


TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Water Resources

 William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243
 1-888-891-8332 (TDEC)

Notice of Intent (NOI) for General NPDES Permit for Stormwater Discharges from Construction Activities (TNR100000)

Site or Project Name: Andes Trace Subdivision		NPDES Tracking Number: TNR	
Street Address or Location: 1609 Old Andes Road		Construction Start Date: October, 2020	
		Estimated End Date: October, 2021	
Site Description: Residential Subdivision		Latitude (dd.dddd): 35.9493	
		Longitude (-dd.dddd): -84.0959	
County(ies): Knox	MS4 Jurisdiction (if applicable): Knox	Acres Disturbed: 48.82	
		Total Acres: 64.07	
Check the appropriate box(s) if there are streams and/or wetlands on or adjacent to the construction site: Streams <input type="checkbox"/> Wetlands <input checked="" type="checkbox"/>			
If wetlands are located on-site and may be impacted, attach wetlands delineation report.			
If an Aquatic Resource Alteration Permit (ARAP) has been obtained for this site, what is the permit number?			
Receiving waters: Meadow Creek			
Attach the SWPPP with the NOI: SWPPP Attached <input checked="" type="checkbox"/>		Attach a site location map: Map Attached <input checked="" type="checkbox"/>	
Site Owner/Developer (Primary Permittee): (Provide person, company, or entity that has operational or design control over construction plans and specifications): Ball Homes, LLC			
For corporate entities only, provide correct Tennessee Secretary of State (SOS) Control Number: 000652342 (an incorrect SOS control number may delay NOI processing)			
Site Owner or Developer Contact Name: (individual responsible for site) Mr. D. Ray Ball, Jr.		Title or Position: (the party who signs the certification below) Owner	
Mailing Address: 3609 Walden Drive		City: Lexington	State: KY Zip: 40517
Phone: (859) 268-1191	Fax: (859) 268-9093	E-mail:	
Optional Contact: Mr. Brian D. Stephens, PE		Title or Position: <i>ENGINEER / AUTHORIZED REP.</i>	
Mailing Address: 3609 Walden Drive		City: Lexington	State: KY Zip: 40517
Phone: (859) 268-1191	Fax: (859) 268-9093	E-mail: bstephens@ballhomes.com	
Owner/Developer Certification: (must be signed by president, vice-president or equivalent, or ranking elected official) (Primary Permittee)			
I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.			
Owner/Developer Name: (print/type) <i>Brian D. Stephens</i>		Signature: <i>[Signature]</i>	Date: <i>9/21/20</i>
Contractor(s) Certification: (must be signed by president, vice-president or equivalent, or ranking elected official) (Secondary Permittee)			
I certify under penalty of law that I have reviewed this document, any attachments, and the SWPPP referenced above. Based on my inquiry of the construction site owner/developer identified above and/or my inquiry of the person directly responsible for assembling this NOI and SWPPP, I believe the information submitted is accurate. I am aware that this NOI, if approved, makes the above-described construction activity subject to NPDES permit number TNR100000, and that certain of my activities on-site are thereby regulated. I am aware that there are significant penalties, including the possibility of fine and imprisonment for knowing violations, and for failure to comply with these permit requirements. As specified in Tennessee Code Annotated Section 39-16- 702(a)(4), this declaration is made under penalty of perjury.			
Contractor name, address, and SOS control number (if applicable):		Signature:	Date:
Contractor name, address, and SOS control number (if applicable):		Signature:	Date:

OFFICIAL STATE USE ONLY

Received Date:	Reviewer:	Field Office:	Permit Tracking Number: TNR	Exceptional TN Water:
Fee(s):	T & E Aquatic Flora/Fauna:	SOS Corporate Status:	Waters with Unavailable Parameters:	Notice of Coverage Date:

CONSTRUCTION GENERAL PERMIT - NOTICE OF INTENT (NOI) - INSTRUCTIONS

A completed NOI must be submitted to obtain coverage under the CGP. **Requesting coverage under this permit means that an applicant has obtained and examined a copy of this permit, and thereby acknowledges applicant's claim of ability to be in compliance with permit terms and conditions.** CGP coverage is required for stormwater (SW) discharge(s) from construction activities including clearing, grading, filling and excavating (including borrow pits) of one or more acres of land. This form should be submitted at least 30 days prior to the commencement of land disturbing activities, or no later than 48 hours prior to when a new operator assumes operational control over site specifications or commences work at the site.

The application fee must accompany the NOI and is based on total acreage to be disturbed by an entire project, including any associated construction support activities (e.g., equipment staging yards, material storage areas, excavated material disposal areas, borrow or waste sites, etc.). A separate annual maintenance fee is also required for activities that exceed 1 year under CGP coverage. See TN Rules, Chapter 0400-40-11-.02(b)(12).

Acres Disturbed	= or > 150 acres	= or > 50 < 150 acres	= or > 20 < 50 acres	= or > 5 < 20 acres	= or > 1 < 5 acres	Subsequent coverage
Fee	\$10,000	\$6,000	\$3,000	\$1,000	\$250	\$100

Who must submit the NOI form? All site operators must submit an NOI form. "Operator" for the purpose of this permit and in the context of SW associated with construction activity means any person associated with a construction project who meets either or both of the following two criteria: (1) The person has operational or design control over construction plans and specifications, including the ability to make modifications to those plans and specifications. This person is typically the owner or developer of the project or a portion of the project (e.g., subsequent builder), or the person that is the current land owner of the construction site, and is considered the primary permittee; or (2) The person has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions. This person is typically a contractor or a commercial builder who is hired by the primary permittee, and is considered a secondary permittee.

Owners, developers and all contractors that meet the definition of the operator in subsection 2.2 of the permit shall apply for permit coverage on the same NOI, insofar as possible. After permit coverage has been granted to the initial site-wide primary permittee, any subsequent NOI submittals must include the site's previously assigned permit tracking number and the project name. The comprehensive site-specific SWPPP shall be prepared in accordance with the requirements of part 3 of the permit and must be submitted with the NOI unless the NOI being submitted is to add a subsequent permittee to an existing coverage. Artificial entities (e.g., corporations or partnerships) must submit the correct Tennessee Secretary of State, Division of Business Services, control number. **The NOI will be considered incomplete without a correct control number, and the division reserves the right to deny coverage to artificial entities that are not properly registered and in good standing with the Tennessee Secretary of State.**

Complete the form: Type or print clearly. Answer each item or enter "NA," for not applicable. If you need additional space, attach a separate piece of paper to the NOI form. **The NOI will be considered incomplete without a permit fee and comprehensive site-specific SWPPP (if applicable).**

Describe and locate the project: Use the legal or official name of the construction site. If a construction site lacks street name or route number, give the most accurate information available to describe the location (reference to adjacent highways, roads and structures; eg., intersection of state highways 70 and 100). Latitude and longitude (in decimal degrees) can be found at numerous other web sites. Attach a copy of a map, showing location of site, with boundaries at least one mile outside the site boundaries. Provide estimated starting date of clearing activities and completion date of the project, and an estimate of the number of acres of the site on which soil will be disturbed, including borrow areas, fill areas, stockpiles and the total acres. For linear projects, give location at each end of the construction area.

Name of the receiving waters: Trace the route of SW runoff from the site and determine the name of the water course(s) into which the stormwater runoff drains. Note that the receiving water course may or may not be located on the construction site. If the first water body receiving construction site runoff is unnamed ("unnamed tributary"), determine the name of the waterbody that the unnamed tributary enters.

An ARAP may be required: **If your work will disturb or cause alterations of a stream or wetland, you must obtain an appropriate Aquatic Resource Alteration Permit (ARAP).** If you have a question about the ARAP program, contact your local Field Office (EFO).

Submitting the form and obtaining more information: Note that this form must be signed by the company President, Vice-President, or a ranking elected official in the case of a municipality, for details see subpart 2.5. For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC). Submit the completed NOI form (keep a copy for your records) to the appropriate EFO for the county(ies) where the construction activity is located, addressed to **Attention: Stormwater NOI Processing.**

Notice of Coverage: The division will review NOIs for completeness and accuracy and issue an NOC to site-wide primary operators, authorizing SW discharge from the construction site as of the effective date of the NOC. New subsequent operators will not receive an NOC, but are considered covered under the permit when their permit record is published on TDEC's dataviewer as "active" and with an effective date. TDEC Permit Dataviewer can be found at: http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34001:0

EFO	Street Address	Zip Code	EFO	Street Address	Zip Code
Memphis	8383 Wolf Lake Drive, Bartlett	38133-4119	Cookeville	1221 South Willow Ave.	38506
Jackson	1625 Hollywood Drive	38305-4316	Chattanooga	1301 Riverfront Pkwy, Suite 206	37402
Nashville	711 R S Gass Boulevard	37243	Knoxville	3711 Middlebrook Pike	37921
Columbia	1421 Hampshire Pike	38401	Johnson City	2305 Silverdale Road	37601

Certification

This Stormwater Pollution Prevention Plan (SWPPP) is developed in accordance with the Tennessee General NPDES Permit (TNR100000) for stormwater discharges associated with Construction Activity (TNCGP), and is prepared using sound engineering practices. As instructed by subpart 2.7 of the TNCGP, this plan and its attachments are hereby submitted to the local Environmental Field Office (EFO) along with the complete Notice of Intent (NOI). Typically, construction will not be initiated prior to 30 days from the date of submittal of this document, or prior to receipt of a Notice of Coverage (NOC) from the Tennessee Department of Environment and Conservation (TDEC).

Owner/Developer: Ball Homes, LLC
Attn: Mr. D. Ray Ball
3609 Walden Drive
Lexington, KY 40517
Office: (859) 268-1191

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

Signed:  Date: 9/21/20

Printed Name: Brian D. Stephens

Primary Contractor: _____

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Signed: _____ Date: _____

ANDES TRACE SUBDIVISION
1609 Old Andes Road
Knoxville, TN

Stormwater Pollution Prevention Plan (SWPPP)
and Notice of Intent (NOI)

Submitted to

TDEC

Submitted for

Ball Homes, LLC

Mr. D. Ray Ball, Jr.
6309 Walden Drive
Lexington, KY 40517

Date

September 18, 2020

FMA Project No. 592.007

Submitted By:





TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

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Owner/Developer: Ball Homes, LLC
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Signed: _____ Date: _____

Printed Name: _____

Primary Contractor: _____

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Signed: _____ Date: _____

1. General Information

Current versions of this SWPPP, NOI, and the NOC will be kept on-site for the duration of the project. These items will be available for the use of operators and site personnel involved with visiting the site. A notice will be posted near the construction entrance containing a copy of the NOC with the tracking number assigned by the EFO, the name, company name, telephone number, and address of the project site owner or a local contact person for the development, and a brief description of the project. Also, the erosion and sediment control inspector will post on site a certificate stating that the inspector has successfully completed the Fundamentals of Erosion Prevention and Sediment Control course offered by TDEC.

Any new contractor on the project that has any responsibility to install, inspect, or maintain erosion or sediment control measures will sign the contractor's certification on a copy of the NOI (Attachment 1) and will submit it to the local EFO. Any correspondence with TDEC or any EFO will reference the tracking number assigned to the project. The Contractor will submit a Notice of Termination (NOT) after the complete installation and successful establishment of the final stabilization activities have occurred at the site.

It is the intent and goal of the TNCGP and this SWPPP that stormwater discharge from the property described in this document causes no objectionable color contrast to the water body that receives it. The construction activity will be carried out in such a manner as to prevent discharge that would cause a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of the waters on the property or downstream of the property for fish and aquatic life, livestock watering and wildlife, recreation, irrigation, navigation, or industrial or domestic water supply. Should any discoloration occur prior to effluent leaving the site the contractor is advised to use a polyacrylamide in the influent waters just upstream of the sediment basin/pond/trap.

This plan may be amended for reasons described herein, or for other reasons. When the plans are revised, the contractor will implement the changes to erosion prevention and sediment controls within 48 hours after the need for modification is identified.

2. Site Description

This section provides a description of the existing site conditions and a description of the proposed project.

2.1. Existing Site Conditions

The project area is located west of Chert Pit Road between Old Andes Road and Troutman Lane, surrounded by several neighborhoods. Existing use of the lot consists of a few houses and ground cover consists of open grass, a pond, unmaintained wooded areas, and paved driveways. The average slope of the site is 13%.

Runoff from the site drains to Meadow Creek, which is a 303(d) listed stream for Escherichia Coli. Meadow Creek will not be impacted by this proposed development and will remain in its current condition after the construction of this project.

There are no known sinkholes located within the proposed construction area.

2.2. Project Description

This SWPPP pertains to site development as it relates to site grading, the construction of roads to service the subdivision, a storm water system, utility systems, and a detention area. Access to the site will be provided from Old Andes Road, located south of the property. The total disturbed area from the activities described above and any temporary off-site storage and borrow areas will be approximately 48.82 acres.

Soil disturbing activities will include clearing and grubbing, installing a stabilized construction entrance, perimeter and other erosion controls, grading, access road construction, and utility construction. The anticipated schedule for construction activities is from October 2020 to October 2021.

Soils that will be used for fill will be material that is free of rock or gravel larger than 4 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. These soils will have a plasticity index (PI) less than or equal to 30, a liquid limit less than 60, and a minimum dry density of 90 pounds per cubic foot (pcf).

Control of stormwater runoff for the developed site will be provided via area drains, curb inlets, pipes, and the on-site infiltration ponds.

Reference the construction plans for a general location map, site plan, site details, and for an identification of outfall points of stormwater discharge from the site. There are no non-stormwater discharges on the proposed site. When dewatering open trenches after a rainfall event, the water will be filtered through a filter bag or other device in order to remove suspended sediment before the water is released off – site.

No construction activities related to this project shall take place within a stream without obtaining the proper Aquatic Resource Alteration Permit (ARAP) from TDEC.

3. Spills and Non-Stormwater Contingencies

Fueling of equipment and vehicles on-site will be conducted near the construction entrance/staging area. Spills will be removed immediately. Contaminated soils will be placed on heavy plastic and covered or placed into approved containers to prevent contact with stormwater. Fuel tanks will be located within a designated area. Oils, other vehicle fluids, paints, and solvents will be stored in the construction trailer or other covered structure. Any spills in excess of 2-gallons will be reported to a representative of project Contractor or Owner.

Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials may include, but will not be limited to brooms, dust

pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

If a release containing a hazardous substance in an amount equal to or in excess of a reporting quantity established under either 40 CFR 117 or 40 CFR 302 occurs during a 24-hour period, the Contractor will immediately notify the permittee who shall then notify the National Response Center (NRC) at 800-424-8802, the Tennessee Emergency Management Agency (TEMA) at 800-262-3300 for emergencies or 800-262-3400 for non-emergencies, and the local EFO

Within (14) days of knowledge of discharge, permittee must provide to the EFO a written description of the date of release and the circumstances leading to the release.

In the event that a release occurs, the Contractor will prepare a revision of this document to identify measures to prevent the reoccurrence of such releases and how to clean-up the spill if there is another one. A description of the spill, what caused it and the clean-up measures will also be included.

Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water on the site unless appropriate provisions are provided.

Each contractor is responsible to provide litter control for trash generated by their crew(s). A dumpster or other appropriate securely lidded container for garbage will be located near the construction trailer and is limited to garbage and paper trash only.

On-site vehicles and mechanical equipment will be monitored for leaks and receive regular preventive maintenance to reduce the potential of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled. Asphalt substances used on-site will be applied according to the manufacturer's recommendations. Waste materials will be properly disposed of according to the manufacturer's instructions and in conformance with applicable Local, State, and Federal regulations.

Fertilizers will be applied only in the minimum amounts recommended by the manufacturer or as otherwise specified herein. Once applied, fertilizer will be worked into the soil to limit exposure to stormwater; store fertilizer in a covered shed or other protective enclosure. The contents of used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

Paint containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to the manufacturer's instructions and in conformance with applicable Local, State, and Federal regulations.

Other non-stormwater discharges will be directed toward the detention pond / an area of undisturbed vegetation. These include discharges that are expected from the site during the construction period such as water from water line flushings.

Non-stormwater discharges not specifically listed in this section are prohibited, unless specifically allowed by the Construction General Permit and adequate pollution prevention measures are utilized.

4. Construction Sequencing

The erosion and sediment control best management practices identified in this SWPPP and as shown on the construction plans will be installed in accordance with the Tennessee Erosion and Sediment Control Handbook, latest revision and per Knox County regulations. No soil disturbance activities may take place prior to Knox County's issuance of a grading permit and/or before the erosion control inspection letter has been approved.

4.1. Anticipated Schedule

Clearing, grading, and construction of the proposed improvements will be accomplished in the following sequence and will include the following erosion control measures as a minimum:

Table 1. Estimated Project Schedule

Construction Activity	Estimated Beginning Date	Erosion & Sediment Control Measures
Initial BMP's	October 2020	Silt fence & construction entrance
Strip/Stockpile Topsoil	October 2020	Silt fence & construction entrance
Site Grading	November 2020	Silt fence, construction entrance, reforestation & sediment pond
Storm System Installation	December 2020	Silt fence, construction entrance, sediment pond, & temporary inlet protection
Site Utility Installation	January 2021	Silt fence, construction entrance, sediment pond, & temporary inlet protection
Stabilize Paved Areas	February 2020	Silt fence, construction entrance, sediment pond, & temporary inlet protection, paving & seeding
Stabilize Lawn Areas	February 2020	Silt fence, sediment pond, temporary inlet protection, reforestation, permanent seeding and/or sod
Complete construction	October 2020	Remove all temporary EC items

4.2. Erosion and Sediment Control Measures

The appropriate erosion and sediment control structures will be installed per the erosion control plan prior to any land disturbance activities beginning. The erosion and sediment control devices have been designed for a 5-year, 24-hour storm event. Temporary erosion control measures may be removed at the beginning of the workday but must be replaced at the end of the workday.

Construction entrance/exit: temporary sediment control devices installed wherever construction traffic leaves an active construction site. Reference the civil plans for specific

type. A construction exit will be installed for ingress and egress off Old Andes Road prior to land disturbing activities. Contractor will implement appropriate measures to prevent/minimize the tracking of dirt into the right-of-way. Any sediment deposited in the right-of-way will be removed promptly.

Diversions: ditches and berms that will be constructed as necessary to divert runoff from the active construction area and also off-site runoff from draining into the construction areas. Diversion ditches carrying on-site water shall be directed to the sediment pond.

Check dam: small, temporary structure constructed across a drainage -way (not a stream), typically composed of riprap and includes a center spillway section that is lower than the check dam sides. Reference the civil plans for type and location.

Silt fence: temporary, permeable sediment barrier typically constructed of woven geotextile fabric supported by steel or hardwood posts, buried at the bottom, and erected near small disturbed areas to capture sediment from sheet flow. Silt fencing shall remain in place and be properly maintained during all grading activities until permanent stabilization of the site is established. Reference the civil plans for type and location.

Inlet protection: temporary device installed at the entrance to a storm drain to prevent sediment from construction sites from getting into the storm drain system. Reference the civil plans for specific type and location.

Sediment basin: a temporary basin created by an embankment constructed across a drainage-way, or by an excavation that creates a basin, or by a combination of both, suitably located to capture sediment. Generally, a sediment basin consists of an embankment (dam), a sediment storage area, a sediment forebay, a dewatering mechanism, a principal (or primary) spillway and emergency spillway system, a permanent pool, and scour protection at the outlet pipe of the principal spillway. The sediment basin will have a controlled outlet structure providing the needed storage volume and required discharge flow (reference civil engineering plans and details for drainage areas, runoff coefficient, and basin volume). The sediment pond will have a sediment depth marker indicating when the sediment depth has reached 10% of the design capacity and needs sediment removed.

Sediment trap: temporary ponding areas formed by excavating a sediment storage area and constructing an earthen embankment with a simple riprap spillway. Reference civil plans for size and location.

Temporary vegetation: annual plants that are adapted to site conditions and that sprout and grow rapidly. Stabilization will be completed within 14 days (7 days for > 35% slopes) on portions of the site where construction activities have temporarily ceased. The temporary seed shall be Rye (grain) applied at the rate of 120 lbs. per acre. Prior to seeding, 2,000 lbs. of ground agricultural limestone and 1,000 lbs. of 10-10-10 fertilizer shall be applied to each acre to be stabilized. After seeding, each area will be mulched with straw at rate of 100 lbs/1000 S.F. over the seeded areas. Where practical, the straw mulch is to be tacked into place by a disk with blades set nearly straight. Erosion control matting will be used on steep slopes as necessary to ensure sufficient stabilization. Areas of the site which are to be paved will be temporarily stabilized by applying stone sub-base until bituminous pavement can be applied.

Topsoil will be removed from the work areas, stockpiled, and immediately seeded. Clearing and grubbing will be kept to a minimum necessary to accomplish the grade work within the particular work area. The contractor is encouraged to clear the site in phases to minimize exposed areas. The contractor shall leave the existing vegetation in place until a maximum of 10 days prior to grading activities. For areas of the site that are to receive permanent vegetation, a minimum of 6-inches of topsoil will be placed prior to applying seed and mulch.

Permanent vegetation: annual plants to control erosion by physically protecting a bare soil surface from raindrop impact, flowing water, and wind. Stabilization will be completed within 14 days (7 days for >35% slopes) on portions of the site where construction activities have permanently ceased. The permanent seed shall be drought tolerant, hybrid Kentucky 31 (Jaguar, Lancer, Rebel II, Falcon II, Etc.). Seed at a rate of 6-8 lbs./1000 S.F. use a slow release starter fertilizer with 1 lbs./1000 S.F. nitrogen. If grading is performed during the winter months, seed mixture shall be supplemented with a winter rye or other appropriate mixture to assure stabilization during the winter season. After seeding, each area will be mulched with straw at rate of 100 lbs/1000 S.F. over the seeded areas. Where practical, the straw mulch is to be tacked into place by a disk with blades set nearly straight. Erosion control matting will be used on steep slopes as necessary to ensure sufficient stabilization.

5. Maintenance and Inspections

This section describes the maintenance and inspection practices for the site and the site assessment for quality assurance.

5.1. Maintenance and Inspection Practices

The following maintenance and inspection practices will be used to maintain erosion prevention and sediment controls:

Disturbed areas that have not been finally stabilized, areas used for storage of materials exposed to precipitation, structural control measures, locations where vehicles enter and exit the site, and all points of outfall will be inspected in anticipation of a storm event, at least twice per week (at least 72 hours apart) and following storm events of 0.5-in. or greater. The inspector is also required to keep a rain gauge at the site and a daily log of the rainfall readings must be maintained.

Control structures will be maintained in good working order; if a repair is necessary, it will be initiated within 7 days of discovery and/or prior to the next rain event;

Built up sediment will be removed from silt fence when it has reached one-third the height of the fence;

Silt fences will be inspected for depth of sediment, tears, security of attachment to the fence posts, and to see that the fence posts are firmly in the ground and upright;

The sediment basin will be inspected for depth of sediment, and build up sediment will be removed when it reaches 10 percent of the design capacity and at the end of the project;

Sediment shall be removed from a sediment control device as needed, but at least when the design capacity has been reduced by 50%.

Diversion dikes will be inspected and any breaches promptly repaired;

Temporary and permanent seeding will be checked for bare spots, washouts, and healthy growth and reseeding shall occur as necessary;

Any off-site accumulation not affecting a stream shall be removed and vegetation returned to original condition. If sediment reaches the stream the permittee must contact the local TDEC office prior to any work within the stream;

A maintenance inspection report will be made after each inspection and include grading dates, cease work dates, stabilization dates, and rainfall amounts;

Inspect all outfall points related to the site and fix as needed. Revise SWPPP as needed to correct the issue;

All 303(d) or high quality streams must be inspected and recorded on inspection sheet (Attachment 4) and made available on-site. If problems occur TDEC will issue a violation and owner will have 7 days to correct issue. If issue is not corrected in 7 days a "cease work" will be issued.

Inspectors will be certified with a level 1 rating given by TDEC after appropriate training courses have been completed.

The site superintendent will select individuals who will be responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance reports. These reports must include name, date, observation, and action taken. Reports must be made available on-site.

5.2. Site Assessment

A site assessment for quality assurance of erosion prevention and sediment controls will be conducted at each outfall involving drainage totaling 10 or more acres or 5 or more acres if draining to an impaired or exceptional quality waters, within a month of construction commencing at each portion of the site that drains the qualifying acreage of such portion of the site. The site assessment will be performed by individuals with following qualifications:

- A licensed professional engineer;
- A Certified Professional in Erosion and Sediment Control (CPESC), or;
- A person that successfully completed the "Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites" course.

As a minimum, site assessment will be performed to verify the installation, functionality and performance of the EPSC measures described in the SWPPP. The site assessment will be performed with the inspector, and will include a review and update (if applicable) of the SWPPP. Modifications of plans and specifications for any building or structure, including the design of sediment basins or other sediment controls involving structural, hydraulic, hydrologic or other engineering calculations will be prepared by a licensed professional engineer or landscape architect and stamped and certified in accordance with the Tennessee Code Annotated, Title 62, Chapter 2 and the rules of the Tennessee Board of Architectural and Engineering Examiners.

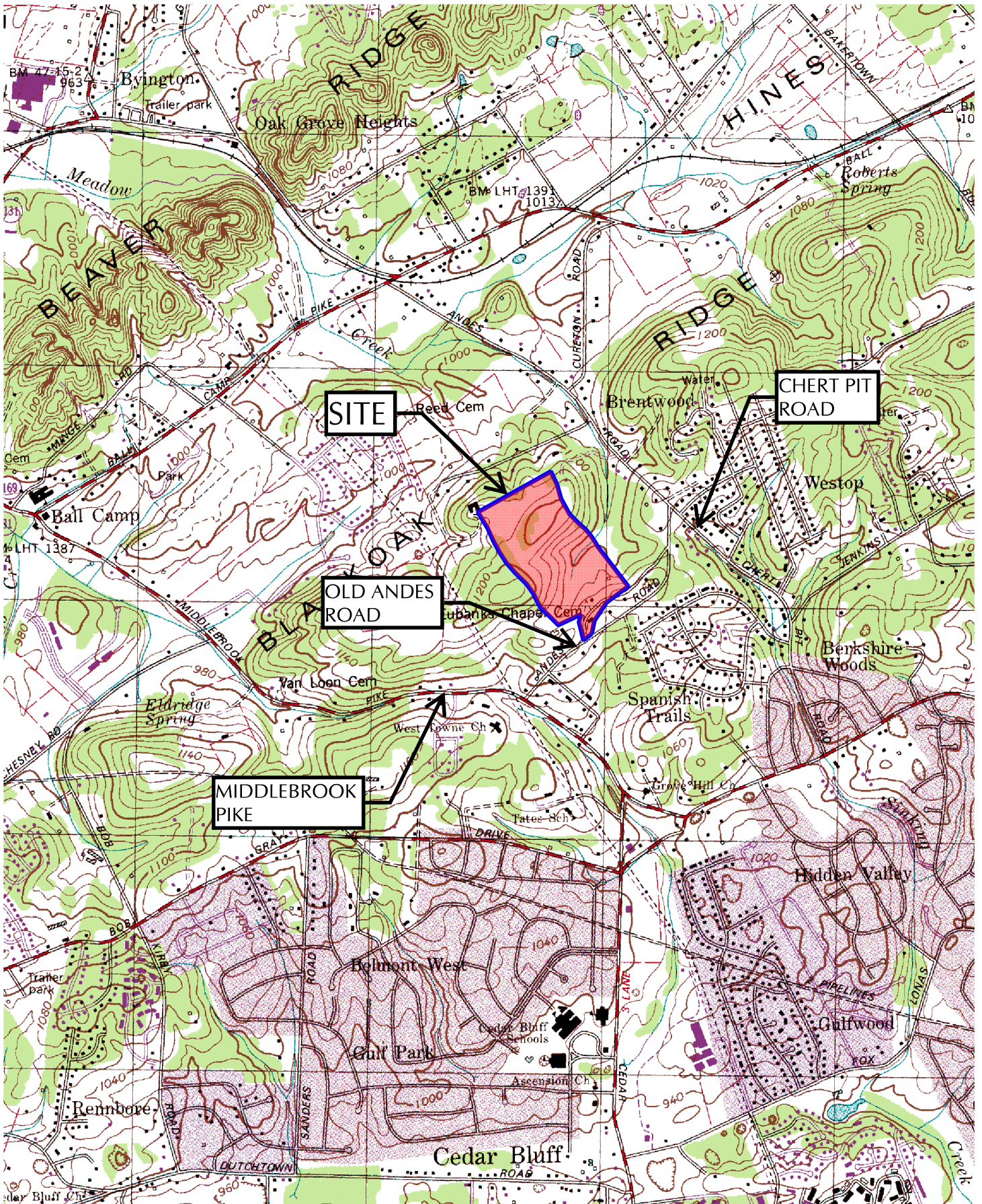
The site assessment findings will be documented and the documentation kept with the SWPPP at the site. The site assessment findings will also be provided in letter format to Knox County Engineering. At a minimum, the documentation will include information included in the inspection form provided in Attachment 4 of this document. The documentation must contain the printed name and signature of the individual performing the site assessment and the following certification:

"I certify under penalty of law that this report and all attachments are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

The site assessment can take the place of one of the twice weekly inspections.

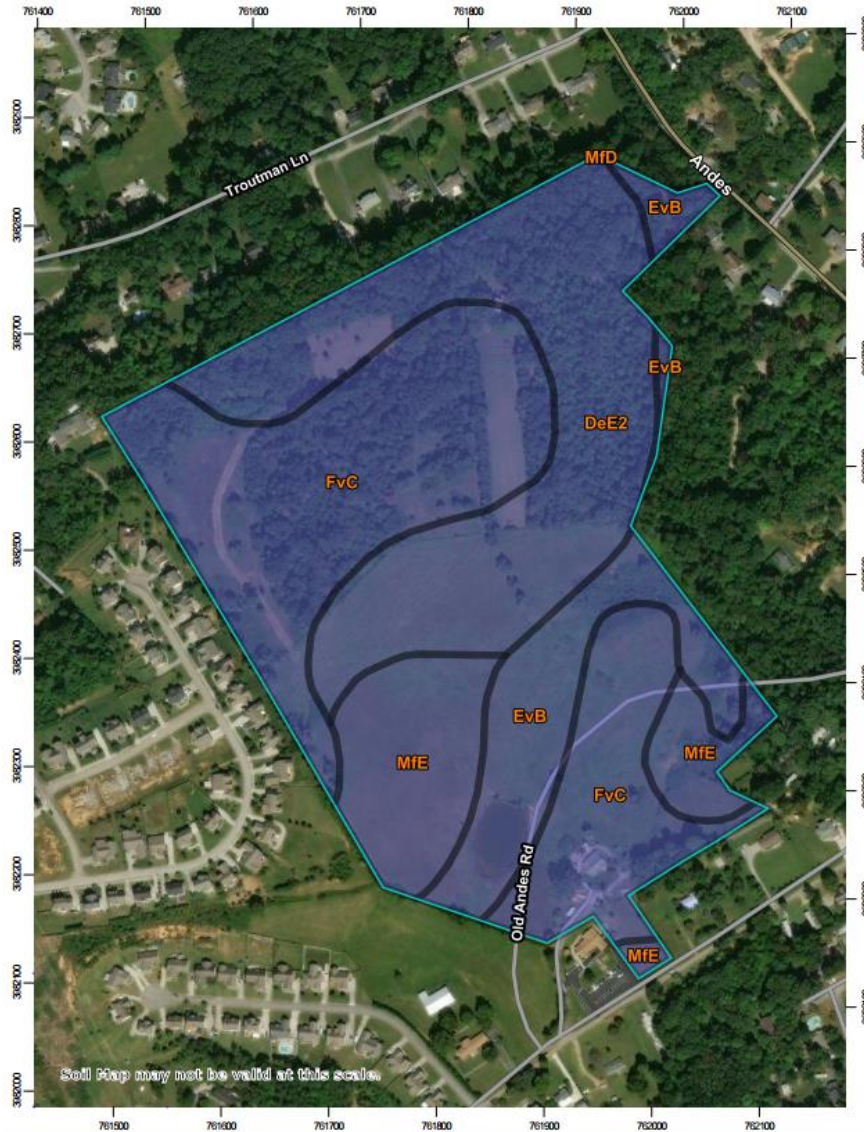
Attachment 1: Notice of Intent (NOI)

Attachment 2: USGS Quadrangle Map



BEARDEN QUAD

Attachment 3: NRCS Soil Map



Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DeE2	Dewey loam, 25 to 40 percent slopes, eroded	B	21.5	33.0%
EvB	Etowah-Minvale complex, 2 to 5 percent slopes	B	8.3	12.8%
FvC	Fullerton-Minvale complex, 5 to 12 percent slopes	B	26.6	40.7%
MfD	Minvale-Fullerton complex, 12 to 25 percent slopes, stony	B	0.0	0.0%
MfE	Minvale-Bodine-Fullerton complex, 25 to 50 percent slopes, stony	B	8.8	13.4%
Totals for Area of Interest			65.2	100.0%

Attachment 4: Inspection Report Form



TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (TDEC)

Division of Water Resources

William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243

1-888-891-8332 (TDEC)

General NPDES Permit for Stormwater Discharges from Construction Activities (CGP)

Construction Stormwater Inspection Certification (Twice-Weekly Inspections)

Site or Project Name: Andes Trace Subdivision		NPDES Tracking Number: TNR
Primary Permittee Name: Ball Homes, LLC		Date of Inspection:
Current approximate disturbed acreage:	Has rainfall been checked/documented daily? <input type="checkbox"/> Yes <input type="checkbox"/> No	Name of Inspector:
Current weather conditions:		Inspector's Training Certification Number:

Please check the box if the following items are on-site:

- Notice of Coverage (NOC)
 Stormwater Pollution Prevention Plan (SWPPP)
 Twice-weekly inspection documentation
 Site contact information
 Rain Gage
 Off-site Reference Rain Gage Location: _____

Best Management Practices (BMPs):

Are the Erosion Prevention and Sediment Controls (EPSCs) functioning correctly: If "No," describe below in Comment Section

1. Are all applicable EPSCs installed and maintained per the SWPPP?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Are EPSCs functioning correctly at all disturbed areas/material storage areas per section 4.1.5?	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Are EPSCs functioning correctly at outfall/discharge points such that there is no objectionable color contrast in the receiving stream, and no other water quality impacts per section 5.3.2?	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Are EPSCs functioning correctly at ingress/egress points such that there is no evidence of track out?	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. If applicable, have discharges from dewatering activities been managed by appropriate controls per section 4.1.4? If "No," describe below the measures to be implemented to address deficiencies.	<input type="checkbox"/> Yes <input type="checkbox"/> No
6. If construction activity at any location has temporarily/permanently ceased, was the area stabilized within 14 days per section 3.5.3.2? If "No," describe below each location and measures taken to stabilize the area(s)	<input type="checkbox"/> Yes <input type="checkbox"/> No
7. Have pollution prevention measures been installed, implemented, and maintained to minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters per section 4.1.5? If "No," describe below the measures to be implemented to address deficiencies.	<input type="checkbox"/> Yes <input type="checkbox"/> No
8. If a concrete washout facility is located on site, is it clearly identified on the project and maintained? If "No," describe below the measures to be implemented to address deficiencies.	<input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No
9. Have all previous deficiencies been addressed? If "No," describe remaining deficiencies in Comment section. <input type="checkbox"/> Check if deficiencies/corrective measures have been reported on a previous form.	<input type="checkbox"/> Yes <input type="checkbox"/> No

Comment Section. If the answer is "No" for any of the above, please describe the problem and corrective actions to be taken. Otherwise, describe any pertinent observations:

Certification and Signature (must be signed by the certified inspector and the permittee per Sections 3.5.8.2 (g) and 7.7.2 of the CGP)

I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Inspector Name and Title:	Signature:	Date:
Primary Permittee Name and Title:	Signature:	Date:

Construction Stormwater Inspection Certification Form (Twice-Weekly Inspections)

Purpose of this form/ Instructions

An inspection, as described in section 3.5.8.2. of the General Permit for Stormwater Discharges from Construction Activities ("Permit"), shall be performed at least twice every calendar week and documented on this form. Inspections shall be performed at least 72 hours apart. Where sites or portion(s) of construction sites have been temporarily stabilized, or runoff is unlikely due to winter conditions (e.g., site covered with snow or ice), such inspection only has to be conducted once per month until thawing results in runoff or construction activity resumes.

As described in section 3.5.8.1 of the Permit, inspectors performing the required twice weekly inspections must have an active certification by completing the "Fundamentals of Erosion Prevention and Sediment Control Level I" course (<http://www.tnepsc.org/>). Twice weekly inspections can also be performed by: a licensed professional engineer or landscape architect; a Certified Professional in Erosion and Sediment Control (CPESC) or a person who has successfully completed the "Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites" course. A copy of the certification or training record for inspector certification should be kept on site.

Qualified personnel, (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, locations where vehicles enter or exit the site, and each outfall.

Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the site's drainage system. Erosion prevention and sediment control measures shall be observed to ensure that they are operating correctly.

Outfall points (where discharges leave the site and/or enter waters of the state) shall be inspected to determine whether erosion prevention and sediment control measures are effective in preventing significant impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

Based on the results of the inspection, any inadequate control measures or control measures in disrepair shall be replaced or modified, or repaired as necessary, before the next rain event if possible, but in no case more than 7 days after the need is identified.

Based on the results of the inspection, the site description identified in the SWPPP in accordance with section 3.5.1 of the Permit and pollution prevention measures identified in the SWPPP in accordance with section 3.5.2 of the Permit, shall be revised as appropriate, but in no case later than 7 days following the inspection. Such modifications shall provide for timely implementation of any changes to the SWPPP, but in no case later than 14 days following the inspection.

All inspections shall be documented on this Construction Stormwater Inspection Certification form. Alternative inspection forms may be used as long as the form contents and the inspection certification language are, at a minimum, equivalent to the division's form and the permittee has obtained a written approval from the division to use the alternative form. Inspection documentation will be maintained on site and made available to the division upon request. Inspection reports must be submitted to the division within 10 days of the request.

Trained certified inspectors shall complete inspection documentation to the best of their ability. Falsifying inspection records or other documentation or failure to complete inspection documentation shall result in a violation of this permit and any other applicable acts or rules.

Attachment 5: Notice of Termination (NOT)



TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (TDEC)

Division of Water Resources

William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243
1-888-891-TDEC (8332)

Notice of Termination (NOT) for General NPDES Permit for Stormwater Discharges from Construction Activities (CGP)

This form is required to be submitted when requesting termination of coverage from the CGP. The purpose of this form is to notify the TDEC that either all stormwater discharges associated with construction activity from the portion of the identified facility where you, as an operator, have ceased or have been eliminated; or you are no longer an operator at the construction site. Submission of this form shall in no way relieve the permittee of permit obligations required prior to submission of this form. Please submit this form to the local DWR Environmental Field Office (EFO) address (see table below). For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC).

Type or print clearly, using ink.

Site or Project Name: Andes Trace Subdivision	NPDES Tracking Number: TNR
Street Address or Location: 1609 Old Andes Road	County(ies): Knox

Name of Permittee Requesting Termination of Coverage:			
Permittee Contact Name:		Title or Position:	
Mailing Address:	City:	State:	Zip:
Phone:	E-mail:		

Check the reason(s) for termination of permit coverage:

<input type="checkbox"/>	Stormwater discharge associated with construction activity is no longer occurring and the permitted area has a uniform 70% permanent vegetative cover OR has equivalent measures such as rip rap or geotextiles, in areas not covered with impervious surfaces.
<input type="checkbox"/>	You are no longer the operator at the construction site (i.e., termination of site-wide, primary or secondary permittee coverage).

Certification and Signature: (must be signed by president, vice-president or equivalent ranking elected official)

<p>I certify under penalty of law that either: (a) all stormwater discharges associated with construction activity from the portion of the identified facility where I was an operator have ceased or have been eliminated or (b) I am no longer an operator at the construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge stormwater associated with construction activity under this general permit, and that discharging pollutants in stormwater associated with construction activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this notice of termination does not release an operator from liability for any violations of this permit or the Clean Water Act.</p> <p>For the purposes of this certification, elimination of stormwater discharges associated with construction activity means that all stormwater discharges associated with construction activities from the identified site that are authorized by a NPDES general permit have been eliminated from the portion of the construction site where the operator had control. Specifically, this means that all disturbed soils at the portion of the construction site where the operator had control have been finally stabilized, the temporary erosion and sediment control measures have been removed, and/or subsequent operators have obtained permit coverage for the site or portions of the site where the operator had control.</p> <p>I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.</p>		
Permittee name (print or type):	Signature:	Date:

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

**Andes Trace Subdivision
Old Andes Road
Knox County, Tennessee**

**Drainage Calculations for Pre-Developed / Post-Developed
Conditions and Water Quality Analysis**

Submitted to

**Knox County Department of
Engineering & Public Works**

Submitted for

**Ball Homes, LLC
Mr. Ray Ball, Jr.
3609 Walden Drive
Lexington, KY 40517**

Date

September 18, 2020

FMA Project No. 592.007

For Knox County Use Only

Submitted By:



CALCULATION SHEET

Name: Christopher Gollhofer, P.E Date: September 18, 2020 Sheet. No: 1
Project: Andes Trace Subdivision Project No: 592.007



PURPOSE:

Calculate the peak runoff for existing and developed conditions. Design an infiltration basin system to attenuate the difference between the 1, 2, 5, 10, 25, and 100-yr., 24-hr. storm events such that the peak developed runoff is not greater than that of the pre-developed conditions. Design infiltration basins to attenuate the channel protection volume as described in the Knox County Stormwater Ordinance. The basin shall contain the Channel Protection Volume below the first control orifice and slowly release it for a minimum time of 24 hours and a maximum time of 72 hours. Design a secondary spillway to pass the 100-yr. storm with one foot of freeboard before overtopping the berm.

Verify that the site water quality measures meet the 80% TSS removal requirement for the site.

Verify the proposed pipe system is sized to convey the runoff from a 25-yr., 24-hr. storm event.

GIVEN:

1. Use SCS Type II distribution with AMC II conditions;
2. Use rainfall values (P) of 2.5-in. for the 1-yr. storm, 3.3-in. for 2-yr. storm, 4.1-in for the 5-yr. storm, 4.8-in. for the 10-yr. storm, 5.5-in. for 25-yr. storm, 6.1-in. for the 50-yr. storm, and 6.5-in. for the 100-yr. storm.
3. Calculations assume the roof drains discharge into grass and are disconnected from other impervious areas.

REFERENCES:

1. SCS, 1986. "Urban Hydrology for Small Watersheds", TR-55;
2. FMA Grading & Drainage plan;
3. Bentley CivilStorm V8i;
4. Stormwater Treatment Assessment Resource (STAR);
5. USACE, 1990. "HEC-1, Flood Hydrograph Package"

CALCULATIONS:

The drainage area map for the pre-developed conditions can be found in Attachment 1. The drainage area map for the post-developed conditions can be found in Attachment 2. A flowchart for the site can be found in Attachment 3. The drainage area map for the pipe system can be found in Attachment 4. The hydrologic soil group designation can be found in Attachment 5.

The Hydrologic Data, including sub-basin curve numbers, areas, times of concentration, and peak runoff flows, are provided in Attachment 6.

The Hydraulic Data, including infiltration basin routing analysis, can be found in Attachment 7.

CALCULATION SHEET



Name: Christopher Gollhofer, P.E Date: September 18, 2020 Sheet. No: 2

Project: Andes Trace Subdivision Project No: 592.007

Supplemental Pond Calculations, including channel protection volume and draw down calculations, can be found in Attachment 8.

The water quality volume calculation can be found in Attachment 9.

The data for the storm pipe system can be found in Attachment 10. The storm pipe, and storm structures data can be found in this attachment.

CONCLUSIONS:

The increase in runoff created by the development does not increase from the pre-developed conditions at the property line for the 1, 2, 5, 10, 25 and 100-yr, 24-hr storm events.

**Table 1
Calculation Results: Points of Interest**

Rainfall Frequency	POI 1		POI 2		POI 3		POI 4	
	Pre-Dev Peak Flow (cfs)	Post-Dev Peak Flow (cfs)	Pre-Dev Peak Flow (cfs)	Post-Dev Peak Flow (cfs)	Pre-Dev Peak Flow (cfs)	Post-Dev Peak Flow (cfs)	Pre-Dev Peak Flow (cfs)	Post-Dev Peak Flow (cfs)
1-yr	5	2	0	0	0	0	0	0
2-yr	19	17	1	1	1	0	2	2
5-yr	37	36	2	1	3	1	5	3
10-yr	58	58	4	2	6	1	8	5
25-yr	80	79	5	3	8	2	12	7
100-yr	116	100	8	4	13	2	18	9

The site uses a combination of infiltration basins and wet detention basin to attenuate the post-developed flows. Below are the summary tables for the on-site detention basins and detention pond:

**Table 2
Calculation Results: Existing Wet Detention Pond**

Rainfall Frequency	Peak Pond Inflow (cfs)	Peak Pond Outflow (cfs)	Maximum Water Surface Elevation
1-yr	8	1	1106.8
2-yr	20	7	1107.1
5-yr	34	20	1107.5
10-yr	47	32	1107.8
25-yr	62	38	1108.2
100-yr	83	38	1108.9

Maximum Allowed WSE = 1110.0

Freeboard = 1110.0 – 1108.9 = 1.1 ft. OK

CALCULATION SHEET



Name: Christopher Gollhofer, P.E. Date: September 18, 2020 Sheet. No: 3

Project: Andes Trace Subdivision Project No: 592.007

Table 3
Calculation Results: Infiltration Basin 1

Rainfall Frequency	Peak Pond Inflow (cfs)	Peak Pond Outflow (cfs)	Maximum Water Surface Elevation
1-yr	11	2	1083.5
2-yr	25	17	1084.6
5-yr	53	34	1085.9
10-yr	79	54	1087.0
25-yr	104	73	1088.0
100-yr	125	91	1089.0

Infiltration Basin Berm Elevation = 1090.0 Freeboard = $1090.0 - 1089.0 = 1.0$ ft. OK

Table 4
Calculation Results: Infiltration Basin 2

Rainfall Frequency	Peak Pond Inflow (cfs)	Peak Pond Outflow (cfs)	Maximum Water Surface Elevation
1-yr	14	0	1128.0
2-yr	25	1	1129.6
5-yr	37	1	1131.3
10-yr	48	1	1132.6
25-yr	59	1	1133.6
100-yr	75	2	1134.9

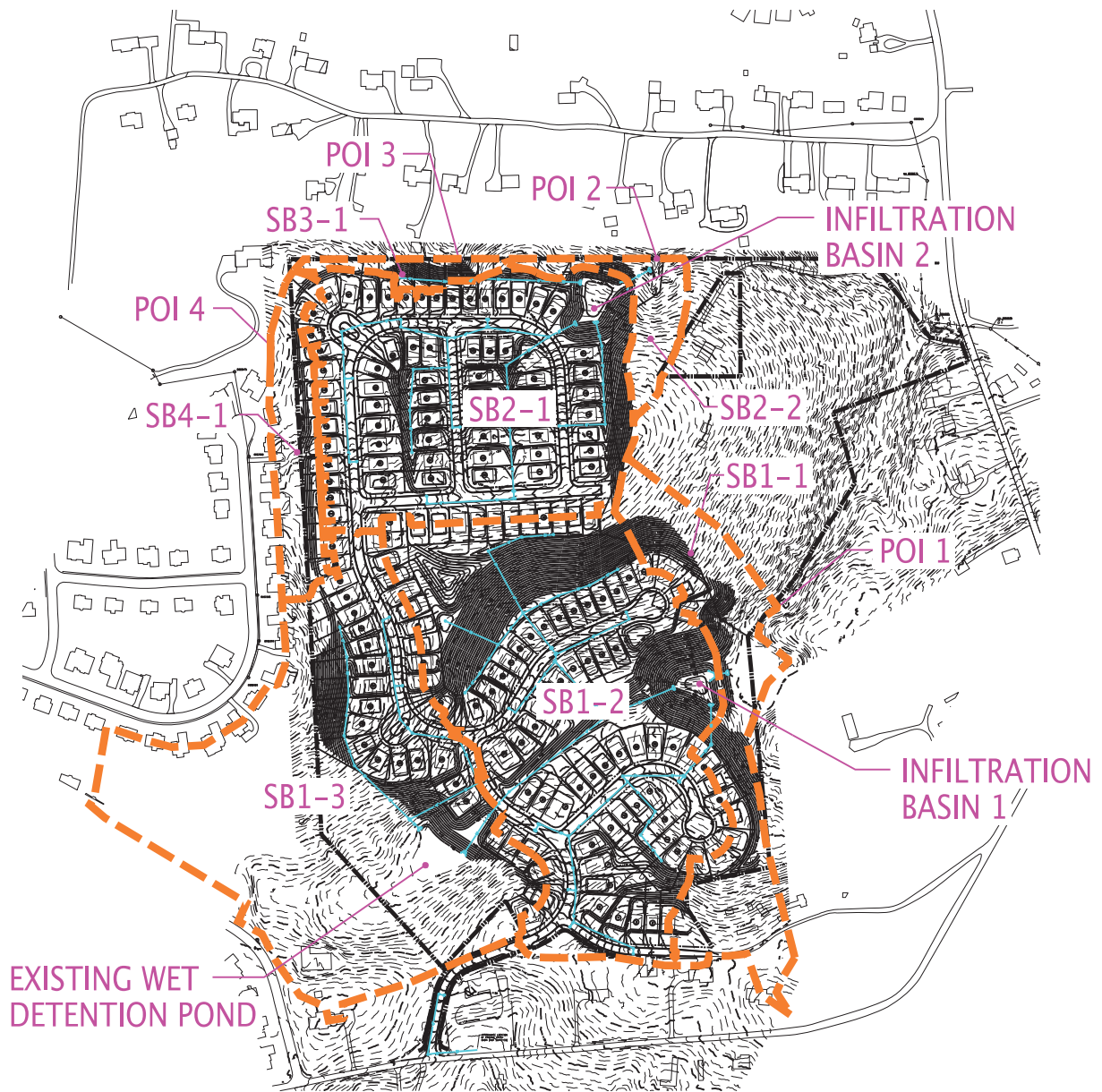
Infiltration Basin Berm Elevation = 1036.0 Freeboard = $1036.0 - 1034.9 = 1.1$ ft. OK

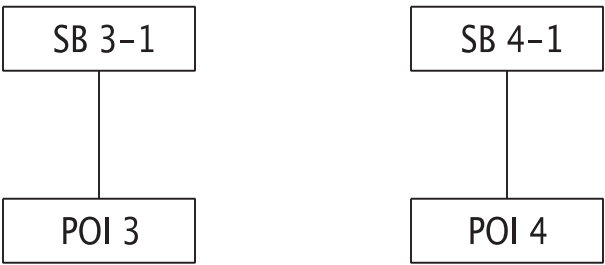
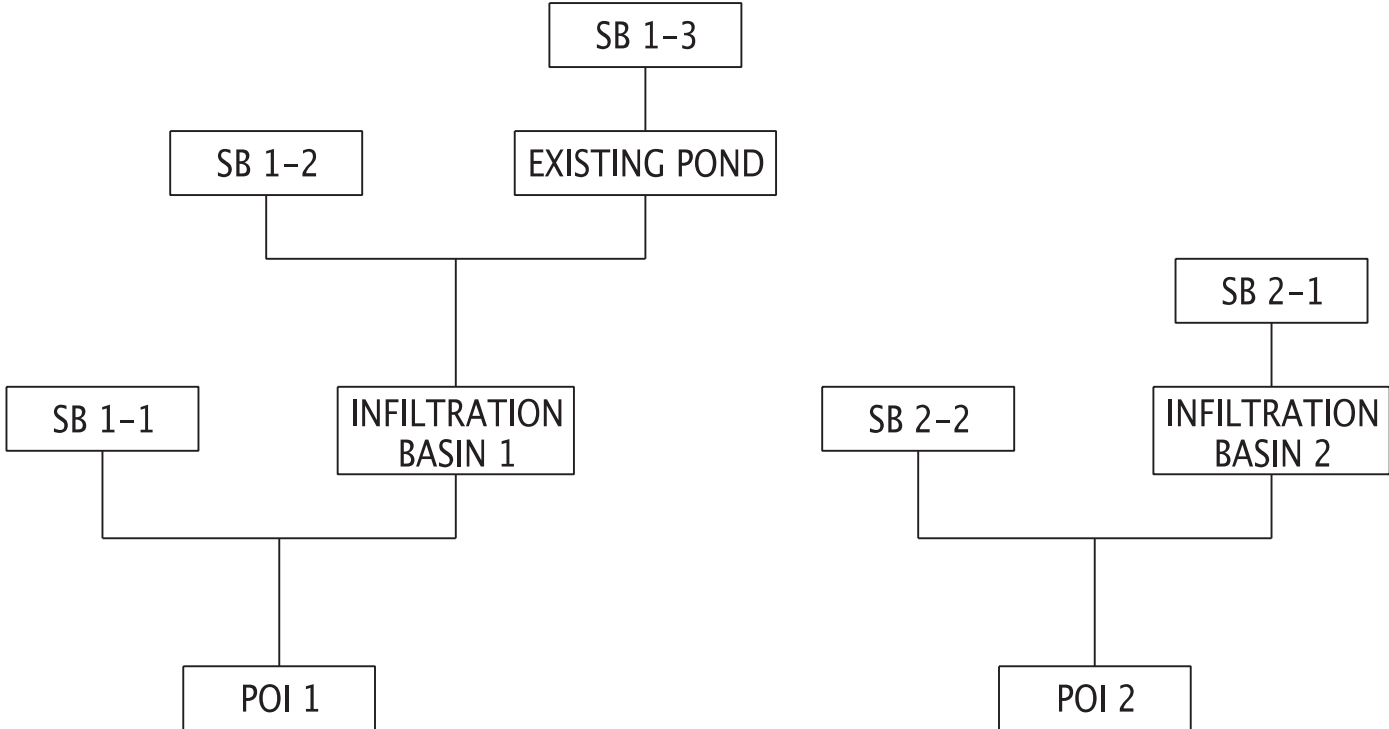
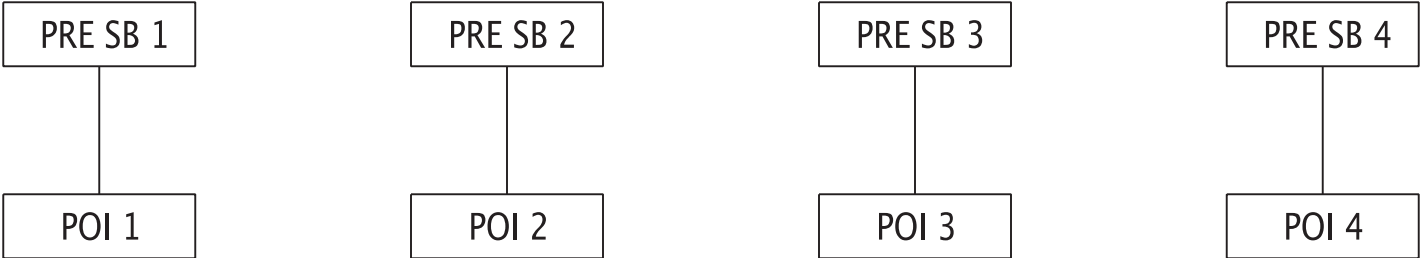
The Channel Protection Volume was contained below the lowest control weir and slowly released for a period of greater than 24 hours and less than 72 hours.

