

**LAND USE APPLICATION SUMMARY**

*Property Location:* 4315 East Lake Harriet Parkway  
*Project Name:* 4315 East Lake Harriet Parkway Addition and Driveway  
*Prepared By:* [Janelle Widmeier](#), Senior City Planner, (612) 673-3156  
*Applicant:* Maria Kenworthy  
*Project Contact:* Jerry Boldenow  
*Request:* Addition to and new driveway for a single-family dwelling.  
*Required Applications:*

<b>Variance</b>	To allow development on a steep slope in the SH Shoreland Overlay District to allow a building addition, retaining walls, and a driveway.
<b>Variance</b>	To reduce the minimum interior side yard requirement adjacent to the north lot line from 12 feet to 6 feet to allow a building addition and from 12 feet to 0 feet to allow a retaining wall not retaining natural grade.
<b>Variance</b>	To reduce the minimum interior side yard requirement adjacent to the south lot line from 12 feet to 0 feet to allow a retaining wall not retaining natural grade.

**SITE DATA**

<b>Existing Zoning</b>	RI Single-Family District SH Shoreland Overlay District
<b>Lot Area</b>	15,140 square feet
<b>Ward(s)</b>	13
<b>Neighborhood(s)</b>	East Harriet
<b>Designated Future Land Use</b>	Urban Neighborhood
<b>Land Use Features</b>	Not applicable.
<b>Small Area Plan(s)</b>	Not applicable.

<b>Date Application Deemed Complete</b>	August 16, 2016	<b>Date Extension Letter Sent</b>	Not applicable
<b>End of 60-Day Decision Period</b>	October 15, 2016	<b>End of 120-Day Decision Period</b>	Not applicable

## BACKGROUND

**SITE DESCRIPTION AND PRESENT USE.** The existing use is a single-family dwelling. It was permitted for construction in 1931 with an attached garage. The site is adjacent to and currently accessed from a public alley.

**SURROUNDING PROPERTIES AND NEIGHBORHOOD.** The surrounding properties are predominately single-family dwellings. Lake Harriet is located across the street to the west.

**PROJECT DESCRIPTION.** The applicant is proposing to construct a rear addition to the single-family dwelling located at the property of 4315 East Lake Harriet Parkway. The addition includes constructing a new attached garage in the northwest corner of the property (the existing attached garage would be converted to a family room). A new driveway is also proposed along the rear of the property that would change the access from the alley from the northeast corner of the site to the southeast corner of the site. A retaining wall is proposed to support the new driveway. Retaining walls are also proposed adjacent to the garage addition.

Almost the entire site is on a steep slope (an average 18 percent slope or greater measured over a horizontal distance of 50 feet or more, with a height of 10 feet or greater) or within 40 feet of the top of a steep slope. In the SH Overlay District, a variance is required to allow development on a steep slope or within 40 feet of a steep slope. Development is defined as the erection, construction, reconstruction, relocation or enlargement of any structure. Structures include, but are not limited to, buildings, walls, canopies, decks, patios, and any objects or things permanently attached to the structure.

The minimum interior side yard requirement for this site is 12 feet. Adjacent to the north side lot line, the addition would be set back 6 feet. The proposed retaining walls would extend up to the side lot lines on both the north and south sides of the property. Because they would not be retaining natural grade, they are not permitted obstructions. Side yard variances are required to allow the addition and the retaining walls where they encroach into the interior side yards.

**PUBLIC COMMENTS.** As of the writing of this report, staff has not received any correspondence from the neighborhood group. Any correspondence received prior to the public meeting will be forwarded on to the Board of Adjustment for consideration.

## ANALYSIS

### VARIANCE: YARDS

The Department of Community Planning and Economic Development has analyzed the application for 1) a variance to reduce the minimum interior side yard requirement adjacent to the north lot line from 12 feet to 6 feet to allow a building addition and from 12 feet to 0 feet to allow a retaining wall not retaining natural grade and 2) a variance to reduce the minimum interior side yard requirement adjacent to the south lot line from 12 feet to 0 feet to allow a retaining wall not retaining natural grade, 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.*

Practical difficulties exist in complying with the ordinance due to circumstances unique to the property. There is significant grade change between the alley and the dwelling. The existing driveway has a 25 percent slope. To address the grade change, the applicant is proposing to infill the rear 15 feet of the property to install a driveway with a more gradual slope that would extend from the south lot line and lead to a new attached garage. A retaining wall is proposed to retain the infill. To support the slope where the existing driveway would be removed, retaining walls would be installed on the north side of the garage addition. Twelve foot wide interior side yards are required adjacent to the north and south lot lines. The variance is requested to allow the walls not retaining natural grade where it extends into the required yards. The new garage is located in the part of the addition that would be setback up to 6 feet from the north lot line. The floor elevation would be 1.4 feet higher than the existing garage floor to minimize the slope of the new driveway. Further, there are limited options where the new garage can be located with the existing footprint of the dwelling. When located in the rear 40 feet of a property, a detached garage can be located up to one foot from the interior side and rear property lines. However, a detached garage also needs to maintain at least 6 feet of separation from any habitable space in a dwelling. Given that the existing attached garage is only 26.5 feet from the rear lot line and only 26 feet from the north lot line, a variance would still likely be required to allow a detached garage. Also, a detached garage would likely require more of the steep slope to be disturbed for development.

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.*

In general, yard controls are established to provide for the orderly development and use of land and to minimize conflicts among land uses by regulating the dimension and use of yards in order to provide adequate light, air, open space and separation of uses. The proposal would comply with other residential district regulations, including maximum floor area ratio, height, lot coverage and impervious surface. The setback reduction requested for the addition is to allow a new attached garage. Although attached, it would be located in the rear 40 feet of the property. A driveway and a large retaining wall separate the subject site from the property to the north. The addition would be over 30 feet from the neighboring dwelling. The proposal would have little effect on the adjacent property's access to light, air and open space. The request for the addition is reasonable and consistent with the intent of the ordinance and the comprehensive plan.

When a wall does not retain natural grade it is more akin to a fence in relation to impacts to adjacent properties. Fence standards are established to promote the public health, safety and welfare, encourage an aesthetic environment and allow for privacy, while maintaining access to light and air. The applicant is proposing to infill the rear 15 feet of the property to install a driveway with a more gradual slope that would extend from the south lot line and lead to a new attached garage. The retaining wall that would support the new driveway would tie into an existing retaining wall on the south lot line. To support the slope where the existing driveway would be removed, retaining walls would be installed on the north side of the garage addition. The proposed retaining walls would not have any effects on adjacent properties access to light and air. The request is reasonable and consistent with the intent of the ordinance and the comprehensive plan.

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 granting of the variances would not affect the character of the area or be injurious to the use or enjoyment of other property in the vicinity. The addition is designed to be compatible with the

Tudor architectural style of the dwelling. Roof pitch and exterior materials would match. Retaining walls are common on this block. A driveway and a large retaining wall separate the subject site from the property to the north. The addition would be over 30 feet from the neighboring dwelling. With the proposed location of the addition and the retaining walls, the proposal would have little effect on the adjacent properties access to light, air and open space. If granted, the proposed variance will not be detrimental to the health, safety or welfare of the public or those utilizing the property provided the structures are constructed to current building codes.

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

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

The site is located across the street from Lake Harriet. A silt fence would be installed to prevent soil erosion during construction. The retaining walls and a stormwater management system would be installed to prevent erosion after construction. The Public Works Department reviewed the erosion control plan and suggested that the silt fence location on the north corner of the addition should be adjusted to prevent it from being knocked over during construction. Staff is recommending that this change is incorporated into the final plans.

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

Because the site is located across the street from Lake Harriet, the proposed structures would have some visibility from the protected water. Visibility of the structures would be reduced by existing vegetation to remain and the structures location at the rear of the property.

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

This standard is not applicable for the proposed development.

## VARIANCE: STEEP SLOPE

The Department of Community Planning and Economic Development has analyzed the application for a variance to allow development on a steep slope in the SH Shoreland Overlay District allow A building addition, retaining walls and a driveway, 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.*

Practical difficulties exist in complying with the ordinance due to circumstances unique to the property. Almost the entire site is on a steep slope or within 40 feet of the top of a steep slope. Because the site is located in the SH overlay district, developing in this area requires a variance. The dwelling cannot be expanded or a new driveway or retaining walls constructed without needing a variance. The existing driveway is very steep with a slope of 25 percent. To create a more gradually sloping driveway, the applicant is proposing to construct a retaining wall 15 feet from and parallel to the alley to support infill for a new driveway. To support the slope where the existing driveway would be removed, retaining walls would be installed on the north and east sides of the addition.

