

OSAGE DEVELOPMENT STORMWATER MANAGEMENT FACILITY-BEST MANAGEMENT PRACTICES OPERATION AND MAINTENANCE PLAN

Prepared for:

Clayton Properties Group, Inc. dba Summit Homes

Lee's Summit, Missouri

**Accepted
Study/Report**

September 2023



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PURPOSE

Stormwater Best Management Practices (BMPs) are implemented in this development to meet stormwater discharge water-quality standards of the City of Lee's Summit, Missouri. Permanent BMPs are provided via this development. In order for physical stormwater BMPs to be effective, proper maintenance is essential. Maintenance includes both routinely scheduled activities, as well as non-routine repairs that may be required after large storms, or because of other unforeseen conditions. ***Maintenance of site specific BMPs is the responsibility of the property owner and a requirement of approval for this development.*** The property owner, heirs and assigns shall maintain appropriate funds to provide all maintenance required up to and including replacement of said facilities at end of their useful life. The property owners shall require implementation of this manual for all BMPs transferred with land ownership transfer to subsequent property owners, heirs and assigns.

1. GENERAL SITE OVERVIEW

Osage Development is a single-family residential development with 184 units. The development is located at the southwest intersection of Northwest Pryor Road and Highway 150, Section 35, Township 47 N, and Range 32 W, in Lee's Summit, Jackson County, Missouri.



Figure 1. Location Map.

1.1 Locations of Stormwater Best Management Practices

The Osage Development has two stormwater detention basins located within the development. The first basin is in Tract C, west of SW Pryor Road, east of SW Maryville Place and south of SW Osage Drive, Appendix A. The second basin is in Tract Q, west of SW Clayton Place, south of MO Highway 150 and north of SW Holdbrooks Drive.

1.2 Types of Stormwater Best Management Practices

There are many different measures which can provide stormwater BMPs. The below list are the ones utilized within this development.

- Stormwater dry detention basins
- Native vegetation

2. MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES

Stormwater management facilities need to be maintained to function properly. This section will discuss how to properly maintain the facilities within this development.

2.1 Extended Dry Detention Basin

Extended dry detention basins provide detention for the water quality volume with a 40-hour release rate, along with detention for up to the 100-year storm event. These basins are typically simple in design, which helps make them relatively easy and inexpensive to maintain.

The basins within this development are planted with native vegetation, which maintenance requirements were discussed in Section 2.1, thus Table 2, is looking at the maintenance for the overall detention basin and not focused on the vegetation.

Table 1. Maintenance of Extended Dry Detention Basin

Required Action	Maintenance Objective	Frequency of Action
Debris and Litter Removal	Removal of debris and litter from the basin area to minimize outlet clogging and improve aesthetics	Periodically and after large rain events
Repairing Erosion	If erosional channels occur due to lack of vegetation and large rainfall events, the area shall be re-graded to fill in the channels and new vegetation shall be established per Section 2.1.	Periodically, as occurs after large rain events
Inspection of Outlet	To ensure the outlet box for the basin is function properly	Yearly in the springtime and periodically until winter
Inspection of the Spillway	To ensure spillway is stable and functioning correctly	Yearly in the springtime and periodically until winter
Removal of Sediment	To ensure the basin has enough volume to handle rainfall events and function as designed	Rare once the area draining to the basin is fully developed and vegetation established. Should occur if owner notices large amounts of silt in the bottom that is preventing the basin from draining/functioning.

Maintenance for the basin shall be minimal to the owner, however if unforeseen events happen, the owner shall restore the basin, per the Detention Basin As-built sheets, Appendix B.

2.2 Inspection of Facilities

The above sections mentioned maintenance and frequency for each action. When an inspection of the facilities is performed, the form found in Appendix C, shall be filled out and included in this report for record keeping. It is recommended that owner walks around the facility areas yearly to check conditions and make sure no major concerns are occurring. If they see something of concern, they should reach out to a licensed professional for a deeper inspection of the issues and guidance on repairs required.

2.3 Repairs to Facilities

Many maintenance items can be done by the owner, however if larger repairs are needed the owner shall seek out a qualified contractor. Items that may require a contractor to perform are:

- Removal of sediment build up.
 - If there is undeveloped land, in proximity of the basin, sediment may be placed there with proper erosion control measure and seeding shall occur.
 - If the surrounding area is fully developed, then sediment shall be hauled off site to a proper disposal location.
- Repairs to the concrete outlet structure, spillway, or outlet pipe.
- Major erosional channels occurring on the sides slopes of the basin.

3. CHANGES TO THE CURRENT PLAN

This section will discuss the process if changes are desired to the current Stormwater Management Facility-Best Management Practices Operation and Maintenance Plan.

