

Village of Mukwonago
Notice of Meeting and Agenda

PLAN COMMISSION MEETING
Monday, August 12, 2024

Time: **6:30 pm**

Place: **Mukwonago Municipal Building, Board Room, 440 River Crest Ct**

1. Call to Order

2. Roll Call

3. Comments from the Public

Please be advised, per Wisconsin Statute Sec. 19.84(2), information and comment will be received from the public by the Plan Commission. The Public Comment Session is granted to the public at the start of each Plan Commission meeting. The Public Comment Session shall last no longer than fifteen (15) minutes and individual presentations are limited to three (3) minutes per speaker. However, these time limits may be extended at the discretion of the Chief Presiding Officer. The Plan Commission may not respond to or have any discussion on information received during the public comment session unless it is placed upon the Agenda for a subsequent meeting. Public comments should be addressed to the Plan Commission as a body. Presentations shall not deal in personalities personal attacks on members of the Plan Commission, the applicant for any project or Village Employees. Comments shall not be used to engage others in a debate in this forum. All comments, questions and concerns should be presented in a respectful professional manner. Any questions to an individual member of the Plan Commission or Staff will be deemed out of order by the Presiding Officer.

4. Approval of Minutes

- 4.1 Minutes from Planning Commission meeting of June 11 2024.
[20240611 PC Minutes draft](#)

5. Public Hearings

All persons interested in making comments about any of the public hearing items will be heard. Formal petitions and written comments regarding any of the public hearing items may be submitted tonight. During the public hearing(s), if you wish to be heard, the Plan Commission asks that you begin by stating your name and address, speak for no more than three minutes and attempt to avoid duplication. Each person speaking at the public hearing must sign the Public Hearing Appearance sign-in sheet before speaking. The sign-in sheet is available on the table located at the back of the room.

- 5.1 Public hearing on Conditional Use Permit for Mama Bear Catering, a Catering Service, located at 225 Bay View Road, Suite 100 (MUKV2014988), applicant (Dana Kohlmann)
[Public Hearing Notice-Mama Bear Catering-Conditional Use Permit](#)
- 5.2 Public hearing on Conditional Use Permit for Final Development Plan for Phase 1 of a Planned Unit Development for Neumann Developments, Inc. for Cardinal Ridge Subdivision located at S92W27720 Edgewood Avenue (MUKV 2091-995), applicant (Neumann Developments, Inc., Developer)
[Public Hearing Notice-Phase 1 Final Development Plan-Cardinal Ridge PUD](#)

6. New Business

Discussion and Possible Action on the Following Items

- 6.1 Discussion and possible recommendation to the Village Board to approve **Resolution 2024-41** Conditional Use Permit for a Mama Bear Catering, a Catering Service, located at 225 Bay View Road, Suite 100 (MUKV 2014-988), applicant (Dana Kohlmann)
[Staff Report-20240805-Mama Bear Catering-CU](#)
[RESOLUTION 2024-41 - Mama Bear Catering CU](#)
- 6.2 Discussion and possible recommendation to the Village Board for approval of **Resolution 2024-42** for a Planned Unit Development Overlay/Final Development Plan for Phase 1 Cardinal Ridge Subdivision located at Edgewood Avenue (MUKV 2091-995), applicant (Neumann Developments, Inc.,)
[1 Staff Report-20240806-Cardinal Ridge PUD Final Development Plan - Phase 1](#)
[2 Mukwonago FDP Submittal 7.10.24](#)
[3 CIVIL PLANS_CARDINAL RIDGE PH1_2024-07-17](#)
[4 SWMP_Cardinal Ridge_Phase I_2024-07-19](#)
[5 maintenance-agreement-Cardinal Ridge](#)
[RESOLUTION 2024-42 Cardinal Ridge Final Development Plan - Phase 1](#)
- 6.3 Discussion and possible action on **PC Resolution 2024-08** A Plan Commission Resolution to approve a Site Plan and Architectural Review (SPAR) for a new canopy structure.
[Staff Report-20240805-Tractor Supply-SPAR](#)
[PC-RESOLUTION 2024-08 - Tractor Supply SPAR](#)

7. Adjournment

Membership:

Eric Brill, John Meiners, Karl Kettner, Mark Penzkover, Tim Rutenbeck, Jason Wamser, Fred Winchowky, and Village Planner (Advisory)

It is possible that a quorum of, members of other governmental bodies of the municipality may be in attendance at the above stated meeting to gather information. No action will be taken by any governmental body at the above stated meeting other than the governmental body specifically referred to above in this notice. Please note, upon reasonable notice, efforts will be made to accommodate the needs of individuals with disabilities through appropriate aids and services. For additional information or to request this service, contact the Municipal Clerk's Office, (262) 363-6420.

MINUTES OF THE PLAN COMMISSION MEETING

Tuesday, June 11, 2024

Call to Order

President Winchowky called the meeting to order at 6:30 p.m. located in the Board Room of the Mukwonago Municipal Building, 440 River Crest Ct.

Roll Call

Commissioners present: Fred Winchowky, Village President
Eric Brill
Tim Rutenbeck
Karl Kettner
John Meiners

Excused: Mark Penzkover
Absent: Jason Wamser

Also present: Peter Gesch, Ruekert-Mielke, Village Planner
Diana Dykstra, Clerk/ Treasurer/ Interim Administrator
Shay Zervas, Deputy Clerk/ Treasurer

Comments from the Public

No Comments
Closed 6:32pm

Approval of Minutes

Meiners/Rutenbeck motion to approve minutes from May 14, 2024 regular meeting.
Unanimously carried.

Public Hearings

Public hearing notice on Conditional Use Permit for a drive-through facility associated with a new restaurant (Dunkin Donuts) located on the north side of Bay View Road, West of STH 83, at MUKV2014987, applicant (Kardo Group, LLC)

No Comments
Closed 6:33 pm

New Business

Discussion and possible recommendation to approve Resolution 2024-35 Conditional Use Permit for a drive-through facility associated with a new restaurant (Dunkin Donuts) located on the north side of Bay View Road, West of STH 83, at MUKV2014987, applicant (Kardo Group, LLC)

Meiners/Rutenbeck motioned to recommend to Village Board to approve Resolution 2024-35 Conditional Use Permit for a drive-through facility associated with a new restaurant (Dunkin Donuts) located on the north side of Bay View Road, West of STH 83, at MUKV2014987, applicant (Kardo Group, LLC) Unanimously carried.

Discussion and possible action on PC-Resolution 2024-07 A Plan Commission Resolution to approve a site Plan and Architectural Review for Dunkin Donuts Drive Through MUKV2014-987

Commissioner Meiners commented against the location of entrance/exit of driveway, he felt it is too close to intersection of 83 and Bayview Rd and expressed concern about traffic and potential for accidents.

Planner Gesch stated that DOT confirmed location of entrance/exit driveway. The site plan already addressed and removed entrance that was located closer to 83 intersection. He stated it is a possibility that Donkin' Donuts could explore access through Brooklife Church access road behind location. No issue from Fire Department regarding small lot size.

Motion carried 4 - 1, (Meiners Opposed)

Adjournment

Meeting adjourned at 6:50 p.m.

Respectfully Submitted,
Shay Zervas
Deputy Clerk/Treasurer

NOTICE OF PUBLIC HEARING
VILLAGE OF MUKWONAGO PLAN COMMISSION

The Village of Mukwonago Plan Commission will conduct a public hearing on Monday, August 12, 2024, for the following:

Conditional Use Permit for Mama Bear Catering, a Catering Service, located at 225 Bay View Road, Suite 100 (MUKV2014988), applicant (Dana Kohlmann)

The meeting will be held in the Board Room of the Village Hall located at 440 River Crest Court, Mukwonago, Waukesha and Walworth Counties. The meetings starts at 6:30PM and the public hearings will be conducted in the order listed on the meeting agenda.

For information regarding these public hearings, contact the Village Planner at planner@villageofmukwonago.gov or 262-363-6420 during regular office hours. All interested parties will be heard.

Notice was sent to property owners within 250 feet of the property and surrounding municipality Clerks within 1000 feet of the Village of Mukwonago boundary.

Upon reasonable notice, efforts will be made to accommodate the needs of individuals with disabilities through appropriate aids and services. For additional information or to request this service, please contact Diana Dykstra, at 262-363-6420.

VILLAGE OF MUKWONAGO
Diana Dykstra, Clerk-Treasurer

Legal notice to be published in the *Waukesha Freeman* on July 27 and August 3, 2024.

NOTICE OF PUBLIC HEARING
VILLAGE OF MUKWONAGO PLAN COMMISSION

The Village of Mukwonago Plan Commission will conduct a public hearing on Monday, August 12, 2024, for the following:

Final Development Plan for Phase 1 of a Planned Unit Development for Neumann Developments, Inc. for Cardinal Ridge Subdivision located at S92W27720 Edgewood Avenue (MUKV2091995), applicant (Neumann Developments, Inc., Developer)

The meeting will be held in the Board Room of the Village Hall located at 440 River Crest Court, Mukwonago, Waukesha and Walworth Counties. The meetings starts at 6:30PM and the public hearings will be conducted in the order listed on the meeting agenda.

For information regarding these public hearings, contact the Village Planner at planner@villageofmukwonago.gov or 262-363-6420 during regular office hours. All interested parties will be heard.

Notice was sent to property owners within 250 feet of the property and surrounding municipality Clerks within 1000 feet of the Village of Mukwonago boundary.

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VILLAGE OF MUKWONAGO
Diana Dykstra, Clerk-Treasurer

Legal notice to be published in the *Waukesha Freeman* on July 27 and August 3, 2024.

PLAN COMMISSION STAFF REPORT

TO: Village of Mukwonago Plan Commission

FROM: Peter Gesch, P.E., Ruekert & Mielke, Inc.

REPORT DATE: August 5, 2024

MEETING DATE: August 12, 2024, 6:30 P.M.

SUBJECT: Mama Bear Catering – Conditional Use

BASIC INFORMATION	
Project:	Mama Bear Catering
Applicant:	Dana Kohlmann
Consulting Engineer:	N/A
Consulting Architect:	N/A
Request:	Conditional Use Permit
Staff Recommendation:	Approve with Conditions

PARCEL DATA/CHARACTERISTICS	
Tax Key:	MUKV2014988
Site Address:	225 Bay View Road, Suite 100
Acreage:	2.00 Acres
Current Use:	Vacant/For Lease
Proposed Use:	Catering Service
Reason for Request:	Opening a Catering Service
Land Use Classification:	Business
Zoning Classification:	B-2 – General Business

Project Summary & Overview

Mama Bear Catering plans to lease the 2,000 square foot area in Suite 100 at the above address. The space will be utilized as a commercial kitchen to support Mama Bear Catering's normal operations. The kitchen may be rented out to other catering cooks or food truck operators to prepare food and take off-site. No on-site food trucks will be serving food and no food service will occur out of the building. The applicant may also utilize the space for cooking classes in the future however exact plans have not yet been established.

The applicant will need to coordinate with the Fire Department and Building Inspection for proper fire protection.

~Mukwonago, Village of > 12-10215 > Mama Bear Catering > Staff Report-20240805-Mama Bear Catering-Conditional Use~

Conditional Use Request

Attached to this staff report is the justification questions for a Conditional Use Permit that have been answered by the applicant. The Planning Commission shall take these into consideration when making their decisions.

Conditional Use Process / Findings

The established review procedures are that the Plan Commission shall hold a public hearing and make a recommendation to the Village Board whom makes the final decision.

Following the close of the public hearing, the Plan Commission may recommend (1) approval, (2) approval with conditions, or (3) denial.

If approval is recommended, the Plan Commission can recommend conditions deemed necessary to protect public health, safety, and welfare. The Plan Commission, in passing on the matter, will need to make the following determinations consistent with Section 100-354 of Mukwonago's Zoning Regulations:

1. The establishment, maintenance or operation of the conditional use will not be detrimental to or endanger the public health, safety or welfare of the Village.
2. The uses, values and enjoyment of other property in the surrounding neighborhood that are already permitted shall be, in no foreseeable manner, substantially impaired or diminished by the establishment, maintenance or operation of the conditional use.
3. The establishment, maintenance or operation of the conditional use is compatible with surrounding properties, whether in the same or different zoning districts. In making this determination, the Plan Commission and Village Board must determine whether the petitioner has demonstrated there are no adverse effects on surrounding properties or that potentially adverse effects have been eliminated or reduced to an acceptable level. Approaches that could be employed to mitigate potentially adverse effects will depend on the particular circumstances but may include:
 - a. Adjusting the location of the use, or parts thereof, on the subject property;
 - b. Limiting hours of operation;
 - c. Limiting the size or scope of the use, or parts thereof;
 - d. Controlling how the use is managed on an ongoing basis;
 - e. Providing additional landscaping;
 - f. Providing additional screening; and
 - g. Limiting operations conducted out-of-doors, if otherwise allowed
4. The establishment of the conditional use will not impede the normal and ordinary development and improvement of the surrounding property for uses permitted within the district and/or which are consistent with the standards in the Comprehensive Plan.
5. Adequate utilities, access roads, drainage and other necessary site improvements have been or are being made to accommodate the use.
6. Adequate measures have been taken or will be taken providing ingress and egress to minimize traffic congestion on public streets so as not to diminish the level of service of any intersection which is impacted by traffic arising from the conditional use.

In addition, the property owner / tenant has shown compliance with the requirements set forth in the Village's zoning regulations for specified use.

~Mukwonago, Village of > 12-10215 > Mama Bear Catering > Staff Report-20240805-Mama Bear Catering-Conditional Use~

The Village Board will carefully review the recommendation of the Plan Commission and concurs with the Plan Commission's findings set forth above, provided the conditional use is operated pursuant to the conditions of approval set forth in this order.

These findings are incorporated into the draft conditional use order which is attached.

The Plan Commission shall approve a conditional use application if the terms and conditions of the zoning regulations are met. However, in the event the terms and conditions of the ordinance are not consented to and complied with by the applicant, the Commission may deny the application. In addition, the Commission may deny the application or place conditions on it if substantial evidence, as defined in §62.23(7) Wis. Stats. is presented. That evidence must demonstrate the inability of the applicant to comply with or meet the conditions of the zoning regulations or that the conditions to be applied by the Plan Commission are necessary to protect the public health, safety or welfare of the community based upon the presentation of substantial evidence. Potential motion for approval to Recommend to the Village Board approval of the project as a conditional use as set forth in the attached conditional use order as drafted, provided the Village Attorney approves the final form of the conditional use order.

Staff Review

Engineering:	No Comments
Public Works	No Comments
Utilities	No Comments
Police	No comments
Fire:	Will coordinate with applicant for fire protection and detection needs.
Building Inspection	Will coordinate with applicant as needed through the application process.
Planning	No comments

Recommended Action

Conditional Use Permit

Staff recommends the Planning Commission recommend to the Village Board approval of a conditional use permit as set forth in the provided resolution.

To – Grant a Conditional Use Permit for a drive-thru facility with the following on-going conditions deemed necessary to protect the health, safety, and welfare:

1. Ongoing conditions of approval. The following conditions shall constitute an ongoing obligation:
 - a. Any modifications to the site, buildings, site improvements, shall require the conditional use application being updated.
2. The following conditions are also true and are consistent with Section 100-354 of Mukwonago's zoning regulations:

- a. The establishment, maintenance or operation of the conditional use will not be detrimental to or endanger the public health, safety or welfare of the Village.
- b. The uses, values and enjoyment of other property in the surrounding neighborhood that are already permitted shall be, in no foreseeable manner, substantially impaired or diminished by the establishment, maintenance or operation of the conditional use.
- c. The establishment, maintenance or operation of the conditional use is compatible with surrounding properties, whether in the same or different zoning districts.
- d. The establishment of the conditional use will not impede the normal and ordinary development and improvement of the surrounding property for uses permitted within the district and/or which are consistent with the standards in the Comprehensive Plan.
- e. Adequate utilities, access roads, drainage and other necessary site improvements have been or are being made to accommodate the use.
- f. Adequate measures have been taken or will be taken providing ingress and egress to minimize traffic congestion on public streets so as not to diminish the level of service of any intersection which is impacted by traffic arising from the conditional use.

Attachments

1. Application and Development Information

Process Details: PZ24-0021Property Address: 225 BAY VIEW RD 100 | Parcel: [MUKV2014988](#)**Property Owner:** GREENWALD FAMILY LIMITED PARTNERSHIP**Summary Information**

> 13 Process Step(s) Found

> 0 Inspection(s) Found

This CONDITIONAL USE (AMENDMENT) was created from an application. [Click here to view the application.](#)**Amount Due**Process - CONDITIONAL USE
(AMENDMENT) Total**\$475.00**[Pay Now](#)**Process Information**

Filed As	CONDITIONAL USE (AMENDMENT)	Application Date	07/01/2024
Process Name	CONDITIONAL USE (AMENDMENT)	Date Process Started	No Data to Display
Process Number	PZ24-0021	Date Completed	No Data to Display
Status	Preprocess - Hold	Last Status Change	07/01/2024
Scope Of Work	Mama Bear Catering to occupy the former Buckys Fine Meats space. Operation details in business plan attached, but space will be used as a commercial prep kitchen for our ongoing catering business as well as licensing space to other culinary artisans for their prep kitchen needs. Ultimately we would like to also use the space for cooking classes and be open to the public for the sale of food items made by the culinary artisans that work within the space. The space will be occupied for kitchen prep work most days between 7 am to 7 pm. Hours for sale of items to the public will need to be determined at a later date, but saturday and sunday mornings would be the goal to start with.		
Conditions	No Data to Display		

Process Step Information

Step Number	Step Display Name	Status	Date Step Started	Date Step Completed	Date Step Due	
1	Application Completeness Review	Not Started				View
2	Schedule Hearing Dates	Not Started				View
3	Notify Land Owners - 250ft - Send to Clerk	Not Started				View
4	Notify Muni's within 1000ft - Include with 250ft Buffer	Not Started				View
5	Run Ad - Class 2 Notice	Not Started				View
6	Staff Review	Not Started				View
7	Post PC Agenda	Not Started				View
8	PC PH Review Recommend Resol	Not Started				View
9	Village Board	Not Started				View
10	Village Board Decision	Not Started				View
11	Owner and Applicant Notified	Not Started				View
12	Update Map	Not Started				View
13	Engineer - Refresh GIS Map	Not Started				View

Document Summary

Document Title

IMAGES OF EXISTING ELEVATIONS OF STRUCTURE(S)

[\[Expand All\]](#)

Version	Document Title	Review Status	Received	Completed	
1	IMAGES OF EXISTING ELEVATIONS OF STRUCTURE(S)	Not Started			No Attachment

IMAGES OF PROPOSED ELEVATIONS OF STRUCTURE(S) AND MATERIALS

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Document Title

Version	Document Title	Review Status	Received	Completed	
1	IMAGES OF PROPOSED ELEVATIONS OF STRUCTURE(S) AND MATERIALS	Not Started			No Attachment

MATERIALS AND PRODUCTS LIST TO BE UTILIZED - ALSO SUBMIT SAMPLE BOARD TO PLANNER

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	MATERIALS AND PRODUCTS LIST TO BE UTILIZED - ALSO SUBMIT SAMPLE BOARD TO PLANNER	Not Started			No Attachment

PROJECT SUMMARY - DESCRIBE HOURS OF OPERATION, NO. OF EMPLOYEES, IMPROVEMENTS SOUGHT

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	PROJECT SUMMARY - DESCRIBE HOURS OF OPERATION, NO. OF EMPLOYEES, IMPROVEMENTS SOUGHT	Not Started			No Attachment

SITE PLAN - SHOW EXISTING A/C OTHER MECHANICALS, PARKING, LIGHTING, MEETS SITE PLAN REG'S IF APPLICABLE

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	SITE PLAN - SHOW EXISTING A/C OTHER MECHANICALS, PARKING, LIGHTING, MEETS SITE PLAN REG'S IF APPLICABLE	Not Started			No Attachment

Review Comments/Concerns

Show All

[Collapse All]

Title	Type	Comment Type	Corrected	Date Found	Date Corrected	Process Step	Review	
No records to display.								

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Inspection Information

Inspection Type	Inspector	Status	Scheduled Date	Completed Date	Result	
No records to display.						

Fees & Payments

Date	Action	Qty	Description	Billed	Paid
7/1/2024	Invoice Item	1.00	PZE Fees: CONDITIONAL USE PERMIT (Invoice Number: 00005447)	\$475.00	

Applicant Information

Address	Dana Kohlmann S80 W30764 Meadowlark circle Mukwonago, WI 53149-_____				
Phone	No Data to Display	Fax	No Data to Display		
Mobile	No Data to Display	Other Phone	No Data to Display		

Owner Information

Address	GREENWALD FAMILY LIMITED PARTNERSHIP S86 W19050 WOODS RD MUSKEGO, WI 53150				
Phone	No Data to Display	Fax	No Data to Display		
Mobile	No Data to Display	Other Phone	No Data to Display		

Parcel/Land Details

Dimensional Information

Zoning/Rezoning and Usage

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JUSTIFICATION OF THE PROPOSED CONDITIONAL USE

The Plan Commission and Village Board of the Village of Mukwonago will base their decisions on the category standards listed below. It is in the best interest of the applicant to base their presentation on the same applicable set of standards when presenting their petition. **Applicant: Please fill out ALL of the questions. Use additional sheets of paper if needed.**

- A. How is the proposed conditional use (the use in general, independent of its location) in harmony with the purposes, goals, objectives, policies and standards of the Village of Mukwonago Comprehensive Plan, the Zoning Ordinance, and any other plan, program, or ordinance adopted, or under consideration pursuant to official notice by the Village?

The intended use will align closely with the various permitted uses in B-2 zoning. Our alignment with the community is emphasized in section F.

- B. How is the proposed conditional use, in its specific location, in harmony with the purposes, goals, objectives, policies and standards of the Village of Mukwonago Comprehensive Plan, the Zoning Ordinance, and any other plan, program, or ordinance adopted, or under consideration pursuant to official notice by the Village?

The specific location aligns with the comprehensive plan and is consistent with multiple permitted uses in B-2 zoning.

- C. Does the proposed conditional use, in its proposed location and as depicted on the required site plan (see Section 100-354 (a), (b), and (c)), result in any substantial or undue adverse impact on nearby property, the character of the neighborhood, environmental factors, traffic factors, parking, public improvements, public property or rights-of-way, or other matters affecting the public health, safety, or general welfare, either as they now exist or as they may in the future be developed as a result of the implementation of the provisions of the Zoning Ordinance, the Comprehensive Plan, or any other plan, program, map ordinance adopted or under consideration pursuant to official notice by the Village or other governmental agency having jurisdiction to guide development?

No, this will not result in any negative consequences. The parking impact should be minimal compared to nearby spaces. Commercial deliveries will be conducted at the rear of the building in line with other restaurants in the vicinity.

- D. How does the proposed conditional use maintain the desired consistency of land uses, land use intensities, and land use impacts as related to the environs of the subject property?

• This will have no additional impacts on the property.

- E. Is the proposed conditional use located in an area that will be adequately served by and will not impose an undue burden on, any of the improvements, facilities, utilities or services provided by public agencies serving the subject property?

The existing public utilities serving the building are adequate for our requirements.

F. Do the potential public benefits of the proposed conditional use outweigh all potential adverse impacts of the proposed conditional use (as identified in Sections 100-354 (e)(1) and (2)), after taking into consideration the Applicant's proposal and any requirements recommended by the Applicant to ameliorate such impacts?

Yes, the general public will derive direct benefit from this initiative. We intend to provide cooking classes accessible to all members of the community, and we will also facilitate open sales hours for individuals to procure goods from the talented artisans and crafters who will be utilizing our kitchen facilities. Additionally, we plan to offer a platform for local producers to showcase and sell their wares, thereby fostering a stronger connection between the community and locally-sourced food items. Furthermore, the advantages of having a licensed and inspected commercial kitchen available for rent extend far beyond the confines of our establishment at 225 Bayview. It is essential for artisans who sell their creations at farmers markets and various festivals to have access to a workspace like ours. By providing this space, we aim to encourage the growth of new businesses and increase the number of vendors participating in local markets and events, including but not limited to Phantom Junction Stage, Wednesday Farmers Market, and more.

CONFIDENTIAL

Mama Bear Catering, LLC

BUSINESS PLAN

PREPARED MAY 2024

Contact Information

Dana Kohlmann
mamabearkohlmann@gmail.com
Mamabearcatering.info

2628935083

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Executive Summary

Mama Bear Catering, LLC is a catering company that is family-owned and operated and is currently in search of funding to broaden its operations. The company's objective is to procure a 2,000 square foot establishment in Mukwonago, WI, which will function as the primary location for its services. This facility will allow Mama Bear Catering to cater to both individual and corporate events, offer cooking classes, provide rental space for commercial kitchens, host a retail vendor market, and conduct cooking classes.

Our proprietor, Dana Kohlmann, possesses extensive culinary expertise that enhances our operations. Specializing in scrumptious, homemade comfort food, Dana guides our team in devising menus that guarantee happiness. Mama Bear Catering has established an impressive reputation, adeptly catering to events with over 250 guests at local sites such as Schuett Farm in the 2023 pumpkin season and the community quilt show hosted by the Crazy Quilters in 2024.

The new facility will be equipped with top-of-the-line commercial-grade ovens, refrigeration units, sinks, and other essential equipment to ensure that we meet food safety standards and maintain high quality in our services. The increased capacity of the facility will allow us to expand our corporate and private event catering services. Additionally, we will offer the capacity for food entrepreneurs to lease our commercial kitchen, as well as provide retail space for local food vendors to showcase their products in a market setting. We also plan to organize hands-on cooking classes for individuals of all ages.

To bring this expansion to life, we have proudly outlined funding for the purchase of kitchen equipment. At Mama Bear Catering, our hearts are filled with passion for supporting and uniting people over delicious home-cooked meals. The new facility will give us the space needed to advance our mission and keep serving our beloved community.

Opportunity

Problem & Solution

Problem Worth Solving

Mama Bear Catering, LLC is currently operating out of a rented commercial kitchen as it offers catering services. However, the growing demand in the market has highlighted the need for expansion. Consequently, Mama Bear Catering is actively seeking to establish its own dedicated facility.

The new establishment will serve multiple purposes. Firstly, it will allow Mama Bear Catering to maintain its commitment of delivering exceptional catering services. Additionally, the facility will have ample capacity to accommodate other caterers who may be interested in renting space. It will also provide market space for the vendors that choose to rent. Also, it will provide an opportunity to offer cooking lessons to the local community.

Our Solution

Mama Bear Catering, LLC is excited to announce its plan to expand its operations with the acquisition of a spacious 2000 sq. ft. facility. This new facility will serve as the central hub for a diverse range of business activities, catering to the needs of the community in various ways.

One of the primary services that Mama Bear Catering will offer at the new facility is **catering**. We pride ourselves on providing affordable, homestyle meals that cater to various occasions. Our clientele includes both individuals and businesses who trust us to deliver delicious food for their events. From seasonal gatherings and business functions to more intimate celebrations like bridal showers, graduations, anniversaries, and office parties, we have consistently met the expectations of our customers. Notably, we have developed strong relationships with esteemed clients such as Schuett Farm and the Mukwonago Crazy Quilters Guild.

In addition to catering, Mama Bear Catering's new facility will feature a commercial kitchen that can be **rented** by local caterers and food truck operators. We have identified a demand for this service among fellow caterers in the area. By providing access to storage and available equipment, we aim to support and foster collaboration within the local catering community.

The facility will also offer **vendor market** spaces, providing local vendors with the opportunity to showcase and sell their products. This will not only benefit the vendors themselves but also contribute to the overall vibrancy of the community by promoting local businesses.

Furthermore, Mama Bear Catering is passionate about sharing our culinary expertise with the community. We will be offering **cooking classes**, allowing individuals to learn new skills and enhance their love for the culinary arts. These classes will cater to private events and birthday parties, creating fun and educational experiences for all participants.

Through our expanded operations and range of services, Mama Bear Catering, LLC is committed to making a positive impact in the community. We believe that by providing exceptional food, supporting local caterers, promoting local vendors, and sharing our culinary knowledge, we can contribute to the growth and well-being of the community we serve.

Products & Services

Services Breakdown

Mama Bear Catering, LLC is committed to providing high-quality food with a personalized touch. Our goal is to create dishes that evoke the same warmth and care as a mother's cooking. We pride ourselves on our ability to customize our offerings to meet the unique needs of each individual customer. In addition to our catering services, we will collaborate with talented artisans to showcase their culinary creations in our kitchen. On weekends, we will offer these artisanal foods for sale at our location as part of our commitment to supporting local talent and providing our community with a diverse and enticing culinary experience. We understand the importance of flexibility and will work closely with each artisan to establish a schedule that accommodates their availability while ensuring seamless operations. Our aim is to foster a collaborative environment where everyone can thrive. At Mama Bear Catering, LLC, we are passionate about sharing the joy of food and celebrating the talents of our artisans. Join us in experiencing the delicious creations that our team and community have to offer.

Pricing

At Mama Bear Catering, our mission is to offer cost-effective and top-notch catering services to our local community. Our pricing structure is transparent and competitive, taking into consideration factors such as food costs, labor costs, overhead expenses, and marketing efforts.

Catering services are tailored based on the level of service needed and the specific cuisine preferences. Our basic catering package begins at a rate of \$15 per person, which includes a main course, two side dishes, and essential paper goods. For more elaborate events, we offer

customized menus with a selection of appetizers and desserts, with pricing customized to suit individual preferences and needs.

Rental kitchen is available for hourly rentals at a rate of ~~\$18 per hour~~, offering access to dry storage, coolers, and freezers. This option is ideal for aspiring chefs, food entrepreneurs, or individuals seeking a professional kitchen space.

Vendor marketplace will be available for the public on weekends to exhibit products crafted by artisans who lease our commercial kitchen. This platform will offer a space for chefs and artisans to market their goods within the local community. Each sale made during our vendor market will be subject to a ~~10%~~ commission fee payable to Mama Bear Catering.

Cooking classes will also be available at a rate of \$25 per person, with a minimum of 10 participants required. These classes will focus on teaching culinary skills and promoting healthy eating habits.

As a startup, we strive to deliver accessible and affordable services to our community while upholding a sustainable business model. We are dedicated to maintaining transparency in our pricing and will routinely review and adjust our rates to ensure fair and competitive pricing for our clientele.

Target Market

Rental Kitchen and Cooking Classes

Mama Bear Catering, a family-owned and operated catering company, offers a licensed commercial kitchen for rent. Our fully equipped kitchen is suitable for bakers, pastry chefs, caterers, and other culinary artisans.

In addition to our rental kitchen, we also provide a range of cooking classes for different age groups and skill levels. Our kids' classes, designed for ages 7-18, teach valuable cooking skills in a fun and interactive way. These classes are perfect for introducing children to the culinary world, teaching food safety and promoting healthy eating habits.

During our cooking classes, participants will learn essential techniques, explore various cuisines, and create delicious dishes under the guidance of experienced chefs. We provide a supportive environment where children can gain confidence and a sense of accomplishment in the kitchen.

Mama Bear Catering aims to build a strong community and empower individuals with culinary knowledge that lasts a lifetime through our rental kitchen and cooking classes.

Competition

Barriers to Entry

In the area, there are rental kitchen options such as the Kiskstarter kitchen in Waukesha, The Petite Chef school of Cookery in Dousman, and Chef Pam in Waukesha. For cooking classes, you can learn from Chef Pam and The Petite Chef school and cookery.

Current Alternatives

Catering

In the area, there are several catering options available; however, none quite compare to the unique experience of Mama Bear Catering, LLC. Our meticulous attention to detail and personalized approach to each event sets us apart from the competition. We aim to fulfill the need for a personal touch in the catering industry, offering a level of customer engagement that is unmatched.

Rental Space for Local Caterers

Chef Pam, Kickstart Kitchen, and Petite Chef currently offer rental spaces. However, with the increasing number of food trucks in the area, there is a growing demand for this service among local caterers. Mama Bear Catering, LLC recognizes this need and aims to provide a valuable solution.

Vendor Market Space

In addition to our primary services, Mama Bear Catering, LLC will provide local vendors with the chance to utilize retail space within our establishment.

In addition to our primary services, Mama Bear Catering, LLC will provide local vendors with the chance to utilize retail space within our establishment.

Cooking Classes

Driven by a genuine passion for the culinary arts, we are excited to share our expertise with the community. Mama Bear Catering, LLC provides exclusive private cooking classes for various occasions and birthday parties. While Chef Pam's in Waukesha and Petite Chef also offer similar classes, there is a significant demand in the area that remains unmet.

Our Advantages

The owner and founder, Dana Kohlmann, brings a wealth of knowledge and expertise to Mama Bear Catering, with an impressive 28 years in the restaurant business. Her extensive experience ensures the success of our business and sets us apart from the competition. Dana's dedication and commitment to the industry can be seen in their impressive resume, leaving no doubt about their qualifications. What truly sets Dana apart is their unwavering dedication to treating each client as family. At Mama Bear Catering, we believe in creating a warm and welcoming environment, and Dana exemplifies this as a true mama bear.

As a family-owned and oriented business, Mama Bear Catering takes pride in our strong focus on family values. We understand the importance of creating an environment that is not only welcoming but also fosters a sense of belonging for both our team and customers. With Dana Kohlmann at the helm as the owner and founder, we lead by example and embody these values in everything we do.

In our continuous pursuit of excellence, we have sought the guidance of Chef Pam of Waukesha. Through this invaluable collaboration, we have gained valuable insights into the industry and learned from the gold standard of kitchen rental. This partnership allows us to constantly improve our operations and deliver exceptional services to our clients. With Chef Pam's expertise and guidance, we are equipped with the knowledge and skills to exceed our clients' expectations.

Looking towards the future, we have plans to hire dedicated and skilled temporary workers specifically for catering events and cooking classes. This strategic approach ensures that we have a highly qualified team that is passionate about their craft. By employing professionals who are dedicated and driven, we can guarantee the highest level of service and expertise for our clients. At Mama Bear Catering, we are committed to delivering outstanding experiences that will leave a lasting impression.

Execution

Marketing & Sales

Marketing Plan

In an effort to increase the visibility of our catering startup within the local community, we will place emphasis on word-of-mouth marketing strategies. This will involve offering outstanding

food and service at various local events. As we cultivate a reputation for excellence, we will also leverage social media platforms and our website to further enhance the profile of Mama Bear Catering.

Initial marketing efforts will center around continuing to provide catering services for established local community events, such as the quilt show, pumpkin season festivities, and school functions where our presence has already been established. To incentivize attendees at these events to consider booking our services for their own occasions, we will offer coupons.

Through social media channels, we will share captivating images of our culinary offerings, showcase events we have catered, and announce details about our cooking classes in order to actively engage our followers. Concurrently, our website will serve as a hub for promoting our services, facilitating online orders, and displaying our class schedule.

Our primary emphasis in the initial stages will be on delivering exceptional food and memorable experiences that generate positive buzz surrounding Mama Bear Catering.

Sales Plan

Mama Bear Catering will boost sales by leveraging our excellent reputation for delicious homemade comfort food. We will promote our catering services through word-of-mouth, social media marketing, and advertising at local farmers markets. We will also use traditional print marketing methods like distributing flyers and brochures.

We offer convenient ordering options, including online orders through our website, as well as phone and email orders. Online orders can be securely paid for through Square, and we accept major credit cards and Square payments in person.

As a new catering business, our main focus is on providing convenient payment methods and exceptional customer service to drive sales growth. We will monitor our sales performance by tracking metrics such as monthly sales totals, average order value, and website conversion rates using Square. This will allow us to set monthly sales goals and refine our sales and marketing strategies for profitable business growth.

Operations

Locations & Facilities

Mama Bear Catering, LLC is currently operating from a small commercial kitchen space that has been rented out at a local coffee shop. Although this space enables us to prepare food for catering events and classes, it is insufficient for the level of growth we aspire to achieve.

Currently, we are in the process of searching for a rental space in Mukwonago that spans 2,000 square feet. Ideally, this space would already be equipped with large cooler and freezer storage facilities. By securing such a space, we would be able to expand our catering services and accommodate larger events, such as cooking classes, birthday parties, and team-building activities. This strategic expansion would also allow us to diversify our sources of revenue.

In order to fully utilize the chosen space, we would need to equip it with additional ovens, holding equipment (such as Alto-Shaam units), and furnishings suitable for hosting classes and events. Additionally, the monthly rental fees should include provisions for garbage disposal, pest control, and general maintenance costs.

The acquisition of a properly equipped space of this size would provide Mama Bear Catering, LLC with the opportunity to significantly expand our catering operations and offer a wider range of community cooking classes and private events. This increased capacity and variety of services would help foster stronger community bonds and support our mission of uniting people through the joy of home-cooked meals.

Equipment & Tools

In order to ensure the successful operation of Mama Bear Catering, it is crucial that we have access to a fully equipped commercial kitchen space. This area will serve as the central hub for various activities, including food preparation, cooking classes, and catering operations. The key elements of this space will include the following equipment and tools:

- Commercial-grade refrigerators and freezers to adequately store fresh ingredients and prepared foods
- A three-compartment sink that will facilitate proper cleaning and sanitization of dishes and utensils
- A commercial oven that will be instrumental in the baking and roasting of menu items
- A commercial dishwasher that will efficiently clean large quantities of dishes and cookware

RESOLUTION 2024-41

Village of Mukwonago Order Granting a Conditional Use and Prescribing Conditions for a Catering Service (Mama Bear Catering) on Parcel MUKV2014988, 225 Bay View Road, Suite 100, Mukwonago, WI

WHEREAS, DANA KOHLMANN (hereinafter "owner") leases space at the property identified MUKV201498, site address 225 Bay View Road, Suite 100 (hereinafter "subject property") in the Village of Mukwonago, more particularly described as follows:

PT NW1/4 SEC 36 T5N R18E COM SW COR NW1/4 N00°51'E 132.11 FT THE BGN N00°51'E 636.11 FT S63°57'E 299.65 FT S 26°02'W 280.21 FT SWLY ALG CURVE 43.82 FT SWLY ALG CURVE 99.55 FT S13°58'W 62.20 FT TO BGN DOC# 2795848

WHEREAS, the owner has, consistent with the Village of Mukwonago's zoning regulations, submitted a conditional use application for a new Catering Service per Section 100-251, and

WHEREAS, upon receipt of the petition submitted by the owner, the Village Clerk properly referred such petition to the Plan Commission; and

WHEREAS, allowing for required public notice, the Plan Commission conducted a public hearing on August 12, 2024, to consider the petitioner's request; and

WHEREAS, members of the public in attendance were given ample opportunity to provide comment regarding the petitioner's request; and

WHEREAS, the Plan Commission passed a motion recommending to the Village Board that the conditional use be approved subject to certain conditions; and

WHEREAS, the Plan Commission, in passing on the matter, has made the following determinations consistent with Section 100-354 of Mukwonago's zoning regulations:

1. The establishment, maintenance or operation of the conditional use will not be detrimental to or endanger the public health, safety or welfare of the Village.
2. The uses, values and enjoyment of other property in the surrounding neighborhood that are already permitted shall be, in no foreseeable manner, substantially impaired or diminished by the establishment, maintenance or operation of the conditional use.
3. The establishment of the conditional use will not impede the normal and ordinary development and improvement of the surrounding property for uses permitted within the district and/or which are consistent with the standards in the Comprehensive Plan.
4. Adequate utilities, access roads, drainage and other necessary site improvements have been or are being made to accommodate the use.
5. Adequate measures have been taken or will be taken providing ingress and egress to minimize traffic congestion on public streets so as not to diminish the level of service of any intersection which is impacted by traffic arising from the conditional use.

Return to:

Diana Dykstra, Clerk-Treasurer
Village of Mukwonago
440 River Crest Court
Mukwonago, WI 53149

Parcel Number: MUKV 2014988

In addition, the owner has shown compliance with the requirements set forth in the Village's zoning regulations for the specified use.

WHEREAS, the Village Board has carefully reviewed the recommendation of the Plan Commission and concurs with the Plan Commission's findings set forth above, provided the conditional use is operated pursuant to the conditions of approval set forth in this order.

NOW THEREFORE, IT IS HEREBY DETERMINED AND ORDERED AS FOLLOWS:

1. **Authorized uses.** Subject to the terms and conditions of this approval and the sections of the zoning code that apply, the owner is authorized to operate a Catering Service.

2. **Issuance of permit required.** The zoning administrator is authorized to issue the owner a conditional use permit when all conditions enumerated in section 3 have been satisfied to his or her satisfaction. Such permit is the last approval before the owner/tenant can begin to establish the use as authorized herein.

3. **Initial conditions of approval.** The following conditions shall be satisfied prior to the issuance of the conditional use permit:

- a. The owner must accept the terms and conditions of this conditional use order in its entirety in writing within 6 months of the date of this decision. Prior to such expiration, the owner may request an extension to this time period and the Village Clerk may approve an extension with good cause.
- b. This order must be recorded against the subject property in the Waukesha County register of deeds office (only if subsections 3(a) through 3(b) have been satisfied).

In the event the requirements enumerated in subsections 3(a) and 3(b) above are not satisfied, this order shall automatically be null and void without any further action by the Village of Mukwonago on the aforementioned date.

4. **Ongoing conditions of approval.** The following conditions shall constitute an ongoing obligation:

- a. Any modifications to the site, buildings, site improvements shall require the conditional use application being updated.

5. **Expansion or changes.** The conditional use hereby authorized shall be confined to the subject property without extension or expansion. Any expansion or change in use shall require issuance of a new conditional use approval pursuant to the requirements in effect at the time of application.

6. **Modification of property boundary lines.** The owner shall not change the size and/or shape of the subject property by any means without the approval of the Village Board. If the Village Board determines that a proposed change is substantial with regard to the overall size of the parcel and/or configuration, such change shall require issuance of a new conditional use approval pursuant to the requirements in effect at the time of application.

7. **Plans and related matters.** Unless otherwise expressly stated herein, plans that are specifically required by this conditional use order may be amended upon the prior approval of the Plan Commission if the Plan Commission finds the amendment to be minor and consistent with the conditional use order and permit. Any change in any plan that the Plan Commission feels, in its sole discretion to be substantial, shall require a new conditional use approval and all procedures in place at the time must be followed.

8. **Inspection.** The owner shall allow Village of Mukwonago staff, officials, and other authorized agents to inspect the subject property, at any reasonable time and for any proper purpose related to compliance with this conditional use order.

9. **Discontinuance.** Should the conditional use be discontinued in use for 365 consecutive days the use

shall be terminated as set forth in the Village of Mukwonago's zoning regulations.

10. **Private rights.** This approval is given under the Village of Mukwonago's zoning regulations and is not to be interpreted to abrogate any private rights other owners may have pursuant to deed restrictions or restrictive covenants.

11. **Interpretation.** If any aspect of this conditional use order is in conflict with any other aspect of the conditional use order, the more restrictive provisions shall be controlling, as determined by the Plan Commission.

12. **Other permits.** This order shall not be deemed to constitute a building permit, or constitute any other license or permit required by Village ordinance, or other local, state, or federal law.

13. **Severability.** In the event a court of competent jurisdiction determines that a paragraph or phrase of this conditional use order is unlawful, illegal, or unconstitutional, said determination as to the particular phrase or paragraph shall not void the rest of the conditional use order and the remainder shall continue in full force and effect.

14. **Heirs, successors, and assigns.** This conditional use order shall be binding upon the owner and their heirs, successors, and assigns. Upon a change in ownership, the owner shall notify the Village Clerk.

15. **Ongoing review.** This conditional use may be reviewed by the Plan Commission with notice to the owner at any time upon complaint or upon Plan Commission initiative. If it is determined that the authorized use is no longer compatible, or that the provisions of this approval have not been complied with, the Village Board may revoke or amend this order after recommendation by the Plan Commission and holding of a public hearing.

16. **Amendment.** The owner may propose an amendment to this conditional use order at anytime by submitting a written petition to the Village Clerk, which shall be reviewed pursuant to the requirements in effect at the time of application.

17. **Violation.** Any violation of this order may be treated as a violation of Mukwonago's zoning regulations and each day of each violation of each condition herein shall be treated as a separate violation.

18. **Acceptance.** GRANTEES hereby accept the said Conditional Use Grant and covenant strictly to comply with all the terms and conditions thereof. GRANTEES acknowledge that, in accordance with the provisions of the Zoning Code, failure to comply with any conditions of the Conditional Use Grant is cause for the termination of said Grant by the Village. GRANTEES also acknowledge that approval of the Conditional Use Grant allows the appropriate Village officials to conduct reasonable and routine inspections of the property. This Covenant shall run with the land and shall be binding on the GRANTEES and all persons claiming any estate or interest in the Premises by, through or under the GRANTEES, as long as the said Premises are used as described in the Conditional Use Grant

Approved this 21st day of August, 2024.

BY THE VILLAGE BOARD OF THE VILLAGE OF MUKWONAGO

Fred Winchowky, Village President

Attest:

Diana Dykstra, Village Clerk-Treasurer

STATE OF WISCONSIN, WAUKESHA/WALWORTH COUNTY

Personally came before me this ____ day of _____ 2024, the persons described above, Fred Winchowky, Village President, and Diana Dykstra, Village Clerk, to me known to be the persons who executed the foregoing instrument and to me known to be such Village President and Village Clerk of the Village of Mukwonago and acknowledged that they executed the foregoing instrument as such officers of said municipal corporation by its authority and pursuant to the authorization by the Village Board from their meeting on the ____ day of _____, 2024.

NOTARY PUBLIC

My Commission Expires:

The remainder of this page left intentionally blank.

Acceptance by Owner

I, _____ verify that I am an authorized agent for DANA KOHLMANN accepts the terms stated herein.

Dated this _____ day of _____, 2024

_____, agent

STATE OF WISCONSIN, WAUKESHA

Personally, came before me this _____ day of _____, 2024, the above-named person,
_____ to me known to be the person who executed the foregoing instrument and acknowledged
the same.

NOTARY PUBLIC

My Commission Expires:

Drafted by Peter Gesch, Contracted Village Planner at the direction of the Mukwonago Village Board.

PLAN COMMISSION STAFF REPORT

TO: Village of Mukwonago Plan Commission

FROM: Peter Gesch, P.E., Ruekert & Mielke, Inc.

REPORT DATE: August 6, 2024

MEETING DATE: August 12, 2024, 6:30 P.M.

SUBJECT: Cardinal Ridge Subdivision – Phase 1 Final Development Plan Approval

BASIC INFORMATION	
Project:	Cardinal Ridge Subdivision
Applicant:	Bryan Lindgren – Neumann Developments, Inc.
Consulting Engineer:	Trio Engineering
Request:	PUD Overlay – Final Development Plan Phase 1
Staff Recommendation:	Approve with Conditions

PARCEL DATA/CHARACTERISTICS	
Tax Key:	MUKV2091995 (Lands Attached per Ord. 1030)
Acreage (Phase 1):	9.57Acres (6.92Acres in MUKV Future Phase)
Total Number of Units (Phase 1):	23 Units (13 Units in MUKV Future Phase)
Density:	2.18 Dwelling Units per Acre
Total Green Space:	60% of lot area required
Park Area Dedication:	Park owned by HOA to be provided on outlot in future phase.
Storm Water:	Handled on-site in outlots
Current Use:	Agriculture
Proposed Use:	Single Family Residential Subdivision
Current Zoning:	R-3 Single Family Residential (Via Ordinance 1027)
Proposed Zoning:	R-3 Single Family Residential with PUD Overlay

Project Summary & Overview

A General Development Plan was presented to Plan Commission on April 9, 2024 and approved by the Village Board on April 17, 2024. Village Ordinance requires the submittal of a Final Development Plan (construction plans) for each phase of Development as construction progresses.

Neumann Developments, Inc. is planning to move forward with Phase 1 of the subdivision which is entirely within the Village of Mukwonago at the end of Cardinal Lane. As part of Phase 1, grading will be completed in Phase 2 on lands in the Village of Vernon to achieve site balance with grading.

Staff have worked with the Developer and their Engineer to review the submitted documents and the Developer has modified the development documents to meet the requirements of Village Department Heads. Staff review has been coordinated with Waukesha County for review of storm water and erosion control within the Village of Vernon to ensure the documents were developed to satisfy the requirements of both municipalities.

Staff have also worked with the Village of Vernon and Neumann Developments to create a joint Developer Agreement that meets the standards of both municipalities and gives the Village of Mukwonago approval authority of its public infrastructure in both municipalities.

Specific Request

The Applicant is seeking the review and approval of the Final Development Plan for Phase 1 of the subdivision which contains a PUD overlay in the Village of Mukwonago. This is a review and consideration of approval of the construction documents for Phase 1 of the development.

PUD Modifications

The following PUD modifications were approved by the Village Board on April 17, 2024. No changes to the below PUD modifications are being requested.

The proposed portion of the subdivision in Mukwonago includes 36 single-family residential lots ranging in size from 9,000 square feet to 22,061 square feet. Phase 1 contains 23 total lots with 13 more lots to be developed in the Village in a future phase. The average proposed lot size is 12,770 square feet. The minimum lot area required in the R-3 Single-Family Small Lot – Residential District is 10,000 square feet. The setbacks associated with each lot are also less than required. Below is table summary of the approved modifications:

	R-3 Zoning District	R-3 with PUD Overlay (Approved)
Min. Lot Area:	10,000 S.F.	9,000 S.F.
Min. Lot Width:	80 Feet Interior/100 Feet Corner	70 Feet Interior, 80 Feet Corner
Max. Building Coverage:	25%	40%
Min. Greenspace:	60% Total Lot Size	5,000 S.F. (55.6% of 9,000 S.F. Lot)
Street Yard Setback:	30 Feet	25 Feet
Interior Side Yard:	15 Feet	7.5 Feet, 15 Feet at side street corner
Rear Yard:	30 Feet	20 Feet

Due to on-site natural features and necessary layouts for roadways and storm water management, the PUD modifications will allow the applicant to better cluster the lots and more adequately develop the land to meet the basic intent of the Comprehensive Plan and Zoning Code.

Staff Report – Final Development Plan – Phase 1
Cardinal Ridge Subdivision
August 6, 2024
Page 3

Staff Review

Engineering	No comments at this time.
Public Works	No comments at this time.
Utilities	No comments at this time.
Police	No comments at this time.
Fire	No comments at this time.
Building Inspection	No comments at this time.
Planning	No comments at this time.

Staff have worked with the Developer and their Engineer to address all outstanding comments.

Recommended Action

Staff recommends the Planning Commission recommend approval to the Village Board for the PUD Final Development Plan for Phase 1 of the subdivision. Any outstanding conditions enumerated in Resolution 2024-18 will be addressed in future phases of the subdivision prior to the Final Plat for those phases. It is also recommended that this Final Development Plan be approved with the conditions outlined in the attached resolution.

Attachments

1. Final Development Plan – Phase 1 Approval Request dated July 10, 2024
2. Cardinal Ridge Phase 1 Civil Plans dated July 17, 2024.
3. Cardinal Ridge Storm Water Management Plan dated July 19, 2024
4. Cardinal Ridge Storm Water Maintenance Agreement.



July 10, 2024

Village of Mukwonago
440 River Crest Court
Mukwonago, WI 53149

Dear Plan Commission,

We are excited to be submitting for approval the final development plans for our Cardinal Ridge Subdivision located in the Village of Mukwonago:

- Subject property:
 - Address: S92W27720 Edgewood Ave (vacant land north of Cardinal Lane)
 - Tax Key: MUKV2091995
 - Size: approximately 16.5001 acres
 - Current Owner: Cardinal Ridge LLC
 - Current Zoning: R-3 PUD

The Village of Mukwonago Board approved the R-3 PUD overlay modifications at its April 17th meeting. The details of the modifications are listed below.

R-3 PUD Overlay

- Total Units = 36 Lots
- Proposed Gross Density = 2.18 units/acre
- Min. Lot Size = 9,000 SF (Avg. 12,770 SF)
- Min. Lot Width at building setback = 70' interior/ 80' corner lot
- Min. Lot Width at R.O.W. = 60' wide and 45' in cul-de-sac's
- Min. Front = 25'
- Min Side = 7.5', 15' at side street corner
- Min. Rear = 20'
- Max Building Coverage = 40%
- Min. Greenspace = 5000 SF

We are requesting approval of the final development plan (FDP), which consists of our construction plans for phase 1. Subsequent phases that contain lots within The Village of Mukwonago will be submitted for review and FDP approval as we construct those phases.

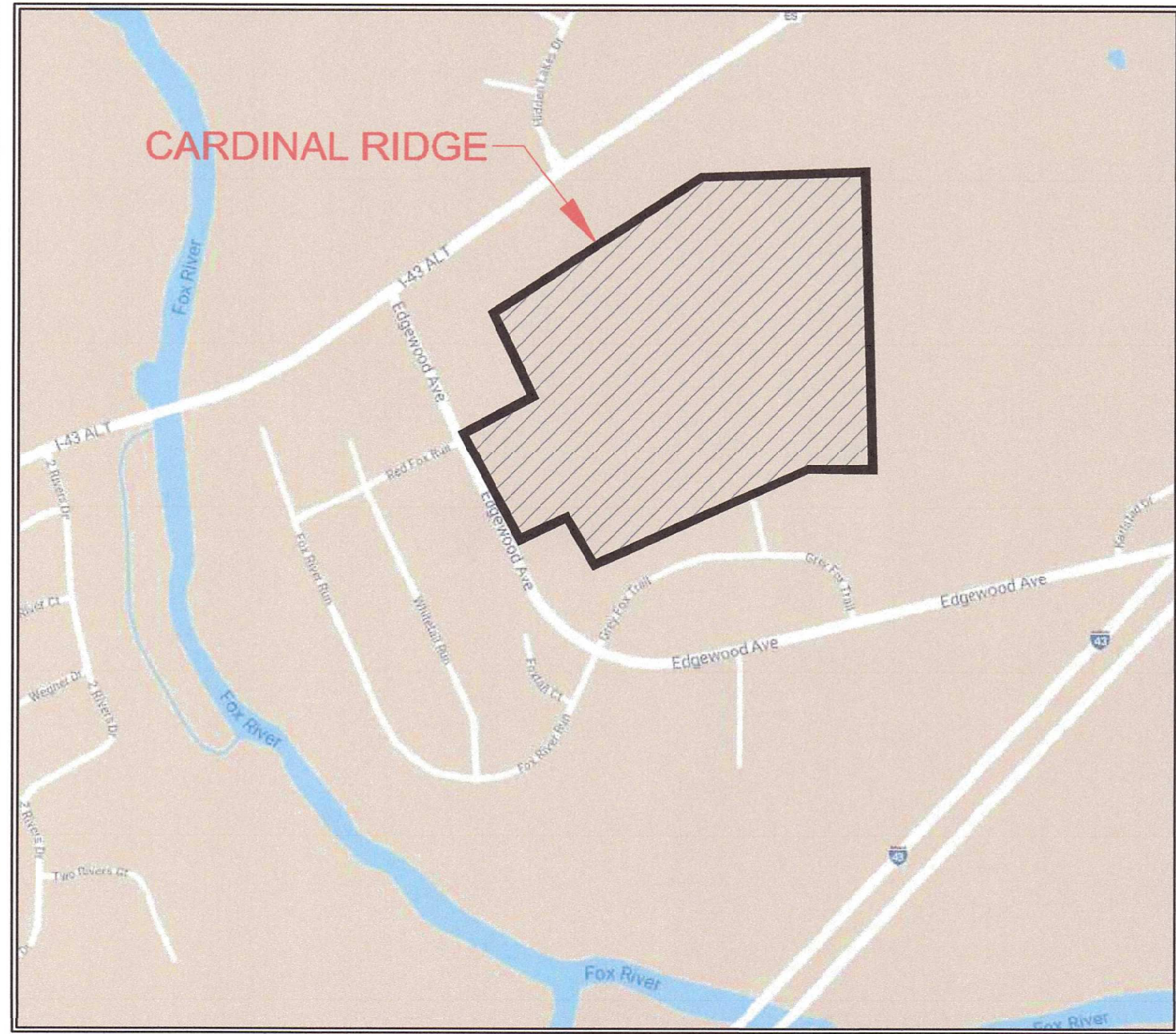
Thank you for your consideration of this proposed project.

Sincerely,

Eric Obarski
Neumann Developments, Inc.

GENERAL NOTES

1. THE LATEST EDITIONS OF THE FOLLOWING DOCUMENTS AND ANY SUPPLEMENTS THERETO, SHALL GOVERN ALL CONSTRUCTION ITEMS ON THIS PLAN UNLESS OTHERWISE NOTED.
 - STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN, 6TH EDITION (SSSWCW)
 - THE WISCONSIN D.O.T. STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION, LATEST EDITION
 - WDNR STORMWATER RUNOFF TECHNICAL STANDARDS.
 - WISDOT PAL APPROVED EROSION CONTROL MEASURES LIST, LATEST EDITION.
 - VILLAGE OF MUKWONAGO STANDARDS & REQUIREMENTS FOR DEVELOPMENT, LATEST EDITION.
 - VILLAGE OF VERNON DEVELOPMENT STANDARDS & REQUIREMENTS FOR DEVELOPMENT, LATEST ADDITION
2. THE CONTRACTOR SHALL TAKE ALL MEASURES NECESSARY TO MINIMIZE EROSION, WATER POLLUTION AND SILTATION CAUSED BY CONSTRUCTION OF THIS PROJECT. EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH WISCONSIN DEPARTMENT OF NATURAL RESOURCES TECHNICAL STANDARDS.
3. EROSION CONTROL PLAN: PRIOR TO BEGINNING WORK, AN APPROVED EROSION CONTROL PLAN WILL BE PROVIDED BY THE ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY IMPLEMENTING THE APPROVED PLAN.
4. THE CONTRACTOR SHALL FIELD VERIFY THE ELEVATIONS OF THE BENCHMARKS PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL ALSO FIELD VERIFY LOCATION, ELEVATION AND SIZE OF EXISTING UTILITIES, AND VERIFY FLOOR, CURB OR PAVEMENT ELEVATIONS WHERE MATCHING INTO EXISTING WORK. THE CONTRACTOR SHALL FIELD VERIFY HORIZONTAL CONTROL BY REFERENCING SHOWN COORDINATES TO KNOWN PROPERTY LINES. NOTIFY ENGINEER OF DISCREPANCIES IN EITHER VERTICAL OR HORIZONTAL CONTROL PRIOR TO PROCEEDING WITH WORK.
5. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO BEGINNING CONSTRUCTION (CALL DIGGERS HOTLINE AT 800-242-8511). COST OF REPLACEMENT OR REPAIR OF EXISTING UTILITIES DAMAGED AS A RESULT OF THE CONTRACTOR'S OPERATION SHALL BE THE CONTRACTOR'S RESPONSIBILITY
6. EXISTING UTILITY INFORMATION IS SHOWN FROM SURVEY WORK, FIELD OBSERVATIONS, AVAILABLE PUBLIC RECORDS, AND AS-BUILT DRAWINGS. EXACT LOCATIONS AND ELEVATIONS OF UTILITIES SHALL BE DETERMINED PRIOR TO INSTALLING NEW WORK. EXCAVATE TEST PITS AS REQUIRED.
7. PROPERTY CORNERS SHALL BE CAREFULLY PROTECTED UNTIL THEY HAVE BEEN REFERENCED BY A PROFESSIONAL LAND SURVEYOR. PROPERTY MONUMENTS DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
8. ENGINEER SHALL BE NOTIFIED 48 HOURS IN ADVANCE OF PERFORMING ANY CONSTRUCTION.
9. ALL TRENCHING SHALL BE PERFORMED ACCORDING TO OSHA STANDARDS.
10. ALL ITEMS SHALL INCLUDE ALL THE NECESSARY MATERIALS AND LABOR TO COMPLETE THE ITEM IN PLACE.
11. THE CONTRACTOR SHALL CLEAN ALL ADJACENT STREETS OF ANY SEDIMENT OR DEBRIS AS REQUIRED BY MUNICIPAL ORDINANCE.
12. NOTIFY ENGINEER IF DRAIN TILE ARE ENCOUNTERED DURING SITE CONSTRUCTION. RECONNECT ANY BROKEN OR DAMAGED DRAIN TILE DURING CONSTRUCTION.



LOCATION MAP
NOT TO SCALE



CONTRACTOR IS REQUIRED TO CONTACT DIGGERS HOTLINE TOLL FREE TO OBTAIN LOCATION OF UNDERGROUND UTILITIES PRIOR TO COMMENCING THE WORK. WISCONSIN STATUTE 182.0715 REQUIRES MIN. OF 3 WORK DAYS NOTICE BEFORE YOU EXCAVATE.
CALL DIGGERS HOTLINE 1-800-242-8511

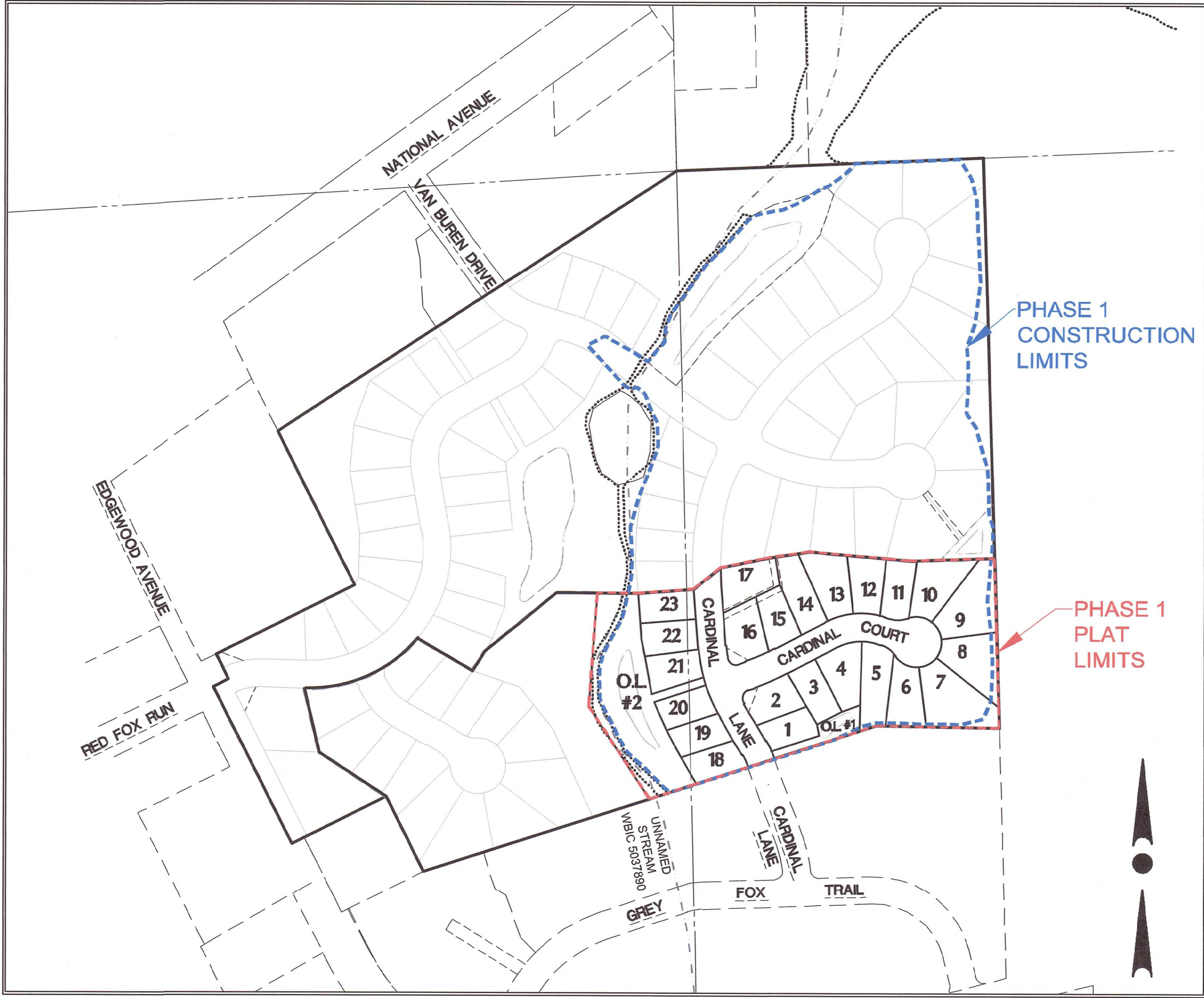
NOTE:
EXISTING UNDERGROUND UTILITY INFORMATION WAS OBTAINED FROM AVAILABLE RECORDS. THE ENGINEER MAKES NO GUARANTEE AS TO THE ACCURACY OF THIS INFORMATION. VERIFICATION TO THE SATISFACTION OF THE CONTRACTOR OF ALL UNDERGROUND UTILITIES, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE ASSUMED AS A CONDITION OF THE CONTRACT. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN LOCATION OF UTILITIES IN THE FIELD AND LOCATIONS SHOWN ON THE PLANS.

CARDINAL RIDGE

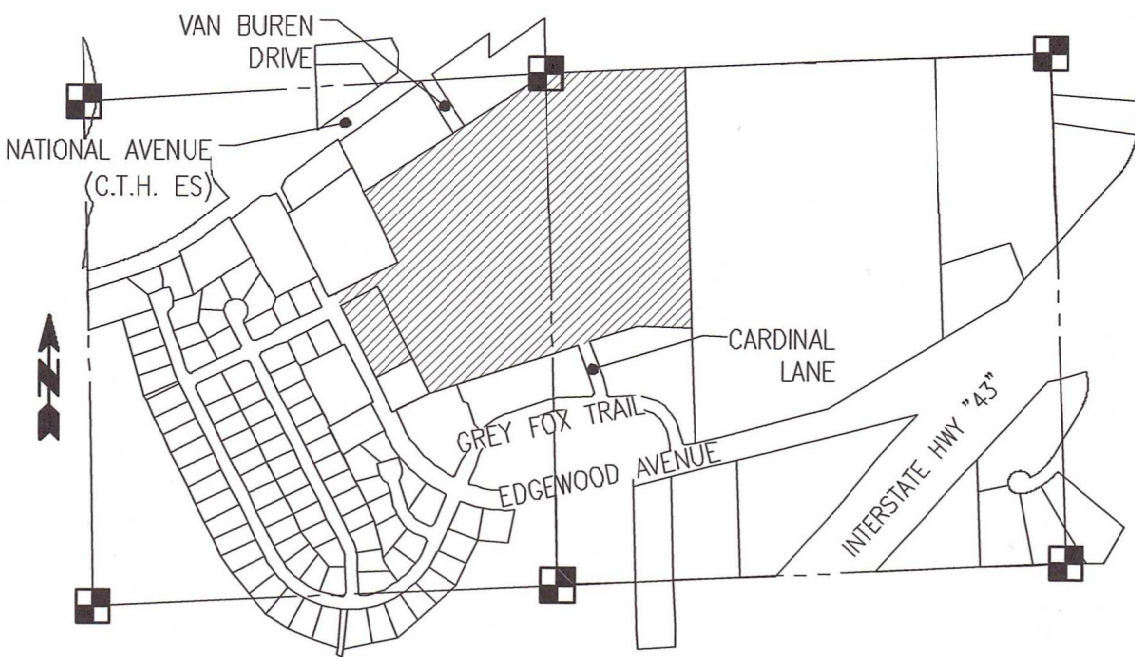
SINGLE FAMILY RESIDENTIAL SUBDIVISION

PHASE 1 – SITE DEVELOPMENT PLANS

VILLAGE OF MUKWONAGO & VILLAGE OF VERNON, WISCONSIN



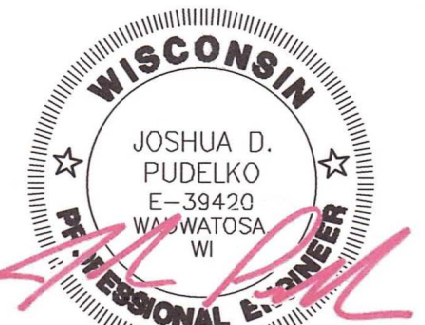
SITE PLAN
SCALE: 1" = 200'



LOCALITY MAP:
S. 1/2, SEC. 19, T. 5 N., R. 19 E.
SCALE: 1"=1000'

OWNER / DEVELOPER:
CARDINAL RIDGE, LLC
N27W24025 PAUL COURT, STE. 100
PEWAUKEE, WI 53072
CONTACT: ERIC OBARSKI
PHONE: (262) 542-9200
EMAIL: eobarski@neumanncompanies.com

ENGINEER / SURVEYOR:
TRIO ENGINEERING, LLC
4100 N. CALHOUN RD., SUITE 300
BROOKFIELD, WI 53005
CONTACT: JOSH PUDELKO, P.E., M.S.
PHONE: (262) 790-1480
EMAIL: jpudelko@trioeng.com



4100 N. CALHOUN RD., SUITE 300
BROOKFIELD, WI 53005
PHONE: (262) 790-1480
FAX: (262) 790-1481
EMAIL: info@trioeng.com

PROJECT:
CARDINAL RIDGE - PHASE 1
SINGLE FAMILY DEVELOPMENT
VILLAGE OF MUKWONAGO & VILLAGE OF VERNON, WISCONSIN
BY: NEUMANN DEVELOPMENTS, INC.
N27W24025 PAUL COURT, SUITE 100
PEWAUKEE, WI 53072

REVISION HISTORY	
DATE	DESCRIPTION
06/17/2024	PHASE 1 SUBMITTAL
07/17/2024	PER VILLAGE REVIEW

DATE:
JULY 17, 2024

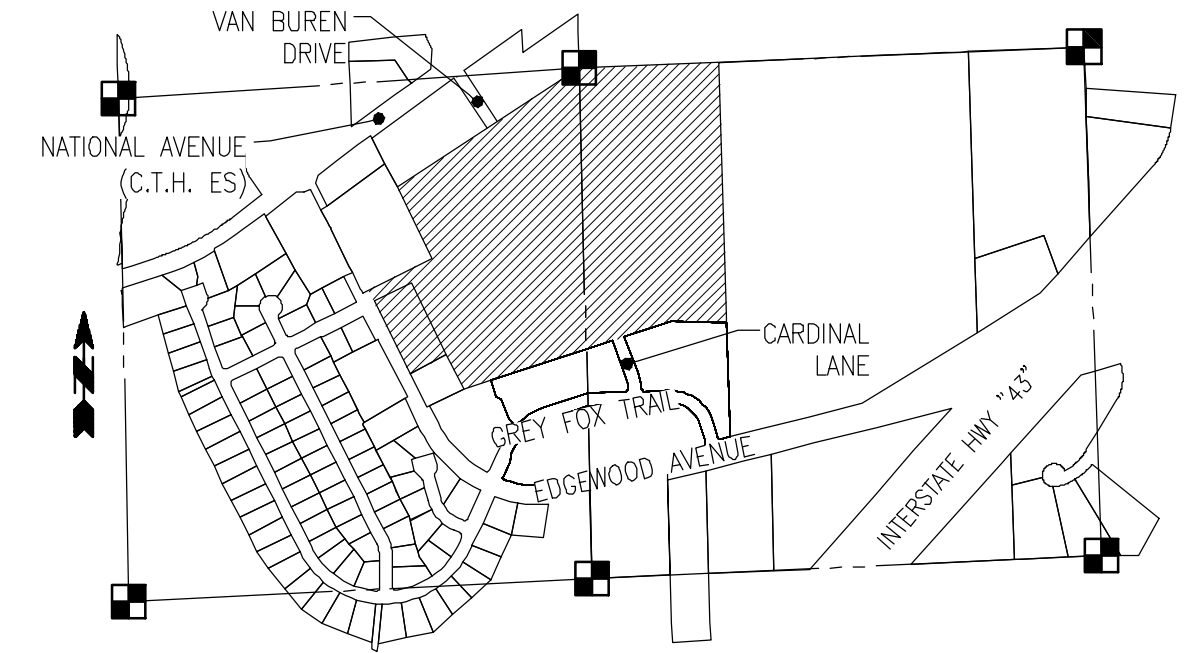
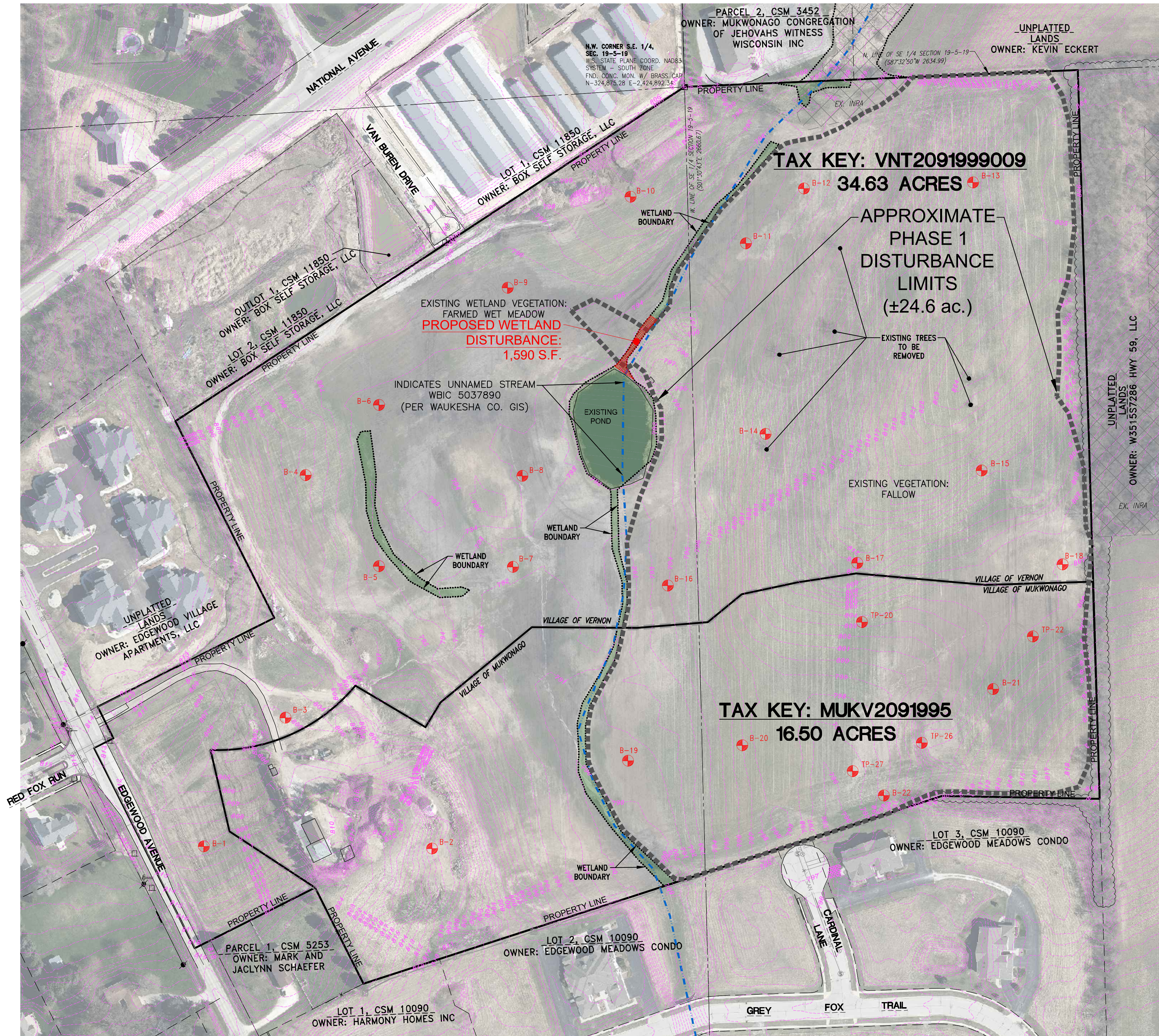
JOB NUMBER:
21-040-953

DESCRIPTION:
COVER SHEET

SHEET
T1

SHEET INDEX

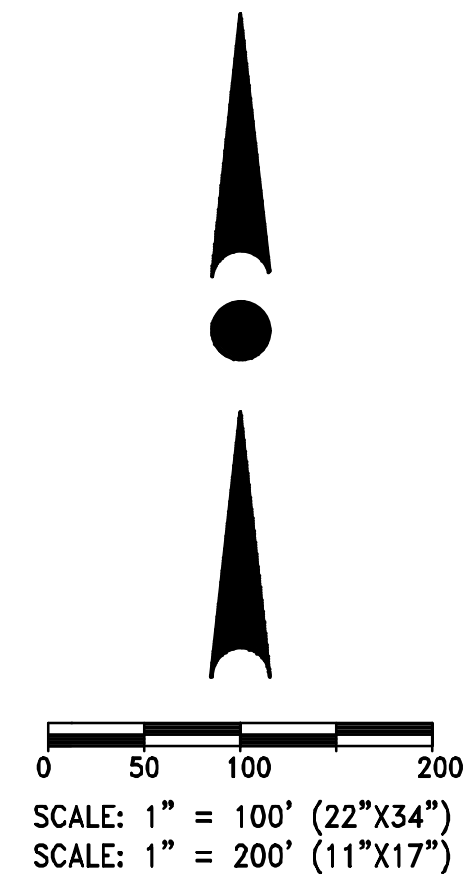
CIVIL	
T1	- COVER SHEET
C0.1	- EXISTING SITE PLAN
C0.2	- OVERALL PROPOSED SITE PLAN
C0.3	- PHASE 1 SITE PLAN
C1.0	- OVERALL GRADING PLAN
C1.1-C1.3	- GRADING AND DRAINAGE PLAN
C1.1M	- MASTER GRADING PLAN
C1.4-1.6	- POND PLANS & DETAILS
C2.0	- EROSION CONTROL PLAN
C2.1	- LATE SEASON STABILIZATION REQUIREMENTS
C3.0	- OVERALL SANITARY SEWER & WATER MAIN SYSTEM PLAN
C3.1-C3.2	- SANITARY SEWER & WATER MAIN PLAN & PROFILES
C4.0	- OVERALL STORM SEWER SYSTEM PLAN
C4.1-C4.2	- ROADWAY & STORM SEWER PLAN & PROFILES
C4.3	- STORM SEWER PLAN & PROFILES
C5.0	- CUL-DE-SAC & INTERSECTION DETAILS PLAN
C5.1	- CURB RAMP DETAILS PLAN
C6.0-C6.1	- CONSTRUCTION NOTES & DETAILS



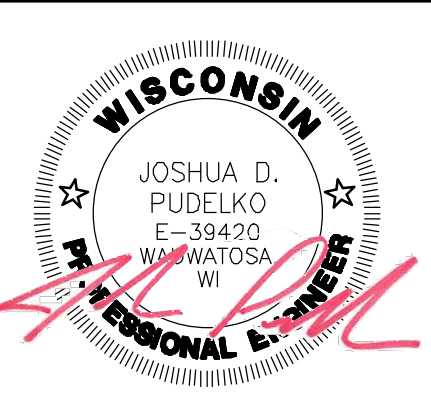
BEING ALL OF LOT 1 OF CERTIFIED SURVEY
MAP NUMBER 8142 LOCATED IN A PART OF
THE NORTHWEST 1/4 AND THE SOUTHWEST
1/4 SOUTHEAST 1/4 AND THE NORTHEAST
1/4 AND THE SOUTHEAST 1/4 OF THE
SOUTHWEST 1/4 OF SECTION 19, TOWN 5
NORTH, RANGE 19 EAST, IN THE VILLAGE
OF MUKWONAGO AND VILLAGE OF VERNON,
WAUKESHA COUNTY, WISCONSIN.

WETLAND DELINEATION NOTE:

Wetland boundaries shown herein are based on a field delineation and Wetland Delineation Report prepared by Dave Meyer of Wetland & Waterway Consulting, LLC conducted in October of 2020.



NOTE: EXISTING UNDERGROUND UTILITY INFORMATION WAS OBTAINED FROM AVAILABLE RECORDS. THE ENGINEER MAKES NO GUARANTEE AS TO THE ACCURACY OF THIS INFORMATION. VERIFICATION TO THE SATISFACTION OF THE CONTRACTOR OF ALL UNDERGROUND UTILITIES, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE ASSUMED AS A CONDITION OF THE CONTRACT. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN LOCATION OF UTILITIES IN THE FIELD AND LOCATIONS SHOWN ON THE PLANS.



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**PROJECT:
CARDINAL RIDGE - PHASE 1
SINGLE FAMILY DEVELOPMENT
VILLAGE OF MUKWONAGO & VILLAGE OF VERNON, WISCONSIN
BY: NEUMANN DEVELOPMENTS, INC.**

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21-040-953

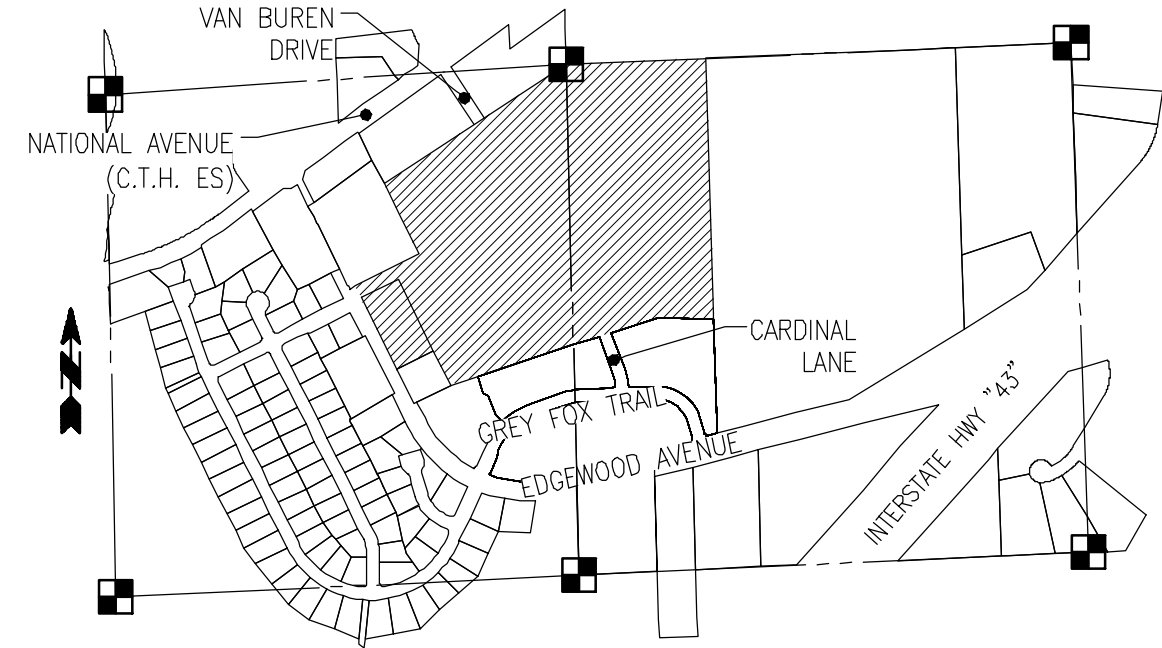
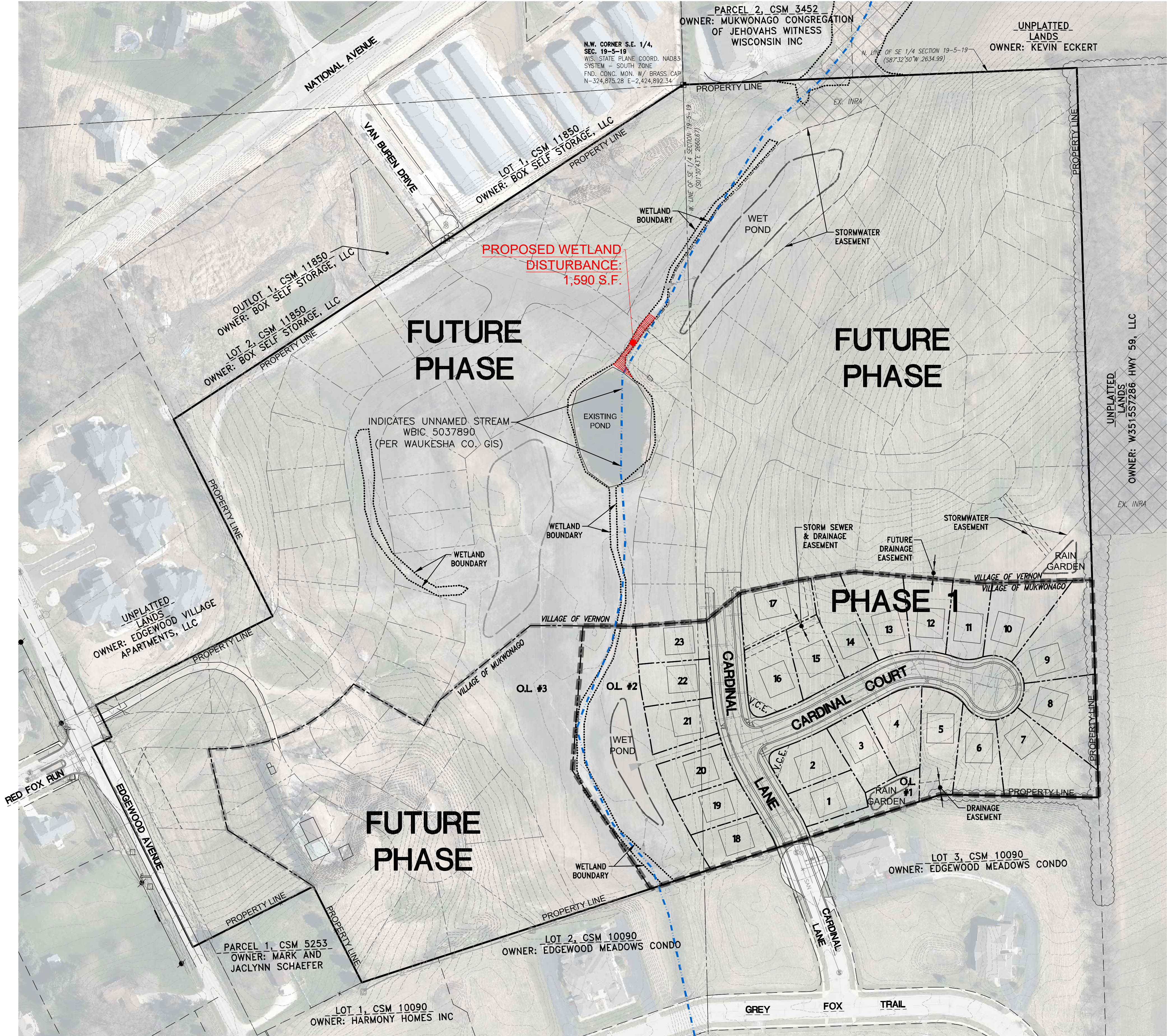
DESCRIPTION:

EXISTING SITE PLAN

SHEET

CO.1

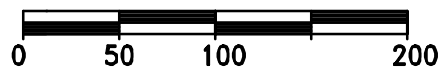
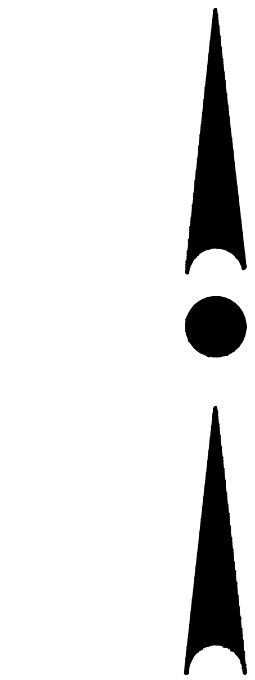
X:\2021\21-040-953-HEIN PROPERTY VERNON MUKWONAGO\DRAWINGS\CONSTRUCTION PLANS\HEIN PROPERTY_PHASE 1\PROPOSED SITE PLAN_22X34.DWG



LOCALITY MAP:
S. 1/2, SEC. 19, T. 5 N., R. 19 E.
SCALE: 1"=1000'

WETLAND DELINEATION NOTE:

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SCALE: 1" = 100' (22"x34")
SCALE: 1" = 200' (11"x17")



CONTRACTOR IS REQUIRED TO CONTACT DIGGERS HOTLINE TOLL FREE TO OBTAIN LOCATION OF UNDERGROUND UTILITIES PRIOR TO COMMENCING THE WORK. WISCONSIN STATUTE 182.0715 REQUIRES MIN. OF 3 WORK DAYS NOTICE BEFORE YOU EXCAVATE.
CALL DIGGERS HOTLINE 1-800-242-8511
NOTE: EXISTING UNDERGROUND UTILITY INFORMATION WAS OBTAINED FROM AVAILABLE RECORDS. THE ENGINEER MAKES NO GUARANTEE AS TO THE ACCURACY OF THIS INFORMATION. VERIFICATION TO THE SATISFACTION OF THE CONTRACTOR OF ALL UNDERGROUND UTILITIES, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE ASSUMED AS A CONDITION OF THE CONTRACT. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN LOCATION OF UTILITIES IN THE FIELD AND LOCATIONS SHOWN ON THE PLANS.



