



AGENDA OF THE PLANNING  
COMMISSION  
CITY OF BIRCHWOOD VILLAGE  
WASHINGTON COUNTY, MINNESOTA  
June 27th, 2024  
7:00 P.M.

**CALL TO ORDER**

**PUBLIC FORUM**

**APPROVE AGENDA**

**REGULAR AGENDA**

- A. Approve May 23, 2024, PC Meeting Minutes\* (pp. 2-12)
- B. 24-01-VB (425 Lake) Variance\* (pp. 13-49)
  - 1. Review and Discuss Variance Application
  - 2. Review City Planner Report
  - 3. Discuss and Recommendations to City Council
    - a. Commission Finding of Fact
    - b. Conditions of Support/Commission Action
- C. ORD 2024-06-03 (302.017) Lot Merge Required\* (pp. 50-51)
  - 1. Review Proposed Ordinance
  - 2. Recommendation to the City Council

**ADJOURN**

MEETING MINUTES (Draft)

Birchwood Planning Commission Regular Meeting

City Hall - 7:00 PM Regular Meeting 5/23/2024

Submitted by Michael Kraemer – secretary

COMMISSIONERS PRESENT: — Andy Sorenson - Chairman, Michael McKenzie, Michael Kraemer, Casey Muhm

COMMISSIONERS ABSENT: Michelle Maiers-Atakpu

OTHERS PRESENT: Council Member Ryan Hankins, Mike Tschida, Lisa Madore, Carson Schifsky

TO ORDER: Meeting called to order by Chairman Andy Sorenson at 7:02PM.

1. PUBLIC FORUM
  - a. none
2. APPROVE AGENDA
  - a. Motion by McKenzie, 2<sup>nd</sup> by Muhm to approve agenda as presented. Vote: Yes - 4, No – 0. Motion passed.
3. REGULAR AGENDA
  - a. Item A – Review/Approve April 25, 2024 Planning Commission Meeting Minutes.
    - i. Motion by McKenzie, 2<sup>nd</sup> by Muhm to approve the minutes. Vote: Yes – 4, No – 0, Motion passed.
  - b. Item B – 24-01-VB (425 Lake) Variance
    1. Public Hearing – Chairman Sorenson opened the public hearing on Variance 24-01-VB.
      - a. Carson Schifsky was present representing the property owners at 425 Lake Ave and presented the details of the variance 24-01-VB.
        - i. Variance 24-01-VB requested variance from Village Code 302.020 STRUCTURE LOCATION REQUIREMENTS prohibiting retaining walls within 50’ of the OHW of White Bear Lake.
      - b. Lisa Madore discussed her 5/21/2024 email outlining the concerns of property owner Kathy Madore (mother) who lives immediately north of 425 Lake Ave.
        - i. Concerns centered around eliminating any negative impacts from the proposed retaining wall construction to the Madore property, and prohibiting any additional runoff onto the Madore property.

- c. Chairman Sorenson closed the public hearing witnessing no additional speakers.
- 2. Review and Discuss Variance Application
  - a. Discussion centered around the lack of completeness of the application. Information needed for the Planning Commission to fully understand the proposed project was missing. (I.e., Examples of elements missing included but are not limited to: wall location dimensions, height and length; wall materials and anchoring; slope stabilization materials, methods and details; stair and deck replacement materials, dimensions, and details; and final grading and drainage plans.)
- 3. Discuss and Recommendations to the City Council
  - a. **ACTION TAKEN:** The applicant elected to have the variance application tabled at this time and verbally agreed to file a formal request with the City Administrator to reflect the applicant's decision.
- 4. ADJOURN 7:44 PM
  - a. Motion by Motion by Muhm, 2<sup>nd</sup> by McKenzie to adjourn meeting. Vote: Yes - 4, No – 0. Motion passed.

# CERTIFICATE OF SURVEY

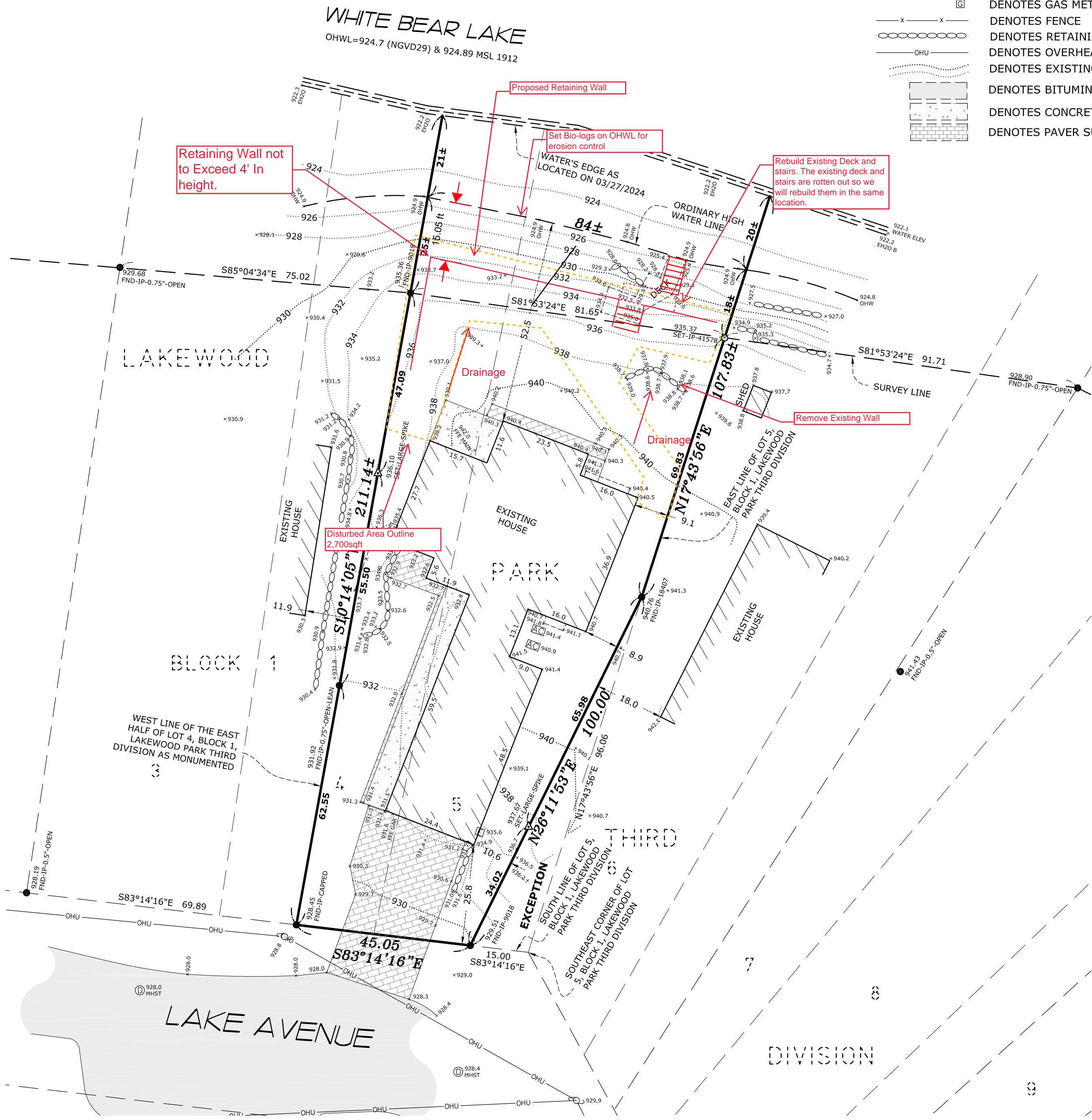
~for~ **BLAISER POOLS**  
 ~of~ **425 LAKE AVENUE**  
**BIRCHWOOD, MN**

## BENCHMARK

DNR PAINT MARK ON SLAB OF  
 PUMPHOUSE AT MATOSKA PARK  
 ELEVATION: 928.74  
 DATUM: MSL 1912

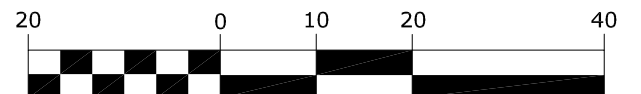
## LEGEND

- DENOTES IRON MONUMENT FOUND AS LABELED
- DENOTES IRON MONUMENT SET, MARKED RLS# 41578
- △ DENOTES SET PKNAIL
- ⊠ DENOTES AIR CONDITIONING UNIT
- ⊞ DENOTES ELECTRICAL BOX
- x 952.36 DENOTES EXISTING SPOT ELEVATION
- ⊕ DENOTES POWER POLE
- ⊙ DENOTES STORM SEWER MANHOLE
- ⊞ DENOTES GAS METER
- x — x — DENOTES FENCE
- ○ — ○ — DENOTES RETAINING WALL
- ○ — ○ — DENOTES OVERHEAD UTILITY
- ⋯ DENOTES EXISTING CONTOURS
- ▨ DENOTES BITUMINOUS SURFACE
- ▩ DENOTES CONCRETE SURFACE
- ▧ DENOTES PAVER SURFACE



**NORTH**

GRAPHIC SCALE



1 INCH = 20 FEET

### PROPERTY DESCRIPTION: Per Warranty Deed Doc. No. 845086

The East Half of Lot 4, Block 1, LAKEWOOD PARK THIRD DIVISION, Washington County, Minnesota.

**ALSO:** Lot 5, Block 1, LAKEWOOD PARK THIRD DIVISION, EXCEPT a triangular piece, commencing at the Southeast corner of Lot 5, thence Westerly along the South line of said Lot 5, a distance of 15 feet; thence Northeasterly to a point where a diagonal line 100 feet in length would intersect the East line of said Lot 5, thence Southerly along said East line of said Lot 5 to the point of beginning, Washington County, Minnesota.

#### IMPERVIOUS SURFACE CALCULATIONS

TOTAL LOT AREA ABOVE OHWL .....	12,713 SQ. FT.
EXISTING HOUSE AND GARAGE AND OVERHANGS .....	3,832 SQ. FT.
EXISTING PAVERS AND DRIVEWAY .....	1,027 SQ. FT.
EXISTING CONCRETE .....	182 SQ. FT.
EXISTING RETAINING WALL .....	70 SQ. FT.
TOTAL IMPERVIOUS SURFACE .....	5,111 SQ. FT.
PERCENT IMPERVIOUS .....	40.2%

#### NOTES

- Field survey was completed by E.G. Rud and Sons, Inc. on 03/27/2024.
- Bearings shown are on the Washington County Coordinate System.
- Parcel ID Number: 30-030-21-13-0011 & 30-030-21-13-0012.
- This survey was prepared without the benefit of title work. Additional easements, restrictions and/or encumbrances may exist other than those shown hereon. Survey subject to revision upon receipt of a current title commitment or an attorney's title opinion.
- Due to field work being completed during the winter season there may be improvements in addition to those shown that were not visible due to snow and ice conditions characteristic of Minnesota winters.

I hereby certify that this survey, plan or report was prepared by me or under my direct supervision and that I am a duly Registered Land Surveyor under the laws of the State of Minnesota.

*Jason E. Rud*  
 JASON E. RUD  
 Date: 04/04/2024 License No. 41578

DRAWN BY: BCD	JOB NO: 24.0225BT	DATE: 03/28/2024	
CHECK BY: DSH	FIELD CREW: DT/RW		
1			
2			
3			
NO.	DATE	DESCRIPTION	BY

**E.G. RUD & SONS, INC.**  
 EST. 1977  
 Professional Land Surveyors  
 6776 Lake Drive NE, Suite 110  
 Lino Lakes, MN 55014  
 Tel. (651) 361-8200 Fax (651) 361-8701

www.egrud.com

# DIAMOND PRO<sup>®</sup>

## QUARRIED FACE RETAINING WALL

THE LOOK OF NATURAL QUARRIED STONE WITH THE TIME-TESTED STRENGTH OF DIAMOND PRO



**BELGARD**  
PAVES THE WAY<sup>™</sup>



DEVELOPED BY  
**ANCHOR**  
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# DIAMOND PRO<sup>®</sup>

## QUARRIED FACE RETAINING WALL

THE LOOK OF NATURAL QUARRIED STONE WITH THE TIME-TESTED STRENGTH OF DIAMOND PRO

### ✔ FEATURES & BENEFITS

- Rear-lip locator
- Large cores for ease in handling
- Matching corner and cap for a seamless appearance
- Gravity walls can be built up to 4 ft high\*, including buried course with a 7.1° batter
- Walls in excess of 50 ft high have been built with Diamond Pro when combined with geosynthetic reinforcement
- Minimum outside radius, measured from the top course to the front of the units: 4 ft
- Minimum inside radius, measured on the base course to the front of the units: 6 ft

### 📦 SHAPES & SIZES

#### BLOCK



8 x 18 x 12

#### ANCHOR™ PINS



5"L x 0.5" Diameter

#### CAP



4 x 18 / 12 x 13

#### CORNER



8 x 17 x 8

### 🔥 AVAILABLE COLORS



NEWPORT GRAY



GOLD CREEK

**BELGARD<sup>®</sup>** PAVES THE WAY

For more info, visit [Belgard.com](http://Belgard.com)

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5909 Baker Road, Suite 550  
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Ph: 952-351-9600

480 S. 16th Street  
West Des Moines, IA 50265  
Ph: 515-224-0200



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Revised: 04/05/23 BEL22-412\_NFD W

## Variance at 425 Lake Ave

Madore, Lisa <LisaMadore@edinarealty.com>

Tue 5/21/2024 3:01 PM

To:City of Birchwood Village <info@cityofbirchwood.com>;Rebecca Kellen <Rebecca.Kellen@cityofbirchwood.com>

Cc:Madore, Kathy <KathyMadore@edinarealty.com>

Hello Rebecca,

I'm writing on behalf of Kathy Madore who is currently out of the country. Since she will not be in attendance for the upcoming Planning Commission meeting, I will be in attendance on her behalf, but at minimum wanted to make her concern be heard on the record.

She's not opposed to the proposed retaining wall at 425 Lake Ave so long as the project will not negatively impact her property. She has a sloped hillside on the shared western property line with the property requesting a variance and she wanted to make sure that building this retaining wall will not increase run off onto her property and in turn cause her hillside to start to erode.

Please let me know if you have any questions.

Thank you,

Lisa Madore on behalf of Kathy Madore

### KATHY MADORE

📞 651.592.4444  
✉️ kathyfadore@edinarealty.com  
📍 2137 4th St, White Bear Lake, MN  
🌐 www.themadores.edinarealty.com



### LISA MADORE

📞 651.216.1335  
✉️ lisamadore@edinarealty.com  
📍 2137 4th St, White Bear Lake, MN  
🌐 www.themadores.edinarealty.com

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# memo

To: Rebecca Kellen, City Administrator  
Birchwood Village Planning Commission and City Council

From: Ben Wikstrom, Planning Consultant

CC:

Date: May 23, 2024

Re: 425 Lake Avenue Variance Application – Additional Information

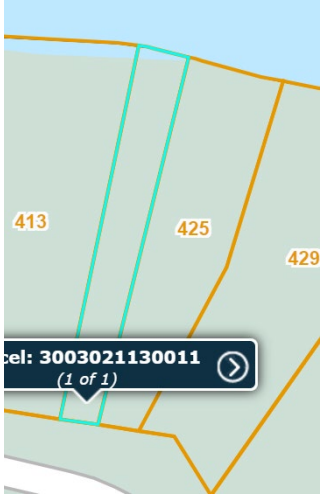
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Council Member Hankins requested some additional information regarding the variance application for the property located at 425 Lake Avenue, which was provided from the applicant and is part of the packet.

One additional item of note is regarding the non-conforming status of the lot due to size. It was mentioned at the end of the staff report, but some further explanation is warranted. There exists a state statute that requires contiguously-owned, non-conforming, shoreland parcels (defined as those within 1,000 feet of lakes, generally) to be combined for the purposes of sale or development. In my experience consulting to Cities with shoreland areas, this requirement was applied to lots that were to be built upon with new (or replacement) residences, or sold for the same purpose. However, the language in the statute is ambiguous, as it can be read to apply to any development, meaning building permit.

