

MONROE COUNTY DRAINAGE BOARD
Thursday February 1, 2024, at 8:30 AM
Location: Showers Building Room 106D
Hybrid Meeting with Virtual Attendance via Teams

AGENDA

1. Call to Order
2. Approval of Minutes for: January 4, 2024 +* Page 2
3. Public Input for Items not on the Agenda
4. Business
 - a. Preliminary Drainage Plan: Clear Creek Homes New Office +* Page 7
 - b. Preliminary Drainage Plan: Simtra (formerly Baxter) Building Expansion +* Page 16
 - c. Preliminary Drainage Plan: The Trails at Robertson Farm +* Page 27
 - d. Preliminary Drainage Plan: North Park VA Health Center +* Page 64
 - e. Drainage Board 2024 Meeting Dates - Revised +* Page 69
5. Staff Reports/Discussion
 - a. Meetings on January 30, 2024, and February 13, 2024, to discuss Stormwater Management Ordinance and Technical Standards
6. Adjournment
 - a. Date of Next Meeting: Thursday March 7, 2024, at 8:30 AM

+ Attachment Included

* Board Action Requested

The meeting link and packet will be available on the County Events Calendar at www.co.monroe.in.us.

Anyone who requires an auxiliary aid or service for effective communication, or a modification of policies or procedures to participate in a program, service, or activity of Monroe County, should contact Monroe County Title VI Coordinator Angie Purdie, (812)349-2550, apurdie@co.monroe.in.us, as soon as possible but no later than forty-eight (48) hours before the scheduled event.

Individuals requiring special language services should, if possible, contact the Monroe County Government Title VI Coordinator at least seventy-two (72) hours prior to the date on which the services will be needed.

The meeting is open to the public.

MINUTES
MONROE COUNTY DRAINAGE BOARD
Thursday, January 4, 2024, at 8:30 AM
Location: Showers Building Room 106D
Hybrid Meeting with Virtual Attendance via Zoom

MEMBERS PRESENT: Bob Autio, Trohn Enright-Randolph (*ex officio*), Ginger Davis, Lee Jones, Bill Riggert

MEMBERS ABSENT: none

STAFF: Donna Barbrick (Secretary), Kelsey Thetonia (MS4 Coordinator), Adam Rickert (Stormwater), Erica Penna (Stormwater), Tina Engle (Stormwater), Daniel Brown (Planning), Anne Crecelius (Planning)

OTHERS: Fabian Sotomayor, Don Grinstead, Tom Wininger, Jodi Key, Daniel Butler, AJ Willis, Terry Quillman

1. **Call to Order: Autio called the meeting to order at 8:30 a.m.**
2. **Approval of Minutes from November 1, 2023 and December 6, 2023**

Bill Riggert said he was not at the November meeting. Someone commented that he could still vote.

Motion by Riggert to approve the November minutes; seconded by Jones. VOTE: AYE (unanimous). Minutes approved.

Motion by Riggert to approve the December minutes; seconded by Jones. VOTE: AYE (unanimous). Minutes approved.

3. **Public Input for Items not on the Agenda (none)**
4. **Business**

- a. **PUO-23-6 Preliminary Drainage Plan: North Park II B-9 Fill Site – Karst updates +**

Kelsey Thetonia reviewed the location and the plan for a fill site. She said she wanted to bring it to Drainage Board (DB) to review environmental impacts. She said a number of sinkholes and springs were found on the property. She said a couple of these are on the portion that they are proposing to fill. She said the request from Planning is that they are adding a use to the PUD. She said there is a stream that runs through the middle of the property and goes underneath SR 46 before it goes to Stouts Creek. She said there is a 36-inch pipe that discharges here. She said I want to make sure that we have the drainage here figured out. She said the drainage area for the stream is larger than I thought it was. She said we could potentially ask for a buffer around the stream. She said I could ask Daniel Butler to look at the impacts on the stream. She said the proposed grading plan for the east side of the property is a 30- to 40-foot slope. She said I am questioning whether there is a sinking stream since there is a 36-inch culvert discharging from I-69. She said I would like for Daniel Butler to look at this again.

Ginger Davis said there was some subsidence that occurred by the roundabout. She said I would not be surprised if there were karst features there. She said there were some signs that said Karst Area/Low Spray Zone while it was being developed. Thetonia noted a comment from Daniel Butler that the spring has been monitored since I-69 construction.

Thetonia said the Drainage Board had asked for a more detailed investigation into the geology of the west side of the development. She said I would like a wetland delineation at the development plan review to make sure we are not inadvertently filling in jurisdictional wetlands. She said I will talk to Bynum Fanyo about getting that completed. Riggert commented that a quarry operation pulling rock out and wasting it, then you have big chunks of stones with openings and voids.

Autio asked about any proposed sampling for the downstream end of the stream. He said sampling would help determine the quality of that fill, if there are any impacts to water quality. Thetonia said we do not normally require water quality sampling so I would have to make it clear what standards they should be meeting. Riggert commented there might be guidelines for landfills. Jones said a number of tests are done every month at the current landfill, and some tests are quarterly. Thetonia said I will make sure that is in my comments.

Thetonia asked if there was anything Planning or Daniel Butler wanted to add. Daniel Butler (attending virtually) spoke. He said I wanted to add that we have done environmental report on the entirety of the property and that is separate from the karst report. He said this plan does take into account avoiding anything like that found on the site. He said we are avoiding the stream that goes through the middle of the site entirely. He said we took into account the comments from the last DB meeting and incorporated those. He said the north of the site is required to stay as an open space and that is where some of the outlet from the stream goes to and where we are outletting from our current fill operations and that will be kept as such in this phase. He said he would send that report to Thetonia. He said we do not have any opposition to any type of sampling that you would like to incorporate into this.

Jones asked if they are going to fill to the height of the hill on both sides of the stream, doesn't that affect the stream a lot. Thetonia said we could ask for mapping of the flood plain and use that for our buffer. She said if we are filling in part of that flood zone, then that would have impacts during a major flood event; for most rain events, it would not have a major effect. She said I have asked for a bench within that long slope, and we have talked about velocity slowing measures.

Davis commented groundwater flow in this area is generally to the north. She said but in a karst zone, groundwater does not necessarily follow the rules.

b. SPP-23-3 Preliminary Drainage Plan: North Park Area B-3 Lot 3 – Stone Carver Drive +*

Thetonia said this is also designed by Bynum Fanyo. She said I reviewed their preliminary plat, and I was told that each individual lot provides detention as they are developed. She said I can go over this with you and then ask for a vote.

She gave an overview of the site. She said I asked them to meet the new ordinance release rates and they were able to do that. She said there is a bypass culvert under the road. She said there will be a detention pond inside the drainage easement. She said each lot will provide their own detention, as well. Terry Quillman asked about the pipe going under the road. She said it is my understanding that they are trying to bypass the discharge from the western area but in future development they would have detention on that parcel. Quillman commented on a potential for scouring/erosion in that area. Autio asked if there was enough room on the lots for them to provide detention.

AJ Willis (attending virtually) spoke. He said the double yard inlet is capturing 9.15 acres of runoff. He said about half of the basin is offsite flow. He said the reason I incorporated the double yard inlet to

bypass that runoff is to keep it out of the roadway network. He said the discharge points are the existing pond and also the proposed pond. He said we are proposing riprap in there that should prevent erosion.

He said there are no future plans for development right now. He said without knowing what is going on the site and what grading will be, we do not know yet where those detention ponds are going to be going or how much storage would be needed. Thetonia said okay, so we can look at that when it comes to us; right now, we are just looking at detention for the new roadway.

Davis asked about bioswale technical standards and if those would be included in the ditch. Thetonia said the ditches would get standard roadside treatment. She said I have asked for catch basins so we can capture some sediment.

Autio asked if there were any questions or a motion. **Motion to approve the preliminary drainage plan by Riggert. Second by Autio. VOTE: AYE (unanimous). Approved.**

c. Drainage Easement Waiver Request (after-the-fact): 408 W Irie Ct. (Southern Meadows Lot 60) +*

Thetonia said we have Tom Winger the developer here as well as property owners here. She said I was conducting other inspections when I noticed structures built in drainage easements in this new subdivision, so I wanted to take it to the DB to discuss whether these needed to be removed or to grant a waiver. She said with the knowledge that it is in a drainage easement, we could always require it to be removed if needed.

She said the easement on Lot 61 is for a plastic storm pipe. She said DB looked at this in November and decided to table it. She displayed photos of the yard and the easement. She said there was a survey stake that was driven through the pipe. Winger said that had been taken care of. She noted that there was only six inches of cover on the pipe. She said the pipe itself was placed on top of native soil, not fill. She said it would be the owner's responsibility to have the fence removed if we need to get in there to maintain that pipe. She said Terry Quillman had an idea to come up with a simple written agreement. Riggert suggested having that recorded in case the house is sold so the new homeowners would be aware.

Autio invited the homeowner to speak. Don Grinstead said I was relieved to know that the fence had no impact on the pipe. He said we have grandchildren and little dog, so we needed a fence. He said I appreciate the consideration of the committee. He said it appears the pipe is in good working order.

Autio asked are you amenable to the agreement. Grinstead asked if it was a standard practice to have that document or is this an unusual circumstance. Quillman said I suggested it only in a situation where property owners built something without a permit, and it gives the board an opportunity to work with the property owner should they need to work in there.

Thetonia said installing a fence within a drainage easement that would require prior permission from the DB. She said any obstruction in the easement requires DB approval, whether there is a permit required or not. She said I am more used to doing agreements like this with commercial properties.

Autio said motion to approve the waiver with the condition of a simple written agreement that is recorded, with photos attached. Riggert said so moved. Seconded by Davis. VOTE: AYE (unanimous). Waiver approved with condition.

d. Drainage Easement Waiver Request (after-the-fact): 404 W Irie Ct. (Southern Meadows Lot 58) +*

Thetonia displayed images of the property and said this is a deck located in a drainage easement. She said the deck goes up to the property line and it is ten feet within the easement.

Riggert asked if that swale was graded in during the development. Thetonia said the original grading was not documented well. She said Lot 57 was regraded. She said there is a lot of elevation change in the area. She said the rear yard of this lot is still pretty flat. She noted that Lot 57 is currently installing a swimming pool and a retaining wall.

Quillman (former MS4 Coordinator) said this came in when I was here. He said I talked to the engineer then about making sure that these back lots could drain to the pond and not let it drift into the next backyard. He said the curbing is at the low point to catch overflow; it is a significant ditch is what it amounts to. There was a discussion about where the centerline of the flow path was located.

Fabian Sotomayor commented that paneling under the deck had been removed from the sides of the deck, following a suggestion from the county.

Jackie Jelen (attending virtually) said this deck would have required a building permit and they have applied for an after-the-fact permit and we have been on hold. She said no matter the discussion at DB, Planning will also have a subsequent process for the homeowner to go through. She said we will be following up with the subsequent process following the DB.

Autio asked if the easement could be moved. Davis asked about the flow amount for the amount of impervious surface. Thetonia said I had Katie Stein look at that. She said there are seven inlets in this low spot so that gives you a sense of the amount of water that would be draining to that. Tom Winger commented that the criteria that Katie Stein was put to was that if all the inlets were completely plugged up and we had a 100-year rain event, it was good; she certified that that was good.

Davis said it is hard to tell from these images what the flow path actually is compared to the as-built. She said it looks like the path may do some curving and that would be concerning for the corner of that deck. She said I just want to raise that concern. There was a discussion of the flow path.

Riggert had a question about allowable impervious area on the lots. Jelen said there is a minimum open space requirement for this zone of 40%.

Autio said our options are to deny, accept with conditions and even if we accept the waiver with conditions, Planning might still come in and say it has to be removed. Thetonia said yes, they could; your decision will certainly be considered at the BZA meeting if they are asked to go to the BZA.

Riggert had a question about Stein's analysis. Thetonia said I do not want to speak for her, but she had the information when I asked her to certify the as-builts.

Riggert said I'd be willing to make a motion to allow them to keep the deck with the understanding that if work is needed in the easement, it would be removed, some sort of written agreement be recorded and documented with photos. Jones suggested a condition that the skirting never be put back. Thetonia and others said yes. Davis suggested a condition that if there was evidence of erosion along the footing, then it could be brought back to us for consideration.

Autio put forth a motion to approve this waiver with conditions that

- **the deck be removed if there needs to be maintenance in the swale**

- **No skirting on the deck**
- **There is a simple written agreement with the homeowners that is recorded**
- **If there is evidence of erosion along the footing, it could be brought back to DB**

Davis said so moved. Riggert seconded. VOTE: AYE (unanimous). Waiver approved with conditions.

5. Future Drainage Plan Reviews:

- a. SIT-23-15 Preliminary Drainage Plan: Clear Creek Homes New Office**
- b. PUO-23-7 Preliminary Drainage Plan: The Trails at Robertson Farm**

Thetonia briefly went over some upcoming drainage plans and how things will be processed with new stormwater permitting. There was a discussion of permitting with OpenGov. She said I will be looking for feedback from local engineers.

6. Staff Reports/Discussion

a. January/February meetings to complete final reviews of Stormwater Management Ordinance and Technical Standards

Thetonia said she could ask someone from Christopher Burke to come to one of the meetings. Quillman said he would consider a permanent term on DB. He said he is undecided at this point. There was a discussion of changing the day of the week that DB meets but no decision was made.

7. Adjournment

a. Date of Next Meeting: Thursday February 1, 2024, at 8:30 AM

The meeting adjourned at approximately 9:58 am.

Minutes approved: _____

President

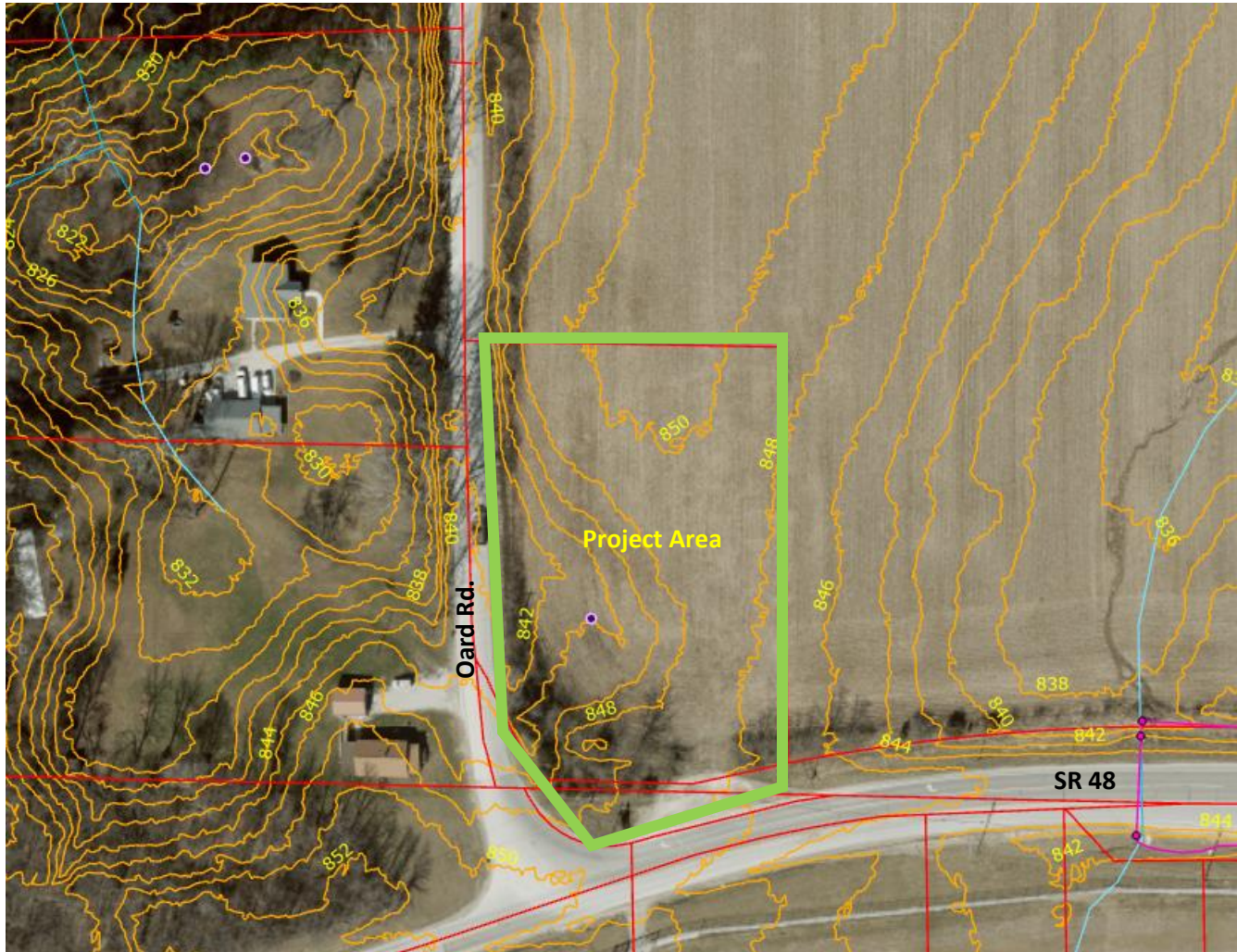
Secretary

Project Name: Clear Creek Homes New Office
Engineer/Design Firm: Bill Riggert, BRCJ
Address: 72 N Oard Road
Acres: 1.81 acres +/-

Planning Number: SIT-23-15
Watershed: Cave Creek
Karst Report: Not Completed
Wetland Delineation: Not Completed

Project Summary

The Clear Creek Homes New Office project is located on Oard Road in the Cave Creek Critical Watershed. The project site is bordered by agricultural/residential to the north, Oard Road and residential to the west, State Road 48 and the Monroe County Airport to the south, and agricultural and residential to the east. The project is proposing a new office/storage building, parking lot, and display area for five model homes.




Project Drainage

The site improvements primarily drain west and north towards Oard Road. The detention pond will discharge to the roadside ditch then flow north through the new driveway culvert and the roadside ditch continues north for about 350 ft. where it then flows west under Oard Rd via MC culvert. The culvert discharges into a compound sinkhole on private property.

Preliminary Project Comments:Critical Watershed and Detention Design:

- This project is located in the Cave Creek Critical Watershed and shall meet the Critical Watershed release rates of 0.25 and 0.45 cfs/acre for the 10% and 1% AEP events, unless downstream outfalls are more restrictive.

Adequacy of Outlet:

- Regrade ditch from detention pond outlet to at least the property boundary. The ditch flows north to a MC culvert under Oard Rd. This culvert outlets to a compound sinkhole on the west side of Oard Rd.  and remove proposed landscaping from the roadside ditch.

Karst/Sensitive Environmental Areas:

- There is a sinkhole on the south side of the property according to the 2011 Sinkhole Inventory. Verify if there is a sinkhole in this area. Place all sinkholes in SCAs and provide overflow Drainage Easements.
- Is bedrock going to be an issue for cut/fill operations?

Drainage Easements:

- All stormwater infrastructure outside the public right-of-way will be placed in drainage easements.

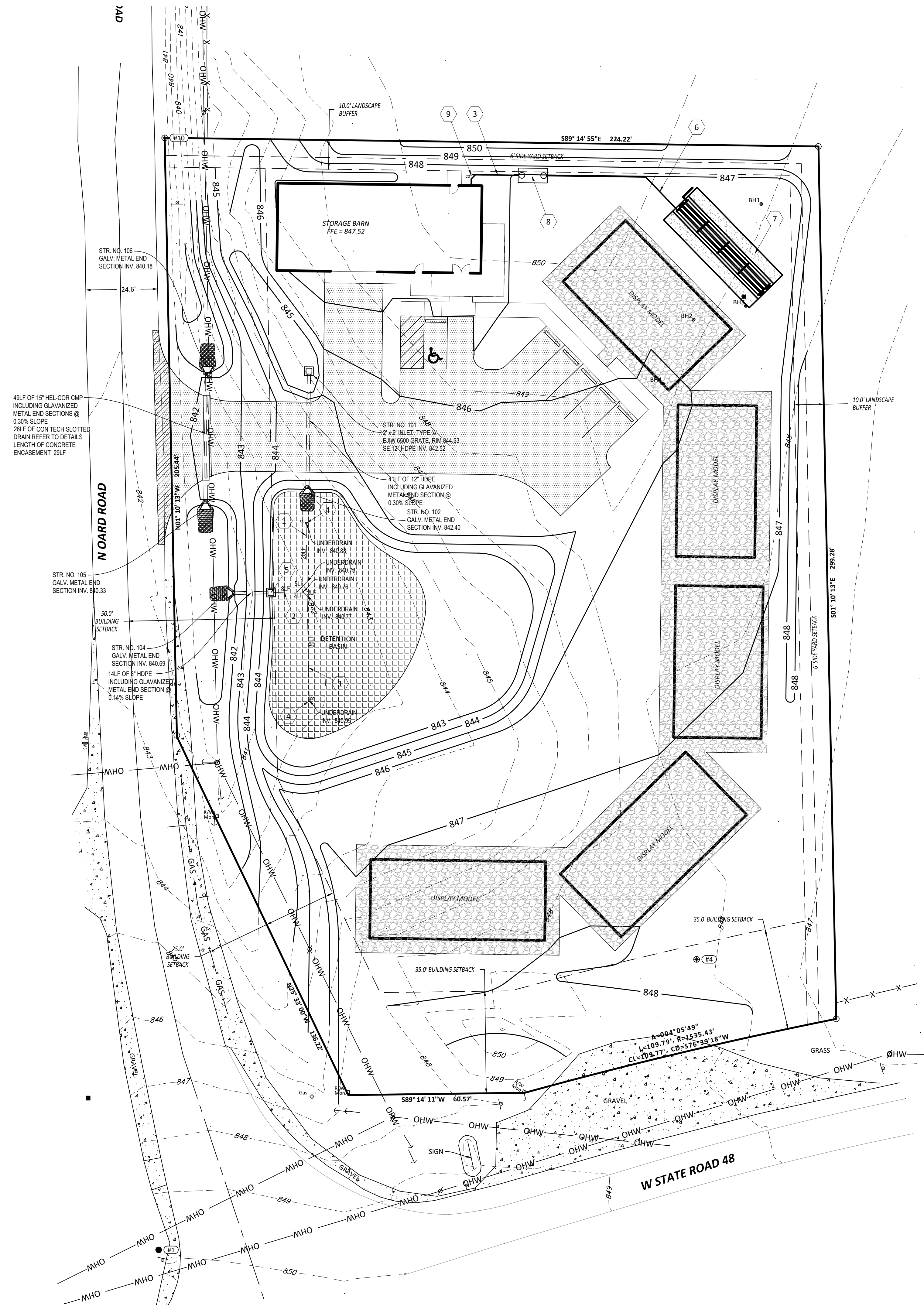
If a pump is required for the commercial septic system, please include inspections and maintenance of the pump in the Operations & Maintenance manual.

Use updated rainfall tables in new Technical Standards Manual.

**This site drains to a sinkhole, so consider whether we will require this site to comply with the Draft Tech Stds Manual Ch. 6 Section B3.

3. Site-Specific Release Rates for Sites Draining to Sinkholes

For proposed developments that drain to sinkholes, a more restrictive release rate and additional storage on site will be required. The release rate must be such that the drawdown time from the end of a 100-year, 48-hour storm is no less than two days (as determined by routing this hydrograph through the pond). For proposed developments within the Sinking and Cave Creek watersheds, a minimum of three inches of runoff over the disturbed area must be released at a rate that results in a drawdown time from the end of a 100-year, 48-hour storm of no less than two days.



GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING AS REQUIRED TO COMPLETELY INSTALL THE WORK INDICATED.
2. CONTRACTOR SHALL COORDINATE EXACT UTILITY LOCATIONS WITH THE LOCAL UTILITY COMPANIES PRIOR TO COMMENCING ANY WORK. CONTACT THE INDIANA UNDERGROUND PLANT PROTECTION SERVICES INC. AT 1-800-382-5544 AND OTHER UTILITIES PRIOR TO ANY EXCAVATION ON THE SITE.
3. CONTRACTOR IS REQUIRED TO VERIFY FIELD CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO BEGINNING WORK.
4. COORDINATE WITH VAN BUREN WATER, INC. 812-825-9760 FOR NEW DOMESTIC SERVICE.
5. PIPE LENGTHS INDICATED ARE APPROXIMATE. CONTRACTOR TO PROVIDE AND INSTALL NECESSARY LENGTH TO COMPLETE INSTALLATION.
6. ALL SANITARY LATERALS SHALL HAVE A MINIMUM COVER OF 30", UNLESS NOTED OTHERWISE.
7. ALL STORM LATERALS SHALL HAVE A MINIMUM COVER OF 24", UNLESS NOTED OTHERWISE.
8. ALL SANITARY AND STORM LATERALS SHALL HAVE A MINIMUM SLOPE OF 1/8" PER FOOT UNLESS NOTED OTHERWISE.