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 request is reasonable and consistent with the intent of the ordinance and the comprehensive plan. The SH Shoreland Overlay District is established to preserve and enhance the environmental qualities of surface waters and the natural and economic values of shoreland areas within the city, to provide for the efficient and beneficial utilization of those waters and shoreland areas, to comply with the requirements of state law regarding the management of shoreland areas, and to protect the public health, safety and welfare. In order to ensure that adverse environmental impacts are minimal, development on or within 40 feet of a steep slope in the SH Overlay District can only be approved through a variance. Development allowed by variance is subject to the following conditions:

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.*

Development currently exists on the subject property and adjacent properties that are located on the steep slope and within 40 feet of the steep slope.

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

If the variance is approved, the development footings and foundation are required to comply with the building code requirements, which include being founded in material with an embedment and setback from the slope surface sufficient to provide vertical and lateral support for the footing without detrimental settlement. Engineering plans will be required for the driveway retaining wall. The applicant will be required to work closely with the Construction Code Services Section of CPED during the duration of the development to ensure that all procedures are followed in order to comply with city and other applicable requirements to meet this condition.

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

The area of the site impacted by construction would be limited to the rear of the property. A silt fence would be installed to prevent soil erosion during construction. The retaining walls would be installed to prevent erosion after construction. The applicant would also install a stormwater management system. Trees where development is proposed would need to be removed. The applicant has not indicated if any other trees would be removed. Final plans will need to show which trees are to be removed. If the plans are approved and implemented in the manner required by the building code and in accordance with the soil erosion plan and stormwater management plan, the development should present no danger of falling rock, mud, uprooted trees, or other environmental issues.

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.*

Because the site is located across the street from Lake Harriet, the proposed structures would have some visibility from the protected water. Visibility of the structures would be reduced by existing vegetation to remain and the structures location at the rear of the property. The site is not located in an historic area. The proposed development would also be consistent with the surrounding physical context. Surrounding development is predominantly single-family dwellings that are larger in scale.

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 the variance would not affect the character of the area or be injurious to the use or enjoyment of other property in the vicinity. Areas of the steep slope have been already been altered by development. The addition to the dwelling would be comparatively moderate in size to the existing structure. There are retaining walls on both sides of the public alley as well as on the north side of the property for the neighbor's driveway. Regrading would only be necessary at the rear of the site where the driveway is proposed. The applicant has also indicated that they would plant trees elsewhere on the site to replace those that need to be removed for construction. If granted, the proposed variance will not be detrimental to the health, safety or welfare of the public or those utilizing the property provided the proposed construction is built to current building codes and the erosion control plan and stormwater management plan is implemented using best practices.

**Additional Standards for Variances within the SH Shoreland Overlay District**

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

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

The site is located across the street from Lake Harriet. A silt fence would be installed to prevent soil erosion during construction. The retaining walls and a stormwater management system would be installed to prevent erosion after construction. The Public Works Department reviewed the erosion control plan and suggested that the silt fence location on the north corner of the addition should be adjusted to prevent it from being knocked over during construction. Staff is recommending that this change is incorporated into the final plans.

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

Because the site is located across the street from Lake Harriet, the proposed structures would have some visibility from the protected water. Visibility of the structures would be reduced by existing vegetation to remain and the structures location at the rear of the property.

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

This standard is not applicable for the proposed development.

**RECOMMENDATIONS**

The Department of Community Planning and Economic Development recommends that the Zoning Board of Adjustment adopt staff findings for the applications by Maria Kenworthy for the property located at 4315 East Lake Harriet Parkway:

**A. Variance to reduce the north minimum interior side yard requirement.**

Recommended motion: **Approve** the variance to reduce the minimum interior side yard requirement adjacent to the north lot line from 12 feet to 6 feet to allow a building addition and from 12 feet to 0 feet to allow a retaining wall not retaining natural grade, 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 September 15, 2018, unless extended by the Zoning Administrator, or the permit may be revoked for non-compliance.

**B. Variance to reduce the south minimum interior side yard requirement.**

Recommended motion: **Approve** the variance to reduce the minimum interior side yard requirement adjacent to the south lot line from 12 feet to 0 feet to allow a retaining wall not retaining natural grade, 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 September 15, 2018, unless extended by the Zoning Administrator, or the permit may be revoked for non-compliance.

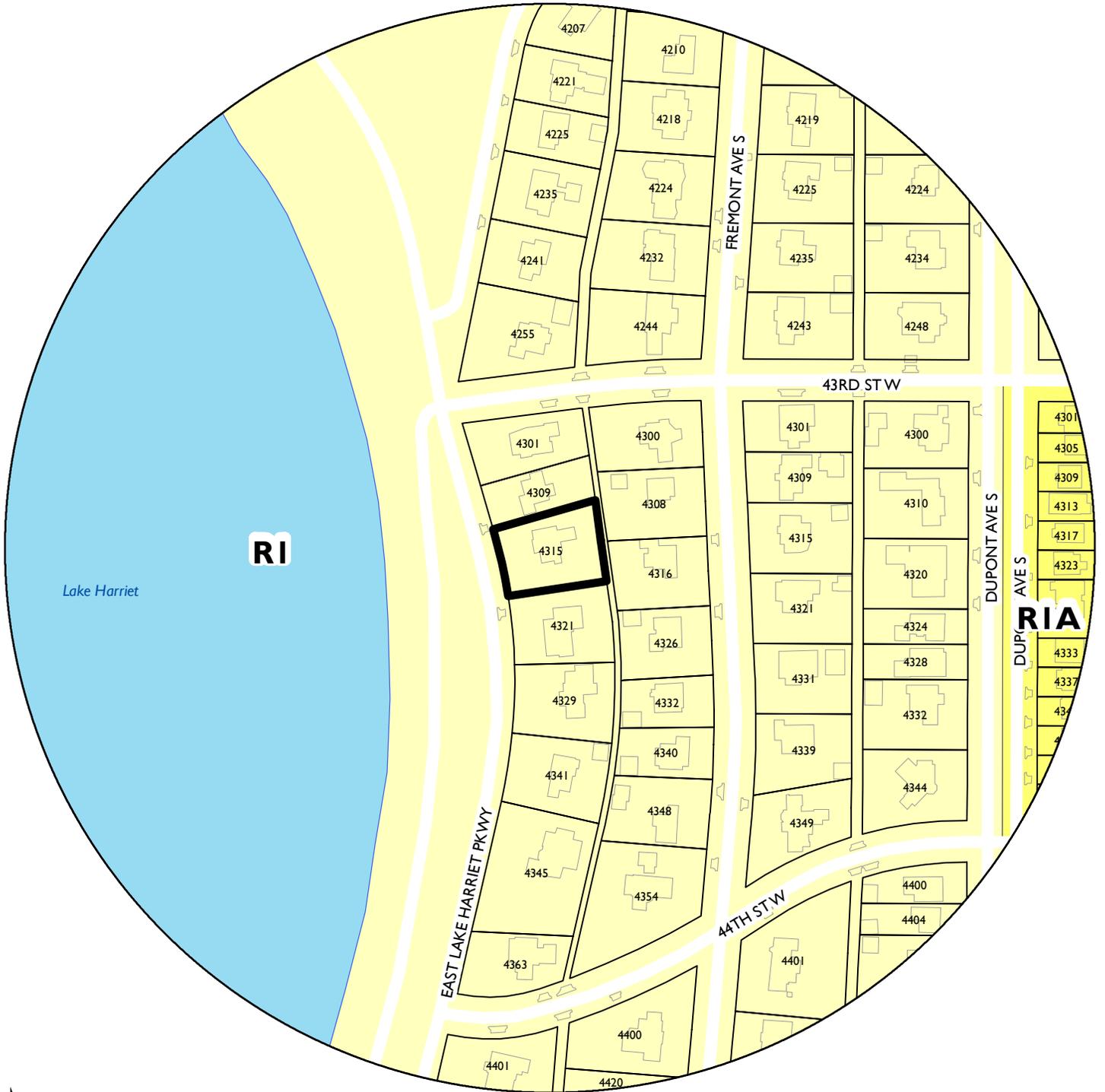
**C. Variance to allow development on a steep slope in the SH Shoreland Overlay District.**

Recommended motion: **Approve** the variance to allow development on or within 40 feet of the top of a steep slope in the SH Shoreland Overlay District allow a building addition, retaining walls and a driveway, subject to the following conditions:

1. Approval of the final site, elevation, floor, erosion control, stormwater management system, and tree removal plans by the Department of Community Planning and Economic Development.
2. All site improvements shall be completed by September 15, 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. Existing survey
4. Proposed site plan
5. Erosion control plan
6. Stormwater management system design
7. Floor plans
8. Building elevations
9. Photos



PROPERTY ADDRESS  
**4315 East Lake Harriet Parkway**

FILE NUMBER  
**BZZ-7844**

## **Practical Difficulties Exist in Complying with Existing Ordinance (3)**

### **1. Steep Slope Shoreline**

This property was purchased in 2016 with all of the steep slopes in their present condition. The home was built in approximately 1932. The conditions, steep slopes, were always present and probably reestablished at that time. The existing garage is what I call unusable because of the steep and short downhill garage entrance from the alley. We were unable to get a dumpster for demolition down the driveway slope. Lloyd's Construction Services was unable to place a dumpster on the property. Because of the Parkway in front of the home, we can't place a dumpster there. Also, curb cuts are no longer an option from the parkway so our only alternative is to relocate the driveway from the southeast corner of the property in order for this home to have a garage that is actually approachable and there for usable.