It is the opinion of staff that the intent of the non-conforming statute and ordinance – beyond the lot combination requirement - is to eventually eliminate uses that are non-conforming and now considered undesirable. In this case, whether this was a vacant lot or remnant or anything else, the City, as well as the Conservation District and Watershed District, would want mitigation measures in place to control erosion for the health of White Bear Lake. However, with the statutory requirement pertaining to lot combinations, there exists a situation on the subject property that could require adjacent lots to be combined. In the aerial below, the highlighted parcel adjacent to 425 Lake Avenue is owned by the same party.





Staff did not yet inquire as to the reason the lot exists or why it hasn't been combined with 425 Lake Avenue. It clearly is non-buildable on its own. The Planning Commission may wish to add a condition to their recommendation to the City Council that requires the parcels to be combined prior to construction of the wall. If more direction is needed as to whether the statute applies to a retaining wall building permit, the commission could direct staff to ask for the City Attorney's opinion prior to the City Council meeting and final decision.

Please note that a variance from a state statute is not allowed, so the City cannot grant a variance forgoing the combination requirement. This is different than granting a variance for the setback; the question is to whether the statutory requirement applies to this permit application.

## Considerations for Managing Nonconforming Lots in Shoreland Areas

### Purpose

The purpose of this document is to help local governments administer their shoreland ordinances in a manner that is consistent with Minnesota laws and that minimizes impact to shoreland resources. The issues covered in this document involve nonconforming lots in shoreland as regulated under Minnesota Statutes, § 394.36, subd. 5 (for counties), § 462.357 subd. 1e(d) (for cities), and Minnesota Rules, parts 6120.2500 to 6120.3900.

### Resource Concerns with Nonconforming Lots

Small shoreland lots created before the adoption of local shoreland ordinances are often not suitable for the size and intensity of contemporary lakeshore development. It may be difficult for development on these small lots to meet the 25% impervious surface limit in state shoreland standards, provide space for septic systems, and provide enough vegetation to filter and treat stormwater. Development of small lots can result in an increased risk of nutrient flow into surface waters, drainage problems between lots, crowding of docks and recreational facilities, and degradation of near shore habitat.



### Statutory Standards for Managing Nonconforming Lots in Shoreland

The nonconforming lot provisions in the shoreland rules (Minnesota Rules 6120.3300, subp. 2(D)) work to bring nonconforming shoreland lots into conformance over time. In 2009, the Minnesota Legislature amended certain portions of Minnesota Statutes, Chapters 394 and 462, giving nonconforming shoreland lots greater protections to continue. The changes to Chapters 394 and 462 are the same, supersede some provisions in the shoreland rules, and were made to ensure that the sale and development of small shoreland lots is consistently administered across the state. The changes affect:

1. when variances are not needed for single nonconforming lots of record, and
2. when multiple contiguous nonconforming lots under common ownership must be combined.

## Single Nonconforming Lots of Record

According to statute, a single nonconforming lot of record **MAY** be allowed as a building site **without a variance** from lot size requirements specified in the ordinance, even if the required lot sizes are larger than those in state rules, when:

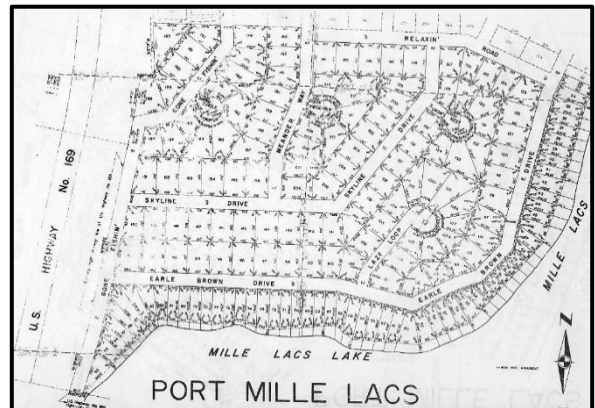
1. all structure and septic system setbacks are met,
2. a type 1 sewage treatment system can be installed or a connection can be made to a public sewer, **and**
3. impervious surface does not exceed 25%.

If all three of these criteria can be met, the statute provides local governments with an expedited manner for approving the development of nonconforming shoreland lots of record without a variance. If all of these criteria cannot be met, then a variance is required and the local government processes the variance according to its variance procedures and statutory criteria for variances. Local governments **MAY** be stricter and require a variance for developing nonconforming lots, even if the lots do meet the three criteria.

## Multiple Contiguous Nonconforming Lots Under Common Ownership

According to statute, an individual nonconforming lot that is part of a contiguous group of lots under common ownership **MUST** be considered a separate parcel for **sale or development**, if:

1. the lot is at least 66% of lot area and width requirements in Minnesota Rule, part 6120.3300, subp. 2a;
2. the lot is connected to a public sewer or a Type 1 sewage system;
3. the impervious surface does not exceed 25%; and
4. the development is consistent with the comprehensive plan.



If the lot does not meet all of these criteria, the lot **MUST** be combined with one or more of the contiguous lots so they equal a conforming lot as much as possible. **Because the statutory language is mandatory, local governments cannot grant a variance to this requirement.**

### **Local governments cannot grant variances to mandatory statutes.**

Although Minnesota Statutes (§ 394.27, Subd. 7 for counties and § 462.357 Subd. 6 for cities) permits local governments to grant variances, the authority extends only to variances from “official controls” or “zoning ordinances.” Official controls and zoning ordinances are defined as actions taken by local governments that are adopted by ordinance. Neither statute authorizes local governments to grant variances to a mandatory statutory requirement.

However, the statute includes an “out” for the sale of certain lots. Contiguous lots under common ownership that don’t meet the above four criteria may be **sold** if each lot contained a habitable residential dwelling at the time they came under common ownership, and:

1. the lots are suitable for, or served by, a sewage system consistent with Minnesota Rules, chapter 7080, or
2. the lots are connected to a public sewer.

### **Application to Wild & Scenic River and the Lower St. Croix Riverway Districts**

Local governments should administer the substandard lot provisions in their Wild & Scenic and Lower St. Croix Riverway ordinances consistent with Minnesota Rules, part 6105.0110, subp. 1 (Wild & Scenic) and Minnesota Rules, part. 6105.0380, subp. 2 (Lower St. Croix).

### **Summary**

Minnesota law affords certain protections for the continuance, repair, replacement, restoration, maintenance and improvement of legal nonconformities. It is notable, however, that the law specifically limits when these protections apply, requiring that multiple contiguous nonconforming lots under common ownership **must** be combined unless certain requirements are met. To alleviate potential confusion, local governments should amend their ordinances for consistency with Minnesota statutes governing nonconforming lots in shoreland areas.

The statements in this document do not have the force and effect of law. This document is informational only and should not be interpreted as creating new criteria or requirements beyond what is already established in the relevant statutes and rules. Whether a local shoreland ordinance or zoning decision complies with the relevant statutes and rules will be determined on a case-by-case basis. Nothing in this document should be considered legal advice. Local governments should consult their attorney for specific advice in adopting, amending, and administering ordinances.

24-01-VB (425 Lake)



**City of Birchwood Village**

Petition for Variance Application

207 Birchwood Ave, Birchwood, MN 55110

Phone: 651-426-3403 Fax: 651-426-7747

Email: info@cityofbirchwood.com

**FOR OFFICIAL USE ONLY**

Application Received Date: 4-11-24 Amount Paid: \$ 4000.00

Payment Type (Circle One): Cash / Check / Money Order / Credit Card (online payment)

Check/Money Order # C42555642

Application Complete? Yes  No  If no, date application was deemed complete: 4/15/24

Signature of City Planner: Email confirmation received Date: 4/15/24

*Completed requests for variances submitted prior to the first Thursday of the month will be considered by the Planning Commission at its next meeting on the fourth Thursday of the month. Requests submitted after the first Thursday of the month will be considered at the following meeting. All final decisions on variance applications are made by the City Council, which meets on the second Tuesday every month.*

1. Name of Applicant(s) Schifsky Companies LLC

Address 5640 Memorial Dr

City Stillwater State MN Zip Code 55082

Business Phone 651.260.3248 Home Phone \_\_\_\_\_

2. Address of Property Involved if different from above: 425 Lake Ave Birchwood Village

3. Name of Property Owner(s) if different from above and describe Applicant's interest in the property:

Robert Davidson

4. Specific Code Provision from which Variance is requested: OHWL Structure Setback

5. Describe in narrative form what the Applicant is proposing to do that requires a variance:  
Client is requesting to build a retaining wall 15' back from the ordinary high water level of White Bear Lake. The client is experiencing drainage and erosion issues on the hillside. The recommended fix is to build a retaining wall.

6. Type of Project:

- New Construction (empty lot)
- Addition
- Demolition
- Landscaping
- Repair or removal of nonconforming structure
- Other (describe) \_\_\_\_\_

7. Type of Structure Involved:

- |  |  |
|--|--|
| <input type="checkbox"/> Single Dwelling   | <input type="checkbox"/> Double Dwelling |
| <input type="checkbox"/> Garage  | <input type="checkbox"/> Addition        |
| <input type="checkbox"/> Tennis Court  | <input type="checkbox"/> Pool            |
| <input type="checkbox"/> Grading/Filling   |  |
| <input checked="" type="checkbox"/> Other (describe) <u>Build retaining wall</u> |  |

8. Using the criteria from the City Code for a variance (see last page), explain why a variance is justified in this situation and describe what "Practical Difficulties" exist:

The erosion of the hillside is a constant battle due to the elevations of the lot.  
Building a retaining wall would help prevent soil from eroding down the hill into the lake.  
\_\_\_\_\_  
\_\_\_\_\_

9. Describe any measures the Applicant is proposing to undertake if the variance is granted, including measures to decrease the amount of water draining from the property:

The retaining wall will create less water running down the hill, and eroding the hillside  
into the lake. When heavy rains come the water washes dirt into the lake because  
the slope on the hillside is too steep.  
\_\_\_\_\_

10. Describe any alternatives the Applicant considered (if any) that do not require a variance:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

11. Can an emergency vehicle (Fire Truck or Ambulance) access all structures on the property after the proposed change?      Yes       No

12. Does the proposed change bring any other nonconforming use into conformity with the City Building Code?      Yes       No

If yes, explain: \_\_\_\_\_

13. Are there other governmental regulations that apply to the proposed action, including requirements of the Rice Creek Watershed District?      Yes       No

If yes, please identify the regulations AND attach evidence demonstrating compliance:  
\_\_\_\_\_

14. Please provide the applicable information in the following Table:

	EXISTING	PROPOSED	CHANGE
<b>1. Total Square Footage of Lot</b>	12,713		
<b>2. Maximum Impervious Surface (25% of item 1)</b>			
<b>3. Roof Surface</b>	3,832		
<b>4. Sidewalks</b>			
<b>5. Driveways</b>			
<b>6. Other Impervious Surface</b>	70	103	
<b>7. Total of Items 3-6</b>			
<b>8. Percent Impervious Surface</b>	30.69%	31.50%	0.81%

15. Please attach the following:

- Legal description of property.
- Plot plan drawn to scale showing existing and proposed new and changed structures on the lot. Also show existing structures on adjacent lots.

**Criteria for Granting a Variance.** Pursuant to Minn. Stat. Sec. 462.357, subd. 6, as it may be amended from time to time, the Planning Commission may issue recommendations to the City Council for variances from the provisions of this zoning code. A variance is a modification or variation of the provisions of this zoning code as applied to a specific piece of property.

Variances to the strict application of the provisions of the Code may be granted, however, no variance may be granted that would allow any use that is prohibited within the City. Conditions and safeguards may be imposed on the variances so granted. A variance shall not be granted unless the following criteria are met:

**SUBD. 1.**

- A. Variances shall only be permitted
  - i. when they are in harmony with the general purposes and intent of the ordinance and
  - ii. when the variances are consistent with the comprehensive plan.
- B. Variances may be granted when the applicant for the variance establishes that there are practical difficulties in complying with the zoning ordinance.

**SUBD. 2.** "Practical difficulties," as used in connection with the granting of a variance, means that

- i. Special conditions or circumstances exist which are peculiar to the land, structure, or building involved.
- ii. The condition which result in the need for the variance were not created by the applicant's action or design solution. The applicant shall have the burden of proof for showing that no other reasonable design solution exists.
- iii. The granting of a variance will result in no increase in the amount of water draining from the property.
- iv. Granting the variance will not impair an adequate supply of light and air to adjacent property, or unreasonably diminish or impair established property values within the surrounding area, or in any other respect impair the public health, safety, or welfare of the residents of the City.
- v. No variance shall be granted simply because there are no objections or because those who do not object outnumber those who do.
- vi. Financial gain or loss by the applicant shall not be considered if reasonable use for the property exists under terms of the Zoning Code.

**NOTICE:**

**\*The City and its representatives accept no responsibility for errors and/or damages caused due to incomplete and/or inaccurate information herein. It is the responsibility of the applicant to ensure the accuracy and completeness of this information.**

**\*The City will hold applicant responsible for any damage to public property that occurs in the course of performing the activities of this permit.**

**\*Under penalty of perjury the applicant declares that the information provided in and enclosed herewith is complete and all documents represented are true and correct representations of the actual project/building that will be built in conformance with such representation if approved.**

Signature of Applicant: Carson J Schifsky Date: 4/10/2024



# CERTIFICATE OF SURVEY

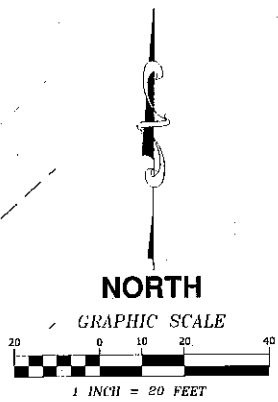
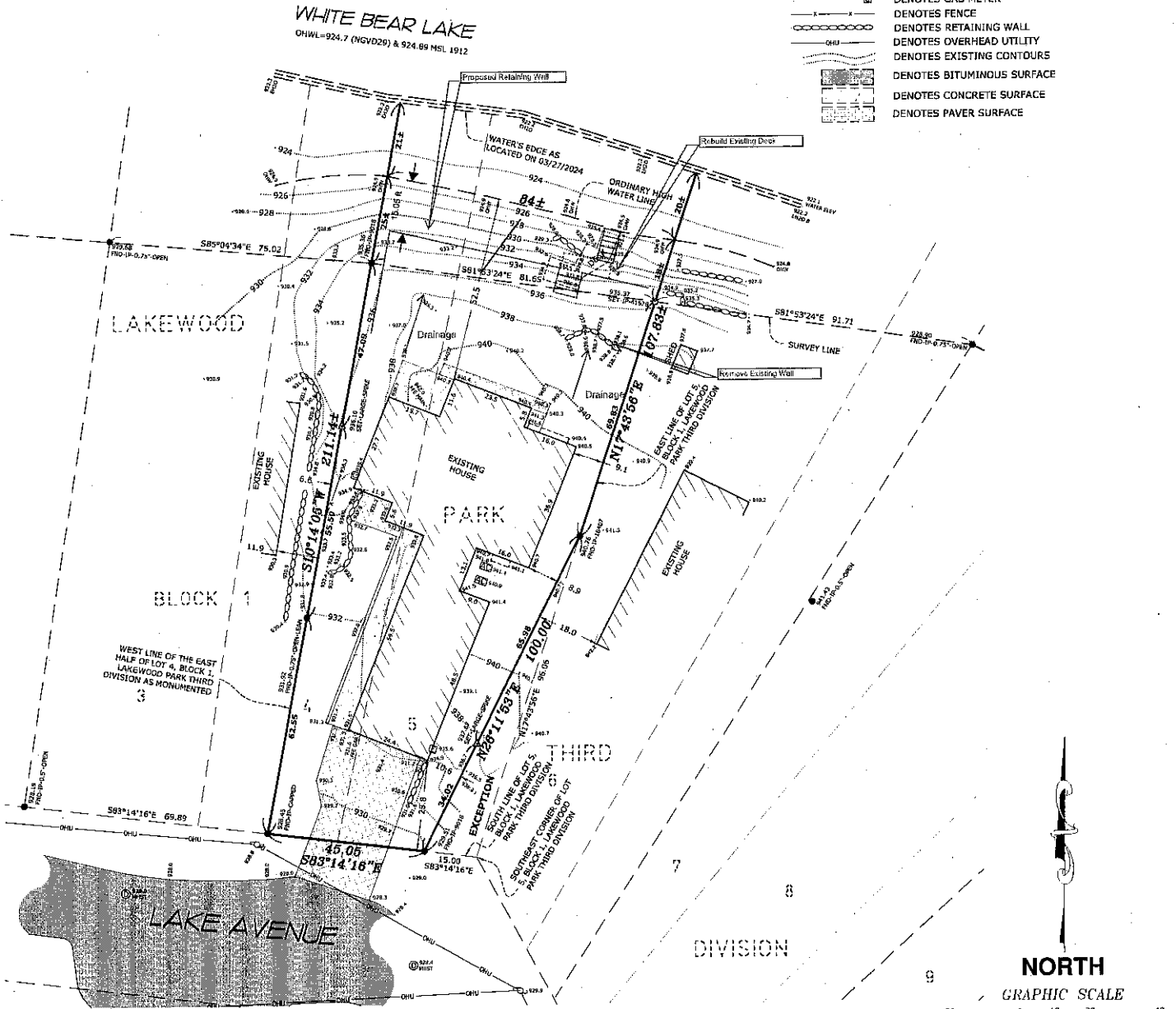
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 ~of~ **425 LAKE AVENUE**  
**BIRCHWOOD, MN**

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 DATUM: MSL 1912

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### PROPERTY DESCRIPTION: Per Warranty Deed Doc. No. 845086

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- Parcel ID Number: 30-030-21-13-0011 & 30-030-21-13-0012.
- This survey was prepared without the benefit of title work. Additional easements, restrictions and/or encumbrances may exist other than those shown hereon. Survey subject to revision upon receipt of a current title commitment or an attorney's title opinion.
- Due to field work being completed during the winter season there may be improvements in addition to those shown that were not visible due to snow and ice conditions characteristic of Minnesota winters.

