



CPED STAFF REPORT

Prepared for the Zoning Board of Adjustment
 BOA Agenda Item #2
 July 14, 2016
 BZZ-7772

LAND USE APPLICATION SUMMARY

Property Location: 4628 West Lake Harriet Parkway
Project Name: Variances for new home construction
Prepared By: Andrew Liska, City Planner, 612.673.2264
Applicant: Brian and Nancy Siska
Project Contact: Brian and Nancy Siska
Request: To allow development within 40' of a steep slope in the Shoreland Overlay District and to increase the maximum permitted height for a new single-family dwelling located at 4628 West Lake Harriet Parkway.

Required Applications:

Variance	To develop within 40' of a steep slope in the Shoreland Overlay District
	To increase the maximum permitted height of a new single-family dwelling from 33' at the peak to 37' at the peak and 28' at the midpoint to 28.5' at the midpoint.

SITE DATA

Existing Zoning	RI, SH
Lot Area	9,439 square feet
Ward(s)	13
Neighborhood(s)	Linden Hills Neighborhood Council
Designated Future Land Use	Urban Neighborhood
Land Use Features	NA
Small Area Plan(s)	NA

Date Application Deemed Complete	June 21, 2016	Date Extension Letter Sent	NA
End of 60-Day Decision Period	August 20, 2016	End of 120-Day Decision Period	NA

BACKGROUND

SITE DESCRIPTION AND PRESENT USE. The parcel is a through lot with West Lake Harriet Parkway to the east and Upton Avenue South to the west. The site is approximately 60' x 165' (9,439 square feet). The topography is high on the Upton Avenue South and decreases in elevation nearly 19.5 feet near West Lake Harriet Parkway. There is an 18% change in grade and thus, is classified as a steep slope. There are a number of mature trees on site.

A two and one-half story single-family dwelling with attached garage built in 1913 currently occupies this site. The structure is 40.6 feet tall measured to the peak. There is an existing curb cut off of West Lake Harriet Parkway that accesses the tuck-under garage.

SURROUNDING PROPERTIES AND NEIGHBORHOOD. The parcels in between Upton Avenue South and West Lake Harriet Parkway have similar topography with the high elevations near Upton Avenue South and sloping down to the east towards West Lake Harriet Parkway.

The structure to the north, 4624 West Lake Harriet Parkway, is a two story, single-family dwelling. The structure to the south, 4632 West Lake Harriet Parkway, is a two story, single-family dwelling. Due to the slope, structures in this area have exposed basements facing West Lake Harriet Parkway. The applicant has provided a height demonstration of surrounding dwellings showing the height of the existing structure measured from grade to the peak – see attachment # 6. The height of a number of structures in the area exceeds the maximums permitted by the Zoning Code.

There is a mixture of older homes, remodeled homes, and new homes built in this area. With this rich mixture of the ages of the dwellings, there isn't a predominant style of homes in this area.

PROJECT DESCRIPTION. The applicant has proposed to remove the existing structure and construct a new two story single-family dwelling. The proposed dwelling seeks to emulate the existing structure – one that is deteriorated beyond practical repair - while also reducing the overall footprint and height of the structure. The proposed design includes similar roof lines and general architectural styles to pay homage to the existing structure and to blend into the existing built environment. The proposal includes a similar tuck-under garage design and utilizes the existing curb cut off of West Lake Harriet Parkway. A retaining wall allows for access into the basement level for parking. The applicant will utilize a similar retaining wall in this location and has also proposed terraced retaining walls on the north side of the property. These retaining walls do not require any additional variance requests but are included in the general development variance request.

No point of the basement is exposed greater than 12 feet nor is more than 6 feet exposed for more than 50% of the perimeter and thus, the lower level is considered a basement and not a story. Code requires that the basement is included in gross floor area calculations if it is exposed greater than 3.5 feet for more than 50% of the perimeter. The basement is exposed less than 3.5 feet for more than 50% of the perimeter and thus, is not included in the floor area ratio calculations. The proposed FAR is (3,657.5 square feet / 9,439 square feet) .387; well below the .5 permitted by Code.

The height of the structure is measured from a point 10 feet in front of the proposed structure, measured toward West Lake Harriet Parkway – this elevation is at 862'. From this grade point to the peak of the proposed structure, the height is 37 feet - Code limits peak height to 33 feet. The proposed midpoint height is 28.5 feet and Code limits midpoint height to 28 feet. The applicants are seeking to increase the height of the proposed structure.

In addition to the height variance, the applicants are seeking a variance to allow development in the Shoreland Overlay District. All other aspects of this proposal meet Zoning requirements.

PUBLIC COMMENTS. As of writing this staff report, staff has not received any correspondence from the Linden Hills Neighborhood Council. Staff will forward comments, if any are received, at the Board of Adjustment meeting.

ZONING ANALYSIS. An analysis indicates that the proposed dwelling meets the Design Standard points for new 1-4 dwelling units. Seventeen points are the minimum point total needed for approval and this proposal received 22 out of 27 possible points for the following design standards:

- The exterior building materials are masonry, brick, stone, stucco, wood, cement-board siding, and/or glass (6 points);
- The height of the structure is within one-half story of the predominant height of residential buildings within one hundred (100) feet of the site (4 points);
- The total diameter of trees retained or planted equals not less than three (3) inches per one thousand square feet of total lot area, or fraction thereof. Tree diameter shall be measured at four and one-half (4.5) feet above grade (4 points);
- Not less than twenty (20) percent of the walls on each floor that face a public street, not including walls on half stories, are windows (3 points);
- The structure includes a basement as defined by the building code (3 points);
- Not less than ten (10) percent of the walls on each floor that face a rear or interior side lot line, not including walls on half stories, are windows (2 points);

ANALYSIS

VARIANCE

The Department of Community Planning and Economic Development has analyzed the application for a variance of Chapter 525, Article IX Variances, specifically Section 525.520(17) “to permit development in the SH Shoreland Overlay District on a steep slope or bluff, or within forty (40) feet of the top of a steep slope or bluff, based on the following findings:

1. *Practical difficulties exist in complying with the ordinance because of circumstances unique to the property. The unique circumstances were not created by persons presently having an interest in the property and are not based on economic considerations alone.*

The circumstance upon which the variance is requested is unique to the parcel of land. The existing steep slope combined with the location near Lake Harriet creates the need for this variance. This practical difficulty was not created by the applicant.

2. *The property owner or authorized applicant proposes to use the property in a reasonable manner that will be in keeping with the spirit and intent of the ordinance and the comprehensive plan.*

The applicant is proposing to use the property in a reasonable matter. This is a residential area and the proposed use is a single-family dwelling; this use is consistent with the character of the area and the future land-use map demonstrated in the Comprehensive Plan.

The intent of the ordinance authorizing development in the SH Shoreland Overlay District is to protect natural features within the City of Minneapolis from potentially harmful development. The proposal is reasonable and will result in development that will not compromise Lake Harriet.

3. *The proposed variance will not alter the essential character of the locality or be injurious to the use or enjoyment of other property in the vicinity. If granted, the proposed variance will not be detrimental to the health, safety, or welfare of the general public or of those utilizing the property or nearby properties.*

The proposed variance will not alter the character of the locality or be injurious to the use or enjoyment of other property in the vicinity. The proposed development is replacing an existing structure on site and is designed in a manner to resemble the existing structure while reducing the overall height and size.

Health, safety, and welfare of the general public will not be compromised if this variance is granted. If approved, this new single-family dwelling will provide this area will a quality structure that will not negatively impact the surrounding homes or Lake Harriet.

FINDINGS REQUIRED BY THE MINNEAPOLIS CODE FOR DEVELOPMENT IN THE SHORELAND OVERLAY DISTRICT

Chapter 551.470 Location of Development prohibits development except as authorized by variance. Development authorized by variance shall be subject to the following:

1. *Development must currently exist on the steep slope or within 40 feet of the top of a steep slope within 500 feet of the proposed development.*

Single-family dwellings currently exist within 500 feet of the proposed development location.

2. *The foundation and underlying material shall be adequate for the slope condition and soil type.*

The soil, upon which the dwelling is proposed, is adequate in supporting a new dwelling. The soil boring report regarding the *Design and Construction Considerations* notes, “the geological materials present... generally appear suitable for support of the proposed new single-family house using conventional spread footings and grade supported slabs” (page 8). As a part of the application for the construction of the new home, the applicant is required to get Construction Code Services approval for the construction and a major aspect of this is to ensure the soil is sufficient in supporting this development.

3. *The development shall present no danger of falling rock, mud, uprooted trees or other materials.*

The proposed development will utilize much of the existing footprint which limits the amount of disturbed soil. Based on the Building Code analysis of the soil and grade on site, Construction Code Services may require a shoring system in locations during construction. If the plans are approved and implemented in the manner required by the Building Code and in accordance with the plans, the development should present no danger of any falling rock, mud, uprooted trees or other material.

4. *The view of the developed slope from the protected water shall be consistent with the natural appearance of the slope, with any historic areas, and with the surrounding physical contexts.*

Following development, the view of the new development from Lake Harriet will resemble the existing conditions. The proposed development is 3.5 feet shorter at the peak than the existing structure. In addition, there are two Hackberry (24” and 21”) located between the proposed development and Lake Harriet. These trees have been proposed on the site plan and are included in the conditions of approval for this application. There is an existing tree on the western side of the boulevard that also blocks the view as well as several mature trees and vegetation along the Lake Harriet.

In addition, the Zoning Board of Adjustment shall consider, but not limited to the following factors when considering conditional use permit or variance requests within the SH Shoreland Overlay District:

1. *The prevention of soil erosion or other possible pollution of public waters, both during and after construction.*

In utilizing much of the existing footprint for the construction of the new development, the amount of disturbed soil is being minimized. In addition, the applicants have provided a demolition plan that features both silt fencing and erosion logs between the construction site and the protected water. The applicant has proposed terraced retaining walls that will reduce/eliminate erosion once the structure is complete.

2. *Limiting the visibility of structures and other development from protected waters.*

Following development, there will be minimal visibility of the structure from Lake Harriet. Two large existing Hackberry trees are located in the front yard of the site. In addition, there is a boulevard tree on the west side of West Lake Harriet Parkway. Along the banks of Lake Harriet there are several mature trees and vegetation as well that will greatly minimize the visibility of this structure. The height of the proposed structure is 3.5 feet shorter than the existing structure even further minimizing the visibility from Lake Harriet.

3. *The suitability of the protected water to safely accommodate the types, uses and numbers of watercraft that the development may generate.*

There is no watercraft associated with the proposed development.

The Department of Community Planning and Economic Development has analyzed the application for a variance of Chapter 525, Article IX Variances, specifically Section 525.520(4) "Unless otherwise controlled by conditional use permit, to vary the height requirements for any structure," based on the following findings:

1. *Practical difficulties exist in complying with the ordinance because of circumstances unique to the property. The unique circumstances were not created by persons presently having an interest in the property and are not based on economic considerations alone.*

The circumstance upon which the variance is requested is unique to the parcel of land. The steep slope combined with the original platting off of West Lake Harriet Parkway makes complying with the height requirements very difficult. Due to the platting, the height of the structure is calculated at an elevation 10 feet in front of the building wall. The slope from rear to front essentially creates a walk-out basement look facing the front. The applicant did not create this grade change nor did they create the original platting off of West Lake Harriet Parkway.

2. *The property owner or authorized applicant proposes to use the property in a reasonable manner that will be in keeping with the spirit and intent of the ordinance and the comprehensive plan.*

The applicant is proposing to use the property in a reasonable matter. This is a residential area and the proposed use is a single-family dwelling; this use is consistent with the character of the area and the future land-use map demonstrated in the Comprehensive Plan.

The intent of the height regulation is to create compatible built environments and provides protection from development towering over surrounding dwellings. As the height demonstration attached shows, many of the structures in this area exceed the maximum permitted height. When looking at the surrounding properties heights', it is clear that the proposed height is keeping with the spirit and intent of the ordinance.

- 3. The proposed variance will not alter the essential character of the locality or be injurious to the use or enjoyment of other property in the vicinity. If granted, the proposed variance will not be detrimental to the health, safety, or welfare of the general public or of those utilizing the property or nearby properties.*

The proposed variance will not alter the character of the locality or be injurious to the use or enjoyment of other property in the vicinity. The steep slope affects all of the structures on these through lots in a similar manner in that the rear of the home is buried into the hillside and the front of the home has the basement exposed. The exposed basement may not be considered an essential characteristic of this area but on parcels with the steep slope this design and look of the home is very common.

The structure to the south measures nearly 42 feet to the peak. The structure to the north measures over 34.5 feet to the peak and this parcel sits 6 feet higher in grade than the subject parcel. The structure two parcels to the south measures at 48 feet from grade to peak. The existing structure on site measures 40.6 feet in height. The proposed structure is 37 feet to the peak. The proposed height will blend with the built environment and not alter the essential character of the area.

Health, safety, and welfare of the general public will not be compromised if this variance is granted. If approved, this new single-family dwelling will provide this area will a quality structure that will not negatively impact the surrounding homes or Lake Harriet.

FINDINGS REQUIRED BY THE MINNEAPOLIS CODE FOR DEVELOPMENT IN THE SHORELAND OVERLAY DISTRICT

Chapter 551.470 Location of Development prohibits development except as authorized by variance. Development authorized by variance shall be subject to the following:

- 1. Development must currently exist on the steep slope or within 40 feet of the top of a steep slope within 500 feet of the proposed development.*

Single-family dwellings currently exist within 500 feet of the proposed development location.

- 2. The foundation and underlying material shall be adequate for the slope condition and soil type.*

The soil, upon which the dwelling is proposed, is adequate in supporting a new dwelling. The soil boring report regarding the *Design and Construction Considerations* notes, “the geological materials present... generally appear suitable for support of the proposed new single-family house using conventional spread footings and grade supported slabs” (page 8). As a part of the application for the construction of the new home, the applicant is required to get Construction Code Services approval for the construction and a major aspect of this is to ensure the soil is sufficient in supporting this development.

- 3. The development shall present no danger of falling rock, mud, uprooted trees or other materials.*

The proposed development will utilize much of the existing footprint which limits the amount of disturbed soil. Based on the Building Code analysis of the soil and grade on site, Construction Code Services may require a shoring system in locations during construction. If the plans are approved and implemented in the manner required by the Building Code and in accordance with the plans, the development should present no danger of any falling rock, mud, uprooted trees or other material.