### **2. Interior Sideyard Setback from 10 ft. to 6 ft. North Property Line**

The next two variances are closely related due to the slopes at the back of the property. Because of the current unusable garage situation, we would like the north sideyard setback reduced from 10 ft. to 6' allowing us the most space available for a flat area in front of the garage. This would reduce the steepness of the new proposed driveway greatly when you enter from the southeast corner. Off street parking is a major concern on East Lake Harriet Boulevard. Parking is nonexistent most of the time because of the people using Lake Harriet. As many of you know that are familiar with Lake Harriet Boulevard, it is unfortunately often full and congested with parked cars. Aesthetically this change will enhance the property greatly, improve safety, and actually divert water coming from the existing alley location.

### **3. Interior Sideyard Setback from 10 ft. to 0 ft. Southeast Corner**

This variance would allow us to move the drive and retaining wall as far south as possible which would once again give the driveway as gentle of a slope as possible. Both number 2 & number 3 would increase off street parking and reduce the driveway slope.

## **Property Owner Proposes to Use the Property in a Reasonable Manner**

**Maria Kenworthy, the property owner, will renovate the five bedroom house in a careful thorough manner.**

- A. The windows will be replaced to match style, size, and shape of the existing.**
- B. Central Air Conditioning will be added which will eliminate the need for the many window units currently installed.**
- C. New kitchen and bathrooms in keeping with the style of the house.**
- D. My intent is to bring the home to the level of finish that homeowners request, without compromising on quality and originality of this home. When this project is finished, as I have planned, the only difference will be, that it is completely updated and carefully restored as these beautiful old homes deserve and are in need of.**

**As always, I follow and respect ordinances and code requirement. My passion is to keep these homes from being destroyed by carelessness and no regard for the beautiful old architecture that we savor in this city and are proud of.**

## **The Proposed Variance will not alter the Essential Character of the Locality**

- 1. As for altering the character of the property, the completed project will be a tremendous improvement to the Lake Harriet neighborhood.**
- 2. The welfare and safety of people approaching the property from the alley will be greatly improved, whether on foot or by car.**
  - a. Trash pickup.**
  - b. Mail/Parcel Delivery**
  - c. Yard maintenance.**
- 3. Neighboring homeowners will have a much improved and stellar property to enjoy.**

# BOUNDARY AND TOPOGRAPHIC SURVEY FOR M K I, INC.

## OF LOTS 27 & 28, BLOCK 3, LYNNHURST HENNEPIN COUNTY, MINNESOTA

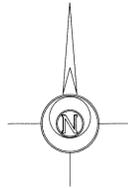
**LEGAL DESCRIPTION OF PREMISES:**

Lots 27 and 28, Block 3, Lynnhurst, Minneapolis, Minnesota.

This survey shows the boundaries and topography of the above described property, and the location of an existing house, driveway, and all other existing "hardcover" thereon. It does not purport to show any other improvements or encroachments.

- : Iron marker found
- : Iron marker set
- : Existing contour line

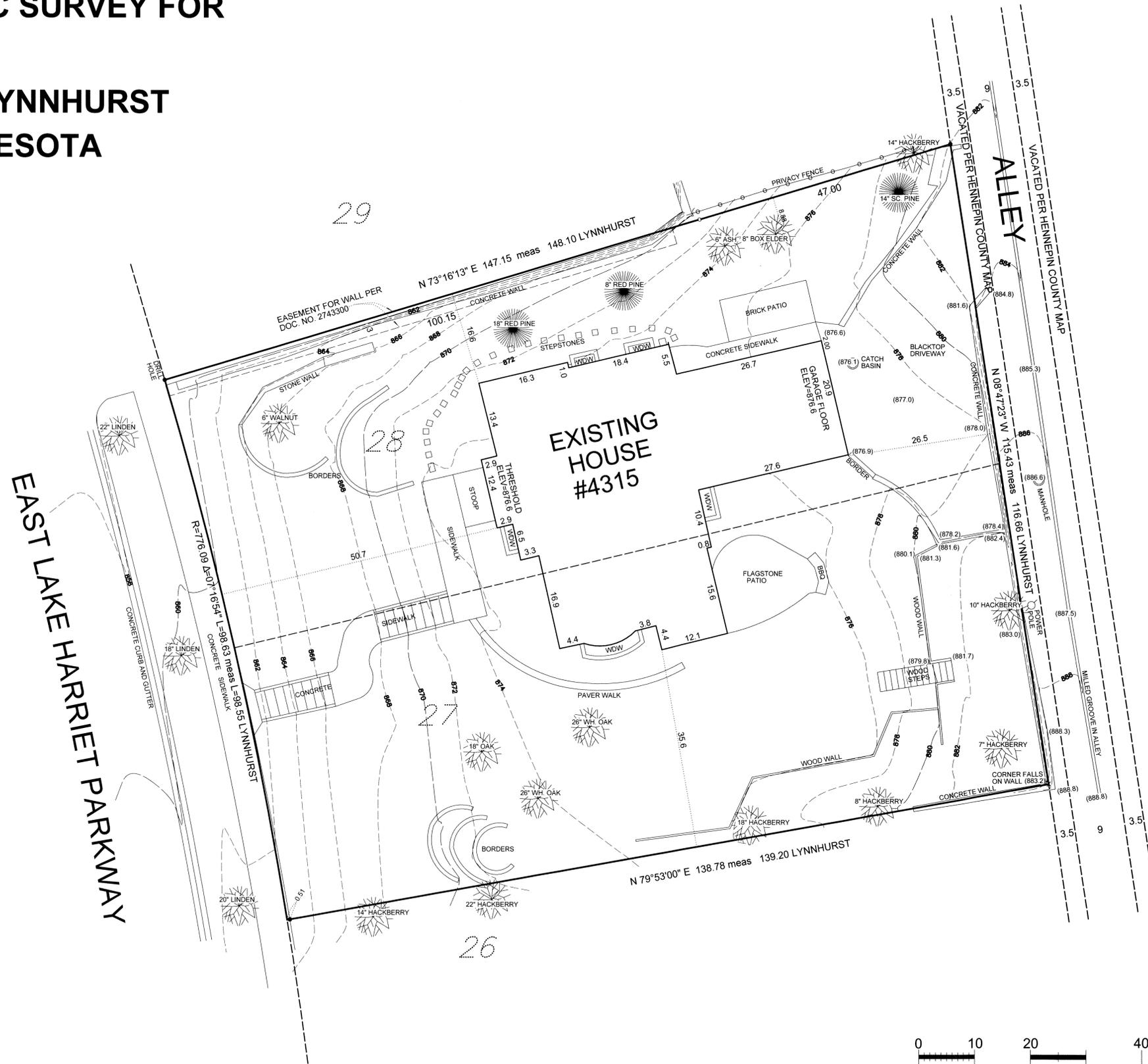
Note: The certificate of title for this property only includes Lots 27 and 28. The tax descriptions include an additional 3.5 feet of vacated alley.



**EXISTING HARDCOVER**

LOT	15140+- S.F.
HOUSE	2268+- S.F.
CONCRETE WALKS	523+-
PAVER WALK	51+-
DRIVEWAY	1192+-
BRICK PATIO	121+-
FLAGSTONE PATIO	225+-
BBQ	13+-
BORDERS	82+-
WOOD WALL & STEPS	79+-
WALLS	320+-
WINDOWWELLS	33+-
STEPSTONES	24+-
<b>TOTAL</b>	<b>4931+- S.F.</b>
	4931/15140=32.57%

EAST LAKE HARRIET PARKWAY



REVISIONS	
DATE	REMARKS

DESIGNED	CHECKED
DRAWN	

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 Land Surveyor under the laws of the State of Minnesota.

*Michael J. [Signature]*  
DATE: 5-9-15 MINN. LICENSE NUMBER: 22,755-5



**GRONBERG & ASSOCIATES, INC.**  
CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS  
445 N. WILLOW DRIVE LONG LAKE, MN 55356  
PHONE: 952-473-4141 FAX: 952-473-4435

DATE	5-4-16
SCALE	1" = 10'
TAX	16-169
SHEET	1 OF 2

# BOUNDARY AND TOPOGRAPHIC SURVEY FOR M K I, INC.

## OF LOTS 27 & 28, BLOCK 3, LYNNHURST HENNEPIN COUNTY, MINNESOTA

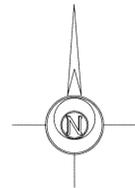
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- - - : Existing contour line
- - - : Proposed contour line
- (876.6) : Existing spot elevation
- (877.5) : Proposed spot elevation

Note: The certificate of title for this property only includes Lots 27 and 28. The tax descriptions include an additional 3.5 feet of vacated alley.