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VILLAGE OF MUKWONAGO & VILLAGE OF VERNON, WISCONSIN
BY: NEUMANN DEVELOPMENTS, INC.
N27W24025 PAUL COURT, SUITE 100
PEWAUKEE, WI 53072

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DATE:

JULY 17, 2024

JOB NUMBER:

21-040-953

DESCRIPTION:

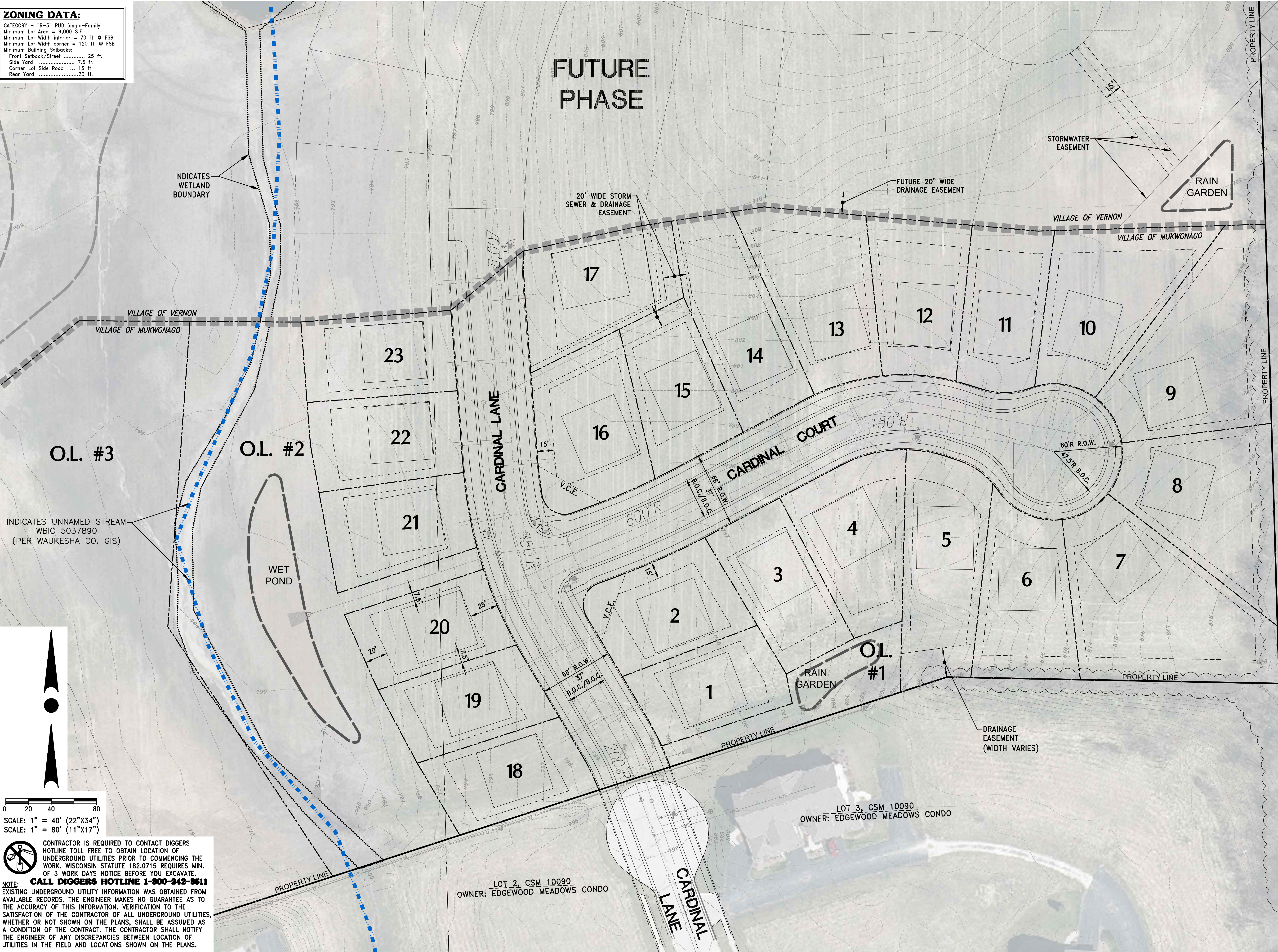
**OVERALL
PROPOSED SITE
PLAN**

SHEET

C0.2

X:\2021\21-040-953-HEIN PROPERTY VERNON MUKWONAGO\DRAWINGS\CONSTRUCTION PLANS\HEIN PROPERTY PHASE 1\PROPOSED SITE PLAN.20X34.DWG

ZONING DATA:
CATEGORY - "R-3" PUD Single-Family
Minimum Lot Area = 9,000 S.F.
Minimum Lot Width Interior = 70 ft. ● FSB
Minimum Lot Width corner = 120 ft. ● FSB
Minimum Building Setbacks:
Front Setback/Street 25 ft.
Side Yard 7.5 ft.
Corner Lot Side Road 15 ft.
Rear Yard 20 ft.



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TRIO
DESIGN • LAND SURVEYING
CIVIL ENGINEERING

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DATE:
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JOB NUMBER:
21-040-953

DESCRIPTION:

**PHASE 1
SITE PLAN**

SHEET

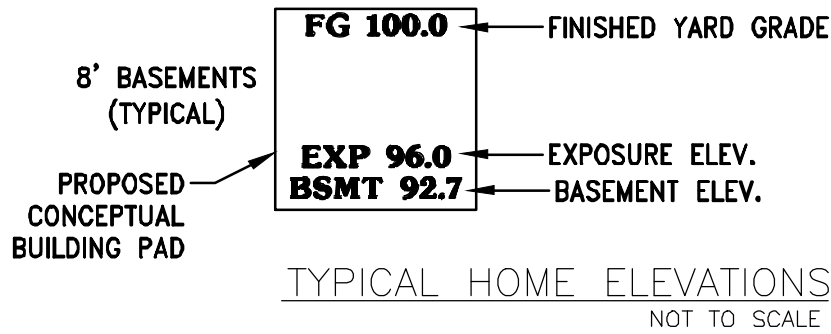
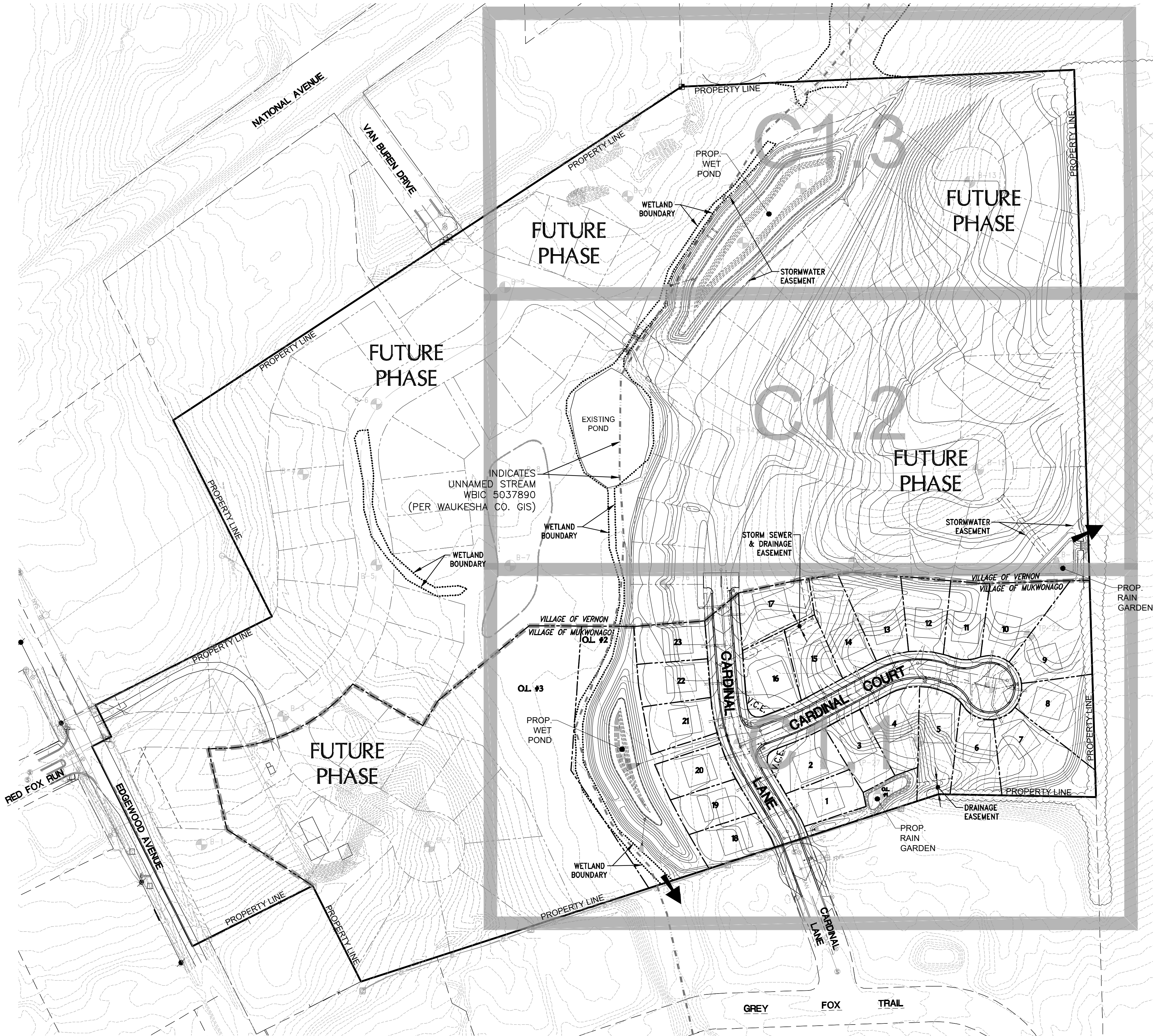
C0.3

UNPLATTED LANDS
OWNER: W351557286 HWY 59, LLC

LOT 3, CSM 10090
OWNER: EDGEWOOD MEADOWS CONDO

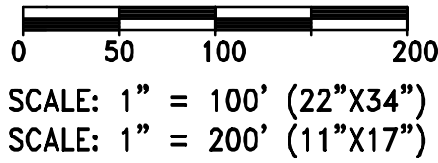
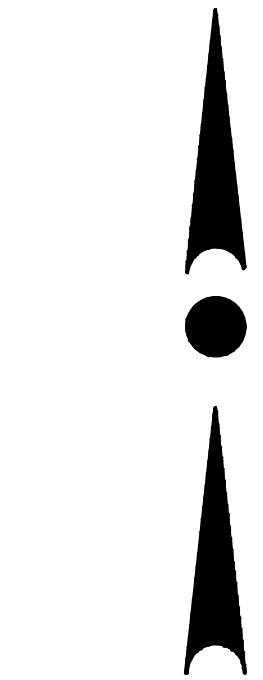
LOT 2, CSM 10090
OWNER: EDGEWOOD MEADOWS CONDO

X:\2021\21-040-953-HEIN PROPERTY VERNON MUKWONAGO\DRAWINGS\CONSTRUCTION PLANS\HEIN PROPERTY_PHASE 1_GRADING_22X34.DWG



VISION CORNER EASEMENT NOTE:
PER VILLAGE ORDINANCE (SECTION 100-406), LANDSCAPING, MONUMENTS AND OTHER OBSTRUCTIONS MUST NOT BE LOCATED WITHIN VISION CORNER EASEMENT.

LEGEND:	
--- 85.0 ---	- EXISTING CONTOUR
— 85.0 —	- PROPOSED CONTOUR
x 850.5	- PROPOSED SPOT ELEVATION
←	- PROPOSED FLOW ARROW
FG 850.0	- PROPOSED YARD GRADE
EXP 842.0	- PROPOSED EXPOSURE GRADE
⊗	- SOIL BORING LOCATION



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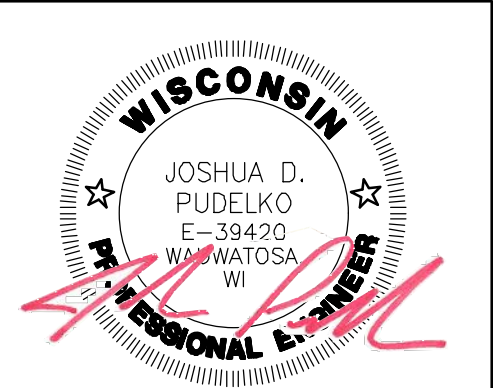
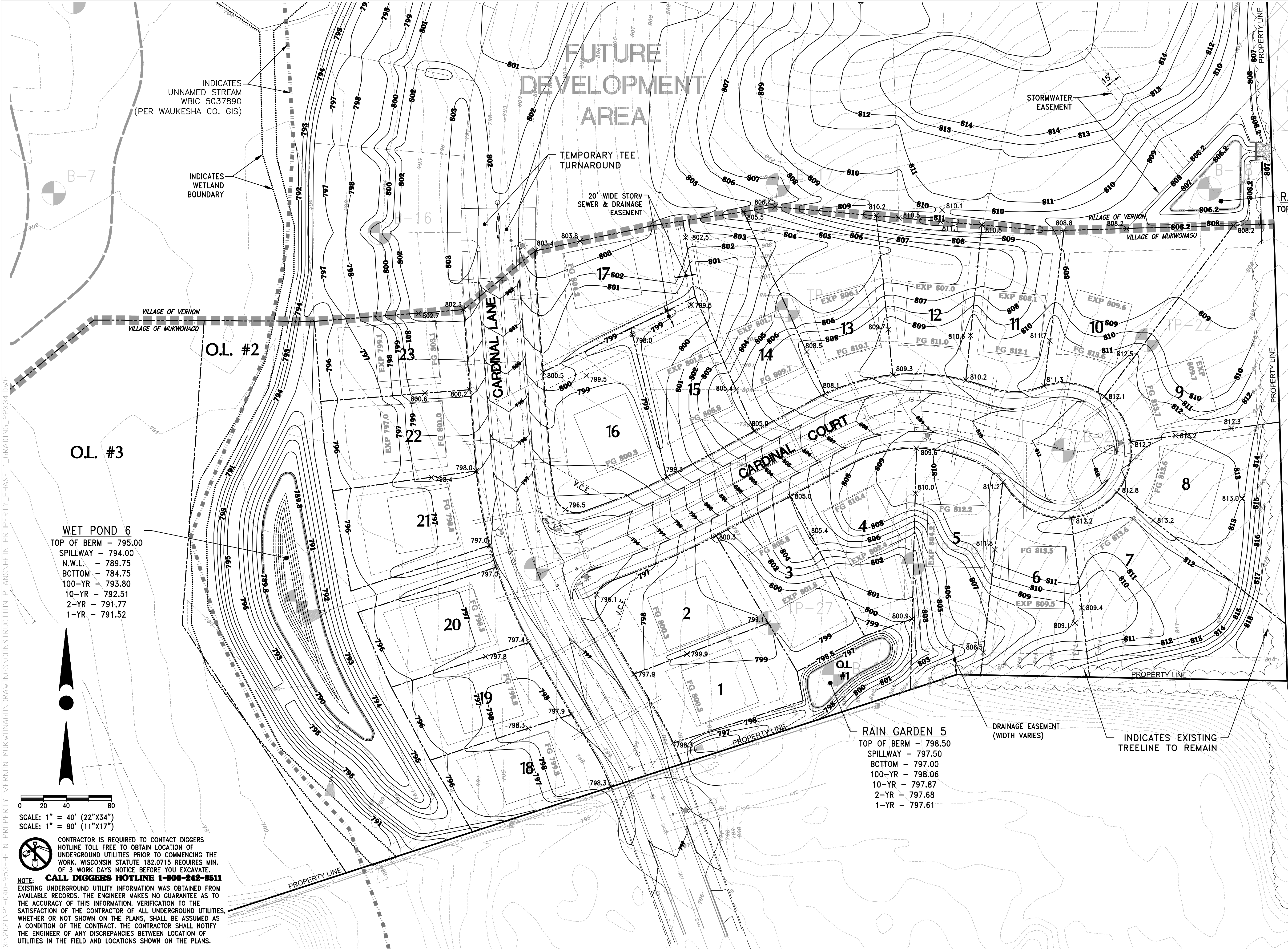
JOB NUMBER:
21-040-953

DESCRIPTION:

**OVERALL GRADING
& DRAINAGE PLAN**

SHEET

C1.0



PROJECT:
CARDINAL RIDGE - PHASE 1
SINGLE FAMILY DEVELOPMENT
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BY: NEUMANN DEVELOPMENTS, INC.
N27W24025 PAUL COURT, SUITE 100
PEWAUKEE, WI 53072

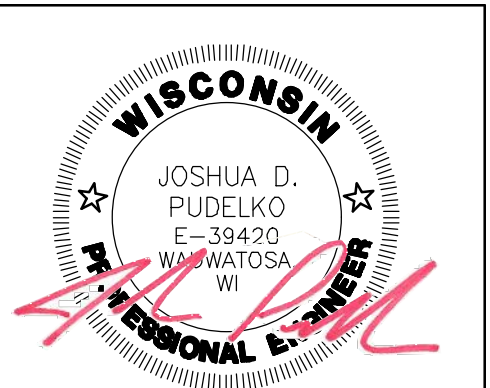
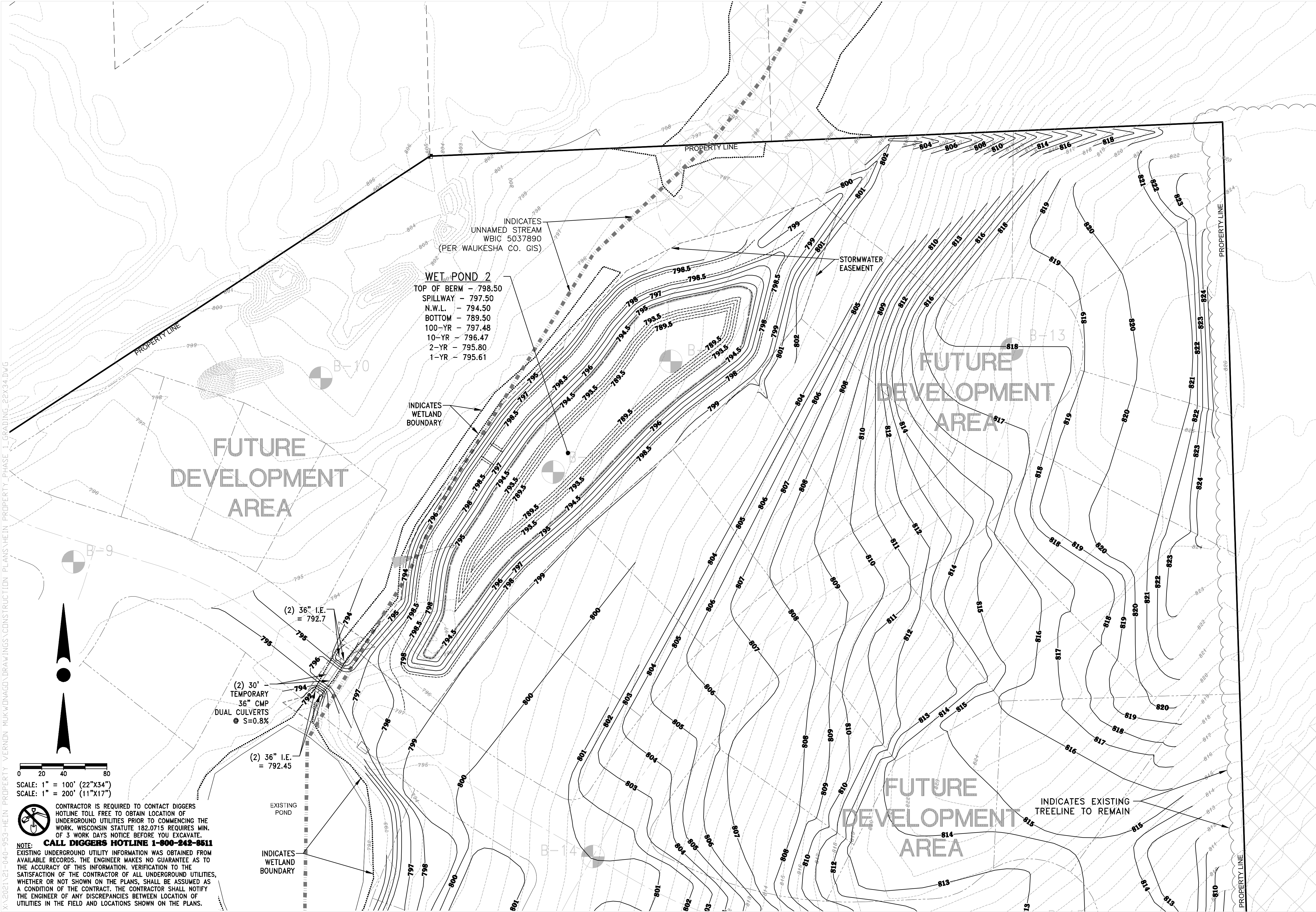
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JULY 17, 2024

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21-040-953

DESCRIPTION:
GRADING &
DRAINAGE PLAN

SHEET
C1.1



PROJECT:
CARDINAL RIDGE - PHASE 1
SINGLE FAMILY DEVELOPMENT
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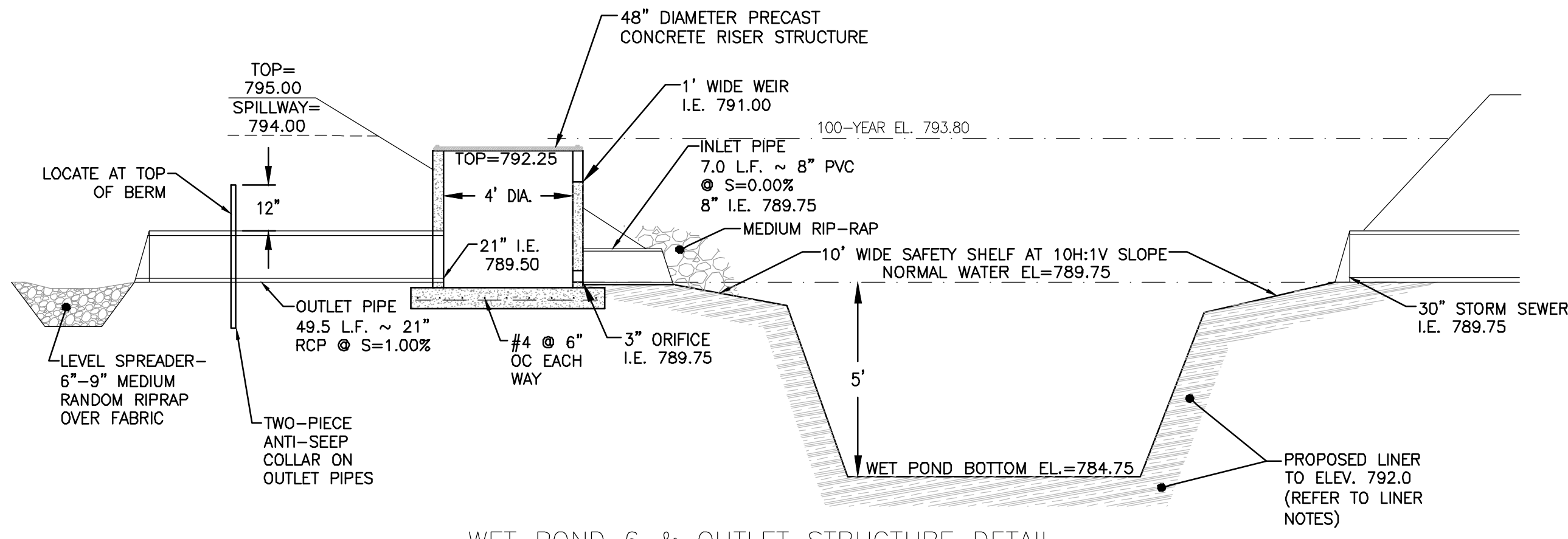
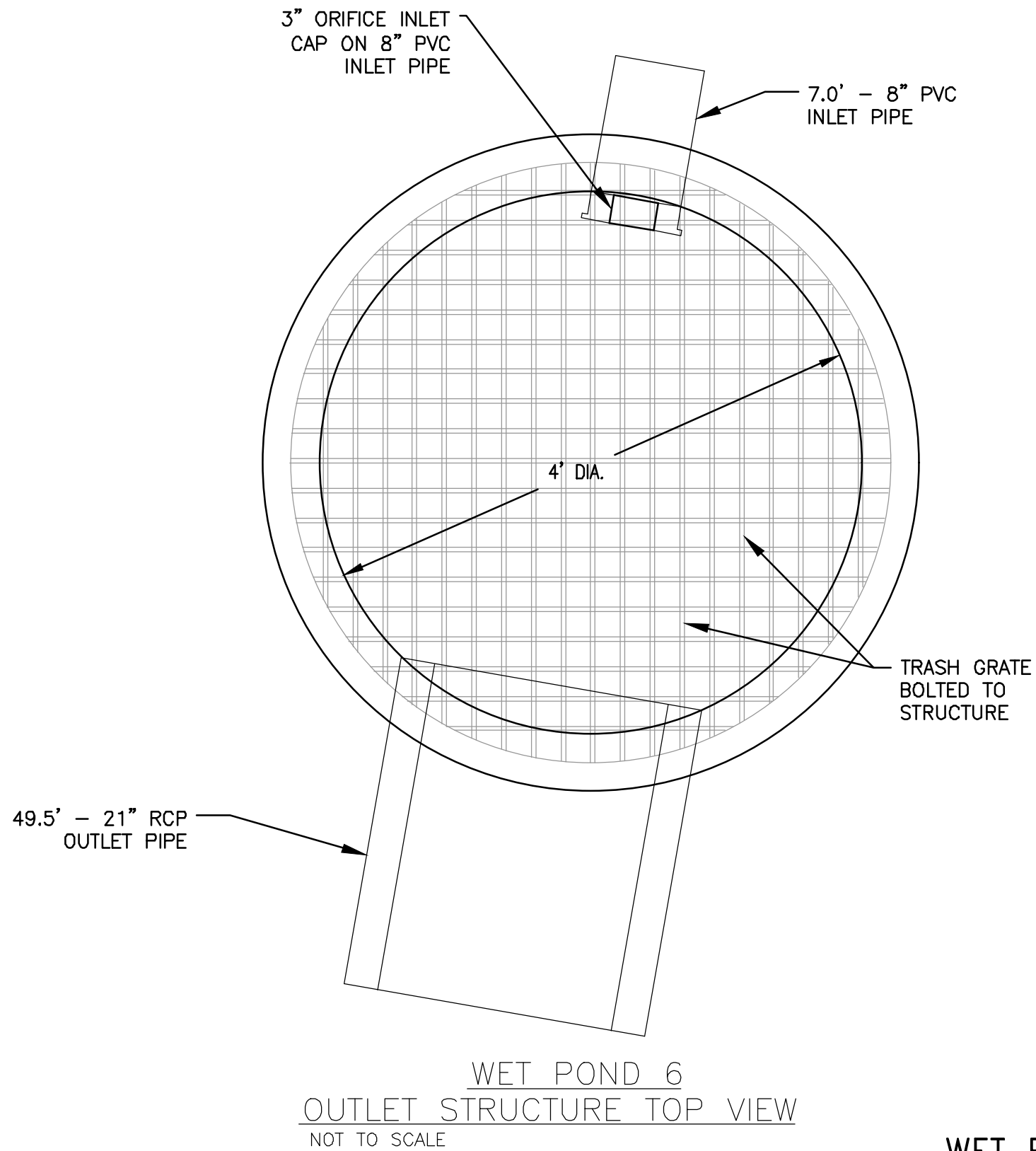
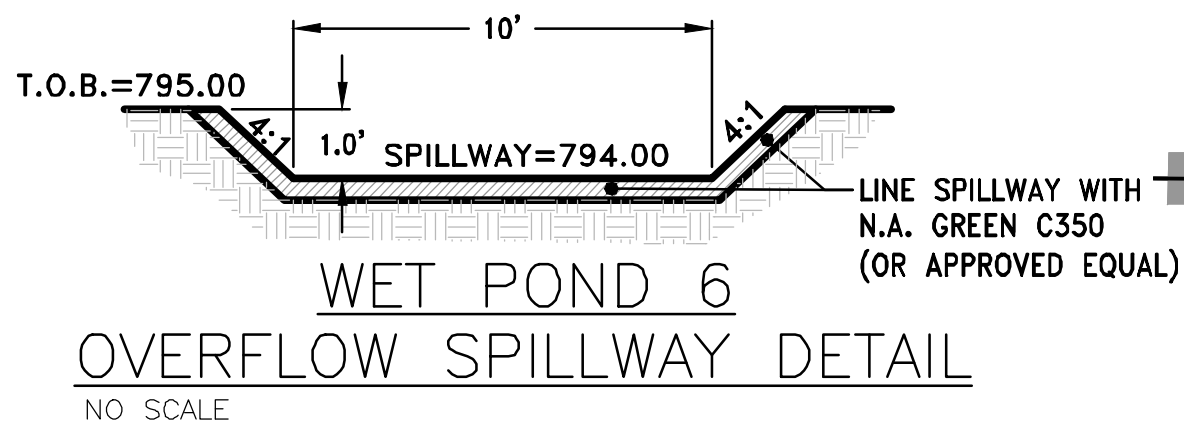
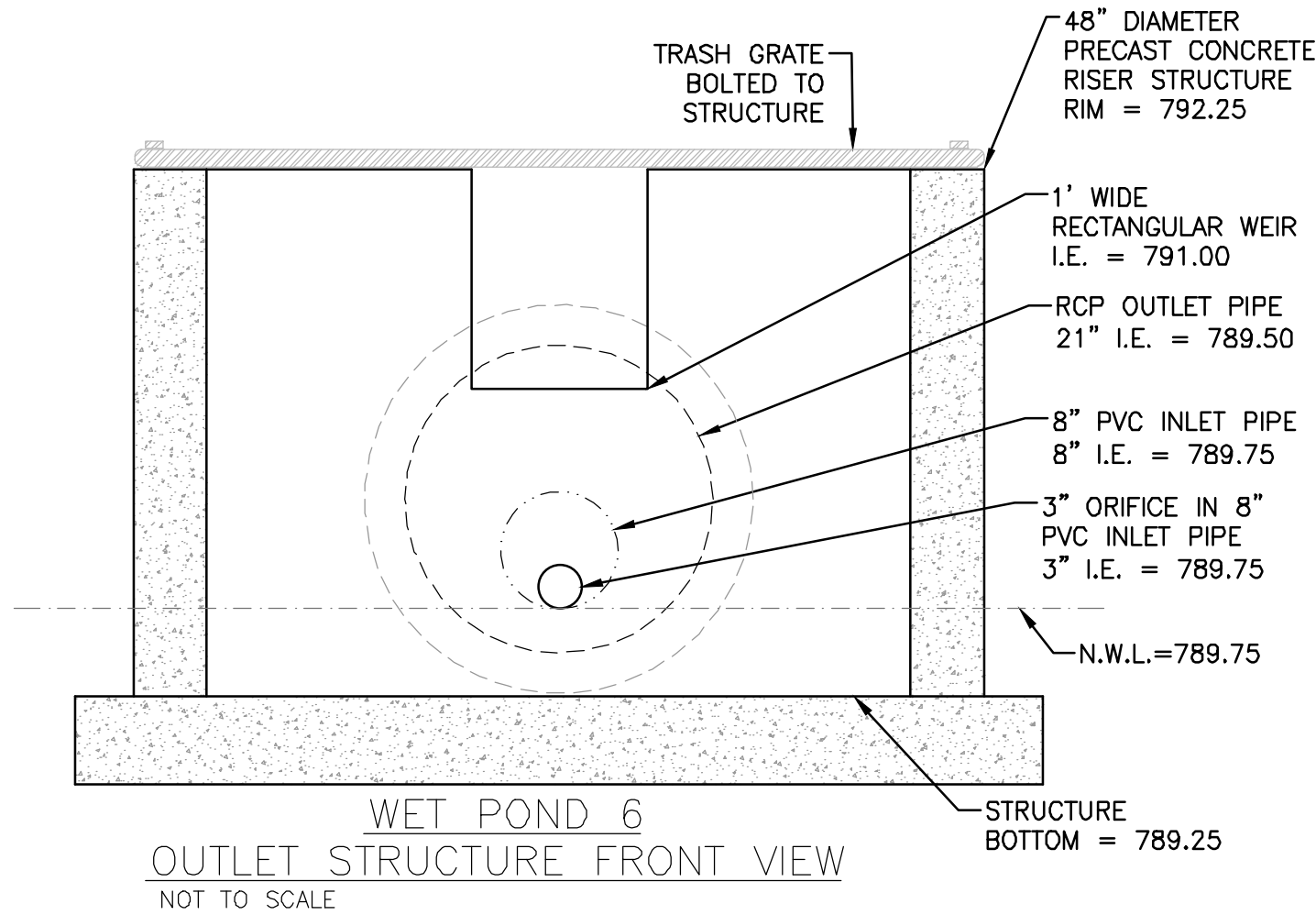
DATE:
JULY 17, 2024

JOB NUMBER:
21-040-953

DESCRIPTION:
**GRADING &
DRAINAGE PLAN**

SHEET
C1.3

X:\2021\21-040-953-HEIN PROPERTY VERNON MUKWONAGO\DRAWINGS\CONSTRUCTION PLANS\HEIN PROPERTY_PHASE 1_POND3_22X34.DWG

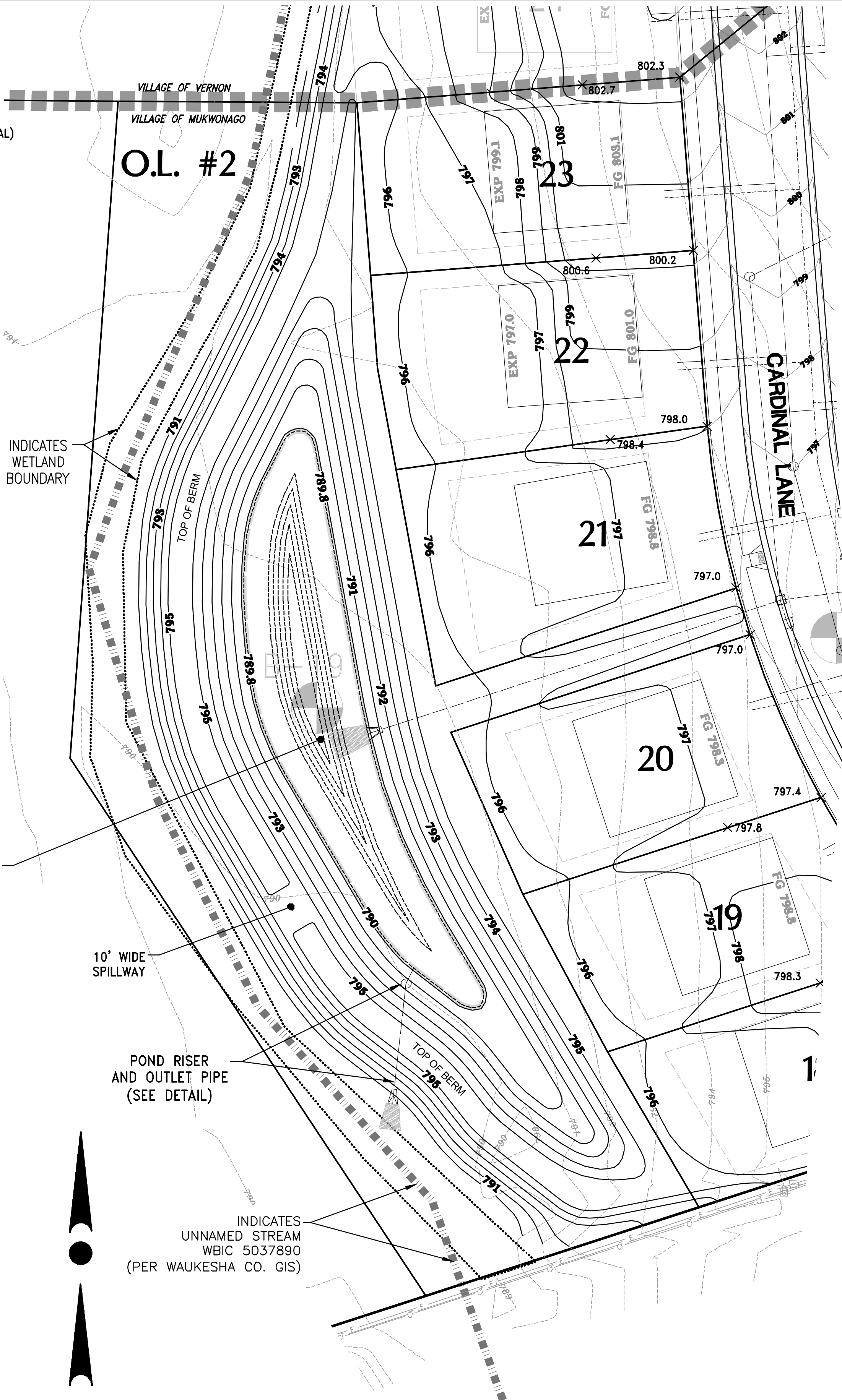


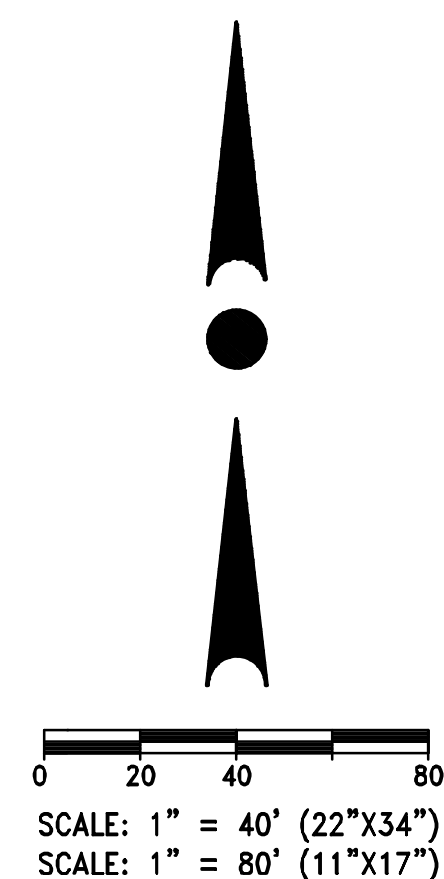
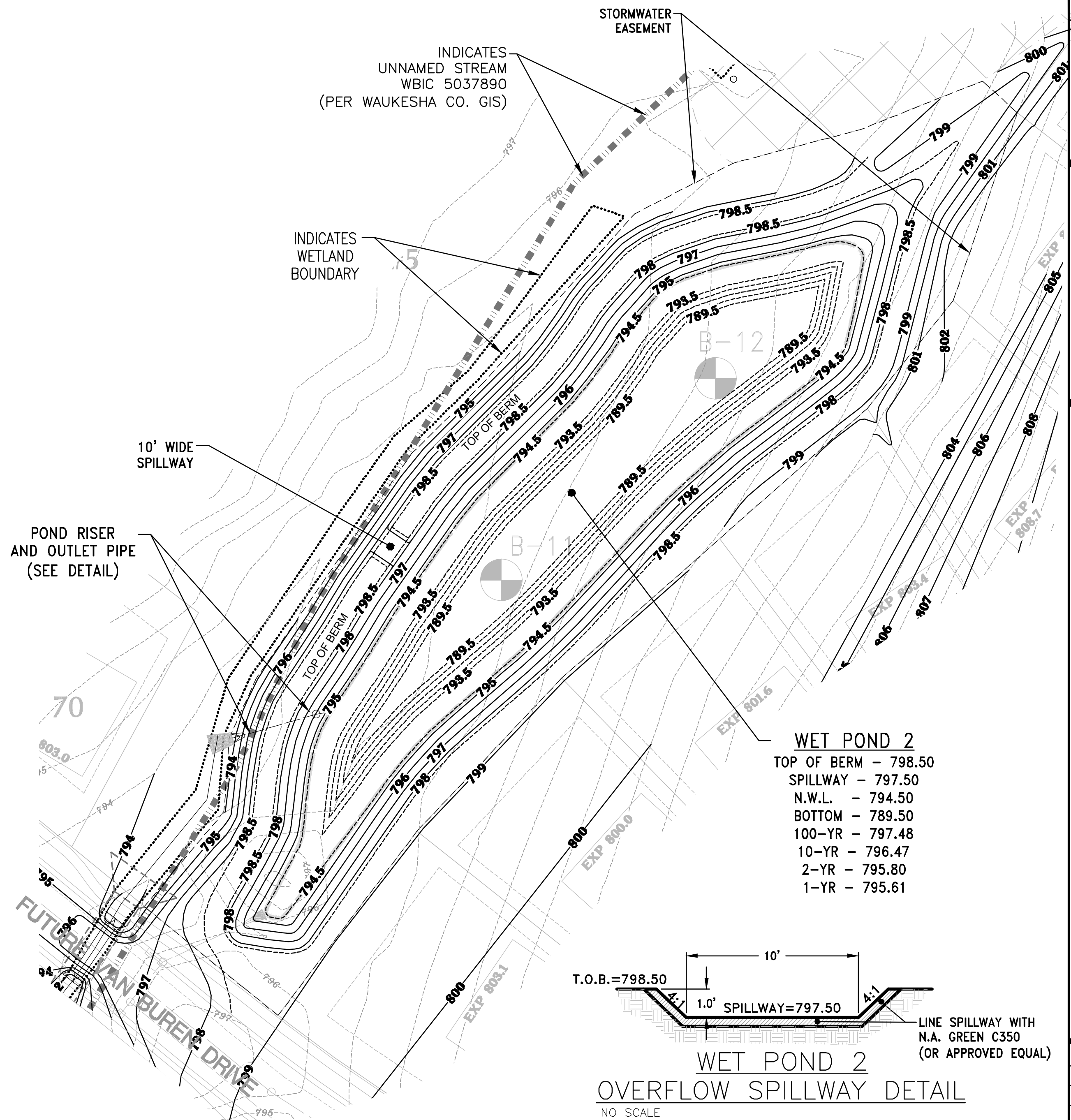
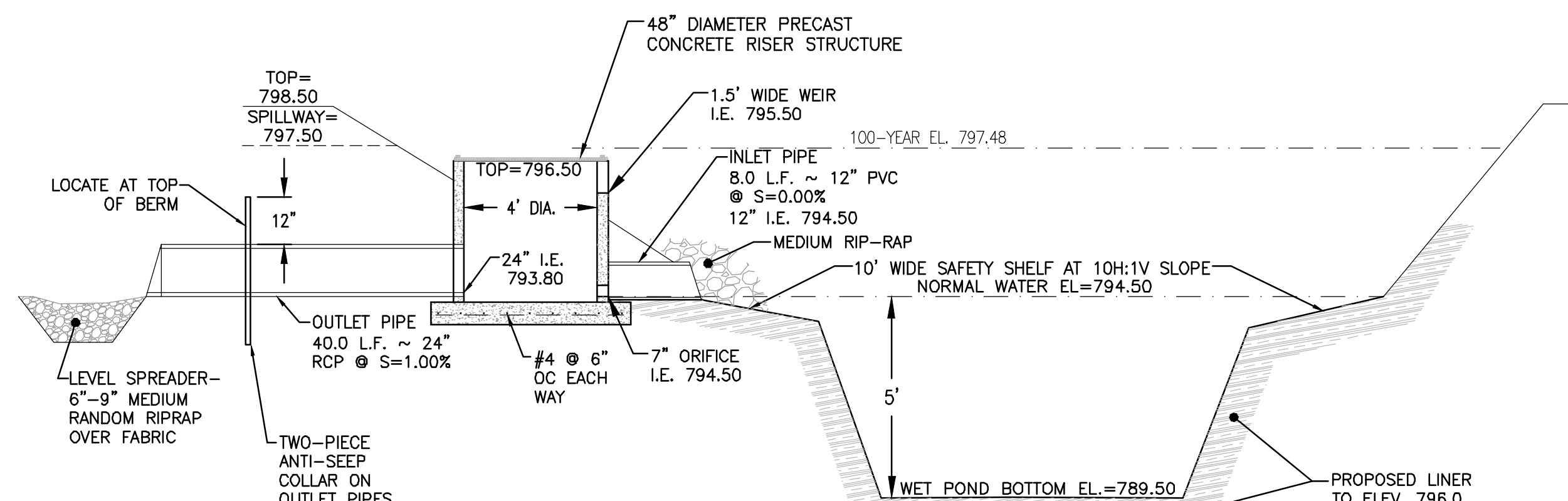
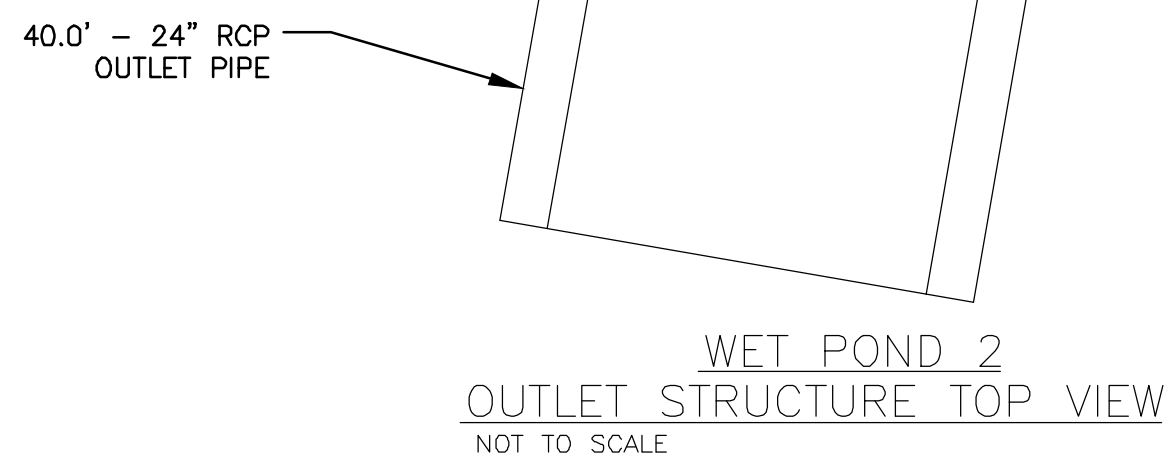
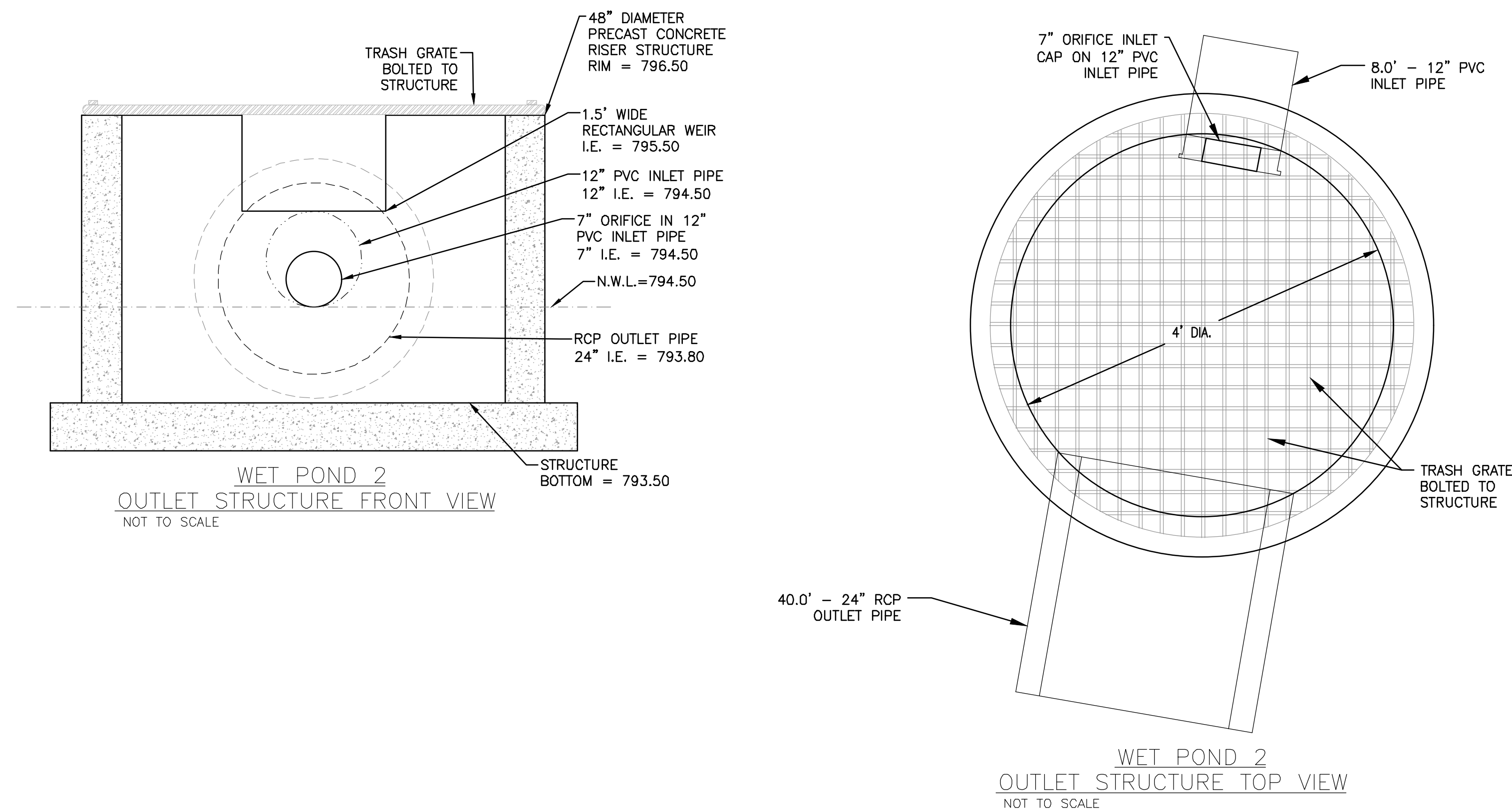
CLAY LINER NOTE:
- 2" THICK CLAY LINER IN ACCORDANCE WITH WDNR TECH. STD. 1001 TYPE A, AND SOILS REPORT.
- GEOSYNTHETIC CLAY LINER (GCL) OR HDPE LINER, IN ACCORDANCE WITH WDNR TECH. STD. 1001 TYPE A, MAY BE USED IN LIEU OF CLAY LINERS.
- LINER SHALL BE PLACED TO THE 2-YEAR PEAK PONDING ELEVATION OR A MIN. 1' ABOVE THE SEASONAL HIGH GROUND WATER ELEVATION, WHICHEVER IS HIGHER.
- CLAY LINER MATERIALS SHOULD BE COMPACTED TO A MINIMUM OF 90 TO 92% DRY DENSITY AS DETERMINED BY MODIFIED PROCTOR (ASTM D1557).
- IF PREDOMINANTLY GRANULAR TEXTURE SOILS AND/OR GROUNDWATER INFLOW IS ENCOUNTERED AT OR BELOW THE BOTTOM ELEVATION OF THE POND, A "SACRIFICIAL" LIFT OF CLAYEY FILL MAY BE REQUIRED TO BE PLACED ALONG THE SIDEWALLS AND BASE PRIOR TO COMMENCING WITH ACTUAL LINER PLACEMENT/CONSTRUCTION TO AID IN ATTAINING A SATISFACTORILY COMPACTED LINER SECTION. THE PLACEMENT OF A "SACRIFICIAL" LAYER IS PARTICULARLY BENEFICIAL IN CREATING A STABLE SUBBASE IN THE EVENT SLIGHT GROUNDWATER SEEPAGE OCCURS.
- GEOTECHNICAL TESTING SHALL BE PERFORMED ON POTENTIAL CLAY LINER MATERIAL TO CONFIRM THAT SPECIFICATIONS ARE MET.
- WET POND SHALL BE FILLED TO NORMAL WATER LEVEL IMMEDIATELY AFTER PLACING LINER TO PREVENT CRACKING.

RIP-RAP NOTE:
RIP-RAP IS TO EXTEND FROM ALL STORM SEWER OUTFALLS TO THE DOWNSLOPE EDGE OF THE WET POND SAFETY SHELF.

TWO-PIECE ANTI-SEEP COLLAR NOTES:
- ANTI-SEEP COLLARS SHALL INCLUDE 1/4" POLYETHYLENE SHEETS WITH COLLAR FOR PIPE; DIMENSIONS SHALL BE AS NOTED ON THE DETAIL.
- INSTALL ANTI-SEEP COLLARS PER MANUFACTURER SPECIFICATIONS.

WET POND 6
TOP OF BERM - 795.00
SPILLWAY - 794.00
N.W.L. - 789.75
BOTTOM - 784.75
100-YR - 793.81
10-YR - 792.51
2-YR - 791.77
1-YR - 791.52





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- WORK POND SHALL BE FILLED TO NORMAL WATER LEVEL IMMEDIATELY AFTER PLACING LINER TO PREVENT CRACKING.

RIP-RAP NOTE:
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DESCRIPTION:

**POND
DETAILS**

SHEET

C1.5



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X:\2021\21-040-953-HEIN PROPERTY VERNON MUKWONAGO\DRAWINGS\CONSTRUCTION PLANS\HEIN PROPERTY_PHASE 1_PONDS_22X34.DWG



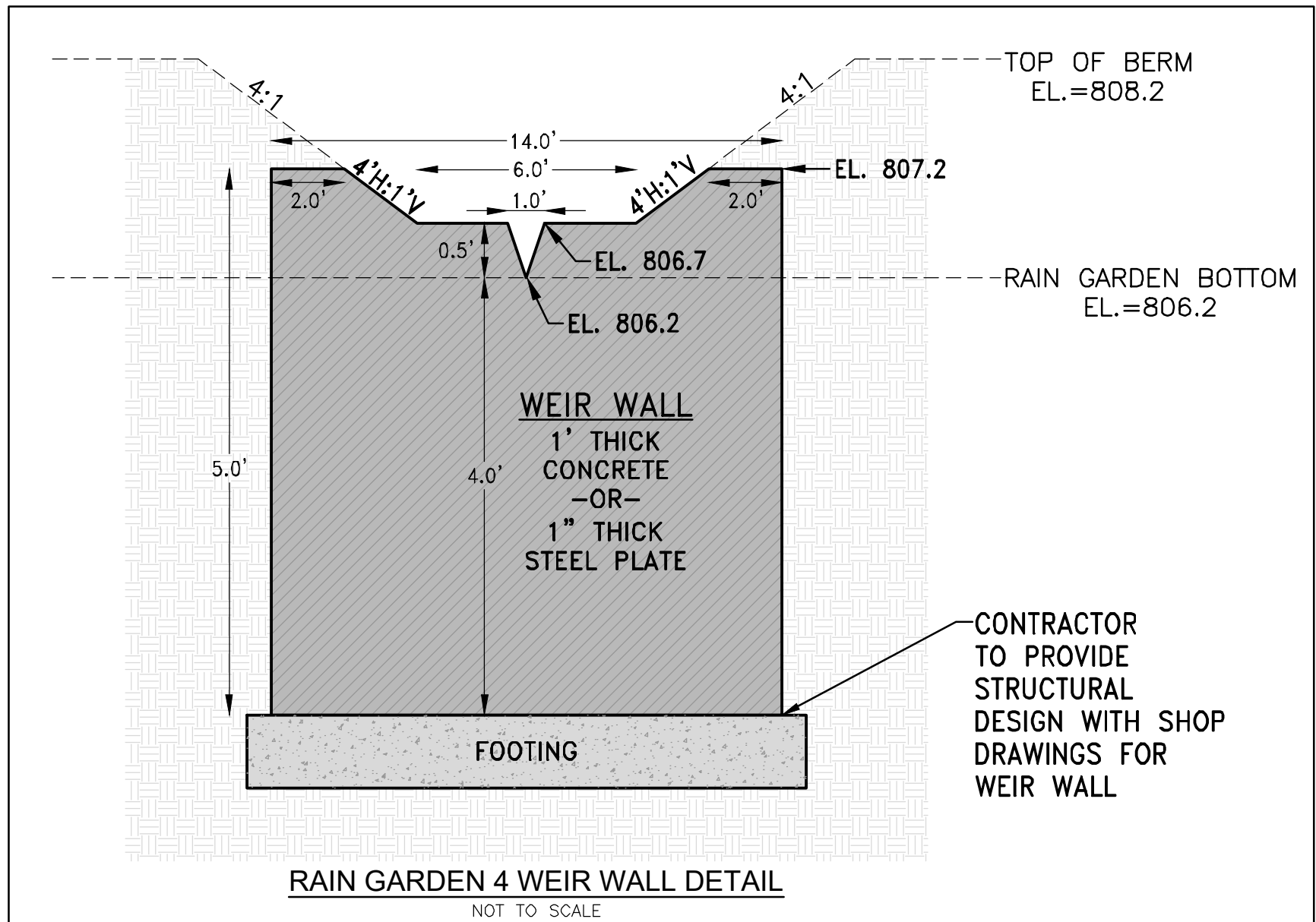
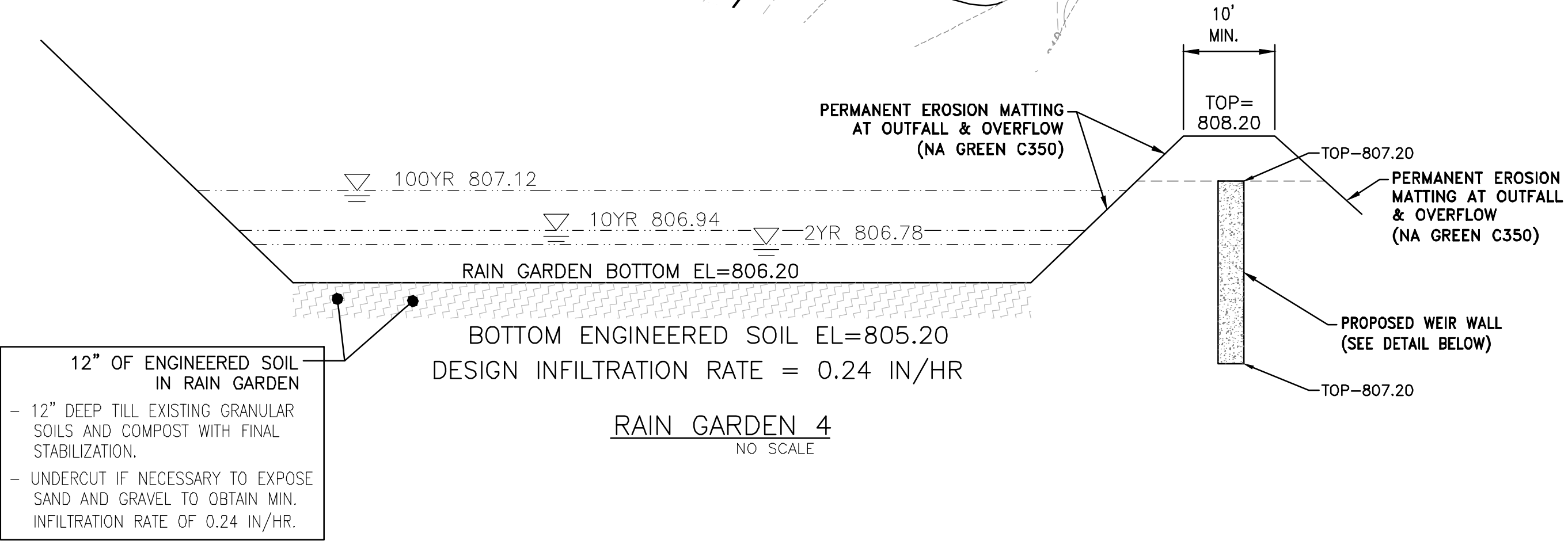
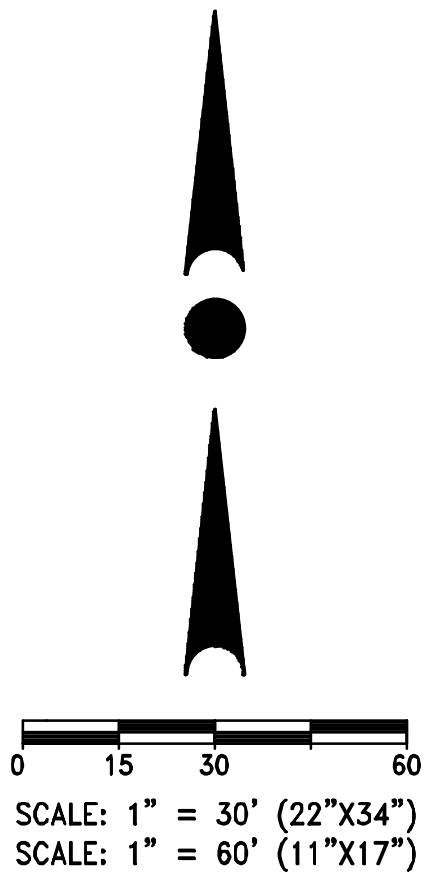
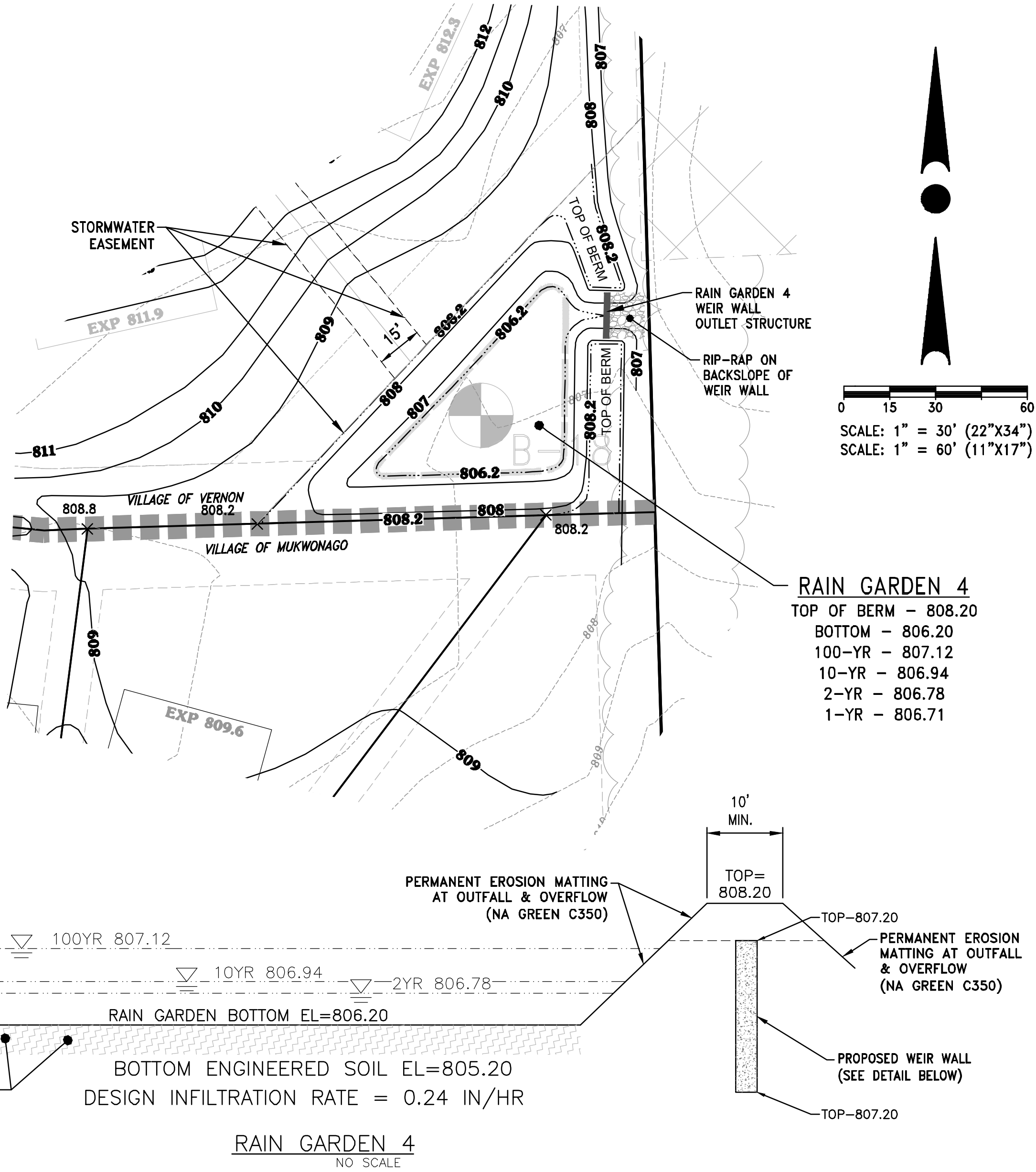
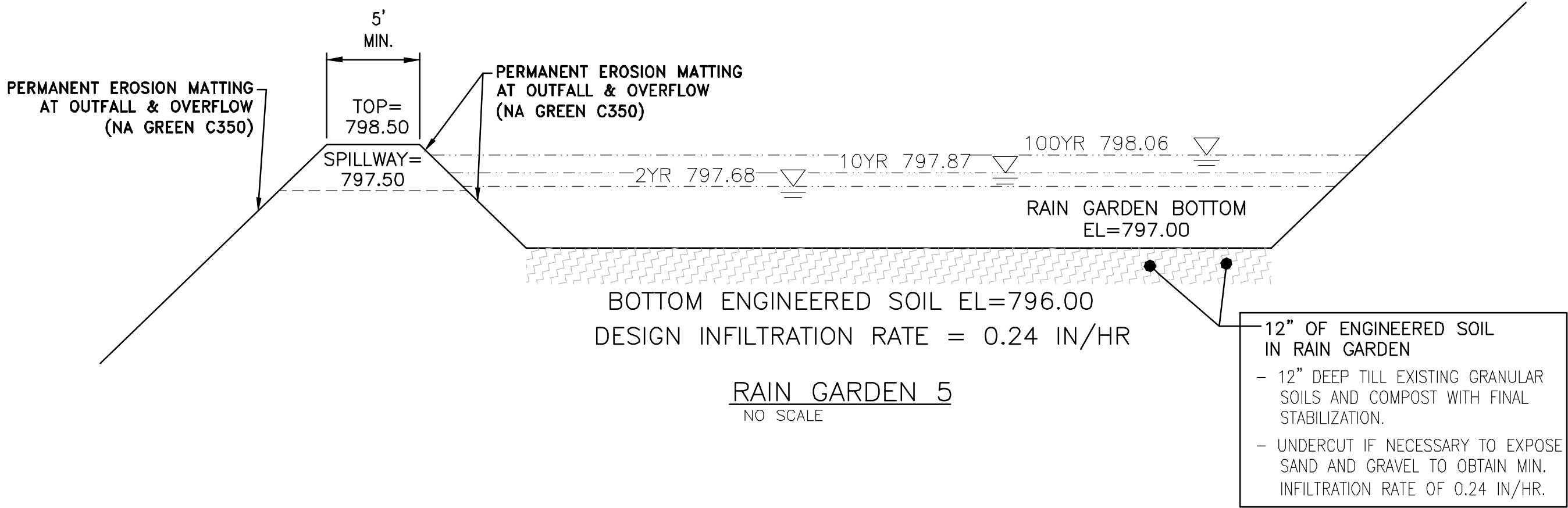
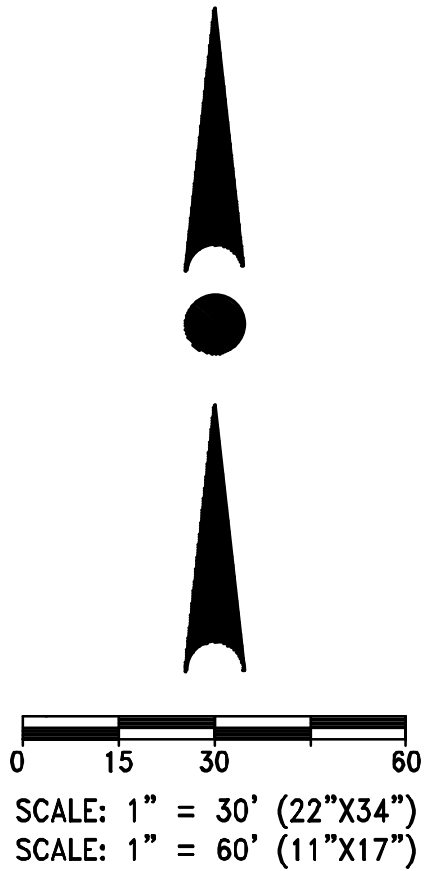
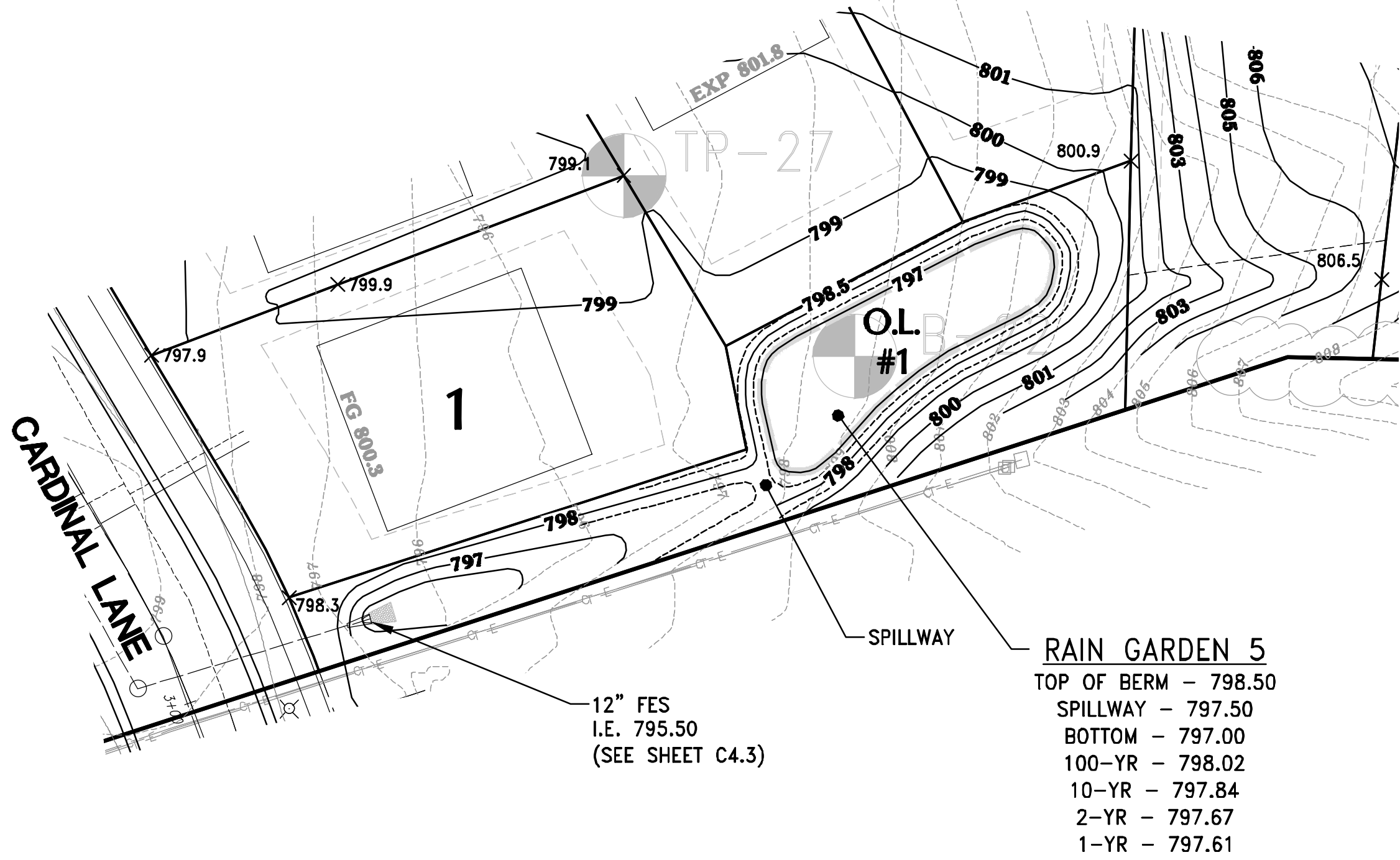
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CALL DIGGERS HOTLINE 1-800-242-8511

NOTE:
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ENGINEERED SOIL MIX:	
COMPONENT	% COMPOSITION (BY VOLUME)
LOCAL SAND	70%
COMPOST	30%

RAIN GARDEN CONSTRUCTION NOTES

- RAIN GARDEN FOOTPRINT SHALL BE (OVER)EXCAVATED WITH ROUGH GRADING.
- FINAL RAIN GARDEN WORK SHALL NOT BE INSTALLED UNTIL THE SITE IS SUBSTANTIALLY STABILIZED.
- DURING ALL PHASES OF CONSTRUCTION, THE BASIN AREAS SHALL BE PROTECTED FROM HEAVY EQUIPMENT COMPACTION.
- REMOVE ACCUMULATED SEDIMENT PRIOR TO PLACEMENT OF ENGINEERED SOIL.
- ENGINEERED SOIL SHALL BE PLACED IN 6 INCH LIFTS TO AVOID COMPACTION.
- ENGINEERED SOIL PLACED IN THE RAIN GARDEN AREAS SHALL NOT BE COMPACTED.
- PLACEMENT OF ENGINEERED SOILS SHALL BE SUSPENDED IN PERIODS OF RAINFALL AND SNOWMELT AND SHALL REMAIN SUSPENDED IF PONDED WATER IS PRESENT.



4100 N. CALHOUN RD., SUITE 300
BROOKFIELD, WI 53005
PHONE: (262) 790-1480
FAX: (262) 790-1481
EMAIL: info@trioeng.com

PROJECT:
CARDINAL RIDGE - PHASE 1
SINGLE FAMILY DEVELOPMENT
VILLAGE OF MUKWONAGO & VILLAGE OF VERNON, WISCONSIN
BY: NEUMANN DEVELOPMENTS, INC.
N27W24025 PAUL COURT, SUITE 100
PEWAUKEE, WI 53072

REVISION HISTORY

DATE	DESCRIPTION
05/17/2024	PHASE 1 SUBMITTAL
07/17/2024	PER VILLAGE REVIEW

DATE:
JULY 17, 2024

JOB NUMBER:
21-040-953

DESCRIPTION:
POND DETAILS

SHEET

C1.6

X:\2021\21-040-953-HEIN PROPERTY MUKWONAGO\DRAWINGS\CONSTRUCTION PLANS\HEIN PROPERTY_PHASE 1_EROSION CONTROL_22X34.DWG

- EROSION CONTROL NOTES:
1. THE CONTRACTOR SHALL TAKE ALL MEASURES NECESSARY TO MINIMIZE EROSION, WATER POLLUTION AND SILTATION CAUSED BY CONSTRUCTION OF THIS PROJECT. EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH WISCONSIN DEPARTMENT OF NATURAL RESOURCES TECHNICAL STANDARDS.
 2. EROSION CONTROL PLAN: PRIOR TO BEGINNING WORK, THE CONTRACTOR MAY BE REQUIRED TO SUBMIT AN EROSION AND SEDIMENT CONTROL PLAN, DETAILING SPECIFIC MEASURES THAT WILL BE USED IN THE VARIOUS STAGES OF CONSTRUCTION FOR APPROVAL BY THE ENGINEER.
 3. IMPLEMENTATION: THE CONTRACTOR SHALL NOT BEGIN WORK UNTIL AFTER INITIAL EROSION AND SEDIMENT CONTROL DEVICES ARE IN PLACE AND APPROVED BY THE ENGINEER.
 4. EROSION CONTROL MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:
 - A. DIVERT UPSTREAM RUNOFF FROM FLOWING THROUGH THE CONSTRUCTION SITE.
 - B. PROTECT DOWNSTREAM OR ADJACENT WATERWAYS AND WETLANDS WITH SILT FENCE.
 - C. DELAY STRIPPING TOPSOIL UNTIL REQUIRED FOR CONSTRUCTION.
 - D. PLACE SILT FENCE OR EROSION CONTROL BALES IN DITCHES AND OTHER DRAINAGE WAYS TO COLLECT SEDIMENT AND TO SLOW THE VELOCITY OF RUNOFF.
 - E. MAINTAIN EXISTING SEDIMENT BASIN AS DICTATED BY SITE CONDITIONS.
 - F. PROTECT STORM SEWER INLETS AND THE UPSTREAM END OF CULVERTS WITH SILT FENCE OR EROSION CONTROL BALES.
 - G. PROMPT REMOVAL OF EXCAVATED MATERIAL.
 - H. PROPER STORAGE OF BACKFILL AND BEDDING MATERIALS INCLUDING PLACING SILT FENCE OR EROSION CONTROL BALES ON THE DOWNSLOPE SIDES OF SPOIL PILES.
 - I. CONSTRUCTION OF TRACKING PAD TO CONSTRUCTION SITE TO PREVENT SEDIMENT FROM BEING TRACKED ONTO ROADWAYS.
 - J. PROMPT (SAME DAY) CLEANUP OF MATERIAL TRACKED ONTO ADJACENT STREETS.
 - K. TIMELY RESTORATION OF DAMAGE SURFACE AREAS.
 - L. ALL AREAS THAT WILL REMAIN DISTURBED AFTER OCTOBER 15, MUST BE TEMPORARY SEEDED AS OF THAT DATE.
 5. TEMPORARY EROSION CONTROL MEASURES:
 - A. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY EROSION CONTROL MEASURES, WHERE EROSION IS LIKELY TO BE A PROBLEM, PRIOR TO BEGINNING WORK ON THOSE SECTION(S) OF THE PROJECT. TEMPORARY EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL AFTER PERMANENT EROSION CONTROL, SUCH AS SEEDING OR SODDING, HAS BEEN ESTABLISHED.
 - B. IN THE EVENT THE PERMANENT EROSION CONTROL MEASURES ARE NOT FULLY IMPLEMENTED IN CURRENT CONSTRUCTION SEASON, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL NECESSARY TEMPORARY EROSION CONTROL MEASURES UNTIL AFTER PERMANENT MEASURES HAVE BEEN COMPLETED IN THE FOLLOWING YEAR.
 6. ALL DISTURBANCE AREAS THAT REMAIN INACTIVE FOR SEVEN DAYS OR LONGER SHALL RECEIVE TEMPORARY SEEDING.
 7. TRENCH DEWATERING SHALL BE IN ACCORDANCE WITH WDNR TECHNICAL STANDARDS.
 8. INSTALL SILT FENCE IN ACCORDANCE WITH WDNR TECHNICAL STANDARD DETAILS
 9. ALL RIP RAP AT PIPE OUTLETS SHALL BE 3'x5' MEDIUM RIP RAP OVER TYPE R FABRIC PER WDOT SPECIFICATIONS UNLESS OTHERWISE DESIGNATED.
 10. EROSION CONTROL INSPECTION AND MAINTENANCE
 - A. INSPECT EROSION CONTROL MEASURES WEEKLY AND AFTER SITE RECEIVES 0.5" OF RAIN IN A 24-HOUR PERIOD DURING CONSTRUCTION.
 - B. REPAIR OR REPLACE EROSION CONTROLS THAT ARE DAMAGED OR FAILING.
 11. ALL AREAS TO BE SEEDDED AND MULCHED SHALL USE WDOT SEED MIXTURE NO. 20. MULCH SHALL APPLIED PER WDOT SPECIFICATIONS USING METHOD B FOR PLACEMENT.

CONSTRUCTION SEQUENCE PLAN

1. INSTALL TRACKING PAD. MAIN STREET IS THE ONLY ENTRANCE TO BE USED FOR CONSTRUCTION ACTIVITIES.
2. INSTALL SILT FENCE AROUND THE PERIMETER OF THE SITE.
3. CLEAR AND GRUB CONSTRUCTION AREAS AS REQUIRED.
4. STRIP TOPSOIL FROM THE TEMPORARY SEDIMENT BASIN AREA (INCLUDING ASSOCIATED/ADJACENT FILL PLACEMENT AREAS) AND STOCKPILE. SEED AND STABILIZE STOCKPILES IMMEDIATELY UPON COMPLETION OF STOCKPILING.
5. CONSTRUCT TEMPORARY DIVERSION BERMS AND SWALES (WITH DITCH CHECKS) TO DIRECT RUNOFF TO THE TEMPORARY SEDIMENT BASINS, AS INDICATED ON THE PLAN.
6. BEGIN STRIPPING TOPSOIL, IMPORTING OF CLEAN STRUCTURAL FILL, AND ROUGH GRADING OF THE SITE. NOTE THAT ROUGH GRADING MAY OCCUR CONCURRENT WITH CONSTRUCTION OF THE TEMPORARY DIVERSIONS.
7. INSTALL SANITARY SEWER AND WATER MAIN. COMPLETE ALL TESTING AND CONTACT VILLAGE PRIOR TO CONNECTING TO EXISTING MAINS. NOTE THAT THIS STEP MAY BEGIN CONCURRENT WITH ROUGH GRADING ONCE THE UTILITY AREAS HAVE BEEN GRADED TO SUBGRADE.
8. INSTALL STORM SEWER AND ASSOCIATED EROSION CONTROL MEASURES PER EROSION CONTROL PLAN. NOTE THAT THIS STEP MAY BEGIN CONCURRENT WITH SANITARY SEWER AND WATER MAIN INSTALLATION.
9. FINISH GRADE THE SITE. NOTE THAT THIS STEP MAY OCCUR CONCURRENT WITH STORM SEWER INSTALLATION.
10. INSTALL STONE BASE COURSE, CONSTRUCT CURB AND SIDEWALK, AND PLACE BINDER COURSE PAVEMENT. NOTE THAT THIS STEP MAY BEGIN CONCURRENT WITH FINISH GRADING.
11. REMOVE TRACKING PAD ONCE ROADS ARE COMPLETED. RESTORE DISTURBED AREA.
12. RESPREAD TOPSOIL AND PLACE SEED, MULCH, MATTING AND OTHER SITE STABILIZERS AS NEEDED. NOTE THAT THIS STEP MAY BEGIN CONCURRENT WITH FINISH GRADING AND ROAD CONSTRUCTION. ALSO NOTE THAT ANY AREAS, SUCH AS POND SLOPES, THAT ARE FINISH GRADED AND TOPSOILED SHALL BE SEEDDED, MULCHED AND/OR MATTED IMMEDIATELY AFTER TOPSOIL IS PLACED.
13. LATE SEASON (AFTER OCTOBER 15) STABILIZATION NOTES:
 - 13.1. ALL AREAS THAT WILL REMAIN DISTURBED AFTER OCTOBER 15 MUST BE TEMPORARY SEEDDED AS OF THAT DATE.
 - 13.2. ANY FINAL SITE STABILIZATION THAT OCCURS AFTER OCTOBER 15 MAY REQUIRE CONTRACTOR TO COVER DISTURBED AREAS WITH THE ANIONIC FORM OF POLYACRYLAMIDE (PAM), PER WDNR TECHNICAL STANDARD 1050 AND WISDOT PAL LIST. CONTRACTOR SHALL COORDINATE WITH VILLAGE ENGINEER AND WDNR FOR LATE SEASON STABILIZATION REQUIREMENTS.
14. REMOVE CONSTRUCTION EROSION CONTROL MEASURES AFTER SITE IS STABILIZED (SUBSTANTIALLY VEGETATED) AND ALL PHASE 4 CONSTRUCTION IS COMPLETE.