I hereby certify that this survey, plan or report was prepared by me or under my direct supervision and that I am a duly Registered Land Surveyor under the laws of the State of Minnesota.

*(Signature)*  
 JASON E. RUD  
 Date: 04/04/2024 License No. 41578

DRAWN BY: RCD	JOB NO: 24-0225BT	DATE: 03/28/2024	
CHECK BY: DSM	FIELD CREW: DT/RW		
1			
2			
3			
NO.	DATE	DESCRIPTION	BY

**E. G. RUD & SONS, INC.**  
 Professional Land Surveyors  
 6776 Lake Drive NE, Suite 110  
 Lino Lakes, MN 55014  
 Tel. (651) 361-8200 Fax (651) 361-8701

## City of Birchwood Village

Intellipay <noreply@intellipay.com>

Thu 4/11/2024 10:40 AM

To:City of Birchwood Village <info@cityofbirchwood.com>

## City of Birchwood Village

### Payment Receipt

Schifsky Companies  
3476 Lake Elmo Ave  
Lake Elmo MN 55042  
651.260.3248  
carson@schifskycompanies.com

Your bank account will be debited the amount of the payment.

***Please ensure there are sufficient funds available in your bank account to cover this amount.***

Customer Account:	Variance Permit
Invoice:	C42555642
<b>Payment Amount:</b>	<b>\$4,000.00</b>
<b>Service Fee:</b>	<b>\$2.00</b>
<b>Payment Total:</b>	<b>\$4,002.00</b>
Payment Date:	04/11/2024
Bank Name:	
Bank Account:	Checking account ending in 225
Reference Number	C42555642P72426111
Comments:	
Payment Origin:	Online Payment Terminal
Agent:	Online Payment Page
Merchant#:	M8145

### Other

Explain: Variance Permit

Thank you,  
City of Birchwood Village  
Support: 651-426-3403 Email: info@cityofbirchwood.com

\* The service fee is non-refundable.

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# STAFF REPORT

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**Meeting Date(s):** May 23, 2024 Planning Commission  
June 11, 2024 City Council

**Scope:** OHWL Setback Variance  
**Applicant:** Schifsky Companies, LLC

**Representative:** Carson Schifsky  
**Property Location:** 425 Lake Avenue

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Report prepared by Ben Wikstrom, Planning Consultant

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## **ATTACHMENTS**

1. Application
2. Survey/site plan
3. Pictures

## **BACKGROUND**

Schifsky Companies, LLC (Carson Schifsky) has applied for a variance to allow construction of a retaining wall within the Ordinary High Water Line setback from White Bear Lake. The property can be seen in the aerial below, taken from the Washington County GIS website:



**SURROUNDING USES**

North: White Bear Lake  
East: Single-family home  
South: Lake Avenue and City park  
West: Single-family home

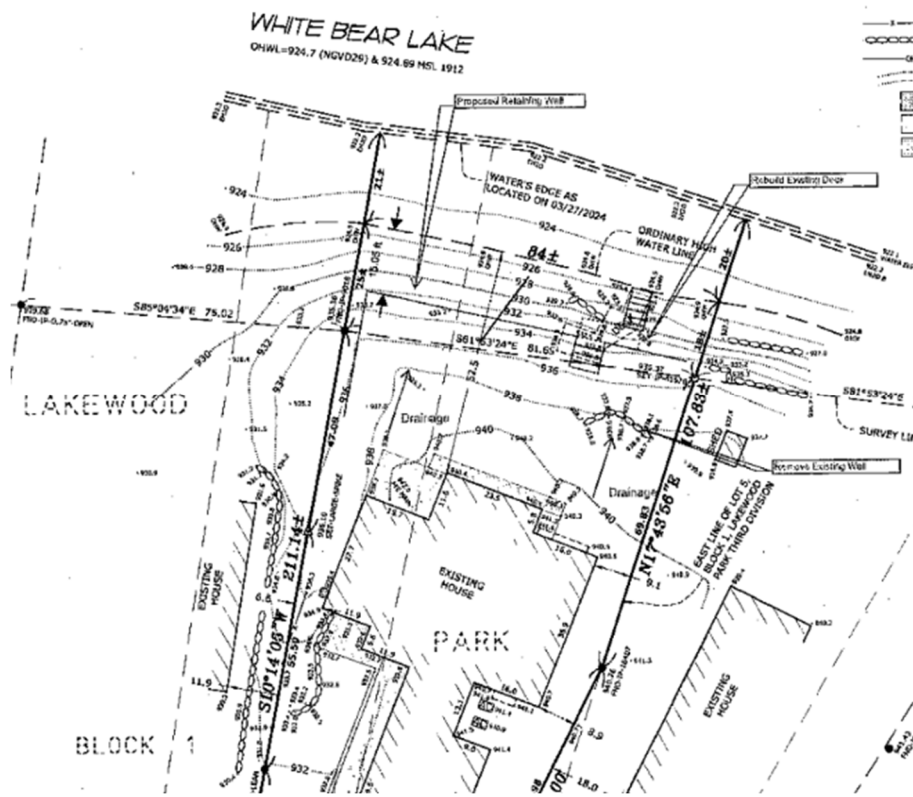
**PROPOSED CONSTRUCTION**

The applicant is proposing to construct the retaining wall to mitigate erosion problems that are occurring on site. The top of wall would be 12” in width, for a length of 33’. The area of impact is shown on the pictures below, followed by an example of the type of wall (brochure attached).





The applicant is also proposing replacement of an existing decking area, with “similar dimensions” according to written correspondence with the homeowner. The deck may need to be shifted slightly to the east to allow for proper and effective construction of the retaining wall. The deck must remain the same size or be smaller. No pictures of the deck were available at the time of this report, although the location is called out on the survey that was submitted.



**APPLICANT COMMENT**

From the application:

5. Describe in narrative form what the Applicant is proposing to do that requires a variance:  
Client is requesting to build a retaining wall 15' back from the ordinary high water level of  
White Bear Lake. The client is experiencing drainage and erosion issues on the  
hillside. The recommended fix is to build a retaining wall.

8. Using the criteria from the City Code for a variance (see last page), explain why a variance is justified in this situation and describe what "Practical Difficulties" exist:  
The erosion of the hillside is a constant battle due to the elevations of the lot.  
Building a retaining wall would help prevent soil from eroding down the hill into the lake.

9. Describe any measures the Applicant is proposing to undertake if the variance is granted, including measures to decrease the amount of water draining from the property:  
The retaining wall will create less water running down the hill, and eroding the hillside  
into the lake. When heavy rains come the water washes dirt into the lake because  
the slope on the hillside is too steep.

**STAFF ANALYSIS**

For an explanation of a variance analysis, here is an excerpt from the ordinance:

SUBD. 1.

*A. Variances shall only be permitted*

*i. when they are in harmony with the general purposes and intent of the ordinance and*

*ii. when the variances are consistent with the comprehensive plan.*

*B. Variances may be granted when the applicant for the variance establishes that there are practical difficulties in complying with the zoning ordinance.*

SUBD. 2. *"Practical difficulties," as used in connection with the granting of a variance, means that:*

*i. Special conditions or circumstances exist which are peculiar to the land, structure, or building involved.*

- ii. The condition which result in the need for the variance were not created by the applicant's action or design solution. The applicant shall have the burden of proof for showing that no other reasonable design solution exists.*
- iii. The granting of a variance will result in no increase in the amount of water draining from the property.*
- iv. Granting the variance will not impair an adequate supply of light and air to adjacent property, or unreasonably diminish or impair established property values within the surrounding area, or in any other respect impair the public health, safety, or welfare of the residents of the City.*
- v. No variance shall be granted simply because there are no objections or because those who do not object outnumber those who do.*
- vi. Financial gain or loss by the applicant shall not be considered if reasonable use for the property exists under terms of the Zoning Code.*

### **STAFF COMMENT**

The proposed retaining wall meets the above criteria for a variance, and will address a problem with erosion that is evident on the site. The applicant must receive approval from the Rice Creek Watershed District, which is in process, and any approval of the variance should be contingent on receiving that approval. Any other applicable approvals (WBCD, DNR) are also required prior to construction.

One item of note is the impervious surface. The survey shows a total impervious percentage on site of 40.2%, while the chart on the application shows 31.69%. It appears that the existing pavers and concrete elsewhere on site were left off the chart. The 33 s.f. of additional retaining wall is assumed to be correct for one tier of wall. That is staff's understanding of the proposed wall design based on correspondence from the applicant, and seems to make sense with a 50-foot wide lot. If that is the case, the proposed impervious percentage on the chart is calculated incorrectly (it adds 103 s.f. to the existing total, rather than just the new 33 s.f.). The applicant should be present to clarify. Regardless, the amount of impervious to be added is negligible, and necessary for the mitigation. 33 s.f. of additional surface would be 0.2%; 103 s.f. of additional surface would be 0.81%.

As we have discussed before, most communities will not calculate the top of a wall as impervious, especially one at 12" wide, as there is no impact on runoff from that small width (many ordinances exclude sidewalks or other surfaces less than 3' in width). The other items that have been previously discussed with similar applications that also apply here are the fact that this lot is legally non-conforming based on the size and width of the lot (12,713 s.f. and 50' in width) compared to current ordinance requirements (15,000 s.f. riparian lots and 80' in width at the OHWL setback); and that the impervious limit is already exceeded, making that non-conforming, as well. Any change, whether negligible or not, will be increasing the non-conformity. Whether these items require additional variances to be granted or should be at least noted, and if the City Code should be reviewed to address the many non-conforming situations (and impervious regulations) in the City should be a topic of discussion.

In this case, the proposed construction seems necessary to address a problem and the impact on stormwater is negligible or non-existent.

### **STAFF RECOMMENDATION**

Staff recommends approval of the variance application at 425 Lake Avenue, based on the following findings:

1. A retaining wall is necessary to mitigate an erosion problem on the slope to the lake within the OHWL setback.
2. A retaining wall is a reasonable request to mitigate the problem.
3. The character of the neighborhood would not be altered with approval of the variance.
4. Neighborhood property values will not be diminished with approval of the variance and construction of the wall.
5. The slope of the property, creating the need for the wall and variance, was not established by the applicant.
6. If the applicant receives approval of all necessary jurisdictional permits, the City concurs that the proposed construction is necessary and reasonable.
7. The deck area to be replaced must be of the same size as or smaller than the existing structure.



## Fw: Fw: 425 Lake Street RCWD

Rebecca Kellen <Rebecca.Kellen@cityofbirchwood.com>

Mon 5/13/2024 9:56 AM

To: Carson Schifsky <carson@schifskycompanies.com>

Cc: Ben Wikstrom <benwikstrom@gmail.com>; Alan Kantrud <hakantrud@protonmail.com>; AGrace@ricecreek.org <AGrace@ricecreek.org>; Patrick Hughes <PHughes@ricecreek.org>; Andy Sorenson <asconstruction@me.com>; Michelle Maiers-Atakpu <pmatakpu@comcast.net>; Mike Kraemer <mrkraemer50@gmail.com>; MICHAEL McKenzie <mgmcke31@comcast.net>; Casey Muhm <casey.muhm@gmail.com>

Bcc: Margaret Ford <margaret.ford@cityofbirchwood.com>; Ryan Hankins <ryan.hankins@cityofbirchwood.com>; Kathy Weier <kathy.weier@cityofbirchwood.com>; Mark Foster <mark.foster@cityofbirchwood.com>; Justin McCarthy <justin.mccarthy@cityofbirchwood.com>

Hi Carson,

I hope you are doing well. I just wanted to let you know that we have received guidance from our attorney that any decision that is made with regard to the variance will need to be put on hold until the permitting from RCDW is secure. You may want to begin the permitting process to avoid hold up however, as you are aware, it is uncertain as to the outcome of the variance request until it goes through the process. We are still on tap for the variance to be reviewed at the 5/23/24 Planning Committee meeting at 7PM and then at the City Council Meeting on June 11<sup>th</sup> at 6:45PM. Please let me know if you have any questions. Thanks.



Rebecca Kellen, MBA

City Administrator

City of Birchwood Village, MN

office: (651) 426-3403

fax: (651) 426-7747

email: [rebecca.kellen@cityofbirchwood.com](mailto:rebecca.kellen@cityofbirchwood.com)

website: <http://www.cityofbirchwood.com/>



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**From:** H.A.Kantrud <hakantrud@protonmail.com>

**Sent:** Monday, May 13, 2024 9:42 AM

**To:** Rebecca Kellen <Rebecca.Kellen@cityofbirchwood.com>

**Cc:** Ben Wikstrom <benwikstrom@gmail.com>

**Subject:** Re: Fw: 425 Lake Street RCWD

We would typically put the decision from our body on hold until they have that in-hand...

H. Alan

"Conservatives pride themselves on resisting change, which is as it should be. But intelligent deference to tradition and stability can evolve into intellectual sloth and moral fanaticism, as when conservatives

simply decline to look up from dogma because the effort to raise their heads and reconsider is too great." William F. Buckley

\*\*\*\*\*

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Sent with [Proton Mail](#) secure email.

On Monday, May 13th, 2024 at 9:35 AM, Rebecca Kellen <Rebecca.Kellen@cityofbirchwood.com> wrote:

Hi Alan,

I received this from RCWD in regard to the variance we have on tap for the upcoming planning commission meeting. I believe this would cover our needs with respect to the RCDW permit they will be required to have. They want to make sure the variance is approved prior to getting that permit. Please confirm that this would suffice for our purposes, if that is the case. Thanks.



Rebecca Kellen, MBA

City Administrator

City of Birchwood Village, MN

office: (651) 426-3403

fax: (651) 426-7747

email: [rebecca.kellen@cityofbirchwood.com](mailto:rebecca.kellen@cityofbirchwood.com)

website: <http://www.cityofbirchwood.com/>



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**From:** Anna Grace <AGrace@ricecreek.org>  
**Sent:** Monday, May 13, 2024 9:27 AM  
**To:** Rebecca Kellen <Rebecca.Kellen@cityofbirchwood.com>  
**Cc:** Patrick Hughes <PHughes@ricecreek.org>  
**Subject:** 425 Lake Street RCWD

Good Morning Rebecca,

I am reaching out regarding the 425 Lake Street backyard landscaping project.

The landscaper has indicated the City would like to see comments from Rice Creek ahead of the May 23<sup>rd</sup> Planning Commission meeting.

