

DECLARATION OF JIM BOUSHKA

Pursuant to Section 132.001 of the Texas Civil Practice and Remedies Code, Declarant Jim Boushka hereby makes the following declaration under penalty of perjury:

1. My name is James Boushka. I am over the age of eighteen and am fully competent to make this declaration. The facts stated in this declaration are true and correct and based upon my personal knowledge.

2. This Declaration is made on behalf of Hardy T Land, LLC in support of its Appeal of the May 2, 2024 Takings Impact Assessment for Requested Infrastructure for the Hardy Tract, from Chad Gilpin, P.E., City Engineer, relating to Project No. SUB2023-0042 (known as the “Hardy Subdivision”) and Project No. SD2022-0025 (known as the “Hardy Driveway”). A copy of the Notice of Appeal is attached hereto as **Exhibit A**. We initially gave notice of our intent to be heard at the December 17, 2024 City Council Meeting, but we were notified that meeting had been cancelled by the City.

3. I am a manager of Bunker Ranch, LLC, Hardy T Land, LLC and the Overlook at Bunker Ranch, LLC. I have over 7 years of experience in residential real estate development and construction, including as the owner and developer of 7 residential subdivision projects, including Bunker Ranch.

4. Hardy T Land owns an approximately 79-acre tract (the “Hardy Tract”) in the City of Dripping Springs (the “City”) that has been approved by the City for development as a residential subdivision, being an extension to and comprising Phase 6 of Bunker Ranch Subdivision, in accordance with Project No. SUB2023-0042 (known as the “Hardy Subdivision”), on the condition that Hardy T Land also improve (to the City’s specifications) a private caliche road located in the Dripping Springs extra territorial jurisdiction (the “ETJ”) that runs from the proposed Hardy Subdivision to Highway 290 (the “Hardy Driveway”). Attached hereto are (i) the deed conveying the Hardy Tract and (as tenants in common) the Hardy Driveway to Hardy T Land (**Exhibit B**); (ii) the plans for the Hardy Subdivision (**Exhibit C**); (iii) the City’s conditional approval of the Hardy Subdivision (**Exhibit D**); and (iv) the City’s approval with conditions of the plans for the Hardy Driveway (**Exhibit E**).

5. Aerial photos depicting the Hardy Subdivision and Hardy Driveway locations are attached at **Exhibit F**. The Hardy Subdivision consists of 72 lots, which (like the existing, completed phases of Bunker Ranch Subdivision) are large lots, and with respect to the Hardy Subdivision, intended to be on average approximately .75 acre in size to accommodate the City’s desire for reduced density. Primary access for the Hardy Subdivision will be via Bunker Ranch Boulevard, which a Traffic Impact Analysis (“TIA”) determined to be sufficient to handle the traffic flow stemming from the Hardy Subdivision. A copy of the TIA is attached hereto as **Exhibit G**. The City is requiring, as a condition to approval of the Hardy Subdivision development, the improvement of the Hardy Driveway to serve as a fire apparatus road and a secondary point of vehicular access to the Hardy Subdivision. It is the secondary access requirement imposed by the City that has apparently also led the City to impose requirements for construction of a sidewalk

along one side of the Hardy Driveway and to require payment of a fee-in-lieu of construction of a sidewalk along the other side. *See Exhibit H*; *see also* City Code section 15.4.2. Hardy T Land sought from the Planning and Zoning Commission waivers of the secondary access and sidewalk requirements relating to the Hardy Driveway, as well as variances from the requirement to build sidewalks within the Hardy Subdivision, all of which were denied. It is noted that no prior phases of Bunker Ranch Subdivision were required to install sidewalks, and thus there are no sidewalks within Bunker Ranch Subdivision (as it is currently existing) to which sidewalks within the Hardy Subdivision could feasibly connect. The City staff has indicated that the denials of sidewalk variances by P&Z is not subject to administrative appeal. This is a separate question from the issue at hand, namely, whether the City must compensate Hardy T Land for the substantial costs associated with the sidewalk and fee-in lieu requirements based on the law relating to Takings and Rough Proportionality.

6. Hardy T Land LLC owns as tenants in common with a third party the approximately 3000 x 60 ft strip of land that is currently improved as a private caliche driveway and referred to herein as the “Hardy Driveway,” which is located between two large approximately 80-acre privately-owned family tracts unrelated to the Hardy development, and which extends from the proposed Hardy Subdivision to Hwy 290. *See Exhibit B*. The fact that Hardy T Land owns the Hardy Driveway as tenants in common with a third party, prevents it as a matter of law from unilaterally dedicating the driveway and/or any sidewalk improvement associated with the driveway to the City as a public right-of-way. Thus, the conditionally approved site development plan contemplates that the Hardy Driveway and any sidewalk improvements will remain private property.

7. While Hardy T Land has challenged the necessity and extent of the required Hardy Driveway improvements, which Hardy T Land alleges far exceed those needed for a fire apparatus road and secondary access point, the subject of this appeal of the Takings Impact Assessment focuses on the City’s requirements for the developer to (i) construct and pay for a *sidewalk to nowhere* along one side of the Hardy Driveway and (ii) pay a fee in lieu of a *sidewalk to nowhere* on the other side of this private drive, both of which—along with related increases in the construction costs associated with the private drive—constitute exactions for which the City must compensate Hardy T Land.

8. To put the City’s requirements for the Hardy Driveway in context, I provide some background on the Hardy Tract and surrounding properties.

9. Bunker Ranch LLC owned and developed Phases 1-5 of the Bunker Ranch residential subdivision that is situated south of Hwy 290 and west of the Arrowhead subdivision. Consistent with maintaining its rural appeal, the Bunker Ranch residential subdivision includes large, approximately 1-acre lots, and was not required to build sidewalks. As mentioned above, the City waived the requirement for sidewalks within prior phases of the Bunker Ranch Subdivision. In 2020, Overlook at Bunker Ranch, LLC proposed to develop an additional 18.25 acres to the south of Bunker Ranch, as an extension of Bunker Ranch (known as the Overlook at Bunker Ranch or the “Florio Tract,” Project No. SFL2021-0001)). The City waived sidewalks for

the Overlook at Bunker Ranch development due to sidewalks “not providing any beneficial pedestrian connectivity.” See **Exhibit I**.

10. In 2021, Hardy T Land acquired the Hardy Tract, which is located to the west of the existing Bunker Ranch Subdivision and the proposed Florio Tract development, and which at the time of acquisition was located outside of the City limits. The Hardy Tract was acquired with the specific intent to develop a residential subdivision that would be an extension of Bunker Ranch Subdivision, and this plan was discussed at length with the City both before and after the acquisition of the Hardy Tract. See **Exhibit J**. Hardy T Land also acquired co-ownership of the Hardy Driveway extending from the new proposed Phase 6 of Bunker Ranch to Hwy 290. Prior to Hardy T Land’s acquisition of the Hardy Tract and Hardy Driveway tract, principals of Hardy T Land (including me) participated in numerous and extensive meetings and calls with the City, during which it was discussed that this new addition would be an extension of Bunker Ranch Subdivision and that the Hardy Driveway might be required for secondary emergency fire access to satisfy the “remoteness” requirements of Fire Code Sec. D104.3. It is not disputed by the City that the fire code does not require sidewalks, and that the fire marshal did not determine that sidewalks must be built.

11. In 2021, Hardy T Land voluntarily annexed the Hardy Tract into the City in reliance on the City’s representations that it would be an extension of (and treated like) prior phases of Bunker Ranch Subdivision. However, the Hardy Driveway tract remains in the EJT. Despite no public facilities, sidewalks, trails, or roads existing in the vicinity of the Hardy Driveway, and despite the City previously waiving sidewalk requirements in all prior phases of the Bunker Ranch Subdivision, as well as in the Florio Tract, the City is now requiring costly sidewalks both within the Hardy Subdivision (Phase 6 of Bunker Ranch) and along the Hardy Driveway. Again, this appeal of the Takings Impact Assessment focuses on the *sidewalk to nowhere* and fee in lieu requirements along the Hardy Driveway.

12. While *public* sidewalks can advance a legitimate state interest, they do not do so along the *private* Hardy Driveway. There is no evidence showing that the development of the Hardy Driveway will have any impact on existing (or future planned and funded) infrastructure, such that the City is permitted to force Hardy T Land to pay for the sidewalk improvements and fees-in-lieu. In addition, there is no evidence showing that a sidewalk along the Hardy Driveway will provide any pedestrian connectivity with the rest of Bunker Ranch Subdivision or surrounding properties at all.

13. First, Mr. Gilpin’s Taking Impact Assessment refers, without any detail or engineering analysis, to the City’s “standard of requiring sidewalks on both sides of a roadway” as supporting his (incorrect) conclusion that there is no municipal taking of property, and that the sidewalk requirements are roughly proportional to the impact of the subdivision development. He offers no information or individualized, engineering analysis at all, including any supporting documentation on the level of pedestrian traffic (or corresponding reduction in vehicle traffic) that could be anticipated on a sidewalk along the Hardy Driveway. Given that a half-mile sidewalk along the Hardy Driveway would go nowhere and connect with nothing at Hwy 290 or within the remainder of the Bunker Ranch Subdivision, it defies logic to suggest that the impact of the Hardy

Tract subdivision requires the sidewalk. A copy of the Takings Impact Assessment is attached hereto as **Exhibit K**.

14. Second, sidewalks along the private Hardy Driveway significantly impair—rather than promote—safety. The Takings Impact Assessment asserts that sidewalks are “solely to benefit the safety of the future residents of the proposed development.” *Id.* But it does not explain how, why, or on what basis that statement is made. On the contrary, sidewalks along the private Hardy Driveway are *not required* by the Fire Code or the Fire Marshal—tasked with determining safety issues associated with developments. The Takings Impact Assessment does not address or attempt to address this fact and provides nothing to support its claim. Further, the required sidewalk would dead-end into Hwy 290’s dangerous traffic, where there are no existing sidewalks, or any planned and funded sidewalks. To promote access via a sidewalk to nowhere will decrease safety for any pedestrians foolhardy enough to decide to walk to Hwy 290 along the Hardy Driveway. Encouraging pedestrian traffic to enter this dangerous area of Hwy 290, where there are no public improvements or safety measures in place or planned is simply negligent. And as shown in **Exhibit F** there are no existing or planned public or even private trail systems connecting to the Hardy Driveway. *See* ppt. 2-11. The existing trails within Bunker Ranch Subdivision dead end into a fence abutting private ranch property located adjacent to the east of the Hardy Driveway. In addition, there is currently fencing along both sides of the Hardy Driveway separating the driveway from the adjacent, privately-owned ranch properties, thus, without additional land grants by adjacent owners, there is no possibility of connectivity between Bunker Ranch, Hardy Tract and any public trails within the vicinity. The closest public sidewalk to the Hardy Driveway is in front of Walnut Springs Middle School, which is approximately 1 mile from the intersection of the Hardy Driveway/Hwy 290 and there are no existing, or planned and funded public sidewalks on Hwy 290 for that entire 1 mile.

15. Third, Mr. Gilpin makes a conclusory statement that the requirements of the Hardy Driveway are required to protect waterways or the environment. There is no explanation as to how that would support the City’s requirement for the addition of a sidewalk, which by its very nature will increase impervious cover. During public comment at the P&Z hearing, neighbors and concerned citizens expressed their disapproval of adding more cement (i.e., from the sidewalks). Further, Mr. Gilpin did not even consider whether expanding the width of the road by requiring the sidewalk would necessitate the removal of additional large, native trees that currently line both sides of Hardy Driveway. Surely, removing these trees at the expense of cement sidewalks could not possibly be beneficial for the environment. *See Exhibit F*, p. 12-18.

16. Fourth, Mr. Gilpin does not offer nor address any reasonable alternatives to building sidewalks along the Hardy Driveway.

17. I am qualified by my years of experience in residential development and construction to determine the relative and reasonable costs of the Hardy Driveway with and without the City’s sidewalk requirements. Attached as **Exhibit L** is a current estimate of the cost of the Hardy Driveway, based on the City’s current approval with conditions. I believe that this is a reasonable cost estimate based on the current market and City’s requirements, and the actual cost will continue to grow and is likely to be higher at the time of construction because of the passage


of time and delay caused by the disputes with the City relating to their excessive requirements for the Hardy Driveway. Attached as **Exhibit M** is a current estimate of the cost for the Hardy Driveway without the requirement for a sidewalk along one side. The compensation due to Hardy T Land is **\$2,011,936**, which is the difference between the two estimates plus the fee in lieu on one side, and represents the costs associated with the *sidewalks to nowhere*.

18. Attached hereto as **Exhibit N** is correspondence Greenberg Traurig, LLP sent on our behalf on April 3, 2024, and we have done everything possible to resolve this matter since, to no avail. We are asking the Council to make the right decision, and award compensation for this taking of private property. If we are unable to get compensation for the exactions that do not flow from the subdivision's impact, we intend to seek relief from the Courts. The extreme costs of the Hardy Driveway, due to the City staff's specifications, compared to the relatively small number of lots proposed for the Hardy Tract to meet City's desire for reduced density, essentially destroys the economic viability of the Hardy Subdivision project. We have even requested, and been denied, additional density within the Hardy Subdivision. After many years of trying to reach an acceptable compromise with the City on this issue, I note that if Hardy T Land is forced to build the required sidewalks and pay the fees in lieu as required by the City as a condition to development of the Hardy Tract, Hardy T Land may be left with no option but to abandon the development of the Hardy Tract with its limited density, as currently contemplated.

19. Hardy T. Land's counsel, Jamie Rose with Greenberg Traurig, LLP, has corresponded with Laura Mueller, City Attorney of Dripping Springs, regarding the procedures for this hearing. Apparently, the City had no procedures in place for this type of Appeal before January 7, 2025—just two weeks prior to our appeal hearing. Attached hereto as **Exhibit O** are email correspondence between Jamie Rose and Laura Mueller.

20. My name is Jim Boushka, my date of birth is March 29, 1961, and my address is 6836 FM 2244, Rd 3-302, Austin, Texas 78746. I declare under penalty of perjury that the foregoing is true and correct.

Executed in Travis County, State of Texas, on the 16th day of January 2025

Signed by:

73A7FDC58B02475

Jim Boushka

Exhibit A

Jamie A Rose
Tel 512.320.7281
Fax 512.320.7210
Jamie.Rose@gtlaw.com

December 12, 2024

Planning@cityofdrippingsprings.com
c/o Laura Mueller
City Attorney
City of Dripping Springs, Texas
lmueller@cityofdrippingsprings.com

Re: Notice of Appeal – Takings/Rough Proportionality Assessment – Hardy Driveway and Hardy Subdivision.

Dear City of Dripping Springs, Texas,

On behalf of Hardy T. Land, LLC, and Bunker Ranch, LLC (collectively, “Appellants”), regarding the Hardy Driveway (Project No. SD2022-0025) and the Hardy Subdivision (Project No. SUB2023-0042), please consider this letter as a formal, written notice of appeal of the May 2, 2024 Takings Impact Assessment for Requested Infrastructure for the Hardy Tract, from Chad Gilpin, P.E., City Engineer, and Laura Mueller, City Attorney, attached hereto as Exhibit A (the “Assessment”).

Appellants hereby request this appeal be placed on the agenda for the City of Dripping Spring’s meeting to be held on January 21, 2025.

Please let us know if you wish to discuss in advance of the Planning & Zoning meeting.


Best regards,

/s/ Jamie Rose

Jamie A. Rose
Shareholder



To: Jamie Rose

From: Chad Gilpin, P.E.,  City Engineer; Laura Mueller, City Attorney

Date: May 2, 2024

RE: Takings Impact Assessment for Required Infrastructure for the Hardy Tract

INTRODUCTION

The City of Dripping Springs has required, due to site development and fire requirements, that the project commonly known as the Hardy Tract build a road as specified in Exhibit “A.” The property owner has requested a Takings Impact Assessment related to this requirement. For the City to impose this requirement it must show that “the required dedication is related both in nature and extent to the project’s anticipated impact, though a precise mathematical calculation is not required.”¹ This assessment will show that the road requirement is roughly proportional to the impact of the Bunker Ranch/Hardy Tract project.

REQUIREMENTS

The City, in consultation with the Fire Department (North Hays County Fire – ESD), requires a minimum twenty-six (26) foot roadway and a five (5) foot sidewalk on one side. This was based on the representation by the developer that multi-family may be placed on the tract. If no multi-family is on the tract, the roadway only must be twenty-four (24) feet. This is a fire requirement. Section 11.3.4 of the City Subdivision Ordinance requires all subdivisions with fifty (50) or more lots or units have at least two points of vehicular access and must be connected via improved roadways. The standard is to require sidewalks on both sides of the roadway, but the City waived the requirement for the second side on request of the developer in return for payment of fee-in-lieu. In addition, drainage improvements are required, but are only those needed to meet the Water Quality and Drainage mitigation as required by the Water Quality Ordinance Article 22.05.² The extent of the drainage improvements are only those that directly affect the required roadway and the sidewalk. These improvements are not required to be oversized for any other development.

The purpose of requiring two points of vehicular access is to provide safety and adequate traffic circulation to the residents of the subdivision. The subdivision ordinance is attached as Exhibit “A.” The requirement of adequate drainage and water quality is to ensure that any required or planned improvements do not burden other private or public parties with adverse stormwater flows. In addition, it aids in protecting all waterways in the area from pollutants. The Ordinance adopted Article 22.05 is attached to this assessment as Exhibit “C.” The remoteness requirement is from the Fire Code Section D106.3. It is attached as Exhibit “B.” These required improvements

¹ *Dolan v. City of Tigard*, 512 U.S. 374, 391 (1994).

² All references to Ordinances or Sections are to the City of Dripping Springs Code of Ordinances unless otherwise stated. City of Dripping Springs Code of Ordinances are available on the City’s website and municode.com.

are reasonably related to and accomplish the legitimate municipal goal of public safety while ensuring that neighboring properties are not burdened by new development.

The roadway only needs to be twenty-four (24) feet in width unless multi-family is built adjacent to the roadway. This is the minimum for any subdivision within the City of Dripping Springs. Fire requires twenty-six (26) feet if there will be multi-family.

IMPACT OF DEVELOPMENT

The Hardy Tract will add an additional seventy-five lots. In addition, the development is seventy-eight acres. This roadway is only for the residents of this development and does not have to be open to the public. In addition, the City is not asking that it be oversized to meet the needs of the public in general, only to meet the minimum city and fire requirements. Detention and Water Quality are required by the Hardy Tract subdivision to mitigate increased flows to neighboring properties caused by the roadway. The issue of the expense of the drainage is the fact that the second access point, the roadway in question, is between two parcels that are currently not owned by the developer. This requires that the drainage, sidewalk, and roadway must be included in their owned property.

DISCUSSION AND ANALYSIS

The requirements the City and Fire require are the minimum for roads and drainage for any residential development. In addition, the minimum normally required for a sidewalk on a two-lane rural roadway (which is the roadway required by the City) is five feet on both sides. The City waived the requirement that the sidewalk be on both sides, instead only requiring it on one side. These requirements are required for safety and are also sized to an extent appropriate to a development of this size. The nature of a subdivision as proposed is a two-lane rural road with sidewalks including adequate drainage.

ALTERNATIVES

The development could build a second point of access in another part of the development. In addition, the City has offered to review the possibility of allowing drainage to be stored on an adjacent agricultural lot. Finally, the developer could also appeal the partial waiver of the sidewalk to the Planning & Zoning Commission.

CONCLUSION AND RECOMMENDATIONS

The City and Fire is open to limiting the roadway to twenty-four feet so long as no multi-family is built in this development or adjacent to this roadway. If any other variances or waivers are requested, or decisions to be appealed, the processes must be followed. The City is not requiring that the development pay for any additional city infrastructure or fees that are not the minimum required by the number of lots and acres within this subdivision. The Hardy Drive and related infrastructure is not for the public or the City, it is solely to benefit the safety of the future residents of the proposed development.

Exhibit B

amount therein stated, bearing interest and payable to the order of First Lien Lender as therein provided, the payment of which First Lien Note to the extent of the funds advanced for the purchase of the Property (defined below) is secured by the vendor's lien herein retained and by a deed of trust (the "First Lien Deed of Trust") of even date herewith to Steve Dujka, Trustee; and

3. Delivery and payment to Grantor by JPH INVESTMENT HOLDINGS, LLC, a Texas limited liability company ("Second Lien Lender"), at the instance and request of Grantee, of the proceeds from one certain promissory note dated on or about the date of this Deed (the "Second Lien Note"), executed by Grantee, in the original principal amount therein stated, bearing interest and payable to the order of Second Lien Lender as therein provided, the payment of which Second Lien Note to the extent of the funds advanced for the purchase of the Property (defined below) is secured by a subordinate vendor's lien herein retained and by a subordinate deed of trust (the "Second Lien Deed of Trust") of even date herewith to James P. Hendricks, Trustee.

Grantor hereby EXCEPTS from the Property hereby conveyed and RESERVES UNTO ITSELF, its successors and assigns, all of the oil, gas and other minerals of every kind and character, whether similar or dissimilar, known or unknown, in, on, under and which may be discovered, mined, produced, or recovered from the Property, or any portion thereof, that are owned by Grantor as of the date of this instrument (hereinafter the "Mineral Reservation"). The Mineral Reservation expressly excluding water, sand, gravel, limestone, rock, building stone, caliche, surface shale, near surface lignite, iron, and similar materials considered part of the surface estate. In connection with the Mineral Reservation, Grantor hereby WAIVES AND RELEASES any and all rights of every kind on the part of itself and its successors and assigns, to use the surface of the Land between the natural surface thereof and a depth of five hundred feet (500') in connection with the exploration, prospecting, mining, drilling, producing, saving, transporting, storing, treating or otherwise dealing with the oil, gas and other minerals lying in, on and under the Land or which may be produced therefrom.

This conveyance and the warranties of title herein are expressly made subject to: a) *ad valorem* taxes for the year 2021, not yet due and payable, and all subsequent years, including any and all assessments for prior years due to changes in land usage; and b) the matters set forth on **EXHIBIT B**, attached hereto and incorporated herein by this reference for all purposes (collectively, the "Permitted Exceptions").

BY ITS ACCEPTANCE OF THIS SPECIAL WARRANTY DEED, GRANTEE ACKNOWLEDGES AND AGREES THAT, EXCEPT FOR THE SPECIAL WARRANTY OF TITLE SET FORTH HEREIN AND THOSE REPRESENTATIONS AND WARRANTIES IN THAT CERTAIN FARM AND RANCH CONTRACT BETWEEN GRANTOR AND STEVE HARRAN AND JIM BOUSHKA, PREDECESSORS IN INTEREST TO GRANTEE, DATED MARCH 5, 2021 AS AMENDED BY THAT CERTAIN FIRST AMENDMENT TO FARM AND RANCH CONTRACT DATED JUNE 17, 2021 AND THAT CERTAIN SECOND AMENDMENT TO FARM AND RANCH CONTRACT DATED AUGUST 23, 2021 (COLLECTIVELY, THE "GRANTOR REPRESENTATIONS AND WARRANTIES"), GRANTEE ACKNOWLEDGES AND AGREES THAT GRANTOR HAS NOT MADE, DOES NOT MAKE AND SPECIFICALLY DISCLAIMS ANY REPRESENTATIONS, WARRANTIES,

PROMISES, COVENANTS, AGREEMENTS OR GUARANTIES OF ANY KIND OR CHARACTER WHATSOEVER, WHETHER EXPRESS OR IMPLIED, ORAL OR WRITTEN, PAST, PRESENT OR FUTURE, OF, AS TO, CONCERNING OR WITH RESPECT TO: (A) THE NATURE, QUALITY OR CONDITION OF THE PROPERTY, INCLUDING, WITHOUT LIMITATION, THE WATER, SOIL AND GEOLOGY; (B) THE INCOME TO BE DERIVED FROM THE PROPERTY OR THE PROPERTY'S INCOME POTENTIAL; (C) THE SUITABILITY OF THE PROPERTY FOR ANY AND ALL ACTIVITIES AND USES WHICH GRANTEE MAY CONDUCT THEREON; (D) THE COMPLIANCE OF OR BY THE PROPERTY OR ITS OPERATION WITH ANY LAWS, RULES, ORDINANCES OR REGULATIONS OF ANY APPLICABLE GOVERNMENTAL AUTHORITY OR BODY; (E) THE HABITABILITY OR MERCHANTABILITY OF THE PROPERTY OR ITS FITNESS FOR ANY PARTICULAR PURPOSE; (F) THE PRESENCE OF ANY ENDANGERED OR THREATENED SPECIES ON THE PROPERTY, AS WELL AS THE SUITABILITY OF THE PROPERTY AS HABITAT FOR ANY OF THOSE SPECIES; (G) THE PRESENCE OF ANY HISTORICAL OR ARCHEOLOGICALLY SIGNIFICANT SITE ON THE PROPERTY; (H) THE AVAILABILITY, CAPACITY OR LOCATION OF UTILITIES TO SERVE THE PROPERTY; (I) THE IMPACT UPON OR PRECISE NATURE OF OPERATIONS CONDUCTED UPON THE PROPERTY IN CONNECTION WITH ANY OIL, GAS AND MINERAL OPERATIONS WHICH MAY HAVE BEEN PREVIOUSLY CONDUCTED UPON OR NEAR THE PROPERTY OR (J) ANY OTHER MATTER WITH RESPECT TO THE PROPERTY OTHER THAN AS MAY BE SPECIFICALLY REPRESENTED IN THE GRANTOR REPRESENTATIONS AND WARRANTIES.

WITHOUT LIMITING THE FOREGOING, EXCEPT AS SET FORTH IN GRANTOR'S REPRESENTATIONS AND WARRANTIES, GRANTOR DOES NOT AND HAS NOT MADE ANY REPRESENTATION OR WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ANY HAZARDOUS SUBSTANCES (defined below) OR SOLID WASTE (defined at 40 C.F.R., Part 261) ON, UNDER OR ABOUT THE PROPERTY OR THE COMPLIANCE OF THE PROPERTY WITH ANY OF THE FOLLOWING ENVIRONMENTAL LAWS AND GRANTEE FURTHER RELEASES GRANTOR FROM ANY CLAIMS, DEMANDS OR CHARGES THAT MAY BE BROUGHT BY IT WITH RESPECT TO THE FOLLOWING ENVIRONMENTAL LAWS - THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT ("CERCLA"), THE SUPERFUND AMENDMENT AND REAUTHORIZATION ACT, THE RESOURCE CONSERVATION RECOVERY ACT, THE FEDERAL WATER POLLUTION CONTROL ACT, THE FEDERAL ENVIRONMENTAL PESTICIDES ACT, THE CLEAN WATER ACT, THE CLEAN AIR ACT, THE TEXAS NATURAL RESOURCES CODE, THE TEXAS WATER CODE, THE TEXAS SOLID WASTE DISPOSAL ACT, THE TEXAS HAZARDOUS SUBSTANCES SPILL PREVENTION AND CONTROL ACT, ANY SO CALLED FEDERAL, STATE OR LOCAL "SUPERFUND" OR "SUPERLIEN" STATUTE, OR ANY OTHER STATUTE, LAW, ORDINANCE, CODE, RULE, REGULATION, ORDER OR DECREE REGULATING, RELATING TO OR IMPOSING LIABILITY (INCLUDING STRICT LIABILITY) OR STANDARDS OF CONDUCT CONCERNING ANY HAZARDOUS SUBSTANCES (COLLECTIVELY, THE "ENVIRONMENTAL LAWS"). FOR PURPOSES OF THIS INSTRUMENT, THE TERM "HAZARDOUS SUBSTANCES" SHALL MEAN AND INCLUDE THOSE ELEMENTS OR COMPOUNDS WHICH ARE CONTAINED ON THE LIST OF HAZARDOUS SUBSTANCES ADOPTED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY AND THE LIST OF TOXIC POLLUTANTS DESIGNATED BY

CONGRESS OR THE ENVIRONMENTAL PROTECTION AGENCY OR UNDER ANY ENVIRONMENTAL LAWS. (49 CFR 172.101 AND 40 CFR PART 301) AND AMENDMENTS THERETO OR ANY SUBSTANCES, MATERIALS OR WASTES WHICH ARE OR BECOME REGULATED UNDER ANY APPLICABLE ENVIRONMENTAL LAW, INCLUDING, WITHOUT LIMITATION, ANY MATERIAL, WASTE, OR SUBSTANCE WHICH IS (i) PETROLEUM, (ii) ASBESTOS, (iii) POLYCHLORINATED BIPHENS, (iv) DESIGNATED AS A "HAZARDOUS SUBSTANCE" UNDER SECTION 331 OF THE CLEAN WATER ACT OR LISTED PURSUANT TO SECTION 307 OF THE CLEAN WATER ACT OR (v) DEFINED AS A "HAZARDOUS WASTE" PURSUANT TO SECTION 101 OF CERCLA.

GRANTEE FURTHER ACKNOWLEDGES AND AGREES THAT: (i) GRANTEE HAS BEEN GIVEN FREE AND FULL OPPORTUNITY TO INSPECT THE PROPERTY; (ii) GRANTEE IS A SOPHISTICATED BUYER OF REAL PROPERTY, (iii) GRANTEE WILL BE PURCHASING THE PROPERTY PURSUANT TO ITS INDEPENDENT EXAMINATION, STUDY, INSPECTION AND KNOWLEDGE OF THE PROPERTY; (iv) GRANTEE IS RELYING UPON ITS OWN DETERMINATION OF THE VALUE OF THE PROPERTY AND USES TO WHICH THE PROPERTY MAY BE PUT, AND NOT ON ANY INFORMATION PROVIDED OR TO BE PROVIDED BY GRANTOR OR ITS AGENTS; AND (v) THE PURCHASE PRICE REFLECTS THE "AS IS" NATURE OF THIS INTENDED TRANSACTION. GRANTEE SPECIFICALLY ACKNOWLEDGES AND AGREES THAT, EXCEPT AS OTHERWISE SPECIFICALLY SET FORTH IN THE GRANTOR REPRESENTATIONS AND WARRANTIES, GRANTOR IS SELLING THE PROPERTY AND GRANTEE IS PURCHASING THE PROPERTY ON AN "AS IS", "WHERE IS" AND "WITH ALL FAULTS" BASIS.

TO HAVE AND TO HOLD the Land, subject to the Mineral Reservation and the Permitted Exceptions, unto Grantee, and Grantee's successors and assigns forever, and Grantor does hereby bind Grantor, and Grantor's successors and assigns, to WARRANT and FOREVER DEFEND, all and singular the Land unto Grantee and Grantee's successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof, by, through, or under Grantor, but not otherwise, but subject, however, to the Mineral Reservation and the Permitted Exceptions.

Ad valorem taxes for the current year have been prorated as of the Effective Date of this instrument.

First Lien Lender, at Grantee's request, has paid in cash to Grantor that certain portion of the purchase price of the Property as is evidenced by the above referenced First Lien Note. It is expressly agreed and stipulated that a first and superior vendor's lien against and superior title (to the extent of the portion of the First Lien Note advanced for the purchase of the Property), is hereby retained by Grantor against the Property for the benefit of First Lien Lender until the above-described First Lien Note, and all interest accruing thereon, have been fully paid in accordance with their terms. Grantor does hereby TRANSFER, ASSIGN and CONVEY unto First Lien Lender said vendor's lien and superior title to the Property, WITHOUT RECOURSE against Grantor. Upon the full and complete payment of the First Lien Note and satisfaction and performance of all covenants, conditions, obligations and liabilities under the First Lien Deed of Trust, then this conveyance shall

become absolute and the vendor's lien and superior title herein reserved shall be automatically released and discharged.

In addition, Second Lien Lender, at Grantee's request, has paid in cash to Grantor that certain portion of the purchase price of the Property as is evidenced by the above referenced Second Lien Note. It is expressly agreed and stipulated that a subordinate vendor's lien (to the extent of the portion of the Second Lien Note advanced for the purchase of the Property), is hereby retained by Grantor against the Property for the benefit of Second Lien Lender until the above-described Second Lien Note, and all interest accruing thereon, have been fully paid in accordance with their terms. Grantor does hereby TRANSFER, ASSIGN and CONVEY unto Second Lien Lender said vendor's lien, WITHOUT RECOURSE against Grantor. Upon the full and complete payment of the Second Lien Note and satisfaction and performance of all covenants, conditions, obligations and liabilities under the Second Lien Deed of Trust, then this conveyance shall become absolute and the vendor's lien and superior title herein reserved shall be automatically released and discharged.

(Signature page follows)

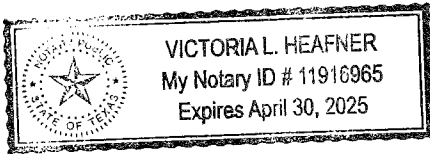
The following individuals join in the execution of this Special Warranty Deed to reflect the relinquishment of their homestead rights, if any, in and to the Property.

Hardy E. Thompson III
Hardy E. Thompson, III

Susan S. Thompson
Susan S. Thompson

THE STATE OF TEXAS §
 §
COUNTY OF Hays §

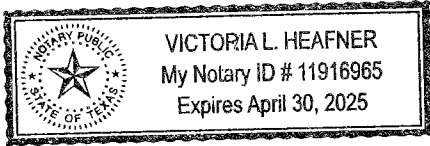
This instrument was acknowledged before me on the 16th day of September, 2021 by Hardy E. Thompson, III.



[Signature]
Notary Public, State of Texas

THE STATE OF TEXAS §
 §
COUNTY OF Hays §

This instrument was acknowledged before me on the 16th day of September, 2021 by Susan S. Thompson.



[Signature]
Notary Public, State of Texas

After recording, please return to:
GF No. 20-4146-D
Attn: Vicki Heafner
Corridor Title Company
171 Benney Lane, Bldg. 1
Dripping Springs, Texas 78620

EXHIBIT A**LEGAL DESCRIPTION OF THE LAND**

Tract 1: Being 78.021 acres of land, more or less, out of the B. F. HANNA LEAGUE, in Hays County, Texas, being a portion of that certain 79.61 acre tract conveyed in Deed recorded in Volume 1733, Page 755, Official Public Records, Hays County, Texas. Said 78-021 acre tract being more particularly described by metes and bounds in **Exhibit "A-1"** attached hereto and made a part hereof.

Tract 2: A one-half undivided interest in and to that certain 3.706 acres of land, more or less, out of the B.F. HANNA LEAGUE, in Hays County, Texas, being all of a called 4.25 acre tract conveyed to P & H Family Limited Partnership No. 1 in Exhibit C by deed of record in Volume 1733, Page 755, Official Public Records, Hays County, Texas. Said 3.706 acre tract being more particularly described by metes and bounds in **Exhibit "A-2"** attached hereto and made a part hereof.

Tract 3: A one-half undivided interest in and to that certain 1.507 acre tract of land, more or less, out of the BENJAMIN F. HANNA SURVEY NO. 28, ABSTRACT NO. 222, in Hays County, Texas, being a portion of a called 79.61 acre tract conveyed to P & H Family Limited Partnership No. 1 as Tract A by Deed of record in Volume 1733, Page 755, Official Public Records, Hays County, Texas. Said 1.507 acre tract being more particularly described by metes and bounds in **Exhibit "A-3"** attached hereto and made a part hereof.

Tract 4: Being all of Grantor's right, title and interest in and to that certain non-exclusive easement for ingress and egress sixty (60) feet in width, lying south of and adjacent to the northern boundary of that certain 79.39-acre tract being out of and a part of quarter section No. 15. of the B. F. HANNA LEAGUE and a portion of the A. J. Holford Survey, in Hays County, Texas, said 79.39 acre-tract being more particularly described on Exhibit B to that certain Special Warranty Deed dated October 23, 2000 recorded at Document No. 00025537, Volume 1733, Page 748 in the Official Public Records of Hays County, Texas (the "FLP 2 Tract"); said easement over the FLP 2 Tract being created and described as Item #4 in that Special Warranty Deed dated October 23, 2000, executed by Hardy E. Thompson, Jr. and Patty King Thompson, to P & H Family Limited Partnership No. 1, a Texas limited partnership, recorded in Volume 1733, Page 755, Official Public Records, Hays County, Texas.

Tract 5: Being all of Grantor's right, title and interest in and to a one-half undivided interest in any other easements of ingress and egress appurtenant to Tract 1 or to the FLP 2 Tract, as described as Item #3 in that Special Warranty Deed dated October 23, 2000, executed by Hardy E. Thompson, Jr. and Patty King Thompson, to P & H Family Limited Partnership No. 1, a Texas limited partnership, recorded in Volume 1733, Page 755, Official Public Records, Hays County, Texas.

EXHIBIT A-1

METES AND BOUNDS DESCRIPTION AND SURVEY PLAT OF TRACT 1

[SEE ATTACHED]

EXHIBIT A-1

78.021 ACRES
 BUNKER RANCH
 DRIPPING SPRINGS, TX

PROJECT NO.: 304-065
 MARCH 4, 2021

LEGAL DESCRIPTION

BEING A 78.021 ACRE TRACT OF LAND (INCLUDING A 60 SQUARE FOOT AREA IN CONFLICT) OUT OF THE BENJAMIN F. HANNA SURVEY NO. 28, ABSTRACT NO. 222, SITUATED IN HAYS COUNTY, TEXAS, BEING A PORTION OF A CALLED 79.61 ACRE TRACT CONVEYED TO P & H FAMILY LIMITED PARTNERSHIP NO. 1 AS TRACT A BY DEED OF RECORD IN VOLUME 1733, PAGE 755, OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS (O.P.R.H.C.T.); SAID 78.021 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

COMMENCING, at a ½ inch iron rod with "CEC" cap set at the northeast corner of the remainder of said 79.61 acre tract, being an interior "ell" corner of a called 4.25 acre tract described in Exhibit C of said deed recorded in Volume 1733, Page 755, O.P.R.H.C.T.;

THENCE, along the common line of said remainder of 79.61 acre tract and of said 4.25 acre tract, S00°25'57"W, a distanced of 60.03 feet to a ½ inch iron rod with "CEC" cap set for the easterly common corner of said 78.021 acre tract and of said remainder of 79.61 acre tract and the **POINT OF BEGINNING**, hereof.

THENCE, along the common line of said 78.021 acre tract and partially of said 4.25 acre tract and then partially of a called 44.123 acre tract conveyed to the Elry and Barbara Hudson Living Trust by deed of record in Volume 2851, Page 80, O.P.R.H.C.T., S00°25'57"W, passing at distance of 39.91 feet, a ½ inch iron rod found at the westerly common corner of said 4.25 acre tract and of said 44.123 acre tract, continuing for a total distance of 652.82 feet to a ½ inch iron rod found at the westerly common corner of said 44.123 acre tract and of Bunker Ranch Phase 2, a subdivision of record in Document No. 20017197, O.P.R.H.C.T.;

THENCE, along the common line of said 78.021 acre tract and partially of said Bunker Ranch Phase 2 and then partially of the remainder of a called 111.67 acre tract conveyed to Bunker Ranch, LLC by deed of record in Document No. 16020931, O.P.R.H.C.T., S00°21'25"W, passing at 629.14 feet, a ½ inch iron rod with "CEC" cap set at the westerly common corner of said Bunker Ranch Phase 2 and the said remainder of 111.67 acre tract, continuing for a total distance of 2,259.99 feet to a ½ inch iron rod found at the westerly common corner of said remainder of 111.67 acre tract of a called 18.250 acre tract conveyed to The Overlook at Bunker Ranch, LLC by deed of record in Document No. 20061246, O.P.R.H.C.T.;

THENCE, bounding the area of conflict, the following two (2) courses and distances:

1. S05°53'31"E, a distance of 10.82 feet to a found ½ inch iron rod;
2. S86°15'32"W, a distance of 5.94 feet to an 8 inch cedar fence post found at the northerly common corner of said 18.250 acre tract and of a called 603.70 acre tract conveyed to Anna Marie Widen Speir, et al, by deed of record in Volume 1734, Page 427, O.P.R.H.C.T.;

THENCE, along the common line of said 78.021 acre tract and of said 603.70 acre tract, S88°42'30"W, a distance of 1,237.34 feet to a ½ inch iron rod with "CEC" cap set at the southerly common corner of said 78.021 acre tract and of a called 79.39 acre tract conveyed to P & H Family Limited Partnership No. 2 by deed of record in Volume 1733, Page 748, O.P.R.H.C.T.;

78.021 ACRES
BUNKER RANCH
DRIPPING SPRINGS, TX

PROJECT NO.: 304-065
MARCH 4, 2021

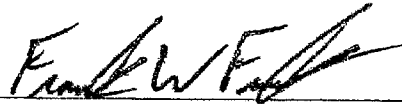
THENCE, along the common line of said 78.021 acre tract and of said 79.39 acre tract, the following three (3) courses and distances:

1. N18°14'48"E, a distance of 881.92 feet to a found ½ inch iron rod;
2. N19°44'58"W, a distance of 1,048.36 feet to a found 8 inch cedar fence post;
3. N12°13'46"E, a distance of 1,128.80 feet to a ½ inch iron rod set at the westerly common corner of said 78.021 acre tract and said remainder of 79.61 acre tract;

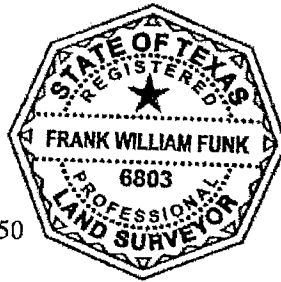
THENCE, along the common line of said 78.021 acre tract and of said remainder of 79.61 acre tract, N88°43'55"E, 1,100.12 feet to the **POINT OF BEGINNING**, and containing 78.021 acres (3,398,613 square feet) of land, more or less.

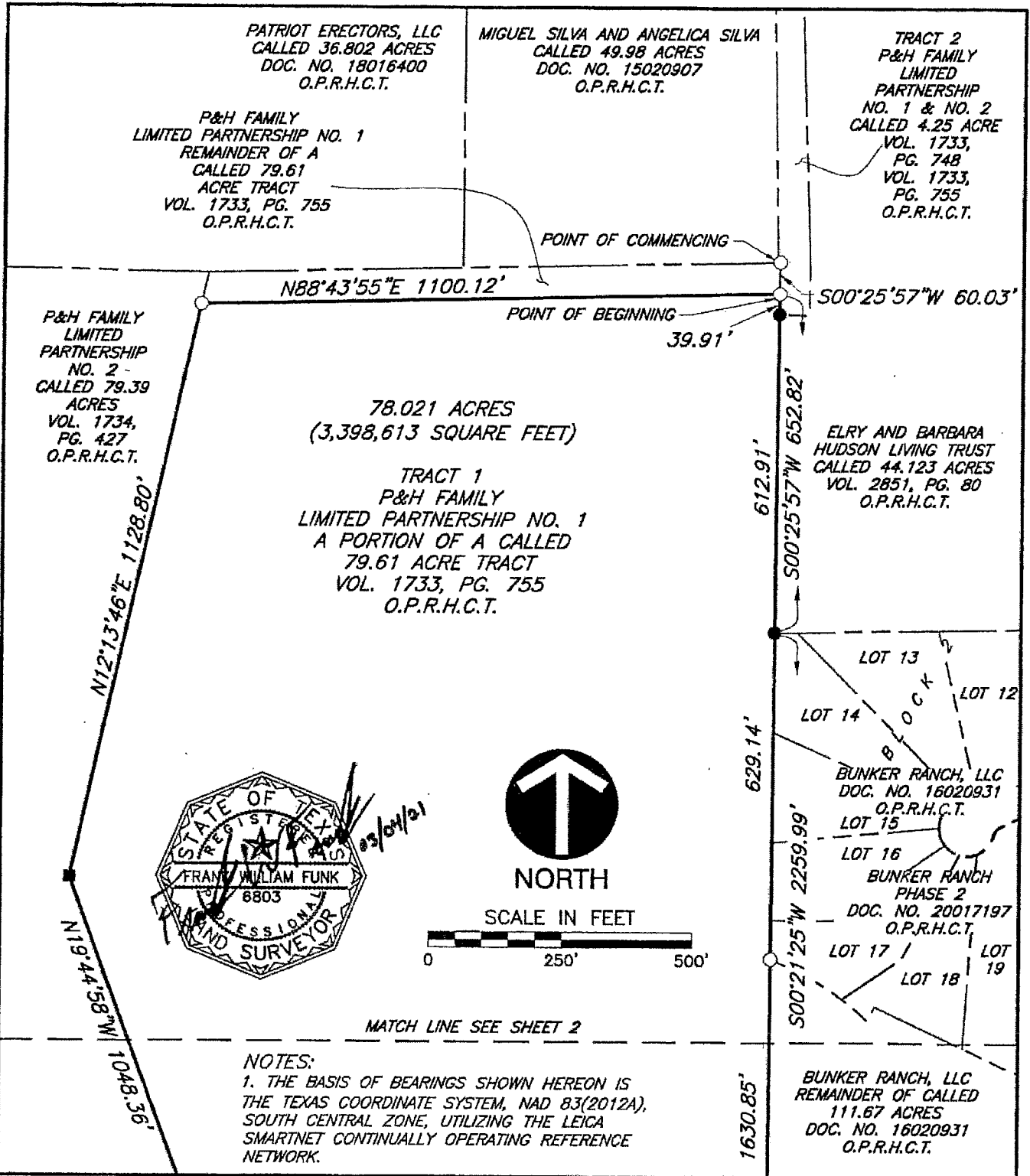
THE BASIS OF BEARING OF THIS SURVEY IS TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NSRS 2011(2012A), UTILIZING THE LEICA SMARTNET CONTINUALLY OPERATING REFERENCE NETWORK.

Witness my hand and seal this 4th day of March, 2021.




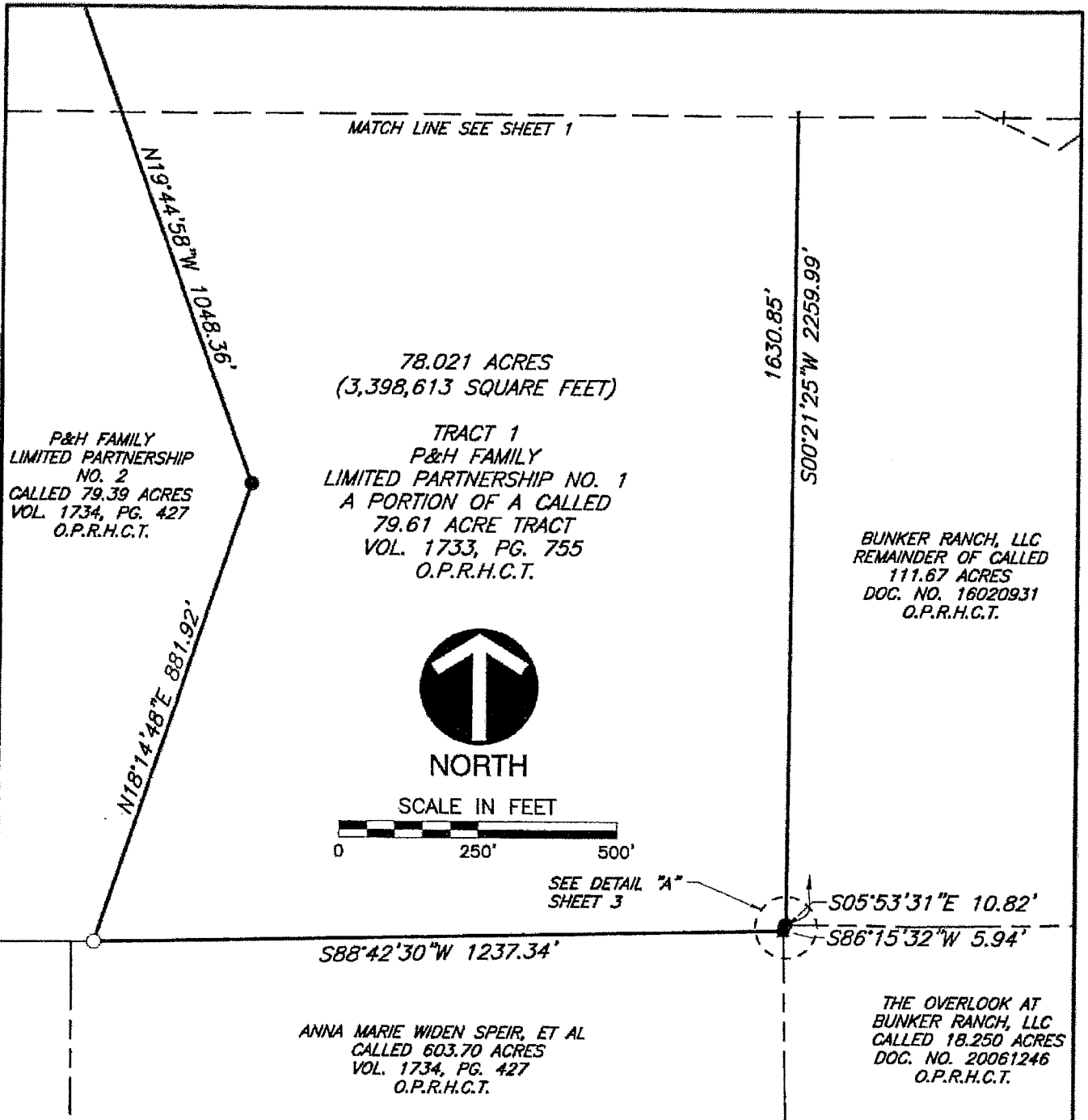
Frank William Funk, R.P.L.S. 6803
Civil & Environmental Consultants, Inc.
3711 S. MoPac Expressway, Building 1, Suite 550
Austin, TX 78746
Texas Registered Surveying Firm No. 10194419






P:\300-000\304-065\Survey\Draw\304-065-SVD1 P AND H EXHIBIT.dwg[EXHIBIT SHEET 1 OF 3] LS:(03/04/2021 - ehapkin) -- LP: 3/14/2021 9:44 AM

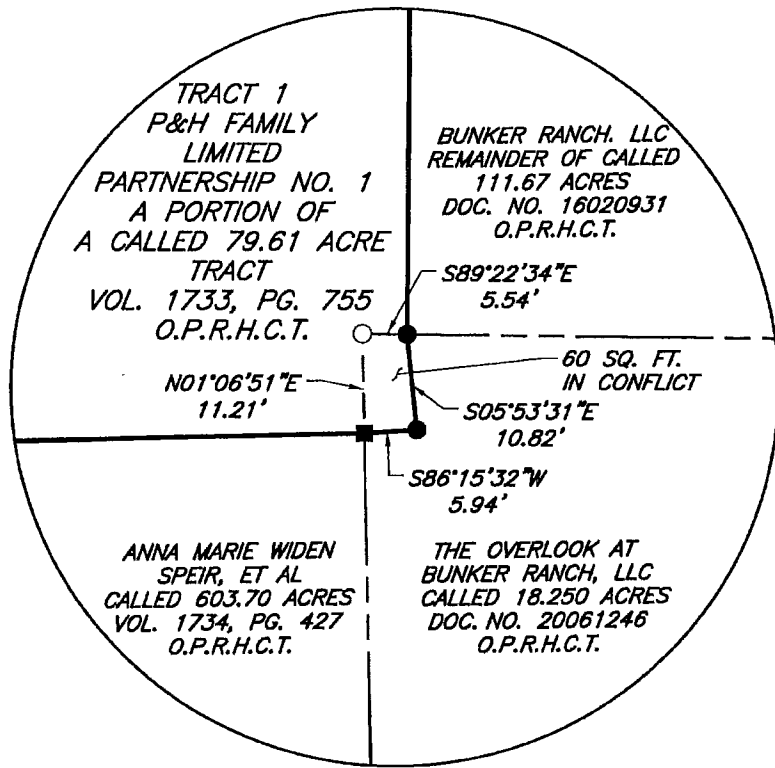
 Civil & Environmental Consultants, Inc. 3711 South MoPac Expressway · Building 1, Suite 550 · Austin, TX 78746 Ph: 512.439.0400 · Fax: 512.329.0096 Texas Registered Surveying Firm 10194419 www.cecinc.com Texas Registered Engineering Firm F-38		STEVE HARREN CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS	
		P & H TRACT EXHIBIT	
DRAWN BY: ESH DATE: MARCH, 2021	CHECKED BY: FWF DWG SCALE: 1"=250'	APPROVED BY: FWF PROJECT NO: 304-065	SHEET NO.: 1 OF 3



P:\300-000\304-065\Survey\Drawings\EXHIBIT SHEET 2 OF 3\LS:(03/04/2021 - ehoplitt) - LP: 3/4/2021 9:44 AM

NOTES:
 1. THE BASIS OF BEARINGS SHOWN HEREON IS THE TEXAS COORDINATE SYSTEM, NAD 83(2012A), SOUTH CENTRAL ZONE, UTILIZING THE LEICA SMARTNET CONTINUALLY OPERATING REFERENCE NETWORK.

 Civil & Environmental Consultants, Inc. 3711 South MoPac Expressway · Building 1, Suite 550 · Austin, TX 78746 Texas Registered Surveying Firm 10194419 Ph: 512.439.0400 · Fax: 512.329.0096 www.cecinc.com Texas Registered Engineering Firm F-38		STEVE HARREN	
		CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS	
DRAWN BY: ESH		CHECKED BY: FWF	
DATE: MARCH, 2021		DWG SCALE: 1"=250'	
APPROVED BY: FWF		SHEET NO.: 2 OF 3	
PROJECT NO: 304-065			



DETAIL "A"
 SCALE 1" = 20'

LEGEND:

- 1/2" IRON ROD FOUND
- FENCE POST FOUND
- 1/2" IRON ROD SET W/ "CEC" CAP
- SUBJECT PROPERTY LINE
- - - - - ADJACENT PROPERTY LINE
- O.P.R.H.C.T. OFFICIAL PUBLIC RECORDS, HAYS COUNTY, TEXAS
- DOC. NO. DOCUMENT NUMBER
- VOL. VOLUME
- PG. PAGE

P:\300-000\304-065-Survey\Drawg\304-065-SV01 P AND H EXHIBIT.dwg[EXHIBIT SHEET 3 OF 3] LS:(03/04/2021 - ehopkin) - LP: 3/4/2021 2:00 PM



Civil & Environmental Consultants, Inc.

3711 South MoPac Expressway · Building 1, Suite 550 · Austin, TX 78746

Texas Registered
 Surveying Firm 10194419

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 www.cecinc.com

Texas Registered
 Engineering Firm F-38

STEVE HARREN

CITY OF DRIPPING SPRINGS,
 HAYS COUNTY, TEXAS

P & H TRACT
 EXHIBIT

DRAWN BY:	ESH	CHECKED BY:	FWF	APPROVED BY:	FWF	SHEET NO.:
DATE:	MARCH, 2021	DWG SCALE:	1"=250'	PROJECT NO.:	304-065	3 OF 3

EXHIBIT A-2

METES AND BOUNDS DESCRIPTION AND SURVEY PLAT OF TRACT 2

[SEE ATTACHED]

EXHIBIT A-2

3.706 ACRES
 BUNKER RANCH
 DRIPPING SPRINGS, TX

PROJECT NO.: 304-065
 APRIL 29, 2021

LEGAL DESCRIPTION

BEING A 3.706 ACRE TRACT OF LAND OUT OF THE BENJAMIN F. HANNA SURVEY NO. 28, ABSTRACT NO. 222, SITUATED IN HAYS COUNTY, TEXAS, BEING ALL OF A CALLED 4.25 ACRE TRACT CONVEYED TO P & H FAMILY LIMITED PARTNERSHIP NO. 1 IN EXHIBIT C BY DEED OF RECORD IN VOLUME 1733, PAGE 755, OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS (O.P.R.H.C.T.); SAID 3.706 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a ½ inch iron rod with "CEC" cap set at an interior "ell" corner of said 3.706 acre tract, being the northeast corner of a called 79.61 acre tract, being described in Exhibit A of said deed recorded in Volume 1733, Page 755, O.P.R.H.C.T., for the **POINT OF BEGINNING**, hereof;

THENCE, along the common line of said 3.706 acre tract and of said 79.61 acre tract, S88°43'55"W, a distance of 3.37 feet to a found cotton spindle in a fence post at the southerly common corner of said 3.706 acre tract and of a called 49.98 acre tract conveyed to Miguel Silva and Angelica Silva by deed of record in Document No. 15020907, O.P.R.H.C.T.;

THENCE, along the common line of said 3.706 acre tract and of said 49.98 acre tract, generally following the fence, the following six (6) courses and distances:

1. N01°03'57"W, a distance of 453.05 feet to a calculated point;
2. N01°56'10"W, a distance of 547.42 feet to a calculated point;
3. N01°13'49"W, a distance of 182.02 feet to a calculated point;
4. N01°27'10"W, a distance of 445.20 feet to a calculated point;
5. N02°33'10"W, a distance of 563.42 feet to a calculated point;
6. N02°40'11"W, a distance of 802.30 feet to a ½ inch iron rod found in the southerly right-of-way line of U.S. Highway 290 at the northerly common corner of said 3.706 acre tract and of said 49.98 acre tract;

THENCE, along the common line of said 3.706 acre tract and of the southerly right-of-way line of U.S. Highway 290, N89°24'56"E, a distance of 60.00 feet to a ½ inch iron rod with "CEC" cap set at the northerly common corner of said 3.706 acre tract and of a called 18.340 acre tract conveyed to Nelda Kyle by deed of record in Volume 1264, Page 812, O.P.R.H.C.T.;

THENCE, along the common line of said 3.706 acre tract and partially of said 18.340 acre tract, and then partially of a called 44.123 acre tract conveyed to the Elry and Barbara Hudson Living Trust in Volume 2851, Page 80, O.P.R.H.C.T., S02°00'08"E, a distance of 2995.00 feet to a found ½ inch iron rod;

THENCE, along the common line of said 3.706 acre tract and of said 44.123 acre tract, the following two (2) courses and distances:

1. S00°49'45"W, a distance of 99.68 feet to a found ½ inch iron rod;

3.706 ACRES
BUNKER RANCH
DRIPPING SPRINGS, TX

PROJECT NO.: 304-065
APRIL 29, 2021

2. N89°00'40"W, a distance of 56.01' feet to a ½ inch iron rod found in the easterly line of said 79.61 acre tract found at the westerly common corner of said 3.706 acre tract and of said 44.123 acre tract;

THENCE, along the common line of said 3.706 acre tract and of said 79.61 acre tract, N00°25'57"E, a distance of 99.94 feet to the **POINT OF BEGINNING**, and containing 3.706 acres (161,454 square feet) of land, more or less.

THE BASIS OF BEARING OF THIS SURVEY IS TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NSRS 2011(2012A), UTILIZING THE LEICA SMARTNET CONTINUALLY OPERATING REFERENCE NETWORK.

Witness my hand and seal this 29th day of April, 2021.



Frank William Funk, R.P.L.S. 6803
Civil & Environmental Consultants, Inc.
3711 S. MoPac Expressway, Building 1, Suite 550
Austin, TX 78746
Texas Registered Surveying Firm No. 10194419





U.S. HIGHWAY 290
(R.O.W. VARIES)

LEGEND:

- 1/2" IRON ROD FOUND
- ⊙ COTTON SPINDLE FOUND
- 1/2" IRON ROD SET W/ "CEC" CAP
- △ CALCULATED POINT

BEARING BASIS:
TEXAS COORDINATE SYSTEM NSRS
2011(2012A), SOUTH CENTRAL
ZONE, UTILIZING THE LEICA
SMARTNET CONTINUALLY
OPERATING REFERENCE NETWORK.

MIGUEL SILVA AND
ANGELICA SILVA
CALLED 49.98 ACRES
DOC. NO. 15020907
O.P.R.H.C.T.

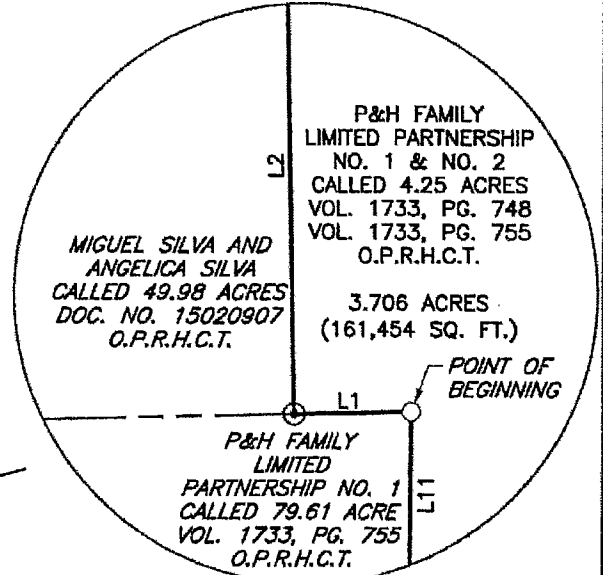
NELDA KYLE
CALLED 18.340
ACRES
VOL. 1264,
PG. 812
O.P.R.H.C.T.

P&H FAMILY
LIMITED PARTNERSHIP
NO. 1 & NO. 2
CALLED 4.25 ACRE
VOL. 1733, PG. 748
VOL. 1733, PG. 755
O.P.R.H.C.T.

3.706 ACRES
(161,454 SQ. FT.)

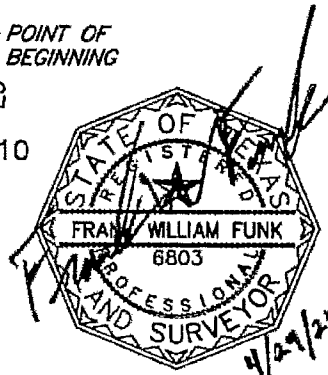
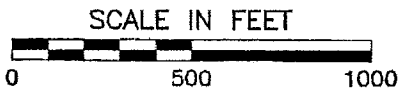
P&H FAMILY
LIMITED
PARTNERSHIP NO. 1
CALLED 79.61 ACRE
VOL. 1733, PG. 755
O.P.R.H.C.T.

ELRY AND BARBARA
HUDSON LIVING TRUST
CALLED 44.123 ACRES
VOL. 2851, PG. 80
O.P.R.H.C.T.



DETAIL "A"
SCALE 1" = 5'

LINE TABLE		
LINE #	BEARING	DISTANCE
L1	S88°43'55"W	3.37'
L2	N01°03'57"W	453.05'
L3	N01°56'10"W	547.42'
L4	N01°13'49"W	182.02'
L5	N01°27'10"W	445.20'
L6	N02°33'10"W	563.42'
L7	N02°40'11"W	802.30'
L8	N89°24'56"E	60.00'
L9	S00°49'45"W	99.68'
L10	N89°00'40"W	56.01'
L11	N00°25'57"E	99.94'



P:\300-000\304-065\Survey\Draw\304-065-S101 P&H Tract 2 Boundary.dwg[LAYOUT] LS-(4/29/2021 - frank) - LP: 4/29/2021 6:14 PM



Civil & Environmental Consultants, Inc.

3711 South MoPac Expressway · Building 1, Suite 550 · Austin, TX 78746

Texas Registered
Surveying Firm 10194419

Ph: 512.439.0400 · Fax: 512.329.0096

www.cecinc.com

Texas Registered
Engineering Firm F-38

STEVE HARREN

CITY OF DRIPPING SPRINGS
HAYS COUNTY, TEXAS

P&H TRACT
U.S. 290 ACCESS

DRAWN BY:	CEC	CHECKED BY:	FWF	APPROVED BY:	FWF	SHEET NO.:	
DATE:	APRIL, 2021	DWG SCALE:	1"=500'	PROJECT NO.:	304-065		1 OF 1

EXHIBIT A-3

METES AND BOUNDS DESCRIPTION AND SURVEY PLAT OF TRACT 3

[SEE ATTACHED]

EXHIBIT A-3

1.507 ACRES
 BUNKER RANCH
 DRIPPING SPRINGS, TX

PROJECT NO.: 304-065
 APRIL 29, 2021

LEGAL DESCRIPTION

BEING A 1.507 ACRE TRACT OF LAND OUT OF THE BENJAMIN F. HANNA SURVEY NO. 28, ABSTRACT NO. 222, SITUATED IN HAYS COUNTY, TEXAS, BEING A PORTION OF A CALLED 79.61 ACRE TRACT CONVEYED TO P & H FAMILY LIMITED PARTNERSHIP NO. 1 AS TRACT A BY DEED OF RECORD IN VOLUME 1733, PAGE 755, OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS (O.P.R.H.C.T.); SAID 1.507 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a ½ inch iron rod with "CEC" cap set at the northeast corner of the said 79.61 acre tract, being an interior "ell" corner of a called 4.25 acre tract described in Exhibit C of said deed recorded in Volume 1733, Page 755, O.P.R.H.C.T., for the **POINT OF BEGINNING** hereof;

THENCE, along the common line of said 1.507 acre tract and of said 4.25 acre tract, S00°25'57"W, a distance of 60.03 feet to a ½ inch iron rod with "CEC" cap set at the easterly common corner of said 1.507 acre tract and the remainder of said 79.61 acre tract;

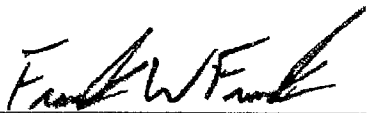
THENCE, along the common line of said 1.507 acre tract and of said remainder of 79.61 acre tract, S88°43'55"W, 1,100.12 feet to a ½ inch iron rod with "CEC" cap set in the common line of said 79.61 acre tract and of a called 79.39 acre tract conveyed to P&H Family Limited Partnership No. 2 by deed of record in Volume 1733, Page 748, O.P.R.H.C.T., at the westerly common corner of said 1.507 acre tract and of the remainder of said 79.61 acre tract;

THENCE, along the common line of said 1.507 acre tract and of said 79.39 acre tract, N12°13'46"E, a distance of 61.70 feet to a ½ inch iron rod found in the southerly line of a called 36.802 acre tract conveyed to Patriot Erectors, LLC by deed of record in Document No. 18016400, O.P.R.H.C.T., at the northerly common corner of said 1.507 acre tract and of said 79.39 acre tract;

THENCE, along the common line of said 1.507 acre tract and partially of said 36.802 acre tract, and then partially of a called 49.98 acre tract conveyed to Miguel Silva and Angelica Silva by deed of record in Document No. 15020907, O.P.R.H.C.T., and then partially of said 4.25 acre tract, N88°43'55"E, passing at a distance of 1,084.13, a found cotton spindle in a fence post at the southerly common corner of said 49.98 acre tract and of said 4.25 acre tract, continuing for a total distance of 1,087.50 feet to the **POINT OF BEGINNING**, and containing 1.507 acres (65,628 square feet) of land, more or less.

THE BASIS OF BEARING OF THIS SURVEY IS TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NSRS 2011(2012A), UTILIZING THE LEICA SMARTNET CONTINUALLY OPERATING REFERENCE NETWORK.

Witness my hand and seal this 29th day of April, 2021.



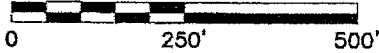
Frank William Funk, R.P.L.S. 6803
 Civil & Environmental Consultants, Inc.
 3711 S. MoPac Expressway, Building 1, Suite 550
 Austin, TX 78746
 Texas Registered Surveying Firm No. 10194419





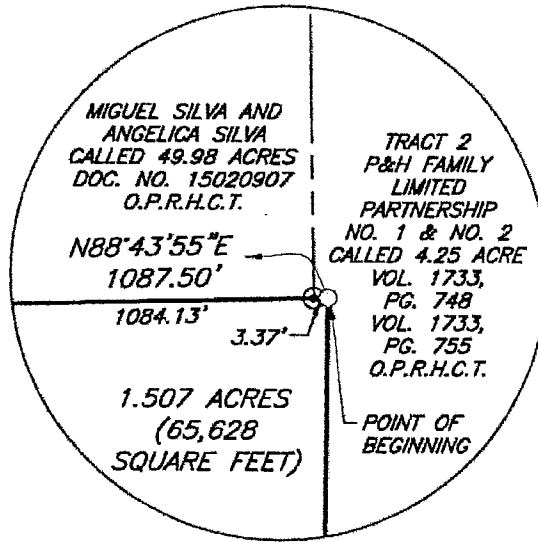
NORTH

SCALE IN FEET



LEGEND:

- 1/2" IRON ROD FOUND
- ⊙ COTTON SPINDLE FOUND
- 1/2" IRON ROD SET W/ "CEC" CAP



DETAIL "A"
SCALE 1" = 40'

PATRIOT ERECTORS, LLC CALLED
36.802 ACRES
DOC. NO. 18016400
O.P.R.H.C.T.

MIGUEL SILVA AND ANGELICA SILVA
CALLED 49.98 ACRES
DOC. NO. 15020907
O.P.R.H.C.T.

TRACT 2
P&H FAMILY
LIMITED
PARTNERSHIP
NO. 1 & NO. 2
CALLED 4.25 ACRE
VOL. 1733,
PG. 748
VOL. 1733,
PG. 755
O.P.R.H.C.T.

P&H FAMILY
LIMITED
PARTNERSHIP
NO. 2
CALLED 79.39
ACRES
VOL. 1733,
PG. 748
O.P.R.H.C.T.

TRACT 1
P&H FAMILY
LIMITED PARTNERSHIP NO. 1
A REMAINDER OF A CALLED 79.61
ACRE TRACT
VOL. 1733, PG. 755 O.P.R.H.C.T.

1.507 ACRES
(65,628 SQUARE FEET)

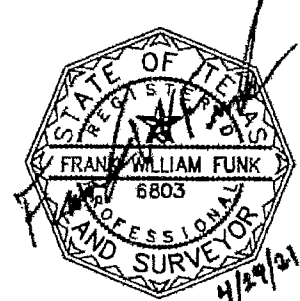
TRACT 3
P&H FAMILY
LIMITED PARTNERSHIP NO. 1
PORTION OF A
CALLED 79.61
ACRE TRACT
VOL. 1733, PG. 755
O.P.R.H.C.T.

ELRY AND BARBARA
HUDSON LIVING TRUST
CALLED 44.123 ACRES
VOL. 2851, PG. 80
O.P.R.H.C.T.

THE BASIS OF BEARINGS SHOWN HEREON IS THE TEXAS COORDINATE SYSTEM, NSRS 2011 (2012A), SOUTH CENTRAL ZONE, UTILIZING THE LEICA SMARTNET CONTINUALLY OPERATING REFERENCE NETWORK.

SEE DETAIL "A"

POINT OF BEGINNING
S00°25'57"W 60.03'



Civil & Environmental Consultants, Inc.

3711 South MoPac Expressway · Building 1, Suite 550 · Austin, TX 78746

Texas Registered
Surveying Firm 10194419

Ph: 512.439.0400 · Fax: 512.329.0096

www.cecinc.com

Texas Registered
Engineering Firm F-38

STEVE HARREN

CITY OF DRIPPING SPRINGS,
HAYS COUNTY, TEXAS

P & H TRACT 3
EXHIBIT

DRAWN BY:	ESH	CHECKED BY:	FWF	APPROVED BY:	FWF	SHEET NO.:	1 OF 1
DATE:	APRIL, 2021	DWG SCALE:	1" = 250'	PROJECT NO.:	304-065		

P:\300-000\304-065\Survey\Drawings\REMAINDER EXHIBIT.dwg EXHIBIT SHEET 1 OF 1 LS:(04/29/2021 - ehoksh) - LP: 4/29/2021 6:10 PM

EXHIBIT B

Permitted Exceptions

1. Easement granted to Southwestern Bell Telephone Company, dated July 12, 1937, recorded in Volume 115, Page 86, of the Deed Records of Hays County, Texas (Tract 2).
2. Easement granted to Dripping Springs Water Supply Corporation, dated December 18, 2002, recorded in Volume 3228, Page 542, of the Official Public Records of Hays County, Texas (Tracts 1 and 3).
3. Non-exclusive ingress and egress easement set out in Special Warranty Deed recorded in Volume 1733, Page 748, Official Public Records, Hays County, Texas (Tract 3).
4. Rights and claims of cotenants in the land and to the rights of anyone claiming under them including, but not limited to, rights of partition, claims for improvements, claims for reimbursement, owelty of partition, and agreements between co-tenants (Tracts 2 and 3).
5. Easement granted to Pedernales Electric Cooperative, Inc. pursuant to Condemnation Proceedings filed May 19, 1953, under Cause No. 1648, in the County Court of Hays County, Texas and file of record in Document No. 21022398 of the Official Public Records of Hays County, Texas and as affected by Amendment recorded in Volume 1983, Page 576, of the Official Public Records of Hays County, Texas (Tract 1).
6. Easement granted to Dripping Springs Water Supply Corporation, dated December 4, 2003, recorded in Volume 3228, Page 534, of the Official Public Records of Hays County, Texas (Tract 2).
7. Affidavit to the public regarding a non-standard and/or proprietary on-site sewage facility installed on subject property, as recorded in Document No. 18037775, of the Official Public Records of Hays County, Texas. (Tract 4)
8. An approximately 60 square foot area located at the southeast corner of the Land in conflict with description of 18.250 acre tract in deed to The Overlook at Bunker Ranch, LLC recorded at Clerk's File No. 20061246, of the Official Public Records of Hays County, Texas.

**THE STATE OF TEXAS
COUNTY OF HAYS**

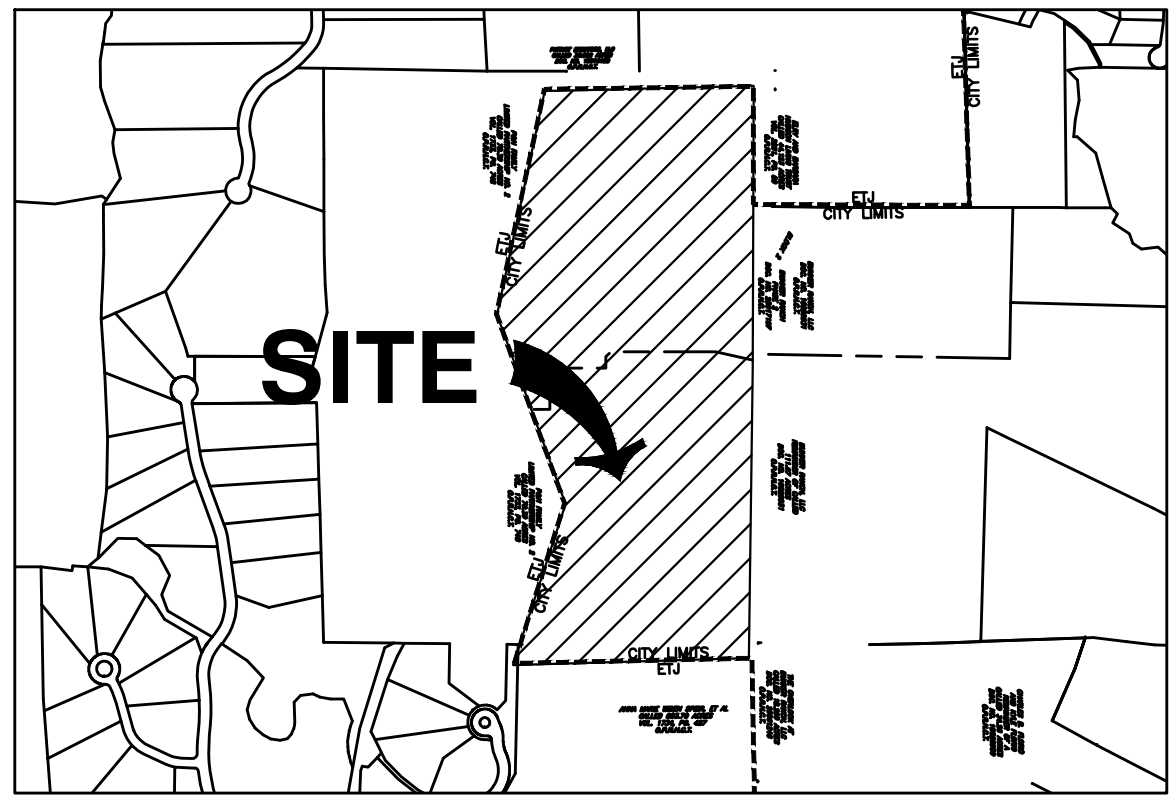
I hereby certify that this instrument was FILED on the date and the time stamped hereon by me and was duly RECORDED in the Records of Hays County, Texas.

21051171 DEED
09/17/2021 09:07:15 AM Total Fees: \$110.00

Elaine H. Cárdenas, MBA, PhD, County Clerk
Hays County, Texas



Exhibit C



OWNER/TEAM INFORMATION

CIVIL ENGINEER
CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
3711 S. MOPAC EXPRESSWAY, BUILDING 1, SUITE 550
AUSTIN, TX 78746
PH: (512) 439-0400
CONTACT: BRIAN ESTES, PE

OWNER / DEVELOPER
HARDY T LAND, LLC
STEVE HARREN
317 GRACE LANE #240
AUSTIN, TEXAS 78746

LAND SURVEYOR
CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
3711 S. MOPAC EXPRESSWAY, BUILDING 1, SUITE 550
AUSTIN, TX 78746
PH: (512) 439-0400
CONTACT: SYDNEY SMITH XINOS, R.P.L.S.

SUMMARY

FULL PURPOSE CITY LIMITS
ZONING: SF-2

AREAS

LOTS (73)	63.14 AC	80.93%
POND LOTS (3)	5.66 AC	7.25%
R.O.W.	9.22 AC	11.82%
TOTAL =	78.02 AC.	

IMPERVIOUS COVER

CONCRETE = 182,836 S.F.
SIDEWALK = 65,483 S.F.
ASSUMED I.C. PER RESIDENTIAL LOT = 8,500 S.F.
IMPERVIOUS COVER TOTAL = 885,819 S.F.
IMPERVIOUS COVER TOTAL = 20.34 AC.
TOTAL AREA = 78.02 AC.

PROPOSED IMPERVIOUS COVER = 26.07%
MAX. ALLOWED IMPERVIOUS COVER = 40%

LOT COUNT

NUMBER OF LOTS = 73
AVERAGE LOT = 0.86 AC
TOTAL = 63.14 AC

BUILDING SETBACKS

FRONT = 25'
BACK = 15'
SIDE = 15'

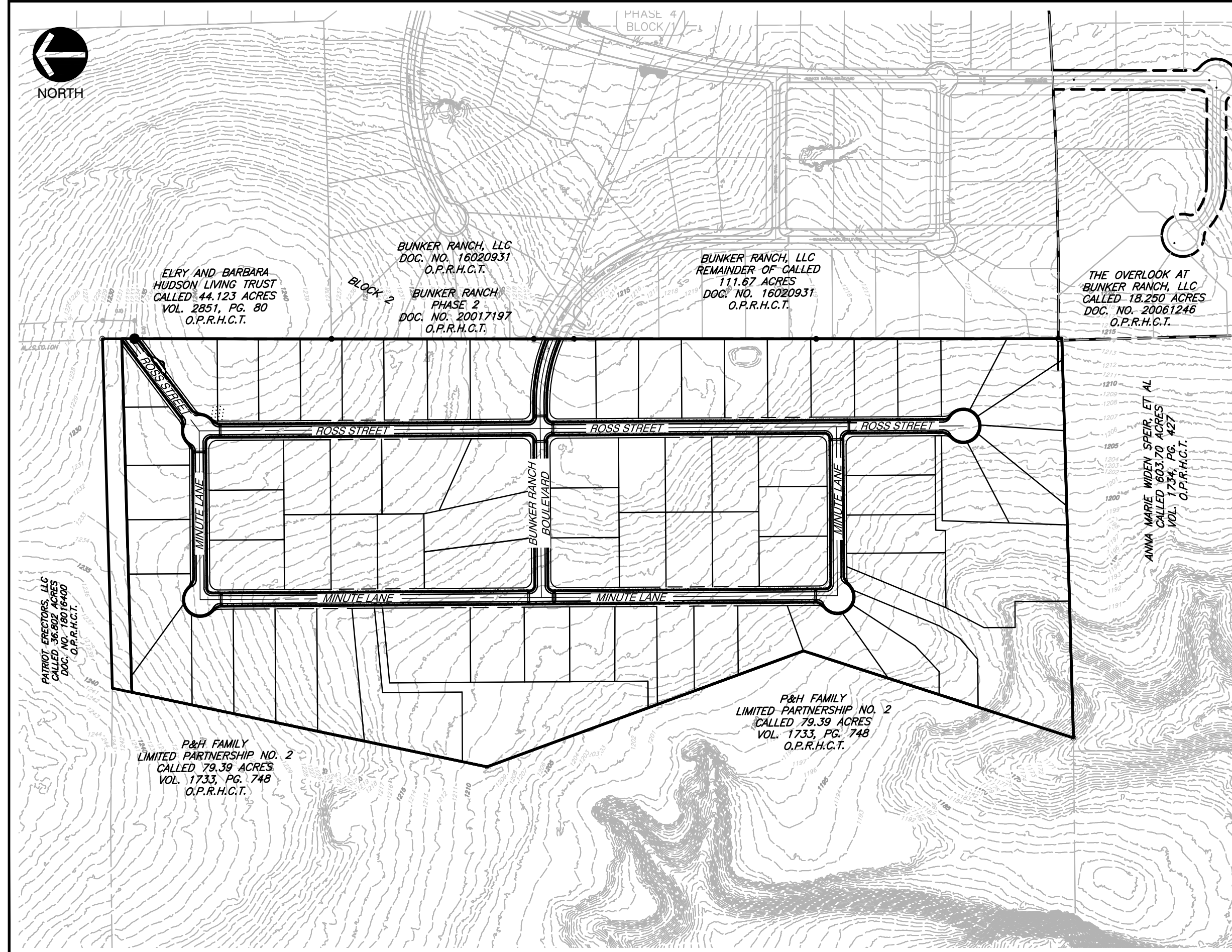
PLAT NOTES

- ALL RESPONSIBILITY FOR THE ACCURACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN REVIEWING THESE PLANS, THE CITY MUST REPLY ON THE ADEQUACY OF THE WORK OF THE DESIGN ENGINEER.
- ASSIGNED CITY ADDRESS NUMBERS SHALL BE PERMANENTLY AFFIXED TO ALL STRUCTURES IN SUCH POSITION AS TO BE PLAINLY VISIBLE AND LEGIBLE FROM THE STREET.
- NO PORTION OF THIS TRACT FALLS WITHIN FEMA 1% ANNUAL CHANCE FLOOD HAZARD AREA PER FEMA PANEL 48209C0085F DATED 9/2/2005.
- WATER PROVIDER: DRIPPING SPRINGS WATER SUPPLY CORP.
- A PORTION OF THIS PROJECT IS LOCATED WITHIN THE EDWARDS AQUIFER CONTRIBUTING ZONE.
- THE JURISDICTIONAL AUTHORITY FOR ONSITE SEWAGE FACILITIES (OSSF) FALLS UNDER THE TEXAS COMMISSION OF ENVIRONMENTAL QUALITY. THE AUTHORIZED AGENT IS THE CITY OF DRIPPING SPRINGS.
- THE HOA SHALL BE RESPONSIBLE FOR OPERATION AND MAINTENANCE OF STORMWATER FACILITIES.
- DRIPPING SPRINGS WATER SUPPLY CORPORATION WILL OWN AND OPERATE THE WATER FACILITIES AS PER NOTE 4.
- THE HOA SHALL BE THE OWNER AND OPERATOR OF ROADWAY FACILITIES
- A WATER QUALITY BMP MAINTENANCE PLAN HAS BEEN PREPARED FOR THIS DEVELOPMENT AND IS ON FILE AT THE CITY HALL IN THE SITE DEVELOPMENT CASE # SD2022-0066.

SUBDIVISION CONSTRUCTION DRAWINGS

FOR HARDY T LAND

CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX



LEGAL DESCRIPTION

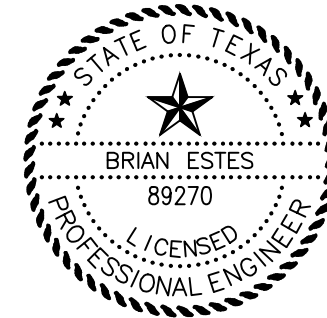
BEING A 78.021 ACRE TRACT OUT OF THE BENJAMIN F. HANNA SURVEY NO. 28, ABSTRACT NO. 222, SITUATED IN HAYS COUNTY, TEXAS, BEING ALL OF TRACT 1, CONVEYED TO HARDY T LAND, LLC BY SPECIAL WARRANTY DEED OF RECORD IN DOCUMENT NO. 21051171, OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS (O.P.R.H.C.T.)

NOTES:

- OWNER WILL BE ABLE TO CONTINUE DEVELOPMENT PROCESS, SUCH AS ROADS, UTILITIES, AND ACCEPTANCE THEREOF. HOWEVER, NO BUILDING CERTIFICATE OF OCCUPANCY WILL BE ISSUED UNTIL CONNECTIVITY IS ESTABLISHED IN CONFORMANCE WITH THE 2018 INTERNATIONAL FIRE CODE, APPENDIX D, SECTION D107.1 AND SECTION D107.2.
- CONNECTION TO THE EXISTING BUNKER RANCH BOULEVARD STUB AT BUNKER RANCH PHASE 4 MUST BE COMPLETED PRIOR TO APPROVAL OF THE FINAL PLAT FOR HARDY.
- STREET TREES SHALL BE PLANTED IN EACH LOT PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY PER THE QUANTITY, SIZE AND LOCATION REQUIREMENTS OF SUBDIVISION ORDINANCE 28.06.051.
- DEVELOPER WILL BUILD SIDEWALKS ADJACENT TO COMMON AREAS; HOME BUILDERS WILL BUILD SIDEWALKS ON RESIDENTIAL LOTS. DEVELOPER WILL BOND SIDEWALKS PRIOR TO CONSTRUCTION.

SUBMITTED BY : BRIAN ESTES, PE

02/13/2024



I CERTIFY THAT THESE ENGINEERING DOCUMENTS ARE COMPLETE, ACCURATE AND ADEQUATE FOR THE INTENDED PURPOSES, INCLUDING CONSTRUCTION, BUT ARE NOT AUTHORIZED FOR CONSTRUCTION PRIOR TO FORMAL CITY APPROVAL.

Sheet #	Description
01	COVER SHEET
02	GENERAL NOTES
03	PRELIMINARY PLAN
04	PRELIMINARY PLAN
05	EXISTING CONDITIONS
06	EXISTING DRAINAGE AREA MAP
07	PROPOSED DRAINAGE AREA MAP
08	ROSS STREET NORTH (0+00 - 4+50)
09	ROSS STREET NORTH (4+50 - END)
10	ROSS STREET SOUTH (0+00 - 9+50)
11	ROSS STREET SOUTH (9+50 - END)
12	MINUTE LANE NORTH (0+00 - 5+50)
13	MINUTE LANE NORTH (5+50 - END)
14	MINUTE LANE SOUTH (0+00 - 9+50)
15	MINUTE LANE SOUTH (9+50 - END)
16	BUNKER RANCH BLVD. (0+00 - END)
17	GENERAL DETAILS 2
18	GENERAL DETAILS
19	OVERALL WATER PLAN
20	WATER LINE A P&P (0+00 - 3+50)
21	WATER LINE A P&P (3+50 - 14+50)
22	WATER LINE A P&P (14+50 - 21+50)
23	WATER LINE A P&P (21+50 - END)
24	WATER LINE B P&P (0+00 - 6+00)
25	WATER LINE B P&P (6+00 - 16+00)
26	WATER LINE B P&P (16+00 - 24+00)
27	WATER LINE B P&P (24+00 - END)
28	WATER LINE C P&P
29	UTILITY DETAILS
30	OVERALL STORM PLAN
31	STORM LINES A
32	STORM LINE A1 & A2
33	STORM B
34	STORM LINES B1 & B2
35	STORM LINE C
36	STORM LINE C1-C5
37	STORM LINES D
38	STORM LINE D-2
39	STORM LINE E
40	STORM LINES E1-E2-E3
41	STORM LINE F
42	E&S CONTROL PLAN
43	DETENTION POND A
44	DETENTION POND B
45	DETENTION POND C
46	WATER QUALITY POND B
47	WATER QUALITY POND C
48	WATER QUALITY POND CALCULATIONS
49	SIGNING AND STRIPING PLAN
50	STRUCTURAL DETAILS

APPROVED BY:

CITY ADMINISTRATOR

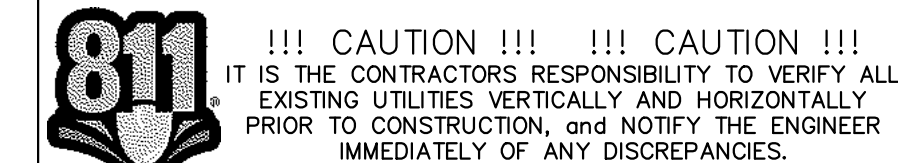
CITY ENGINEER

DRIPPING SPRINGS WATER SUPPLY CORPORATION

APPROVED BY:

HAYS COUNTY ESD #6

SITE PERMIT NUMBER



NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
Texas Registered Engineering Firm F-38
3711 South Mopac Expressway - Building 1, Suite 550 - Austin, TX 78746
Ph: 512.439.0400 - Fax: 512.329.0096
www.cechinc.com

HARDY T LAND LLC
HARDY T LAND
DRIPPING SPRINGS, HAYS COUNTY, TX

DATE: 02/13/2024	DRAWN BY: STAFF
DWG SCALE: 1"=300'	MISC: 304-065
PROJECT NO: 304-065	APPROVED BY: BE
DRAWING NO. 01	
SHEET 01 OF 50	

A:130-0001-DW-001-0002-DWG (Hardy) (02/13/24) - COVER SHEET (1/1/2024) - 8/9/2024 4:02 PM

Exhibit D



DRIPPING SPRINGS
Texas

City of Dripping Springs

511 Mercer Street • PO Box 384 • Dripping Springs, TX 78620 • 512.858.4725
cityofdrippingsprings.com

Open spaces, friendly faces.

Date: **March 7, 2024**

Name: **Luis Garcia**
Company: **CEC**
Email: **lgarcia@cecinc.com**

Dear **Luis Garcia**:

CONDITIONAL APPROVAL

This letter is to inform you that case **SUB2023-0042 HARDY CONSTRUCTION PLANS** has received a conditional approval. **Each the following conditions must be addressed before the permit is approved.**

1. Final approval will be withheld until completion of the secondary access.
2. Provide copy of executed drainage easement.

Should you have any questions or concerns, please feel free to reach out to the planning department.

Regards,

Tory Carpenter, AICP
Planning Director
City of Dripping Springs

Exhibit E



DRIPPING SPRINGS
Texas

City of Dripping Springs

511 Mercer Street • PO Box 384 • Dripping Springs, TX 78620 • 512.858.4725
cityofdrippingsprings.com

Open spaces, friendly faces.

Date: **November 7, 2023**

Name: **Michael Theone**
Company: **Civil & Environmental Consultants, Inc.**
Email: **mtheone@cecinc.com**

Dear **Michael Theone**:

CONDITIONAL APPROVAL

This letter is to inform you that the case **SD2022-0025 HARDY DRIVEWAY** has received a conditional approval. **Each the following conditions must be addressed before the permit is approved.**

1. Submit executed drainage easement document.
2. I do not see the level spreader details for the culvert discharge. Please add details or clarify location. The one detail reference 508S-13 is a standard headwall detail that will not fit the situation.
3. Confirm 100-yr flow is contained within the ROW. Provide an exhibit confirming the spread of the 100-yr is contained within the ROW.
4. Since this roadway is in the ETJ provide a signature block on the cover with approval by the County Transportation Department prior to submitting to the City for final approval and signatures.

Should you have any questions or concerns, please feel free to reach out to the planning department.

Regards,

Michelle Fischer
City Administrator
City of Dripping Springs

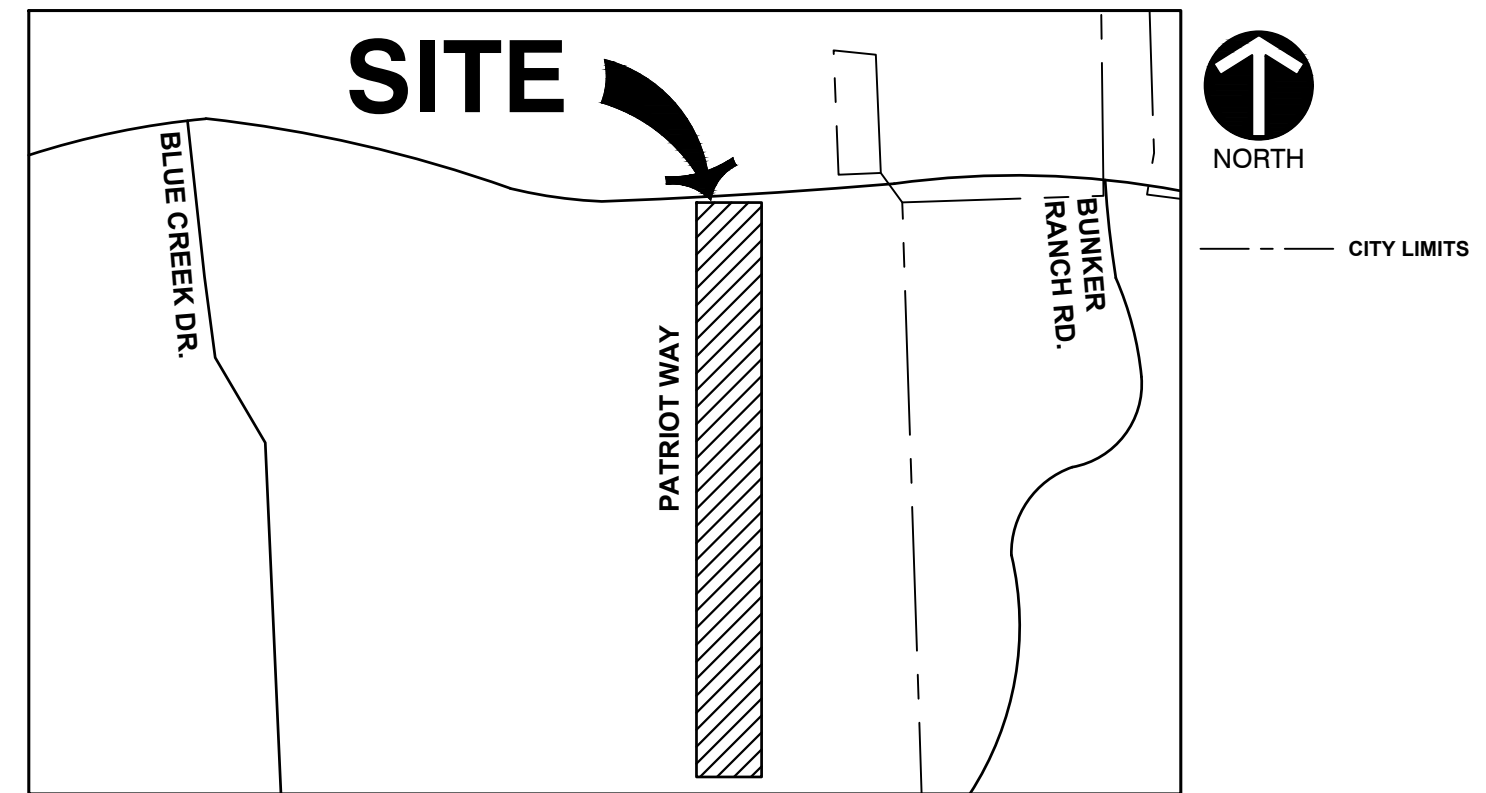
HARDY T LAND, LLC

HARDY DRIVEWAY

CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

SITE DEVELOPMENT PLANS

SUBMITTAL DATE: 8/10/2022



VICINITY MAP
SCALE: 1"=1000'

OWNER/TEAM INFORMATION

CIVIL ENGINEER
CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
3711 S. MOPAC EXPRESSWAY, BUILDING 1, SUITE 550
AUSTIN, TX 78746
PH: 512-439-0400
CONTACT: MICHAEL THEONE, PE

OWNER / DEVELOPER
HARDY T LAND, LLC
317 GRACE LANE #240
AUSTIN, TEXAS 78746

LAND SURVEYOR
CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
3711 S. MOPAC EXPRESSWAY, BUILDING 1, SUITE 550
AUSTIN, TX 78746
PH: 512-439-0400
CONTACT: SYDNEY XINOS, RPLS

IMPERVIOUS COVER

IMPERVIOUS COVER TOTAL: 1.85 AC
TOTAL AREA: 3.706 AC
IMPERVIOUS COVER: 49.9%

NOTES

ALL RESPONSIBILITY FOR ACCURACY OF THESE PLANS REMAIN WITH THE ENGINEER WHO PREPARED THEM. IN REVIEWING THESE PLANS, THE CITY OF DRIPPING SPRINGS MUST RELY ON THE ADEQUACY OF THE WORK OF THE DESIGN ENGINEER.

THIS SITE LIES WITHIN THE EDWARDS AQUIFER CONTRIBUTING ZONE.
CZP EAPP ID NO. 11003502, REGULATED ENTITY NO. RN11601258

NO PORTION OF THIS SITE LIES WITHIN A FEMA FLOODPLAIN AS DEPICTED IN FEMA FIRM PANEL 48209C0085F, DATED 9/2/2005.

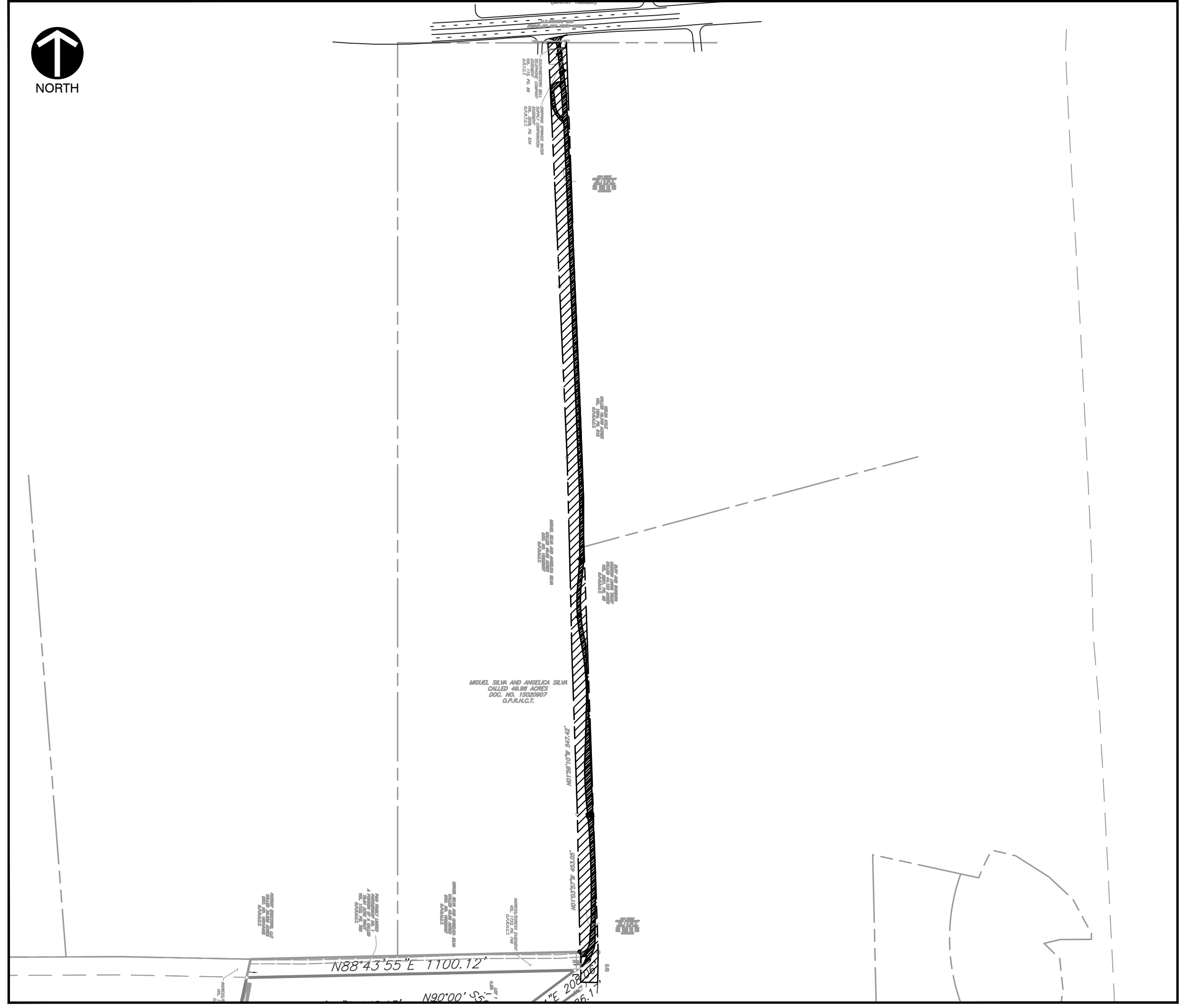
A WATER QUALITY BMP MAINTENANCE PLAN HAS BEEN PREPARED FOR THIS DEVELOPMENT AND IS ON FILE AT CITY HALL IN SITE DEVELOPMENT CASE# SD2022-0025.

THE OWNER OF THE PROPERTY - HARDY T LAND, LLC - IS RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE STORMWATER UTILITIES WITHIN THIS DEVELOPMENT.

THE EXISTING ROAD BASE IS TO BE UTILIZED IN THE CONSTRUCTION OF THIS ROADWAY PER THE APPROVAL OF THE GEOTECHNICAL ENGINEER.

FLOOD STATEMENT:
NO PORTION OF THE SITE IS LOCATED WITHIN THE 100-YEAR FLOODPLAIN AS DEFINED BY THE FLOOD INSURANCE RATE MAP PANEL NO. 48209C0085F FOR TRAVIS COUNTY, TEXAS, DATED SEPTEMBER 2, 2005.

WATERSHED INFORMATION:
ENTIRETY OF THE SITE LIES WITHIN EDWARDS AQUIFER CONTRIBUTING ZONE. SITE DEVELOPMENT PERMIT WILL REQUIRE A CONTRIBUTING ZONE PLAN (CZP) FROM TCEO.



SITE MAP
SCALE: 1"=300'

LEGAL DESCRIPTION

A0222 BENJAMIN F HANNA SURVEY, ACRES 3.706

ADDRESS

2901 W HWY 290
DRIPPING SPRINGS, TX 78620

SITE DEVELOPMENT PLANS INDEX

SHEET NO.	SHEET TITLE
01	COVER SHEET
02	GENERAL NOTES
03	EXISTING CONDITIONS & DEMO PLAN
04	LAYOUT SHEET
05	SITE DETAILS
06	SITE DETAILS 2
07	EROSION PLAN SHEET
08	EROSION DETAILS
09	EXISTING DMAP1 OF 2
10	EXISTING DMAP 2 OF 2
11	PROPOSED DMAP 1 OF 2
12	PROPOSED DMAP 2 OF 2
13	TXDOT CULVERT - EXISTING DMAP
14	TXDOT CULVERT - PROPOSED DMAP
15	OVERALL GRADING AND DRAINAGE PLAN
16	TXDOT DRIVEWAY
17	UNDERGROUND DETENTION 1 OF 2
18	UNDERGROUND DETENTION 2 OF 2
19	UNDERGROUND DETENTION CALCS
20	GRADING AND DRAINAGE 1
21	GRADING AND DRAINAGE 1 CALCS
22	GRADING AND DRAINAGE 2
23	GRADING AND DRAINAGE 2 CALCS
24	GRADING AND DRAINAGE 3
25	GRADING AND DRAINAGE 3 CALCS
26	DRAINAGE DETAILS
27	STORM PLAN & PROFILES A-C
28	STORM PLAN & PROFILES D-G
29	STORM PLAN & PROFILES H-K
30	STORM PLAN & PROFILES L-M
31	RIGID PAVEMENT DESIGN
32	ROAD PLAN & PROFILE STA 0+00-11+00
33	ROAD PLAN & PROFILE STA 11+00-22+00
34	ROAD PLAN & PROFILE STA 22+00-END
35	ROAD PLAN STA 30.25 - LINE OF SIGHT
36	ROADSIDE DITCH P&P 0+00-10+00
37	ROADSIDE DITCH P&P 10+00-END
38	ROADSIDE DITCH SECTIONS
39	UNDERGROUND DETENTION 1 1 OF 2
40	UNDERGROUND DETENTION 1 2 OF 2
41	UNDERGROUND DETENTION 2 1 OF 2
42	UNDERGROUND DETENTION 2 2 OF 2

REVISION RECORD

NO.	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
1221 South Mopac Expressway - Suite 350 - Austin, TX 78746
Ph: 512.439.0400 - Fax: 512.329.0096
www.cetcinc.com

HARDY T LAND, LLC
SITE DEVELOPMENT PLANS
HARDY DRIVEWAY
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF THE EXPANSION OF AN EXISTING 16 FOOT WIDE PRIVATE DRIVEWAY TO 26 FEET IN WIDTH SPANNING APPROXIMATELY 3,000 LINEAR FEET.

SUBMITTED BY : MICHAEL A. THEONE

8/10/2022

I CERTIFY THAT THESE ENGINEERING DOCUMENTS ARE COMPLETE, ACCURATE AND ADEQUATE FOR THE INTENDED PURPOSES, INCLUDING CONSTRUCTION, BUT ARE NOT AUTHORIZED FOR CONSTRUCTION PRIOR TO FORMAL CITY APPROVAL.



!!! CAUTION !!!
IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, and NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

REVISIONS

NO.	DESCRIPTION	REVISE (R) / ADD (A) SHEET NO.	PLAN SET SHEET TOTAL	NET IC CHANGE	SITE IC	% IC	APPROVED / DATE

CORRECTIONS

NO.	DESCRIPTION	REVISE (R) / ADD (A) SHEET NO.	PLAN SET SHEET TOTAL	NET IC CHANGE	SITE IC	% IC	APPROVED / DATE

CITY OF DRIPPING SPRINGS SITE DEVELOPMENT PERMIT # SD-2022-0025

APPROVED BY: _____ CITY ADMINISTRATOR _____ CITY ENGINEER _____ PLANNING DIRECTOR	APPROVED BY: _____ DRIPPING SPRINGS WATER SUPPLY CORPORATION _____ HAYS COUNTY ESD #6 _____ HAYS COUNTY TRANSPORTATION DEPARTMENT
---	---

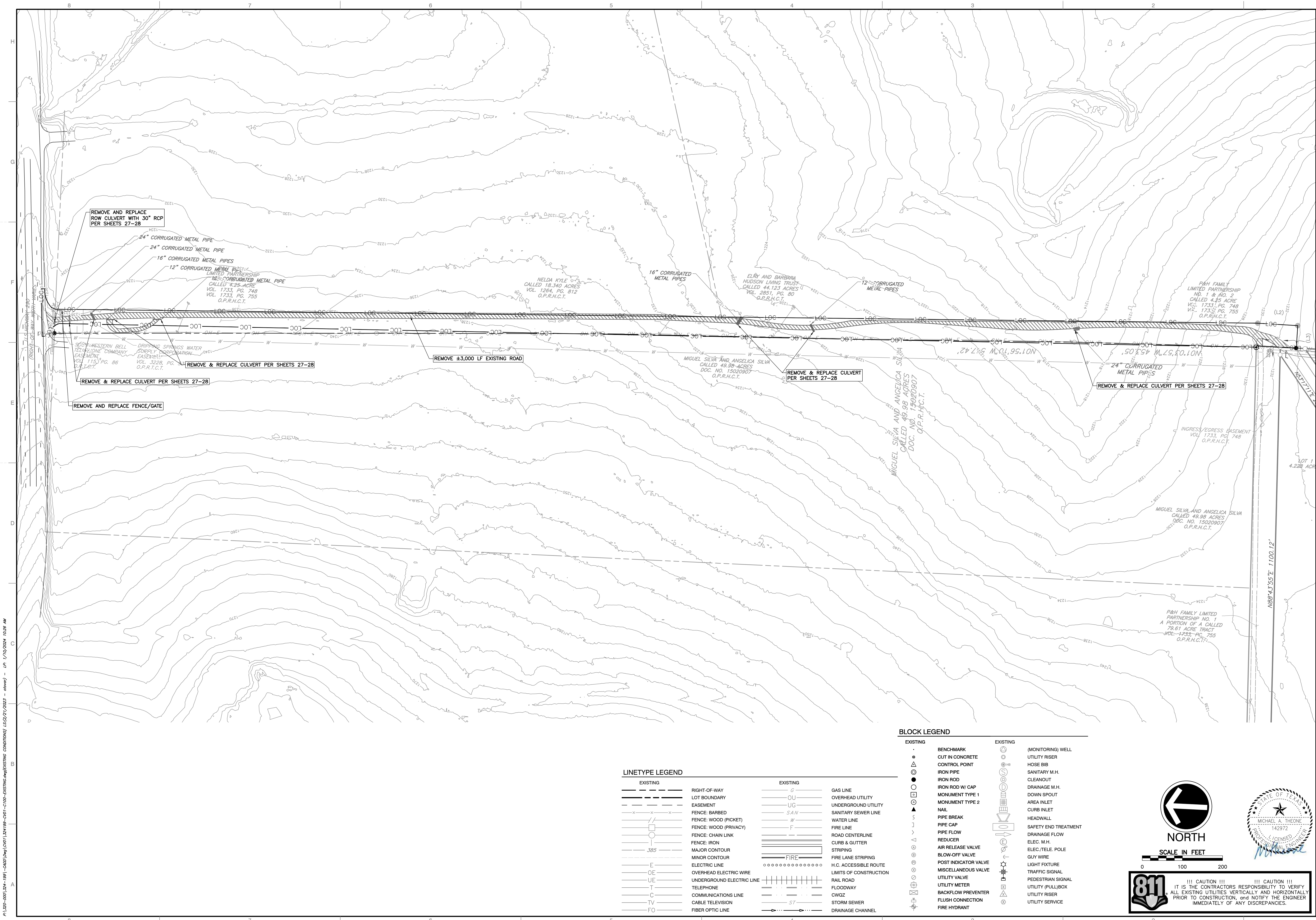
COVER SHEET

DATE: 8/10/2022	DRAWN BY: NTS	CHECKED BY: MICHAEL A. THEONE	CEC
PROJECT NO: 324-199			CB
APPROVED BY:			MAT

DRAWING NO.: **01**

SHEET 01 OF 42

A:\300-2021\3021-199-1\3021-199-001\3021-199-001-000-COVER-SHEET.dwg (COVER SHEET) LST(A) 2024 - 8/10/2024 10:26 AM
 User: mtheone



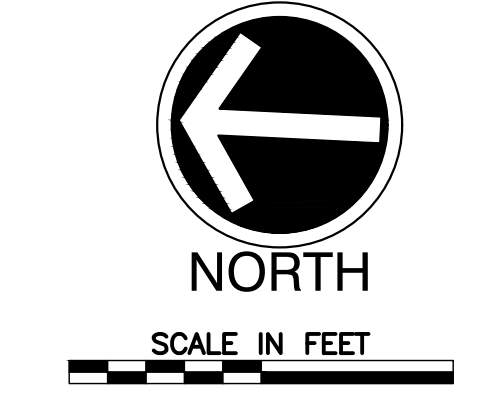
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LINETYPE LEGEND

EXISTING		EXISTING	
---	RIGHT-OF-WAY	G	GAS LINE
- - -	LOT BOUNDARY	OU	OVERHEAD UTILITY
- . - . -	EASEMENT	UG	UNDERGROUND UTILITY
- x - x -	FENCE: BARBED	SAN	SANITARY SEWER LINE
- - -	FENCE: WOOD (PICKET)	W	WATER LINE
- o - o -	FENCE: WOOD (PRIVACY)	F	FIRE LINE
- x - x -	FENCE: CHAIN LINK	---	ROAD CENTERLINE
- - -	FENCE: IRON	---	CURB & GUTTER
- - -	MAJOR CONTOUR	---	STRIPING
- - -	MINOR CONTOUR	---	FIRE LANE STRIPING
- - -	ELECTRIC LINE	o o o o o o o o o o	H.C. ACCESSIBLE ROUTE
- - -	UNDERGROUND ELECTRIC LINE	---	LIMITS OF CONSTRUCTION
- - -	OVERHEAD ELECTRIC WIRE	---	RAIL ROAD
- - -	TELEPHONE	---	FLOODWAY
- - -	COMMUNICATIONS LINE	---	STORM SEWER
- - -	CABLE TELEVISION	---	DRAINAGE CHANNEL
- - -	FIBER OPTIC LINE	---	

BLOCK LEGEND

EXISTING		EXISTING	
•	BENCHMARK	⊕	(MONITORING) WELL
⊕	OUT IN CONCRETE	⊕	UTILITY RISER
⊕	CONTROL POINT	⊕	HOSE BIB
⊕	IRON PIPE	⊕	SANITARY M.H.
⊕	IRON ROD	⊕	CLEANOUT
⊕	IRON ROD W/ CAP	⊕	DRAINAGE M.H.
⊕	MONUMENT TYPE 1	⊕	DOWN SPOUT
⊕	MONUMENT TYPE 2	⊕	AREA INLET
⊕	NAIL	⊕	CURB INLET
⊕	PIPE BREAK	⊕	HEADWALL
⊕	PIPE CAP	⊕	SAFETY END TREATMENT
⊕	PIPE FLOW	⊕	DRAINAGE FLOW
⊕	REDUCER	⊕	ELEC. M.H.
⊕	AIR RELEASE VALVE	⊕	ELEC./TELE. POLE
⊕	BLOW-OFF VALVE	⊕	GUY WIRE
⊕	POST INDICATOR VALVE	⊕	LIGHT FIXTURE
⊕	MISCELLANEOUS VALVE	⊕	TRAFFIC SIGNAL
⊕	UTILITY VALVE	⊕	PEDESTRIAN SIGNAL
⊕	UTILITY METER	⊕	UTILITY (PULL) BOX
⊕	BACKFLOW PREVENTER	⊕	UTILITY RISER
⊕	FLUSH CONNECTION	⊕	UTILITY SERVICE
⊕	FIRE HYDRANT		



811 !!! CAUTION !!!
 IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, and NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

REVISION RECORD

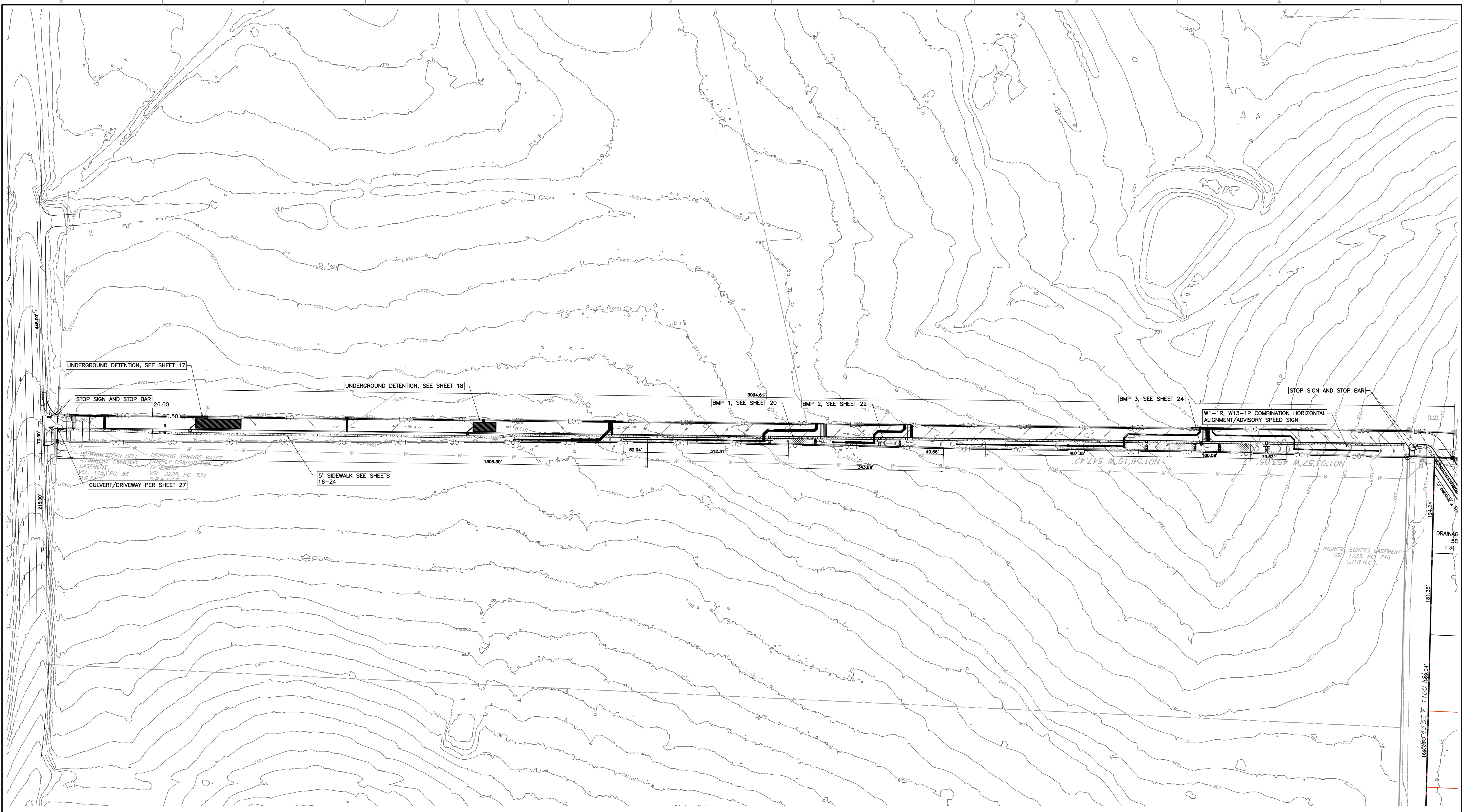
NO.	DATE	DESCRIPTION


Civil & Environmental Consultants, Inc.
 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.359.0096
 www.cecinc.com

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

EXISTING CONDITIONS & DEMO PLAN
 DATE: 1/10/2024 DRAWN BY: CEC
 DWG SCALE: 1" = 100' CHECKED BY: CB
 PROJECT NO: 324-199
 APPROVED BY: MT
 SHEET 03 OF 42

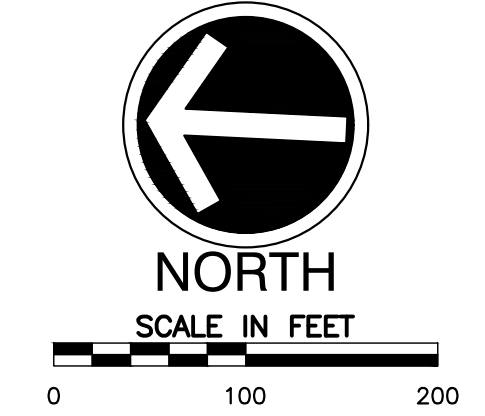
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ZONING	ETJ
LAND USE DESIGNATION	PRIVATE DRIVEWAY
PROPOSED LAND USE	PRIVATE DRIVEWAY
TOTAL SITE AREA (AC)	3.71
EXISTING IMPERVIOUS COVER AREA (AC)	1.14
EXISTING IMPERVIOUS COVER PERCENT	30.7%
PROPOSED ONSITE IMPERVIOUS COVER AREA (AC)	1.85
PROPOSED ONSITE IMPERVIOUS COVER PERCENT	49.9%

PROPOSED	EXISTING	DESCRIPTION
---	---	RIGHT-OF-WAY
- - -	- - -	LOT BOUNDARY
- . - .	- . - .	EASEMENT
- x - x	- x - x	FENCE: BARBED
- / - /	- / - /	FENCE: WOOD (PICKET)
- □ - □	- □ - □	FENCE: WOOD (PRIVACY)
- ○ - ○	- ○ - ○	FENCE: CHAIN LINK
- ○ - ○	- ○ - ○	FENCE: IRON
- - -	- - -	MAJOR CONTOUR
- - -	- - -	MINOR CONTOUR
- E - E	- E - E	ELECTRIC LINE
- OE - OE	- OE - OE	OVERHEAD ELECTRIC WIRE
- UE - UE	- UE - UE	UNDERGROUND ELECTRIC LINE
- T - T	- T - T	TELEPHONE
- C - C	- C - C	COMMUNICATIONS LINE
- TV - TV	- TV - TV	CABLE TELEVISION
- FO - FO	- FO - FO	FIBER OPTIC LINE
- G - G	- G - G	GAS LINE
- OU - OU	- OU - OU	OVERHEAD UTILITY
- UG - UG	- UG - UG	UNDERGROUND UTILITY
- SAN - SAN	- SAN - SAN	SANITARY SEWER LINE
- W - W	- W - W	WATER LINE
- F - F	- F - F	FIRE LINE
- R - R	- R - R	ROAD CENTERLINE
- C & G - C & G	- C & G - C & G	CURB & GUTTER
- S - S	- S - S	STRIPING
- FIRE - FIRE	- FIRE - FIRE	FIRE LINE STRIPING
- LOC - LOC	- LOC - LOC	H.C. ACCESSIBLE ROUTE
- L - L	- L - L	LIMITS OF CONSTRUCTION
- RR - RR	- RR - RR	RAIL ROAD
- F - F	- F - F	FLOODWAY
- CHWZ - CHWZ	- CHWZ - CHWZ	CHWZ
- ST - ST	- ST - ST	STORM SEWER
- D - D	- D - D	DRAINAGE CHANNEL

PROPOSED	EXISTING	DESCRIPTION
•	•	BENCHMARK
○	○	CUT IN CONCRETE
△	△	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
○	○	PIPE BREAK
○	○	PIPE CAP
○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
○	○	UTILITY METER
○	○	BACKFLOW PREVENTER
○	○	FLUSH CONNECTION
○	○	FIRE HYDRANT
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BIB
○	○	SANITARY M.H.
○	○	CLEANOUT
○	○	DRAINAGE M.H.
○	○	DOWN SPOUT
○	○	AREA INLET
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○	○	SAFETY END TREATMENT
○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
○	○	ELEC./TELE. POLE
○	○	GUY WIRE
○	○	LIGHT FIXTURE
○	○	TRAFFIC SIGNAL
○	○	PEDESTRIAN SIGNAL
○	○	UTILITY (PULL)BOX
○	○	UTILITY RISER
○	○	UTILITY SERVICE



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 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

DATE:	8/10/2022	DRAWN BY:	CEC
DWG SCALE:	1" = 100'	CHECKED BY:	CB
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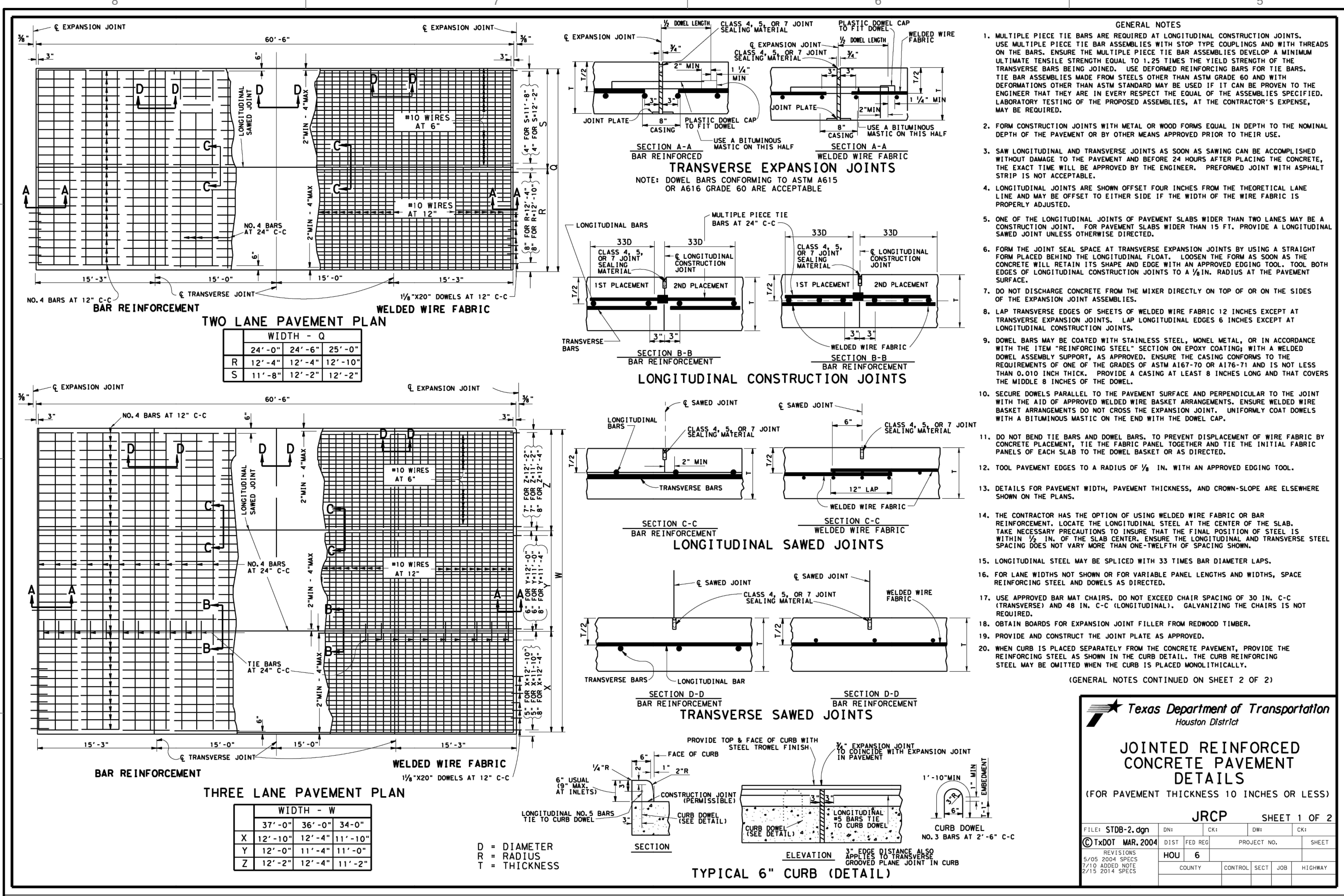


TABLE 7.3
SUMMARY OF HAYS COUNTY ROAD STANDARDS*

Functional Classification	Country Lane	Local Street	Minor Collector	2501-5000 Major Collector	5001-15000 Minor Arterial	More than 15000 Major Arterial
Design Speed	25 mph	25 mph	35 mph	45 mph	55 mph	
Number of Lanes	2	2	2	2	4	All elements including geometric layout and cross-section
ROW Width	50'	60'	60'	70'	100'	
Width of Traveled way	18'	20'	22'	24'	48'	
Width of Shoulders	2'	4'	5'	6'	8'	
Minimum Centerline Radius	200'	300'	375'	675'	975'	
Minimum Tangent Length between Reverse Curves or Compound Curves	50'	100'	150'	300'	500'	shall be approved
Minimum Radius for Edge of Pavement at Intersections	25'	25'	25'	25'	25'	by the Road Director
Intersection Street Angle	80-100	80-100	80-100	80-100	80-100	
Maximum Grade	11%	11%	10%	9%	8%	on a case-by-case basis.
Minimum Street Centerline Offset at Adjacent Intersections	125'	125'	125'	125'	125'	
Minimum Stopping Sight Distance	175'	175'	250'	350'	550'	
Minimum Intersection Sight Distance	250'	250'	350'	450'	550'	
Ditch Foreslope Grade	4:01	4:01	5:01	5:01	6:01	
Ditch Backslope Grade	3:01	3:01	4:01	4:01	4:01	
Minimum Cui-de-sac ROW Radius	65'	70'	70'	70'	70'	
Minimum Cui-de-sac Pavement Radius	35'	45'	45'	45'		

Notes:

- Any deviation from these standards must be the subject of an approved variance.
- Lots that are restricted by plat note to one single-family residence shall be presumed to generate 10 one-way trips per day. Average daily traffic for all other lots shall be determined on a case-by-case basis by the Road Director.
- Occasional short runs between intersections may exceed the amounts shown, but maximum grades through intersections may not exceed the amounts shown.
- The entire side ditch shall be contained entirely within the road right-of-way or a dedicated drainage easement. Guardrails shall be designed in accordance with current TXDOT standards.
- No cul-de-sac shall have a cross slope that exceeds 6 percent.
- Revegetation of disturbed areas within new road rights of way is required.
- required wherever ditch depth exceeds 8'-0" from edge of shoulder to bottom of ditch on Country Lanes and Local streets, 6'-0" from edge of shoulder to bottom of ditch on Minor Collectors, and 4'-0" from edge of shoulder to bottom of ditch on Major Collectors and Minor Arterials.
- Individual driveway entrances, if not shown on the approved construction plans, must be approved by the Road Director. Maximum spacing between commercial driveways or curb cuts is 150ft. Safety-end treatment required on all driveways. (Minimum 6:1 slope)
- All design standards may be modified on a case-by-case basis as each project merits depending upon topography and other pertinent features. This is to include possible wider ROWs when designed backsploes will not fit within standard ROW.
- Utility construction and design, if intended to be underground, shall comply with USDOT utility guide. The design and installation of utilities needs to be coordinated with the Hays County Road Dept.
- No road and drainage construction may begin until a set of construction and drainage plans have been approved by the County Road Department.
- Seventy-Two (72) hours before construction is to begin a preconstruction meeting is required to be held. Contact the County Road Department for scheduling information.