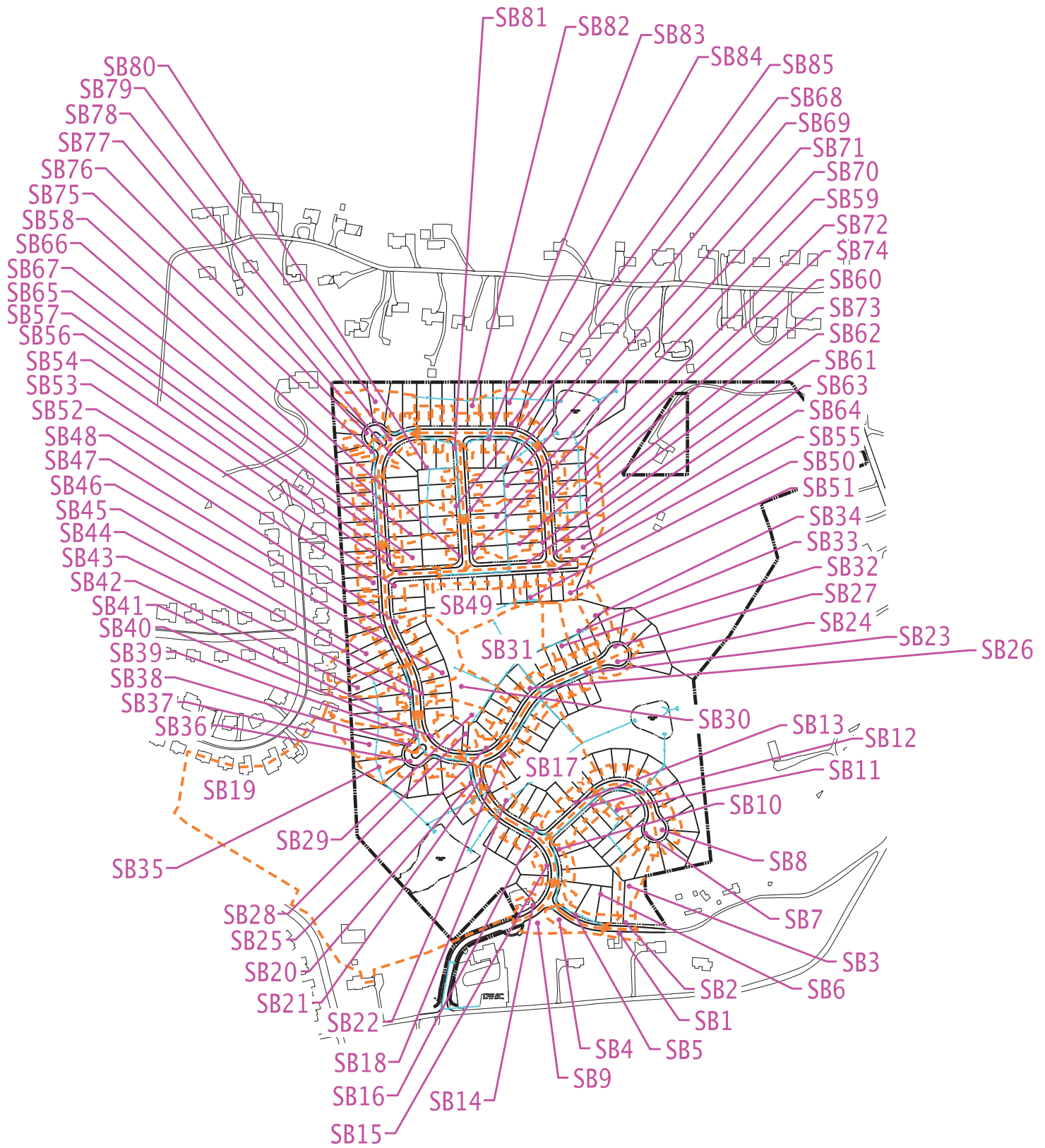
The storm system is properly sized to transport the flows generated from a 25-year, 24-hour storm event.

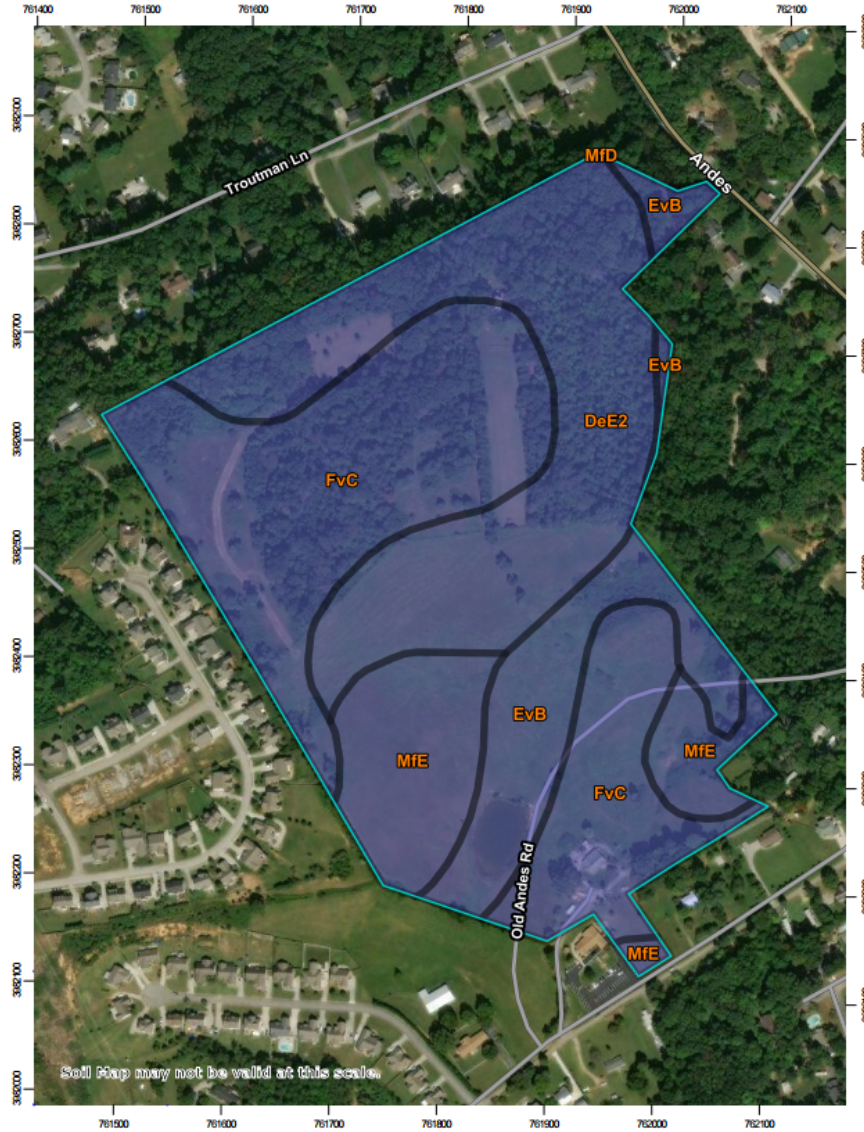
The water quality for the site was calculated using the STAR modeling software. The STAR model calculated that the site achieves 80.1% TSS Removal which is more than the required 80%. The STAR model has been provided with the submittal of this report.











Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DeE2	Dewey loam, 25 to 40 percent slopes, eroded	B	21.5	33.0%
EvB	Etowah-Minvale complex, 2 to 5 percent slopes	B	8.3	12.8%
FvC	Fullerton-Minvale complex, 5 to 12 percent slopes	B	26.6	40.7%
MfD	Minvale-Fullerton complex, 12 to 25 percent slopes, stony	B	0.0	0.0%
MfE	Minvale-Bodine-Fullerton complex, 25 to 50 percent slopes, stony	B	8.8	13.4%
Totals for Area of Interest			65.2	100.0%

Curve Number Data:

Pre SB 1

Surface Description	Soil Type	Area (Ac.)	CN
Impervious	-	1.199	98
Water	-	0.703	100
Woods – good condition	B	5.986	55
Grass/Open Space – good condition	B	41.052	61
Composite		48.939	62

Pre SB 2

Surface Description	Soil Type	Area (Ac.)	CN
Woods – good condition	B	3.000	55
Grass/Open Space – good condition	B	0.940	61
Composite		3.940	56

Pre SB 3

Surface Description	Soil Type	Area (Ac.)	CN
Impervious	-	0.020	98
Woods – good condition	B	4.940	55
Grass/Open Space – good condition	B	0.985	61
Composite		5.946	56

Pre SB 4

Surface Description	Soil Type	Area (Ac.)	CN
Impervious	-	0.241	98
Woods – good condition	B	3.591	55
Grass/Open Space – good condition	B	4.345	61
Composite		8.177	59

Post SB1-1

Surface Description	Soil Type	Area (Ac.)	CN
Impervious	-	0.324	98
Woods – good condition	B	4.284	55
Grass/Open Space – good condition	B	2.172	61
Composite		6.780	59

Post SB1-2

Surface Description	Soil Type	Area (Ac.)	CN
Impervious	-	5.614	98
Woods – good condition	B	3.751	55
Grass/Open Space – good condition	B	10.476	61
Composite		19.842	70

Post SB1-3

Surface Description	Soil Type	Area (Ac.)	CN
Impervious	-	3.036	98
Water	-	0.290	100
Woods – good condition	B	1.211	55
Grass/Open Space – good condition	B	16.203	61
Composite		20.740	67

Post SB2-1

Surface Description	Soil Type	Area (Ac.)	CN
Impervious	-	6.097	98
Woods – good condition	B	1.860	55
Grass/Open Space – good condition	B	6.819	61
Composite		14.776	76

Post SB2-2

Surface Description	Soil Type	Area (Ac.)	CN
Woods – good condition	B	1.445	55
Grass/Open Space – good condition	B	0.201	61
Composite		1.646	56

Post SB3-1

Surface Description	Soil Type	Area (Ac.)	CN
Woods – good condition	B	0.612	55
Grass/Open Space – good condition	B	0.230	61
Composite		0.842	57

Post SB4-1

Surface Description	Soil Type	Area (Ac.)	CN
Impervious	-	0.213	98
Woods – good condition	B	0.650	55
Grass/Open Space – good condition	B	1.935	61
Composite		2.797	62

Time of Concentration (Tc) Calculation Data:

Pre SB1: Tc = 0.35 hr

TR-55 Sheet Flow

Hydraulic Length	100.0ft	Slope	0.030ft/ft
Manning's n	0.400	2 Year 24 Hour Depth	3.3in

TR-55 Shallow Concentrated Flow

Hydraulic Length	395.0ft	Slope	0.145ft/ft
Is Paved?	False		

TR-55 Channel Flow

Flow Velocity	12.00ft/s	Slope	0.050ft/ft
Hydraulic Length	638.0ft	Manning's n	0.030

TR-55 Channel Flow

Flow Velocity	13.00ft/s	Slope	0.034ft/ft
Hydraulic Length	207.0ft	Manning's n	0.030

Pre SB2: Tc = 0.23 hr

TR-55 Sheet Flow

Hydraulic Length	70.0ft	Slope	0.040ft/ft
Manning's n	0.400	2 Year 24 Hour Depth	3.3in

TR-55 Shallow Concentrated Flow

Hydraulic Length	348.0ft	Slope	0.140ft/ft
Is Paved?	False		

TR-55 Channel Flow

Flow Velocity	9.00ft/s	Slope	0.190ft/ft
Hydraulic Length	270.0ft	Manning's n	0.030

ATTACHMENT 6 - HYDROLOGIC DATA

Pre SB3: Tc = 0.19 hr

TR-55 Sheet Flow

Hydraulic Length	80.0ft	Slope	0.090ft/ft
Manning's n	0.400	2 Year 24 Hour Depth	3.3in

TR-55 Shallow Concentrated Flow

Hydraulic Length	299.0ft	Slope	0.150ft/ft
Is Paved?	False		

TR-55 Channel Flow

Flow Velocity	7.00ft/s	Slope	0.175ft/ft
Hydraulic Length	285.0ft	Manning's n	0.030

Pre SB4: Tc = 0.31 hr

TR-55 Sheet Flow

Hydraulic Length	100.0ft	Slope	0.040ft/ft
Manning's n	0.400	2 Year 24 Hour Depth	3.3in

TR-55 Shallow Concentrated Flow

Hydraulic Length	534.0ft	Slope	0.080ft/ft
Is Paved?	False		

TR-55 Channel Flow

Flow Velocity	7.00ft/s	Slope	0.120ft/ft
Hydraulic Length	149.0ft	Manning's n	0.030

Post SB1-1: Tc = 0.29 hr

TR-55 Sheet Flow

Hydraulic Length	100.0ft	Slope	0.050ft/ft
Manning's n	0.400	2 Year 24 Hour Depth	3.3in

TR-55 Shallow Concentrated Flow

Hydraulic Length	395.0ft	Slope	0.145ft/ft
Is Paved?	False		

TR-55 Channel Flow

Flow Velocity	7.00ft/s	Slope	0.220ft/ft
Hydraulic Length	185.0ft	Manning's n	0.030

TR-55 Channel Flow

Flow Velocity	10.3ft/s	Slope	0.075ft/ft
Hydraulic Length	346.0ft	Manning's n	0.022

TR-55 Channel Flow

Flow Velocity	17.73ft/s	Slope	0.030ft/ft
Hydraulic Length	472.0ft	Manning's n	0.030

ATTACHMENT 6 - HYDROLOGIC DATA

Post SB1-2: Tc = 0.12 hr

TR-55 Sheet Flow

Hydraulic Length	100.0ft	Slope	0.080ft/ft
Manning's n	0.150	2 Year 24 Hour Depth	3.3in

TR-55 Shallow Concentrated Flow

Hydraulic Length	60.0ft	Slope	0.170ft/ft
Is Paved?	False		

TR-55 Channel Flow

Flow Velocity	12.25ft/s	Slope	0.043ft/ft
Hydraulic Length	973.0ft	Manning's n	0.013

Post SB1-3: Tc = 0.11 hr

TR-55 Sheet Flow

Hydraulic Length	100.0ft	Slope	0.070ft/ft
Manning's n	0.150	2 Year 24 Hour Depth	3.3in

TR-55 Shallow Concentrated Flow

Hydraulic Length	109.0ft	Slope	0.200ft/ft
Is Paved?	False		

TR-55 Channel Flow

Flow Velocity	12.87ft/s	Slope	0.070ft/ft
Hydraulic Length	175.0ft	Manning's n	0.035

Post SB2-1: Tc = 0.10 hr

TR-55 Sheet Flow

Hydraulic Length	31.0ft	Slope	0.020ft/ft
Manning's n	0.150	2 Year 24 Hour Depth	3.3in

TR-55 Shallow Concentrated Flow

Hydraulic Length	250.0ft	Slope	0.120ft/ft
Is Paved?	False		

TR-55 Channel Flow

Flow Velocity	11.58ft/s	Slope	0.040ft/ft
Hydraulic Length	1,238.0ft	Manning's n	0.013

Post SB2-2: Tc = 0.20 hr

TR-55 Sheet Flow

Hydraulic Length	100.0ft	Slope	0.110ft/ft
Manning's n	0.400	2 Year 24 Hour Depth	3.3in

TR-55 Shallow Concentrated Flow

Hydraulic Length	373.0ft	Slope	0.160ft/ft
Is Paved?	False		

TR-55 Channel Flow

Flow Velocity	4.00ft/s	Slope	0.18ft/ft
Hydraulic Length	71.0ft	Manning's n	0.030

Sub-Basin Data Summary Table

Sub-Basin	Area (acres)	SCS CN	Tc (hours)
Pre SB1	48.939	62	0.35
Pre SB2	3.940	56	0.23
Pre SB3	5.946	56	0.19
Pre SB4	8.177	59	0.31
Post SB1-1	6.780	59	0.29
Post SB1-2	19.842	70	0.12
Post SB1-3	20.740	67	0.11
Post SB2-1	14.776	76	0.10
Post SB2-2	1.646	56	0.20
Post SB3-1	0.842	57	0.10
Post SB4-1	2.797	62	0.10

Sub-Basin Flow Data

Sub-Basin	1-Year	2-Year	5-Year	10-Year	25-Year	100-Year
Pre SB1	5	19	37	58	80	116
Pre SB2	0	1	2	4	5	8
Pre SB3	0	1	3	6	8	13
Pre SB4	0	2	5	8	12	18
Post SB1-1	0	2	5	7	11	16
Post SB1-2	11	23	38	51	65	87
Post SB1-3	8	20	34	47	62	83
Post SB2-1	14	25	37	48	59	75
Post SB2-2	0	0	1	2	2	4
Post SB3-1	0	0	1	1	2	2
Post SB4-1	0	2	3	5	7	9

Calculation Results: Points of Interest

Rainfall Frequency	POI 1		POI 2		POI 3		POI 4	
	Pre-Dev Peak Flow (cfs)	Post-Dev Peak Flow (cfs)	Pre-Dev Peak Flow (cfs)	Post-Dev Peak Flow (cfs)	Pre-Dev Peak Flow (cfs)	Post-Dev Peak Flow (cfs)	Pre-Dev Peak Flow (cfs)	Post-Dev Peak Flow (cfs)
1-yr	5	2	0	0	0	0	0	0
2-yr	19	17	1	1	1	0	2	2
5-yr	37	36	2	1	3	1	5	3
10-yr	58	58	4	2	6	1	8	5
25-yr	80	79	5	3	8	2	12	7
100-yr	116	100	8	4	13	2	18	9

INFILTRATION BASINS AND DETENTION CALCULATIONS:

The proposed development uses a combination of infiltration basins and a wet detention basin to attenuate the post-developed flows.

EXISTING WET DETENTION BASIN:

An existing farm pond is located on the site and is planned to be converted to a wet detention area. The following tables, for post-developed conditions, include the stage-storage information (cumulative volumes), outlet structure design, and routing calculations for the Detention Basin with a maximum ponding elevation of 1110.0.

Elevation-Area-Volume Data Table

Elevation (ft)	Area From Plan (acres)	Adjusted Area (acres)	Storage (Adjusted) (cf)
1106.00	0.290	0.275	0
1106.70	0.365	0.347	9,483
1107.00	0.398	0.378	14,220
1108.00	0.506	0.481	32,917
1109.00	0.640	0.608	56,631
1110.0 (Max Ponding Elevation)	0.774	0.736	85,902

Adjustment Factor for storage loss due to construction contingency: 5%

Outlet Structure Data Table

Channel Protection Orifice			
Outlet Structure Type	Orifice	Orifice Coefficient	0.600
Flow Direction	Forward Flow Only	Elevation	1106.00
Number of Openings	1		
Orifice Type	Circular Orifice	Orifice Diameter	2.0in
7.75' Control Weir			
Outlet Structure Type	Weir	Weir Coefficient	3.33
Flow Direction	Forward Flow Only	Elevation	1106.70
Weir Type	Rectangular		
Rectangular Weir	Suppressed	Weir Length	7.75ft
Riser Spillway			
Outlet Structure Type	Weir	Weir Coefficient	3.00
Flow Direction	Forward Flow Only	Elevation	1108.75
Weir Type	Rectangular		
Rectangular Weir	Suppressed	Weir Length	10.0ft

ATTACHMENT 7 – INFILTRATION BASIN DATA

Outlet Structure Stage-Discharge Table

Water Elevation (ft)	2" Channel Protection Orifice (cfs)	7.75' Control Weir (cfs)	Outlet Spillway (cfs)	Total (cfs)	42" Outlet Pipe (cfs)
1106.00	0	0	0	0*	0
1106.70	0.08	0	0	0.1*	37.3
1107.00	0.10	4	0	4.3*	45.2
1108.00	0.15	38	0	38.4*	64.7
1109.00	0.18	90	4	94	79.6*
1110.00	0.21	155	42	197	92.1*

*Controls Outflow

Routing Results Table

Storm Event (year)	Peak Inflow to basin (cfs)	Peak Outflow from basin (cfs)	Basin Elevation Maximum (ft)
1	8	1	1106.8
2	20	7	1170.1
5	34	20	1107.5
10	47	32	1107.8
25	62	38	1108.2
100	83	38	1108.9

INFILTRATION BASIN 1:

The following tables, for post-developed conditions, include the stage-storage information (cumulative volumes), outlet structure design, and routing calculations for the Infiltration Basin with a berm elevation of 1090.0.

Elevation-Area-Volume Data Table

Elevation (ft)	Area From Plan (acres)	Adjusted Area (acres)	Storage (Adjusted) (cf)
1082.00	0.134	0.127	0
1082.70	0.150	0.143	4,119
1083.00	0.157	0.149	6,029
1084.00	0.181	0.171	13,018
1085.00	0.206	0.196	21,023
1085.50	0.219	0.208	25,426
1086.00	0.232	0.221	30,096
1087.00	0.261	0.248	40,291
1088.00	0.289	0.275	51,663
1089.00	0.320	0.304	64,264
1090.00 (Berm)	0.351	0.333	78,149

Adjustment Factor for storage loss due to construction contingency: 5%

Outlet Structure Data Table

Channel Protection Orifice			
Outlet Structure Type	Orifice	Orifice Coefficient	0.600
Flow Direction	Forward Flow Only	Elevation	1082.00
Number of Openings	1		
Orifice Type	Circular Orifice	Orifice Diameter	1.5in
14" Control Orifice			
Outlet Structure Type	Orifice	Orifice Coefficient	0.600
Flow Direction	Forward Flow Only	Elevation	1082.70
Number of Openings	1		
Orifice Type	Circular Orifice	Orifice Diameter	14.0in
27" Control Orifice			
Outlet Structure Type	Orifice	Orifice Coefficient	0.600
Flow Direction	Forward Flow Only	Elevation	1083.00
Number of Openings	1		
Orifice Type	Circular Orifice	Orifice Diameter	27.0in

ATTACHMENT 7 – INFILTRATION BASIN DATA

27" Control Orifice

Outlet Structure Type	Orifice	Orifice Coefficient	0.600
Flow Direction	Forward Flow Only	Elevation	1085.50
Number of Openings	1		
Orifice Type	Circular Orifice	Orifice Diameter	27.0in

11" Control Orifice

Outlet Structure Type	Orifice	Orifice Coefficient	0.600
Flow Direction	Forward Flow Only	Elevation	1087.00
Number of Openings	1		
Orifice Type	Circular Orifice	Orifice Diameter	11.0in

Riser Spillway

Outlet Structure Type	Weir	Weir Coefficient	3.00
Flow Direction	Forward Flow Only	Elevation	1088.60
Weir Type	Rectangular		
Rectangular Weir	Suppressed	Weir Length	10.0ft

Outlet Structure Stage-Discharge Table

Water Elevation (ft)	1.5" Channel Protection Orifice (cfs)	14" Control Orifice (cfs)	27" Control Orifice (cfs)	27" Control Orifice (cfs)	11" Control Orifice (cfs)	Outlet Spillway (cfs)	Total (cfs)	36" Outlet Pipe (cfs)
1082.00	0	0	0	0	0	0	0*	10.8
1082.70	0.05	0	0	0	0	0	0*	30.4
1083.00	0.06	0	0	0	0	0	0.1*	35.7
1084.00	0.08	2.92	0	0	0	0	3.0*	49.3
1085.00	0.10	4.31	17.91	0	0	0	2.3*	59.9
1085.50	0.11	4.86	22.45	0	0	0	27.4*	64.6
1086.00	0.12	5.36	26.22	0	0	0	31.7*	68.9
1087.00	0.13	6.23	32.46	11.72	0	0	50.5*	76.9
1088.00	0.14	6.99	37.69	22.45	2.34	0	69.6*	84.1
1089.00	0.16	7.68	42.27	29.50	3.95	7.6	91.1	90.7*
1090.00	0.17	8.31	46.40	35.17	5.07	49.7	144.8	96.9*

*Controls Outflow

Routing Results Table

Storm Event (year)	Peak Inflow to basin (cfs)	Peak Outflow from basin (cfs)	Basin Elevation Maximum (ft)
1	11	2	1083.5
2	25	17	1084.6
5	53	34	1085.9
10	79	54	1087.0
25	104	73	1088.0
100	125	91	1089.0

INFILTRATION BASIN 2:

The following tables, for post-developed conditions, include the stage-storage information (cumulative volumes), outlet structure design, and routing calculations for the Infiltration Basin with a berm elevation of 1036.0.

Elevation-Area-Volume Data Table

Elevation (ft)	Area From Plan (acres)	Adjusted Area (acres)	Storage (Adjusted) (cf)
1126.00	0.246	0.233	0
1126.70	0.264	0.251	7,381
1127.00	0.272	0.258	10,704
1128.00	0.297	0.282	22,476
1129.00	0.326	0.310	35,380
1130.00	0.355	0.337	49,482
1131.00	0.389	0.369	64,878
1132.00	0.422	0.401	81,666
1133.00	0.459	0.436	99,905
1134.00	0.496	0.471	119,656
1135.00	0.535	0.508	140,982
1136.00 (Berm)	0.575	0.546	163,945

Adjustment Factor for storage loss due to construction contingency: 5%

Outlet Structure Data Table

Channel Protection Orifice			
Outlet Structure Type	Orifice	Orifice Coefficient	0.600
Flow Direction	Forward Flow Only	Elevation	1126.00
Number of Openings	1		
Orifice Type	Circular Orifice	Orifice Diameter	2.0in

ATTACHMENT 7 – INFILTRATION BASIN DATA

3" Control Orifice

Outlet Structure Type	Orifice	Orifice Coefficient	0.600
Flow Direction	Forward Flow Only	Elevation	1126.70
Number of Openings	1		
Orifice Type	Circular Orifice	Orifice Diameter	3.0in

6" Control Orifice

Outlet Structure Type	Orifice	Orifice Coefficient	0.600
Flow Direction	Forward Flow Only	Elevation	1133.00
Number of Openings	1		
Orifice Type	Circular Orifice	Orifice Diameter	6.0in

Riser Spillway

Outlet Structure Type	Weir	Weir Coefficient	3.00
Flow Direction	Forward Flow Only	Elevation	1135.00
Weir Type	Rectangular		
Rectangular Weir	Suppressed	Weir Length	10.0ft

Outlet Structure Stage-Discharge Table

Water Elevation (ft)	2" Channel Protection Orifice (cfs)	3" Control Orifice (cfs)	6" Control Orifice (cfs)	Outlet Spillway (cfs)	Total (cfs)	24" Outlet Pipe (cfs)
1126.00	0	0	0	0	0*	14.6
1126.70	0.08	0	0	0	0.1*	19.3
1127.00	0.10	0.10	0	0	0.2*	21.0
1128.00	0.15	0.26	0	0	0.4*	25.9
1129.00	0.18	0.35	0	0	0.5*	30.0
1130.00	0.21	0.42	0	0	0.6*	33.6
1131.00	0.23	0.48	0	0	0.7*	36.8
1132.00	0.26	0.54	0	0	0.8*	39.8
1133.00	0.28	0.59	0	0	0.9*	42.6
1134.00	0.30	0.63	0.82	0	1.7*	45.2
1135.00	0.31	0.68	1.25	0	2.2*	47.7
1136.00 (Berm)	0.33	0.72	1.57	30	32.6*	50

*Controls Outflow

ATTACHMENT 7 – INFILTRATION BASIN DATA

Routing Results Table

Storm Event (year)	Peak Inflow to basin (cfs)	Peak Outflow from basin (cfs)	Basin Elevation Maximum (ft)
1	14	0	1128.0
2	25	1	1129.6
5	37	1	1131.3
10	48	1	1132.6
25	59	1	1133.6
100	75	2	1134.9

Supplemental Pond Calculations: The calculations for Water Quality Volume and Channel Protection Volume is shown below. Refer to Knox County, Tennessee Stormwater Management Manual for equations and tables.

Water Quality Volume:

The site has been developed to treat the minimum required TSS removal % of 80%. The STAR modeling software was used to analyze the site as a whole. The STAR model calculated a TSS Removal value of 80.1% which exceeds the minimum 80% TSS removal requirement. The STAR model has been provided with the submittal of this report. A map of the inputs for the model and a screenshot of the model output can be found on the following pages.

Existing Wet Detention Pond

Calculate the Water Quality Volume:

Eq. 3-21 $WQv = (P Rv A)/12$	
Eq. 3-22 $Rv = 0.015 + 0.0092(I)$	
85th percent annual rainfall depth in Knox Co., P =	1.1 in.
Total drainage area, A =	20.74 ac.
Percent of impervious cover, I =	14.6 %
Volumetric runoff coefficient, Rv =	0.15
Water quality volume, WQv =	0.28 ac-ft

Calculate the Channel Protection Volume:

Step 1: Rainfall depth, 1-yr, 24 hr, (P) =	*1.5 in.
Step 2: Estimate Runoff CN	67
Step 3: Find Ia from CN from Table 3-13:	0.985
Ia/P =	0.657
S =	4.93
Step 4: Calculate Qd with Equation 3-12	0.05 in.
Step 5: Calculate Tc (shown above)	0.110 hrs.
Step 6: Find qu from Figure 3-6	515 csm/in.
Step 7: Find peak outflow/peak inflow ratio, qo/qi	0.035
Extended detention time (24-72 hrs.), T =	24 hr.
Step 8: Estimate storage/runoff, V S/V R	
Eq. 3-35 $V S/VR = 0.682 - 1.43(q0/q1) + 1.64(q0/q1)^2 - 0.804(q0/q1)^3 =$	0.63
Step 9: Calculate Channel Protection Volume, CPv	
Eq. 3-36 $Vs = (Vs/Vr)(Qd)(A)/12 = CPv$	0.05 ac-ft

* 1.5" used based on the STAR model showing that > 1" total rainfall volume being retained across the site

Existing Wet Detention Pond Channel Protection Volume:

The pond is designed to detain the Channel Protection Volume and completely release it between 24 and 72 hours. Refer to Outlet Structure Routing Table in Attachment 7 for calculated flow rates.

Draw Down Time Calculation

Calculated CPv =	0.05 ac-ft
	2,327 cf
Volume @ 3' Weir	9,483 cf
CPv Maximum Water Surface Elevation (WSE)	1106.70
Max. Flow	0.08 cfs
Min. Flow	0.00 cfs
ED=Volume / [(Max Flow - Min Flow)/2]*(1hr/3600s) =	64 hrs.

Check - The ED time is between 24-72 hours (ok)

Infiltration Basin 1**Calculate the Water Quality Volume:**

<i>Eq. 3-21</i> $WQv = (P Rv A)/12$	
<i>Eq. 3-22</i> $Rv = 0.015 + 0.0092(I)$	
85th percent annual rainfall depth in Knox Co., P =	1.1 in.
Total drainage area, A =	19.84 ac.
Percent of impervious cover, I =	28.3 %
Volumetric runoff coefficient, Rv =	0.28
Water quality volume, WQv =	0.50 ac-ft

Calculate the Channel Protection Volume:

Step 1: Rainfall depth, 1-yr, 24 hr, (P) =	*1.5 in.
Step 2: Estimate Runoff CN	70
Step 3: Find Ia from CN from Table 3-13:	0.857
Ia/P =	0.571
S =	4.29
Step 4: Calculate Qd with Equation 3-12	0.08 in.
Step 5: Calculate Tc (shown above)	0.120 hrs.
Step 6: Find qu from Figure 3-6	480 csm/in.
Step 7: Find peak outflow/peak inflow ratio, qo/qi	0.038
Extended detention time (24-72 hrs.), T =	24 hr.
Step 8: Estimate storage/runoff, V S/V R	
<i>Eq. 3-35</i> $V S/VR = 0.682 - 1.43(q0/q1) + 1.64(q0/q1)^2 - 0.804(q0/q1)^3 =$	0.63
Step 9: Calculate Channel Protection Volume, CPv	
<i>Eq. 3-36</i> $Vs = (Vs/VR)(Qd)(A)/12 = CPv$	0.09 ac-ft

* 1.5" used based on the STAR model showing that > 1" total rainfall volume being retained across the site

Infiltration Basin 1 Channel Protection Volume:

The infiltration basin 1 is designed to detain the Channel Protection Volume and completely release it between 24 and 72 hours. Refer to Outlet Structure Routing Table in Attachment 7 for calculated flow rates.

Draw Down Time Calculation

Calculated CPv =	0.09 ac-ft
	3,806 cf
Volume @ 3' Weir	4,119 cf
CPv Maximum Water Surface Elevation (WSE)	1082.70
Max. Flow	0.05 cfs
Min. Flow	0.00 cfs
ED = Volume / [(Max Flow - Min Flow)/2]*(1hr/3600s) =	49 hrs.

Check - The ED time is between 24-72 hours (ok)

Infiltration Basin 2

Calculate the Water Quality Volume:

Eq. 3-21 $WQv = (P Rv A)/12$	
Eq. 3-22 $Rv = 0.015 + 0.0092(I)$	
85th percent annual rainfall depth in Knox Co., P =	1.1 in.
Total drainage area, A =	14.78 ac.
Percent of impervious cover, I =	41.3 %
Volumetric runoff coefficient, Rv =	0.39
Water quality volume, WQv =	0.53 ac-ft

Calculate the Channel Protection Volume:

Step 1: Rainfall depth, 1-yr, 24 hr, (P) =	*1.5 in.
Step 2: Estimate Runoff CN	76
Step 3: Find Ia from CN from Table 3-13:	0.632
Ia/P =	0.421
S =	3.16
Step 4: Calculate Qd with Equation 3-12	0.19 in.
Step 5: Calculate Tc (shown above)	0.100 hrs.
Step 6: Find qu from Figure 3-6	540 csm/in.
Step 7: Find peak outflow/peak inflow ratio, qo/qi	0.033
Extended detention time (24-72 hrs.), T =	24 hr.
Step 8: Estimate storage/runoff, V S/V R	
Eq. 3-35 $V S/VR = 0.682 - 1.43(q0/q1) + 1.64(q0/q1)^2 - 0.804(q0/q1)^3 =$	0.64
Step 9: Calculate Channel Protection Volume, CPv	
Eq. 3-36 $Vs = (Vs/Vr)(Qd)(A)/12 = CPv$	0.15 ac-ft

* 1.5" used based on the STAR model showing that > 1" total rainfall volume being retained across the site

Infiltration Basin 2 Channel Protection Volume:

The infiltration basin 2 is designed to detain the Channel Protection Volume and completely release it between 24 and 72 hours. Refer to Outlet Structure Routing Table in Attachment 7 for calculated flow rates.

Draw Down Time Calculation

Calculated CPv =	0.15 ac-ft
	6,390 cf
Volume @ 3' Weir	7,381 cf
CPv Maximum Water Surface Elevation (WSE)	1126.70
Max. Flow	0.08 cfs
Min. Flow	0.00 cfs
ED = Volume / [(Max Flow - Min Flow)/2]*(1hr/3600s) =	50 hrs.

Check - The ED time is between 24-72 hours (ok)

Sediment Forebay Calculations:

Design the sediment forebay for the basin.

Impervious area to the pond via HW 3 =	2.83 ac
Sediment forebay volume (0.1" per imperv. area), Vsf =	0.02 ac-ft
	1,027 cf

**Sediment Forebay
Elevation-Area-Volume Data Table**

Elev.	Area (sf) from Plan	Avg. Area (sf)	Incr. H (ft.)	Total H (ft)	Inc. Vol. (cf)	Total Vol. (cf)	Total Vol. (ac-ft)
1082.00	288				0	0	0.00
1084.00	403	345	2	2	691	691	0.02
1085.00	496	450	1	3	450	1,141	0.03

Check - The provided forebay volume exceeds the required forebay volume (ok)

Design the sediment forebay for the basin.

Impervious area to the pond via HW 21 =	2.85 ac
Sediment forebay volume (0.1" per imperv. area), Vsf =	0.02 ac-ft
	1,035 cf

**Sediment Forebay
Elevation-Area-Volume Data Table**

Elev.	Area (sf) from Plan	Avg. Area (sf)	Incr. H (ft.)	Total H (ft)	Inc. Vol. (cf)	Total Vol. (cf)	Total Vol. (ac-ft)
1082.00	275				0	0	0.00
1084.00	438	357	2	2	713	713	0.02
1085.00	543	491	1	3	491	1,204	0.03

Check - The provided forebay volume exceeds the required forebay volume (ok)

Design the sediment forebay for the basin.

Impervious area to the pond via HW 44 = 1.89 ac
 Sediment forebay volume (0.1" per imperv. area), Vsf = 0.02 ac-ft
 686 cf

**Sediment Forebay
 Elevation-Area-Volume Data Table**

Elev.	Area (sf) from Plan	Avg. Area (sf)	Incr. H (ft.)	Total H (ft)	Inc. Vol. (cf)	Total Vol. (cf)	Total Vol. (ac-ft)
1106.00	280				0	0	0.00
1108.00	443	361	2	2	723	723	0.02

Check - The provided forebay volume exceeds the required forebay volume (ok)

Design the sediment forebay for the basin.

Impervious area to the pond via HW 63 & 69 = 6.157 ac
 Sediment forebay volume (0.1" per imperv. area), Vsf = 0.05 ac-ft
 2,235 cf

**Sediment Forebay
 Elevation-Area-Volume Data Table**

Elev.	Area (sf) from Plan	Avg. Area (sf)	Incr. H (ft.)	Total H (ft)	Inc. Vol. (cf)	Total Vol. (cf)	Total Vol. (ac-ft)
1126.00	644				0	0	0.00
1128.00	1,088	866	2	2	1,732	1,732	0.04
1129.00	1,398	1,243	1	3	1,243	1,243	0.07

Check - The provided forebay volume exceeds the required forebay volume (ok)



Site Model Element Data Table

Element	Routed To Element Number	Area/Units (sf/#)	Description
1	8	12,611	Wet Pond
2	1	29,973	Road "A & C"
3	2	2	Full Lots (149-150)
4	2	26	Front Lots (61-70 & 151-166)
5	1	12	Rear Lots (161-172)
6	1	4,604	Rear Swale (151-160)
7	6	10	Rear Lots (151-160)
8	0	5,840	Infiltration Basin 1
9	8	4	Rear Lots (23-25 & 44)
10	8	18,414	Rear Swale (1-15, 26-43, 48-59, 65-68, 72-82)
11	10	68	Rear Lots (1-15, 26-33, 34-43, 48-82)
12	8	67,064	Road "CDAB"
13	12	66	Front Lots (1-60 & 167-172)
14	0	8,982	Infiltration Basin 2
15	14	83,143	Road "CEF"
16	14	51	Front Lots (71-121)
17	14	27	Full Lots (122-148)
18	14	10,710	Rear Swale (83-123)
19	18	39	Rear Lots (83-121)
20	0	4,595	Rear Swale (16-18, 45-47, 124-126)
21	0	10	Rear Lots (16-22 & 45-47)
22	0	477,600	Excess Area

The Stormwater Treatment Assessment Resource (STAR) modeling program was used to analyze the TSS Removal percentage of the site. First, a drainage map was developed (refer to Attachment above) based on site topography to determine the number and types of elements that would be created. Next, embedded elements were created representing three lot scenarios: half of a lot draining to the front, half of a lot draining to the rear, and a full lot. These embedded lot elements were inserted into the site model as a group instead of modeling each lot individually. For example, element 6 "Rear Swale" has seven rear half lots draining into the swale. This situation was modeled by using one rear half lot embedded element with a multiplier of seven, as opposed to modeling all seven lots as seven separate elements. The embedded element information can be found below.

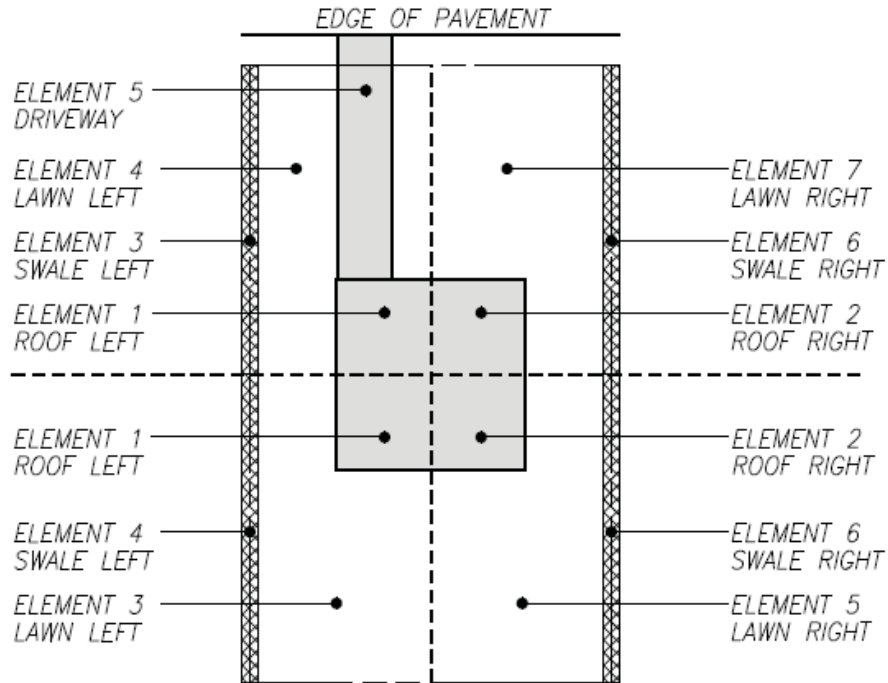
Next, elements were created to model the infiltration basins. The lots and roads were routed to the corresponding swales, stream buffer zone, or open space, as shown on the drainage map.

Based on the STAR modeling results (next page), the TSS removal is 80.1%, which exceeds the 80% TSS removal requirement.

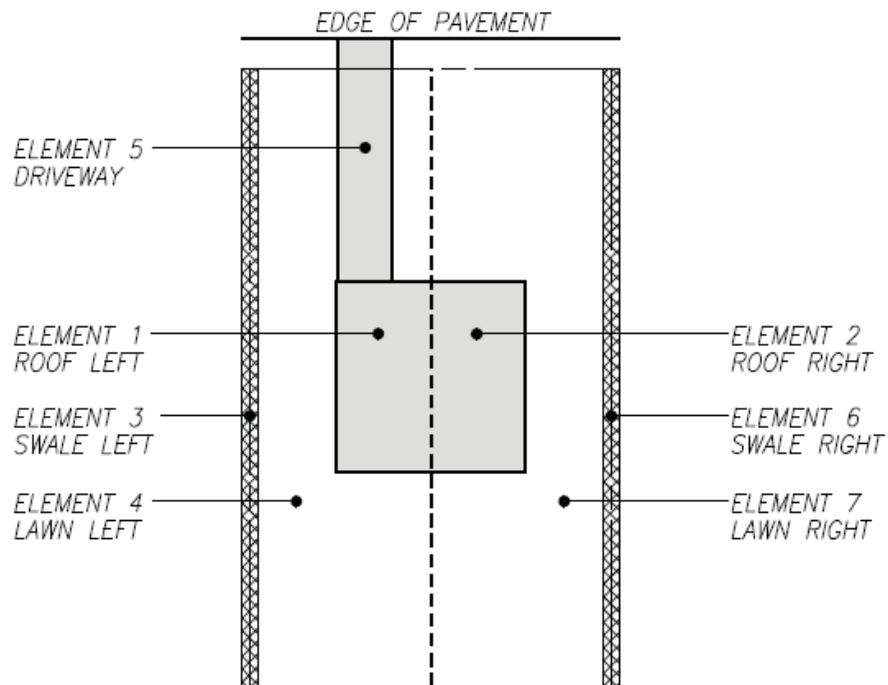
Target requirements		OVERALL DESIGN RESULTS				CONTAMINANT REMOVAL RESULTS				VOLUME RETENTION RESULTS				*****CHECK OTHER THINGS*****			
Adj WQTV depth, in.	1.00	Design OK?	RED		Polluted removal OK?	GREEN		WQTV ret OK?	RED		Other OK?	RED		Hydrology OK?	No		
Adj WQTV vol, ft3	58300	Target poll. rem for green, %		80.0	Portion polluted removed, %		80.1	Total ret OK?	GREEN		Gen reviewer checks done?		Yes	Gen designer checks done?	Yes		
Cont. surf. area, ft2	699000	Target poll. rem for yellow, %		80.0	Net polluted vol released, ft3		11600	Portion WQTV retained, %		60.8	Edit general checks & history	... elem	Yes	Elem reviewer checks done?	Yes		
Total surface area, ft2	2171000	Target WQTV ret for green, %		80.0	Net polluted depth released, in.		0.0641	Net volume ret. depth, in.		1.27	Elem designer checks done?	Yes	Yes	Yes	Surface spreading		
Imp:active ratio (X:1)	1.53	Target WQTV ret for yellow, %		80.0	Net hotspot vol released, ft3		0	Net runoff vol, ft3		32800							
Num design elements	22	Target total ret for green, in.		1.00				Net runoff depth, in.		0.181							
Make-up elem # (0 = sum)	22	Target total ret for yellow, in.		1.00													
		Max poll depth for green, in.		1.00													
		Max poll depth for yellow, in.		1.00													

Design elements														
Design element #	Discharges to design element #	Area, ft2	Special conditions	Soil	Depth surf to restrictive,	Type restrictive layer	Base SCM / management	Element SCM inputs	Design element description	Designer checked?	Reviewer accepted?	Edit elem checks	Element values	
1	8	12610	none	silt loam	24.0	default	02. wet pond\wet pond	... inputs	Existing Pond	Yes	Yes	...k elem	... element	
2	1	29970	none	silt loam	24.0	default	impervious\impervious	... inputs	Road "A&C"	Yes	Yes	...k elem	... element	
3	2	16860	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	2 Full Lots (Lots 149-150)	Yes	Yes	...k elem	... element	
4	2	85540	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	...nt Lots (Lots 61-70 & 151-166)	Yes	Yes	...k elem	... element	
5	1	61860	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	12 Rear Lots (Lots 161-172)	Yes	Yes	...k elem	... element	
6	1	4604	none	silt loam	24.0	default	03. vegetated swale\vegetated swale	... inputs	Rear Swale (Lots 151-160)	Yes	Yes	...k elem	... element	
7	6	51550	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	10 Rear Lots (Lots 151-160)	Yes	Yes	...k elem	... element	
8	0	2458	none	silt loam	45.0	default	04. bioretention\bioretention with underdrain	... inputs	Infiltration Basin 1	Yes	Yes	...k elem	... element	
9	8	20620	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	4 Rear Lots (Lots 23-25 & 44)	Yes	Yes	...k elem	... element	
10	8	18410	none	silt loam	24.0	default	03. vegetated swale\vegetated swale	... inputs	...15, 26-43, 48-59, 65-68, 72-82)	Yes	Yes	...k elem	... element	
11	10	350500	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	... (Lots 1-15, 26-33, 34-43, 48-82)	Yes	Yes	...k elem	... element	
12	8	67060	none	silt loam	24.0	default	impervious\impervious	... inputs	Road "CDAB"	Yes	Yes	...k elem	... element	
13	12	217100	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	...ront Lots (Lots 1-60 & 167-172)	Yes	Yes	...k elem	... element	
14	0	5717	none	silt loam	45.0	default	04. bioretention\bioretention with underdrain	... inputs	Infiltration Basin 2	Yes	Yes	...k elem	... element	
15	14	83140	none	silt loam	24.0	default	impervious\impervious	... inputs	Road "CEF"	Yes	Yes	...k elem	... element	
16	15	197400	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	...t Lots (Lots 71-126 & 132-135)	Yes	Yes	...k elem	... element	
17	15	151700	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	...l Lots (Lots 127-131 & 136-148)	Yes	Yes	...k elem	... element	
18	14	14210	none	silt loam	24.0	default	03. vegetated swale\vegetated swale	... inputs	...Swale (Lots 83-126 & 132-135)	Yes	Yes	...k elem	... element	
19	18	247400	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	...r Lots (Lots 83-126 & 132-135)	Yes	Yes	...k elem	... element	
20	0	3286	none	silt loam	24.0	default	03. vegetated swale\vegetated swale	... inputs	Rear Swale (16-18, 45-47)	Yes	Yes	...k elem	... element	
21	0	51550	none	silt loam	24.0	default	15. embedded\Embedded design	... inputs	10 Rear Lots (16-22 & 45-47)	Yes	Yes	...k elem	... element	
22	0	477600	none	silt loam	24.0	default	05. managed vegetated areas\turf, good	... inputs	Excess Area	Yes	Yes	...k elem	... element	

1/2 LOT EMBEDDED ELEMENT – FRONT



1/2 LOT EMBEDDED ELEMENT – REAR



FULL LOT EMBEDDED ELEMENT

ATTACHMENT 9 – WATER QUALITY CALCULATION

Embedded Element Data Table
Full Lot

Element	To Element Number ¹	Area (sf)	Description	To Element
1	3	1,100	Roof left	Swale left
2	6	1,300	Roof right	Swale right
3	-1	640	Swale left	Site model downstream element
4	3	2,010	Lawn left	Swale left
5	3	605	Driveway	Swale left
6	-1	640	Swale right	Site model downstream element
7	6	2,135	Lawn right	Swale right

Embedded Element Data Table
Front of Lot

Element	To Element Number	Area (sf)	Description	To Element
1	3	540	Roof left	Swale left
2	6	640	Roof right	Swale right
3	-1	235	Swale left	Site model downstream element
4	3	380	Lawn left	Swale left
5	-1	605	Driveway	Site model downstream element
6	-1	235	Swale right	Site model downstream element
7	6	655	Lawn right	Swale right

Embedded Element Data Table
Rear of Lot

Element	To Element Number	Area (sf)	Description	To Element
1	4	570	Roof left	Swale left
2	6	665	Roof right	Swale right
3	4	1,630	Lawn left	Swale left
4	-1	405	Swale left	Site model downstream element
5	6	1,480	Lawn right	Swale right
6	-1	405	Swale right	Site model downstream element