3.1 Ownership Change

In the event of ownership change of the land which BMPs are located on, the following steps should be performed.

1. Current owner shall have all BMPs inspected and reviewed to be fully functioning, per this plan. If deficiencies are found both parties shall discuss and agree upon a plan to address deficiencies.
2. City shall be notified via writing of the ownership change within 30 days.
3. Appendix D shall be updated with the new owner information.

3.2 Additional Land Added to the Development

If additional land is added into the development, this document shall be updated to include any stormwater management facilities located within the additional area. A revision date shall be provided for the document along with a copy provided to the City of Lee's Summit, Missouri for review.

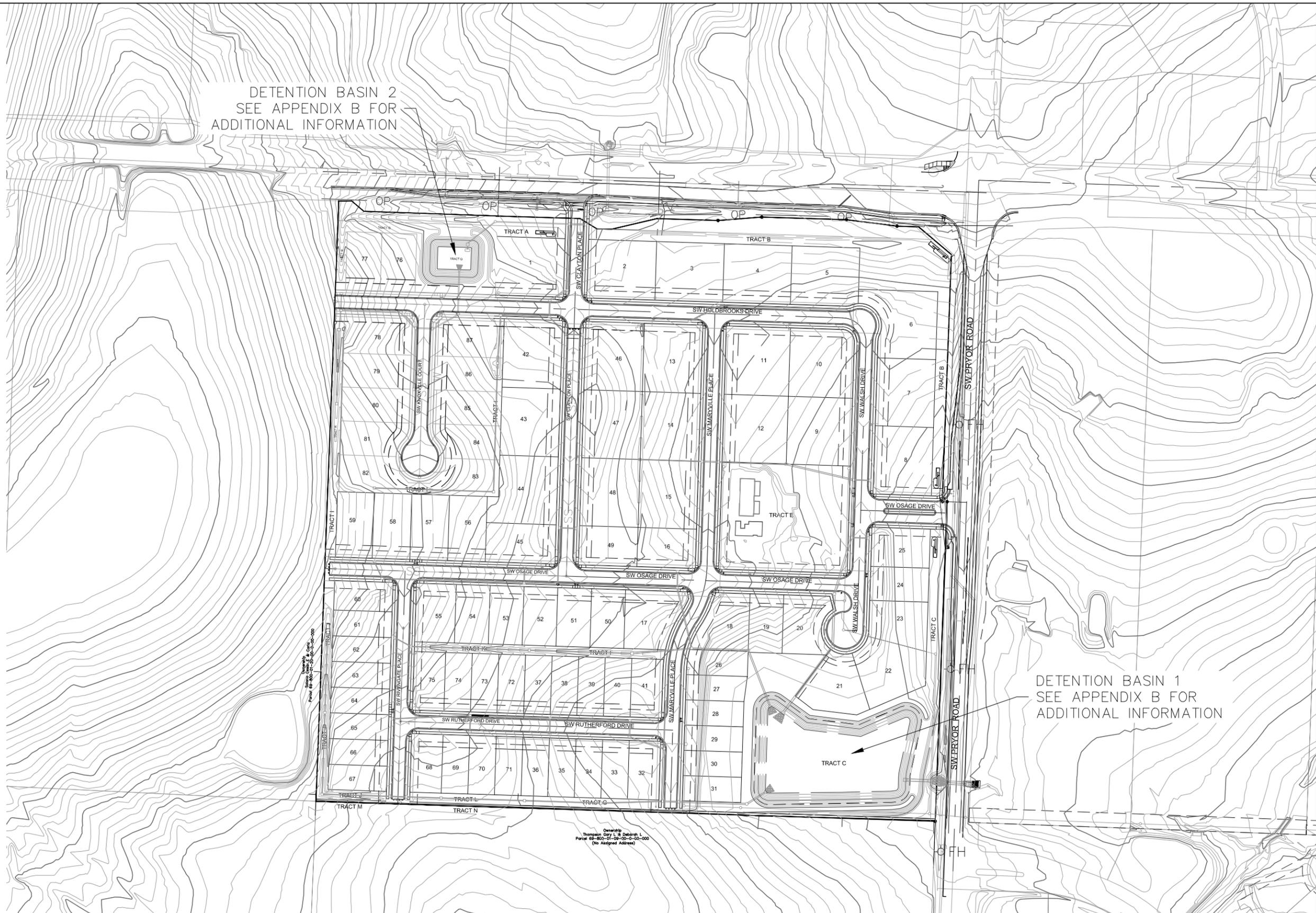
3.3 Changes to How Maintenance is Performed

If the owner has desire to change the recommended maintenance mentioned in this document, they shall prepare an update to this document and present it to Development Services Department with the City of Lee's Summit, Missouri to review. The City may require a licensed professional to update the recommendations.