**EXISTING HARDCOVER**

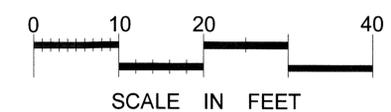
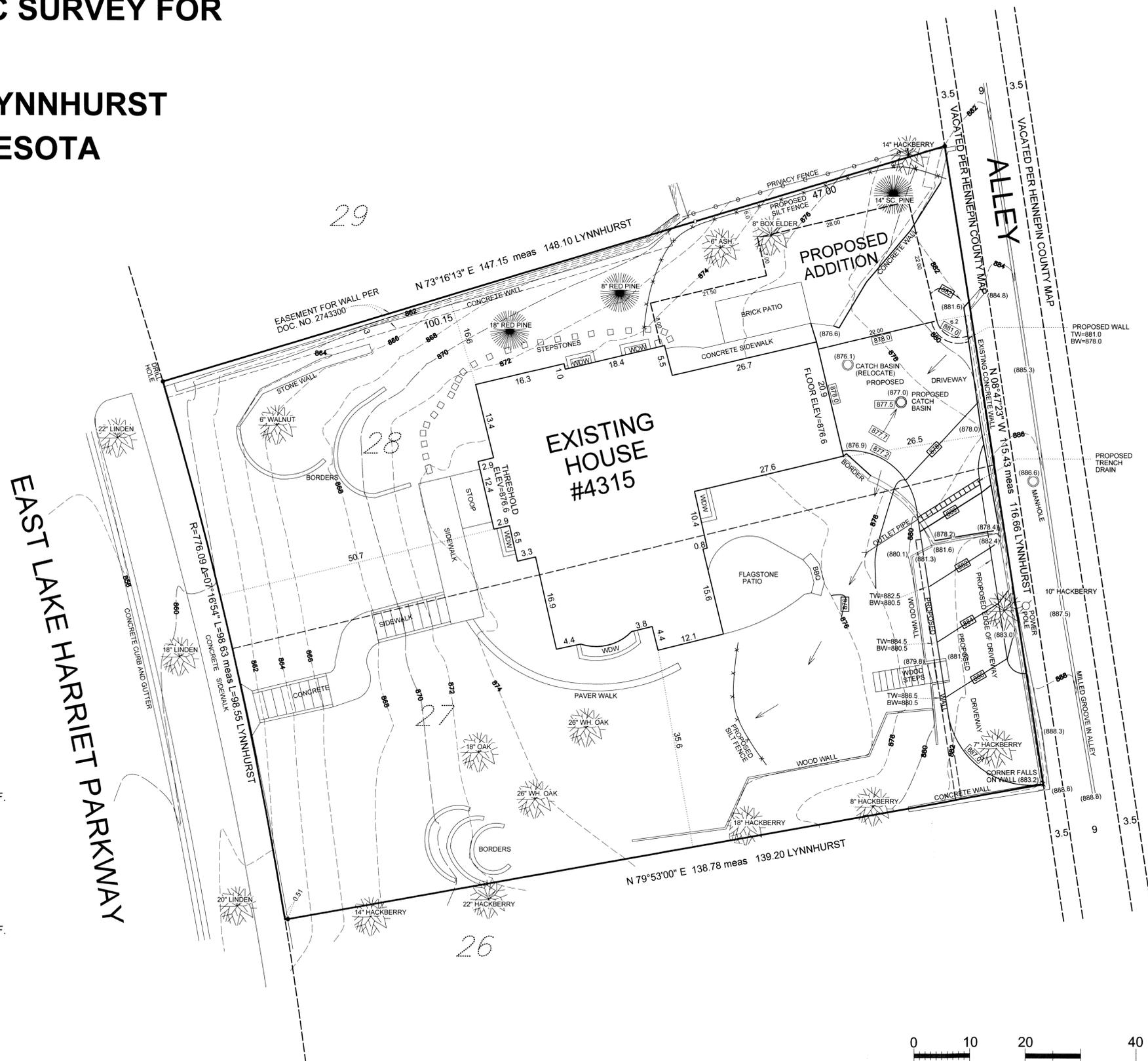
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TOTAL 4931+- S.F.  
4931/15140=32.57%

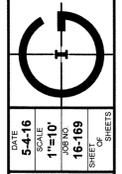
**PROPOSED ADDITION**

REMOVE	
DRIVEWAY	1192+- S.F.
BRICK PATIO	121+-
CONCRETE WALK	99+-
WALLS	88+-
WOOD WALL AND STEPS	79+-
ADD	
ADDITION	896+-
NEW DRIVEWAY	1316+-
NEW WALL	46+-
NEW TOTAL	5610+- S.F.

5610/15140=37.05%



**GRONBERG & ASSOCIATES, INC.**  
CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS  
445 N. WILLOW DRIVE LONG LAKE, MN 55356  
PHONE: 952-473-4141 FAX: 952-473-4435



DATE	5-4-16
SCALE	1"=40'
PROJECT	27-28
SHEET	16-169
SHEETS	16

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 Land Surveyor under the laws of the State of Minnesota.

DATE 5-4-16 MINN. LICENSE NUMBER 22255

DESIGNED		
DRAWN		
CHECKED		
REVISIONS		
DATE	BY	REMARKS
7-19-16		PROPOSED DRIVEWAY, GRADES ADDED
8-12-16		HARDCOVER ADDED

# SOILS EROSION AND SEDIMENT CONTROL FOR M K I, INC. OF LOTS 27 & 28, BLOCK 3, LYNNHURST HENNEPIN COUNTY, MINNESOTA

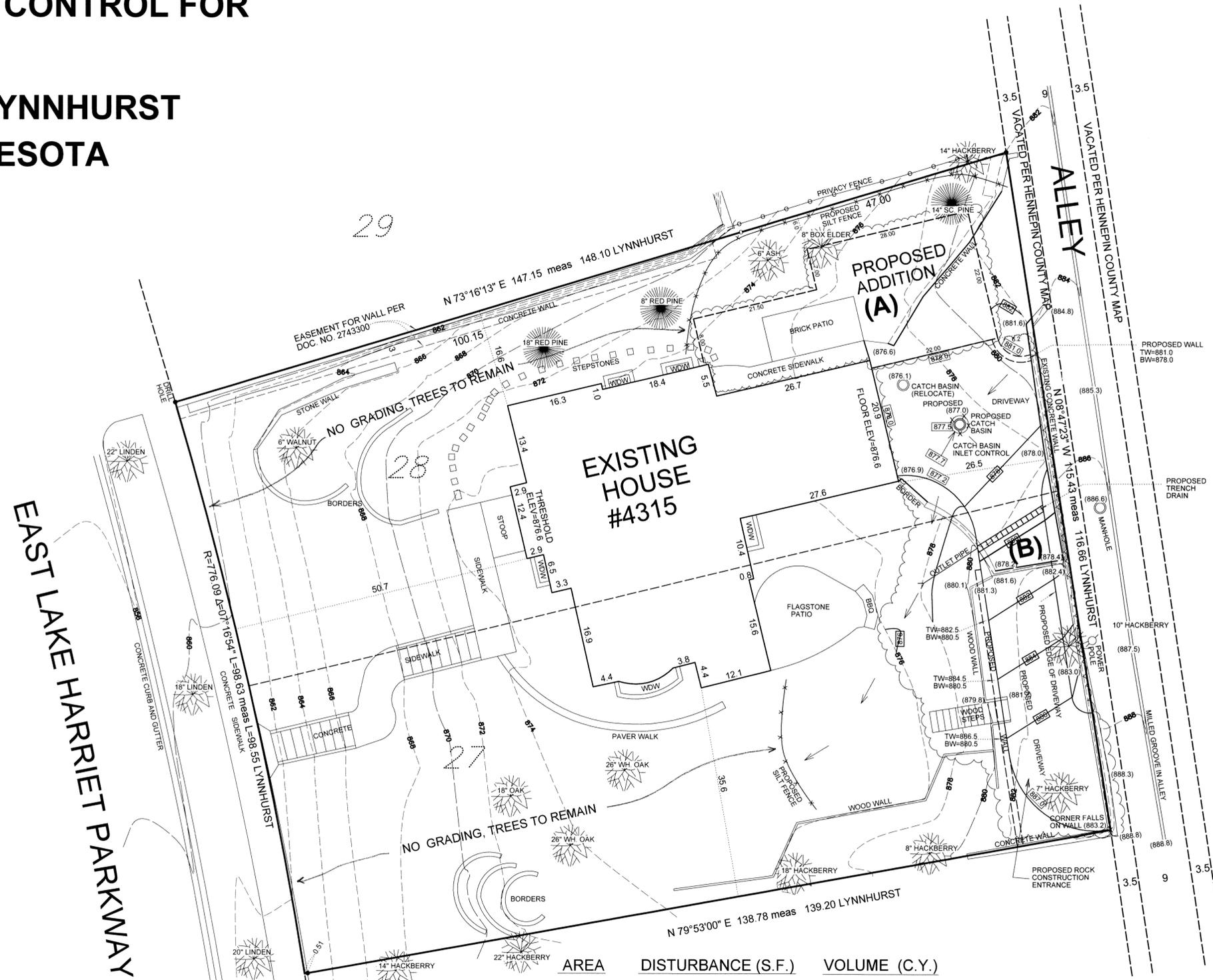
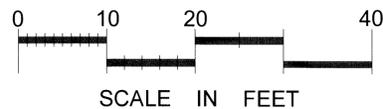
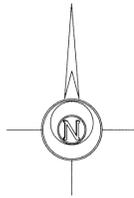
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	AREA	DISTURBANCE (S.F.)	VOLUME (C.Y.)
26 (A)		1060	120 C.Y. EXCAVATION
(B)		2200	30 C.Y. EXCAVATION
			100 C.Y. FILL
TOTALS	3260		150 C.Y. EXCAVATION 100 C.Y. FILL