NOTES:

- ALL IMPROVEMENTS SHALL BE MADE IN ACCORDANCE WITH THE RELEASED SITE PLAN. ANY ADDITIONAL IMPROVEMENTS WILL REQUIRE SITE PLAN AMENDMENT AND APPROVAL OF THE DEVELOPMENT SERVICES DEPARTMENT.
- APPROVAL OF THIS SITE PLAN DOES NOT INCLUDE BUILDING AND FIRE CODE APPROVAL NOR BUILDING PERMIT APPROVAL.
- STRIPING - FIRE APPARATUS ACCESS ROADS SHALL BE CONTINUOUSLY MARKED BY PAINTED LINES OF RED TRAFFIC PAINT SIX INCHES (6") IN WIDTH TO SHOW THE BOUNDARIES OF THE LANE. THE WORDS "FIRE LANE - NO PARKING" SHALL APPEAR IN FOUR INCH (4") WHITE LETTERS AT 25 FEET INTERVALS ON THE RED BORDER MARKINGS ALONG BOTH SIDES OF THE FIRE LANES.
- SIGNS SHALL READ "FIRE LANE- NO PARKING" AND SHALL BE 12" WIDE AND 18" HIGH. SIGNS SHALL BE PAINTED ON A WHITE BACKGROUND WITH LETTERS AND BORDERS IN RED. USING NOT LESS THAN 2" LETTERING. SIGNS SHALL BE PERMANENTLY AFFIXED TO A STATIONARY POST AND THE BOTTOM OF THE SIGN SHALL BE SIX FEET (6') ABOVE FINISHED GRADE. SIGNS SHALL BE SPACED NOT MORE THAN FIFTY FEET (50') APART ALONG BOTH SIDES OF THE FIRE LANE.

REVISION RECORD

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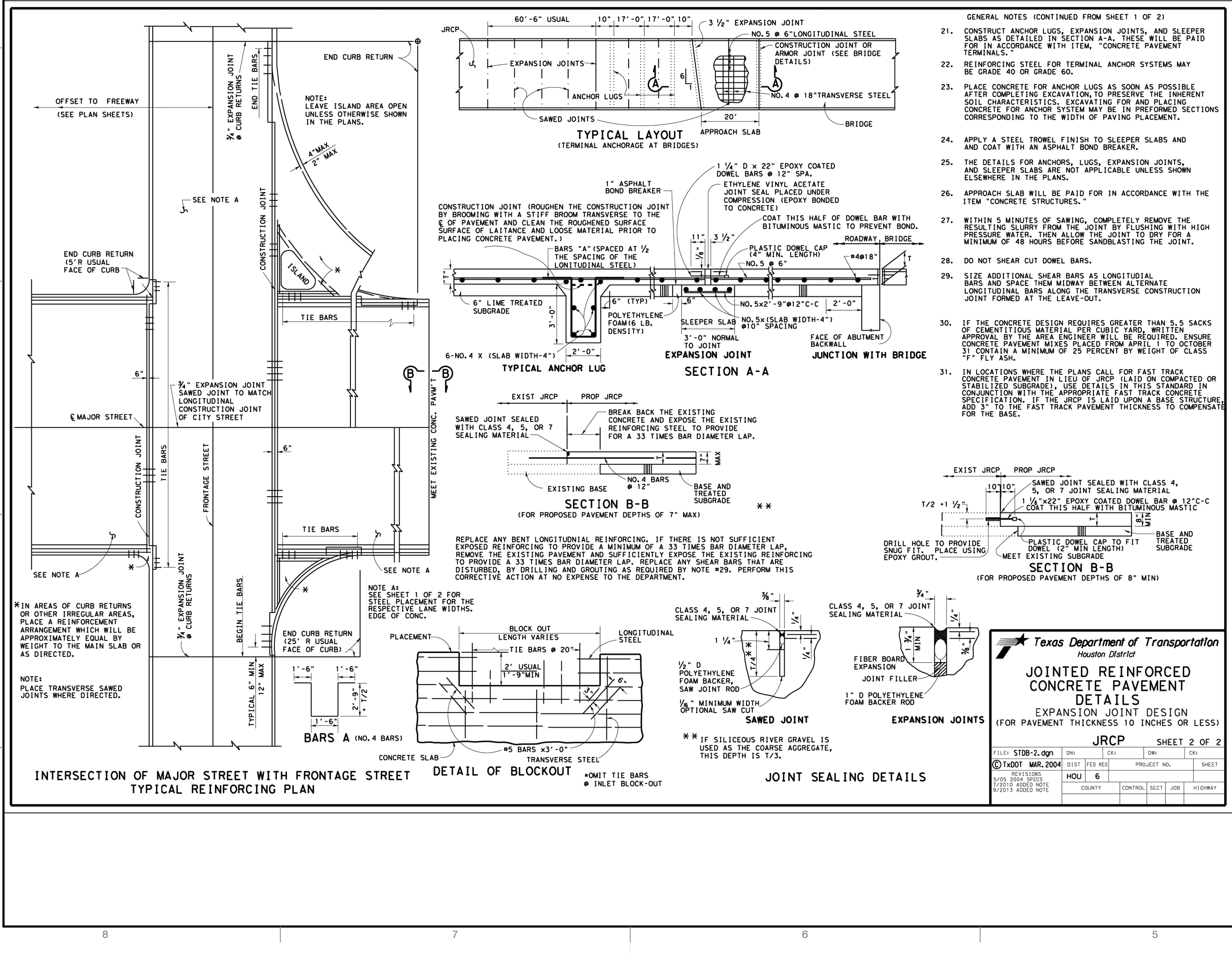


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TEXAS DEPARTMENT OF TRANSPORTATION
Houston District

JOINTED REINFORCED CONCRETE PAVEMENT DETAILS
(FOR PAVEMENT THICKNESS 10 INCHES OR LESS)

JRPC SHEET 2 OF 2

FILE: STDB-2.dgn (D) DATE: MAR 2008 (D) PROJECT NO. (D) SHEET (D)

11/02/024 (D) COUNTY: (D) CONTROL: (D) JOB: (D)

TEXAS DEPARTMENT OF TRANSPORTATION
Houston District

JOINTED REINFORCED CONCRETE PAVEMENT DETAILS
EXPANSION JOINT DESIGN
(FOR PAVEMENT THICKNESS 10 INCHES OR LESS)

JRPC SHEET 2 OF 2

FILE: STDB-2.dgn (D) DATE: MAR 2008 (D) PROJECT NO. (D) SHEET (D)

11/02/024 (D) COUNTY: (D) CONTROL: (D) JOB: (D)

STATE OF TEXAS
MICHAEL A. THEONE
142972
LICENSED PROFESSIONAL ENGINEER

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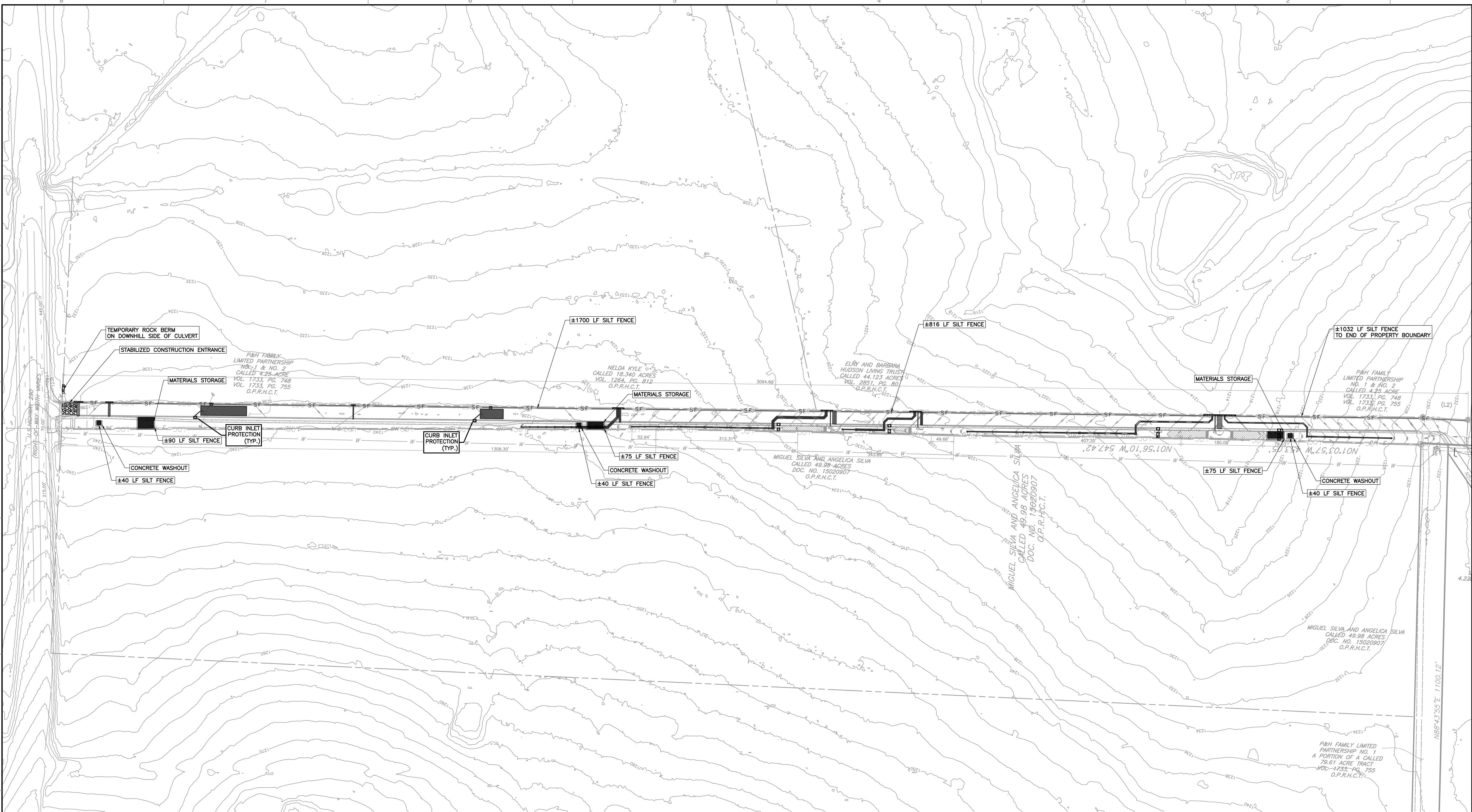
05

DATE: 11/02/024 DRAWN BY: CEC
DWG SCALE: NTS CHECKED BY: CB
PROJECT NO: 324-199
APPROVED BY: MT

DRAWING NO.: SHEET 05 OF 42

SD-2022-0025

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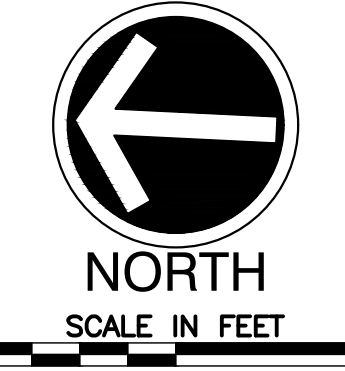
LINETYPE LEGEND

PROPOSED	EXISTING	
---	---	RIGHT-OF-WAY
---	---	LOT BOUNDARY
---	---	EASEMENT
X / X	X / X	FENCE: BARBED
		FENCE: WOOD (PICKET)
		FENCE: WOOD (PRIVACY)
		FENCE: CHAIN LINK
		FENCE: IRON
385	385	MAJOR CONTOUR
E	E	MINOR CONTOUR
OE	OE	ELECTRIC LINE
UE	UE	OVERHEAD ELECTRIC WIRE
T	T	UNDERGROUND ELECTRIC LINE
C	C	TELEPHONE
TV	TV	COMMUNICATIONS LINE
FO	FO	CABLE TELEVISION
---	---	FIBER OPTIC LINE

PROPOSED	EXISTING	
○	○	GAS LINE
○	○	OVERHEAD UTILITY
○	○	UNDERGROUND UTILITY
SAN	SAN	SANITARY SEWER LINE
W	W	WATER LINE
F	F	FIRE LINE
---	---	ROAD CENTERLINE
---	---	CURB & GUTTER
---	---	STRIPING
---	---	FIRE LINE STRIPING
LOC	LOC	H.C. ACCESSIBLE ROUTE
---	---	LIMITS OF CONSTRUCTION
---	---	RAIL ROAD
---	---	FLOODWAY
---	---	CHWZ
---	---	STORM SEWER
---	---	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	
●	●	BENCHMARK
○	○	CUT IN CONCRETE
○	○	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
○	○	PIPE BREAK
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○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
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○	○	DRAINAGE FLOW
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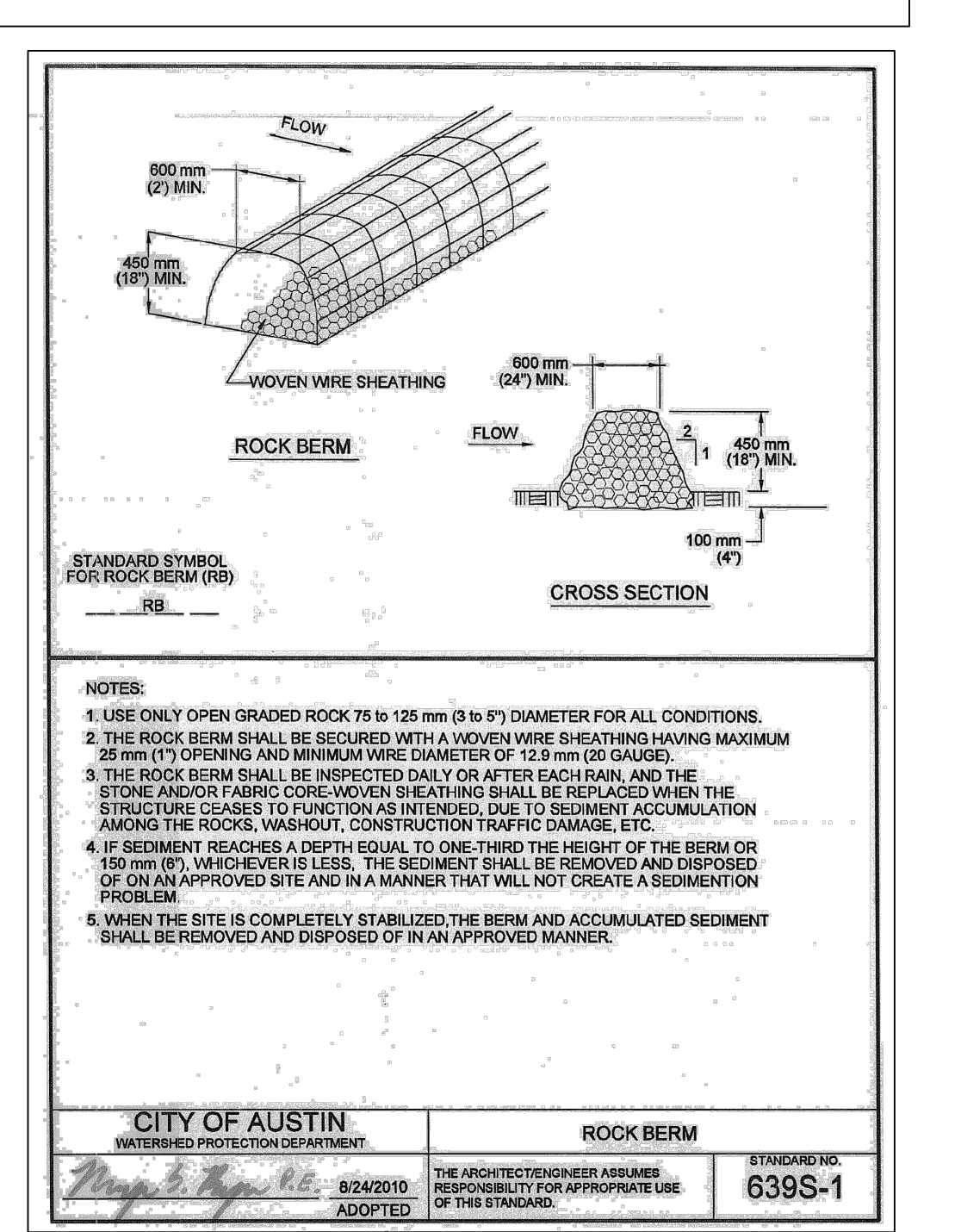
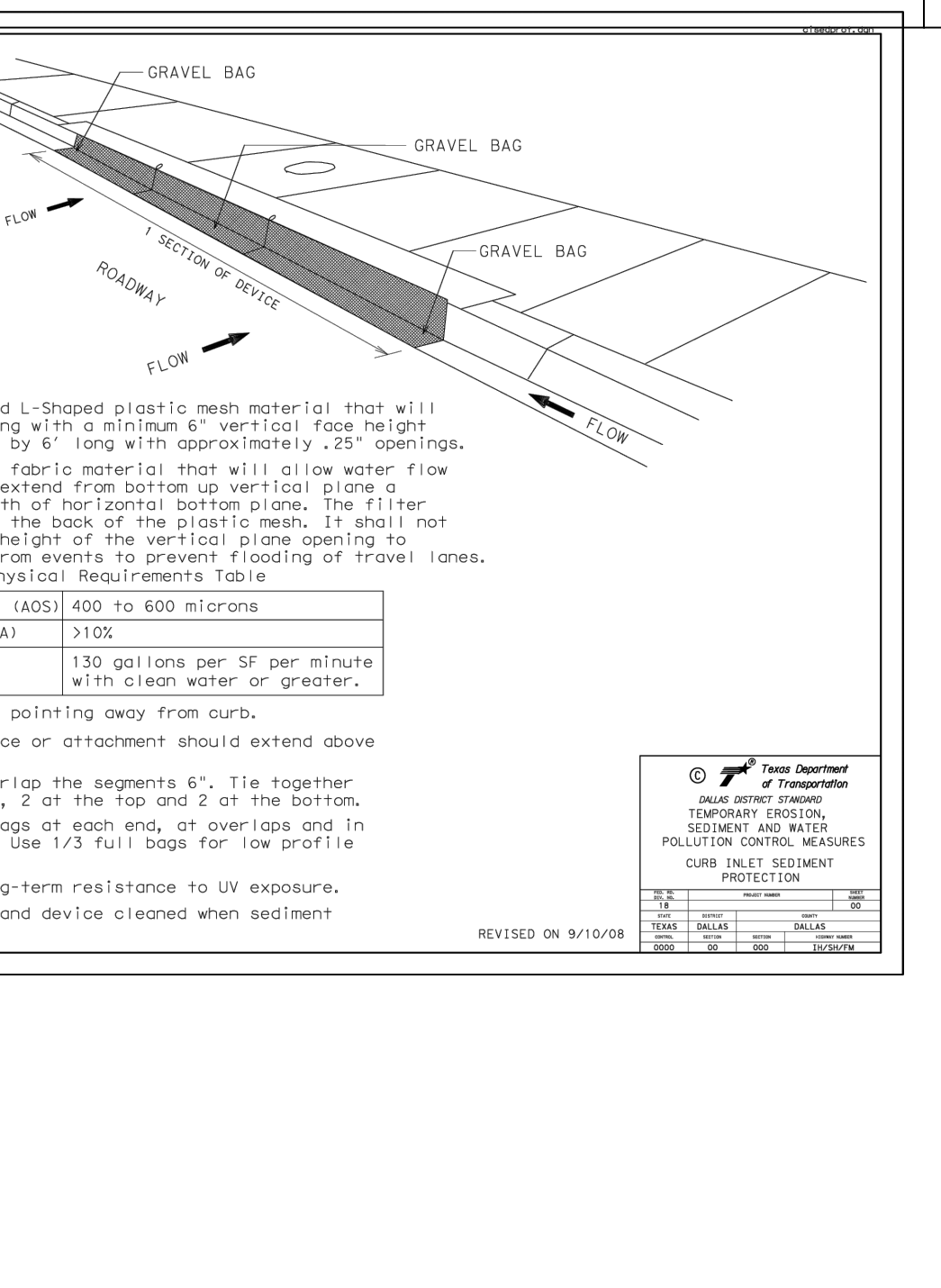
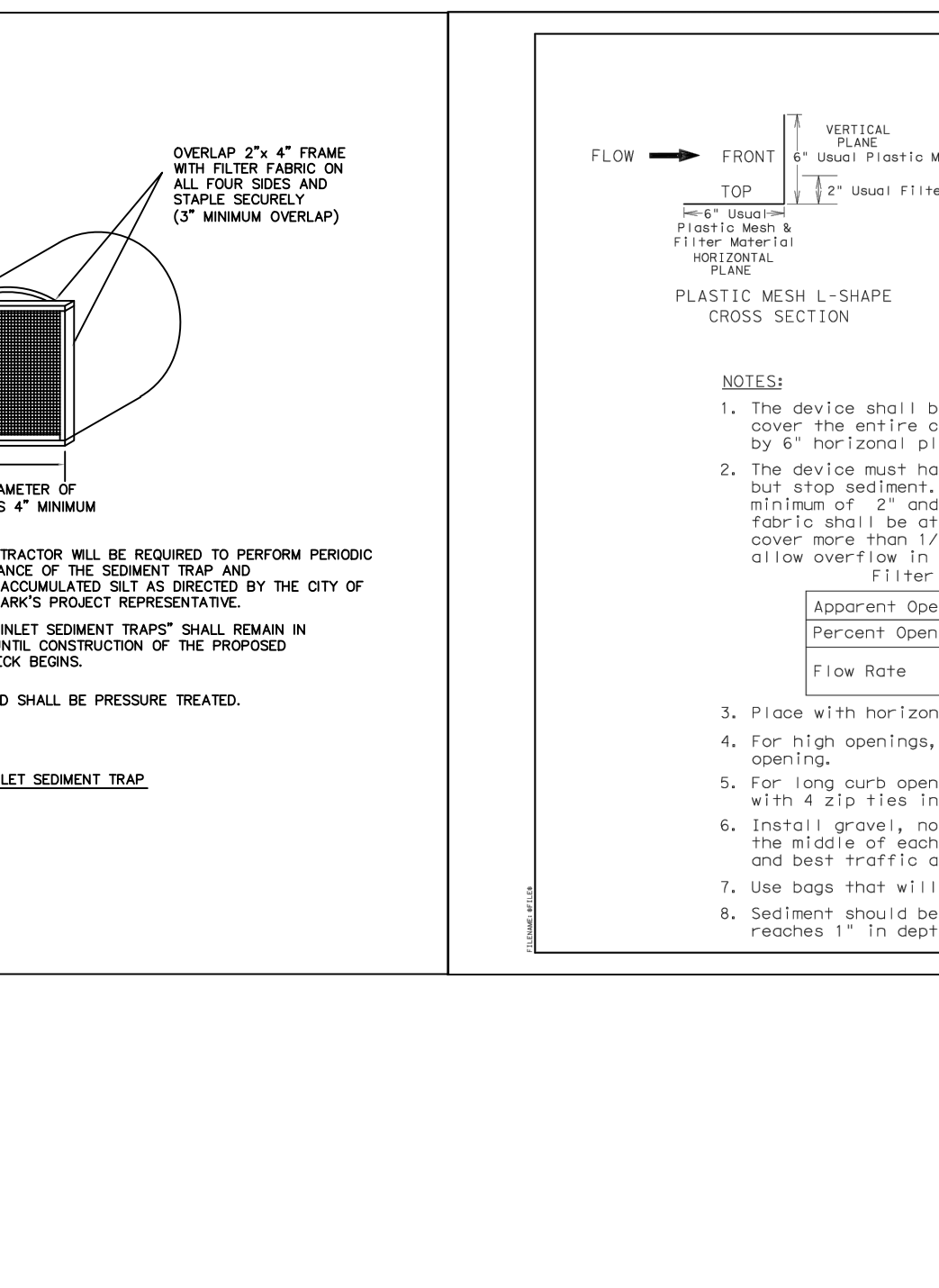
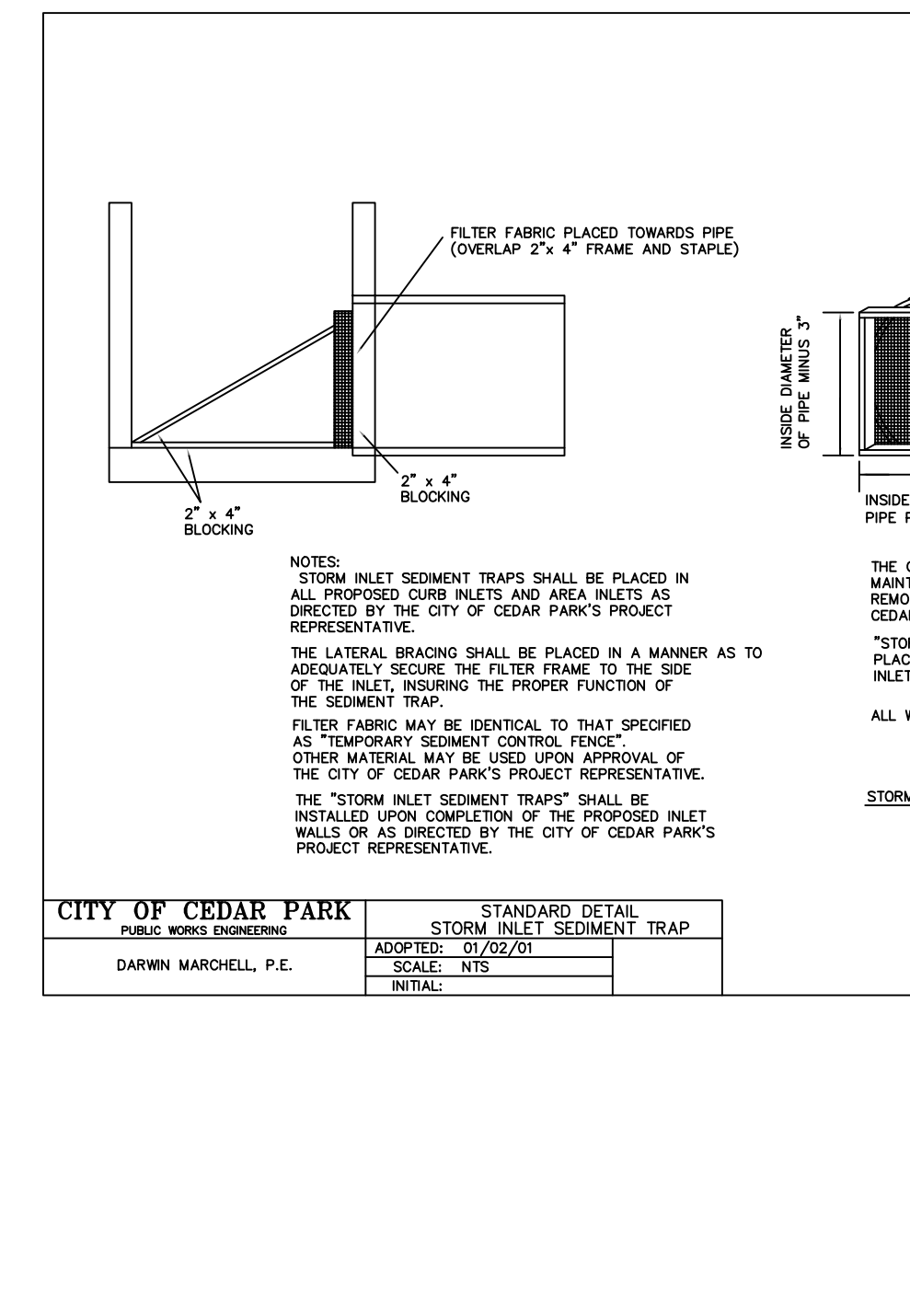
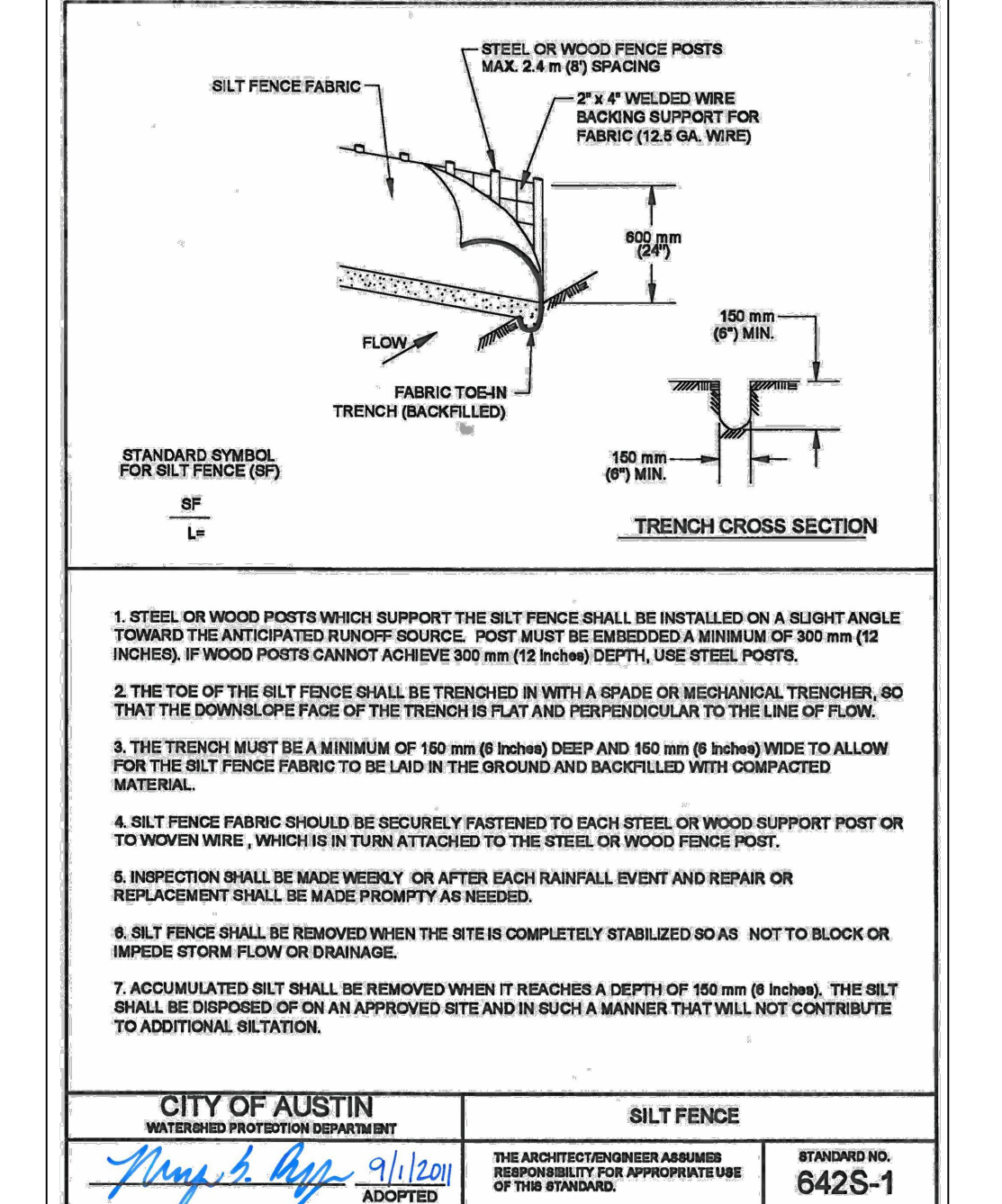
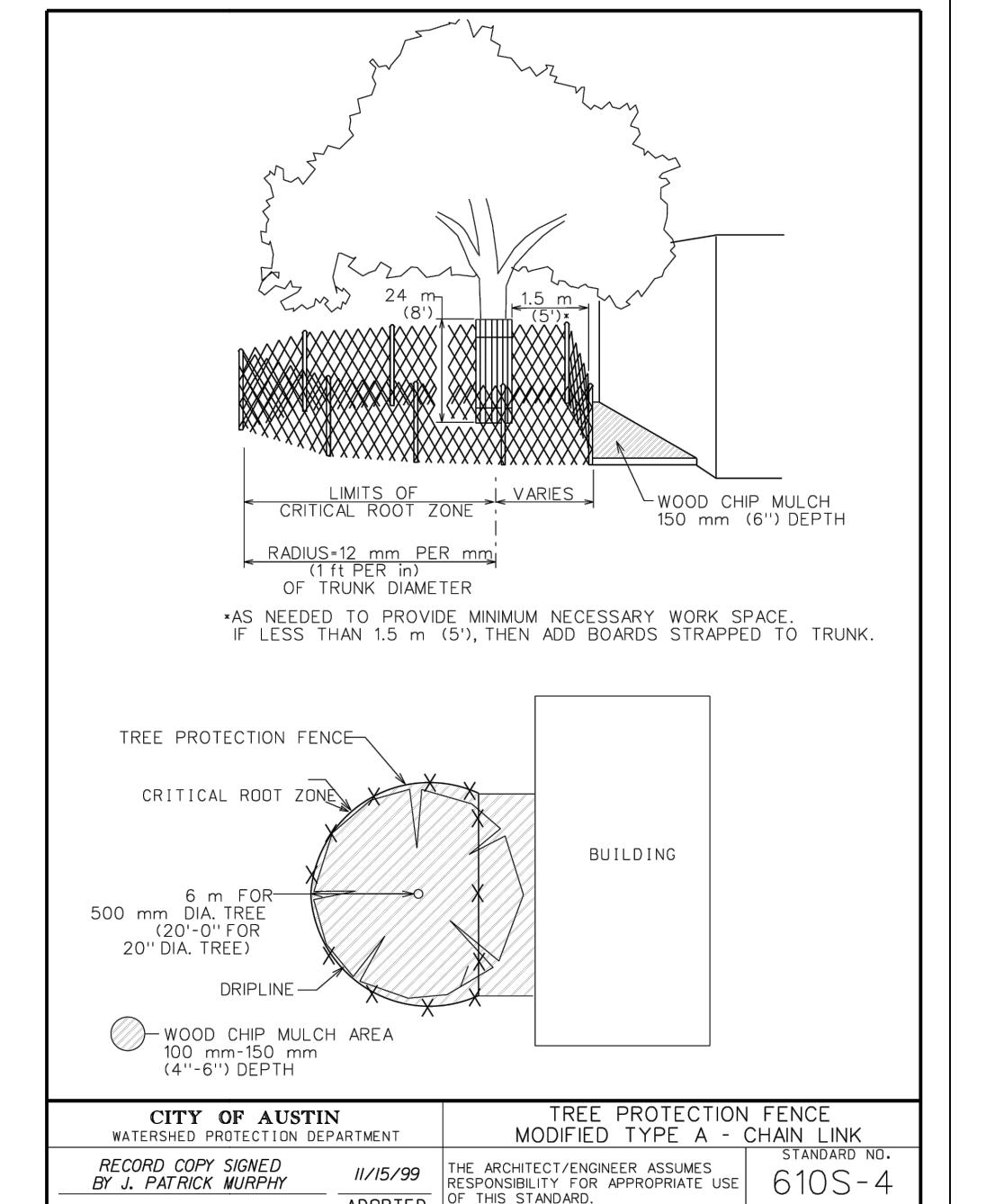
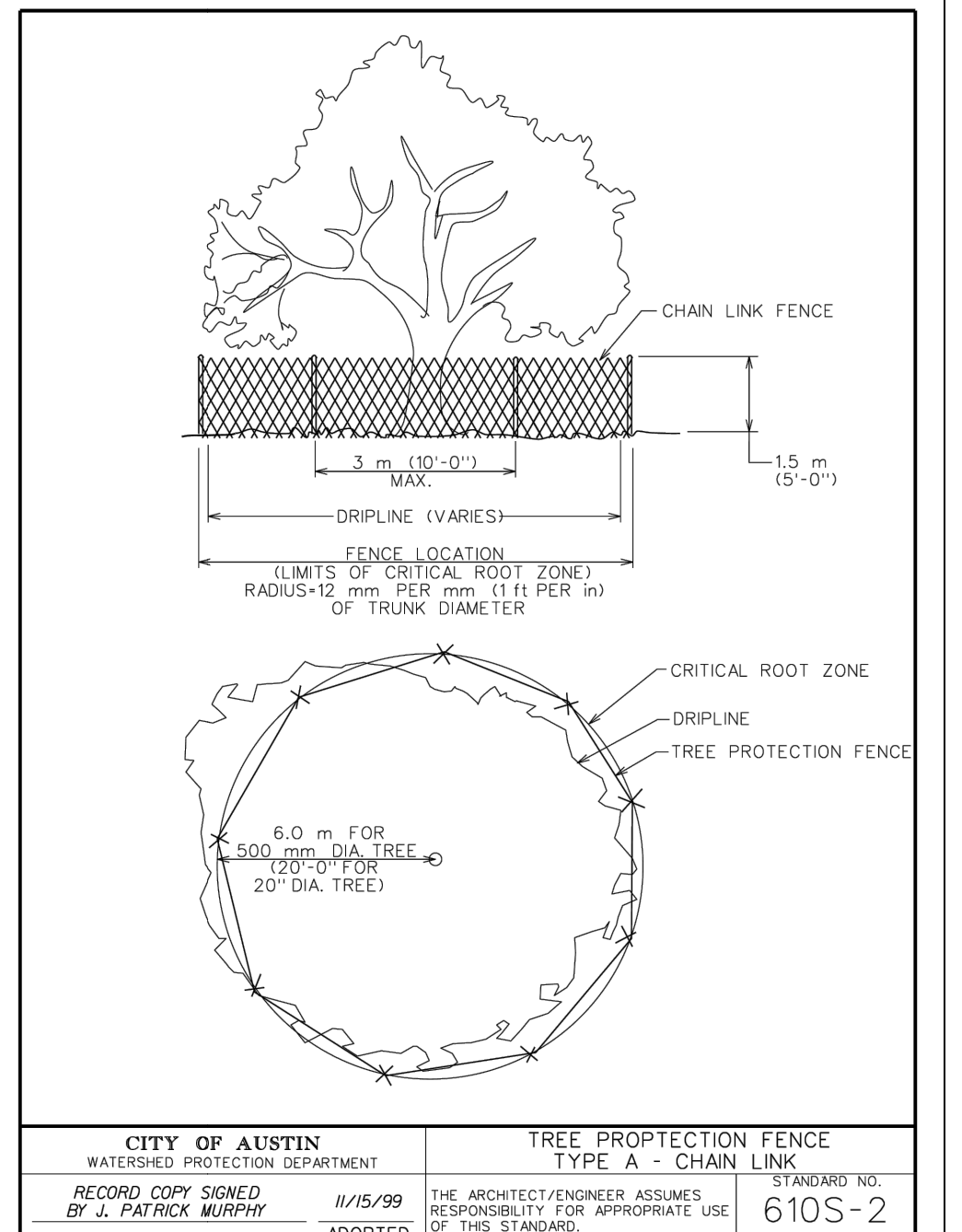
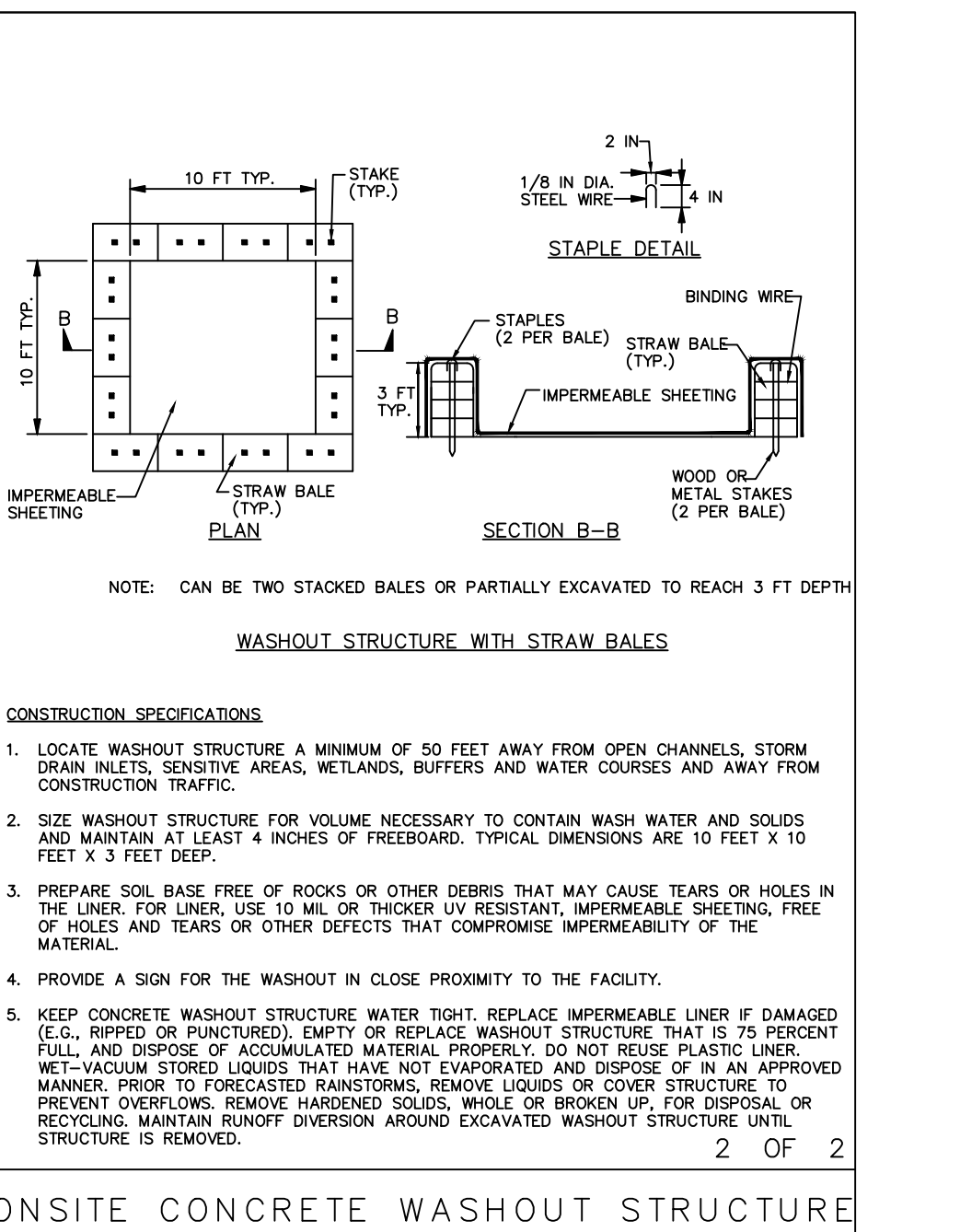
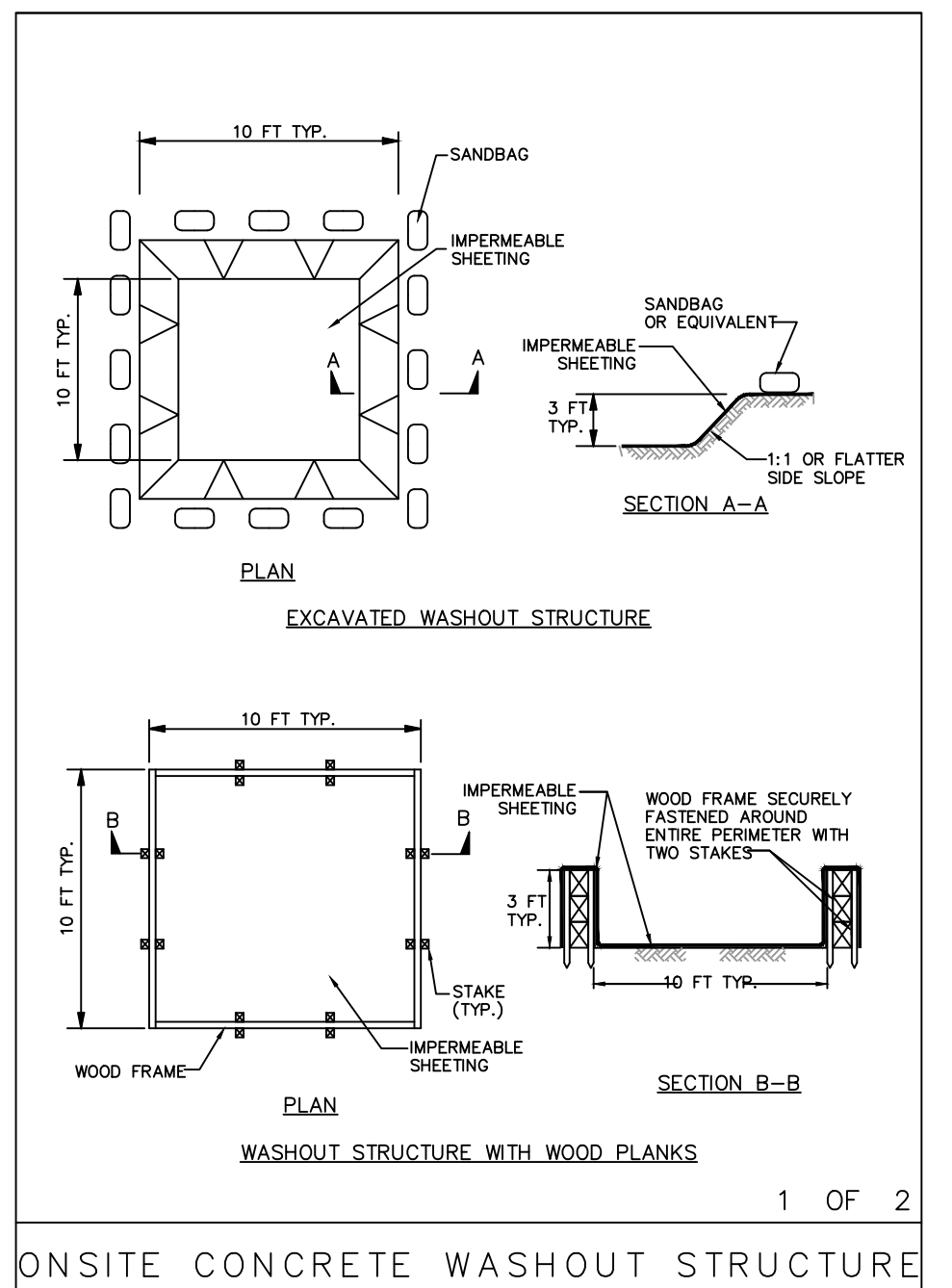
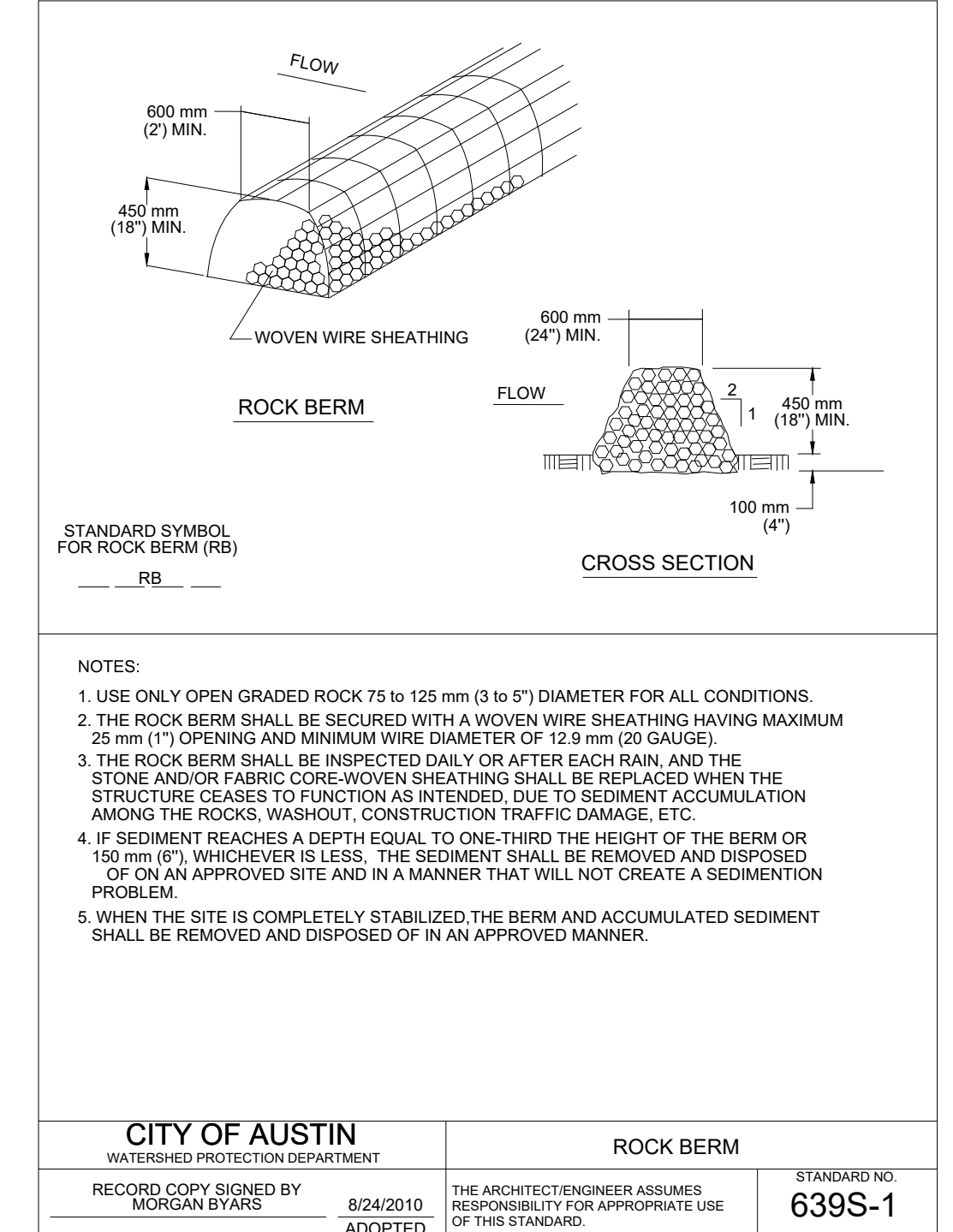
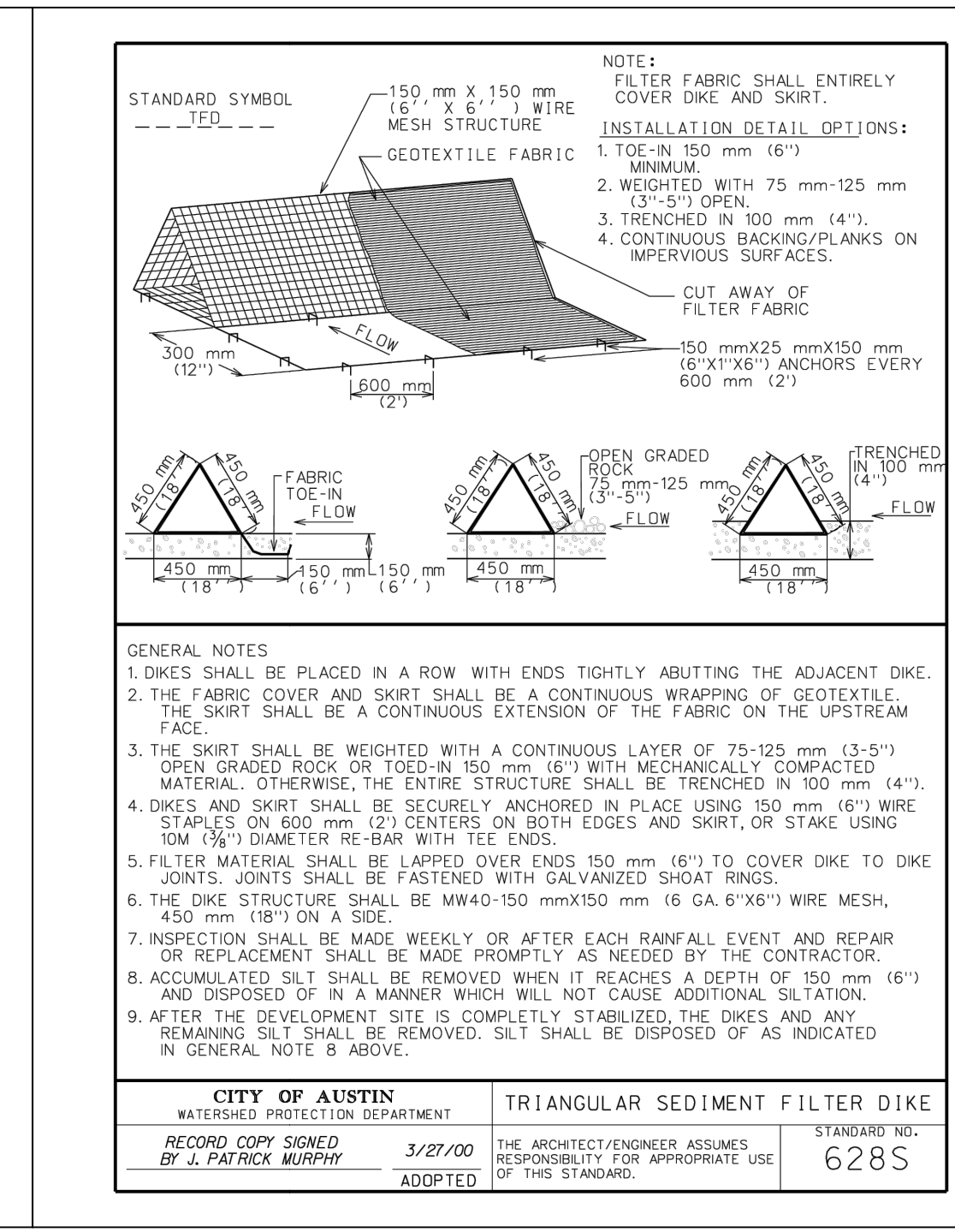
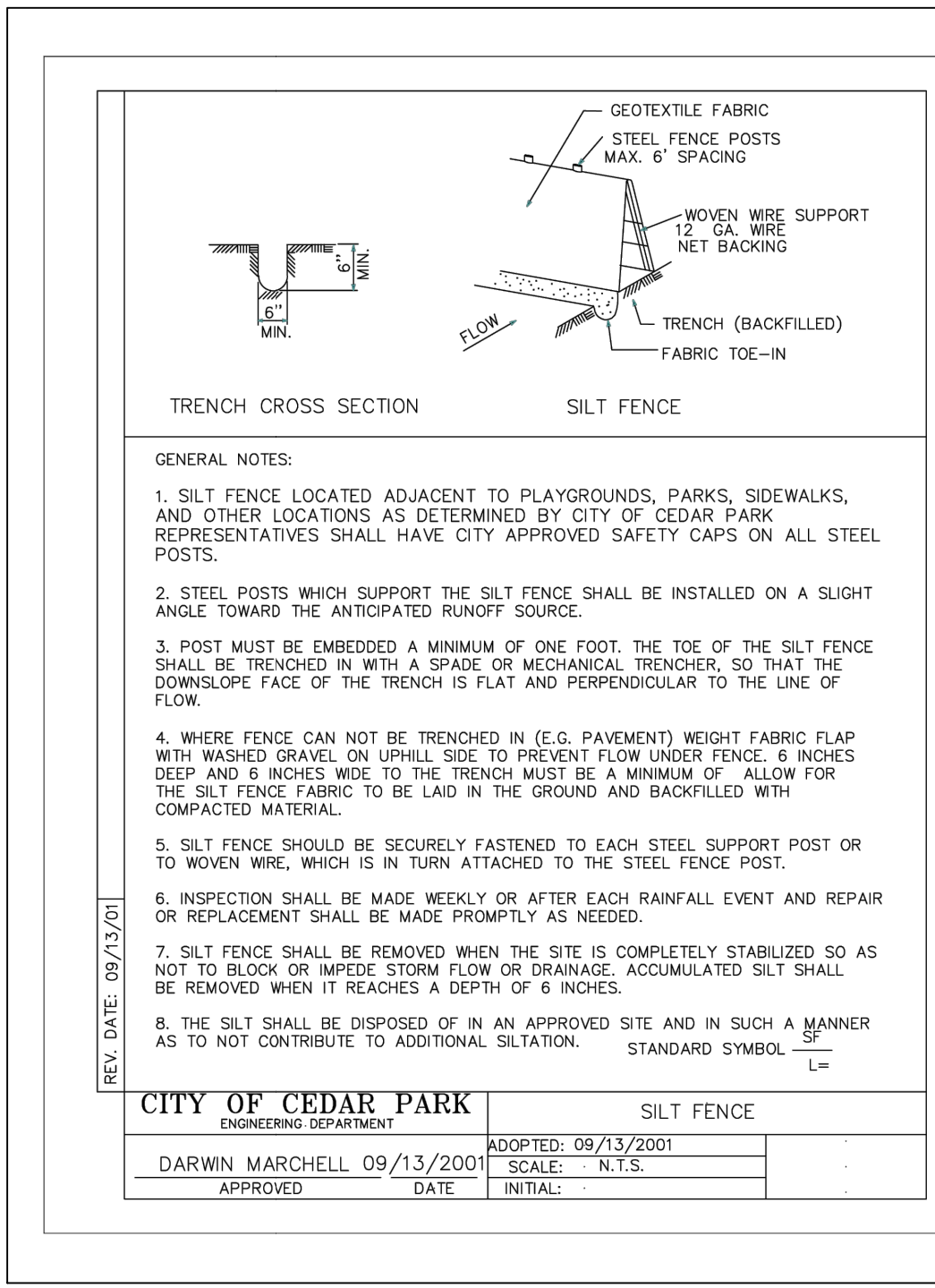
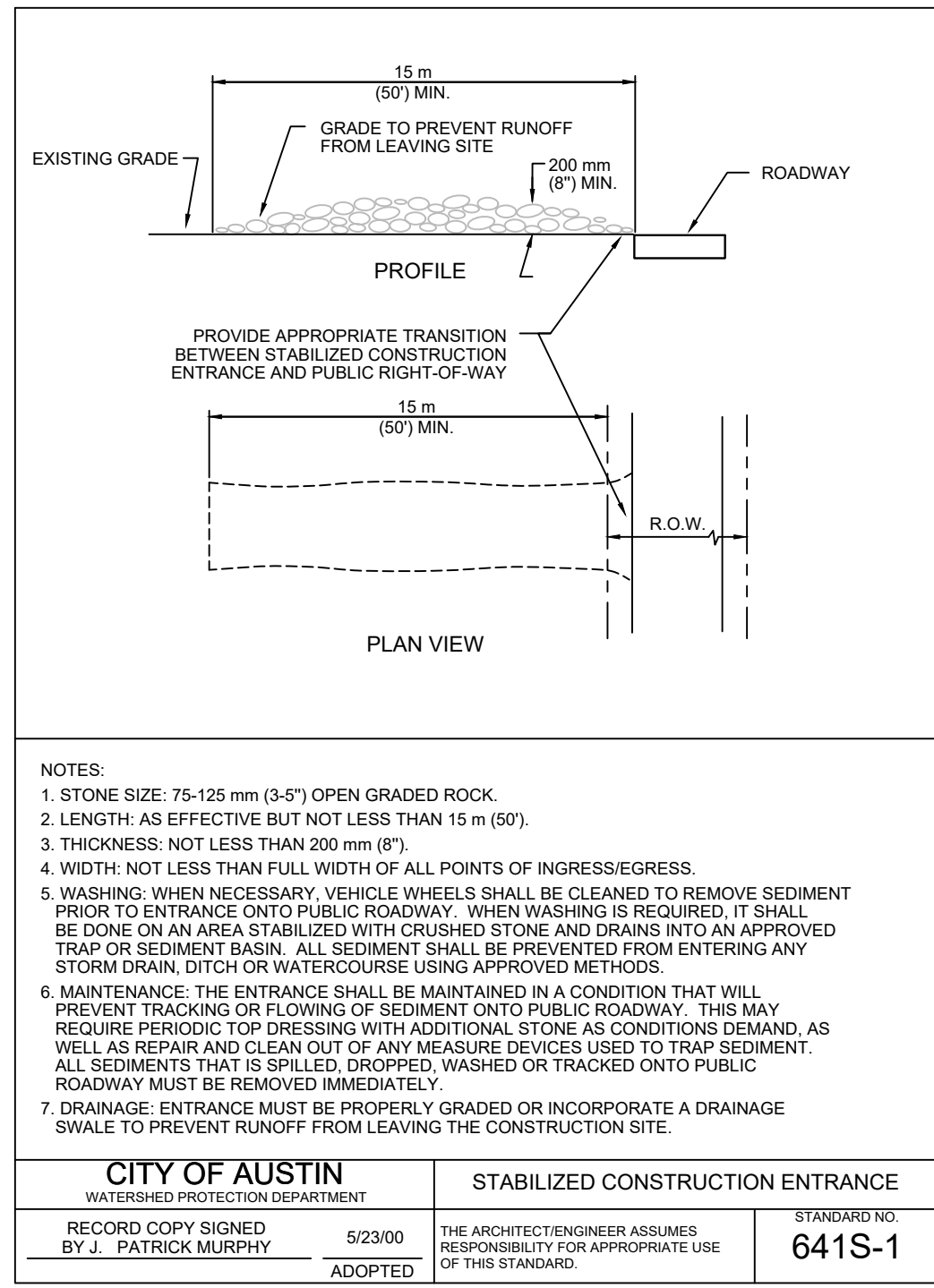
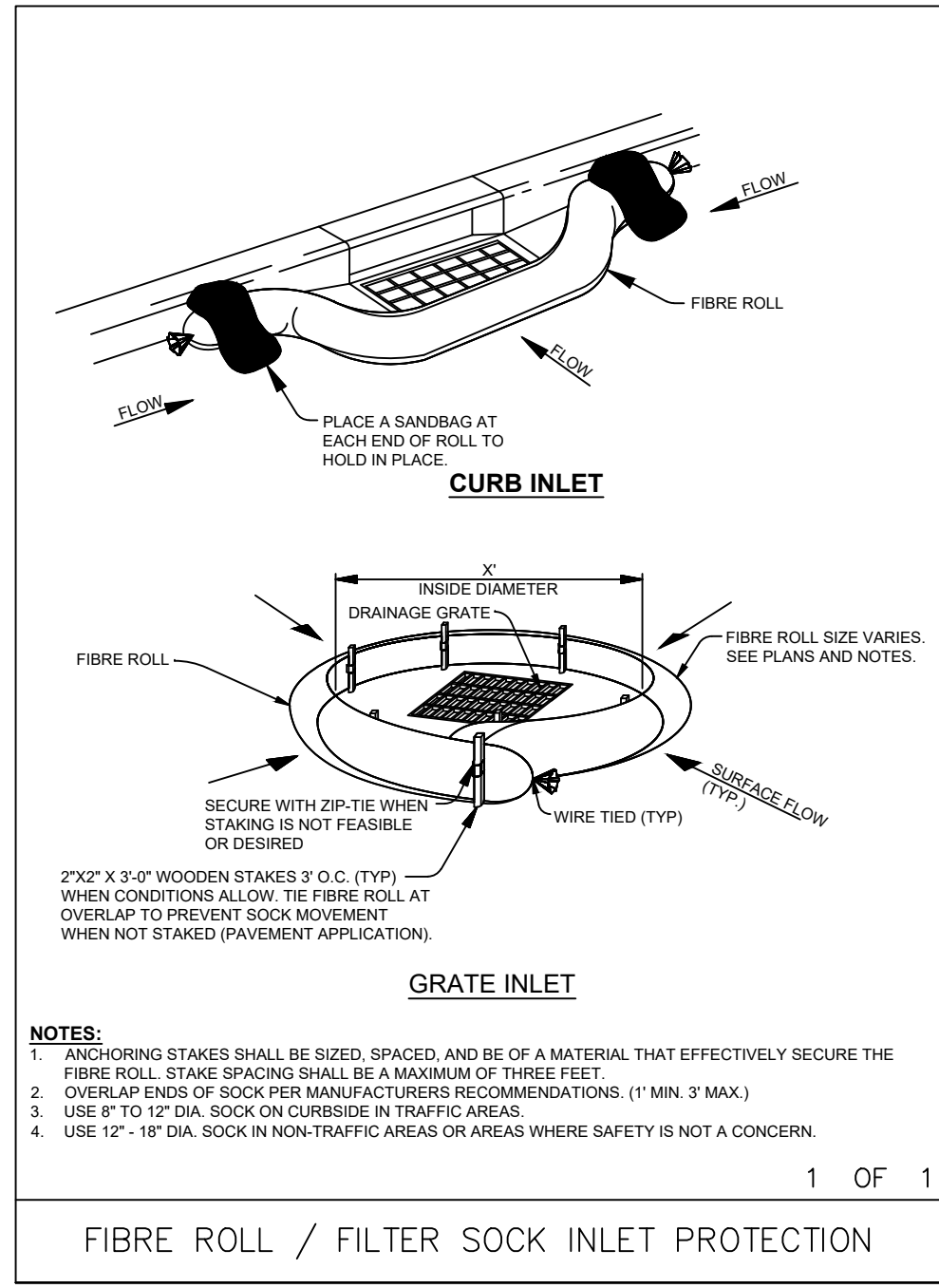
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 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

EROSION PLAN SHEET

DATE: 8/10/2022	DRAWN BY: CB
DWG SCALE: 1" = 100'	CHECKED BY: MT
PROJECT NO: 324-199	APPROVED BY:

DRAWING NO. **07**
 SHEET 07 OF 42



REVISION RECORD

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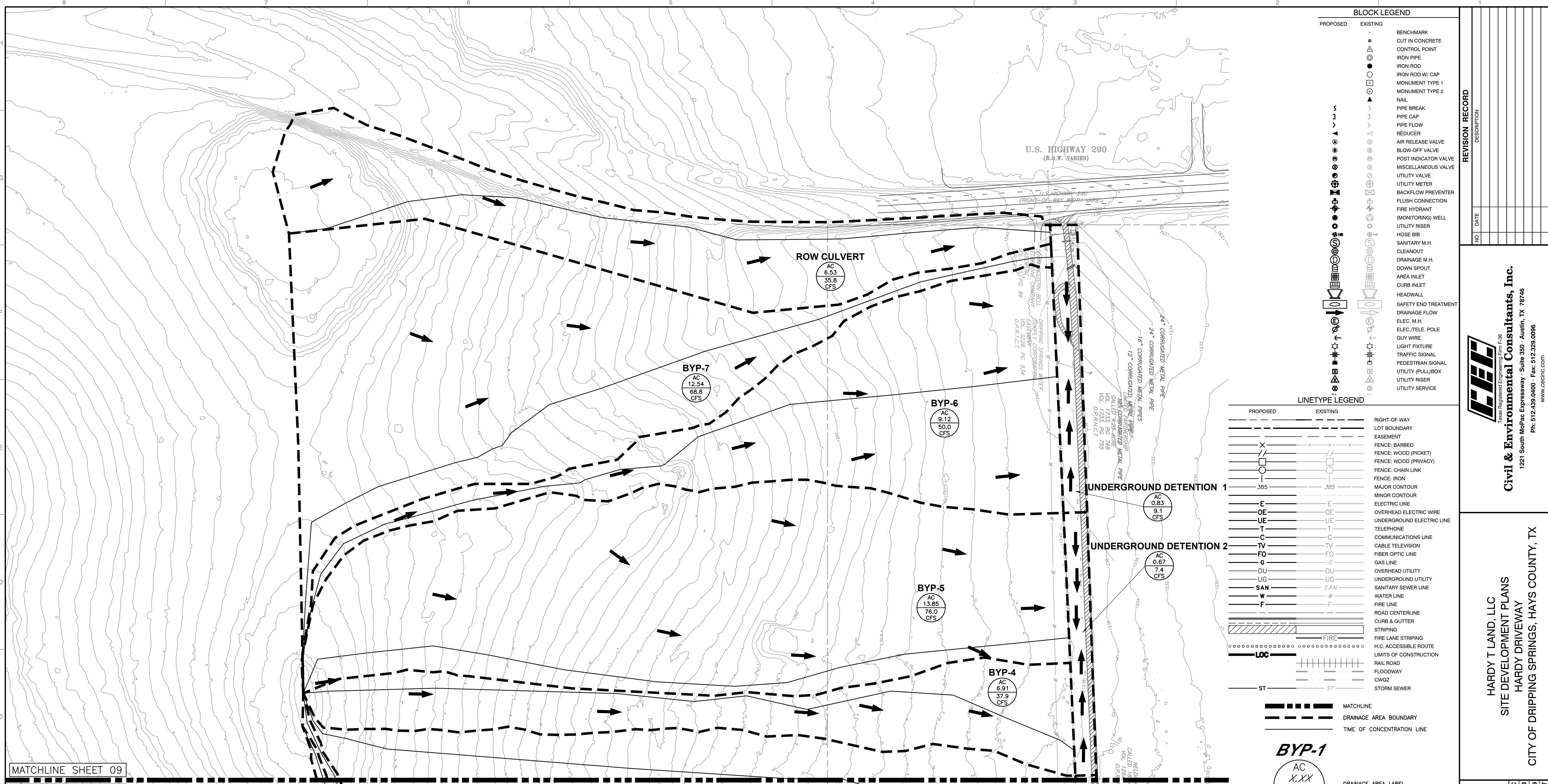
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SITE DEVELOPMENT PLANS
HARDY DRIVEWAY
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

EROSION DETAILS

DATE: 1/10/2024
DRAWN BY: CEK
DWG SCALE: NTS
PROJECT NO: 324-199
CHECKED BY: MT
APPROVED BY: MT

DRAWING NO. 08
SHEET 08 OF 42

SD-2022-0025



MATCHLINE SHEET 09

MATCHLINE SHEET 10

Subbasin	BY-1	EX-1	BY-2	EX-2	BY-3	EX-3	ROW CULVERT	BY-4	BY-5	BY-6	BY-7	UNDERGROUND DETENTION 1	UNDERGROUND DETENTION 2
Area	315.00	463.20	1441.93	641.10	284.40	309.63	6.53	13.85	9.12	12.54	6.83	0.83	0.67
Impervious	0.0077221	0.0107054	0.0003475	0.0517223	0.00232477	0.0102031	0.00107095	0.02164819	0.01424995	0.01999974	0.00129383	0.000104075	
Pervious	0.4	3.94	0.4	3.74	0.4	3.94	0.4	3.94	0.4	3.94	0.4	3.94	0.4
Composite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shear Flow	0.0464	0.0204	0.0306	0.0228	0.0446	0.0208	0.0228	0.0424	0.0204	0.0224	0.0224	0.0036	0.0036
Length	100	100	100	100	100	100	100	100	100	100	100	100	100
Roughness	0.24	0.011	0.24	0.011	0.24	0.011	0.24	0.24	0.24	0.24	0.24	0.011	0.011
Time	0.13	0.02	0.14	0.02	0.15	0.02	0.14	0.14	0.14	0.14	0.14	0.04	0.04
Shear Concentration	0.0434	0.0204	0.0434	0.0228	0.0434	0.0208	0.0434	0.0434	0.0434	0.0434	0.0434	0.0036	0.0036
Length	1783	475	1914	96	1783	475	1617	1637	1722	1906	2056	541	487
Paved?	p	p	p	p	p	p	p	p	p	p	p	p	p
Time	0.15	0.02	0.16	0.01	0.15	0.01	0.15	0.14	0.14	0.15	0.24	0.13	0.12
Summary													
Travel Time	0.30	0.04	0.34	0.03	0.30	0.06	0.30	0.29	0.30	0.38	0.44	0.17	0.16
Tc	17.92	3.82	20.25	1.55	17.92	3.82	17.81	17.52	17.95	22.72	26.41	10.38	9.58
Lag Time	10.75	3.03	12.15	2.08	10.75	2.08	10.68	10.51	10.73	13.04	15.83	6.23	5.75
Existing Run-off Values													
2 Year	15.00	1.50	13.00	0.70	41.00	4.50	8.50	9.00	18.00	11.80	16.30	2.60	2.10
10 Year	26.80	2.80	24.80	1.20	76.90	8.30	15.20	16.00	32.20	21.20	29.10	4.60	3.70
25 Year	38.30	3.70	35.30	1.70	109.90	11.80	21.70	22.50	46.00	30.30	41.60	6.90	5.60
100 Year	63.30	5.70	58.60	2.50	181.60	16.90	33.80	37.50	76.00	50.00	68.80	9.10	7.40

Storm Event	Existing	Proposed
02-YR	11	11
10-YR	20.1	20.1
25-YR	26.7	26.5
100-YR	40.7	39.9

NOTE: POINT OF ANALYSIS FLOW SUMMARY TABLE DESCRIBES ONLY THE ON-SITE FLOWS FOR EACH STORM EVENT. ALL BYPASS FLOWS REMAIN AS SHOWN WITHIN THE DRAINAGE AREA MAPS AND DO NOT CHANGE BETWEEN PROPOSED AND EXISTING CONDITIONS.

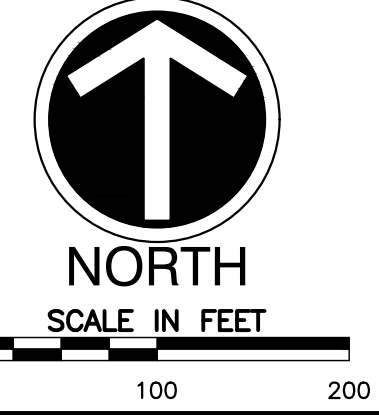
- PROPOSED
- EXISTING
- BENCHMARK
- CUT IN CONCRETE
- CONTROL POINT
- IRON PIPE
- IRON ROD
- IRON ROD W/ CAP
- MONUMENT TYPE 1
- MONUMENT TYPE 2
- NAIL
- PIPE BREAK
- PIPE CAP
- PIPE FLOW
- REDUCER
- AIR RELEASE VALVE
- BLOW-OFF VALVE
- POST INDICATOR VALVE
- MISCELLANEOUS VALVE
- UTILITY VALVE
- UTILITY METER
- BACKFLOW PREVENTER
- FLUSH CONNECTION
- FIRE HYDRANT
- (MONITORING) WELL
- UTILITY RISER
- HOSE BIB
- SANITARY M.H.
- CLEANOUT
- DRAINAGE M.H.
- DOWN SPOUT
- AREA INLET
- CURB INLET
- HEADWALL
- SAFETY END TREATMENT
- DRAINAGE FLOW
- ELEC. M.H.
- ELEC. TELE. POLE
- QUI/WIRE
- LIGHT FIXTURE
- TRAFFIC SIGNAL
- PEDESTRIAN SIGNAL
- UTILITY PULLBOX
- UTILITY RISER
- UTILITY SERVICE

- PROPOSED
- EXISTING
- RIGHT-OF-WAY
- LOT BOUNDARY
- EASEMENT
- FENCE: BARBED
- FENCE: WOOD (PICKET)
- FENCE: WOOD (PRIVACY)
- FENCE: CHAIN LINK
- FENCE: IRON
- MAJOR CONTOUR
- MINOR CONTOUR
- ELECTRIC LINE
- OVERHEAD ELECTRIC WIRE
- UNDERGROUND ELECTRIC LINE
- TELEPHONE
- COMMUNICATIONS LINE
- CABLE TELEVISION
- FIBER OPTIC LINE
- GAS LINE
- OVERHEAD UTILITY
- UNDERGROUND UTILITY
- SANITARY SEWER LINE
- WATER LINE
- FIRE LINE
- ROAD CENTERLINE
- CURB & GUTTER
- STRIPING
- FIRE LANE STRIPING
- H.C. ACCESSIBLE ROUTE
- LIMITS OF CONSTRUCTION
- RAIL ROAD
- FLOODWAY
- CWQZ
- STORM SEWER

BYP-1

AC
X.XX
X.X
CFS

DRAINAGE AREA LABEL



811

!!! CAUTION !!!

IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, and NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

REVISION RECORD

NO.	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
 1221 South MoPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.359.0096
 www.cecinc.com

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

EXISTING DMAP1 OF 2

DATE: 1/10/2024 | DRAWN BY: [Signature] | CHECKED BY: [Signature]
 DWS SCALE: 1"=100' | PROJECT NO: 324-199

DRAWING NO: **09** OF 42

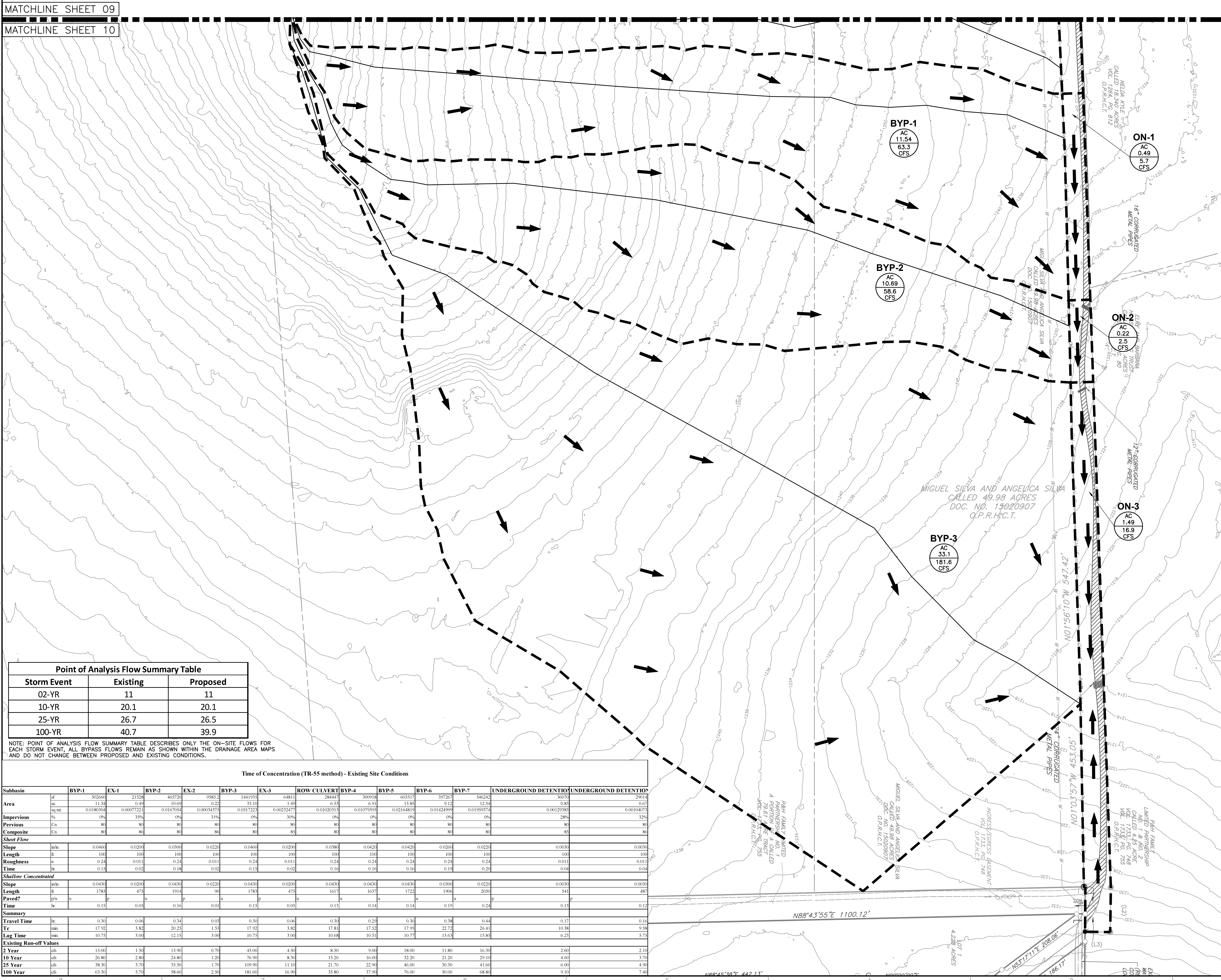
SHEET 09 OF 42

SD-2022-0025

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MATCHLINE SHEET 09

MATCHLINE SHEET 10



BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
•	•	BENCHMARK
○	○	CUT IN CONCRETE
⊙	⊙	CONTROL POINT
⊘	⊘	IRON PIPE
⊚	⊚	IRON ROD
⊙	⊙	IRON ROD W/ CAP
⊙	⊙	MONUMENT TYPE 1
⊙	⊙	MONUMENT TYPE 2
⊙	⊙	NAIL
⊙	⊙	PIPE BREAK
⊙	⊙	PIPE CAP
⊙	⊙	PIPE FLOW
⊙	⊙	REDUCER
⊙	⊙	AIR RELEASE VALVE
⊙	⊙	BLOW-OFF VALVE
⊙	⊙	POST INDICATOR VALVE
⊙	⊙	MISCELLANEOUS VALVE
⊙	⊙	UTILITY METER
⊙	⊙	BACKFLOW PREVENTER
⊙	⊙	FLUSH CONNECTION
⊙	⊙	FIRE HYDRANT
⊙	⊙	(MONITORING) WELL
⊙	⊙	UTILITY RISER
⊙	⊙	HOSE BIB
⊙	⊙	SANITARY M.H.
⊙	⊙	CLEANOUT
⊙	⊙	DRAINAGE M.H.
⊙	⊙	DOWN SPOUT
⊙	⊙	AREA INLET
⊙	⊙	CURB INLET
⊙	⊙	HEADWALL
⊙	⊙	SAFETY END TREATMENT
⊙	⊙	DRAINAGE FLOW
⊙	⊙	ELEC. M.H.
⊙	⊙	ELEC./TELE. POLE
⊙	⊙	QUI/WIRE
⊙	⊙	LIGHT FIXTURE
⊙	⊙	TRAFFIC SIGNAL
⊙	⊙	PEDESTRIAN SIGNAL
⊙	⊙	UTILITY PULLBOX
⊙	⊙	UTILITY RISER
⊙	⊙	UTILITY SERVICE

LINE TYPE LEGEND

PROPOSED	EXISTING	DESCRIPTION
---	---	RIGHT-OF-WAY
---	---	LOT BOUNDARY
---	---	EASEMENT
---	---	FENCE: BARBED
---	---	FENCE: WOOD (PICKET)
---	---	FENCE: WOOD (PRIVACY)
---	---	FENCE: CHAIN LINK
---	---	FENCE: IRON
---	---	MAJOR CONTOUR
---	---	MINOR CONTOUR
---	---	ELECTRIC LINE
---	---	OVERHEAD ELECTRIC WIRE
---	---	UNDERGROUND ELECTRIC LINE
---	---	TELEPHONE
---	---	COMMUNICATIONS LINE
---	---	CABLE TELEVISION
---	---	FIBER OPTIC LINE
---	---	GAS LINE
---	---	OVERHEAD UTILITY
---	---	UNDERGROUND UTILITY
---	---	SANITARY SEWER LINE
---	---	WATER LINE
---	---	FIRE LINE
---	---	ROAD CENTERLINE
---	---	CURB & GUTTER
---	---	STRIPING
---	---	FIRE LANE STRIPING
---	---	H.C. ACCESSIBLE ROUTE
---	---	LIMITS OF CONSTRUCTION
---	---	RAIL ROAD
---	---	FLOODWAY
---	---	CWQZ
---	---	STORM SEWER

Point of Analysis Flow Summary Table

Storm Event	Existing	Proposed
02-YR	11	11
10-YR	20.1	20.1
25-YR	26.7	26.5
100-YR	40.7	39.9

NOTE: POINT OF ANALYSIS FLOW SUMMARY TABLE DESCRIBES ONLY THE ON-SITE FLOWS FOR EACH STORM EVENT. ALL BYPASS FLOWS REMAIN AS SHOWN WITHIN THE DRAINAGE AREA MAPS AND DO NOT CHANGE BETWEEN PROPOSED AND EXISTING CONDITIONS.

Time of Concentration (TR-55 method) - Existing Site Conditions

Subbasin	Time of Concentration (min)										UNDERGROUND DETENTION (min)		
	BYP-1	EX-1	BYP-2	EX-2	BYP-3	EX-3	ROW CULVERT	BYP-4	BYP-5	BYP-6	BYP-7		
Area	11.54	0.49	10.69	0.22	33.10	1.49	6.53	6.91	13.88	9.12	12.54	0.83	0.67
Impervious	0%	35%	0%	31%	0%	30%	0%	0%	0%	0%	0%	28%	32%
Pervious	80	80	80	80	80	80	80	80	80	80	80	80	80
Composite	80	80	80	80	80	80	80	80	80	80	80	80	80
Slope	0.046	0.020	0.030	0.022	0.040	0.020	0.030	0.020	0.040	0.020	0.020	0.030	0.030
Length	100	100	100	100	100	100	100	100	100	100	100	100	100
Roughness	0.24	0.01	0.24	0.01	0.24	0.01	0.24	0.24	0.24	0.24	0.24	0.01	0.01
Time	0.15	0.02	0.18	0.02	0.15	0.02	0.16	0.16	0.19	0.19	0.24	0.15	0.12
Slope Concentrated													
Slope	0.0430	0.0200	0.0430	0.0220	0.0430	0.0200	0.0430	0.0430	0.0430	0.0300	0.0220	0.0300	0.0300
Length	1783	475	1914	90	1783	475	1617	1637	1723	1906	209	541	487
Paved?	u	u	u	u	u	u	u	u	u	u	u	u	u
Time	0.15	0.05	0.16	0.01	0.15	0.05	0.13	0.14	0.19	0.19	0.24	0.15	0.12
Summary													
Travel Time	0.30	0.06	0.34	0.03	0.30	0.06	0.30	0.29	0.30	0.38	0.44	0.16	0.16
Time	17.92	3.82	20.25	1.53	17.92	3.82	17.81	17.52	17.95	22.72	26.41	10.38	9.58
Lag Time	10.75	3.04	12.15	3.04	10.75	3.04	10.68	10.51	10.77	13.63	15.85	6.23	5.75
Existing Run-off Values													
2 Year	15.00	1.50	13.90	0.70	43.00	4.50	8.50	9.00	18.00	11.80	16.30	2.60	2.10
10 Year	26.80	2.80	24.80	1.20	76.90	8.30	15.30	16.00	32.30	21.20	29.10	4.60	3.70
25 Year	38.30	3.70	35.50	1.70	109.90	11.10	21.70	22.90	46.00	30.20	41.60	6.00	4.90
100 Year	63.30	5.70	58.60	2.50	181.60	16.90	35.80	37.90	76.00	50.00	68.80	9.10	7.40

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
 1221 South MoPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0096
 www.cectinc.com

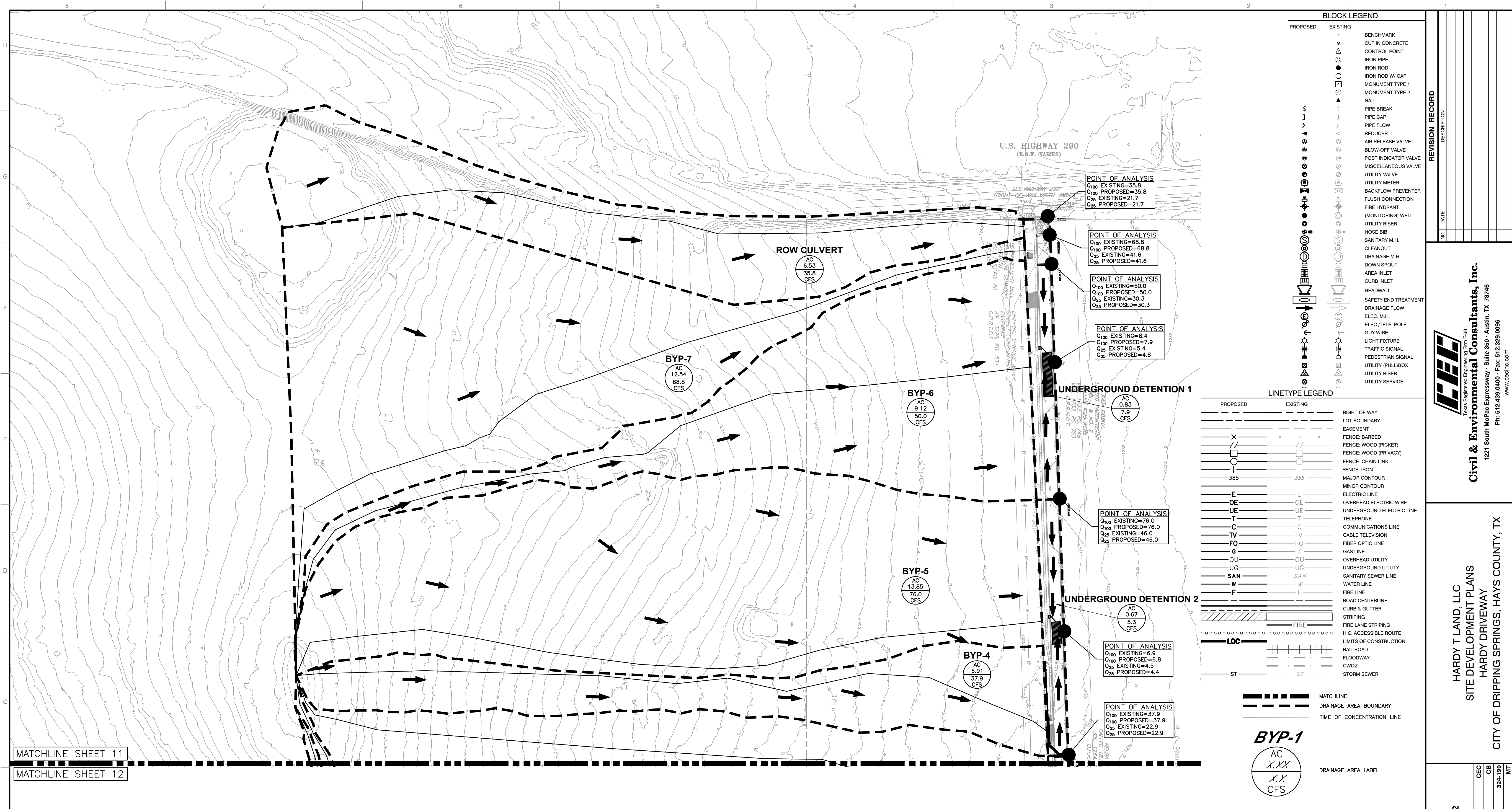
HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

EXISTING DIMAP 2 OF 2

DATE: 1/10/2024 DRAWN BY: CEC
 DWG SCALE: 1"=100' CHECKED BY: CB
 PROJECT NO: 324-199
 APPROVED BY: MT

811 !!! CAUTION !!!
 IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

DRAWING NO. **10** OF 42
 SHEET 10 OF 42
 SD-2022-0025



- BLOCK LEGEND**
- PROPOSED EXISTING
- BENCHMARK
 - ◊ CUT IN CONCRETE
 - ◊ CONTROL POINT
 - IRON PIPE
 - ◊ IRON ROD
 - ◊ IRON ROD W/ CAP
 - ◊ MONUMENT TYPE 1
 - ◊ MONUMENT TYPE 2
 - NAIL
 - ◊ PIPE BREAK
 - ◊ PIPE CAP
 - ◊ PIPE FLOW
 - ◊ REDUCER
 - ◊ AIR RELEASE VALVE
 - ◊ BLOW-OFF VALVE
 - ◊ POST INDICATOR VALVE
 - ◊ MISCELLANEOUS VALVE
 - ◊ UTILITY VALVE
 - ◊ UTILITY METER
 - ◊ BACKFLOW PREVENTER
 - ◊ FLUSH CONNECTION
 - ◊ FIRE HYDRANT
 - ◊ (MONITORING) WELL
 - ◊ UTILITY RISER
 - ◊ HOSE BIB
 - ◊ SANITARY M.H.
 - ◊ CLEANOUT
 - ◊ DRAINAGE M.H.
 - ◊ DOWN SPOUT
 - ◊ AREA INLET
 - ◊ CURB INLET
 - ◊ HEADWALL
 - ◊ SAFETY END TREATMENT
 - ◊ DRAINAGE FLOW
 - ◊ ELEC. M.H.
 - ◊ ELEC./TELE. POLE
 - ◊ Q/J WIRE
 - ◊ LIGHT FIXTURE
 - ◊ TRAFFIC SIGNAL
 - ◊ PEDESTRIAN SIGNAL
 - ◊ UTILITY PULLBOX
 - ◊ UTILITY RISER
 - ◊ UTILITY SERVICE

- LINETYPE LEGEND**
- PROPOSED EXISTING
- RIGHT-OF-WAY
 - LOT BOUNDARY
 - EASEMENT
 - X— FENCE: BARBED
 - X— FENCE: WOOD (PICKET)
 - X— FENCE: WOOD (PRIVACY)
 - FENCE: CHAIN LINK
 - FENCE: IRON
 - 385 MAJOR CONTOUR
 - 385 MINOR CONTOUR
 - E— ELECTRIC LINE
 - OE— OVERHEAD ELECTRIC WIRE
 - UE— UNDERGROUND ELECTRIC LINE
 - T— TELEPHONE
 - C— COMMUNICATIONS LINE
 - TV— CABLE TELEVISION
 - FO— FIBER OPTIC LINE
 - G— GAS LINE
 - OU— OVERHEAD UTILITY
 - UG— UNDERGROUND UTILITY
 - SAN— SANITARY SEWER LINE
 - W— WATER LINE
 - F— FIRE LINE
 - ROAD CENTERLINE
 - CURB & GUTTER
 - STRIPING
 - FIRE LANE STRIPING
 - H.C. ACCESSIBLE ROUTE
 - LIMITS OF CONSTRUCTION
 - RAIL ROAD
 - FLOODWAY
 - CWOZ
 - STORM SEWER

REVISION RECORD

NO.	DATE	DESCRIPTION

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 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0096
 www.celcinc.com

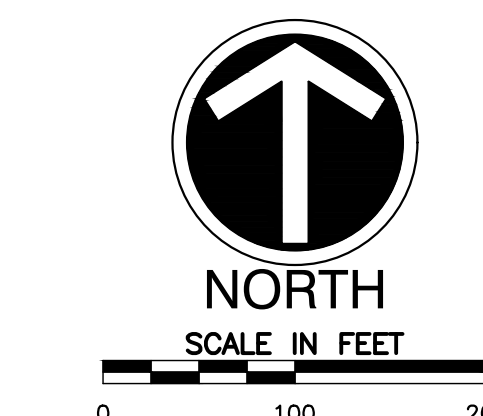
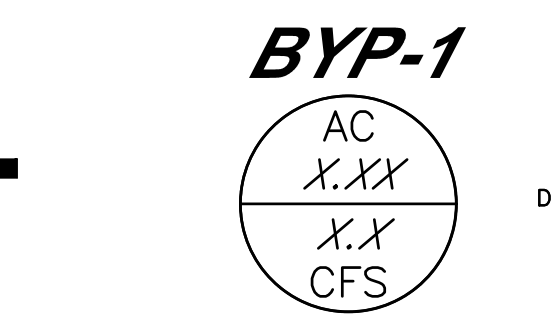
HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

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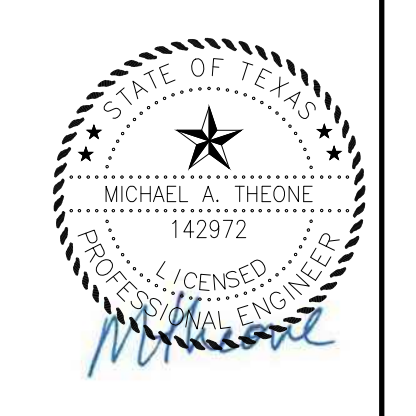
MATCHLINE SHEET 11
 MATCHLINE SHEET 12

Time of Concentration (TR-55 method) - Proposed Site Conditions

Subbasin	BYP-1	PR-1	BYP-2	PR-2	BYP-3	PR-3	ROW CULVERT	BYP-4	BYP-5	BYP-6	BYP-7	UNDERGROUND DETENTION	UNDERGROUND DETENTION
Area	11.54	213.28	465.72	958.2	1441.95	6481.1	2844.7	3699.8	6151.7	3972.7	5462.2	3670	2014
Impervious	0.0180304	0.0007221	0.0167041	0.0001475	0.0112221	0.00212477	0.01079399	0.0142899	0.01959374	0.0142899	0.01959374	0.0012083	0.00104073
Perchance	38	38	38	38	38	38	38	38	38	38	38	38	38
Composite	38	38	38	38	38	38	38	38	38	38	38	38	38
Sheet Flow	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206
Slope	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430
Length	1783	475	1916	96	1783	475	1617	1722	1906	2055	541	487	487
Roughness	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Time	10.75	3.06	12.15	3.06	10.75	3.06	10.75	10.75	13.63	15.85	4.88	4.51	4.51
Slope	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430
Length	1783	475	1916	96	1783	475	1617	1722	1906	2055	541	487	487
Roughness	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Time	10.75	3.06	12.15	3.06	10.75	3.06	10.75	10.75	13.63	15.85	4.88	4.51	4.51
Slope	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430
Length	1783	475	1916	96	1783	475	1617	1722	1906	2055	541	487	487
Roughness	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Time	10.75	3.06	12.15	3.06	10.75	3.06	10.75	10.75	13.63	15.85	4.88	4.51	4.51
Summaries													
Travel Time	10.75	3.06	12.15	3.06	10.75	3.06	10.75	10.75	13.63	15.85	4.88	4.51	4.51
Lag Time	10.75	3.06	12.15	3.06	10.75	3.06	10.75	10.75	13.63	15.85	4.88	4.51	4.51
Proposed Run-off Values													
1 Year	13.00	1.68	13.00	1.68	13.00	1.68	8.50	9.00	18.00	11.80	16.30	1.05	1.1
10 Year	26.80	3.80	24.80	1.20	17.90	8.40	15.20	16.00	32.20	21.20	29.10	3.40	2.6
25 Year	38.30	5.80	35.50	1.60	25.90	11.20	21.70	22.90	46.00	30.30	41.60	4.80	3.4
100 Year	63.80	9.70	58.60	2.40	44.00	17.10	35.80	37.90	76.00	50.00	68.80	7.60	5.3



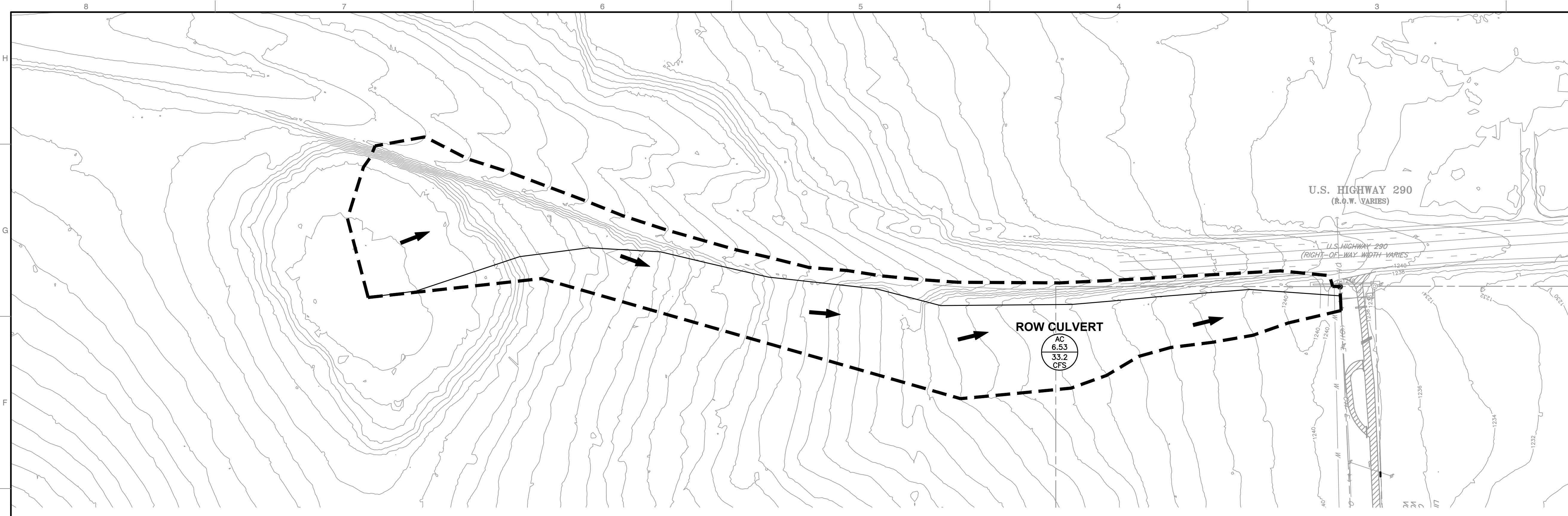
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PROPOSED DMAP 1 OF 2

DATE: 1/10/2024 DRAWN BY: CEC
 DWS SCALE: 1"=100' CHECKED BY: CB
 PROJECT NO: 324-199
 APPROVED BY: MT

DRAWING NO. **11**
 SHEET 11 OF 42



- BLOCK LEGEND**
- | PROPOSED | EXISTING | |
|----------|----------|----------------------|
| ● | ● | BENCHMARK |
| ○ | ○ | CUT IN CONCRETE |
| ○ | ○ | CONTROL POINT |
| ○ | ○ | IRON PIPE |
| ○ | ○ | IRON ROD |
| ○ | ○ | IRON ROD W/ CAP |
| ○ | ○ | MONUMENT TYPE 1 |
| ○ | ○ | MONUMENT TYPE 2 |
| ○ | ○ | NAIL |
| ○ | ○ | PIPE BREAK |
| ○ | ○ | PIPE CAP |
| ○ | ○ | PIPE FLOW |
| ○ | ○ | REDUCER |
| ○ | ○ | AIR RELEASE VALVE |
| ○ | ○ | BLOW-OFF VALVE |
| ○ | ○ | POST INDICATOR VALVE |
| ○ | ○ | MISCELLANEOUS VALVE |
| ○ | ○ | UTILITY VALVE |
| ○ | ○ | UTILITY METER |
| ○ | ○ | BACKFLOW PREVENTER |
| ○ | ○ | FLUSH CONNECTION |
| ○ | ○ | FIRE HYDRANT |
| ○ | ○ | (MONITORING) WELL |
| ○ | ○ | UTILITY RISER |
| ○ | ○ | HOSE BIB |
| ○ | ○ | SANITARY M.H. |
| ○ | ○ | CLEANOUT |
| ○ | ○ | DRAINAGE M.H. |
| ○ | ○ | DOWN SPOUT |
| ○ | ○ | AREA INLET |
| ○ | ○ | CURB INLET |
| ○ | ○ | HEADWALL |
| ○ | ○ | SAFETY END TREATMENT |
| ○ | ○ | DRAINAGE FLOW |
| ○ | ○ | ELEC. M.H. |
| ○ | ○ | ELEC./TELE. POLE |
| ○ | ○ | QUY WIRE |
| ○ | ○ | LIGHT FIXTURE |
| ○ | ○ | TRAFFIC SIGNAL |
| ○ | ○ | PEDESTRIAN SIGNAL |
| ○ | ○ | UTILITY (PULL) BOX |
| ○ | ○ | UTILITY RISER |
| ○ | ○ | UTILITY SERVICE |

REVISION RECORD

NO.	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0096
 www.celcinc.com

ROW CULVERT

Runoff Calculations (Eq 2-1)

Event	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A (ac)	6.53	6.53	6.53	6.53	6.53	6.53
C	0.21	0.23	0.25	0.29	0.32	0.36
Tc (min)	5.0	5.0	5.0	5.0	5.0	5.0
i (in/hr)	6.14	7.80	9.18	11.11	12.61	14.12
Q (cfs)	8.4	11.7	15.0	21.0	26.3	33.2

"C" Value Calculations (Table 2-1)

Area (ac)	% of Area		2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
0.00	0%	Pasture	0.33	0.36	0.38	0.42	0.45	0.49
6.53	100%	Grass	0.21	0.23	0.25	0.29	0.32	0.36
0.00	0%	Forest/Wood	0.31	0.34	0.36	0.40	0.43	0.47
0.00	0%	Concrete	0.75	0.80	0.83	0.88	0.92	0.97
6.53	100%							

- NOTES:**
- ALL DRAINAGE CALCULATIONS HAVE BEEN DETERMINED VIA THE RATIONAL METHOD
 - DRAINAGE FOR THIS DEVELOPMENT HAS BEEN DESIGNED SUCH THAT THERE WILL BE NO ADVERSE IMPACTS ON THE CAPACITY, FUNCTION OR INTEGRITY OF TEXAS DEPARTMENT OF TRANSPORTATION RIGHT OF WAY DRAINAGE FACILITIES.
 - TxDOT ATLAS 14 RAINFALL DATA FOR ZONE-1 OF HAYS COUNTY HAS BEEN UTILIZED FOR ANALYSIS.

Rational Method Runoff Equation (Eq. 2-1)

$$Q_p = CiA$$

Q_p peak runoff (cfs)
 C runoff coefficient
 i intensity of rainfall (in/hr) - Eq 2-8
 A area (acres)

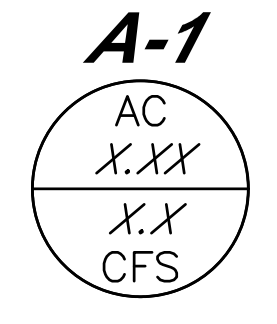
Rainfall Intensity Equation (Eq. 2-8)

$$i = a / (t + b)^c$$

i intensity of rainfall (in/hr)
 t storm duration (min)
 a, b, c storm frequency coefficients

Freq.	a	b	c
2	64.5986	12.9935	0.8144
5	78.5582	12.7853	0.8024
10	92.0534	13.166	0.7949
25	112.6923	13.9657	0.7872
50	130.8565	14.8519	0.7829
100	152.128	16.1074	0.7795

- LINETYPE LEGEND**
- | PROPOSED | EXISTING | |
|----------|----------|----------------------------|
| --- | --- | RIGHT-OF-WAY |
| --- | --- | LOT BOUNDARY |
| --- | --- | EASEMENT |
| X-X-X-X | X-X-X-X | FENCE: BARBED |
| □ | □ | FENCE: WOOD (PICKET) |
| □ | □ | FENCE: WOOD (PRIVACY) |
| ○ | ○ | FENCE: CHAIN LINK |
| --- | --- | FENCE: IRON |
| --- | --- | MAJOR CONTOUR |
| --- | --- | MINOR CONTOUR |
| E | E | ELECTRIC LINE |
| OE | OE | OVERHEAD ELECTRIC WIRE |
| UE | UE | UNDERGROUND ELECTRIC LINE |
| T | T | TELEPHONE |
| C | C | COMMUNICATIONS LINE |
| TV | TV | CABLE TELEVISION |
| FO | FO | FIBER OPTIC LINE |
| G | G | GAS LINE |
| OU | OU | OVERHEAD UTILITY |
| UG | UG | UNDERGROUND UTILITY |
| SAN | SAN | SANITARY SEWER LINE |
| W | W | WATER LINE |
| F | F | FIRE LINE |
| --- | --- | ROAD CENTERLINE |
| --- | --- | CURB & GUTTER |
| --- | --- | STRIPING |
| --- | --- | FIRE LANE STRIPING |
| --- | --- | H.C. ACCESSIBLE ROUTE |
| --- | --- | LIMITS OF CONSTRUCTION |
| --- | --- | RAIL ROAD |
| --- | --- | FLOODWAY |
| --- | --- | CWQZ |
| --- | --- | STORM SEWER |
| --- | --- | DRAINAGE AREA BOUNDARY |
| --- | --- | TIME OF CONCENTRATION LINE |

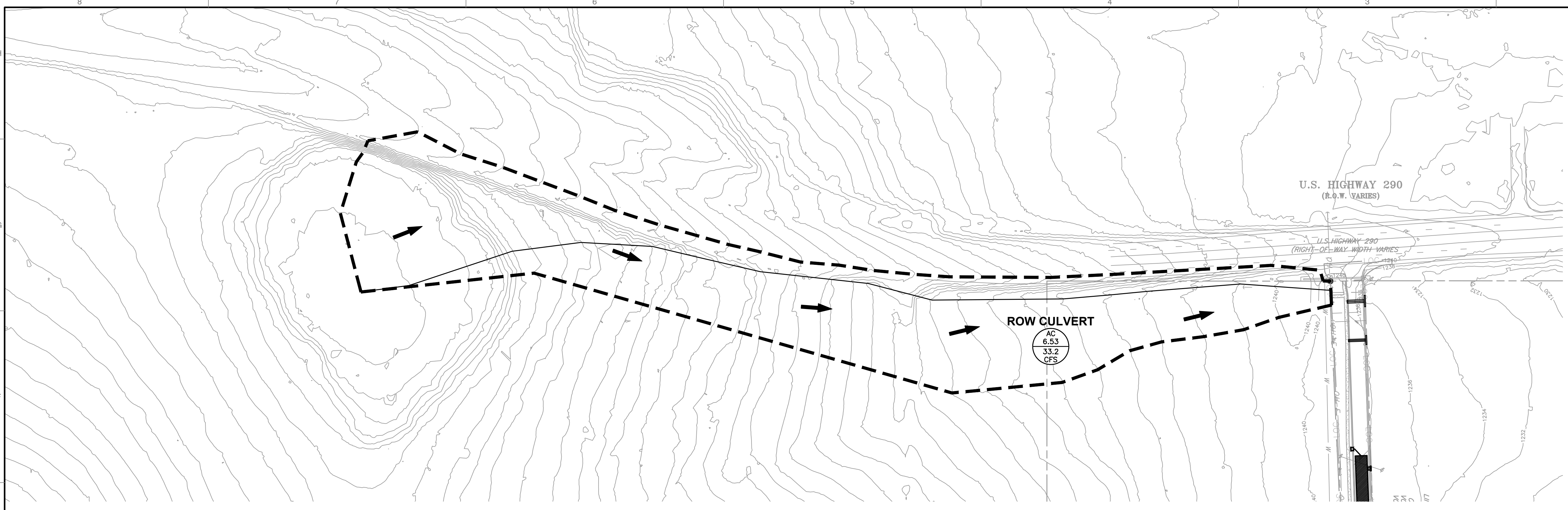


811 !!! CAUTION !!!
 IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, and NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

TxDOT CULVERT - EXISTING DMAP

DATE:	1/10/2024	DRAWN BY:	CEC
DWG SCALE:	1"=20'	CHECKED BY:	CB
PROJECT NO.:	324-199	APPROVED BY:	MT



- BLOCK LEGEND**
- PROPOSED EXISTING
- BENCHMARK
 - CUT IN CONCRETE
 - CONTROL POINT
 - IRON PIPE
 - IRON ROD
 - IRON ROD W/ CAP
 - MONUMENT TYPE 1
 - MONUMENT TYPE 2
 - NAIL
 - PIPE BREAK
 - PIPE CAP
 - PIPE FLOW
 - REDUCER
 - AIR RELEASE VALVE
 - BLOW-OFF VALVE
 - POST INDICATOR VALVE
 - MISCELLANEOUS VALVE
 - UTILITY VALVE
 - UTILITY METER
 - BACKFLOW PREVENTER
 - FLUSH CONNECTION
 - FIRE HYDRANT
 - (MONITORING) WELL
 - UTILITY RISER
 - HOSE BIB
 - SANITARY M.H.
 - CLEANOUT
 - DRAINAGE M.H.
 - DOWN SPOUT
 - AREA INLET
 - CURB INLET
 - HEADWALL
 - SAFETY END TREATMENT
 - DRAINAGE FLOW
 - ELEC. M.H.
 - ELEC./TELE. POLE
 - Q/J/WIRE
 - LIGHT FIXTURE
 - TRAFFIC SIGNAL
 - PEDESTRIAN SIGNAL
 - UTILITY (PULL)BOX
 - UTILITY RISER
 - UTILITY SERVICE

- LINETYPE LEGEND**
- PROPOSED EXISTING
- RIGHT-OF-WAY
 - LOT BOUNDARY
 - EASEMENT
 - FENCE: BARBED
 - FENCE: WOOD (PICKET)
 - FENCE: WOOD (PRIVACY)
 - FENCE: CHAIN LINK
 - FENCE: IRON
 - MAJOR CONTOUR
 - MINOR CONTOUR
 - ELECTRIC LINE
 - OVERHEAD ELECTRIC WIRE
 - UNDERGROUND ELECTRIC LINE
 - TELEPHONE
 - COMMUNICATIONS LINE
 - CABLE TELEVISION
 - FIBER OPTIC LINE
 - GAS LINE
 - OVERHEAD UTILITY
 - UNDERGROUND UTILITY
 - SANITARY SEWER LINE
 - WATER LINE
 - FIRE LINE
 - ROAD CENTERLINE
 - CURB & GUTTER
 - STRIPING
 - FIRE LANE STRIPING
 - H.C. ACCESSIBLE ROUTE
 - LIMITS OF CONSTRUCTION
 - RAIL ROAD
 - FLOODWAY
 - CWQZ
 - STORM SEWER
 - DRAINAGE AREA BOUNDARY
 - TIME OF CONCENTRATION LINE

REVISION RECORD

NO.	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0096
 www.cedcinc.com

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

TXDOT CULVERT - PROPOSED DMAP

DATE: 1/10/2024 DRAWN BY: CEC
 DWG SCALE: 1"=20' PROJECT NO: 324-199
 PROJECT NO: 324-199
 APPROVED BY: MT

DRAWING NO: **14**
 SHEET 14 OF 42

ROW CULVERT

Runoff Calculations (Eq 2-1)

Event	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A (ac)	6.53	6.53	6.53	6.53	6.53	6.53
C	0.21	0.23	0.25	0.29	0.32	0.36
Tc (min)	5.0	5.0	5.0	5.0	5.0	5.0
i (in/hr)	6.14	7.80	9.18	11.11	12.61	14.12
Q (cfs)	8.4	11.7	15.0	21.0	26.3	33.2

"C" Value Calculations (Table 2-1)

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6.53	100%	Grass	0.21	0.23	0.25	0.29	0.32	0.36
0.00	0%	Forest/Wood	0.31	0.34	0.36	0.40	0.43	0.47
0.00	0%	Concrete	0.75	0.80	0.83	0.88	0.92	0.97
6.53	100%							

- NOTES:**
- ALL DRAINAGE CALCULATIONS HAVE BEEN DETERMINED VIA THE RATIONAL METHOD.
 - DRAINAGE FOR THIS DEVELOPMENT HAS BEEN DESIGNED SUCH THAT THERE WILL BE NO ADVERSE IMPACTS ON THE CAPACITY, FUNCTION OR INTEGRITY OF TEXAS DEPARTMENT OF TRANSPORTATION RIGHT OF WAY DRAINAGE FACILITIES.
 - TXDOT ATLAS 14 RAINFALL DATA FOR ZONE-1 OF HAYS COUNTY HAS BEEN UTILIZED FOR ANALYSIS.

Rational Method Runoff Equation (Eq. 2-1)

$Q_p = C_i A$

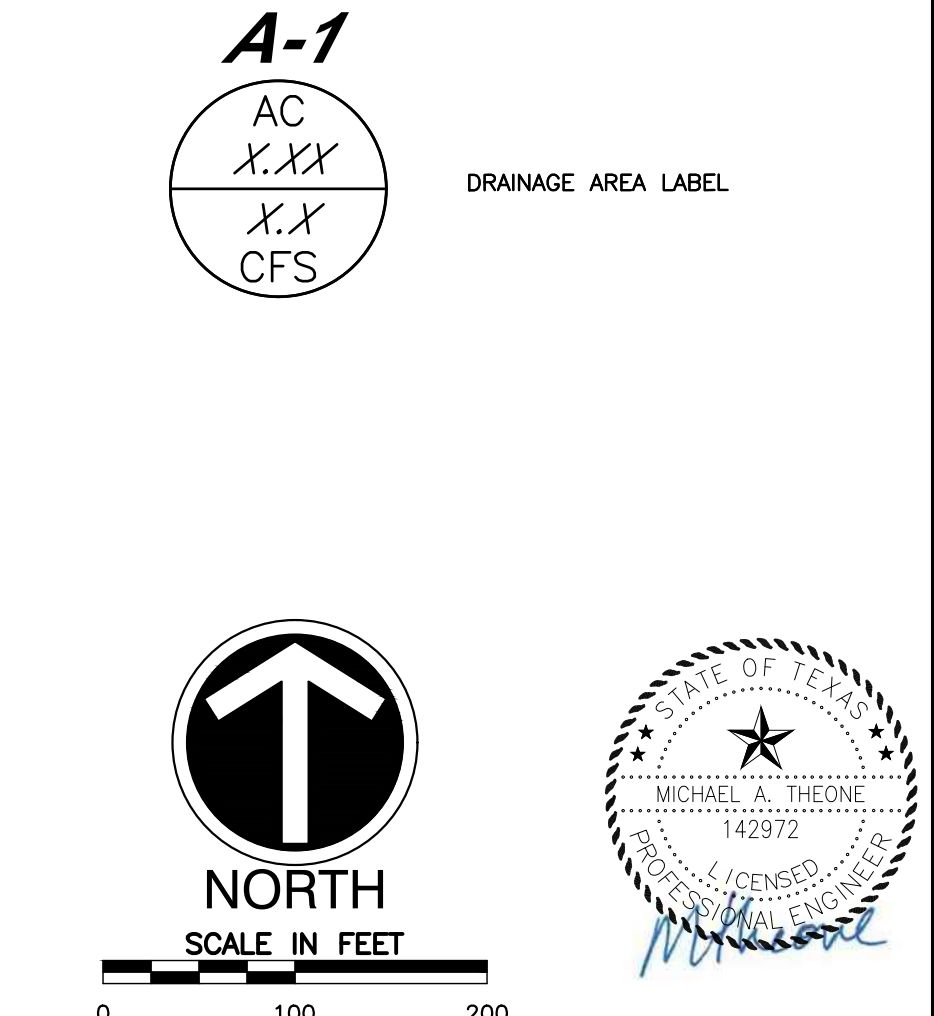
Q_p peak runoff (cfs)
 C runoff coefficient
 i intensity of rainfall (in/hr) - Eq 2-8
 A area (acres)

Rainfall Intensity Equation (Eq. 2-8)

$i = \frac{a}{(t+b)^c}$

i intensity of rainfall (in/hr)
 t storm duration (min)
 a, b, c storm frequency coefficients

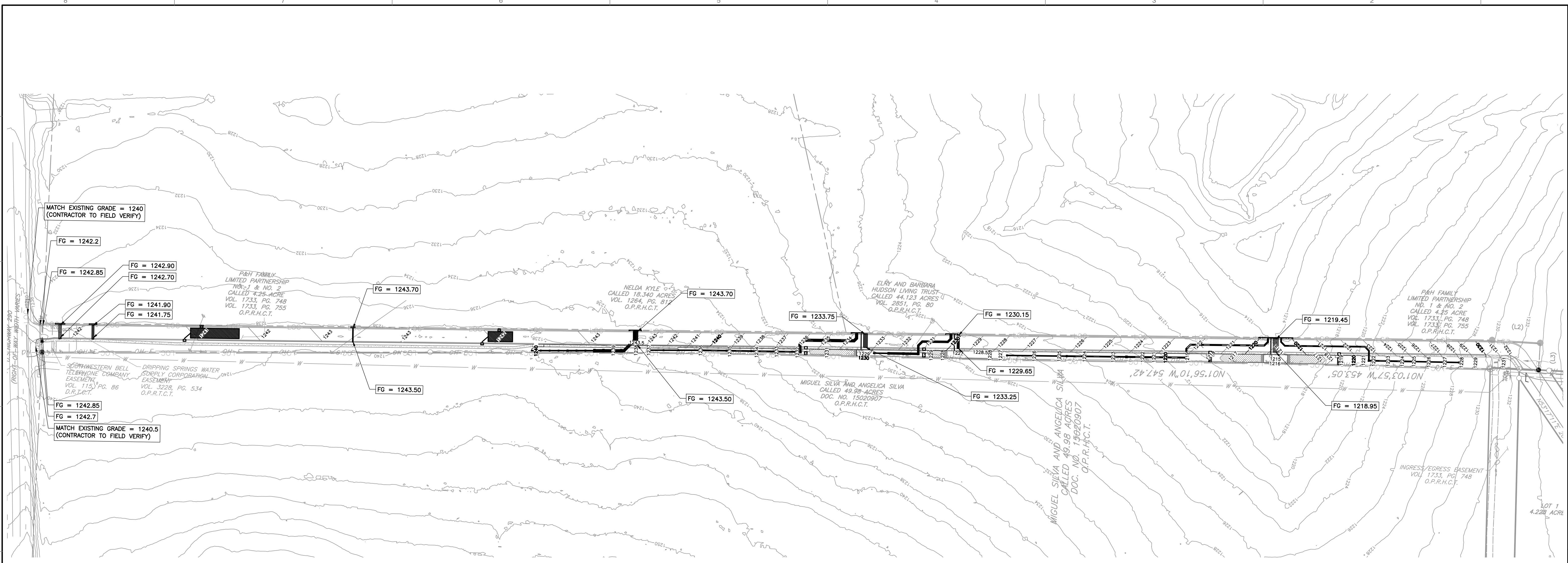
Freq.	a	b	c
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5	78.5582	12.7853	0.8024
10	92.0534	13.166	0.7949
25	112.6923	13.9657	0.7872
50	130.8565	14.8519	0.7829
100	152.128	16.1074	0.7795



811

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NOTES

1. DRAINAGE FOR THIS DEVELOPMENT DOES NOT DRAIN TO TXDOT ROW, DOES NOT CAUSE TXDOT DRAINAGE TO BE BLOCKED, AND HAS BEEN DESIGNED SUCH THAT THERE WILL BE NO ADVERSE IMPACTS ON THE CAPACITY, FUNCTION OR INTEGRITY OF TEXAS DEPARTMENT OF TRANSPORTATION RIGHT OF WAY DRAINAGE FACILITIES.