PLAN NOTES

1. 4" PERFORATED HDPE TYPE 'S' PIPE UNDERDRAIN @ 0.50% MIN. SLOPE - REFER TO DETAIL SHEET C802.
2. 4" HDPE TYPE 'S' PIPE UNDERDRAIN @ 0.50% MIN. SLOPE
3. 4" SANITARY SEWER LATERAL, ASTM D-3034 SDR 35 PVC PIPE, FROM OFFICE TO SEPTIC TANK @ 1.00% SLOPE MIN.
4. EXTERIOR CLEANOUT (TYPICAL) - REFER TO DETAIL SHEET C802.
5. STRUCTURE 103 CONTROL STRUCTURE - REFER TO DETAIL SHEET C802.
6. 4" SANITARY SEWER LINE, ASTM D-3034 SDR 35 PVC PIPE, FROM SEPTIC TANK TO PRESBY @ 1.00% SLOPE MIN.
7. PRESBY SYSTEM - REFER TO DETAIL SHEET C803
8. 1250 GALLON SEPTIC TANK - REFER TO DETAIL SHEET C803
9. SANITARY CLEANOUT (TYPICAL) - REFER TO DETAIL SHEET C803

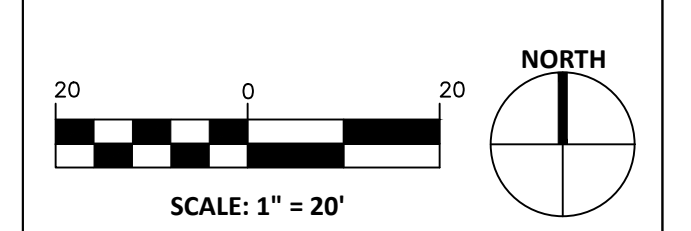
BRCJ
 LAND SURVEYING - CIVIL ENGINEERING - GIS
 1351 West Tapp Road
 Bloomington, Indiana 47403
 Phone: 812.336.8277
 Fax: 812.336.0817
 www.brcjcivil.com

NOT FOR CONSTRUCTION

**CLEAR CREEK HOMES
 NEW OFFICE**
 72 NORTH OARD ROAD
 BLOOMINGTON, INDIANA

BRCJ Project No: 9424

SITE UTILITY PLAN



Date: 10-17-2023 Issue: ISSUED FOR PERMITTING

REVISION SCHEDULE		
Rev. #	Rev. Description:	Issue Date

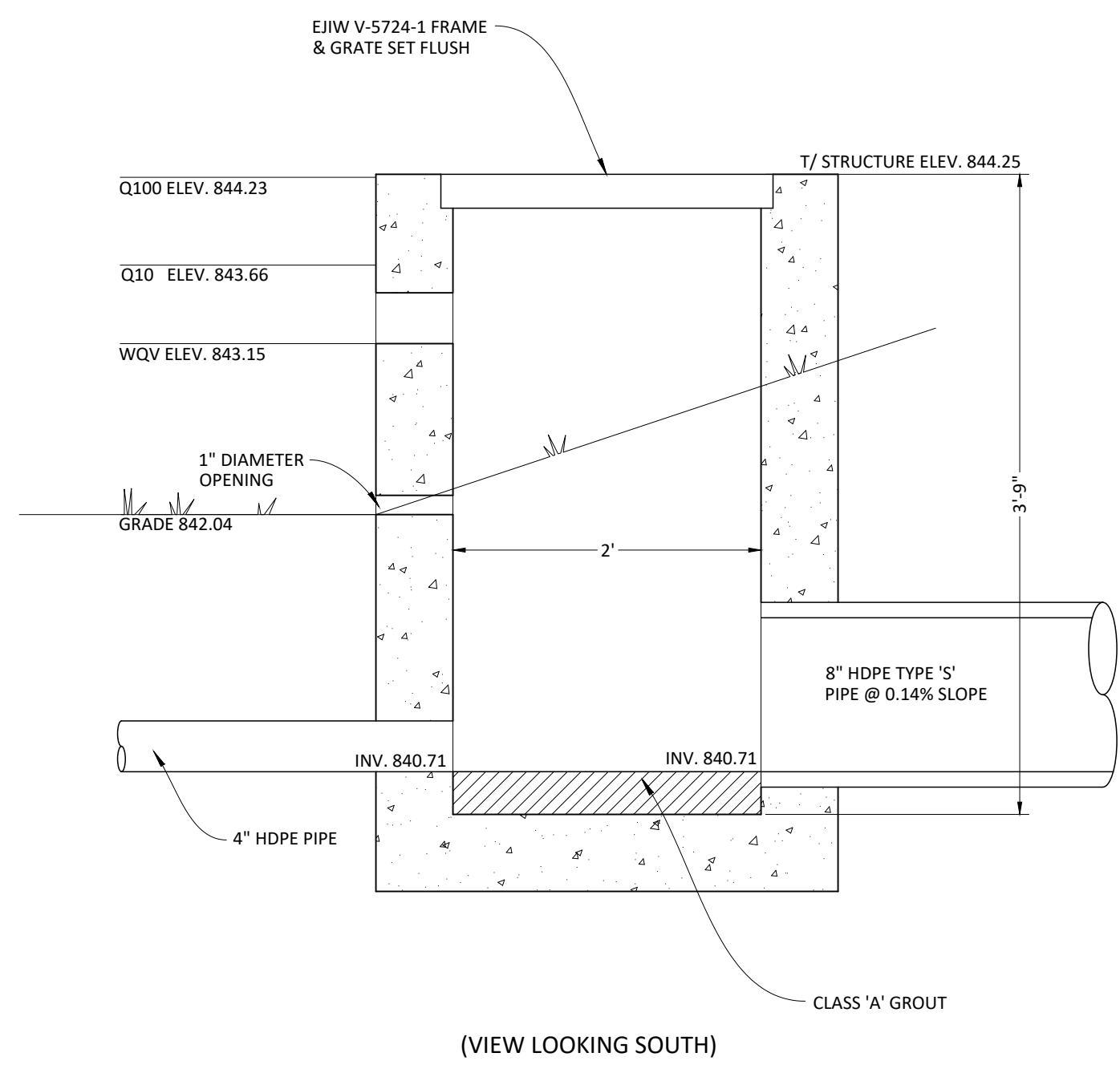
Drawn By: GBM
 Designed By: GBM
 Checked By: WSR



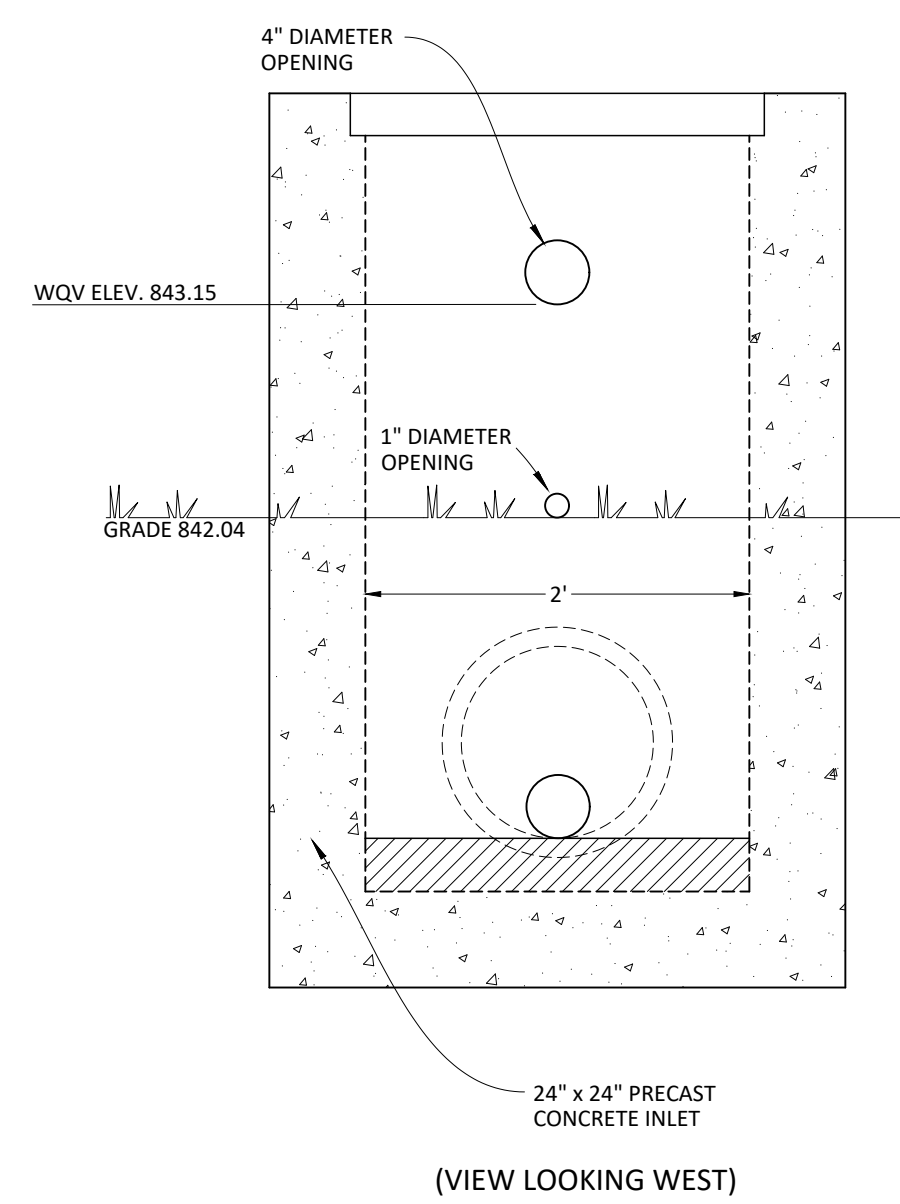
LEGEND

- PROPOSED CONTOURS
- EXISTING CONTOURS
- EX MATCH EXISTING GRADE
- HP HIGH POINT
- RIM TOP OF CASTING
- F.F.E. FINISH FLOOR ELEVATION
- ⊙ EXTERIOR CLEANOUT

C601



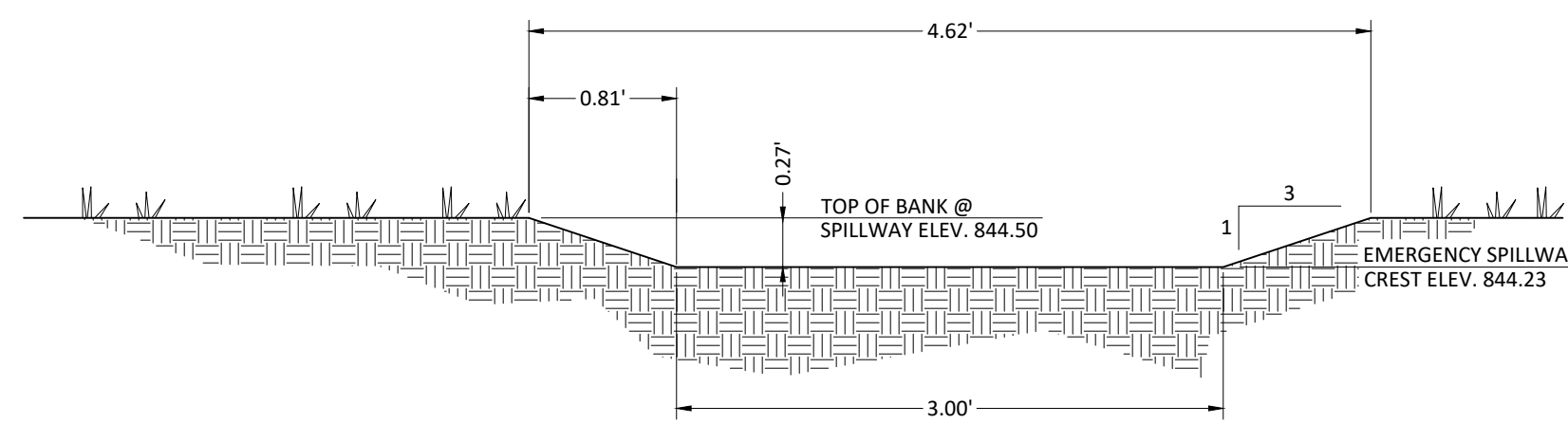
(VIEW LOOKING SOUTH)



(VIEW LOOKING WEST)

STR. 103 DETENTION BASIN CONTROL STRUCTURE

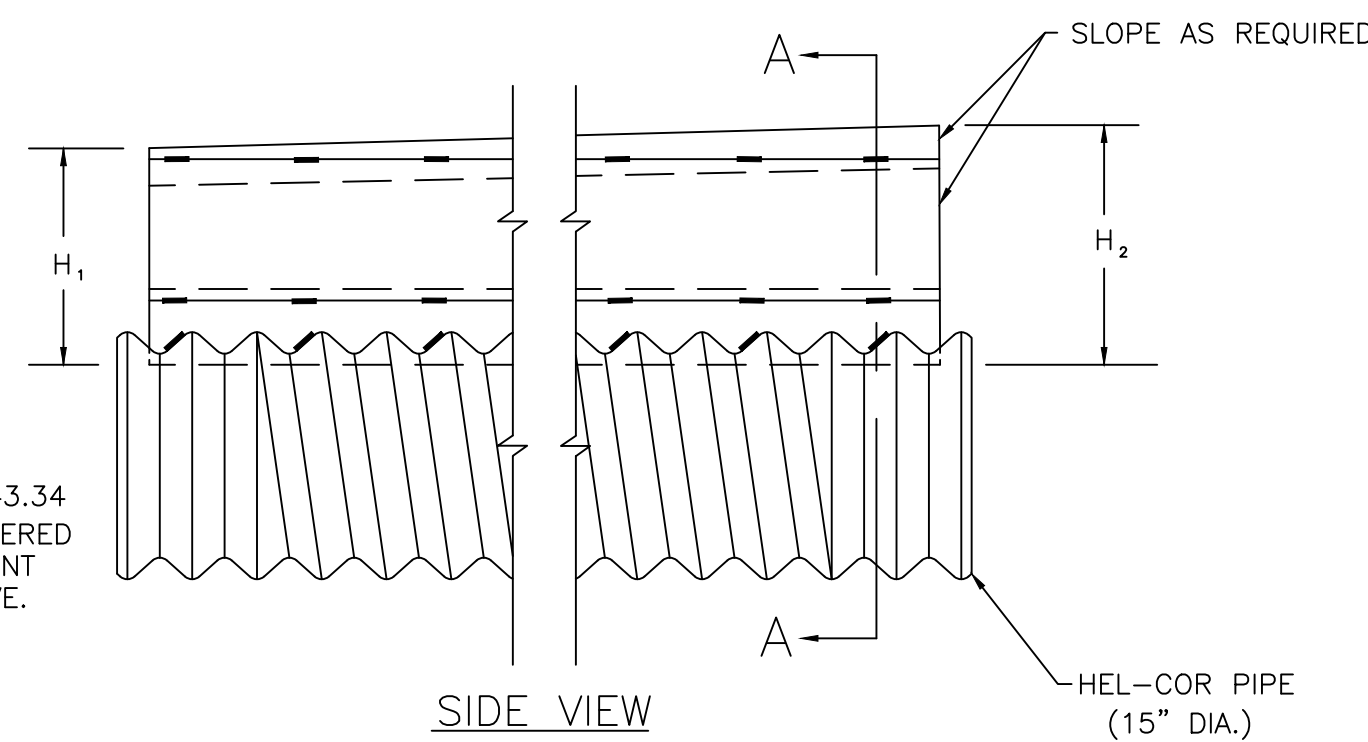
N.T.S.



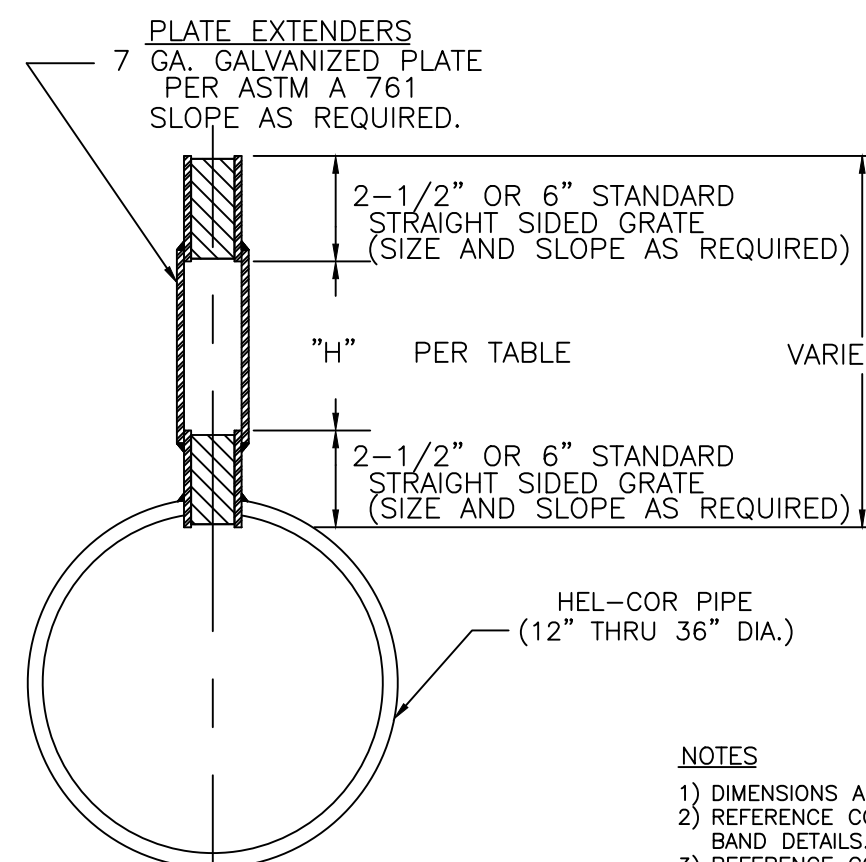
EMERGENCY SPILLWAY

N.T.S.

TOP OF SLOTTED DRAIN 843.34 WHICH IS 1/4\"/>



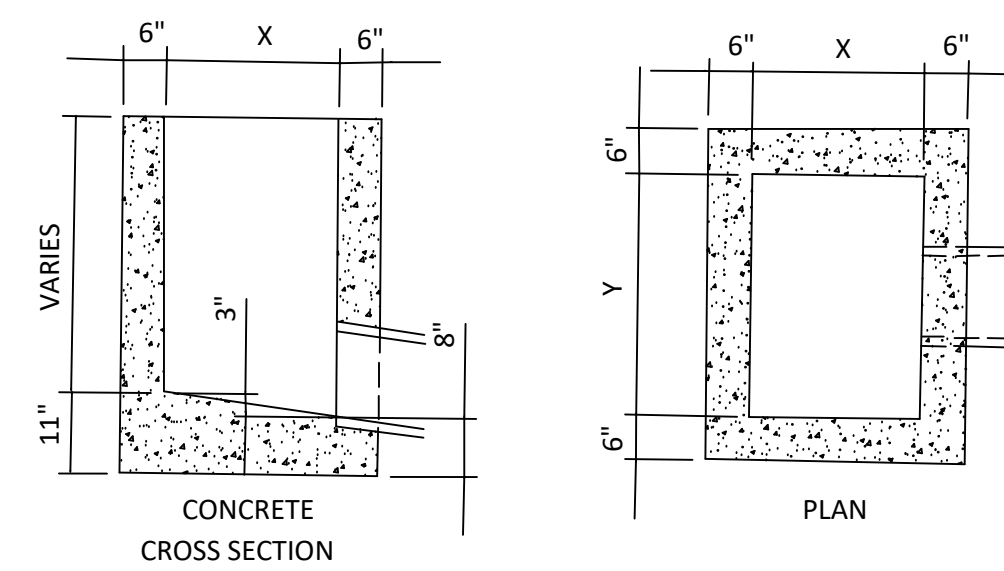
SIDE VIEW



SECTION A-A
PATENT # 5,380,121
PATENT # 5,564,857

- NOTES**
- 1) DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
 - 2) REFERENCE CONTECH BAND MANUAL DWG. #1008466 FOR BAND DETAILS.
 - 3) REFERENCE CONTECH SLOTTED DRAIN DWG. #1002697
 - 4) DIMENSIONS FOR H₁ AND H₂ AS REQUIRED.
 - 5) H₁ & H₂ MEASURED FROM TOP OF GRATE TO BOTTOM OF GRATE.
 - 6) ORDER MUST NOTE IF FOR AIRPORT LOADING FOR SPECIAL WELDING & REINFORCEMENT.
 - 7) REFERENCE DWG. #1008136, SLOTTED DRAIN INSTALLATION, AIRPORT LOADINGS OR 1008607C FOR HIGHWAY LOADINGS.

SLOTTED DRAIN VARIABLE HEIGHT GRATE

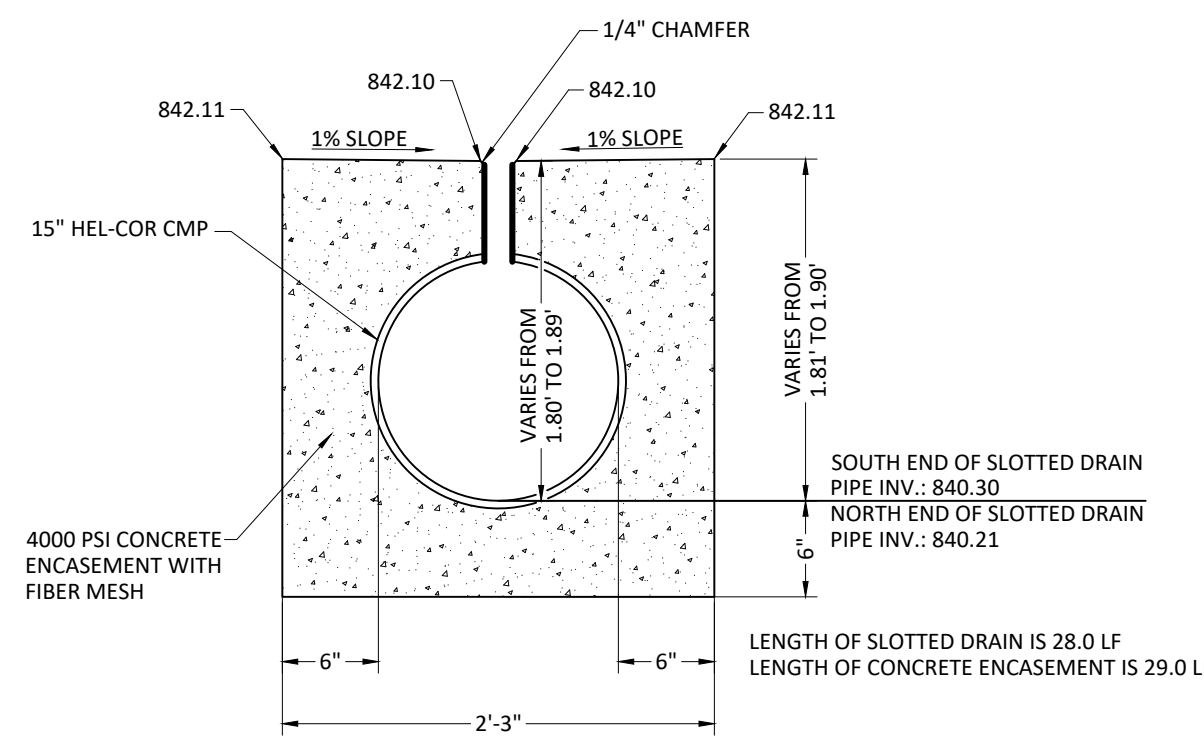


NOTE: BOX TO REST ON 4\"/>

TYPE	X	Y
A	24"	24"
B	20"	42"
C	30"	48"
E	30"	30"
J	24"	36"

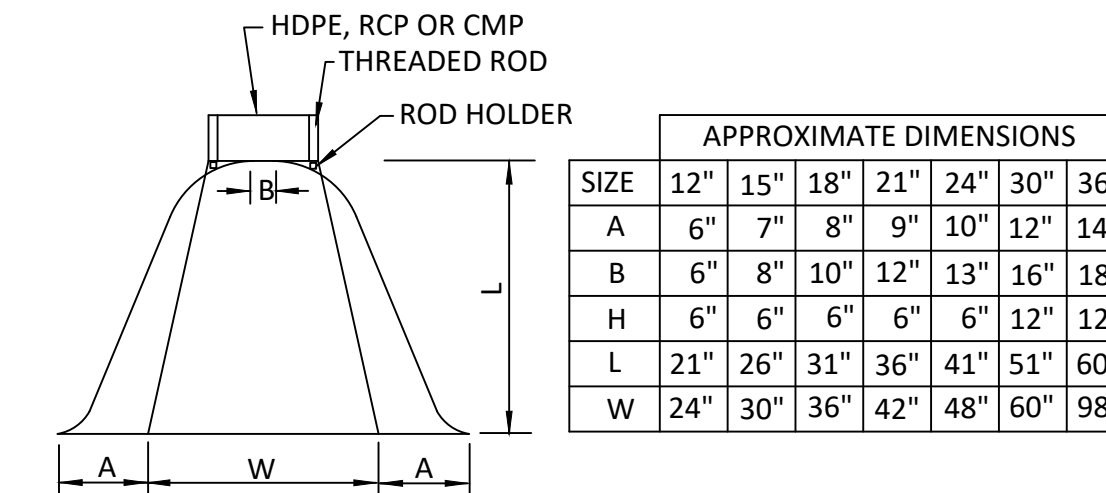
STORM INLET DETAIL

N.T.S.



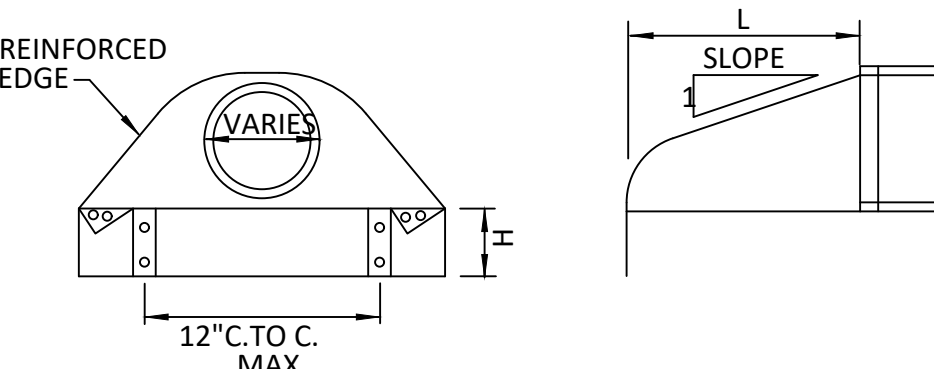
SLOTTED DRAIN CONCRETE ENCASEMENT DETAIL

N.T.S.



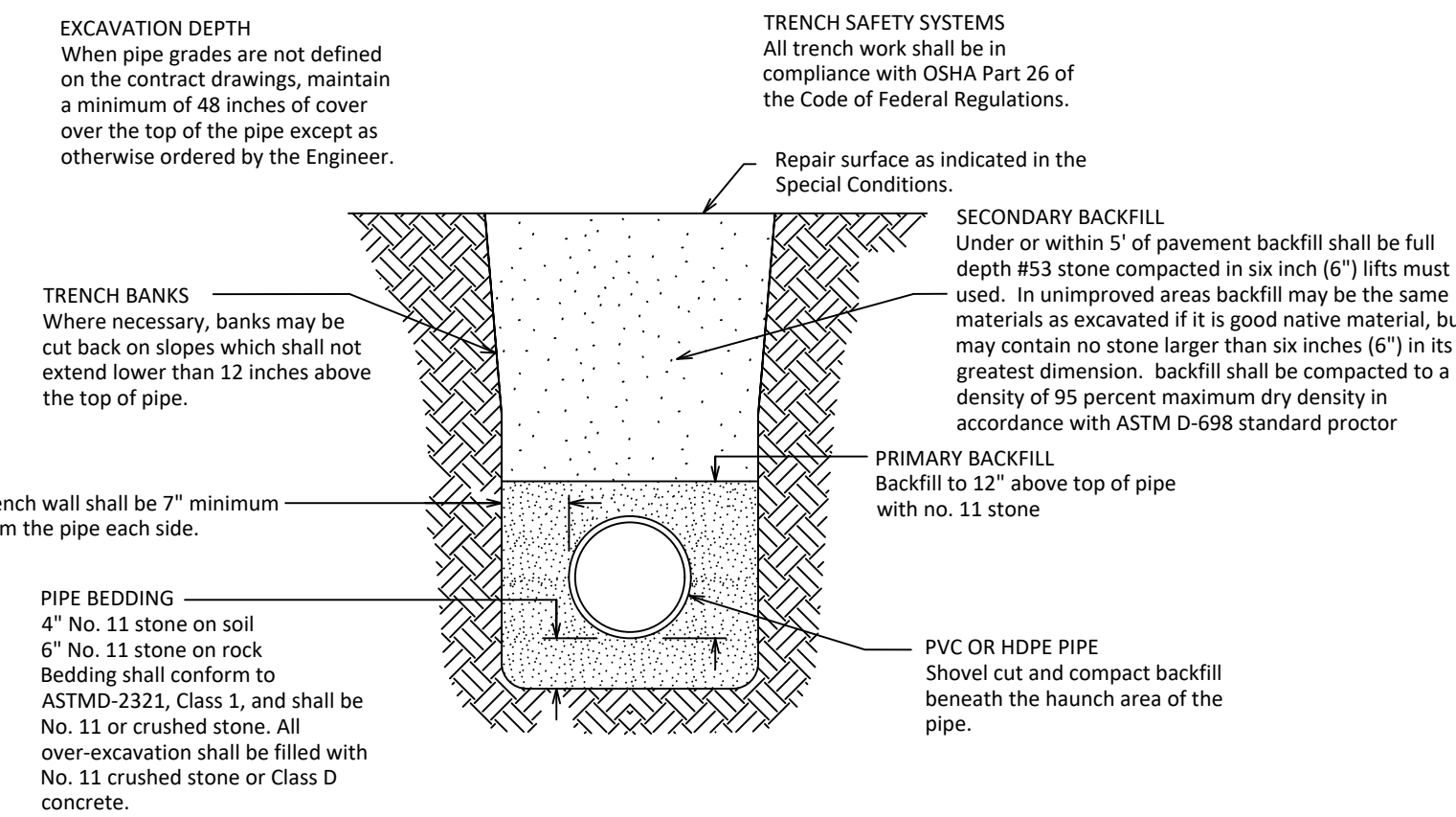
APPROXIMATE DIMENSIONS

SIZE	12"	15"	18"	21"	24"	30"	36"
A	6"	7"	8"	10"	12"	14"	
B	6"	8"	10"	12"	13"	16"	18"
H	6"	6"	6"	6"	6"	12"	12"
L	21"	26"	31"	36"	41"	51"	60"
W	24"	30"	36"	42"	48"	60"	98"



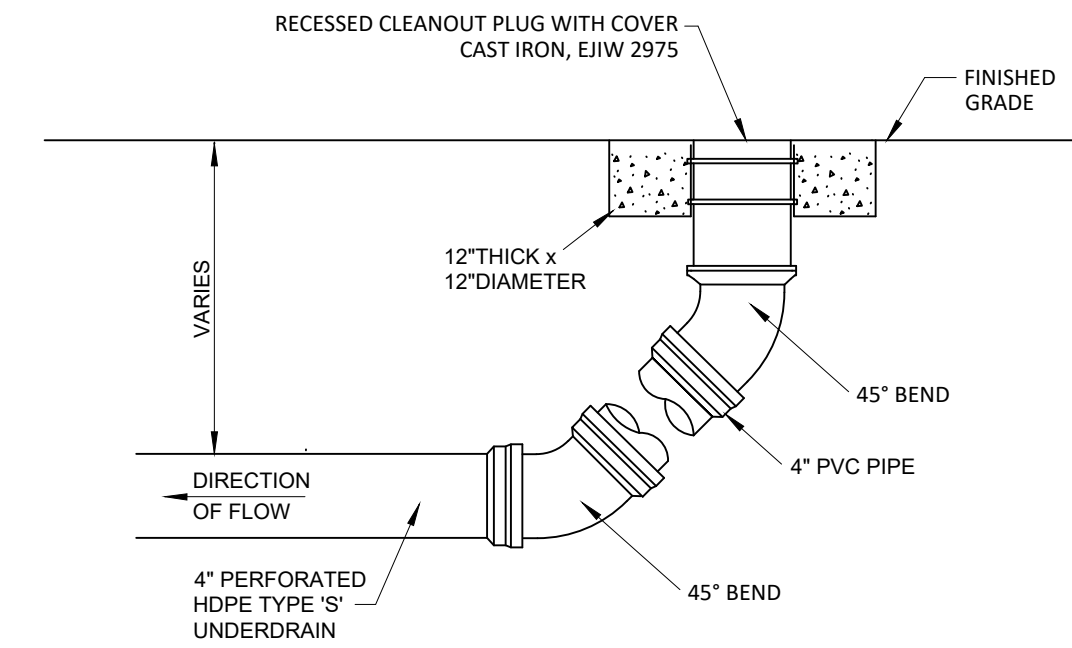
GALVANIZED METAL END SECTION

N.T.S.