I have relayed to the landscaper a Rule E, Floodplain Alteration and Rule D, Erosion and Sediment Control permit will be required. The bracketed information below was shared with Schifsky Companies.

Is this sufficient for the Planning Commission's variance review?

[ If the project applies for RCWD permit application with the guidance below, the project is found to be compliant with Rules E and D, the 48-hour notice to the Board is complete, the project addresses any CAPROC items, RCWD would then issue the permit. From review of the current plans, no RCWD variance is required for the project. Typical Administrative permit review process for work within the floodplain.

From review of the plans a RCWD permit for Rule D and E will be required.

- [Rule E, Floodplain Alteration](#) the RCWD 100-year regulatory floodplain elevation for the site extends off White Bear Lake and is 927.2 NAVD 88. Work within the floodplain triggers Rule E and D.
- [Rule D, Erosion and Sediment Control Plans](#) Rule 2(a)(3), Any land-disturbing activity that requires a District permit under a rule other than Rule D."

DNR regulates below the OHW. The RCWD regulatory floodplain elevation off White Bear Lake is 927.2 NAVD 88.

-

General RCWD permit submittal guidance:

1. The RCWD application form can be found [here](#). The application must be signed by the current landowner(s). From review of Washington County Maps, the current listed owner of the parcel is Coyleen Davidson.
2. Please deliver or mail the application fee in the form of a check to the RCWD office. The total application fee is \$300. The RCWD office is located at 4325 Pheasant Ridge Dr. NE #611, Blaine, MN, 55449. The building is open Monday through Friday from 8:00 a.m. to 4:30 p.m.
3. Please create a short project narrative discussing the proposed work.
  1. Be sure to include further details of proposed deck and stairs within narrative – concrete pilings, etc.?
4. Items to add to the survey for RCWD:

1. Add erosion control and stabilization methods to the plan set with a key.
  - Erosion control measures should be located down gradient of all land disturbing activities. **As land disturbance is proposed within 50 feet of a waterbody redundant erosion control BMPs are recommended in these locations.**
  - Here is a MPCA link for additional BMP guidance, [https://stormwater.pca.state.mn.us/index.php/Sediment\\_control\\_practices - Perimeter controls for disturbed areas](https://stormwater.pca.state.mn.us/index.php/Sediment_control_practices_-_Perimeter_controls_for_disturbed_areas)
  - **For disturbed areas what is the proposed stabilization method seeding, sodding, etc.?**
2. Update work areas/land disturbance areas to include stairs and deck.
3. Based on the below RCWD definitions, state the total area of proposed new and/or reconstructed impervious surface. If none, please state – if removing impervious surface please state the square footage:
  - RCWD defines Impervious Surface as, a compacted surface or a surface covered with material (i.e., gravel, asphalt, concrete, Class 5, etc.) that increases the depth of runoff compared to natural soils and land cover. Including but not limited to roads, driveways, parking areas, sidewalks and trails, patios, tennis courts, basketball courts, swimming pools, building roofs, covered decks, and other structures.
  - RCWD defines, Reconstruction as, removal of an impervious surface such that the underlying structural aggregate base is effectively removed, and the underlying native soil exposed.
4. State the RCWD regulatory floodplain elevation of White Bear Lake 927.2 NAVD 88
5. The project will need to calculate any cut (removal) and fill within the floodplain. Compensatory floodplain storage volume is not required for a one-time deposition of up to 100 cubic yards of fill, per parcel, if there is no adverse impact to the 100-Year Flood Elevation. If 100 cubic yards or greater is proposed, mitigation is required for the entirety of fill. Calculations showing worked out methodology will need to be provided between OHW and RCWD 100-year floodplain. For example, this calculation could be  $(LxWxD)/27 = \text{cubic yards}$ . Ensure to include rock, sand, dirt, concrete, etc.

All application items, except for the fee, can be submitted electronically to my email address.

-

General RCWD Administrative Permit Process Timeline:

- Application items are submitted and reviewed for completeness (my guidance list above are the intake items needed).
- Once any **incomplete items** (missing items) are addressed, the application moves onto review.
- RCWD staff will reach out with any comments or concerns. Given workload and time of year this is typically 10-15 business days.
- Once any comments and concerns are addressed, the application will be noticed for the 48-hour comment period to the Board for Administrative CAPROC (Conditional Approval Pending Receipt of Changes).
- Once any CAPROC items are addressed by the project team RCWD can issue the permit. ]

Thank you,

**Anna Grace**

Regulatory Technician

Rice Creek Watershed District

4325 Pheasant Ridge Dr. NE, #611

Blaine, MN 55449-4539

Direct: (763) 398-3071

[agrace@ricecreek.org](mailto:agrace@ricecreek.org)



# PROPOSED BOULDER RETAINING WALLS

## 425 LAKE AVENUE

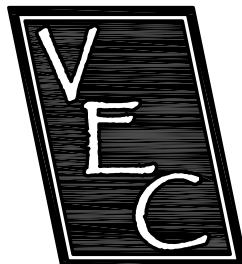
### BIRCHWOOD, MINNESOTA

GENERAL NOTES

1. IN PREPARATION OF WALL DESIGN, SOIL STRENGTH PARAMETERS WERE ASSUMED, BASED ON A REVIEW OF MINNESOTA GEOLOGICAL SURVEY SURFICIAL GEOLOGY SOIL MAPS OF THE PROJECT AREA AND INFORMATION FROM THE CLIENT. IT IS THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE TO VERIFY THE SOIL STRENGTH PARAMETERS ARE REPRESENTATIVE OF THE SOILS AVAILABLE FOR WALL CONSTRUCTION. IF THE SOIL STRENGTH PARAMETERS ARE FOUND TO BE INCONSISTENT WITH THOSE ASSUMED, THIS DESIGN IS NO LONGER VALID AND IT IS THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE TO NOTIFY VEC SO THE RETAINING WALL SYSTEM CAN BE REDESIGNED. FAILURE TO NOTIFY VEC MAY RESULT IN FAILURE OF THE RETAINING WALL.
2. DESIGN SOIL PARAMETERS:
  - A. RETAINED SOIL: IMPORTED/ON-SITE SAND SOILS    PHI = 30 DEGREES    GAMMA = 125 PCF.
  - B. FOUNDATION SOIL: IMPORTED/ON-SITE SAND SOILS    PHI = 30 DEGREES    GAMMA = 125 PCF.
3. ANY EXCAVATION PERFORMED BELOW THE FOUNDATION GRADE OF THE WALL SHOULD HAVE PROPER 1:1 LATERAL OVERSIZING. EXCAVATION OVERSIZING SHOULD BE MEASURED FROM THE FRONT TO THE BACK OF THE LOWEST BOULDER.
4. THIS SET OF BOULDER RETAINING WALL PLANS ARE BASED ON THE PROJECT PLAN, PREPARED BY E. G. RUD & SONS, INC., DATED 3/28/2024, WITH ADDITIONAL INFORMATION PROVIDED BY SCHIFSKY COMPANIES. IF OTHER PLANS ARE PRODUCED THAT CONTAIN DIFFERENT INFORMATION THAN THAT REFERENCED, THIS PLAN MAY NEED TO BE REVISED AND/OR THE WALL MAY NEED TO BE REDESIGNED.
5. LOCATIONS OF THE BOULDER RETAINING WALLS IN RELATION TO PROPERTY LINES, UTILITY EASEMENTS, WATERSHED EASEMENTS, OR ANY OTHER TYPE OF EASEMENTS ARE THE RESPONSIBILITY OF THE OWNER. VEC ASSUMES NO LIABILITY FOR THE LOCATIONS OF THE BOULDER RETAINING WALLS, OR IF CONSTRUCTION OF THE PROPOSED BOULDER RETAINING WALLS ENCROACH ANY PROPERTY LINES OR EASEMENTS.
6. IT IS IMPERATIVE THAT THE SITE SURVEYING OF THE BOULDER RETAINING WALLS BE BASED ON THE PLANS REFERENCED ABOVE AND NOT PROFILE PLANS PREPARED BY VEC. SURVEYING OF THE BOULDER RETAINING WALLS MUST TAKE INTO ACCOUNT THE DESIGN BATTER INDICATED ON THE ENCLOSED PLANS AND DETAILS. FAILURE TO TAKE INTO ACCOUNT WALL BATTER FOR THE BOULDER RETAINING WALL SURVEYING WILL PRODUCE INCORRECT LOCATIONS OF ALL TOP OF WALL AND SHALL BE CORRECTED AT NO COST TO VEC.
7. WALL GEOMETRY, LOCATIONS, SLOPES AND SURCHARGE LOADS FOR THE BOULDER RETAINING WALLS WERE ASSUMED FROM THE PROJECT PLANS REFERENCED ABOVE. IF CONDITIONS VARY GREATLY IN THE FIELD FROM THOSE SHOWN ON THIS PLAN, VEC MUST BE NOTIFIED PRIOR TO CONSTRUCTION OF THE BOULDER RETAINING WALLS TO REVIEW THE DESIGN AND/OR PLANS. MODIFICATIONS TO THE DESIGN AND/OR PLANS MAY BE REQUIRED AFTER THE REVIEW, AND MAY TAKE UP TO TEN BUSINESS DAYS TO COMPLETE.
8. PLEASE REFER TO ANY PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION. IF THERE ARE DISCREPANCIES BETWEEN ANY INFORMATION ON THESE PLANS AND INFORMATION IN THE PROJECT SPECIFICATIONS, THE MORE RESTRICTIVE INFORMATION TAKES PRECEDENCE.

SHEET INDEX	
SHEET NO.	SHEET DESCRIPTION
W1	TITLE PAGE AND GENERAL NOTES
W2	WALL CONSTRUCTION NOTES
W3	WALL LOCATION SKETCH
W4 - W5	WALL ELEVATION VIEWS
W6	SECTIONS AND DETAILS

Vickery Engineering & Consulting, LLC



Post Office Box 86  
Grandy, MN 55029  
phone: 952-465-8272

www.vickeryeng.com

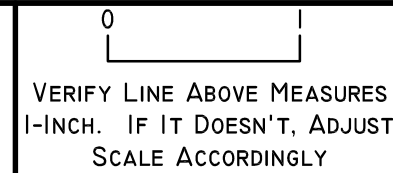
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PROPOSED BOULDER RETAINING WALLS  
425 LAKE AVENUE  
BIRCHWOOD, MINNESOTA

TITLE PAGE AND GENERAL NOTES

REV:	DATE:	DESCRIPTION:

SCALE: NONE



VEC PROJECT No:	VEC 24-106
DRAWN BY:	VEC
REVIEWED BY:	RWV
DATE:	6/13/2024

SHEET: **W1** OF: **6** CLIENT: SCHIFSKY COMPANIES

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATIONS, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

RONALD W. VICKERY, PE  
 DATE: 6/13/2024    REG. No.: 24065\_30

# WALL CONSTRUCTION NOTES

## DESCRIPTION

THIS WORK CONSISTS OF CONSTRUCTING BOULDER WALL STRUCTURES AT THE LOCATIONS INDICATED ON THE SITE GRADING PLAN, PREPARED BY E. G. RUD & SONS, INC., DATED 3/28/2024, WITH ADDITIONAL INFORMATION PROVIDED BY SCHIFSKY COMPANIES. BOULDER WALLS ARE FORMED OF INTERLOCKING, DRY-STACKED ROCKS WITHOUT REINFORCING STEEL, MORTAR, OR CONCRETE.

## CONSTRUCTION REQUIREMENTS

**BOULDERS:** BOULDERS SHALL CONSIST OF NATURAL STONE WITH VARYING HEIGHTS AND NOMINAL DEPTHS RANGING FROM 12 TO 36 INCHES (FRONT TO BACK).

**GENERAL:** THE FOLLOWING DEFINITIONS APPLY TO BOULDER WALL CONSTRUCTION:

- (A) **BASE ROCK:** THE BASE ROCK IS THE LOWERMOST ROCK IN THE BOULDER WALL, AND BEARS DIRECTLY ON THE SOIL SUBGRADE.
- (B) **FACING ROCK:** THE FACING ROCKS COMPRISE THE BULK OF THE BOULDER WALL AND ARE STACKED ABOVE THE BASE ROCK.
- (C) **CAP ROCK:** THE CAP ROCK IS THE UPPERMOST ROCK IN THE BOULDER WALL SECTION AND "CAPS" THE BOULDER WALL.

### BOULDER WALL CONSTRUCTION:

(A) **BOULDER WALL FOUNDATION EXCAVATION:** EXCAVATE A FOUNDATION TRENCH AT LEAST 12 INCHES BELOW THE GRADE AT THE BOTTOM OF THE WALL, RUNNING THE FULL LENGTH OF THE PROPOSED BOULDER WALL, OR TO THE DEPTH SHOWN ON THE PLANS. EXCAVATE THE FOUNDATION TO A MINIMUM WIDTH EQUAL TO THE SPECIFIED BASE ROCK WIDTH PLUS 12 INCHES TO INCLUDE THE AGGREGATE BEHIND THE BOULDER WALL. EXERCISE CARE DURING EXCAVATION OF THE BACK CUT. STABILITY OF TEMPORARY CUT SLOPES IS THE RESPONSIBILITY OF THE CONTRACTOR.

(B) **BOULDER PLACEMENT:** PLACE THE FIRST COURSE OF ROCK (BASE ROCK) ON FIRM, UNYIELDING SOIL WITH FULL CONTACT BETWEEN THE ROCK AND THE SUBGRADE. EXCAVATE ANY LOOSE, SOFT OR OTHERWISE UNSUITABLE MATERIAL PRESENT AT FOUNDATION GRADE AND REPLACE WITH SUITABLE FOUNDATION FILL. COMPACT THE FOUNDATION FILL AS NEEDED. AS THE BOULDER WALL IS CONSTRUCTED, PLACE THE ROCKS SO THAT THERE ARE NO CONTINUOUS JOINTS IN EITHER THE VERTICAL OR LATERAL DIRECTION. STOCKPILE A SUFFICIENT NUMBER OF ROCKS TO PROVIDE A GOOD SELECTION FOR PLACEMENT. TO OBTAIN A BETTER FIT, PLACE ROCKS WHICH DO NOT MATCH THE SPACES OFFERED BY THE PREVIOUS COURSE IN A DIFFERENT LOCATION. AVOID PLACING ROCKS WHICH HAVE SHAPES THAT CREATE VOIDS WITH A LINEAR DIMENSION GREATER THAN 8 INCHES. EXCEPT IN ISOLATED CASES, PLACE EACH ROCK SO THAT IT BEARS ON AT LEAST TWO ROCKS BELOW IT. LOCATE AT LEAST ONE BEARING POINT A DISTANCE NO GREATER THAN 6 INCHES FROM THE AVERAGE FACE OF THE BOULDER WALL. THE ALLOWABLE TOLERANCE FOR BASE ROCK WIDTHS IS 3 INCHES; HOWEVER, DO NOT PLACE TWO OR MORE CONSECUTIVE BASE ROCKS WITH A WIDTH LESS THAN SPECIFIED ON THE PLANS. SLOPE THE TOP SURFACE OF EACH ROCK TOWARDS THE BACK OF THE BOULDER WALL AT AN INCLINATION OF AT LEAST 5 PERCENT. THE MINIMUM BOULDER WALL THICKNESS IS BASED ON MINIMUM BASE ROCK WIDTH, AS SPECIFIED ON THE PLANS, AND ALLOWABLE FACE BATTER. THE REQUIRED MINIMUM FACE BATTER IS 10 DEGREES. SECURELY PLACE FACING ROCKS SO THAT THE ROCKS ARE UNABLE TO BE MOVED WITH A PRY BAR AFTER THE BOULDER WALL IS COMPLETE.

(C) **VOIDS:** WHERE VOIDS WITH A MINIMUM DIMENSION OF 6 INCHES OR GREATER EXIST IN THE FACE OF THE BOULDER WALL, CHINK THE VOIDS WITH SMALLER ROCK.