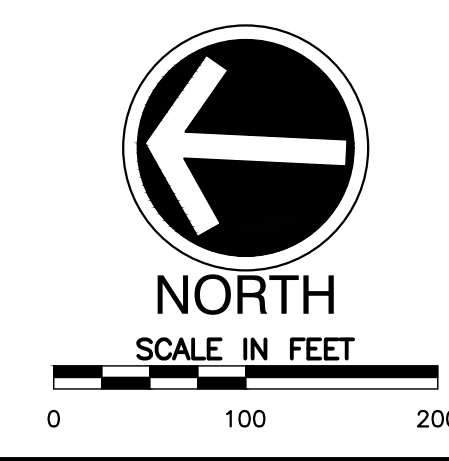
LINETYPE LEGEND

PROPOSED	EXISTING	DESCRIPTION
---	---	RIGHT-OF-WAY
---	---	LOT BOUNDARY
---	---	EASEMENT
X / X	X / X	FENCE BARBED
X / X	X / X	FENCE WOOD (PICKET)
X / X	X / X	FENCE WOOD (PRIVACY)
X / X	X / X	FENCE CHAIN LINK
X / X	X / X	FENCE IRON
385	385	MAJOR CONTOUR
---	---	MINOR CONTOUR
E	E	ELECTRIC LINE
OE	OE	OVERHEAD ELECTRIC WIRE
UE	UE	UNDERGROUND ELECTRIC LINE
T	T	TELEPHONE
C	C	COMMUNICATIONS LINE
TV	TV	CABLE TELEVISION
FO	FO	FIBER OPTIC LINE

PROPOSED	EXISTING	DESCRIPTION
G	G	GAS LINE
OU	OU	OVERHEAD UTILITY
UG	UG	UNDERGROUND UTILITY
SAN	SAN	SANITARY SEWER LINE
W	W	WATER LINE
F	F	FIRE LINE
---	---	ROAD CENTERLINE
---	---	CURB & GUTTER
---	---	STRIPING
---	---	FIRE LINE STRIPING
LOC	LOC	H.C. ACCESSIBLE ROUTE
---	---	LIMITS OF CONSTRUCTION
---	---	RAIL ROAD
---	---	FLOODWAY
---	---	CHWZ
---	---	STORM SEWER
---	---	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
•	•	BENCHMARK
○	○	OUT IN CONCRETE
△	△	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
▲	▲	PIPE BREAK
▼	▼	PIPE CAP
○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
○	○	UTILITY METER
○	○	BACKFLOW PREVENTER
○	○	FLUSH CONNECTION
○	○	FIRE HYDRANT
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BIB
○	○	SANITARY M.H.
○	○	CLEANOUT
○	○	DRAINAGE M.H.
○	○	DOWN SPOUT
○	○	AREA INLET
○	○	CURB INLET
○	○	HEADWALL
○	○	SAFETY END TREATMENT
○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
○	○	ELEC./TELE. POLE
○	○	GUY WIRE
○	○	LIGHT FIXTURE
○	○	TRAFFIC SIGNAL
○	○	PEDESTRIAN SIGNAL
○	○	UTILITY (PULL) BOX
○	○	UTILITY RISER
○	○	UTILITY SERVICE



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REVISION RECORD

NO.	DATE	DESCRIPTION

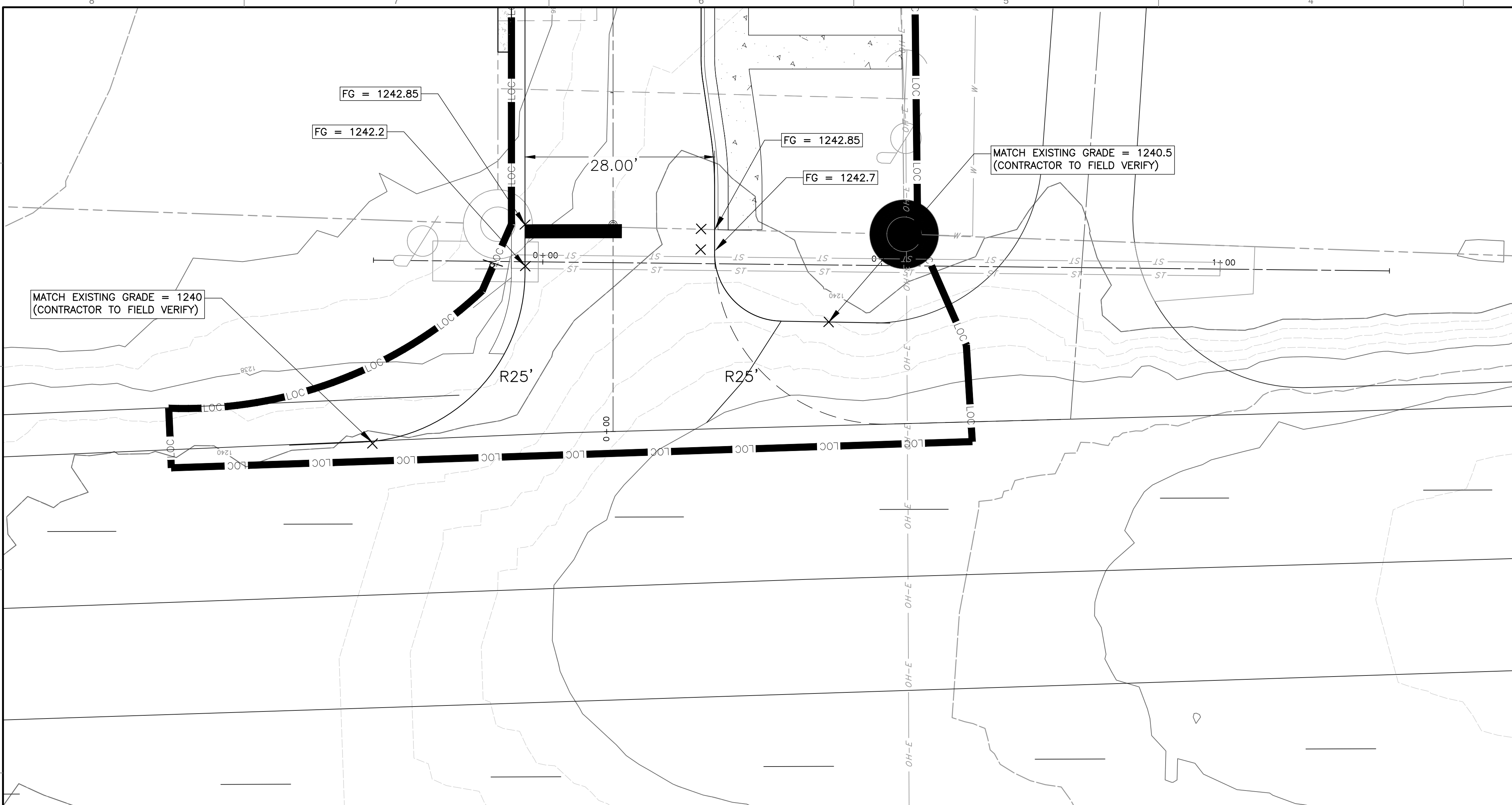
Civil & Environmental Consultants, Inc.
 Texas Registered Engineering Firm F-88
 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0096
 www.cetcinc.com

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

OVERALL GRADING AND DRAINAGE PLAN

DATE:	1/10/2024	DRAWN BY:	CEC
DWG SCALE:	1"=100'	CHECKED BY:	CB
PROJECT NO.:	324-199	APPROVED BY:	MT

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LINETYPE LEGEND

PROPOSED	EXISTING	DESCRIPTION
---	---	RIGHT-OF-WAY
- - -	- - -	LOT BOUNDARY
- - -	- - -	EASEMENT
- x - x -	- x - x -	FENCE: BARBED
- - -	- - -	FENCE: WOOD (PICKET)
- / - / -	- / - / -	FENCE: WOOD (PRIVACY)
- o - o -	- o - o -	FENCE: CHAIN LINK
- - -	- - -	FENCE: IRON
- - -	- - -	MAJOR CONTOUR
- - -	- - -	MINOR CONTOUR
- - -	- - -	ELECTRIC LINE
- - -	- - -	OVERHEAD ELECTRIC WIRE
- - -	- - -	UNDERGROUND ELECTRIC LINE
- - -	- - -	TELEPHONE
- - -	- - -	COMMUNICATIONS LINE
- - -	- - -	CABLE TELEVISION
- - -	- - -	FIBER OPTIC LINE
- - -	- - -	GAS LINE
- - -	- - -	OVERHEAD UTILITY
- - -	- - -	UNDERGROUND UTILITY
- - -	- - -	SANITARY SEWER LINE
- - -	- - -	WATER LINE
- - -	- - -	FIRE LINE
- - -	- - -	ROAD CENTERLINE
- - -	- - -	CURB & GUTTER
- - -	- - -	STRIPING
- - -	- - -	FIRE LANE STRIPING
- - -	- - -	H.C. ACCESSIBLE ROUTE
- - -	- - -	LIMITS OF CONSTRUCTION
- - -	- - -	RAIL ROAD
- - -	- - -	FLOODWAY
- - -	- - -	CWOZ
- - -	- - -	STORM SEWER
- - -	- - -	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
•	•	BENCHMARK
○	○	CUT IN CONCRETE
△	△	CONTROL POINT
□	□	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
○	○	PIPE BREAK
○	○	PIPE CAP
○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
○	○	UTILITY METER
○	○	BACKFLOW PREVENTER
○	○	FLUSH CONNECTION
○	○	FIRE HYDRANT
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BB
○	○	SANITARY M.H.
○	○	CLEANOUT
○	○	DRAINAGE M.H.
○	○	DOWN SPOT
○	○	AREA INLET
○	○	CURB INLET
○	○	HEADWALL
○	○	SAFETY END TREATMENT
○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
○	○	ELEC./TELE. POLE
○	○	GUY WIRE
○	○	LIGHT FIXTURE
○	○	TRAFFIC SIGNAL
○	○	PEDESTRIAN SIGNAL
○	○	UTILITY (PULL) BOX
○	○	UTILITY RISER
○	○	UTILITY SERVICE

REVISION RECORD

NO.	DATE	DESCRIPTION

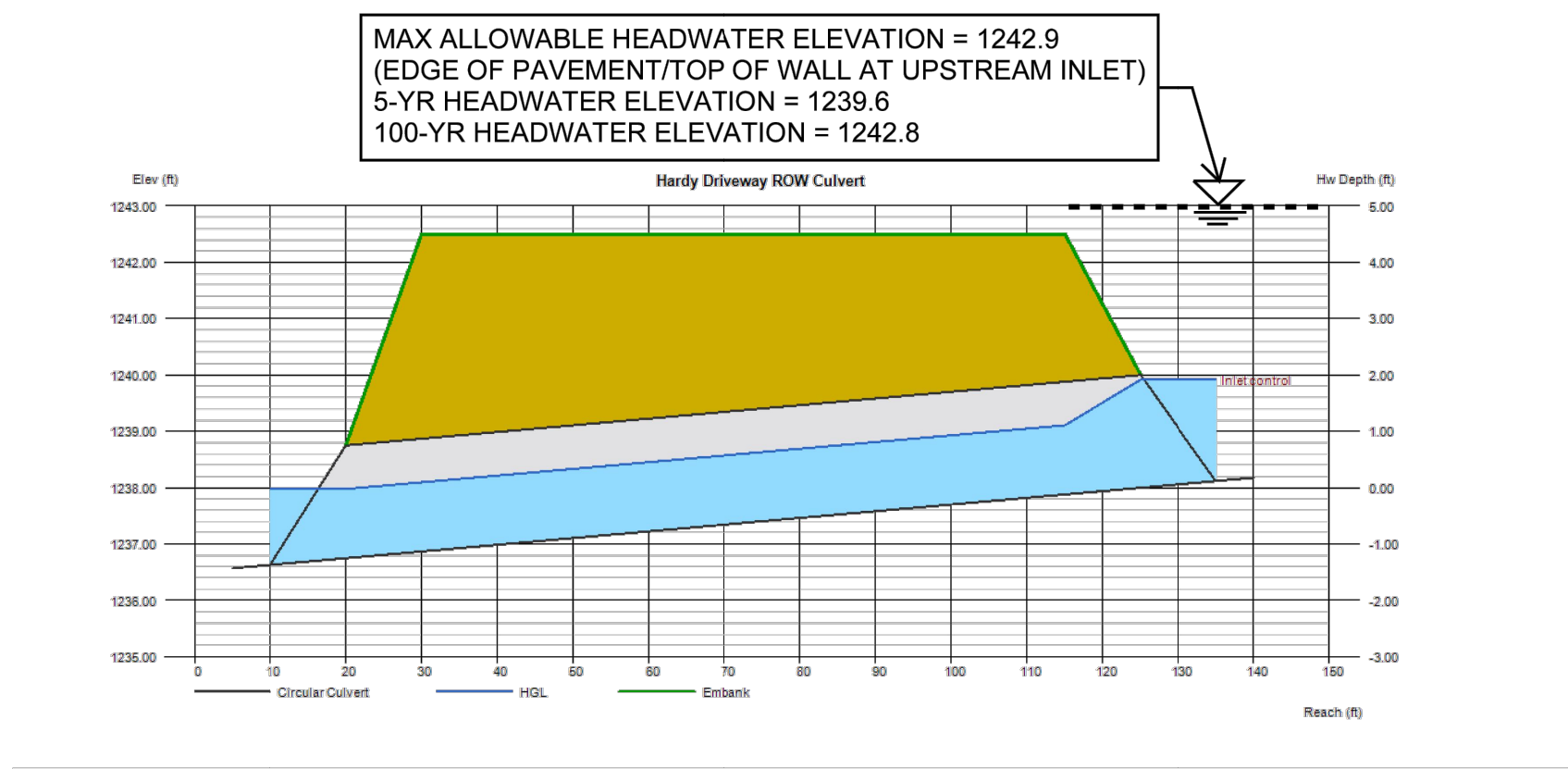
Civil & Environmental Consultants, Inc.
 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0096
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Culvert Report

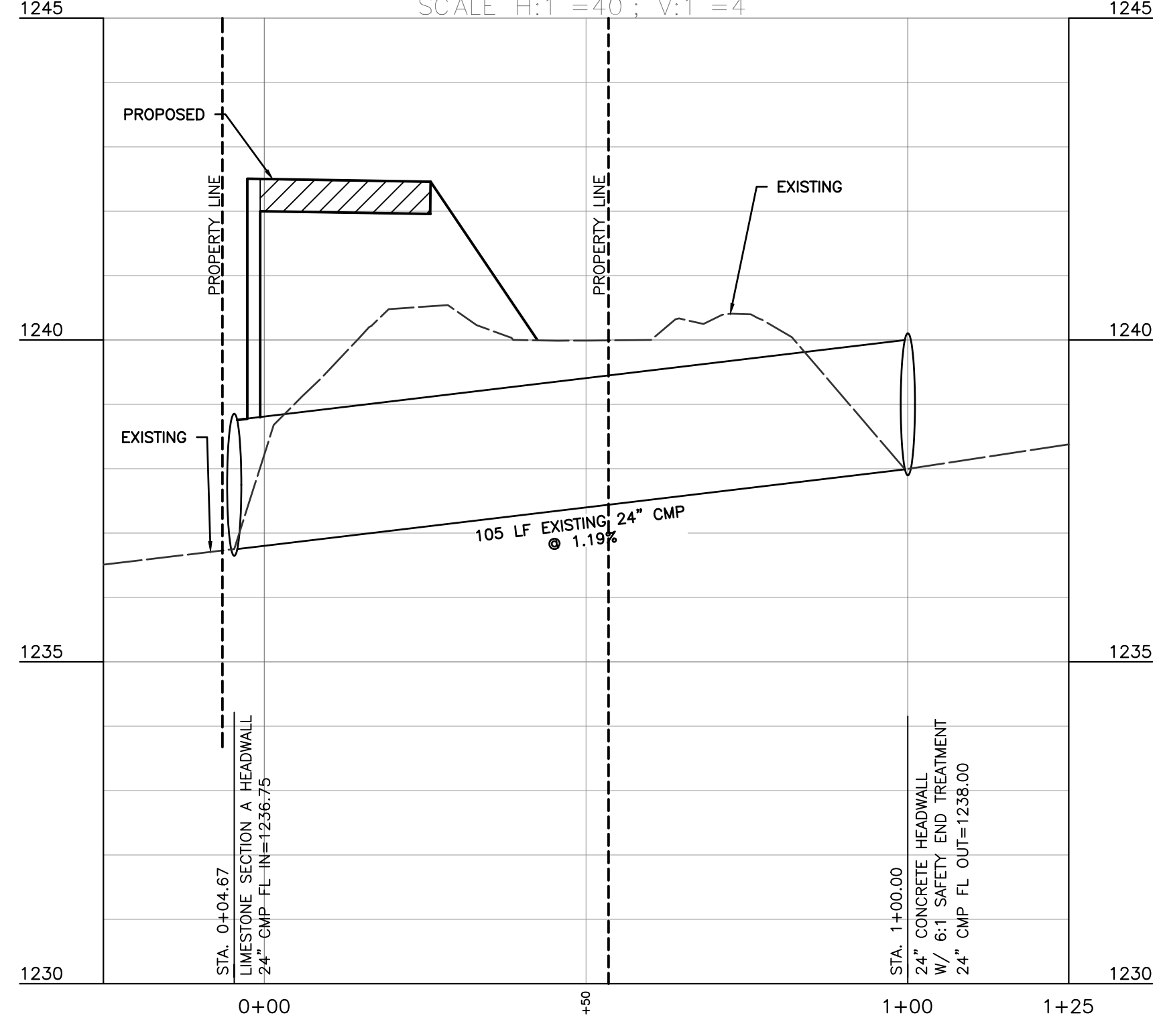
Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 17 2023

Hardy Driveway ROW Culvert

Invert Elev Dn (ft)	= 1236.75	Calculations	
Pipe Length (ft)	= 105.00	Qmin (cfs)	= 11.70
Slope (%)	= 1.19	Qmax (cfs)	= 33.20
Invert Elev Up (ft)	= 1238.00	Tailwater Elev (ft)	= 0.00
Rise (in)	= 24.0	Highlighted	
Shape	= Circular	Qtotals (cfs)	= 11.70
Span (in)	= 24.0	Qpipe (cfs)	= 11.70
No. Barrels	= 1	Qvertop (cfs)	= 0.00
n-Value	= 0.024	Veloc Dn (ft/s)	= 5.79
Culvert Type	= Circular Corrugate Metal Pipe	Veloc Up (ft/s)	= 5.79
Culvert Entrance	= Mitered to slope (C)	HGL Dn (ft)	= 1237.98
Coeff. K,M,c,Y,k	= 0.021, 1.33, 0.0463, 0.75, 0.7	HGL Up (ft)	= 1239.23
Embankment		Hw Elev (ft)	= 1239.92
Top Elevation (ft)	= 1242.50	Hw/D (ft)	= 0.96
Top Width (ft)	= 85.00	Flow Regime	= Inlet Control
Crest Width (ft)	= 30.00		

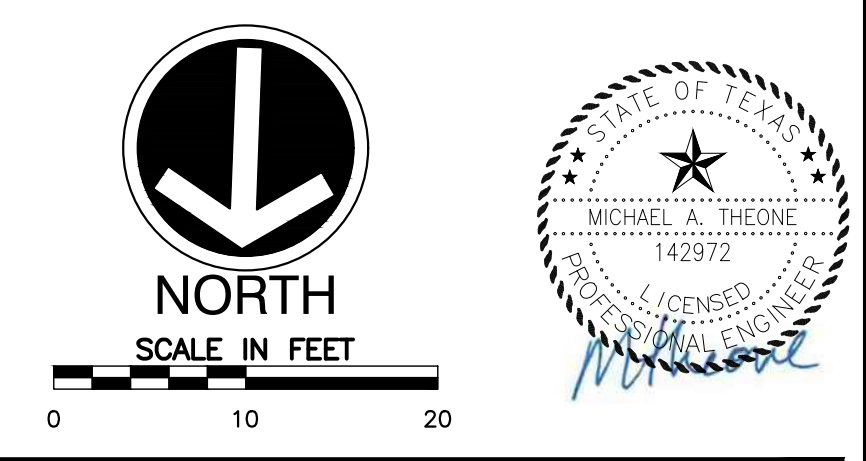


STORM LINE IN R.O.W. PROFILE



Hardy Driveway Hydraflow Results

Storm Event	Q Total (cfs)	Q Pipe (cfs)	Q Over (cfs)	Velocity Dn (ft/s)	Velocity Up (ft/s)	Depth Dn (in)	Depth Up (in)	HGL Dn (ft)	HGL Up (ft)	HGL Hw (ft)	HGL Hw/D
2-yr	8.4	8.4	0.0	5.1	5.1	12.4	12.4	1237.78	1239.03	1239.56	0.78
5-yr	11.7	11.7	0.0	5.8	5.8	14.7	14.7	1237.98	1239.23	1239.92	0.96
10-yr	15.0	15.0	0.0	6.4	6.4	16.7	16.7	1238.15	1240.35	1240.95	1.48
25-yr	21.0	21.0	0.0	7.6	7.6	19.7	19.7	1238.39	1241.68	1242.86	2.43
50-yr	26.4	20.5	5.9	7.5	6.5	19.5	24.0	1238.37	1241.55	1242.67	2.33
100-yr	33.2	20.8	12.5	7.6	6.6	19.6	24.0	1238.38	1241.62	1242.77	2.39

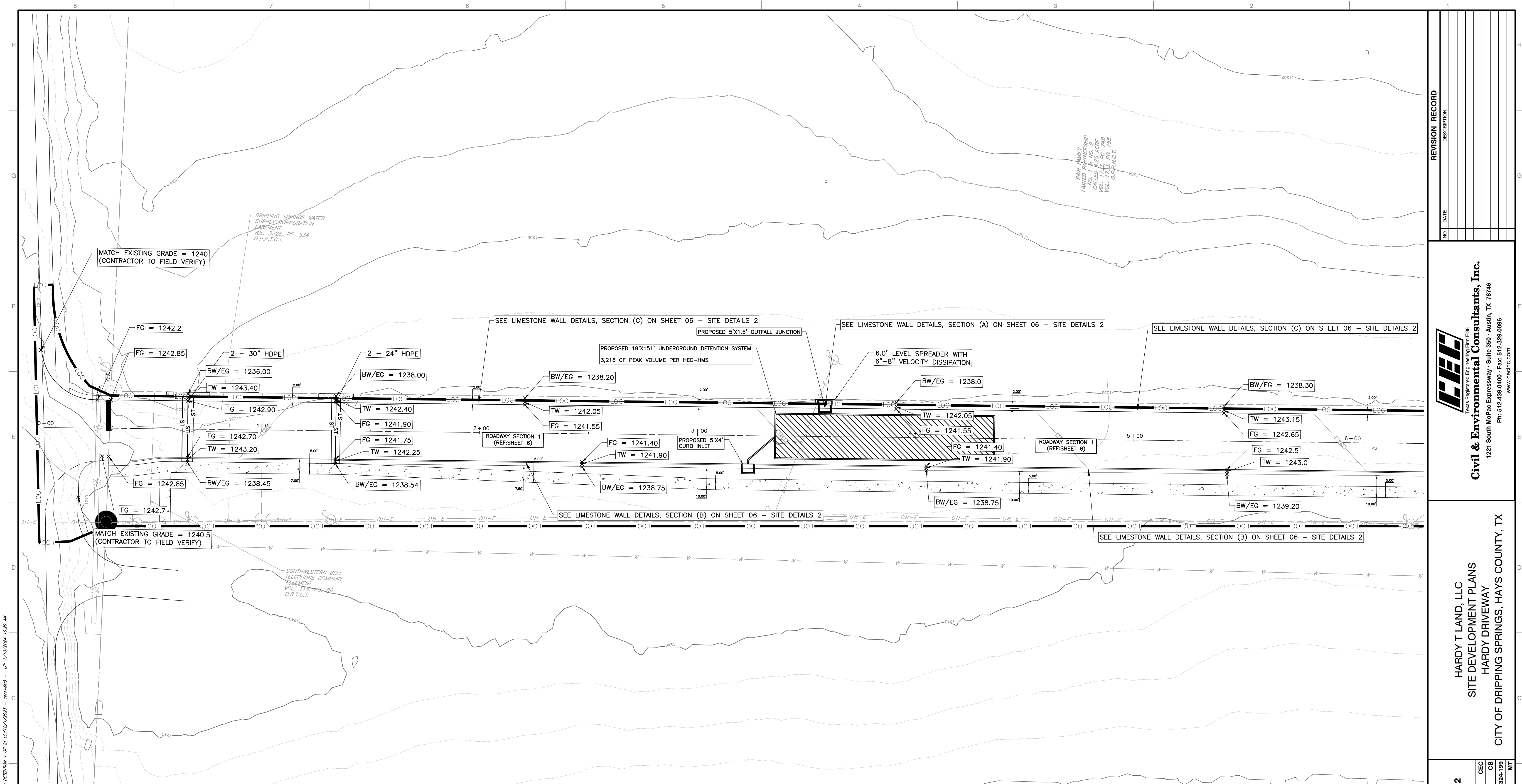


TXDOT DRIVEWAY

DATE: 1/10/2024 DRAWN BY: CEC
 DWG SCALE: 1"=20' CHECKED BY: CB
 PROJECT NO: 324-199
 APPROVED BY: MT

DRAWING NO.: **16**

SHEET 16 OF 42



A:\300-2021\300-2021-191-1000\Drawings\0101\300-2021-191-1000-UNDERGROUND DETENTION 1 OF 2 15:12:17 2023 - 2023 - 11/10/2024 10:29 AM

LINTYPE LEGEND			
PROPOSED	EXISTING		
—	—	RIGHT-OF-WAY	
- - -	- - -	LOT BOUNDARY	
- . - . -	- . - . -	EASEMENT	
X - X - X	X - X - X	FENCE: BARBED	
/ / /	/ / /	FENCE: WOOD (PICKET)	
□	□	FENCE: WOOD (PRIVACY)	
○	○	FENCE: CHAIN LINK	
- - -	- - -	FENCE: IRON	
- - -	- - -	MAJOR CONTOUR	
- - -	- - -	MINOR CONTOUR	
E	E	ELECTRIC LINE	
OE	OE	OVERHEAD ELECTRIC WIRE	
UE	UE	UNDERGROUND ELECTRIC WIRE	
T	T	TELEPHONE	
C	C	COMMUNICATIONS LINE	
TV	TV	CABLE TELEVISION	
FO	FO	FIBER OPTIC LINE	
PROPOSED	EXISTING		
○	○	GAS LINE	
- O -	- O -	OVERHEAD UTILITY	
- UG -	- UG -	UNDERGROUND UTILITY	
- SAN -	- SAN -	SANITARY SEWER LINE	
- W -	- W -	WATER LINE	
F	F	FIRE LINE	
-	-	ROAD CENTERLINE	
-	-	CURB & GUTTER	
-	-	STRIPING	
-	-	FIRE LANE STRIPING	
---	---	H.C. ACCESSIBLE ROUTE	
---	---	LIMITS OF CONSTRUCTION	
---	---	RAIL ROAD	
---	---	FLOODWAY	
---	---	CHWZ	
---	---	STORM SEWER	
---	---	DRAINAGE CHANNEL	
PROPOSED	EXISTING	PROPOSED	EXISTING
•	•	•	•
⊙	⊙	⊙	⊙
⊗	⊗	⊗	⊗
⊘	⊘	⊘	⊘
⊙	⊙	⊙	⊙
○	○	○	○
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Civil & Environmental Consultants, Inc.
 Texas Registered Engineering Firm F-38
 1221 South MoPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.359.0096
 www.cecinc.com

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

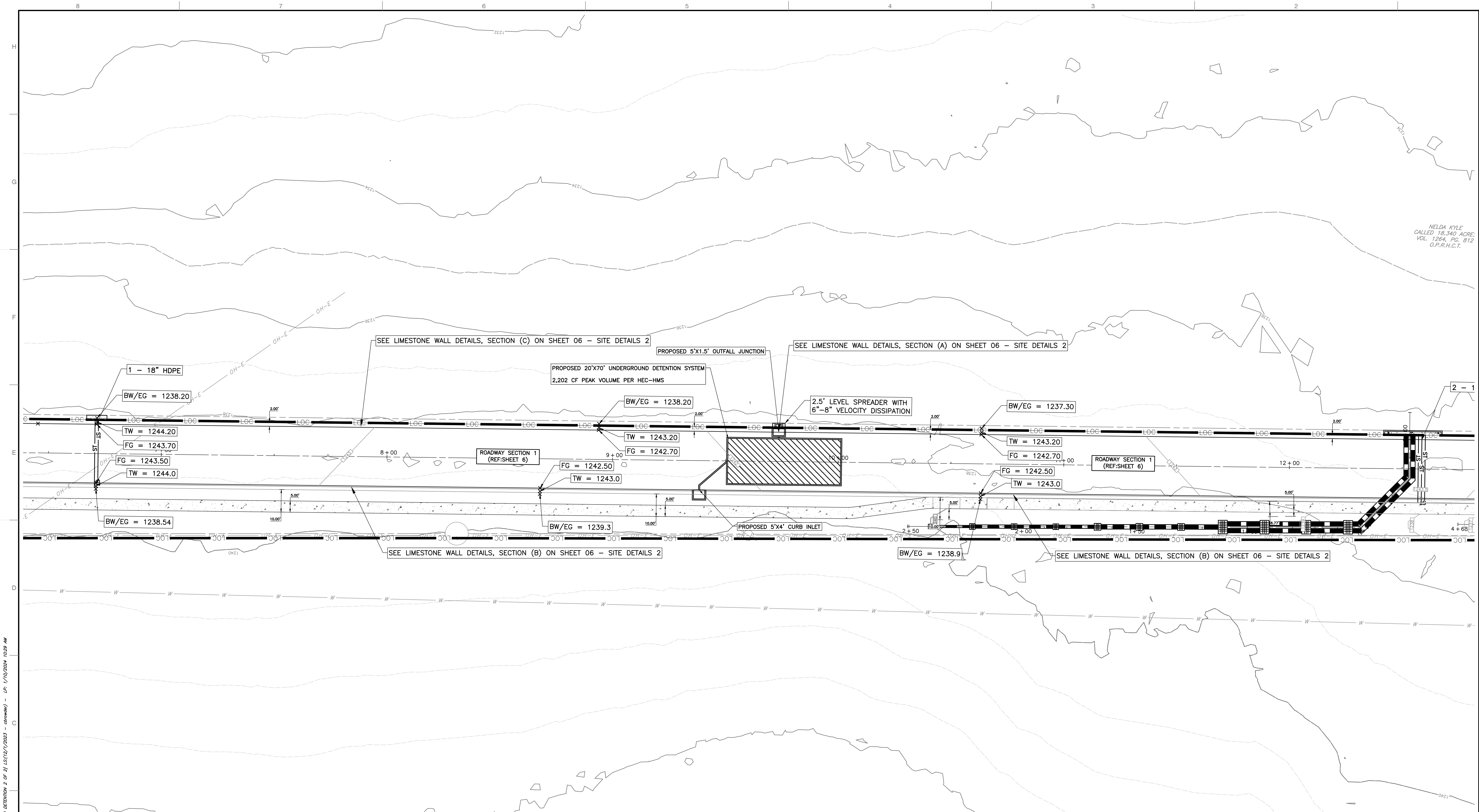
UNDERGROUND DETENTION 1 OF 2

DRAWING NO.: 17

DATE: 11/02/2024 | DRAWN BY: CB | SHEET 17 OF 42

DWG SCALE: 1"=20' | PROJECT NO: 324-199

APPROVED BY: MT



NELDA KYLE
CALLED 18.340 ACRES
VOL. 1264, PG. 812
O.P.R.H.C.T.

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HARDY T LAND, LLC
SITE DEVELOPMENT PLANS
HARDY DRIVEWAY
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

LINETYPE LEGEND

PROPOSED	EXISTING	DESCRIPTION
---	---	RIGHT-OF-WAY
---	---	LOT BOUNDARY
---	---	EASEMENT
X-X-X	X-X-X	FENCE: BARBED
- -	- -	FENCE: WOOD (PICKET)
□-□-□	□-□-□	FENCE: WOOD (PRIVACY)
○-○-○	○-○-○	FENCE: CHAIN LINK
—	—	FENCE: IRON
385	385	MAJOR CONTOUR
—	—	MINOR CONTOUR
E	E	ELECTRIC LINE
OE	OE	OVERHEAD ELECTRIC WIRE
UE	UE	UNDERGROUND ELECTRIC LINE
T	T	TELEPHONE
C	C	COMMUNICATIONS LINE
TV	TV	CABLE TELEVISION
FO	FO	FIBER OPTIC LINE
---	---	GAS LINE
---	---	OVERHEAD UTILITY
---	---	UNDERGROUND UTILITY
SAN	SAN	SANITARY SEWER LINE
W	W	WATER LINE
F	F	FIRE LINE
---	---	ROAD CENTERLINE
---	---	CURB & GUTTER
---	---	STRIPING
---	---	FIRE LANE STRIPING
---	---	H.C. ACCESSIBLE ROUTE
---	---	LIMITS OF CONSTRUCTION
---	---	RAIL ROAD
---	---	FLOODWAY
---	---	CHWZ
---	---	STORM SEWER
---	---	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
•	•	BENCHMARK
○	○	CUT IN CONCRETE
△	△	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
▲	▲	PIPE BREAK
○	○	PIPE CAP
○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
○	○	UTILITY METER
○	○	BACKFLOW PREVENTER
○	○	FLUSH CONNECTION
○	○	FIRE HYDRANT
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BIB
○	○	SANITARY M.H.
○	○	CLEANOUT
○	○	DRAINAGE M.H.
○	○	DOWN SPOUT
○	○	AREA INLET
○	○	CURB INLET
○	○	HEADWALL
○	○	SAFETY END TREATMENT
○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
○	○	ELEC./TELE. POLE
○	○	GUY WIRE
○	○	LIGHT FIXTURE
○	○	TRAFFIC SIGNAL
○	○	PEDESTRIAN SIGNAL
○	○	UTILITY (PULL) BOX
○	○	UTILITY RISER
○	○	UTILITY SERVICE

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STATE OF TEXAS
MICHAEL A. THEONE
142972
LICENSED PROFESSIONAL ENGINEER

NORTH
SCALE IN FEET
0 20 40

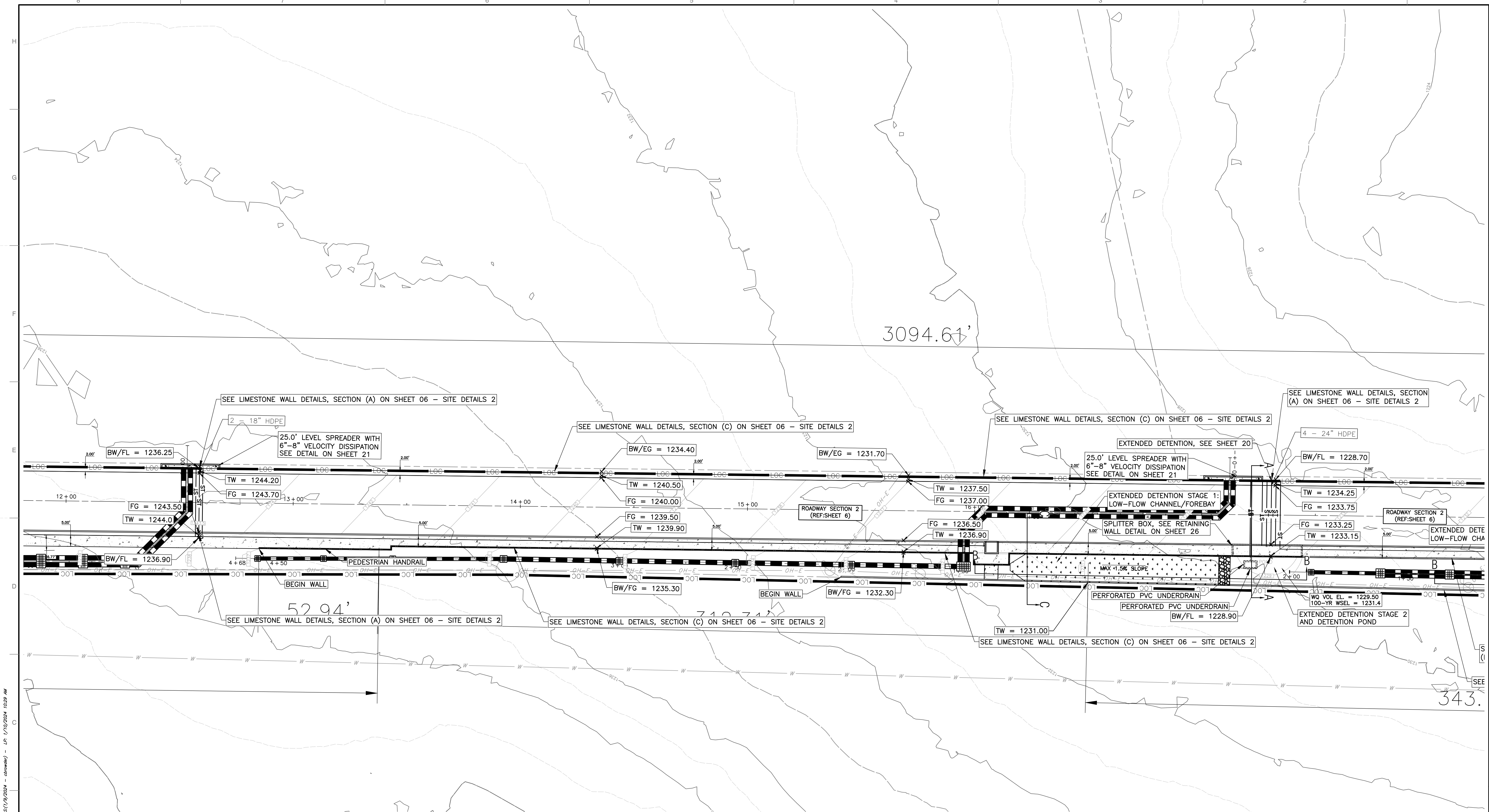
UNDERGROUND DETENTION 2 OF 2

DRAWING NO. **18**

DATE: 1/10/2024 | DRAWN BY: CEC
DWG SCALE: 1"=20' | CHECKED BY: CB
PROJECT NO: 324-199
APPROVED BY: MT

SHEET 18 OF 42

A:\2024\2024-199-1\000\DWG\001\324199-001-C200-UNDERGROUND DETENTION 2 OF 2 LS(12/1/2023 - 09:56:54) - LP: 1/10/2024 10:29 AM



A:\2022-0025-0025-1991-0000\DWG\DWG1\2022-0025-1991-0000-0000.dwg (drawing) - LA 1/10/2024 10:29 AM

LINETYPE LEGEND

PROPOSED	EXISTING	DESCRIPTION
---	---	RIGHT-OF-WAY
---	---	LOT BOUNDARY
---	---	EASEMENT
-X-X-	-X-X-	FENCE: BARBED
- _ -	- _ -	FENCE: WOOD (PICKET)
- _ -	- _ -	FENCE: WOOD (PRIVACY)
- _ -	- _ -	FENCE: CHAIN LINK
- _ -	- _ -	FENCE: IRON
---	---	MAJOR CONTOUR
---	---	MINOR CONTOUR
-E-	-E-	ELECTRIC LINE
-OE-	-OE-	OVERHEAD ELECTRIC WIRE
-UE-	-UE-	UNDERGROUND ELECTRIC LINE
-T-	-T-	TELEPHONE
-C-	-C-	COMMUNICATIONS LINE
-TV-	-TV-	CABLE TELEVISION
-FO-	-FO-	FIBER OPTIC LINE
---	---	GAS LINE
---	---	OVERHEAD UTILITY
---	---	UNDERGROUND UTILITY
-SAN-	-SAN-	SANITARY SEWER LINE
-W-	-W-	WATER LINE
-F-	-F-	FIRE LINE
---	---	ROAD CENTERLINE
---	---	CURB & GUTTER
---	---	STRIPING
---	---	FIRE LINE STRIPING
---	---	H.C. ACCESSIBLE ROUTE
---	---	LIMITS OF CONSTRUCTION
---	---	RAIL ROAD
---	---	FLOODWAY
---	---	CHWZ
---	---	STORM SEWER
---	---	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
●	●	BENCHMARK
○	○	CUT IN CONCRETE
○	○	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
○	○	PIPE BREAK
○	○	PIPE CAP
○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
○	○	UTILITY METER
○	○	BACKFLOW PREVENTER
○	○	FLUSH CONNECTION
○	○	FIRE HYDRANT
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BIB
○	○	SANITARY M.H.
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○	○	DOWN SPOUT
○	○	AREA INLET
○	○	CURB INLET
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○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
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STATE OF TEXAS
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 142972
 LICENSED PROFESSIONAL ENGINEER

NORTH
 SCALE IN FEET
 0 20 40

REVISION RECORD

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 www.cedcinc.com

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

GRADING AND DRAINAGE 1

DATE: 1/10/2024
 DWG SCALE: 1"=20'
 PROJECT NO: 324-199
 DRAWN BY: CEC
 CHECKED BY: CB
 APPROVED BY: MT

DRAWING NO. **20**
 SHEET 20 OF 42

Texas Commission on Environmental Quality
TSS Removal Calculations 04-20-2009

Project Name: **Hardy Driveway**
 Date Prepared: **7/13/2022**

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348. Characters shown in red are data entry fields. Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_{d1} = 27.2(A_{N1} \times P)$

where: L_{d1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load
 A_{N1} = Net increase in impervious area for the project
 P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project
 County = **Hays**
 Total project area included in plan = **3.71** acres
 Predevelopment impervious area within the limits of the plan = **1.14** acres
 Total post-development impervious area within the limits of the plan = **1.850** acres
 Total post-development impervious cover fraction = **0.50**
 P = **33** inches
 L_{d1} TOTAL PROJECT = **637** lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = **4**

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = **1**

Total drainage basin/outfall area = **0.51** acres
 Predevelopment impervious area within drainage basin/outfall area = **0.18** acres
 Post-development impervious area within drainage basin/outfall area = **0.290** acres
 Post-development impervious fraction within drainage basin/outfall area = **0.57**
 L_{d1} THIS BASIN = **99** lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Extended Detention**
 Removal efficiency = **75** percent

4. Calculate Maximum TSS Load Removed (L_d) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_d = (BMP \text{ efficiency}) \times P \times (A_i \times 34.6 + A_p \times 0.54)$

where: A_i = Total On-Site drainage area in the BMP catchment area
 A_p = Impervious area proposed in the BMP catchment area
 A_r = Pervious area remaining in the BMP catchment area
 L_d = TSS Load removed from this catchment area by the proposed BMP

A_i = **0.51** acres
 A_p = **0.290** acres
 A_r = **0.22** acres
 L_d = **251** lbs.

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired L_{d1} THIS BASIN = **251** lbs.
 F = **1.00**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth = **4.00** inches
 Post Development Runoff Coefficient = **0.40**
 On-site Water Quality Volume = **2952** cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP = **0.00** acres
 Off-site impervious cover draining to BMP = **0.00** acres
 Impervious fraction of off-site area = **0**
 Off-site Runoff Coefficient = **0.00**
 Off-site Water Quality Volume = **0** cubic feet

Storage for Sediment = **590**
 Total Capture Volume (required water quality volume) \times 1.20 = **3543** cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP. The values for BMP Types not selected in cell C45 will show NA.

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = **3543** cubic feet

EXTENDED DETENTION CALCULATIONS FOR DEVELOPMENT PERMIT

DRAINAGE AREA DATA:
 Drainage Area to Control (DA) 0.51 ac.
 Drainage Area Impervious Cover 0.93% %

WATER QUALITY CONTROL CALCULATIONS (PER TCEQ RG-348):

Water Quality Volume (REQ WQV = 1.2*WQV PER TCEQ)

100-year Peak Flow Rate to Control (Q100)

Forebay Area (Af)

Depth of forebay (D)

Forebay Water Quality Volume (WQV_{ponded}=Af*D)

Stage 2 Water Quality Volume

Water Quality Elevation (WQE)

Extended Detention Drawdown Time

Underdrain Orifice Size (Diameter)

Underdrain Orifice Size (Area)

Orifice Calculation:

$Q = V / T$

WQV 148.0 cf

Time = 48 Hr x 60 Min x 60 Sec = 172800 Sec

Q 0.000856 cfs

Assumption: Average Head Will

Occur .5 Feet Below WQE

WQE 1229 ft msl.

Orifice E 1224.989 ft msl.

H average 3.511 ft

$Q = 0.6 * A * (2 * 32.2 * (H))^{0.5}$

A 9.49E-05 sqft

D 0.010994 ft

D 0.131929 in

REQUIRED PROVIDED

148 cf 150.5 cf

5.5 cfs

10.0 sf

Min 2 ft 2.0 ft

Max 5 ft

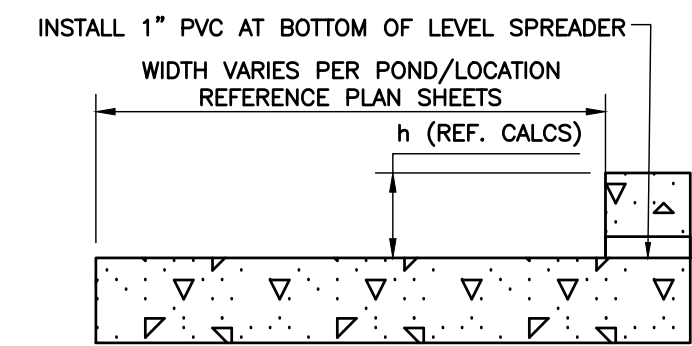
20.0 cf

130.5 cf

1229.5 ft msl.

Min 48 hr 48 hr

0.1 in 0.0137 sq-in



TYPICAL LEVEL SPREADER DETAIL

Pond 1 - Detention Pond Values from HEC-HMS Hydrologic Modeling Software

Storm Event	Q-Ex (cfs)	Q-Pr (cfs)	PR-Routed (cfs)	WS Elevation (ft)
2-yr	1.4	1.6	1.1	1230.8
10-yr	2.7	2.8	2.6	1231.1
25-yr	3.6	3.8	3.4	1231.2
100-yr	5.6	5.7	5.3	1231.4

Pond 1 Outflow Velocity (Weir) [v=Q/A]

Storm Event	*Q-Routed (cfs) [Q]	Area of Weir (ft^2) [A]	Weir Velocity (fps) [v]
2-yr	1.1	2.1	0.523809524
10-yr	2.6	4.9	0.53
25-yr	3.4	6.0	0.57
100-yr	5.3	7.5	0.71

Pond 1 Outflow Velocity (Orifice) [v=C_d(2gH)^{0.5}]

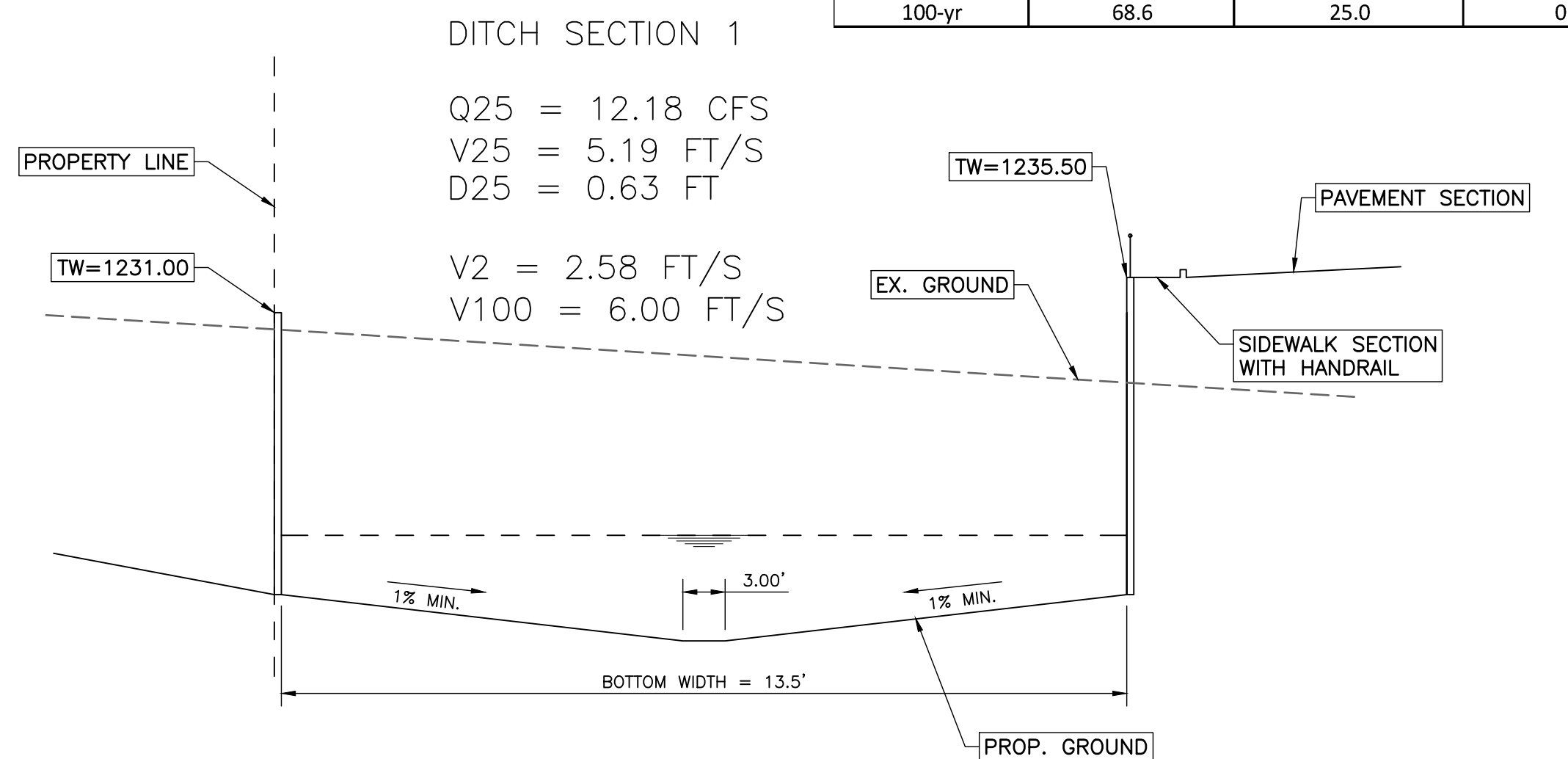
Storm Event	Discharge	Head (ft) [H]	Orifice Velocity (fps)
2-yr	0.6	1.2	5.2
10-yr	0.6	1.3	5.6
25-yr	0.6	1.5	5.8
100-yr	0.6	1.7	6.2

HARDY DRIVEWAY Detention Pond Stage Values - BMP 1

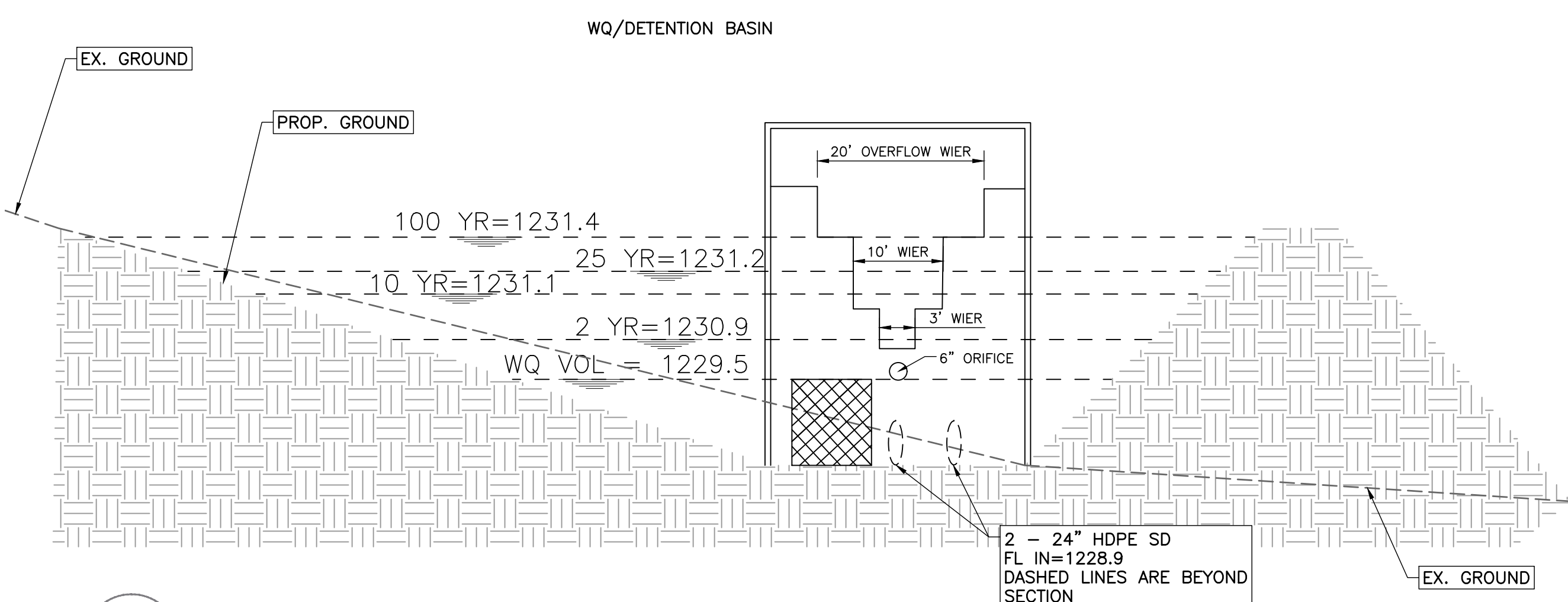
Stage	Area (sf)	Area (ac)	Volume (cf)	Cum. Volume (cf)	Ac-ft
1229.75	0	0.000000	0 cf	0 cf	0.0000
1230.00	353	0.008104	44	44	0.0010
1231.00	1,559	0.035790	956	1,000	0.0230
1232.00	2,253	0.051722	1,906	2,906	0.0667
1233.00	2,732	0.062718	2,493	5,399	0.1239
1234.00	3,180	0.073003	2,956	8,355	0.1918

Pond 1 Outflow Velocity (Level Spreader) [v=Q/A]

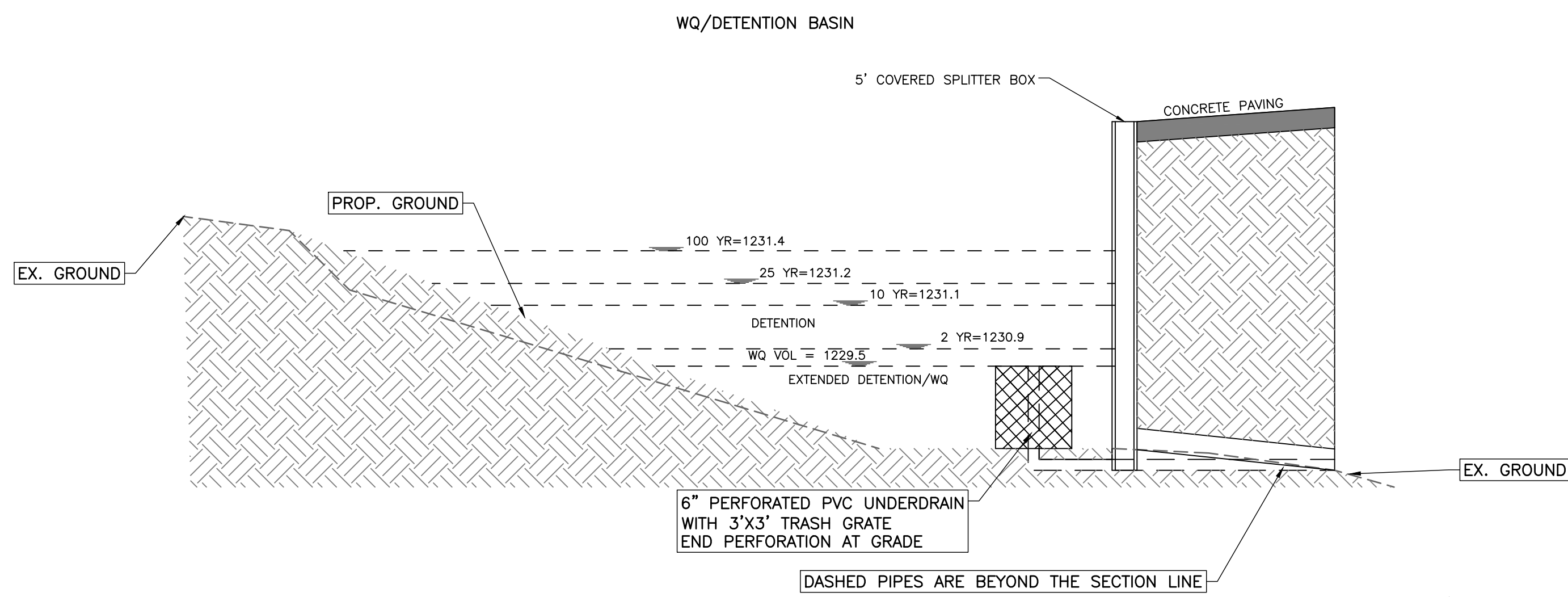
Storm Event	*Q-Routed (cfs) [Q]	Length of Level Spreader (ft) [L]	Height of Level Spreader (ft) [h]	Area of Level Spreader (ft^2) [A=L*h]	Level Spreader Velocity (fps) [v]
2-yr	16.1	25.0	0.50	12.5	1.3
10-yr	29.4	25.0	0.50	12.5	2.4
25-yr	41.7	25.0	0.50	12.5	3.3
100-yr	68.6	25.0	0.50	12.5	5.5



1 POND CROSS SECTION C SCALE: NTS



1 POND CROSS SECTION B SCALE: NTS



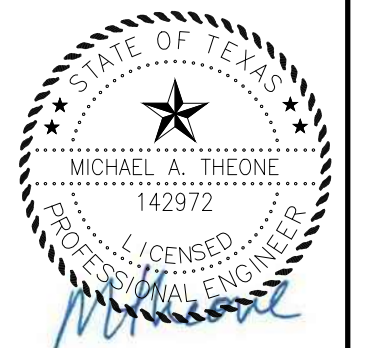
1 POND CROSS SECTION A SCALE: NTS

REVISION RECORD

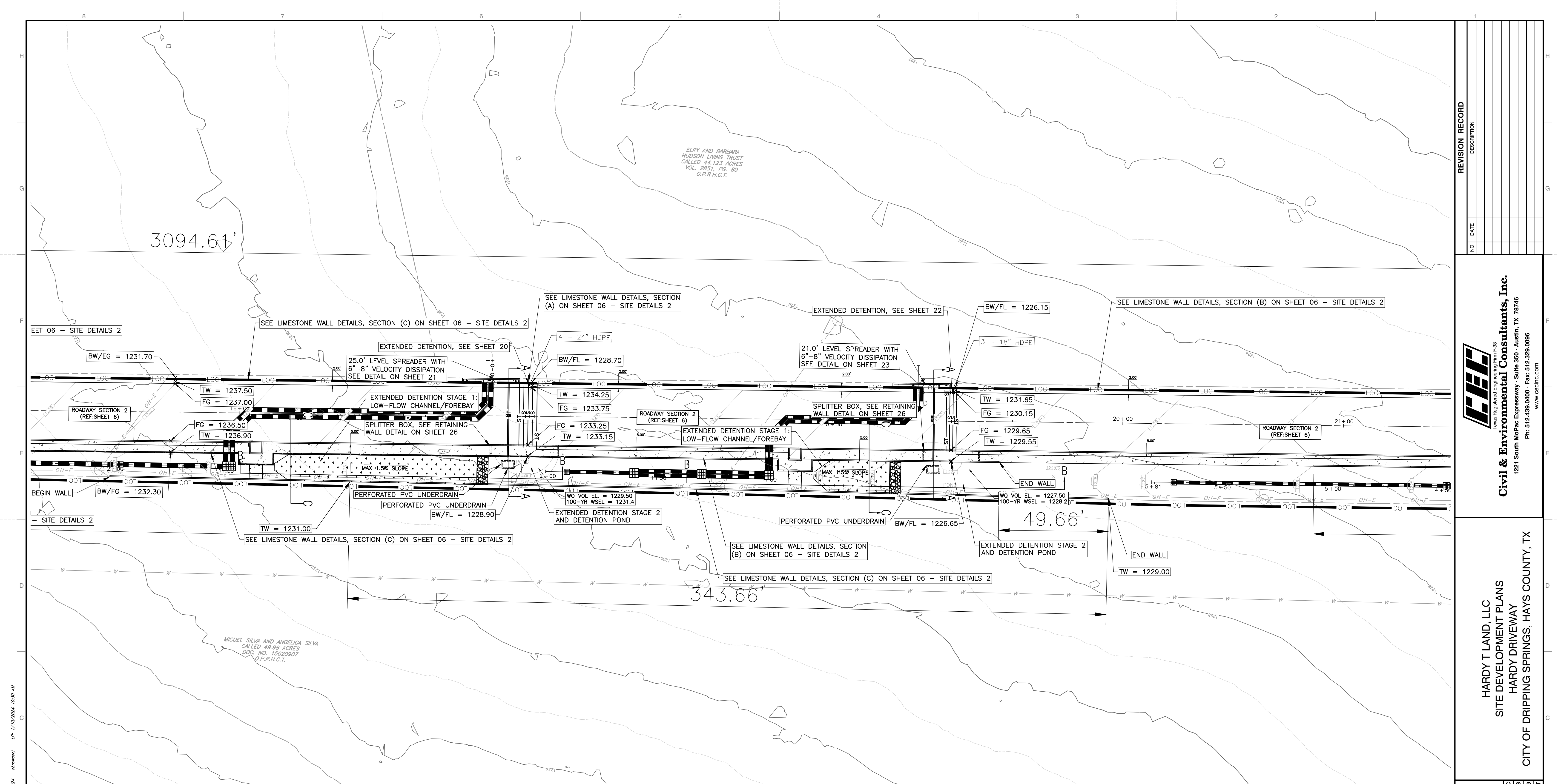
Civil & Environmental Consultants, Inc.
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 www.cecinc.com

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

GRADING AND DRAINAGE 1 CALCS
 DATE: 1/10/2024 DRAWN BY: NTS CHECKED BY: NTS
 PROJECT NO: 324-199
 APPROVED BY: [Signature]



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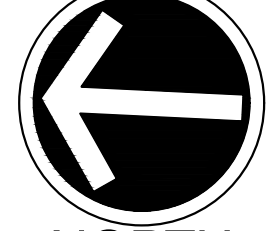
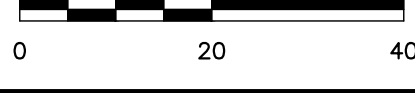


NO.	DATE	REVISION RECORD	DESCRIPTION

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 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.359.0086
 www.cetinc.com

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

A:\130-2021\130-2021-1991-1000\Drawings\130-2021-1991-1000-CDD-BMP-Grading\Grading and Drainage.dwg - 1/10/2024 10:30 AM

LINTYPE LEGEND				BLOCK LEGEND			
PROPOSED	EXISTING	DESCRIPTION	SYMBOL	PROPOSED	EXISTING	DESCRIPTION	SYMBOL
---	---	RIGHT-OF-WAY	○	●	●	BENCHMARK	○
---	---	LOT BOUNDARY	○	○	○	OUT IN CONCRETE	○
---	---	EASEMENT	○	○	○	CONTROL POINT	○
---	---	FENCE BARBED	○	○	○	IRON PIPE	○
---	---	FENCE WOOD (PICKET)	○	○	○	IRON ROD	○
---	---	FENCE WOOD (PRIVACY)	○	○	○	IRON ROD W/ CAP	○
---	---	FENCE CHAIN LINK	○	○	○	MONUMENT TYPE 1	○
---	---	FENCE IRON	○	○	○	MONUMENT TYPE 2	○
---	---	MAJOR CONTOUR	○	○	○	NAIL	○
---	---	MINOR CONTOUR	○	○	○	PIPE BREAK	○
---	---	ELECTRIC LINE	○	○	○	PIPE CAP	○
---	---	OVERHEAD ELECTRIC WIRE	○	○	○	PIPE FLOW	○
---	---	UNDERGROUND ELECTRIC WIRE	○	○	○	REDUCER	○
---	---	TELEPHONE	○	○	○	AIR RELEASE VALVE	○
---	---	COMMUNICATIONS LINE	○	○	○	BLOW-OFF VALVE	○
---	---	CABLE TELEVISION	○	○	○	POST INDICATOR VALVE	○
---	---	FIBER OPTIC LINE	○	○	○	MISCELLANEOUS VALVE	○
---	---		○	○	○	UTILITY VALVE	○
---	---		○	○	○	UTILITY METER	○
---	---		○	○	○	BACKFLOW PREVENTER	○
---	---		○	○	○	FLUSH CONNECTION	○
---	---		○	○	○	FIRE HYDRANT	○


 NORTH
 SCALE IN FEET




GRADING AND DRAINAGE 2

DATE: 1/10/2024 DRAWN BY: CEC
 DWG SCALE: 1"=20' CHECKED BY: CB
 PROJECT NO: 324-199
 APPROVED BY: MT

DRAWING NO. **22**

SHEET 22 OF 42

EXTENDED DETENTION CALCULATIONS FOR DEVELOPMENT PERMIT

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348. Characters shown in red are data entry fields. Characters shown in black (bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_{R} = 27.2(A_{i} \times P)$

where:
 L_{R} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load
 A_{i} = Net increase in impervious area for the project
 P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project
 County = **Hays**
 Total project area included in plan = **3.71** acres
 Predevelopment impervious area within the limits of the plan = **1.14** acres
 Total post-development impervious area within the limits of the plan = **1.850** acres
 Total post-development impervious cover fraction = **0.50**
 P = **33** inches

L_{R} TOTAL PROJECT = **637** lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = **4**

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = **2**

Total drainage basin/outfall area = **0.22** acres
 Predevelopment impervious area within drainage basin/outfall area = **0.07** acres
 Post-development impervious area within drainage basin/outfall area = **0.110** acres
 Post-development impervious fraction within drainage basin/outfall area = **0.50**
 L_{R} THIS BASIN = **36** lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Extended Detention**
 Removal efficiency = **75** percent

4. Calculate Maximum TSS Load Removed (L_{R}) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_{R} = (\text{BMP efficiency}) \times P \times (A_{i} \times 34.6 + A_{p} \times 0.54)$

where:
 A_{i} = Total On-Site drainage area in the BMP catchment area
 A_{p} = Impervious area proposed in the BMP catchment area
 A_{p} = Pervious area remaining in the BMP catchment area
 L_{R} = TSS Load removed from this catchment area by the proposed BMP

A_{i} = **0.22** acres
 A_{p} = **0.110** acres
 A_{p} = **0.11** acres
 L_{R} = **96** lbs.

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired L_{R} THIS BASIN = **96** lbs.
 F = **1.00**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth = **4.00** inches
 Post Development Runoff Coefficient = **0.36**
 On-site Water Quality Volume = **1142** cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP = **0.00** acres
 Off-site impervious cover draining to BMP = **0.00** acres
 Impervious fraction of off-site area = **0**
 Off-site Runoff Coefficient = **0.00**
 Off-site Water Quality Volume = **0** cubic feet

Storage for Sediment = **228** cubic feet
 Total Capture Volume (required water quality volume(s) x 1.20) = **1370** cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP.
 The values for BMP Types not selected in cell C45 will show NA.

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = **1370** cubic feet

DRAINAGE AREA DATA:
 Drainage Area to Control (DA) **0.22 ac.**
 Drainage Area Impervious Cover **50.00% %**

WATER QUALITY CONTROL CALCULATIONS (PER TCEQ RG-348):

Water Quality Volume (REQ WQV = 1.2*WQV PER TCEQ) **1,370 cf**

100-year Peak Flow Rate to Control (Q100) **2.2 cfs**

Forebay Area (Af)

Depth of forebay (D) **Min 2 ft**
Max 5 ft

Forebay Water Quality Volume (WQV_{ponded}=Af*D) **1,154.0 cf**

Stage 2 Water Quality Volume **281.5 cf**

Water Quality Elevation (WQE) **1227.5 ft msl.**

Extended Detention Drawdown Time **Min 48 hr**

Underdrain Orifice Size (Diameter) **48 hr**

Underdrain Orifice Size (Area) **0.4 in**
0.1261 sq-in

Orifice Calculation:
 $Q = V / T$

WQV **1,370.0 cf**

Time = 48 Hr x 60 Min x 60 Sec = 172800 Sec

Q **0.007928 cfs**

Assumption: Average Head Will Occur .5 Feet Below WQE

WQE **1227.75 ft msl.**

Orifice E **1223.717 ft msl.**

H average **3.533 ft**

$Q = 0.6 * A * (2 * 32.2 * (H))^{0.5}$

A **0.000876 sqft**

D **0.033397 ft**

D **0.400767 in**

Pond 2 - Detention Pond Values from HEC-HMS Hydrologic Modeling Software

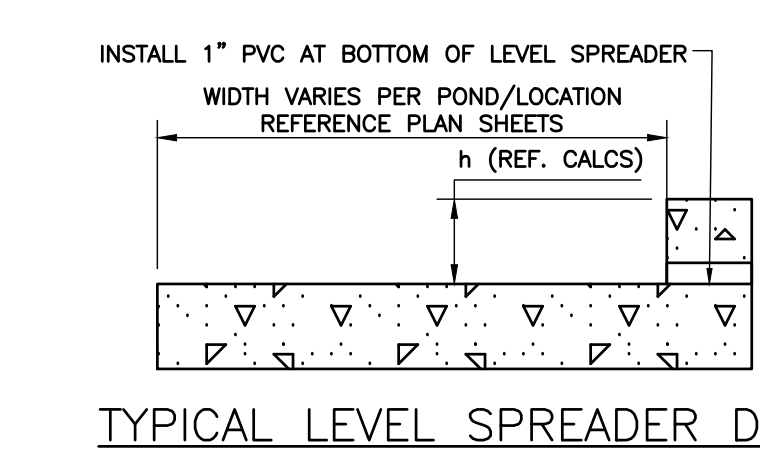
Storm Event	Q-Ex (cfs)	Q-Pr (cfs)	PR-Routed (cfs)	WS Elevation (ft)
2-yr	0.6	0.7	0.6	1228.0
10-yr	1.2	1.2	1.2	1228.1
25-yr	1.6	1.7	1.6	1228.1
100-yr	2.5	2.5	2.4	1228.2

Pond 2 Outflow Velocity (Weir) [v=Q/A]

Storm Event	*Q-Routed (cfs) [Q]	Area of Weir (ft^2) [A]	Weir Velocity (fps) [v]
2-yr	0.6	0.5	1.2
10-yr	1.2	0.7	1.78
25-yr	1.6	0.7	2.37
100-yr	2.4	1.2	1.96

Pond 2 Outflow Velocity (Orifice) [v=C_d(2gh)^{1/2}]

Storm Event	Discharge	Head (ft) [H]	Orifice Velocity (fps)
2-yr	0.6	0.3	2.4
10-yr	0.6	0.3	2.8
25-yr	0.6	0.3	2.8
100-yr	0.6	0.5	3.2

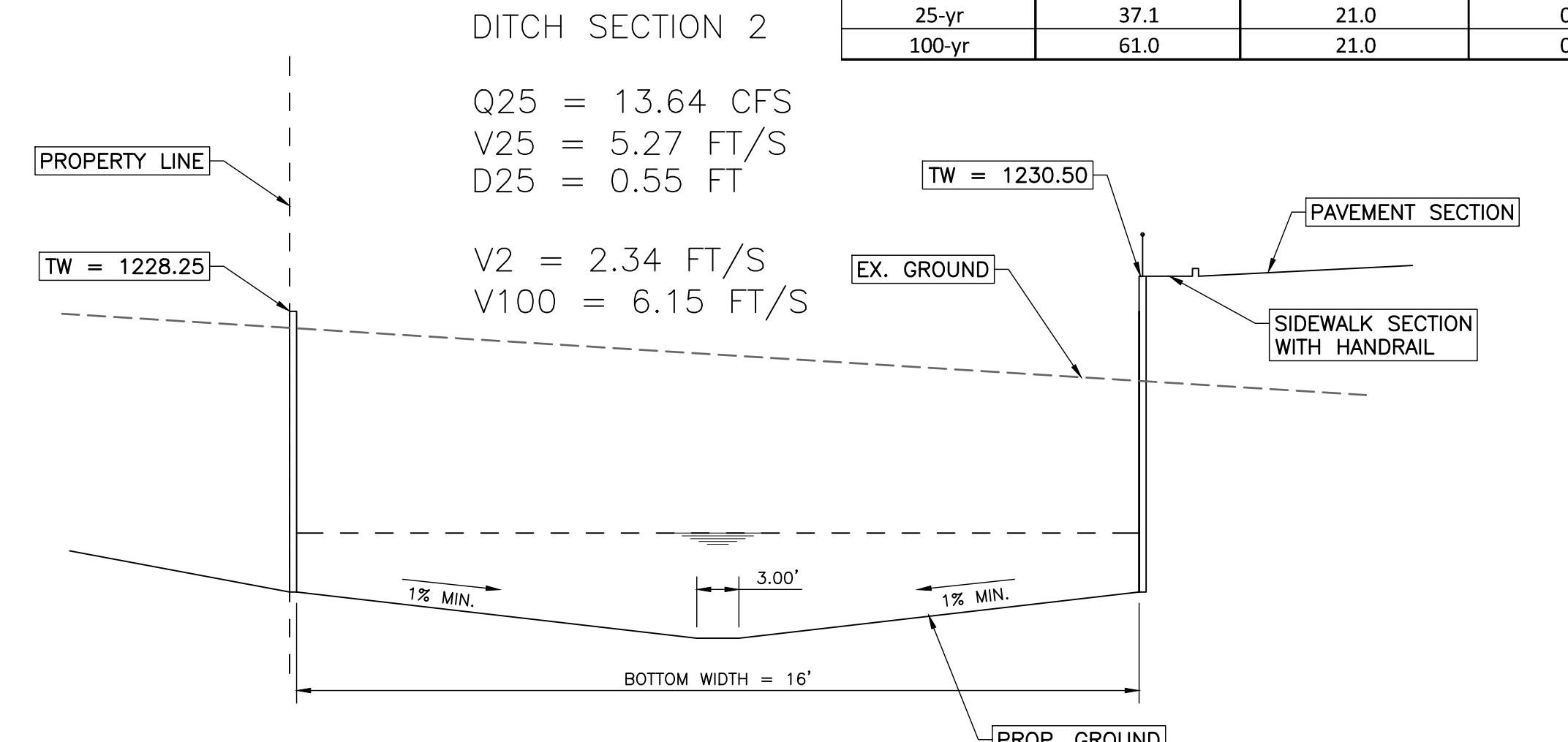


HARDY DRIVEWAY Detention Pond Stage Values - BMP 2

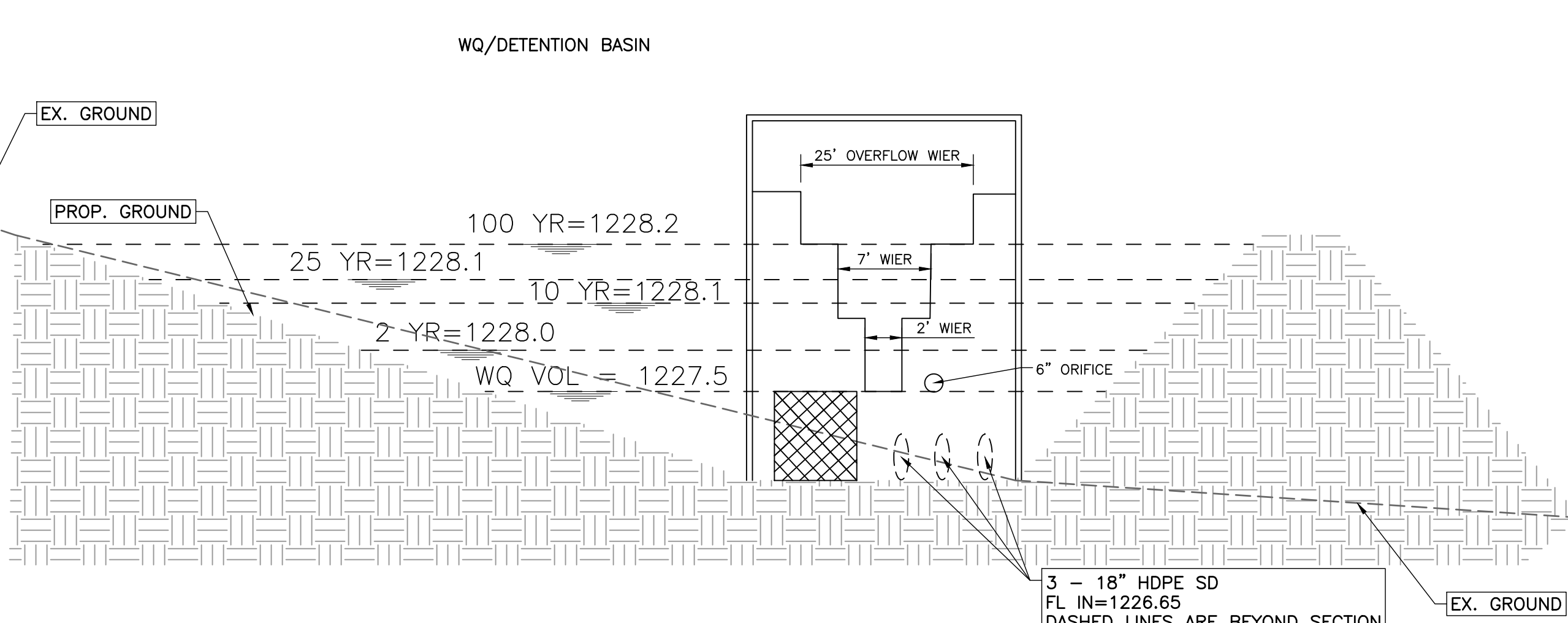
Stage	Area (sf)	Area (ac)	Volume (cf)	Cum. Volume (cf)	Ac-ft
1227.75	0	0.000000	0 cf	0 cf	0.0000
1228.00	1,381	0.031703	173	173	0.0040
1229.00	1,609	0.036938	1,495	1,668	0.0383
1230.00	2,155	0.049472	1,882	3,550	0.0815
1231.00	2,443	0.056084	2,299	5,849	0.1343

Pond 2 Outflow Velocity (Level Spreader) [v=Q/A]

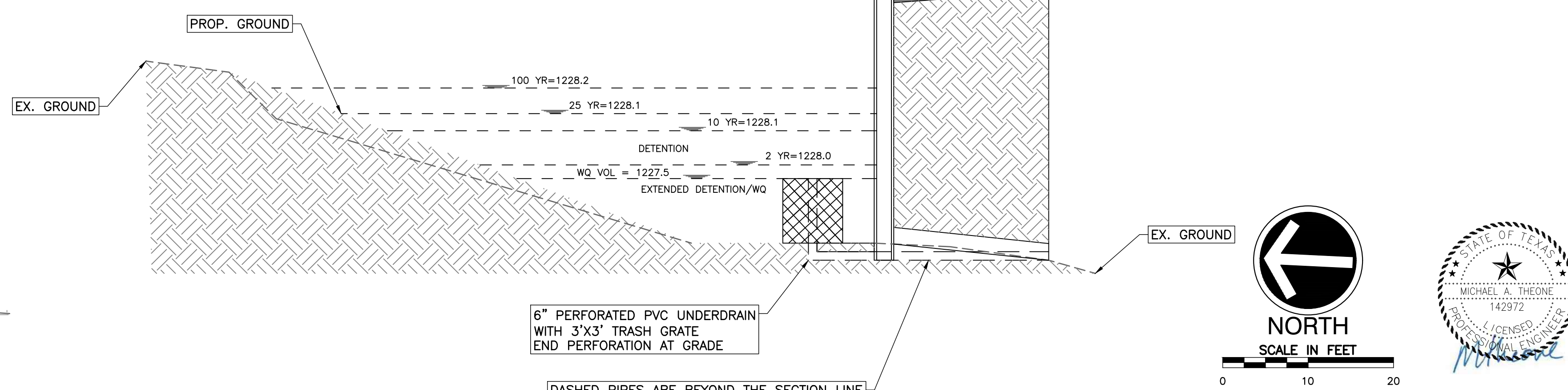
Storm Event	*Q-Routed (cfs) [Q]	Length of Level Spreader (ft) [L]	Height of Level Spreader (ft) [h]	Area of Level Spreader (ft^2) [A=L*h]	Level Spreader Velocity (fps) [v]
2-yr	14.5	21.0	0.50	10.5	1.4
10-yr	26.0	21.0	0.50	10.5	2.5
25-yr	37.1	21.0	0.50	10.5	3.5
100-yr	61.0	21.0	0.50	10.5	5.8



2 POND CROSS SECTION C
SCALE: NTS



2 POND CROSS SECTION B
SCALE: NTS



2 POND CROSS SECTION A
SCALE: NTS

811 !!! CAUTION !!!
 IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

STATE OF TEXAS
 MICHAEL A. THEONE
 142972
 LICENSED PROFESSIONAL ENGINEER

NORTH
 SCALE IN FEET
 0 10 20

REVISION RECORD

NO.	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
 Texas Registered Engineering Firm F-88
 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0086
 www.cetcinc.com

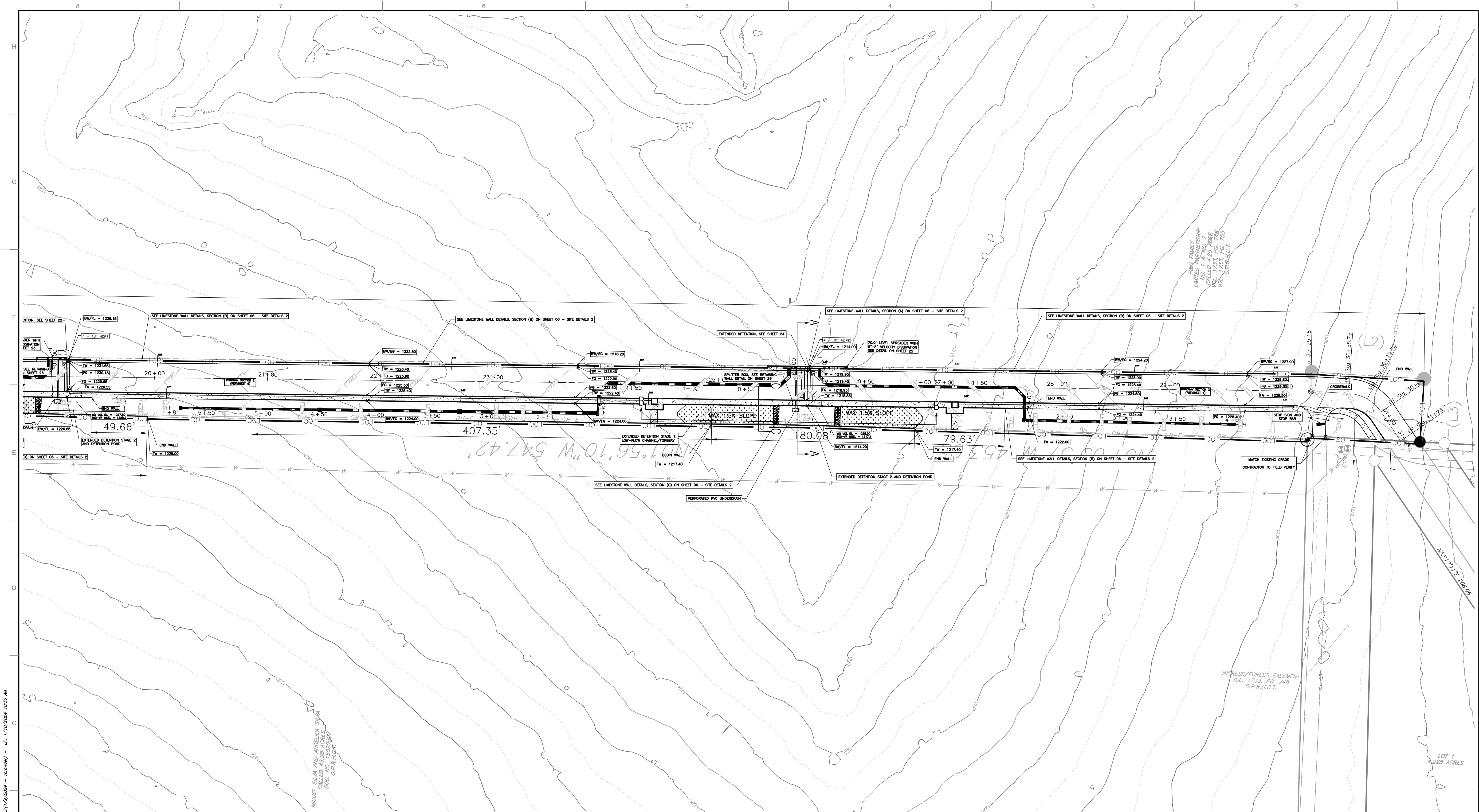
HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

GRADING AND DRAINAGE 2 CALCS

DATE: 1/10/2024 DRAWN BY: CEC
 DWG SCALE: 1"=10' CHECKED BY: CB
 PROJECT NO: 324-199
 APPROVED BY: MT

DRAWING NO. **23**

SHEET 23 OF 42



LINETYPE LEGEND

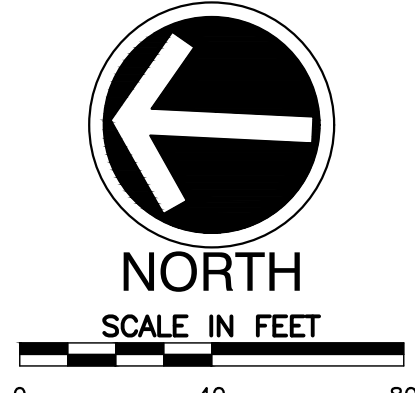
PROPOSED	EXISTING	DESCRIPTION
---	---	RIGHT-OF-WAY
- - - -	- - - -	LOT BOUNDARY
- - - -	- - - -	EASEMENT
- x - x -	- x - x -	FENCE: BARBED
- - -	- - -	FENCE: WOOD (PICKET)
- - -	- - -	FENCE: WOOD (PRIVACY)
- - - -	- - - -	FENCE: CHAIN LINK
- - - -	- - - -	FENCE: IRON
- - - -	- - - -	MINOR CONTOUR
- - - -	- - - -	MAJOR CONTOUR
- - - -	- - - -	ELECTRIC LINE
- - - -	- - - -	OVERHEAD ELECTRIC WIRE
- - - -	- - - -	UNDERGROUND ELECTRIC LINE
- - - -	- - - -	TELEPHONE
- - - -	- - - -	COMMUNICATIONS LINE
- - - -	- - - -	CABLE TELEVISION
- - - -	- - - -	FIBER OPTIC LINE

PROPOSED	EXISTING	DESCRIPTION
○	○	GAS LINE
○	○	OVERHEAD UTILITY
○	○	UNDERGROUND UTILITY
SAN	SAN	SANITARY SEWER LINE
W	W	WATER LINE
F	F	FIRE LINE
---	---	ROAD CENTERLINE
---	---	CURB & GUTTER
---	---	STRIPING
---	---	FIRE LINE STRIPING
LOC	LOC	H.C. ACCESSIBLE ROUTE
---	---	LIMITS OF CONSTRUCTION
---	---	RAIL ROAD
---	---	FLOODWAY
---	---	CHWZ
---	---	STORM SEWER
---	---	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
●	●	BENCHMARK
○	○	CUT IN CONCRETE
○	○	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
○	○	PIPE BREAK
○	○	PIPE CAP
○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
○	○	UTILITY METER
○	○	BACKFLOW PREVENTER
○	○	FLUSH CONNECTION
○	○	FIRE HYDRANT

PROPOSED	EXISTING	DESCRIPTION
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BIB
○	○	SANITARY M.H.
○	○	CLEANOUT
○	○	DRAINAGE M.H.
○	○	DOWN SPOUT
○	○	AREA INLET
○	○	CURB INLET
○	○	HEADWALL
○	○	SAFETY END TREATMENT
○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
○	○	ELEC./TELE. POLE
○	○	GUY WIRE
○	○	LIGHT FIXTURE
○	○	TRAFFIC SIGNAL
○	○	PEDESTRIAN SIGNAL
○	○	UTILITY (PULL) BOX
○	○	UTILITY RISER
○	○	UTILITY SERVICE



811 !!! CAUTION !!!
 IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, and NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

A:\130-200\130-200\Drawings\130-200-DR-130-200-001-130-200-001.dwg - 1/10/2024 10:30 AM

REVISION RECORD

NO.	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
 1221 South MoPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.359.0096
 www.cetinc.com

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

GRADING AND DRAINAGE 3
 DATE: 1/10/2024
 DWG SCALE: 1"=40'
 PROJECT NO: 324-199
 APPROVED BY: [Signature]
 SHEET 24 OF 42

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Hardy Driveway**
Date Prepared: **7/13/2022**

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348. Characters shown in red are data entry fields. Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_{R} = 27.2(A_{I} \times P)$

where:
 L_{R} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load
 A_{I} = Net increase in impervious area for the project
 P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project
 County = **Hays**
 Total project area included in plan = **3.71** acres
 Predevelopment impervious area within the limits of the plan = **1.14** acres
 Total post-development impervious area within the limits of the plan = **1.850** acres
 Total post-development impervious cover fraction = **0.50**
 P = **33** inches

L_{R} TOTAL PROJECT = **637** lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = **4**

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = **3**

Total drainage basin/outfall area = **1.49** acres
 Predevelopment impervious area within drainage basin/outfall area = **0.44** acres
 Post-development impervious area within drainage basin/outfall area = **0.720** acres
 Post-development impervious fraction within drainage basin/outfall area = **0.48**
 L_{R} THIS BASIN = **251** lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Extended Detention**
 Removal efficiency = **75** percent

4. Calculate Maximum TSS Load Removed (L_{R}) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_{R} = (\text{BMP efficiency}) \times P \times (A_{I} \times 34.6 + A_{P} \times 0.54)$

where:
 A_{I} = Total On-Site drainage area in the BMP catchment area
 A_{P} = Impervious area proposed in the BMP catchment area
 A_{P} = Pervious area remaining in the BMP catchment area
 L_{R} = TSS Load removed from this catchment area by the proposed BMP

A_{I} = **1.49** acres
 A_{P} = **0.720** acres
 A_{P} = **0.77** acres
 L_{R} = **627** lbs.

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired L_{R} THIS BASIN = **280** lbs.
 F = **0.46**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth = **0.37** inches
 Post Development Runoff Coefficient = **0.35**
 On-site Water Quality Volume = **697** cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP = **0.00** acres
 Off-site impervious cover draining to BMP = **0.00** acres
 Impervious fraction of off-site area = **0**
 Off-site Runoff Coefficient = **0.00**
 Off-site Water Quality Volume = **0** cubic feet

Storage for Sediment = **139** cubic feet
 Total Capture Volume (required water quality volume(s) x 1.20) = **837** cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP.
 The values for BMP Types not selected in cell C45 will show NA.

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = **837** cubic feet

EXTENDED DETENTION CALCULATIONS FOR DEVELOPMENT PERMIT

DRAINAGE AREA DATA:
 Drainage Area to Control (DA) 1.49 ac.
 Drainage Area Impervious Cover 48.00% %

WATER QUALITY CONTROL CALCULATIONS (PER TCEQ RG-348):

Water Quality Volume (REQ WQV = 1.2*WQV PER TCEQ) **837 cf**

100-year Peak Flow Rate to Control (Q100) **14.8 cfs**

Forebay Area (Af) **400.0 sf**

Depth of forebay (D) **Min 2 ft**

Forebay Water Quality Volume (WQVponded=Af*D) **800.0 cf**

Stage 2 Water Quality Volume **104.0 cf**

Water Quality Elevation (WQE) **1215 ft msl.**

Extended Detention Drawdown Time **Min 48 hr**

Underdrain Orifice Size (Diameter) **0.3 in**

Underdrain Orifice Size (Area) **0.0771 sq-in**

Orifice Calculation:
 $Q = V / T$

WQV **837.0 cf**

Time = 48 Hr x 60 Min x 60 Sec = 172800 Sec

Q **0.004844 cfs**

Assumption: Average Head Will Occur .5 Feet Below WQE

WQE **1215.75 ft msl.**

Orifice E **1211.724 ft msl.**

H average **3.526 ft**

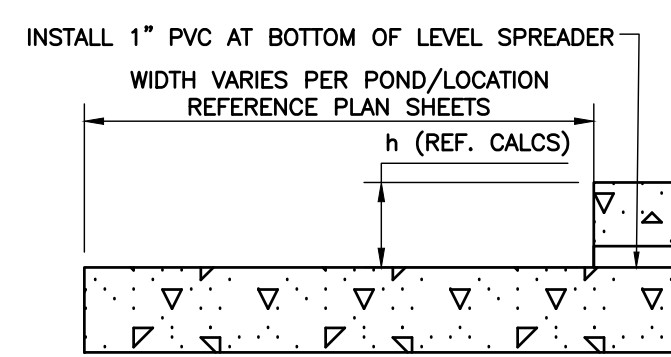
$Q = 0.6 * A * (2 * 32.2 * (H))^{0.5}$

A **0.000536 sqft**

D **0.026117 ft**

D **0.313408 in**

	REQUIRED	PROVIDED
Water Quality Volume (REQ WQV = 1.2*WQV PER TCEQ)	837 cf	904.0 cf
100-year Peak Flow Rate to Control (Q100)	14.8 cfs	
Forebay Area (Af)		400.0 sf
Depth of forebay (D)	Min 2 ft	2.0 ft
Forebay Water Quality Volume (WQVponded=Af*D)		800.0 cf
Stage 2 Water Quality Volume		104.0 cf
Water Quality Elevation (WQE)		1215 ft msl.



Pond 3 - Detention Pond Values from HEC-HMS Hydrologic Modeling Software

Storm Event	Q-Ex (cfs)	Q-Pr (cfs)	PR-Routed (cfs)	WS Elevation (ft)
2-yr	4.5	4.4	4.4	1216.7
10-yr	8.3	7.9	7.9	1217.1
25-yr	11.1	10.6	10.6	1217.2
100-yr	16.9	16.5	16.5	1217.4

Pond 3 Outflow Velocity (Weir) [v=Q/A]

Storm Event	*Q-Routed (cfs) [Q]	Area of Weir (ft*2) [A]	Weir Velocity (fps) [v]
2-yr	4.4	1.9	2.315789474
10-yr	7.9	4.9	1.61
25-yr	10.6	6.0	1.77
100-yr	16.5	7.5	2.20

Pond 3 Outflow Velocity (Orifice) [v=Cd(2gH)^(1/2)]

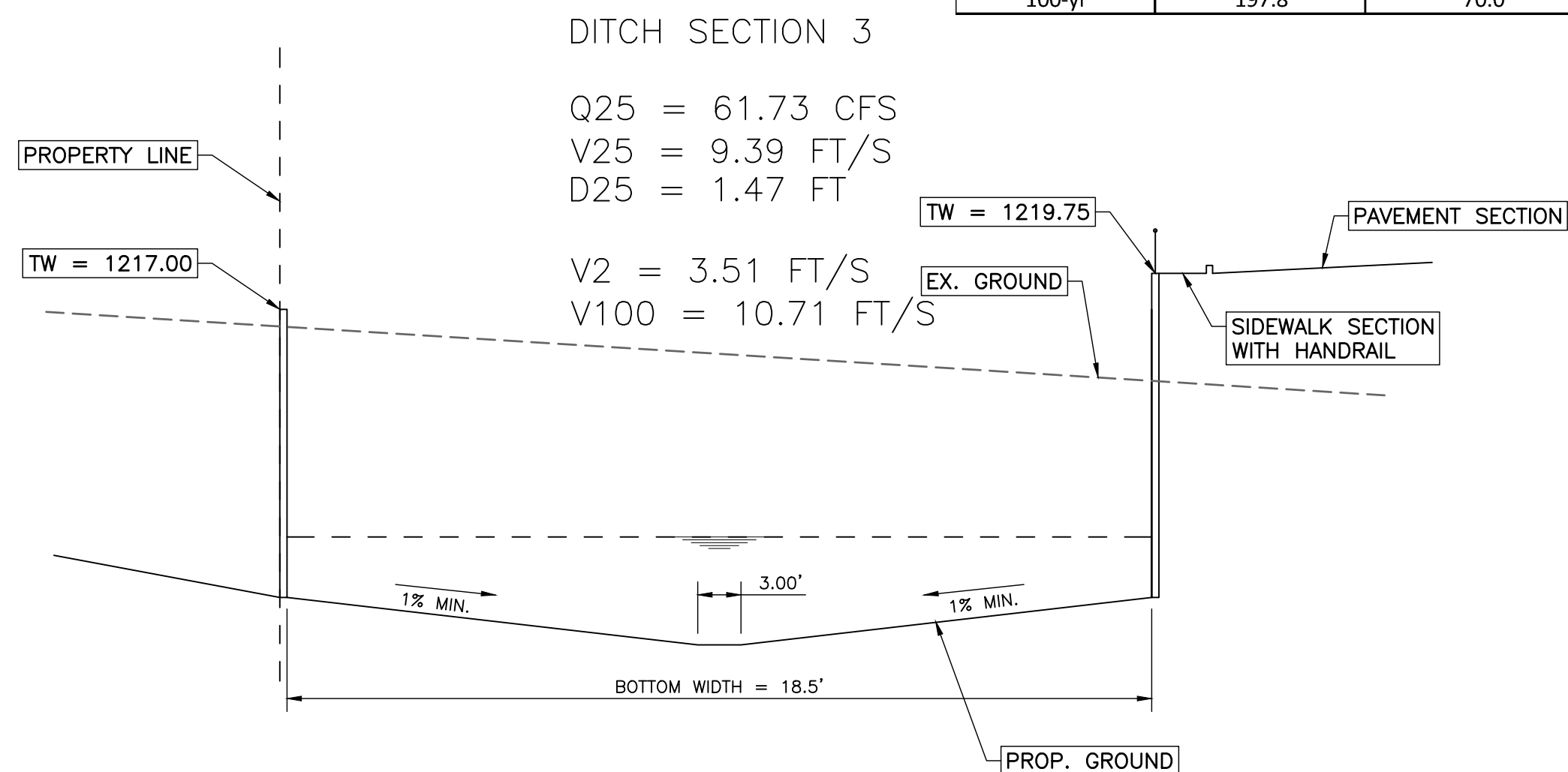
Storm Event	Discharge	Head (ft) [H]	Orifice Velocity (fps)
2-yr	0.6	1.0	4.7
10-yr	0.6	1.3	5.6
25-yr	0.6	1.5	5.8
100-yr	0.6	1.7	6.2

HARDY DRIVEWAY Detention Pond Stage Values - BMP 3

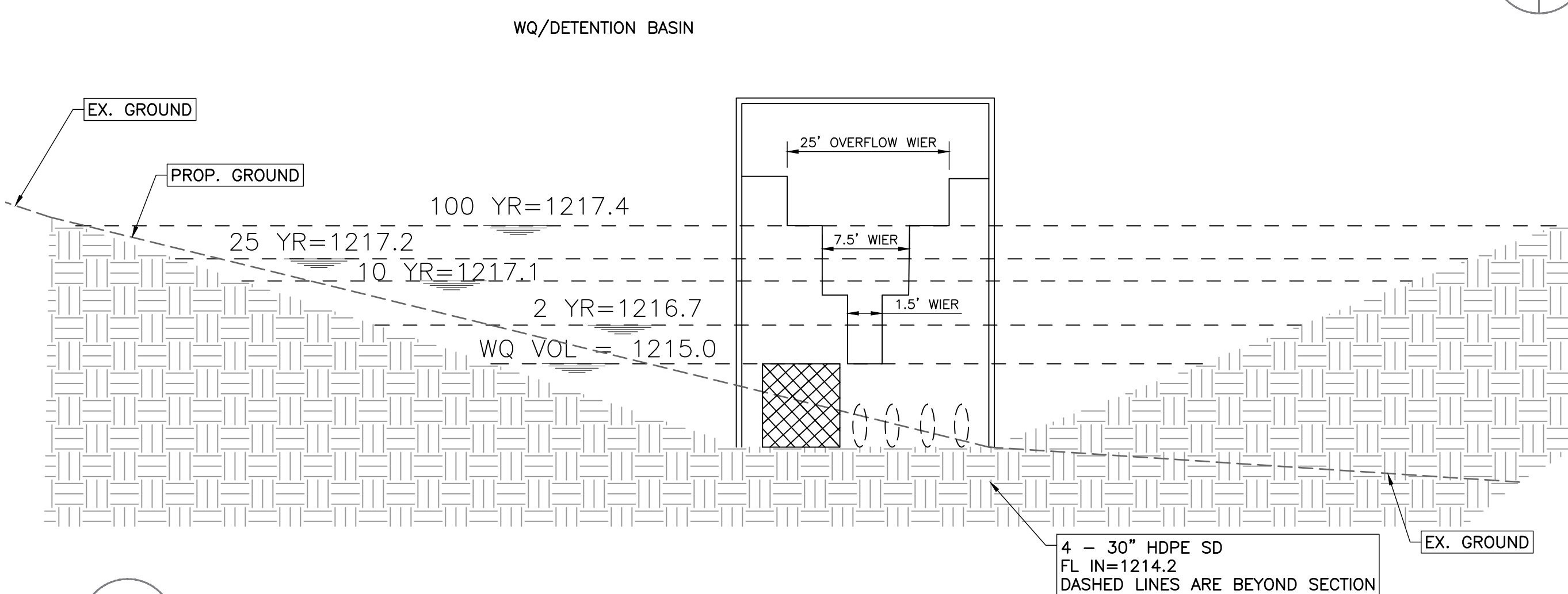
Stage	Area (sf)	Area (ac)	Volume (cf)	Cum. Volume (cf)	Ac-ft
1215.75	0	0.000000	0 cf	0 cf	0.0000
1216.00	850	0.019513	106	106	0.0024
1217.00	3,000	0.068871	1,925	2,031	0.0466
1218.00	4,467	0.102548	3,734	5,765	0.1323
1219.00	5,735	0.131657	5,101	10,866	0.2494
1220.00	6,597	0.151446	6,166	17,032	0.3910

Pond 3 Outflow Velocity (Level Spreader) [v=Q/A]

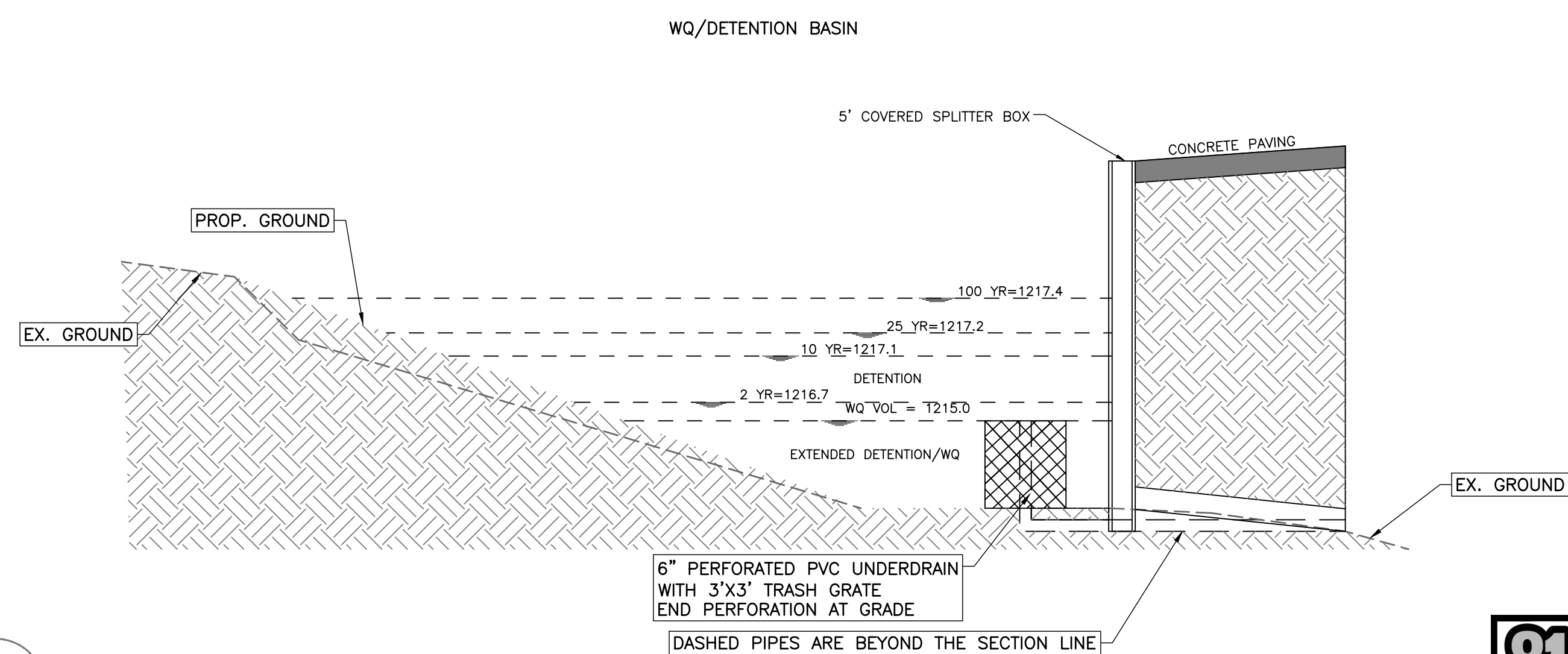
Storm Event	*Q-Routed (cfs) [Q]	Length of Level Spreader (ft) [L]	Height of Level Spreader (ft) [h]	Area of Level Spreader (ft*2) [A=L*h]	Level Spreader Velocity (fps) [v]
2-yr	47.0	70.0	0.50	35	1.3
10-yr	84.4	70.0	0.50	35	2.4
25-yr	120.2	70.0	0.50	35	3.4
100-yr	197.8	70.0	0.50	35	5.7



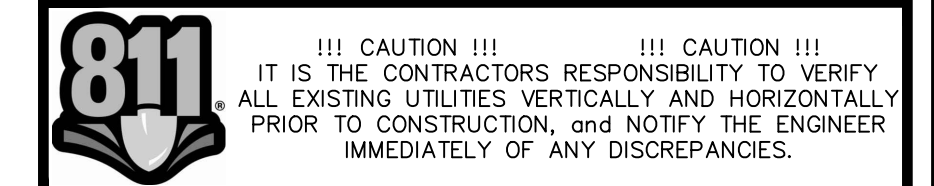
3 POND CROSS SECTION C
SCALE: NTS



3 POND CROSS SECTION B
SCALE: NTS



3 POND CROSS SECTION A
SCALE: NTS



REVISION RECORD

NO.	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
 Texas Registered Engineering Firm F-88
 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0086
 www.cetinc.com

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

GRADING AND DRAINAGE 3 CALCS

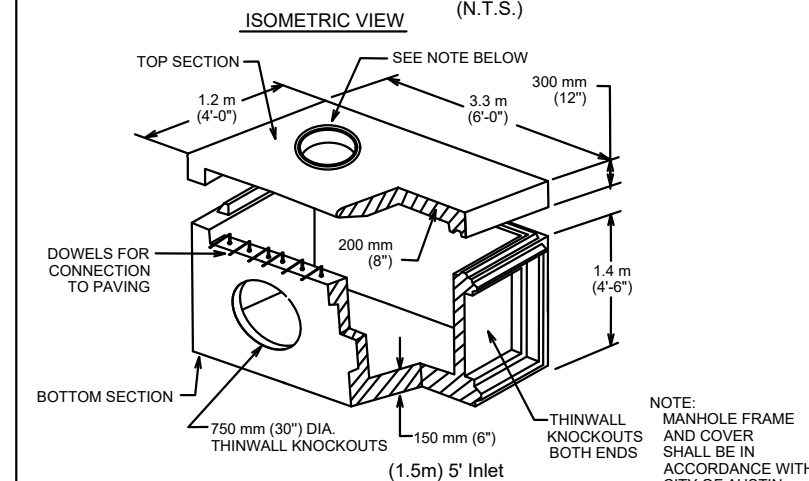
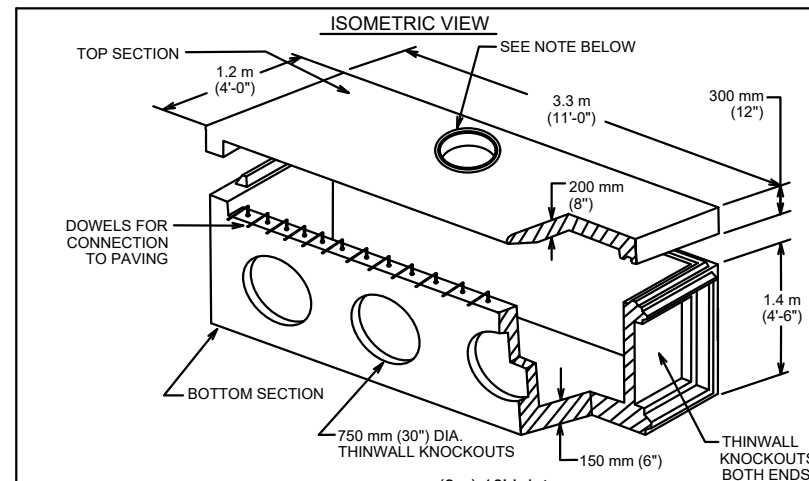
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 APPROVED BY: MT

DRAWING NO. **25**

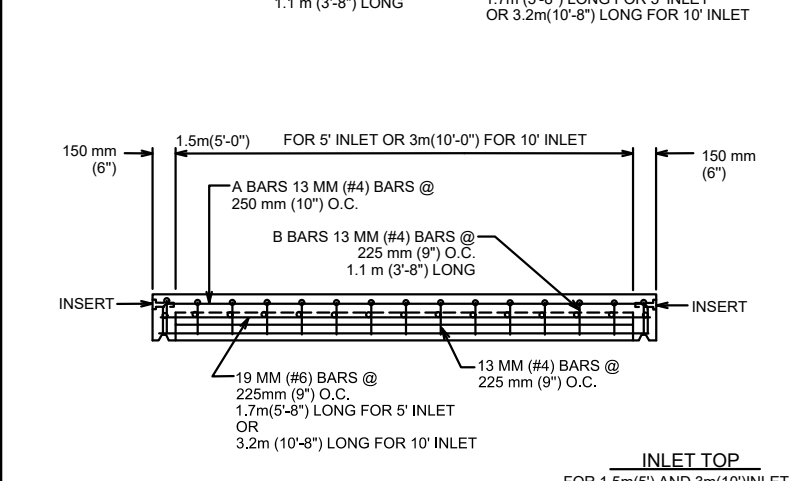
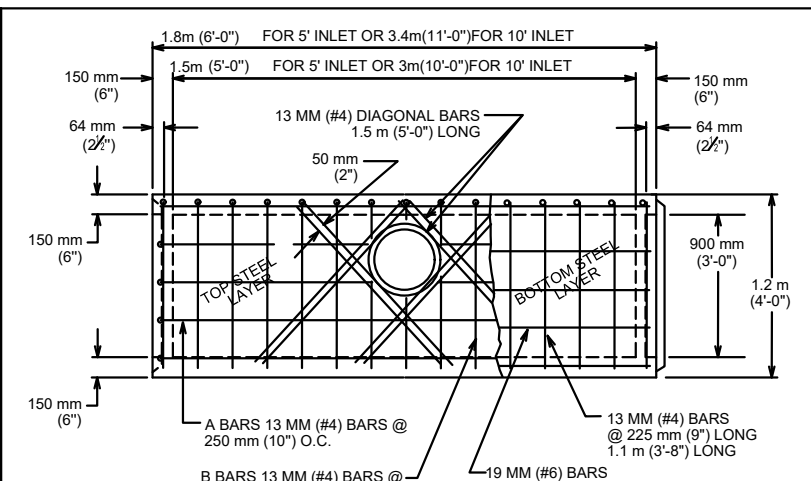
SHEET 25 OF 42

SD-2022-0025

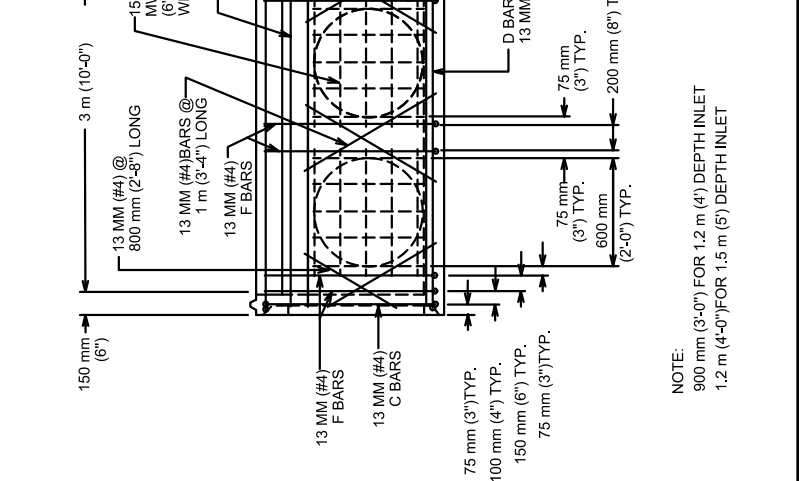
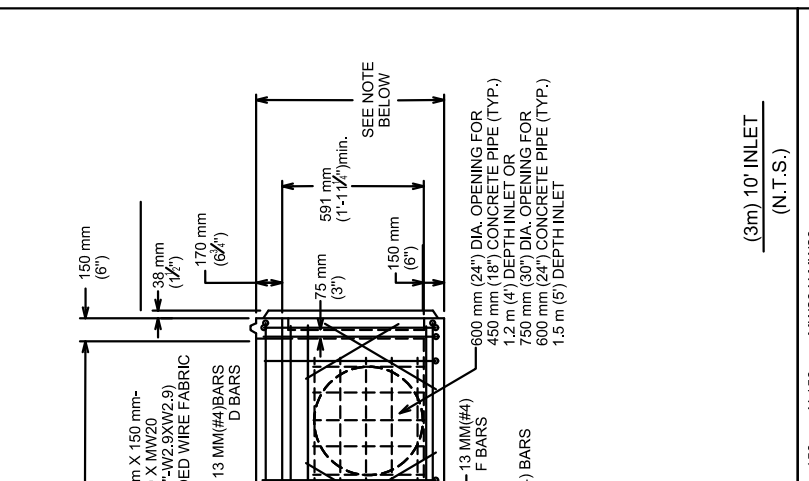
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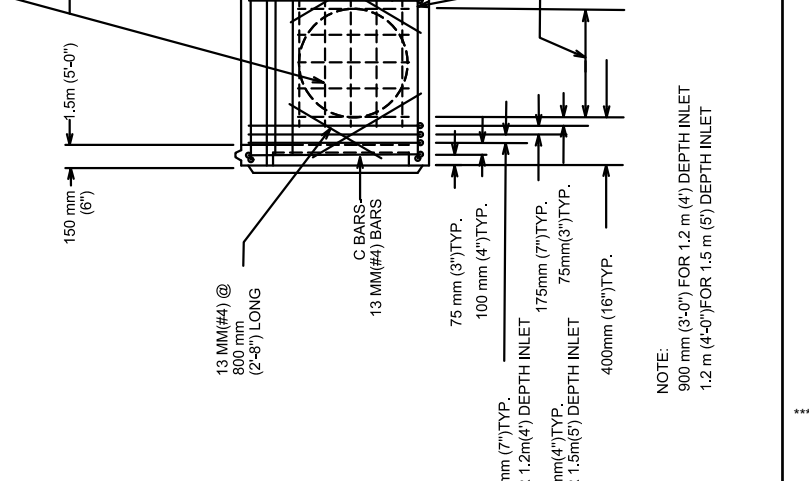
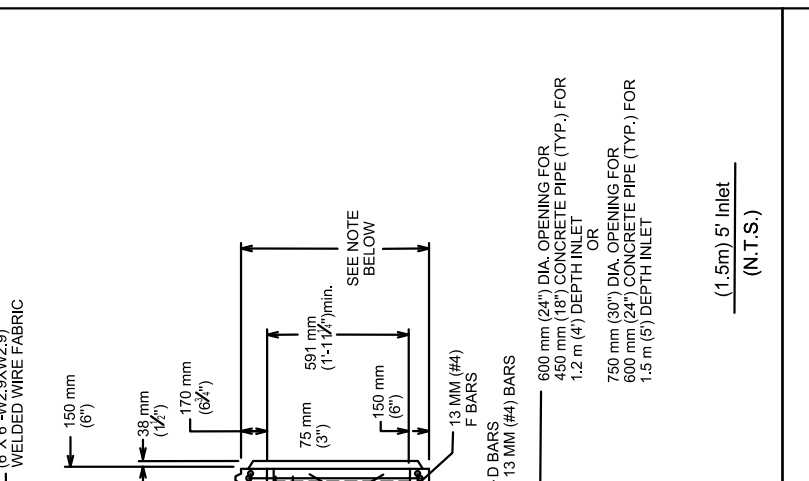
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APPROVED	DATE	REVISION RECORD



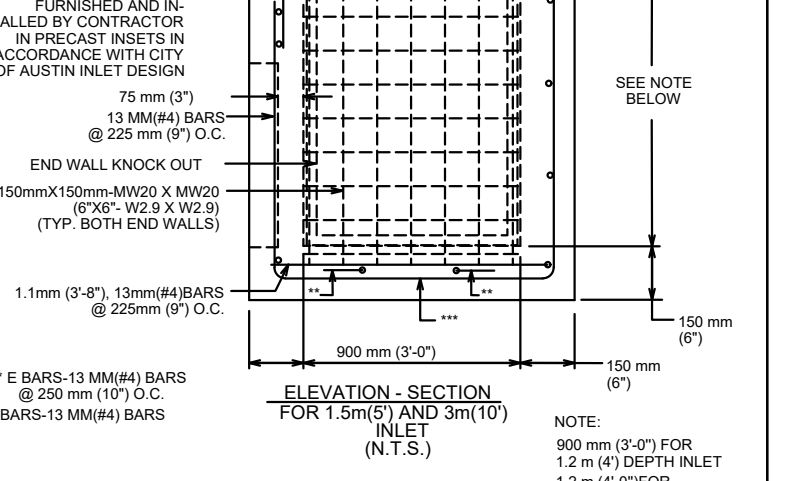
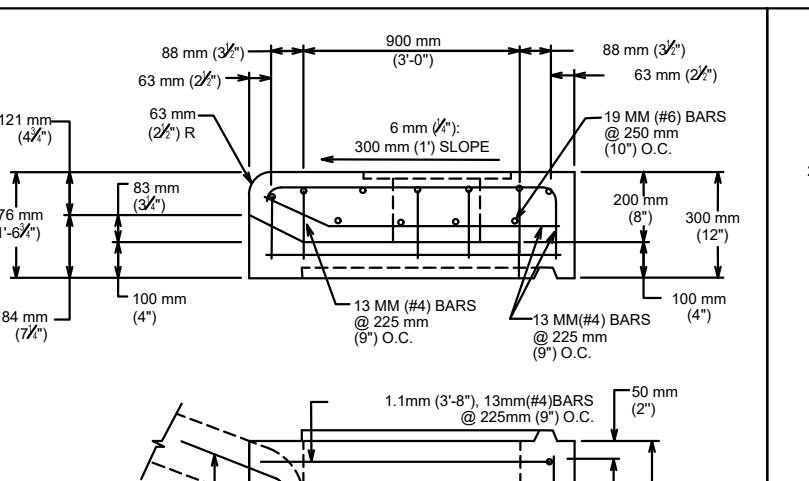
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APPROVED	DATE	REVISION RECORD



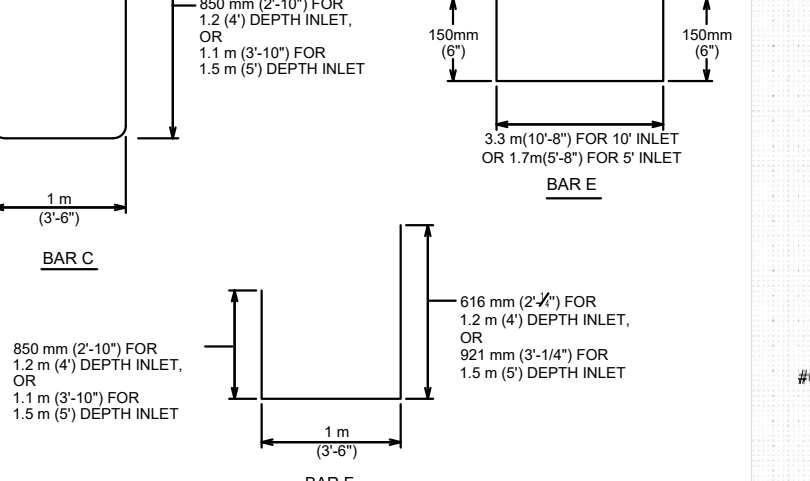
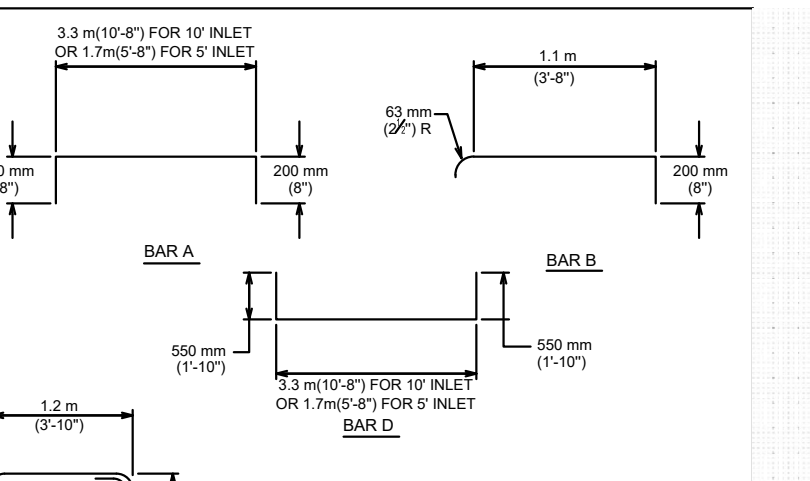
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APPROVED	DATE	REVISION RECORD



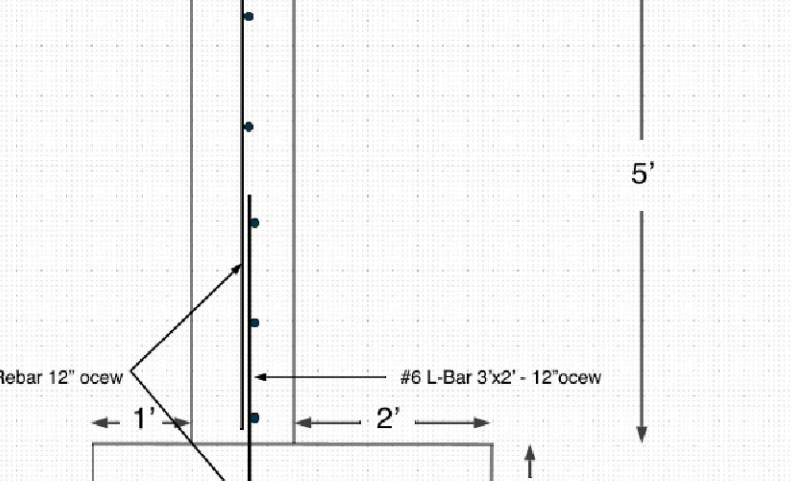
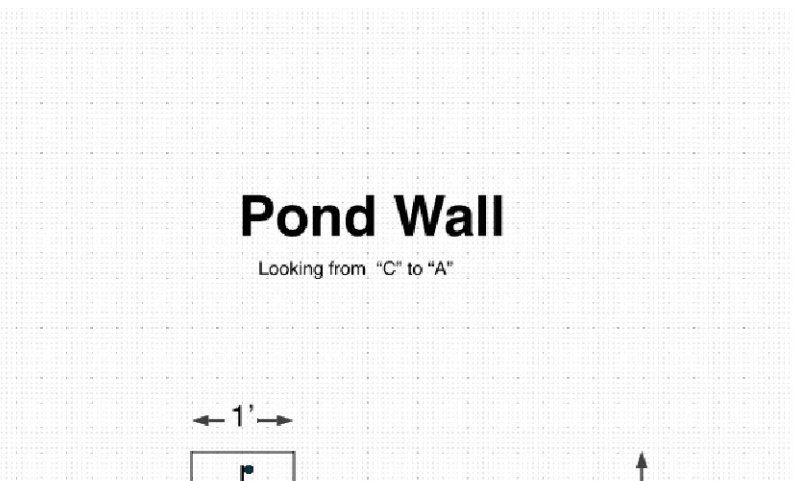
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APPROVED	DATE	REVISION RECORD



CITY OF AUSTIN WATERBURY PROTECTION DEPARTMENT	CURB INLET 1.5m(5') AND 3m(10') PRECAST TYPE I OR TYPE I-A	STANDARD NO. 508S-4
APPROVED	DATE	REVISION RECORD



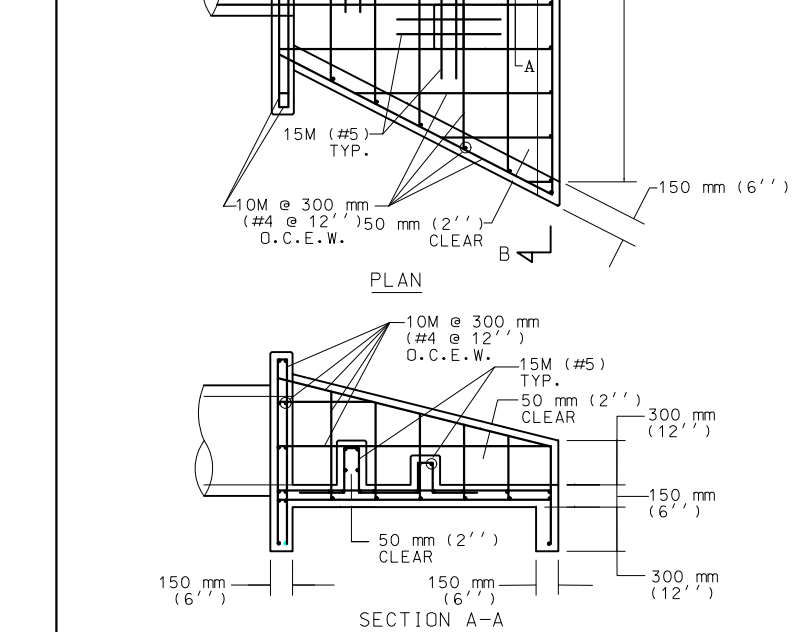
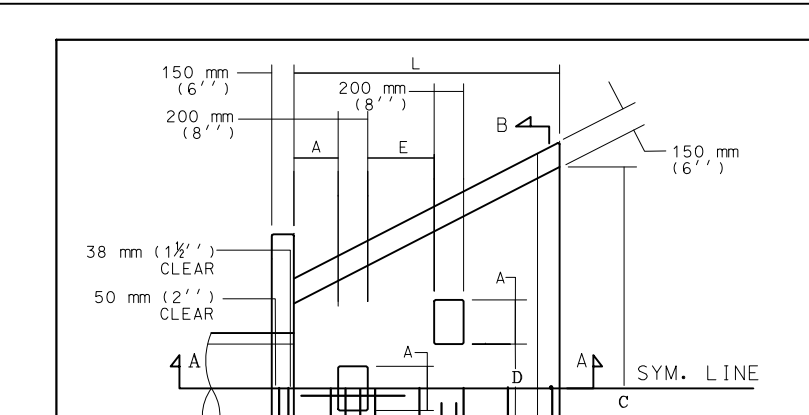
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APPROVED	DATE	REVISION RECORD



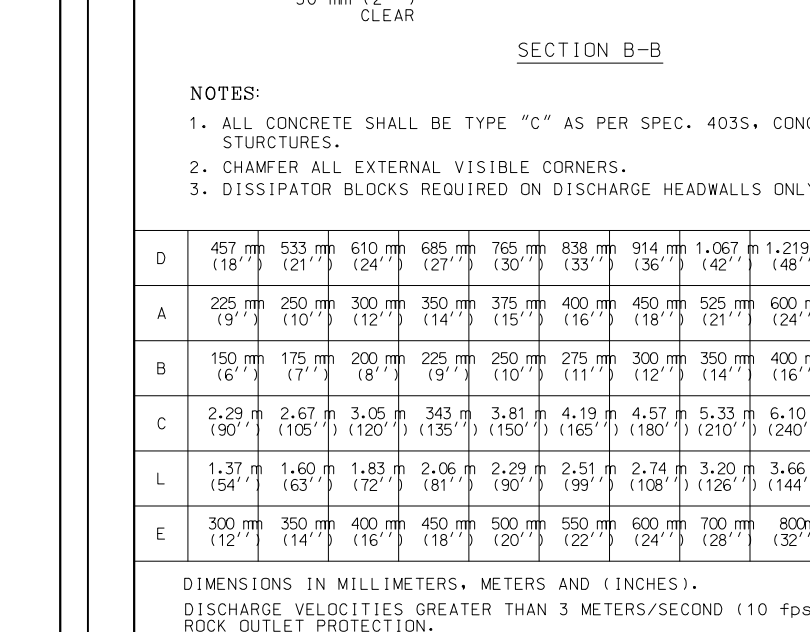
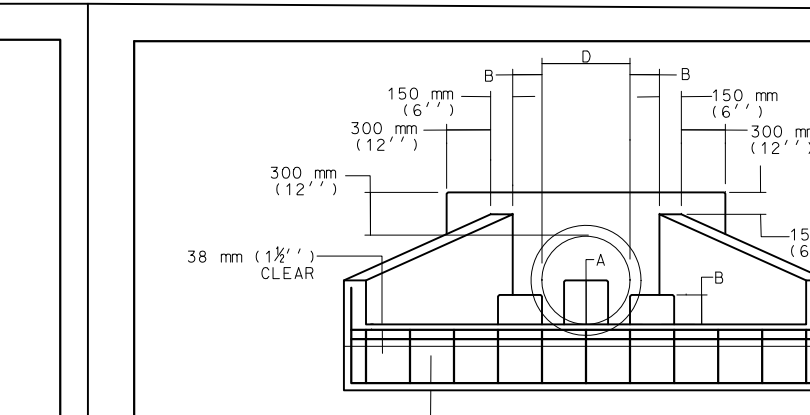
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APPROVED	DATE	REVISION RECORD

NO.	DATE	REVISION RECORD DESCRIPTION

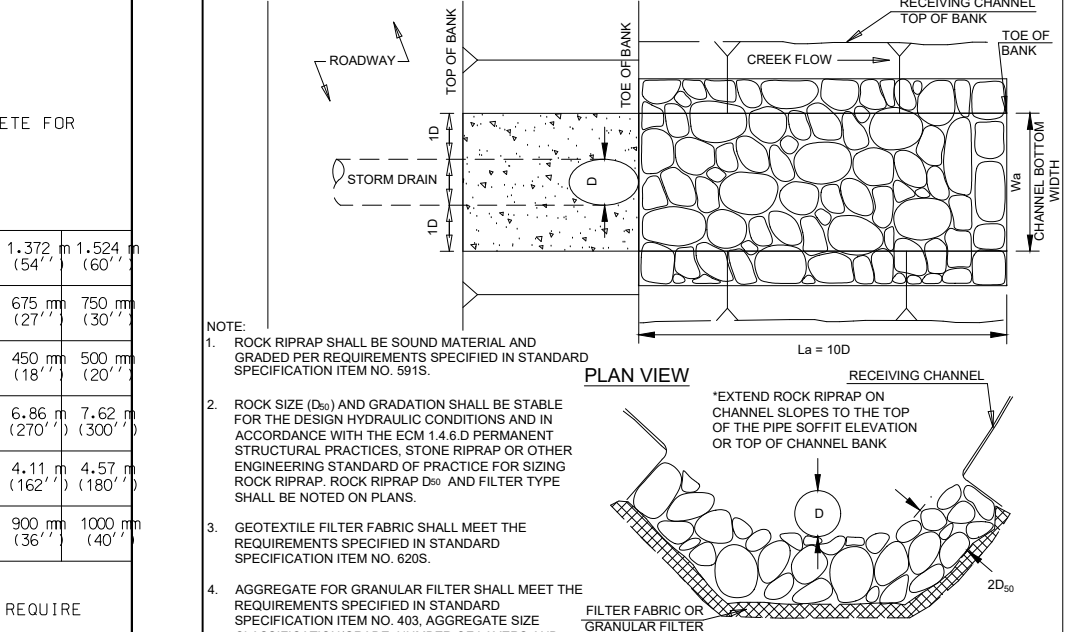
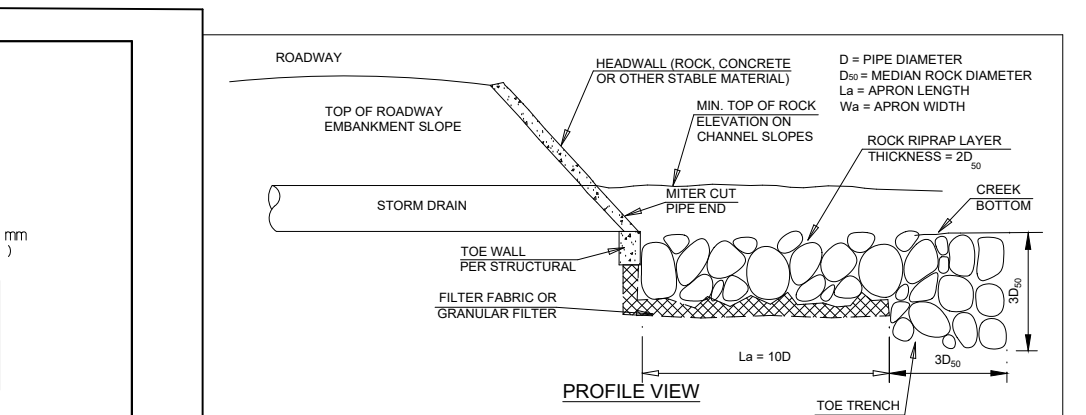
- NOTES:
- ALL CONCRETE SHALL BE CLASS "A" AS PER ITEM 403S.
 - ALL REINFORCING STEEL SHALL BE GRADE 60.
 - DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
 - IN AREAS OF CONFLICT BETWEEN REINFORCING STEEL, PIPES AND MANHOLE FRAME, THE REINFORCEMENT SHALL BE CLEAR AS DIRECTED BY THE ENGINEER.
 - PAYMENT FOR INLET AT THE CONTRACT PRICE SHALL INCLUDE THE TRANSITION CURB, IN ACCORDANCE WITH CITY OF AUSTIN STANDARD SPECIFICATIONS ITEM NO. 508S.
 - INVERT OF INLET SHALL BE SLOPED 1:20 WITH FILL CONCRETE BY CONTRACTOR, SHAPED AS "V" SECTION.
 - THIS STANDARD COMPLETES WITH THE CITY OF AUSTIN STANDARD SPECIFICATIONS ITEM NO. 508S.
 - WHEN PLACING PRECAST INLETS IN SERIES TO CREATE A 15' OR 20' CURB INLET, THE CONNECTION BETWEEN INLET BOXES SHALL BE SOUL-TIGHT AND FULLY CONVEY THE PEAK DESIGN FLOW FROM THE UPSTREAM INLET(S). THE 2:00 INVERT SLOPE DESCRIBED IN NOTE 6 OF THIS DETAIL SHALL EXTEND FROM THE MOST DOWNSTREAM POINT TO THE MOST UPSTREAM OF THE CONNECTED INLET BOXES. AT NO TIME CAN MORE THAN 20' OF CURB OPENING BE CONNECTED TO A MAIN STORM DRAIN LINE WITH ONE LATERAL STORM DRAIN CONNECTION.



