEVATION

MA CIVIL CONTACT: JOSEPH PARKS, PE
DIRECT LINE: 423-664-1682



REVISIONS

WATER LINE EXTENSION PHASE II

at

JASPER HIGHLANDS SUBDIVISION

for

THUNDER ENTERPRISES

104 BATTLECREEK ROAD
KIMBALL, TN 37350
Phone 423-421-9975
Fax 423-296-4200

March Adams & Associates
Civil and Site Engineers
318 Dunlap Ave.
P.O. Box 2689
Chattanooga, Tennessee 37409
PH (423)648-4677

DESIGN MM
CHECKED JP
JOB No. 17218
DATE 10-24-2018

C211

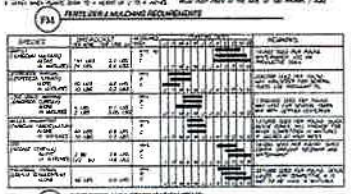
RESERVOIR HYDRODYNAMIC MIXING SYSTEM

MA CIVIL CONTACT: JOSEPH PARKS, PE
DIRECT LINE 423-664-1462

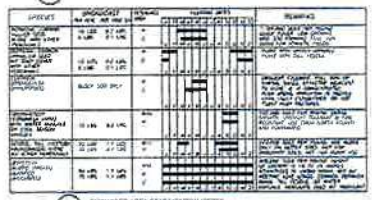
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DISTURBED-AREA STABILIZATION (WITH BLANKETING ONLY)



DISTURBED AREA STABILIZATION (STRAW)

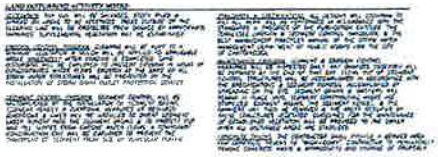


DISTURBED AREA STABILIZATION (PERM)

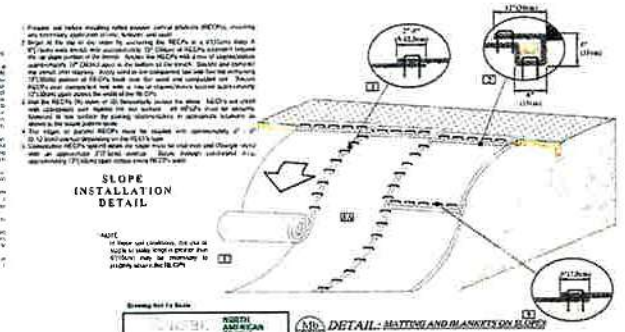
SEDIMENT & EROSION CONTROL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR TEMPORARY EROSION & SEDIMENT CONTROL (INVOLVING A TMC WEST MANAGEMENT PRACTICES MANUAL OF THE STORM WATER MANAGEMENT ORDINANCE OF PUBLIC WORKS FOR THE CITY OF CHATTANOOGA.
2. CONTRACTOR SHALL BE RESPONSIBLE DURING CONSTRUCTION FOR THE MAINTENANCE OF ALL TEMPORARY & PERMANENT CONTROL DEVICES AND SHALL REPAIR, REPLACE OR SUPPLEMENT THEM TO ENSURE A SATISFACTORY CONTROL THROUGHOUT THE CONSTRUCTION PERIOD.
3. EXCAVATED & EROSION CONTROL SEDIMENT & STORM DRAINAGE DEVICES SHALL BE CONSTRUCTED PRIOR TO ANY OTHER CONSTRUCTION.
4. TEMPORARY & EROSION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL ALL CONSTRUCTION IS COMPLETE & UNTIL A PERMANENT GROUND COVER HAS BEEN ESTABLISHED.
5. ALL GRADED AREAS SHALL BE SEEDED WITH A TEMPORARY FAST GROWING COVER AND/OR MULCH. SEEDING SHALL MEET SPEC. DURING WINTERIZING ACTIVITY AREAS IN WHICH WORK HAVING BEEN HALTED FOR A TIME GREATER THAN FIVE DAYS SHALL FIRST PASS OF AT LEAST 10 DAYS.
6. EXISTING DRAINAGE STRUCTURES TO BE PROTECTED. PROTECTION OF INLETS & EQUIPMENT USE TO PREVENT SILT FROM ENTERING.
7. MULCHING & FERTILIZING RATES FOR TEMPORARY AND PERMANENT STAGES OF GRASS SHALL BE PER CHARTS ON DETAIL SHEET.
8. ADDITIONAL EROSION CONTROL DEVICES SHALL BE USED AS REQUIRED.
9. SILT FENCE AND/OR SAU SOCK SHALL BE CLEANED OR REPLACED WHEN SILT LOSSES UP TO 50% CAPACITY OF SILT FENCE AND/OR SILT SOCK.
10. IF ANY SUITS OR CLAIMS ARE LEVIED AGAINST THE PROPERTY OR PROPERTY OWNER BECAUSE OF LACK OF EROSION AND/OR SEDIMENT CONTROL, THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEFENSE OF SUCH SUITS OR CLAIMS AND ON THE END OF THE SUIT ANY FINES OR PENALTIES LEVIED FROM THE CONTRACT PAYMENT.
11. EROSION PREVENTION MEASURES SHALL BE IMPLEMENTED AT ALL TIMES. IF FINAL IMPLEMENTATION OF THE APPROVED PLAN SHALL NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL CONTROLS & MEASURES SHALL BE IMPLEMENTED AS DIRECTED BY THE ENGINEER OR INSPECTOR.
12. CONSTRUCTION SITE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT EFFECTIVE SEDIMENT CONTROL. CONTRACTOR SHALL REMOVE ALL SEDIMENT DEPOSITED ON PAVED AREAS AND ROADWAYS WITHIN 24 HOURS OF DISCOVERY OR AS DIRECTED BY THE ENGINEER.
13. THE CONTRACTOR SHALL USE EFFECTIVE MEASURES AND METHODS TO PREVENT DUST & CONSTRUCTION DEBRIS FROM BLOWING ONTO ADJACENT PROPERTIES. THIS CAN BE ACCOMPLISHED BY SMALL TEMPORARY SEDIMENT BARRIERS, SILT FENCES AT TOES AND/OR DIVERSIONS OF SEDIMENT LADEN WATER AT TEMPORARY DRAINAGE OUTLETS. TEMPORARY SEDIMENT CONTROL DEVICES SHALL BE REMOVED AFTER FINAL INSPECTION. IN NO EVENT SHALL CONSTRUCTION DEBRIS BE ALLOWED TO ENTER WATERWAYS. SEDIMENTS REMOVED DURING CONSTRUCTION SHALL BE DISPOSED OF PERMANENTLY ENCLOSED IN A MANNER SUBSEQUENT TO PREVENT EROSION.
14. CONTRACTOR SHALL DRIVE ALL VEHICLES AND EQUIPMENT TO CONTROL DUST. CONTRACTOR SHALL CONTROL DUST BY SPRINKLING, AS DETAILED. CALCIUM CHLORIDE, OR BY OTHER METHODS AS DIRECTED BY ENGINEER AND/OR OWNER'S REPRESENTATIVE, AT NO ADDITIONAL COST TO OWNER.
15. CONTRACTOR TO COMPLY WITH ALL STATE & LOCAL SEDIMENT CONTROL & NPDES PERMITTING REQUIREMENTS.
16. TC 1500 SEED MIX TO BE USED.
17. TEMPORARY EROSION CONTROL DEVICES TO BE INSTALLED PRIOR TO INITIATION OF GROUND CONSTRUCTION SHALL MAINTAIN ALL TEMPORARY EROSION CONTROL DEVICES & SHALL REMOVE SILT FENCE AFTER SITE IS STABILIZED.
18. ALL SOIL DETAILS TO BE FOLLOWED AND/OR MODIFIED TO PROVIDE PROPER DRAINAGE.
19. ALL AREAS NOT DISTURBED DURING AND TO BE MISSED, LANDSCAPED, GRADED, AND/OR ANYTHING & ABANDONED SHALL HAD ADEQUATE STAND OF GRASS IS OBTAINED.
20. SEEDING & FERTILIZING RATES FOR TEMPORARY & PERMANENT STAGES OF GRASS SHALL BE PER THE CITY OF CHATTANOOGA SOIL MANAGEMENT PRACTICES MANUAL OF THE STORM WATER DEPARTMENT OF PUBLIC WORKS FOR THE CITY OF CHATTANOOGA.

LAND DISTURBANCE ACTIVITY NOTES:



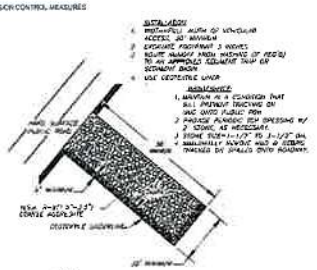
CHANNEL INSTALLATION DETAIL



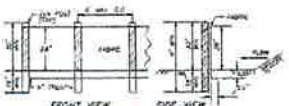
SLOPE INSTALLATION DETAIL

MB DETAIL: MATTING AND BLANKETS IN CHANNELS (MC)

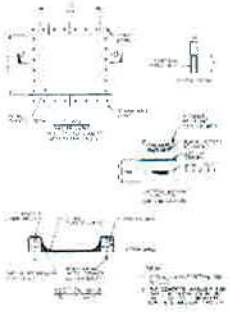
MB DETAIL: MATTING AND BLANKETS ON SLOPES (MS)



CE DETAIL: STONE PAD CONSTRUCTION EXIT (SE)



SF DETAIL: SILT FENCE - TYPE A (SF)



CW DETAIL: CONCRETE WASHOUT (CW)

REVISIONS

WATER LINE EXTENSION PHASE II

at

JASPER HIGHLANDS SUBDIVISION

for

THUNDER ENTERPRISES

104 BATTLECREEK ROAD
KIMBALL, TN 37347
Phone 423-971-5975
Fax 423-228-4500

March Adams & Associates
P.O. Box 3668
Chattanooga, Tennessee 37404
Ph# (423)265-8679

DESIGN: MA
CHECKED: JP
JOB No.: 18018
DATE: 05/24/2018

C300

SEDIMENT AND EROSION CONTROL NOTES AND DETAILS

TJ2018\18120_Jasper Highlands Ph II Water Ext\CVIL\Dwgs\18018 CE Details Phase II.dwg 5/29/2018 1:06:20 PM jmcNeill

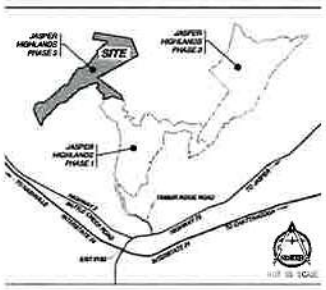
EXHIBIT G

JASPER HIGHLANDS SUBDIVISION

PHASE 3

PROPOSED WATERLINE

DEVELOPED BY:
THUNDER ENTERPRISES
104 BATTLECREEK ROAD
KIMBALL, TENNESSEE 37380
(423) 421-9775



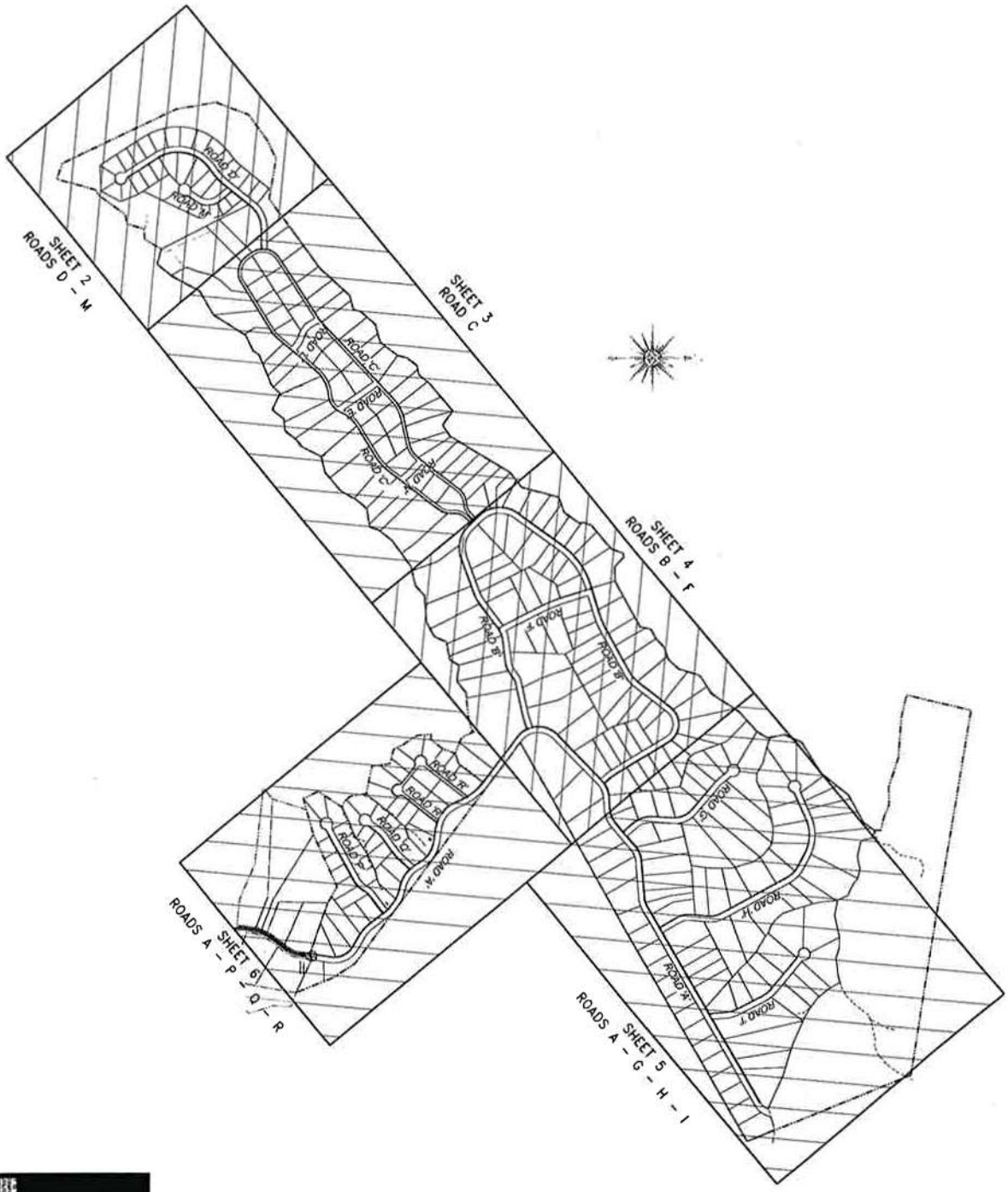
VICINITY MAP

PREPARED BY:
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
77 COTHER STREET CROSSVILLE, TN 38555
(931) 456-6071
JANUARY 2017

THE ATTACHED DRAWINGS FOR WATER LINES IN JASPER HIGHLANDS SUBDIVISION - PHASE 3 HAVE BEEN REVIEWED AND APPROVED BY CLARENCE HOWARD AS REPRESENTATIVE FOR JASPER HIGHLANDS SUBDIVISION.

CLARENCE HOWARD 01-11-2017 DATE

Copyright 2017 FECS



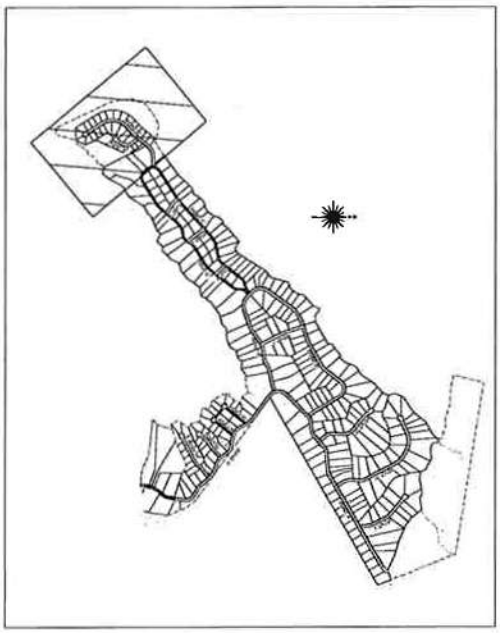
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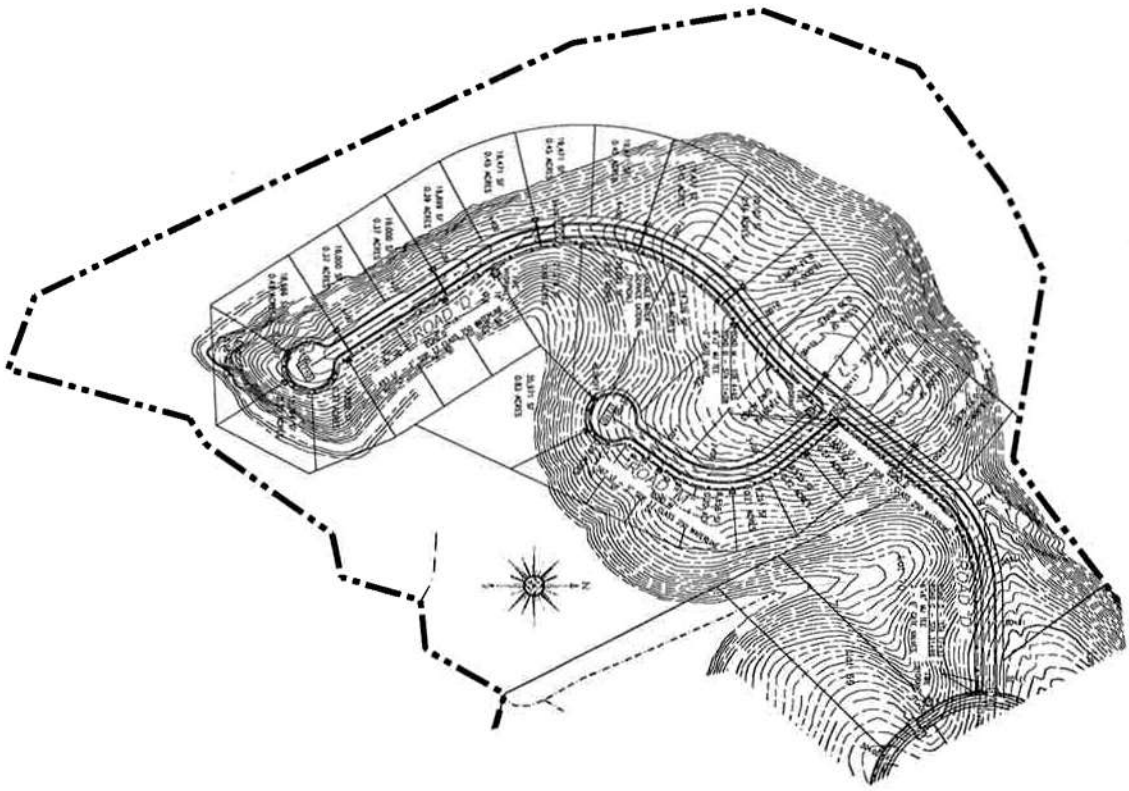
DRAWN BY:
CHK'D:
APPROVED BY: BARRY R. FIELD, P.E.
DATE: 06 JANUARY 2017
SCALE: 1" = 400'
PROJECT NUMBER: 159-16
SHEET NO. 1 OF 6

JASPER HIGHLANDS SUBDIVISION
PHASE 3 - OVERALL
PROPOSED WATERLINE
DEVELOPER: THUNDER ENTERPRISES
104 BATTLECREEK ROAD
KIMBALL, TENNESSEE 37380

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
PROFESSIONAL CIVIL ENGINEERING SERVICES
77 COTHER STREET
PHONE (931) 456-6071 CROSSVILLE, TN 38555 FAX (931) 456-6071