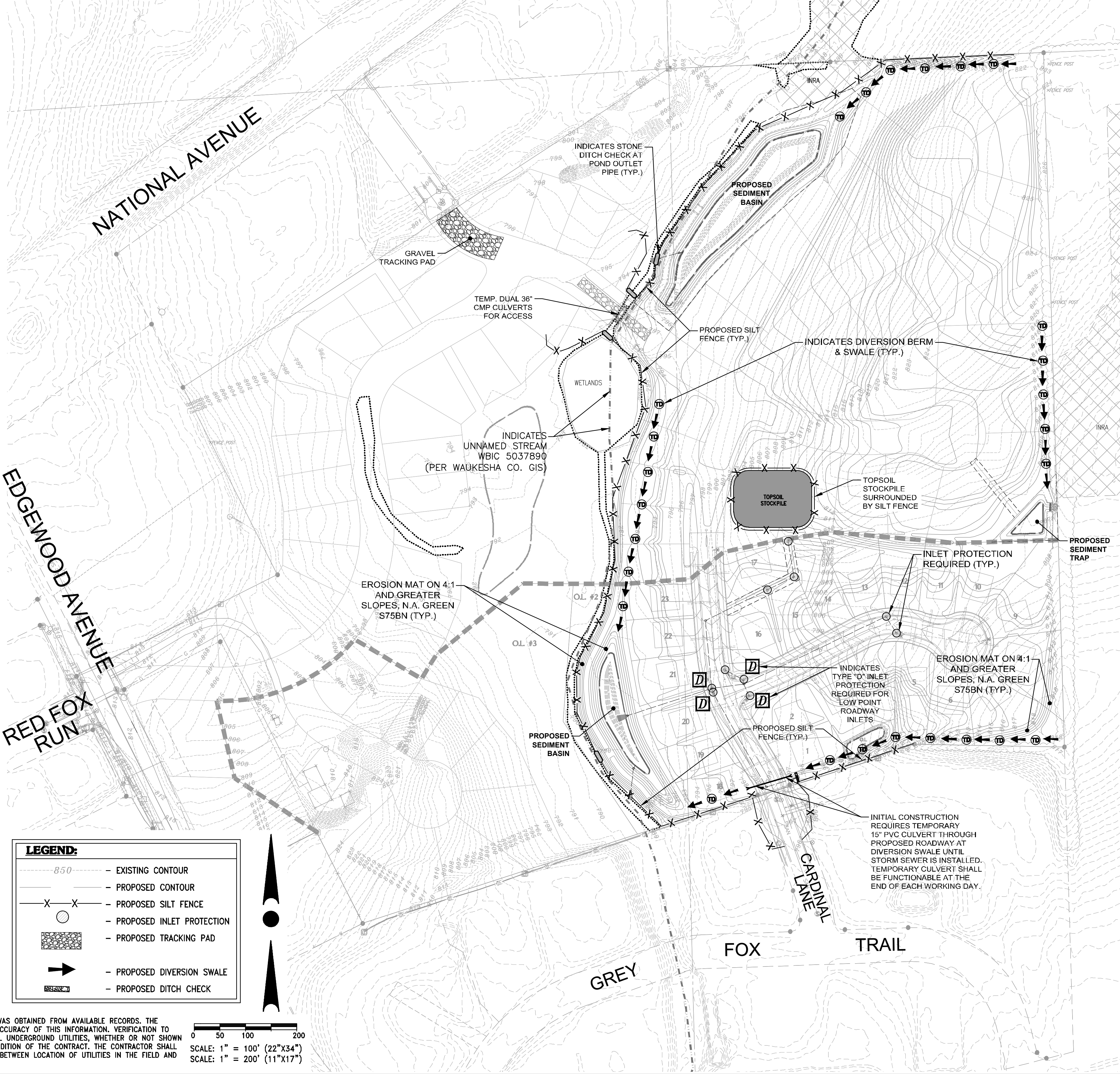
TEMPORARY DEWATERING GEOTEXTILE BAG

1. IF DEWATERING IS REQUIRED, A GEOTEXTILE DEWATERING BAG MEETING THE SPECIFICATIONS IN THE TABLE TO THE RIGHT SHALL BE UTILIZED AS STATED ON THE EROSION CONTROL PLAN.
2. REFER TO WDNR TECHNICAL STANDARDS 1061 AND MANUFACTURERS REQUIREMENTS FOR INSTALLATION AND MAINTENANCE REQUIREMENTS. CONTRACTOR MAY USE THRACE-LING, INC 275EX GEOTEXTILE BAG, OR FUNCTIONAL EQUIVALENT TO MEET TECHNICAL STANDARD REQUIREMENTS.
3. CONTRACTOR MAY INSTALL HAY BALES AROUND DEWATERING BAG FOR STABILIZATION AS DICTATED BY SITE CONDITIONS.
5. MAX FLOW RATE SHALL NOT EXCEED 100GPM

Property	Test Method	Type I Value
Maximum Apparent Opening Sizes	ASTM D-4751	0.212 mm
Grab Tensile Strength	ASTM D-4632	200 lbs.
Mullen Burst	ASTM D-3786	350 psi
Permeability	ASTM D-4491	0.28 cm/sec
Fabric	Nominal Representative Weight	8 oz

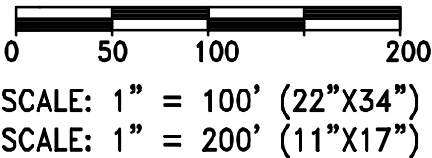
LEGEND:

- 850 — EXISTING CONTOUR
- PROPOSED CONTOUR
- X X — PROPOSED SILT FENCE
- — PROPOSED INLET PROTECTION
- ▢ — PROPOSED TRACKING PAD
- ➔ — PROPOSED DIVERSION SWALE
- PROPOSED DITCH CHECK



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BROOKFIELD, WI 53005
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PROJECT:
CARDINAL RIDGE - PHASE 1
SINGLE FAMILY DEVELOPMENT
VILLAGE OF MUKWONAGO & VILLAGE OF VERNON, WISCONSIN
BY: NEUMANN DEVELOPMENTS, INC.
N27W24025 PAUL COURT, SUITE 100
PEWAUKEE, WI 53072

REVISION HISTORY

DATE	DESCRIPTION
05/17/2024	PHASE 1 SUBMITTAL
07/17/2024	PER VILLAGE REVIEW

DATE:
JULY 17, 2024

JOB NUMBER:
21-040-953

DESCRIPTION:
EROSION CONTROL PLAN

SHEET

C2.0

X:\2021\21-040-953-HEIN PROPERTY VERNON MUKWONAGO\DRAWINGS\CONSTRUCTION PLANS\HEIN PROPERTY_PHASE 1\EROSION CONTROL_22X34.DWG

LATE SEASON STABILIZATION REQUIREMENTS FOR SITES >1 ACRE

1. Vegetated Channels (roadside swales and other stormwater conveyances):

All planned vegetated channels shall be stabilized with BMPs (erosion control matting, sod, etc.) by no later than November 15 in accordance with DNR technical standards and the criteria listed below. Ditch checks, sediment traps and other sediment control BMPs are only for use *during* channel grading work, and must be replaced with final site stabilization BMPs per the approved plans ASAP. None of these are suitable for controlling erosion/sedimentation of open channels over winter.

2. Timing Determines Requirements and BMPs:

The stabilization BMPs that must be implemented depend on the timing of the seeding (cool season grasses), and are organized in three risk categories, as listed below. The later the timing, the lower the success rates are for timely vegetative cover - and therefore the higher the risks of erosion and off-site sediment discharges.

a. Risk Level 1: Permanent Vegetation (before September 15):

To ensure successful fall seed germination, topsoil, seed and fertilize all disturbed areas by September 15 in accordance with the following:

- Seeding.** Prepare seedbed and sow seeds per the rates and mixes of Wisconsin Department of Transportation (WisDOT) Roadway Standard Section 630.
- Erosion Control:** Immediately apply mulch, erosion control matting, or other permanent stabilization BMPs as specified in the approved erosion control plans. Application of all erosion control measures shall follow DNR technical standards.
- Maintenance:** Inspect all seeded areas weekly. Ensure adequate water is provided until full vegetative cover is obtained, and repair any erosion problems, wash outs, etc.

b. Risk Level 2: Temporary Vegetation (before October 15):

Due to the cooler soil temperatures and the likelihood of overnight frost conditions, perennial cool season plant growth is slow and survival is at risk from September 15 - October 15. To offer more protection from soil erosion during this period, topsoil, seed and fertilize all disturbed areas by October 15 in accordance with the following:

- Seeding:** The above noted seeding mix must include a minimum of 2 lbs. per 1,000 sq. ft. of a temporary cover (i.e. winter wheat or annual rye grass for fall plantings) per Section 630.
- Erosion Control:** Immediately apply mulch, erosion control matting, or other stabilization BMPs as specified in the approved plan, following DNR technical standards. The following are minimum requirements for stabilizing sites during this period. Approved plans may be more restrictive due to site conditions:
 - Channel Flow (roadside swales, etc.) and Backslopes:** Stake erosion matting over all the entire channel cross-section and all backslopes using a minimum WisDOT Erosion Control Product Acceptability (PAL) Class 3 Type A matting, unless otherwise called for in the approved plan.
 - Other disturbed areas:** Apply Type B Soil Stabilizer, mulch and tackifier from the PAL to all disturbed areas that remain exposed.
 - Infalls/Outfalls:** Install sod pads (2 rolls) at all culvert outfalls, and other high-erosion locations in accordance with County standards.
- Maintenance:** Inspect all seeded areas weekly. Ensure adequate water is provided until full temporary cover is obtained, and repair any erosion problems, wash outs, etc.

c. Risk Level 3: Dormant Seeding (before November 15):

For areas not stabilized by October 15, erosion risks are high and additional erosion control measures and oversight are required, as described below. Temporary seeding must still be done, but fall germination and survival may be very limited. For perennial plants, dormant seeding should be done between October 20 and November 15. This means seed germination is planned for the following spring. To offer more protection from soil erosion during this period, topsoil, seed and fertilize all disturbed areas by November 15 in accordance with the following:

- Seeding Rate:** Same seed mix as Risk Level 2 (including temporary cover crop) except the rates for perennial species must applied at 1.5 x WisDOT section 630 rates (apply rates of 3-5 lbs./1000 sq.ft.). Rates are increased to allow for poor germination rates associated with dormant seeding due to frozen conditions.

- Erosion Control:** In addition to applying topsoil, the above noted seed mix and starter fertilizer, the following are minimum requirements for stabilizing sites during this period. Approved erosion control plans may be more restrictive:

- Channel Flow (roadside swales, etc.) and Backslopes:** Apply Type A soil stabilizer and staked PAL Class 3 Type A erosion matting over the entire channel and all backslopes.
- Other Areas:** Apply Type A Soil Stabilizer from the PAL to all other disturbed areas that remain exposed.
- Infalls/Outfalls:** Install sod pads (2 rolls) at all culvert outfalls, and other high-erosion locations in accordance with County standards.

- Maintenance:** Inspect all seeded areas weekly. Ensure adequate water is provided until full temporary cover is obtained, and repair any erosion problems, wash outs, etc.

- Reports:** The Project Engineer shall be responsible for emailing a report to the LRD by 4:30 pm every Wednesday after October 15, which shall include the following information:

- Detailed status of all land disturbing and stabilization activities as of the day of the report.
- Results of erosion control site inspections since October 15 or the previous report, whichever is shorter.
- Any erosion control failures encountered and actions taken to rectify.
- Projections for completion of all stabilization activities, including a 10- day plan based on the latest weather predictions.



PROJECT:
CARDINAL RIDGE - PHASE 1
SINGLE FAMILY DEVELOPMENT
VILLAGE OF MUKWONAGO & VILLAGE OF VERNON, WISCONSIN
BY: NEUMANN DEVELOPMENTS, INC.
N27W24025 PAUL COURT, SUITE 100
PEWAUKEE, WI 53072

REVISION HISTORY	
DATE	DESCRIPTION
06/17/2024	PHASE 1 SUBMITTAL
07/17/2024	PER VILLAGE REVIEW

DATE:
JULY 17, 2024

JOB NUMBER:
21-040-953

DESCRIPTION:
**LATE SEASON
STABILIZATION
REQUIREMENTS**

SHEET

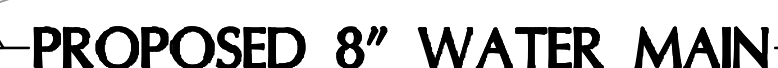
C2.1



REVISION HISTORY	
DATE	DESCRIPTION
06/17/2024	PHASE 1 SUBMITTAL
07/17/2024	PER VILLAGE REVIEW

C3.0

	- EXISTING CONTOUR
	- EXISTING SANITARY SEWER
	- EXISTING SANITARY MANHOLE
	- EXISTING WATER MAIN
	- EXISTING HYDRANT
	- EXISTING STORM SEWER
	- EXISTING STORM MANHOLE
	- EXISTING STORM INLET
	- EXISTING TRANSFORMER
	- EXISTING ELECTRIC PEDESTAL
	- EXISTING TELEPHONE PEDESTAL
	- EXISTING CATV PEDESTAL
	- EXISTING POWER POLE
	- PROPOSED SANITARY SEWER
	- PROPOSED SANITARY MANHOLE
	- PROPOSED WATER MAIN
	- PROPOSED HYDRANT
	- PROPOSED WATER VALVE
	- PROPOSED STORM SEWER
	- PROPOSED STORM MANHOLE
	- PROPOSED STORM INLET
	- PROPOSED STORM END SECTION



REMOVE EXISTING
SAN MH #1 &
CONNECT TO EXISTING
15" SANITARY SEWER

—CONNECT TO EX. 12"
WATER MAIN
W/ 12"x8" REDUCER

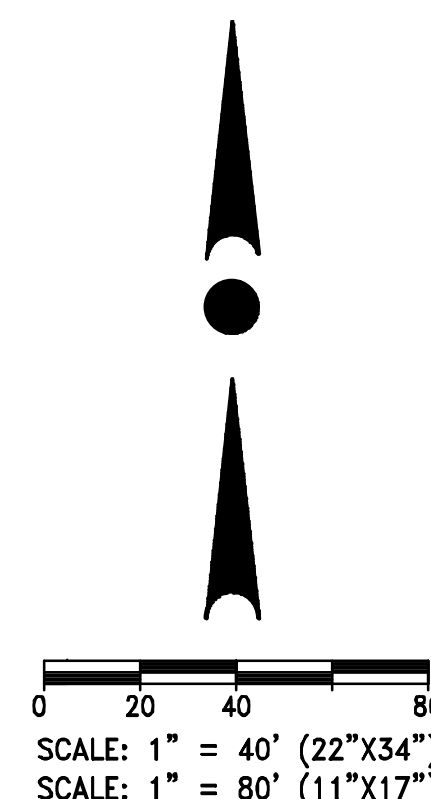
RELOCATE
EXISTING
HYDRANT
ASSEMBLY



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CALL DIGGERS HOTLINE 1-800-242-8511

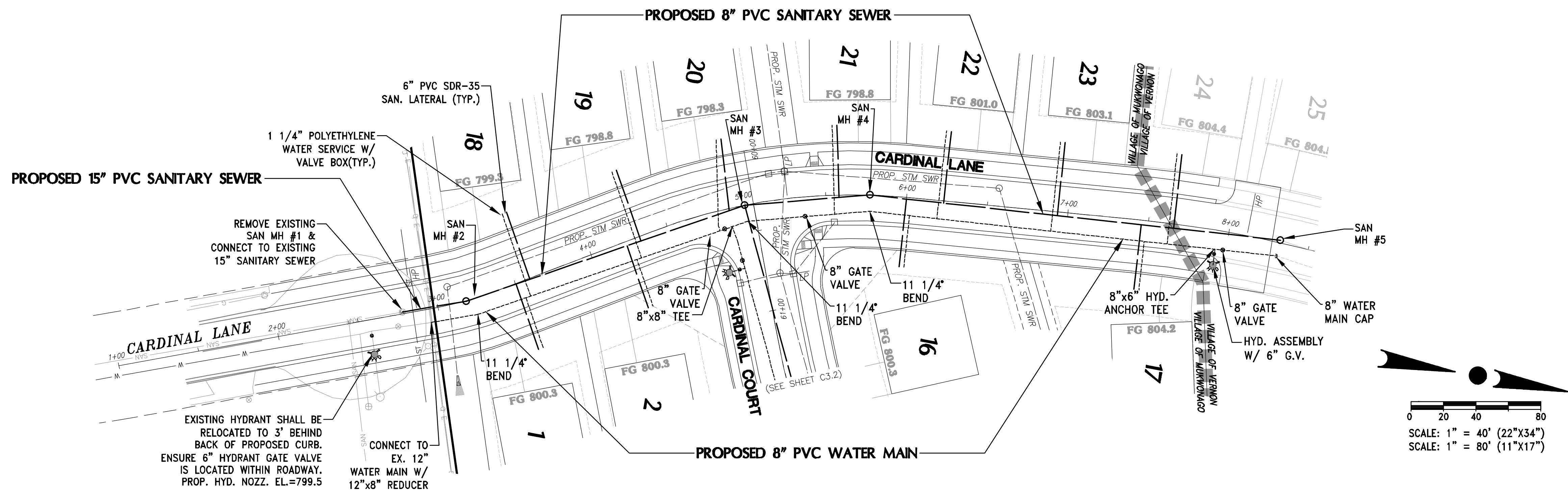
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REVISION HISTORY	
DATE	DESCRIPTION
05/17/2024	PHASE 1 SUBMITTAL
07/17/2024	PER VILLAGE REVIEW

DESCRIPTION:
**SANITARY SEWER
& WATER MAIN
PLAN & PROFILE**

C3.1



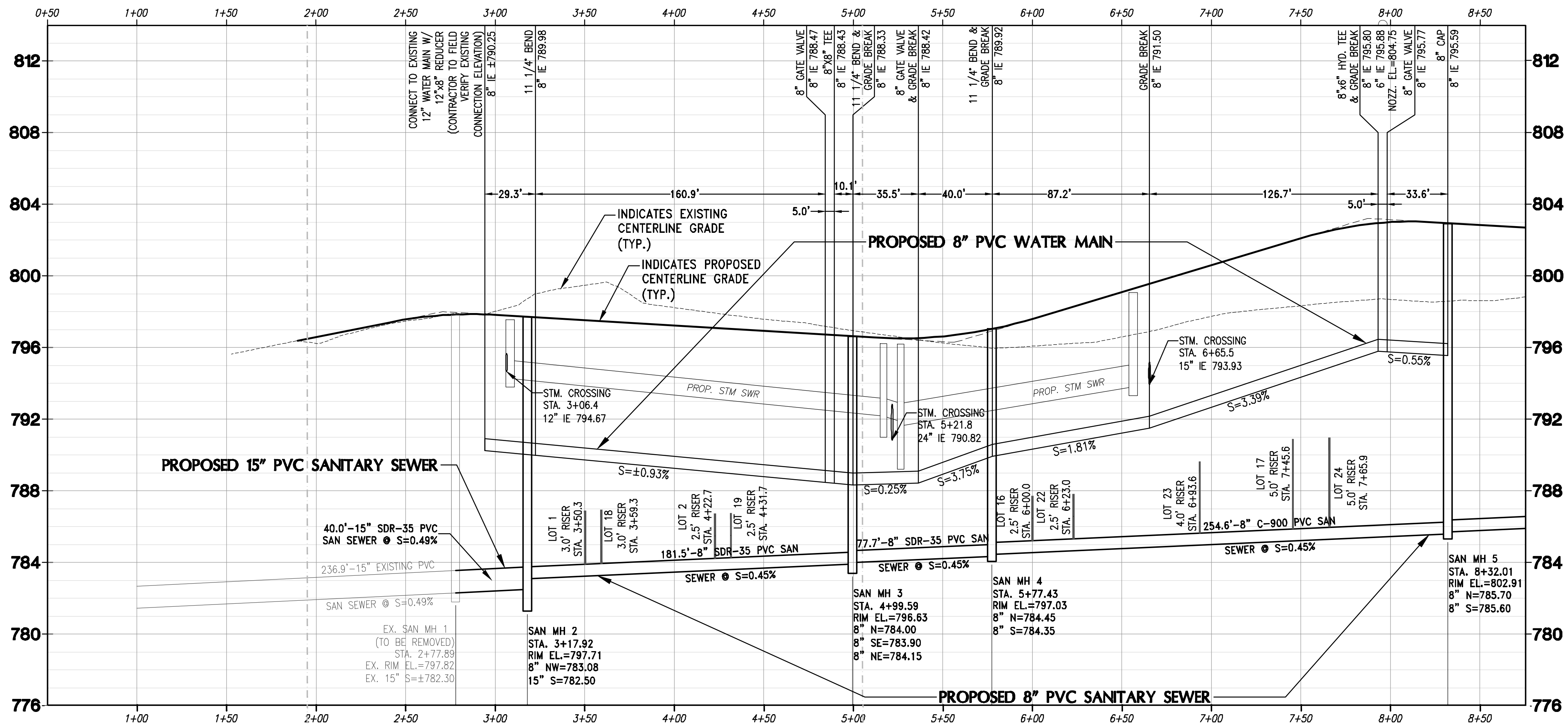
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SANITARY SEWER AND WATER MAIN

FROM: STA: 2+50 TO: STA: 8+50





4100 N. CALHOUN RD., SUITE 300
BROOKFIELD, WI 53005
PHONE: (262) 790-1480
FAX: (262) 790-1481
EMAIL: info@trioeng.com

PROJECT:
CARDINAL RIDGE - PHASE 1

SINGLE FAMILY DEVELOPMENT
VILLAGE OF MUKWONAGO & VILLAGE OF VERNON, WISCONSIN

**BY: NEUMANN DEVELOPMENTS, INC.
N27W24025 PAUL COURT, SUITE 100
PEWAUKEE, WI 53072**

REVISION HISTORY

DATE	DESCRIPTION
05/17/2024	PHASE 1 SUBMITTAL
07/17/2024	PER VILLAGE REVIEW

DATE:

JULY 17, 2024

JOB NUMBER:

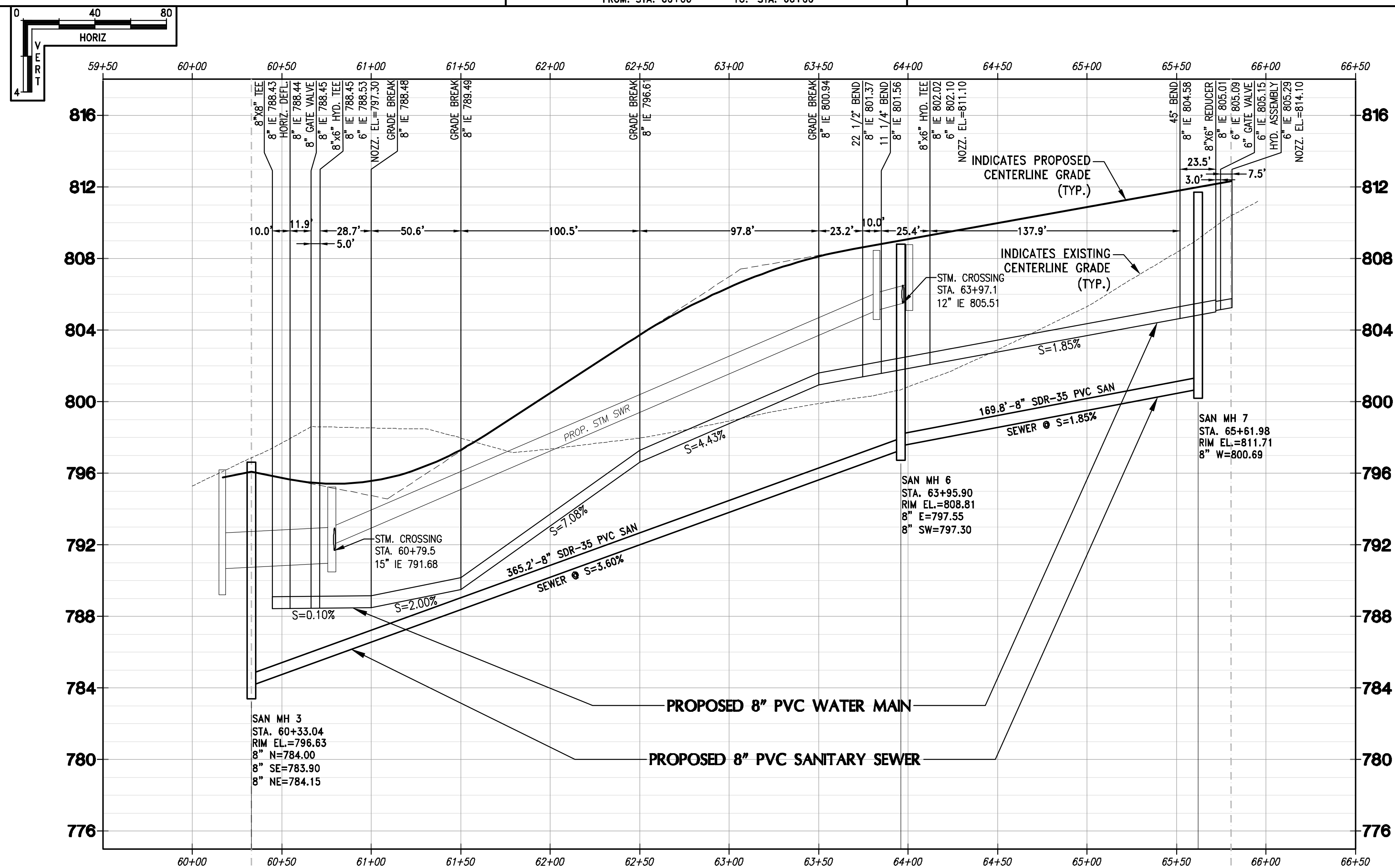
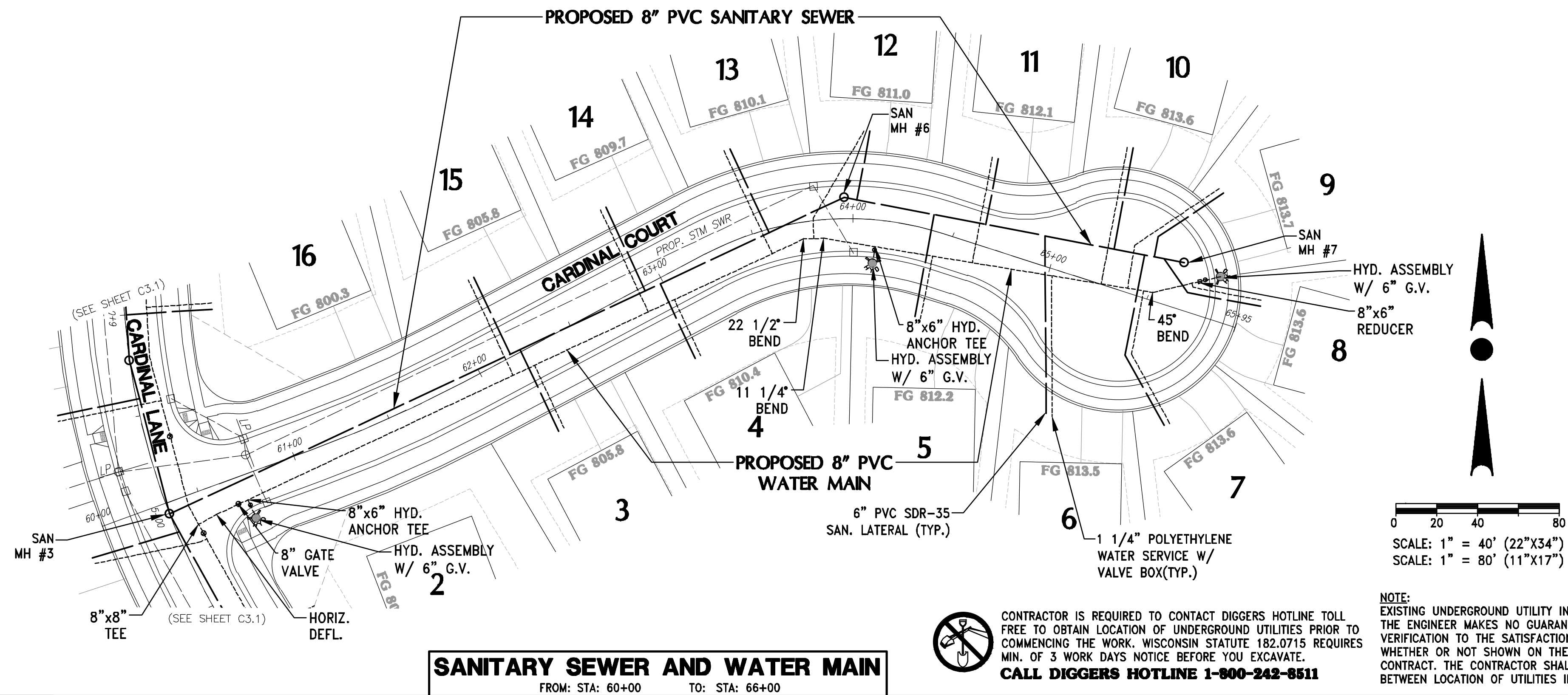
21-040-953

DESCRIPTION:

SANITARY SEWER & WATER MAIN PLAN & PROFILE

SHEET

C3.2





REVISION HISTORY

DATE:
JULY 17, 2024

DESCRIPTION:

**OVERALL
STORM SEWER
SYSTEM PLAN**

C4.0



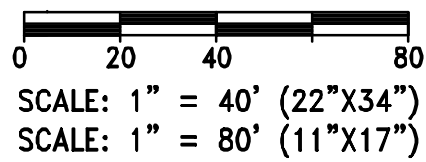
STORM SEWER NOTES

STORM SEWER

- ALL PUBLIC STORM SEWER SHALL BE RCP (REINFORCED CONCRETE PIPE) WITH GASKETED JOINTS.
- STORM SEWER SHALL BE R.C.P. MEETING SECTION 8.6.0 (SSWCW) AND BE RUBBER GASKETED MEETING THE REQUIREMENTS PER SWS 3.2.11.
- PIPE CLASSES:
 - 12" DIA. RCP STORM SEWER SHALL BE CL-V
 - 15" DIA. RCP STORM SEWER SHALL BE CL-IV
 - 18" & ABOVE DIA. RCP STORM SEWER SHALL BE CL-III
- STORM MANHOLES SHALL BE MIN. 48" DIAMETER PRECAST CONCRETE WITH NEENAH R-1710 FRAMES AND COVERS. R-1580 FRAMES AND COVERS MAY BE USED WHERE HEIGHT RESTRICTIONS APPLY. REFER TO STORM SEWER MANUAL FOR MANHOLE SIZING INFORMATION.
- CATCH BASINS SHALL HAVE 12" SUMPS AND SHALL CONFORM TO FILE NO. 26 OF THE STANDARD SPECIFICATIONS WITH A NEENAH R-322B-BC WITH TYPE C GRATES FOR VERTICAL CURB APPLICATIONS.
- FIELD INLETS USE A NEENAH R-2560-D3 OR EQUAL TYPE BREATHE CASTING.

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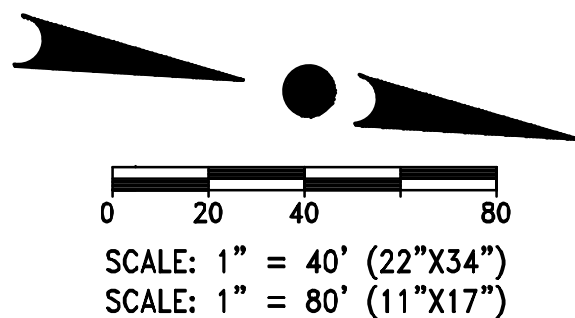
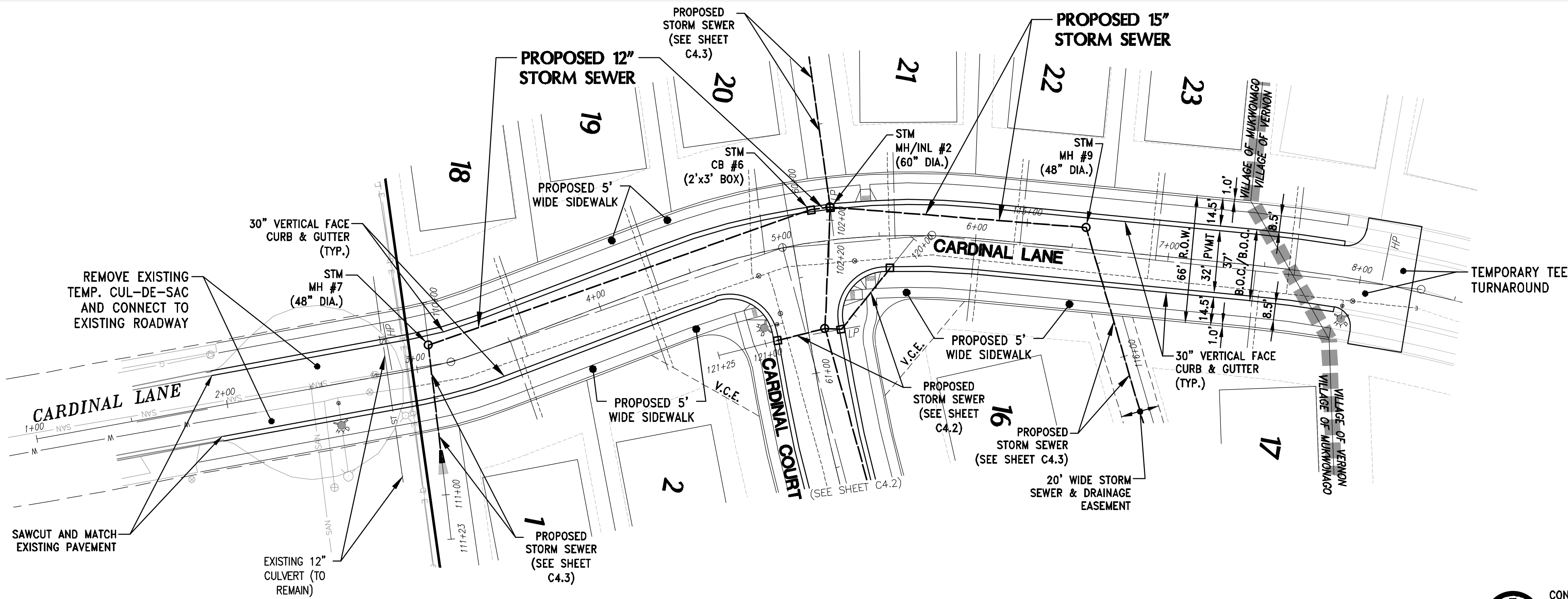
CONTRACTOR IS REQUIRED TO CONTACT DIGGERS HOTLINE TOLL
FREE TO OBTAIN LOCATION OF UNDERGROUND UTILITIES PRIOR TO
COMMENCING THE WORK. WISCONSIN STATUTE 182.0715 REQUIRES
MIN. OF 3 WORK DAYS NOTICE BEFORE YOU EXCAVATE.
CALL DIGGERS HOTLINE 1-800-242-8511



LEGEND:

-  - EXISTING CONTOUR
 - EXISTING SANITARY SEWER
 - EXISTING WATER MAIN
 - EXISTING STORM SEWER
 - PROPOSED SANITARY SEWER
 - PROPOSED SANITARY MANHOLE
 - PROPOSED WATER MAIN
 - PROPOSED HYDRANT
 - PROPOSED WATER VALVE
 - PROPOSED STORM SEWER
 - PROPOSED STORM MANHOLE
 - PROPOSED STORM INLET
 - PROPOSED STORM END SECTION

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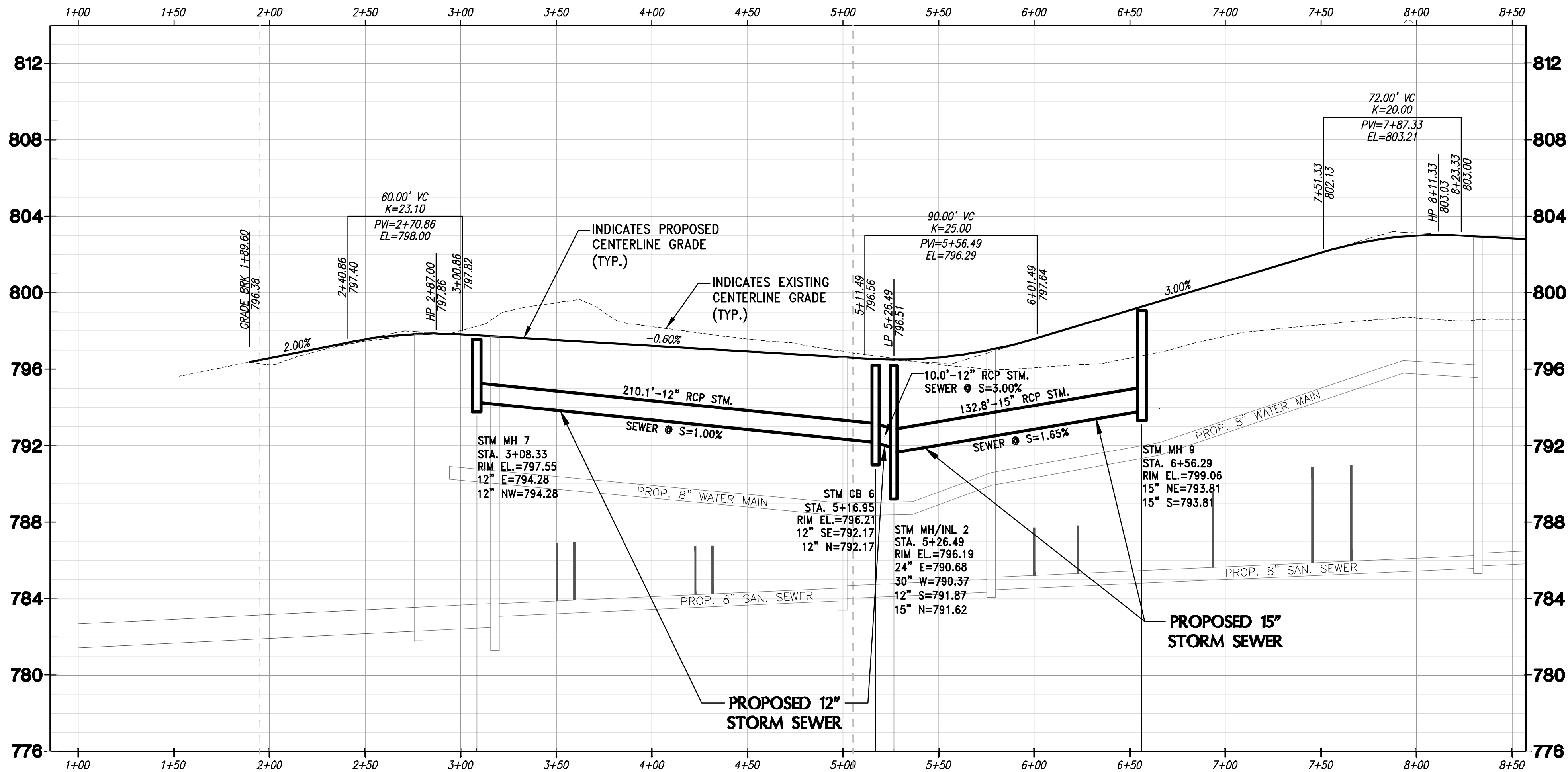


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ROADWAY & STORM SEWER

FROM: STA: 1+00 TO: STA: 8+50



4100 N. CALHOUN RD., SUITE 300
BROOKFIELD, WI 53005
PHONE: (262) 790-1480
FAX: (262) 790-1481
EMAIL: info@trioeng.com

PROJECT:
CARDINAL RIDGE - PHASE 1
SINGLE FAMILY DEVELOPMENT
VILLAGE OF MUKWONAGO & VILLAGE OF VERNON, WISCONSIN
BY: NEUMANN DEVELOPMENTS, INC.
N27W24025 PAUL COURT, SUITE 100
PEWAUKEE, WI 53072

REVISION HISTORY

DATE	DESCRIPTION
05/17/2024	PHASE 1 SUBMITTAL
07/17/2024	PER VILLAGE REVIEW

DATE:

JULY 17, 2024

JOB NUMBER:

21-040-953

DESCRIPTION:

**ROADWAY &
STORM SEWER
PLAN & PROFILE**

SHEET

C4.1

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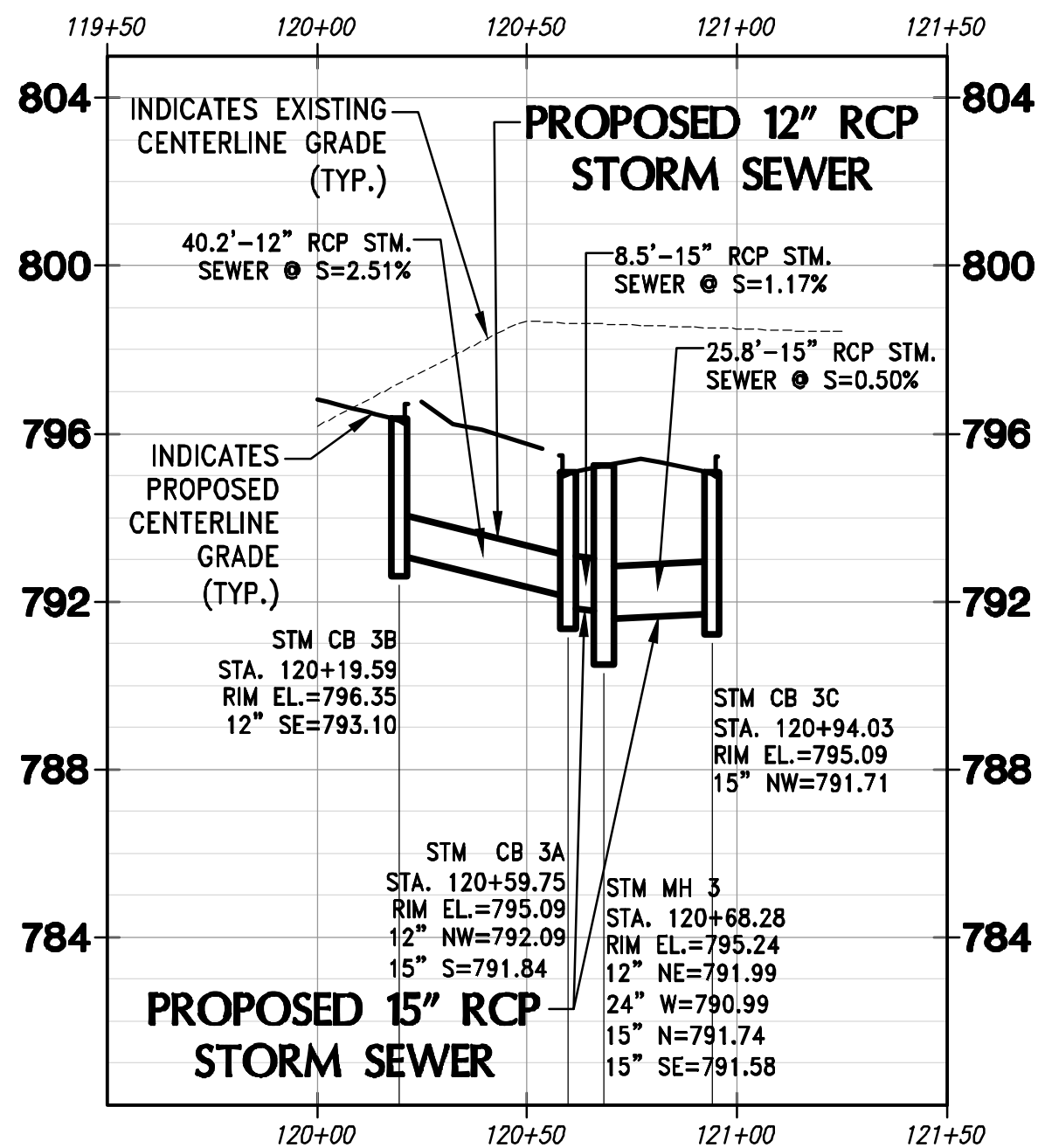


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STORM SEWER

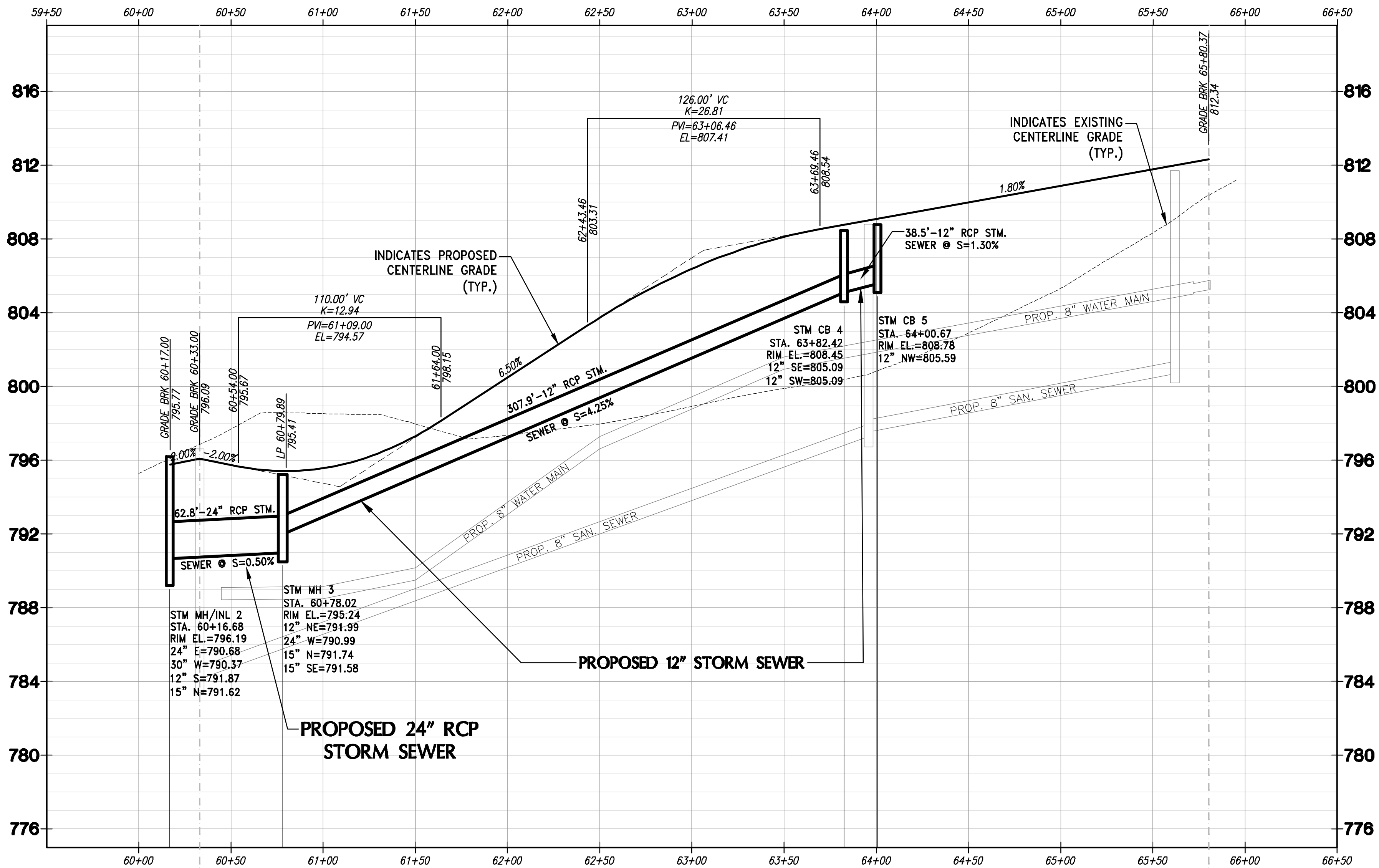
FROM: STA: 120+00 TO: STA: 121+00



PROPOSED 24" RCP STORM SEWER

ROADWAY & STORM SEWER

FROM: STA: 60+00 TO: STA: 66+00



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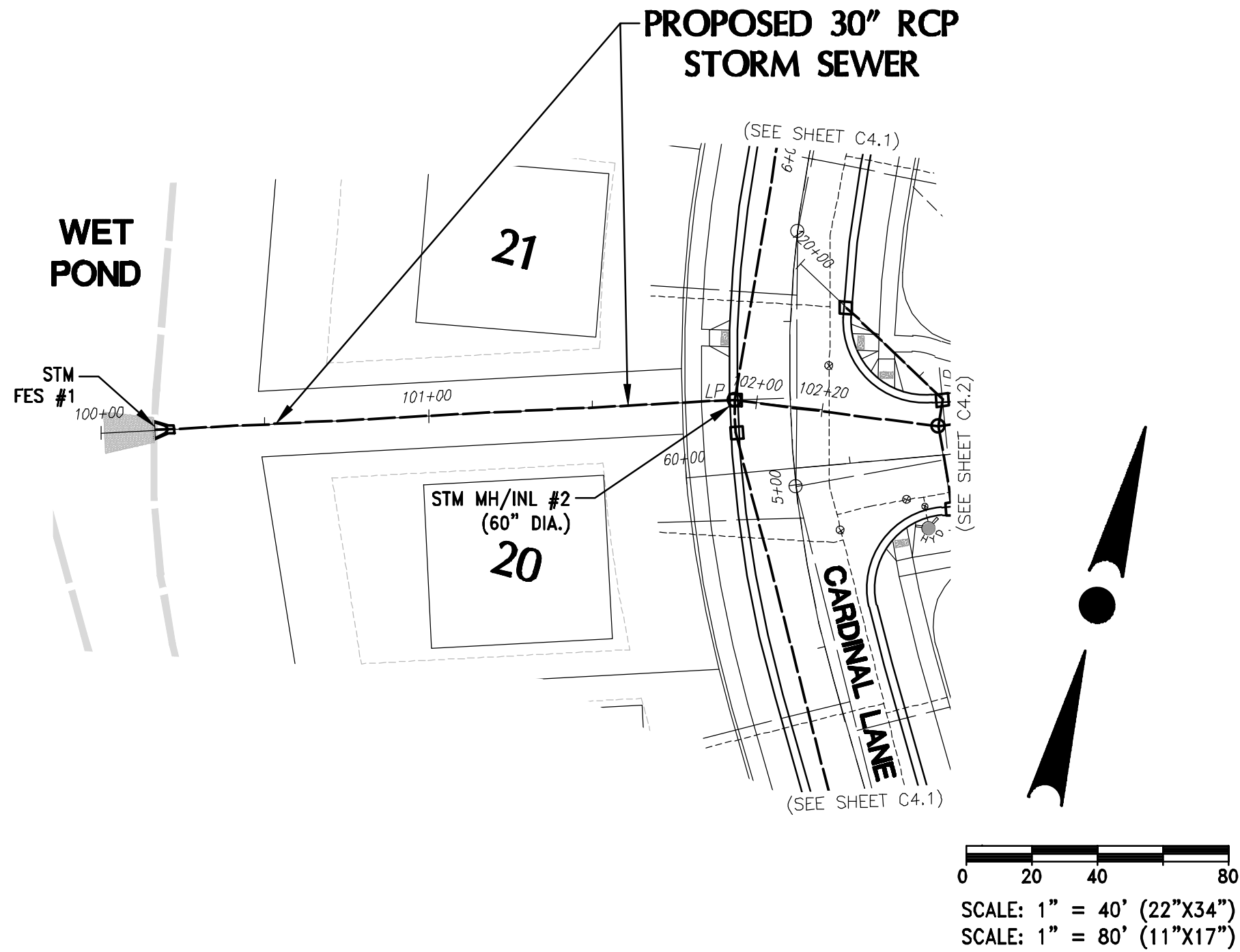
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**ROADWAY &
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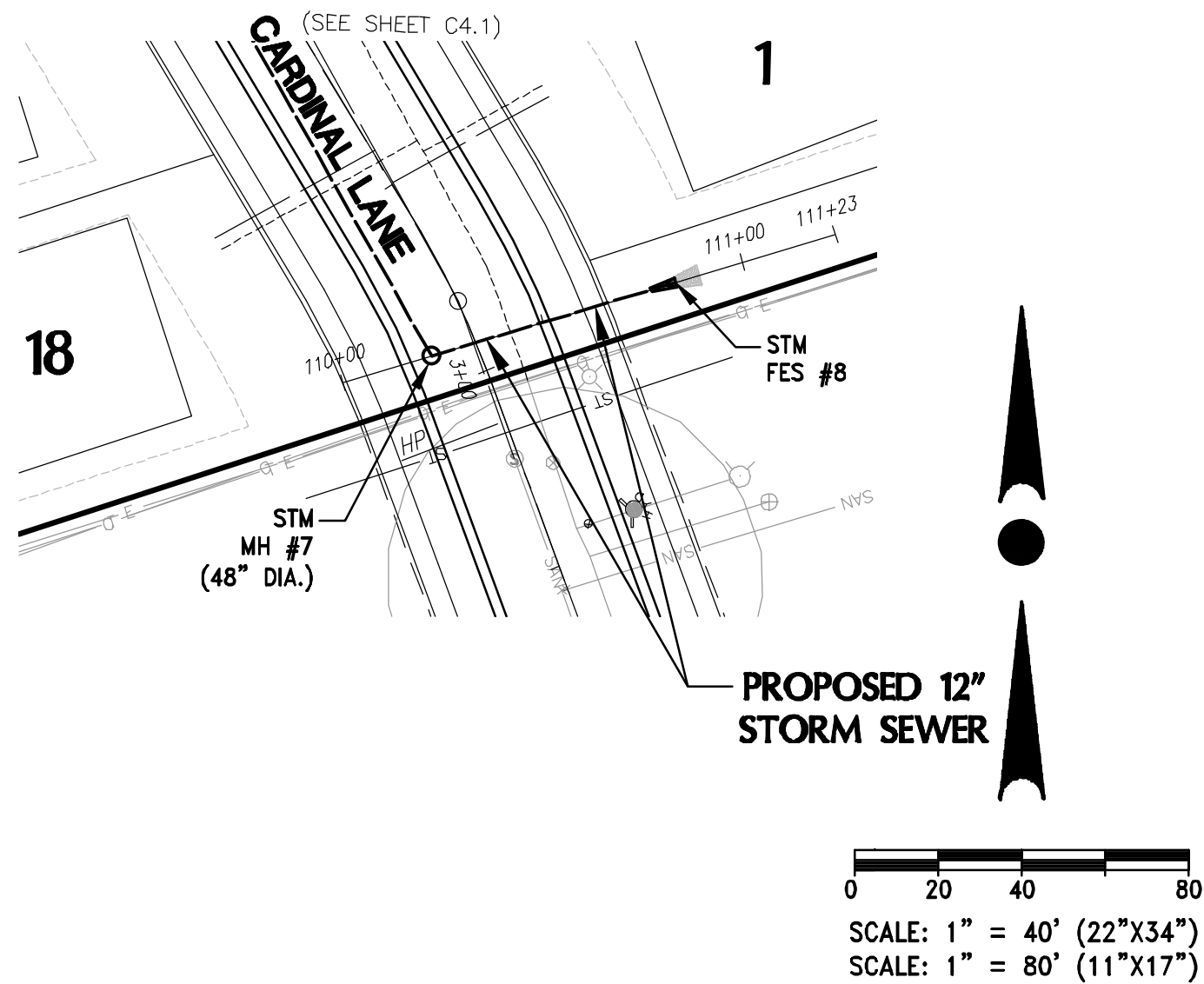
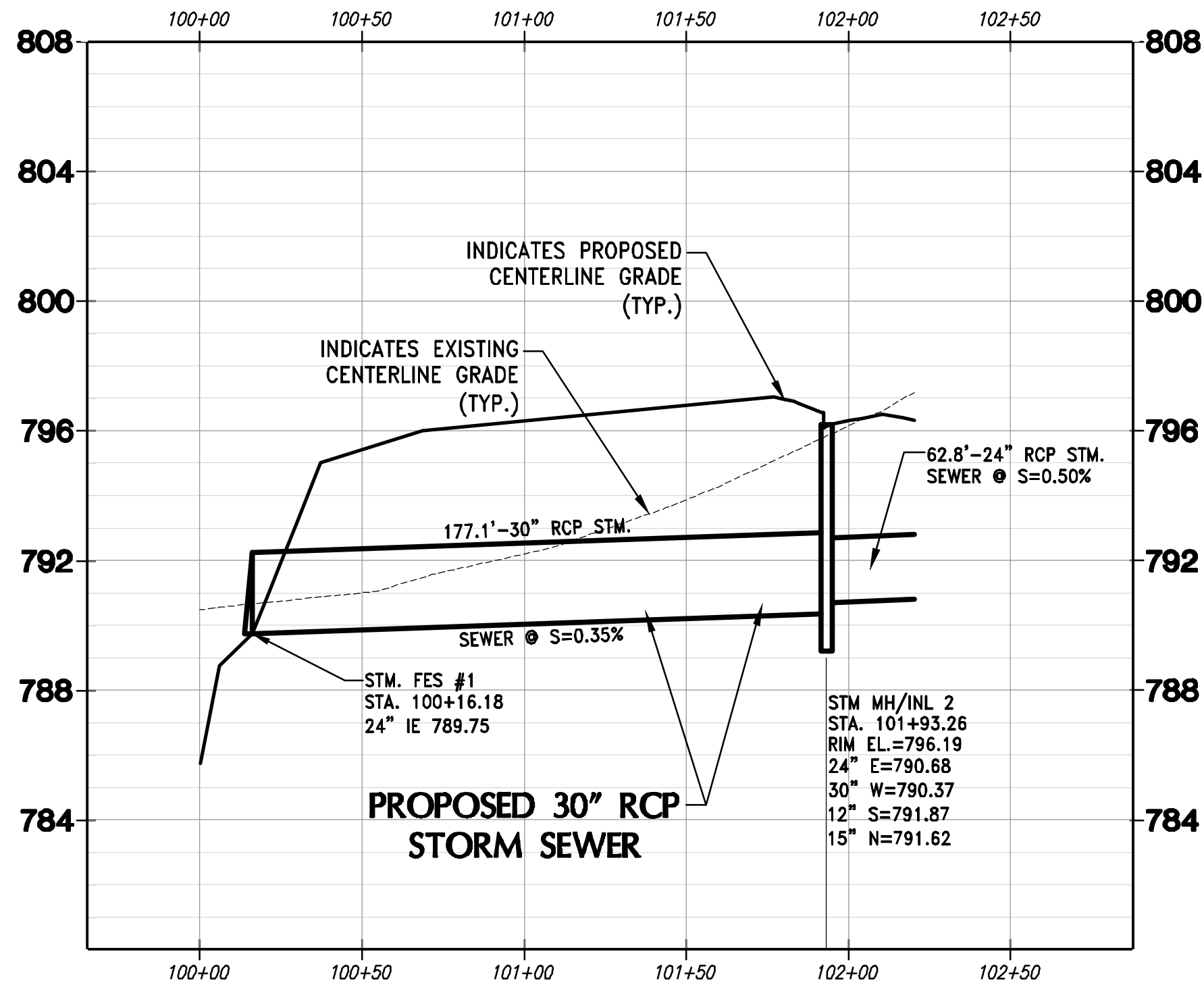
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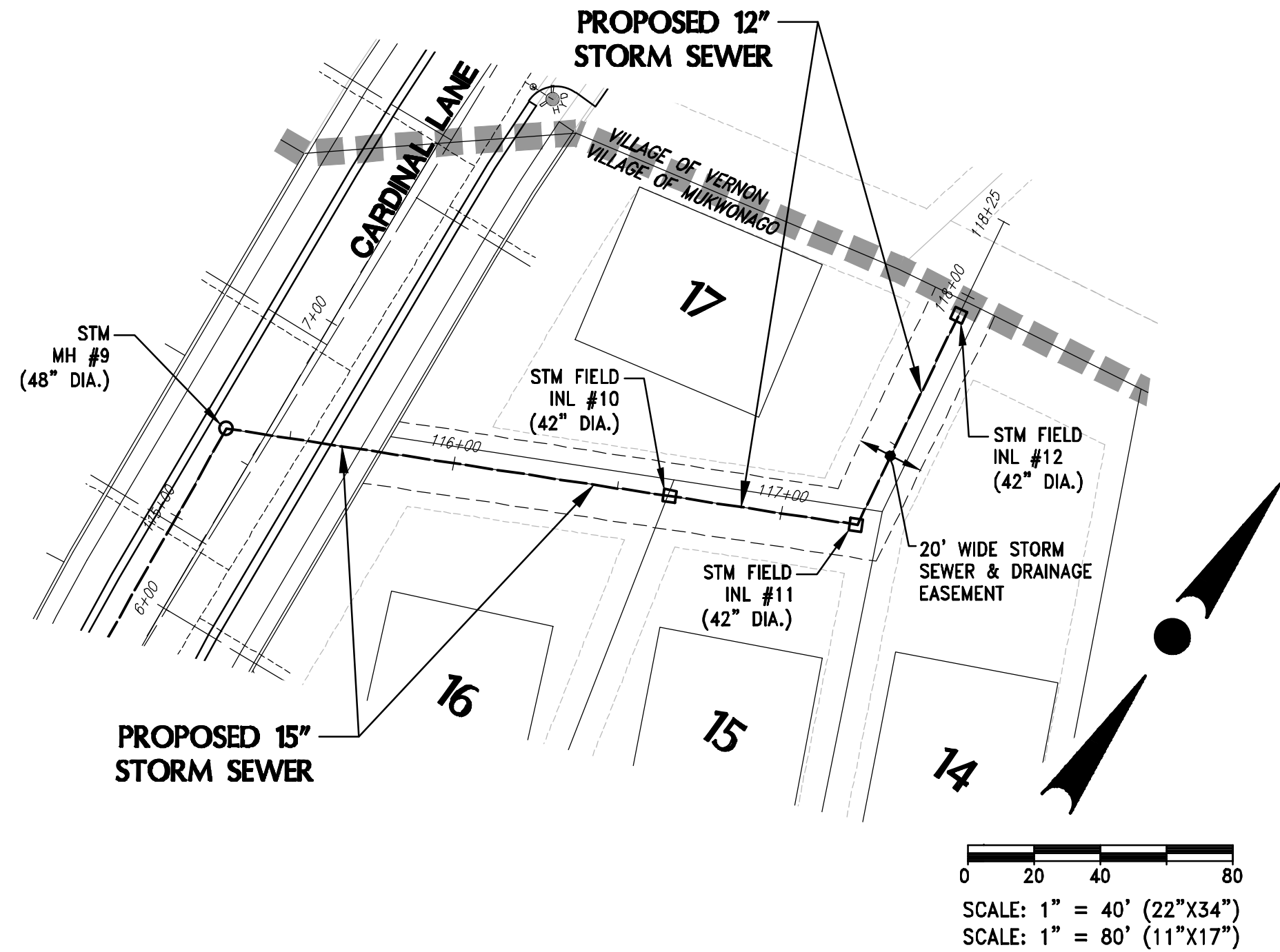
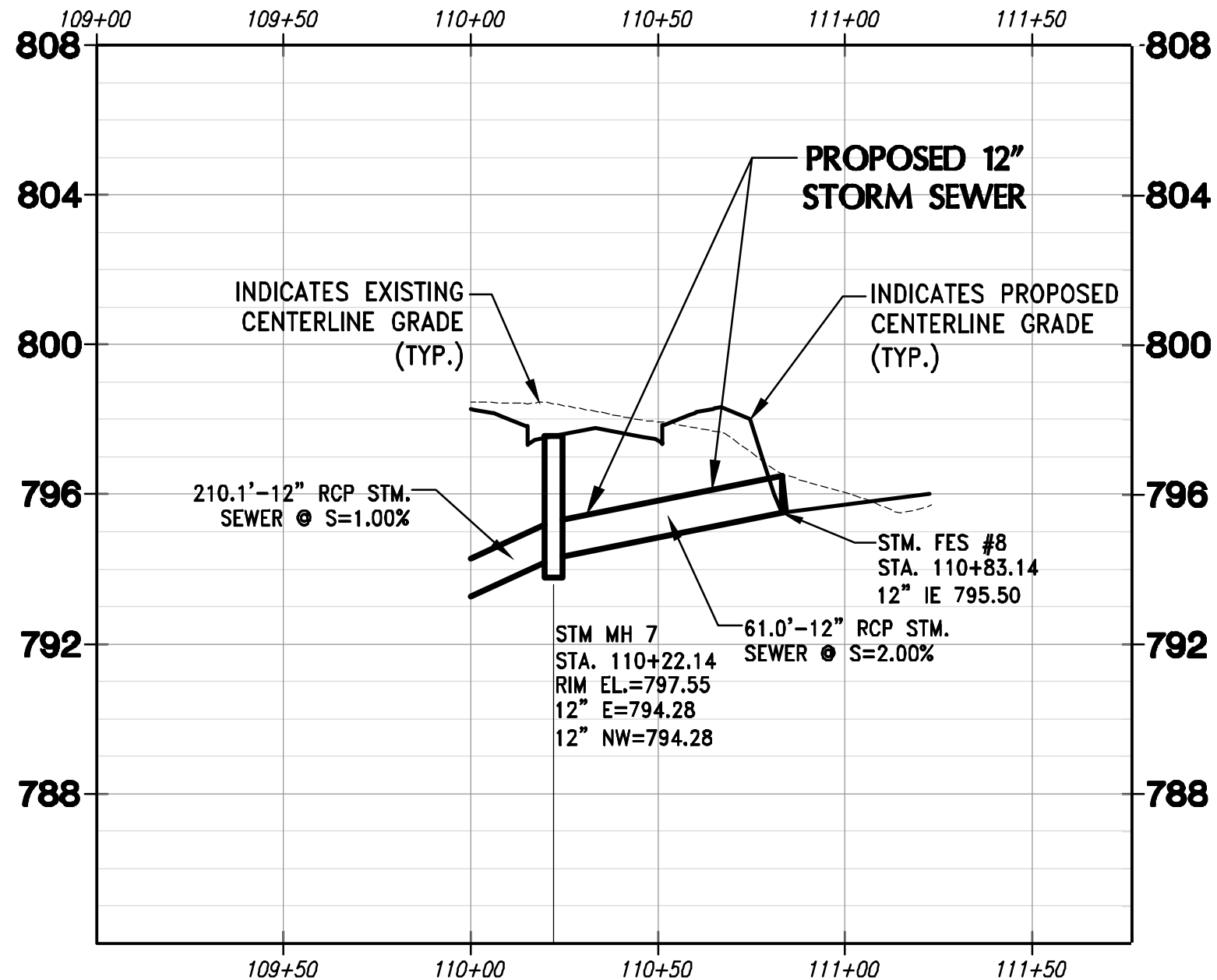
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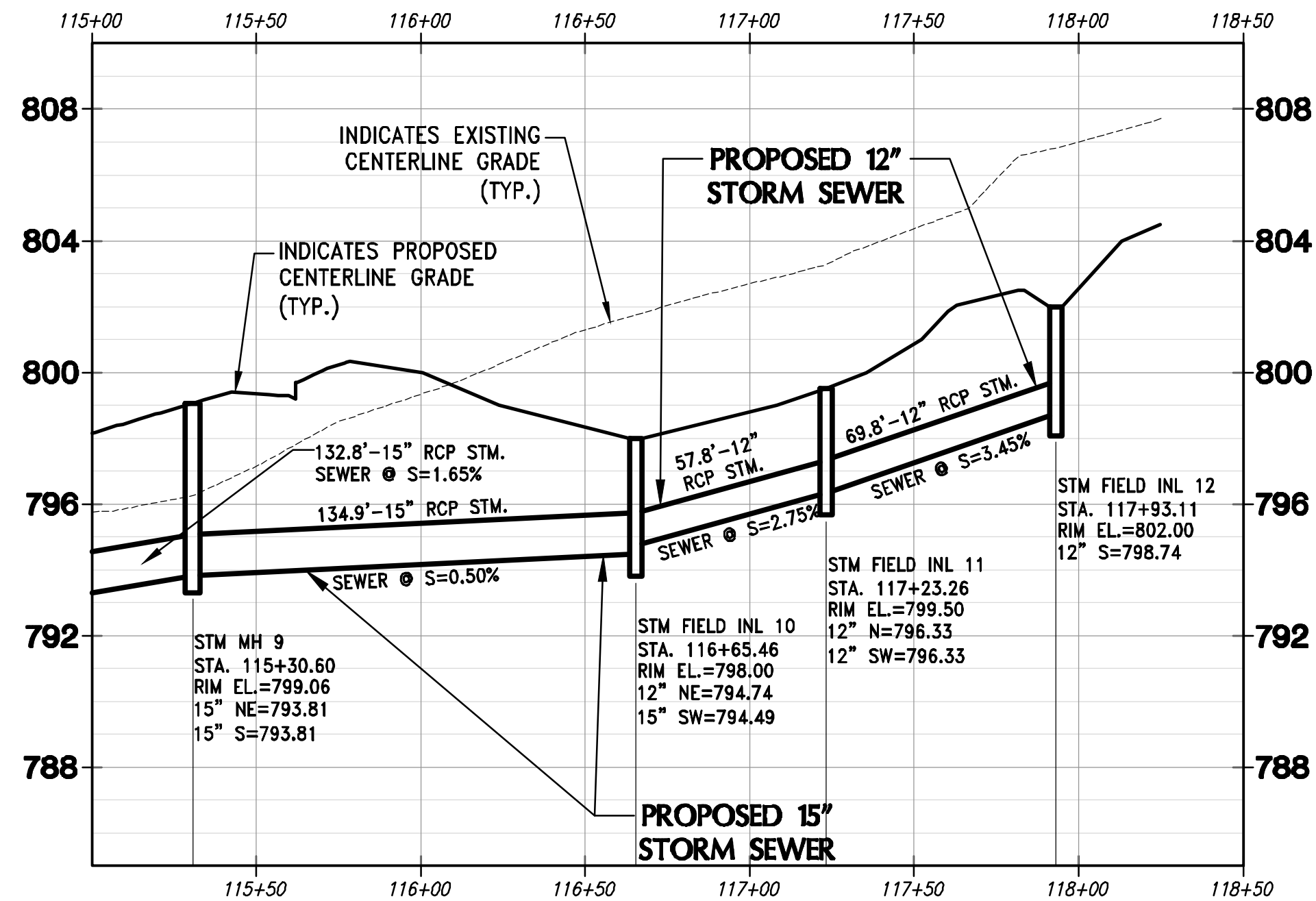
STORM SEWER
FROM: STA: 100+00 TO: STA: 102+00



STORM SEWER
FROM: STA: 110+00 TO: STA: 111+00



STORM SEWER
FROM: STA: 115+00 TO: STA: 118+00



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STORM SEWER
PLAN & PROFILE

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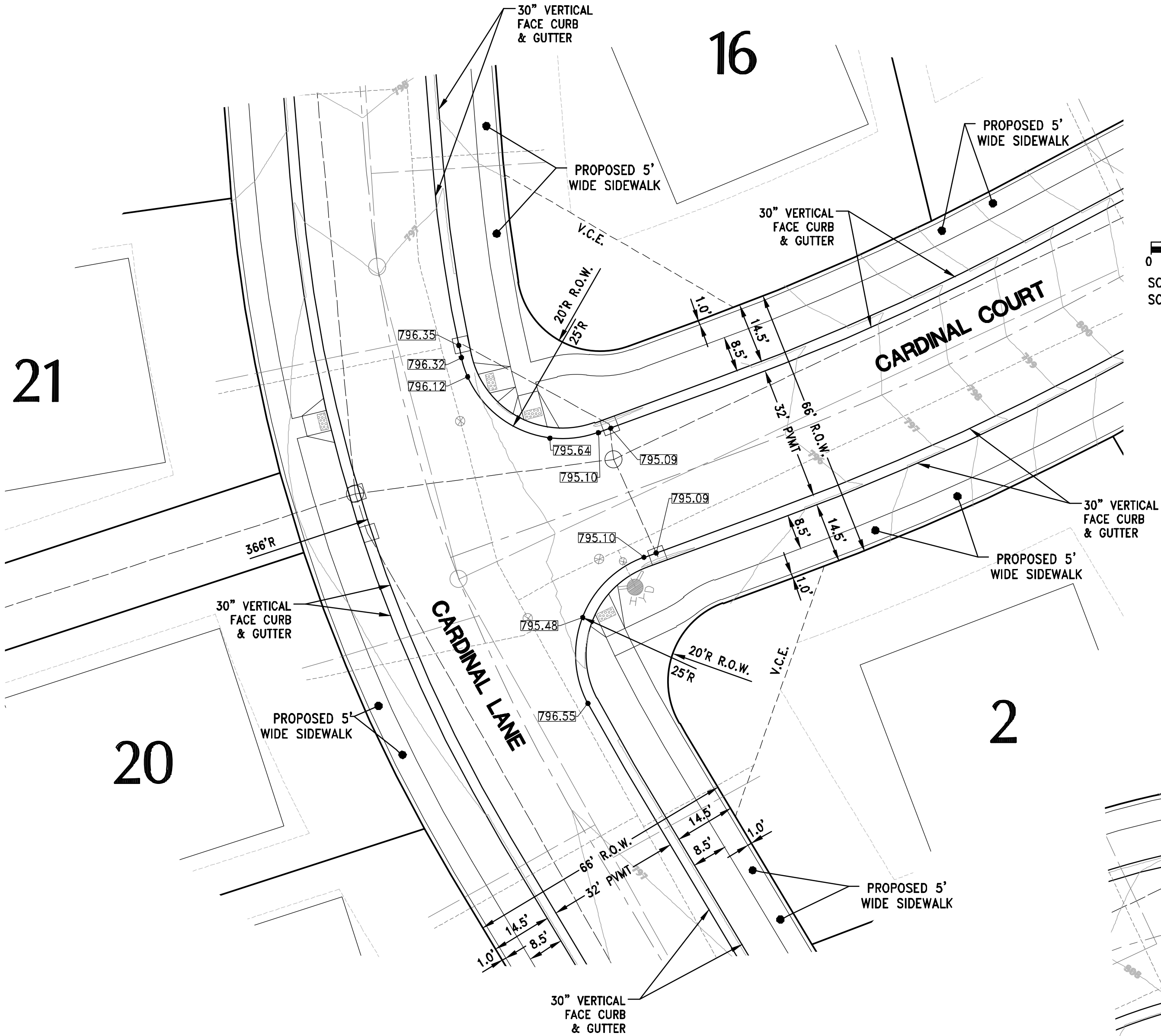
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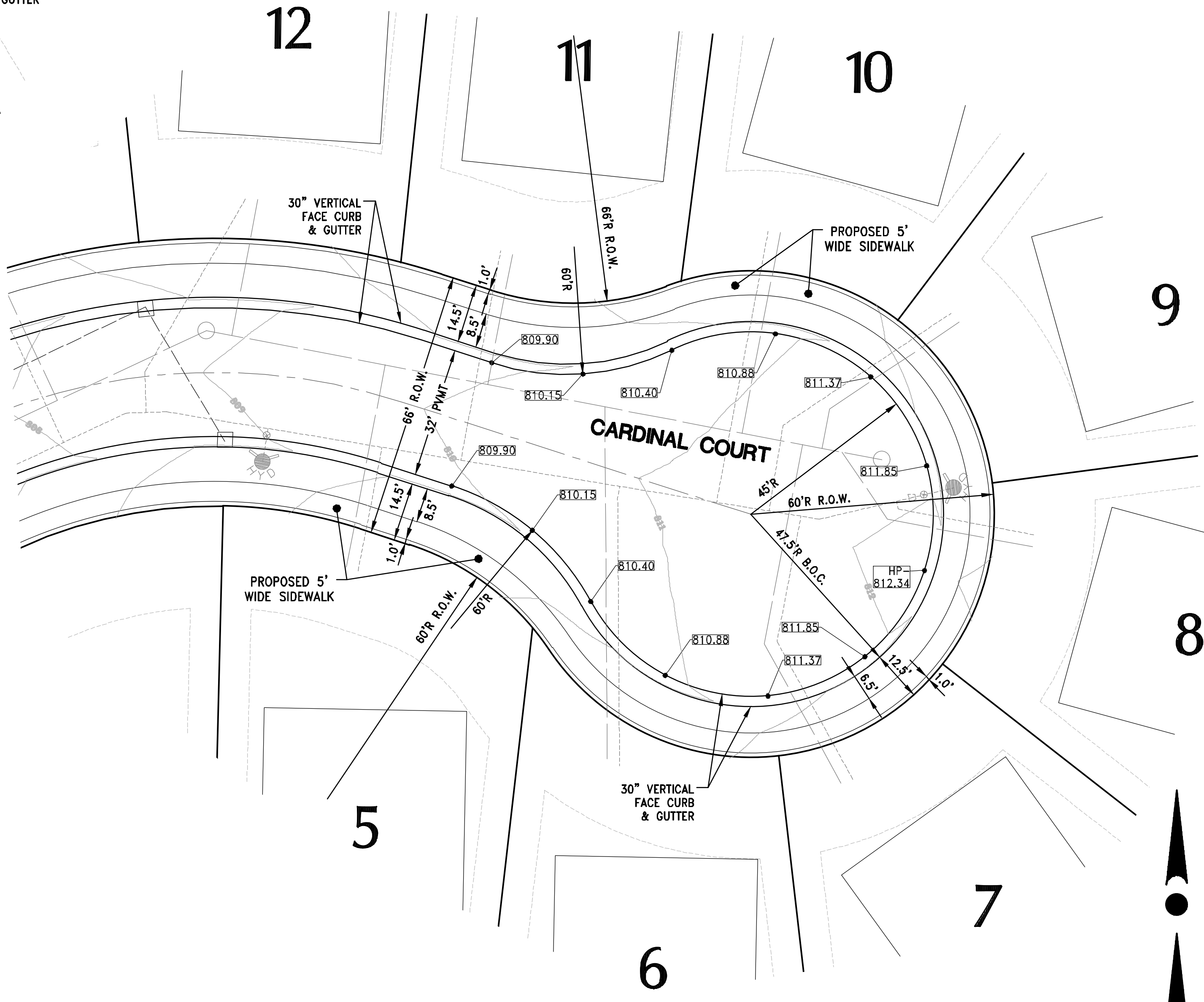


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SCALE: 1" = 20' (22"X34")
SCALE: 1" = 40' (11"X17")



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CUL-DE-SAC &
INTERSECTION
DETAIL

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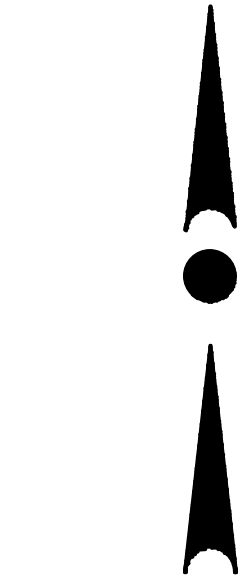
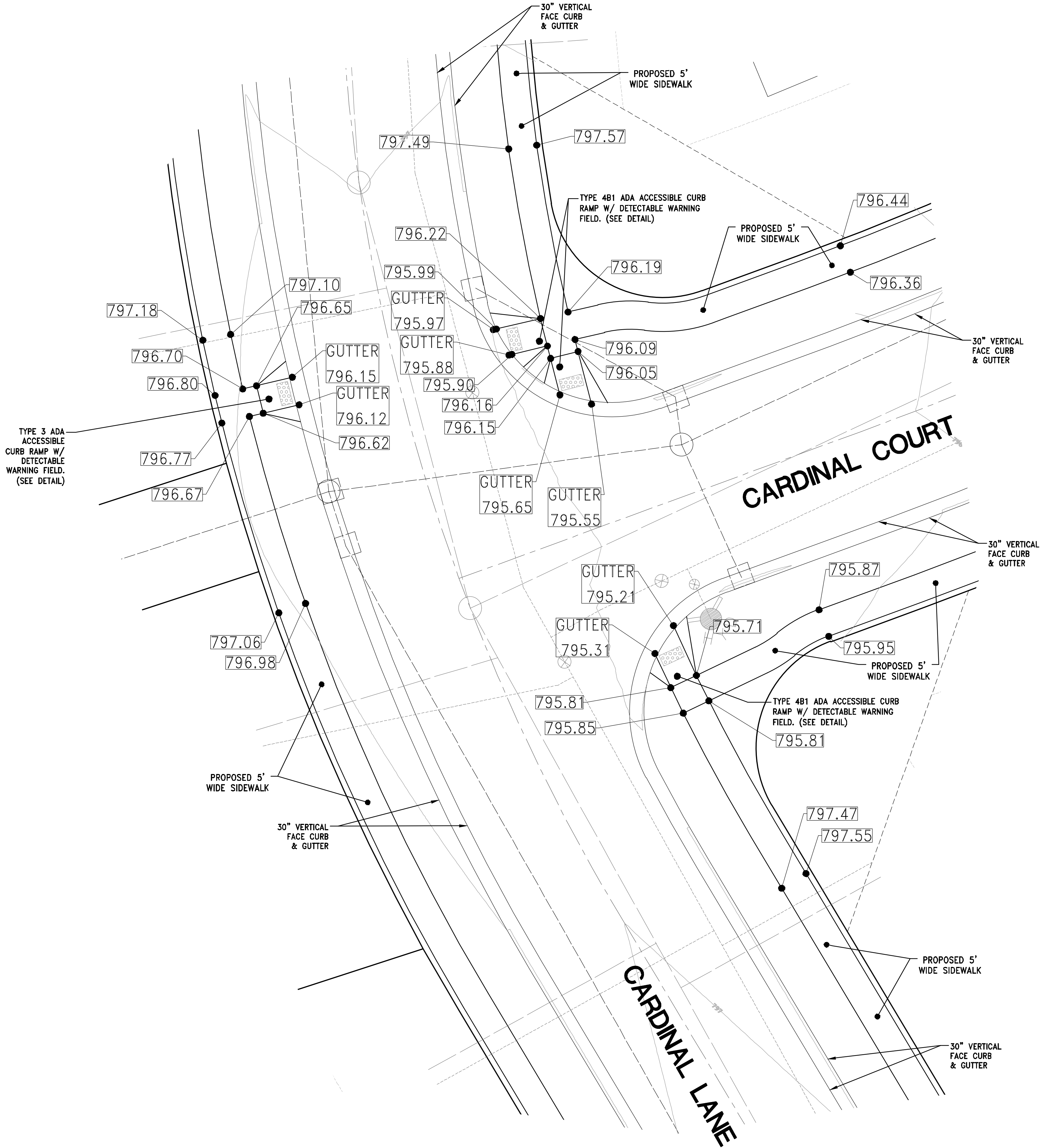
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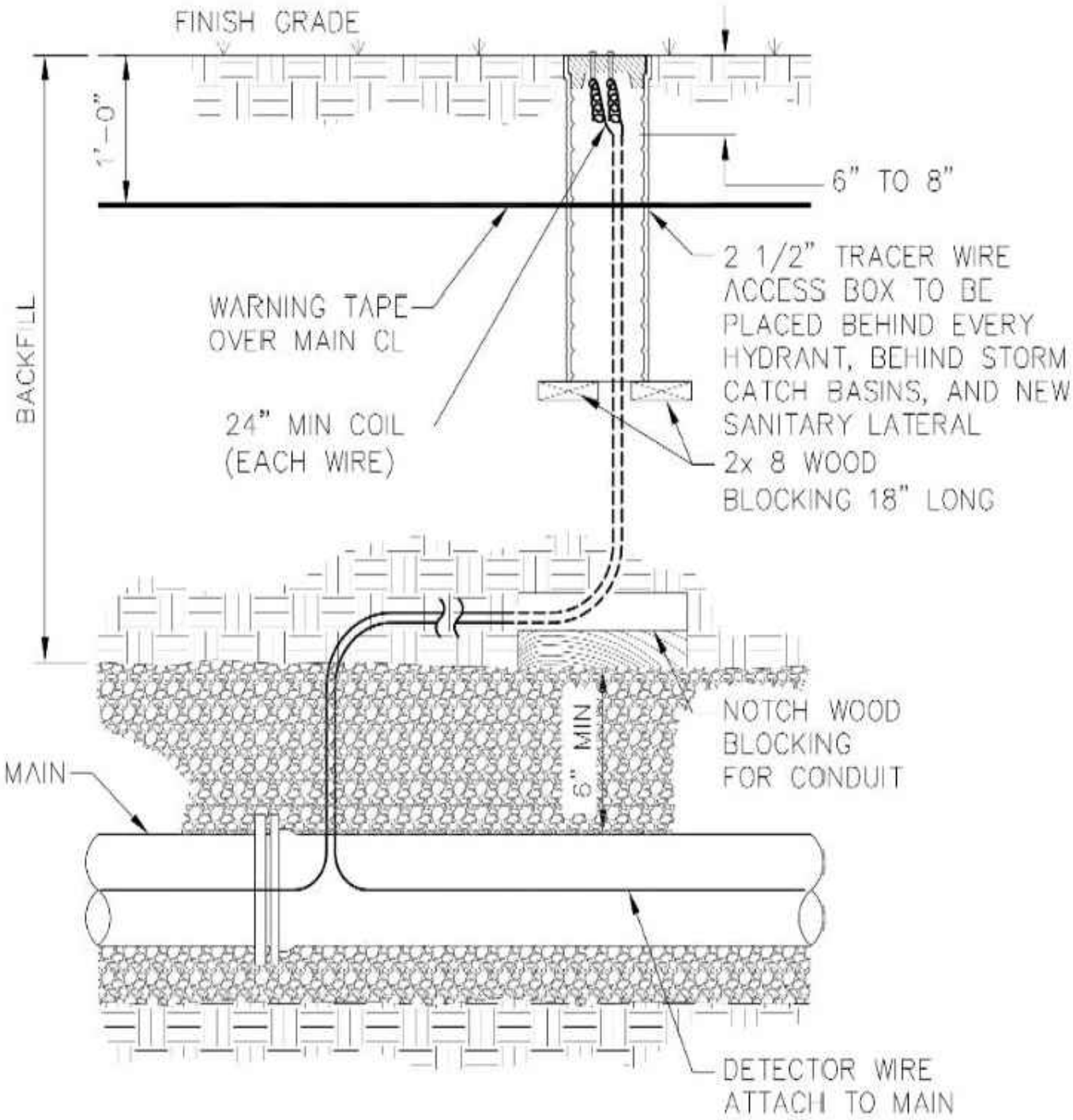
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**INTERSECTION
RAMP
DETAILS**

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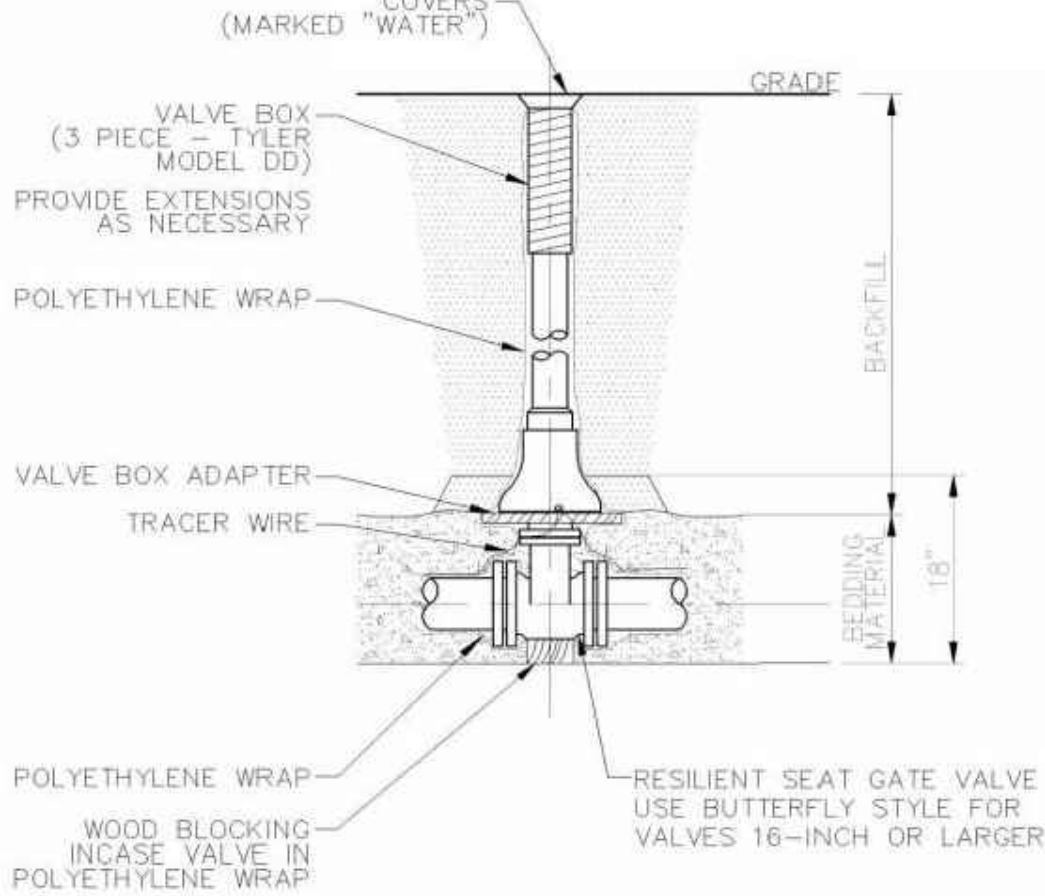
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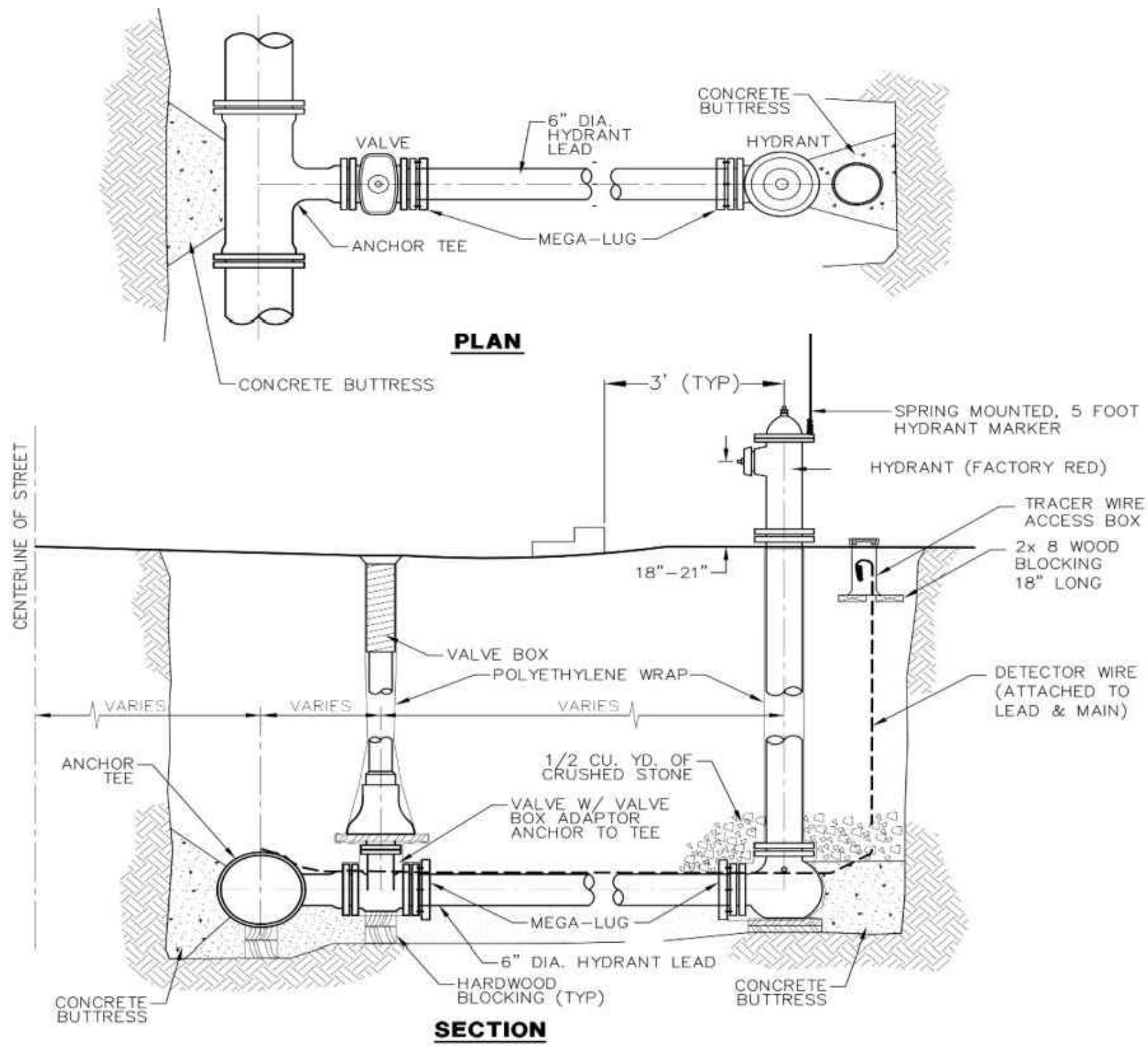
DETECTOR WIRE & LOCATION BOX (ON TERRACE)

NO SCALE



STANDARD GATE VALVE BOX SETTING

NO SCALE



NOTE :
REFER TO FILE NO. 38 OF THE "STANDARD SPECIFICATIONS
FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN" FOR
FURTHER INFORMATION

HYDRANT LEADS SHALL BE RESTRAINED

HYDRANT SETTING DETAIL

NO SCALE

WATER SERVICES

- ALL SERVICES TWO (2) INCH OR SMALLER SHALL BE DR9 HDPE (CTS) WITH A MINIMUM INSIDE DIAMETER OF 1 1/4 INCH.
- CORPORATION STOPS USE MUELLER B-25008 OR FORD FB1001. SHALL WITHSTAND A 150 PSI PRESSURE TEST.
- CURB VALVES USE MUELLER H15165 OR FORD B44M. SHALL WITHSTAND A 150 PSI PRESSURE TEST.
- COMPRESSION FITTINGS WITH STAINLESS STEEL STIFFENERS SHALL BE USED FOR CORPORATION STOPS AND CURB VALVES.
- FOR 2 1/2 INCH AND LARGER SERVICES, FOLLOW SWS PART IV AND V. PROVIDE TEE CONNECTION WITH ANCHOR VALVE MEGA LUGGED TO IT. PROVIDE PLUG AND BUTTRESS.
- USE TEFLON TAPE OF TEFLON PASTE ON THREADED JOINTS.

