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)

Application for Aquatic Resource Alteration Permit (ARAP) & State §401 Water Quality Certification

OFFICIAL STATE USE ONLY	Site #:		Permit #:	

Section 1. Applicant Information (individual responsible for site, signs certification below)

Applicant Name (company or individual): Michael Williamson		SOS #:	Status: N/A
Primary Contact/Signatory: Michael Williamson		Signatory's Title or Position:	
Mailing Address: 20 25th Street, Suite 6		City: Cleveland	State: TN Zip: 37311
Phone: 423-667-6367	Fax:	E-mail:	

Section 2. Alternate Contact/Consultant Information (a consultant is not required)

Alternate Contact Name: Christopher M Berry, PE			
Company: Berry Engineers, LLC		Title or Position: Partner	
Mailing Address: 63 Broad St NW		City: Cleveland	State: TN Zip: 37311
Phone: 423--790-5880	Fax:	E-mail: michaelappraiser@yahoo.com	

Section 3. Fee (application will be incomplete until fee is received)

☐ No Fee ☒ Fee Submitted with Application Amount Submitted: $ $1500

Current application fee schedules can be found at the Division of Water Resources webpage at:
https://www.tn.gov/environment/permit-permits/water-permits1/aquatic-resource-alteration-permit--arap-.html
or by calling (615) 532-0625. Please make checks payable to "Treasurer, State of Tennessee".

Billing Contact (if different from Applicant): Name: Email:

Address: Phone:

Section 4. Project Details (fill in information and check appropriate boxes)

Site or Project Name: Briar Creek Subdivision		Nearest City, Town or Major Landmark: Cleveland
Street Address or Location (include zip):		
County(ies): Bradley	MS4 Jurisdiction: Cleveland	Latitude (dd.dddd): 35.1772 Longitude (dd.dddd): -84.8217

Resources Proposed for Alteration: ☑ Stream / River ☐ Wetland ☐ Reservoir

Name of Water Resource (for more information, access *http://tdeconline.tn.gov/dwr*): Little Chatata Creek

Brief Project Description (a more detailed description is required under Section 8):
Residential Sub. along Michigan Ave Rd in Cleveland

Does the proposed activity require approval from the U.S. Army Corps of Engineers, the Tennessee Valley Authority, or any other federal, state, or local government agency? ☐ Yes ☒ No

If Yes, provide the permit reference numbers:

Will the activity require a 401 Water Quality Certification: ☐ Yes ☐ No

If Yes, attach any 401 WQC pre-filing meeting request documentation

Is the proposed activity associated with a larger common plan of development: ☐ Yes ☒ No

If Yes, submit site plans and identify the location and overall scope of the common plan of development.

Plans attached? ☐ Yes ☒ No

If applicable, indicate any other federal, state, or local permits that are associated with the overall project site (common plan of development) that have been obtained in the past (e.g., construction general permit and/or other ARAP):

Application for Aquatic Resource Alteration Permit (ARAP) & State §401 Water Quality Certification

Section 5. Project Schedule (fill in information and check appropriate boxes)		
Proposed start date: 8/1/2024	Estimated end date: 8/1/2025	
Is any portion of the activity complete now?	☐ Yes	☒ No
If yes, describe the extent of the completed portion: N/A		

The required information in Sections 6-11 must be submitted on a separate sheet(s) and submitted in the same numbered format as presented below. If any question in not applicable, state the reason why it is not applicable.

Section 6. Description		**Attached** Yes	No
6.1	A narrative description of the scope of the project	☒	☐
6.2	USGS topographic map indicating the exact location of the project (can be a photographic copy)	☒	☐
6.3	Photographs of the resource(s) proposed for alteration with location description (photo locations should be noted on map)	☒	☐
6.4	A narrative description of the **existing** stream and/or wetland characteristics including, but not limited to, dimensions (e.g., depth, length, average width), substrate and riparian vegetation	☒	☐
6.5	A narrative description of the **proposed** stream and/or wetland characteristics including, but not limited to, dimensions (e.g., depth, length, average width), substrate and riparian vegetation	☒	☐
6.6	In the case of wetlands, include a wetland delineation with delineation forms and site map denoting location of data points	☒	☐
6.7	A copy of all hydrologic or jurisdictional determination documents issued for water resources on the project site	☒	☐

Section 7. Project Rationale	**Attached** Yes	No
Describe the need for the proposed activity, including, but not limited to the purpose, alternatives considered and rationale for selection of least impactful alternative, and what will be done to avoid or minimize impacts to water resources	☒	☐

Section 8. Technical Information		**Attached** Yes	No
8.1	Detailed plans, specifications, blueprints, or legible sketches of present site conditions and the proposed activity. Plans must be 8.5.x 11 inches. Additional larger plans may also be submitted to aid in application review. The detailed plans should be superimposed on existing and new conditions (e.g., stream cross sections where road crossings are proposed)	☒	☐
8.2	For the proposed activity and compensatory mitigation, provide a discussion regarding the sequencing of events and construction methods and any proposed monitoring	☒	☐
8.3	Depiction and narrative on the location and type of erosion prevention and sediment control (EPSC) measures for the proposed alterations and any other measures to treat, control, or manage impacts to waters	☒	☐

Section 9. Water Resources Degradation (degree of proposed impact)

Note that in most cases, activities that exceed the scope of the General Permit limitations are considered greater than *de minimis* degradation to water quality.

Please provide your basis for concluding the proposed activity will cause one of the following levels of water quality degradation:

- ☒ a. *De minimis* degradation, no appreciable permanent loss of resource values
- ☐ b. Greater than *de minimis* degradation (if greater than *de minimis* complete Sections 10-11)

For information and guidance on the definition of de minimis and degradation, refer to the Antidegradation Statement in Chapter 0400-40-03-.06 of the Tennessee Water Quality Criteria Rule:
https://publications.tnsosfiles.com/rules/0400/0400-40/0400-40.htm
For more information on specifics on what General Permits can cover, refer to the Natural Resources Unit webpage at:
https://www.tn.gov/environment/permit-permits/water-permits1/aquatic-resource-alteration-permit--arap-.html

Application for Aquatic Resource Alteration Permit (ARAP) & State §401 Water Quality Certification

Section 10. Detailed Alternatives Analysis		Attached Yes	Attached No
10.1	Analyze all reasonable alternatives and describe the level of degradation and permanent loss of resource value caused by each alternative. Assessment must consider options other than the "Preferred" and "No Action" alternatives. Provide associated rationale for selecting or rejecting all alternatives considered and demonstration that the least impactful practicable alternative was selected.	☒	☐
10.2	Discuss the social and economic consequences of each alternative	☒	☐
10.3	Demonstrate that the degradation associated with the preferred alternative will not violate water quality criteria for uses designated in the receiving waters, and is necessary to accommodate important economic and social development in the area	☒	☐

Section 11. Compensatory Mitigation		Attached Yes	Attached No
11.1	A detailed discussion of the proposed compensatory mitigation. Provide evidence of credit reservation if proposing to utilize a third-party provider.	☐	☒
11.2	Analysis of any proposed appreciable loss of resource value using the TN Stream Mitigation Guidelines. Provide Stream Quantification Tool (SQT) results if applicable. Include Existing Condition Score (ECS) and debit/credit calculations.	☐	☐
11.3	Describe how the compensatory mitigation would result in no net loss of resource value	☐	☐
11.4	Provide a detailed monitoring plan for the compensatory mitigation site if permittee-responsible project is proposed	☐	☐
11.5	Describe the long-term protection measures for the compensatory mitigation site if permittee-responsible project is proposed (e.g., deed restrictions, conservation easement)	☐	☐

Certification and Signature

An application submitted by a corporation must be signed by a principal executive officer; from a partnership or proprietorship, by the partner or proprietor respectively; from a municipal, state, federal or other public agency or facility, the application must be signed by either a principal executive officer, ranking elected official, or other duly authorized employee. ***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. The project proponent hereby requests that the certifying authority review and take action on this CWA 401 certification request within the applicable reasonable period of time.***

Michael Williamson	Owner		6/3/2024
Michael Williamson	Owner		6/3/2024
Printed Name	Official Title	Signature	Date

Note that this form must be signed by the principal executive officer, partner or proprietor, or a ranking elected official in the case of a municipality; for details see **Certification and Signature** statement above. For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC). Submit the completed ARAP Application form (keep a copy for your records) to the appropriate EFO for the county(ies) where the proposed activity is located, addressed to **Attention: ARAP Processing**. You may also electronically submit the complete application and all associated attachments to water.permits@tn.gov.

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., 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

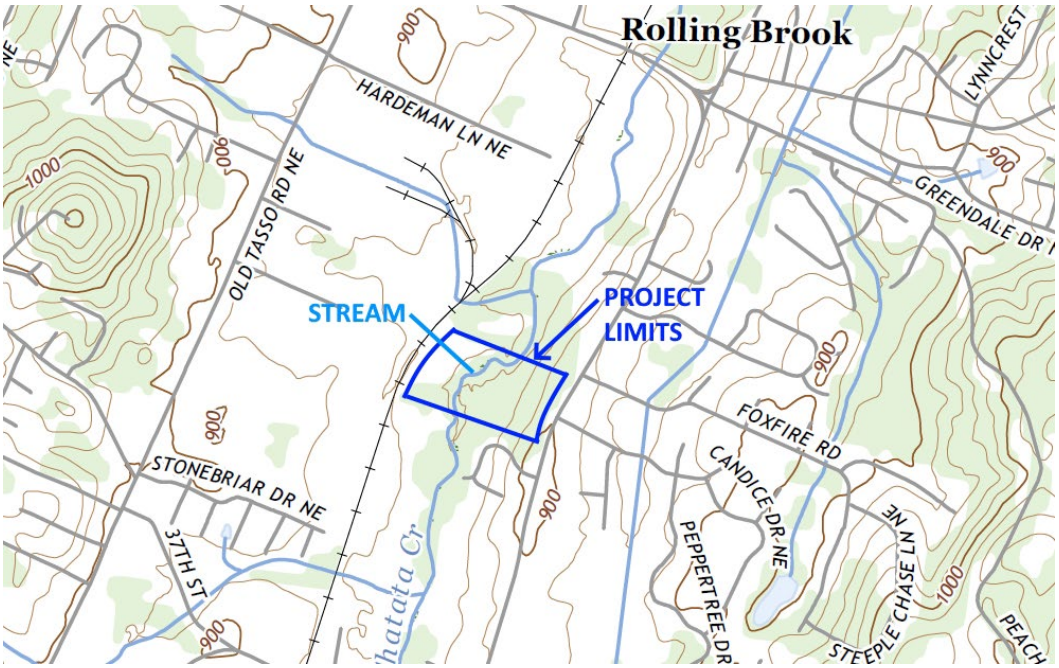
6. PROJECT DESCRIPTION

6.1 Scope of the Project

The proposed subdivision includes the following scope of work to be covered by the general ARAP permit:

- One road crossing of stream
- One waterline crossing of stream
- One sanitary sewer crossing of stream
- Two stormwater outfalls to stream

6.2 USGS Site Map



6.3 Photographs

See Appendix A for project photographs of the streams.

6.4 Existing Stream Description

Little Chatata Creek flows from southwest to northeast through the property. The existing stream characteristics, consist of:

- ~12'-20' wide
- 1'-3' flow depth
- Mud & gravel bottom
- Woodland & brush banks at crossings.

6.5 Proposed Modifications

Little Chatata Creek will have a permanent roadway crossing with installation of new triple, 12'x6' box bridge. A waterline crossing along the roadway alignment is proposed. A sanitary sewer crossing is proposed north of the roadway crossing and connecting to an existing sewer manhole structure. Two stormwater outfalls are proposed to the stream from the proposed detention basins.

6.6 Wetland Delineation Forms

S&ME provided a wetland assessment within the vicinity of Little Chatata Creek and determined that no wetland features were present . TDEC personnel reviewed the report and agreed with the findings.

6.7 Jurisdictional Determination Documents

S&ME provided a wetland assessment within the vicinity of Little Chatata Creek and determined that no wetland features were present . TDEC personnel reviewed the report and agreed with the findings. Little Chatata Creek is a jurisdictional stream through the project.

7. Purpose & Justification

The purpose of crossing the streams is to allow construction within the site and provide infrastructure for a residential subdivision.

8. Technical Information

8.1 Plans

Plans are provided within Appendix C. Large size supplemental plans are enclosed.

8.2 Construction Sequencing

Typical construction methods are anticipated for the project.

1. Silt fence will be placed around the perimeter of the disturbed area.
2. Construction exit will be installed.
3. Stream diversion & dewatering will be used for stream culvert replacement.
4. Land clearing and grading will commence. Temporary stabilization will be placed where work has stopped in accordance with the general permit.

8.3 Erosion Prevention & Sediment Control Measures

EPSC plans are provided within Appendix C and the supplemental plans provided.

10. Alternatives

The selected plan for the subdivision minimally disturbs the channels, and the stream has a buffer zone included in order to preserve them. The proposed public roadway crossing is perpendicular to the stream to minimize impacts. Waterline installation follows the alignment of the roadway crossings to minimize impacts.

11. Mitigation

11.1 Proposed Mitigation

Mitigation is not required for impacts covered under the general permits.

11.2 Mitigation Discussion

Mitigation is not required for impacts covered under the general permits.

11.3 Mitigation Monitoring

N/A

11.4 Mitigation Protection

N/A

APPENDIX A

Project Photographs

Figure 1. Little Chatata Creek Section (Typical Flow)

Figure 2. Little Chatata Creek Section (High Flow)

APPENDIX B

Wetland Assessment

Wetland Assessment
Proposed Michigan Avenue Residential Development
Cleveland, Bradley County, Tennessee
S&ME Project No. 210470

PREPARED FOR:

Michael Williamson
559 Kinser Road SE
Cleveland, Tennessee 37323

PREPARED BY:

S&ME, Inc.
4291 Highway 58
Chattanooga, TN 37416

February 15, 2021

February 15, 2021

Michael Williamson
559 Kinser Road SE
Cleveland, Tennessee 37323

Attention: Mr. Michael Williamson
michaelappraiser@yahoo.com

Reference: **Wetland Assessment**
Proposed Michigan Avenue Residential Development
Michigan Avenue at Powhatan Drive NE
Cleveland, Bradley County, Tennessee
S&ME Project 210470

Dear Mr. Williamson:

S&ME, Inc. (S&ME) is pleased to submit this report of Wetland Assessment for the above-referenced project site in Chattanooga, Hamilton County, Tennessee. The work was conducted in general conformance with the scope of services outlined in S&ME Proposal No. 210470, dated January 13, 2021, and authorized by you on January 13, 2021. S&ME appreciates the opportunity to provide services for this project. If you have any questions, please call.

Sincerely,

S&ME, Inc.

F. Barry Burnette
Project Scientist

Kristy Smedley, QHP
Senior Scientist

Cc: Mr. Benjamin Berry, Berry Engineers LLC

Table of Contents

Appendices

1.0 Project Information

Information concerning the project was provided to Ms. Kristy Smedley of S&ME by Mr. Ben Berry of Berry Engineers, LLC via email on January 12, 2021. Mr. Berry provided a copy of a Conceptual Site Plan for a Townhome / Apartment Development within the subject property. According to the Bradley County GIS website, the subject property is identified as Parcel 050_012.02 and composed of approximately 19.48 acres. Based on the provided information and our review of aerial imagery and the USGS topographic map including the property, a portion of Little Chatata Creek bisects the property. S&ME was requested to determine if wetlands were located on site adjacent to Little Chatata Creek.

2.0 Methodology

Jurisdictional waters of the U.S., including wetlands, are defined by 33 CFR Part 328.3 and are protected by Section 404 of the Clean Water Act (33 USC 1344), which is administered and enforced by the USACE. The TDEC-DWR has jurisdiction over waters of the state. The wetland assessment was performed using the Routine On-Site Determination Method as defined in the Corps of Engineers *1987 Wetlands Delineation Manual* and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region.*[1] This technique uses a multi-parameter approach, which requires positive evidence of three criteria: hydrophytic vegetation, hydric soils, and wetland hydrology. Areas exhibiting all three wetland characteristics, as well as surface waters, are considered jurisdictional.

Our assessment for the possible occurrence of wetlands within the assessed area consisted of using a combination of in-house research and field reconnaissance. In-house research included: 1) a review of the U.S. Geological Survey 7.5-minute topographic map of the East Cleveland, Tennessee quadrangle (dated 1976); 2) review of the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map for the above-referenced quadrangle (reviewed online at http://wetlandsfws.er.usgs.gov/); 3) review of the web soil survey for Bradley County, Tennessee published by the US Department of Agriculture (USDA), Natural Resources Conservation Service; and 4) review of a 2019 aerial photograph of the site (obtained from Google Earth®). Subsequent to the in-house review, jurisdictional waters of the U.S., including wetlands, were assessed in the field employing the USACE methodology referenced above.

3.0 Results of Wetland Assessment

S&ME evaluated the soils, vegetation, and hydrology within suspect wetland areas that were located within the assessed portion of the project site. The results are summarized in the sections below, and areas evaluated correspond to the data point locations depicted on Figure 4 in Appendix I. S&ME conducted the field assessment February 1, 2021. According to the Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS), the

[1] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. U.S. Army Corps of Engineers, Washington, D.C., 100 pp. plus appendices, and U.S. Army Corps of Engineers. 2012. *Final Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region*, ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-10-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

following rainfall amounts were recorded from the nearest data station (Station TN-BR-4) within seven days prior to the site visits: 0.58-inch on January 25, 2021; 0.64-inch on January 26, 2021; and 0.31-inch on January 31, 2021.

3.1 In-House Review

S&ME reviewed the referenced topographic quadrangle map to examine the topography and drainage of the site and vicinity (Figure 1). The topographic map indicates that the evaluated portion of the property is generally flat, with Little Chatata Creek, depicted as a solid blue line on the topographic map, generally crossing the property from south to north. The soil survey information reviewed (Figure 2) depicts the portion of the property evaluated as being underlain by Lindside silt loam (Li)- 0 to 3 percent, which is listed on the National Hydric Soils List as potentially containing hydric inclusions in Bradley County. Little Chatata Creek is depicted as a linear, forested/shrub wetland, within the project site on NWI map reviewed (Figure 3). No other streams or wetlands are depicted within the assessed area on the NWI map. No creeks or areas of inundation are visible on the 2019 Google Earth aerial reviewed. The background image of Figure 4 is the 2019 Google Earth aerial photograph.

3.2 Field Observations

On February 1, 2021 two S&ME natural resource professionals, including a Qualified Hydrologic Professional (QHP) trained in the TDEC Guidance for Making Hydrologic Determinations, performed an evaluation of the subject property to identify and characterize potential on-site jurisdictional features.

3.2.1 Wetland Assessment

Wetland determination data forms were completed at four locations within the assessed portion of the property, in proximity to Little Chatata Creek. The data point locations were chosen based on geomorphic position and/or the observation of other hydrologic indicators. In addition, S&ME personnel evaluated soils in several other locations within the assessed area of the property, but given the absence of hydric soil indicators, did not complete wetland data forms in those locations. In our opinion, none of the areas evaluated were determined to meet the characteristics of a wetland, as they were lacking hydric soils and/or a dominance of hydrophytic vegetation.

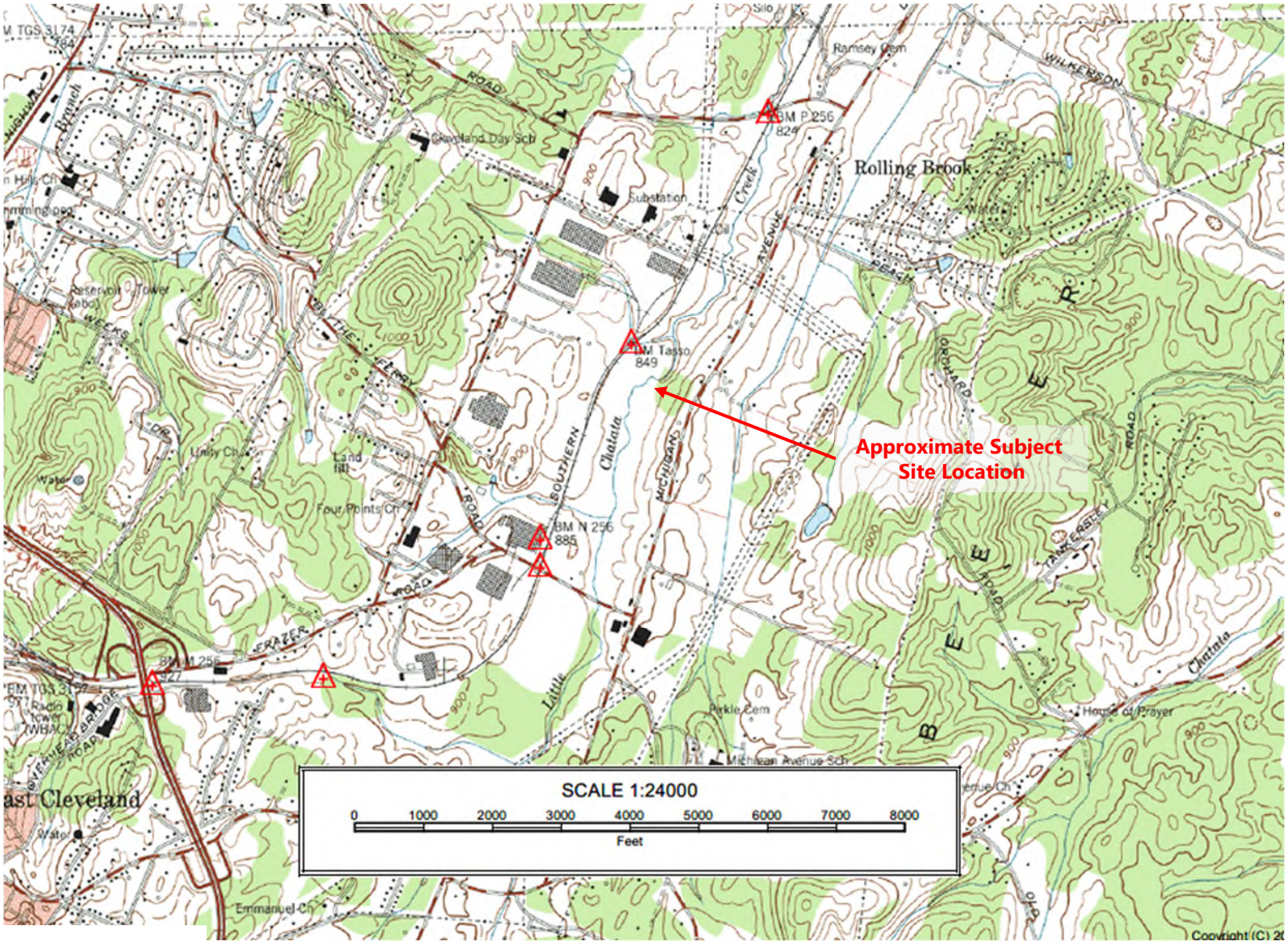
4.0 Conclusions and Recommendations

S&ME conducted a wetland assessment on a portion of the property in proximity to Little Chatata Creek. No jurisdictional wetlands were identified within the assessed portion of the property.

All wetland determinations are preliminary until verified by the USACE and TDEC-DWR and should be used for planning purposes only until the verification is complete. If future project plans propose to impact the area assessed, we recommend agency concurrence be obtained to confirm our findings. S&ME was not requested provide agency verification services as part of this assessment.

Appendices

Appendix I –Figures



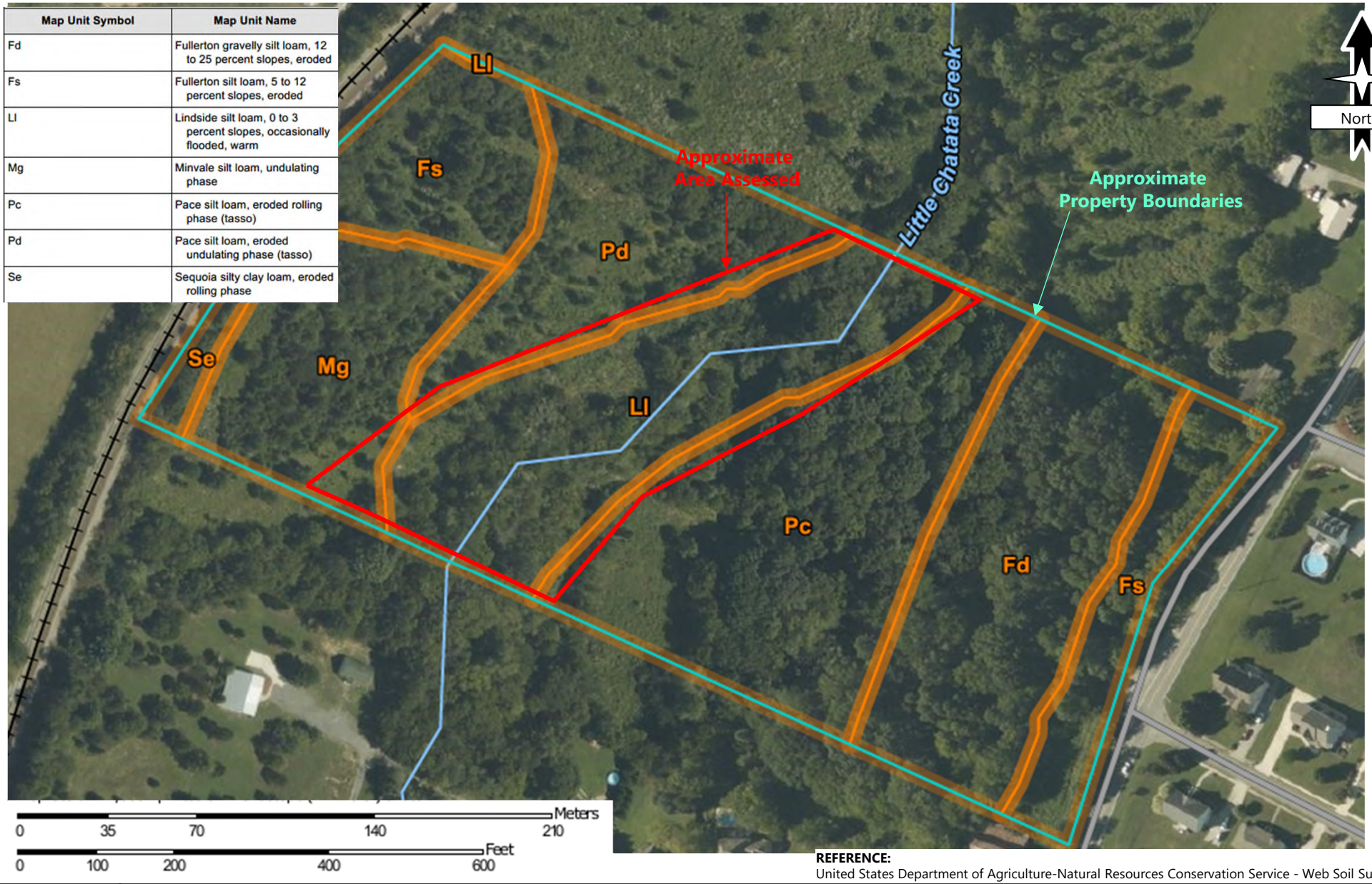
REFERENCE:
EAST CLEVELAND, TN QUADRANGLE, DATED 1976

USGS TOPOGRAPHIC MAP EXHIBIT

MICHIGAN AVENUE RESIDENTIAL DEVELOPMENT
CLEVELAND, BRADLEY COUNTY, TENNESSEE

SCALE:	AS SHOWN
DATE:	2/11/2021
PROJECT NUMBER	210470
FIGURE NO.	1

Map Unit Symbol	Map Unit Name
Fd	Fullerton gravelly silt loam, 12 to 25 percent slopes, eroded
Fs	Fullerton silt loam, 5 to 12 percent slopes, eroded
Ll	Lindside silt loam, 0 to 3 percent slopes, occasionally flooded, warm
Mg	Minvale silt loam, undulating phase
Pc	Pace silt loam, eroded rolling phase (tasso)
Pd	Pace silt loam, eroded undulating phase (tasso)
Se	Sequoia silty clay loam, eroded rolling phase



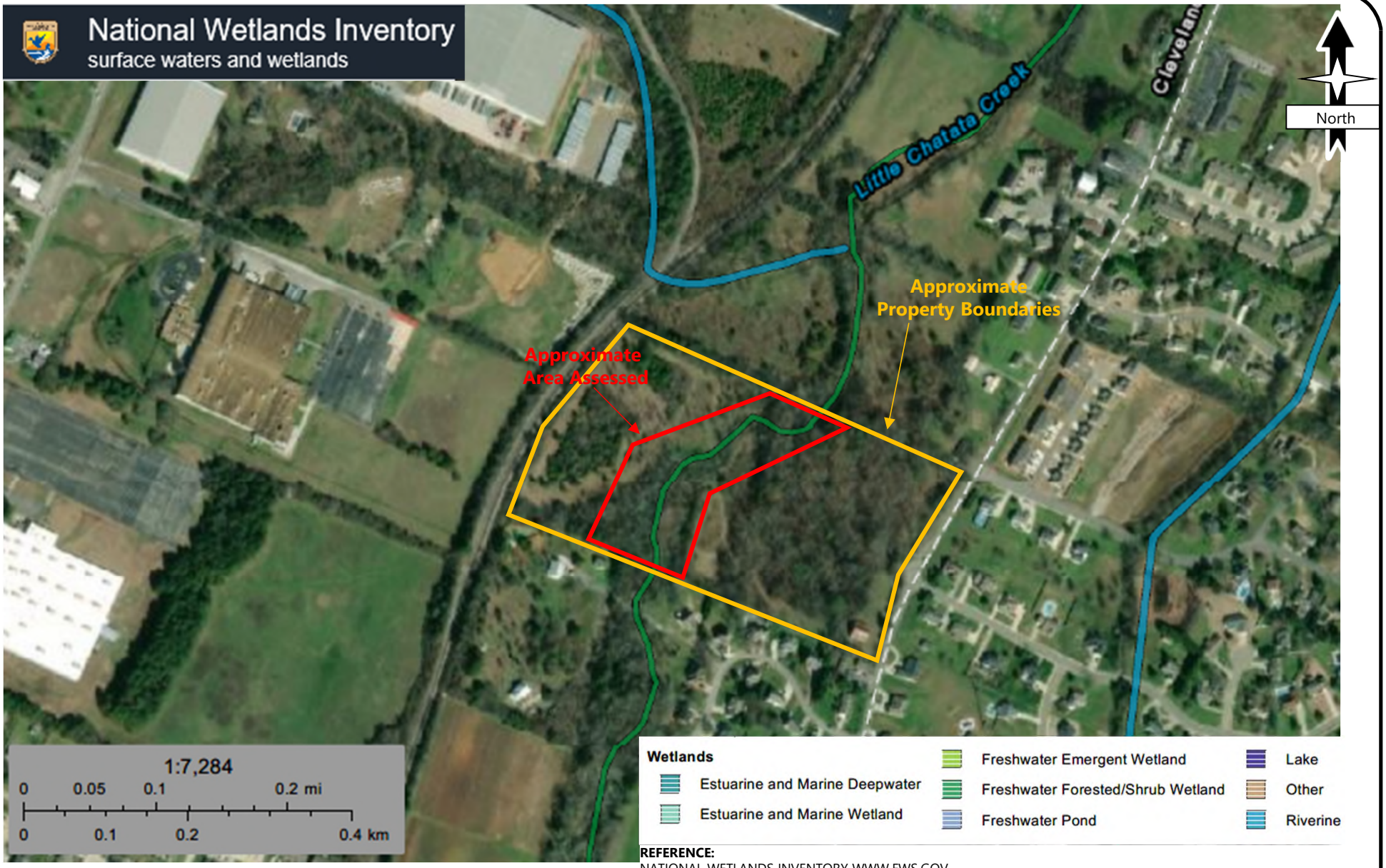
REFERENCE:
United States Department of Agriculture-Natural Resources Conservation Service - Web Soil Survey

MAPPED SOILS EXHIBIT

MICHIGAN AVENUE RESIDENTIAL DEVELOPMENT
CLEVELAND, BRADLEY COUNTY, TENNESSEE

SCALE: AS SHOWN
DATE: 2/11/2021
PROJECT NUMBER 210470

FIGURE NO. 2

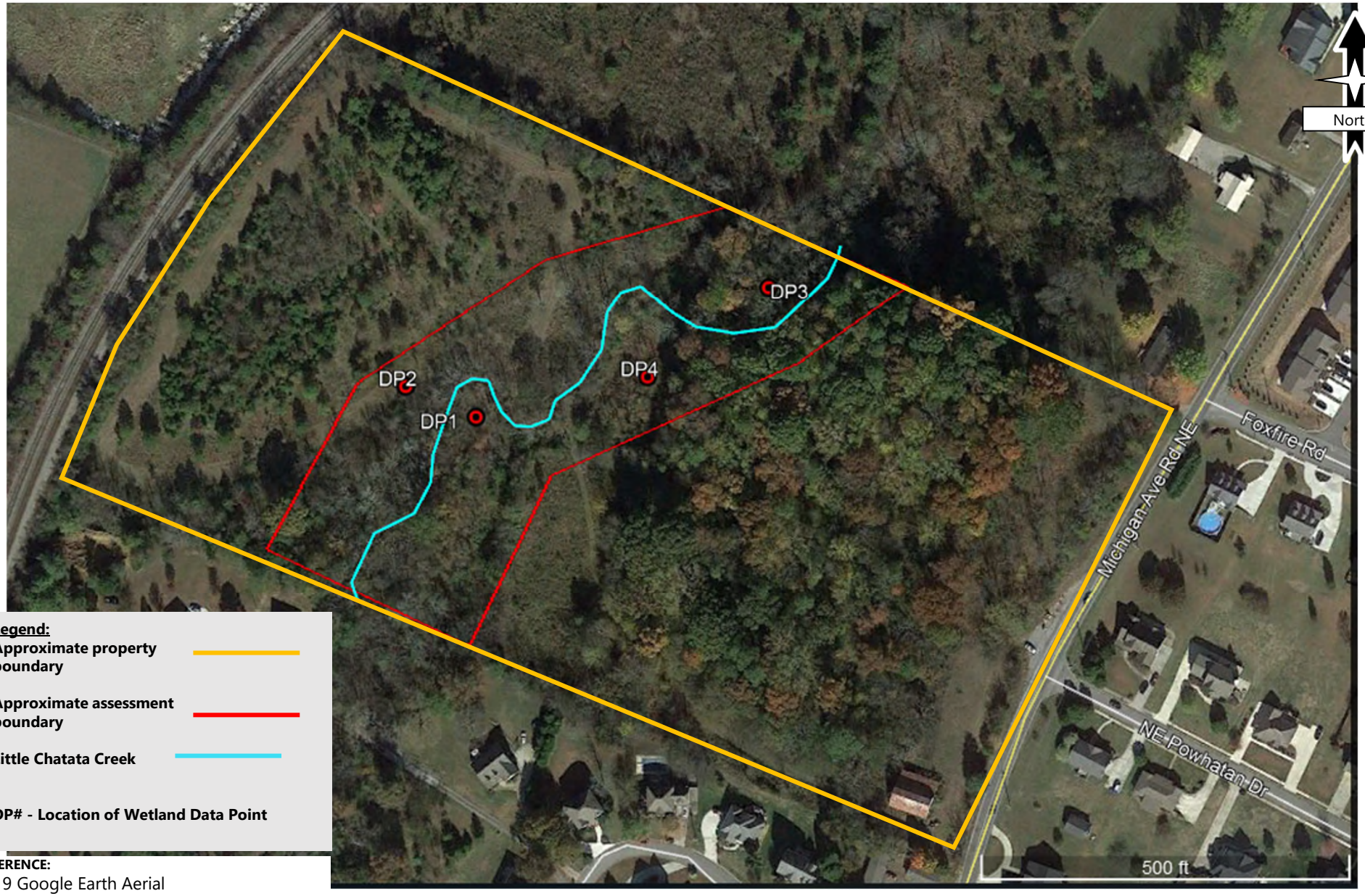


REFERENCE:
NATIONAL WETLANDS INVENTORY WWW.FWS.GOV

NATIONAL WETLANDS INVENTORY MAP EXHIBIT

MICHIGAN AVENUE RESIDENTIAL DEVELOPMENT
CLEVELAND, BRADLEY COUNTY, TENNESSEE

SCALE:	FIGURE NO.
AS SHOWN	3
DATE: 2/8/2021	
PROJECT NUMBER 210291	



Legend:

Approximate property boundary

Approximate assessment boundary

Little Chatata Creek

DP# - Location of Wetland Data Point

REFERENCE:
2019 Google Earth Aerial

OVERVIEW OF FINDINGS

MICHIGAN AVENUE RESIDENTIAL DEVELOPMENT
CLEVELAND, BRADLEY COUNTY, TENNESSEE

SCALE: AS SHOWN

DATE: 2/11/2021

PROJECT NUMBER 210470

FIGURE NO. 4

Appendix II – Representative Photos

Date: 2/1/2021

Photographer: Kristy Smedley

1	**Location / Orientation**	From DP1, facing west. 35.177963 Latitude; -84.823950 Longitude.
	Remarks	View of area around DP1. Little Chatata Creek in background.