- 4. The view of the developed slope from the protected water shall be consistent with the natural appearance of the slope, with any historic areas, and with the surrounding physical contexts.*

Following development, the view of the new development from Lake Harriet will resemble the existing conditions. The proposed development is 3.5 feet shorter at the peak than the existing structure. In addition, there are two Hackberry (24" and 21") located between the proposed development and Lake Harriet. These trees have been proposed on the site plan and are included in the conditions of approval for this application. There is an existing tree on the western side of the boulevard that also blocks the view as well as several mature trees and vegetation along the Lake Harriet.

In addition, the Zoning Board of Adjustment shall consider, but not limited to the following factors when considering conditional use permit or variance requests within the SH Shoreland Overlay District:

1. The prevention of soil erosion or other possible pollution of public waters, both during and after construction.

In utilizing much of the existing footprint for the construction of the new development, the amount of disturbed soil is being minimized. In addition, the applicants have provided a demolition plan that features both silt fencing and erosion logs between the construction site and the protected water. The applicant has proposed terraced retaining walls that will reduce/eliminate erosion once the structure is complete.

2. Limiting the visibility of structures and other development from protected waters.

Following development, there will be minimal visibility of the structure from Lake Harriet. Two large existing Hackberry trees are located in the front yard of the site. In addition, there is a boulevard tree on the west side of West Lake Harriet Parkway. Along the banks of Lake Harriet there are several mature trees and vegetation as well that will greatly minimize the visibility of this structure. The height of the proposed structure is 3.5 feet shorter than the existing structure even further minimizing the visibility from Lake Harriet.

3. The suitability of the protected water to safely accommodate the types, uses and numbers of watercraft that the development may generate.

There is no watercraft associated with the proposed development.

RECOMMENDATIONS

The Department of Community Planning and Economic Development recommends that the Zoning Board of Adjustment adopt staff findings for the application by Brian and Nancy Siska for the property located at 4628 West Lake Harriet Parkway:

A. Variance to permit development in the SH Shoreland Overlay District on a steep slope or bluff, or within forty (40) feet of the top of a steep slope or bluff for the construction of a new single-family dwelling.

Recommended motion: **Approve** the application, subject to the following conditions:

1. Approval of the final site, elevation and floor plans by the Department of Community Planning and Economic Development.
2. The existing 24" and 21" Hackberry trees located in the front yard along West Lake Harriet Parkway shall be protected during construction and shall remain.
3. All site improvements shall be completed by July 14, 2018, unless extended by the Zoning Administrator, or the permit may be revoked for non-compliance.

B. Variance to increase the maximum permitted height of a new single-family dwelling from 33' at the peak to 37' at the peak and 28' at the midpoint to 28.5' at the midpoint for the construction of a new single-family dwelling.

Recommended motion: **Approve** the application, subject to the following conditions:

1. Approval of the final site, elevation and floor plans by the Department of Community Planning and Economic Development.
2. All site improvements shall be completed by July 14, 2018, unless extended by the Zoning Administrator, or the permit may be revoked for non-compliance.

ATTACHMENTS

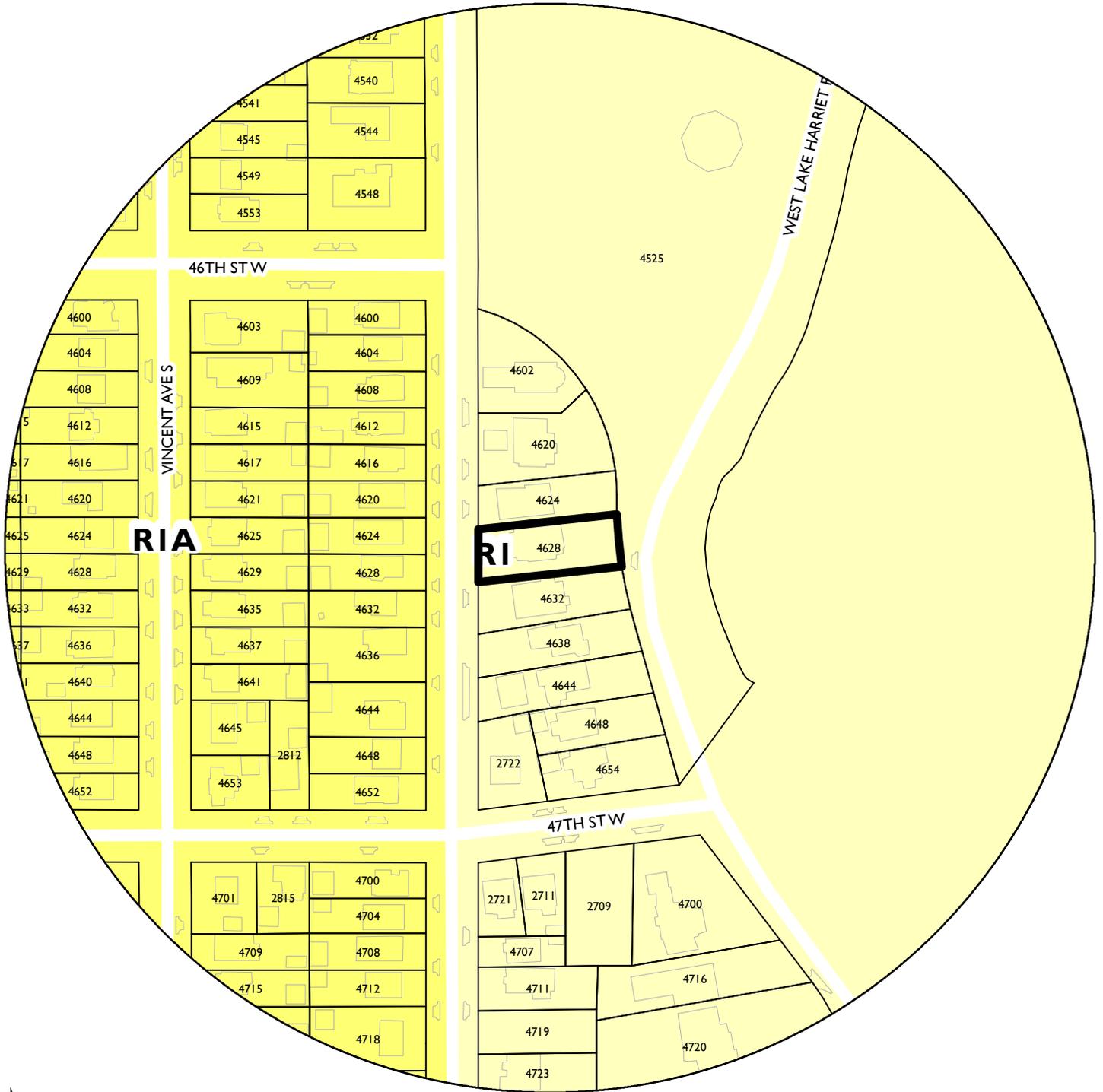
1. Zoning map
2. Written description and findings submitted by applicant
3. Survey
4. Site plan
5. Demolition plan
6. Height demonstration of surrounding structures
7. Streetscape renderings
8. Floor plans
9. Building Elevations
10. Geotechnical report
11. Photos
12. Context photos of area
13. Correspondence

Brian and Nancy Siska

13th

NAME OF APPLICANT

WARD



PROPERTY ADDRESS

4628 West Lake Harriet Parkway

FILE NUMBER

BZZ-7772

June 21, 2016

4628 West Lake Harriet Parkway Statement of Proposed Use and Description of Project

Brian and Nancy Siska, the owners of 4628 West Lake Harriet Parkway, wish to build a new single family home on the site of the existing single family residence at that address. The property is in the R1 Single Family District and the SH Shoreland Overlay District. The new home was carefully designed to respect the scale and character of existing homes nearby. Its steeply pitched gabled roof emulates the rooflines of the existing 1913 residence it is intended to replace. Its wood shingled exterior and details harmonize with the massing and character of other wood framed houses of the era in the area.

The property is a "through lot". It faces public streets on the east and west sides, West Lake Harriet Parkway and Upton Avenue South respectively. Building setbacks on both of those sides are determined as front yard setbacks, by lines connecting points of the two adjacent residences that are nearest the public streets on each side.

The property slopes steeply from the northwest to the southeast. The physical characteristics of the site are unique and challenging. For this reason we are seeking a variance for the height of the building, and a variance for building on a steep slope.

Variance #1, Height Variance, Findings 1-3

- 1. Practical difficulties exist in complying with the ordinance because of circumstances unique to the property. The unique circumstances were not created by persons presently having an interest in the property and are not based on economic considerations alone.**

The 60' x 165' lot at 4628 West Lake Harriet Parkway drops 19.37 feet from the northwest corner of the lot to the south east corner of the lot, and 13.4 feet from the northwest corner to the southeast corner of the buildable area defined by the building setbacks. The buildable portion of the property sits 3-5 feet lower than the adjacent sidewalk on the Upton side, which slopes from north to south.

The proposed new residence is a 2 ½ story home, which is intended to replace the 3 ½ story home which presently exists at the site. The new residence has been conservatively designed in terms of height. The main level has been dropped to the elevation of existing grade on the west side (Upton Avenue). Floor framing throughout is 12" deep, the lower level ceiling height is 8'0" and the main level ceiling height is 9'0". Ceiling heights on the upper level, which is contained in the volume of the roof, vary from 6' 10" to 9' 0" (see building sections and elevations).

Visually, the house is further reduced in height from the Upton Avenue side due to the fact that the buildable area is significantly lower (3-5 feet) than the adjacent sidewalk and street, which slope from north to south.

Following is data that contrasts the size and height of the existing residence (per survey and City of Minneapolis) with that of the proposed house:

	Existing residence	Proposed residence
Height to peak of ridge (East elevation facing Lake Harriet Pkwy.)	40' 7"	37' 0"
Height to peak of ridge (West elevation facing Upton Ave.)	32' 1"	28' 6"
Height to midpoint of gable roof (East elevation facing Lake Harriet Pkwy.)	NA	27' 6"
Height to midpoint of gable roof (West elevation facing Upton Ave.)	NA	19' 0"
Lower level footprint size	1922 sq. ft.	1889 sq. ft.
Total square footage size (Includes lower level garage)	6108 sq. ft.	5546 sq. ft.

The height of the proposed house is compatible with heights of existing homes facing Upton Avenue, which range from 23.4 feet to 33.5'. It is also compatible with heights of the homes facing West Lake Harriet Parkway, which range from 34.6' to 48' in height. (See additional survey data re heights of nearby properties.)

The site is unique and challenging. It presents practical difficulties in complying with the ordinance due to the steep slope of the entire site, and that within the buildable area. The unique circumstances were not created by persons presently having an interest in the property, and are not based on economic considerations alone.

- 2. The property owner or authorized applicant proposes to use the property in a reasonable manner that will be in keeping with the spirit of the ordinance and comprehensive plan.**

The proposed new single family residence will be a retirement home for the owners. This use is compatible with residential use in the R1 zoning district and the SH Shoreland Overlay District.

- 3. The proposed variance will not alter the essential character of the locality or be injurious to the use or enjoyment of other property in the vicinity. If granted, the proposed variance will not be detrimental to the health, safety, or welfare of the general public or of those utilizing the property or nearby properties.**

The proposed new house was inspired by the early 20th century era homes which predominate in Linden Hills. It's gabled roof forms, wood frame construction, exterior material expression and details were carefully designed to harmonize with the character of the existing neighborhood and block. The new home will be shorter in height than the existing and less bulky in massing than the existing house, improving light and views for neighboring properties. The 3 stall garage is tucked into the lower level, reducing lot coverage and creating safety for drivers and pedestrians by allowing exit from the lot while driving in a forward direction.

The existing residence at 4628 West Lake Harriet Parkway was built in 1913, and has been unoccupied for over three years, with water and utilities turned off by the previous owner. The house, the exterior walkways, stairs, and retaining walls on the property are in increasingly deteriorating condition. The proposed home will enhance the existing character of the general area and the specific block. Replacement and/or restoration of exterior site aspects will be advantageous to the health, safety and welfare of its occupants and that of the general public.

Variance #2, Steep Slope Variance, SH Shoreland Overlay District, Findings 1-3

- 1. Practical difficulties exist in complying with the ordinance because of circumstances unique to the property. The unique circumstances were not created by persons presently having an interest in the property and are not based on economic considerations alone.**

As previously described, the lot at 4628 West Lake Harriet Parkway slopes from the northwest to the southeast. The 60' x 165' lot drops 19.37 feet from its northwest corner to its south east corner , and 13.4 feet from the northwest corner to the southeast corner of the buildable area defined by the building setbacks. In addition, the buildable portion of the property sits 3-5 feet lower than the adjacent sidewalk on the Upton side, which slopes from north to south.

An area of steep slope has been identified by the city of Minneapolis Zoning staff. It runs diagonally across the site from the high point at the northwest corner of the lot.

In that area there is a steep slope of at least 18% measured over a distance of at least 50 feet.

The steep slope which exists on this lot is a practical difficulty. Development on a steep slope or within 40 feet of a steep slope is not allowed in the SH Shoreland Overlay District without a variance. Much of the buildable area lies within 40 feet of the steep slope. The unique circumstances of this lot were not created by the current owners and are not created by economic considerations alone.

- 2. The property owner or authorized applicant proposes to use the property in a reasonable manner that will be in keeping with the spirit of the ordinance and comprehensive plan.**

The proposed house is intended as a retirement home for single family use, which is compatible with the use of surrounding properties on that block. The house is approximately 172 feet from the shoreline of Lake Harriet, and is screened from view by layers of mature trees.

- 3. The proposed variance will not alter the essential character of the locality or be injurious to the use or enjoyment of other property in the vicinity. If granted, the proposed variance will not be detrimental to the health, safety, or welfare of the general public or of those utilizing the property or nearby properties.**

Granting this variance will not alter the essential character of the locality. A new single family dwelling in an area that is predominantly single family homes is consistent with the character of the area. The proposed house meets all setback requirements and is similar in height to other homes on the block.

Additional Standards for Variances within the SH Shoreland Overlay District (#1)

- 1. Development must currently exist on the steep slope or within forty (40) feet of the top of a steep slope within five hundred (500) feet of the proposed development.**

If granted a variance, the proposed new home will replace an existing home that has been there for over one hundred years. That home is located amidst an established neighborhood of other single family homes. Several of those homes exist within forty feet of the steep slope identified on this property, and many of the homes exist within five hundred feet of the proposed new home.