CURB BOXES

- SHALL BE TYLER 101F WITH FOUR (4) FOOT HEAVY-DUTY ROD WITH GUIDE RING AND STAINLESS STEEL BOLTS
- SHALL BE SCREW-ON STYLE.
- USE VALVE STEM EXTENDERS.
- SHALL BE PLACED ON THE RIGHT OF WAY LINE IN LAWN AREA, NOT IN AN EXISTING OR PROPOSED DRIVEWAY APPROACH.
- ALL CURB STOPS, LATERALS, AND HYDRANTS SHALL BE A MINIMUM OF 10 FEET FROM THE APPROACH.

INSTALLATION AND PLACEMENT

- NO WATER SERVICE SHALL BE LAID THROUGH ANY TRENCH HAVING CINDERS, RUBBISH, ROCK, OR ANY OTHER MATERIAL WHICH MAY CAUSE INJURY TO OR DISINTEGRATION OF THE SERVICE PIPE, UNLESS ADEQUATE MEANS OF PROTECTION ARE PROVIDED BY SAND FILLING OR SUCH OTHER INSULATION AS MAY BE APPROVED BY THE VILLAGE.
- SERVICE PIPES PASSING THROUGH CURB OR RETAINING WALLS SHALL BE ADEQUATELY SAFEGUARDED BY PROVISION OF CHANNEL SPACE OR PIPE CASING, NOT LESS THAN TWICE THE DIAMETER OF THE SERVICE CONNECTION. THE SPACE BETWEEN THE SERVICE PIPE AND CHANNEL OR PIPE CASING, SHALL BE FILLED AND LIGHTLY CAULKED WITH OAKUM, MASTIC CEMENT, OR OTHER RESILIENT MATERIAL, AND MADE IMPERVIOUS TO MOISTURE.
- PRESSURE TEST WATER MAIN SECTIONS BEFORE INSTALLING SERVICES TWO (2) INCH AND SMALLER, FOLLOWING SWS 4.15.0
- ALL WATER SERVICES SHALL BE WET TAPPED UNDER NORMAL OPERATING SYSTEM PRESSURE. USE DOUBLE-STRAP PVC TAPPING SADDLE FOR SERVICE LINES TWO (2) INCH AND SMALLER. USE FORD FS202 OR 303, OR SMITH-BLAIR 377 OR 372.
- ALL SERVICES SHALL BE INSTALLED A MINIMUM OF TEN (10) FEET FROM EXISTING OR FUTURE DRIVEWAY LOCATIONS.
- ALL NEW SERVICES SHALL EXTEND TEN (10) FEET BEYOND RIGHT OF WAY LINE.
- ALL WATER SERVICES ARE TO BE CENTERED ON THE LOT AS CLOSE AS PRACTICAL (WITHIN FIVE (5) FEET OF CENTER).
- ALL SERVICES SHALL BE STAKED PRIOR TO CONSTRUCTION.
- PROVIDE A TWO (2) BY SIX (6) INCH HARDWOOD MARKER AT END OF SERVICE FROM INVERT OF SERVICE TO TWO (2) FEET ABOVE FINISHED GRADE.
- ALL UNUSED WATER SERVICES SHALL HAVE THE CORPORATION STOP TURNED OFF AND THE SERVICE (AND ALL APPURTENANCES) REMOVED TO THE CORPORATION STOP.
- TEST SERVICES FOLLOWING SWS 5.5.18.

COVER DEPTH

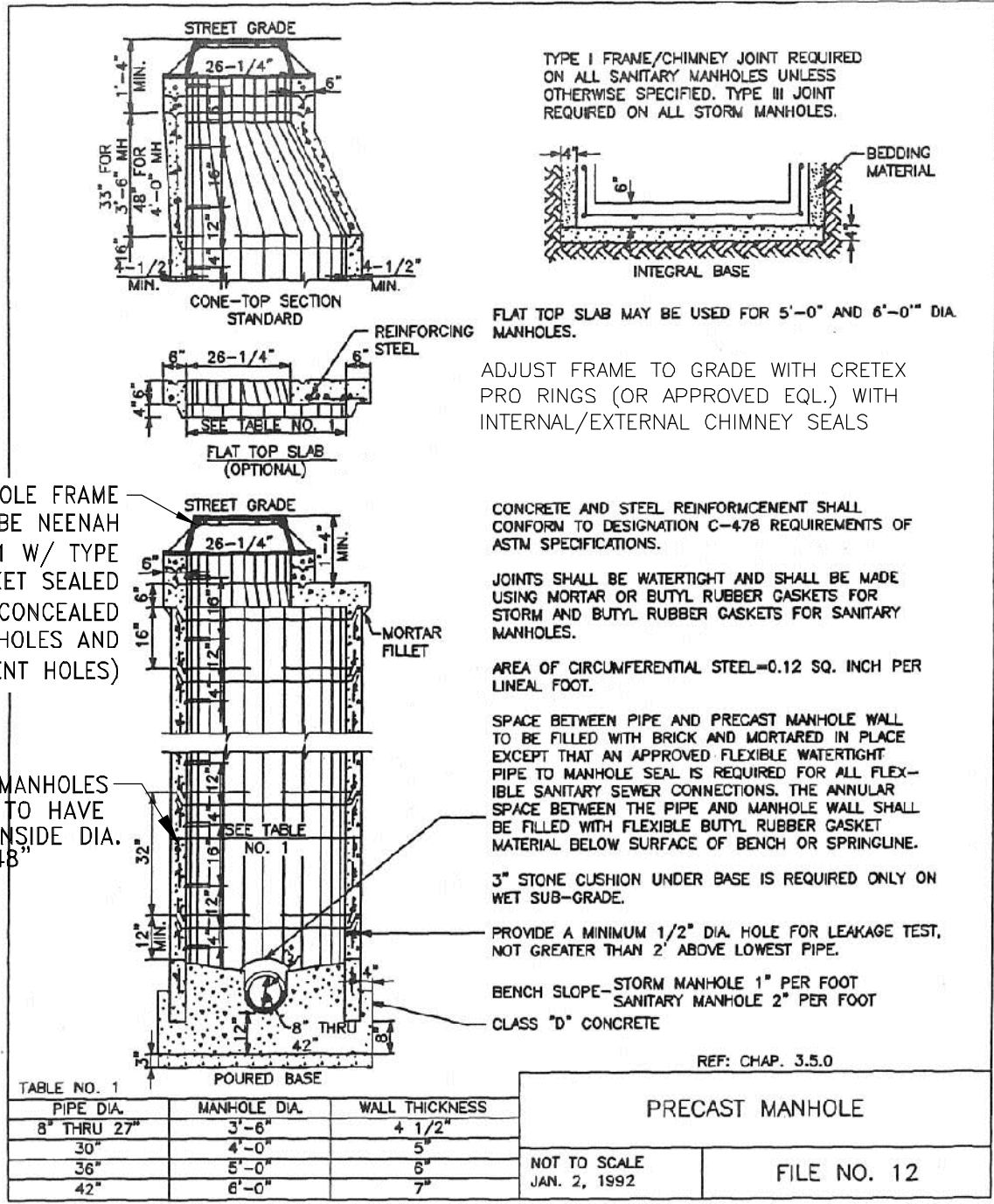
- THE MINIMUM DEPTH OF COVER BETWEEN FINISH GRAD AND THE TOP OF THE WATER MAIN PIPE SHALL BE 6 FEET.
- NO WATER MAIN SHALL BE INSTALLED WITH MORE THAN 8 FEET OF COVER BELOW FINISH GRADE.

BEDDING AND COVER MATERIAL

- NO WATER SERVICE OR WATER MAIN SHALL BE LAID THROUGH ANY TRENCH HAVING CINDERS, RUBBISH, ROCK, OR ANY OTHER MATERIAL WHICH MAY CAUSE INJURY OR DISINTEGRATION OF THE PIPE.
- WATER MAIN BEDDING AND COVER MATERIAL SHALL BE CRUSHED STONE OR SAND. WATER VALVE BONNETS SHALL BE SET IN STONE ON WOOD BLOCKING.
- IF A WET TRENCH CONDITION EXISTS, THE WATER MAIN BEDDING AND COVER MATERIAL SHALL BE SUPPORTED BY 3" OF CRUSHED LIMESTONE CHIPS OR CRUSHED LIMESTONE SCREENINGS, CONFORMING TO CHAPTER 8.43.0, TABLES 32 AND 33 OF THE "SWS" AND PLACED AS SHOWN ON FILE NO. 36 OF THE "STANDARD SPECIFICATIONS".

TESTING

- HYDROSTATIC TESTING SHALL BE PERFORMED AS SPECIFIED IN CHAPTER 4.15.0 OF THE "SWS".....A VILLAGE REPRESENTATIVE MUST BE PRESENT AT ALL TIMES DURING THE TESTING PROCESS.
- IN A NEW DEVELOPMENT THE CONTRACTOR HAS THE OPTION TO TEST THE ENTIRE NEW WATER MAIN, INCLUDING



SANITARY MANHOLE DETAIL

NO SCALE

- WATER MAIN SHALL BE DISINFECTED IN ACCORDANCE WITH SWS 4.3.12 AND SWS 4.16.0.
- CONTRACTOR SHALL FURNISH AND BOND CHLORINE TABLETS TO THE INSIDE SPIGOT END TOP OF EACH PIPE AS IT IS INSTALLED IN THE GROUND.
- ALL PIPING INSTALLED OUTSIDE OF THE WATER MAIN SEGMENTS SHALL BE DISINFECTED BY SWABING WITH A FIVE (5%) HYPOCHLORITE SOLUTION AND THOROUGHLY FLUSHED. THE ENTIRE INTERIOR SURFACES OF ALL PIPES AND FITTINGS SHALL BE THOROUGHLY SWABBED.
- CONTRACTOR SHALL USE EXTREME CARE TO INSURE THE CLEANLINESS OF ALL WATER MAIN MATERIALS USED.
- ALL COST OF STERILIZATION WORK, INCLUDING RE-CHLORINATION IF NECESSARY, FLUSHING, SAMPLING AND PROCESSING OF BACTERIOLOGICAL SAMPLES SHALL BE PAID FOR BY THE DEVELOPER OR CONTRACTOR.

DISINFECTION

- A SAFE SAMPLE MUST BE OBTAINED FROM EACH OF THE SEGMENTS HYDROSTATICALLY TESTED.
- SAMPLES SHALL ALSO BE TAKEN FROM CONNECTION TO INTERSECTING MAINS TO CHECK EFFECTIVENESS OF THE DISINFECTION PROCEDURE.
- SAMPLES MUST BE PROVEN SAFE BY A WISCONSIN DNR-CERTIFIED INDEPENDENT LABORATORY.
- VILLAGE OF MUKWONAGO UTILITY SHALL RECEIVE A COPY OF THE BACTERIOLOGICAL TEST BEFORE WATER MAIN WILL BE PLACED IN SERVICE.
- IF A TEST IS PROVING UNSATISFACTORY, THE WATER MAIN SHALL BE STERILIZED BY THE CONTRACTOR BY SUCH METHODS AS HE DEEMS NECESSARY AND SAMPLES TAKEN UNTIL ACCEPTABLE RESULTS ARE OBTAINED.

SAFE SAMPLES

- A SAFE SAMPLE MUST BE OBTAINED FROM EACH OF THE SEGMENTS HYDROSTATICALLY TESTED.
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FLUSHING/FILLING WATER MAIN

- WATER FOR TESTING AND FLUSHING OF MAINS WILL BE MADE AVAILABLE BY THE MUKWONAGO UTILITY SUBJECT TO ITS REQUIREMENTS AND CHARGES.
- CONTRACTOR SHALL NOTIFY THE UTILITY OF FLUSHING/FILLING SCHEDULE, AND OBTAIN A METER TO BE USED.
- ALL FLUSHING/FILLING OF NEW MAINS SHALL BE COMPLETED BY CONTRACTOR.

WATER DISCHARGE

- PROVISIONS SHALL BE MADE TO CONVEY WATER USED FOR FLUSHING OR TESTING TO A SUITABLE DISCHARGE POINT WITHOUT CAUSING DAMAGE OR EROSION TO PROPERTIES.
- WATER WASTED FROM PIPELINE, WELL, AND/OR TOWER THAT MAY REACH BODIES OF SURFACE WATER MAY NOT CONTAIN ANY SUBSTANCES IN CONCENTRATIONS THAT ADVERSELY AFFECT THE WATER AS DETERMINED BY NR 105 AND NR 106.
- FOR CHLORINE, NO TOTAL RESIDUAL CHLORINE MAY BE MEASURED IN WATER BEING DISCHARGED TO SURFACE WATER.
- WATER WITH RESIDUAL CHLORINE MAY BE DISCHARGED TO THE SANITARY SEWER WITH PRIOR APPROVAL OF THE UTILITIES DIRECTOR.
- IF CHLORINATED WATER IS CONTAINED BY A DIKE OR BERM AND ALLOWED TO SEEP INTO THE GROUND, OR DISCHARGED TO AN AREA AT A RATE WHERE IT WILL SEEP INTO THE GROUND PRIOR TO REACHING A SURFACE WATER, THEN NO CHLORINE NEUTRALIZATION IS REQUIRED.



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SINGLE FAMILY DEVELOPMENT
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NOTES &
DETAILS

SHEET

C6.1

Cardinal Ridge – Phase I

Village of Vernon and Village of Mukwonago, Wisconsin

Storm Water Management Plan

Prepared by:



Trio Engineering LLC

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May 20, 2024
Revised July 19, 2024

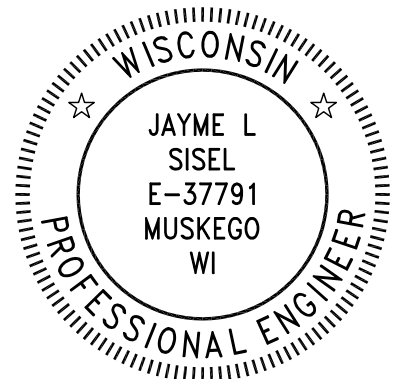


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Introduction

The Cardinal Ridge development is a proposed 95-lot residential subdivision on a 50.75-acre parcel that is split between two municipalities. The northern 33.04 acres of the site is located within the Village of Vernon. The southern 17.71 acres is located within the Village of Mukwonago. Since the drainage is split between two municipalities, the stormwater management practices that are located within the Village of Vernon will be designed to meet the Village of Vernon stormwater management requirements. Likewise, the stormwater management practices that are located within the Village of Mukwonago will be designed to meet the Village of Mukwonago stormwater standards.

This report documents the design computations for Phase I of the proposed development and presents a plan for stormwater management that meets the requirements of the Village of Vernon, the Village of Mukwonago, and the Wisconsin Department of Natural Resources (WDNR).

Owner/ Developer

The owner, developer, and responsible entity for installation and maintenance of the storm water management practices is:

Neumann Development, Inc.
N27 W24025 Paul Ct., Suite 100
Pewaukee, Wisconsin 53072
Contract: Bryan Lindgren
Phone: (262) 542-9200

Design Requirements

The following design standards have been used to develop the stormwater management plan for the “Cardinal Ridge” development:

- Village of Vernon: Waukesha County Chapter 14, Article VIII, Stormwater Management & Erosion Control Ordinance
- Village of Mukwonago: Chapter 34, Article II, Division 4, Stormwater Management and Erosion Control
- Wisconsin Department of Natural Resources (WDNR): Technical Standards, NR151, and NR216
- Summary of Village of Vernon design requirements:
 - Peak Discharge:
 - Village of Vernon: The peak flow discharge rates of stormwater runoff from the site under the post-development site conditions shall not exceed the rates under the pre-development conditions for the 1, 2, 10, and 100-yr, 24-hr design storms.

- Water Quality (Total Suspended Solids): Reduce to the maximum extent practicable the total suspended solids load by 80% for new development sites, based on an average annual rainfall, as compared to no runoff management controls.
- Infiltration: For low imperviousness developments, such as low-density residential, one of the following shall be met:
 - Infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 90% of the pre-development infiltration volume, based on an average annual rainfall.
 - No more than 1% of the project site is required as an effective infiltration area.
- Summary of Village of Mukwonago design requirements:
 - Peak Discharge:
 - Village of Mukwonago: Reduce the 100-yr, 24-hr post-development runoff rate to the 10-yr, 24-hr pre-development runoff rate. Reduce the 10 and 2-yr, 24-hr post-development runoff rates to no greater than the 2-yr, 24-hr pre-development runoff rate. In addition, control the 1-yr, 24-hr post-development runoff rate to the 1-yr, 24-hr pre-development rate.
 - Water Quality (Total Suspended Solids): Reduce to the maximum extent practicable the total suspended solids load by 80% for new development sites, based on an average annual rainfall, as compared to no runoff management controls.
 - Infiltration: For medium imperviousness developments, such as medium-density residential, one of the following shall be met:
 - Infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 75% of the pre-development infiltration volume, based on an average annual rainfall.
 - No more than 2% of the project site is required as an effective infiltration area.

Analysis Overview

The Stormwater Management Plan for the “Cardinal Ridge” development has been designed in accordance with the Village of Vernon and the Village of Mukwonago stormwater management requirements and all applicable state requirements. Existing and proposed stormwater runoff conditions for the site were analyzed for: runoff volume, peak volume, discharge, detention basin storage capacity required, outlet structure and storm sewer system requirements. The software package used for modeling and analysis was HydroCAD Version 10.20 software by HydroCAD Software Solutions. HydroCAD uses NRCS methods to generate runoff and pond routing hydrographs. The model’s capabilities include modeling simple drainage basins, combining hydrographs to determine runoff and storage requirements, and detention basin and outlet structure sizing.

MSE3 rainfall distributions were used for modeling the 1, 2, 10 and 100-year, 24-hour storm events. The corresponding rainfall data used for modeling was taken from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency Tables for Wisconsin Counties and is shown in the following table.

TABLE 1
Design Rainfall Values

Storm Recurrence Interval	24-hour Rainfall Depths
1-year	2.4 inches
2-year	2.7 inches
10-year	3.81 inches
100-year	6.18 inches

Soil types for the site were determined from the NRCS Soil Survey Maps for Waukesha County. The Soil Survey identifies the soils at the site as a mix of Type D soils (Hochheim loams), Type C/D soils (Brookston silt loam), and Type B/D (Sebewa and Lamartine silt loams). Based on this, a hydrologic soil group Type C was used to determine runoff curve numbers for the site. Refer to Appendix E for details.

Pre-Development Watershed Description

The existing site is occupied by agricultural fields. Surface drainage for the site is generally towards the center of the property, to an unnamed tributary to the Fox River that flows from north to south and divides the site in half. A limited area of the site also drains to the east, towards a wooded wetland on the adjacent property that eventually drains south to another unnamed tributary to the Fox River.

Pre-development land cover types, topography, drainage subareas, and flow paths are shown on Figure 1. The following tables summarize the results of the stormwater model for pre-development conditions for each municipality. A schematic plan of the hydrological analyses and detailed hydrological computations for pre-development conditions are included in Appendix A.

TABLE 2
Village of Vernon
Pre-Development Site Conditions

Subarea or Junction	Description	Total Area (acres)	Impervious Area (acres)	Time of Conc. (min.)	Peak Flow Rate (cfs)			
					1-year	2-year	10-year	100-year
V-1	Subarea	11.21	0.00	14	10.14	13.15	25.46	54.95
V-2	Subarea	1.86	0.00	8	1.72	2.22	4.33	9.32
V-3	Subarea	1.93	0.00	8	2.22	2.87	5.52	11.78
V-4	Subarea	1.76	0.00	9	1.81	2.35	4.53	9.68
V-1L	Total Vernon Outflow	16.78	0.00	-	15.34	19.91	38.63	83.07

TABLE 3
Village of Mukwonago
Pre-Development Site Conditions

Subarea or Junction	Description	Total Area (acres)	Impervious Area (acres)	Time of Conc. (min.)	Peak Flow Rate (cfs)			
					1-year	2-year	10-year	100-year
M-2	Subarea	5.68	0.00	14	5.24	6.79	13.24	28.45
M-4	Subarea	3.49	0.00	11	3.56	4.60	8.87	18.98
M-1L	Total Mukwonago Outflow	9.17	0.00	-	8.73	11.32	21.93	47.08

Post-Development Site Drainage Description

Phase I of the proposed development plan encompasses the east half of the subdivision and includes the construction of fifty-two (52) single-family residential lots. Stormwater management for Phase I of the proposed development will be provided by 2 wet detention ponds and 2 rain gardens. Since the drainage is split between two municipalities, the stormwater management practices that are located within the Village of Vernon will be designed to meet the Village of Vernon stormwater management requirements. Likewise, the stormwater management practices that are located within the Village of Mukwonago will be designed to meet the Village of Mukwonago stormwater standards.

Figure 2 shows the proposed land cover, grading, drainage subarea boundaries, flow paths, and proposed site and stormwater management improvements. The following table summarizes the results of the hydrologic analyses for post-development conditions for each municipality. A schematic plan of the hydrological analyses and detailed hydrological computations for post-development conditions are included in Appendix B.

TABLE 4
Village of Vernon
Post-Development Site Conditions

Subarea, Junction or Pond	Description	Total Area (acres)	Impervious Area (acres)	Time of Conc. (min.)	Peak Flow Rate (cfs)			
					1-year	2-year	10-year	100-year
V-2	Subarea	12.81	5.15	17	16.89	20.65	35.22	67.62
2P	Pond 2P	-	-	-	1.33	2.05	5.76	24.33
V-4	Subarea	1.48	0.42	14	1.66	2.10	3.83	7.80
4B	Rain Garden 4B	-	-	-	0.50	1.03	3.39	7.49
V-7	Subarea	0.26	0.00	6	0.18	0.26	0.59	1.44
V-8	Subarea	1.15	0.44	15	1.36	1.70	3.05	6.11
V-9	Subarea	0.82	0.23	6	1.29	1.61	2.92	5.89
V-1L	Total Vernon Outflow	16.52	6.24	-	2.72	3.54	9.24	35.29

TABLE 5
Village of Mukwonago
Post-Development Site Conditions

Subarea, Junction or Pond	Description	Total Area (acres)	Impervious Area (acres)	Time of Conc. (min.)	Peak Flow Rate (cfs)			
					1-year	2-year	10-year	100-year
M-5	Subarea	1.62	0.53	10	2.30	2.87	5.13	10.24
5B	Rain Garden 5B	-	-	-	0.84	1.61	4.81	9.89
M-6	Subarea	7.54	3.34	15	10.60	12.96	22.07	42.18
6P	Pond 6P	-	-	-	1.41	2.20	10.22	21.47
M-8	Subarea	0.27	0.00	6	0.19	0.27	0.61	1.49
M-1L	Total Mukwonago Outflow	9.43	3.87	-	1.43	2.23	10.34	21.76

Stormwater Detention Basin Design & Summary

Phase I of the development plan proposes two wet detention ponds and two rain gardens as the primary means of stormwater management for the site. In conformance with WDNR requirements, the wet detention ponds have been designed with 4:1 side slopes on the berms, 10-foot top of berm widths, 10-foot wide safety shelves below the normal water level (NWL). All outfall structures discharge to energy dissipating level spreaders prior to discharging into the adjacent wetlands.

The following table summarizes the detention system routing analysis for post development conditions. Details of the stormwater management facilities are included in Appendix B.

TABLE 6
Post-Development Site Conditions

<i>Vernon Pond 2 (2P)</i>				
System Details:		Outlet Control:		
Bottom elevation = 789.5		7-inch diameter orifice at I.E. 794.5		
Normal water elevation = 794.5		1.5-foot sharp-crested weir at elevation 795.5		
10-foot spillway at elevation = 797.5		48-inch horizontal grate at elevation 796.5		
Top of berm elevation = 798.5		24-inch diameter outlet pipe at I.E. 793.8		
	1-year Storm	2-year Storm	10-year Storm	100-year Storm
Peak Inflow (cfs)	16.89	20.65	35.22	67.62
Peak Outflow (cfs)	1.33	2.05	5.76	24.33
Max Water Surface Elev.	795.61	795.80	796.47	797.48
Max Storage Volume (ac-ft)	0.72	0.85	1.35	2.18
<i>Vernon Rain Garden 4 (4B)</i>				
System Details:		Outlet Control:		
Bottom of Engineered Soil elevation = 804.7		Native infiltration rate = 0.24 in/hr (soils report)		
Top of Engineered Soil elevation = 805.7		V-notch weir at elevation 806.2		
Top of berm elevation = 808.5				
	1-year Storm	2-year Storm	10-year Storm	100-year Storm
Peak Inflow (cfs)	1.66	2.10	3.83	7.80
Peak Outflow (cfs)	0.50	1.03	3.39	7.49
Max Water Surface Elev.	806.71	806.78	806.94	807.12
Max Storage Volume (ac-ft)	0.04	0.05	0.06	0.07
<i>Mukwonago Rain Garden 5 (5B)</i>				
System Details:		Outlet Control:		
Bottom of Engineered Soil elevation = 795.0		Native infiltration rate = 0.24 in/hr (soils report)		
Top of Engineered Soil elevation = 797.0		10-foot spillway at elevation 797.5		
Top of berm elevation = 798.5				
	1-year Storm	2-year Storm	10-year Storm	100-year Storm
Peak Inflow (cfs)	2.30	2.87	5.13	10.24
Peak Outflow (cfs)	0.84	1.61	4.81	9.89
Max Water Surface Elev.	797.61	797.67	797.84	798.02
Max Storage Volume (ac-ft)	0.05	0.06	0.06	0.08

TABLE 6
Post-Development Site Conditions

Mukwonago Pond 6 (6P)				
System Details:		Outlet Control:		
Bottom elevation = 784.75		3-inch diameter orifice at I.E. 789.75		
Normal water elevation = 789.75		1-foot sharp-crested weir at elevation 791.0		
10-foot spillway at elevation = 794.0		48-inch horizontal grate at elevation 792.25		
Top of berm elevation = 795.0		24-inch diameter outlet pipe at I.E. 789.5		
	1-year Storm	2-year Storm	10-year Storm	100-year Storm
Peak Inflow (cfs)	10.60	14.01	26.68	51.49
Peak Outflow (cfs)	1.41	2.20	10.22	21.47
Max Water Surface Elev.	791.52	791.77	792.51	793.81
Max Storage Volume (ac-ft)	0.42	0.49	0.74	1.28

Peak Discharge Summaries

Village of Vernon requires post-development peak discharge rates to be no greater than pre-development discharge rates for the 1, 2, 10, and 100-yr, 24-hr design storms. The following table compares the results of the analysis from a peak discharge standpoint for the Village of Vernon.

TABLE 7
Village of Vernon
Comparison of Peak Discharge

	Pre-Development		Post-Development
1-year	15.34 cfs	>	2.72 cfs
2-year	19.91 cfs	>	3.54 cfs
10-year	38.63 cfs	>	9.24 cfs
100-year	83.07 cfs	>	35.29 cfs

Village of Mukwonago requires post-development peak discharge rates for the 100-yr, 24-hr storm to be no greater than the pre-development discharge rates for the 10-yr, 24-hr storm event. In addition, the post-development peak discharge rates for the 2 and 10-yr, 24-hr storms shall be no greater than the pre-development discharge rates for the 2-yr, 24-hr storm. The 1-yr, 24-hr post-development runoff rate shall be no greater than the 1-yr, 24-hr pre-development rate. The following table compares the results of the analysis from a peak discharge standpoint for the Village of Mukwonago.

TABLE 8
Village of Mukwonago
Comparison of Peak Discharge

1-year Pre-Development		1-yr Post-Development
8.73 cfs	>	1.43 cfs
2-year Pre-Development		10-yr Post-Development
11.32 cfs	>	10.34 cfs
10-year Pre-Development		100-yr Post-Development
21.93 cfs	>	21.76 cfs

Water Quality

Both the Village of Vernon and the Village of Mukwonago require new development sites to be designed to remove 80 percent of TSS, based on an average annual rainfall as compared to no runoff management controls. Stormwater quality was analyzed using SLAMM Version 10.5.0 software, developed by Robert Pitt and John Voorhees. The results of the SLAMM analysis indicate that approximately 81.3 percent of TSS will be removed from stormwater as a result of the proposed wet detention ponds and rain gardens. In addition, approximately 59.4 percent of total phosphorus will be removed from the development site. Detailed computations are included in Appendix C.

Infiltration

In conformance with Steps A and B of the WDNR Conservation Practice Standard 1002, *Site Evaluation for Stormwater Infiltration*, the site was initially screened to determine eligibility for infiltration. Based on the soil boring logs provided by Professional Service Industries, Inc., this site is exempt from meeting infiltration performance standards due to the shallow groundwater identified at the soil boring locations. However, based on recent correspondence with Waukesha County, it has been requested that the site be designed to infiltrate site runoff to the maximum extent practicable and that infiltration calculations be provided for the site.

Infiltration was analyzed using winSLAMM to determine runoff volumes for both pre-development and post-development conditions. The results of the winSLAMM analysis indicate that the site will infiltrate approximately 75.2 percent of the pre-development infiltration volume. Detailed computations are included in Appendix D.

Conclusion

The proposed development will maintain compliance with the Village of Vernon, the Village of Mukwonago, and the WDNR's requirements for control of stormwater quantity, quality, and infiltration. We request, on behalf of the owner, approval of this Stormwater Management Plan to allow for construction of Phase I of the Cardinal Ridge subdivision development.

Prepared by:

SOUND STORMWATER DESIGN LLC



Jayme Sisel, P.E.

FIGURES

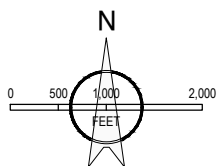
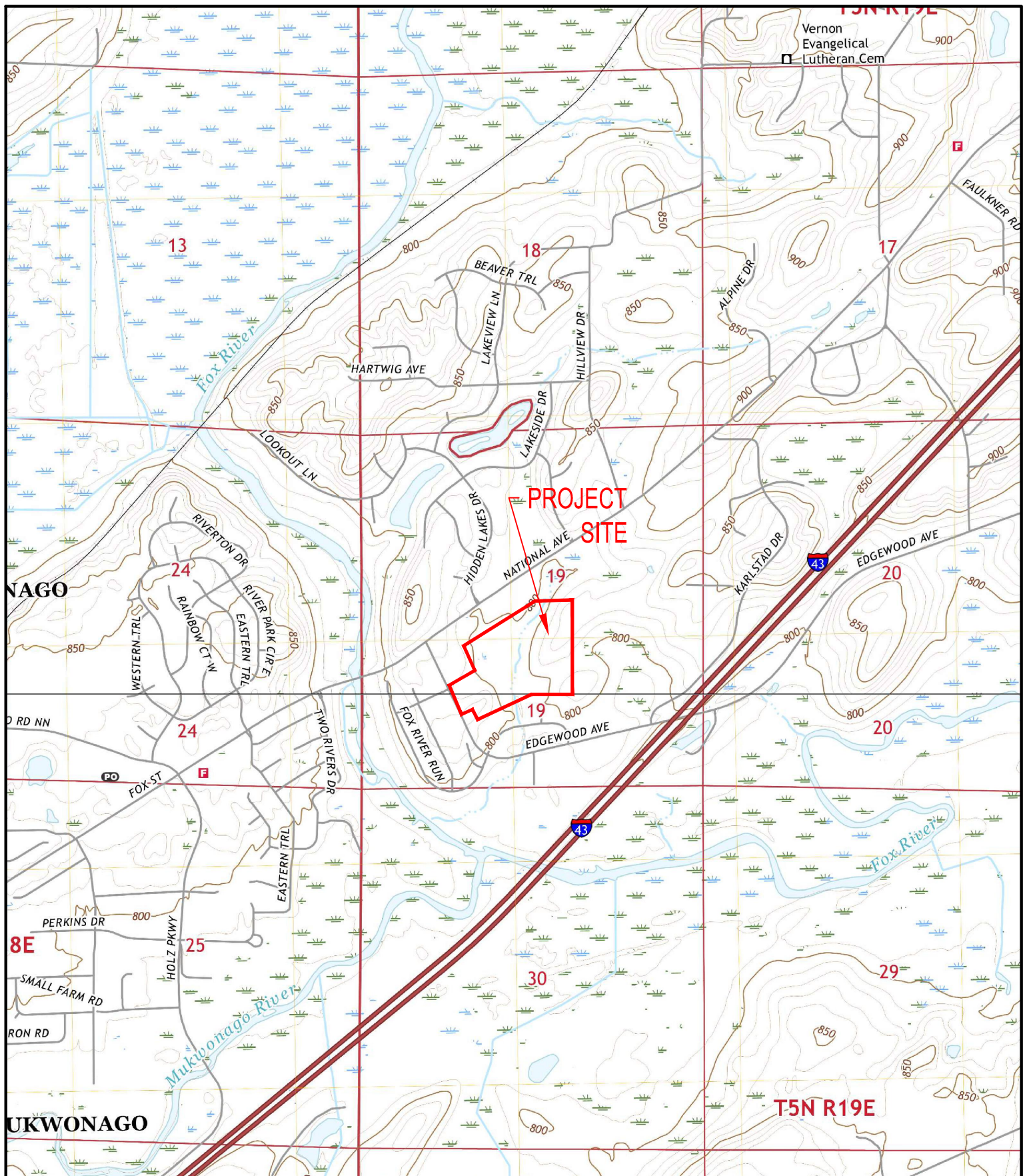


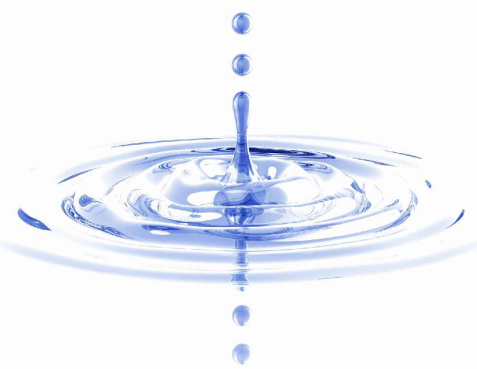
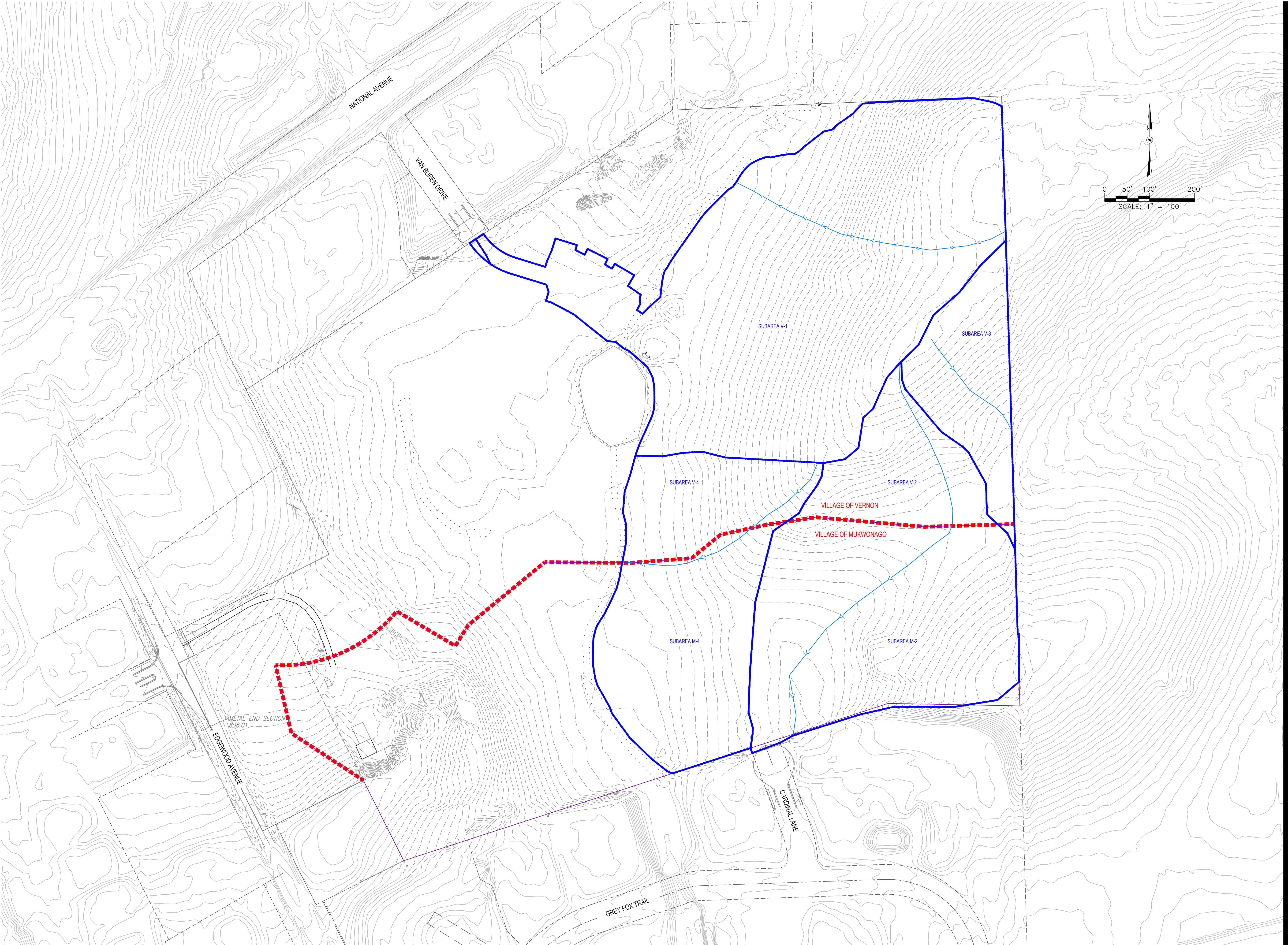
FIGURE 1

SITE LOCATION MAP **CARDINAL RIDGE** **VILLAGE OF VERNON &** **VILLAGE OF MUKWONAGO, WI**



**SOUND STORMWATER
 DESIGN**

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SOUND STORMWATER
DESIGN

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CLIENT:

PROJECT TITLE:
**CARDINAL RIDGE
PHASE I**
EDGEWOOD AVENUE
VERONA/MUKWONAGO, WISCONSIN

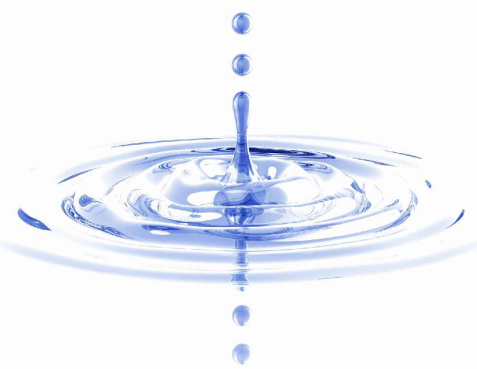
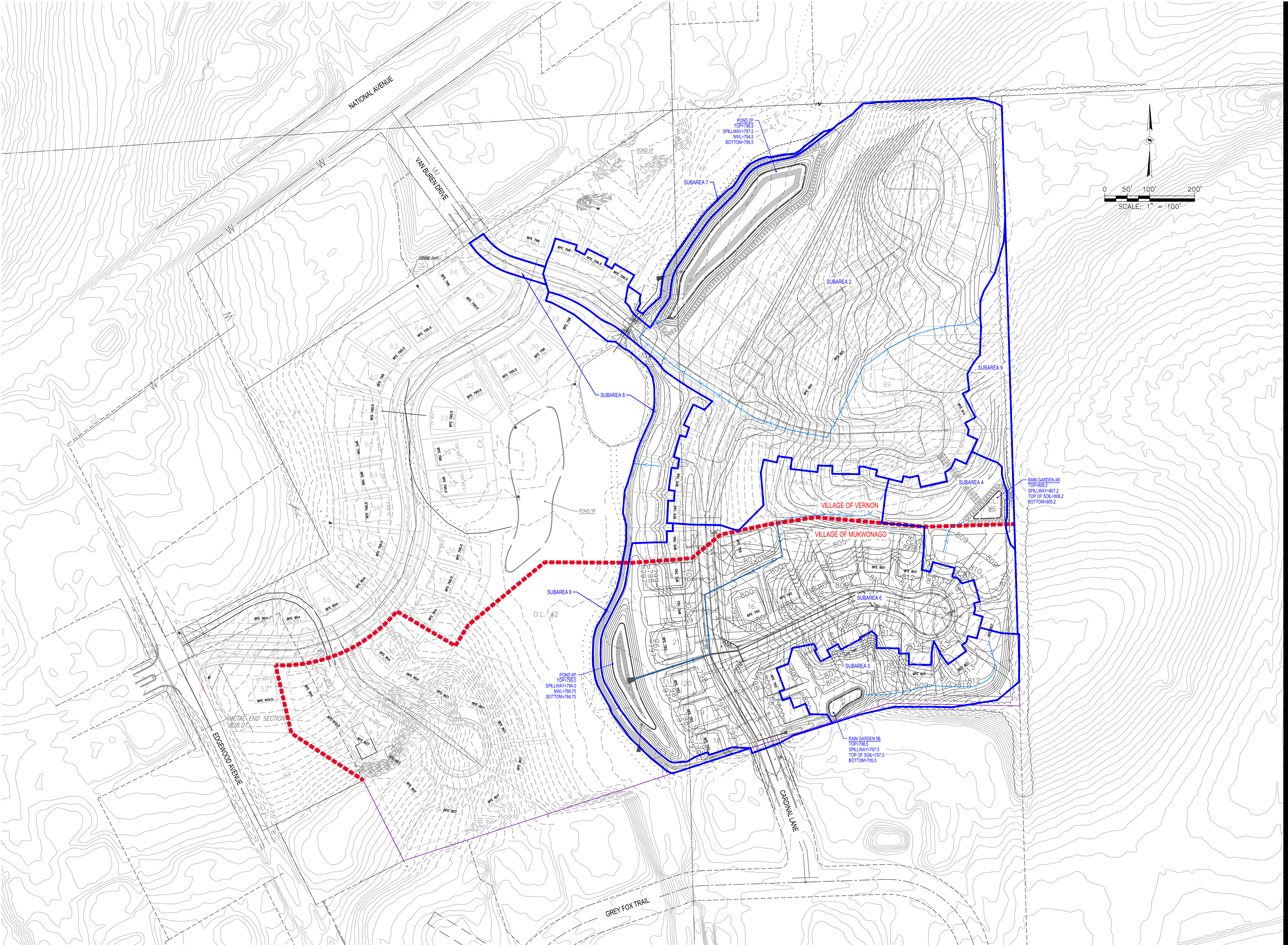
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JOB NO: 2022-004

SHEET TITLE:
**PRE-
DEVELOPMENT
CONDITIONS PLAN**

FIGURE:

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SOUND STORMWATER DESIGN

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EDGEWOOD AVENUE
VERONA/MUKWONAGO, WISCONSIN

DATE: 05-20-24

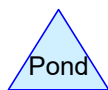
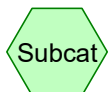
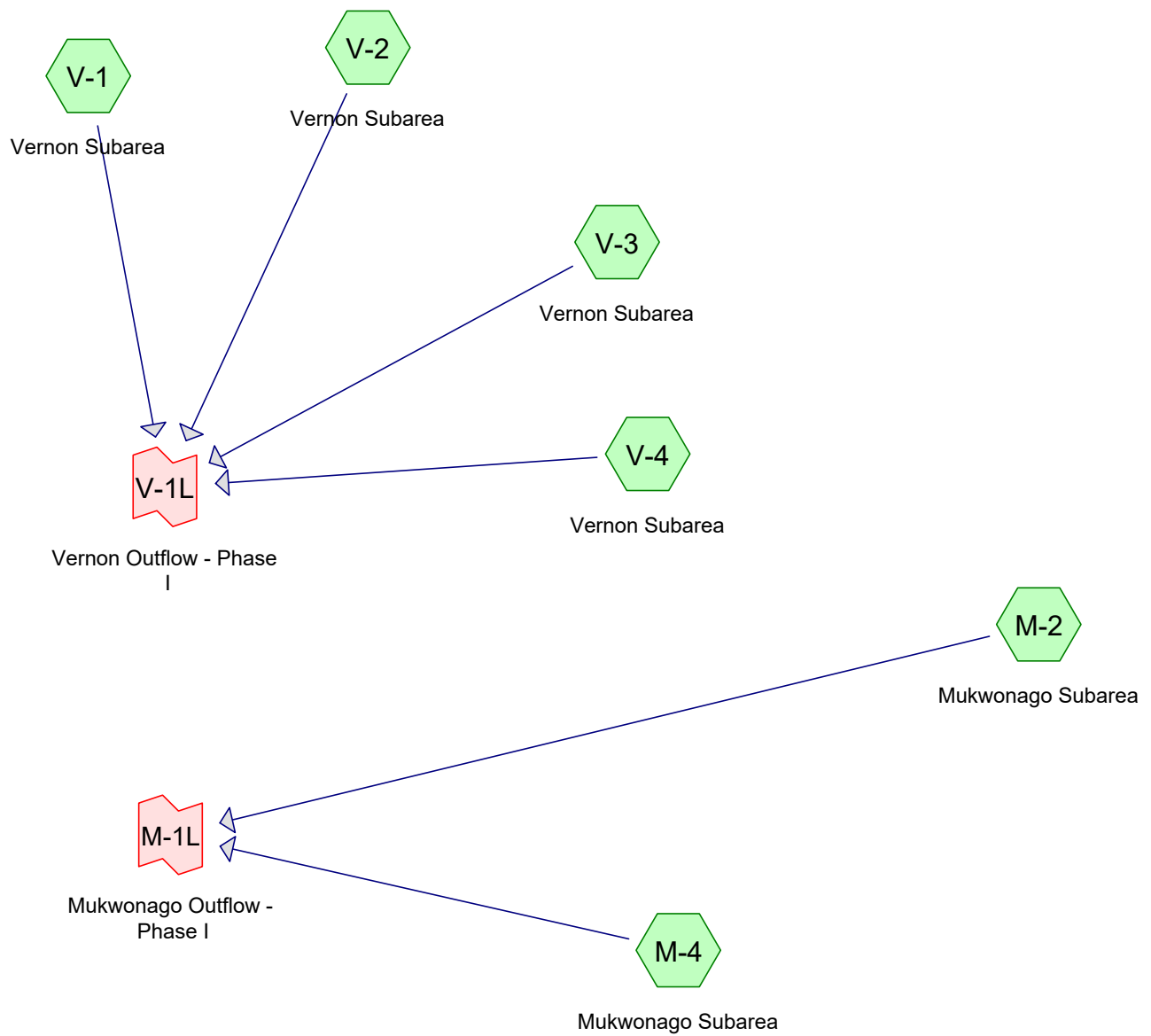
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SHEET TITLE:
**POST-
DEVELOPMENT
CONDITIONS PLAN**

FIGURE:

APPENDIX A

Pre-Development Hydrologic Analysis



Routing Diagram for Existing Phase I
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Existing_Phase I

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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 yr	MSE 24-hr	3	Default	24.00	1	2.40	2
2	2 yr	MSE 24-hr	3	Default	24.00	1	2.70	2
3	10 yr	MSE 24-hr	3	Default	24.00	1	3.81	2
4	100 yr	MSE 24-hr	3	Default	24.00	1	6.18	2

Existing_Phase I

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
25.950	78	cropland (M-2, M-4, V-1, V-2, V-3, V-4)
25.950	78	TOTAL AREA

Existing_Phase I

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MSE 24-hr 3 1 yr Rainfall=2.40"

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Page 4

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentM-2: Mukwonago Subarea Runoff Area=5.680 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=1,010' Tc=13.6 min CN=78 Runoff=5.24 cfs 0.342 af

SubcatchmentM-4: Mukwonago Subarea Runoff Area=3.490 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=520' Slope=0.0400 '/' Tc=11.1 min CN=78 Runoff=3.56 cfs 0.210 af

SubcatchmentV-1: Vernon Subarea Runoff Area=11.210 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=635' Tc=14.2 min CN=78 Runoff=10.14 cfs 0.675 af

SubcatchmentV-2: Vernon Subarea Runoff Area=1.860 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=1,010' Tc=13.6 min CN=78 Runoff=1.72 cfs 0.112 af

SubcatchmentV-3: Vernon Subarea Runoff Area=1.930 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=275' Slope=0.0600 '/' Tc=8.3 min CN=78 Runoff=2.22 cfs 0.116 af

SubcatchmentV-4: Vernon Subarea Runoff Area=1.780 ac 0.00% Impervious Runoff Depth>0.72"
Flow Length=520' Slope=0.0400 '/' Tc=11.1 min CN=78 Runoff=1.81 cfs 0.107 af

Link M-1L: Mukwonago Outflow - Phase I Inflow=8.73 cfs 0.553 af
Primary=8.73 cfs 0.553 af

Link V-1L: Vernon Outflow - Phase I Inflow=15.34 cfs 1.011 af
Primary=15.34 cfs 1.011 af

Total Runoff Area = 25.950 ac Runoff Volume = 1.564 af Average Runoff Depth = 0.72"
100.00% Pervious = 25.950 ac 0.00% Impervious = 0.000 ac

Existing_Phase I

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MSE 24-hr 3 2 yr Rainfall=2.70"

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Page 13

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentM-2: Mukwonago Subarea Runoff Area=5.680 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=1,010' Tc=13.6 min CN=78 Runoff=6.79 cfs 0.435 af

SubcatchmentM-4: Mukwonago Subarea Runoff Area=3.490 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=520' Slope=0.0400 '/' Tc=11.1 min CN=78 Runoff=4.60 cfs 0.267 af

SubcatchmentV-1: Vernon Subarea Runoff Area=11.210 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=635' Tc=14.2 min CN=78 Runoff=13.15 cfs 0.859 af

SubcatchmentV-2: Vernon Subarea Runoff Area=1.860 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=1,010' Tc=13.6 min CN=78 Runoff=2.22 cfs 0.143 af

SubcatchmentV-3: Vernon Subarea Runoff Area=1.930 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=275' Slope=0.0600 '/' Tc=8.3 min CN=78 Runoff=2.87 cfs 0.148 af

SubcatchmentV-4: Vernon Subarea Runoff Area=1.780 ac 0.00% Impervious Runoff Depth>0.92"
Flow Length=520' Slope=0.0400 '/' Tc=11.1 min CN=78 Runoff=2.35 cfs 0.136 af

Link M-1L: Mukwonago Outflow - Phase I Inflow=11.32 cfs 0.703 af
Primary=11.32 cfs 0.703 af

Link V-1L: Vernon Outflow - Phase I Inflow=19.91 cfs 1.286 af
Primary=19.91 cfs 1.286 af

Total Runoff Area = 25.950 ac Runoff Volume = 1.988 af Average Runoff Depth = 0.92"
100.00% Pervious = 25.950 ac 0.00% Impervious = 0.000 ac

Existing_Phase I

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MSE 24-hr 3 10 yr Rainfall=3.81"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentM-2: Mukwonago Subarea Runoff Area=5.680 ac 0.00% Impervious Runoff Depth>1.74"
Flow Length=1,010' Tc=13.6 min CN=78 Runoff=13.24 cfs 0.821 af

SubcatchmentM-4: Mukwonago Subarea Runoff Area=3.490 ac 0.00% Impervious Runoff Depth>1.74"
Flow Length=520' Slope=0.0400 '/' Tc=11.1 min CN=78 Runoff=8.87 cfs 0.505 af

SubcatchmentV-1: Vernon Subarea Runoff Area=11.210 ac 0.00% Impervious Runoff Depth>1.74"
Flow Length=635' Tc=14.2 min CN=78 Runoff=25.46 cfs 1.621 af

SubcatchmentV-2: Vernon Subarea Runoff Area=1.860 ac 0.00% Impervious Runoff Depth>1.74"
Flow Length=1,010' Tc=13.6 min CN=78 Runoff=4.33 cfs 0.269 af

SubcatchmentV-3: Vernon Subarea Runoff Area=1.930 ac 0.00% Impervious Runoff Depth>1.74"
Flow Length=275' Slope=0.0600 '/' Tc=8.3 min CN=78 Runoff=5.52 cfs 0.279 af

SubcatchmentV-4: Vernon Subarea Runoff Area=1.780 ac 0.00% Impervious Runoff Depth>1.74"
Flow Length=520' Slope=0.0400 '/' Tc=11.1 min CN=78 Runoff=4.53 cfs 0.257 af

Link M-1L: Mukwonago Outflow - Phase I Inflow=21.93 cfs 1.326 af
Primary=21.93 cfs 1.326 af

Link V-1L: Vernon Outflow - Phase I Inflow=38.63 cfs 2.426 af
Primary=38.63 cfs 2.426 af

Total Runoff Area = 25.950 ac Runoff Volume = 3.753 af Average Runoff Depth = 1.74"
100.00% Pervious = 25.950 ac 0.00% Impervious = 0.000 ac

Existing_Phase I

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentM-2: Mukwonago Subarea Runoff Area=5.680 ac 0.00% Impervious Runoff Depth>3.74"
Flow Length=1,010' Tc=13.6 min CN=78 Runoff=28.45 cfs 1.768 af

SubcatchmentM-4: Mukwonago Subarea Runoff Area=3.490 ac 0.00% Impervious Runoff Depth>3.74"
Flow Length=520' Slope=0.0400 '/' Tc=11.1 min CN=78 Runoff=18.98 cfs 1.087 af

SubcatchmentV-1: Vernon Subarea Runoff Area=11.210 ac 0.00% Impervious Runoff Depth>3.74"
Flow Length=635' Tc=14.2 min CN=78 Runoff=54.95 cfs 3.489 af

SubcatchmentV-2: Vernon Subarea Runoff Area=1.860 ac 0.00% Impervious Runoff Depth>3.74"
Flow Length=1,010' Tc=13.6 min CN=78 Runoff=9.32 cfs 0.579 af

SubcatchmentV-3: Vernon Subarea Runoff Area=1.930 ac 0.00% Impervious Runoff Depth>3.74"
Flow Length=275' Slope=0.0600 '/' Tc=8.3 min CN=78 Runoff=11.78 cfs 0.601 af

SubcatchmentV-4: Vernon Subarea Runoff Area=1.780 ac 0.00% Impervious Runoff Depth>3.74"
Flow Length=520' Slope=0.0400 '/' Tc=11.1 min CN=78 Runoff=9.68 cfs 0.554 af

Link M-1L: Mukwonago Outflow - Phase I Inflow=47.08 cfs 2.855 af
Primary=47.08 cfs 2.855 af

Link V-1L: Vernon Outflow - Phase I Inflow=83.07 cfs 5.224 af
Primary=83.07 cfs 5.224 af

Total Runoff Area = 25.950 ac Runoff Volume = 8.078 af Average Runoff Depth = 3.74"
100.00% Pervious = 25.950 ac 0.00% Impervious = 0.000 ac

Existing_Phase I

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment M-2: Mukwonago Subarea

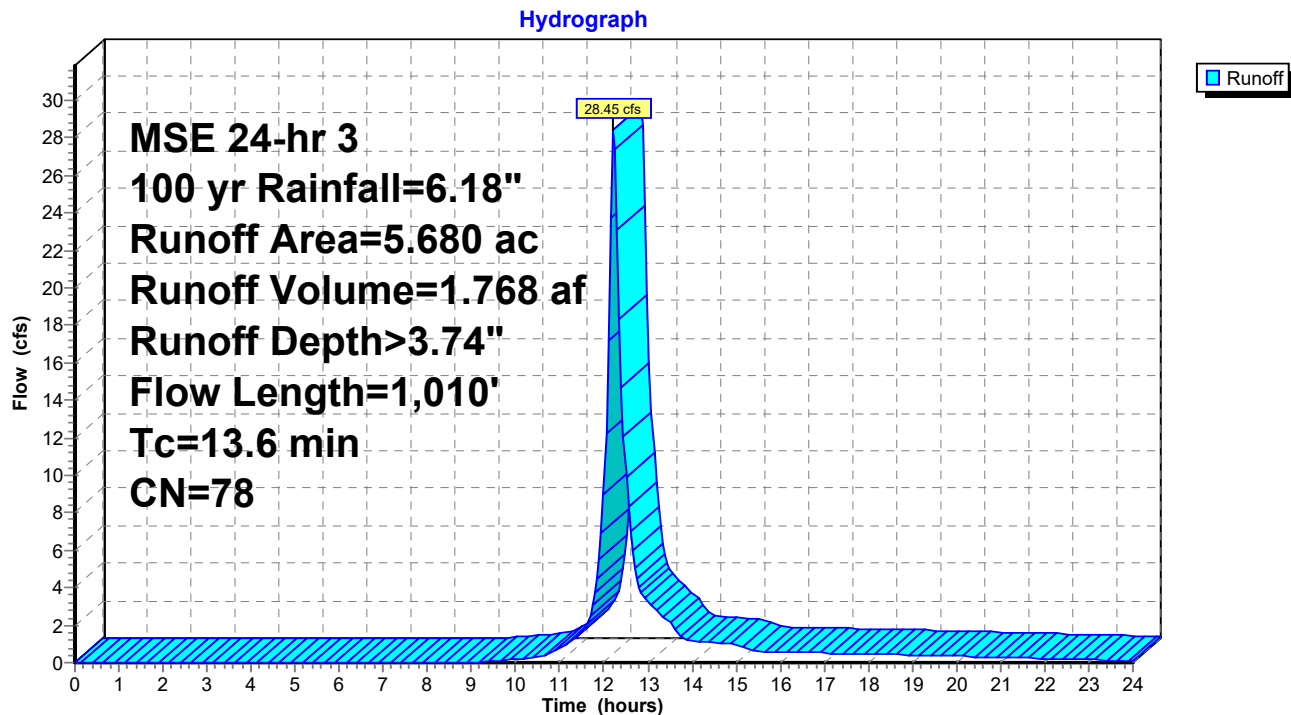
Runoff = 28.45 cfs @ 12.22 hrs, Volume= 1.768 af, Depth> 3.74"
Routed to Link M-1L : Mukwonago Outflow - Phase I

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 5.680	78	cropland
5.680		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0600	0.22		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.8	200	0.0600	3.94		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.2	710	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
13.6	1,010	Total			

Subcatchment M-2: Mukwonago Subarea



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment M-4: Mukwonago Subarea

Runoff = 18.98 cfs @ 12.19 hrs, Volume= 1.087 af, Depth> 3.74"

Routed to Link M-1L : Mukwonago Outflow - Phase I

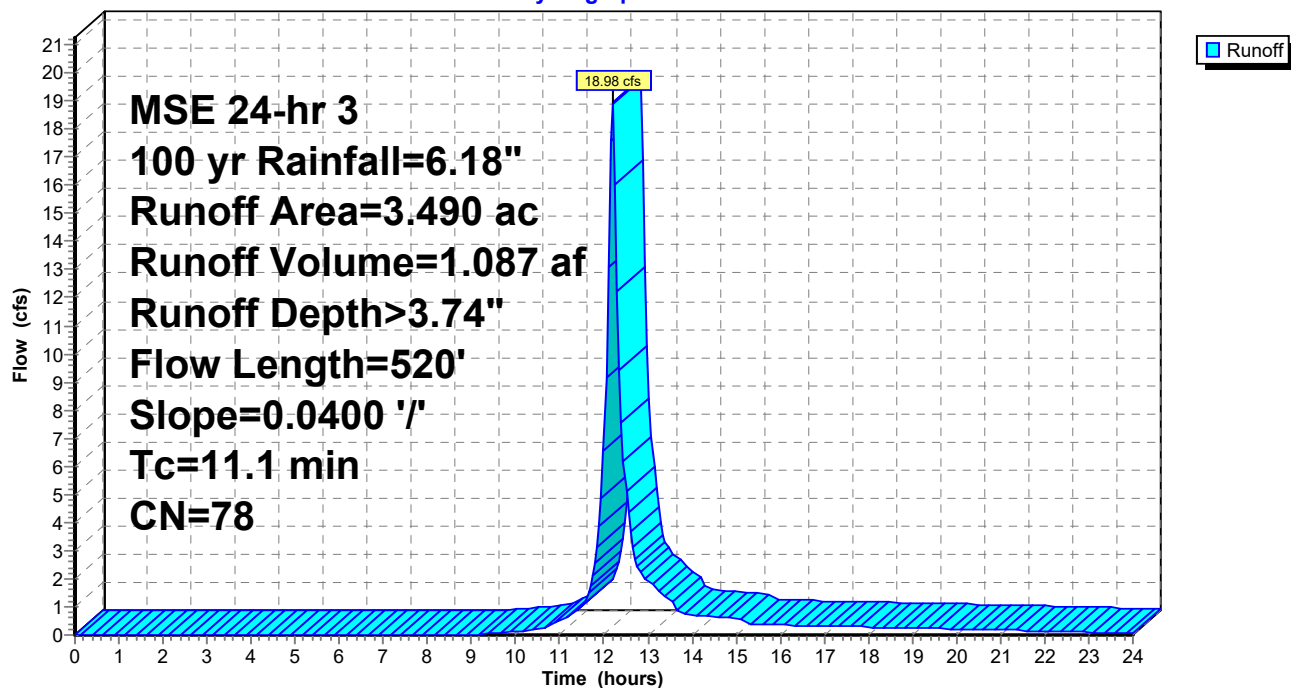
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 3.490	78	cropland
3.490		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0400	0.19		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.70"
2.2	420	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
11.1	520	Total			

Subcatchment M-4: Mukwonago Subarea

Hydrograph



Existing_Phase I

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment V-1: Vernon Subarea

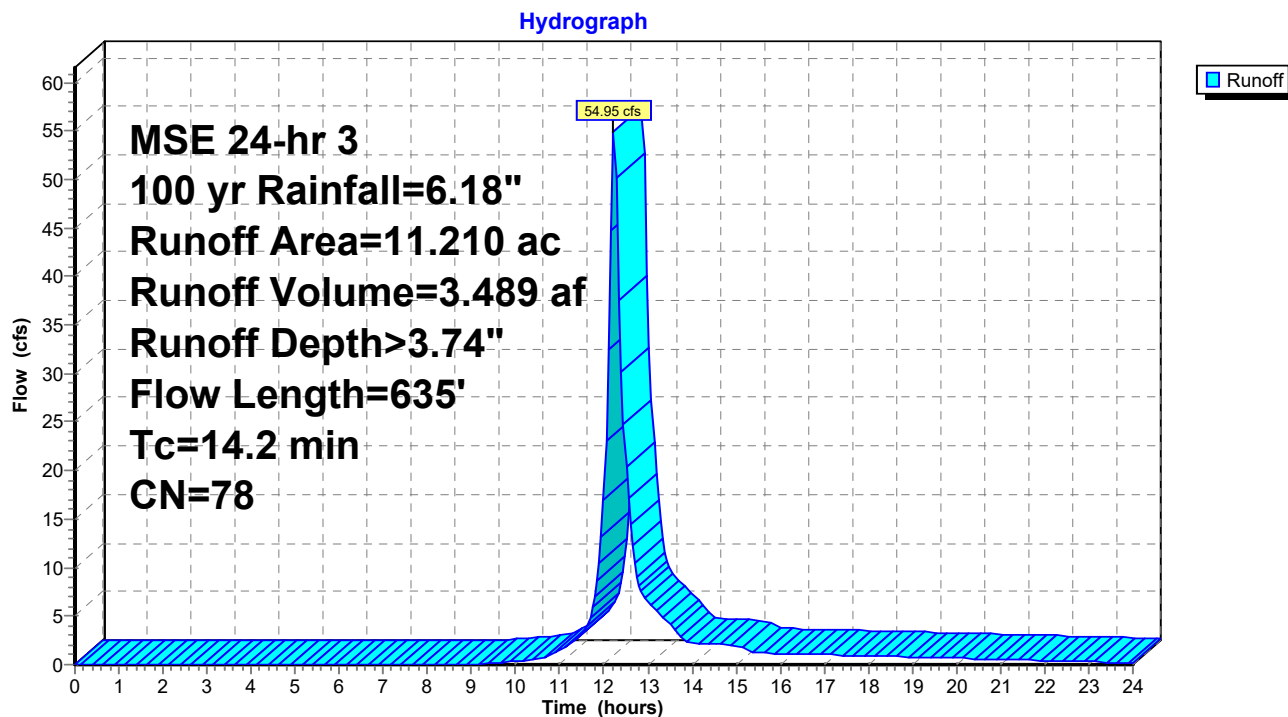
Runoff = 54.95 cfs @ 12.22 hrs, Volume= 3.489 af, Depth> 3.74"
Routed to Link V-1L : Vernon Outflow - Phase I

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 11.210	78	cropland
11.210		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0200	0.14		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.4	60	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.0	475	0.0600	3.94		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
14.2	635	Total			

Subcatchment V-1: Vernon Subarea



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment V-2: Vernon Subarea

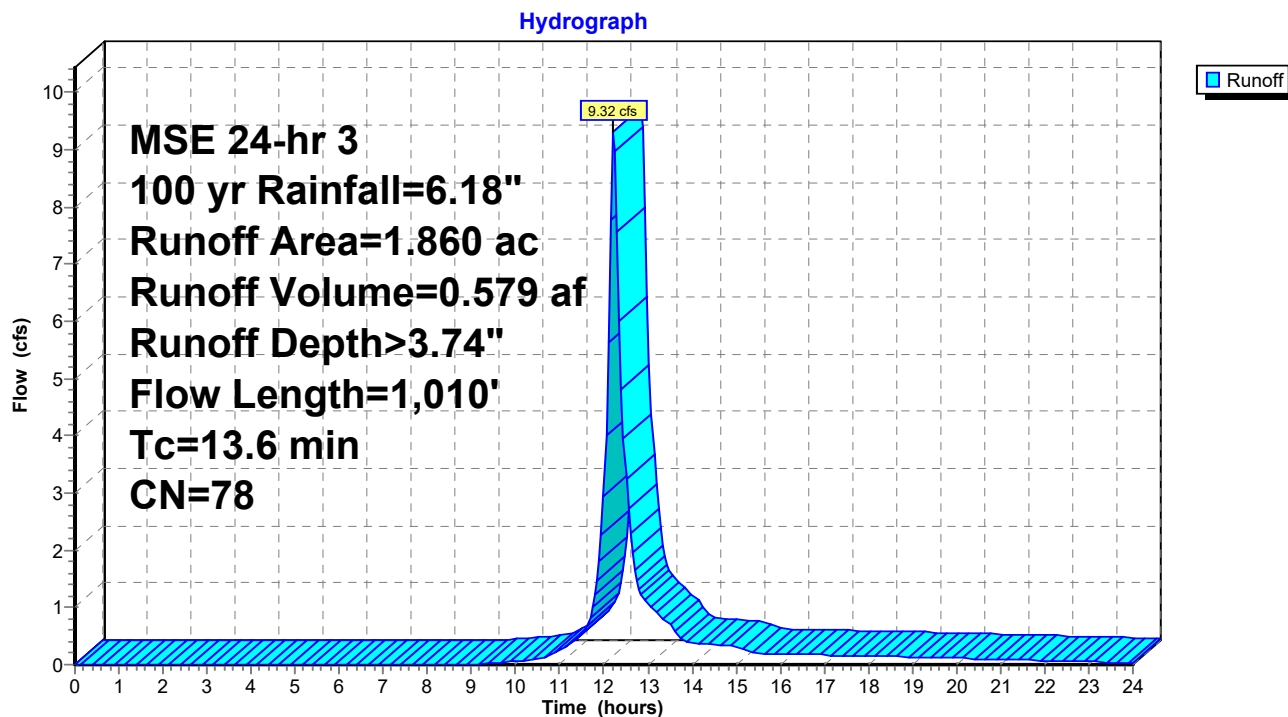
Runoff = 9.32 cfs @ 12.22 hrs, Volume= 0.579 af, Depth> 3.74"
Routed to Link V-1L : Vernon Outflow - Phase I

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 1.860	78	cropland
1.860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0600	0.22		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.8	200	0.0600	3.94		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.2	710	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
13.6	1,010	Total			

Subcatchment V-2: Vernon Subarea



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment V-3: Vernon Subarea

Runoff = 11.78 cfs @ 12.16 hrs, Volume= 0.601 af, Depth> 3.74"
Routed to Link V-1L : Vernon Outflow - Phase I

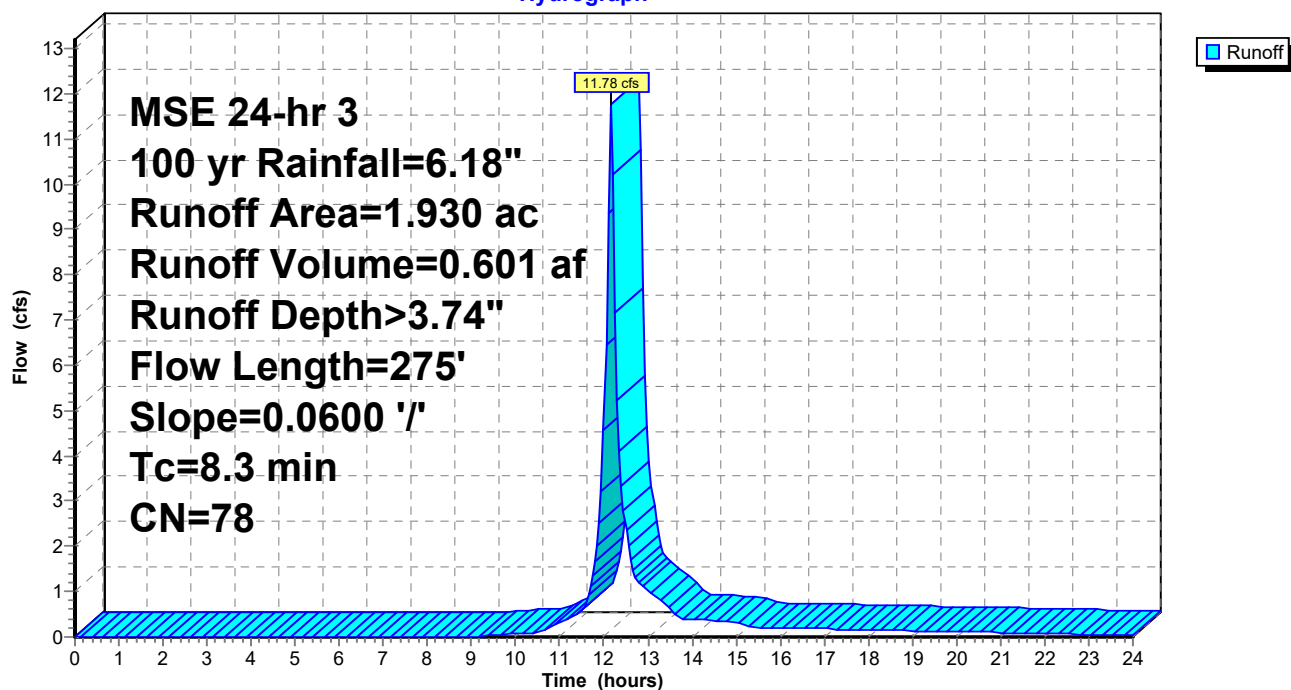
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 1.930	78	cropland
1.930		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0600	0.22		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.7	175	0.0600	3.94		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
8.3	275	Total			

Subcatchment V-3: Vernon Subarea

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment V-4: Vernon Subarea

Runoff = 9.68 cfs @ 12.19 hrs, Volume= 0.554 af, Depth> 3.74"
Routed to Link V-1L : Vernon Outflow - Phase I

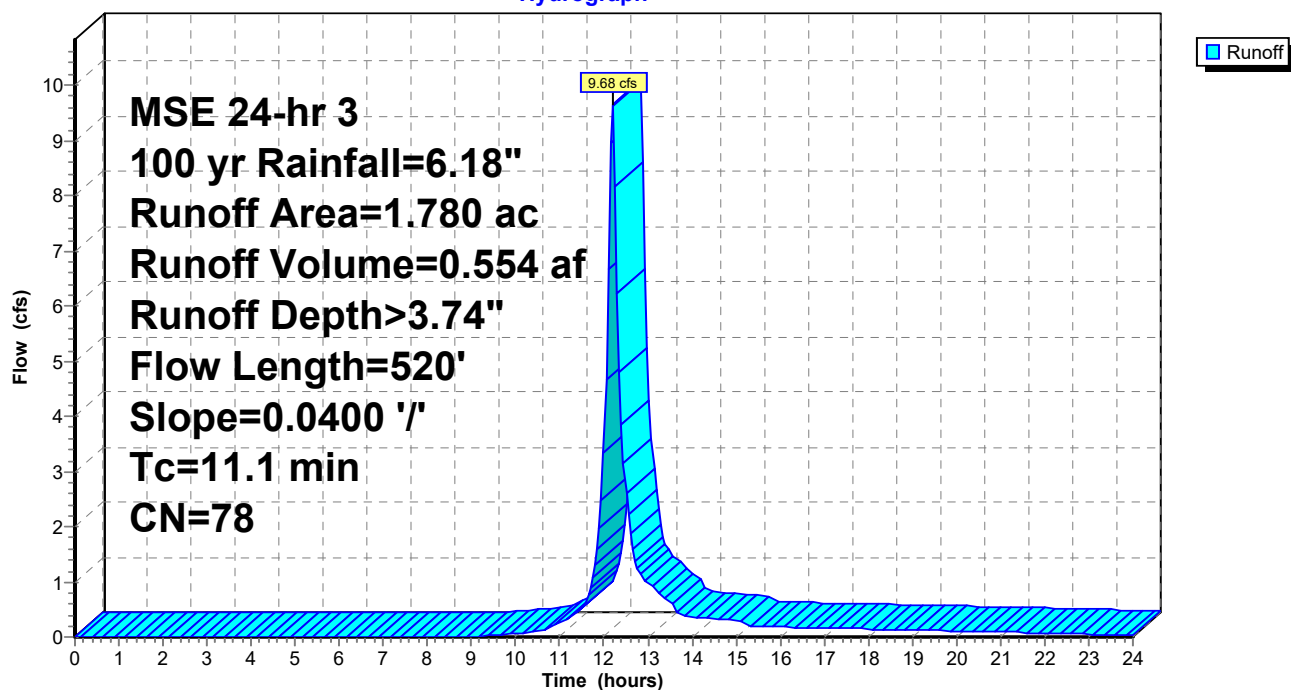
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 1.780	78	cropland
1.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0400	0.19		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.70"
2.2	420	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
11.1	520	Total			