**GRONBERG & ASSOCIATES, INC.**  
CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS  
445 N. WILLOW DRIVE LONG LAKE, MN 55356  
PHONE: 952-473-4141 FAX: 952-473-4435

DATE: 8-12-16

SCALE: 1"=10'

JOB NO: 16-169

SHEET NO: 16-169

DESIGNED: \_\_\_\_\_

DRAWN: \_\_\_\_\_

CHECKED: \_\_\_\_\_

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 Land Surveyor under the laws of the State of Minnesota.

DATE: 8-12-16 MINN. LICENSE NUMBER: 12,255





September 1<sup>st</sup>, 2016

Maria Kenworthy  
MKI Incorporated  
4534 Freemont Ave. S.  
Minneapolis, MN 55419

Re: 4315 East Lake Harriet Parkway, Minneapolis

Maria,

As requested, we have performed a stormwater analysis on the referenced project site, including the design of a proposed underground infiltration system to mitigate stormwater impacts. The following have been included for your reference:

1. Existing and proposed drainage area maps, including the approximate location of the proposed infiltration system.
2. Infiltration system details.
3. Stormwater runoff calculations

The table below summarizes and compares the existing and proposed stormwater runoff volumes and rates.

Location	Runoff Volume (CF)		Peak Flow (cfs)					
	1.1" Infiltration Event		Return Period					
			2-yr		10-yr		100-yr	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
West	11	7	0.21	0.18	0.60	0.53	1.54	2.01
North	12	3	0.11	0.05	0.26	0.15	0.60	0.39
Sanitary	95	0	0.12	0.00	0.19	0.00	0.31	0.00
<b>OVERALL</b>	<b>119</b>	<b>10</b>	<b>0.44</b>	<b>0.23</b>	<b>1.04</b>	<b>0.68</b>	<b>2.44</b>	<b>2.40</b>

Comparison between the existing and proposed conditions shows that overall proposed runoff volume from the site is reduced, and peak runoff rates from the site are reduced for all storm events. Of particular concern are flows to the northern adjacent property, and the existing driveway storm drain directly connected to the City sanitary sewer system. Runoff volume and flow rates for all storms are reduced to the north, and the sanitary sewer connection is proposed to be abandoned. Under proposed conditions, a portion of the flows to the north and the area previously draining to the sanitary sewer will be routed to an underground infiltration system (see drainage area maps). Rerouting of a portion of the north drainage area and the area previously routed the sanitary sewer results in a slightly higher 100-yr peak flow to the west under proposed conditions. However, we believe this to be acceptable as runoff volumes and peak flow rates from the site as a whole are reduced.

Please don't hesitate to contact me should you have questions.

Lance R. Hoff, P.E.  
Direct – 612.710.7053

# BLK 3, LYNNHURST MINNESOTA

EAST LAKE HARRIET PARKWAY

29

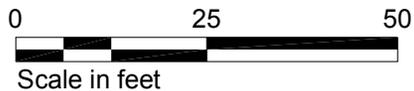
26

EXISTING  
HOUSE  
#4315

**NORTH:**  
TOTAL AREA: 3,600 SF  
IMP AREA: 1,220 SF

**SANITARY:**  
TOTAL AREA: 1,288 SF  
IMP AREA: 3,216 SF

**WEST:**  
TOTAL AREA: 10,252 SF  
IMP AREA: 2,435 SF



**TRITON**  
STORMWATER SOLUTIONS



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PHONE: (810) 222-7652 • FAX: (810) 222-1769  
WWW.TRITONSW.COM

## DRAINAGE AREAS EXISTING CONDITIONS

4315 EAST LAKE HARRIET PARKWAY

MINNEAPOLIS, MN

9-1-2016

OWNER:

MKI INCORPORATED

ENGINEER:

GRONBERG & ASSOCIATES, INC.

TRITON  
PRJ. #:

4225

DESIGNED BY: LRH

REVISIONS:

**GRONBERG & ASSOC**  
CIVIL ENGINEERS, LAND SURVEYOR  
445 N. WILLOW DRIVE LONG  
PHONE: 952-473-4141



5416  
SCALE  
1"=10'  
16-688  
SHEET

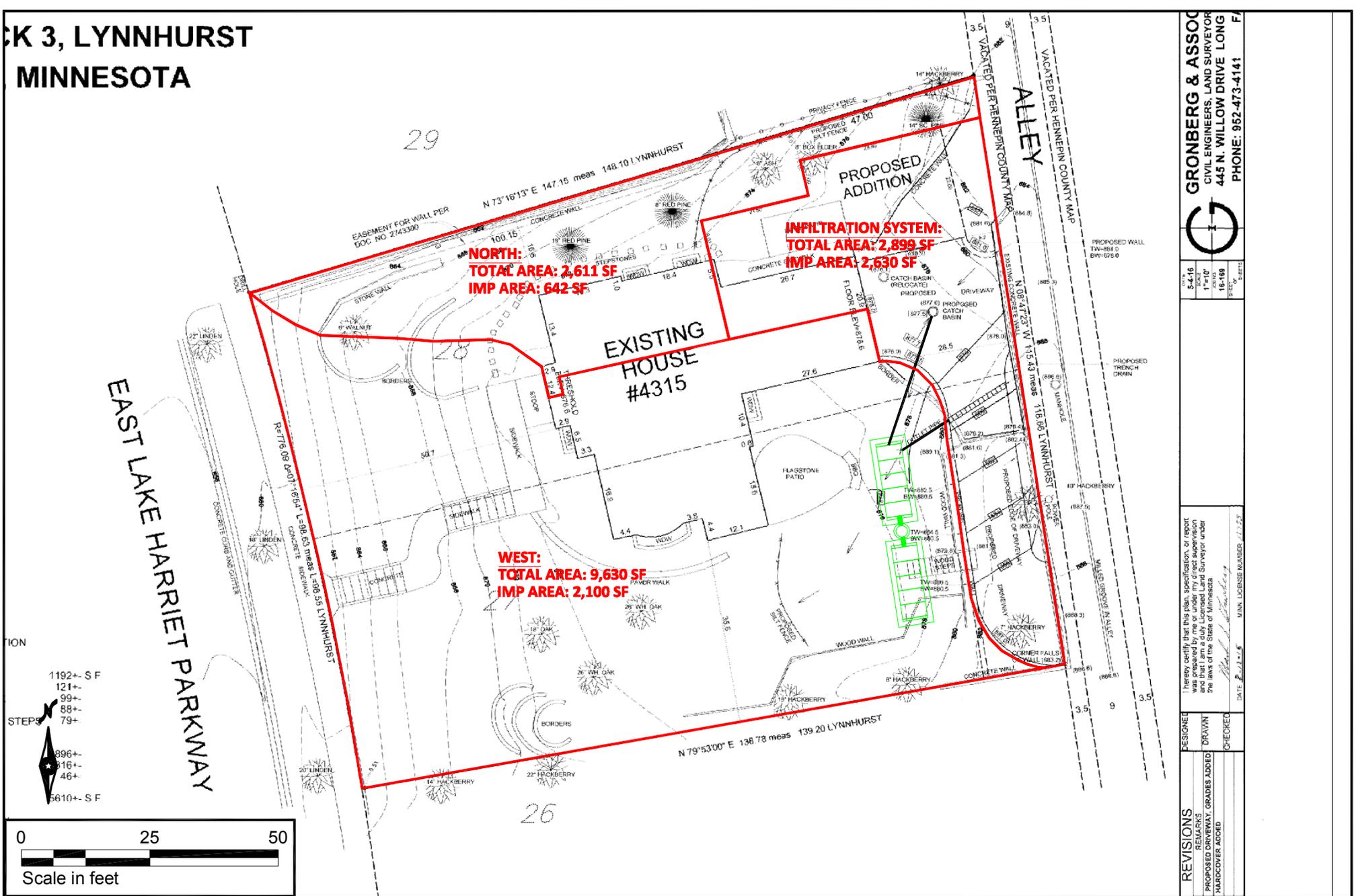
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

DATE: 9-1-16 MNN. LICENSE NUMBER: 22,255-C

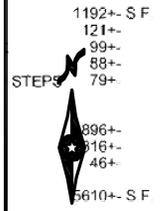
DESIGNER  
DRAWN  
CHECKED

REVISIONS  
REMARKS

**BLK 3, LYNNHURST  
MINNESOTA**



**EAST LAKE HARRIET PARKWAY**



**GRONBERG & ASSOCIATES, INC.**  
 CIVIL ENGINEERS, LAND SURVEYORS  
 445 N. WILLOW DRIVE LONG BEACH, MN  
 PHONE: 952-473-4141

**54-16**  
 SCALE: 1"=10'  
 SHEET: 16-108  
 DATE: 9-1-2016

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.