Date: 2/1/2021

Photographer: Kristy Smedley

2	**Location / Orientation**	From DP2, facing south. 35.178076 Latitude; -84.824268 Longitude.
	Remarks	View of area around DP2.

Date: 2/1/2021

Photographer: Kristy Smedley

3	**Location / Orientation**	From Little Chatata Creek, facing north. 35.178277 Latitude; -84.822593 Longitude.
	Remarks	View of area of DP3 located. On left bank in photo.

Date: 2/1/2021

Photographer: Kristy Smedley

4	**Location / Orientation**	From DP4, facing north. 35.178112 Latitude; -84.823174 Longitude.
	Remarks	View of area around DP4.

Appendix III– USACE Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Michigan Avenue Residential Development City/County: Cleveland / Bradley Sampling Date: 2/1/2021

Applicant/Owner: Michael Williamson State: TN Sampling Point: DP-1

Investigator(s): K. Smedley & B. Burnette of S&ME Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR or MLRA): LRR N Lat: 35.177963 Long: -84.823950 Datum: NAD 83

Soil Map Unit Name: Lindside silt loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✔ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-1

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis occidentalis	40	YES	FACU
2. Gleditsia triacanthos	40	YES	FAC
3. Ulums rubra	10	NO	FAC
4. Liquidambar styraciflua	2	NO	FAC
5.		-	-
6.		-	-
7.		-	-
8.		-	-
	92	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 feet)			
1. Celtis occidentalis	10	YES	FACU
2. Ligustrum sinense	2	NO	FACU
3.		-	-
4.		-	-
5.		-	-
6.		-	-
7.		-	-
8.		-	-
9.		-	-
10.		-	-
	12	= Total Cover	
Herb Stratum (Plot size: 30 Feet)			
1. Festuca sp.	40	YES	FAC
2. Lamium purpureum	5	NO	NI
3. Ligustrum sinense	4	NO	FACU
4. Chasmanthium latifolium	2	NO	FACU
5.		-	-
6.		-	-
7.		-	-
8.		-	-
9.		-	-
10.		-	-
11.		-	-
12.		-	-
	51	= Total Cover	
Woody Vine Stratum (Plot size: 30 feet)			
1.		-	-
2.		-	-
3.		-	-
4.		-	-
5.		-	-
6.		-	-
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	4	x 3 =	12
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	9 (A)		32 (B)

Prevalence Index = B/A = 3.55

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10+	10YR 3/2	100						Organic/root mass
1-3	10YR 3/3	100						
3-10+	10YR 4/3	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Michigan Avenue Residential Development City/County: Cleveland / Bradley Sampling Date: 2/1/2021

Applicant/Owner: Michael Williamson State: TN Sampling Point: DP-2

Investigator(s): K. Smedley & B. Burnette of S&ME Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR or MLRA): LRR N Lat: 35.178168 Long: -84.824156 Datum: NAD 83

Soil Map Unit Name: Lindside silt loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-2

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Gleditsia triacanthos	25	YES	FAC
2.		-	-
3.		-	-
4.		-	-
5.		-	-
6.		-	-
7.		-	-
8.		-	-
	25	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 feet)			
1. Ligustrum sinense	3	YES	FACU
2.		-	-
3.		-	-
4.		-	-
5.		-	-
6.		-	-
7.		-	-
8.		-	-
9.		-	-
10.		-	-
	3	= Total Cover	
Herb Stratum (Plot size: 30 Feet)			
1. Vernonia gigantea	25	YES	FAC
2. Solidago altissima	25	YES	FACU
3. Allium ascalonicum	15	NO	NI
4. Festuca sp.	10	NO	FAC
5. Lamium purpureum	5	NO	NI
6. Oxalis corniculata	3	NO	FACU
7. Lonicera japonica	3	NO	FACU
8. Geranium carolinianum	2	NO	NI
9. Rubus argutus	2	NO	FACU
10. Dicanthelium clandestinum	2	NO	FAC
11.		-	-
12.		-	-
	92	= Total Cover	
Woody Vine Stratum (Plot size: 30 feet)			
1.		-	-
2.		-	-
3.		-	-
4.		-	-
5.		-	-
6.		-	-
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	4	x 3 =	12
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	9 (A)		32 (B)

Prevalence Index = B/A = 3.56

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	100						Organic/root mass
4-10+	10YR 4/4	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Michigan Avenue Residential Development City/County: Cleveland / Bradley Sampling Date: 2/1/2021

Applicant/Owner: Michael Williamson State: TN Sampling Point: DP-3

Investigator(s): K. Smedley & B. Burnette of S&ME Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR N Lat: 35.178445 Long: -84.822627 Datum: NAD 83

Soil Map Unit Name: Lindside silt loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✔
Hydric Soil Present?	Yes ____	No ✔	
Wetland Hydrology Present?	Yes ✔	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✔	Depth (inches): ____
Water Table Present?	Yes ____	No ✔	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✔	Depth (inches): ____

Wetland Hydrology Present? Yes ✔ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-3

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis occidentalis	30	YES	FACU
2. Quercus alba	10	NO	FACU
3. Ulmus americana	10	NO	FACW
4. Fraxinus pennsylvanica	5	NO	FACW
5.		-	-
6.		-	-
7.		-	-
8.		-	-
	55	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 feet)			
1. Fraxinus pennsylvanica	15	YES	FACW
2.		-	-
3.		-	-
4.		-	-
5.		-	-
6.		-	-
7.		-	-
8.		-	-
9.		-	-
10.		-	-
	15	= Total Cover	
Herb Stratum (Plot size: 30 Feet)			
1. Ligustrum sinense	5	YES	FACU
2. Festuca sp.	5	YES	FAC
3. Viola sororia	2	NO	FAC
4. Lamium purpureum	2	NO	NI
5.		-	-
6.		-	-
7.		-	-
8.		-	-
9.		-	-
10.		-	-
11.		-	-
12.		-	-
	14	= Total Cover	
Woody Vine Stratum (Plot size: 30 feet)			
1.		-	-
2.		-	-
3.		-	-
4.		-	-
5.		-	-
6.		-	-
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	3	x 2 =	6
FAC species	2	x 3 =	6
FACU species	3	x 4 =	12
UPL species	0	x 5 =	0
Column Totals:	8 (A)		24 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: DP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100						Organic/root mass
2-4	10YR 4/3	100						
4-10+	10YR 4/4	95	10YR 5/6	5	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** ✔

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Michigan Avenue Residential Development City/County: Cleveland / Bradley Sampling Date: 2/1/2021

Applicant/Owner: Michael Williamson State: TN Sampling Point: DP-4

Investigator(s): K. Smedley & B. Burnette of S&ME Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR N Lat: 35.178112 Long: -84.823174 Datum: NAD 83

Soil Map Unit Name: Lindside silt loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✔
Hydric Soil Present?	Yes ____	No ✔	
Wetland Hydrology Present?	Yes ____	No ✔	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✔	Depth (inches): ____
Water Table Present?	Yes ____	No ✔	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✔	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-4

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ulmus alata	25	YES	FACU
2. Liquidambar styraciflua	10	YES	FAC
3.		-	-
4.		-	-
5.		-	-
6.		-	-
7.		-	-
8.		-	-
	35	= Total Cover	

Sapling/Shrub Stratum (Plot size: 30 feet)			
1. Ligustrum sinense	10	YES	FACU
2. Acer negundo	3	YES	FAC
3.		-	-
4.		-	-
5.		-	-
6.		-	-
7.		-	-
8.		-	-
9.		-	-
10.		-	-
	13	= Total Cover	

Herb Stratum (Plot size: 30 Feet)			
1. Dichanthelium clandestinum	40	YES	FAC
2. Ligustrum sinense	10	NO	FACU
3. Allium ascalonicum	8	NO	NI
4. Lamium purpureum	8	NO	NI
5. Festuca sp.	3	NO	FAC
6. Lonicera japonica	2	NO	FACU
7.		-	-
8.		-	-
9.		-	-
10.		-	-
11.		-	-
12.		-	-
	71	= Total Cover	

Woody Vine Stratum (Plot size: 30 feet)			
1.		-	-
2.		-	-
3.		-	-
4.		-	-
5.		-	-
6.		-	-
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/3	100						Organic/root mass
2-10+	10YR 4/4	98	10YR 5/6	2	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

APPENDIX C

Project Plans

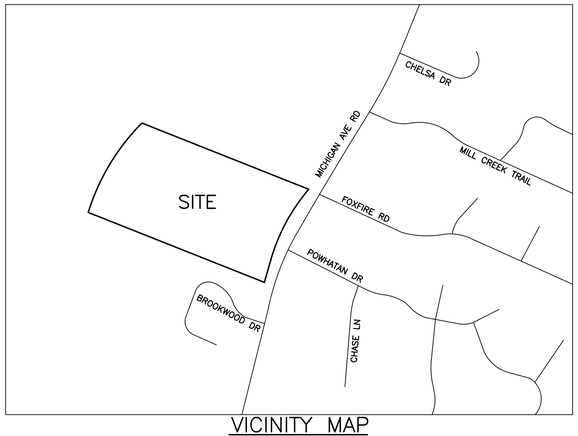
SITE IMPROVEMENTS FOR:

BRIAR CREEK SUBDIVISION

A RESIDENTIAL SUBDIVISION IN CLEVELAND, TENNESSEE

CALL BEFORE YOU DIG
UTILITIES PROTECTION CENTER
TENNESSEE
1-800-351-1111
THREE WORKING DAYS BEFORE YOU DIG

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



VICINITY MAP
N.T.S.

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

CIVIL ENGINEER:
BERRY ENGINEERS LLC
63 BROAD ST NW, CLEVELAND, TN 37311
(423) 790-5880

SURVEYOR:
RICHMOND SURVEYING CO.
363 FIRST STREET SW
CLEVELAND, TN 37311
423-479-7749

PROJECT DESCRIPTION:	NEW CONSTRUCTION OF 56 RESIDENTIAL LOTS
LOCATION:	MICHIGAN AVENUE RD, CLEVELAND, TN 37312
ZONING:	R2
FLOOD ZONE:	ZONE X, AS SHOWN ON MAP #47011C0137E, DATED 02/02/2007

SETBACK REQUIREMENTS:	REQUIRED
FRONT	25'
REAR	15'
SIDE	10'
MIN. LOT WIDTH (SINGLE FAMILY)	50'
MIN. LOT WIDTH (TOWNHOME)	20'

INDEX OF SHEETS

LOCAL CONTACTS

CITY OF CLEVELAND – PLANS REVIEW
185 2ND STREET NE
CLEVELAND, TN 37311
TONYA YOUNG
423-479-1913

CITY OF CLEVELAND – PLANNING
185 2ND STREET NE
CLEVELAND, TN 37311
ROBERT VARNELL
423-479-4551

CITY OF CLEVELAND – ENGINEERING
185 2ND STREET NE
CLEVELAND, TN 37311
BRIAN BECK
423-479-1913

CITY OF CLEVELAND – STORMWATER
185 2ND STREET NE
CLEVELAND, TN 37311
CHRIS BROOM
423-479-1913

CITY OF CLEVELAND – TRANSPORTATION
185 2ND STREET NE
CLEVELAND, TN 37311
DAVID SHEELY
423-479-1913

CLEVELAND UTILITIES – WATER & SEWER
2450 GUTHRIE AVENUE NW
CLEVELAND, TN 37311
BRIAN SELLS
423-478-9372

CLEVELAND UTILITIES – ELECTRIC
JEFF LUTHER
423-244-1818

CHATTANOOGA GAS – NATURAL GAS
2207 OLAN MILLS DRIVE
CHATTANOOGA, TN 37421
JANA HALL-PAPA
423-421-3263

CHARTER (SPECTRUM)
EARL ANGLE OR JAMEY KEENER
423-458-4816
EARL.ANGLE@CHARTER.COM
JAMEY.KEENER@CHARTER.COM

AT&T
MIKE BERRY
770-335-1153

KINDER MORGAN (PIPELINE)
MATT TATE
678-326-6489
MATTHEW_TATE@KINDERMORGAN.COM

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
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CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
1		
2		
3		
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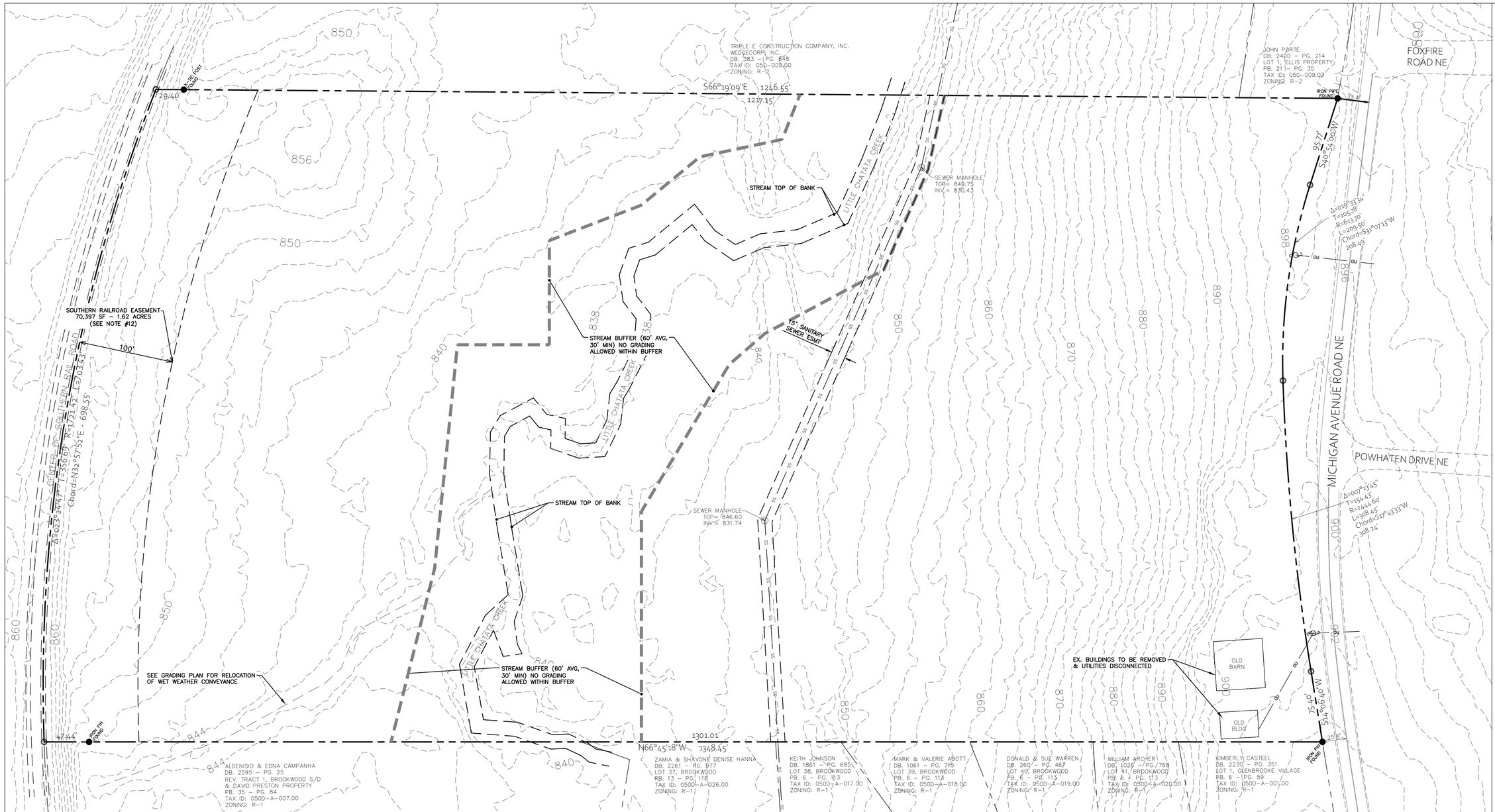
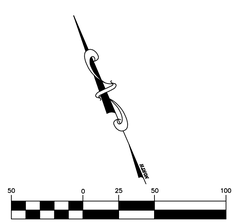
SHEET NAME:
COVER SHEET

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-00



EXISTING CONDITIONS ARE BASED ON A SURVEY BY OTHERS



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CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
1		
2		
3		
4		
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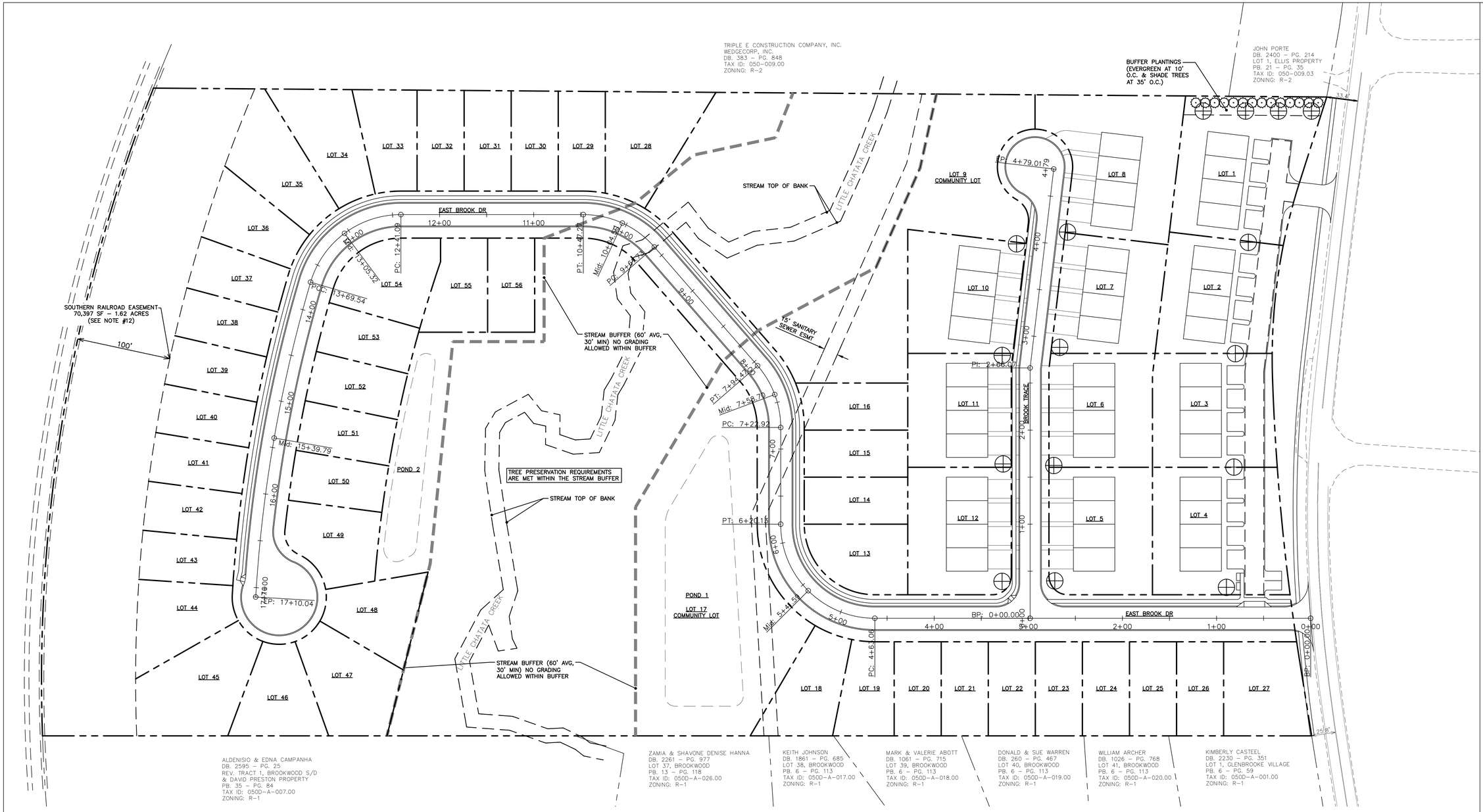
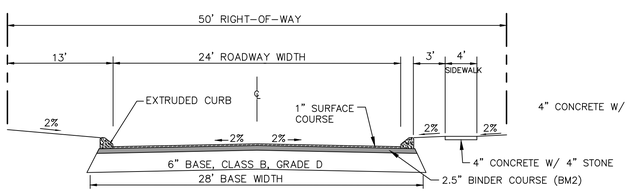
SHEET NAME:
EXISTING CONDITIONS

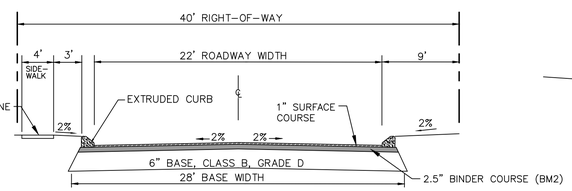
DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-01

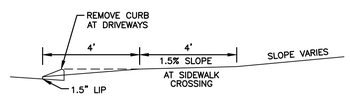




EAST BROOK DRIVE CROSS-SECTION
NORMAL CROWN



BROOK TRACE
NORMAL CROWN



TYPICAL DRIVEWAY PROFILE AT SIDEWALK

REFER TO PRELIMINARY PLAT FOR LOT DIMENSIONS AND DETAILS

TREE CALCULATIONS FOR MULTIFAMILY PARCELS:

1. MULTI-FAMILY DEVELOPMENT AREA IS 4.5 ACRES, REQUIRING 45 TREES (30 SHOWN, BALANCE INCLUDED IN TREE PRESERVATION AREA).

TREE PRESERVATION NOTES:

1. TREE PRESERVATION IS PROVIDED WITHIN THE STREAM BUFFER AS SHOWN.

LANDSCAPE LEGEND

- RED MAPLE (2" CAL)
- SHUMARD OAK (2" CAL)
- FLOWERING DOGWOOD (2" CAL)
- LEYLAND CYPRESS (6' HEIGHT)

50 0 25 50 100
1 inch = 50 ft.

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423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
1		
2		
3		
4		
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7		
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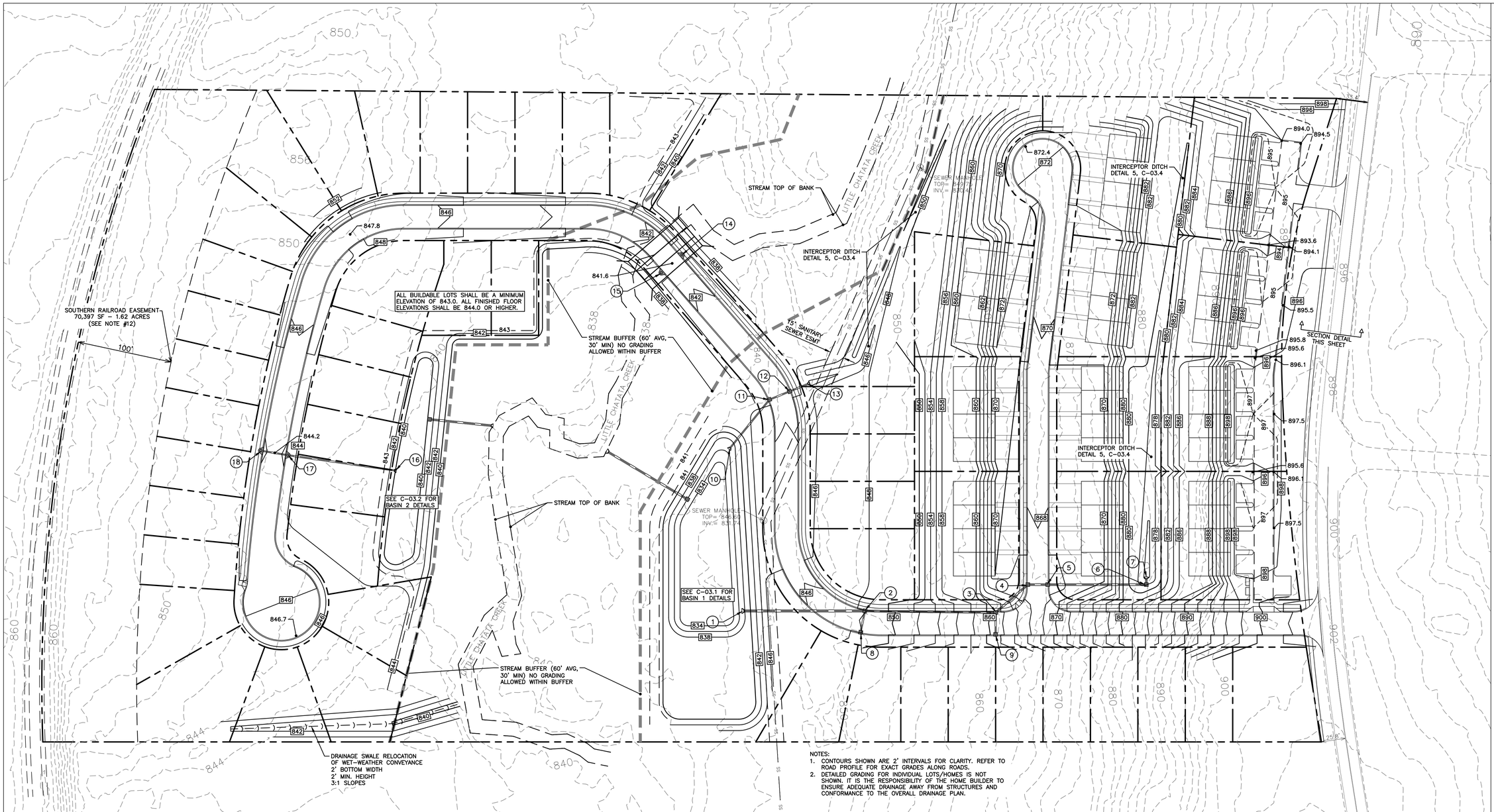
SHEET NAME:
OVERALL SITE LAYOUT PLAN

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-02.0



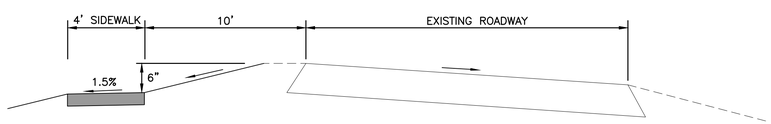
DRAINAGE SCHEDULE

STRUCTURE NUMBER	STRUCTURE TYPE	GRATE/PVMT ELEV	INVERT ELEV	PIPE SIZE/TYPE	PIPE LENGTH	PIPE SLOPE
7	ENDWALL		875.0			
7–6				24" HDPE	10'	10%
6	JUNCTION BOX	878.5	874.0			
6–5				24" HDPE	104'	12%
5	GRATE INLET	867.0	862.0			
5–4				24" HDPE	21'	4.8%
4	GRATE INLET	867.0	861.0			
4–3				24" HDPE	45'	12%
3	GRATE INLET	860.7	855.7			
3–2				24" HDPE	138'	9.3%
2	GRATE INLET	847.9	842.9			
2–1				30" HDPE	130'	4.5%
1	ENDWALL		837.0			
9	GRATE INLET	860.7	856.7			
9–3				18" HDPE	21'	4.8%
8	GRATE INLET	847.9	843.9			
8–2				18" HDPE	21'	4.8%

DRAINAGE SCHEDULE

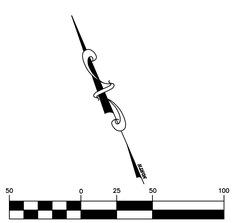
STRUCTURE NUMBER	STRUCTURE TYPE	GRATE/PVMT ELEV	INVERT ELEV	PIPE SIZE/TYPE	PIPE LENGTH	PIPE SLOPE
13	ENDWALL		842.0			
13–12				18" HDPE	21'	10%
12	GRATE INLET	843.4	839.9			
12–11				18" HDPE	21'	2.4%
11	GRATE INLET	843.4	839.4			
11–10				18" HDPE	65'	3.7%
10	ENDWALL		837.0			
15	THROAT INLET	841.3	TIE TO BOX CULVERT			
14	THROAT INLET	841.3	TIE TO BOX CULVERT			
19	THROAT INLET	843.9	840.4			
18–17				18" HDPE	21'	1.0%
18	THROAT INLET	843.9	840.2			
17–16				18" HDPE	110'	0.3%
16	ENDWALL		839.9			

**NOTE: TOP OF THROAT INLETS SHALL BE 0.5' ABOVE GRATE/PVMT ELEVATION



MICHIGAN AVE RD SIDEWALK
SECTION DETAIL

SEE SHEET C-02.6 FOR EARTHWORK SPECIFICATIONS



CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

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20 25TH STREET, SUITE 6
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423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
1		
2		
3		
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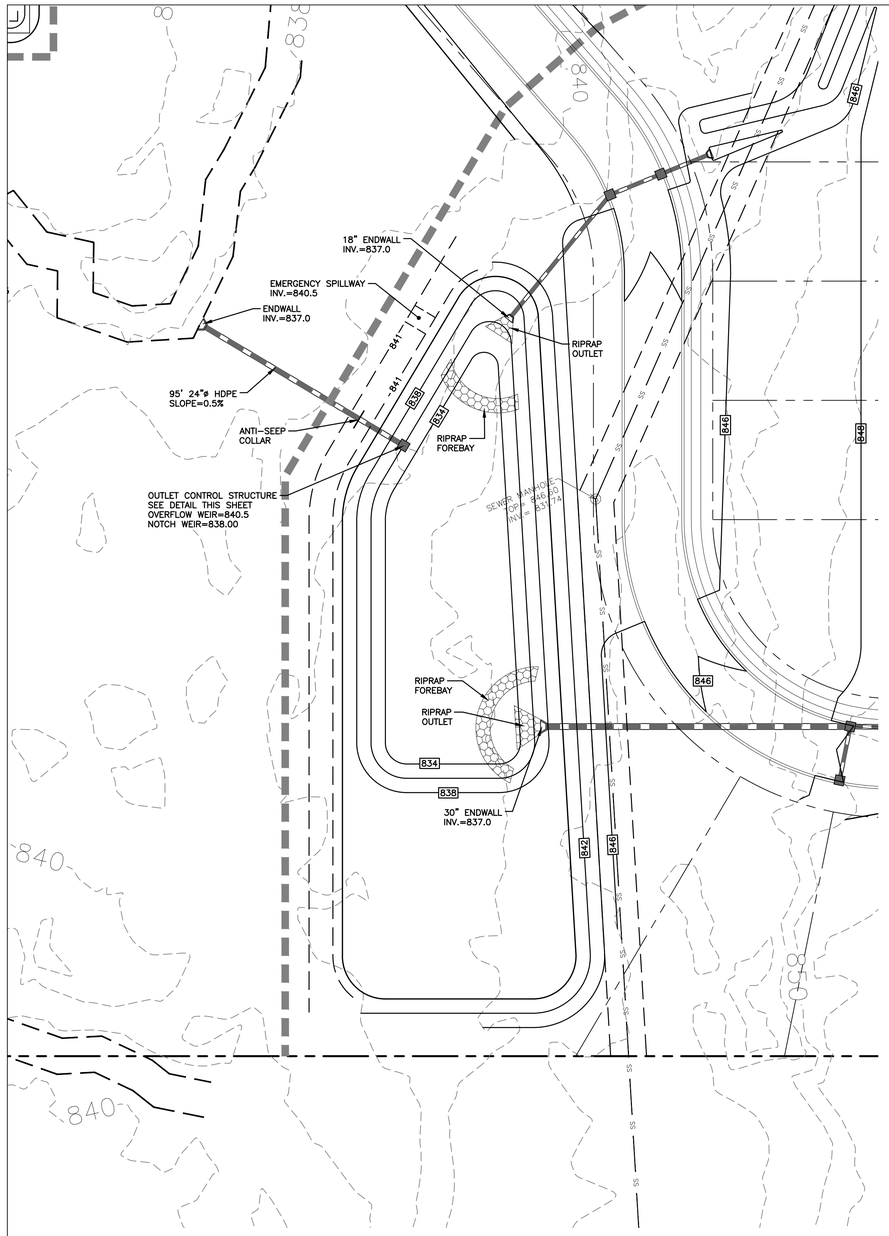
SHEET NAME:
GRADING & DRAINAGE PLAN

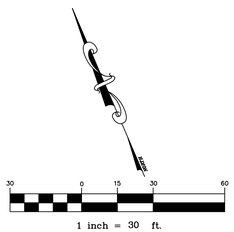
DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-03.0

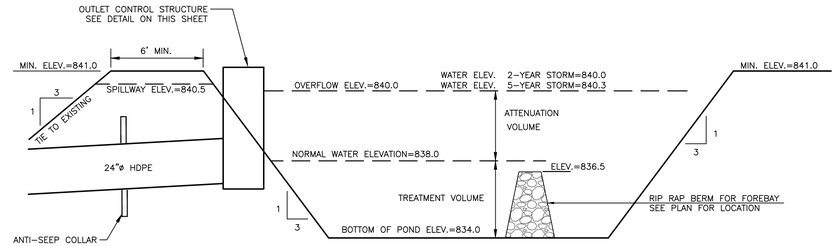


DETENTION BASIN 1 PLAN

SCALE: 1" = 30' HORIZONTAL

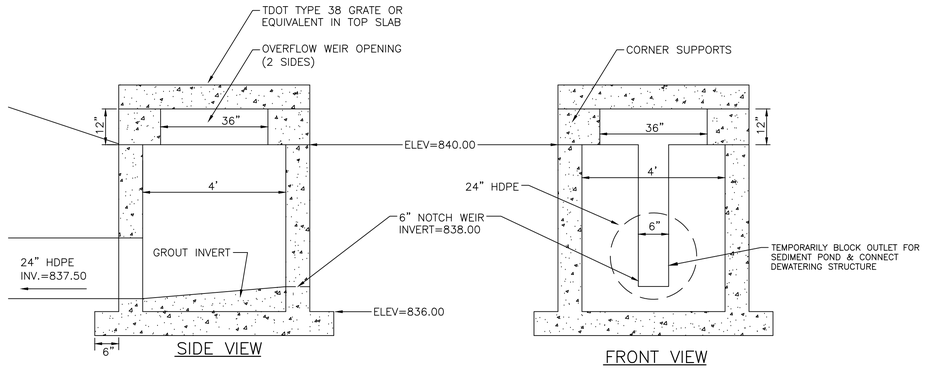


NOTE: AFTER COORDINATION WITH THE CITY, THIS POND DESIGN WAS MODIFIED TO DETAIN FOR THE 2-YEAR & 5-YEAR DESIGN STORMS AND REDUCE THE BERM ELEVATION TO PRESERVE THE OVERBANK FLOODPLAIN CAPACITY OF THE LITTLE CHATATA CREEK FOR LARGER DESIGN STORMS.



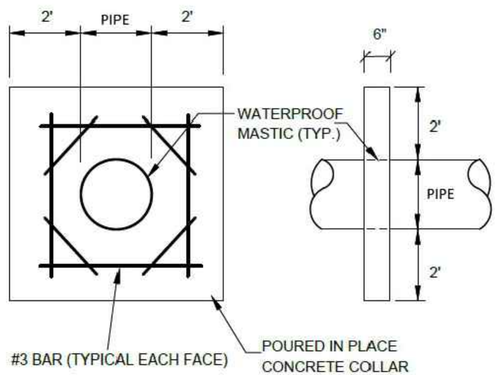
BASIN #1 CROSS SECTIONAL VIEW
STORMWATER SYSTEM SCHEMATIC

N.T.S



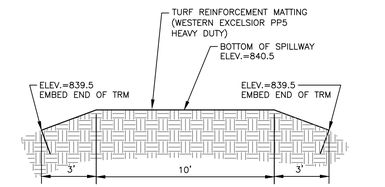
OUTLET CONTROL STRUCTURE 1

N.T.S.

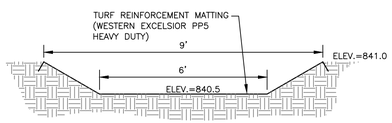


NOTE: CONCRETE SHALL BE 3000 PSI @ 28 DAYS
REINFORCING STEEL, ASTM A615, GRADE 60: FY - 60,000 PSI
COLLAR SHOULD BE PLACED AT LEAST TWO FEET FROM PIPE JOINT

ANTI-SEEP COLLAR DETAIL



SIDE VIEW



FRONT VIEW

GRASSED EMERGENCY SPILLWAY

N.T.S.