APPENDIX A

Location of Stormwater Management Facilities

DWG: F:\2019\2001-2500\019-2339-A\40-Design\Reports\GNCV\BMP\MaintenancePlan\CAD Files\AppendixA.dwg
 DATE: Sep 14, 2023 2:09pm
 USER: cwoodward
 XREFS: OverallDevelopmenttextbit



PROJECT NO:	A019-2339
DRAWN BY:	JES/AA
DATE:	2021.11.03

APPENDIX A-STORM WATER MANAGEMENT FACILITY LOCATION



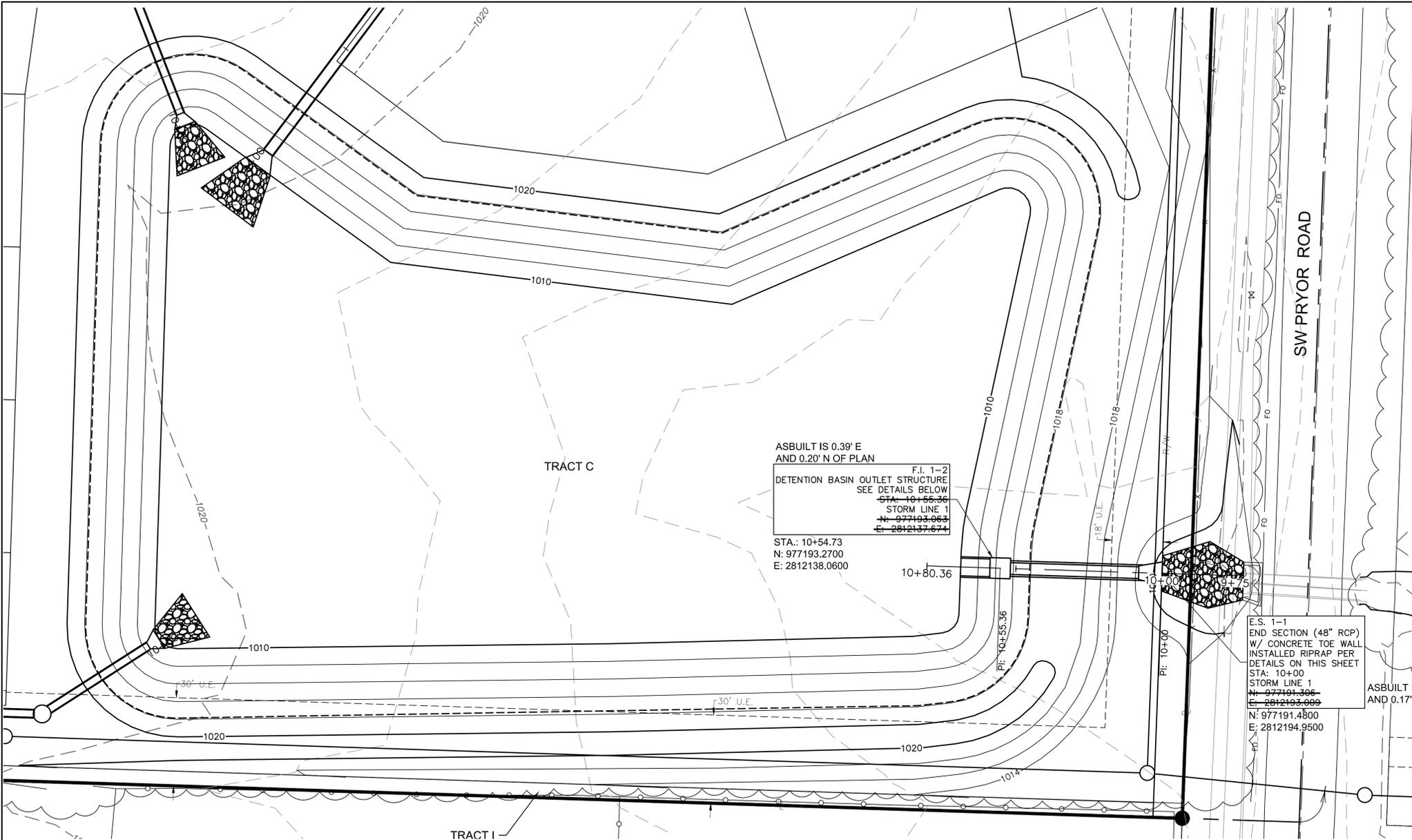
1301 Burlington Street
 North Kansas City, MO 64116
 TEL 816.361.1177