REV #	DATE	DESCRIPTION





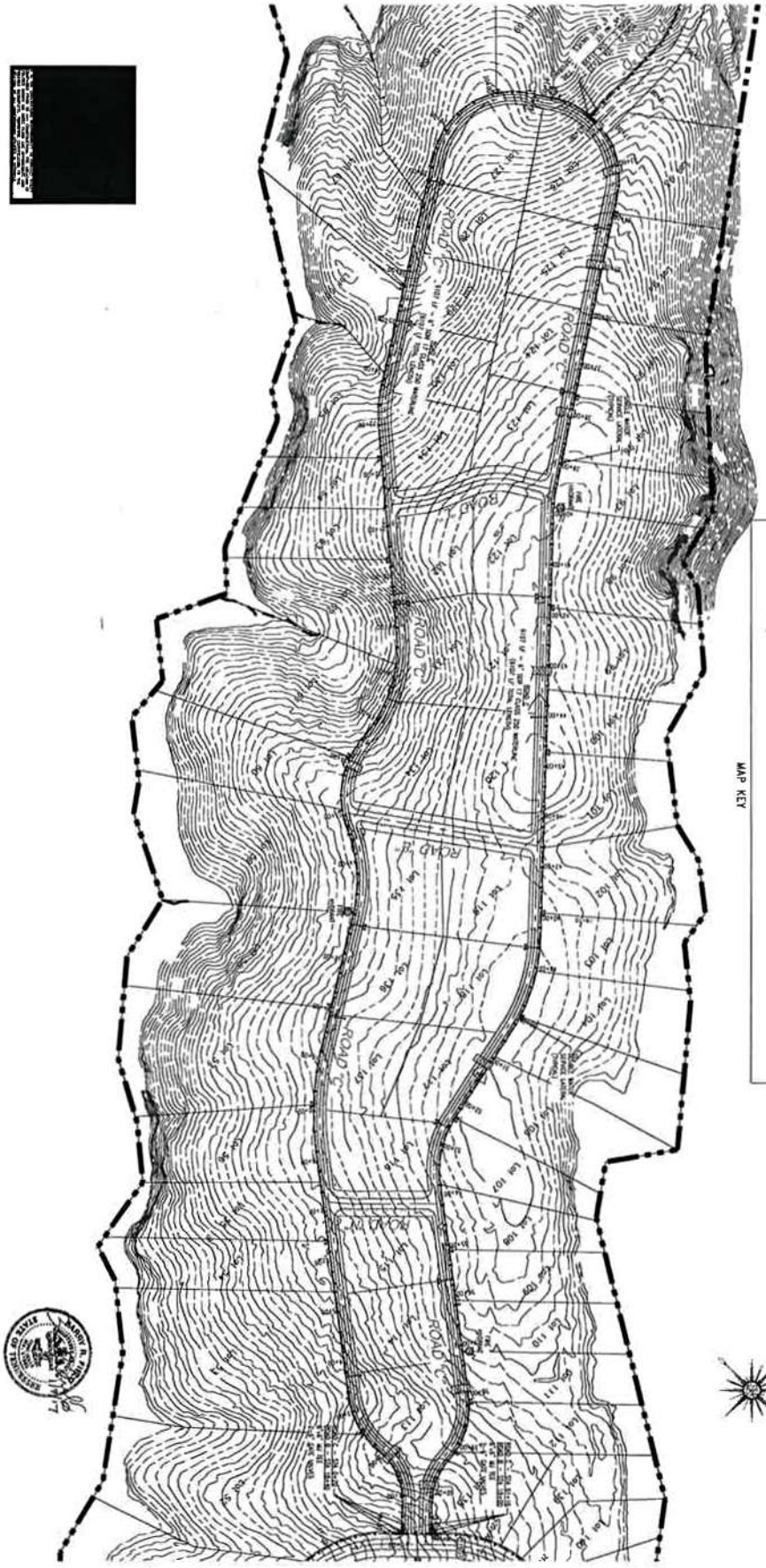
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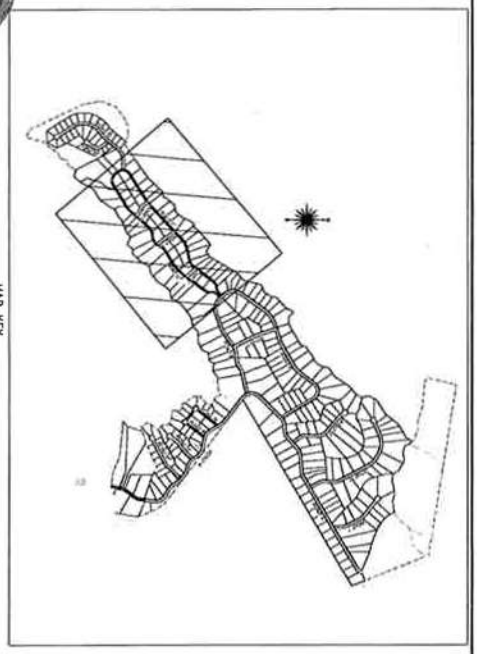
DRAWN BY:	AMH
APPROVED BY:	MARK R. FIELD, P.E.
DATE:	09 JANUARY 2017
SCALE	1" = 100'
PROJECT NUMBER :	759-16
SHEET NO.	2 OF 5

JASPER HIGHLANDS SUBDIVISION
PHASE 3 - ROADS D M
PROPOSED WATERLINE
DEVELOPER: THUNDER ENTERPRISES
104 BATTLECREEK ROAD
KIMBALL, TENNESSEE 37380

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
PROFESSIONAL CIVIL ENGINEERING SERVICES
77 COTHER STREET
PHONE (931) 456-6071 CROSSVILLE, TN 38555 FAX (931) 456-6071

REV #	DATE	DESCRIPTION



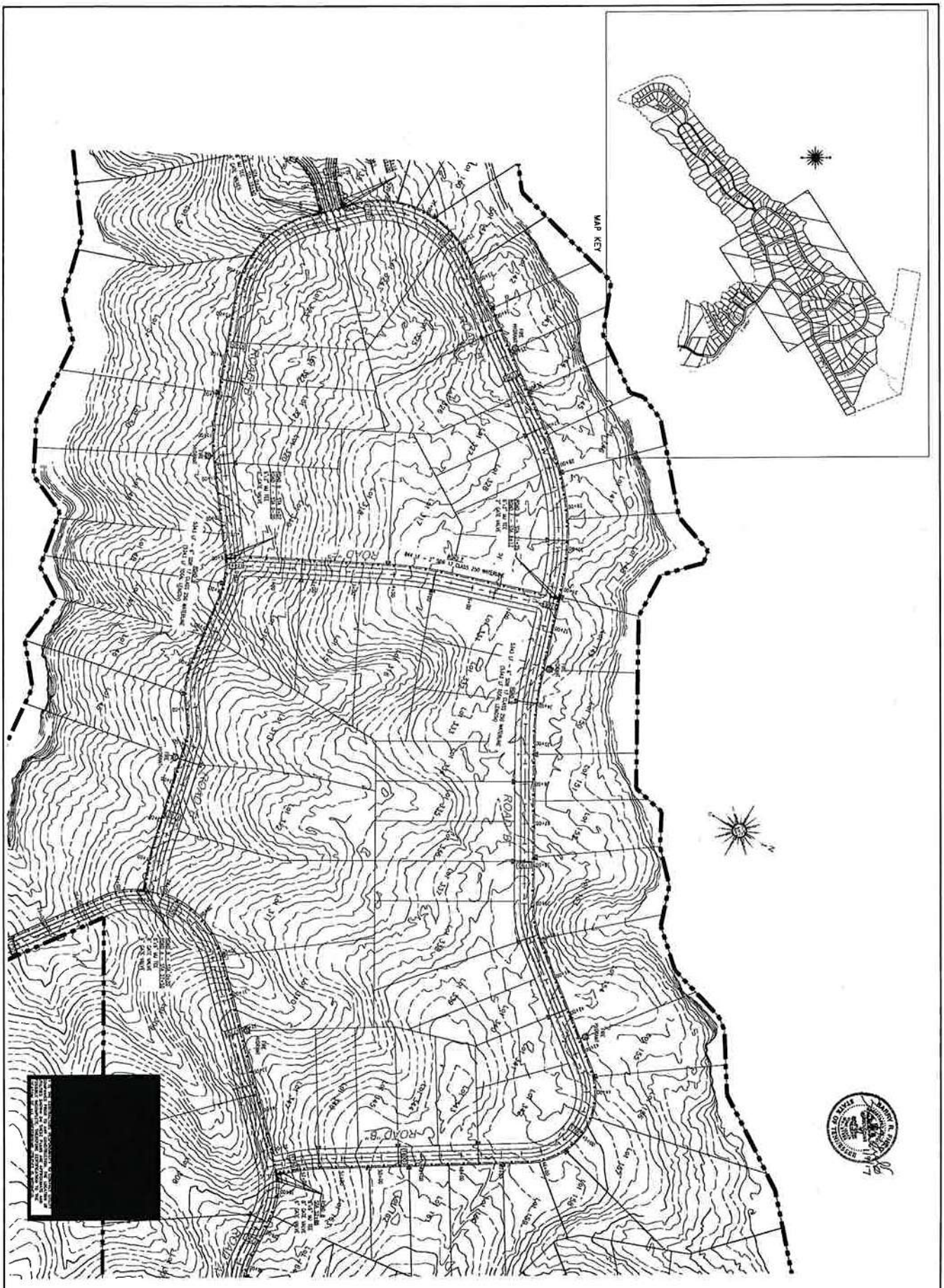


JASPER HIGHLANDS SUBDIVISION
PHASE 3 - ROAD C
PROPOSED WATERLINE
DEVELOPER: THUNDER ENTERPRISES
104 BATTLECREEK ROAD
KIMBALL, TENNESSEE 37380

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
PROFESSIONAL CIVIL ENGINEERING SERVICES
77 COTHER STREET
PHONE (931) 456-6071 CROSSVILLE, TN 38555 FAX (931) 456-6071

REV #	DATE	DESCRIPTION

DRAWN BY: AMH
APPROVED BY: MARK R. FIELD, P.E.
DATE: 06 JANUARY 2017
SCALE: 1" = 100'
PROJECT NUMBER: 716-16
SHEET NO. 3 OF 7 SHEETS
FILE NO.

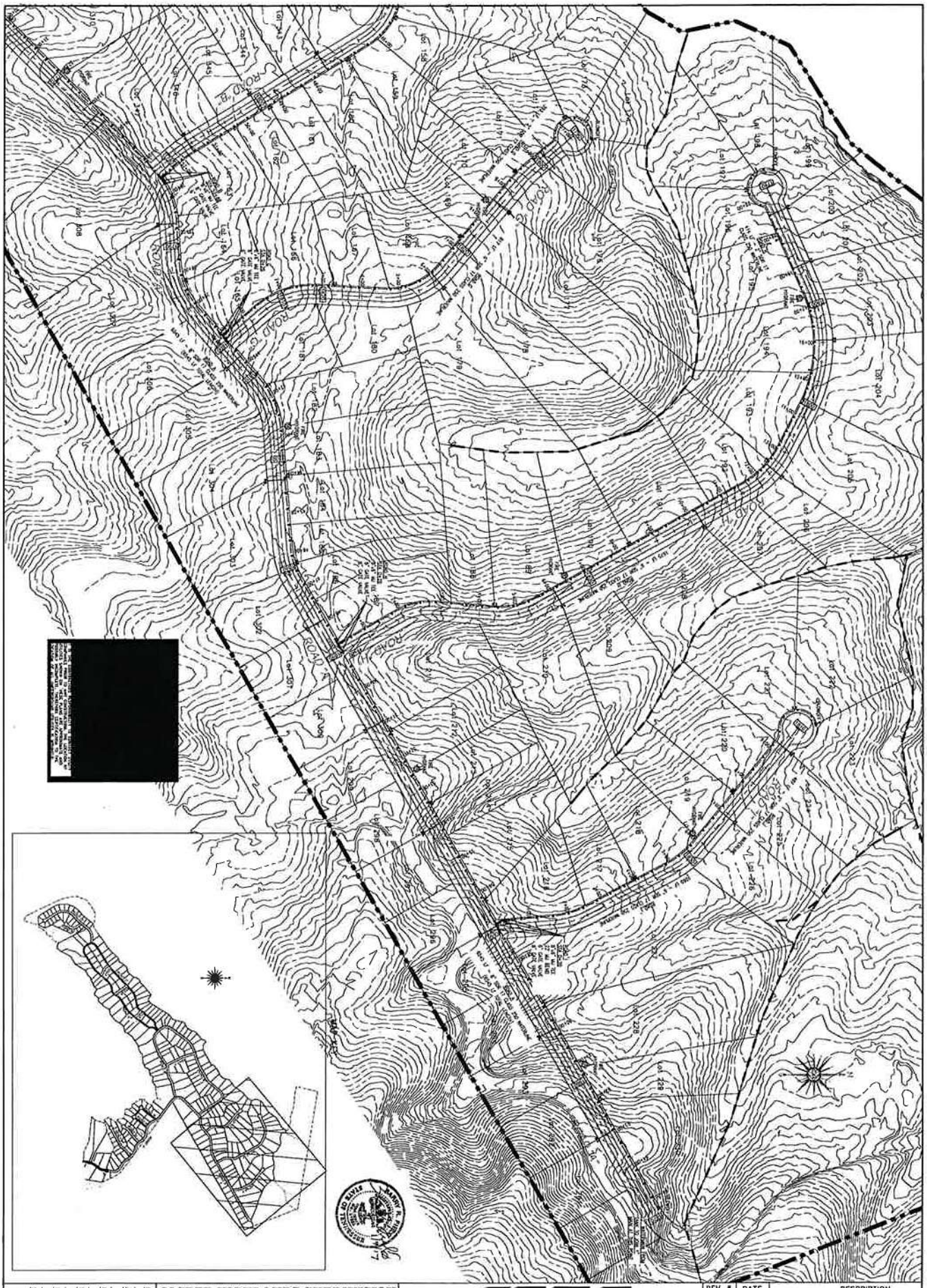


JASPER HIGHLANDS SUBDIVISION
PHASE 3 - ROADS B F
PROPOSED WATERLINE
DEVELOPER: THUNDER ENTERPRISES
104 BATTLECREEK ROAD
KIMBALL, TENNESSEE 37380

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
PROFESSIONAL CIVIL ENGINEERING SERVICES
77 COTHER STREET
PHONE (931) 456-6071 CROSSVILLE, TN 38555 FAX (931) 456-6071

REV #	DATE	DESCRIPTION

DRAWN BY: AMH
APPROVED BY: MARK R. FIELD, P.E.
DATE: 06 JANUARY 2017
SCALE: 1" = 100'
PROJECT NUMBER: 736-15
SHEET NO: 4 OF 7

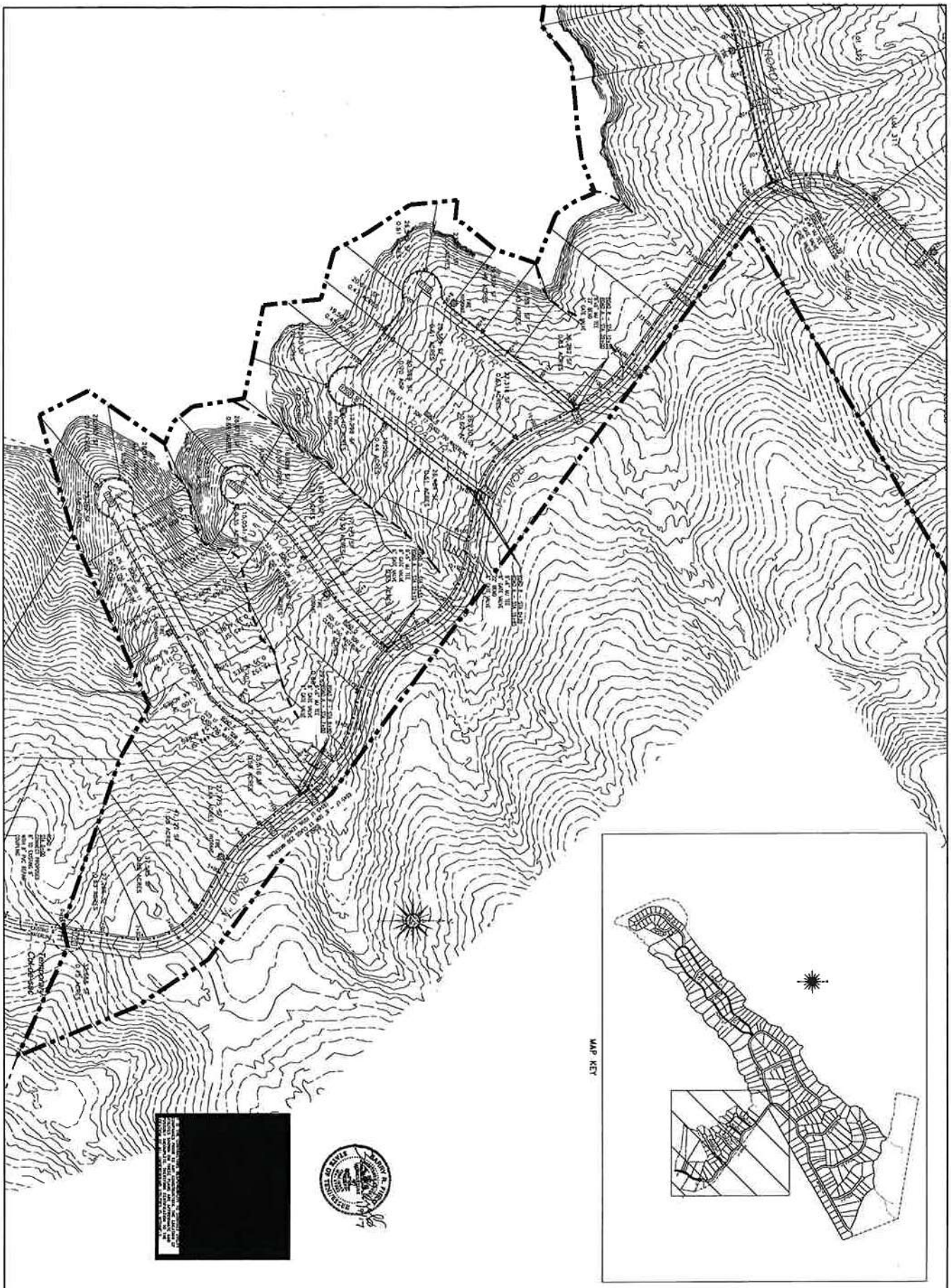


DRAWN BY:	
ANM	
APPROVED BY:	
BARRY R. FIELD, P.E.	
DATE:	
06 JANUARY 2017	
SCALE	
1" = 100'	
PROJECT NUMBER:	
769-16	
SHEET NO.	
5 OF 7	

JASPER HIGHLANDS SUBDIVISION
PHASE 3 - ROADS A G H I
PROPOSED WATERLINE
DEVELOPER: THUNDER ENTERPRISES
104 BATTLECREEK ROAD
KIMBALL, TENNESSEE 37380

FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
PROFESSIONAL CIVIL ENGINEERING SERVICES
77 COTHER STREET
PHONE (931) 456-6071 CROSSVILLE, TN 38555 FAX (931) 456-6071

REV #	DATE	DESCRIPTION



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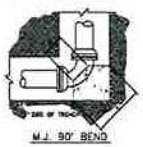
JASPER HIGHLANDS SUBDIVISION
PHASE 3 - ROADS A P Q R
PROPOSED WATERLINE

DEVELOPER: THUNDER ENTERPRISES
104 BATTLECREEK ROAD
KIMBALL, TENNESSEE 37380

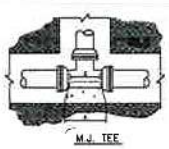
FECS
FIELD'S ENGINEERING CONSULTANT SERVICES, LLC
PROFESSIONAL CIVIL ENGINEERING SERVICES
77 COTHER STREET
PHONE (931) 456-6071 CROSSVILLE, TN 38555 FAX (931) 456-6071

REV #	DATE	DESCRIPTION

DRAWN BY: MM
APPROVED BY: GARRY R. FIELD, P.E.
DATE: 06 JANUARY 2017
SCALE: 1" = 100'
PROJECT NUMBER: 765-16
SHEET NO. 6 OF 7



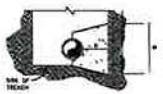
M.J. 90° BEND



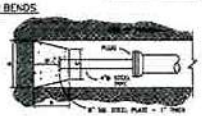
M.J. TEE



M.J. 45°- 22 1/2°- 11 1/4° BENDS



TYPICAL SECTION



M.J. PLUG

90° BEND

SIZE	3"	4"	6"	8"	10"	12"	16"
A	1.5'	1.6'	2.0'	2.5'	3.0'	3.5'	4.5'
B	1.5'	1.6'	2.0'	2.5'	3.0'	3.5'	4.5'
C	3"	3"	3"	3"	3"	3"	3"
D	6"	8"	12"	16"	20"	24"	32"

45° BEND

SIZE	3"	4"	6"	8"	10"	12"	16"
A	1.0'	1.0'	1.5'	2.0'	2.5'	3.0'	4.0'
B	1.0'	1.0'	1.5'	2.0'	2.5'	3.0'	4.0'
C	3"	3"	3"	3"	3"	3"	3"
D	6"	8"	12"	16"	20"	24"	32"

22-1/2° BEND

SIZE	3"	4"	6"	8"	10"	12"	16"
A	8"	8"	1.0'	1.5'	2.0'	2.5'	3.5'
B	8"	8"	1.0'	1.5'	2.0'	2.5'	3.5'
C	3"	3"	3"	3"	3"	3"	3"
D	6"	8"	12"	16"	20"	24"	32"

11-1/4° BEND

SIZE	3"	4"	6"	8"	10"	12"	16"
A	6"	6"	8"	1.0'	1.5'	1.5'	2.5'
B	6"	6"	8"	1.0'	1.5'	1.5'	2.5'
C	3"	3"	3"	3"	3"	3"	3"
D	6"	8"	12"	16"	20"	24"	32"

THRUST BLOCK DETAILS & DIMENSIONS

NOTE: ALL MECHANICAL JOINT.