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
1		
2		
3		
4		
5		
6		
7		
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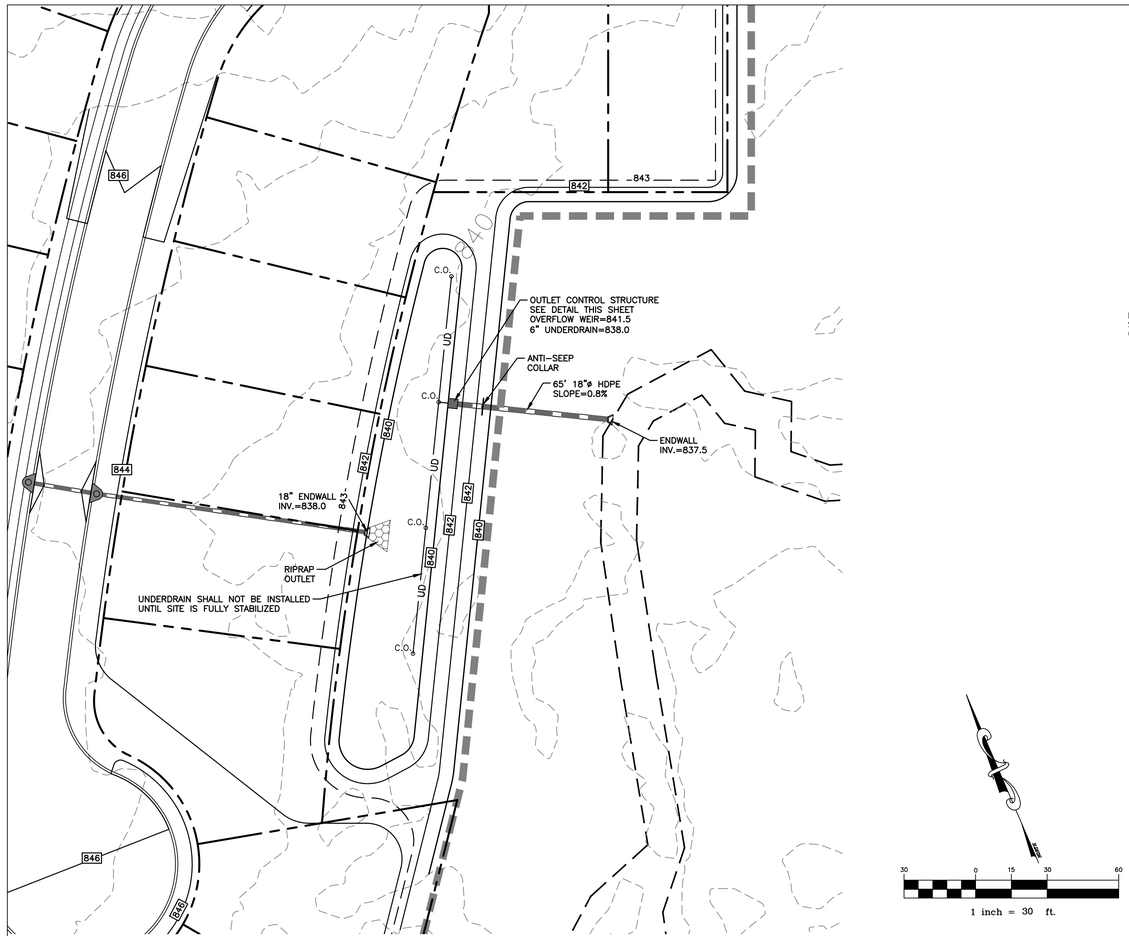
SHEET NAME:
DETENTION BASIN 1
DETAILS

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-03.1



DETENTION BASIN 2 PLAN

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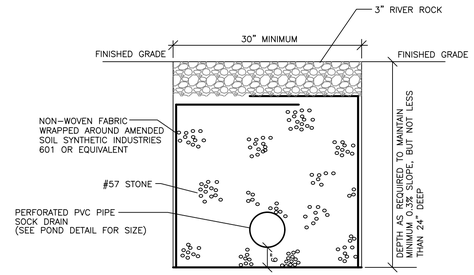

UNDER DRAIN CROSS SECTION

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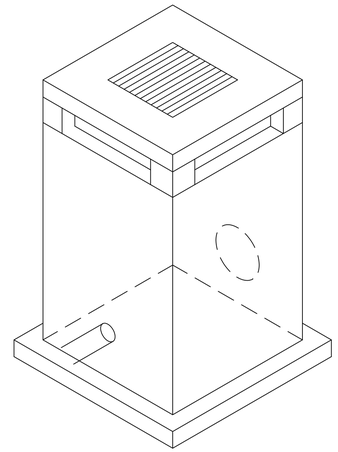
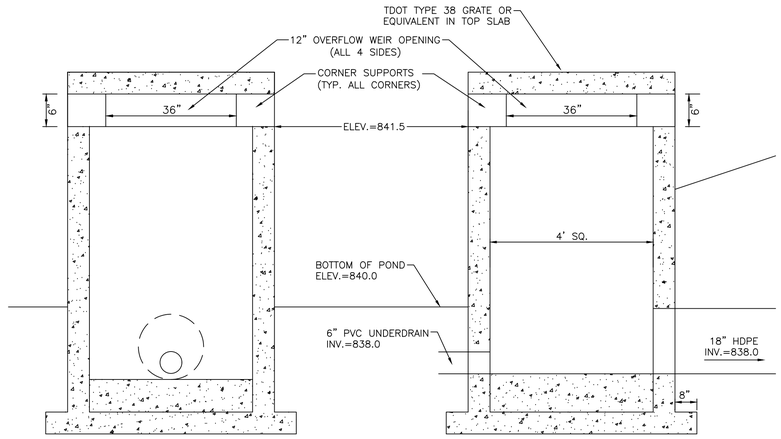


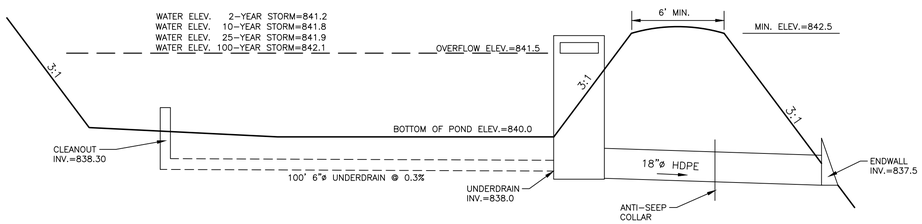
ISOMETRIC VIEW



FRONT VIEW SIDE VIEW

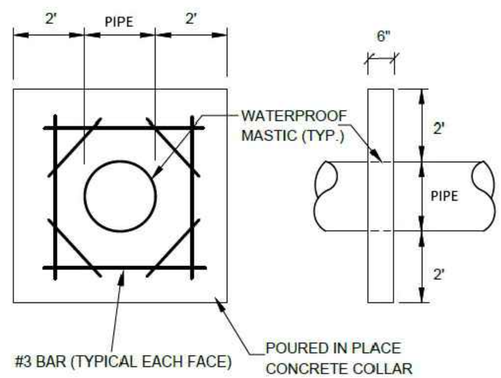
OUTLET CONTROL STRUCTURE

N.T.S.



BASIN #2 CROSS SECTIONAL VIEW
STORMWATER SYSTEM SCHEMATIC

N.T.S



NOTE: CONCRETE SHALL BE 3000 PSI @ 28 DAYS
REINFORCING STEEL, ASTM A615, GRADE 60: FY - 60,000 PSI
COLLAR SHOULD BE PLACED AT LEAST TWO FEET FROM PIPE JOINT

ANTI-SEEP COLLAR DETAIL

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FOR REVIEW

REVISIONS

1		
2		
3		
4		
5		
6		
7		
8		
9		
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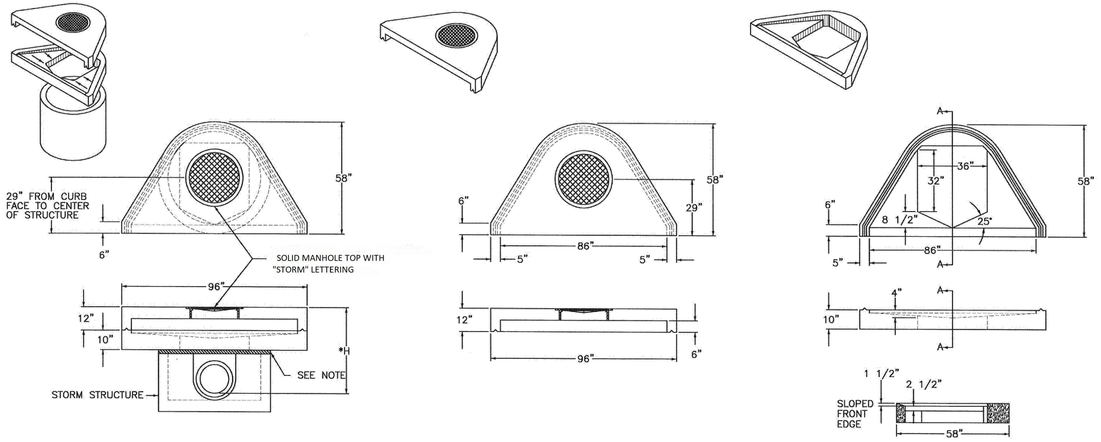
SHEET NAME:
DETENTION BASIN 2 DETAILS

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-03.2

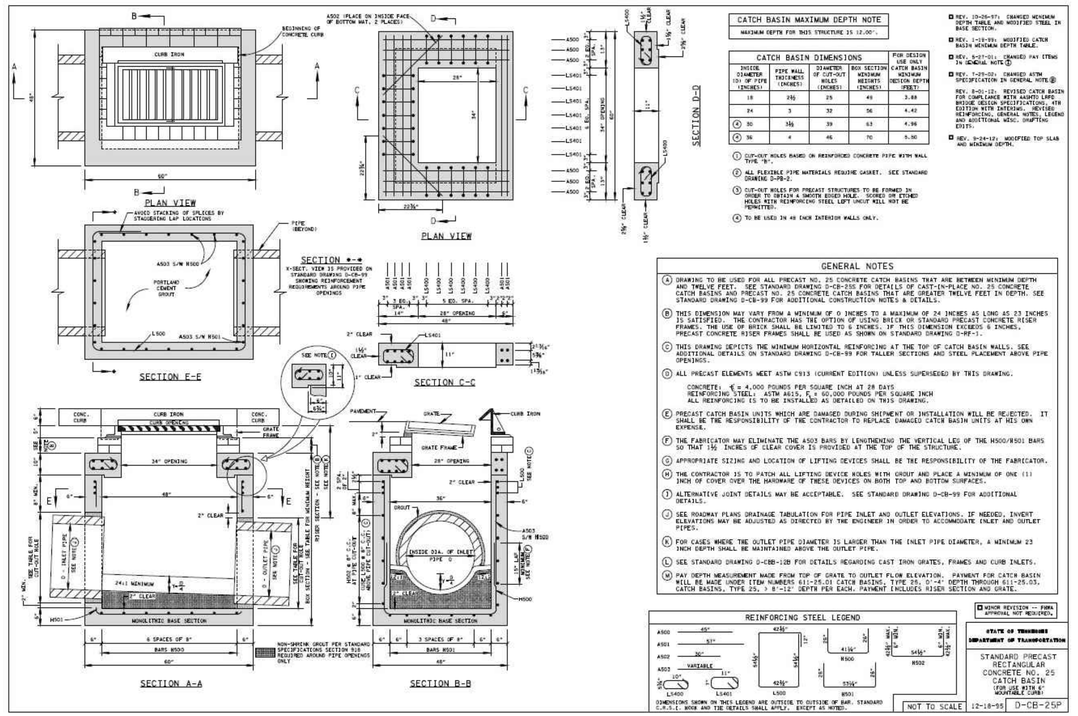


NOTE: 4" OF ADJUSTMENT IF ROADWAY SLOPE IS EQUAL TO OR LESS THAN 5 PERCENT, IF ROADWAY SLOPE EXCEEDS 5 PERCENT, THEN ADDITIONAL ADJUSTMENT MUST BE USED UP TO A MAXIMUM OF 8"

CURB INLET TOP – CENTER

N.T.S.

1



CATCH BASIN MAXIMUM DEPTH NOTE

MAXIMUM DEPTH FOR THIS STRUCTURE IS 12.00'.

CATCH BASIN DIMENSIONS

INSIDE DIAMETER (ID) OF PIPE (INCHES)	PIPE WALL THICKNESS (INCHES)	DIAMETER OF CUT-OUT HOLES (INCHES)	BOX SECTION MINIMUM HEIGHTS (INCHES)	FOR DESIGN USE ONLY CATCH BASIN MINIMUM DEPTH (FEET)
18	2½	25	46	3.88
24	3	33	56	4.40
④ 30	3½	39	63	4.96
④ 36	4	46	70	5.50

① CUT-OUT HOLES BASED ON REINFORCED CONCRETE PIPE WITH WALL TYPE "B".

② ALL FLEXIBLE PIPE MATERIALS REQUIRE GASKET. SEE STANDARD DRAWING D-PB-2.

③ CUT-OUT HOLES FOR PRECAST STRUCTURES TO BE FORMED IN ORDER TO OBTAIN A SMOOTH EDGED HOLE. SCORED OR ETCHED HOLES WITH REINFORCING STEEL LEFT UNCUT WILL NOT BE PERMITTED.

④ TO BE USED IN 48 INCH INTERIOR WALLS ONLY.

- REV. 10-26-17: CHANGED MINIMUM DEPTH TABLE AND MODIFIED STEEL IN BASE NOTES.
- REV. 1-18-19: MODIFIED CATCH BASIN MINIMUM DEPTH TABLE.
- REV. 9-27-21: CHANGED PAY ITEMS IN GENERAL NOTE ⑤
- REV. 7-29-22: CHANGED ASTM SPECIFICATION IN GENERAL NOTE ⑧
- REV. 8-31-12: REVISED CATCH BASIN FOR COMPLIANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION WITH INTERIM. REVISED REINFORCING, GENERAL NOTES, LEGEND AND ADDITIONAL MISC. DRAFTING EDITS.
- REV. 11-24-21: MODIFIED TOP SLAB AND MINIMUM DEPTH.

GENERAL NOTES

(A) DRAWING TO BE USED FOR ALL PRECAST NO. 25 CONCRETE CATCH BASINS THAT ARE BETWEEN MINIMUM DEPTH AND TWELVE FEET. SEE STANDARD DRAWING D-CB-23S FOR DETAILS OF CAST-IN-PLACE NO. 25 CONCRETE CATCH BASINS AND PRECAST NO. 25 CONCRETE CATCH BASINS THAT ARE GREATER TWELVE FEET IN DEPTH. SEE STANDARD DRAWING D-CB-99 FOR ADDITIONAL CONSTRUCTION NOTES & DETAILS.

(B) THIS DIMENSION MAY VARY FROM A MINIMUM OF 0 INCHES TO A MAXIMUM OF 24 INCHES AS LONG AS 23 INCHES IS SATISFIED. THE CONTRACTOR HAS THE OPTION OF USING BRICK OR STANDARD PRECAST CONCRETE RISER FRAMES. THE USE OF BRICK SHALL BE LIMITED TO 6 INCHES. IF THIS DIMENSION EXCEEDS 6 INCHES, PRECAST CONCRETE RISER FRAMES SHALL BE USED AS SHOWN ON STANDARD DRAWING D-MP-1.

(C) THIS DRAWING DEPICTS THE MINIMUM HORIZONTAL REINFORCING AT THE TOP OF CATCH BASIN WALLS. SEE ADDITIONAL DETAILS ON STANDARD DRAWING D-CB-99 FOR TALLER SECTIONS AND STEEL PLACEMENT ABOVE PIPE OPENINGS.

(D) ALL PRECAST ELEMENTS MEET ASTM C913 (CURRENT EDITION) UNLESS SUPERSEDED BY THIS DRAWING.

CONCRETE: f'_c = 4,000 POUNDS PER SQUARE INCH AT 28 DAYS
REINFORCING STEEL: ASTM A615, F_y = 60,000 POUNDS PER SQUARE INCH
ALL REINFORCING IS TO BE INSTALLED AS DETAILED ON THIS DRAWING.

(E) PRECAST CATCH BASIN UNITS WHICH ARE DAMAGED DURING SHIPMENT OR INSTALLATION WILL BE REJECTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE DAMAGED CATCH BASIN UNITS AT HIS OWN EXPENSE.

(F) THE FABRICATOR MAY ELIMINATE THE A503 BARS BY LENGTHENING THE VERTICAL LEG OF THE HS00/R501 BARS SO THAT 1½ INCHES OF CLEAR COVER IS PROVIDED AT THE TOP OF THE STRUCTURE.

(G) APPROPRIATE SIZING AND LOCATION OF LIFTING DEVICES SHALL BE THE RESPONSIBILITY OF THE FABRICATOR.

(H) THE CONTRACTOR IS TO PATCH ALL LIFTING DEVICE HOLES WITH GROUT AND PLACE A MINIMUM OF ONE (1) INCH OF COVER OVER THE HARDWARE OF THESE DEVICES ON BOTH TOP AND BOTTOM SURFACES.

(I) ALTERNATIVE JOINT DETAILS MAY BE ACCEPTABLE. SEE STANDARD DRAWING D-CB-99 FOR ADDITIONAL DETAILS.

(J) SEE ROADWAY PLANS DRAINAGE TABULATION FOR PIPE INLET AND OUTLET ELEVATIONS. IF NEEDED, INVERT ELEVATIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER IN ORDER TO ACCOMMODATE INLET AND OUTLET PIPES.

(K) FOR CASES WHERE THE OUTLET PIPE DIAMETER IS LARGER THAN THE INLET PIPE DIAMETER, A MINIMUM 23 INCH DEPTH SHALL BE MAINTAINED ABOVE THE OUTLET PIPE.

(L) SEE STANDARD DRAWING D-CBM-12B FOR DETAILS REGARDING CAST IRON GRATES, FRAMES AND CURB INLETS.

(M) PAY DEPTH MEASUREMENT MADE FROM TOP OF GRATE TO OUTLET FLOW ELEVATION. PAYMENT FOR CATCH BASIN WILL BE MADE UNDER ITEM NUMBERS 611-25.01 CATCH BASINS, TYPE 25, 0'-4" DEPTH THROUGH 611-25.03, CATCH BASINS, TYPE 25, > 8'-12" DEPTH PER EACH. PAYMENT INCLUDES RISER SECTION AND GRATE.

REINFORCING STEEL LEGEND

- ☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

STANDARD PRECAST RECTANGULAR CONCRETE NO. 25 CATCH BASIN (FOR USE WITH 6" MOUNTABLE CURB)

NOT TO SCALE 12-18-95 D-CB-25P

TDOT GRATE INLET DETAIL

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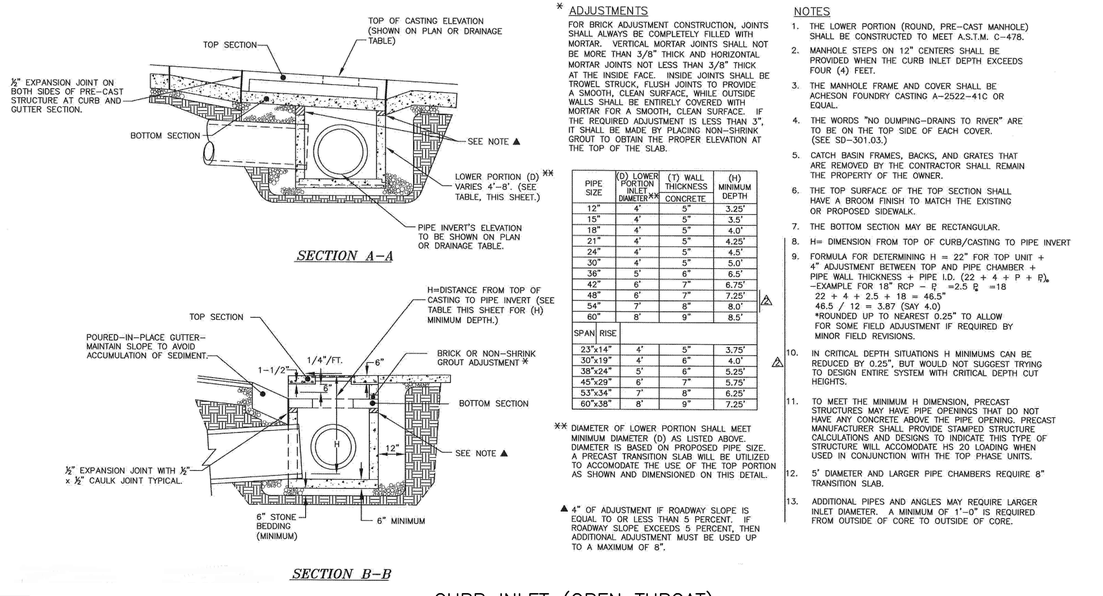

* ADJUSTMENTS

FOR BRICK ADJUSTMENT CONSTRUCTION, JOINTS SHALL ALWAYS BE COMPLETELY FILLED WITH MORTAR. VERTICAL MORTAR JOINTS SHALL NOT BE MORE THAN 3/8" THICK AND HORIZONTAL MORTAR JOINTS NOT LESS THAN 3/8" THICK AT THE INSIDE FACE. INSIDE JOINTS SHALL BE TROWEL STRUCK, FLUSH JOINTS TO PROVIDE A SMOOTH, CLEAN SURFACE, WHILE OUTSIDE WALLS SHALL BE ENTIRELY COVERED WITH MORTAR FOR A SMOOTH, CLEAN SURFACE. IF THE REQUIRED ADJUSTMENT IS LESS THAN 3", IT SHALL BE MADE BY PLACING NON-SHRINK GROUT TO OBTAIN THE PROPER ELEVATION AT THE TOP OF THE SLAB.

PIPE SIZE	(D) LOWER PORTION INLET DIAMETER **	(T) WALL THICKNESS CONCRETE	(H) MINIMUM DEPTH
12"	4'	5"	3.25'
15"	4'	5"	3.5'
18"	4'	5"	4.0'
21"	4'	5"	4.25'
24"	4'	5"	4.5'
30"	4'	5"	5.0'
36"	5'	6"	6.5'
42"	6'	7"	6.75'
48"	6'	7"	7.25'
54"	7'	8"	8.0'
60"	8'	9"	8.5'
SPAN	RISE		
23"x14"	4'	5"	3.75'
30"x19"	4'	6"	4.0'
38"x24"	5'	6"	5.25'
45"x29"	6'	7"	5.75'
53"x34"	7'	8"	6.25'
60"x38"	8'	9"	7.25'

** DIAMETER OF LOWER PORTION SHALL MEET MINIMUM DIAMETER (D) AS LISTED ABOVE. DIAMETER IS BASED ON PROPOSED PIPE SIZE. A PRECAST TRANSITION SLAB WILL BE UTILIZED TO ACCOMODATE THE USE OF THE TOP PORTION AS SHOWN AND DIMENSIONED ON THIS DETAIL.

▲ 4" OF ADJUSTMENT IF ROADWAY SLOPE IS EQUAL TO OR LESS THAN 5 PERCENT. IF ROADWAY SLOPE EXCEEDS 5 PERCENT, THEN ADDITIONAL ADJUSTMENT MUST BE USED UP TO A MAXIMUM OF 8".

NOTES

1. THE LOWER PORTION (ROUND, PRE-CAST MANHOLE) SHALL BE CONSTRUCTED TO MEET A.S.T.M. C-478.
2. MANHOLE STEPS ON 12" CENTERS SHALL BE PROVIDED WHEN THE CURB INLET DEPTH EXCEEDS FOUR (4) FEET.
3. THE MANHOLE FRAME AND COVER SHALL BE ACHESON FOUNDRY CASTING A-2522-41C OR EQUAL.
4. THE WORDS "NO DUMPING-DRAINS TO RIVER" ARE TO BE ON THE TOP SIDE OF EACH COVER. (SEE SD-301.03.)
5. CATCH BASIN FRAMES, BACKS, AND GRATES THAT ARE REMOVED BY THE CONTRACTOR SHALL REMAIN THE PROPERTY OF THE OWNER.
6. THE TOP SURFACE OF THE TOP SECTION SHALL HAVE A BROOM FINISH TO MATCH THE EXISTING OR PROPOSED SIDEWALK.
7. THE BOTTOM SECTION MAY BE RECTANGULAR.
8. H= DIMENSION FROM TOP OF CURB/CASTING TO PIPE INVERT
9. FORMULA FOR DETERMINING H = 22" FOR TOP UNIT + 4" ADJUSTMENT BETWEEN TOP AND PIPE CHAMBER + PIPE WALL THICKNESS + PIPE I.D. (22 + 4 + P + $\frac{P}{2}$)
   -EXAMPLE FOR 18" RCP = $\frac{P}{2}$ =2.5 ℄ =18
   22 + 4 + 2.5 + 18 = 46.5"
   46.5 / 12 = 3.87 (SAY 4.0)
   *ROUNDED UP TO NEAREST 0.25" TO ALLOW FOR SOME FIELD ADJUSTMENT IF REQUIRED BY MINOR FIELD REVISIONS.
10. IN CRITICAL DEPTH SITUATIONS H MINIMUMS CAN BE REDUCED BY 0.25", BUT WOULD NOT SUGGEST TRYING TO DESIGN ENTIRE SYSTEM WITH CRITICAL DEPTH CUT HEIGHTS.
11. TO MEET THE MINIMUM H DIMENSION, PRECAST STRUCTURES MAY HAVE PIPE OPENINGS THAT DO NOT HAVE ANY CONCRETE ABOVE THE PIPE OPENING. PRECAST MANUFACTURER SHALL PROVIDE STAMPED STRUCTURE CALCULATIONS AND DESIGNS TO INDICATE THIS TYPE OF STRUCTURE WILL ACCOMODATE HS 20 LOADING WHEN USED IN CONJUNCTION WITH THE TOP PHASE UNITS.
12. 5' DIAMETER AND LARGER PIPE CHAMBERS REQUIRE 8" TRANSITION SLAB.
13. ADDITIONAL PIPES AND ANGLES MAY REQUIRE LARGER INLET DIAMETER. A MINIMUM OF 1'-0" IS REQUIRED FROM OUTSIDE OF CORE TO OUTSIDE OF CORE.

CURB INLET (OPEN THROAT)

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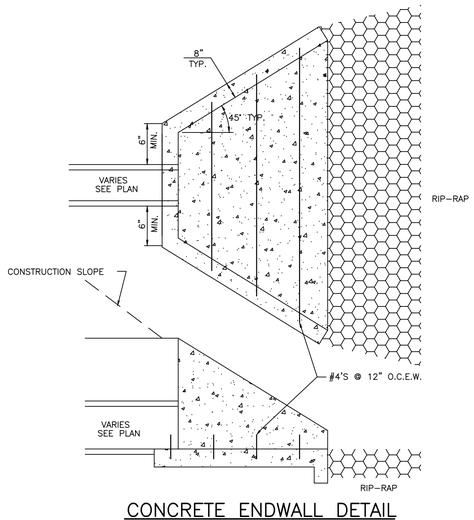

CONCRETE ENDWALL DETAIL

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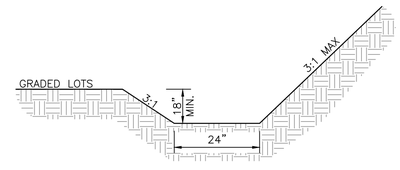

TYPICAL INTERCEPTOR DITCH

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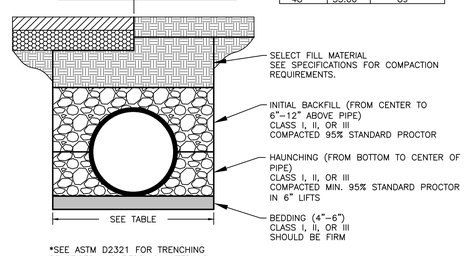
DIAMETER	O.D.	RECOMMENDED TRENCH WIDTH
4"	4.72"	21"
6"	6.95"	23"
8"	9.16"	25"
10"	11.31"	28"
12"	14.45"	31"
15"	17.65"	34"
18"	21.10"	39"
24"	28.30"	48"
30"	36.10"	66"
36"	42.25"	78"
42"	47.00"	83"
48"	53.00"	89"



*SEE ASTM D2321 FOR TRENCHING PRACTICES AND BEDDING MATERIALS.

HDPE PIPE TRENCHING & BACKFILL REQUIREMENTS

6

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

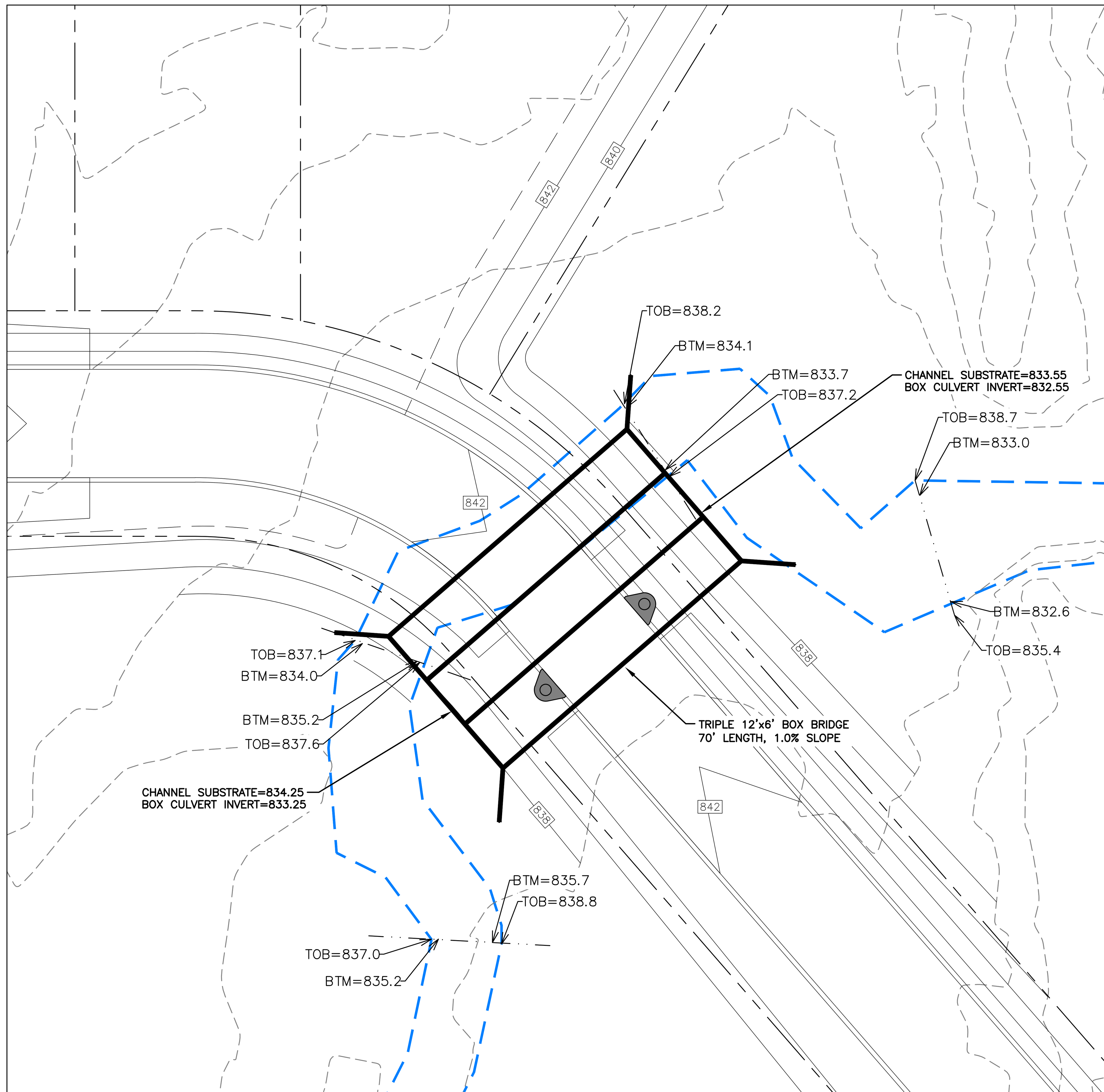
FOR REVIEW

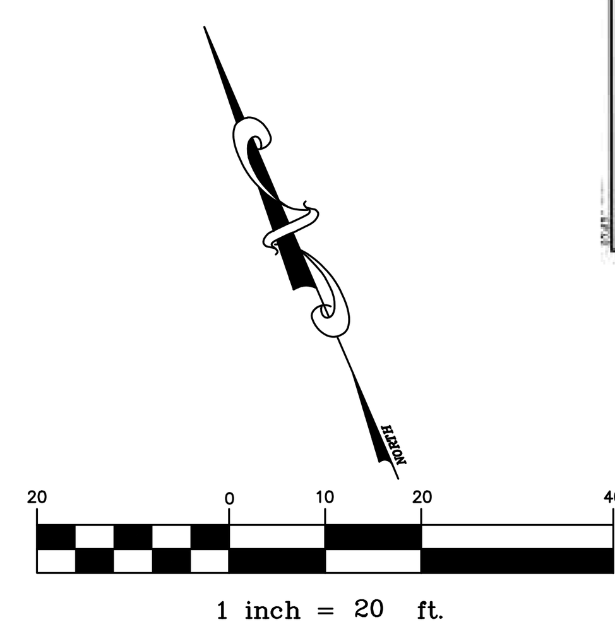
REVISIONS		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

SHEET NAME:
GRADING & DRAINAGE DETAILS

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-03.3





BOX CULVERT PLAN

SCALE: 1" = 20' HORIZONTAL

STD-17-96&98_3BARREL_BOX12'.DGN

3 @ 12 x 4 REINFORCED CONCRETE BOX BRIDGE

	Maximum Fill Height ft.	ST in.	SB in.	WT in.	IT in.	BW ft.	Bars TST Size	Bars TST No.	Bars TST Spacing in.	Bars TST Length ft.	Bars TSB Size	Bars TSB No.	Bars TSB Spacing in.	Bars TSB Length ft.	Bars BST Size	Bars BST No.	Bars BST Spacing in.	Bars BST Length ft.	Bars BSB Size	Bars BSB No.	Bars BSB Spacing in.	Bars BSB Length ft.	Bars EWE Size	Bars EWE No.	Bars EWE Spacing in.	Bars EWE Length ft.	Bars EWI Size	Bars EWI No.	Bars EWI Spacing in.	Bars EWI Length ft.	Bars IW Size	Bars IW No.	Bars IW Spacing in.	Bars IW Length ft.	Bars LNT No.	Bars LND No.	Bars WS No.	Concrete CY/LF	Reinf. Steel LB/LF
Continuous	No Fill	11.5	11	8	8	38.67	7	2	6	38.17	7	2	6	38.17	6	1	12	39.17	5	2	6	39.17	4	2	12	4.00	5	2	12	4.00	4	4	12	4.00	152	72	8	3.11	733
	3	14	14	8	8	38.67	9	1	12	38.17	6	2	6	38.17	7	1	12	39.17	8	1	12	39.17	4	2	12	4.00	5	2	12	4.00	4	4	12	4.00	152	72	8	3.78	710
	5	13	13	8	8	38.67	7	2	6	38.17	6	2	6	38.17	8	1	12	39.17	6	2	6	39.17	4	2	12	4.00	5	2	12	4.00	4	4	12	4.00	190	0	8	3.54	751
	10	15	15	8	8	38.67	7	2	6	38.17	6	2	6	38.17	8	1	12	39.17	6	2	6	39.17	4	2	12	4.00	5	2	12	4.00	4	4	12	4.00	190	0	8	4.02	751
Moment Break	20	16	16	8	8	38.67	4	3	12	12.67	9	2	6	38.17	9	2	6	39.17	4	3	12	12.67	4	2	12	4.00	5	2	12	4.00	4	4	12	4.00	190	0	8	4.26	835
	30	21	21	8	8	38.67	4	3	12	12.67	8	2	6	38.17	11	1	12	39.17	4	3	12	12.67	4	2	12	4.00	5	2	12	4.00	5	4	12	4.00	190	0	8	5.47	727
	40	26	26	8	8	38.67	4	3	12	12.67	8	2	6	38.17	11	1	12	39.17	4	3	12	12.67	4	2	12	4.00	5	2	12	4.00	5	4	12	4.00	190	0	8	6.68	727
	50	31	31	8	8	38.67	4	3	12	12.67	8	2	6	38.17	11	1	12	39.17	4	3	12	12.67	4	2	12	4.00	5	2	12	4.00	4	8	6	4.00	190	0	8	7.89	731
	60	34	34	8	8	38.67	4	3	12	12.67	9	2	6	38.17	9	2	6	39.17	4	3	12	12.67	4	2	12	4.00	5	2	12	4.00	7	4	12	4.00	190	0	8	8.62	857