Sub-Basin Data Summary Table

Sub-Basin	Downstream Element	Area (acres)	SCS CN	Tc (hours)	Peak Flow (25-Year Storm Event) (cfs)	Peak Flow (100-Year Storm Event) (cfs)
SB 1	CB 12	0.098	71	0.100	0	0
SB 2	CB 11	0.093	85	0.100	1	1
SB 3	AD 16	0.438	64	0.100	1	2
SB 4	CB 20	0.204	71	0.100	1	1
SB 5	CB 10	0.217	78	0.100	1	1
SB 6	AD 15	1.561	68	0.100	5	7
SB 7	DCB 13	0.615	82	0.100	3	4
SB 8	DCB 5	0.775	89	0.100	5	6
SB 9	CB 9	0.328	76	0.100	1	2
SB 10	CB 8	0.273	84	0.100	1	2
SB 11	AD 14	0.057	76	0.100	0	0
SB 12	CB 7	0.352	82	0.100	2	2
SB 13	CB 6	0.313	81	0.100	2	2
SB 14	CB 19	0.235	82	0.100	1	2
SB 15	DCB 18	0.538	76	0.100	2	3
SB 16	DCB 17	0.294	88	0.100	2	2
SB 17	AD 22	1.845	66	0.100	6	8
SB 18	AD 23	0.246	62	0.100	1	1
SB 19	OS 25	15.575	61	0.100	38	54
SB 20	CB 51	0.210	75	0.100	1	1
SB 21	CB 58	0.035	85	0.100	0	0
SB 22	CB 33	0.196	88	0.100	1	1
SB 23	DCB 27	0.656	85	0.100	4	5
SB 24	CB 35	0.190	81	0.100	1	1
SB 25	CB 34	0.189	77	0.100	1	1
SB 26	DCB 28	0.744	87	0.100	4	5
SB 27	CB 36	0.291	90	0.100	2	2
SB 28	AD 39	0.290	66	0.100	1	1
SB 29	AD 38	0.333	63	0.100	1	1
SB 30	AD 37	0.611	62	0.100	2	2
SB 31	AD 29	1.764	59	0.100	4	6
SB 32	AD 41	0.400	61	0.100	1	1
SB 33	AD 42	0.365	62	0.100	1	1
SB 34	AD 43	0.301	60	0.100	1	1
SB 35	AD 46	0.202	62	0.100	1	1
SB 36	CB 53	0.300	91	0.100	2	2
SB 37	AD 47	0.564	62	0.100	1	2
SB 38	CB 54	0.067	83	0.100	0	0
SB 39	CB 52	0.412	85	0.100	2	3
SB 40	CB 59	0.312	80	0.100	2	2
SB 41	AD 48	0.621	63	0.100	2	2
SB 42	AD 49	0.432	64	0.100	1	2
SB 43	CB 55	0.214	84	0.100	1	1
SB 44	CB 60	0.271	87	0.100	2	2
SB 45	AD 50	0.547	68	0.100	2	2

ATTACHMENT 10 – PIPE SYSTEM DATA

Sub-Basin	Downstream Element	Area (acres)	SCS CN	Tc (hours)	Peak Flow (25-Year Storm Event) (cfs)	Peak Flow (100-Year Storm Event) (cfs)
SB 46	AD 40	0.740	63	0.100	2	3
SB 47	CB 56	0.472	90	0.100	3	4
SB 48	CB 57	0.354	85	0.100	2	2
SB 49	AD 30	1.208	66	0.100	4	5
SB 50	AD 31	0.150	71	0.100	1	1
SB 51	AD 32	0.305	66	0.100	1	1
SB 52	CB 79	0.311	90	0.100	2	2
SB 53	CB 94	0.267	81	0.100	1	2
SB 54	CB 95	0.077	86	0.100	0	1
SB 55	DCB 93	0.778	87	0.100	5	6
SB 56	CB 80	0.100	88	0.100	1	1
SB 57	AD 85	0.442	66	0.100	1	2
SB 58	CB 86	0.227	87	0.100	1	2
SB 59	CB 87	0.183	87	0.100	1	1
SB 60	AD 91	0.293	66	0.100	1	1
SB 61	DCB 92	0.297	76	0.100	1	2
SB 62	CB 68	0.176	88	0.100	1	1
SB 63	CB 67	0.224	87	0.100	1	2
SB 64	AD 66	0.480	63	0.100	1	2
SB 65	CB 78	0.492	89	0.100	3	4
SB 66	CB 88	0.350	87	0.100	2	2
SB 67	AD 84	0.498	67	0.100	2	2
SB 68	CB 82	0.252	87	0.100	1	2
SB 69	CB 72	0.352	84	0.100	2	2
SB 70	AD 90	0.497	68	0.100	2	2
SB 71	AD 89	0.861	70	0.100	3	4
SB 72	CB 70	0.380	86	0.100	2	3
SB 73	AD 65	0.383	62	0.100	1	1
SB 74	AD 64	0.372	64	0.100	1	1
SB 75	CB 77	0.070	92	0.100	0	1
SB 76	CB 76	0.436	91	0.100	3	3
SB 77	CB 74	0.191	82	0.100	1	1
SB 78	CB 75	0.376	86	0.100	2	3
SB 79	AD 99	0.484	67	0.100	2	2
SB 80	AD 83	0.994	69	0.100	3	5
SB 81	CB 73	0.176	78	0.100	1	1
SB 82	AD 98	0.125	75	0.100	1	1
SB 83	DCB 71	1.004	83	0.100	5	7
SB 84	AD 97	0.360	68	0.100	1	2
SB 85	DCB 81	0.795	91	0.100	5	6

**On-Site Inlets Data Table
25-Year Storm**

Inlet	Elevation (TC) (ft)	Elevation (EI) (ft)	Hydraulic Grade (Maximum) (ft)	Captured Flow (cfs)	Freeboard (ft)
MH 4	1,113.33	1,107.28	1,109.61	n/a	1.09
DCB 5	1,115.55	1,108.48	1,114.46	5	3.33
CB 6	1,119.66	1,110.38	1,116.33	1	2.81
CB 7	1,119.58	1,110.73	1,116.77	1	4.60
CB 8	1,126.08	1,120.61	1,121.48	1	3.68
CB 9	1,135.04	1,130.94	1,131.36	1	3.69
CB 10	1,140.75	1,136.71	1,137.06	1	3.75
CB 11	1,154.93	1,150.89	1,151.18	0	3.56
CB 12	1,154.93	1,151.18	1,151.37	0	1.08
DCB 13	1,115.55	1,111.80	1,114.47	4	2.20
AD 14	1,118.97	1,112.00	1,116.77	0	-0.77
AD 15	1,116.00	1,112.90	1,116.77	5	1.22
AD 16	1,118.00	1,115.00	1,116.78	1	3.13
DCB 17	1,125.74	1,121.64	1,122.61	2	3.03
DCB 18	1,125.74	1,121.99	1,122.71	4	3.46
CB 19	1,135.04	1,131.29	1,131.58	1	3.50
CB 20	1,140.75	1,137.00	1,137.25	1	13.96
AD 22	1,113.78	1,098.24	1,099.82	6	23.52
AD 23	1,127.00	1,101.91	1,103.48	1	18.52
AD 24	1,123.00	1,102.91	1,104.48	n/a	8.03
MH 26	1,124.93	1,114.04	1,116.90	n/a	5.52
DCB 27	1,123.94	1,114.35	1,118.42	4	3.65
DCB 28	1,123.94	1,114.70	1,120.29	6	-0.19
AD 29	1,122.00	1,116.10	1,122.19	4	3.08
AD 30	1,169.00	1,165.47	1,165.92	4	2.72
AD 31	1,170.72	1,167.62	1,168.00	1	2.72
AD 32	1,172.29	1,169.29	1,169.57	1	3.65
CB 33	1,132.01	1,127.91	1,128.36	1	3.39
CB 34	1,132.01	1,128.26	1,128.62	1	3.67
CB 35	1,128.17	1,124.07	1,124.50	1	3.42
CB 36	1,128.17	1,124.42	1,124.75	1	2.67
AD 37	1,124.87	1,119.90	1,122.20	2	2.80
AD 38	1,128.00	1,124.90	1,125.20	1	2.83
AD 39	1,138.00	1,135.00	1,135.17	1	3.52
AD 40	1,169.00	1,165.28	1,165.48	2	1.81
AD 41	1,124.00	1,120.90	1,122.19	1	2.74
AD 42	1,126.00	1,122.90	1,123.26	1	2.77
AD 43	1,128.00	1,125.00	1,125.23	1	2.40
MH 45	1,117.00	1,113.90	1,114.60	n/a	2.19
AD 46	1,154.44	1,151.34	1,152.25	1	2.26
AD 47	1,156.00	1,152.90	1,153.74	1	2.41
AD 48	1,158.00	1,154.90	1,155.59	2	2.72
AD 49	1,168.00	1,164.90	1,165.28	1	2.72
AD 50	1,174.00	1,171.00	1,171.28	2	3.35
CB 51	1,134.21	1,130.11	1,130.86	2	3.36
CB 52	1,142.25	1,138.15	1,138.89	2	3.27
CB 53	1,149.98	1,146.13	1,146.71	1	3.29
CB 54	1,153.98	1,150.13	1,150.69	0	3.63
CB 55	1,161.85	1,157.75	1,158.22	1	3.66
CB 56	1,176.30	1,172.20	1,172.64	1	3.41
CB 57	1,176.30	1,172.55	1,172.89	1	3.35

ATTACHMENT 10 – PIPE SYSTEM DATA

Inlet	Elevation (TC) (ft)	Elevation (EI) (ft)	Hydraulic Grade (Maximum) (ft)	Captured Flow (cfs)	Freeboard (ft)
CB 58	1,134.21	1,130.46	1,130.86	0	3.34
CB 59	1,142.25	1,138.50	1,138.91	1	3.36
CB 60	1,161.85	1,158.10	1,158.49	1	2.62
AD 64	1,145.00	1,141.90	1,142.38	1	2.64
AD 65	1,154.00	1,150.90	1,151.36	1	3.84
AD 66	1,162.00	1,157.64	1,158.16	1	3.68
CB 67	1,162.95	1,158.85	1,159.27	1	3.47
CB 68	1,162.95	1,159.20	1,159.48	1	12.24
CB 70	1,142.51	1,128.32	1,130.27	1	3.58
DCB 71	1,135.73	1,130.23	1,132.15	7	1.97
CB 72	1,137.53	1,133.03	1,135.56	1	1.28
CB 73	1,137.53	1,133.38	1,136.25	1	2.74
CB 74	1,147.53	1,143.33	1,144.79	1	2.17
CB 75	1,147.53	1,143.68	1,145.36	2	3.16
CB 76	1,155.16	1,151.31	1,152.00	1	3.22
CB 77	1,157.65	1,153.80	1,154.43	0	3.55
CB 78	1,164.47	1,160.37	1,160.92	2	3.77
CB 79	1,174.35	1,170.25	1,170.58	1	3.52
CB 80	1,174.35	1,170.60	1,170.83	0	2.17
DCB 81	1,135.73	1,131.98	1,133.56	9	3.16
CB 82	1,142.51	1,138.66	1,139.35	1	2.12
AD 83	1,143.00	1,139.90	1,140.88	3	2.77
AD 84	1,154.00	1,150.90	1,151.23	2	2.79
AD 85	1,168.00	1,165.00	1,165.21	1	3.71
CB 86	1,160.21	1,156.11	1,156.50	1	3.46
CB 87	1,160.21	1,156.46	1,156.75	1	3.26
CB 88	1,164.47	1,160.72	1,161.21	2	2.03
AD 89	1,137.00	1,133.90	1,134.97	3	2.44
AD 90	1,154.00	1,150.90	1,151.56	2	2.38
AD 91	1,164.00	1,160.90	1,161.62	1	3.21
DCB 92	1,171.15	1,166.95	1,167.94	1	2.90
DCB 93	1,171.15	1,167.30	1,168.25	4	3.80
CB 94	1,177.18	1,173.08	1,173.38	1	3.55
CB 95	1,177.18	1,173.43	1,173.63	0	2.46
AD 97	1,134.00	1,131.00	1,131.54	1	2.55
AD 98	1,135.00	1,132.00	1,132.45	1	2.75
AD 99	1,149.00	1,146.00	1,146.25	2	1.09

**On-Site Inlets Data Table
100-Year Storm**

Inlet	Elevation (TC) (ft)	Elevation (EI) (ft)	Hydraulic Grade (Maximum) (ft)	Captured Flow (cfs)	Freeboard (ft)
AD 22	1,113.78	1,098.24	1,100.16	8	13.62
AD 23	1,127.00	1,101.91	1,103.81	1	23.19
AD 24	1,123.00	1,102.91	1,104.81	n/a	18.19

**On-Site Conduit Data Table
25-Year Storm**

Pipe	Upstream Structure	Downstream Structure	Dia. (in)	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Length (ft)	Slope (ft/ft)	Maximum Velocity (ft/s)	Peak Flow (cfs)
4-3	MH 4	HW3	18.0	1,107.28	1,082.00	112.1	0.226	27.11	21
5-4	DCB 5	MH 4	18.0	1,108.48	1,107.38	120.1	0.009	11.87	21
6-5	CB 6	DCB 5	15.0	1,110.38	1,108.58	180.3	0.010	9.56	12
7-6	CB 7	CB 6	15.0	1,110.73	1,110.48	24.5	0.010	8.90	11
8-7	CB 8	CB 7	15.0	1,120.61	1,110.83	233.5	0.042	10.25	11
9-8	CB 9	CB 8	15.0	1,130.94	1,120.71	159.4	0.064	10.74	4
10-9	CB 10	CB 9	15.0	1,136.71	1,131.04	92.2	0.062	8.69	2
11-10	CB 11	CB 10	15.0	1,150.89	1,136.81	190.3	0.074	4.84	1
12-11	CB 12	CB 11	15.0	1,151.18	1,150.99	18.5	0.010	2.51	0
13-5	DCB 13	DCB 5	15.0	1,111.80	1,111.55	24.5	0.010	3.53	4
14-7	AD 14	CB 7	15.0	1,112.00	1,110.83	117.3	0.010	2.79	3
15-14	AD 15	AD 14	15.0	1,112.90	1,112.10	80.3	0.010	3.22	4
16-15	AD 16	AD 15	15.0	1,115.00	1,113.00	96.4	0.021	0.97	1
17-8	DCB 17	CB 8	15.0	1,121.64	1,120.71	93.4	0.010	5.91	6
18-17	DCB 18	DCB 17	15.0	1,121.99	1,121.74	24.5	0.010	5.52	4
19-9	CB 19	CB 9	15.0	1,131.29	1,131.04	24.5	0.010	3.46	1
20-10	CB 20	CB 10	15.0	1,137.00	1,136.81	18.5	0.010	3.07	1
22-21	AD 22	HW 21	42.0	1,098.24	1,082.00	210.4	0.077	24.41	72
23-22	AD 23	AD 22	42.0	1,101.91	1,098.34	356.6	0.010	9.73	38
24-23	AD 24	AD 23	42.0	1,102.91	1,102.01	90.5	0.010	9.68	37
25-24	OS 25	AD 24	42.0	1,104.30	1,103.01	129.0	0.010	9.68	37
26-22	MH 26	AD 22	18.0	1,114.04	1,098.34	219.4	0.072	18.08	29
27-26	DCB 27	MH 26	18.0	1,114.35	1,114.14	21.0	0.010	15.53	27
28-27	DCB 28	DCB 27	15.0	1,114.70	1,114.45	24.5	0.010	17.70	22
29-28	AD 29	DCB 28	15.0	1,116.10	1,114.80	129.6	0.010	13.39	16
30-29	AD 30	AD 29	15.0	1,165.47	1,116.20	206.8	0.238	18.73	5
31-30	AD 31	AD 30	15.0	1,167.62	1,165.57	105.8	0.019	5.30	1
32-31	AD 32	AD 31	15.0	1,169.29	1,167.72	92.4	0.017	4.38	1
33-26	CB 33	MH 26	15.0	1,127.91	1,114.14	187.6	0.073	9.21	2
34-33	CB 34	CB 33	15.0	1,128.26	1,128.01	24.5	0.010	3.90	1
35-27	CB 35	DCB 27	15.0	1,124.07	1,120.19	235.8	0.016	5.11	2
36-35	CB 36	CB 35	15.0	1,124.42	1,124.17	24.5	0.010	3.72	1
37-29	AD 37	AD 29	15.0	1,119.90	1,116.20	116.2	0.032	4.30	5
38-37	AD 38	AD 37	15.0	1,124.90	1,120.00	100.0	0.049	7.77	2
39-38	AD 39	AD 38	15.0	1,135.00	1,125.00	70.8	0.141	5.67	1
40-37	AD 40	AD 37	15.0	1,165.28	1,120.00	168.8	0.268	11.24	2
41-29	AD 41	AD 29	15.0	1,120.90	1,116.20	114.4	0.041	2.09	3
42-41	AD 42	AD 41	15.0	1,122.90	1,121.00	95.9	0.020	5.49	2
43-42	AD 43	AD 42	15.0	1,125.00	1,123.00	94.4	0.021	4.35	1
45-44	MH 45	HW 44	15.0	1,113.90	1,106.00	36.6	0.216	25.50	18
46-45	AD 46	MH 45	15.0	1,151.34	1,114.00	224.1	0.167	17.83	7
47-46	AD 47	AD 46	15.0	1,152.90	1,151.44	92.9	0.016	7.20	6
48-47	AD 48	AD 47	15.0	1,154.90	1,153.00	117.0	0.016	6.86	5
49-48	AD 49	AD 48	15.0	1,164.90	1,155.00	113.5	0.087	11.16	3
50-49	AD 50	AD 49	15.0	1,171.00	1,165.00	89.3	0.067	8.75	2
51-45	CB 51	MH 45	15.0	1,130.11	1,114.00	226.9	0.071	15.12	12
52-51	CB 52	CB 51	15.0	1,138.15	1,130.21	138.0	0.058	13.32	10
53-52	CB 53	CB 52	15.0	1,146.13	1,138.25	136.7	0.058	12.05	6
54-53	CB 54	CB 53	15.0	1,150.13	1,146.23	54.0	0.072	12.49	5
55-54	CB 55	CB 54	15.0	1,157.75	1,150.23	99.0	0.076	12.56	5
56-55	CB 56	CB 55	15.0	1,172.20	1,157.85	194.0	0.074	9.97	2
57-56	CB 57	CB 56	15.0	1,172.55	1,172.30	24.5	0.010	3.80	1
58-51	CB 58	CB 51	15.0	1,130.46	1,130.21	24.5	0.010	0.37	0

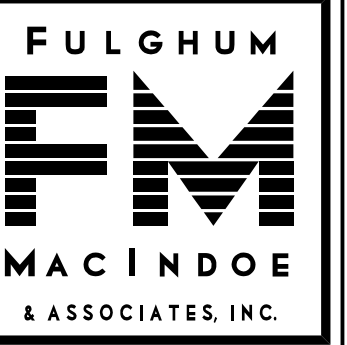
ATTACHMENT 10 – PIPE SYSTEM DATA

Pipe	Upstream Structure	Downstream Structure	Dia. (in)	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Length (ft)	Slope (ft/ft)	Maximum Velocity (ft/s)	Peak Flow (cfs)
59-52	CB 59	CB 52	15.0	1,138.50	1,138.25	24.5	0.010	2.81	1
60-55	CB 60	CB 55	15.0	1,158.10	1,157.85	24.5	0.010	4.08	1
64-63	AD 64	HW 63	15.0	1,141.90	1,126.00	68.1	0.234	18.16	5
65-64	AD 65	AD 64	15.0	1,150.90	1,142.00	110.9	0.080	11.48	4
66-65	AD 66	AD 65	15.0	1,157.64	1,151.00	117.0	0.057	9.36	3
67-66	CB 67	AD 66	15.0	1,158.85	1,157.74	110.8	0.010	4.23	2
68-67	CB 68	CB 67	15.0	1,159.20	1,158.95	24.5	0.010	3.36	1
70-69	CB 70	HW 69	30.0	1,128.32	1,126.00	82.2	0.028	15.22	49
71-70	DCB 71	CB 70	30.0	1,130.23	1,128.42	181.1	0.010	9.45	37
72-71	CB 72	DCB 71	18.0	1,133.03	1,130.33	98.0	0.028	11.73	21
73-72	CB 73	CB 72	18.0	1,133.38	1,133.13	24.5	0.010	11.11	20
74-73	CB 74	CB 73	15.0	1,143.33	1,133.48	138.1	0.071	14.47	10
75-74	CB 75	CB 74	15.0	1,143.68	1,143.43	24.5	0.010	7.52	9
76-75	CB 76	CB 75	15.0	1,151.31	1,143.78	113.5	0.066	12.88	7
77-76	CB 77	CB 76	15.0	1,153.80	1,151.41	62.6	0.038	9.94	6
78-77	CB 78	CB 77	15.0	1,160.37	1,153.90	137.7	0.047	10.58	5
79-78	CB 79	CB 78	15.0	1,170.25	1,160.47	242.9	0.040	7.04	2
80-79	CB 80	CB 79	15.0	1,170.60	1,170.35	24.5	0.010	2.90	0
81-71	DCB 81	DCB 71	15.0	1,131.98	1,131.73	24.5	0.010	7.39	9
82-73	CB 82	CB 73	15.0	1,138.66	1,133.48	85.5	0.061	13.37	9
83-82	AD 83	CB 82	15.0	1,139.90	1,138.76	103.3	0.011	6.23	6
84-83	AD 84	AD 83	15.0	1,150.90	1,140.00	119.6	0.091	11.24	3
85-84	AD 85	AD 84	15.0	1,165.00	1,151.00	123.0	0.114	8.18	1
86-82	CB 86	CB 82	15.0	1,156.11	1,138.76	175.5	0.099	9.51	2
87-86	CB 87	CB 86	15.0	1,156.46	1,156.21	24.5	0.010	3.40	1
88-78	CB 88	CB 78	15.0	1,160.72	1,160.47	24.5	0.010	4.68	2
89-70	AD 89	CB 70	15.0	1,133.90	1,128.42	150.5	0.036	11.40	12
90-89	AD 90	AD 89	15.0	1,150.90	1,134.00	124.3	0.136	18.29	9
91-90	AD 91	AD 90	15.0	1,160.90	1,151.00	113.5	0.087	14.59	8
92-91	DCB 92	AD 91	15.0	1,166.95	1,161.00	126.8	0.047	11.31	7
93-92	DCB 93	DCB 92	15.0	1,167.30	1,167.05	24.5	0.010	5.98	6
94-93	CB 94	DCB 93	15.0	1,173.08	1,167.40	253.7	0.022	7.13	1
95-94	CB 95	CB 94	15.0	1,173.43	1,173.18	24.5	0.010	2.62	0
97-96	AD 97	HW 96	15.0	1,131.00	1,126.00	283.0	0.018	6.44	3
98-97	AD 98	AD 97	15.0	1,132.00	1,131.10	61.1	0.015	5.30	2
99-98	AD 99	AD 98	15.0	1,146.00	1,132.10	202.5	0.069	8.46	2

**On-Site Conduit Data Table
100-Year Storm**

Pipe	Upstream Structure	Downstream Structure	Dia. (in)	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Length (ft)	Slope (ft/ft)	Maximum Velocity (ft/s)	Peak Flow (cfs)
22-21	AD 22	HW 21	42.0	1,098.24	1,082.00	210.4	0.077	26.57	96
23-22	AD 23	AD 22	42.0	1,101.91	1,098.34	356.6	0.010	10.64	54
24-23	AD 24	AD 23	42.0	1,102.91	1,102.01	90.5	0.010	10.57	53
25-24	OS 25	AD 24	42.0	1,104.30	1,103.01	129.0	0.010	10.56	53

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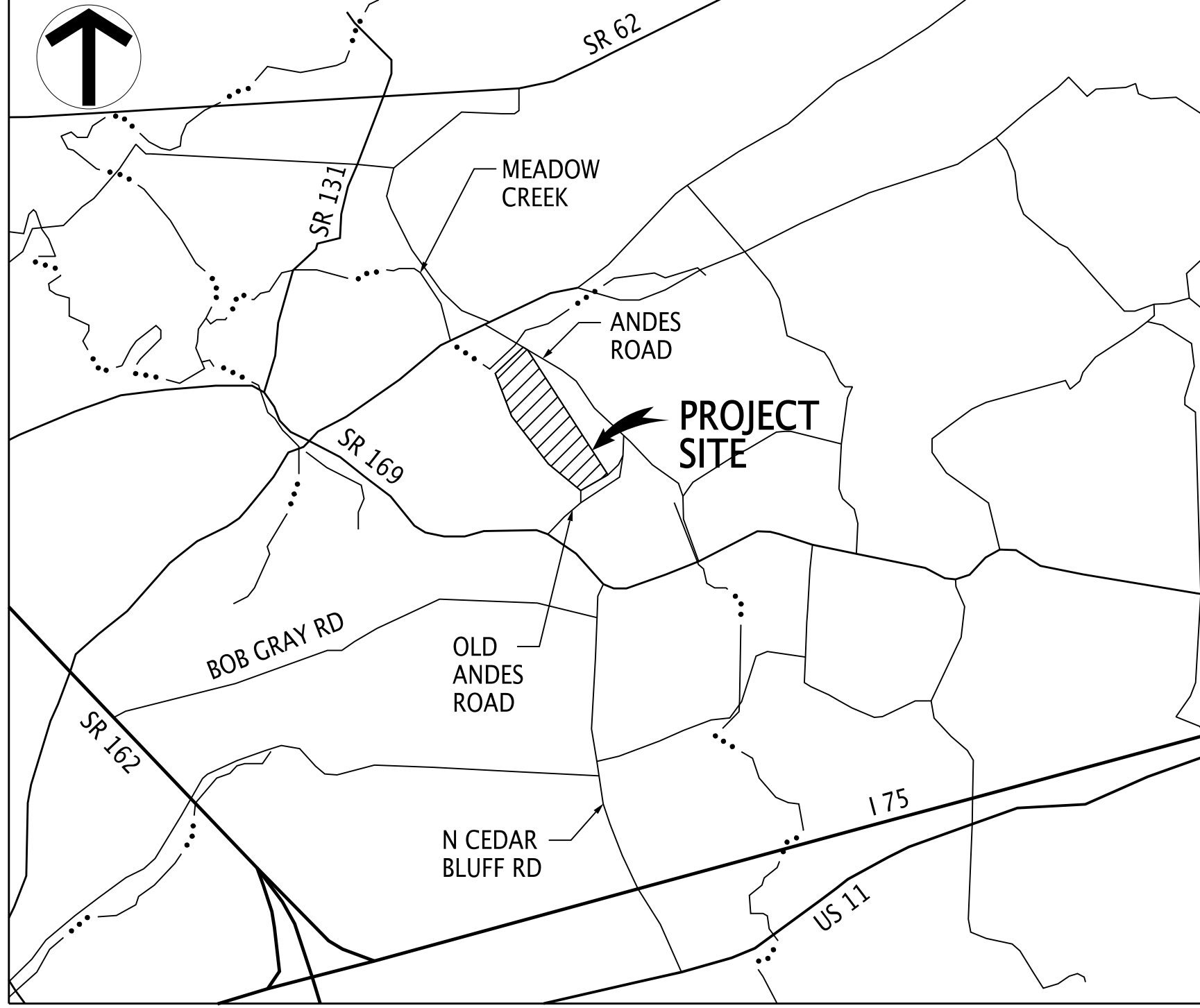
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BALL HOMES, LLC
6309 WALDEN DRIVE
LEXINGTON, KY 40517
CONTACT: MR. D. RAY BALL, JR.
TELEPHONE NO.: 859.268.1191

COVER SHEET AND INDEX



LOCATION MAP
(NOT TO SCALE)



OVERALL MAP
(NOT TO SCALE)

DRAWING INDEX

SHEET NO.	REV. NO.	ISSUE DATE	TITLE
C1	0	09/18/20	COVER SHEET AND INDEX
C2	0	09/18/20	LAYOUT AND PAVING PLAN
C3	0	09/18/20	LAYOUT AND PAVING PLAN
C4	0	09/18/20	LAYOUT AND PAVING PLAN
C5	0	09/18/20	GRADING PLAN
C6	0	09/18/20	GRADING PLAN
C7	0	09/18/20	GRADING PLAN
C8	0	09/18/20	ESPC PLAN - STAGE 1
C9	0	09/18/20	ESPC PLAN - STAGE 1
C10	0	09/18/20	ESPC PLAN - STAGE 1
C11	0	09/18/20	ESPC PLAN - STAGE 2
C12	0	09/18/20	ESPC PLAN - STAGE 2
C13	0	09/18/20	ESPC PLAN - STAGE 2
C14	0	09/18/20	ESPC PLAN - STAGE 3
C15	0	09/18/20	ESPC PLAN - STAGE 3
C16	0	09/18/20	ESPC PLAN - STAGE 3
C17	0	09/18/20	STORM DRAINAGE PLAN
C18	0	09/18/20	STORM DRAINAGE PLAN
C19	0	09/18/20	STORM DRAINAGE PLAN
C20	0	09/18/20	WATER PLAN
C21	0	09/18/20	WATER PLAN
C22	0	09/18/20	WATER PLAN
C23	0	09/18/20	SANITARY SEWER PLAN
C24	0	09/18/20	SANITARY SEWER PLAN
C25	0	09/18/20	SANITARY SEWER PLAN
C26	0	09/18/20	SANITARY SEWER PLAN
C27	0	09/18/20	ROAD PROFILES
C28	0	09/18/20	ROAD PROFILES
C29	0	09/18/20	ROAD PROFILES
C30	0	09/18/20	DETAILS
C31	0	09/18/20	DETAILS
C32	0	09/18/20	DETAILS
C33	0	09/18/20	INFILTRATION BASIN DETAILS
C34	0	09/18/20	INFILTRATION BASIN DETAILS
C35	0	09/18/20	WKUD DETAILS
C36	0	09/18/20	SANITARY SEWER PROFILES
C37	0	09/18/20	SANITARY SEWER PROFILES
C38	0	09/18/20	SANITARY SEWER PROFILES
C39	0	09/18/20	SANITARY SEWER PROFILES
C40	0	09/18/20	TRAFFIC CONTROL PLAN
C41	0	09/18/20	STORM PROFILES
C42	0	09/18/20	STORM PROFILES
C43	0	09/18/20	STORM PROFILES
C44	0	09/18/20	STORM PROFILES

NOT ISSUED
NOT ISSUED
NOT ISSUED
NOT ISSUED

File Name: A:\6921\592.007\DWG\592.007-C01.dwg
Plot Date: 9/18/2020

PROJ. MGR.	DESIGNED BY	DRAWN BY	Issue No.	Date
	WCF	CHG	ISSUED FOR CONSTRUCTION	09/18/20
			Revision/Issue	
Project	592.007	Sheet	C1	
Date	09/18/20	Scale	AS NOTED	



ANDES TRACE SUBDIVISION
1609 OLD ANDES ROAD
KNOXVILLE, TENNESSEE 37931

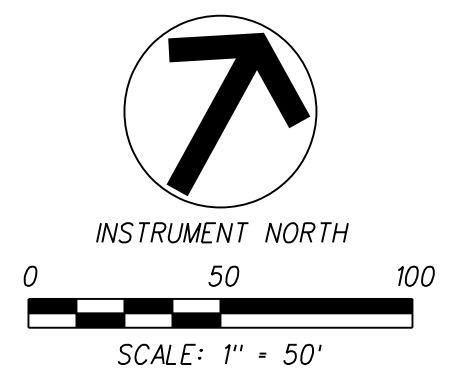
BALL HOMES, LLC
6309 WALDEN DRIVE
LEXINGTON, KY 40517
CONTACT: MR. D. RAY BALL, JR.
TELEPHONE NO.: 859.268.1191

**LAYOUT AND
PAVING PLAN**

PROJ. NO.	DESIGNED BY	DRAWN BY	DATE
592.007	CHG	HNU	09/18/20
ISSUED FOR CONSTRUCTION	Revision/Issue		No.

Project: 592.007
Date: 09/18/20
Scale: 1"=50'
Sheet: **C3**

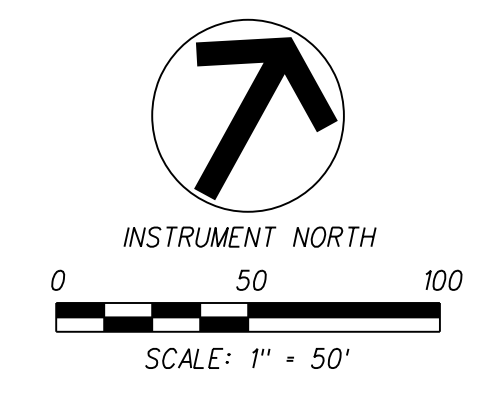
NOTES:
1. REFER TO SHEET C2 FOR NOTES AND LEGEND.



CURVE NO.	P.I. COORDINATES		DELTA ANGLE	RADIUS	TANGENT	LENGTH
	NORTHING	EASTING				
C3	593,256.1940	2,531,978.4085	16° 52' 59" (RT)	250.00	37.10	123.53
C4	593,452.5271	2,531,921.4183	56° 37' 14" (RT)	125.00	67.33	43.87

File Name: A:\6901\592.007\DWG\592.007-C03.dwg
Plot Date: 9/18/2020

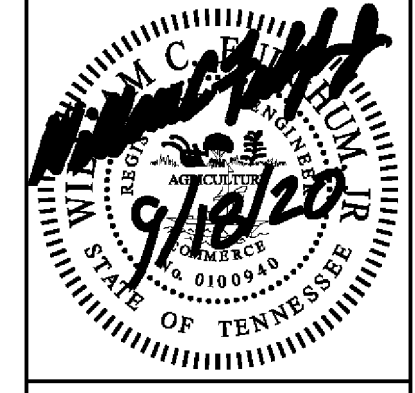
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- NOTES:**
1. REFER TO SHEET C2 FOR NOTES AND LEGEND.
 2. LOTS 44-47, 115-121 SHALL BE REZONED PRIOR TO BEING PLATTED OR HOUSES BUILT.



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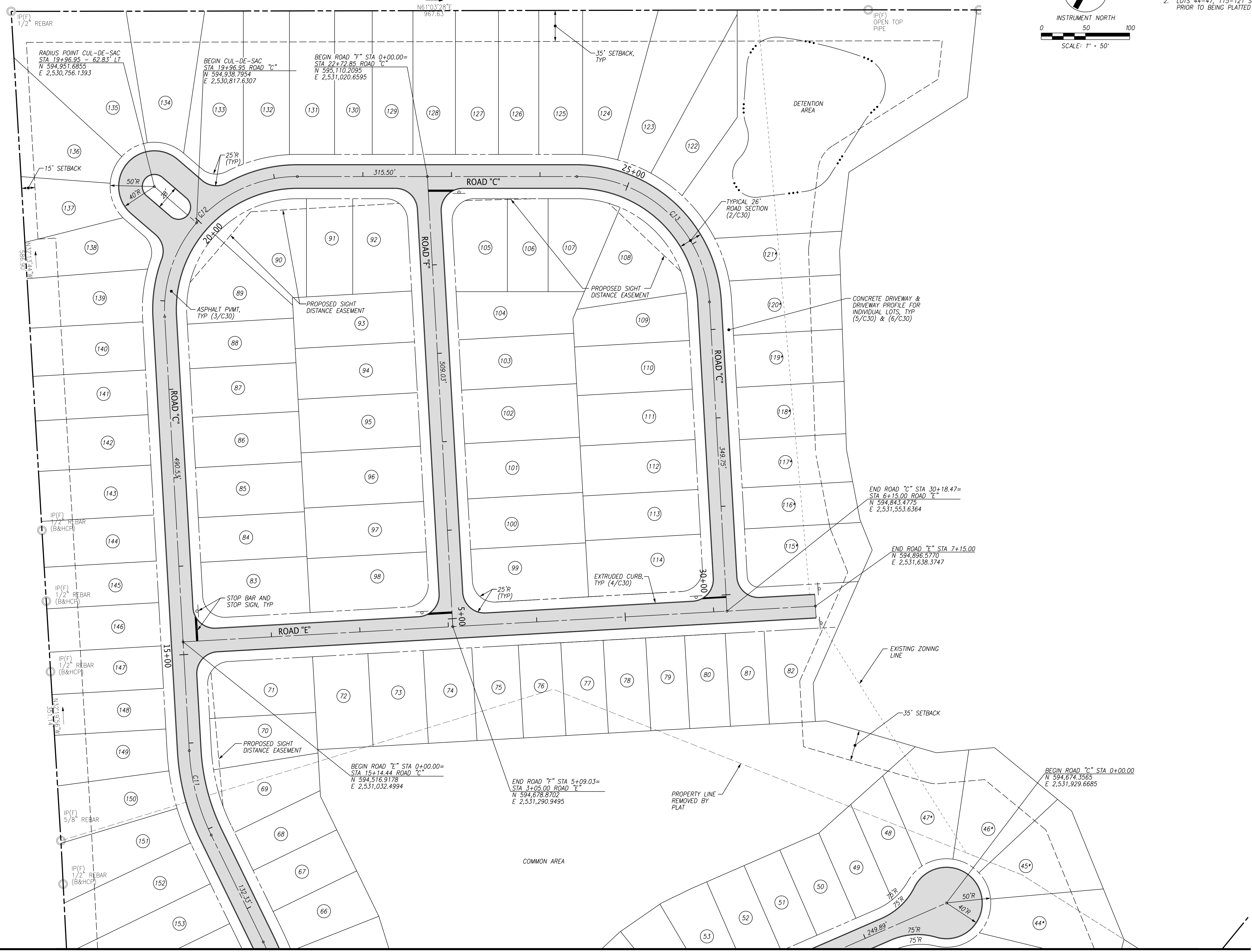
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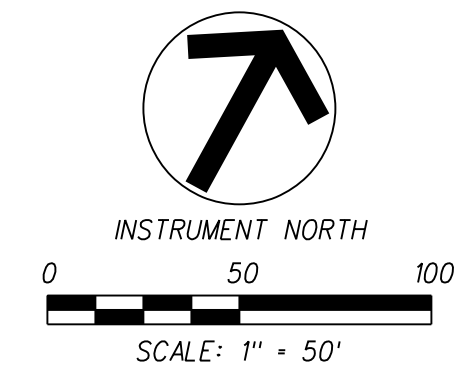
LAYOUT AND PAVING PLAN

PROJ. MGR.	DESIGNED BY	DRAWN BY	DATE
	CHG	HNU	
	WCF		
	ISSUED FOR CONSTRUCTION		09/18/20
	Revision/Issue		Date

Project	592.007	Sheet	C4
Date	09/18/20		
Scale	1"=50'		

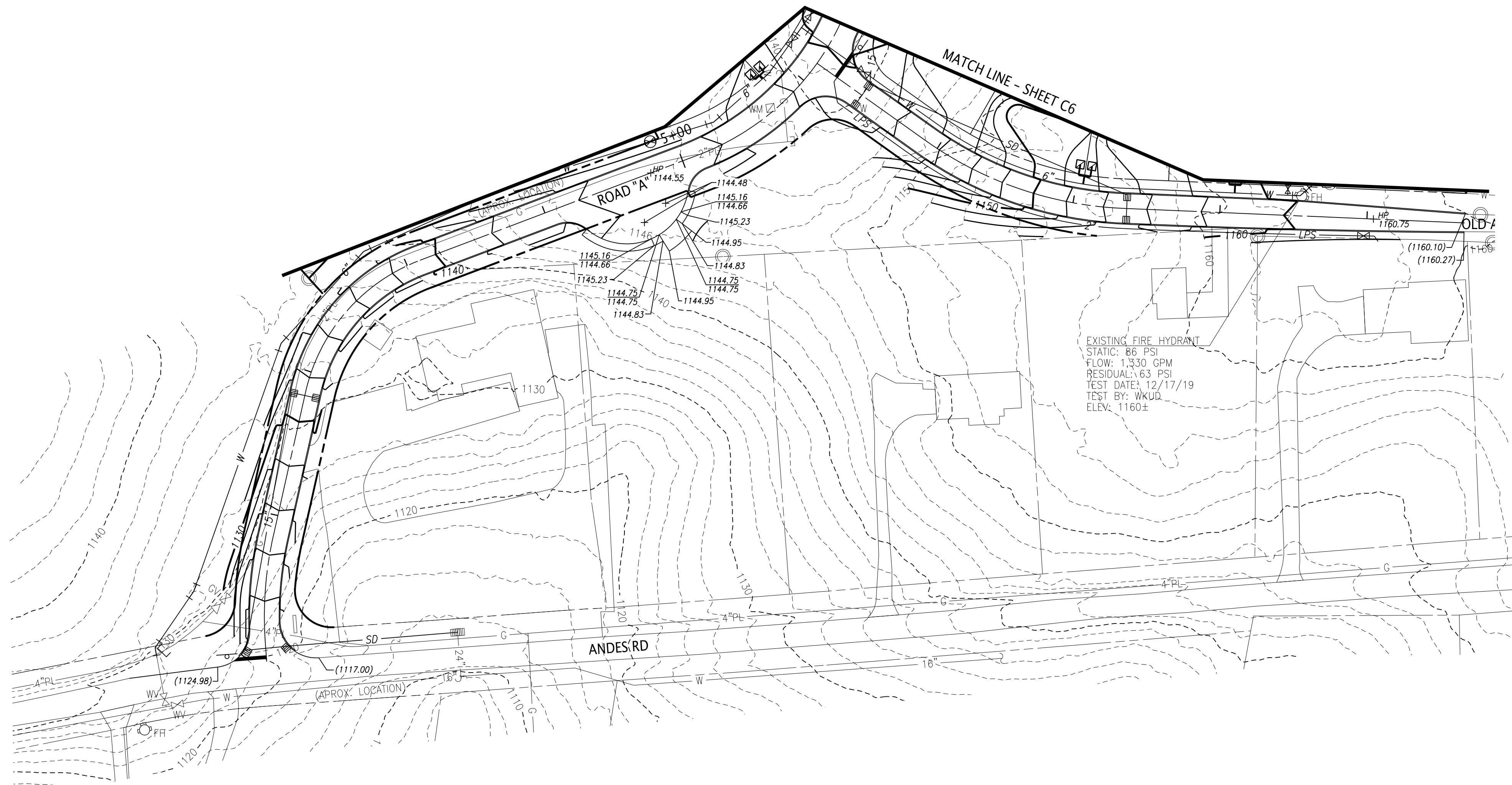


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 Plot Date: 9/18/2020



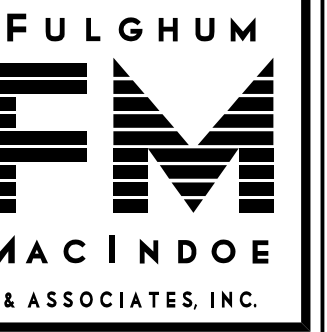
GRADING NOTES:

1. THE TOPOGRAPHIC DATA WAS TAKEN FROM AVAILABLE KOIS MAPS.
2. UNLESS NOTED OTHERWISE, THE PROPOSED GRADES SHOWN ON THESE DRAWINGS ARE FINISHED GRADE. EXISTING AND PROPOSED CONTOURS ARE SHOWN AT 2-FT. INTERVALS.
3. THE ACCURACY OF THE GRADES IS DEPENDANT ON THE DATA PROVIDED BY THE OWNER OR OWNER'S REPRESENTATIVE. FIELD VERIFY AS NECESSARY PRIOR TO CONSTRUCTION.
4. THE SITE SHALL BE CLEARED AND GRUBBED WITHIN THE LIMITS OF EXCAVATION. COMPLETELY DISPOSE OF ALL MATERIALS RESULTING FROM CLEARING AND GRUBBING OFF-SITE. BURNING SHALL NOT BE PERMITTED UNLESS PRIOR APPROVAL IS OBTAINED BY THE LOCAL FIRE DEPARTMENT. THE CONTRACTOR MUST OBTAIN A PERMIT AND MEET ALL OF THE REQUIREMENTS AS SPECIFIED BY THE FIRE DEPARTMENT.
5. ALL TREES STUMPS, BOULDERS, AND OTHER OBSTRUCTIONS SHALL BE REMOVED TO A DEPTH OF 2 FT BELOW THE SUBGRADE. ROCK SHALL BE SCARIFIED TO DEPTH OF 1 FT BELOW SUBGRADE.
6. STRIP TOPSOIL FULL DEPTH (6-IN. MIN.) AND TEMPORARILY STOCKPILE EXCAVATED MATERIALS. INSTALL SILT FENCE OR OTHER APPROPRIATE EROSION CONTROL STRUCTURES ON THE DOWN HILL SIDE OF THE STOCKPILE.
7. PROOF ROLL ALL AREAS TO RECEIVE FILL. PROOF ROLL WITH A FULLY LOADED TANDEM AXLE DUMP TRUCK USING A CRISS-CROSS PATTERN (4 PASSES MIN.) AREAS FAILING THE PROOF ROLLING SHALL BE UNDERCUT AND BACKFILLED USING AN ENGINEERED FILL OR STABILIZED BY A METHOD APPROVED BY THE PROJECT GEOTECHNICAL ENGINEER.
8. AREAS THAT EXHIBIT WEAK SOIL OR OTHERWISE UNSUITABLE CONDITIONS SHALL BE UNDERCUT TO A FIRM LEVEL OF SOIL FOLLOWED BY BACKFILLING THE UNDERCUT AREAS USING AN ENGINEERED FILL. TDOT NO. 57, OR TDOT NO. 67 STONE.
9. FILL MATERIAL SHALL BE SATISFACTORY MATERIAL FREE FROM ROOTS AND OTHER ORGANIC MATERIAL. FROZEN MATERIAL AND TRASH. FILL MATERIAL SHALL ALSO BE FREE OF STONE OR OTHER MATERIAL LARGER THAN 6 IN. AND LARGER THAN 4 IN. IN THE TOP 6 IN. OF AN EMBANKMENT.
10. FILL SOILS SHALL HAVE A PI LESS THAN 35 & A MAXIMUM DRY DENSITY OF 90 PCF OR GREATER.
11. UNSATISFACTORY SOILS INCLUDE MATERIALS THAT ARE TOO WET OR TOO SOFT, EXPANSIVE SOILS AND SOILS CLASSIFIED PT. OH, AND OL. LEGALLY DISPOSE OF UNSATISFACTORY SOILS OFF-SITE UNLESS OTHERWISE APPROVED BY THE OWNER OR GEOTECHNICAL ENGINEER.
12. FILL MATERIAL SHALL BE PLACED IN LOOSE, HORIZONTAL LIFTS NOT EXCEEDING 8 IN. THICKNESS. UNLESS NOTED OTHERWISE, COMPACT EACH LAYER TO AT LEAST 98% MAXIMUM DRY DENSITY. COMPACT THE UPPER 24 IN. OF FILL BENEATH PAVEMENTS AND THE UPPER 12 IN. BENEATH BUILDING SLABS TO 100% MAXIMUM DRY DENSITY. MAINTAIN THE MOISTURE CONTENT TO WITHIN -3 TO +3 PERCENT OF THE OPTIMUM MOISTURE CONTENT.
13. A 6 IN. (MIN.) LAYER OF TOPSOIL SHALL BE PLACED OVER THE AREAS TO BE SEEDD AND TO THE FINISH GRADE ELEVATIONS AS SHOWN ON THE DRAWINGS.
14. DO NOT ALLOW WATER TO ACCUMULATE IN EXCAVATIONS OR POND ON-SITE. PROVIDE NECESSARY MEASURES TO KEEP THE SITE FREE-DRAINING.
15. PROTECT AND MAINTAIN SUBGRADES UNTIL PLACEMENT OF THE FINAL SURFACE IS ACHIEVED.
16. CONTRACTOR IS RESPONSIBLE TO ASSURE THAT THE FINISHED GRADES CONFORM WITH THE DETENTION POND DESIGN PARAMETERS. ONCE GRADING IS COMPLETE AND PRIOR TO FINAL SEEDING, SUBMIT AN AS-BUILT SURVEY FOR THE OWNER'S REVIEW.
17. VERIFY GRADES WHEREVER NECESSARY TO BRING THE PROPOSED LINES, ELEVATIONS, SLOPES, AND CROSS-SECTIONS OF THE GRADING WORK TO WITHIN THE FOLLOWING TOLERANCES ABOVE OR BELOW THAT AS SHOWN ON THE PLANS: SUBGRADE 0.1', UNPAVED AREAS 0.1', SIDEWALKS 0.10', PAVEMENTS 0.04', AND BUILDINGS 0.04'.
18. SLOPES GREATER THAN 4:1 SLOPE AT A HEIGHT GREATER THAN 6-FT SHALL BE TESTED BY THE PROJECT GEOTECHNICAL ENGINEER TO DETERMINE STABILITY.
19. DISTURBED AREAS SHALL BE STABILIZED IN AN EXPEDIENT MANNER TO MINIMIZE TIME OF EXPOSURE TO WEATHER.

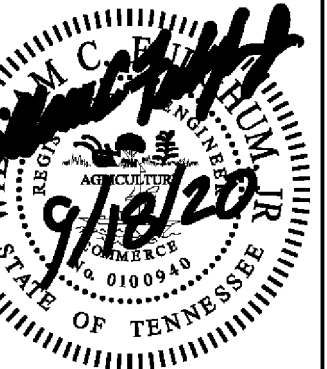


LEGEND:

---	PROPERTY LINE
--- 1012 ---	EXISTING CONTOUR
— 1012 —	PROPOSED CONTOUR
1007.9 ⁺	PROPOSED SPOT SHOT
←	PROPOSED FLOW ARROW
(1/C2)	DETAIL REF. (DETAIL NO./SHT. NO.)
TYP.	TYPICAL



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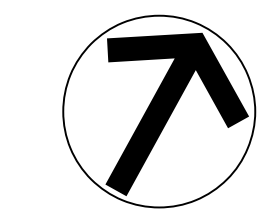
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1609 OLD ANDES ROAD
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BALL HOMES, LLC
6309 WALDEN DRIVE
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GRADING PLAN

PROJ. NO.	DESIGNED BY	DRAWN BY	DATE
	WCF	HNU	09/18/20
	CHG		
	ISSUED FOR CONSTRUCTION		
	Revision/Issue		

Project	Sheet
592.007	C5
Date	Scale
09/18/20	1"=50'



INSTRUMENT NORTH
0 50 100
SCALE: 1" = 50'

NOTES:
1. REFER TO SHEET C5 FOR NOTES AND LEGEND.

MATCH LINE - SHEET C7



DETENTION POND BERM
TYP (28/C32)

EMERGENCY
SPILLWAY
(29/C32)

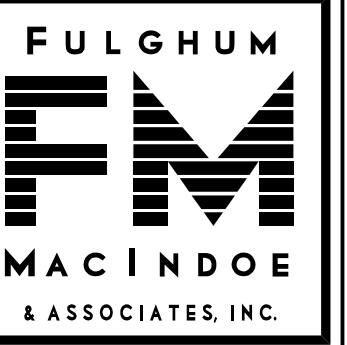
INFILTRATION
BASIN 1
(36/C33)

TRAPEZOIDAL
DITCH SECTION
TYP (33/C32)

TYPICAL LOT
GRADING
TYP (18/C31)

DITCH SECTION
TYP (7/C30)

MATCH LINE - SHEET C5



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GRADING PLAN

PROJ. MGR.	DESIGNED BY	DRAWN BY	Date
	MCF	CHG	
		HNU	
ISSUED FOR CONSTRUCTION	Revision/Issue		09/18/20
No.			

Project: 592.007
Date: 09/18/20
Scale: 1"=50'

Sheet: **C6**



INSTRUMENT NORTH
0 50 100
SCALE: 1" = 50'

NOTES:
1. REFER TO SHEET C5 FOR NOTES AND LEGEND.