- 2. The foundation and underlying material shall be adequate for the slope condition and soil type.**

The foundation of the proposed residence will be located primarily over the footprint of the existing residence on the site. Soil borings were completed in two (2) other locations indicated on the site plan. The soils report indicates sandy soil suitable for structural bearing capacity. (See attached). The footings, foundation, and structural system of the house will be designed by structural engineer Jerry Palms, PE, of ArchiStructures, in accordance with Minnesota State Building Code, and will include information regarding soil quality and soil preparation.

3. The development shall present no danger of falling rock, mud, uprooted trees or other materials.

An erosion control plan has been previously submitted in regards to the demolition of the existing house on the site. It will be strictly followed during demolition and construction. Turf, shrubs, and plantings will secure permeable areas and should present no risk of falling rock, mud, uprooted trees or other materials.

4. The view of the developed slope from the protected water shall be consistent with the natural appearance of the slope, with any historic areas, and with the surrounding physical context.

As viewed from Lake Harriet, the proposed house on the developed site will be screened by layers of mature trees on the property and on the boulevard. The new home is narrower, smaller, and shorter than the existing house it is to replace. It is of similar height and massing to the two adjacent homes, and nearby homes on the block.

Additional standards for development in the SH Shoreland Overlay District(#2)

1. The prevention of soil erosion or other possible pollution of public waters, both during and after construction.

Soil erosion will be prevented during construction by adhering to the City of Minneapolis Standard Erosion and Sediment Control Notes.

2. Limiting the visibility of structures and other development from protected waters.

As above, the proposed new home is narrower, smaller, and shorter than the existing home on the site. It is similar in height, bulk, and massing to the two adjacent homes, and other homes on the block. It is more than 170 feet from the western shoreline of Lake Harriet, and is screened by layers of mature trees.

3. The suitability of the protected water to safely accommodate the types, uses and numbers of watercraft that the development may generate.

The proposed single family home will not create any additional personal watercraft use than what is currently permitted by the existing ordinance.

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PROFESSIONAL LAND SURVEYORS

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www.kempersurveys.com

4628 WEST LAKE HARRIET PARKWAY

CITY OF MINNEAPOLIS, HENNEPIN COUNTY, MINNESOTA

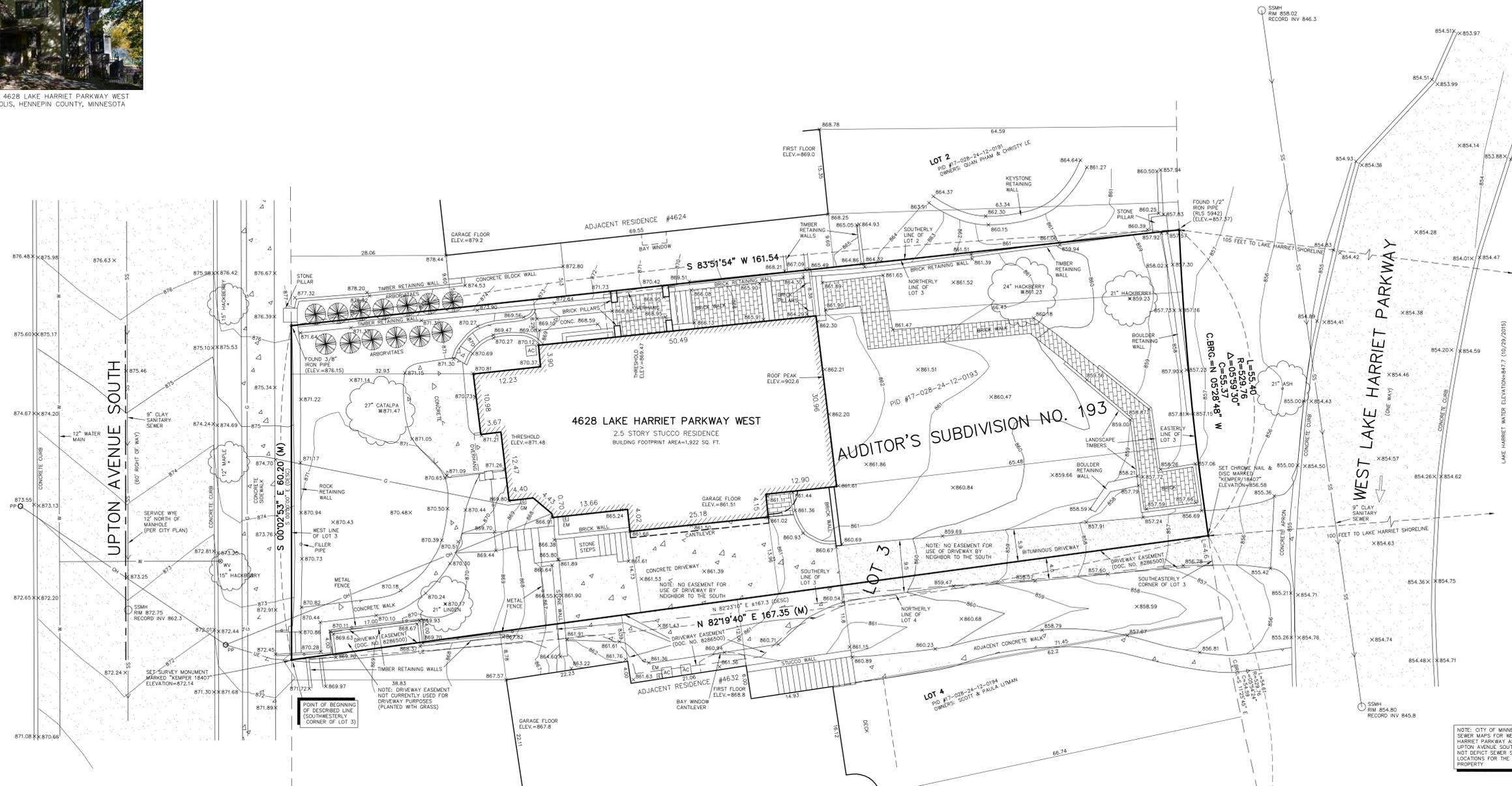


EASTERLY SIDE OF 4628 LAKE HARRIET PARKWAY WEST
CITY OF MINNEAPOLIS, HENNEPIN COUNTY, MINNESOTA



WESTERLY SIDE OF 4628 LAKE HARRIET PARKWAY WEST
CITY OF MINNEAPOLIS, HENNEPIN COUNTY, MINNESOTA

1 INCH EQUALS 10 FEET
BASIS FOR BEARINGS:
HENNEPIN COUNTY
COORDINATE SYSTEM
(NAD 83, 1996)
BASIS FOR ELEVATION:
NAVD 88
(VIA REAL TIME GPS
MEASUREMENTS UTILIZING
MINNESOTA DEPARTMENT
OF TRANSPORTATION
VRS NETWORK)
CONTOUR INTERVAL=1 FOOT



LEGAL DESCRIPTION
WARRANTY DEED DOC. NO. 9195597
That part of Lot 3, Auditor's Subdivision No. 193, Hennepin County, Minnesota, lying northerly of the following described line: Beginning at the Southerly corner of said Lot 3, and assuming the West line of said Lot 3 bears North 00 degrees 00 minutes 00 seconds East; thence North 82 degrees 23 minutes 10 seconds East 167.3 feet, more or less, to a point on the Easterly line of said Lot 3, distant 4.6 feet northerly of the Southeasterly corner thereof, measured along said easterly line.

SUBJECT PROPERTY =
9,439 SQ. FT. OR
0.2167 ACRES

- LEGEND**
- 860— EXISTING CONTOUR LINE
 - X870.43 EXISTING SPOT ELEVATION
 - SSMH ○ SANITARY SEWER MANHOLE
 - PP ○ POWER POLE
 - WV ⊗ WATER VALVE
 - EM □ ELECTRIC METER
 - GM □ GAS METER
 - AC □ AIR CONDITIONER
 - OH — OVERHEAD UTILITY LINES
 - SS — SANITARY SEWER
 - W — WATER MAIN/SERVICE
 - G — GAS MAIN/SERVICE
 - UE — UNDERGROUND ELECTRIC LINES
 - (M) DENOTES DIMENSION MEASURED DURING THE COURSE OF THIS SURVEY
 - (DESC) DENOTES RECORD DIMENSION PER LEGAL DESCRIPTIONS
 - DENOTES SET SURVEY MONUMENT MARKED "KEMPER 18407"

ZONING REQUIREMENTS
ZONED R1 - SINGLE-FAMILY RESIDENTIAL DISTRICT
SUBJECT TO SHORELAND OVERLAY DISTRICT

BUILDING SETBACKS:
FRONT - 25 FEET
(THE REQUIRED FRONT YARD SHALL BE INCREASED WHERE THE ESTABLISHED FRONT YARD OF THE CLOSEST PRINCIPAL BUILDING ORIGINALLY DESIGNED FOR RESIDENTIAL PURPOSES LOCATED ON THE SAME BLOCK FACE ON EITHER SIDE OF THE PROPERTY EXCEEDS THE FRONT YARD REQUIRED BY THE ZONING DISTRICT. IN SUCH CASE, THE REQUIRED FRONT YARD SHALL BE NOT LESS THAN SUCH ESTABLISHED FRONT YARD. PROVIDED THAT WHERE THERE ARE PRINCIPAL BUILDINGS ORIGINALLY DESIGNED FOR RESIDENTIAL PURPOSES ON BOTH SIDES OF THE PROPERTY, THE REQUIRED FRONT YARD SHALL BE NOT LESS THAN THAT ESTABLISHED BY A LINE JOINING THOSE PARTS OF BOTH BUILDINGS NEAREST TO THE FRONT LOT LINE, NOT INCLUDING ANY OBSTRUCTIONS ALLOWED. NOTHING IN THIS PROVISION SHALL AUTHORIZE A FRONT YARD LESS THAN THAT REQUIRED BY THE ZONING DISTRICT)

SIDE - 7 FEET (52-61.99' LOT WIDTH)
REAR - 6 FEET
(AS PER CITY OF MINNEAPOLIS ZONING CODE)

MAXIMUM FLOOR AREA RATIO - 0.5 OR 2,500 SQ. FT. OF GROSS FLOOR AREA, WHICHEVER IS GREATER
MAXIMUM LOT COVERAGE - 45% BY STRUCTURES
MAXIMUM IMPERVIOUS SURFACE COVERAGE - 60%
MAXIMUM HEIGHT - 2.5 STORIES OR 28 FEET, WHICHEVER IS LESS

HARDCOVER SUMMARY
HOUSE FOOTPRINT = 1,922 SQ. FT.
PORTION OF BITUMINOUS DRIVEWAY ON SUBJECT PROPERTY = 391 SQ. FT.
PORTION OF CONCRETE DRIVEWAY ON SUBJECT PROPERTY = 638 SQ. FT.
BRICK WALKS & STEPS = 657 SQ. FT.
CONCRETE WALKS, PATIO & STEPS = 527 SQ. FT.
STONE STEPS = 101 SQ. FT.
TOTAL IMPERVIOUS SURFACE COVERAGE = 4,236 SQ. FT. (44.9% OF PROPERTY AREA)

FLOODPLAIN NOTE:
SUBJECT PROPERTY LIES WITHIN FLOOD ZONE "X" (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP COMMUNITY PANEL NUMBER 27055-0362 E, DATED SEPTEMBER 2, 2004, HENNEPIN COUNTY, MINNESOTA

NOTE: A SURVEY BY SURVEY SPECIALISTS (LS 18890) DATED SEPTEMBER 29, 2003, WHICH IS AN EXHIBIT FOR RECIPROCAL EASEMENT AGREEMENT DOC. NO. 8286500, WAS USED AS A REFERENCE FOR THIS SURVEY

PREPARED FOR:
BRIAN SISK
560 KOKESH FARM ROAD
ORONO, MINNESOTA 55359
952-221-4665

ARCHITECT:
MICHAELA MAHADY, AIA, CID
SALA ARCHITECTS, INC.
904 SOUTH 4TH STREET
STILLWATER, MINNESOTA 55082
651-351-0361
FAX 651-351-7327
mmahady@salaarc.com

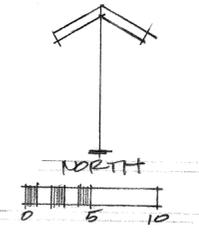
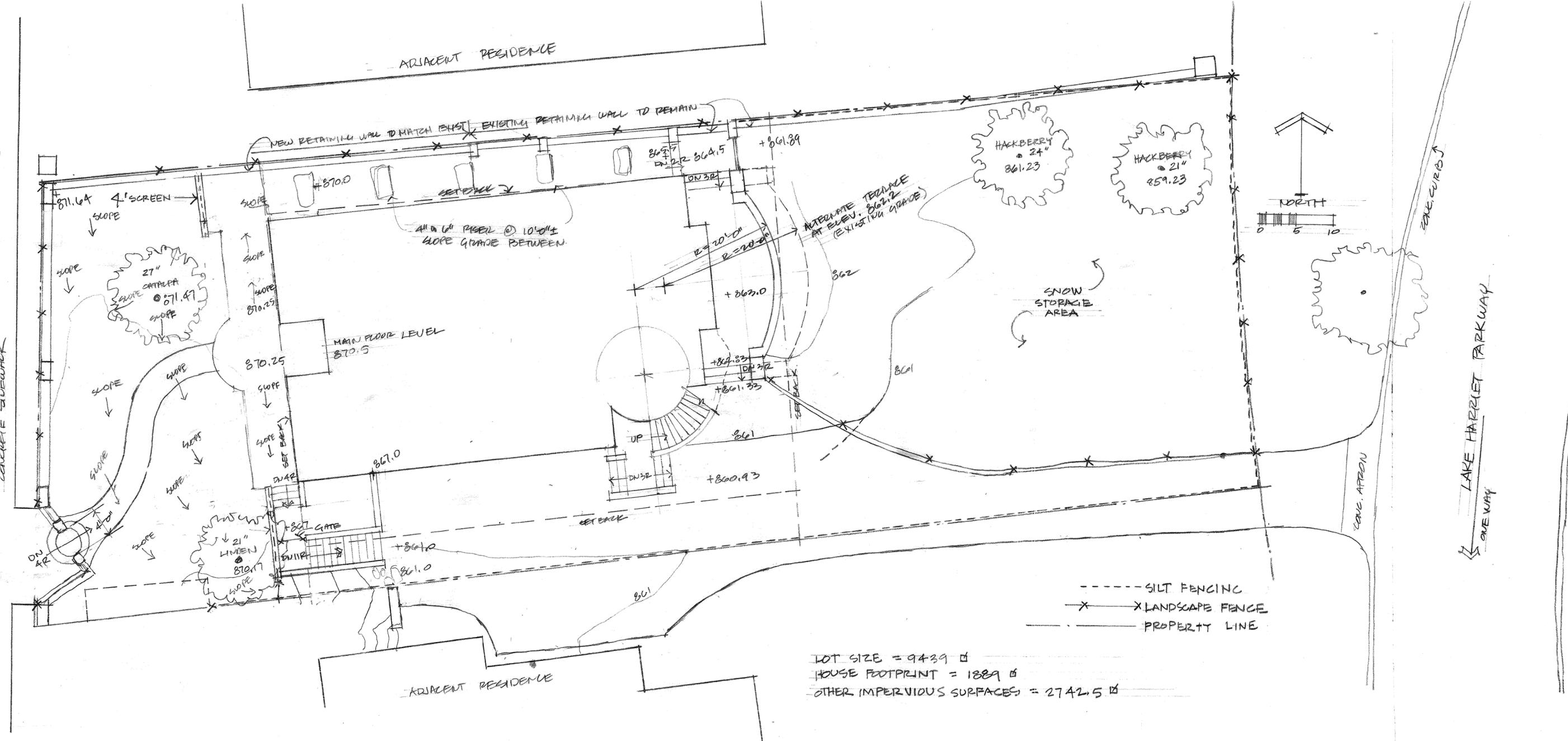
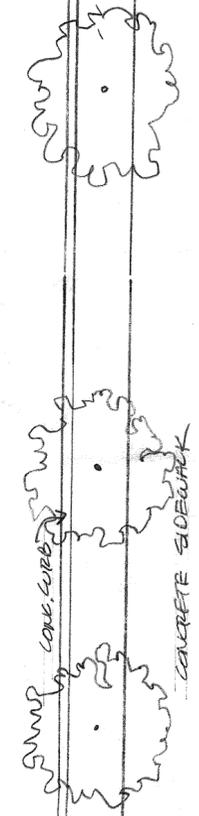