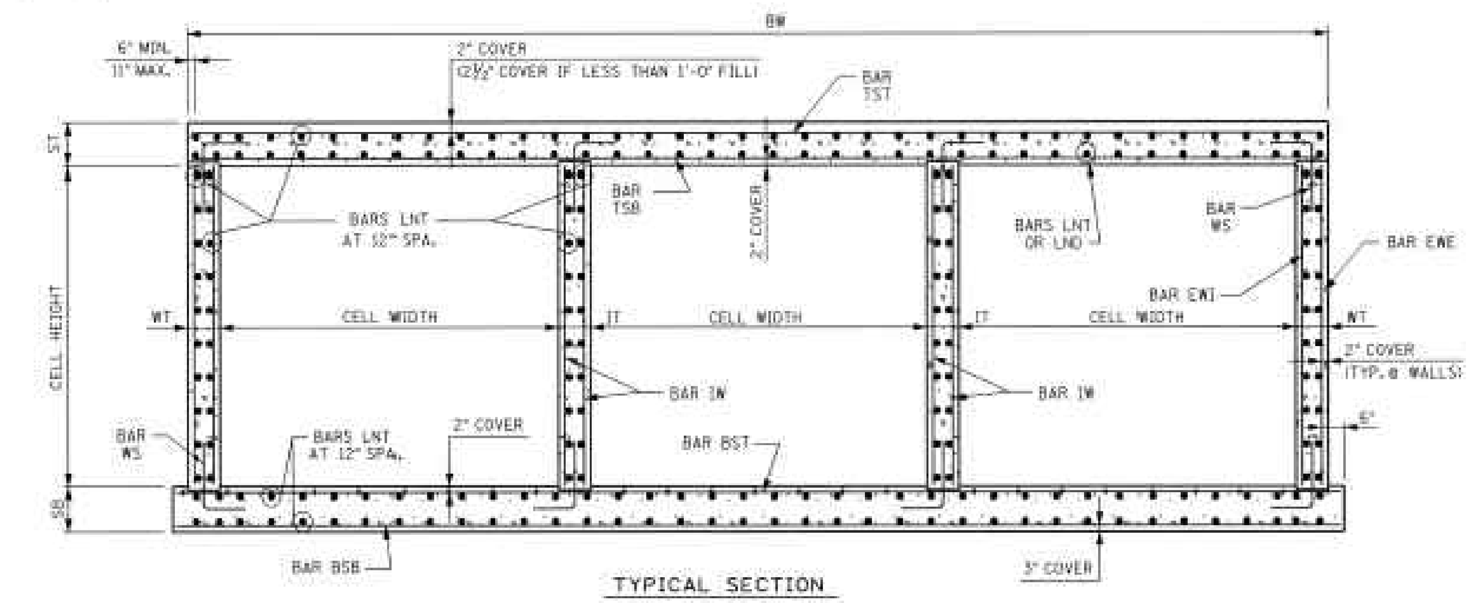
3 @ 12 x 5 REINFORCED CONCRETE BOX BRIDGE

	Maximum Fill Height ft.	ST in.	SB in.	WT in.	IT in.	BW ft.	Bars TST Size	Bars TST No.	Bars TST Spacing in.	Bars TST Length ft.	Bars TSB Size	Bars TSB No.	Bars TSB Spacing in.	Bars TSB Length ft.	Bars BST Size	Bars BST No.	Bars BST Spacing in.	Bars BST Length ft.	Bars BSB Size	Bars BSB No.	Bars BSB Spacing in.	Bars BSB Length ft.	Bars EWE Size	Bars EWE No.	Bars EWE Spacing in.	Bars EWE Length ft.	Bars EWI Size	Bars EWI No.	Bars EWI Spacing in.	Bars EWI Length ft.	Bars IW Size	Bars IW No.	Bars IW Spacing in.	Bars IW Length ft.	Bars LNT No.	Bars LND No.	Bars WS No.	Concrete CY/LF	Reinf. Steel LB/LF
Continuous	No Fill	11.5	11	8	8	38.67	7	2	6	38.17	7	2	6	38.17	6	1	12	39.17	5	2	6	39.17	4	2	12	5.00	5	2	12	5.00	4	4	12	5.00	160	72	8	3.21	745
	3	14	14	8	8	38.67	9	1	12	38.17	6	2	6	38.17	7	1	12	39.17	8	1	12	39.17	4	2	12	5.00	5	2	12	5.00	4	4	12	5.00	160	72	8	3.88	721
	5	13	13	8	8	38.67	7	2	6	38.17	6	2	6	38.17	8	1	12	39.17	6	2	6	39.17	4	2	12	5.00	5	2	12	5.00	4	4	12	5.00	198	0	8	3.64	762
	10	15	15	8	8	38.67	7	2	6	38.17	6	2	6	38.17	9	1	12	39.17	9	1	12	39.17	4	2	12	5.00	5	2	12	5.00	4	4	12	5.00	198	0	8	4.12	778
Moment Break	20	16	16	8	8	38.67	4	3	12	12.67	9	2	6	38.17	11	1	12	39.17	4	3	12	12.67	4	2	12	5.00	5	2	12	5.00	4	4	12	5.00	198	0	8	4.36	788
	30	21	21	8	8	38.67	4	3	12	12.67	8	2	6	38.17	11	1	12	39.17	4	3	12	12.67	4	2	12	5.00	5	2	12	5.00	5	4	12	5.00	198	0	8	5.57	740
	40	26	26	8	8	38.67	4	3	12	12.67	8	2	6	38.17	11	1	12	39.17	4	3	12	12.67	4	2	12	5.00	5	2	12	5.00	5	4	12	5.00	198	0	8	6.78	740
	50	31	31	9	8	38.83	4	3	12	12.67	8	2	6	38.33	11	1	12	39.33	4	3	12	12.67	4	2	12	5.00	5	2	12	5.00	4	8	6	5.00	198	0	8	8.05	747
	60	34	34	10	8	39.00	4	3	12	12.67	9	2	6	38.50	9	2	6	39.50	4	3	12	12.67	4	2	12	5.00	5	2	12	5.00	7	4	12	5.00	202	0	8	8.85	881

3 @ 12 x 6 REINFORCED CONCRETE BOX BRIDGE

	Maximum Fill Height ft.	ST in.	SB in.	WT in.	IT in.	BW ft.	Bars TST Size	Bars TST No.	Bars TST Spacing in.	Bars TST Length ft.	Bars TSB Size	Bars TSB No.	Bars TSB Spacing in.	Bars TSB Length ft.	Bars BST Size	Bars BST No.	Bars BST Spacing in.	Bars BST Length ft.	Bars BSB Size	Bars BSB No.	Bars BSB Spacing in.	Bars BSB Length ft.	Bars EWE Size	Bars EWE No.	Bars EWE Spacing in.	Bars EWE Length ft.	Bars EWI Size	Bars EWI No.	Bars EWI Spacing in.	Bars EWI Length ft.	Bars IW Size	Bars IW No.	Bars IW Spacing in.	Bars IW Length ft.	Bars LNT No.	Bars LND No.	Bars WS No.	Concrete CY/LF	Reinf. Steel LB/LF
Continuous	No Fill	11.5	11	8	8	38.67	7	2	6	38.17	7	2	6	38.17	6	1	12	39.17	5	2	6	39.17	4	2	12	6.00	5	2	12	6.00	4	4	12	6.00	168	72	8	3.31	756
	3	14	14	8	8	38.67	9	1	12	38.17	6	2	6	38.17	7	1	12	39.17	8	1	12	39.17	4	2	12	6.00	5	2	12	6.00	4	4	12	6.00	168	72	8	3.98	733
	5	13	13	8	8	38.67	7	2	6	38.17	6	2	6	38.17	8	1	12	39.17	6	2	6	39.17	4	2	12	6.00	5	2	12	6.00	4	4	12	6.00	206	0	8	3.74	774
	10	15	15	8	8	38.67	7	2	6	38.17	6	2	6	38.17	5	2	6	39.17	6	2	6	39.17	4	2	12	6.00	5	2	12	6.00	4	4	12	6.00	206	0	8	4.22	751
Moment Break	20	16	16	8	8	38.67	4	3	12	12.67	9	2	6	38.17	11	1	12	39.17	4	3	12	12.67	4	2	12	6.00	5	2	12	6.00	4	4	12	6.00	206	0	8	4.46	799
	30	21	21	8	8	38.67	4	3	12	12.67	8	2	6	38.17	11	1	12	39.17	4	3	12	12.67	4	2	12	6.00	6	2	12	6.00	5	4	12	6.00	206	0	8	5.67	758
	40	26	26	9	8	38.83	4	3	12	12.67	8	2	6	38.33	11	1	12	39.33	4	3	12	12.67	4	2	12	6.00	5	2	12	6.00	5	4	12	6.00	206	0	8	6.94	754
	50	31	31	10	8	39.00	4	3	12	12.67	8	2	6	38.50	11	1	12	39.50	4	3	12	12.67	4	2	12	6.00	5	2	12	6.00	4	8	6	6.00	210	0	8	8.23	768
	60	34	34	11	8	39.17	4	3	12	12.67	9	2	6	38.67	9	2	6	39.67	4	3	12	12.67	4	2	12	6.00	5	2	12	6.00	7	4	12	6.00	210	0	8	9.03	900

Note: Maximum fill height shown in the table is measured from the bottom of the top slab. To obtain the total fill height from the flow line, add the height of the box.
Note: When height of fill above the top slab is less than 1 foot, the top mat of reinforcing in the top slab shall be constructed with 2-1/2 inches of concrete cover.
The following bar information applies to all fill cases in the tables above:
Bars LNT Size = 4 Spacing = 12 in.
Bars LND Size = 4 Spacing = 6 in.
Bars WS Size = 8 Length = 5.00 ft. Spacing = 12 in.



TYPICAL SECTION

NOTE: FOR DESCRIPTIONS OF BOX DIMENSIONS AND REINFORCING BAR DESIGNATIONS SEE STANDARD DRAWING NO. STD-17-5.

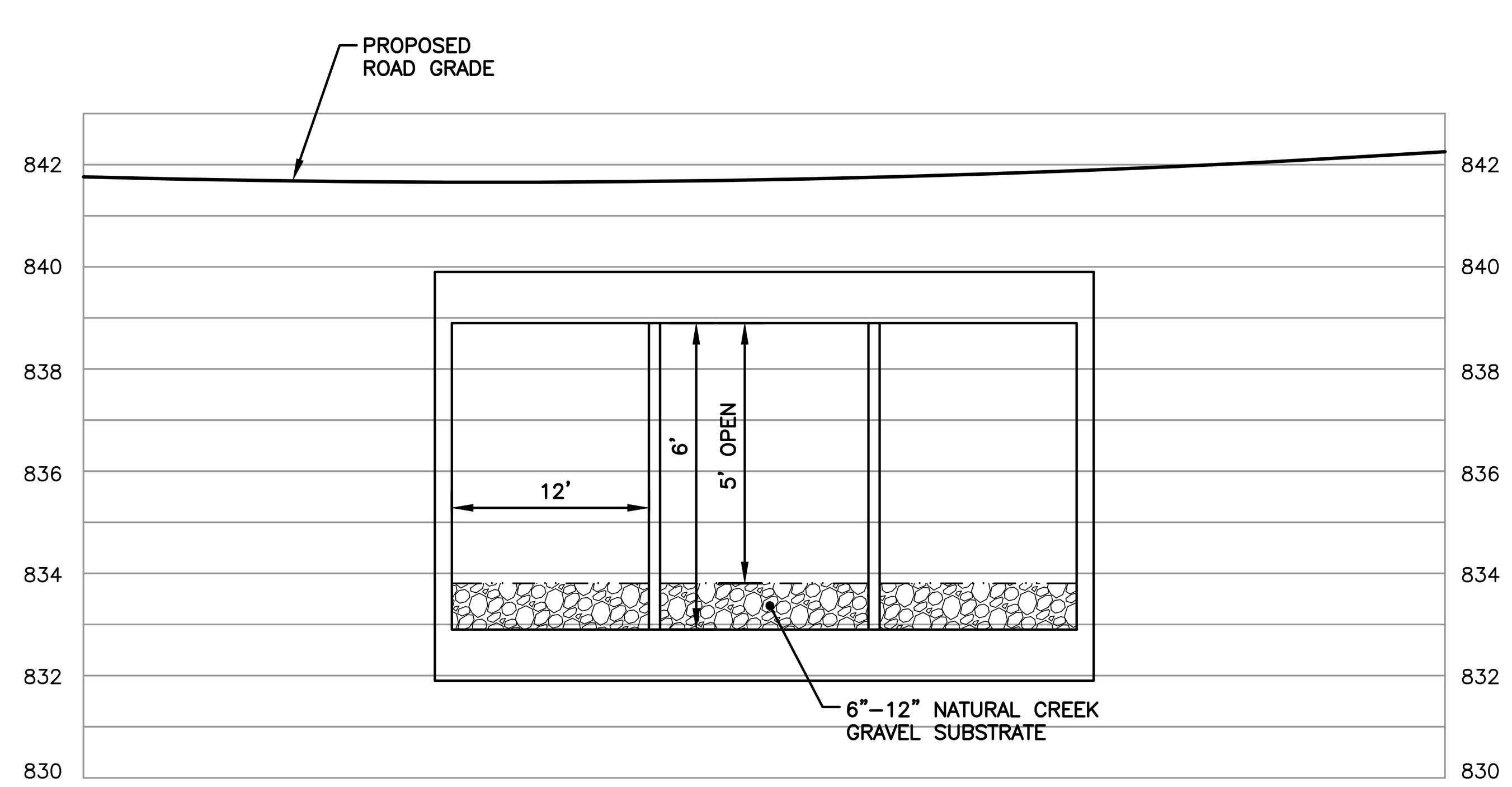
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STANDARD REINFORCED CONCRETE BOX BRIDGE
INTERIOR SECTION
SPANS: 3 BARRELS AT 12'-0"
CLEAR HEIGHTS 4'-0" THRU 6'-0"
0' THRU 60' FILL
2010

CORRECT Edward P. Wasserman
ENGINEER OF STRUCTURES

STD-17-96

CONST. NO. | PROJECT NO. | YEAR 2010 | SHEET NO.

REVISIONS



BOX CULVERT SECTION

N.T.S.

CIVIL ENGINEER:
BERRY ENGINEERS LLC
TEL: (423) 790-5880
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS

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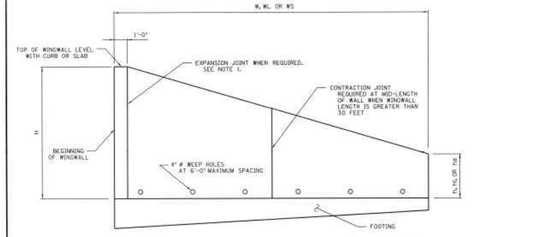
SHEET NAME:
BOX CULVERT PLAN

DATE: 06/03/2024
DRAWN BY: CMB
CHECKED BY: BMB
PROJECT NO.: 24021

SHEET NUMBER:
C-03.4

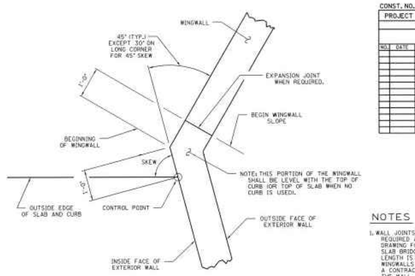
STD173.DGN



NOTE: SEE TABLES ON STANDARD DRAWINGS STD-17-11 THRU 14 FOR WINGWALL DIMENSIONS

W = WINGWALL LENGTH FOR 90° SKEW
WL = LENGTH OF LONG WINGWALL FOR SKEWS OTHER THAN 90°.
WS = LENGTH OF SHORT WINGWALL FOR SKEWS OTHER THAN 90°
H = HEIGHT AT BEGINNING OF WINGWALL
h = MIN. HEIGHT OF END OF WINGWALL FOR 90° SKEW
h1 = MIN. HEIGHT OF END OF LONG WINGWALL FOR SKEWS OTHER THAN 90°
h2 = MIN. HEIGHT OF END OF SHORT WINGWALL FOR SKEWS OTHER THAN 90°

ELEVATION VIEW OF WINGWALL



TYPICAL CORNER DETAIL

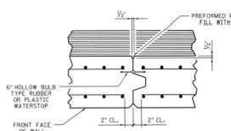
CONST. NO.	PROJECT NO.	YEAR	SHEET NO.
		2010	

REVISIONS

NO.	DATE	BY	BRIEF DESCRIPTION

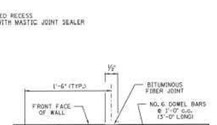
NOTES

1. WALL JOINTS - AN EXPANSION JOINT IS REQUIRED AT THE LOCATION SHOWN ON THIS DRAWING FOR ALL BOX BRIDGES, AND FOR SLAB BRIDGES WHENEVER THE WINGWALL LENGTH IS GREATER THAN 15 FEET. FOR WINGWALLS GREATER THAN 30 FEET, PLACE A CONTRACTION JOINT AT MID-LENGTH OF THE WALL.
   IF RUSTICATION GROOVES ARE USED, THE JOINTS SHALL BE SPACED TO COINCIDE WITH THE GROOVES. EXPANSION MATERIALS SHALL MEET THE REQUIREMENTS OF SPECIFICATION ARTICLES 604.2.6 AND 918.1.1. JOINT MATERIAL SHALL MEET THE REQUIREMENTS OF SPECIFICATIONS SECTION 905. FOOTING AND FOOTING REINFORCEMENT SHALL BE CONTINUOUS.



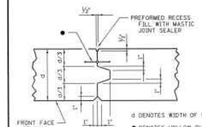
NOTE: STOP KEY 1'-0" BELOW TOP OF WALL

CONTRACTION JOINT



▲ DENOTES ½" THICKNESS FOR 9" HOLLOW BULB TYPE RUBBER OR PLASTIC WATERSTOP

EXPANSION JOINT DETAIL



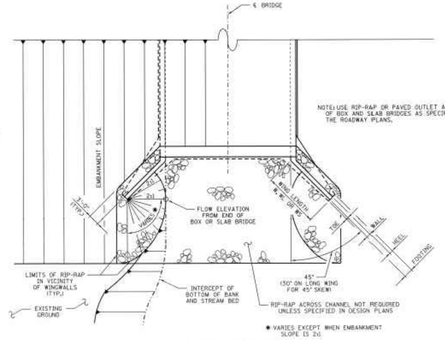
d DENOTES WIDTH OF WINGWALL

● DENOTES HOLLOW BULB TYPE RUBBER OR PLASTIC WATERSTOP

TYPICAL KEY DETAIL

THE EXPANSION JOINT SHALL BE USED IN THE WALL ONLY AND NOT CARRIED THROUGH THE FOOTING. NO REINFORCEMENT SHALL PASS THROUGH THE EXPANSION JOINT. ALL EXPOSED JOINT MATERIAL WRAPPED IN ONE LAYER OF TARPAPER WITH A TARPAPER CAP OVER THE END. THE COST OF THE BITUMINOUS FIBER AND DOWEL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CLASS A CONCRETE.

WALL JOINT DETAILS



★ VARIES EXCEPT WHEN EMBANKMENT SLOPE IS 2:1

PLAN VIEW OF WINGWALLS

(90° SKEW SHOWN, OTHER SKEWS SIMILAR)

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL WINGWALL DETAILS AND NOTES

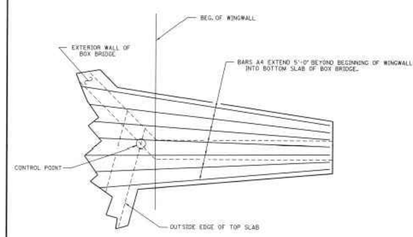
STANDARD REINFORCED CONCRETE BRIDGE BOX AND SLAB TYPE

2010

CORRECT Edward P. Wasserman
ENGINEER OF STRUCTURES

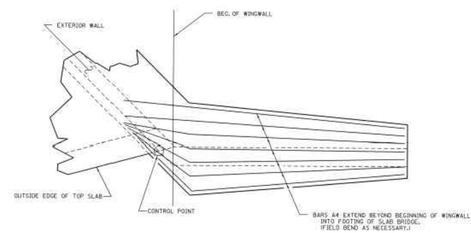
STD-17-10

STD174.DGN



PLAN OF WING FOOTING DETAIL FOR CONCRETE BOX BRIDGE

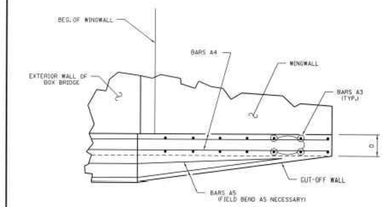
NOTE: FOR CROSS SECTION OF WINGWALL & FOOTING, SEE "SECTION" ON SHEET STD-17-15.



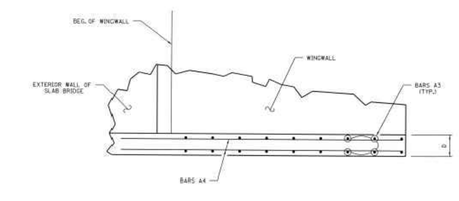
PLAN OF WING FOOTING DETAIL FOR SLAB TYPE BRIDGE

NOTE: FOR CROSS SECTION OF WINGWALL & FOOTING, SEE "SECTION" ON SHEET STD-17-15.

NOTE: FOR ADDITIONAL INFORMATION ABOUT FOOTING & WINGWALLS, SEE TABLE OF WALL DIMENSIONS, REINFORCING STEEL, SCHEDULE AND QUANTITIES ON DWG. STD-17-15.



ELEVATION OF WING FOOTING DETAIL FOR CONCRETE BOX BRIDGE



ELEVATION OF WING FOOTING DETAIL FOR SLAB TYPE BRIDGE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

WINGWALL DESIGN SECTIONS

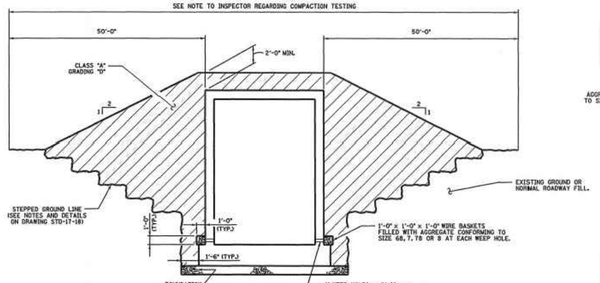
STANDARD REINFORCED CONCRETE BRIDGE BOX AND SLAB TYPE

2010

CORRECT Edward P. Wasserman
ENGINEER OF STRUCTURES

STD-17-16

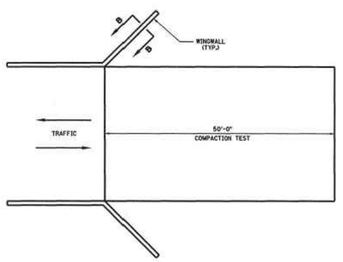
STD175.DGN



BACKFILL PLACEMENT

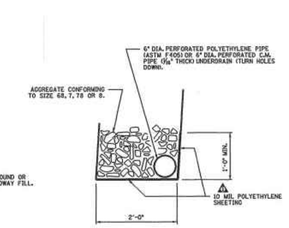
(BOX CULVERT SHOWN SLAB BRIDGES SIMILAR)

NOTE: CLASS "A" GRADING "D" LIMITS ARE TYPICAL FOR BOX CULVERT OR BRIDGE AND WINGWALLS.



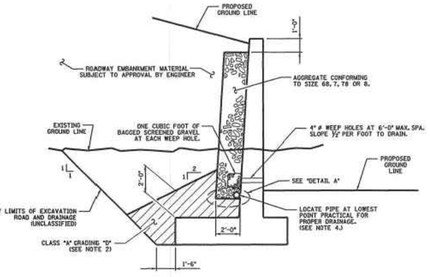
PLAN OF APPROACH ROADWAY AND CULVERT

6" DIA. PERFORATED POLYETHYLENE PIPE. (ASTM F405) OR 6" DIA. PERFORATED C.M. PIPE (16 GA. THICK) UNDERDRAIN (TURN HOLES DOWN).



DETAIL A

NOTE TO INSPECTOR: SEE MATERIALS AND TESTS SAMPLING AND TESTING SCHEDULE FOR FREQUENCY OF COMPACTION TESTING OF EMBANKMENT AND BACKFILL MATERIAL. ALSO, NOTE 1.



WINGWALL SECTION "B-B"

NOTES

1. BACKFILLING UNLESS OTHERWISE SPECIFIED OR DIRECTED, THE CONTRACTOR SHALL BACKFILL BEHIND EXTERIOR WALLS AND WINGWALLS OF BOX AND SLAB TYPE BRIDGES AND CULVERTS AS SOON AS THE FOLLOWING CONDITIONS ARE MET:
   A. CONCRETE SURFACES AGAINST WHICH BACKFILL WILL BE PLACED HAVE BEEN GIVEN A CLASS 1 FINISH AS SPECIFIED IN SUBSECTION 604.21.
   B. REPRESENTATIVE SPECIMENS OF THE CONCRETE IN THE STRUCTURE SECTION ON WHICH CURED BY THE METHODS AND IN THE MANNER THAT THE CONCRETE WHICH THE TEST SPECIMENS REPRESENT IS CURED, ATTAIN A COMPRESSIVE STRENGTH OF 3000 PSI.
   C. THE CONCRETE SHALL HAVE BEEN PLACED A MINIMUM OF SEVEN (7) DAYS NOT COUNTING THE DAY OF THE SEVEN HOUR HOLIDAY IN WHICH THE TEMPERATURE IS 40° F OR BELOW 40° F OR 21 CALENDAR DAYS WHICHEVER OCCURS FIRST.

   THE PLACEMENT OF BACKFILL AND EMBANKMENT SHALL BE IN ACCORDANCE WITH SUBSECTION 204.11 AND SUBSECTION 205.04, RESPECTIVELY, AND AS SPECIFIED ON THE PLANS.
2. IN LIEU OF THE CLASS "A" GRADING "D" MATERIAL SHOWN, CLASS "B" GRADING "C" OR "D" MAY BE USED.
3. BACKFILL: BACKFILLING OF BOX AND SLAB BRIDGES AND WINGWALLS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 204.13 OF THE STANDARD SPECIFICATIONS, THE REQUIREMENTS FOR STEPPING OF EXCAVATION SURFACES IN PREPARATION, FOR PROPER LAYERING AND COMPACTING OF BACKFILL, AND FOR MAINTAINING (AT ALL TIMES) EQUAL HEIGHTS OF BACKFILL AGAINST EXTERIOR WALLS OF BOX AND SLAB BRIDGES SHALL BE STRICTLY ENFORCED. SEE STANDARD STD-17-18 FOR OTHER NOTES AND DETAILS.
4. LOCATE PIPE AT LOWEST POINT PRACTICAL FOR PROPER DRAINAGE WITH SLOPE PARALLEL TO ABUTMENT BEAM OR RETAINING WALL (½" PER FOOT MINIMUM). INSTALL PIPE AND 1'-0" OF COVER AS SOON AS POSSIBLE AFTER FORMING WALL.
5. WEEP HOLES SHALL BE PROVIDED AT A SPACING NOT TO EXCEED 6 FEET IN THE WINGWALLS AND 6 FEET IN THE BOX OR SLAB BRIDGE EXTERIOR WALLS.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

BACKFILL AND DRAINAGE DETAILS

STANDARD REINFORCED CONCRETE BRIDGE BOX AND SLAB TYPE

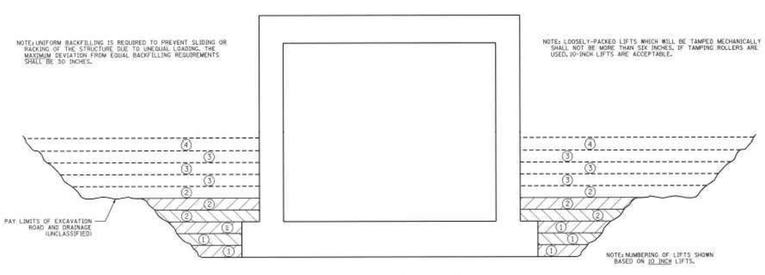
2010

CORRECT Edward P. Wasserman
ENGINEER OF STRUCTURES

STD-17-17

STD175.DGN

NOTE: UNIFORM BACKFILLING IS REQUIRED TO PREVENT SLIDING OR RACKING OF THE STRUCTURE DUE TO UNEQUAL LOADING. THE MAXIMUM DEVIATION FROM EQUAL BACKFILLING REQUIREMENTS SHALL BE 30 INCHES.



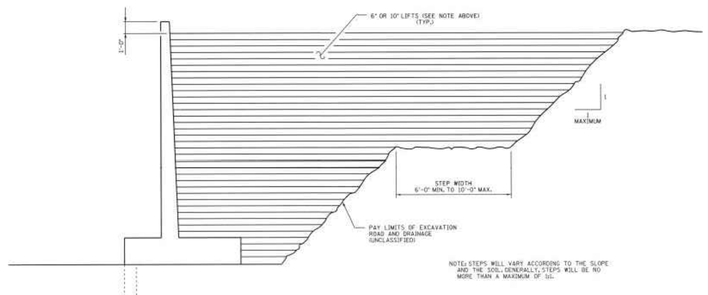
NOTE: LOOSELY-PACKED LIFTS WHICH WILL BE TAMPED MECHANICALLY SHALL NOT BE MORE THAN SIX INCHES. IF TAMPING ROLLERS ARE USED, 10-INCH LIFTS ARE ACCEPTABLE.

NOTE: NUMBERING OF LIFTS SHOWN BASED ON 10 INCH LIFTS.

UNIFORM BACKFILL PLACEMENT

(BOX BRIDGE SHOWN, SLAB BRIDGES SIMILAR)

NOTE: IF ANY PART OF THE STRUCTURE IS TO FUNCTION AS A RETAINER FOR BACKFILL - SUCH AS ABUTMENTS, RETAINING WALLS, WING WALLS, ARCHES, SIDE WALLS OF BOX CULVERTS, OR MONOP STRUCTURES, THE BOUNDARY SLOPES SHOULD BE STEPPED IN ORDER TO PREVENT ANY WEDGE ACTION. SEE NOTE REGARDING BACKFILL ON DRAWING STD-17-2 AND OTHER NOTES AND DETAILS ON DRAWING STD-17-17.



NOTE: STEPS WILL VARY ACCORDING TO THE SLOPE AND THE SOIL. GENERALLY, STEPS WILL BE NO MORE THAN A MAXIMUM OF 10'.

WINGWALL SECTION OF BACKFILL PLACEMENT

(BOX BRIDGE SHOWN, SLAB BRIDGE SIMILAR)

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

BACKFILL DETAILS

STANDARD REINFORCED CONCRETE BRIDGE BOX AND SLAB TYPE

2010

CORRECT Edward P. Wasserman
ENGINEER OF STRUCTURES

STD-17-18

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
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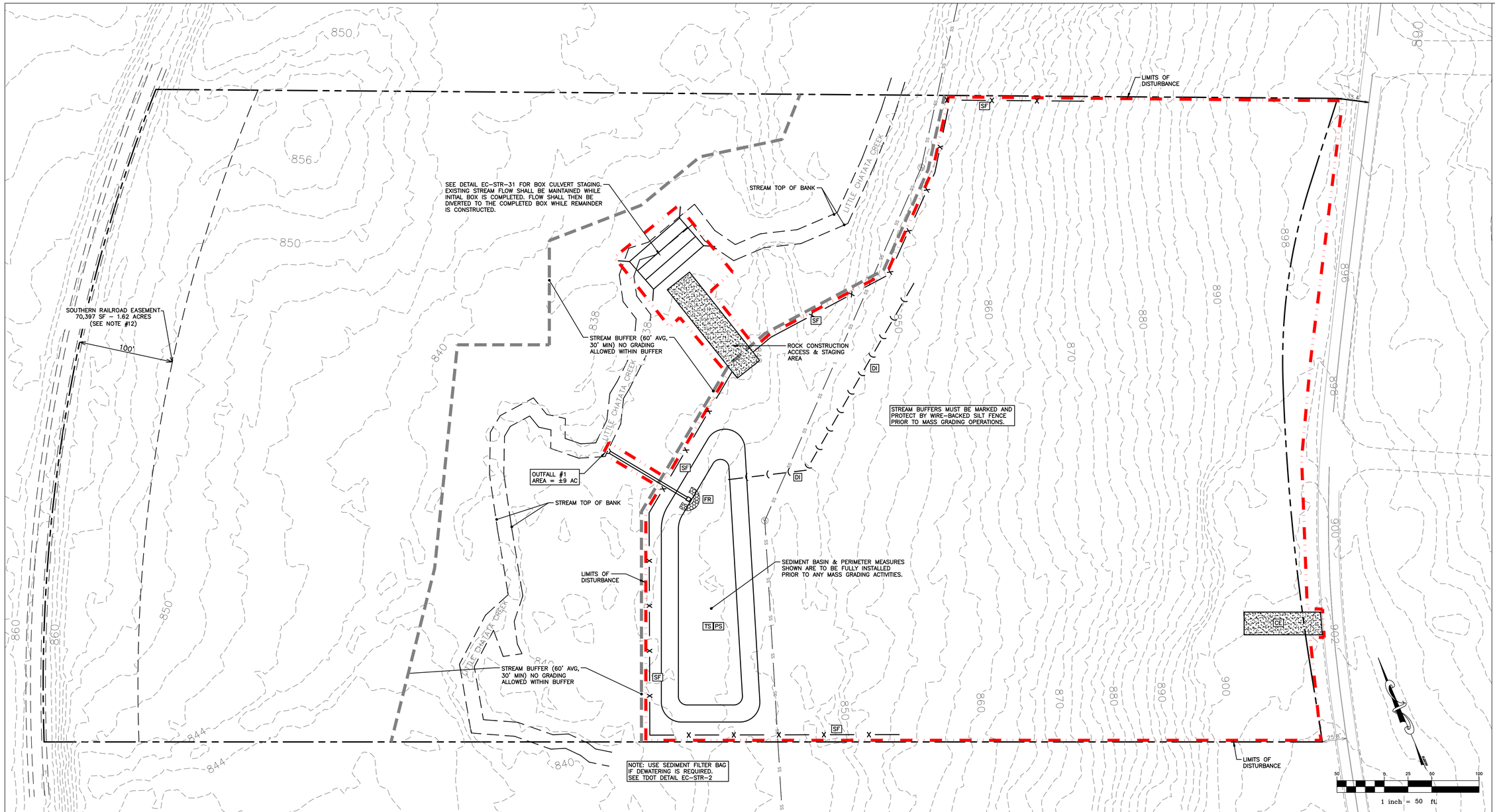
SHEET NAME:
BOX CULVERT DETAILS

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-03.5



EROSION CONTROL NOTES

1. NO TREES ARE TO BE REMOVED AND/OR VEGETATION DISTURBED EXCEPT AS NECESSARY FOR GRADING PURPOSES.
2. TOPSOIL IS TO BE STRIPPED FROM ALL CUT AND FILL AREAS, STOCKPILED, AND REDISTRIBUTED OVER ALL GRADED AREAS TO A MINIMUM OF 4". ALL AREAS NOT COVERED BY BUILDINGS OR PAVING TO RECEIVE TOPSOIL.
3. ALL GRADED AREAS INCLUDING SLOPES ARE TO BE STABILIZED WITHIN 14 DAYS AFTER GRADING IS COMPLETED. COORDINATE WITH LANDSCAPING DRAWINGS AS TO TYPE OF PERMANENT GROUND COVER TO BE USED. AT A MINIMUM, ALL DISTURBED AREAS ARE TO BE SEEDED AND MULCHED.
4. CUT AND FILL SLOPES ARE NOT TO EXCEED 4:1 UNLESS OTHERWISE NOTED.
5. CONSTRUCT EROSION CONTROL DEVICES AS SHOWN AND WHERE DESIGNATED BY THE ENGINEER.
6. ALL NEW STRUCTURES AND EXISTING STRUCTURES SHALL HAVE ALL SEDIMENT REMOVED PRIOR TO ACCEPTANCE.
7. ALL DIMENSIONS AND LOCATIONS OF TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL DEVICES SHALL BE SUBJECT TO ADJUSTMENT AS NECESSARY TO BE EFFECTIVE.
8. WHEN THE TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL DEVICES ARE NO LONGER REQUIRED FOR THE INTENDED PURPOSE THEY SHALL BE REMOVED.
9. SILT FENCES ARE TO BE REPLACED WHEN EFFECTIVENESS IS SIGNIFICANTLY REDUCED, OR AS DIRECTED.
10. EROSION CONTROL MEASURES SHALL MEET OR EXCEED MINIMUM CRITERIA, STANDARDS AND SPECIFICATIONS SET BY THE CITY OF CLEVELAND.
11. CONTRACTOR SHALL ENSURE THAT ANY EROSION CONTROL MEASURES DO NOT CAUSE WATER TO ENTER ONTO ROADWAY.
12. CONTRACTOR IS RESPONSIBLE TO PERFORM ALL REQUIRED INSPECTIONS AND TO SUBMIT ALL REQUIRED DOCUMENTATION TO THE LOCAL AUTHORITY.
13. TOPSOIL MATERIAL AND SEEDING
    A. TOPSOIL MATERIAL HAS BEEN SAVED FOR USE IN FINISH GRADING. AFTER SIFTING OUT ALL PLANT GROWTH, RUBBISH, AND STONES, USE FOR AREAS DESIGNATED TO RECEIVE GRASS. IF STOCKPILED TOPSOIL IS NOT SUFFICIENT QUANTITY TO COMPLETE WORK, FURNISH ACCEPTABLE TOPSOIL FOR GRASS AREAS UNLESS NOTED OTHERWISE ON THE DRAWINGS. GRASS AREAS SHALL BE DEFINED AS THAT GRADED AREA DISTURBED DURING CONSTRUCTION NOT TO BE PAVED OR BUILT UPON.
    B. ACCEPTABLE TOPSOIL MATERIAL SHALL BE DEFINED AS NATURAL FERTILE, AGRICULTURAL SOIL, CAPABLE FOR SUSTAINING VIGOROUS PLANT GROWTH, UNIFORM COMPOSITION THROUGHOUT, WITHOUT ADMIXTURE OF SUBSOIL, FREE OF STONES, LUMPS, PLANTS AND THEIR ROOTS, STICKS,OR OTHER EXTRANEOUS MATTER; DO NOT DELIVER WHILE IN A FROZEN OR MUDDY CONDITION.
    C. GRASS SEED SHALL BE OF THE PREVIOUS SEASON'S CROP AND THE DATE OF ANALYSIS SHOWN ON EACH BAG FOR TESTING. GRADING CONTRACTOR SHALL HIRE A QUALIFIED LANDSCAPE CONTRACTOR TO PREP FOR AND PERFORM ALL PERMANENT SEEDING.
    D. THE SEED SHALL COMPLY WITH ALL PROVISIONS OF THE U.S. DEPARTMENT OF AGRICULTURE AS TO LABELING, PURITY, AND GERMINATION.
    E. PERMANENT STAND OF GRASS SHALL BE ESTABLISHED 30 DAYS PRIOR TO GRAND OPENING. ALL WATERING, MAINTENANCE, MOWING, ETC. SHALL BE PERFORMED BY THE SITE CONTRACTOR WITH ACCEPTANCE BY OWNER.
14. SEE SHEET C-04.4 TO C-04.6 FOR ADDITIONAL DETAILS ON EROSION AND SEDIMENT CONTROL.