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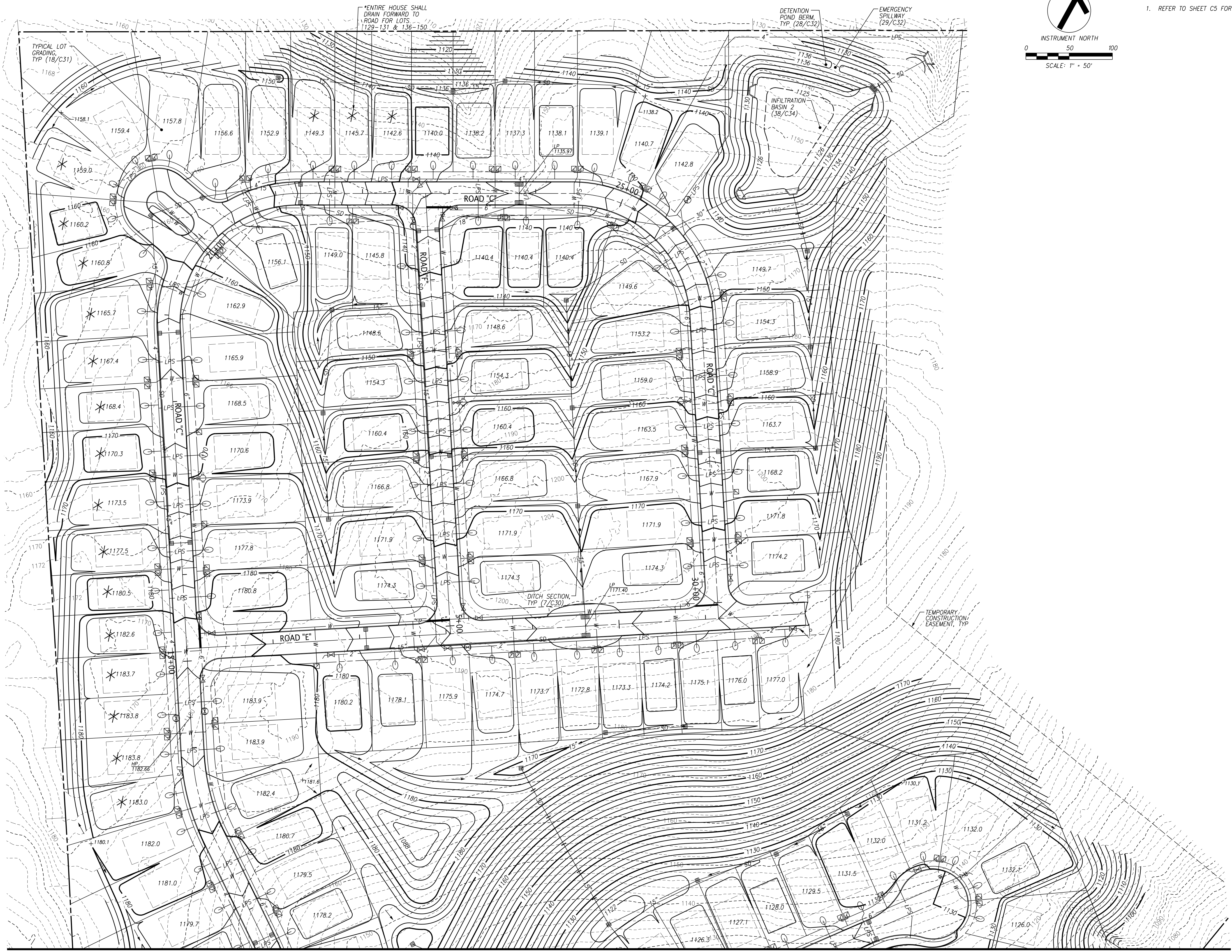
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GRADING PLAN

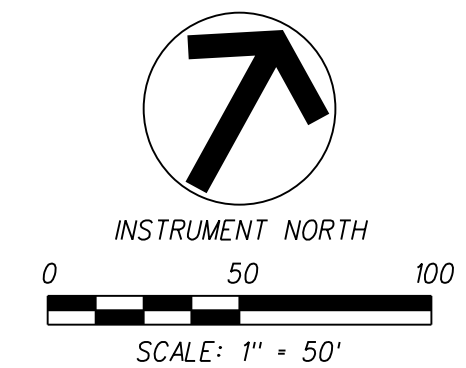
PROJ. NO.	DESIGNED BY	DRAWN BY	Date
592.007	CHC	HNU	09/18/20
ISSUED FOR CONSTRUCTION	Revision/Issue		
No.			

Project	Sheet
592.007	C7
Date	Scale
09/18/20	1"=50'



MATCH LINE - SHEET C6

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Plot Date: 9/18/2020



EPSC NOTES:

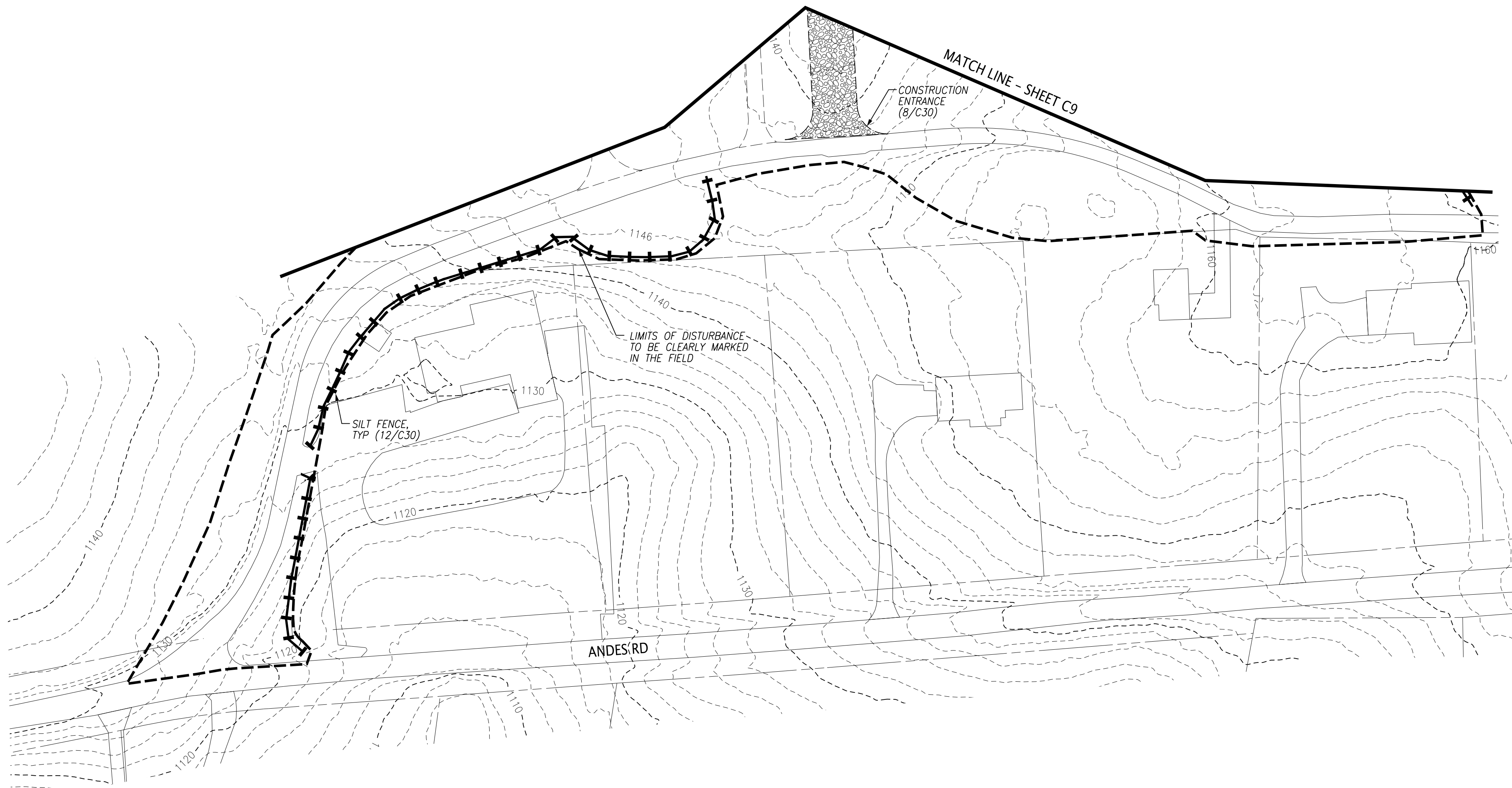
1. EROSION CONTROL DEVICES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE TDEC'S EROSION AND SEDIMENT CONTROL HANDBOOK AND TDEC'S CONSTRUCTION ACTIVITY PERMIT REQUIREMENTS. THE DEVICES SHOWN ON THE DRAWINGS ARE THE MINIMUM REQUIRED. THE CONTRACTOR SHALL PROVIDE ADDITIONAL EROSION CONTROL DEVICES AS NEEDED.
2. INSTALL TEMPORARY SEDIMENT TRAP(S) WHERE SHOWN OR AS OTHERWISE APPROPRIATE. CONSTRUCT AND MAINTAIN IN ACCORDANCE WITH THE REQUIREMENTS OF TDEC'S EROSION & SEDIMENT CONTROL HANDBOOK. MUDDY WATER COLLECTED IN SEDIMENT TRAP(S) SHALL BE HELD UNTIL IT IS AT LEAST AS CLEAR AS UPSTREAM WATER BEFORE IT IS DISCHARGED TO SURFACE WATERS. DISCHARGE THROUGH A PIPE OR LINED CHANNEL SO THAT THE DISCHARGE DOES NOT CAUSE EROSION & SEDIMENTATION.
3. INSTALL TEMPORARY DIVERSION BERMS OR DIVERSION CHANNELS AS NECESSARY TO DIVERT STORM WATER FROM RUNNING ONTO THE DISTURBED AREAS AND TO DIVERT RUNOFF FROM DISTURBED AREAS TO THE TEMPORARY SEDIMENT TRAP(S).
4. APPLY TEMPORARY SEEDING WHENEVER GRADING OPERATIONS ARE TEMPORARILY HALTED FOR OVER 14 DAYS AND FINAL GRADING OF EXPOSED SURFACES IS TO BE COMPLETED WITHIN ONE YEAR. APPLY TEMPORARY SEEDING TO SOIL STOCKPILES.
5. APPLY PERMANENT SEEDING WHENEVER GRADING OPERATIONS ARE COMPLETED AND ALL CONSTRUCTION OPERATIONS WILL NOT IMPACT THE DISTURBED AREA. APPLY PERMANENT SEEDING TO ALL NON-CONSTRUCTION AREAS, WHICH SHOW SIGNS OF EXCESSIVE EROSION.
6. UNLESS NOTED OTHERWISE PERMANENT SEEDING SHALL BE DROUGHT TOLERANT, HYBRID KENTUCKY 31 (JAGUAR, LANCER, REBEL II, FALCON II, ETC.). SEED AT A RATE OF 6-8 LBS./1000 S.F. USE A SLOW RELEASE STARTER FERTILIZER WITH 1 LBS./1000 S.F. NITROGEN. IF GRADING IS PERFORMED DURING THE WINTER MONTHS, SEED MIXTURE SHALL BE SUPPLEMENTED WITH A WINTER RYE OR OTHER APPROPRIATE MIXTURE TO ASSURE STABILIZATION DURING THE WINTER SEASON.
7. MULCH WITH STRAW AT A RATE OF 100 LBS./1000 S.F. OVER THE SEEDED AREAS.
8. EXCAVATE STORMWATER SEDIMENT PONDS AS FIRST ITEM OF CONSTRUCTION.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF SITE CONSTRUCTION POLLUTION PREVENTION CONTROLS THROUGHOUT THE LIFE OF THE PROJECT.
10. ADEQUATE DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES, BEST MANAGEMENT PRACTICES, AND/OR OTHER STORMWATER MANAGEMENT FACILITIES SHALL BE PROVIDED AND MAINTAINED AT ALL TIMES DURING CONSTRUCTION. DAMAGES TO ADJACENT PROPERTY AND/OR THE CONSTRUCTION SITE CAUSED BY THE CONTRACTOR'S FAILURE TO PROVIDE AND MAINTAIN ADEQUATE DRAINAGE, EROSION PREVENTION AND SEDIMENT CONTROL FOR THE CONSTRUCTION AREA SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
11. FOR SLOPES TO BE PROTECTED BUT NOT REFORESTED (POND BERMS, SLOPES BETWEEN BUILDINGS, ETC.) APPLY HYDROSEED USING THE SEED MIX SPECIFIED IN EPSC NOTE 6 (SHEET C8). APPLY FUSION SURFACE TREATMENT (JEN-HILL CONSTRUCTION MATERIALS) AT A RATE OF 4,500 LBS/AC ALONG WITH THE HYDROSEED MIX. OBTAIN A SOIL SAMPLE TO CONFIRM THE APPLICATION RATE. INSTALL PER THE MANUFACTURER'S RECOMMENDATIONS.

EPSC - STAGE 1 SEQUENCING NOTES:

1. BEGIN STAGE 1 EROSION & SEDIMENT CONTROL BY INSTALLING A STABILIZED CONSTRUCTION ENTRANCE. THIS WILL BE THE FIRST CONSTRUCTION WORK ON THE PROJECT.
2. INSTALL PERIMETER SILT FENCE AS SHOWN ON THIS PLAN.
3. STAGE 1 EROSION AND SEDIMENT CONTROL (EPSC) MEASURES SHALL BE IN PLACE BEFORE CLEARING, GRUBBING, EXCAVATION, GRADING, CUTTING OR FILLING OCCURS, EXCEPT AS SUCH WORK MAY BE NECESSARY TO INSTALL EPSC MEASURES.
4. CONSTRUCT SEDIMENT PONDS & TRAPS AS SHOWN ON THIS PLAN.
5. CONSTRUCT DIVERSION DITCHES AS NEEDED TO ROUTE STORM WATER TO THE SEDIMENT PONDS & TRAPS.
6. THIS WILL END STAGE 1.

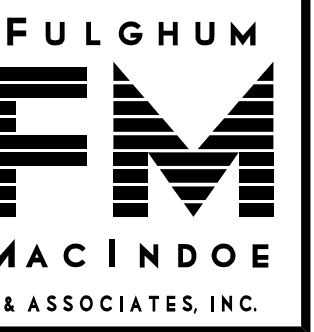
KNOX COUNTY STANDARD NOTES:

1. REFER TO SHEET C11 FOR KNOX COUNTY STANDARD NOTES.



LEGEND:

——— 1022 ———	PROPOSED CONTOUR
- - - - - 1022 - - - - -	EXISTING CONTOUR
———+———	PROPOSED DIVERSION BERM
+++++	PROPOSED SILT FENCE
—————	PROPERTY LINE
(1/C2)	DETAIL REF. (DETAIL NO./SHT. NO.)
TYP.	TYPICAL



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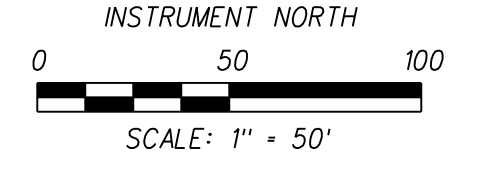
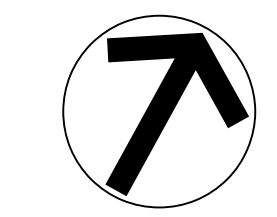
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EPSC PLAN - STAGE 1

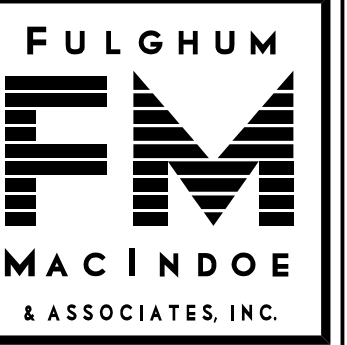
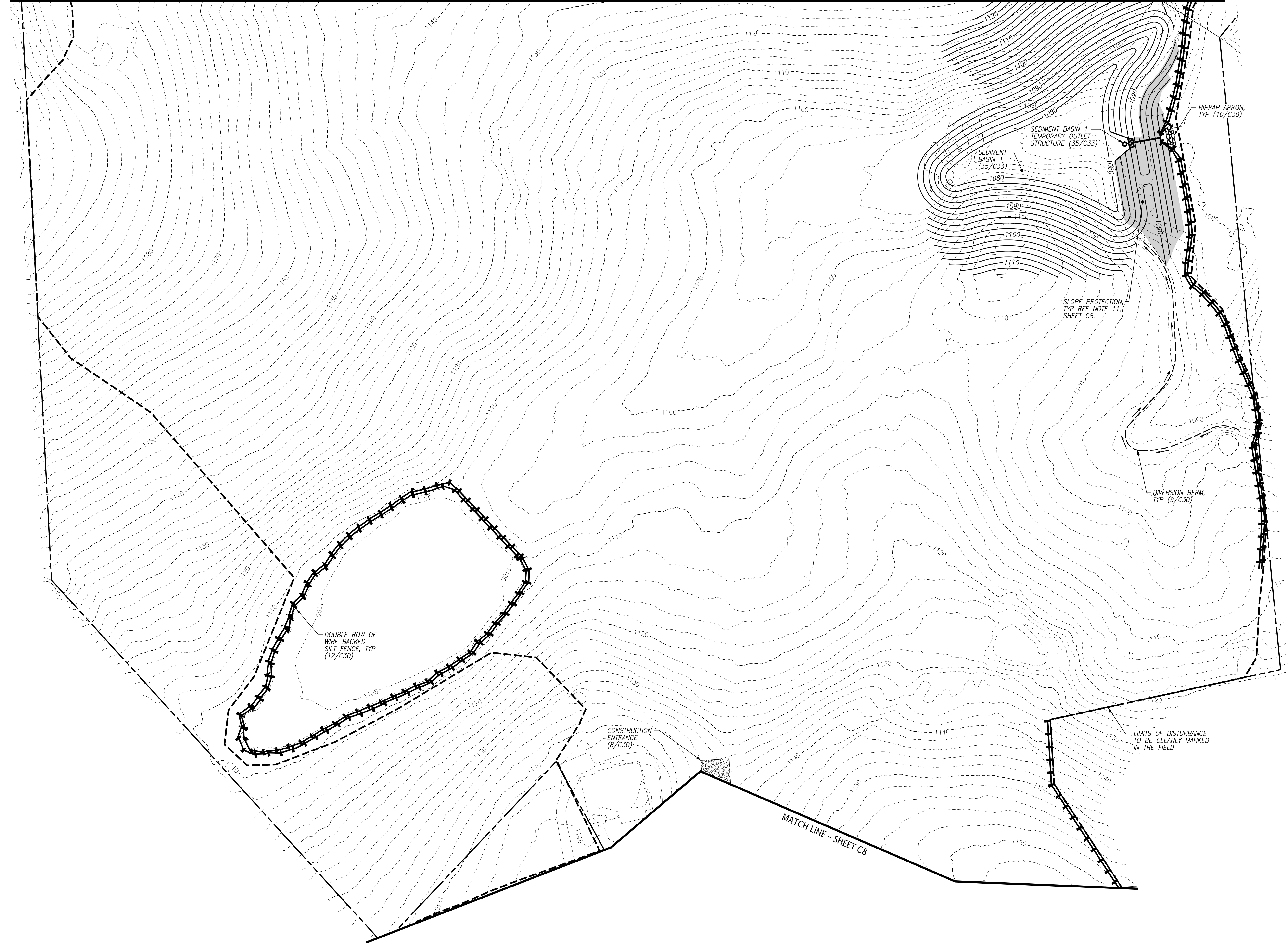
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	ISSUED FOR CONSTRUCTION		09/18/20
No.	Revision/Issue		Date

Project	Sheet
592.007	C8
Date	
09/18/20	
Scale	
1"=50'	



- EPSC NOTES:**
1. REFER TO SHEET C8 FOR EPSC NOTES, STAGE 1 SEQUENCING NOTES, AND LEGEND.
 2. REFER TO SHEET C11 FOR KNOX COUNTY STANDARD NOTES.

MATCH LINE - SHEET C10



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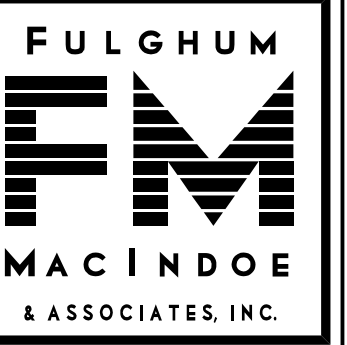
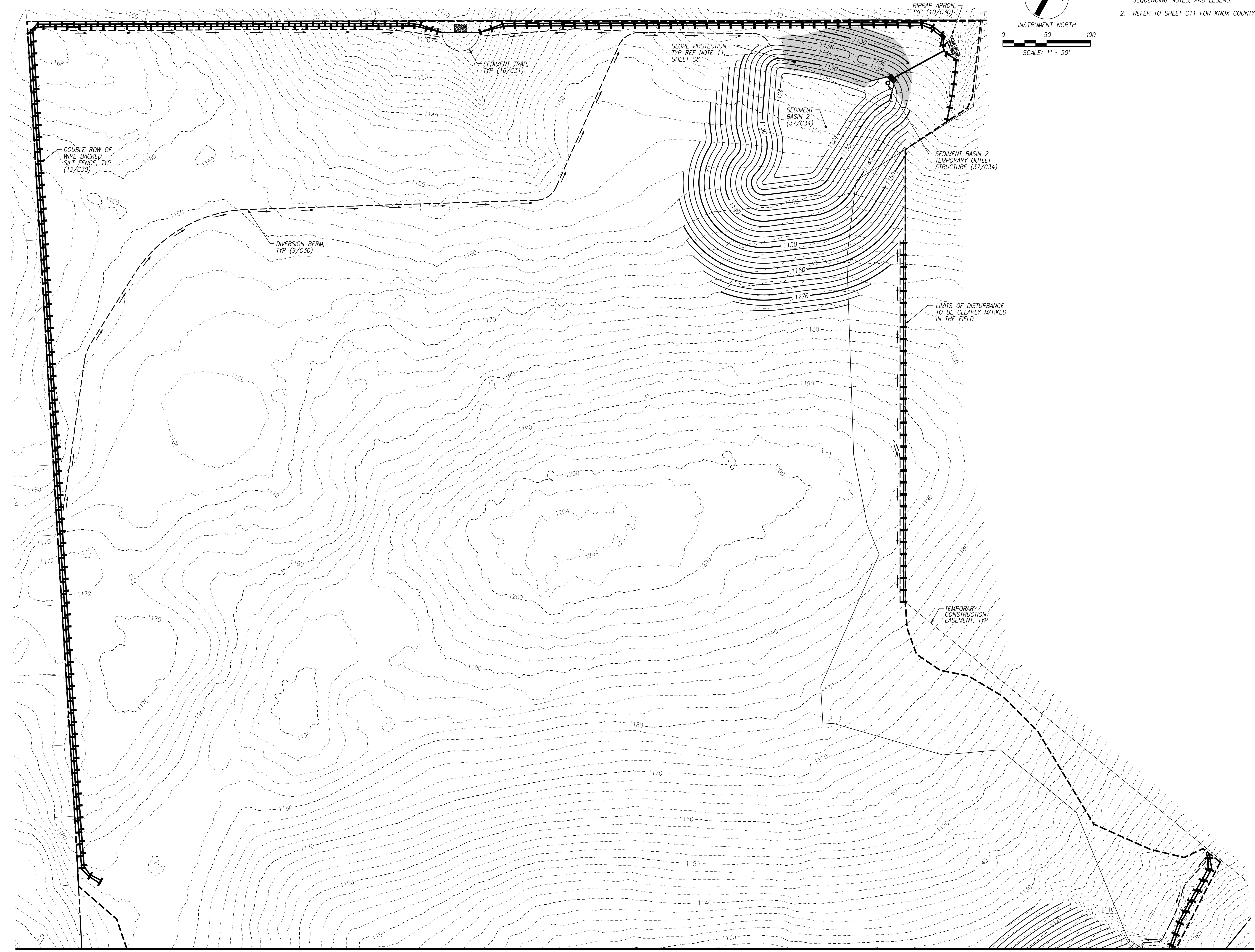
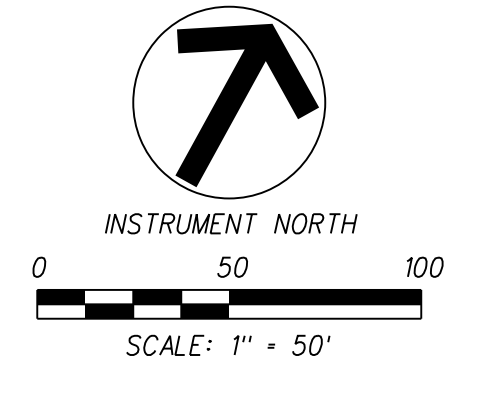
EPSC PLAN - STAGE 1

PROJ. MGR.	DESIGNED BY	DRAWN BY	Date
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	WCF		
	ISSUED FOR CONSTRUCTION		09/18/20
	Revision/Issue		

Project	Sheet
592.007	C9
Date	
09/18/20	
Scale	
1"=50'	

File Name: A:\6921\592.007\DWG\592007-009.dwg
Plot Date: 9/18/2020

- EPSC NOTES:**
1. REFER TO SHEET C8 FOR EROSION CONTROL NOTES, STAGE 1 SEQUENCING NOTES, AND LEGEND.
 2. REFER TO SHEET C11 FOR KNOX COUNTY STANDARD NOTES.



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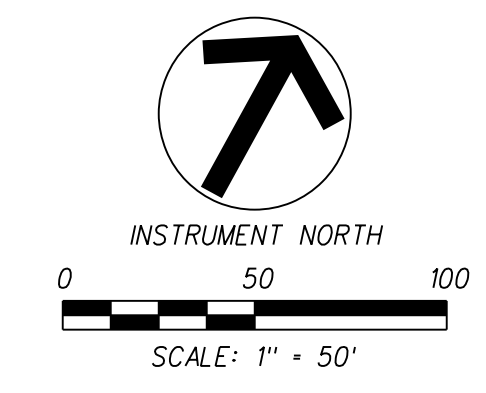
EPSC PLAN - STAGE 1

PROJ. MGR.	DESIGNED BY	DRAWN BY	Date
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	WCF		
	ISSUED FOR CONSTRUCTION		09/18/20
	Revision/Issue		

Project 592.007
Date 09/18/20
Scale 1"=50'

Sheet **C10**

File Name: A:\6921\592.007\DWG\592007C10.dwg
Plot Date: 9/18/2020



KNOX COUNTY STANDARD EPSC NOTES:

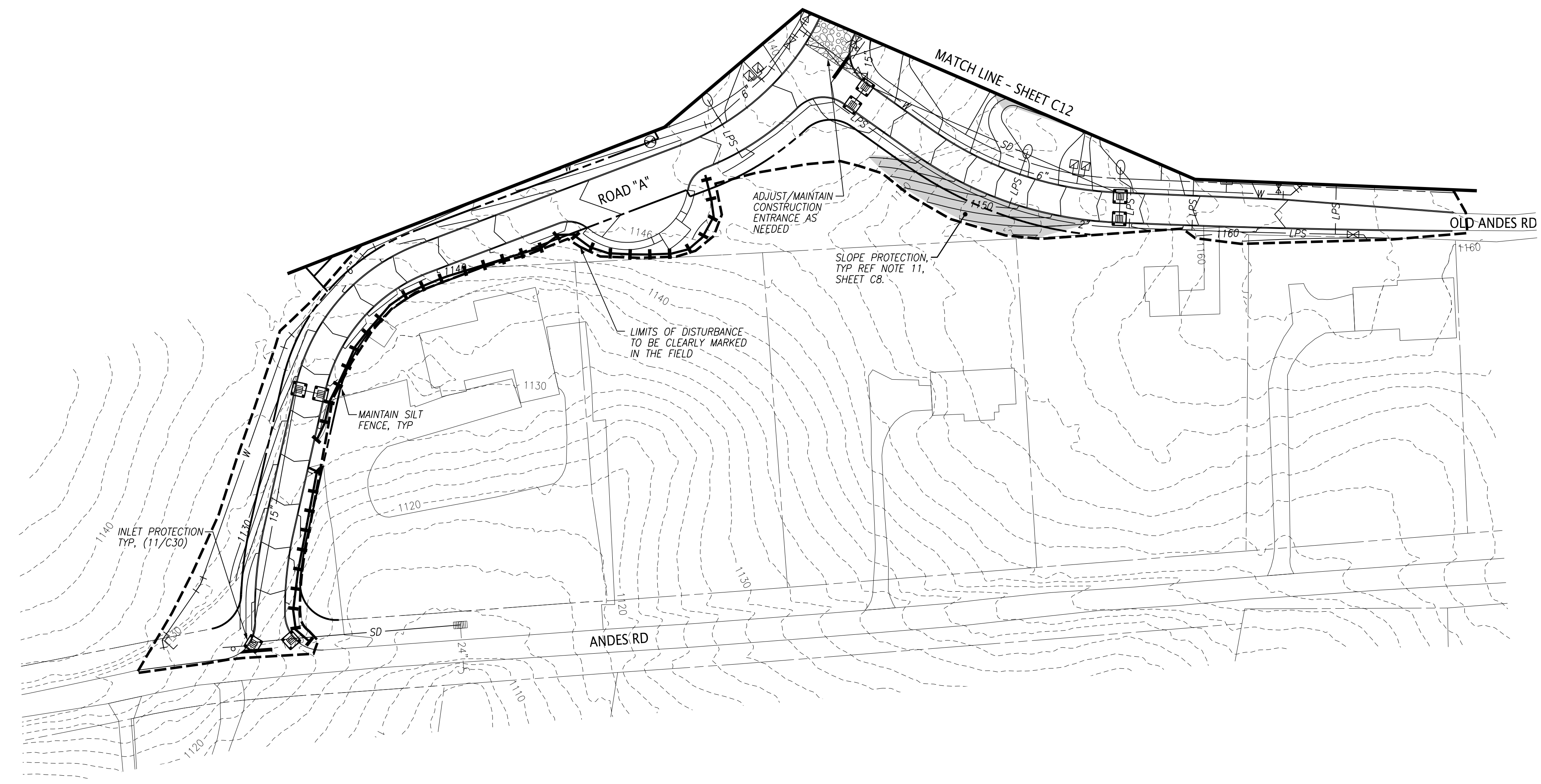
1. THIS SITE IS A PRIORITY CONSTRUCTION ACTIVITY.
2. ADEQUATE DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES, BEST MANAGEMENT PRACTICES, AND/OR OTHER STORMWATER MANAGEMENT FACILITIES SHALL BE PROVIDED & MAINTAINED AT ALL TIMES DURING CONSTRUCTION. DAMAGES TO ADJACENT PROPERTY AND/OR THE CONSTRUCTION SITE CAUSED BY THE CONTRACTOR'S FAILURE TO PROVIDE AND MAINTAIN ADEQUATE DRAINAGE AND EROSION/SEDIMENT CONTROL FOR THE CONSTRUCTION AREA SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. QUALITY ASSURANCE OF EROSION PREVENTION AND SEDIMENT CONTROLS SHALL BE CONDUCTED BY QUALIFIED PERSONNEL PERFORMING SITE ASSESSMENT AT EACH OUTFALL INVOLVING DRAINAGE TOTALING 10 OR MORE ACRES, OR FIVE OR MORE ACRES IF DRAINING TO IMPAIRED OR EXCEPTIONAL WATERS. THIS ASSESSMENT WILL BE CONDUCTED AT EACH QUALIFYING OUTFALL WITHIN A MONTH OF CONSTRUCTION COMMENCEMENT. (SEE CGP SEC. 3.1.2 FOR ASSESSMENT LANGUAGE)
4. FUGITIVE SEDIMENT THAT HAS ESCAPED THE CONSTRUCTION SITE MUST BE REMOVED SO THAT IT IS NOT SUBSEQUENTLY WASHED INTO STORM SEWERS AND/OR STREAMS BY THE NEXT RAIN AND/OR SO THAT IT DOES NOT POSE A SAFETY HAZARD TO USERS OF PUBLIC STREETS. ARRANGEMENTS CONCERNING REMOVAL OF SEDIMENT ON ADJOINING PROPERTY MUST BE SETTLED BY THE PERMITTED AND THE ADJOINING LAND OWNER.
5. SEDIMENT SHOULD BE REMOVED FROM SEDIMENT TRAPS, SILT FENCES, SEDIMENTATION PONDS, OTHER SEDIMENT CONTROLS WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50%.
6. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PICKED UP PRIOR TO ANTICIPATED STORM EVENTS OR BEFORE BEING CARRIED OFF THE SITE BY WIND, OR OTHERWISE PREVENTED FROM BECOMING A POLLUTION SOURCE FOR STORMWATER DISCHARGES.
7. PRECONSTRUCTION VEGETATIVE GROUND COVER SHALL NOT BE DESTROYED, REMOVED, OR DISTURBED MORE THAN 14 DAYS PRIOR TO GRADING OR EARTH MOVING UNLESS THE AREA IS SEEDED AND/OR MULCHED OR OTHER TEMPORARY COVER IS INSTALLED.
8. EXISTING VEGETATION SHOULD BE PRESERVED TO THE MAXIMUM EXTENT PRACTICABLE.
9. TEMPORARY OR PERMANENT SOIL STABILIZATION MUST BE COMPLETED NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS PERMANENTLY OR TEMPORARILY CEASED. STEEP SLOPES (>35%) MUST BE PERMANENTLY OR TEMPORARILY STABILIZED WITHIN 7 DAYS.
10. SITE INSPECTIONS SHALL BE PERFORMED AT LEAST TWICE WEEKLY AT A MINIMUM OF 72 HOURS APART ON ALL UNSTABILIZED SITES.

EPSC - STAGE 2 SEQUENCING NOTES:

1. MAINTAIN STAGE 1 CONSTRUCTION ENTRANCE/EXIT & OTHER EPSC DEVICES.
2. INSTALL, ADJUST, AND MAINTAIN STAGE 2 EROSION & SEDIMENT CONTROLS AS SHOWN ON THIS PLAN INCLUDING INSTALLATION OF OTHER BMP'S NEEDED TO MEET TDEC'S PERFORMANCE REQUIREMENTS. THESE BMP'S MAY INCLUDE SEDIMENT TRAPS, DIVERSION BERMS, SLOPE DRAINS, ETC.
3. CLEAR AND GRUB THE AREA WITHIN THE LIMITS OF DISTURBANCE.
4. BEGIN MASS GRADING, STORMWATER SYSTEM, & UTILITY CONSTRUCTION.
5. INSTALL INLET PROTECTION & SLOPE PROTECTION AS DESCRIBED ON THIS PLAN.
6. ONCE SUBGRADES ARE ACHIEVED APPLY TOPSOIL, SEEDING, MULCH, OR OTHER PROTECTION TO THE DISTURBED AREAS AS SHOWN ON THIS PLAN.

EPSC NOTES:

1. REFER TO SHEET C8 FOR EROSION CONTROL NOTES.

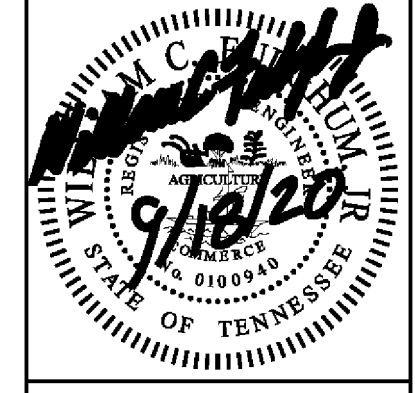


LEGEND:

	PROPOSED DITCH PROTECTION
	PROPOSED SLOPE PROTECTION
	PROPOSED REFORESTATION
	PROPOSED PROPERTY LINE
	PROPOSED SILT FENCE
	LIMITS OF DISTURBANCE
	PROPOSED DIVERSION BERM
	TEMPORARY INLET PROTECTION
	TEMPORARY ROCK CHECK DAM
	DETAIL REF. (DETAIL NO./SHT. NO.)
	TYP. TYPICAL



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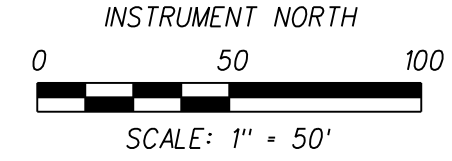
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CONTACT: MR. D. RAY BALL, JR.
TELEPHONE NO.: 859.268.1191

EPSC PLAN - STAGE 2

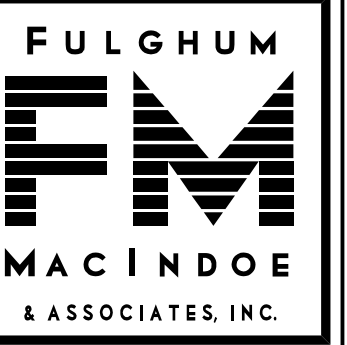
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DESIGNED BY	CHG
DRAWN BY	HNU
ISSUED FOR CONSTRUCTION	09/18/20
Revision/Issue	No.

Project	592.007	Sheet	C11
Date	09/18/20		
Scale	1"=50'		

File Name: A:\6901\592.007\DWG\592007C011.dwg
Plot Date: 9/18/2020



- EPSC NOTES:**
1. REFER TO SHEET C8 FOR EROSION CONTROL NOTES.
 2. REFER TO SHEET C11 FOR KNOX COUNTY STANDARD NOTES, STAGE 2 SEQUENCING NOTES, AND LEGEND.



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EPSC PLAN - STAGE 2

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	MCF		
	ISSUED FOR CONSTRUCTION		09/18/20
	Revision/Issue		

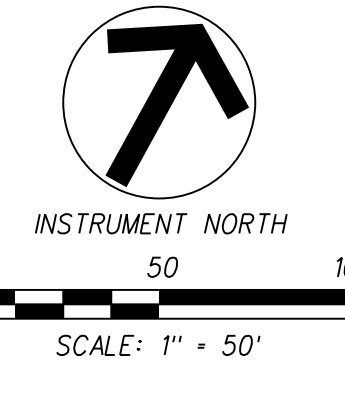
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592.007	C12
Date	
09/18/20	
Scale	
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MATCH LINE - SHEET C13

MATCH LINE - SHEET C11



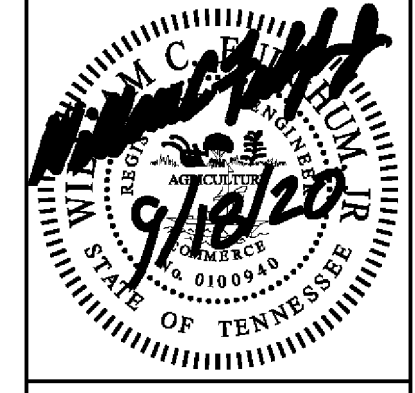
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- EPSC NOTES:**
1. REFER TO SHEET C8 FOR EROSION CONTROL NOTES.
 2. REFER TO SHEET C11 FOR KNOX COUNTY STANDARD NOTES, STAGE 2 SEQUENCING NOTES, AND LEGEND.



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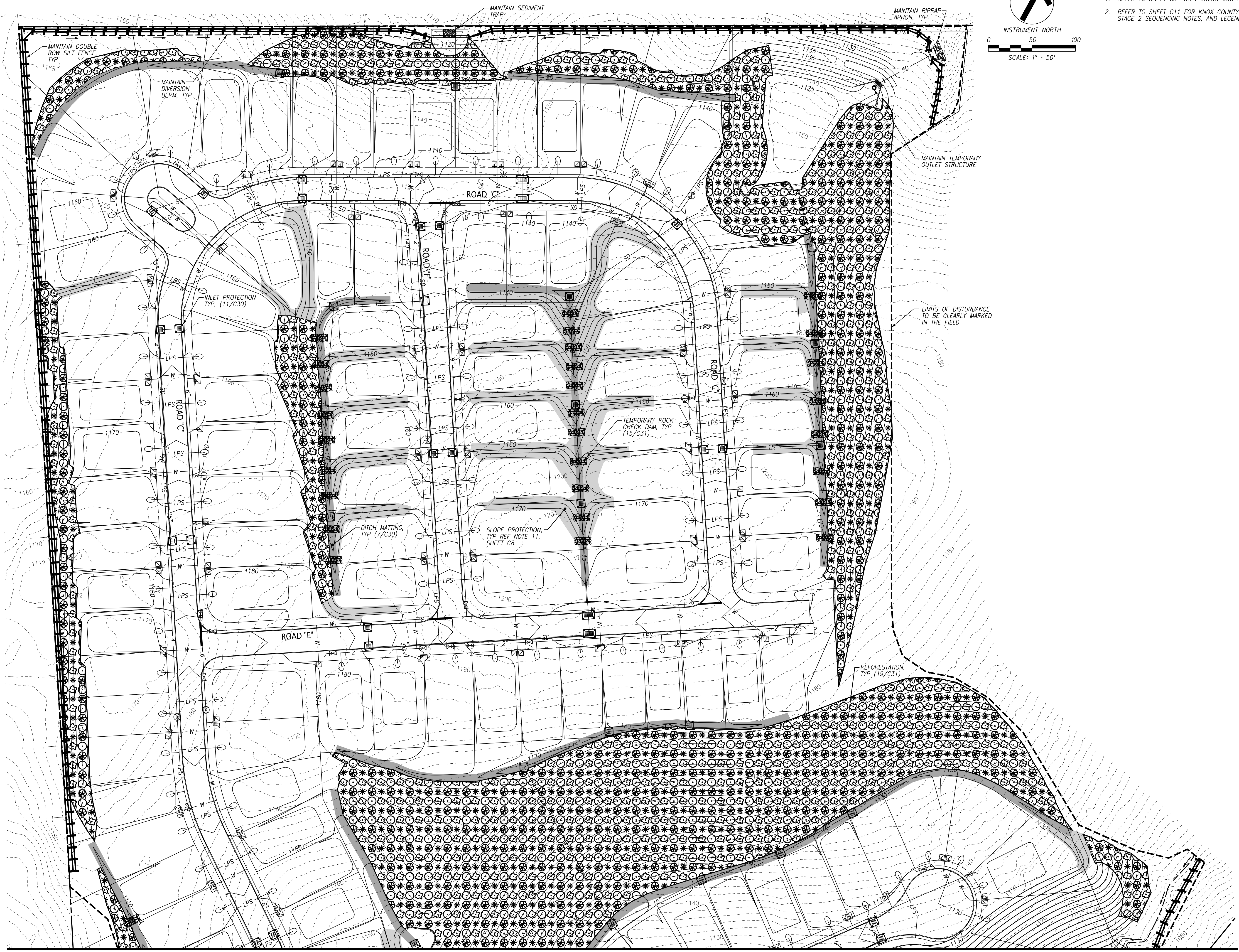
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EPSC PLAN - STAGE 2

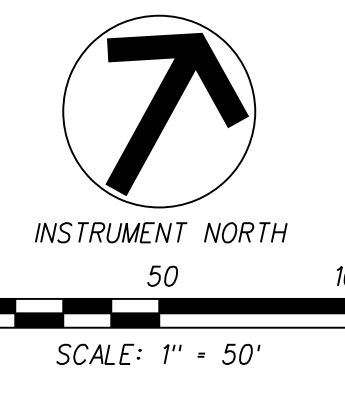
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	WCF		
	ISSUED FOR CONSTRUCTION		09/18/20
No.	Revision/Issue		Date

Project	Sheet
592.007	C13
Date	
09/18/20	
Scale	
1"=50'	



MATCH LINE - SHEET C12

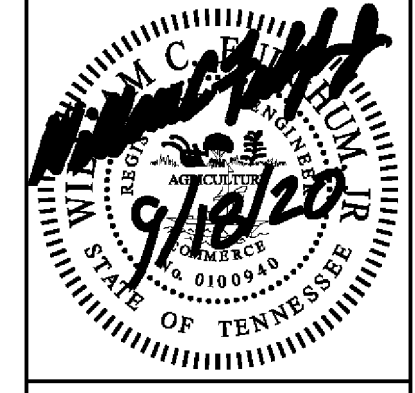
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- EPSC NOTES:**
1. REFER TO SHEET C8 FOR EROSION CONTROL NOTES.
 2. REFER TO SHEET C11 FOR KNOX COUNTY STANDARD NOTES.
 3. REFER TO SHEET C14 FOR STAGE 3 SEQUENCING NOTES AND LEGEND.



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EPSC PLAN - STAGE 3

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	MCF		
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No.	Revision/Issue		

Project	Sheet
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Date	
09/18/20	
Scale	
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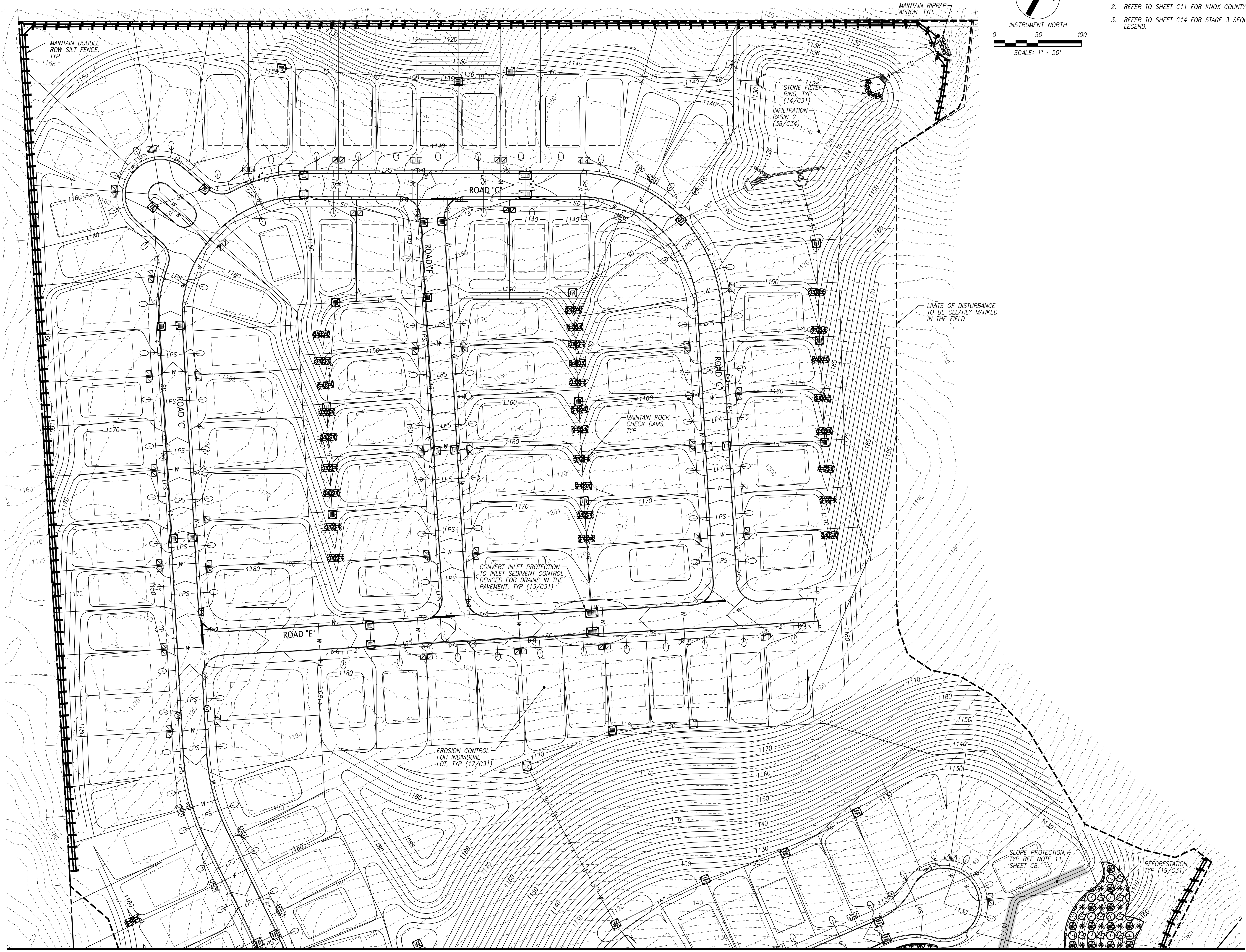
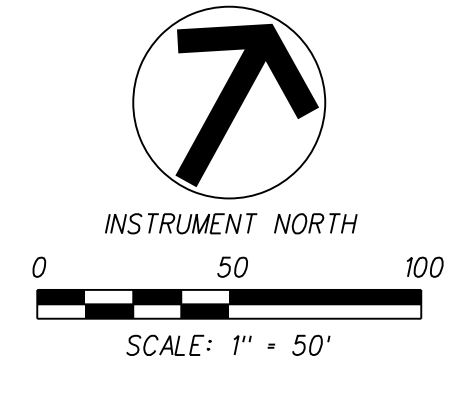
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MATCH LINE - SHEET C14



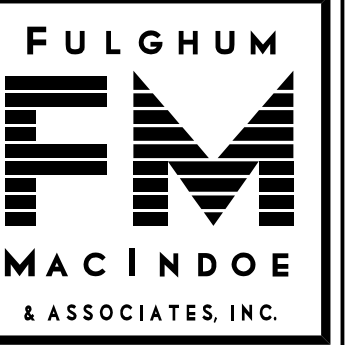
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- EPSC NOTES:**
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 2. REFER TO SHEET C11 FOR KNOX COUNTY STANDARD NOTES.
 3. REFER TO SHEET C14 FOR STAGE 3 SEQUENCING NOTES AND LEGEND.



File Name: A:\6091\6091_0071\6091\6091.dwg
 Plot Date: 9/18/2020

MATCH LINE - SHEET C15



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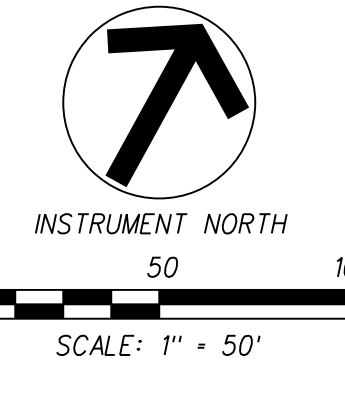


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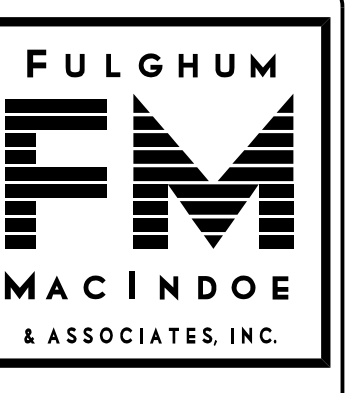
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EPSC PLAN - STAGE 3

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	WCF		
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No.			
Project	Sheet		
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Date	Scale		
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STORM PIPE NOTES:
 1. REFER TO SHEET C17 FOR STORM PIPE NOTES AND LEGEND.