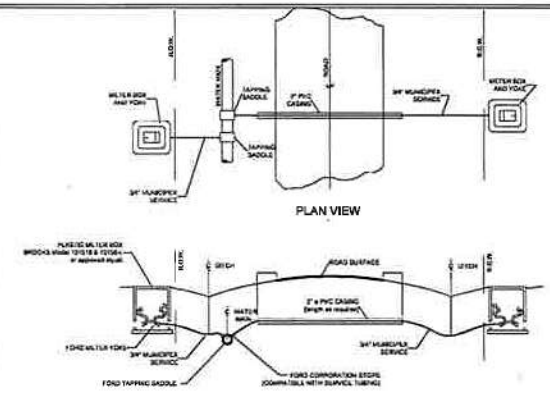
THRUST BLOCK TO BE POURED AGAINST UNDISTURBED EARTH

TEE

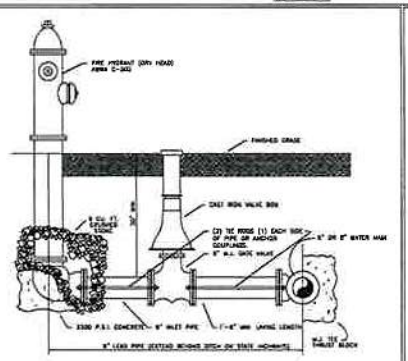
SIZE		3"	4"	6"	8"	10"	12"	16"
Main		3"	4"	6"	8"	10"	12"	16"
Branch		3"	4"	6"	8"	10"	12"	16"
A		2.5'	2.5'	4.0'	2.5'	4.5'	5.0'	7.0'
B		2.5'	2.5'	4.0'	2.5'	4.5'	5.0'	7.0'
C		1.0'	1.0'	1.0'	1.0'	1.0'	1.0'	3.0'
D		1.5'	1.5'	2.1'	1.5'	2.1'	2.8'	3.4'

PLUG

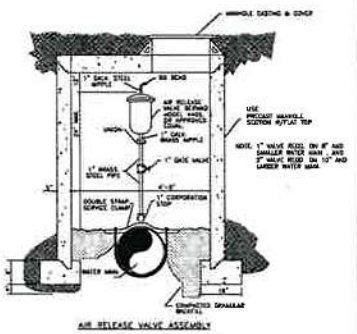
SIZE	3"	4"	6"	8"	10"	12"	16"
A	2.5'	2.5'	3.4'	3.4'	4.5'	5.5'	7.0'
B	2.5'	2.5'	3.4'	3.4'	4.5'	5.5'	7.0'
C	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'	3.0'
D	1.1'	1.1'	1.1'	1.5'	2.2'	3.0'	3.5'



NOTE: MAINTAIN 30" COVER

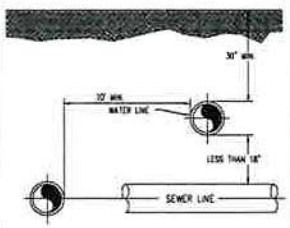


FIRE HYDRANT INSTALLATION

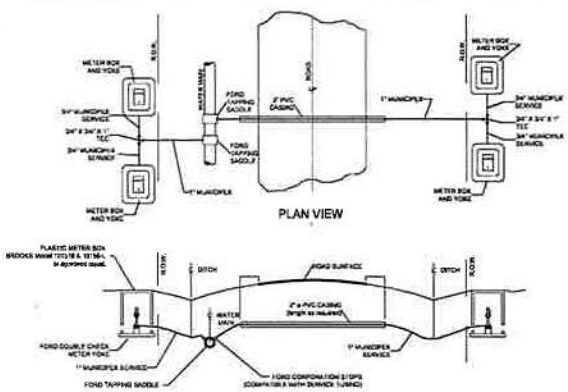


AIR RELEASE VALVE ASSEMBLY

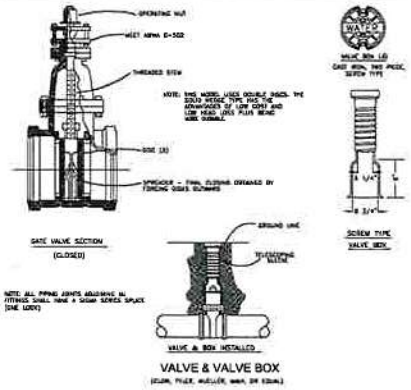
AIR RELEASE VALVE ASSEMBLY



SEPARATION OF PIPED UTILITIES

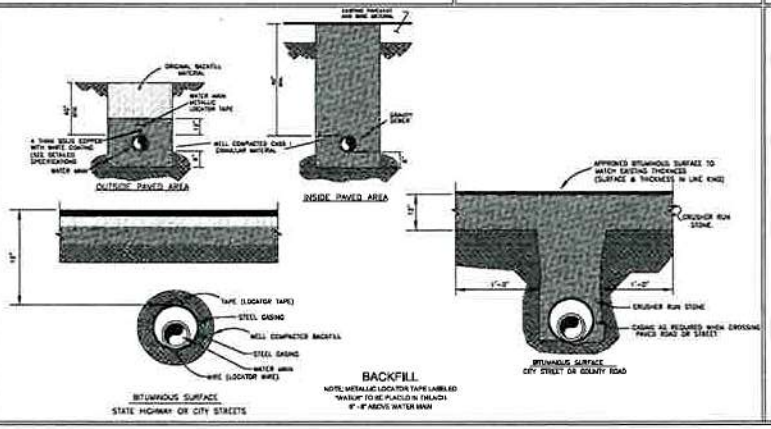


NOTE: MAINTAIN 30" COVER



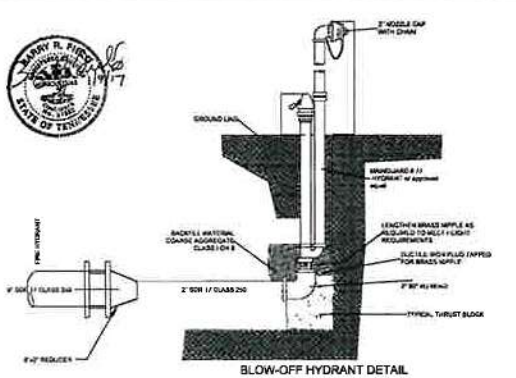
VALVE & VALVE BOX

(CLOW, FLEX, MUELLER, MAN, OR EQUAL)



BACKFILL

NOTE: METALLIC LOCATOR TAPE LABELED "WATER" TO BE PLACED IN TRENCH 6"-8" ABOVE WATER MAIN



BLOW-OFF HYDRANT DETAIL

REV #	DATE	DESCRIPTION

FECS

FIELDS ENGINEERING CONSULTANT SERVICES, LLC

PROFESSIONAL CIVIL ENGINEERING SERVICES

77 COTHER STREET

PHONE (931) 456-6071 CROSSVILLE, TN 38555 FAX (931) 456-6071

JASPER HIGHLANDS SUBDIVISION PHASE 3

WATER DETAILS

DEVELOPER: THUNDER ENTERPRISES
104 BATTLECREEK ROAD
KIMBALL, TENNESSEE 37380

DRAWN BY: AMH

APPROVED BY: BARRY R. FIELD, P.E.

DATE: 06 JANUARY 2017

SCALE: AS SHOWN

PROJECT NUMBER: 759-16

SHEET NO. 7 OF 7

Copyright FECS 2017

EXHIBIT H

WATER SERVICE CONTRACT

This Contract is made and entered on this ____ day of November, 2013, by and between **SOUTH PITTSBURG BOARD OF WATER WORKS AND SEWERS**, hereinafter called the "Board", and **THUNDER INVESTMENTS, INC.**, hereinafter called the "Developer".

WITNESSETH:

WHEREAS, the Board has established and is operating a water supply system serving a portion of Marion County, Tennessee, adjacent to which the Developer has a development known as **JASPER HIGHLANDS SUBDIVISION PHASE 1-A and Phase 1-B**, hereinafter collectively referred to as the "Development"; and,

WHEREAS, the Development has received final plat approval from the Marion County Regional Planning Commission for both Phases 1-A and 1-B; and,

WHEREAS, the final plat drawings of said development have been prepared by the Developer, a reduced copy of such plats being attached hereto as Exhibit A to this Contract for Phase 1-A and Phase 1-B; and,

WHEREAS, the Developer hereby agrees to bear the expense necessary to improve the Board's water distribution system and to extend its own private water distribution system to and within the Development, as may be necessary to properly serve the Development and provide for future water use in the area; and,

WHEREAS, the Developer has requested the Board to make a commitment to serve the Development; and,

WHEREAS, the Board is willing and able to serve the Development upon the terms, provisions and conditions hereinafter set out, all of which are acceptable to the Board.

NOW, THEREFORE, for and in consideration of the mutual covenants of the parties, and other good and valuable consideration, the receipt and legal sufficiency of which are hereby acknowledged, the parties do hereby agree as follows:

1. Upon completion by the Developer of all the Board's requirements set forth

herein, the Board hereby agrees to and will permit the Developer to upgrade the Board's pumps and connect onto the Board's water main or mains and, after the approval of construction plans and specifications by the Board, permit the Developer to install a master water meter, water mains, valves, fittings, pipes, and other water system improvements for water service, (hereinafter the "Water System Improvements") to the Development. The parties acknowledge and agree that the Board shall supply a sufficient quantity of water to serve up to two hundred ten (210) improved lots in the Development (Phases 1-A and 1-B). Any expansion for future needs shall be negotiated by the parties. It is further agreed that any and all costs associated with this project, including but not limited to costs associated with upgrading the Board's pumps, setting the master meter, and installing water lines, shall be the sole and separate responsibility of the Developer, and the Developer shall indemnify and hold the Board harmless therefrom.

2. At its own expense and at no cost or expense to the Board, the Developer shall furnish, install, lay and construct all the Water System Improvements as required by the Board to be installed to serve the Development, including all labor and materials. The parties acknowledge and agree that the Water System Improvements covered by this Contract shall be made using Developer's private funds, and that no grant or other public funds shall be involved or used in the making of such improvements. The construction and installation of the Water System Improvements shall be in strict accordance with the plans, specifications and requirements, as submitted by the Developer's engineer, CTI Engineers, Inc., and as approved by the Board's engineer, Stigall Engineering, Inc., and the State of Tennessee, and shall be subject to inspection and approval by the Board. The Water System Improvements are described in an unattached Exhibit "B", which Exhibit "B" shall be maintained in the office of the Board. All Water System Improvements shall be constructed and located as approved by the Board. The contractors selected to install the Water System Improvements shall be subject to the approval of the Board, and the parties agree that the Developer shall provide its own labor and materials for such installation, subject to inspection by and approval of the Board and/or its engineer. For all work to be performed and materials to be installed on the Board's side of the master meter

serving the Development, Payment and Performance Bonds must be provided by the contractors and/or the Developer, as requested by the Board, and in such amounts as requested by the Board. The Developer may complete all work covered by this Contract that is on the Developer's side of said master meter without posting a payment and/or performance bond, with the understanding that the Board may not approve Developer's final connection without either (a) completion of the necessary work and proof of payment of all contractors and subcontractors by lien waivers in form approved by the Board, or (b) the posting of payment and/or performance bonds as reasonably deemed necessary by the Board, as more fully detailed in Section 2 herein.

3. The Developer shall give reasonable notice to the Board before any work is commenced and reasonable notice of the several stages as the work progresses so that the Board may observe the work and make reasonable inspections of same.

4. With respect to the Development, the Developer will pay the following:

(A) Any and all costs associated with this project, including but not limited to costs associated with upgrading the Board's pumps, setting the master meter, installing water lines, engineering costs, inspection fees, and permitting fees.

(B) When the installation of the system is complete, Developer will pay a cost for water and a minimum bill each month in accordance with a schedule attached hereto as Exhibit "C".

(C) The Developer will pay the Board's engineer, Stigall Engineering Associates, Inc., for engineering and inspection work performed for the Board on this project.

(D) The Developer shall pay any and all fees charged by the Tennessee Department of Environment and Conservation for the review and approval of plans for Water System Improvements construction.

(E) The Developer shall pay all fees charged by an RPR inspector approved by the Board to supervise and inspect the installation of the Water System Improvements.

(F) The Developer shall pay for and install safety equipment as required by the Board to insure that no damage will occur to the Board's water system due to low pressure

downstream of the Developer's master water meter.

5. The Board and Developer acknowledge and agree that, once the improvements covered by this Contract are completed, the master water meter and all water system components, including but not limited to pumps, lines, tanks, and meters, located on the Board's side (upstream) of the master water meter shall be and remain the sole and separate property of the Board, and that all water system components, including but not limited to pumps, lines, tanks, and meters, located on the Developer's side (downstream) of the master water meter shall be and remain the sole and separate property of the Developer.

6. The Board will not allow final connection to its water system until the Water System Improvements for the Development as described on Exhibit "B" hereto have been constructed, inspected and accepted for use by the Board.

7. The Developer hereby warrants all Water System Improvements installed pursuant to the provisions of this Contract against defects in workmanship and materials for a period of one (1) year from the date of acceptance thereof in writing by the Board. The Developer shall reimburse the Board upon demand for all costs and expenses incurred by the Board to repair all breaks, leaks, or defects of any type whatsoever arising from any cause whatsoever occurring within one (1) year from the date the Water System Improvements are accepted in writing by the Board. The Developer hereby warrants that the Water System Improvements shall be paid for in full by the Developer and that the Water System Improvements shall remain free from all liens or encumbrances.

8. At such time as the Board has accepted the Water System Improvements on the Board's side of the Developer's master meter as part of the Board's system, the Developer shall post a maintenance bond with the Board in amount and form acceptable to the Board. The Board shall release the maintenance bond upon completion of the one-year warranty period provided that any repairs to the Water System Improvements located on the Board's side of the master meter have been completed and paid for by the Developer.

9. The Developer agrees to obtain at its own cost and expense, for and on behalf of itself and the Board, all such licenses and permits as may be necessary or appropriate, as determined by the Board, particularly such as may be required by the State of Tennessee or Marion County. The Developer further agrees to execute, acknowledge and deliver to the Board, or if otherwise directed by the Board, to the City of South Pittsburg, Tennessee, any and all easements that may be necessary or appropriate as determined by the Board for the construction, operation and maintenance of the Board's water system, or portion thereof, whether such is for the benefit of this Development or others.

10. Upon installation, testing, disinfection, approval and acceptance for use by the Board, all Water System Improvements leading from the Board's existing system to the Developer's master water meter, including, without limitation, mains, water lines, equipment, facilities, instrumentalities, lateral lines, meter boxes, and connections, installed by Developer shall become and remain the sole property of the Board, or if otherwise directed by the Board, shall become the property of the City of South Pittsburg, Tennessee, without the necessity of a formal conveyance from the Developer to the Board or to the City of South Pittsburg, Tennessee. The Developer does hereby warrant that title to the same shall be free and unencumbered. Notwithstanding said provision as to title, the Developer further agrees that it will execute, acknowledge, and deliver a deed formally conveying title to said Water System Improvements it installs to the Board, or if otherwise directed by the Board, to the City of South Pittsburg, Tennessee, upon demand by the Board.

Likewise, upon installation, testing, disinfection, and of all Water System Improvements leading from the Developer's master water meter to and through the Development, including, without limitation, mains, water lines, equipment, facilities, instrumentalities, lateral lines, meter boxes, and connections, installed by Developer shall become and remain the sole property of the Developer

11. The parties recognize that there may be failures of pressure or supply due to line breaks, power failure, flood, failure of the Board's suppliers to furnish it with adequate water at

a reasonable pressure, or other causes. While the Board will endeavor to satisfactorily serve the Development in the same manner as it serves other areas and customers, it cannot and does not warrant or guarantee that there will be at all times adequate pressure. The parties agree that the Board shall not be responsible or liable for any failures to supply water or to supply water at a reasonable pressure, and the Board shall only be responsible for water pressure to the Developer's master water meter.

12. The Board shall be under no obligation to furnish any water service for the Development until the Developer has fully and satisfactorily performed this Contract.

13. After completion of the Water System Improvements, Developer may assign this Contract to or for the benefit of any other person or entity with the Board's prior written consent, which consent shall not be unreasonably withheld.

14. The Developer agrees to produce and submit to the Board as-built drawings for all the Water System Improvements it constructs.

15. In the event the Developer fails to install the Water System Improvements in accordance with the terms of this Contract, the Board may, in its sole discretion, elect to accept all or a portion of the water system implements installed. Should the Board choose to accept all or a portion of these improvements, the Board shall become the sole owner of these improvements upon giving the Developer written notice of its acceptance without the necessity of any further writing, contract, or deed. The Board's election to accept such Water System Improvements under this paragraph shall not be construed as an assumption of any obligation related to these improvements of the Developer or of any third party. The Developer hereby acknowledges and agrees that the Board may obtain a Court order for specific performance if the Developer fails to perform. The Developer further acknowledges and agrees that the Board shall be entitled to monetary damages if the Developer fails to perform.

16. In the event the Developer fails to install the Water System Improvements in accordance with the terms of this Contract, the amounts paid to the Board and its engineer under Paragraph Four (4) are not refundable to the Developer.

17. The Developer shall require any contractor or contractors which perform work to install the Water System Improvements on the Board's side of the master meter to furnish the Board with bonds covering faithful performance and the payment of obligations arising from work on such portion of the Water System Improvements.

18. The Developer shall provide any lender or contractor which performs work on the installation of these Water System Improvements a copy of this Contract before entering into any contract with such lender or contractor.

19. The Developer covenants and agrees to hold the Board harmless from the claim of any person, firm, or corporation, and to defend any action at law or equity brought, and to protect the Board against any judgments rendered growing out of the installation of the Water System Improvements provided for in this Contract, whether the same be on private or public property.

20. In the event litigation or other legal proceedings are commenced by either party to enforce any rights under this Agreement, all reasonable legal expenses (including reasonable attorney's fees) and other direct costs of litigation of the prevailing party shall be paid by the non-prevailing party, with such determinations to be made by the Court or other tribunal hearing such proceeding.

21. The Developer understands and agrees that no third party shall obtain any benefits or rights under this Contract, with respect to water tapping privileges, and no connection shall be made to any customer site, until all necessary arrangements have been made in accordance with the Board's Rules and Regulations.

22. The Board's Rules and Regulations as may be revised or amended from time to time, are incorporated into and made a part of this Contract.

23. The invalidity or unenforceability of any provision hereof shall not affect the validity or enforceability of the remaining provisions.

24. This Contract shall constitute the entire agreement of the parties. This Contract may be modified or amended only by an instrument in writing executed by all parties hereto.

IN WITNESS WHEREOF, the parties have entered into this Contract, as of the day and date first above written.

SOUTH PITTSBURG BOARD OF WATER WORKS AND SEWERS

By: Charles E Reynolds
Charles B. Reynolds, Chairman

THUNDER INVESTMENTS, INC.

By: John C. Thomas

Title: CEO

SEE ATTACHED FOLLOWING PAGE FOR NOTARY ACKNOWLEDGMENTS

STATE OF TENNESSEE)
COUNTY OF MARION)

Before me, a Notary Public, in and for said County and State aforesaid, personally appeared Charles E. Reynolds, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who, upon oath, acknowledged himself to be the Chairman of South Pittsburg Board of Water Works and Sewers, a public corporation, and that he as such Chairman executed the foregoing instrument for the purpose therein contained, by signing the name of the corporation by himself as the Chairman.

Witness my hand and official seal at South Pittsburg, Tennessee on this the 14 day of November, 2013.

Charlynn Peoples
NOTARY PUBLIC

My Commission Expires: 01-31-2015

CHARLYNN PEOPLES
NOTARY PUBLIC
MARION COUNTY

STATE OF TENNESSEE)
COUNTY OF MARION)

Before me, a Notary Public, in and for said County and State aforesaid, personally appeared John Thornton, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who, upon oath, acknowledged himself to be the _____ of Thunder Investments, Inc., and that he, as such _____ executed the foregoing instrument for the purpose therein contained, by signing the name of the corporation by himself as such _____.

Witness my hand and official seal at South Pittsburg, Tennessee on this the 14 day of November, 2013.

Charlynn Peoples
NOTARY PUBLIC

My Commission Expires: 01-31-2015

CHARLYNN PEOPLES
NOTARY PUBLIC
MARION COUNTY

EXHIBIT A

(See Attached Plats of Jasper Highlands Phases 1-A and 1-B)

EXHIBIT "B"

See plans and specifications for the Water System Improvements as prepared by CTI Engineers, Inc., engineers for the Developer, which plans and specifications are incorporated herein by specific reference thereto

EXHIBIT "C"

Developer shall pay to the Board the standard out-of-town rates for water per one thousand (1,000) gallons of water used, with a minimum bill of $190.00 per month. The current water rate schedule is below, and the Board shall have the absolute right to adjust the rates.