CERTIFICATION
I HEREBY CERTIFY THAT THIS SURVEY, PLAN, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A FULLY LICENSED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.
Mark D. Kemper
MARK D. KEMPER, PLS 18407
DATED THIS 22ND DAY OF OCTOBER, 2015

CERTIFICATE OF SURVEY

15263 (15263.DWG) D.B. TODD HOLEN

← OPTON AVENUE SOUTH



← LAKE HARRIET PARKWAY ONE WAY

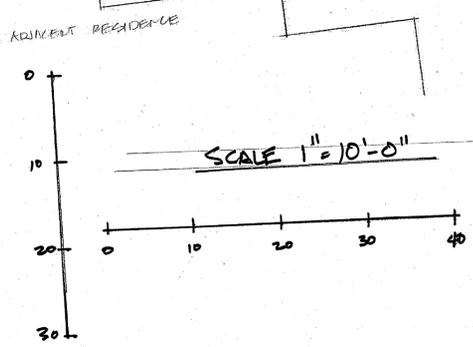
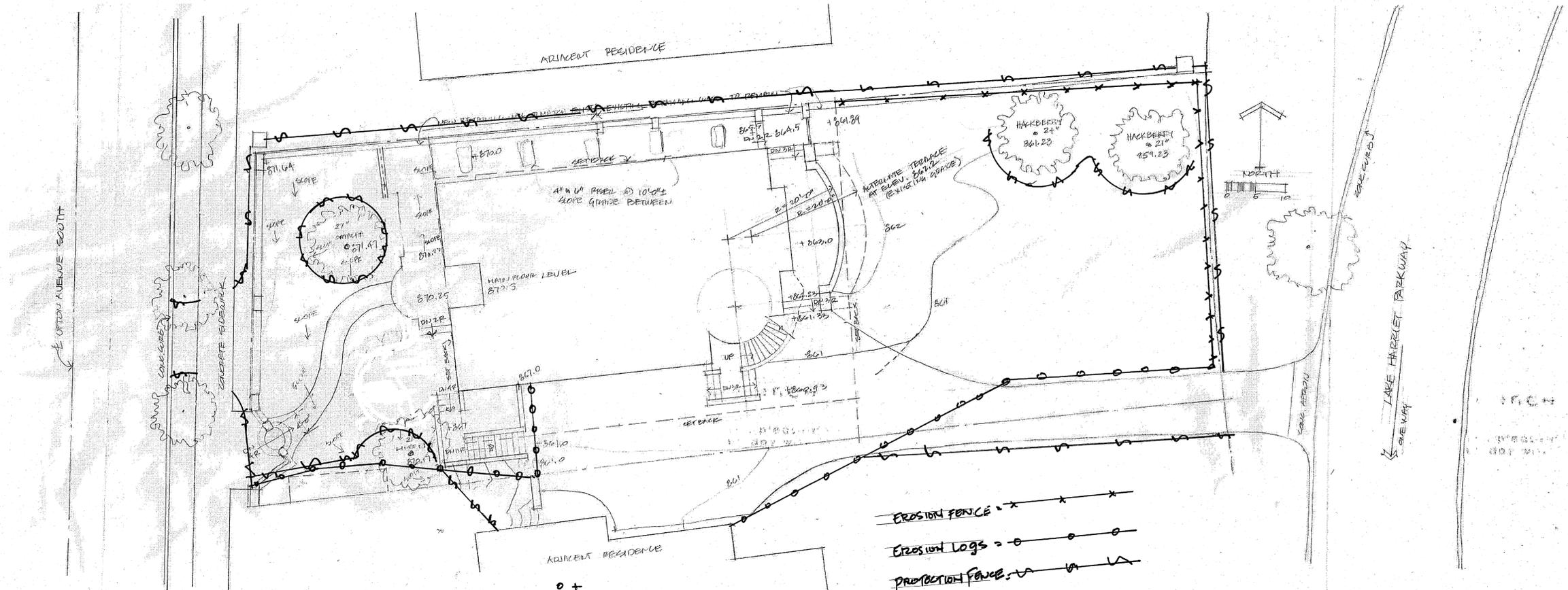
ADJACENT RESIDENCE

ADJACENT RESIDENCE

- SILT FENCING
- X- LANDSCAPE FENCE
- _____ PROPERTY LINE

LOT SIZE = 9439 sq ft
 HOUSE FOOTPRINT = 1389 sq ft
 OTHER IMPERVIOUS SURFACES = 2742.5 sq ft

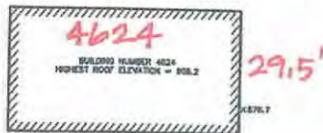
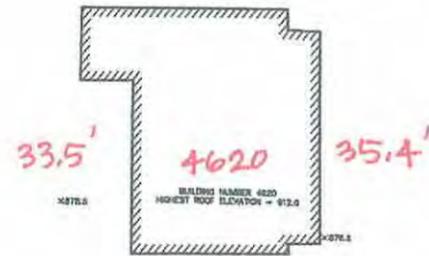
PRELIMINARY SITE DIAGRAM



- EROSION FENCE = - x - x - x -
- EROSION LOGS = - o - o - o -
- PROTECTION FENCE = - v - v - v -

EROSION & PROTECTION FENCE.
 4628 W. LAKE HARRIET PARKWAY
 BOYER BUILDING CORPORATION, MN LIC. SC002988
 952-475-2097

1" = 10'



SURVEY FOR: **BRIAN SISKA**

PROPERTY ADDRESS: 4628 West Lake Harriet Parkway, City of Minneapolis, Minnesota.

LEGAL DESCRIPTION:

Per warranty deed, document Number 9195597.

That part of Lot 3, Auditor's Subdivision No. 193, Hennepin County, Minnesota, lying northerly of the following described line: Beginning at the Southerly corner of said Lot 3, and assuming the West line of said Lot 3 bears North 00 degrees 00 minutes 00 seconds East; thence North 82 degrees 23 minutes 10 seconds East 167.3 feet, more or less, to a point on the Easterly line of said Lot 3, distant 4.6 feet northerly of the Southeastery corner thereof, measured along said easterly line.

CERTIFICATION:

I hereby certify that this map was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

Dated: June 6, 2016

Anderson Engineering of Minnesota, LLC

by: *Jack Bolke*
 Jack Bolke
 Minnesota License No. 20261

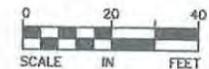
NOTES:

1. The horizontal datum and bearings are based on the Hennepin County Coordinate System NAD83 (1996).
2. The area of the property described hereon is 9,439 square feet or 0.2167 acres.
3. No title work was provided for the preparation of this survey to verify the legal description or the existence of any easements or encumbrances.
4. Building setbacks per City of Minneapolis zoning code:

Front - 25 feet
 (The required front yard shall be increased where the established front yard of the closest principal building originally designed for residential purposes located on the same block face on either side of the property exceeds the front yard required by the zoning district. In such case, the required front yard shall be not less than such established front yard, provided that where there are principal buildings originally designed for residential purposes on both sides of the property, the required front yard shall be not less than that established by a line joining those parts of both buildings nearest to the front lot line, not including any obstructions allowed. Nothing in this provision shall authorize a front yard less than that required by the zoning district.)

Side - 7 feet

Rear - 6 Feet



● DENOTES FOUND IRON MONUMENT



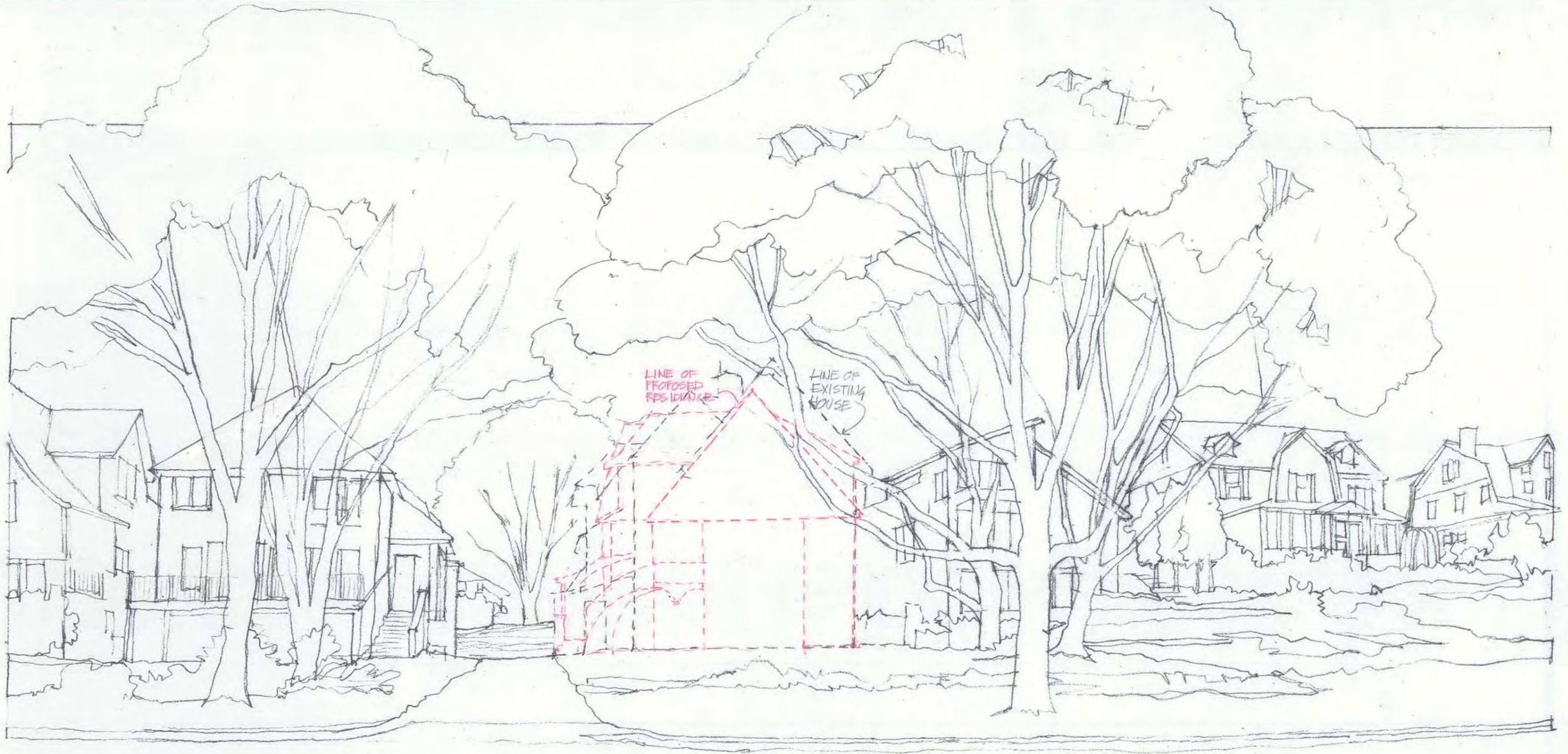
Anderson Engineering of Minnesota, LLC
 13605 1st Avenue North
 Suite 100
 Plymouth, MN 55441
 763-412-4000 (o) 763-412-4090 (f)
 www.ae-mn.com