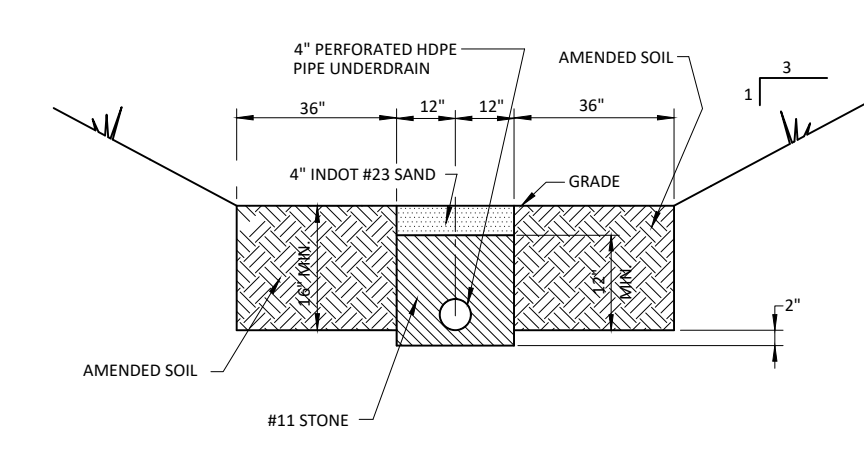
BEDDING AND BACKFILL FOR PVC AND HDPE PIPE

N.T.S.



TYPICAL UNDERDRAIN CLEANOUT

N.T.S.



RAIN GARDEN UNDERDRAIN TRENCH DETAIL

N.T.S.

AMENDED SOIL:

DESCRIPTION:
THE AMENDED SOIL AS STATED IN CHAPTER 830 (B) 4 OF THE MONROE COUNTY ZONING ORDINANCE IS A MIXTURE OF 25% COARSE #3 SAND, 25% OF TOP SOIL, AND 50% COMPOST. THIS MIXTURE SHALL BE PLACED TO A MINIMUM DEPTH OF 18\"/>

Bledsoe Riggert Cooper James
BRCJ
1400 SURREYWAY - CIVIL ENGINEERING - 005
1351 West Tapp Road
Bloomington, Indiana 47403
Phone: 812.336.8277
Fax: 812.336.0817
www.brcjcivil.com

BLOOMINGTON BEDFORD PAOLI

NOT FOR CONSTRUCTION

CLEAR CREEK HOMES NEW OFFICE
72 NORTH OARD ROAD
BLOOMINGTON, INDIANA

BRCJ Project No: 9424

SITE DETAILS

Date: 10-17-2023
Issue: ISSUED FOR PERMITTING

REVISION SCHEDULE

Rev. #	Rev. Description:	Issue Date

Drawn By: GBM
Designed By: GBM
Checked By: WSR

C802

DRAINAGE REPORT

STATE ROAD 48 & OARD ROAD
FOR
CLEAR CREEK HOMES

72 North Oard Road
Bloomington, Indiana 47404

Subject:

Updated Water Quality Treatment and Site Hydrology
For the Developed Site with respect to the previously approved
Drainage Report

Owner:

Brett Oeding
2403 W 3rd. Street
Bloomington, Indiana 47404

Prepared by:

Bledsoe Riggert Cooper James, Inc.
1351 West Tapp Road
Bloomington, Indiana 47403

BRCJ Project No. 9424

Date:

October 05, 2023

Bledsoe Riggert Cooper James
LAND SURVEYING • CIVIL ENGINEERING • GIS

CLEAR CREEK HOMES
 #9424 HYDROLOGY STUDY

Introduction:

The purpose of this report is to compare and evaluate the existing conditions of the project site and the proposed developed site, determining the impact of the proposed improvement, and establish a stormwater management plan that controls the anticipated increase in stormwater quantity and provides a means of treatment that assures stormwater discharge quality is in accordance with the Monroe County Drainage Ordinance. Stormwater quantity will be addressed by on-site detention based on Monroe County Drainage Ordinance on Critical Watershed Areas designated release rates per acre for the post development runoff using the SSA Program, post developed area runoff will be reduced to the Critical Watershed Area requirements, Q10 of 0.25 cfs per acre and Q100 of 0.45 cfs per acre over the 1.137 acres site development project area.

Stormwater quality will be provided using Rain Gardens and vegetative filtering. This report starts with an analysis of the updated developed site conditions using the values associated with Critical Watershed Area data utilizing the previously approved existing, pre developed site conditions. Then evaluate the post developed conditions, and concludes with a solution to provide stormwater quantity and quality control for the developed site. The SSA program was utilized to perform the analysis. Release values from the detained developed site which contains 1.137 acres, will be as follows:

Q10 = 0.25 cfs/ac x 1.137 acres = 0.28 cfs (Actual release rate for dev. site from DETN 0.25 cfs)
 Q100 = 0.45 cfs/ac x 1.137 acres = 0.51 cfs (Actual release rate for dev. site from DETN 0.41 cfs)

The previously approved stormwater calculations are attached at the back of this report for clarity. In addition, the developed site was delineated into three (3) sub areas of which sub areas 1 and 2 release to the northwest and sub area 3 releases to the east. Also, note that sub area 3 had only minor grading with seeding and landscaping added to meet landscape requirements as approved by the airport authority. Sub area 2 has the site development with minor access work in sub area 1.

DEVELOPED FLOW NORTHWEST	AREA = 1.384 ACRES
Q10	0.61 CFS (RELEASE FROM DET 0.25 CFS)
Q100	1.27 CFS (RELEASE FROM DET 0.41 CFS)

DEVELOPED FLOW EAST	AREA = 0.192 ACRES
Q10	0.43 CFS
Q100	0.69 CFS

(1)

CLEAR CREEK HOMES

#9424 HYDROLOGY STUDY

EXISTING FLOW NORTHWEST	AREA = 1.033 ACRES
Q10	1.00 CFS
Q100	1.42 CFS

EXISTING FLOW EAST	AREA = 0.543 ACRES
Q10	0.43 CFS
Q100	0.70 CFS

72 N. Oard Road
Bloomington, IN 47404

HUC: 05120202040010

Receiving Water: Richland Creek to west receives a portion and
Cave Creek to the east receives the remainder
Monroe County, Van Buren Township
Site is located in the SE Quarter of Section 34, T9N, R2W

Latitude: 39 Degrees 37' 12" North
Longitude: 86 Degree 09' 56" West

The site is not located in a floodplain or floodway
FIRM 18105C0136D December 17, 2010

Water Quality Treatment Volume:

The Water Quality Volume will be drained via an underdrain system and a 1" diameter opening in the control orifice (the calculation follows:)

$$V_{ave} = \{[2(32.2) \times (1.11 - .0417)]^{.5}\} / 2 = 4.147 \text{ fps}$$
$$A = .00545 \text{ sf}$$
$$Q = VA = .022607 \text{ cfs}$$

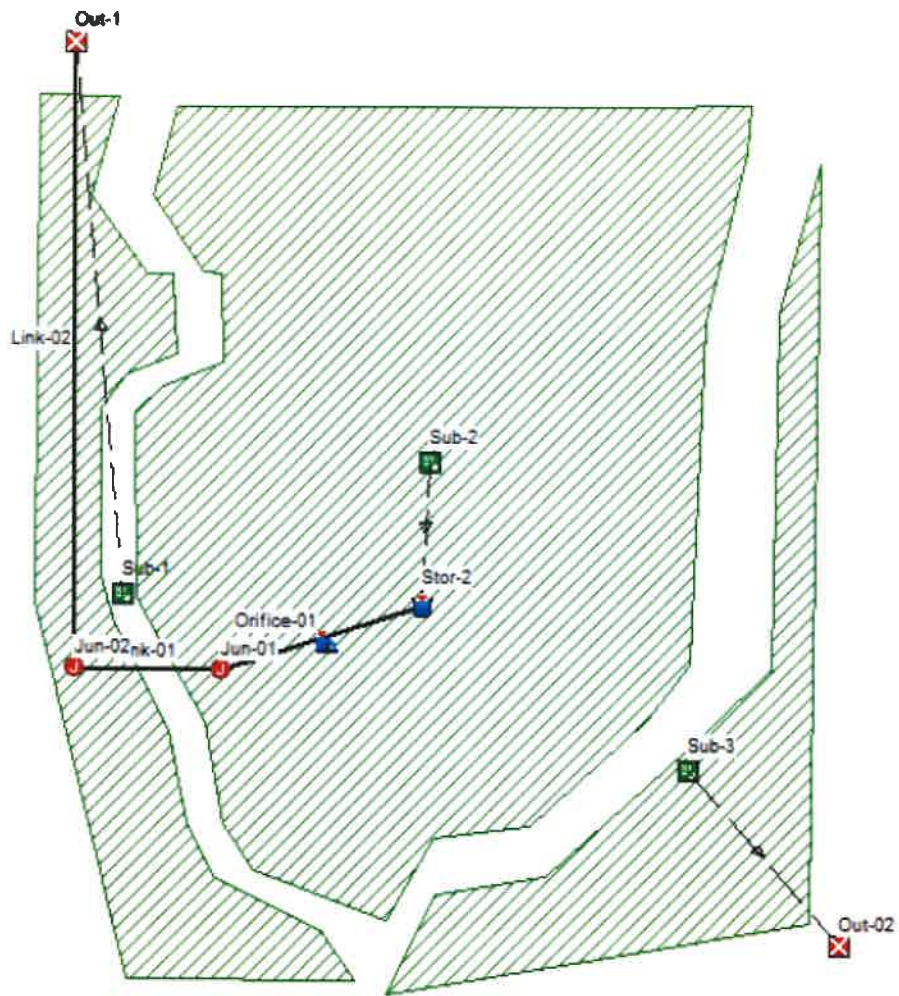
$$4027.65 \text{ cft} / .022607(3600) = 49.50 \text{ hours which exceeds the 48-hour min.}$$

Water Surface Elevation in the Detention Basin is as follows for the different Storm Events, after providing the required WQV storage volume at Elevation 843.15

Q10 Elevation = 843.66 at the Detention Basin with a max. flowrate of 0.25 cfs < 0.28 cfs for the developed area.

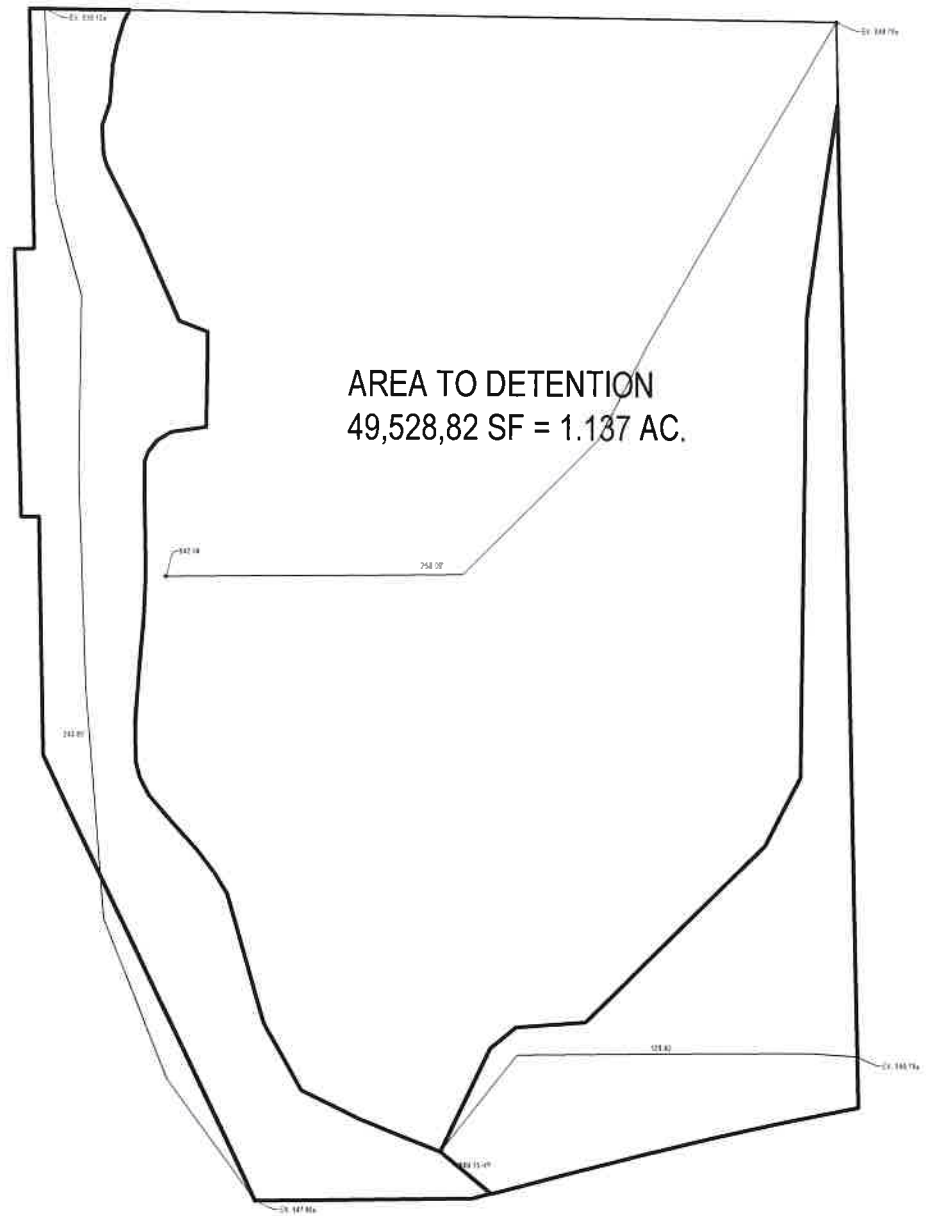
Q100 Elevation = 844.23 at the Detention Basin with a max. flowrate of 0.41 cfs < 0.51 cfs for the developed area.

(2)



Developed_Condition_Model

AREA DRAINING NORTH
10,718,97 SF = 0.246 AC.



AREA TO DETENTION
49,528,82 SF = 1.137 AC.

AREA DRAINING EAST
8,381,03 SF = 0.192 AC.

DEVELOPED CONDITION

Project Name: Simtra Project Greenlight
Engineer/Design Firm: Bryan Sheward, Kimley-Horn
Address: 927 S Curry Pike
Acres: 4.27 acres +/-

Planning Number: TBD
Watershed: Sinking Creek
Karst Report: Not Completed
Wetland Delineation: Not Completed



Project Summary

The Simtra (formerly Baxter) Project Greenlight project is located between Curry Pike and Liberty Drive in the Sinking Creek watershed. The project site is bordered by Highland Village Church and commercial to the north, Curry Pike and residential to the west, the railroad and commercial to the south, and Liberty Drive and commercial to the east. The project is proposing a building and parking expansion on the west side of the property.

Project Drainage

Sinking Creek with mapped FEMA floodplain flows through the middle of the property. Underground detention is proposed for the building and parking expansion and will meet the critical watershed release rates. A hydrodynamic separator will also be provided for water quality treatment (upstream from the underground detention).

Preliminary Drainage Comments:

Critical Watershed:

- This project is located in the Sinking Creek Critical Watershed and shall meet the Critical Watershed release rates of 0.25 and 0.45 cfs/acre for the 10% and 1% AEP events, unless downstream outfalls are more restrictive.

Adequacy of Outlet:

- The underground detention facility will discharge to existing storm sewer on the property, which discharges to Sinking Creek.
- Provide calculations demonstrating adequacy of downstream infrastructure where underground detention will be discharging.

Downstream Drainage Concerns:

- Severe downstream drainage concerns in Sinking Creek. There are homes within the Sinking Creek floodplain.
- The project will be required to meet the critical watershed release rates.

Drainage Easements:

- All stormwater infrastructure outside the public right-of-way will be placed in drainage easements.



PRELIMINARY DRAINAGE MEMORANDUM

To: Kelsey Thetonia, MS4 Coordinator - Monroe County Highway Department
Monroe County Drainage Board

From: Bryan A. Sheward, P.E.
Kimley-Horn and Associates, Inc.

Date: January 19, 2024

Re: *Project Greenlight*
927 S Curry Pike
Bloomington, IN 47403

Project Summary

Project Name: Project Greenlight
Location: 927 S Curry Pike Bloomington, IN 47403
Zoning: IG
Report Type: Preliminary Drainage Memorandum
Reviewing Agency: Monroe County Highway Department & Drainage Board
Design Standards: Stormwater Technical Standards Manual Monroe County, Indiana
(August 2022 Draft)
Monroe County Zoning Ordinance

Introduction

Kimley-Horn and Associates Inc. (Kimley-Horn) has been retained by Simtra BioPharma Solutions (Simtra) to provide civil engineering plans for a proposed ±139,260 SF building (Building H) to be located on the western side of the current campus immediately west of existing Building D. The project is referred to as “Project Greenlight” and includes the proposed building, necessary utilities to serve the building, loading docks and ground level mechanical / electrical equipment on the north side of the building, the reconstruction of the existing gated entry drive onto Curry Pike, an additional vehicle parking area to the north and underground detention to serve the proposed added impervious surface created by the project.

Existing Conditions

The existing Simtra campus consists of multiple buildings spread across an approximate 30-acre site. Three ingress/egress curb cuts exist for the site, two onto Curry Pike to the west and one onto Liberty Drive to the east. Sinking Creek runs from northeast to southwest through the center of the campus and has a mapped floodway with base flood elevations (BFE) noted which encumbers a significant portion of the shared vehicle parking areas that serve the various buildings onsite. Campus-wide site topographic survey was collected as part of this project and the BFE was mapped against the collected topographic survey to determine potential floodplain extents past the floodway line.

The portion of the site planned for proposed Building H is currently undeveloped and is located south of the existing northern Curry Pike curb cut, due west of existing Building D and north of existing Building E. In the existing conditions, the project site area drains in two directions. The northern portion sheet flows to the existing internal private access drive that loops around existing Building B and drains down the center of the inverted sloped drive to the east to an existing inlet that conveys runoff further eastward to a small dry detention basin before releasing to the Sinking Creek ditch. The central and southern portions of the project site area sheets drain across the grass to the southeast corner of the project site where existing storm inlets collect runoff and direct flow via subsurface piping around the west side of Building E to a dry detention basin north of the southern Curry Pike entrance's guard shack, which releases to the south into Sinking Creek immediately east of Sinking Creek's crossing under Curry Pike. Refer to an existing drainage area map in **Appendix D** for more information.

FEMA

According to FEMA Flood Insurance Rate Map 18105C0137D dated December 17, 2010 (**Appendix B**), the campus has a mapped Zone "AE" floodway through the middle with adjacent edges to the east and west residing in Zone X. The specific location where the proposed Building H will be located resides entirely within Zone X.

Proposed Conditions

During the evaluation of existing drainage patterns onsite, it was found that much of the project site area drained south to Sinking Creek rather than east. Each existing sub watershed area releases to the Sinking Creek ditch which runs through the site, but the BFE of the south route is significantly lower than the east route. As outlined in the Introduction above, the proposed improvements will include the building, associated utilities to serve the building and necessary pavement improvements predominantly on the north side of the building. The proposed building will be connected to the existing adjacent Building D to the east and provisions will be made to collect roof drainage off the western edge of Building D to maintain the existing drainage patterns of conveying water to the south and west around the west side of Building E on the south side of the project site. An existing storm inlet located within the parking lot west of existing Building E will be the ultimate discharge point for the proposed underground detention system proposed for the project. Due to site size constraints, traditional above ground stormwater detention is not feasible. The proposed underground stormwater detention system proposed is composed of three interconnected ADS SC-740 StormTech Chamber beds with an ultimate discharge to the south.

Underground Stormwater Detention Explanation

The FEMA BFE of Sinking Creek at the discharge point to the south is ~ 842.8' and the acreage of disturbance is ±4.27-acres. Per conversations with the Monroe County Highway Department at the beginning of the project, it was understood that the underground detention system would need to be positioned such that the bottom of the system be placed above the BFE and the entire system would need to be wrapped in an impermeable barrier to prevent groundwater infiltration.

The more restrictive Sinking Creek watershed maximum release rates were provided by Kelsey Thetonia, the Monroe MS4 coordinator. The standard 0.5 cfs/ac (10-yr) & 0.9 cfs/ac release rates are cut in half to 0.25 cfs/ac (10-yr) and 0.45 cfs/ac (100-yr):

- 10-YR storm event =0.25 cfs/AC
 - Max allowable release rate = (0.25 cfs/ac) * (4.27 AC) =1.07 cfs
- 100-YR storm event =0.45 cfs/AC
 - Max allowable release rate = (0.45 cfs/ac) * (4.27 AC) =1.92 cfs

Monroe County, Indiana Stormwater Technical Standards Manual (August 2022 Draft) Chapter Six, Section B.3 states that “for proposed developments that drain to sinkholes, a more restrictive release rate and additional storage on site will be required. The release rate must be such that the drawdown time from the end of a 100-year, 48-hour storm is no less than two days (as determined by routing this hydrograph through the pond). For proposed developments within the Sinking and Cave Creek watersheds, a minimum of three inches of runoff over the disturbed area must be released at a rate that results in a drawdown time from the end of a 100-year, 48-hour storm of no less than two days.”

- $4.27 \text{ AC} * (3"/12")' = 1.07 \text{ acre-feet required at 48 hours}$

This site exists in the Sinking Creek watershed, therefore the storage required shall be no less than 1.07-acre feet at 48 hours of a 100-yr, 48-hr storm. If the more restrictive new drawdown requirement was not a requirement, the site improvements would only require 1.22 acre-feet of detention. However, given this requirement and the maximum release rates, the proposed underground storage shall be no less than 1.57 acre-feet.

48-HR Drawdown NOT INCLUDED - Release Rates

10-YR 24-HR = 1.03 cfs
 100-YR 24-HR = 1.91 cfs

48-HR Drawdown Release Rates – Release Rates

10-YR 24-HR = 0.30 cfs
 100-YR 24-HR = 1.47 cfs
 100-YR 48-HR = 1.70 cfs

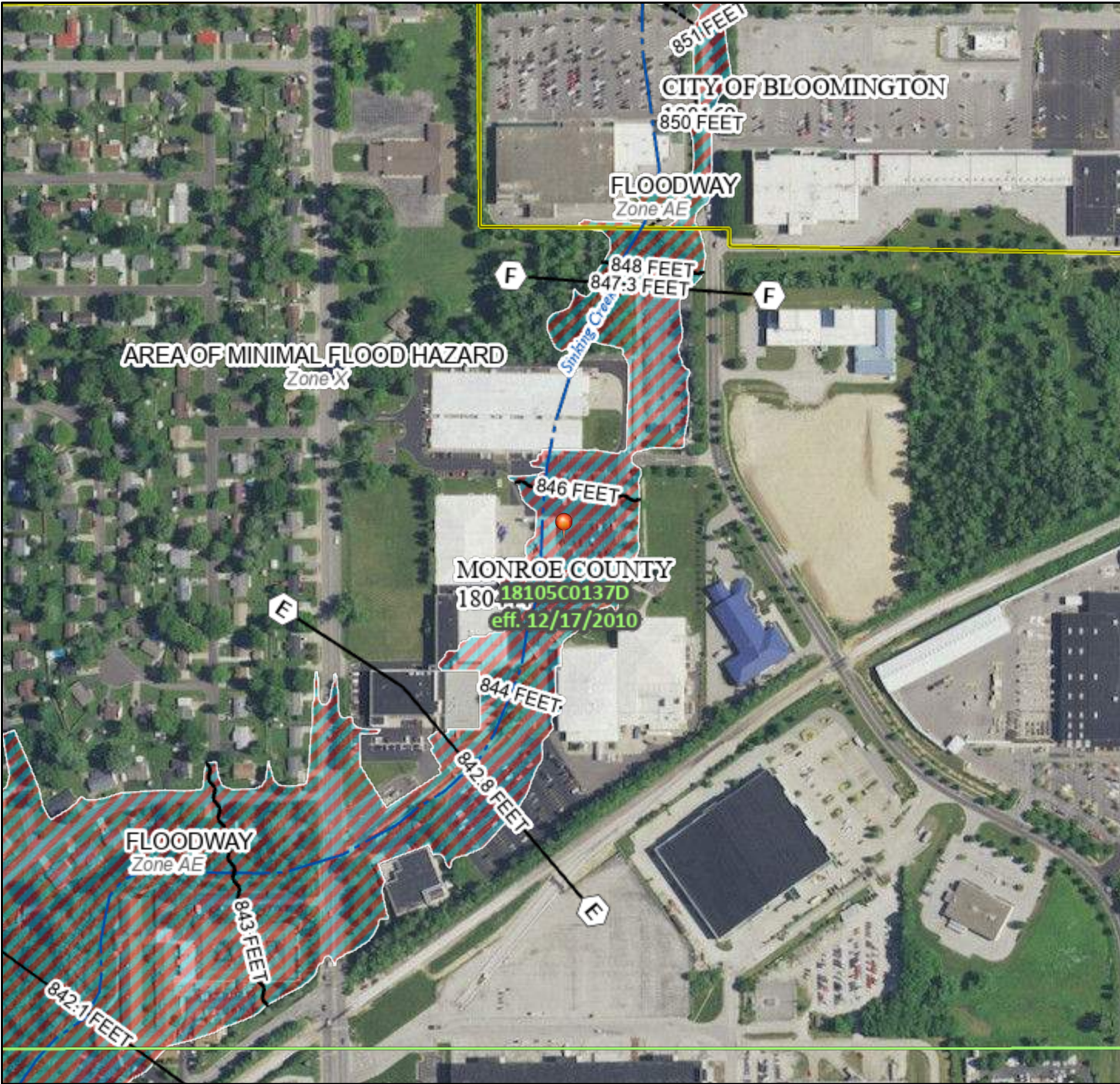
Attachments

- Appendix A – Aerial Photography
- Appendix B – FEMA Firmette
- Appendix C – Soil Survey
- Appendix D – Exhibit & Calculations
- Appendix E – ADS SC-740 StormTech Chamber Details

DWL RQDD O RRG EPUGDHU) BWVH



FHOG



1) 6 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

68-82	68-86	LWHRW %DHJRRG OHYDVLRLQ % -FCH\$ 9 \$
		LWK%RUFBVK -FCH\$ 9 \$ 9 \$
		\$HODWRAJRRGD

26-32	26-36	\$DOD & OPHORR EPUG \$HJVR R DODD FROPHIORRZWKDHUDH G-BWKOHW WKOQRCHIRRW RU ZWKGLD DJHD/ROHW WKOQRCHVTOUHEOHFCH;
		XWXUH&QGLVLRQ/\$DOD &OCHJRRG EPUG -FCH;
		\$JHZWK&GHGJRRGLNGHWR HYH GH RVHV -FCH;
		\$JHZWKJRRGLNGHWRHYH -FCH;

26-38	26-42	\$JHR DQED JRRG EPUG -FCH;
		(IHFWLYHJ
		\$JHR & GHWHUEHGJRRG EPUG -FCH;
		&OCHD & OYHUW RU &VRURZU HYHLNH RU JRRGD

26-44	26-48	\$JRW & FWLRQ/ ZWKSDOD & OCH DVHU & OIHOYDVLRLQ
		&DWDJ DUDQFW
		%DHJRRG OHYDVLRLQ %
		LEW R & VXG
		-XJLVLFVLRQ%&OCH
		&DWDJ DUDQFW %&HOLQH
		\$JROLOH%&HOLQH
		\$JURD&LFDJWUH