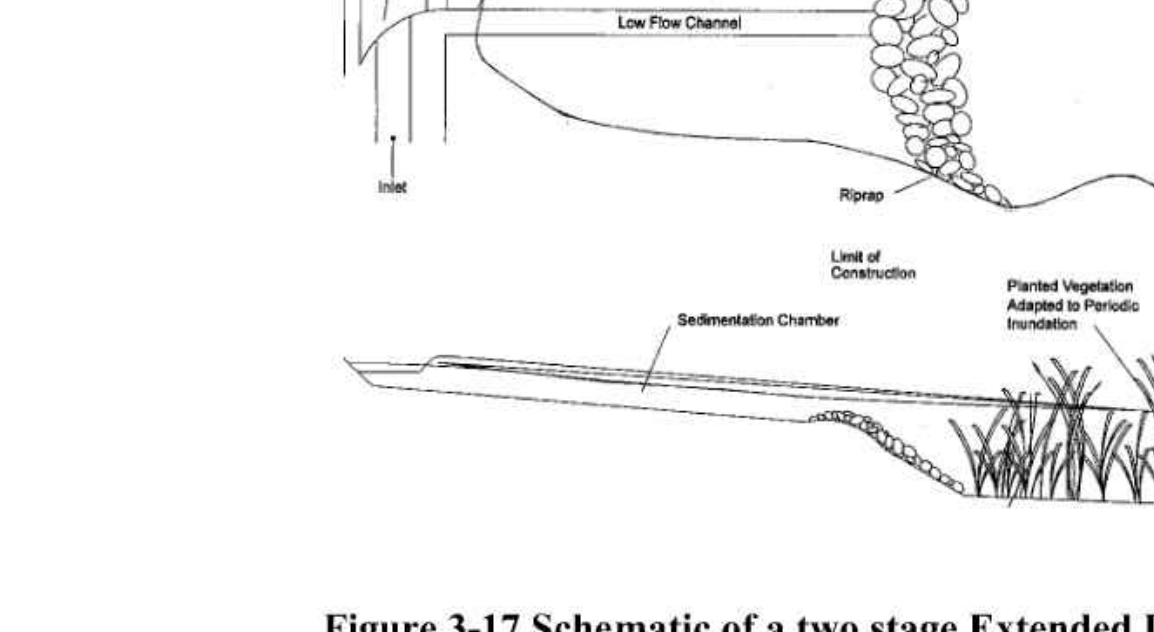
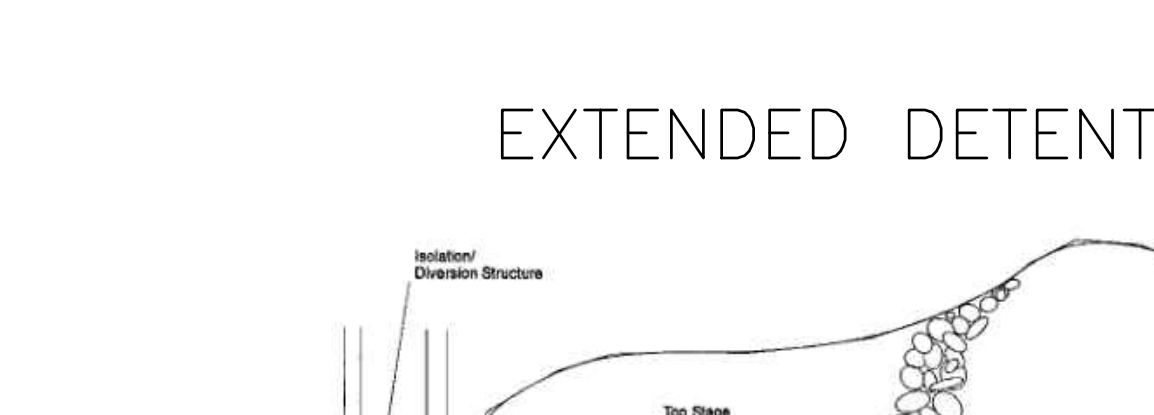
CITY OF AUSTIN WATERBURY PROTECTION DEPARTMENT	STANDARD HEADWALL AND ENERGY DISSIPATORS	STANDARD NO. 508S-13
RECORD COPY SIGNED BY: BILL GARDNER	DATE: 08/20/07	APPROVED



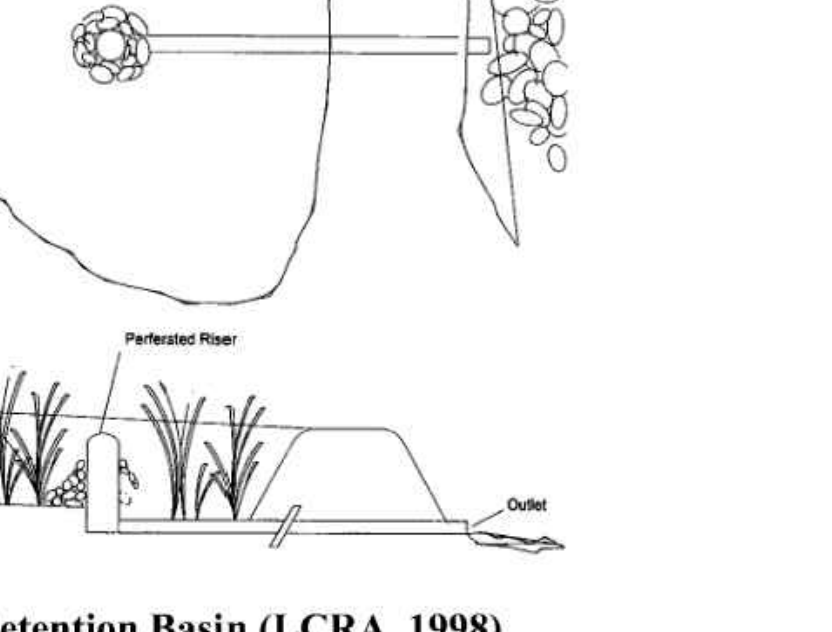
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RECORD COPY SIGNED BY: BILL GARDNER	DATE: 08/20/07	APPROVED



CITY OF AUSTIN WATERBURY PROTECTION DEPARTMENT	STANDARD HEADWALL AND ENERGY DISSIPATORS	STANDARD NO. 508S-13
RECORD COPY SIGNED BY: ANDREW BYARS	DATE: 09/01/2011	APPROVED



CITY OF AUSTIN WATERBURY PROTECTION DEPARTMENT	STANDARD HEADWALL AND ENERGY DISSIPATORS	STANDARD NO. 508S-20
RECORD COPY SIGNED BY: ANDREW BYARS	DATE: 09/01/2011	APPROVED



CITY OF AUSTIN WATERBURY PROTECTION DEPARTMENT	STANDARD HEADWALL AND ENERGY DISSIPATORS	STANDARD NO. 508S-20
RECORD COPY SIGNED BY: ANDREW BYARS	DATE: 09/01/2011	APPROVED

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EXTENDED DETENTION DETAIL

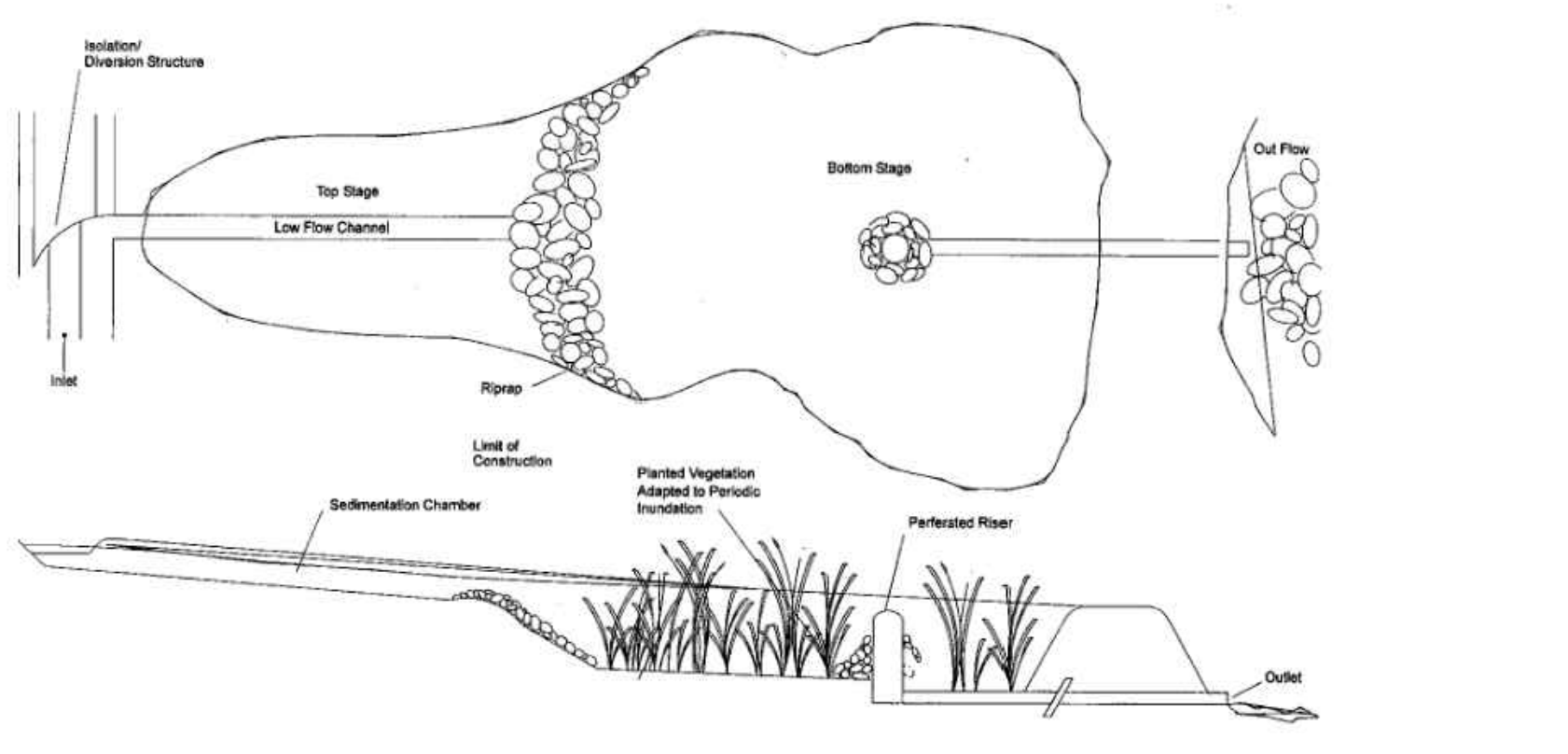
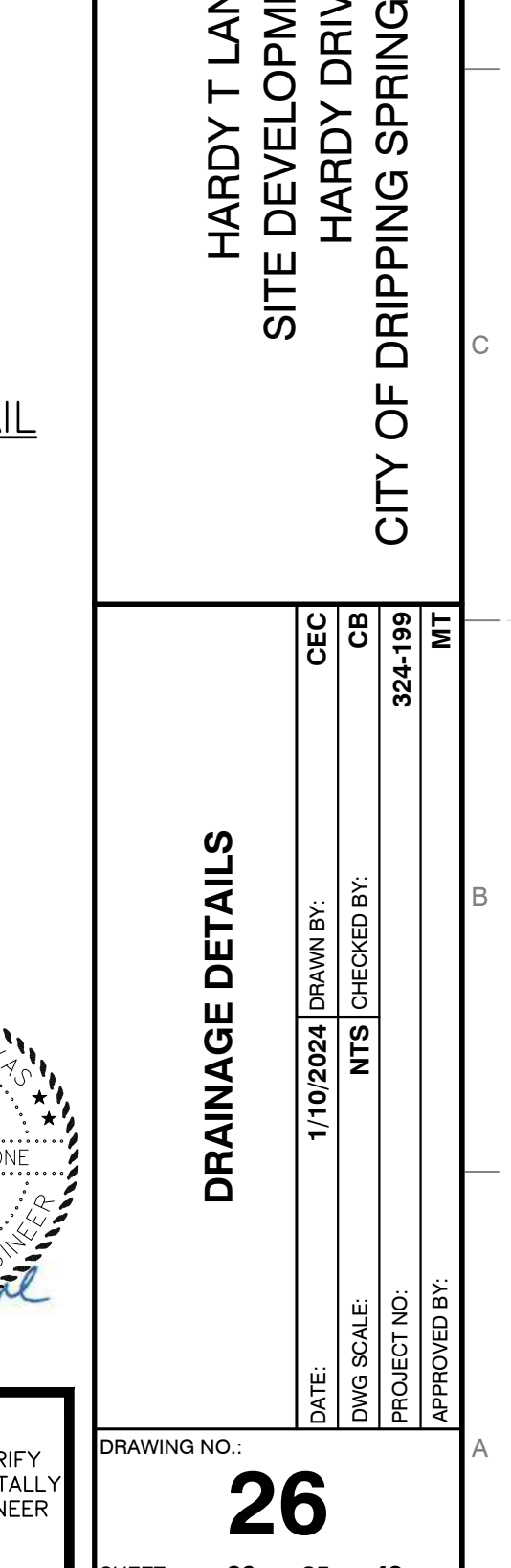
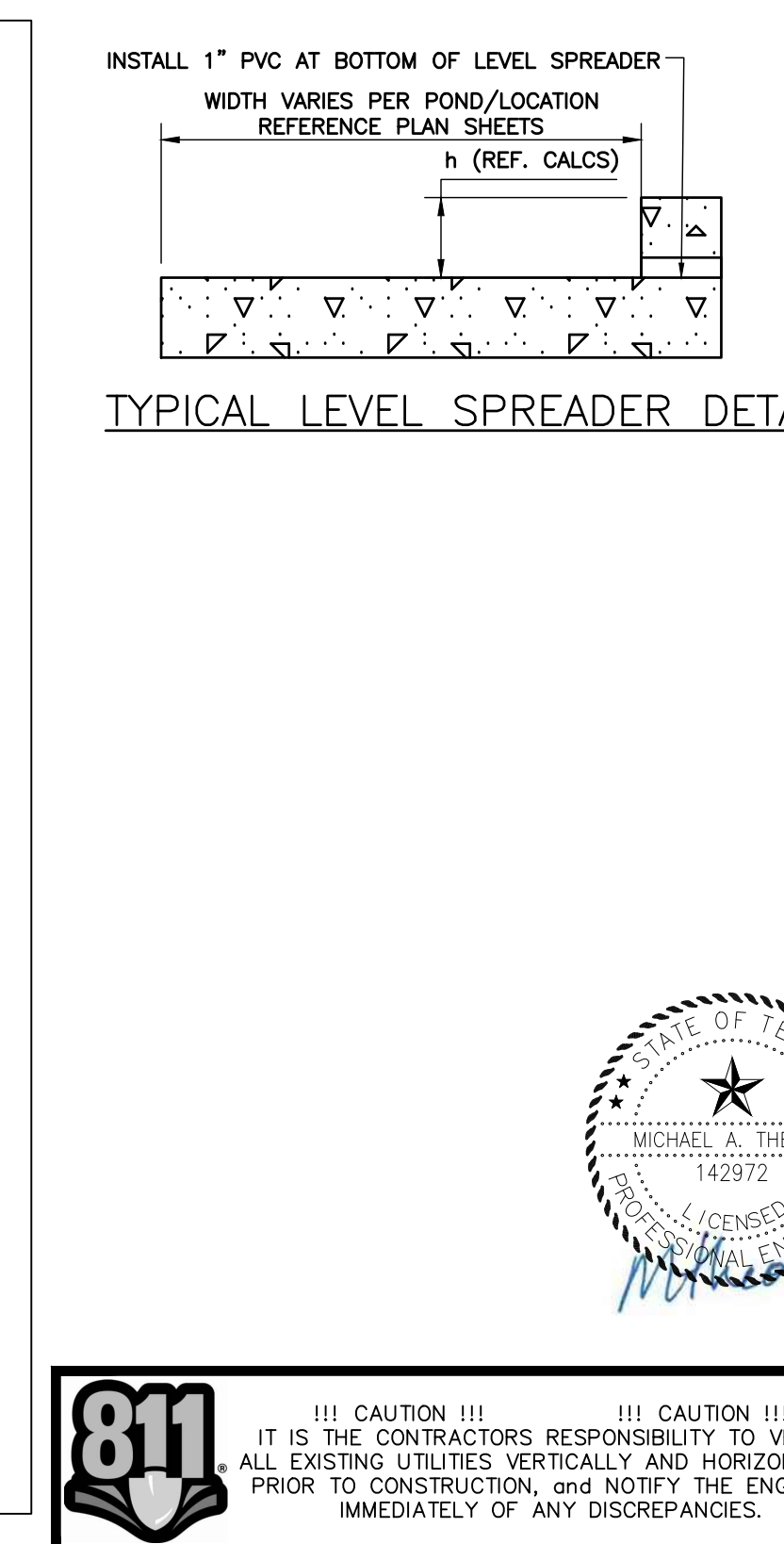
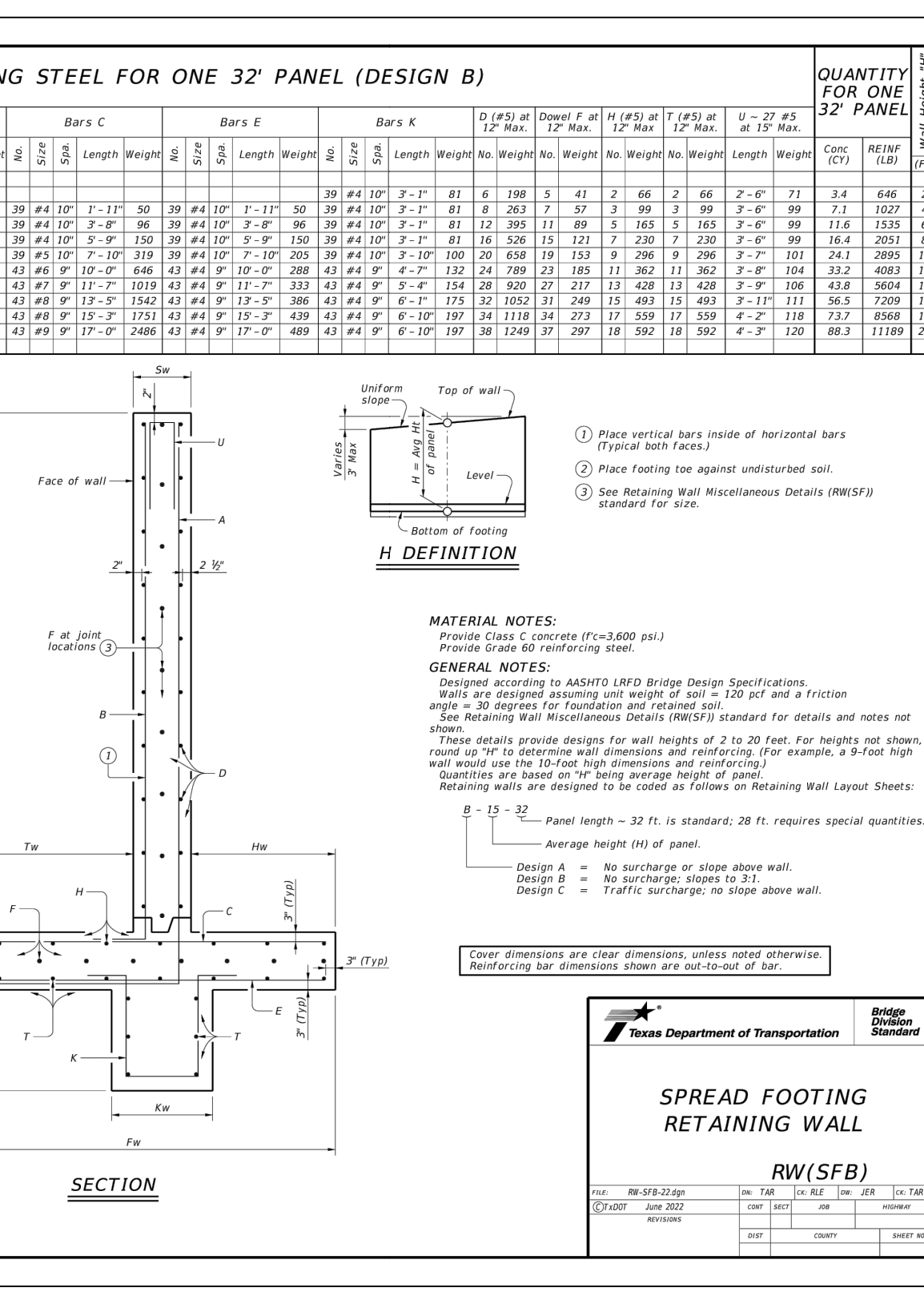
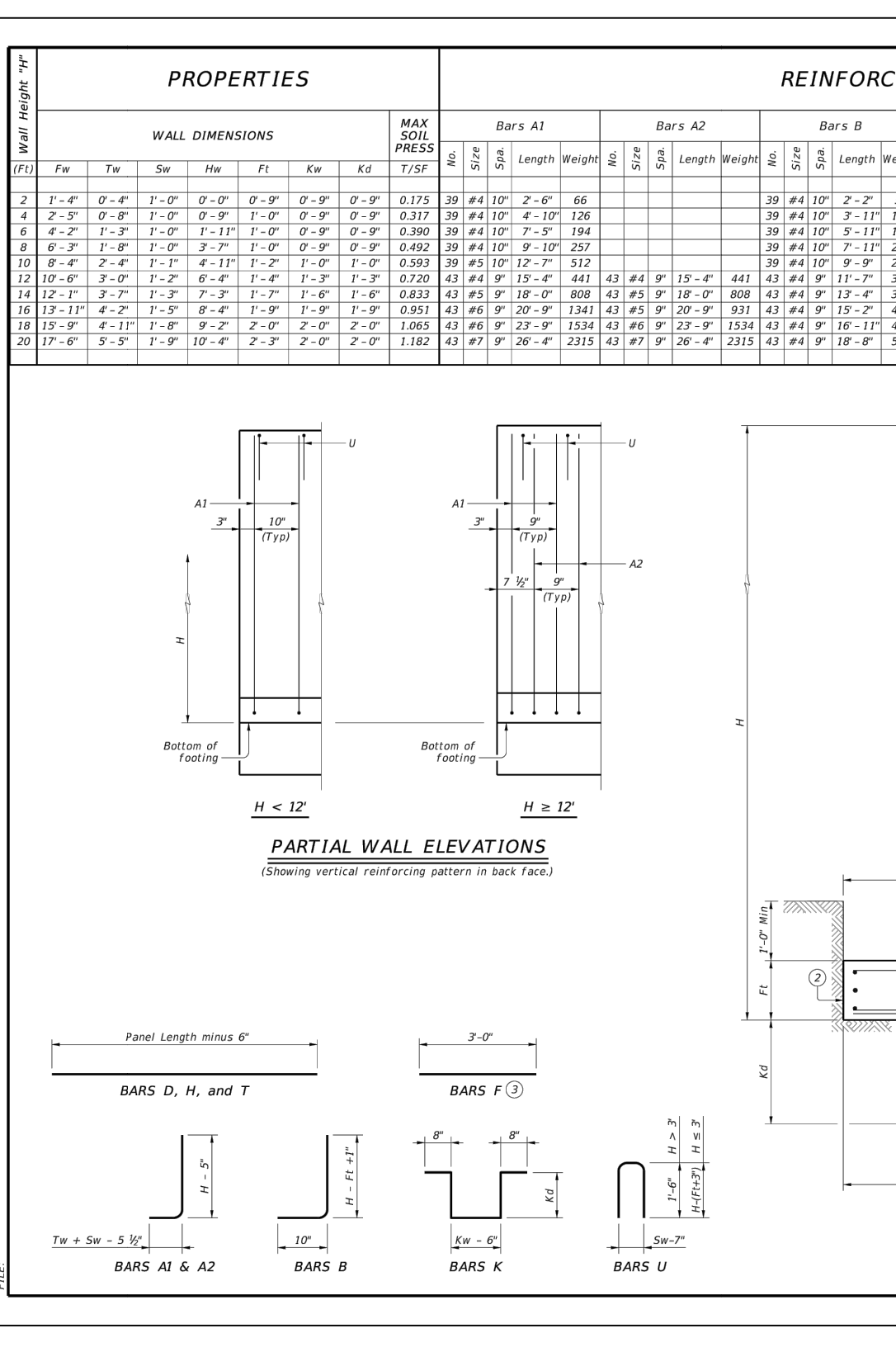
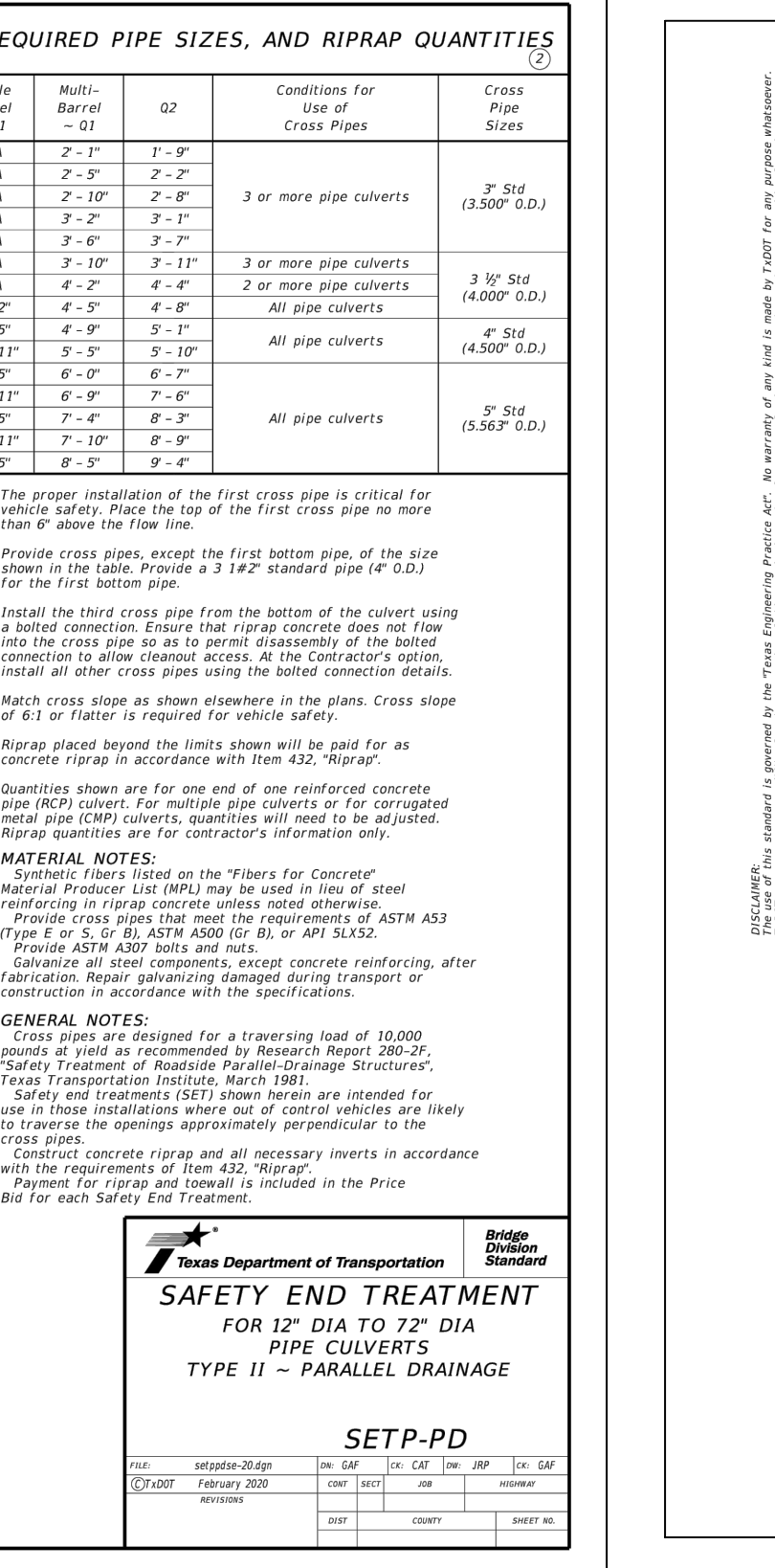
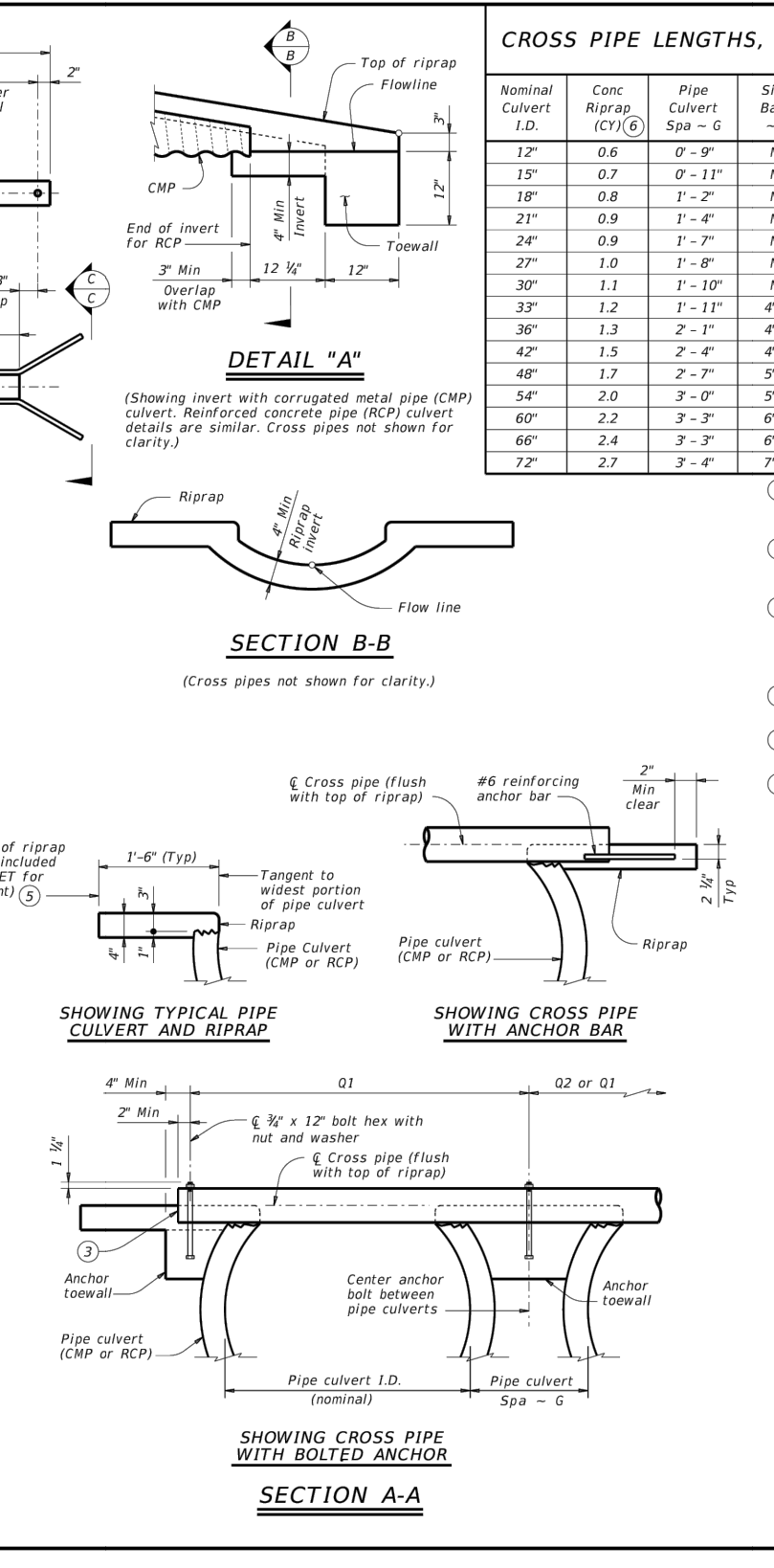
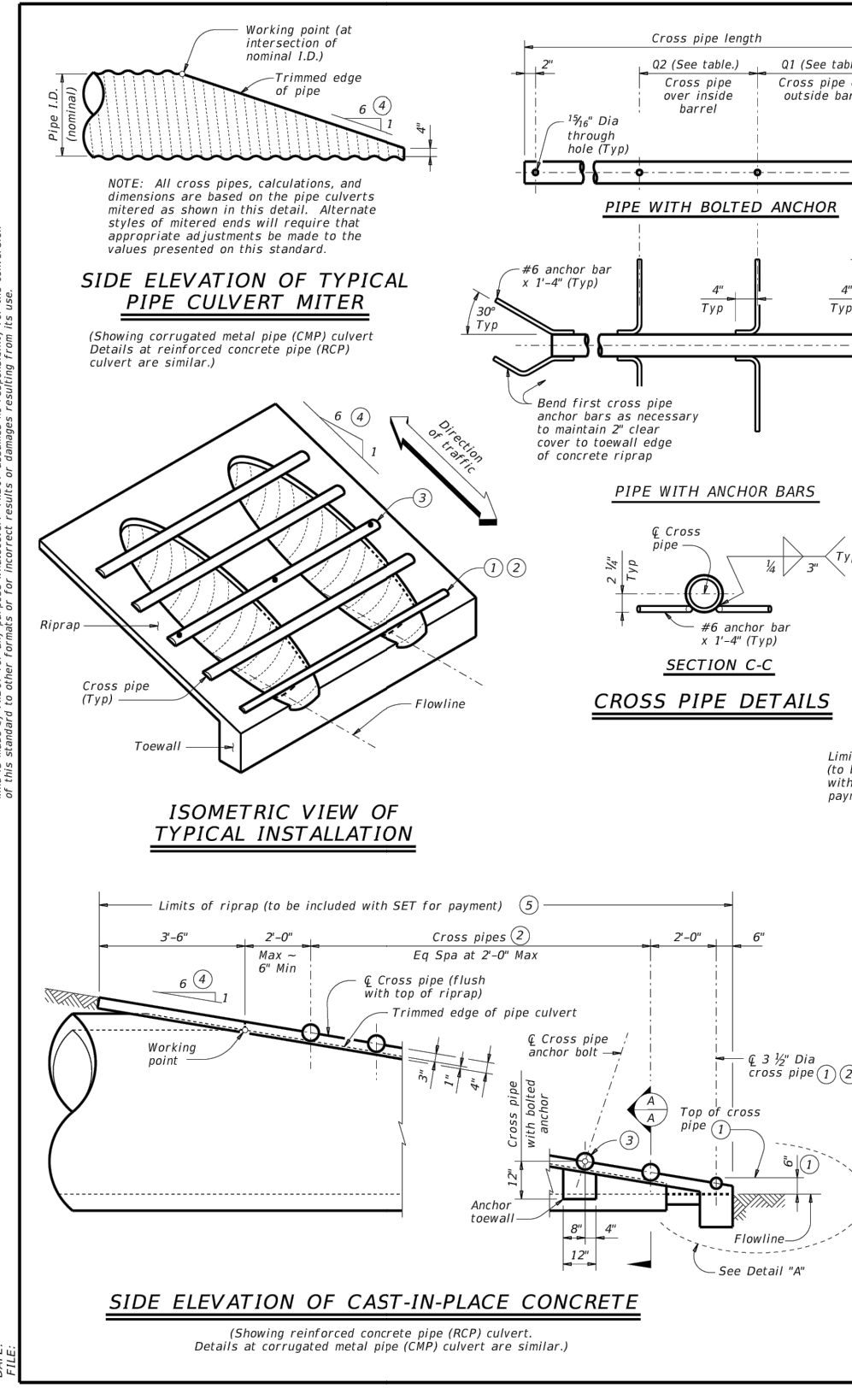


Figure 3-17 Schematic of a two stage Extended Detention Basin (LCRA, 1998)



CITY OF AUSTIN WATERBURY PROTECTION DEPARTMENT	STANDARD HEADWALL AND ENERGY DISSIPATORS	STANDARD NO. 508S-13
RECORD COPY SIGNED BY: BILL GARDNER	DATE: 08/20/07	APPROVED

CITY OF AUSTIN WATERBURY PROTECTION DEPARTMENT	STANDARD HEADWALL AND ENERGY DISSIPATORS	STANDARD NO. 508S-13
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RECORD COPY SIGNED BY: ANDREW BYARS	DATE: 09/01/2011	APPROVED

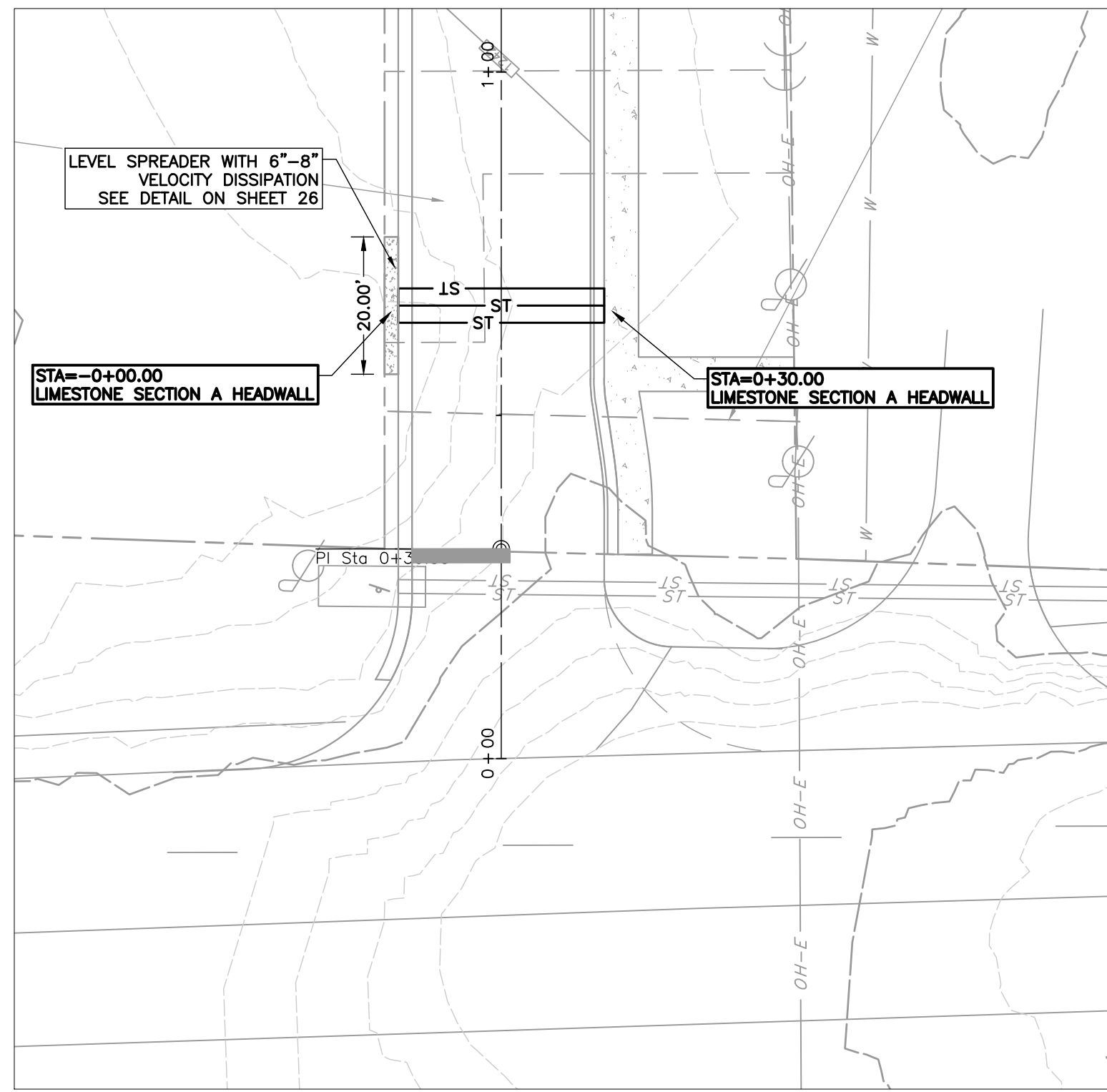
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RECORD COPY SIGNED BY: ANDREW BYARS	DATE: 09/01/2011	APPROVED

CITY OF AUSTIN WATERBURY PROTECTION DEPARTMENT	STANDARD HEADWALL AND ENERGY DISSIPATORS	STANDARD NO. 508S-20
RECORD COPY SIGNED BY: ANDREW BYARS	DATE: 09/01/2011	APPROVED

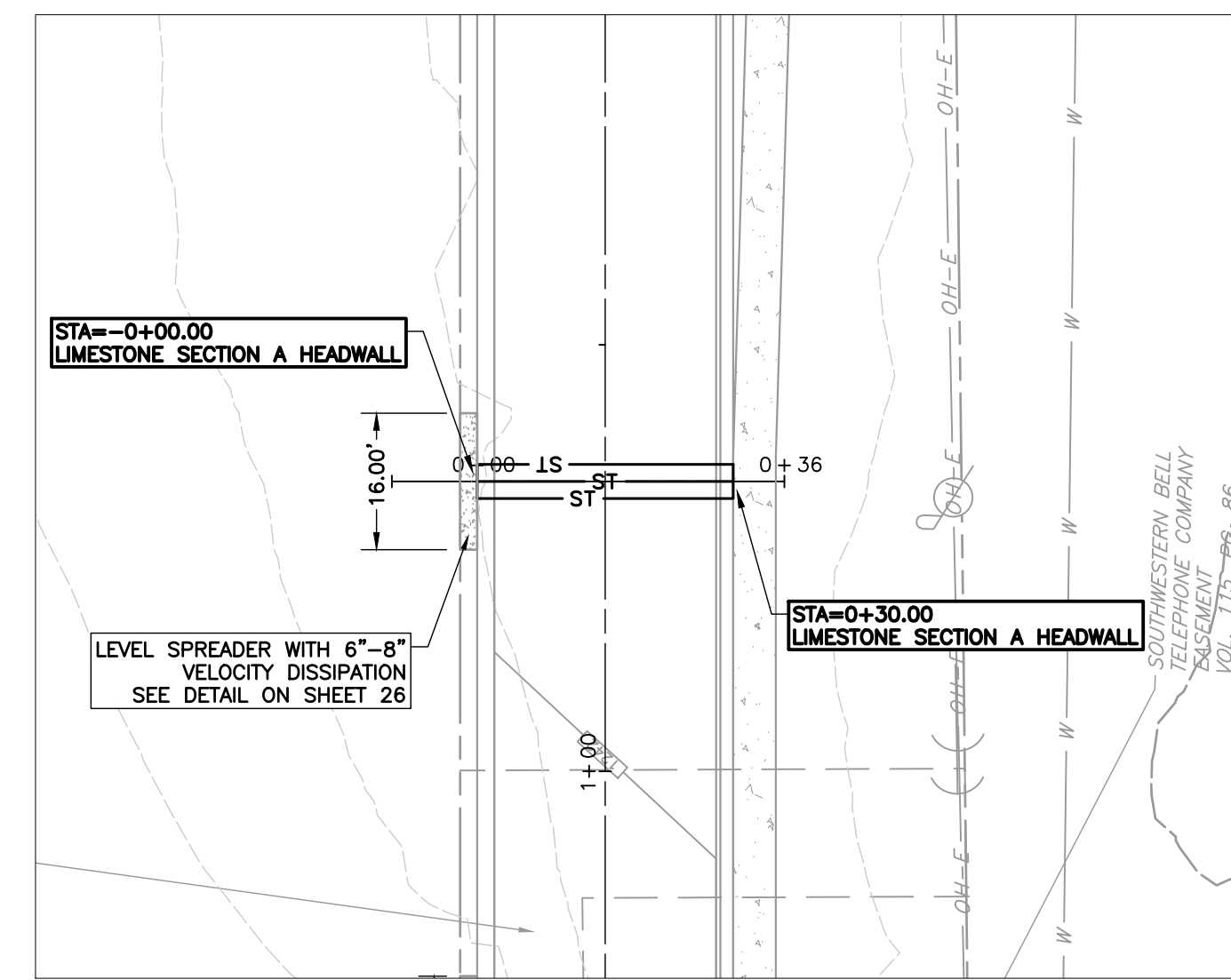
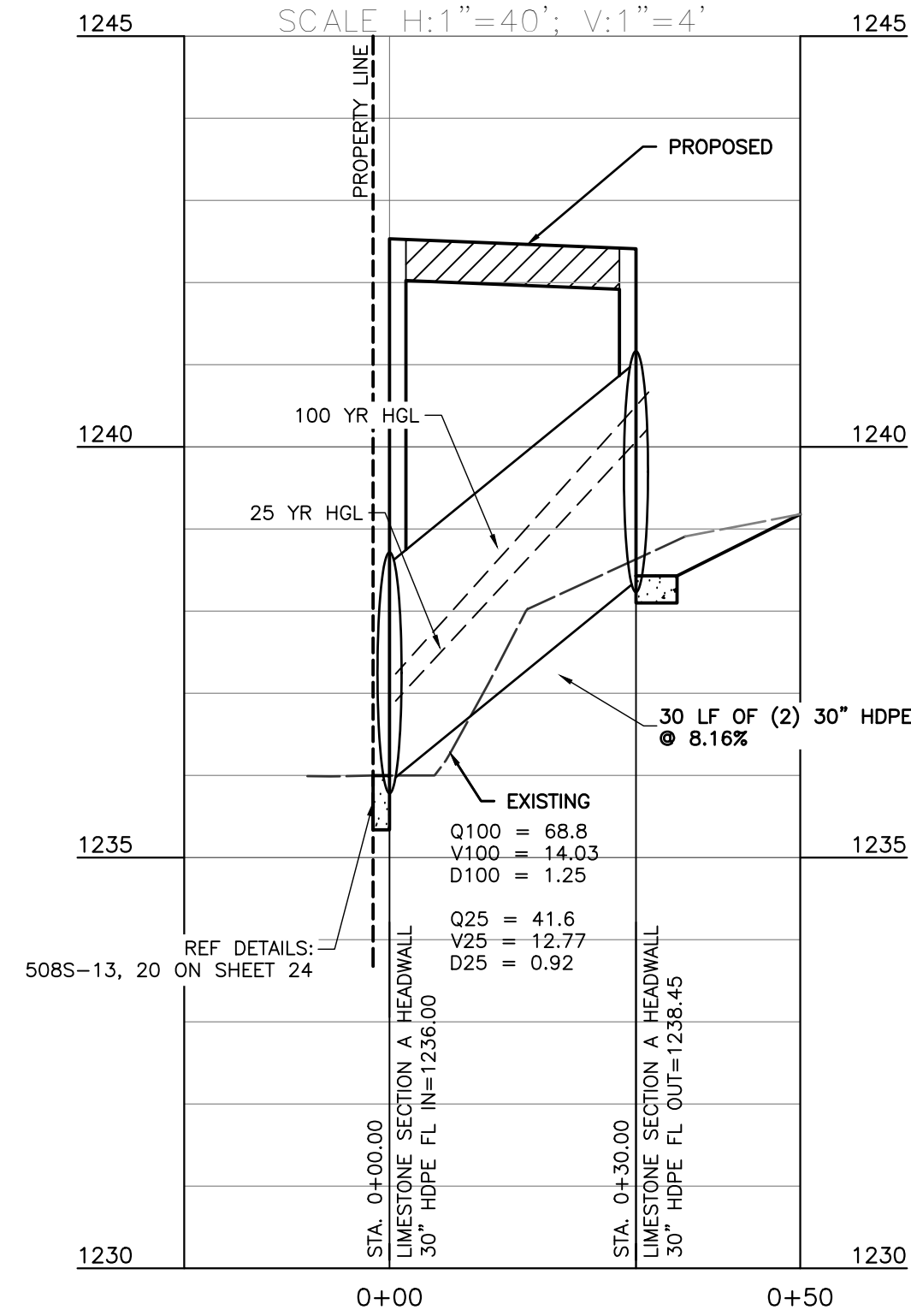
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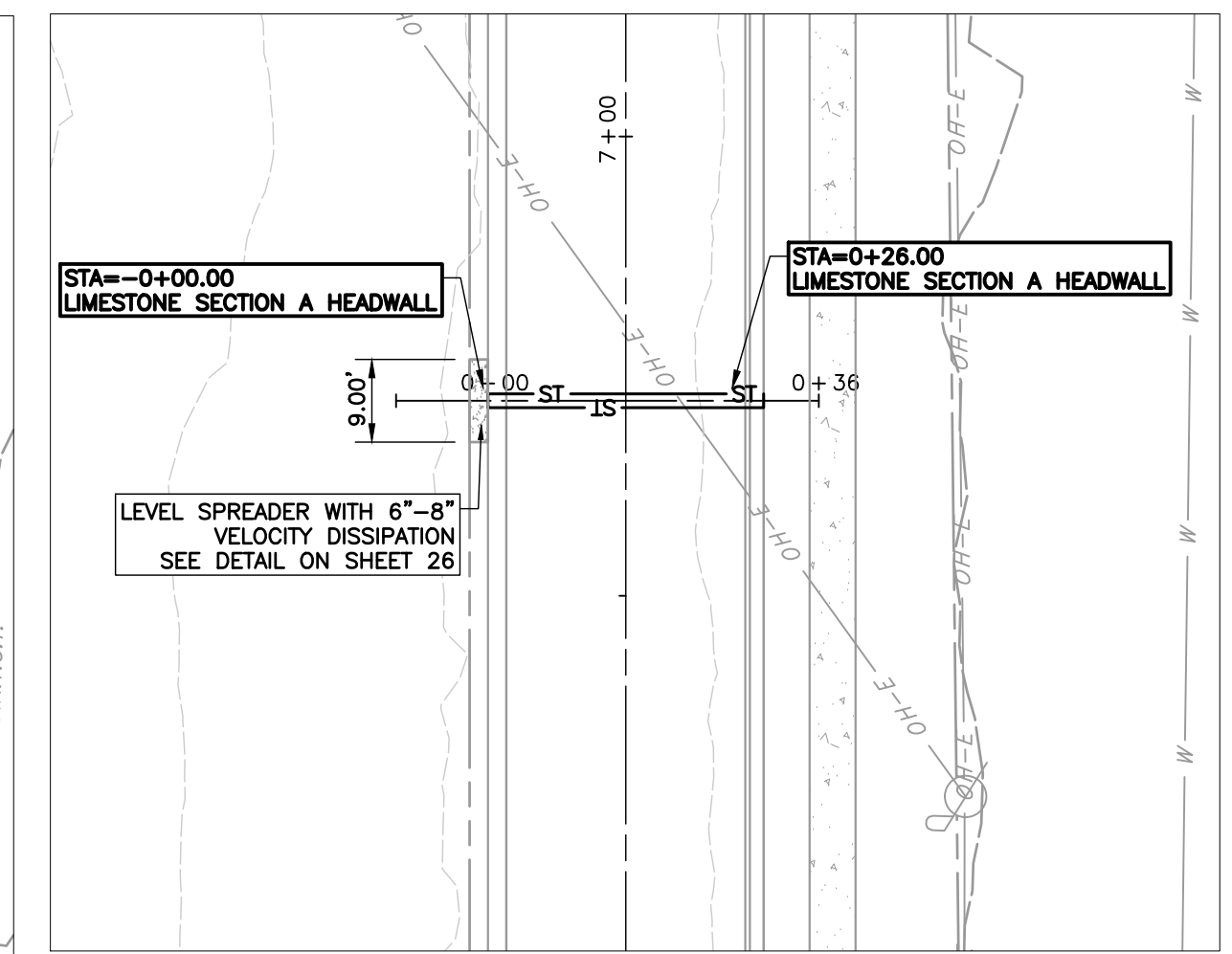
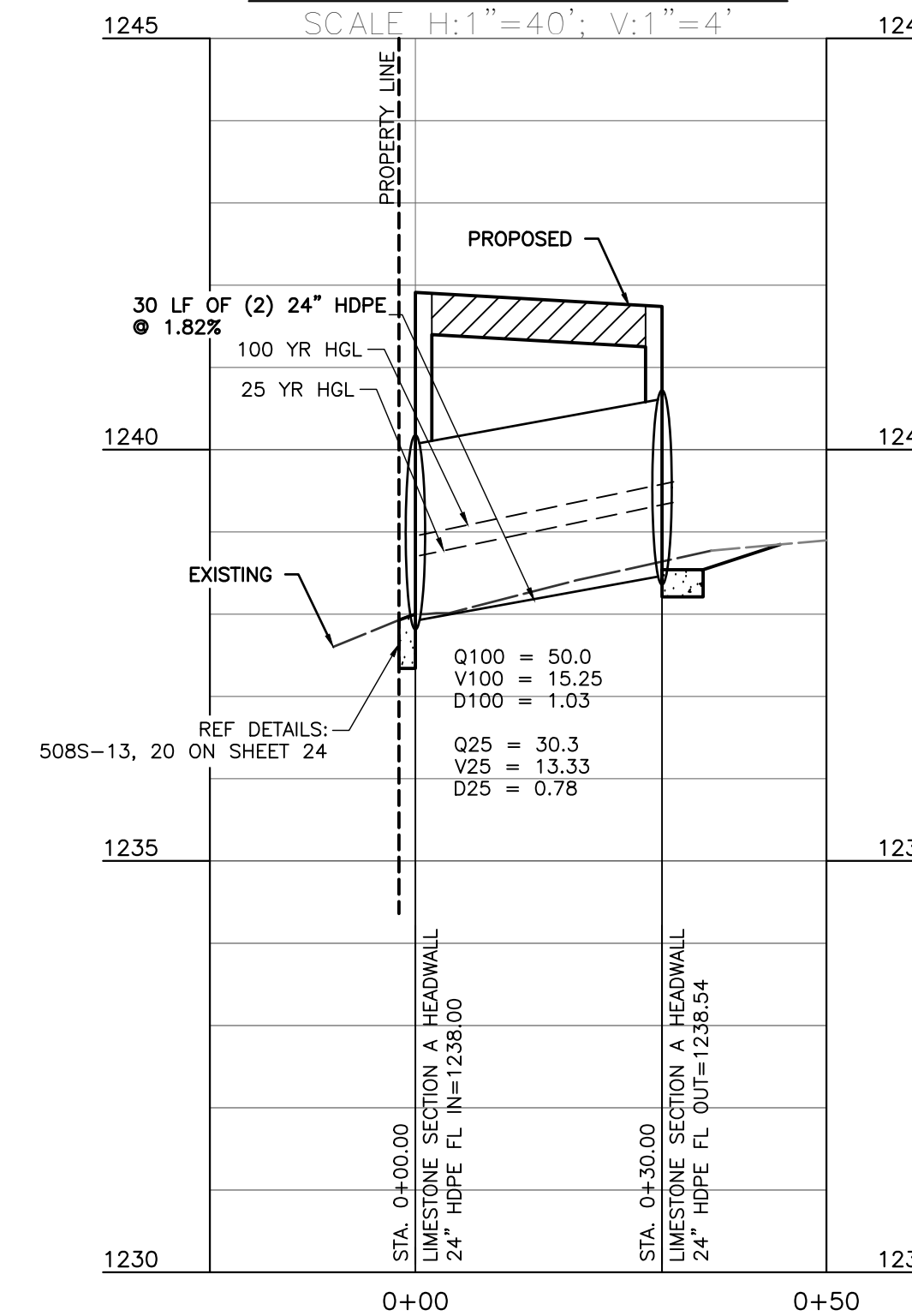
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- SIDEWALK CULVERTS WILL BE REQUIRED AT ANY LOCATION WHERE THE PROPOSED SIDEWALK CROSSES A CHANNELIZED FLOW PATH.



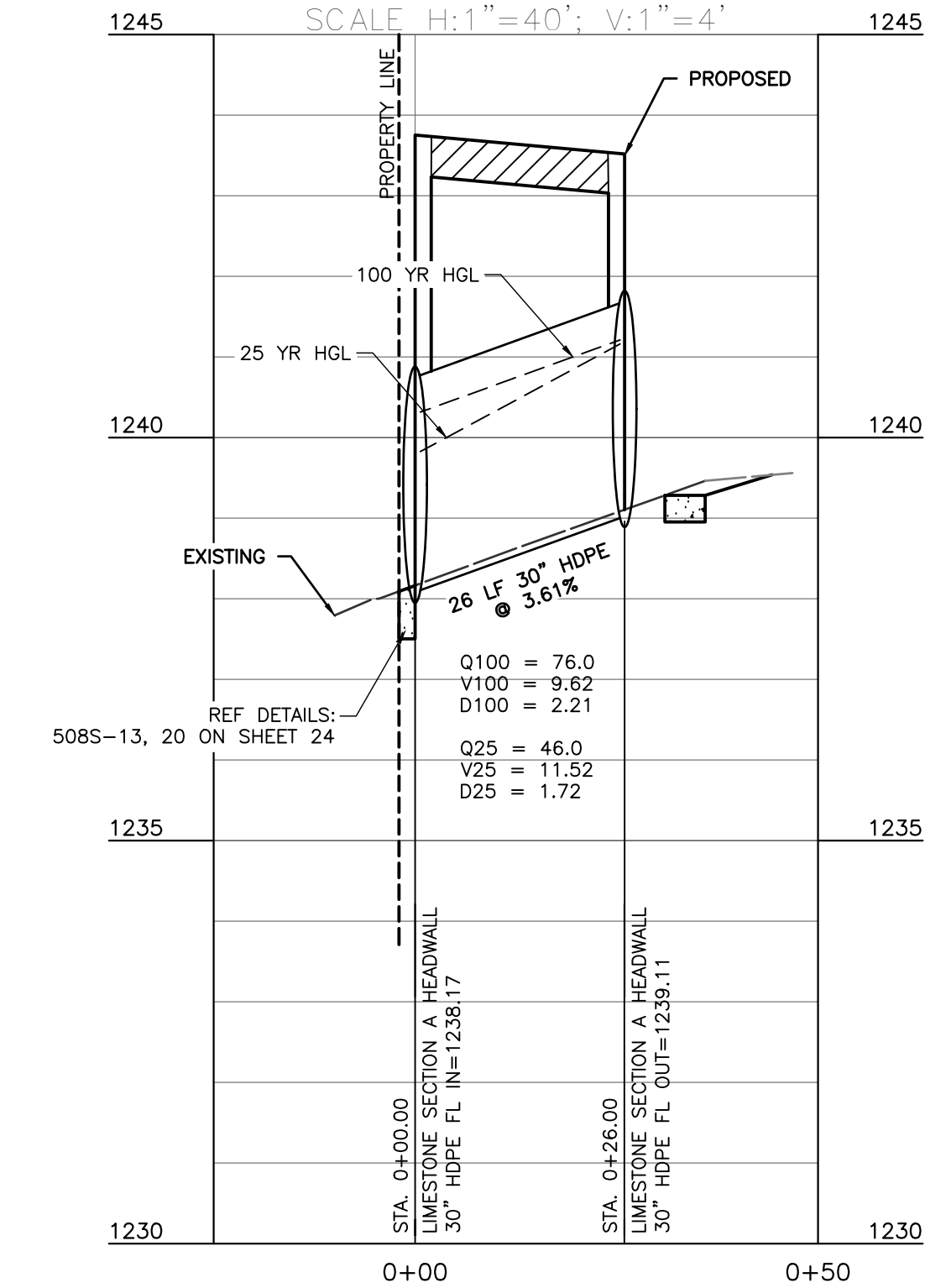
STORM LINE A PROFILE



STORM LINE B PROFILE



STORM LINE C PROFILE



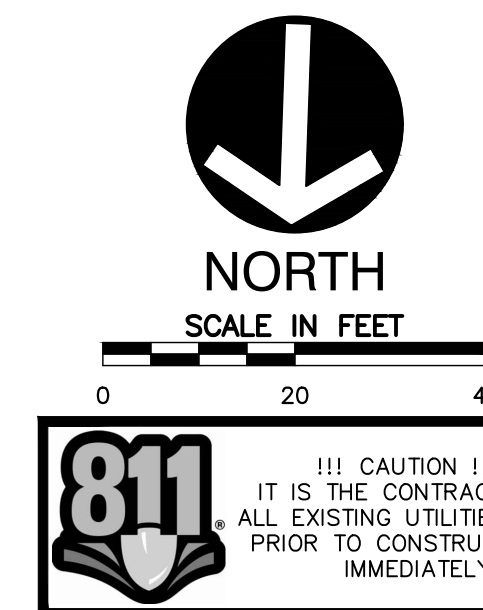
NO	DATE	REVISION RECORD	DESCRIPTION

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 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
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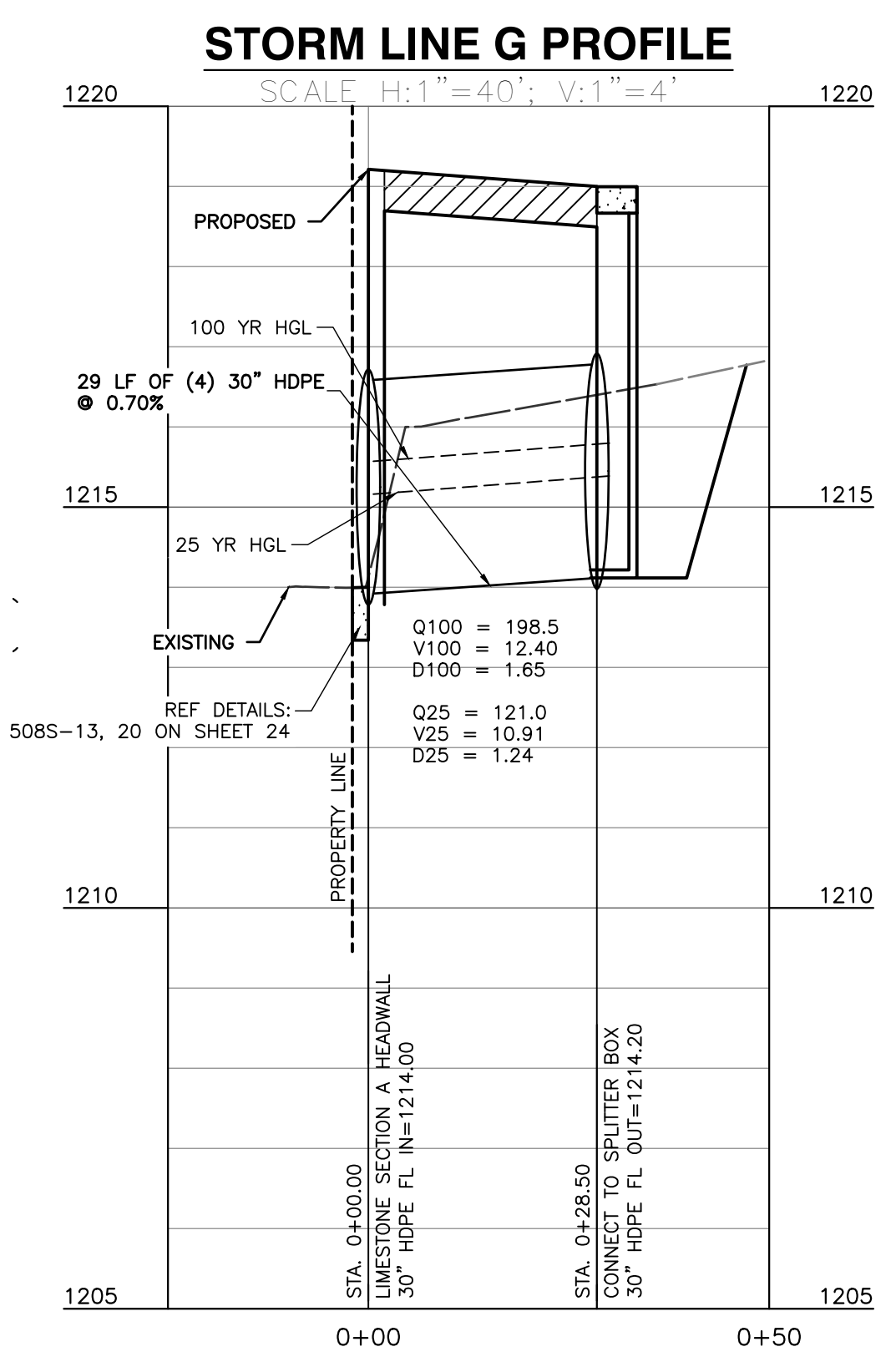
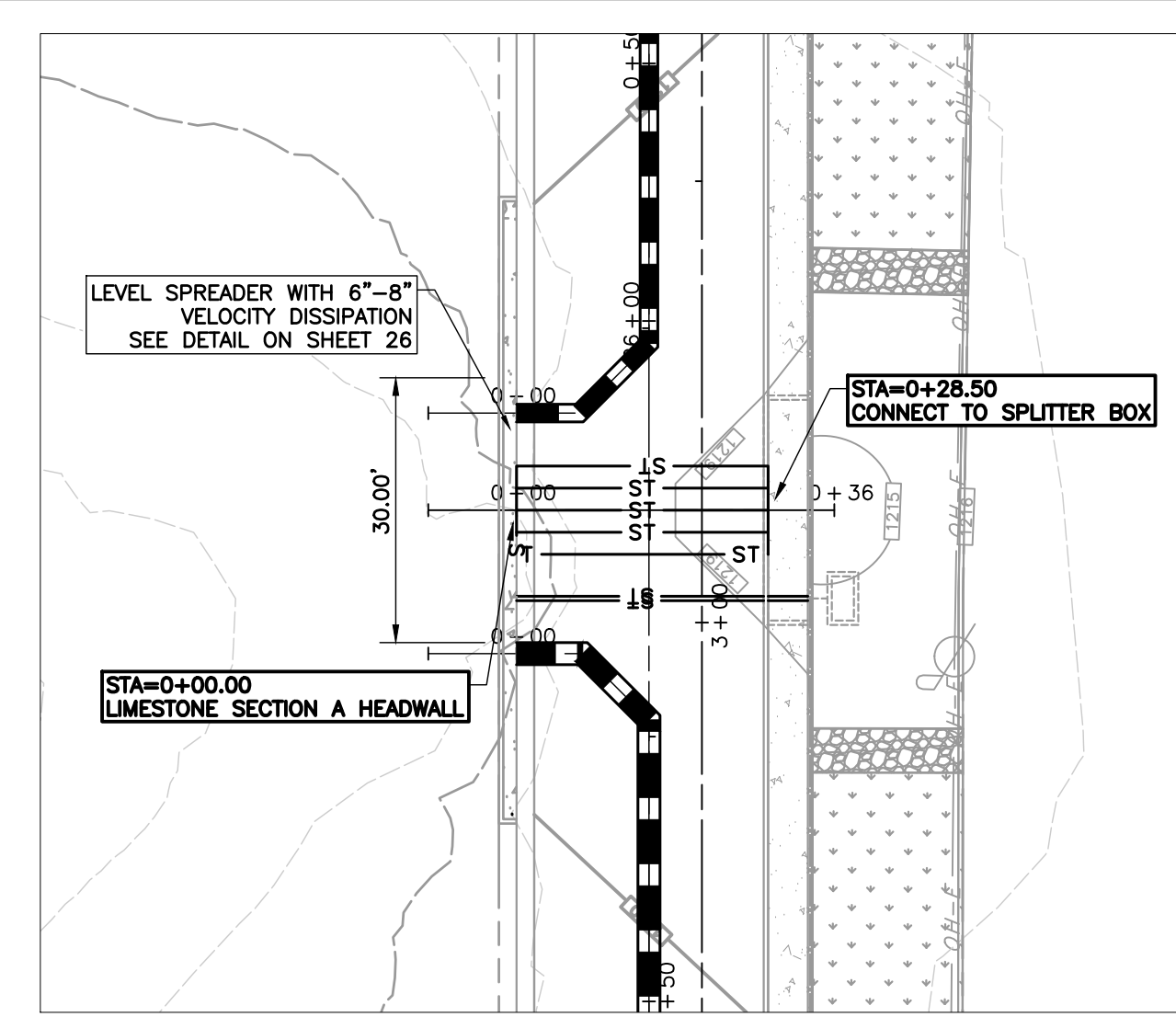
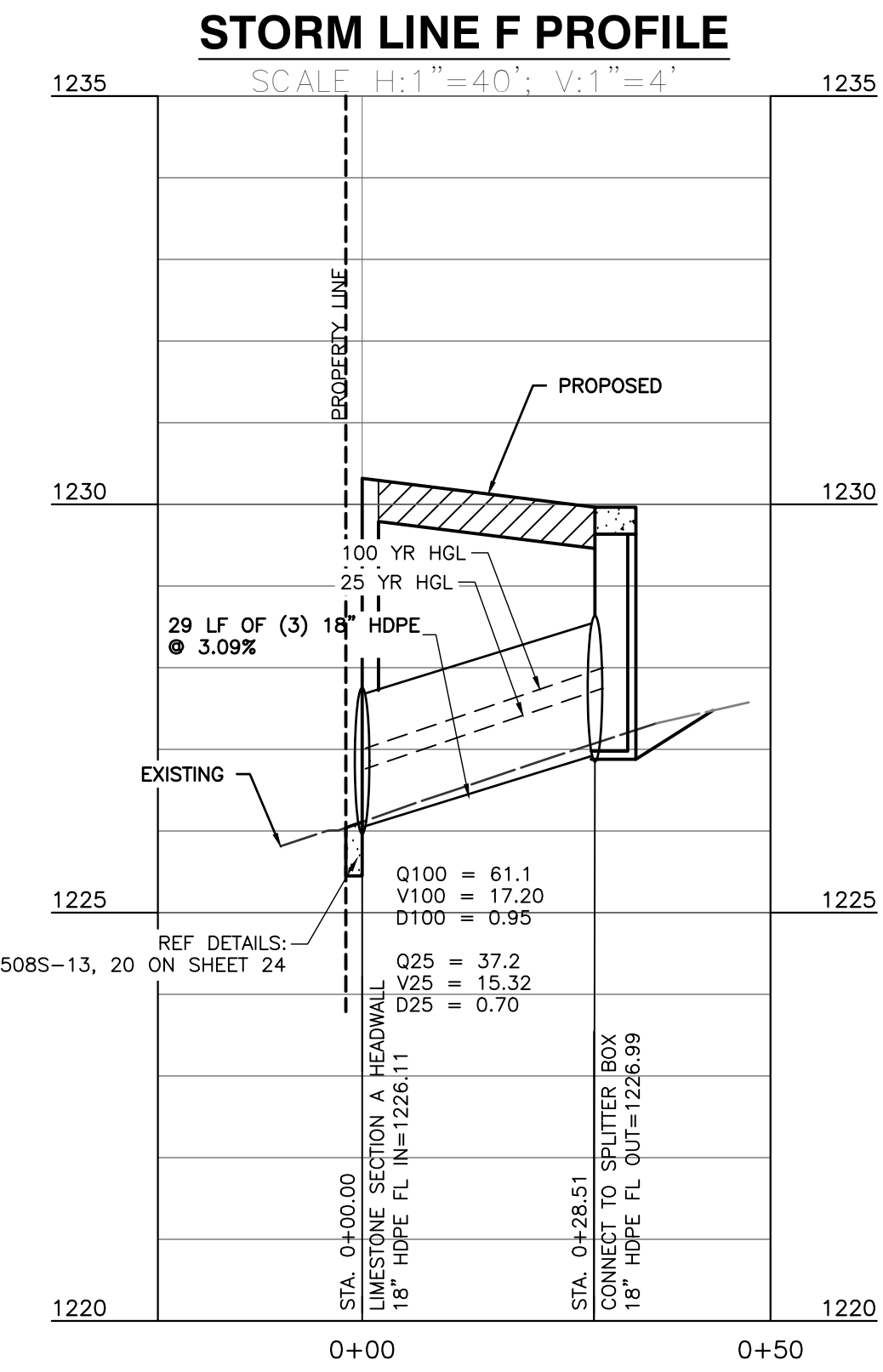
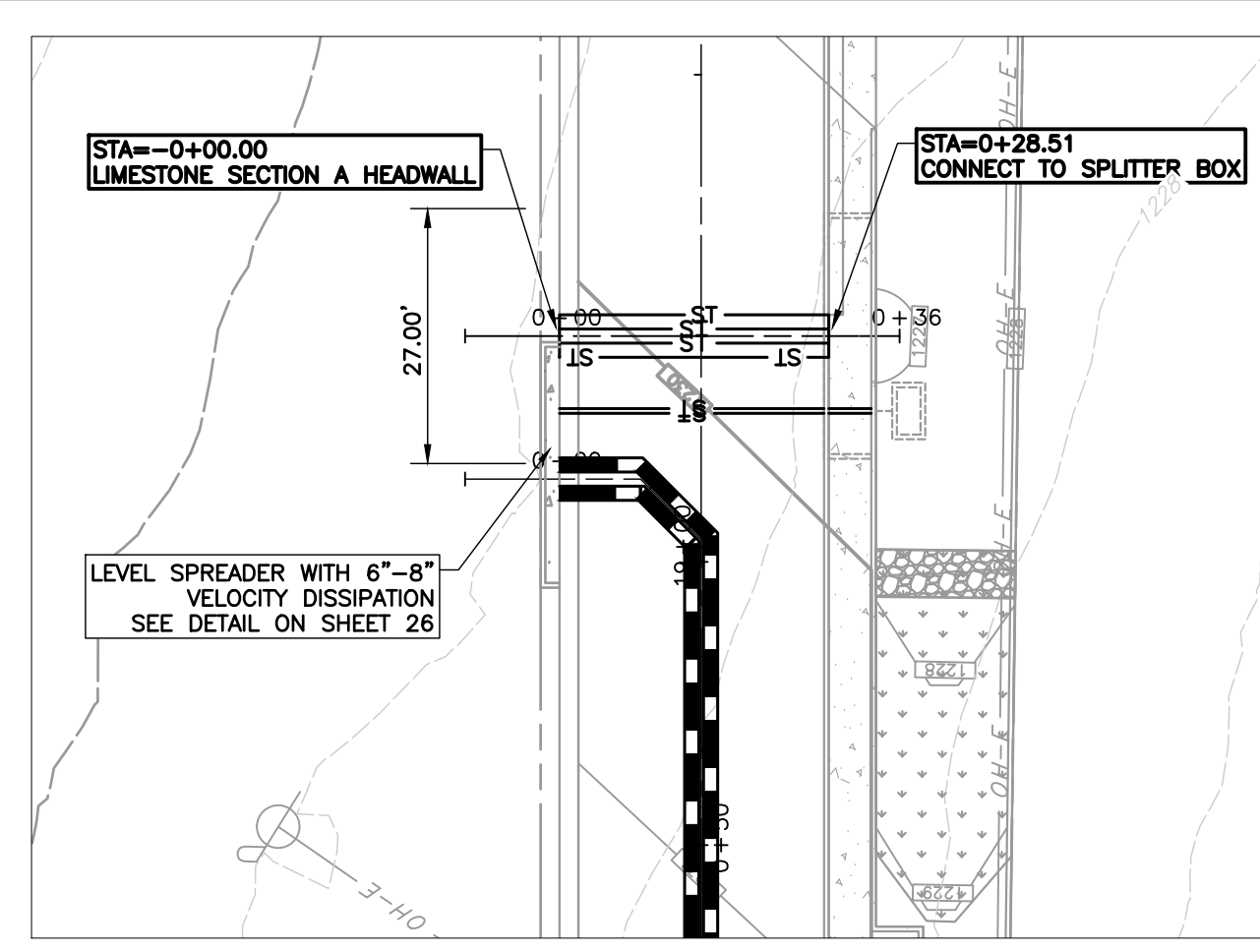
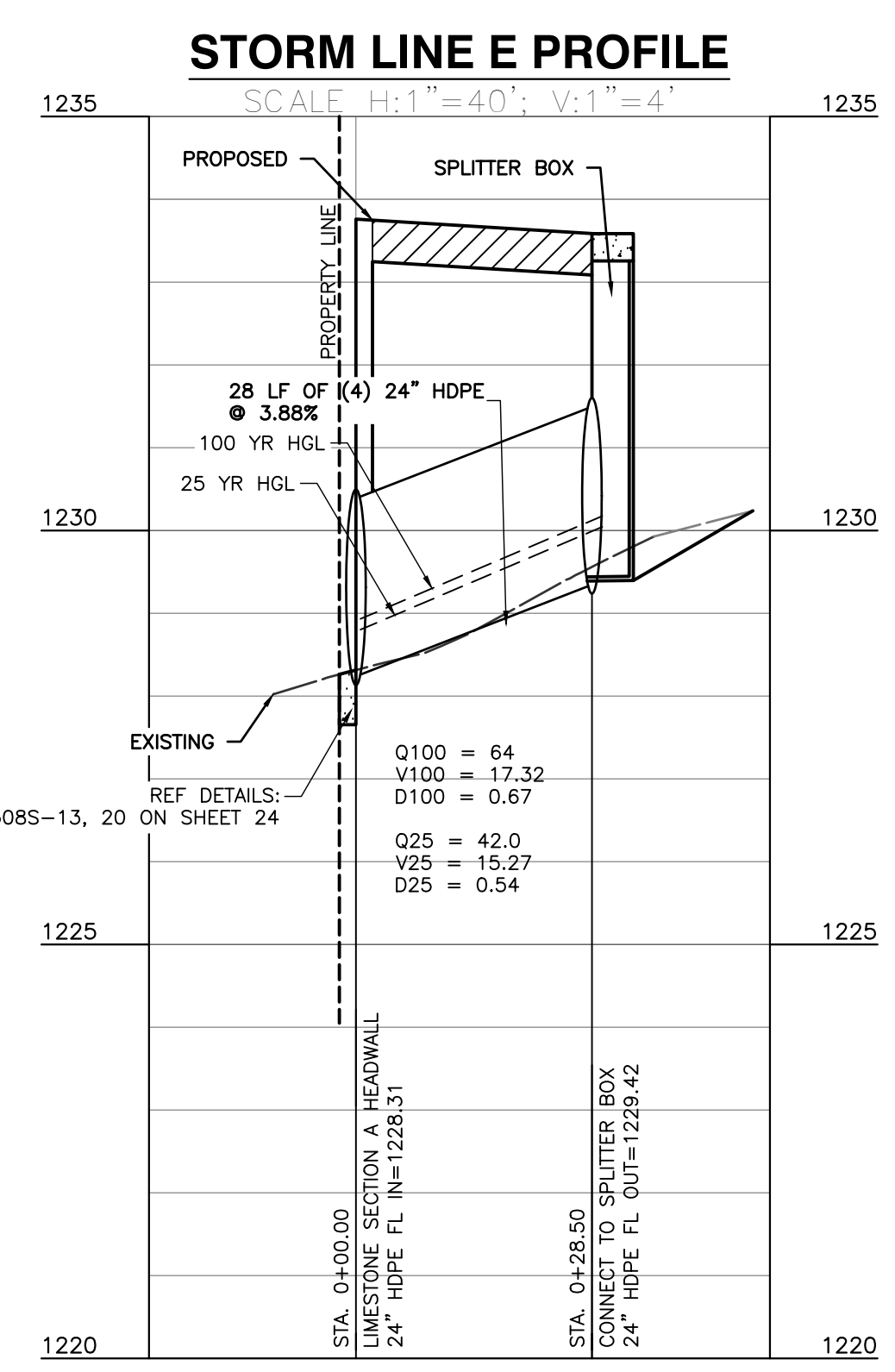
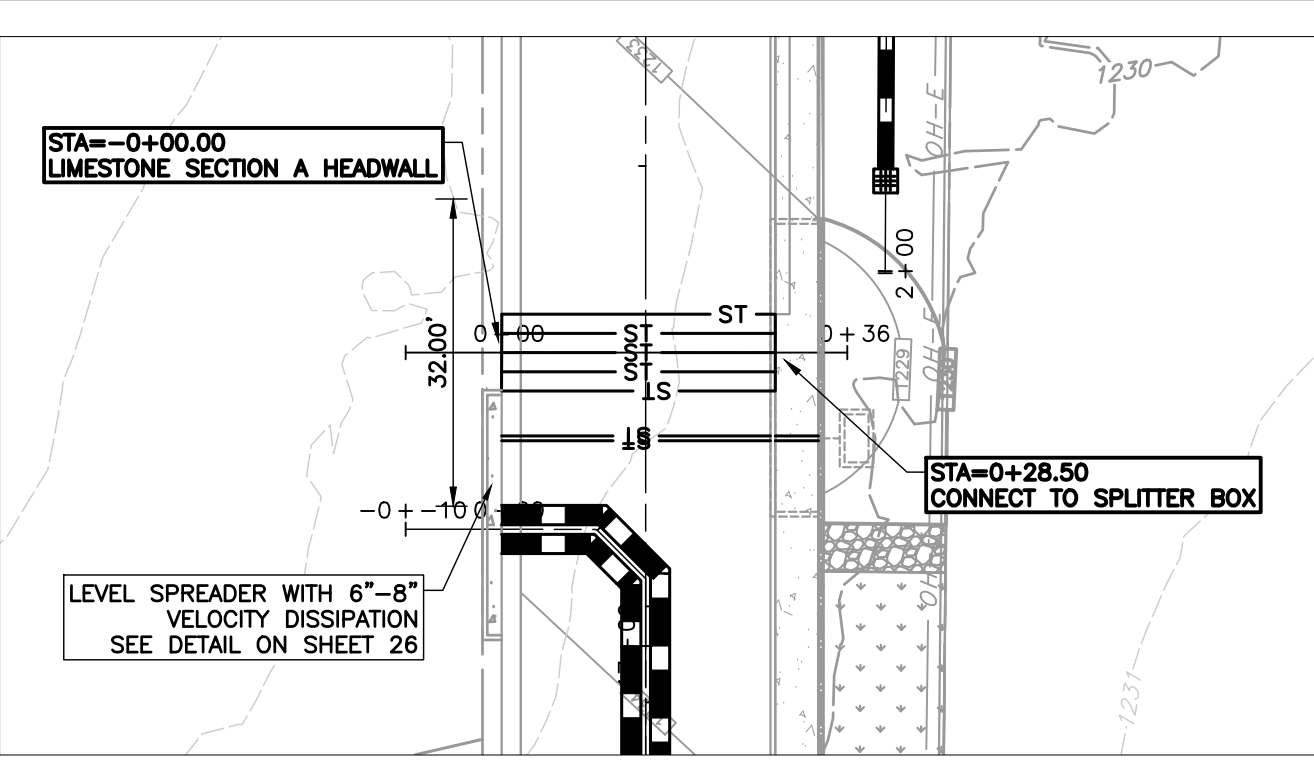
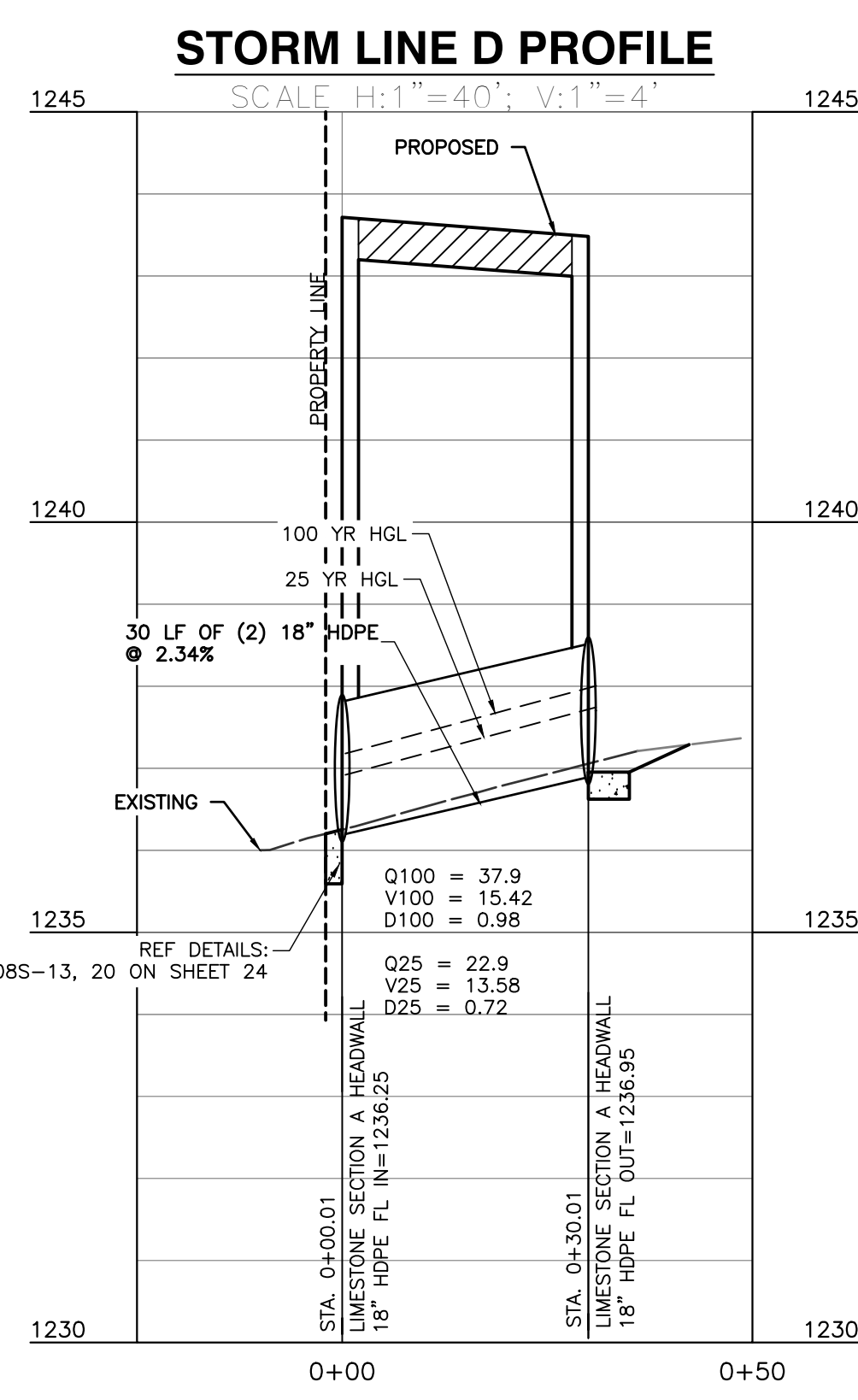
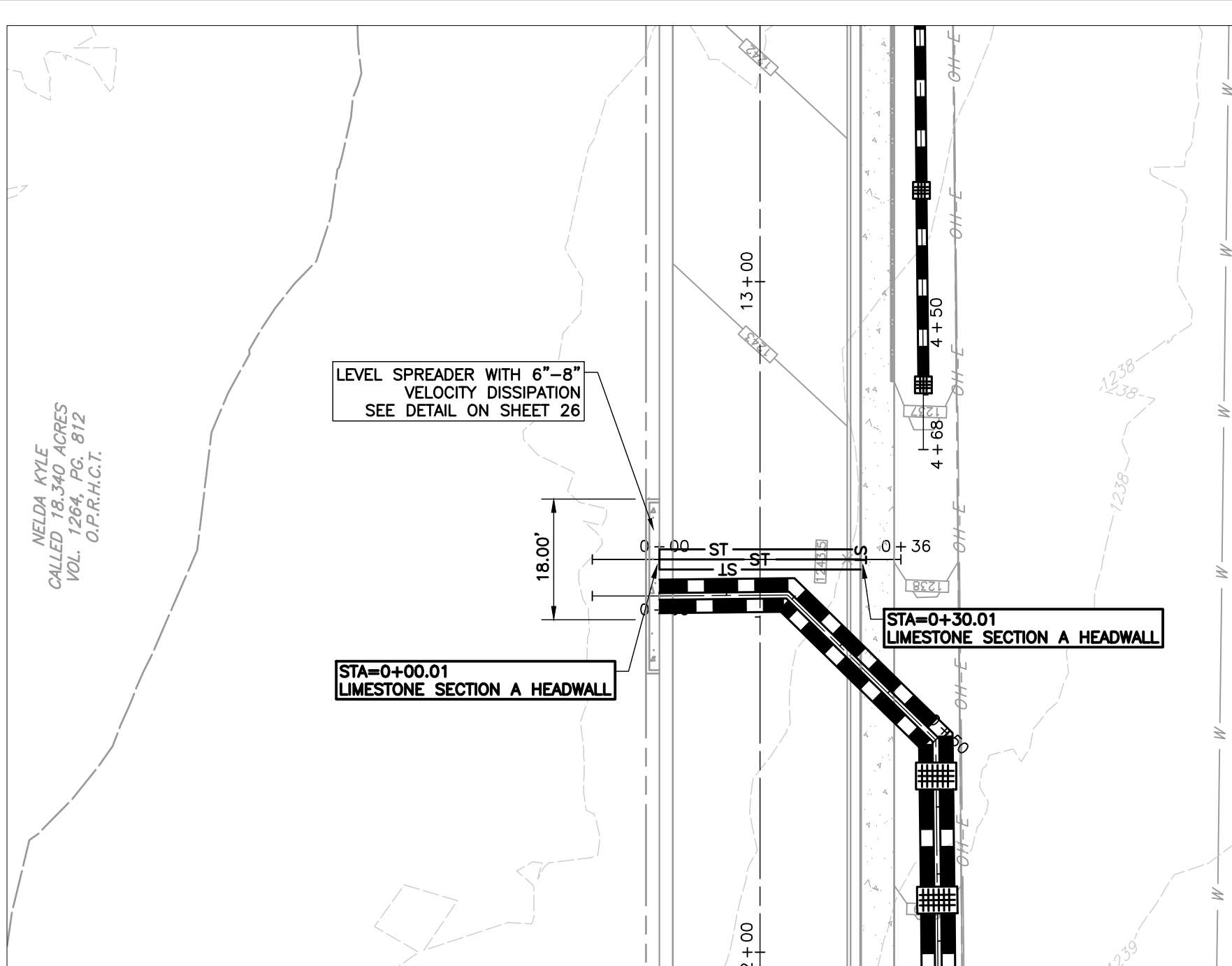
HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

STORM PLAN & PROFILES A-C

DATE:	1/10/2024	DRAWN BY:	CEC
DWG SCALE:	1"=20'	CHECKED BY:	CB
PROJECT NO.:	324-199	APPROVED BY:	MT

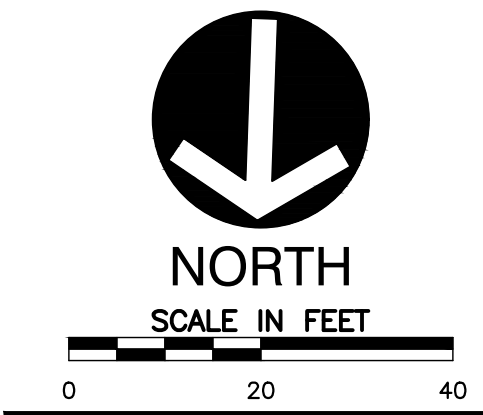


DRAWING NO.:
27
 SHEET 27 OF 42



NOTES

- SEE SHEET 06 FOR LIMESTONE SECTION/WALL DETAILS.
- SIDEWALK CULVERTS WILL BE REQUIRED AT ANY LOCATION WHERE THE PROPOSED SIDEWALK CROSSES A CHANNELIZED FLOW PATH.



811 !!! CAUTION !!!
IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, and NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

REVISION RECORD

NO.	DATE	DESCRIPTION

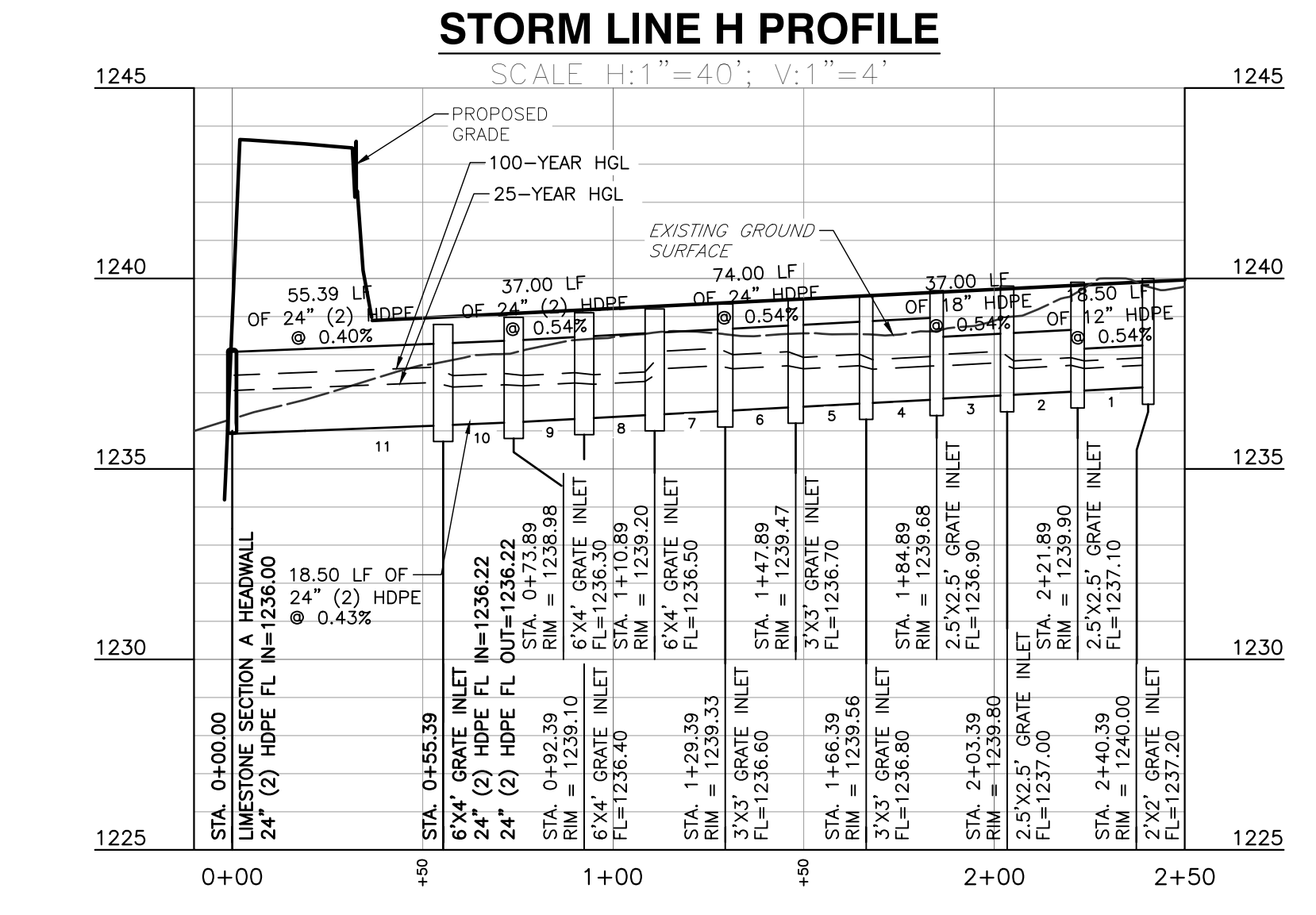
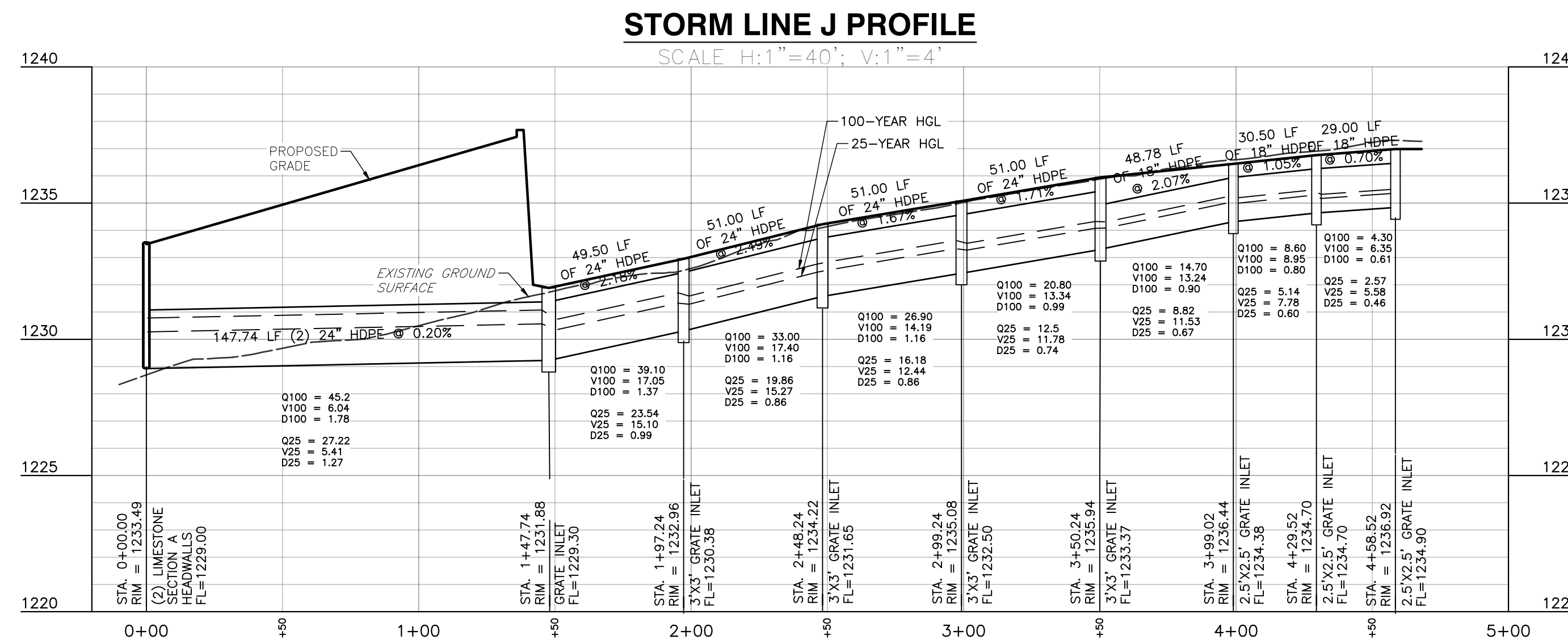
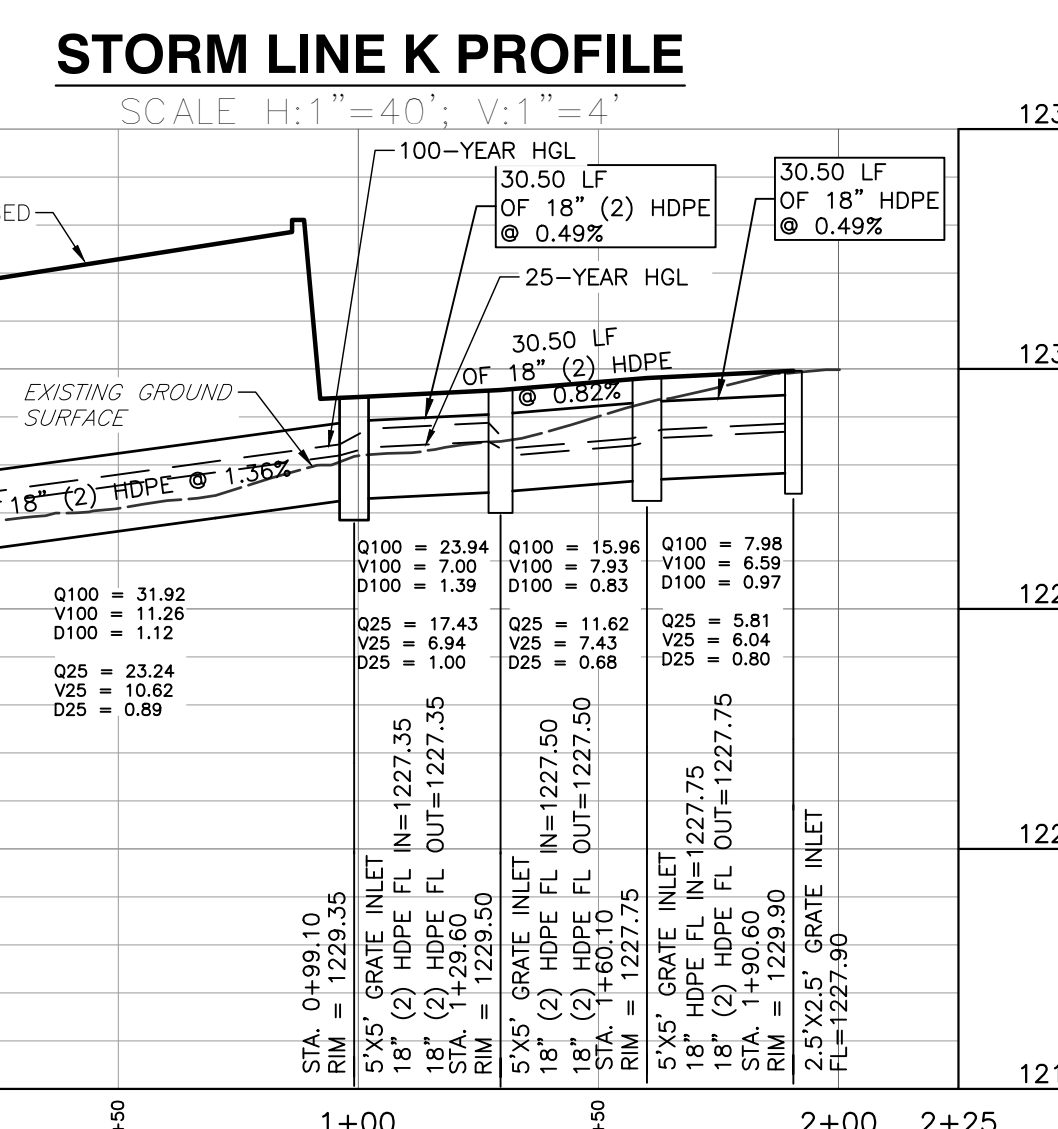
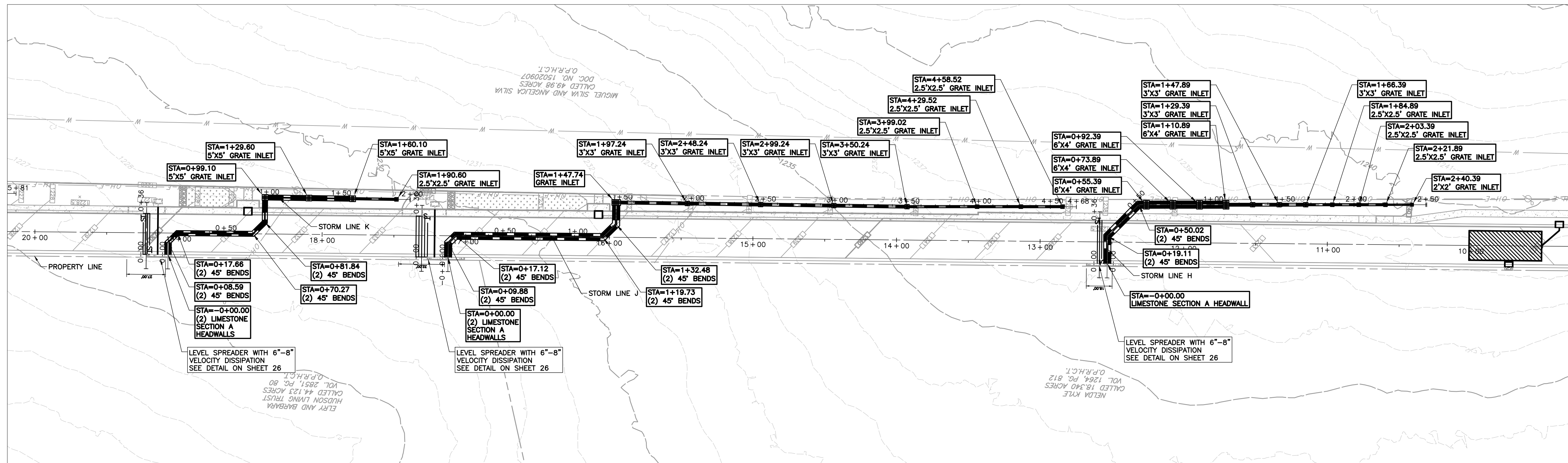
Civil & Environmental Consultants, Inc.
 1221 South McRae Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0096
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HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

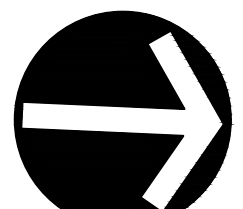
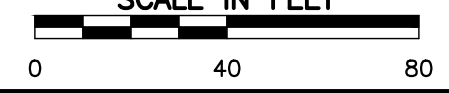
STORM PLAN & PROFILES D-G


DATE: 1/10/2024	DRAWN BY: CEC
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PROJECT NO: 324-199	APPROVED BY: MT


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- ### NOTES
- SEE SHEET 06 FOR LIMESTONE SECTION/WALL DETAILS.
 - SIDEWALK CULVERTS WILL BE REQUIRED AT ANY LOCATION WHERE THE PROPOSED SIDEWALK CROSSES A CHANNELIZED FLOW PATH.


NORTH
 SCALE IN FEET



 MICHAEL A. THEONE
 LICENSED PROFESSIONAL ENGINEER
 142972

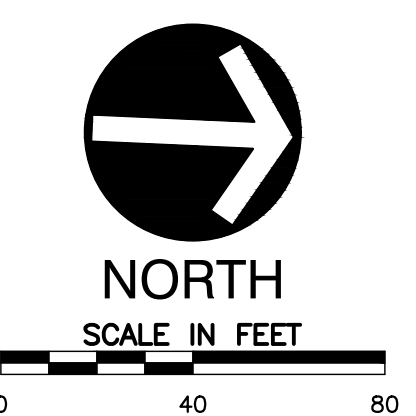
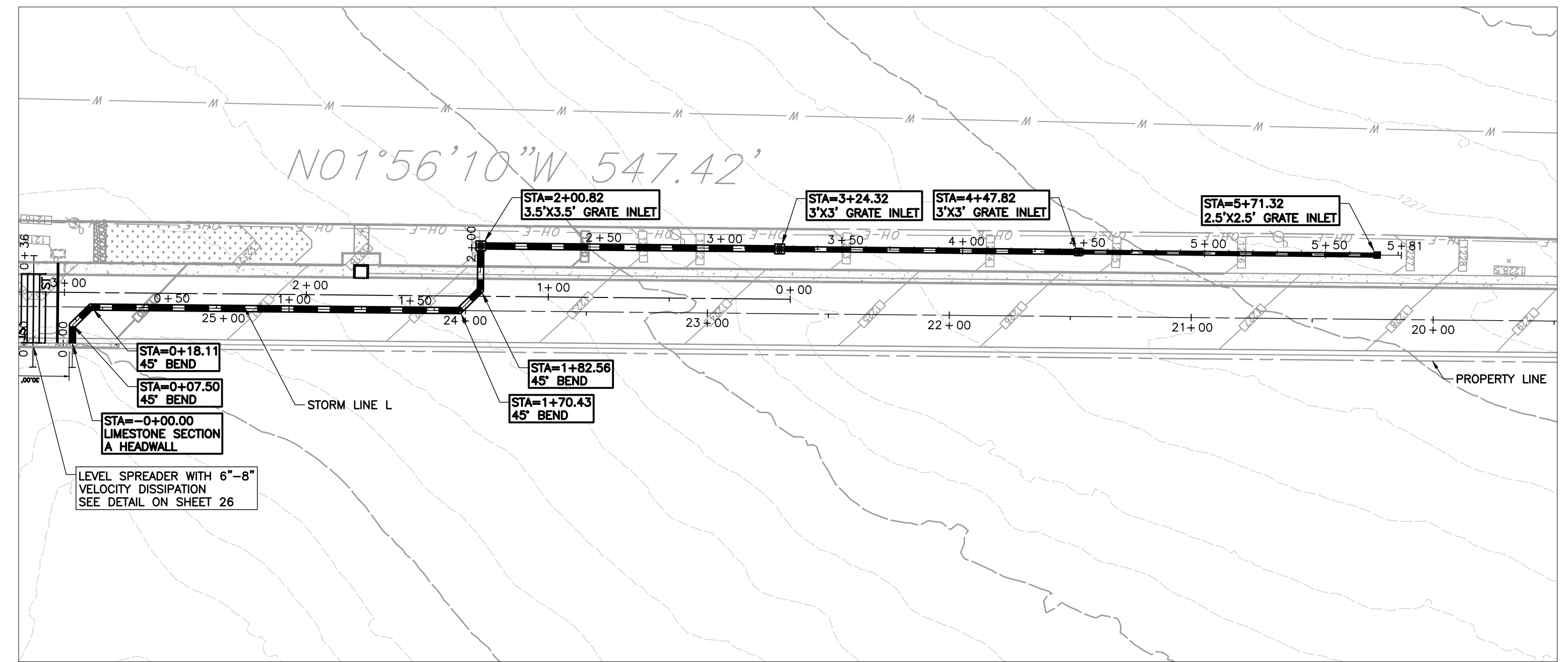
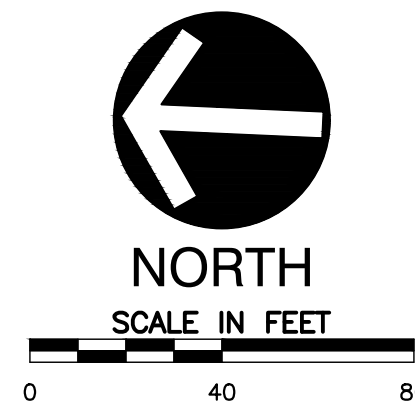
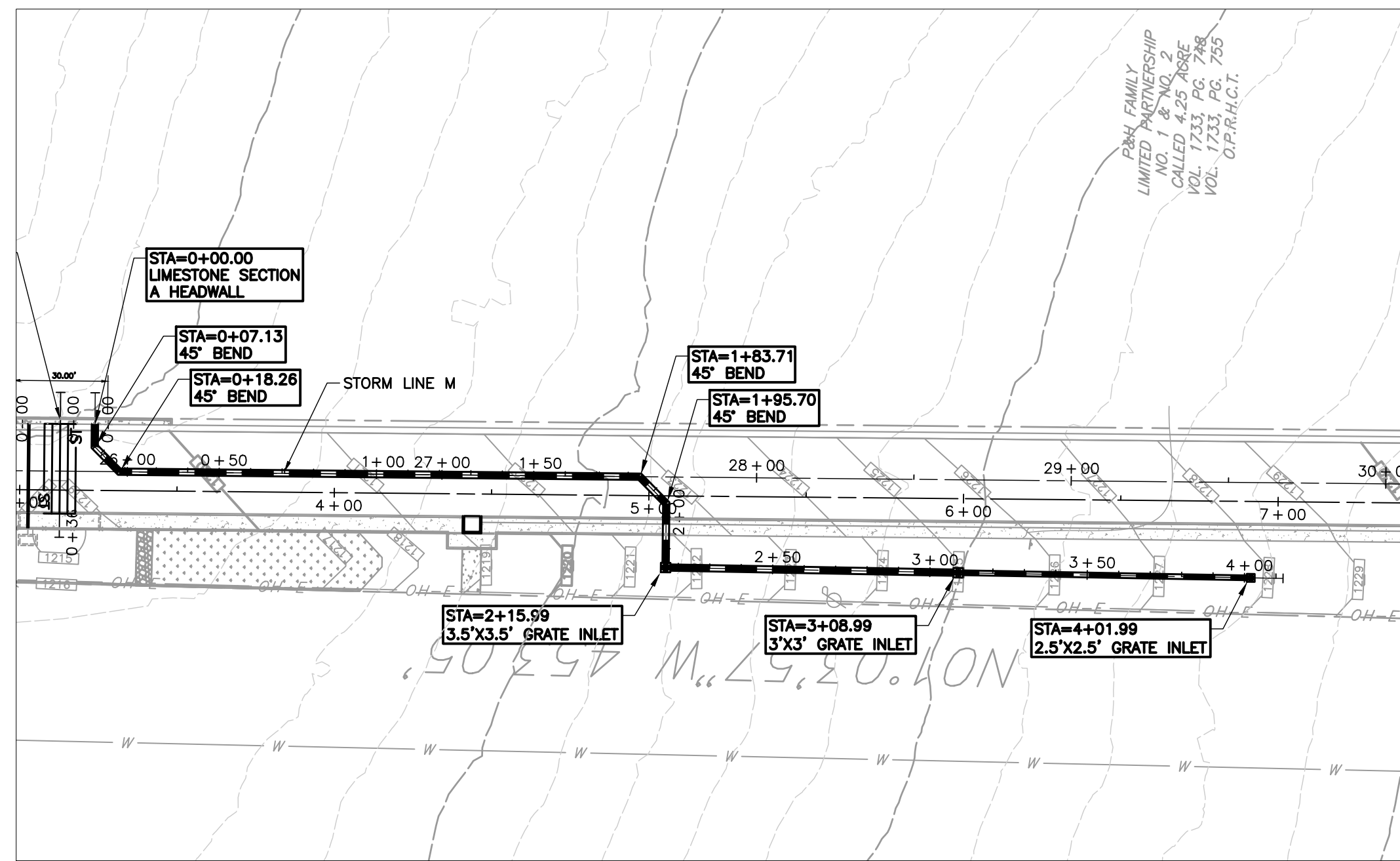

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REVISION RECORD
 NO. DATE DESCRIPTION

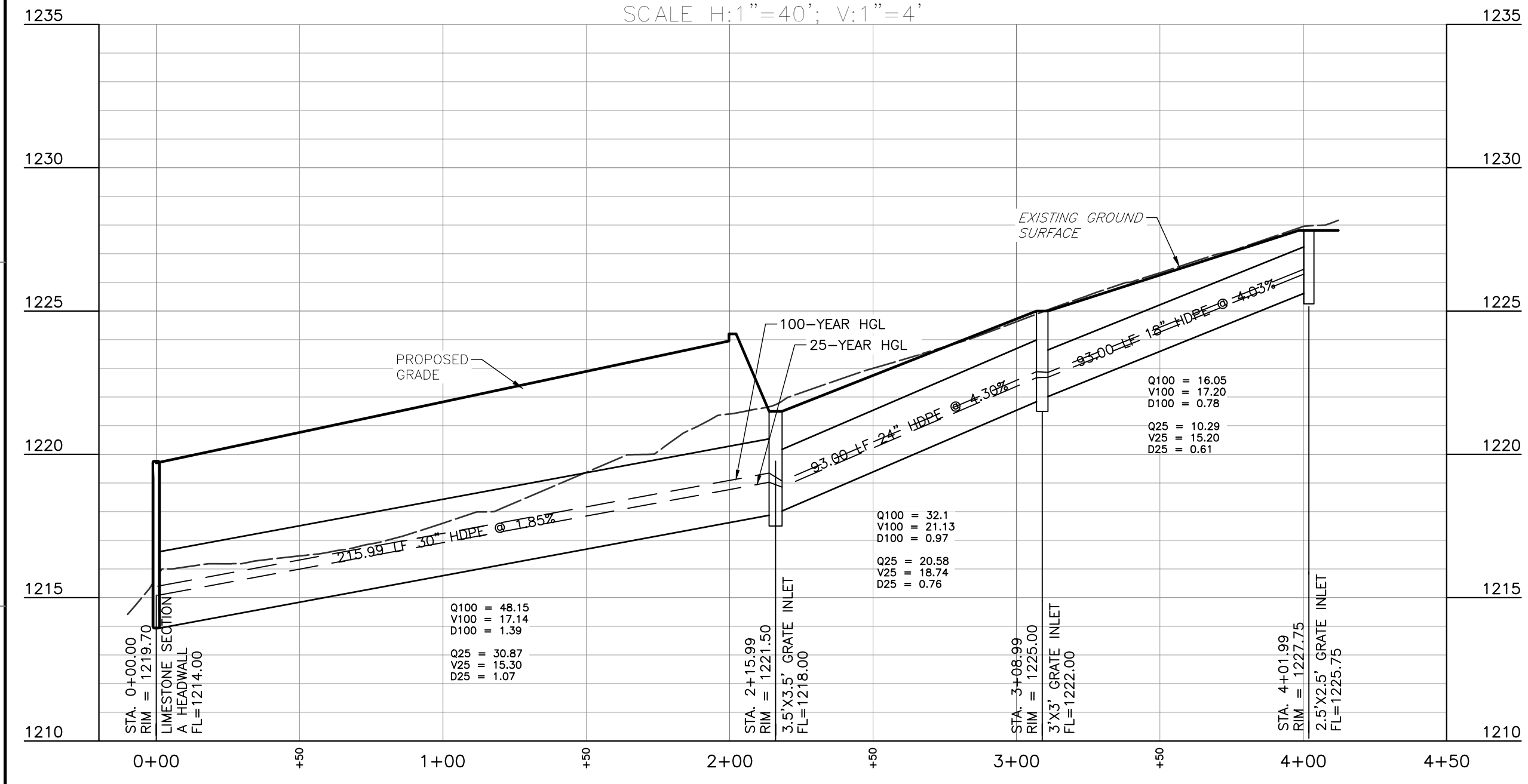
HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

STORM PLAN & PROFILES H-K
 DATE: 1/10/2024 | DRAWN BY: CEC
 DWG SCALE: 1" = 40' | CHECKED BY: CB
 PROJECT NO: 324-199
 APPROVED BY: MT

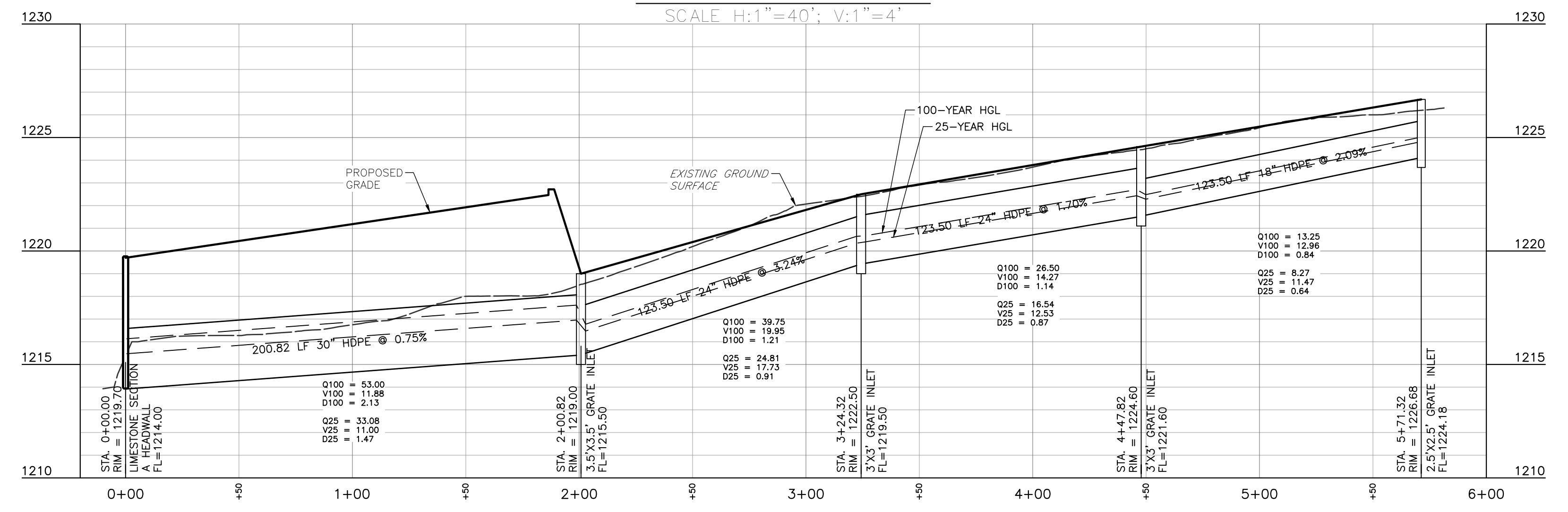
DRAWING NO.:
29
 SHEET 29 OF 42



STORM LINE M PROFILE
SCALE: H:1"=40'; V:1"=4'



STORM LINE L PROFILE
SCALE: H:1"=40'; V:1"=4'



NOTES

- SEE SHEET 06 FOR LIMESTONE SECTION/WALL DETAILS.
- SIDEWALK CULVERTS WILL BE REQUIRED AT ANY LOCATION WHERE THE PROPOSED SIDEWALK CROSSES A CHANNELIZED FLOW PATH.

811 !!! CAUTION !!!
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NO.	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
1221 South McPac Expressway - Suite 350 - Austin, TX 78746
Ph: 512.439.0400 - Fax: 512.329.0096
www.cetinc.com

HARDY T LAND, LLC
SITE DEVELOPMENT PLANS
HARDY DRIVEWAY
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

DATE: 1/10/2024	DRAWN BY: CEK
DWG SCALE: 1" = 40'	CHECKED BY: CB
PROJECT NO: 324-199	APPROVED BY: MT

A:\20-201\24-191-000\DWG\2021\24191-001-C40-STDW\CONCRETE PAVEMENT DESIGN LS(1/10/2024 - 09:56) - UP: 1/10/2024 10:31 AM

Rigid Pavements

Based on the Hays County criteria stated above, a design ADT of 750 and 500, and a design ESAL value of 34,000 and 25,000 was selected for design. We performed our analyses using current AASHTO pavement thickness design procedures and ACI 325.12R-02 guidance. Based on these procedures, and Hays County, City of Dripping Springs and City of Austin criteria, together with known subgrade conditions, the following Jointed Reinforced Concrete Pavement thickness is recommended:

Local Roadway	34,000 ESALs	6.0 in. concrete over 6.0 in. subbase
Local Roadway	25,000 ESALs	6.0 in. concrete over 6.0 in. subbase

The 6.0-inch thickness for the Local Roadway Category is set based on reinforcing steel cover requirements and recommended depth of control joints. In addition, the following recommendations to guide pavement detailing and material selection are provided.