EXHIBIT	1
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APPENDIX B

Detention Basin As-Built Plan

DWG: F:\2019\2001-2500\019-2339-A\40-Design\AutoCAD\Final Plans - Asbuilts\Sheets\CNCV\STREET & STORM\C_DBP01_A192339.dwg USER: bworthley
 DATE: Apr 14, 2021 11:31am XREFS: C_PIBLK_A192339 C_PBASE_A192339 C_PBNDRY_A192339 C_PSTRM_A192339

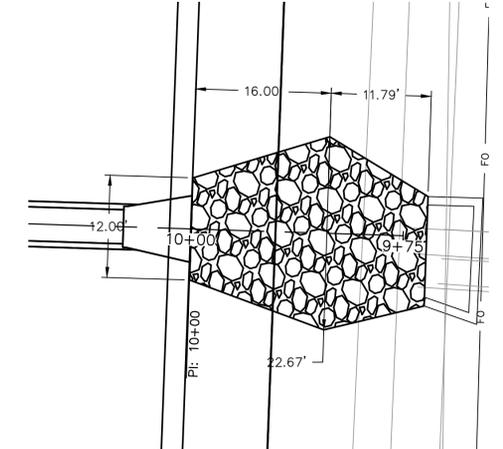


AS-BUILT IS 0.39' E
 AND 0.20' N OF PLAN
 F.I. 1-2
 DETENTION BASIN OUTLET STRUCTURE
 SEE DETAILS BELOW
 STA: 10+55.36
 STORM LINE 1
 N: 977193.063
 E: 2812137.674

STA: 10+54.73
 N: 977193.2700
 E: 2812138.0600

E.S. 1-1
 END SECTION (48" RCP)
 W/ CONCRETE TOE WALL
 INSTALLED RIPRAP PER
 DETAILS ON THIS SHEET
 STA: 10+00
 STORM LINE 1
 N: 977191.366
 E: 2812193.666

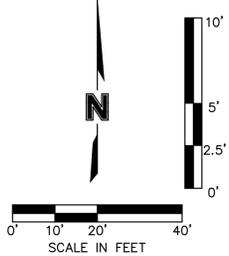
AS-BUILT IS 1.94' E
 AND 0.17' N OF PLAN



RIP RAP DETAIL
 1"=10'

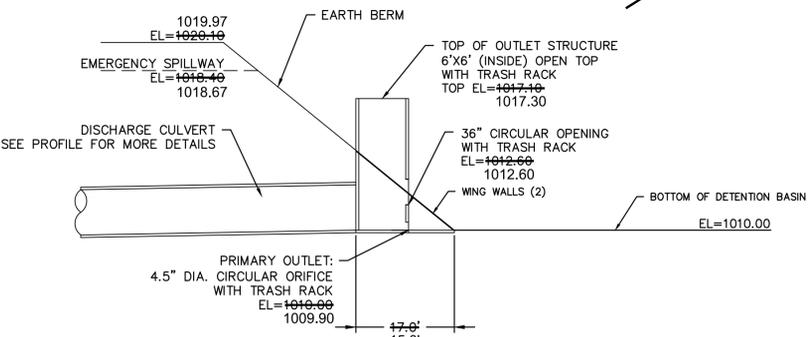
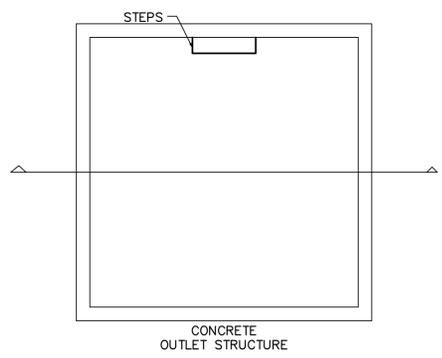
Riprap Calculations							
End Section	Q ₁₀₀ (cfs)	Pipe Diameter (ft)	Class*	D50* (in)	Apron Length (ft)	Apron Depth (ft)	Minimum Area (SY)
E.S. 1-1	56.3	4	2	6	16	1.65	30.8

*Per Table 10.1 HEC 14-FHWA-Energy Dissipators Pg. 10-18



BASIN SPILLWAY DETAILS	
TYPE	RECTANGULAR BROAD CRESTED WEIR
LENGTH	160 FT
SPILLWAY ELEVATION	1018.40 FT
SPILLWAY DEPTH	1.70 FT
TOP ELEVATION	1020.10 FT
100-YR FLOW (AT 0.68' FLOW DEPTH)	233.27 CFS