Subcatchment V-4: Vernon Subarea

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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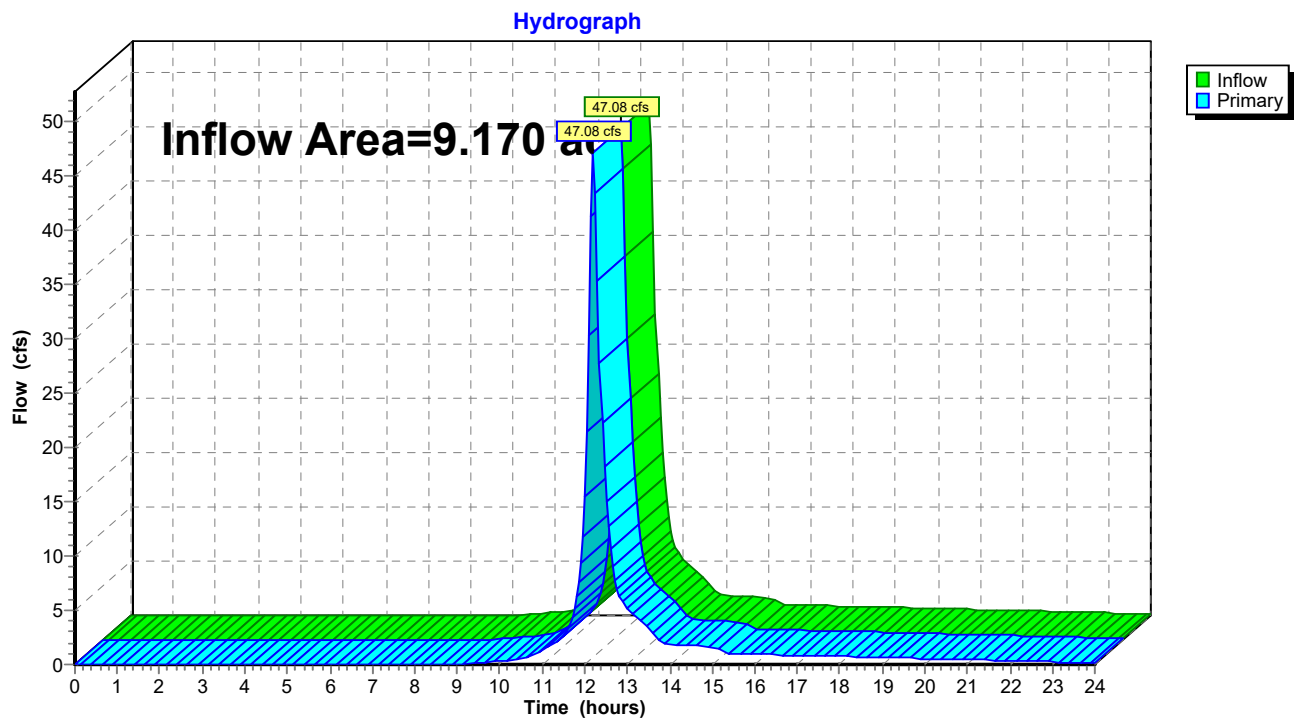
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Summary for Link M-1L: Mukwonago Outflow - Phase I

Inflow Area = 9.170 ac, 0.00% Impervious, Inflow Depth > 3.74" for 100 yr event
Inflow = 47.08 cfs @ 12.21 hrs, Volume= 2.855 af
Primary = 47.08 cfs @ 12.21 hrs, Volume= 2.855 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 99L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link M-1L: Mukwonago Outflow - Phase I



Existing_Phase I

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MSE 24-hr 3 100 yr Rainfall=6.18"

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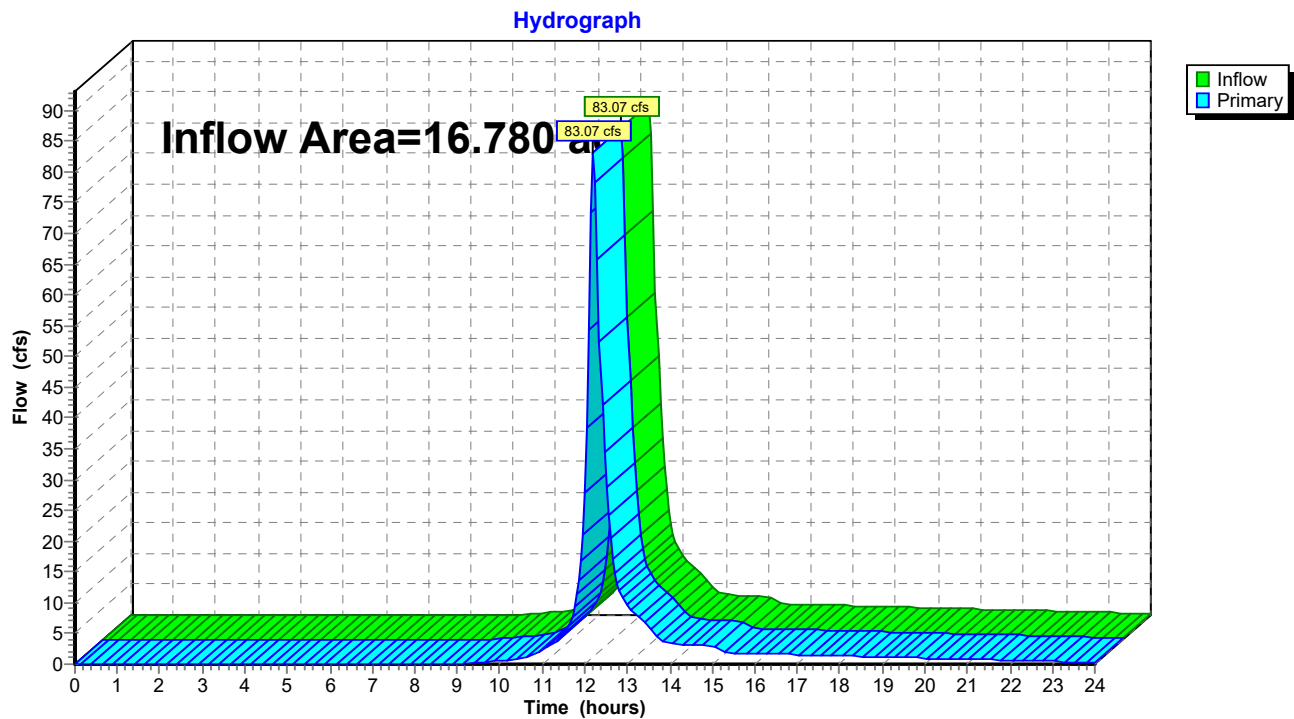
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Summary for Link V-1L: Vernon Outflow - Phase I

Inflow Area = 16.780 ac, 0.00% Impervious, Inflow Depth > 3.74" for 100 yr event
Inflow = 83.07 cfs @ 12.21 hrs, Volume= 5.224 af
Primary = 83.07 cfs @ 12.21 hrs, Volume= 5.224 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link V-1L: Vernon Outflow - Phase I



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Multi-Event Tables

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Events for Subcatchment M-2: Mukwonago Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	5.24	0.342	0.72
2 yr	2.70	6.79	0.435	0.92
10 yr	3.81	13.24	0.821	1.74
100 yr	6.18	28.45	1.768	3.74

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Multi-Event Tables

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Events for Subcatchment M-4: Mukwonago Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	3.56	0.210	0.72
2 yr	2.70	4.60	0.267	0.92
10 yr	3.81	8.87	0.505	1.74
100 yr	6.18	18.98	1.087	3.74

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Multi-Event Tables

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Events for Subcatchment V-1: Vernon Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	10.14	0.675	0.72
2 yr	2.70	13.15	0.859	0.92
10 yr	3.81	25.46	1.621	1.74
100 yr	6.18	54.95	3.489	3.74

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Multi-Event Tables

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Events for Subcatchment V-2: Vernon Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.72	0.112	0.72
2 yr	2.70	2.22	0.143	0.92
10 yr	3.81	4.33	0.269	1.74
100 yr	6.18	9.32	0.579	3.74

Existing_Phase I

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Multi-Event Tables

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Events for Subcatchment V-3: Vernon Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	2.22	0.116	0.72
2 yr	2.70	2.87	0.148	0.92
10 yr	3.81	5.52	0.279	1.74
100 yr	6.18	11.78	0.601	3.74

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Multi-Event Tables

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Events for Subcatchment V-4: Vernon Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.81	0.107	0.72
2 yr	2.70	2.35	0.136	0.92
10 yr	3.81	4.53	0.257	1.74
100 yr	6.18	9.68	0.554	3.74

Existing_Phase I

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Multi-Event Tables

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Events for Link M-1L: Mukwonago Outflow - Phase I

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	8.73	8.73	0.00
2 yr	11.32	11.32	0.00
10 yr	21.93	21.93	0.00
100 yr	47.08	47.08	0.00

Existing_Phase I

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Multi-Event Tables

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Events for Link V-1L: Vernon Outflow - Phase I

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	15.34	15.34	0.00
2 yr	19.91	19.91	0.00
10 yr	38.63	38.63	0.00
100 yr	83.07	83.07	0.00

APPENDIX B

Post-Development Hydrologic Analysis



Routing Diagram for Proposed Phase I
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Proposed_Phase I

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 yr	MSE 24-hr	3	Default	24.00	1	2.40	2
2	2 yr	MSE 24-hr	3	Default	24.00	1	2.70	2
3	10 yr	MSE 24-hr	3	Default	24.00	1	3.81	2
4	100 yr	MSE 24-hr	3	Default	24.00	1	6.18	2

Proposed_Phase I

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
14.320	74	grass (M-5, M-6, M-8, V-2, V-4, V-8, V-9)
10.110	98	impervious (M-5, M-6, V-2, V-4, V-8, V-9)
0.760	71	meadow (M-8, V-7, V-8)
0.760	100	water (M-6, V-2)
25.950	84	TOTAL AREA

Proposed_Phase I

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MSE 24-hr 3 1 yr Rainfall=2.40"

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Time span=0.00-20.00 hrs, dt=0.04 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentM-5: Mukwonago Subarea Runoff Area=1.620 ac 32.72% Impervious Runoff Depth>0.88"
Flow Length=370' Tc=9.8 min CN=82 Runoff=2.30 cfs 0.119 af

SubcatchmentM-6: Mukwonago Subarea Runoff Area=7.540 ac 46.68% Impervious Runoff Depth>1.05"
Flow Length=550' Slope=0.0300 '/' Tc=15.1 min CN=85 Runoff=10.60 cfs 0.657 af

SubcatchmentM-8: Mukwonago Subarea Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>0.41"
Flow Length=50' Slope=0.0800 '/' Tc=6.0 min CN=71 Runoff=0.19 cfs 0.009 af

SubcatchmentV-2: Vernon Subarea Runoff Area=12.810 ac 44.73% Impervious Runoff Depth>1.05"
Flow Length=1,030' Slope=0.0300 '/' Tc=17.2 min CN=85 Runoff=16.89 cfs 1.116 af

SubcatchmentV-4: Vernon Subarea Runoff Area=1.480 ac 28.38% Impervious Runoff Depth>0.82"
Flow Length=90' Slope=0.0200 '/' Tc=14.3 min CN=81 Runoff=1.66 cfs 0.102 af

SubcatchmentV-7: Vernon Subarea Runoff Area=0.260 ac 0.00% Impervious Runoff Depth>0.41"
Tc=6.0 min CN=71 Runoff=0.18 cfs 0.009 af

SubcatchmentV-8: Vernon Subarea Runoff Area=1.150 ac 38.26% Impervious Runoff Depth>0.88"
Flow Length=955' Tc=14.7 min CN=82 Runoff=1.36 cfs 0.084 af

SubcatchmentV-9: Vernon Subarea Runoff Area=0.820 ac 28.05% Impervious Runoff Depth>0.83"
Tc=6.0 min CN=81 Runoff=1.29 cfs 0.057 af

Pond 2P: Pond Peak Elev=795.61' Storage=0.720 af Inflow=16.89 cfs 1.116 af
Primary=1.33 cfs 0.679 af Secondary=0.00 cfs 0.000 af Outflow=1.33 cfs 0.679 af

Pond 4B: Rain Garden - revised with Peak Elev=806.71' Storage=0.044 af Inflow=1.66 cfs 0.102 af
Discarded=0.02 cfs 0.014 af Primary=0.50 cfs 0.066 af Outflow=0.52 cfs 0.080 af

Pond 5B: Rain Garden Peak Elev=797.61' Storage=0.052 af Inflow=2.30 cfs 0.119 af
Discarded=0.02 cfs 0.011 af Primary=0.84 cfs 0.060 af Outflow=0.86 cfs 0.072 af

Pond 6P: Pond Peak Elev=791.52' Storage=0.415 af Inflow=10.60 cfs 0.718 af
Primary=1.41 cfs 0.439 af Secondary=0.00 cfs 0.000 af Outflow=1.41 cfs 0.439 af

Link M-1L: Mukwonago Outflow - Phase I Inflow=1.43 cfs 0.449 af
Primary=1.43 cfs 0.449 af

Link V-1L: Vernon Outflow - Phase I Inflow=2.72 cfs 0.894 af
Primary=2.72 cfs 0.894 af

Total Runoff Area = 25.950 ac Runoff Volume = 2.152 af Average Runoff Depth = 1.00"
58.11% Pervious = 15.080 ac 41.89% Impervious = 10.870 ac

Proposed_Phase I

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MSE 24-hr 3 2 yr Rainfall=2.70"

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Time span=0.00-20.00 hrs, dt=0.04 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentM-5: Mukwonago Subarea Runoff Area=1.620 ac 32.72% Impervious Runoff Depth>1.09"
Flow Length=370' Tc=9.8 min CN=82 Runoff=2.87 cfs 0.147 af

SubcatchmentM-6: Mukwonago Subarea Runoff Area=7.540 ac 46.68% Impervious Runoff Depth>1.28"
Flow Length=550' Slope=0.0300 '/' Tc=15.1 min CN=85 Runoff=12.96 cfs 0.803 af

SubcatchmentM-8: Mukwonago Subarea Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>0.56"
Flow Length=50' Slope=0.0800 '/' Tc=6.0 min CN=71 Runoff=0.27 cfs 0.013 af

SubcatchmentV-2: Vernon Subarea Runoff Area=12.810 ac 44.73% Impervious Runoff Depth>1.28"
Flow Length=1,030' Slope=0.0300 '/' Tc=17.2 min CN=85 Runoff=20.65 cfs 1.363 af

SubcatchmentV-4: Vernon Subarea Runoff Area=1.480 ac 28.38% Impervious Runoff Depth>1.03"
Flow Length=90' Slope=0.0200 '/' Tc=14.3 min CN=81 Runoff=2.10 cfs 0.127 af

SubcatchmentV-7: Vernon Subarea Runoff Area=0.260 ac 0.00% Impervious Runoff Depth>0.56"
Tc=6.0 min CN=71 Runoff=0.26 cfs 0.012 af

SubcatchmentV-8: Vernon Subarea Runoff Area=1.150 ac 38.26% Impervious Runoff Depth>1.09"
Flow Length=955' Tc=14.7 min CN=82 Runoff=1.70 cfs 0.104 af

SubcatchmentV-9: Vernon Subarea Runoff Area=0.820 ac 28.05% Impervious Runoff Depth>1.03"
Tc=6.0 min CN=81 Runoff=1.61 cfs 0.071 af

Pond 2P: Pond Peak Elev=795.80' Storage=0.854 af Inflow=20.65 cfs 1.363 af
Primary=2.05 cfs 0.865 af Secondary=0.00 cfs 0.000 af Outflow=2.05 cfs 0.865 af

Pond 4B: Rain Garden - revised with Peak Elev=806.78' Storage=0.048 af Inflow=2.10 cfs 0.127 af
Discarded=0.02 cfs 0.014 af Primary=1.03 cfs 0.090 af Outflow=1.06 cfs 0.105 af

Pond 5B: Rain Garden Peak Elev=797.67' Storage=0.055 af Inflow=2.87 cfs 0.147 af
Discarded=0.02 cfs 0.012 af Primary=1.61 cfs 0.089 af Outflow=1.63 cfs 0.100 af

Pond 6P: Pond Peak Elev=791.77' Storage=0.491 af Inflow=14.01 cfs 0.891 af
Primary=2.20 cfs 0.605 af Secondary=0.00 cfs 0.000 af Outflow=2.20 cfs 0.605 af

Link M-1L: Mukwonago Outflow - Phase I Inflow=2.23 cfs 0.618 af
Primary=2.23 cfs 0.618 af

Link V-1L: Vernon Outflow - Phase I Inflow=3.54 cfs 1.142 af
Primary=3.54 cfs 1.142 af

Total Runoff Area = 25.950 ac Runoff Volume = 2.640 af Average Runoff Depth = 1.22"
58.11% Pervious = 15.080 ac 41.89% Impervious = 10.870 ac

Proposed_Phase I

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MSE 24-hr 3 10 yr Rainfall=3.81"

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Time span=0.00-20.00 hrs, dt=0.04 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentM-5: Mukwonago Subarea Runoff Area=1.620 ac 32.72% Impervious Runoff Depth>1.95"
Flow Length=370' Tc=9.8 min CN=82 Runoff=5.13 cfs 0.264 af

SubcatchmentM-6: Mukwonago Subarea Runoff Area=7.540 ac 46.68% Impervious Runoff Depth>2.19"
Flow Length=550' Slope=0.0300 '/' Tc=15.1 min CN=85 Runoff=22.07 cfs 1.378 af

SubcatchmentM-8: Mukwonago Subarea Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>1.20"
Flow Length=50' Slope=0.0800 '/' Tc=6.0 min CN=71 Runoff=0.61 cfs 0.027 af

SubcatchmentV-2: Vernon Subarea Runoff Area=12.810 ac 44.73% Impervious Runoff Depth>2.19"
Flow Length=1,030' Slope=0.0300 '/' Tc=17.2 min CN=85 Runoff=35.22 cfs 2.340 af

SubcatchmentV-4: Vernon Subarea Runoff Area=1.480 ac 28.38% Impervious Runoff Depth>1.87"
Flow Length=90' Slope=0.0200 '/' Tc=14.3 min CN=81 Runoff=3.83 cfs 0.231 af

SubcatchmentV-7: Vernon Subarea Runoff Area=0.260 ac 0.00% Impervious Runoff Depth>1.20"
Tc=6.0 min CN=71 Runoff=0.59 cfs 0.026 af

SubcatchmentV-8: Vernon Subarea Runoff Area=1.150 ac 38.26% Impervious Runoff Depth>1.95"
Flow Length=955' Tc=14.7 min CN=82 Runoff=3.05 cfs 0.187 af

SubcatchmentV-9: Vernon Subarea Runoff Area=0.820 ac 28.05% Impervious Runoff Depth>1.88"
Tc=6.0 min CN=81 Runoff=2.92 cfs 0.128 af

Pond 2P: Pond Peak Elev=796.47' Storage=1.350 af Inflow=35.22 cfs 2.340 af
Primary=5.76 cfs 1.722 af Secondary=0.00 cfs 0.000 af Outflow=5.76 cfs 1.722 af

Pond 4B: Rain Garden - revised with Peak Elev=806.94' Storage=0.059 af Inflow=3.83 cfs 0.231 af
Discarded=0.03 cfs 0.016 af Primary=3.39 cfs 0.190 af Outflow=3.41 cfs 0.206 af

Pond 5B: Rain Garden Peak Elev=797.84' Storage=0.064 af Inflow=5.13 cfs 0.264 af
Discarded=0.02 cfs 0.013 af Primary=4.81 cfs 0.204 af Outflow=4.82 cfs 0.217 af

Pond 6P: Pond Peak Elev=792.51' Storage=0.743 af Inflow=26.68 cfs 1.582 af
Primary=10.22 cfs 1.273 af Secondary=0.00 cfs 0.000 af Outflow=10.22 cfs 1.273 af

Link M-1L: Mukwonago Outflow - Phase I Inflow=10.34 cfs 1.300 af
Primary=10.34 cfs 1.300 af

Link V-1L: Vernon Outflow - Phase I Inflow=9.24 cfs 2.253 af
Primary=9.24 cfs 2.253 af

Total Runoff Area = 25.950 ac Runoff Volume = 4.581 af Average Runoff Depth = 2.12"
58.11% Pervious = 15.080 ac 41.89% Impervious = 10.870 ac

Proposed_Phase I

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Time span=0.00-20.00 hrs, dt=0.04 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentM-5: Mukwonago Subarea Runoff Area=1.620 ac 32.72% Impervious Runoff Depth>4.00"
Flow Length=370' Tc=9.8 min CN=82 Runoff=10.24 cfs 0.540 af

SubcatchmentM-6: Mukwonago Subarea Runoff Area=7.540 ac 46.68% Impervious Runoff Depth>4.31"
Flow Length=550' Slope=0.0300 '/' Tc=15.1 min CN=85 Runoff=42.18 cfs 2.706 af

SubcatchmentM-8: Mukwonago Subarea Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>2.91"
Flow Length=50' Slope=0.0800 '/' Tc=6.0 min CN=71 Runoff=1.49 cfs 0.065 af

SubcatchmentV-2: Vernon Subarea Runoff Area=12.810 ac 44.73% Impervious Runoff Depth>4.30"
Flow Length=1,030' Slope=0.0300 '/' Tc=17.2 min CN=85 Runoff=67.62 cfs 4.595 af

SubcatchmentV-4: Vernon Subarea Runoff Area=1.480 ac 28.38% Impervious Runoff Depth>3.89"
Flow Length=90' Slope=0.0200 '/' Tc=14.3 min CN=81 Runoff=7.80 cfs 0.480 af

SubcatchmentV-7: Vernon Subarea Runoff Area=0.260 ac 0.00% Impervious Runoff Depth>2.91"
Tc=6.0 min CN=71 Runoff=1.44 cfs 0.063 af

SubcatchmentV-8: Vernon Subarea Runoff Area=1.150 ac 38.26% Impervious Runoff Depth>3.99"
Flow Length=955' Tc=14.7 min CN=82 Runoff=6.11 cfs 0.383 af

SubcatchmentV-9: Vernon Subarea Runoff Area=0.820 ac 28.05% Impervious Runoff Depth>3.90"
Tc=6.0 min CN=81 Runoff=5.89 cfs 0.266 af

Pond 2P: Pond Peak Elev=797.48' Storage=2.179 af Inflow=67.62 cfs 4.595 af
Primary=24.33 cfs 3.872 af Secondary=0.00 cfs 0.000 af Outflow=24.33 cfs 3.872 af

Pond 4B: Rain Garden - revised with Peak Elev=807.12' Storage=0.072 af Inflow=7.80 cfs 0.480 af
Discarded=0.03 cfs 0.019 af Primary=7.49 cfs 0.432 af Outflow=7.52 cfs 0.451 af

Pond 5B: Rain Garden Peak Elev=798.02' Storage=0.075 af Inflow=10.24 cfs 0.540 af
Discarded=0.02 cfs 0.015 af Primary=9.89 cfs 0.477 af Outflow=9.91 cfs 0.492 af

Pond 6P: Pond Peak Elev=793.81' Storage=1.280 af Inflow=51.49 cfs 3.183 af
Primary=21.47 cfs 2.838 af Secondary=0.00 cfs 0.000 af Outflow=21.47 cfs 2.838 af

Link M-1L: Mukwonago Outflow - Phase I Inflow=21.76 cfs 2.904 af
Primary=21.76 cfs 2.904 af

Link V-1L: Vernon Outflow - Phase I Inflow=35.29 cfs 5.016 af
Primary=35.29 cfs 5.016 af

Total Runoff Area = 25.950 ac Runoff Volume = 9.098 af Average Runoff Depth = 4.21"
58.11% Pervious = 15.080 ac 41.89% Impervious = 10.870 ac

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment M-5: Mukwonago Subarea

Runoff = 10.24 cfs @ 12.17 hrs, Volume= 0.540 af, Depth> 4.00"
Routed to Pond 5B : Rain Garden

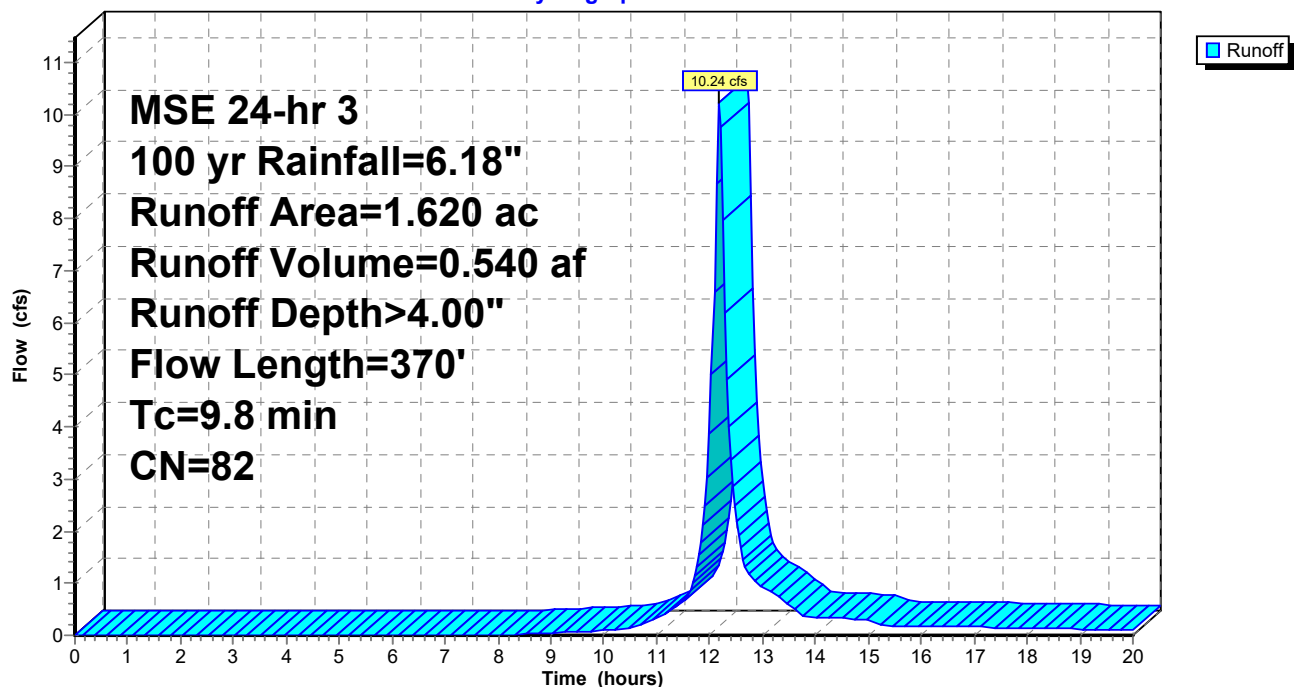
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.530	98	impervious
* 1.090	74	grass
1.620	82	Weighted Average
1.090		67.28% Pervious Area
0.530		32.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	55	0.0300	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
1.6	315	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
9.8	370	Total			

Subcatchment M-5: Mukwonago Subarea

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment M-6: Mukwonago Subarea

Runoff = 42.18 cfs @ 12.23 hrs, Volume= 2.706 af, Depth> 4.31"
Routed to Pond 6P : Pond

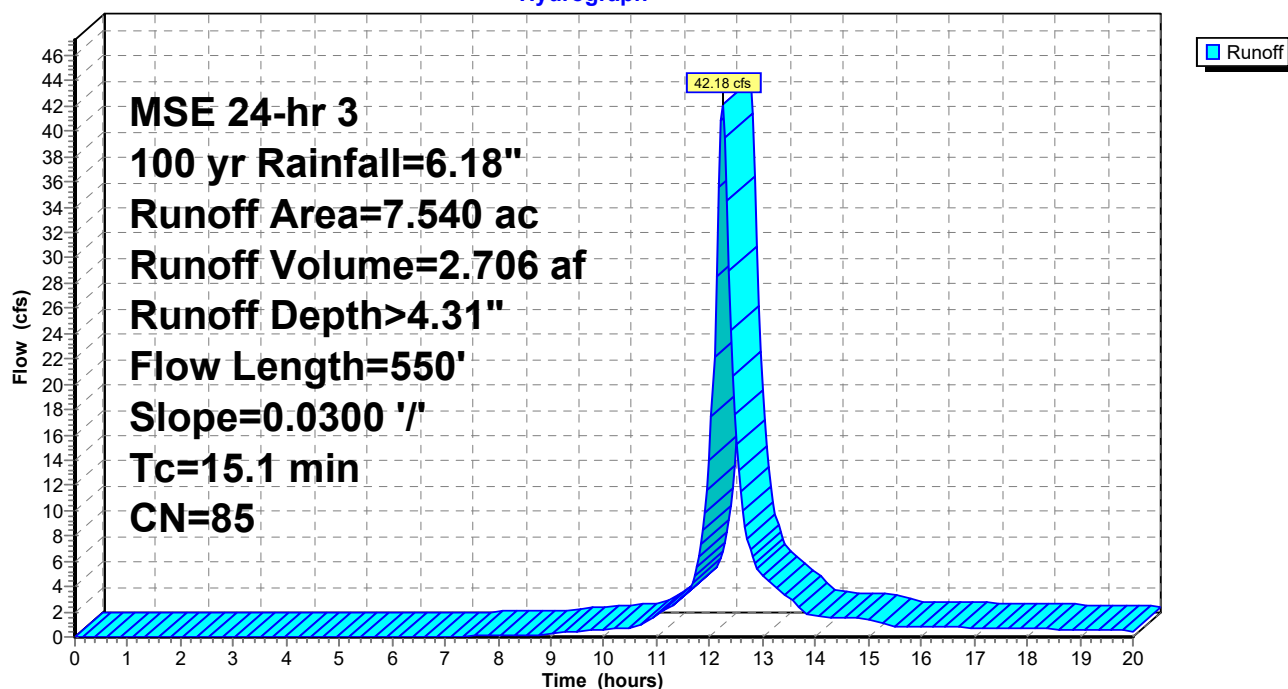
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	3.340	98	impervious
*	4.020	74	grass
*	0.180	100	water
	7.540	85	Weighted Average
	4.020		53.32% Pervious Area
	3.520		46.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0300	0.13		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
1.0	175	0.0300	2.79		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.9	275		5.00		Direct Entry,
15.1	550				Total

Subcatchment M-6: Mukwonago Subarea

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment M-8: Mukwonago Subarea

Runoff = 1.49 cfs @ 12.13 hrs, Volume= 0.065 af, Depth> 2.91"

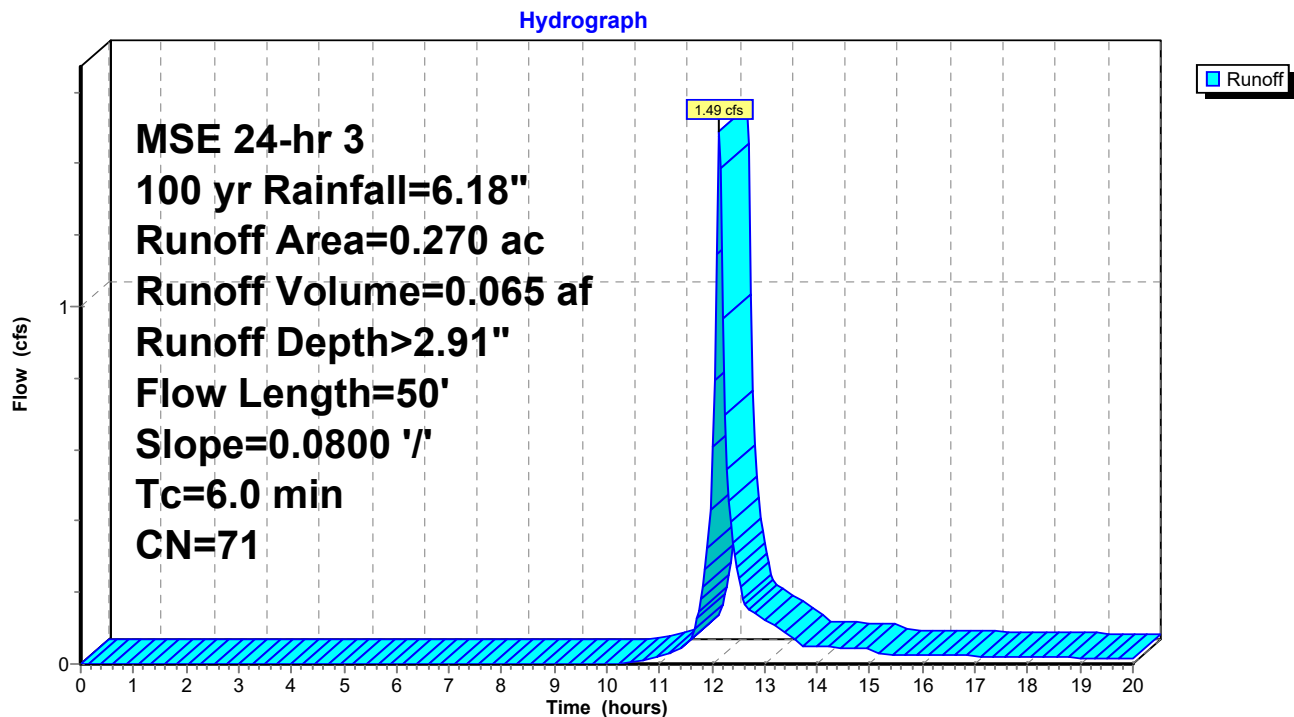
Routed to Link M-1L : Mukwonago Outflow - Phase I

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.040	74	grass
* 0.230	71	meadow
0.270	71	Weighted Average
0.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.0800	0.16		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
5.1	50	Total, Increased to minimum Tc = 6.0 min			

Subcatchment M-8: Mukwonago Subarea



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment V-2: Vernon Subarea

Runoff = 67.62 cfs @ 12.26 hrs, Volume= 4.595 af, Depth> 4.30"
Routed to Pond 2P : Pond

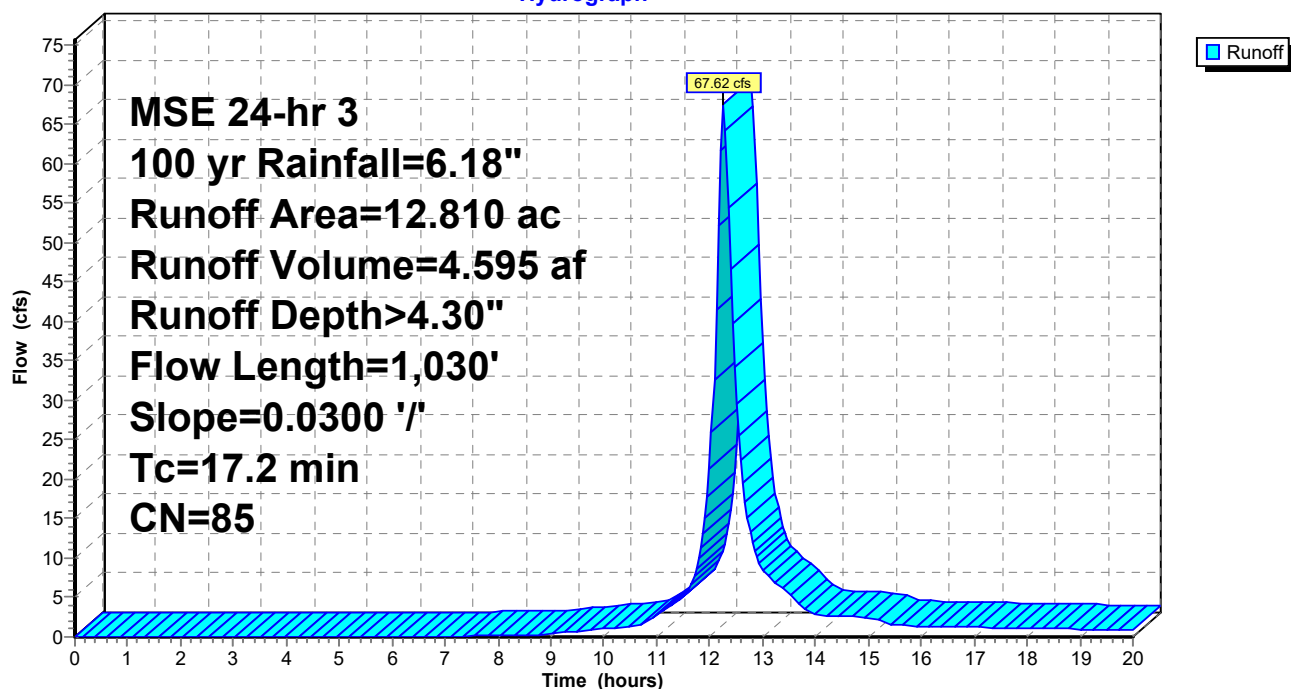
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 5.150	98	impervious
* 7.080	74	grass
* 0.580	100	water
12.810	85	Weighted Average
7.080		55.27% Pervious Area
5.730		44.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0300	0.13		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
2.0	340	0.0300	2.79		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.0	590		5.00		Direct Entry,
17.2	1,030	Total			

Subcatchment V-2: Vernon Subarea

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment V-4: Vernon Subarea

Runoff = 7.80 cfs @ 12.22 hrs, Volume= 0.480 af, Depth> 3.89"

Routed to Pond 4B : Rain Garden - revised with v-notch weir

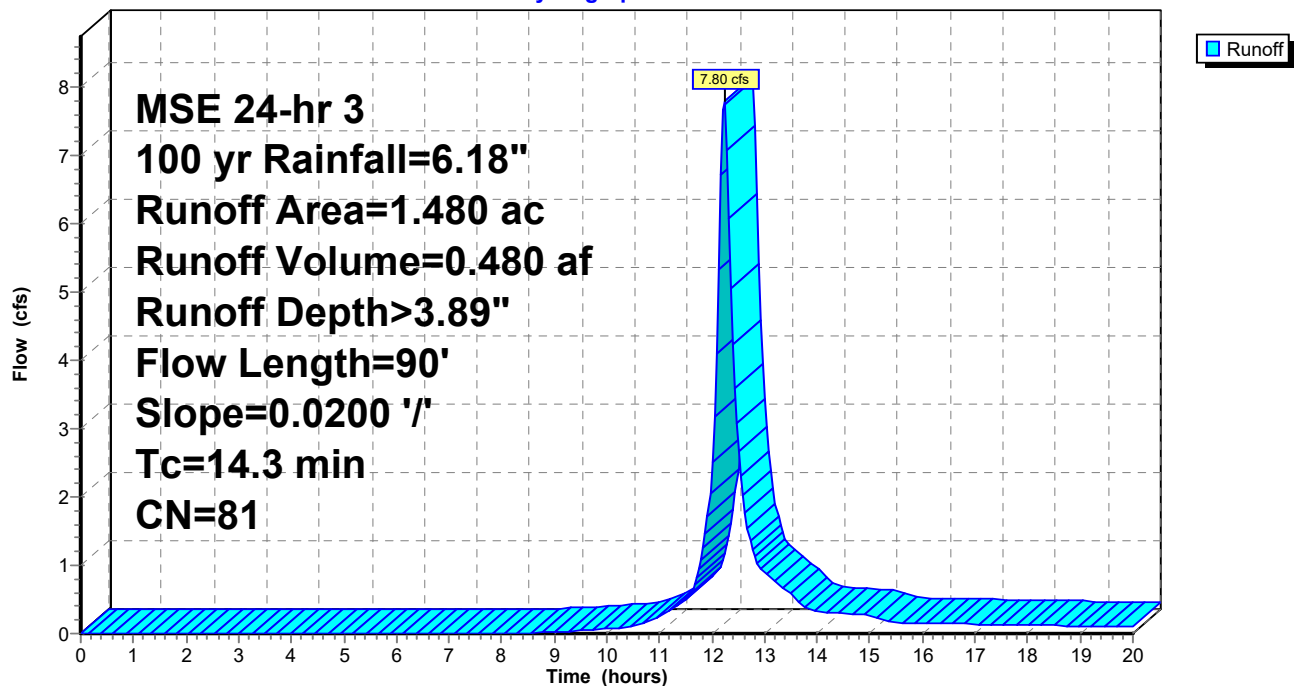
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.420	98	impervious
*	1.060	74	grass
	1.480	81	Weighted Average
	1.060		71.62% Pervious Area
	0.420		28.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	90	0.0200	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"

Subcatchment V-4: Vernon Subarea

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment V-7: Vernon Subarea

Runoff = 1.44 cfs @ 12.13 hrs, Volume= 0.063 af, Depth> 2.91"
Routed to Link V-1L : Vernon Outflow - Phase I

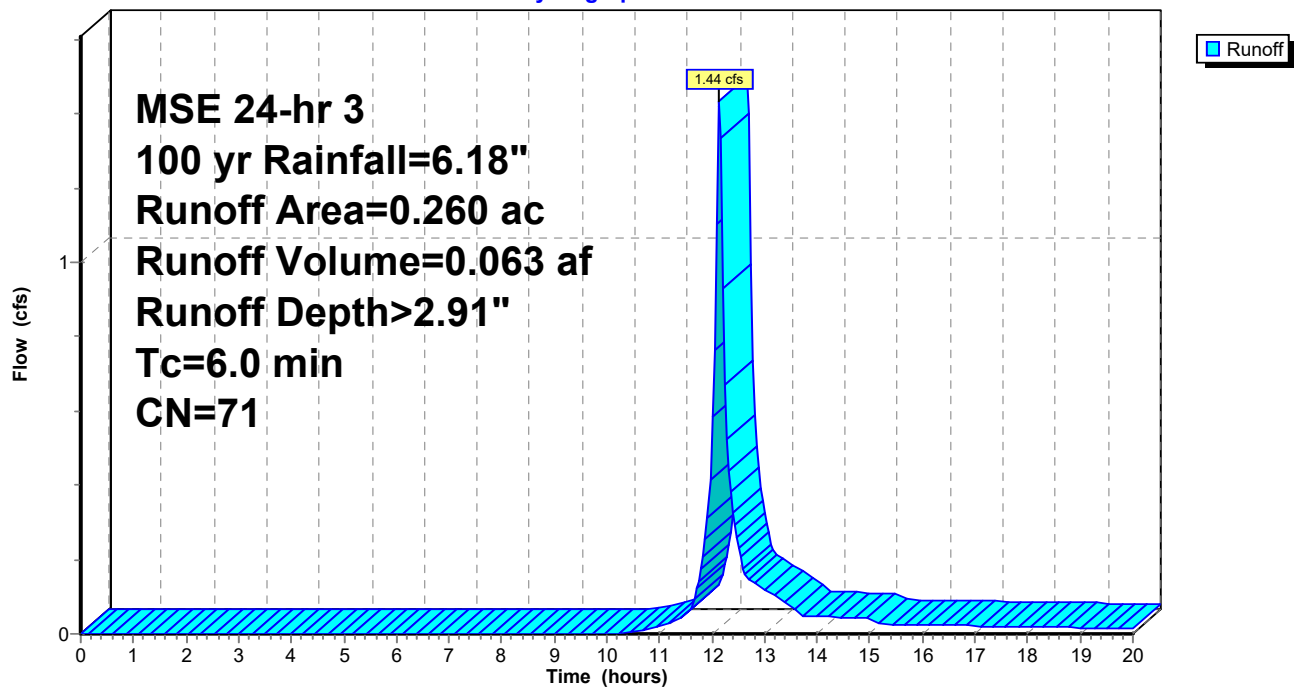
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.260	71	meadow
0.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment V-7: Vernon Subarea

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment V-8: Vernon Subarea

Runoff = 6.11 cfs @ 12.23 hrs, Volume= 0.383 af, Depth> 3.99"
Routed to Link V-1L : Vernon Outflow - Phase I

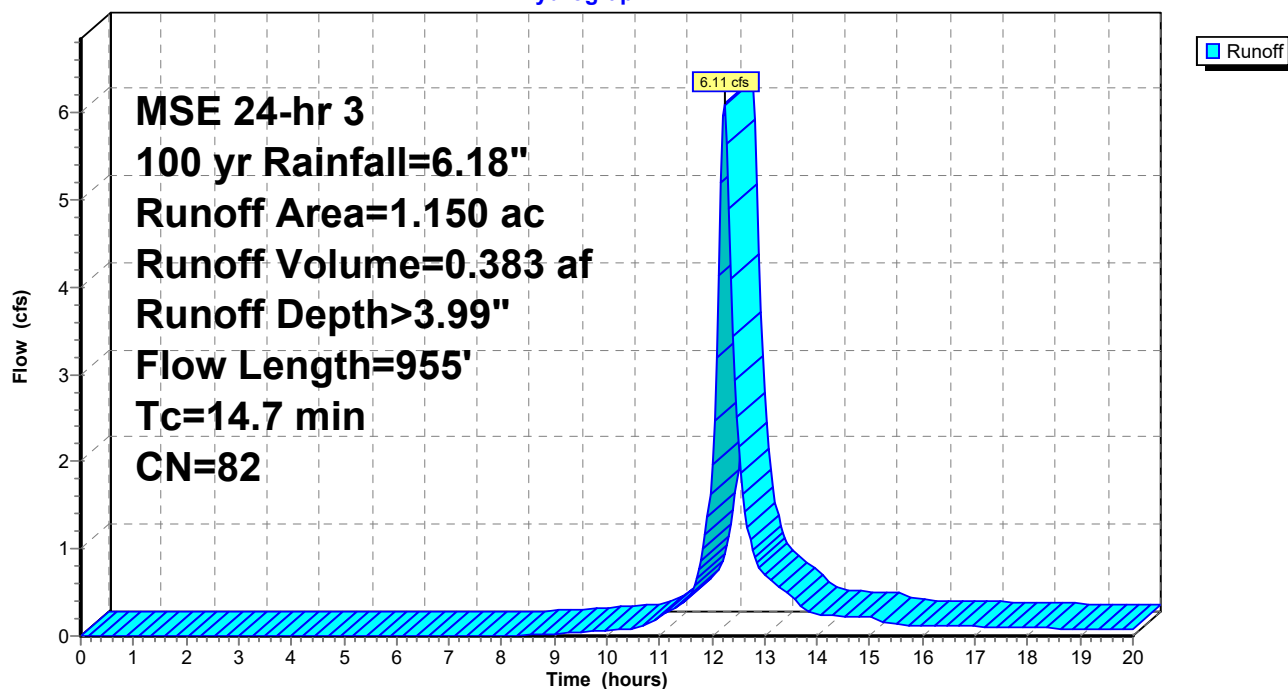
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

Area (ac)	CN	Description
* 0.440	98	impervious
* 0.440	74	grass
* 0.270	71	meadow
1.150	82	Weighted Average
0.710		61.74% Pervious Area
0.440		38.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	65	0.0400	0.13		Sheet Flow, Grass: Dense n= 0.240 P2= 2.70"
0.0	10	0.2000	7.20		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	495	0.0100	1.61		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.3	385		5.00		Direct Entry,
14.7	955	Total			

Subcatchment V-8: Vernon Subarea

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Subcatchment V-9: Vernon Subarea

Runoff = 5.89 cfs @ 12.13 hrs, Volume= 0.266 af, Depth> 3.90"
Routed to Link V-1L : Vernon Outflow - Phase I

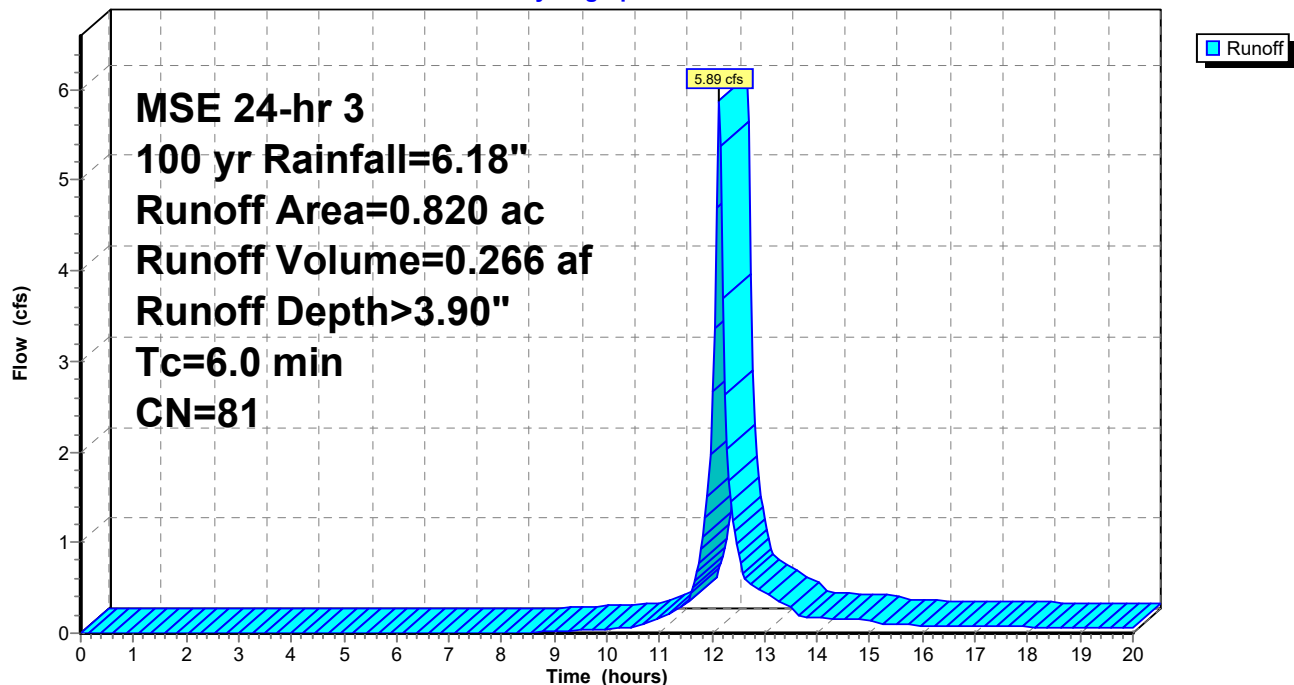
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 100 yr Rainfall=6.18"

	Area (ac)	CN	Description
*	0.230	98	impervious
*	0.590	74	grass
	0.820	81	Weighted Average
	0.590		71.95% Pervious Area
	0.230		28.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment V-9: Vernon Subarea

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Pond 2P: Pond

Inflow Area = 12.810 ac, 44.73% Impervious, Inflow Depth > 4.30" for 100 yr event
Inflow = 67.62 cfs @ 12.26 hrs, Volume= 4.595 af
Outflow = 24.33 cfs @ 12.58 hrs, Volume= 3.872 af, Atten= 64%, Lag= 19.2 min
Primary = 24.33 cfs @ 12.58 hrs, Volume= 3.872 af
Routed to Link V-1L : Vernon Outflow - Phase I
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link V-1L : Vernon Outflow - Phase I

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
Peak Elev= 797.48' @ 12.58 hrs Surf.Area= 0.872 ac Storage= 2.179 af

Plug-Flow detention time= 108.2 min calculated for 3.872 af (84% of inflow)
Center-of-Mass det. time= 69.1 min (843.6 - 774.5)

Volume	Invert	Avail.Storage	Storage Description
#1	794.50'	2.643 af	Pond (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
794.50	0.580	0.000	0.000	0.580
795.00	0.660	0.310	0.310	0.660
796.00	0.720	0.690	1.000	0.722
797.00	0.820	0.769	1.769	0.823
798.00	0.930	0.874	2.643	0.934

Device	Routing	Invert	Outlet Devices
#1	Primary	793.80'	24.0" Round Culvert L= 42.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 793.80' / 793.60' S= 0.0048 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	794.50'	7.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	795.50'	1.5' long x 1.00' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Device 1	796.50'	48.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	797.50'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=24.32 cfs @ 12.58 hrs HW=797.48' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 24.32 cfs @ 7.74 fps)
2=Orifice (Passes < 2.11 cfs potential flow)
3=Sharp-Crested Rectangular Weir (Passes < 7.73 cfs potential flow)
4=Grate (Passes < 40.05 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=794.50' TW=0.00' (Dynamic Tailwater)

5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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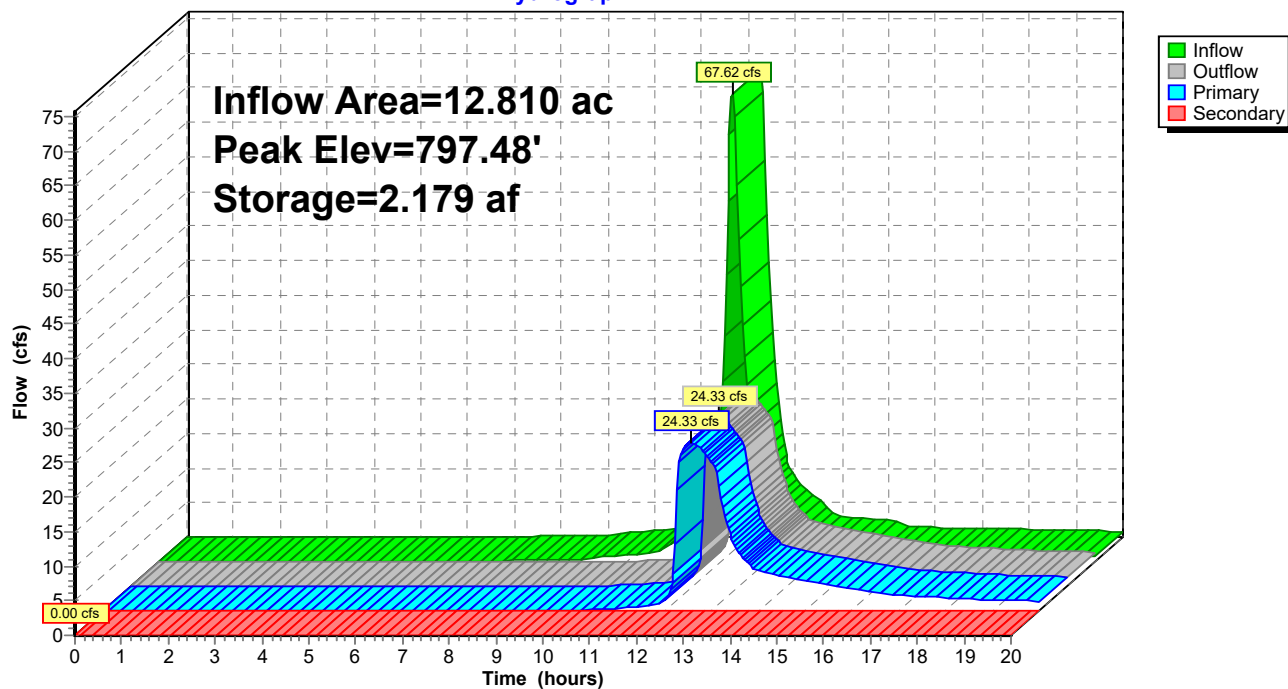
MSE 24-hr 3 100 yr Rainfall=6.18"

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Pond 2P: Pond

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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Pond 4B: Rain Garden - revised with v-notch weir

Inflow Area = 1.480 ac, 28.38% Impervious, Inflow Depth > 3.89" for 100 yr event
Inflow = 7.80 cfs @ 12.22 hrs, Volume= 0.480 af
Outflow = 7.52 cfs @ 12.26 hrs, Volume= 0.451 af, Atten= 4%, Lag= 2.1 min
Discarded = 0.03 cfs @ 12.26 hrs, Volume= 0.019 af
Primary = 7.49 cfs @ 12.26 hrs, Volume= 0.432 af
Routed to Link V-1L : Vernon Outflow - Phase I

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
Peak Elev= 807.12' @ 12.26 hrs Surf.Area= 0.075 ac Storage= 0.072 af

Plug-Flow detention time= 38.2 min calculated for 0.450 af (94% of inflow)
Center-of-Mass det. time= 17.9 min (796.6 - 778.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	805.20'	0.183 af	Infiltration Basin (Conic) Listed below (Recalc)			
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
805.20	0.050	0.0	0.000	0.000	0.050	
806.20	0.050	30.0	0.015	0.015	0.054	
807.00	0.070	100.0	0.048	0.063	0.074	
808.00	0.120	100.0	0.094	0.157	0.124	
808.20	0.140	100.0	0.026	0.183	0.144	
Device	Routing	Invert	Outlet Devices			
#1	Discarded	805.20'	0.240 in/hr Exfiltration over Wetted area			
			Conductivity to Groundwater Elevation = 802.50' Phase-In= 0.01'			
#2	Primary	806.20'	Asymmetrical Weir, C= 3.27			
			Offset (feet) -6.00 0.00 2.50 3.00 3.50 6.00 12.00			
			Height (feet) 2.00 0.50 0.50 0.00 0.50 0.50 2.00			

Discarded OutFlow Max=0.03 cfs @ 12.26 hrs HW=807.12' (Free Discharge)
↑1=Exfiltration (Controls 0.03 cfs)

Primary OutFlow Max=7.40 cfs @ 12.26 hrs HW=807.12' TW=0.00' (Dynamic Tailwater)
↑2=Asymmetrical Weir (Weir Controls 7.40 cfs @ 1.68 fps)

Proposed_Phase I

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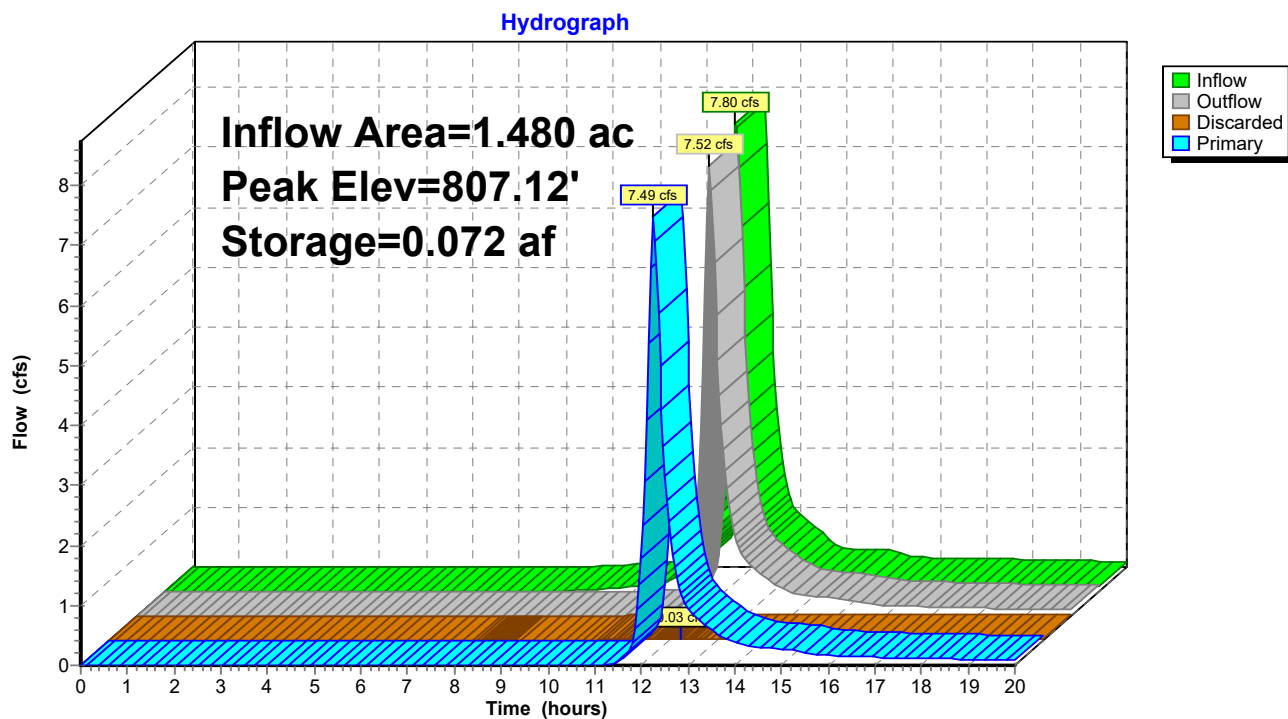
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MSE 24-hr 3 100 yr Rainfall=6.18"

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Pond 4B: Rain Garden - revised with v-notch weir



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Pond 5B: Rain Garden

Inflow Area = 1.620 ac, 32.72% Impervious, Inflow Depth > 4.00" for 100 yr event
Inflow = 10.24 cfs @ 12.17 hrs, Volume= 0.540 af
Outflow = 9.91 cfs @ 12.20 hrs, Volume= 0.492 af, Atten= 3%, Lag= 1.5 min
Discarded = 0.02 cfs @ 12.20 hrs, Volume= 0.015 af
Primary = 9.89 cfs @ 12.20 hrs, Volume= 0.477 af
Routed to Pond 6P : Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
Peak Elev= 798.02' @ 12.20 hrs Surf.Area= 0.061 ac Storage= 0.075 af

Plug-Flow detention time= 41.7 min calculated for 0.491 af (91% of inflow)
Center-of-Mass det. time= 14.0 min (787.3 - 773.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	795.00'	0.109 af	Infiltration Basin (Conic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
795.00	0.040	0.0	0.000	0.000	0.040
796.00	0.040	30.0	0.012	0.012	0.043
797.00	0.040	30.0	0.012	0.024	0.047
797.50	0.050	100.0	0.022	0.046	0.057
798.00	0.060	100.0	0.027	0.074	0.067
798.50	0.080	100.0	0.035	0.109	0.087

Device	Routing	Invert	Outlet Devices												
#1	Discarded	795.00'	0.240 in/hr Exfiltration over Wetted area												
			Conductivity to Groundwater Elevation = 784.00' Phase-In= 0.01'												
#2	Primary	797.50'	10.0' long x 6.0' breadth Broad-Crested Rectangular Weir												
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00												
			2.50 3.00 3.50 4.00 4.50 5.00 5.50												
			Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65												
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83												

Discarded OutFlow Max=0.02 cfs @ 12.20 hrs HW=798.02' (Free Discharge)

↑1=Exfiltration (Controls 0.02 cfs)

Primary OutFlow Max=9.83 cfs @ 12.20 hrs HW=798.02' TW=792.90' (Dynamic Tailwater)

↑2=Broad-Crested Rectangular Weir (Weir Controls 9.83 cfs @ 1.89 fps)

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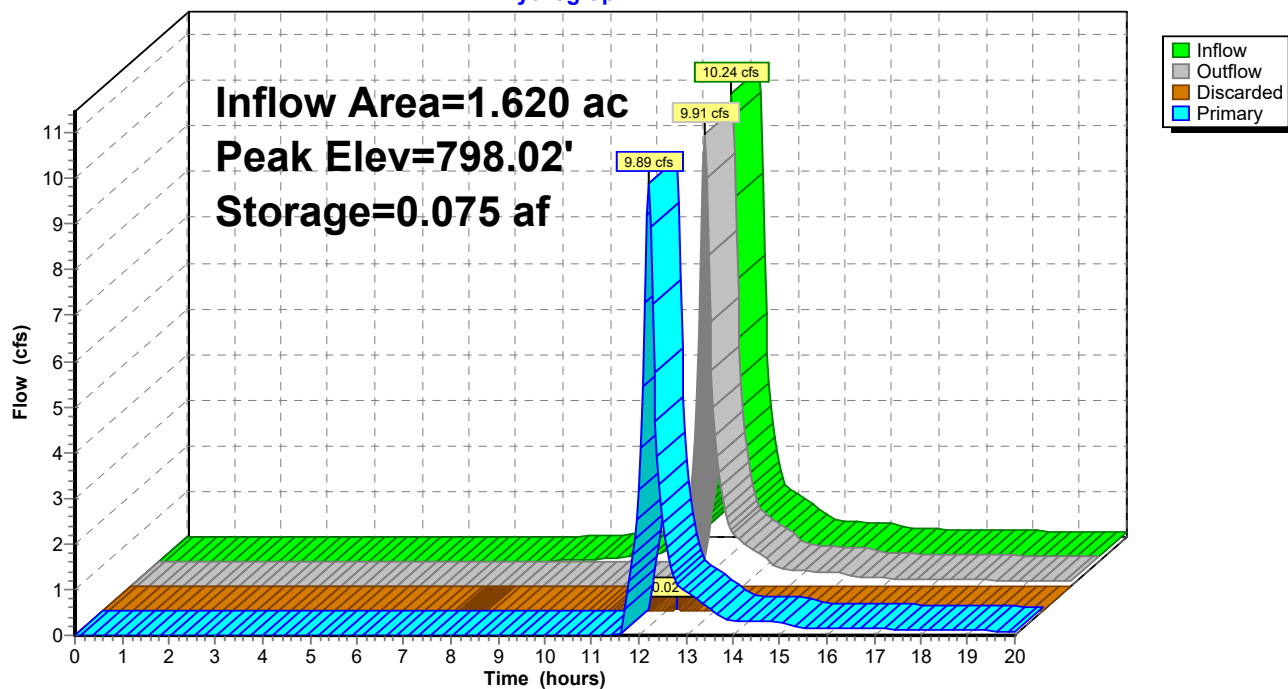
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Pond 5B: Rain Garden

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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Summary for Pond 6P: Pond

Inflow Area = 9.160 ac, 44.21% Impervious, Inflow Depth > 4.17" for 100 yr event
Inflow = 51.49 cfs @ 12.22 hrs, Volume= 3.183 af
Outflow = 21.47 cfs @ 12.47 hrs, Volume= 2.838 af, Atten= 58%, Lag= 14.8 min
Primary = 21.47 cfs @ 12.47 hrs, Volume= 2.838 af
Routed to Link M-1L : Mukwonago Outflow - Phase I
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link M-1L : Mukwonago Outflow - Phase I

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs
Peak Elev= 793.81' @ 12.47 hrs Surf.Area= 0.464 ac Storage= 1.280 af

Plug-Flow detention time= 78.4 min calculated for 2.838 af (89% of inflow)
Center-of-Mass det. time= 46.9 min (821.4 - 774.5)

Volume	Invert	Avail.Storage	Storage Description
#1	789.75'	1.898 af	Pond (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
789.75	0.180	0.000	0.000	0.180
790.00	0.190	0.046	0.046	0.190
791.00	0.260	0.224	0.270	0.261
792.00	0.330	0.294	0.565	0.331
793.00	0.400	0.364	0.929	0.402
794.00	0.480	0.439	1.368	0.483
795.00	0.580	0.529	1.898	0.584

Device	Routing	Invert	Outlet Devices
#1	Primary	789.50'	21.0" Round Culvert L= 42.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 789.50' / 789.30' S= 0.0048 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#2	Device 1	789.75'	3.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads
#3	Device 1	791.00'	1.0' long x 1.25' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Device 1	792.25'	48.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	794.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=21.47 cfs @ 12.47 hrs HW=793.81' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 21.47 cfs @ 8.93 fps)
↑ **2=Orifice** (Passes < 0.47 cfs potential flow)
↑ **3=Sharp-Crested Rectangular Weir** (Passes < 6.78 cfs potential flow)
↑ **4=Grate** (Passes < 75.60 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=789.75' TW=0.00' (Dynamic Tailwater)

↑ **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed_Phase I

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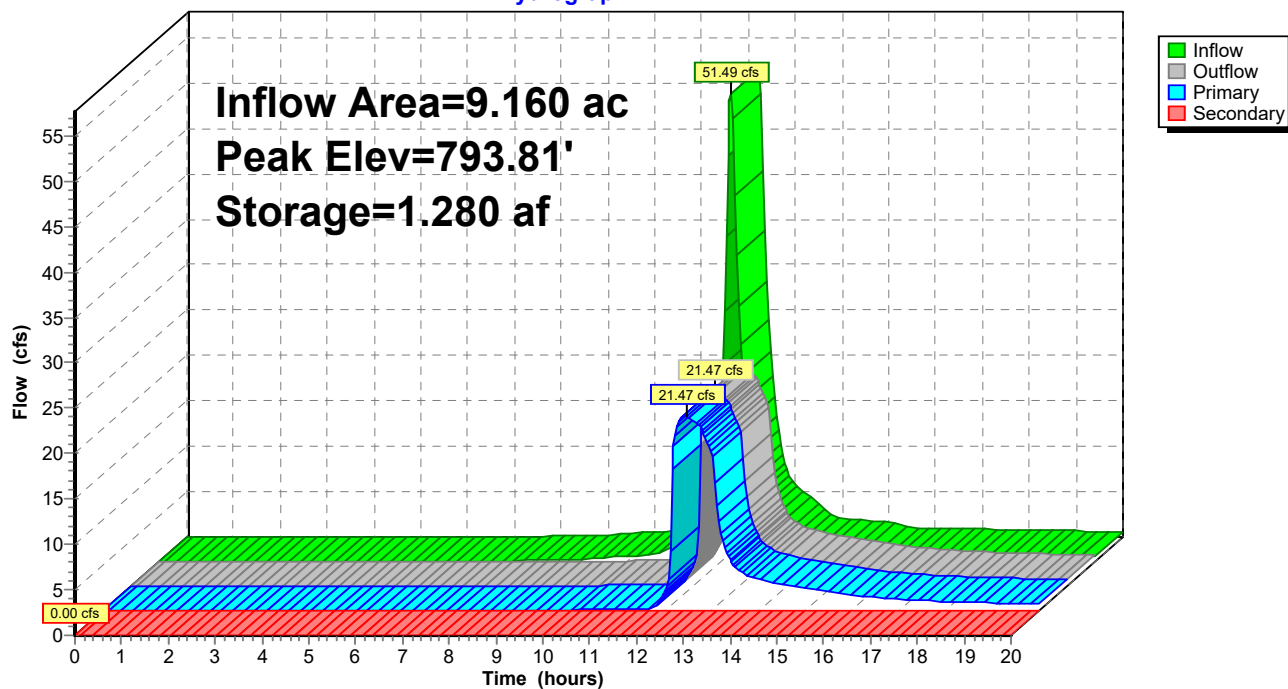
MSE 24-hr 3 100 yr Rainfall=6.18"

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Pond 6P: Pond

Hydrograph



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Summary for Link M-1L: Mukwonago Outflow - Phase I

Inflow Area = 9.430 ac, 42.95% Impervious, Inflow Depth > 3.70" for 100 yr event

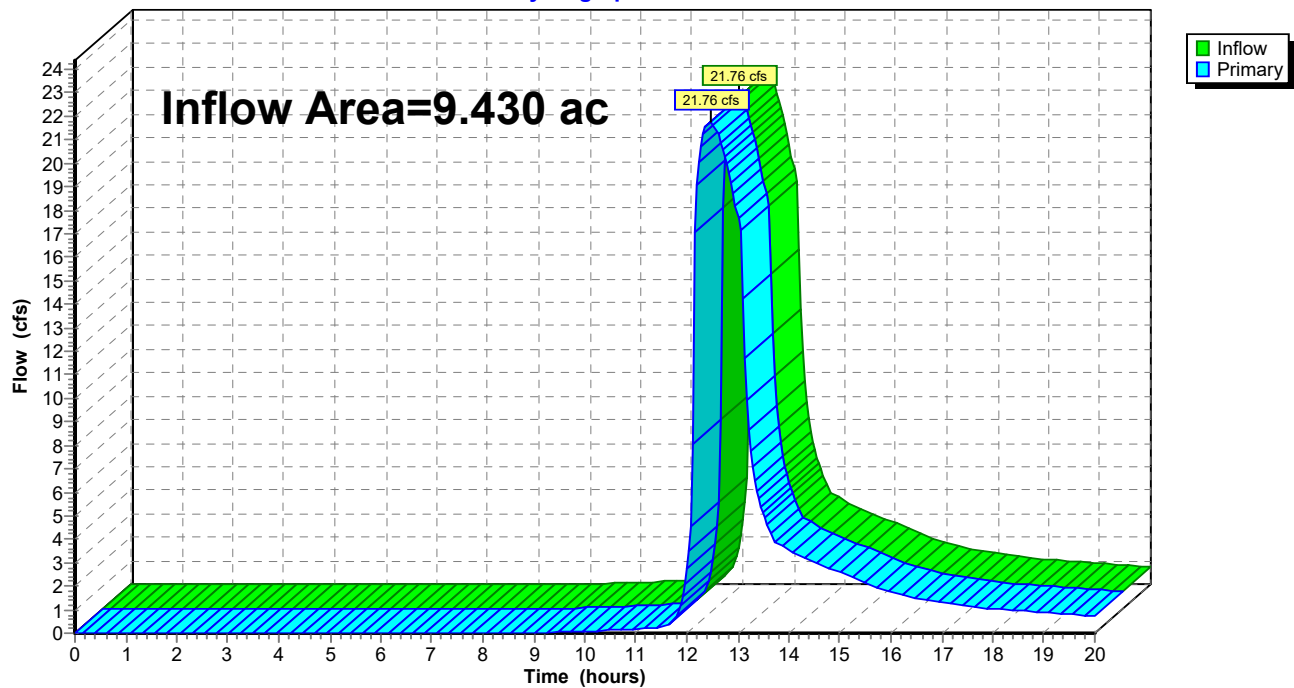
Inflow = 21.76 cfs @ 12.45 hrs, Volume= 2.904 af

Primary = 21.76 cfs @ 12.45 hrs, Volume= 2.904 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs

Link M-1L: Mukwonago Outflow - Phase I

Hydrograph



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MSE 24-hr 3 100 yr Rainfall=6.18"

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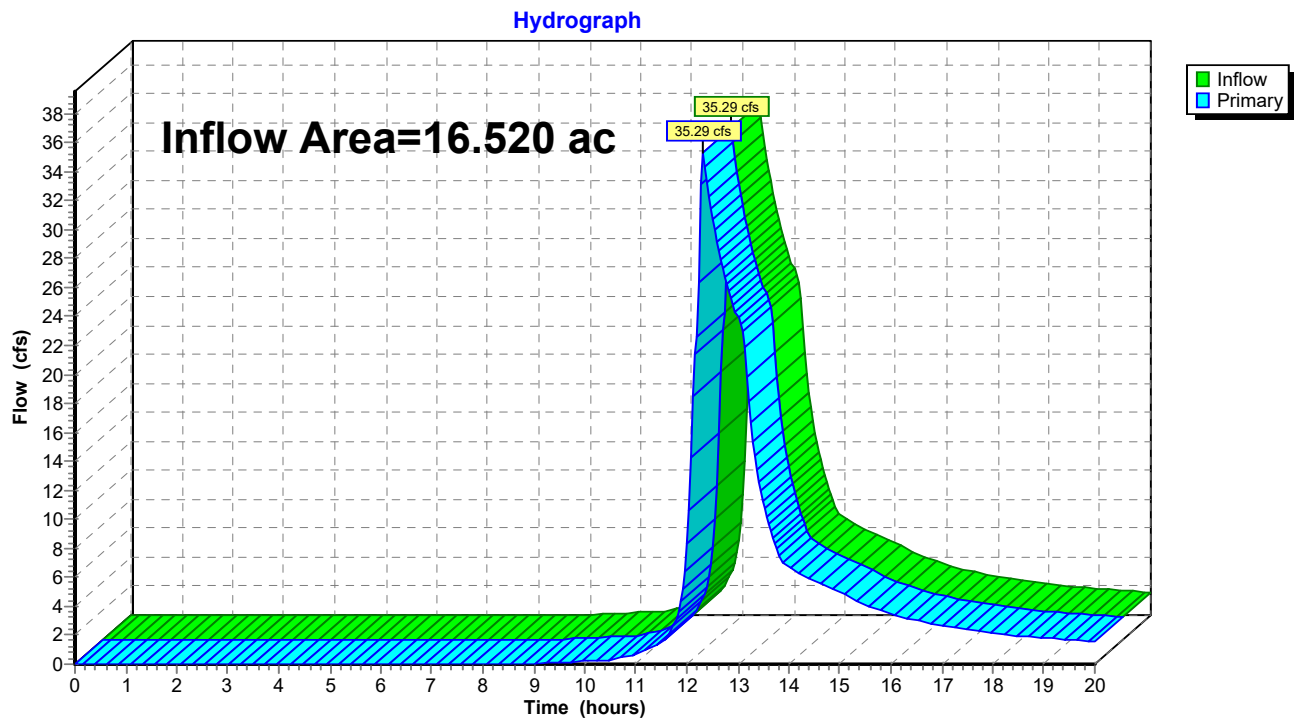
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Summary for Link V-1L: Vernon Outflow - Phase I

Inflow Area = 16.520 ac, 41.28% Impervious, Inflow Depth > 3.64" for 100 yr event
Inflow = 35.29 cfs @ 12.33 hrs, Volume= 5.016 af
Primary = 35.29 cfs @ 12.33 hrs, Volume= 5.016 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.04 hrs

Link V-1L: Vernon Outflow - Phase I



Proposed_Phase I

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Multi-Event Tables

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Events for Subcatchment M-5: Mukwonago Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	2.30	0.119	0.88
2 yr	2.70	2.87	0.147	1.09
10 yr	3.81	5.13	0.264	1.95
100 yr	6.18	10.24	0.540	4.00

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Multi-Event Tables

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Events for Subcatchment M-6: Mukwonago Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	10.60	0.657	1.05
2 yr	2.70	12.96	0.803	1.28
10 yr	3.81	22.07	1.378	2.19
100 yr	6.18	42.18	2.706	4.31

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Multi-Event Tables

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Events for Subcatchment M-8: Mukwonago Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.19	0.009	0.41
2 yr	2.70	0.27	0.013	0.56
10 yr	3.81	0.61	0.027	1.20
100 yr	6.18	1.49	0.065	2.91

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Events for Subcatchment V-2: Vernon Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	16.89	1.116	1.05
2 yr	2.70	20.65	1.363	1.28
10 yr	3.81	35.22	2.340	2.19
100 yr	6.18	67.62	4.595	4.30

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Events for Subcatchment V-4: Vernon Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.66	0.102	0.82
2 yr	2.70	2.10	0.127	1.03
10 yr	3.81	3.83	0.231	1.87
100 yr	6.18	7.80	0.480	3.89

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Multi-Event Tables

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Events for Subcatchment V-7: Vernon Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	0.18	0.009	0.41
2 yr	2.70	0.26	0.012	0.56
10 yr	3.81	0.59	0.026	1.20
100 yr	6.18	1.44	0.063	2.91

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Events for Subcatchment V-8: Vernon Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.36	0.084	0.88
2 yr	2.70	1.70	0.104	1.09
10 yr	3.81	3.05	0.187	1.95
100 yr	6.18	6.11	0.383	3.99

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Events for Subcatchment V-9: Vernon Subarea

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1 yr	2.40	1.29	0.057	0.83
2 yr	2.70	1.61	0.071	1.03
10 yr	3.81	2.92	0.128	1.88
100 yr	6.18	5.89	0.266	3.90

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Multi-Event Tables

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Events for Pond 2P: Pond

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	16.89	1.33	1.33	0.00	795.61	0.720
2 yr	20.65	2.05	2.05	0.00	795.80	0.854
10 yr	35.22	5.76	5.76	0.00	796.47	1.350
100 yr	67.62	24.33	24.33	0.00	797.48	2.179

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Multi-Event Tables

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Events for Pond 4B: Rain Garden - revised with v-notch weir

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	1.66	0.52	0.02	0.50	806.71	0.044
2 yr	2.10	1.06	0.02	1.03	806.78	0.048
10 yr	3.83	3.41	0.03	3.39	806.94	0.059
100 yr	7.80	7.52	0.03	7.49	807.12	0.072

Proposed_Phase I

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Multi-Event Tables

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Events for Pond 5B: Rain Garden

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	2.30	0.86	0.02	0.84	797.61	0.052
2 yr	2.87	1.63	0.02	1.61	797.67	0.055
10 yr	5.13	4.82	0.02	4.81	797.84	0.064
100 yr	10.24	9.91	0.02	9.89	798.02	0.075

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Multi-Event Tables

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Page 91

Events for Pond 6P: Pond

Event	Inflow (cfs)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Storage (acre-feet)
1 yr	10.60	1.41	1.41	0.00	791.52	0.415
2 yr	14.01	2.20	2.20	0.00	791.77	0.491
10 yr	26.68	10.22	10.22	0.00	792.51	0.743
100 yr	51.49	21.47	21.47	0.00	793.81	1.280

Proposed_Phase I

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Multi-Event Tables

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Events for Link M-1L: Mukwonago Outflow - Phase I

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	1.43	1.43	0.00
2 yr	2.23	2.23	0.00
10 yr	10.34	10.34	0.00
100 yr	21.76	21.76	0.00

Proposed_Phase I

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Multi-Event Tables

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Events for Link V-1L: Vernon Outflow - Phase I

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1 yr	2.72	2.72	0.00
2 yr	3.54	3.54	0.00
10 yr	9.24	9.24	0.00
100 yr	35.29	35.29	0.00

APPENDIX C

Treatment Analysis / WinSLAMM

Treatment Analysis Results

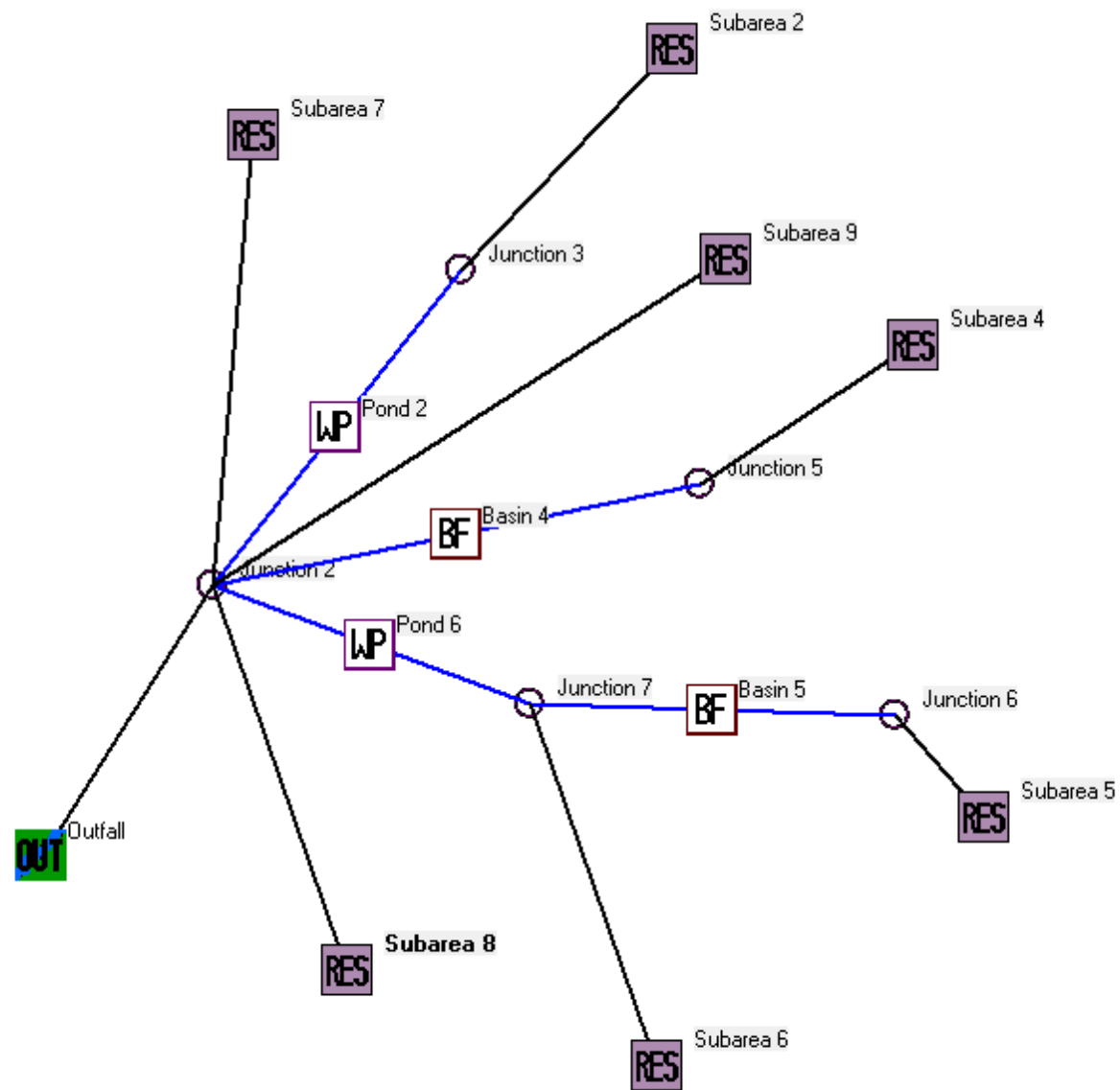
FOR: Cardinal Ridge - Phase I

LOCATION: Vernon and Mukwonago, Wisconsin

Treatment Analysis - Total Suspended Solids (TSS)						
Subarea	Total Loading (lbs)	Stormwater BMP	BMP		Total Solids Yield (lbs)	% TSS Removed
			lbs IN	lbs OUT		
2	3541	Pond 2P	3541	588	588	
4	226	Rain Garden 4B and Disconnected Roofs/Patios	261	34	34	
5	261	Rain Garden 5B and Disconnected Roofs/Patios	296	9	Directed to 6P	
6	2141	Pond 6P	2176	405	405	
7	2	-	-	-	2	
8	263	Disconnected Roofs and Patios, Sumped CBs	263	129	129	
9	125	Disconnected Roofs and Patios	125	68	68	
Total	6559	--	--	--	1226	81.3%

Treatment Analysis - Total Phosphorus				
Land Use	Total Phosphorus Loading No Controls (lbs)	Stormwater BMP	Total Phosphorus Loading With Controls (lbs)	% Total Phosphorus Removed
Total	28.60	Pond 2P, Rain Garden 4B, Rain Garden 5B, Pond 6P, & Select Disconnected Roofs and Patios	11.60	59.4%

WinSLAMM Treatment Analysis (Connected Impervious Model)



SLAMM for Windows Version 10.5.0
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Data file name: C:\Data\Jobs\2022\2022-004_Hein Property - TRIO\Project_Information\Calcs\SLAMM\Proposed_Phase I_Connected.mdb
Data file description:
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Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Start of Winter Season: 12/06 End of Winter Season: 03/28
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 07-19-2024 Time of run: 12:03:46
Total Area Modeled (acres): 25.950
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	1.086E+06	-	96.72	6559	-
Outfall Total with Controls:	1.018E+06	6.26%	25.29	1608	75.48%
Annualized Total After Outfall Controls:	1.032E+06			1630	

Pollutant	Concentration - No Controls	Concentration - With Controls	Conc. Units	Pollutant Yield No Controls	Pollutant Yield With Controls	Pol. Yield Units	Percent Reduction
Particulate Solids	96.72	25.29	mg/L	6559	1608	lbs	75.48 %
Total Phosphorus	0.4217	0.2083	mg/L	28.60	13.24	lbs	53.71 %

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WinSLAMM Version 10.5.0
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Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdX
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Study period starting date: 01/05/69 Study period ending date: 12/31/69
Start of Winter Season: 12/06 End of Winter Season: 03/28
Date: 07-19-2024 Time: 12:03:57
Site information:

LU# 1 - Residential: Subarea 2 Total area (ac): 12.810
1 - Roofs 1: 1.860 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.660 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.750 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.880 ac. Smooth Street Length = 0.4192 mi Street Width = 36.99905 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 7.080 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.580 ac. Source Area PSD File:
LU# 2 - Residential: Subarea 4 Total area (ac): 1.480
1 - Roofs 1: 0.280 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.140 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.060 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 3 - Residential: Subarea 5 Total area (ac): 1.620
1 - Roofs 1: 0.340 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.190 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.090 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 4 - Residential: Subarea 6 Total area (ac): 7.540
1 - Roofs 1: 1.320 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.520 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.510 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.990 ac. Smooth Street Length = 0.2207 mi Street Width = 37.00725 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

51 - Small Landscaped Areas 1: 4.020 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 70 - Water Body Areas: 0.180 ac. Source Area PSD File:
 LU# 5 - Residential: Subarea 7 Total area (ac): 0.260
 57 - Undeveloped Areas 1: 0.260 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 LU# 6 - Residential: Subarea 8 Total area (ac): 1.420
 1 - Roofs 1: 0.180 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 31 - Sidewalks 1: 0.110 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 37 - Streets 1: 0.150 ac. Smooth Street Length = 0.0334 mi Street Width = 37.0509 ft Street Edges = 2
 Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 51 - Small Landscaped Areas 1: 0.480 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 57 - Undeveloped Areas 1: 0.500 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 LU# 7 - Residential: Subarea 9 Total area (ac): 0.820
 1 - Roofs 1: 0.150 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 31 - Sidewalks 1: 0.080 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 51 - Small Landscaped Areas 1: 0.590 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - Pond 2
 Particle Size Distribution file name: Not needed - calculated by program
 Initial stage elevation (ft): 5
 Peak to Average Flow Ratio: 3.8
 Maximum flow allowed into pond (cfs): No maximum value entered
 Outlet Characteristics:

Outlet type: Sharp Crested Weir
 1. Sharp crested weir length (ft): 1.5
 2. Sharp crested weir height from invert: 2.5
 3. Sharp crested weir invert elevation above datum (ft): 6
 Outlet type: Orifice 1
 1. Orifice diameter (ft): 0.75
 2. Number of orifices: 1
 3. Invert elevation above datum (ft): 5
 Outlet type: Broad Crested Weir
 1. Weir crest length (ft): 10
 2. Weir crest width (ft): 10
 3. Height from datum to bottom of weir opening: 8
 Outlet type: Vertical Stand Pipe
 1. Stand pipe diameter (ft): 4
 2. Stand pipe height above datum (ft): 7

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.2000	0.00	0.00
2	4.00	0.3700	0.00	0.00
3	5.00	0.5800	0.00	0.00
4	5.50	0.6600	0.00	0.00

Control Practice 2: Biofilter CP# 1 (DS) - Basin 4

- | Soil Data | Soil Type Fraction in Eng. Soil |
|-----------|---------------------------------|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| 10 | 10 |
| 11 | 11 |
| 12 | 12 |
| 13 | 13 |
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| 93 | 93 |
| 94 | 94 |
| 95 | 95 |
| 96 | 96 |
| 97 | 97 |
| 98 | 98 |
| 99 | 99 |
| 100 | 100 |

Biofilter Outlet/Discharge Characteristics:

1. Weir crest length (ft)

- Outlet type: Evaporation\Evapotranspiration

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Outlet type: Other Outlet		
Stage Number	Stage (ft)	Discharge Rate (cfs)
1	1.00	0.000
2	1.20	0.050
3	1.40	0.260
4	1.60	1.270
5	1.80	4.570
6	2.00	9.780
7	3.00	66.460

Control Practice 3: Biofilter CP# 2 (DS) - Basin 5

1. Top area (square feet) = 3276
2. Bottom area (square feet) = 1905
3. Depth (ft): 3.5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.24
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 0.24
12. Engineered soil depth (ft) = 2
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data	Soil Type Fraction in Eng. Soil
User-Defined Media Type	1.000

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 2.5

Outlet type: Evaporation\Evapotranspiration

Month Number	Month	Evapotranspiration (in/day)	Evaporation (in/day)
1	January	.	.6
2	February	.	.7
3	March	.	.9
4	April	.	1.3
5	May	.	2.1

6	June	.	3.2
7	July	.	5.
8	August	.	5.4
9	September	.	4.7
10	October	.	3.2
11	November	.	1.6
12	December	.	.6

Control Practice 4: Wet Detention Pond CP# 2 (DS) - Pond 6

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 5

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Sharp Crested Weir

1. Sharp crested weir length (ft): 1
2. Sharp crested weir height from invert: 4
3. Sharp crested weir invert elevation above datum (ft): 6.25

Outlet type: Orifice 1

1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 9.25

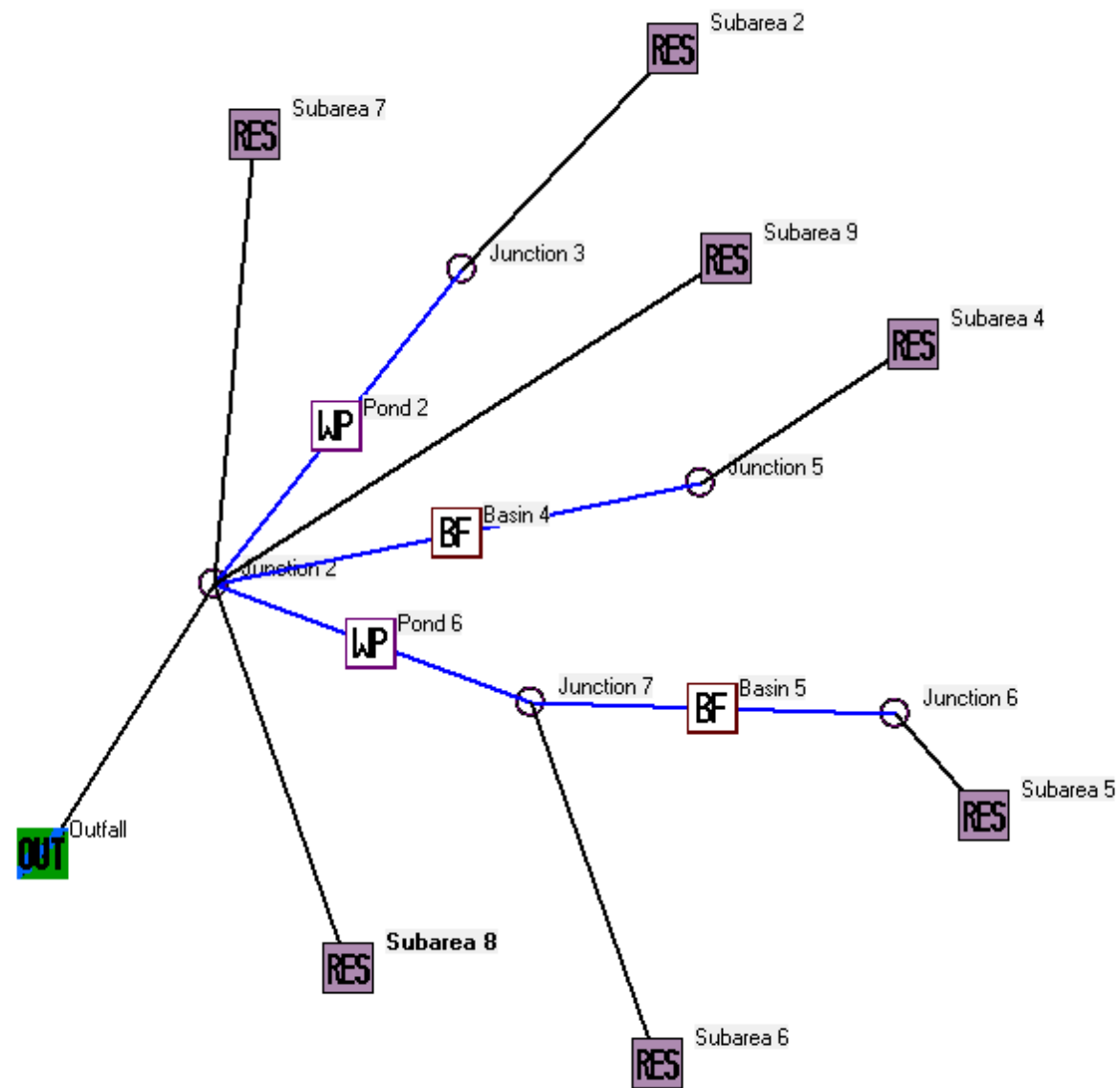
Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 4
2. Stand pipe height above datum (ft): 7.5

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0100	0.00	0.00
2	4.00	0.0600	0.00	0.00
3	5.00	0.1800	0.00	0.00
4	5.25	0.1900	0.00	0.00
5	6.25	0.2600	0.00	0.00
6	7.25	0.3300	0.00	0.00
7	8.25	0.4000	0.00	0.00
8	9.25	0.4800	0.00	0.00
9	10.25	0.5800	0.00	0.00

WinSLAMM Treatment Analysis (Disconnected Impervious Model)



SLAMM for Windows Version 10.5.0

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Data file name: C:\Data\Jobs\2022\2022-004_Hein Property - TRIO\Project_Information\Calcs\SLAMM\Proposed Phase I.mdb

Data file description:

Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN

Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx

Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx

Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdxd

Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std

Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std

Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std

Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False

Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv

Cost Data file name:

If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations

Seed for random number generator: -42

Start of Winter Season: 12/06

End of Winter Season: 03/28

Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69

Date of run: 07-19-2024 Time of run: 12:13:46

Total Area Modeled (acres): 25.950

Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	965423	-	102.8	6195	-
Outfall Total with Controls:	947043	1.90%	20.74	1226	80.21%
Annualized Total After Outfall Controls:	960197			1243	

Pollutant	Concentration - No Controls	Concentration - With Controls	Conc. Units	Pollutant Yield No Controls	Pollutant Yield With Controls	Pol. Yield Units	Percent Reduction
Particulate Solids	102.8	20.74	mg/L	6195	1226	lbs	80.21 %
Total Phosphorus	0.4490	0.1962	mg/L	27.06	11.60	lbs	57.13 %

Data file name: C:\Data\Jobs\2022\2022-004_Hein Property - TRIO\Project_Information\Calcs\SLAMM\Proposed_Phase I.mdb
WinSLAMM Version 10.5.0
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Study period starting date: 01/05/69 Study period ending date: 12/31/69
Start of Winter Season: 12/06 End of Winter Season: 03/28
Date: 07-19-2024 Time: 12:13:59
Site information:

Pre-Development Area Description	Pre-Development Area (ac)	Pre-Development CN
cropland	25.950	83
Total Area (ac)/Composite CN	25.950	83

LU# 1 - Residential: Subarea 2 Total area (ac): 12.810
1 - Roofs 1: 1.860 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.660 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.750 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.880 ac. Smooth Street Length = 0.4192 mi Street Width = 36.99905 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 7.080 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.580 ac. Source Area PSD File:
LU# 2 - Residential: Subarea 4 Total area (ac): 1.480
1 - Roofs 1: 0.280 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.140 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.060 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 3 - Residential: Subarea 5 Total area (ac): 1.620
1 - Roofs 1: 0.340 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

31 - Sidewalks 1: 0.190 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 51 - Small Landscaped Areas 1: 1.090 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 LU# 4 - Residential: Subarea 6 Total area (ac): 7.540
 1 - Roofs 1: 1.320 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 25 - Driveways 1: 0.520 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 31 - Sidewalks 1: 0.510 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 37 - Streets 1: 0.990 ac. Smooth Street Length = 0.2207 mi Street Width = 37.00725 ft Street Edges = 2
 Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 51 - Small Landscaped Areas 1: 4.020 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 70 - Water Body Areas: 0.180 ac. Source Area PSD File:
 LU# 5 - Residential: Subarea 7 Total area (ac): 0.260
 57 - Undeveloped Areas 1: 0.260 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 LU# 6 - Residential: Subarea 8 Total area (ac): 1.420
 1 - Roofs 1: 0.180 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 31 - Sidewalks 1: 0.110 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 37 - Streets 1: 0.150 ac. Smooth Street Length = 0.0334 mi Street Width = 37.0509 ft Street Edges = 2
 Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz CB-
 CP#5
 51 - Small Landscaped Areas 1: 0.480 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 57 - Undeveloped Areas 1: 0.500 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 LU# 7 - Residential: Subarea 9 Total area (ac): 0.820
 1 - Roofs 1: 0.150 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 31 - Sidewalks 1: 0.080 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 51 - Small Landscaped Areas 1: 0.590 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - Pond 2
 Particle Size Distribution file name: Not needed - calculated by program
 Initial stage elevation (ft): 5
 Peak to Average Flow Ratio: 3.8
 Maximum flow allowed into pond (cfs): No maximum value entered
 Outlet Characteristics:
 Outlet type: Sharp Crested Weir
 1. Sharp crested weir length (ft): 1.5
 2. Sharp crested weir height from invert: 2.5
 3. Sharp crested weir invert elevation above datum (ft): 6
 Outlet type: Orifice 1
 1. Orifice diameter (ft): 0.58
 2. Number of orifices: 1
 3. Invert elevation above datum (ft): 5
 Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
 2. Weir crest width (ft): 10
 3. Height from datum to bottom of weir opening: 8
- Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 4
 2. Stand pipe height above datum (ft): 7

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.2000	0.00	0.00
2	4.00	0.3700	0.00	0.00
3	5.00	0.5800	0.00	0.00
4	5.50	0.6600	0.00	0.00
5	6.50	0.7200	0.00	0.00
6	7.50	0.8200	0.00	0.00
7	8.50	0.9300	0.00	0.00

Control Practice 2: Biofilter CP# 1 (DS) - Basin 4

1. Top area (square feet) = 5942
2. Bottom area (square feet) = 2177
3. Depth (ft): 3
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.24
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 0.24
12. Engineered soil depth (ft) = 1
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data Soil Type Fraction in Eng. Soil
User-Defined Media Type 1.000

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 2.99

Outlet type: Evaporation\Evapotranspiration

Month Number	Month	Evapotranspiration (in/day)	Evaporation (in/day)
1	January	.	.6
2	February	.	.7
3	March	.	.9
4	April	.	1.3
5	May	.	2.1
6	June	.	3.2
7	July	.	5.
8	August	.	5.4
9	September	.	4.7
10	October	.	3.2
11	November	.	1.6
12	December	.	.6

Outlet type: Other Outlet

Stage Number	Stage (ft)	Discharge Rate (cfs)
1	1.00	0.000
2	1.20	0.050
3	1.40	0.260
4	1.60	1.270
5	1.80	4.570
6	2.00	9.780
7	3.00	66.460

Control Practice 3: Biofilter CP# 2 (DS) - Basin 5

1. Top area (square feet) = 3276
2. Bottom area (square feet) = 1905
3. Depth (ft): 3.5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.24
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 0.001
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 0.24
12. Engineered soil depth (ft) = 2
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data
Soil Type Fraction in Eng. Soil

User-Defined Media Type 1.000
 Biofilter Outlet/Discharge Characteristics:
 Outlet type: Broad Crested Weir
 1. Weir crest length (ft): 10
 2. Weir crest width (ft): 10
 3. Height of datum to bottom of weir opening: 2.5
 Outlet type: Evaporation\Evapotranspiration

Month Number	Month	Evapotranspiration (in/day)	Evaporation (in/day)
1	January	.	.6
2	February	.	.7
3	March	.	.9
4	April	.	1.3
5	May	.	2.1
6	June	.	3.2
7	July	.	5.
8	August	.	5.4
9	September	.	4.7
10	October	.	3.2
11	November	.	1.6
12	December	.	.6

Control Practice 4: Wet Detention Pond CP# 2 (DS) - Pond 6
 Particle Size Distribution file name: Not needed - calculated by program
 Initial stage elevation (ft): 5
 Peak to Average Flow Ratio: 3.8
 Maximum flow allowed into pond (cfs): No maximum value entered
 Outlet Characteristics:
 Outlet type: Sharp Crested Weir
 1. Sharp crested weir length (ft): 1
 2. Sharp crested weir height from invert: 4
 3. Sharp crested weir invert elevation above datum (ft): 6.25
 Outlet type: Orifice 1
 1. Orifice diameter (ft): 0.25
 2. Number of orifices: 1
 3. Invert elevation above datum (ft): 5
 Outlet type: Broad Crested Weir
 1. Weir crest length (ft): 10
 2. Weir crest width (ft): 10
 3. Height from datum to bottom of weir opening: 9.25
 Outlet type: Vertical Stand Pipe
 1. Stand pipe diameter (ft): 4
 2. Stand pipe height above datum (ft): 7.5
 Pond stage and surface area

Entry	Stage	Pond Area	Natural Seepage	Other Outflow
-------	-------	-----------	-----------------	---------------

Number	(ft)	(acres)	(in/hr)	(cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0100	0.00	0.00
2	4.00	0.0600	0.00	0.00
3	5.00	0.1800	0.00	0.00
4	5.25	0.1900	0.00	0.00
5	6.25	0.2600	0.00	0.00
6	7.25	0.3300	0.00	0.00
7	8.25	0.4000	0.00	0.00
8	9.25	0.4800	0.00	0.00
9	10.25	0.5800	0.00	0.00

Control Practice 5: Catchbasin Cleaning CP# 1 (SA) - SA Device, LU# 6 ,SA# 37

1. Fraction of area served by catchbasins = 1.00
2. Number of catchbasins = 4
3. Average sump depth below catchbasin outlet invert (feet) = 3
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 1
6. Typical outlet pipe Mannings n = 0.013
7. Typical outlet pipe slope (ft/ft) = 0.02
8. Typical catchbasin sump surface area (square feet) = 16
9. Total catchbasin depth (feet) = 8
10. Inflow hydrograph peak to average flow ratio = 3.8
11. Leakage rate through sump bottom (in/hr) = 0
12. Catchbasin Critical Particle Size File Name: Not needed - calculated by program

APPENDIX D

Infiltration Analysis / WinSLAMM

Infiltration Analysis Results

FOR: Cardinal Ridge - Phase I

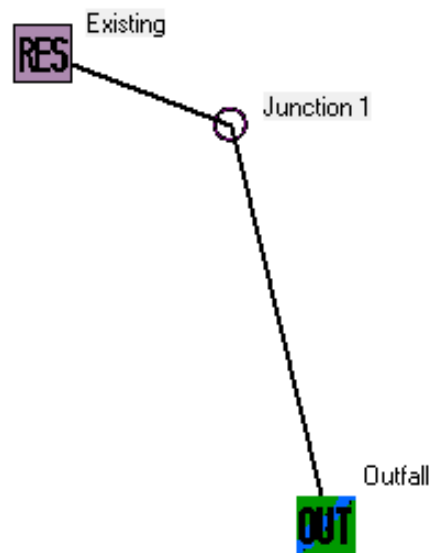
LOCATION: Vernon and Mukwonago, Wisconsin

Pre-Development				
Disturbed Area	25.95	acres	=	1,130,382 sq-ft
Average Annual Rainfall	29.02	inches	=	2.42 feet
Total Rainfall Volume	2,733,640	cu-ft		
Total Runoff (from SLAMM Output)	359,396	cu-ft		
Total Pre-Development Infiltration Volume	2,374,244	cu-ft		

Post-Development				
Total Runoff (from SLAMM Output)	947,043	cu-ft		
Total Post-Development Infiltration Volume	1,786,597	cu-ft		

Percent Infiltrated				
Post Infiltration Vol / Pre Infiltration Vol	75.2%			

WinSLAMM Infiltration Analysis (Existing Conditions Model)



Data File: C:\Data\Jobs\2022\2022-004_Hein Property - TRIO\Project_Information\Calcs\SLAMM\Existing_Phase I.mdb

Rain File: WisReg - Milwaukee WI 1969.RAN

Date: 07-19-24 Time: 12:21:02 PM

Site Description:

Runoff Volume Total (cf) at the Outfall

Rain Number	Rain Total (in)	Outfall Total (cf)	Rv	Total Losses (in.)	Calculated CN*	Event Peak Flow (cfs)	Pre-Dev Runoff Vol. (cf)
Minimum:	0	0	0	0.01	74.9	0	0
Maximum:	1.96	36607	0.198	1.57	91.1	5.512	62919
Average:	0.25	1684	0.016	0.23	77.3	2.112	10268.5
Total:	29.02	195299		26.95			359396

* Note: NRCS does not recommend using CN method for rains < 0.5 in.

See 'PreDevelopment Areas and CN' Help for more info.

SLAMM for Windows Version 10.5.0

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Data file name: C:\Data\Jobs\2022\2022-004_Hein Property -
TRIO\Project_Information\Calcs\SLAMM\Existing_Phase I.mdb

Data file description:

Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN

Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx

Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx

Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdX

Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std

Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std

Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std

Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False

Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv

Cost Data file name:

If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load
% Reduction calculations

Seed for random number generator: -42

Start of Winter Season: 12/06 End of Winter Season: 03/28

Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69

Date of run: 07-19-2024 Time of run: 12:21:28

Total Area Modeled (acres): 25.950

Years in Model Run: 0.99

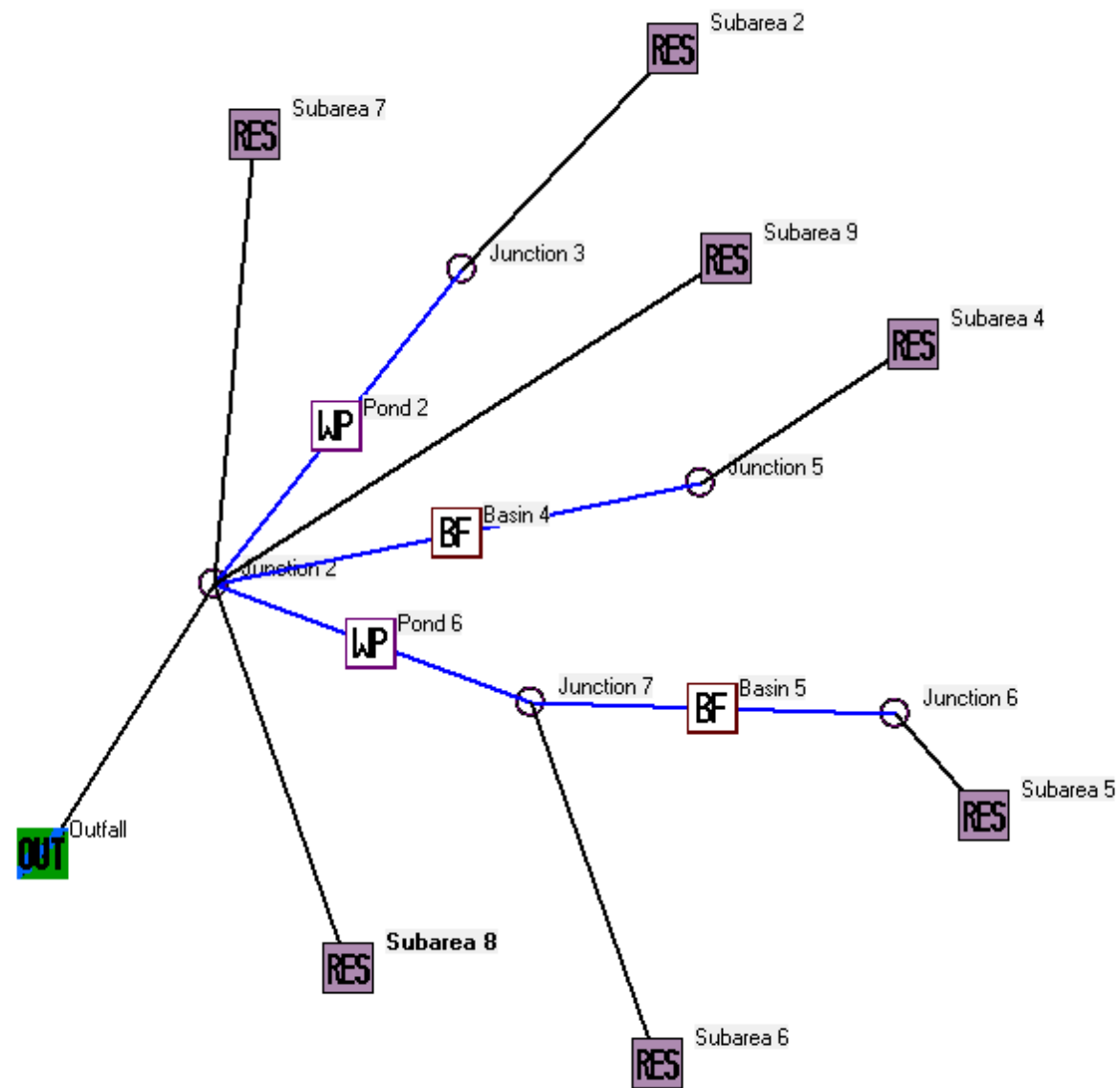
	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	195298	-	227.0	2768	-
Outfall Total with Controls:	195299	0.00%	227.0	2768	0.00%
Annualized Total After Outfall Controls:	198011			2806	

Data file name: C:\Data\Jobs\2022\2022-004_Hein Property - TRIO\Project_Information\Calcs\SLAMM\Existing_Phase I.mdb
 WinSLAMM Version 10.5.0
 Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
 Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
 Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
 Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
 Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
 Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppd
 Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
 Cost Data file name:
 If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
 Seed for random number generator: -42
 Study period starting date: 01/05/69 Study period ending date: 12/31/69
 Start of Winter Season: 12/06 End of Winter Season: 03/28
 Date: 07-19-2024 Time: 12:21:36
 Site information:

Pre-Development Area Description	Pre-Development Area (ac)	Pre-Development CN
Existing	25.950	83
Total Area (ac)/Composite CN	25.950	83

LU# 1 - Residential: Existing Total area (ac): 25.950
 45 - Large Landscaped Areas 1: 25.950 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

WinSLAMM Treatment Analysis (Disconnected Impervious Model)



SLAMM for Windows Version 10.5.0
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Data file name: C:\Data\Jobs\2022\2022-004_Hein Property - TRIO\Project_Information\Calcs\SLAMM\Proposed Phase I.mdb
Data file description:
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdxd
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Start of Winter Season: 12/06 End of Winter Season: 03/28
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 07-19-2024 Time of run: 12:13:46
Total Area Modeled (acres): 25.950
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	965423	-	102.8	6195	-
Outfall Total with Controls:	947043	1.90%	20.74	1226	80.21%
Annualized Total After Outfall Controls:	960197			1243	

Pollutant	Concentration - No Controls	Concentration - With Controls	Conc. Units	Pollutant Yield No Controls	Pollutant Yield With Controls	Pol. Yield Units	Percent Reduction
Particulate Solids	102.8	20.74	mg/L	6195	1226	lbs	80.21 %
Total Phosphorus	0.4490	0.1962	mg/L	27.06	11.60	lbs	57.13 %

Data file name: C:\Data\Jobs\2022\2022-004_Hein Property - TRIO\Project_Information\Calcs\SLAMM\Proposed_Phase I.mdb
WinSLAMM Version 10.5.0
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppd
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Study period starting date: 01/05/69 Study period ending date: 12/31/69
Start of Winter Season: 12/06 End of Winter Season: 03/28
Date: 07-19-2024 Time: 12:13:59
Site information:

Pre-Development Area Description	Pre-Development Area (ac)	Pre-Development CN
cropland	25.950	83
Total Area (ac)/Composite CN	25.950	83

LU# 1 - Residential: Subarea 2 Total area (ac): 12.810
1 - Roofs 1: 1.860 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.660 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.750 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.880 ac. Smooth Street Length = 0.4192 mi Street Width = 36.99905 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 7.080 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.580 ac. Source Area PSD File:
LU# 2 - Residential: Subarea 4 Total area (ac): 1.480
1 - Roofs 1: 0.280 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.140 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.060 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
LU# 3 - Residential: Subarea 5 Total area (ac): 1.620
1 - Roofs 1: 0.340 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

31 - Sidewalks 1: 0.190 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 51 - Small Landscaped Areas 1: 1.090 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 LU# 4 - Residential: Subarea 6 Total area (ac): 7.540
 1 - Roofs 1: 1.320 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 25 - Driveways 1: 0.520 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 31 - Sidewalks 1: 0.510 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 37 - Streets 1: 0.990 ac. Smooth Street Length = 0.2207 mi Street Width = 37.00725 ft Street Edges = 2
 Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 51 - Small Landscaped Areas 1: 4.020 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 70 - Water Body Areas: 0.180 ac. Source Area PSD File:
 LU# 5 - Residential: Subarea 7 Total area (ac): 0.260
 57 - Undeveloped Areas 1: 0.260 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 LU# 6 - Residential: Subarea 8 Total area (ac): 1.420
 1 - Roofs 1: 0.180 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 31 - Sidewalks 1: 0.110 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 37 - Streets 1: 0.150 ac. Smooth Street Length = 0.0334 mi Street Width = 37.0509 ft Street Edges = 2
 Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz CB-
 CP#5
 51 - Small Landscaped Areas 1: 0.480 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 57 - Undeveloped Areas 1: 0.500 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 LU# 7 - Residential: Subarea 9 Total area (ac): 0.820
 1 - Roofs 1: 0.150 ac. Pitched Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 31 - Sidewalks 1: 0.080 ac. Disconnected Normal Clayey Low Density Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 51 - Small Landscaped Areas 1: 0.590 ac. Normal Clayey Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - Pond 2
 Particle Size Distribution file name: Not needed - calculated by program
 Initial stage elevation (ft): 5
 Peak to Average Flow Ratio: 3.8
 Maximum flow allowed into pond (cfs): No maximum value entered
 Outlet Characteristics:
 Outlet type: Sharp Crested Weir
 1. Sharp crested weir length (ft): 1.5
 2. Sharp crested weir height from invert: 2.5
 3. Sharp crested weir invert elevation above datum (ft): 6
 Outlet type: Orifice 1
 1. Orifice diameter (ft): 0.58
 2. Number of orifices: 1
 3. Invert elevation above datum (ft): 5
 Outlet type: Broad Crested Weir

- ## Pond stage and surface area

Control Practice 2: Biofilter CP# 1 (DS) – Basin 4

- | | |
|-------------------------|---------------------------------|
| Soil Data | Soil Type Fraction in Eng. Soil |
| User-Defined Media Type | 1.000 |

Outlet type: Broad Crested Weir

- Outlet type: Evaporation\Evapotranspiration

User-Defined Media Type 1.000
 Biofilter Outlet/Discharge Characteristics:
 Outlet type: Broad Crested Weir
 1. Weir crest length (ft): 10
 2. Weir crest width (ft): 10
 3. Height of datum to bottom of weir opening: 2.5
 Outlet type: Evaporation\Evapotranspiration

Month Number	Month	Evapotranspiration (in/day)	Evaporation (in/day)
1	January	.	.6
2	February	.	.7
3	March	.	.9
4	April	.	1.3
5	May	.	2.1
6	June	.	3.2
7	July	.	5.
8	August	.	5.4
9	September	.	4.7
10	October	.	3.2
11	November	.	1.6
12	December	.	.6

Control Practice 4: Wet Detention Pond CP# 2 (DS) - Pond 6
 Particle Size Distribution file name: Not needed - calculated by program
 Initial stage elevation (ft): 5
 Peak to Average Flow Ratio: 3.8
 Maximum flow allowed into pond (cfs): No maximum value entered
 Outlet Characteristics:
 Outlet type: Sharp Crested Weir
 1. Sharp crested weir length (ft): 1
 2. Sharp crested weir height from invert: 4
 3. Sharp crested weir invert elevation above datum (ft): 6.25
 Outlet type: Orifice 1
 1. Orifice diameter (ft): 0.25
 2. Number of orifices: 1
 3. Invert elevation above datum (ft): 5
 Outlet type: Broad Crested Weir
 1. Weir crest length (ft): 10
 2. Weir crest width (ft): 10
 3. Height from datum to bottom of weir opening: 9.25
 Outlet type: Vertical Stand Pipe
 1. Stand pipe diameter (ft): 4
 2. Stand pipe height above datum (ft): 7.5
 Pond stage and surface area

Entry	Stage	Pond Area	Natural Seepage	Other Outflow
-------	-------	-----------	-----------------	---------------

Number	(ft)	(acres)	(in/hr)	(cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0100	0.00	0.00
2	4.00	0.0600	0.00	0.00
3	5.00	0.1800	0.00	0.00
4	5.25	0.1900	0.00	0.00
5	6.25	0.2600	0.00	0.00
6	7.25	0.3300	0.00	0.00
7	8.25	0.4000	0.00	0.00
8	9.25	0.4800	0.00	0.00
9	10.25	0.5800	0.00	0.00

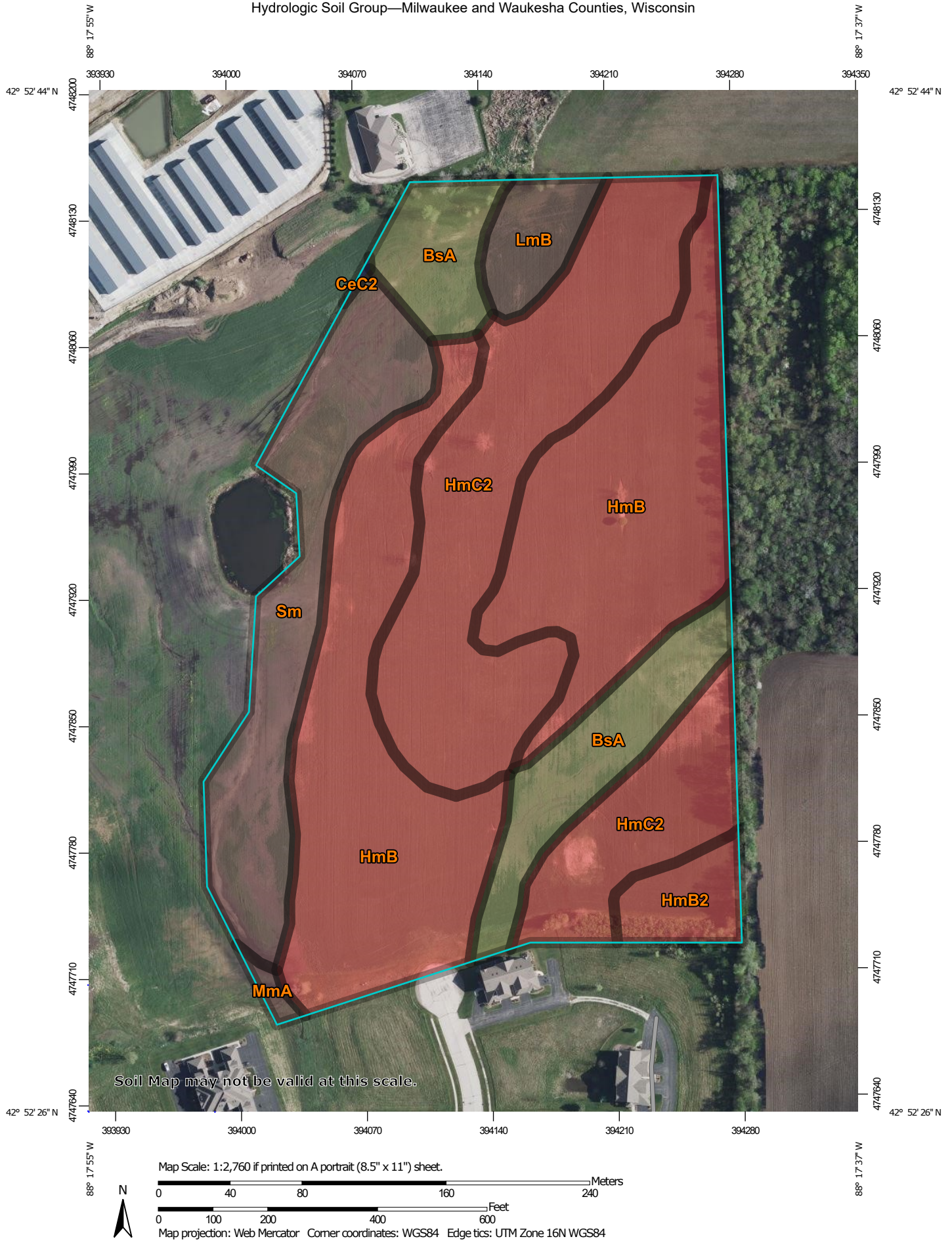
Control Practice 5: Catchbasin Cleaning CP# 1 (SA) - SA Device, LU# 6 ,SA# 37

1. Fraction of area served by catchbasins = 1.00
2. Number of catchbasins = 4
3. Average sump depth below catchbasin outlet invert (feet) = 3
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 1
6. Typical outlet pipe Mannings n = 0.013
7. Typical outlet pipe slope (ft/ft) = 0.02
8. Typical catchbasin sump surface area (square feet) = 16
9. Total catchbasin depth (feet) = 8
10. Inflow hydrograph peak to average flow ratio = 3.8
11. Leakage rate through sump bottom (in/hr) = 0
12. Catchbasin Critical Particle Size File Name: Not needed - calculated by program

APPENDIX E

Soil Survey & Geotechnical Exploration and Site Feasibility Evaluation Report

Hydrologic Soil Group—Milwaukee and Waukesha Counties, Wisconsin



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Milwaukee and Waukesha Counties, Wisconsin
 Survey Area Data: Version 17, Sep 10, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 20, 2020—Aug 20, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BsA	Brookston silt loam, 0 to 2 percent slopes	C/D	3.1	11.3%
CeC2	Casco loam, 6 to 12 percent slopes, eroded	B	0.0	0.0%
HmB	Hochheim loam, 2 to 6 percent slopes	D	10.6	38.8%
HmB2	Hochheim loam, 2 to 6 percent slopes, eroded	D	0.8	2.9%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	D	8.0	29.4%
LmB	Lamartine silt loam, 0 to 3 percent slopes	B/D	0.9	3.2%
MmA	Matherton silt loam, 1 to 3 percent slopes	B/D	0.1	0.5%
Sm	Sebewa silt loam, 0 to 2 percent slopes	B/D	3.8	13.9%
Totals for Area of Interest			27.3	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



Professional Service Industries, Inc.
821 Corporate Court, Waukesha, WI 53189
Phone: (262) 521-2125
Fax: (262) 521-2471

April 8, 2024

Neumann Development Inc.
N27 W24025 Paul Court, Suite 100
Pewaukee, WI 53072

Attn: Mr. Eric Obarski
Project Manager

Re: Geotechnical Exploration and Site Feasibility Evaluation
Proposed Cardinal Crest Subdivision
Edgewood Avenue
Mukwonago, WI
PSI Project No. 00523364

Dear Mr. Obarski:

The geotechnical exploration and site feasibility evaluation for the referenced project has been completed. An electronic copy of the report is being provided via email. Paper copies can be issued upon request. After you have had the opportunity of reading the report, please call at any time with any questions or comments you may have. Professional Service Industries, Inc. (PSI), an Intertek Company, appreciates the opportunity to be of service on this project, and looks forward to continuing as your geotechnical consultant during the design and construction phases, as well as your upcoming projects.

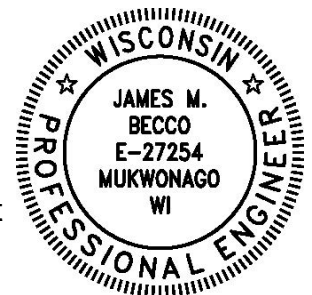
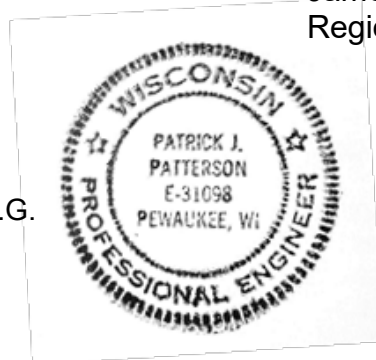
Sincerely,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Christopher D. Volkert
Project Manager

James M. Becco, P.E.
Regional Vice President

Patrick J. Patterson, P.E., P.G.
Senior Engineer
Environmental Services



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**GEOTECHNICAL EXPLORATION AND SITE
FEASIBILITY EVALUATION**

For the:

Proposed Cardinal Crest Subdivision
Edgewood Avenue
Mukwonago, WI

Prepared for:

Neumann Development Inc.
N27 W24025, Suite 100
Pewaukee, WI 53072

Prepared by:

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April 8, 2024

PSI Project Number: 00523364

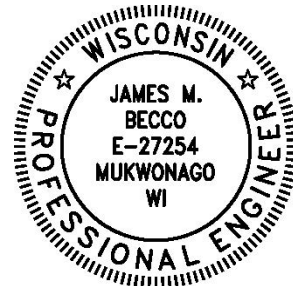


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Christopher D. Volkert
Project Manager

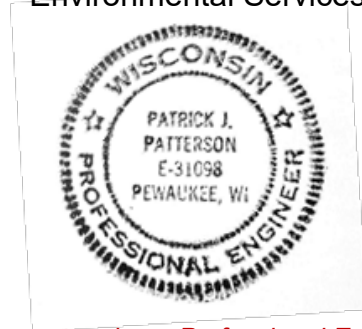
A handwritten signature in black ink, appearing to read "James M. Becco".

James M. Becco, P.E.
Regional Vice President



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Patrick J. Patterson
Senior Engineer
Environmental Services



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INTRODUCTION

General

This report presents the results of the geotechnical exploration and site feasibility evaluation for the proposed Cardinal Crest Subdivision project located in Mukwonago, Wisconsin. The work was performed for Neumann Development Inc., at the request of Mr. Eric Obarski.

Purpose

The purpose of this study was to evaluate the subsurface conditions at specific boring locations on the site, and to establish parameters for use by the design engineers and architects in preparing the foundation, floor slab, pavement, and stormwater management designs for the proposed project. A comprehensive foundation evaluation and recommendations for specific structures were beyond the scope of this preliminary site evaluation but are recommended as part of design planning.

Scope

The scope of services included a site reconnaissance, the subsurface exploration, an evaluation of soil characteristics by field and laboratory testing, and an evaluation of the data obtained. The scope of the field work, including the number, location, and depth of the borings was determined by the client.

Authorization

The description of services and authorization to perform this geotechnical exploration and site feasibility evaluation were in the form of signed PSI Proposal No. 417801, dated February 7, 2024. This report has been prepared on behalf of, and exclusively for the use of Neumann Development Inc. The information contained in this report may not be relied upon by any other parties without the express written consent of PSI, and acceptance by such parties of PSI's General Conditions.

SITE AND PROJECT DESCRIPTION

Site Features

The project site is located east of Edgewood Avenue, extending east about 1,800 feet. It is south of National Avenue, and directly north of Cardinal Court, in Mukwonago, Wisconsin. At the time of the exploration, the site was a farm field with a building and unpaved drive areas located on the southwestern side of the property. There is a wetland area in the north-central portion of the site. There are residential properties to the northeast and south, storage units to the north, and dense forests and farm fields to the east. Aerial photos of various years between 2000 and 2023 reviewed on Google Earth indicate that the site was a vacant agricultural

property in the 2000 photo. The wetland area in the central portion of the property is visible and appears to be a pond. The building in the southwestern portion of the site was present in the 2005 photo. Additionally, it appears that a pond is present on the southeast portion of the site, in the approximate area of B-18. The site remains relatively similar in appearance in subsequent photos with the exception of the pond in the southeast portion of the site which appears to become increasingly vegetated and/or filled in subsequent years. In the 2015 and subsequent photos, the pond is no longer visible and may have been completely filled. The subject site is depicted on the enclosed Boring Location Plan (Figure 1).

Project Description

Based on information provided by the client, it is understood that the proposed project will consist of the construction of 94 single-family homes with attached garages and basements, and associated roadways. There will be six (6) outlots, and six (6) stormwater management areas. The structures are estimated to be up to 2 stories above grade. No other details were provided.

Structural loads were not provided for the proposed buildings but are estimated to be light to moderate in magnitude. For the purpose of this report, it is estimated that maximum column and wall loads will not exceed 100 kips and 10 kips per lineal foot respectively. When structural loads are determined, PSI must be informed in order to determine if revisions to this report are necessary.

A grading plan and finished floor elevations for the proposed structures was not provided; however, based upon the topography map provided to PSI, and the grades of the surrounding neighboring properties, it is estimated that substantial cuts and fills of several feet or more (possibly in excess of 10 feet or even more) may be necessary at this site. The location of the buildings or other structure details were not provided, nor were planned elevations or final surface grades. When a grading plan is available, and when finished floor elevations, utility inverts, and roadway grades have been established, PSI must be informed so that any necessary reevaluation or redirection of the recommendations included herein can be made.

Six (6) stormwater management areas are proposed as part of the development. These will consist of four (4) wet ponds and two (2) dry pond/rain gardens. Based on the plan provided by the client, planned bottom elevations range from EL. 805.7 to EL. 785.7. Other design details of the stormwater management areas have not been provided.

The new pavements are estimated to consist of asphalt or concrete. Traffic loading for pavements has not been provided. However, it is understood that traffic will generally consist of light passenger vehicle traffic, delivery trucks, garbage trucks, school buses, and snow removal vehicles.

When additional information becomes available and/or if any of the information provided herein is incorrect or changes, PSI must be informed so that any necessary re-evaluation or revisions to this report can be made.

This preliminary exploration has been commissioned to evaluate the subsurface conditions across areas of the subject site and to provide subsurface information for general site feasibility and preliminary design planning for the proposed development. The number and spacing of the borings requested is not considered sufficient to serve as a conventional foundation evaluation for the proposed buildings. Additional borings are necessary and recommended within each of the proposed building footprints to further evaluate more specific soil conditions and provide subsequent recommendations at each building location. Additional borings are also recommended to assist in establishing finished floor, yard, utility invert, and basement slab elevations. When additional project information becomes available, PSI must be provided an opportunity to review them and determine if a redirection of the evaluation and recommendations contained herein is warranted.

EXPLORATION AND LABORATORY PROCEDURES

Scope Summary

The field and laboratory data utilized in the evaluation of the subsurface materials was obtained by drilling exploratory test borings, securing soil samples by the split-spoon sampling method, and subjecting the samples to standard laboratory testing.

With respect to the stormwater management areas, the field and laboratory work for classification of the subgrade soils was performed to provide information for use by the basin design personnel when considering requirements of Chapter NR151 of the Wisconsin Administrative Code, and of WDNR Technical Standard 1002, "Site Evaluation for Stormwater Infiltration" guidelines. The design of the proposed stormwater management area was beyond the scope of services for this project.

Field Exploration

Twenty-two (22) soil borings were drilled for this project. B-1 to B-6, B-9, B-13 to B-17, B-20, and B-21 were performed in the area of the lots and roadways to a depth of 20 feet below existing grade, and B-7, B-8, B-10 to B-12, B-18, B-19, and B-22 were performed in the planned stormwater management areas to a depth of 15 feet below existing grade. The number, depths, and locations of the borings were determined by the client. The borings were located in the field by the drill crew utilizing a consumer grade GPS device. They are estimated to be accurate to within several feet. The approximate locations of the borings performed are shown on the Boring Location Plan (Figure 1), which is provided in the Appendix of this report. The surface elevations shown on the logs were estimated by interpolation of a 1-foot contour map of the property, provided by the client. The elevations are estimated to be accurate to within about 1

foot.

The soil test borings were performed with an all-terrain vehicle (ATV) mounted rotary drilling rig utilizing continuous flight hollow stem augers to advance the holes. Representative samples were obtained by the Standard Penetration Test (SPT) method using split-spoon sampling procedures in general accordance with ASTM D-1586 procedures. Samples were collected at 2.5-foot intervals to 10 feet, and then at 5-foot intervals thereafter to the end of the borings. As an exception, samples were obtained at 2-foot intervals at the borings performed within the proposed pavement and/or stormwater management areas. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer, falling thirty (30) inches, required to advance the split-spoon sampler one (1) foot into the soil. The sampler is lowered to the bottom of the drill hole and the number of blows recorded for each of the three (3) successive increments of six (6) inches penetration. The “N” value is obtained by adding the second and third incremental numbers. The SPT provides a means of estimating the relative density of granular soils and comparative consistency of cohesive soils, thereby providing a method of evaluating the relative strength and compressibility characteristics of the subsoils.

The SPT soil samples were transferred into clean glass jars immediately after retrieval and returned to the laboratory upon completion of the field operations. Samples will be discarded unless other instructions are received. The soil samples were visually classified in general accordance with the Unified Soil Classification System (ASTM D-2488-75). As an exception, the soil samples from B-7, B-8, B-10 to B-12, B-18, B-19, and B-22 were visually classified by a certified soil tester in general accordance with USDA National Resources Conservation Service textural soil classification procedures. A description of the subsurface conditions encountered at each boring location is shown on the enclosed Soil Boring Logs. After completion of the borings, the auger holes were backfilled to the ground surface with soil cuttings and bentonite.

A copy of the Soil Boring Logs, Boring Location Plan (Figure 1), and Soil Evaluation – Storm Forms are enclosed in the Appendix. The soil stratification shown on the logs represents the approximate soil conditions in the actual boring locations at the time of the exploration. The terms and symbols used on the logs are described in the General Notes found in the Appendix.

Laboratory Physical Testing

Soil samples obtained from the exploration were visually classified in the laboratory, and subjected to testing, which included moisture content determinations.

Selected cohesive soil samples were tested in unconfined compression with a controlled strain loading rate and/or with a calibrated hand penetrometer to aid in evaluating the soil strength characteristics. The values of strength tests performed on soil samples obtained by the Standard Penetration Test Method (SPT) are considered approximate, recognizing that the SPT method provides a representative but somewhat disturbed soil sample.

The laboratory testing was performed in general accordance with the respective ASTM methods, as applicable, and the results are shown on the boring logs in the Appendix.

DESCRIPTION OF SUBSURFACE CONDITIONS

General

A description of the subsurface conditions encountered at the test boring locations is shown on the Soil Boring Logs. The lines of demarcation shown on the logs represent an approximate boundary between the various soil classifications. It must be recognized that the soil descriptions are considered representative estimates for the specific test hole location, but those variations may occur between and beyond the sampling intervals and boring locations. Soil depths, topsoil, and layer thicknesses, and demarcation lines utilized for preconstruction planning should not be expected to yield exact and final quantities. A summary of the major soil profile components is described in the following paragraphs.

Soil Conditions

Lot and Pavement Borings (B-1 to B-6, B-9, B-13 to B-17, B-20, and B-21) USCS Classification

The surficial materials at the borings consisted of about 8 to 12 inches of topsoil, generally consisting of dark brown sandy silt with gravel. Underlying the topsoil were natural soils generally consisting of brown sandy clay with gravel; silty medium to fine sand and gravel; silty medium to coarse sand and gravel; medium to fine sand and gravel; sandy silt with gravel; silt with sand and gravel; lean clay with sand and gravel; gravel with medium to coarse sand; and clayey sand and gravel to the termination depths. The natural granular soils were in a very loose to extremely dense condition in relative density with N-values ranging from 3 blows per foot (bpf) to 50 blows per 2 inches of sampler penetration. The natural cohesive soils were very soft to very stiff in consistency with unconfined compressive strengths ranging from 0.1 to 3.5 tons per square foot (tsf).

Stormwater Management Area Borings (B-7, B-8, B-10 to B-12, B-18, B-19, and B-22) USDA Classification

The surficial materials at the borings consisted of about 8 to 12 inches of black silt loam topsoil. Underlying the topsoil at boring B-8 was possible fill consisting of gray and brown mottled gravelly sandy loam, and brown gravelly silty clay loam to a depth of about 5 feet (EL. 788.5) below existing grade. Underlying the possible fill at B-8 and the topsoil at the remaining stormwater borings were natural soils generally comprised of silt loam, gravelly fine sandy loam, gravelly fine sand, sandy loam, silty clay loam, very gravelly fine sand, gravelly sand, gravelly loam, loamy sand, clay loam, loamy fine sand, and fine sand to the termination depths. The natural granular soils were in a loose to extremely dense condition in relative density with N-values ranging from 5 blows per foot (bpf) to 50 blows per 1 inch of sampler penetration.

The foregoing discussion of soil conditions on this site represents a generalized soil profile as determined at the test boring locations. A more detailed description and supporting data for each test location can be found on the individual Soil Boring Logs.

Groundwater Observations

Groundwater observations were made during the drilling operations, and in the open boreholes at completion. Groundwater was encountered during auger advancement in all borings except B-22 at depths of about 1 to 18.5 feet below existing grade (EL. 794 to EL. 778.5), with depths of about 1 to 6 feet (EL. 807.5 to EL. 787.5) being more typical. Upon completion and removal of the augers, groundwater was present at borings B-2 through B-9, B-13, B-15 through B-19, and B-21, at depths of about 1.5 to 12 feet below existing grade (EL. 793.5 to EL. 793).

The groundwater observations reported herein are considered approximate. It must be recognized that groundwater levels fluctuate with time due to variations in seasonal precipitation, lateral drainage conditions, and soil permeability characteristics. Longer-term monitoring would be required and is recommended to further evaluate groundwater levels on this site.

EVALUATION AND RECOMMENDATIONS

General Development Considerations

In view of the subsurface conditions encountered in the test borings, together with the structural loading criteria and development grades anticipated, conventional spread footings, along with conventional slab-on-grade construction, can be used for support of the proposed structure. However, relatively shallow groundwater was encountered in most of the borings. As such, substantial difficulty with groundwater, and with excavation subgrade and sidewall stability will likely be experienced, especially where excavations encroach upon or extend below the groundwater. An adequate dewatering effort will be necessary. The over-excavation of unstable zones along the use of a crushed stone working mat may also be required and may become extensive.

It is recommended that the basement slabs be placed at least 2 feet above the groundwater level to prevent moisture problems and constantly running sump pumps. It is also recommended that further evaluation of groundwater levels across the site using backhoe test pits (and possibly monitoring wells) be performed as part of design planning to assist in establishing appropriate basement floor and associated surface elevations. Significant filling to raise finished exterior grades may be necessary in order to establish basement slabs at appropriate elevations; and in order to establish sufficient drainage pathways, to allow for similar entrance elevations, to meet utility slope requirements, and to achieve aesthetic requirements. Detailed and careful design and construction planning will be required. Dependent upon the results of further groundwater evaluation, and if proper grading/filling cannot be accomplished, it may be necessary to eliminate basements.

It should be noted that the borings were relatively widely spaced, especially considering the size of the site. As such, variations in subsurface conditions should be expected, and the removal or undercutting of loose, wet, unstable or otherwise unsuitable natural soils may be necessary, and may become extensive in some areas of the property. In addition, substantial difficulty with groundwater, and with subgrade and excavation instability may be experienced in some areas. It is recommended that additional exploration be performed to further evaluate areas of shallower groundwater in order to assist with development planning and with establishing basement floor and yard elevations.

The floor slabs and pavements can be supported by the existing soils following proper preparation, which will include the removal of soft, unstable or unsuitable zones. Some instability and the need for undercutting may occur.

A discussion of the foundation design parameters, as well as the support conditions for the floor slab and pavement areas, is included in the following sections.

Site Preparation

The presence of organic topsoil and vegetation in the subgrade can adversely affect the serviceability of structural fills, foundations, floor slabs, pavements, and other structures placed upon them. Approximately 8 to 12 inches of topsoil was present on the surface of the site at the boring locations. However, some variation should be anticipated, especially encroaching upon the wetland areas where thicker deposits may be present. All topsoil, vegetation, trees, roots and other organic matter must be stripped from the areas of footings, floor slabs, pavements, sidewalks, and other structures.

Topsoil depths and/or the presence of organic soils may increase substantially within and encroaching upon wetland areas. Very shallow groundwater levels may also be present. It is generally recommended that development within wetland areas not be performed due to the typical presence of highly organic soils and shallow groundwater. If such development is contemplated, special permits may be required from the Army Corps of Engineers, the WDNR, or other government agencies.

Site preparation will require removal of the existing structure(s) and any remnants of former buildings, including foundations and underground utilities. Extensive areas of loose backfill material may be encountered within utility trenches, adjacent to the existing structures, and in former building, basement, and other structural areas. Other fill deposits not disclosed by the borings may also be present within the general area of the existing building and roadways that may have been placed as part of the development. These will also require removal. The areas, including basements, must then be properly backfilled with compacted structural fill. Prior to the backfilling, the areas must be observed by a PSI representative to evaluate the suitability of the subgrade for subsequent support of the new building, utilities, or other structures.

The majority of the property was a farm field at the time of the field exploration. If any remnant drain tiles are encountered during construction, it is generally recommended that they be tied into new drainage structures or otherwise be properly drained to a suitable area (in accordance with any applicable regulatory requirements or restrictions), since they may still actively drain areas of the subject site or adjacent properties.

After stripping the topsoil and cutting high areas of the site to the planned finished grade, and prior to the placement of new fill which may be placed to raise grades, the subgrade must be thoroughly proofrolled to detect unstable, yielding soils. This should consist of overlapping passes in a perpendicular grid pattern, with a fully-loaded tandem-axle dump truck, or other equipment of similar size and weight suitable for the surface conditions. Proofrolling should be performed in consultation with the geotechnical engineer at the time of construction. Some difficulty with subgrade preparation may be experienced, especially in wet or cold weather, or during thawing conditions. Additionally, instability can become more severe in silty and clayey materials, which are considered to be moderately to highly moisture sensitive. It is generally recommended that earthwork be carried out during relatively warm, dry weather. Any soft, wet, or otherwise unstable zones which cannot be improved by scarification and aeration, must be removed and replaced with compacted structural fill, such as clean crushed stone, possibly in conjunction with the use of a geotextile fabric. Construction delays and difficulty with subgrade stabilization may be experienced during periods of wet and/or cool weather. Substantial difficulty may be experienced by construction equipment in accessing and moving around the site. Consideration should be given to installing construction roads to reduce disturbance to the sensitive subgrade soils.

Every effort must be made to keep excavations dry. If construction proceeds during wet weather, some additional over excavation may be necessary. If weather permits, the soil could be dried and recompacted. A crushed stone working mat, possibly in conjunction with a geotextile fabric, may also be feasible to help stabilize subgrades. Site grading runoff should be directed to catch basins, so that the potential for the softening of the foundation subgrade soils is reduced.

If site grades are raised in excess of 2 feet, the first lift of new fill must be placed so as to extend a minimum lateral distance of 5 feet beyond the planned top building pad dimension (for fills less than 5 feet in thickness), or for a distance equal to at least 1 foot laterally beyond the top pad dimension for every foot of fill thickness (for fills greater than 5 feet in depth). Subsequent lifts can then be placed on an approximate 1H:1V slope back up to the planned top perimeter dimension of the pad. Similarly, where undercutting of unsuitable soils is performed beneath foundations, floor slabs, or other structural areas, it is recommended that the removal extend laterally beyond the perimeter of the structure at least 1 foot for every foot of removal below the planned bearing depth. Proper moisture control is essential to reduce the amount of compactive effort necessary to achieve the desired densities.

When a firm and stable subgrade is established, low areas may be raised to planned grades with properly compacted structural fill. Any new fill should be a clean granular soil, such as

those materials meeting the gradations outlined in Section 209 or 305 of the State of Wisconsin Standard Specification for Highway and Structure Construction. If fine-grained soils, such as those with high silt or clay content are used, they should generally be placed over large open areas, where conditions are more favorable for the proper placement and compaction of such materials. It must be recognized that high silt or clay content materials are difficult to compact when placed at moisture contents beyond a few percent of the optimum moisture content. Fill must be placed in layers of not more than nine (9) inches in thickness, at moisture contents at or near optimum, and be compacted to a minimum density of 95 percent of the maximum dry density as determined by ASTM designation D-698. Silt, clay, and wet granular soils are not suitable for reuse as compacted fill in trenches, or adjacent to foundation stem walls or retaining walls.

Proper moisture control is essential to reduce the amount of compactive effort necessary to achieve the desired densities. This is especially true of clayey soils, where scarification and aeration may be required to achieve near - optimum moisture levels prior to compaction. A sheep'sfoot roller is generally required for compaction of clayey soils, whereas a vibratory smooth drum roller is preferred for granular material. Small hand-operated compactors should be used in confined areas; granular fills are generally more readily compacted to the required densities in such applications.

It is recommended that well-graded granular soils be utilized as backfill in new utility trenches and alongside below grade walls to reduce the potential for consolidation and settlement of the fill. All fill soils must be placed and compacted under engineering-controlled conditions, to provide suitable support for overlaying structures and roadways. Additional guidance can be provided at the time of construction in the selection process for grade-raising fill and trench backfill.

The selection of fill materials for various applications should be done in consultation with the soils engineer. Similarly, the evaluation of the subgrade and placement and compaction of fill for structural applications should be monitored and tested by a qualified representative of the soils engineer.

Foundation Evaluation

The following is a general overview of the subsurface conditions for the site, as it relates to foundation analysis, and can be used in preliminary site planning.

The proposed structures may be supported by a conventional spread foundation system, bearing on suitable naturally occurring soils or within structural fill, prepared as discussed in a previous section. For preliminary planning conventional spread footings bearing upon suitable natural soils, or compacted structural fill (or lean concrete mix) used to replace unsuitable materials, can be designed to exert net allowable soil bearing pressures of 1,500 to 4,000 psf, dependent upon location and bearing elevation. However, some undercutting of soft, loose, wet, or otherwise unsuitable natural soils may be required, especially where excavations extend

below the groundwater or perched zones. All foundations must bear upon suitable and stable soils of sufficient strength.

The suitability of the existing soils for support of the proposed foundation must be determined by testing by a qualified geotechnical engineer during construction, utilizing static cone penetrometer tests or dynamic cone penetrometer tests for cohesive and granular soils, respectively. Soft, loose, or otherwise unsuitable materials not disclosed by the borings, may be encountered in the foundation excavations at the bearing elevation. If unsuitable existing soil is present, it must be removed throughout a zone extending one foot laterally for each two feet removed below the foundation, on either side of the planned footing. The over-excavated area must be backfilled with structural compacted fill.

In lieu of the use of compacted structural fill, the existing fill soils and any unsuitable natural materials could be removed from beneath new footings and the excavation backfilled to the original planned bearing depth with a lean concrete mix. If it is elected to utilize a lean concrete mix to replace the unsuitable soils, the foundation excavations should be about 4 inches wider than the proposed footing width and must extend through the unsuitable bearing materials to the natural soils. The concrete must be placed immediately after excavation to avoid intrusion of soil into the excavation. The concrete should contain sufficient aggregate and cement to attain a 28-day compressive strength of at least 1000 psi. Some sloughing or caving of the overlying soils may be experienced. Should this occur during concrete placement, the area must be removed and recast. Additionally, should caving become extensive, it may be necessary to substantially widen excavations to avoid soil intrusion into the concrete. This may result in the use of additional concrete quantities significantly in excess of preconstruction budget estimates.

Wet soils, and groundwater or perched zones may be encountered within foundation excavations in most areas, and a substantial loss in strength along with a soft or loose subgrade may develop when the confining effect of the overburden is removed. This may require undercutting and the use of a crushed stone working mat or a "mud mat" to achieve a stable bearing grade. Substantial sloughing and caving may also occur, and dewatering may be required.

All perimeter footings and all footings in unheated areas must be placed at a depth of at least 4 feet (or deeper if required by local code or in accordance with customary practice) below the finished grade for frost protection. Due to periodic severity of winters in this area, it is recommended that footings in poorly heated or unheated areas of the building also be placed at least 4 feet below the adjacent exterior grade. Interior footings not subject to frost action may be placed at a shallow depth of at least 18 inches below the floor slab, provided they bear on suitable natural soils or engineered fills. All footings must be protected from the effects of frost if construction is carried out during winter months.

It is recommended that the footings supporting individual columns have a minimum dimension of 24 inches, and continuous footings have a minimum width of 18 inches, even if the maximum

recommended allowable bearing pressure is not fully utilized. In order to minimize the effects of any slight differential movement that may occur due to variations in the character of the supporting soils and any variations in seasonal moisture contents, it is recommended that all foundations be suitably reinforced to make them as rigid as needed.

In general, the performance of the foundation system on this site is dependent on the various factors discussed herein. The excavation, preparation, and concreting of foundations should be monitored and tested by a representative of the soils engineer.

Preliminary Floor Slab and Pavement Subgrades

Prior to constructing the floor slabs or pavements, and prior to the placement of any fill used to raise grades, the exposed subgrade must be prepared utilizing the proofrolling procedures described previously. In areas that exhibit soft, yielding or unstable soil conditions, the following remedial measures are recommended to provide a stable subgrade. It is recommended that the and proofrolling operations be monitored by a representative of the geotechnical engineer to ensure that a firm, suitable subgrade is present prior to placement of new fills, or to construction of floor slabs and pavements.

Localized wet, soft or unstable areas can be undercut to such depths determined necessary in the field to reach stable material, and the area backfilled with imported crushed stone, such as the 1¼-inch gradation specified in Section 305 of the WisDOT Standard Specifications, placed and compacted as recommended in the Site Preparation section of this report. If relatively thick zones or areas of extensive yielding are observed, and they cannot be stabilized by normal discing, aeration and recompaction procedures, undercutting and replacement with crushed stone and geotextile fabric (if needed) may also be required in these areas.

The floor slab(s) may be designed utilizing an estimated modulus of subgrade reaction of 125 pci based on the presence of suitable and stable soils, prepared as discussed in this report. However, this is based on common range values obtained from 1 ft. x 1 ft. plate load tests on specific soil types. Depending on how the slab load is applied, the value may need to be modified for larger areas using the following:

Modulus of Subgrade Reaction	$k_s = \left(\frac{k}{B} \right)$ for cohesive soil
	$k_s = k \left(\frac{B+1}{2B} \right)^2$ for cohesionless soil

where: k_s = coefficient of vertical subgrade reaction for loaded area
 k = coefficient of vertical subgrade reaction for a 1x1 foot square area
 B = width of area loaded, in feet

The final design and detailing should be performed by a qualified structural engineer based on the intended slab use, loading conditions and anticipated subgrade conditions.

A granular mat, which can be designed as a drainage layer, should be provided below the floor slab. This must be a minimum of six (6) inches in thickness and properly compacted. In moisture sensitive areas, a vapor retarder may be placed beneath the floor slab or base course, however, it is recommended that the architect be consulted in this regard. The proper use of a vapor retarder may not completely prevent moisture beneath or on top of slabs. If the base course contains sharp particles, a cushion layer of sand approximately 2 inches in thickness may be required to provide protection from puncture.

The floor slabs should be suitably reinforced to make them as rigid as necessary and proper joints provided at the junction of slabs and the foundation system so that a small amount of independent movement can occur without causing damage. Large floor areas must be provided with joints at frequent intervals (maximum spacing of 30 times the slab thickness, per ACI) to compensate for concrete volume changes (shrinkage). Where the slab will be supporting live loads, such as from moving vehicles, joints must be keyed or dowelled to permit proper load transfer. It is recommended that appropriate construction methods and curing procedures be used to minimize shrinkage and curling of the floor slabs.

Below Grade Walls

It is recommended that basement slabs be placed at least 2 feet above the groundwater. However, groundwater was encountered during auger advancement in all borings except B-22 at depths of about 1 to 18.5 feet below existing grade (EL. 794 to EL. 778.5), with relatively shallow depths of about 1 to 6 feet (EL. 807.5 to EL. 787.5) being more typical. As such, substantial difficulty with groundwater, and with excavation subgrade and sidewall stability will likely be experienced, especially where excavations encroach upon or extend below the groundwater. An adequate dewatering effort will be necessary. Additionally, the over-excavation of unstable zones along the use of a crushed stone working mat will likely be required and may become extensive.

It is recommended that further evaluation of groundwater levels across the site using backhoe test pits (and possibly monitoring wells) be performed as part of design planning to assist in establishing appropriate basement floor and associated surface elevations. Significant filling to raise finished exterior grades may be necessary in order to establish basement slabs at appropriate elevations; and in order to establish sufficient drainage pathways, to allow for similar entrance elevations, to meet utility slope requirements, and to achieve aesthetic requirements. Detailed and careful design and construction planning will be required. Dependent upon the results of further groundwater evaluation, and if proper grading/filling cannot be accomplished, it may be necessary to eliminate basements.

It is recommended that an underdrain system and drainage course be placed beneath the floor slab and that a drain tile system be placed alongside the basement foundation (if conventional construction is used) to alleviate excessive lateral pressure on the walls. The drainage system should be connected to adequate sumps for drainage and be properly discharged in accordance with all state and local discharge requirements. Drain tile should have a minimum

diameter of four (4) inches and should be wrapped with an appropriate filter fabric. Drainage pipes should be surrounded by clean gravel and extend up to the near ground surface in window well areas. At least six (6) inches of clean $\frac{3}{4}$ inch stone should be utilized for the free draining layer beneath the floor areas.

The below grade walls must be backfilled for a lateral distance of 3 to 4 feet with a well-graded, free draining granular material. This should be placed in lifts not exceeding 12 inches in thickness and be compacted to at least 95 percent of the Standard Proctor density. Based upon the use of a clean, crushed stone fill, and a drained condition, an equivalent fluid pressure of 65 psf may be used as the horizontal component of earth pressure at rest. However, when a proposed fill material has been selected, a representative sample must be submitted to PSI for testing to verify the above values and associated recommendations. Silt and clay soils, organic soils, and wet granular materials are not suitable for use as backfill alongside basement walls. It must be recognized that the above value is based upon a drained condition and is exclusive of traffic and other surcharge loads near the walls, which must be factored into the design.

Exterior/Unheated Area Slabs

Based on the borings, entry slabs, sidewalks, aprons, and other slabs in exterior or unheated areas may bear upon silty or clayey soils in at least some areas. Such materials are highly frost susceptible and poorly drained. Slabs placed directly upon such soils are subject to heaving and subsequent settlement due to freeze/thaw cycles. This can result in cracking, misalignment, and other related effects (especially at joints). It is recommended that consideration be given to limited undercutting of the frost susceptible materials to a depth of 1 to 2 feet below the slab, and replacement with well graded, properly placed and compacted granular soils. A properly designed underdrain system connected to the municipal sewer (if permissible) or directed to on-site stormwater management areas should also be incorporated to reduce the potential effects of freeze/thaw cycles.

Utility Construction

The on-site soils can generally be used for support of utility lines. However, some undercutting of soft, wet, or otherwise unsuitable soils, in conjunction with the placement of crushed stone or other suitable granular backfill may be necessary. Some difficulty with the stability of utility trenches may be experienced, especially in the presence of water. The use of sloping, shoring, bracing, or trench boxes will likely be required. Utility construction should be performed in accordance with "The Standard Specifications for Sewer and Water Line Construction" for the State of Wisconsin.

It is recommended that well graded granular soils such as those specified in Tables 37 and 39 of the Standard Specification for Sewer and Water Construction be utilized as backfill in utility trenches to reduce the potential for consolidation and settlement of the backfill. All fill soils must be properly placed and compacted under engineering-controlled conditions to provide suitable support for overlaying structures and roadways. Silty and clayey soils, organic soils, and wet

materials are not recommended for use as backfill within utility trenches due to the substantial difficulty of obtaining proper compaction in confined areas. Substantial importing of suitable fill will likely be required.

As with all excavation work, all open cut trenches must be properly shored and braced as required by applicable federal and state OSHA codes, and as necessary to protect life and property.

CONSTRUCTION CONSIDERATIONS

Groundwater Control

Groundwater observations were made during the drilling operations, and in the open boreholes upon completion of drilling and removal of the augers. Groundwater was encountered during auger advancement in all borings except B-22 at depths of 1 to 18.5 feet below existing grade (EL. 794 to EL. 778.5). Upon completion and removal of the augers, groundwater was present at borings B-2 through B-9, B-13, B-15 through B-19, and B-21, at depths of about 1.5 to 12 feet below existing grade (EL. 793.5 to EL. 793).

On the basis of the observations, substantial difficulty with groundwater may be experienced during excavation work on this site. For low volume perched zones, a filtered sump pump or other conventional means may suffice to control the groundwater. However, for excavations encroaching upon or extending below the groundwater, or for larger volume perched zones, more severe difficulty is likely to be experienced and prolonged dewatering with a series of sumps and high-capacity pumps (with sufficient lifting capacity), or other more comprehensive means may be necessary to facilitate construction. Due and proper care must be used during dewatering in order to avoid rapid or excessive drawdown, which may cause settlement or other related distress to existing buildings, utilities, or other structures.

Since portions of the anticipated subgrade soils are subject to softening when exposed to free moisture, every effort should be made to keep excavations dry. Site grading should be performed to direct runoff away from the construction area, so that the potential for the softening of the subgrade soils is reduced.

It must be recognized that groundwater levels fluctuate with time due to variations in seasonal precipitation, lateral drainage conditions, and soil permeability characteristics. Additional evaluation of groundwater levels is recommended.

Excavations and Site Drainage

Sloping, shoring or bracing of the excavation sidewalls will be necessary to facilitate construction and to protect life and property. Sloughing and caving should be expected within unprotected excavations. The degree of excavation instability problems is dependent upon the

depth and length of time that excavations remain open, excavation bank slopes, water levels and the effectiveness of any dewatering systems. However, severe instability may occur within granular or soft clay soils. All excavation work must be performed in accordance with OSHA and local building code requirements.

Where excavations encroach upon or extend below the groundwater or perched zones and into sand, silt, or soft clay, a substantially unstable subgrade may develop when the confining effect of the overburden is removed. Significant sloughing or caving of sidewalls may also occur. Some over-excavation of softened or loosened soils, in conjunction with the use of a crushed stone working mat, may be necessary to establish a stable bearing subgrade. Additionally, significantly widened excavations may result, or be required to maintain or achieve sidewall stability. Extreme difficulty with excavations and in achieving a stable subgrade may be experienced on this site, especially when encroaching upon or extending below the groundwater.

It is mandated that excavations, whether they be for utility trenches, or footing excavations, be constructed in accordance with current Occupational Safety and Health Administration (OSHA) guidelines to protect workers and others during construction. PSI recommends that these regulations be strictly enforced; otherwise, workers could be in danger and the owner(s) and the contractor(s) could be liable for substantial penalties. The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. PSI is providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

Since the subgrade soils are generally sensitive to moisture, every effort should be made to provide adequate drainage across the site during construction, and to prevent ponding of runoff on the subgrade. These soils are also subject to erosion caused by runoff, and erosion control measures should be implemented where needed or required by local ordinances.

Seismic Design Considerations

The soils encountered in the borings are estimated to meet the criteria for Site Class D in accordance with 1613.2.5.2 of the International Building Code-2018 (which directs to the simplified design procedure outlined in ASCE 7 – Minimum Design Loads and Associated Criteria for Buildings and Other Structures).

PAVEMENT DESIGN RECOMMENDATIONS

Pavements for this project are understood to consist of residential roads, which are estimated to be primarily subjected to light passenger vehicle traffic, and occasional delivery trucks, garbage trucks, and school buses.

The near surface pavement subgrade soils encountered at the borings predominately consisted of sandy silt soils with an estimated visual classification of A-4 by the AASHTO soil classification method. These soils are generally rated as poor for pavement subgrade support, based on their moderate shrink/swell potential and frost susceptibility; and fair to poor drainage characteristics. Provided that the subgrade soils are prepared as outlined in the Site Preparation section of this report, the in-place subgrade soils and any new structural fill can be used for standard flexible or rigid pavement construction.

Evaluation of the visual soil classification has been made in estimating pertinent subgrade design coefficients as described in the Wisconsin Soils Manual for Pavement Design. Based on the soils encountered, and with proper subgrade preparation and drainage, the following pavement subgrade design parameters are recommended for the pavement section design. However, if soils with support characteristics different from the lean clay materials are encountered or are used to raise grades in new pavement areas, revised coefficients will need to be provided.

PAVEMENT SUBGRADE DESIGN COEFFICIENTS

AASHTO Soil Classification	A-4
Design Frost Index	F-3 to F-4
Design Group Index	12
Soil Support Value	3.8
Estimated Subgrade Modulus (k)	150 pci

The subject site is located in an area that experiences annual freezing cycles. The granular subgrade soils encountered at the borings are not generally considered to be highly susceptible to frost action. However, near surface layers of finer grained soils may be encountered. In addition, it is generally good customary practice to control surface runoff in order to reduce the potential for frost action. It is recommended that underdrains be placed within the subgrade, just below the granular base, to help reduce the potential for trapping water within the aggregate base layer. Sufficient drain tiles extending radially outward an adequate distance from each interior catch basin must be installed. In addition, drain tiles should extend along curb lines, up the slope from curb inlets. The drain tile should be directly connected to the storm sewer manholes or catch basins (if permissible by local municipal or other applicable code). The drain tile should consist of perforated PVC pipe of adequate diameter placed beneath the base layer, extending a sufficient distance into the subgrade. The pipe should be surrounded by appropriately sized clean stone, with the pipe and stone being wrapped with a geotextile filter fabric to reduce the potential for soils to migrating into and obstruct the pipe. It is also

recommended that roof drains be connected to the stormwater collection system to minimize the potential for this water to enter the base and subgrade.

STORMWATER MANAGEMENT AREA CONSIDERATIONS

Borings B-7, B-8, B-10 to B-12, B-18, B-19, and B-22 were completed within the areas of proposed stormwater management basins. The subgrade soils encountered in the borings have been visually classified in general accordance with the USDA textural soil classification system. They consisted of silt loam, gravelly fine sandy loam, gravelly fine sand, sandy loam, silty clay loam, very gravelly fine sand, gravelly sand, gravelly loam, loamy sand, clay loam, loamy fine sand, and fine sand. Groundwater was encountered during auger advancement at all stormwater borings except B-22, at depths of about 3 to 13 feet (EL. 803.5 to 782.5) below existing grade. Upon completion and removal of the augers, groundwater was present at borings B-7, B-8, B-18, B-19 at depths of about 2 to 4 feet (EL. 788.5 to EL. 789.5) below existing grade.

With regard to the above soil and groundwater conditions encountered at the borings, NR 151.124(4)(c)1 and 2 – *Infiltration rate exemptions* indicates that infiltration practices located in an area where the infiltration rate of the soil measured at the proposed bottom of the infiltration system is less than 0.6 inches per hour using a scientifically credible field test method; or an area where the least permeable soil horizon to 5 feet below the proposed bottom of the infiltration system using the USDA method of soils analysis consists of sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay or clay may be credited toward meeting the requirements, but the decision to infiltrate under these conditions is optional. In addition, NR 151.124(4)(b)1 – *Separation distances* indicates that infiltration practices shall be located so that the characteristics of the soil and the separation distance between the bottom of the infiltration system and the elevation of seasonal high groundwater or the top of bedrock are in accordance with the following Table (reproduced from NR 151.124):

Table 3. Separation Distances and Soil Characteristics		
Source Area	Separation Distance	Soil Characteristics
Industrial, Commercial, Institutional Parking Lots and Roads	5 feet or more	Filtering Layer*
Residential Arterial Roads	5 feet or more	Filtering Layer*
Roofs Draining to Surface Infiltration Practices	1 foot or more	Native or Engineered Soil with Particles Finer than Coarse Sand
Roofs Draining to Surface Infiltration Practices	Not Applicable	
All Other Impervious Source Areas	3 feet or more	Filtering Layer*

*Defined in NR 151.002(14r) as a "soil that has at least a 3-foot deep layer with at least 20 percent fines; or at least a 5-foot deep layer with at least 10 percent fines; or an engineered soil with an equivalent level of protection as determined by the regulatory authority for the site."

The information shown above is a selected excerpt from NR151 that is intended only as general guidance for considering stormwater management in conjunction with the encountered subsurface conditions at the borings. Basin design must be performed by a qualified and experienced firm. In addition, the entirety of Chapter NR151 of the Wisconsin Administrative Code, the Site Evaluation for Stormwater Infiltration (1002) document, and other applicable references; along with appropriate state, local or other municipal requirements must be consulted as part of site-specific stormwater design.

It is recommended that stormwater management basins not be placed in close proximity to basements or other below grade structures. Proper and careful consideration of soils and subsurface conditions must be given during site and design planning, and extreme care must be exercised during construction. Lateral migration of water may result in substantially increased sump pump activity and can quickly overcome the ability of such pumps to maintain a desirable water level, resulting in significant flooding. The potential for such conditions to occur can greatly increase when below grade floor elevations encroach upon or are below the elevation of basin bottoms and/or when basins are placed in close proximity to structures (strongly not recommended). In addition, the presence of granular or other generally permeable soils, which is typically necessary in the areas of structures for utility backfill, alongside basement walls, or within other development excavations/trenches can act as extensive migration channels to rapidly carry large volumes of water from basins and into nearby below grade structures. Building codes or municipal regulations may require that floor elevations of below grade structures be a specified distance above the water level of nearby basins or other stormwater features. It is therefore recommended that the design engineer (or other appropriate representative) review applicable municipal or other regulatory requirements and verify the design normal and design high water elevations of stormwater basins/features with respect to planned or existing below grade slab elevations.

GENERAL COMMENTS

This geotechnical exploration and evaluation has been prepared to aid in the evaluation of the subsurface conditions on this site. The recommendations presented herein are based on the available soil information and the preliminary project information provided. Any changes in the planned project activities should be brought to the attention of the soil engineer to determine if modifications in the recommendations are required. The final design plans and specifications should also be reviewed by the soil engineer to determine that the recommendations presented herein have been interpreted and implemented as intended.

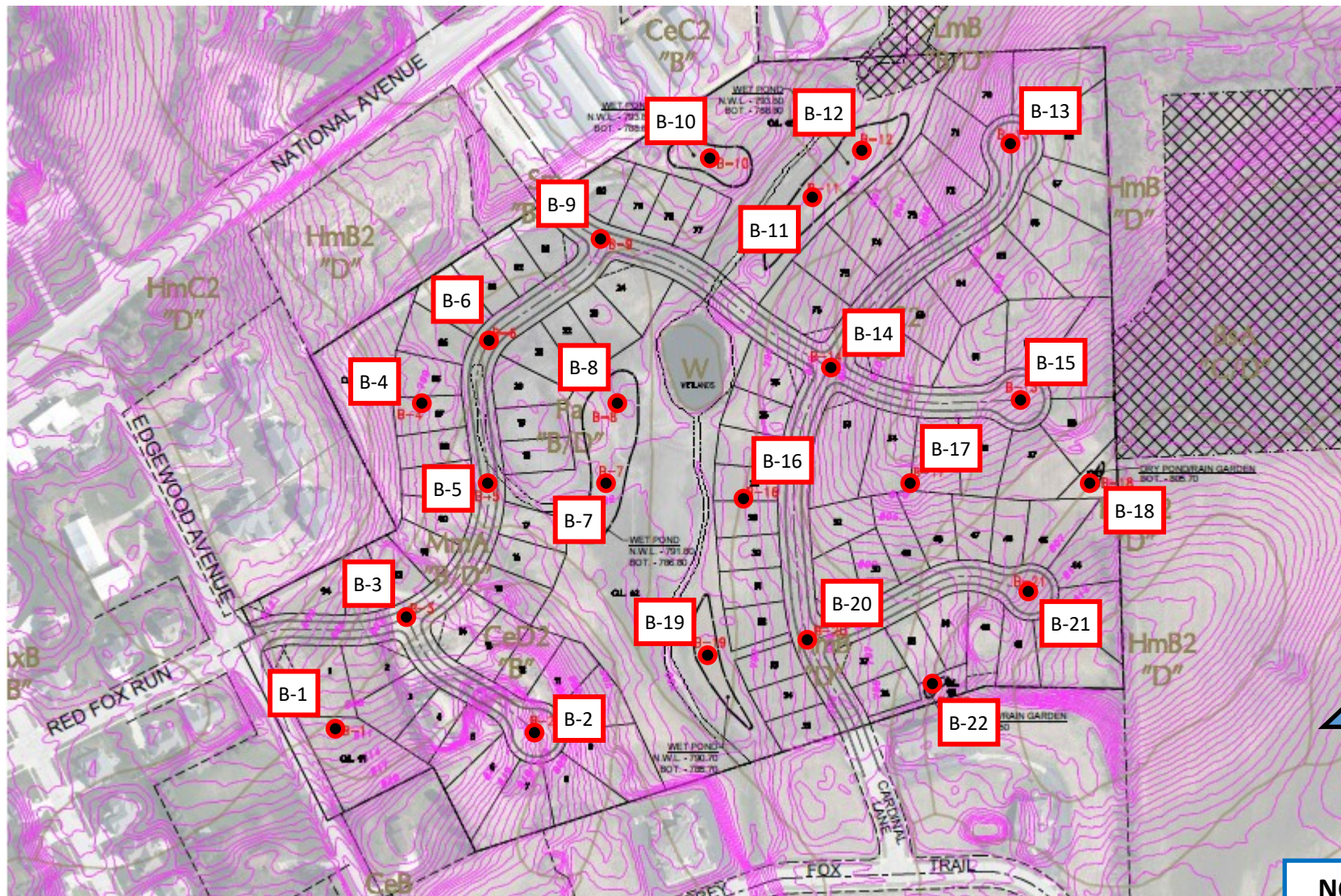
This geotechnical study has been conducted in a manner consistent with that level of care ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. The findings, recommendations and opinions contained herein have been promulgated in accordance with generally accepted practice in the fields of foundation

engineering, soils mechanics, and engineering geology. No other representations, expressed or implied, and no warranty or guarantee is included or intended in this report.

It is recommended that the earthwork and foundation operations be monitored by the soil engineer, to test and evaluate the subgrade stability, bearing capacities, and the selection, placement and compaction of controlled fills. WisDOT Standard Specifications for Highway and Structure Construction can also serve as a guide in implementing the subgrade preparation and other earthwork operations.