68-92		LJLWDD DWD\$DLOEDH
		RJLWDD DWD\$DLOEDH
		XEBSG

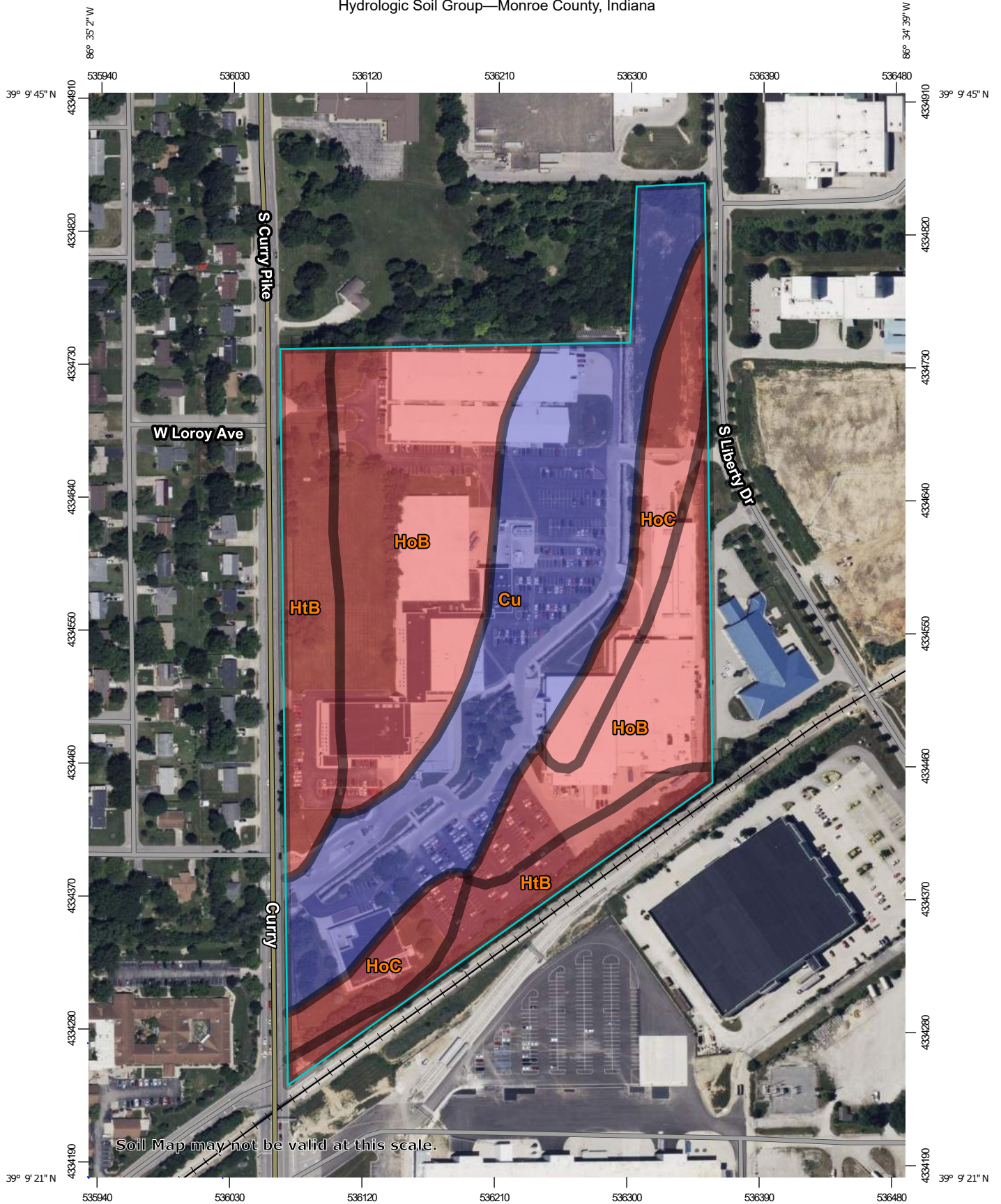
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SRLQV VHOHFWHGEWKHXJU DQGGRV GRW UHJH
DQDWKULWDWL YHSJRSJWJ O RFDVLRLQ

74LVBSFBDLHV ZWKJWV WDDQDUG/IRU WKHXHR
GLJWDD IO RRGES/LI LW LV GRW YRLGDV GHVULBGEORZ
74HEDVBSVRRFBDLHV ZWKJWV EDHES
DFXUR WDDQDUG/

74IORRGKQJGLQRUBMLRLQ LV GHLYHG GLUHFWOIURVWK
DVKULWDWL YH%ZEVHUYL FV SURLGGE 74LVBS
ZV HSRUWHGRQ DW 30 DQGGRV GRW
UHOHFW FROQV RU DQDQW V&HIXQV WR WKLVDWHDQD
WLF 74% DQGHIFWLYHLQRUBMLRLQ B FROQRU
BFRFV&LUVHGE QZDQDVRHU WLF

74LVBSLBDLHV YRLGLI WKHQHURU RUHR WKHIROORZQJES
HOHQWV GR GRW DSSDUJ EDHESLBU IO RRGJROHDEHV
OHFHG VDDHEDU BSRUHWLRLQDWH FFRQWALGHQWILHUV
)SSQHD QEHU DQGHIFWLYHGDMH DSLBHVIRU
XEBSGDQGXRGUQLJGDJHDV FROQRV BHXVHGRU
UHODWRAJSURVH

Hydrologic Soil Group—Monroe County, Indiana



Map Scale: 1:3,580 if printed on A portrait (8.5" x 11") sheet.



Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Cu	Cuba silt loam, frequently flooded	B	10.4	34.6%
HoB	Hosmer silt loam, 2 to 6 percent slopes	D	11.0	36.7%
HoC	Hosmer silt loam, 6 to 12 percent slopes	D	3.8	12.6%
HtB	Hosmer-Urban land complex, 2 to 12 percent slopes	D	4.8	16.1%
Totals for Area of Interest			30.0	100.0%

SITE SUMMARY

PROPOSED IMPERVIOUS COVER	= 3.27 AC
PROPOSED PERVIOUS COVER	= 1.00 AC
TOTAL ACREAGE OF DISTURBANCE	= 4.27 AC

LEGEND

- A. PROPOSED IMPERVIOUS COVER
- B. PROPOSED PERVIOUS COVER

6' SIDE YARD PARKING SETBACK

ZONING = IG

BFE: 846 FT

BFE 844 FT

EX BUILDING E

ADS SC740 UNDERGROUND DETENTION CHAMBER SYSTEM
IMPERMEABLE BARRIER WRAPPED
STONE BOTTOM = 843.00
BOTTOM OF CHAMBER = 843.50
TOP OF CHAMBER = 846.00
TOP OF COVER STONE = 846.50
TOTAL SYSTEM STORAGE = 1.601 AF

ADS SC740 UNDERGROUND DETENTION CHAMBER SYSTEM
IMPERMEABLE BARRIER WRAPPED
STONE BOTTOM = 843.00
BOTTOM OF CHAMBER = 843.50
TOP OF CHAMBER = 846.00
TOP OF COVER STONE = 846.50
TOTAL SYSTEM STORAGE = 1.601 AF

ADS SC740 UNDERGROUND DETENTION CHAMBER SYSTEM
IMPERMEABLE BARRIER WRAPPED
STONE BOTTOM = 843.00
BOTTOM OF CHAMBER = 843.50
TOP OF CHAMBER = 846.00
TOP OF COVER STONE = 846.50
TOTAL SYSTEM STORAGE 1.601 AF

PROPOSED BUILDING
FF = 850.75
FOOTPRINT SF = 73,830 SF
TOTAL SF = 139,260 SF

BAXTER HEALTHCARE CORP.
1077 S. CURRY PIKE
BLOOMINGTON, IN 47403
1.072 AC ± (D) 0.896 AC ± (C)

DETENTION OUTFALL LOCATION

S. CURRY PIKE (MINOR ARTERIAL
= SECONDARY ARTERIAL)

77' FRONT YARD BUILDING SETBACK**

75' FRONT YARD PARKING SETBACK

ZONING = RS3.5

DRAFT - 2024-01-19

Indiana Utilities Protection Service
Call 811
 before you dig

GRAPHIC SCALE IN FEET
 0 20' 40' 80'

NORTH

jacobs wyper
 ARCHITECTS

1232 Chancellor Street
 Philadelphia, PA 19107
 tel: 215.985.0400
 www.jacobswyper.com

PROJECT TEAM:

DEDC
 ENGINEERING / DESIGN / CONSULTING

30 South 17th Street
 Philadelphia, PA 19103
 PHONE: 267-504-7286

Kimley Horn

500 EAST 96TH STREET
 SUITE 300
 INDIANAPOLIS, IN 46240
 PHONE: 317.218.9560

This document is an instrument of service prepared solely for Kimley-Horn's client and for a particular purpose. Any other use or reliance is without liability to Kimley-Horn.

GRADING LEGEND

XXXX.XX	FINISHED GRADE SPOT ELEVATION
TC XXX.XX	TOP OF CURB / BOTTOM OF CURB SPOT ELEVATION
FL XXX.XX	FLOW LINE SPOT ELEVATION
ME XXX.XX	MATCH EXISTING SPOT ELEVATION
FF XXX.XX	FINISHED FLOOR SPOT ELEVATION
FG XXX.XX	FINISHED GRADE NEAR BUILDING SPOT ELEVATION
FW XXX.XX	TOP OF WALL SPOT ELEVATION
BW XXX.XX	BOTTOM OF WALL SPOT ELEVATION
R XXX.XX	RISE ELEVATION
STR XX	STRUCTURE ID & RIM ELEVATION
STR XX	STRUCTURE ID & INVERT ELEVATION
LN1 XXX.XX	PROPOSED CONTOUR
620	PROPOSED SWALE
—	RIDGE LINE
X.XX%	SLOPE AND FLOW DIRECTION
←	100-YEAR OVERLAND OVERFLOW ROUTE
←	DETENTION BASIN 100-YEAR EMERGENCY
←	PROPOSED SWALE
—	PROPOSED STORM SEWER
—	PROPOSED STORM STRUCTURES
—	PROPOSED SANITARY MANHOLE
—	PROPOSED STORM/SANITARY CLEANOUT
—	PROPOSED WATER STRUCTURES
—	PROPOSED LIGHT POLES
—	PROPOSED TRANSFORMER PAD

GENERAL PLAN NOTES

REFER TO GENERAL NOTES SHEET FOR MORE INFORMATION INCLUDING THE FOLLOWING: (EXISTING LEGEND, BENCHMARK INFORMATION, AND SPECIFIC GENERAL PLAN NOTES.)

EXISTING LEGEND

○ BOLLARD	○ MISC LID	○ YARD LIGHT
⊕ CONTROL BENCHMARK	⊕ MONITOR WELL	⊕ SANITARY CLEANOUT
⊕ ROW MONUMENT	⊕ GAS MARKER	⊕ SANITARY MANHOLE
⊕ FLAG POLE	⊕ GAS METER	⊕ VENT PIPE
⊕ MAIL BOX	⊕ GAS VALVE	⊕ STORM CURB INLET
○ UTILITY POLE	⊕ AC UNIT	⊕ STORM INLET
○ POST	⊕ AREA LIGHT	⊕ STORM ROOF DRAIN
⊕ SOIL BORING	⊕ ELECTRICAL BOX	⊕ STORM DRAIN MANHOLE
⊕ HANDICAP SYMBOL	⊕ ELECTRICAL HAND HOLE	⊕ STORM YARD DRAIN
⊕ SIGN	⊕ ELECTRICAL METER	⊕ FIRE DEPT CONNECTION
⊕ CABLE MANHOLE	⊕ ELECTRICAL MANHOLE	⊕ FIRE HYDRANT
⊕ CABLE PEDESTAL	⊕ ELECTRICAL MARKER	⊕ IRRIGATION VALVE
⊕ TELEPHONE PEDESTAL	⊕ ELECTRICAL TRANSFORMER	⊕ POST INDICATOR VALVE
⊕ TELEPHONE HAND HOLE	⊕ GUY POLE/WIRE	⊕ WELL
⊕ TELEPHONE MARKER	⊕ POWER POLE	⊕ WATER METER
⊕ TELEPHONE MANHOLE	⊕ TRAFFIC SIGNAL POLE	⊕ WATER VALVE
⊕ FIBER OPTIC MARKER	⊕ TRAFFIC MANHOLE	⊕ TREE / STUMP
— SWALE	— TS	— TOE OF SLOPE
— FENCE LINE	— TB	— TOP OF BANK
— SS	— FW	— UNDERGROUND FIBER OPTIC
— SD	— OHE	— OVERHEAD ELECTRICAL
— W	— GAS	— UNDERGROUND GAS
— TREE LINE	— TEL	— UNDERGROUND TELEPHONE

Simtra BioPharma Solutions

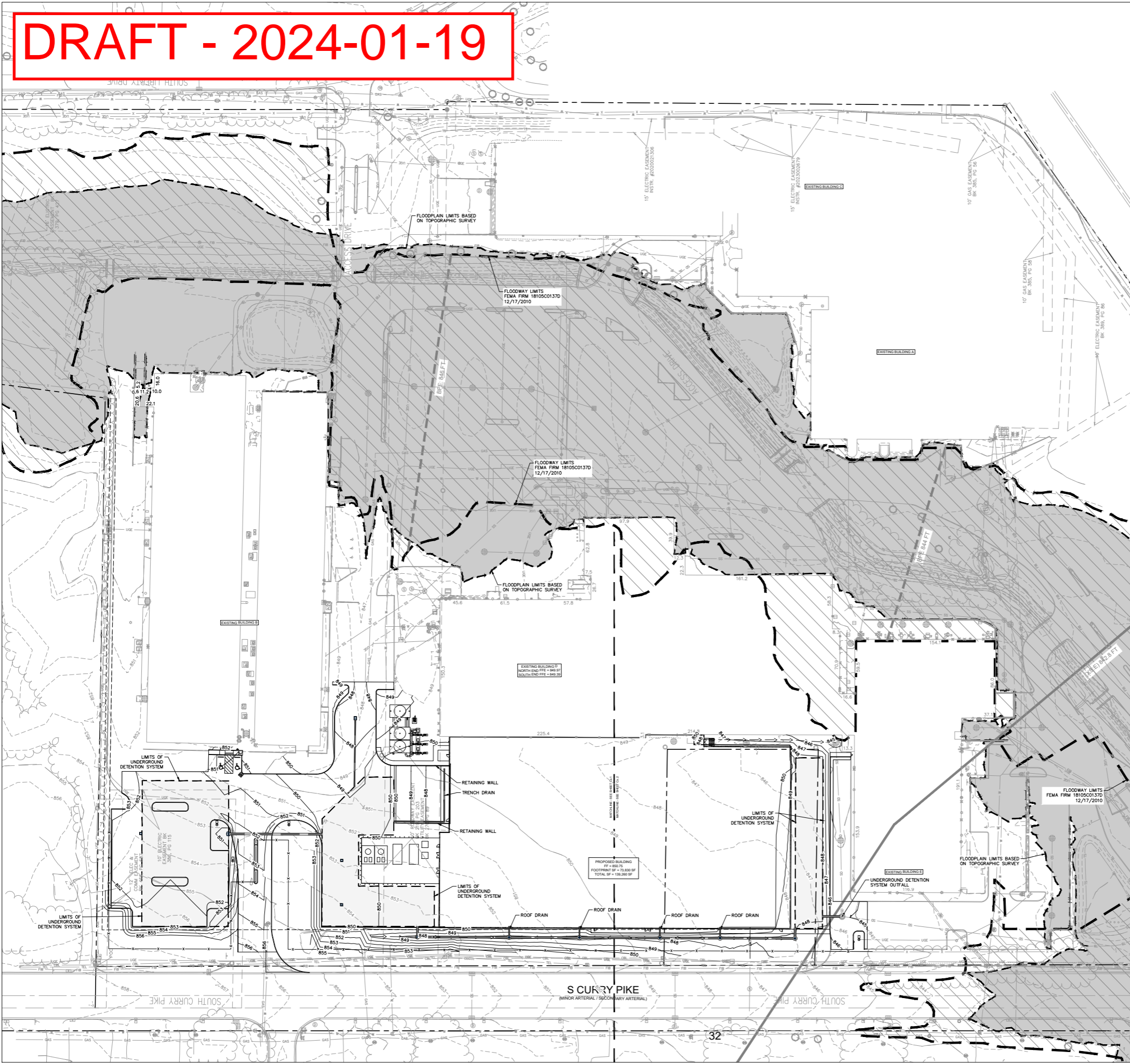
Project BlueSky Building H



Revision Schedule

OVERALL GRADING AND DRAINAGE PLAN

C5.0





Proposed Impervious



UD Required for
CFS/AC



Proposed Pervious



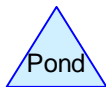
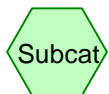
Proposed Impervious



UG Required for 48-HR
Drawdown



Proposed Pervious



Routing Diagram for 2024-01-16_Simtra
Prepared by Kimley-Horn & Associates, Printed 1/17/2024
HydroCAD® 10.20-3c s/n 02344 © 2023 HydroCAD Software Solutions LLC

SC-740 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH SC-740.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRPD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT². THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRPD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

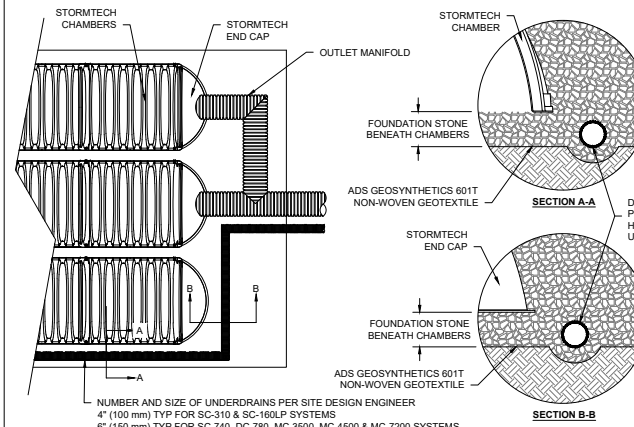
- STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOTTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELLED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4"-2" (20-50 mm).
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

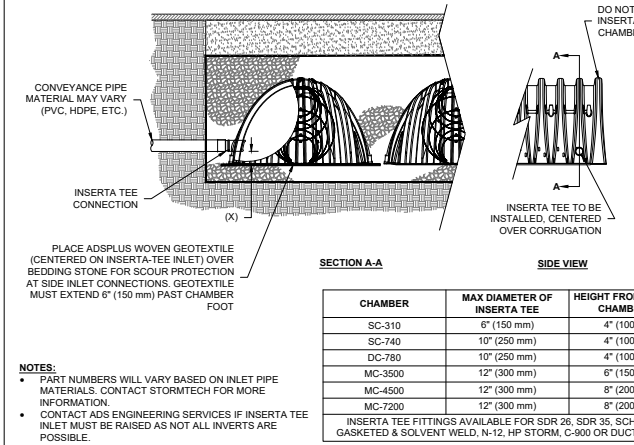
- STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER Tired LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.



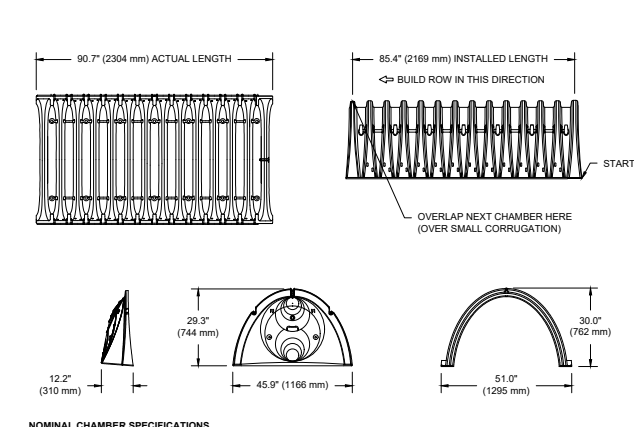
5 UNDERDRAIN DETAIL



6 INSERTA-TEE SIDE INLET DETAIL

CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
MC-7200	12" (300 mm)	8" (200 mm)

2 SC-740 TECHNICAL SPECIFICATIONS



SIZE (W X H X INSTALLED LENGTH)	CHAMBER STORAGE	MINIMUM INSTALLED STORAGE*	WEIGHT
51.0" X 30.0" X 85.4"	45.9 CUBIC FEET (2.12 m ³)	74.9 CUBIC FEET (2.12 m ³)	75.0 lbs. (33.6 kg)
(1295 mm X 762 mm X 2169 mm)	(1.30 m ³)	(2.12 m ³)	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS

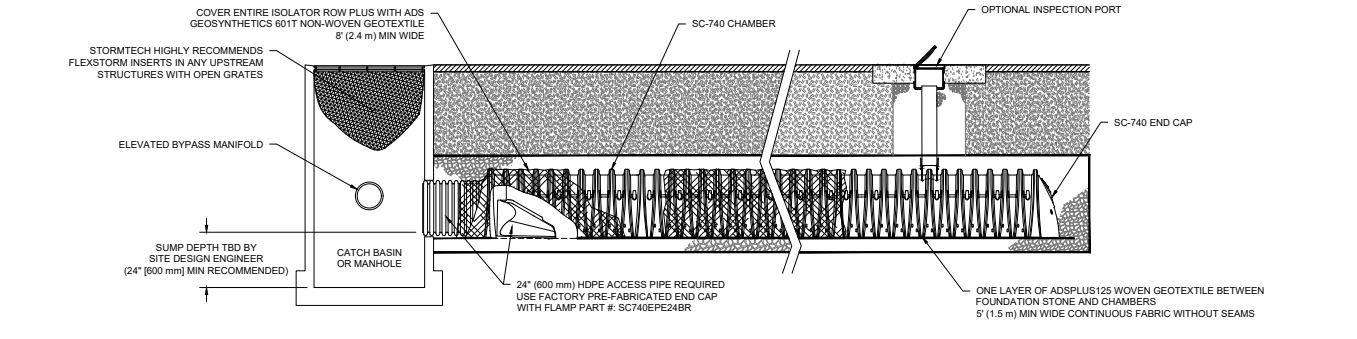
PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
 PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
 PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
 PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC740EP0E0T / SC740EP0E0TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EP0E0B / SC740EP0E0BPC	---	---	---	0.5" (13 mm)
SC740EP0E0T / SC740EP0E0TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EP0E0B / SC740EP0E0BPC	---	---	---	0.6" (15 mm)
SC740EP10T / SC740EP10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EP10B / SC740EP10BPC	---	---	---	0.7" (18 mm)
SC740EP12T / SC740EP12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EP12B / SC740EP12BPC	---	---	---	1.2" (30 mm)
SC740EP15T / SC740EP15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EP15B / SC740EP15BPC	---	---	---	1.3" (33 mm)
SC740EP18T / SC740EP18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EP18B / SC740EP18BPC	---	---	---	1.6" (41 mm)
SC740EP24B*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)
SC740EP24BR*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

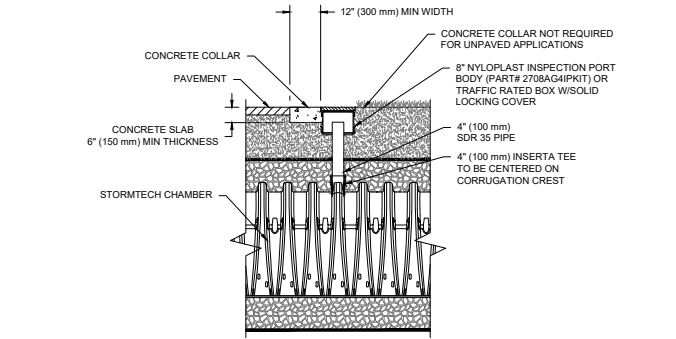
ALL STUBS, EXCEPT FOR THE SC740EP24B/SC740EP24BR ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EP24B/SC740EP24BR THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 SUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL.



3 SC-740 ISOLATOR ROW PLUS DETAIL



NOTE: INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION CREST.

4 4" PVC INSPECTION PORT DETAIL (SC SERIES CHAMBER)

INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
- REMOVE/OPEN LID ON NYLOPLAST FILTER IF INSTALLED
 - REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
 - USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
 - LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
 - IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
- REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
 - USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
 - MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
 - IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2; IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
 - APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

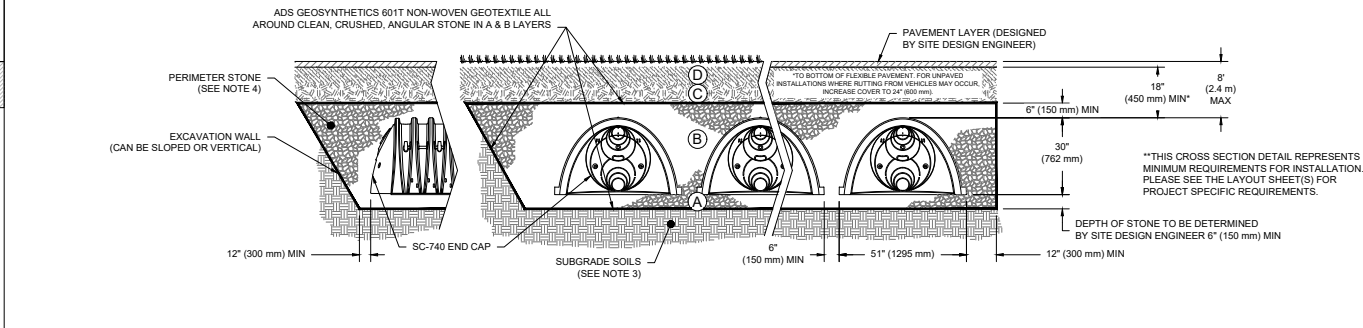
- INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
- CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED AGGREGATE MIXTURES, <3% FINES OR PROCESSED AGGREGATE. OR MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

PLEASE NOTE:

- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
- WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
- ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT². AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

1 SC-740 CROSS SECTION DETAIL

Project Name: The Trails at Robertson Farm
Engineer/Design Firm: Daniel Butler, Bynum Fanyo
Address: 4691 S Victor Pike
Acres: 44 acres +/-

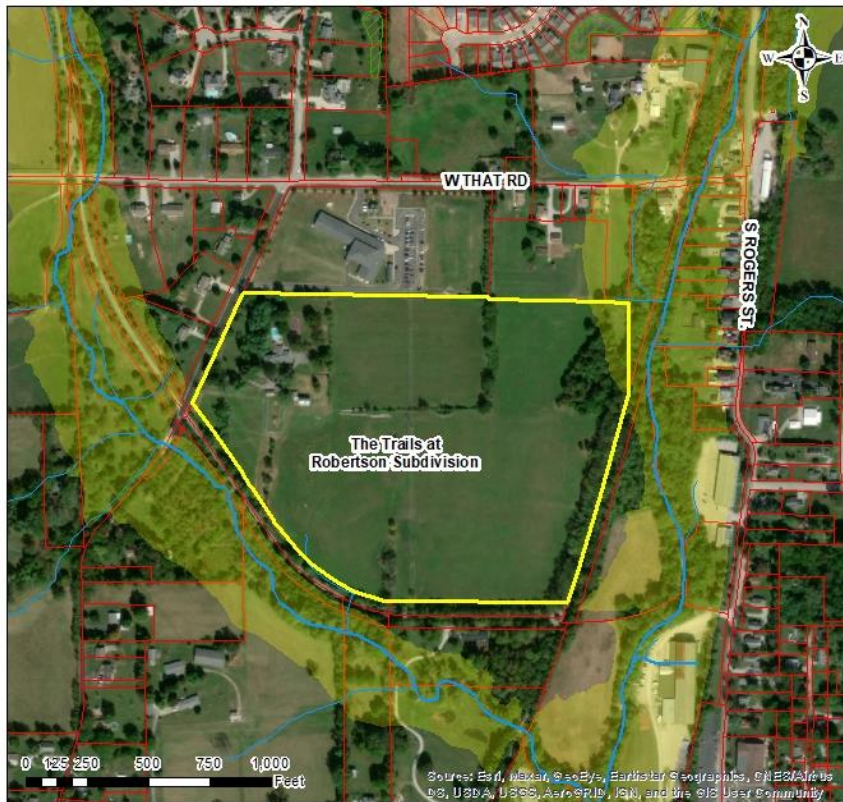
Planning Number: PUO-23-7
Watershed: Clear Creek
Karst Report: Completed 11/6/2020
Wetland Delineation: Completed 10/27/2020

Project Summary

The Trails at Robertson Subdivision (originally introduced in early 2021) is located directly above the confluence of the main branch of Clear Creek and the West Fork of Clear Creek. The project site is bordered by That Road, Lighthouse Christian Academy and residential properties to the north, by Victor Pike to the west, the Clear Creek Trail to the south, and the Bloomington Rail Trail to the east. The Clear Creek watershed is a critical watershed.