- Over-excavate and remove any surficial CH clay soils and then scarify and moisture-condition the existing subgrade (limestone derivative material) to a depth of 6 inches and compact to 95% of the maximum dry density as determined using Test Method TEX-113-E at a moisture content within 2% of optimum.
- Provide at least 6 inches of compacted subbase material beneath the concrete pavement. A site-generated subbase material mined on-site is acceptable provided it conforms with the criteria for select fill presented on page 7 of this report.
- The subbase material should be compacted to 95% of the maximum dry density determined by TxDOT Test Method TEX-113-E at a moisture content within 2% of optimum. The compacted subbase should extend 2 ft beyond the edges of the pavement structure (including curbs).
- The concrete pavement should be reinforced with #4 longitudinal bars spaced at 16-inch centers, and transverse bars spaced at 24-inch centers. As an alternate, #10

welded wire fabric (WWF) may be used with 6-inch spacing between longitudinal wires and 12-inch spacing between transverse wires. All reinforcements should be chaired to be secure at slab mid-height. Please refer to TxDOT JCRP Detail Sheet 1 of 2 attached in Appendix 1, for other details (Note: TxDOT longitudinal bar spacing is different.)

- The concrete mix should be designed to satisfy a 28-day design strength of 4,500 psi with a flexural strength of 650 psi (third point loading). To promote aggregate interlock and efficient load transfer, we recommend crushed limestone aggregate. Contractor should submit concrete mix designs at least 2 weeks before paving commencement.
- For slipform paving operations, we recommend a maximum concrete slump of 1 to 1.5 inches. For concrete placed by hand or with a vibratory or roller screed, we recommend a maximum slump of 4 inches.
- We recommend a concrete air content of 3 to 5%.
- Transverse control joints should be placed on minimum 15 ft centers. Joints should penetrate at least 1/4 of the pavement thickness and should be cut within the time allocations prescribed by ACI criteria (ACI 302.1R, Reference 19). For early-entry saw cutting, the time of cutting is usually in the range of 2 to 6 hrs. We recommend that the successful bidding contractor address this issue in his Quality Control Plan submitted for approval by the engineer. It is important to make the saw cuts early to avoid premature crack formation but not too early to avoid possible spalling and raveling damage to the concrete.
- Full depth expansion joints should be constructed at 180 ft spacing.
- Longitudinal joints will also be required along the centerline of the pavement. The longitudinal joints should be cut at the same time as the transverse joints using the same procedure.
- All saw cut joints should be approximately 1/4 inch wide and will need to be routed. See details on the attached TxDOT JCRP Detail Sheets – Appendix A. All joints will need to be sealed with appropriate joint sealer satisfying requirements of ACI 325.12R-4.7. Proposed joint sealer product information shall be submitted to the engineer for approval. The use of backer material and silicone sealer is recommended. Routine maintenance of joints and joint filler over the life of the pavement will be required and could include re-sealing on a 5 to 10-year frequency.
- It is recommended that the successful bidding contractor provide a detailed Quality Control Plan document outlining specific joint locations (including cul de sacs), method of construction of joints, proposed backer material and joint filler material and periodic maintenance recommendations.

- Appropriate curing compounds should be used to properly cure the concrete pavement. Proposed curing compounds and application procedures should be submitted for review to the engineer.
- In lieu of ribbon curbs, it may be possible to thicken the edges of the pavement to support wheel loads and mitigate possible edge cracking if vehicles run off the pavement edge. Guidance is given by the National Ready Mix Concrete Association (NRMCA). NRMCA suggests thickening the edges by 50% of the pavement thickness over a transition extending 4 ft from the pavement edge.
- Pavement construction should follow the concrete paving specifications provided in Appendix B. In addition, pavement construction should be in general conformance with City of Austin Standard Specifications Item 360.

NO.	DATE	DESCRIPTION

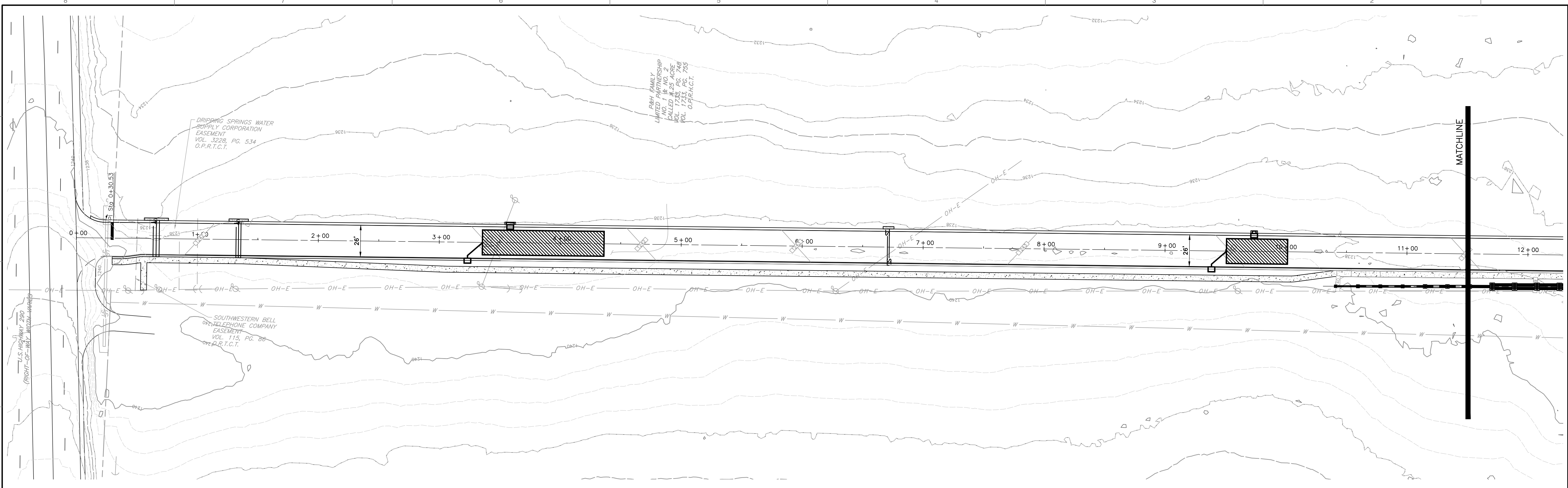


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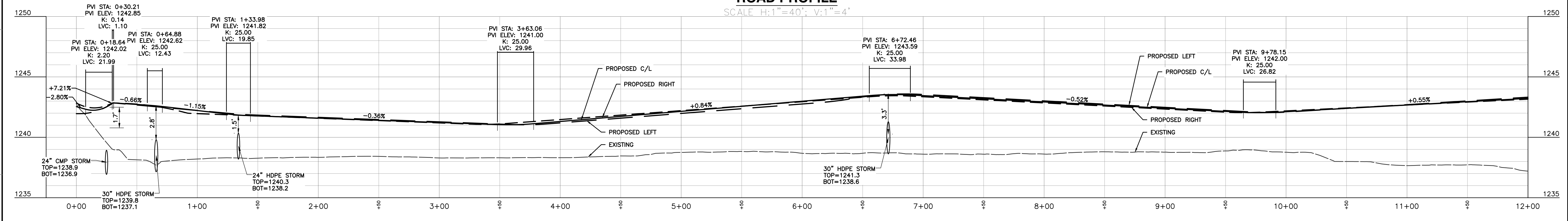
HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

RIGID PAVEMENT DESIGN	
DATE: 1/10/2024	DRAWN BY: NTS
DWG SCALE: NTS	CHECKED BY: NTS
PROJECT NO: 324-199	APPROVED BY: MT





ROAD PROFILE
SCALE H:1"=40'; V:1"=4'

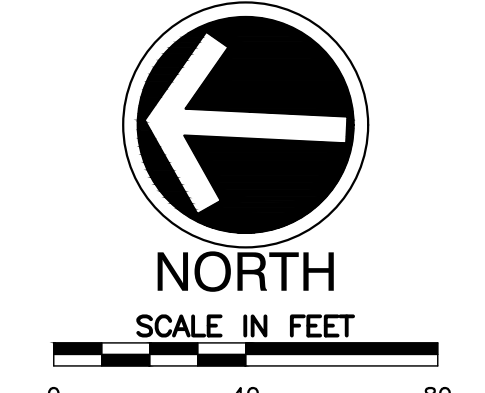


LINETYPE LEGEND

PROPOSED	EXISTING	DESCRIPTION
—	—	RIGHT-OF-WAY
—	—	LOT BOUNDARY
—	—	EASEMENT
X	X	FENCE BARBED
X	X	FENCE WOOD (PICKET)
X	X	FENCE WOOD (PRIVACY)
X	X	FENCE CHAIN LINK
X	X	FENCE IRON
385	385	MAJOR CONTOUR
—	—	MINOR CONTOUR
E	E	ELECTRIC LINE
OE	OE	OVERHEAD ELECTRIC WIRE
UE	UE	UNDERGROUND ELECTRIC LINE
T	T	TELEPHONE
C	C	COMMUNICATIONS LINE
TV	TV	CABLE TELEVISION
FO	FO	FIBER OPTIC LINE
—	—	GAS LINE
—	—	OVERHEAD UTILITY
—	—	UNDERGROUND UTILITY
SAN	SAN	SANITARY SEWER LINE
W	W	WATER LINE
F	F	FIRE LINE
—	—	ROAD CENTERLINE
—	—	CURB & GUTTER
—	—	STRIPING
—	—	FIRE LINE STRIPING
—	—	H.C. ACCESSIBLE ROUTE
—	—	LIMITS OF CONSTRUCTION
—	—	RAIL ROAD
—	—	FLOODWAY
—	—	CHWZ
—	—	STORM SEWER
—	—	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
•	•	BENCHMARK
○	○	CUT IN CONCRETE
△	△	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
▲	▲	NAIL
▲	▲	PIPE BREAK
△	△	PIPE CAP
△	△	PIPE FLOW
△	△	REDUCER
△	△	AIR RELEASE VALVE
△	△	BLOW-OFF VALVE
△	△	POST INDICATOR VALVE
△	△	MISCELLANEOUS VALVE
△	△	UTILITY VALVE
△	△	UTILITY METER
△	△	BACKFLOW PREVENTER
△	△	FLUSH CONNECTION
△	△	FIRE HYDRANT
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BIB
○	○	SANITARY M.H.
○	○	CLEANOUT
○	○	DRAINAGE M.H.
○	○	DOWN SPOUT
○	○	AREA INLET
○	○	CURB INLET
○	○	HEADWALL
○	○	SAFETY END TREATMENT
○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
○	○	ELEC./TELE. POLE
○	○	GUY WIRE
○	○	LIGHT FIXTURE
○	○	TRAFFIC SIGNAL
○	○	PEDESTRIAN SIGNAL
○	○	UTILITY (PULL)BOX
○	○	UTILITY RISER
○	○	UTILITY SERVICE



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REVISION RECORD

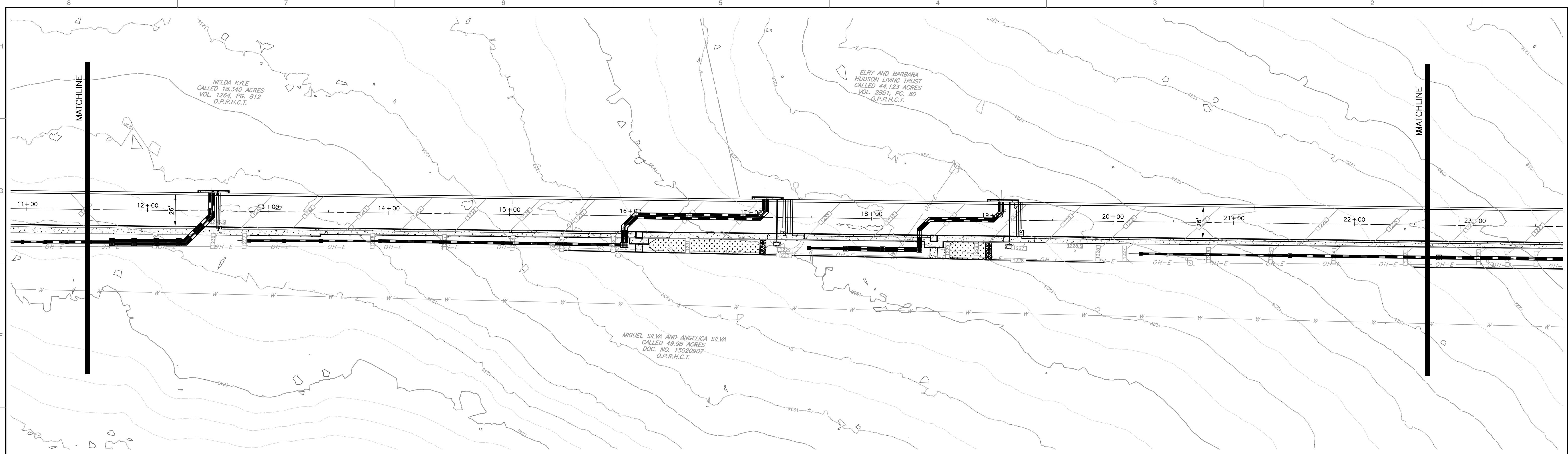
NO.	DATE	DESCRIPTION

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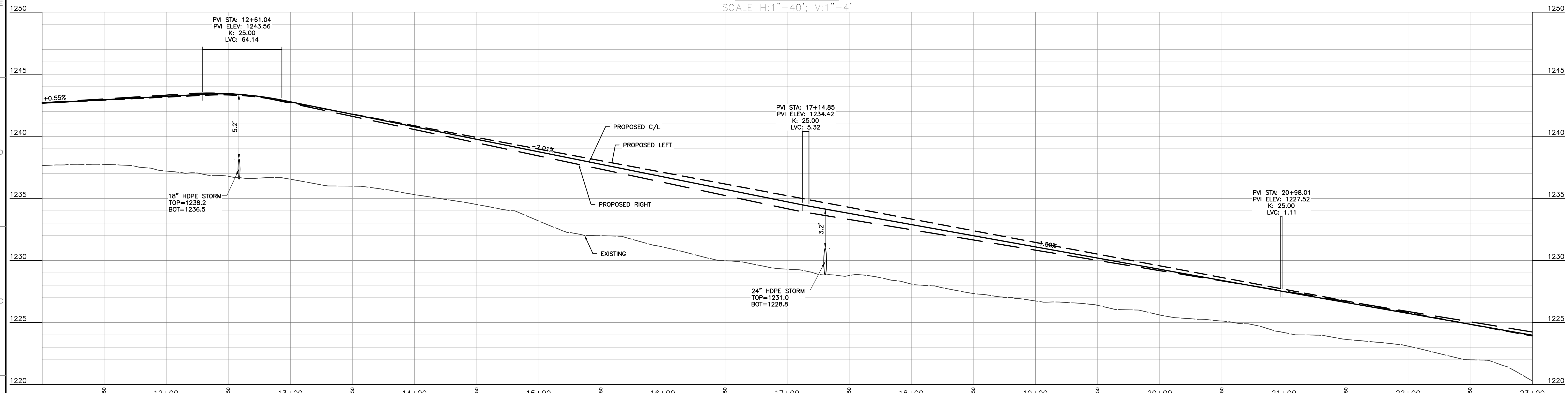
HARDY T LAND, LLC
SITE DEVELOPMENT PLANS
HARDY DRIVEWAY
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

ROAD PLAN & PROFILE STA 0+00-11+00

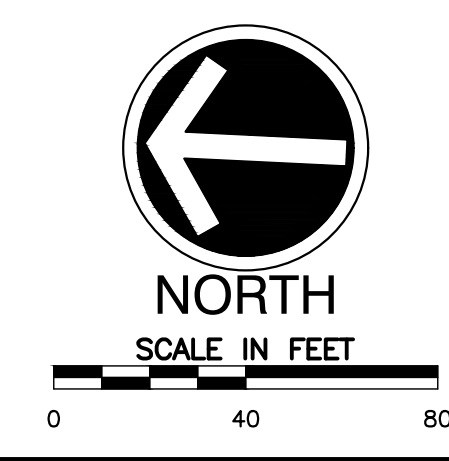
DATE: 1/10/2024
DRAWN BY: CEC
PROJECT NO: 324-199
CHECKED BY: CB
APPROVED BY: MT



ROAD PROFILE
SCALE: H:1"=40'; V:1"=4'



LINETYPE LEGEND		BLOCK LEGEND	
PROPOSED	EXISTING	PROPOSED	EXISTING



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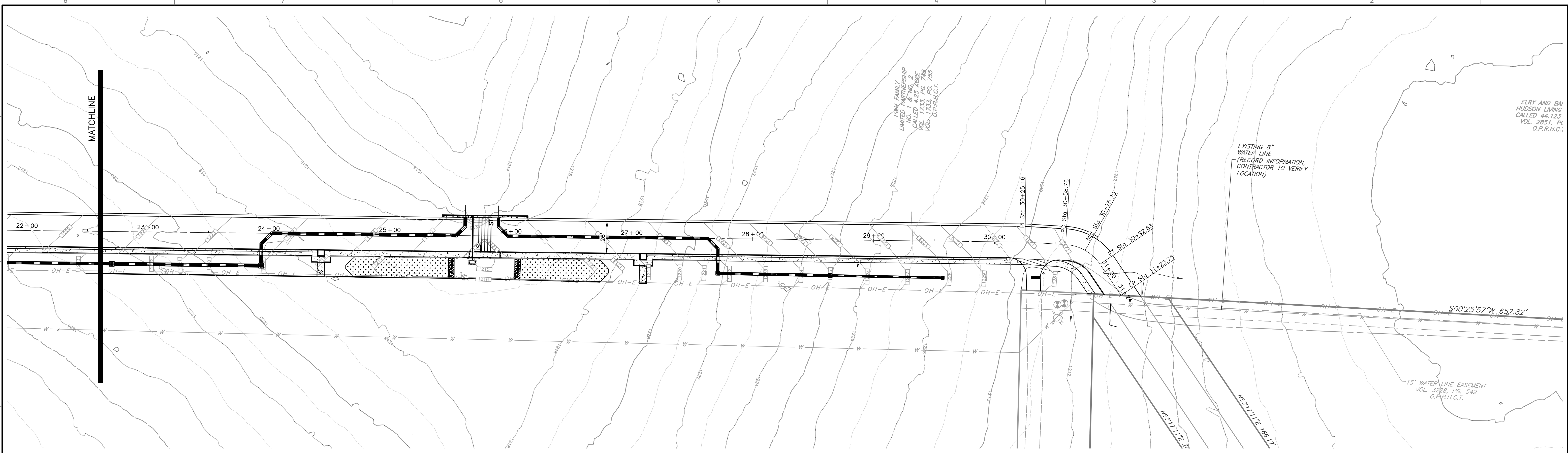
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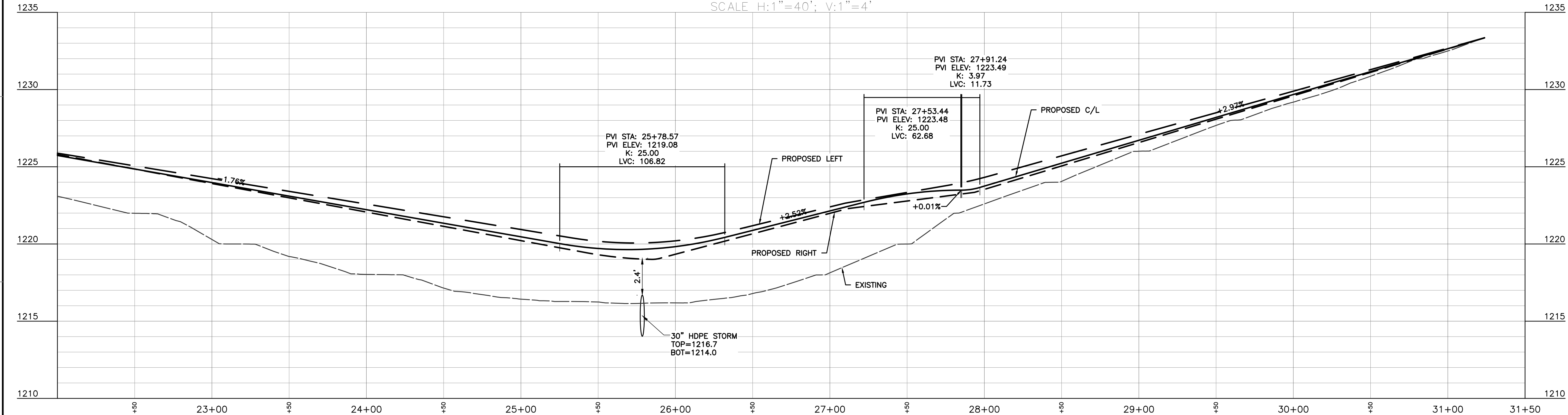
ROAD PLAN & PROFILE STA 11+00-22+00

DATE:	1/10/2024	DRAWN BY:	CEC
DWG. SCALE:	1" = 40'	CHECKED BY:	CB
PROJECT NO.:	324-199	APPROVED BY:	MT

DRAWING NO. **33**
SHEET 33 OF 42



ROAD PROFILE
SCALE: H:1"=40'; V:1"=4'



LINETYPE LEGEND

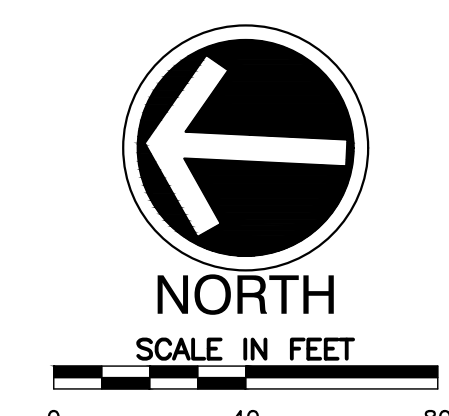
PROPOSED	EXISTING	DESCRIPTION
---	---	RIGHT-OF-WAY
---	---	LOT BOUNDARY
---	---	EASEMENT
-x-x-	-x-x-	FENCE: BARBED
- _ -	- _ -	FENCE: WOOD (PICKET)
- _ -	- _ -	FENCE: WOOD (PRIVACY)
-o-o-	-o-o-	FENCE: CHAIN LINK
-E-E-	-E-E-	FENCE: IRON
-385-	-385-	MAJOR CONTOUR
-E-E-	-E-E-	MINOR CONTOUR
-E-E-	-E-E-	ELECTRIC LINE
-OE-OE-	-OE-OE-	OVERHEAD ELECTRIC WIRE
-UE-UE-	-UE-UE-	UNDERGROUND ELECTRIC LINE
-T-T-	-T-T-	TELEPHONE
-C-C-	-C-C-	COMMUNICATIONS LINE
-TV-TV-	-TV-TV-	CABLE TELEVISION
-FO-FO-	-FO-FO-	FIBER OPTIC LINE

LINETYPE LEGEND (Continued)

PROPOSED	EXISTING	DESCRIPTION
-O-O-	-O-O-	GAS LINE
-OU-OU-	-OU-OU-	OVERHEAD UTILITY
-UG-UG-	-UG-UG-	UNDERGROUND UTILITY
-SAN-SAN-	-SAN-SAN-	SANITARY SEWER LINE
-W-W-	-W-W-	WATER LINE
-F-F-	-F-F-	FIRE LINE
-R-R-	-R-R-	ROAD CENTERLINE
-C-C-	-C-C-	CURB & GUTTER
-S-S-	-S-S-	STRIPING
-F-F-	-F-F-	FIRE LINE STRIPING
-LOC-LOC-	-LOC-LOC-	H.C. ACCESSIBLE ROUTE
-L-L-	-L-L-	LIMITS OF CONSTRUCTION
-R-R-	-R-R-	RAIL ROAD
-F-F-	-F-F-	FLOODWAY
-C-C-	-C-C-	CHWZ
-ST-ST-	-ST-ST-	STORM SEWER
-D-D-	-D-D-	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
●	●	BENCHMARK
○	○	CUT IN CONCRETE
△	△	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
▲	▲	PIPE BREAK
○	○	PIPE CAP
○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
○	○	UTILITY METER
○	○	BACKFLOW PREVENTER
○	○	FLUSH CONNECTION
○	○	FIRE HYDRANT
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BIB
○	○	SANITARY M.H.
○	○	CLEANOUT
○	○	DRAINAGE M.H.
○	○	DOWN SPOUT
○	○	AREA INLET
○	○	CURB INLET
○	○	HEADWALL
○	○	SAFETY END TREATMENT
○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
○	○	ELEC./TELE. POLE
○	○	GUY WIRE
○	○	LIGHT FIXTURE
○	○	TRAFFIC SIGNAL
○	○	PEDESTRIAN SIGNAL
○	○	UTILITY (PULL) BOX
○	○	UTILITY RISER
○	○	UTILITY SERVICE



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REVISION RECORD

NO.	DATE	DESCRIPTION

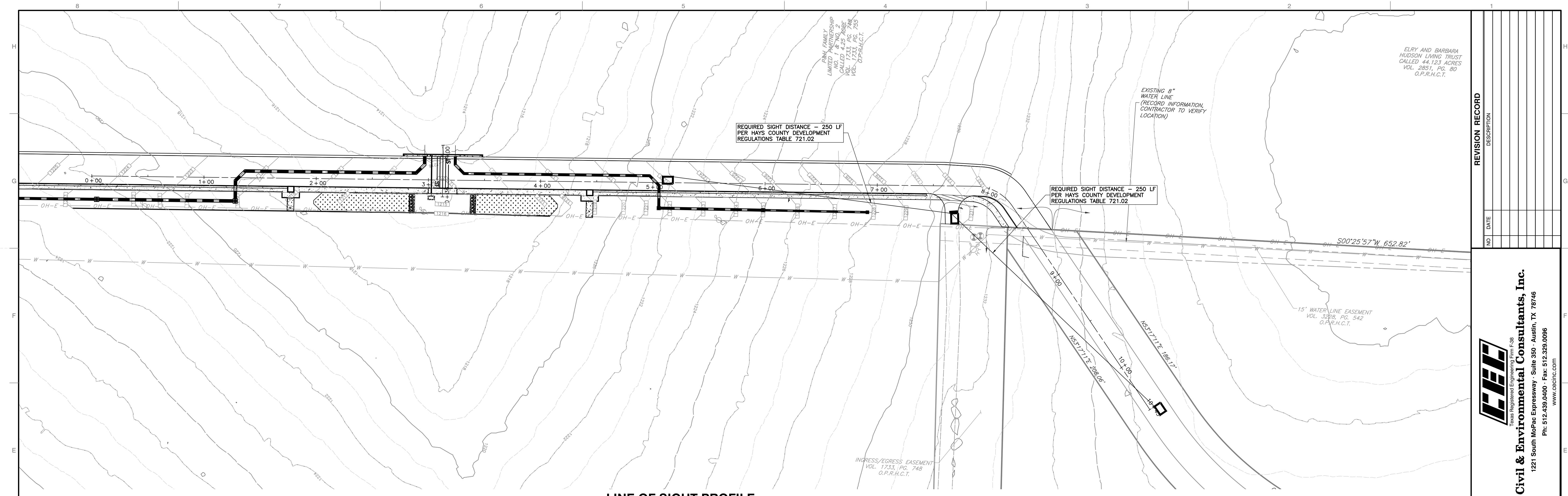
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CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

ROAD PLAN & PROFILE STA 22+00-END

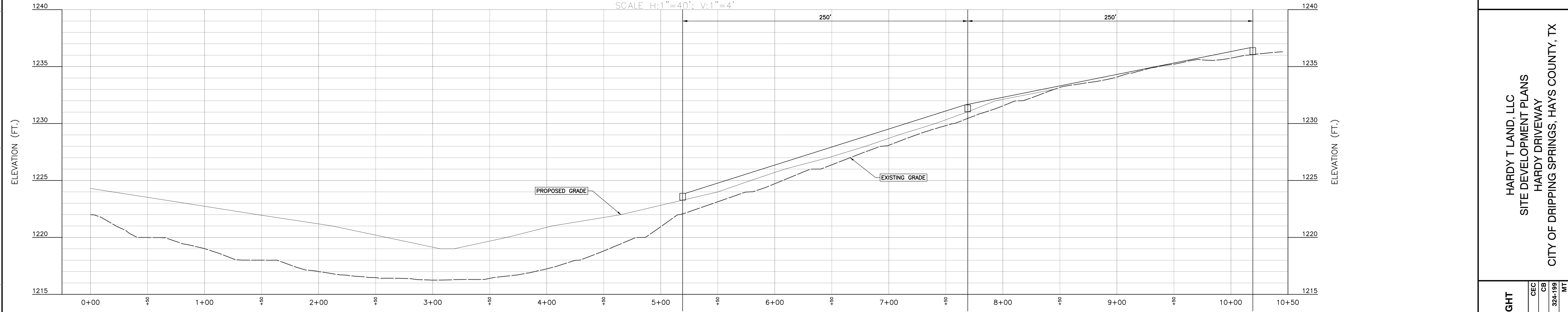
DATE: 1/10/2024 | DRAWN BY: CEC
DWG SCALE: 1" = 40' | CHECKED BY: CB
PROJECT NO: 324-199
APPROVED BY: MT

DRAWING NO. **34**
SHEET 34 OF 42



LINE OF SIGHT PROFILE

SCALE H:1"=40'; V:1"=4'



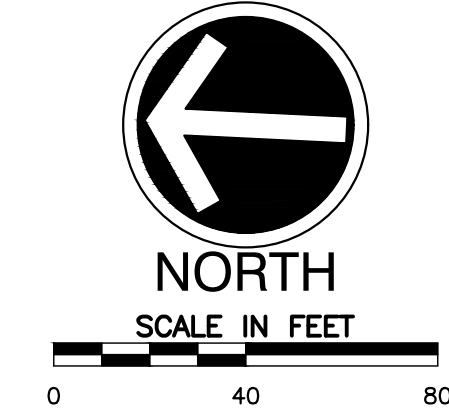
LINETYPE LEGEND

PROPOSED	EXISTING	DESCRIPTION
—	—	RIGHT-OF-WAY
- - -	- - -	LOT BOUNDARY
- · - · -	- · - · -	EASEMENT
X X X X	X X X X	FENCE: BARBED
		FENCE: WOOD (PICKET)
□ □ □ □	□ □ □ □	FENCE: WOOD (PRIVACY)
○ ○ ○ ○	○ ○ ○ ○	FENCE: CHAIN LINK
—	—	FENCE: IRON
385	385	MAJOR CONTOUR
—	—	MINOR CONTOUR
E	E	ELECTRIC LINE
OE	OE	OVERHEAD ELECTRIC WIRE
UE	UE	UNDERGROUND ELECTRIC LINE
T	T	TELEPHONE
C	C	COMMUNICATIONS LINE
TV	TV	CABLE TELEVISION
FO	FO	FIBER OPTIC LINE

PROPOSED	EXISTING	DESCRIPTION
○	○	GAS LINE
—	—	OVERHEAD UTILITY
UG	UG	UNDERGROUND UTILITY
SAN	SAN	SANITARY SEWER LINE
W	W	WATER LINE
F	F	FIRE LINE
—	—	ROAD CENTERLINE
—	—	CURB & GUTTER
—	—	STRIPING
—	—	FIRE LINE STRIPING
LOC	LOC	H.C. ACCESSIBLE ROUTE
—	—	LIMITS OF CONSTRUCTION
—	—	RAIL ROAD
—	—	FLOODWAY
—	—	CHWZ
—	—	STORM SEWER
—	—	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
●	●	BENCHMARK
△	△	CUT IN CONCRETE
○	○	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
○	○	PIPE BREAK
○	○	PIPE CAP
○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
○	○	UTILITY METER
○	○	BACKFLOW PREVENTER
○	○	FLUSH CONNECTION
○	○	FIRE HYDRANT
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BIB
○	○	SANITARY M.H.
○	○	CLEANOUT
○	○	DRAINAGE M.H.
○	○	DOWN SPOUT
○	○	AREA INLET
○	○	CURB INLET
○	○	HEADWALL
○	○	SAFETY END TREATMENT
○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
○	○	ELEC./TELE. POLE
○	○	GUY WIRE
○	○	LIGHT FIXTURE
○	○	TRAFFIC SIGNAL
○	○	PEDESTRIAN SIGNAL
○	○	UTILITY (PULL)BOX
○	○	UTILITY RISER
○	○	UTILITY SERVICE



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NO.	DATE	DESCRIPTION

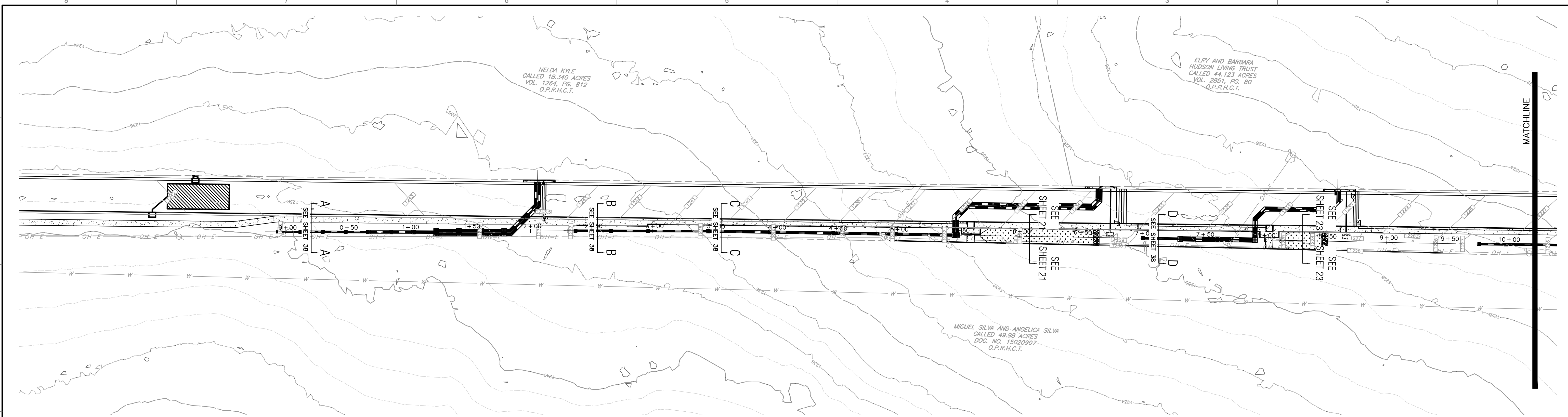
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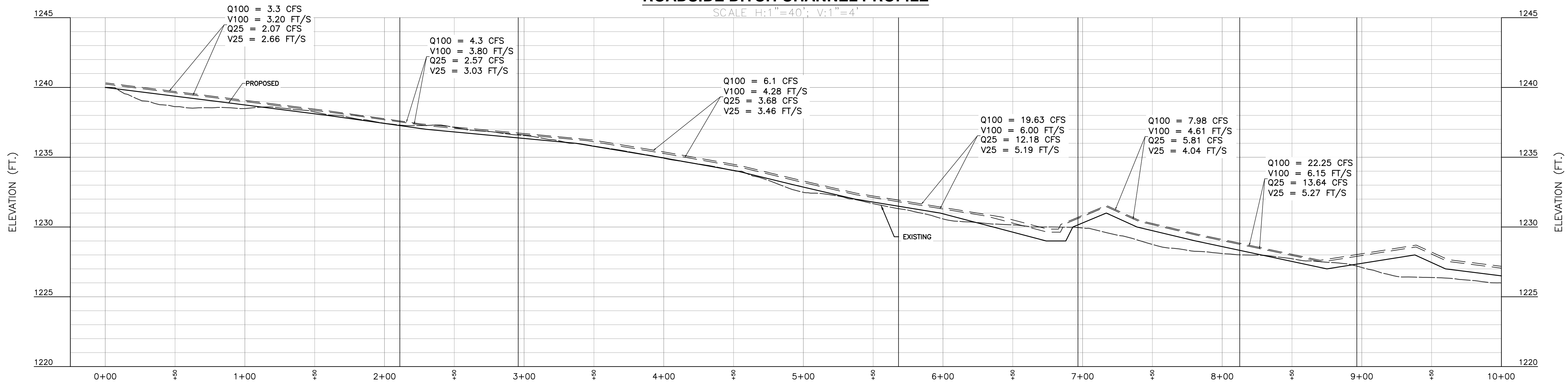
ROAD PLAN STA 30.25 - LINE OF SIGHT

DATE:	1/10/2024	DRAWN BY:	CEC
DWG SCALE:	1" = 40'	CHECKED BY:	CB
PROJECT NO.:	324-199	APPROVED BY:	MT

A:\2022\3025\3025-199-000\Drawings\3025-199-000-LINE OF SIGHT\ROAD PLAN STA 30.25 - LINE OF SIGHT.dwg (1/10/2024 10:31 AM)



ROADSIDE DITCH CHANNEL PROFILE
SCALE H:1"=40'; V:1"=4'



LINETYPE LEGEND

PROPOSED	EXISTING	DESCRIPTION
---	---	RIGHT-OF-WAY
---	---	LOT BOUNDARY
---	---	EASEMENT
-X-X-	-X-X-	FENCE: BARBED
- _ -	- _ -	FENCE: WOOD (PICKET)
- _ -	- _ -	FENCE: WOOD (PRIVACY)
- _ -	- _ -	FENCE: CHAIN LINK
- _ -	- _ -	FENCE: IRON
-385-	-385-	MAJOR CONTOUR
-385-	-385-	MINOR CONTOUR
-E-	-E-	ELECTRIC LINE
-OE-	-OE-	OVERHEAD ELECTRIC WIRE
-UE-	-UE-	UNDERGROUND ELECTRIC LINE
-T-	-T-	TELEPHONE
-C-	-C-	COMMUNICATIONS LINE
-TV-	-TV-	CABLE TELEVISION
-FO-	-FO-	FIBER OPTIC LINE
-G-	-G-	GAS LINE
-OU-	-OU-	OVERHEAD UTILITY
-UG-	-UG-	UNDERGROUND UTILITY
-SAN-	-SAN-	SANITARY SEWER LINE
-W-	-W-	WATER LINE
-F-	-F-	FIRE LINE
-R-	-R-	ROAD CENTERLINE
-C&G-	-C&G-	CURB & GUTTER
-STRIPING-	-STRIPING-	STRIPING
-FIRE-	-FIRE-	FIRE LINE STRIPING
-LOC-	-LOC-	H.C. ACCESSIBLE ROUTE
-LIMITS-	-LIMITS-	LIMITS OF CONSTRUCTION
-RAIL-	-RAIL-	RAIL ROAD
-FLOOD-	-FLOOD-	FLOODWAY
-CHWZ-	-CHWZ-	CHWZ
-ST-	-ST-	STORM SEWER
-DRAIN-	-DRAIN-	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
•	•	BENCHMARK
○	○	OUT IN CONCRETE
△	△	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
▲	▲	PIPE BREAK
○	○	PIPE CAP
○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
○	○	UTILITY METER
○	○	BACKFLOW PREVENTER
○	○	FLUSH CONNECTION
○	○	FIRE HYDRANT
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BIB
○	○	SANITARY M.H.
○	○	CLEANOUT
○	○	DRAINAGE M.H.
○	○	DOWN SPOUT
○	○	AREA INLET
○	○	CURB INLET
○	○	HEADWALL
○	○	SAFETY END TREATMENT
○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
○	○	ELEC./TELE. POLE
○	○	GUY WIRE
○	○	LIGHT FIXTURE
○	○	TRAFFIC SIGNAL
○	○	PEDESTRIAN SIGNAL
○	○	UTILITY (PULL)BOX
○	○	UTILITY RISER
○	○	UTILITY SERVICE

811 !!! CAUTION !!!
IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, and NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

STATE OF TEXAS
MICHAEL A. THEONE
142972
LICENSED PROFESSIONAL ENGINEER

NORTH
SCALE IN FEET
0 40 80

REVISION RECORD

NO.	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
Texas Registered Engineering Firm F-88
1221 South McPac Expressway - Suite 350 - Austin, TX 78746
Ph: 512.439.0400 - Fax: 512.329.0096
www.cecinc.com

HARDY T LAND, LLC
SITE DEVELOPMENT PLANS
HARDY DRIVEWAY
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

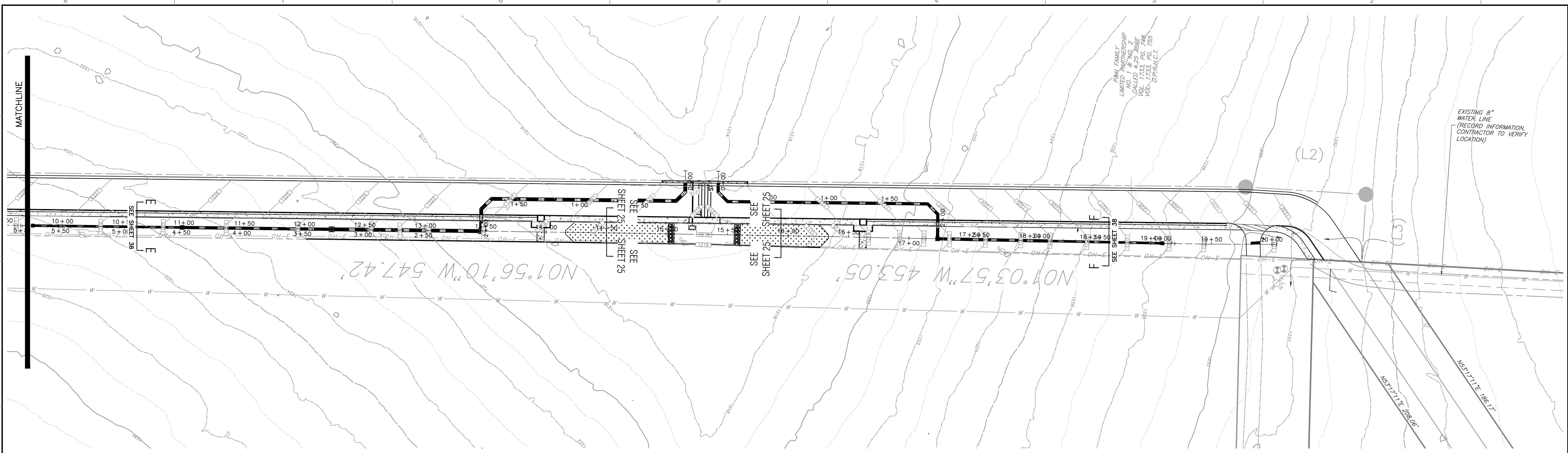
ROADSIDE DITCH P&P 0+00-10+00

DATE: 1/10/2024 DRAWN BY: CEC
DWG SCALE: 1" = 40' CHECKED BY: CB
PROJECT NO: 324-199
APPROVED BY: MT

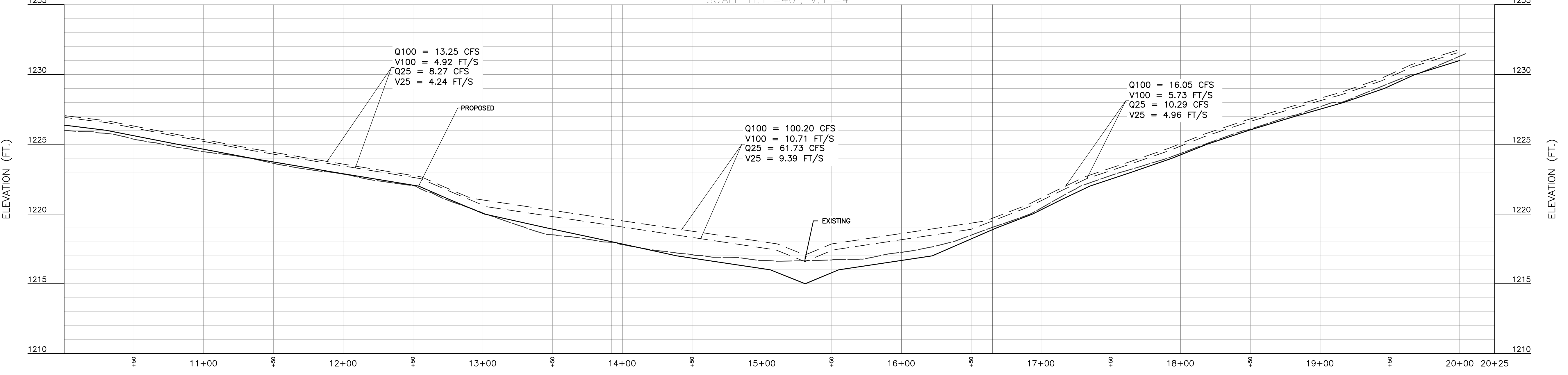
36
SHEET 36 OF 42

SD-2022-0025

A:\2024\2024-199-1\002\DWG\001\324199-001-CDD-ROADSIDE DITCH PLAN PROFILE.dwg/ROADSIDE DITCH PLAN PROFILE.dwg - Plotted on 1/10/2024 10:11 AM



ROADSIDE DITCH CHANNEL PROFILE
SCALE: H:1"=40'; V:1"=4'



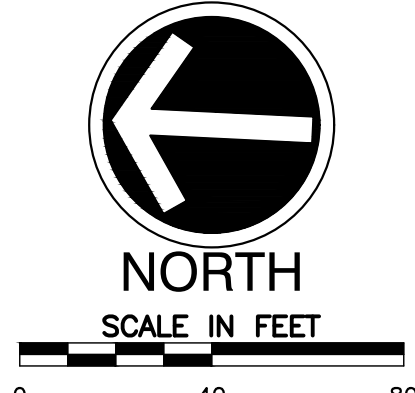
LINETYPE LEGEND

PROPOSED	EXISTING	DESCRIPTION
---	---	RIGHT-OF-WAY
---	---	LOT BOUNDARY
---	---	EASEMENT
-x-x-	-x-x-	FENCE: BARBED
-x-x-	-x-x-	FENCE: WOOD (PICKET)
-x-x-	-x-x-	FENCE: WOOD (PRIVACY)
-x-x-	-x-x-	FENCE: CHAIN LINK
-x-x-	-x-x-	FENCE: IRON
---	---	MAJOR CONTOUR
---	---	MINOR CONTOUR
-E-	-E-	ELECTRIC LINE
-OE-	-OE-	OVERHEAD ELECTRIC WIRE
-UE-	-UE-	UNDERGROUND ELECTRIC LINE
-T-	-T-	TELEPHONE
-C-	-C-	COMMUNICATIONS LINE
-TV-	-TV-	CABLE TELEVISION
-FO-	-FO-	FIBER OPTIC LINE

PROPOSED	EXISTING	DESCRIPTION
-G-	-G-	GAS LINE
-OU-	-OU-	OVERHEAD UTILITY
-UG-	-UG-	UNDERGROUND UTILITY
-SAN-	-SAN-	SANITARY SEWER LINE
-W-	-W-	WATER LINE
-F-	-F-	FIRE LINE
-R-	-R-	ROAD CENTERLINE
-CG-	-CG-	CURB & GUTTER
-S-	-S-	STRIPING
-FLS-	-FLS-	FIRE LINE STRIPING
-HCA-	-HCA-	H.C. ACCESSIBLE ROUTE
-LLOC-	-LLOC-	LIMITS OF CONSTRUCTION
-RR-	-RR-	RAIL ROAD
-F-	-F-	FLOODWAY
-CHWZ-	-CHWZ-	CHWZ
-ST-	-ST-	STORM SEWER
-DC-	-DC-	DRAINAGE CHANNEL

BLOCK LEGEND

PROPOSED	EXISTING	DESCRIPTION
•	•	BENCHMARK
○	○	CUT IN CONCRETE
⊙	⊙	CONTROL POINT
○	○	IRON PIPE
○	○	IRON ROD
○	○	IRON ROD W/ CAP
○	○	MONUMENT TYPE 1
○	○	MONUMENT TYPE 2
○	○	NAIL
○	○	PIPE BREAK
○	○	PIPE CAP
○	○	PIPE FLOW
○	○	REDUCER
○	○	AIR RELEASE VALVE
○	○	BLOW-OFF VALVE
○	○	POST INDICATOR VALVE
○	○	MISCELLANEOUS VALVE
○	○	UTILITY VALVE
○	○	UTILITY METER
○	○	BACKFLOW PREVENTER
○	○	FLUSH CONNECTION
○	○	FIRE HYDRANT
○	○	(MONITORING) WELL
○	○	UTILITY RISER
○	○	HOSE BIB
○	○	SANITARY M.H.
○	○	CLEANOUT
○	○	DRAINAGE M.H.
○	○	DOWN SPOUT
○	○	AREA INLET
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○	○	SAFETY END TREATMENT
○	○	DRAINAGE FLOW
○	○	ELEC. M.H.
○	○	ELEC./TELE. POLE
○	○	GUY WIRE
○	○	LIGHT FIXTURE
○	○	TRAFFIC SIGNAL
○	○	PEDESTRIAN SIGNAL
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○	○	UTILITY RISER
○	○	UTILITY SERVICE



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REVISION RECORD

NO.	DATE	DESCRIPTION

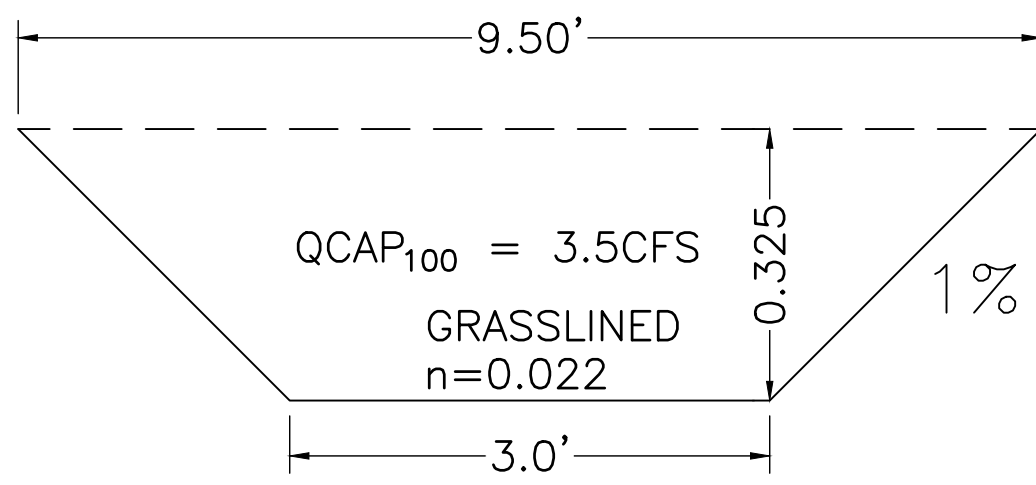
Civil & Environmental Consultants, Inc.
Texas Registered Engineering Firm F-88
1221 South McPac Expressway - Suite 350 - Austin, TX 78746
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HARDY T LAND, LLC
SITE DEVELOPMENT PLANS
HARDY DRIVEWAY
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

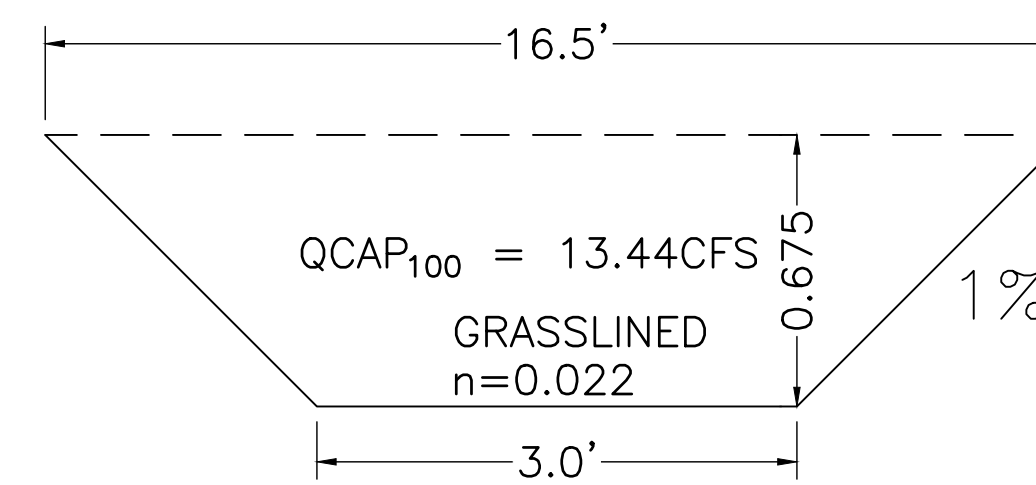
ROADSIDE DITCH P&P 10+00-END

DATE: 1/10/2024 | DRAWN BY: CEC
DWG SCALE: 1" = 40' | PROJECT NO: 324-199
PROJECT NO: 324-199 | APPROVED BY: MT

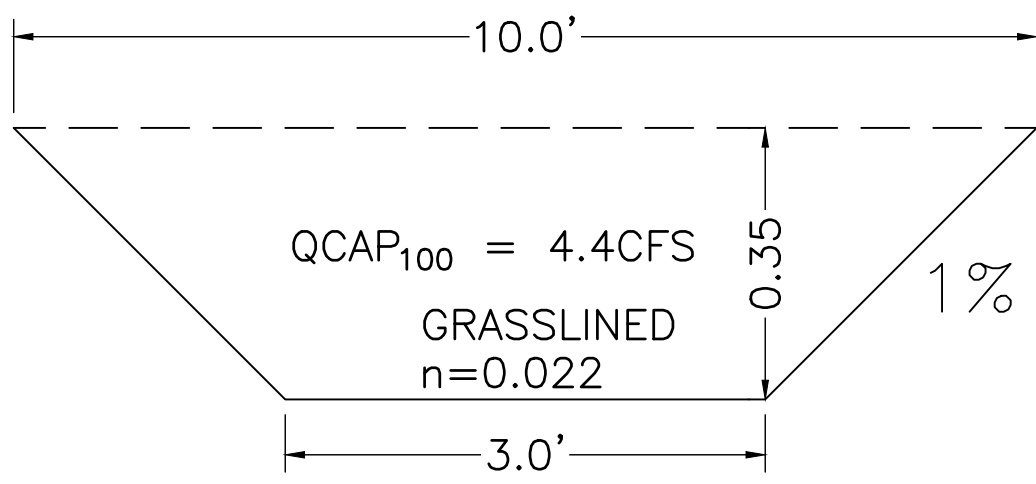
DRAWING NO. **37** OF 42



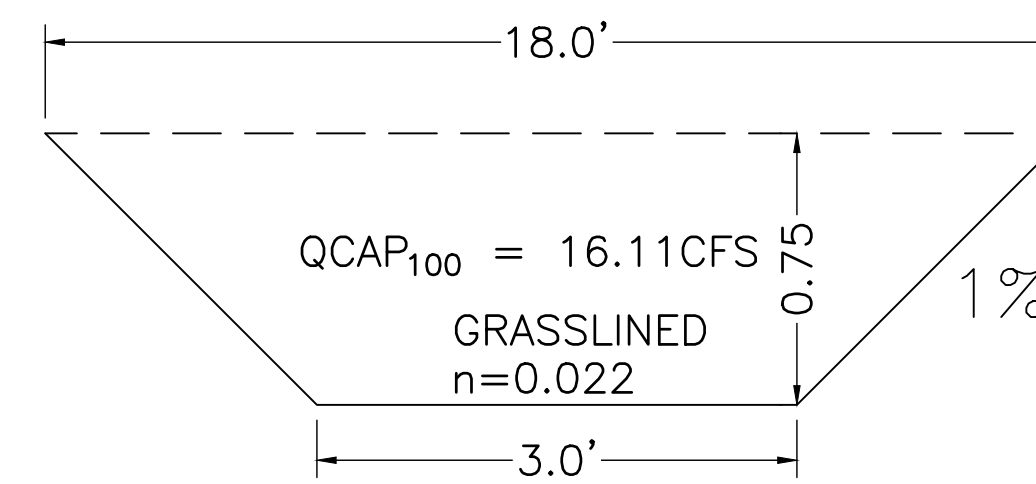
A ROADSIDE DITCH SECTION
SCALE: NTS ROADSIDE DITCH A



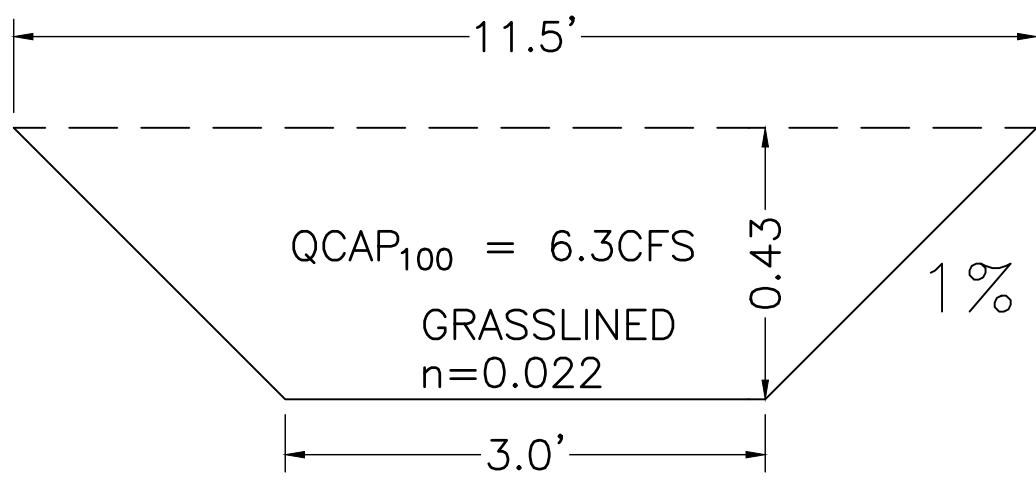
E ROADSIDE DITCH SECTION
SCALE: NTS ROADSIDE DITCH E



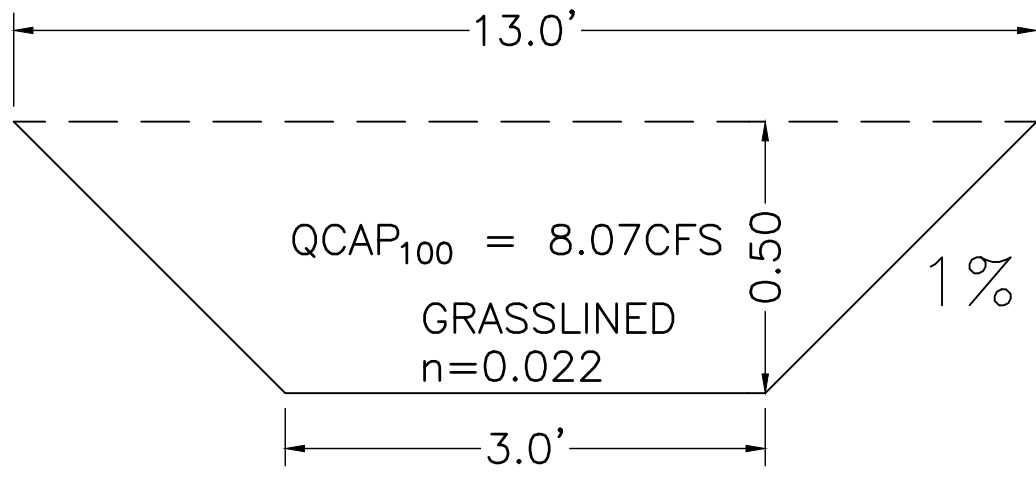
B ROADSIDE DITCH SECTION
SCALE: NTS ROADSIDE DITCH B



F ROADSIDE DITCH SECTION
SCALE: NTS ROADSIDE DITCH F



C ROADSIDE DITCH SECTION
SCALE: NTS ROADSIDE DITCH C



D ROADSIDE DITCH SECTION
SCALE: NTS ROADSIDE DITCH D

NO	DATE	DESCRIPTION

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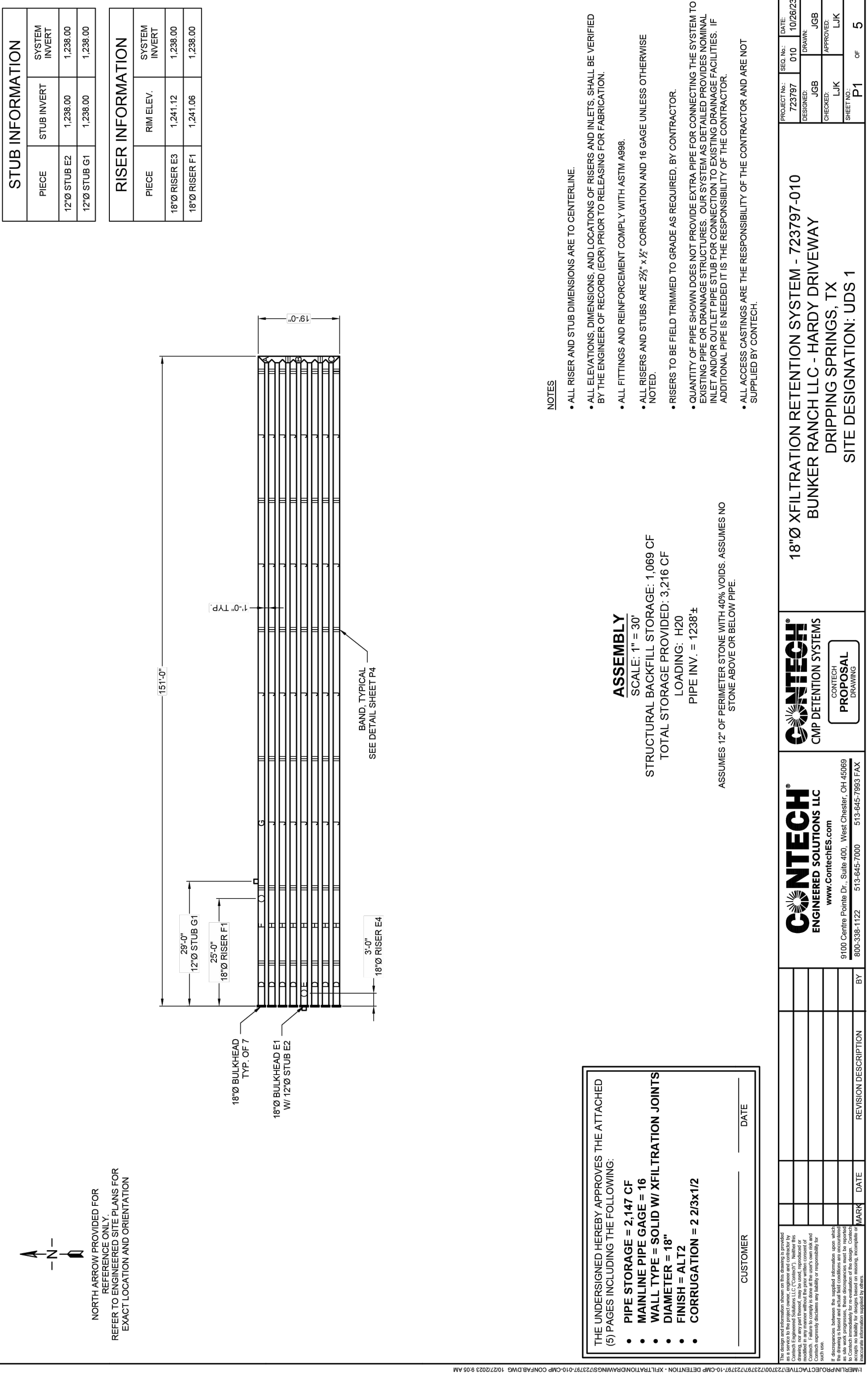
ROADSIDE DITCH SECTIONS	CEC
DATE: 1/10/2024	DRAWN BY:
DWG SCALE: 1" = 40'	CHECKED BY:
PROJECT NO: 324-199	APPROVED BY:
	MT



811 !!! CAUTION !!!
IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, and NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
!!! CAUTION !!!

A:\20-201\2024-199\2024\DWG\1324199-001-CED-ROADSIDE DITCH PLAN PROPOSED DITCH SECTIONS LS(1/10/2024 - draw) - LP: 1/10/2024 10:33 AM

A:\300-200\324-199-000\DWG\001\324199-001-000.dwg FROM CONTECH\dwg\UNDERGROUND DETENTION 1 1 OF 2] LS(1/10/2024 - 09:06:56) - LP 1/10/2024 10:32 AM



STUB INFORMATION		
PIECE	STUB INVERT	SYSTEM INVERT
12'0" STUB E2	1,238.00	1,238.00
12'0" STUB G1	1,238.00	1,238.00

RISER INFORMATION		
PIECE	RIM ELEV.	SYSTEM INVERT
18"0" RISER E3	1,241.12	1,238.00
18"0" RISER F1	1,241.08	1,238.00

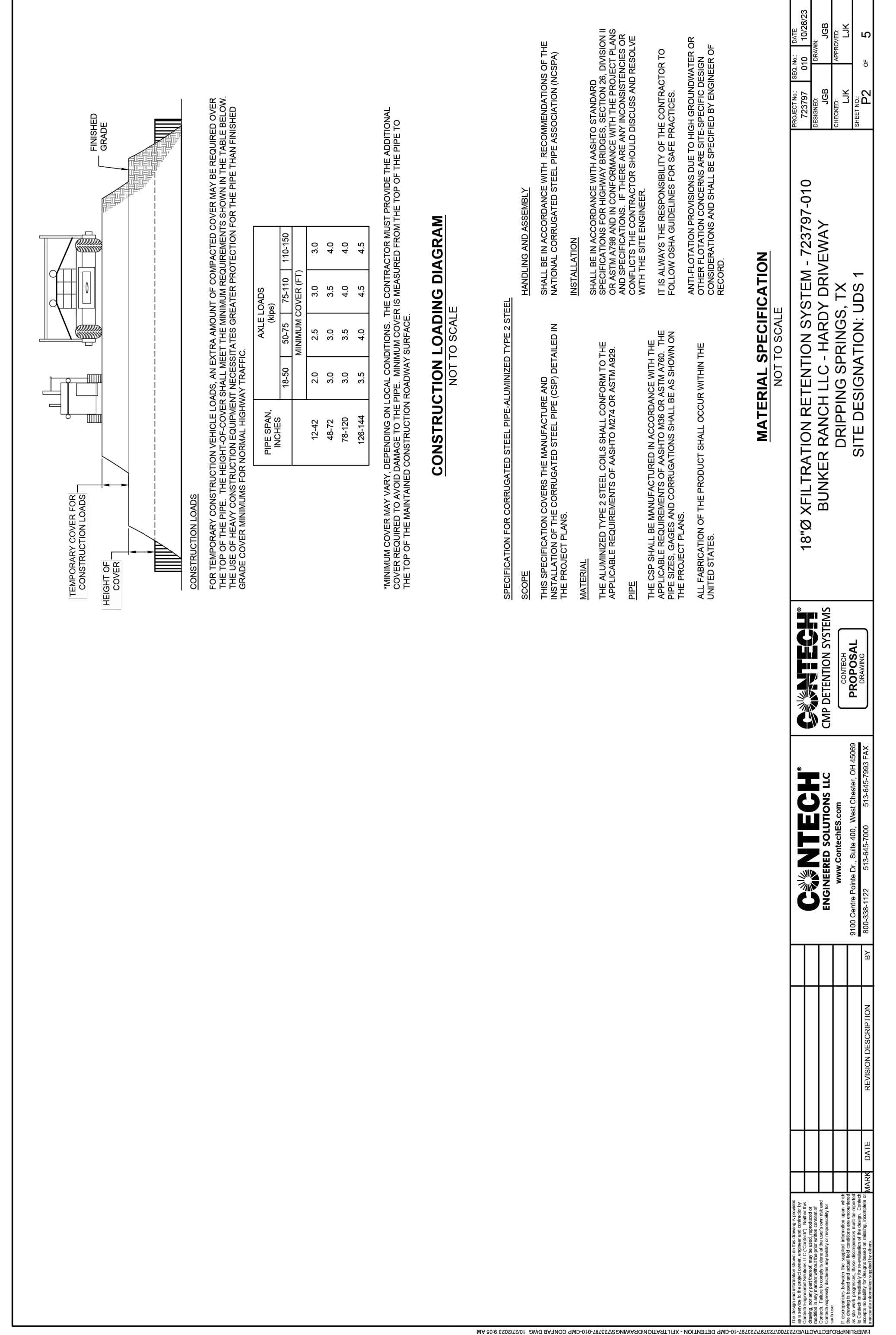
- NOTES**
- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE.
 - ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD (EOR) PRIOR TO BEGINNING OF FABRICATION.
 - ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A996.
 - RISERS TO BE FIELD TRIMMED TO GRADE AS REQUIRED BY CONTRACTOR.
 - QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING STRUCTURE. CONTRACTOR SHALL VERIFY EXISTING STRUCTURE AND PROVIDE INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING PACKAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND ARE NOT SUPPLIED BY CONTECH.
 - ALL ACCESS CASTINGS ARE THE RESPONSIBILITY OF THE CONTRACTOR AND ARE NOT SUPPLIED BY CONTECH.

ASSEMBLY
 SIZE: 18" x 12' x 30'
 STRUCTURAL BACKFILL STORAGE: 1,089 CF
 TOTAL STORAGE PROVIDED: 3,216 CF
 LOADING: H20
 PIPE INV. = 1238'
 ASSUMES 12" OF PERMEABLE STONE WITH 40% Voids. ASSUMES NO STONE ABOVE OR BELOW PIPE.

THE UNDERSIGNED HEREBY APPROVES THE ATTACHED (5) PAGES INCLUDING THE FOLLOWING:

- PIPE STORAGE = 2,147 CF
- MAINLINE PIPE GAGE = 16
- WALL TYPE = SOLID W/ XFILTRATION JOINTS
- FINISH = ALT 2
- CORRUGATION = 2 2/3x12

8300 Centre Pointe Dr., Suite 402, West Chester, OH 45089 800.338.1122 513.845.7000 513.845.7003 FAX		8300 Centre Pointe Dr., Suite 402, West Chester, OH 45089 800.338.1122 513.845.7000 513.845.7003 FAX	
PROJECT NO.	723797-010	DATE	10/26/23
DESIGNED BY	CB	CHECKED BY	LJK
DRAWN BY	LJK	APPROVED BY	P1
SCALE			5



PIPE SPAN, INCHES	AXLE LOADS (kips)	MINIMUM COVER (FT)
18-50	50.75	75-110
20	25	3.0
48-72	3.0	3.5
78-100	3.0	3.5
128-144	3.5	4.0
	4.0	4.5

CONSTRUCTION LOADING DIAGRAM
 NOT TO SCALE

SCOPE
 THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE CORRUGATED STEEL PIPE (CSP) DETAILED IN THE PROJECT PLANS.

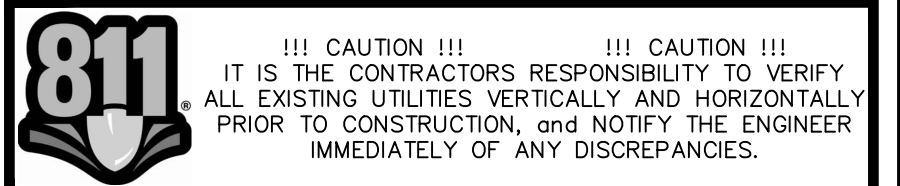
MATERIAL
 THE ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M27 OR ASTM A662.

PIPE
 THE CSP SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M27 OR ASTM A662. THE PIPE SIZES, GAGES AND CORRUGATIONS SHALL BE AS SHOWN ON THE PROJECT PLANS.

INSTALLATION
 ALL FABRICATION OF THE PRODUCT SHALL OCCUR WITHIN THE UNITED STATES.

MATERIAL SPECIFICATION
 NOT TO SCALE

8300 Centre Pointe Dr., Suite 402, West Chester, OH 45089 800.338.1122 513.845.7000 513.845.7003 FAX		8300 Centre Pointe Dr., Suite 402, West Chester, OH 45089 800.338.1122 513.845.7000 513.845.7003 FAX	
PROJECT NO.	723797-010	DATE	10/26/23
DESIGNED BY	CB	CHECKED BY	LJK
DRAWN BY	LJK	APPROVED BY	P2
SCALE			5



UNDERGROUND DETENTION 1 1 OF 2		REVISION RECORD	
DATE:	8/10/2022	NO.	DATE
DWG SCALE:	NTS	DESCRIPTION	
PROJECT NO.:	324-199		
APPROVED BY:	MAT		
HARDY T LAND, LLC SITE DEVELOPMENT PLANS HARDY DRIVEWAY CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX			
DRAWING NO. 39 OF 42		CIVIL & ENVIRONMENTAL CONSULTANTS, INC. 1221 South McPac Expressway - Suite 350 - Austin, TX 78746 Ph: 512.439.0400 - Fax: 512.329.0096 www.cbecinc.com	

INSTALLATION NOTES

- WHEN PLACING THE FIRST LIFT OF BACKFILL IT IS RECOMMENDED TO COMPACT AND FINISH THE SURFACE OF THE TRENCH AND AROUND THE PIPE MANHOLES PRIOR TO PLACING THE REMAINING LIFTS OF BACKFILL.
- COVER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
- IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED IN AREAS WITH DETENTION SYSTEMS, THE AGENTS SHOULD BE RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE DETENTION SYSTEM FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE DETENTION SYSTEM DESIGNER'S DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-40"	12"	2.25" x 1/2"
48"-96"	12"	3" x 1 1/2" x 1 1/2"
96"	D8	3" x 1 1/2" x 1 1/2"

• STRUCTURAL BACKFILL MUST EXTEND TO TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS RECOMMENDED FOR ALL TYPES OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.

TABLE 2:

MATERIAL LOCATION	MATERIAL SPECIFICATION
FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD
FOUNDATION	ASHTO 28.5.2 - PER ENGINEER OF RECORD
BEDDING	ASHTO M 83.3, 307.4, 467.5, 56.57
BACKFILL	FREE-DRAINING, ANGULAR, WASHED-STONE PER ASHTO M 43.3, 397.4, 467.5, 56.57 OR APPROVED EQUIV.
COVER MATERIAL	UP TO MIN. COVER - ASHTO M 146 A-1, A-2, A-3 ABOVE MIN. COVER - PER ENGINEER OF RECORD
RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD
SIDE GEOTEXTILE	NONE
GEOTEXTILE BETWEEN LAYERS	NONE

NOTES:

- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER, Z BUT NO LESS THAN 12" FOR DIAMETERS < 72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT APPROVED REGIONAL EQUIVALENTS FOR SECTION 5 INCLUDE CA-7, MIDOT 6AA, 6A, OR 6S, PROVIDED THEY MEET THE PARTICLE SIZES INDICATED.
- APPROVED REGIONAL EQUIVALENTS FOR SECTION 5 INCLUDE CA-7, MIDOT 6AA, 6A, OR 6S, PROVIDED THEY MEET THE PARTICLE SIZES INDICATED.

CONTECH ENGINEERS SOLUTIONS LLC
 9100 Coates Pointe Dr., Suite 400, West Chester, OH 45390
 937.338.1122 937.338.1122 937.338.1122

CONTECH ENGINEERS SOLUTIONS LLC
 18"Ø XFLTRATION RETENTION SYSTEM - 723797-010
 BUNKER RANCH LLC - HARDY DRIVEWAY
 DRIPPING SPRINGS, TX
 SITE DESIGNATION: UDS 1

PROJECT NO.	723797	DATE:	01/02/2024
DESIGNER	JOB	DRAWN	JOB
CHECKED	LJK	APPROVED	LJK
DATE			

GENERAL NOTES:

- JOINTS TO BE ASSEMBLED PER ASHTO BRIDGE CONSTRUCTION SPECIFICATION SEC. 28.4.2.4.
- BAND MATERIALS AND/OR COATING CAN VARY BY LOCATION. CONTACT YOUR CONTECH REPRESENTATIVE FOR AVAILABILITY.
- BANDS ARE SHAPED TO MATCH THE PIPE-ARCH WHEN APPLICABLE.
- BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
 - 12" THRU 48" 1-PIECE
 - 48" THRU 72" 2-PIECE
 - 72" THRU 144" 3-PIECE
- BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS.
- ALL CMP IS REROLLED TO HAVE ANNULAR END CORRUPTIONS OF 2.25"x1/2"
- DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
- ORDER SHALL DESIGNATE GASKET OPTION, IF REQUIRED (SEE DETAILS ABOVE).

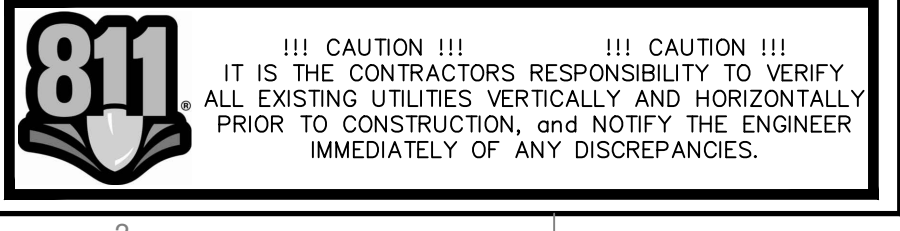
GENERAL NOTES:

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 18"Ø XFLTRATION RETENTION SYSTEM - 723797-010
 BUNKER RANCH LLC - HARDY DRIVEWAY
 DRIPPING SPRINGS, TX
 SITE DESIGNATION: UDS 1

PROJECT NO.	723797	DATE:	01/02/2024
DESIGNER	JOB	DRAWN	JOB
CHECKED	LJK	APPROVED	LJK
DATE			



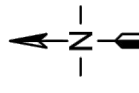
UNDERGROUND DETENTION 1 2 OF 2

DATE: 8/10/2022 DRAWN BY: CEC
 PROJECT NO: NTS CHECKED BY: 324-199
 APPROVED BY: MAT

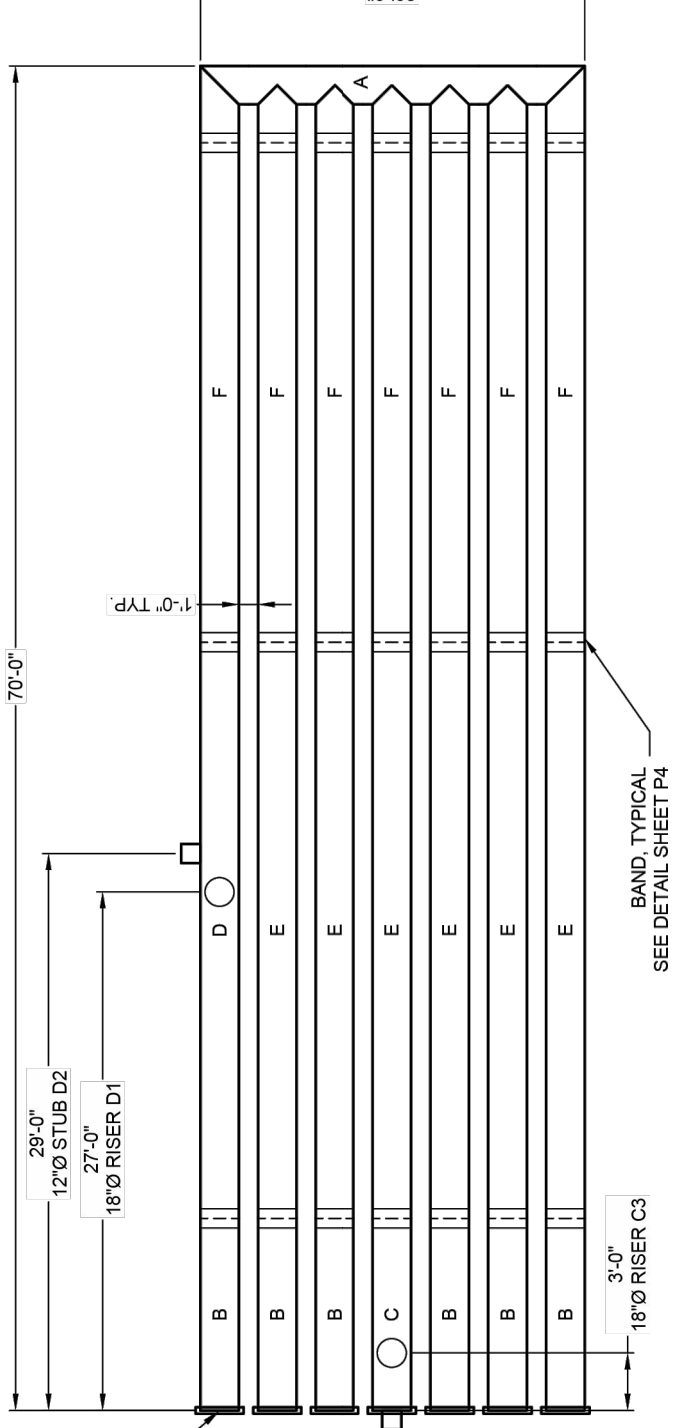
HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

Civil & Environmental Consultants, Inc.
 1221 South MoPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0096
 www.cetinc.com

NO.	DATE	REVISION RECORD	DESCRIPTION
P3			
P4			



NORTH ARROW PROVIDED FOR REFERENCE ONLY. CONTRACTOR TO VERIFY EXISTING UTILITIES FOR EXACT LOCATION AND ORIENTATION.



STUB INFORMATION

PIECE	STUB INVERT	SYSTEM INVERT
12'Ø STUB C2	1,238.50	1,238.50
12'Ø STUB D2	1,238.50	1,238.50

RISER INFORMATION

PIECE	RISER ELEV.	SYSTEM INVERT
18\"/>	1,242.15	1,238.50
18\"/>	1,242.08	1,238.50

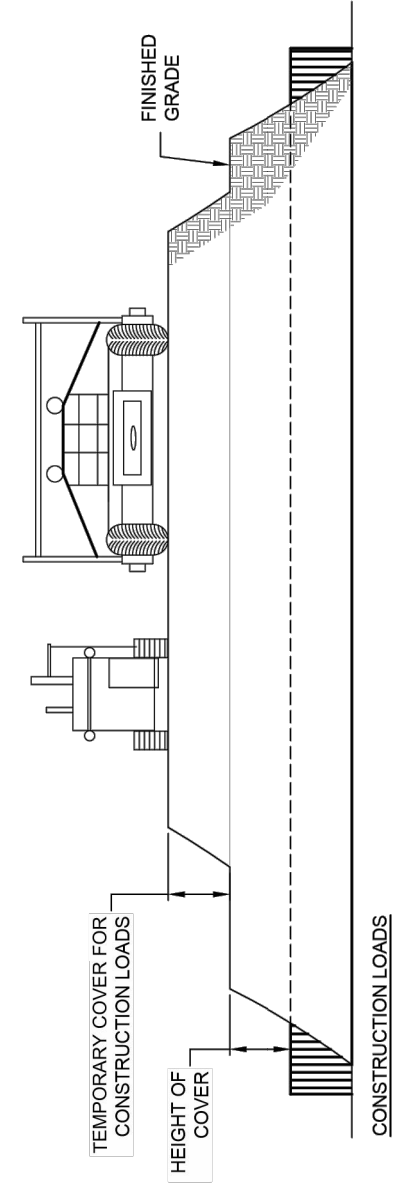
- NOTES**
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 - ALL RISER AND STUB DIMENSIONS AND FINISHES SHALL BE VERIFIED BY THE ENGINEER OF RECORD (EOR) PRIOR TO RELEASING FOR FABRICATION.
 - ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A888.
 - RISERS TO BE FIELD TRIMMED TO GRADE AS REQUIRED. BY CONTRACTOR.
 - QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING UTILITY. CONTRACTOR TO VERIFY EXISTING UTILITY LOCATION AND CONNECTION. ADDITIONAL PIPE IS NEEDED IF IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
 - ALL ACCESS CASTINGS ARE THE RESPONSIBILITY OF THE CONTRACTOR AND ARE NOT SUPPLIED BY CONTECH.

ASSEMBLY
SCALE: 1" = 10'
STRUCTURAL BACKFILL STORAGE: 644 CF
TOTAL STORAGE PROVIDED: 2,202 CF
PIPE INV. = 1238.50'
ASSUMES 12' OF STONE PERIMETER WITH 40% Voids.
ASSUMES NO STONE ABOVE OR BELOW PIPE.

THE UNDERSIGNED HEREBY APPROVES THE ATTACHED (5) PAGES INCLUDING THE FOLLOWING:
 • PIPE STORAGE = 1,558 CF
 • MAINLINE PIPE GAGE = 16
 • MAINLINE PIPE GAGE = 24
 • DIAMETER = 24
 • FINISH = AL12
 • CORRUGATION = 2.23x1/2

CUSTOMER _____ DATE _____

 9100 Center Pointe Dr., Suite 400, West Chester, OH 45399 800-338-1122 513-945-7000 513-945-7993 FAX www.conteches.com		 CONTECH CIVIL DETENTION SYSTEMS PROPOSAL DRAWING		PROJECT No. 723797 DRAWN: C.J.G. CHECKED: L.J.K. DATE: 10/26/2023
24"Ø XFLTRATION RETENTION SYSTEM - 723797-020 BUNKER RANCH LLC - HARDY DRIVEWAY DRIPPING SPRINGS, TX SITE DESIGNATION: UDS 2				SHEET No. P1 of 5 DRAWN: C.J.G. CHECKED: L.J.K. DATE: 10/26/2023



AXLE LOADS

PIPE SPAN, INCHES	18-50	30-75	75-110	110-150
MINIMUM COVER (FT)	2.0	2.5	3.0	3.0
	4.0	3.0	3.5	4.0
	7.0	3.0	3.5	4.0
	1.5	4.0	4.5	4.5

CONSTRUCTION LOADING DIAGRAM
NOT TO SCALE

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH RECOMMENDATIONS OF THE NATIONAL CORRUGATED STEEL PIPE ASSOCIATION (NCSA)

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II AND SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

MATERIAL
THE ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M214 OR ASTM A888.

PIPE
THE CSP SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M214 OR ASTM A888. PIPE SIZES, GAGES AND CORRUGATIONS SHALL BE AS SHOWN ON THE PROJECT PLANS.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY EXISTING UTILITY LOCATION AND CONNECTION. OTHER LOCATION CONCERNS ARE THE SPECIFIC DESIGNER'S RESPONSIBILITY AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.

MATERIAL SPECIFICATION
NOT TO SCALE

 9100 Center Pointe Dr., Suite 400, West Chester, OH 45399 800-338-1122 513-945-7000 513-945-7993 FAX www.conteches.com		 CONTECH CIVIL DETENTION SYSTEMS PROPOSAL DRAWING		PROJECT No. 723797 DRAWN: C.J.G. CHECKED: L.J.K. DATE: 10/26/2023
24"Ø XFLTRATION RETENTION SYSTEM - 723797-020 BUNKER RANCH LLC - HARDY DRIVEWAY DRIPPING SPRINGS, TX SITE DESIGNATION: UDS 2				SHEET No. P2 of 5 DRAWN: C.J.G. CHECKED: L.J.K. DATE: 10/26/2023



!!! CAUTION !!!
IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION, and NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

UNDERGROUND DETENTION 2 1 OF 2

DATE: 8/10/2022 DRAWN BY: CEC
 PROJECT NO: NTS CHECKED BY: CB
 324-199
 APPROVED BY: MAT

HARDY T LAND, LLC
 SITE DEVELOPMENT PLANS
 HARDY DRIVEWAY
 CITY OF DRIPPING SPRINGS, HAYS COUNTY, TX

Texas Registered Engineering Firm F-88
 1221 South McPac Expressway - Suite 350 - Austin, TX 78746
 Ph: 512.439.0400 - Fax: 512.329.0096
 www.cceinc.com

REVISION RECORD

NO.	DATE	DESCRIPTION

INSTALLATION NOTES

- WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS RECOMMENDED TO COMPACT AND FINISH THE TOP SURFACE OF THE BACKFILL MATERIAL. THE PIPE MANHOLES SHOULD BE COMPACTED UNDER AND AROUND THE PIPE MANHOLE. THE BACKFILL MATERIAL MAY BE ALLOWED TO SETTLE OR BE COMPACTED DEPENDENT ON SITE SPECIFIC CONDITIONS, AS APPROVED BY THE ENGINEER.
- IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED TO MAINTAIN ACCESS TO THE ROADWAY, THE RECOMMENDED OVER THE UPPER HALF OF THE PIPE, THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE BACKFILL FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE DESIGNER'S DESIGN GUIDE FOR ADDITIONAL INFORMATION.

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1 1/4"
12"-40"	12"	2.25" x 1.02"
48"-80"	12"	3" x 1 1/2" x 1 1/2"
96"	D8	3" x 1 1/2" x 1 1/2"

STRUCTURAL BACKFILL MUST EXTEND TO TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS RECOMMENDED FOR ALL APPLICATIONS OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.

TABLE 2:

MINIMUM TRENCH WIDTH	MINIMUM EMBANKMENT WIDTH
PIPE ≤ 24" D - 4'-0"	PIPE ≤ 24" D - 3'-0"
PIPE 24" - 144" D - 4'-0"	PIPE 24" - 144" D - 3'-0"
PIPE 144" D - 7'-0"	PIPE > 144" D - 7'-0"

TABLE 3:

FOUNDATION	PER ENGINEER OF RECORD
ASHTO M 82.3, 307, 4, 467, 5, 96, 97	
ASHTO M 82.3, 307, 4, 467, 5, 96, 97	

TABLE 4:

BACKFILL	PER ENGINEER OF RECORD
FREE-DRAINING, ANGULAR, WASHED-STONE PER ASHTO M 4.3, 3.397, 4, 467, 5, 96, 97 OR APPROVED EQUIV.	

TABLE 5:

COVER MATERIAL	PER ENGINEER OF RECORD
UP TO MIN. COVER - ASHTO M 146 A-1, A-2, A-3 ABOVE MIN. COVER - PER ENGINEER OF RECORD	

TABLE 6:

RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD
NONE	

TABLE 7:

SIDE GEOTEXTILE	NONE
NONE	

TABLE 8:

GEOTEXTILE BETWEEN LAYERS	NONE
NONE	

NOTES:

- FOR MULTIPLE BARRELS INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE PIPE DIAMETER, Z BUT NO LESS THAN 12" FOR DIAMETERS < 24". FOR 24" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT THE MANUFACTURER FOR APPROVED REGIONAL EQUIVALENTS FOR SECTIONS 5 INCLUDE CA-7, MDOT 6AA, 6A, OR 6S. PROVIDED THEY MEET THE PARTICLE SIZES INDICATED.
- APPROVED REGIONAL EQUIVALENTS FOR SECTIONS 5 INCLUDE CA-7, MDOT 6AA, 6A, OR 6S. PROVIDED THEY MEET THE PARTICLE SIZES INDICATED.

MANUFACTURER RECOMMENDED BACKFILL
NOT TO SCALE

CONTECH ENGINEERS SOLUTIONS LLC
9100 Coates Pointe Dr., Suite 400, West Chester, OH 45390
www.conteches.com
937.338.1122 937.338.1122 937.338.1122

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937.338.1122 937.338.1122 937.338.1122

CONTECH
CMP DETENTION SYSTEMS
PROPOSAL DRAWING

24"Ø XFILTRATION RETENTION SYSTEM - 723797-020
BUNKER RANCH LLC - HARDY DRIVEWAY
DRIPPING SPRINGS, TX
SITE DESIGNATION: UDS 2

PROJECT NO. 723797 DATE: 10/26/2023
DESIGNED BY C.J.G. DRAWN BY C.J.G.
CHECKED BY L.J.K. APPROVED BY L.J.K.
SHEET NO. P3 OF 5

GENERAL NOTES:

- DELIVERED BAND STYLE AND FASTENER TYPE MAY VARY BY FABRICATION PLANT.
- JOINT IS TO BE ASSEMBLED PER ASHTO BRIDGE CONSTRUCTION SPECIFICATION SEC. 26.4.2.4.
- BAND MATERIAL AND GAGE TO BE SAME AS RISER MATERIAL.
- IF RISER HAS A HEIGHT OF COVER OF 12" OR MORE, USE A SLIP JOINT.
- BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
 - 5'-2" PIECES
 - 5'-2" PIECES
- ALL RISER JOINT COMPONENTS WILL BE FIELD ASSEMBLED.
- MANHOLE RISERS IN APPLICATIONS WHERE TRAFFIC LOADS ARE IMPOSED REQUIRE SPECIAL DESIGN CONSIDERATIONS.
- DIMENSIONS SUBJECT TO MANUFACTURING TOLERANCES.

12" RISER BAND DETAIL
NOT TO SCALE

CONNECTION DETAIL
7 1/2" TECHO SHOWN - MAY VARY

PLAIN END CMP RISER PIPE

GENERAL NOTES:

- JOINT IS TO BE ASSEMBLED PER ASHTO BRIDGE CONSTRUCTION SPECIFICATION SEC. 26.4.2.4.
- BAND MATERIALS AND/OR COATING CAN VARY BY LOCATION. CONTACT YOUR CONTECH REPRESENTATIVE FOR AVAILABILITY.
- BANDS ARE SHAPED TO MATCH THE PIPE-ARCH WHEN APPLICABLE.
- BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
 - 12" THRU 48" 1-PIECE
 - 48" THRU 144" 3-PIECE
 - 102" THRU 144" 3-PIECE
- BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS.
- ALL CMP IS RE-ROLLED TO HAVE ANNULAR END CORRUPTIONS OF 2.25"x1/2".
- DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
- ORDER SHALL DESIGNATE GASKET OPTION, IF REQUIRED (SEE DETAILS ABOVE).

H-12 HUGGER BAND DETAIL
NOT TO SCALE

CONNECTION DETAIL
(H88)

CONNECTION DETAIL
(H88)

CONTECH ENGINEERS SOLUTIONS LLC
9100 Coates Pointe Dr., Suite 400, West Chester, OH 45390
www.conteches.com
937.338.1122 937.338.1122 937.338.1122

CONTECH
CMP DETENTION SYSTEMS
PROPOSAL DRAWING

24"Ø XFILTRATION RETENTION SYSTEM - 723797-020
BUNKER RANCH LLC - HARDY DRIVEWAY
DRIPPING SPRINGS, TX
SITE DESIGNATION: UDS 2

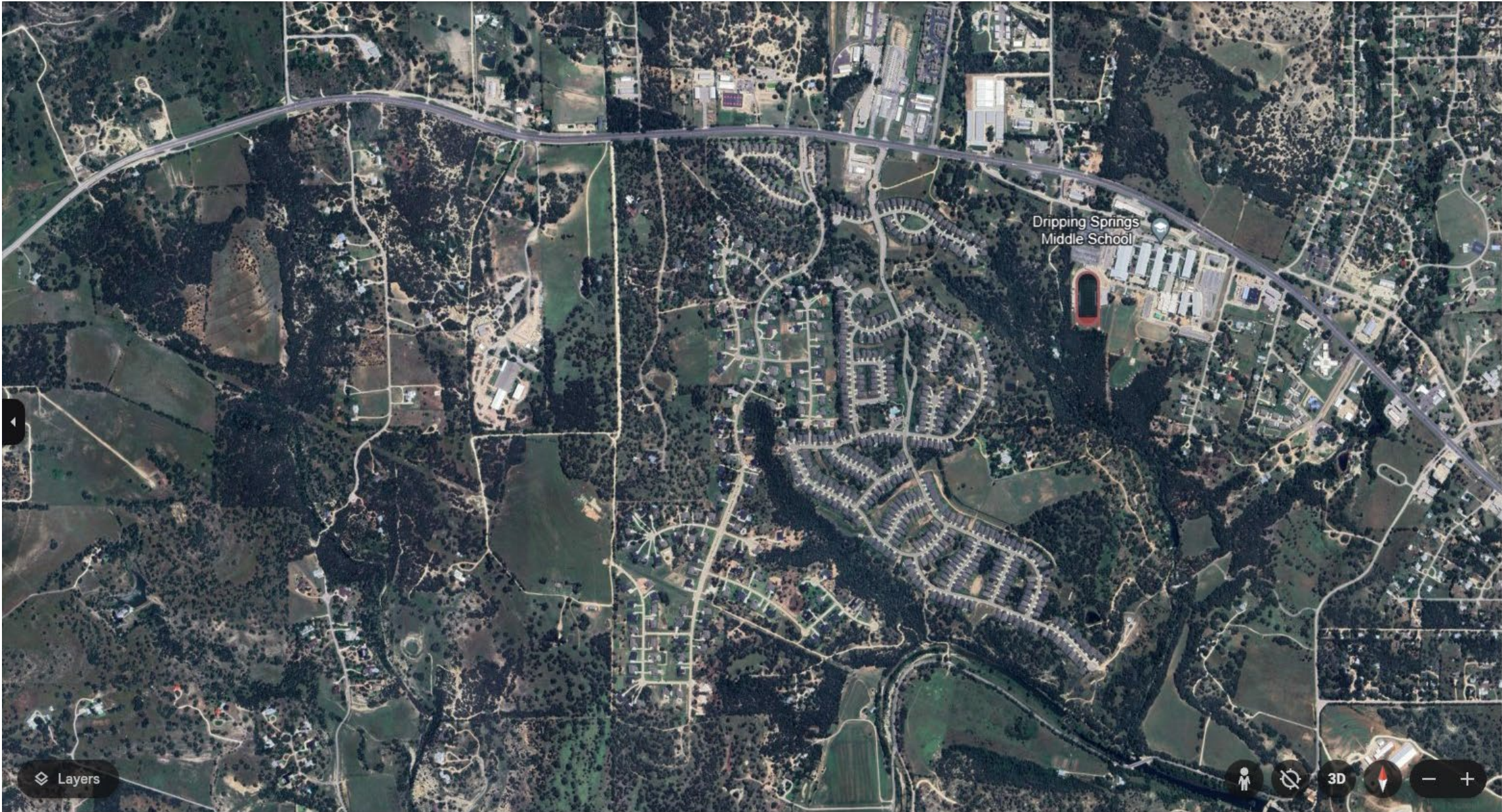
PROJECT NO. 723797 DATE: 10/26/2023
DESIGNED BY C.J.G. DRAWN BY C.J.G.
CHECKED BY L.J.K. APPROVED BY L.J.K.
SHEET NO. P4 OF 5

Exhibit F

Dripping Springs
Middle School

Overview

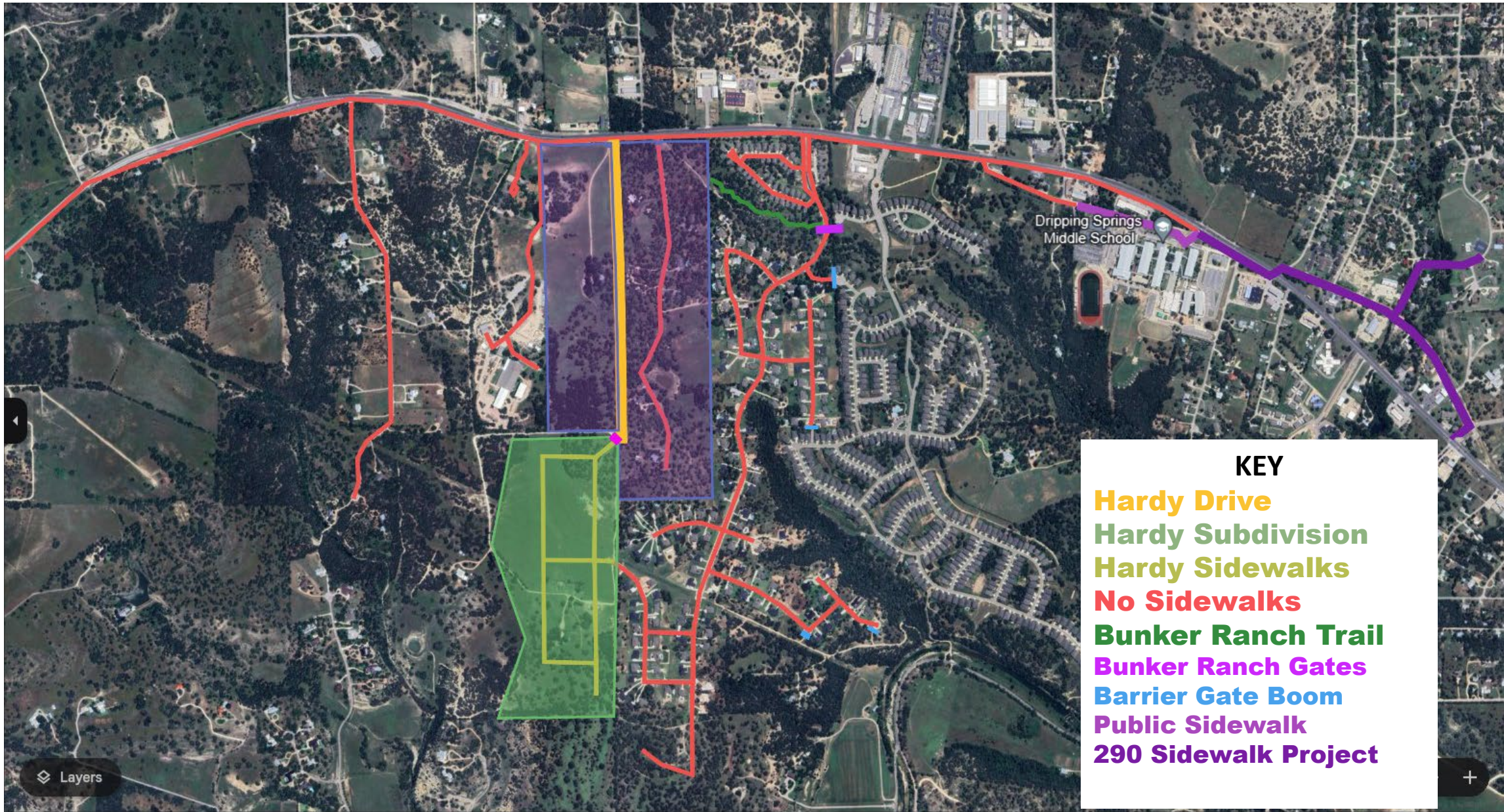




Dripping Springs Middle School

Layers





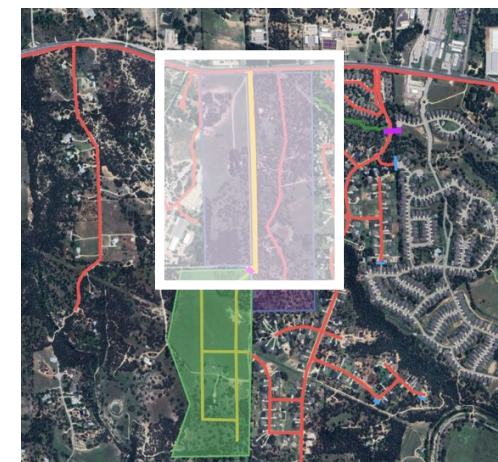
KEY

- Hardy Drive**
- Hardy Subdivision**
- Hardy Sidewalks**
- No Sidewalks**
- Bunker Ranch Trail**
- Bunker Ranch Gates**
- Barrier Gate Boom**
- Public Sidewalk**
- 290 Sidewalk Project**

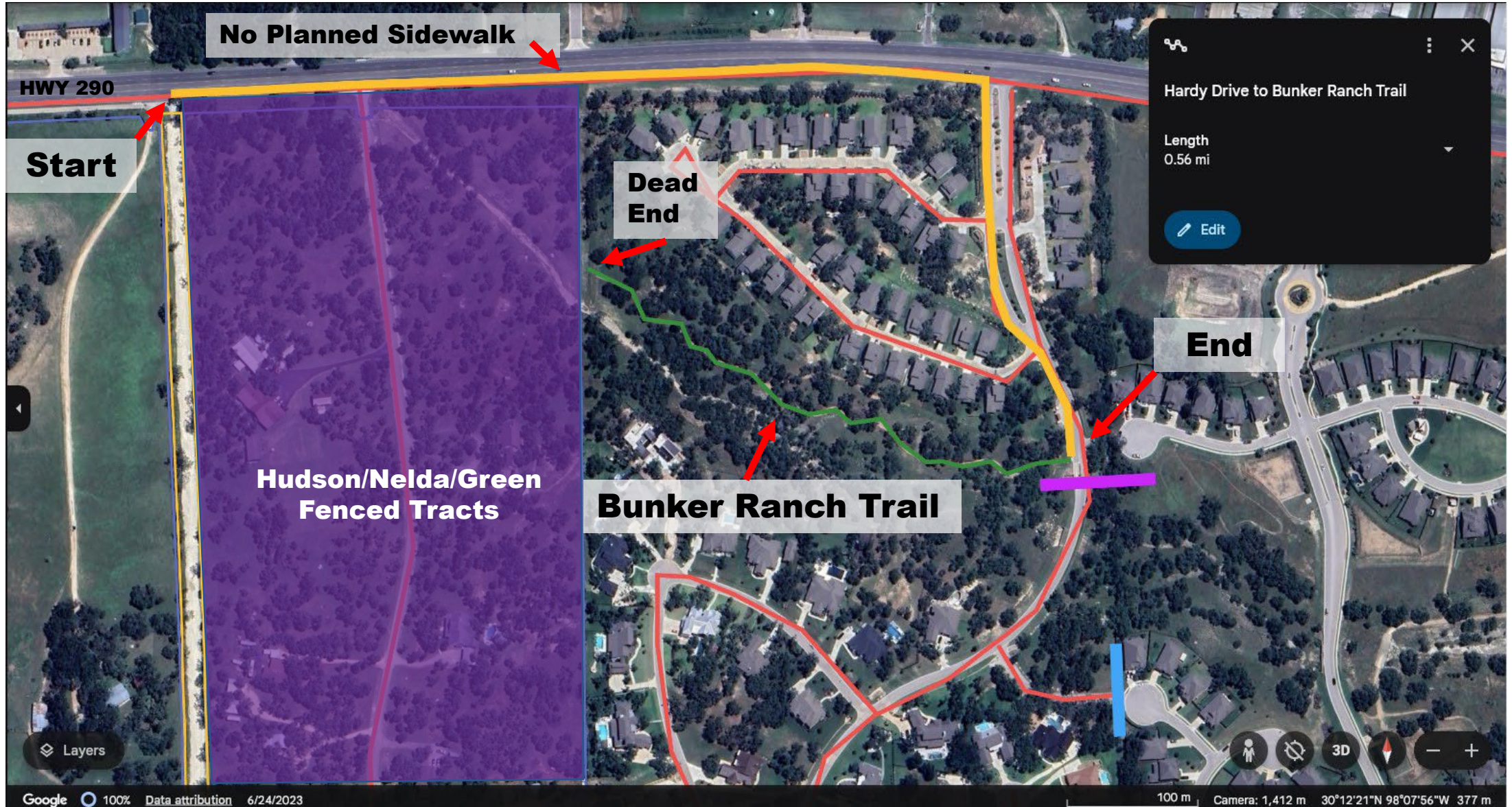


Hardy Drive Neighboring Land

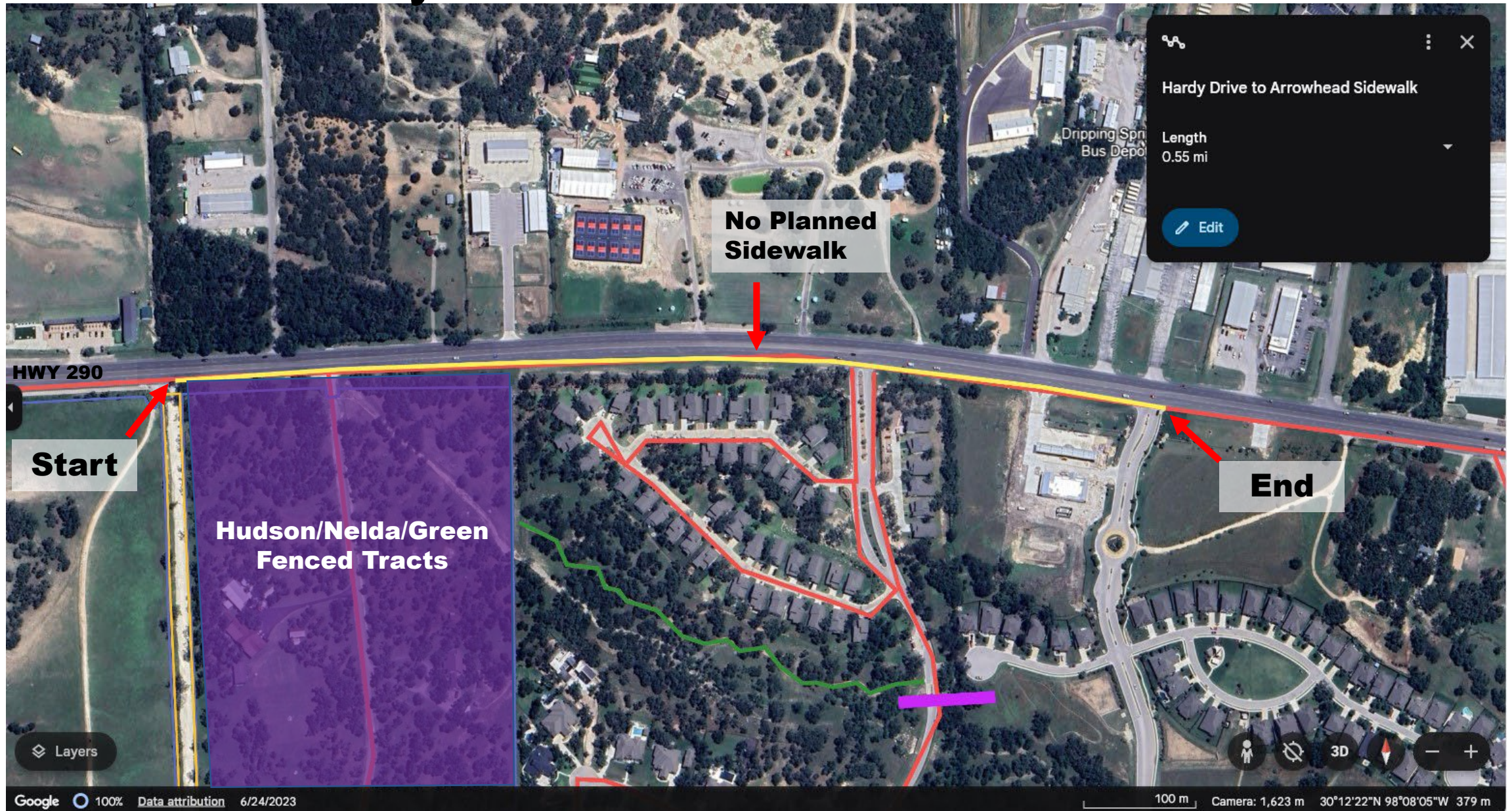
- Private
- Fenced
- Rural
- Large Parcels
- No Planned Development/Sale
- No Planned Multifamily Development
- No Planned Commercial Development
- No Connectivity



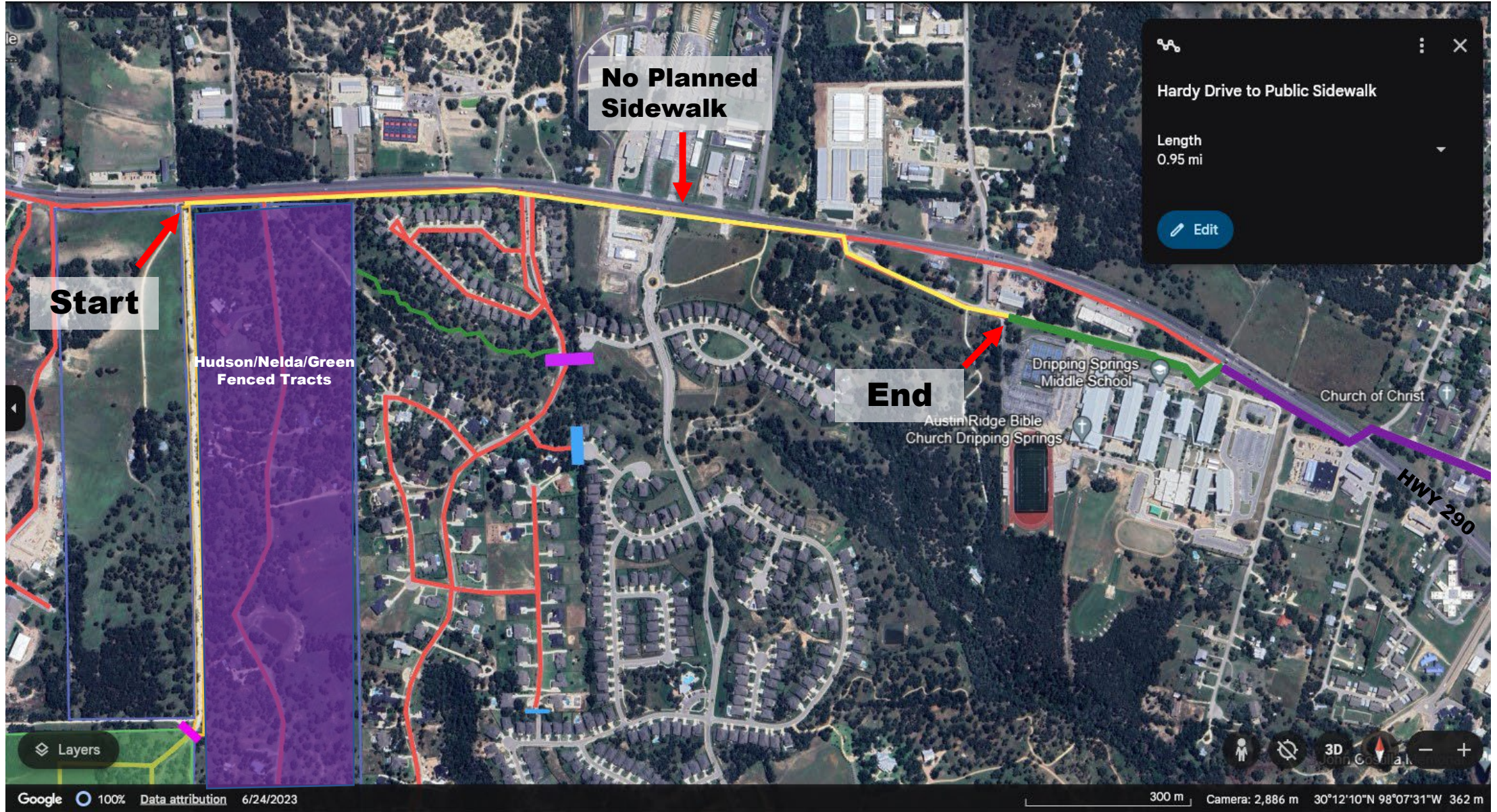
Proximity to Bunker Ranch Trail: Half of a Mile



Proximity to Arrowhead: Half of a Mile

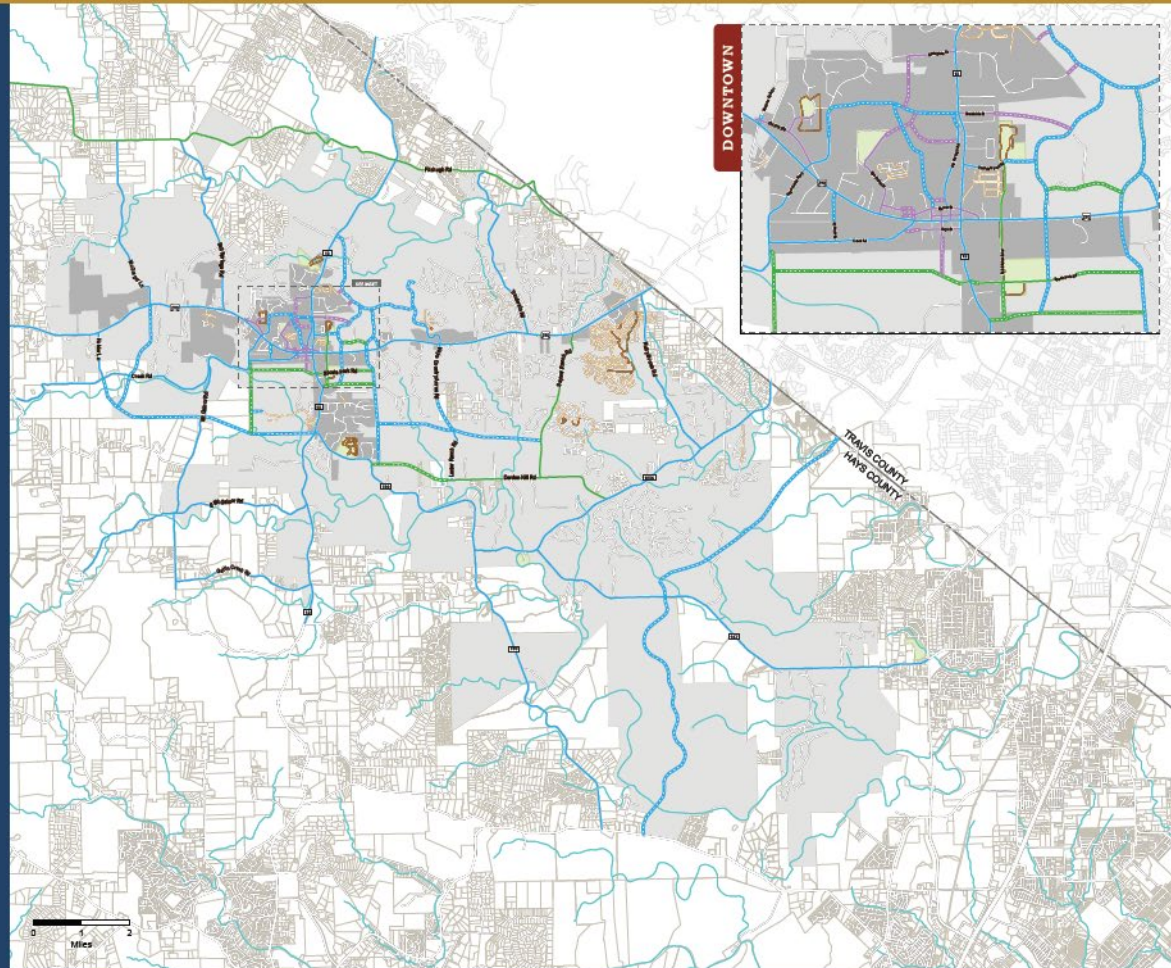


Proximity to Closest Public Sidewalk - Walnut Springs - ~1 Mile



City's Future Sidewalk Plans

MULTIMODAL PLAN



LEGEND

MULTIMODAL PLAN

SHARED-USE PATH

- Blue line: Released
- Green line: Proposed

SIDEWALK

- Red line: Released
- Black line: Proposed

SIDEWALK WITH RAISED BICYCLE LANE

- Green line: Released
- Blue line: Proposed

EXISTING SIDEWALKS

- Orange line

EXISTING TRAILS

- Black line

OTHER

- CITY LIMITS
- EXTRATERRITORIAL JURISDICTION (ETJ)
- PARKS
- CREEKS & RIVERS
- COUNTY BOUNDARY

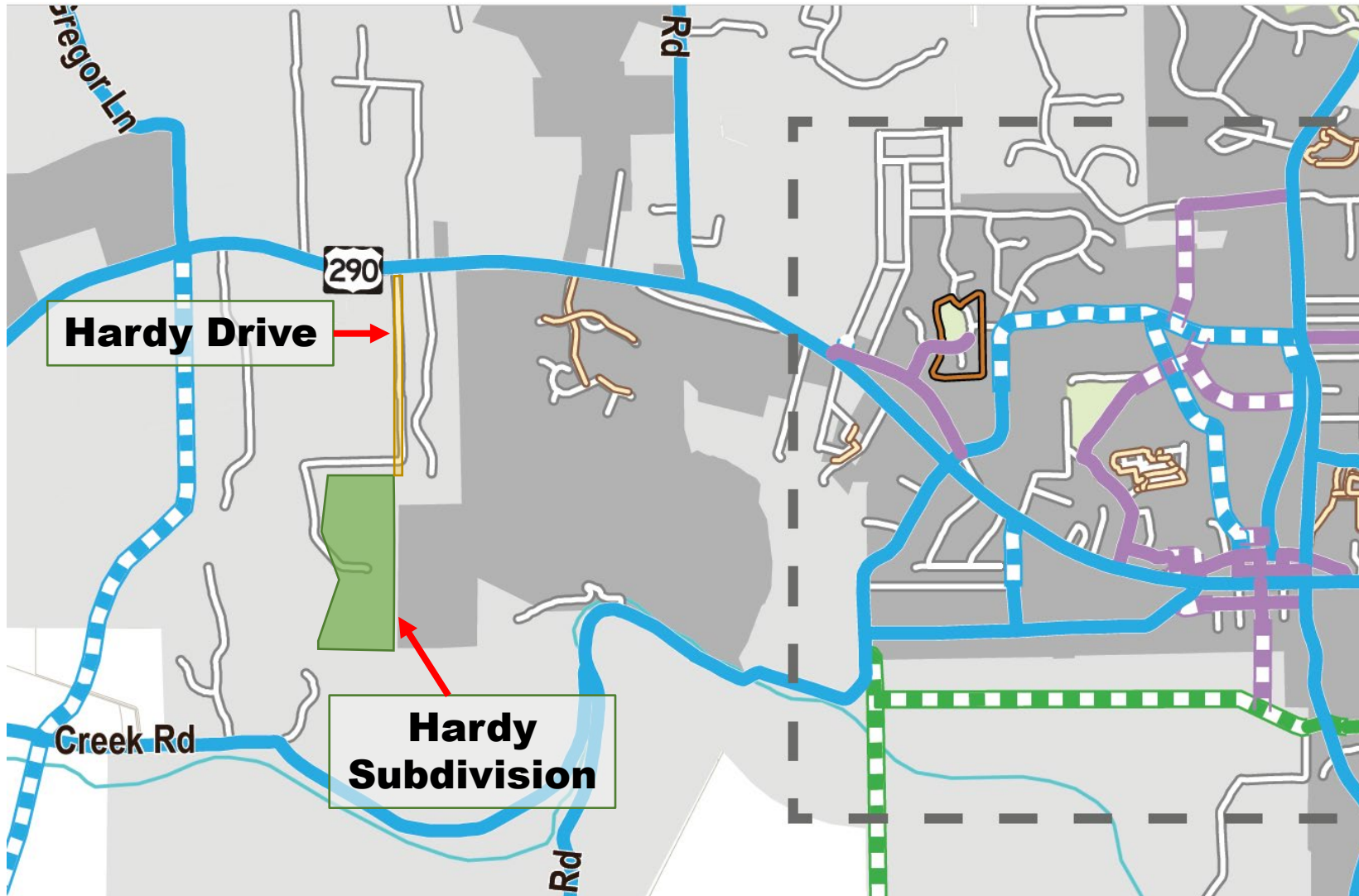
October 2021

This Multimodal Plan depicts proposed multimodal enhancements to existing roadways and proposed roadways. This Multimodal Plan does not preclude pedestrian and/or bicycle enhancements not indicated on this map. Final alignments of proposed roadways will be determined in cooperation with TxDOT, Hays County and its Long Range Transportation Plan, and the subdivision platting process.



204 Lavaca Street, Suite 500, Austin, TX 78701
512-904-2700 | www.hre.com

City's Future Sidewalk Plans Cont.