- (1) IF THERE IS NO ROCK CONTACT WITHIN THE BOULDER WALL THICKNESS, CHINK THE VOID WITH A SMALLER PIECE OF ROCK.
- (2) CHINKING ROCKS SHOULD NOT PROVIDE PRIMARY STRUCTURAL SUPPORT FOR THE OVERLYING ROCK.
- (3) CHINKING ROCKS SHOULD NOT BE ABLE TO BE MOVED OR REMOVED BY HAND AFTER BOULDER WALL IS COMPLETE. RESET LOOSE CHINKING ROCKS UNTIL SECURELY PLACED OR GROUTED IN PLACE. DO NOT ALLOW GROUT TO BE READILY VISIBLE FROM THE FACE OF THE BOULDER WALL.

(D) **BOULDER WALL AGGREGATE:** INSTALL AGGREGATE, CONSISTING OF 3/4" TO 1 1/2" CLEAR CRUSHED AGGREGATE (NO PEA GRAVEL), BETWEEN THE BOULDER WALL AND THE BACK CUT FACE BEING SUPPORTED. THE AGGREGATE LAYER SHALL BE TO THE DIMENSIONS SHOWN ON THE PLANS, WITH A MINIMUM DEPTH OF 12 INCHES. PLACE AGGREGATE CONCURRENT WITH BOULDER WALL SO THAT AT NO TIME IS EITHER MORE THAN 12 INCHES HIGHER THAN THE OTHER. SEPARATE THE AGGREGATE FROM THE BACK OF THE BOULDERS BY A NON-WOVEN GEOTEXTILE (MIRAFI 140N OR APPROVED EQUAL). OVERLAP THE NON-WOVEN GEOTEXTILE AT LEAST 18 INCHES AT ALL SEAMS. THE TOP OF THE AGGREGATE SHOULD ALSO BE "CAPPED" WITH THE GEOTEXTILE, AS SHOWN ON THE CROSS-SECTIONS.

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PROPOSED BOULDER RETAINING WALLS  
425 LAKE AVENUE  
BIRCHWOOD, MINNESOTA

WALL CONSTRUCTION NOTES

REV:	DATE:	DESCRIPTION:

SCALE:  
**NONE**

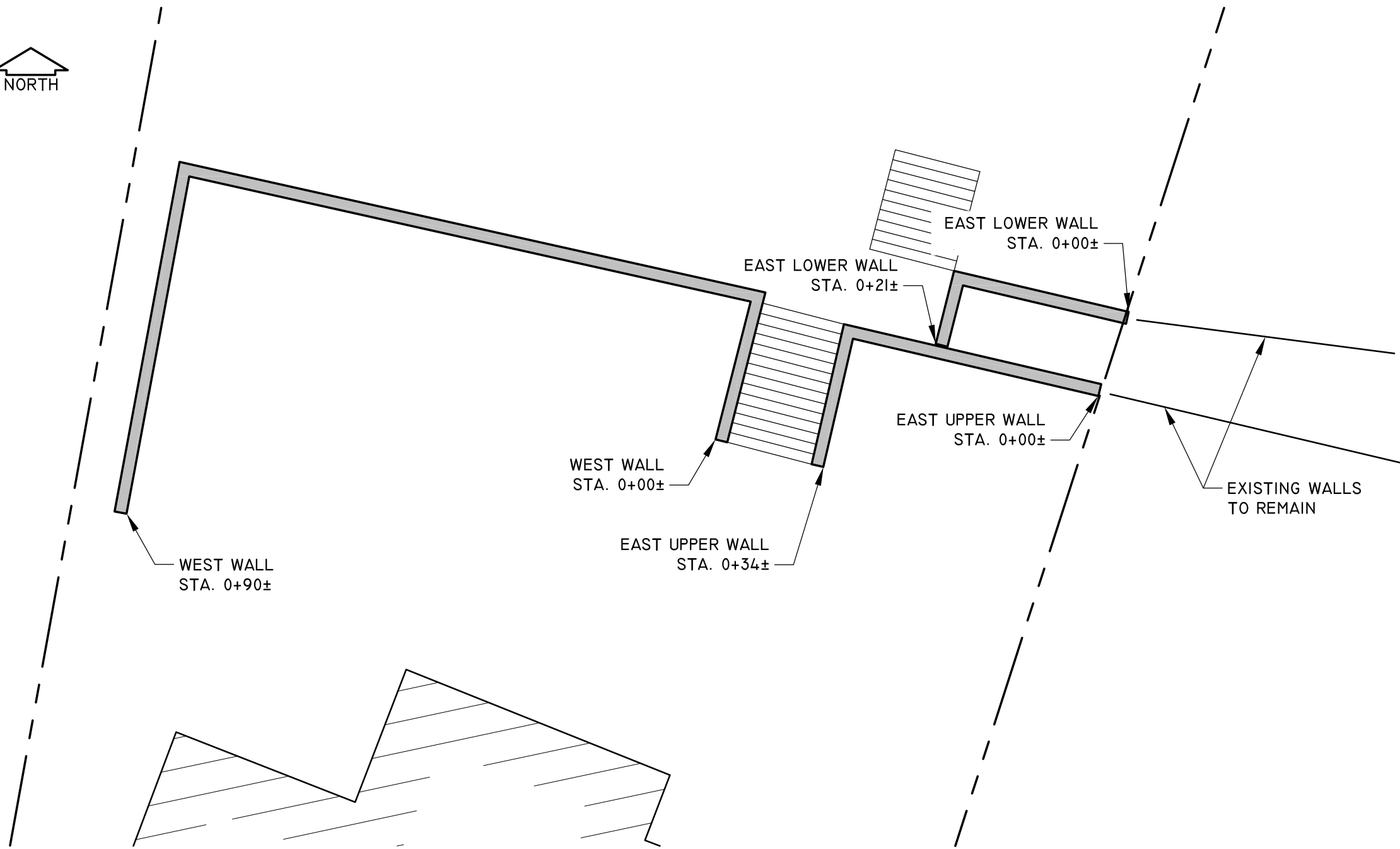
0 1  
VERIFY LINE ABOVE MEASURES  
1-INCH. IF IT DOESN'T, ADJUST  
SCALE ACCORDINGLY

SHEET: **W2** OF: **6** CLIENT: SCHIFSKY COMPANIES

VEC PROJECT No:	VEC 24-106
DRAWN BY:	VEC
REVIEWED BY:	RWV
DATE:	6/13/2024

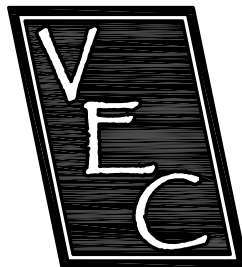
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATIONS, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

RONALD W. VICKERY, PE  
DATE: 6/13/2024 REG. No.: 24065 31



1  
W3
**WALL LOCATION SKETCH**  
 (NOT TO SCALE)

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**PROPOSED BOULDER RETAINING WALLS**  
**425 LAKE AVENUE**  
**BIRCHWOOD, MINNESOTA**  
**WALL LOCATION SKETCH**

SCALE:

**NONE**



VERIFY LINE ABOVE MEASURES  
 1-INCH. IF IT DOESN'T, ADJUST  
 SCALE ACCORDINGLY

SHEET: **W3** OF: **6**

CLIENT:  
**SCHIFSKY COMPANIES**

REV:	DATE:	DESCRIPTION:

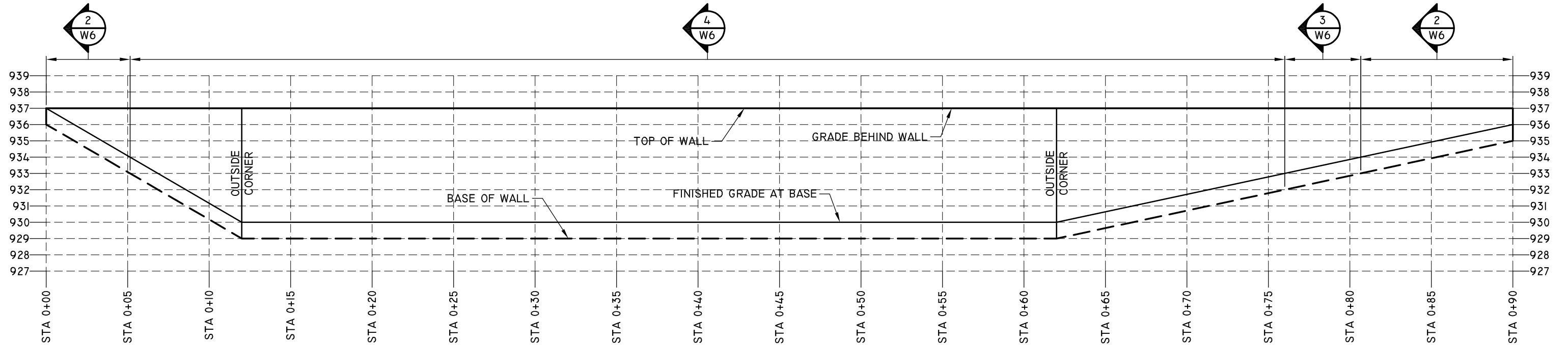
VEC PROJECT No:	VEC 24-106
DRAWN BY:	VEC
REVIEWED BY:	RWV
DATE:	6/13/2024

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RONALD W. VICKERY, PE

DATE: 6/13/2024 REG. No.: 24065 32





1 BOULDER WALL - ELEVATION VIEW  
 WEST WALL (MAXIMUM BEARING PRESSURE = 1,000 PSF)  
 W4 (SCALE: 1"=6'-0")

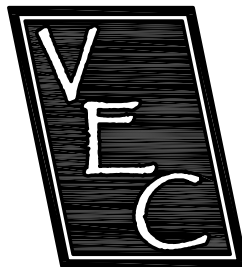
**LEGEND**

- INDICATES CROSS-SECTION TO BE USED (SEE SHEET W6)

**NOTES**

- 1) GRADES SHOWN ARE APPROXIMATE, AND MAY VARY IN THE FIELD AT THE TIME OF CONSTRUCTION. MINOR ADJUSTMENT OF THE TOP AND BOTTOM OF WALL ELEVATIONS IS PERMISSIBLE, PROVIDING THE CROSS-SECTIONS INDICATED ARE FOLLOWED. SEE SHEET W6 FOR CROSS-SECTION INFORMATION.
- 2) MINIMUM EMBEDMENT IS SHOWN ON THE CROSS-SECTIONS. EXTRA EMBEDMENT IS ALLOWED IF NEEDED TO ACCOMMODATE BOULDER SIZES.

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**PROPOSED BOULDER RETAINING WALLS**  
 425 LAKE AVENUE  
 BIRCHWOOD, MINNESOTA  
 WALL ELEVATION VIEWS

SCALE:



SCALE: 1" = 6'

REV:	DATE:	DESCRIPTION:

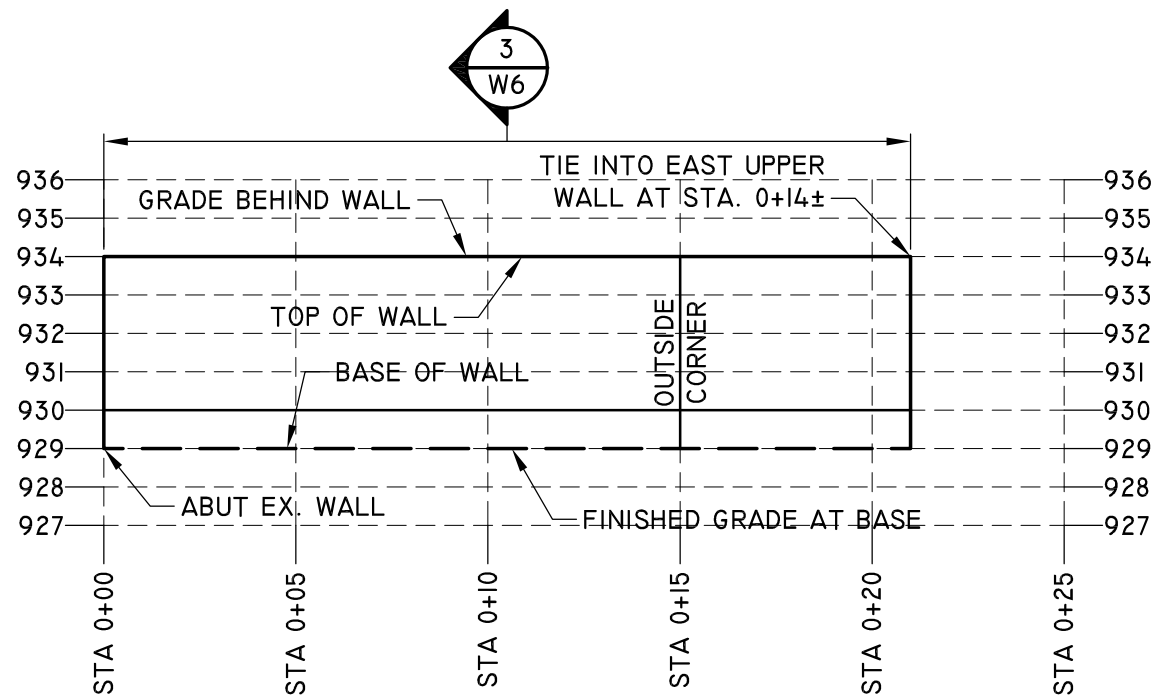
VEC PROJECT NO:	VEC 24-106
DRAWN BY:	VEC
REVIEWED BY:	RWV
DATE:	6/13/2024

SHEET: **W4** OF: **6** CLIENT: SCHIFSKY COMPANIES

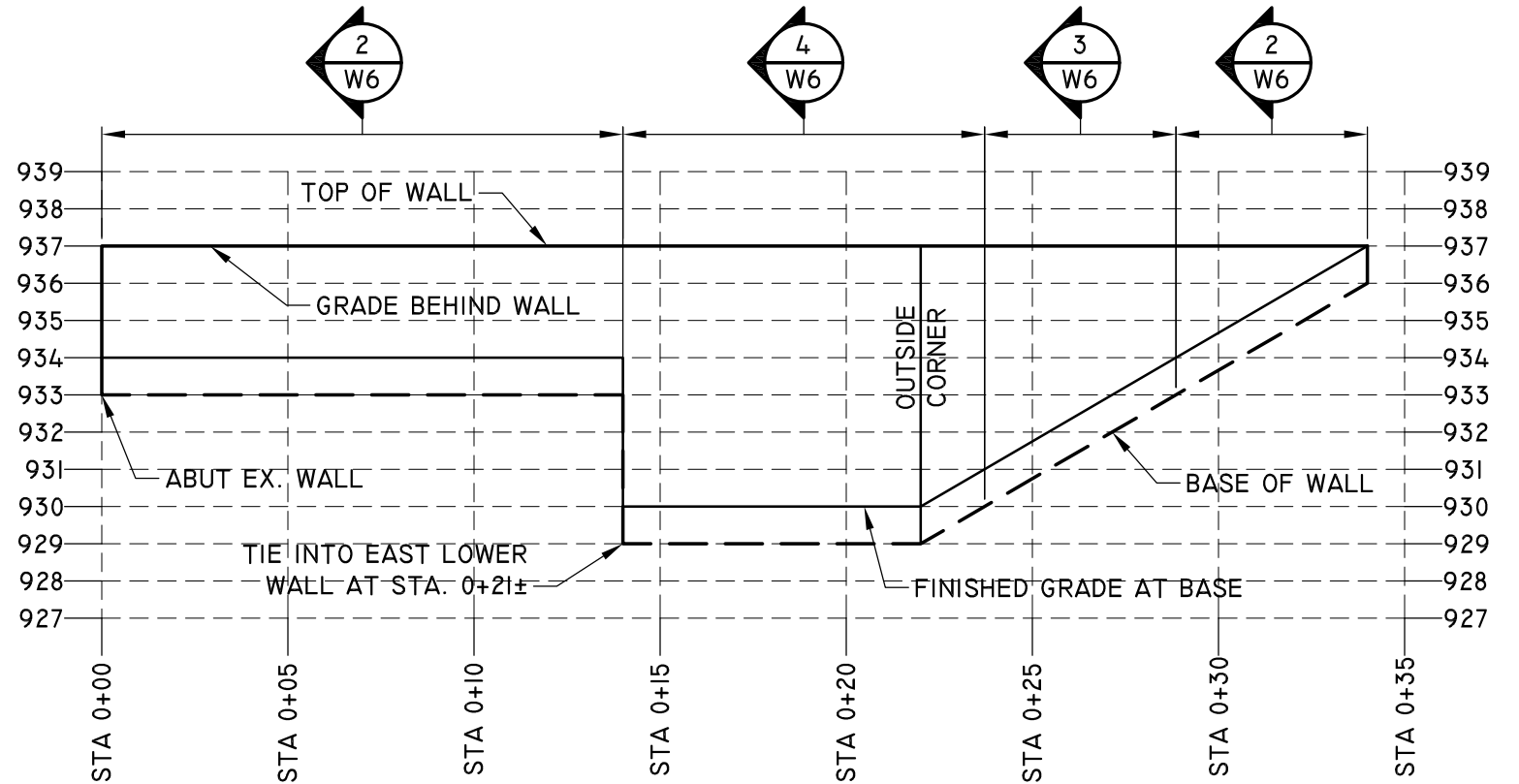
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RONALD W. VICKERY, PE

DATE: 6/13/2024 REG. No.: 24065  
 33



**1**  
**W5**  
BOULDER WALL - ELEVATION VIEW  
EAST LOWER WALL (MAXIMUM BEARING PRESSURE = 1,000 PSF)  
(SCALE: 1"=5'-0")



**2**  
**W5**  
BOULDER WALL - ELEVATION VIEW  
EAST UPPER WALL (MAXIMUM BEARING PRESSURE = 1,000 PSF)  
(SCALE: 1"=5'-0")

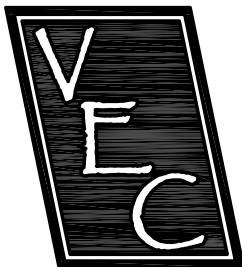
**LEGEND**

- INDICATES CROSS-SECTION TO BE USED (SEE SHEET W6)

**NOTES**

- 1) GRADES SHOWN ARE APPROXIMATE, AND MAY VARY IN THE FIELD AT THE TIME OF CONSTRUCTION. MINOR ADJUSTMENT OF THE TOP AND BOTTOM OF WALL ELEVATIONS IS PERMISSIBLE, PROVIDING THE CROSS-SECTIONS INDICATED ARE FOLLOWED. SEE SHEET W6 FOR CROSS-SECTION INFORMATION.
- 2) MINIMUM EMBEDMENT IS SHOWN ON THE CROSS-SECTIONS. EXTRA EMBEDMENT IS ALLOWED IF NEEDED TO ACCOMMODATE BOULDER SIZES.