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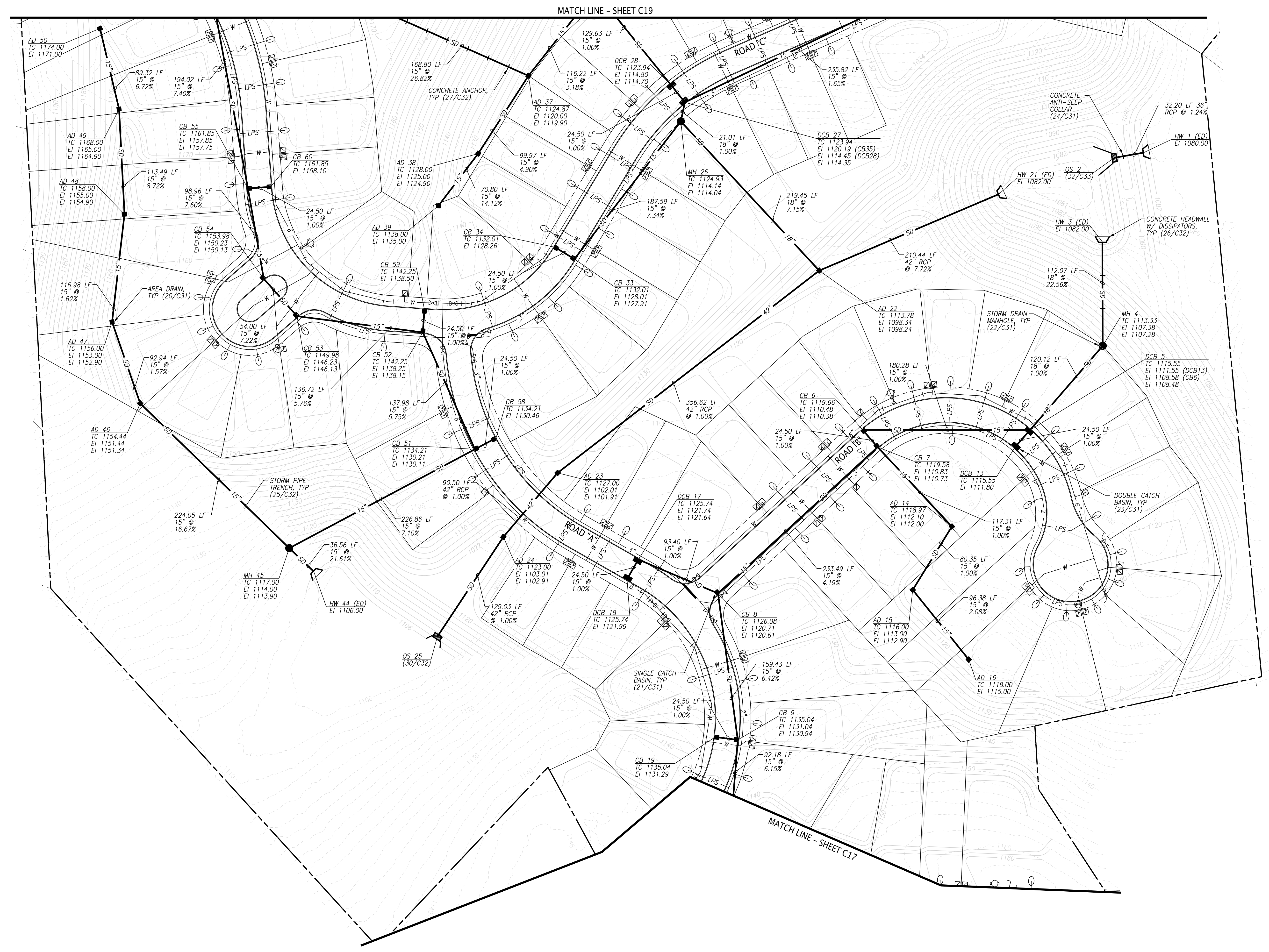
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STORM DRAINAGE PLAN

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	WCF		
	ISSUED FOR CONSTRUCTION		09/18/20
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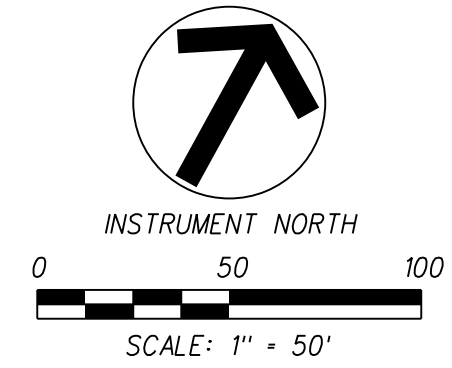
Project	Sheet
592.007	C18
Date	Scale
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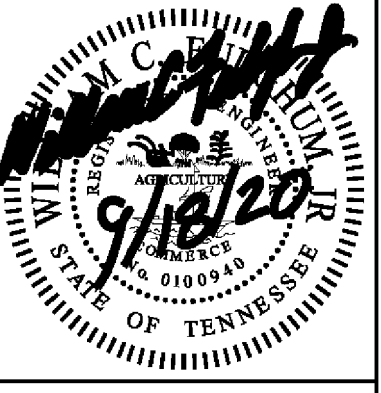
STORM PIPE NOTES:
1. REFER TO SHEET C17 FOR STORM PIPE NOTES AND LEGEND.



MATCH LINE - SHEET C18



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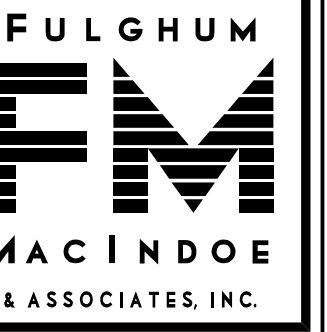
STORM PLAN

PROJ. MGR.	DESIGNED BY	DRAWN BY	Date
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Project 592.007
Date 09/18/20
Scale 1"=50'
Sheet **C19**

File Name: A:\6971582\0071\DWG\1592003\019.dwg
Plot Date: 9/18/2020

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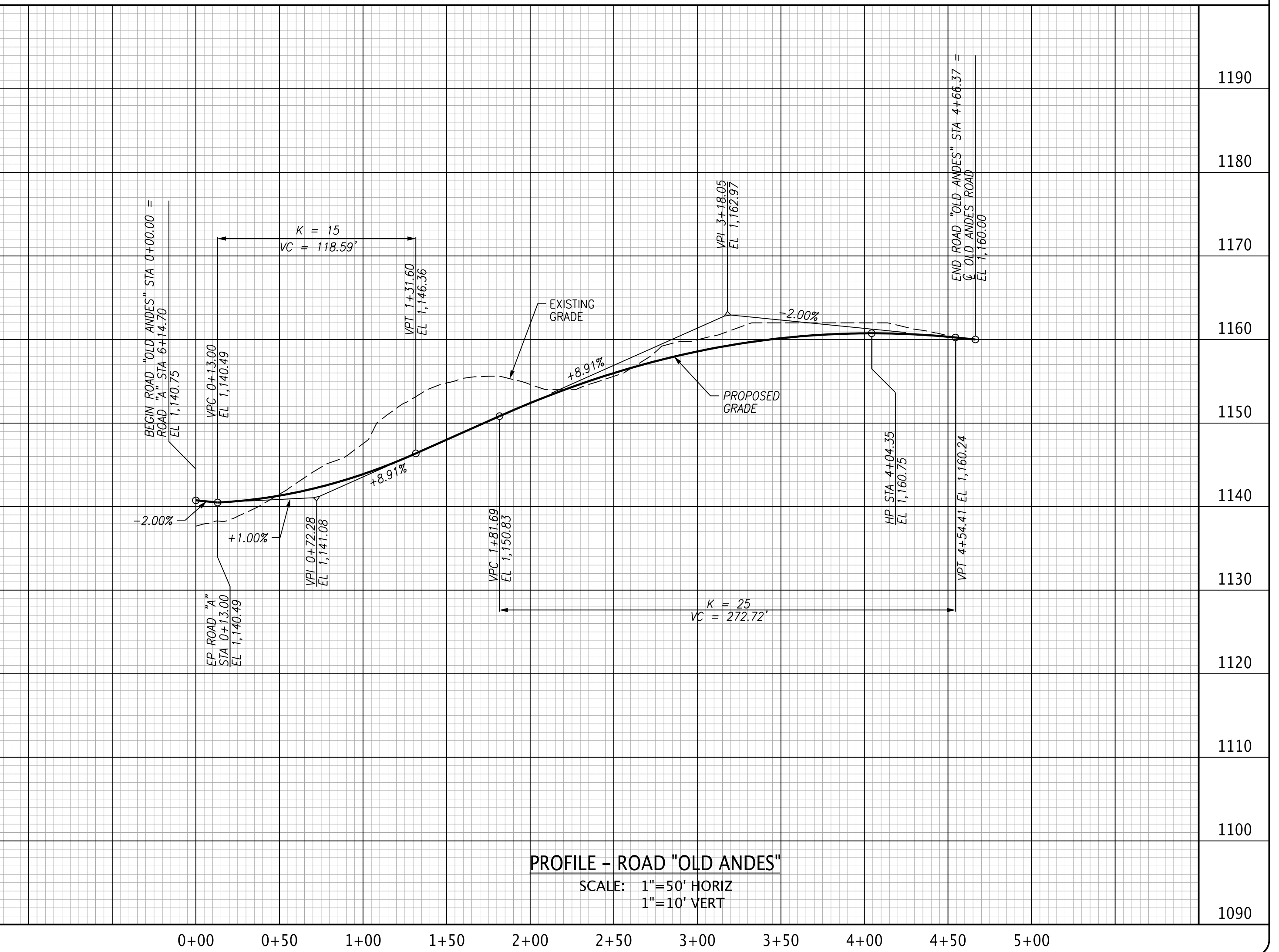
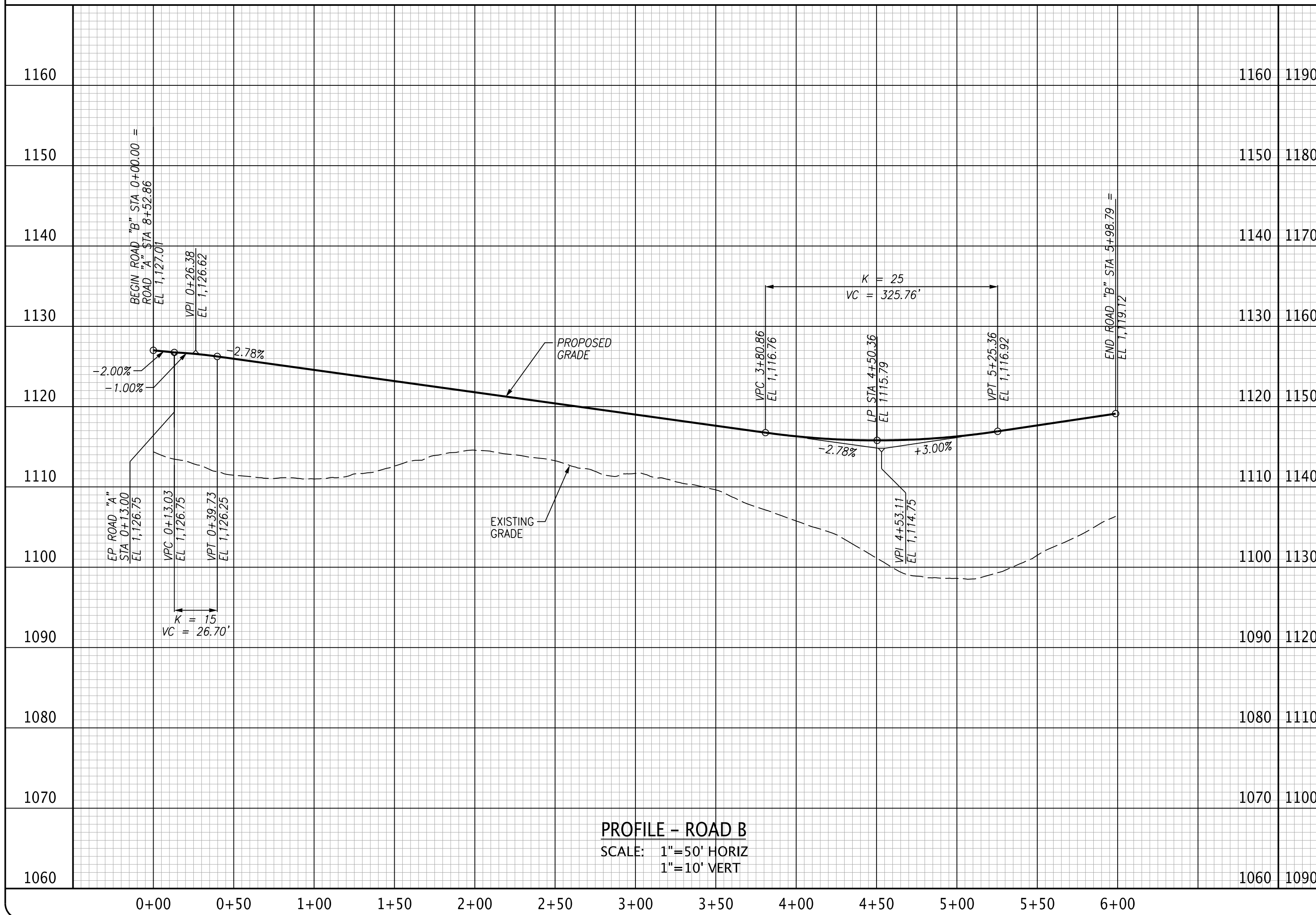
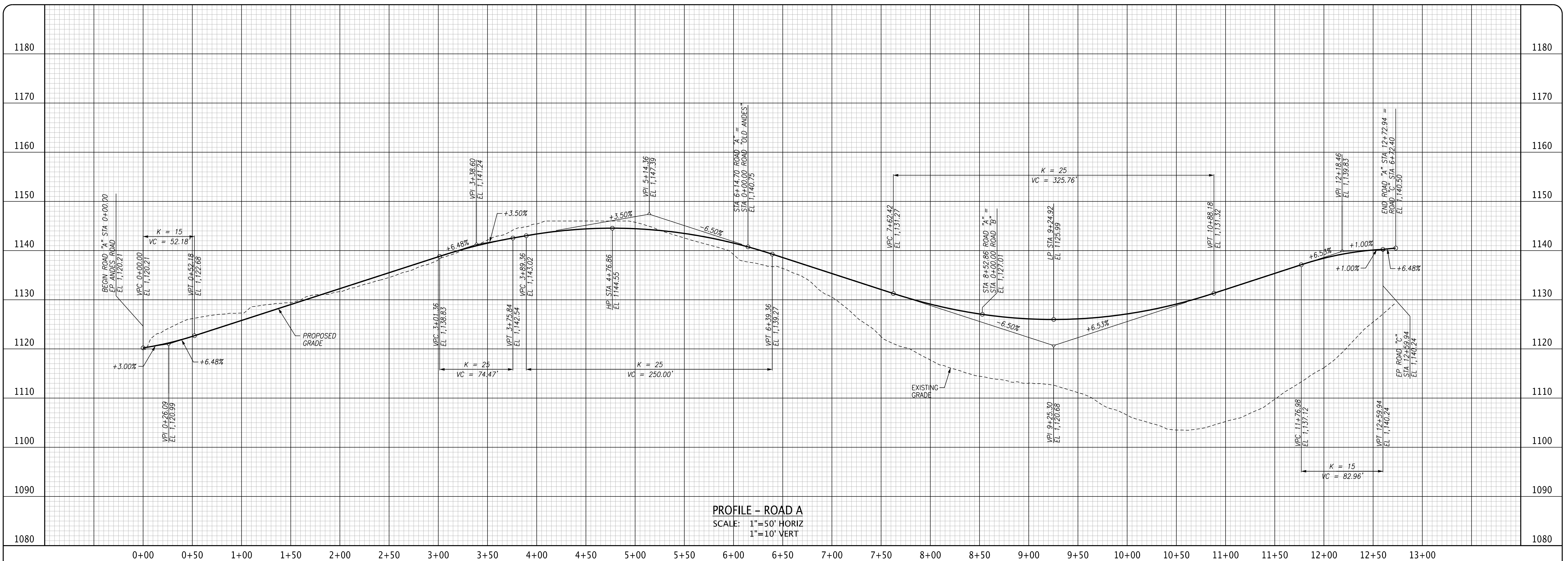
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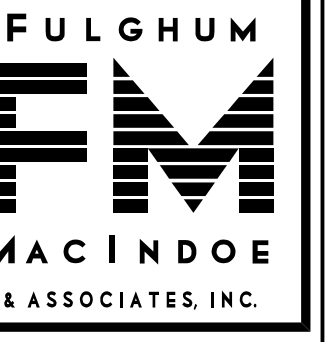
ROAD PROFILES

PROJ. MGR.	DESIGNED BY	DRAWN BY	Date
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	WCF		
	ISSUED FOR CONSTRUCTION		09/18/20
	Revision/Issue		

Project	592.007	Sheet	C27
Date	09/18/20		
Scale	NOTED		



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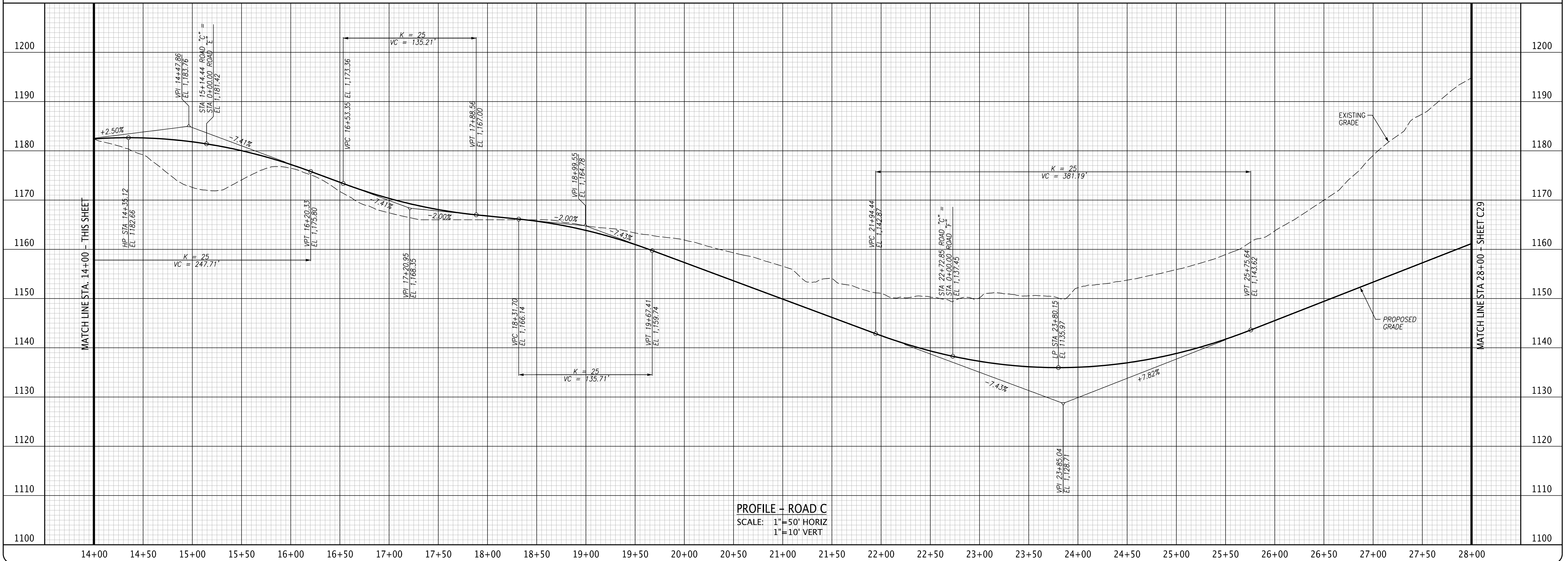
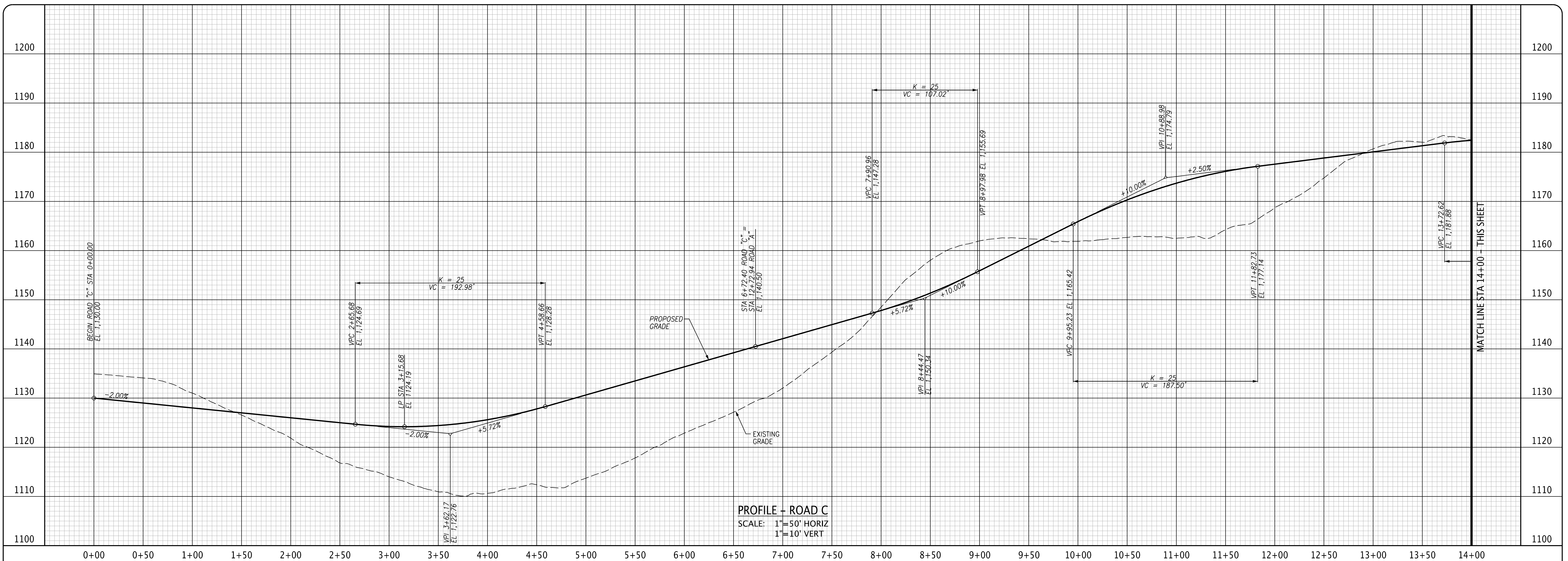
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ROAD PROFILES

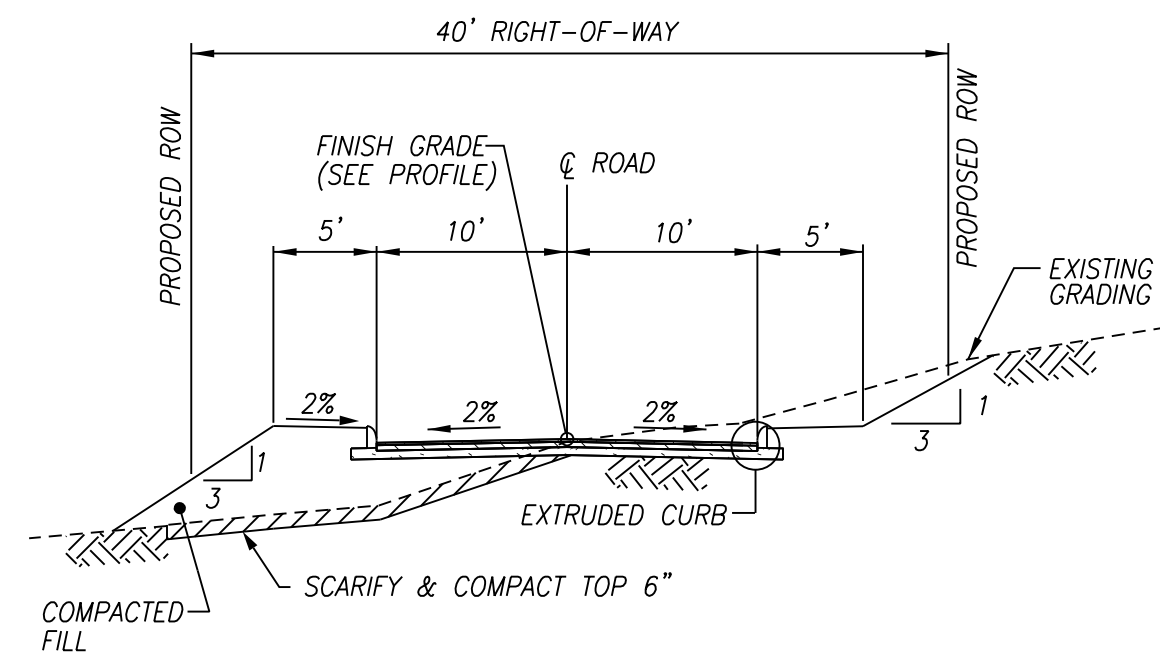
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ISSUED FOR CONSTRUCTION	09/18/20
REVISION/ISSUE	Date

Project 592.007
Date 09/18/20
Scale NOTED
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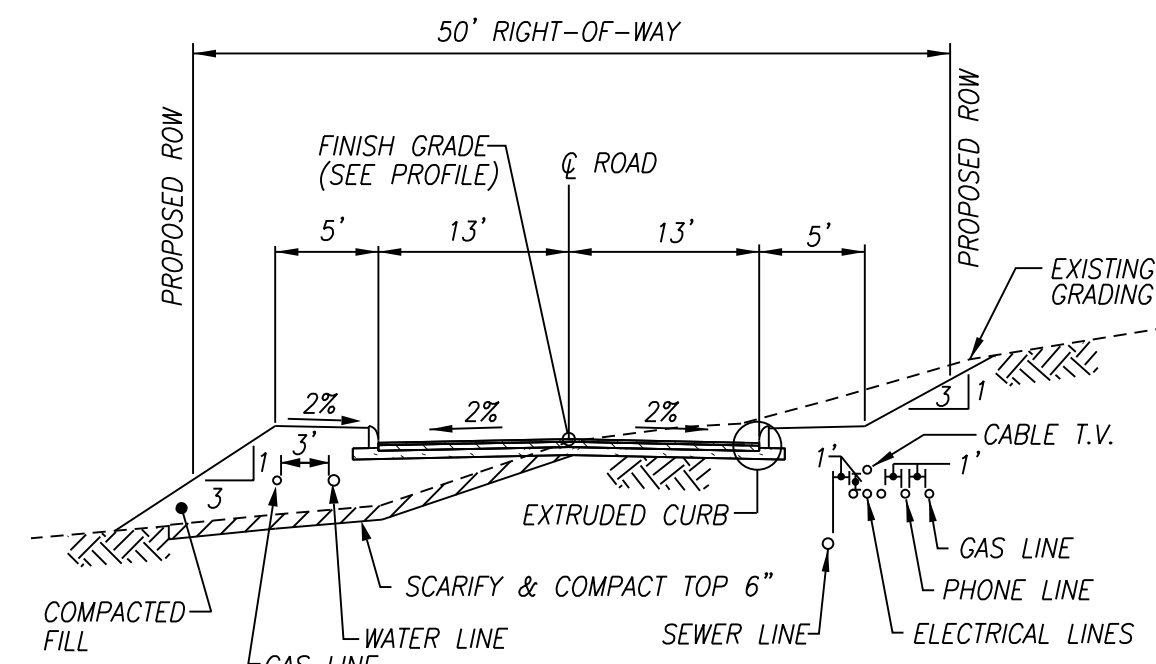
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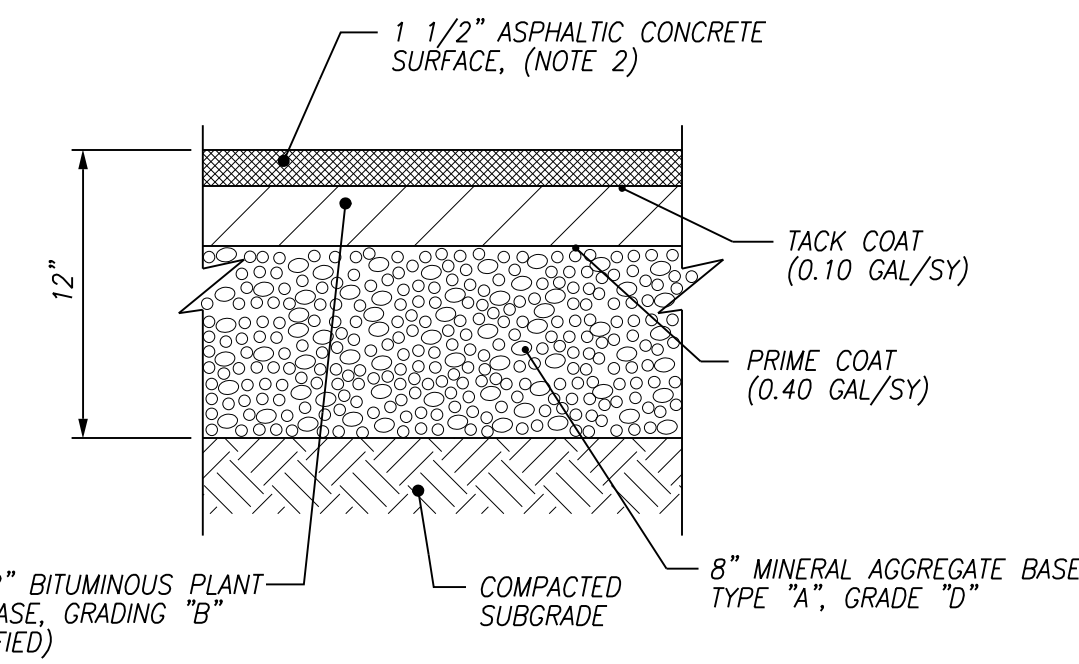
NOTE:
1. UTILITY LOCATIONS MAY VARY. REFERENCE UTILITY PLANS FOR LOCATIONS

1 TYPICAL 20' ROAD SECTION
C30 NTS



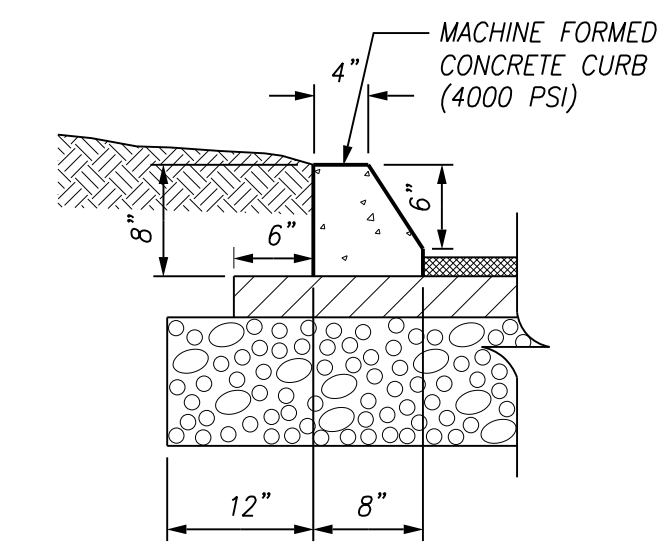
NOTE:
1. UTILITY LOCATIONS MAY VARY. REFERENCE UTILITY PLANS FOR LOCATIONS

2 TYPICAL 26' ROAD SECTION
C30 NTS



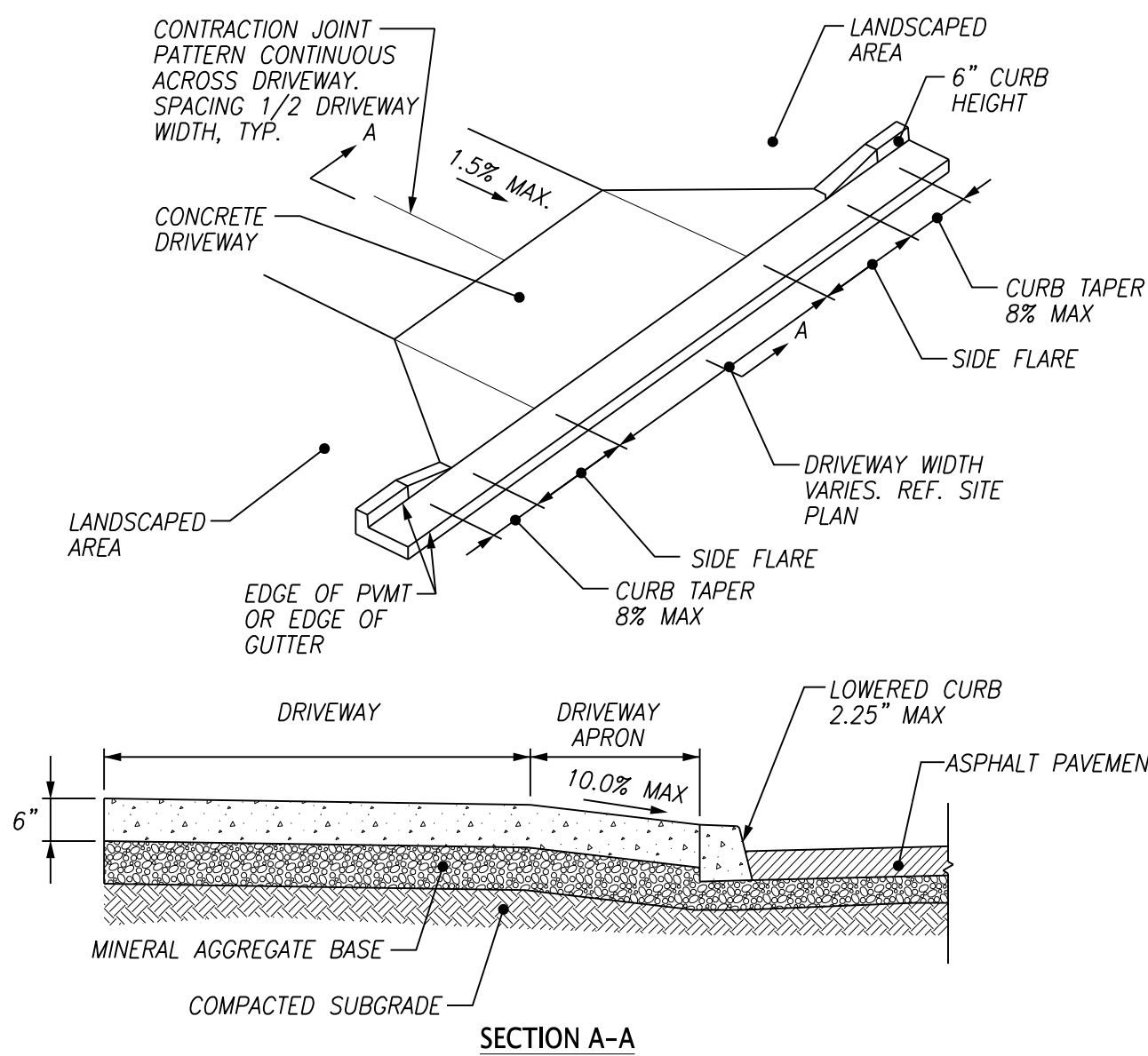
NOTE:
1. PAVEMENT HAS NOT BEEN DESIGNED FOR CONSTRUCTION TRAFFIC/ACTIVITIES. USE OF THESE SURFACES FOR CONSTRUCTION ACTIVITIES SHALL BE DONE AT THE CONTRACTOR'S CONVENIENCE AND RISK. DAMAGE TO PAVEMENT RESULTING FROM THESE ACTIVITIES SHALL BE REPAIRED IN CONFORMANCE WITH THE INITIAL PAVEMENT SPECIFICATIONS.
2. ASPHALTIC CONCRETE SURFACE COURSE SHALL BE GRADE "E" MIX FOR ROADS WITH A SLOPE LESS THAN OR EQUAL TO 10%; FOR SLOPES GREATER, USE GRADE "D" MIX.

3 ASPHALT PAVEMENT SECTION
C30 NTS



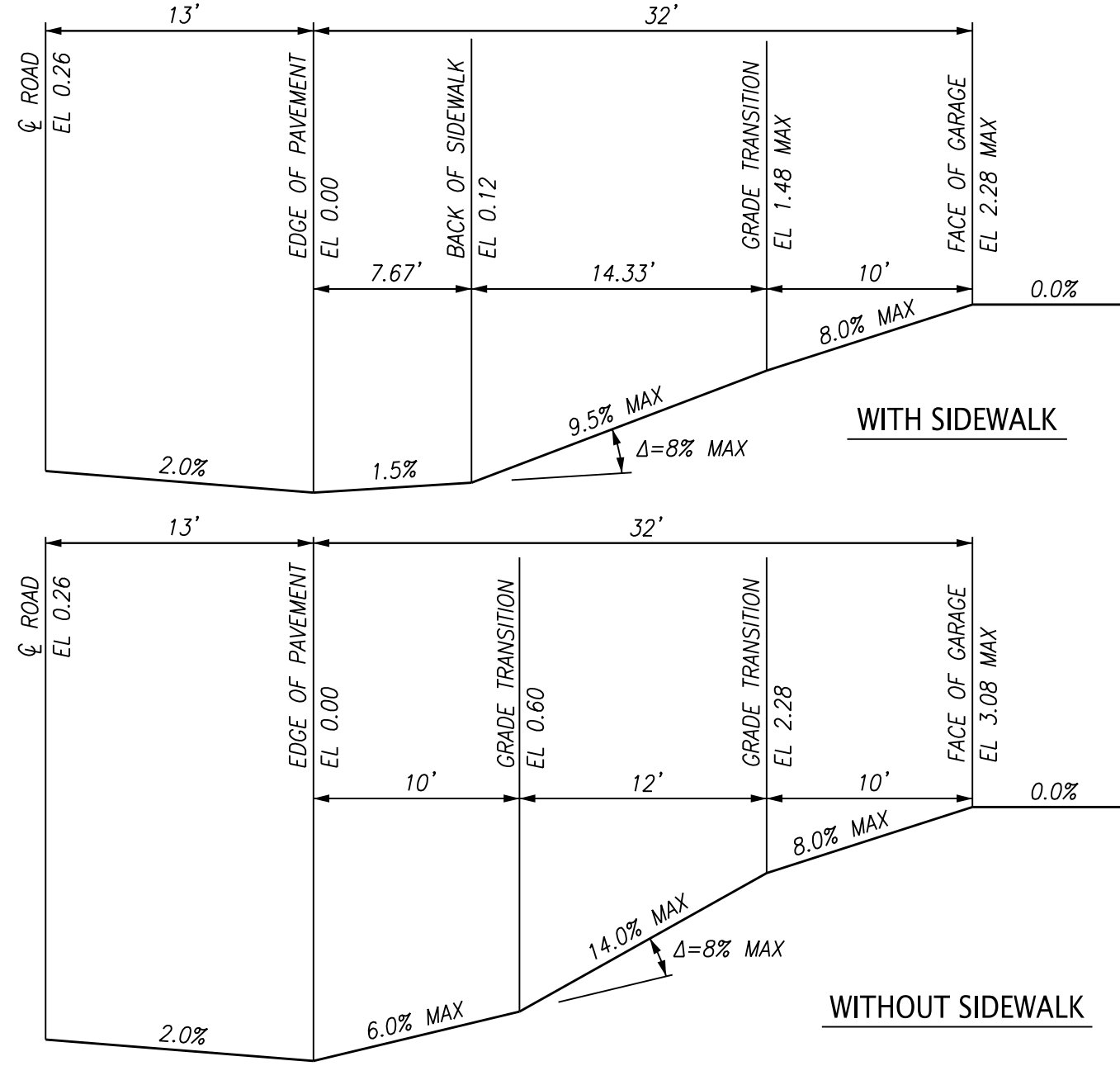
NOTES:
1. PREFORMED 1/2" EXPANSION JOINTS SHALL BE EQUALLY SPACED AT 25' MAXIMUM CENTERS. EQUALLY SPACE 1/4" CONTRACTION JOINTS AT 5' MAXIMUM CENTERS BETWEEN EXPANSION JOINTS.
2. EXPANSION JOINT MATERIAL REQUIRED FOR GRASS MEDIANS.
3. EXACT CURB DIMENSIONS MAY BE ALTERED SLIGHTLY TO FIT STANDARD EXTRUDED CURB MACHINES, BUT SUCH VARIANCES MUST BE APPROVED BY THE ENGINEER.
4. IMMEDIATELY AFTER THE CONCRETE HAS SUFFICIENTLY SET, BACKFILL BEHIND CURBS TO PREVENT PONDING OF SURFACE WATER.

4 EXTRUDED CURB
C30 NTS

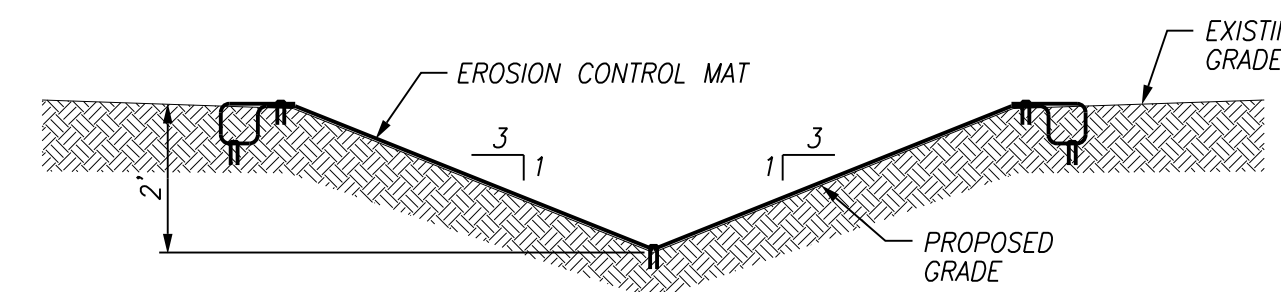


NOTE:
1. REF. TDOT STANDARD DRAWING RP-D-15.

5 CONCRETE DRIVEWAY - TDOT TYPE "A"
C30 NTS



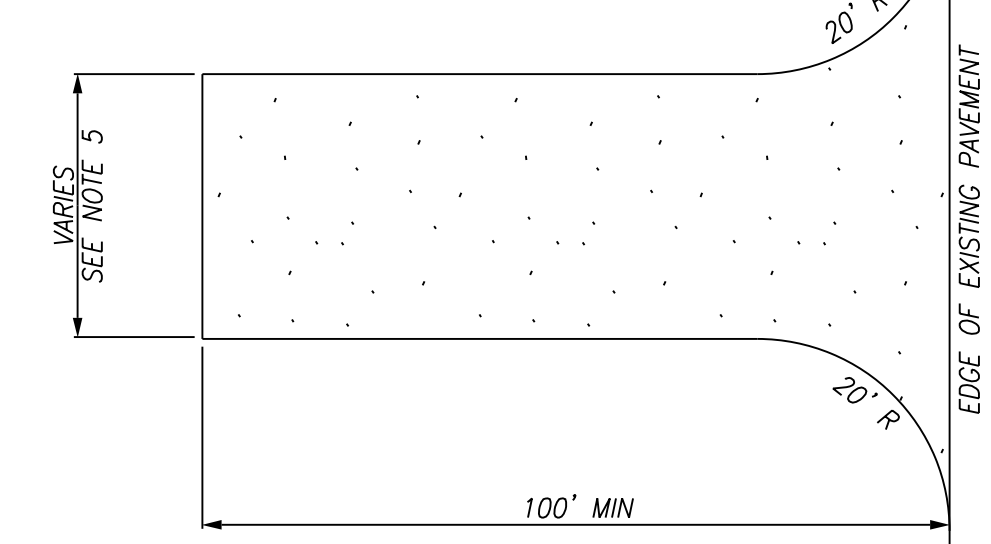
6 TYPICAL DRIVEWAY PROFILE
C30 NTS



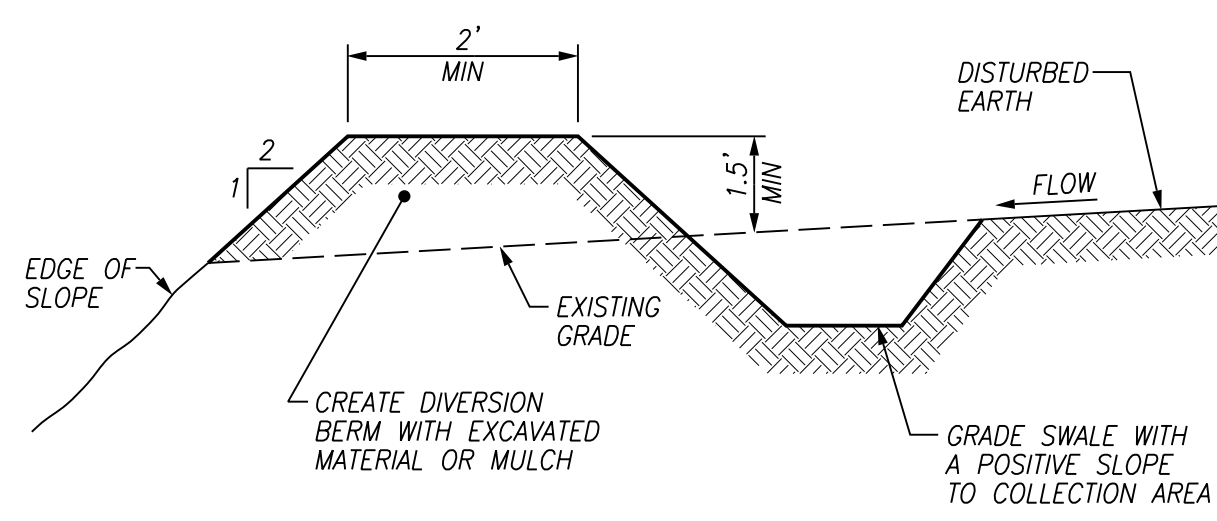
NOTES:
1. EROSION CONTROL MAT SHALL BE WESTERN EXCELSIOR EXCEL PPS-12 OR EQUAL AND INSTALLED PER THE MANUFACTURER'S SPECIFICATIONS.

7 TYPICAL DITCH SECTION
C30 NTS

NOTES:
1. THE PURPOSE OF THE STABILIZED CONSTRUCTION ENTRANCE IS TO AID THE CONTRACTOR IN ELIMINATING TRACKING OF MUD ONTO PUBLIC STREETS. THE DETAIL DOES NOT LIMIT THIS RESPONSIBILITY. OTHER METHODS OF SEDIMENT REMOVAL SHALL BE IMPLEMENTED IF THIS DOES NOT ADEQUATELY REMOVE THE MUD.
2. CONSTRUCT THE PAD WITH A 6" (MIN) THICKNESS OF 2" TO 3" CRUSHED STONE UNDERLAY STONE WITH PROPEX 315ST WOVEN GEOTEXTILE OR EQUAL FABRIC TO MEET OR EXCEED AASHTO M288, CLASS 1 STANDARDS.
3. ADD CRUSHED STONE TO THE PAD AS NECESSARY TO MAINTAIN THE PROPER FUNCTIONING OF THE PAD.
4. LOCATION TO BE COORDINATED WITH THE OWNER.
5. WIDTH SHALL BE 20 FEET FOR ONE-WAY TRAFFIC AND 30 FEET FOR TWO-WAY.
6. REMOVE GRAVEL MATERIAL AND FILTER FABRIC AT COMPLETION OF CONSTRUCTION, OR AS PAVED SURFACES ARE FINISHED.



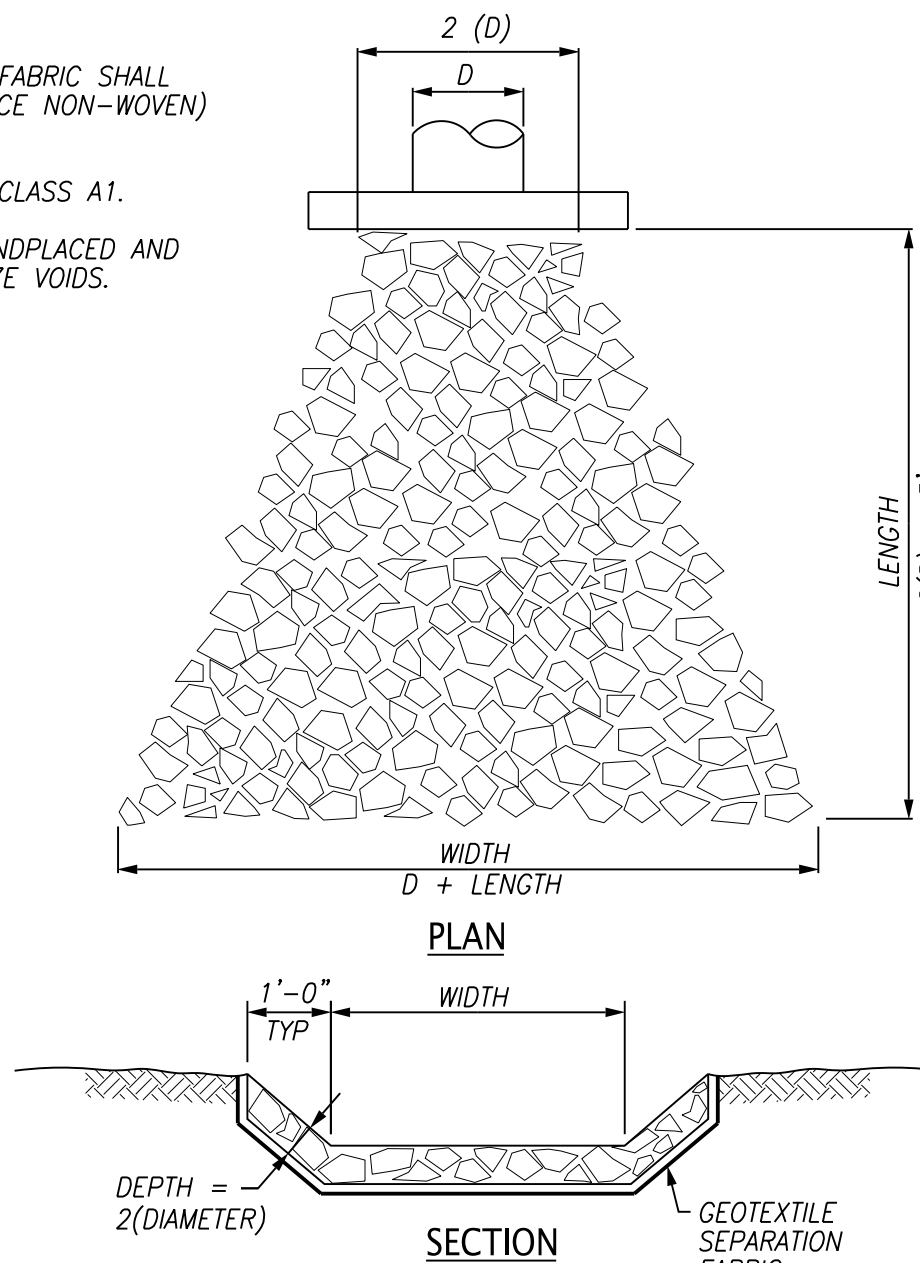
8 CONSTRUCTION ENTRANCE
C30 NTS



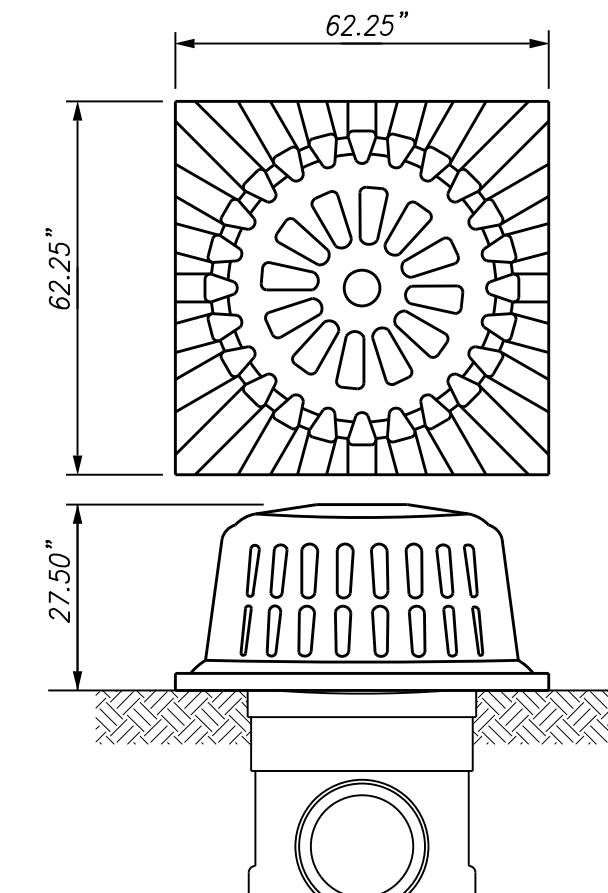
NOTES:
1. PROVIDE SLOPE DRAIN AS NECESSARY TO CONVEY RUNOFF TO A STABILIZED OUTLET.
2. PIPE DIAMETER SHALL CONFORM TO TDEC REQUIREMENTS.

9 DIVERSION BERM
C30 NTS

NOTES:
1. GEOTEXTILE SEPARATION FABRIC SHALL BE GEOTEX 861 (8 OUNCE NON-WOVEN) BY PROPEX OR EQUAL.
2. RIPRAP SHALL BE TDOT CLASS A1.
3. ALL ROCK SHALL BE HANDPLACED AND IN A MANNER TO MINIMIZE VOIDS.