OUT OF TOWN RATES

	GALLONS		RATE		AMOUNT	
FIRST	2000	$	7.67	$	15.34	MINIMUM
NEXT	15000	$	4.61	$	72.15	
	17000			$	87.49	
NEXT	30000	$	4.31	$	129.30	
	47000			$	216.79	
ALL OVER	47000	$	3.62			

Absolute non prorate, tax 9.75%
RATE INCREASE EFFECTIVE 10/01/13

EXHIBIT I

INITIAL DISTRIBUTION SYSTEM EVALUATION

IDSE

STANDARD MONITORING PLAN

For The

Jasper Highlands Water

PWSID # 0008280

In compliance with the Final Stage 2 Disinfectants and Disinfection Byproducts Rule For Systems Serving <500

RECEIVED
APR 01 2008
ENVIRONMENT & CONSERVATION
CHATTANOOGA FIELD OFFICE

July 29, 2016

Updated: 9/12/18

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Standard Monitoring Plan Form for Systems Serving < 10,000

I. GENERAL INFORMATION

A. PWS Information*

B. Date Submitted* _____

PWSID: 0000~~2~~06

PWS Name: Jasper Highlands Water

PWS Address: P.O. BOX 408 138 S CEDAR AVENUE

City: SOUTH PITTSBURG State: TN Zip: 37380

Population Served: _____

System Type:	Source Water Type:	Buying / Selling Relationships:
■ CWS	■ Subpart H	☐ Consecutive System
☐ NTNCWS	☐ Ground	☒ Wholesale System

C. PWS Operations

Residual Disinfectant Type: ■ Chlorine ☐ Chloramines ☐ Other: _____

Number of Disinfected Sources: 1 Surface ___ GWUDI ___ Ground ___ Purchased

D. Contact Person*

Name: Clarence E. Howard

Title: MANAGER

Phone #: 423-421-1775 Fax #: 423-220-4500

E-mail: Clarence@jhwater.com

II. IDSE REQUIREMENTS*

A. Number of Sites	B. Schedule	C. Standard Monitoring Frequency
Total: 2		
Near Entry Point: 1	☐ Schedule 1	☐ During peak historical month (1 monitoring period)
Avg Residence Time: 1	☐ Schedule 2	
High TTHM: 2	☐ Schedule 3	☒ Every 90 days (4 monitoring periods)
High HAA6: 1	☒ Schedule 4	☐ Every 60 days (6 monitoring periods)

Standard Monitoring Plan Form for Systems Serving <500

III. SELECTING STANDARD MONITORING SITES

A. Data Evaluated Put a "✓" in each box corresponding to the data that you used to select each type of standard monitoring site. Check all that apply.

Data Type	Type of Site			
	Near Entry Pt.	Avg. Residence Time	High TTHM	High HAA5
System Configuration				
Pipe layout, locations of storage facilities		✓	✓	✓
Locations of sources and consecutive system entry points	✓			
Pressure zones				
Information on population density		✓	✓	✓
Locations of large customers			✓	✓
Water Quality and Operational Data				
Disinfectant residual data		✓	✓	✓
Stage 1 DBP data		✓	✓	✓
Other DBP data				
Microbiological monitoring data (e.g., HPC)				
Tank level data, pump run times		✓	✓	✓
Customer billing records		✓	✓	✓

B. Summary of Data* Provide a summary of data you relied on to justify standard monitoring site selection (*attach additional sheets if needed*)

During the preliminary gathering of data distribution system piping layout, pipe size and population density were the primary tools used. On into the project estimations of water retention times in the piping, storage tanks and endpoints were contributing factors. In the final stages chlorine residual and customer water usage played a big part in the selection of sites.

Standard Monitoring Plan Form for Systems Serving < 500

IV. JUSTIFICATION OF STANDARD MONITORING SITES*

Standard Monitoring Site ID (from map)[1]	Site Type	Justification
S21	☐ Near Entry Pt ■ Avg. Res. Time ☐ High TTHM ☐ High HAA5	This site should provide data in water storage tank turnover and should be representative of our system.
S22	☐ Near Entry Pt ☐ Avg. Res. Time ■ High TTHM ☐ High HAA5	This site should provide data on problems in outlying areas of the distribution system at typical sites.
S23	☐ Near Entry Pt ☐ Avg. Res. Time ■ High TTHM ☐ High HAA5	This site should provide data on minimal usage, few taps, and residual at non-typical sites.
S24	☐ Near Entry Pt ☐ Avg. Res. Time ☐ High TTHM ■ High HAA5	This site should provide viable data on locations with few customers in isolated picket areas.
S25	■ Near Entry Pt ☐ Avg. Res. Time ☐ High TTHM ☐ High HAA5	This site will provide data on DBP precursors leaving the water treatment plant.

[1] *Verify that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form).*

V. PEAK HISTORICAL MONTH AND STANDARD MONITORING SCHEDULE

A. Peak Historical Month* Auguar

B. If Multiple Sources, Source Used to Determine Peak Historical Month (write "N/A" if only one source in your system)

n/a

C. Peak Historical Month Based On* (check all that apply)

☒ High TTHM ☒ Warmest water temperature

☒ High HAA5

If you used other information to select your peak historical month, explain here (attach additional sheets if needed)

Standard Monitoring Plan Form for Systems Serving < 500

V. PEAK HISTORICAL MONTH AND STANDARD MONITORING SCHEDULE (Continued)

D. Proposed Standard Monitoring Schedule*

Standard Monitoring Site ID (from map) [1]	Projected Sampling Date (date or week) [2]			
	Period 1	Period 2	Period 3	Period 4
JH 1	5/12/09	8/11/09	11/10/0	2/9/10
JH 15	5/12/09	8/11/09	11/10/0	2/9/10

[2] *period = monitoring period. Complete for the number of periods from Section II.C. Can list exact date or week (e. , week of 7/9/07)*

VI. PLANNED STAGE 1 DBPR COMPLIANCE MONITORING SCHEDULE*

Stage 1 DBPR Monitoring Site ID (from map) [1]	Projected Sampling Date (date or week) [2]			
	Period 1	Period 2	Period 3	Period 4
JH 1	5/5/09	8/4/09	11/3/09	2/2/10
JH 15				

[1] *Verify that site IDs match IDs on your distribution system schematic (See Section VII of this form).*

[2] *period = monitoring period. Complete for the number of periods in which you must conduct Stage 1 DBPR monitoring during IDSE monitoring. Can list exact date or week (e.g., week of 7/9/07)*

Standard Monitoring Plan Form for Systems Serving < 500

VII. DISTRIBUTION SYSTEM SCHEMATIC*

ATTACH a schematic of your distribution system.

Distribution system schematics are not confidential and should not contain information that poses a ***security risk*** to your system. EPA recommends that you use one of two options:

Option 1: Distribution system schematic with no landmarks or addresses indicated. Show locations of sources, entry points, storage facilities, standard monitoring locations, and Stage 1 compliance monitoring locations (required). Also include pressure zone boundaries and locations of pump stations. Provide map scale.

Option 2: City map without locations of pipes indicated. Show locations of sources, entry points, storage facilities, standard monitoring locations, and Stage 1 compliance monitoring locations (required). Also include boundaries of the distribution system, pressure zone boundaries and locations of pump stations. Provide map scale.

VIII. ATTACHMENTS

- ■ Distribution System Schematic* (Section VII).
- ■ Additional sheets for the summary of data or site justifications (Sections III and IV).
- □ Additional copies of Page 3 for justification of Standard Monitoring Sites (Section IV).
- □ Additional sheets for explaining how you used data other than TTHM, HAA5, and temperature data to select your peak historical month (Section V).
- □ Additional sheets for planned Stage 1 DBPR compliance monitoring schedule (Section VI).

Total Number of Pages in Your Plan 24

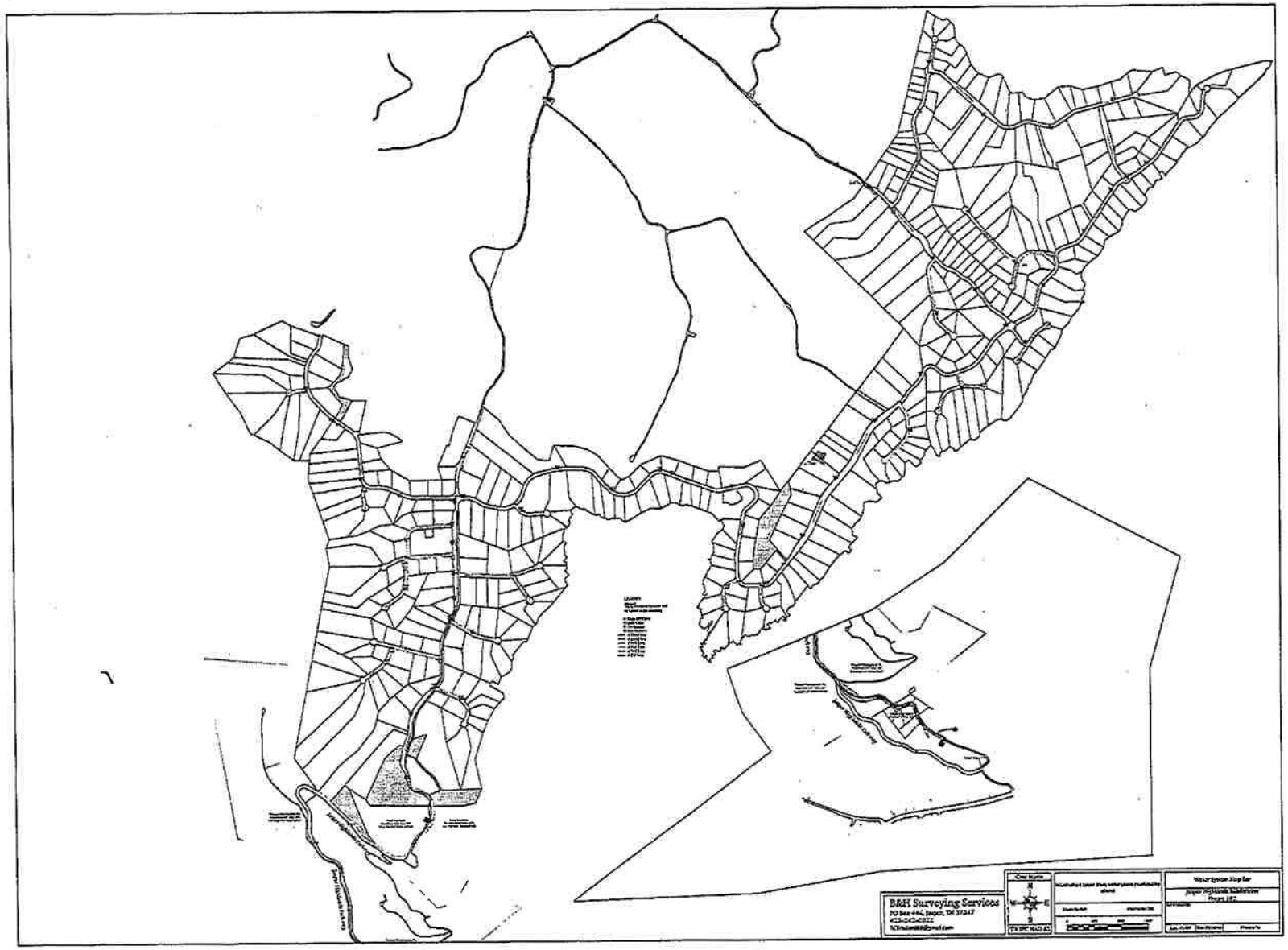
Note: Fields with an asterisk (*) are required by the Stage 2 DBPR

ATTACHMENT #1

DISTRIBUTION SYSTEM SCHEMATICS

OF THE

Jasper Highlands Water Distribution System


B&H Surveying Services
PO Box 444, Bristol, TN 37621
423-540-6822
N
W
E
S

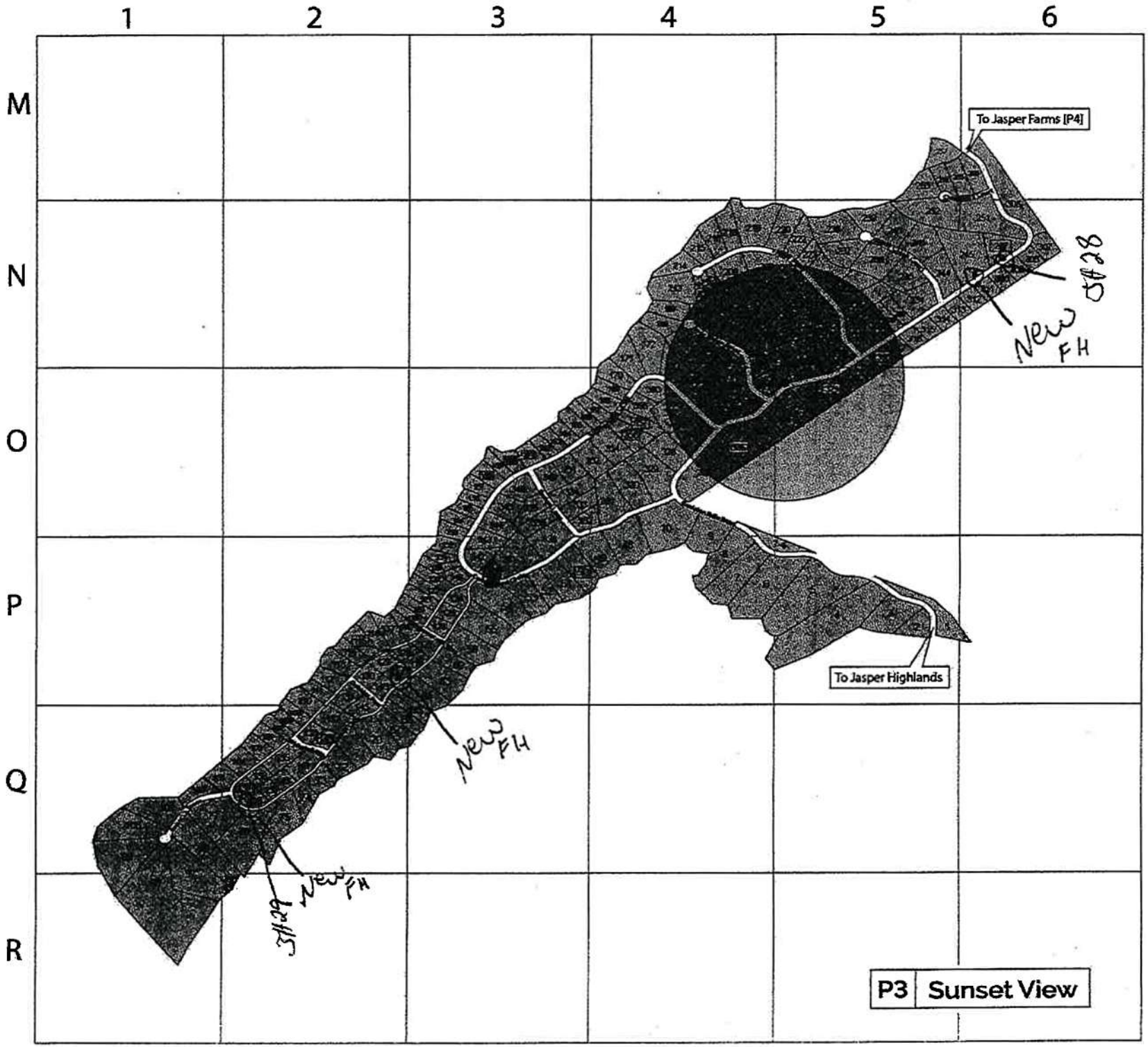


JHFD HOME LIST

07/07/2016

Phase 1

Phase 2
TH 23
TH 24
TH 25
TH 27
TH 26
TH 22
TH 21
TH 20
TH 19
TH 18
TH 17
TH 16
G
H
J
K
L


1
2
3
4
5
6
M
N
O
P
Q
R
To Jasper Farms [P4]
New FH
To Jasper Highlands
New FH
New FH
P3 Sunset View

ZONE #1 SOUTH PITTSBURG MOUNTAIN
BT, STAGE 1 and STAGE 2
DBP MONITORING SITES

BACTERIOLOGICAL TEST SITES

JH 1 **Draggin Canoe**

JH 15 **River Bluffs Drive**

STAGE 1 DBP THM/HAA5 MONITORING SITE

JH 1 Dragging Canoe

STAGE 2 DBP THM/HAA5 MONITORING SITE

JH 15 River Bluffs Drive

SOUTH PITTSBURG MOUNTAIN WATER STORAGE TANK

Jasper Highlands Underground Tank 8,000 Gallons

ATTACHMENT #2

JUSTIFICATION OF SITES

OF THE

JASPER HIGHLANDS WATER DISTRIBUTION SYSTEM

SITE JUSTIFICATIONS

STAGE 2 DBP THM/HAA5 MONITORING SITES

During the inital Stage 1 selection of sites the South Pittsburg Water System deemed the four most benefical sites to be those of highest THMs and HAA5s. All four sites chosen were of Maximum residence time in our system instead of one maximum and three average resident time locations. Therefore, it was concluded by the South Pittsburg Water System that monitoring of these sites would be considered to be representative of our system in relation to formation of DBPs in our water storage areas of the longest time in the system. In selection of the Stage 2 sites all information gathered from from Stage 1 sites were carefully considered. Stage 2 requires four additional sites to be added, one (1) Ave. Res. Time site, two (2) High THM sites and one (1) High HAA5 site. We have added an additional site, one (1) Near Entry Point Site, to help in monitoring our water treatment plant output. All sites chosen were those considered to be of greatest benefit in determining future solutions in detering or eliminating DBP in our system.

JH 1 Dragging Canoe- This site is located in Zone 1. It was chosen because it represents the Avg. Res. Time. This site should provide the optimum details of average water quality in water storage tank turnover as it travels to the endpoints.

JH 15 Jasper Highlands Blvd - This site is located in Zone 1. It was chosen because it represents a High THMs site. This site was in an area of fewer water connections and minimal water usage. This site is representative of water usage at numerous locations in outlying areas of our system. It should provide an overall view of problem areas in the system.

ATTACHMENT #3

CERTIFICATION DOCUMENTATION

BY

JASPER HIGHLANDS

CERTIFICATION
OF

STAGE 2 DBP
STANDARD MONITORING PLAN

BY

JASPER HIGHLANDS

I hereby certify that the information and data supplied to me and used in this monitoring plan is true and accurate to the best of my belief and knowledge at the time of execution.

Signature: _____ Date: _____

Operator

ATTACHMENT #4

OTHER SITES OF INTEREST

OF THE

JASPER HIGHLANDS WATER DISTRIBUTION SYSTEM

ALTERNATE SITES CONSIDERED
FOR THMs AND HAA5s COMPLIANCE SAMPLING

#	Location	City	Address	Rt. #	Zone	Type
1	JH 3					
2	JH 11					
3	Jaycee Drive	S.P.	182 Jaycee Drive	COM	3	GB
4	Barker Ave	S.P.	1520 Barker Ave	4	2	FH
5	Judy Drive	S.P.	166 Judy Drive	3	2	FH
6	Water Front Drive #1	Kimball	1027 Water Front Pl	5	2	SP
7	Sweedens Cove Road	Kimball	2143 Sweedens Cove Road	7	3	SP
8	Highway 2 Lofty	Kimball	920 Battlecreek Road	66	2	FH
9	Water Front Drive #2	S.P.	1639 Water Front Pl	5	2	FH
10	Kimball Cove Road	Kimball	123 Kimball Cove Road	4	2	FH
11	Boyd Ave.	Kimball	1639 Boyd Ave	5	2	FH
12	Boyd Street	Kimball	20 Boyd Street	5	2	GB
13	Pondarosa Drive	Kimball	333 Pondarosa Drive	3	2	SP
14	Cain St	Kimball	24 Cain St	5	2	GB
15	Raulston Cove	Kimball	350 Raulston Cove Rd	6	2	FH
16	Cedar Point Lane	Kimball	156 Cedar Point Lane	6	2	FH
17	Highway 2	Kimball	Ellen Drive & Highway 2	6	2	SP
18	Marion Recycle Center	Kimball	HWY 2	6	2	GB
19	Misty Meadow Drive	Kimball	312 Misty Meadow Drive	6	2	SP
20	Marion Lumber Co.	Kimball	220 E Third St	COM	3	FH
21	Riverport	Kimball	849 Riverport	COM	3	FH
22	13th Street	S.P.	419 Thirteenth St	15	3	GB
23	Bob Kellerman	S.P.	450 E Third St	14	3	GB
24	Hughes Road	S.P.	125 Hughes Road	16	3	SP
25	Chance Road	S.P.	615 Chance Road	16	3	SP
26	Mountain View Apartments	S.P.	2230 Hamilton Ave	16	3	FH
27	Kirk Circle	S.P.	2000 Kirk Circle	14	3	FH
28	Dogwood Trail	S.P.	6600Dogwood Trail	9	3	FH
29	Grahman Road	S.P.	590 Graham Home Place	17	4	SP
30	Griffin Lane	S.P.	280 Griffin Lane	17	4	FH
31	Home Lane	N.H.	455 Hom Lake	17	4	FH
32	Old Ferry Road	N.H.	685 Rivers Landing	17	4	SP
33	Hogjaw (Lakeview Drive)	N.H.	1210 Lakeview Dr	17	4	GB
34	Cambell Lane	N.H.	280Cambell Lane	17	4	GB
35	Raily Lane	N.H.	460 Raily Lane	17	4	GB
36	Summers Lane	N.H.	310 Summers Lane	17	4	FH
37	R.O. Blevins (Short Hollow)	N.H.	304 Short Hollow Rd	17	4	GB
38	Long Hollow Road	N.H.	1291 Long Hollow Road	17	4	GB
39	Pine Grove Road	N.H.	146 Pine Grove Road	17	4	GB
40	Betty Hill Lane	N.H.	320 Betty Hill Lane	17	4	GB
41	Long Island Road	N.H.	2418 Long Island Road	17	4	GB
42	Brandy Hills #1	N.H.	600 Brandy Hills	17	4	SP
43	Brandy Hills #2	N.H.	306 Brandy Hills	17	4	FH
44	Rum Ridge	N.H.	335 Rum Ridge	17	4	SP
		N.H.				
		N.H.				