W. LAKE HARRIET PARKWAY STREETScape, MINNEAPOLIS, MINNESOTA
PROPOSED RESIDENCE - 4628 W. LAKE HARRIET PARKWAY

JUNE 9, 2016



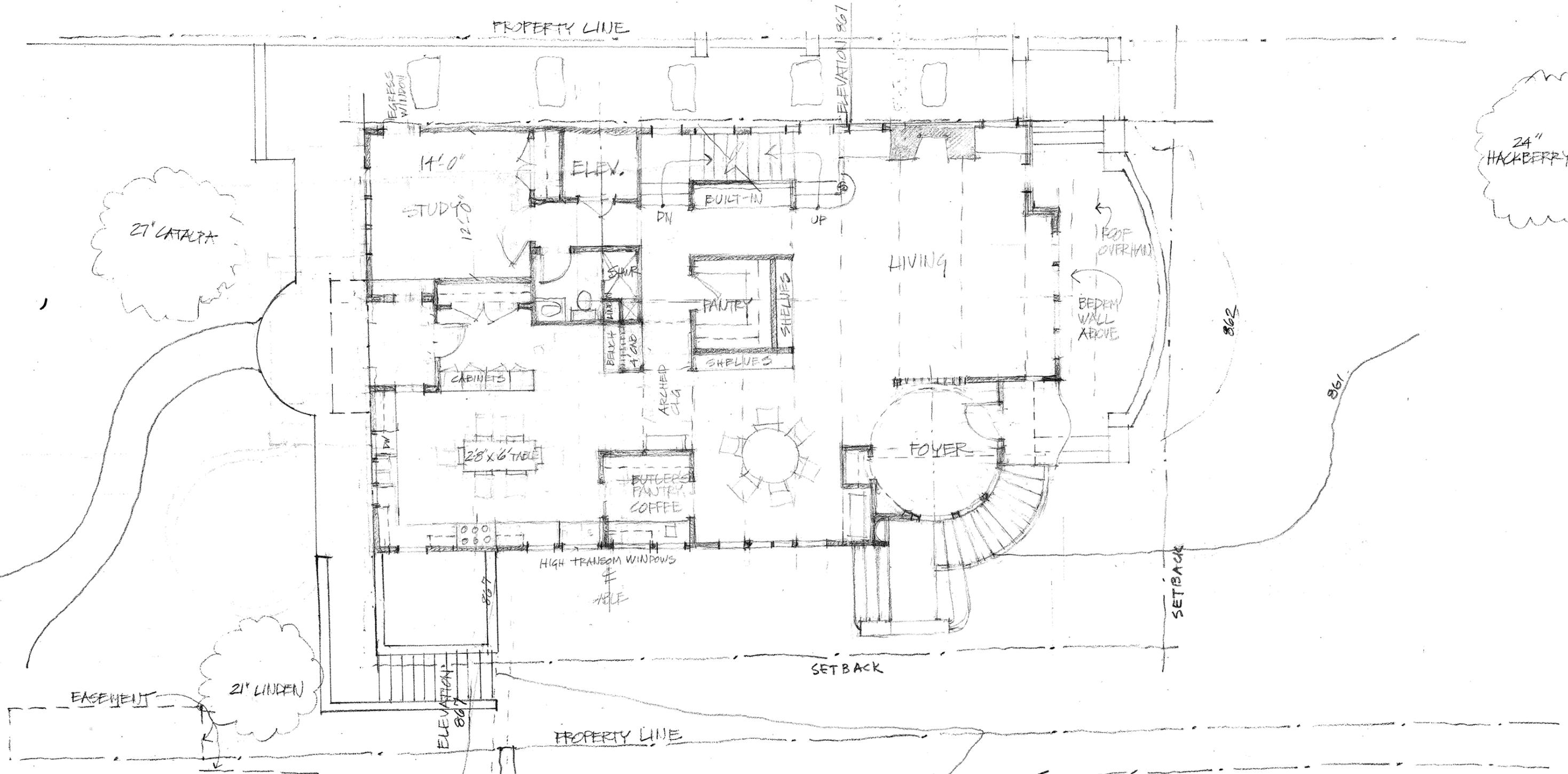


W. LAKE HARRIET PARKWAY STREETScape, MINNEAPOLIS, MINNESOTA

APRIL 22, 2016

SA
LA

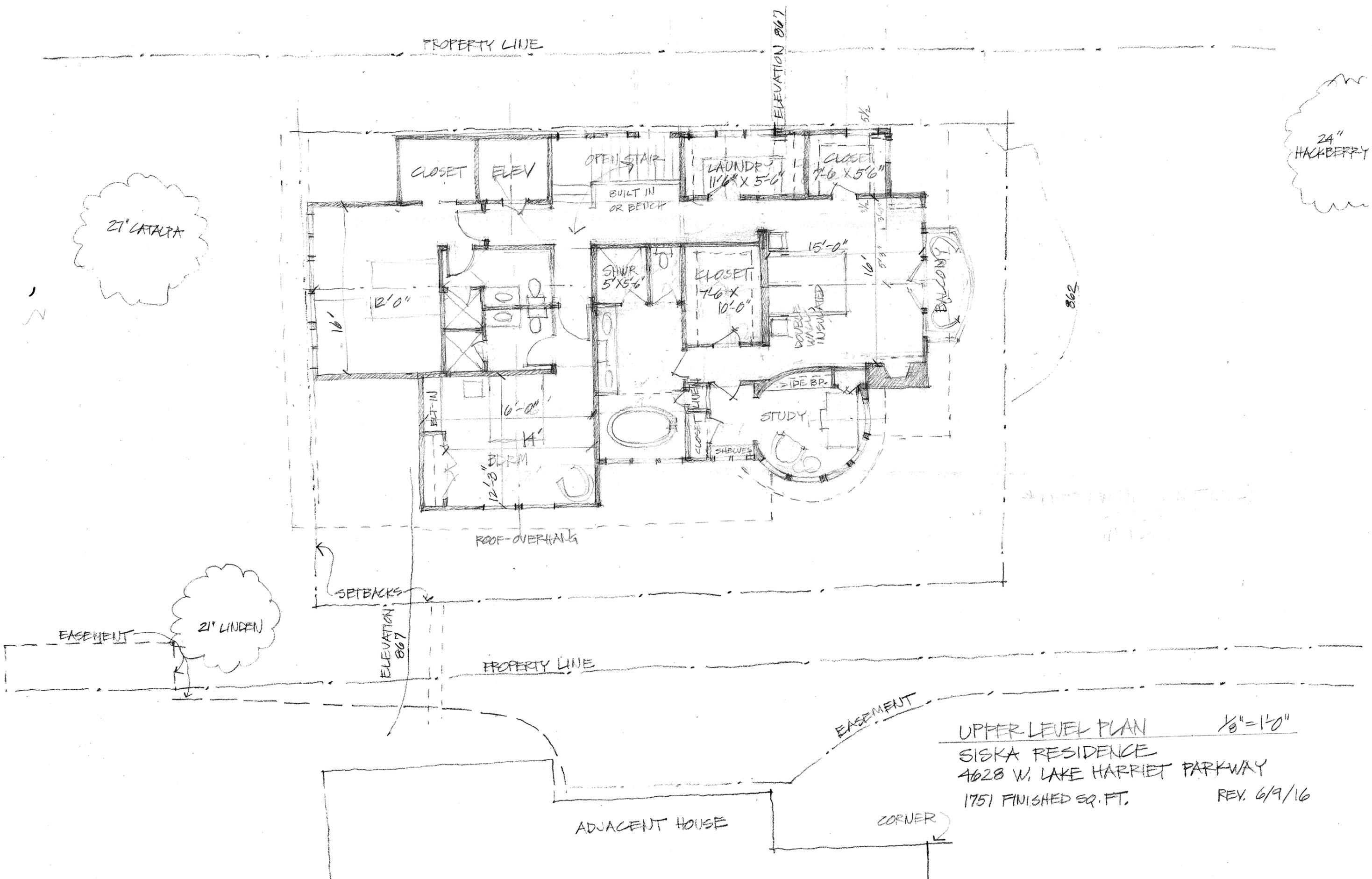
2



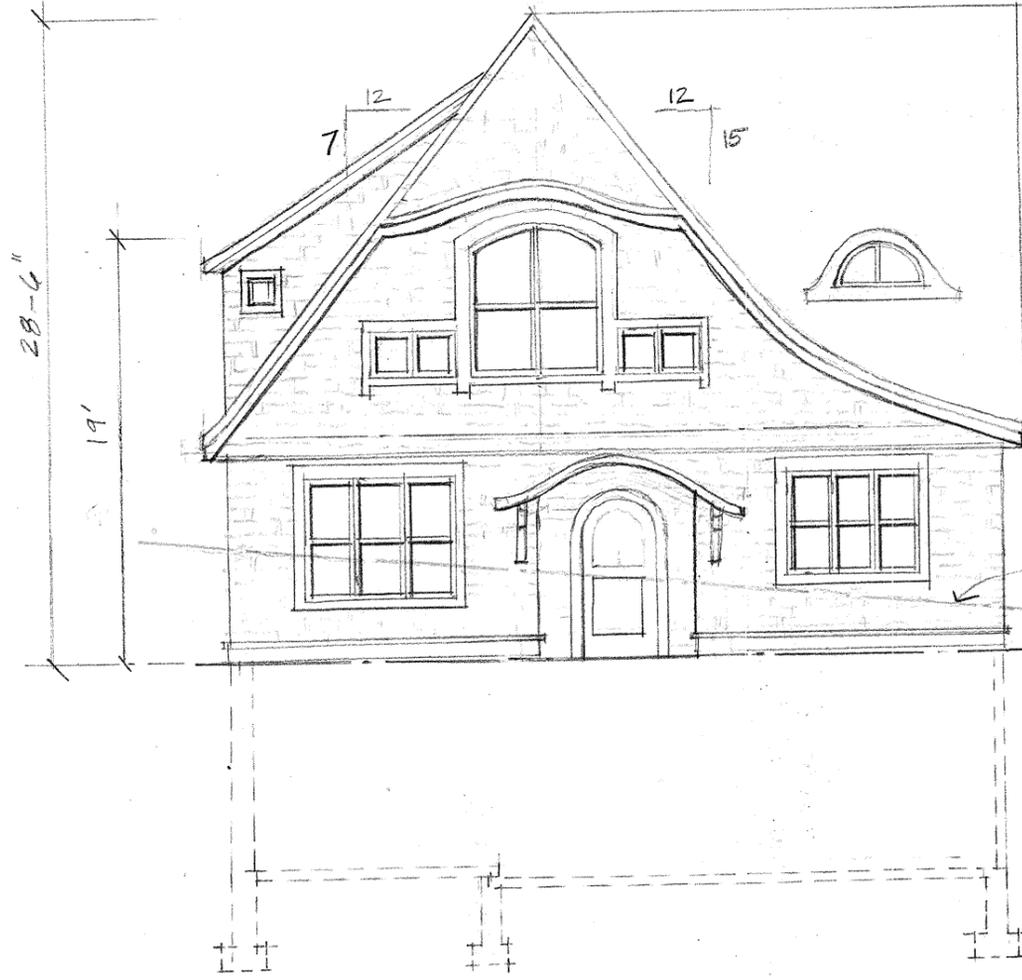
MAIN LEVEL PLAN
 SIKKA RESIDENCE
 4628 W. LAKE HARRIET PARKWAY
 19065 FINISHED ✓
 MAY 3, 16
 REV. MAY 27, 16
 REV. 6.9.16

1/8" = 1'-0"

ADJACENT HOUSE



UPPER LEVEL PLAN $\frac{1}{8}'' = 1'-0''$
 SISKA RESIDENCE
 4628 W. LAKE HARRIET PARKWAY
 1751 FINISHED SQ. FT. REV. 6/9/16



WEST ELEVATION
(UPTON AVENUE)

TYPICAL EXTERIOR MATERIALS:

- ROOF: CEDAR SHAKES
- FASCIA: CEDAR, PAINTED
- #TRIM
- WALLS: SAWN CEDAR SHINGLES,
HAND APPLIED
- WINDOWS: GLAD DOUBLEHUNG,
MARVIN OR SIMILAR
- STONE: STONE VENEER @ BASE,
TO BE SELECTED
- PORCH: CURVED COPPER
ROOF
OVER OPEN PORCH
@ UPTON

380.5 UPPER LEVEL

SLOPED GRADE @ ADJACENT SIDEWALK
870.5 MAIN LEVEL F.F.
(@ EXISTING GRADE)



EAST ELEVATION
(W. LAKE HARRIET PARKWAY)

SISKA RESIDENCE
4628 LAKE HARRIET PARKWAY WEST
MPLS. MN.

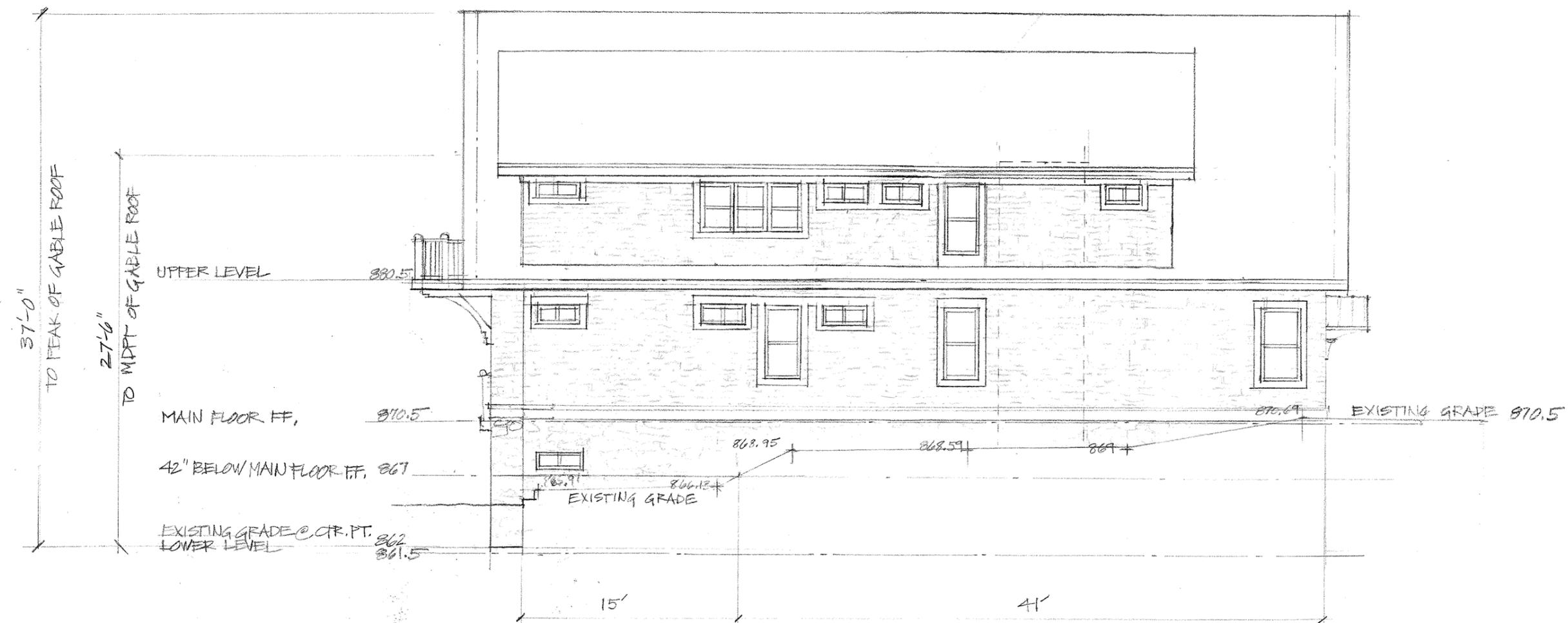
1/8" = 1'-0"
APRIL 20, 2016
REV. MAY 12, 2016
" MAY 27, 2016
" JUNE 9, 2016



SISKA RESIDENCE - SOUTH ELEVATION

1/8" = 1'-0"

MAY 11, 2016
REV. JUNE 9, 2016



SISKA RESIDENCE - NORTH ELEVATION (REVISED)

$\frac{1}{8}'' = 1'-0''$
 MAY 12, 2016
 REV. MAY 27, 2016
 " JUNE 9, 2016

Geotechnical Evaluation Report

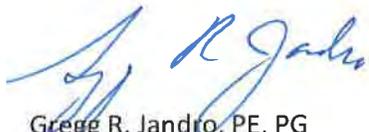
Proposed Single-Family House
4628 Lake Harriet Parkway
Minneapolis, Minnesota

Prepared for

Boyer Building Corporation

Professional Certification:

I hereby certify that this plan, specification, 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.