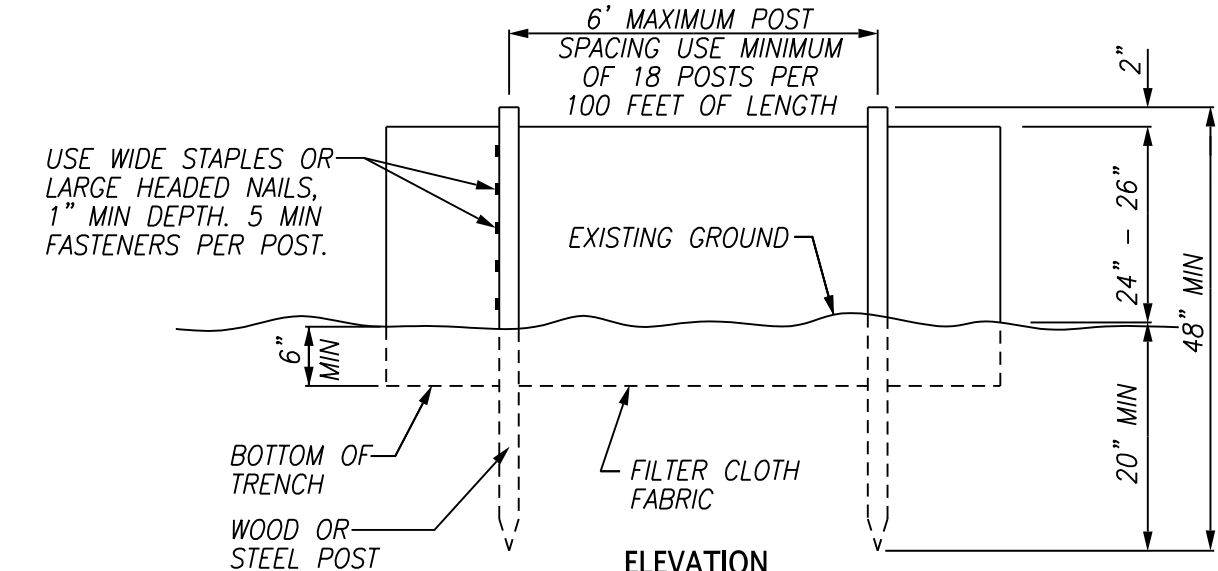


10 RIPRAP APRON
C30 NTS



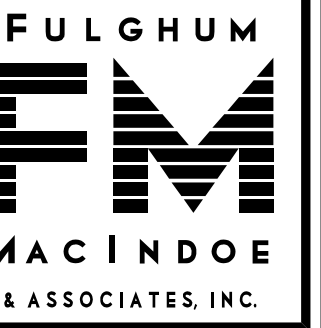
NOTES:
1. SILT SAVER SQUARE FRAME AND FILTER, MODEL NO. SS-200A OR APPROVED EQUAL FOR INLETS IN OPEN AREAS.
2. TO BE USED ON ALL STRUCTURES WHILE GRADING ACTIVITIES ARE ONGOING. REPLACE INLET PROTECTION WITH AN INTERNAL SYSTEM ONCE DRAINS ARE LOCATED IN PAVED AREAS.
3. ONCE PERMANENT VEGETATION IS ESTABLISHED, REMOVE THE INLET PROTECTION, BACKFILL TRENCH WITH TOPSOIL, AND APPLY SEED AND MULCH TO ALL DISTURBED AREAS.

11 INLET PROTECTION
C30 NTS



NOTES:
1. SILT FENCE SHALL BE PRE-ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
2. SILT FENCE SHALL HAVE AN APPROVED BACKING OR A BUILT-IN REINFORCED STRUCTURE AS RECOMMENDED BY THE MANUFACTURER TO SUPPORT THE GEOTEXTILE FABRIC.
3. ONCE PERMANENT VEGETATION IS ESTABLISHED, REMOVE THE SILT FENCE, BACKFILL TRENCH WITH TOPSOIL, AND APPLY SEED AND MULCH TO ALL DISTURBED AREAS. LEGALLY DISPOSE OF REMOVED FENCE OFF-SITE.
4. PLACE SILT FENCE AT LEAST 5 TO 7 FEET AWAY FROM STEEP OR LONG SLOPES TO IMPOUND STORMWATER RUNOFF.
5. POST SPACING SHALL BE 4 FEET MAXIMUM WITHIN A DRAINAGE CHANNEL.
6. TURN LAST 7 TO 10 FEET OF SILT FENCE UPHILL.

12 SILT FENCE
C30 NTS



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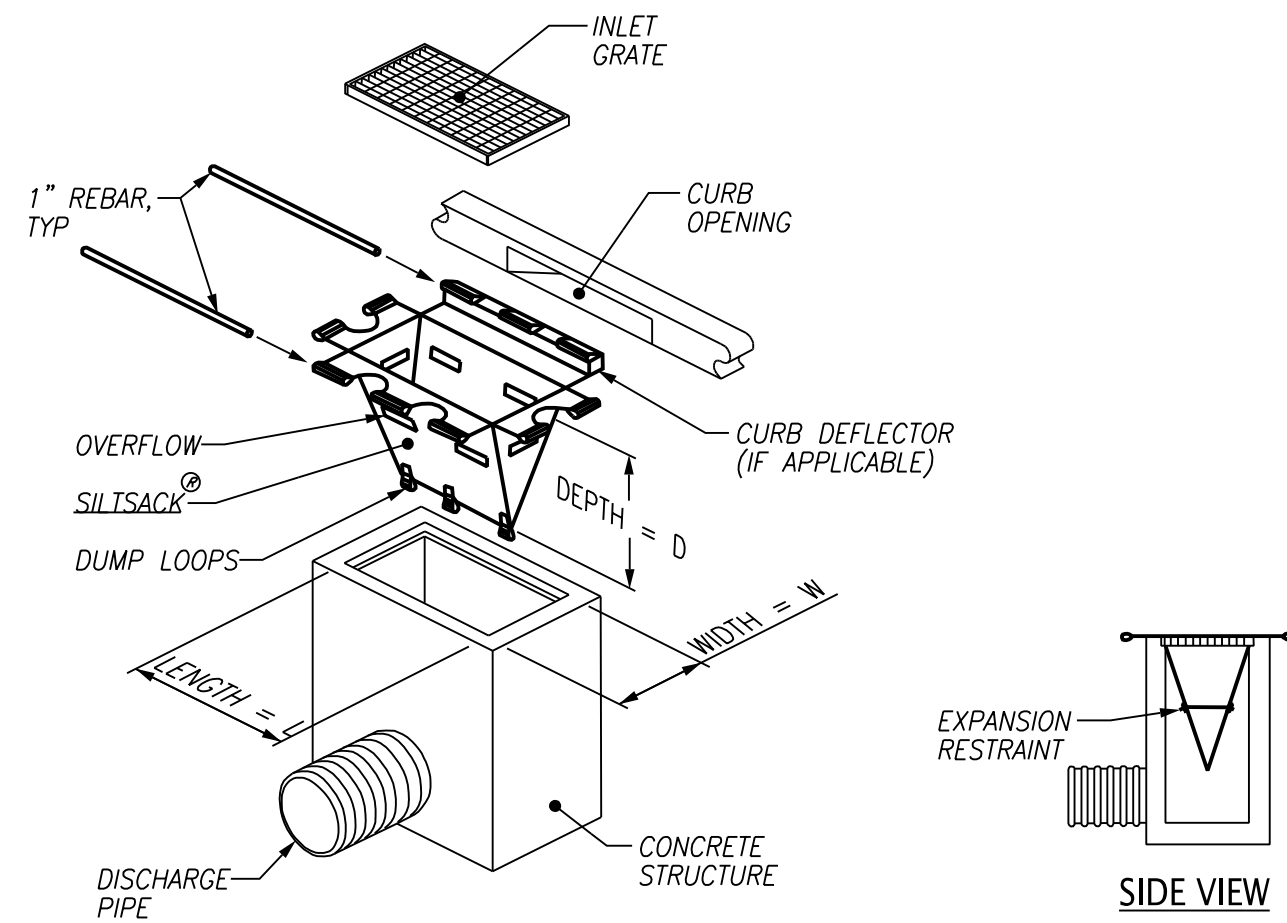
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DETAILS

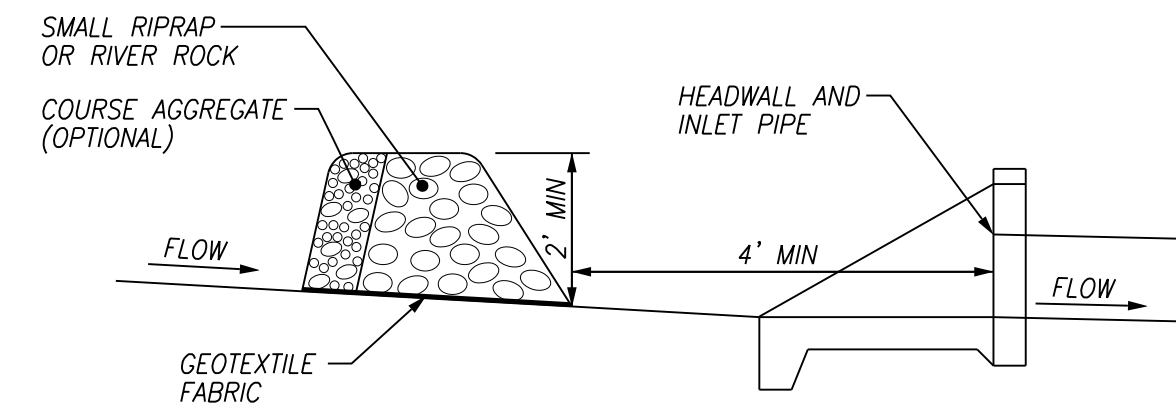
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		Revision/Issue	
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		Date	

C30



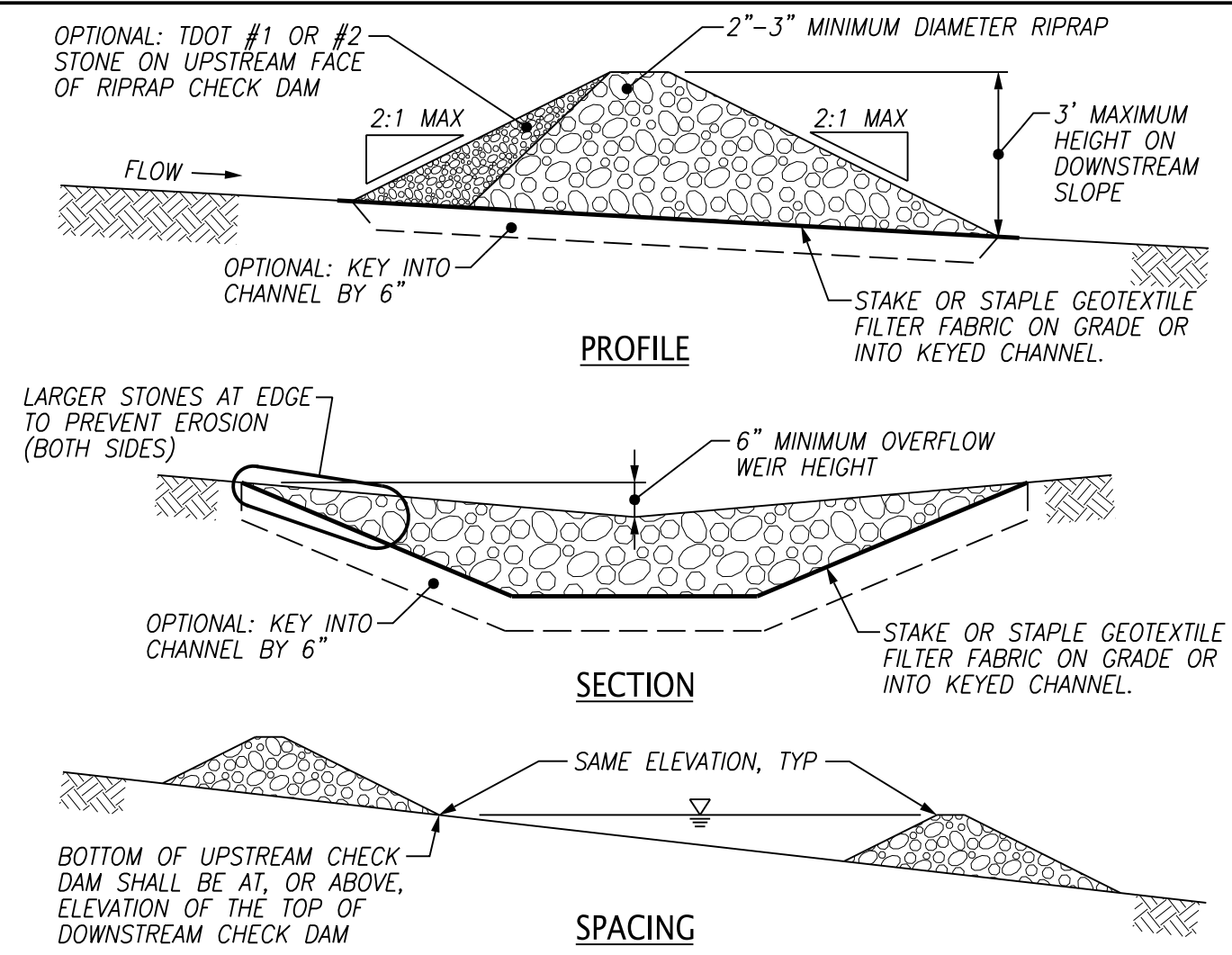
- NOTES:**
1. THE INLET SEDIMENT CONTROL DEVICE SHALL BE SILTSACK® OR EQUIVALENT, FOR USE ON STORM STRUCTURES LOCATED IN PAVED AREAS WHERE THERE IS A POTENTIAL FOR RECEIVING SEDIMENT LADEN RUNOFF.
 2. REMOVE ONCE PERMANENT VEGETATION IS ESTABLISHED.

13 INLET SEDIMENT CONTROL DEVICE
C31 NTS



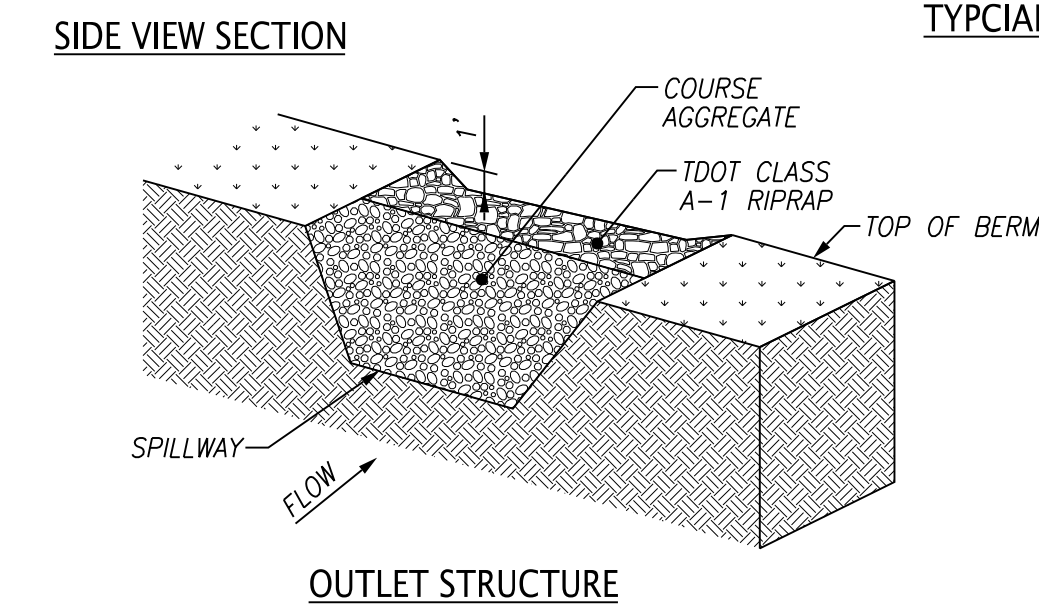
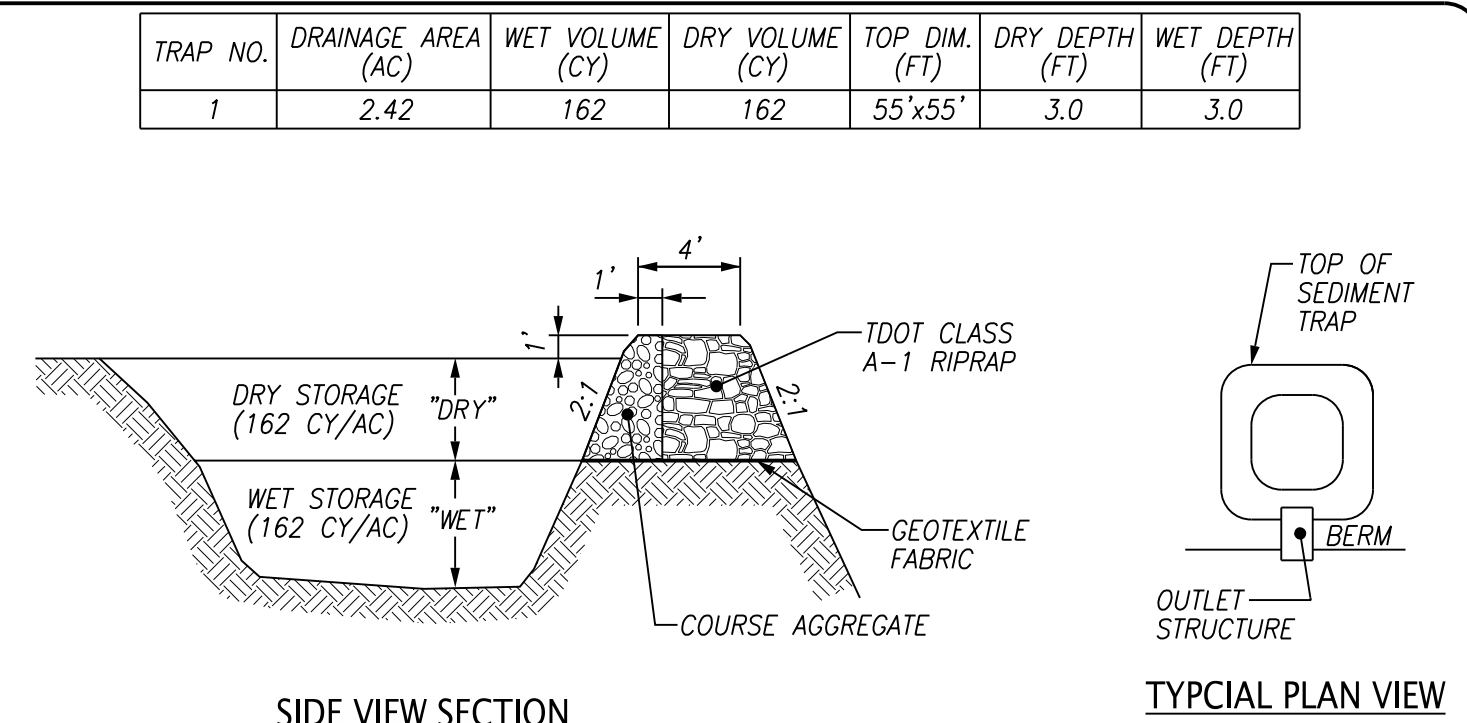
- NOTES:**
1. THE SMALL RIPRAP STONE SHALL BE TDOT CLASS A-1 (CLEAN FROM FINES) WITH STONE SIZES FROM 2" TO 15".
 2. THE COURSE AGGREGATE SHALL BE TDOT #57 (CLEAN FROM FINES) WITH A MINIMUM STONE SIZE OF 3/4 INCH.
 3. CONSTRUCT, MAINTAIN, AND REMOVE IN ACCORDANCE WITH THE TENNESSEE EROSION & SEDIMENT CONTROL HANDBOOK.

14 STONE FILTER RING
C31 NTS

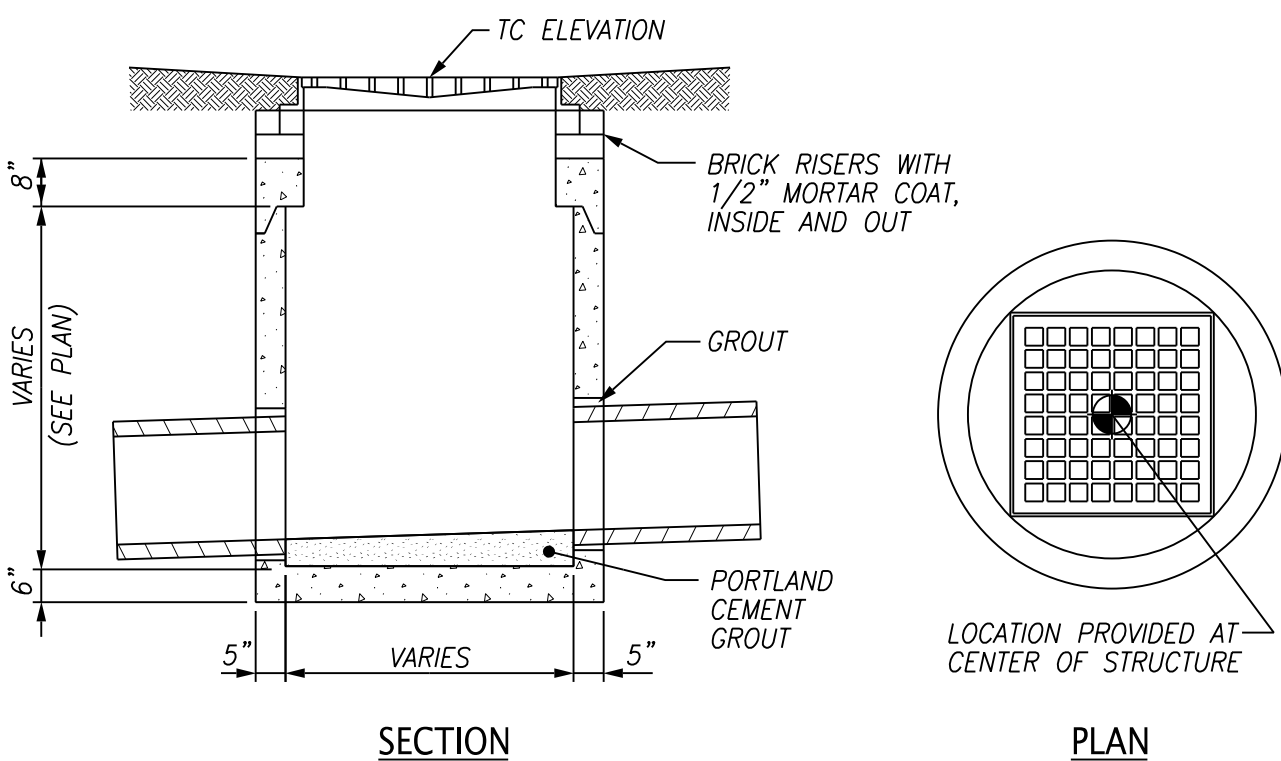


- NOTES:**
1. GEOTEXTILE SEPARATION FABRIC SHALL BE GEOTEX 801 (8 OUNCE NON-WOVEN) BY PROPEX OR EQUAL.
 2. CONSTRUCT, MAINTAIN, AND REMOVE IN ACCORDANCE WITH THE TENNESSEE EROSION & SEDIMENT CONTROL HANDBOOK.

15 TEMPORARY ROCK CHECK DAM
C31 NTS

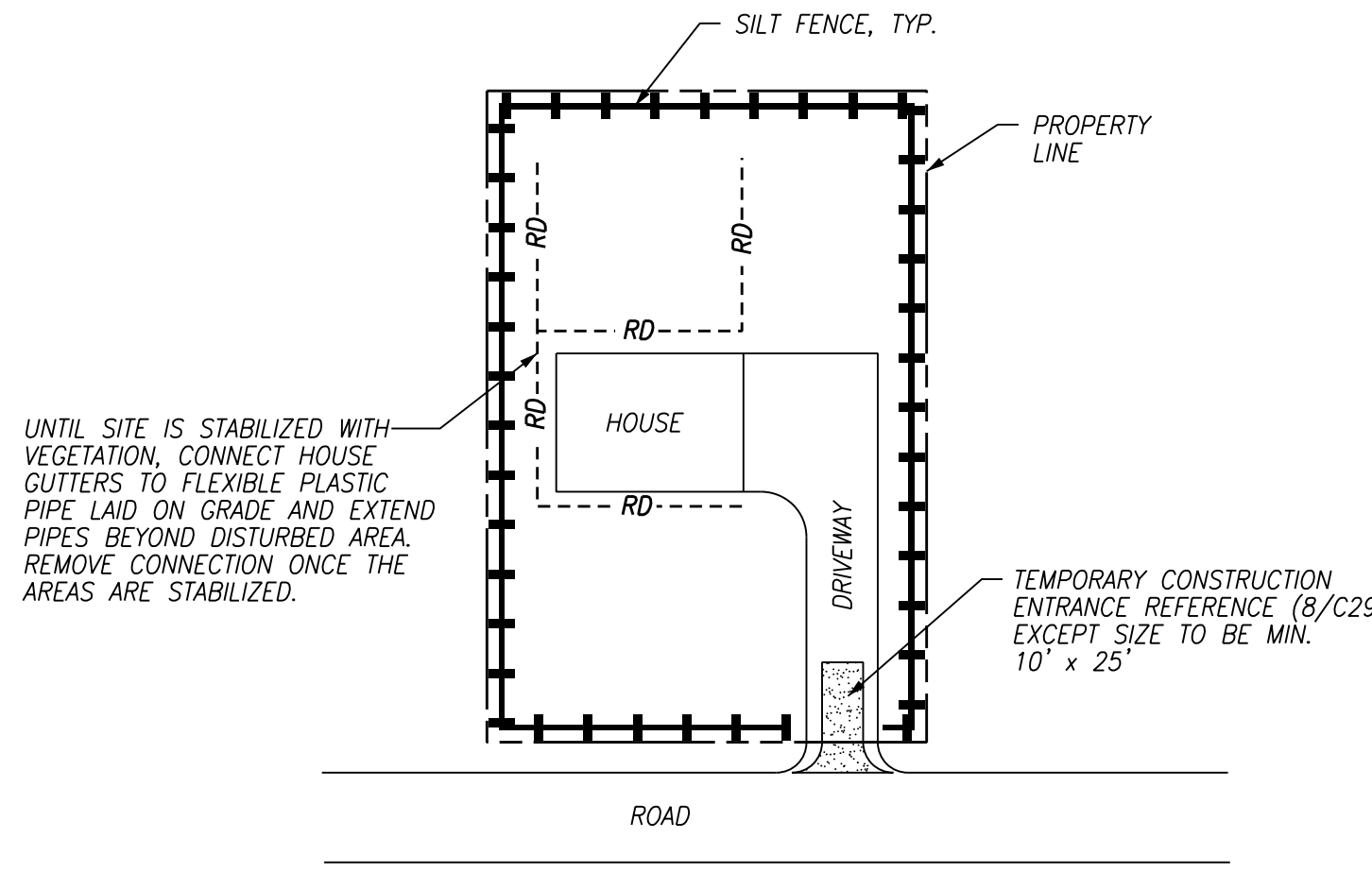


16 TEMPORARY SEDIMENT TRAP AND OUTLET
C31 NTS

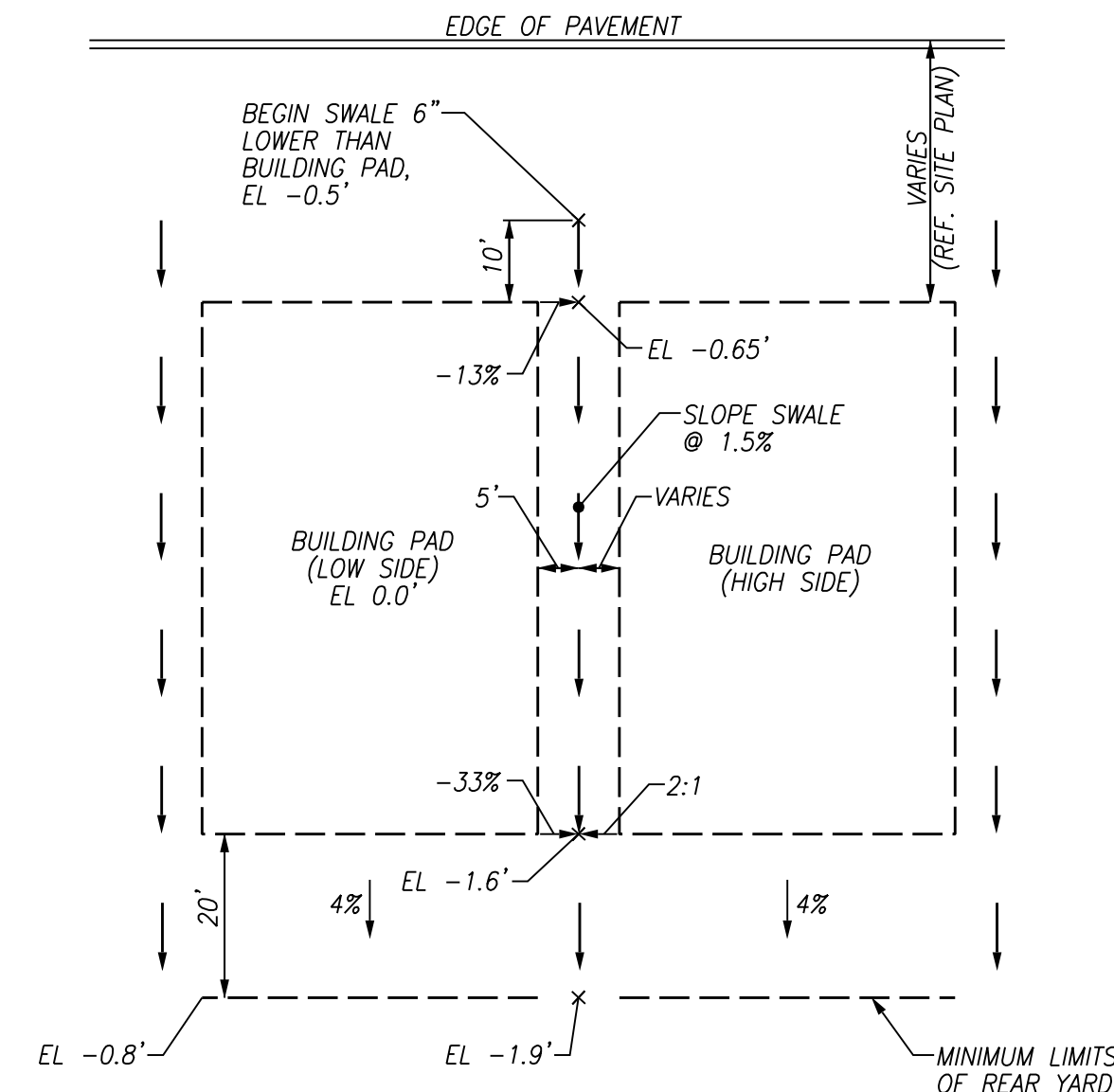


- NOTES:**
1. AREA DRAINS SHALL BE CIRCULAR OR SQUARE PRECAST CONCRETE STRUCTURE IN ACCORDANCE WITH ASTM C478 OR C913 (LATEST REVISION). DIMENSIONS VARY DEPENDING ON PIPE SIZE AND ANGLE OF PIPES IN AND OUT OF STRUCTURE. THE OPENING IN THE STRUCTURE TOP SHALL NOT BE LESS THAN THE GRATE DIMENSIONS.
 2. LADDER BARS SHALL BE PROVIDED PER OSHA REGULATIONS.
 3. LOCATION AND TC ELEVATIONS GIVEN AT CENTER OF THE STRUCTURE.
 4. FRAME AND GRATE SHALL BE EJ USA INCORPORATED MODEL NO. V-5630 OR EQUAL. THE GRATE SHALL BE STAMPED WITH "DUMP NO WASTE... DRAINS TO WATERWAYS" WITH FISH IMAGE, OR EQUAL.
 5. SHIM THE FRAME TO MATCH THE CROSS SLOPE AND GUTTER LINE SLOPES OF THE PAVEMENT.

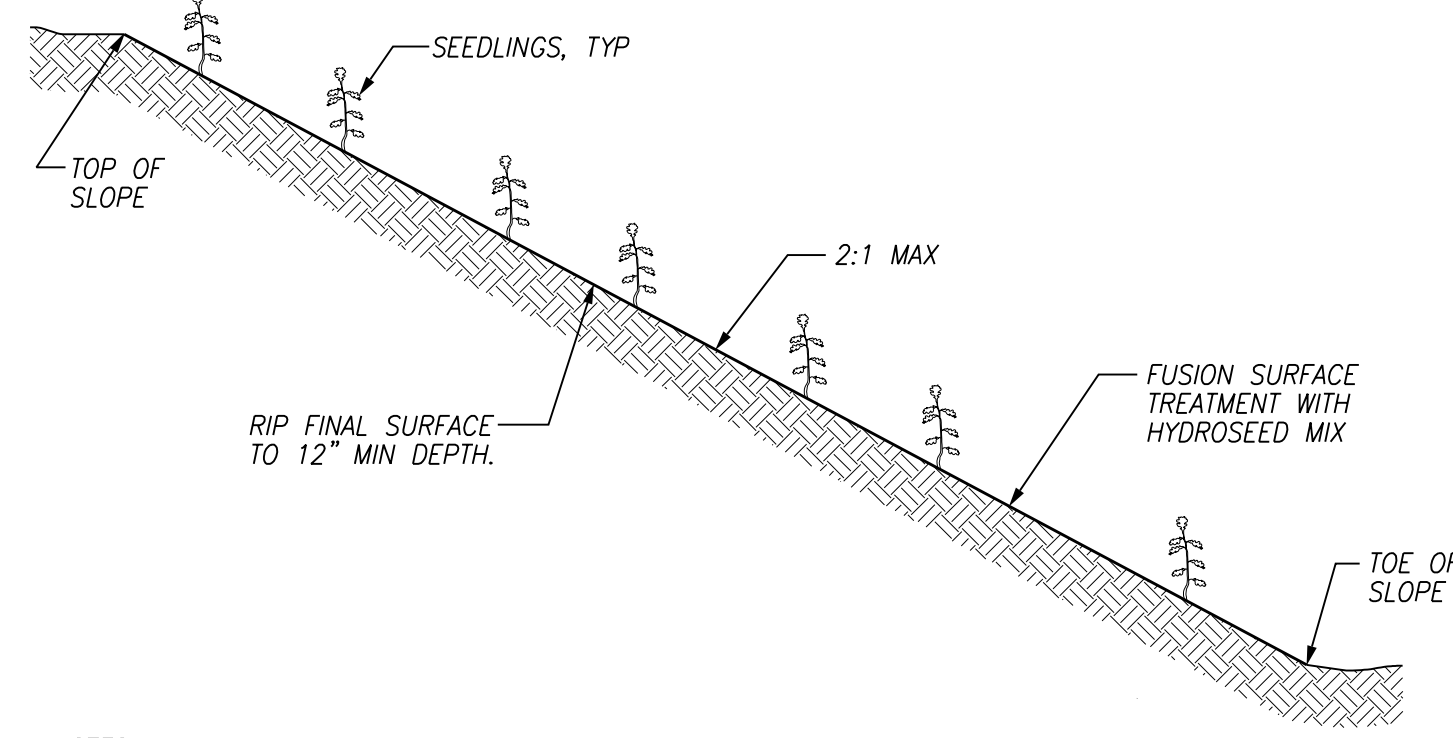
20 AREA DRAIN
C31 NTS



17 EROSION CONTROL DETAIL FOR HOME CONSTRUCTION
C31 NTS

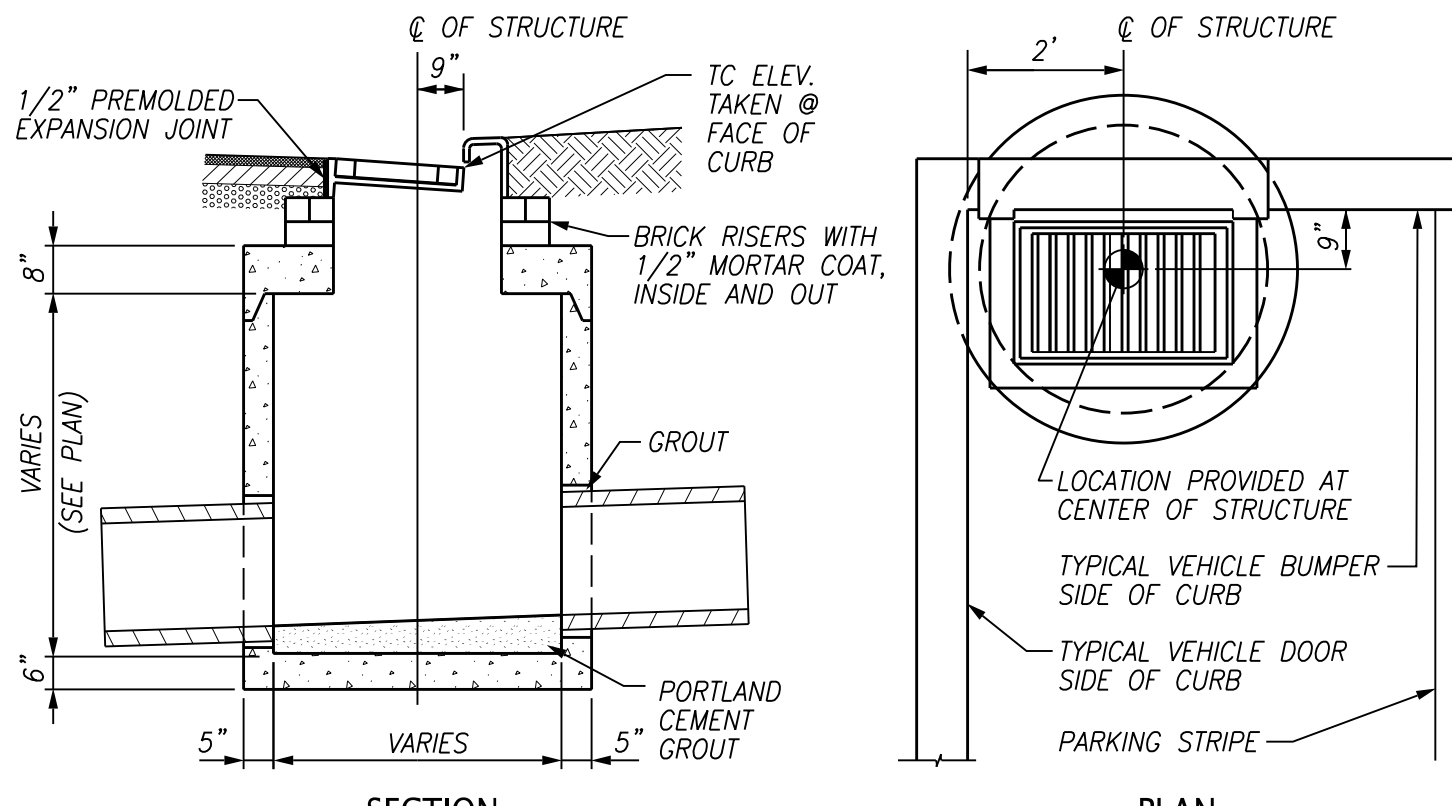


18 TYPICAL LOT GRADING
C31 NTS



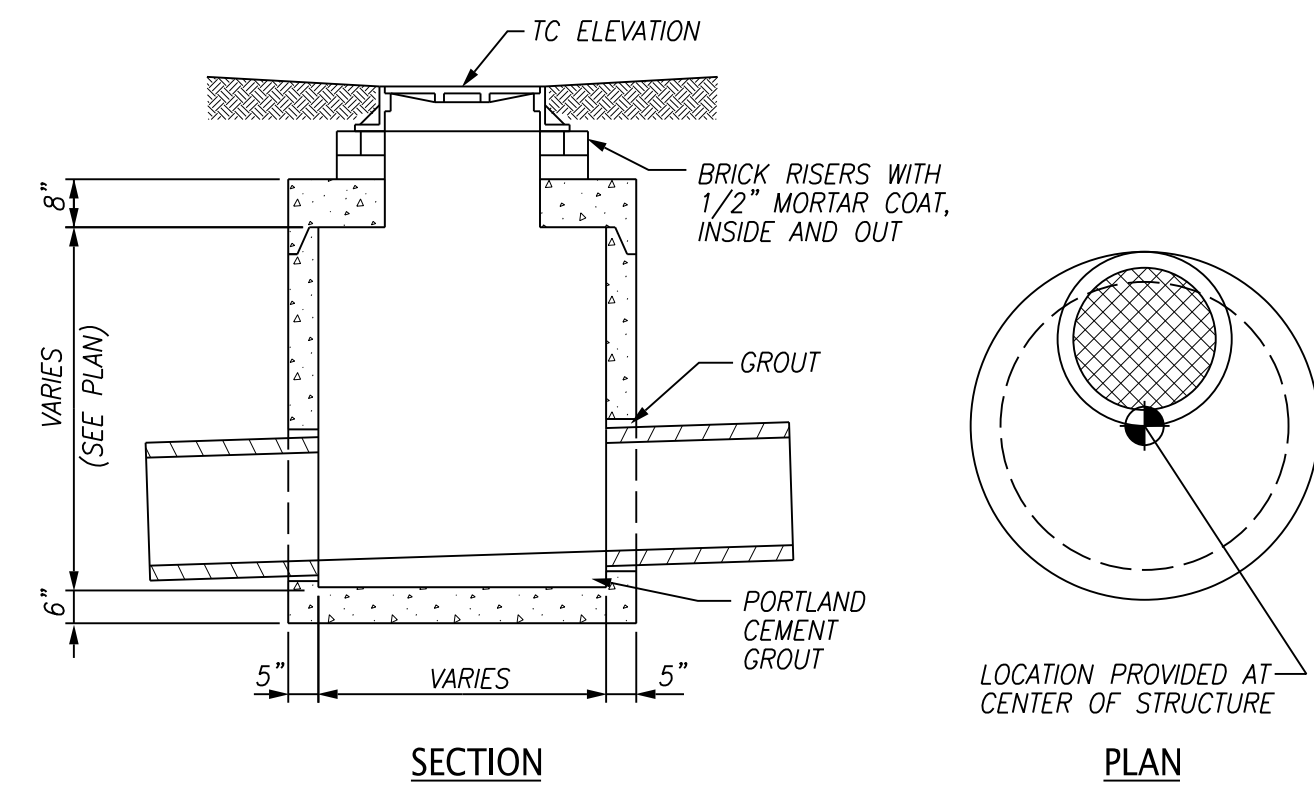
- NOTES:**
1. SEEDLINGS SHALL BE A MIX OF AT LEAST 6 OF THE FOLLOWING SPECIES: AMERICAN PLUM, BLACKGUM, BLACK CHERRY, NORTHERN RED OAK, TULIP POPLAR, RED MAPLE, REDBUD, SCARLET OAK, SWEETGUM, AND WHITE OAK. INSTALL ON 12" X 12" GRID OR 300 PER ACRE. PLANTING DATES RANGE FROM DECEMBER TO MID-APRIL.
 2. HYDROSEED SLOPE WITH ERNST NC MOUNTAINS UPL MEADOW MIX (ERNMX 303). APPLY 20 LBS/AC. ADD FERTILIZER TO THE HYDROSEED MIX. USE 19-19-19 AND APPLIED AT A RATE OF 400 LBS/AC. ADD ANNUAL COVER CROP TO THE HYDROSEED MIX AS FOLLOWS: OATS (JANUARY TO FEBRUARY) APPLIED AT 30 LBS/AC, BROWNTOP MILLET (MARCH TO AUGUST) APPLIED AT 10 LBS/AC, WINTER RYE GRAIN (SEPTEMBER TO DECEMBER) APPLIED AT 30 LBS/AC.
 3. APPLY FUSION SURFACE TREATMENT (JEN-HILL CONSTRUCTION MATERIALS) AT A RATE OF 4,500 LBS/AC ALONG WITH THE HYDROSEED MIX. OBTAIN A SOIL SAMPLE TO CONFIRM THE APPLICATION RATE. INSTALL PER THE MANUFACTURER'S RECOMMENDATIONS.
 4. PROTECT FINISHED SLOPE FROM BEING DISTURBED.

19 REFORESTATION
C31 NTS



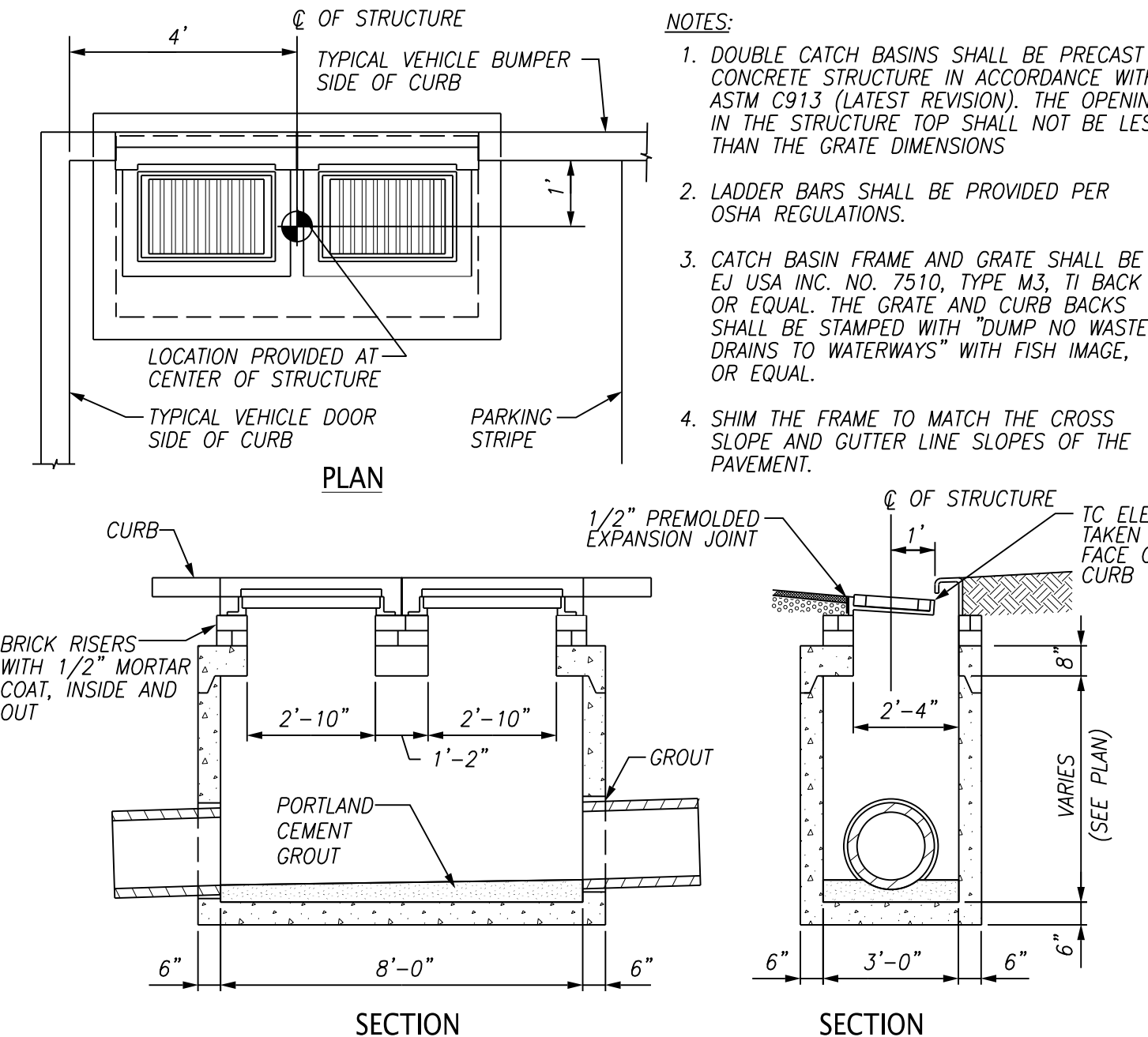
- NOTES:**
1. CATCH BASINS SHALL BE CIRCULAR OR SQUARE PRECAST CONCRETE STRUCTURE IN ACCORDANCE WITH ASTM C478 OR C913 (LATEST REVISION). DIMENSIONS VARY DEPENDING ON PIPE SIZE AND ANGLE OF PIPES IN AND OUT OF STRUCTURE. THE OPENING IN THE STRUCTURE TOP SHALL NOT BE LESS THAN THE GRATE DIMENSIONS.
 2. LADDER BARS SHALL BE PROVIDED PER OSHA REGULATIONS.
 3. CATCH BASIN FRAME AND GRATE SHALL BE EJ USA INC. NO. 7510, TYPE M3, T1 BACK OR EQUAL. THE GRATE AND CURB BACKS SHALL BE STAMPED WITH "DUMP NO WASTE... DRAINS TO WATERWAYS" WITH FISH IMAGE, OR EQUAL.
 4. SHIM THE FRAME TO MATCH THE CROSS SLOPE AND GUTTER LINE SLOPES OF THE PAVEMENT.

21 SINGLE CATCH BASIN
C31 NTS



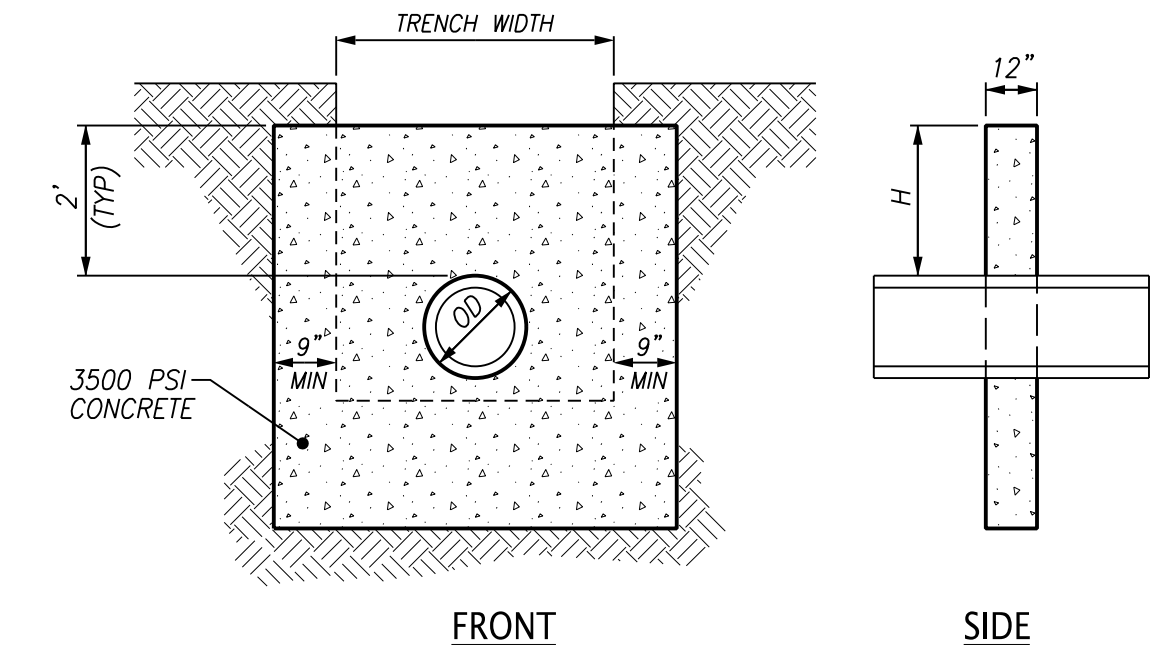
- NOTES:**
1. MANHOLES SHALL BE CIRCULAR OR SQUARE PRECAST CONCRETE STRUCTURE IN ACCORDANCE WITH ASTM C478 OR C913 (LATEST REVISION). DIMENSIONS VARY DEPENDING ON PIPE SIZE AND ANGLE OF PIPES IN AND OUT OF STRUCTURE. THE OPENING IN THE STRUCTURE TOP SHALL NOT BE LESS THAN THE GRATE DIMENSIONS.
 2. LADDER BARS SHALL BE PROVIDED PER OSHA REGULATIONS.
 3. LOCATION AND TC ELEVATIONS GIVEN AT CENTER OF THE STRUCTURE.
 4. TYPE A SOLID COVER OR EQUAL. THE COVER SHALL BE STAMPED WITH "STORM SEWER" AND "DUMP NO WASTE... DRAINS TO WATERWAYS" WITH FISH IMAGE, OR EQUAL.
 5. ADJUST ALL SIDES OF THE FRAME AND COVER TO MATCH PAVEMENT CROSS SLOPE AND LONGITUDINAL SLOPE OR FLUSH WITH FINISHED GRADE.

22 STORM DRAIN MANHOLE
C31 NTS



- NOTES:**
1. DOUBLE CATCH BASINS SHALL BE PRECAST CONCRETE STRUCTURE IN ACCORDANCE WITH ASTM C913 (LATEST REVISION). THE OPENING IN THE STRUCTURE TOP SHALL NOT BE LESS THAN THE GRATE DIMENSIONS.
 2. LADDER BARS SHALL BE PROVIDED PER OSHA REGULATIONS.
 3. CATCH BASIN FRAME AND GRATE SHALL BE EJ USA INC. NO. 7510, TYPE M3, T1 BACK OR EQUAL. THE GRATE AND CURB BACKS SHALL BE STAMPED WITH "DUMP NO WASTE... DRAINS TO WATERWAYS" WITH FISH IMAGE, OR EQUAL.
 4. SHIM THE FRAME TO MATCH THE CROSS SLOPE AND GUTTER LINE SLOPES OF THE PAVEMENT.