Bacteriological Sample Site Plan

JASPER HIGHLANDS
PWSID #0008286

Last Updated: June 30, 2016

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Purpose/Objective

The Tennessee Department of Environment and Conservation, Division of Water Resources regulations require that bacteriological samples are to be collected according to a written sample siting plan. This plan is to ensure that collection sites are representative of water throughout the distribution system. Samples will be collected from areas used by all customers and will include…

- Residential areas (at least 30%)
- Dead end lines
- Low use areas
- Commercial areas
- Areas near storage tanks

Sampling sites will be distributed to ensure that no area served by the system is neglected during the year. The justification for selecting sampling sites is to aid our operators in understanding the bacteriological quality of the water throughout the system and to monitor and evaluate the quality of the water consumed by all the users of the system.

General System Information

The official name and address for this system is

Jasper Highlands
2475 Jasper Blvd
South Pittsburg, TN 37380

The PWSID number for this system is
TN0008286

The population served by this system is 30.

The Person(s) responsible for reporting to the Division of Water resources and keeping the plan updated is Keith Garth, System Operator.

Date of last plan update June 30, 2016.

The Jasper Highlands (JH) PWSID #: TN0008286 provides drinking water to 30 customers. JH is operated annually.

Water is supplied by the South Pittsburg Board of Water Works. Source water is the Tennessee River. JH is fed from the Kimball Tank which is 170,000 gallons. The tank feeds a 6" master meter which feeds pump station #1. Pump Station #1 consists of two 50 HP motors and two 170 gallons per minute pumps. From Pump Station #1 it is pump to pump in an 8,000 gallon underground tank and pump station #2 pumps water and maintains water pressure to the distribution system which has 21 customers, PVC and plastic pipe, blow offs and fire hydrants.

The system is required to collect one (1) routine bacteriological sample per month. Sample site locations are rotated between the two distil ends of the system at sites 1 and 2. In the event of a positive sample we are required to collect three repeat samples within 24 hours of notification.

JH primarily utilizes the South Pittsburg Board of Water Works bacteriological sample analyses.

Special purpose samples are collected during repairs, in response to complaints, or for other maintenance reasons. Collection of these types of samples is necessary to ensure that coliform bacteria have not entered the distribution system as a result of events such as installation of mains, main line repair or routine maintenance. Special purpose samples cannot be included in compliance or assessment trigger calculations. Special purpose samples are collected in addition to any samples collected in accordance with this plan for compliance with the Revised Total Coliform Rule.

This plan contains examples of responses to treatment triggers which may require level 1 and or level 2 assessments to be conducted. It is anticipated that the systems certified water and owner will conduct any required level 1 assessment. JH has made arrangements with South Pittsburg Board of Water Works operators who are qualified to conduct a level 2 assessment if needed. The plan also contains example public notification documents that can be used if needed.

Keith Garth, Certified Distribution Operator, is responsible for insuring that proper sampling procedures are followed and that samples are collected in accordance with this plan. Keith Garth will annually review the sampling plan and update the plan when the population served increases sufficiently to require an increased number of samples and at any time significant changes to the system are made impacting hydraulic flows in the system. A copy of this plan will be kept in the JH main office.

Number of Samples Required

The number of samples to be taken by JH is determined by the Tennessee Department of Environment and Conservation, Division of Water Resources, Rule 0400-45-1-.07(b)

Routine samples
Presently, based on a population served of approximately 30 JH is required to take one (1) routine samples each month.

Our system can take the required number of samples, or more than is required. The number of samples our system will take is one (1) each month. The number of routine samples required the month following a total coliform-positive sample is one (1).

Routine samples

The Division of Water Resources has approved one monthly monitoring. We are required to collect one (1) routine bacteriological monthly. Our system can take the required number of samples, or more than is required. The number of samples our system will take is one (1) monthly.

Additionally, the number of routine samples required the month following a total coliform-positive sample is three (3) and are subject to increased monthly monitoring if certain conditions exist.

Repeat samples
If a routine bacteriological sample is total coliform-positive, the number of repeat samples required is three (3). The system must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one repeat sample at a tap within five service connections upstream and at least one repeat sample at a tap within five service connections downstream of the original sampling site. A set of three (3) repeat samples will be collected for each positive sample. The repeat sampling procedure will continue until all samples are total coliform negative or a treatment technique trigger has been exceeded. Reference page 11 for additional actions required in the event of a positive sample.

The person(s) responsible for reporting to the Division of Water Resources is Keith Garth.

The Division of Water Resources can be contacted at the following numbers:

Chattanooga Field Office
423-634-5745

Selected Sampling Sites

JH will collect one (1) routine sample per month. If a primary sampling site is not available, a secondary sampling site will be selected from the list for routine monitoring. Sampling will be conducted as follows.

Samples are to be taken from each designated site throughout the year and be alternated each monitoring period to ensure all areas of the system are represented during the course of a year.

One sample will be taken per month at the beginning of the month.

Primary Routine Total Coliform Sampling Sites:

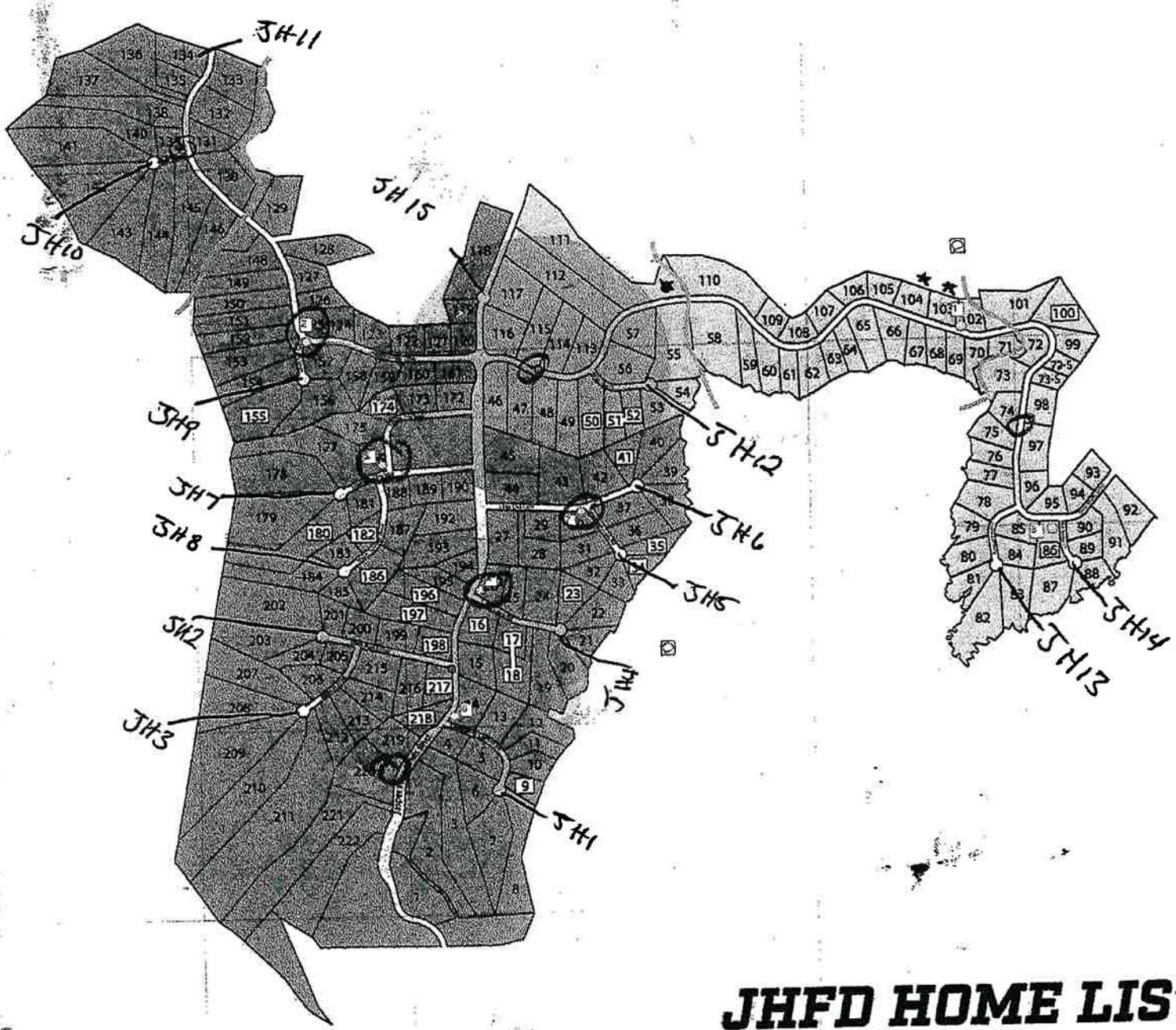
Map Site ID	Specific Addresses or GPS Coordinates	Zone	Water Source
1	Dragging Canoe	1	TN River
2	Deer Run	2	TN River
3	Bobcat Trail	2	TN River
4	Cash Cave Rd	1	TN River
5	Sequoyah Cove	1	TN River
6	Little Owl Ln.	1	TN River
7	Swedens Overlook	2	TN River
8	Jasper Springs Drive	2	TN River
9	Gray Fox	2	TN River
10	River View Ct.	3	TN River
11	1B West End of Line	3	TN River
12	Misty View Ct.	1	TN River
13	Kimball Point	4	TN River
14	Blue Bridge Ct.	4	TN River
15	JH Blvd End of Line	4	TN River

The goal should be to collect all required samples at the first or second week in the monthly monitoring period. This is to allow ample time to collect another sample should one arrive at the laboratory and not be able to be analyzed. (i.e. leaked in transit, out of holding time, lab accident, etc...). Samples must be analyzed within 30 hours of collection.

If there is a total coliform or E. coli positive sample, three repeat samples will be collected within 24 hours of notification. Reference page 17 for additional guidance.

Record Maintenance - Water and Distribution Systems

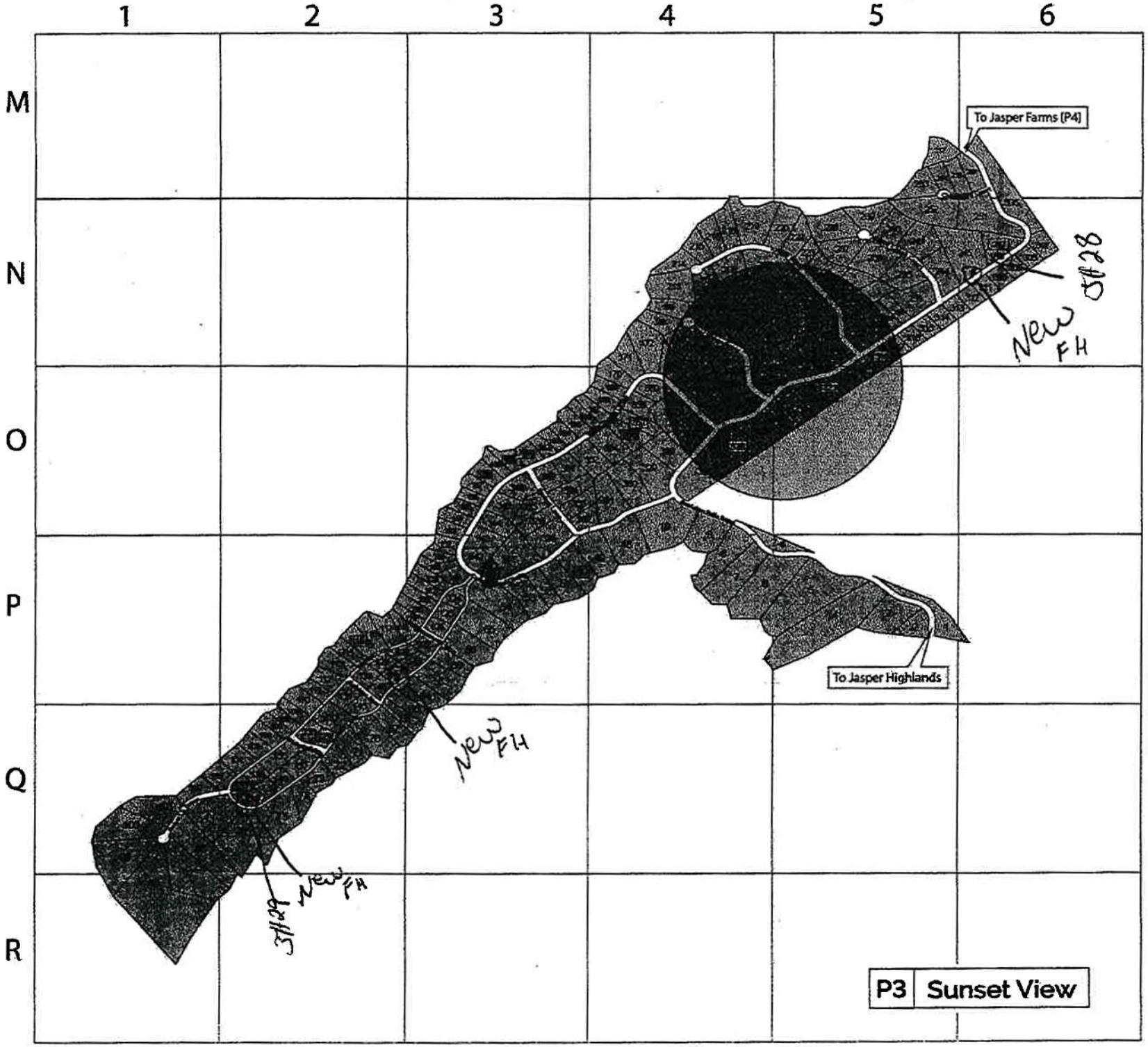
RECORD	Must Be Kept For	Source
Bacteriological Analysis	Five (5) Years	0400-45-1-.20(1)(a)
Chemical Analysis	Ten (10) Years	0400-45-1-.20(1)(a)
Actions to Correct Violations	Three (3) Years after last action	0400-45-1-.20(1)(b)
Written reports, summaries, communications relating to Sanitary Surveys	Ten (10) Years after Sanitary Survey	0400-45-1-.20(1)(c)
Variances/Exemptions	Five (5) Years following expiration	0400-45-1-.20(1)(d)
Combined Finished Turbidity	Next Sanitary Survey	0400-45-1-.20(1)(f)
Individual Filter Turbidity	Three (3) Years	0400-45-1-.31(6)(b)(4)(ii)
Daily Worksheets & Shift Logs used to produce MOR	Next Sanitary Survey	0400-45-1-.20(1)(g)
Cross-Connection Plans and Inspection Records	Five (5) Years	0400-45-1-.20(1)(h)
Complaint Logs	Five (5) Years	0400-45-1-.20(1)(h)
Facility Maintenance Records	Five (5) Years	0400-45-1-.20(1)(h)
Storage Tank Inspections	Five (5) Years (required)	0400-45-1-.20(1)(h)
	Life of the tank (Recommended)	Guidance Document, Sanitary Survey
Lead and Copper	Twelve (12) Years	0400-45-1-.33(12)
Bacteriological Records indicating adequate disinfection of lines, tanks, filters, and wells	Five (5) Years	0400-45-1-.17 (8)
Consumer Confidence Reports (CCR)	Three (3) Years	0400-45-1-.35(5)(h)
Flush and free chlorine residual for new taps where main has to be uncovered.	Next Sanitary Survey or Three (3) Years	0400-45-1-.17(32)



JHFD HOME LIST

07/07/2016

Phase 2
STH23
STH24
STH22
STH21
STH20
STH19
STH18
STH17
STH16
STH25
STH26
STH27
G
H
I
J
K
L


1
2
3
4
5
6
M
N
O
P
Q
R
To Jasper Farms (P4)
New FH
To Jasper Highlands
New FH
New FH
P3 Sunset View

Sampling Procedure

1. Review the sample siting plan to determine where and when samples are to be taken.
2. After arriving at the sampling site, remove any attachments on the faucet.
3. Consider the use of a sodium hypochlorite spray solution or flaming to disinfect the faucet. Flaming should not be used on plastic faucets.
4. Turn the water on and let it run for several minutes until temperature stabilizes.
   - Flush out the customer lines, and
   - Ensure that the water being sampled is from the distribution lines, not the plumbing fixture. (A thermometer can be used to determine when water is being drawn from the distribution system and not the plumbing fixture. The water temperature will stabilize once all the water from the fixture has been flushed out and the water flowing from the faucet is coming from the distribution system.)
5. Adjust the flow from the faucet to a slow, steady stream.
6. Take a sample of water flowing from the tap and determine and document the free chlorine residual.
7. Open the laboratory supplied container used to take the bacteriological sample. Consider using latex gloves to prevent contamination.
8. Do not touch the inside of the bottle or lid.
9. Do not set the lid down.
10. Do not rinse the bottle out.
11. Grasp the container near the bottom and quickly place it under the flowing stream.
12. Fill the bottle to the neck or indicated fill line. Do not overfill. Collect at least 100 mL of water, this is the volume the laboratory must have for testing.
13. Remove the sample container from the flow as soon as it is filled. SEAL THE CONTAINER IMMEDIATELY.
14. Turn off the water and replace any fixtures or attachments that were removed previously.
15. Fill out the bacteriological sample slip. Instructions are included on page 11
16. Place the container and completed forms in the shipping box.
17. Insure that the sample is delivered to the laboratory in a timely manner. Analysis must be initiated with within 30 hours from the time sample is collected.
18. Record sampling event and information in the bacteriological sampling log. Refer to page 13.

Faucets to Avoid

Avoid taking samples at these faucets if at all possible.

- Unprotected Outdoor Faucets
- Frost-proof Faucets

If you cannot avoid these, be sure to use good sampling techniques. Avoid dust, obvious contamination, splashing rain, snow and other possible sources of contamination, such as:

- An indoor faucet connected to a pressure tank, or water heater.
- A new faucet.
- A hot water faucet.
- A recently repaired faucet.
- Faucets with threaded taps.
- Mixing faucets.
- Sites with a higher-than-usual possibility for bacterial contamination.
- Swing/swivel faucets.
- Faucets positioned close to a sink or the ground. (It must be high enough to keep it from touching the sampling container.
- Leaky faucets or faucets which allow water to seep around the valve stem.
- Faucets that supply areas, such as janitorial or commercial sinks, where bacterial contamination is likely.
- Faucets that have aerators. (If such faucets are to be used, the aerators should be removed before a sample is collected.)

What does this all mean? Avoid any faucet that will threaten to contaminate a sample. The idea is to sample the water in the distribution system, not necessarily the condition of the plumbing fixture. You may not always be able to avoid all these types of faucets. If you have to take a sample from one of these faucets, you should exercise extreme care and use good sampling techniques including spray disinfection or flaming of the faucet where appropriate.