There is an approximately 2-acre +/- floodplain area at the northeast corner of the site, Zone AE/Floodway. There are no NWI wetlands on the property.

A karst survey (surface inspection only) was completed by Hydrogeology, Inc., with the report dated November 6, 2020. The site contains six (6) sinkholes – five (5) located on the northeast portion of the property, and one (1) located on the south side of the property.



The current land use on the site is hay field with one single family residential home. The project proposes to create a mix of single-family and multi-family residential homes. The development will occur in three phases over seven years.

Project Drainage

The site is divided into three (3) main drainage areas. Approximately 8 acres drains northeast towards Clear Creek, and the rest of the site drains south/southwest towards West Fork Clear Creek. There are two existing culverts under the Clear Creek Trail that will be utilized for pond outlets. There is not a clear outlet for the pond at the northeast corner; in 2021, a stilling basin was proposed at this outlet.

Four (4) detention ponds are being proposed on the project site. The ponds will be placed in drainage easements and maintained by a Homeowners Association.

Emails are provided in this packet from March 2021, where questions regarding drainage design for this project are asked by an upstream neighbor to this project.

Preliminary Drainage Comments for the Trails at Robertson Farm:Critical Watershed and Detention Design:

- This project is located in the Clear Creek Critical Watershed and shall meet the Critical Watershed release rates of 0.25 and 0.45 cfs/acre for the 10% and 1% AEP events, unless downstream outfalls are more restrictive.
- Post-development sediment storage shall provide 110% of the required storage for the 1% AEP event.

Adequacy of Outlets/Receiving Infrastructure:

- Provide calculations demonstrating adequacy of existing culverts under the trails where ponds will be discharging.
- There is not a clear outlet for the pond at the northeast corner; in 2021, a stilling basin was proposed at this outlet. Is this adequate?

Karst/Sensitive Environmental Areas:

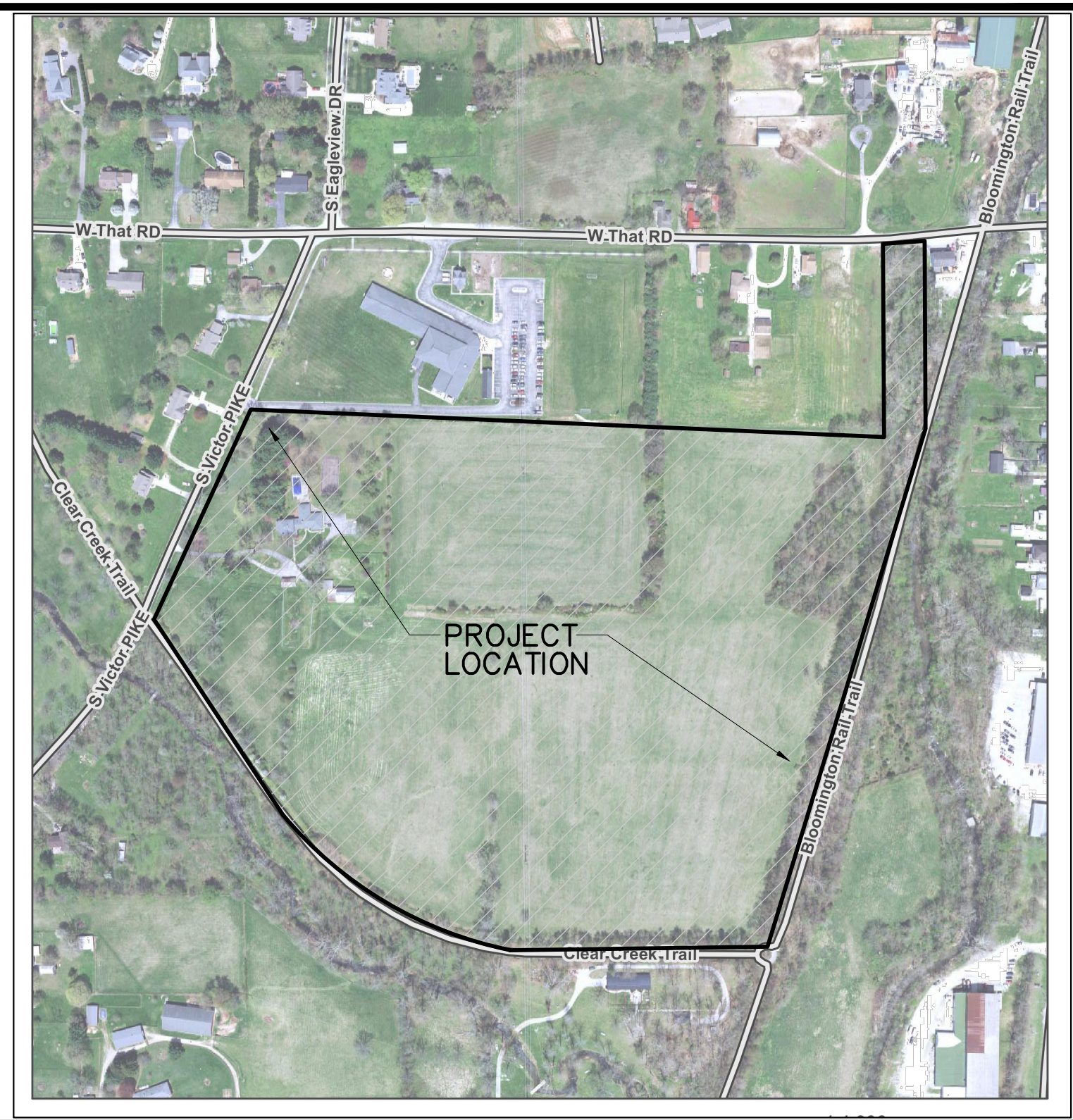
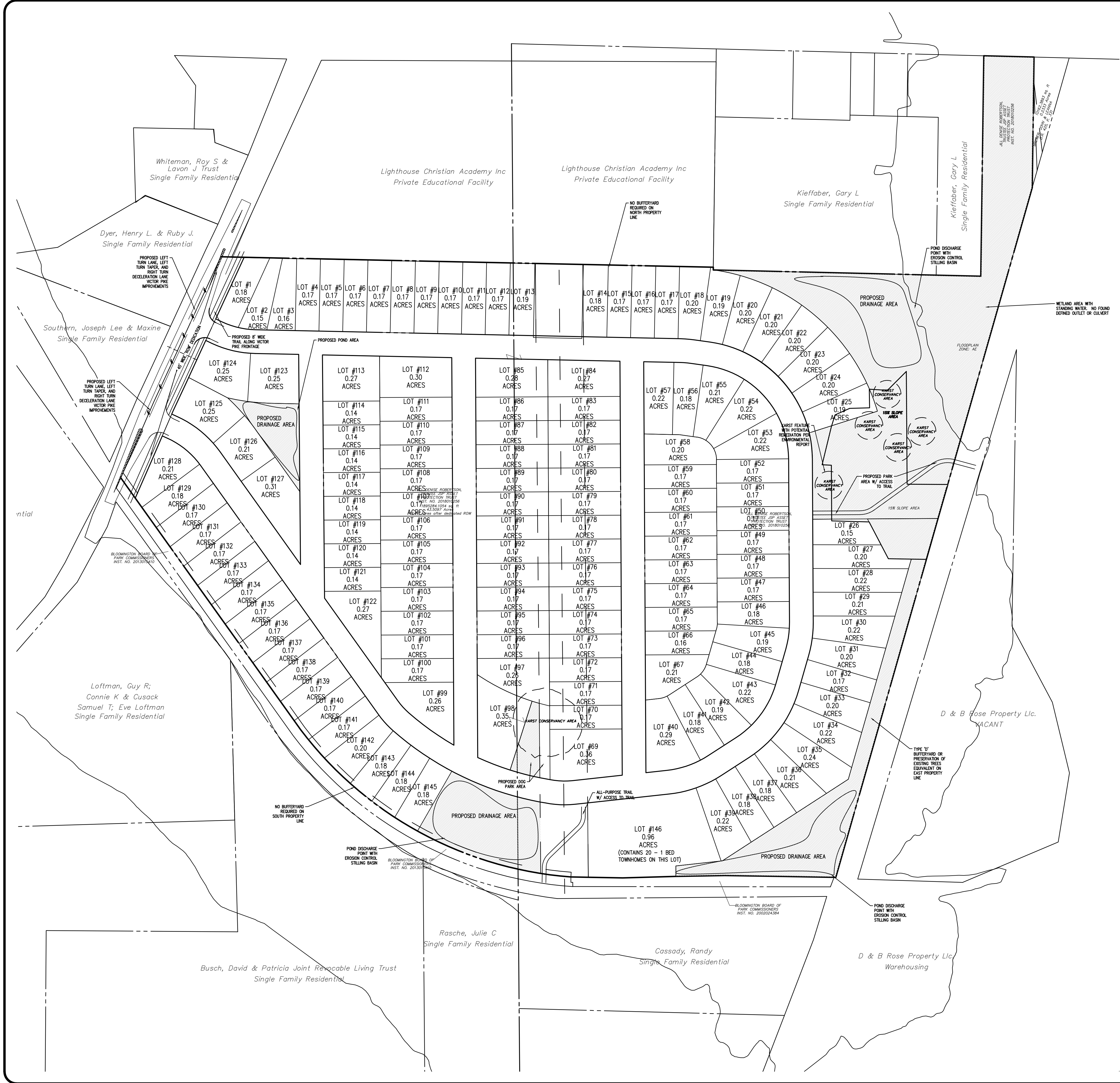
- Place sinkholes in SCAs. Provide overflow Drainage Easements for all SCAs.
- Avoid all wetlands on the property and provide additional velocity dissipation and water quality treatment for any site runoff discharging to wetlands, if the Drainage Board will allow discharges to wetlands. What other measures can we apply to the outlet of the northeast detention pond?
- Check for existing wells in the area.
- Is bedrock going to be an issue? Are significant excavations anticipated?

Tree Removal/Planting:

- Show number of trees to be removed in the detention pond areas. Provide tree replanting plan with a ratio of at least 1:1 tree replacement for any trees being removed as a result of detention ponds.
- New trees and shrubs cannot be placed on pond embankments, spillways, or within 10 ft. of any stormwater infrastructure.

Drainage Easements:

- All infrastructure outside the right-of-way will be placed in Drainage Easements accessible from the right-of-way. Ponds will be placed within Common Areas with Drainage Easements.
- All floodplain on the property shall be placed in Drainage Easements.
- Discharge from the ponds should be placed in Drainage Easements to the nearest receiving waterway (West Fork Clear Creek or Clear Creek).



VICINITY/LOCATION MAP
SCALE: 1"=1000'

SITE IMPROVEMENT LEGEND

- [Symbol] EXTENT OF DESIGNATED OPEN SPACE
- TOTAL LOT AREA = 42.97 ACRES
- OPEN SPACE = 7.16 ACRES (7.16 ACRES SHOWN)(17% DESIGNATED OPEN SPACE)

revisions:

ARCHITECTURE
CIVIL ENGINEERING
PLANNING

BYNUM FANYO & ASSOCIATES, INC.
528 north walnut street
(812) 332-8030

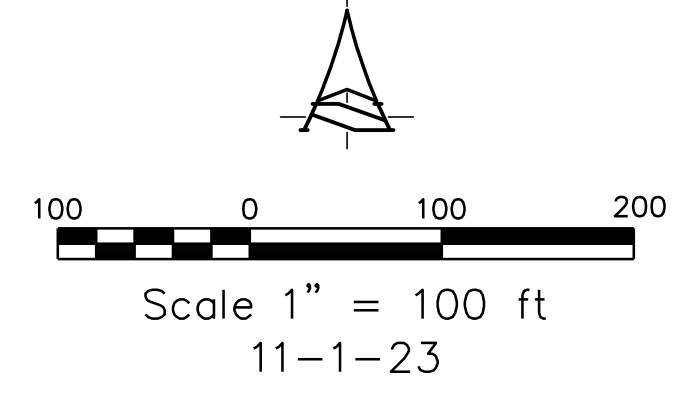
bloomington, indiana
(812) 339-2990 (Fax)

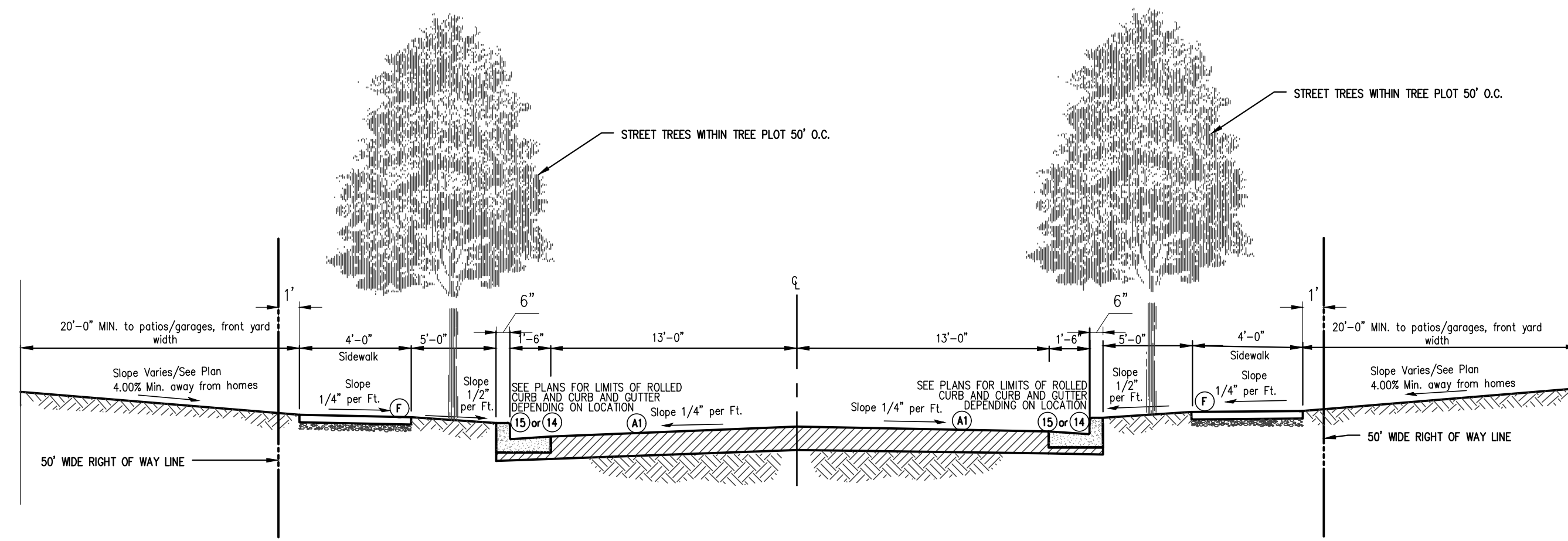
certified by:

PROPOSED
THE TRAILS AT ROBERTSON FARM
SUBDIVISION PUD RE-ZONE
4691 SOUTH VICTOR PIKE
BLOOMINGTON, INDIANA 47403

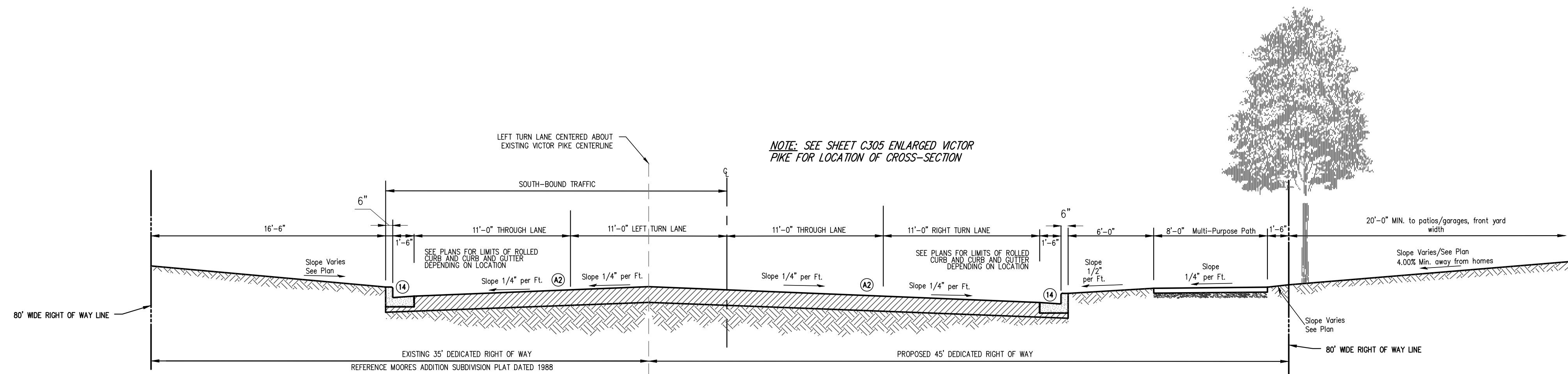
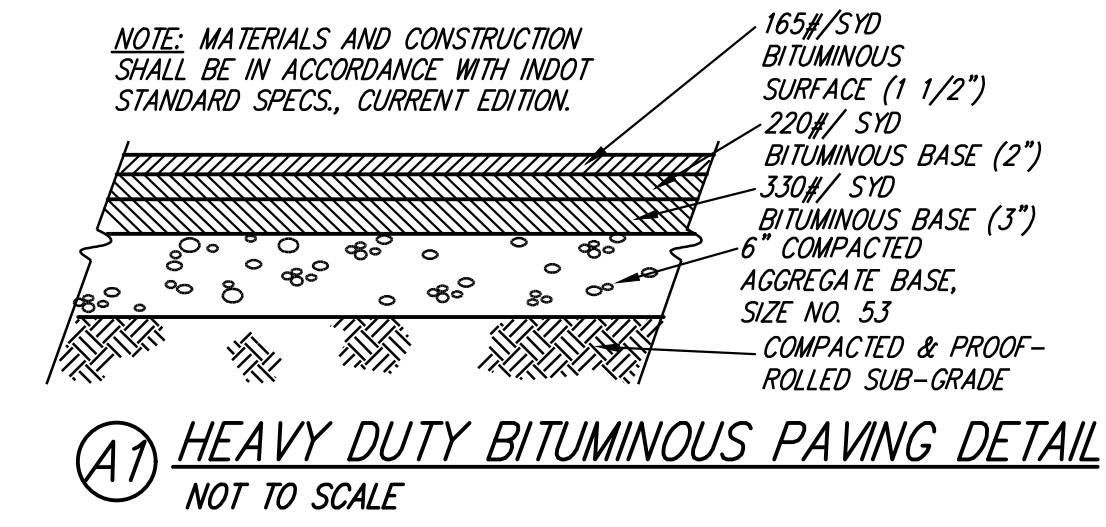
title: OVERALL SITE PLAN

designed by: DJB
drawn by: DJB
checked by: JSF
sheet no: C301
project no.: 402039

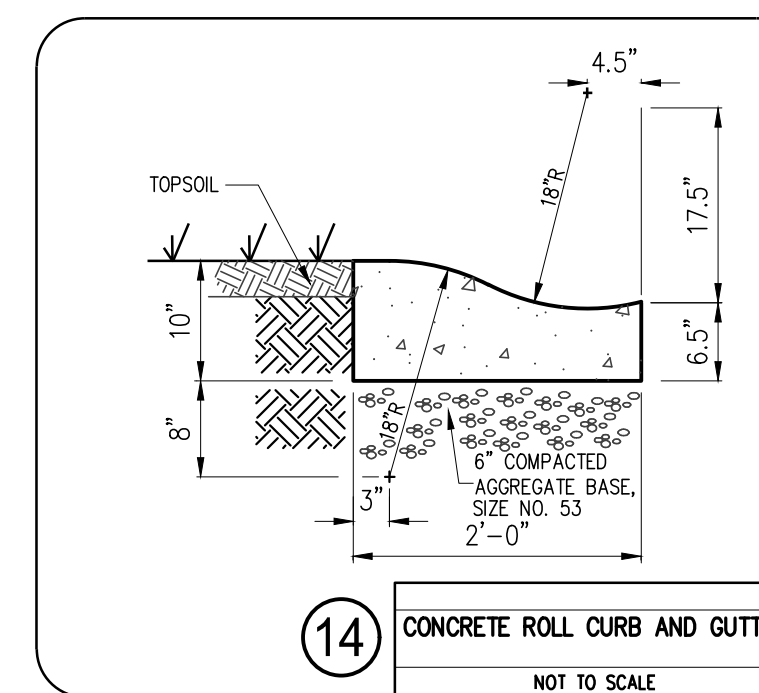
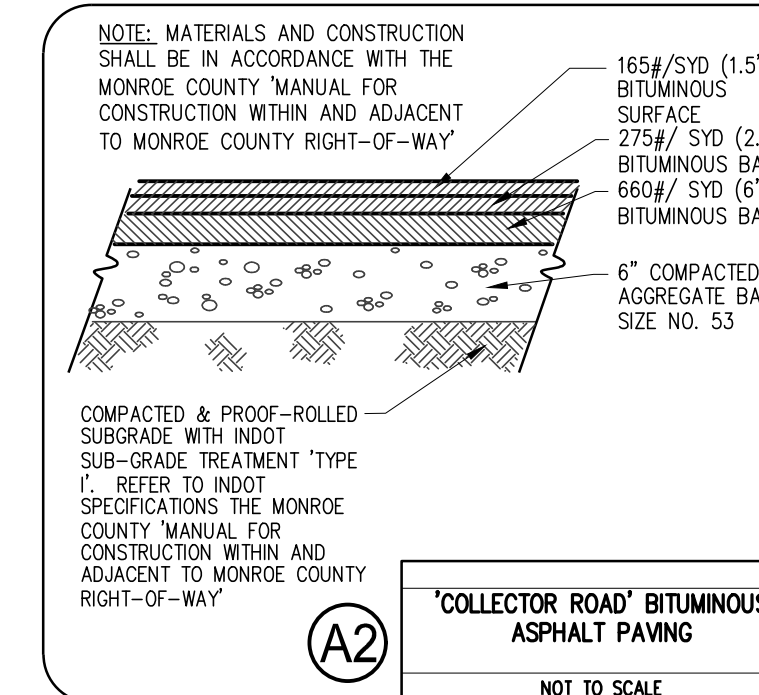




TYPICAL PUBLIC ROAD CROSS SECTION WITH SIDEWALK ON BOTH SIDES



VICTOR PIKE CROSS SECTION AT WIDEST POINT
Scale 1" = 5 ft



revisions:

ARCHITECTURE
CIVIL ENGINEERING
PLANNING
BYNUM FANYO & ASSOCIATES, INC.
528 north walnut street
(812) 332-8030
bloomington, indiana
(812) 339-2990 (Fax)

certified by:

PROPOSED
THE TRAILS AT ROBERTSON FARM
SUBDIVISION PUD RE-ZONE
4691 SOUTH VICTOR PIKE
BLOOMINGTON, INDIANA 47403

title: SITE DETAILS

designed by: DJB
drawn by: DJB
checked by: JSF
sheet no: C401
project no.: 402039

Trails at Robertson Farm Subdivision

Preliminary Drainage & Water Quality Calculations

December 16, 2023

Project Narrative:

Located 0.14 mi south of the intersection of S. Victor Pk. and W. That Rd. and bound by a private residence to the north, the Clear Creek Trail to the south, rail road to the east and S. Victor Pk. to the west a 42.97 ac parcel of land at 4691 S. Victor Pk. will be developed into a residential neighborhood consisting of 145 lots containing a mix of duplexes and single family homes. The site currently consists of a single family home and the majority of the property is a hay field.

The site can be broken down into 3 drainage basins. The Northeast Basin drains to the northeast towards the Bloomington Rail Trail (BRT) and the adjacent Clear Creek. The Southeast Basin drains southeast also to the BRT and adjacent Clear Creek. The Central Basin is further divided in two subbasins and both generally drain southwesterly. Any existing culverts at the discharge locations for these basins will be hydraulically analyzed to check detained discharges from the project.

Due to the site's proximity within a county classified critical watershed (Clear Creek north of Jackson Creek confluence and West Fork Clear Creek) the site must meet more stringent stormwater guidelines as approved at a late 2020 meeting of the Monroe County Drainage Board.

The following are calculations that reflect these new guidelines for the design of four detention/water quality ponds where indicated in the included Post-Developed Basin Map. Calculations are included for detention, water quality, flood routing and storm sewer infrastructure design and begins with the discussion on special design criteria for the project.

Design Criteria:

Due to the project's location within a critical watershed the County is requiring more stringent post-developed drainage requirements. On behalf of the client, White Oak Endeavors, LLC, Bynum Fanyo agrees to design stormwater infrastructure in accordance with the following:

During Construction Sediment: It will be specified in the project plans that detention ponds are to be excavated before earth disturbing activities and that each will be outfitted with a perforated PE pipe riser surrounded with crushed stone to clean during-construction discharges prior to leaving the site. Sediment storage will be at a rate of 1,800 cf per acre.

Post-Developed Sediment Storage: An amount equal to 5% of the required detention volume will be added to the storage volume of each pond for post-construction sediment storage. The current requirement is 0%.

Pre-Developed Runoff Rates: Pre-developed 10% EP and 1% EP runoff rates will be calculated using Hydraflow's Hydrographs program using the 24-hr NRCS method with the Type II rainfall distribution as required. Runoff travel times will be generated using the TR-55 method. Results will only be used for comparison purposes to Allowable Pond Discharge Rates discussed below.

Post-Developed Runoff Rates: Post-developed 10% EP and 1% EP runoff rates will be calculated using Autodesk Civil 3D Hydraflow Hydrographs Extension program using the 24-hour NRCS method with the Type II rainfall distribution as required by the County MS4 Coordinator. Runoff travel times will be generated using the TR-55 method. Curve numbers will be selected based on the next less infiltrating capacity classification.

Allowable Detention Pond Discharge Rates: Per latest approved guidelines for critical watersheds detention ponds will be designed to release post-developed 10% EP runoff to a rate of 0.25 cfs/ac and 1% EP runoff to a rate of 0.45 cfs/ac. The current ordinance requires that the 10% EP post-developed runoff be released at the 10% EP pre-developed rate and the same for 1% EP storm. The Technical Standards from the most current proposed draft of the future ordinance require 0.50 cfs/ac and 0.90 cfs/ac respectively.

Water Quality: Once site improvements are complete and grass is established throughout the site, all ponds will be converted to permanent water quality/detention facilities. The ponds will be outfitted with perforated underdrain pipes contained in clean crushed stone, covered with amended soil and heavily vegetated with a water friendly variety of plantings.

Pond Emergency Overflow: – Emergency overflow spillways will be designed to safely handle 1.25 times the post-developed 1% EP rates plus any 1% EP offsite discharges entering the detention pond.

Offsite Runoff through the Project: Offsite runoff will either be routed around detention ponds where room allows or allowed to enter the ponds. Where offsite runoff enters a pond a secondary outlet control structure may be added in the pond with its control elevation set at the on-site 100-year pond flood elevation.

Storm Sewerage: Stormwater inlet pipes will be sized using the Rational Method for the 10% EP storm. Inlet piping from low points in the design and culverts will be sized for the 1% EP storm.

Drainage Easements: Detention ponds, their discharge pipes and overflow spillways, flood routing paths and storm sewer infrastructure will be covered by drainage easements in the County's favor where required by the County MS4 Coordinator.

Sinkhole Conservancy: Sinkhole conservancy easements will be recorded in the County's favor per current easement requirements.

Impact Statement:

Summary:

Basin Characteristics

(Pre-Developed Conditions)

Basin Characteristics

(Post-Developed Conditions)

10% EP Storm						
Basin Area	Pre-Developed Drainage Area (Ac)	Post-Developed Drainage Area (Ac)	Post-Developed Q (cfs)	Pre-Developed Q (cfs)	(1) Allowable Q (cfs)	(2) Actual Q (cfs)
NE	7.10	7.10		1.78	1.78	
SE	5.74	5.74		1.44	1.44	-
C1	21.76	21.76		5.44	5.44	
C2	4.01	4.01		1.00	1.00	

1% EP Storm						
Basin Area	Pre-Developed Drainage Area (Ac)	Post-Developed Drainage Area (Ac)	Post-Developed Q (cfs)	Pre-Developed Q (cfs)	(1) Allowable Q (cfs)	(2) Actual Q (cfs)
NE	7.10	7.10		3.20	3.20	
SE	5.74	5.74		2.58	2.58	-
C1	21.76	21.76		9.79	9.79	
C2	4.01	4.01		1.80	1.80	

- (1) Allowable Discharge: 10% EP at 0.25 cfs/ac and the 1% EP at 0.45 cfs/ac.
(2) Actual Discharge = Pond Discharge as calculated via hydrograph routing.