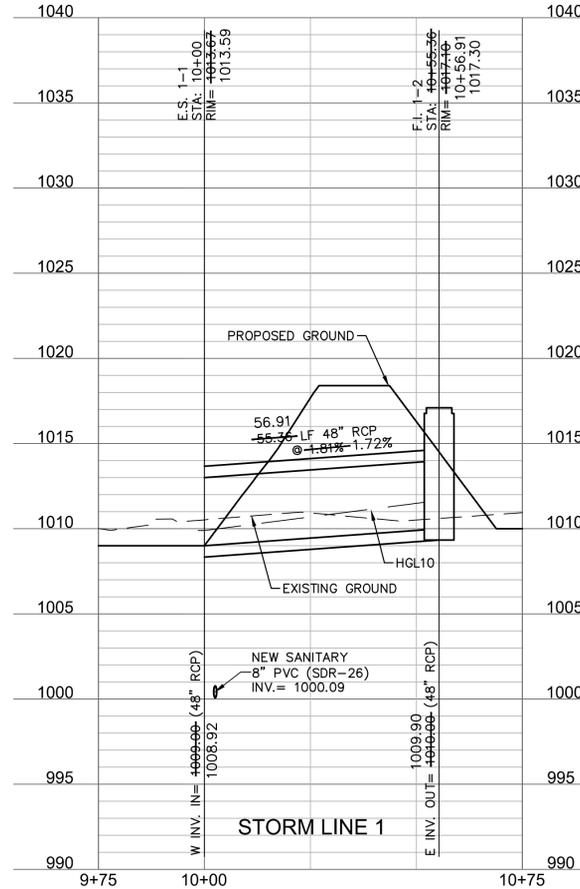
AS-BUILT BASIN DETAILS	
SPILLWAY TYPE	RECTANGULAR BROAD CRESTED WEIR
SPILLWAY LENGTH	200 FT
LOW POINT ON SPILLWAY ELEVATION	1018.60 FT
SPILLWAY DEPTH	1.40 FT
LOW POINT ON DAM ELEVATION	1020.00 FT
100-YR DESIGN WATER SURFACE ELEVATION	1017.16 FT
100-YR AS-BUILT WATER SURFACE ELEVATION	1017.15 FT
DESIGN STORAGE	528,652 CF
AS-BUILT STORAGE	513,200 CF



BASIN OUTLET STRUCTURE DETAIL
 N.T.S.

AS-BUILT

4/14/2021
 REFER TO MASTER DRAINAGE PLAN FOR UPDATED GRADING



Olsson - Civil Engineering
 Missouri Certification Authority #: 001892
 1307 Burlington Street
 North Kansas City, MO 64116
 TEL 816.361.1177
 www.olsson.com