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**PROPOSED BOULDER RETAINING WALLS**  
425 LAKE AVENUE  
BIRCHWOOD, MINNESOTA  
**WALL ELEVATION VIEWS**

SCALE:



SCALE: 1" = 5'

REV:	DATE:	DESCRIPTION:

VEC PROJECT NO:	VEC 24-106
DRAWN BY:	VEC
REVIEWED BY:	RWV
DATE:	6/13/2024

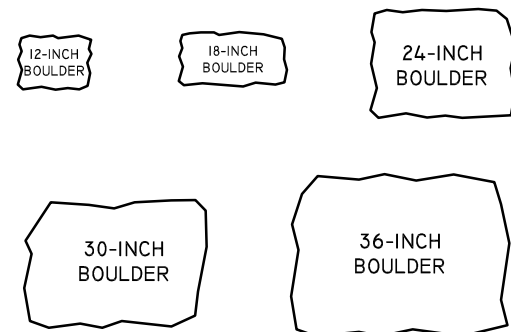
SHEET: **W5** OF: **6** CLIENT: SCHIFSKY COMPANIES

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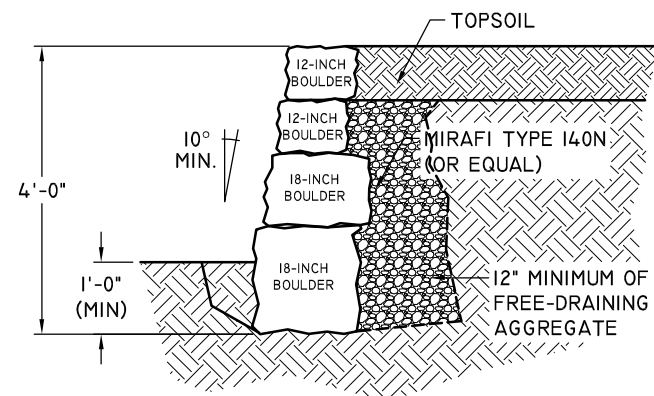
RONALD W. VICKERY, PE

DATE: 6/13/2024 REG. No.: 24065

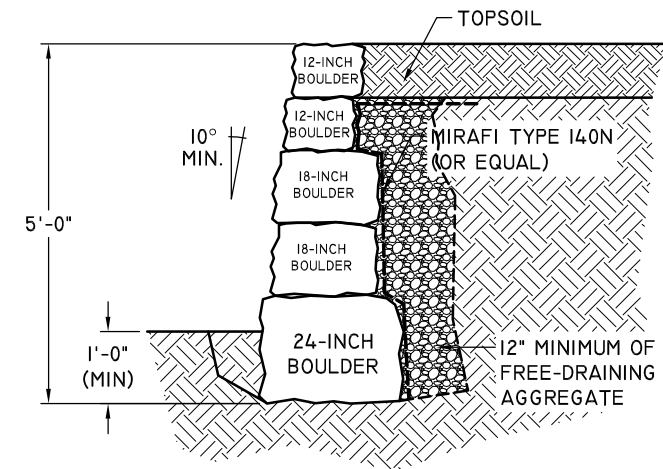
**NOTE:** ALL BOULDER SHAPES SHOWN ARE FOR DETAILING PURPOSES ONLY. ACTUAL BOULDER SHAPES MAY VARY GREATLY IN THE FIELD. BOULDER SIZES SHOWN ARE MINIMUM DEPTH OF THE BOULDER, AND THE DEPTHS SHOWN IN THE CROSS-SECTIONS SHOULD BE CONSIDERED MINIMUM DEPTHS INTO THE SLOPE (PERPENDICULAR TO THE WALL FACE). BOULDER HEIGHTS MAY VARY.



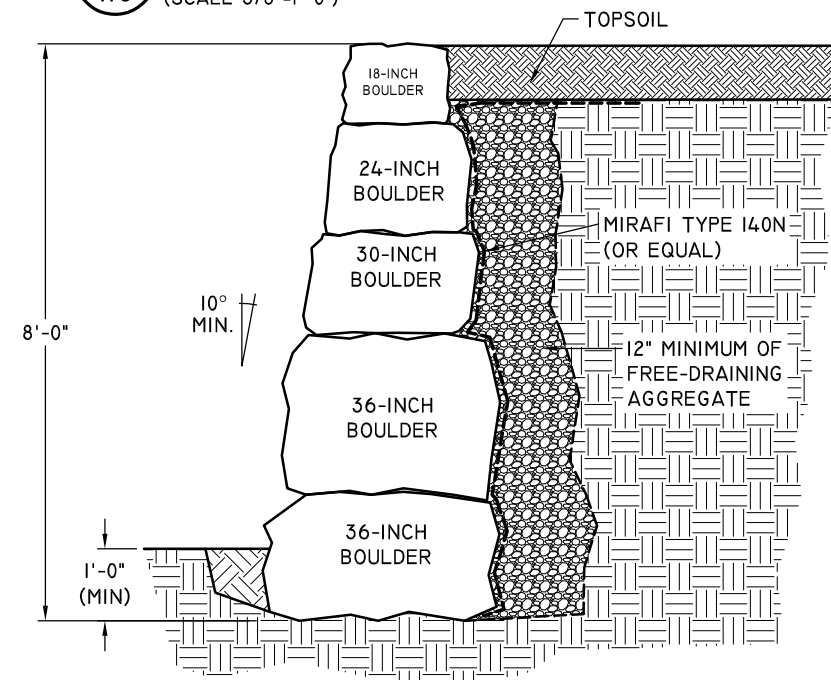
**1**  
W6  
PROPOSED BOULDER WALLS  
BOULDER DESIGNATIONS  
(NOT TO SCALE)



**2**  
W6  
PROPOSED BOULDER WALLS  
UP TO 4-FOOT WALL SECTION, NO SLOPE OR SURCHARGE  
(SCALE 3/8"=1'-0")

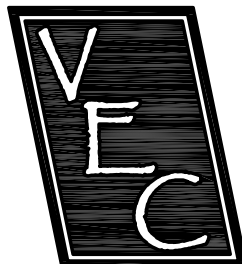


**3**  
W6  
PROPOSED BOULDER WALLS  
UP TO 5-FOOT WALL SECTION, NO SLOPE OR SURCHARGE  
(SCALE 3/8"=1'-0")



**4**  
W6  
PROPOSED BOULDER WALLS  
UP TO 8-FOOT WALL SECTION, NO SLOPE OR SURCHARGE  
(SCALE 3/8"=1'-0")

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**PROPOSED BOULDER RETAINING WALLS**  
425 LAKE AVENUE  
BIRCHWOOD, MINNESOTA  
SECTIONS AND DETAILS

SCALE:

**AS SHOWN**

0 1  
VERIFY LINE ABOVE MEASURES  
1-INCH. IF IT DOESN'T, ADJUST  
SCALE ACCORDINGLY

SHEET:

**W6**

OF:

**6**

CLIENT:  
SCHIFSKY COMPANIES

REV:	DATE:	DESCRIPTION:

VEC PROJECT NO:	VEC 24-106
DRAWN BY:	VEC
REVIEWED BY:	RWV
DATE:	6/13/2024

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RONALD W. VICKERY, PE

DATE: 6/13/2024 REG. No.: 24065  
35



## Boulder Wall Calculations - 4-Foot Total Wall Height, No Crest Slope

Project VEC 24-106 - June 13, 2024

425 Lake Avenue, Birchwood, Minnesota

Page 1 of 3

### Design Parameters:

Retained Soil Friction Angle, $\phi_{sr} := 30\text{deg}$	Soil Unit Weight, $\gamma_s := 125\text{pcf}$	Crest Slope, $\beta := 0\text{deg}$
Foundation Soil Friction Angle, $\phi_{sf} := 30\text{deg}$		Surcharge Load $q_s := 0 \frac{\text{lbf}}{\text{ft}^2}$
$\delta_1 := \frac{2}{3} \cdot \phi_{sr} \quad \delta_1 = 20\text{-deg}$	Rock Unit Weight, $\gamma_r := 145\text{pcf}$	
Exposed Height, $H_e := 3\text{ft}$	Wall Embedment, $H_b := 1\text{ft}$	Total Height, $H_r := H_e + H_b$ $H_r = 4\text{ft}$
Top of Wall Width, $W_t := 1\text{ft}$	Base of Wall Width, $W_b := 1.5\text{ft}$	
$\alpha := 83\text{deg}$	$\psi := 90\text{deg} - \alpha \quad \psi = 7\text{-deg}$	$v := \tan(\phi_{sf}) \quad v = 0.577$
Stone reduction friction factor $\mu_b := .8$	Leveling Pad depth: $LP_d := 1\text{ft}$	

### Calculate Wall Weight:

$W_1 := .5 \cdot (W_b - W_t) \cdot H_e \cdot \gamma_r \cdot 1\text{ft}$	$W_1 = 108.75\text{ lbf}$	$W_2 := W_t \cdot H_e \cdot \gamma_r \cdot 1\text{ft}$	$W_2 = 435\text{ lbf}$
$W_3 := H_b \cdot W_b \cdot \gamma_s \cdot 1\text{ft}$	$W_3 = 187.5\text{ lbf}$	$W_w := W_1 + W_2 + W_3$	$W_w = 731.3\text{ lbf}$

### Active Earth Pressure Coefficient (Ka):

$$K_a := \frac{(\cos(\phi_{sr} + \psi))^2}{(\cos(\psi))^2 \cdot (\cos(\delta_1 - \psi)) \cdot \left[ 1 + \sqrt{\frac{[(\sin(\phi_{sr} + \delta_1)) \cdot (\sin(\phi_{sr} - \beta))]}{[(\cos(\delta_1 - \psi)) \cdot (\cos(-\psi - \beta))]}]} \right]^2} \quad K_a = 0.25$$

### Total Horizontal Force:

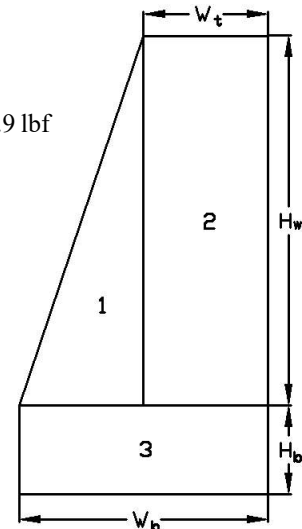
Horizontal Force From Soil, $F_{ah} := .5 \cdot \gamma_s \cdot K_a \cdot H_r \cdot H_r \cdot \cos(\delta_1 - \psi) \cdot 1\text{ft}$		$F_{ah} = 243.9\text{ lbf}$
Horizontal Force From Surcharge, $F_s := q_s \cdot K_a \cdot H_r \cdot 1\text{ft}$		$F_s = 0$
Total Horizontal Force, $F_h := F_{ah} + F_s$	$F_h = 243.9\text{ lbf}$	

### Frictional Resistance:

Vertical Force From Soil, $F_{av} := .5 \cdot \gamma_s \cdot K_a \cdot H_r \cdot H_r \cdot \sin(\delta_1 - \psi) \cdot 1\text{ft}$		$F_{av} = 56.3\text{ lbf}$
$F_u := v \cdot (W_w + F_{av})$	$F_u = 454.7\text{ lbf}$	

### Factor of Safety, Base Sliding:

FOS Sliding, $FOS_s := \frac{F_u}{F_h}$		$FOS_s = 1.864$
---	--	-----------------





## Boulder Wall Calculations - 4-Foot Total Wall Height, No Crest Slope

Project VEC 24-106 - June 13, 2024

425 Lake Avenue, Birchwood, Minnesota

Page 2 of 3

### Calculate Overturning Moment:

$$\text{Driving Moment, } M_o := \left[ 0.5 \cdot K_a \cdot \gamma_s \cdot H_r \cdot H_r \cdot \cos(\delta_1 - \psi) \cdot \left( \frac{H_r}{3} \right) \right] + \left[ q_s \cdot K_a \cdot H_r \cdot \left( \frac{H_r}{2} \right) \right] \quad M_o = 325.2 \text{ lbf}$$

### Calculate Resisting Moment:

Resisting Moment is calculated by taking the sum of the weights times the moment arms for each section of wall above

$$M1 := \frac{W1 \cdot (W_{ba} - W_t) \cdot \left( \frac{2}{3} \right)}{1 \text{ ft}} \quad M1 = 36.25 \text{ lbf}$$

$$M2 := \frac{W2 \cdot \left[ (W_{ba} - W_t) + \frac{W_t}{2} \right]}{(1 \text{ ft})} \quad M2 = 435 \text{ lbf}$$

$$M3 := \frac{W2 \cdot \left( \frac{W_{ba}}{2} \right)}{1 \text{ ft}} \quad M3 = 326.3 \text{ lbf}$$

$$\text{Resisting Moment, } M_r := M1 + M2 + M3 \quad M_r = 797.5 \text{ lbf}$$

### Factor of Safety, Overturning:

$$\text{FOS Overturning, } FOS_{ot} := \frac{M_r}{M_o} \quad FOS_{ot} = 2.453$$

### Analyze Bearing Capacity

Bearing capacity coefficients:

$$N_q := (\exp(\pi \cdot \tan(\phi_{sf}))) \cdot \left( \tan \left( 45 \cdot \text{deg} + \frac{\phi_{sf}}{2} \right) \right)^2 \quad N_q = 18.401$$

$$N_c := (N_q - 1) \cdot \cot(\phi_{sf}) \quad N_c = 30.14$$

$$N_\gamma := 2(N_q + 1) \cdot \tan(\phi_{sf}) \quad N_\gamma = 22.402$$

$$\text{Eccentricity of Resultant Vertical Bearing Force (E): } E := \left( \frac{W_{ba}}{2} \right) - \frac{(M_r - M_o)}{\frac{W_w}{1 \text{ ft}}} \quad E = 0.104 \text{ ft}$$