Bacteriological Sample Slip Information

DATE: A SAMPLE COLLECTOR: M

TIME: B CHLORINE RESIDUAL: D

SYSTEM: Japer Highlands PSWID: 0008286 G

ADDRESS: (I) 2475 Jasper Blvd COUNTY: MARION K
SOUTH PITTSBURG TN 37380 TELEPHONE: H

SAMPLE COLLECTION POINT: J

SAMPLE TYPE: C LOCATION CODE: E

REPEAT SAMPLES: F "S" – SAME "A" ABOVE "B" BELOW

a. **Sample date**. Record the date the sample is collected. Example: August 22, 2002 would read 082202.

b. **Sample time**. Record the time of day in military time. 8:30 a.m. would be recorded as 0830. 1:30 p.m. would be recorded as 1330.

c. **Sample type**. Sample types are recorded as follows:

D – Routine	S – Special
R – Repeat	Q – Quality Control
N – New lines	F – Fix or Repair

Failure to record the correct sample type can result in a monitoring requirement violation. Most samples will be coded as a "D" for a routine sample. Follow-up samples immediately following a positive routine sample are repeat samples and are coded as "R".

d. **Chlorine Residual**. All systems that disinfect their water must record the chlorine residual when coliform samples are collected. Chlorine residuals should be reported to the nearest one tenth of a milligram per liter or one tenth of a part per million.

e. **Location code**. This 3-digit block would only be used when repeat samples are collected. The laboratory will furnish the numbers to be put in these blocks.

f. **Repeat Sample Location**. Same ☐ Above ☐ Below ☐
Only used when collecting repeat "R" samples.

g. **PSWID number**. XXXX Water System's PWSID # is 000XXX. In order to get credit for the sample, the PWSID number must be correct.

h. **Phone**. Provide a daytime telephone number to be called by the laboratory if they need to contact you about the sample.

i. **Address**. Provide the complete mailing address of the Water System from which the sample was collected.

j. **Sample Location**. Provide sufficient information so that you can return to the sample site for repeat samples if necessary and sufficient information that the sample site can be identified on your sampling site plan.

k. **County**. Record the county where the public water system is located.

Bacteriological Sample Log

Date Sample Taken MM/DD/YY	Time Sample Taken (Military time)	Sample Location	Chlorine Residual	Date Sample Mailed MM/DD/YY	Date Sample Results Reviewed	Sample Results Positive (+) Negative (-)	If Sample * Results +, Repeat Samples Taken (Yes=Y)	Date Public Notice Given

Military Time

8:30 a.m. is 0830 in MT (essentially clock time)
1:30 p.m. is 1330 in MT (clock time plus 12)

*Show Date, Time, Place, and provide for Results of each repeat sample taken on this log.

Actions to be taken if a Sample is Total Coliform-Positive

Should one of the routine samples be total coliform-positive, we are required to take a set of three (3) repeat samples. The set of repeat samples will be taken as follows:

- at least one of the repeat samples must be taken from the sampling tap where the original total coliform-positive samples was taken;
- at least one of the repeat samples must be taken at a tap within 5 service connections downstream from the original sampling site;
- at least one of the repeat samples must be taken at a tap within 5 service connections upstream from the original sampling site;
- the complete set of repeat samples must be taken within 24 hours of the system being notified of a positive coliform result, or when instructed to sample by the Division of Water Resources;
- the entire set of repeat samples must be taken on the same day.

- If a total coliform-positive sample is at the end of the distribution system, or one service connection away from the end of the distribution system, the system must still take all required repeat samples. One sample at the original positive site and two upstream samples within 5 service connections will be collected.

- To comply with the requirements of the Ground Water Rule, one untreated source water sample must be collected within 24 hours of notification. This sample shall be coded "s" for special and is in addition to the three required repeat samples.

- Should one of the repeat samples be positive, another set must be taken.

Repeat samples must be taken until:

- total coliforms are not detected in one complete set of repeat samples, or
- the system exceeds the total coliform treatment technique trigger during the month and notifies the State Department of Environment and Conservation, Division of Water Resources.

If on reduced quarterly sampling and in the event of a TC positive sample, three routine samples are required the following month.

Increased monitoring to monthly is required if:

- A level 2 assessment or two level 1 assessments are triggered in a rolling 12 month period.
- An E.coli MCL violation.
- A coliform treatment technique violation.
- Two RTCR monitoring violations in a rolling 12-month period.
- One RTCR monitoring violation and one level 1 assessment in a rolling 12 month period.

Sampling During Weekends and Holidays

Routine should be taken on Mondays and Tuesdays to avoid a problem with repeat samples. This should allow ample time for repeat samples to be collected before the weekend if they are required. If a holiday should occur, which could cause a problem with either routine or repeat sampling being submitted to the state laboratory, samples must be taken to the South Pittsburg Board of Water Works for analysis. Planning ahead, and following these guidelines, should avoid any sampling problems associated with weekends or holidays.

Should it not be possible to collect repeat samples and submit them for analysis within the required 24-hour period because of a holiday or weekend, the system will provide for a "boil water notice" to be issued until sufficient samples can be collected and analyzed to verify that the contamination has been eliminated. Refer to page 18 for an example of a "boil water notice".

Treatment Technique Triggers

Level 1 Assessments

A level 1 assessment is required to be conducted as soon as practical but no later than 30 days of the following events. A Division of Water Resources Level 1 Assessment form must be completed and submitted to the Division of Water Resources. Refer to Appendix A for Level 1 Assessment forms.

- For systems, which take less than 40 samples during a month, the system has exceeded the Level 1 treatment technique trigger if the system has more than one total coliform-positive sample, including repeat samples during a month.

- The system fails to collect every required repeat sample after any single total coliform positive sample.

Level 1 assessment for a CWS must be conducted by a licensed certified operator or the owner. The owner and certified operator will conduct Level 1 assessments if a trigger is exceeded. A State approved Level 1 Assessment form must be completed and submitted to the Division of Water Resources within 30 days of the trigger exceedance. Any sanitary defects or deficiencies must be corrected within 30 days of the trigger exceedance or in accordance with an approved schedule from the Division of Water Resources.

Treatment Technique Triggers

Level 2 Assessments

A level 2 assessment is required to be conducted as soon as practical but no later than 30 days of any of the following events.

- An E.Coli Maximum Contaminant Level (MCL) violation
- A second Level 1 assessment trigger within a rolling 12 month period.

Level 2 assessments for all systems must be conducted by an licensed operator who is certified to at least the same level as the public water system being assessed and who has completed an approved level 2 training certification course from the Division of Water Resources. A system serving a population of less than 50,000 must use a 3rd party assessor. JH has made arrangements with South Pittsburg Board of Water Works to conduct a level 2 assessment if needed.

A Division of Water Resources Level 2 Assessment form must be completed and submitted to the Division of Water Resources within 30 days of the trigger exceedance. Any sanitary defects or deficiencies must be corrected within 30 days of the trigger exceedance or in accordance with an approved schedule from the Division of Water Resources.

E.coli Maximum Contaminant Level (MCL) Violations

An E.coli MCL violation occurs when any of the following conditions exist.

- An E.coli positive repeat sample follows a Total Coliform positive routine sample.
- A Total Coliform positive repeat sample follows an E.coli positive routine sample.
- A system fails to take all required repeat samples (3) following an E.coli positive routine sample.
- A system fails to test for E.coli when any repeat sample tests positive for total coliform.

Actions to be taken if an E. coli-Positive Sample is involved in the Violation (A Violation Requiring a Tier 1 Public Notification)

If any repeat sample is E. coli -positive or any repeat sample following an E. coli-positive routine sample is total coliform-positive:

- Report the violation to the State no later than the end of the day when the system was notified of the results, unless the system is notified after the Department office is closed, in which case it must notify the State before the end of the next business day.

  Person to Contact: State Inspector at the Chattanooga Field Office
  Telephone: 423-634-5745 or 1-888-891-8332
- Notify the public using this procedure:
  - Furnish a copy of the notice to customers via direct delivery and or the local radio and television stations served by the public water system as soon as possible, **but no later than 24 hours after the violation;**
- Refer to the EPA Public Notification Handbook for specific content and delivery requirements. An example PN is contained on the following page.
  - The notice should contain the language shown in the example notice on the next page;
  - The system may want to describe what is being done to correct the problem:
    - Total number of samples taken,
    - Total number of positive samples,
    - Problem areas,
    - Mains are being flushed, etc.
    -
- A Level Two Assessment must be conducted within 30 days of the E. coli positive sample.

Tier 1 PN for Violating the *E. coli* MCL

DRINKING WATER WARNING
E. coli Is Present in Rural Utility Districts Water
BOIL YOUR WATER BEFORE DRINKING OR USING

Our water system detected *E. coli* bacteria in our distribution system. As our customers, you have a right to know what happened and what we are doing to correct this situation. On April 4, 2016, we learned that coliform bacteria were present and one of our routine samples collected on April 2, 2016, was total coliform-positive (TC+). As required by the Revised Total Coliform Rule, one of our follow-up steps was to collect repeat samples at and near the location where the TC+ sample was originally taken. One of these repeat samples collected on April 5 tested positive for *E. coli.* We are now conducting additional sampling to determine the extent of the problem and are conducting a thorough investigation to determine the source of the contamination.

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a rolling boil, let it boil for one minute, and let it cool before using it. Boiling kills bacteria and other organisms in the water. You may also use bottled water. Use boiled or bottled water for drinking, making ice, preparing food and washing dishes until further notice.
Also, if you have a severely compromised immune system, have an infant, or are elderly, you may be at increased risk and should seek advice about drinking water from your health care providers. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at (800) 426-4791. If you have specific health concerns, consult your doctor. We are also providing regular updates on this situation on Local Channels or Radio Station WEPG (91.0 AM).

What does this mean?
Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps and associated headaches. *E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, some of the elderly, and people with severely-compromised immune systems.* These symptoms are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice.

What is being done?
We are conducting a thorough investigation to determine the source of the contamination and will be working with the State to implement corrective actions to ensure that our water supplies are protected against contamination. We will keep you informed of the steps we are taking to protect your drinking water and will provide information on any steps you should be taking. We will inform you when tests show no bacteria and you no longer need to boil your water. We are also providing regular updates on this situation on local channel or Radio Station WEPG (91.0 AM).

For more information, please contact Keith Garth, Assistant Manager of South Pittsburg Board of Water Works, at (423413-4321 or write to 106 N Elm Avenue South Pittsburg, TN 37380.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.
This notice is being sent to you by Jasper Highlands.
State Water System ID# Tn 0002697

06/30/16

Treatment Technique Violations

A treatment technique violation occurs when any of the following conditions occur.

- The system exceeds a treatment technique trigger and then fails to conduct an assessment or complete corrective actions within required timeframes.

Actions to be taken in the event of a Treatment Technique Violation (A Violation Requiring a Tier 2 Public Notification)

A public water system that has violated the treatment technique for total coliforms by failing to conduct an assessment, complete corrective actions or fails to complete the approved seasonal start up procedure must;

- Report the violation to the State no later than the end of the next business day after system learns of the violation.

  Person to Contact: State Inspector at the Chattanooga Field Office
  Telephone: 423-634-5745 or 1-888-891-8332
  - A Tier 2 Public Notice must be issued:

  Tier 2 notices must be issued within 30 days of learning of the violation.
- Refer to the EPA Public Notification Handbook for specific content and delivery requirements. Examples are contained in the next two pages

- Notify the public using this procedure:
  - Furnish a copy of the notice to the customers served by the public water system via mail or other direct delivery as soon as possible, **but no later than 30 days after the violation;**
    - The notice should contain the language shown in the example notices on the next pages;
    - The system may want to describe what is being done to correct the problem:

Tier 2 PN for Failure to Perform a Level 1 or 2 Assessment
DRINKING WATER NOTICE
JH Failed to Conduct an Assessment of the Facility and Distribution System

Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the distribution system. In one sample we collected on June 12, 2016, and one sample collected on June 16, 2016, we found coliforms, indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct an assessment to identify problems and to correct any problems that are found. We were required to conduct a Level 1 assessment within 30 days of learning of the second total coliform-positive (TC+) sample. A Level 1 assessment is a study of the water system to identify potential problems and determine (if possible) why total coliform bacteria have been found in our water system. As our customers, you have a right to know what happened and what we are doing to correct this situation. As required by the Revised Total Coliform Rule, *we failed to conduct the required Level 1 or 2 assessment* within 30 days, and have therefore, violated a requirement of the Revised Total Coliform Rule.

What does this mean?
This is not an emergency. If it had been an emergency, you would have been notified within 24 hours. Failure to conduct an assessment to identify the sanitary defect that triggered the assessment has the potential to cause distribution system contamination. *Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.* Failure to perform the assessment prolonged the risk of fecal contamination of our distribution system water. While we have not detected any evidence of fecal contamination in our distribution system, we are committed to correcting the deficiency to eliminate the potential threat of contamination.

What should I do?

- You do not need to boil your water or take other corrective actions. However, if you have specific health concerns, consult your doctor.

- If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from their health care providers about drinking this water. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at (800) 426-4791.

You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours. We will announce any emergencies on local channel or Radio Station WEPG (91.0 AM).

What is being done?
We have since completed the Level 1 assessment and identified the cause of the sanitary defect; damage to the storage tank. We are implementing the corrective action plan established by the State. Under this plan, the damage will be repaired and the tank will be disinfected by August 31, 2016.

For more information, please contact Keith Garth, Assistant Manager of South Pittsburg Board of Water Works, at (423) 413-4321 or write to 106 N Elm Avenue South Pittsburg, TN 37380.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail. This notice is being sent to you by Jasper Highlands
State Water System ID# Tn 0002697 Sent: 06/30/16

Example of a Tier 2 PN for Failure to Perform Corrective Action

DRINKING WATER NOTICE

JH Failed to Perform Corrective Action Following an Assessment of the Facility and Distribution System

Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the distribution system. We found coliforms, indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessment(s) to identify problems and to correct any problems that are found. This past summer, we were required to conduct a Level 1 assessment. We completed the required Level 1 assessment and identified the cause of the sanitary defect to be damage to the storage tank. *While we failed to correct the sanitary defect within the required timeframe,* we are implementing the corrective action plan established by the State. As our customers, you have a right to know what happened and what we are doing to correct this situation. As required by the Revised Total Coliform Rule, we failed to complete the corrective action within the required timeframe, and have therefore, violated a requirement of the Revised Total Coliform Rule.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours. Failure to correct the identified defect that was found during the assessment has the potential to cause distribution system contamination. *Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.*

What should I do?

- You do not need to boil your water or take other corrective actions. However, if you have specific health concerns, consult your doctor.

- If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from their health care providers about drinking this water. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at (800) 426-4791.

You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours. We will announce any emergencies on local channel or Radio Station WEPG (91.0 AM).

What is being done?

Since being informed of the failure, we have begun to correct the sanitary defect identified during the Level 1 assessment. During the assessment, the sanitary defect was determined to be damage to the storage tank. We are in communication with the State and have modified the corrective action plan's schedule to repair and disinfect the storage tank.

For more information, please contact Keith Garth, Assistant Manager of South Pittsburg Board of Water Works, at (423) 413-4321 or write to 106 N Elm Avenue South Pittsburg, TN 37380.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by Jasper Highlands State Water System ID# Tn 0002697

Sent: 06/30/16

Monitoring and Reporting Violations

A Monitoring or Reporting violation occurs when any of the following conditions exist.

- A system fails to collect all routine or additional routine samples
- A system fails to take/analyze for E-coli after a total coliform positive routine.
- A system fails to submit a monitoring report, assessment report or certification of start- up procedure completion.
- A system fails to notify the State of an E.coli positive sample.

Actions to be taken in the event of a Monitoring/ Reporting Violation (A Violation Requiring a Tier 3 Public Notification)

A public water system that has violated the Monitoring and or Reporting requirements must;

- Report the violation to the State no later than the end of the next business day after system learns of the violation.

  Person to Contact: State Inspector at the Chattanooga Field Office
  Telephone: 423-634-5745 or 1-888-891-8332
  - A Tier 3 Public Notice must be provided to customers:

  Tier 3 notices must be issued within 360 days of learning of the violation.
- Refer to the EPA Public Notification Handbook for specific content and delivery requirements. Examples are contained in the next two pages
- Notify the public using this procedure:
  - Furnish a copy of the notice to the customers served by the public water system via mail or other direct delivery as soon as possible, **but no later than 365 days after the violation;**
    - The notice should contain the language shown in the example notices on the next pages;
    - The system may want to describe what is being done to correct the problem:

Example Tier 3 PN for Failure to Take All Routine Total Coliform Samples in the Required Compliance Period

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER
Monitoring Requirements Not Met for System D

We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During December 2016, we did not complete all monitoring or testing for total coliform, and therefore, cannot be sure of the quality of your drinking water during that time.

On January 11, 2017, we became aware that our water system failed to collect all of the required monthly routine total coliform distribution system samples in December 2016. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we did to correct the situation. None of the 12 samples that we did collect was positive for total coliform or *E. coli* bacteria.

What should I do?
There is nothing you need to do. You do not need to boil your water or take other corrective actions. You may continue to drink the water. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours. We will also announce any emergencies on local channel and Radio Station WEPG (91.0 AM).

What was done?
We collected all 15 of the required routine total coliform samples in January and tested them for *E. coli.* None of the samples collected in January was positive for *E. coli.*

For more information, please contact Keith Garth, Assistant Manager of South Pittsburg Board of Water Works, at (423) 413-4321 or write to 106 N Elm Avenue South Pittsburg, TN 37380.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by Jasper Highlands
State Water System ID# Tn 0002697 Sent: 06/30/16

Example Tier 3 PN for Failure to Notify the State Following an *EC*+ Sample Result

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER
Reporting Requirements Not Met for System F

Our system failed to notify the state of an *E. coli*-positive (*EC*+) routine sample by the end of the day that we learned of the violation. The water system has not exceeded the *E. coli* MCL standard set by the Revised Total Coliform Rule. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we did to correct the situation.

What should I do?
There is nothing you need to do. You do not need to boil your water or take other corrective actions. You may continue to drink the water. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours. We will also announce any emergencies on local channel and Radio Station WEPG (91.0 AM).

What was done?
We notified the state of the routine monitoring sample that was *EC*+.

For more information, please contact Keith Garth, Assistant Manager of South Pittsburg Board of Water Works, at (423) 413-4321 or write to 106 N Elm Avenue South Pittsburg, TN 37380.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by Jasper Highlands
State Water System ID# Tn 0002697 Sent: 06/30/16

Appendix A – ANNUAL CHECKLIST

TENNESSEE DEPARTMENT OF ENVIRONMENT & CONSERVATION
DIVISION OF WATER RESOURCES - DRINKING WATER UNIT
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Ave., 11th Floor
Nashville, TN 37243-1102
615-532-0191

SEASONAL NON-COMMUNITY PUBLIC WATER SYSTEMS

State Approved Start-up Checklist for PWSID # and Name _____

Under the Revised Total Coliform Rule (RTCR), systems that are only opened part of the year or seasonal are required to follow the steps below and submit this form to the regional Environmental Field Office prior to serving water to the public for the season. To locate the Environmental Field Office for your area copy and paste the link below into your browser: http://www.tn.gov/environment/field-offices.shtml

(1.)	**Well Source and Pump House Start-up Shut-down**			
(a.)	Is pump house protected from trespassers (locked and completely secure)	YES	NO	N/A
(b.)	Well casing is structurally sound	YES	NO	N/A
(c.)	Chemicals (i.e. gas, solvents, pesticides) are stored outside isolation radius or at least more than 100 feet from well	YES	NO	N/A
(d.)	Is backup generator stored to capture any leaks in secondary containment area	YES	NO	N/A
(e.)	Well cap is tight with no openings that would allow insect infiltration	YES	NO	N/A
(f.)	Well vent is turned downward and the screen is intact	YES	NO	N/A
(g.)	Rodents and insects are kept out of the pump house and away from the well (keep area mowed)	YES	NO	N/A
(h.)	Sample tap does not leak and flows freely when open	YES	NO	N/A
(i.)	A water meter is working properly and water usage records are maintained	YES	NO	N/A
	COMMENTS:			
(2.)	**Chlorination and Other Treatment (softening, filters, phosphate, etc.)**			
(a.)	Are all treatment systems installed and operating properly	YES	NO	N/A
(b.)	Chlorine is pumping at an adequate dose throughout distribution system including distal ends	YES	NO	N/A
(c.)	The chlorine residual test kit is working, reagents are not expired and is properly calibrated at the beginning of the season.	YES	NO	N/A
(d.)	Chlorinator inspected and declared to be operating properly	YES	NO	N/A
(e.)	The chemical injection point has been cleaned and chemical feed pump is working properly	YES	NO	N/A
(f.)	Unless otherwise approved by the Division, system must ensure measureable disinfectant residual of 0.2 ppm at all distal ends of distribution system	YES	NO	N/A
	COMMENTS:			

(3.)	**Monitoring and Reporting**			
(a.)	All required total coliform bacteria samples were collected prior to serving water to the public with a negative result	YES	NO	N/A
	COMMENTS:			
(4.)	**Storage Tanks**			
(a.)	Flush the interior of the tank	YES	NO	N/A
(b.)	The tank overflow pipe is screened and air gap is maintained above ground	YES	NO	N/A
(c.)	Tank has been visually inspected for damage or repairs	YES	NO	N/A
	COMMENTS:			
(5.)	**Pressure Tanks**			
(a.)	Pressure tank is checked to ensure pressure is being maintained and tank is not waterlogged	YES	NO	N/A
(b.)	All valves, gauges, controls, etc. are properly operating	YES	NO	N/A
(c.)	Pressure tanks thoroughly flushed	YES	NO	N/A
	COMMENTS:			
(6.)	**Distribution Lines**			
(a.)	Lines walked to ensure none are exposed or leaking	YES	NO	N/A
(b.)	Each valve located and are working properly	YES	NO	N/A
(c.)	Flush distribution lines and check chlorine residual at 2 locations on 2 separate days	YES	NO	N/A
(d.)	Ensure RV dump station maintains air gap	YES	NO	N/A
	COMMENTS:			
(7.)	**Additional Comments:**			