10 YEAR DETENTION/WATER QUALITY POND TABLE for C1 POND			
(1) STORM DURATION (hours)	(2) 2 YR POST WATERSHED DISCH. RATE (cfs)	(3) 2 YR PRE (ALLOWABLE DISCH. RATE) (cfs)	(4) REQ'D STORAGE (cf)
0.083	100.51		28,747
0.166	76.39		42,753
0.25	58.05		47,744
0.50	39.71	5.44	62,200
0.75	30.54		68,335
1	21.37		57,826

100 YEAR DETENTION/WATER QUALITY POND TABLE for POND C1			
(1) STORM DURATION (hours)	(2) Anticip. 100 YR POST WATERSHED DISCH. RATE (cfs)	(3) 100 YR PRE (ALLOWABLE DISCH. RATE) (cfs)	(4) REQ'D STORAGE (cf)
0.083	141.06		39,693
0.166	107.20		58,697
0.25	81.47		65,050
0.50	55.74	9.79	83,399
0.75	42.87		90,060
1	30.01		73,399

Pond C1 discharge to pond number C2 before leaving the site. Using Hydraflow Hydrographs runoff from their contributing areas were routed through ponds C1 and C2 then combined

Column 3 is the max. allowed in a critical watershed at its computed time of concentration. The above table was used to determine the minimum volume required for pond C1.

This pond will have an average contour 2D area of 24,000 sq. ft. (4' deep = 96,000 provided)

Column 2 assumes flow using 0.62 coefficient, 5 min. TOC

10 YEAR DETENTION/WATER QUALITY POND TABLE for C2 POND			
(1) STORM DURATION (hours)	(2) 2 YR POST WATERSHED DISCH. RATE (cfs)	(3) 2 YR PRE (ALLOWABLE DISCH. RATE) (cfs)	(4) REQ'D STORAGE (cf)
0.083	18.52		5,298
0.166	14.07		7,876
0.25	10.69		8,794
0.50	7.31	1.00	11,453
0.75	5.62		12,578
1	3.93		10,636

100 YEAR DETENTION/WATER QUALITY POND TABLE for POND C2			
(1) STORM DURATION (hours)	(2) Anticip. 100 YR POST WATERSHED DISCH. RATE (cfs)	(3) 100 YR PRE (ALLOWABLE DISCH. RATE) (cfs)	(4) REQ'D STORAGE (cf)
0.083	25.85		7,272
0.166	19.65		10,756
0.25	14.93		11,915
0.50	10.21	1.80	15,264
0.75	8.01		16,907
1	5.49		13,395

Pond C1 discharge to pond number C2 before leaving the site. Using Hydraflow Hydrographs runoff from their contributing areas were routed through ponds C1 and C2 then combined

Column 3 is the max. allowed in a critical watershed at its computed time of concentration. The above table was used to determine the minimum volume required for pond C2.

This pond will have an average contour 2D area of 9,300 sq. ft. (4' deep = 37,200 provided)

Column 2 assumes flow using 0.62 coefficient, 5 min. TOC

10 YEAR DETENTION/WATER QUALITY POND TABLE for NE POND			
(1) STORM DURATION (hours)	(2) 2 YR POST WATERSHED DISCH. RATE (cfs)	(3) 2 YR PRE (ALLOWABLE DISCH. RATE) (cfs)	(4) REQ'D STORAGE (cf)
0.083	32.79		9,377
0.166	25.66		14,390
0.25	21.30		17,714
0.50	14.43	1.78	22,960
0.75	11.14		25,483
1	9.15		26,753

100 YEAR DETENTION/WATER QUALITY POND TABLE for NE POND			
(1) STORM DURATION (hours)	(2) Anticip. 100 YR POST WATERSHED DISCH. RATE (cfs)	(3) 100 YR PRE (ALLOWABLE DISCH. RATE) (cfs)	(4) REQ'D STORAGE (cf)
0.083	45.78		12,875
0.166	35.56		19,499
0.25	29.62		23,976
0.50	20.64	3.20	31,654
0.75	16.37		35,855
1	13.77		38,369

Pond C1 discharge to pond number C2 before leaving the site. Using Hydraflow Hydrographs runoff from their contributing areas were routed through ponds C1 and C2 then combined

Column 3 is the max. allowed in a critical watershed at its computed time of concentration. The above table was used to determine the minimum volume required for NE POND.

This pond will have an average contour 2D area of 22,000 sq. ft. (4' deep = 88,000 provided)

Column 2 assumes flow using 0.62 coefficient, 5 min. TOC

10 YEAR DETENTION/WATER QUALITY POND TABLE for SE POND			
(1) STORM DURATION (hours)	(2) 2 YR POST WATERSHED DISCH. RATE (cfs)	(3) 2 YR PRE (ALLOWABLE DISCH. RATE) (cfs)	(4) REQ'D STORAGE (cf)
0.083	26.51		7,581
0.166	20.75		11,636
0.25	17.22		14,320
0.50	11.67	1.44	18,567
0.75	9.00		20,582
1	7.40		21,635

100 YEAR DETENTION/WATER QUALITY POND TABLE for SE POND			
(1) STORM DURATION (hours)	(2) Anticip. 100 YR POST WATERSHED DISCH. RATE (cfs)	(3) 100 YR PRE (ALLOWABLE DISCH. RATE) (cfs)	(4) REQ'D STORAGE (cf)
0.083	37.01		10,411
0.166	28.75		15,770
0.25	23.95		19,393
0.50	16.69	2.58	25,610
0.75	13.20		28,913
1	11.14		31,073

Pond C1 discharge to pond number C2 before leaving the site. Using Hydraflow Hydrographs runoff from their contributing areas were routed through ponds C1 and C2 then combined

Column 3 is the max. allowed in a critical watershed at its computed time of concentration. The above table was used to determine the minimum volume required for SE POND.

This pond will have an average contour 2D area of 19,500 sq. ft. (4' deep = 78,000 provided)

Column 2 assumes flow using 0.62 coefficient, 5 min. TOC

White Oak Endeavors LLC
Kevin Schmidt
witwen@gmail.com

Date: November 6, 2020

Subject:

**4691 S. Victor Pike – Karst Survey
Bloomington, IN**

Contact:

Jason Krothe

Phone:

812-219-0210

Email: jnkrothe@hydrogeologyinc.com

Dear Mr. Schmidt:

Hydrogeology Inc. (Hydrogeology) respectfully submits this summary report for the karst survey conducted at 4691 S. Victor Pike in Bloomington, Indiana (the Site, Figure 1).

1 – Overview

The Site is located at 4691 S. Victor Pike in Bloomington, Indiana and is approximately 45-acres (Figure 2). The property currently consists of mostly open pasture and agricultural land with some areas of trees.

2 - Geology / Physiography

The Site is in the Mitchell Plateau physiographic region, which is one of the primary karst forming areas in Indiana. The bedrock at the Harrodsburg Limestone (Hasenmueller, Estell, Keith, and Thompson, 2008) . The Harrodsburg Limestone is composed primarily of limestone but includes small amounts of shale, dolostone, sandstone, and chert (Rexroad,1986). It is typically between 70 and 120 feet thick in the Bloomington area (Rexroad,1986). Several water wells registered with the Indiana Department of Natural Resources (IDNR) were located on or immediately adjacent to the Site (Figure 3). Based on the drilling logs for those wells, bedrock at the site is limestone with some layers of shale (Attachment A). Soil thickness was between 5 and 8 feet based on the drilling logs.

3 – Sinkholes & Springs

Sinkholes are surface depressions that form in a variety of ways in karst areas (Figure 4). Sinkholes will often time have a swallow hole, which is an opening in the ground where water infiltrates. Groundwater flow in karst areas is predominantly fracture flow, meaning the bedrock itself has low permeability while the fractures in the bedrock are

essentially open conduits that allow water, soil, and other materials to travel quickly through the subsurface. Water that drains into a sinkhole can eventually discharge at a karst spring (Figure 5).

4 – Karst Field Survey

Hydrogeology conducted a karst field survey at the Site on October 22, and November 2, 2020. Prior to the field survey the area had received over 2 inches of rain in the previous week. All karst features were located with a sub-meter GPS unit. The following karst features were identified:

Sinkhole 1 -Sinkhole 1 is located on the northeast portion of the property (Figures 6 & 7) approximately 90 feet from the eastern property boundary. As defined by the outer rim, it is approximately 4-feet long by 3-feet wide and 2-feet deep. It is filled with barbed wire and other debris which prevented inspection of the bottom of the sinkhole for openings or bedrock. Photographs of Sinkhole 1 can be viewed in Attachment B, Page 20.

Mitigation

Due to the small size of Sinkhole 1 an aggregate cap could be installed (Attachment C). The purpose of an aggregate cap is to allow natural infiltration through the sinkhole while stabilizing the sinkhole.

Sinkhole 2 - Sinkhole 2 is located on the northeast portion of the property (Figures 6 & 7) approximately 120 feet from the eastern property boundary. As defined by the outer rim, it is approximately 6-feet long by 4-feet wide and 2-feet deep. It is filled with debris which prevented inspection of the bottom of the sinkhole for openings or bedrock. Photographs of Sinkhole 2 can be viewed in Attachment B, Page 20.

Mitigation

Due to the small size of Sinkhole 2 an aggregate cap could be installed (Attachment C). The purpose of an aggregate cap is to allow natural infiltration through the sinkhole while stabilizing the sinkhole.

Sinkhole 3 - Sinkhole 3 is located on the northeast portion of the property (Figures 6 & 7) approximately 250 feet from the eastern property boundary. As defined by the outer rim, it is approximately 5-feet long by 4-feet wide and 2-feet deep. It is soil filled with no visible opening or bedrock. Photographs of Sinkhole 3 can be viewed in Attachment B, Page 21.

Mitigation

Due to the small size of Sinkhole 3 an aggregate cap could be installed (Attachment C). The purpose of an aggregate cap is to allow natural infiltration through the sinkhole while stabilizing the sinkhole.

Sinkhole 4 - Sinkhole 4 is located on the northeast portion of the property (Figures 6 & 7) approximately 200 feet from the eastern property boundary. As defined by the outer rim, it is approximately 10-feet long by 5-feet and 1-foot deep. It is soil filled with no visible opening or bedrock. Photographs of Sinkhole 4 can be viewed in Attachment B, Page 21.

Mitigation

Due to the small size of Sinkhole 4 an aggregate cap could be installed (Attachment C). The purpose of an aggregate cap is to allow natural infiltration through the sinkhole while stabilizing the sinkhole.

Sinkhole 5 - Sinkhole 5 is located on the northeast portion of the property (Figures 6 & 7) approximately 300 feet from the eastern property boundary. As defined by the outer rim, it is approximately 6-feet long by 5-feet and 1-foot deep. It is grass filled with no visible opening or bedrock. Photographs of Sinkhole 5 can be viewed in Attachment B, Page 18.

Mitigation

Due to the small size of Sinkhole 5 an aggregate cap could be installed (Attachment C). The purpose of an aggregate cap is to allow natural infiltration through the sinkhole while stabilizing the sinkhole.

Sinkhole 6 -Sinkhole 6 is located on the south side of the property (Figure 6 & 8) approximately 240 feet from the southern property boundary. As defined by the outer rim, it is approximately 100-feet long by 85-feet wide and 2-feet deep and approximately 0.15 acres. The sinkhole is grass filled and flat bottomed with no exposed bedrock or openings in the soil. Photographs of Sinkhole 6 can be viewed in Attachment B, Pages 13 and 14.

Mitigation

In accordance with Chapter 829 of the Monroe County Zoning Ordinance, Sinkhole 6 should have a Sinkhole Conversancy Area (SCA) that encompasses the entire sinkhole and all the area within twenty-five (25) feet of the sinkhole rim.

5 – Study Limitations

The identification of karst features at the Site was limited to surface inspection. No subsurface investigations were conducted. Undocumented karst features are possible in the subsurface. Dense vegetation was present in portions of the Site. Identification of karst surface features can be difficult in areas with dense ground vegetation. Clearing of ground vegetation was not within the scope of work for this survey.

6 – Karst Best Management Practices

The following are karst management practices that should be considered for the Site:

Water Quality

Groundwater recharge in karst areas predominately occurs through sinkholes and swallets. Water infiltrates into a sinkhole or swallet, then flows along karst conduits and typically discharges to a karst spring. There is minimal filtration of the water throughout this shallow groundwater cycle. Therefore, it is critical to maintain or improve water quality at the Site.

Impacts to water quality at the Site are most likely to occur due to erosion and sediment mobilization during construction. Erosion and sediment control will be critical to preventing water quality impacts. All sinkholes should be protected with appropriate erosion and sediment controls for the duration of construction at the Site.

In addition to these measures a low salt no herbicide/pesticide spray policy should be implemented for the Site.

Drainage Alteration

Alteration of natural drainage patterns can result in the development of new sinkholes, particularly when run-off is concentrated. The drainage plan for the Site should maintain the existing drainage patterns wherever possible and prevent concentrated run-off. To prevent development of new sinkholes, detention basins should be lined with an impervious material.

Unknown Karst Features

Previously unknown karst features are possibly present in the subsurface at the Site. If any previously unknown karst feature is identified during development of the Site, the features should be protected with erosion and sediment control measures and inspected by a karst specialist.

7 – Summary

A desktop review and survey were conducted at the Site to identify any karst features. There was approximately 2 inches of rain at the Site in the week prior to the initial field survey on October 22, 2020. Six sinkholes were identified at the Site. Sinkholes 1-5 could receive an aggregate cap treatment to allow natural infiltration and stabilize the sinkholes. Sinkhole 6 should receive a SCA in accordance with the Monroe County Zoning Ordinance. The karst field survey was limited to surface inspection with no subsurface investigation. Unknown karst features are likely present in the subsurface at the Site. If a previously unknown karst feature is discovered during construction activities the feature should be protected with erosion and sediment control measures and inspected by a karst specialist.

Hydrogeology appreciates the opportunity to provide this summary report. If you have any questions, concerns, or comments please do not hesitate to contact me directly at (812) 219-0210.

Sincerely,

Hydrogeology Inc.



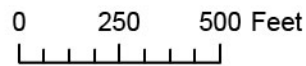
Jason N. Krothe, LPG IN-2511
President





LEGEND

 SITE BOUNDARY



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**KARST SURVEY
4691 S. VICTOR PIKE
BLOOMINGTON, IN**

SITE BOUNDARY



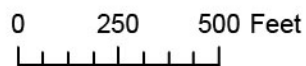
FIGURE
2



LEGEND

 SITE BOUNDARY

 WATER WELL



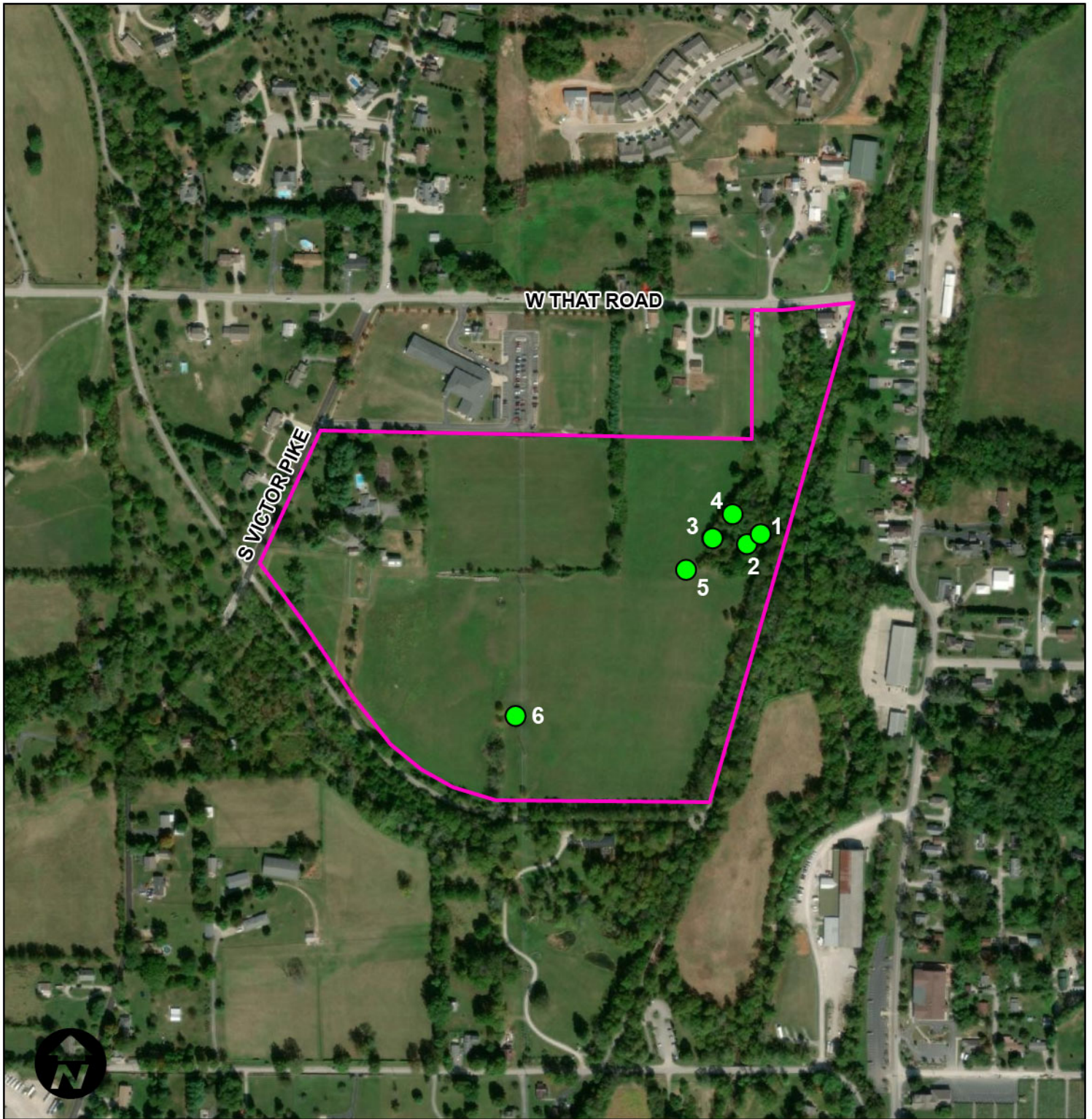
**KARST SURVEY
4691 S. VICTOR PIKE
BLOOMINGTON, IN**

WATER WELLS

hydrogeology inc.

FIGURE
3

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



LEGEND

- SITE BOUNDARY
- SINKHOLE LOCATION
(size not to scale)

0 250 500 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

KARST SURVEY
4691 S. VICTOR PIKE
BLOOMINGTON, IN

SINKHOLES


hydrogeology inc.

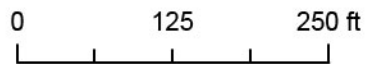
FIGURE
6



LEGEND

 SITE BOUNDARY

 SINKHOLE LOCATION
(size not to scale)



KARST SURVEY
4691 S. VICTOR PIKE
BLOOMINGTON, IN

SINKHOLES 1-5

hydrogeology inc.

FIGURE
7

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



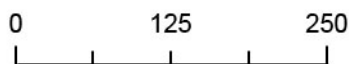
LEGEND



SITE BOUNDARY



SINKHOLE 6 (to scale)



KARST SURVEY
4691 S. VICTOR PIKE
BLOOMINGTON, IN

SINKHOLE 6

hydrogeology inc.

FIGURE

8

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Record of Water Well Indiana Department of Natural Resources

Reference Number	Driving Direction to Well	Date Completed
213655	ON THAT ROAD 1 BNLOCK WEST RODGERS ST. ON SO. SIDE ROAD	10/23/1973

Owner-Contractor	Name	Address	Telephone
Owner	ERNEST KIEFFABER #1	R5 BLOOMINGTON, IN	Not available
Driller	GEORGE SNAPP	R5 BLOOMINGTON, IN	Not available
Operator	GEORGE SNAPP	License Not available	

Construction Details			
Well	Use: Home	Drilling Method: Cable Tool	Pump Type: Not available
	Depth: 70.0	Pump Setting Depth: Not available	Water Quality: Not available
Casing	Length: 7.0	Material: Not available	Diameter: 5.6
Screen	Length: Not available	Material: Not available	Diameter: Not available
	Slot Size: Not available		

Well Capacity Test	Type of Test: Not available	Test Rate: Not available	Bail Test Rate: 1.0 gpm
	Drawdown: Not available	Static Water Level: 15.0 ft.	Bailer Drawdown: 50.0 ft.

Grouting Information	Material: Not available	Depth: From (not available) To (not available)	
	Installation Method: Not available	Number of Bags Used: Not available	

Well Abandonment	Sealing Material: Not available	Depth: From (not available) To (not available)	
	Installation Method: Not available	Number of Bags Used: Not available	

Administrative	County: MONROE Range: 1W Topo Map: CLEAR CREEK Field Located By: JRD Courthouse Location By: Not available Location Accepted w/o Verification By: Not available Subdivision Name: Not available Ft W of EL: 2,050.0 Ft E of WL: Not available Ground Elevation: 670.0 Bedrock Elevation: 665.0 UTM Easting: 539531	Township: 8N Section: NW of the NW of the SE of Section 20 Grant: Not available Field Located On: 7/27/1978 Courthouse Location On: Not available Location Accepted w/o Verification On: Not available Lot Number: Not available Ft N of SL: 2,500.0 Ft S of NL: Not available Depth of Bedrock: 5.0 Aquifer Elevation: Not available UTM Northing: 4329337
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Well Log

Top	Bottom	Formation
0.0	5.0	TOP SOIL CLAY
5.0	70.0	LIMESTONE W/ LAYERS SHALE

Comments
 MC 665; OWNER VERIFIED; 10 FT EAST OF HOUSE THAT'S PAINTED GREEN.

Record of Water Well Indiana Department of Natural Resources

Reference Number	Driving Direction to Well	Date Completed
213685	FROM BLOOMINGTON SOUTH ROGERS STREET TOE THAT ROAD. 0.25 TO VICTOR PIKE ROAD. 1ST HOUSE ON LEFT	10/5/1978

Owner-Contractor	Name	Address	Telephone
Owner	DONALD ROBERTSON	Not available	Not available
Driller	FRED SMITH	8565 O. S. ROAD 37 SOUTH	Not available
Operator	FRED SMITH	License Not available	

Construction Details			
Well	Use: Home	Drilling Method: Cable Tool	Pump Type: Not available
	Depth: 200.0	Pump Setting Depth: Not available	Water Quality: Not available
Casing	Length: 9.0	Material: Not available	Diameter: 6.0
Screen	Length: Not available	Material: Not available	Diameter: Not available
	Slot Size: Not available		

Well Capacity Test	Type of Test: Not available	Test Rate: Not available	Bail Test Rate: 0.5 gpm for 1.0 hrs.
	Drawdown: Not available	Static Water Level: 25.0 ft.	Bailer Drawdown: 175.0 ft.

Grouting Information	Material: Not available	Depth: From (not available) To (not available)	
	Installation Method: Not available	Number of Bags Used: Not available	

Well Abandonment	Sealing Material: Not available	Depth: From (not available) To (not available)	
	Installation Method: Not available	Number of Bags Used: Not available	

Administrative	County: MONROE Range: 1W Topo Map: CLEAR CREEK Field Located By: PES Courthouse Location By: Not available Location Accepted w/o Verification By: Not available Subdivision Name: Not available Ft W of EL: Not available Ft E of WL: 2,200.0 Ground Elevation: 679.0 Bedrock Elevation: 673.0 UTM Easting: 539189	Township: 8N Section: SE of the NE of the SW of Section 20 Grant: Not available Field Located On: 7/2/1980 Courthouse Location On: Not available Location Accepted w/o Verification On: Not available Lot Number: Not available Ft N of SL: 1,900.0 Ft S of NL: Not available Depth of Bedrock: 6.0 Aquifer Elevation: Not available UTM Northing: 4329137
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Well Log

Top	Bottom	Formation
0.0	6.0	SOIL
6.0	90.0	LIMESTONE
90.0	200.0	SHALE

Comments
MC 673;
NEIGHBOR
VERIFIED

Record of Water Well Indiana Department of Natural Resources

Reference Number	Driving Direction to Well	Date Completed
213665	CLEAR CREEK, IN	Not available

Owner-Contractor	Name	Address	Telephone
Owner	JACK JAMES	CLEAR CREEK	Not available
Driller	GEORGE SNAPP	R5 BNOX 86 BLOOMINGTON, IN	Not available
Operator	GEORGE SNAPP	License Not available	

Construction Details			
Well	Use: Home Depth: 95.0	Drilling Method: Cable Tool Pump Setting Depth: Not available	Pump Type: Not available Water Quality: Not available
Casing	Length: 10.0	Material: Not available	Diameter: 6.0
Screen	Length: Not available Slot Size: Not available	Material: Not available	Diameter: Not available

Well Capacity Test	Type of Test: Not available Drawdown: Not available	Test Rate: Not available Static Water Level: 10.0 ft.	Bail Test Rate: 3.0 gpm Bailer Drawdown: 80.0 ft.
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Grouting Information	Material: Not available Installation Method: Not available	Depth: From (not available) To (not available) Number of Bags Used: Not available
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Well Abandonment	Sealing Material: Not available Installation Method: Not available	Depth: From (not available) To (not available) Number of Bags Used: Not available
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Administrative	County: MONROE Range: 1W Topo Map: CLEAR CREEK Field Located By: JRD Courthouse Location By: Not available Location Accepted w/o Verification By: Not available Subdivision Name: Not available Ft W of EL: 1,500.0 Ft E of WL: Not available Ground Elevation: 655.0 Bedrock Elevation: 647.0 UTM Easting: 539684	Township: 8N Section: NE of the NW of the SE of Section 20 Grant: Not available Field Located On: 7/28/1977 Courthouse Location On: Not available Location Accepted w/o Verification On: Not available Lot Number: Not available Ft N of SL: 2,500.0 Ft S of NL: Not available Depth of Bedrock: 8.0 Aquifer Elevation: Not available UTM Northing: 4329330
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Well Log

Top	Bottom	Formation
0.0	8.0	TOP SOIL
8.0	95.0	HARD BLUE LIMESTONE

Comments
POST OFFICE
VERIFIED

Record of Water Well Indiana Department of Natural Resources

Reference Number	Driving Direction to Well	Date Completed
213729	ON THAT ROAD WEST OF ROGERS STREET AT CLEAR CREEK, IN. ABOUT 0.25 MILE WEST ON SO. SIDE OF ROAD	7/10/1979

Owner-Contractor	Name	Address	Telephone
Owner	ERNEST M, KIEFFABER	689 WEST THAT ROAD	Not available
Driller	GEORGE SNAPP	4625 S. STANISFER LANE	Not available
Operator	GEORGE SNAPP	BLOOMINGTON, IN License Not available	

Construction Details			
Well	Use: Home	Drilling Method: Cable Tool	Pump Type: Not available
	Depth: 80.0	Pump Setting Depth: Not available	Water Quality: Not available
Casing	Length: 9.5	Material: Not available	Diameter: 5.6
Screen	Length: Not available	Material: Not available	Diameter: Not available
	Slot Size: Not available		

Well Capacity Test	Type of Test: Not available	Test Rate: Not available	Bail Test Rate: 2.0 gpm
	Drawdown: Not available	Static Water Level: 15.0 ft.	Bailer Drawdown: 60.0 ft.