**Boulder Wall Calculations - 4-Foot Total Wall Height, No Crest Slope**

**Project VEC 24-106 - June 13, 2024**

**425 Lake Avenue, Birchwood, Minnesota**

**Page 3 of 3**

**Analyze Bearing Capacity (continued)**

$B_f := W_{ba} + L_{Pd} \quad B_f = 2.5 \text{ ft} \quad B_{f1} := B_f - 2 \cdot E \quad B_{f1} = 2.292 \text{ ft}$

Ultimate bearing capacity of foundation soils (Qult):

$Q_{ult} := 0.5 \cdot \gamma_s \cdot B_{f1} \cdot N_\gamma + \gamma_s \cdot H_b \cdot N_q \quad Q_{ult} = 5509.051 \cdot \text{psf}$

$Q_a := \frac{W_w}{B_{f1} \cdot 1 \text{ ft}} \quad Q_a = 319.069 \cdot \text{psf} \quad FOS_{bc} := \frac{Q_{ult}}{Q_a} \quad FOS_{bc} = 17.266$

**Summary of Results**

Total Height:	$H_r = 4 \text{ ft}$	Base Sliding Factor of Safety:	$FOS_s = 1.864$
Crest Slope:	$\beta = 0 \cdot \text{deg}$	Overtuning Factor of Safety:	$FOS_{ot} = 2.453$
Surcharge:	$q_s = 0 \cdot \frac{\text{lbf}}{\text{ft}^2}$	Bearing Capacity Factor of Safety:	$FOS_{bc} = 17.266$

I hereby certify that this plan, specification, or report was prepared under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Ronald W. Vickery, PE  
Registration Number: 24065  
June 13, 2024



**Boulder Wall Calculations - 5-Foot Total Wall Height, No Crest Slope**  
**Project VEC 24-106 - June 13, 2024**  
**425 Lake Avenue, Birchwood, Minnesota**  
**Page 1 of 3**

**Design Parameters:**

Retained Soil Friction Angle, $\phi_{sr} := 30\text{deg}$	Soil Unit Weight, $\gamma_s := 125\text{pcf}$	Crest Slope, $\beta := 0\text{deg}$
Foundation Soil Friction Angle, $\phi_{sf} := 30\text{deg}$	Rock Unit Weight, $\gamma_r := 145\text{pcf}$	Surcharge Load $q_s := 0 \frac{\text{lbf}}{\text{ft}^2}$
$\delta_1 := \frac{2}{3} \cdot \phi_{sr} \quad \delta_1 = 20\text{-deg}$	Wall Embedment, $H_b := 1\text{ft}$	Total Height, $H_r := H_e + H_b$ $H_r = 5\text{ft}$
Exposed Height, $H_e := 4\text{ft}$	Base of Wall Width, $W_{ba} := 2\text{ft}$	
Top of Wall Width, $W_t := 1\text{ft}$		
$\alpha := 83\text{deg}$	$\psi := 90\text{deg} - \alpha \quad \psi = 7\text{-deg}$	$v := \tan(\phi_{sf}) \quad v = 0.577$
Stone reduction friction factor $\mu_b := .8$	Leveling Pad depth: $LP_d := 1\text{ft}$	

**Calculate Wall Weight:**

$W_1 := .5 \cdot (W_{ba} - W_t) \cdot H_e \cdot \gamma_r \cdot 1\text{ft}$	$W_1 = 290\text{ lbf}$	$W_2 := W_t \cdot H_e \cdot \gamma_r \cdot 1\text{ft}$	$W_2 = 580\text{ lbf}$
$W_3 := H_b \cdot W_{ba} \cdot \gamma_s \cdot 1\text{ft}$	$W_3 = 250\text{ lbf}$	$W_w := W_1 + W_2 + W_3$	$W_w = 1120\text{ lbf}$

**Active Earth Pressue Coefficient (Ka):**

$$K_a := \frac{(\cos(\phi_{sr} + \psi))^2}{(\cos(\psi))^2 \cdot (\cos(\delta_1 - \psi)) \cdot \left[ 1 + \sqrt{\frac{[(\sin(\phi_{sr} + \delta_1)) \cdot (\sin(\phi_{sr} - \beta))]}{[(\cos(\delta_1 - \psi)) \cdot (\cos(-\psi - \beta))]}]} \right]^2} \quad K_a = 0.25$$

**Total Horizontal Force:**

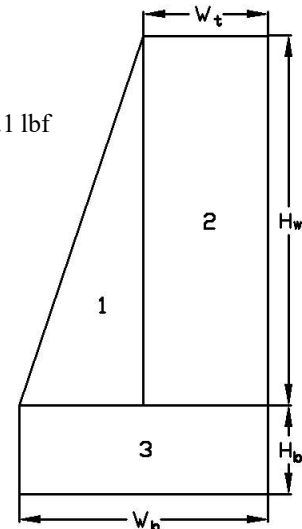
Horizontal Force From Soil, $F_{ah} := .5 \cdot \gamma_s \cdot K_a \cdot H_r \cdot H_r \cdot \cos(\delta_1 - \psi) \cdot 1\text{ft}$	$F_{ah} = 381.1\text{ lbf}$
Horizontal Force From Surcharge, $F_s := q_s \cdot K_a \cdot H_r \cdot 1\text{ft}$	$F_s = 0$
Total Horizontal Force, $F_h := F_{ah} + F_s$	$F_h = 381.1\text{ lbf}$

**Frictional Resistance:**

Vertical Force From Soil, $F_{av} := .5 \cdot \gamma_s \cdot K_a \cdot H_r \cdot H_r \cdot \sin(\delta_1 - \psi) \cdot 1\text{ft}$	$F_{av} = 88\text{ lbf}$
$F_u := v \cdot (W_w + F_{av})$	$F_u = 697.4\text{ lbf}$

**Factor of Safety, Base Sliding:**

FOS Sliding, $FOS_s := \frac{F_u}{F_h}$	$FOS_s = 1.83$
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**Boulder Wall Calculations - 5-Foot Total Wall Height, No Crest Slope****Project VEC 24-106 - June 13, 2024****425 Lake Avenue, Birchwood, Minnesota****Page 2 of 3****Calculate Overturning Moment:**

$$\text{Driving Moment, } M_o := \left[ 0.5 \cdot K_a \cdot \gamma_s \cdot H_r \cdot H_r \cdot \cos(\delta_1 - \psi) \cdot \left( \frac{H_r}{3} \right) \right] + \left[ q_s \cdot K_a \cdot H_r \cdot \left( \frac{H_r}{2} \right) \right] \quad M_o = 635.1 \text{ lbf}$$

**Calculate Resisting Moment:**

Resisting Moment is calculated by taking the sum of the weights times the moment arms for each section of wall above

$$M_1 := \frac{W_1 \cdot (W_{ba} - W_t) \cdot \left( \frac{2}{3} \right)}{1 \text{ ft}} \quad M_1 = 193.333 \text{ lbf}$$

$$M_2 := \frac{W_2 \cdot \left[ (W_{ba} - W_t) + \frac{W_t}{2} \right]}{(1 \text{ ft})} \quad M_2 = 870 \text{ lbf}$$

$$M_3 := \frac{W_2 \cdot \left( \frac{W_{ba}}{2} \right)}{1 \text{ ft}} \quad M_3 = 580 \text{ lbf}$$

$$\text{Resisting Moment, } M_r := M_1 + M_2 + M_3 \quad M_r = 1643.3 \text{ lbf}$$

**Factor of Safety, Overturning:**

$$\text{FOS Overturning, } FOS_{ot} := \frac{M_r}{M_o} \quad FOS_{ot} = 2.587$$

**Analyze Bearing Capacity**

Bearing capacity coefficients:

$$N_q := (\exp(\pi \cdot \tan(\phi_{sf}))) \cdot \left( \tan \left( 45 \cdot \text{deg} + \frac{\phi_{sf}}{2} \right) \right)^2 \quad N_q = 18.401$$

$$N_c := (N_q - 1) \cdot \cot(\phi_{sf}) \quad N_c = 30.14$$

$$N_\gamma := 2(N_q + 1) \cdot \tan(\phi_{sf}) \quad N_\gamma = 22.402$$

$$\text{Eccentricity of Resultant Vertical Bearing Force (E): } E := \left( \frac{W_{ba}}{2} \right) - \frac{(M_r - M_o)}{\frac{W_w}{1 \text{ ft}}} \quad E = 0.1 \text{ ft}$$





**Boulder Wall Calculations - 5-Foot Total Wall Height, No Crest Slope**

**Project VEC 24-106 - June 13, 2024**

**425 Lake Avenue, Birchwood, Minnesota**

**Page 3 of 3**

**Analyze Bearing Capacity (continued)**

$B_f := W_{ba} + L_{Pd} \quad B_f = 3 \text{ ft} \quad B_{f1} := B_f - 2 \cdot E \quad B_{f1} = 2.8 \text{ ft}$

Ultimate bearing capacity of foundation soils (Qult):

$Q_{ult} := 0.5 \cdot \gamma_s \cdot B_{f1} \cdot N_\gamma + \gamma_s \cdot H_b \cdot N_q \quad Q_{ult} = 6221.132 \cdot \text{psf}$

$Q_a := \frac{W_w}{B_{f1} \cdot 1 \text{ ft}} \quad Q_a = 399.943 \cdot \text{psf} \quad FOS_{bc} := \frac{Q_{ult}}{Q_a} \quad FOS_{bc} = 15.555$

**Summary of Results**

Total Height:	$H_r = 5 \text{ ft}$	Base Sliding Factor of Safety:	$FOS_s = 1.83$
Crest Slope:	$\beta = 0 \cdot \text{deg}$	Overtuning Factor of Safety:	$FOS_{ot} = 2.587$
Surcharge:	$q_s = 0 \cdot \frac{\text{lbf}}{\text{ft}^2}$	Bearing Capacity Factor of Safety:	$FOS_{bc} = 15.555$

I hereby certify that this plan, specification, or report was prepared under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Ronald W. Vickery, PE  
Registration Number: 24065  
June 13, 2024



## Boulder Wall Calculations - 8-Foot Total Wall Height, No Crest Slope

Project VEC 24-106 - June 13, 2024

425 Lake Avenue, Birchwood, Minnesota

Page 1 of 3

### Design Parameters:

Retained Soil Friction Angle, $\phi_{sr} := 30\text{deg}$	Soil Unit Weight, $\gamma_s := 125\text{pcf}$	Crest Slope, $\beta := 0\text{deg}$
Foundation Soil Friction Angle, $\phi_{sf} := 30\text{deg}$	Rock Unit Weight, $\gamma_r := 145\text{pcf}$	Surcharge Load $q_s := 0 \frac{\text{lbf}}{\text{ft}^2}$
$\delta_1 := \frac{2}{3} \cdot \phi_{sr} \quad \delta_1 = 20\text{deg}$	Wall Embedment, $H_b := 1\text{ft}$	Total Height, $H_r := H_e + H_b$
Exposed Height, $H_e := 7\text{ft}$	Base of Wall Width, $W_{ba} := 3\text{ft}$	$H_r = 8\text{ft}$
Top of Wall Width, $W_t := 1.5\text{ft}$		
$\alpha := 83\text{deg}$	$\psi := 90\text{deg} - \alpha \quad \psi = 7\text{deg}$	$v := \tan(\phi_{sf}) \quad v = 0.577$
Stone reduction friction factor $\mu_b := .8$	Leveling Pad depth: $LP_d := 1\text{ft}$	

### Calculate Wall Weight:

$W_1 := .5 \cdot (W_{ba} - W_t) \cdot H_e \cdot \gamma_r \cdot 1\text{ft}$	$W_1 = 761.25\text{ lbf}$	$W_2 := W_t \cdot H_e \cdot \gamma_r \cdot 1\text{ft}$	$W_2 = 1522.5\text{ lbf}$
$W_3 := H_b \cdot W_{ba} \cdot \gamma_s \cdot 1\text{ft}$	$W_3 = 375\text{ lbf}$	$W_w := W_1 + W_2 + W_3$	$W_w = 2658.8\text{ lbf}$

### Active Earth Pressue Coefficient (Ka):

$$K_a := \frac{(\cos(\phi_{sr} + \psi))^2}{(\cos(\psi))^2 \cdot (\cos(\delta_1 - \psi)) \cdot \left[ 1 + \sqrt{\frac{[(\sin(\phi_{sr} + \delta_1)) \cdot (\sin(\phi_{sr} - \beta))]}{[(\cos(\delta_1 - \psi)) \cdot (\cos(-\psi - \beta))]}]} \right]^2} \quad K_a = 0.25$$

### Total Horizontal Force:

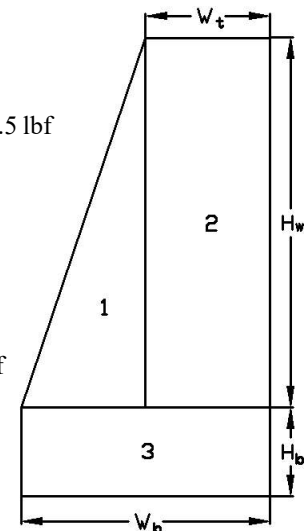
Horizontal Force From Soil, $F_{ah} := .5 \cdot \gamma_s \cdot K_a \cdot H_r \cdot H_r \cdot \cos(\delta_1 - \psi) \cdot 1\text{ft}$	$F_{ah} = 975.5\text{ lbf}$
Horizontal Force From Surcharge, $F_s := q_s \cdot K_a \cdot H_r \cdot 1\text{ft}$	$F_s = 0$
Total Horizontal Force, $F_h := F_{ah} + F_s$	$F_h = 975.5\text{ lbf}$

### Frictional Resistance:

Vertical Force From Soil, $F_{av} := .5 \cdot \gamma_s \cdot K_a \cdot H_r \cdot H_r \cdot \sin(\delta_1 - \psi) \cdot 1\text{ft}$	$F_{av} = 225.2\text{ lbf}$
$F_u := v \cdot (W_w + F_{av})$	$F_u = 1665.1\text{ lbf}$

### Factor of Safety, Base Sliding:

FOS Sliding,  $FOS_s := \frac{F_u}{F_h} \quad FOS_s = 1.707$





**Boulder Wall Calculations - 8-Foot Total Wall Height, No Crest Slope**  
**Project VEC 24-106 - June 13, 2024**  
**425 Lake Avenue, Birchwood, Minnesota**  
**Page 2 of 3**

**Calculate Overturning Moment:**

$$\text{Driving Moment, } M_o := \left[ 0.5 \cdot K_a \cdot \gamma_s \cdot H_r \cdot H_r \cdot \cos(\delta_1 - \psi) \cdot \left( \frac{H_r}{3} \right) \right] + \left[ q_s \cdot K_a \cdot H_r \cdot \left( \frac{H_r}{2} \right) \right] \quad M_o = 2601.4 \text{ lbf}$$

**Calculate Resisting Moment:**

Resisting Moment is calculated by taking the sum of the weights times the moment arms for each section of wall above

$$M1 := \frac{W1 \cdot (W_{ba} - W_t) \cdot \left( \frac{2}{3} \right)}{1 \text{ ft}} \quad M1 = 761.25 \text{ lbf}$$

$$M2 := \frac{W2 \cdot \left[ (W_{ba} - W_t) + \frac{W_t}{2} \right]}{(1 \text{ ft})} \quad M2 = 3425.6 \text{ lbf}$$

$$M3 := \frac{W2 \cdot \left( \frac{W_{ba}}{2} \right)}{1 \text{ ft}} \quad M3 = 2283.8 \text{ lbf}$$

$$\text{Resisting Moment, } M_r := M1 + M2 + M3 \quad M_r = 6470.6 \text{ lbf}$$

**Factor of Safety, Overturning:**

$$\text{FOS Overturning, } FOS_{ot} := \frac{M_r}{M_o} \quad FOS_{ot} = 2.487$$

**Analyze Bearing Capacity**

Bearing capacity coefficients:

$$N_q := (\exp(\pi \cdot \tan(\phi_{sf}))) \cdot \left( \tan \left( 45 \cdot \text{deg} + \frac{\phi_{sf}}{2} \right) \right)^2 \quad N_q = 18.401$$

$$N_c := (N_q - 1) \cdot \cot(\phi_{sf}) \quad N_c = 30.14$$

$$N_\gamma := 2(N_q + 1) \cdot \tan(\phi_{sf}) \quad N_\gamma = 22.402$$

$$\text{Eccentricity of Resultant Vertical Bearing Force (E): } E := \left( \frac{W_{ba}}{2} \right) - \frac{(M_r - M_o)}{\frac{W_w}{1 \text{ ft}}} \quad E = 0.045 \text{ ft}$$