STABILIZATION TABLE

SITE AREA DESCRIPTION	STABILIZATION TIME FRAME	EXEMPTIONS
Perimeter dikes, swales, ditches, & slopes	5 days	none
High Quality Water Zones (HQW)	5 days	none
Slopes Steeper than 3:1	5 days	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
Slopes 3:1 or flatter	14 days	7 days for slopes greater than 50 feet in length
All other areas with slopes flatter than 4:1	14 days	none (except for perimeters and HQW zones

***Extensions of time may be approved by the permitting authority based on weather or other site-specific conditions that make compliance impracticable.

STABILIZATION PRACTICES

1. Contractor shall provide temporary and permanent stabilization to all disturbed areas not otherwise covered by buildings or parking area.
2. Temporary stabilization is required as soon as possible after final grade is achieved, but no later than 5 days for slope areas and 14 days for all other areas. Temporary stabilization includes mulching and seeding.
3. The seeded areas will be checked regularly to ensure that a good stand is maintained. Areas should be fertilized and re-seeded as needed.

SEE THIS SHEET FOR TEMPORARY SEEDING SCHEDULE

STABILIZATION TABLES

FOR SLOPES BETWEEN 2:1 AND 3:1

Date	Type	Planting Rate
Mar 1 - June 1	Sericea Lespedeza (scarified) and	50 lbs./acre
Mar 1 - Apr 15	Add Tall Fescue or	120 lbs./acre
Mar 1 - June 30	Add Hulled Common Bermudagrass	25 lbs./acre
June 1 - Sept 1	***Tall Fescue and ***Browntop Millet or ***Sorghum-Sudan Hybrids	120 lbs./acre 35 lbs./acre 30 lbs./acre
Sept 1 - Mar 1	Sericea Lespedeza (unhulled/unscarified) and Tall Fescue	70 lbs./acre 120 lbs./acre
Nov 1 - Mar 1	Add Abruzzi Rye	25 lbs./acre

FOR ALL OTHER AREAS

Date	Type	Planting Rate
Aug 15 - Nov 1	Tall Fescue	300 lbs./acre
Nov 1 - Mar 1	Tall Fescue and Abruzzi Rye	300 lbs./acre
Mar 1 - Apr 15	Tall Fescue	300 lbs./acre
Apr 15 - June 30	Hulled Common Bermudagrass	25 lbs./acre
July 15 - Aug 15	Tall Fescue and ***Browntop Millet or ***Sorghum-Sudan Hybrids	35 lbs./acre

***Temporary - Reseed according to optimum season for desired permanent vegetation. Do not allow temporary cover to grow over 12 inches in height before mowing to keep fescue from being shaded out.

EROSION CONTROL LEGEND

CE	TEMPORARY GRAVEL CONSTRUCTION EXIT	
SF	SILT FENCE (TYPE C, WIRE BACKED)	— X — X —
RR	RIP RAP (6"ø PERMANENT)	
CD	ROCK CHECK DAM	
FR	FILTER RING INLET PROTECTION	
MAT	EROSION CONTROL MATTING	
IP	INLET PROTECTION	
CW	CONCRETE TRUCK WASH OUT AREA	
TS PS	TEMPORARY & PERMANENT STABILIZATION	
	LIMITS OF DISTURBANCE (15± ACRES)	

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
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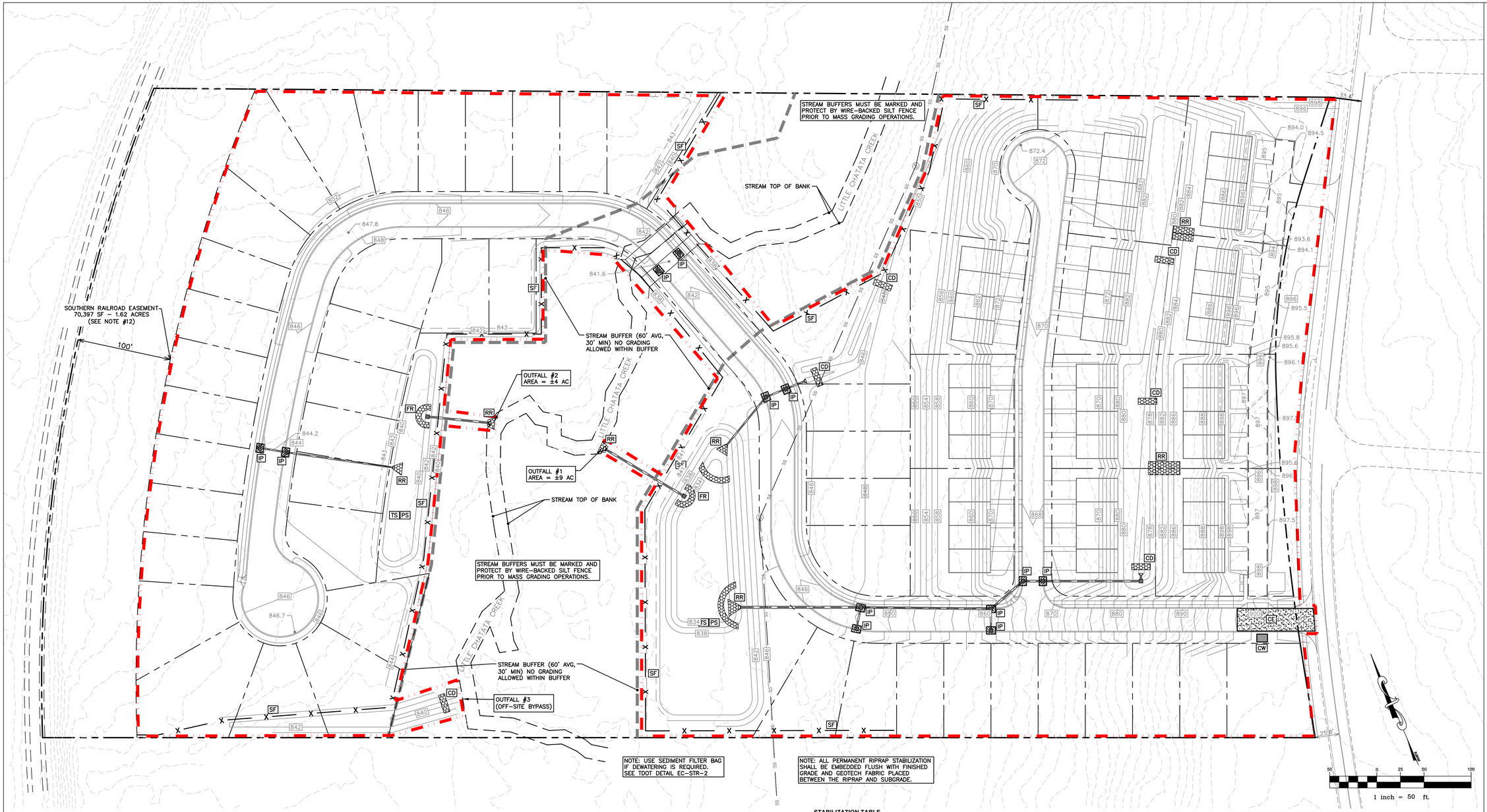
SHEET NAME:
EROSION CONTROL PLAN (PHASE 1)

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-04.1



EROSION CONTROL NOTES

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2. TOPSOIL IS TO BE STRIPPED FROM ALL CUT AND FILL AREAS, STOCKPILED, AND REDISTRIBUTED OVER ALL GRADED AREAS TO A MINIMUM OF 4". ALL AREAS NOT COVERED BY BUILDINGS OR PAVING TO RECEIVE TOPSOIL.
3. ALL GRADED AREAS INCLUDING SLOPES ARE TO BE STABILIZED WITHIN 14 DAYS AFTER GRADING IS COMPLETED. COORDINATE WITH LANDSCAPING DRAWINGS AS TO TYPE OF PERMANENT GROUND COVER TO BE USED. AT A MINIMUM, ALL DISTURBED AREAS ARE TO BE SEEDED AND MULCHED.
4. CUT AND FILL SLOPES ARE NOT TO EXCEED 4:1 UNLESS OTHERWISE NOTED.
5. CONSTRUCT EROSION CONTROL DEVICES AS SHOWN AND WHERE DESIGNATED BY THE ENGINEER.
6. ALL NEW STRUCTURES AND EXISTING STRUCTURES SHALL HAVE ALL SEDIMENT REMOVED PRIOR TO ACCEPTANCE.
7. ALL DIMENSIONS AND LOCATIONS OF TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL DEVICES SHALL BE SUBJECT TO ADJUSTMENT AS NECESSARY TO BE EFFECTIVE.
8. WHEN THE TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL DEVICES ARE NO LONGER REQUIRED FOR THE INTENDED PURPOSE THEY SHALL BE REMOVED.
9. SILT FENCES ARE TO BE REPLACED WHEN EFFECTIVENESS IS SIGNIFICANTLY REDUCED, OR AS DIRECTED.
10. EROSION CONTROL MEASURES SHALL MEET OR EXCEED MINIMUM CRITERIA, STANDARDS AND SPECIFICATIONS SET BY THE CITY OF CLEVELAND.
11. CONTRACTOR SHALL ENSURE THAT ANY EROSION CONTROL MEASURES DO NOT CAUSE WATER TO ENTER ONTO ROADWAY.
12. CONTRACTOR IS RESPONSIBLE TO PERFORM ALL REQUIRED INSPECTIONS AND TO SUBMIT ALL REQUIRED DOCUMENTATION TO THE LOCAL AUTHORITY.
13. TOPSOIL MATERIAL AND SEEDING
    - A. TOPSOIL MATERIAL HAS BEEN SAVED FOR USE IN FINISH GRADING. AFTER SIFTING OUT ALL PLANT GROWTH, RUBBISH, AND STONES, USE FOR AREAS DESIGNATED TO RECEIVE GRASS. IF STOCKPILED TOPSOIL IS NOT SUFFICIENT QUANTITY TO COMPLETE WORK, FURNISH ACCEPTABLE TOPSOIL FOR GRASS AREAS UNLESS NOTED OTHERWISE ON THE DRAWINGS. GRASS AREAS SHALL BE DEFINED AS THAT GRADED AREA DISTURBED DURING CONSTRUCTION NOT TO BE PAVED OR BUILT UPON.
    - B. ACCEPTABLE TOPSOIL MATERIAL SHALL BE DEFINED AS NATURAL FERTILE, AGRICULTURAL SOIL, CAPABLE FOR SUSTAINING VIGOROUS PLANT GROWTH, UNIFORM COMPOSITION THROUGHOUT, WITHOUT ADMIXTURE OF SUBSOIL, FREE OF STONES, LUMPS, PLANTS AND THEIR ROOTS, STICKS,OR OTHER EXTRANEOUS MATTER; DO NOT DELIVER WHILE IN A FROZEN OR MUDDY CONDITION.
    - C. GRASS SEED SHALL BE OF THE PREVIOUS SEASON'S CROP AND THE DATE OF ANALYSIS SHOWN ON EACH BAG FOR TESTING. GRADING CONTRACTOR SHALL HIRE A QUALIFIED LANDSCAPE CONTRACTOR TO PREP FOR AND PERFORM ALL PERMANENT SEEDING.
    - D. THE SEED SHALL COMPLY WITH ALL PROVISIONS OF THE U.S. DEPARTMENT OF AGRICULTURE AS TO LABELING, PURITY, AND GERMINATION.
    - E. PERMANENT STAND OF GRASS SHALL BE ESTABLISHED 30 DAYS PRIOR TO GRAND OPENING. ALL WATERING, MAINTENANCE, MOWING, ETC. SHALL BE PERFORMED BY THE SITE CONTRACTOR WITH ACCEPTANCE BY OWNER.
14. SEE SHEET C-04.4 TO C-04.6 FOR ADDITIONAL DETAILS ON EROSION AND SEDIMENT CONTROL.

STABILIZATION TABLE

SITE AREA DESCRIPTION	STABILIZATION TIME FRAME	EXEMPTIONS
Perimeter dikes, swales, ditches, & slopes	5 days	none
High Quality Water Zones (HQW)	5 days	none
Slopes Steeper than 3:1	5 days	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
Slopes 3:1 or flatter	14 days	7 days for slopes greater than 50 feet in length
All other areas with slopes flatter than 4:1	14 days	none (except for perimeters and HQW zones

***Extensions of time may be approved by the permitting authority based on weather or other site-specific conditions that make compliance impracticable.

STABILIZATION PRACTICES

1. Contractor shall provide temporary and permanent stabilization to all disturbed areas not otherwise covered by buildings or parking area.
2. Temporary stabilization is required as soon as possible after final grade is achieved, but no later than 5 days for slope areas and 14 days for all other areas. Temporary stabilization includes mulching and seeding.
3. The seeded areas will be checked regularly to ensure that a good stand is maintained. Areas should be fertilized and re-seeded as needed.

SEE THIS SHEET FOR TEMPORARY SEEDING SCHEDULE

STABILIZATION TABLES

FOR SLOPES BETWEEN 2:1 AND 3:1

Date	Type	Planting Rate
Mar 1 - June 1	Sericea Lespedeza (scarified) and Add Tall Fescue or Add Hulled Common Bermudagrass	50 lbs./acre 120 lbs./acre 25 lbs./acre
June 1 - Sept 1	***Tall Fescue and ***Browntop Millet or ***Sorghum-Sudan Hybrids	120 lbs./acre 35 lbs./acre 30 lbs./acre
Sept 1 - Mar 1	Sericea Lespedeza (unhulled/unscarified) and Tall Fescue	70 lbs./acre 120 lbs./acre
Nov 1 - Mar 1	Add Abruzzi Rye	25 lbs./acre

FOR ALL OTHER AREAS

Date	Type	Planting Rate
Aug 15 - Nov 1	Tall Fescue	300 lbs./acre
Nov 1 - Mar 1	Tall Fescue and Abruzzi Rye	300 lbs./acre
Mar 1 - Apr 15	Tall Fescue	300 lbs./acre
Apr 15 - June 30	Hulled Common Bermudagrass	25 lbs./acre
July 15 - Aug 15	Tall Fescue and ***Browntop Millet or ***Sorghum-Sudan Hybrids	35 lbs./acre

***Temporary - Reseed according to optimum season for desired permanent vegetation. Do not allow temporary cover to grow over 12 inches in height before mowing to keep fescue from being shaded out.

EROSION CONTROL LEGEND

CE	TEMPORARY GRAVEL CONSTRUCTION EXIT	
SF	SILT FENCE (TYPE C, WIRE BACKED)	
RR	RIP RAP (6"ø PERMANENT)	
CD	ROCK CHECK DAM	
FR	FILTER RING INLET PROTECTION	
MAT	EROSION CONTROL MATTING	
IP	INLET PROTECTION	
CW	CONCRETE TRUCK WASH OUT AREA	
TS PS	TEMPORARY & PERMANENT STABILIZATION	
	LIMITS OF DISTURBANCE (15± ACRES)	

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
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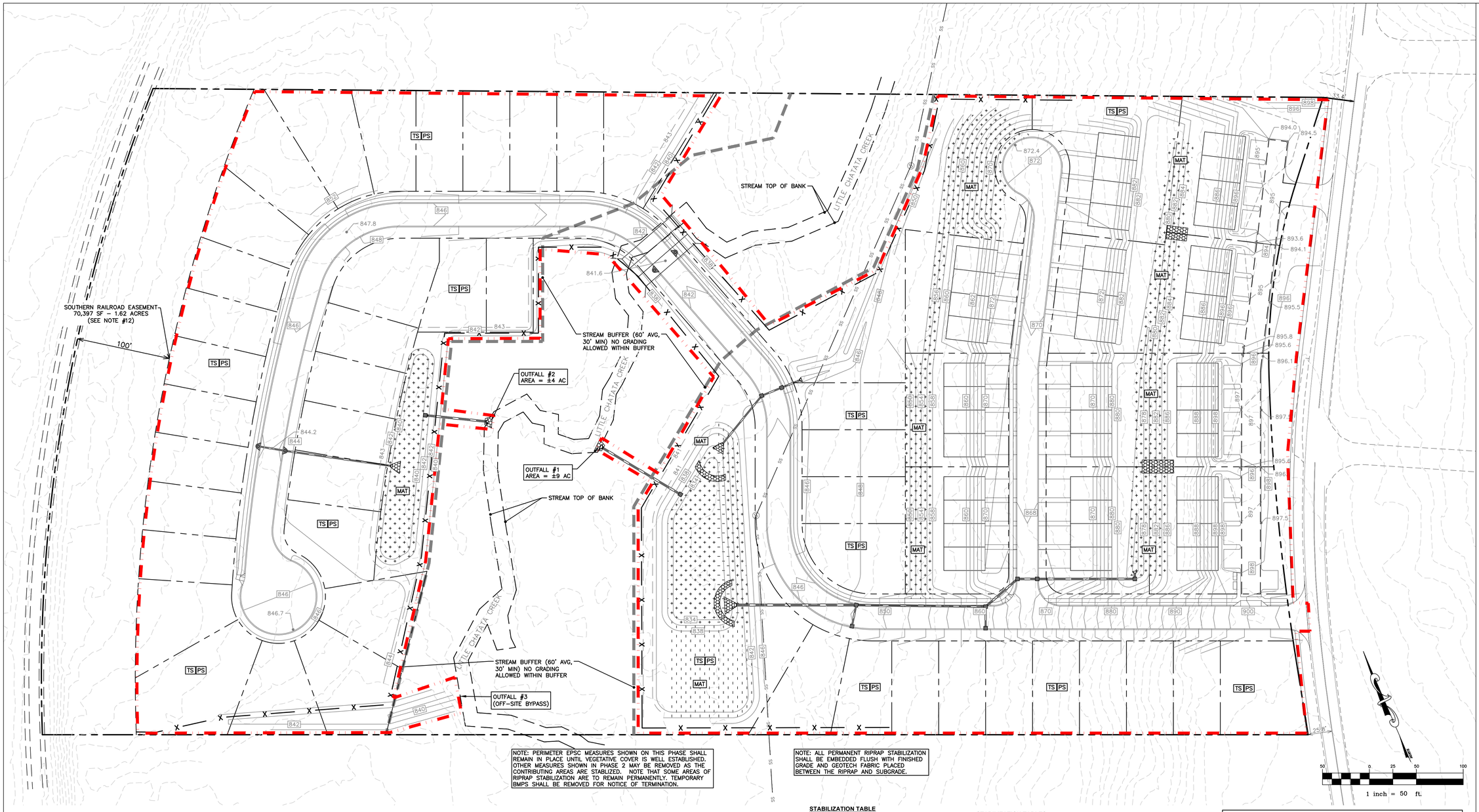
SHEET NAME:
EROSION CONTROL PLAN (PHASE 2)

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-04.2



EROSION CONTROL NOTES

1. NO TREES ARE TO BE REMOVED AND/OR VEGETATION DISTURBED EXCEPT AS NECESSARY FOR GRADING PURPOSES.
2. TOPSOIL IS TO BE STRIPPED FROM ALL CUT AND FILL AREAS, STOCKPILED, AND REDISTRIBUTED OVER ALL GRADED AREAS TO A MINIMUM OF 4". ALL AREAS NOT COVERED BY BUILDINGS OR PAVING TO RECEIVE TOPSOIL.
3. ALL GRADED AREAS INCLUDING SLOPES ARE TO BE STABILIZED WITHIN 14 DAYS AFTER GRADING IS COMPLETED. COORDINATE WITH LANDSCAPING DRAWINGS AS TO TYPE OF PERMANENT GROUND COVER TO BE USED. AT A MINIMUM, ALL DISTURBED AREAS ARE TO BE SEEDED AND MULCHED.
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14. SEE SHEET C-04.4 TO C-04.6 FOR ADDITIONAL DETAILS ON EROSION AND SEDIMENT CONTROL.

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SEE THIS SHEET FOR TEMPORARY SEEDING SCHEDULE

STABILIZATION TABLES

FOR SLOPES BETWEEN 2:1 AND 3:1

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	and	
Mar 1 - Apr 15	Add Tall Fescue	120 lbs./acre
	or	
Mar 1 - June 30	Add Hulled Common Bermudagrass	25 lbs./acre
June 1 - Sept 1	***Tall Fescue and	120 lbs./acre
	***Browntop Millet or	35 lbs./acre
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FOR ALL OTHER AREAS

Date	Type	Planting Rate
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Nov 1 - Mar 1	Tall Fescue and Abruzzi Rye	300 lbs./acre
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EROSION CONTROL LEGEND

CE	TEMPORARY GRAVEL CONSTRUCTION EXIT	
SF	SILT FENCE (TYPE C, WIRE BACKED)	X X
RR	RIP RAP (6"ø PERMANENT)	
CD	ROCK CHECK DAM	
FR	FILTER RING INLET PROTECTION	
MAT	EROSION CONTROL MATTING	
IP	INLET PROTECTION	
CW	CONCRETE TRUCK WASH OUT AREA	
TS PS	TEMPORARY & PERMANENT STABILIZATION	
	LIMITS OF DISTURBANCE (15± ACRES)	

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PROJECT:
BRIAR CREEK
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FOR REVIEW

REVISIONS		
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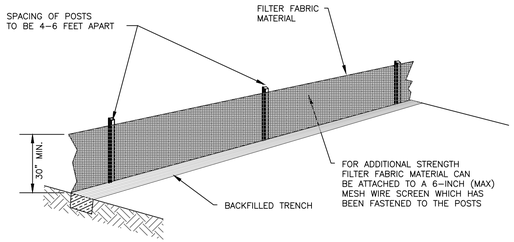
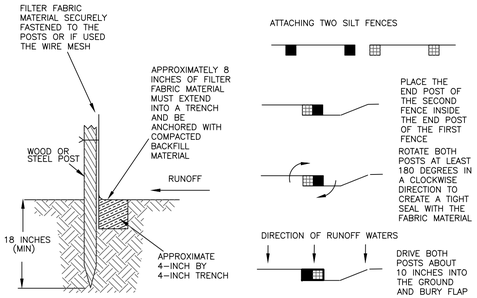
SHEET NAME:
EROSION CONTROL PLAN (PHASE 3)

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-04.3

1





SILT FENCE DETAIL

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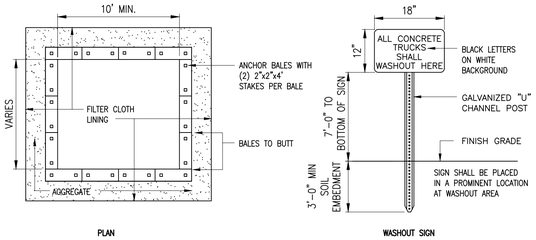
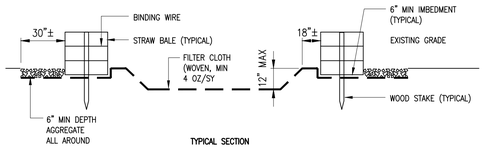
2





TYPICAL SECTION

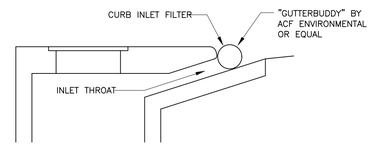
NOTES:

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

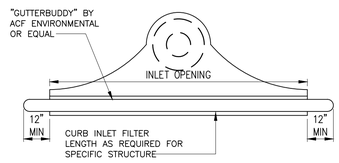
CONCRETE WASHOUT AREA DETAIL

NTS

3



SECTION



PLAN

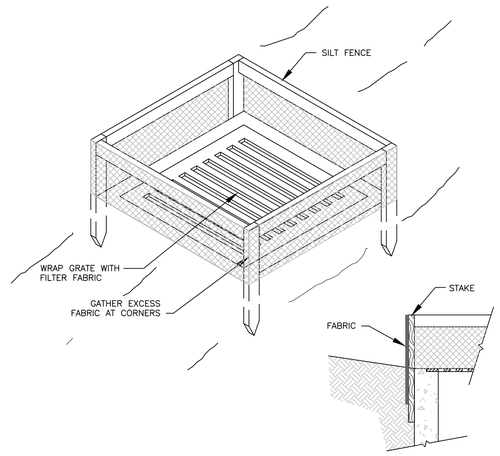
NOTES:

1. INSTALL FILTER PRIOR TO BEGINNING CONSTRUCTION
2. INSPECT ONCE EACH WEEK AND AFTER ANY RAIN EVENT.
3. REMOVE ANY FINES AND DEBRIS THAT MAY HAVE ACCUMULATED AND DISPOSE OF PROPERLY.

CURB INLET PROTECTION

N.T.S.

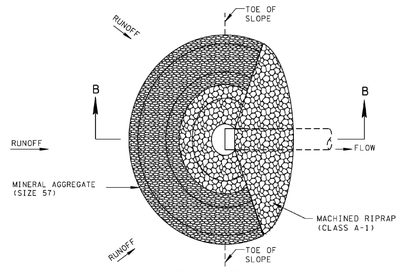
4



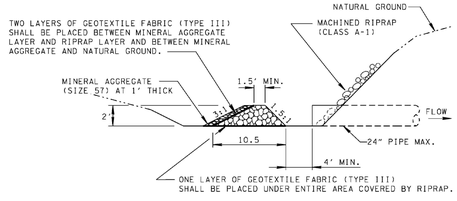
STORM DRAIN INLET PROTECTION

N.T.S.

5



PLAN VIEW

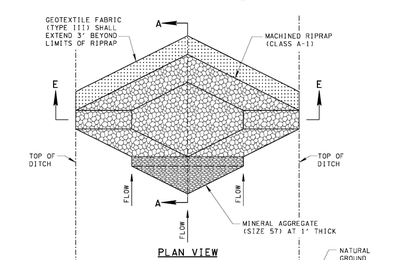


SECTION B - B

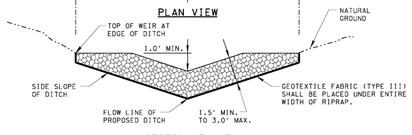
FILTER RING DETAIL

N.T.S.

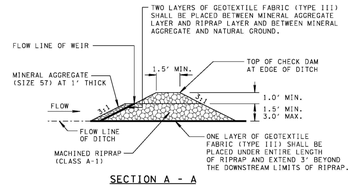
6



PLAN VIEW



SECTION E - E

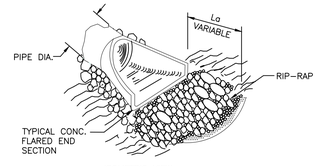


SECTION A - A

CHECK DAM DETAIL

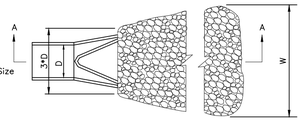
N.T.S.

7

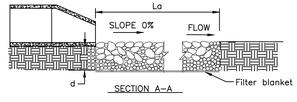


ISOMETRIC VIEW

D = Pipe Dia.
La = Apron Length
W = Apron Width
D50 = Median Riprap Size
d = Apron Depth
2.25 x D50 (Min.)



PLAN



SECTION A–A

ELEVATION TABLE			
Do	La	W	D50
18"	14'	7.5'	8"
24"	20'	10'	10"
30"	25'	12.5'	10"
36"	32'	15'	12"
42"	32'	17.5'	12"
48"	37'	20'	15"

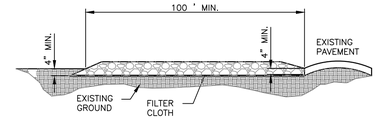
NOTES:

SEE APPROPRIATE SCHEDULE FOR DIMENSIONS
1. La is the length of the riprap apron.
2. d = 1.5 times the maximum stone diameter but not less than 6".
3. A filter blanket or filter fabric should be installed between the rip-rap and soil foundation.

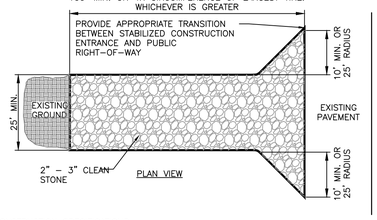
RIP RAP APRON – OUTLET CHANNEL

N.T.S.

8



SIDE ELEVATION



CONSTRUCTION SPECIFICATIONS

1. STONE – USE COARSE AGGREGATE (2 – 3 INCH STONE)
2. LENGTH – AS EFFECTIVE, BUT NOT LESS THAN 100 FEET.
3. THICKNESS – NOT LESS THAN EIGHT (8) INCHES.
4. WIDTH – NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
5. WASHING – WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH, OR WATERCOURSE THROUGH USE OF SAND BAGS, GRAVEL, BOARDS OR OTHER APPROVED METHODS.
6. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
7. 12' X 24' METAL GRATE MAY BE USED. GRATE SHALL BE 25' AWAY FROM PAVEMENT AND APPROPRIATE SEDIMENT CONTROL TRAPPING DEVICE SHALL BE USED AT GRATE OUTLET POINT.

CONSTRUCTION EXIT DETAIL

N.T.S.

CIVIL ENGINEER:
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3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
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PROJECT:
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FOR REVIEW

REVISIONS		
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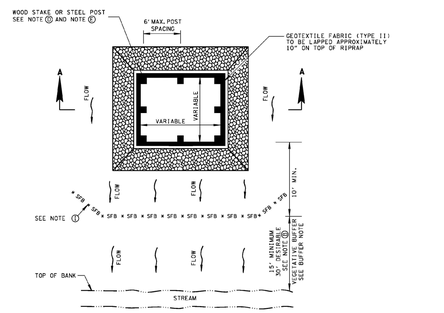
SHEET NAME:
EROSION CONTROL DETAILS

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-04.4



PLAN VIEW

BUFFER NOTE:
ATTEMPTS SHOULD BE MADE TO PROVIDE THE DESIRABLE WIDTH AT ALL SITES. THE AVERAGE WIDTH OF THE BUFFER STRIP MAY BE USED WHEN CALCULATING THE DESIRABLE WIDTH.

SECTION A-A

TRENCHING DETAIL

EROSION CONTROL PLAN LEGEND: ▦ DEWATERING STRUCTURE

DEWATERING STRUCTURE VOLUMES AND DIMENSIONS				
PUMP DIAMETER (INCHES)	PUMP RATE (GALLONS PER MINUTE)	STORAGE VOLUME REQ'D (CUBIC YARDS)	INTERIOR DIMENSIONS	EXTERIOR DIMENSIONS
2	140	84	30' X 30'	44' X 44'
3	260	155	41' X 41'	55' X 55'
4	500	298	57' X 57'	71' X 71'
6	1,100	654	85' X 85'	99' X 99'

① DIMENSIONS BASED ON THE MAXIMUM STRUCTURE HEIGHT OF 30" AND THE LENGTH BEING EQUAL TO THE WIDTH. OPTIONAL EXCAVATION IS NOT INCLUDED.

② ADJUSTMENTS SHOULD BE MADE TO THE DIMESIONS TO OBTAIN THE BEST CONFIGURATION FOR THE PROJECT SITE. DIMENSIONS ARE BASED ON THE DEWATERING STRUCTURE BEING HORIZONTAL.

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-1 TO EC-STR-1.

☐ REV. 10-26-00: IN TEMPORARY EROSION AND SEDIMENT CONTROL PAY ITEMS BLOCK CHANGED PAY ITEM NUMBERS AND DESCRIPTIONS TO CONCUR WITH CHANGES MADE BY CONSTRUCTION DIVISION.

☐ REV. 5-27-01: REVISED PAY ITEMS AND GENERAL NOTES TO COMPLY WITH NEW PAY ITEM SYSTEM GOING IN EFFECT OCTOBER 26, 2001.

☐ REV. 12-18-02: ADDED PAY ITEM NOS. 209-08.02 AND 209-08.04. CHANGED SHEET NAME.

☐ REV. 1-22-03: CHANGED GENERAL NOTE (H).

☐ REV. 4-1-08: REMOVED TEMPORARY REFERENCE, REMOVED PAY ITEMS TABLE, REPLACED GENERAL NOTES AND DEWATERING STRUCTURE VOLUMES TABLE, AND OTHER MINOR DRAFTING EDITS.

☐ REV. 8-1-12: MODIFIED BUFFER DIMENSION, ADDED BUFFER NOTES, MINOR EDITS TO GENERAL NOTES.

DEWATERING STRUCTURE GENERAL NOTES

Ⓐ DEWATERING STRUCTURES MAY BE USED WHENEVER SEDIMENT LADEN WATER IS REMOVED BY MEANS OF PUMPING. THEY SHOULD BE USED IN CONJUNCTION WITH THE DEWATERING OF COFFERDAMS, TRENCHES, ENCLOSED DITCHES, AND OTHER CONSTRUCTION ACTIVITIES WHICH REQUIRE THE REMOVAL OF SEDIMENT LADEN WATER.

Ⓑ DEWATERING STRUCTURES SHOULD NOT BE PLACED WITHIN A JURISDICTIONAL WETLAND OR WITHIN 15 FEET (30 FEET DESIRABLE) OF A STABILIZED OUTLET, STREAM, OR OTHER NATURAL WATER RESOURCE. WHEN DISCHARGING TO SEDIMENT-IMPAIRED STREAMS OR EXCEPTIONAL TENNESSEE WATERS, THE BUFFER SHALL BE A MINIMUM OF 30 FEET WITH A DESIRABLE WIDTH OF 60 FEET. BUFFER REQUIREMENT DOES NOT APPLY TO ANY LOCATION ON SITE WITH A VALID ARAP OR EQUIVALENT PERMIT BY FEDERAL AGENCIES.

Ⓒ THE MINIMUM STORAGE VOLUME REQUIRED FOR A DEWATERING STRUCTURE SHOULD BE BASED ON 2 HOURS OF PUMPING AT THE RATE SHOWN IN THE "DEWATERING STRUCTURE VOLUMES AND DIMENSIONS" TABLE. THE MINIMUM STORAGE VOLUME REQUIRED IN CUBIC FEET IS OBTAINED BY MULTIPLYING THE PUMPING RATE IN GALLONS PER MINUTE BY 16.

Ⓓ POST SHALL BE PLACED ALONG THE INTERIOR PERIMETER OF THE DEWATERING STRUCTURE. ONE POST SHOULD BE PLACED IN EACH CORNER AND POSTS SHOULD BE PLACED ALONG THE SIDES AT A MAXIMUM SPACING OF 6 FEET. POST SHOULD BE EMBEDDED A MINIMUM OF 30 INCHES INTO THE EXISTING GROUND AND SHOULD EXTEND AT A MINIMUM THE HEIGHT OF THE DEWATERING STRUCTURE.