DESIGNED: [Signature]  
 DRAWN: [Signature]  
 CHECKED: [Signature]

REVISIONS:  
 REMARKS  
 PROPOSED DRIVEWAY, GRADES ADDED  
 HARD COVER ADDED

**TRITON**  
 U.S. GREEN BUILDING COUNCIL MEMBER  
 STORMWATER SOLUTIONS  
 GREEN  
 U.S. GREEN BUILDING COUNCIL MEMBER

8664 EAST GRAND RIVER, SUITE 110, #176  
 BRIGHTON, MI 48116  
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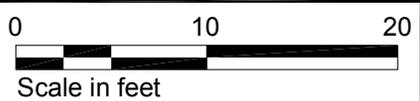
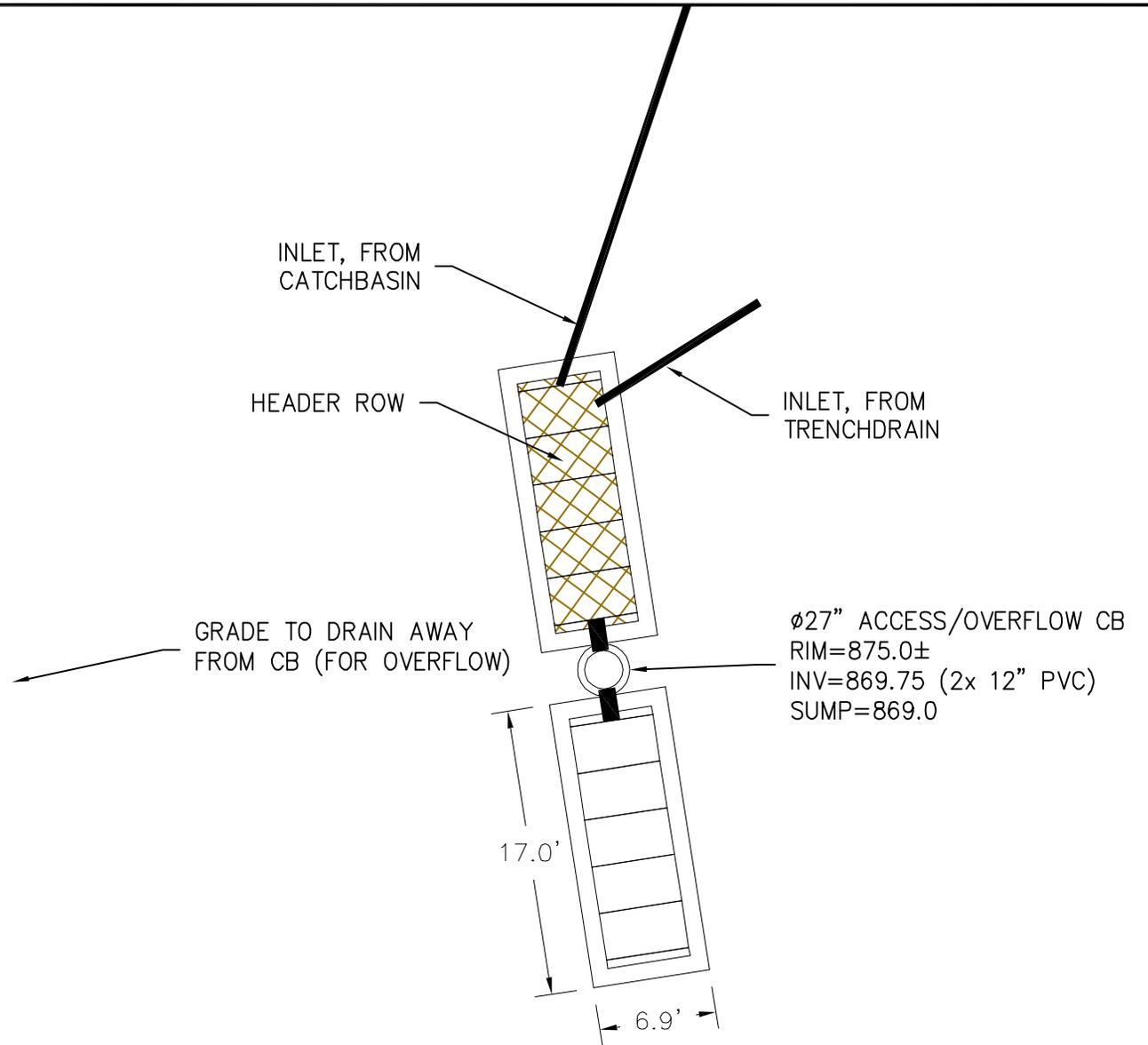
<b>DRAINAGE AREAS PROPOSED CONDITIONS</b>	
4315 EAST LAKE HARRIET PARKWAY	
MINNEAPOLIS, MN	9-1-2016

<b>OWNER:</b>	MKI INCORPORATED
<b>ENGINEER:</b>	GRONBERG & ASSOCIATES, INC.
<b>TRITON PRJ. #:</b>	4225

DESIGNED BY: LRH
REVISIONS:

TRITON SYSTEM:  
 10 S-29 CHAMBERS  
 4 END CAPS  
 6" COVER STONE, 6" BASE STONE  
 24 CY STONE, 40% VOIDS  
 548 CF TOTAL STORAGE

TOP OF STONE - 873.0  
 TOP OF CHAMBER - 872.5  
 CHAMBER INVERT - 869.5  
 BOTTOM OF STONE - 869.0



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 BRIGHTON, MI 48116  
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### TRITON LAYOUT

4315 EAST LAKE HARRIET PARKWAY

MINNEAPOLIS, MN

9-1-2016

OWNER:

MKI INCORPORATED

ENGINEER:

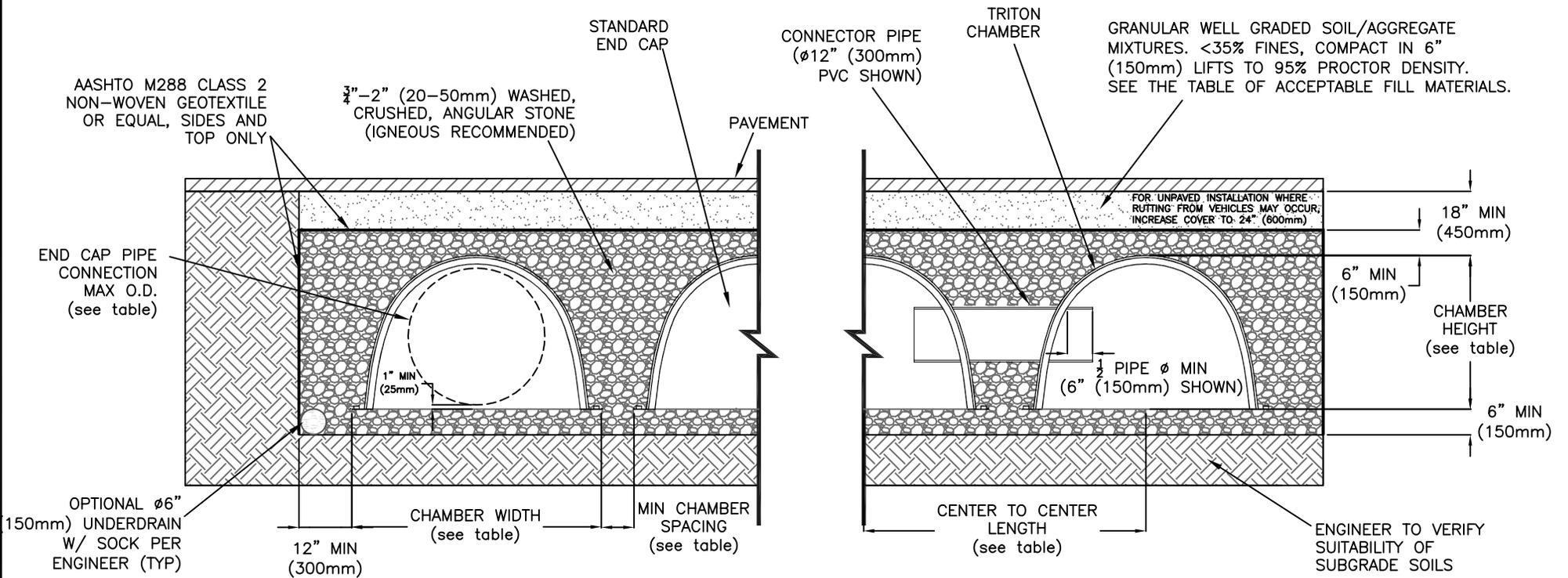
GRONBERG & ASSOCIATES, INC.