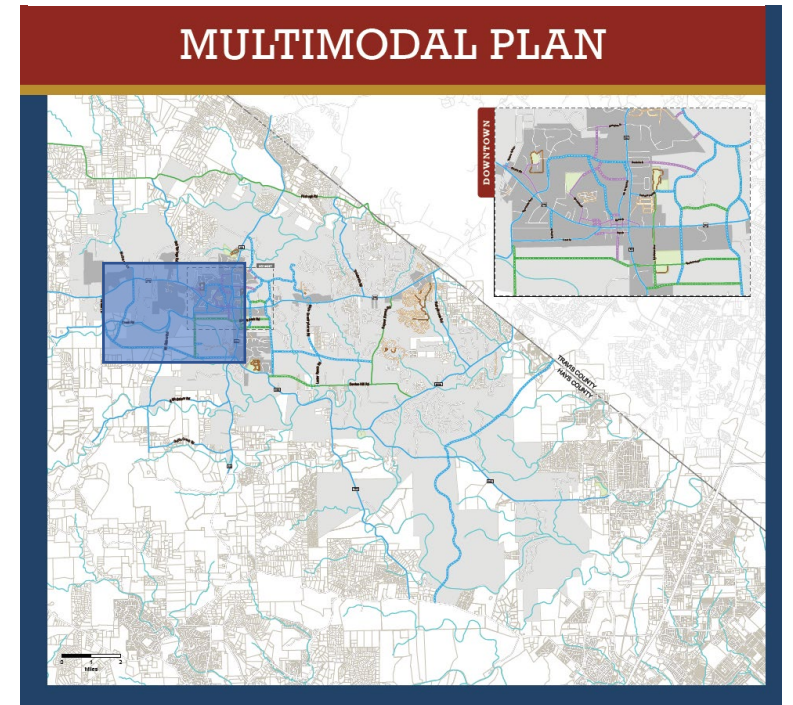


SIDEWALK

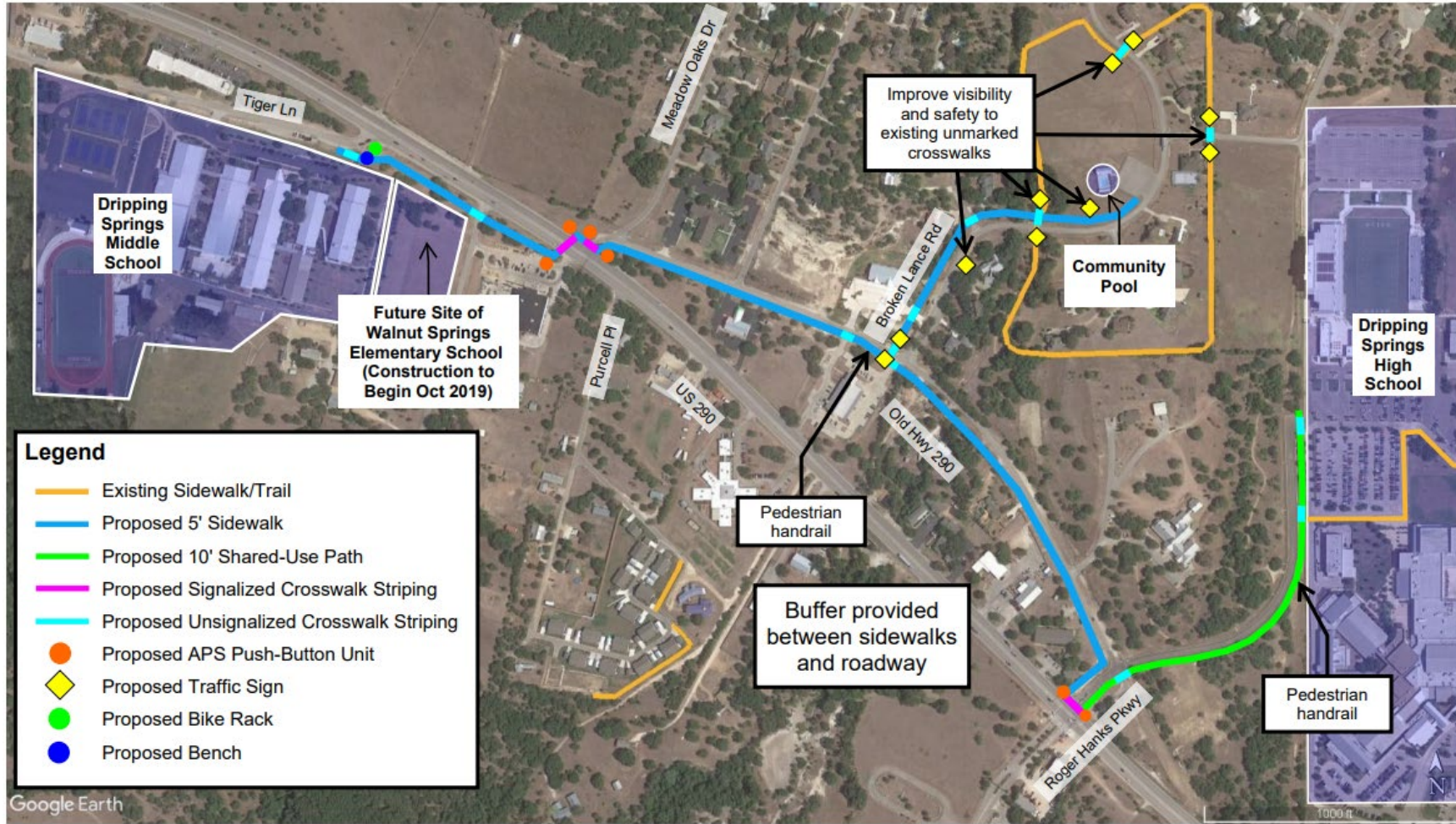
- Enhanced
- Proposed

SIDEWALK WITH RAISED BICYCLE LANE

- Enhanced
- Proposed



City of Dripping Springs
DSMS to DSHS SRTS Shared-Use Path/Sidewalk Project
Project Layout Map

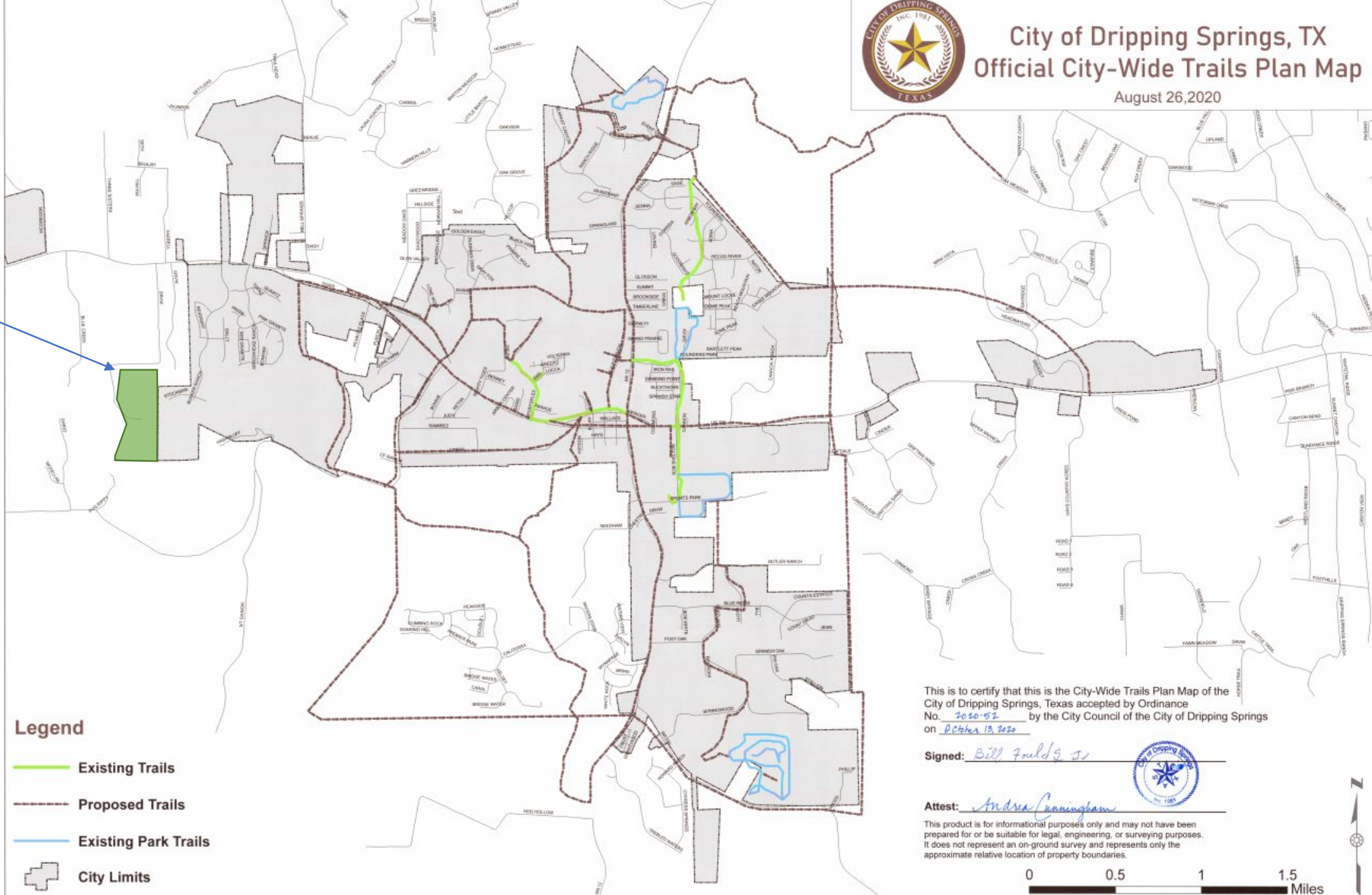


Dripping Spr Middle School SRTS SUP/Sidewalk Project along US Hwy 290 from DSpr High School to DSpr Middle School Project # 0_AUS_Dripping Springs03_SRTS-TA_Dripping Springs MS SUP & Sidewalk






City of Dripping Springs, TX Official City-Wide Trails Plan Map

August 26, 2020



Legend

-  Existing Trails
-  Proposed Trails
-  Existing Park Trails
-  City Limits

This is to certify that this is the City-Wide Trails Plan Map of the City of Dripping Springs, Texas accepted by Ordinance No. 2020-52 by the City Council of the City of Dripping Springs on October 13, 2020

Signed: *Bill Foulds Jr*

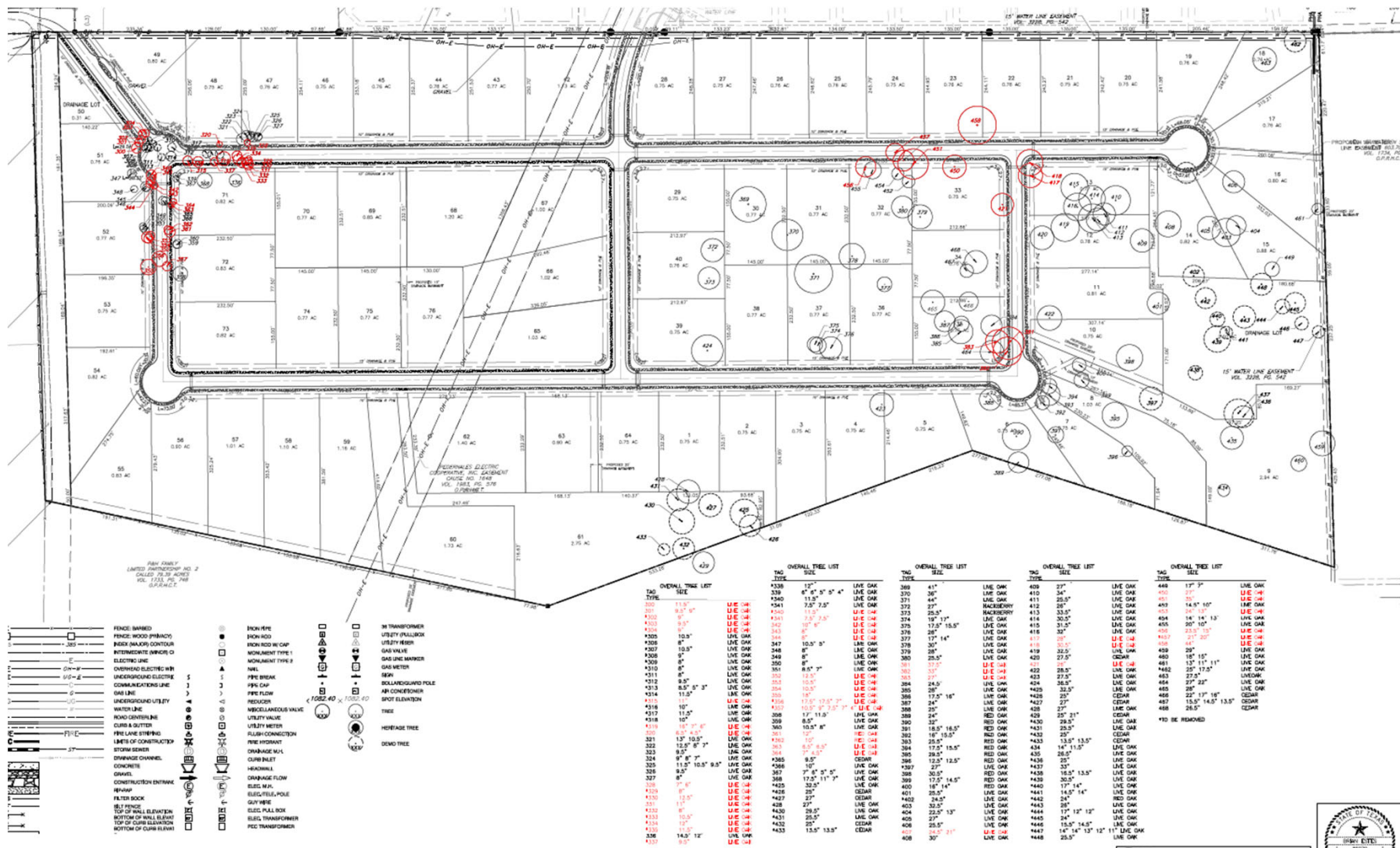


Attest: *Andrea Cunningham*

This product is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-ground survey and represents only the approximate relative location of property boundaries.



Protected Tree Removal



NORTH
SCALE IN FEET
0 100 200



Protected Tree Removal – Hardy Drive



Protected Tree Removal – Hardy Drive Cont.



Protected Tree Removal – Hardy Drive Cont.



Protected Tree Removal – Hardy Drive Cont.



Protected Tree Removal – Hardy Drive Cont.



Protected Tree Removal – Hardy Drive Cont.



Supplemental Slides

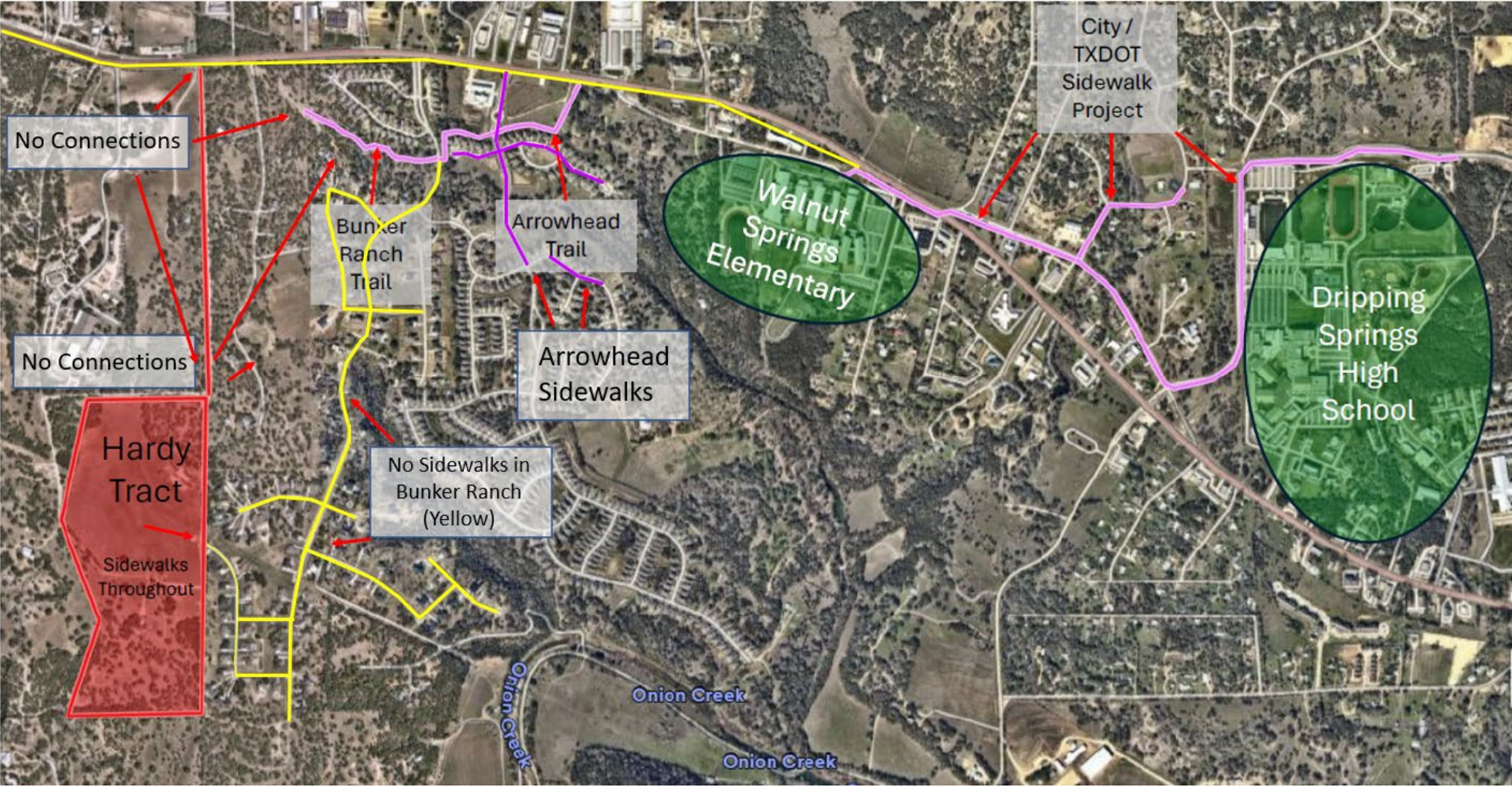


Exhibit G

JUNE 9, 2021

REVISED TRAFFIC IMPACT ANALYSIS FOR THE PROPOSED BUNKER RANCH SUBDIVISION EXPANSION

US 290 and
Bunker Ranch Boulevard

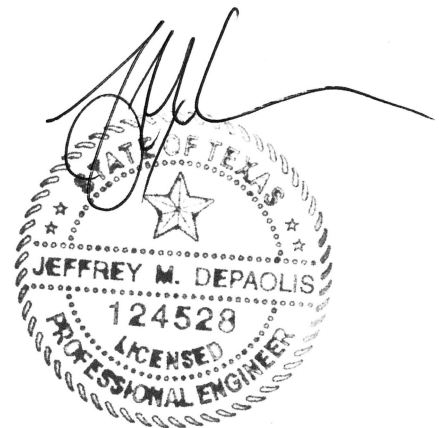
City of Dripping Springs
Hays County, Texas

Prepared for:

The Overlook at Bunker Ranch, LLC
Mr. Steve Harren
317 Grace Lane #240
Austin, Texas 78746
(512) 644-6800

Prepared by:

Civil & Environmental Consultants, Inc.
Mr. Jeffrey M. DePaolis, P.E., PTOE
333 Baldwin Road
Pittsburgh, Pennsylvania 15205
(412) 429-2324



Civil & Environmental Consultants, Inc.

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**REVISED TRAFFIC IMPACT ANALYSIS
FOR THE PROPOSED
BUNKER RANCH SUBDIVISION EXPANSION
City of Dripping Springs, Hays County, Texas**

EXECUTIVE SUMMARY

General Overview of the Development

- The Bunker Ranch subdivision is located south of US 290, at its intersection with Bunker Ranch Boulevard, in the City of Dripping Springs, Hays County, Texas.
- The Bunker Ranch subdivision was previously approved to include 160 single family units and 42 condominium units. At the time of the data collection for this project, 58 single family units and six (6) condominium units have been constructed and occupied.
- The proposed expansion will include the construction of an additional 228 single family units (388 total single family units).
- Access to the Bunker Ranch subdivision is provided via Bunker Ranch Boulevard at its intersection with US 290. No changes to the site access are planned with the expansion.
- Traffic Impact Analysis revised in order to address review comments received from the traffic engineering consultant for the City of Dripping Springs (HDR Engineering, Inc.) dated June 3, 2021.

Study Intersection

- US 290 with Bunker Ranch Boulevard (existing unsignalized);
- US 290 with Arrowhead Ranch Boulevard (existing unsignalized); and
- US 290 with Springs Lane (existing unsignalized).

Trip Generation and Distribution

- Trip generation of the proposed Bunker Ranch subdivision was determined using rates and formulae contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation*, Tenth Edition, 2017:
 - Land Use Code 210, *Single-Family Detached Housing*, was used to determine the trip generation of the proposed 228 additional single family units.
- Estimated Trip Generation for the proposed development:

AM Peak Hour:	40 Entering / 122 Exiting / 162 Total
PM Peak Hour:	134 Entering / 79 Exiting / 213 Total
- Trip distribution provided by the City of Dripping Springs indicates 80% / 20% distribution with the majority of trips originating from or destined to the east of the site along US 290.

Mitigation Measures to be Constructed Concurrent with Development

- No mitigation measures recommended for the Bunker Ranch development expansion.

**REVISED TRAFFIC IMPACT ANALYSIS
FOR THE PROPOSED
BUNKER RANCH SUBDIVISION EXPANSION
City of Dripping Springs, Hays County, Texas**

Civil & Environmental Consultants (CEC) has completed this Revised Traffic Impact Analysis for the construction of the proposed expansion of the Bunker Ranch subdivision, which is located south of US 290, at its intersection with Bunker Ranch Boulevard, in the City of Dripping Springs, Hays County, Texas.

This Traffic Impact Analysis has been revised in order to address review comments received from the traffic engineering consultant for the City of Dripping Springs, HDR Engineering Inc., dated June 3, 2021.

The following sections of this report contain a project description, data collection, site traffic generation and distribution, projected traffic volumes, analysis, and conclusions and recommendations.

**PROJECT DESCRIPTION/DATA COLLECTION/EXISTING
ROADWAY DESCRIPTION**

PROJECT DESCRIPTION

As shown in Figure 1, the Bunker Ranch subdivision is located south of US 290, at its intersection with Bunker Ranch Boulevard, in the City of Dripping Springs, Hays County, Texas.

The Bunker Ranch subdivision was previously approved to include 160 single family units and 42 condominium units. At the time data collection was performed for this project, 58 single family units and six (6) condominium units had been constructed and occupied. The proposed expansion will include the construction of an additional 228 single family units, for a total of 388 single family units following the proposed expansion.

A copy of the site plan for the proposed Bunker Ranch subdivision has been included with this report as Figure 2.

In accordance with a scope of study developed by the representatives of the City of Dripping Springs and provided to CEC via an email dated March 31, 2021, the following intersections were selected for study:

- US 290 with Bunker Ranch Boulevard (existing unsignalized);
- US 290 with Arrowhead Ranch Boulevard (existing unsignalized); and
- US 290 with Springs Lane (existing unsignalized).

A total of three (3) existing intersections were included in the scope of the study. A copy of the completed City of Dripping Springs/Texas Department of Transportation Traffic Impact Analysis

Scope and Study Area form provided by the City of Dripping Springs has been included in Appendix A to this report.

The study intersections with respect to the site are illustrated in Figure 3.

DATA COLLECTION

Manual turning movement counts were performed at the existing study intersections on Tuesday, April 20, 2021 from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. These time periods were assumed to include the weekday AM and weekday PM peak hours of vehicular activity for the study area. Summaries of the data collected during the turning movement counts at the study intersections have been included in Appendix C to this report.

The overall peak hours determined from these counts are as follows:

- AM Peak Hour – 8:00 AM – 9:00 AM
- PM Peak Hour – 4:30 PM – 5:30 PM

The results of the turning movement counts are presented in Figure 4.

However, as a result of measures put in place to prevent the spread of COVID-19 including stay at home orders, canceling of events and public gatherings, business closures, university and school closures, increased telecommuting, and increased jobless numbers, traffic volumes observed at the time the turning movement counts were conducted collected may be lower than under pre-COVID conditions in some locations. Therefore, at the request of the City of Dripping Springs, historic traffic count data during pre-COVID conditions was reviewed in order to determine if an adjustment factor is necessary to account for variations in traffic volumes due to the COVID-19 pandemic.

Pre-COVID 24-hour traffic volumes collected in January 2018 along US 290, west of Bell Springs Road, were provided by the City of Dripping Springs. According to this count data, the Average Daily Traffic (ADT) along US 290, west of Bell Springs Road, was 14,959 vehicles per day in 2018.

In order to project current year, 2021, traffic volumes, CEC calculated a background traffic growth rate for the study area. This growth rate was calculated based on Average Annual Daily Traffic (AADT) volume data obtained from the TXDOT Traffic Count Database System (TCDS). The data includes the five (5) most recent years of AADT count data available for three (3) count stations along US 290. Based on this count data, a background traffic growth rate of 2.44 percent per year, linear was calculated. This background traffic growth rate was approved by the City of Dripping Springs Traffic Consultant, HDR Inc., on April 30, 2021. Detailed background traffic growth rate calculations are provided in Appendix B to this report.

The background traffic growth rate of 2.44 percent per year, linear, was then applied to the 2018 ADT volumes provided by the City of Dripping Springs in order to depict existing 2021 24-hour

ADT traffic volumes along US 290, west of Bell Springs Road. The resultant 2021 ADT traffic volumes for US 290, west of Bell Springs Road, was estimated to be 16,054 vehicles per day.

An Automatic Traffic Recorder (ATR) was installed along US 290, west of Bell Springs Road, for 48-continuous hours on Tuesday, April 20, 2021 and Wednesday, April 21, 2021. Based on the data collected using the ATR, the average ADT for this location along US 290 was identified to be approximately 20,717 vehicles per day. This reflects an increase of 4,663 vehicles per day when compared to the ADT data provided by the City of Dripping Springs, grown to estimate existing 2021 conditions. As a result, it is CEC's opinion that traffic volumes within the study area do not require an adjustment factor to account for COVID-19. This evaluation was provided to and approved by the City of Dripping Spring's Traffic Consultant, HDR Inc., in a virtual meeting held on April 3, 2021.

Traffic volume comparisons to evaluate COVID-19 traffic conditions are provided in Appendix D to this report.

EXISTING CONDITIONS

A field reconnaissance of the study area was conducted by CEC to obtain information such as roadway widths, roadway grades, and posted speed limits within the environs of the study intersection. A description of the study roadways is as follows:

US 290 – Within the study area, US 290 is a State-maintained, principal arterial roadway providing a five (5) lane, 63-foot wide improved surface with a 15 foot wide center two-way left turn lane and five (5) foot-wide paved shoulders.

At its intersection with Bunker Ranch Boulevard, US 290 provides a three (3) lane approach for eastbound traffic (two (2) exclusive through lanes and an exclusive right turn lane) and a three (3) lane approach for westbound traffic (left turns from the center, two-way left turn lane and two (2) exclusive through lanes). The intersection is controlled by a Stop sign on the Bunker Ranch Boulevard approach to US 290.

At its intersection with Arrowhead Ranch Boulevard/Dripping Springs Independent School District (DSISD) Transportation Department driveway, US 290 provides a four (4) lane approach for eastbound traffic (left turns from the center, two-way left turn lane, two (2) exclusive through lanes and an exclusive right turn lane) and a three (3) lane approach for westbound traffic (left turns from the center, two-way left turn lane, an exclusive through lane, and a shared through/right turn lane). The intersection is controlled by a Stop sign on the Arrowhead Ranch Boulevard driveway approach to US 290. Although there is no Stop sign on the DSISD Transportation Department driveway approach to US 290, it is assumed that this minor street approach to US 290 is intended to stop prior to entering US 290.

At its intersection with Springs Lane, US 290 provides a three (3) lane approach for eastbound traffic (left turns from the center, two-way left turn lane and two (2) exclusive through lanes) and a two (2) lane approach for westbound traffic (an exclusive through lane and a shared through/right turn lane). The intersection is controlled by a Stop sign on the Springs Lane approach to US 290.

The posted speed limit of US 290 is 60 miles per hour west of Arrowhead Ranch Boulevard and 50 miles per hour east of Arrowhead Ranch Boulevard.

Bunker Ranch Boulevard – At its intersection with US 290, Bunker Ranch Boulevard is a privately-maintained roadway, providing a 20-foot wide lane for ingress traffic and a 20-foot wide lane for egress traffic, separated by a 20-foot wide median. Bunker Ranch Boulevard provides a one (1) lane approach to US 290 for northbound traffic. The posted speed limit on Bunker Ranch Boulevard is 25 mph.

Arrowhead Ranch Boulevard – At its intersection with US 290, Arrowhead Ranch Boulevard is a privately-maintained roadway providing a 24-foot wide lane for ingress traffic and a 24-foot wide lane for egress traffic, separated by a eight (8) foot wide median. Arrowhead Ranch Boulevard provides a one (1) lane approach to US 290 for northbound traffic. There is no posted speed limit on Arrowhead Ranch Boulevard.

Dripping Springs Independent School District (DSISD) Transportation Department Driveway – At its intersection with US 290, the Dripping Springs Independent School District (DSISD) Transportation Department driveway is a privately-maintained roadway providing a 40-foot wide improved lane with a single lane approach to US 290 for southbound traffic. There is no posted speed limit on the DSISD Transportation Department driveway.

Springs Lane – At its intersection with US 290, Springs Lane is a privately-owned roadway, providing a two (2) lane, 30-foot wide improved surface with a single lane approach to US 290 for southbound traffic. There is no posted speed limit on Springs Lane.

Photographs of each approach to the study intersections are included in Appendix E to this report.

EXISTING 2021 CONDITION CAPACITY ANALYSIS

Capacity calculations were performed for each of the existing study intersections using existing 2021 peak hour traffic volumes and the methodologies published by the Transportation Research Board in their *Highway Capacity Manual*, Sixth Edition, 2017. This methodology determines how well an intersection, approach to an intersection, or movement at an intersection operates, and assigns to it a Level of Service (LOS) A through F, with LOS A representing the best operating conditions and LOS F, the worst. Detailed definitions of LOS have been included in Appendix F to this report.

The results of the capacity calculations performed using existing 2021 peak hour traffic volumes and conditions at the existing study intersections are presented in Figure 5 for the weekday AM and weekday PM peak hours. LOS, delay, and volume to capacity ratios for each approach to each study intersection are summarized in Table 1 and Table 2 for the weekday AM and weekday PM peak hours, respectively.

The results of the capacity calculations performed using existing 2021 condition traffic volumes revealed that each of the existing study intersections currently operates at an overall intersection Level of Service A during both the weekday AM and weekday PM peak hours, with all movements

at the study intersections operating at a Level of Service C or better, with the exception of the DSISD Transportation Department driveway approach to US 290, which currently operates at a LOS D during the weekday AM peak hour and a LOS E during the weekday PM peak hour. Copies of the capacity calculations performed using existing 2021 peak hour traffic volumes and conditions at the existing study intersections are included in Appendix G to this report.

FORECASTED 2025 NO-BUILD (BASE) TRAFFIC VOLUMES

The proposed Bunker Ranch subdivision expansion is anticipated to be completed and fully occupied in 2025. Therefore, traffic volumes were projected for the study intersections for forecasted 2025 conditions.

Forecasted 2025 background traffic volumes for the weekday AM and weekday PM peak hours were determined by applying the aforementioned background traffic growth rate of 2.44 percent per year, linear, to the existing 2021 peak hour traffic volumes (Figure 4). The resultant forecasted 2025 background weekday AM and weekday PM peak hour traffic volumes are presented in Figure 6.

As previously discussed, the Bunker Ranch subdivision was previously approved to include 160 single family units and 42 condominium units but, at the time data collection was performed for this project, 58 single family units and six (6) condominium units had been constructed and occupied. Therefore, the anticipated weekday AM and PM peak hour trips to be generated by the 102 single family units and 36 condominium units that have been approved but not yet constructed or occupied have been included in the within the approved no-build (base) condition traffic volumes.

Vehicular trip generation of the 102 single family units and 36 condominium units that have been approved but not yet constructed or occupied was projected based upon data published by the Institute of Transportation Engineers (ITE) in their *Trip Generation*, Tenth Edition, 2017. Land Use Code 210, *Single-Family Detached Housing*, was used to estimate the trip generation for the 102 single family units and Land Use Code 220, *Multifamily Low-Rise*, was used to estimate the trip generation for the 36 multi-family condo units.

Using this methodology, the approved but not yet constructed or occupied residential units within the Bunker Ranch subdivision can be anticipated to generate a total of 90 trips during the weekday AM peak hour (22 trips entering and 68 trips exiting) and a total of 122 trips during the weekday PM peak hour (77 trips entering and 45 trips exiting). Copies of the trip generation calculations performed in order to estimate the anticipated trip generation of the approved but not yet constructed or occupied residential units within the Bunker Ranch subdivision are included in Appendix H to this report.

The forecasted trips to be generated by the approved but not yet constructed or occupied residential units within the Bunker Ranch subdivision were distributed onto the study roadways and through the study intersections based on an arrival/departure distribution provided by the Traffic Engineering Consultant for the City of Dripping Springs. According to this information, 80 percent of primary trips within the study area are anticipated to originate from and be destined to

the east along US 290 and the remaining 20 percent of primary trips are anticipated to originate from and be destined to the west along US 290. The anticipated distribution of the forecasted trips to be generated by the approved but not yet constructed or occupied residential units within the Bunker Ranch subdivision is presented in Figure 7.

The anticipated trips to be added to the study intersections by the approved but not yet constructed or occupied residential units within the Bunker Ranch subdivision during the weekday AM and weekday PM peak hours are presented in Figure 8.

Similarly, it is understood that approximately 181 of the 403 residential units that have been approved as part of the Arrowhead Ranch residential development have been constructed and are occupied. Therefore, the anticipated weekday AM and PM peak hour trips to be generated by the 222 single family units that have been approved but not yet constructed or occupied have been included in the within the approved no-build (base) condition traffic volumes.

Vehicular trip generation of the 222 single family units that have been approved but not yet constructed or occupied was projected based upon data published by the aforementioned *Trip Generation*. Land Use Code 210, *Single-Family Detached Housing*, was used to estimate the trip generation for the 222 single family units.

Using this methodology, the approved but not constructed or occupied residential units within the Arrowhead Ranch residential development can be anticipated to generate a total of 158 trips during the weekday AM peak hour (40 trips entering and 118 trips exiting) and a total of 207 trips during the weekday PM peak hour (131 trips entering and 76 trips exiting).

The forecasted trips to be generated by the approved but not yet constructed or occupied residential units within the Arrowhead Ranch development were distributed onto the study roadways and through the study intersections based on the aforementioned arrival/departure distribution provided by the Traffic Engineering Consultant for the City of Dripping Springs. The anticipated distribution of the forecasted trips to be generated by the approved but not yet constructed or occupied residential units within the Arrowhead Ranch residential development is presented in Figure 9.

In addition, according to representatives of the City of Dripping Springs, a 6,000 SF super convenience store with 10 vehicle fueling positions and a 1,800 SF liquor store are currently planned to be constructed as part of the Arrowhead Ranch development. It is CEC's understanding that these commercial developments have not submitted a TIA and are not currently approved by the City of Dripping Springs. However, the City of Dripping Springs has requested that the anticipated trips to be generated by these planned commercial developments be included in the background traffic projections.

The City of Dripping Springs provided a conceptual site plan for these planned Arrowhead Ranch commercial developments. Based on the site plan provided, access to these commercial developments is proposed via a new site access driveway to US 290, the centerline of which is shown to be located approximately 320 feet west of the centerline of Arrowhead Ranch Boulevard, that will be restricted to right turns in/right turns out only. A second, full-movement driveway to

Arrowhead Ranch Boulevard is also planned to provide access to these commercial developments. A copy of the conceptual site plan for the planned Arrowhead Ranch commercial developments is included in Appendix I to this report.

Vehicular trip generation for the planned Arrowhead Ranch commercial developments was projected based upon data published in the aforementioned *Trip Generation*. Land Use Code 960, *Super Convenience Market/Gas Station*, was used to estimate the trip generation for the 6,000 SF super convenience store with 10 vehicle fueling positions. Land Use Code 899, *Liquor Store*, was used to estimate the trip generation for the 1,800 SF liquor store.

Using this methodology, the proposed 6,000 SF super convenience store with 10 vehicle fueling positions can be anticipated to generate a total of 488 trips during the weekday AM peak hour (244 trips entering and 244 trips exiting) and a total of 386 trips during the weekday PM peak hour (193 trips entering and 193 trips exiting). Similarly, the proposed 1,800 SF liquor store can be anticipated to generate a total of eight (8) trips during the weekday AM peak hour (four (4) trips entering and four (4) trips exiting) and a total of 29 trips during the weekday PM peak hour (15 trips entering and 14 trips exiting).

In addition, a portion of the total trips to be generated by the proposed Arrowhead Ranch 6,000 SF super convenience store with 10 vehicle fueling positions can be anticipated to be pass-by trips (those trips that are already traveling the study roadways and will stop at the site as an intermediate stop between their primary origin and their primary destination). The forecasted pass-by trips to be generated by the planned 6,000 SF super convenience store with 10 vehicle fueling positions, as a percentage of the total site trip generation, were estimated using data published by ITE in their *Trip Generation Handbook*, Third Edition, 2017. Land Use Code 960, *Super Convenience Market/Gas Station*, was used to estimate the trip generation for the 6,000 SF super convenience store with 10 vehicle fueling positions. According to this information, a *Super Convenience Market/Gas Station* can be anticipated to generate approximately 76 percent pass-by trips during both the weekday AM and PM peak hours.

Using this methodology, approximately 370 of the 488 trips generated by the planned 6,000 SF super convenience store with 10 vehicle fueling positions during the weekday AM peak hour can be anticipated to be pass-by trips (185 trips entering/185 trips exiting) and approximately 294 of the total 386 trips generated by the planned 6,000 SF super convenience store with 10 vehicle fueling positions during the weekday PM peak hour can be anticipated to be pass-by trips (147 trips entering/147 trips exiting).

The forecasted primary trips to be generated by the planned Arrowhead Ranch commercial developments were distributed onto the study roadways and through the study intersections based on the aforementioned arrival/departure distribution provided by the Traffic Engineering Consultant for the City of Dripping Springs. The anticipated distribution of the forecasted trips to be generated by the planned Arrowhead Ranch commercial developments is presented in Figure 10.

Forecasted pass-by trips to be generated by the planned super convenience store with 10 vehicle fueling positions were distributed through the study intersections based on the existing peak hour

traffic volume distributions along US 290 during each individual peak hours analyzed for both the weekday AM and PM peak hours. The forecasted pass-by trip distribution percentages are presented in Figure 11.

The anticipated trips to be added to the study intersections by the approved but not yet constructed or occupied residential units within the Arrowhead Ranch residential development during the weekday AM and weekday PM peak hours are presented in Figure 12.

The anticipated trips to be added to the study intersections by the planned Arrowhead Ranch liquor store during the weekday AM and weekday PM peak hours are presented in Figure 13.

The forecasted primary trips to be added to the study intersections by the planned Arrowhead Ranch super convenience market/gas station are presented in Figure 14.

The forecasted pass-by trips to be added to the study intersections by the planned Arrowhead Ranch super convenience market/gas station are presented in Figure 15.

The total trips to be added to each of the study intersections by the Arrowhead Ranch development, including both primary and pass-by trips, are presented in Figure 16.

Forecasted 2025 no-build traffic volumes for the weekday AM and weekday PM peak hours were determined by adding anticipated trips to be added to the study intersections by the approved but not yet constructed or occupied residential units within the Bunker Ranch subdivision (Figure 8) and the total trips to be added to each of the study intersections by the Arrowhead Ranch development (Figure 16) to the forecasted 2025 background traffic volumes (Figure 6). The resultant 2025 no-build (base) traffic volumes are presented in Figure 17.

FORECASTED 2025 NO-BUILD (BASE) CONDITION CAPACITY CALCULATIONS

Capacity calculations were performed for each of the study intersections using forecasted 2025 no-build (base) condition traffic volumes during the weekday AM and weekday PM peak hours. The results of the capacity calculations performed using forecasted 2025 no-build (base) condition traffic volumes are presented in Figure 18 for the weekday AM and weekday PM peak hours. LOS, delay, and volume to capacity ratios for each approach to each study intersection are summarized in Table 1 and Table 2 for the weekday AM and weekday PM peak hours, respectively.

The results of the capacity calculations performed using forecasted 2025 no-build (base) condition traffic volumes revealed that the study intersections of US 290 with Bunker Ranch Boulevard and US 290 with Springs Lane are anticipated to operate at an overall intersection Level of Service A during the weekday AM and PM peak hours, with all movements at each intersection forecasted to operate at a LOS C or better during each of the peak hours analyzed.

However, the study intersection of US 290 with Arrowhead Ranch Boulevard/DSISD Transportation Department driveway is anticipated to operate at an overall intersection Level of Service F during both the weekday AM and PM peak hours, with both the northbound Arrowhead

Ranch Boulevard and the southbound DSISD Transportation Department driveway approaches to the intersection operating at LOS F during each of the peak hours analyzed.

Copies of the capacity calculations performed using forecasted 2025 no-build (base) traffic volumes and conditions are included in Appendix L to this report.

According to the City of Dripping Springs Code of Ordinances, Chapter 28, Exhibit A, Section 11.11, *“The intersections included within the traffic impact analysis shall be considered adequate to serve the proposed development if existing intersections can accommodate the existing service volume, the service volume of the proposed development, and the service volume of approved but unbuilt developments holding valid, unexpired building permits at level of service “C” or above.”* Therefore, because of the forecasted decrease in Level of Service, mitigation measures will need to be considered for the intersection of US 290 with Arrowhead Ranch Boulevard.

Warrants for the installation of traffic signal control were evaluated at the study intersection of US 290 with Arrowhead Ranch Boulevard. These analyses were performed using criteria published in Chapter 4C, Traffic Control Signal Needs Studies, contained in the *Texas Manual on Uniform Traffic Control Devices* (TMUTCD). Specifically Warrant III, the *Peak Hour* warrant, was evaluated. The peak hour signal warrant is anticipated to be satisfied at the intersection of US 290 with Arrowhead Ranch Boulevard under forecasted 2025 no-build (base) conditions during both the weekday AM and weekday PM peak hours. Therefore, traffic signal control is assumed to be necessary for the planned Arrowhead Ranch development and the installation of traffic signal control at the intersection of US 290 with Arrowhead Ranch Boulevard would be the sole responsibility of the Arrowhead Ranch development.

Copies of the graphs used to verify warrants for the installation of traffic signal control are included in Appendix L to this report.

Therefore, capacity calculations were then performed for the study intersection of US 290 with Arrowhead Ranch Boulevard assuming the installation of a traffic signal at the intersection. The results of these capacity calculations revealed that the intersection of US 290 with Arrowhead Ranch Boulevard could be anticipated to operate at an overall intersection Level of Service C or better during the weekday AM and PM peak hours, with all movements operating at a LOS C or better, following installation of traffic signal control. The anticipated Levels of Service at the intersection of US 290 with Arrowhead Ranch Boulevard, assuming the installation of a traffic signal, are presented in Figure 19 for the weekday AM and weekday PM peak hours. LOS, delay, and volume to capacity ratios for each approach are summarized in Table 1 and Table 2 for the weekday AM and weekday PM peak hours, respectively.

Copies of the capacity calculations performed using forecasted 2025 no-build (base) traffic volumes including mitigations are included in Appendix M to this report.

SITE TRAFFIC GENERATION AND DISTRIBUTION

VEHICULAR TRIP GENERATION

Vehicular trip generation for the proposed Bunker Ranch subdivision expansion was projected based upon data published in the aforementioned *Trip Generation*. Land Use Code 210, *Single-Family Detached Housing*, was used to estimate the trip generation for the proposed 228 Single family units.

Using this methodology, the proposed Bunker Ranch subdivision expansion can be anticipated to generate a total of 162 trips during the weekday AM peak hour (40 trips entering and 122 trips exiting) and a total of 213 trips during the weekday PM peak hour (134 trips entering and 79 trips exiting).

SITE TRAFFIC DISTRIBUTION

As previously detailed, arrival and departure distribution for the proposed Bunker Ranch subdivision expansion was provided by the Traffic Engineering Consultant for the City of Dripping Springs. This trip distribution is summarized in Figure 7.

The forecasted trips to be added to each of the study intersections by the proposed Bunker Ranch subdivision expansion are presented in Figure 20.

FORECASTED 2025 BUILD (WITH DEVELOPMENT) TRAFFIC VOLUMES

The forecasted 2025 build traffic volumes (with development) at each of the study intersections during the weekday AM and weekday PM hours were determined by adding the forecasted trips to be added to the study intersection by the proposed Bunker Ranch subdivision expansion (Figure 20) to the forecasted 2025 no-build (base) traffic volumes (Figure 17). The resultant forecasted 2025 build (with development) traffic volumes are presented in Figure 21.

FORECASTED 2025 BUILD (WITH DEVELOPMENT) CONDITION CAPACITY CALCULATIONS

Capacity calculations were performed for each of the study intersections using forecasted 2025 build (with development) traffic volumes and conditions during the weekday AM and weekday PM peak hours. The results of the capacity calculations performed using forecasted 2025 build (with development) conditions and traffic volumes are presented in Figure 22 for the weekday AM and weekday PM peak hours. LOS, delay, and volume to capacity ratios for each approach are summarized in Table 1 and Table 2 for the weekday AM and weekday PM peak hours, respectively.

The results of the capacity calculations performed using forecasted 2025 build (with development) condition traffic volumes revealed that the study intersections of US 290 with Bunker Ranch Boulevard and US 290 with Springs Lane are anticipated to continue to operate at an overall intersection Level of Service A during the weekday AM and PM peak hours, with all movements

at each intersection forecasted to operate at a LOS D or better. Therefore, no mitigation measures are necessary for the intersections of US 290 with Bunker Ranch Boulevard and US 290 with Springs Lane following completion of the Bunker Ranch subdivision expansion.

However, similar to the analyses performed for the 2025 no-build (base) conditions, the study intersection of US 290 with Arrowhead Ranch Boulevard is anticipated to operate with an overall intersection Level of Service F during both the weekday AM and PM peak hours, with both the northbound Arrowhead Ranch Boulevard and the southbound DSISD Transportation Department driveway approaches to the intersection operating at LOS F during each of the peak hours analyzed under existing traffic control. As previously detailed, warrants for the installation of traffic signal control at the intersection of US 290 with Arrowhead Ranch Boulevard are forecasted to be satisfied under forecasted 2025 no-build (base) conditions. Therefore, traffic signal control is assumed to be necessary for the planned Arrowhead Ranch development. Installation of traffic signal control at the intersection of US 290 with Arrowhead Ranch Boulevard is the sole responsibility of the Arrowhead Ranch development.

Copies of the capacity calculations performed using forecasted 2025 build (with development) traffic volumes are included in Appendix N to this report.

Therefore, capacity calculations were then performed for the study intersection of US 290 with Arrowhead Ranch Boulevard assuming the installation of a traffic signal at the intersection. The results of these capacity calculations revealed that the intersection of US 290 with Arrowhead Ranch Boulevard could be anticipated to operate at an overall intersection Level of Service C or better during the weekday AM and PM peak hours, with all movements operating at a LOS C or better, following installation of traffic signal control. The anticipated Levels of Service at the intersection of US 290 with Arrowhead Ranch Boulevard, assuming the installation of a traffic signal, are presented in Figure 23 for the weekday AM and weekday PM peak hours. LOS, delay, and volume to capacity ratios for each approach are summarized in Table 1 and Table 2 for the weekday AM and weekday PM peak hours, respectively.

Copies of the capacity calculations performed using forecasted 2025 build (with development) traffic volumes including mitigations are included in Appendix O to this report.

ADDITIONAL ANALYSES

SIGNAL WARRANT EVALUATION

As previously discussed, warrants for the installation of traffic signal control at the study intersection of US 290 with Arrowhead Ranch Boulevard are anticipated to be satisfied under forecasted 2025 no-build (base) conditions and are forecasted to continue to be satisfied under forecasted 2025 build (with development) conditions.

According to the City of Dripping Springs Code of Ordinances, Chapter 28, Exhibit A, Section 11.11, *“The intersections included within the traffic impact analysis shall be considered adequate to serve the proposed development if existing intersections can accommodate the existing service volume, the service volume of the proposed development, and the service volume of approved but*

unbuilt developments holding valid, unexpired building permits at level of service “C” or above.” Therefore, signal warrant evaluations were not performed for the intersections of US 290 with Bunker Ranch Boulevard and US 290 with Springs Lane.

QUEUING ANALYSIS

Traffic volumes at each of the study intersections were used to perform queuing analyses for each approach to each intersection. These queuing analyses were reported as the 95th percentile queue from the average of five (5) runs of SimTraffic Traffic Signal Coordination Software by TrafficWare. The results of these queuing analyses are summarized in Table 1 and Table 2 for the weekday AM and weekday PM peak hours, respectively.

As described under Existing Conditions, a center, two-way left turn lane is provided along US 290 within the study area. SimTraffic Traffic Signal Coordination Software does not account for left turns being made within a center two-way left turn lane. Therefore, in order to accurately model the intersections, the center, two-way left turn lane was treated as an exclusive left turn lane at each of the study intersections.

Based on the results of these queuing analyses, each of the existing auxiliary turn lanes at the study intersections is of sufficient length to accommodate all existing queues, as well as all forecasted 2025 queues, both without and following the proposed Bunker Ranch subdivision expansion.

However it should be noted that the right turn in/right turn out driveway proposed to be constructed as part of the planned Arrowhead Ranch commercial developments will be located in the middle of the taper of the existing eastbound right turn lane on US 290 at its intersection with Arrowhead Ranch Boulevard. Therefore, it is anticipated that the eastbound right turn lane on US 290 will need to be lengthened in order to accommodate the location of the right turn in/right turn out driveway and the increase in traffic volumes associated with the Arrowhead Ranch development.

Copies of the queuing analyses performed for existing 2021, forecasted 2025 no-build (base), forecasted 2025 no-build (base) mitigated, forecasted 2025 build (with development), and forecasted 2025 build (with development) mitigated conditions have been included in Appendix P, Appendix Q, Appendix R, Appendix S and Appendix T to this report, respectively.

STOPPING SIGHT DISTANCE

Stopping sight distance calculations were performed for the US 290 approaches to Arrowhead Ranch Boulevard, as warrants for the installation of traffic signal control at the intersection are anticipated to be satisfied and the installation of a traffic signal is anticipated to be required in order to mitigate the impacts caused by the construction of the proposed Arrowhead Ranch commercial development. Stopping sight distance calculations were completed based on the methodologies presented in the TXDOT *Roadway Design Manual*, July 2020. For analysis purposes, the stopping sight distance required for vehicles approaching a stopped vehicle along US 290 was evaluated

The posted speed limit of US 290 is 60 miles per hour west of Arrowhead Ranch Boulevard and 50 miles per hour east of Arrowhead Ranch Boulevard. Therefore, for analysis purposes, the stopping sight distance calculations were conservatively based on a posted speed limit of 60 miles per hour. According to the TXDOT Roadway Design Manual, Section 3, Table 2-1, the required stopping sight distance for a 60 mph posted speed limit is 570 feet.

The available stopping sight distance for the US 290 approaches to Arrowhead Ranch Boulevard was measured to the location of the projected back of the queues on US 290. Based on the results of the queuing analysis performed, the back of queue on the eastbound US 290 approach to Arrowhead Ranch Boulevard was identified to be approximately 230 feet back from the intersection during the weekday AM peak hour and approximately 196 feet back from the intersection during the weekday PM peak hour. The back of queue on the westbound US 290 approach to Arrowhead Ranch Boulevard was identified to be approximately 170 feet back from the intersection during the weekday AM peak hour and approximately 152 feet back from the intersection during the weekday PM peak hour.

Based on the sight distance measurements performed at the intersection of US 290 with Arrowhead Ranch Boulevard, greater than 1,000 feet of sight distance is available to the back of queue along eastbound US 290 and greater than 1,000 feet of sight distance is available to the back of queue along westbound US 290. Therefore, the available sight distance along US 290 to the back of queue at Arrowhead Ranch Boulevard exceeds the required stopping sight distance for a posted speed limit of 60 miles per hour.

CONCLUSIONS/RECOMMENDATIONS

The study concluded that the construction of the proposed Bunker Ranch Residential Development expansion will have no significant impact on the operation of the study intersections.

Following completion of the proposed Bunker Ranch Residential Development expansion, the study intersections of US 290 with Bunker Ranch Boulevard and US 290 with Springs Lane are anticipated to continue to operate at an overall intersection Level of Service A during the weekday AM and PM peak hours, with all movements operating at a LOS D or better.

However, it should be noted that, under both forecasted 2025 no-build (base) and forecasted 2025 build (with development) conditions, the study intersection of US 290 with Arrowhead Ranch Boulevard is anticipated to operate at an overall intersection Level of Service F during both the weekday AM and PM peak hours, with both the northbound Arrowhead Ranch Boulevard and the southbound DSISD Transportation Department driveway approaches to the intersection operating at LOS F during each of the peak hours analyzed. These Failure Levels of Service can be directly attributed to the traffic volumes generated by the planned Arrowhead Ranch commercial developments, including a 1,800 SF liquor store and a 6,000 SF super convenience store with 10 vehicle fueling positions.

Warrants for the installation of traffic signal control are anticipated to be satisfied at the intersection of US 290 with Arrowhead Ranch Boulevard under forecasted 2025 no-build (base)

TABLES

TABLE 1
SUMMARY OF CAPACITY ANALYSIS RESULTS - AM PEAK HOUR
Proposed Bunker Ranch Subdivision Expansion Traffic Impact Analysis
City of Dripping Springs, Hays County, Texas

Intersection/Movement	2021 Existing Conditions					2025 No-Build Conditions					2025 No-Build Mitigated Conditions ⁽⁵⁾					2025 Build Conditions					2025 Build Mitigated Conditions ⁽⁵⁾					
	LOS ⁽¹⁾	Delay ⁽¹⁾	V/C ⁽²⁾	95th % Queue (ft) ⁽³⁾	Bay Length (ft) ⁽⁴⁾	LOS ⁽¹⁾	Delay ⁽¹⁾	V/C ⁽²⁾	95th % Queue (ft) ⁽³⁾	Bay Length (ft) ⁽⁴⁾	LOS ⁽¹⁾	Delay ⁽¹⁾	V/C ⁽²⁾	95th % Queue (ft) ⁽³⁾	Bay Length (ft) ⁽⁴⁾	LOS ⁽¹⁾	Delay ⁽¹⁾	V/C ⁽²⁾	95th % Queue (ft) ⁽³⁾	Bay Length (ft) ⁽⁴⁾	LOS ⁽¹⁾	Delay ⁽¹⁾	V/C ⁽²⁾	95th % Queue (ft) ⁽³⁾	Bay Length (ft) ⁽⁴⁾	
US 290 with Bunker Ranch Boulevard																										
Eastbound US 290																										
EB Through			--	0'	1490'			--	0'	1490'			--	--	--			--	0'	1490'			--	--	--	
EB Right	A	0.0	--	0'	240'	A	0.0	--	0'	240'	--	--	--	--	--	A	0.0	--	0'	240'	--	--	--	--	--	
EB Approach			--	--	--			--	--	--			--	--	--			--	--	--			--	--	--	
Westbound US 290																										
WB Left ⁽⁶⁾	A	9.4	0.046	36'	150'+	A	9.9	0.075	43'	150'+	--	--	--	--	--	B	10.2	0.123	45'	150'+	--	--	--	--	--	
WB Through	A	0.0	--	0'	780'	A	0.0	--	0'	780'	--	--	--	--	--	A	0.0	--	0'	780'	--	--	--	--	--	
WB Approach	A	0.6	--	--	--	A	0.9	--	--	--	--	--	--	--	--	A	1.4	--	--	--	--	--	--	--	--	
Northbound Bunker Ranch Blvd.																										
NB Approach	B	11.8	0.045	48'	--	B	14.4	0.213	60'	--	--	--	--	--	--	C	20.5	0.517	156'	--	--	--	--	--	--	
Overall Intersection	A	0.5	--	--	--	A	1.3	--	--	--	--	--	--	--	--	A	3.3	--	--	--	--	--	--	--	--	
US 290 with Arrowhead Ranch Boulevard																										
Eastbound US 290																										
EB Left ⁽⁶⁾	A	8.9	0.001	3'	150'+	A	8.7	0.001	0'	150'+	B	16.6	0.00	5'	150'+	A	8.8	0.001	5'	150'+	B	20.0	0.00	4'	150'+	
EB Through	A	0.0	--	0'	780'	A	0.0	--	2'	780'	C	23.5	0.78	201'	780'	A	0.0	--	0'	780'	C	32.2	0.85	230'	780'	
EB Right	A	0.0	--	0'	250'	A	0.0	--	10'	250'	B	18.0	0.17	58'	250'	A	0.0	--	9'	250'	C	21.5	0.16	59'	250'	
EB Approach	A	0.0	--	--	--	A	0.0	--	--	--	C	23.3	--	--	--	A	0.0	--	--	--	C	31.9	--	--	--	
Westbound US 290																										
WB Left ⁽⁶⁾	A	0.2	0.053	32'	150'	B	11.3	0.296	96'	150'	B	17.5	0.63	132'	150'	B	12.3	0.327	95'	150'	C	27.1	0.74	160'	150'	
WB Through	A	0.0	--	0'	440'	A	0.0	--	11'	440'	B	14.8	0.45	150'	440'	A	0.0	--	21'	440'	B	18.2	0.46	170'	440'	
WB Right	A	0.0	--	--	--	A	0.0	--	--	--	B	15.5	--	--	--	A	3.4	--	--	--	C	20.7	--	--	--	
WB Approach	A	0.6	--	--	--	A	3.2	--	--	--	B	15.5	--	--	--	A	3.4	--	--	--	C	20.7	--	--	--	
Northbound Arrowhead Ranch Blvd.																										
NB Approach	C	19.6	0.248	68'	--	F	2,413	6.111	358'	--	C	22.9	0.74	318'	--	F	3508.7	8.462	355'	--	C	28.5	0.67	335'	--	
Southbound DSISD Driveway																										
SB Approach	D	31.9	0.017	15'	--	F	105.9	0.062	13'	--	B	15.5	0.01	9'	--	F	145.0	0.084	13'	--	B	16.9	0.00	10'	--	
Overall Intersection	A	1.3	--	--	--	F	509.9	--	--	--	C	20.1	--	--	--	F	690.3	--	--	--	C	26.8	--	--	--	
US 290 with Springs Lane																										
Eastbound US 290																										
EB Left ⁽⁶⁾	A	9.1	0.003	11'	150'+	A	9.6	0.003	8'	150'+	--	--	--	--	--	A	9.7	0.003	10'	150'+	--	--	--	--	--	
EB Through	A	0.0	--	0'	440'	A	0.0	--	0'	440'	--	--	--	--	--	A	0.0	--	0'	440'	--	--	--	--	--	
EB Approach	A	0.0	--	--	--	A	0.0	--	--	--	--	--	--	--	--	A	0.0	--	--	--	--	--	--	--	--	
Westbound US 290																										
WB Through																										
WB Right	A	0.0	--	0'	490'	A	0.0	--	0'	490'	--	--	--	--	--	A	0.0	--	0'	490'	--	--	--	--	--	
WB Approach			--	--	--			--	--	--			--	--	--			--	--	--			--	--	--	
Southbound Springs Lane																										
SB Approach	C	17.0	0.056	35'	--	C	19.7	0.067	36'	--	--	--	--	--	--	C	20.9	0.072	40'	--	--	--	--	--	--	
Overall Intersection	A	0.2	--	--	--	A	0.2	--	--	--	--	--	--	--	--	A	0.2	--	--	--	--	--	--	--	--	

(1) Level of service determined through the use of Synchro Traffic Simulation Software, Version 11. All calculations were performed using the methodologies published in Highway Capacity Manual 6th Edition by the Transportation Research Board.
(2) Volume to capacity ration (v/c) were calculated using Synchro Traffic Simulation Software, Version 11. All calculations were performed using the methodologies published in Highway Capacity Manual 6th Edition by the Transportation Research Board.
(3) 95th percentile queue lengths were calculated using SimTraffic Traffic Signal Coordination Software. Results of queuing analysis represent the average of five (5) SimTraffic simulation runs.
(4) Existing queue storage capacity was determined through the use of Google Earth Software and signal plans. All storage lengths were rounded up to the nearest 5 ft. increment.
(5) Results of the capacity analyses performed without mitigations indicate that the intersection of US 290 with Arrowhead Ranch Boulevard is forecasted to operate under LOS F conditions. Therefore, it is anticipated that mitigation measures will need to be constructed by the Arrowhead Ranch development in order to mitigate the projected LOS F conditions. As a result, mitigated conditions for this study represent the anticipated need to install traffic signal control at the intersection of US 290 with Arrowhead Ranch Boulevard.

**TABLE 2
SUMMARY OF CAPACITY ANALYSIS RESULTS - PM PEAK HOUR
Proposed Bunker Ranch Subdivision Expansion Traffic Impact Analysis
City of Dripping Springs, Hays County, Texas**

Intersection/Movement	2021 Existing Conditions					2025 No-Build Conditions					2025 No-Build Mitigated Conditions ⁽⁵⁾					2025 Build Conditions					2025 Build Mitigated Conditions ⁽⁵⁾					
	LOS ⁽¹⁾	Delay ⁽¹⁾	V/C ⁽²⁾	95th % Queue (ft) ⁽³⁾	Bay Length (ft) ⁽⁴⁾	LOS ⁽¹⁾	Delay ⁽¹⁾	V/C ⁽²⁾	95th % Queue (ft) ⁽³⁾	Bay Length (ft) ⁽⁴⁾	LOS ⁽¹⁾	Delay ⁽¹⁾	V/C ⁽²⁾	95th % Queue (ft) ⁽³⁾	Bay Length (ft) ⁽⁴⁾	LOS ⁽¹⁾	Delay ⁽¹⁾	V/C ⁽²⁾	95th % Queue (ft) ⁽³⁾	Bay Length (ft) ⁽⁴⁾	LOS ⁽¹⁾	Delay ⁽¹⁾	V/C ⁽²⁾	95th % Queue (ft) ⁽³⁾	Bay Length (ft) ⁽⁴⁾	
US 290 with Bunker Ranch Boulevard																										
Eastbound US 290																										
EB Through			--	0'	1490'			--	0'	1490'			--	--	--	A	0.0	--	0'	1490'	--	--	--	--	--	
EB Right	A	0.0	--	0'	240'	A	0.0	--	0'	240'	--	--	--	--	--	A	0.0	--	4'	240'	--	--	--	--	--	
EB Approach			--	--	--			--	--	--			--	--	--			--	--	--			--	--	--	
Westbound US 290																										
WB Left ⁽⁶⁾	A	9.1	0.016	21'	150'+	A	9.7	0.1	45'	150'+	--	--	--	--	--	B	10.9	0.254	68'	150'+	--	--	--	--	--	
WB Through	A	0.0	--	0'	780'	A	0.0	--	0'	780'	--	--	--	--	--	A	0.0	--	0'	780'	--	--	--	--	--	
WB Approach	A	0.1	--	--	--	A	0.8	--	--	--	--	--	--	--	--	A	1.8	--	--	--	--	--	--	--	--	
Northbound Bunker Ranch Blvd.																										
NB Approach	B	12.1	0.078	50'	--	B	14.2	0.196	98'	--	--	--	--	--	--	C	20.5	0.45	196'	--	--	--	--	--	--	
Overall Intersection	A	0.3	--	--	--	A	1.1	--	--	--	--	--	--	--	--	A	2.7	--	--	--	--	--	--	--	--	
US 290 with Arrowhead Ranch Boulevard																										
Eastbound US 290																										
EB Left ⁽⁶⁾	B	11.8	0.004	2'	150'+	B	11.7	0.004	8'	150'+	B	13.6	0.01	5'	150'+	B	12.5	0.004	6'	150'+	B	13.4	0.01	9'	150'+	
EB Through	A	0.0	--	0'	780'	A	0.0	--	0'	780'	B	18.0	0.69	196'	780'	A	0.0	--	0'	780'	B	18.1	0.71	196'	780'	
EB Right	A	0.0	--	0'	250'	A	0.0	--	10'	250'	B	14.0	0.08	45'	250'	A	0.0	--	13'	250'	B	13.8	0.08	42'	250'	
EB Approach	A	0.0	--	--	--	A	0.0	--	--	--	B	17.8	--	--	--	A	0.0	--	--	--	B	17.9	--	--	--	
Westbound US 290																										
WB Left ⁽⁶⁾	A	9.4	0.068	33'	150'	B	11.4	0.352	116'	150'	B	12.3	0.62	151'	150'	B	12	0.372	148'	150'	B	12.8	0.64	152'	150'	
WB Through	A	0.0	--	0'	440'	A	0.0	--	0'	440'	B	11.8	0.54	143'	440'	A	0.0	--	111'	440'	B	12.2	0.59	152'	440'	
WB Right																										
WB Approach	A	0.6	--	--	--	A	3.0	--	--	--	B	11.9	--	--	--	A	2.9	--	--	--	B	12.4	--	--	--	
Northbound Arrowhead Ranch Blvd.																										
NB Approach	B	14.2	0.106	42'	--	F	1,016.3	3.051	326'	--	C	21.2	0.63	183'	--	F	1362.1	3.78	321'	--	C	22.2	0.64	189'	--	
Southbound DSISD Driveway																										
SB Approach	E	41.4	0.02	11'	--	F	155.1	0.079	11'	--	B	16.3	0.01	14'	--	F	204.7	0.103	20'	--	B	17.1	0.01	12'	--	
Overall Intersection	A	0.8	--	--	--	F	140.0	--	--	--	B	15.2	--	--	--	F	171.2	--	--	--	B	15.5	--	--	--	
US 290 with Springs Lane																										
Eastbound US 290																										
EB Left ⁽⁶⁾	B	10.1	0.003	6'	150'+	B	11.2	0.004	12'	150'+	--	--	--	--	--	B	11.8	0.004	9'	150'+	--	--	--	--	--	
EB Through	A	0.0	--	0'	440'	A	0.0	--	0'	440'	--	--	--	--	--	A	0.0	--	0'	440'	--	--	--	--	--	
EB Approach	A	0.0	--	--	--	A	0.0	--	--	--	--	--	--	--	--	A	0.0	--	--	--	--	--	--	--	--	
Westbound US 290																										
WB Through																										
WB Right	A	0.0	--	0'	490'	A	0.0	--	0'	490'	--	--	--	--	--	A	0.0	--	0'	490'	--	--	--	--	--	
WB Approach																										
Southbound Springs Lane																										
SB Approach	C	18.9	0.068	46'	--	C	23.6	0.089	44'	--	--	--	--	--	--	D	26.7	0.102	46'	--	--	--	--	--	--	
Overall Intersection	A	0.2	--	--	--	A	0.2	--	--	--	--	--	--	--	--	A	0.2	--	--	--	--	--	--	--	--	

(1) Level of service determined through the use of Synchro Traffic Simulation Software, Version 11. All calculations were performed using the methodologies published in Highway Capacity Manual 6th Edition by the Transportation Research Board.
(2) Volume to capacity ration (v/c) were calculated using Synchro Traffic Simulation Software, Version 11. All calculations were performed using the methodologies published in Highway Capacity Manual 6th Edition by the Transportation Research Board.
(3) 95th percentile queue lengths were calculated using SimTraffic Traffic Signal Coordination Software. Results of queuing analysis represent the average of five (5) SimTraffic simulation runs.
(4) Existing queue storage capacity was determined through the use of Google Earth Software and signal plans. All storage lengths were rounded up to the nearest 5 ft. increment.
(5) Results of the capacity analyses performed without mitigations indicate that the intersection of US 290 with Arrowhead Ranch Boulevard is forecasted to operate under LOS F conditions. Therefore, it is anticipated that mitigation measures will need to be constructed by the Arrowhead Ranch development in order to mitigate the projected LOS F conditions. As a result, mitigated conditions for this study represent the anticipated need to install traffic signal control at the intersection of US 290 with Arrowhead Ranch Boulevard.
(6) A two-way center left turn lane is provided along US 290 within the environs of the study. Synchro Traffic Simulation Software, Version 11 does not account for left turns being made within a center two-way left turn lane. Therefore, in order to accurately model the intersections, the center two-way left turn lane was treated as an exclusive left turn lane at each of the study intersections. For analysis purpose, the lanes were evaluated as having a storage length of 150 feet. However, additional storage is available within this center two-way left turn lane.

Source: Analysis by CEC.

TABLE 3
APPROVED BUNKER RANCH SUBDIVISION TRIP GENERATION SUMMARY
Proposed Bunker Ranch Subdivision Expansion Traffic Impact Analysis
City of Dripping Springs, Hays County, Texas

Description/Land Use Code	Size	Time Period	Trip Generation ⁽¹⁾		
			Primary Trips		
			In	Out	Total
APPROVED BUNKER RANCH SUBDIVISION					
Approved Existing Bunker Ranch Subdivision					
Single-Family Detached Housing	160 units	Weekday 24 Hour	801	801	1602
		Weekday AM Peak Hour	30	88	118
		Weekday PM Peak Hour	101	59	160
Multifamily Low-Rise	42 units	Weekday 24 Hour	153	154	307
		Weekday AM Peak Hour	5	16	21
		Weekday PM Peak Hour	17	10	27
Subtotal	--	Weekday 24 Hour	954	955	1,909
		Weekday AM Peak Hour	35	104	139
		Weekday PM Peak Hour	118	69	187
Existing Bunker Ranch Subdivision Currently Constructed/Occupied⁽²⁾					
Single-Family Detached Housing	58 units	Weekday 24 Hour	315	315	630
		Weekday AM Peak Hour	12	34	46
		Weekday PM Peak Hour	38	22	60
Multifamily Low-Rise	6 units	Weekday 24 Hour	22	22	44
		Weekday AM Peak Hour	1	2	3
		Weekday PM Peak Hour	3	2	5
Subtotal	--	Weekday 24 Hour	337	337	674
		Weekday AM Peak Hour	13	36	49
		Weekday PM Peak Hour	41	24	65
Bunker Ranch Subdivision Approved Residential Units Not Yet Constructed/Occupied to be Included in Background Traffic Volumes					
Single-Family Detached Housing	102 units	Weekday 24 Hour	486	486	972
		Weekday AM Peak Hour	18	54	72
		Weekday PM Peak Hour	63	37	100
Multifamily Low-Rise	36 units	Weekday 24 Hour	131	132	263
		Weekday AM Peak Hour	4	14	18
		Weekday PM Peak Hour	14	8	22
Subtotal	--	Weekday 24 Hour	617	618	1,235
		Weekday AM Peak Hour	22	68	90
		Weekday PM Peak Hour	77	45	122

(1) Anticipated trip generation calculated based on the rates published in the Institute of Transportation Engineers (ITE) *Trip Generation*, 10th Edition publication.

(2) Data regarding the number of residential units that have yet to be constructed or occupied have been provided by the City of Dripping Springs. The Bunker Ranch Development has currently been approved for the construction of 160 single family units and 42 condo units. At this time, 102 single family units and 36 condo units have yet to be constructed or occupied.

TABLE 4
PROPOSED BUNKER RANCH SUBDIVISION EXPANSION TRIP GENERATION SUMMARY
Proposed Bunker Subdivision Expansion Traffic Impact Analysis
City of Dripping Springs, Hays County, Texas

Description/Land Use Code	Size	Time Period	Trip Generation ⁽¹⁾		
			Primary Trips		
			In	Out	Total
BUNKER RANCH RESIDENTIAL DEVELOPMENT					
Proposed Total Bunker Ranch Subdivision After Expansion					
Single-Family Detached Housing	388 units	Weekday 24 Hour	1810	1810	3620
		Weekday AM Peak Hour	70	210	280
		Weekday PM Peak Hour	235	138	373
Approved Bunker Ranch Subdivision Single Family Units⁽³⁾					
Single-Family Detached Housing	160 units	Weekday 24 Hour	801	801	1602
		Weekday AM Peak Hour	30	88	118
		Weekday PM Peak Hour	101	59	160
Proposed New Bunker Ranch Subdivision Residential Single Family Units⁽³⁾					
Single-Family Detached Housing	228 units	Weekday 24 Hour	1,009	1,009	2,018
		Weekday AM Peak Hour	40	122	162
		Weekday PM Peak Hour	134	79	213

- (1) Anticipated trip generation calculated based on the rates published in the Institute of Transportation Engineers (ITE) *Trip Generation*, 10th Edition publication.
- (2) Data regarding the number of residential units that have yet to be constructed or occupied have been provided by the City of Dripping Springs. The Bunker Ranch Development has currently been approved for the construction of 160 single family units and 42 condo units. At this time, 102 single family units and 36 condo units have yet to be constructed or occupied.
- (3) From Table 3.
- (4) The total Bunker Ranch Subdivision Trips was calculated by adding the existing approved Bunker Ranch Subdivision trips (160 Single Family Residential Units plus 42 Multifamily Low-Rise Residential Units shown on Table 3) to the proposed Bunker Ranch Subdivision Expansion trips (Additional 228 Single Family Residential Units shown on Table 4).

Source: Analysis by CEC.

TABLE 5
PROPOSED BUNKER RANCH SUBDIVISION APPROVED PLUS EXPANSION TRIP GENERATION SUMMARY
Proposed Bunker Subdivision Expansion Traffic Impact Analysis
City of Dripping Springs, Hays County, Texas

Description/Land Use Code	Size	Time Period	Trip Generation ⁽¹⁾		
			Primary Trips		
			In	Out	Total
APPROVED BUNKER RANCH SUBDIVISION ⁽¹⁾					
Approved Existing Bunker Ranch Subdivision					
Single-Family Detached Housing	160 units	Weekday 24 Hour	801	801	1602
		Weekday AM Peak Hour	30	88	118
		Weekday PM Peak Hour	101	59	160
Multifamily Low-Rise	42 units	Weekday 24 Hour	153	154	307
		Weekday AM Peak Hour	5	16	21
		Weekday PM Peak Hour	17	10	27
Subtotal	--	Weekday 24 Hour	954	955	1,909
		Weekday AM Peak Hour	35	104	139
		Weekday PM Peak Hour	118	69	187
PROPOSED NEW BUNKER RANCH SUBDIVISION EXPANSION ⁽²⁾					
Single-Family Detached Housing	228 units	Weekday 24 Hour	1,009	1,009	2,018
		Weekday AM Peak Hour	40	122	162
		Weekday PM Peak Hour	134	79	213
Multifamily Low-Rise	--	Weekday 24 Hour	--	--	--
		Weekday AM Peak Hour	--	--	--
		Weekday PM Peak Hour	--	--	--
Subtotal	--	Weekday 24 Hour	1,009	1,009	2,018
		Weekday AM Peak Hour	40	122	162
		Weekday PM Peak Hour	134	79	213
TOTAL APPROVED BUNKER RANCH SUBDIVISION PLUS PROPOSED NEW BUNKER RANCH SUBDIVISION EXPANSION					
Single-Family Detached Housing	388 units	Weekday 24 Hour	1,810	1,810	3,620
		Weekday AM Peak Hour	70	210	280
		Weekday PM Peak Hour	235	138	373
Multifamily Low-Rise	42 units	Weekday 24 Hour	153	154	307
		Weekday AM Peak Hour	5	16	21
		Weekday PM Peak Hour	17	10	27
Subtotal	--	Weekday 24 Hour	1,963	1,964	3,927
		Weekday AM Peak Hour	75	226	301
		Weekday PM Peak Hour	252	148	400

(1) From Table 3.

(2) From Table 4.

Source: Analysis by CEC.

TABLE 6
ARROWHEAD RANCH DEVELOPMENT TRIP GENERATION SUMMARY
Proposed Bunker Ranch Subdivision Expansion Traffic Impact Analysis
City of Dripping Springs, Hays County, Texas

Description/Land Use Code	Size	Time Period	Trip Generation ⁽¹⁾								
			Primary Trips			Pass-By Trips			Total Trips		
			In	Out	Total	In	Out	Total	In	Out	Total
ARROWHEAD RANCH DEVELOPMENT											
Total Approved Arrowhead Ranch Residential Development											
Single-Family Detached Housing	403 units	Weekday 24 Hour	1874	1874	3748	0	0	0	1,874	1,874	3,748
		Weekday AM Peak Hour	73	218	291	0	0	0	73	218	291
		Weekday PM Peak Hour	244	143	387	0	0	0	244	143	387
Existing Arrowhead Ranch Residential Development Currently Constructed/Occupied⁽²⁾											
Single-Family Detached Housing	181 units	Weekday 24 Hour	898	897	1795	0	0	0	898	897	1,795
		Weekday AM Peak Hour	33	100	133	0	0	0	33	100	133
		Weekday PM Peak Hour	113	67	180	0	0	0	113	67	180
Arrowhead Ranch Residential Development Approved Residential Units Not Yet Constructed/Occupied to be Included in Background Traffic Volumes											
Single-Family Detached Housing	222 units	Weekday 24 Hour	976	977	1953	0	0	0	976	977	1,953
		Weekday AM Peak Hour	40	118	158	0	0	0	40	118	158
		Weekday PM Peak Hour	131	76	207	0	0	0	131	76	207
Planned Arrowhead Ranch Development Commercial Development⁽³⁾											
Liquor Store	1,800 SF	Weekday 24 Hour	92	91	183	0	0	0	92	91	183
		Weekday AM Peak Hour	4	4	8	0	0	0	4	4	8
		Weekday PM Peak Hour	15	14	29	0	0	0	15	14	29
Super Convenience Market/Gas Station	6,000 SF	Weekday 24 Hour	No Data Available for Weekday 24-Hour Period						1,153	1,152	2,305
		Weekday AM Peak Hour	59	59	118	185	185	370	244	244	488
		Weekday PM Peak Hour	46	46	92	147	147	294	193	193	386
SubTotal		Weekday 24 Hour	--	--	--	--	--	--	1,245	1,243	2488
		Weekday AM Peak Hour	63	63	126	185	185	370	248	248	496
		Weekday PM Peak Hour	61	60	121	147	147	294	208	207	415

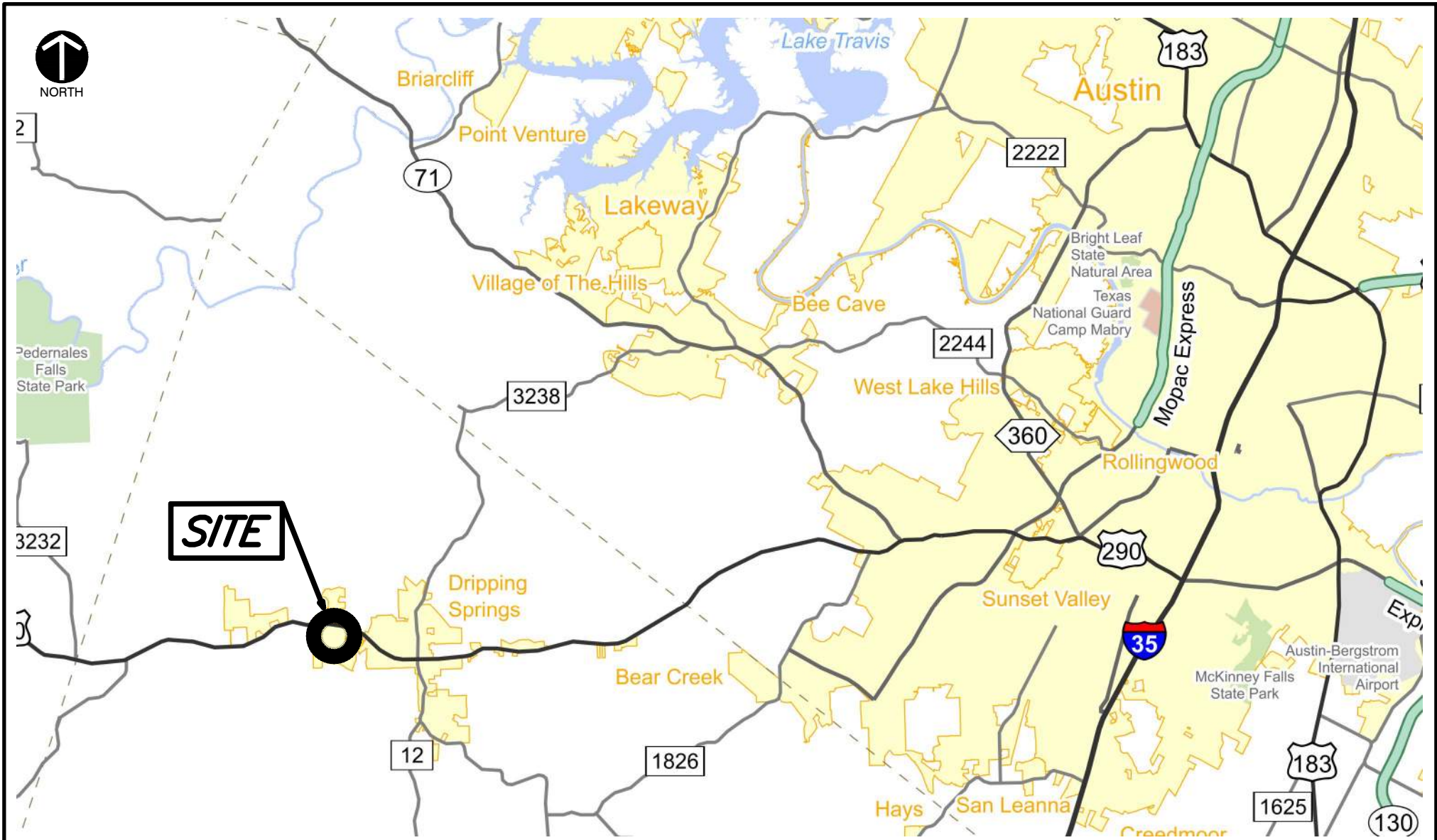
(1) Anticipated trip generation calculated based on the rates published in the Institute of Transportation Engineers (ITE) *Trip Generation*, 10th Edition publication.

(2) Data regarding the number of residential units that are currently constructed and occupied have been provided by the City of Dripping Springs.

(3) The City of Dripping Springs has requested that trips associated with the planned Arrowhead Ranch Super Convenience Market/Gas Station and Liquor Store be included in the background traffic projections. A conceptual site plan for these commercial developments has been provided by the City of Dripping Springs.

Source: Analysis by CEC.

FIGURES

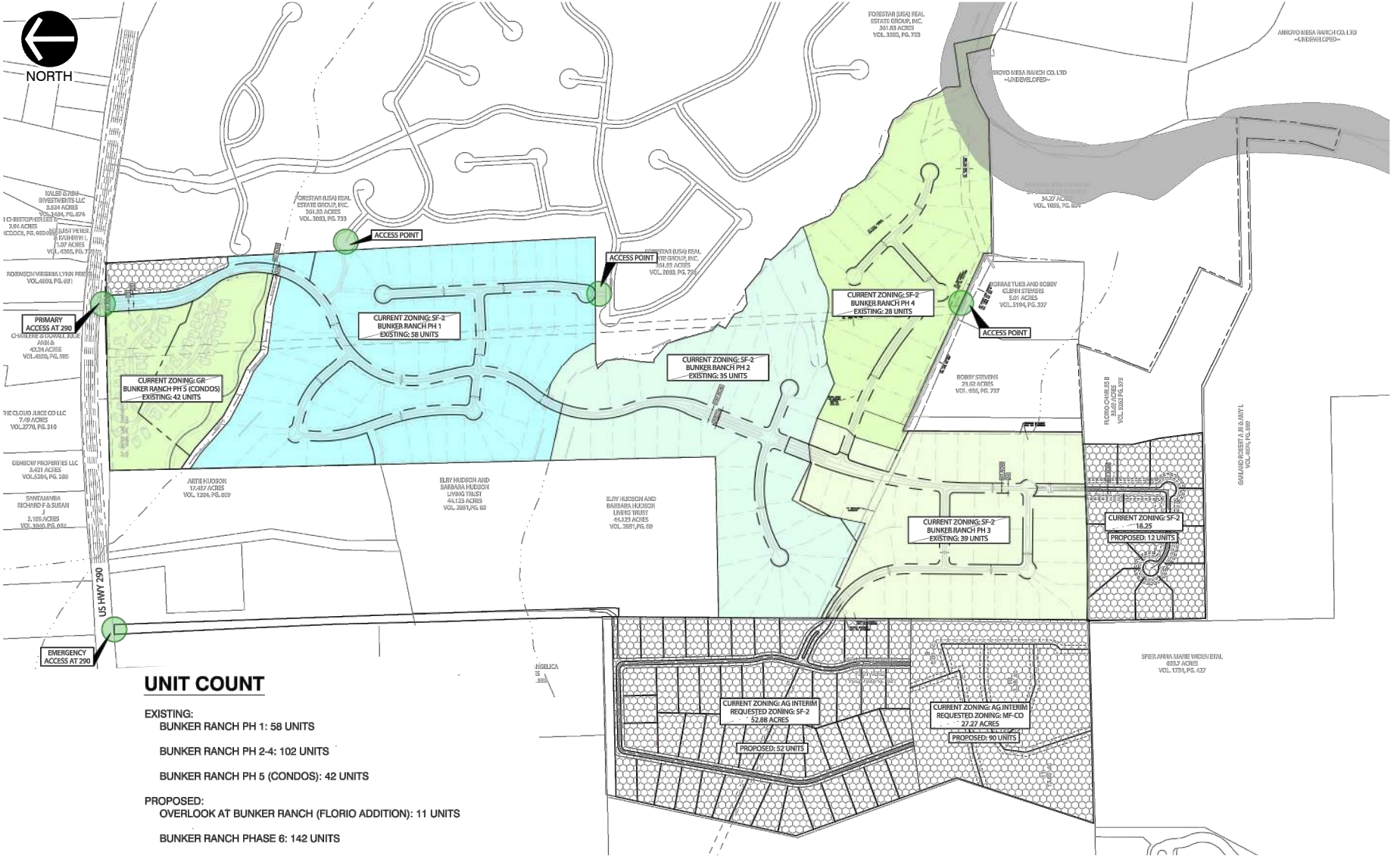


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**BUNKER RANCH SUBDIVISION EXPANSION
 TRAFFIC IMPACT ANALYSIS
 CITY OF DRIPPING SPRINGS
 HAYS COUNTY, TEXAS**

SITE LOCATION

DRAWN BY:	ANL	CHECKED BY:	CAD	APPROVED BY:	JMD	FIGURE NO.:	1
DATE:	MAY 2021	DWG SCALE:	NOT TO SCALE	PROJECT NO.:	304-065		



UNIT COUNT

- EXISTING:
 - BUNKER RANCH PH 1: 58 UNITS
 - BUNKER RANCH PH 2-4: 102 UNITS
 - BUNKER RANCH PH 5 (CONDOS): 42 UNITS
- PROPOSED:
 - OVERLOOK AT BUNKER RANCH (FLORIO ADDITION): 11 UNITS
 - BUNKER RANCH PHASE 6: 142 UNITS



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 412-429-2324 · 800-365-2324
 www.cecinc.com

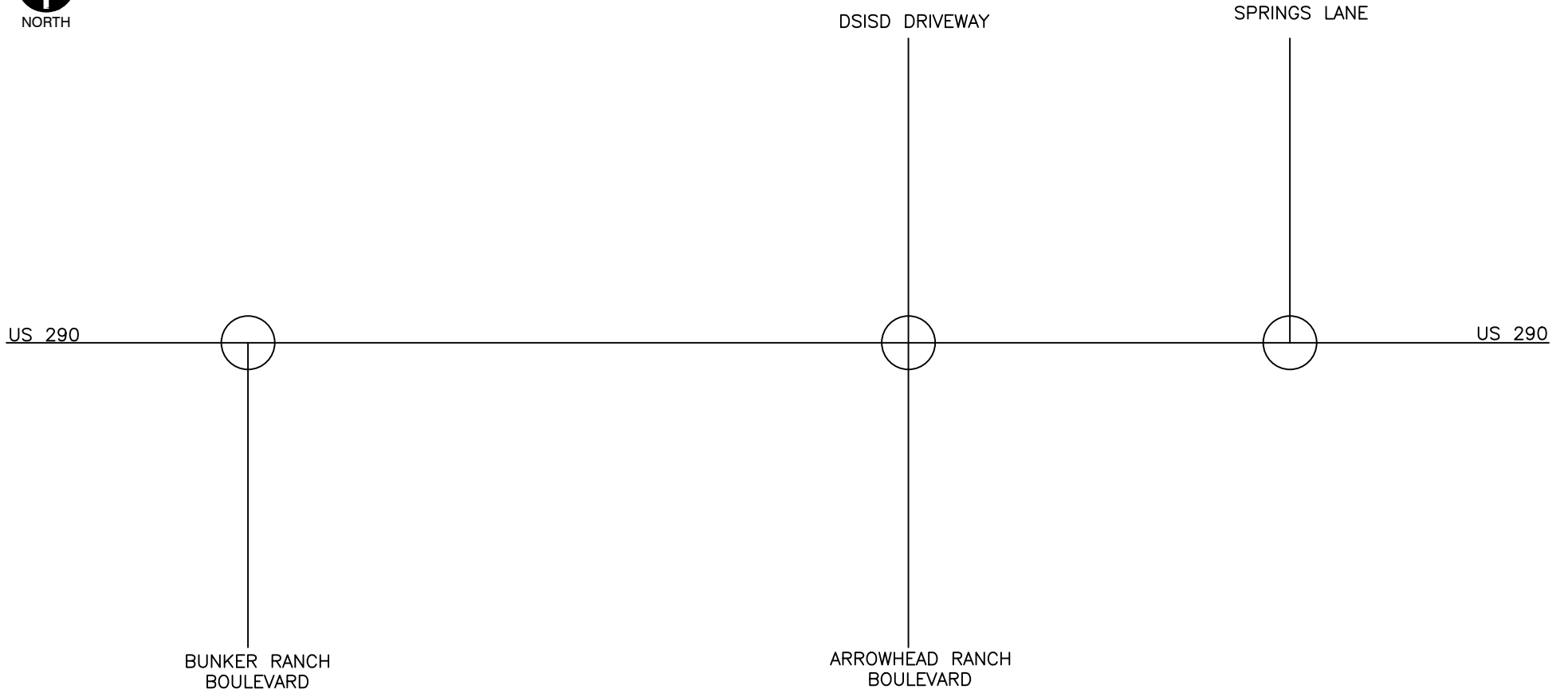
**BUNKER RANCH SUBDIVISION EXPANSION
 TRAFFIC IMPACT ANALYSIS
 CITY OF DRIPPING SPRINGS
 HAYS COUNTY, TEXAS**

SITE PLAN

DRAWN BY:	ANL	CHECKED BY:	CAD	APPROVED BY:	JMD	FIGURE NO.:	2
DATE:	MAY 2021	DWG SCALE:	NOT TO SCALE	PROJECT NO:	304-065		




NORTH

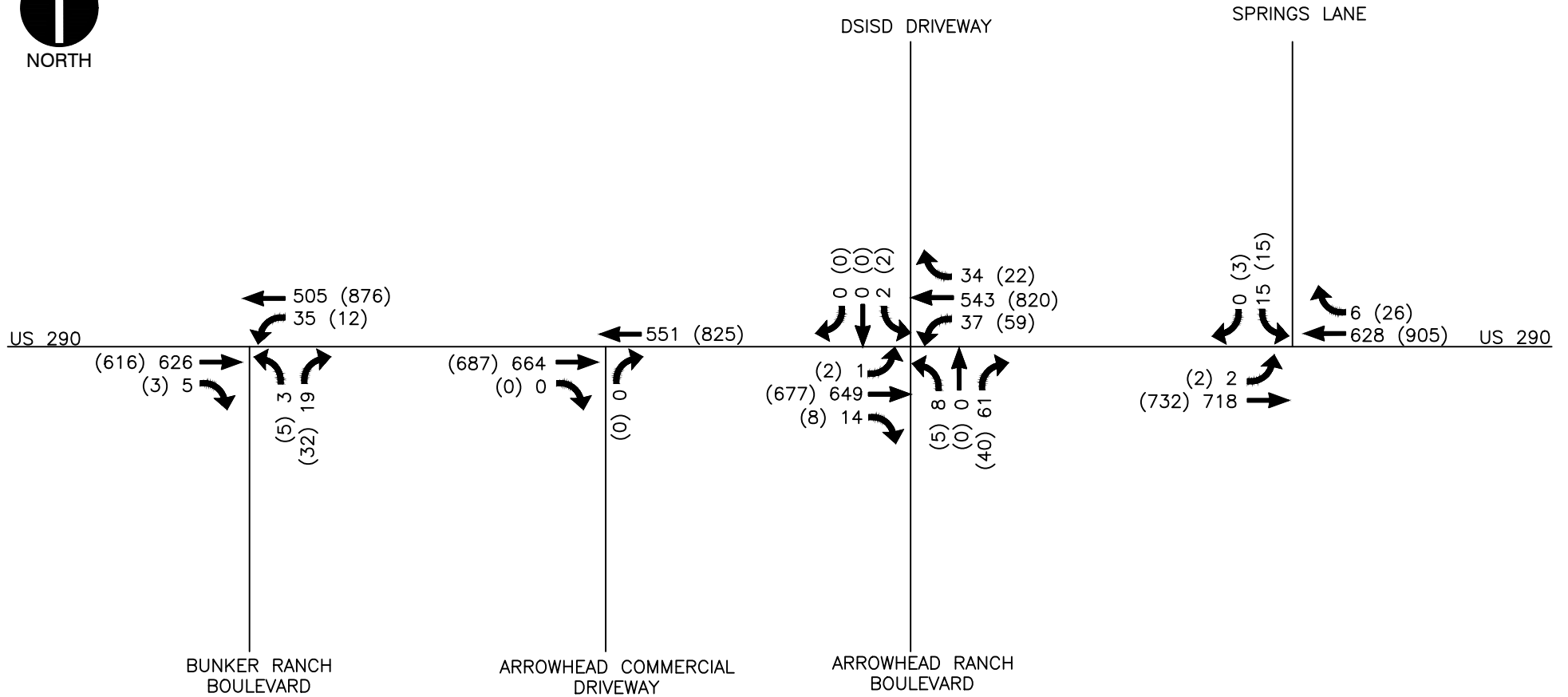


LEGEND




Existing Unsignalized Intersection

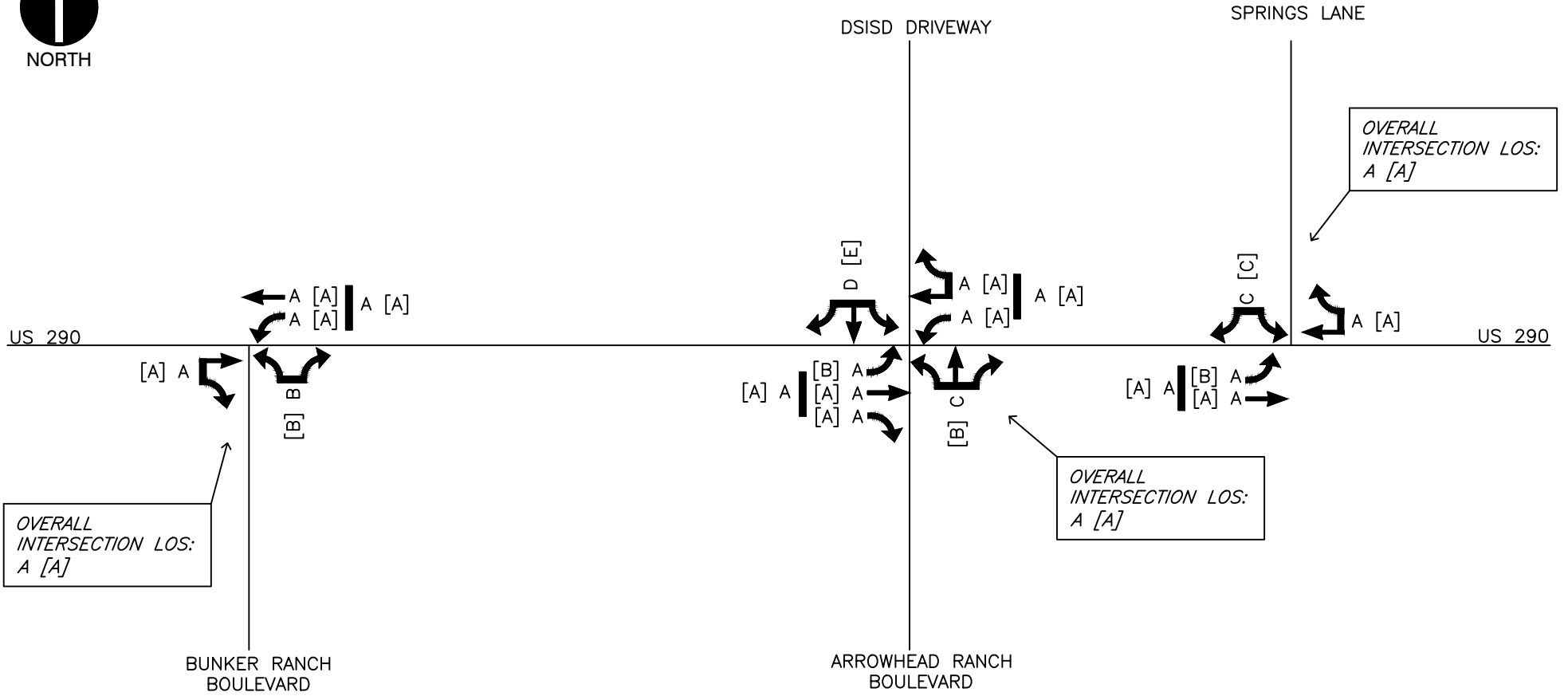
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
STUDY INTERSECTIONS			
DRAWN BY:	ANL	CHECKED BY:	CAD
DATE:	MAY 2021	DWG SCALE:	NOT TO SCALE
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LEGEND


123 A.M. Peak Hour Traffic Volumes
 (123) P.M. Peak Hour Traffic Volumes

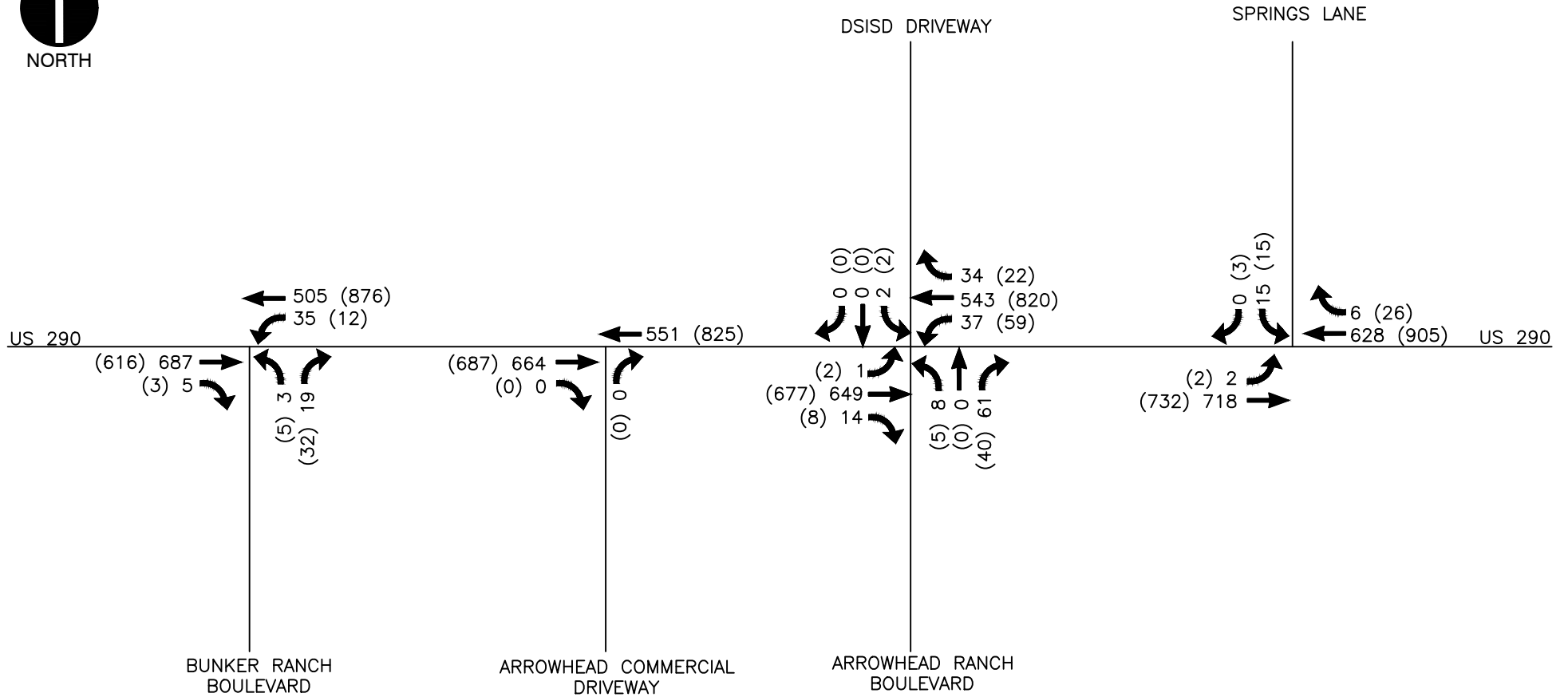
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
		EXISTING 2021 PEAK HOUR TRAFFIC VOLUMES	
DRAWN BY: ANL DATE: MAY 2021	CHECKED BY: CAD DWG SCALE: NOT TO SCALE	APPROVED BY: JMD PROJECT NO: 304-065	FIGURE NO.: 4



LEGEND


- A A.M. Peak Hour Levels of Service
- [B] P.M. Peak Hour Levels of Service

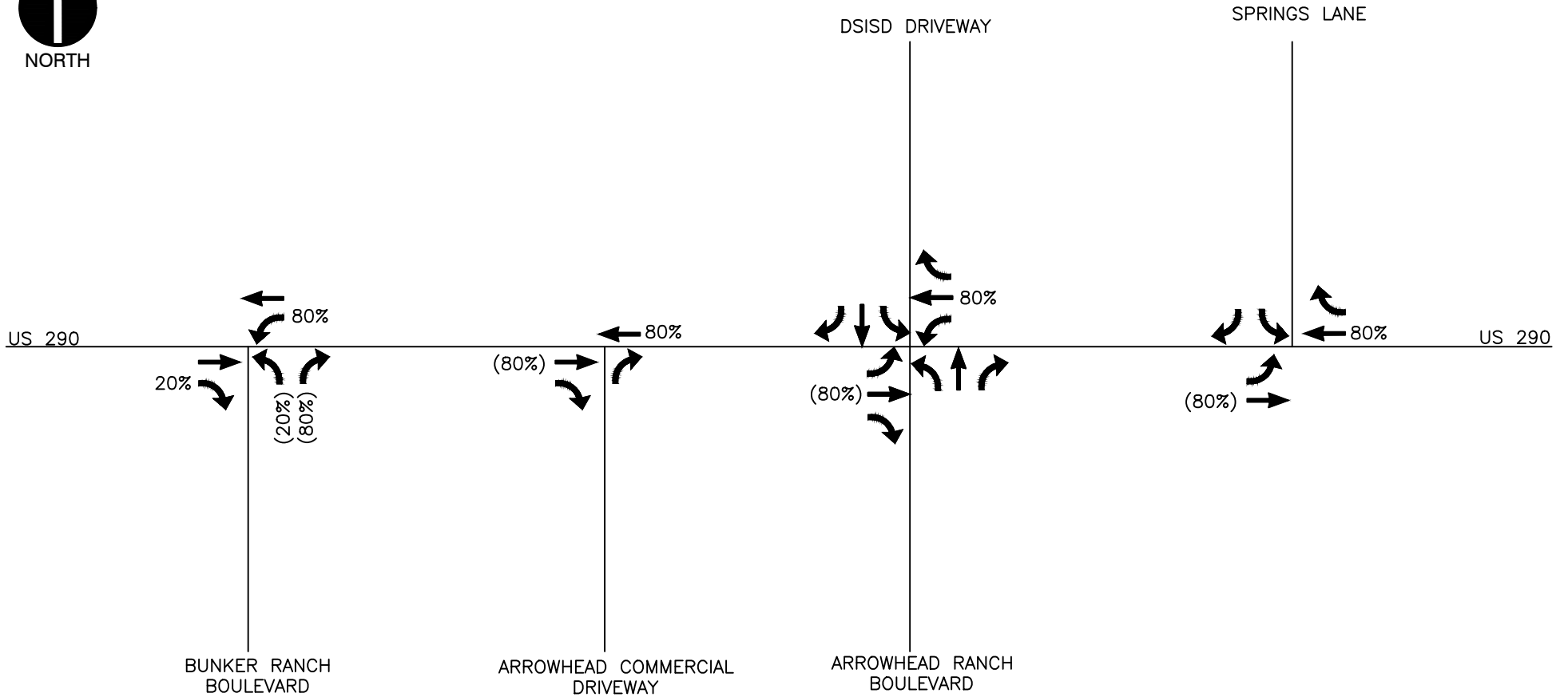
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
EXISTING 2021 PEAK HOUR LEVELS OF SERVICE			
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DATE:	MAY 2021	DWG SCALE:	NOT TO SCALE
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LEGEND


123 A.M. Peak Hour Traffic Volumes
 (123) P.M. Peak Hour Traffic Volumes

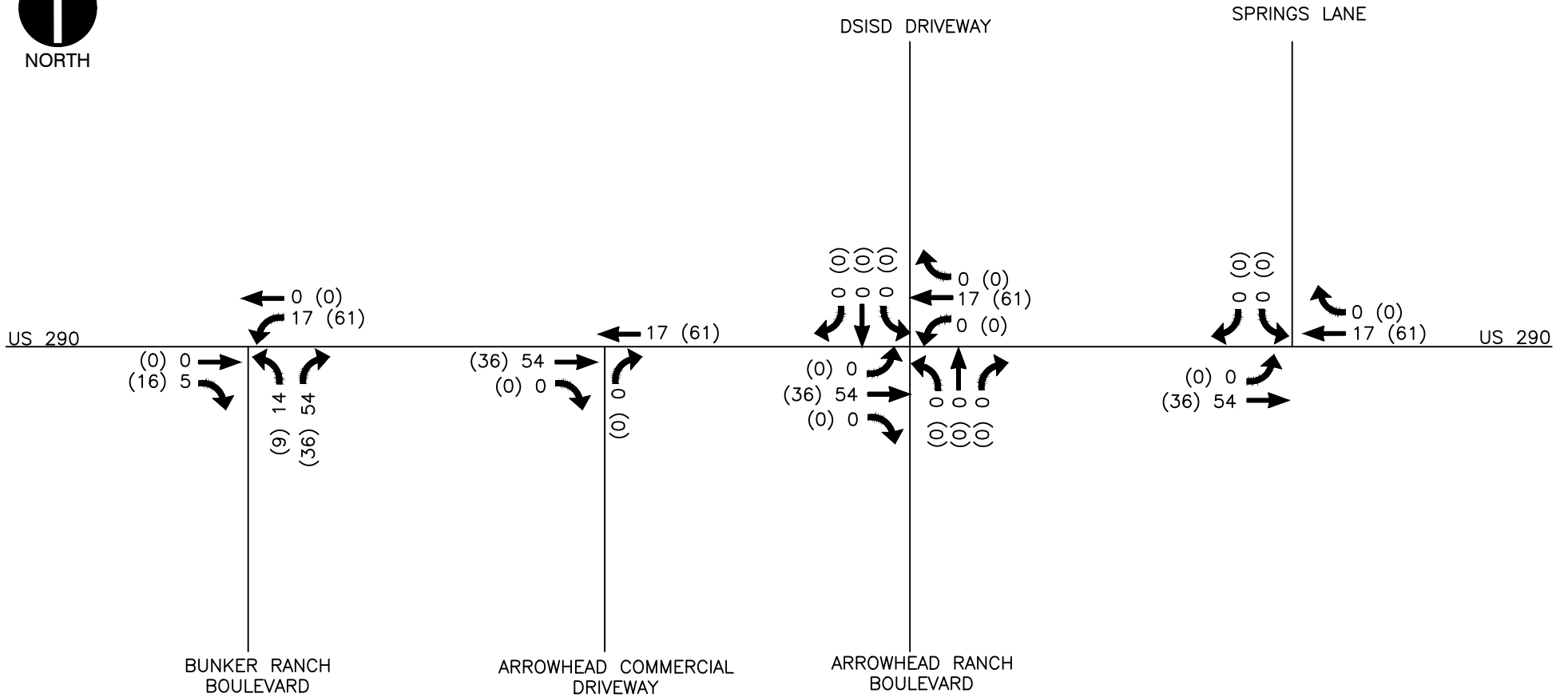
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
FORECASTED 2025 BACKGROUND PEAK HOUR TRAFFIC VOLUMES			
DRAWN BY: ANL DATE: MAY 2021	CHECKED BY: CAD DWG SCALE: NOT TO SCALE	APPROVED BY: JMD PROJECT NO: 304-065	FIGURE NO.: 6



LEGEND


- 12% Primary Trip Arrival Distribution
- (12%) Primary Trip Departure Distribution

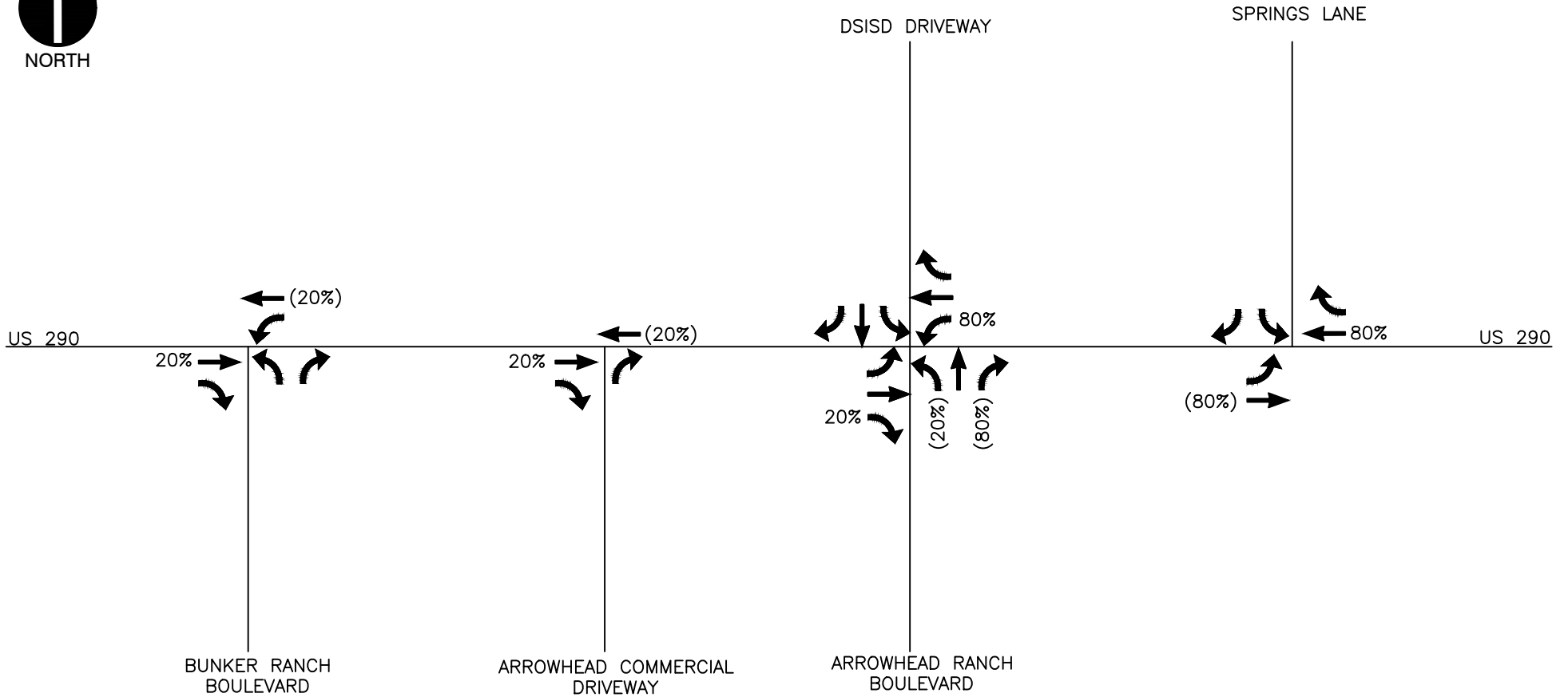
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
ANTICIPATED BUNKER RANCH RESIDENTIAL PRIMARY TRIP ARRIVAL/DEPARTURE DISTRIBUTION			
DRAWN BY:	ANL	CHECKED BY:	CAD
DATE:	MAY 2021	DWG SCALE:	NOT TO SCALE
APPROVED BY:	JMD	PROJECT NO:	304-065
			FIGURE NO.: 7



LEGEND


- 123 A.M. Peak Hour Traffic Volumes
- (123) P.M. Peak Hour Traffic Volumes

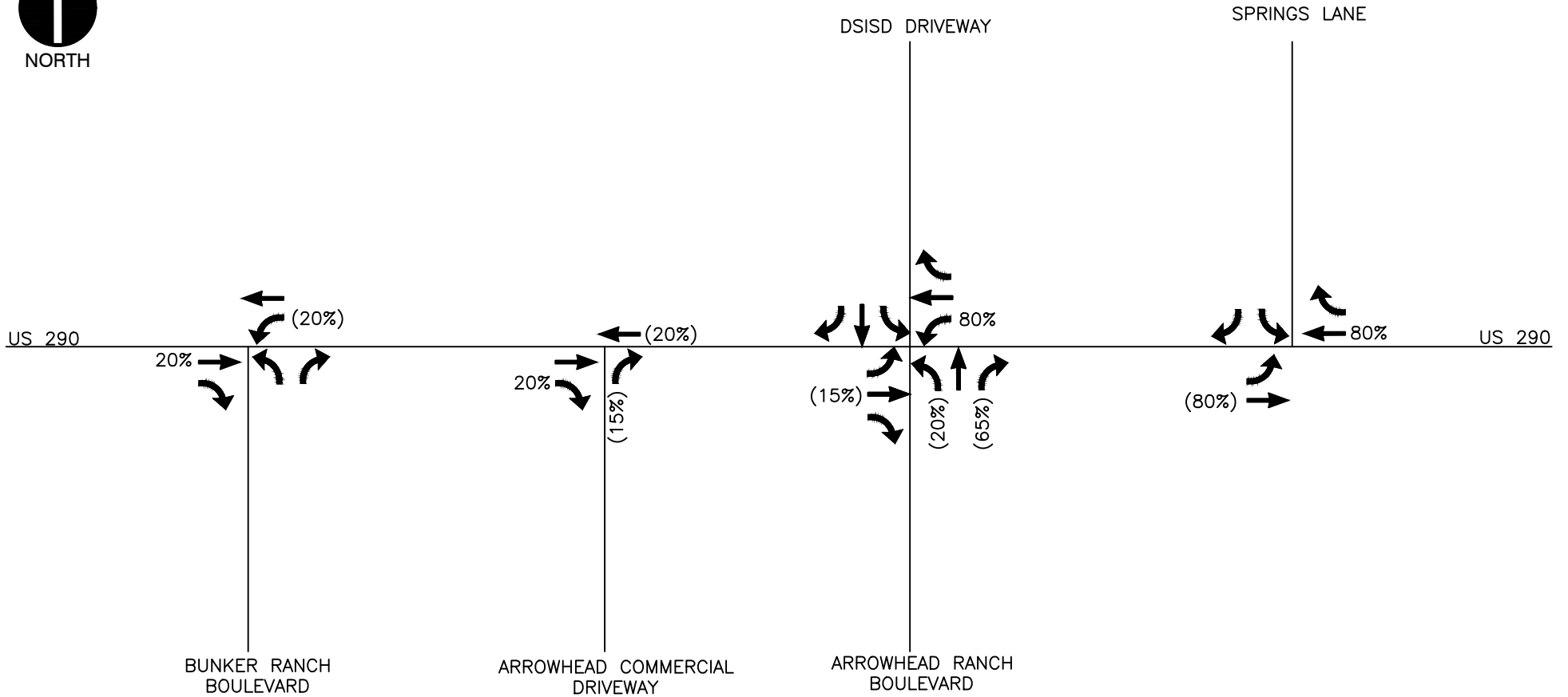
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
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DATE: MAY 2021 DWG SCALE: NOT TO SCALE		PROJECT NO: 304-065 8	



LEGEND


- 12% Primary Trip Arrival Distribution
- (12%) Primary Trip Departure Distribution

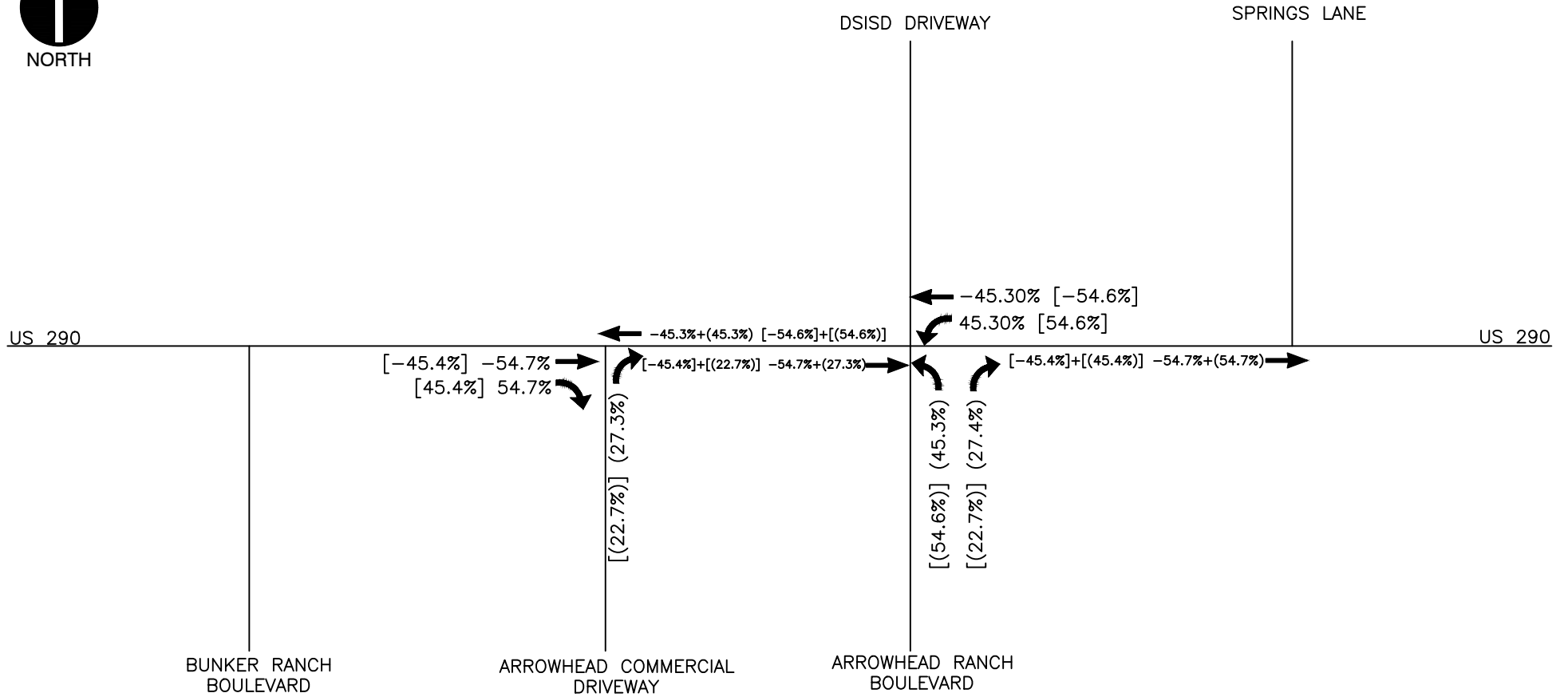
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
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APPROVED BY: JMD		FIGURE NO.: 9	
PROJECT NO: 304-065			



LEGEND


- 12% Primary Trip Arrival Distribution
- (12%) Primary Trip Departure Distribution

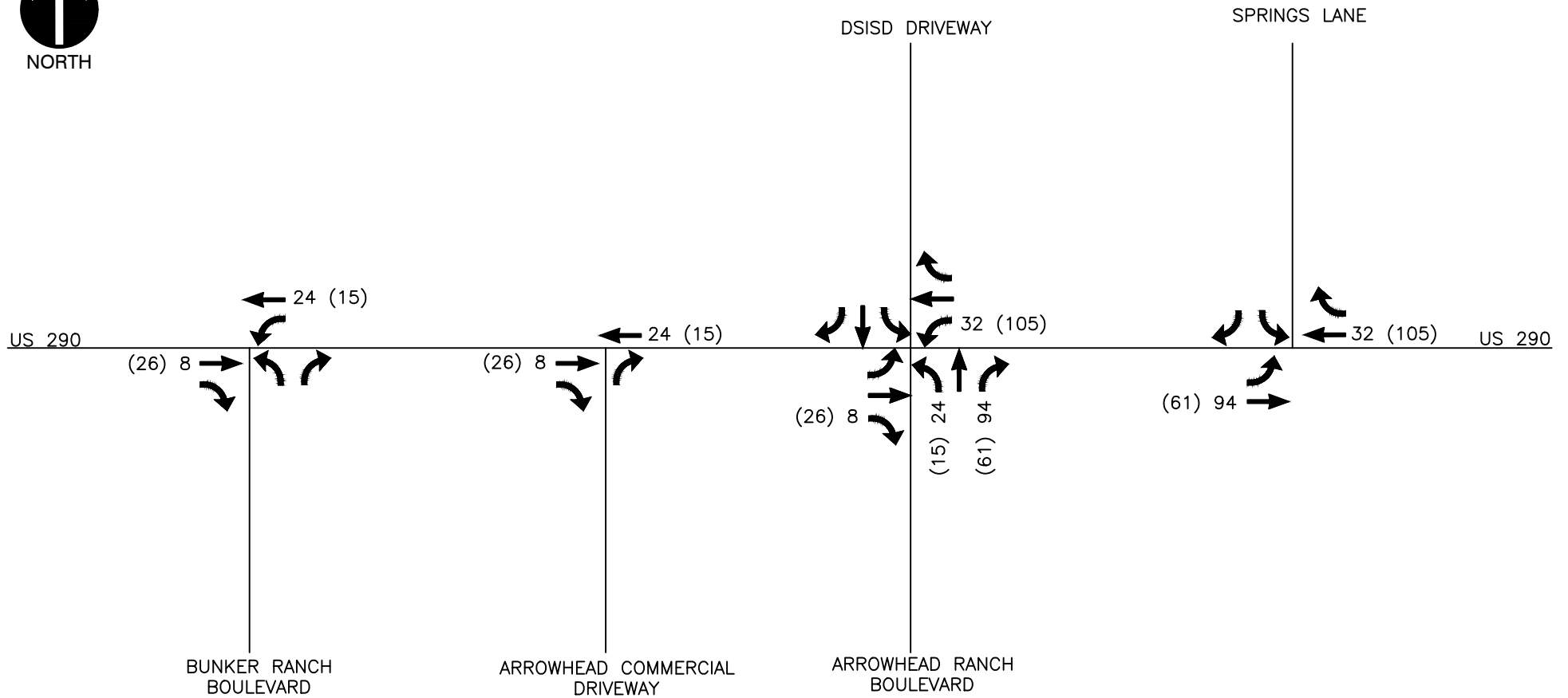
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
DRAWN BY: ANL CHECKED BY: CAD APPROVED BY: JMD FIGURE NO.:		ANTICIPATED ARROWHEAD RANCH COMMERCIAL PRIMARY TRIP ARRIVAL/DEPARTURE DISTRIBUTION	
DATE: MAY 2021 DWG SCALE: NOT TO SCALE PROJECT NO: 304-065		10	



LEGEND


- 12% AM Peak Hour Arrival Trip Distribution
- (12%) AM Peak Hour Departure Trip Distribution
- [12%] PM Peak Hour Arrival Trip Distribution
- [(12%)] PM Peak Hour Departure Trip Distribution

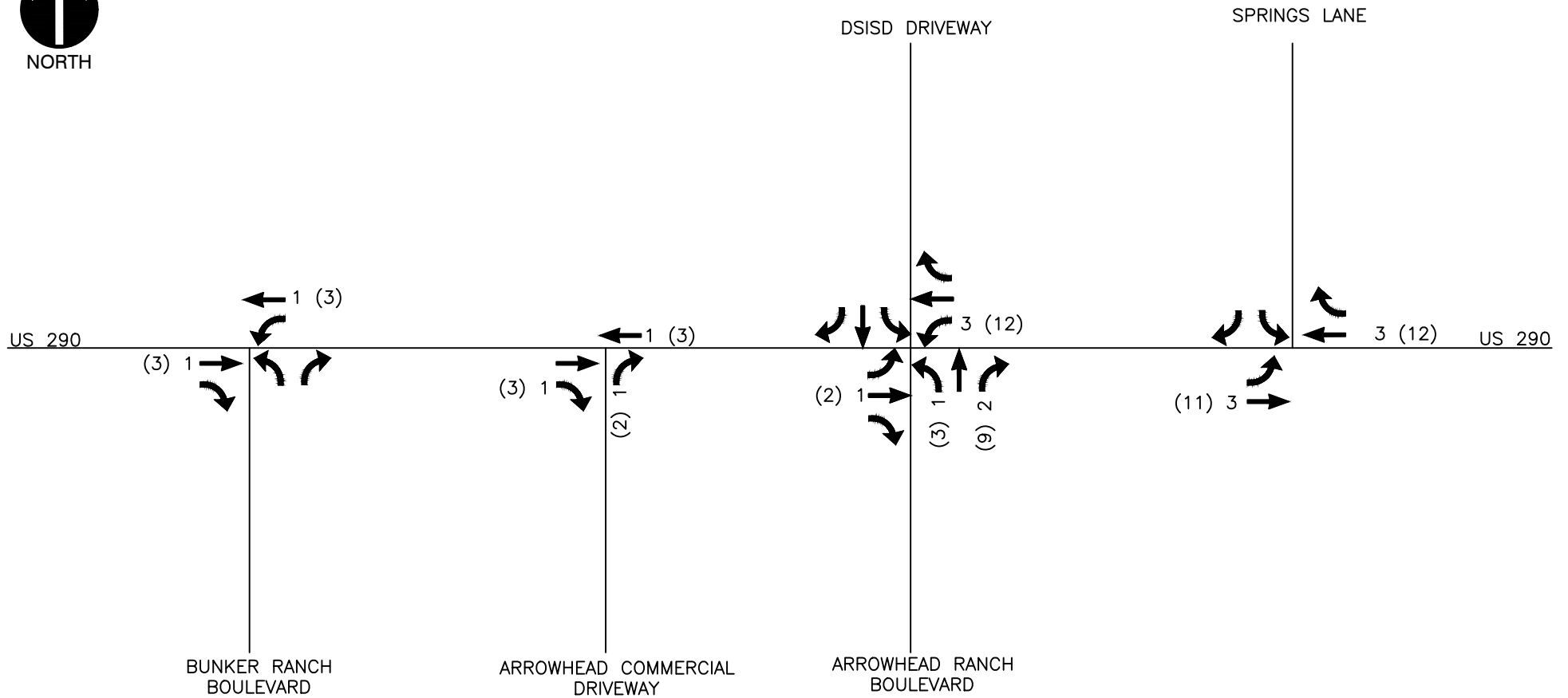
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
ANTICIPATED ARROWHEAD RANCH COMMERCIAL PASS-BY TRIP ARRIVAL/DEPARTURE DISTRIBUTION			
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DATE: MAY 2021	DWG SCALE: NOT TO SCALE	PROJECT NO: 304-065	11



LEGEND


- 123 A.M. Peak Hour Traffic Volumes
- (123) P.M. Peak Hour Traffic Volumes

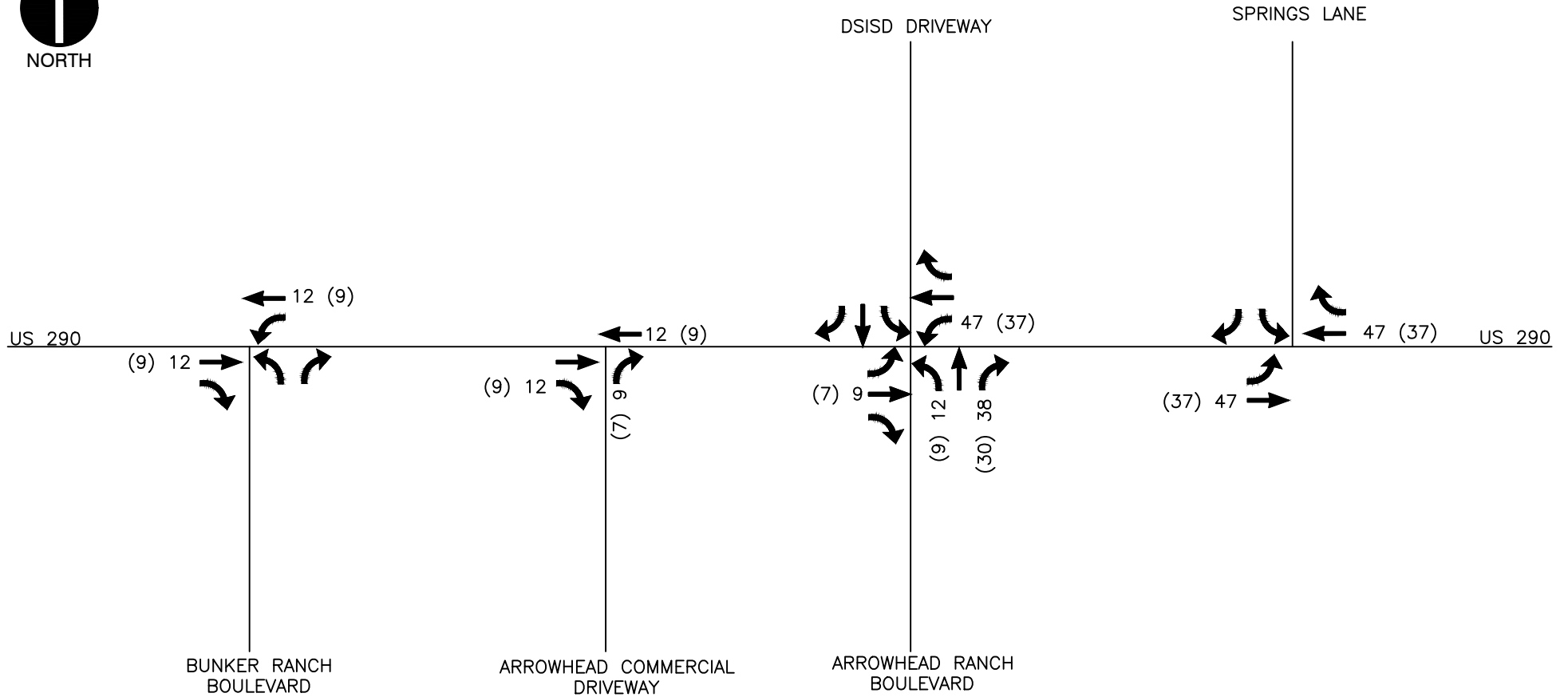
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ANTICIPATED ARROWHEAD RANCH APPROVED BACKGROUND RESIDENTIAL SITE GENERATED PEAK HOUR TRIPS		ANTICIPATED ARROWHEAD RANCH APPROVED BACKGROUND RESIDENTIAL SITE GENERATED PEAK HOUR TRIPS	
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LEGEND