Appendix

Figure 1 – Boring Location Plan
Soil Boring Logs
General Notes
Soil Evaluation – Storm Form
USDA Classification Chart



DATE STARTED: 2/29/24 DATE COMPLETED: 2/29/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 809.5 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: ASV D-50 ATV - Rig #420 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-1 Water ▽ While Drilling 3.5 feet ▼ Upon Completion Not Obsvd ▽ Delay N/A	
BORING LOCATION:					

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						Topsoil, Dark Brown Sandy Silt With Gravel, Moist (10"± Thick)	TPSL				
				1	6	Brown Sandy Clay With Gravel, Very Moist	CL	5-4-7 N=11			Q _r = 0.3 tsf
				2	8	Brown Silty Medium to Fine Sand and Gravel, Wet	SM	7-7-8 N=15			
805	5			3	18	Brown Sandy Clay With Gravel, Wet	CL	3-4-3 N=7			
				4	18		CL	6-10-16 N=26			Q _r = 0.1 tsf
800	10			5	14	Orangish-Brown to Gray Silty Medium to Coarse Sand and Gravel, Wet	SM	15-37-37 N=74			
795	15			6	16		SM	13-35-34 N=69			
790	20					End of Boring at 20'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 2/29/24 DATE COMPLETED: 2/29/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 813 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: ASV D-50 ATV - Rig #420 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-2	
		Water ▽ While Drilling 13.5 feet ▼ Upon Completion 8.5 feet ▽ Delay N/A		BORING LOCATION: 	

Elevation (feet)	Depth (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @				Additional Remarks
									× Moisture ■ PL ● LL ▲ Qu * Qp				
0		[Graphic Log: Topsoil]			Topsoil, Dark Brown Sandy Silt With Gravel, Moist (8"± Thick)	TPSL		14	×				
		[Graphic Log: Sand & Gravel]	1	10	Brown Medium to Fine Sand and Gravel With Clay Lenses, Moist		16-15-9 N=24	9	×	○			
810		[Graphic Log: Sand & Gravel]	2	12		SP	10-13-13 N=26	3	×	○			
5		[Graphic Log: Sand & Gravel]	3	10			10-15-14 N=29	8	×	○			
805		[Graphic Log: Sand & Gravel]	4	12	▼ Brown Sandy Silt With Gravel, Moist to Wet		15-21-39 N=60	8	×			>>○	
10		[Graphic Log: Sand & Gravel]	5	16		ML	11-21-23 N=44	9	×			○	
800		[Graphic Log: Sand & Gravel]	6	18	Brown Silty Medium to Coarse Sand and Gravel, Wet	SM	8-13-33 N=46	9	×			○	
795		[Graphic Log: Sand & Gravel]			End of Boring at 20'								
20		[Graphic Log: Sand & Gravel]			Cave-In at 11'								

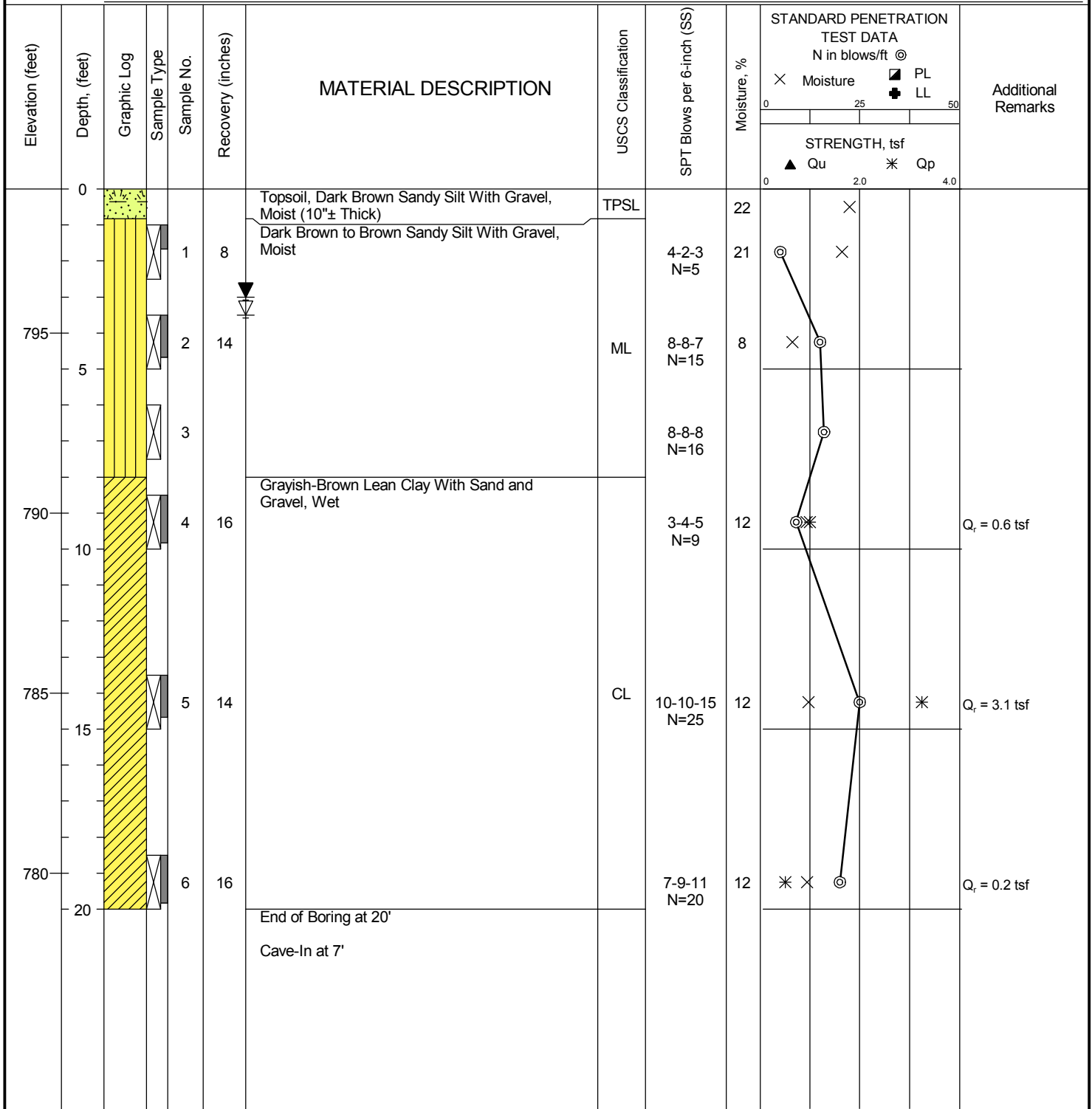
	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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DATE STARTED: 2/29/24 DATE COMPLETED: 2/29/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 805 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: ASV D-50 ATV - Rig #420 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-3	
		Water ▽ While Drilling 6 feet ▼ Upon Completion 12 feet ▽ Delay N/A		BORING LOCATION:	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
									× Moisture ▣ PL ● LL ▲ Qu * Qp	
800	0				Topsoil, Dark Brown Sandy Silt With Gravel, Moist (9"± Thick)	TPSL		14		
			1	12	Brown Sandy Silt With Gravel, Moist to Wet		7-8-10 N=18	9		
	5		2	14			4-6-6 N=12	14		
			3	16		ML	4-4-4 N=8	10		
795	10		4	5			4-9-9 N=18	10		
					Gray Silt With Sand and Gravel, Moist					
790	15		5	14		ML	4-5-9 N=14	16		
					Gray Sandy Clay With Gravel, Wet					
785	20		6	6		CL	7-11-12 N=23	17		
					End of Boring at 20'					
					Cave-In at 13'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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DATE STARTED: 2/28/24 DATE COMPLETED: 2/28/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 799 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:	DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: ASV D-50 ATV - Rig #420 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:	BORING B-4 <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="3" style="width: 5%; text-align: center; vertical-align: middle;">Water</td> <td style="width: 10%; text-align: center;">▽</td> <td style="width: 75%;">While Drilling</td> <td style="width: 10%; text-align: right;">3.5 feet</td> </tr> <tr> <td style="text-align: center;">▼</td> <td>Upon Completion</td> <td style="text-align: right;">3 feet</td> </tr> <tr> <td style="text-align: center;">▽</td> <td>Delay</td> <td style="text-align: right;">N/A</td> </tr> </table> BORING LOCATION:	Water	▽	While Drilling	3.5 feet	▼	Upon Completion	3 feet	▽	Delay	N/A
Water	▽	While Drilling		3.5 feet								
	▼	Upon Completion		3 feet								
	▽	Delay	N/A									



	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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DATE STARTED: 2/29/24 DATE COMPLETED: 2/29/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 794.5 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: ASV D-50 ATV - Rig #420 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-5	
		Water ∇ While Drilling ▼ Upon Completion ▽ Delay 1 feet 2 feet N/A		BORING LOCATION:	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0					Topsoil, Black Sandy Silt With Gravel, Moist (12"± Thick)	TPSL				
			1	8	Brown Sandy Silt With Gravel, Wet		2-6-8 N=14	9	×	
790	5		2	10			5-6-8 N=14	8	×	
			3	8		ML	7-5-6 N=11	10	×	
785	10		4	6			11-9-9 N=18	10	×	
					Gray Silty Medium to Fine Sand and Gravel, Wet					
780	15		5	14		SM	24-37-41 N=78	8	×	>>⊙
775	20		6	16			23-35-43 N=78	9	×	>>⊙
					End of Boring at 20'					
					Cave-In at 5'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 2/28/24 DATE COMPLETED: 2/28/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 794.5 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: ASV D-50 ATV - Rig #420 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-6	
		Water ▽ While Drilling 3.5 feet ▼ Upon Completion 3 feet ▽ Delay N/A		BORING LOCATION:	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
									× Moisture ■ PL ▲ Qu * Qp	
0		[Topsoil Symbol]			Topsoil, Dark Brown Sandy Silt With Gravel, Very Moist (11"± Thick)	TPSL				
		[Silt Symbol]	1		Brown Sandy Silt With Gravel, Wet	ML	9-11-9 N=20			
790	5	[Silt Symbol]	2	12		ML	6-9-11 N=20			
		[Silt Symbol]	3	18	Grayish-Brown Silt With Sand, Very Moist	ML	8-8-10 N=18			
785	10	[Clay Symbol]	4	14	Grayish-Brown Lean Clay, Moist	CL	4-6-7 N=13			Q _r = 2.2 tsf
		[Clay Symbol]	5	16	Gray Sandy Clay With Gravel, Wet	CL	5-6-5 N=11			
780	15	[Clay Symbol]	6	14	Gray Lean Clay With Sand and Gravel, Wet	CL	6-7-5 N=12			
775	20				End of Boring at 20'					
					Cave-In at 5'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 2/27/24 DATE COMPLETED: 2/27/24 COMPLETION DEPTH: 15.0 ft BENCHMARK: N/A ELEVATION: 792.5 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-7 Water While Drilling Upon Completion Delay 5 feet 3 feet N/A BORING LOCATION:	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0					Topsoil, Black Silt Loam, Moist (10"± Thick)					
					Gray Silt Loam, Moist					
790			1	12			5-4-3-2 N=7	17		
			2		Pale Brown Gravelly Fine Sandy Loam, Moist to Wet		2-2-4-4 N=6			
5			3	8			3-3-5-12 N=8	15		
785			4	18	Brown Gravelly Fine Sand, Wet		8-13-9-6 N=22	11		
			5	14			4-4-4-10 N=8	19		
780			6	20			6-7-9-9 N=16	16		
			7	24			13-14-17-18 N=31	9		
15					End of Boring at 15'					
					Cave-In at 6'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 2/27/24		DRILL COMPANY: PSI, Inc.		BORING B-8	
DATE COMPLETED: 2/27/24		DRILLER: DT LOGGED BY: AW			
COMPLETION DEPTH: 15.0 ft		DRILL RIG: Marooka D-50 ATV - Rig #395		Water ▽ While Drilling ▼ Upon Completion ▽ Delay 5 feet 4 feet N/A	
BENCHMARK: N/A		DRILLING METHOD: Hollow Stem Auger			
ELEVATION: 793.5 ft		SAMPLING METHOD: 2-in SS			
LATITUDE:		HAMMER TYPE: Automatic		BORING LOCATION:	
LONGITUDE:		EFFICIENCY: N/A			
STATION: N/A OFFSET: N/A		REVIEWED BY:			
REMARKS:					

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
										X Moisture PL LL 02550 STRENGTH, tsf ▲ Qu * Qp 02.04.0	
	0					Topsoil Fill, Black Silt Loam, Moist (11"± Thick)			35		
				1	6	Possible Fill, Brown Gravelly Sandy Loam Mottled Gray, Moist		4-4-6-7 N=10	12		
790				2	8	Possible Fill, Brown Gravelly Silty Clay Loam, Moist		4-6-8-7 N=14	9		
5				3	20	Brown Gravelly Fine Sandy Loam, Wet		8-8-8-7 N=16	15		
785				4	12	Brown Gravelly Fine Sand, Wet		4-5-12-17 N=17	24		
10				5	16			4-6-9-12 N=15	17		
				6	14			7-9-9-13 N=18	17		
780				7	18			12-14-16-15 N=30	11		
15						End of Boring at 15'					
						Cave-In at 7'					

	Professional Service Industries, Inc.	PROJECT NO.: 00523364
	821 Corporate Court, Suite 100	PROJECT: Proposed Cardinal Crest Subdivision
	Waukesha, WI 53189	LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave
	Telephone: (262) 521-2125	Mukwonago, WI

The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 2/28/24 DATE COMPLETED: 2/28/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 795 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: ASV D-50 ATV - Rig #420 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-9	
		Water ∇ While Drilling ▼ Upon Completion ∇ Delay 1 feet 1.5 feet N/A		BORING LOCATION:	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0					Topsoil, Black Sandy Silt With Gravel, Moist (10"± Thick)	TPSL				
			1	10	Brown Silty Medium to Fine Sand and Gravel, Wet	SM	8-11-14 N=25	7	×	⊙
			2	12	Brown Gravel With Medium to Coarse Sand, Trace Silt, Wet		8-17-21 N=38	7	×	⊙
790	5		3	12		GM	9-19-27 N=46	8	×	⊙
			4	14			12-26-27 N=53	8	×	>>⊙
785	10				Brown Medium to Fine Sand With Silt, Wet					
			5	18		SM	7-9-11 N=20	25	⊙	×
780	15									
			6	14			10-10-11 N=21	20	⊙	×
775	20				End of Boring at 20'					
					Cave-In at 3'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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DATE STARTED: 2/29/24 DATE COMPLETED: 2/29/24 COMPLETION DEPTH: 15.0 ft BENCHMARK: N/A ELEVATION: 801.5 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: ASV D-50 ATV - Rig #420 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-10 Water ☐ While Drilling ☒ Upon Completion ☐ Delay 7 feet Not Obsvd N/A BORING LOCATION:	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @				Additional Remarks
										× Moisture ■ PL ▲ Qu * Qp				
800	0					Topsoil, Black Silt Loam, Moist (9"± Thick)								
						Pale Brown Very Gravelly Fine Sand, Moist								
				1	14			8-8-10-13 N=18	3	×	⊙			
				2	16			10-12-12-15 N=24	3	×	⊙			
795	5					Brown Gravelly Sand, Moist to Wet								
				3	16			12-13-12-16 N=25	3	×	⊙			
				4	14			5-10-11-12 N=21	9	×	⊙			
	10			5	10			10-17-12-8 N=29	13		×	⊙		
790				6	16			6-12-16-14 N=28	14		×	⊙		
				7	16			6-12-21-15 N=33	12		×	⊙		
	15					End of Boring at 15'								
						Cave-In at 6'								

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/1/24 DATE COMPLETED: 3/1/24 COMPLETION DEPTH: 15.0 ft BENCHMARK: N/A ELEVATION: 795.5 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-11 Water ▽ While Drilling ▼ Upon Completion ▽ Delay 13 feet Not Obsvd N/A BORING LOCATION:	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
795	0					Topsoil, Black Silt Loam, Moist (10"± Thick)				X Moisture ▲ Qu ■ PL + LL	
				1	5	Black and Brown Gravelly Loam, Moist	3-3-4-6 N=7	14	20	X	
				2	6	Light Brownish-Gray Gravelly Loam Mottled Dark Yellowish-Brown, Moist	7-8-9-12 N=17	7		X	
790	5			3	12	Grayish-Brown Silt Loam Mottled Gray, Moist	6-12-8-8 N=20	8		X	
				4	6	Gray Gravelly Loamy Sand, Wet	4-6-8-6 N=14	14		X	
785	10			5	12	Gray Silt Loam, Wet	2-3-3-5 N=6	8		X	
				6	6		69/8"	7		X	>>⊙
				7	3		50/5"	11		X	>>⊙
	15					End of Boring at 15' Cave-In at 10'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/1/24 DATE COMPLETED: 3/1/24 COMPLETION DEPTH: 15.0 ft BENCHMARK: N/A ELEVATION: 797 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-12 Water ☐ While Drilling ☒ Upon Completion ☐ Delay 3 feet Not Obsvd N/A BORING LOCATION:	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0					Topsoil, Dark Brown Silt Loam, Moist (10"± Thick)				X Moisture ▲ Qu 0 2.0 4.0 ■ PL + LL 0 25 50	
					Gray Clay Loam, Moist					
795			1	10	Brown Sandy Loam, Moist to Wet		2-2-12-14 N=14	22		
			2	14			6-10-7-14 N=17	21		
5					Pale Brown Gravelly Loam, Wet			9		
			3	20			4-3-4-5 N=7	9		
790			4	18			3-3-4-5 N=7	10		
			5	5			3-4-5-4 N=9	13		
					Gray Gravelly Loam, Wet					
785			6	10			6-15-30-37 N=45	9		
			7	3			50/4"	4		
15					End of Boring at 15'					
					Cave-In at 9'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/1/24 DATE COMPLETED: 3/1/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 820 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-13	
		Water ∇ While Drilling ∇ Upon Completion ∇ Delay 13.5 feet 7 feet N/A		BORING LOCATION:	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @				Additional Remarks
										× Moisture ▣ PL ▴ Qu ✱ Qp				
0						Topsoil, Dark Brown Sandy Silt With Gravel, Moist (11"± Thick)	TPSL		19					
				1	8	Brown Lean Clay With Sand and Gravel, Moist	CL	3-6-10 N=16	19	⊗			✱	Q _r = 2.1 tsf
				2	6	Light Brown Silty Medium to Coarse Sand and Gravel, Moist		67/11"	6	×			>>⊕	
815	5			3	12			6-11-16 N=27	9	×	⊗			
				4	12			9-15-19 N=34	8	×	⊗			
810	10						SM							
				5	8			15-17-34 N=51	11	×			>>⊕	
805	15			6	1			50/2"					>>⊕	
800	20					End of Boring at 20'								

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/1/24 DATE COMPLETED: 3/1/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 803 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-14 Water ☐ While Drilling ☒ Upon Completion ☐ Delay 6 feet Not Obsvd N/A BORING LOCATION:	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0					Topsoil, Dark Brown Sandy Silt With Gravel, Moist (11"± Thick)	TPSL				
			1	10	Brown Sandy Silt With Gravel, Moist to Wet		4-4-4 N=8	19	⊗	
800			2	14			2-2-4 N=6	13	⊗	
5			3	10			4-11-14 N=25	9	⊗	
795			4	12		ML	8-33-17 N=50	9	⊗	
10										
790			5	10			90/10"	12	⊗	>>⊗
15										
785			6	3			50/5"	8	⊗	>>⊗
20					End of Boring at 20'					
					Cave-In at 10'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/1/24 DATE COMPLETED: 3/1/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 815 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-15 Water ▽ While Drilling 18.5 feet ▼ Upon Completion 10 feet ▽ Delay N/A BORING LOCATION: 	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks	
									X Moisture PL LL 0 25 50 ▲ Qu * Qp 0 2.0 4.0		
815	0	[Topsoil, Black Sandy Silt With Gravel, Moist (12"± Thick)]			Topsoil, Black Sandy Silt With Gravel, Moist (12"± Thick)	TPSL		19	X		
		[Brown Sandy Clay With Gravel, Moist]	1	12	Brown Sandy Clay With Gravel, Moist	CL	2-3-6 N=9	10	*X	Q _r = 0.4 tsf	
		[Brown Sandy Silt With Gravel, Very Moist]			Brown Sandy Silt With Gravel, Very Moist	ML	4-3-6 N=9	9	X		
810	5	[Brown Sandy Clay With Gravel, Very Moist]	2	12	Brown Sandy Clay With Gravel, Very Moist	CL	4-4-8 N=12	10	*X	Q _r = 0.4 tsf	
		[Brown Silty Sand and Gravel, Moist]	3		Brown Silty Sand and Gravel, Moist	SM	7-17-32 N=49	9	X		
805	10	[End of Boring at 20']	4	6	End of Boring at 20'		50/6"	7	X	>>⊙	
800	15		5	4							
795	20		6	5							

Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00523364
PROJECT: Proposed Cardinal Crest Subdivision
LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave
Mukwonago, WI

The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/2/24 DATE COMPLETED: 3/2/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 794 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-16 Water ▽ While Drilling 1 feet ▼ Upon Completion 3 feet ▽ Delay N/A BORING LOCATION: 	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						Topsoil, Black Sandy Silt With Gravel, Moist (12"± Thick)	TPSL		21	X Moisture ▲ Qu * Qp PL LL	
				1	8	Brown Sandy Clay With Gravel, Moist	CL	3-6-6 N=12	18		
						Brown Gravel With Medium to Fine Sand, Wet					
790				2	12		GM	13-17-33 N=50	9		
	5					Brown Clayey Sand and Gravel					
				3	12			5-2-1 N=3	10		
785				4	8		SC	3-3-10 N=13	11		
	10					Brown Gravel With Sand and Silt, Wet					
780				5	14			20-34-34 N=68	9		>>⊙
	15						GM				
775				6	8			7-14-32 N=46	8		⊙
	20					End of Boring at 20'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/1/24 DATE COMPLETED: 3/1/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 811 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-17	
		Water ▽ While Drilling 3.5 feet ▼ Upon Completion 11 feet ▽ Delay N/A		BORING LOCATION:	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @			Additional Remarks
									× Moisture ■ PL ▲ Qu * Qp			
810	0		1	0	Topsoil, Dark Brown Sandy Silt With Gravel, Moist (10"± Thick)	TPSL	3-4-8 N=12	17	×	○		
			2	8	Brown Silty Medium to Fine Sand and Gravel, Wet	SM	16-11-6 N=17	10	×	○		
805	5		3	16	Brown Sandy Silt With Gravel, Very Moist		3-6-10 N=16	9	×	○		
			4	14			13-17-23 N=40	5	×		○	
800	10		5	12		ML	9-25-40 N=65	8	×			>>○
795	15		6	5			50/6"	8	×			>>○
20	20				End of Boring at 20'							
					Cave-In at 12'							

Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00523364
PROJECT: Proposed Cardinal Crest Subdivision
LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave
Mukwonago, WI

DATE STARTED: 3/1/24 DATE COMPLETED: 3/1/24 COMPLETION DEPTH: 15.0 ft BENCHMARK: N/A ELEVATION: 806.5 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-18 Water While Drilling Upon Completion Delay 3 feet 4 feet N/A	
BORING LOCATION:					

Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
805	0				Topsoil, Black Silt Loam, Moist (12"± Thick)					
			1	8	Dark Brown Gravelly Loam, Moist		13-9-5-5 N=14			
			2	8	Brown Loamy Fine Sand, Wet		3-5-5-6 N=10			
800	5		3	16	Light Yellowish-Brown Gravelly Loam Mottled Gray, Wet		4-5-4-4 N=9			
			4	12			3-47-6-6 N=53			
	10		5	6			4-2-3-4 N=5			
795			6	10			92/10"			
			7	8	Gray Gravelly Loam, Wet		50/6"			
	15				End of Boring at 15'					
					Cave-In at 9'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/2/24 DATE COMPLETED: 3/2/24 COMPLETION DEPTH: 15.0 ft BENCHMARK: N/A ELEVATION: 790.5 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-19 Water While Drilling Upon Completion Delay 3 feet 2 feet N/A BORING LOCATION:	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
790	0					Topsoil, Black Silt Loam, Moist (11"± Thick)					
				1	6	Brown Gravelly Loam Mottled Gray, Moist to Wet		5-5-3-4 N=8	12	X Moisture ▲ Qu ■ PL + LL	
				2	14	Gray Gravelly Fine Sandy Loam, Wet		19-21-9-5 N=30	9		
785	5			3	10	Gray Gravelly Fine Sand, Wet		5-4-3-4 N=7	8		
				4	14			3-7-9-11 N=16	10		
780	10			5	12			10-19-12-12 N=31	20		
				6	14			14-12-14-25 N=26	9		
				7	6			50/6"	9		
15	15					End of Boring at 15'					
						Cave-In at 3'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/2/24 DATE COMPLETED: 3/2/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 797 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-20 Water ☐ While Drilling ☒ Upon Completion ☐ Delay 18.5 feet Not Obsvd N/A BORING LOCATION:	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @			Additional Remarks	
									× Moisture ■ PL ▼ Qu * Qp				
0		[Topsoil Layer]			Topsoil, Dark Brown Sandy Silt With Gravel, Moist (11"± Thick)	TPSL		17	×				
795		[Sand Layer]	1	5	Light Brown Medium to Fine Sand and Gravel With Silt, Moist to Wet		4-11-12 N=23	3	×	⊙			
5		[Sand Layer]	2	8			7-12-11 N=23	6	×	⊙			
790		[Sand Layer]	3	14			18-29-30 N=59	2	×			>>⊙	
10		[Sand Layer]	4	14			14-34-32 N=66	2	×			>>⊙	
785		[Sand Layer]				SM							
15		[Sand Layer]	5	14			9-20-17 N=37	4	×		⊙		
780		[Sand Layer]											
20		[Sand Layer]	6	16			11-19-20 N=39	5	×		⊙		
					End of Boring at 20'								
					Cave-In at 8'								

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/2/24 DATE COMPLETED: 3/2/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 808 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-21 Water ▽ While Drilling 3.5 feet ▼ Upon Completion 8 feet ▽ Delay N/A BORING LOCATION: 	
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Elevation (feet)	Depth (feet)	Graphic Log	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
									X Moisture ▲ Qu PL LL 	
0		[Topsoil]			Topsoil, Dark Brown Sandy Silt With Gravel, Moist (11"± Thick)	TPSL		23		
		[Brown Sandy Clay]	1	10	Brown Sandy Clay With Gravel, Moist to Wet	CL	5-3-4 N=7	14		Q _r = 0.3 tsf
805			2	14			4-3-4 N=7	11		
5		[Brown Silty Sand]	3	8	Brown Silty Medium to Fine Sand and Gravel, Very Moist to Moist		4-5-8 N=13	9		
800			4	14			5-15-19 N=34	7		
			5	12		SM	50/6"	6		>>⊙
795			6	5			50/5"	8		>>⊙
790					End of Boring at 20'					
20					Cave-In at 9'					

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 3/2/24 DATE COMPLETED: 3/2/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 799 ft LATITUDE: LONGITUDE: STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: PSI, Inc. DRILLER: DT LOGGED BY: AW DRILL RIG: Marooka D-50 ATV - Rig #395 DRILLING METHOD: Hollow Stem Auger SAMPLING METHOD: 2-in SS HAMMER TYPE: Automatic EFFICIENCY: N/A REVIEWED BY:		BORING B-22 Water ☐ While Drilling ☒ Upon Completion ☐ Delay Not Obsvd Not Obsvd N/A BORING LOCATION:	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						Topsoil, Dark Brown Silt Loam, Moist (8"± Thick)					
						Pale Brown Gravelly Loam, Moist to Wet					
				1	16			4-3-5-5 N=8			
795				2	3			5-8-7-6 N=15			
5				3	8			2-4-5-6 N=9			
				4	2			50/3"			
790				5	16			73/9"			
10				6	12			71/11"			
				7				50/1"			
785						End of Boring at 15'					
						Cave-In at 9'					
780											
	20										

	Professional Service Industries, Inc. 821 Corporate Court, Suite 100 Waukesha, WI 53189 Telephone: (262) 521-2125	PROJECT NO.: 00523364 PROJECT: Proposed Cardinal Crest Subdivision LOCATION: SEC of National Ave (Hwy ES) & Edgewood Ave Mukwonago, WI
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GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.	☒ SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
HSA: Hollow Stem Auger - typically 3 1/4" or 4 1/4" I.D. openings, except where noted.	■ ST: Shelby Tube - 3" O.D., except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry	▮ RC: Rock Core
R.C.: Diamond Bit Core Sampler	↓ TC: Texas Cone
H.A.: Hand Auger	☞ BS: Bulk Sample
P.A.: Power Auger - Handheld motorized auger	☒ PM: Pressuremeter
	CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N ₆₀ : A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q _u : Unconfined compressive strength, TSF
Q _p : Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL), %
DD: Dry unit weight, pcf
▼, ▼, ▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (3/4 in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to 3/4 in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

<u>Q_u - TSF</u>	<u>N - Blows/foot</u>	<u>Consistency</u>
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

<u>Description</u>	<u>Criteria</u>
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term</u>	<u>% Dry Weight</u>
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

<u>Description</u>	<u>Criteria</u>	<u>Description</u>	<u>Criteria</u>
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick	Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick	Lensed:	Inclusion of small pockets of different soils
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing	Layer:	Inclusion greater than 3 inches thick (75 mm)
Slickensided:	Fracture planes appear polished or glossy, sometimes striated	Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
		Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

<u>Q_u - TSF</u>	<u>Consistency</u>
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

<u>Description</u>	<u>Criteria</u>
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

<u>Voids</u>	<u>Void Diameter</u>
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

<u>(Typically Sedimentary Rock)</u>	
<u>Component</u>	<u>Size Range</u>
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

<u>Rock Mass Description</u>	<u>RQD Value</u>
Excellent	90 - 100
Good	75 - 90
Fair	50 - 75
Poor	25 - 50
Very Poor	Less than 25

DEGREE OF WEATHERING

Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	SAND AND SANDY SOILS			GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
		CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
				ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
				MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
		HIGHLY ORGANIC SOILS			PT

SOIL EVALUATION - STORM

Page 1 of 2

In accordance with SPS 382.365 & 385, Wis. Adm. Code and WDNR Standard 1002

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road. <i>Please print all information.</i> Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04 (1) (m)].						County	
						Waukesha	
						Parcel I.D.	
						Reviewed by:	
						Date:	
Property Owner				Property Location: Mukwonago, WI			
				Govt. Lot			
Property Owner's Mailing Address				Lot #	Block #	Subd. Name or CSM#	
City	State	Zip Code	Phone Number	☒ City ☐ Village ☐ Town		Nearest Road	
				Mukwonago			
Drainage area _____ ☐ sq. ft. ☐ acres Optional: Test Site Suitable for (check all that apply) ☐ Irrigation ☐ Bioretention trench ☐ Trench(es) ☐ Rain Garden ☐ Grassed swale ☐ Reuse ☐ Infiltration trench ☐ SDS (> 15' wide) ☐ Other _____				Hydraulic Application Test Method: ☒ Morphological Evaluation ☐ Double Ring Infiltrometer ☐ Other (specify)		Soil Moisture	
						Date of Test Pits: February 27, 2024	
						USDA-NRCS WETS Value: 11	
						☐ Dry = 1; ☒ Normal = 2; ☐ Wet = 3.	

1	Obs. #	☒ Boring ☐ Pit	B-7	Ground surface elevation ± Elevation of limiting factor: 10"±							
	Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
	1	0-10	10YR 2/1		sil	0 cr	mfr		<15		0.13
	2	10-48	10YR 5/1		sil	1 f sbk	mfr		<15		0.13
	3	48-96	10YR 6/3		grfsl	0 m	mfr		>15		0.5
	4	96-180	10YR 5/3		grfs	0 m	mfr		>15		0.5
Comment: gray soils at 10 inches; wet soils at 5 feet											

2	Obs. #	☒ Boring ☐ Pit	B-10	Ground surface elevation ± Elevation of limiting factor: 7±							
	Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
	1	0-9	10YR 2/1		sil	0 cr	mfr		<15		0.13
	2	9-60	10YR 6/3		vgrfs	0 sg	ml		>35		0.5
	3	60-180	10YR 5/3		grs	0 m	mfr		>15		0.5
Comment: wet soils at 7 feet											

CST/PSS Name (Please Print)			Signature		CST/PSS/Geologist Number	
Patrick J. Patterson					G-229	
Address			Date Evaluation Conducted		Telephone Number	
821 Corporate Court, Waukesha, WI 53189			2/27/2024		262 521 2125	

SBD-10793 (R.01/17)

3	Obs. #	☒ Boring ☐ Pit	B-8	Ground surface elevation ±		Elevation of limiting factor: ground surface				
Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-11	10YR 2/1		sil	0 cr	mfr		<15		0.13
2	11-36	10YR 4/3	c 2 d 10YR 6/1	grsl	0 m	mfr		>15		0.5
3	36-60	10YR 5/3		grscl	1 f sbk	mfi		>15		0.04
4	60-96	10YR 5/3		grfsl	0 m	mfr		>15		0.5
5	96-180	10YR 5/3		grfs	0 m	mfr		>15		0.5
Comment: possible fill to 5 feet; wet soils at 5 feet										

4	Obs. #	☒ Boring ☐ Pit	B-11	Ground surface elevation ±		Elevation of limiting factor: 5'±				
Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-10	10YR 2/1		sil	0 cr	mfr		<15		0.13
2	10-36	10YR 2/1&5/3		grl	1 f sbk	mfr		>15		0.24
3	36-84	10YR 6/2	c 2 d 10YR 4/4	grl	1 f sbk	mfr		>15		0.24
4	84-108	10YR 5/2	m 2 p 10YR 5/1	sil	2 thin pl	mfr		<15		0.13
5	108-132	10YR 6/1		grls	1 thin pl	mfr		>15		1.63
6	132-180	10YR 6/1		sil	2 thin pl	mfr		<15		0.13
Comment: redoximorphic features indicative of seasonal groundwater and gray soils at 3 feet; wet soils at 9 feet										

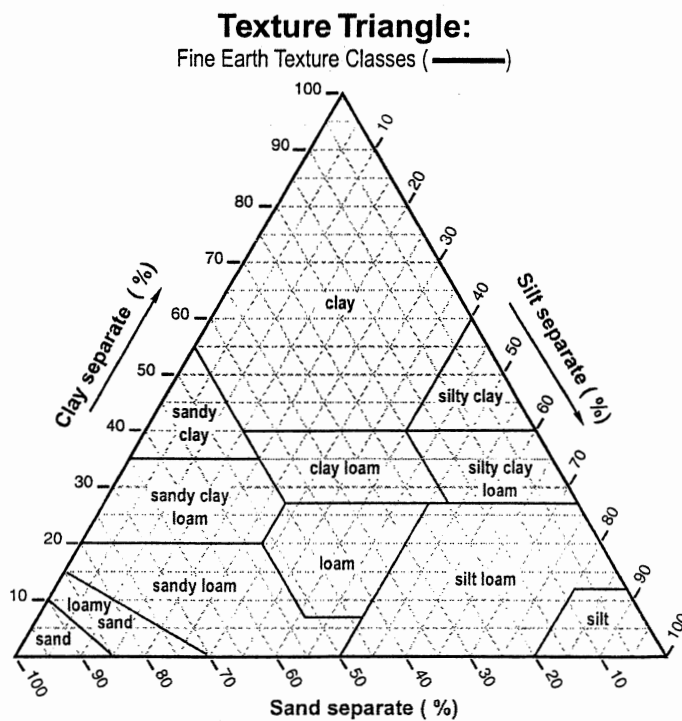
5	Obs. #	☒ Boring ☐ Pit	B-12	Ground surface elevation ±		Elevation of limiting factor: 10"±				
Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-10	10YR 3/3		sil	0 cr	mfr		<15		0.13
2	10-24	10YR 6/1		cl	1 vythin pl	mfi		<15		0.03
3	24-60	10YR 4/3		sl	0 m	mfr		<15		0.5
4	60-132	10YR 6/3		grl	0 m	mfr		>15		0.24
5	132-180	10YR 5/1		grl	0 m	mfr		>15		0.24
Comment: redoximorphic features indicative of seasonal groundwater at 10 inches; wet soils at 3 feet; gray soils at 11 feet										

6	Obs. #	☒ Boring ☐ Pit	B-18	Ground surface elevation ±		Elevation of limiting factor: 3'±				
Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-12	10YR 2/1		sil	0 cr	mfr		<15		0.13
2	12-36	10YR 3/3		grl	1 f sbk	mfr		<15		0.24
3	36-60	10YR 5/3		lfs	0 m	mfr		<15		1.63
4	60-156	10YR 6/4	m 2 p 10YR 5/1	grl	1 f sbk	mfr		>15		0.24
5	156-180	10YR 5/1		grl	1 f sbk	mfr		>15		0.24
Comment: redoximorphic features at 5 feet; gray soils at 13 feet; wet soils at 3 feet										

Page 3 of 3

7	Obs. #	☒ Boring	B-19		Ground surface elevation ±						Elevation of limiting factor: 11"±	
		☐ Pit										
Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate		
										Inches/Hr.		
1	0-11	10YR 2/1		sil	0 cr	mfr		<15		0.13		
2	11-54	10YR 4/3	c 2 d 10YR 6/1	grl	1 f sbk	mfr		>15		0.24		
3	54-84	10YR 5/1		grfsl	0 m	mfr		>15		0.5		
4	84-132	10YR 5/1		grfs	0 m	mfr		>15		0.5		
5	132-180	10YR 5/1		grfsl	0 m	mfr		>15		0.5		
Comment: redoximorphic features at 11 inches; gray soils at 4.5 feet; wet soils at 3 feet												

8	Obs. #	☒ Boring	B-22							
		☐ Pit	Ground surface elevation ±		Elevation of limiting factor: 5±					
Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-8	10YR 3/3		sil	0 cr	mfr		<15		0.13
2	8-180	10YR 6/3		grl	1 f sbk	mfr		>15		0.24
Comment: very moist to wet soils at about 5 feet										



TEXTURE MODIFIERS - Conventions for using "Rock Fragment Texture Modifiers" and for using textural adjectives that convey the "% volume" ranges for Rock Fragments - Size and Quantity.

Fragment Content % By Volume	Rock Fragment Modifier Usage
< 15	No texture adjective is used (noun only; e.g., <i>loam</i>).
15 to < 35	Use adjective for appropriate size; e.g., <i>gravelly</i> .
35 to < 60	Use "very" with the appropriate size adjective; e.g., <i>very gravelly</i> .
60 to < 90	Use "extremely" with the appropriate size adjective; e.g., <i>extremely gravelly</i> .
≥ 90	No adjective or modifier. If ≤ 10% fine earth, use the appropriate noun for the dominant size class; e.g., <i>gravel</i> . Use Terms in Lieu of Texture .

(SOIL) TEXTURE

This is the numerical proportion (percent by weight) of sand, silt, and clay in a soil. Sand, silt, and clay content is estimated in the field by hand (or quantitatively measured in the office/lab by hydrometer or pipette) and then placed within the texture triangle to determine **Texture Class**. Estimate the **Texture Class**; e.g., *sandy loam*; or **Subclass**; e.g., *fine sandy loam* of the fine earth (≤ 2 mm) fraction, or choose a **Term in Lieu of Texture**; e.g., *gravel*. If appropriate, use a **Textural Class Modifier**; e.g., *gravelly silt loam*.

NOTE: Soil Texture encompasses only the fine earth fraction (≤ 2 mm). **Particle Size Distribution (PSD)** encompasses the whole soil, including both the fine earth fraction (≤ 2 mm; weight %) and rock fragments (> 2 mm; volume %).

TEXTURE CLASS

Texture Class or Subclass	Code	
	Conv.	NASIS
Coarse Sand	cos	COS
Sand	s	S
Fine Sand	fs	FS
Very Fine Sand	vfs	VFS
Loamy Coarse Sand	lcos	LCOS
Loamy Sand	ls	LS
Loamy Fine Sand	lfs	LFS
Loamy Very Fine Sand	lvfs	LVFS
Coarse Sandy Loam	cosl	COSL
Sandy Loam	sl	SL
Fine Sandy Loam	fsl	FSL
Very Fine Sandy Loam	vfsl	VFSL
Loam	l	L
Silt Loam	sil	SIL
Silt	si	SI
Sandy Clay Loam	scl	SCL
Clay Loam	cl	CL
Silty Clay Loam	sicl	SICL
Sandy Clay	sc	SC
Silty Clay	sic	SIC
Clay	c	C

TEXTURE MODIFIERS - (adjectives)

ROCK FRAGMENTS: Size & Quantity ¹	Code		Criteria: Percent (By Volume) of Total Rock Fragments and Dominated By (<i>name size</i>): ¹
	Conv.	PDP/ NASIS	
ROCK FRAGMENTS (> 2 mm; ≥ Strongly Cemented)			
Gravelly	GR	GR	≥ 15% but < 35% gravel
Fine Gravelly	FGR	GRF	≥15% but < 35% fine gravel
Medium Gravelly	MGR	GRM	≥15% but < 35% med. gravel
Coarse Gravelly	CGR	GRC	≥ 15% but < 35% coarse gravel
Very Gravelly	VGR	GRV	≥ 35% but < 60% gravel
Extremely Gravelly	XGR	GRX	≥ 60% but < 90% gravel
Cobbly	CB	CB	≥ 15% but < 35% cobbles
Very Cobbly	VCB	CBV	≥ 35% but < 60% cobbles
Extremely Cobbly	XCB	CBX	≥ 60% but < 90% cobbles
Stony	ST	ST	≥ 15% but < 35% stones
Very Stony	VST	STV	≥ 35% but < 60% stones
Extremely Stony	XST	STX	≥ 60% but < 90% stones
Bouldery	BY	BY	≥ 15% but < 35% boulders
Very Bouldery	VBY	BYV	≥ 35% but < 60% boulders
Extremely Bouldery	XBY	BYX	≥ 60% but < 90% boulders
Channery	CN	CN	≥ 15% but < 35% channers
Very Channery	VCN	CNV	≥ 35% but < 60% channers
Extremely Channery	XCN	CNX	≥ 60% but < 90% channers
Flaggy	FL	FL	≥ 15% but < 35% flagstones
Very Flaggy	VFL	FLV	≥ 35% but < 60% flagstones
Extremely Flaggy	XFL	FLX	≥ 60% but < 90% flagstones
PARAROCK FRAGMENTS (> 2 mm; < Strongly Cemented) ^{2, 3}			
Parabouldery	PBY	PBY	(same criteria as bouldery)
Very Parabouldery	VPBY	PBYV	(same criteria as very bouldery)
Extr. Parabouldery	XPBY	PBYX	(same criteria as ext. bouldery)
etc.	etc.	etc.	(same criteria as non-para)

¹ The "Quantity" modifier (e.g., *very*) is based on the total rock fragment content. The "Size" modifier (e.g., *cobbly*) is independently based on the largest, dominant fragment size. For a mixture of sizes (e.g., *gravel and stones*), a smaller size-class is named only if its quantity (%) sufficiently exceeds that of a larger size-class. For field texture determination, a smaller size-class must exceed 2 times the quantity (vol. %) of a larger size class before it is named (e.g., 30% gravel and 14% stones = *very gravelly*, but 20% gravel and 14% stones = *stony*). For more explicit naming criteria see NSSH-Part 618, Exhibit 618.11(Soil Survey Staff, 2001b).

APPENDIX F

BMP Design Summary Sheets

Pond 2P Data Summary Sheet

Design Element	Design Data
Site assessment data: (see attached maps)	
Contributing drainage area to basin (subarea V-2)	12.81 acres
Distance to nearest private well (including off-site wells)	> 100 feet
Distance to nearest municipal well	> 1,000 feet
Ground slope at site of proposed basin	average 3%
Proposed outfall conveyance system/discharge (w/ distances)	24" outfall pipe, 42 ft.
Any downstream roads or other structures? (describe)	Yes – culvert at proposed road
Soil investigation data (see attached map & soil logs):	
Number of soil investigations completed	2 (in basin area, see plan)
Do elevations of test holes extend 5 ft. below proposed bottom?	Yes (see soil tests and plan details)
Average soil texture at pond bottom elevation (USDA)	Gravelly Loam
Distance from pond bottom to bedrock	> 5 feet
Distance from pond bottom to seasonal water table	Bottom 0.5 ft. to 1 ft. above water level or seasonal water level indicators (mottling)
General basin design data (see attached detailed drawings):	
Permanent pool surface area	0.58 acres
Design permanent pool water surface elevation	elev. 794.5
Top of berm elevation (after settling) and width	elev. 798.0 / 10 feet wide
Length/width (dimensions/ratio)	450 ft. (L) x 75 ft. (W) = 6:1
Safety shelf design (length, grade, max. depth)	10 ft. @ 10% slope/1' deepest
Liner yes/no, material, thickness	yes
Ave. water depth (minus safety shelf/sediment)	4 ft. (in center)
Sediment forebay size & depth	N/A
Sediment storage depth & design maintenance	2 ft. depth for pool 15 year maintenance schedule

Basin Inflow, Outflow & Storage Data				
Inflow Peak Flows	Maximum Outflow Rate	Max. Water Elevation	Storage Volume at Max. Elev.	Outflow Control Structures*
16.89 cfs (Post 1-yr./24 hr. peak)	1.33 cfs	795.61 ft.	0.720 ac. ft.	#1 & #2
20.65 cfs (Post 2-yr./24 hr. peak)	2.05 cfs	795.80 ft.	0.854 ac. ft.	#1 & #2
35.22 cfs (Post 10-yr./24 hr. peak)	5.76 cfs	796.47 ft.	1.350 ac. ft.	#1 & #2
67.62 cfs (Post 100-yr./24 hr. peak)	24.33 cfs	797.48 ft.	2.179 ac. ft.	#1, #2, #3

* The controlling elements are summarized below (See attached detail drawing of outlet structure):

- #1 = 7- inch outlet pipe, invert elev. @ 794.50
- #2 = 1.5-foot sharp-crested weir, elev. @ 795.50
- #3 = 48-inch horizontal grate, elev. @ 796.50
- #4 = 10 foot wide emergency spillway @ elev. 797.50

Water Quality Data for Development Site		
Parameter	Units	Removal
Total Suspended Solids	Lbs / year	81.3%
Total Phosphorus	Lbs / year	59.4%

Rain Garden 4B Data Summary Sheet

Design Element	Design Data
Site assessment data: (see attached maps)	
Contributing drainage area to basin (Subarea V-4)	1.48 acres
Distance to nearest private well (including off-site wells)	> 100 feet
Distance to nearest municipal well	> 1,000 feet
Ground slope at site of proposed basin	average 2%
Proposed outfall conveyance system/discharge (w/ distances)	V-notch weir wall
Any downstream roads or other structures? (describe)	No – sheet flows offsite
Soil investigation data (see attached map & soil logs):	
Number of soil investigations completed	1 (in basin area, see plan)
Do elevations of test holes extend 5 ft. below proposed bottom?	Yes (see soil tests and plan details)
Average soil texture at pond bottom elevation (USDA)	Gravelly Loam
Design infiltration rate at basin bottom and method of analysis	0.24 in/hr, Tech Standard 1002, Table 2
Measured infiltration rate following construction	
Distance from pond bottom to bedrock	> 5 feet
Distance from BMP bottom to highest groundwater table	Bottom 1.7 ft. above water level
General basin design data (see attached detailed drawings):	
Basin bottom area	0.05 acres
Effective infiltration area	0.05 acres
1% of development area (Development Site 25.95 acres)	0.26 acres
Basin bottom elevation	elev. 805.2
Top of berm elevation (after settling) and width	elev. 808.2 / 10 feet wide
Basin storage below outlet	653 cu. ft.
Time to completely infiltrate stored water	<1 hr
Sediment forebay size & depth	N/A
Pre-treatment prior to infiltration	N/A – backyards, roof, patio

Infiltration Data for Development Site				
Pre-dev. infil. volume	Post-dev. infil. volume w/basin	% of Pre-dev. infil. provided	Average annual runoff volume	25% of the runoff from the 2 yr. / 24 hr. storm (cu. ft.)
2,374,244 cu. ft.	1,786,597 cu. ft.	75.2%	947,043 cu. Ft.	22,977 cu. Ft.

Basin Inflow, Outflow & Storage Data				
Inflow Peak Flows	Maximum Outflow Rate	Max. Water Elevation	Storage Volume at Max. Elev.	Outflow Control Structures*
1.66 cfs (Post 1-yr./24 hr. peak)	0.50 cfs	806.71 ft.	0.044 ac. ft.	#1 & #2
2.10 cfs (Post 2-yr./24 hr. peak)	1.03 cfs	806.78 ft.	0.048 ac. ft.	#1 & #2
3.83 cfs (Post 10-yr./24 hr. peak)	3.39 cfs	806.94 ft.	0.059 ac. ft.	#1 & #2
7.80 cfs (Post 100-yr./24 hr. peak)	7.49 cfs	807.12 ft.	0.072 ac. ft.	#1 & #2

* The controlling elements are summarized below (See attached detail drawing of outlet structure):

#1 = Infiltration @ 0.24 in./hr.

#2 = V-notch sharp-crested weir, elev. 806.2

Water Quality Data for Development Site		
Parameter	Units	Removal
Total Suspended Solids	Lbs / year	81.3%
Total Phosphorus	Lbs / year	59.4%

Rain Garden 5B Data Summary Sheet

Design Element	Design Data
Site assessment data: (see attached maps)	
Contributing drainage area to basin (Subarea M-5)	1.62 acres
Distance to nearest private well (including off-site wells)	> 100 feet
Distance to nearest municipal well	> 1,000 feet
Ground slope at site of proposed basin	average 3%
Proposed outfall conveyance system/discharge (w/ distances)	spillway, 10-ft
Any downstream roads or other structures? (describe)	Yes – proposed road crossing and structure at Pond 6
Soil investigation data (see attached map & soil logs):	
Number of soil investigations completed	1 (in basin area, see plan)
Do elevations of test holes extend 5 ft. below proposed bottom?	Yes (see soil tests and plan details)
Average soil texture at pond bottom elevation (USDA)	Gravelly Loam
Design infiltration rate at basin bottom and method of analysis	0.24 in/hr, Tech Standard 1002, Table 2
Measured infiltration rate following construction	
Distance from pond bottom to bedrock	> 5 feet
Distance from BMP bottom to highest groundwater table	> 5 feet
General basin design data (see attached detailed drawings):	
Basin bottom area	0.04 acres
Effective infiltration area	0.04 acres
1% of development area (Development Site 25.95 acres)	0.26 acres
Basin bottom elevation	elev. 795.0
Top of berm elevation (after settling) and width	elev. 798.5 / 10 feet wide
Basin storage below outlet	1,045 cu. ft.
Time to completely infiltrate stored water	25 hrs
Sediment forebay size & depth	N/A
Pre-treatment prior to infiltration	N/A – backyards, roof, patio

Infiltration Data for Development Site				
Pre-dev. infil. volume	Post-dev. infil. volume w/basin	% of Pre-dev. infil. provided	Average annual runoff volume	25% of the runoff from the 2 yr. / 24 hr. storm (cu. ft.)
2,374,244 cu. ft.	1,786,597 cu. ft.	75.2%	947,043 cu. Ft.	22,977 cu. Ft.

Basin Inflow, Outflow & Storage Data				
Inflow Peak Flows	Maximum Outflow Rate	Max. Water Elevation	Storage Volume at Max. Elev.	Outflow Control Structures*
2.30 cfs (Post 1-yr./24 hr. peak)	0.84 cfs	797.61 ft.	0.052 ac. ft.	#1 & #2
2.87 cfs (Post 2-yr./24 hr. peak)	1.61 cfs	797.67 ft.	0.055 ac. ft.	#1 & #2
5.13 cfs (Post 10-yr./24 hr. peak)	4.81 cfs	797.84 ft.	0.064 ac. ft.	#1 & #2
10.24 cfs (Post 100-yr./24 hr. peak)	9.89 cfs	798.02 ft.	0.075 ac. ft.	#1 & #2

* The controlling elements are summarized below (See attached detail drawing of outlet structure):

#1 = Infiltration @ 0.24 in./hr.

#2 = 10 foot wide emergency spillway @ elev. 797.5

Water Quality Data for Development Site		
Parameter	Units	Removal
Total Suspended Solids	Lbs / year	81.3%
Total Phosphorus	Lbs / year	59.4%

Pond 6P Data Summary Sheet

Design Element	Design Data
Site assessment data: (see attached maps)	
Contributing drainage area to basin (subarea M-6)	7.54 acres
Distance to nearest private well (including off-site wells)	> 100 feet
Distance to nearest municipal well	> 1,000 feet
Ground slope at site of proposed basin	average 3%
Proposed outfall conveyance system/discharge (w/ distances)	21" outfall pipe, 42 ft.
Any downstream roads or other structures? (describe)	Yes – culvert at Grey Fox Trail
Soil investigation data (see attached map & soil logs):	
Number of soil investigations completed	1 (in basin area, see plan)
Do elevations of test holes extend 5 ft. below proposed bottom?	Yes (see soil tests and plan details)
Average soil texture at pond bottom elevation (USDA)	Sandy Loam
Distance from pond bottom to bedrock	> 5 feet
Distance from pond bottom to seasonal water table	Bottom 3.75 ft. below water level
General basin design data (see attached detailed drawings):	
Permanent pool surface area	0.18 acres
Design permanent pool water surface elevation	elev. 789.75
Top of berm elevation (after settling) and width	elev. 795.0 / 10 feet wide
Length/width (dimensions/ratio)	250 ft. (L) x 50 ft. (W) = 5:1
Safety shelf design (length, grade, max. depth)	10 ft. @ 10% slope/1' deepest
Liner yes/no, material, thickness	yes
Ave. water depth (minus safety shelf/sediment)	4 ft. (in center)
Sediment forebay size & depth	N/A
Sediment storage depth & design maintenance	2 ft. depth for pool 15 year maintenance schedule

Basin Inflow, Outflow & Storage Data				
Inflow Peak Flows	Maximum Outflow Rate	Max. Water Elevation	Storage Volume at Max. Elev.	Outflow Control Structures*
10.60 cfs (Post 1-yr./24 hr. peak)	1.41 cfs	791.52 ft.	0.415 ac. ft.	#1 & #2
14.01 cfs (Post 2-yr./24 hr. peak)	2.20 cfs	791.77 ft.	0.491 ac. ft.	#1 & #2
26.68 cfs (Post 10-yr./24 hr. peak)	10.22 cfs	792.51 ft.	0.743 ac. ft.	#1, #2, #3
51.49 cfs (Post 100-yr./24 hr. peak)	21.47 cfs	793.81 ft.	1.280 ac. ft.	#1, #2, #3

* The controlling elements are summarized below (See attached detail drawing of outlet structure):

- #1 = 3- inch outlet pipe, invert elev. @ 789.75
- #2 = 1-foot sharp-crested weir, elev. @ 791.00
- #3 = 48-inch horizontal grate, elev. @ 792.25
- #4 = 10 foot wide emergency spillway @ elev. 794.00

Water Quality Data for Development Site		
Parameter	Units	Removal
Total Suspended Solids	Lbs / year	81.3%
Total Phosphorus	Lbs / year	59.4%

APPENDIX G

Watershed Summary Sheets

Data Summary Sheet for Stormwater Management Plan

Project Name: Cardinal Ridge – Phase I **Project Size:** 25.95 Acres **Project type:** Residential Subdivision **No. of Lots:** 52 lots
Number of Runoff Discharge Points: 3 **Watershed (ultimate discharge):** Unnamed tributary to the Fox River
Watershed Area (including off-site runoff traveling through project area): 25.95 acres
Public Land Survey Location: Section 19, T5N R19E (Mukwonago Township)

Summary Data Elements	Vernon Subwatershed (Link V-1L)		Mukwonago Subwatershed (Link M-1L)			
	Pre-develop	Post-develop	Pre-develop	Post-develop		
Watershed Areas (see attached map)	16.78 acres	16.52 acres	9.17 acres	9.43 acres		
Average Watershed Slopes	2%	2%	2%	2%		
Land Uses (% of each, see attached map)	100% cropland	6.24 ac. impervious 9.17 ac. lawn 0.53 ac. meadow 0.58 ac. water	100% cropland	0.39 ac. impervious 0.78 ac. lawn 0.03 ac. woodland		
Runoff Curve Numbers	RCN = 78	impervious = 98 lawn = 74 meadow = 71 water = 100 RCN = 84	RCN = 78	impervious = 98 lawn = 74 woodland = 70 RCN = 82		
Conveyance System Types	Sheet flow	50% grass swale 50% storm sewer	Sheet flow	Sheet flow to backyards		
Summary of Average Conveyance System Data	2% grade	2' depth swale/2% Sewer see calcs.	2% grade	2% grade		
Time of Concentration (Tc) (see attached map & worksheets)	0.23 hrs.	0.29 hrs.	0.23 hrs.	0.11 hrs.		
Runoff volume: 25% of 2-yr 24-hr post-developed storm (for low-density residential only)	N/A	15,311 cu. ft.	N/A	7,666 cu. ft.		
Runoff volume: first half-inch (watershed area in sq. ft. X .04 ft.)	N/A	29,983 cu. ft.	N/A	17,115 cu. ft.		
Runoff volume: average annual basis (WinSLAMM Output)	359,396 cu. ft.*	947,043 cu. ft.*	359,396 cu. ft.*	947,043 cu. ft.*		
Infiltration Volume [2.4 ft. X onsite subwatershed area (sq. ft.)] - average annual runoff volume	1,754,248 cu. ft.	1,727,066 cu. ft.	958,668 cu. ft.	985,849 cu. ft.		
Peak Flow: 1-year/24 hour	15.34 cfs	2.72 cfs	8.73 cfs	1.43 cfs		
Peak Flow: 2-yr./24 hour	19.91 cfs	3.54 cfs	11.32 cfs	2.23 cfs		
Peak Flow: 10-yr./24 hour	38.63 cfs	9.24 cfs	21.93 cfs	10.34 cfs		
Peak Flow: 100-yr./24 hour	83.07 cfs	35.29 cfs	47.08 cfs	21.76 cfs		

*: Vernon and Mukwonago Subwatersheds combined

Stormwater Management Practice Maintenance Agreement

Document Number

Neumann Developments, Inc., as “Owner” of the property described below, in accordance with Chapter 14 Waukesha County Code of Ordinances, agrees to install and maintain stormwater management practice(s) on the subject property in accordance with approved plans and Stormwater Permit conditions. The owner further agrees to the terms stated in this document to ensure that the stormwater management practice(s) continues serving the intended functions in perpetuity. This Agreement includes the following exhibits:

Exhibit A: Legal Description of the real estate for which this Agreement applies (“Property”).

Exhibit B: Location Map(s) – shows an accurate location of each stormwater management practice affected by this Agreement.

Exhibit C: Maintenance Plan – prescribes those activities that must be carried out to maintain compliance with this Agreement.

Note: After construction verification has been accepted by Waukesha County for all planned stormwater management practices, an addendum(s) to this agreement shall be recorded by the Owner showing design and construction details. The addendum may contain several additional exhibits.

Through this Agreement, the Owner hereby subjects the Property to the following covenants, conditions and restrictions:

1. The Owner shall be responsible for the routine and extraordinary maintenance and repair of the stormwater management practice(s) and drainage easements identified in Exhibit B in accordance with the maintenance plan contained in Exhibit C.
2. Upon written notification by Village of Vernon or Village of Mukwonago or their designee, the Owner(s) shall, at their own cost and within a reasonable time period determined by the Village of Vernon or Village of Mukwonago, have an inspection of the stormwater management practice conducted by a qualified professional, file a report with the Village of Vernon or Village of Mukwonago and complete any maintenance or repair work recommended in the report. The Owner(s) shall be liable for the failure to undertake any maintenance or repairs.
3. In addition, and independent of the requirements under paragraph 2 above, the Village of Vernon or Village of Mukwonago, or its designee, is authorized to access the property as necessary to conduct inspections of the stormwater management practices or drainage easements to ascertain compliance with the intent of this Agreement and the activities prescribed in Exhibit C. The Village of Vernon or Village of Mukwonago may require work to be done which differs from the report described in paragraph 2 above, if the Village of Vernon or Village of Mukwonago reasonably concludes that such work is necessary and consistent with the intent of this agreement. Upon notification by the Village of Vernon or Village of Mukwonago of required maintenance or repairs, the Owner(s) shall complete the specified maintenance or repairs within a reasonable time frame determined by the Village of Vernon or Village of Mukwonago.
4. If the Owner(s) do not complete an inspection under 2 above or required maintenance or repairs under 3. above within the specified time period, the Village of Vernon or Village of Mukwonago is authorized, but not required, to perform the specified inspections, maintenance or repairs. In the case of an emergency situation, as determined by the Village of Vernon or Village of Mukwonago, no notice shall be required prior to the Village of Vernon or Village of Mukwonago performing emergency maintenance or repairs. The Village of Vernon or Village of Mukwonago may levy the costs and expenses of such inspections, maintenance or repair related actions as a special charge against the Property and collected as such in accordance with the procedures under s. 66.0627 Wis. Stats. or subch. VII of ch. 66 Wis. Stats.
5. This Agreement shall run with the Property and be binding upon all heirs, successors and assigns. After the Owner records the addendum noted above, the Village of Vernon or Village of Mukwonago shall have the sole authority to modify this agreement upon a 30-day notice to the current Owner(s).

Name and Return Address

Land Resources Division
515 W Moreland Blvd, Rm AC260
Waukesha, WI 53188

Parcel Identification Number(s) – (PIN)

Dated this ____ day of _____, 20__.

Owner:

Bryan Lindgren

Acknowledgements

State of Wisconsin:
County of Waukesha

Personally came before me this ____ day of _____, 20__, the above named Bryan Lindgen to me known to be the person who executed the foregoing instrument and acknowledged the same.

[Name]

Notary Public, Waukesha County, WI

My commission expires:_____.

This document was drafted by:

Jayme L. Sisel, P.E.
Sound Stormwater Design LLC
Muskego, WI 53150

For Certification Stamp

Exhibit A – Legal Description

The following description and reduced copy map identifies the land parcel(s) affected by this Agreement. For a larger scale view of the referenced document, contact the Waukesha County Register of Deeds office.

Date of Recording:

Map Produced By: Trio Engineering LLC

Legal Description:

REZONING EXHIBIT “A”

LEGAL DESCRIPTION “A” (Lands to be rezoned to “R-3”):

All that part of Lot 1 of Certified Survey Map No. 8142, recorded in the Office of the Register of Deeds for Waukesha County on October 22, 1996, in Volume 71 of Certified Survey Maps, at Pages 23 through 25 inclusive, as Document No. 2166785, being located in a part of the Northeast 1/4 and the Southeast 1/4 of the Southwest 1/4 and the Northwest 1/4 and the Southwest 1/4 of the Southeast 1/4 of Section 19, Town 5 North, Range 19 East, in the Village of Vernon, Waukesha County, Wisconsin, now being more particularly bounded and described as follows:

Commencing at the East 1/4 Corner of said Section 19; Thence South 87°32'52" West and along the North line of the said Southeast 1/4 Section, 1902.96 feet to a point on the East line of said Lot 1 of Certified Survey Map No. 8142; Thence South 01°43'08" East and along the East line of said Lot 1 of said Certified Survey Map No. 8142, 952.16 feet to a point to the place of beginning of lands hereinafter described;

Thence continuing South 1°43'08" East and along the East line of said Lot 1 of said Certified Survey Map No. 8142, 404.35 feet to a point; Thence North 88°54'57" West, 292.78 feet to a point; Thence South 72°00'22" West, 1132.21 feet to a point on the Southeasterly line of Certified Survey Map No. 5253; Thence North 26°40'38" West and along the said existing Corporate Limits line, 200.00 feet to a point; Thence North 56°47'31" West and along the said existing Corporate Limits line, 191.03 feet to a point; Thence North 13°05'19" West and along the said existing Corporate Limits Line, 155.18 feet to a point; Thence South 88°14'25" East and along the said existing Corporate Limits Line, 3.07 feet to a point; Thence Northeasterly 302.58 feet along the arc of a curve, whose center lies to the Northwest, whose radius is 333 feet, whose central angle is 52°03'40", and whose chord bears North 65°43'45" East, 292.27 feet to a point; Thence South 59°23'49" East and along the said existing Corporate Limits Line, 151.31 feet to a point; Thence North 31°29'21" East and along the said existing Corporate Limits Line, 54.12 feet to a point; Thence North 50°35'42" East and along the said existing Corporate Limits Line, 220.30 feet to a point; Thence South 89°39'13" East and along the said existing Corporate Limits Line, 195.07 feet to a point; Thence North 85°31'46" East and along the said existing Corporate Limits Line, 132.35 feet to a point; Thence North 50°39'11" East and along the said existing Corporate Limits Line, 82.26 feet to a point; Thence North 77°52'12" East and along the said existing Corporate Limits Line, 105.65 feet to a point; Thence North 81°19'56" East and along the said existing Corporate Limits Line, 110.16 feet to a point; Thence South 84°58'32" East and along the said existing Corporate Limits Line, 242.15 feet to a point; Thence North 88°16'52" East and along the said existing Corporate Limits Line, 200.00 feet to the point of beginning of this description.

Said Parcel contains 718,743 Square Feet (or 16.5000 Acres) of land, more or less.

Exhibit A – Legal Description (continued)

REZONING EXHIBIT “B”

LEGAL DESCRIPTION “A” (Lands to be rezoned to “R-3”):

All that part of Lot 1 of Certified Survey Map No. 8142, recorded in the Office of the Register of Deeds for Waukesha County on October 22, 1996, in Volume 71 of Certified Survey Maps, at Pages 23 through 25 inclusive, as Document No. 2166785, being located in a part of the Northeast 1/4 and the Southeast 1/4 of the Southwest 1/4 and the Northwest 1/4 of the Southeast 1/4 of Section 19, Town 5 North, Range 19 East, in the Village of Vernon, Waukesha County, Wisconsin, now being more particularly bounded and described as follows:

Commencing at the East 1/4 Corner of said Section 19; Thence South 87°32'52" West and along the North line of the said Southeast 1/4 Section, 1902.96 feet to the place of beginning of lands hereinafter described;

Thence South 01°43'08" East and along the East line of said Lot 1 of said Certified Survey Map No. 8142, 952.16 feet to a point; Thence South 88°16'52" West and along the existing Corporate Limits line, 200.00 feet to a point; Thence North 84°58'32" West and along the said existing Corporate Limits line, 242.15 feet to a point; Thence South 81°19'56" West and along the said existing Corporate Limits line, 110.16 feet to a point; Thence South 77°52'12" West and along the said existing Corporate Limits line, 105.65 feet to a point; Thence South 50°39'11" West and along the said existing Corporate Limits line, 82.26 feet to a point; on the West line of the said Southeast 1/4 Section; Thence South 85°31'46" West and along the said West line and said existing Corporate Limits line, 132.35 feet to a point; Thence North 89°39'13" West and along the said existing Corporate Limits line, 195.07 feet to a point; Thence South 50°35'42" West, 220.30 feet to a point; Thence South 31°29'21" West and along the said existing Corporate Limits line, 54.12 feet to a point; Thence North 59°23'49" West and along the said existing Corporate Limits line, 151.31 feet to a point; Thence Southwesterly 305.65 feet along the arc of a curve, whose center lies to the Northwest, whose radius is 333.07 feet, whose central angle is 52°34'47", and whose chord bears South 65°59'28" West, 295.04 feet to a point; Thence South 13°05'19" East and along the said existing Corporate Limits line, 155.18 feet to a point; Thence South 56°47'31" East and along the said existing Corporate Limits line, 191.03 feet to a point; Thence South 63°19'22" West, 250.80 feet to a point; Thence North 26°40'38" West and along said existing Corporate Limits line, 482.88 feet to a point; Thence North 63°19'22" East and along said existing Corporate Limits line, 407.95 feet to a point; Thence North 26°40'38" West and along said existing Corporate Limits line, 409.98 feet to a point on the Southeasterly line of Certified Survey Map No. 11850; Thence North 56°44'10" East and along the said existing Corporate Limits line, 645.76 feet to a point; Thence North 56°44'10" East and along the said Southeasterly line, 487.73 feet to a point marking the Center of said Section 19; Thence North 87°32'52" East and along the said North line of the said Southeast 1/4 Section, 732.00 feet to the point of beginning of this description.

Said Parcel contains 1,511,059 Square Feet (or 34.6891 Acres) of land, more or less.

Exhibit B - Location Map

Stormwater Management Practices Covered by this Agreement

The stormwater management practices covered by this Agreement are depicted in the reduced copy of a portion of the construction plans, as shown below. All of the noted stormwater management practices are located within a drainage easement, as noted in Exhibit A.

Stormwater Practices: Ponds (2), Rain Gardens (2), Grass Swales
Location of Practices: Outlots as represented on the Cardinal Ridge Final Plat

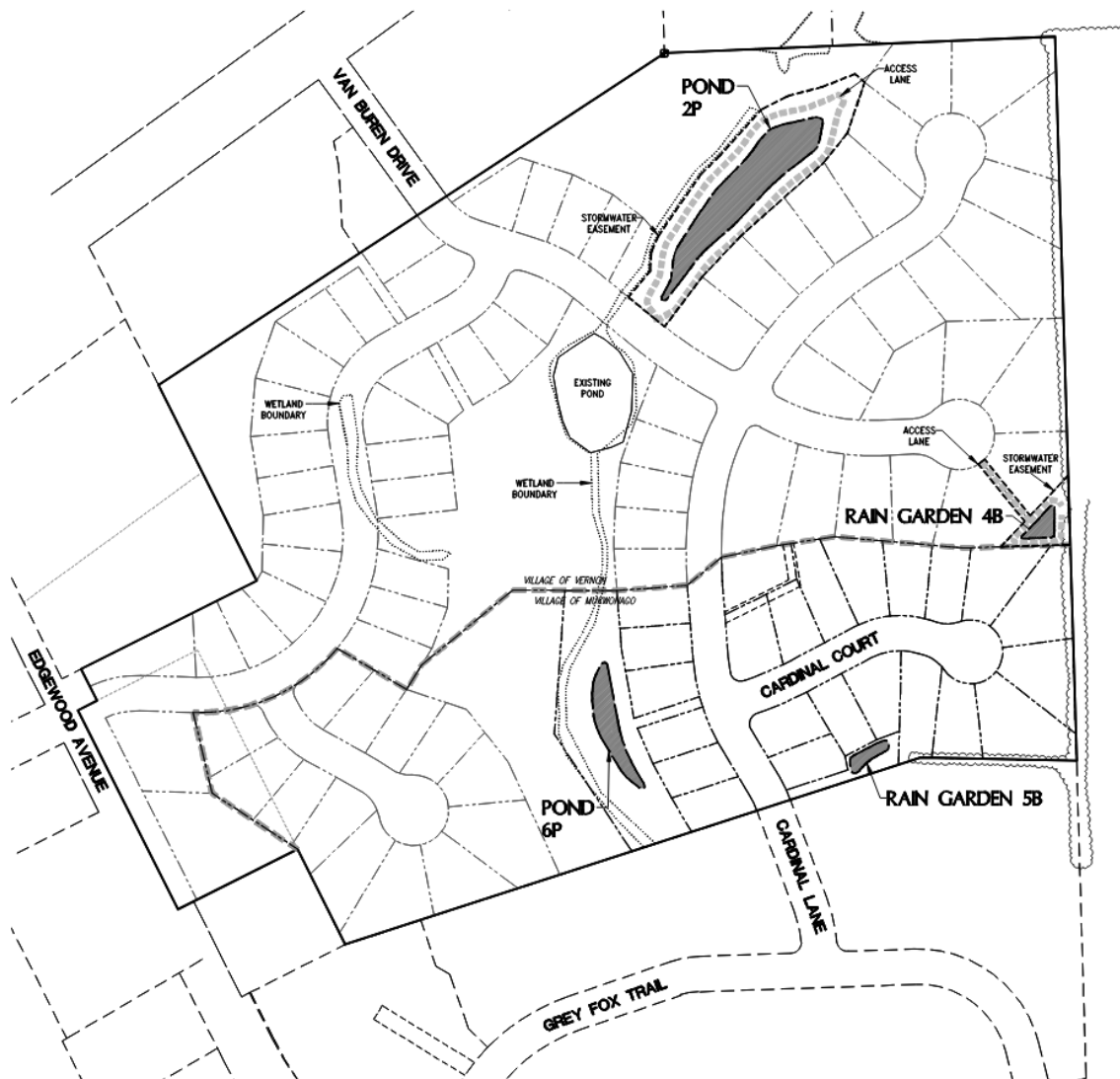


Exhibit C

Stormwater Practice Maintenance Plan

This exhibit explains the basic function of each of the stormwater practices listed in Exhibit B and prescribes the minimum maintenance requirements to remain compliant with this Agreement. The maintenance activities listed below are aimed to ensure these practices continue serving their intended functions in perpetuity. The list of activities is not all inclusive, but rather indicates the minimum type of maintenance that can be expected for this particular site. Access to the stormwater practices for maintenance vehicles is shown in Exhibit B. Any failure of a stormwater practice that is caused by a lack of maintenance will subject the Owner(s) to enforcement of the provisions listed on page 1 of this Agreement by the Village of Vernon or Village of Mukwonago.

System Description:

The stormwater management system includes two (2) ponds, two (2) rain gardens, and all associated pipes, outlet control structures, grass swales, earthen berms, and other components of these practices. The ponds and rain gardens are designed to trap over 80% of sediment in runoff and maintain pre-development downstream peak flows. In addition, the rain gardens are designed to reduce runoff volumes from the site by intercepting runoff and allowing it to slowly seep (infiltrate) into the underlying soil and groundwater. Vigorous vegetation cover of native plants and grasses within the rain gardens is essential to long-term function of these systems. All orifices, outlet structures, pipes, and spillways must be maintained as specified in this Agreement.

“As-built” construction drawings of the ponds and rain gardens, showing actual dimensions, elevations, outlet structures, etc. will be recorded as an addendum(s) to this agreement within 60 days after Waukesha County accepts verification of construction from the project engineer.

Minimum Maintenance Requirements – Ponds:

To ensure the proper long-term function of the stormwater management practices described above, the following activities must be completed:

1. All outlet pipes must be checked monthly to ensure there is no blockage from floating debris or ice. Any blockage must be removed immediately.
2. Grass swales shall be preserved to allow free flowing of surface runoff in accordance with approved grading plans. No buildings or other structures are allowed in these areas. No grading or filling is allowed that may interrupt flows in any way.
3. Grass swales, inlets and outlets must be checked after heavy rains (minimum of annually) for signs of erosion. Any eroding areas must be repaired immediately to prevent premature sediment build-up in the downstream ponds. Erosion matting is recommended for repairing grassed areas.
4. NO trees are to be planted or allowed to grow on the earthen berms. Tree root systems can reduce soil compaction and cause berm failure. The berms must be inspected annually and any woody vegetation removed.
5. Invasive plant and animal species shall be managed in compliance with Wisconsin Administrative Code Chapter NR 40. This may require eradication of invasive species in some cases.
6. If the permanent pool falls below the safety shelf, a review shall be performed to determine whether the cause is liner leakage or an insufficient water budget. If the cause is leakage, the liner shall be repaired. Leakage due to muskrat burrows may require removal of the animals, repair of the liner with clay, and embedding wire mesh in the liner to deter further burrowing. If the permanent pool cannot be sustained at the design elevation, benching of the safety shelf may be necessary.
7. If floating algae or weed growth becomes a nuisance (decay odors, etc.), it must be removed from the pond and deposited where it cannot drain back into the pond. Removal of the vegetation from the water reduces regrowth the following season (by harvesting the nutrients). Wetland vegetation must be maintained along the waters edge for safety and pollutant removal purposes.
8. If mosquitoes become a nuisance, the use of mosquito larvicide containing naturally-occurring Bti soil bacteria is recommended.
9. When sediment in the ponds has accumulated to an elevation of three feet below the outlet elevation, it must be removed (see Exhibit D). All removed sediment must be placed in an appropriate upland disposal site and stabilized (grass cover) to prevent sediment from washing back into the pond. Failure to remove sediment from the ponds will cause resuspension of previously trapped sediments and increase downstream deposition.
10. No grading or filling of the pond or berm other than for sediment removal is allowed, unless otherwise approved by the Village of Vernon or Village of Mukwonago.

Exhibit C

Stormwater Practice Maintenance Plan (continued)

11. Periodic mowing of the grass swales will encourage vigorous grass cover and allow better inspections for erosion. Waiting until after August 1 will avoid disturbing nesting wildlife. Mowing around the ponds may attract nuisance populations of geese to the property and is not necessary or recommended.
12. Any other repair or maintenance needed to ensure the continued function of the stormwater practices or as ordered by the Village of Vernon or Village of Mukwonago under the provisions listed on page 1 of this Agreement.
13. Aerators/Fountains – If an aerator or fountain is desired for visual and other aesthetic effects (aerators designed to mix the contents of the pond are prohibited) they must meet all of the items below:
 - Use an aerator/fountain that does not have a depth of influence that extends into the sediment storage depth (i.e. more than three feet below the normal water surface).
 - If the water surface drops due to drought or leakage, the aerator / fountain may not be operated until the water rises enough for the depth of influence to be above the sediment storage layer. Therefore, if the depth of influence of the aerator / fountain is two feet, the water surface must be within one foot or less of the lowest pond outlet.
 - Provide an automatic shut-off of the aerator/fountain as the pond starts to rise during a storm event. The aerator/fountain must remain off while the pond depth returns to the permanent pool elevation and, further, shall remain off for an additional 48 hours, as required for the design micron particle size to settle to below the draw depth of the pump.
 - Configure the pump intake to draw water primarily from a horizontal plane so as to minimize the creation of a circulatory pattern from bottom to top throughout the pond.

Minimum Maintenance Requirements – Rain Gardens:

To ensure the proper function of rain gardens, the following list of maintenance activities are recommended:

1. A minimum of 70% soil cover made up of native grasses must be maintained on the basin bottom to ensure infiltration rates. Periodic burning or mowing and controlled burning every 5 to 10 years is recommended to enhance establishment of the prairie grasses (which may take 2-3 years) and maintain the minimum native cover. To reduce competition from cool season grasses (bluegrass, fescues, quack, etc.) and other weeds:
 - For the first year, cut to a 6” height three times – once each in June, July and early August. To prevent damage to the native grasses, do not mowed below a 6” height. Remove excessive accumulation of clippings to avoid smothering next year’s seedlings.
 - After the first year, mowing may only be needed in early June each year to help control the spread of cool season plants. The mowing should also be raised to 10-12” to avoid damage to the warm season plants.
 - Burning may also be used to manage weeds in 2-5 years intervals. Late spring burns (mid-late May) provide maximum stimulus to warm season grasses and work well to control cool season grasses. Burn when the cool season grasses are growing and the warm season plants are just barely starting to grow to get maximum control of cool season species.
 - Any major bare areas or areas taken over by nonnative species must be reseeded. To clear area of weeds and cool season grasses, treat with an herbicide that contains glyphosphate in accordance with manufacture’s instructions. Ensure a firm seedbed is prepared to a depth of 3 inches (a roller is recommended). Seeding should occur in early-mid June. Seed with Big Bluestem, Indian Grass, Little Blue Stem or Switchgrass (preferably an equal mix of all four types). A companion crop of oats is recommended. Seed must be placed at a depth of 1/4 – 1/2” and a minimum rate of 1/4 pound per 100 square feet. If broadcast seeding by hand, drag leaf rake over soil surface after seeding. Then roll it again and cover with a light layer of mulch and staked erosion control netting to hold it in place until germination. For other planting details, see NRCS standard 342 (Critical Area Planting).
2. The rain gardens and all components (grass swales, inlets, outlets, etc.) should be inspected after each heavy rain, but at a minimum of once per year. If the basin is not draining properly (within 72 hours), further inspection may be required by persons with expertise in storm water management and/or soils.
 - If soil testing or observations show that the soil surface has become crusted, sealed or compacted, some deep tillage should be performed. Deep tillage will cut through the underlying soils at a 2-3 foot depth, loosening the soil and improving infiltration rates, with minimal disturbance of the surface vegetation. Types of tillage equipment that can be used include a subsoiler or straight, narrow-shanked chisel plow.

Exhibit C

Stormwater Practice Maintenance Plan (continued)

- If sedimentation is determined to be causing the failure, the accumulated sediment must be removed and the area reseeded in accordance with the notes above.
- 3. All flow control devices must be kept free of debris. Any blockage must be removed immediately.
- 4. Any eroding areas must be repaired immediately to prevent premature sediment build-up in the system. Erosion matting is recommended for repairing grassed areas.
- 5. Heavy equipment and vehicles must be kept off of the bottom and side slopes of basins to prevent soil compaction. Soil compaction will reduce infiltration rates and may cause failure of the rain garden, resulting in ponding and possible growth of wetland plants.
- 6. No trees are to be planted or allowed to grow on the earthen berms or the bottom of the rain garden. On the berms, tree root systems can reduce soil compaction and cause berm failure. On the basin bottom, trees may shade out the native grasses. The rain garden must be inspected annually and any woody vegetation removed.
- 7. Grass swales leading to the rain garden shall be preserved to allow free flowing of surface runoff in accordance with approved grading plans. No buildings or other structures are allowed in these areas. No grading or filling of swales is permitted.
- 8. No grading or filling of the rain garden or berms other than for sediment removal is allowed, unless otherwise approved by the Village of Vernon or Village of Mukwonago.
- 9. Periodic mowing of grass swales will encourage rigorous grass cover and allow better inspections for erosion. Waiting until after August 1 will avoid disturbing nesting wildlife.
- 10. Any other repair or maintenance needed to ensure the continued function of the rain garden as ordered by the Village of Vernon or Village of Mukwonago under the provisions listed on page 1 of this Agreement.

**VILLAGE OF MUKWONAGO
WAUKESHA AND WALWORTH COUNTIES**

RESOLUTION NO. 2024-42

**RESOLUTION APPROVING THE PLANNED UNIT DEVELOPMENT OVERLAY FINAL
DEVELOPMENT PLAN FOR PHASE 1 OF CARDINAL RIDGE SUBDIVISION, NEUMANN
DEVELOPMENTS, INC.**

WHEREAS, pursuant to Chapter 100-53 of the Municipal Code, an application by Neumann Developments, Inc. was submitted for a Planned Unit Development (hereinafter “PUD”) for the vacant 16.50-acre property located at S92W27720 Edgewood Avenue, between National Avenue and Edgewood Avenue, also known as the lands attached and executed in Ordinance 1030, in the Village of Mukwonago, which is part of the overall subdivision known as Cardinal Ridge, and

WHEREAS, a PUD application requires the submittal of a Final Development Plan for each phase of the subdivision within the PUD overlay for review by the Village Plan Commission and Village Board, and

WHEREAS, Neumann Developments, Inc. has submitted a Final Development Plan for Phase 1 for the PUD in the form of a formal request, civil site drawings, storm water management plan and storm water maintenance agreement, and

WHEREAS, the subject property has base zoning classification of R-3, and

WHEREAS, R-3 zoning requires a minimum lot area of 10,000 square feet and the applicant is requesting a minimum lot area of 9,000 square feet with associated set-back and lot width reductions, and

WHEREAS, the Village Board approved the General Development Plan and associated PUD modifications at it’s regular meeting on April 17, 2024, and

WHEREAS, the Plan Commission has reviewed the applicants Final Development Plan for Phase 1 at their meeting on August 12, 2024 and recommended Village Board approval of the same, and

WHEREAS, the Plan Commission conducted a public hearing at their meeting on August 12, 2024, regarding the same matter, and

WHEREAS, Neumann Developments, Inc. will apply for Final Development Plan approval of future phases within the Village of Mukwonago at a later date and shall not proceed with development on such phases until approval is received.

NOW, THEREFORE, BE IT RESOLVED by the Village Board of the Village of Mukwonago, Wisconsin hereby approves the Final Development Plan for Phase 1 for the project with civil site plans dated July 17, 2024 and a storm water management plan dated July 19, 2024.

NOW, THEREFORE, BE IT FURTHER RESOLVED no development with the exception of land disturbing activity as outlined in the early grading agreement approved at the July 17, 2024 Village Board Meeting may be undertaken until the following conditions have been satisfied:

1. A Developer Agreement is executed by both the Village of Mukwonago and Village of Vernon for the Cardinal Ridge Subdivision.
2. A letter of credit is provided in the Village's Standard Form for all Phase 1 improvements.
3. A signed copy of the storm water maintenance agreement is provided for execution.
4. A preconstruction meeting is held with pertinent development staff, contractors, and Village Department Heads prior to development beyond site grading work.

Passed and adopted by the Village of Mukwonago Village Board this 21st day of August, 2024.

VILLAGE OF MUKWONAGO

By: _____
Fred Winchowky, Village President

Attest: _____
Diana Dykstra, Village Clerk

PLAN COMMISSION STAFF REPORT

TO: Village of Mukwonago Plan Commission

FROM: Peter Gesch, P.E., Ruekert & Mielke, Inc.

REPORT DATE: August 5, 2024

MEETING DATE: August 12, 2024, 6:30 P.M.

SUBJECT: Tractor Supply – Site Plan & Architectural Review

BASIC INFORMATION	
Project:	Tractor Supply Canopy
Applicant:	OnPoint (Tractor Supply)
Consulting Engineer:	Tommy Hood Engineering
Consulting Architect:	Saorsa Architecture
Request:	Site Plan & Architectural Review
Staff Recommendation:	Approve with Conditions

PARCEL DATA/CHARACTERISTICS	
Tax Key:	MUKV2009978009
Acreage:	Part of 10.86 Acres
Current Use:	Business – Tractor Supply
Proposed Use:	Business – Tractor Supply
Reason for Request:	Canopy for Exterior Storage
Land Use Classification:	Business
Zoning Classification:	B-2 – General Business

Project Summary & Overview

The existing Tractor Supply building located at 857 S Rochester St, Unit 500, desires to construct a canopy structure over their existing outdoor storage area on the south side of the existing building. The structure will be required to meet all applicable state and local codes and will undergo final review by the fire department and building inspection prior to issuance of building permits.