Grouting Information	Material: Not available	Depth: From (not available) To (not available)	
	Installation Method: Not available	Number of Bags Used: Not available	

Well Abandonment	Sealing Material: Not available	Depth: From (not available) To (not available)	
	Installation Method: Not available	Number of Bags Used: Not available	

Administrative	County: MONROE Range: 1W Topo Map: CLEAR CREEK Field Located By: PES Courthouse Location By: Not available Location Accepted w/o Verification By: Not available Subdivision Name: Not available Ft W of EL: 1,900.0 Ft E of WL: Not available Ground Elevation: 658.0 Bedrock Elevation: 650.0 UTM Easting: 539556	Township: 8N Section: SE of the SW of the NE of Section 20 Grant: Not available Field Located On: 7/2/1980 Courthouse Location On: Not available Location Accepted w/o Verification On: Not available Lot Number: Not available Ft N of SL: 2,550.0 Ft S of NL: Not available Depth of Bedrock: 8.0 Aquifer Elevation: Not available UTM Northing: 4329337
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Well Log

Top	Bottom	Formation
0.0	8.0	TOP SOIL RED CLAY
8.0	80.0	HARD WHITE LIMESTONE

Comments
VERIFIED BY
MAILBOX



VIA EMAIL

October 27, 2020

Mr. Kevin Schmidt
White Oak Endeavors, LLC.
witwen@gmail.com

**Subject: Water/Wetland Delineation Summary Report
4691 South Victor Pike Property
Monroe County, Indiana
Redwing Project No.: 20-177**

Dear Mr. Schmidt:

Redwing Ecological Services, Inc. (Redwing) is pleased to provide White Oak Endeavors, LLC. with this Water/Wetland Delineation Summary Report for the 45-acre site in Monroe County, Indiana. The goal of these services was to identify the location and extent of jurisdictional water/wetland features on the site in order to assist with development planning for this project.

Based on the delineation, jurisdictional water/wetland features present on the site include:

- one intermittent stream totaling 491 linear feet (0.028 acre)
- one wetland totaling 1.099 acre; consisting of 0.473 acre of emergent wetland and 0.626 acre of forested wetland

The wooded portions of the site and some isolated trees represent suitable summer roosting habitat for the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*). This report presents the study methodology, results, and a discussion of development-related issues.

METHODOLOGY

A delineation of jurisdictional waters of the U.S., including wetlands, within the project site was conducted by Redwing wetland scientists on October 19, 2020. It has not been verified by the U.S. Army Corps of Engineers (USACE) or Indiana Department of Environment (IDEM). The wetland delineation was accomplished through documentation of the presence/absence of hydric soils, wetland hydrology, and hydrophytic vegetation following the Routine On-Site Documentation Method, as defined in the Regional

Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region Version 2.0 (August 2016). Soil, hydrology, and vegetation data were formally collected at six data points located within the project boundary. The presence of open waters, such as streams and ponds, within the site was determined based on evaluations of ordinary high-water mark (OHWM), defined bed and bank features, and flow regime. The quality of the on-site intermittent stream was assessed using the Rapid Bioassessment Protocol (RBP) developed by the U.S. Environmental Protection Agency. The boundary of delineated water/wetland areas was surveyed using Trimble, sub-meter accurate, GPS equipment.

Federally-listed species potentially present at the property include the gray bat (*Myotis grisescens*), Indiana bat, and northern long-eared bat. Suitable winter habitat for these species includes caves, abandoned mine portals, sinkholes, and other underground habitat used as hibernacula. The gray bat utilizes these features for roosting year-round. Suitable summer habitat for the Indiana bat includes forested areas comprised of trees that have a diameter-at-breast height (dbh) greater than five inches and exhibit exfoliating bark, cracks, or crevices. Areas that contain trees with a dbh greater than three inches with exfoliating bark, cracks, or crevices represent suitable summer habitat for the northern long-eared bat.

RESULTS

The approximately 45-acre has an address of at 4691 South Victor Pike and is located immediately southeast of the intersection of South Victor Pike and West That Road. This site consists primarily of open field, with smaller wooded areas associated with fence rows and riparian corridors. The water/wetland features delineated on site are depicted on Figure 1 and summarized in the following table.

Feature	Stream Length (feet)	Stream Width (feet)	Area (acres)	Federal Status	Wetland Type
Intermittent Stream 1	491	2.5	0.028	Jurisdictional	
Intermittent Stream Total	491		0.028		
Wetland 1	---	---	0.473	Jurisdictional	Emergent
	---	---	0.626	Jurisdictional	Forested
Jurisdictional Wetland Total	---	---	1.099		
Jurisdictional Features Total	491	---	1.127		

DISCUSSION

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. Water/wetland impacts are also regulated by the IDEM under Section 401 of the Clean Water Act and state

statues. Permit requirements will vary depending on final development plans. Under the new *Navigable Water Protection Rule: Definition of "Waters of the United States"* (NWPR), streams that exhibit only ephemeral flows, along with wetlands that do not directly abut intermittent or perennial streams, are considered federally non-jurisdictional and impacts to them are no longer regulated by the USACE. Ephemeral streams are no longer regulated by IDEM as waters of the state; however, federally non-jurisdictional wetlands are regulated by IDEM under the State Isolated Wetland Rule. Potential water/wetland permitting thresholds in Indiana are presented below.

- Avoidance of all water/wetland impacts would require no permits from, or coordination with, the USACE or IDEM. An official Jurisdictional Determination (JD) to approve the delineation can be obtained from the USACE if needed.
- Impacts to less than 0.1 acre of jurisdictional waters or 300 feet of stream do not require coordination with the USACE.
- Impacts to less than one acre of jurisdictional waters and 1,500 feet of stream can be authorized under a Regional General Permit (RGP) with the USACE.
- Impacts to greater than one acre of jurisdictional waters or 1,500 feet of stream will require a Section 404 Individual Permit with the USACE.
- Impacts to less than 0.1 acre of regulated wetlands and 150 feet of regulated stream (via culverting only) can be approved under an abbreviated RGP Notification process with IDEM. If IDEM has not responded within 30 days of notification, the project is considered approved.
- Impacts to greater than 0.1 acre of regulated wetlands and any amount of regulated stream (other than < 150 feet of culverting) will require an Individual WQC from the IDEM.

The USACE typically requires compensatory mitigation if impacts to jurisdictional waters exceed 0.1 acre of total waters or 300 linear feet of stream. IDEM typically requires compensatory mitigation if impacts to jurisdictional waters exceed 150 linear feet of encapsulated stream or 0.1 acre of wetland. Mitigation can be provided through purchase of credits from either a private mitigation bank or the Indiana Stream and Wetland Mitigation Program (IN SWMP), or through permittee-responsible mitigation (PRM), which entails restoration/creation/preservation of stream or wetland habitat either on-site or within the immediate watershed. Streams must be mitigated based on type and quality, at ratios generally ranging from 0.5:1 to 3:1. Based on the RBP assessment, the on-site intermittent would likely require a 1:1 mitigation ratio. Use of the IN SWMP requires an additional 20% markup to account for temporal loss. Both bank and IN SWMP stream credits currently sell for approximately \$400 per linear foot. Wetlands must be mitigated, depending on type and quality, at ratios ranging from 2:1 for emergent wetland to 4:1 for forested wetland. Both bank and IN SWMP wetland credits currently sell for approximately \$80,000 per acre, with a 20% temporal loss markup for use of IN SWMP.

The use of permittee-responsible mitigation is only allowed as a last resort as it must be proven to be ecologically preferable over banks or the IN SWMP. This requires identification/purchase of an appropriate

site, detailed wetland/stream design plans, required construction/planting, up to ten years of monitoring, and protection of the site in perpetuity through recording of a conservation easement or deed restriction.

Under the Section 404 permitting process, the USACE determines if consultation with the U.S. Fish and Wildlife Service (USFWS) is required to address potential impacts to T/E species. The T/E species issues of concern on the property are limited to the clearing of mature trees which represent suitable Indiana and northern long-eared bat summer habitat. Consultation with the USFWS will be required to resolve potential impacts to habitat for these species and ensure compliance with the Endangered Species Act. This could involve limiting tree clearing to the unoccupied season (October 1 through March 31) or surveys to confirm the presence/absence of the species.

Under the 404 permitting process, the USACE also determines if consultation with the State Historic Preservation Office (SHPO) is required to address potential impacts to significant archaeological or cultural-historic resources. No historic structures appear to be present and we are not aware of any archeological or cultural resource surveys that have been conducted on the project site.

CONCLUSION

In conclusion, based on Redwing's delineation, jurisdictional water/wetland features present in the northeast corner of the site include one intermittent stream totaling 491 linear feet (0.028 acre) and one 1.099-acre wetland consisting of 0.473 acre of emergent wetland and 0.626 acre of forested wetland. This delineation has not been verified by the USACE. If impacts can be avoided by the proposed development, no permits from, or coordination with, the USACE, KDOW, USFWS or SHPO will be required. If a portion of these features must be impacted, the project can likely be authorized under a RGP with the USACE and an individual WQC with KDOW (assuming impacts total less than one acre). Impacts to greater than 0.1 acre of jurisdictional waters and 300 feet of jurisdictional stream will require mitigation. Specific permit requirements and mitigation costs can be determined once a proposed site design has been developed.

We appreciate the opportunity to assist you on this important project. Please call Rich Fangman or Ron Thomas at (502) 625-3009 with any questions on this report or the overall project.

Sincerely,



[Richard Fangman \(Oct 27, 2020 15:52 EDT\)](#)

Richard J. Fangman
Project Aquatic Biologist



[Ronald L. Thomas \(Oct 27, 2020 16:40 EDT\)](#)

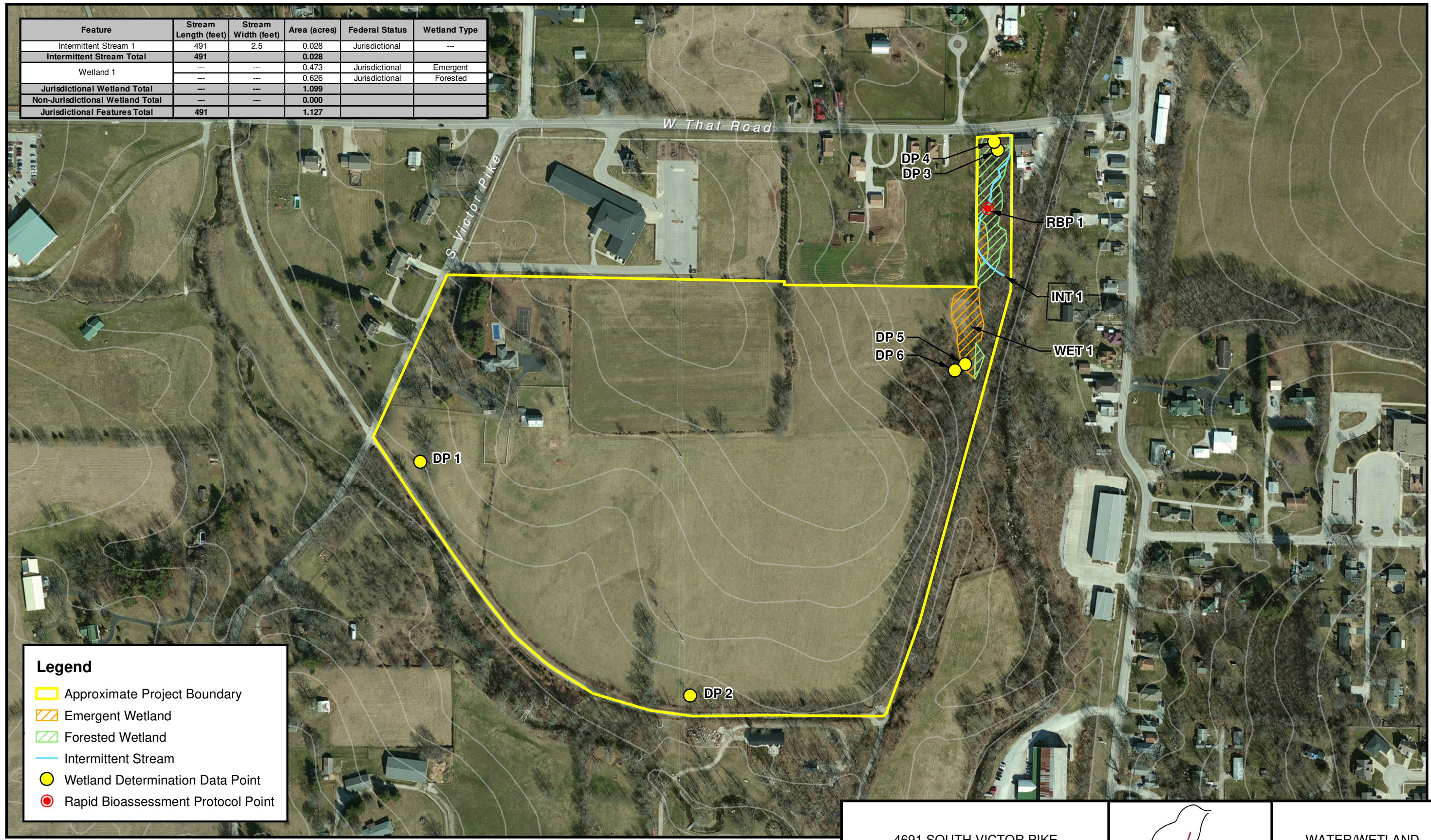
Ronald L. Thomas
Principal
Senior Ecologist

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Attachments: Figure 1 – Water/Wetland Location Map

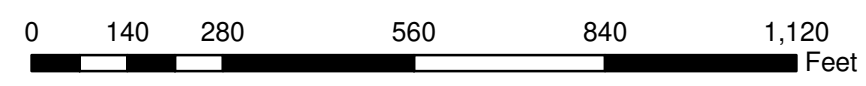
Source: World Imagery - Esri and the GIS User Community (2019).

Feature	Stream Length (feet)	Stream Width (feet)	Area (acres)	Federal Status	Wetland Type
Intermittent Stream 1	491	2.5	0.028	Jurisdictional	---
Intermittent Stream Total	491	---	0.028	Jurisdictional	---
Wetland 1	---	---	0.473	Jurisdictional	Emergent
	---	---	0.626	Jurisdictional	Forested
Jurisdictional Wetland Total	---	---	1.099	Jurisdictional	---
Non-Jurisdictional Wetland Total	---	---	0.000	---	---
Jurisdictional Features Total	491	---	1.127	Jurisdictional	---

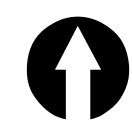


Legend

- Approximate Project Boundary
- Emergent Wetland
- Forested Wetland
- Intermittent Stream
- Wetland Determination Data Point
- Rapid Bioassessment Protocol Point



NOTE: JURISDICTIONAL WATER/WETLAND BOUNDARIES WERE DELINEATED AND SURVEYED BY REDWING WETLAND SCIENTISTS ON OCTOBER 19, 2020. THESE BOUNDARIES HAVE NOT BEEN VERIFIED BY THE U.S. ARMY CORPS OF ENGINEERS. USE OF THIS MAP IS FOR PRELIMINARY PLANNING PURPOSES ONLY.



4691 SOUTH VICTOR PIKE
MONROE COUNTY, INDIANA
REVISED DATE: 10-26-20 DRAWN BY: ZTT



WATER/WETLAND
LOCATION MAP
FIGURE 1

P:\2020 Projects\20-177-4691 South Victor Pike\Figures\Water\Wetland Location Map.mxd, 10-27-2020, ebowman

From: Kelsey Thetonia
To: "Guy Loftman"
Cc: Dave Busch; Jacqueline Nester Jelen; Rebecca Payne
Subject: RE: Updates on Drainage Board meeting 3/17/21 2012-PUO-06
Date: Monday, March 8, 2021 12:07:00 PM

Hello Mr. Loftman,

I apologize for missing your call earlier. I will address your items in red text below. Please let me know if you need anything else. Thank you,

Kelsey Thetonia, CPESC, CESSWI
MS4 Coordinator | Monroe County Highway Department
(812) 349-2499 | www.co.monroe.in.us

From: Guy Loftman <[REDACTED]>
Sent: Friday, March 5, 2021 11:17 AM
To: Kelsey Thetonia <kthetonia@co.monroe.in.us>
Cc: Dave Busch <[REDACTED]>; Jacqueline Nester Jelen <jnester@co.monroe.in.us>; Rebecca Payne <rpayne@co.monroe.in.us>; Guy Loftman <[REDACTED]>
Subject: Updates on Drainage Board meeting 3/17/21 2012-PUO-06

Hello Ms. Thetonia,

I am an adjoining neighbor to the South of the White Oaks/Robertson Trails PUD, and oppose that plan. I have three requests.

1. Please confirm that there will be a Drainage Board meeting at 9:00 a.m. on March 17 at 9:00 at which it is expected that a vote will be taken concerning the White Oaks/Robertson Trails PUO.

I confirm the Drainage Board meeting has been continued to 9:00 am on March 17th and the Board will vote to approve the preliminary drainage plan for The Trails at Robertson Farm. Here is the zoom meeting info (same as the 3/3 meeting):

<https://monroecounty-in.zoom.us/j/82753473529?pwd=STdjUEg5V1BHcW1VRVpaS1dTYXhyQT09>
Meeting ID: 827 5347 3529
Password: 152943
Dial by your location
+1 312 626 6799 US (Chicago)

2. Please immediately forward to me any additional communications as they are received from the applicants for that PUO. Of particular interest to me are Mr. Butler's statements in response to your concerns shown in the draft minutes of the February 3 DB meeting that the applicants would determine the capacities of culverts under the trail, and whether each of them was sufficient to handle the presumed maximum runoff flow entering that culvert. There are also references to rock borings, wetland delineations, tree removal, etc. Please provide me copies of any additional statements, documents, studies, drawings, etc. as they are received.

Mr. Butler surveyed the two existing pipes under the Clear Creek Trail after the 2/3/21 DB meeting and confirmed that they will be able to handle the discharge from the site. This site is meeting the very stringent release rates required for this watershed. We also have a Karst Survey, Phase I Environmental Assessment and a Wetlands Delineation Report. Here are links to these documents:

<https://www.dropbox.com/s/2b75qb2aj1g3kw0/20IN0612%20Environmental%20Phase%20I%20Report%20FINAL.pdf?>

[dl=0](#)

<https://www.dropbox.com/s/q068w9d5shd5xxl/WaterWetland%20Summary%20Report.pdf?dl=0>

https://www.dropbox.com/s/yd9xhc2dl379az6/20201106_Victor_Pike_Karst_Report%20-%20Copy.pdf?dl=0

3. Please provide me with a copy of the draft minutes for the March 3 meeting when they are available.

The 3/3/21 meeting minutes are not yet available, but I will send them to you when I have them. In the meantime, you are welcome to request a recording of the meeting by emailing zoom@co.monroe.in.us.

Thanks,

Guy Loftman
4835 S. Victor Pike
[REDACTED]

On Thu, Mar 4, 2021 at 11:51 AM Rebecca Payne <rpayne@co.monroe.in.us> wrote:

Hello,

According to our MS4 Coordinator, the Drainage Board decided to continue the meeting in 2 weeks and will vote on the White Oaks project at that time. Since the meeting occurred just yesterday morning, the minutes are not yet available; it usually takes a couple of weeks before they are completed. Please check back with Kelsey, MS4 Coordinator and cc'd here, for updates regarding availability of meeting minutes.

Thank you,

Rebecca Payne, AICP
Planner/GIS Specialist
Monroe County Planning Department
501 N. Morton St., Suite 224
Bloomington, IN 47404
rpayne@co.monroe.in.us
Phone: (812) 349-2560
Fax: (812) 349-2967

From: Dave Busch <[REDACTED]>
Sent: Wednesday, March 3, 2021 10:48 AM
To: Jacqueline Nester Jelen <jnester@co.monroe.in.us>; Rebecca Payne <rpayne@co.monroe.in.us>
Cc: Guy Loftman <[REDACTED]>
Subject: drainage board meeting 3/3/21 2012-PUO-06

Good morning,
We were unable to attend the drainage board meeting this morning for White Oak Endeavors, LLC. We would like to see the minutes of the meeting and if the drainage board voted to approve or deny.
Thank you in advance.
Best regards,
Patty and Dave Busch

--

Guy Loftman
4835 S. Victor Pike
Bloomington, IN 47403
[REDACTED]

Guy Loftman is a retired attorney, and is no longer practicing law

From: Kelsey Thetonia
To: ["Guy Loftman"](#); [Daniel Butler](#); [Jacqueline Nester Jelen](#); [Rebecca Payne](#); [Dave Busch](#)
Subject: RE: White Oak Drainage questions
Date: Tuesday, March 9, 2021 10:54:00 AM

Hi Mr. Loftman,

I've received your questions and will work with Mr. Butler to answer them. Please note that at this stage of the project, we are only reviewing the preliminary drainage plan. Thank you,

Kelsey Thetonia, CPESC, CESSWI
MS4 Coordinator | Monroe County Highway Department
(812) 349-2499 | www.co.monroe.in.us

From: Guy Loftman <[REDACTED]>
Sent: Tuesday, March 9, 2021 9:30 AM
To: Kelsey Thetonia <kthetonia@co.monroe.in.us>; Daniel Butler <[REDACTED]>;
Jacqueline Nester Jelen <jnester@co.monroe.in.us>; Rebecca Payne <rpayne@co.monroe.in.us>;
Dave Busch <[REDACTED]>; Guy Loftman <[REDACTED]>
Subject: White Oak Drainage questions

Hello Ms. Thetonia and Mr. Butler,

I appreciate Ms. Thetonia's March 8 response to my earlier email. As so often happens, answers create questions.

Ms. Thetonia says, "Mr. Butler surveyed the two existing pipes under the Clear Creek Trail after the 2/3/21 DB meeting and confirmed that they will be able to handle the discharge from the site. This site is meeting the very stringent release rates required for this watershed."

The White Oak documentation shows two existing 12 inch pipes under the Clear Creek Trail west of Victor Pike. Presumably they have handled the runoff from this site since the trail was established. Obviously White Oak wouldn't change the total runoff. However, it looks like it will concentrate the discharge for much of the site in the detention ponds, and increase the rate of flow to those ponds. I particularly address the detention pond at the south end of the Duke easement, by the planned walkway to the Clear Creek trail.

My basic concern is, the current Robertson farm drainage empties into the West Fork of Clear Creek along permeable natural surfaces extending from Victor Pike to the rail trail roundabout. It looks like the proposal would have most of that water enter this detention pond. Without properly controlled discharge from the detention pond there would be a vastly increased outflow rate at this location. If the detention pond won't contain stormwater sufficiently I conclude that the runoff concentrated in this small area might easily exceed the capacity of the culvert under that section of the trail. So, how do we know that this pond will completely contain the stormwater from a maximum event without increasing the flow rate to the existing culvert?

Here are some more specific questions that would help me understand the situation.

1. How many acres will drain into this detention pond? Please show supporting documentation and calculations.
2. What will be the surface area of the pond if it is full, in percentages of an acre? Please show supporting documentation and calculations.
3. How much water will the pond hold if full? Acre inches would seem an appropriate unit for the response. Please show supporting documentation and calculations.
4. How high will the dike surrounding the pond be, compared to its discharge point? Please show supporting documentation and calculations.
5. How high will the dike surrounding the pond be, compared to the adjoining ground surface? Please show supporting documentation and calculations.
6. What will be the discharge rate from the pond? Please show supporting documentation and calculations.
7. What percentage of storm water will get to the pond through the storm sewers, and what percentage through surface flow? Please show supporting documentation and calculations.
8. Is it expected that stormwater will ever go over the top of the dike surrounding the pond? Please show supporting documentation and calculations.
9. What will be the elevation drop from the bottom of the discharge facility in the pond to the bottom of the discharge facility near the trail? Please show supporting documentation and calculations.
10. Will there be a swale leading to the pond from Victor Pike along the southern edge of the lots adjoining the trail, near the existing fence?
11. What is the maximum rainfall event for which this storm water management system is designed?
12. What is the maximum 24 hour rainfall event in Monroe County for each year since 2000?
13. What are the water release rates for this site?
14. What is the total amount of impervious surface expected for the entire 44 acre site (in acres and/or percentage of the total site)? Does this total include all roads, roofs, driveways, patios and sidewalks? If not, what does it include?

I'm a stormwater novice, and may not have phrased these questions quite right, but hopefully they will be sufficient to identify and address my concerns.

I include Mr. Butler on this email because he may have the answers more readily available. Please include this email in the Drainage Board packet for March 3.

Thank you for your attention to and assistance with this matter.

Respectfully yours,
Guy Loftman

--

Guy Loftman
4835 S. Victor Pike
Bloomington, IN 47403
[REDACTED]

Guy Loftman is a retired attorney, and is no longer practicing law

Project Name: North Park VA Health Center
Engineer/Design Firm: Daniel Butler, Bynum Fanyo
Address: 3098 N Lintel Dr.
Acres: 8.13 acres +/-

Planning Number: PUD-23-7
Watershed: Stouts Creek
Karst Report: Not Completed
Wetland Delineation: Not Completed

Project Summary

The North Park VA Health Center is located northwest of the intersection of W Hunter Valley Rd. (formerly Curry Pike) and SR 46 in the Stouts Creek watershed. The project site is bordered by forest to the north, commercial/institutional to the west and south, and SR 46 to the east. The project is proposing a new building with parking lots, and modification to the existing regional detention pond.



Project Drainage

The project site drains from south to north towards a tributary of Stouts Creek. Modifications to the existing regional detention pond are proposed to increase capacity.

Preliminary Drainage Comments:

Drainage Easements/Infrastructure:

- All stormwater infrastructure outside the public right-of-way will be placed in drainage easements.
- There is existing storm sewer on site that will be utilized. As-built inverts and pipe size/materials are provided. Verify condition of existing infrastructure.
- There is existing corrugated plastic pipe in the right-of-way.
- No new storm infrastructure is shown on the conceptual plans yet, but I am assuming runoff from all new impervious surface will be routed to the pond?

Adequacy of Outlet:

- The detention pond discharges to a tributary to Stouts Creek.
- Not located in a critical watershed.

Release Rates/WQv:

- Can the pond modifications meet the 0.9 and 0.5 cfs/acre release rates for the 1% and 10% AEP events?
- 0.5" WQv provided.



BYNUM FANYO & ASSOCIATES, INC.

ARCHITECTURE
CIVIL ENGINEERING
PLANNING

January 25, 2024

Monroe County Highway Department

RE: VA Clinic @ 3098 North Lintel Drive (North Park Area B-2)

Monroe County Drainage Engineer or To Whom It May Concern:

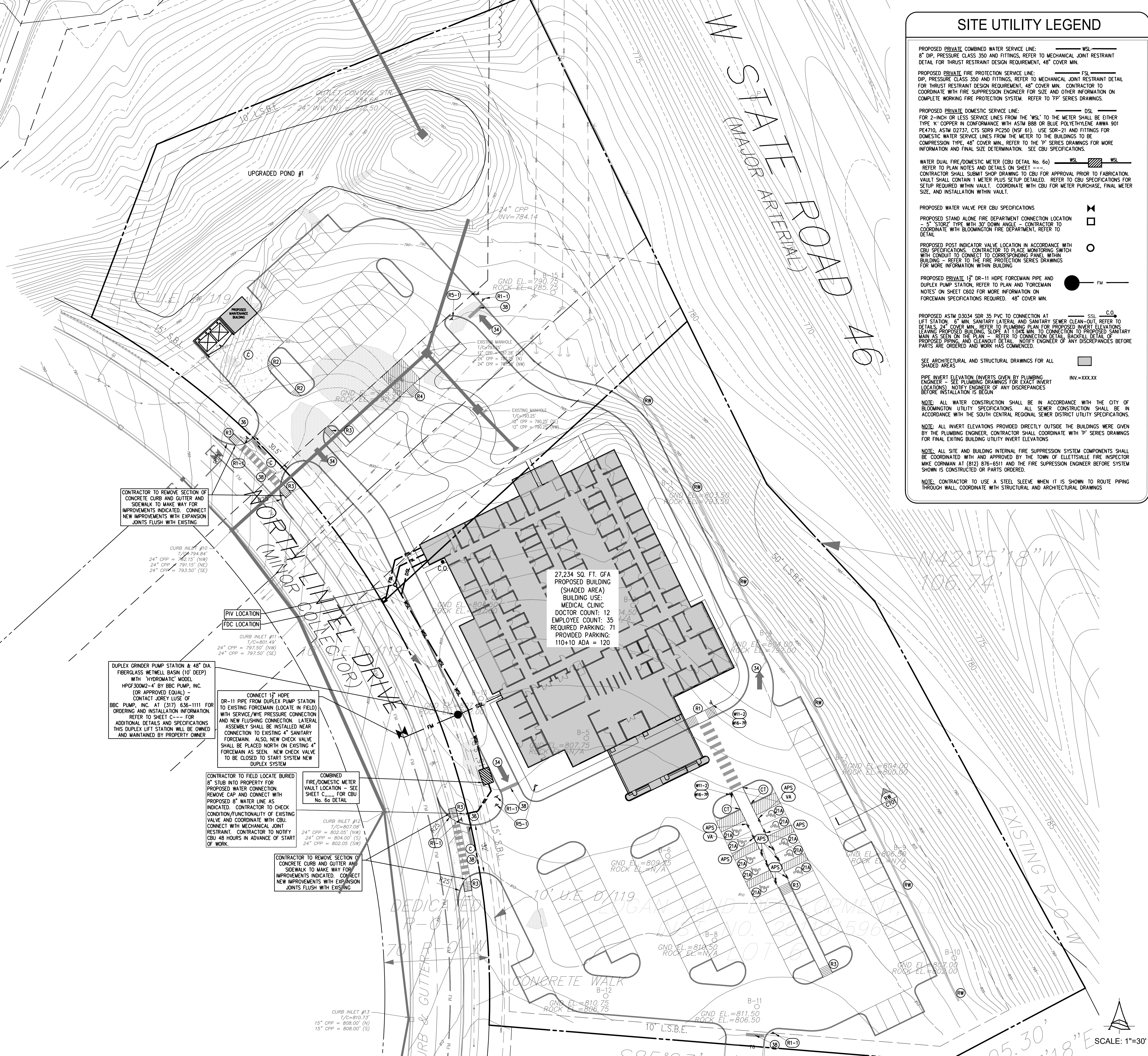
This packet serves as a drainage report and narrative for the new development known as the 'VA Clinic' site located along North Lintel Drive, Bloomington, IN 47404. Attached you will find a report calculating pre-developed and post-developed conditions along with basin maps within the drainage areas of the site and outside the site. You will also find a map showing all sub-basins delineated that are directed toward the proposed pond on site.