TRITON  
 PRJ. #:

4225

DESIGNED BY: LRH

REVISIONS:



	CHAMBER WIDTH	CHAMBER SPACING	CENTER TO CENTER LENGTH	CHAMBER HEIGHT	MAX END CAP CONNECTION
S29	59" (1499mm)	6.0" (150mm) *7.5" (190mm)	66.5" (1690mm)	36" (914mm)	32" (813mm)
S22	55" (1397mm)	6.0" (150mm)	61.0" (1549mm)	35" (889mm)	30" (762mm)
C10	39.7" (1008mm)	6.0" (150mm)	45.7" (1161mm)	25" (635mm)	20" (508mm)
M6	33.6" (853mm)	6.0" (150mm)	39.6" (1006mm)	17.5" (445mm)	14" (356mm)

\*7.5" (190mm) SPACING OF DISTRIBUTION ROWS IS REQUIRED ONLY WHEN A PERPENDICULAR MAIN HEADER ROW IS USED. IF AN INLINE MAIN HEADER ROW IS USED, THEN MIN SPACING CAN BE 6" (150mm)

**CONCEPTUAL PLAN DISCLAIMER**  
 THIS GENERIC DETAIL DOES NOT ENCOMPASS THE SIZING, FIT, AND APPLICABILITY OF THE TRITON CHAMBER SYSTEM FOR THIS SPECIFIC PROJECT. IT IS THE ULTIMATE RESPONSIBILITY OF THE DESIGN ENGINEER TO ASSURE THAT THE STORMWATER SYSTEM DESIGN IS IN FULL COMPLIANCE WITH ALL APPLICABLE LAWS AND REGULATIONS. TRITON PRODUCTS MUST BE DESIGNED AND INSTALLED IN ACCORDANCE WITH TRITON'S MINIMUM REQUIREMENTS. TRITON STORMWATER SOLUTIONS DOES NOT APPROVE PLANS, SIZING, OR SYSTEM DESIGNS. THE DESIGN ENGINEER IS RESPONSIBLE FOR ALL DESIGN DECISIONS.

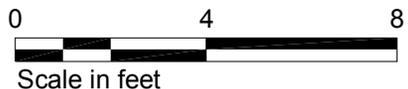
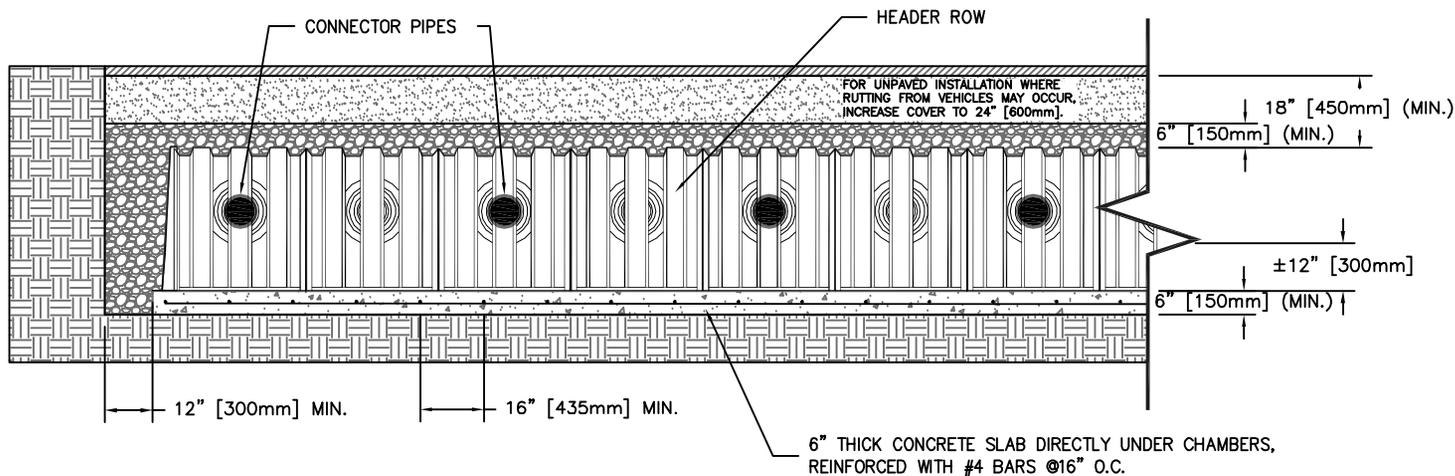
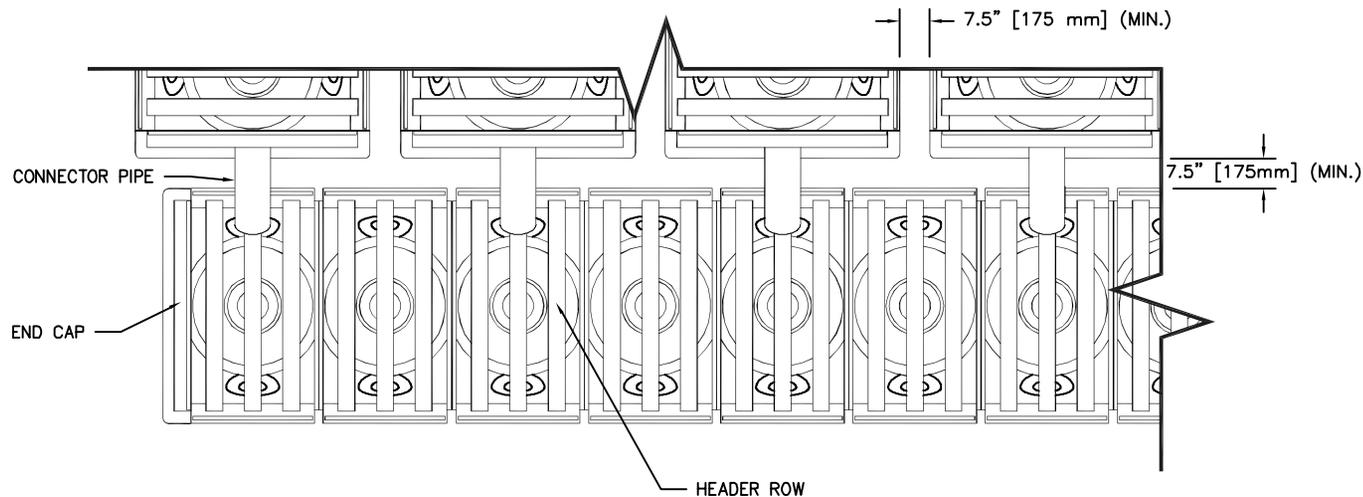
**TRITON**  
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# CHAMBER CROSS SECTION INFILTRATION

TRITON - STANDARD DETAILS

REVISED:  
 02-26-16 JWM



**CONCEPTUAL PLAN DISCLAIMER:**  
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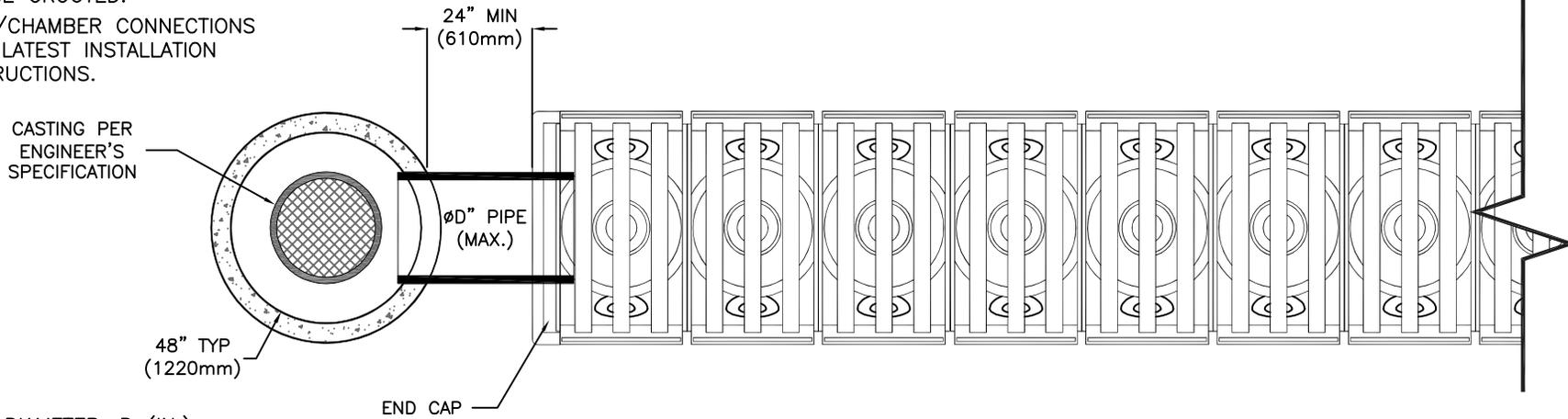
## TRITON HEADER ROW WITH CONCRETE BASE SLAB