Ⓔ THE POST SHOULD BE A MINIMUM 2.25" (NOMINAL) X 2.25" (NOMINAL) HARDWOOD POST (OAK OR HICKORY) OR MINIMUM 1.25 LB./FT. STEEL POST (STD. "T" OR "U" SECTION).

Ⓕ DIVERT ANY STORMWATER RUNOFF AWAY FROM THE DEWATERING STRUCTURE.

Ⓖ SEDIMENT FILTER BAGS MAY BE USED TO COLLECT SEDIMENT WHEN PUMPING FROM A DEWATERING STRUCTURE INTO AN ADJACENT STREAM WHEN APPROVED BY THE ENGINEER. SEE STANDARD DRAWING EC-STR-2.

Ⓗ ONLY GEOTEXTILE FABRIC (TYPE II) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

Ⓘ INSTALL SILT FENCE WITH WIRE BACKING BETWEEN STREAM AND/OR DRAINAGE DITCH AND THE DEWATERING STRUCTURE. SEE STANDARD DRAWINGS EC-STR-3C AND EC-STR-3E FOR INSTALLATION DETAILS.

Ⓙ THE EXISTING VEGETATIVE BUFFER SHOULD REMAIN BETWEEN SILT FENCE WITH WIRE BACKING AND STABILIZED OUTLET, STREAM OR OTHER NATURAL RESOURCE. BUFFER ZONE EXEMPTIONS ARE DEFINED BASED ON EXISTING LAND USES.

Ⓚ THE VOLUME OF DEWATERING STRUCTURE SHOWN IN THE EROSION PREVENTION AND SEDIMENT CONTROL PLANS IS TO BE BASED ON USE OF THE 4 INCH PUMP SHOWN IN THE "DEWATERING STRUCTURE VOLUMES AND DIMENSIONS" TABLE.

Ⓛ DEWATERING STRUCTURES SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
209-10.01	TEMPORARY DEWATERING STRUCTURE PER CUBIC YARD

SILT FENCE WITH WIRE BACKING SHALL BE PAID FOR ACCORDING TO ITS RESPECTIVE STANDARD DRAWING.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE DEWATERING STRUCTURE.

Ⓜ THE ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE STRUCTURE IS HALF FULL AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

DEWATERING STRUCTURE

10-26-92 EC-STR-1

1

PLAN VIEW

BUFFER NOTE:
ATTEMPTS SHOULD BE MADE TO PROVIDE THE DESIRABLE WIDTH AT ALL SITES. THE AVERAGE WIDTH OF THE BUFFER STRIP MAY BE USED WHEN CALCULATING THE DESIRABLE WIDTH.

SECTION A-A

☐ REV. 8-1-12: MODIFIED BUFFER DIMENSION, ADDED BUFFER NOTE, MINOR EDITS TO GENERAL NOTES.

☐ REV. 10-26-03: ADDED EROSION CONTROL SYMBOL.

☐ REV. 5-27-04: CORRECTED DIMENSION IN SECTION A-A.

☐ REV. 4-15-06: ADDED CONNECTION SLEEVE AND OPTIONAL LIFTING STRAPS. REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.

☐ REV. 4-1-08: REMOVED TEMPORARY REFERENCE, REVISED GENERAL NOTES, AND DRAFTING EDITS.

☐ REV. 5-14-10: ADDED FILTER BAG SPECIFICATIONS.

☐ REV. 2-28-01: CORRECTED PAY ITEM NUMBER IN PLAN VIEW.

☐ REV. 5-27-01: CHANGED ITEM NOS. 209-08 TO 209-08.03, 209-08.10 TO 209-09.02 AND 303-15.01 TO 303-10.01. CHANGED DESCRIPTION IN ITEM NO. 209-20.03.

☐ REV. 12-18-02: CHANGED SILT FENCE (WITHOUT BACKING) TO SILT FENCE (WITH BACKING) IN PLAN AND SECTIONAL VIEW. CHANGED PAY ITEM FROM 209-08.03 TO 209-08.02 FOR SILT FENCE.

FILTER BAG SPECIFICATIONS

PROPERTIES		TEST METHOD
WEIGHT	10.0 oz/yd.	ASTM D3776
TENSILE STRENGTH	250 lbs.	ASTM D4632
TENSILE ELONGATION AT BREAK	50%	ASTM D4632
PUNCTURE STRENGTH	115 lbs.	ASTM D4833
TRAPEZOIDAL TEAR	100 lbs.	ASTM D4533
MULLEN BURST	350 lbs.	ASTM D3786
WATER, FLOW RATE	80 gpm/ft.2	ASTM D4491
PERMITTIVITY	1.2 sec.-1	ASTM D4491
UV RESISTANCE	70% str. Ret.	ASTM D4355

STANDARD BAG MINIMUM DIMENSIONS	MAXIMUM FLOW RATE
15 X 10 ft.	up to 1500 gpm
15 X 15 ft.	up to 2000 gpm

NOTE:
THE MATERIAL SHALL BE A NON-WOVEN GEOTEXTILE FABRIC BAG RESISTANT TO ROT, MILDEW, PUNCTURE AND TEARING, WITH A MINIMUM SEAM BREAKING STRENGTH OF 200 LBS (90 Kgs) THE SEAMS SHALL DEMONSTRATE LESS ELONGATION AND DEFORMATION OF THE GEOTEXTILE FABRIC.

EROSION CONTROL PLAN LEGEND: SEDIMENT FILTER BAG

SEDIMENT FILTER BAG GENERAL NOTES

Ⓐ SPECIAL PROVISION 209B IS TO BE USED FOR SEDIMENT FILTER BAGS. ALL REFERENCES IN SPECIAL PROVISION 209B TO PUMPING FROM SEDIMENT TRAPS ALSO APPLIES TO PUMPING FROM COFFERDAMS.

Ⓑ SEDIMENT FILTER BAG INSTALLATION, INCLUDING DOWNSLOPE GEOTEXTILE AND SILT FENCE WITH WIRE BACKING SHOULD NOT BE PLACED WITHIN A JURISDICTIONAL WETLAND OR WITHIN 15 FEET (30 FEET DESIRABLE) OF A STABILIZED OUTLET, STREAM, OR OTHER NATURAL WATER RESOURCE. WHEN DISCHARGING TO SEDIMENT-IMPAIRED STREAMS OR EXCEPTIONAL TENNESSEE WATERS, THE BUFFER SHALL BE A MINIMUM OF 30 FEET WITH A DESIRABLE WIDTH OF 60 FEET. BUFFER REQUIREMENT DOES NOT APPLY TO ANY LOCATION ON SITE WITH A VALID ARAP OR EQUIVALENT PERMIT BY FEDERAL AGENCIES.

Ⓒ CONTRACTOR SHALL EXERCISE CAUTION NOT TO BURST OR DAMAGE THE SEDIMENT FILTER BAG WHEN PUMPING.

Ⓓ THE LENGTH AND WIDTH OF THE SEDIMENT BAG SHOWN ON THIS DRAWING MAY VARY PER VENDOR SPECIFICATIONS. THE MINIMUM "FOOTPRINT" OF THE BAG SHALL BE 150 SQUARE FEET.

Ⓔ SEDIMENT FILTER BAGS MAY BE EQUIPPED WITH A SEWN-IN SLEEVE OF SUFFICIENT SIZE TO ACCEPT A MINIMUM FOUR-INCH DIAMETER PUMP DISCHARGE HOSE. A HOSE CONNECTION THROUGH A SLIT IN THE BAG IS ALSO ACCEPTABLE. THE DISCHARGE HOSE SHOULD BE EXTENDED INTO THIS SLEEVE A MINIMUM OF SIX INCHES AND BE TIGHTLY SECURED WITH A HOSE CLAMP OR OTHER SUITABLE MEANS TO PREVENT LEAKAGE.

Ⓕ THE PUMP DISCHARGE HOSE CONNECTION SLEEVE, OR SLIT, SHALL BE SECURELY TIED OFF DURING DISPOSAL OF THE SEDIMENT FILTER BAG IN ORDER TO PREVENT LEAKAGE OF COLLECTED SEDIMENTS.

Ⓖ ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

Ⓗ SURROUND SEDIMENT FILTER BAG ASSEMBLY WITH SILT FENCE WITH WIRE BACKING. SEE STANDARD DRAWING EC-STR-3C AND EC-STR-3E FOR INSTALLATION DETAILS.

Ⓘ EXISTING VEGETATIVE BUFFER TO REMAIN BETWEEN SILT FENCE WITH WIRE BACKING AND STABILIZED OUTLET, STREAM OR OTHER NATURAL WATER RESOURCE. BUFFER ZONE EXEMPTIONS ARE DEFINED BASED ON EXISTING LAND USES.

Ⓙ SEDIMENT TUBES OR FILTER SOCKS MAY BE USED AS AN ALTERNATIVE TO SILT FENCE WITH WIRE BACKING. SEE STANDARD DRAWINGS EC-STR-37 AND EC-STR-8 FOR INSTALLATION DETAILS. FILTER SOCKS MAY NOT REQUIRE STAKING WHEN APPROVED BY THE ENGINEER.

Ⓚ SEDIMENT FILTER BAGS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-09.03	SEDIMENT FILTER BAG (15' X 15') PER EACH
209-09.04	SEDIMENT FILTER BAG (15' X 10') PER EACH
303-10.01	MINERAL AGGREGATE (SIZE 57) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

SILT FENCE WITH BACKING, SEDIMENT TUBES, AND FILTER SOCKS SHALL BE PAID FOR ACCORDING TO ITS RESPECTIVE STANDARD DRAWING.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF SEDIMENT FILTER BAGS.

Ⓛ WHEN SEDIMENT FILTER BAGS ARE REPLACED ONLY THE REPLACEMENT BAG SHALL BE PAID FOR. MAINTENANCE ON ALL OTHER PARTS OF THE SEDIMENT FILTER BAG ASSEMBLY SHALL BE INCLUDED IN THE INITIAL PAYMENT.

Ⓜ ONLY SEDIMENT FILTER BAGS LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED.

Ⓝ SEDIMENT FILTER BAGS SHALL BE REPLACED WHEN SEDIMENT HAS ACCUMULATED TO ONE-HALF OF THE BAGS CAPACITY OR IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SEDIMENT FILTER BAG

10-26-00 EC-STR-2

2

TEMPORARY CULVERT CROSSING

PLAN VIEW OF TEMPORARY CULVERT CROSSING

SECTION A-A

C = ½ DIAMETER OF PIPE OR 18" WHICHEVER IS GREATER
N = ½ DIAMETER OF PIPE OR 12" WHICHEVER IS GREATER

EROSION CONTROL PLAN LEGEND:

TCC	TEMPORARY CULVERT CROSSING (DESCRIBE NUMBER AND SIZE OF PIPES)
TCE	TEMPORARY CONSTRUCTION EXIT
TCF	TEMPORARY CONSTRUCTION FORD

TEMPORARY CONSTRUCTION EXIT

PLAN VIEW OF TEMPORARY CONSTRUCTION ROAD

SECTION B-B

TEMPORARY CONSTRUCTION FORD

(NOT TO BE PLACED IN STREAMS)

PLAN VIEW OF TEMPORARY CONSTRUCTION FORD

SECTION C-C

☐ REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-25 TO EC-STR-25.

REV. 5-27-01: CHANGED ITEM NO. 303-15.01 TO 303-10.01. CHANGED DESCRIPTIONS IN ITEM NOS. 621-03.02 TO 621-03.10, AND 709-05.05 TO 709-05.07.

☐ REV. 12-18-02: CHANGED GENERAL NOTE Ⓑ.

☐ REV. 1-22-03: CORRECTED GENERAL NOTE Ⓒ.

☐ REV.7-29-03: ADDED GEOTEXTILE FABRIC TO TEMPORARY CULVERT CROSSING AND TEMPORARY CONSTRUCTION ROAD ENTRANCE DETAILS. CHANGED MINERAL AGGREGATE TO CLASS A-3 RIPRAP IN TEMPORARY CONSTRUCTION ROAD ENTRANCE DETAIL. CHANGED GENERAL NOTES Ⓓ AND Ⓕ.

☐ REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.

☐ REV. 4-1-08: REVISED VARIOUS GENERAL NOTES, MISC. EDITS TO DRAWING, AND REMOVED CLASS A-2 RIPRAP.

☐ REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

GENERAL NOTES

Ⓐ TEMPORARY CULVERT CROSSINGS SHALL CONSIST OF ONE OR MORE TEMPORARY DRAINAGE PIPES INSTALLED ACROSS A FLOWING WATER COURSE FOR USE BY CONSTRUCTION EQUIPMENT. THE TEMPORARY DRAINAGE PIPES WILL VARY IN SIZE FROM EIGHTEEN TO SEVENTY-TWO INCHES IN DIAMETER.

Ⓑ MINIMIZE CLEARING OF VEGETATION FROM STREAM BANKS WHEN USING TEMPORARY CULVERT CROSSINGS.

Ⓒ TEMPORARY CULVERT CROSSINGS SHALL BE SEPARATED FROM FLOWING WATER DURING THEIR CONSTRUCTION AND REMOVAL.

Ⓓ PROVISION SHOULD BE MADE TO PREVENT CONSTRUCTION ROAD RUNOFF FROM ENTERING THE STREAM.

Ⓔ TEMPORARY CULVERT CROSSINGS SHOULD BE REMOVED, INCLUDING THE AGGREGATE AND GEOTEXTILE, AS SOON AS POSSIBLE AFTER THE CROSSING IS NO LONGER REQUIRED. ANY EXPOSED AREAS SHOULD BE IMMEDIATELY STABILIZED.

Ⓕ FOR SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT -IMPAIRED STREAMS, A 9-INCH LAYER OF MACHINED RIPRAP (CLASS A-3) SHALL BE SUBSTITUTED FOR THE MINERAL AGGREGATE (SIZE 57) USED TO TOP-DRESS A TEMPORARY CULVERT CROSSING.

Ⓖ ALL TEMPORARY CULVERT CROSSINGS AND TEMPORARY CONSTRUCTION FORDS SHALL BE PLACED PERPENDICULAR TO THE STREAM WHERE POSSIBLE. CROSSINGS MAY DEVIATE AS MUCH AS 15 DEGREES FROM PERPENDICULAR, IF NECESSARY.

Ⓗ TEMPORARY CONSTRUCTION EXITS SHALL BE BUILT TO REDUCE SEDIMENT LEAVING THE CONSTRUCTION SITE VIA CONSTRUCTION VEHICLES AND TO REDUCE SEDIMENT TRACKING ON TO PUBLIC ROADS AND OTHER PAVED AREAS.

Ⓘ ADDITIONAL STONE MAY BE REQUIRED TO TOP-DRESS THE STONE PAD IF IT BECOMES CLOGGED WITH SEDIMENT TO ENSURE THE TEMPORARY CONSTRUCTION EXIT REMAINS EFFECTIVE.

Ⓙ ON SITES WHERE THE GRADE TOWARD THE PUBLIC ROAD IS GREATER THAN 2% A MOUNTABLE BERM AT LEAST 6 INCHES HIGH WITH 3:1 SIDE SLOPES SHOULD BE PROVIDED AT THE END OF THE PAD TO PREVENT RUNOFF FROM LEAVING THE SITE.

Ⓚ TEMPORARY CONSTRUCTION EXITS SHOULD BE REMOVED WHEN NO LONGER REQUIRED. ANY EXPOSED AREAS SHOULD BE IMMEDIATELY STABILIZED.

Ⓛ TEMPORARY CONSTRUCTION FORDS ARE EFFECTIVE FOR INFREQUENT CROSSINGS OF DITCHES OR SWALES. THEY SHALL NOT BE USED IN STREAMS, WETLANDS OR OTHER NATURAL WATER RESOURCES.

Ⓜ TEMPORARY CONSTRUCTION FORDS SHOULD BE CONSTRUCTED TO MINIMIZE THE BLOCKAGE OF FLOW AND TO ALLOW FREE FLOW OVER THE FORD. THE MAXIMUM AMOUNT OF BLOCKAGE ALLOWED IS THE LESSER OF TWELVE INCHES OR ONE-HALF THE HEIGHT OF THE EXISTING BANKS.

Ⓝ A MOUNTABLE BERM AT LEAST 6 INCHES HIGH WITH 3:1 SIDE SLOPES SHOULD BE PROVIDED ON EITHER SIDE OF THE CHANNEL TO PREVENT RUNOFF FROM ENTERING THE CHANNEL.

Ⓞ TEMPORARY CONSTRUCTION FORDS SHOULD BE REMOVED WHEN NO LONGER REQUIRED. THE CHANNEL BANKS SHOULD BE RESTORED TO THEIR ORIGINAL DIMENSIONS. ANY EXPOSED AREAS SHOULD BE IMMEDIATELY STABILIZED.

Ⓟ ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

Ⓠ TEMPORARY CULVERT CROSSINGS, TEMPORARY CONSTRUCTION EXITS, AND TEMPORARY CONSTRUCTION FORDS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD AND DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
303-10.01	MINERAL AGGREGATE (SIZE 57) PER TON
621-03.02 THRU 621-03.11	_ _" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT
709-05.05	MACHINED RIPRAP (CLASS A-3) PER TON
709-05.06	MACHINED RIPRAP (CLASS A-1) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY CULVERT CROSSINGS, TEMPORARY CONSTRUCTION EXITS, AND TEMPORARY CONSTRUCTION FORDS.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TEMPORARY CULVERT CROSSING, CONSTRUCTION EXIT, CONSTRUCTION FORD

10-26-92 EC-STR-25

3

4

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
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4		
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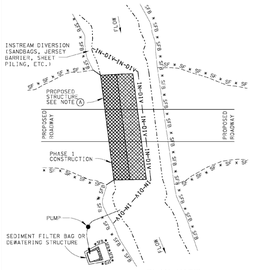
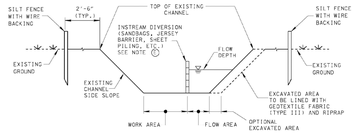
8		
9		
10		

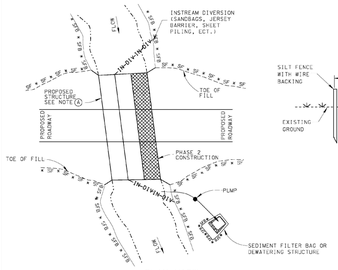
SHEET NAME:
EROSION CONTROL DETAILS

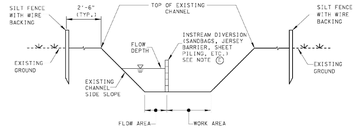
DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

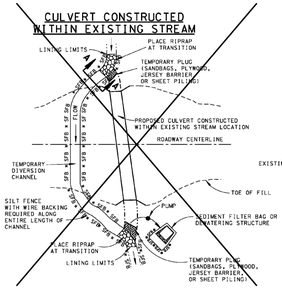
SHEET NUMBER:
C-04.5

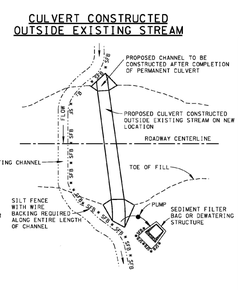


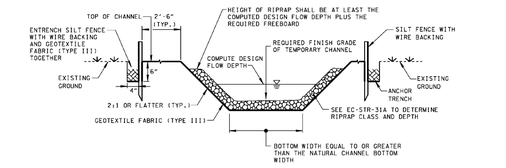


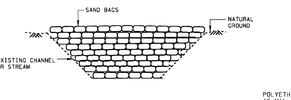


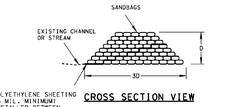


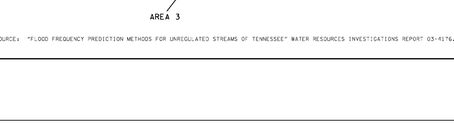












PHASE 1

PLAN VIEW

TYPICAL CHANNEL CROSS-SECTION

PHASE 2

PLAN VIEW

TYPICAL CHANNEL CROSS-SECTION

EROSION CONTROL PLAN LEGEND: —IN—DIV— INSTREAM DIVERSION

INSTREAM DIVERSION GENERAL NOTES

Ⓐ INSTREAM DIVERSIONS ARE GENERALLY USED WHERE IT IS NECESSARY TO MAINTAIN THE STREAM FLOW WITHIN THE EXISTING CHANNEL DURING THE CONSTRUCTION OF A MULTI-BARREL CULVERT, BOX BRIDGE, OR SLAB BRIDGE. THIS ALLOWS INSTREAM WORK TO BE COMPLETED IN THE DRY, SEPARATED FROM FLOWING WATER.

Ⓑ EXAMPLE SHOWN IS FOR NEW CONSTRUCTION OR REPLACEMENT OF A STRUCTURE WHEN THE ROADWAY IS CLOSED TO TRAFFIC OR WHEN A RUNAROUND IS USED. FOR AN EXAMPLE WHEN TRAFFIC IS MAINTAINED DURING CONSTRUCTION SEE EC-STR-30A. TRAFFIC CONTROL SHOULD BE BASED ON THE SPECIFIC PROJECT, NOT ON THE EXAMPLE SHOWN.

Ⓒ EXAMPLE SHOWN IS FOR NEW CONSTRUCTION OF A MULTI-BARREL STRUCTURE. ADJUSTMENTS SHOULD BE MADE TO THE INSTREAM DIVERSION FOR A STRUCTURE REPLACEMENT OR WHEN A BRIDGE IS REPLACED WITH A MULTI-BARREL STRUCTURE.

Ⓓ THE CONSTRUCTION PHASING SHOWN IS AN EXAMPLE. THE CONSTRUCTION PHASING USED SHOULD BE BASED UPON FIELD CONDITIONS OF THE SPECIFIC PROJECT AT THE TIME OF CONSTRUCTION. THE INSTREAM DIVERSION SHOULD BE ADJUSTED ACCORDINGLY.

Ⓔ THE HEIGHT OF THE INSTREAM DIVERSION SHOULD BE A MINIMUM OF 1 FOOT HIGHER THAN THE ORDINARY FLOW IN THE REDUCED CHANNEL WIDTH.

Ⓕ WHERE IT IS NECESARRY TO EXCAVATE THE CHANNEL TO PROVIDE SUFFICENT FLOW AREA FOR THE ORDINARY FLOW THE EXCAVATED AREA SHOULD BE LINED WITH GEOTEXTILE FABRIC AND RIPRAP. THE EXCAVATED AREA SHOULD BE LIMITED TO CONSTRUCITON LIMITS OF THE STRUCTURE.

Ⓖ DURING CONSTRUCTION OF THE INSTREAM DIVERSION, DAMAGE TO THE EXISTING STREAM AND CANOPY SHALL BE MINIMIZED. ALL EXISTING VEGETATION OUTSIDE THE CUT AND FILL LINES BUT INSIDE THE RIGHT-OF-WAY SHALL NOT BE DISTURBED UNLESS IT INTERFERES WITH CONSTRUCTION OR SAFETY STANDARDS.

Ⓗ CONSTRUCTION SHALL PROCEED AS FOLLOWS:

1. USE INSTREAM DIVERSION TO DIVERT FLOW TO ONE SIDE OF THE EXISTING CHANNEL AND/OR INTO BARREL(S) OF THE EXISTING CULVERT.
2. REMOVE PORTION OF EXISTING STRUCTURE, IF APPLICABLE, AND CONSTRUCT ONE OR MORE BARRELS OF THE PROPOSED CULVERT AND PLACE INLET AND OUTLET PROTECTION.
3. USE INSTREAM DIVERSION TO DIVERT FLOW TO OTHER SIDE OF THE EXISTING CHANNEL AND INTO BARREL(S) OF THE NEWLY CONSTRUCTED PROPOSED STRUCTURE.
4. REMOVE REMAINING PORTION OF EXISTING STRUCTURE, IF APPLICABLE, AND CONSTRUCT REMAINING BARRELS OF THE PROPOSED STRUCTURE AND PLACE INLET AND OUTLET PROTECTION.
5. REMOVE INSTREAM DIVERSION.

Ⓘ INSTREAM DIVERSION SHALL BE INSPECTED WEEKLY OR AFTER EVERY RAIN EVENT. ANY NEEDED REPAIRS SHALL BE DONE IMMEDIATELY.

Ⓙ INSTREAM DIVERSION MAY BE CONSTRUCTED OF SANDBAGS, JERSEY BARRIER, RIPRAP, SHEET PILING, OR OTHER MATERIALS USED TO SEPERATE THE FLOWING WATER FROM THE WORK AREA.

Ⓚ ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

Ⓛ FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR DEWATERING STRUCTURES (EC-STR-1), SEDIMENT FILTER BAGS (EC-STR-2), SILT FENCE (EC-STR-3B) AND SILT FENCE WITH WIRE BACKING (EC-STR-3C), SEE THEIR RESPECTIVE STANDARD DRAWINGS.

Ⓜ INSTREAM DIVERSIONS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-65.04 TEMPORARY IN STREAM DIVERSION PER LINEAR FOOT

OPTIONAL EXCAVATION, GEOTEXTILE, AND RIPRAP SHALL BE INCLUDED IN THE COST OF INSTREAM DIVERSION.

DEWATERING STRUCTURES, SEDIMENT FILTER BAGS, SILT FENCE, AND SILT FENCE WITH WIRE BACKING SHALL BE PAID FOR ACCORDING TO THEIR RESPECTIVE STANDARD DRAWINGS.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF INSTREAM DIVERSION.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
INSTREAM DIVERSION (WITHOUT TRAFFIC)
1-1-10 EC-STR-30

1

2

CULVERT CONSTRUCTED WITHIN EXISTING STREAM

PLAN VIEW

CULVERT CONSTRUCTED OUTSIDE EXISTING STREAM

PLAN VIEW

SECTION A-A

ELEVATION VIEW

CROSS SECTION VIEW

PLUG DETAIL

EROSION CONTROL PLAN LEGEND: ≡ ≡ ≡ TEMPORARY DIVERSION CHANNEL (DESCRIBE - SIZE AND TYPE OF LINING)

TEMPORARY DIVERSION CHANNELS GENERAL NOTES

Ⓐ DIVERSION CHANNELS SHALL BE USED TO DIVERT NORMAL STREAM FLOW FROM AN ERODIBLE AREA IN ORDER TO PREVENT POLLUTION OF THE STREAM DUE TO EROSION.

Ⓑ EXAMPLE SHOWN IS FOR NEW CULVERT CONSTRUCTION. OTHER PROJECTS WOULD BE CONSTRUCTED IN A SIMILAR MANNER.

Ⓒ TEMPORARY DIVERSION CHANNELS SHALL BE DESIGNED USING A 2-YEAR, 24-HOUR STORM FREQUENCY FLOW RATE. STANDARD DRAWING EC-STR-31A, MAY BE USED AS A GUIDELINE FOR DETERMINING THE CHANNEL SIZE. FOR ANY SITE WHERE Q_{50} EXCEEDS 500 CFS, THE DESIGN OF THIS MEASURE SHOULD BE COMPLETED BY THE HYDRAULICS SECTION OF THE STRUCTURES DIVISION. AT SITES WHICH INVOLVE EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE STABILITY OF THE RIPRAP CHANNEL LINING SHOULD BE DESIGNED FOR THE 5-YEAR, 24-HOUR PEAK FLOW.

Ⓓ ALL TEMPORARY DIVERSION CHANNELS SHALL HAVE A TRAPEZOIDAL SHAPE AND THE BOTTOM WIDTH SHALL BE EQUAL TO OR GREATER THAN THE NATURAL CHANNEL BOTTOM WIDTH.

Ⓔ TO DETERMINE RIPRAP CLASS AND DEPTH USE STANDARD DRAWING EC-STR-31A.

Ⓕ ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

Ⓖ GEOTEXTILE (TYPE III) (EROSION CONTROL) SHALL BE USED EITHER WITH OR WITHOUT RIPRAP, AS RECOMMENDED IN NOTE B6 ON STANDARD DRAWING EC-STR-31A.

Ⓗ GEOTEXTILE FABRIC (TYPE III) SHALL BE USED ALONE ONLY IN CHANNELS WITH INTERMITTENT FLOW. USE A RIPRAP LINED CHANNEL OR CULVERT WHERE THE STREAM FLOWS YEAR-ROUND.

Ⓘ WHERE EXCAVATION FOR A DIVERSION CHANNEL EXPOSES BEDROCK, GEOTEXTILE FABRIC AND RIPRAP SHALL BE REQUIRED ONLY ON THE SIDES OF THE CHANNEL.

Ⓙ RIPRAP TRANSITIONS AT THE ENTRANCE AND EXIT OF THE DIVERSION CHANNEL SHALL BE DESIGNED IN ACCORDANCE WITH APPROVED TDOT METHODS.

Ⓚ DURING CONSTRUCTION OF THE DIVERSION CHANNEL, DAMAGE TO THE EXISTING STREAM AND DAMAGE TO THE CANOPY SHALL BE MINIMIZED. ALL EXISTING VEGETATION OUTSIDE THE CUT AND FILL LINES BUT INSIDE THE RIGHT-OF-WAY SHALL NOT BE DISTURBED UNLESS IT INTERFERES WITH SAFETY STANDARDS.

Ⓛ THE PROJECT SHALL BE PLANNED IN ORDER TO MINIMIZE THE LENGTH OF TIME THE DIVERSION WILL BE REQUIRED.

Ⓜ DIVERSION CHANNEL CONSTRUCTION SHALL BE COMPLETED IN THE DRY BEFORE DIVERTING WATER FROM THE EXISTING CHANNEL. WHERE THIS IS NOT FEASIBLE, TEMPORARY FLOW DIVERSION STRUCTURES CAN BE USED UNTIL WORK IS COMPLETE. THESE STRUCTURES CAN BE ANY NON-ERODIBLE MATERIAL.

Ⓝ CONSTRUCTION SHALL PROCEED AS FOLLOWS:

1. CONSTRUCT A MEANDERING TEMPORARY CHANNEL ADJACENT TO THE PROPOSED PROJECT. ISOLATE THE TEMPORARY CHANNEL FROM THE EXISTING CHANNEL WITH TEMPORARY PLUGS. TEMPORARY EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 209 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
2. THE DIVERSION CHANNEL SHALL BE STABILIZED AND INSPECTED BY THE PROJECT ENGINEER BEFORE FLOW IS DIVERTED. DIVERT FLOW BY MOVING THE TEMPORARY PLUGS FROM THE TEMPORARY CHANNEL TO THE EXISTING CHANNEL. A COFFER DAM MAY BE USED UPSTREAM TO PREVENT STREAM FLOW DURING THIS OPERATION.
3. CONSTRUCT THE PROJECT IN THE EXISTING STREAM AND PLACE PERMANENT EROSION CONTROL ON THE EXISTING STREAM BANKS.
4. WHERE A TEMPORARY PLUG IS REQUIRED AT THE DOWNSTREAM END OF THE DIVERSION, IT SHOULD BE REMOVED FIRST. THEN REMOVE THE UPPER PLUG IN ORDER TO RELEASE FLOW INTO THE RECONSTRUCTED CHANNEL.
5. REMOVE LINING MATERIALS FROM THE DIVERSION CHANNEL, RESTORE THE AREA TO GRADE, AND STABILIZE EXPOSED SOILS.

Ⓞ ALTERNATIVE DIVERSION METHOD MAY INCLUDE PARALLEL JERSEY BARRIERS LINED WITH POLYETHYLENE SHEETING (6 MIL MINIMUM).

Ⓟ DIVERSION CHANNEL SHALL BE INSPECTED WEEKLY OR AFTER EVERY RAIN EVENT. ANY NEEDED REPAIRS SHALL BE DONE IMMEDIATELY.

Ⓠ FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR DEWATERING STRUCTURES (EC-STR-1), SEDIMENT FILTER BAGS (EC-STR-2), AND SILT FENCE WITH WIRE BACKING (EC-STR-3C) SEE THEIR RESPECTIVE STANDARD DRAWINGS.

Ⓡ TEMPORARY DIVERSION CHANNELS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-65.03	TEMPORARY DIVERSION CHANNEL PER LINEAR FOOT
709-05.06	MACHINED RIPIAP (CLASS A-1) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

DEWATERING STRUCTURES, SEDIMENT FILTER BAGS, AND SILT FENCE WITH WIRE BACKING SHALL BE PAID FOR ACCORDING TO THEIR RESPECTIVE STANDARD DRAWINGS.

TEMPORARY PLUGS SHALL BE PAID FOR UNDER THEIR RESPECTIVE ITEM NUMBERS.

PAYMENT SHALL INCLUDE ALL MATERIALS (EXCAVATION, GEOTEXTILE FABRIC, RIPRAP, ETC.) AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY DIVERSION CHANNELS.

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-31 TO EC-STR-31.

◘ REV. 5-27-01: CHANGED ITEM NO. 740-03.01 TO 740-10.03. CHANGED REFERENCE OF TEMPORARY EROSION CONTROL PIPE TO TEMPORARY PIPE.

◘ REV. 12-18-02: CHANGED ALL SILT FENCE IN DETAILS TO ENHANCED SILT FENCE. CHANGED GENERAL NOTE Ⓔ.

◘ REV. 4-15-06: MODIFIED ALL GENERAL NOTES. REMOVED "TEMPORARY CULVERT USED DURING CONSTRUCTION". REMOVED TABLE FOR "PIPE DIA. FOR STREAM CROSSINGS OR TEMP. DIVERSION CHANNELS (INCHES)" REMOVED DETAIL FOR "TEMP. DIVERSION CHANNEL W/GEOTEXTILE FABRIC LINING."REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.

◘ REV. 4-1-08: REVISED GENERAL NOTES, ADDED NOTE R, AND MISC. EDITS TO DRAWING.

◘ REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

◘ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
TEMPORARY DIVERSION CHANNEL
10-26-92 EC-STR-31

3

"K" VALUES FOR TEMPORARY DIVERSION CHANNEL DEPTH HYDROLOGIC AREA 1

DRAINAGE AREA (ACRES)	FLOW RATE (cfs)	INCREASING CHANNEL SLOPE → 0.5%	1.0%	1.5%	2.0%	2.5%	3.0%
SEE NOTE BELOW	4.0	56.6	40.0	32.7	28.3	25.3	23.1
	10.0	141.4	100.0	81.6	70.7	63.2	57.7
	25.0	353.6	250.0	204.1	176.8	158.1	144.3
128.0	35.3	499.2	353.0	288.2	249.6	223.3	203.8
150.0	39.8	562.9	398.0	325.0	281.4	251.7	229.8
200.0	49.4	698.6	494.0	403.3	349.3	312.4	285.2
250.0	58.5	826.9	584.7	477.4	413.4	369.8	337.6
300.0	67.2	950.4	672.0	548.7	475.2	425.0	388.0
400.0	83.5	1180.9	835.0	681.8	590.4	528.1	482.1
500.0	98.8	1397.2	988.0	806.7	698.6	624.9	570.4
600.0	113.3	1602.8	1133.3	925.4	801.4	716.8	654.3
700.0	127.3	1800.9	1273.4	1039.7	900.4	805.4	735.2
800.0	140.8	1991.2	1408.0	1149.6	995.6	890.5	812.9
900.0	153.9	2176.5	1539.0	1256.6	1088.2	973.3	888.5
1000.0	166.7	2357.5	1667.0	1361.1	1178.7	1054.3	962.4
1100.0	179.1	2532.9	1791.0	1462.3	1266.4	1132.7	1034.0
1200.0	191.3	2705.4	1913.0	1562.0	1352.7	1209.9	1104.5
1300.0	203.2	2873.7	2032.0	1659.1	1436.8	1285.1	1173.2

THE DESIGN FLOW RATE MAY BE DETERMINED FROM THIS TABLE FOR DRAINAGE AREAS > OR = 128 ACRES. FOR SMALLER DRAINAGE AREAS, USE TR-55 TO DETERMINE THE DESIGN FLOW RATE. ONCE THE DESIGN FLOW RATE HAS BEEN DETERMINED, USE THIS TABLE TO FIND THE REQUIRED "K" VALUE.