Gregg R. Jandro, PE, PG
Vice President – Principal Engineer
License Number: 18221
June 8, 2016



Project B1604686

Braun Intertec Corporation

June 8, 2016

Project B1604686

Mr. John Boyer
Boyer Building Corporation
3435 County Road 101
Minnetonka, MN 55345

Re: Geotechnical Evaluation Report
Proposed Single-Family House
4628 Lake Harriet Parkway
Minneapolis, Minnesota

Dear Mr. Boyer:

We have completed our geotechnical evaluation report for the proposed single-family house in Minneapolis, Minnesota. The purpose of our evaluation was to assist you and your design team in evaluating the subsurface soil and groundwater conditions with regard to design and construction of the new house. Please read the entire attached report for details regarding our findings and recommendations.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please call Henry Vloo at 612.366.1621 or Joe Westphal at 952.995.2238.

Sincerely,

BRAUN INTERTEC CORPORATION

Handwritten signature of Henry Vloo in blue ink, with a small "for" written above it.

Henry Vloo, PE
Associate Principal – Senior Engineer

Handwritten signature of Gregg R. Jandro in blue ink.

Gregg R. Jandro, PE, PG
Vice President – Principal Engineer

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Appendix

Boring Location Sketch

Log of Boring Sheets ST-1 and ST-2

Descriptive Terminology of Soil

A. Introduction

A.1. Project Description

Boyer Building Corporation is planning to demolish an existing house and construct a new house in Minneapolis, Minnesota. The lot is about 0.22 acres in size.

A.2. Purpose

The purpose of our evaluation was to assist you and your design team in evaluating the subsurface soil and groundwater conditions with regard to design and construction of the new single-family house.

A.3. Background Information and Reference Documents

To facilitate our evaluation, we were provided with or reviewed the following information or documents:

- Available public aerial photographs showing the existing site conditions.
- Geologic atlas showing the general soil types present in this area.
- Certificate of Survey plan prepared by Kemper and Associates, Inc., dated October 29, 2015, showing the proposed new house and the boundaries of the lot.

A.4. Site Conditions

An existing single-family house is currently present on this site. The lot has a number of mature trees on it and slopes down from west to east. The lots on either side of this lot are each occupied by a single-family house.

A.5. Scope of Services

Our scope of services for this project was originally submitted on May 20, 2016 as a Proposal to Mr. John Boyer of Boyer Building Corporation. We received authorization to proceed in the form of a contract signed by Mr. Boyer on May 20, 2016. Tasks performed in accordance with our authorized scope of services included:

- The boring locations were chosen by Boyer Building Company and Braun Intertec and then staked in the field by Braun Intertec.
- Clearing exploration locations of underground utilities.
- Performing 2 penetration test borings to nominal depths of 21 to 25 feet below grade.
- Performing laboratory tests on selected penetration test samples.
- Preparing this report containing a boring location sketch, exploration logs, a summary of the geologic materials encountered, results of laboratory tests, and recommendations for structure subgrade preparation and the design of the proposed single-family house.

Our scope of services was performed under the terms of our General Conditions dated September 1, 2013.

B. Results

B.1. Exploration Logs

B.1.a. Log of Boring Sheets

Log of Boring sheets for our penetration test borings are included in the Appendix. The logs identify and describe the geologic materials that were penetrated, and present the results of penetration resistance data, laboratory tests performed on penetration test samples retrieved from them, and groundwater measurements.

Strata boundaries were inferred from changes in the penetration test samples and the auger cuttings. Because sampling was not performed continuously, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may also occur as gradual rather than abrupt transitions.

B.1.b. Geologic Origins

Geologic origins assigned to the materials shown on the logs and referenced within this report were based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance data, (4) laboratory test results, and (5) available common

knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

B.2. Geologic Profile

B.2.a. Geologic Materials

The general geologic profile at the borings consisted of either concrete pavement (ST-1), or about 2 feet of topsoil (clayey sand) fill at the surface (ST-2) followed by fill soils to depths of 6 and 9 feet, respectively.

The fill soils consisted of poorly graded sand with silt and silty sand. These soils were slightly organic and ranged in color from brown to dark brown to black. Penetration resistance values recorded in the granular fills soils ranged from 1 to 2 blows per foot (BPF) indicating that these soils were not compacted when placed.

Below the fill soils, the borings encountered mostly glacially deposited soils consisting of poorly graded sand or poorly graded sand with silt to the termination depths of the borings. Penetration resistance values recorded in the glacial sand soils ranged from 5 to 13 BPF corresponding to relative densities of loose to medium dense.

B.2.b. Groundwater

While drilling, groundwater was observed in both Borings ST-1 and ST-2 at depths of 10 1/2 and 12 feet respectively, corresponding to elevations of 850 and 851. Seasonal and annual fluctuations of groundwater should also be anticipated.

B.3. Laboratory Test Results

The moisture contents completed on the selected soil samples tested were determined to vary from approximately 4 to 12 percent, indicating that the sand soils tested were considered to be mostly dry of the soils' estimated optimum moisture content. The silty sand fill in Boring ST-2 was likely near the soils' optimum moisture content.

Two soils samples, one from Boring ST-1 at 5 feet below the surface and one from Boring ST-2 at 10 feet below the surface, were washed through a number 200 sieve to assist in classifying these soil. The samples tested had 3 percent passing this sieve, classifying both samples as poorly graded sand. The individual test results can be found in the right hand margin of various log of boring sheets, opposite the soil sample tested.

C. Basis for Recommendations

C.1. Design Details

The existing single-family house on this lot will be demolished and a new single-family house is proposed to be constructed on this site. Based on the Certificate of Survey, the proposed garage floor elevation is 861.51. The drawing did not indicate any basement floor elevation.

C.1.a. Building Structure Loads

We have assumed that bearing wall loads associated with the proposed house will range from 3 to 4 kips (3,000 to 4,000 pounds) per linear foot (klf) and column loads, if any, will be no greater than 75 kips per column.

C.1.b. Anticipated Grade Changes

Based on the contour elevations of the preliminary plans, the existing ground surface elevations range from about 856 at the east end of the lot to about 870 at the west end of the lot. It is likely that minimal grade changes are required on this site.

C.1.c. Precautions Regarding Changed Information

We have attempted to describe our understanding of the proposed construction to the extent it was reported to us by others. Depending on the extent of available information, assumptions may have been made based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, we should be notified. New or changed information could require additional evaluation, analyses and/or recommendations.

C.2. Design and Construction Considerations

The geologic materials present below the pavement section, topsoil fill and fill soils generally appear suitable for support of the proposed new single-family house using conventional spread footings and grade-supported slabs.

The topsoil is not suitable to support fill and houses and is also not suitable for use as engineered fill in the house pads and streets. The existing un-compacted fill soils encountered by the borings appear to be suitable to be re-used as compacted fill. However, any organic material or debris that is encountered will need to be removed from these soils before being re-used.

D. Recommendations

The following recommendations are based on the results of our soil borings and laboratory test results.

D.1. Building Pad Subgrade Preparation

D.1.a. Demolition

The existing home will need to be demolished and removed from this site and properly disposed of. This includes removing all foundations, slabs and underground utilities that are currently present on this lot.

D.1.b. Excavations

We recommend removing the pavements, topsoil fill and sand fill soils from beneath the proposed house pad and oversize areas. Table 1 lists the recommended minimum excavation depths at the individual boring locations.

Table 1. Anticipated Excavation Depths for Residential Construction

Boring	Surface Elevation (ft)	Anticipated Depth of Excavation (ft)	Approximate Bottom Elevation (ft)
ST-1	860.5	6	854 1/2
ST-2	863.3	9	854

Excavation depths will vary between the borings. Portions of the excavations may also be deeper than indicated by the borings.

To provide lateral support to replacement backfill, additional required fill and the structural loads they will support, we recommend oversizing (widening) the excavations 1 foot horizontally beyond the outer edges of the building perimeter footings for each foot the excavations extend below bottom-of-footing subgrade elevations.

Prior to placing engineered fill, if needed, or construction of footings, we recommend that the soils exposed in the bottom of the excavation be surface compacted by a minimum of 5 passes by a large, self-propelled, vibratory compactor. This is to densify the near surface soils and provide a more uniform bearing surface for additional fill soils or improved support for the spread footing foundations and floor slabs.

D.1.c. Excavation Dewatering

Water was observed at depths of 850 to 851 as our borings were being completed. Water will likely not be encountered while completing the recommended soil correction work.

D.1.d. Excavation Side Slopes

The onsite soils generally appear to consist of soils meeting OSHA Type C requirements, which indicate excavation side slopes should be constructed to lie back at a minimum horizontal to vertical slope of 1 1/2 to 1 or flatter. An OSHA approved competent person should review the excavation conditions in the field. If site constraints do not allow the construction of temporary slopes with these dimensions, then temporary shoring may be required, and we should be consulted for additional recommendations.

All excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, "Excavations and Trenches." This document states that excavation safety is the responsibility of the contractor. Reference to these OSHA requirements should be included in the project specifications.

D.1.e. Selecting Excavation Backfill and Additional Required Fill

If the bottoms of the excavations are overly wet and unstable, we recommend the initial backfill soil consist of least 2 feet of coarse sand having less than 50 percent of the particles by weight passing a #40 sieve, and less than 5 percent of the particles passing a #200 sieve. Based on the borings, this material will be present on this site.

Onsite soils free of organic soil and debris can be considered for reuse as backfill and fill. However, the topsoil should not be re-used as engineered fill under the house pad.

D.1.f. Placement and Compaction of Backfill and Fill

We recommend spreading backfill and fill in loose lifts of approximately 8 to 12 inches depending on the soil type used and the size of compactor used. Each lift should be compacted to a minimum of 98 percent of the standard Proctor dry density (ASTM D698).

D.2. Spread Footings

D.2.a. Embedment Depth

For frost protection, we recommend embedding perimeter footings of the structures, including the attached garages, a minimum of 42 inches below the lowest exterior grade. Interior footings may be placed directly below floor slabs. We recommend embedding building footings not heated during winter

construction, and other unheated footings associated with decks, porches, stoops or sidewalks 60 inches below the lowest exterior grade.

D.2.b. Net Allowable Bearing Pressure

We recommend sizing spread footings to exert a net allowable bearing pressure of up to 2,500 pounds per square foot (psf). This value includes a safety factor of at least 3.0 with regard to bearing capacity failure. The net allowable bearing pressure can be increased by one-third its value for occasional transient loads, but not for repetitive loads due to traffic, or for other live loads from snow or occupancy.

D.2.c. Settlement

We estimate that total and differential settlements among the footings will amount to less than 1 and 1/2 inch, respectively, under the assumed loads.

D.3. Basement Walls

The following sections address soil parameters for basement wall design. Design parameters and recommendations for site retaining wall(s) can be found in section D.9.

D.3.a. Drainage Control

We recommend installing subdrains behind the basement walls, adjacent to the wall footings, below the slab elevation. Preferably the subdrains should consist of perforated pipes embedded in washed gravel, which in turn is wrapped in filter fabric. Perforated pipes encased in a filter “sock” and embedded in washed gravel, however, may also be considered.

We recommend routing the subdrains to a sump and pump capable of routing any accumulated groundwater to a storm sewer or other suitable disposal site.

General waterproofing of basement walls surrounding occupied or potentially occupied areas is recommended even with the use of free-draining backfill because of the potential cost impacts related to seepage after construction is complete.

D.3.b. Selection, Placement and Compaction of Backfill

Unless a drainage composite is placed against the backs of the exterior perimeter basement walls, we recommend that backfill placed within 2 horizontal feet of those walls consist of sand having less than 50 percent of the particles by weight passing a #40 sieve and less than 5 percent of the particles by weight passing a #200 sieve. Sand meeting this gradation appears to be present on the site. We recommend that the balance of the backfill placed against exterior perimeter walls also consist of sand,

though it is our opinion that the sand may contain up to 20 percent of the particles by weight passing a #200 sieve.

If clay must be considered for use to make up the balance of the below-grade wall backfill (assuming a drainage composite or sand is placed against the backs of the walls), post-compaction consolidation of the clay occurring under its own weight can be expected to continue beyond the end of construction. The magnitude of consolidation could amount to between 1 and 3 percent of the backfill thickness, or wall height, and if not accommodated could cause slabs or pavements to settle unfavorably or be damaged.

Should lean clay still be considered for use as backfill, however, we further recommend that:

- The bottoms of the excavations required for basement wall construction are wide enough to accommodate compaction equipment.
- Backfill is placed at moisture contents at least equal to, but not more than three percentage points above, its optimum moisture content.
- Backfill is placed in loose lifts no thicker than 6 inches prior to compaction.
- The relative compaction of the backfill is measured through density testing at intervals not exceeding one test per 50 horizontal feet for each 2 vertical feet of backfill placed.

We recommend a walk behind compactor be used to compact the backfill placed within about 5 feet of the basement walls. Further away than that, a self-propelled compactor can be used. Compaction criteria for basement walls should be determined based on the compaction recommendations provided above in Section D.1.

Exterior backfill not capped with slabs or pavement should be capped with a low-permeability soil to limit the infiltration of surface drainage into the backfill. The finished surface should also be sloped to divert water away from the walls.