Detailed architectural plans for the proposed canopy have been submitted and are included for review.

Staff Report – SPAR
Tractor Supply
August 5, 2024
Page 2

Staff Review

Engineering:	No Comments
Public Works	No Comments
Utilities	No Comments
Police	No Comments
Fire:	Review of fire suppression and detection coordinated with State review.
Building Inspection	Will coordinate with applicant for applicable building permits.
Planning	No Comments

Recommended Action

Site Plan and Architectural Review

Staff Recommends the Planning Commission Approve a resolution for the Site Plan and Architectural Review, as set forth in the attached resolution.

Attachments

1. Application and Development Information
2. Plans and Site Drawings

Process Details: PZ24-0020

Property Address: 857 S ROCHESTER ST UNIT 500 | Parcel: [MUKV2009978009](#)

Property Owner: BROOKLIFE CHURCH INC

Summary Information

> 18 Process Step(s) Found > 0 Inspection(s) Found

This Site Plan was created from an application. [Click here to view the application.](#)

Process Information

Amount Due

Process - Site Plan \$507.00
Total [Pay Now](#)

Filed As	Site Plan	Application Date	06/26/2024
Process Name	Site Plan	Date Process Started	No Data to Display
Process Number	PZ24-0020	Date Completed	No Data to Display
Status	Preprocess - Hold	Last Status Change	06/26/2024
Scope Of Work	Interior remodel of existing Tractor Supply store space and minor addition of covered shaded area/canopy in the existing sidelot with NO new impervious -		
Conditions	No Data to Display		

Process Step Information

Step Number	Step Display Name	Status	Date Step Started	Date Step Completed	Date Step Due	
1	Review Application for Completeness	Not Started				View
2	Staff Review	Not Started				View
3	CIVIL DRAWINGS	Not Started				View
4	STORMWATER MGT PLAN	Not Started				View
5	LIGHTING PLAN	Not Started				View
6	LANDSCAPE PLAN	Not Started				View
7	EROSION CONTROL PLAN	Not Started				View
8	PRE CON ESCROW TO DEPUTY CLERK \$5K	Not Started				View
9	Post PC Agenda	Not Started				View
10	PC Review and Decision	Not Started				View
11	VILLAGE BOARD NOTIFICATION ONLY	Not Started				View
12	Owner and Applicant Notified	Not Started				View
13	LETTER OF CREDIT - IF INFRASTRUCTURE VILLAGE RESPONSIBILITY	Not Started				View
14	STORM WATER MAINT AGMT	Not Started				View
15	DEVELOPER AGMT	Not Started				View
16	PRE CON MTG	Not Started				View
17	POST APPROVAL CONSTR ESCROW \$10K	Not Started				View

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Step Number	Step Display Name	Status	Date Step Started	Date Step Completed	Date Step Due	
18	LETTER OF COMPLETENESS/ ZONING PERMIT ISSUANCE	Not Started				View

Document Summary

Document Title

CIVIL DRAWINGS

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	CIVIL DRAWINGS	Not Started			No Attachment

EROSION CONTROL PLAN

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	EROSION CONTROL PLAN	Not Started			No Attachment

LANDSCAPE PLAN

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	LANDSCAPE PLAN	Not Started			No Attachment

LIGHTING PLAN

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	LIGHTING PLAN	Not Started			No Attachment

PROFESSIONAL SERVICES AGREEMENT

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	PROFESSIONAL SERVICES AGREEMENT	Not Started	6/26/2024		View Document
1	PROFESSIONAL SERVICES AGREEMENT	Not Started	6/26/2024		View Document

professional plans for remodel work

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	professional plans for remodel work	Not Started	6/26/2024		View Document
1	professional plans for remodel work	Not Started	6/26/2024		View Document

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Document Title

SITE PLAN

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	SITE PLAN	Not Started			No Attachment

STATE APPROVAL COVER SHEET

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	STATE APPROVAL COVER SHEET	Not Started	6/26/2024		View Document
1	STATE APPROVAL COVER SHEET	Not Started	6/26/2024		View Document

STATE APPROVAL PART 2

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	STATE APPROVAL PART 2	Not Started	6/26/2024		View Document
1	STATE APPROVAL PART 2	Not Started	6/26/2024		View Document

STORMWATER MGT PLAN

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	STORMWATER MGT PLAN	Not Started			No Attachment

SUBMITTAL ESCROW \$5K

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	SUBMITTAL ESCROW \$5K	Not Started			No Attachment

vendor plans - spec drawings

[Expand All]

Version	Document Title	Review Status	Received	Completed	
1	vendor plans - spec drawings	Not Started	6/26/2024		View Document
1	vendor plans - spec drawings	Not Started	6/26/2024		View Document

Review Comments/Concerns

Show All

[Collapse All]

Title	Type	Comment Type	Corrected	Date Found	Date Corrected	Process Step	Review	
No records to display.								

Inspection Information

Inspection Type	Inspector	Status	Scheduled Date	Completed Date	Result	
No records to display.						

Fees & Payments

Date	Action	Qty	Description	Billed	Paid
6/26/2024	Invoice Item	1,600.00	PZE Fees: Site Plan - Major (Invoice Number: 00005435)	\$507.00	

Applicant Information

Address

onpoint
205 powell pl
brentwood, tn 37027

Phone

No Data to Display

Fax

No Data to Display

Mobile

No Data to Display

Other Phone

No Data to Display

Parcel/Land Details

Notes

No Data to Display

Zoning/Rezoning and Usage

Dimensional Information

Notes

No Data to Display

Utility Details

Setback Details

Miscellaneous Fields

Parking Details

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TRACTOR SUPPLY CO.
LIVE GOODS CENTER
857 S ROCHESTER ST. SUITE 500
MUKWONAGO WI 53149
STORE #339

DESIGN CRITERIA

1. APPLICABLE CODES:

- A. 2021 IBC
B. MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES (ASCE 7-16)
C. BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318-08)
D. STEEL CONSTRUCTION MANUAL, 14TH EDITION (AISC 325-11)
E. SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS (AISC 360-11)
F. AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE (D1.1-04)

2. LIVE LOAD:

- A. ROOF LOAD: 20 PSF
B. HEATER LOAD: 350 LB POINT LOAD
C. DRY SPRINKLER: 5 PSF

3. DEAD LOAD:

- A. ROOF LOAD: 5 PSF

4. OCCUPANCY CATEGORY: II

5. SNOW LOAD:

- A. GROUND SNOW LOAD: 30 psf
B. IMPORTANCE FACTOR: 1.0
C. SNOW EXPOSURE FACTOR: 0.90
D. THERMAL FACTOR: 1.00

6. WIND LOAD:

- A. BASIC DESIGN WIND VELOCITY: 107 mph
B. INTERNAL PRESSURE COEFFICIENTS: +/- 0.18
C. EXPOSURE: C
D. WALL PRESSURE: 62 PSF; ROOF PRESSURE: 69.8 PSF

7. SEISMIC LOAD:

- A. DESIGN METHOD- EQUIVALENT LATERAL FORCE PROCEDURE
B. Ss= 0.082
C. S1 0.05
D. Sds - 0.96g
E. Sd1 - 0.55g
F. IMPORTANCE FACTOR: 1.0
G. SITE CLASS: D
H. BUILDING USE: C
I. SEISMIC RESPONSE COEFFICIENT: 0.090
J. SEISMIC FORCE RESISTING SYSTEM - ORDINARY STEEL FRAME
K. RESPONSE MODIFICATION COEFFICIENT: 3.5
L. DEFLECTION AMPLIFICATION FACTOR: 3.5

8. FUTURE LOADS:

- A. UNLESS SPECIFICALLY NOTED, THERE ARE NO PROVISION MADE FOR FUTURE FLOOR, ROOF, OR OTHER LOADS.

A. CONCRETE SLAB TO BE 3000 PSK

B. CONCRETE SLAB CONTROL JOINTS SHALL BE CUT INTO THE SLAB AT A DEPTH OF 1/3 TIMES THE THICKNESS OF THE SLAB FIBER FOR FIBER REINFORCED SLABS, 1/4 TIMES THE THICKNESS OF THE SLAB FOR ALL OTHER SLABS USING CONVENTIONAL WET-CUT SAW, AND 1/5 TIMES THE THICKNESS OF THE SLAB FOR ALL OTHER SLABS USING EARLY-ENTRY DRY-CUT SAW. SLAB SHALL BE SAWCUT WITHIN 4 HOURS OF CONCRETE PLACEMENT USING EARLY-ENTRY DRY-CUT SAW OR WITHIN 12 HOURS USING WET-CUT SAW. MAXIMUM SPACING OF INTERIOR SLAB CONTROL JOINTS. UNLESS NOTED OTHERWISE, SHALL BE 15'-0" (MAX.) IN EACH DIRECTION. CONSTRUCTION OF CONTROL JOINTS SHALL BE SUCH THAT THE AREA CONTAINED HAS A MAXIMUM RATIO OF LONG SIDE TO SHORT SIDE OF 1.5 TO 1.0 OR AS SHOWN ON THE CONSTRUCTION DRAWINGS.

C. SLAB CONSTRUCTION POINTS SHALL BE USED IN PLACE OF CONTROL POINTS WHERE NEEDED TO INTERRUPT A CONTINUOUS POUR. SLAB CONSTRUCTION POINTS SHALL BE DOWELED.

D. PLACEMENT OF WELDED WIRE REINFORCEMENT IN SLAB, WHERE SPECIFIED, SHALL BE AT A CONSISTENT DEPTH OF 1 1/2" FROM TOP SLAB. WELDED WIRE REINFORCEMENT SHALL BE PROPERLY CHAIRED ABOVE GRADE.

E. REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DOCUMENTS FOR SLAB FINISHES, SLAB DEPRESSIONS, THICKENED SLABS (IN ADDITION TO THICKENED SLABS NOTED ON STRUCTURAL DRAWINGS), ELEVATIONS, AND ENCASED OR EMBEDDED ITEMS.

F. PLUMBING AND ELECTRICAL CONDUITS SHALL BE PLACED BELOW THE SLAB AND NOT WITHIN THE SLAB. VERTICAL PENETRATIONS ARE

MATERIALS:

1. THE MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 3000 PSI AT 28 DAYS UNLESS OTHERWISE SPECIFIED.

2. REINFORCING BARS SHALL BE DEFORMED STEEL AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60, UNLESS OTHERWISE SPECIFIED.
3. PORTLAND CEMENT SHALL CONFORM TO THE REQUIREMENTS OF ASTM C150 TYPE II. PORTLAND CEMENT SHALL BE USED IN THE MANUFACTURE OF ALL CONCRETE, UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS OR APPROVED BY THE ENGINEER. CONCRETE MIX DESIGN SHALL BE APPROVED BY THE DESIGN ENGINEER.

4. AGGREGATE, BOTH COARSE AND FINE, USED IN THE MANUFACTURE OF CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF ASTM C33. THE MAXIMUM COARSE AGGREGATE SIZE SHALL BE 1-1/2 INCHES.

5. ANCHOR BOLTS TO BE ASTM F1554 GR 55. ALL BOLTS TO BE HEADED.

6. ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 AND SHALL BE SPliced BY LAPPING THE ENDS IN CONFORMANCE WITH ACI 318

CONCRETE PLACEMENT AND FINISHING

1. CONTRACTOR SHALL COORDINATE CONCRETE WORK WITH ARCHITECTURAL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR AND ITEMS EMBEDDED IN CONCRETE, BEFORE THE CONCRETE IS PLACED.

2. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION BEGINNING. ALL INTERFERENCES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO WORK COMMENCING.

3. CONCRETE SHALL NOT BE PLACED BEFORE FORMWORK HAS BEEN COMPLETED; SNOW, ICE, DEBRIS, AND WATER HAVE BEEN REMOVED; REINFORCEMENT HAS BEEN SECURED IN PLACE; EXPANSION JOINT MATERIAL, ANCHORS, MOISTURE BARRIERS, WATERSTOPS AND OTHER EMBEDDED ITEMS HAVE BEEN POSITIONED; AND THE ENTIRE PREPARATION HAS BEEN INSPECTED AND APPROVED.

4. CONCRETE SHALL NOT BE PLACED:
A. ON FROZEN SUBGRADE OR ON ONE THAT CONTAINS FROZEN MATERIAL
B. IN STANDING WATER ON SUBGRADE OR IN EXCAVATIONS.
C. ON SOILS THAT HAVE BEEN DISTURBED BY RAINFALL OR SEEPAGE. IF THE BEARING SOIL HAS BEEN SOFTENED BY SURFACE WATER INTRUSION DURING EXPOSURE, THE UNSUITABLE SOILS SHALL BE REMOVED AND

MATERIALS AND CONSTRUCTION

ALL MATERIALS SHALL BE AS INDICATED BELOW UNLESS NOTED OTHERWISE ON DESIGN DRAWINGS.

1. STRUCTURAL STEEL
EXPOSED CARBON STEEL SHALL BE FINISHED TO OWNER'S SPECIFICATION.
A. HSS SHAPES: ASTM A500, GRADE B (Fy= 46 KSI)
B. OTHER ROLLED SHAPES AND PLATES: ASTM A992 (Fy= 50 KSI MIN)

2. BOLTS, NUTS, WASHERS, AND ROD (UNO)
A. STRUCTURAL BOLTS: ASTM A325; ALL NUTS, BOLTS, AND WASHERS TO BE GALVANIZED
B. THREADED ROD: ASTM A93 GRADE B7 (Fu= 125 KSI)
C. NUTS: ASTM A563 HEAVY HEX GRADE DH
D. WASHERS: ASTM F436
E. ALL BOLTED CONNECTIONS SHALL HAVE DIRECT TENSION, INDICATING WASHER BY APPLIED BOLTING OR APPROVED EQUIVALENT.

3. GRATING

A. ALL STEEL GRATING SHALL BE WELDED TYPE W-19-4 STEEL GRATING WITH 11/4" X 1/8" BEARING BARS AS MANUFACTURED BY GRATING PACIFIC INC. OR APPROVED EQUAL.
B. ALL STEEL GRATING SHALL BE HOT DIPPED GALVANIZED
C. ALL GRATING SHALL BE FULLY Banded.
4. WELDING ELECTRODES
A. UTILIZE E70XX ELECTRODES IN ACCORDANCE WITH AWS D1.1
B. ALL FILLET WELDS SHALL BE 1/4" OR THE MAXIMUM ALLOWABLE SIZE FOR THE MEMBERS BEING JOINED UNLESS NOTED OTHERWISE. ALL GROOVE WELDS SHALL BE COMPLETE JOINT PENETRATION WELDS UNLESS NOTED OTHERWISE.

5. UNLESS SPECIFICALLY NOTED ALL STRUCTURAL CONNECTIONS SHALL BE DESIGNED AS BEARING TYPE CONNECTIONS ABLE TO SUPPORT 1/2 THE ALLOWABLE LOAD OF THE BEAM. ALL SHOP DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO FABRICATION

6. SHOP PAINT TO BE FABRICATORS STANDARD RUST INHIBITIVE GRAY PRIMER AT AN AVERAGE OF 2 MILS DFT. FOR STRUCTURAL SHAPES PROVIDE SP 3 POWER TOOL CLEAN SURFACE PREPARATION

7. ALL STRUCTURAL SHAPES SHALL HAVE 5 MIL OF SHERWIN WILLIAMS ACROLON 21811 LIGHT GRAY OR APPROVED EQUAL.

8. ALL DECKING FOR ROOF TO BE VULCRAFT 1.5 B 22 STRUCTURAL STABILITY
1. THE ERECTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURES DURING ERECTION. THE ERECTED STEEL SHALL BE ADEQUATELY GRACED TO RESIST DURING ERECTION, CONSTRUCTION, AND

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BOLTING PROCEDURE

12. STEEL, PRIOR TO BOLTING, SHALL BE INSPECTED TO SEE THAT THE SURFACES ARE IN CLOSE CONTACT AND THAT THE AREAS ARE FREE FROM BURRS
13. WELDING OF OR TO HIGH-STRENGTH BOLTS IS PROHIBITED.
14. ALL JOINT SURFACES, INCLUDING THOSE ADJACENT TO THE BOLT HEADS, NUTS OR WASHERS, SHALL BE INSPECTED PRIOR TO BOLTING TO SEE THAT THE MATING SURFACES ARE IN CLOSE CONTACT AND ARE FREE FROM BURRS, DIRT AND OTHER FOREIGN MATERIALS THAT WOULD PREVENT SOLID SEATING OF PARTS.
15. WHEN CONNECTIONS REQUIRE NEW HOLES IN EXISTING STEEL, THE HOLES SHALL BE DRILLED OR PUNCHED AND REAMED AND THE DIAMETER OF OF THE BOLT.
16. HIGH-STRENGTH BOLTS SHALL NEVER BE DRIVEN INTO THE HOLES. IF BOLTS DO NOT ENTER EASILY, HOLES SHALL BE ALIGNED BY FURTHER DRIFTING OR MODERATE REAMING. ANY BURRS SHALL BE REMOVED.
17. ALL EQUIPMENT USED FOR TIGHTENING BOLTS MUST BE IN GOOD CONDITION. FOR TIGHTENING 7/8 INCH OR SMALLER BOLTS, THE AIR PRESSURE AT THE POWER WRENCH, WHEN IT IS IN OPERATION, SHALL BE A MINIMUM OF 90 PSIG AND THE REQUIRED TIGHTENING OF BOLTS SHALL BE ACHIEVED IN APPROXIMATELY 10 SECONDS. FOR LARGER BOLTS, THE AIR PRESSURE SHALL BE AS RECOMMENDED FOR THE POWER WRENCHES USED, AND IT SHALL BE DEMONSTRATED THAT THE AIR PRESSURE IS ADEQUATE FOR SATISFACTORY TENSIONING OF BOLTS
18. ALL BOLTS IN ANY CONNECTION SHALL BE INSTALLED WITH ALL NUTS ON THE SAME SIDE UNLESS INTERFERENCES WILL NOT PERMIT. FIELD CONNECTIONS IN OTHER THAN A VERTICAL PLANE SHALL BE INSTALLED WITH NUTS ON THE LOWER SIDE, EXCEPT FOR CONNECTIONS OF HORIZONTAL PLATFORM BRACING NOT SUBJECT TO STRESS REVERSAL OR WHERE SPACE RESTRICTIONS MAKE THIS IMPOSSIBLE.
19. IF USED, DIRECT TENSION INDICATION (DTI) WASHERS SHALL CONFORM TO ASTM F959 AND SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S PUBLISHED SPECIFICATIONS.
20. WHEN IMPACT WRENCHES ARE USED, WRENCHES OF ADEQUATE CAPACITY AND SUFFICIENT AIR SUPPLY SHALL BE PROVIDED TO PERFORM THE REQUIRED TIGHTENING OF EACH BOLT.
21. ALL BOLTS SHALL BE 7/8-INCH DI

SPECIAL INSPECTIONS.

1. SECTION 1704.6 STRUCTURAL OBSERVATION: THE OWNER SHALL

EMPLOY A REGISTERED DESIGN PROFESSIONAL TO PERFORM

STRUCTURAL OBSERVATION. PRIOR TO COMMENCEMENT OF

OBSERVATION, THE STRUCTURAL OBSERVER SHALL SUBMIT TO THE

BUILDING OFFICIAL A WRITTEN STATEMENT IDENTIFYING

FREQUENCY AND EXTENT OF STRUCTURAL OBSERVATIONS.

2. SECTION 1705.2 STRUCTURAL STEEL INSPECTION. VERIFY THAT ALL

BOLTS HAVE BEEN TENSIONED CORRECTLY PER SPECS. SNUG TIGHT

FOR GREENHOUSE TRUSSES AND DTI WASHERS FOR W SECTIONS

3. SECTION 1705.3 CONCRETE CONSTRUCTION: INSPECTION OF

REINFORCING STEEL INCLUDING PRESTRESSING TENDONS AND

PLACEMENT, PRIOR TO CONCRETE PLACEMENT.

4. SECTION 1705.3 CONCRETE CONSTRUCTION: VERIFYING USE OF

REQUIRED DESIGN MIX.

5. SECTION 1705.3 CONCRETE CONSTRUCTION: PRIOR TO CONCRETE

PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS,

PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE

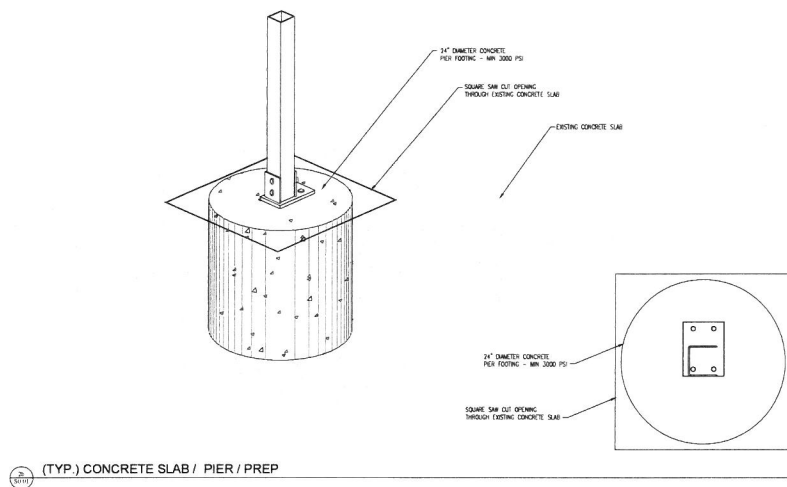
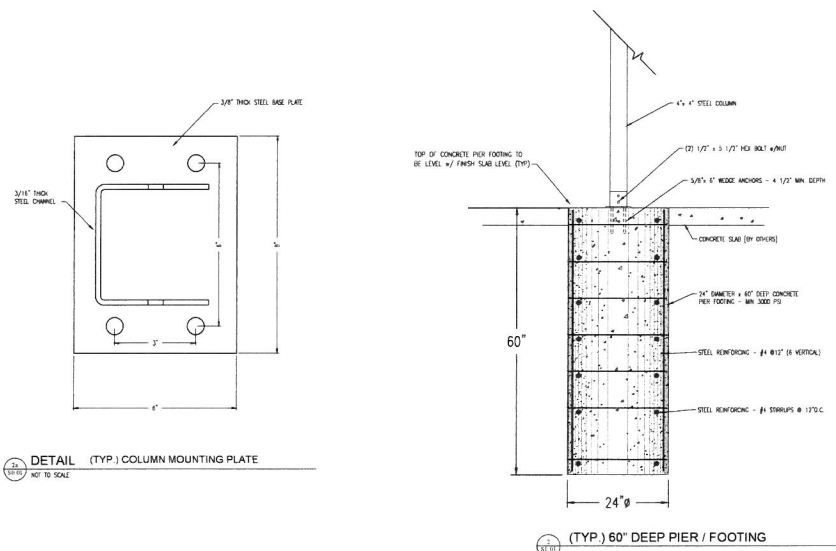
TEMPERATURE OF THE CONCRETE, ONCE EVERY 200 YDS.

6. SECTION 1705.3 CONCRETE CONSTRUCTION: INSPECTION OF

CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION

TECHNIQUES, DURING PLACEMENT.



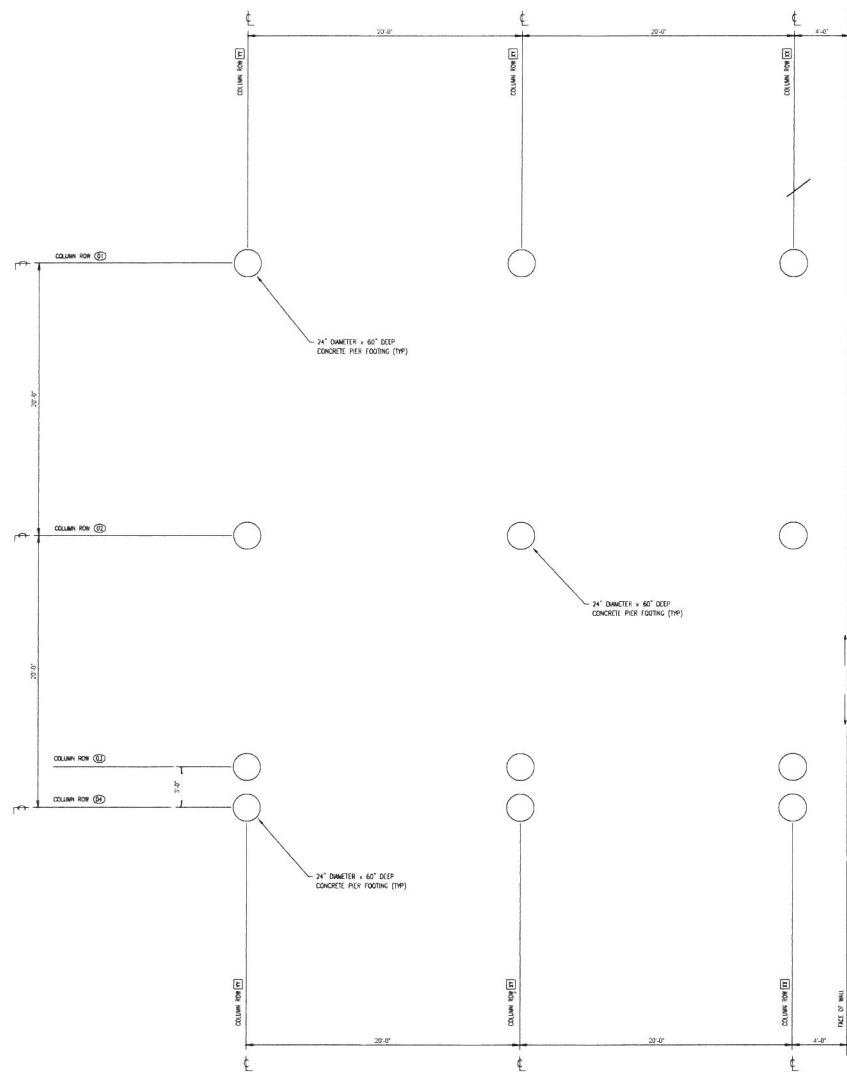


NOTE:

NO EQUIPMENT [FIRE SUPPRESSION, ELECTRICAL, PLUMBING, ETC.] ABOVE BEAMS AREA FOR RETRACTABLE SHADE SYSTEM OPERATION ONLY.

CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS

DO **NOT** SCALE DRAWINGS



REAR

EXISTING BUILDING

FRONT



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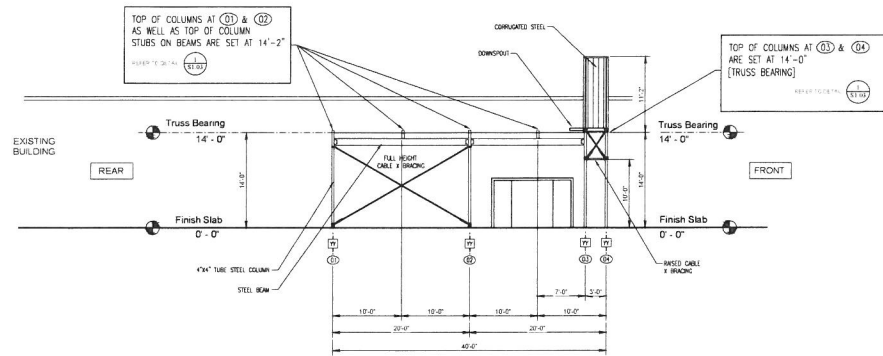
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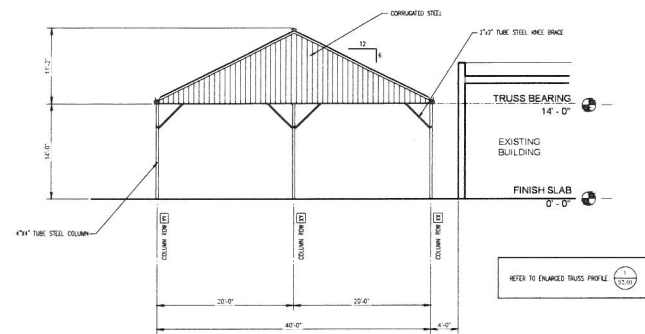
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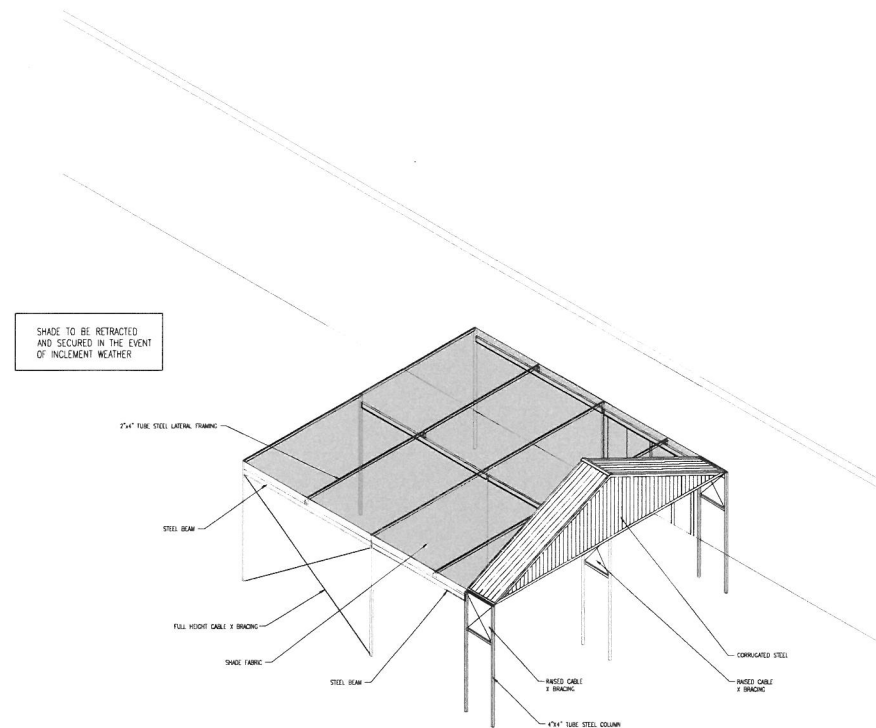
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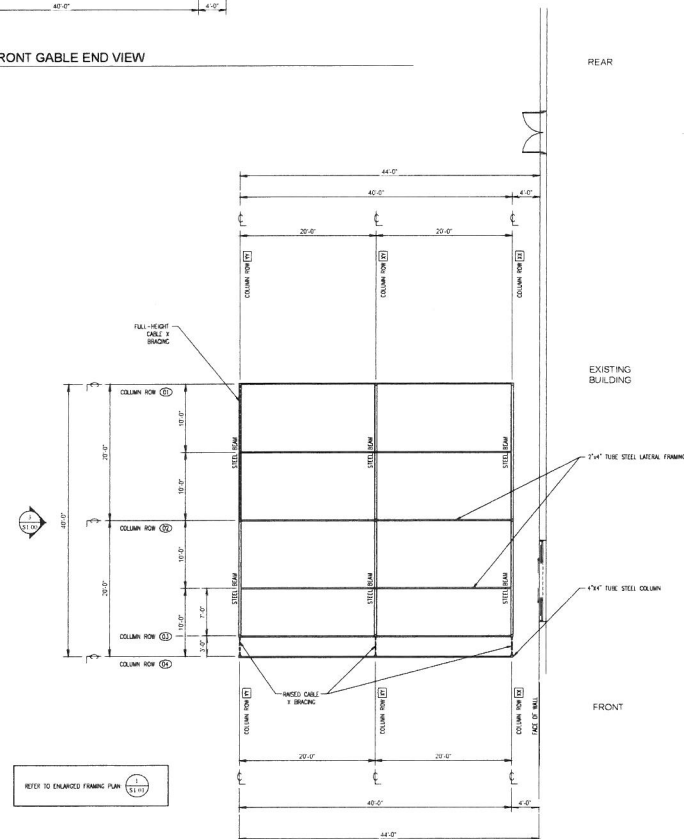
1
1/8"=1'-0"
EXTERIOR ELEVATION / SIDE VIEW



2
1/8"=1'-0"
ELEVATION / FRONT GABLE END VIEW



3
1/8"=1'-0"
3D ISOMETRIC



4
1/8"=1'-0"
FRAMING PLAN

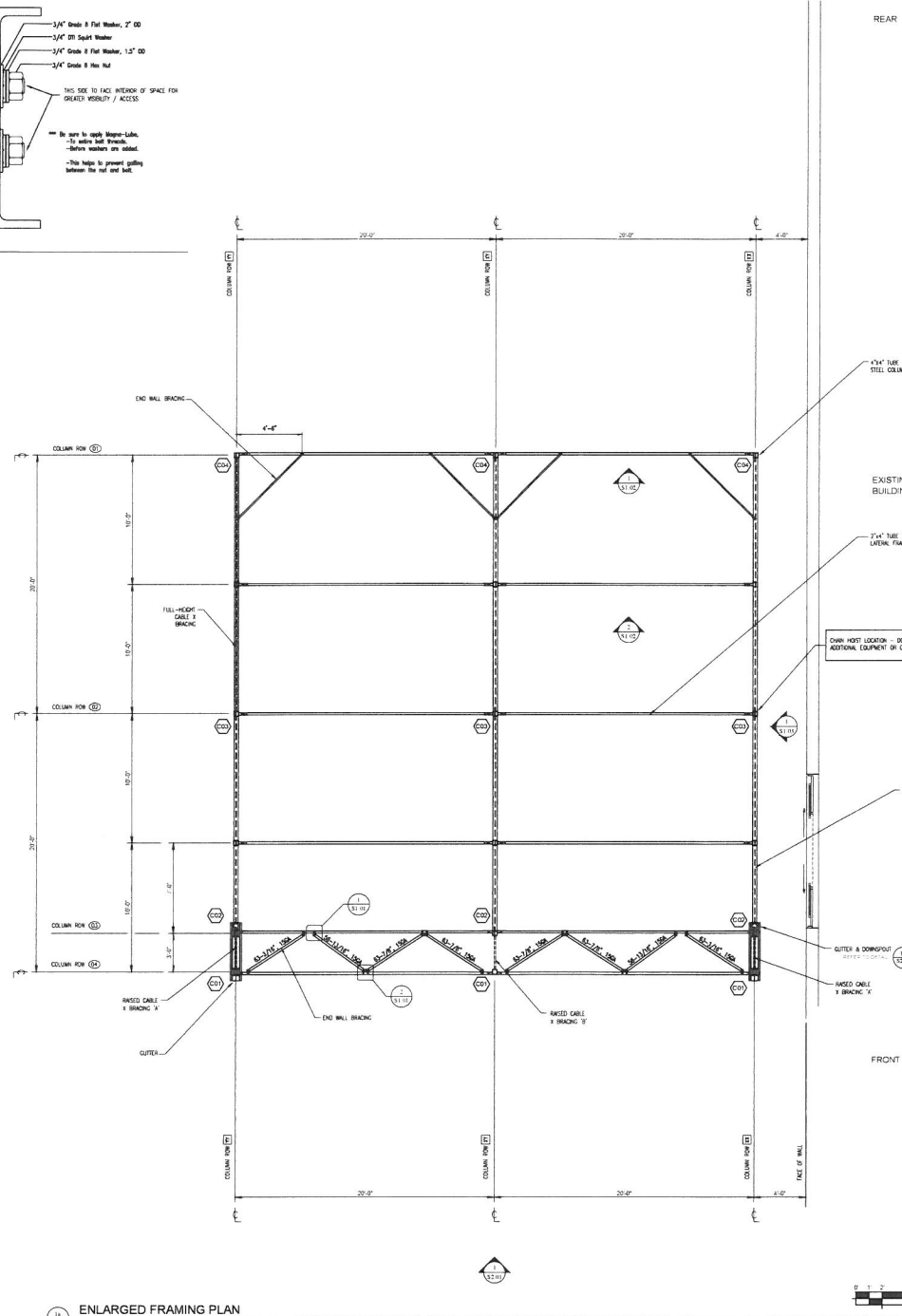
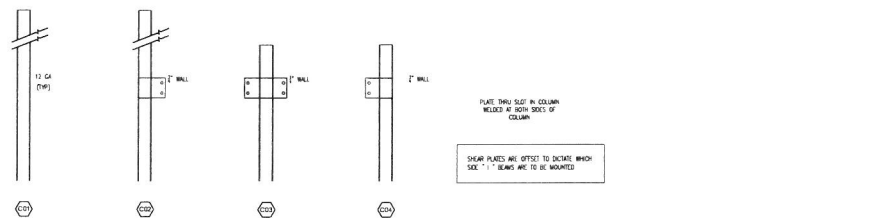
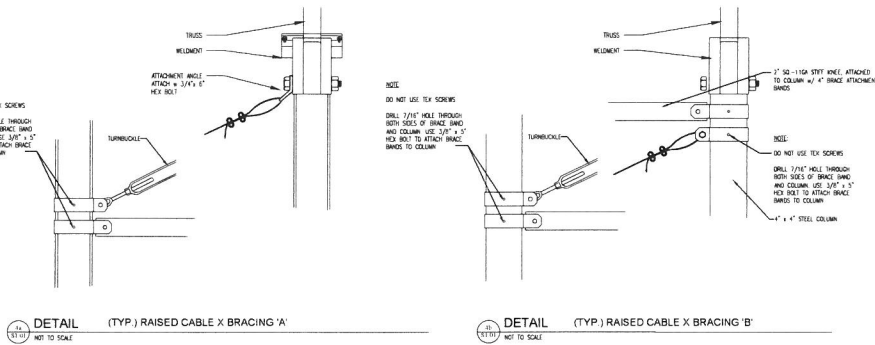
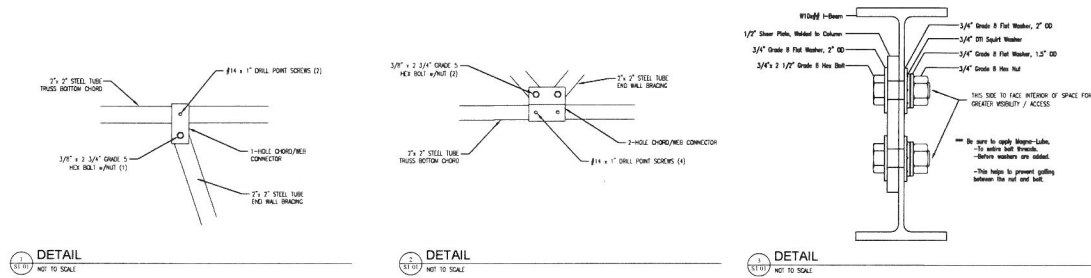
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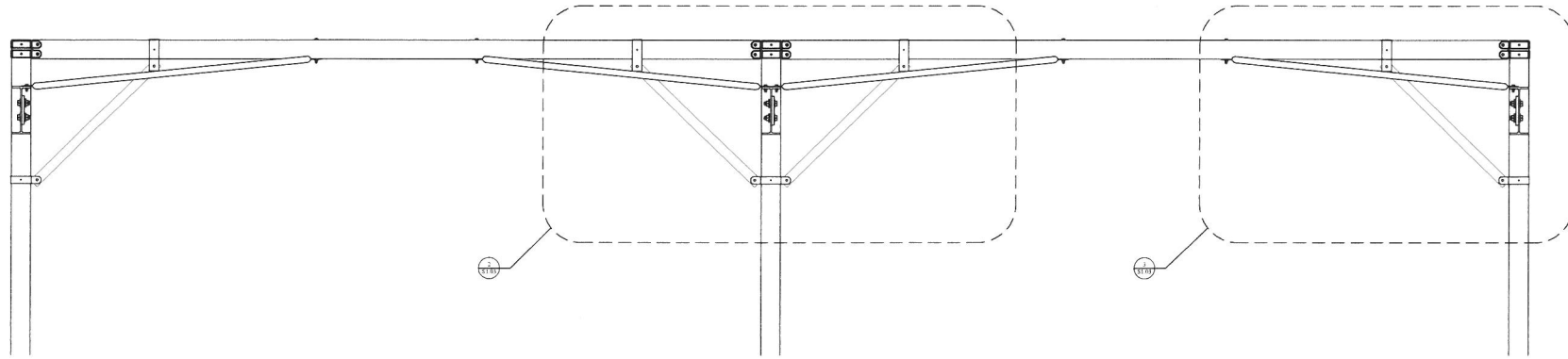


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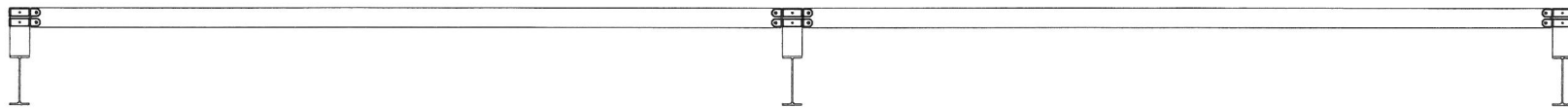
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1
ST.02
DETAIL
NOT TO SCALE



2
ST.02
DETAIL
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NOTE:

NO EQUIPMENT (FIRE SUPPRESSION, ELECTRICAL, PLUMBING, ETC.) ABOVE BEAMS. AREA FOR RETRACTABLE SHADE SYSTEM OPERATION ONLY.

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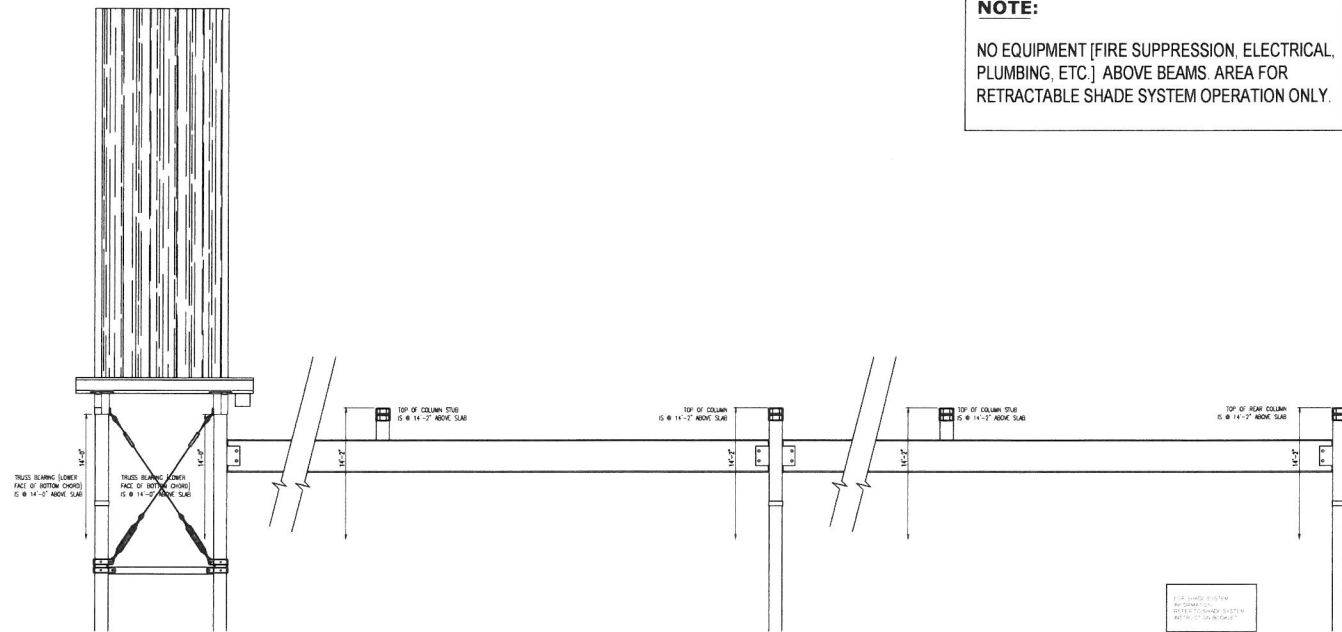
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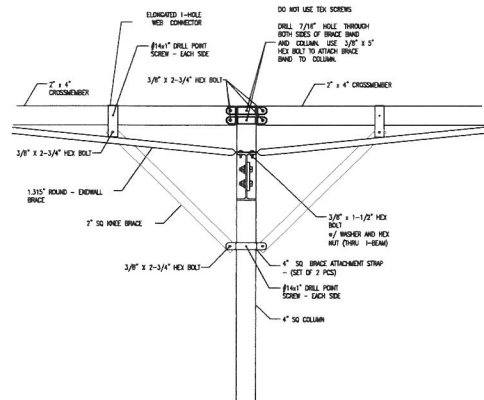
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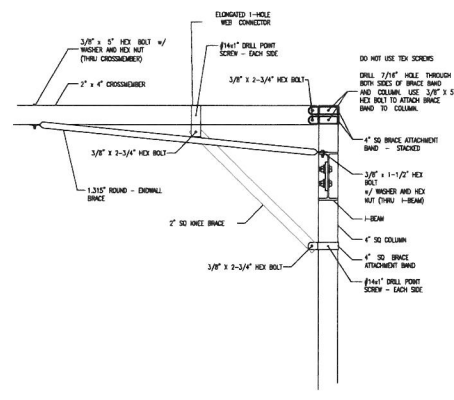


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DETAIL
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NOT TO SCALE



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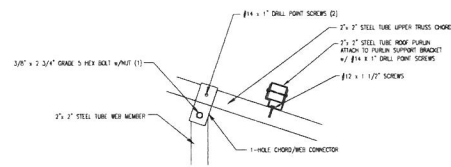
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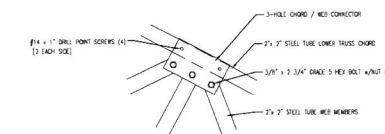
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Professional Engineer
3-4-24

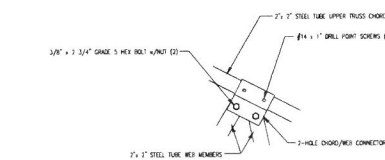
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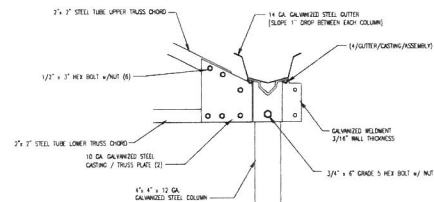
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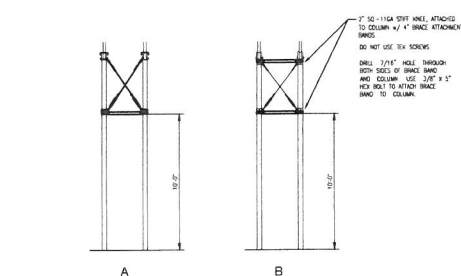
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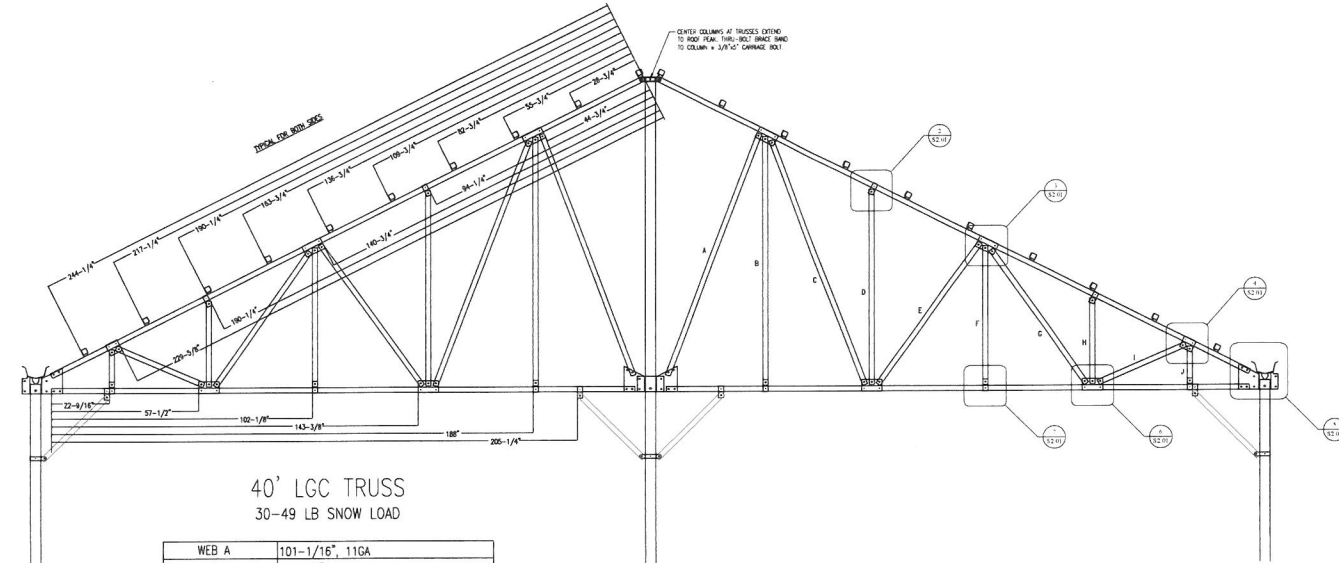
DETAIL 3-HOLE WEB CONNECTOR
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DETAIL 4-HOLE WEB CONNECTOR
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DETAIL 5-HOLE WEB CONNECTOR
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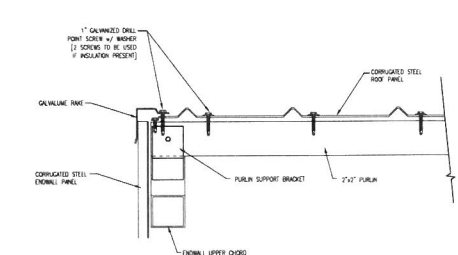


WEB A	101-1/16", 11GA
WEB B	97-1/4", 11GA
WEB C	102-1/2", 11GA
WEB D	76-7/16", 11GA
WEB E	68-1/16", 11GA
WEB F	54-5/16", 11GA
WEB G	64-5/16", 11GA
WEB H	33-1/2", 11GA
WEB I	37-1/8", 11GA
WEB J	14-1/2", 11GA
UPPER CHORD	258-3/4", 11GA
LOWER CHORD(S)	227-13/16", 11GA
KNEE BRACE	36", 11GA
PURLINS	20 RUNS, 15GA, 27" SPACING
COLUMNS	12GA

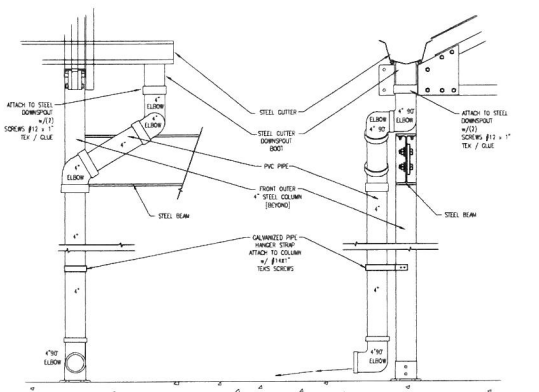
ENLARGED TRUSS PROFILE
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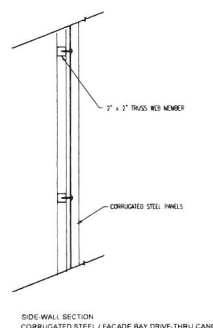
DETAIL 6-HOLE WEB CONNECTOR
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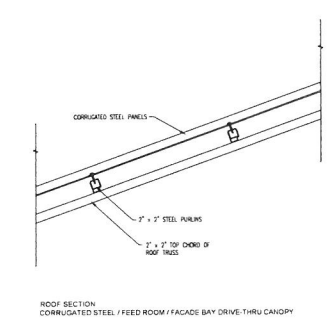
DETAIL 7-HOLE WEB CONNECTOR
NOT TO SCALE



DETAIL DOWNSPOUT
NOT TO SCALE



DETAIL 8-HOLE WEB CONNECTOR
NOT TO SCALE



DETAIL 9-HOLE WEB CONNECTOR
NOT TO SCALE

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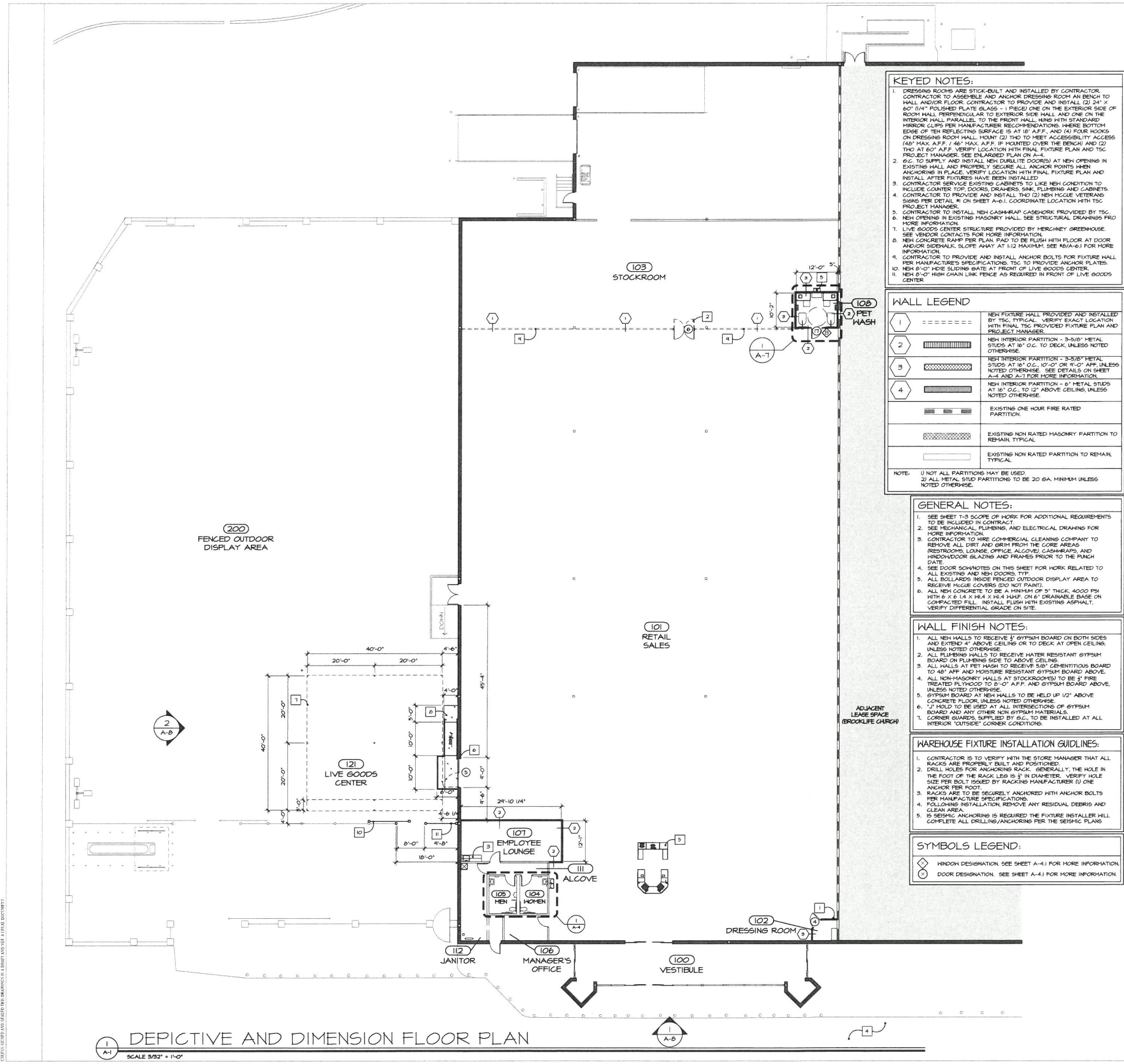
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UNLESS SHOWN OTHERWISE, THE DRAWINGS, EXCEPT AS NOTED, ARE TO BE CONSIDERED AS A GENERAL REFERENCE.

1 A-1 DEPICTIVE AND DIMENSION FLOOR PLAN
SCALE 3/32" = 1'-0"

KEYED NOTES:

1. DRESSING ROOMS ARE STOCK-BUILT AND INSTALLED BY CONTRACTOR. CONTRACTOR TO ASSEMBLE AND ANCHOR DRESSING ROOM ANCHOR TO HALL AND/OR FLOOR. CONTRACTOR TO PROVIDE AND INSTALL (2) 24" X 60" (1/4") POLISHED PLATE GLASS - (1) PEGU ONE ON THE EXTERIOR SIDE OF ROOM HALL PERPENDICULAR TO EXTERIOR SIDE HALL AND ONE ON THE INTERIOR HALL PARALLEL TO THE FRONT HALL HING WITH STANDARD HINGERS CLIPS PER MANUFACTURER'S RECOMMENDATIONS. HINGERS BOTTOM EDGE OF THE REFLECTING SURFACE IS AT 18" AFF. AND (4) FOUR HOOKS ON DRESSING ROOM HALL MOUNT (2) TWO TO MEET ACCESSIBILITY ACCESS (48" MAX AFF. / 46" MAX AFF. IF MOUNTED OVER THE BENCH) AND (2) TWO AT 60" AFF. VERIFY LOCATION WITH FINAL FUTURE PLAN AND TSC PROJECT MANAGER. SEE PLUMBING PLAN ON A-1.
2. 6.6. TO SUPPLY AND INSTALL NEW DRESSING ROOMS AT NEW OPENINGS IN EXISTING HALL AND PROPERLY SECURE ALL ANCHOR POINTS WHEN ANCHORING IN PLACE. VERIFY LOCATION WITH FINAL FUTURE PLAN AND INSTALL AFTER FIXTURES HAVE BEEN INSTALLED.
3. CONTRACTOR SERVICE EXISTING CABINETS TO LIKE NEW CONDITION TO INCLUDE COUNTER TOPS, DOORS, DRAWERS, SINK, PLUMBING AND CABINETS.
4. CONTRACTOR TO PROVIDE AND INSTALL TWO (2) NEW HIGGIE VETERANS SIGNS PER DETAIL # ON SHEET A-6.1. COORDINATE LOCATION WITH TSC PROJECT MANAGER.
5. CONTRACTOR TO INSTALL NEW CASHWRAP CASEWORK PROVIDED BY TSC.
6. NEW OPENINGS IN EXISTING MASONRY HALL SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
7. LIVE GOODS CENTER STRUCTURE PROVIDED BY HERCHNEY GREENHOUSE. SEE VENDOR CONTACTS FOR MORE INFORMATION.
8. NEW CONCRETE RAMP PER PLAN, PAD TO BE FLUSH WITH FLOOR AT DOOR AND/OR SIDEWALK. SLOPE MAX AT 1:12 MAXIMUM. SEE A-6/A-6.1 FOR MORE INFORMATION.
9. CONTRACTOR TO PROVIDE AND INSTALL ANCHOR BOLTS FOR FUTURE HALL PER MANUFACTURER'S SPECIFICATIONS. TSC TO PROVIDE ANCHOR PLATES.
10. NEW 8'-0" HIGH SLIDING GATE AT FRONT OF LIVE GOODS CENTER.
11. NEW 8'-0" HIGH CHAIN LINK FENCE AS REQUIRED IN FRONT OF LIVE GOODS CENTER.

WALL LEGEND

1	-----	NEW FUTURE HALL PROVIDED AND INSTALLED BY TSC. TYPICAL. VERIFY EXACT LOCATION WITH FINAL TSC PROVIDED FUTURE PLAN AND PROJECT MANAGER.
2		NEW INTERIOR PARTITION - 3-5/8" METAL STUDS AT 16" O.C. TO DECK, UNLESS NOTED OTHERWISE.
3		NEW INTERIOR PARTITION - 3-5/8" METAL STUDS AT 16" O.C. TO 10'-0" AFF. UNLESS NOTED OTHERWISE. SEE DETAILS ON SHEET A-4 AND A-7 FOR MORE INFORMATION.
4		NEW INTERIOR PARTITION - 6" METAL STUDS AT 16" O.C. TO 12" ABOVE CEILING, UNLESS NOTED OTHERWISE.
		EXISTING ONE HOUR FIRE RATED PARTITION.
		EXISTING NON RATED MASONRY PARTITION TO REMAIN. TYPICAL.
		EXISTING NON RATED PARTITION TO REMAIN. TYPICAL.

NOTE: 1) NOT ALL PARTITIONS MAY BE USED.
2) ALL METAL STUD PARTITIONS TO BE 20 GA. MINIMUM UNLESS NOTED OTHERWISE.

GENERAL NOTES:

1. SEE SHEET T-3 SCOPE OF WORK FOR ADDITIONAL REQUIREMENTS TO BE INCLUDED IN CONTRACT.
2. SEE MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR MORE INFORMATION.
3. CONTRACTOR TO HIRE COMMERCIAL CLEANING COMPANY TO REMOVE ALL DIRT AND GRIME FROM THE CORE AREAS (RESTROOMS, LOUNGE, OFFICE, ALCOVE, CASHWRAPS, AND WINDOW/DOOR GLAZING AND FRAMES PRIOR TO THE PUNCH DATE.
4. SEE DOOR SOWNOTES ON THIS SHEET FOR WORK RELATED TO ALL EXISTING AND NEW DOORS. TYP.
5. ALL BOLLARDS INSIDE FENCED OUTDOOR DISPLAY AREA TO RECEIVE HIGGIE COVERS (DO NOT PAINT).
6. ALL NEW CONCRETE TO BE A MINIMUM OF 3" THICK, 4000 PSI WITH 6 X 6 1/4 X 1/4 H.H.F. ON 6" DRAINABLE BASE ON COMPACTED FILL. INSTALL FLUSH WITH EXISTING ASPHALT. VERIFY DIFFERENTIAL GRADE ON SITE.

WALL FINISH NOTES:

1. ALL NEW WALLS TO RECEIVE 5/8" GYPSUM BOARD ON BOTH SIDES AND EXTEND 4" ABOVE CEILING OR TO DECK AT OPEN CEILING, UNLESS NOTED OTHERWISE.
2. ALL PLUMBING HALLS TO RECEIVE WATER RESISTANT GYPSUM BOARD ON PLUMBING HALLS TO ABOVE CEILING.
3. ALL WALLS AT PET WASH TO RECEIVE 5/8" GYPSUM BOARD ABOVE CEILING.
4. ALL NON-MASONRY HALLS AT STOCKROOMS TO BE 5/8" FIRE TREATED PLYWOOD TO 8'-0" AFF. AND GYPSUM BOARD ABOVE, UNLESS NOTED OTHERWISE.
5. GYPSUM BOARD AT NEW WALLS TO BE HELD UP 1/2" ABOVE CONCRETE FLOOR, UNLESS NOTED OTHERWISE.
6. "J" HOLD TO BE USED AT ALL INTERSECTIONS OF GYPSUM BOARD AND ANY OTHER NON GYPSUM MATERIALS.
7. CORNER GUARDS, SUPPLIED BY G.C., TO BE INSTALLED AT ALL INTERIOR "OUTSIDE" CORNER CONDITIONS.

WAREHOUSE FIXTURE INSTALLATION GUIDELINES:

1. CONTRACTOR IS TO VERIFY WITH THE STORE MANAGER THAT ALL RACKS ARE PROPERLY BUILT AND POSITIONED.
2. DRILL HOLES FOR ANCHORING RACKS. GENERALLY, THE HOLE IN THE FOOT OF THE RACK LEG IS 3/4" IN DIAMETER. VERIFY HOLE SIZE PER BOLT ISSUED BY RACKING MANUFACTURER (1) ONE ANCHOR PER FOOT.
3. RACKS ARE TO BE SECURELY ANCHORED WITH ANCHOR BOLTS PER MANUFACTURE SPECIFICATIONS.
4. FOLLOWING INSTALLATION, REMOVE ANY RESIDUAL DEBRIS AND CLEAN AREA.
5. IF SEISMIC ANCHORING IS REQUIRED THE FIXTURE INSTALLER WILL COMPLETE ALL DRILLING/ANCHORING PER THE SEISMIC PLANS.

SYMBOLS LEGEND:

- ◇ WINDOW DESIGNATION. SEE SHEET A-4.1 FOR MORE INFORMATION.
- DOOR DESIGNATION. SEE SHEET A-4.1 FOR MORE INFORMATION.

DOOR SOWNOTES:

1. AUTO, OVERHEAD, AND ALUMINUM STOREFRONT DOORS - REPLACE SEALS AND SHEEPS. GREASE AND ADJUST AS NEEDED. REPLACE ANY DAMAGED AND/OR MISSING PLASTIC CURTAIN STRIPS. ALL WORK TO BE DONE BY AN APPROVED LICENSED DOOR VENDOR.
2. ALL MANUAL DOORS - REPLACE SEALS, SHEEPS, AND ADJUST DOOR HARDWARE IF NOT OPERATING PROPERLY. RE-PAINT DOORS AND FRAMES PER TSC SOP. RE-CALCUL FRAME TO HALL IF NEEDED. CLEAN OFF OLD CALK PRIOR TO INSTALLING NEW. ROLLER HANDLES AND KICK PLATES IF APPLICABLE. INSTALL DOOR SILENCERS AND/OR STOPS IF NEEDED.

EXTERIOR SOWNOTES:

1. INSTALL TWO (2) NEW VETERANS PARKING SIGNS ON BLACK BUDDY POST BY HIGGIE. COORDINATE LOCATION WITH TSC PM.
2. ENSURE ALL EXISTING SITE POLE LIGHTS ARE IN GOOD WORKING ORDER. BID AS ALTERNATE IF REPAIRS ARE NEEDED.
3. ENSURE THAT ALL HALL PACKS ARE IN GOOD WORKING ORDER AND NO COVERS ARE DAMAGED OR MISSING. BID AS ALTERNATE IF ANY HALL PACK COVERS NEED TO BE REPLACED.
4. PRESSURE WASH HIGGIE SIDE OF CANOPY. ENSURE ALL LIGHT FIXTURES/BULBS ARE WORKING.
5. PAINT FRONT AND LEFT EXTERIOR ELEVATION PER STANDARD CRITERIA PLANS. FILL ALL PENETRATIONS AND REPAIR/RESOLE ANY WATER PENETRATIONS PRIOR TO PAINTING.
6. ENSURE ALL RECEPTACLES ON THE EXTERIOR OF THE BUILDING ARE WORKING. REPLACE ALL DAMAGED, MISSING, OR STANDARD COVERS WITH EXTERIOR HEAVYWEAR PROOF COVERS. ALL EXTERIOR HEATER PROOF COVERS TO OPEN AND ALLOW PLUGS TO BE COVERED WHILE IN USE.
7. CUT OUT AND REPLACE UP TO 100 SF OF ASPHALT. VERIFY IN FIELD.
8. CRACK FILL AND PRESSURE WASH EXISTING CONCRETE AT FDD. RE-PAINT HALL DRIVE ASLE.
9. REMOVE EXISTING GATES AND FENCE AS REQUIRED FOR NEW OPENING AT LIVE GOODS CENTER.
10. REMOVE EXISTING BOLLARDS AT NEW LIVE GOODS CENTER AND RAMP.
11. ADJUST AND RE-HANG EXISTING GATES TO OPEN AND CLOSE CORRECTLY.
12. PAINT EXISTING NEW/EXISTING RAILING GRAY, TYP.
13. BUILD LIVE GOODS CENTER PER PLANS.

VESTIBULE 100 SOWNOTES:

1. THOROUGHLY DISINFECT HALLS. ALL PENETRATIONS REPAIRED, CLEANED AND PAINTED WHITE PER S2.
2. CLEAN EXISTING GLAZING AND ENSURE ALL MULLIONS ARE WATER TIGHT.
3. REMOVE EXISTING VCT FLOORING.
4. BRIND BURNISH AND POLISH EXISTING CONCRETE FLOORING PER TSC SPEC.
5. REMOVE AND REPLACE ALL EXISTING CEILING TILES. EXISTING GRID TO REMAIN. TYP.
6. REPLACE ALL LIGHT COVERS IN LAY-IN CEILING.
7. ENSURE RECEPTACLES ARE IN GOOD WORKING ORDER.

SALES FLOOR 101 SOWNOTES:

1. PAINT ALL INTERIOR SALES FLOOR HALLS PER STANDARD CRITERIA PLANS. REMOVE ALL FORESCIENCE AND REPAIR ALL CRACKS IN DRYWALL PRIOR TO PAINTING.
2. PAINT ALL COLUMNS PER STANDARD CRITERIA PLANS.
3. REMOVE EXISTING DRESSING ROOM AND INSTALL NEW PER PLANS.
4. CONTRACTOR TO REPLACE DAMAGED CEILING TILE AS DIRECT BY TSC PM (500 SF MIN) VERIFY IN FIELD PRIOR TO FINAL BID.
5. CONTRACTOR TO REPLACE ALL DAMAGED VCT FLOORING AS DIRECTED BY TSC PM (10,000 SF MINIMUM) VERIFY IN FIELD PRIOR TO FINAL BID.
6. INSTALL NEW LVT PER PLANS AND AS REQUIRED BY TSC PROJECT MANAGER.
7. CONTRACTOR TO MAX ALL NEW AND EXISTING VCT/LVT FLOORING. STRIP EXISTING FLOORING PRIOR TO MAXING.
8. HIGH DUST ALL HALLS AND CLEAN DIFFUSERS.
9. ADD NEW ELECTRICAL ITEMS PER ELECTRICAL PLANS.
10. ENSURE ALL LIGHT FIXTURES ARE OPERATIONAL.
11. ENSURE ALL EXISTING RECEPTACLES ARE WORKING. REPLACE ALL DAMAGED/MISSING COVERS.
12. INSTALL NEW FIBERGLASS CASHWRAP PROVIDED BY TSC.
13. PROVIDE AND INSTALL NEW DOORS IN EXISTING HALL.

ALCOVE III SOWNOTES:

1. THOROUGHLY DISINFECT HALLS. ALL PENETRATIONS REPAIRED AND PAINTED WHITE PER S2.
2. REPLACE ALL DAMAGED/STAINED CEILING TILE AS REQUIRED BY TSC PM.
3. REPLACE ALL DAMAGED VCT FLOORING (100 SF MIN) VERIFY IN FIELD PRIOR TO FINAL BID.
4. STRIKE AND MAX EXISTING / NEW VCT FLOORING.
5. REPLACE ALL LIGHT COVERS.
6. CLEAN AND SANITIZE EXISTING DRINKING FOUNTAIN.
7. INSTALL NEW FRP TO 48" AFF AT ALL WALLS AROUND EXISTING DRINKING FOUNTAIN.

WOMEN 104 SOWNOTES:

1. EXISTING FRP HALL TO BE REMOVED. HALLS TO BE THOROUGHLY CLEANED, DISINFECTED, REPAIRED AND PAINTED TSC BEIGE.
2. INSTALL NEW FRP TO 48" AFF.
3. CLEAN AND SANITIZE EXISTING CERAMIC TILE FLOORING.
4. PAINT EXISTING GYPSUM BOARD CEILING. REPAIR ALL CRACKS AND PENETRATIONS PRIOR TO PAINTING.
5. CLEAN EXISTING WATER CLOSET AND HARDWARE. REPLACE SEAT. CLEAN EXISTING WALL MOUNTED SINK AND HARDWARE. RE-CALCUL TO HALL AND INSTALL NEW TOUGH LESS FAUCET.
6. REPLACE ALL LIGHT COVERS.
7. CLEAN EXISTING EXHAUST FAN AND COVER.
8. INSTALL NEW METAL PLATE BELOW EXISTING HAND DRYER.
9. CLEAN EXISTING MIRROR. REPLACE ANY PLASTIC HANGERS WITH METAL.
10. CLEAN EXISTING HAND DRYER. ENSURE UNIT IS IN GOOD WORKING ORDER.

MEN 105 SOWNOTES:

1. EXISTING FRP HALL TO BE REMOVED. HALLS TO BE THOROUGHLY CLEANED, DISINFECTED, REPAIRED AND PAINTED TSC BEIGE.
2. INSTALL NEW FRP TO 48" AFF.
3. CLEAN AND SANITIZE EXISTING TILE CERAMIC FLOORING.
4. PAINT EXISTING GYPSUM BOARD CEILING. REPAIR ALL CRACKS AND PENETRATIONS PRIOR TO PAINTING.
5. CLEAN AND SANITIZE EXISTING TOILET PARTITIONS. ENSURE SCREENS ARE TIGHT ON PANELS AND HALL.
6. CLEAN EXISTING WATER CLOSET AND HARDWARE. REPLACE SEAT. CLEAN EXISTING WALL MOUNTED URINAL. RE-CALCUL TO HALL AND INSTALL NEW TOUGHLESS FIXTURE.
7. CLEAN EXISTING HALL MOUNTED SINK AND HARDWARE. RE-CALCUL TO HALL AND INSTALL NEW TOUGH LESS FAUCET.
8. REPLACE ALL LIGHT COVERS.
9. CLEAN EXISTING EXHAUST FAN AND COVER.
10. INSTALL NEW METAL PLATE BELOW EXISTING HAND DRYER.
11. CLEAN EXISTING MIRROR. REPLACE ANY PLASTIC HANGERS WITH METAL.
12. CLEAN EXISTING HAND DRYER. ENSURE UNIT IS IN GOOD WORKING ORDER.

EMPLOYEE LOUNGE 107 SOWNOTES:

1. MODIFY EXISTING EMPLOYEE LOUNGE AND BUILD NEW HALLS PER PLANS.
2. REMOVE AND REPLACE EXISTING VCT FLOORING. APPLY THREE (3) COATS OF MAX ON NEW VCT. TYP.
3. REMOVE EXISTING ACT AND INSTALL NEW PER PLANS.
4. SERVICE EXISTING BREAK ROOM CABINET TO INCLUDE DOORS, DRAWERS, COUNTERS, PLUMBING, ETC.
5. INSTALL NEW LIGHT FIXTURES PER PLANS.
6. CLEAN AND ADJUST EXISTING DIFFUSERS / GRILLS AND DUCTWORK AS REQUIRED TO WORK WITH NEW CEILING GRID.

MANAGER'S OFFICE 106 SOWNOTES:

1. THOROUGHLY DISINFECT AND CLEAN HALLS. ALL PENETRATIONS REPAIRED AND PAINTED WHITE PER S2.
2. STRIP AND MAX EXISTING VCT FLOORING.
3. REMOVE AND REPLACE ALL CEILING TILE IN THE EXISTING CEILING GRID.
4. REPLACE ALL LIGHT COVERS.

STOCKROOM 103 SOWNOTES:

1. HIGH DUST ALL HALLS AND EXPOSED CEILING.
2. PROVIDE AND INSTALL HIGGIE COVERS ON ALL BOLLARDS.
3. ENSURE ALL RECEPTACLES ARE WORKING. REPLACE ANY DAMAGED OR MISSING COVERS.



5401 VIRGINIA WAY
BRENTWOOD, TN 37027
PHONE: (615) 440-4200



FUSION/PETWASH/LIVE
GOODS CENTER:
857 S ROCHESTER ST
MUKWONAGO, WI 53149

JOB NUMBER:
23-024F
REVISIONS:

FEBRUARY 15, 2024
A-1
DEPICTIVE & DIMENSION
FLOOR PLAN

GENERAL NOTES:

1. ALL PAINTING APPLICATIONS MAY UTILIZE BRUSH, ROLLER OR AIRLESS SPRAYER; HOWEVER, ALL COATS MUST BE BACK-ROLLED. SEE SHERWIN WILLIAMS DATA SHEET APPLICATION RECOMMENDATIONS.
2. ANY EXPOSED FOUNDATION WALLS SHALL BE PAINTED TO MATCH SKT515 - SANDERLING, TYP.
3. COORDINATE WITH MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR ALL PENETRATIONS IN THE EXTERIOR FACADES.
4. ALL OPEN CMU CELLS TO BE TAILED FOAM FILLED.
5. FLASH, DRAFT STOP AND INSULATE AROUND ALL PENETRATIONS INCLUDED BUT NOT LIMITED TO: PLUMBING PIPES, VENTS, ELECTRICAL WIRES, CONDUITS, ELECTRICAL FIXTURES, MECHANICAL SERVICES, AND IN SOME CASES, STRUCTURAL MEMBERS THROUGHOUT THE BUILDING ENCLOSURE. CONTRACTOR TO CHOOSE APPROPRIATE INFILL MATERIAL(S) AS REQUIRED SUCH AS BUT NOT LIMITED TO: CAULK, FOAM PAINT, NON-DETERIOROUS ELASTOMERIC SEALANT, ADHESIVES OR EFFECTIVE GASKETS. DO NOT EXCEED MANUFACTURER'S PUBLISHED TOLERANCES FOR MAXIMUM OPENING SIZES FOR INFILL. REFER TO ASTM C1193 FOR A STANDARD GUIDE FOR USE OF JOINT SEALERS.
6. GENERAL CONTRACTOR OR THE OWNER'S TESTING COMPANY SHALL PROVIDE MOISTURE TESTING OF ALL CMU AND CONCRETE EXTERIOR WALL PER ASTM D4268 PRIOR TO APPLICATION OF PAINT. TSC PROJECT MANAGER MUST APPROVE THE APPLICATION OF PAINT IN WRITING, IF THE MOISTURE CONTENT IS ABOVE 10%.
7. GENERAL CONTRACTOR TO PROVIDE NON-CORROSIVE METAL SLOPE GUARDS AT ALL SLOPE ROOFING/ANNEXES, TYP.
8. REMOVE OR RELOCATE ALL ITEMS FROM EXTERIOR WALL AS REQUIRED FOR NEW LIVE GOODS CENTER STRUCTURE.
9. CONTRACTOR TO PAINT ALL EXISTING TRIM, GUTTERS, DOWNSPOUTS, ETC. TO MATCH FINISH BELOW/ADJACENT. SEE STANDARD CRITERIA PLANS AND SPECIFICATIONS.
10. CONTRACTOR TO PAINT EXTERIOR ELEVATIONS PER SOH ON T-3.

EXTERIOR FINISH SCHEDULE

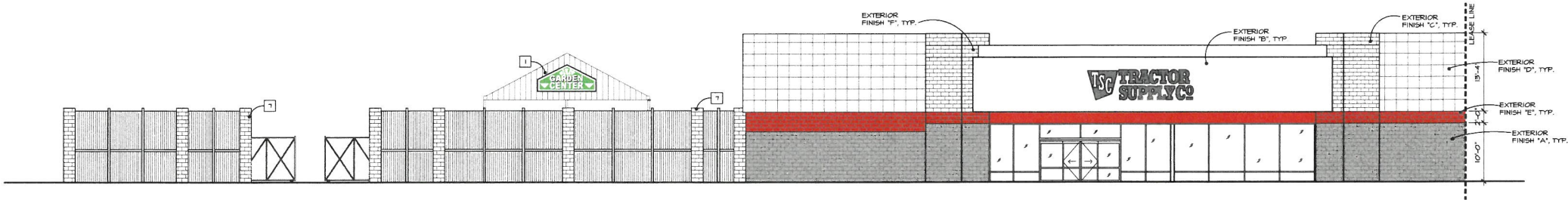
	A	EXISTING SMOOTH FACE CMU- PAINT COLOR TO MATCH SKT515 - SANDERLING, TYP. BELOW 4'-0" A.F.F. AT LEFT SIDE AND 10'-0" A.F.F. AT FRONT.		D	EXISTING EIFS- PAINT COLOR TO MATCH SKT532 - URBAN PUTTY, TYP.
	B	EXISTING EIFS- PAINT COLOR TO MATCH SKT532 - URBAN PUTTY, TYP. ABOVE 12'-0" A.F.F. TYP.		E	EXISTING SMOOTH/SPLIT FACE CMU BLOCK PAINT COLOR TO MATCH PAINT SAFETY RED, TYP.
	C	EXISTING SPLIT FACE CMU BLOCK PAINT COLOR TO MATCH SKT532 - URBAN PUTTY, TYP. ABOVE 4'-0" A.F.F. AT LEFT SIDE AND 10'-0" A.F.F. AT FRONT.		F	EXISTING SMOOTH FACE CMU BLOCK PAINT COLOR TO MATCH SKT532 - URBAN PUTTY, TYP.

NOTES:
1) NOT ALL FINISHES/PAINTS MAY BE USED
2) SEE TSC CRITERIA PLANS FOR ALTERNATE PPG PAINT SPECIFICATIONS
3) SEE A-1 FOR EXTERIOR PAINTING SPECIFICATIONS/COLORS

KEYED NOTES:

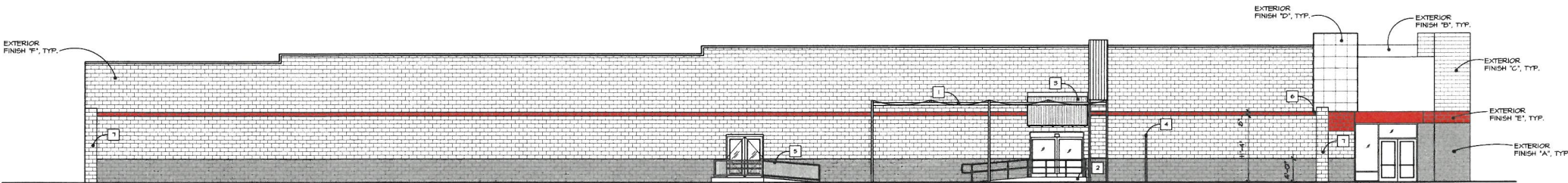
1. LIVE GOODS CENTER STRUCTURE PROVIDED BY MICHNEY GREENHOUSE. SEE VENDOR CONTACTS FOR MORE INFORMATION.
2. NEW CONCRETE, RAHP AND RAILING PER PLAN, PAD TO BE FLUSH WITH FLOOR AT DOOR AND/OR SIDEWALK. SLOPE AWAY AT 1:12 MAXIMUM. PAINT RAILINGS GRAY PER SCP.
3. NEW METAL AWNING ABOVE ENTRY DOOR. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
4. NEW 8'-0" HIGH CHAIN FENCE IN FRONT OF LIVE GOODS CENTER.
5. PAINT EXISTING RAILINGS GRAY PER SCP.
6. ALIGN RED STRIP WITH FRONT ELEVATION.
7. PAINT ALL EXISTING FENCE PILASTERS AT FOD TO MATCH SKT532 - URBAN PUTTY, TYP.

NOTE: NOT ALL NOTES MAY BE USED



1 FRONT EXTERIOR ELEVATION

SCALE 1/8" = 1'-0"



2 RIGHT EXTERIOR ELEVATION

SCALE 1/8" = 1'-0"



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FEBRUARY 15, 2024

A-8
EXTERIOR ELEVATIONS

**VILLAGE OF MUKWONAGO
WAUKESHA AND WALWORTH COUNTIES**

PC RESOLUTION NO. 2024-08

**A RESOLUTION FOR A SITE PLAN AND ARCHITECTURAL REVIEW FOR TRACTOR
SUPPLY, MUKV2009978009, 857 S ROCHESTER ST., UNIT 500**

WHEREAS, pursuant to Section 100-601 of the Zoning Code, an application for a site plan and architectural review has been filed for the approval of a new canopy structure, which application was filed in the office of the Village Clerk, Village of Mukwonago, Wisconsin, and

WHEREAS, the application has been submitted by Tractor Supply Co., (owner), and

WHEREAS, the use is a permitted use within the B-2 Community Business District – in which the subject property is located, and

WHEREAS, the plan of operation and plans have been reviewed and recommended by the Plan Commission.

NOW, THEREFORE, BE IT RESOLVED by the Plan Commission of the Village of Mukwonago, Wisconsin hereby approves the site plan and architectural review for the new canopy structure to be constructed at Tractor Supply, based upon the plans submitted to the Village.

NOW, THEREFORE, BE IT FURTHER RESOLVED the site plan and architectural review approval shall be subject to the following conditions:

1. Prior to any land disturbing activity, the applicant must submit a complete and final set of site construction plans to the Village and receive approval of said plans prior to issuance of any building permits. Plans shall include but are not limited to grading, utilities, utility calculations, erosion control, landscaping, lighting, building architecture, building materials and other plans as required. All Village department heads must verify in writing whether they have approved the final plans within their purview. Any outstanding matters must be resolved to staff's satisfaction. Construction shall comply with any conditions of approval issued by staff.
2. A final erosion control plan shall be submitted for review and approval.
3. All required regulatory agency permits shall be received and provided to the Village prior to the start of construction.
4. Prior to any land-disturbing activity, a pre-construction meeting must be held with the applicant's representatives and primary contractors, and Village department heads and representatives. The applicant representative shall coordinate such meeting.
5. The applicant must obtain all required land disturbance permits within nine months of this date, and start construction within six months of the date of building permit issuance and continue in good faith to completion.
6. Prior to any land-disturbing activity, the applicant must reimburse the Village for any outstanding charges and establish an escrow account with the Village as may be required.

7. The applicant must obtain all required building permits within nine months of this date, and start construction within six months of the date of building permit issuance and continue in good faith to completion.
8. All work related to this project must comply with all project plans approved by the Village.
9. The developer must comply with all requirements related to impact fees imposed by the Village.
10. The developer shall comply with all parts of the Municipal Code as it relates to this project.
11. If the approved plans need to be revised to address any of the conditions of approval or to conform to Building and Fire Safety Codes, the Zoning Administrator and the Building Inspectors are authorized to approve minor modifications so long as the overall project elements remain unchanged. If they determine that the revision is substantial, the plans must be submitted to the Plan Commission for review and approval.
12. Any future modification to the site such as modification of parking, lighting, grading, signage, fences, etc. may require Site Plan and Architectural Review.

Passed and adopted by the Village of Mukwonago Plan Commission this 12th day of August, 2024.

VILLAGE OF MUKWONAGO

By: _____
Fred Winchowky, Village President

Attest: _____
Shay Zervas, Deputy Clerk-Treasurer