***** Note: Remember to update your Wellhead Protection Plan**
If you have any questions, contact your local Environmental Field Office at (888) 891-TDEC (8332)

Appendix A – Level 1 ASSESSMENT FORM

TENNESSEE DEPARTMENT OF ENVIRONMENT & CONSERVATION
DIVISION OF WATER RESOURCES – DRINKING WATER UNIT
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Ave., 11th Floor
Nashville, TN 37243-1102
615-532-0191

REVISED TOTAL COLIFORM RULE LEVEL 1 ASSESSMENT

Water System Name:	
PWSID #:	
Assessment Performed By:	
Date of Assessment:	
	(1.) Sampling
☐ Yes ☐ No If Yes, explain	**(a.) Review total coliform sample results and chlorine residuals for the past three months (six months if sampling quarterly). Are there any trends in bacteria samples or chlorine residuals?**
	(b.)Sampling Guidance
	• The water should be allowed to run for a few minutes to ensure it was from the distribution system and not household plumbing. • The faucet should be disinfected. • The chlorine residual should be taken but not using the bacteria sample bottle. • Care should be taken not to touch the inside of the bottle or lid, not to set the lid down and not rinse the bottle out. Container should not touch faucet. • The water should be flowing in a slow, steady stream. • Container should not be overfilled and should be sealed immediately. • Outdoor faucets, frost-proof faucets should be avoided. • If possible, avoid faucet connected to water heater, pressure tank; hot water faucet, new faucet, swing/swivel faucets, janitor sink faucets or other potentially contaminated faucets.
	(c.) Describe below the sampling technique used for bacteria sampling:
	(d.)Name of Sampler

☐Yes ☐No If Yes, explain	(e.) Are conditions at the sample tap unsanitary and prone to external contamination?
☐Yes ☐No Explain sending/use of tap	(f.) Has the sample site been in regular use? Would the typical use of the tap be prone to contamination (food preparation, utility sink, etc.)?
	(g.) Describe how the samples were processed:
	I. Samples shipped or delivered? II. Time between sample collection and delivery to lab? III. Samples cooled or ambient temperature? IV. Fresh sample bottles? V. Properly stored sample bottles?
	(h.) If the system has a certified bacteriological lab, review their lab procedures, QA/QC and the cleanliness of the lab. Provide observations below:
	(2.) General –File Review
	(a.) Review last sanitary survey and survey letter for identified problems affecting water quality, particularly repeat issues. Provide observations below:

	(b.) Review Monthly Operating Reports (MORs) for past 6 months paying special attention to chlorine residual leaving plant and turbidity levels. Provide observations below:
	(c.) Review files for filter exceedance reports, filter performance reports, identify filter run times. Provide observations below:
☐ Yes ☐ No If Yes, explain	(d.) Has there been a loss of service due to a failure of water transmission or distribution facilities?
☐ Yes ☐ No If Yes, explain	(e.) Could any operation or maintenance activities have introduced contamination?
☐ Yes ☐ No If Yes, explain	(f.) Has there been recent delivery of new treatment chemicals? Were they confirmed to be the correct chemical and strength?
☐ Yes ☐ No If Yes, explain	(g.) Has there been vandalism or unauthorized access to facilities identified?
	(3.)Distribution System
☐ Yes ☐ No	(a.) Have all issues identified in the last professional tank inspection and sanitary survey been addressed? Describe below:

☐ Yes ☐ No	(b.) Have there been line replacements, water line breaks or repairs at new construction within the past 3 months? Describe disinfection techniques employed below:
☐ Yes ☐ No	(c.) If the tank or clearwell inspection or repair was within the past 3 months, was proper disinfection employed afterward? When were the tanks last cleaned out? Describe disinfection technique below:
☐ Yes ☐ No	(d.) Is there an ongoing flushing program and when was the last flushing performed? Describe below:
☐ Yes ☐ No If yes, explain	(e.) Are there any areas where it is difficult to maintain chlorine residual without flushing? Explain below:
☐ Yes ☐ No If Yes, explain	(f.) Has there been any firefighting in the area within the past 3 months that would have dropped water pressure or other low pressure events such as line breaks?
	(4.) Cross Connections
☐ Yes ☐ No	(a.) Are backflow prevention devices being tested annually?
☐ Yes ☐ No If Yes, explain	(b.) Are there backflow prevention devices in the vicinity of the total coliform positive site or places that should have backflow prevention devices?

☐Yes ☐No	(d.) Within the area of concern, have there been surveys conducted for the detection and elimination of hazards associated with cross-connections? Describe the area (e.g., residential, commercial, sparsely populated rural, etc.) and any known backflow prevention devices and potential risks.
	(5.) Plant Operation/Treatment
☐Yes ☐No If No, explain	(a.) Are all of the facilities secure to prevent unauthorized access? Explain below:
☐Yes ☐No	(b.) Is the treatment facility operated and manned 24 hours a day? Explain below.
	(c.) If unmanned while in operation, what monitoring/shutdown alarms are in place at the treatment facility (turbidity, chlorine residual, etc.) and are they operational? Describe below:
☐Yes ☐No If Yes, explain	(d.) Has there been any unusual filter performance within the past 3 months?
☐Yes ☐No If Yes, explain	(e.) Review turbidity records for the past three months. Have there been any turbidity exceedances of more than 1 NTU in either the individual filters or combined?

☐Yes ☐No If Yes, explain	**(g.) Have there been any interruptions within the past 3 months that could have affected turbidity or disinfection (chlorine feed or UV disinfection)?**
☐Yes ☐No If Yes, explain	
☐Yes ☐No If Yes, explain	**(h.) Are there any unsanitary conditions, rodents, birds, general housekeeping problems at any of the facilities?**
☐Yes ☐No If Yes, explain	
☐Yes ☐No If Yes, explain	**(i.) Were there any observed leaks or other signs of poor maintenance within the facilities? Describe below:**
☐Yes ☐No	
☐Yes ☐No	**(j.) If leaks or other signs of poor maintenance are present, is the pressure tank maintaining appropriate pressure? If there is a pressure tank present, is it maintaining appropriate pressure?**
☐Yes ☐No	**(k.) If the system is using a cartridge filter, is the filter the correct absolute 1 micron cartridge and is it changed according to manufacturer's recommendation? Provide comments below:**
	(6.) Chlorine Residual
☐Yes ☐No	**(a.) Has the system been achieving the proper contact time, if required (minimum of 15 minutes)? Indicate below if system is not chlorinating and discuss system's contact time below:**
☐Yes ☐No	**(b.) Is there consistent chlorine residual in the water leaving the plant? Describe**

☐Yes ☐No	(c.) Does the unit have the proper UV lamp?
☐Yes ☐No	(d.) Does the lamp need replaced?
☐Yes ☐No	(e.) Is the lamp sleeve clean?
	(8.) Source
☐Yes ☐No If Yes, explain	(a.) Have there been any new or auxiliary sources brought online? Explain below:
	_____ _____ _____ _____
☐Yes ☐No If yes, explain	If seasonal, were there any problems with the startup procedure? Explain below:
	_____ _____ _____
	(9.) Well/Spring
☐Yes ☐No	(a.) Is Springbox in good condition? Describe Springbox below:
	_____ _____ _____ _____
☐Yes ☐No	(b.) Is Springbox/well head protected from surface water drainage/Infiltration? Describe below:
	_____ _____ _____ _____
☐Yes ☐No	(c.) Is well casing above grade/flood zone? Describe setting below:
	_____ _____ _____ _____
☐Yes ☐No	(d.) Is the sanitary seal on the well casing is intact?
☐Yes ☐No	(e.) Is well vent screened?
☐Yes ☐No If yes, explain	(f.) Was there any heavy precipitation or flooding within the 30 days prior to the coliform positive event? Describe below:
☐Yes ☐No	_____

☐ Yes ☐ No If Yes, explain	(b.) Is the intake or equipment in need of repair?
☐ Yes ☐ No If Yes, explain	(c.) Was there any heavy precipitation or flooding within the 30 days prior to the total coliform positive event? Describe below:
☐ Yes ☐ No If Yes, explain	(d.) Have there been any changes in sources of potential contamination in proximity of the water source?
	(11.) Assessment Statement and Proposed Remedy

Attach additional sheets if necessary

Certification Statement

I certify, under penalty of law, including but not limited to penalties for perjury, that this document and all attachments were prepared by me, or under my direction or supervision; that all of the submitted information is to the best of my knowledge and belief true, accurate, and complete; and that I am lawfully present in the United States as a U.S. citizen or a qualified alien as defined in 8 U.S.C. §1641(b). As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury. I understand that the penalties for providing false information and making false or fraudulent statements or representations include revocation in a fine, permit or license, civil penalties, and/or criminal prosecution resulting in a fine, imprisonment or both.

_____ _____

Signature **Date**

EXHIBIT J

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243
PHONE: 615-532-0191 FAX: 615-532-0686

March 20, 2014

Mr. Jerry Hightower, PE
CTI Engineers, Inc.
1122 Riverfront Parkway
Chattanooga TN 37402

Re: Jasper Highlands Water System (PWSID# Not Yet Assigned)
Marion County
Project Number WS 13-1248
Jasper Highlands Development – Water System (Phases 1A & 1B)

Dear Mr. Hightower:

The Tennessee Department of Environment and Conservation, Division of Water Resources, acknowledges receipt of four sets of final construction documents on December 13, 2013.

This project consists of 8-inch, 6-inch, and 2-inch water lines along with two water pumping stations; a 15,000 gallon storage tank; and a master meter connection to the South Pittsburg Water System. This project will serve 85 lots in Phase 1A and an additional 139 lots in Phase 1B As indicated by our stamp, this project has been approved for construction.

This letter, with the enclosed engineering documents bearing our official stamp, constitutes approval by the Commissioner of the Tennessee Department of Environment and Conservation for construction of the referenced facility. Approval is granted in accordance with the Tennessee Safe Drinking Water Act of 1983 and Regulations of the Water Quality Control Board. One complete set of plans and specifications, bearing the official stamp, must be kept at the construction site. Projects utilizing previously approved standard specifications are not required to maintain a stamped copy of the specifications at the construction site. All construction must conform with these approved documents. It is the responsibility of the water utility and/or their engineer to ensure that construction conforms to the plans and specifications. We have retained one copy of this submittal for our records. Please take note of the following comments:

The elevation of the proposed storage tank (near pump station #2) will not allow the tank to provide gravity flow storage or maintain water service during a power failure. Pump station #2 will have to run continuously to maintain water pressure in the system. When the Jasper Highlands development reaches 50 active water service connections, additional water storage capacity will be required at a higher elevation.

Approval expires one year from the stamped approval date unless construction is either underway or complete. Any request for its extension must be made prior to this expiration date. Deviations from the approved plan documents which may affect the quality or quantity of potable water must be submitted and approved in writing before such changes are made.

The Division's appropriate Field Office may desire to schedule an inspection of the construction work to verify compliance with the approved plans and specifications. Therefore the engineer or the water utility shall notify the Chattanooga Field Office of the start of construction. This notification may be made by completing and mailing the attached "Construction Start Notification" form to the field office.

To expedite matters, please reference the assigned WS Project Number on future correspondence. If we may be of any assistance, please contact us at (615) 532-0191.

Sincerely,

R. William Hench, P.E.
Drinking Water Engineering
Division of Water Resources

RWH/ DWS104

Enclosures: Approved Construction Documents
Construction Start Notification Form

cc: Chattanooga Field Office - Division of Water Resources
Donald Blansett, South Pittsburg Water System
John Thornton, Thunder Enterprises

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243
PHONE: 615-532-0191 FAX: 615-532-0686

July 22, 2016

Mr. Joseph Parks, PE
March Adams & Associates
310 Dodds Avenue
PO Box 3689
Chattanooga TN 37404

Re: Jasper Highlands (PWSID# 0008286)
Marion County
Project Number DW 16-0816
Jasper Highlands Phase 2 - Water Lines & Storage Tank

Dear Mr. Parks:

The Tennessee Department of Environment and Conservation, Division of Water Resources, acknowledges receipt of five sets of final construction documents on July 20, 2016.

This project consists of approximately 35,800 feet of 8-inch, 6-inch, 4-inch, and 2-inch water lines along with a 269,000 gallon water storage tank. As indicated by our stamp, this project has been approved for construction.

This letter, with the enclosed engineering documents bearing our official stamp, constitutes approval by the Commissioner of the Tennessee Department of Environment and Conservation for construction of the referenced facility. Approval is granted in accordance with the Tennessee Safe Drinking Water Act of 1983 and Regulations of the Tennessee Board of Water Quality, Oil and Gas. One complete set of plans and specifications, bearing the official stamp, must be kept at the construction site. Projects utilizing previously approved standard specifications are not required to maintain a stamped copy of the specifications at the construction site. All construction must conform with these approved documents. It is the responsibility of the water utility and/or their engineer to ensure that construction conforms to the plans and specifications. We have retained one copy of this submittal for our records. Please take note of the following:

1. **The bolted steel, glass coated water storage tank must be designed/constructed in accordance with AWWA Standard D103 and disinfected in accordance with AWWA Standard C652.**
2. **Customers served with water pressure over 100 psi must have pressure reducers.**

Approval expires one year from the stamped approval date unless construction is either underway or complete. Any request for its extension must be made prior to this expiration date.

Deviations from the approved plan documents which may affect the quality or quantity of potable water must be submitted and approved in writing before such changes are made.

The Division's appropriate Field Office may desire to schedule an inspection of the construction work to verify compliance with the approved plans and specifications. Therefore the engineer or the water utility shall notify the Chattanooga Field Office of the start of construction. This notification may be made by completing and mailing the attached "Construction Start Notification" form to the field office.

To expedite matters, please reference the assigned DW Project Number on future correspondence. If we may be of any assistance, please contact us at (615) 532-0191.

Sincerely,

R. William Hench

R. William Hench, P.E.
Drinking Water Engineering
Division of Water Resources

RWH/ DWS104

Enclosures: Approved Construction Documents
Construction Start Notification Form

cc: Chattanooga Field Office - Division of Water Resources
John Thornton, Thunder Enterprises

CONSTRUCTION START NOTIFICATION

INSTRUCTIONS: **WHEN THE CONSTRUCTION START DATE FOR A PROJECT IS KNOWN, COMPLETE THIS FORM AND MAIL OR FAX TO:**

Gary Burriss
Chattanooga Field Office
Division of Water Resources
1301 Riverfront Parkway, Suite 206
Chattanooga TN 37402
(423) 634-6389

Water System - _____

County - _____

Project Name - _____

WS Project Number - _____

Start Construction Date - _____

Estimated Completion - _____

Will this project require interruption of water service? _____ **Yes**
_____ **No**

Number of Customers Affected _____

EXHIBIT K

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
CHATTANOOGA ENVIRONMENTAL FIELD OFFICE
1301 RIVERFRONT PARKWAY, SUITE 206
CHATTANOOGA, TENNESSEE 37402
PHONE (423) 634-5745 STATEWIDE 1-888-891-8332 FAX (423) 634-6389

June 22, 2018

Mr. John Thornton, Owner
Thunder Enterprises
P. O. Box 4737
Chattanooga, TN 37405

Re: **Sanitary Survey of Community Water System**
Jasper Highlands Water System
P.W.S.I.D. No. 0008286
Marion County, Tennessee

Dear Mr. Thornton:

We would like to thank the staff of Jasper Highlands Water System for their assistance and cooperation in conducting the sanitary survey on June 19, 2018. Mohammed Faleh and Amy Francis conducted the survey with the assistance of Clarence Howard. The survey consisted of records review to document the operational performance and an on-site inspection of the water distribution system. The survey covered the time period from April 2017, to April 2018. In accordance with the Sanitary Survey Manual for Community Public Water Supplies, Jasper Highlands Water System earned 421 points out of a possible 421 points for a numerical rating of one hundred percent **(100%).** With this score, the system will remain among Tennessee's **"Approved"** public water supplies. A copy of the rating form is attached.

The following deficiencies, comments, and/or recommendations correspond with the attached rating form and should be addressed as applicable:

1. **Section 1: System Management and Operation**
   - **Subsection A. Record Keeping**

     The system has good record keeping. All necessary records were available and well organized. This effort should be continued as paperwork is added to the files.

General Observations, Comments, and Other Recommendations

1. **Emergency Operation Plan**

   The Emergency Operation Plan needs to be kept up-to-date for it to be effective in an emergency. It should be reviewed periodically and updated as needed since your water system is still changing rapidly.

2. **Disinfection By-Product Monitoring**

   The current Disinfection By-Product monitoring site is 302 River Bluffs Drive. As the distribution system continues to grow, this site location may need to be adjusted, so that it represents the end of your distribution system. Your current Disinfection By-Products Plan states that samples will be collected during the second week of July. This will need to be modified so that sampling is done in conjunction with South Pittsburg Water System. They will be collecting samples during the **first week of July 2018.**

3. **Chlorine Residual**

   The chlorine residual was measured at 1.07 mg/L during the survey, which is satisfactory.

4. **Bacteriological Sampling**

   The required bacteriological sampling rate for the Jasper Highlands Water System will remain at one sample per month based on 90 connections serving an estimated population of 223 people.

Again, we thank the Jasper Highlands water system personnel for their assistance and courtesy during our visit. If you have any questions or need additional information, please contact Mohammed Faleh, Amy Francis, or me at this office. Our telephone number is (423) 634-5745.

Sincerely,

Gary K. Burriss

Gary K. Burriss
Chattanooga Environmental Field Office
Division of Water Resources

Enclosure

cc: Freda Crutchfield, Division of Water Resources, Nashville Central Office
Keith Garth, Certified Operator, Jasper Highlands Water System
Clarence Howard, Sr., VP of Construction, Jasper Highlands Water System
Mohammed Faleh, Chattanooga Environmental Field Office
Amy Francis, Chattanooga Environmental Field Office

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
CHATTANOOGA ENVIRONMENTAL FIELD OFFICE
1301 RIVERFRONT PARKWAY, SUITE 206
CHATTANOOGA, TENNESSEE 37402

Jasper Highlands Water System
Drinking Water Monitoring Program
June 2018

The following should be reported on the Monthly Operation Report:

1. Free chlorine residual - daily
2. Daily amount of water purchased from South Pittsburg Water System
3. Date and location of bacteriological samples with chlorine residual
4. Any unusual occurrences in the "Remarks" section

PWSID:	0008286	Water System Name:	Jasper Highlands Water System
Survey Date:	Jun 19, 2018	System Category (Points):	421

421 - Consecutive Systems/Distribution Only
488 - Treatment Systems/Wholesalers
599 - Both Treatment and Distribution

System Management and Operation (94)

Requirement	Points Range	Deduction	Comments
A. Record Keeping 0400-45-01-.20	(0)	Narrative	Good Record Keeping.
B. Construction Projects 0400-45-01-.05, 0400-45-01-.17	(1-5)	0	
C. Submission of Monthly Operations Reports 0400-45-01-.17	(0)	Narrative	
D. Reporting Requirements 0400-45-01-.18	(4-30)	0	
E. Public Notification 0400-45-01-.19	(3-10)	0	
F. Facility Maintenance Fee	(0)	Narrative	
G. Enforcement – TCA §68-221-701 et seq.	(4-10)	0	
H. Emergency Operations Plan 0400-45-01-.17	(3)		Needs to be updated.
	Deficiency Subtotal	0	

2. Operator Compliance (23)

Requirement	Points Range	Deduction	Comments
A. Certified Operator – Plant and Distribution System 0400-45-01-.17(1) and 0400-49-01-.04	(3-15)	0	Keith Garth Ds1
	Deficiency Subtotal	0	

3. Source (25)

Requirement	Points Range	Deduction	Comments
A. Source Adequacy 0400-45-01-.02, .05, .16, .17(13) and .34(3)	(3-5)	0	Purchased / South Pittsburg W.S
B. Intake 0400-45-01-.05, .17	(2)	0	N/A
C. Wellhead/Springbox Construction 0400-45-01-.05(12), .16 and .17(3) and (16)	(2)	0	N/A
D. Source Protection Plans 0400-45-01-.34	(1-2)	0	N/A
	Deficiency Subtotal	0	