D.3.c. Configuring and Resisting Lateral Loads

Below-grade wall design can be based on active earth pressure conditions if the walls are allowed to rotate slightly. If rotation cannot be tolerated, then design should be based on at-rest earth pressure conditions. Rotation up to 0.002 times the wall height is generally required to activate active earth pressure conditions when walls are backfilled with sand*. Rotation up to 0.02 times the wall height is required when walls are backfilled with clay.

- * To design for sand backfill, excavations required for wall construction should be wide enough and flat enough so that sand is present within a zone that (1) extends at least two horizontal feet beyond the bottom outer edges of the wall footings (the wall heel, not the stem) and then (2) rises up and away from the wall at an angle no steeper than 60 degrees from horizontal. We anticipate these geometric conditions will be met if the excavations meet OSHA requirements for the types of soils likely to be exposed in the excavation, and the wall footings are cast against wood forms rather than any portion of the excavation.

Recommended equivalent fluid pressures for wall design based on active and at-rest earth pressure conditions are presented below in Table 2. Assumed wet unit backfill weights, and internal friction angles are also provided. The recommended equivalent fluid pressures in particular assume a level backfill with no surcharge – they would need to be revised for sloping backfill or other dead or live loads that are placed within a horizontal distance behind the walls that is equal to the height of the walls. Our design values also assume that the walls are drained so that water cannot accumulate behind the walls.

Table 2. Recommended Below-Grade Wall Design Parameters

Backfill Soil	Wet Unit Weight (pcf)	Friction Angle (deg)	Equivalent Fluid Pressure, Active Case (pcf)	Equivalent Fluid Pressure, At-Rest Case (pcf)
Sand	120	33	35	50
Clay	120	26	50	70

Resistance to lateral earth pressures will be provided by passive resistance against the basement wall footings, and by sliding resistance along the bottoms of the wall footings. We recommend assuming a passive pressure equal to 320 pcf for sandy soil with sliding coefficients equal to 0.50. These values are un-factored.

D.4. Interior Slabs

D.4.a. Moisture Vapor Protection

If floor coverings or coatings less permeable than the concrete slab will be used, we recommend that a vapor retarder or vapor barrier be placed immediately beneath the slab. Some contractors prefer to bury the vapor retarder or barrier beneath a layer of sand to reduce curling and shrinkage, but this practice risks trapping water between the slab and vapor retarder or barrier.

Regardless of where the vapor retarder or barrier is placed, we recommend consulting with floor covering manufacturers regarding the appropriate type, use and installation of the vapor retarder or barrier to preserve warranty assurances.

D.4.b. Radon

In preparation for radon mitigation systems, we recommend that slabs on grade be constructed over a layer of gas permeable material consisting of a minimum of 4 inches of either clean aggregate, or sand underlain with a geotextile matting suitable for venting the subgrade. The clean aggregate material should consist of sound rock no larger than 2 inches and no smaller than 1/4 inch. Sand should have less than 50 percent of the particles by weight passing a #40 sieve and less than 5 percent of the particles by weight passing a #200 sieve.

Above the gas permeable aggregate or sand, a polyethylene sheeting (6 mil minimum) should be placed. The sheeting should be properly lapped and penetrations through the sheeting sealed. Penetrations through the slab and foundation walls should also be sealed.

D.5. Exterior Slabs

Though not necessarily designed to accommodate dead and live load surcharges or vehicles, exterior slabs can be subjected to both. Settlement of exterior slabs on poorly compacted foundation backfill, utility backfill and other compressible naturally deposited soils or fills can also contribute to unfavorable surface drainage conditions and frost-related damage (see below) to the slabs and adjacent structures, including buildings and pavements. Subgrades supporting exterior slabs should therefore be prepared in accordance with the excavation and backfilling recommendations provided above in Section D.1. To accommodate the potential for exterior slabs bearing unanticipated traffic loads, we recommend using the compaction criteria provided in Section D.1 for pavements. Additional commentary on the risks associated with frost, and recommendations for helping mitigate those risks, is provided in Section D.6.

D.6. Frost Protection

D.6.a. General

All or some of the exterior slabs, as well as pavements, will be underlain with sandy soils. Most of these soils have a low susceptibility to frost. However, some of the silty sand soils encountered by the borings are considered to be moderately to highly frost-susceptible. Such soils can retain moisture and heave upon freezing. In general, this characteristic is not an issue unless these soils become saturated due to surface runoff or infiltration or are excessively wet in-situ. Once frozen, unfavorable amounts of general and isolated heaving of the soils and the surface structures supported on them could develop. This type

of heaving could impact design drainage patterns and the performance of exterior slabs and pavements, as well as any isolated exterior footings and piers. To address most of the heave related issues, we recommend that general site grades and grades for exterior surface features be set to direct surface drainage away from buildings, across large paved areas and away from walkways to limit the potential for saturation of the subgrade and any subsequent heaving. General grades should also have enough “slope” to tolerate potential larger areas of heave which may not fully settle when thawed.

It should be noted that general runoff and infiltration from precipitation are not the only sources of water that can saturate subgrade soils and contribute to frost heave. Roof drainage and the irrigation of landscaped areas in close proximity to exterior slabs, pavements, and isolated footings and piers, contribute as well.

D.6.b. Exterior Slabs

Even small amounts of frost-related differential movement at walkway joints or cracks can create tripping hazards. Several subgrade improvement options can be explored to address this condition.

The most conservative and potentially most costly subgrade improvement option to help limit the potential for heaving, but not eliminate it, would be to remove any frost-susceptible soils present below the exterior slabs’ “footprints” down to the bottom-of-footing grades or to a maximum depth of 4 feet below subgrade elevations, whichever is less. We recommend the resulting excavation then be refilled with sand or sandy gravel having less than 50 percent of the particles by weight passing the #40 sieve and less than 5 percent of the particles by weight passing a #200 sieve. The bottom of the excavation should be sloped toward one or more collection points so that any water entering the backfill can be collected and removed. A series of perforated drainpipes will need to be installed to collect and dispose of the infiltrating water and/or groundwater that could accumulate within the backfill. The piping should be connected to a storm sewer or a sump to remove any accumulated water, or “day lighted” if grades permit. If the water is not removed, it is our opinion this option will not be effective in controlling heave.

An important geometric aspect of the excavation and replacement approach described above is sloping the banks of the excavations to create a more gradual transition between the unexcavated soils considered to be frost-susceptible and the excavation backfill which is not, to attenuate differential movement that may occur along the excavation boundary. We recommend 3:1 (horizontal:vertical) banks along transitions between frost-susceptible and non-frost-susceptible soils.

Another option is to only protect critical areas, such as doorways and entrances, via stoops or localized excavations with sloped transitions between frost-susceptible and non-frost-susceptible soils as described above.

Regardless of what is done to the walkway or pavement area subgrade, it will be critical the end-user develop a detailed maintenance program to seal and/or fill any cracks and joints that may develop during the useful life of the various surface features. Concrete and bituminous will experience episodes of normal thermo-expansion and thermo-contraction during its useful life. During this time, cracks may develop and joints may open up, which will expose the subgrade and allow any water flowing overland to enter the subgrade and either saturate the subgrade soils or to become perched atop it. This occurrence increases the potential for heave due to freezing conditions in the general vicinity of the crack or joint. This type of heave has the potential to become excessive if not addressed as part of a maintenance program. Special attention should be paid to areas where dissimilar materials abut one another, where construction joints occur and where shrinkage cracks develop.

The on-going performance of pavements is impacted by conditions under which the pavement is asked to perform. These conditions include the environmental conditions, the actual use conditions and the level of ongoing maintenance performed. With regard to bituminous pavements in particular, because of normal thermo expansion and contraction, it is not unusual to have cracking develop within the first few years of placement and for the cracking to continue throughout the life of the pavement. A regular maintenance plan should be developed for filling cracks in bituminous pavements to lessen the potential impacts for cold weather distress due to frost heave or warm weather distress due to wetting and softening of the subgrade. It is also not unusual for bituminous pavements to require a seal coat within the first 5 to 10 years to increase the long-term performance.

D.6.c. Isolated Footing and Piers

Soils classifying as “silt” (USCS symbols ML or MH), “clay” (CL or CH), or as being “silty” or “clayey” (including but not limited to SP-SM, SC-SM, SM or SC), have the potential for adhering to poured concrete or masonry block features built through the normal frost zone. In freezing conditions, this soil adhesion could result in the concrete or masonry construction being lifted out of the ground. This lifting action is also known as heave due to adfreezing. The potential for experiencing the impacts of adfreezing increases with poor surface drainage in the area of below grade elements, in areas of poorly compacted clayey or silty soils and in areas of saturated soils. To limit the impacts of adfreeze, we recommend placing a low friction separation barrier, such as high density insulation board, between the backfill and the element. Extending isolated piers deeper into the frost-free zone, enlarging the bottom of the piers and then providing tension reinforcement can also be considered. Recommendations for specific foundation conditions can be provided as needed.

D.7. Free Standing Retaining Walls

The following comments and recommendations may be used in retaining wall design and construction, however, final design responsibility will rest with the wall design engineer. Our scope of services did not include global stability analysis. If desired, we can provide global stability analysis of the proposed walls, however, to provide this service final retaining wall design plans and additional soil borings would be required.

D.7.a. Subgrade Excavation

We recommend the retaining walls bear in naturally occurring glacial soils judged suitable for wall support by a geotechnical engineer or on engineered fill. Additional soil borings along the wall footing alignment should be performed to aid in judging the allowable soil capacity. We recommend all organic soils (including topsoil), fill soils or very soft to rather soft clayey soils be completely removed down to suitable soils from below the wall foundations.

We also recommend for excavations that extend below design-footing elevation, the excavation bottoms be extended laterally beyond the edges of the proposed footings a minimum of 1 foot for each vertical foot below the footing at that location (i.e., 1:1 lateral oversizing). For modular block retaining walls, we recommend the lateral oversizing extend outward and downward from the back of the geogrid behind the wall.

D.7.b. Foundations

Assuming the retaining wall foundations bear in suitable glacially deposited soils or engineered fill, it is our opinion the wall foundations can be designed using a maximum allowable bearing capacity of 2,000 psf.

This recommended bearing capacity assumes a geotechnical engineer observes the wall foundation subgrade prior to foundation or fill placement.

D.7.c. Backfill and Drainage

Unless a drainage composite is placed against the backs of the retaining walls, we recommend that backfill placed within 2 horizontal feet of the walls consist of sand having less than 50 percent of the particles by weight passing a #40 sieve and less than 7 percent of the particles by weight passing a #200 sieve.

Outside of the drainage zone, the balance of the wall backfill should be in accordance with the wall design parameters as included in the retaining wall specifications. We recommend backfill placed behind and below the walls be compacted to a minimum of 95 percent of standard Proctor density. The compaction level should be increased to 100 percent within 3 feet vertically of pavement areas. Small hand-operated equipment should be used to compact the backfill directly behind the walls to avoid excessive deflection of the walls. Backfill in front of the walls should be compacted to a minimum of 95 percent to limit movement.

We recommend installing subdrains behind the retaining walls, adjacent to the wall footings. Preferably the subdrains should consist of perforated pipes embedded in washed gravel, which in turn is wrapped in filter fabric. Perforated pipes encased in a filter “sock” and embedded in washed gravel, however, may also be considered.

D.7.d. Lateral Pressures

Please refer to Section D.3.d for design parameters for retaining walls.

D.8. Construction Quality Control

D.8.a. Excavation Observations

We recommend having a geotechnical engineer observe all excavations related to subgrade preparation and spread footing, slab-on-grade and pavement construction. The purpose of the observations is to evaluate the competence of the geologic materials exposed in the excavations, and the adequacy of required excavation oversizing.

D.8.b. Materials Testing

We recommend density tests be taken in excavation backfill and additional required fill placed below spread footings, slab-on-grade construction, engineered retaining walls, beside foundation walls, behind basement walls and within the reinforced zone of retaining walls.

D.8.c. Cold Weather Precautions

If site grading and construction is anticipated during cold weather, all snow and ice should be removed from cut and fill areas prior to additional grading. No fill should be placed on frozen subgrades. No frozen soils should be used as fill.

Concrete delivered to the site should meet the temperature requirements of ASTM C 94. Concrete should not be placed on frozen subgrades. Concrete should be protected from freezing until the necessary strength is attained. Frost should not be permitted to penetrate below footings.

E. Procedures

E.1. Penetration Test Borings

The penetration test borings were drilled on May 27, 2016 with a geoprobe. The borings were performed in accordance with ASTM D 1586. Penetration test samples were taken at 2 1/2- or 5-foot intervals. Actual sample intervals and corresponding depths are shown on the boring logs.

E.2. Material Classification and Testing

E.2.a. Visual and Manual Classification

The geologic materials encountered were visually and manually classified in accordance with ASTM Standard Practice D 2488. A chart explaining the classification system is attached. Samples were placed in jars and returned to our facility for review and storage.

E.2.b. Laboratory Testing

The results of the laboratory tests performed on geologic material samples are noted on or follow the appropriate attached exploration logs. The tests were performed in accordance with ASTM or AASHTO procedures.

E.3. Groundwater Measurements

The drillers checked for groundwater as the penetration test borings were advanced, and again after auger withdrawal. The boreholes were then immediately backfilled.

F. Qualifications

F.1. Variations in Subsurface Conditions

F.1.a. Material Strata

Our evaluation, analyses and recommendations were developed from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth, and therefore strata boundaries and thicknesses must be

inferred to some extent. Strata boundaries may also be gradual transitions, and can be expected to vary in depth, elevation and thickness away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until additional exploration work is completed, or construction commences. If any such variations are revealed, our recommendations should be re-evaluated. Such variations could increase construction costs, and a contingency should be provided to accommodate them.

F.1.b. Groundwater Levels

Groundwater measurements were made under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. It should be noted that the observation periods were relatively short, and groundwater can be expected to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

F.2. Continuity of Professional Responsibility

F.2.a. Plan Review

This report is based on a limited amount of information, and a number of assumptions were necessary to help us develop our recommendations. It is recommended that our firm review the geotechnical aspects of the designs and specifications, and evaluate whether the design is as expected, if any design changes have affected the validity of our recommendations, and if our recommendations have been correctly interpreted and implemented in the designs and specifications.

F.2.b. Construction Observations and Testing

It is recommended that we be retained to perform observations and tests during construction. This will allow correlation of the subsurface conditions encountered during construction with those encountered by the borings, and provide continuity of professional responsibility.