- 123 A.M. Peak Hour Traffic Volumes
- (123) P.M. Peak Hour Traffic Volumes

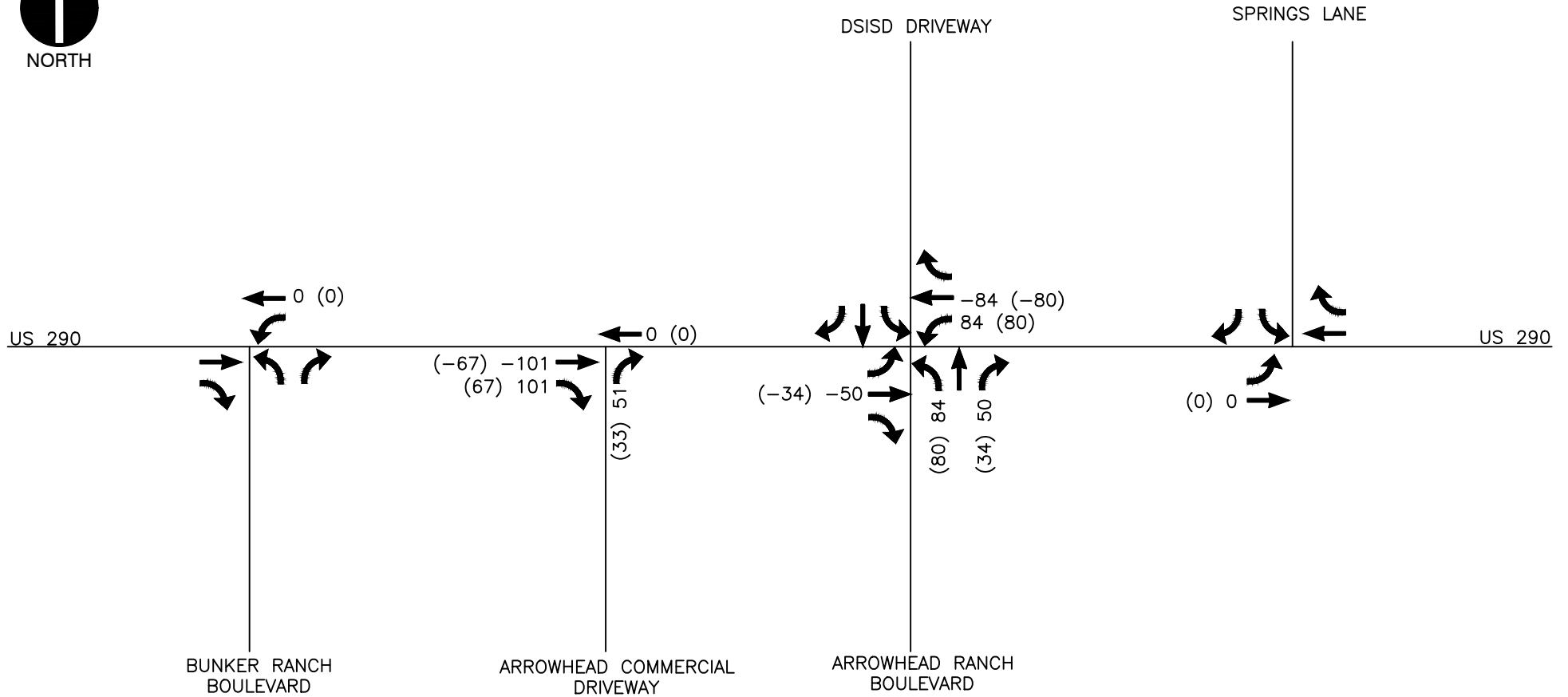
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
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DATE: MAY 2021 DWG SCALE: NOT TO SCALE		PROJECT NO: 304-065 13	



LEGEND


- 123 A.M. Peak Hour Traffic Volumes
- (123) P.M. Peak Hour Traffic Volumes

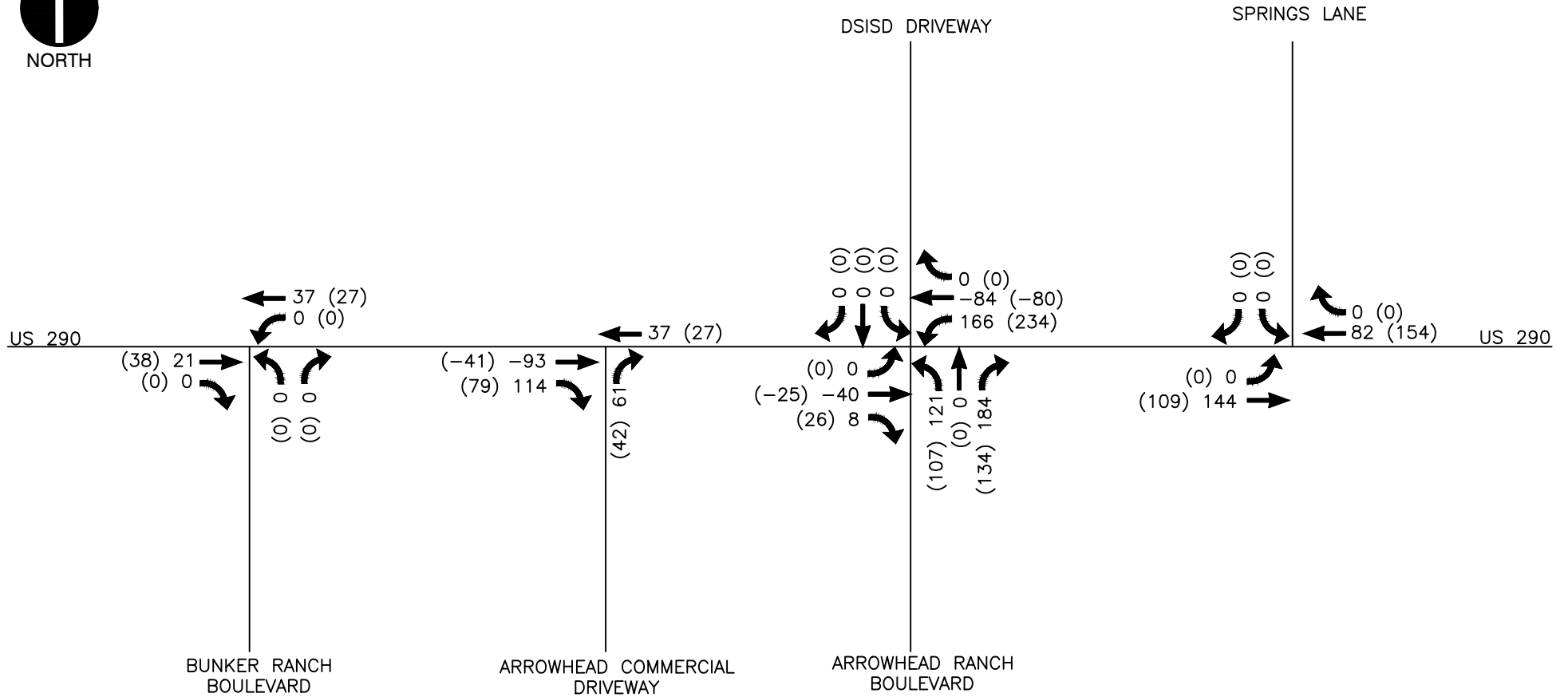
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
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DATE: MAY 2021 DWG SCALE: NOT TO SCALE PROJECT NO: 304-065		14	



LEGEND


- 123 A.M. Peak Hour Traffic Volumes
- (123) P.M. Peak Hour Traffic Volumes

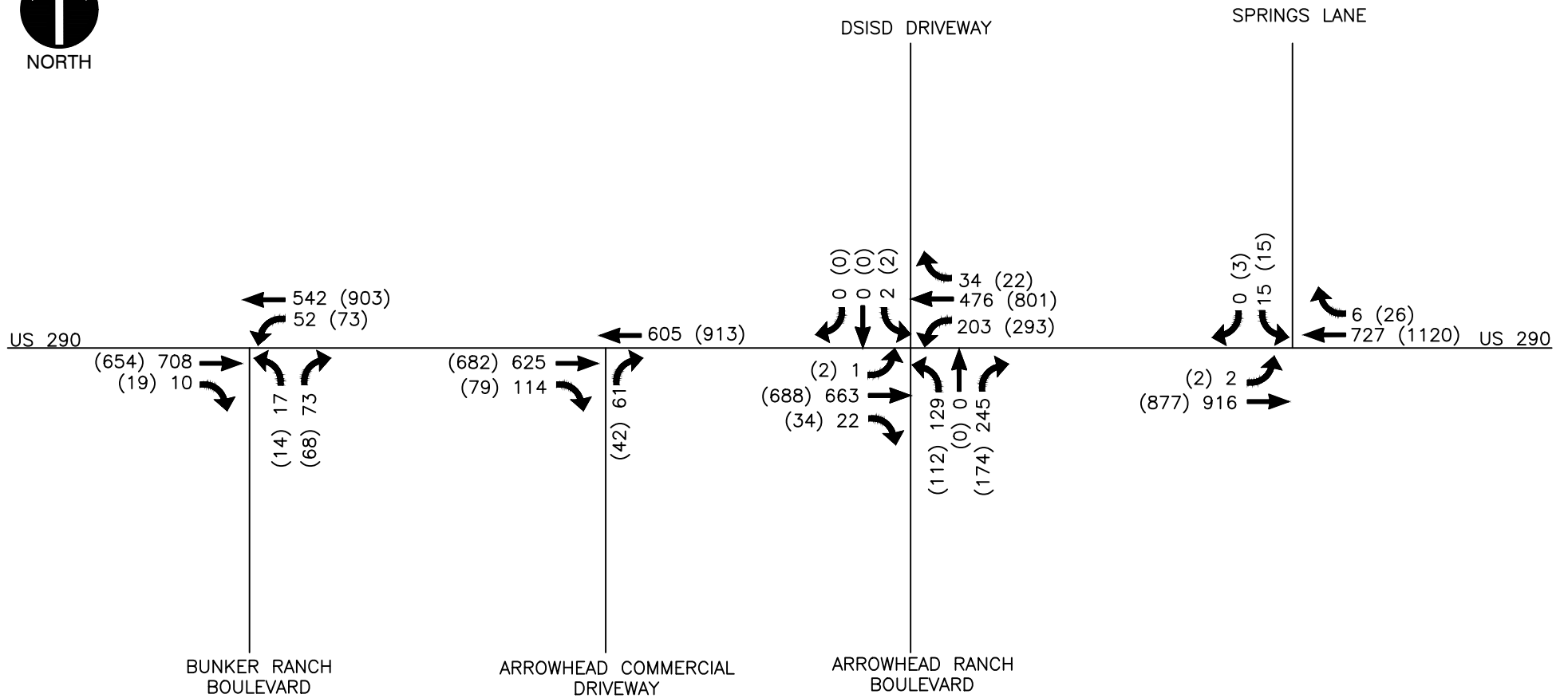
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
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DATE: MAY 2021 DWG SCALE: NOT TO SCALE		PROJECT NO: 304-065	



LEGEND


- 123 A.M. Peak Hour Traffic Volumes
- (123) P.M. Peak Hour Traffic Volumes

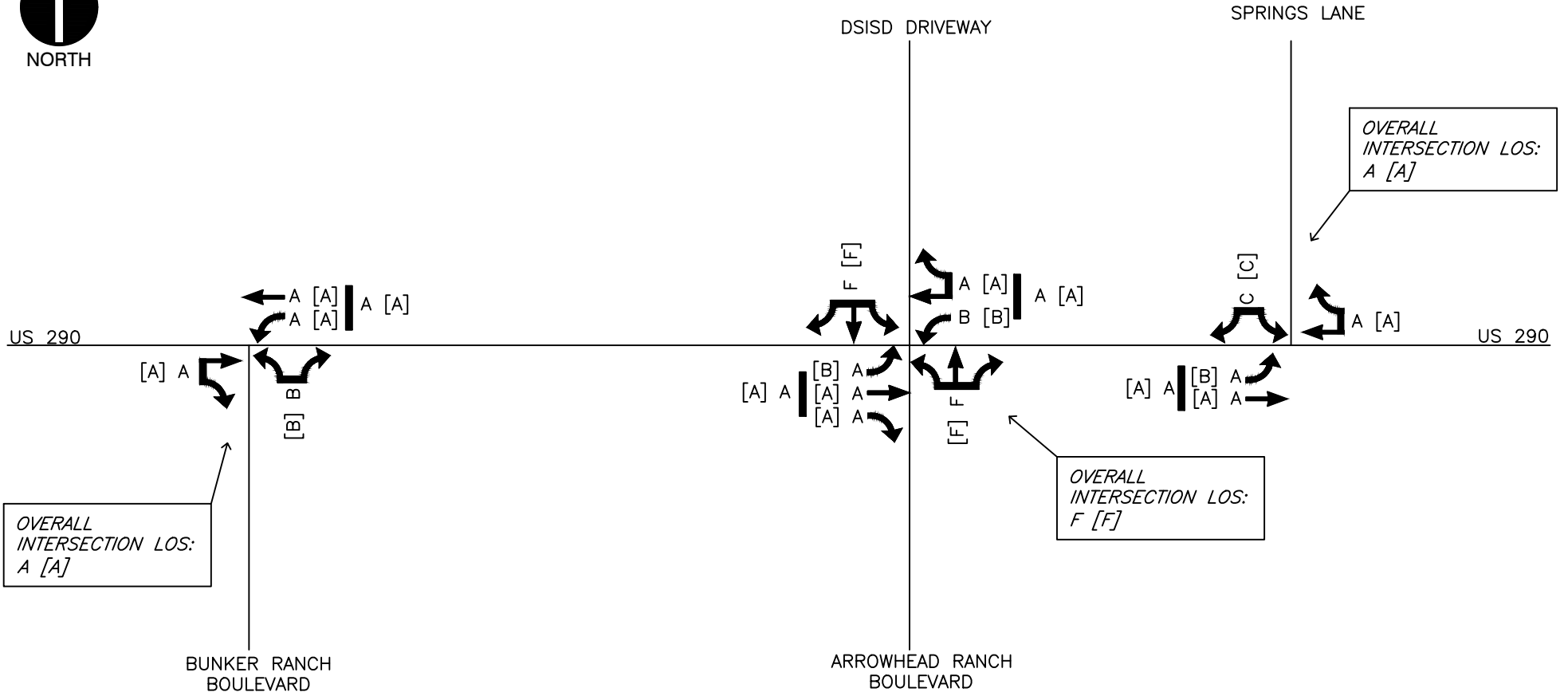
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
ANTICIPATED ARROWHEAD RANCH TOTAL BACKGROUND SITE GENERATED PEAK HOUR TRIPS			
DRAWN BY:	ANL	CHECKED BY:	CAD
DATE:	MAY 2021	DWG SCALE:	NOT TO SCALE
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FIGURE NO.:			16



LEGEND


123 A.M. Peak Hour Traffic Volumes
 (123) P.M. Peak Hour Traffic Volumes

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		FORECASTED 2025 NO-BUILD (BASE) PEAK HOUR TRAFFIC VOLUMES	
DRAWN BY: ANL DATE: MAY 2021	CHECKED BY: CAD DWG SCALE: NOT TO SCALE	APPROVED BY: JMD PROJECT NO: 304-065	FIGURE NO.: 17



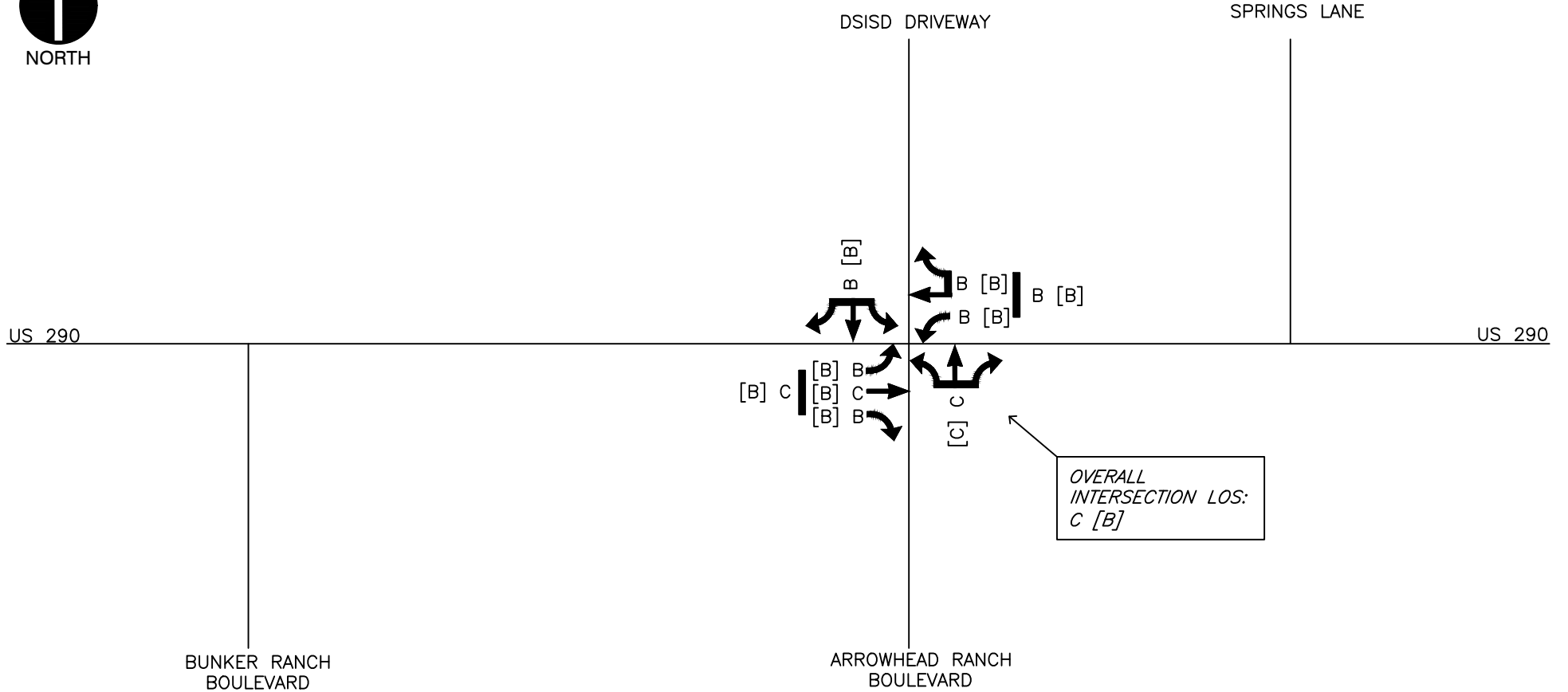
LEGEND

- A A.M. Peak Hour Levels of Service
- [B] P.M. Peak Hour Levels of Service

 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
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DATE: MAY 2021 DWG SCALE: NOT TO SCALE PROJECT NO: 304-065			




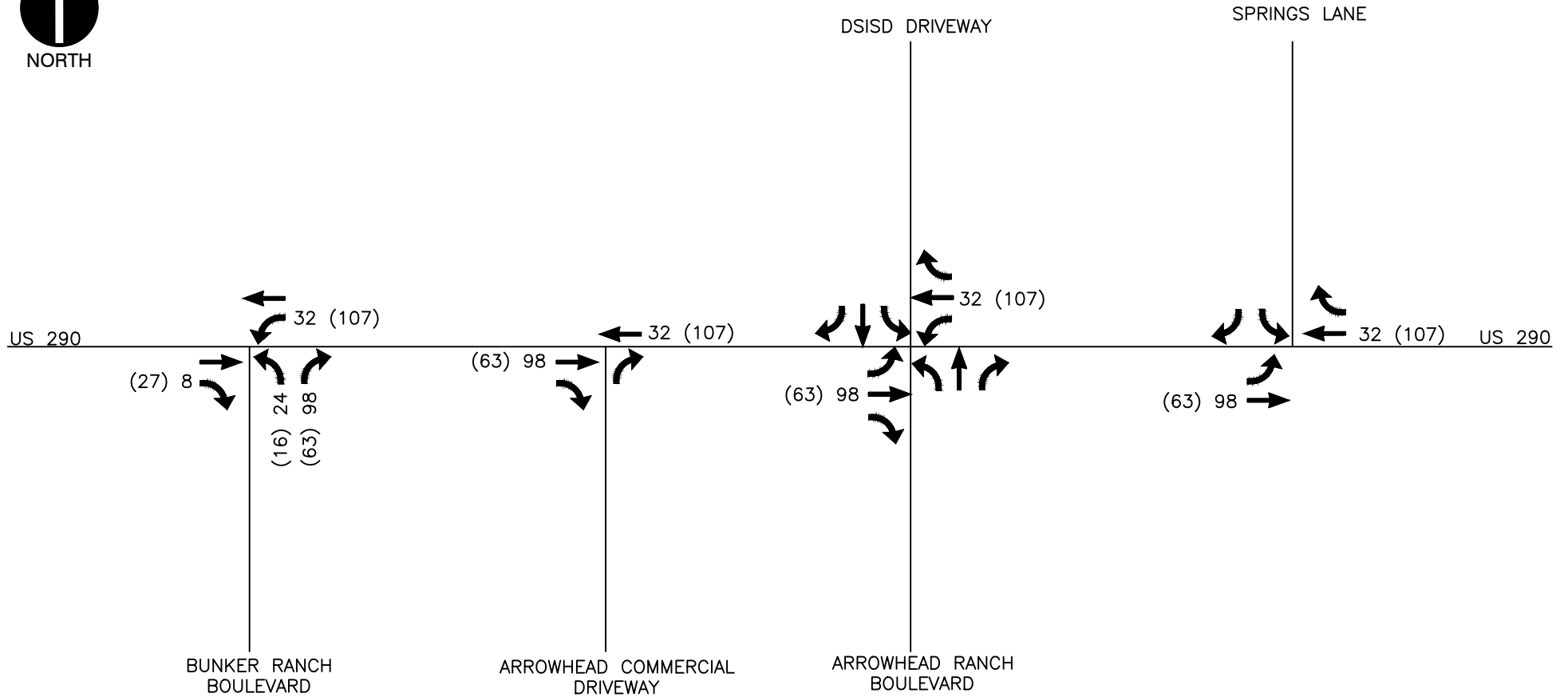
NORTH



LEGEND


- A A.M. Peak Hour Levels of Service
- [B] P.M. Peak Hour Levels of Service

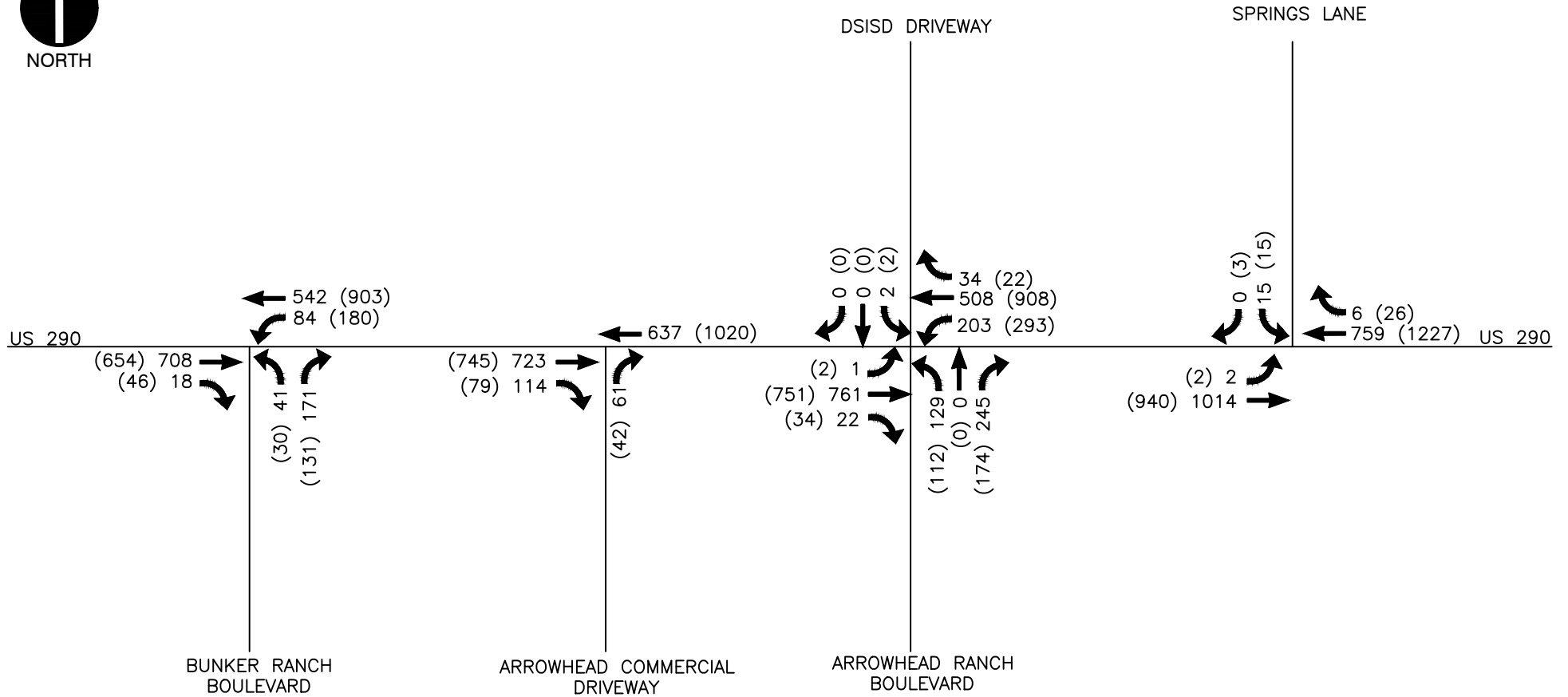
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
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DATE: MAY 2021 DWG SCALE: NOT TO SCALE PROJECT NO.: 304-065			



LEGEND


- 123 A.M. Peak Hour Traffic Volumes
- (123) P.M. Peak Hour Traffic Volumes

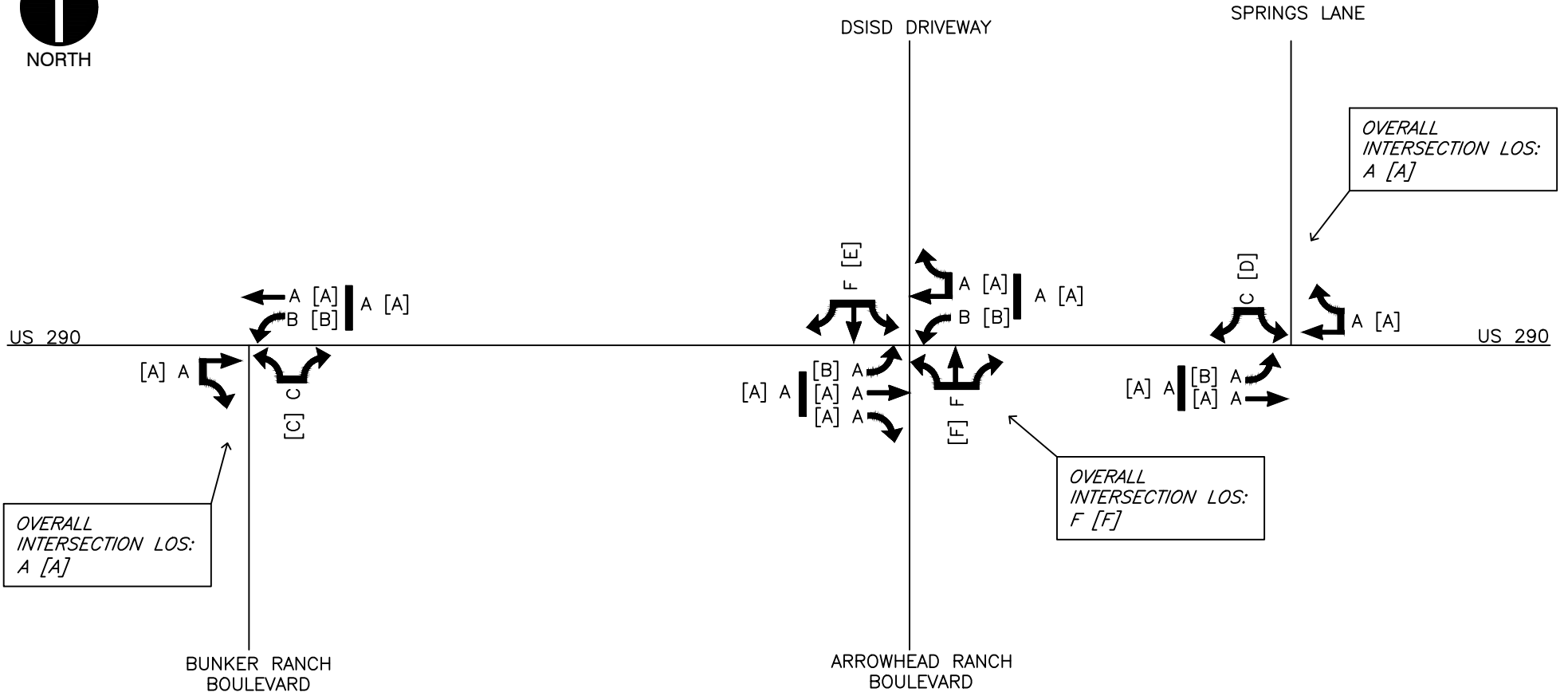
 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS	
ANTICIPATED PROPOSED BUNKER RANCH PRIMARY SITE GENERATED PEAK HOUR TRIPS			
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APPROVED BY:	JMD	PROJECT NO:	304-065
FIGURE NO.:			20



LEGEND


- 123 A.M. Peak Hour Traffic Volumes
- (123) P.M. Peak Hour Traffic Volumes

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FORECASTED 2025 BUILD (WITH DEVELOPMENT) PEAK HOUR TRAFFIC VOLUMES			
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APPROVED BY:	JMD	PROJECT NO.:	304-065
FIGURE NO.:			21



LEGEND

- A A.M. Peak Hour Levels of Service
- [B] P.M. Peak Hour Levels of Service

 Civil & Environmental Consultants, Inc. 333 Baldwin Road · Pittsburgh, PA 15205 412-429-2324 · 800-365-2324 www.cecinc.com		BUNKER RANCH SUBDIVISION EXPANSION TRAFFIC IMPACT ANALYSIS CITY OF DRIPPING SPRINGS HAYS COUNTY, TEXAS FORECASTED 2025 BUILD (WITH DEVELOPMENT) PEAK HOUR LEVELS OF SERVICE	
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APPROVED BY:	JMD	PROJECT NO.:	304-065
FIGURE NO.:			22

APPENDIX A
TRAFFIC IMPACT ANALYSIS SCOPE OF STUDY



TRAFFIC IMPACT ANALYSIS SCOPE AND STUDY AREA

Project Name:	Bunker Ranch	Date:	March 31, 2021
Location:	South of the intersection of US 290 and Bunker Ranch Boulevard		
Owner's Agent:	Civil & Environmental Consultants, Inc.	Phone:	512-439-0400

1. Background Information

The following information should be provided:

- Site Map or Site Plan.
- Location/Study area map specifying major roadways within the study area.
- Identify state and county roadways in the study area. Scope should be provided to all agencies impacted by the study.
- Identify adopted plans and public infrastructure improvement projects applicable to this site.

2. Intersection Level of Service

Calculations for AM and PM peak hours must be performed for the intersections listed below, showing existing traffic conditions and projected traffic conditions, identifying site, non-site, and total traffic:

- US 290 and Bunker Ranch Boulevard
- US 290 and Arrowhead Ranch Boulevard
- US 290 and Springs Lane
- All Site Driveways Accessing US 290

AM and PM peak-hour turning movement counts will be collected at the study intersections to determine existing background traffic and should be collected while school is in session. If

historical counts must be obtained due to the COVID-19 pandemic and reduced traffic, a growth rate approved by the city must be applied to reflect existing “2021” conditions. If counts are collected during the COVID-19 reduced traffic conditions, adjustments to the traffic counts should be made, and data to justify the adjustments should be provided with the submittal of the TIA.

The Intersection Capacity Analysis should include the following build-out phases/years:

- Phase 1 – Residential land use buildout year
- Phase 2 – Commercial land use buildout year

Intersection Capacity Analysis for each phase/year shall include:

- Level of Service by movements
- Delay by movements
- V/C by movements
- Queuing analysis with 95% queue length by movements, vs existing storage bay and/or distance from adjacent intersection(s)

3. Roadway Analysis

Document the projected daily volumes on Bunker Ranch Boulevard for each analysis phase/year.

4. Sight Distance Analysis

- When proposed mitigation recommends a new traffic signal be installed, an analysis of the stopping sight distance on approach to stopped queues (back of queue) should be included.
- New intersections or driveways must provide an analysis of the intersection sight distance. The intersection of US 290 and Bunker Ranch Boulevard is considered an existing driveway and does not require a sight distance analysis.

5. Transportation Improvements

The following adopted plans and public infrastructure improvement projects applicable to this site should be considered in the analysis.

- Dripping Springs Traffic Study 2020 (Dripping Springs)
- Dripping Springs Thoroughfare Plan (Dripping Springs)

Consider the following for transportation improvements related to the site:

- Improvements required to mitigate the impact of site traffic for intersections below Level of Service C, based on City of Dripping Springs Code Chapter 28, Exhibit A, Section 11.11.

6. Other Considerations

- Ensure automated traffic data captures demand. Manual observations or a multiple period analysis may be necessary.
- Capture and report data to calibrate model for existing operational analysis (i.e. queue length and approach/movement delay recommended)
- Methodology for capacity and level of service shall be Highway Capacity Manual, latest edition (i.e. Synchro, version 10).
- Discuss and illustrate model calibration (i.e. queue length and approach/movement delay recommended).

7. Study Assumptions

The following assumptions must be included in the analysis:

- Background traffic —the average annual growth rate shall be calculated using available sources and documented in the report. Identified growth rate for use in analysis which must be approved by the City prior to submittal
- Projects for background traffic calculations:
 - Arrowhead Ranch
The City will provide available land use information for the proposed development.
- Transit Trips/Walking/Biking Reductions – N/A
- Internal Capture Reductions – N/A
- Pass-By Trip Reductions – Appropriate pass-by trip reductions may be applied to commercial land uses based on the ITE Trip Generation Manual, 10th Edition.
- Trip distribution – To be determined based on existing and historical data. Analysis used to support distribution assumptions should be provided with the submittal of the TIA. Obtain approval by the City prior to submittal.

8. Submittal Requirements

- Submit an electronic version of the draft TIA report for agency review. Once all agency comments are resolved, submit two (2) printed copies of the final report, signed and sealed by a professional engineer licensed in the State of Texas for submittal to City of Dripping Springs. The final report should also be provided in electronic format. Submit an electronic version of the draft and final TIA report TxDOT through DropBox.
- The submittal should include the following: PDF of the TIA, Synchro Network for all conditions analyzed and background DXF or aerial format (Synchro files must be in real world coordinates), excel spreadsheets with, overall trip generation, internal and pass-by trip reduction rates if applicable, site trip distribution and assignment within roadway network and site driveways, A CAD file for the site plan, if available.
- Traffic signal modeling requirements:
 - All intersections must be modeled in one Synchro file (including unsignalized intersections).
 - Synchro signal timing sheets are to be included with the submittal.


- Present intersection LOS by movements, Delay by movements, v/c by movements, and 95% queue length by movements in a tabular format (preferably in 11"x17") for different scenarios noted.
- The following Maps should be included in the TIA report:
 - Site Map or Site Plan.
 - Location/Study area map specifying major roadways within the study area.
 - A map showing all bicycle routes, bus transit and bus stops within ½ mile of the site
 - A map showing all background projects and trip generation for each project,
 - A map showing all roadways and driveways analyzed (labeled and dimensioned)
 - An aerial map of all intersections with roadway improvements (dimensioned), including above ground utilities called out.

This scope and study are based upon discussions between Civil & Environmental Consultants, Inc., the City of Dripping Springs transportation consultant, and TxDOT. Any change in these assumptions may require a change in scope.

Approved by: 
Chad Gilpin, P.E., City Engineer, City of Dripping Springs

Reviewed by: 
Leslie D. Pollack, P.E., PTOE, HDR Engineering, Inc.

Approved by: 
Scott R. Cunningham, P.E., TxDOT Austin District

Agree to follow: 
Jeffrey M. DePaolis, P.E., PTOE, Civil & Environmental Consultants, Inc.

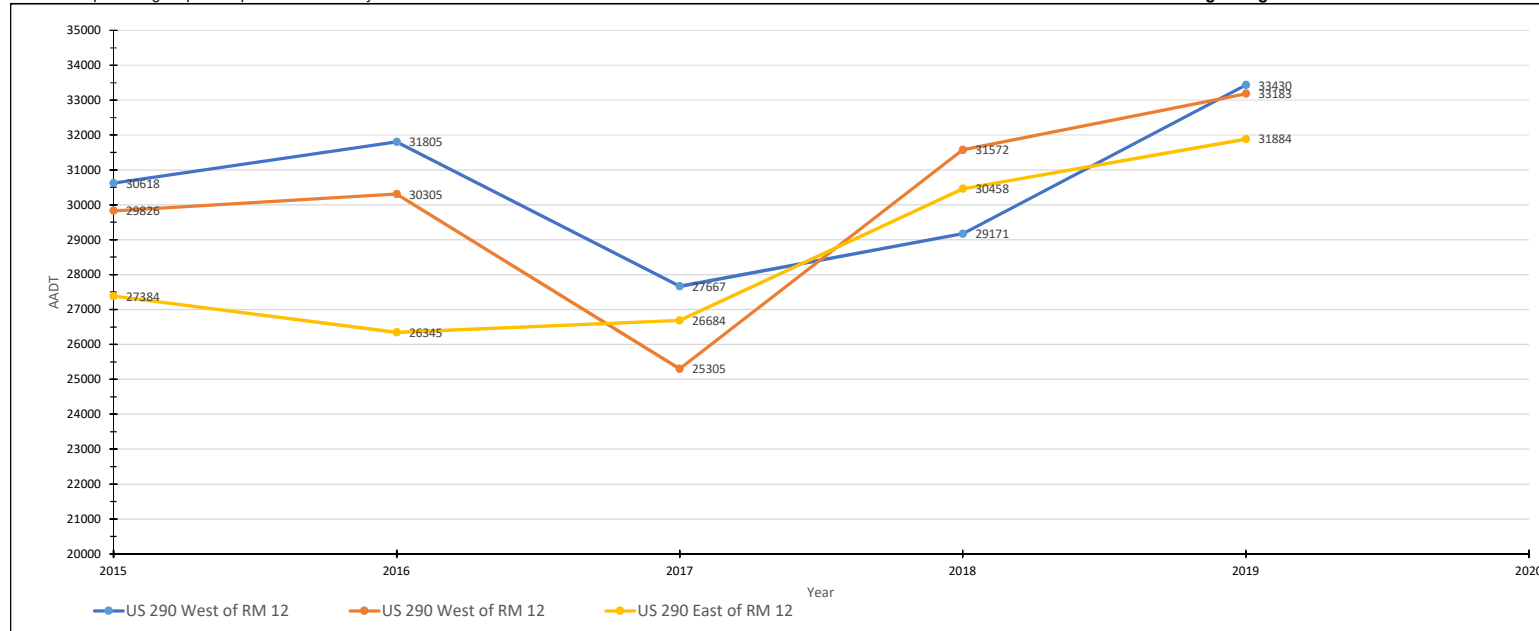
APPENDIX B
BACKGROUND TRAFFIC GROWTH RATE CALCULATIONS

**TABLE A1
BACKGROUND TRAFFIC GROWTH RATE CALCULATIONS**

Station ID #	Location	AADT Traffic Counts (1)											Statistics					
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Slope	Y-Intercept	Number of Data Points	R Squared	Growth Rate (2)	Weight
109.265	US 290 West of RM 12						30618	31805	27667	29171	33430	299.0000	-572544.8	5	0.045	0.90%	0.34	0.31%
109.273	US 290 West of RM 12						29826	30305	25305	31572	33183	798.1000	-1579729.5	5	0.183	2.40%	0.34	0.81%
109.321	US 290 East of RM 12						27384	26345	26684	30458	31884	1311.3	-2616341.1	5	0.703	4.10%	0.32	1.33%
Total											98,497					1.00	2.44%	

- (1) Traffic count data obtained from the TXDOT Traffic Count Database System (TCDS)
- (2) Growth rate percentage equals slope of line divided by most recent count.

Average Weighted Growth Rate 2.44%



Droznek, Chris

From: Pollack, Leslie <Leslie.Pollack@hdrinc.com>
Sent: Friday, April 30, 2021 4:06 PM
To: Droznek, Chris
Subject: RE: Bunker Ranch TIA

Hi Chris, I am good with the growth rate as proposed. Thank you!

Leslie D. Pollack, P.E., PTOE
D 512.904.3728 M 512.560.1619

hdrinc.com/follow-us

From: Droznek, Chris <cdroznek@cecinc.com>
Sent: Friday, April 30, 2021 7:23 AM
To: Pollack, Leslie <Leslie.Pollack@hdrinc.com>
Subject: RE: Bunker Ranch TIA

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Leslie,

Thank you. I'm also attaching a copy of the calculated growth rate for the study area. Since our project is located on US 290, I collected AADT data along US 290. From the TXDOT Traffic Count Database System (TCDS) I was able to locate 3 count locations along US 290 and within Dripping Springs. I utilized the most recent 5 years of AADT data available for the calculations. From this data I calculated a linear growth rate of 2.44% per year using a weighted average of the three locations.

I understand that you want to verify this information prior to submission of the TIA. Please review the attached calculated growth rate and provide me with any comments or suggestions as to what background traffic growth rate you would like to utilize for the study area.

Thank you,

Chris

Chris A. Droznek II, P.E. | *Project Manager*
Civil & Environmental Consultants, Inc.
333 Baldwin Road, Pittsburgh, PA 15205
direct 412.249.3177 **office** 412.429.2324 **mobile** 412.804.8807
www.cecinc.com

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APPENDIX C
TURNING MOVEMENT COUNT SUMMARIES

GRAM Traffic Counting, Inc.

3751 FM 1105, Bldg. A
Georgetown, TX 78626
512-832-8650

File Name : Site 1 - US 290 & Bunker Ranch Blvd - AM
Site Code : 1
Start Date : 4/20/2021
Page No : 1

Groups Printed- Vehicles - Heavy vehicles

Start Time	Southbound					US 290 Westbound					Bunker Ranch Blvd Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	
07:00	0	0	0	0	0	4	82	0	0	86	0	0	2	0	2	0	148	0	0	148	236
07:15	0	0	0	0	0	4	100	0	0	104	0	0	4	0	4	0	161	0	0	161	269
07:30	0	0	0	0	0	8	131	0	1	140	0	0	5	0	5	0	178	1	0	179	324
07:45	0	0	0	0	0	11	118	0	0	129	1	0	3	0	4	0	157	0	0	157	290
Total	0	0	0	0	0	27	431	0	1	459	1	0	14	0	15	0	644	1	0	645	1119
08:00	0	0	0	0	0	12	137	0	0	149	0	0	5	0	5	0	137	1	0	138	292
08:15	0	0	0	0	0	5	109	0	0	114	0	0	3	0	3	0	141	0	0	141	258
08:30	0	0	0	0	0	7	108	0	0	115	3	0	1	0	4	0	180	2	0	182	301
08:45	0	0	0	0	0	11	151	0	0	162	0	0	10	1	11	0	168	2	0	170	343
Total	0	0	0	0	0	35	505	0	0	540	3	0	19	1	23	0	626	5	0	631	1194
Grand Total	0	0	0	0	0	62	936	0	1	999	4	0	33	1	38	0	1270	6	0	1276	2313
Apprch %	0	0	0	0	0	6.2	93.7	0	0.1	99.9	10.5	0	86.8	2.6	99.9	0	99.5	0.5	0	100.0	
Total %	0	0	0	0	0	2.7	40.5	0	0	43.2	0.2	0	1.4	0	1.6	0	54.9	0.3	0	55.2	
Vehicles	0	0	0	0	0	60	825	0	1	886	3	0	32	1	36	0	1168				
% Vehicles	0	0	0	0	0	96.8	88.1	0	100	88.7	75	0	97	100	94.7	0	92	83.3	0	91.9	90.6
Heavy vehicles																					
% Heavy vehicles	0	0	0	0	0	3.2	11.9	0	0	11.3	25	0	3	0	5.3	0	8	16.7	0	8.1	9.4

Start Time	Southbound					US 290 Westbound					Bunker Ranch Blvd Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00																					
08:00	0	0	0	0	0	12	137	0	0	149	0	0	5	0	5	0	137	1	0	138	292
08:15	0	0	0	0	0	5	109	0	0	114	0	0	3	0	3	0	141	0	0	141	258
08:30	0	0	0	0	0	7	108	0	0	115	3	0	1	0	4	0	180	2	0	182	301
08:45	0	0	0	0	0	11	151	0	0	162	0	0	10	1	11	0	168	2	0	170	343
Total Volume	0	0	0	0	0	35	505	0	0	540	3	0	19	1	23	0	626	5	0	631	1194
% App. Total	0	0	0	0	0	6.5	93.5	0	0	99.9	13	0	82.6	4.3	99.9	0	99.2	0.8	0	100.0	
PHF	.000	.000	.000	.000	.000	.729	.836	.000	.000	.833	.250	.000	.475	.250	.523	.000	.869	.625	.000	.867	.870
Vehicles	0	0	0	0	0	34	433	0	0	467	3	0	18	1	22	0	569	4	0	573	1062
% Vehicles						97.1	85.7	0	0	86.5	100	0	94.7	100	95.7	0	90.9	80.0	0	90.8	88.9
Heavy vehicles																					
% Heavy vehicles	0	0	0	0	0	2.9	14.3	0	0	13.5	0	0	5.3	0	4.3	0	9.1	20.0	0	9.2	11.1

GRAM Traffic Counting, Inc.

3751 FM 1105, Bldg. A
Georgetown, TX 78626
512-832-8650

File Name : Site 1 - US 290 & Bunker Ranch Blvd - PM
Site Code : 1
Start Date : 4/20/2021
Page No : 1

Groups Printed- Vehicles - Heavy vehicles

Start Time	Southbound					US 290 Westbound					Bunker Ranch Blvd Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	
16:00	0	0	0	0	0	6	151	0	0	157	2	0	10	0	12	0	172	1	0	173	342
16:15	0	0	0	0	0	8	188	0	0	196	0	0	10	0	10	0	155	0	0	155	361
16:30	0	0	0	0	0	5	295	0	0	300	0	0	7	0	7	0	141	1	0	142	449
16:45	0	0	0	0	0	5	196	0	0	201	2	0	5	0	7	0	156	1	0	157	365
Total	0	0	0	0	0	24	830	0	0	854	4	0	32	0	36	0	624	3	0	627	1517
17:00	0	0	0	0	0	2	186	0	0	188	2	0	10	0	12	0	157	1	0	158	358
17:15	0	0	0	0	0	0	199	0	0	199	1	0	10	0	11	0	162	0	0	162	372
17:30	0	0	0	0	0	6	178	0	0	184	2	0	8	0	10	0	162	1	0	163	357
17:45	0	0	0	0	0	2	164	0	0	166	0	0	10	0	10	0	142	1	0	143	319
Total	0	0	0	0	0	10	727	0	0	737	5	0	38	0	43	0	623	3	0	626	1406
Grand Total	0	0	0	0	0	34	1557	0	0	1591	9	0	70	0	79	0	1247	6	0	1253	2923
Apprch %	0	0	0	0	0	2.1	97.9	0	0		11.4	0	88.6	0		0	99.5	0.5	0		
Total %	0	0	0	0	0	1.2	53.3	0	0	54.4	0.3	0	2.4	0	2.7	0	42.7	0.2	0	42.9	
Vehicles	0	0	0	0	0	32	1508				100	0	95.7	0	96.2	0	1186				96.1
% Vehicles	0	0	0	0	0	94.1	96.9	0	0	96.8	100	0	95.7	0	96.2	0	95.1	100	0	95.1	96.1
Heavy vehicles																					
% Heavy vehicles	0	0	0	0	0	5.9	3.1	0	0	3.2	0	0	4.3	0	3.8	0	4.9	0	0	4.9	3.9

Start Time	Southbound					US 290 Westbound					Bunker Ranch Blvd Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	0	0	0	0	0	5	295	0	0	300	0	0	7	0	7	0	141	1	0	142	449
16:45	0	0	0	0	0	5	196	0	0	201	2	0	5	0	7	0	156	1	0	157	365
17:00	0	0	0	0	0	2	186	0	0	188	2	0	10	0	12	0	157	1	0	158	358
17:15	0	0	0	0	0	0	199	0	0	199	1	0	10	0	11	0	162	0	0	162	372
Total Volume	0	0	0	0	0	12	876	0	0	888	5	0	32	0	37	0	616	3	0	619	1544
% App. Total	0	0	0	0	0	1.4	98.6	0	0		13.5	0	86.5	0		0	99.5	0.5	0		
PHF	.000	.000	.000	.000	.000	.600	.742	.000	.000	.740	.625	.000	.800	.000	.771	.000	.951	.750	.000	.955	.860
Vehicles	0	0	0	0	0	12	860	0	0	872	5	0	31	0	36	0	583	3	0	586	1494
% Vehicles						98.2		0	0	98.2	100	0	96.9	0	97.3	0	94.6	100	0	94.7	96.8
Heavy vehicles																					
% Heavy vehicles	0	0	0	0	0	0	1.8	0	0	1.8	0	0	3.1	0	2.7	0	5.4	0	0	5.3	3.2

GRAM Traffic Counting, Inc.

3751 FM 1105, Bldg. A
Georgetown, TX 78626
512-832-8650

File Name : Site 2 - US 290 & Arrowhead Ranch Blvd - AM
Site Code : 2
Start Date : 4/20/2021
Page No : 1

Groups Printed- Vehicles - Heavy Vehicles

Start Time	Bus Barn Driveway Southbound					US 290 Westbound					Arrowhead Ranch Blvd Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	
07:00	0	0	0	0	0	4	97	0	0	101	1	0	22	0	23	0	156	0	0	156	280
07:15	3	0	0	0	3	9	106	0	0	115	1	0	20	0	21	0	160	2	0	162	301
07:30	1	0	1	0	2	12	138	3	1	154	2	0	21	0	23	0	176	0	0	176	355
07:45	1	0	0	0	1	11	143	4	0	158	2	0	10	0	12	0	168	0	0	168	339
Total	5	0	1	0	6	36	484	7	1	528	6	0	73	0	79	0	660	2	0	662	1275
08:00	0	0	0	0	0	6	144	0	0	150	2	0	15	0	17	0	142	2	0	144	311
08:15	1	0	0	0	1	11	119	2	0	132	3	0	16	0	19	0	155	3	0	158	310
08:30	0	0	0	0	0	8	126	6	0	140	2	0	13	0	15	1	173	4	0	178	333
08:45	1	0	0	0	1	12	154	26	0	192	1	0	17	0	18	0	179	5	0	184	395
Total	2	0	0	0	2	37	543	34	0	614	8	0	61	0	69	1	649	14	0	664	1349
Grand Total	7	0	1	0	8	73	1027	41	1	1142	14	0	134	0	148	1	1309	16	0	1326	2624
Apprch %	87.5	0	12.5	0		6.4	89.9	3.6	0.1		9.5	0	90.5	0		0.1	98.7	1.2	0		
Total %	0.3	0	0	0	0.3	2.8	39.1	1.6	0	43.5	0.5	0	5.1	0	5.6	0	49.9	0.6	0	50.5	
Vehicles	4	0	0	0	4	69	919	7	1	996	7	0	130	0	137	1	1223				
% Vehicles	57.1	0	0	0	50	94.5	89.5	17.1	100	87.2	50	0	97	0	92.6	100	93.4	12.5	0	92.5	90.1
Heavy Vehicles																					
% Heavy Vehicles	42.9	0	100	0	50	5.5	10.5	82.9	0	12.8	50	0	3	0	7.4	0	6.6	87.5	0	7.5	9.9

Start Time	Bus Barn Driveway Southbound					US 290 Westbound					Arrowhead Ranch Blvd Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Thru	Right	U-TURN	App. Total	Thru	Right	U-TURN	App. Total	Thru	Right	U-TURN	App. Total				
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00																					
08:00	0	0	0	0	0	6	144	0	0	150	2	0	15	0	17	0	142	2	0	144	311
08:15	1	0	0	0	1	11	119	2	0	132	3	0	16	0	19	0	155	3	0	158	310
08:30	0	0	0	0	0	8	126	6	0	140	2	0	13	0	15	1	173	4	0	178	333
08:45	1	0	0	0	1	12	154	26	0	192	1	0	17	0	18	0	179	5	0	184	395
Total Volume	2	0	0	0	2	37	543	34	0	614	8	0	61	0	69	1	649	14	0	664	1349
% App. Total	100	0	0	0		6	88.4	5.5	0		11.6	0	88.4	0		0.2	97.7	2.1	0		
PHF	.500	.000	.000	.000	.500	.771	.881	.327	.000	.799	.667	.000	.897	.000	.908	.250	.906	.700	.000	.902	.854
Vehicles	2	0	0	0	2	36	476	3	0	515	1	0	59	0	60	1	601	2	0	604	1181
% Vehicles						97.3	87.7	8.8	0	83.9	12.5	0	96.7	0	87.0	100	92.6	14.3	0	91.0	87.5
Heavy Vehicles																					
% Heavy Vehicles	0	0	0	0	0	2.7	12.3	91.2	0	16.1	87.5	0	3.3	0	13.0	0	7.4	85.7	0	9.0	12.5

GRAM Traffic Counting, Inc.

3751 FM 1105, Bldg. A
Georgetown, TX 78626
512-832-8650

File Name : Site 2 - US 290 & Arrowhead Ranch Blvd - PM
Site Code : 2
Start Date : 4/20/2021
Page No : 1

Groups Printed- Vehicles - Heavy Vehicles

Start Time	Bus Barn Driveway Southbound					US 290 Westbound					Arrowhead Ranch Blvd Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	
16:00	2	0	0	0	2	7	161	0	0	168	2	0	8	0	10	0	183	2	0	185	365
16:15	1	0	0	0	1	14	205	2	0	221	0	0	16	0	16	0	161	1	0	162	400
16:30	0	0	0	0	0	18	236	2	0	256	0	0	11	0	11	1	152	2	0	155	422
16:45	1	0	0	0	1	13	189	1	0	203	0	0	12	0	12	0	166	4	0	170	386
Total	4	0	0	0	4	52	791	5	0	848	2	0	47	0	49	1	662	9	0	672	1573
17:00	0	0	0	0	0	9	198	5	0	212	3	0	11	0	14	1	182	0	0	183	409
17:15	1	0	0	0	1	19	197	14	0	230	2	0	6	0	8	0	177	2	0	179	418
17:30	3	0	2	0	5	15	175	10	0	200	0	0	8	0	8	2	182	0	0	184	397
17:45	6	0	0	0	6	12	157	6	0	175	0	0	11	0	11	0	158	4	0	162	354
Total	10	0	2	0	12	55	727	35	0	817	5	0	36	0	41	3	699	6	0	708	1578
Grand Total	14	0	2	0	16	107	1518	40	0	1665	7	0	83	0	90	4	1361	15	0	1380	3151
Apprch %	87.5	0	12.5	0		6.4	91.2	2.4	0		7.8	0	92.2	0		0.3	98.6	1.1	0		
Total %	0.4	0	0.1	0	0.5	3.4	48.2	1.3	0	52.8	0.2	0	2.6	0	2.9	0.1	43.2	0.5	0	43.8	
Vehicles	13	0	2	0	15	105	1464										1302				
% Vehicles	92.9	0	100	0	93.8	98.1	96.4	7.5	0	94.4	85.7	0	97.6	0	96.7	75	95.7	93.3	0	95.6	95
Heavy Vehicles																					
% Heavy Vehicles	7.1	0	0	0	6.2	1.9	3.6	92.5	0	5.6	14.3	0	2.4	0	3.3	25	4.3	6.7	0	4.4	5

Start Time	Bus Barn Driveway Southbound					US 290 Westbound					Arrowhead Ranch Blvd Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Thru	Right	U-TURN	App. Total	Thru	Right	U-TURN	App. Total	Thru	Right	U-TURN	App. Total				
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	0	0	0	0	0	18	236	2	0	256	0	0	11	0	11	1	152	2	0	155	422
16:45	1	0	0	0	1	13	189	1	0	203	0	0	12	0	12	0	166	4	0	170	386
17:00	0	0	0	0	0	9	198	5	0	212	3	0	11	0	14	1	182	0	0	183	409
17:15	1	0	0	0	1	19	197	14	0	230	2	0	6	0	8	0	177	2	0	179	418
Total Volume	2	0	0	0	2	59	820	22	0	901	5	0	40	0	45	2	677	8	0	687	1635
% App. Total	100	0	0	0		6.5	91	2.4	0		11.1	0	88.9	0		0.3	98.5	1.2	0		
PHF	.500	.000	.000	.000	.500	.776	.869	.393	.000	.880	.417	.000	.833	.000	.804	.500	.930	.500	.000	.939	.969
Vehicles	2	0	0	0	2	58	796	1	0	855	5	0	38	0	43	1	647	7	0	655	1555
% Vehicles						98.3	97.1	4.5	0	94.9	100	0	95.0	0	95.6	50.0	95.6	87.5	0	95.3	95.1
Heavy Vehicles																					
% Heavy Vehicles	0	0	0	0	0	1.7	2.9	95.5	0	5.1	0	0	5.0	0	4.4	50.0	4.4	12.5	0	4.7	4.9

GRAM Traffic Counting, Inc.

3751 FM 1105, Bldg. A
Georgetown, TX 78626
512-832-8650

File Name : Site 3 - US 290 & Springs Ln - AM
Site Code : 3
Start Date : 4/20/2021
Page No : 1

Groups Printed- Vehicles - Heavy Vehicles

Start Time	Springs Ln Southbound					US 290 Westbound					Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	
07:00	9	0	1	0	10	0	97	2	0	99	0	0	0	0	0	1	181	0	0	182	291
07:15	7	0	2	0	9	0	122	2	0	124	0	0	0	0	0	1	191	0	0	192	325
07:30	6	0	1	0	7	0	146	6	0	152	0	0	0	0	0	0	208	0	0	208	367
07:45	9	0	1	0	10	0	158	4	0	162	0	0	0	0	0	0	177	0	0	177	349
Total	31	0	5	0	36	0	523	14	0	537	0	0	0	0	0	2	757	0	0	759	1332
08:00	5	0	0	0	5	0	158	1	0	159	0	0	0	0	0	0	159	0	0	159	323
08:15	5	0	0	0	5	0	135	0	0	135	0	0	0	0	0	1	173	0	0	174	314
08:30	2	0	0	0	2	0	138	3	0	141	0	0	0	0	0	0	187	0	1	188	331
08:45	3	0	0	0	3	0	197	2	0	199	0	0	0	0	0	1	199	0	0	200	402
Total	15	0	0	0	15	0	628	6	0	634	0	0	0	0	0	2	718	0	1	721	1370
Grand Total	46	0	5	0	51	0	1151	20	0	1171	0	0	0	0	0	4	1475	0	1	1480	2702
Apprch %	90.2	0	9.8	0		0	98.3	1.7	0		0	0	0	0		0.3	99.7	0	0.1		
Total %	1.7	0	0.2	0	1.9	0	42.6	0.7	0	43.3	0	0	0	0	0	0.1	54.6	0	0	54.8	
Vehicles	44	0	4	0	48	0	1004									1372					
% Vehicles	95.7	0	80	0	94.1	0	87.2	90	0	87.3	0	0	0	0	0	75	93	0	100	93	90.5
Heavy Vehicles																					
% Heavy Vehicles	4.3	0	20	0	5.9	0	12.8	10	0	12.7	0	0	0	0	0	25	7	0	0	7	9.5

Start Time	Springs Ln Southbound					US 290 Westbound					Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Thru	Right	U-TURN	App. Total	Thru	Right	U-TURN	App. Total	Thru	Right	U-TURN	App. Total				
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00																					
08:00	5	0	0	0	5	0	158	1	0	159	0	0	0	0	0	0	159	0	0	159	323
08:15	5	0	0	0	5	0	135	0	0	135	0	0	0	0	0	1	173	0	0	174	314
08:30	2	0	0	0	2	0	138	3	0	141	0	0	0	0	0	0	187	0	1	188	331
08:45	3	0	0	0	3	0	197	2	0	199	0	0	0	0	0	1	199	0	0	200	402
Total Volume	15	0	0	0	15	0	628	6	0	634	0	0	0	0	0	2	718	0	1	721	1370
% App. Total	100	0	0	0		0	99.1	0.9	0		0	0	0	0		0.3	99.6	0	0.1		
PHF	.750	.000	.000	.000	.750	.000	.797	.500	.000	.796	.000	.000	.000	.000	.000	.500	.902	.000	.250	.901	.852
Vehicles	15	0	0	0	15	0	525	6	0	531	0	0	0	0	0	2	667	0	1	670	1216
% Vehicles							83.6	100	0	83.8	0	0	0	0	0	100	92.9	0	100	92.9	88.8
Heavy Vehicles																					
% Heavy Vehicles	0	0	0	0	0	0	16.4	0	0	16.2	0	0	0	0	0	0	7.1	0	0	7.1	11.2

GRAM Traffic Counting, Inc.

3751 FM 1105, Bldg. A
Georgetown, TX 78626
512-832-8650

File Name : Site 3 - US 290 & Springs Ln - PM
Site Code : 3
Start Date : 4/20/2021
Page No : 1

Groups Printed- Vehicles - Heavy Vehicles

Start Time	Springs Ln Southbound					US 290 Westbound					Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	
16:00	3	0	0	0	3	0	185	4	0	189	0	0	0	0	0	0	203	0	0	203	395
16:15	4	0	1	0	5	0	226	6	0	232	0	0	0	0	0	0	182	0	0	182	419
16:30	4	0	0	0	4	0	260	6	0	266	0	0	0	0	0	1	162	0	0	163	433
16:45	2	0	2	0	4	0	192	7	0	199	0	0	0	0	0	1	187	0	0	188	391
Total	13	0	3	0	16	0	863	23	0	886	0	0	0	0	0	2	734	0	0	736	1638
17:00	7	0	1	0	8	0	211	6	0	217	0	0	0	0	0	0	190	0	0	190	415
17:15	2	0	0	0	2	0	242	7	0	249	0	0	0	0	0	0	193	0	0	193	444
17:30	3	0	0	0	3	0	193	4	0	197	0	0	0	0	0	1	195	0	0	196	396
17:45	3	0	0	0	3	0	189	4	0	193	0	0	0	0	0	0	169	0	0	169	365
Total	15	0	1	0	16	0	835	21	0	856	0	0	0	0	0	1	747	0	0	748	1620
Grand Total	28	0	4	0	32	0	1698	44	0	1742	0	0	0	0	0	3	1481	0	0	1484	3258
Apprch %	87.5	0	12.5	0		0	97.5	2.5	0		0	0	0	0	0	0.2	99.8	0	0		
Total %	0.9	0	0.1	0	1	0	52.1	1.4	0	53.5	0	0	0	0	0	0.1	45.5	0	0	45.5	
Vehicles	28	0	3	0	31	0	1613									1419					
% Vehicles	100	0	75	0	96.9	0	95	97.7	0	95.1	0	0	0	0	0	100	95.8	0	0	95.8	95.4
Heavy Vehicles																					
% Heavy Vehicles	0	0	25	0	3.1	0	5	2.3	0	4.9	0	0	0	0	0	0	4.2	0	0	4.2	4.6

Start Time	Springs Ln Southbound					US 290 Westbound					Northbound					US 290 Eastbound					Int. Total
	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	Left	Thru	Right	U-TURN	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	4	0	0	0	4	0	260	6	0	266	0	0	0	0	0	1	162	0	0	163	433
16:45	2	0	2	0	4	0	192	7	0	199	0	0	0	0	0	1	187	0	0	188	391
17:00	7	0	1	0	8	0	211	6	0	217	0	0	0	0	0	0	190	0	0	190	415
17:15	2	0	0	0	2	0	242	7	0	249	0	0	0	0	0	0	193	0	0	193	444
Total Volume	15	0	3	0	18	0	905	26	0	931	0	0	0	0	0	2	732	0	0	734	1683
% App. Total	83.3	0	16.7	0		0	97.2	2.8	0		0	0	0	0	0	0.3	99.7	0	0		
PHF	.536	.000	.375	.000	.563	.000	.870	.929	.000	.875	.000	.000	.000	.000	.000	.500	.948	.000	.000	.951	.948
Vehicles	15	0	2	0	17	0	864	25	0	889	0	0	0	0	0	2	700	0	0	702	1608
% Vehicles			66.7	0	94.4	0	95.5	96.2	0	95.5	0	0	0	0	0	100	95.6	0	0	95.6	95.5
Heavy Vehicles																					
% Heavy Vehicles	0	0	33.3	0	5.6	0	4.5	3.8	0	4.5	0	0	0	0	0	0	4.4	0	0	4.4	4.5

GRAM Traffic Counting, Inc.

3751 FM 1105, Bldg. A
Georgetown, TX 78626
512-832-8650

Site Code: 1
Station ID:
US 290
East of CR 239
Latitude: 0' 0.0000 Undefined

Start Time	20-Apr-21 Tue	Westbound		Hour Totals		Eastbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		9	167			7	192				
12:15		11	164			4	179				
12:30		6	219			5	148				
12:45		4	183	30	733	4	140	20	659	50	1392
01:00		4	182			1	159				
01:15		3	216			2	153				
01:30		4	202			8	154				
01:45		3	177	14	777	4	162	15	628	29	1405
02:00		2	216			2	139				
02:15		1	201			3	189				
02:30		5	190			4	216				
02:45		4	164	12	771	3	176	12	720	24	1491
03:00		6	215			3	201				
03:15		3	234			4	184				
03:30		3	209			5	168				
03:45		3	173	15	831	6	184	18	737	33	1568
04:00		4	197			8	189				
04:15		5	225			7	221				
04:30		9	261			24	182				
04:45		16	211	34	894	21	188	60	780	94	1674
05:00		12	212			28	200				
05:15		26	241			33	190				
05:30		51	210			56	197				
05:45		70	180	159	843	59	173	176	760	335	1603
06:00		66	210			89	155				
06:15		71	169			99	157				
06:30		66	167			132	164				
06:45		86	135	289	681	141	134	461	610	750	1291
07:00		101	104			173	108				
07:15		122	118			195	100				
07:30		165	131			218	117				
07:45		170	96	558	449	177	88	763	413	1321	862
08:00		159	107			167	92				
08:15		138	71			163	70				
08:30		163	66			173	65				
08:45		190	81	650	325	187	62	690	289	1340	614
09:00		193	77			175	52				
09:15		133	61			172	52				
09:30		159	45			166	38				
09:45		161	43	646	226	171	41	684	183	1330	409
10:00		162	40			175	25				
10:15		178	30			175	24				
10:30		168	23			153	21				
10:45		158	36	666	129	150	16	653	86	1319	215
11:00		159	28			171	19				
11:15		153	14			164	11				
11:30		176	13			209	17				
11:45		139	12	627	67	182	6	726	53	1353	120
Total		3700	6726			4278	5918			7978	12644
Percent		35.5%	64.5%			42.0%	58.0%			38.7%	61.3%

GRAM Traffic Counting, Inc.

3751 FM 1105, Bldg. A
Georgetown, TX 78626
512-832-8650

Site Code: 1
Station ID:
US 290
East of CR 239
Latitude: 0' 0.0000 Undefined

Start Time	21-Apr-21 Wed	Westbound		Hour Totals		Eastbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		12	159			3	173				
12:15		9	197			7	157				
12:30		4	189			3	152				
12:45		8	181	33	726	1	151	14	633	47	1359
01:00		3	153			0	152				
01:15		4	208			2	158				
01:30		6	188			9	170				
01:45		2	158	15	707	2	146	13	626	28	1333
02:00		2	176			4	151				
02:15		3	180			3	186				
02:30		3	177			5	222				
02:45		4	182	12	715	3	176	15	735	27	1450
03:00		4	152			1	174				
03:15		6	207			2	160				
03:30		5	184			5	168				
03:45		2	200	17	743	8	192	16	694	33	1437
04:00		10	194			8	219				
04:15		5	232			9	200				
04:30		8	225			21	176				
04:45		13	220	36	871	15	168	53	763	89	1634
05:00		12	243			23	172				
05:15		23	227			45	194				
05:30		47	219			39	194				
05:45		61	266	143	955	65	180	172	740	315	1695
06:00		66	201			64	184				
06:15		68	178			117	163				
06:30		80	193			112	166				
06:45		96	168	310	740	151	136	444	649	754	1389
07:00		81	130			187	115				
07:15		139	118			194	123				
07:30		155	124			188	95				
07:45		183	128	558	500	188	89	757	422	1315	922
08:00		149	102			187	91				
08:15		144	93			170	105				
08:30		149	82			172	91				
08:45		175	88	617	365	196	89	725	376	1342	741
09:00		171	80			177	59				
09:15		175	67			164	51				
09:30		166	60			167	36				
09:45		154	44	666	251	170	38	678	184	1344	435
10:00		148	38			173	58				
10:15		163	33			164	30				
10:30		161	25			177	28				
10:45		188	23	660	119	177	28	691	144	1351	263
11:00		168	17			162	32				
11:15		156	23			174	14				
11:30		184	8			182	13				
11:45		184	17	692	65	169	5	687	64	1379	129
Total		3759	6757			4265	6030			8024	12787
Percent		35.7%	64.3%			41.4%	58.6%			38.6%	61.4%
Grand Total		7459	13483			8543	11948			16002	25431
Percent		35.6%	64.4%			41.7%	58.3%			38.6%	61.4%

ADT ADT 20,716 AADT 20,716

APPENDIX D
COVID-19 TRAFFIC VOLUME FACTOR EVALUATION

Volume Comparison for COVID-19 Factor Determination

Data Source	ADT Traffic Volumes		
	Eastbound	Westbound	Total
Tuesday, January 30, 2018	7,570	7,389	14,959
Grown to 2021 (2.44% per year linear)	8,124	7,930	16,054
Tuesday, April 20, 2021	10,196	10,426	20,622
Wednesday, April 21, 2021	10,295	10,516	20,811
Average	10,246	10,471	20,717
Difference	2,122	2,541	4,663

Linear Growth Rate	2.44%
2018	2021
	1.0732

Based on data, no factor to adjust 2021 traffic volumes to account for COVID conditions will be applied.

2018 traffic count data provided by the City of Dripping Springs

GRAM Traffic Counting Inc.

3751 FM 1105 Bldg A
Georgetown, TX 78626
512-832-8650

Site Code: 2
Station ID:
Hwy 290
West of Bell Springs Rd
Latitude: 0' 0.0000 Undefined

Start Time	30-Jan-18 Tue	Eastbound		Hour Totals		Westbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		4	131			18	124				
12:15		3	110			5	132				
12:30		6	133			6	120				
12:45		4	122	17	496	3	122	32	498	49	994
01:00		1	145			1	125				
01:15		2	135			4	113				
01:30		4	115			2	124				
01:45		2	117	9	512	1	116	8	478	17	990
02:00		3	113			3	121				
02:15		2	152			2	125				
02:30		1	170			1	115				
02:45		3	142	9	577	2	148	8	509	17	1086
03:00		4	136			5	161				
03:15		1	107			2	146				
03:30		12	100			0	173				
03:45		7	105	24	448	3	130	10	610	34	1058
04:00		6	107			3	150				
04:15		3	121			5	160				
04:30		10	97			6	171				
04:45		19	101	38	426	8	156	22	637	60	1063
05:00		23	123			9	195				
05:15		35	129			20	170				
05:30		55	164			34	142				
05:45		67	130	180	546	52	166	115	673	295	1219
06:00		91	125			36	159				
06:15		108	109			60	151				
06:30		134	106			51	145				
06:45		123	83	456	423	64	101	211	556	667	979
07:00		118	69			65	115				
07:15		166	70			84	60				
07:30		168	63			89	95				
07:45		153	55	605	257	106	85	344	355	949	612
08:00		152	32			90	66				
08:15		144	43			92	63				
08:30		164	36			95	78				
08:45		166	26	626	137	122	55	399	262	1025	399
09:00		147	17			104	69				
09:15		150	30			109	49				
09:30		127	36			126	36				
09:45		147	24	571	107	123	30	462	184	1033	291
10:00		141	23			89	24				
10:15		117	15			93	34				
10:30		116	20			122	32				
10:45		134	12	508	70	108	23	412	113	920	183
11:00		133	16			97	16				
11:15		134	5			120	15				
11:30		114	6			118	10				
11:45		116	4	497	31	109	6	444	47	941	78
Total		3540	4030			2467	4922			6007	8952
Percent		46.8%	53.2%			33.4%	66.6%			40.2%	59.8%
Grand Total		3540	4030			2467	4922			6007	8952
Percent		46.8%	53.2%			33.4%	66.6%			40.2%	59.8%
ADT		ADT 3,815		AADT 3,815							

APPENDIX E
INTERSECTION APPROACH PHOTOGRAPHS

Intersection: US 290 with Bunker Ranch Boulevard

Eastbound US 290 Approach



Westbound US 290 Approach



Intersection: US 290 with Bunker Ranch Boulevard

Northbound Bunker Ranch Boulevard



Intersection: US 290 with Arrowhead Ranch Boulevard/DSISD Driveway

Eastbound US 290 Approach



Westbound US 290 Approach



Intersection: US 290 with Arrowhead Ranch Boulevard/DSISD Driveway

Northbound Arrowhead Ranch Boulevard Approach



Looking at Southbound DSISD Driveway



Intersection: US 290 with Springs Lane Road

Eastbound US 290 Approach



Westbound US 290 Approach



Intersection: US 290 with Springs Lane Road

Southbound Springs Lane Approach



APPENDIX F
LEVEL OF SERVICE DEFINITIONS

LEVELS OF SERVICE

Intersection levels of service (LOS) were determined through implementation of the methodology presented in the *Highway Capacity Manual 6th Edition*, published by the Transportation Research Board.

i. Signalized Intersections

An explanation of level of service at signalized intersections is as follows:

This subsection describes the LOS criteria for the motorized vehicle mode. The criteria for the motorized vehicle mode are different from those for other modes. Specifically, the motorized vehicle mode criteria are based on performance measures that are field measurable and perceivable by travelers. The criteria for other modes are based on scores reported by travelers indicating their perception of service quality.

LOS can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay alone is used to characterize LOS for the entire intersection of an approach. Control delay and volume-to-capacity ratio are used to characterize LOS for a lane group. Delay quantifies the increase in travel time due to traffic signal control. It is also a surrogate measure of driver discomfort and fuel consumption. The volume-to-capacity ratio quantifies the degree to which a phase's capacity is utilized by a lane group. The following paragraphs describe each LOS.

LOS A describes operations with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

A lane group can incur a delay less than 80 s/veh when the volume-to-capacity ratio exceeds 1.0. This condition typically occurs when the cycle length is short, the signal progression is favorable, or both. As a result, both the delay and volume-to-capacity ratio are considered when lane group LOS is established. A ratio of 1.0 or more indicates that cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80 s/veh represents failure from a delay perspective).

Exhibit 19-8 lists the LOS thresholds established for the motor vehicle mode at a signalized intersection.

Exhibit 19-8

LOS Criteria: Signalized Intersection

Control Delay (s/veh)	LOS by Volume-to-Capacity (v/c) Ratio ⁽¹⁾	
	v/c ≤ 1.0	v/c > 1.0
≤ 10	A	F
> 10 – 20	B	F
> 20 – 35	C	F
> 35 – 55	D	F
> 55 – 80	E	F
> 80	F	F

(1) For approach-based and intersectionwide assessments, LOS is defined solely by control delay.

ii. Unsignalized Intersections

The following level-of-service criteria for two-way stop-controlled and all-way stop-controlled intersections differ from the criteria for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from various kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Thus, a higher level of control delay is acceptable at a signalized intersection for the same level of service.

Level of service for two-way stop-controlled (TWSC) intersections and an all-way stop control intersections is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement), as well as the major-street left turns, by using the criteria given in Exhibit 20-2 and Exhibit 21-8. For TWSC intersections, LOS is not defined for the intersection as a whole or for major –street approaches for three primary reasons: (a) major-street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles a typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay for all vehicles; and (c) the resulting low delay can mask LOS deficiencies for minor movements. Level of service for two-way stop control is not defined for the intersection as a whole, while level of service for all-way stop control is defined for the intersection as a whole. Level of service criteria are given in Exhibit 20-2 (two-way stop-controlled intersections) and Exhibit 21-8 (all-way stop controlled intersections).

Exhibit 20-2 and Exhibit 21-8

LOS Criteria: Two-Way and All-Way Stop Controlled Intersections

Control Delay (s/veh)	LOS by Volume-to-Capacity (v/c) Ratio ⁽¹⁾⁽²⁾	
	v/c ≤ 1.0	v/c > 1.0
0 – 10	A	F
> 10 – 15	B	F
> 15 – 25	C	F
> 25 – 35	D	F
> 35 – 50	E	F
> 50	F	F

- (1) TWSC: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.
- (2) AWSC: For approaches and intersectionwide assessment, LOS is defined solely by control delay.

APPENDIX G
EXISTING 2021 CAPACITY CALCULATIONS

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	626	5	35	505	3	19
Future Vol, veh/h	626	5	35	505	3	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	240	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	10	20	3	15	0	6
Mvmt Flow	720	6	40	580	3	22

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	726	0	1090
Stage 1	-	-	-	-	720
Stage 2	-	-	-	-	370
Critical Hdwy	-	-	4.16	-	6.8
Critical Hdwy Stg 1	-	-	-	-	5.8
Critical Hdwy Stg 2	-	-	-	-	5.8
Follow-up Hdwy	-	-	2.23	-	3.5
Pot Cap-1 Maneuver	-	-	866	-	213
Stage 1	-	-	-	-	448
Stage 2	-	-	-	-	675
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	866	-	203
Mov Cap-2 Maneuver	-	-	-	-	329
Stage 1	-	-	-	-	448
Stage 2	-	-	-	-	644

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	557	-	-	866	-
HCM Lane V/C Ratio	0.045	-	-	0.046	-
HCM Control Delay (s)	11.8	-	-	9.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection												
Int Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑	↗	↖	↑↑			↕			↕	
Traffic Vol, veh/h	1	649	14	37	543	34	8	0	61	2	0	0
Future Vol, veh/h	1	649	14	37	543	34	8	0	61	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	250	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	8	86	3	13	92	88	0	4	0	0	0
Mvmt Flow	1	764	16	44	639	40	9	0	72	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	679	0	0	780	0	0	1174	1533	382	1131	1529	340
Stage 1	-	-	-	-	-	-	766	766	-	747	747	-
Stage 2	-	-	-	-	-	-	408	767	-	384	782	-
Critical Hdwy	4.1	-	-	4.16	-	-	9.26	6.5	6.98	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	8.26	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	8.26	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.23	-	-	4.38	4	3.34	3.5	4	3.3
Pot Cap-1 Maneuver	923	-	-	827	-	-	75	118	610	161	118	662
Stage 1	-	-	-	-	-	-	218	415	-	376	423	-
Stage 2	-	-	-	-	-	-	409	414	-	616	408	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	923	-	-	827	-	-	72	112	610	136	112	662
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	112	-	136	112	-
Stage 1	-	-	-	-	-	-	218	415	-	376	401	-
Stage 2	-	-	-	-	-	-	387	392	-	543	408	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.6			19.6			31.9		
HCM LOS							C			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	327	923	-	-	827	-	-	136
HCM Lane V/C Ratio	0.248	0.001	-	-	0.053	-	-	0.017
HCM Control Delay (s)	19.6	8.9	-	-	9.6	-	-	31.9
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1	0	-	-	0.2	-	-	0.1

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	718	628	6	15	0
Future Vol, veh/h	2	718	628	6	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	8	17	0	0	0
Mvmt Flow	2	845	739	7	18	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	746	0	-	0	1170 373
Stage 1	-	-	-	-	743 -
Stage 2	-	-	-	-	427 -
Critical Hdwy	4.1	-	-	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	871	-	-	-	189 630
Stage 1	-	-	-	-	436 -
Stage 2	-	-	-	-	632 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	871	-	-	-	189 630
Mov Cap-2 Maneuver	-	-	-	-	317 -
Stage 1	-	-	-	-	435 -
Stage 2	-	-	-	-	632 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	17
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	871	-	-	-	317
HCM Lane V/C Ratio	0.003	-	-	-	0.056
HCM Control Delay (s)	9.1	-	-	-	17
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	616	3	12	876	5	32
Future Vol, veh/h	616	3	12	876	5	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	240	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	0	0	2	0	4
Mvmt Flow	716	3	14	1019	6	37

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	719	0	1254 358
Stage 1	-	-	-	-	716 -
Stage 2	-	-	-	-	538 -
Critical Hdwy	-	-	4.1	-	6.8 6.98
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.34
Pot Cap-1 Maneuver	-	-	892	-	167 633
Stage 1	-	-	-	-	450 -
Stage 2	-	-	-	-	555 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	892	-	164 633
Mov Cap-2 Maneuver	-	-	-	-	299 -
Stage 1	-	-	-	-	450 -
Stage 2	-	-	-	-	546 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	12.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	550	-	-	892	-
HCM Lane V/C Ratio	0.078	-	-	0.016	-
HCM Control Delay (s)	12.1	-	-	9.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 6th TWSC
3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

2021 Existing Conditions
Timing Plan: PM Peak Hour

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑↑	↗	↙	↑↑			↕			↕	
Traffic Vol, veh/h	2	677	8	59	820	22	5	0	40	2	0	0
Future Vol, veh/h	2	677	8	59	820	22	5	0	40	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	250	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	50	5	13	2	3	96	0	0	5	0	0	0
Mvmt Flow	2	698	8	61	845	23	5	0	41	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	868	0	0	706	0	0	1247	1692	349	1332	1689	434
Stage 1	-	-	-	-	-	-	702	702	-	979	979	-
Stage 2	-	-	-	-	-	-	545	990	-	353	710	-
Critical Hdwy	5.1	-	-	4.14	-	-	7.5	6.5	7	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.7	-	-	2.22	-	-	3.5	4	3.35	3.5	4	3.3
Pot Cap-1 Maneuver	530	-	-	888	-	-	132	94	638	114	94	576
Stage 1	-	-	-	-	-	-	400	443	-	272	331	-
Stage 2	-	-	-	-	-	-	495	327	-	642	440	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	530	-	-	888	-	-	125	87	638	101	87	576
Mov Cap-2 Maneuver	-	-	-	-	-	-	125	87	-	101	87	-
Stage 1	-	-	-	-	-	-	398	441	-	271	308	-
Stage 2	-	-	-	-	-	-	461	304	-	598	438	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.6			14.2			41.4		
HCM LOS							B			E		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	438	530	-	-	888	-	-	101
HCM Lane V/C Ratio	0.106	0.004	-	-	0.068	-	-	0.02
HCM Control Delay (s)	14.2	11.8	-	-	9.4	-	-	41.4
HCM Lane LOS	B	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.4	0	-	-	0.2	-	-	0.1

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	732	905	26	15	3
Future Vol, veh/h	2	732	905	26	15	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	5	5	4	0	34
Mvmt Flow	2	771	953	27	16	3

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	980	0	-	0	1357 490
Stage 1	-	-	-	-	967 -
Stage 2	-	-	-	-	390 -
Critical Hdwy	4.1	-	-	-	6.8 7.58
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.64
Pot Cap-1 Maneuver	712	-	-	-	143 447
Stage 1	-	-	-	-	334 -
Stage 2	-	-	-	-	659 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	712	-	-	-	143 447
Mov Cap-2 Maneuver	-	-	-	-	257 -
Stage 1	-	-	-	-	333 -
Stage 2	-	-	-	-	659 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	18.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	712	-	-	-	277
HCM Lane V/C Ratio	0.003	-	-	-	0.068
HCM Control Delay (s)	10.1	-	-	-	18.9
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

APPENDIX H
BUNKER RANCH TRIP GENERATION CALCULATIONS

**Trip Generation Calculations
Bunker Ranch Development
City of Dripping Springs, Hays County, Texas**

Proposed Total Bunker Ranch Development Single Family Homes (160 Approved plus 228 Proposed)

388	units	ITE Land Use Code	210	Single-Family Detached Housing
	Weekday 24-Hour	=====>	Ln(T) = 0.92 Ln(X) + 2.71	(50 % Entering/ 50 % Exiting)
			Ln(T) = 0.92 Ln(388) + 2.71	
			Ln(T) = 0.92 (5.961) + 2.71	
			Ln(T) = 8.19	(1810 Entering/ 1810 Exiting)
			T = 3619.622	
			T = 3620	
	A.M. Peak Hour	=====>	T = 0.71 (X) + 4.8	(25 % Entering/ 75 % Exiting)
			T = 0.71 (388.00) + 4.80	
			T = 280.28	
			T = 280	(70 Entering/ 210 Exiting)
	P.M. Peak Hour	=====>	Ln(T) = 0.96 Ln(X) + 0.2	(63 % Entering/ 37 % Exiting)
			Ln(T) = 0.96 Ln(388) + 0.2	
			Ln(T) = 0.96 (5.961) + 0.2	
			Ln(T) = 5.92	(235 Entering/ 138 Exiting)
			T = 373.368	
			T = 373	

**Trip Generation Calculations
Bunker Ranch Development
City of Dripping Springs, Hays County, Texas**

Bunker Ranch Approved Single Family Units

160	units	ITE Land Use Code	210	Single-Family Detached Housing
	Weekday 24-Hour	=====>	$\text{Ln}(T) = 0.92 \text{ Ln}(X) + 2.71$ $\text{Ln}(T) = 0.92 \text{ Ln}(160) + 2.71$ $\text{Ln}(T) = 0.92 (5.075) + 2.71$ $\text{Ln}(T) = 7.38$ $T = 1602.243$ $T = 1602$	(50 % Entering/ 50 % Exiting) (801 Entering/ 801 Exiting)
	A.M. Peak Hour	=====>	$T = 0.71 (X) + 4.8$ $T = 0.71 (160.00) + 4.80$ $T = 118.4$ $T = 118$	(25 % Entering/ 75 % Exiting) (30 Entering/ 88 Exiting)
	P.M. Peak Hour	=====>	$\text{Ln}(T) = 0.96 \text{ Ln}(X) + 0.2$ $\text{Ln}(T) = 0.96 \text{ Ln}(160) + 0.2$ $\text{Ln}(T) = 0.96 (5.075) + 0.2$ $\text{Ln}(T) = 5.07$ $T = 159.520$ $T = 160$	(63 % Entering/ 37 % Exiting) (101 Entering/ 59 Exiting)

**Trip Generation Calculations
Bunker Ranch Development
City of Dripping Springs, Hays County, Texas**

Bunker Ranch Single Family Homes Currently Built and Occupied

58	units	ITE Land Use Code	210	Single-Family Detached Housing
	Weekday 24-Hour	=====>	$\text{Ln}(T) = 0.92 \text{ Ln}(X) + 2.71$ $\text{Ln}(T) = 0.92 \text{ Ln}(58) + 2.71$ $\text{Ln}(T) = 0.92 (4.060) + 2.71$ $\text{Ln}(T) = 6.45$ $T = 629.929$ $T = 630$	(50 % Entering/ 50 % Exiting) (315 Entering/ 315 Exiting)
	A.M. Peak Hour	=====>	$T = 0.71 (X) + 4.8$ $T = 0.71 (58.00) + 4.80$ $T = 45.98$ $T = 46$	(25 % Entering/ 75 % Exiting) (12 Entering/ 34 Exiting)
	P.M. Peak Hour	=====>	$\text{Ln}(T) = 0.96 \text{ Ln}(X) + 0.2$ $\text{Ln}(T) = 0.96 \text{ Ln}(58) + 0.2$ $\text{Ln}(T) = 0.96 (4.060) + 0.2$ $\text{Ln}(T) = 4.10$ $T = 60.221$ $T = 60$	(63 % Entering/ 37 % Exiting) (38 Entering/ 22 Exiting)

**Trip Generation Calculations
Bunker Ranch Development
City of Dripping Springs, Hays County, Texas**

Bunker Ranch Development Approved Multifamily Units

42	units	ITE Land Use Code	220	Multifamily Low-Rise
	Weekday 24-Hour	=====>	T = 7.32 (X) T = 7.32 (42.00) T = 307.44 T = 307	(50 % Entering/ 50 % Exiting) (153 Entering/ 154 Exiting)
	A.M. Peak Hour	=====>	Ln(T) = 0.95 Ln(X) - 0.51 Ln(T) = 0.95 Ln(42) - 0.51 Ln(T) = 0.95 (3.738) - 0.51 Ln(T) = 3.04 T = 20.922 T = 21	(23 % Entering/ 77 % Exiting) (5 Entering/ 16 Exiting)
	P.M. Peak Hour	=====>	Ln(T) = 0.89 Ln(X) - 0.02 Ln(T) = 0.89 Ln(42) - 0.02 Ln(T) = 0.89 (3.738) - 0.02 Ln(T) = 3.31 T = 27.290 T = 27	(63 % Entering/ 37 % Exiting) (17 Entering/ 10 Exiting)

**Trip Generation Calculations
Bunker Ranch Development
City of Dripping Springs, Hays County, Texas**

Bunker Ranch Development Multifamily Units Currently Constructed and Occupied

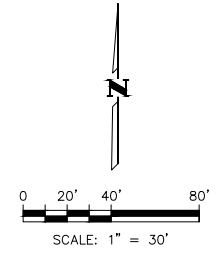
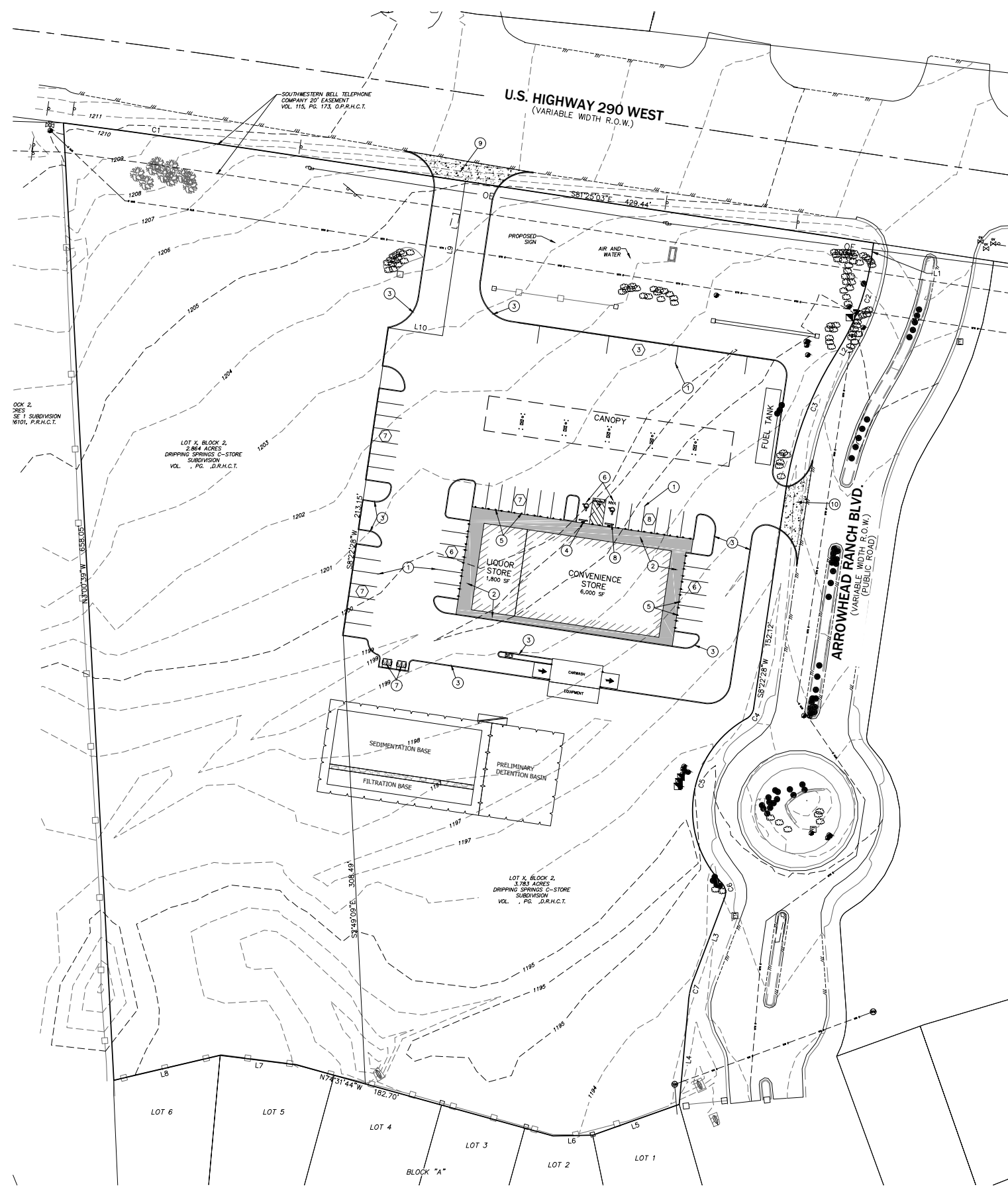
6	units	ITE Land Use Code	220	Multifamily Low-Rise
	Weekday 24-Hour	=====>	T = 7.56 (X) - 40.86 T = 7.56 (6.00) - 40.86 T = 4.5 T = 5	(50 % Entering/ 50 % Exiting) (2 Entering/ 3 Exiting)
	A.M. Peak Hour	=====>	Ln(T) = 0.95 Ln(X) - 0.51 Ln(T) = 0.95 Ln(6) - 0.51 Ln(T) = 0.95 (1.792) - 0.51 Ln(T) = 1.19 T = 3.294 T = 3	(23 % Entering/ 77 % Exiting) (1 Entering/ 2 Exiting)
	P.M. Peak Hour	=====>	Ln(T) = 0.89 Ln(X) - 0.02 Ln(T) = 0.89 Ln(6) - 0.02 Ln(T) = 0.89 (1.792) - 0.02 Ln(T) = 1.57 T = 4.829 T = 5	(63 % Entering/ 37 % Exiting) (3 Entering/ 2 Exiting)

APPENDIX I
ARROWHEAD RANCH CONCEPTUAL SITE PLAN

TRAFFIC SUMMARY TABLE

SITE USE		
CONVENIENCE STORE		6,000 SF
PARKING STORAGE STANDARDS		
MINIMUM PARKING RATIO	1 PER 200 SF GFA	
SITE USE		
LIQUOR STORE		1,800 SF
PARKING STORAGE STANDARDS		
MINIMUM PARKING RATIO	1 PER 200 SF GFA	
SITE USE		
CAR WASH		910 SF
PARKING STORAGE STANDARDS		
MINIMUM PARKING RATIO	1 PER WASHING BAY	
REGULAR		
MINIMUM REQUIRED PARKING		40
PARKING SPACES		44
PARKING BY GAS PUMPS		10
ACTUAL/PROPOSED PARKING (INCLUDING H.C. PARKING)		24
HANDICAPPED (ADA)		
REQUIRED REGULAR H.C. PARKING		2 TOTAL
PROPOSED H.C. PARKING		2 (1 V.A. INCLUDED)
REQUIRED V.A. PARKING		1 (1 INCLUDED IN TOTAL)

	TOTAL ACRES	IMPERVIOUS COVER (SF)	IMPERVIOUS COVER (AC)	IMPERVIOUS COVER (%)
LOT A C-STORE	3.783	70,430	1.617	42.74 %
LOT B RETAIL	2.864	32,346	0.743	25.94 %
TOTAL SITE	6.647	102,776	2.36	35.50 %



LEGEND	
	BOUNDARY / RIGHT OF WAY LINE
	CONCRETE CURB
	EASEMENT / SETBACK LINE
	FIRE LANE
	OVERHEAD UTILITIES
	EXISTING GAS MAIN
	EXISTING EDGE OF ASPHALT
	ELECTRIC, GAS, TELEPHONE AND CABLE T.V. EASEMENT
	BUILDING SETBACK LINE
	VEHICULAR NON-ACCESS EASEMENT
	DOWNSPOUT
	LIGHT POLES
	EXISTING LIGHT POLES
	EXISTING UTILITY POLE
	EXISTING GUY WIRE
	EXISTING FIRE HYDRANT
	EXISTING WATER VALVE
	EXISTING TRAFFIC SIGNAL POLE
	EXISTING WATER METER
	EXISTING ELECTRIC METER
	EXISTING TELEPHONE PEDESTAL
	EXISTING CABLE BOX
	CONCRETE WHEEL STOP
	SIGN
	PARKING STALL COUNT
	ACCESSIBLE PARKING
	CONCRETE DRIVEWAY

CIVIL KEY NOTES	
1	PAVEMENT STRIPING (TYPICAL) (REFERENCE SHEET C13)
2	CONCRETE SIDEWALK (REFERENCE SHEET C13)
3	6" CONCRETE CURB (TYPICAL) (REFERENCE SHEET C13)
4	HANDICAP SIGN (REFERENCE ARCHITECTURAL PLANS FOR DETAILS)
5	BOLLARDS (REFERENCE SHEET C13)
6	ACCESSIBILITY STRIPING (REFERENCE SHEET C13)
7	GARBAGE DUMPSTER (REFERENCE ARCHITECTURAL PLANS FOR DETAILS)
8	CONCRETE WHEEL STOP (REFERENCE SHEET C13)
9	TXDOT CONCRETE DRIVEWAY (REFERENCE SHEET C13)
10	CONCRETE DRIVEWAY (REFERENCE SHEET C14)
11	CURB RAMP (REFERENCE SHEET C13)
12	DOWNSPOUT (REFERENCE ARCHITECTURAL PLANS FOR DETAILS)

- NOTES:**
- REFERENCE STRUCTURAL PLANS FOR FOUNDATION.
 - ALL CURB RADI ARE 3' UNLESS OTHERWISE NOTED.
 - REFER TO GENERAL NOTE SHEET FOR ADDITIONAL SITE NOTES.
 - *C* IN PARKING SPACE DENOTES COMPACT SPACE. COMPACT SPACES ARE 8' X 16'.
 - PAVEMENT MARKINGS IN BEXAR COUNTY R.O.W. MUST BE THERMOPLASTIC.
 - PAVEMENT DESIGN FOR AUXILIARY LANES ABUTTING AN EXISTING ROAD SHALL BE MINIMUM 2" HMAC TYPE D (OR TYPE C) AND 12" HMAC TYPE B OR MATCH EXISTING PAVEMENT SECTION (IF KNOWN).
 - REFER TO GENERAL NOTE SHEET FOR CANOPY AND FUEL TANK DETAILS.
 - REFERENCE ARCHITECTURAL PLANS FOR CAR WASH CONFIGURATION AND DETAILS.

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 PREPARED UNDER THE
 SUPERVISION OF
 NATIONAL BOARD OF
 PROFESSIONAL ENGINEERING
 #69502 CON
 March 26, 2021

DRIPPING SPRINGS REAL ESTATE, LLC
 7410 BLANCO ROAD, SUITE 225
 SAN ANTONIO, TEXAS 78216

DRIPPING SPRINGS C-STORE
 PLAT NO. #####

REV	DATE	DESCRIPTION

DESIGNED BY: WPF
 DRAFTED BY: JWH
 CHECKED BY: NFU

SHEET
 ##
 OF C17

Drawn by: JWH, Date: 03/26/21, 11:23 AM, User: JWH, Plot: 0, Scale: 1"=30', Title: Dripping Springs C-Store, Location: Dripping Springs, State: TX, County: Bexar, Project: Dripping Springs C-Store, Plat: 0, Block: A, Lot: 1, Sublot: 1, Sheet: 1 of 17

APPENDIX J
ARROWHEAD RANCH TRIP GENERATION CALCULATIONS

**Trip Generation Calculations
Arrowhead Ranch Development
City of Dripping Springs, Hays County, Texas**

Approved Arrowhead Ranch Residential Units		ITE Land Use Code	210		Single-Family Detached Housing
403	units				
Weekday 24-Hour	=====>	Ln(T) = 0.92	Ln(X) +	2.71	(50 % Entering/ 50 % Exiting)
		Ln(T) = 0.92	Ln(403) +	2.71	
		Ln(T) = 0.92	(5.999) +	2.71	
		Ln(T) =	8.23		(1874 Entering/ 1874 Exiting)
		T =	3748.165		
		T =	3748		
A.M. Peak Hour	=====>	T = 0.71	(X) +	4.8	(25 % Entering/ 75 % Exiting)
		T = 0.71	(403.00) +	4.80	
		T =	290.93		
		T =	291		(73 Entering/ 218 Exiting)
P.M. Peak Hour	=====>	Ln(T) = 0.96	Ln(X) +	0.2	(63 % Entering/ 37 % Exiting)
		Ln(T) = 0.96	Ln(403) +	0.2	
		Ln(T) = 0.96	(5.999) +	0.2	
		Ln(T) =	5.96		(244 Entering/ 143 Exiting)
		T =	387.215		
		T =	387		

Trip Generation Calculations
Arrowhead Ranch Development
City of Dripping Springs, Hays County, Texas

Arrowhead Ranch Single Family Residential Units Currently Constructed and Occupied
 181 units ITE Land Use Code 210

Single-Family Detached Housing

Weekday 24-Hour	=====>	Ln(T) = 0.92 Ln(X) + 2.71	(50 % Entering/ 50 % Exiting)
		Ln(T) = 0.92 Ln(181) + 2.71	
		Ln(T) = 0.92 (5.198) + 2.71	
		Ln(T) = 7.49	(898 Entering/ 897 Exiting)
		T = 1794.743 T = 1795	
A.M. Peak Hour	=====>	T = 0.71 (X) + 4.8	(25 % Entering/ 75 % Exiting)
		T = 0.71 (181.00) + 4.80	
		T = 133.31	
		T = 133	(33 Entering/ 100 Exiting)
P.M. Peak Hour	=====>	Ln(T) = 0.96 Ln(X) + 0.2	(63 % Entering/ 37 % Exiting)
		Ln(T) = 0.96 Ln(181) + 0.2	
		Ln(T) = 0.96 (5.198) + 0.2	
		Ln(T) = 5.19	(113 Entering/ 67 Exiting)
		T = 179.569 T = 180	

**Trip Generation Calculations
Arrowhead Ranch Development
City of Dripping Springs, Hays County, Texas**

1,800	Square Feet	ITE Land Use Code	899		Liquor Store	
	Weekday 24-Hour	=====>	T = 101.49	(X)		(50 % Entering/ 50 % Exiting)
			T = 101.49	(1.80)		
			T =	182.682		
			T =	183		(92 Entering/ 91 Exiting)
	A.M. Peak Hour Peak Hour of Generator	=====>	T = 4.55	(X)		(51 % Entering/ 49 % Exiting)
			T = 4.55	(1.80)		
			T =	8.19		
			T =	8		(4 Entering/ 4 Exiting)
	P.M. Peak Hour	=====>	T = 16.37	(X)		(50 % Entering/ 50 % Exiting)
			T = 16.37	(1.80)		
			T =	29.466		
			T =	29		(15 Entering/ 14 Exiting)

**Trip Generation Calculations
Arrowhead Ranch Development
City of Dripping Springs, Hays County, Texas**

10 6,000	Vehicle Fueling Positions Square Feet	ITE Land Use Code	960	Super Convenience Market/Gas Station	
	Weekday 24-Hour	=====>	T = 230.52 (X) T = 230.52 (10) T = 2305.2 T = 2305		(50 % Entering/ 50 % Exiting) (1153 Entering/ 1152 Exiting)
	A.M. Peak Hour	=====>	T = [(VFP Factor) x (Number of VFP)] + [(GFA Factor) x (GFA)] + (Constant) T = (16.1 x 10) + (135 x 6) + -483 T = 488 T = 488		(50 % Entering/ 50 % Exiting) (244 Entering/ 244 Exiting)
	P.M. Peak Hour	=====>	T = [(VFP Factor) x (Number of VFP)] + [(GFA Factor) x (GFA)] + (Constant) T = (11.5 x 10) + (82.9 x 6) + -226 T = 386.4 T = 386		(50 % Entering/ 50 % Exiting) (193 Entering/ 193 Exiting)

Pass-By Trip Generation

A.M. Peak Hour	=====>	76	%	Pass-By Trips	
				Primary	= 59 Entering / 59 Exiting
				Pass-By	= 185 Entering / 185 Exiting
P.M. Peak Hour	=====>	76	%	Pass-By Trips	
				Primary	= 46 Entering / 46 Exiting
				Pass-By	= 147 Entering / 147 Exiting

APPENDIX K
FORECASTED 2025 NO-BUILD (BASE) CAPACITY CALCULATIONS

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	708	10	52	542	17	73
Future Vol, veh/h	708	10	52	542	17	73
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	240	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	10	20	3	15	0	6
Mvmt Flow	814	11	60	623	20	84

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	825	0	1246
Stage 1	-	-	-	-	814
Stage 2	-	-	-	-	432
Critical Hdwy	-	-	4.16	-	6.8
Critical Hdwy Stg 1	-	-	-	-	5.8
Critical Hdwy Stg 2	-	-	-	-	5.8
Follow-up Hdwy	-	-	2.23	-	3.5
Pot Cap-1 Maneuver	-	-	795	-	169
Stage 1	-	-	-	-	401
Stage 2	-	-	-	-	628
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	795	-	156
Mov Cap-2 Maneuver	-	-	-	-	284
Stage 1	-	-	-	-	401
Stage 2	-	-	-	-	581

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	486	-	-	795	-
HCM Lane V/C Ratio	0.213	-	-	0.075	-
HCM Control Delay (s)	14.4	-	-	9.9	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.8	-	-	0.2	-

HCM 6th TWSC
 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

2025 No Build (Base)
 Timing Plan: AM Peak Hour

Intersection												
Int Delay, s/veh	509.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑			↔			↔	
Traffic Vol, veh/h	1	663	22	203	476	34	129	0	245	2	0	0
Future Vol, veh/h	1	663	22	203	476	34	129	0	245	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	250	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	8	86	3	13	92	88	0	4	0	0	0
Mvmt Flow	1	780	26	239	560	40	152	0	288	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	600	0	0	806	0	0	1540	1860	390	1450	1866	300
Stage 1	-	-	-	-	-	-	782	782	-	1058	1058	-
Stage 2	-	-	-	-	-	-	758	1078	-	392	808	-
Critical Hdwy	4.1	-	-	4.16	-	-	9.26	6.5	6.98	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	8.26	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	8.26	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.23	-	-	4.38	4	3.34	3.5	4	3.3
Pot Cap-1 Maneuver	987	-	-	808	-	-	~ 35	74	603	94	73	702
Stage 1	-	-	-	-	-	-	212	408	-	244	304	-
Stage 2	-	-	-	-	-	-	221	297	-	610	397	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	987	-	-	808	-	-	~ 27	52	603	38	51	702
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 27	52	-	38	51	-
Stage 1	-	-	-	-	-	-	212	408	-	244	214	-
Stage 2	-	-	-	-	-	-	156	209	-	318	397	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.2	\$ 2413.3	105.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	72	987	-	-	808	-	-	38
HCM Lane V/C Ratio	6.111	0.001	-	-	0.296	-	-	0.062
HCM Control Delay (s)	\$ 2413.3	8.7	-	-	11.3	-	-	105.9
HCM Lane LOS	F	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	49.3	0	-	-	1.2	-	-	0.2

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	916	727	6	15	0
Future Vol, veh/h	2	916	727	6	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	8	17	0	0	0
Mvmt Flow	2	1078	855	7	18	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	862	0	-	0	1402	431
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	543	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	789	-	-	-	133	578
Stage 1	-	-	-	-	380	-
Stage 2	-	-	-	-	552	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	789	-	-	-	133	578
Mov Cap-2 Maneuver	-	-	-	-	263	-
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	552	-
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	19.7			
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	789	-	-	-	263	
HCM Lane V/C Ratio	0.003	-	-	-	0.067	
HCM Control Delay (s)	9.6	-	-	-	19.7	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	654	19	73	903	14	68
Future Vol, veh/h	654	19	73	903	14	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	240	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	0	0	2	0	4
Mvmt Flow	760	22	85	1050	16	79

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	782	0	1455 380
Stage 1	-	-	-	-	760 -
Stage 2	-	-	-	-	695 -
Critical Hdwy	-	-	4.1	-	6.8 6.98
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.34
Pot Cap-1 Maneuver	-	-	845	-	123 612
Stage 1	-	-	-	-	428 -
Stage 2	-	-	-	-	462 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	845	-	111 612
Mov Cap-2 Maneuver	-	-	-	-	243 -
Stage 1	-	-	-	-	428 -
Stage 2	-	-	-	-	415 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	486	-	-	845	-
HCM Lane V/C Ratio	0.196	-	-	0.1	-
HCM Control Delay (s)	14.2	-	-	9.7	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0.3	-

HCM 6th TWSC
 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

2025 No Build (Base)
 Timing Plan: PM Peak Hour

Intersection												
Int Delay, s/veh	140											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑			↔			↔	
Traffic Vol, veh/h	2	688	34	293	801	22	112	0	178	2	0	0
Future Vol, veh/h	2	688	34	293	801	22	112	0	178	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	250	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	50	5	13	2	3	96	0	0	5	0	0	0
Mvmt Flow	2	709	35	302	826	23	115	0	184	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	849	0	0	744	0	0	1730	2166	355	1801	2190	425
Stage 1	-	-	-	-	-	-	713	713	-	1442	1442	-
Stage 2	-	-	-	-	-	-	1017	1453	-	359	748	-
Critical Hdwy	5.1	-	-	4.14	-	-	7.5	6.5	7	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.7	-	-	2.22	-	-	3.5	4	3.35	3.5	4	3.3
Pot Cap-1 Maneuver	541	-	-	859	-	-	~ 58	48	633	51	46	583
Stage 1	-	-	-	-	-	-	394	438	-	142	199	-
Stage 2	-	-	-	-	-	-	258	197	-	637	423	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	541	-	-	859	-	-	~ 42	31	633	26	30	583
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 42	31	-	26	30	-
Stage 1	-	-	-	-	-	-	392	436	-	141	129	-
Stage 2	-	-	-	-	-	-	167	128	-	451	421	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3	\$ 1016.3	155.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	98	541	-	-	859	-	-	26
HCM Lane V/C Ratio	3.051	0.004	-	-	0.352	-	-	0.079
HCM Control Delay (s)	\$ 1016.3	11.7	-	-	11.4	-	-	155.1
HCM Lane LOS	F	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	29	0	-	-	1.6	-	-	0.2

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon


Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	877	1120	26	15	3
Future Vol, veh/h	2	877	1120	26	15	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	5	5	4	0	34
Mvmt Flow	2	923	1179	27	16	3

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1206	0	-	0	1659 603
Stage 1	-	-	-	-	1193 -
Stage 2	-	-	-	-	466 -
Critical Hdwy	4.1	-	-	-	6.8 7.58
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.64
Pot Cap-1 Maneuver	586	-	-	-	90 371
Stage 1	-	-	-	-	254 -
Stage 2	-	-	-	-	604 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	586	-	-	-	90 371
Mov Cap-2 Maneuver	-	-	-	-	195 -
Stage 1	-	-	-	-	253 -
Stage 2	-	-	-	-	604 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	23.6
HCM LOS			C

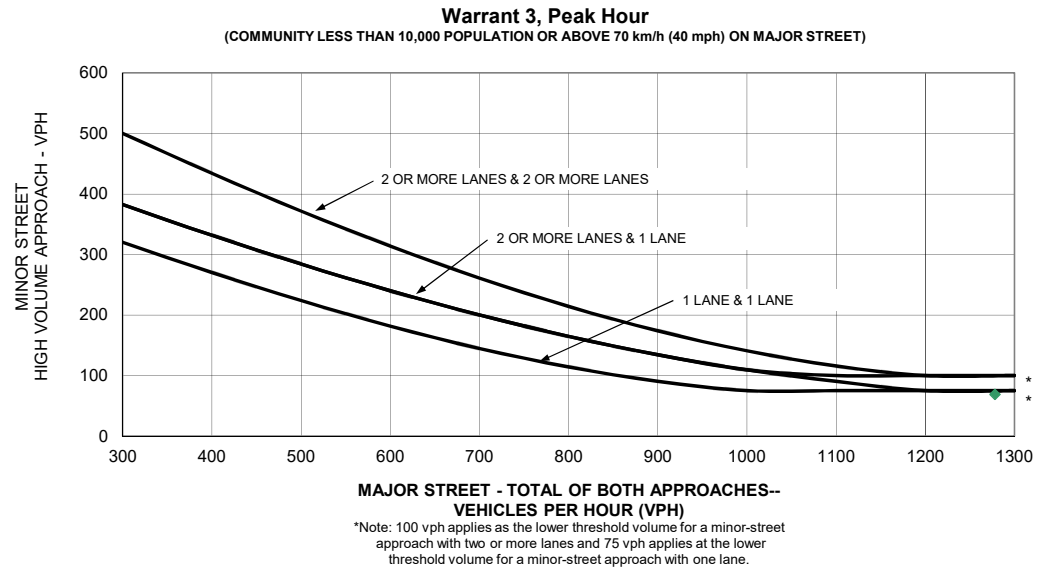
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	586	-	-	-	212
HCM Lane V/C Ratio	0.004	-	-	-	0.089
HCM Control Delay (s)	11.2	-	-	-	23.6
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

APPENDIX L
TRAFFIC SIGNAL WARRANT EVALUATION

Project: Bunker Ranch TIA		Calculations: CAD
Major Street	Name: US 290	Date: 5/6/21
	Speed Limit (mph): 50-60	Checked by: JMD
	Approach Lanes: 2	Date: 5/6/21
Minor Street	Name: Arrowhead Ranch Blvd	 Civil & Environmental Consultants, Inc.
	Speed Limit (mph): 25	
	Approach Lanes: 1	
Population < 10000? Yes		

Warrant 3 - Peak Hour

Signal Warrant Satisfied? Yes No



Scenario	Major Street (vph)	Minor Street (vph)	Warrant Volume Minor Street	Warrant Satisfied?
2021 Existing, AM Peak	1278	69	75	NO
2021 Existing, PM Peak	1588	45	75	NO
2025 No-Build, AM Peak	1399	374	75	YES
2025 No-Build, PM Peak	1840	286	75	YES
2025 Build, AM Peak	1529	374	75	YES
2025 Build, PM Peak	2010	286	75	YES

Signal warrant satisfied if hourly threshold satisfied for any 1 hour of an average day.