Requirement	Points Range	Deduction	Comments
A. Aerator 0400-45-01-.05, .17	(2)	0	N/A
B. Chemicals/Chemical Feeders 0400-45-01-.05(8), and .17, .36	(2)	0	N/A
C. Mixing 0400-45-01-.02, .05, .17	(2)	0	N/A
D. Flocculation 0400-45-01-.02, .05, .17	(2)	0	N/A
E. Sedimentation 0400-45-01-.02, .05, .17	(2)	0	N/A
F. Filtration/Alternative Technology 0400-45-01-.17(12) and (27)	(2-30)	0	N/A
G. Re-wash/Filter-to-waste 0400-45-01-.17 (35)	(2)	0	N/A
H. Turbidimeters/Calibration 0400-45-01-.05 (11).17, .31, .39	(2-4)	0	N/A
I. Disinfection 0400-45-01-.02, .17, .31, .36	(2-30)	0	N/A
J. Disinfection Contact Time 0400-45-01-.02, .17, .31	(2-4)	0	N/A
K. Master Meter 0400-45-01-.17 (2) and (3)	(1-2)	0	N/A
L. Maintenance of Equipment, Buildings and Grounds 0400-45-01-.02, .17(3), (17) and (19)	(1)	0	N/A
M. Laboratory Facilities 0400-45-01-.02, .14, .17(3)	(1-3)	0	N/A
N. Safety 0400-45-01-.02	(2)	0	N/A
O. Sludge Handling/Backwash Handling 0400-45-1-.05	(2)	0	N/A
P. Sanitary Conditions 0400-45-01-.17 (17)	(2)	0	N/A
Q. Fluoridation Techniques 0400-45-01-.06, .12, .17	(2)	0	N/A
R. Design Capacity 0400-45-01-.05 (10)	(2-4)	0	N/A
S. Filter Backwash Recycling 0400-45-01-.31 (9)	(1)	0	N/A
	Deficiency Subtotal	0	

Requirement	Points Range	Deduction	Comments
A. Laboratory-Process Monitoring (excluding Turbidity and Chlorine Residual) 0400-45-01-.17(3)	(5)	0	
B. Bacteriological Monitoring	(2-6)	0	
C. Bacteriological Compliance 0400-45-01-.06	(4-7)	0	
D. Turbidity Monitoring	(2-3)	0	N/A
E. Turbidity Compliance	(4-7)	0	N/A
F. Chorine Residual Monitoring 0400-45-01-.17, .31, .36	(2-3)	0	
G. Primary Chemicals Monitoring	(2-3)	0	
H. Primary Chemicals Compliance	(4)	0	
I. Lead and Copper Monitoring 0400-45-01-.33	(2-3)	0	
J. Lead and Copper Action Level 0400-45-01-.33	(3-5)	0	
K. Disinfection/Disinfection By-Products and Precursors Monitoring 0400-45-01-.36, .37, .38	(2-3)	0	
L. Disinfection/Disinfection By-Products and Precursors Compliance 0400-45-01-.06, .36	(2-30)	0	
M. Secondary Chemicals 0400-45-01-.12	(2)	0	
N. Secondary Chemicals Compliance 0400-45- 01-.12	(3)	0	
O. Cryptosporidium Monitoring 0400-45-01-.39	(0)	Narrative	
	Deficiency Subtotal	0	

6. Finished Water Storage (25)

Requirement	Points Range	Deduction	Comments
A. Adequate Storage 0400-45-01-.17 (14)	(2-4)	0	
B. Inspection and Maintenance of Reservoirs, Tanks and Clearwell 0400-45-01-.17 (16), (17), (33) and (34)	(1-10)	0	
	Deficiency Subtotal	0	

Requirement	Points Range	Deduction	Comments
A. Pump Facilities 0400-45-01-.17 (9) and (13)	(1-4)	0	
B. Maintenance of Pumping Equipment 0400-45-01-.17(13)	(1-3)	0	
	Deficiency Subtotal	0	

8. Distribution System and Cross Connection Controls (86)

Requirement	Points Range	Deduction	Comments
A. Notification, Inspection, Disinfection and Sample Collection of New or Existing Facilities 0400-45-01-.17 (8) and (19)	(3-5)	0	
B. Flushing Program/Blow Offs 0400-45-01-.17(10) and (23)	(3-4)	0	
C. Fire Hydrants 0400-45-01-.17 (18)	(0)	Narrative	
D. Adequate Pressure 0400-45-01-.17 (9)	(5)	0	
E. Map of Distribution System 0400-45-01-.17 (15)	(3)	0	
F. Approved Cross Connection Policy or Ordinance and Plan 0400-45-01-.17 (6)	(4)	0	
G. Working Cross Connection Program 0400-45-01-.17(6)	(3-9)	0	
H. Unaccounted Water Loss	(0)	Narrative	
	Deficiency Subtotal	0	

Total Deficiency Points:	0
Points Available:	421
Overall Rating:	100

Points Available
421 - Consecutive Systems/Distribution Only
488 - Treatment Systems/Wholesalers
599 - Both Treatment and Distribution

Inspector: Mohammed H. Faleh, Amy Francis

Additional Comments/Explanations:

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
CHATTANOOGA ENVIRONMENTAL FIELD OFFICE
1301 RIVERFRONT PARKWAY, SUITE 206
CHATTANOOGA, TENNESSEE 37402
PHONE (423) 634-5745 STATEWIDE 1-888-891-8332 FAX (423) 634-6389

June 12, 2017

Mr. John Thornton, Owner
Thunder Enterprises
P. O. Box 4737
Chattanooga, TN 37405

Re: **Sanitary Survey of Community Water System**
Jasper Highlands Water System
P.W.S.I.D. No. 0008286
Marion County, Tennessee

Dear Mr. Thornton:

We would like to thank the staff of Jasper Highlands Water System for their assistance and cooperation in conducting the sanitary survey on June 7, 2017. Mohammed Faleh and Amy Francis conducted the survey with the assistance of Clarence Howard, Brian Smith and Keith Garth. The survey consisted of records review to document the operational performance and an on-site inspection of the water distribution system. The survey covered the time period from April 2016, to April 2017. In accordance with the Sanitary Survey Manual for Community Public Water Supplies, Jasper Highlands Water System earned 418 points out of a possible 421 points for a numerical rating of ninety-nine percent **(99%)**. With this score, the system will remain among Tennessee's **"Approved"** public water supplies. A copy of the rating form is attached.

The following deficiencies, comments, and/or recommendations correspond with the attached rating form and should be addressed as applicable:

1. **Section 1: System Management and Operation**
   - **Subsection A. Record Keeping**

     The system has good record keeping. All necessary records were available and well organized.

   - **Subsection B. Construction Projects**

     The system failed to notify our department of start construction notification for the 269,000 gallon water storage tank. The system needs to notify our office of any major construction projects within the water system as new phases are added.

2. Section 8: Distribution and Cross Connection Controls

Subsection G. Working Cross Connection Program

More work is needed on the system's cross connection program in accordance with Rule 400-45-01-.17(6). Special attention should be given to keeping cross connection records maintained in an orderly manner. A few backflow prevention devices have not been tested since the last sanitary survey. Those devices need to be tested as soon as possible.

General Observations, Comments, and Other Recommendations

1. Storage Tank

The system needs to work out a schedule with South Pittsburg Water System for filling the new storage tank, especially if it occurs during the summer months. Unplanned high usage could cause an unnecessary strain on the South Pittsburg distribution system.

2. Disinfection By-Product Monitoring

A site needs to be selected for the Disinfection By-Product monitoring, which should be done in conjunction with South Pittsburg Water System during the **first week of July 2017**. The dead ends of the distribution system should be considered in the selection of the site. A future sampling schedule will be determined based on the results of this sample. As the distribution system grows, this site location may need to be adjusted.

3. Chlorine Residual

The chlorine residual was measured at 0.95 mg/L during the survey, which is satisfactory.

4. Bacteriological Sampling

The required bacteriological sampling rate for the Jasper Highlands Water System will remain at one sample per month based on 31 connections serving an estimated population of 77 people.

Again, we thank the Jasper Highlands water system personnel for their assistance and courtesy during our visit. If you have any questions or need additional information, please contact Mohammed Faleh, Amy Francis, or me at this office. Our telephone number is (423) 634-5745.

Sincerely,

Gary K. Burriss
Chattanooga Environmental Field Office
Division of Water Resources

Enclosure

cc: Freda Crutchfield, Division of Water Resources, Nashville Central Office
Keith Garth, Certified Operator, Jasper Highlands Water System
Clarence Howard, Sr., VP of Construction, Jasper Highlands Water System
Brian Smith, Operator, Jasper Highlands Water System
Amy Francis, Chattanooga Environmental Field Office

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Water Resources
Chattanooga Environmental Field Office
1301 Riverfront Parkway, Suite 206
Chattanooga, Tennessee 37402

Jasper Highlands Water System
Drinking Water Monitoring Program
June 2017

The following should be reported on the Monthly Operation Report

1. Free chlorine residual - daily
2. Daily amount of water purchased from South Pittsburg Water System
3. Date and location of bacteriological samples with chlorine residual
4. Any unusual occurrences in the "Remarks" section

Sanitary Survey Rating

PWSID: 0008286 Water System Name: Jasper Highlands Water System

Survey Date: Jun 7, 2017 System Category (Points): 421

421 - Consecutive Systems/Distribution Only
488 - Treatment Systems/Wholesalers
599 - Both Treatment and Distribution

1. System Management and Operation (94)

Requirement	Points Range	Deduction	Comments
A. Record Keeping 0400-45-01-.20	(0)	Narrative	Good Record Keeping.
B. Construction Projects 0400-45-01-.05, 0400-45-01-.17	(1-5)	0	Fails to notify DWR prior to construction.
C. Submission of Monthly Operations Reports 0400-45-01-.17	(0)	Narrative	
D. Reporting Requirements 0400-45-01-.18	(4-30)	0	
E. Public Notification 0400-45-01-.19	(3-10)	0	
F. Facility Maintenance Fee	(0)	Narrative	
G. Enforcement – TCA §68-221-701 et seq.	(4-10)	0	
H. Emergency Operations Plan 0400-45-01-.17	(3)		Updated on July 27, 2016.
	Deficiency Subtotal	0	

Operator Compliance (23)

Requirement	Points Range	Deduction	Comments
A. Certified Operator – Plant and Distribution System 0400-45-01-.17(1) and 0400-49-01-.04	(3-15)	0	Keith Garth Ds1
	Deficiency Subtotal	0	

3. Source (25)

Requirement	Points Range	Deduction	Comments
A. Source Adequacy 0400-45-01-.02, .05, .16, .17(13) and .34(3)	(3-5)	0	Purchased / South Pittsburg W.S
B. Intake 0400-45-01-.05, .17	(2)	0	N/A
C. Wellhead/Springbox Construction 0400-45-01-.05(12), .16 and .17(3) and (16)	(2)	0	N/A
D. Source Protection Plans 0400-45-01-.34	(1-2)	0	N/A
	Deficiency Subtotal	0	

4. Treatment (153)

Requirement	Points Range	Deduction	Comments
A. Aerator 0400-45-01-.05, .17	(2)	0	N/A
B. Chemicals/Chemical Feeders 0400-45-01-.05(8), and .17, .36	(2)	0	N/A
C. Mixing 0400-45-01-.02, .05, .17	(2)	0	N/A
D. Flocculation 0400-45-01-.02, .05, .17	(2)	0	N/A
E. Sedimentation 0400-45-01-.02, .05, .17	(2)	0	N/A
F. Filtration/Alternative Technology 0400-45-01-.17(12) and (27)	(2-30)	0	N/A
G. Re-wash/Filter-to-waste 0400-45-01-.17 (35)	(2)	0	N/A
H. Turbidimeters/Calibration 0400-45-01-.05 (11).17, .31, .39	(2-4)	0	N/A
I. Disinfection 0400-45-01-.02, .17, .31, .36	(2-30)	0	N/A
J. Disinfection Contact Time 0400-45-01-.02, .17, .31	(2-4)	0	N/A
K. Master Meter 0400-45-01-.17 (2) and (3)	(1-2)	0	N/A
L. Maintenance of Equipment, Buildings and Grounds 0400-45-01-.02, .17(3), (17) and (19)	(1)	0	N/A
M. Laboratory Facilities 0400-45-01-.02, .14, .17(3)	(1-3)	0	N/A
N. Safety 0400-45-01-.02	(2)	0	N/A
O. Sludge Handling/Backwash Handling 0400-45-1-.05	(2)	0	N/A
P. Sanitary Conditions 0400-45-01-.17 (17)	(2)	0	N/A
Q. Fluoridation Techniques 0400-45-01-.06, .12, .17	(2)	0	N/A
R. Design Capacity 0400-45-01-.05 (10)	(2-4)	0	N/A
S. Filter Backwash Recycling 0400-45-01-.31 (9)	(1)	0	N/A
	Deficiency Subtotal	0	

5. Monitoring, Data Verification and Compliance (175)

Requirement	Points Range	Deduction	Comments
A. Laboratory-Process Monitoring (excluding Turbidity and Chlorine Residual) 0400-45-01-.17(3)	(5)	0	
B. Bacteriological Monitoring	(2-6)	0	
C. Bacteriological Compliance 0400-45-01-.06	(4-7)	0	
D. Turbidity Monitoring	(2-3)	0	N/A
E. Turbidity Compliance	(4-7)	0	N/A
F. Chorine Residual Monitoring 0400-45-01-.17, .31, .36	(2-3)	0	
G. Primary Chemicals Monitoring	(2-3)	0	
H. Primary Chemicals Compliance	(4)	0	
I. Lead and Copper Monitoring 0400-45-01-.33	(2-3)	0	
J. Lead and Copper Action Level 0400-45-01-.33	(3-5)	0	
K. Disinfection/Disinfection By-Products and Precursors Monitoring 0400-45-01-.36, .37, .38	(2-3)	0	
L. Disinfection/Disinfection By-Products and Precursors Compliance 0400-45-01-.06, .36	(2-30)	0	
M. Secondary Chemicals 0400-45-01-.12	(2)	0	
N. Secondary Chemicals Compliance 0400-45- 01-.12	(3)	0	
Cryptosporidium Monitoring 0400-45-01-.39	(0)	Narrative	
	Deficiency Subtotal	0	

6. Finished Water Storage (25)

Requirement	Points Range	Deduction	Comments
A. Adequate Storage 0400-45-01-.17 (14)	(2-4)	0	
B. Inspection and Maintenance of Reservoirs, Tanks and Clearwell 0400-45-01-.17 (16), (17), (33) and (34)	(1-10)	0	
	Deficiency Subtotal	0	

7. Pumps, Pump Facilities and Controls (18)

Requirement	Points Range	Deduction	Comments
A. Pump Facilities 0400-45-01-.17 (9) and (13)	(1-4)	0	
Maintenance of Pumping Equipment 0400-45-01-.17(13)	(1-3)	0	
	Deficiency Subtotal	0	

8. Distribution System and Cross Connection Controls (86)

Requirement	Points Range	Deduction	Comments
A. Notification, Inspection, Disinfection and Sample Collection of New or Existing Facilities 0400-45-01-.17 (8) and (19)	(3-5)	0	
B. Flushing Program/Blow Offs 0400-45-01-.17(10) and (23)	(3-4)	0	
C. Fire Hydrants 0400-45-01-.17 (18)	(0)	Narrative	
D. Adequate Pressure 0400-45-01-.17 (9)	(5)	0	
E. Map of Distribution System 0400-45-01-.17 (15)	(3)	0	
F. Approved Cross Connection Policy or Ordinance and Plan 0400-45-01-.17 (6)	(4)	0	
G. Working Cross Connection Program 0400-45-01-.17(6)	(3-9)	3	More Work is needed on C.C. Program.
Unaccounted Water Loss	(0)	Narrative	
	Deficiency Subtotal	3	

Total Deficiency Points:	3
Points Available:	421
Overall Rating:	99

Points Available
421 - Consecutive Systems/Distribution Only
488 - Treatment Systems/Wholesalers
599 - Both Treatment and Distribution

Inspector: Mohammed H. Faleh, Amy Francis

Additional Comments/Explanations:

EXHIBIT L

BILL OF SALE

THIS BILL OF SALE is made and delivered this_____day of_____, 2020 (the "***Effective Date***"), by and from **THUNDER AIR, INC.**, a Tennessee corporation, d/b/a **JASPER HIGHLANDS DEVELOPMENT, INC.,** ("***Seller***"), to **TENNESSEE-AMERICAN WATER COMPANY**, a Tennessee public utility corporation ("***Buyer***"), pursuant to an Asset Purchase Agreement by and between Seller and Buyer and dated _____, 2020 (the "***Purchase Agreement***").

1. Sale and Transfer of Assets. As of the Effective Date, Seller has sold and transferred to Buyer certain real estate and improvements relating to a water system operated by the Seller and identified as the "Water System" in the Purchase Agreement. For good and valuable consideration in hand paid by the Buyer to the Seller as set forth in the Purchase Agreement, the receipt and adequacy of which are hereby acknowledged by the Seller, and for performing other obligations as required by the Purchase Agreement, Seller does now hereby bargain, sell, convey, transfer, assign, and deliver to Buyer, its successors and assigns forever, all of the Seller's right, title, and interest in and to all of the Seller's property and assets used in or related to the continuing operation of the Water System, including, but not limited to, the following (collectively, the "***Assets***"):

(a) the Assigned Contracts (as defined in Section 5.1(c) of the Purchase Agreement);

(b) all interests in real estate (excepting public streets and public rights-of-way), water sources, wells, mains, pipes, pipelines, manholes, pumps, facilities, meters, tanks, storage facilities, valves, hydrants, water treatment facilities, water system network and related appurtenances, structures, improvements, fixtures, rights-of-way, rights, uses, franchises, licenses and easements owned by Seller and relating to the Water System, or in which Seller has an interest, and all hereditaments, tenements and appurtenances belonging, appertaining or relating thereto;

(c) all machinery, equipment, tools, keys and locks, leasehold improvements, goods, and other tangible personal property relating to the Water System owned by Seller, or in which Seller has an interest;

(d) all lubricants, spare parts, fuel, chemicals, raw materials, and other supplies and inventories ("Supplies") owned by the Seller, or in which the Seller has an interest, relating to the Water System;

(e) all rights to warranties received from the suppliers of any machinery, equipment, facilities or Supplies, and related claims, credits, and rights of recovery with respect thereto;

(f) all rights of Seller under any written or oral contract, easement, license, agreement, lease, plan, instrument, registration, permit, certificate, or other authorization or approval of any nature, or other document, commitment, arrangement, undertaking, practice or authorization, relating to the Water System;

(g) all Permits of or held by the Seller (to the extent transferable to Buyer under applicable law) and all pending applications therefore, renewals thereof or exemptions therefrom, including but not limited to those listed in Schedule 4.1(q) of the Purchase Agreement;

(h) all rights and choses in action of Seller arising out of occurrences before or after the Closing relating to the Assets, including any rights of Seller under any warranties or insurance claims related to the Assets;

(i) all of the intangible rights and property of Seller utilized by Seller in the operation of the Water System; and

(j) all information, files, records, data, plans, contracts and recorded knowledge relating to the Assets, including customer and supplier lists and property records, related to the foregoing.

Notwithstanding the foregoing, the Assets do not include the following assets of the Seller (collectively, the "***Excluded Assets***"):

(a) The portion of the water pipes extending from each customer's water meter to the customer's residence;

(b) Any and all piping and fixtures internal to each individual customer's structure (whether residential, commercial, industrial or other types); and

(c) Seller's cash on hand on the date of Closing and Seller's account receivables related to the Water System for services rendered through the close of business on the Closing Date.

2. Seller Warranties; Further Actions. Seller warrants that it is the true and lawful owner of the Assets and that the Assets are free and clear of all claims, mortgages, liens, security interests or encumbrances of any kind or any conditional sales agreement or title retention agreement. Seller will forever warrant and defend the title of the Assets against the claims and demands of all persons whomsoever. The terms and provisions of the Purchase Agreement shall not be discharged upon, but shall survive, the execution and delivery of this Bill of Sale. The Seller further agrees to execute and deliver to Buyer such other instruments of transfer and conveyance and to take such other action as may be reasonably necessary to perfect the Buyer's title in and to the Assets.

All capitalized terms in this Bill of Sale not defined herein are subject to the definition of such terms in the Purchase Agreement.

[Signature on following page]

IN WITNESS WHEREOF, Seller is executing this Bill of Sale as of the Effective Date.

SELLER:

THUNDER AIR, INC.
a Tennessee corporation and d/b/a
JASPER HIGHLANDS DEVELOPMENT, INC.

By:_____
Name:_____
Title: _____

STATE OF TENNESSEE

COUNTY OF _____

On this____day of_____, 2020, before me appeared_____as _____ of **THUNDER AIR, INC.,** a Tennessee corporation d/b/a **JASPER HIGHLANDS DEVELOPMENT, INC**., known personally to me and duly sworn by me, and that he is duly authorized to sign this Bill of Sale on behalf and to bind the Seller thereof.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal in the County and State aforesaid, the day and year first above written.

_____
NOTARY PUBLIC

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing has been served via either U.S. Mail, postage prepaid, or electronically to the following this 3rd day of February 2020.

Vance Broemel
Daniel Whitaker
Consumer Protection and Advocate Division
Office of the Attorney General
P.O. Box 20207
Nashville, TN 37202