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
1	6/15/2020	TRASH RACKS ADDED TO OUTLET STRUCTURE DETAIL	

2020

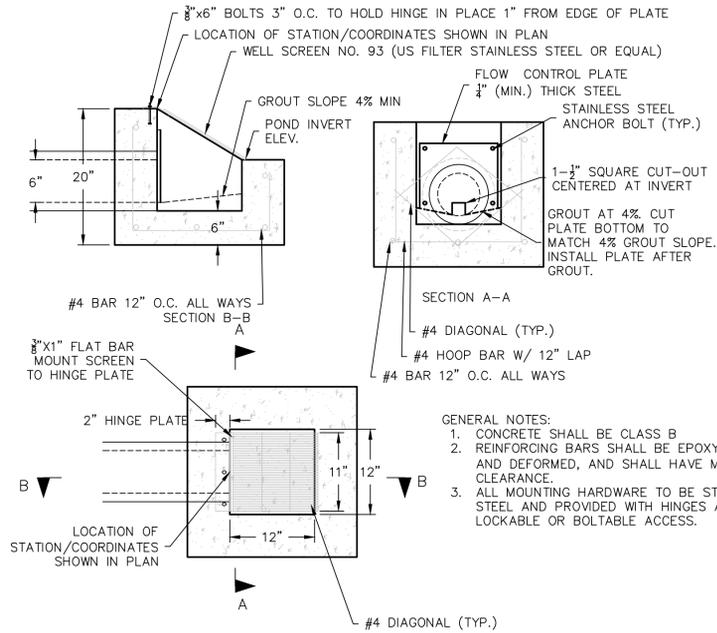
LEE'S SUMMIT, MISSOURI

DETENTION BASIN PLAN
 STREET & STORM SEWER PLANS
 OSAGE
 FIRST PLAT

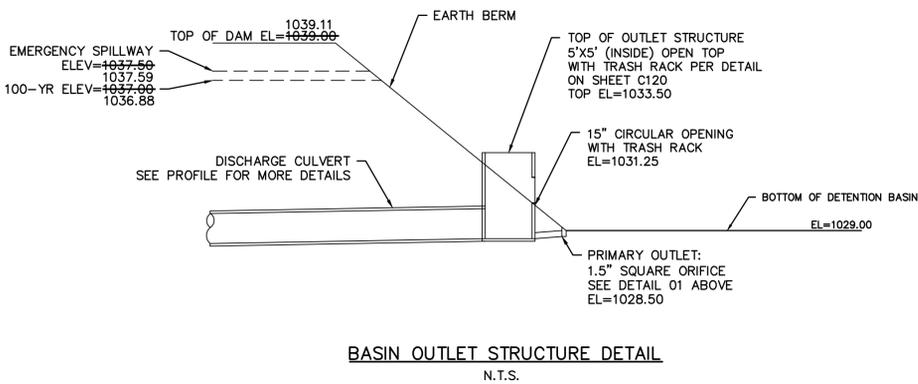
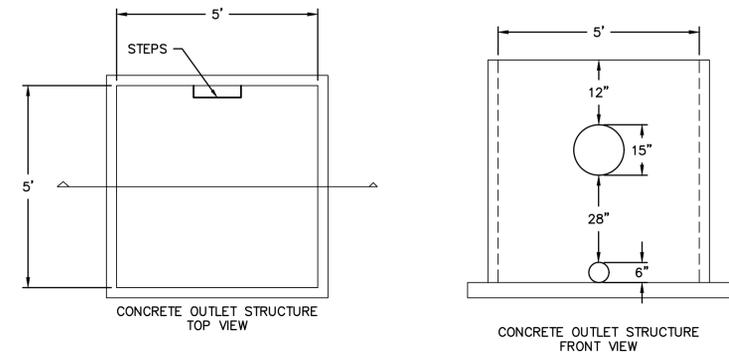
drawn by: AA
 checked by: SS
 designed by: AA
 QA/QC by: JES
 project no.: A19-2339
 drawing no.: C_DBP01_A192339
 date: 3/17/2020

SHEET
 C108