This project site is 5.18 acres on two lots with additional off-site acreage coming to the regional pond on this project site. You will find a report breakdown of pre-developed and post-developed impervious areas and other characteristics to calculate runoff coefficients and time of concentration, as attached. The additional acreage of drainage area coming from off-site includes the North Lintel Dr ROW south of this project site and the nursing home/memory care center lot to the west of this site. The regional pond on-site is existing on-site now and will be re-developed to capture and slow down runoff from existing off-site along with the on-site calculations. We have determined that the post-developed site sheds a higher total stormwater runoff rate than the current existing site to the north runoff area. Therefore, we have determined additional detention/sizing in the regional pond was necessary to match rainfall event's runoff rates (in this case, exceed the pre-development runoff rates). Also, please note that we will take the runoff rates from the nursing home/memory care lot before it travels through the ponds (located on that lot) to design for non-functioning ponds possibility from that lot. All stormwater from our site will be treated in this pond and all stormwater will ultimately exit the property to the north into the creek to the north. This creek is known as a tributary to Stouts Creek. Please see attached calculations and plans to model the site's peak runoff rates.

There are no other current downstream restrictions off-site that will inhibit the stormwater discharge that we are proposing for this project.

Sincerely,

Daniel Butler, P.E., Project Engineer



SITE UTILITY LEGEND

- PROPOSED PRIVATE COMBINED WATER SERVICE LINE: WSL
- 8" DIP, PRESSURE CLASS 350 AND FITTINGS, REFER TO MECHANICAL JOINT RESTRAINT DETAIL FOR THRUST RESTRAINT DESIGN REQUIREMENT, 48" COVER MIN.
- PROPOSED PRIVATE FIRE PROTECTION SERVICE LINE: FSL
- DIP, PRESSURE CLASS 350 AND FITTINGS, REFER TO MECHANICAL JOINT RESTRAINT DETAIL FOR THRUST RESTRAINT DESIGN REQUIREMENT, 48" COVER MIN. CONTRACTOR TO COORDINATE WITH FIRE SUPPRESSION ENGINEER FOR SIZE AND OTHER INFORMATION ON COMPLETE WORKING FIRE PROTECTION SYSTEM. REFER TO 'P' SERIES DRAWINGS.
- PROPOSED PRIVATE DOMESTIC SERVICE LINE: DSL
- FOR 2-INCH OR LESS SERVICE LINES FROM THE WSL TO THE METER SHALL BE EITHER TYPE 'K' COPPER IN CONFORMANCE WITH ASTM B88 OR BLUE POLYETHYLENE AWMA 901 PE4710, ASTM D2737, CIS SDR9 PC250 (NSF 61). USE SDR-21 AND FITTINGS FOR DOMESTIC WATER SERVICE LINES FROM THE METER TO THE BUILDINGS TO BE COMPRESSION TYPE, 48" COVER MIN., REFER TO THE 'P' SERIES DRAWINGS FOR MORE INFORMATION AND FINAL SIZE DETERMINATION. SEE CBU SPECIFICATIONS.
- WATER DUAL FIRE/DOMESTIC METER (CBU DETAIL No. 6a) WMS
- REFER TO PLAN NOTES AND DETAILS ON SHEET ---
- CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO CBU FOR APPROVAL PRIOR TO FABRICATION. VAULT SHALL CONTAIN 1 METER PLUS SETUP DETAILED. REFER TO CBU SPECIFICATIONS FOR SETUP REQUIRED WITHIN VAULT. COORDINATE WITH CBU FOR METER PURCHASE, FINAL METER SIZE, AND INSTALLATION WITHIN VAULT.
- PROPOSED WATER VALVE PER CBU SPECIFICATIONS WV
- PROPOSED STAND ALONE FIRE DEPARTMENT CONNECTION LOCATION FDC
- 5" STODIP TYPE WITH 30" DOWN ANGLE - CONTRACTOR TO COORDINATE WITH BLOOMINGTON FIRE DEPARTMENT, REFER TO DETAIL
- PROPOSED POST INDICATOR VALVE LOCATION IN ACCORDANCE WITH CBU SPECIFICATIONS - CONTRACTOR TO PLACE MONITORING SWITCH WITH CONDUIT TO CONNECT TO CORRESPONDING PANEL WITHIN BUILDING - REFER TO THE FIRE PROTECTION SERIES DRAWINGS FOR MORE INFORMATION WITHIN BUILDING
- PROPOSED PRIVATE 1 1/2" DR-11 HOPE FORCE MAIN PIPE AND DUPLEX PUMP STATION. REFER TO PLAN AND FORCE MAIN NOTES ON SHEET C002 FOR MORE INFORMATION ON FORCE MAIN SPECIFICATIONS REQUIRED. 48" COVER MIN. FM
- PROPOSED ASTM D3034 SDR 35 PVC TO CONNECTION AT LEFT STATION. 6" MIN. SANITARY LATERAL AND SANITARY SEWER CLEAN-OUT, REFER TO DETAILS. 24" COVER MIN. REFER TO PLUMBING PLAN FOR PROPOSED INVERT ELEVATIONS LEAVING PROPOSED BUILDING. SLOPE AT 1/4% MIN. TO CONNECTION TO PROPOSED SANITARY MAIN AS SHOWN ON THE PLAN - REFER TO CONNECTION DETAIL, BACKFLOW DETAIL OF PROPOSED PIPING, AND CLEANOUT DETAIL. NOTIFY ENGINEER OF ANY DISCREPANCIES BEFORE PARTS ARE ORDERED AND WORK HAS COMMENCED.
- SEE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR ALL SHARED AREAS SA
- PIPE INVERT ELEVATION (INVERTS GIVEN BY PLUMBING ENGINEER - SEE PLUMBING DRAWINGS FOR EXACT INVERT LOCATIONS). NOTIFY ENGINEER OF ANY DISCREPANCIES BEFORE INSTALLATION IS BEGUN INV=XXXX.XX
- NOTE: ALL WATER CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF BLOOMINGTON UTILITY SPECIFICATIONS. ALL SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE SOUTH CENTRAL REGIONAL SEWER DISTRICT UTILITY SPECIFICATIONS.
- NOTE: ALL INVERT ELEVATIONS PROVIDED DIRECTLY OUTSIDE THE BUILDINGS WERE GIVEN BY THE PLUMBING ENGINEER. CONTRACTOR SHALL COORDINATE WITH 'P' SERIES DRAWINGS FOR FINAL EXISTING BUILDING UTILITY INVERT ELEVATIONS
- NOTE: ALL SITE AND BUILDING INTERNAL FIRE SUPPRESSION SYSTEM COMPONENTS SHALL BE COORDINATED WITH AND APPROVED BY THE TOWN OF ELLETTSVILLE FIRE INSPECTOR MIKE CORNMAN AT (812) 876-6511 AND THE FIRE SUPPRESSION ENGINEER BEFORE SYSTEM SHOWN IS CONSTRUCTED OR PARTS ORDERED.
- NOTE: CONTRACTOR TO USE A STEEL SLEEVE WHEN IT IS SHOWN TO ROUTE PIPING THROUGH WALL. COORDINATE WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS

EXISTING LEGEND

- EXISTING FENCE
- EXISTING WATER LINE
- EXISTING OVERHEAD UTILITY LINES
- EXISTING UNDERGROUND ELECTRIC LINES
- EXISTING UNDERGROUND TELEPHONE LINES
- EXISTING UNDERGROUND FIBER OPTIC LINES
- EXISTING GAS LINE
- EXISTING SANITARY FORCE MAIN
- EXISTING ELEVATION CONTOUR LINE
- EXISTING SANITARY SEWER AND MANHOLE
- EXISTING STORM SEWER AND INLET
- PROPERTY LINE
- GEOTECHNICAL REPORT BORE HOLE LOCATION - SEE SEPARATE GEOTECHNICAL REPORT BY 'APEC' FOR MORE INFORMATION
- GEOTECHNICAL BORING KEY
- GROUND ELEV.=XXX
- ROCK ELEV.=XXX

SITE IMPROVEMENT LEGEND

- (A) PROPOSED ROAD BITUMINOUS PAVING - REFER TO DETAIL
- (A1) PROPOSED HEAVY DUTY ROAD BITUMINOUS PAVING - REFER TO DETAIL
- (C) PROPOSED REINFORCED CONCRETE PAVING - REFER TO DETAIL
- (F) PROPOSED CONCRETE PATIO OR SIDEWALK - REFER TO PLAN FOR LOCATIONS AND REFER TO DETAIL ON DETAILS SHEET.
- (F1) PROPOSED MONOLITHIC CURBS AND SIDEWALK - REFER TO DETAIL
- (13) PROPOSED 6" STANDING CONCRETE CURB - REFER TO DETAIL
- (DC) PROPOSED DEPRESSED CURB - CONTRACTOR TO REFER TO DETAIL FOR 'MONOLITHIC CURB AND SIDEWALK' OR 'STANDING CONCRETE CURB' BUT WITH 0" CURB HEIGHT TO CREATE A FLUSH, SMOOTH TRANSITION FROM ASPHALT TO CONCRETE WHERE INDICATED
- (DC1) PROPOSED DEPRESSED CURB - CONTRACTOR TO REFER TO DETAIL FOR 'CONCRETE CURB AND GUTTER' BUT WITH 1/4" CURB HEIGHT 'UP' TO CREATE A CURB AND GUTTER LOOK BUT WITH LIP WHERE INDICATED TO MATCH EXISTING
- (C1) PROPOSED CONCRETE CURB TRANSITION, 6' LENGTH FROM 0" TO 6" CURB HEIGHT
- (ST) PROPOSED CONCRETE STOOP TO CONNECT TO SIDEWALK WITH EXPANSION JOINT - REFER TO GRADING PLAN AND DETAILS IN ARCHITECT'S PLANS FOR CONNECTION TO BUILDING
- (R1) PROPOSED SIDEWALK ACCESSIBLE RAMP, 1:12 SLOPE MAX., 5/8" DEEP GROOVES SPACED 2" O.C. - TRANSITION CURB FROM 0" TO 6" CURB HEIGHT OVER 6' LENGTH
- (R2) PROPOSED SIDEWALK ACCESSIBLE RAMP, TYPE "G" - REFER TO DETAIL
- (R3) PROPOSED INDOT SIDEWALK ACCESSIBLE RAMP, TYPE "H" - REFER TO DETAIL
- (R4) PROPOSED INDOT SIDEWALK ACCESSIBLE RAMP, TYPE "A" - REFER TO DETAIL
- (21) PROPOSED PARKING MARKING, PAINTED, SOLID, WHITE, 4" WIDE
- (21A) PROPOSED ADA PARKING MARKING AND CROSS-HATCH; PAINTED, SOLID, BLUE - REFER TO DETAIL
- (34) PROPOSED STRAIGHT LANE INDICATION ARROW PARKING MARKING, THERMOPLASTIC, SOLID, WHITE, 3"-3" WIDE, 9"-6" TALL (TRANSVERSE MARKING LANE INDICATION ARROW PER INDOT STANDARD SPECIFICATION 808.07 AND STANDARD DRAWING 808-WKPM-01)
- (36) PROPOSED STOP BAR PAVEMENT MARKING; PAVEMENT MARKING PAINT, SOLID, WHITE, 24" SPACING, 12" LONG, 4" SEPARATION FROM ANY CROSS-WALK MARKINGS
- (38) PROPOSED CROSSWALK PAVEMENT MARKING; PAVEMENT MARKING PAINT, SOLID, 24" WIDE, 24" SPACING, WHITE, 6" WIDTH, SEE PLAN (CROSSWALK PER INDOT STANDARD 808.07)
- (APS) ACCESSIBLE RESERVED PARKING SIGN, REFER TO DETAIL
- (VA) VAN ACCESSIBLE SUPPLEMENTAL SIGN ACCORDING TO NATIONAL ADA STANDARDS - FASTEN BELOW ACCESSIBLE RESERVED PARKING SIGN WHERE INDICATED, REFER TO DETAIL
- (R1-1) PROPOSED INDOT 30" x 30" ROAD 'STOP' SIGN - REFER TO DETAILS
- (DE) PROPOSED OPAQUE DUMPSTER SCREEN WITH BOLLARDS - REFER TO ARCHITECTURAL DETAILS FOR MORE INFORMATION AND BOLLARD ARRANGEMENT
- (PB) PROPOSED CONCRETE PARKING BUMPER BLOCK, 7" LONG - REFER TO DETAIL
- (RW) PROPOSED SEGMENTAL BLOCK RETAINING WALL, SEE GRADING PLAN FOR ELEVATIONS AT GRADE - REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR DETAILS. WALL MUST BE 30" TALLER THAN IMMEDIATE ADJACENT GRADE. ALSO, REFER TO TYPICAL SECTION DETAIL OF THESE PLANS
- (RW1) PROPOSED DECORATIVE RETAINING WALL, SEE GRADING PLAN FOR ELEVATIONS AT GRADE - REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR DETAILS
- (L) OUTDOOR THERAPY AREA - PROPOSED LANDSCAPING WALKING PATHS, STAIRS, ORNAMENTAL FENCING AND OTHER GARDEN FEATURES. REFER TO LANDSCAPE PLAN FOR PLANTINGS AND ARCHITECTURAL PLANS FOR SPECIFICATIONS OF FEATURES. REFER TO SITE GRADING AND DRAINAGE PLANS, AS WELL
- (XX) # OF PARKING SPACES PER PARKING ROW
- SEE ARCHITECTURAL & STRUCTURAL DRAWINGS/SPECIFICATIONS FOR ALL SHADED AREAS

PROJECT NATURE & USE

THE PROPERTY WILL BE USED AS 'MEDICAL CLINIC' CLASSIFIED AS A LOW INTENSITY USE. THIS WILL INCLUDE 2 NEW BUILDINGS WITH 110 VEHICLE PARKING STALLS AND 10 ADA PARKING STALLS FOR A TOTAL OF 120. THIS LOT IS IN THE 'NORTH PARK ORDINANCE PUD' ZONE, AND 'MEDICAL CLINIC' IS A PERMITTED USE BUT WILL NEED TO BE APPROVED BY THE MONROE COUNTY PLAN COMMISSION. LOT SIZE = 5.18 ACRES (TWO LOTS) BLOOMINGTON AND RICHLAND TOWNSHIP; SE QUARTER OF SECTION 24 & 19, 19N, R2W

OWNER CONTACT INFO.

DEVELOPER: ZRB DEVELOPMENT - 9152 KENT AVE., INDIANAPOLIS, IN 46202 (CONTACT: ZACH BURNS - (317)443-1879)

NOTE TO CONTRACTOR

CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS & DEPTHS AND NOTIFY ENGINEER OF ANY INACCURACIES IN LOCATION OR ELEVATION OR NOTIFY CONFLICTS PRIOR TO & AFTER ANY EXCAVATION. NO PAYMENT SHALL BE MADE TO CONTRACTOR FOR UTILITY DESTRUCTION OR UNDERGROUND CHANGES REQUIRED DUE TO CONFLICTING ELEVATIONS.

revisions:

ARCHITECTURE
CIVIL ENGINEERING
PLANNING

BYNUM FANYO & ASSOCIATES, INC.

528 north walnut street
Bloomington, Indiana
(812) 339-2990 (Fax)

certified by:

PROPOSED VETERANS AFFAIRS HOSPITAL AT NORTH PARK

3054 N LINTEL DRIVE
BLOOMINGTON, IN 47404

title: SITE IMPROVEMENT PLAN

designed by: DAS
drawn by: DAS
checked by: DJB
sheet no: C301
project no.: 402344

SCALE: 1"=30'

STR #	Upstream Manhole	Downstream Manhole	Length (ft)	C	A (Ac)	C*A	C*A Sum (min)	t (min)	t _{cum.} (min)	i (in/hr)	Q (cfs)	Pipe Diameter (in)	Pipe Slope (%)	Pipe Capacity (cfs)	Velocity (ft/s)	Travel Time (min)	Rim Elevation (UP)	Rim Elevation (DN)	Invert Elevation (UP)	Invert Elevation (DN)	Pipe Cover (UP)	Pipe Cover (DN)	Comment
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
101	RD/UD	102	76	0.76	0.19	0.14	-	5.00	-	10.40	1.50	8	1.30	1.49	4.26	0.30	823.00	822.25	820.83	819.84	1.50	1.74	*
102	101	102B	38	0.81	0.47	0.38	-	5.00	-	10.40	5.46	12	2.00	5.45	6.94	0.09	822.25	823.00	819.84	819.08	1.41	2.92	15*
102A	UD	102B	154	0.86	0.51	0.44	-	5.00	-	10.40	4.56	12	1.50	4.72	6.01	0.43	825.00	823.00	822.50	820.19	1.50	1.81	
102B	102/102A	103	164	0.95	0.00	0.00	-	5.00	-	10.40	10.02	18	1.00	11.37	6.44	0.42	823.00	822.00	819.08	817.44	2.42	3.06	15*
103	102B	108	124	0.82	0.18	0.15	-	5.00	-	10.40	11.56	18	1.10	11.93	6.75	0.31	822.00	819.90	817.44	816.08	3.06	2.32	6*
104	RD/UD	105	120	0.57	0.57	0.32	-	10.00	-	8.08	2.63	12	1.00	3.85	4.90	0.41	820.20	821.60	818.37	817.17	0.83	3.43	**
105A	RD	105	50	0.64	0.06	0.04	-	5.00	-	10.40	0.40	8	1.50	1.60	4.58	0.18	822.50	821.60	819.84	819.09	1.99	1.84	
105	104/105A/UD	106	78	0.85	0.21	0.18	-	5.00	-	10.40	4.48	12	1.50	4.72	6.01	0.22	821.60	822.12	817.17	816.00	3.43	5.12	***
106	105/RD	107	84	0.83	0.30	0.25	-	5.00	-	10.40	7.07	15	1.20	7.66	6.24	0.22	822.12	819.25	816.00	814.99	4.87	3.01	****
107	106/UD/RD	108	38	0.61	0.36	0.22	-	10.00	-	8.08	8.85	18	1.00	11.37	6.44	0.10	819.25	819.90	814.99	814.61	2.76	3.79	5*
108	103/107	110	236	0.85	0.09	0.08	-	5.00	-	10.40	21.20	24	0.77	21.51	6.85	0.57	819.90	822.50	814.61	812.79	3.29	7.71	6A*
109	-	110	20	0.91	0.28	0.25	-	5.00	-	7.45	1.90	8	2.50	2.06	5.91	0.06	822.21	822.50	819.66	819.16	1.88	2.67	7*
110	108/109/RD	111	26	0.95	0.00	0.00	-	5.00	-	10.40	23.10	24	1.00	24.52	7.80	0.06	822.50	822.06	812.79	812.53	7.71	7.53	
111	RD/110	112	60	0.92	0.16	0.15	-	5.00	-	10.40	24.63	24	1.05	25.12	8.00	0.13	822.06	822.16	812.53	811.90	7.53	8.26	7*
112	111/RD	113	32	0.79	0.10	0.08	-	5.00	-	10.40	25.45	24	1.10	25.71	8.18	0.07	822.16	819.00	811.90	811.55	8.26	5.45	7*
113	112/RD	OUT	172	0.66	0.39	0.26	-	5.00	-	10.40	28.13	24	1.40	29.01	9.23	0.31	819.00	812.50	811.55	809.14	5.45	1.36	8*
114	UD/RD	117	60	0.74	0.51	0.38	-	15.00	-	4.84	1.83	8	2.00	1.85	5.29	0.19	821.00	821.50	818.78	817.58	1.55	3.25	9*
115	RD	117	127	0.54	0.23	0.12	-	5.00	-	10.40	1.29	8	1.00	1.30	3.74	0.57	822.25	821.50	819.50	818.23	2.08	2.60	10*
116	RD	117	92	0.82	0.18	0.15	-	5.00	-	10.40	1.54	8	1.50	1.60	4.58	0.33	822.25	821.50	819.50	818.12	2.08	2.71	11*
117	114/115/UD1	118	58	0.90	0.22	0.20	-	5.00	-	10.40	6.71	12	3.10	6.78	8.64	0.11	821.50	822.50	817.58	815.78	2.92	5.72	12*
118	RD/116	120	102	0.95	0.00	0.00	-	5.00	-	10.40	6.71	15	1.00	6.99	5.70	0.30	822.50	822.50	815.78	814.76	5.47	6.49	
119	UD/RD	120	60	0.68	0.34	0.23	-	5.00	-	10.40	2.40	12	1.00	3.85	4.90	0.20	820.50	822.50	817.67	817.07	1.83	4.43	13*
120	117/118	121	80	0.95	0.00	0.00	-	5.00	-	10.40	9.12	15	3.00	12.11	9.87	0.14	822.50	817.50	814.76	812.36	6.49	3.89	
121	119/RD	OUT	154	0.95	0.06	0.06	-	5.00	-	10.40	9.71	15	3.80	13.63	11.10	0.23	817.50	811.00	812.36	806.51	3.89	3.24	14*
To Pond 1 (before detention)											37.84												

Comments:

- * Anticipated rain garden/bio-swale to hold 224.5 cubic feet of water when casting raised to 824.00. (Impervious area to this structure = 4950 sq. ft. x 1/2" = 206.2 cu. Ft.) (Requirement met)
- ** Anticipated water quality/detention pond no. 3 to hold 469 cubic feet of water when casting raised to 821.11 - see water quality/detention pond 3 below (Impervious area to this structure = 11264 sq. ft. x 1/2" = 469 cu. Ft.) (Requirement met)
- *** Anticipated bio-swale/rain garden to hold only 60.8 cubic feet of water volume when casting rim set at 822.00 and the northeast detention pond will provide the additional water quality requirement for this structure. (Impervious area to this structure = 9000 sq. ft. x 1/2" = 375 cu. Ft - 60.8 = 314.2 required)
- **** The northeast water quality/detention pond no. 1 will provide the stormwater quality requirement for this structure. (Impervious area to this structure = 12,400 sq. ft. x 1/2" = 516.6 cu. Ft.)
- 5* Anticipated water quality/detention pond no. 2 to hold 408 cubic feet of water when casting raised to 821.16. - see water quality/detention pond 3 below (Impervious area to this structure = 9800 sq. ft. x 1/2" = 408 cu. Ft.) (Requirement met)
- 6* Anticipated bio-swale/rain garden to hold only 158 cubic feet of water volume when casting rims set at 823.08 and the northeast water quality/detention pond no. 1 will provide the additional stormwater quality requirement for this area. (Impervious area to this structure = 6700 sq. ft. x 1/2" = 279.2 cu. Ft. - 158 = 121 cu. Ft. required)
- 6A* Anticipated rain garden/bio-swale to hold 240.7 cubic feet of water when casting raised to 821.40. (Impervious area to this structure = 3500 sq. ft. x 1/2" = 146 cu. Ft.) (Requirement met)
- 7* The northeast water quality/detention pond no. 1 will provide the stormwater quality requirement for structures 109, 111, and 112. (Impervious area to these structures = 19750 sq. ft. x 1/2" = 822.9 cu. Ft.)
- 8* The northeast water quality/detention pond no. 1 will provide the stormwater quality requirement for this structure. (Impervious area to this structure = 14550 sq. ft. x 1/2" = 606.25 cu. Ft.)
- 9* Anticipated bio-swale/rain garden to hold only 491 cubic feet of water volume when casting rim set at 821.40 and the northeast water quality/detention pond no. 1 will provide the additional

- stormwater quality requirement for this area. (Impervious area to this structure = 18560 sq. ft. x 1/2" = 773.3 cu. Ft. - 491.2 = 282.1 required)
- 10* The northeast water quality/detention pond no. 1 will provide the stormwater quality requirement for this area. (Impervious area to this structure = 7530 sq. ft. x 1/2" = 313.75 cu. Ft.)
- 11* The northeast water quality/detention pond no. 1 will provide the stormwater quality requirement for this area. (Impervious area to this structure = 6900 sq. ft. x 1/2" = 287.5 cu. Ft.)
- 12* Anticipated bio-swale/rain garden to hold 359 cubic feet of water when casting raised to 822.00. (Impervious area to this structure = 7900 sq. ft. x 1/2" = 329.1 cu. Ft.) (Requirement met)
- 13* Anticipated bio-swale/rain garden to hold only 45.5 cubic feet of water volume when casting rim set at 821.90 and the northeast water quality/detention pond no. 1 will provide the additional stormwater quality requirement for this structure. (Impervious area to this structure = 7529 sq. ft. x 1/2" = 313.7 cu. Ft. - 45.5 = 268.2 required)
- 14* The northeast water quality/detention pond no. 1 will provide the stormwater quality requirement for this structure. (Impervious area to this structure = 2292 sq. ft. x 1/2" = 95.5 cu. Ft.)
- 15* Anticipated bio-swale/rain garden to hold only 546 cubic feet of water volume when casting rims set at 823.50 and the northeast water quality/detention pond no. 1 will provide the additional stormwater quality requirement for this area. (Impervious area to this structure = 16583 sq. ft. x 1/2" = 691 cu. Ft. - 546 = 144 cu. Ft. required)

On-site northeast water quality/detention pond no. 1 stormwater quality requirement calculation:

Requirement from impervious area of the site not already meeting stormwater quality requirement (see above comments) ->
 $516.6 \text{ ft}^3 + 314.2 + 121 + 822.9 + 606.25 + 282.1 + 313.75 + 287.5 + 268.2 + 95.5 + 144 = 3772.4 \text{ ft}^3 \text{ required}$

Pond Calculation:

806 contour: 2206 sq. ft. The outlet control structure rim must be set at least at 807.05 to achieve 3772.4 ft³ storage
 807 contour: 3000 sq. ft.
 808 contour: 3882 sq. ft.
 809 contour: 4871 sq. ft.
 810 contour: 5998 sq. ft.
 811 contour: 7289 sq. ft.

Water quality/detention pond no. 2 stormwater quality requirement calculation:

408 ft³ required

Pond Calculation:

820 contour: 168 sq. ft. The outlet control structure rim must be set at least at 821.16 to achieve 408 ft³ storage
 821 contour: 438 sq. ft.
 821.5 contour: 604 sq. ft.

Water quality/detention pond no. 3 stormwater quality requirement calculation:

469 ft³ required

Pond Calculation:

821 contour: 834 sq. ft. The outlet control structure rim must be set at least at 821.11 to achieve 469 ft³ storage
 822 contour: 1554 sq. ft.
 823 contour: 2562 sq. ft.



Monroe County Stormwater Services

Located at Monroe County Highway Department:
501 N. Morton Street, Suite 216, Bloomington, IN 47404

Phone: (812) 349-2565

Fax: (812) 349-2959

www.co.monroe.in.us

To: Monroe County Drainage Board
From: Kelsey Thetonia, MS4 Coordinator
Date: January 23, 2024
Re: Updated 2024 Meeting Schedule for the Monroe County Drainage Board

Location: Room 106D, Showers Building OR virtual attendance via Zoom (Hybrid format)

Time: 8:30 AM

Monthly Meeting Dates:

January 4, 2024
February 1, 2024
March 7, 2024
April 9, 2024
May 14, 2024
June 11, 2024
July 9, 2024
August 13, 2024
September 10, 2024
October 8, 2024
November 12, 2024
December 10, 2024

If there is a change in the date, time, or location, we will issue a notice for the changes. If you have any questions or concerns with the above dates, please contact Kelsey Thetonia at (812) 349-2499.