APPENDIX M
FORECASTED 2025 NO-BUILD (BASE) MITIGATED CAPACITY CALCULATIONS

HCM 6th Signalized Intersection Summary
 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

2025 No Build (Base) Mitigated
 Timing Plan: AM Peak Hour



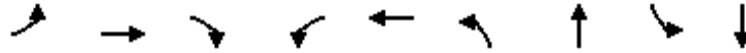
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑	↗	↖	↑↑			↕			↕	
Traffic Volume (veh/h)	1	663	22	203	476	34	129	0	245	2	0	0
Future Volume (veh/h)	1	663	22	203	476	34	129	0	245	2	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1976	1781	625	1930	1707	537	596	1976	1841	1900	1976	1900
Adj Flow Rate, veh/h	1	780	26	239	560	40	152	0	288	2	0	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	0	8	86	3	13	92	88	0	4	0	0	0
Cap, veh/h	350	1002	157	377	1256	90	233	19	342	387	0	0
Arrive On Green	0.00	0.30	0.30	0.11	0.41	0.41	0.32	0.00	0.32	0.32	0.00	0.00
Sat Flow, veh/h	1882	3385	530	1838	3071	219	501	60	1063	870	0	0
Grp Volume(v), veh/h	1	780	26	239	295	305	440	0	0	2	0	0
Grp Sat Flow(s),veh/h/ln	1882	1692	530	1838	1622	1668	1624	0	0	871	0	0
Q Serve(g_s), s	0.0	14.2	2.4	5.6	8.8	8.9	14.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	14.2	2.4	5.6	8.8	8.9	16.9	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.13	0.35		0.65	1.00		0.00
Lane Grp Cap(c), veh/h	350	1002	157	377	663	682	594	0	0	387	0	0
V/C Ratio(X)	0.00	0.78	0.17	0.63	0.45	0.45	0.74	0.00	0.00	0.01	0.00	0.00
Avail Cap(c_a), veh/h	487	1412	221	440	797	820	892	0	0	600	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.6	21.6	17.5	14.9	14.3	14.3	21.1	0.0	0.0	15.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.9	0.5	2.3	0.5	0.5	1.8	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.9	0.3	2.0	2.6	2.7	6.3	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.6	23.5	18.0	17.3	14.8	14.8	22.9	0.0	0.0	15.5	0.0	0.0
LnGrp LOS	B	C	B	B	B	B	C	A	A	B	A	A
Approach Vol, veh/h		807			839			440				2
Approach Delay, s/veh		23.3			15.5			22.9				15.5
Approach LOS		C			B			C				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.7	25.9		27.6	6.1	33.4		27.6				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	10.0	28.0		34.0	5.0	33.0		34.0				
Max Q Clear Time (g_c+I1), s	7.6	16.2		2.1	2.0	10.9		18.9				
Green Ext Time (p_c), s	0.2	3.7		0.0	0.0	3.0		2.7				

Intersection Summary

HCM 6th Ctrl Delay	20.1
HCM 6th LOS	C

Timings
3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

2025 No Build (Base) Mitigated
Timing Plan: AM Peak Hour

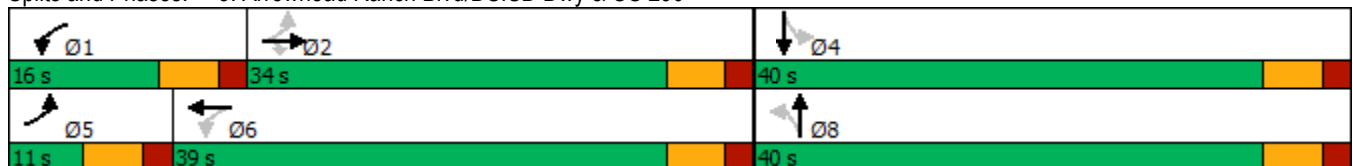


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↙	↕	↘	↙	↕		↕		↕
Traffic Volume (vph)	1	663	22	203	476	129	0	2	0
Future Volume (vph)	1	663	22	203	476	129	0	2	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2		1	6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	5	2	2	1	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	16.0	16.0	11.0	16.0	11.0	11.0	11.0	11.0
Total Split (s)	11.0	34.0	34.0	16.0	39.0	40.0	40.0	40.0	40.0
Total Split (%)	12.2%	37.8%	37.8%	17.8%	43.3%	44.4%	44.4%	44.4%	44.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0		6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	Min	None	Min	None	None	None	None
Act Effct Green (s)	27.9	22.7	22.7	38.3	36.7		25.3		25.3
Actuated g/C Ratio	0.37	0.30	0.30	0.50	0.48		0.33		0.33
v/c Ratio	0.00	0.78	0.08	0.62	0.41		0.86		0.01
Control Delay	12.0	31.8	0.5	19.8	15.8		34.8		17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	12.0	31.8	0.5	19.8	15.8		34.8		17.5
LOS	B	C	A	B	B		C		B
Approach Delay		30.8			16.9		34.8		17.5
Approach LOS		C			B		C		B

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 76.3
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 26.1
 Intersection Capacity Utilization 64.6%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290



HCM 6th Signalized Intersection Summary
 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

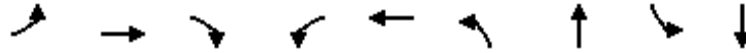
2025 No Build (Base) Mitigated
 Timing Plan: PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑	↖	↗	↑↑			↕			↕	
Traffic Volume (veh/h)	2	688	34	293	801	22	112	0	174	2	0	0
Future Volume (veh/h)	2	688	34	293	801	22	112	0	174	2	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1205	1826	1707	1945	1856	477	1900	1976	1826	1900	1976	1900
Adj Flow Rate, veh/h	2	709	35	302	826	23	115	0	179	2	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	50	5	13	2	3	96	0	0	5	0	0	0
Cap, veh/h	246	1023	427	490	1541	43	215	22	227	389	0	0
Arrive On Green	0.00	0.30	0.30	0.15	0.44	0.44	0.23	0.00	0.23	0.23	0.00	0.00
Sat Flow, veh/h	1148	3469	1447	1853	3503	98	542	94	989	1124	0	0
Grp Volume(v), veh/h	2	709	35	302	416	433	294	0	0	2	0	0
Grp Sat Flow(s),veh/h/ln	1148	1735	1447	1853	1763	1838	1625	0	0	1124	0	0
Q Serve(g_s), s	0.1	9.9	1.0	5.6	9.5	9.5	7.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	9.9	1.0	5.6	9.5	9.5	9.3	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.05	0.39		0.61	1.00		0.00
Lane Grp Cap(c), veh/h	246	1023	427	490	775	809	464	0	0	389	0	0
V/C Ratio(X)	0.01	0.69	0.08	0.62	0.54	0.54	0.63	0.00	0.00	0.01	0.00	0.00
Avail Cap(c_a), veh/h	348	2088	871	824	1479	1542	710	0	0	585	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.6	17.1	14.0	11.0	11.3	11.3	19.8	0.0	0.0	16.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.1	1.3	0.6	0.6	1.4	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.1	0.3	1.6	2.6	2.7	3.4	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	18.0	14.0	12.3	11.8	11.8	21.2	0.0	0.0	16.3	0.0	0.0
LnGrp LOS	B	B	B	B	B	B	C	A	A	B	A	A
Approach Vol, veh/h		746			1151			294				2
Approach Delay, s/veh		17.8			11.9			21.2				16.3
Approach LOS		B			B			C				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.1	22.2		18.6	6.2	30.1		18.6				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	18.0	33.0		21.0	5.0	46.0		21.0				
Max Q Clear Time (g_c+I1), s	7.6	11.9		2.1	2.1	11.5		11.3				
Green Ext Time (p_c), s	0.6	4.2		0.0	0.0	4.9		1.3				
Intersection Summary												
HCM 6th Ctrl Delay				15.2								
HCM 6th LOS				B								

Timings
3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

2025 No Build (Base) Mitigated
Timing Plan: PM Peak Hour

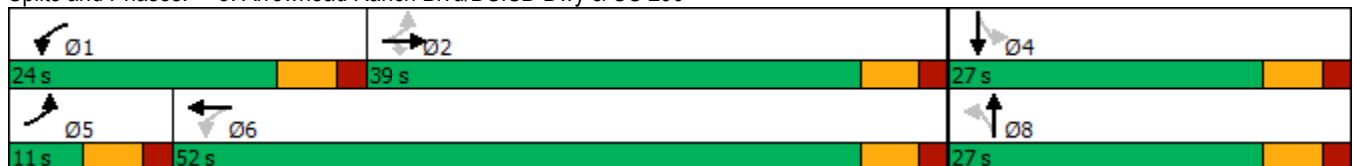


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↘	↙	↕		↕		↕
Traffic Volume (vph)	2	688	34	293	801	112	0	2	0
Future Volume (vph)	2	688	34	293	801	112	0	2	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2		1	6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	5	2	2	1	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	16.0	16.0	11.0	16.0	11.0	11.0	11.0	11.0
Total Split (s)	11.0	39.0	39.0	24.0	52.0	27.0	27.0	27.0	27.0
Total Split (%)	12.2%	43.3%	43.3%	26.7%	57.8%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0		6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	23.8	18.5	18.5	35.0	33.5		10.4		10.4
Actuated g/C Ratio	0.41	0.32	0.32	0.60	0.58		0.18		0.18
v/c Ratio	0.01	0.65	0.06	0.54	0.43		0.65		0.01
Control Delay	7.0	20.6	0.2	9.6	9.1		17.6		22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	7.0	20.6	0.2	9.6	9.1		17.6		22.5
LOS	A	C	A	A	A		B		C
Approach Delay		19.6			9.2		17.6		22.5
Approach LOS		B			A		B		C

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 58.1
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 13.9
 Intersection Capacity Utilization 65.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290



APPENDIX N
FORECASTED 2025 BUILD (WITH DEVELOPMENT) CAPACITY CALCULATIONS

Intersection						
Int Delay, s/veh	3.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	708	18	84	542	41	171
Future Vol, veh/h	708	18	84	542	41	171
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	240	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	10	20	3	15	0	6
Mvmt Flow	814	21	97	623	47	197

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	835	0	1320
Stage 1	-	-	-	-	814
Stage 2	-	-	-	-	506
Critical Hdwy	-	-	4.16	-	6.8
Critical Hdwy Stg 1	-	-	-	-	5.8
Critical Hdwy Stg 2	-	-	-	-	5.8
Follow-up Hdwy	-	-	2.23	-	3.5
Pot Cap-1 Maneuver	-	-	788	-	151
Stage 1	-	-	-	-	401
Stage 2	-	-	-	-	576
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	788	-	132
Mov Cap-2 Maneuver	-	-	-	-	263
Stage 1	-	-	-	-	401
Stage 2	-	-	-	-	505

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	20.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	788	-
HCM Lane V/C Ratio	0.517	-	-	0.123	-
HCM Control Delay (s)	20.5	-	-	10.2	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	2.9	-	-	0.4	-

Intersection												
Int Delay, s/veh	690.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑			↔			↔	
Traffic Vol, veh/h	1	761	22	203	508	34	129	0	245	2	0	0
Future Vol, veh/h	1	761	22	203	508	34	129	0	245	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	250	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	8	86	3	13	92	88	0	4	0	0	0
Mvmt Flow	1	895	26	239	598	40	152	0	288	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	638	0	0	921	0	0	1674	2013	448	1546	2019	319
Stage 1	-	-	-	-	-	-	897	897	-	1096	1096	-
Stage 2	-	-	-	-	-	-	777	1116	-	450	923	-
Critical Hdwy	4.1	-	-	4.16	-	-	9.26	6.5	6.98	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	8.26	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	8.26	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.23	-	-	4.38	4	3.34	3.5	4	3.3
Pot Cap-1 Maneuver	956	-	-	731	-	-	~ 26	59	553	79	59	683
Stage 1	-	-	-	-	-	-	172	361	-	231	292	-
Stage 2	-	-	-	-	-	-	214	285	-	564	351	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	956	-	-	731	-	-	~ 19	40	553	28	40	683
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 19	40	-	28	40	-
Stage 1	-	-	-	-	-	-	172	361	-	231	197	-
Stage 2	-	-	-	-	-	-	~ 144	192	-	270	351	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.4	\$ 3508.7	145
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	52	956	-	-	731	-	-	28
HCM Lane V/C Ratio	8.462	0.001	-	-	0.327	-	-	0.084
HCM Control Delay (s)	\$ 3508.7	8.8	-	-	12.3	-	-	145
HCM Lane LOS	F	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	51.7	0	-	-	1.4	-	-	0.3

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	1014	759	6	15	0
Future Vol, veh/h	2	1014	759	6	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	8	17	0	0	0
Mvmt Flow	2	1193	893	7	18	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	900	0	-	0	1498
Stage 1	-	-	-	-	897
Stage 2	-	-	-	-	601
Critical Hdwy	4.1	-	-	-	6.8
Critical Hdwy Stg 1	-	-	-	-	5.8
Critical Hdwy Stg 2	-	-	-	-	5.8
Follow-up Hdwy	2.2	-	-	-	3.5
Pot Cap-1 Maneuver	763	-	-	-	115
Stage 1	-	-	-	-	363
Stage 2	-	-	-	-	516
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	763	-	-	-	115
Mov Cap-2 Maneuver	-	-	-	-	244
Stage 1	-	-	-	-	362
Stage 2	-	-	-	-	516

Approach	EB	WB	SB
HCM Control Delay, s	0	0	20.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	763	-	-	-	244
HCM Lane V/C Ratio	0.003	-	-	-	0.072
HCM Control Delay (s)	9.7	-	-	-	20.9
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection						
Int Delay, s/veh	2.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	654	46	180	903	30	131
Future Vol, veh/h	654	46	180	903	30	131
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	240	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	6	0	0	2	0	4
Mvmt Flow	760	53	209	1050	35	152

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	813	0	1703 380
Stage 1	-	-	-	-	760 -
Stage 2	-	-	-	-	943 -
Critical Hdwy	-	-	4.1	-	6.8 6.98
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.34
Pot Cap-1 Maneuver	-	-	823	-	84 612
Stage 1	-	-	-	-	428 -
Stage 2	-	-	-	-	344 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	823	-	63 612
Mov Cap-2 Maneuver	-	-	-	-	173 -
Stage 1	-	-	-	-	428 -
Stage 2	-	-	-	-	257 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	20.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	416	-	-	823	-
HCM Lane V/C Ratio	0.45	-	-	0.254	-
HCM Control Delay (s)	20.5	-	-	10.9	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	2.3	-	-	1	-

HCM 6th TWSC
 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

2025 Build
 Timing Plan: PM Peak Hour

Intersection												
Int Delay, s/veh	171.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑			↔			↔	
Traffic Vol, veh/h	2	751	34	293	908	22	112	0	174	2	0	0
Future Vol, veh/h	2	751	34	293	908	22	112	0	174	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	250	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	50	5	13	2	3	96	0	0	5	0	0	0
Mvmt Flow	2	774	35	302	936	23	115	0	179	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	959	0	0	809	0	0	1850	2341	387	1943	2365	480
Stage 1	-	-	-	-	-	-	778	778	-	1552	1552	-
Stage 2	-	-	-	-	-	-	1072	1563	-	391	813	-
Critical Hdwy	5.1	-	-	4.14	-	-	7.5	6.5	7	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.7	-	-	2.22	-	-	3.5	4	3.35	3.5	4	3.3
Pot Cap-1 Maneuver	481	-	-	812	-	-	~47	37	603	40	36	537
Stage 1	-	-	-	-	-	-	360	410	-	121	176	-
Stage 2	-	-	-	-	-	-	239	174	-	610	395	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	481	-	-	812	-	-	~33	23	603	20	23	537
Mov Cap-2 Maneuver	-	-	-	-	-	-	~33	23	-	20	23	-
Stage 1	-	-	-	-	-	-	359	408	-	121	111	-
Stage 2	-	-	-	-	-	-	150	109	-	427	393	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.9	\$ 1362.1	204.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	78	481	-	-	812	-	-	20
HCM Lane V/C Ratio	3.78	0.004	-	-	0.372	-	-	0.103
HCM Control Delay (s)	\$ 1362.1	12.5	-	-	12	-	-	204.7
HCM Lane LOS	F	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	30.7	0	-	-	1.7	-	-	0.3

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	940	1227	26	15	3
Future Vol, veh/h	2	940	1227	26	15	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	5	5	4	0	34
Mvmt Flow	2	989	1292	27	16	3

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1319	0	-	0	1805 660
Stage 1	-	-	-	-	1306 -
Stage 2	-	-	-	-	499 -
Critical Hdwy	4.1	-	-	-	6.8 7.58
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.64
Pot Cap-1 Maneuver	531	-	-	-	72 338
Stage 1	-	-	-	-	221 -
Stage 2	-	-	-	-	581 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	531	-	-	-	72 338
Mov Cap-2 Maneuver	-	-	-	-	170 -
Stage 1	-	-	-	-	220 -
Stage 2	-	-	-	-	581 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	26.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	531	-	-	-	185
HCM Lane V/C Ratio	0.004	-	-	-	0.102
HCM Control Delay (s)	11.8	-	-	-	26.7
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.3

APPENDIX O
FORECASTED 2025 BUILD (WITH DEVELOPMENT) MITIGATED CAPACITY
CALCULATIONS

HCM 6th Signalized Intersection Summary
 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

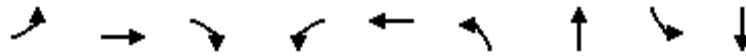
2025 Build Mitigated
 Timing Plan: AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	761	22	203	508	34	129	0	245	2	0	0
Future Volume (veh/h)	1	761	22	203	508	34	129	0	245	2	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1976	1781	625	1930	1707	537	596	1976	1841	1900	1976	1900
Adj Flow Rate, veh/h	1	895	26	239	598	40	152	0	288	2	0	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	0	8	86	3	13	92	88	0	4	0	0	0
Cap, veh/h	320	1054	165	323	1289	86	245	19	390	417	0	0
Arrive On Green	0.00	0.31	0.31	0.11	0.42	0.42	0.37	0.00	0.37	0.37	0.00	0.00
Sat Flow, veh/h	1882	3385	530	1838	3086	206	509	51	1062	901	0	0
Grp Volume(v), veh/h	1	895	26	239	314	324	440	0	0	2	0	0
Grp Sat Flow(s),veh/h/ln	1882	1692	530	1838	1622	1670	1622	0	0	901	0	0
Q Serve(g_s), s	0.0	20.9	3.0	7.0	11.8	11.8	17.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	20.9	3.0	7.0	11.8	11.8	19.7	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.12	0.35		0.65	1.00		0.00
Lane Grp Cap(c), veh/h	320	1054	165	323	677	697	654	0	0	417	0	0
V/C Ratio(X)	0.00	0.85	0.16	0.74	0.46	0.46	0.67	0.00	0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	429	1244	195	343	692	713	654	0	0	417	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.0	27.2	21.0	19.3	17.7	17.7	23.0	0.0	0.0	16.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	5.0	0.4	7.8	0.5	0.5	5.5	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.1	0.4	3.2	3.8	4.0	8.3	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.0	32.2	21.5	27.1	18.2	18.2	28.5	0.0	0.0	16.9	0.0	0.0
LnGrp LOS	B	C	C	C	B	B	C	A	A	B	A	A
Approach Vol, veh/h		922			877			440				2
Approach Delay, s/veh		31.9			20.7			28.5				16.9
Approach LOS		C			C			C				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.1	32.3		37.0	6.1	41.2		37.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	10.0	31.0		31.0	5.0	36.0		31.0				
Max Q Clear Time (g_c+I1), s	9.0	22.9		2.1	2.0	13.8		21.7				
Green Ext Time (p_c), s	0.1	3.4		0.0	0.0	3.3		2.1				
Intersection Summary												
HCM 6th Ctrl Delay				26.8								
HCM 6th LOS				C								

Timings
3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

2025 Build Mitigated
Timing Plan: AM Peak Hour

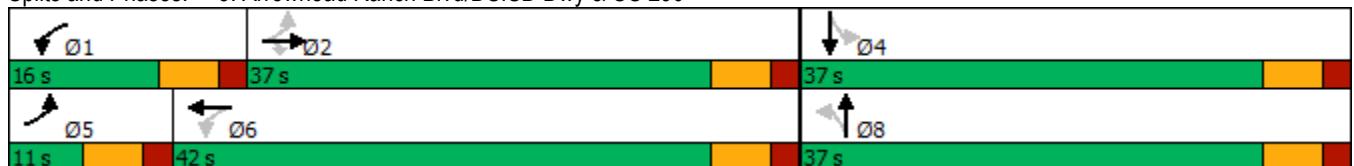


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↙	↕	↘	↙	↕		↕		↕
Traffic Volume (vph)	1	761	22	203	508	129	0	2	0
Future Volume (vph)	1	761	22	203	508	129	0	2	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2		1	6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	5	2	2	1	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	16.0	16.0	11.0	16.0	11.0	11.0	11.0	11.0
Total Split (s)	11.0	37.0	37.0	16.0	42.0	37.0	37.0	37.0	37.0
Total Split (%)	12.2%	41.1%	41.1%	17.8%	46.7%	41.1%	41.1%	41.1%	41.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0		6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	32.6	27.6	27.6	43.1	41.2		31.1		31.1
Actuated g/C Ratio	0.38	0.32	0.32	0.50	0.48		0.36		0.36
v/c Ratio	0.00	0.84	0.07	0.72	0.44		0.81		0.01
Control Delay	11.0	35.4	0.4	27.5	16.5		32.7		19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	11.0	35.4	0.4	27.5	16.5		32.7		19.5
LOS	B	D	A	C	B		C		B
Approach Delay		34.4			19.5		32.7		19.5
Approach LOS		C			B		C		B

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 86.4
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 28.2
 Intersection LOS: C
 Intersection Capacity Utilization 67.3%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290



HCM 6th Signalized Intersection Summary
 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

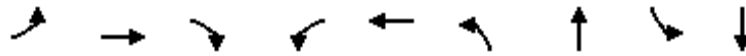
2025 Build
 Timing Plan: PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	751	34	293	908	22	112	0	174	2	0	0
Future Volume (veh/h)	2	751	34	293	908	22	112	0	174	2	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1205	1826	1707	1945	1856	477	1900	1976	1826	1900	1976	1900
Adj Flow Rate, veh/h	2	774	35	302	936	23	115	0	179	2	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	50	5	13	2	3	96	0	0	5	0	0	0
Cap, veh/h	226	1090	455	473	1598	39	211	21	224	377	0	0
Arrive On Green	0.00	0.31	0.31	0.14	0.45	0.45	0.23	0.00	0.23	0.23	0.00	0.00
Sat Flow, veh/h	1148	3469	1447	1853	3516	86	544	91	989	1106	0	0
Grp Volume(v), veh/h	2	774	35	302	469	490	294	0	0	2	0	0
Grp Sat Flow(s),veh/h/ln	1148	1735	1447	1853	1763	1840	1624	0	0	1106	0	0
Q Serve(g_s), s	0.1	11.2	1.0	5.6	11.3	11.3	8.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	11.2	1.0	5.6	11.3	11.3	9.7	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.05	0.39		0.61	1.00		0.00
Lane Grp Cap(c), veh/h	226	1090	455	473	801	836	456	0	0	377	0	0
V/C Ratio(X)	0.01	0.71	0.08	0.64	0.59	0.59	0.64	0.00	0.00	0.01	0.00	0.00
Avail Cap(c_a), veh/h	324	2070	863	761	1423	1486	683	0	0	558	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.4	17.2	13.7	11.3	11.6	11.6	20.7	0.0	0.0	17.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.1	1.4	0.7	0.7	1.5	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.5	0.3	1.6	3.1	3.2	3.6	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.4	18.1	13.8	12.8	12.2	12.2	22.2	0.0	0.0	17.1	0.0	0.0
LnGrp LOS	B	B	B	B	B	B	C	A	A	B	A	A
Approach Vol, veh/h		811			1261			294				2
Approach Delay, s/veh		17.9			12.4			22.2				17.1
Approach LOS		B			B			C				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.1	23.9		18.9	6.2	31.9		18.9				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	17.0	34.0		21.0	5.0	46.0		21.0				
Max Q Clear Time (g_c+I1), s	7.6	13.2		2.1	2.1	13.3		11.7				
Green Ext Time (p_c), s	0.6	4.7		0.0	0.0	5.8		1.3				
Intersection Summary												
HCM 6th Ctrl Delay				15.5								
HCM 6th LOS				B								

Timings
3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

2025 Build
Timing Plan: PM Peak Hour

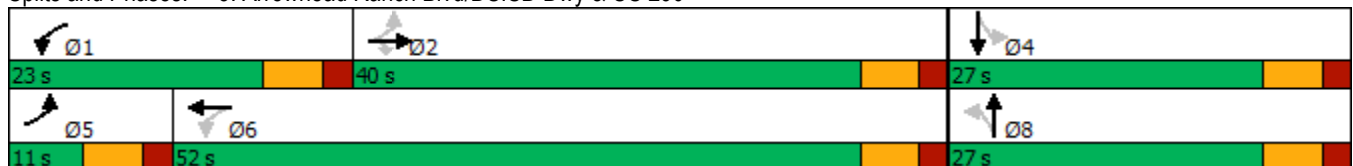


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↙	↑↑	↘	↙	↑↑		↕		↕
Traffic Volume (vph)	2	751	34	293	908	112	0	2	0
Future Volume (vph)	2	751	34	293	908	112	0	2	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2		1	6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	5	2	2	1	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	16.0	16.0	11.0	16.0	11.0	11.0	11.0	11.0
Total Split (s)	11.0	40.0	40.0	23.0	52.0	27.0	27.0	27.0	27.0
Total Split (%)	12.2%	44.4%	44.4%	25.6%	57.8%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0		6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	25.5	20.2	20.2	36.8	35.2		10.6		10.6
Actuated g/C Ratio	0.42	0.34	0.34	0.61	0.59		0.18		0.18
v/c Ratio	0.01	0.67	0.06	0.56	0.48		0.66		0.01
Control Delay	7.0	20.8	0.2	10.0	9.3		18.3		23.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	7.0	20.8	0.2	10.0	9.3		18.3		23.5
LOS	A	C	A	A	A		B		C
Approach Delay		19.9			9.5		18.3		23.5
Approach LOS		B			A		B		C

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 60
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 14.2
 Intersection Capacity Utilization 67.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290



APPENDIX P
EXISTING 2021 QUEUING ANALYSIS

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:45	7:45	7:45	7:45	7:45	7:45
End Time	9:00	9:00	9:00	9:00	9:00	9:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1423	1415	1417	1350	1407	1402
Vehs Exited	1423	1421	1416	1351	1403	1404
Starting Vehs	20	20	17	14	9	15
Ending Vehs	20	14	18	13	13	15
Travel Distance (mi)	728	716	724	689	709	713
Travel Time (hr)	15.2	15.2	15.1	14.5	14.9	15.0
Total Delay (hr)	1.0	1.2	1.0	1.0	1.0	1.0
Total Stops	146	163	145	152	138	148
Fuel Used (gal)	24.0	24.0	23.8	23.0	23.2	23.6

Interval #0 Information Seeding

Start Time	7:45
End Time	8:00
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	8:00
End Time	9:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1423	1415	1417	1350	1407	1402
Vehs Exited	1423	1421	1416	1351	1403	1404
Starting Vehs	20	20	17	14	9	15
Ending Vehs	20	14	18	13	13	15
Travel Distance (mi)	728	716	724	689	709	713
Travel Time (hr)	15.2	15.2	15.1	14.5	14.9	15.0
Total Delay (hr)	1.0	1.2	1.0	1.0	1.0	1.0
Total Stops	146	163	145	152	138	148
Fuel Used (gal)	24.0	24.0	23.8	23.0	23.2	23.6

Intersection: 2: Bunker Ranch Blvd & US 290

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	48	59
Average Queue (ft)	13	20
95th Queue (ft)	36	48
Link Distance (ft)		357
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (ft)	4	46	101	30
Average Queue (ft)	0	11	27	2
95th Queue (ft)	3	32	68	15
Link Distance (ft)			292	108
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150	150		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: US 290 & Spring Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	26	36
Average Queue (ft)	2	11
95th Queue (ft)	11	35
Link Distance (ft)		207
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:15	4:15	4:15	4:15	4:15	4:15
End Time	5:30	5:30	5:30	5:30	5:30	5:30
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1759	1821	1717	1816	1742	1771
Vehs Exited	1762	1804	1712	1813	1739	1766
Starting Vehs	16	7	18	15	17	13
Ending Vehs	13	24	23	18	20	19
Travel Distance (mi)	890	914	860	922	879	893
Travel Time (hr)	18.6	19.1	17.9	19.2	18.4	18.7
Total Delay (hr)	1.3	1.4	1.1	1.4	1.3	1.3
Total Stops	144	148	141	139	130	141
Fuel Used (gal)	30.0	30.9	28.9	31.0	29.4	30.0

Interval #0 Information Seeding

Start Time	4:15
End Time	4:30
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:30
End Time	5:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1759	1821	1717	1816	1742	1771
Vehs Exited	1762	1804	1712	1813	1739	1766
Starting Vehs	16	7	18	15	17	13
Ending Vehs	13	24	23	18	20	19
Travel Distance (mi)	890	914	860	922	879	893
Travel Time (hr)	18.6	19.1	17.9	19.2	18.4	18.7
Total Delay (hr)	1.3	1.4	1.1	1.4	1.3	1.3
Total Stops	144	148	141	139	130	141
Fuel Used (gal)	30.0	30.9	28.9	31.0	29.4	30.0

Intersection: 2: Bunker Ranch Blvd & US 290

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	32	57
Average Queue (ft)	4	25
95th Queue (ft)	21	50
Link Distance (ft)		357
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (ft)	4	38	64	24
Average Queue (ft)	0	15	17	1
95th Queue (ft)	2	33	42	11
Link Distance (ft)			292	108
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150	150		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: US 290 & Spring Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	15	57
Average Queue (ft)	1	16
95th Queue (ft)	6	46
Link Distance (ft)		207
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

APPENDIX Q
FORECASTED 2025 NO-BUILD (BASE) QUEUING ANALYSIS

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:45	7:45	7:45	7:45	7:45	7:45
End Time	9:00	9:00	9:00	9:00	9:00	9:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1725	1757	1766	1806	1744	1759
Vehs Exited	1736	1754	1768	1802	1740	1761
Starting Vehs	39	23	27	29	24	27
Ending Vehs	28	26	25	33	28	28
Travel Distance (mi)	754	767	777	786	757	768
Travel Time (hr)	188.2	192.6	205.5	178.7	148.8	182.8
Total Delay (hr)	172.4	176.6	189.0	162.2	132.7	166.6
Total Stops	297	253	272	335	293	290
Fuel Used (gal)	60.4	62.6	66.3	60.9	53.1	60.7

Interval #0 Information Seeding

Start Time	7:45
End Time	8:00
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	8:00
End Time	9:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1725	1757	1766	1806	1744	1759
Vehs Exited	1736	1754	1768	1802	1740	1761
Starting Vehs	39	23	27	29	24	27
Ending Vehs	28	26	25	33	28	28
Travel Distance (mi)	754	767	777	786	757	768
Travel Time (hr)	188.2	192.6	205.5	178.7	148.8	182.8
Total Delay (hr)	172.4	176.6	189.0	162.2	132.7	166.6
Total Stops	297	253	272	335	293	290
Fuel Used (gal)	60.4	62.6	66.3	60.9	53.1	60.7

Intersection: 2: Bunker Ranch Blvd & US 290

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	51	72
Average Queue (ft)	19	36
95th Queue (ft)	43	60
Link Distance (ft)		357
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

Movement	EB	EB	WB	WB	NB	SB
Directions Served	T	R	L	T	LTR	LTR
Maximum Queue (ft)	4	24	122	19	355	24
Average Queue (ft)	0	1	51	1	326	2
95th Queue (ft)	2	10	96	11	358	13
Link Distance (ft)	780			451	292	108
Upstream Blk Time (%)					100	
Queuing Penalty (veh)					0	
Storage Bay Dist (ft)		250	150			
Storage Blk Time (%)			0			
Queuing Penalty (veh)			0			

Intersection: 4: US 290 & Spring Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	16	40
Average Queue (ft)	1	11
95th Queue (ft)	8	36
Link Distance (ft)		207
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:15	4:15	4:15	4:15	4:15	4:15
End Time	5:30	5:30	5:30	5:30	5:30	5:30
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2088	2118	2059	2049	2112	2086
Vehs Exited	2082	2113	2055	2044	2108	2080
Starting Vehs	28	27	40	33	33	31
Ending Vehs	34	32	44	38	37	36
Travel Distance (mi)	975	992	973	966	1004	982
Travel Time (hr)	161.3	154.7	177.2	173.6	159.4	165.2
Total Delay (hr)	141.0	133.9	157.0	153.6	138.7	144.8
Total Stops	378	390	344	356	374	369
Fuel Used (gal)	66.9	66.0	69.8	69.3	66.7	67.7

Interval #0 Information Seeding

Start Time	4:15
End Time	4:30
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:30
End Time	5:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2088	2118	2059	2049	2112	2086
Vehs Exited	2082	2113	2055	2044	2108	2080
Starting Vehs	28	27	40	33	33	31
Ending Vehs	34	32	44	38	37	36
Travel Distance (mi)	975	992	973	966	1004	982
Travel Time (hr)	161.3	154.7	177.2	173.6	159.4	165.2
Total Delay (hr)	141.0	133.9	157.0	153.6	138.7	144.8
Total Stops	378	390	344	356	374	369
Fuel Used (gal)	66.9	66.0	69.8	69.3	66.7	67.7

Intersection: 2: Bunker Ranch Blvd & US 290

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	56	135
Average Queue (ft)	21	45
95th Queue (ft)	45	98
Link Distance (ft)		357
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

Movement	EB	EB	WB	NB	SB
Directions Served	L	R	L	LTR	LTR
Maximum Queue (ft)	11	24	134	345	18
Average Queue (ft)	0	1	68	301	1
95th Queue (ft)	8	10	116	326	11
Link Distance (ft)				292	108
Upstream Blk Time (%)				100	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)	150	250	150		
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 4: US 290 & Spring Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	27	52
Average Queue (ft)	2	16
95th Queue (ft)	12	44
Link Distance (ft)		207
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

APPENDIX R
FORECASTED 2025 NO-BUILD (BASE) MITIGATED QUEUING ANALYSIS

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:45	7:45	7:45	7:45	7:45	7:45
End Time	9:00	9:00	9:00	9:00	9:00	9:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1998	2020	2035	1992	2016	2012
Vehs Exited	2018	2017	2066	2005	1996	2021
Starting Vehs	42	33	53	33	20	37
Ending Vehs	22	36	22	20	40	25
Travel Distance (mi)	842	857	854	836	851	848
Travel Time (hr)	29.6	30.2	31.6	29.3	30.7	30.3
Total Delay (hr)	10.9	11.2	12.4	10.6	11.8	11.4
Total Stops	1135	1186	1231	1135	1221	1183
Fuel Used (gal)	34.9	35.3	36.0	34.9	35.8	35.4

Interval #0 Information Seeding

Start Time	7:45
End Time	8:00
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	8:00
End Time	9:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1998	2020	2035	1992	2016	2012
Vehs Exited	2018	2017	2066	2005	1996	2021
Starting Vehs	42	33	53	33	20	37
Ending Vehs	22	36	22	20	40	25
Travel Distance (mi)	842	857	854	836	851	848
Travel Time (hr)	29.6	30.2	31.6	29.3	30.7	30.3
Total Delay (hr)	10.9	11.2	12.4	10.6	11.8	11.4
Total Stops	1135	1186	1231	1135	1221	1183
Fuel Used (gal)	34.9	35.3	36.0	34.9	35.8	35.4

Intersection: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

Movement	EB	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	T	R	L	T	TR	LTR	LTR
Maximum Queue (ft)	9	241	221	64	163	182	162	340	18
Average Queue (ft)	0	133	112	19	74	81	61	178	1
95th Queue (ft)	5	201	184	58	132	150	135	318	9
Link Distance (ft)		780	780			451	451	292	108
Upstream Blk Time (%)								2	
Queuing Penalty (veh)								0	
Storage Bay Dist (ft)	150			250	150				
Storage Blk Time (%)		4	0		0	1			
Queuing Penalty (veh)		0	0		1	2			

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:15	4:15	4:15	4:15	4:15	4:15
End Time	5:30	5:30	5:30	5:30	5:30	5:30
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2332	2349	2228	2258	2295	2292
Vehs Exited	2336	2340	2229	2262	2293	2294
Starting Vehs	41	35	42	32	29	35
Ending Vehs	37	44	41	28	31	37
Travel Distance (mi)	1064	1088	1010	1052	1049	1053
Travel Time (hr)	35.8	36.0	33.5	34.3	35.6	35.1
Total Delay (hr)	12.8	12.5	11.3	11.7	12.8	12.2
Total Stops	1278	1276	1209	1209	1252	1243
Fuel Used (gal)	43.7	43.8	41.1	42.7	42.7	42.8

Interval #0 Information Seeding

Start Time	4:15
End Time	4:30
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:30
End Time	5:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2332	2349	2228	2258	2295	2292
Vehs Exited	2336	2340	2229	2262	2293	2294
Starting Vehs	41	35	42	32	29	35
Ending Vehs	37	44	41	28	31	37
Travel Distance (mi)	1064	1088	1010	1052	1049	1053
Travel Time (hr)	35.8	36.0	33.5	34.3	35.6	35.1
Total Delay (hr)	12.8	12.5	11.3	11.7	12.8	12.2
Total Stops	1278	1276	1209	1209	1252	1243
Fuel Used (gal)	43.7	43.8	41.1	42.7	42.7	42.8

Intersection: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

Movement	EB	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	T	R	L	T	TR	LTR	LTR
Maximum Queue (ft)	14	203	185	56	164	199	152	214	18
Average Queue (ft)	1	127	106	13	91	78	57	98	1
95th Queue (ft)	8	187	169	40	150	144	115	179	10
Link Distance (ft)		780	780			451	451	292	108
Upstream Blk Time (%)								0	
Queuing Penalty (veh)								0	
Storage Bay Dist (ft)	150			250	150				
Storage Blk Time (%)		3			2	0			
Queuing Penalty (veh)		0			6	0			

APPENDIX S
FORECASTED 2025 BUILD (WITH DEVELOPMENT) QUEUING ANALYSIS

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:45	7:45	7:45	7:45	7:45	7:45
End Time	9:00	9:00	9:00	9:00	9:00	9:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1897	1884	1853	1951	1875	1891
Vehs Exited	1907	1894	1845	1939	1874	1892
Starting Vehs	41	34	24	18	30	29
Ending Vehs	31	24	32	30	31	28
Travel Distance (mi)	831	815	817	855	815	827
Travel Time (hr)	226.8	235.8	279.0	194.6	213.3	229.9
Total Delay (hr)	209.0	218.4	261.6	176.3	195.7	212.2
Total Stops	439	402	373	426	435	414
Fuel Used (gal)	71.8	74.1	82.8	67.1	68.7	72.9

Interval #0 Information Seeding

Start Time	7:45
End Time	8:00
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	8:00
End Time	9:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1897	1884	1853	1951	1875	1891
Vehs Exited	1907	1894	1845	1939	1874	1892
Starting Vehs	41	34	24	18	30	29
Ending Vehs	31	24	32	30	31	28
Travel Distance (mi)	831	815	817	855	815	827
Travel Time (hr)	226.8	235.8	279.0	194.6	213.3	229.9
Total Delay (hr)	209.0	218.4	261.6	176.3	195.7	212.2
Total Stops	439	402	373	426	435	414
Fuel Used (gal)	71.8	74.1	82.8	67.1	68.7	72.9

Intersection: 2: Bunker Ranch Blvd & US 290

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	58	218
Average Queue (ft)	22	76
95th Queue (ft)	45	156
Link Distance (ft)		357
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	R	L	T	LTR	LTR
Maximum Queue (ft)	11	17	115	29	353	24
Average Queue (ft)	0	1	52	1	322	2
95th Queue (ft)	5	9	95	21	355	13
Link Distance (ft)				451	292	108
Upstream Blk Time (%)					100	
Queuing Penalty (veh)					0	
Storage Bay Dist (ft)	150	250	150			
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			1	0		

Intersection: 4: US 290 & Spring Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	21	49
Average Queue (ft)	1	13
95th Queue (ft)	10	40
Link Distance (ft)		207
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:15	4:15	4:15	4:15	4:15	4:15
End Time	5:30	5:30	5:30	5:30	5:30	5:30
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2247	2322	2298	2290	2217	2275
Vehs Exited	2235	2315	2293	2293	2214	2270
Starting Vehs	32	32	36	44	41	36
Ending Vehs	44	39	41	41	44	42
Travel Distance (mi)	1038	1084	1068	1068	1041	1060
Travel Time (hr)	210.3	204.7	191.7	183.5	171.6	192.4
Total Delay (hr)	188.1	181.9	169.0	160.7	149.7	169.9
Total Stops	500	543	524	553	485	520
Fuel Used (gal)	80.3	80.7	77.6	75.9	71.7	77.3

Interval #0 Information Seeding

Start Time	4:15
End Time	4:30
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:30
End Time	5:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2247	2322	2298	2290	2217	2275
Vehs Exited	2235	2315	2293	2293	2214	2270
Starting Vehs	32	32	36	44	41	36
Ending Vehs	44	39	41	41	44	42
Travel Distance (mi)	1038	1084	1068	1068	1041	1060
Travel Time (hr)	210.3	204.7	191.7	183.5	171.6	192.4
Total Delay (hr)	188.1	181.9	169.0	160.7	149.7	169.9
Total Stops	500	543	524	553	485	520
Fuel Used (gal)	80.3	80.7	77.6	75.9	71.7	77.3

Intersection: 2: Bunker Ranch Blvd & US 290

Movement	EB	WB	NB
Directions Served	R	L	LR
Maximum Queue (ft)	9	83	262
Average Queue (ft)	0	38	84
95th Queue (ft)	4	68	196
Link Distance (ft)			357
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)	240	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	R	L	T	TR	LTR	LTR
Maximum Queue (ft)	8	35	160	183	92	329	35
Average Queue (ft)	0	1	79	15	6	301	4
95th Queue (ft)	6	13	148	111	65	321	20
Link Distance (ft)				451	451	292	108
Upstream Blk Time (%)						100	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)	150	250	150				
Storage Blk Time (%)			2	0			
Queuing Penalty (veh)			10	0			

Intersection: 4: US 290 & Spring Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	11	54
Average Queue (ft)	1	17
95th Queue (ft)	9	46
Link Distance (ft)		207
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 10

APPENDIX T
FORECASTED 2025 BUILD (WITH DEVELOPMENT) MITIGATED
QUEUING ANALYSIS

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:45	7:45	7:45	7:45	7:45	7:45
End Time	9:00	9:00	9:00	9:00	9:00	9:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2194	2168	2165	2115	2205	2168
Vehs Exited	2195	2164	2162	2120	2197	2169
Starting Vehs	47	36	31	37	31	37
Ending Vehs	46	40	34	32	39	35
Travel Distance (mi)	933	909	916	884	913	911
Travel Time (hr)	38.0	36.9	35.7	34.0	37.1	36.3
Total Delay (hr)	16.9	16.3	15.0	14.0	16.1	15.7
Total Stops	1432	1476	1425	1367	1483	1436
Fuel Used (gal)	40.8	39.7	39.6	38.1	39.2	39.5

Interval #0 Information Seeding

Start Time	7:45
End Time	8:00
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	8:00
End Time	9:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2194	2168	2165	2115	2205	2168
Vehs Exited	2195	2164	2162	2120	2197	2169
Starting Vehs	47	36	31	37	31	37
Ending Vehs	46	40	34	32	39	35
Travel Distance (mi)	933	909	916	884	913	911
Travel Time (hr)	38.0	36.9	35.7	34.0	37.1	36.3
Total Delay (hr)	16.9	16.3	15.0	14.0	16.1	15.7
Total Stops	1432	1476	1425	1367	1483	1436
Fuel Used (gal)	40.8	39.7	39.6	38.1	39.2	39.5

Intersection: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

Movement	EB	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	T	R	L	T	TR	LTR	LTR
Maximum Queue (ft)	9	254	249	72	171	202	160	337	24
Average Queue (ft)	0	162	142	18	90	99	73	189	1
95th Queue (ft)	4	230	219	59	160	170	141	335	10
Link Distance (ft)		780	780			451	451	292	108
Upstream Blk Time (%)								4	
Queuing Penalty (veh)								0	
Storage Bay Dist (ft)	150			250	150				
Storage Blk Time (%)		10	0		1	1			
Queuing Penalty (veh)		0	0		3	2			

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:15	4:15	4:15	4:15	4:15	4:15
End Time	5:30	5:30	5:30	5:30	5:30	5:30
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2498	2531	2518	2541	2481	2514
Vehs Exited	2511	2537	2512	2563	2485	2521
Starting Vehs	49	34	32	47	43	42
Ending Vehs	36	28	38	25	39	34
Travel Distance (mi)	1126	1159	1150	1157	1121	1143
Travel Time (hr)	40.4	40.9	39.9	41.5	39.7	40.5
Total Delay (hr)	15.4	15.4	14.7	15.8	14.8	15.2
Total Stops	1408	1465	1362	1503	1398	1427
Fuel Used (gal)	46.7	48.2	47.5	48.7	46.7	47.5

Interval #0 Information Seeding

Start Time	4:15
End Time	4:30
Total Time (min)	15
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:30
End Time	5:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2498	2531	2518	2541	2481	2514
Vehs Exited	2511	2537	2512	2563	2485	2521
Starting Vehs	49	34	32	47	43	42
Ending Vehs	36	28	38	25	39	34
Travel Distance (mi)	1126	1159	1150	1157	1121	1143
Travel Time (hr)	40.4	40.9	39.9	41.5	39.7	40.5
Total Delay (hr)	15.4	15.4	14.7	15.8	14.8	15.2
Total Stops	1408	1465	1362	1503	1398	1427
Fuel Used (gal)	46.7	48.2	47.5	48.7	46.7	47.5

Intersection: 3: Arrowhead Ranch Blvd/DSISD Dwy & US 290

Movement	EB	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	T	R	L	T	TR	LTR	LTR
Maximum Queue (ft)	14	220	209	50	170	192	160	261	24
Average Queue (ft)	1	127	108	15	93	84	58	100	1
95th Queue (ft)	9	196	179	42	152	152	122	189	12
Link Distance (ft)		780	780			451	451	292	108
Upstream Blk Time (%)								0	
Queuing Penalty (veh)								0	
Storage Bay Dist (ft)	150			250	150				
Storage Blk Time (%)		3	0		1	0			
Queuing Penalty (veh)		0	0		5	1			

conditions during both the weekday AM and weekday PM peak hours, and can be anticipated to continue to be satisfied under forecasted 2025 build (with development) conditions. Therefore, the installation of traffic signal control at the intersection of US 290 with Arrowhead Ranch Boulevard is required to accommodate the traffic volumes generated by the proposed Arrowhead Ranch commercial development and the installation of traffic signal control at the intersection would be the sole responsibility of the Arrowhead Ranch development.

The available sight distance along US 290 to the back of queue at Arrowhead Ranch Boulevard exceeds the required stopping sight distance for a posted speed limit of 60 miles per hour.

Capacity calculations performed for the intersection of US 290 with Arrowhead Ranch Boulevard assuming the installation of a traffic signal at the intersection revealed that the intersection can be anticipated to operate at an overall intersection Level of Service C or better during the weekday AM and PM peak hours, with all movements operating at a LOS C or better, following installation of traffic signal control.

The right turn in/right turn out driveway proposed to be constructed as part of the planned Arrowhead Ranch commercial developments will be located in the middle of the taper of the existing eastbound right turn lane on US 290 at its intersection with Arrowhead Ranch Boulevard. Therefore, it is anticipated that the eastbound right turn lane on US 290 will need to be lengthened in order to accommodate the location of the right turn in/right turn out driveway and the increase in traffic volumes associated with the Arrowhead Ranch development.

According to the City of Dripping Springs Code of Ordinances, Chapter 28, Exhibit A, Section 11.11, *“The intersections included within the traffic impact analysis shall be considered adequate to serve the proposed development if existing intersections can accommodate the existing service volume, the service volume of the proposed development, and the service volume of approved but unbuilt developments holding valid, unexpired building permits at level of service “C” or above.”* Therefore, signal warrant evaluations were not performed for the intersections of US 290 with Bunker Ranch Boulevard and US 290 with Springs Lane.

The results of queueing analyses performed for the remaining study intersections revealed that each of the existing auxiliary turn lanes at the study intersections is of sufficient length to accommodate all existing queues, as well as all forecasted 2025 queues, both without and following the proposed Bunker Ranch subdivision expansion.

Therefore, no mitigations to the existing study intersections are anticipated to be required in order to accommodate the traffic volumes anticipated to be generated by the proposed Bunker Ranch subdivision expansion.

This concludes CEC’s Revised Traffic Impact Analysis for the construction of the proposed Bunker Ranch subdivision expansion, located south of US 290 at its intersection with Bunker Ranch Boulevard in the City of Dripping Springs, Hays County, Texas.

Included with this report is a Technical Appendix containing all counts, analyses and calculations.

Exhibit H



DRIPPING SPRINGS
Texas

City of Dripping Springs

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cityofdrippingsprings.com

Open spaces, friendly faces.

Date: **May 20, 2022**

Name: **Steve Harren**
Email: **Steveharren@aol.com**

Dear **Mr. Harren**:

This letter is to inform you that the Development Review Committee reviewed **VAR2022-0005**, a variance requesting to be relieved from the sidewalk requirements for the road from US290 to the Hardy Tract.

The development review committee has approved the variance request with the following conditions:

- 1. Sidewalks are required along the entire length of one side of the road; and**
- 2. Sidewalks along the other side of the road are deferred until the adjacent property is developed.**

Per section 28.04.015(k), this decision can be appealed to the Planning & Zoning Commission. An appeal can be requested in writing via email.

Should you have any questions or concerns, please feel free to reach out to the planning department.

Regards,

Tory Carpenter, AICP
Senior Planner

Exhibit I



CITY OF DRIPPING SPRINGS

PHYSICAL: 511 Mercer Street • MAILING: PO Box 384 • Dripping Springs, TX 78620
512.858.4725 • www.cityofdrippingsprings.com

May 4, 2020

Attn: Steve Harren
Overlook at Bunker Ranch, LLC
317 Grace Lane, Suite 240,
Austin Texas 78746
JBock@sunlandgrp.com

RE: Decision by Development Team Review Committee – Sidewalk Fee-in-Lieu for Overlook at Bunker Ranch

Project Number: SFL2021-0001
Project Name: Overlook at Bunker Ranch
Project Address: 2004 Creek Road

Mr. Harren:

The City of Dripping Springs has finished the review of SFL2021-0001 Overlook at Bunker Ranch. The applicant is requesting to not construct 10,810 square feet of sidewalk with the Overlook at Bunker Ranch due to the proposed sidewalk not providing any beneficial pedestrian connectivity. The applicant is requesting to pay fee-in-lieu for 10,810 square feet of the sidewalk. Per Chapter 28, Article 28.04 Subdivision Ordinances, Section 28.04.019 Sidewalks of the City of Dripping Springs Code of Ordinances:

The Development Review Committee shall consider the following criteria when evaluating a request for fee-in-lieu of construction for sidewalks:

- I. Proximity to the nearest existing sidewalk;
- II. Proximity to public facilities, such as public or private schools, libraries, and other government buildings;
- III. Whether any public sidewalk improvements are planned or contemplated in the area; and
- IV. Any other information deemed appropriate by the Development Review Committee.

The Development Review Committee has found that the sidewalk would currently provide no beneficial pedestrian connectivity to the adjacent subdivisions. There are no proposed sidewalks planned or contemplated in this area and this development is not near any public facilities. The City **approves the sidewalk fee-in-lieu request for the entire 10,810 square feet of sidewalk.**

Gateway to the Hill Country



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Please provide the Sidewalk Fee-in-lieu per the City's Fee Schedule prior to approval of the Preliminary Plat:

Sidewalk Fee-in-Lieu: \$8.00/square foot of approved fee-in-lieu of sidewalk construction

Should you have any questions or concerns in the meantime, please feel free to reach out to the Planning Department.

Sincerely,

Michelle Fischer
City Administrator

Gateway to the Hill Country

City of ~~DR~~ BR
Drip 175K
\$ 86,480
sidewalk fee
in lieu

Exhibit J

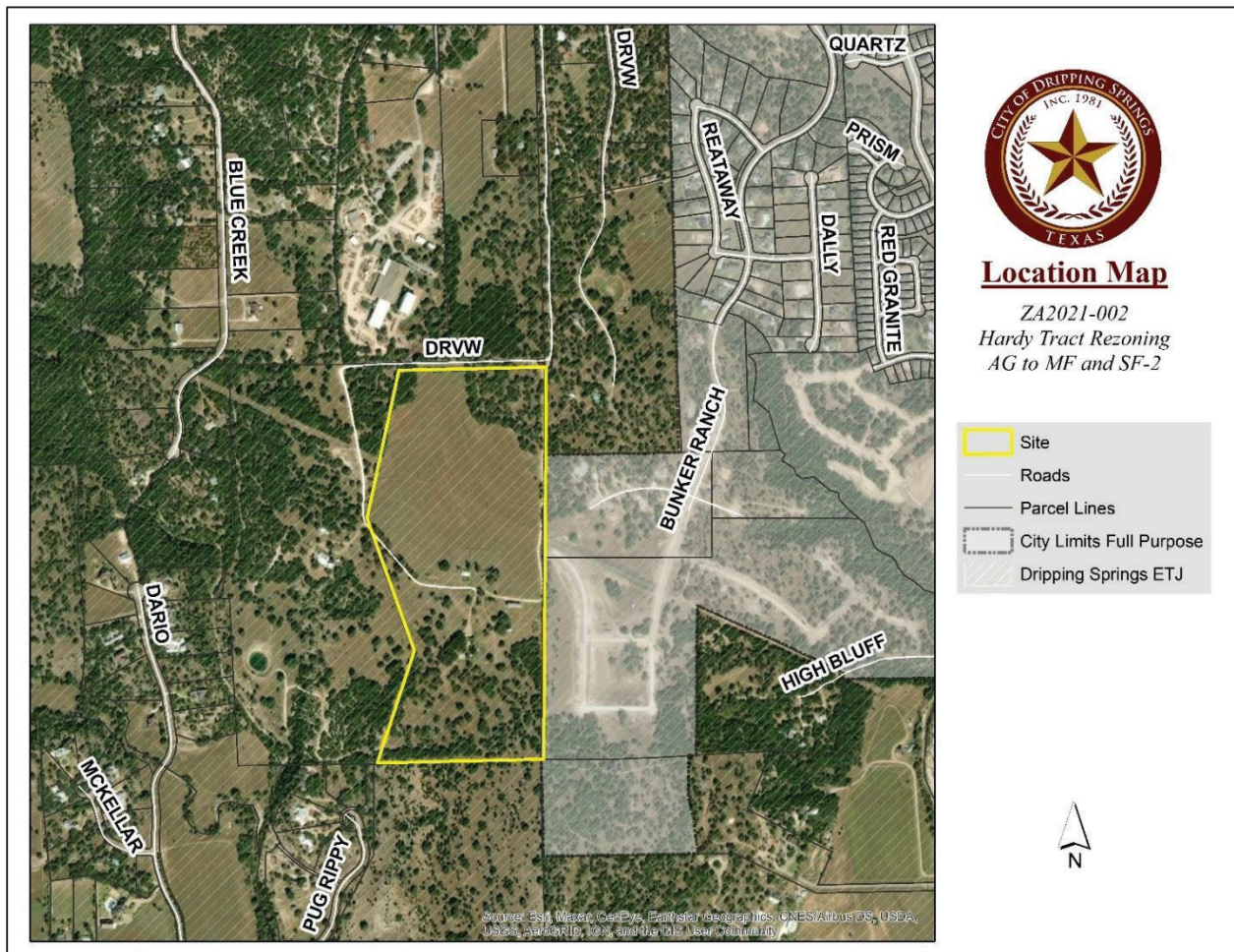


Planning and Zoning Commission Planning Department Staff Report

Planning and Zoning Commission Meeting: June 22, 2021
Project No: ZA2021-0002
Project Planner: Amanda Padilla, Senior Planner

Item Details

Project Name: Hardy Tract
Property Location: 2901 W US Highway 290, Dripping Springs, Texas 78620 (R15103)
Legal Description: Approximately 79.61 acres, situated in the Benjamin F. Hanna Survey No. 28, Abstract No. 222
Applicant: Steve Harren c/o Brian Estes, P.E.
Property Owners: P & H Family Limited Partnership No. 1
Request: Zoning Map Amendment to zone a 78.021-acre tract of land to SF-2, Moderate Density Residential zoning district, upon annexation.
Staff Recommendation: Staff is recommending approval of the SF-2 Zoning district



Planning Department Staff Report

Overview

The applicant submitted a petition for voluntary annexation of the approximately 78.021 acres, therefore should the annexation be approved by City Council at the July 20, 2021 meeting, the applicant would like to request the zoning designation of SF-2, Moderate Density Residential. The applicant’s intention for development of the 78.021-acre tract is a similar build to the property east of this tract, Bunker Ranch Phase 3. The applicant had previously requested SF-2 for the northern portion and MF for the southern portion of the tract but has since removed the MF zoning.

Site Information

Location:

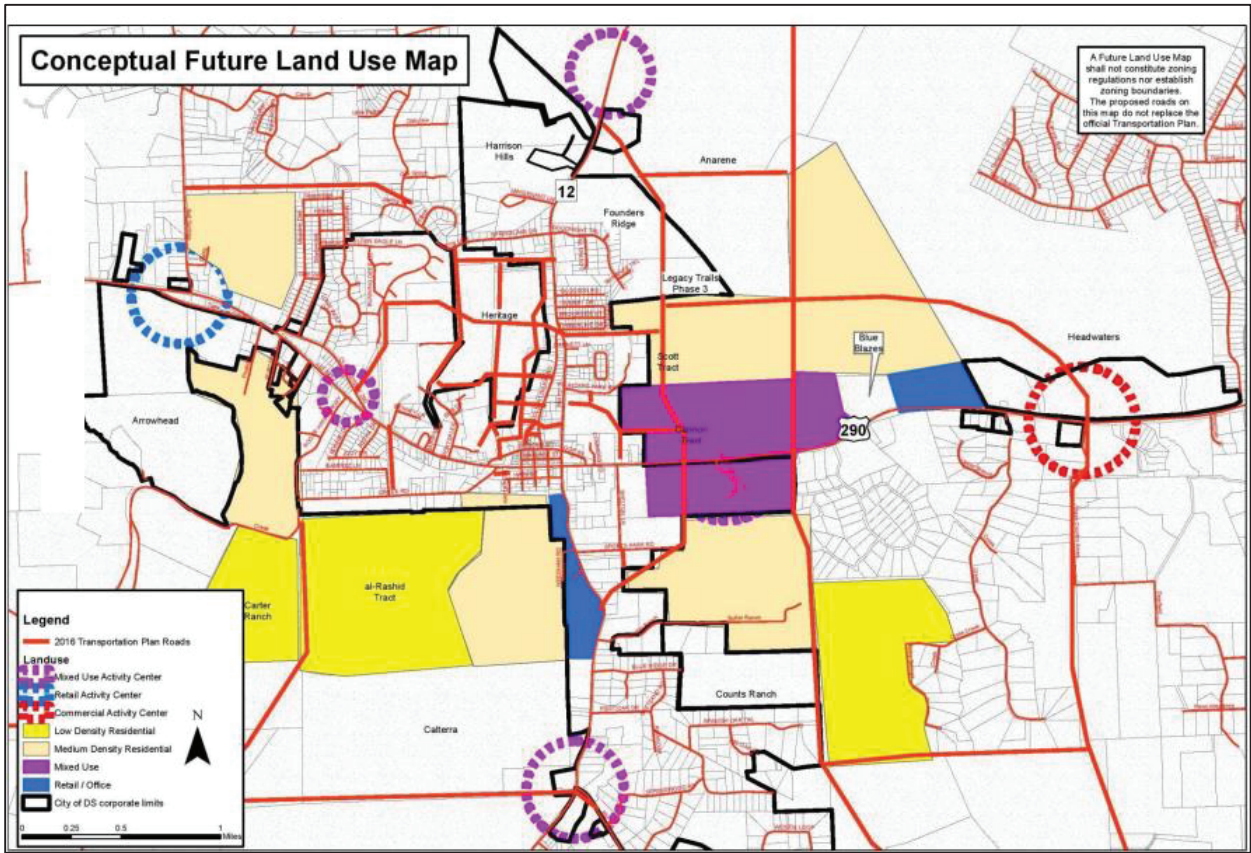
The subject property is located south of US Highway 290, along the western boundary of Bunker Ranch Phase 3 and north of Creek Road.

Physical and Natural Features:

The subject property is open in the norther portion and heavily treed in the southern portion. The property has a residential home that will be removed for development with a 60-foot access easement that extends out to US Highway 290.

Future Land Use and Zoning Designations:

The subject property is not indicated on the Future Land Use Map. There is currently no zoning designation on the property because at the time of application the property was within the City’s Extraterritorial Jurisdiction.



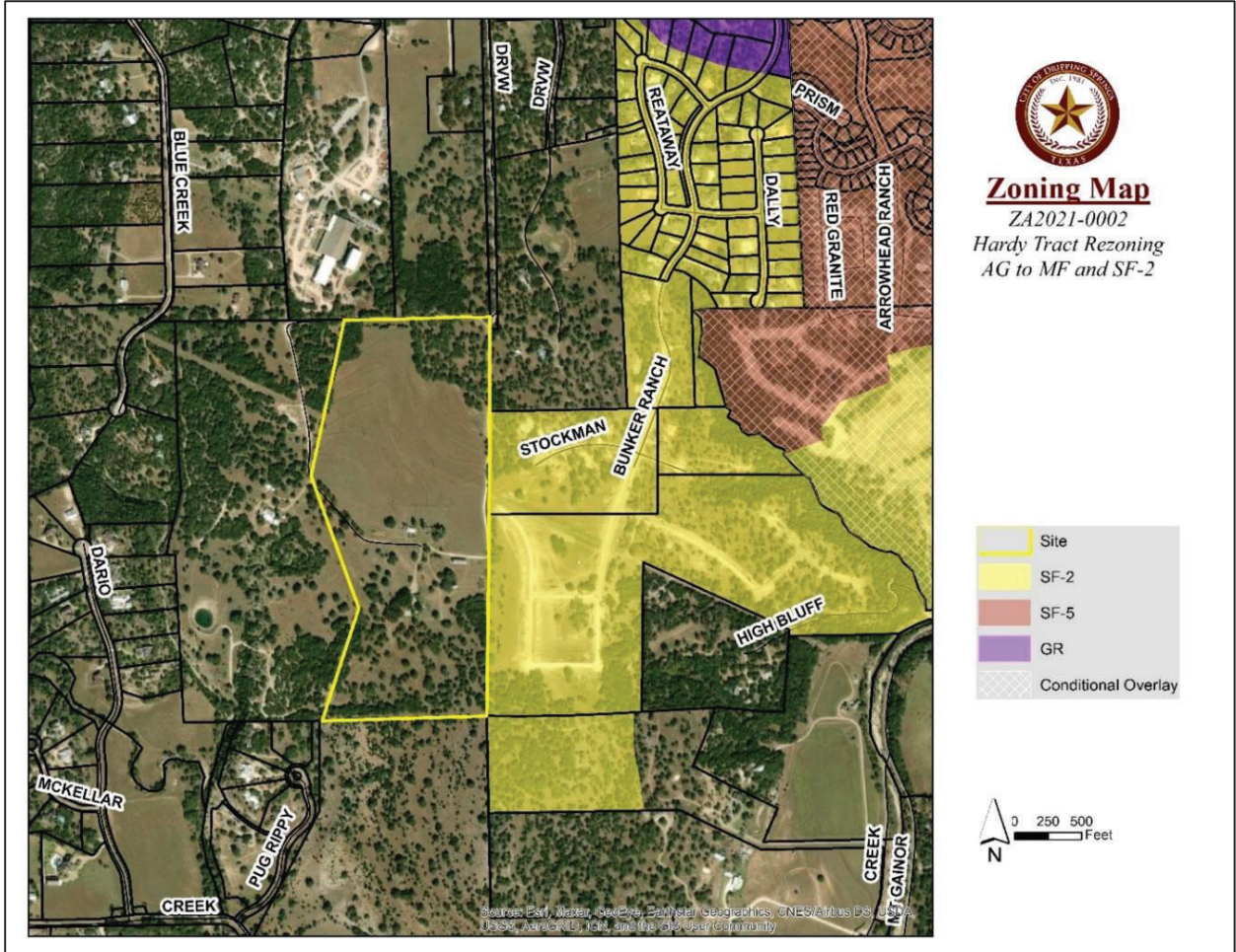
Planning Department Staff Report

Surrounding Properties:

The Subject property is just west of the City Limits. The surrounding lots had originally been large tract residential but in recent years the adjacent City Limit tracts have become zoned SF-2, which allows for tracts greater than a 1/2 acre. The tracts to the north, west, and south are within the ETJ and are larger than 1 acre.

The current zoning and existing uses of the adjacent properties to the north, south, east, and west are outlined in the table below:

Direction	Zoning District	Existing Use	Comprehensive Plan
North	ETJ	Residential	The properties are not within in the Comprehensive Plan or Future Land Use Map.
East	SF-2, Moderate Density Residential	Residential (Bunker Ranch Subdivision)	
South	ETJ	Residential	
West	ETJ	Residential	



Planning Department Staff Report

Property History:

The applicant has come before the commission on April 27, 2021 for a zoning map amendment to zone the property to SF-2 and MF with a conditional overlay. The Planning and Zoning Commission had unanimously voted to postpone the zoning amendment. The applicant met with staff and submitted a new application which is being presented today.

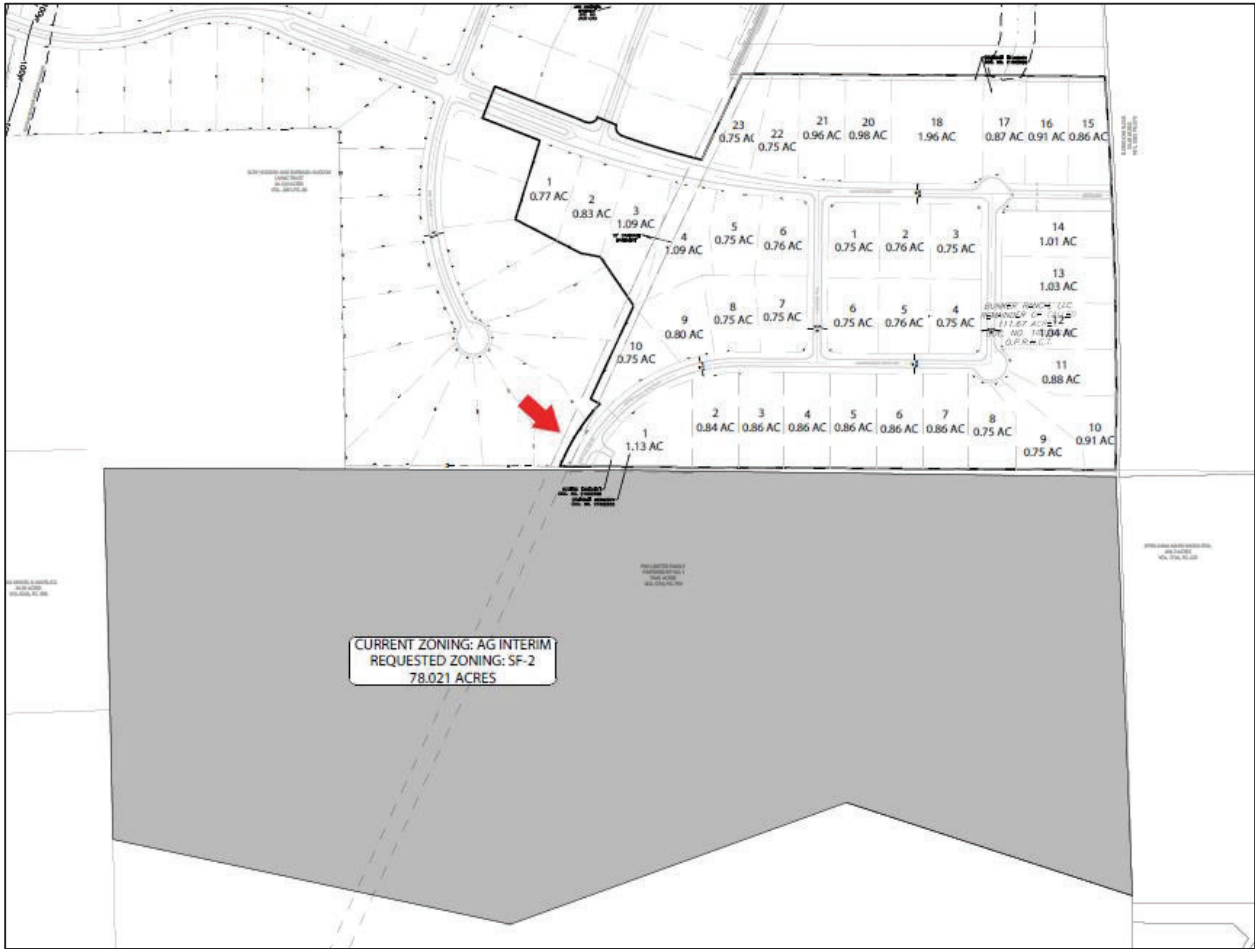
Utilities

The subject property is located within the Dripping Springs Water Supply Corporation service area for Water, Pedernales Electric Cooperative (PEC) service area for electricity and will be utilizing on-site septic facilities for wastewater.

Transportation

The subject property will have ingress and egress through Phase 3 of the Bunker Ranch Development. The access would be through local streets which provide primary land access and connectivity between land parcels and other streets and collectors.

A Traffic Impact Analysis is currently being reviewed by the City’s Transportation Engineer.



Proposed Zoning District

Single-family residential district—Moderate density (SF-2)

The Single-family residential district – moderate density (SF-2) is intended to provide for development of primarily moderate-density detached, single-family residences on lots of at least ½ acre in size.

Permitted uses: Those uses listed for the SF-2 district or any less intense residential district in appendix C [appendix E] (Use Charts) as "P" or "C" are authorized uses permitted by right or conditionally permitted uses, respectively.

Development Standards for SF-2	
Size of Lots	
Minimum Lot area	½ acre
Setback Requirements	
Minimum Front Yard	25 feet
Minimum Side Yard	15 feet
Minimum Rear Yard	25 feet
Height Regulations	
Main Building	2 ½ stories, or 40', whichever is less, for the main buildings
Accessory Building	25'
Other Development Standards	
Impervious Cover	40% total, including main buildings and accessory buildings

Special requirements:

- a) On-site dwellings: Recreational vehicles, manufactured homes, travel trailers or motor homes may not be used for on-site dwelling purposes.
- b) Open storage: Open storage is prohibited (except for materials for the resident's personal use or consumption such as firewood, garden materials, etc.).
- c) Side-entry garages: Single-family homes with side-entry garages where lot frontage is only to one street (not a corner lot) shall have a minimum of 25 feet from the door face of the garage or carport to the side property line for maneuvering.
- d) Swimming pools: Swimming pools shall be constructed and enclosed in accordance with the city building code.
- e) Nonresidential uses: Site plan approval shall be required for any nonresidential use (such as a school, church, child-care center, private recreation facility, etc.) in the SF-2 district. Any nonresidential land use that may be permitted in this district shall conform to the local retail district standards.
- f) Temporary facilities: There shall be no permanent use of temporary facilities or buildings.
- g) Other regulations: Refer to section 5, Development Standards and Use Regulations.
- h) OSSFs: On-site sewage facilities (OSSFs) are prohibited in this district on lots of less than three-quarters of an acre.

Criteria

Staff has reviewed the proposed rezoning request based on the criteria outlined in Chapter 30 Zoning

Exhibit A Zoning Ordinance Section 2.28.2, see below:

Zoning Map Amendment Criteria	
1. Whether the proposed change will be appropriate in the immediate area concerned;	
	<p>The applicant is proposing to zone the subject property to SF-2. The SF-2 Zoning district is consistent with the surrounding areas, and due to the proximity to the ETJ and the surrounding properties, it would serve as a transition to more rural parts of the city’s ETJ. The lots to the east are single-family lots that are equal to or greater to 0.75 acre lots and have the same designation as the zoning requested for the subject property. To the north, south, and west are residential large lots that are over 30 acres and are within the City’s ETJ.</p> <p>SF-2 zoning requires that lots be a minimum of ½ acre and if the wastewater is being provided via an OSSF the lots are required to be a minimum of ¾ acres.</p> <p>Based on the proposed zoning, adjacent City Limits zoning, and the ETJ lots the proposed zoning is appropriate in the area.</p>
2. Their relationship to the general area and the City as a whole;	
	<p>The SF-2 zoning uses proposed will fit in with the surrounding areas zoning districts and will be compatible with the ETJ properties.</p> <p>Though this property is not within the City’s Conceptual Future Land Use Map, the current map shows low density and moderate density on the outer edges of the City Limits, which shows that low density should occur away from the city center.</p>
3. Whether the proposed change is in accord with any existing or proposed plans for providing public schools, streets, water supply, sanitary sewers, and other utilities to the area;	
	<p>The subject property is not shown on any existing or proposed plans for public schools, streets, water supply, sanitary sewers, and other utilities to the area.</p>
4. The amount of undeveloped land currently classified for similar development in the vicinity and elsewhere in the City, and any special circumstances which may make a substantial part of such undeveloped land unavailable for development;	
	<p>The City is seeing an increase in residential development within the city limits and the extraterritorial jurisdiction. Within the vicinity of the subject property to the east are tracts zoned SF-2 the land is currently being developed. Rezoning the subject property to SF-2 is appropriate and will not affect any similar zoned lots within the vicinity. The City has not seen any issues with undeveloped land for properties rezoned to SF-2.</p>
5. The recent rate at which land is being developed in the same zoning classification, particularly in the vicinity of the proposed change;	

As stated above the adjacent lot to the east is currently being developed for SF-2 zoning. The rate of land being developed in this area has increased within the last few years.
6. How other areas designated for similar development will be, or are unlikely to be, affected if the proposed amendment is approved;
Based on the area, the proposed rezone to SF-2 will not affect the surrounding area and will complement the adjacent lots.
7. Whether the proposed change treats the subject parcel of land in a manner which is significantly different from decisions made involving other, similarly situated parcels; and
This property is being treated similarly to other similarly situated parcels within the City Limits.
8. Any other factors which will substantially affect the public health, safety, morals, or general welfare.
Staff does not see this zoning change affecting the public health, safety, morals, or general welfare.

Based on the Criteria listed above, staff finds that the requested zoning amendment is a compatible use that will ensure conformity with the character of the area and will promote the orderly development of the city.

Meetings

- June 22, 2021- Planning and Zoning Commission (Zoning)
- July 20, 2021- City Council (Annexation and Zoning)

Public Notification

A legal notice advertising the public hearing was placed in the Dripping Springs Century-News, signs were posted on the-site, notice was placed on the City Website, and all property owners within a 300-foot radius of the site were notified of the request.

Attachments

- Attachment 1: Rezoning Application
- Attachment 2: Zoning Use Chart
- Attachment 3: Site Exhibit
- Attachment 4: Deed

Recommended Action:	Recommend approval of the Single-Family residential district – Moderate Density (SF-2) Zoning district.
Alternatives/Options:	Recommend denial of the Single-Family residential district – Moderate Density (SF-2) Zoning district.
Budget/Financial Impact:	None calculated at this time.

Planning Department Staff Report

Item 3.

Public Comments:	No public comment was received for this request.
Enforcement Issues:	N/A



CITY OF DRIPPING SPRINGS

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• 512.858.4725 • www.cityofdrippingsprings.com

ZONING/PDD AMENDMENT APPLICATION

Case Number (staff use only): _____ - _____

CONTACT INFORMATION

PROPERTY OWNER NAME P & H Family Limited Partnership No. 1
STREET ADDRESS P O BOX 1696
CITY Dripping Springs STATE TX ZIP CODE 78620
PHONE _____ EMAIL _____

APPLICANT NAME Brian Estes
COMPANY Civil and Environmental Consultants Inc.
STREET ADDRESS 3711 S. Mo Pac Expy Suite 550
CITY Austin STATE Texas ZIP CODE 78746
PHONE 512-439-0400 EMAIL bestes@cecinc.com

REASONS FOR AMENDMENT

TO CORRECT ANY ERROR IN THE REGULATION OR MAP

TO RECOGNIZE CHANGES IN TECHNOLOGY, STYLE OF LIVING, OR MANNER OF CONDUCTING BUSINESS

TO RECOGNIZE CHANGED CONDITIONS OR CIRCUMSTANCES IN A PARTICULAR LOCALITY

TO MAKE CHANGES IN ORDER TO IMPLEMENT POLICIES REFLECTED WITHIN THE COMPREHENSIVE PLAN

PROPERTY & ZONING INFORMATION	
PROPERTY OWNER NAME	P & H Family Family Limited Partnership No. 1
PROPERTY ADDRESS	2901 W US 290, DRIPPING SPRINGS, TX 78620
CURRENT LEGAL DESCRIPTION	A0222 BENJAMIN F HANNA SURVEY, ACRES 77
TAX ID#	R15103
LOCATED IN	<input type="checkbox"/> CITY LIMITS <input type="checkbox"/> EXTRATERRITORIAL JURISDICTION
CURRENT ZONING	AG
REQUESTED ZONING/AMENDMENT TO PDD	SF-2
REASON FOR REQUEST <i>(Attach extra sheet if necessary)</i>	Annex into full purpose city limits
INFORMATION ABOUT PROPOSED USES <i>(Attach extra sheet if necessary)</i>	Will comprise etirely of single family home lots.

COMPLIANCE WITH OUTDOOR LIGHTING ORDINANCE? *

(See attached agreement).

YES (REQUIRED)* YES (VOLUNTARY)* NO*

* If proposed subdivision is in the City Limits, compliance with Lighting Ordinance is **mandatory**. If proposed subdivision is in the ETJ, compliance is **mandatory** when required by a Development Agreement or as a condition of an Alternative Standard/Special Exception/Variance/Waiver.

Voluntary compliance is strongly encouraged by those not required by above criteria *(see Outdoor Lighting tab on the CODS webpage and online Lighting Ordinance under Code of Ordinances tab for more information).*

APPLICANT'S SIGNATURE

The undersigned, hereby confirms that he/she/it is the owner of the above described real property and further, that Brian Estes (Civil & Environmental Consultants, Inc.) is authorized to act as my agent and representative with respect to this Application and the City's zoning amendment process.

(As recorded in the Hays County Property Deed Records, Vol. _____, Pg. _____.)

[Signature]
Name

PRINCIPAL
Title

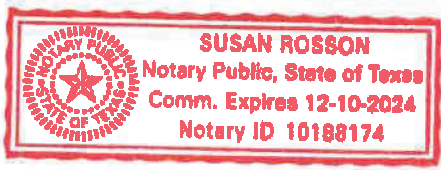
STATE OF TEXAS §
 §
COUNTY OF HAYS §

This instrument was acknowledged before me on the 5th day of March, 2021 by Hardy E. Thompson, III.

[Signature]
Notary Public, State of Texas Susan Rosson

My Commission Expires: 12-10-2024

Hardy E. Thompson, III
Name of Applicant



ZONING AMENDMENT SUBMITTAL

All required items and information (including all applicable above listed exhibits and fees) must be received by the City for an application and request to be considered complete. **Incomplete submissions will not be accepted.** By signing below, I acknowledge that I have read through and met the above requirements for a complete submittal:



5/24/2021

Applicant Signature

Date

CHECKLIST

STAFF	APPLICANT	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Completed Application Form - including all required signatures and notarized
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Application Fee-Zoning Amendment or PDD Amendment (<i>refer to Fee Schedule</i>)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	PDF/Digital Copies of all submitted Documents When submitting digital files, a cover sheet must be included outlining what digital contents are included.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Billing Contact Form
<input type="checkbox"/>	<input checked="" type="checkbox"/>	GIS Data
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Outdoor Lighting Ordinance Compliance Agreement - signed with attached photos/drawings (<i>required if marked "Yes (Required)" on above Lighting Ordinance Section of application</i>)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Legal Description
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Concept Plan
<input type="checkbox"/>	<input type="checkbox"/>	Plans
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Maps
<input type="checkbox"/>	<input type="checkbox"/>	Architectural Elevation
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Explanation for request (<i>attach extra sheets if necessary</i>)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Information about proposed uses (<i>attach extra sheets if necessary</i>)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Public Notice Sign (<i>refer to Fee Schedule</i>)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Proof of Ownership-Tax Certificate or Deed
<input type="checkbox"/>	<input type="checkbox"/> n/a	Copy of Planned Development District (<i>if applicable</i>)
<input type="checkbox"/>	<input type="checkbox"/> n/a	Digital Copy of the Proposed Zoning or Planned Development District Amendment

Project Number: _____ - _____
Only filled out by staff

Date, initials



BILLING CONTACT FORM

Project Name: Bunker Ranch Phase 6 (Hardy Tract 79.61 Acres)
Project Address: 2901 W US 290, Dripping Springs, TX 78620
Project Applicant Name: Cristina Cordoba / Brian Estes

Billing Contact Information

Name: Steve Harren
Mailing Address: 317 Grace Lane #240
Austin, Texas 78746
Email: steveharren@aol.com Phone Number: (512)644-6800

Type of Project/Application (check all that apply):

- | | |
|---|--|
| <input type="checkbox"/> Alternative Standard | <input type="checkbox"/> Special Exception |
| <input type="checkbox"/> Certificate of Appropriateness | <input type="checkbox"/> Street Closure Permit |
| <input type="checkbox"/> Conditional Use Permit | <input type="checkbox"/> Subdivision |
| <input type="checkbox"/> Development Agreement | <input type="checkbox"/> Waiver |
| <input type="checkbox"/> Exterior Design | <input type="checkbox"/> Wastewater Service |
| <input type="checkbox"/> Landscape Plan | <input type="checkbox"/> Variance |
| <input type="checkbox"/> Lighting Plan | <input checked="" type="checkbox"/> Zoning |
| <input type="checkbox"/> Site Development Permit | <input type="checkbox"/> Other _____ |

*Applicants are required to pay all associated costs associated with a project's application for a permit, plan, certificate, special exception, waiver, variance, alternative standard, or agreement, regardless of City approval. Associated costs may include, but are not limited to, public notices and outside professional services provided to the City by engineers, attorneys, surveyors, inspectors, landscape consultants, lighting consultants, architects, historic preservation consultants, and others, as required. Associated costs will be billed at cost plus 20% to cover the City's additional administrative costs. **Please see the online Master Fee Schedule for more details.** By signing below, I am acknowledging that the above listed party is financially accountable for the payment and responsibility of these fees.*

Signature of Applicant

5/24/2021

Date

E.1. Use regulations (charts).

E.1.1. The use of land or buildings shall be in accordance with those listed in the following use charts. No land or building shall hereafter be used and no building or structure shall be erected, altered, or converted other than for those uses specified in the zoning district in which it is located.

- (a) The legend for interpreting the permitted uses in the use charts is:
 - P Designates that the use is permitted in the zoning district indicated.
 - C Designates that the use is prohibited in the zoning district indicated.
 - C Designates that the use may be permitted in the zoning district only pursuant to issuance of a conditional use permit.
 - ** Designates that the use is defined in this chapter.

- (b) Definitions : See definitions in section 1.6 of this chapter for further description of uses.
- (c) Uses not listed : If a use is not listed in the use charts, it is not allowed in any zoning district.
- (d) Use chart organization : The following use categories are listed in the use charts:
 - Agricultural uses.
 - Residential uses.
 - Office uses.
 - Personal and business service uses.
 - Retail uses.
 - Transportation and auto service uses.
 - Amusement and recreational service uses.
 - Institutional/governmental uses.
 - Commercial and wholesale trade uses.
 - Manufacturing and light industrial uses.

Use Chart
Adopted February 17, 2015

Permitted Uses "P"

Conditional Uses "C"

AGRICULTURE	Residential Uses						Nonresidential Uses								
	AG	SF-1	SF-2	SF-4	SF-5	MF-1	O	LR	GR	CS	HO	I	GUI	PR	PP
Bulk Grain and/or Feed Storage	P										X	P			
Farms, General (Crops), Commercial	P	C	C								X				

Greenhouse (Non-Retail)	P	P	P	P							P				
Livestock Sales	P										X				
Orchard/Crop Propagation	P	P	C	C	C	C	C	C	C	C	P	C			
Plant Nursery (Commercial)	P								P	P	X	C			
Small Scale Farm	P	C	C			C	C	C	C	C	P				
Stable, Commercial	P	C									X				
Stables (Private, accessory use)	P	C	C								P				
Stables (Private, principal use)	P	C									X				
Garden (Non-Retail)	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Farm Animals (Exempt - FFA, 4H)	P	C	C	C	C	C	C	C	C	C	P	C			
Farm Animals (Non-Exempt)	P	C	C	C	C	C	C	C	C	C	P	C			

	Residential Uses						Nonresidential Uses									
RESIDENTIAL	AG	SF-1	SF-2	SF-4	SF-5	MF-1	O	LR	GR	CS	HO	I	GUI	PR	PP	
Accessory Bldg./Structure (Nonresidential)							P	P	P	P	P	P				
Accessory Bldg./Structure (Residential)	P	P	P	P	P	P					P					
Accessory Dwelling	P	C	C								P		P			
Caretaker's/Guard Residence	P	P	P								P					

Community or Group Home	C	C	C	C	C						P				
Duplex/Two-Family				P	P	P	P	P	P		P				
Garage Residential Conversion	P	P	C	C							P				
Garden Home/Townhome					P	P	P	P	P		P				
Home Occupation	P	P	P	P	P	P	P	P	P		P				
HUD-Code Manufactured Home	C			C	C	C					X				
Living Quarters on Site with a Business							P	P	P	P	P				
Multiple-Family Dwelling						P	P	P	P		P				
Residential Loft							P	P	P		P				
Rooming/Boarding House						P		P			P				
Single-Family Dwelling, Detached	P	P	P	P	P	P					P				
Single-Family Industrialized Housing	P	P	P	P	P	P					P				
Swimming Pool, Private	P	P	P	P	P	P	P	P	P		P				

OFFICE	Residential Uses						Nonresidential Uses								
	AG	SF-1	SF-2	SF-4	SF-5	MF-1	O	LR	GR	CS	HO	I	GUI	PR	PP
Armed Services Recruiting Center							P	P	P	P	P				
Bank										C	X				
Check Cashing Service								P	P	P	X				
Credit Agency							P	P	P	P	X				
Insurance Agency Offices							P	P	P	P	P				

Offices, General/Professional							P	P	P	P	P				
Office, Brokerage Services							P	P	P	P	P				
Offices, Health Services							P	P	P	P	P				
Offices, Legal Services							P	P	P	P	P				
Offices, Parole/Probation											X		P		
Offices, Professional							P	P	P	P	P				
Offices, Real Estate Office							P	P	P	P	P				
Saving and Loan										C	X				
Security Monitoring Company							P	P	P	P	X				
Telemarketing Center							P	P	P	P	X				

PERSONAL AND BUSINESS SERVICES	Residential Uses							Nonresidential Uses								
	AG	SF-1	SF-2	SF-4	SF-5	MF-1	O	LR	GR	CS	HO*	I	GUI	PR	PP	
All-Terrain Vehicle									P	P	X					
Dealer (Sales Only)											X					
Ambulance Service (Private)										P	X					
Antique Shop								P	P	P	P					
Appliance Repair								P	P	P	X					
Art Dealer/Gallery								P	P	P	P					
Artisan's Shop	P							P	P	P	P					
Artist Studio	P	P	P	P	P	P	P	P	P	P	P					
Auto Sales (New and Used)									C	P	X					
Auto Supply Store									P	P	X					
Bakery or Confectionary (Retail)								P	P	P	P					
Bar								C	C	C	C					
Barbershop								P	P	P	P					
Beauty Shop								P	P	P	P					
Bed and Breakfast Inn or Facility	C	C	C					P	P	P	P					

Bicycle Sales and Repair								P	P	P	P				
Book Store								P	P	P	P				
Building Materials Sales									C	P	X				
Cabinet/Counter/Woodworking Shop (Custom) Retail										C	X	P			
Cabinet/Counter/Woodworking Shop (Manufacturing) Wholesale											X	P			
Cafeteria							C	C	P	P	P				
Communication Equipment Repair										P	X				
Computer Sales								P	P	P	P				
Consignment Shop								P	P	P	P				
Convenience Store (With Gas Sales)									P	P	X				
Convenience Store (Without Gas Sales)							C	P	P	P					
Cooking School								P	P	P	P				
Dance/Drama/Music Studio or School								P	P	P	P				
Department Store									P	P	P				
Drapery, Blind Upholstery Store								P	P	P	P				
Exterminator Services										P	X				
Financial Services								P	P	P	P				
Florist Shop								P	P	P	P				
Food or Grocery Store (General)									P	P	P				
Food or Grocery Store (Limited)								P	P	P	P				
Funeral Home or Mortuary										P	X				
Furniture Store (New and/or Used)								P	P	P	X				
Garden Shop (Inside Storage)								P	P	P	P				
General or Community Retail Store									P	P	P				
Gravestone/Tombstone Sales										P	X				
Hardware Store								P	P	P	P				
Home Improvement Center									P	P	X				
Laundry/Dry Cleaning										P	X				
Lawnmower Sales & Repair									P	P	X				
Live-in Security Quarters							P	P	P	P	P				
Locksmith								P	P	P	X				

Major Appliance Sales									P	P	X				
Market (Public)								P	P	P	P				
Mini-Warehouse - Self Storage										C	X				
Mobile food vendor - 10 days or less							P	P	P	P	P	P	P	P	P
Mobile food vendor - longer than 10 days							C	C	C	C	C	C	C		
Mobile food vendor court							C	C	C	C	C	C	C		
Motorcycle Dealer (Sales, Repair)									P	P	X				
Motel or Hotel									P	P	P				
Needlework Shop								P	P	P	P				
Pet Shop/Supplies								P	P	P	P				
Pharmacy								P	P	P	P				
Photocopying/Duplicating								P	P	P	P				
Photography Studio								P	P	P	P				
Plant Nursery (Retail Sales, Outdoors)									P	P	X				
Radio or Television Studio									P	P	X				
Recycling Center										C	X	P			
Restaurant (No Drive-Through Service)								P	P	P	P				
Restaurant (With Drive-Through)									P	P	X				
Security Systems Installation Company									C	P	X				
Sexually Oriented Business										C	X	C			
Shoe Repair								P	P	P	P				
Studio, Tattoo or Body Piercing								C	C	C	P				
Tailor Shop								P	P	P	P				
Tool and Machinery Rental (Indoor Storage)								P	P	P	X				
Tool and Machinery Rental (Outdoor Storage)										P	X				
Travel Agency							P	P	P	P	P				
Temporary Outdoor Sales/Promotion							C	P	P	P	P				
Upholstery Shop									P	P	P				
Used Merchandise/Furniture								P	P	P	P				
Vacuum Cleaner Sales and Repair								P	P	P	X				

Veterinarian Clinic (Indoor Kennels)										P	P	P	P				
Woodworking Shop (Ornamental, Handmade)										P	P	P	P				

*Permitted in HO district per requirements of chapter 30, article 30.05, Mobile Food Vendors.

TRANSPORTATION AND AUTO SERVICES	Residential Uses						Nonresidential Uses									
	AG	SF-1	SF-2	SF-4	SF-5	MF-1	O	LR	GR	CS	HO	I	GUI	PR	PP	
Antique Vehicle Restoration										P	X					
Auto Body Repair										P	X					
Auto Financing and Leasing								P	P	P	X					
Auto Muffler Shop										P	X					
Auto Paint Shop										P	X					
Auto Tire Sales and Repair									P	P	X					
Auto Upholstery Shop										P	X					
Auto Washing Facility, Attended									P	P	X					
Auto Washing Facility, Unattended									P	P	X					
Auto Wrecker Service										P	X					
Automobile Repair, Major										P	X					
Automobile Repair, Minor								C	C	P	X					
Heliport												P	P			
Helistop												P	P			
Limousine/Taxi Service										P	X					
Oil Change and Inspection									P	P	X					
Parking Lot, Commercial										C						

Parking Structure, Commercial							C	C	C	P	P				
Tire Dealer, Indoor Storage								P	P	P	X				

AMUSEMENT/ RECREATION	Residential Uses						Nonresidential Uses								
	AG	SF-1	SF-2	SF-4	SF-5	MF-1	O	LR	GR	CS	HO	I	GUI	PR	PP
Amusement Arcade (Four or more devices)									P	P	P				
Amusement Services (Indoor)									P	P	P				
Amusement Services (Outdoor)									P	P	X				
Billiard/Pool Facility									P	P	P				
Bingo Hall									P	P	P			P	
Bowling Center									P	P	P			P	
Broadcast Station (With Tower)											X	P			
Country Club (Private)									P		X				
Dance Hall									P	P	P			P	
Day Camp for Children	C	C					C		P	P					
Civic/Conference Center											P		P		
Dinner Theater									P	P	P				
Driving Range														P	
Fairgrounds/Exhibition Area	C													P	
Gaming Club (private)								C	C	C					
Golf Course (Miniature)									P	P				P	
Golf Course (Public, Private)	C								P	P				P	
Health Club							C	P	P	P	P			P	
Motion-Picture Studio, Commercial										P		P			
Motion-Picture Theater									P	P	P				
Museum								P	P	P	P				
Park accessory uses															P

Park and/or Playground	P	P	P	P	P	P	P	P	P	P	P				P
Psychic Reading Services								P	P	P	P				
Rodeo Grounds	C									C		C			
Skating Rink										P					P
Tennis Court	P	P	P	P	P	P					P				P
Theater (Stage)									P	P	P				P
Video Rentals/Sales								P	P	P	P				

INSTITUTIONAL/ GOVERNMENT	Residential Uses						Nonresidential Uses									
	AG	SF-1	SF-2	SF-4	SF-5	MF-1	O	LR	GR	CS	HO	I	GUI	PR	PP	
Assisted Living Facility						C		C	C	C	P					
Broadcast Tower (Commercial)												C				
Cemetery or Mausoleum	C												P			
Child Day-Care Facility	C	C	C	C	C	C	C	P	P	P	P					
Church, Religious Assembly	P	P	P	P	P	P	P	P	P	P	P		P			
Civic Club							P	P	P	P	P					
Community Center (Municipal)											P		P			
Electrical Generating Plant												P	P			
Electrical Substation												P	P			
Emergency Care Clinic									P	P						
Fire Station	P	P	P	P	P	P	P	P	P	P			P			
Fraternal Lodge or Union							P	P	P	P	P					
Government Building (Mun., St., Fed.)										P	P		P			
Group Day-Care Home	C	C	C	C	C	C	C	P	P	P						
Medical Clinic or Office							P	P	P	P	P					

Wireless Communications Tower	C	C	C			C	C	C	C	C		C			
Heliport												P			
Home for the Aged, Residential	C	C	C	C	C	C	C	C	P	P	P				
Hospice								C	P	P	P				
Hospital (Acute Care, General)							C	C	P	P					
Library							P	P	P	P	P		P		
Maternity Home							C	C	P	P	P				
Nursing/Convalescent Home							C	C	P	P					
Orphanage						C	C	C	P	P	P				
Philanthropic Organization							P	P	P	P	P				
Post Office	P	P	P	P	P	P	P	P	P	P	P		P		
Radio, Television, Microwave Tower									C	C		C			
School, K Through 12 (public or private)	P	P	P	P	P	P	P	P	P	P	P		P		
Sewage Pumping Station	C	C	C	C	C	C	C	C	C	C	P	P	P		
Telephone Switching/Exchange Bldg.							C	C	C	P	P		P		
Wastewater Treatment Plant	C	C	C	C	C	C	C	C	C	C		C	P		
Water Supply (Elevated Storage Tank)	C	C	C	C	C	C	C	C	C	C	P	C	P		
Water Supply Facility (Private)	P	P	P	P	P	P		C	C	C		C	P		

COMM. AND WHOLESALE TRADE	Residential Uses						Nonresidential Uses								
	AG	SF-1	SF-2	SF-4	SF-5	MF-1	O	LR	GR	CS	HO	I	GUI	PR	PP
Book Bindery										P	P				
Feed and Grain Store									P	P					

Furniture Manufacture												P			
Heating and Air-Conditioning Sales/Service									P	P					
Pawnshop									C	C					
Propane Sales (Retail)										P					
Taxidermist										P					
Transfer Station/Refuse Pickup												P			
Veterinarian (Outdoor Kennels or Pens)	C									P					
Warehouse/Office										C		P			
Welding Shop										C		P			

LIGHT INDUSTRIAL/ MFG.	Residential Uses						Nonresidential Uses									
	AG	SF-1	SF-2	SF-4	SF-5	MF-1	O	LR	GR	CS	HO	I	GUI	PR	PP	
Contractor's Office (No Outside Storage)								P	P	P	P	P				
Contractor's Office (With Outside Storage)										C		P				
Contractor's Temporary On-site Office	C	C	C	C	C	C	C	C	C	C	P	C				
Electronic Assembly										C		P				
Engine Repair or Manufacture												P				
Laboratory Equipment Manufacture												P				
Machine Shop												P				

Maintenance and Repair Services for Bldgs.										P					
Open Storage/Outside Storage	C									C		P			
Plumbing Shop									P	P					
Research Lab (Nonhazardous)									C	C		P			
Sand/Gravel/Stone Sales or Storage	C									C		P			
Sand/Gravel Quarrying												C			
Sign Manufacturing										C	P	P			
Stone/Clay/Glass Manufacturing										C		P			

(Ordinance 1220.10, adopted 9/12/06; Ordinance 1220.99, adopted 2/17/15; Ordinance 1220.140, att. B, adopted 4/11/17; Ordinance 1220.149, adopted 11/14/17; Ordinance 1220.151, adopted 12/12/17; Ordinance 2018-09, adopted 4/10/18; Ordinance 2019-44, adopted 12/10/19; Ordinance 2020-01, adopted 1/14/20)

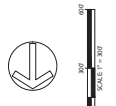
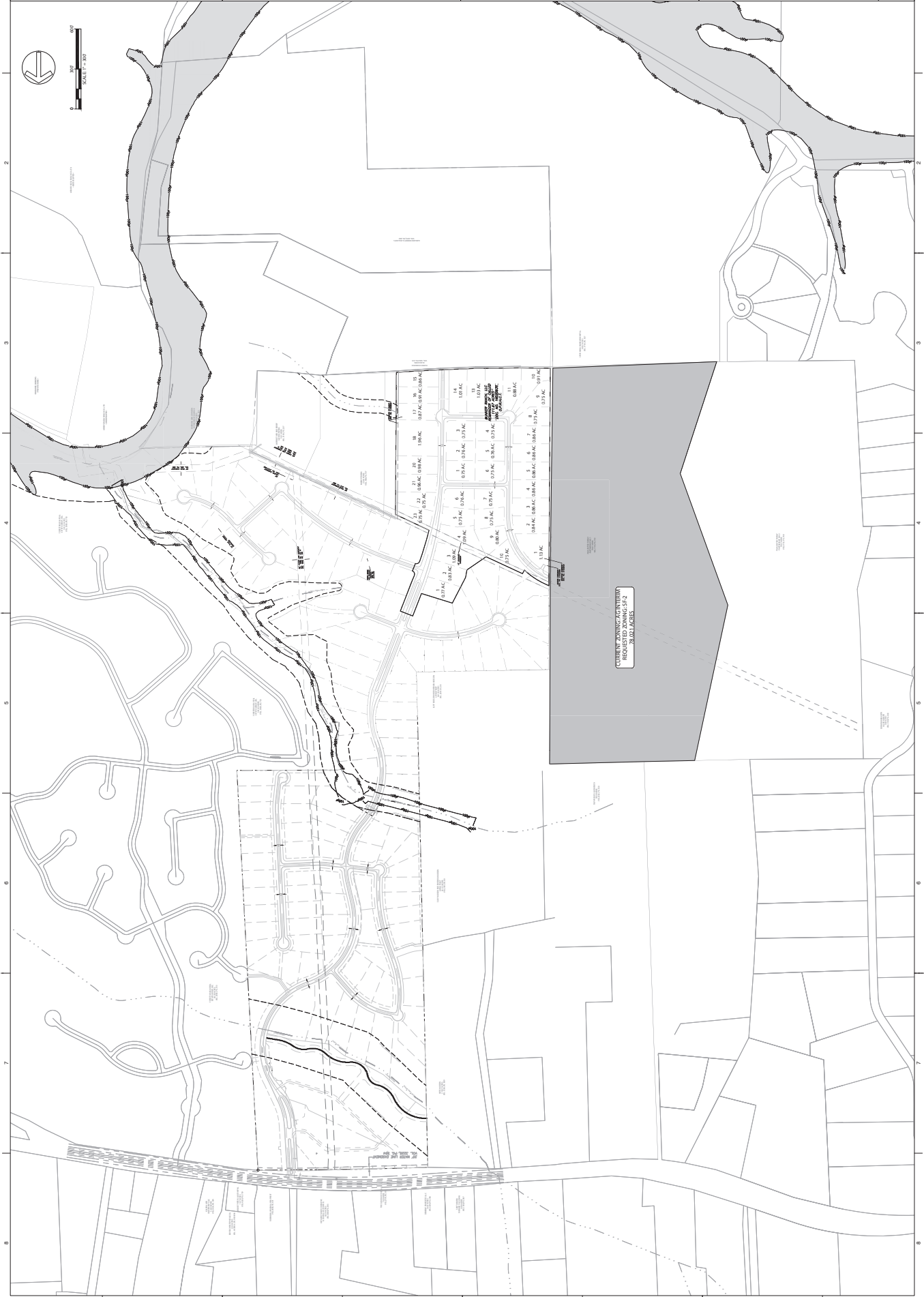
EXHIBIT

APPROVED BY:	
PROJECT NO:	
DWG SCALE:	1"=200'
DATE:	MAY, 2021
DRAWN BY:	
CHECKED BY:	
DRAFT:	
DRAFT:	
DRAFT:	
DRAFT:	

OVERLOOK AT BUNKER RANCH, LLC
 HARDY T LAND
 DRIPPING SPRINGS
 HAYS COUNTY, TEXAS

CCE
 Civil & Environmental Consultants, Inc.
 3711 South Mabry Expressway, Building 1, Suite 550 Austin, TX 78746
 PH: 512.439.0500 Fax: 512.239.0996
 www.cceinc.com

NO.	DATE	DESCRIPTION



7/21
PW

SPECIAL WARRANTY DEED

STATE OF TEXAS §
 § KNOW ALL MEN BY THESE PRESENTS
COUNTY OF HAYS §

THAT the undersigned, Hardy E. Thompson, Jr., and Patty King Thompson, husband and wife (hereinafter referred to as "Grantors"), have GRANTED and CONVEYED, and by these presents do hereby GRANT and CONVEY unto the P & H Family Limited Partnership No. 1, a Texas Limited Partnership, whose mailing address is 1034 Liberty Park Drive, Apt. G2, Austin, Texas 78746 (hereinafter referred to as "Grantee"), the following:

1. The real property described in Exhibit A, which is attached hereto and incorporated herein for all pertinent purposes (hereinafter referred to as "Tract A");
2. A one-half (1/2) undivided interest in the real property described in Exhibit C, which is attached hereto and incorporated herein for all pertinent purposes, (hereinafter referred to as the "Road"), subject to a non-exclusive easement of ingress and egress in the entire Road in the event of a subsequent partition;
3. A one-half (1/2) undivided interest in any other easements of ingress and egress appurtenant to either Tract A or to the real property described in Exhibit B, which is attached hereto and incorporated herein for all pertinent purposes (hereinafter referred to as "Tract B"); and

4. A nonexclusive easement of ingress and egress sixty (60) feet in width lying south of and adjacent to the northern boundary of Tract B and running from the eastern boundary of Tract B to a point where the northern boundary of Tract B intersects with the western boundary of any easement of ingress and egress to and from Tract B to U.S. Highway 290.

Said real property interests are hereinafter referred to collectively as the "Property."

This conveyance is expressly made and accepted subject to all valid and subsisting liens, leases of surface acreage, oil, gas, and mineral leases, all prior mineral conveyances of any nature, easements, restrictions, reservations, covenants, conditions and other matters relating to the Property to the extent that the same are valid and enforceable against said Property, as same are shown by instruments filed for record in the office of the County Clerk of Hays County, Texas, or as same are evident upon inspection of the Property.

TO HAVE AND TO HOLD the Property, together with all and singular the rights and appurtenances thereto in anywise belonging, subject to the foregoing terms and provisions, unto the said Grantee, its successors and/or assigns forever; and Grantors do hereby bind Grantors' heirs, executors, administrators, successors and/or assigns, to WARRANT AND FOREVER DEFEND all and singular the Property, subject, however, as aforesaid, unto the said Grantee, its successors and/or assigns, against every person whomsoever claiming or to claim the same or any part thereof, by, through or under Grantors, but not otherwise.

EXECUTED this 23rd day of October, 2000.

Hardy Evans Thompson Jr.
Hardy E. Thompson, Jr.

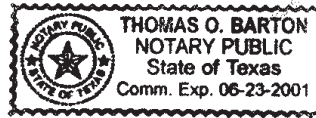
Patty King Thompson
Patty King Thompson

STATE OF TEXAS §
 §
COUNTY OF TRAVIS §

The foregoing instrument was acknowledged before me on the 23rd day of October, 2000, by **Hardy E. Thompson, Jr.**

Thomas O. Barton
Notary Public, State of Texas

STATE OF TEXAS §
 §
COUNTY OF TRAVIS §



The foregoing instrument was acknowledged before me on the 23rd day of October, 2000, by **Patty King Thompson.**

Thomas O. Barton
Notary Public, State of Texas

After Recording Return To:

Thomas O. Barton
McGinnis, Lochridge & Kilgore, L.L.P.
919 Congress Ave., Suite 1300
Austin, Texas 78701

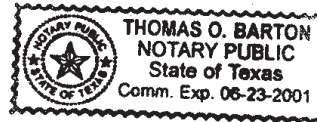


EXHIBIT A

79.61 acres of land out of and a part of quarter section No. 15 of the B. F. Hanna League, situated in Hays County, Texas, said 79.61 acre tract being more particularly described as being a portion of that certain 159.0 acre tract of land conveyed from Katherine Roberts, a widow, to Hardy E. Thompson, and wife Patty Thompson by deed of record in Volume 239, Pages 521-524 of the Deed Records of Hays County, Texas, said 79.61 acre tract being more fully described by metes and bounds as follows

Beginning at a steel pin found at a fence corner at the northeast corner of said quarter section No. 15, same being the common corner of quarter sections No. 14, 15, 16, and 17 of said Hanna League, for the northeast corner of the tract herein described, said point also being the northeast corner of said 159.0 acre tract;

THENCE with the fence along the common line of said quarter sections No. 14 and 15, same being the east line of said 159.0 acre tract, S 00°06'E 2983.98 feet to a steel pin set at a fence corner post for the southeast corner of the tract herein described;

THENCE with a new fence along the south line of this Survey S 88°12'W 1243.27 feet to a steel pin set a fence corner for the southwest corner of the tract herein described:

THENCE with the west line of this survey the following three (3) courses;

1. N 17°46'E, with a fence, 882.44 feet to a steel pin set at a fence corner;
2. N 20°12'W, leaving said fence, 1048.31 feet to a steel pin set at a fence corner;
3. N 11°45'E, with a fence, 1190.68 feet to a steel pin set at a fence corner in the north line of said 159.0 acre tract for the northwest corner of the tract herein described;

THENCE with the fence along the north line of said 159.0 acre tract N 88°15'E 1087.93 feet to the place of BEGINNING containing 79.61 acres of land.

EXHIBIT A

EXHIBIT B

Item 3.

79.39 acres of land out of and a part of quarter section No. 15 of the B. F. Hanna League, and a portion of the A. J. Holford Survey, situated in Hays County, Texas, said 79.39 acre tract being more particularly described as being a portion of that certain 159.0 acre tract of land conveyed from Katherine Roberts, a widow, to Hardy E. Thompson, and wife Patty Thompson by deed of record in Volume 239, Pages 521-524 of the Deed Records of Hays County, Texas, said 79.39 acre tract being more fully described by metes and bounds as follows:

BEGINNING at a steel pin found at a fence corner at the northwest corner of said 159.0 acre tract for the northwest corner of the tract herein described;

THENCE with the fence along the north line of said 159.0 acre tract the following two (2) courses;

- 1. N 89°44'E 832.80 feet to an iron stake found at a bend in said fence at a fence corner on the east side of a gate;
- 2. S 88°52'E 426.95 feet to a steel pin set at a fence corner for the northeast corner of the tract herein described;

THENCE with the east line of this survey the following three (3) courses;

- 1. S 11°45'W, with a fence, 1190.68 feet to a steel pin set at a fence corner;
- 2. S 20°12'E, leaving said fence, 1048.31 feet to a steel pin set at a fence corner;
- 3. S 17°46'W, with a fence, 882.44 feet to a steel pin set at a fence corner for the southeast corner of the tract herein described;

THENCE with a new fence along the south line of this survey N 89°59'W 571.9 feet to a steel pin found at the top of a bluff;

THENCE continue with the fence along the south line of said 159.0 acre tract N 83°00'W 233.9 feet to a steel pin at a fence corner for the southwest corner of the tract herein described, same being the southwest corner of said 159.0 acre tract;

THENCE with the fence along the west line of said 159.0 acre tract the following twelve (12) courses;

- 1. N 01°12'W 71.2 feet;
- 2. N 37°07'W 383.7 feet;
- 3. N 15°10'W 92.6 feet;
- 4. N 53°25'E 44.2 feet;
- 5. N 18°26'W 157.4 feet;
- 6. N 01°23'W 32.74 feet;
- 7. N 12°00'W 230.6 feet;
- 8. N 02°15'W 263.5 feet;
- 9. N 10°36'E 131.8 feet;
- 10. N 01°54'E 406.5 feet;
- 11. N 02°44'W 214.3 feet;
- 12. N 00°11'W 1052.3 feet to the place of BEGINNING Containing 79.39 acres of land.

EXHIBIT B

A 4.25 acre tract of land out of and a part of Quarter Section, Numbers 14 and 17 of the B. F. Hanna League, situated in Hays County, Texas, being more particularly described as being part of those certain two tracts of land that were conveyed to Clayton S. Brown and wife, Henry Louise Brown, by deeds of record in Volume 166, Page 264-266 and Volume 268, Page 594-596 of the Hays County, Texas Deed Records, said 4.25 acre tract being more fully described by metes and bounds as follows:

BEGINNING at a steel pin set at a corner fence post at the southwest corner of the above said Quarter Section No. 17, it being also the southwest corner of that certain 160.0 acre tract conveyed to Clayton S. Brown by the above said deed of record in Volume 166, Pages 264-266 of the Hays County, Texas Deed Records;

THENCE with the fence along the west line of the Clayton S. Brown 160.0 acre tract, North 2993.2 feet to a corner fence post set in concrete in the south line of Highway No. 290 for the northwest corner of the 4.25 acre tract herein described;

THENCE with the south line of Highway No. 290, S 89°33'E, 60.0 feet to a steel pin set for the northeast corner of this 4.25 acre tract;

THENCE South 2990.0 feet to a steel pin set in the common line between said Quarter Sections 14 and 17, said steel pin being also in the north line of that certain 23.0 acre tract of land that was conveyed to Clayton S. Brown by the above said deed found of record in Volume 268, Pages 594-596 of the Hayes County, Texas Deed Records;

THENCE S 0°06'E, 100.00 feet to a steel pin set for the southeast corner of this 4.25 acre tract;

THENCE S 88°15'W, 56.0 feet to a steel pin in the fence on the east line of that certain 159.0 acre tract of land that was conveyed to Hardy E. Thompson and wife, Patty Thompson by deed of record in Volume 239, pages 521-524 of the Hays County, Texas Deed Records;

THENCE with the fence between the said Clayton S. Brown 23.0 acre tract and the said Hardy E. Thompson 159.0 acre tract, N 0°06'E, 100.0 feet to a steel pin found at a fence corner at the northeast corner of said Thompson 159.0 acre tract, said point being also the northwest corner of the above said Clayton S. Brown 23.0 acre tract;

THENCE S 88°15'W, 4.0 feet to the place of beginning; and containing 4.25 acres of land.

FILED AND RECORDED
OFFICIAL PUBLIC RECORDS
On: Oct 26, 2000 at 03:09P

Document Number: 00025538


Amount 21.00

By
Lynn Curry
Lee Carlisle, County Clerk
Hays County

Exhibit K



To: Jamie Rose

From: Chad Gilpin, P.E.,  City Engineer; Laura Mueller, City Attorney

Date: May 2, 2024

RE: Takings Impact Assessment for Required Infrastructure for the Hardy Tract

INTRODUCTION

The City of Dripping Springs has required, due to site development and fire requirements, that the project commonly known as the Hardy Tract build a road as specified in Exhibit “A.” The property owner has requested a Takings Impact Assessment related to this requirement. For the City to impose this requirement it must show that “the required dedication is related both in nature and extent to the project’s anticipated impact, though a precise mathematical calculation is not required.”¹ This assessment will show that the road requirement is roughly proportional to the impact of the Bunker Ranch/Hardy Tract project.

REQUIREMENTS

The City, in consultation with the Fire Department (North Hays County Fire – ESD), requires a minimum twenty-six (26) foot roadway and a five (5) foot sidewalk on one side. This was based on the representation by the developer that multi-family may be placed on the tract. If no multi-family is on the tract, the roadway only must be twenty-four (24) feet. This is a fire requirement. Section 11.3.4 of the City Subdivision Ordinance requires all subdivisions with fifty (50) or more lots or units have at least two points of vehicular access and must be connected via improved roadways. The standard is to require sidewalks on both sides of the roadway, but the City waived the requirement for the second side on request of the developer in return for payment of fee-in-lieu. In addition, drainage improvements are required, but are only those needed to meet the Water Quality and Drainage mitigation as required by the Water Quality Ordinance Article 22.05.² The extent of the drainage improvements are only those that directly affect the required roadway and the sidewalk. These improvements are not required to be oversized for any other development.

The purpose of requiring two points of vehicular access is to provide safety and adequate traffic circulation to the residents of the subdivision. The subdivision ordinance is attached as Exhibit “A.” The requirement of adequate drainage and water quality is to ensure that any required or planned improvements do not burden other private or public parties with adverse stormwater flows. In addition, it aids in protecting all waterways in the area from pollutants. The Ordinance adopted Article 22.05 is attached to this assessment as Exhibit “C.” The remoteness requirement is from the Fire Code Section D106.3. It is attached as Exhibit “B.” These required improvements

¹ *Dolan v. City of Tigard*, 512 U.S. 374, 391 (1994).

² All references to Ordinances or Sections are to the City of Dripping Springs Code of Ordinances unless otherwise stated. City of Dripping Springs Code of Ordinances are available on the City’s website and municode.com.

are reasonably related to and accomplish the legitimate municipal goal of public safety while ensuring that neighboring properties are not burdened by new development.

The roadway only needs to be twenty-four (24) feet in width unless multi-family is built adjacent to the roadway. This is the minimum for any subdivision within the City of Dripping Springs. Fire requires twenty-six (26) feet if there will be multi-family.

IMPACT OF DEVELOPMENT

The Hardy Tract will add an additional seventy-five lots. In addition, the development is seventy-eight acres. This roadway is only for the residents of this development and does not have to be open to the public. In addition, the City is not asking that it be oversized to meet the needs of the public in general, only to meet the minimum city and fire requirements. Detention and Water Quality are required by the Hardy Tract subdivision to mitigate increased flows to neighboring properties caused by the roadway. The issue of the expense of the drainage is the fact that the second access point, the roadway in question, is between two parcels that are currently not owned by the developer. This requires that the drainage, sidewalk, and roadway must be included in their owned property.

DISCUSSION AND ANALYSIS

The requirements the City and Fire require are the minimum for roads and drainage for any residential development. In addition, the minimum normally required for a sidewalk on a two-lane rural roadway (which is the roadway required by the City) is five feet on both sides. The City waived the requirement that the sidewalk be on both sides, instead only requiring it on one side. These requirements are required for safety and are also sized to an extent appropriate to a development of this size. The nature of a subdivision as proposed is a two-lane rural road with sidewalks including adequate drainage.

ALTERNATIVES

The development could build a second point of access in another part of the development. In addition, the City has offered to review the possibility of allowing drainage to be stored on an adjacent agricultural lot. Finally, the developer could also appeal the partial waiver of the sidewalk to the Planning & Zoning Commission.

CONCLUSION AND RECOMMENDATIONS

The City and Fire is open to limiting the roadway to twenty-four feet so long as no multi-family is built in this development or adjacent to this roadway. If any other variances or waivers are requested, or decisions to be appealed, the processes must be followed. The City is not requiring that the development pay for any additional city infrastructure or fees that are not the minimum required by the number of lots and acres within this subdivision. The Hardy Drive and related infrastructure is not for the public or the City, it is solely to benefit the safety of the future residents of the proposed development.

Exhibit L

HARDY ROAD PROJECT WITH THE SIDEWALK

HARDY ROAD

12/4/24

Civil Improvements

Item	Unit	QTY	PRICE	2023 TOTAL	12/24 TOTAL
Mobilization	EA	1	\$ 50,000.00	\$ 7,500	\$ 8,625.0
Surveying and Layout	EA	1	\$ 45,000.00	\$ 45,000	\$ 51,750.0
Clearing	EA	1	\$ 13,000.00	\$ 13,000	\$ 14,950.0
Silt Fence	LF	5000	\$ 3.75	\$ 18,750	\$ 21,562.5
Rock Berm	LF	150	\$ 30.00	\$ 4,500	\$ 5,175.0
*Revegetation	EA	1	\$ 35,000.00	\$ 35,000	\$ 40,250.0
SUB_TOTAL				\$ 123,750	\$ 142,312.5

Street Improvements

Item	Unit	QTY	PRICE	2023 TOTAL	12/24 TOTAL
Street Embankment Material	CT	20388	\$18	\$ 366,978	\$ 422,024
Site Equipment	EA	1	\$375,000	\$ 375,000	\$ 431,250
Subgrade Preperation	CT	20388	\$ 5.00	\$ 101,938	\$ 117,229
Street Signs	EA	1	\$ 5,000.00	\$ 5,000	\$ 5,750
Limestone Butterstick Blocks	ea	5155	\$ 150.00	\$ 773,190	\$ 889,169
Footing Allowance	ea		\$ 175,000.00	\$ 175,000	\$ 201,250
Handrail Allowance	lf	1400	\$ 95.00	\$ 133,000	\$ 152,950
Testing Allowance		1	\$ 55,000.00	\$ 55,000	\$ 63,250
Haul Off Allowance	EA	1	\$ 50,000.00	\$ 50,000	\$ 57,500
Tree Disposal	EA	1	\$ 25,000.00	\$ 25,000	\$ 28,750
SUB-TOTAL				\$ 2,060,106	\$ 2,369,122

Concrete

6" Concrete Allowance	SF	81900	\$ 11.00	\$ 900,900	\$ 1,036,035
Sidewalk Allowance	SF	15750	\$ 5.00	\$ 78,750	\$ 90,563
Retaining Wall Allowance				\$ 300,000	\$ 345,000
SUB-TOTAL				\$ 1,279,650	\$ 1,471,598

Drainage Improvements

Item	Unit	QTY	PRICE	2023 TOTAL	12/24 TOTAL
HDPE	EA	1	\$ 135,777	\$ 135,777	\$ 156,144
6x4 Grate Inlet	EA	5	\$ 13,000	\$ 65,000	\$ 74,750
5x5 grate inlets	EA	3	\$ 9,500	\$ 28,500	\$ 32,775
4x4 Grate Inlets	EA	2	\$ 5,600	\$ 11,200	\$ 12,880
3x3 grate inlets	EA	10	\$ 3,250	\$ 32,500	\$ 37,375
2.5x2.5 grate inlets	EA	9	\$ 2,400	\$ 21,600	\$ 24,840
2x2 Grate Inlets	EA	1	\$ 1,600	\$ 1,600	\$ 1,840
Misc Parts		1	\$ 35,000	\$ 35,000	\$ 40,250
5' Curb Inlet	EA	2	\$ 8,250	\$ 16,500	\$ 18,975
					\$ -
DRAINAGE GRADING	EA	1	\$ 75,000	\$ 75,000	\$ 86,250
					\$ -
Pond Allowance	EA	4	\$ 50,000	\$ 200,000	\$ 230,000
					\$ -
Underground Detention System	EA	1	\$ 275,000	\$ 275,000	\$ 316,250
SUB-TOTAL				\$ 897,677	\$ 1,032,329

Supervision

Project Manager				\$ 75,000	\$ 86,250
Superintendent				\$ 125,000	\$ 143,750
Overhead				\$ 75,000	\$ 86,250
GC Fee				\$ 500,000	\$ 575,000
Onsite Engineer				\$ 150,000	\$ 172,500
SUB-TOTAL				\$ 925,000	\$ 1,063,750

Sidewalk Fee in Lue

\$ 185,700 \$ 185,700

Item	Unit	QTY	PRICE	2023 TOTAL	12/24 TOTAL
ROAD ESTIMATE				\$5,471,183	\$ 6,264,810

Exhibit M

HARDY ROAD PROJECT WITHOUT THE SIDEWALK

HARDY ROAD

12/4/24

Civil Improvements

Item	Unit	QTY	TOTAL 12/24
Mobilization	EA	1	\$ 8,250.0
Surveying and Layout	EA	1	\$ 49,500.0
Clearing	EA	1	\$ 14,300.0
Silt Fence	LF	5000	\$ 20,625.0
Rock Berm	LF	150	\$ 4,950.0
*Revegetation	EA	1	\$ 38,500.0
SUB_TOTAL			\$ 136,125.0

Street Improvements

Item	Unit	QTY	TOTAL 12/24
Street Embankment Material	CT	20388	\$ 238,535
Site Equipment	EA	1	\$ 243,750
Subgrade Preperation	CT	20388	\$ 66,260
Street Signs	EA	1	\$ 3,250
Limestone Butterstick Blocks	ea	5155	\$ 502,574
Footing Allowance	ea		\$ 113,750
Handrail Allowance	lf	1400	\$ 86,450
Testing Allowance		1	\$ 35,750
Haul Off Allowance	EA	1	\$ 32,500
Tree Disposal	EA	1	\$ 16,250
SUB-TOTAL			\$ 1,339,069

Concrete

6" Concrete Allowance	SF	81900	\$ 990,990
Sidewalk Allowance	SF	15750	\$ -
Retaining Wall Allowance			
SUB-TOTAL			\$ 990,990

Drainage Improvements

Item	Unit	QTY	TOTAL 12/24
HDPE	EA	1	\$ 88,255
6x4 Grate Inlet	EA	5	\$ 42,250
5x5 grate inlets	EA	3	\$ 18,525
4x4 Grate Inlets	EA	2	\$ 7,280
3x3 grate inlets	EA	10	\$ 21,125
2.5x2.5 grate inlets	EA	9	\$ 14,040
2x2 Grate Inlets	EA	1	\$ 1,040
Misc Parts		1	\$ 22,750
5' Curb Inlet	EA	2	\$ 10,725
			\$ -
DRAINAGE GRADING	EA	1	\$ 48,750
			\$ -
Pond Allowance	EA	4	\$ 130,000
			\$ -
Underground Detention System	EA	1	\$ 178,750
			\$ -
SUB-TOTAL			\$ 583,490

Supervision

Project Manager			\$ 82,500
Superintendent			\$ 137,500
Overhead			\$ 82,500
GC Fee			\$ 550,000
Onsite Engineer			\$ 165,000
SUB-TOTAL			\$ 1,017,500

Sidewalk Fee in Lue \$ 185,700

ROAD ESTIMATE **TOTAL 12/24**
\$ 4,252,874

Exhibit N

Jamie A Rose
Tel 512.320.7281
Fax 512.320.7210
Jamie.Rose@gtlaw.com

April 3, 2024

Laura Mueller
City Attorney
Dripping Springs, Texas
511 Mercer Street
Dripping Springs, Texas 78620

Via email:
lmuller@cityofdrippingsprings.com

Re: Project No. SUB2023-0042, Hardy subdivision construction plans (the “Hardy Development”); and Project No. SD2022-0025, site development plans for the Hardy Driveway (the “Hardy Driveway”)

Dear Ms. Mueller:

This firm represents Hardy T. Land, LLC and Bunker Ranch, LLC in regards to the above projects and specifically unreasonable conditions the City of Dripping Springs (the “City”) has imposed on the approval of the Hardy Driveway site development plans – and by extension on the approval of the subdivision plat for the Hardy Development – which constitute exactions and a regulatory taking without proper compensation in violation of Local Government Code §212.904 and other applicable law. My clients’ efforts to reach an amicable resolution of these issues have been unsuccessful to date. We are prepared to engage with the City to promptly resolve this matter. We have been instructed to pursue all appropriate legal remedies on behalf of the client starting with an application for determination under Local Government Code §212.904 and with obtaining the City’s takings impact assessment required by Government Code §2007.043.

Please accept this letter as Hardy T. Land, LLC’s (i) request under the Texas Public Information Act for all reports, evaluations, and other information the City maintains, or has access to, that demonstrates that “rough proportionality” test required by Local Government Code §212.904 has been met for its property, (ii) request under the Texas Public Information Act for all reports, evaluations, and other information the City maintains, or has access to, that constitute, support, reference or demonstrate the City’s taking impact analysis under §2007.043 of the Government Code, (iii) request for determination under §212.904(a) of the Local Government Code, (iv) request for the City’s takings impact analysis under §2007.043 of the Government Code, and (v) request for determination as to whether, pursuant to the current Interlocal Cooperation Agreement Between Hays County and the City of Dripping Springs, the City has assumed exclusive responsibility for approving the Hardy Driveway site development plans, such that my client does not have to seek the same approvals from the County.

The City has conditioned its approval of the client's subdivision plat for the Hardy Development on my client's construction and funding of extensive and costly improvements to an existing private driveway, which the City is requiring to be improved as a secondary point of access to the proposed Hardy Development consisting of approximately 78 acres and 72 lots. The City's requirements for the Hardy Driveway include significant expansion of the road, and construction of extensive and costly infrastructure for drainage and water flow, as well as sidewalks, all of which have little or no discernable relationship to the impact of the proposed subdivision development, and which are estimated to cost between \$4,142,747 and \$4,350,131.76, destroying the economic viability of the Hardy Development. Bear in mind, the Hardy Driveway (i) is not situated within the Hardy Development, (ii) is in the City's extra-territorial jurisdiction ("ETJ"), and (iii) is co-owned by Hardy T. Land, LLC as a tenant in common with an unaffiliated, third-party landowner.

The City has never offered engineering or other data that would explain how its position that Hardy T. Land, LLC must pay for such extensive improvements to the private driveway meets the "rough proportionality" standard required by Local Government Code §212.904, and we do not believe a legitimate explanation exists. For example, the available water flow information indicates that the subdivision to the south would not be affected by the addition of culverts, storm drains, and other drainage requirements that are not already in place, as the water flowing to the driveway is flowing west to east, not south. Additionally, the required sidewalks extend to undeveloped regions, implying no foreseeable increase in connectivity or community integration. In fact, the adjacent Bunker Ranch subdivision has no such sidewalks. Further, a traffic impact analysis ("TIA") for the proposed subdivision demonstrates that Bunker Ranch Boulevard (being the primary, existing point of vehicular access to the subdivision) can support the anticipated traffic arising from the proposed subdivision.

The City is mechanically applying UDC 11.3.4, requiring two points of vehicular access to all subdivisions with 50 or more lots. However, the City's engineer has the ability to waive the requirement of a second point of access, and the Hardy Driveway could be minimally improved to provide emergency access for public safety vehicles without the onerous requirements the City seeks to impose. In fact, comparing the treatment of the adjacent Arrowhead subdivision, which consists of more than 400 lots and has one entrance and one exit, casts considerable doubt on any necessity and reasonableness of the onerous requirements of secondary access being imposed in the instant case.

In sum, we think the City can and should proceed with a far less onerous development plan for the Hardy Driveway, consistent with the unified development code, and my client has made various proposals to no avail. However, we intend to ensure that the City must bear its proportionate cost, and compensate my client, for the exactions and regulatory takings imposed by the City on Hardy T. Land's projects.

Laura Mueller
April 3, 2024
Page 3

We look forward to receiving the materials requested herein and, provided we can do so without delay, working with you to reach an amicable resolution of this matter. I am happy to have a preliminary call with you to discuss the foregoing in advance of a call that includes staff, engineers, clients, etc. If that would be helpful, please let me know your availability.

Sincerely,

/s/ Jamie A. Rose
Jamie A. Rose
Shareholder

JAR:cs

cc: Steve Harren
Jim Boushka
Sue Savage
Joe Shaneyfelt (firm)

Andrea Cunningham, City Secretary & Records Management Officer, City of Dripping Springs, via email: acunningham@cityofdrippingsprings.com

Exhibit O

Dominguez, Sylvia (LSS-AUS-LT)

From: Laura Mueller <lmuller@cityofdrippingsprings.com>
Sent: Monday, September 16, 2024 2:11 PM
To: Rose, Jamie (Shld-AUS-LT)
Cc: Shaneyfelt, Joe (Assoc-AUS-LT); ssavage@hsvllp.com
Subject: RE: Hardy Driveway; Hardy Subdivision

Thank you for reaching out. We do not have an established procedure for this so we will treat this like other planning appeals.

1. Submit your written appeal two Fridays before the Tuesday meetings so that it can be placed on the agenda in accordance with our approved agenda policy.
 - a. October 1, 2024 Meeting – need appeal by September 20, 2024
 - b. October 15, 2024 Meeting – need appeal by October 4, 2024
 - c. November 5, 2024 Meeting – need appeal by October 25, 2024
2. All backup materials (other than the meeting presentation) is due the Wednesday before the meeting.
 - a. October 1, 2024 Meeting – need materials by September 25, 2024
 - b. October 15, 2024 Meeting – need materials by October 9, 2024
 - c. November 5, 2024 Meeting – need materials by October 30, 2024.
3. Presentation is due 5 p.m. the day before the Meeting.

This will be an evidentiary hearing will you all will be able to make a presentation on the analysis. Afterwards, the City Council will have 30 days to issue a written decision on the appeal.

Submit your appeal to planning@cityofdrippingsprings.com.

Please let me know if you have any questions.



Laura Mueller
City Attorney

lmuller@cityofdrippingsprings.com
512.858.4725 City Hall

511 Mercer Street • PO Box 384
Dripping Springs, TX 78620

cityofdrippingsprings.com

From: Jamie.Rose@gtlaw.com <Jamie.Rose@gtlaw.com>
Sent: Monday, September 16, 2024 10:37 AM
To: Laura Mueller <lmuller@cityofdrippingsprings.com>
Cc: Joe.Shaneyfelt@gtlaw.com; ssavage@hsvllp.com
Subject: RE: Hardy Driveway; Hardy Subdivision

Laura – following up on the email below, and the procedures that will apply to the appeal of the Takings/Rough Proportionality assessment.

Jamie Rose
Shareholder

Greenberg Traurig, LLP
300 West 6th Street, Suite 2050 | Austin, Texas 78701
T +1 512.320.7281 | F +1 512.320.7210
Jamie.Rose@gtlaw.com | www.gtlaw.com | [View GT Biography](#)



From: Laura Mueller <lmueller@cityofdrippingsprings.com>
Sent: Friday, September 6, 2024 2:32 PM
To: Rose, Jamie (Shld-AUS-LT) <Jamie.Rose@gtlaw.com>
Cc: Shaneyfelt, Joe (Assoc-AUS-LT) <Joe.Shaneyfelt@gtlaw.com>; ssavage@hsvllp.com
Subject: RE: Hardy Driveway; Hardy Subdivision

EXTERNAL TO GT

Jamie,

There is no appeal from the variances. You can appeal the takings assessment to City Council. I will see if there are any requirements for this appeal, and I will let you know next week.

Sincerely,



Laura Mueller
City Attorney

lmueller@cityofdrippingsprings.com
512.858.4725 City Hall

511 Mercer Street • PO Box 384
Dripping Springs, TX 78620

cityofdrippingsprings.com

From: Jamie.Rose@gtlaw.com <Jamie.Rose@gtlaw.com>
Sent: Friday, September 6, 2024 1:16 PM
To: Laura Mueller <lmueller@cityofdrippingsprings.com>
Cc: Joe.Shaneyfelt@gtlaw.com; ssavage@hsvllp.com
Subject: Hardy Driveway; Hardy Subdivision

Laura –

Please confirm that there is no further right of appeal from the P&Z decisions on the appeals/variances heard last week. Assuming that is the case, my clients want to appeal the Takings Impact Assessment and request a hearing before Council on the matter. Please advise of the procedures that will apply to that appeal.

Regards,

Jamie Rose
Shareholder

Greenberg Traurig, LLP
300 West 6th Street, Suite 2050 | Austin, Texas 78701



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Dominguez, Sylvia (LSS-AUS-LT)

From: Laura Mueller <lmuller@cityofdrippingsprings.com>
Sent: Wednesday, January 8, 2025 3:11 PM
To: Rose, Jamie (Shld-AUS-LT)
Cc: Sgovio, Sydney (Assoc-AUS-LT); Aniz Alani
Subject: RE: Hardy T Land Subdivision / Hardy Driveway
Attachments: Takings Assessment Procedures.pdf

Jamie,

In advance of our meeting today, I wanted to send you the Appeal Procedures City Council adopted last night.

Sincerely,



Laura Mueller
City Attorney

lmuller@cityofdrippingsprings.com
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From: Jamie.Rose@gtlaw.com <Jamie.Rose@gtlaw.com>
Sent: Tuesday, January 7, 2025 10:00 AM
To: Laura Mueller <lmuller@cityofdrippingsprings.com>
Cc: Sydney.Sgovio@gtlaw.com
Subject: RE: Hardy T Land Subdivision / Hardy Driveway

Laura – could you do 3:30pm (or another time in the afternoon) tomorrow?

Jamie Rose
Shareholder

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Jamie.Rose@gtlaw.com | www.gtlaw.com | [View GT Biography](#)



From: Laura Mueller <lmuller@cityofdrippingsprings.com>
Sent: Monday, January 6, 2025 4:38 PM
To: Rose, Jamie (Shld-AUS-LT) <Jamie.Rose@gtlaw.com>
Cc: Sgovio, Sydney (Assoc-AUS-LT) <Sydney.Sgovio@gtlaw.com>
Subject: Re: Hardy T Land Subdivision / Hardy Driveway

Yes. Tomorrow. I can do 2p or 330p. I also have availability on Wednesday or Thursday if those times don't work.

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From: Jamie.Rose@gtlaw.com <Jamie.Rose@gtlaw.com>
Sent: Monday, January 6, 2025 12:35:19 PM
To: Laura Mueller <lmuel@cityofdrippingsprings.com>
Cc: Sydney.Sgovio@gtlaw.com <Sydney.Sgovio@gtlaw.com>
Subject: RE: Hardy T Land Subdivision / Hardy Driveway

Laura – do you have time to confer this afternoon or tomorrow regarding this matter?

Jamie Rose
Shareholder

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From: Laura Mueller <lmuel@cityofdrippingsprings.com>
Sent: Monday, December 16, 2024 1:22 PM
To: Rose, Jamie (Shld-AUS-LT) <Jamie.Rose@gtlaw.com>
Cc: Sgovio, Sydney (Assoc-AUS-LT) <Sydney.Sgovio@gtlaw.com>
Subject: RE: Hardy T Land Subdivision / Hardy Driveway

Wednesday, January 15 for Backup Materials.
5 p.m. on January 20th should be fine.

Sincerely,



Laura Mueller
City Attorney
lmuel@cityofdrippingsprings.com
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511 Mercer Street • PO Box 384
Dripping Springs, TX 78620
cityofdrippingsprings.com



From: Jamie.Rose@gtlaw.com <Jamie.Rose@gtlaw.com>
Sent: Monday, December 16, 2024 11:38 AM
To: Laura Mueller <lmuel@cityofdrippingsprings.com>
Cc: Sydney.Sgovio@gtlaw.com
Subject: RE: Hardy T Land Subdivision / Hardy Driveway

Laura –

We want to confirm the deadlines associated with the January 21 Council Meeting.

All backup materials due on Monday, January 13
Presentation due at 5:00 pm on Monday, January 20 **this is MLK Day, so we want to double check this deadline*

Thanks,

Jamie Rose
Shareholder

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From: Laura Mueller <lmueller@cityofdrippingsprings.com>
Sent: Thursday, December 12, 2024 11:14 AM
To: Rose, Jamie (Shld-AUS-LT) <Jamie.Rose@gtlaw.com>
Subject: RE: Hardy T Land Subdivision / Hardy Driveway

I'll move it.



Laura Mueller
City Attorney

lmueller@cityofdrippingsprings.com
512.858.4725 City Hall

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Dripping Springs, TX 78620

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From: Jamie.Rose@gtlaw.com <Jamie.Rose@gtlaw.com>
Sent: Thursday, December 12, 2024 11:05 AM
To: Laura Mueller <lmueller@cityofdrippingsprings.com>
Subject: RE: Hardy T Land Subdivision / Hardy Driveway

We need to shift to January 21. Amended notice coming.

Thanks,

Jamie Rose
Shareholder

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From: Laura Mueller <lmueller@cityofdrippingsprings.com>
Sent: Wednesday, December 11, 2024 2:04 PM
To: Rose, Jamie (Shld-AUS-LT) <Jamie.Rose@gtlaw.com>
Cc: Shaneyfelt, Joe (Assoc-AUS-LT) <Joe.Shaneyfelt@gtlaw.com>; Sgovio, Sydney (Assoc-AUS-LT) <Sydney.Sgovio@gtlaw.com>
Subject: RE: Hardy T Land Subdivision / Hardy Driveway

EXTERNAL TO GT

Okay.



Laura Mueller
City Attorney

lmueller@cityofdrippingsprings.com
512.858.4725 City Hall

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From: Jamie.Rose@gtlaw.com <Jamie.Rose@gtlaw.com>
Sent: Wednesday, December 11, 2024 11:03 AM
To: Laura Mueller <lmueller@cityofdrippingsprings.com>
Cc: Joe.Shaneyfelt@gtlaw.com; Sydney.Sgovio@gtlaw.com
Subject: RE: Hardy T Land Subdivision / Hardy Driveway

Laura – I may have a snag on January 7. Please hold and let me confirm if that date works or we need to do January 21.

Thanks,

Jamie Rose
Shareholder

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From: Rose, Jamie (Shld-AUS-LT) <Jamie.Rose@gtlaw.com>
Sent: Tuesday, December 10, 2024 4:34 PM
To: Laura Mueller <lmueller@cityofdrippingsprings.com>
Cc: Shaneyfelt, Joe (Assoc-AUS-LT) <Joe.Shaneyfelt@gtlaw.com>; Sgovio, Sydney (Assoc-AUS-LT) <Sydney.Sgovio@gtlaw.com>
Subject: Hardy T Land Subdivision / Hardy Driveway

Laura – please see attached revised Notice of Appeal for the January 7, 2025 Council Meeting.

Thanks,

Jamie Rose
Shareholder

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