DWG: F:\2019\2001-2500\019-2339-D\40-Design\AutoCAD\Final Plans - Asbuilt\Sheets\CONV\Street & Storm Plans\C_DBP01_D192339.dwg USER: ascyfor C_PSTRM_D192339
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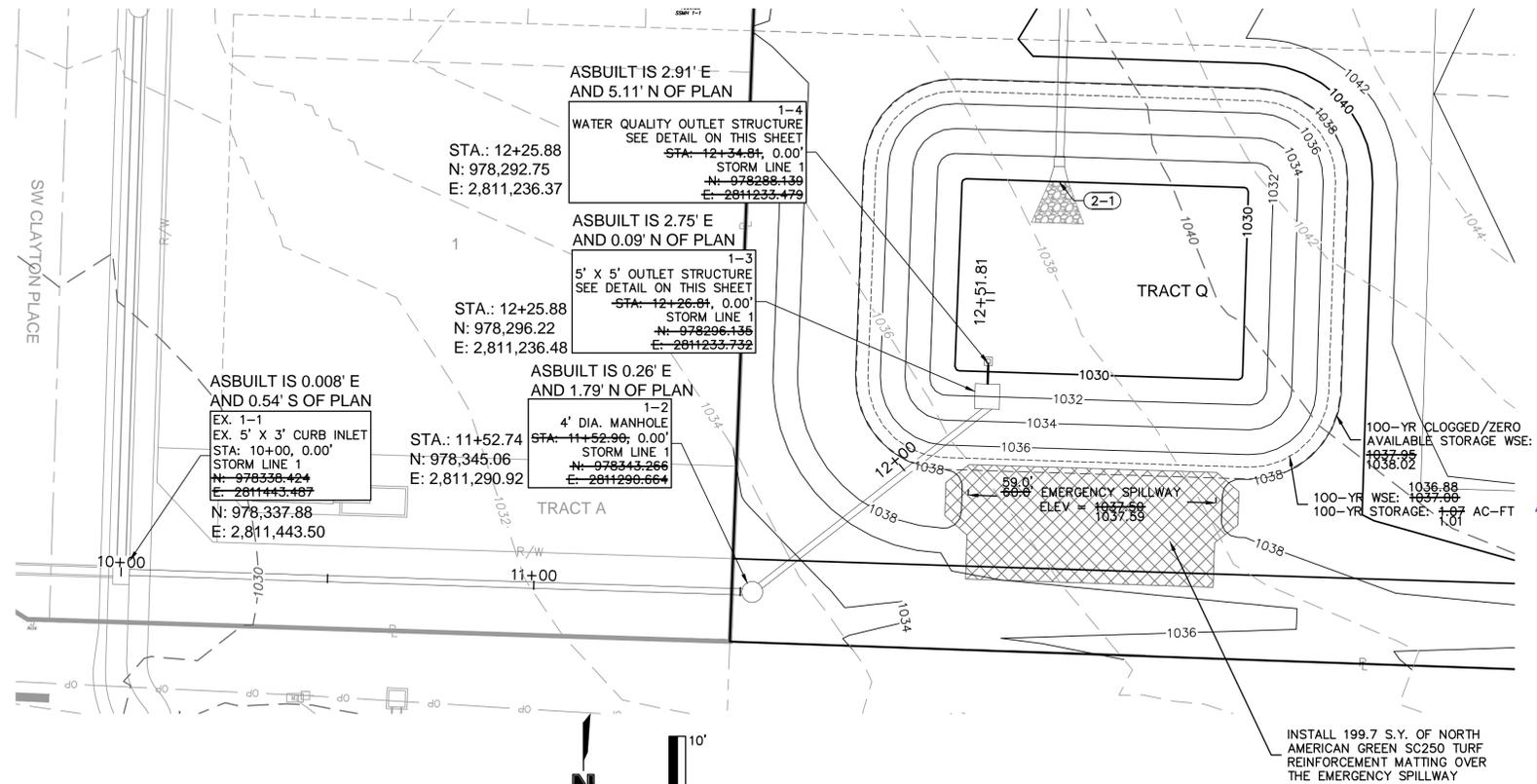
- GENERAL NOTES:**
1. CONCRETE SHALL BE CLASS B
 2. REINFORCING BARS SHALL BE EPOXY COATED AND DEFORMED, AND SHALL HAVE MINIMUM 2" CLEARANCE.
 3. ALL MOUNTING HARDWARE TO BE STAINLESS STEEL AND PROVIDED WITH HINGES AND LOCKABLE OR BOLTABLE ACCESS.