23 DOUBLE CATCH BASIN
C31 NTS



- NOTES:**
1. MAXIMUM SPACING SHALL BE 14 TIMES THE COLLAR HEIGHT (H) OR 25 FEET WHICHEVER IS LESS. MINIMUM SPACING IS 10 FEET.
 2. PROVIDE A COLLAR AT THE HALF-WAY POINT IN THE BERM.
 3. PROVIDE A MINIMUM OF ONE COLLAR FOR BERMS LESS THAN 8 FEET HIGH AND AT LEAST TWO COLLARS FOR BERMS EQUAL TO OR GREATER THAN 8 FEET.

24 CONCRETE ANTI-SEEP COLLAR
C31 NTS

FULGHUM MACINDOE & ASSOCIATES, INC.
10330 HARDIN VALLEY ROAD SUITE 201
KNOXVILLE, TN 37932
OFFICE: 865.690.6419
FAX: 865.690.6448
www.fulghummacindoe.com

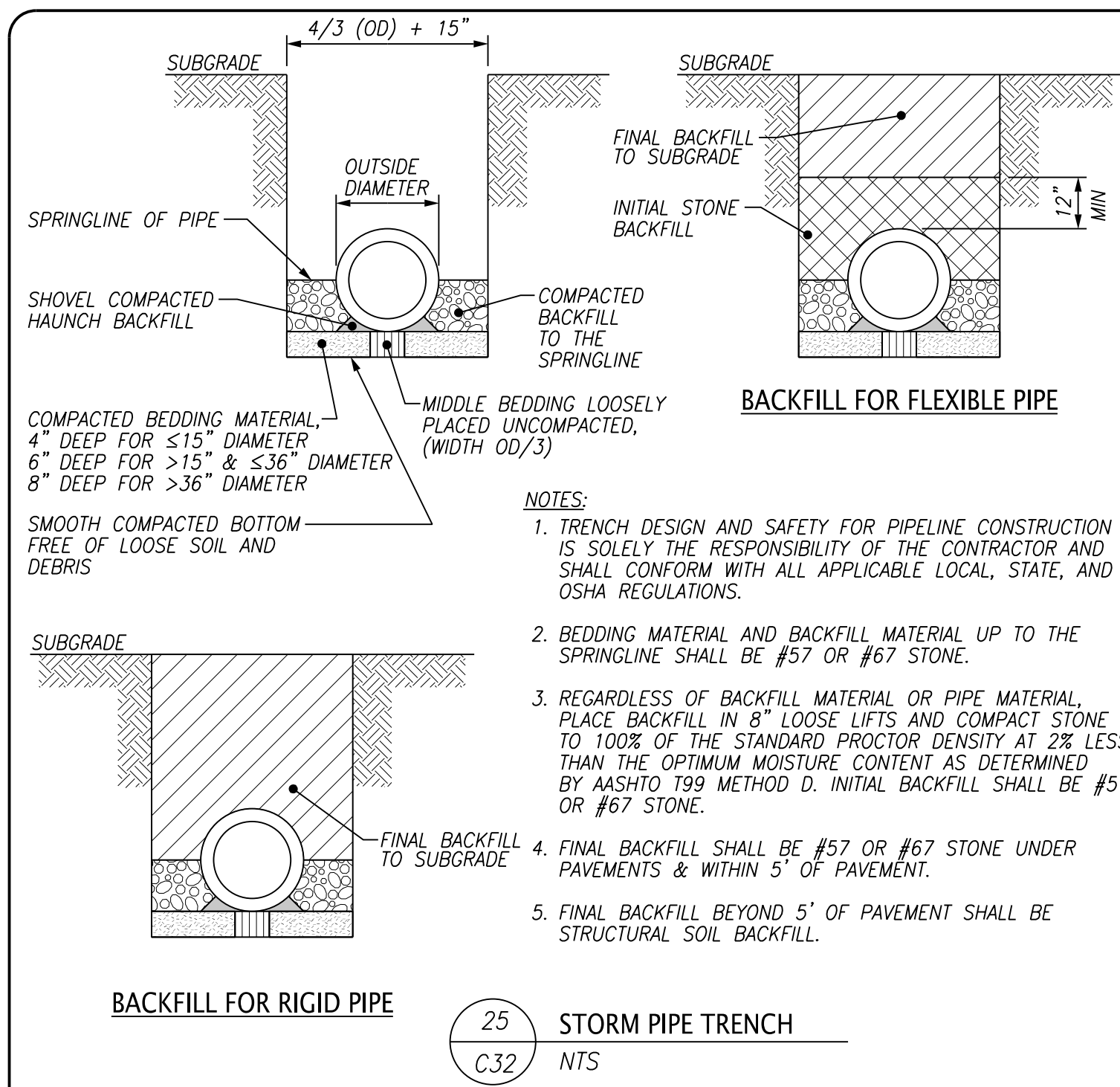
9/18/20
STATE OF TENNESSEE
REGISTERED PROFESSIONAL ENGINEER
NO. 0000000000

ANDES TRACE SUBDIVISION
1609 OLD ANDES ROAD
KNOXVILLE, TENNESSEE 37931

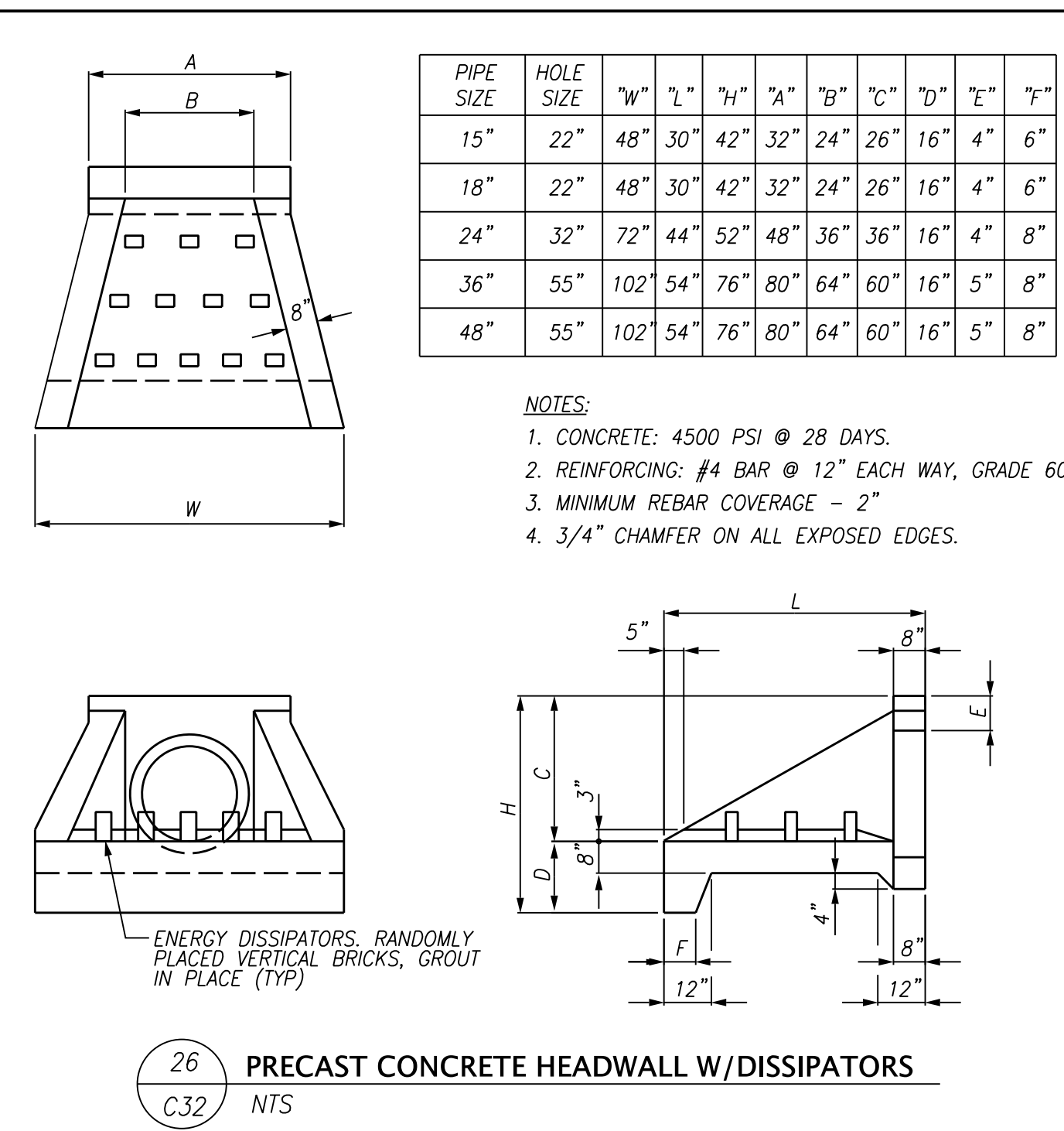
BALL HOMES, LLC
6309 WALDEN DRIVE
LEXINGTON, KY 40517
CONTACT: MR. D. RAY BALL, JR.
TELEPHONE NO.: 859.268.1191

DETAILS

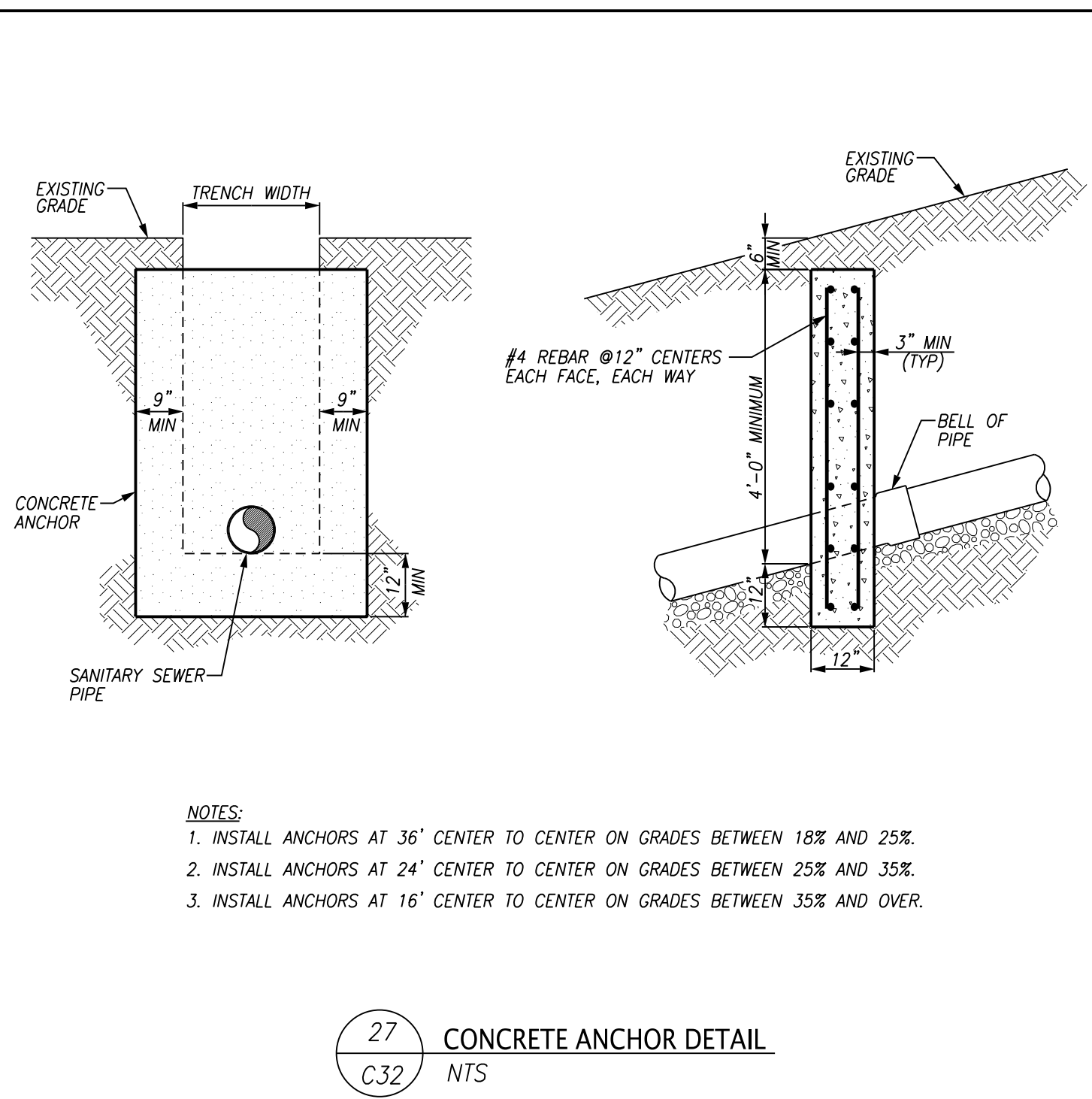
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DESIGNED BY	CHG	ISSUED FOR CONSTRUCTION	09/18/20
DRAWN BY	HNU	REVISION/ISSUE	
SCALE	NTS	SHEET	C31



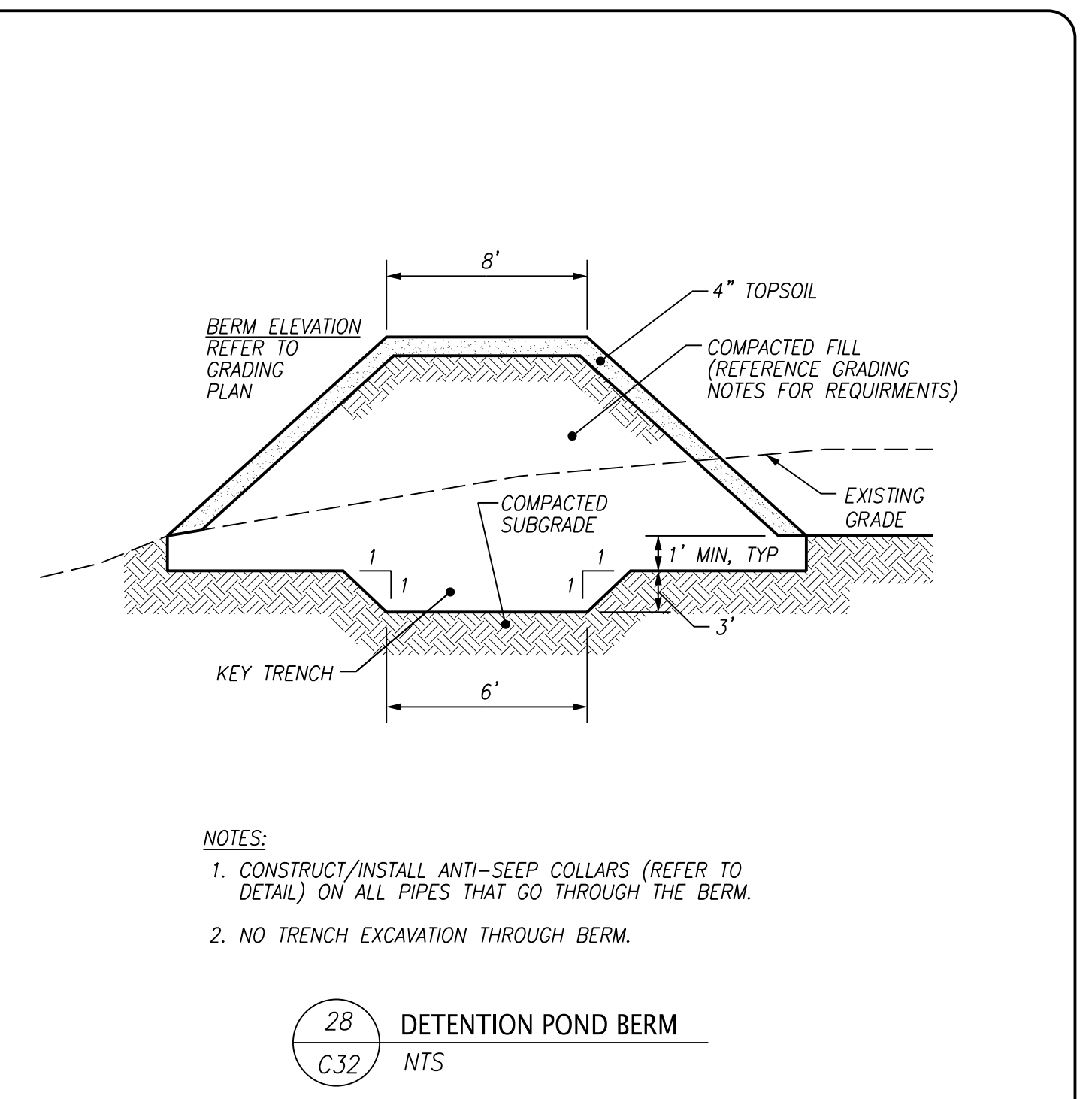
25 STORM PIPE TRENCH
C.32 NTS



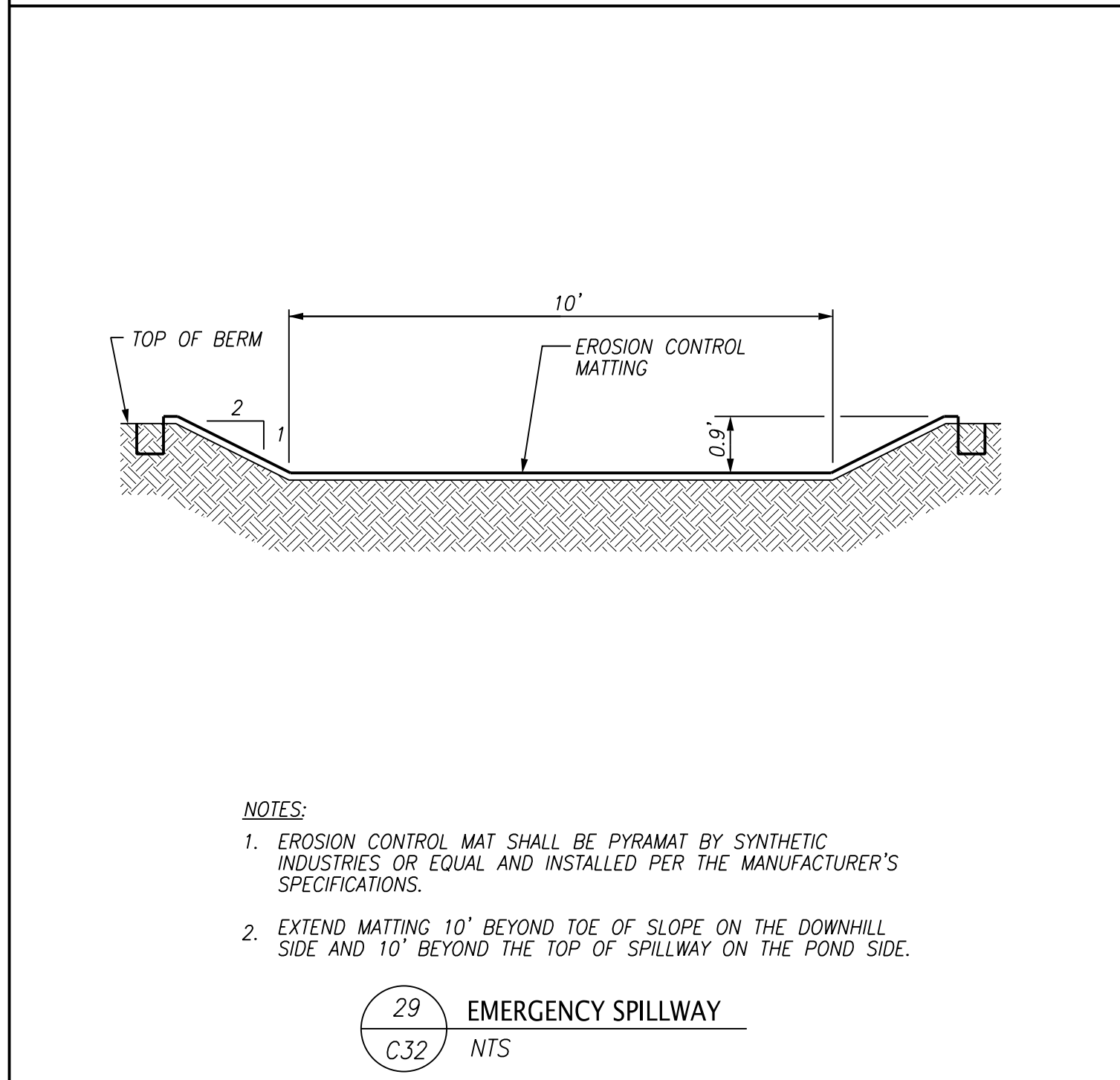
26 PRECAST CONCRETE HEADWALL W/DISSIPATORS
C.32 NTS



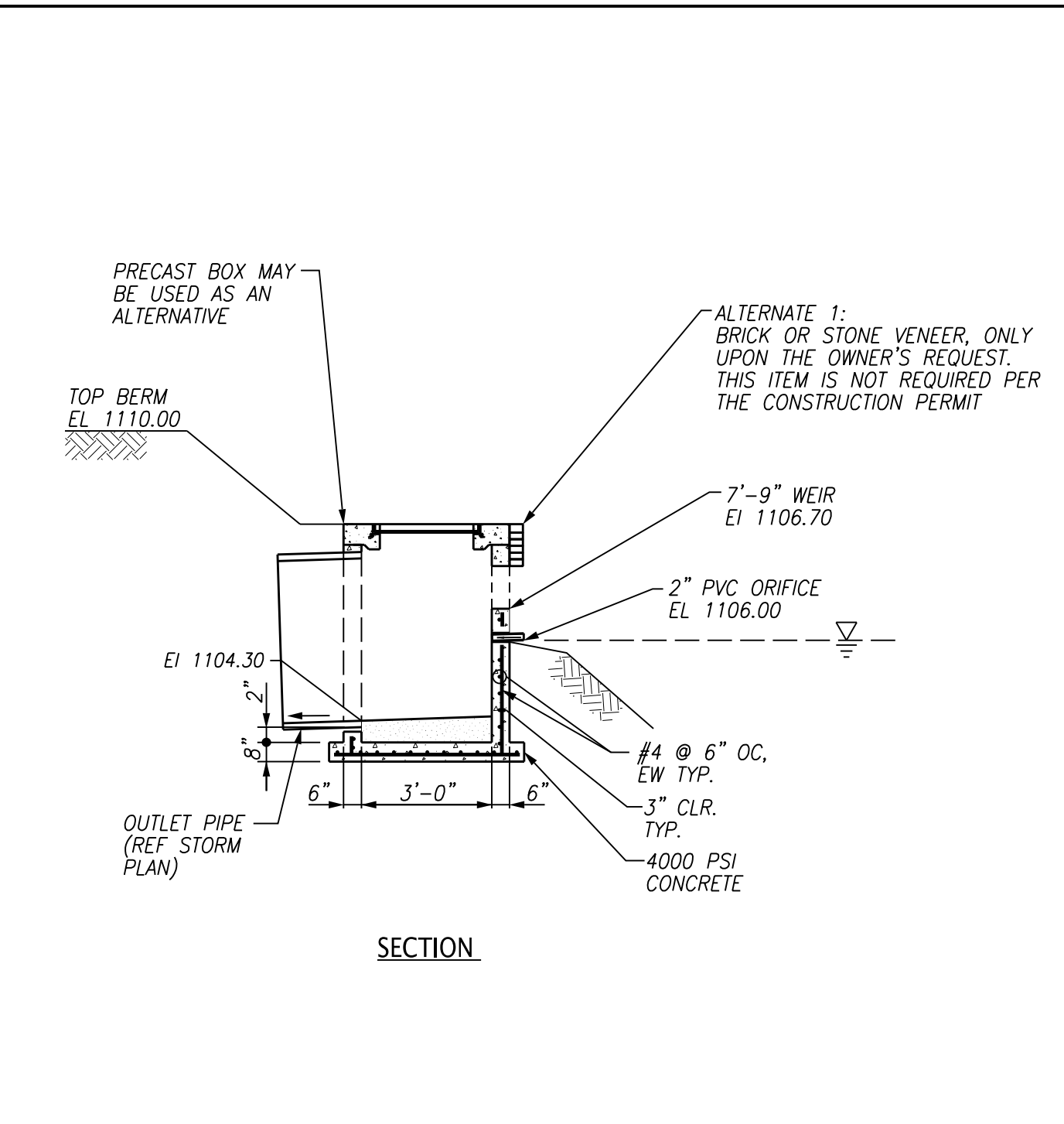
27 CONCRETE ANCHOR DETAIL
C.32 NTS



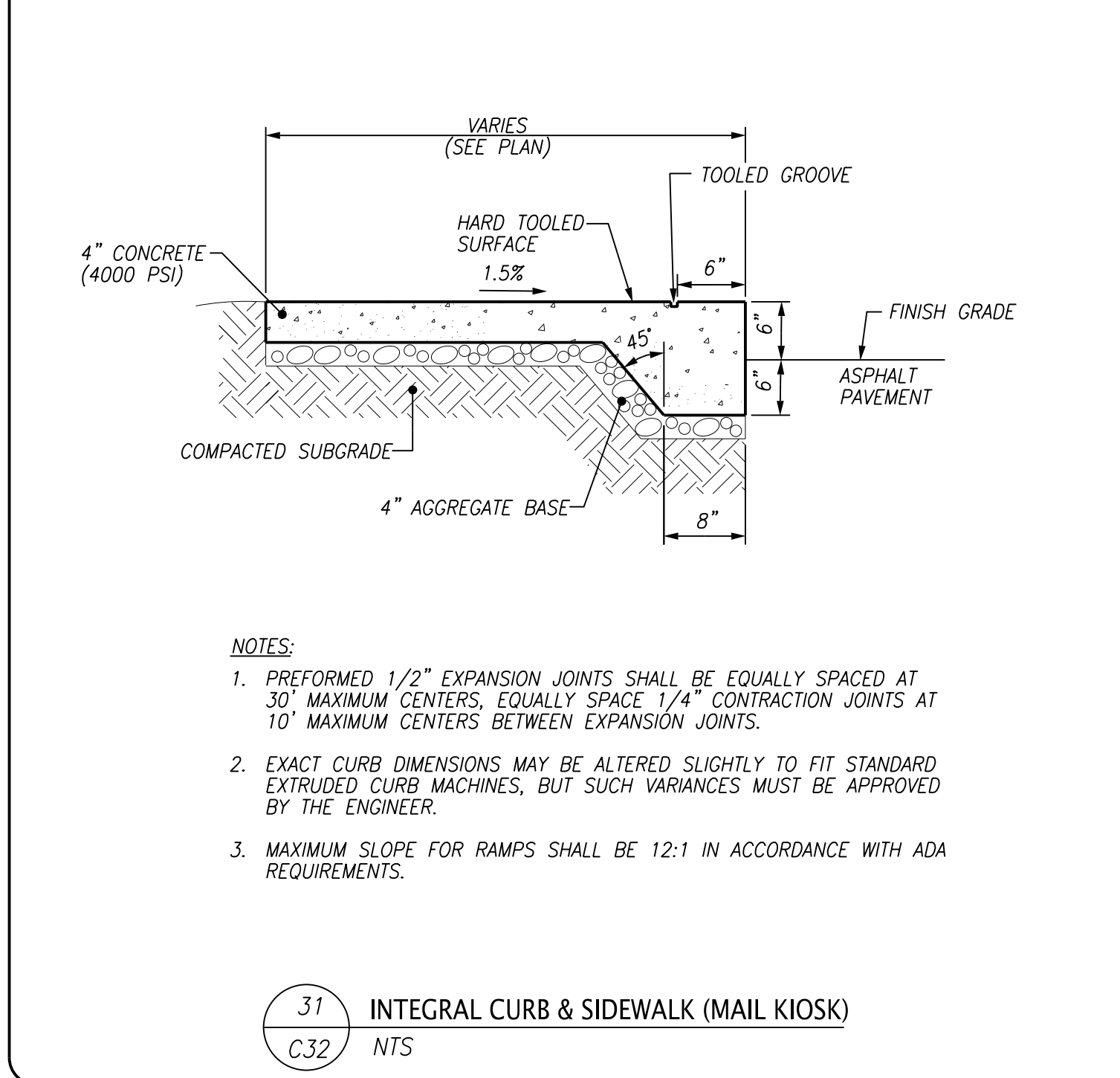
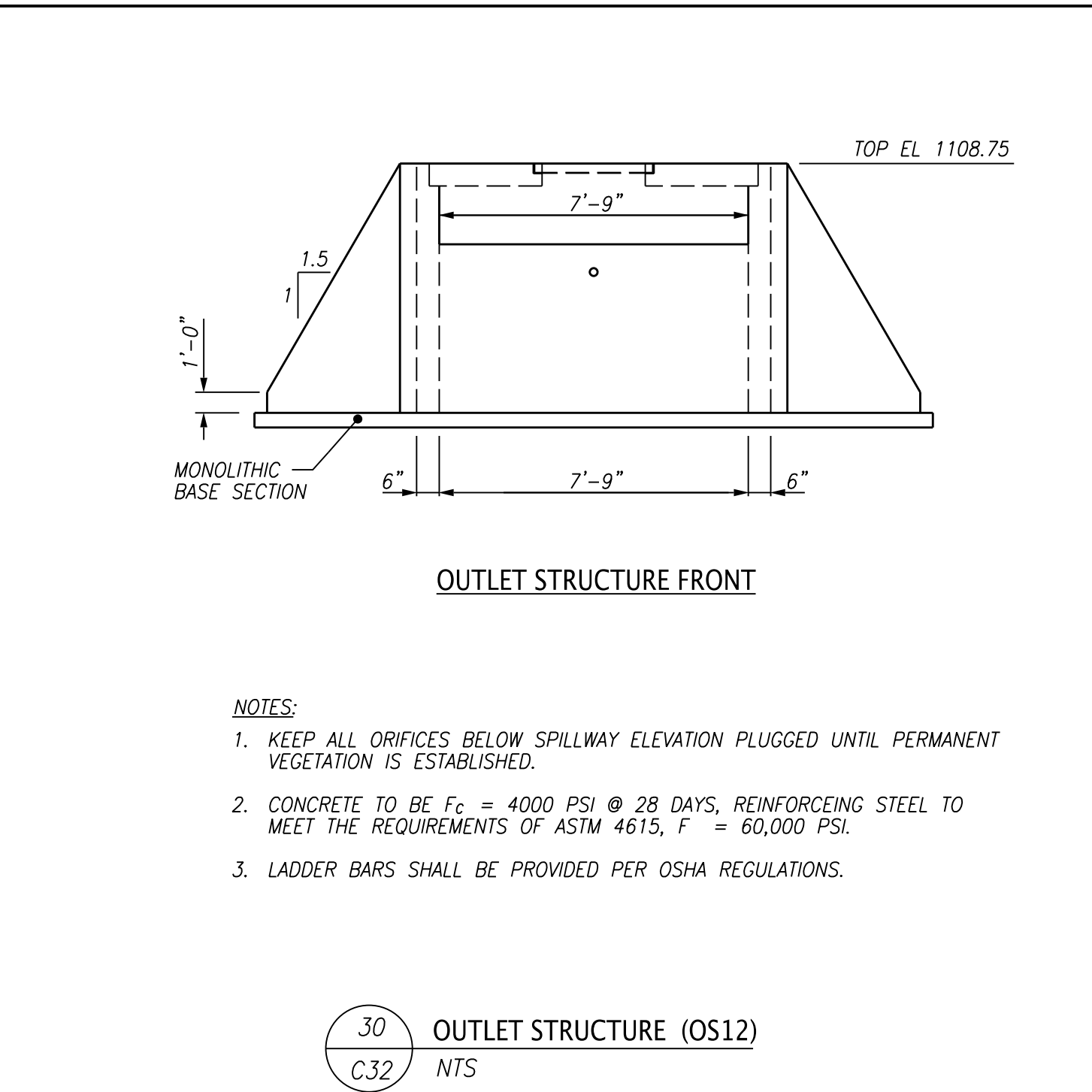
28 DETENTION POND BERM
C.32 NTS



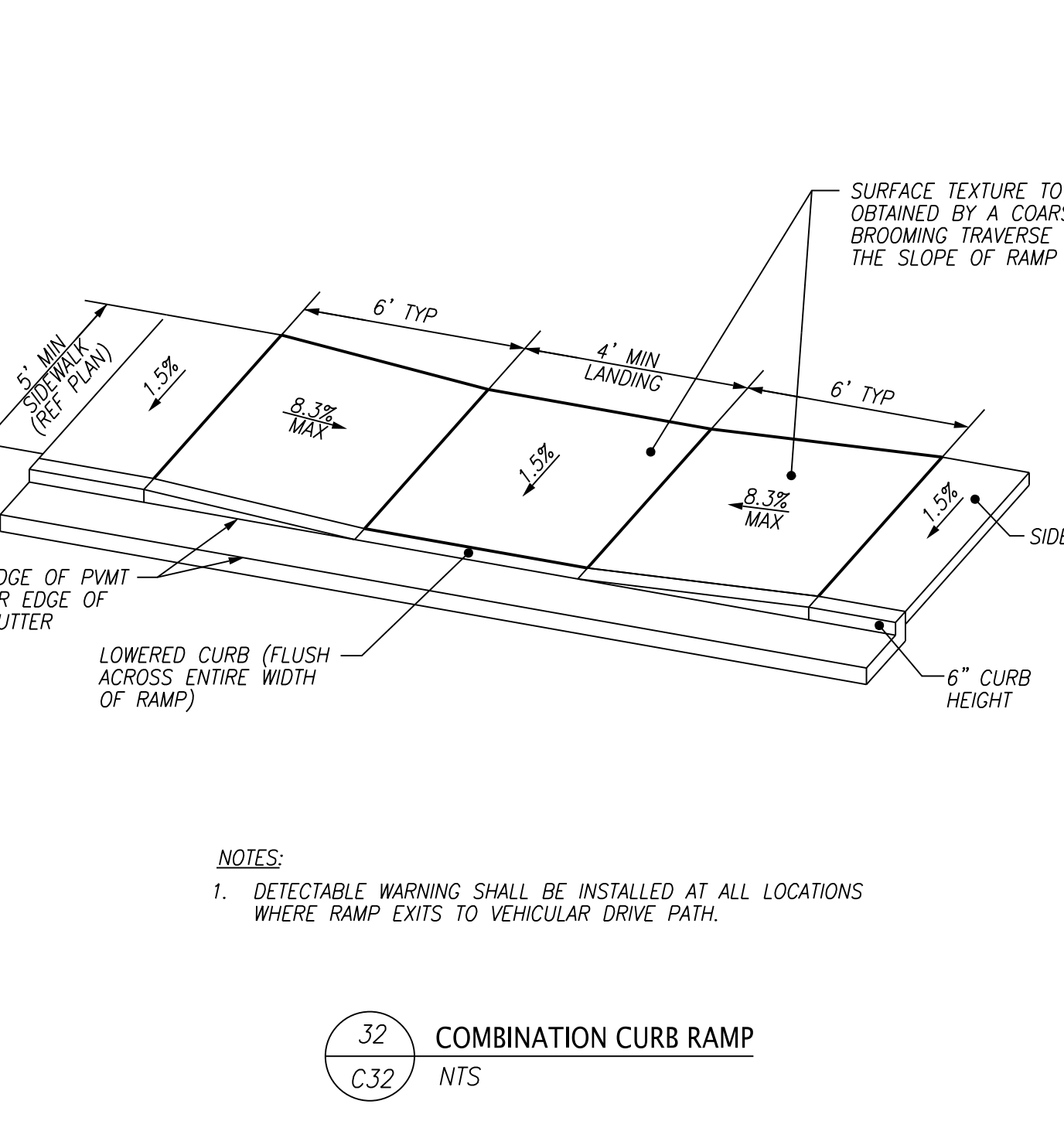
29 EMERGENCY SPILLWAY
C.32 NTS



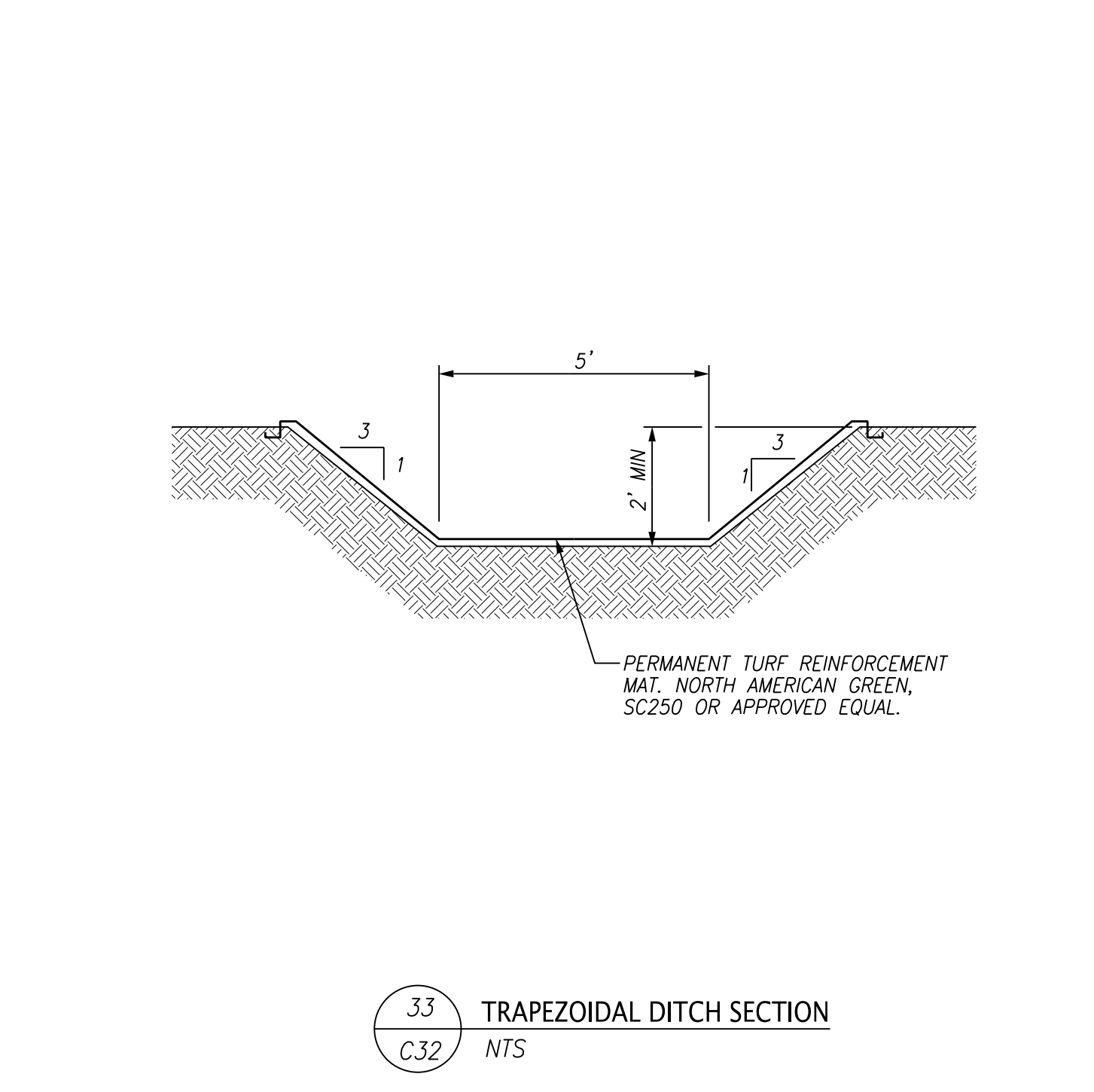
30 OUTLET STRUCTURE (OS12)
C.32 NTS



31 INTEGRAL CURB & SIDEWALK (MAIL KIOSK)
C.32 NTS



32 COMBINATION CURB RAMP
C.32 NTS



33 TRAPEZOIDAL DITCH SECTION
C.32 NTS



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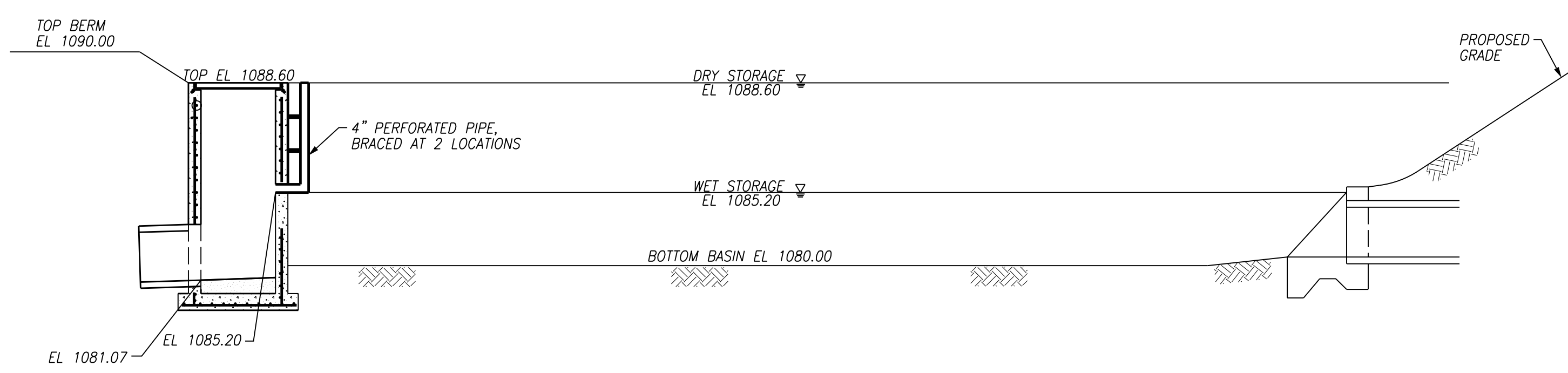
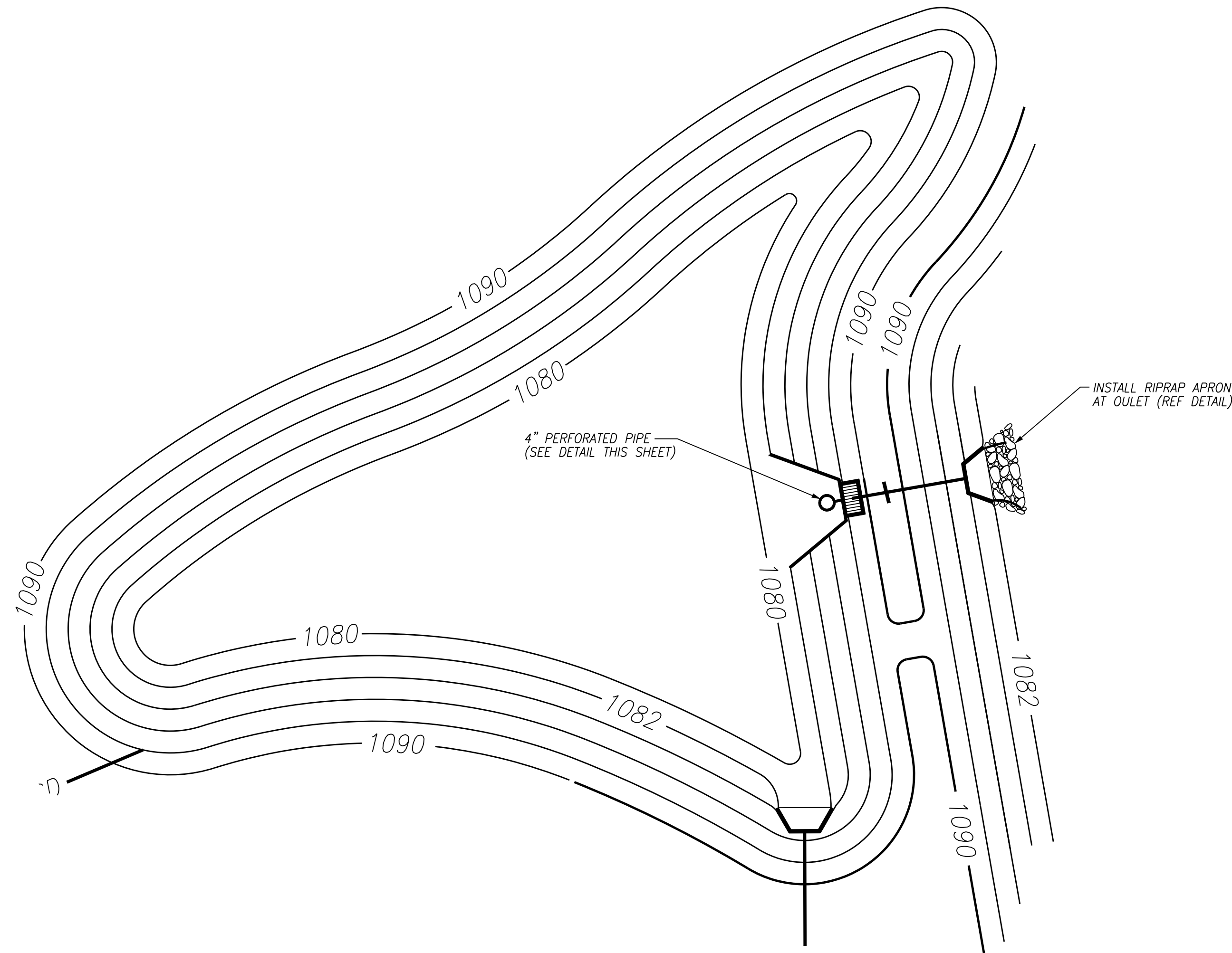


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BALL HOMES, LLC
6309 WALDEN DRIVE
LEXINGTON, KY 40517
CONTACT: MR. D. RAY BALL, JR.
TELEPHONE NO.: 859.268.1191

DETAILS

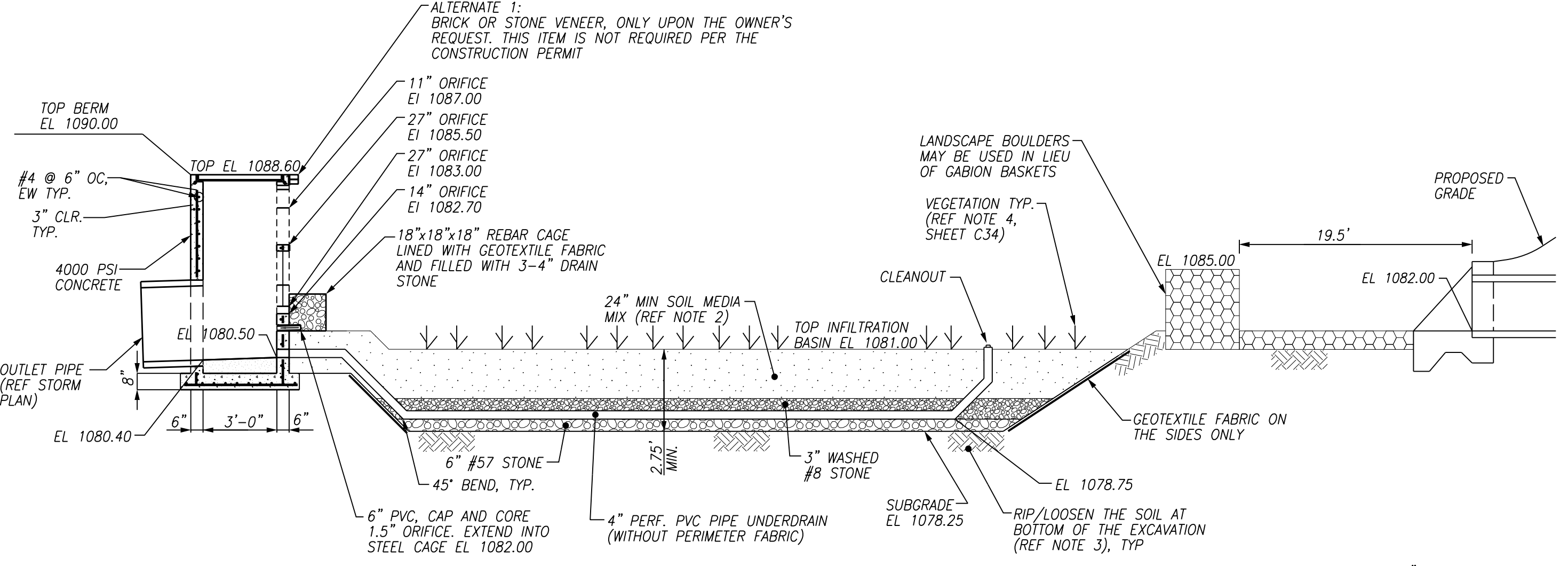
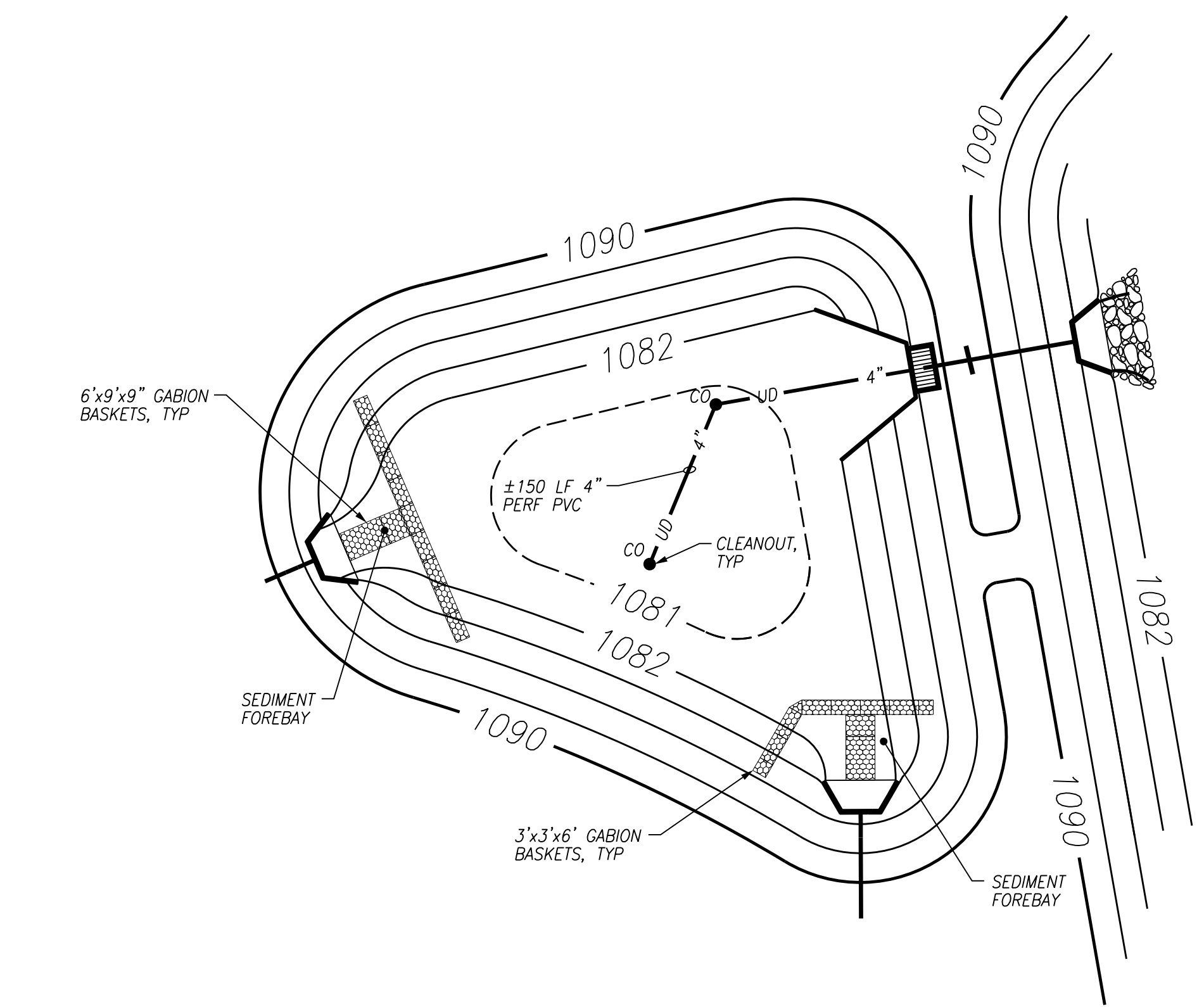
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WCF	CHG	HNU	
ISSUED FOR CONSTRUCTION	REVISION/ISSUE		
09/18/20			
Scale	Project	Sheet	
NTS	592.007	C32	
	Date	09/18/20	



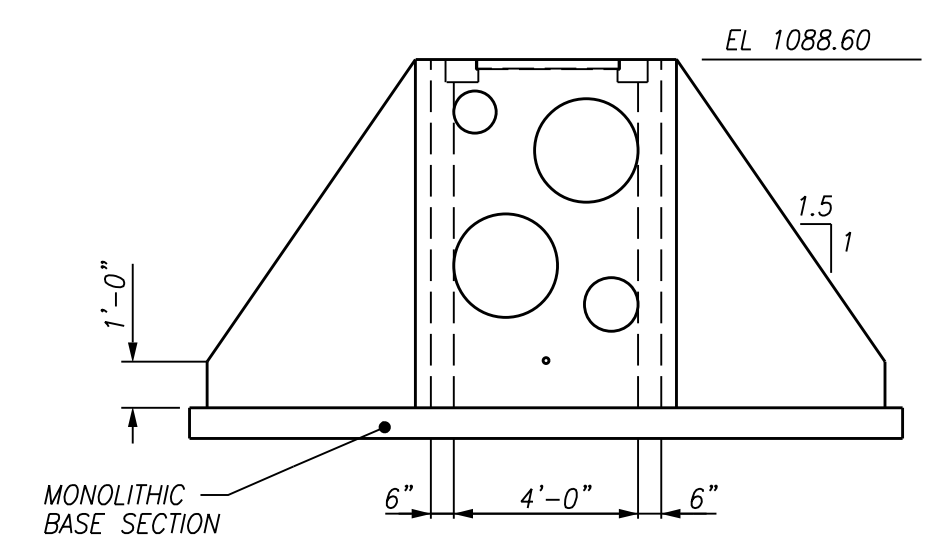
SECTION

- NOTES:**
1. INSTALL 4" PERFORATED PIPE. SET CONNECTION COUPLING AT EL 1085.20.
 2. STORAGE VOLUME REQUIRED: 3203 CY DRY AND 3203 CY WET
STORAGE VOLUME PROVIDED: 3296 CY DRY AND 3308 CY WET

35 SEDIMENT BASIN 1 - STAGE 1 & 2
C33 NTS



SECTION



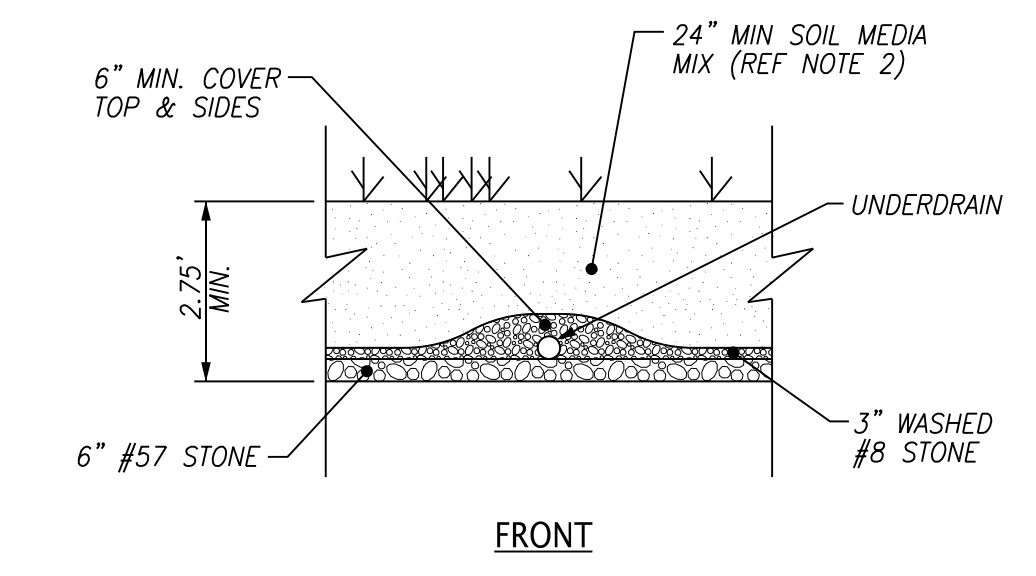
OUTLET STRUCTURE FRONT

- NOTES:**
1. KEEP ALL ORIFICES BELOW SPILLWAY ELEVATION PLUGGED UNTIL PERMANENT VEGETATION IS ESTABLISHED.
 2. CONCRETE TO BE $F_c = 4000$ PSI @ 28 DAYS, REINFORCING STEEL TO MEET THE REQUIREMENTS OF ASTM 4615, $F_y = 60,000$ PSI.
 3. LADDER BARS SHALL BE PROVIDED PER OSHA REGULATIONS.