**Boulder Wall Calculations - 8-Foot Total Wall Height, No Crest Slope**  
**Project VEC 24-106 - June 13, 2024**  
**425 Lake Avenue, Birchwood, Minnesota**  
**Page 3 of 3**

**Analyze Bearing Capacity (continued)**

$B_f := W_{ba} + L_{Pd}$      $B_f = 4 \text{ ft}$      $B_{f1} := B_f - 2 \cdot E$      $B_{f1} = 3.911 \text{ ft}$

Ultimate bearing capacity of foundation soils (Qult):

$Q_{ult} := 0.5 \cdot \gamma_s \cdot B_{f1} \cdot N_\gamma + \gamma_s \cdot H_b \cdot N_q$      $Q_{ult} = 7775.517 \cdot \text{psf}$

$Q_a := \frac{W_w}{B_{f1} \cdot 1 \text{ ft}}$      $Q_a = 679.892 \cdot \text{psf}$      $FOS_{bc} := \frac{Q_{ult}}{Q_a}$      $FOS_{bc} = 11.436$

**Summary of Results**

Total Height:	$H_r = 8 \text{ ft}$	Base Sliding Factor of Safety:	$FOS_s = 1.707$
Crest Slope:	$\beta = 0 \cdot \text{deg}$	Overtuning Factor of Safety:	$FOS_{ot} = 2.487$
Surcharge:	$q_s = 0 \cdot \frac{\text{lbf}}{\text{ft}^2}$	Bearing Capacity Factor of Safety:	$FOS_{bc} = 11.436$

I hereby certify that this plan, specification, or report was prepared under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Ronald W. Vickery, PE  
Registration Number: 24065  
June 13, 2024

# CERTIFICATE OF SURVEY

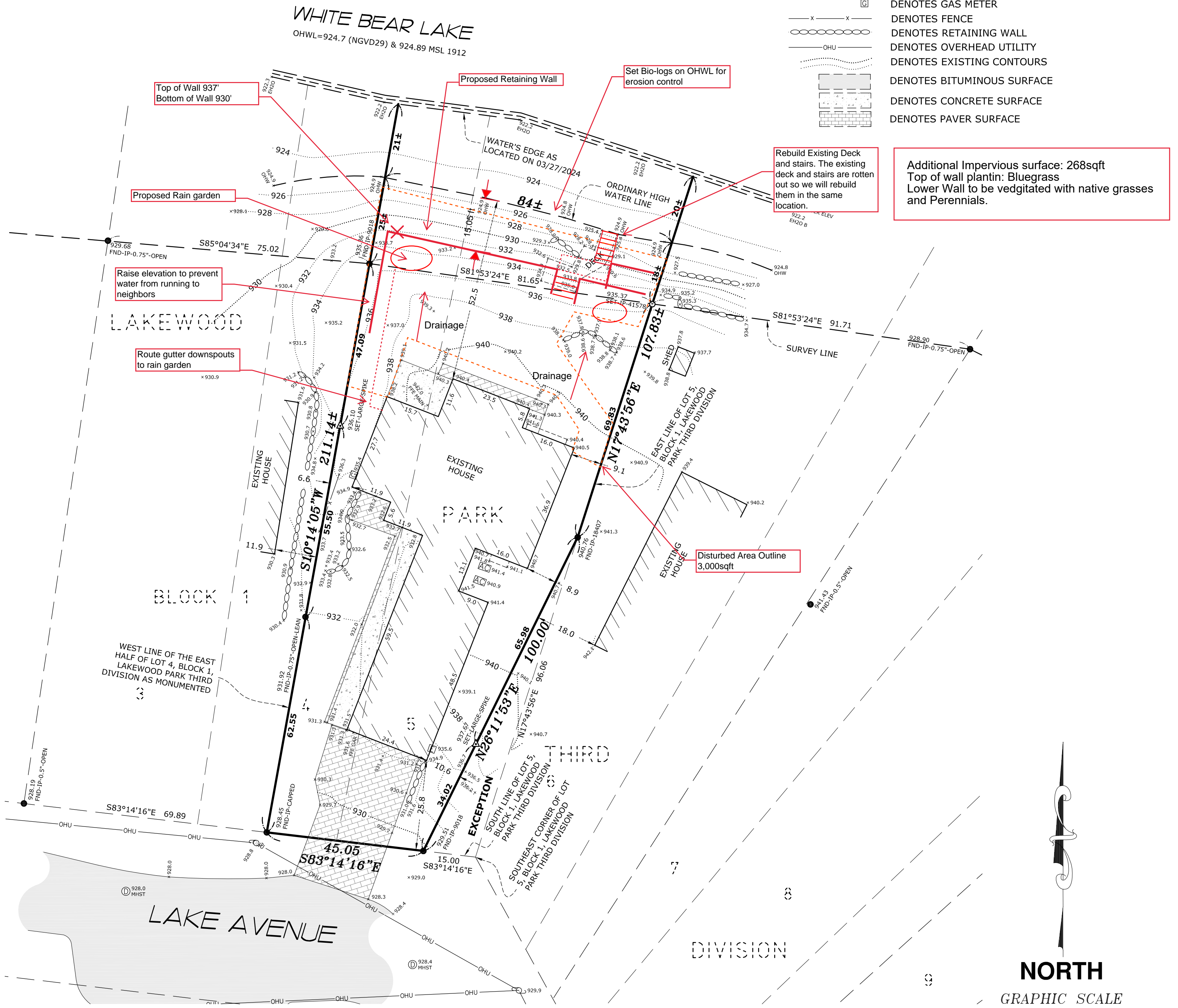
~for~ **BLAISER POOLS**  
 ~of~ **425 LAKE AVENUE**  
**BIRCHWOOD, MN**

## BENCHMARK

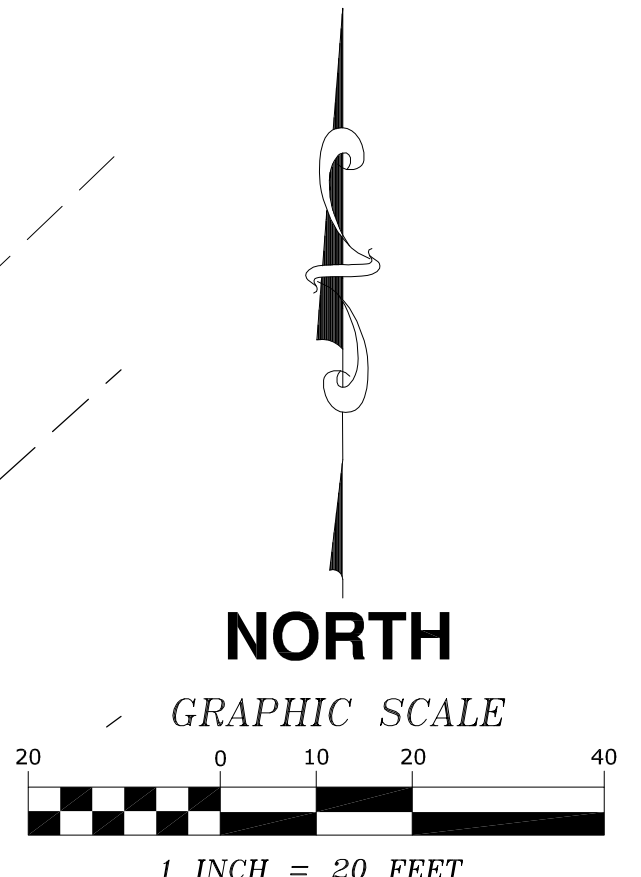
DNR PAINT MARK ON SLAB OF  
 PUMPHOUSE AT MATOSKA PARK  
 ELEVATION: 928.74  
 DATUM: MSL 1912

## LEGEND

- DENOTES IRON MONUMENT FOUND AS LABELED
- DENOTES IRON MONUMENT SET, MARKED RLS# 41578
- △ DENOTES SET PKNAIL
- ⊠ DENOTES AIR CONDITIONING UNIT
- ⊞ DENOTES ELECTRICAL BOX
- x 952.36 DENOTES EXISTING SPOT ELEVATION
- ⊕ DENOTES POWER POLE
- ⊙ DENOTES STORM SEWER MANHOLE
- ⊞ DENOTES GAS METER
- x — x — DENOTES FENCE
- ⊞ DENOTES RETAINING WALL
- OHU — DENOTES OVERHEAD UTILITY
- ⋯ DENOTES EXISTING CONTOURS
- ▨ DENOTES BITUMINOUS SURFACE
- ▩ DENOTES CONCRETE SURFACE
- ▧ DENOTES PAVER SURFACE



Additional Impervious surface: 268sqft  
 Top of wall plantin: Bluegrass  
 Lower Wall to be vedgitated with native grasses and Perennials.



### PROPERTY DESCRIPTION: Per Warranty Deed Doc. No. 845086

The East Half of Lot 4, Block 1, LAKEWOOD PARK THIRD DIVISION, Washington County, Minnesota.

**ALSO: Lot 5, Block 1, LAKEWOOD PARK THIRD DIVISION, EXCEPT a triangular piece, commencing at the Southeast corner of Lot 5, thence Westerly along the South line of said Lot 5, a distance of 15 feet; thence Northeasterly to a point where a diagonal line 100 feet in length would intersect the East line of said Lot 5, thence Southerly along said East line of said Lot 5 to the point of beginning, Washington County, Minnesota.**

**IMPERVIOUS SURFACE CALCULATIONS**

TOTAL LOT AREA ABOVE OHWL	12,713 SQ. FT.
EXISTING HOUSE AND GARAGE AND OVERHANGS	3,832 SQ. FT.
EXISTING PAVERS AND DRIVEWAY	1,027 SQ. FT.
EXISTING CONCRETE	182 SQ. FT.
EXISTING RETAINING WALL	70 SQ. FT.
TOTAL IMPERVIOUS SURFACE	5,111 SQ. FT.
PERCENT IMPERVIOUS	40.2%

### NOTES

- Field survey was completed by E.G. Rud and Sons, Inc. on 03/27/2024.
- Bearings shown are on the Washington County Coordinate System.
- Parcel ID Number: 30-030-21-13-0011 & 30-030-21-13-0012.
- This survey was prepared without the benefit of title work. Additional easements, restrictions and/or encumbrances may exist other than those shown hereon. Survey subject to revision upon receipt of a current title commitment or an attorney's title opinion.
- Due to field work being completed during the winter season there may be improvements in addition to those shown that were not visible due to snow and ice conditions characteristic of Minnesota winters.

I hereby certify that this survey, plan or report was prepared by me or under my direct supervision and that I am a duly Registered Land Surveyor under the laws of the State of Minnesota.

*Jason E. Rud*  
 JASON E. RUD  
 Date: 04/04/2024 License No. 41578

DRAWN BY: BCD	JOB NO: 24.0225BT	DATE: 03/28/2024	
CHECK BY: DSH	FIELD CREW: DT/RW		
1			
2			
3			
NO.	DATE	DESCRIPTION	BY

**E.G. RUD & SONS, INC.**  
 Professional Land Surveyors  
 6776 Lake Drive NE, Suite 110  
 Lino Lakes, MN 55014  
 Tel. (651) 361-8200 Fax (651) 361-8701

# BIRCHWOOD VILLAGE

## Variance Findings Form

**#1: Is the request reasonable with the general purposes and intent of the ordinance?**

The specific Ordinance states \_\_\_\_\_  
(state ordinance requirement), **the purpose of which is to** \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ (explain what the ordinance requirement is intended to prevent or protect).

The proposed variance is **for:** \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ (explain proposal and potential effects).

This variance **is/is not** reasonable with the general purpose and intent of the specific Ordinance **because:** \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ (explain how the proposal is reasonable with or undermines the purpose of the ordinance).

**#2: Are there special conditions or circumstances that are peculiar to the land, structure, or building involved?**

There **are/are no** circumstances unique to the property that would prevent compliance with the specific Ordinance **because:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*(describe any physical characteristics of the property that are unique to this property that prevent*

*compliance with the ordinance requirement, and whether the applicant has demonstrated that no other reasonable alternative exists that would comply with the ordinance; explain what makes this property different from other properties to justify why this applicant should be able to deviate from the ordinance when others must comply).*

**#3: Were the special conditions or circumstances created by the applicant's action or design solution?** The conditions that resulted in the need for the variance were/were not created by the applicant **because:**

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\_\_\_\_\_ (if there are special conditions or circumstances, describe whether they were created by some action of the applicant/property owner).

**#4: Will granting a variance result in *any increase in the amount of water draining from the property?***

Granting the variance **will/will not** increase the amount of water that drains from the property **because:**

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\_\_\_\_\_ (if granting the variance will increase the amount of water that drains from the property, explain how and how much it will increase).

**#5: Will granting the variance *impair an adequate supply of light and air to adjacent property, or unreasonably diminish or impair established property values within the surrounding area, or in any other respect impair the public health, safety, or welfare of the residents of the City?***

Granting the variance will/will not impair light and air to adjacent property, or diminish or impair property values in the area, or impair the public health, safety, or welfare of Birchwood residents **because:**

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**What is your recommendation? (Approve or Deny)**

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**Remember - ALL criteria MUST be satisfied to approve.**

***If approved, what conditions will you impose?*** (Findings must support the conditions; explain the impacts of the proposed development and the conditions that address those impacts. Remember that findings must be directly related and proportional to the impacts created by the variance. Set specific timeframes and deadlines, and consider requiring the following to help ensure compliance with the conditions:

- financial sureties to ensure that the required activities are completed within specified deadlines,
- as-built drawings and/or photos as proof of completion within the terms of the conditions, and/or
- long-term maintenance and operation agreements for stormwater best management practices and vegetation that must be protected or restored as a condition of approval, along with notices of restrictions recorded against properties to ensure that future property owners are aware of their responsibilities and don't unknowingly "undo" any conditions.)

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***conditions continued***

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**ORDINANCE NO. 2024-06-03**

**AN ORDINANCE INSERTING § 302.017 “LOT MERGE REQUIRED” INTO CHAPTER 301 “ZONING CODE GENERAL PROVISIONS”**

**Findings and Purpose:**

*Our ordinances require certain minimum lot sizes and street frontages for properties. It is common that, among multiple contiguous properties under the same ownership, this standard is not met. It is in the interest of those in the village for these standards to be applied where lots are being sold or before development.*

*Pursuant to Minn. Stat. § 462.357, “A municipality may, by ordinance, permit an expansion or impose upon nonconformities reasonable regulations to prevent and abate nuisances and to protect the public health, welfare, or safety.” The city finds that it can best protect the public welfare, health and safety of our residents and those nearby by reducing water use and protecting shoreland, managing limited stormwater infrastructure and maintaining public waters by limiting improvement and expansions on certain lots. The case is especially strong within the White Bear Lake drainage basin due to the frequent low lake levels resulting from groundwater use.*

*Those prerogatives are reasonably exercised through limits on the expansion, sale and improvement of certain lots and uninhabitable non-conforming structures.*

**The City Council of The City of Birchwood, Minnesota ordains:**

**Section 1. City Code § 302.017 is hereby inserted to read:**

302.017. LOT MERGE REQUIRED. Notwithstanding § 302.015 and § 301.050, any lot which, on any date after the date of adoption of this ordinance:

1. is or was contiguous with any other lot under common ownership; and
2. is or was less than the minimum lot size and/or frontage requirement in § 302.010; and
3. had no occupancy within the past year, or does or did not contain a habitable dwelling; and
4. to which § 301.050(b) does not apply,

must be merged with the contiguous lot before sale, development or expansion. No permits may be issued for development, expansion or use of any such lot, nor of any applicable contiguous lot, which has not yet been merged. No person may sell any lot to which this section applies, before it is merged.

Section 2. **Effective date.** This ordinance becomes effective from and after its passage and publication.

Passed by the City Council of The City of Birchwood, Minnesota this 9<sup>th</sup> day of July, 2024.

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Mayor

Attested:

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City Clerk