F.3. Use of Report

This report is for the exclusive use of the parties to which it has been addressed. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

F.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

Appendix




**STANDARD APPROXIMATE LOCATION OF
STANDARD PENETRATION TEST BORING**



SCALE: 1" = 40'

Project No:	B1604686
Drawing No:	B1604686
Scale:	1" = 100'
Drawn By:	JAG
Date Drawn:	5/23/16
Checked By:	JW
Last Modified:	6/2/16

Sheet: _____ of _____
Fig: _____

SOIL BORING LOCATION SKETCH
 GEOTECHNICAL EVALUATION
 RESIDENTIAL PROPERTY
 4628 W. LAKE HARRIET PARKWAY
 MINNEAPOLIS, MINNESOTA

BRAUN
INTERTEC
The Science You Build On.
 11001 Hampshire Avenue S
 Minneapolis, MN 55438
 PH. (952) 995-2000
 FAX (952) 995-2020

(See Descriptive Terminology sheet for explanation of abbreviations)

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2016\04686.GPJ BRAUN_V8_CURRENT.GDT 6/8/16 09:12

Braun Project B1604686 GEOTECHNICAL EVALUATION Proposed New Single Family House 4628 West Lake Harriet Parkway Minneapolis, Minnesota					BORING: ST-1				
DRILLER: BZ			METHOD: Geoprobe		DATE: 5/27/16		SCALE: 1" = 4'		
Elev. feet	Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes	
860.6	0.0	PAV	Approximately 1 inch of concrete driveway over 11 inches of base material.						
859.6	1.0	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, trace Gravel, dark brown to brown, moist.	2					
854.6	6.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace Gravel, light brown to brown, moist, loose. (Glacial Outwash)	1		5	3		
		SP		7					
				8	▼				
848.1	12.5	SP	POORLY GRADED SAND, fine- to coarse-grained, trace Gravel, brown, waterbearing, loose. (Glacial Outwash)	6	▽				An open triangle in the water level (WL) column indicates the depth at which groundwater was observed while drilling. A solid triangle indicates the groundwater level in the boring on the date indicated. Groundwater levels fluctuate.
				7					
				6					
				8					
834.6	26.0		END OF BORING.						
			Water observed at 12 1/2 feet while drilling.						
			Water observed at 10 1/2 feet after withdrawal of auger.						
			Boring immediately backfilled.						

(See Descriptive Terminology sheet for explanation of abbreviations)

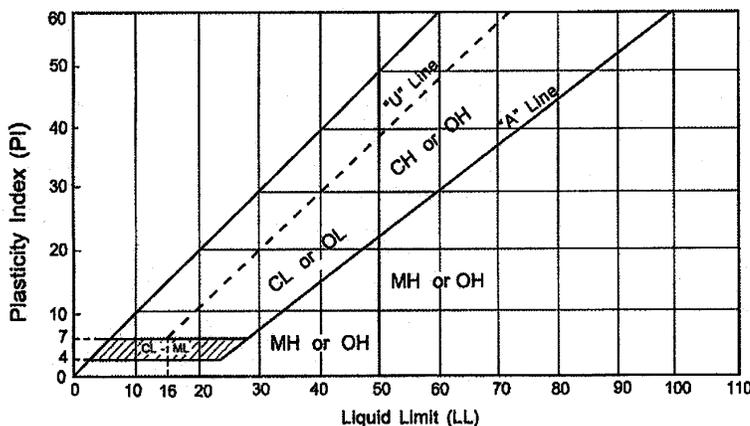
LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2016\04686.GPJ BRAUN_V8_CURRENT.GDT 6/8/16 09:12

Braun Project B1604686 GEOTECHNICAL EVALUATION Proposed New Single Family House 4628 West Lake Harriet Parkway Minneapolis, Minnesota				BORING: ST-2				
DRILLER: BZ		METHOD: Geoprobe		DATE: 5/27/16		SCALE: 1" = 4'		
Elev. feet	Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
863.3	0.0							
861.3	2.0	FILL	FILL: Clayey Sand, organic, with roots and fibers, black, moist. (Topsoil Fill)					
858.3	5.0	FILL	FILL: Silty Sand, fine- to medium-grained, black to dark brown, moist.	2				
854.3	9.0	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, dark brown, moist.	2		12		
852.3	11.0	SP	POORLY GRADED SAND, fine- to coarse-grained, trace Gravel, light brown, moist, medium dense. (Glacial Outwash)	11		4	3	
849.3	14.0	SP-SM	POORLY GRADED SAND with SILT, fine- to medium-grained, trace Gravel, light brown, moist to waterbearing, medium dense. (Glacial Outwash)	13	▽			
842.3	21.0	SP	POORLY GRADED SAND, medium- to coarse-grained, trace Gravel, brown, waterbearing, loose. (Glacial Outwash)	5				
			END OF BORING. Water observed at 12 feet while drilling. Water not observed to cave-in depth of 13 1/2 feet immediately after withdrawal of auger. Boring immediately backfilled.	7				



Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^a				Soils Classification		
				Group Symbol	Group Name ^b	
Coarse-grained Soils more than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines ^e	$C_u \geq 4$ and $1 \leq C_c \leq 3$ ^c	GW	Well-graded gravel ^d	
		Gravels with Fines More than 12% fines ^e	$C_u < 4$ and/or $1 > C_c > 3$ ^c	GP	Poorly graded gravel ^d	
			Fines classify as ML or MH	GM	Silty gravel ^{d f g}	
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines ⁱ	$C_u \geq 6$ and $1 \leq C_c \leq 3$ ^c	SW	Well-graded sand ^h	
		Sands with Fines More than 12% ⁱ	$C_u < 6$ and/or $1 > C_c > 3$ ^c	SP	Poorly graded sand ^h	
			Fines classify as ML or MH	SM	Silty sand ^{f g h}	
Fine-grained Soils 50% or more passed the No. 200 sieve	Silt and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line ^j	CL	Lean clay ^{k l m}	
			PI < 4 or plots below "A" line ^j	ML	Silt ^{k l m}	
		Organic	Liquid limit - oven dried < 0.75	OL	Organic clay ^{k l m n}	
			Liquid limit - not dried < 0.75	OL	Organic silt ^{k l m o}	
	Silt and clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay ^{k l m}	
			PI plots below "A" line	MH	Elastic silt ^{k l m}	
		Organic	Liquid limit - oven dried < 0.75	OH	Organic clay ^{k l m p}	
			Liquid limit - not dried < 0.75	OH	Organic silt ^{k l m q}	
			Highly Organic Soils		PT	Peat
			Primarily organic matter, dark in color and organic odor			

- Based on the material passing the 3-inch (75mm) sieve.
- If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name.
- $C_u = D_{60}/D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
- If soil contains $\geq 15\%$ sand, add "with sand" to group name.
- Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
- If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
- If fines are organic, add "with organic fines" to group name.
- If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.
- Sand with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
- If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
- If soil contains 10 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant.
- If soil contains $\geq 30\%$ plus No. 200, predominantly sand, add "sandy" to group name.
- If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.
- $PI \geq 4$ and plots on or above "A" line.
- $PI < 4$ or plots below "A" line.
- PI plots on or above "A" lines.
- PI plots below "A" line.



Laboratory Tests

DD Dry density, pcf	OC Organic content, %
WD Wet density, pcf	S Percent of saturation, %
MC Natural moisture content, %	SG Specific gravity
LL Liquid limit, %	C Cohesion, psf
PL Plastic limits, %	Ø Angle of internal friction
PI Plasticity index, %	qu Unconfined compressive strength, psf
P200 % passing 200 sieve	qp Pocket penetrometer strength, tsf

Particle Size Identification

- Boulders..... over 12"
- Cobbles 3" to 12"
- Gravel
 - Coarse 3/4" to 3"
 - Fine..... No. 4 to 3/4"
- Sand
 - Coarse No. 4 to No. 10
 - Medium No. 10 to No. 40
 - Fine..... No. 40 to No. 200
- Silt <No. 200, PI < 4 or below "A" line
- Clay <No. 200, PI ≥ 4 and on or about "A" line

Relative Density of Cohesionless Soils

- Very Loose..... 0 to 4 BPF
- Loose..... 5 to 10 BPF
- Medium dense 11 to 30 BPF
- Dense 31 to 50 BPF
- Very dense..... over 50 BPF

Consistency of Cohesive Soils

- Very soft..... 0 to 1 BPF
- Soft 2 to 3 BPF
- Rather soft 4 to 5 BPF
- Medium 6 to 8 BPF
- Rather stiff 9 to 12 BPF
- Stiff 13 to 16 BPF
- Very stiff..... 17 to 30 BPF
- Hard..... over 30 BPF

Drilling Notes

Standard penetration test borings were advanced by 3 1/4" or 6 1/4" ID hollow-stem augers, unless noted otherwise. Jetting water was used to clean out auger prior to sampling only where indicated on logs. All samples were taken with the standard 2" OD split-tube samples, except where noted.

Power auger borings were advanced by 4" or 6" diameter continuous flight, solid-stern augers. Soil classifications and strata depths were inferred from disturbed samples augered to the surface, and are therefore, somewhat approximate.

Hand auger borings were advanced manually with a 1 1/2" or 3 1/4" diameter auger and were limited to the depth from which the auger could be manually withdrawn.

BPF: Numbers indicate blows per foot recorded in standard penetration test, also known as "N" value. The sampler was set 6" into undisturbed soil below the hollow-stem auger. Driving resistances were then counted for second and third 6" increments, and added to get BPF. Where they differed significantly, they are reported in the following form: 2/12 for the second and third 6" increments, respectively.

WH: WH indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WR: WR indicates the sampler penetrated soil under weight of rods alone; hammer weight, and driving not required.

TW: TW indicates thin-walled (undisturbed) tube sample.

Note: All tests were run in general accordance with applicable ASTM standards.



W. LAKE HARRIET PARKWAY STREETScape, MINNEAPOLIS, MINNESOTA
(EXISTING)

JANUARY 19, 2016



4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



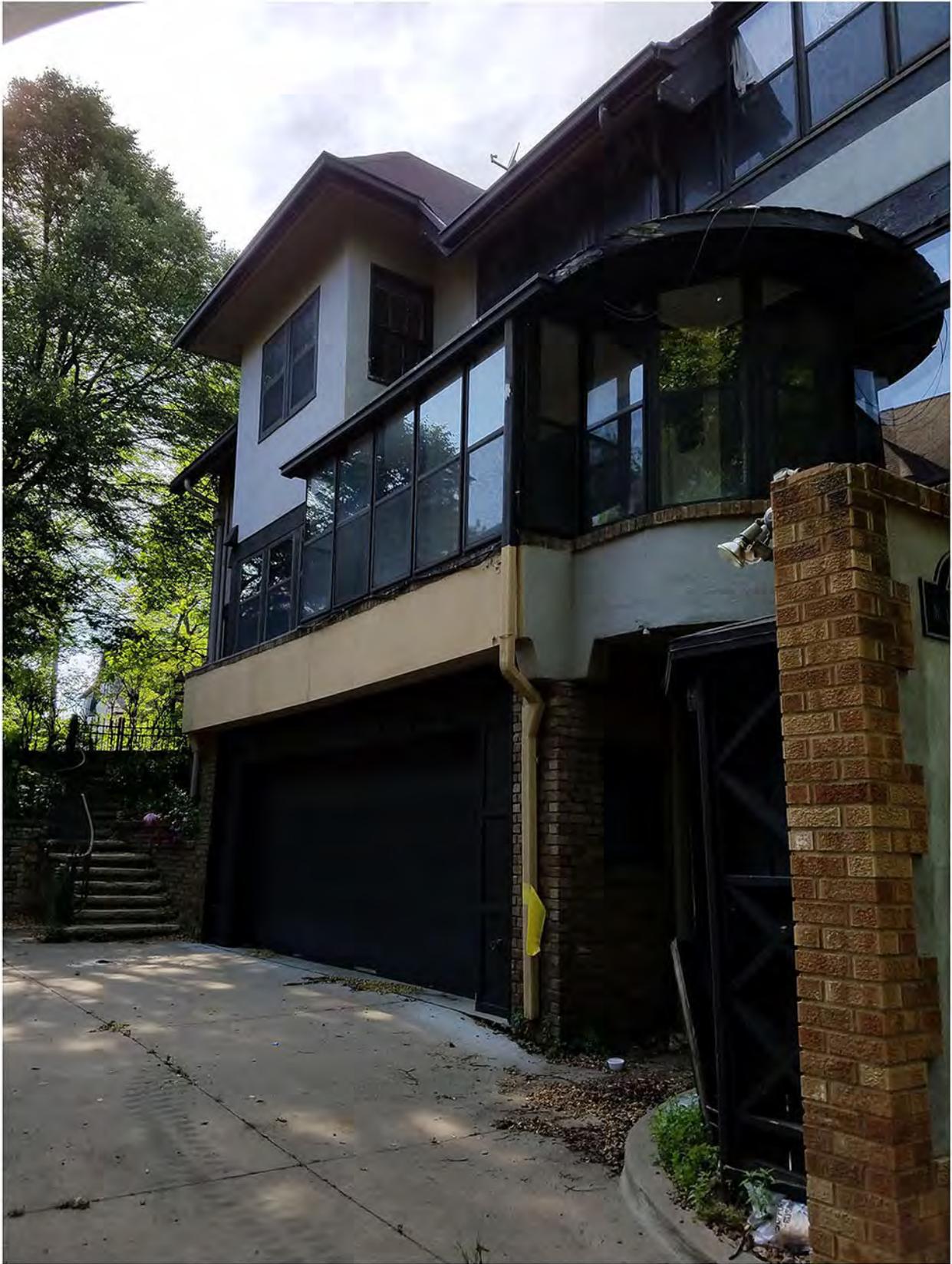
4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4602 West Lake Harriet Parkway



4620 West Lake Harriet Parkway



4624 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4632 West Lake Harriet Parkway



4638 West Lake Harriet Parkway



4644 West Lake Harriet Parkway



4638 West Lake Harriet Parkway



4632 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4628 West Lake Harriet Parkway



4624 West Lake Harriet Parkway



4620 West Lake Harriet Parkway



4620 West Lake Harriet Parkway



4602 West Lake Harriet Parkway



4620 Upton Avenue



4624 Upton Avenue



4628 Upton Avenue



4632 Upton Avenue



4636 Upton Avenue