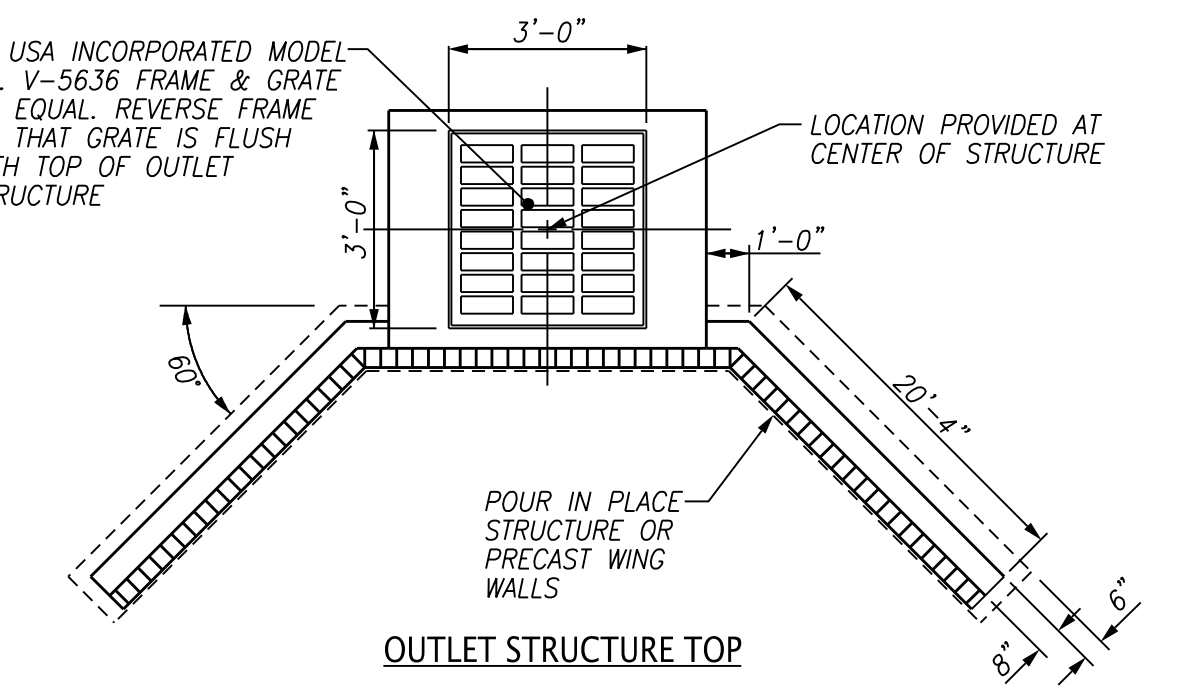
36 INFILTRATION BASIN 1 & OS 2
C33 NTS

INFILTRATION BASIN NOTES:

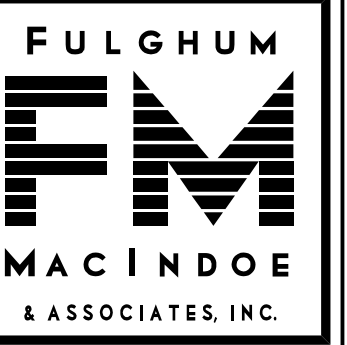
1. BEGIN CONSTRUCTION OF THE VEGETATED INFILTRATION BASIN AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED AND IMPLEMENT TEMPORARY EPSC MEASURES TO DIVERT STORMWATER AWAY FROM THE BASIN UNTIL IT IS COMPLETED.
2. THE SOIL MEDIA SHALL BE UNIFORM AND FREE OF STONES, STUMPS, ROOTS, OR OTHER SIMILAR MATERIAL GREATER THAN 2 INCHES AND A HOMOGENOUS SOIL MIX OF 75% BY VOLUME SAND (USDA SOIL TEXTURAL CLASSIFICATION, COMBINATION OF 25% 3/8" AGGREGATE, WASHED #8 LIMESTONE AND 75% COARSE RIVER SAND, ASTM 33), 15% SANDY LOAM (APPROX. 60% SAND, 30% SILT, 10% CLAY), AND 10% ORGANIC MATTER (SUCH AS PEAT MOSS OR COMPOST WITH A SOLVITA TEST INDICATING MATURATION LEVEL SUFFICIENT TO PROVIDE A FERTILE ORGANIC COMPONENT TO THE SOIL. THE PHOSPHOROUS CONTENT OF SOIL MIX SHOULD BE LOW WITH A P-INDEX BETWEEN 10 TO 30. TEST THE SOIL MEDIA AFTER PLACEMENT. THE PERMEABILITY SHALL BE BETWEEN 2-6 INCHES PER HOUR. CONTACT TOTAL PROPERTY MANAGEMENT, ROBERT WHITAKER, 865.771.0436 OR EQUAL.
3. REMOVE ACCUMULATED SEDIMENT AND RIP/LOOSEN THE BOTTOM SOILS (SUBGRADE) TO A DEPTH OF 6 TO 12 INCHES TO PROMOTE GREATER INFILTRATION AND PROTECT IT FROM COMPACTION AND OTHER CONSTRUCTION ACTIVITIES.
4. DELIVER OR PREPARE THE SOIL MEDIA, AND STORE IT ON AN ADJACENT IMPERVIOUS AREA OR PLASTIC SHEETING. APPLY THE MEDIA IN 12-INCH LIFTS UNTIL THE DESIRED SURFACE ELEVATION. AFTER 5 DAYS, CHECK FOR SETTLEMENT, AND ADD ADDITIONAL MEDIA, AS NEEDED, TO ACHIEVE THE DESIGN ELEVATION.
5. SEED THE AREA WITH SOUTHEAST RAIN GARDEN MIX (ITEM #ERNMX-180-2) AS PROVIDED BY ERNST SEEDS (800.873.3321). PREPARE THE BED, APPLY SEED PER THE RECOMMENDATIONS OF ERNST SEEDS. WATER AS NECESSARY DURING WEEKS OF NO RAIN FOR THE FIRST TWO MONTHS.
6. IF THE SURFACE COVERAGE IS LESS THAN 50% WITHIN 60 DAYS OF PLANTING, REWORK THE GROUND AND RESEED.
7. IF SITE CONSTRUCTION WILL CONTINUE, CORDON-OFF THE BASIN FROM CONSTRUCTION TRAFFIC AND KEEP THE AREA FREE OF SEDIMENT AND DEBRIS.
8. FOR THE FIRST 6 MONTHS FOLLOWING CONSTRUCTION, INSPECT THE BASIN AT LEAST TWICE AFTER STORM EVENTS THAT EXCEED 0.5 INCH OF RAINFALL.
9. ACHIEVE SURFACE AREA COVERAGE OF AT LEAST 75% IN THE FIRST TWO YEARS OF PLANT GROWTH.



FRONT



OUTLET STRUCTURE TOP



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BALL HOMES, LLC
6309 WALDEN DRIVE
LEXINGTON, KY 40517
CONTACT: MR. D. RAY BALL, JR.
TELEPHONE NO.: 859.268.1191

INFILTRATION BASIN DETAILS

PROJ. MGR.	DESIGNED BY	DRAWN BY	Date
	WCF	CHG	09/18/20
			Revision/Issue
			No.

Project 592.007
Date 09/18/20
Scale N.T.S.
C33



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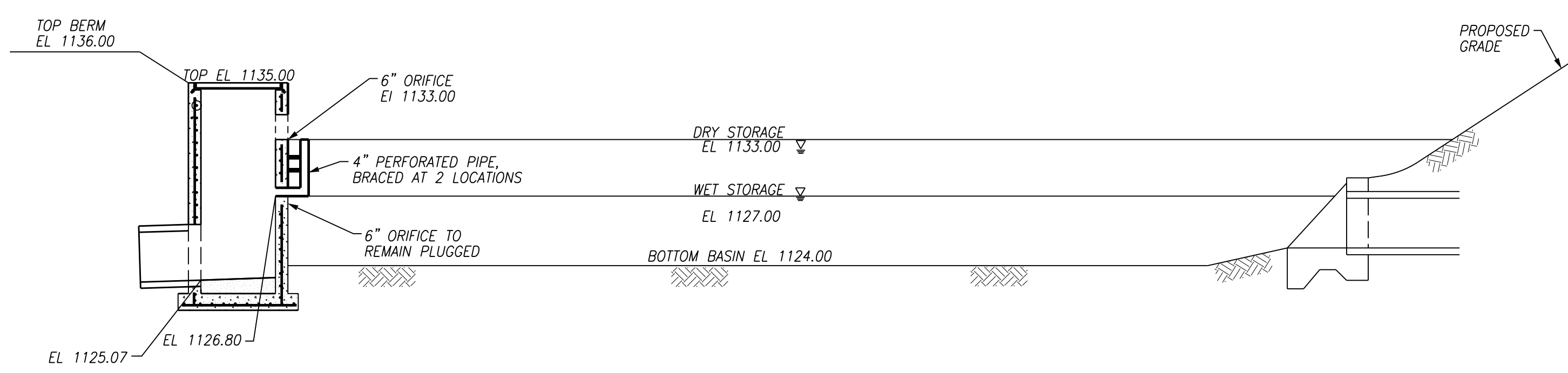
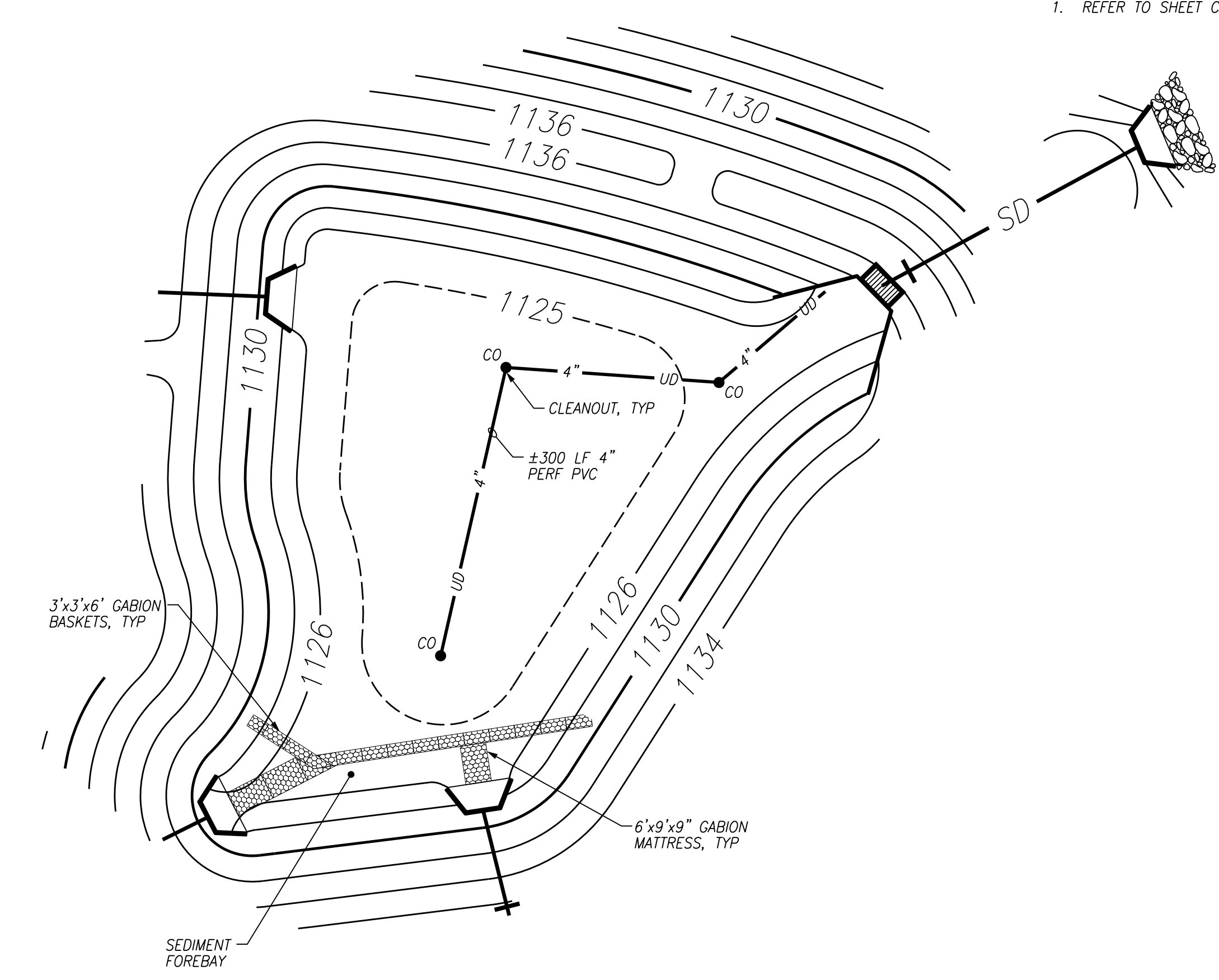
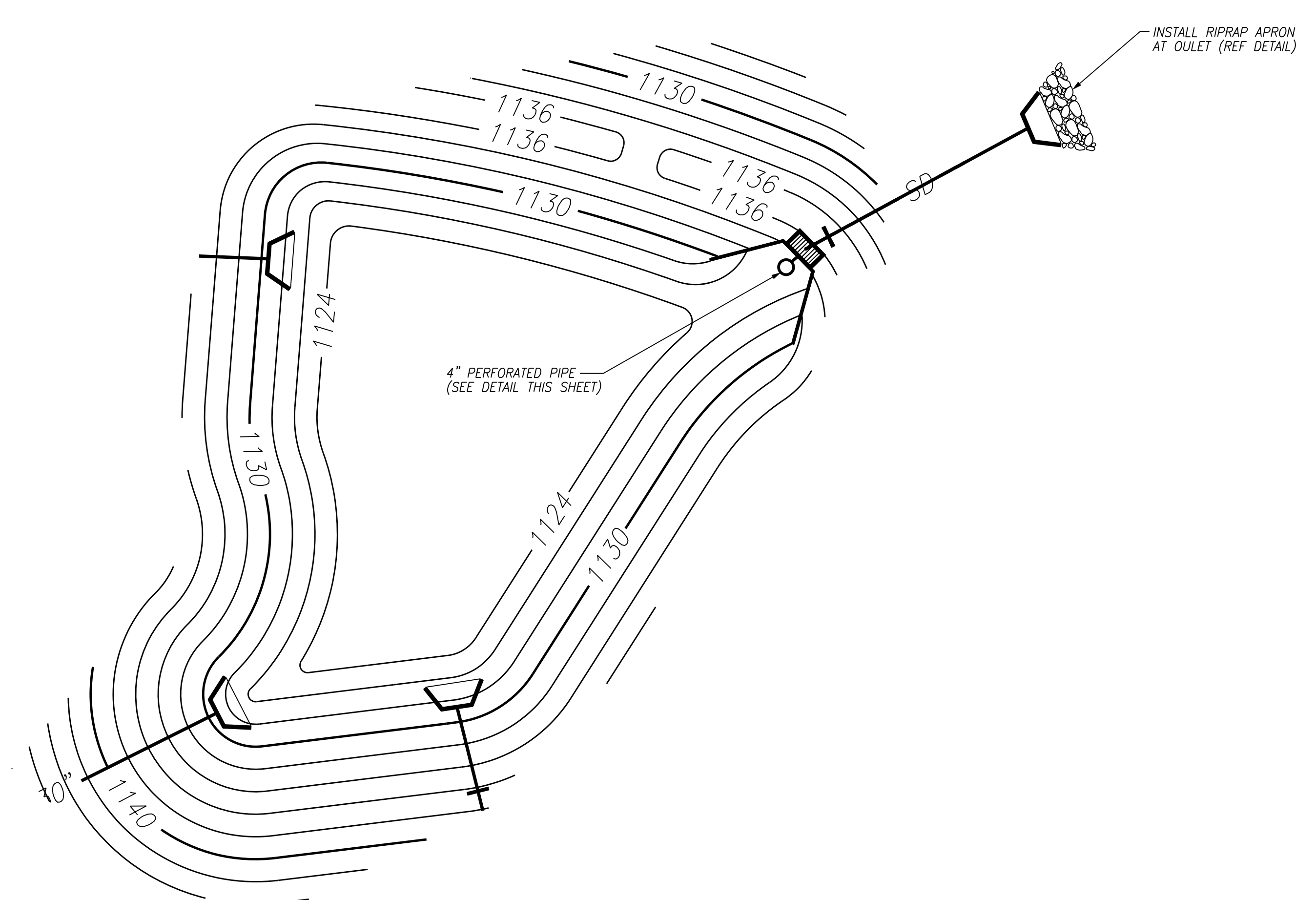
BALL HOMES, LLC
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CONTACT: MR. D. RAY BALL, JR.
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INFILTRATION BASIN DETAILS

PROJECT MGR.	DESIGNED BY	DRAWN BY	DATE
WCF	CHG	HNU	09/18/20
			Revision/Issue
			No.

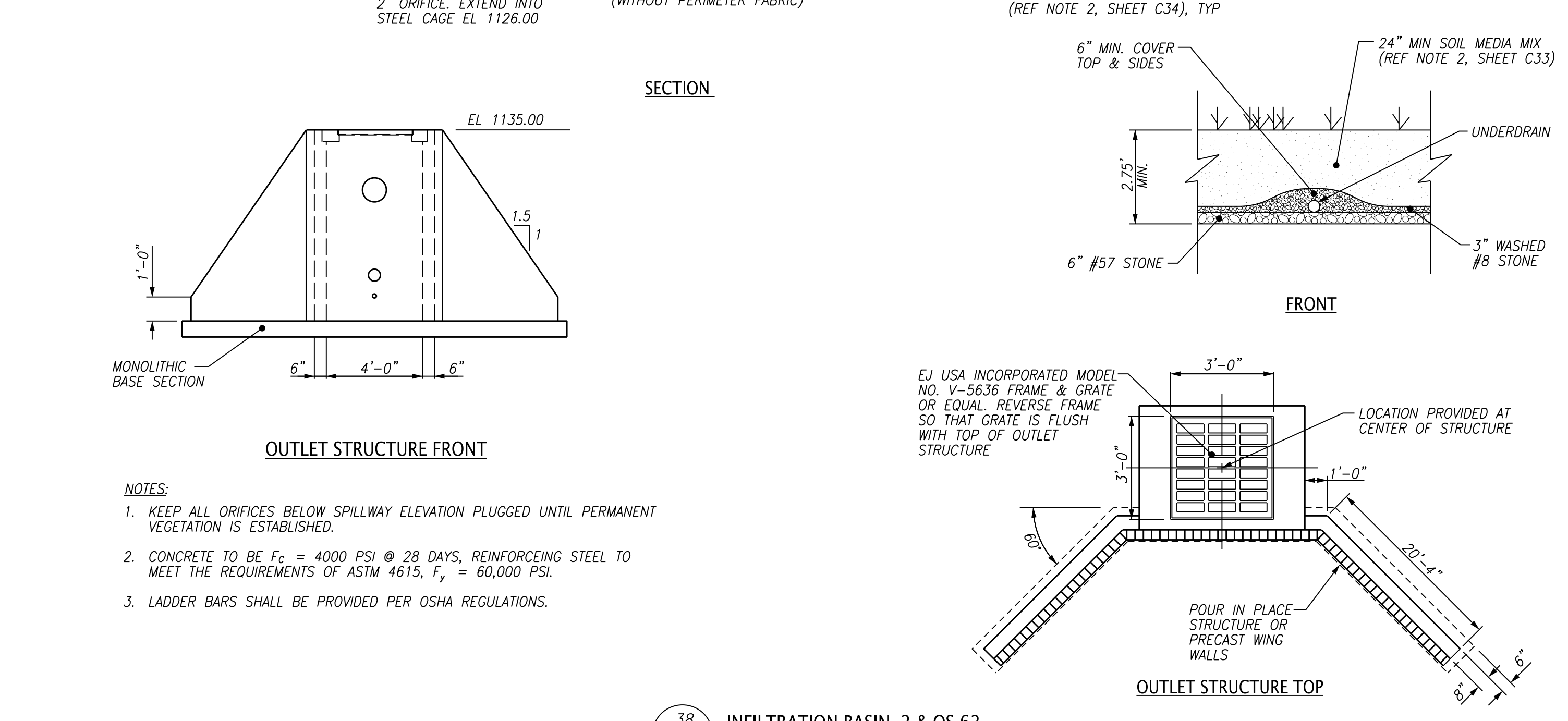
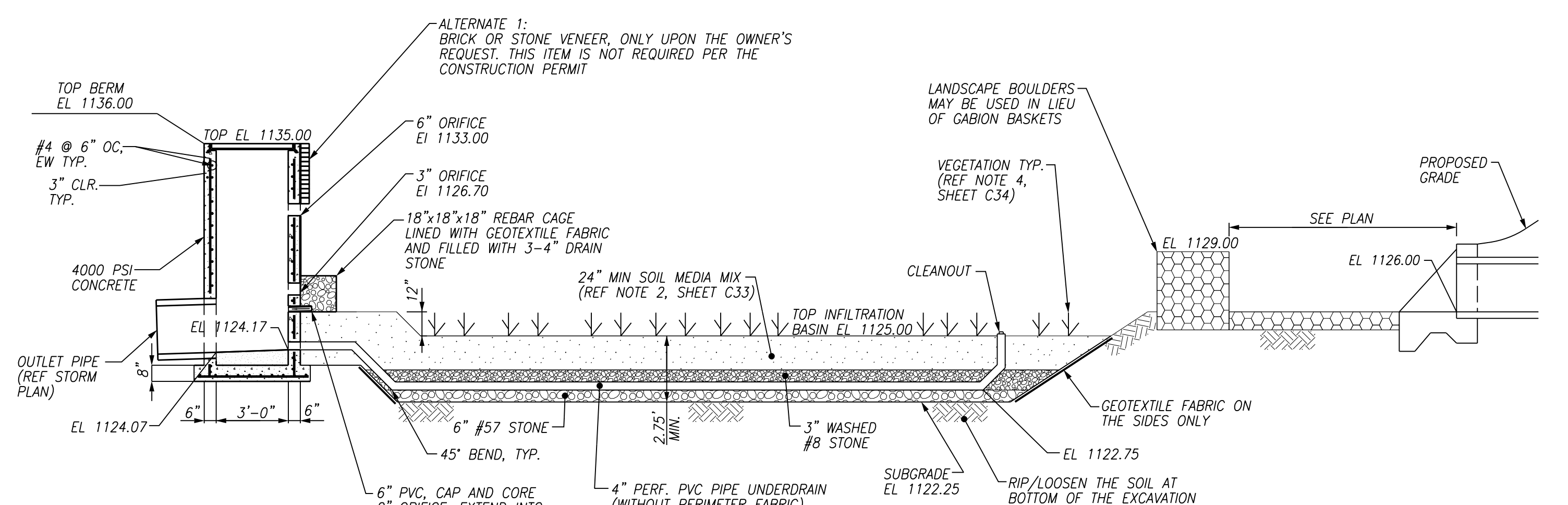
Project	Sheet
592.007	C34
Date	N.T.S.
09/18/20	
Scale	
N.T.S.	

INFILTRATION BASIN NOTES:
1. REFER TO SHEET C.33 FOR INFILTRATION BASIN NOTES.



- NOTES:**
- INSTALL 4" PERFORATED PIPE. SET CONNECTION COUPLING AT EL 1127.00.
 - STORAGE VOLUME REQUIRED: 776 CY DRY AND 776 CY WET
STORAGE VOLUME PROVIDED: 3,304 CY DRY AND 1,073 CY WET

37 SEDIMENT BASIN 2 - STAGE 1 & 2
C34 NTS



- NOTES:**
- KEEP ALL ORIFICES BELOW SPILLWAY ELEVATION PLUGGED UNTIL PERMANENT VEGETATION IS ESTABLISHED.
 - CONCRETE TO BE $F_c = 4000$ PSI @ 28 DAYS, REINFORCING STEEL TO MEET THE REQUIREMENTS OF ASTM 4615, $F_y = 60,000$ PSI.
 - LADDER BARS SHALL BE PROVIDED PER OSHA REGULATIONS.

38 INFILTRATION BASIN 2 & OS 62
C34 NTS

PAVEMENT EDGE DROP-OFF TRAFFIC CONTROL NOTES:

- A. DIFFERENCES IN ELEVATION BETWEEN ADJACENT TRAFFIC LANES OR TRAFFIC LANE AND SHOULDER WHERE THE TRAFFIC LANE IS BEING USED BY TRAFFIC, CAUSED BY BASE, PAVING OR RESURFACING:
 1. DIFFERENCES IN ELEVATION BETWEEN ADJACENT ROADWAY ELEMENTS GREATER THAN 0.75 INCH AND NOT EXCEEDING 2 INCHES:
 - a. WARNING SIGNS, UNEVEN LANES (W8-11) AND/OR SHOULDER DROP-OFF WITH PLAQUE (W8-17 AND W8-17P), SHALL BE PLACED IN ADVANCE OF AND THROUGHOUT THE EXPOSED AREA. MAXIMUM SPACING BETWEEN SIGNS SHALL BE 2,000 FEET WITH A MINIMUM OF 2 SIGNS PER EXPOSED AREA. WHERE UNEVEN PAVEMENT IS ENCOUNTERED, SIGNS SHALL BE PLACED ON EACH SIDE OF THE ROADWAY.
 - b. DIFFERENCES IN ELEVATION BETWEEN ADJACENT TRAFFIC LANES BEING UTILIZED BY TRAFFIC CAUSED BY ADDED PAVEMENT SHALL BE ELIMINATED WITHIN THREE WORKDAYS.
 - c. DIFFERENCES IN ELEVATION BETWEEN ADJACENT TRAFFIC LANES BEING UTILIZED BY TRAFFIC CAUSED BY COLD PLANING SHALL BE ELIMINATED WITHIN THREE WORKDAYS.
 - d. WHEN THE DIFFERENCE IN ELEVATION IS BETWEEN THE TRAFFIC LANE BEING UTILIZED BY TRAFFIC AND SHOULDER THE DIFFERENCE IN ELEVATION SHALL BE ELIMINATED WITHIN SEVEN WORKDAYS AFTER THE CONDITION IS CREATED.
 2. DIFFERENCES IN ELEVATION BETWEEN ADJACENT ROADWAY ELEMENTS GREATER THAN 2 INCHES AND NOT EXCEEDING 6 INCHES. TRAFFIC IS NOT TO BE ALLOWED TO TRAVERSE THIS DIFFERENCE IN ELEVATION.
 - a. SEPARATION SHALL BE ACCOMPLISHED BY DRUMS, BARRICADES OR OTHER APPROVED DEVICES IN ACCORDANCE WITH THE FOLLOWING:
 - (1) WHERE POSTED SPEEDS ARE 50 MPH OR GREATER, SPACING OF THE PROTECTIVE DEVICES SHALL NOT EXCEED 100 FEET.
 - (2) WHERE POSTED SPEEDS ARE LESS THAN 50 MPH, THE MAXIMUM SPACE OF THE PROTECTIVE DEVICES IN FEET SHALL NOT EXCEED TWICE THE POSTED SPEED IN MILES PER HOUR OR 50 FEET, WHICHEVER SPACING IS GREATER.
 - b. IF THE DIFFERENCE IN ELEVATION IS ELIMINATED OR DECREASED TO 2 INCHES OR LESS BY THE END OF EACH WORKDAY, CONES MAY BE USED DURING DAYLIGHT HOURS IN LIEU OF DRUMS, BARRICADES OR OTHER APPROVED PROTECTIVE DEVICES MENTIONED IN PARAGRAPH a. PROVIDED WARNING SIGNS ARE ERECTED. WARNING SIGNS (UNEVEN LANES AND/OR SHOULDER DROP-OFF) SHALL BE PLACED IN ADVANCE OF AND THROUGHOUT THE EXPOSED AREA. MAXIMUM SPACING BETWEEN SIGNS SHALL BE 2,000 FEET WITH A MINIMUM OF 2 SIGNS PER EXPOSED AREA. WHERE UNEVEN PAVEMENT IS ENCOUNTERED, SIGNS SHALL BE PLACED ON EACH SIDE OF THE ROADWAY.
 - c. WHEN THE DIFFERENCE IN ELEVATION IS BETWEEN THE THROUGH TRAFFIC LANE AND THE SHOULDER AND THE ELEVATION DIFFERENCE IS LESS THAN 3.5 INCHES, THE CONTRACTOR MAY USE WARNING SIGNS AND/OR PROTECTIVE DEVICES AS APPLICABLE AND APPROVED BY THE ENGINEER. SEE PARAGRAPH a REGARDING USE OF DRUMS, BARRICADES OR OTHER APPROVED PROTECTIVE DEVICES. WARNING SIGNS (UNEVEN LANES AND/OR SHOULDER DROP-OFF) WILL BE PLACED IN ADVANCE OF AND THROUGHOUT THE EXPOSED AREA. MAXIMUM SPACING BETWEEN SIGNS SHALL BE 2,000 FEET WITH A MINIMUM OF 2 SIGNS PER EXPOSED AREA. WHERE UNEVEN PAVEMENT IS ENCOUNTERED, SIGNS SHALL BE PLACED ON EACH SIDE OF THE ROADWAY.

IN THESE SITUATIONS, THE CONTRACTOR SHALL LIMIT HIS OPERATIONS TO ONE WORK ZONE NOT EXCEEDING 2 MILES IN LENGTH UNLESS OTHERWISE NOTED ON THE PLANS OR APPROVED BY THE ENGINEER. ONCE THE CONTRACTOR BEGINS WORK IN A WORK ZONE, A CONTINUOUS OPERATION SHALL BE MAINTAINED UNTIL THE DIFFERENCE IN ELEVATION IS ELIMINATED. SIMULTANEOUS WORK ON SEPARATE ROADWAYS OF DIVIDED HIGHWAYS WILL BE CONSIDERED INDEPENDENTLY IN REGARD TO RESTRICTION OF WORK ZONE ACTIVITY.

3. DIFFERENCES IN ELEVATION BETWEEN ADJACENT ROADWAY ELEMENTS GREATER THAN 6 INCHES BUT NOT EXCEEDING 18 INCHES, THE CONTRACTOR WITH THE ENGINEER'S APPROVAL, MAY UTILIZE ONE OF THE FOLLOWING:
 - a. THE CONTRACTOR SHALL ACCOMPLISH SEPARATION BY DRUMS, BARRICADES OR OTHER APPROVED DEVICES IN ACCORDANCE WITH THE FOLLOWING:
 - (1) WHERE POSTED SPEEDS ARE 50 MPH OR GREATER, SPACING OF THE PROTECTIVE DEVICES SHALL NOT EXCEED 100 FEET.
 - (2) WHERE POSTED SPEEDS ARE LESS THAN 50 MPH, THE MAXIMUM SPACE OF THE PROTECTIVE DEVICES IN FEET SHALL NOT EXCEED TWICE THE POSTED SPEED IN MILES PER HOUR OR 50 FEET, WHICHEVER SPACING IS GREATER.
 - b. THE CONTRACTOR SHALL PROVIDE DRUMS, BARRICADES OR OTHER APPROVED SEPARATION DEVICES AS SPECIFIED IN PARAGRAPH a. AND CONSTRUCT A STONE WEDGE WITH A 4:1 SLOPE, OR FLATTER, TO ELIMINATE THE VERTICAL OFFSET IF THE LOWER ELEVATION IS AT OR BELOW SUBGRADE AT THE END OF EACH DAY.
 - c. THE CONTRACTOR SHALL PROVIDE DRUMS, BARRICADES OR OTHER APPROVED SEPARATION DEVICES AS SPECIFIED IN PARAGRAPH a. AND IF THE LOWER ELEVATION IS BASE STONE OR ASPHALT PAVEMENT, PLACEMENT OF SUBSEQUENT LAYERS OF PAVEMENT MUST BEGIN THE NEXT WORK DAY AND PROGRESS CONTINUOUSLY UNTIL THE DIFFERENCE IN ELEVATION IS ELIMINATED OR REDUCED TO SIX INCHES OR LESS.
 - d. THE CONTRACTOR SHALL PROVIDE SEPARATION BY PORTABLE BARRIER RAIL.

FOR PRECEDING CONDITIONS a, b, AND c, THE CONTRACTOR SHALL USE THE SHOULDER DROP-OFF WARNING SIGN WITH PLAQUE (W8-17 AND W8-17P). IT SHALL BE PLACED IN ADVANCE OF AND THROUGHOUT THE EXPOSED AREA. MAXIMUM SPACING BETWEEN THE SIGNS SHALL BE 2,000 FEET WITH A MINIMUM OF 2 SIGNS PER EXPOSED AREA. IN THESE SITUATIONS, THE CONTRACTOR SHALL LIMIT HIS OPERATIONS TO ONE WORK ZONE NOT EXCEEDING 1 MILE IN LENGTH UNLESS OTHERWISE NOTED ON THE PLANS OR APPROVED BY THE ENGINEER. ONCE THE CONTRACTOR BEGINS WORK IN A WORK ZONE, A CONTINUOUS OPERATION SHALL BE MAINTAINED UNTIL THE DIFFERENCE IN ELEVATION IS ELIMINATED. SIMULTANEOUS WORK ON SEPARATE ROADWAYS OF DIVIDED HIGHWAYS WILL BE CONSIDERED INDEPENDENTLY IN REGARD TO RESTRICTION OF WORK ZONE ACTIVITY.

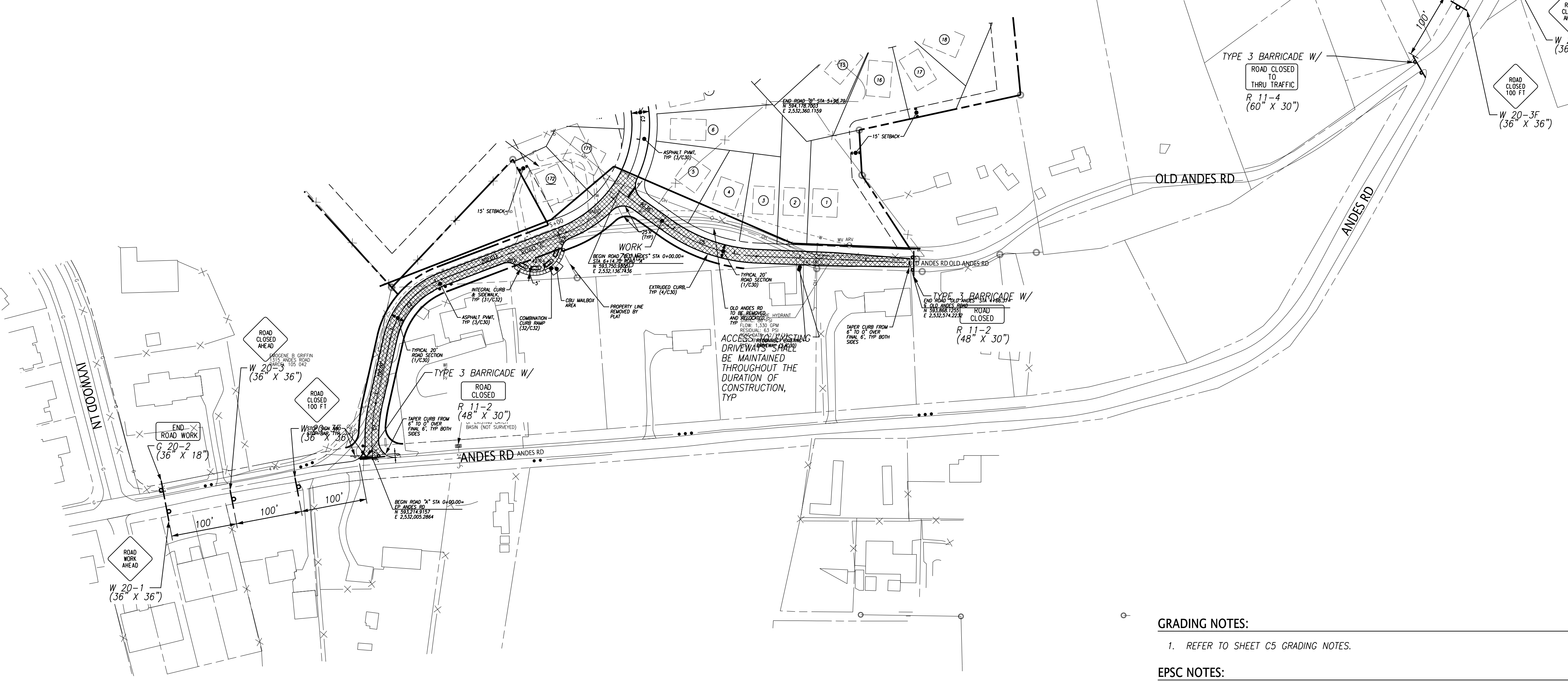
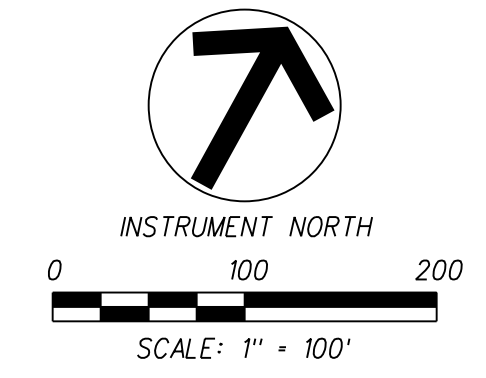
SEPARATION WILL BE PROVIDED BY USE OF PORTABLE BARRIER RAIL. IN THIS SITUATION THE CONTRACTOR SHALL LIMIT HIS OPERATIONS TO ONE WORK ZONE NOT EXCEEDING 1 MILE IN LENGTH UNLESS OTHERWISE NOTED ON THE PLANS OR APPROVED BY THE ENGINEER. ONCE THE CONTRACTOR BEGINS WORK IN A WORK ZONE, A CONTINUOUS OPERATION SHALL BE MAINTAINED UNTIL THE DIFFERENCE IN ELEVATION IS ELIMINATED. SIMULTANEOUS WORK ON SEPARATE ROADWAYS OF DIVIDED HIGHWAYS WILL BE CONSIDERED INDEPENDENTLY IN REGARD TO RESTRICTION OF WORK ZONE ACTIVITY.

- B. IF THE DIFFERENCE IN ELEVATION IS WITHIN 30 FEET OF THE NEAREST TRAFFIC LANE BEING USED BY TRAFFIC CAUSED BY GRADING, EXCAVATION FOR UTILITIES, DRAINAGE STRUCTURES, UNDERCUTTING, ETC.:
 1. IF THE DIFFERENCE IN ELEVATION IS WITHIN 8 FEET OF THE NEAREST TRAFFIC LANE WITH DIFFERENCE IN ELEVATION GREATER THAN 3/4 INCH AND NOT EXCEEDING 2 INCHES.
 - a. WARNING SIGNS (UNEVEN LANES AND/OR SHOULDER DROP-OFF) SHALL BE 2,000 FEET WITH A MINIMUM OF 2 SIGNS PER EXPOSED AREA. WHERE UNEVEN PAVEMENT IS ENCOUNTERED, SIGNS SHALL BE PLACED ON EACH SIDE OF THE ROADWAY.
 2. IF THE DIFFERENCE IN ELEVATION IS WITHIN 8 FEET OF THE NEAREST TRAFFIC LANE WITH DIFFERENCE IN ELEVATION GREATER THAN 2 INCHES AND NOT EXCEEDING 6 INCHES.
 - a. SEPARATION SHALL BE ACCOMPLISHED BY DRUMS, BARRICADES OR OTHER APPROVED DEVICES IN ACCORDANCE WITH THE FOLLOWING:
 - (1) WHERE POSTED SPEEDS ARE 50 MPH OR GREATER, SPACING OF THE PROTECTIVE DEVICES SHALL NOT EXCEED 100 FEET.
 - (2) WHERE POSTED SPEEDS ARE LESS THAN 50 MPH, THE MAXIMUM SPACE OF THE PROTECTIVE DEVICES IN FEET SHALL NOT EXCEED TWICE THE POSTED SPEED IN MILES PER HOUR OR 50 FEET, WHICHEVER SPACING IS GREATER.
 3. IF THE DIFFERENCE IN ELEVATION IS WITHIN 8 FEET OF THE NEAREST TRAFFIC LANE WITH DIFFERENCE IN ELEVATION GREATER THAN 6 INCHES:
 - a. THE CONTRACTOR SHALL ACCOMPLISH SEPARATION BY DRUMS, BARRICADES OR OTHER APPROVED DEVICES IN ACCORDANCE WITH THE FOLLOWING:
 - (1) WHERE POSTED SPEEDS ARE 50 MPH OR GREATER, SPACING OF THE PROTECTIVE DEVICES SHALL NOT EXCEED 100 FEET.
 - (2) WHERE POSTED SPEEDS ARE LESS THAN 50 MPH, THE MAXIMUM SPACE OF THE PROTECTIVE DEVICES IN FEET SHALL NOT EXCEED TWICE THE POSTED SPEED IN MILES PER HOUR OR 50 FEET, WHICHEVER SPACING IS GREATER.
 - b. ELIMINATE VERTICAL OFFSET BY CONSTRUCTING A STONE WEDGE OR GRADING TO A 4:1 SLOPE, OR FLATTER, OR USED PORTABLE BARRIER RAIL.

THE CONTRACTOR SHALL SCHEDULE THE WORK SO AS TO MINIMIZE THE TIME TRAFFIC IS EXPOSED TO AN ELEVATION DIFFERENCE. ONCE THE CONTRACTOR BEGINS AN ACTIVITY THAT CREATES AN ELEVATION DIFFERENCE WITHIN 8 FEET OF A TRAFFIC LANE, THE ACTIVITY SHALL BE PURSUED AS A CONTINUOUS OPERATION UNTIL THE ELEVATION DIFFERENCE IS ELIMINATED.

- C. IF THE DIFFERENCE IN ELEVATION IS FARTHER THAN 8 FEET FROM THE NEAREST TRAFFIC LANE BUT NOT MORE THAN 30 FEET FROM THE NEAREST TRAFFIC LANE: SEPARATION SHALL BE ACCOMPLISHED BY DRUMS, BARRICADES OR OTHER APPROVED DEVICES IN ACCORDANCE WITH THE FOLLOWING:
 1. WHERE POSTED SPEEDS ARE 50 MPH OR GREATER, SPACING OF THE PROTECTIVE DEVICES SHALL NOT EXCEED 100 FEET.
 2. WHERE POSTED SPEEDS ARE LESS THAN 50 MPH, THE MAXIMUM SPACING OF THE PROTECTIVE DEVICES IN FEET SHALL NOT EXCEED TWICE THE POSTED SPEED IN MILES PER HOUR OR 50 FEET, WHICHEVER SPACING IS GREATER.

THE CONTRACTOR SHALL SCHEDULE THE WORK SO AS TO MINIMIZE THE TIME TRAFFIC IS EXPOSED TO AN ELEVATION DIFFERENCE. ONCE THE CONTRACTOR BEGINS AN ACTIVITY THAT CREATES AN ELEVATION DIFFERENCE, THE ACTIVITY SHALL BE PURSUED AS A CONTINUOUS OPERATION UNTIL THE ELEVATION DIFFERENCE IS ELIMINATED.



- TRAFFIC CONTROL NOTES:**
1. ALL TEMPORARY WORK ZONE TRAFFIC CONTROL SIGNAGE, DEVICES, AND PROCEDURES TO BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
 2. THE CONTRACTOR IS TO IMPLEMENT THIS TRAFFIC CONTROL PLAN AS SHOWN AND IS RESPONSIBLE FOR MAKING ANY FIELD ADJUSTMENTS DEEMED NECESSARY IN ACCORDANCE WITH THE MUTCD. THIS PLAN DOES NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES TO THE SAFETY OF THE TRAVELING PUBLIC AND RESIDENTS ALONG THE CONSTRUCTION AREA.
 3. WHEN NOT NEEDED FOR ONGOING WORK ACTIVITIES, TRAFFIC CONTROL SIGNS AND DEVICES SHALL BE REMOVED FROM THE AREA, COVERED, OR OTHERWISE POSITIONED IN A MANNER THAT MAKES IT OBVIOUS THAT THEY ARE NOT IN USE.
 4. CHANNELIZING DEVICES TO BE STANDARD MUTCD DRUMS OR MIN. 28" TALL CONES WITH WEIGHTED BASES AND SHALL BE REFLECTORIZED.
 5. CONTRACTOR TO MAINTAIN ACCESS TO SIDE ROADS AND DRIVEWAYS AT ALL TIMES.
 6. CONTRACTOR TO CONTACT KNOX COUNTY ENGINEERING AT 865.215.5860 AT LEAST ONE DAY PRIOR TO REROUTING TRAFFIC.
 7. ALL SIGNS AND CHANNELIZING DEVICES SHALL HAVE A MEANS OF RETROREFLECTION FOR USE AT NIGHT. REFERENCE MUTCD FOR VARIOUS MEANS OF RETROREFLECTION.
 8. CONTRACTOR SHALL KEEP WORK ZONE LENGTHS TO A MINIMUM BY SHIFTING THE WORK ZONE AS WORK PROGRESSES WHERE PRACTICAL.
 9. ADVANCE WARNING SIGNS SHALL NOT BE DISPLAYED MORE THAN 48 HOURS BEFORE PHYSICAL CONSTRUCTION BEGINS. SIGNS MAY BE ERECTED UP TO ONE WEEK BEFORE NEEDED IF THE SIGN FACE IS FULLY COVERED.
 10. LONG TERM BUT SPORADIC USE WARNING SIGNS MAY REMAIN IN PLACE WHEN NOT REQUIRED PROVIDED THE SIGN FACE IS FULLY COVERED.
 11. TRAFFIC CONTROL DEVICES SHALL NOT BE DISPLAYED OR ERECTED UNLESS RELATED CONDITIONS ARE PRESENT NECESSITATING WARNING.
 12. USE OF BARRICADES AND DRUMS SHALL BE LIMITED TO THE IMMEDIATE AREAS OF CONSTRUCTION WHERE A HAZARD IS PRESENT. THESE DEVICES SHALL NOT BE STORED ALONG THE ROAD WITHIN 10 FEET OF THE EDGE OF TRAVELED WAY BEFORE OR AFTER USE. THESE DEVICES SHALL BE REMOVED FROM THE CONSTRUCTION WORK ZONE WHEN THEY ARE NO LONGER NEEDED. WHERE THERE IS INSUFFICIENT RIGHT-OF-WAY TO PROVIDE FOR THIS SETBACK, THE CONTRACTOR SHALL DETERMINE ALTERNATE LOCATIONS SUBJECT TO APPROVAL BY THE RESPONSIBLE AGENCY.
 13. DURING PERIODS OF INACTIVITY, THE CONTRACTOR SHALL NOT BE PERMITTED TO PARK ANY VEHICLES OR CONSTRUCTION EQUIPMENT WITHIN TEN FEET OF THE EDGE OF PAVEMENT WHILE THE LANE IS OPEN TO TRAFFIC. PRIVATELY OWNED VEHICLES SHALL NOT BE ALLOWED TO BE PARKED WITHIN TEN FEET OF AN OPEN TRAFFIC LANE AT ANY TIME. WHERE THERE IS INSUFFICIENT RIGHT-OF-WAY TO PROVIDE FOR THIS SETBACK, THE CONTRACTOR SHALL DETERMINE ALTERNATE LOCATIONS SUBJECT TO APPROVAL BY THE RESPONSIBLE AGENCY.
 14. PORTABLE BARRIER RAIL WILL BE REQUIRED WHERE DROP OFFS EXCEED 18 INCHES. PORTABLE BARRIER RAIL MAY BE USED WHERE DROP OFFS EXCEED 6 INCHES. FOR MORE SPECIFIC INFORMATION SEE TDOT DROP-OFF POLICY.

- GRADING NOTES:**
1. REFER TO SHEET C5 GRADING NOTES.
- EPSC NOTES:**
1. REFER TO SHEETS C8 FOR EPSC NOTES.



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TELEPHONE NO.: 859.268.1191

TRAFFIC CONTROL PLAN

PROJECT	592.007	SHEET	C40
DATE	09/18/20	SCALE	1"=100'
DRAWN BY	HNU	DESIGNED BY	CHG
PROJ. MGR.	WCF	ISSUED FOR CONSTRUCTION	09/18/20
		REVISION/ISSUE	Date
		No.	