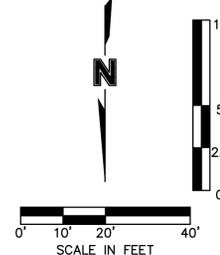
BASIN DETAILS	
EMERGENCY SPILLWAY TYPE	RECTANGULAR BROAD CRESTED WEIR
EMERGENCY SPILLWAY LENGTH	60 FT 59 FT
EMERGENCY SPILLWAY ELEVATION	1037.59 1037.59
EMERGENCY SPILLWAY DEPTH	1.50 FT 1.52 FT
TOP OF DAM ELEVATION	1039.00 1039.11
100-YR FLOW (AT 0.47' FLOW DEPTH)	50.60 CFS 50.60 CFS
100 YEAR PROPOSED STORAGE	1.07 AC-FT 1.01 AC-FT
100 YEAR 100% CLOGGED/ZERO STORAGE AVAILABLE STORAGE WATER SURFACE ELEVATION	1037.95 1038.02
100 YEAR WATER SURFACE ELEVATION	1037.00 1036.88

APPROVED RECORD DRAWING

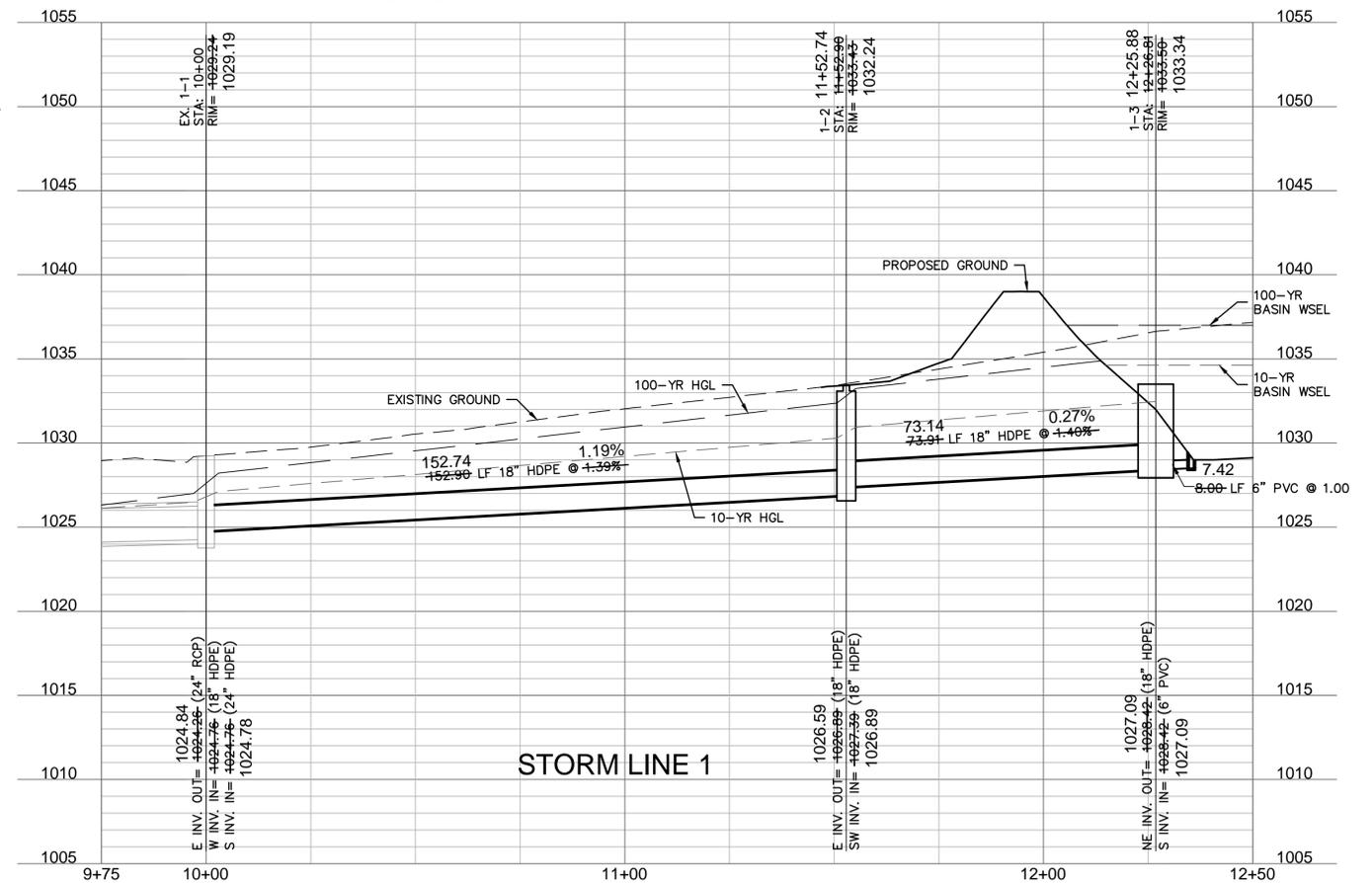
 These plans have been reviewed for accuracy by the Development Services Staff



AS BUILT
08-22-2022



NAG VMAX SC250 TURF REINFORCEMENT MAT



olsson

STATE OF MISSOURI
JULIE ELAINE SELLERS
Professional Engineer
NUMBER PE 2017000367
5/9/2023

REV. NO.	DATE	REVISIONS DESCRIPTION
1	08/11/2023	REVISED PER CITY COMMENTS

DETENTION BASIN PLAN
STREET & STORM SEWER PLANS
OSAGE 3RD PLAT
LEE'S SUMMIT, MO
2021

SHEET C113

APPENDIX C

Inspection Report Form

STORMWATER BMP INSPECTION REPORT FORM

Location of BMP: _____

BMP Type: _____

Date of Inspection: _____

Inspected by: _____

Features				
Maintenance Item	Yes	No	N/A	Comments
Functioning to avoid complaints				
Aesthetically maintained				
Free of trash and debris				
Good vegetation cover				
Free of invasive species				
Evidence of erosion				
Bottom of basin clear of excess sediment				
Outlet structure in working condition				
Spillway in working condition				

Action to be taken: _____

APPENDIX D

Ownership Information

OWNERSHIP INFORMATION

Ownership information shall be updated in the event the property owner where the stormwater BMP's are located changes. Below is contact information for the property owner, shall they need to be contacted regarding the stormwater BMPs.

Stormwater BMP Property Ownership	
Property Owner	Osage Homes Association Inc.
Contact Person	Jake Stauch - Property Manager
Management	Young Management Group, Inc.
Address	10660 Barkley Street, STE 200, Overland Park, KS 66212
Phone Number	913.890.2300 ask for Jake
Email Address	jake@ymqinc.com

Stormwater BMP Property Change of Ownership	
Property Owner	
Contact Person	
Address	
Phone Number	
Email Address	

Stormwater BMP Property Change of Ownership	
Property Owner	
Contact Person	
Address	
Phone Number	
Email Address	

Stormwater BMP Property Change of Ownership	
Property Owner	
Contact Person	
Address	
Phone Number	
Email Address	