"K" VALUES FOR TEMPORARY DIVERSION CHANNEL DEPTH HYDROLOGIC AREA 2

DRAINAGE AREA (ACRES)	FLOW RATE (cfs)	INCREASING CHANNEL SLOPE → 0.5%	1.0%	1.5%	2.0%	2.5%	3.0%
SEE NOTE BELOW	6.0	84.9	60.0	49.0	42.4	37.9	34.6
	15.0	212.1	150.0	122.5	106.1	94.9	86.6
	30.0	424.3	300.0	244.9	212.1	189.7	173.2
	50.0	707.1	500.0	408.2	353.6	316.2	288.7
	70.0	989.9	700.0	571.5	495.0	442.7	404.1
	90.0	1272.8	900.0	734.8	636.4	569.2	519.6
	100.0	1414.2	1000.0	816.5	707.1	632.5	577.4
300.0	117.6	1663.1	1176.0	960.2	831.6	743.8	679.0
400.0	145.0	2050.6	1450.0	1183.9	1025.3	917.1	837.2
500.0	170.5	2411.2	1705.0	1392.1	1205.6	1078.3	984.4
600.0	194.6	2752.1	1946.0	1588.9	1376.0	1230.8	1123.5
700.0	217.7	3078.7	2177.0	1777.5	1539.4	1376.9	1256.9
800.0	239.9	3392.7	2399.0	1958.8	1696.3	1517.3	1385.1
900.0	261.4	3696.8	2614.0	2134.3	1848.4	1653.2	1509.2
1000.0	282.2	3990.9	2822.0	2304.2	1995.5	1784.8	1629.3
1100.0	302.4	4276.6	3024.0	2469.1	2138.3	1912.5	1745.9
1200.0	322.2	4556.6	3222.0	2630.8	2278.3	2037.8	1860.2
1300.0	341.5	4829.5	3415.0	2788.3	2414.8	2159.8	1971.7

THE DESIGN FLOW RATE MAY BE DETERMINED FROM THIS TABLE FOR DRAINAGE AREAS > OR = 300 ACRES. FOR SMALLER DRAINAGE AREAS, USE TR-55 TO DETERMINE THE DESIGN FLOW RATE. ONCE THE DESIGN FLOW RATE HAS BEEN DETERMINED, USE THIS TABLE TO FIND THE REQUIRED "K" VALUE.

"K" VALUES FOR TEMPORARY DIVERSION CHANNEL DEPTH HYDROLOGIC AREA 3

DRAINAGE AREA (ACRES)	FLOW RATE (cfs)	INCREASING CHANNEL SLOPE → 0.5%	1.0%	1.5%	2.0%	2.5%	3.0%
SEE NOTE BELOW	10.0	141.4	100.0	81.6	70.7	63.2	57.7
	25.0	353.6	250.0	204.1	176.8	158.1	144.3
	50.0	707.1	500.0	408.2	353.6	316.2	288.7
109.0	69.3	980.0	693.0	565.8	490.0	438.3	400.1
150.0	89.1	1260.1	891.0	727.5	630.0	563.5	514.4
200.0	111.8	1581.1	1118.0	912.8	790.5	707.1	645.5
250.0	133.4	1886.6	1334.0	1089.2	943.3	843.7	770.2
300.0	154.0	2177.9	1540.0	1257.4	1088.9	974.0	889.1
400.0	193.2	2732.3	1932.0	1577.5	1366.1	1221.9	1115.4
500.0	230.4	3258.3	2304.0	1881.2	1629.2	1457.2	1330.2
600.0	266.1	3763.2	2661.0	2172.7	1881.6	1683.0	1536.3
700.0	300.5	4249.7	3005.0	2453.6	2124.9	1900.5	1734.9
800.0	333.9	4722.1	3339.0	2726.3	2361.0	2111.8	1927.8
900.0	366.4	5181.7	3664.0	2991.6	2590.8	2317.3	2115.4
1000.0	398.2	5631.4	3982.0	3251.3	2815.7	2518.4	2299.0
1100.0	429.3	6071.2	4293.0	3505.2	3035.6	2715.1	2478.6
1200.0	459.8	6502.6	4598.0	3754.3	3251.3	2908.0	2654.7
1300.0	489.8	6926.8	4898.0	3999.2	3463.4	3097.8	2827.9

THE DESIGN FLOW RATE MAY BE DETERMINED FROM THIS TABLE FOR DRAINAGE AREAS > OR = 109 ACRES. FOR SMALLER DRAINAGE AREAS, USE TR-55 TO DETERMINE THE DESIGN FLOW RATE. ONCE THE DESIGN FLOW RATE HAS BEEN DETERMINED, USE THIS TABLE TO FIND THE REQUIRED "K" VALUE.

"K" VALUES FOR TEMPORARY DIVERSION CHANNEL DEPTH HYDROLOGIC AREA 4

DRAINAGE AREA (ACRES)	FLOW RATE (cfs)	INCREASING CHANNEL SLOPE → 0.5%	1.0%	1.5%	2.0%	2.5%	3.0%
SEE NOTE BELOW	15.0	212.1	150.0	122.5	106.1	94.9	86.6
	30.0	424.0	299.8	244.8	212.0	189.6	173.1
	60.0	848.1	599.7	489.6	424.0	379.3	346.2
	100.0	1414.2	1000.0	816.5	707.1	632.5	577.4
	150.0	2121.3	1500.0	1224.7	1060.7	948.7	866.0
	200.0	2828.4	2000.0	1633.0	1414.2	1264.9	1154.7
	250.0	3535.5	2500.0	2041.2	1767.8	1581.1	1443.4
	300.0	4242.6	3000.0	2449.5	2121.3	1897.4	1732.1
	350.0	4949.7	3500.0	2857.7	2474.9	2213.6	2020.7
486.0	377.1	5333.0	3771.0	3079.0	2666.5	2385.0	2177.2
600.0	421.4	5959.5	4214.0	3440.7	2979.7	2665.2	2433.0
700.0	457.1	6464.4	4571.0	3732.2	3232.2	2891.0	2639.1
800.0	490.4	6935.3	4904.0	4004.1	3467.7	3101.6	2831.3
900.0	521.8	7379.4	5218.0	4260.5	3689.7	3300.2	3012.6
1000.0	551.6	7800.8	5516.0	4503.8	3900.4	3488.6	3184.7
1100.0	580.0	8202.4	5800.0	4735.7	4101.2	3668.2	3348.6
1200.0	607.2	8587.1	6072.0	4957.8	4293.6	3840.3	3505.7
1300.0	633.4	8957.6	6334.0	5171.7	4478.8	4006.0	3656.9

THE DESIGN FLOW RATE MAY BE DETERMINED FROM THIS TABLE FOR DRAINAGE AREAS > OR = 486 ACRES. FOR SMALLER DRAINAGE AREAS, USE TR-55 TO DETERMINE THE DESIGN FLOW RATE. ONCE THE DESIGN FLOW RATE HAS BEEN DETERMINED, USE THIS TABLE TO FIND THE REQUIRED "K" VALUE.

SOURCE: "FLOOD FREQUENCY PREDICTION METHODS FOR UNREGULATED STREAMS OF TENNESSEE" WATER RESOURCES INVESTIGATIONS REPORT 03-4176, USGS 2000.

DIVERSION CHANNEL DEPTH TABLES GENERAL NOTES

(A1) THE TABLES ON THIS DRAWING MAY BE USED TO DESIGN TEMPORARY DIVERSION CHANNELS AS SHOWN ON STANDARD DRAWING EC-STR-31.

(A2) THE "K" VALUES PROVIDED IN THE TABLES REPRESENT "CONVEYANCE" WHICH MEASURES THE CAPACITY OF A CHANNEL TO PASS THE FLOW OF WATER. CONVEYANCE IS A TERM IN MANNING'S EQUATION AND IS CONSIDERED TO BE DIMENSIONLESS.

(A3) FOR EACH COMBINATION OF FLOW RATE AND CHANNEL SLOPE IN THE TABLES, THE CORRESPONDING "K" VALUE IS THE CONVEYANCE REQUIRED TO PASS THAT FLOW.

(A4) WHERE APPLICABLE, THE FLOW RATES SHOWN IN THE TABLES ARE BASED ON THE 2-YEAR EVENT AND ARE DETERMINED FROM THE USGS REGRESSION EQUATIONS FOR RURAL AREAS (2000 EDITION). THE REMAINING FLOW RATES ARE PROVIDED AS A REFERENCE FOR FINDING THE REQUIRED CONVEYANCE.

(A5) AS DESCRIBED IN THE PROCEDURE BELOW, THESE TABLES MAY BE USED TO DETERMINE THE 2-YEAR FLOW DEPTH IN A DIVERSION CHANNEL FOR THE FLOW RATES SHOWN. THE FLOW DEPTHS DETERMINED BY THIS PROCEDURE ACCOUNT FOR DIFFERENCES IN HYDRAULIC ROUGHNESS DUE TO THE DIFFERENT CLASSES OF RIPRAP REQUIRED. THE PROCEDURE IS A SIMPLE ALTERNATIVE TO ITERATIVE ANALYSIS USING THE MANNING EQUATION.

(A6) ALL TEMPORARY DIVERSION CHANNELS SHALL HAVE A TRAPEZOIDAL SHAPE AND THE BOTTOM WIDTH SHALL BE EQUAL TO OR GREATER THAN THE NATURAL CHANNEL BOTTOM WIDTH.

PROCEDURE FOR TEMPORARY DIVERSION CHANNEL DESIGN

(B1) USING THE FIGURE PROVIDED ON THIS DRAWING DETERMINE THE HYDROLOGIC AREA IN WHICH THE PROJECT SITE IS LOCATED.

(B2) INTERPOLATE THE REQUIRED "K" VALUE USING THE APPROPRIATE "K" VALUE TABLE, BASED ON THE DESIGN FLOW RATE AND AVERAGE STREAM SLOPE AT THE SITE. WHERE A PROJECT FALLS ON THE BOUNDARY BETWEEN TWO HYDROLOGIC AREAS, USE THE GREATER "K" VALUE. BASED ON THIS "K" VALUE, INTERPOLATE "A" AND "B" VALUES FROM THE TABLE "PARAMETERS FOR DEPTH OF FLOW EQUATION".

(B3) DETERMINE THE BOTTOM WIDTH OF THE EXISTING NATURAL CHANNEL. USE THIS AS THE BOTTOM WIDTH IN THE DEPTH OF FLOW EQUATION PRESENTED ON THIS DRAWING IN ORDER TO COMPUTE THE 2-YEAR FLOW DEPTH IN DIVERSION CHANNEL.

(B4) THE HEIGHT OF THE RIPRAP IN THE CHANNEL WILL BE EQUAL TO THE 2-YEAR FLOW DEPTH PLUS THE REQUIRED FREEBOARD. THE REQUIRED FREEBOARD WILL EITHER BE EQUAL TO THE FLOW DEPTH OR ONE FOOT, WHICHEVER IS LESS. THE TOP OF THE CHANNEL MUST BE EQUAL TO OR GREATER THAN THE HEIGHT OF THE RIPRAP. SEE THE FIGURE PROVIDED ON STANDARD DRAWING EC-STR-31.

(B5) COMPUTE FLOW AREA AS (DEPTH X BOTTOM WIDTH) + (Z X DEPTH^2), WHERE Z IS Z:1 FOR THE SIDE SLOPE.

(B6) COMPUTE VELOCITY AS (FLOW RATE / FLOW AREA). USE COMPUTED VELOCITY TO SELECT RIPRAP CLASS BASED ON APPROVED TDOT METHODS. IF THE COMPUTED VELOCITY IS LESS THAN 2.5 FEET PER SECOND, RIPRAP WILL NOT BE REQUIRED.

PARAMETERS FOR DEPTH OF FLOW EQUATION

K VALUE	A	B
20	-0.213	0.856
30	-0.238	0.998
60	-0.291	1.311
100	-0.323	1.545
175	-0.360	1.846
275	-0.373	2.064
350	-0.378	2.183
400	-0.384	2.260
500	-0.380	2.356
650	-0.401	2.535
750	-0.464	2.796
850	-0.494	2.944
1000	-0.540	3.162
2000	-0.812	4.406
3000	-1.000	5.321
4000	-1.100	5.960
5000	-1.176	6.567
6000	-1.241	7.072
7000	-1.300	7.515
8000	-1.323	7.895

DEPTH OF FLOW EQUATION

FLOW DEPTH = A X *ln* (BOTTOM WIDTH) + B

ln IS THE NATURAL LOG FUNCTION OF THE BOTTOM WIDTH OF THE CHANNEL.

◘ REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.

◘ REV. 4-1-08: DRAWING EDITS UPDATE TABLE AND REVISIONS TO GENERAL NOTES.

◘ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
TEMPORARY DIVERSION CHANNEL DESIGN
1-20-06 EC-STR-31A

4

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
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4		
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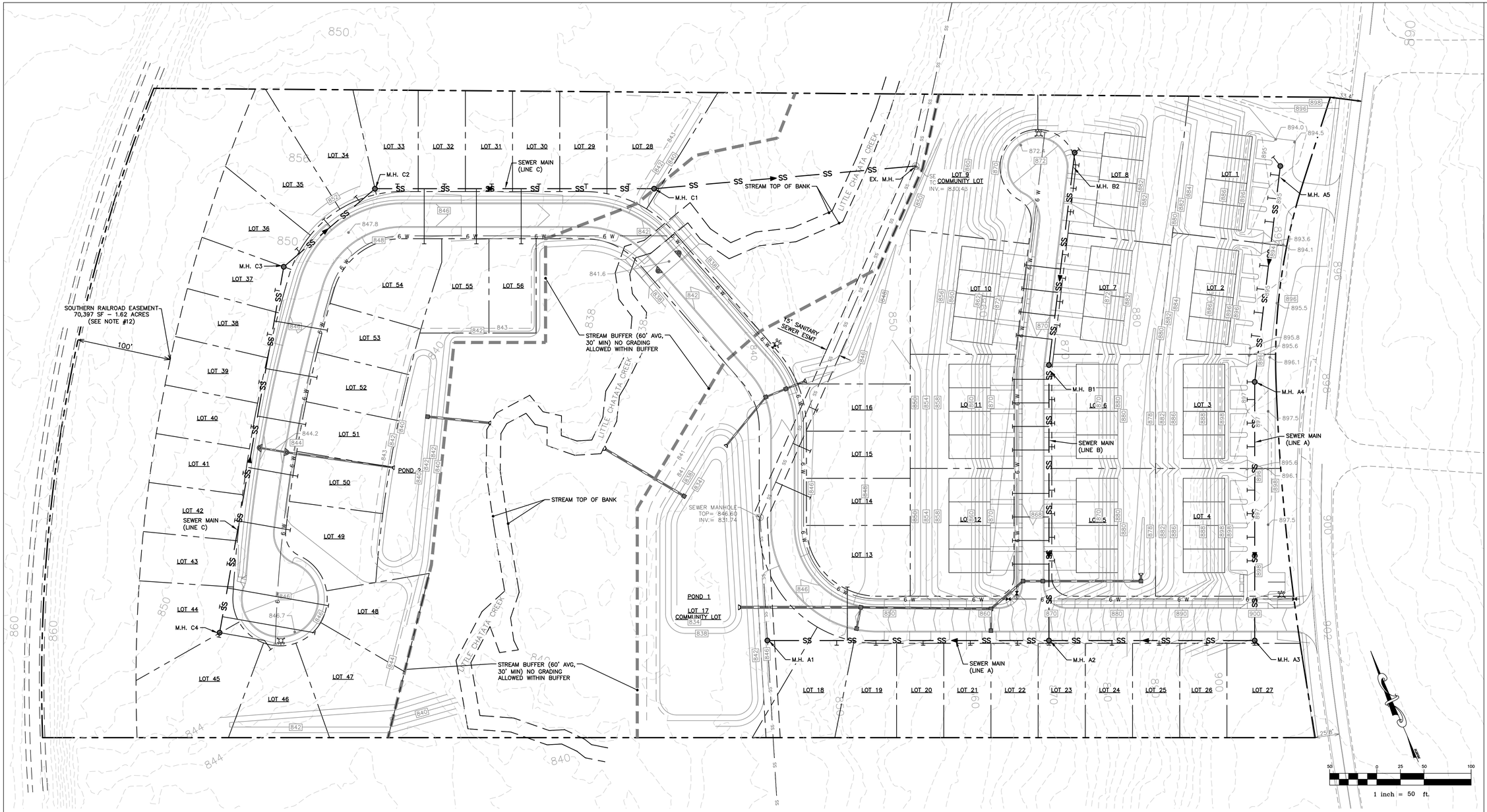
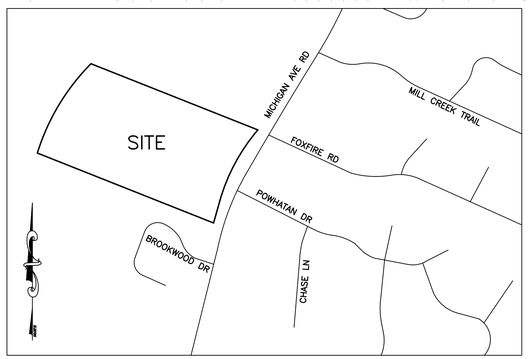
SHEET NAME:
EROSION CONTROL DETAILS

DATE: 06/03/2024
DRAWN BY: CMB
CHECKED BY: BMB
PROJECT NO.: 24021
SHEET NUMBER: C-04.6





VICINITY MAP

SEE SHEET C-05.1 FOR SEWER NOTES

This Design Is Acceptable To

CLEVELAND UTILITIES

_____ DATE: _____

VICE PRESIDENT WATER & WASTEWATER

SEWERAGE WORKS

APPROVED FOR CONSTRUCTION

THIS DOCUMENT BEARING THIS STAMP HAS BEEN REVIEWED BY CLEVELAND UTILITIES AS MEETING THE MINIMUM DESIGN REQUIREMENTS OF CLEVELAND UTILITIES, AND THE TENN. DEPT. OF ENVIRONMENT AND CONSERVATION, DIVISION OF WATER RESOURCES, AND IS HEREBY APPROVED FOR CONSTRUCTION BY CLEVELAND UTILITIES.

DATED _____

THIS APPROVAL SHALL EXPIRE ONE YEAR FROM THE DATE OF APPROVAL. THIS APPROVAL DOES NOT CONSTITUTE FINAL ACCEPTANCE OF THE CONSTRUCTION BY CLEVELAND UTILITIES.

_____

REVIEWED BY

CLEVELAND UTILITIES NUMBER S. _____

CIVIL ENGINEER:

BERRY ENGINEERS LLC

3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312

TEL: (423) 790-5880

DEVELOPER:

MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:

BRIAR CREEK

MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

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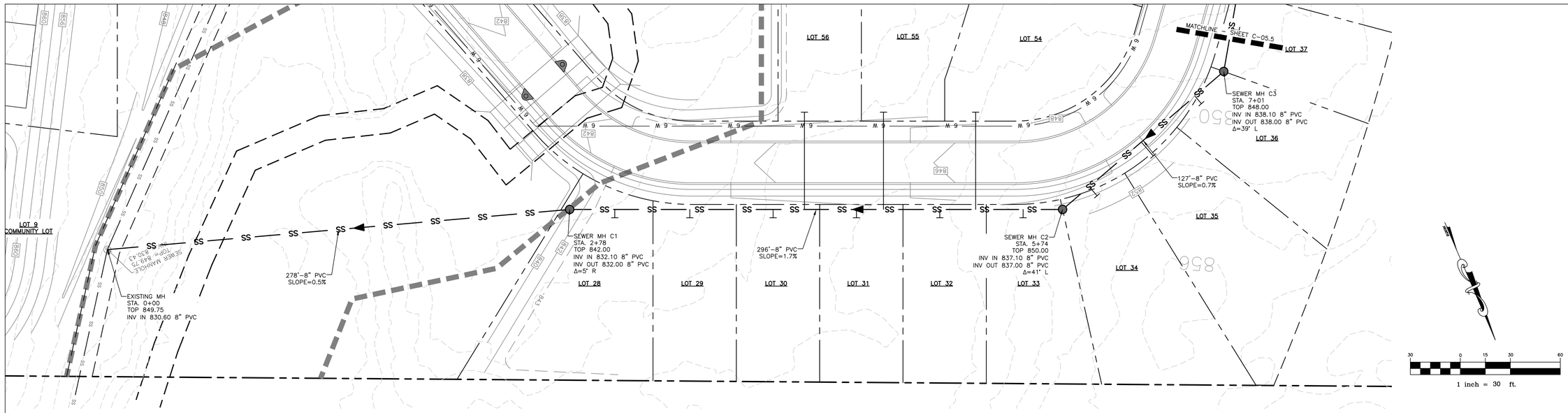
SHEET NAME:

OVERALL SANITARY SEWER PLAN

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:

C-05.0



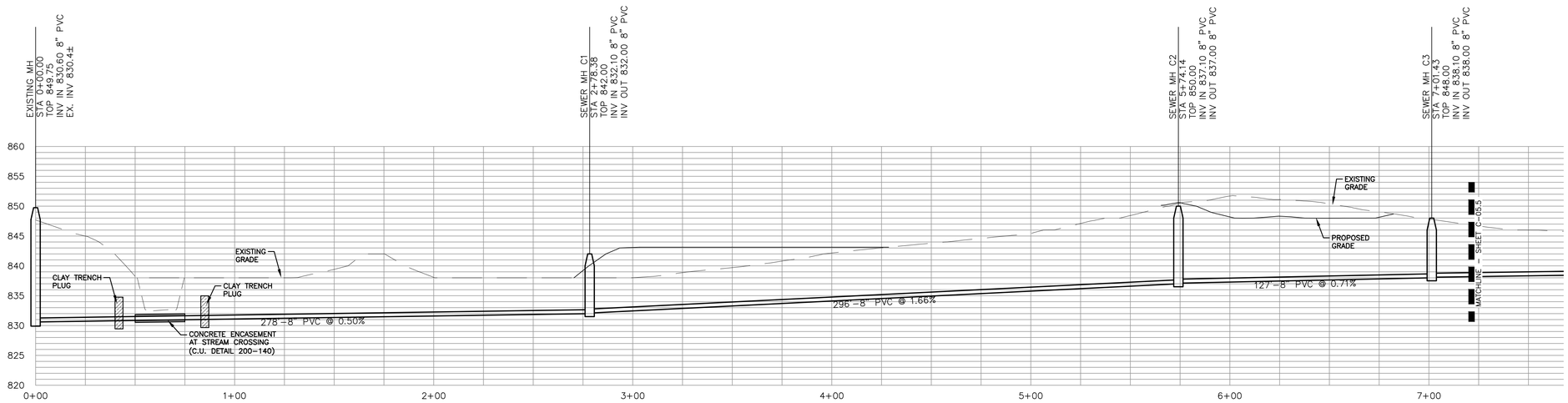
PLAN VIEW – SEWER MAIN C

SCALE: 1" = 30'

SEE SHEET C-05.1 FOR SEWER NOTES & VICINITY MAP

NOTE: USE A 1"ø PVC PIPE TO MARK THE END OF THE NEW SEWER SERVICES. THE PIPE SHOULD EXTEND ABOVE GRADE AND PROCEED DOWN TO THE END OF THE SEWER SERVICE. INSTALL A SOLVENT-WELD TEE ON THE BOTTOM OF THE 1"ø PVC MARKER PIPE TO PREVENT PULL-OUT. ALSO EXTEND A LENGTH OF "BURIED SEWER BELOW" TAPE FROM THE END OF THE SEWER SERVICE TO THE TOP OF THE 1"ø PVC PIPE.

NOTE: ALL SEWER SERVICES ARE TO BE 4"ø, MIN. SLOPE 1%.



PROFILE VIEW – SEWER MAIN C

SCALE: 1" = 30' HORIZONTAL
1" = 10' VERTICAL (3x)

SEWERAGE WORKS
APPROVED FOR CONSTRUCTION

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REVIEWED BY
CLEVELAND UTILITIES NUMBER S. _____

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BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

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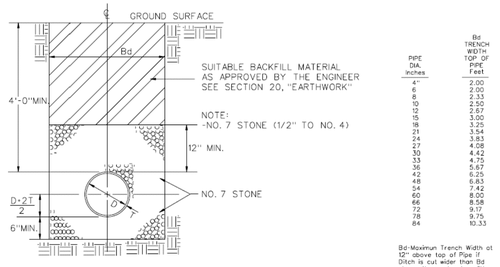
SHEET NAME:
SANITARY SEWER PLAN & PROFILE (LINE C)

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-05.4

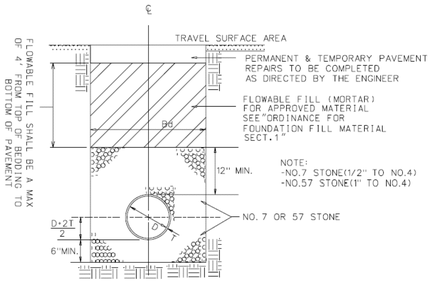


PIPE DIA. Inches	Bd TRENCH WIDTH TOP OF PIPE Feet
4"	2.00
6	2.00
8	2.33
10	2.50
12	2.67
15	3.00
18	3.25
21	3.54
24	3.83
27	4.08
30	4.42
33	4.75
36	5.67
42	6.25
48	6.83
54	7.42
60	8.00
66	8.58
72	9.17
78	9.75
84	10.33

Bd-Maximum Trench Width at 12" above top of Pipe if Ditch is cut wider than Bd shown the contractor will be required to increase bedding to compensate for additional load on pipe at his own expense.

TRENCH DETAIL FOR SEWER PIPE
(NOT IN TRAVELED AREA)
FOR P.V.C., P.E. & D.I. PIPE.

200-10



PIPE DIA. Inches	Bd TRENCH WIDTH TOP OF PIPE Feet
4"	2.00
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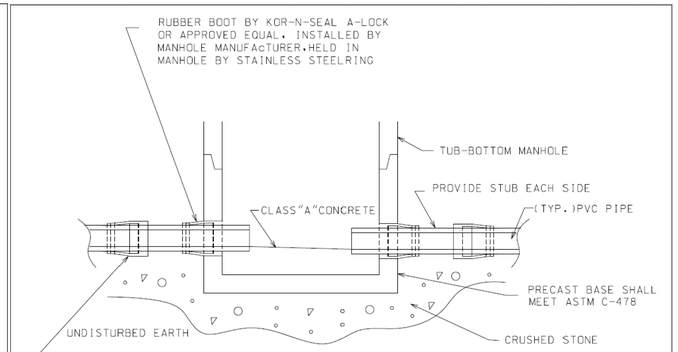
24	3.83
27	4.08
30	4.42
33	4.75
36	5.67
42	6.25
48	6.83
54	7.42
60	8.00
66	8.58
72	9.17
78	9.75
84	10.33

Bd-Maximum Trench Width at 12" above top of Pipe if Ditch is cut wider than Bd shown the contractor will be required to increase bedding to compensate for additional load on pipe at his own expense.

TRENCH DETAIL FOR SEWER PIPE
(FOR TRAVELED AREA INSIDE CITY LIMITS)
FOR P.V.C., P.E. & D.I. PIPE.

200-25

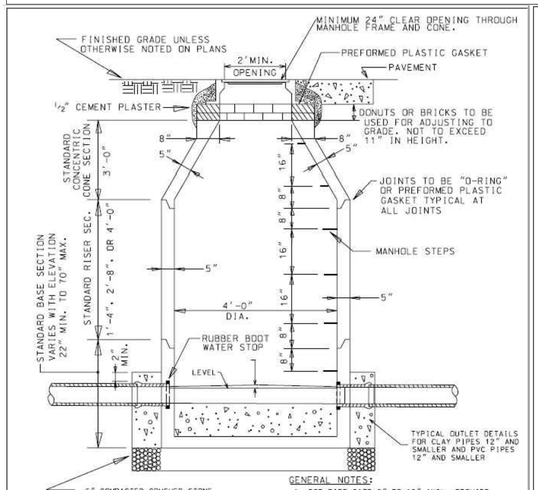


FERNCO TYPE CONNECTORS OR APPROVED EQUAL SHALL BE USED TO JOIN PIPE STUBS TO EXISTING LINE WHERE THE MANHOLE IS BEING SET ON THE ORIGINAL LINE.

ALL MANHOLE CONSTRUCTION MUST USE RUBBER BOOTS. EXCEPTIONS MUST BE AUTHORIZED BY CLEVELANDUTILITIES. IF EXCEPTION IS AUTHORIZED, APPROVED WATERSTOP, IE. FERNCO CONCRETE MANHOLE ADAPTER, AND NONSHRINK GROUT SHALL BE USED TO ATTACH THE SEWER TO THEMANHOLE.

TYPICAL DETAILS FOR PIPE AT BOOTED, TUB-BOTTOM MANHOLE

200-320.1



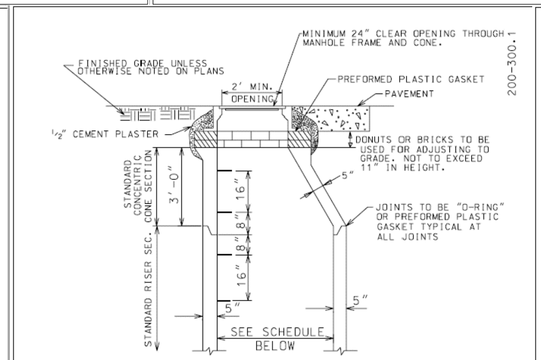
SECTION B-B

GENERAL NOTES:

1. FOR PIPE SIZE 8" TO 12" INCL. PROVIDE JOINT AT OUTSIDE FACE OF MANHOLE AS SHOWN ON SECTIONS.
2. FOR PIPES LARGER THAN 12" PROVIDE A FLEXIBLE JOINT AS CLOSE TO THE OUTSIDE FACE AS THE SHORTEST LENGTHS AVAILABLE WILL PERMIT.
3. WHERE LATERAL SEWERS ARE SHOWN FOR FUTURE CONSTRUCTION. INSTALL A PLUGGED STUB OR DROP CONNECTION WITH PLUGGED STUB AS SHOWN ON PLAN-PROFILE DRAWINGS.
4. MANHOLE STEPS SHALL BE C-1090 AS MANUFACTURED BY RUSSEL PIPE & FOUNDRY CO. OR APPROVED EQUAL.
5. ALL ELEMENTS SHALL CONFORM TO PRECAST SPECIFICATION ASTM C-478 LATEST REVISIONS.
6. ADJUST MANHOLE FRAME TO GRADE BY USING BRICKS OR DONUT RING. NOT TO EXCEED 11" IN HEIGHT.

TYPICAL PRECAST 4'-0" DIAMETER MANHOLE

200-280.1



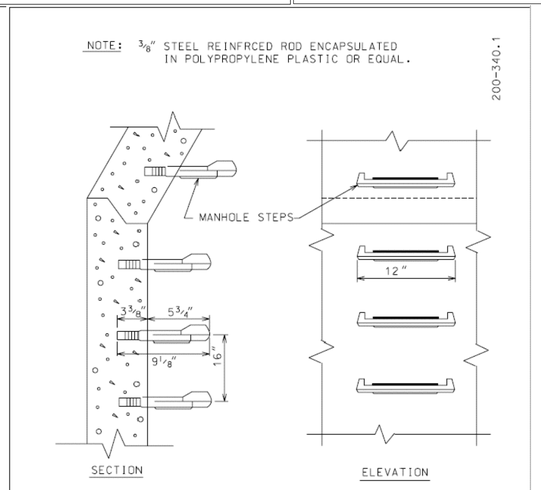
NOTE: DETAILS FOR RISER & BASE SECTION ARE SAME AS SHOWN IN SECTION "A-A" & "B-B"

STANDARD ECCENTRIC CONE
FOR ALL DIAMETER MANHOLES

GENERAL NOTES:

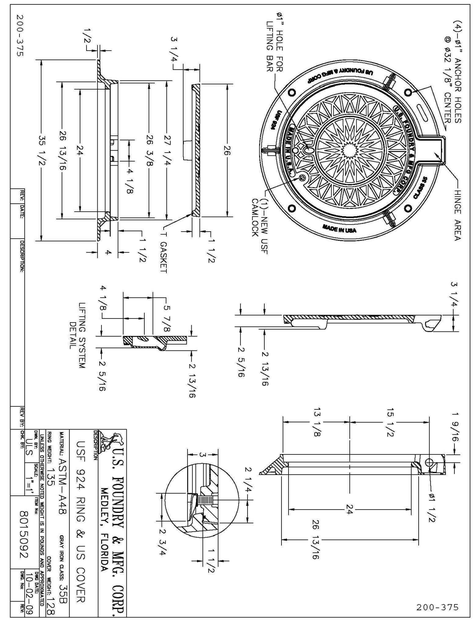
1. FOR PIPE SIZE 8" TO 12" INCL. PROVIDE JOINT AT OUTSIDE FACE OF MANHOLE AS SHOWN ON SECTIONS.
2. FOR PIPES LARGER THAN 12" PROVIDE A FLEXIBLE JOINT AS CLOSE TO THE OUTSIDE FACE AS THE SHORTEST LENGTHS AVAILABLE WILL PERMIT.
3. WHERE LATERAL SEWERS ARE SHOWN FOR FUTURE CONSTRUCTION. INSTALL A PLUGGED STUB OR DROP CONNECTION WITH PLUGGED STUB AS SHOWN ON PLAN-PROFILE DRAWINGS.
4. MANHOLE STEPS SHALL BE C-1090 AS MANUFACTURED BY RUSSEL PIPE & FOUNDRY CO. OR APPROVED EQUAL.
5. ALL ELEMENTS SHALL CONFORM TO PRECAST SPECIFICATION ASTM C-478 LATEST REVISIONS.
6. ADJUST MANHOLE FRAME TO GRADE BY USING BRICKS OR DONUT RING. NOT TO EXCEED 11" IN HEIGHT.

200-300.1

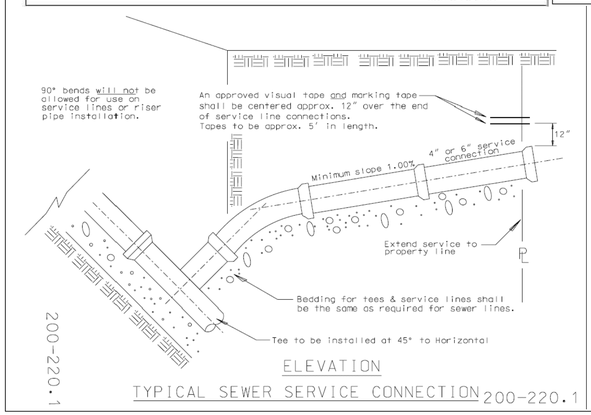


DETAIL OF STANDARD LADDER BARS

200-340.1



200-375



ELEVATION

TYPICAL SEWER SERVICE CONNECTION

200-220.1

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
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20 25TH STREET, SUITE 6
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PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

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SHEET NAME:
SEWER DETAILS

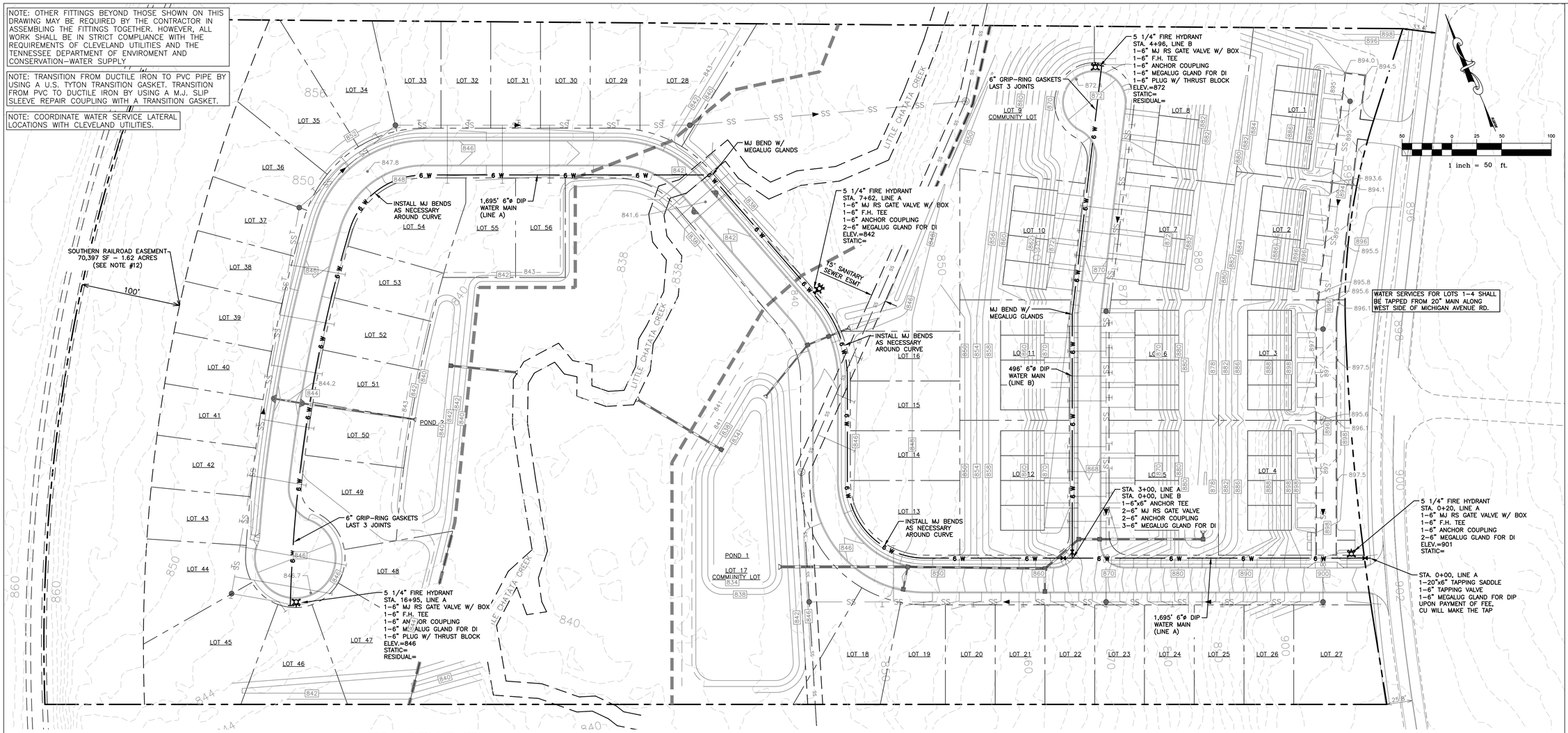
DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-05.6

NOTE: OTHER FITTINGS BEYOND THOSE SHOWN ON THIS DRAWING MAY BE REQUIRED BY THE CONTRACTOR IN ASSEMBLING THE FITTINGS TOGETHER. HOWEVER, ALL WORK SHALL BE IN STRICT COMPLIANCE WITH THE REQUIREMENTS OF CLEVELAND UTILITIES AND THE TENNESSEE DEPARTMENT OF ENVIROMENT AND CONSERVATION–WATER SUPPLY

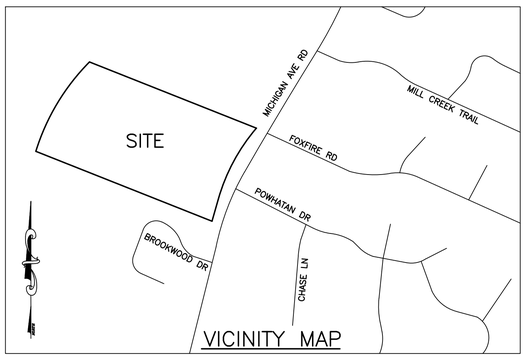
NOTE: TRANSITION FROM DUCTILE IRON TO PVC PIPE BY USING A U.S. TYTON TRANSITION GASKET. TRANSITION FROM PVC TO DUCTILE IRON BY USING A M.J. SLIP SLEEVE REPAIR COUPLING WITH A TRANSITION GASKET.

NOTE: COORDINATE WATER SERVICE LATERAL LOCATIONS WITH CLEVELAND UTILITIES.



CLEVELAND UTILITIES WATER NOTES:

1. THE NOTES ON THIS DRAWING SHALL APPLY TO ALL OF THE DRAWINGS IN THIS CONTRACT.
2. ALL UTILITY WORK SHALL BE IN STRICT ACCORDANCE WITH THE LATEST "STANDARD SPECIFICATIONS AND CONSTRUCTION DETAIL DRAWINGS" OF CLEVELAND UTILITIES AS WELL AS ANY REQUIREMENTS OF THE STATE OF TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION.
3. THE WATER CONSTRUCTION PROJECT SHALL INVOLVE THE INSTALLATION OF APPROXIMATELY 810' OF 2–INCH CLASS 200 PVC PIPE & 3300' OF 6" DUCTILE IRON, AND OTHER APPROPRIATE FITTINGS AND MATERIAL. BIDS ARE TO INCLUDE REPAIRS TO ALL FENCES, YARDS, ROADS, AND DRIVEWAYS.
4. THE EXISTING ELEVATIONS SHOWN ON THE DRAWINGS WERE OBTAINED FROM A FIELD SURVEY BY RICHMOND SURVEYING.
5. NON–METALLIC DETECTION TAPE SHALL BE INSTALLED 18" ABOVE THE WATERLINE, ALONG WITH NUMBER 12 OR 14 GAUGE CAP WIRE TAPED TO THE WATERLINE AS SHOWN IN CLEVELAND UTILITIES DETAIL DRAWING NUMBER 200–30.
6. ALL WATERLINE P.V.C. PIPE SHALL BE SDR21 WITH 200 P.S.I. PRESSURE RATING IN ACCORDANCE WITH A.S.T.M. D–2241. THE PIPE MUST BEAR THE NATIONAL SANITATION FOUNDATION TESTING LABORATORIES, INC. SEAL OF APPROVAL FOR POTABLE WATER OR AN APPROVED EQUAL. ALL DUCTILE IRON WATERLINE PIPE SHALL BE CLASS 50 WITH CEMENT MORTAR LINING.
7. LUBRICANTS SHALL BE NON–TOXIC AND SHALL NOT PROMOTE BIOLOGICAL GROWTH. SOLVENT–CEMENTED JOINTS ARE NOT PERMITTED.
8. PROCEDURES FOR DISINFECTING POTABLE WATERLINES SHALL CONFORM TO THE REQUIREMENTS OF A.W.W.A. C651. ALL WATERLINES SHALL BE DISINFECTED, BACTERIOLOGICAL TESTED, AND PRESSURE TESTED ACCORDING TO CLEVELAND UTILITIES' SPECIFICATIONS PRIOR TO LINE ACCEPTANCE AND THE WATERLINE BEING PLACED INTO SERVICE.
9. PRESSURE AND LEAKAGE TESTS SHALL BE PERFORMED IN STRICT ACCORDANCE WITH CURRENT A.W.W.A. STANDARD C600 AND/OR MANUFACTURER'S PROCEDURES.
10. ALL VALVES AND FITTINGS ARE TO CONFORM TO THE LATEST A.W.W.A. STANDARDS.
11. THE CONTRACTOR SHALL MAKE ARRANGEMENTS WITH THE UTILITY COMPANY FOR CONNECTION TO THE EXISTING UTILITY LINES. THE CONTRACTOR SHALL ADJUST THE LOCATION OF THE PROPOSED WATERLINE TO AVOID CONFLICTS WITH OTHER UTILITIES.
12. THE CONTRACTOR SHALL CALL "TENNESSEE ONE – CALL" AT LEAST TEN BUSINESS DAYS PRIOR TO THE START OF ANY CONSTRUCTION ON THE SITE (1–800–351–1111).
13. THE EXISTING UTILITY FACILITIES, EASEMENTS, AND THEIR LOCATION ARE TAKEN FROM READILY AVAILABLE INFORMATION. THE ACTUAL LOCATIONS OF THE UTILITY FACILITIES AND EASEMENTS MAY VARY SOMEWHAT FROM THE LOCATION SHOWN AND THERE MAY BE UTILITY FACILITIES EXISTING THAT ARE NOT SHOWN OR INDICATED ON THE DRAWINGS. THE SITE UTILITY CONTRACTOR SHALL CONTACT ALL AGENCIES WITH UTILITY FACILITIES IN THE VICINITY OF THE WORK AND SHALL LOCATE ALL UNDERGROUND FACILITIES BEFORE BEGINNING CONSTRUCTION.
14. THE CONTRACTOR SHALL PROVIDE FOR ANY NECESSARY BONDS AS REQUIRED BY GOVERNING AGENCIES.
15. WHERE THE PROPOSED WATER EXTENDS UNDER ANY PAVED SURFACE, THE TRENCH MUST BE BACKFILLED WITH STANDARD FLOWABLE FILL AS SHOWN ON "CONSTRUCTION DETAIL DRAWINGS" 200–35.
16. INSTALL PIPE JOINT RESTRAINTS FOR BELL AND SPIGOT JOINTS ONE FULL PIPE JOINT (20 FT.) FROM THE END OF THE WATERLINE AS SHOWN ON "CONSTRUCTION DETAIL DRAWING" 200–115.
17. THE INITIAL PRESSURES AND FLOWS WERE OBTAINED FROM CLEVELAND UTILITIES.
18. A RESTRAINER SHALL BE PLACED ON THE PIPE SIDE OF THE FLUSH/POST HYDRANT AND VALVE. THE RESTRAINER TIES THE PIPE AND FITTING TOGETHER.
19. THE CONTRACTOR SHALL PROVIDE ANY REQUIRED TRAFFIC CONTROL DURING CONSTRUCTION.
20. ALL WATERLINE WORK MUST BE COMPLETED BY A LICENSED CONTRACTOR IN THE STATE OF TENNESSEE, THE CONTRACTOR MUST BE APPROVED BY CLEVELAND UTILITIES PRIOR TO THE START OF UTILITY CONSTRUCTION.
21. ALL FITTINGS AND PIPES UNDERNEATH THE EXISTING OR THE PROPOSED ROADWAYS SHALL BE DUCTILE IRON.
22. ALL WATERLINES ARE TO BE INSTALLED WITHIN THE EXISTING RIGHT–OF–WAY UNLESS APPROVED PRIOR TO CONSTRUCTION BY CLEVELAND UTILITIES. INSTALL THE PROPOSED WATERLINE WITHIN FIVE FEET OF THE BACK OF THE RIGHT–OF–WAY WHERE POSSIBLE.
23. WATERLINE SHALL NOT BE PLACED UNDER THE EXISTING PAVED ROADWAY OR ITS SHOULDER UNLESS APPROVED PRIOR TO CONSTRUCTION BY CLEVELAND UTILITIES.
24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING ALL ASPHALT, PAVED ROAD/SHOULDER IN GOOD CONDITION. METAL STABILIZER PADS AS WELL AS METAL TRACKS SHALL NOT COME IN CONTACT WITH ASPHALT PAVED SURFACES. A PROTECTIVE COVERING SHALL BE REMOVED TO AID IN DUST CONTROL.
25. ALL FIRE HYDRANTS AND POST HYDRANTS SHOULD BE PLUMBED WITH BREAK–AWAYS AT PROPOSED GROUND LEVEL (I.E. FIRE HYDRANTS SHOULD NOT LEAN TO ONE SIDE AND NOT STAND TOO HIGH OR LOW). ALL GATE VALVE BOXES SHOULD BE LEVEL WITH FINAL ELEVATION.
26. THE CONTRACTOR IS TO NOTIFY CLEVELAND UTILITIES BEFORE BEGINNING ANY CONSTRUCTION IN ORDER TO COORDINATE THE LOCATION OF THE PROPOSED WATERLINE AND ATTAIN ANY COUNTY PERMITS.
27. OPERATION OF EXISTING VALVES:
    A. IN NON–EMERGENCY SITUATION, THE WATER SHOULD NOT BE TURNED OFF WITHOUT FIRST NOTIFYING THE CUSTOMER AFFECTED. THIS MAY REQUIRE NEWSPAPER AND RADIO ANNOUNCEMENTS OR PERSONAL CONTACT, PREFERABLY A DAY OR MORE IN ADVANCE.
    B. WHEN WATER IS PLANNED TO BE OFF,IT SHOULD BE TURNED OFF IN TEH PRESENCE OF WATER DIVISION PERSONNEL, AND THEN ONLY AFTER INSURING THAT THE CONTRACTOR IS ADEQUATELY PREPARED TO EXPEDITE AND COMPLETE THE WORK, AND NOTICE HAS BEEN GIVEN.
    C. THE CONTRACTOR'S PERSONNEL SHOULD NEVER HANDLE CUSTOMER MATTERS BUT SHOULD OBTAIN A WATER DIVISION PERSON TO RESPOND TO THE CUSTOMER.
28. ALL DUCTILE IRON FITTINGS AND VALVES ARE TO BE CONNECTED WITH FOSTER ADAPTERS OR MECHANICAL JOINT COUPLERS UNLESS SPECIFICALLY NOTED OTHERWISE.
29. NO WORK SHALL BE DONE ON PRIVATE PROPERTY UNTIL A UTILITY EASEMENT HAS BEEN OBTAINED AND RECORDED.
30. EXISTING WATER SERVICE LINES ARE TO BE TIED INTO THE PROPOSED WATERLINE WITH THE LEAST AMOUNT OF DISTURBANCE POSSIBLE.
31. THE LOCATION OF THE EXISTING EDGE OF PAVEMENT AND OTHER UTILITIES SHOWN ARE APPROXIMATELY ONLY AND HAVE NOT BEEN SURVEYED OR LOCATED IN RELATIONSHIP TO THE ACTUAL PROPERTY LINES.
32. ANY WATER METERS SET AT OR ABOVE ELEVATION 925 MAY NOT DELIVER SUFFICIENT PRESSURE TO SATISFY THE PROPERTY OWNERS' REQUIREMENTS. IT SHALL BE THE PROPERTY OWNERS' RESPONSIBILITY TO INSTALL A BOOSTER PUMP ON THEIR SERVICE LINE IF THEY REQUIRE ADDITIONAL WATER PRESSURE ABOVE THAT PROVIDED BY CLEVELAND UTILITIES.
33. INSTALL KICKERS AS REQUIRED TO ENSURE THAT THE REVISED PIPE AND FITTINGS DO NOT BLOW LOOSE.
34. ALL 5–1/4" FIRE HYDRANTS SHALL BE ORDERED FROM THE FACTORY IN A PRE–PAINTED ORANGE COLOR
35. FOR NON–LMI SERVICE, SET METER AND EXTEND SERVICE 100' MAXIMUM; TEMPORARILY PLUG IN NEW SERVICE LINE AND CUT AND PLUG WELL LINE.
36. FOR MULTIPLE CUSTOMERS ON ONE LOT, INSTALL 1–INCH SERVICE UNDER ROAD, INSTALL Y–BRANCH AND CONTINUE 3/4" SERVICE LINE.
37. FOR LMI SERVICES SET METER AND EXTEND SERVICE LINE TO POINT BETWEEN WELL AND CUSTOMER, CUT IN NEW SERVICE AND CUT AND PLUG WELL LINE.
38. UNNECESSARY DESTRUCTION OF TREES ALONG THE WATERLINE RIGHT–OF–WAY WILL NOT BE PERMITTED. ALL REASONABLE EFFORTS WILL BE MADE BY THE CONTRACTOR TO PROTECT AND SAFEGUARD TREES.
39. WHERE WATERLINES CROSSED IMPROVED, GRASSED, OR LAWN AREAS, ALL SOD, SHRUBS, FLOWERS, ETC. SHALL BE REPLACED IN THE ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
40. ALL EXCAVATING IS UNCLASSIFIED AND SHALL INCLUDE ALL MATERIAL ENCOUNTERED.
41. SOME OF THE OFF–SITE PROPERTY LINE INFORMATION WAS OBTAINED FROM BRADLEY COUNTY TAX MAPS AND IS APPROXIMATE.
42. THERE SHALL BE NO OPEN BURNING OF CONSTRUCTION MATERIALS OR DEBRIS WITHOUT FIRST OBTAINING A PERMIT FROM THE TENNESSEE DEPARTMENT OF AIR POLLUTION CONTROL. IF A CONTRACTOR DESIRES TO PERFORM OPEN BURNING, HE/SHE WILL BE RESPONSIBLE FOR OBTAINING ANY PERMITS AND FOR VIOLATION OF AIR POLLUTION LAWS. TO OBTAIN A PERMIT, CALL 478–0337 OR ANY FIRE HALL.
43. SILT FENCE AND/OR HAY BALES SHALL BE PLACED AT LOCATIONS DIRECTED BY CLEVELAND UTILITIES TO PROVIDE FOR EROSION CONTROL.
44. THE COST FOR STREAM CROSSINGS SHALL BE INCLUDED IN THE UNIT PRICE BID. NO SEPARATE PAYMENT SHALL BE ALLOWED.
45. ROADWAY PAVEMENT LOCATIONS WERE ASSUMED TO BE IN THE MIDDLE OF THE EXISTING RIGHT–OF–WAYS AND WERE NOT FIELD LOCATED. REVISIONS IN WATERLINE LOCATIONS MAY BE NECESSARY DUE TO THE ACTUAL LOCATION OF THE PAVEMENT.
46. ALL ELEVATIONS SHOWN ON THIS PROJECT ARE BELOW THE 925 FOOT ELEVATION.
47. VALVE K EXTENSIONS ARE TO BE PROVIDED AS REQUIRED. COST IS TO BE INCLUDED IN THE PRICE FOR VALVES (SEE DETAIL 200–435).
48. BACKFILL VALVES, FIRE HYDRANTS, BLOW–OFF ASSEMBLIES, AND OTHER APPURTENANCES THAT ARE PERSONNEL OPERATED WITH 1" DIAMETER CRUSHED STONE; TOP SIX (6) INCHES SHALL BE CRUSHER RUN. SLOPE SURFACE TO DRAIN POSITIVELY AWAY FROM CONSTRUCTION AREA.
49. ALL ROADWAY BORES SHALL BE COMPLETED BEFORE OTHER PIPELINE WORK IS FINALIZED IN THE VICINITY OF THE BORE.
50. IN AREAS SUBJECT TO CORROSION/WASHOUT, PROVIDE MINIMUM 6" RIP RAP WITH FILTER FABRIC (LARGE STONE REQUIRED FOR CREEK CROSSING AND AREAS SUBJECT TO STREAM FLOW).
51. IT IS THE POLICY OF CLEVELAND UTILITIES TO ENSURE COMPLIANCE WITH TITLE VI OF THE CIVIL RIGHTS ACT OF 1964; 49 CFR, PART 21; RELATED STATUTES AND REGULATIONS TO THAT END THAT NO PERSON SHALL BE EXCLUDED FROM PARTICIPATION IN OR BE DENIED BENEFITS OF, OR BE SUBJECTED TO DESCRIMINATION UNDER ANY PROGRAM OR ACTIVITY RECEIVING FEDERAL FINANCIAL ASSISTANCE OR ANY OTHER FUNDING SOURCE ON THE GROUNDS OF RACE, COLOR, SEX, NATIONAL ORIGIN, OR ANCESTRY. BY VIRTUE OF SUBMITTING A RESPONSE TO THIS SOLICITATION, BIDDERS AGREE TO COMPLY WITH THE SAME NON–DESCRIMINATION POLICY.



This Design Is Acceptable To
CLEVELAND UTILITIES

_____ DATE: _____
VICE PRESIDENT WATER & WASTEWATER

WATER WORKS
APPROVED FOR CONSTRUCTION

THIS DOCUMENT BEARING THIS STAMP HAS BEEN REVIEWED BY CLEVELAND UTILITIES AS MEETING THE MINIMUM DESIGN REQUIREMENTS OF CLEVELAND UTILITIES, AND THE TENN. DEPT. OF ENVIRONMENT AND CONSERVATION, DIVISION OF WATER RESOURCES, AND IS HEREBY APPROVED FOR CONSTRUCTION BY CLEVELAND UTILITIES.

DATED _____

THIS APPROVAL SHALL EXPIRE ONE YEAR FROM THE DATE OF APPROVAL. THIS APPROVAL DOES NOT CONSTITUTE FINAL ACCEPTANCE OF THE CONSTRUCTION BY CLEVELAND UTILITIES.

_____
REVIEWED BY
CLEVELAND UTILITIES NUMBER W. _____

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
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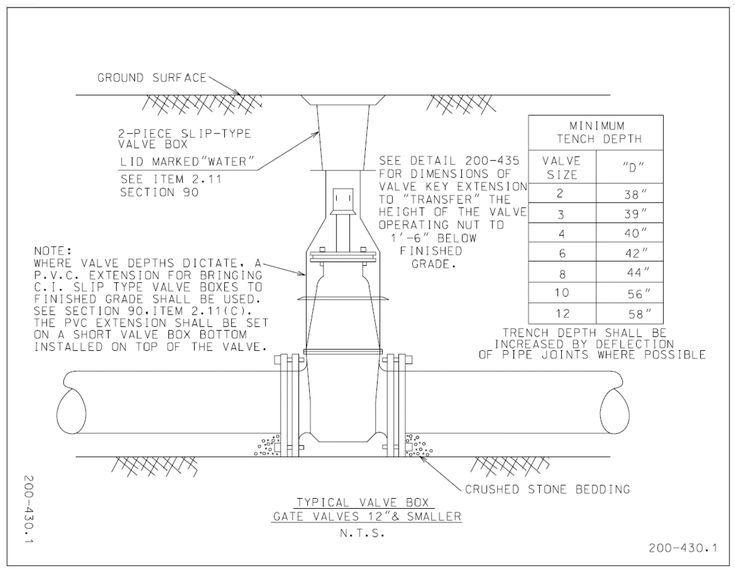
8		
9		
10		

SHEET NAME:
WATER PLAN

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-05.7

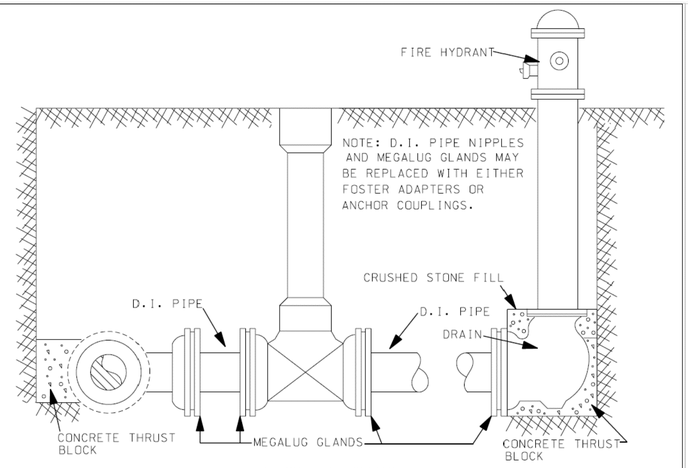


MINIMUM TENCH DEPTH	
VALVE SIZE	"D"
2	38"
3	39"
4	40"
6	42"
8	44"
10	56"
12	58"

TYPICAL VALVE BOX
GATE VALVES 12"& SMALLER
N.T.S.

200-430.1

200-430.1

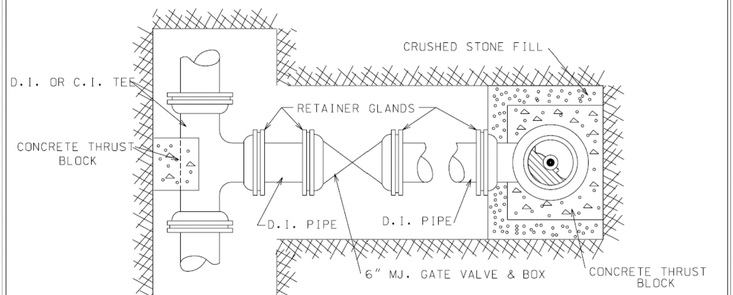


ELEVATION FIRE HYDRANT

NOTE:
1. USE D.I. PIPE WITH MEGALUG GLANDS TO SECURE ALL FITTINGS
2. FIRE HYDRANTS SHALL BE EITHER:
A: AMERICAN DARLING B-84-B
B: MUELLER CENTURION
C. U.S. PIPE METROPOLITAN 250

200-440

200-440

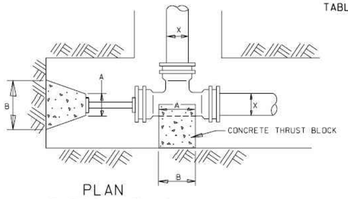


PLAN
FIRE HYDRANT

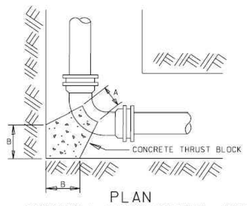
NOTE:
1. USE D.I. PIPE WITH RETAINER GLANDS. FOSTER ADAPTERS. OR ANCHOR COUPLINGS TO SECURE ALL FITTINGS
2. FIRE HYDRANTS SHALL BE EITHER:
A: AMERICAN DARLING B-84-B
B: MUELLER CENTURION
C: U.S. PIPE METROPOLITAN 250

200-450.1

200-450.1



PLAN
TYPICAL PLUG



PLAN
TYPICAL HORIZONTAL BEND

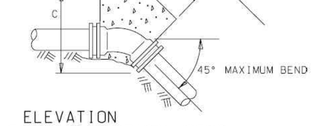
200-90

TABLE OF DIMENSIONS FOR HORIZONTAL & VERTICAL SAG BENDS

PIPE SIZE X	A	B	DEPTH C
90° BEND			
24"	2'-4"	4'-0"	5'-0"
20"	2'-4"	4'-0"	4'-6"
18"	2'-0"	3'-6"	4'-0"
16"	1'-9"	3'-4"	3'-6"
14"	1'-9"	2'-6"	3'-0"
12"	1'-6"	2'-0"	3'-0"
10"	1'-4"	2'-0"	2'-6"
8"	1'-0"	1'-6"	2'-0"
6"	1'-0"	1'-0"	2'-0"
4"	0'-9"	1'-0"	1'-0"
45° BEND			
24"	1'-4"	4'-6"	3'-0"
20"	1'-4"	3'-3"	3'-0"
18"	1'-0"	4'-0"	2'-0"
16"	1'-0"	3'-6"	1'-6"
14"	1'-0"	3'-4"	1'-4"
12"	1'-0"	3'-4"	1'-0"
10"	0'-9"	2'-6"	1'-0"
8"	0'-9"	1'-6"	1'-0"
6"	0'-9"	1'-0"	1'-0"
4"	0'-6"	1'-0"	1'-0"
22 1/2° BEND			
24"	1'-4"	3'-0"	2'-0"
20"	1'-4"	2'-6"	2'-0"
18"	1'-0"	2'-9"	1'-6"
16"	1'-0"	2'-4"	1'-4"
14"	1'-0"	2'-0"	1'-2"
12"	1'-0"	1'-9"	1'-0"
10"	0'-9"	1'-6"	0'-10"
8"	0'-9"	1'-0"	0'-8"
6"	0'-9"	1'-0"	0'-6"
4"	0'-6"	1'-0"	0'-4"

PIPE SIZE X	A	B	DEPTH C
11 1/4° BEND			
24"	1'-4"	1'-6"	2'-0"
20"	1'-4"	1'-3"	2'-0"
18"	1'-0"	1'-4"	1'-6"
16"	1'-0"	1'-2"	1'-4"
14"	1'-0"	1'-0"	1'-2"
12"	1'-0"	1'-0"	1'-0"
10"	0'-9"	1'-0"	0'-10"
8"	0'-9"	1'-0"	0'-8"
6"	0'-9"	1'-0"	0'-6"
4"	0'-6"	1'-0"	0'-4"
UNBALANCED TEE & PLUG			
24"	3'-0"	7'-0"	5'-0"
20"	3'-0"	5'-0"	5'-0"
18"	2'-0"	5'-6"	3'-6"
16"	2'-0"	5'-6"	3'-0"
14"	2'-0"	4'-6"	2'-0"
12"	1'-0"	3'-0"	2'-0"
10"	1'-0"	3'-0"	2'-0"
8"	1'-0"	2'-9"	1'-6"
6"	1'-0"	1'-0"	1'-0"
4"	1'-0"	1'-0"	1'-0"
TEE			
24"	2'-6"	7'-0"	5'-0"
20"	2'-6"	5'-0"	5'-0"
18"	2'-6"	5'-6"	3'-6"
16"	2'-6"	5'-6"	3'-0"
14"	2'-0"	4'-6"	2'-0"
12"	2'-0"	4'-6"	2'-0"
10"	1'-9"	3'-0"	2'-0"
8"	1'-6"	2'-9"	1'-6"
6"	1'-0"	1'-0"	1'-0"
4"	1'-0"	1'-0"	1'-0"

200-90



ELEVATION
TYPICAL VERTICAL BEND

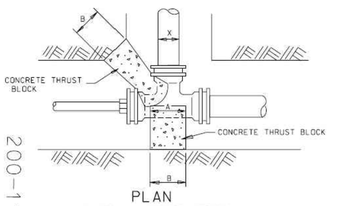
200-100

TABLE OF DIMENSIONS FOR HORIZONTAL & VERTICAL SAG BENDS

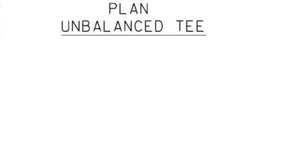
PIPE SIZE X	A	B	DEPTH C
90° BEND			
24"	2'-4"	4'-0"	5'-0"
20"	2'-4"	4'-0"	4'-6"
18"	2'-0"	3'-6"	4'-0"
16"	1'-9"	3'-4"	3'-6"
14"	1'-9"	2'-6"	3'-0"
12"	1'-6"	2'-0"	3'-0"
10"	1'-4"	2'-0"	2'-6"
8"	1'-0"	1'-6"	2'-0"
6"	1'-0"	1'-0"	2'-0"
4"	0'-9"	1'-0"	1'-0"
45° BEND			
24"	1'-4"	4'-6"	3'-0"
20"	1'-4"	3'-3"	3'-0"
18"	1'-0"	4'-0"	2'-0"
16"	1'-0"	3'-6"	1'-6"
14"	1'-0"	3'-6"	1'-4"
12"	1'-0"	3'-4"	1'-0"
10"	0'-9"	2'-6"	1'-0"
8"	0'-9"	1'-6"	1'-0"
6"	0'-9"	1'-0"	1'-0"
4"	0'-6"	1'-0"	1'-0"
22 1/2° BEND			
24"	1'-4"	3'-0"	2'-0"
20"	1'-4"	2'-6"	2'-0"
18"	1'-0"	2'-9"	1'-6"
16"	1'-0"	2'-4"	1'-4"
14"	1'-0"	2'-0"	1'-2"
12"	1'-0"	1'-9"	1'-0"
10"	0'-9"	1'-6"	0'-10"
8"	0'-9"	1'-0"	0'-8"
6"	0'-9"	1'-0"	0'-6"
4"	0'-6"	1'-0"	0'-4"

PIPE SIZE X	A	B	DEPTH C
11 1/4° BEND			
24"	1'-4"	1'-6"	2'-0"
20"	1'-4"	1'-3"	2'-0"
18"	1'-0"	1'-4"	1'-6"
16"	1'-0"	1'-2"	1'-4"
14"	1'-0"	1'-0"	1'-2"
12"	1'-0"	1'-0"	1'-0"
10"	0'-9"	1'-0"	0'-10"
8"	0'-9"	1'-0"	0'-8"
6"	0'-9"	1'-0"	0'-6"
4"	0'-6"	1'-0"	0'-4"
UNBALANCED TEE & PLUG			
24"	3'-0"	7'-0"	5'-0"
20"	3'-0"	5'-0"	5'-0"
18"	2'-0"	5'-6"	3'-6"
16"	2'-0"	5'-6"	3'-0"
14"	2'-0"	4'-0"	3'-0"
12"	2'-0"	4'-6"	2'-0"
10"	1'-0"	3'-0"	2'-0"
8"	1'-0"	2'-9"	1'-6"
6"	1'-0"	1'-0"	1'-0"
4"	1'-0"	1'-0"	1'-0"
TEE			
24"	2'-6"	7'-0"	5'-0"
20"	2'-6"	5'-0"	5'-0"
18"	2'-6"	5'-6"	3'-6"
16"	2'-6"	5'-6"	3'-0"
14"	2'-6"	5'-6"	3'-0"
12"	2'-4"	4'-0"	3'-0"
10"	1'-9"	3'-0"	2'-0"
8"	1'-6"	2'-9"	1'-6"
6"	1'-0"	1'-0"	1'-0"
4"	1'-0"	1'-0"	1'-0"

200-100



PLAN
TYPICAL TEE



PLAN
UNBALANCED TEE

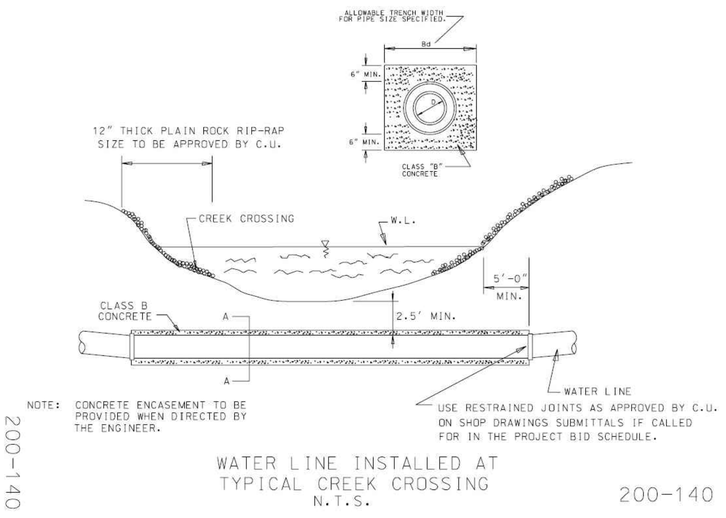
200-110

TABLE OF DIMENSIONS FOR HORIZONTAL & VERTICAL SAG BENDS

PIPE SIZE X	A	B	DEPTH C
90° BEND			
24"	2'-4"	4'-0"	5'-0"
20"	2'-4"	4'-0"	4'-6"
18"	2'-0"	3'-6"	4'-0"
16"	1'-9"	3'-4"	3'-6"
14"	1'-9"	2'-6"	3'-0"
12"	1'-6"	2'-0"	3'-0"
10"	1'-4"	2'-0"	2'-6"
8"	1'-0"	1'-6"	2'-0"
6"	1'-0"	1'-0"	2'-0"
4"	0'-9"	1'-0"	1'-0"
45° BEND			
24"	1'-4"	4'-6"	3'-0"
20"	1'-4"	3'-3"	3'-0"
18"	1'-0"	4'-0"	2'-0"
16"	1'-0"	3'-6"	1'-6"
14"	1'-0"	3'-6"	1'-4"
12"	1'-0"	3'-4"	1'-0"
10"	0'-9"	2'-6"	1'-0"
8"	0'-9"	1'-6"	1'-0"
6"	0'-9"	1'-0"	1'-0"
4"	0'-6"	1'-0"	1'-0"
22 1/2° BEND			
24"	1'-4"	3'-0"	2'-0"
20"	1'-4"	2'-6"	2'-0"
18"	1'-0"	2'-9"	1'-6"
16"	1'-0"	2'-4"	1'-4"
14"	1'-0"	2'-0"	1'-2"
12"	1'-0"	1'-9"	1'-0"
10"	0'-9"	1'-6"	0'-10"
8"	0'-9"	1'-0"	0'-8"
6"	0'-9"	1'-0"	0'-6"
4"	0'-6"	1'-0"	0'-4"

PIPE SIZE X	A	B	DEPTH C
11 1/4° BEND			
24"	1'-4"	1'-6"	2'-0"
20"	1'-4"	1'-3"	2'-0"
18"	1'-0"	1'-4"	1'-6"
16"	1'-0"	1'-2"	1'-4"
14"	1'-0"	1'-0"	1'-2"
12"	1'-0"	1'-0"	1'-0"
10"	0'-9"	1'-0"	0'-10"
8"	0'-9"	1'-0"	0'-8"
6"	0'-9"	1'-0"	0'-6"
4"	0'-6"	1'-0"	0'-4"
UNBALANCED TEE & PLUG			
24"	3'-0"	7'-0"	5'-0"
20"	3'-0"	5'-0"	5'-0"
18"	2'-0"	5'-6"	3'-6"
16"	2'-0"	5'-6"	3'-0"
14"	2'-0"	4'-0"	3'-0"
12"	2'-0"	4'-6"	2'-0"
10"	1'-0"	3'-0"	2'-0"
8"	1'-0"	2'-9"	1'-6"
6"	1'-0"	1'-0"	1'-0"
4"	1'-0"	1'-0"	1'-0"
TEE			
24"	2'-6"	7'-0"	5'-0"
20"	2'-6"	5'-0"	5'-0"
18"	2'-6"	5'-6"	3'-6"
16"	2'-6"	5'-6"	3'-0"
14"	2'-4"	4'-0"	3'-0"
12"	2'-0"	4'-6"	2'-0"
10"	1'-9"	3'-0"	2'-0"
8"	1'-6"	2'-9"	1'-6"
6"	1'-0"	1'-0"	1'-0"
4"	1'-0"	1'-0"	1'-0"

200-110



WATER LINE INSTALLED AT
TYPICAL CREEK CROSSING
N.T.S.

200-140

200-140

CIVIL ENGINEER:
BERRY ENGINEERS LLC
3555 KEITH ST NW, SUITE 109
CLEVELAND, TN 37312
TEL: (423) 790-5880

DEVELOPER:
MICHAEL WILLIAMSON
20 25TH STREET, SUITE 6
CLEVELAND, TN 37311
423-667-6367

PROJECT:
BRIAR CREEK
MICHIGAN AVENUE
CLEVELAND, TN 37312

FOR REVIEW

REVISIONS		
1		
2		
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5		
6		
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9		
10		

SHEET NAME:
WATER DETAILS

DATE:	06/03/2024
DRAWN BY:	CMB
CHECKED BY:	BMB
PROJECT NO.:	24021

SHEET NUMBER:
C-05.8