TRITON - STANDARD DETAILS

REVISED:  
 8-10-16 LRH

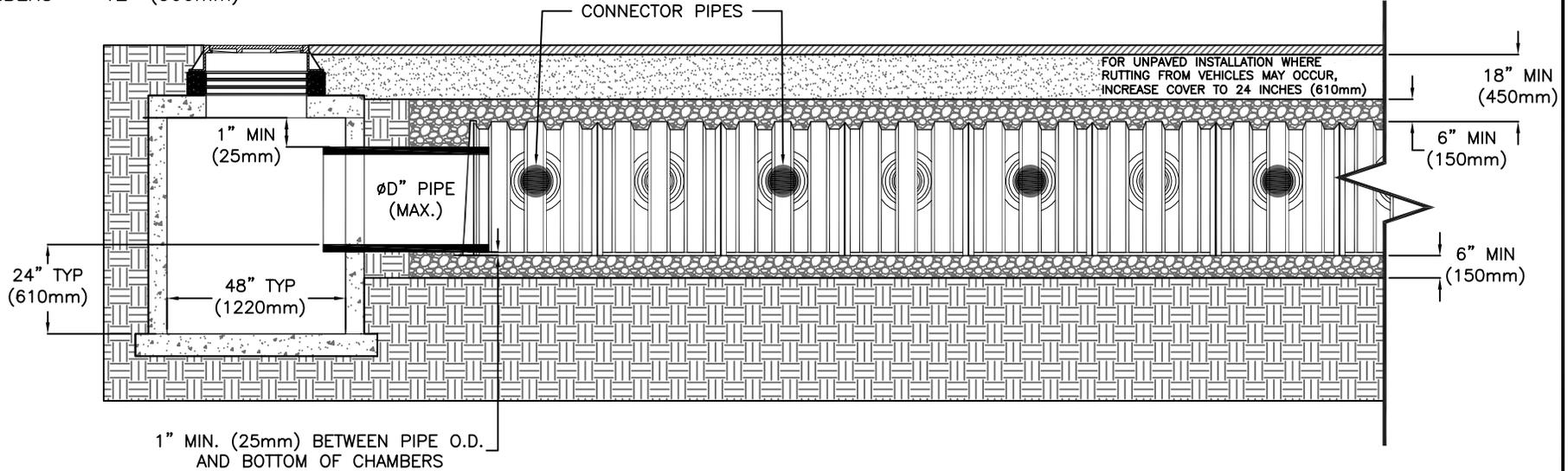
**NOTES:**

1. PIPE/MANHOLE CONNECTIONS TO BE GROUTED.
2. PIPE/CHAMBER CONNECTIONS PER LATEST INSTALLATION INSTRUCTIONS.



**MAX PIPE DIAMETER, D (IN.):**

- S-29 CHAMBERS = 24" (610mm)
- S-22 CHAMBERS = 24" (610mm)
- C-10 CHAMBERS = 18" (450mm)
- M-6 CHAMBERS = 12" (300mm)



**CONCEPTUAL PLAN DISCLAIMER**  
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# HEADER ROW ACCESS STANDARD MH CONNECTION

TRITON - STANDARD DETAILS

REVISED:  
 01-28-16 JWM

# TRITON S-29 PRODUCT SPECIFICATIONS

## 1.0 General

1.1 Triton chambers are designed to control stormwater runoff. As a subsurface retention or detention system, Triton chambers retain and allow effective infiltration of water into the soil. As a subsurface detention system, Triton chambers detain and allow for the metered flow of water to an outfall.

## 2.0 Chamber Parameters

- 2.1 The chamber shall be injection compression molded of a structural grade 1010 green soy resin composite to be inherently resistant to environmental stress cracking (ESCR), creep, and to maintain proper stiffness through temperature ranges of -40 degrees Fahrenheit to 180 degrees Fahrenheit (-40 degrees Celsius to 82.2 degrees Celsius).
- 2.2 The material property for the chamber and end cap must meet or exceed the following:  
 Tensile Strength- Ultimate: 21,755 PSI (150 Mpa)  
 Tensile Strength-Yield: 17,404 PSI (120 Mpa)  
 Tensile Modulus: 1,750-2,240 KSI (12,066 Mpa - 15,444 Mpa)  
 Flex Modulus: 1,600 KSI (11,032 Mpa)  
 Flex Yield Strength: 33,100 PSI (228 Mpa)  
 Compressive Strength: 30,457 PSI (210 Mpa)  
 Shear Strength: 11,500 PSI (79 Mpa)
- 2.3 The nominal chamber dimensions of the Triton S-29 shall be 36.0 inches tall (914 millimeters), 59.0 inches wide (1499 millimeters) and 35.36 inches long (898 millimeters). Lay-up length is 33.35 inches (847 millimeters).
- 2.4 The chamber shall have an elliptical curved section profile.
- 2.5 The chamber shall be open-bottomed.
- 2.6 The chamber shall incorporate an overlapping corrugation joint system to allow chamber rows to be constructed.
- 2.7 The nominal storage volume of a Triton S-29 chamber shall be 41.05 cubic feet (1.162 cubic meters) per chamber when installed per Triton's typical details. This equates to 2.67 cubic feet (0.075 cubic meters) of storage per square foot of bed. This does not include perimeter stone.
- 2.8 The chamber shall have both of its ends open to allow for unimpeded hydraulic flows and visual inspections down a row's entire length.
- 2.9 The chamber shall have five corrugations to achieve strengths defined above.
- 2.10 The chamber shall have five circular and elliptical, indented and raised, surfaces on the top to the chamber for a maximum of 24 inch (610 millimeter) diameter optional top feed inlets, inspection ports and/or clean-out access ports.
- 2.11 The chamber shall have five elliptical, indented, surfaces on either side of the chamber for optional feed inlets, outlets. Capable of accepting pipe O.D. up to 18 inches (450 millimeters).

2.12 The chamber shall be analyzed, designed and field tested using AASHTO LRFD bridge design specifications 1. Design live load shall meet or exceed the AASHTO HS30 or a rear axle load of 48,000 pounds (21,772.4 kg). Design shall consider earth and live loads without pavement as appropriate for the minimum 18 inches (457 millimeters) of total cover to a maximum total cover of 50 feet (15.24 meters).

2.13 The chamber shall be manufactured in an ISO 9001:2008 certified facility

2.14 The service life of the product is over 60 years under a constant sustained load of 10,000 PSI (68.95 Mpa) which is equal to the H-20 loading condition. Under typical loading conditions the Chamber and End Cap has a useful life span of 120 years from date of when manufactured.

## 3.0 End Cap Parameters

- 3.1 The end cap shall be Injection Compression molded of 1010 green soy resin to be inherently resistant to environmental stress cracking (ESCR), creep and to maintain proper stiffness through temperature ranges of -40 degrees Fahrenheit to 180 degrees Fahrenheit (-40 degrees Celsius to 82.2 degrees Celsius).
- 3.2 The end cap shall be designed to fit over the last corrugation of a chamber, which allows: the capping of each end of the chamber row.
- 3.3 The end cap shall have six upper saw guides capable of accepting pipe O.D. up to 17.81 inches (452 millimeters), five middle saw guides capable of accepting pipe O.D. up to 15.99 inches (406mm) and eight lower saw guides capable of accepting pipe O.D. up to 27.92 inches (709 millimeters) to allow easy cutting for various diameters of pipe that may be used to inlet or outlet the system. See end cap detail for further details.
- 3.4 The end cap shall have excess structural adequacies to allow cutting an orifice of any size at any invert elevation.
- 3.5 The primary face of an end cap shall have five corrugations and be angled outward to resist horizontal loads generated near the edges of beds.
- 3.6 The end cap shall be manufactured in an ISO 9001:2008 certified facility.
- 3.7 The service life of the product to be over 60 years under a sustained load of 10,000 PSI (68.95 Mpa) which is equal to the H-20 loading condition.
- 3.8 The nominal storage volume of a Triton S-29 end cap shall be 4.98 cubic feet (0.141 cubic meters) per end cap when installed per triton's typical details. This equates to 1.83 cubic feet (0.052 cubic meters) of storage per square foot of bed.

## 4.0 Installation

4.1 Installation shall be in accordance with the latest Triton Installation manual that can be downloaded from the Triton website: [www.tritonsws.com/support/downloads](http://www.tritonsws.com/support/downloads)

**CONCEPTUAL PLAN DISCLAIMER**  
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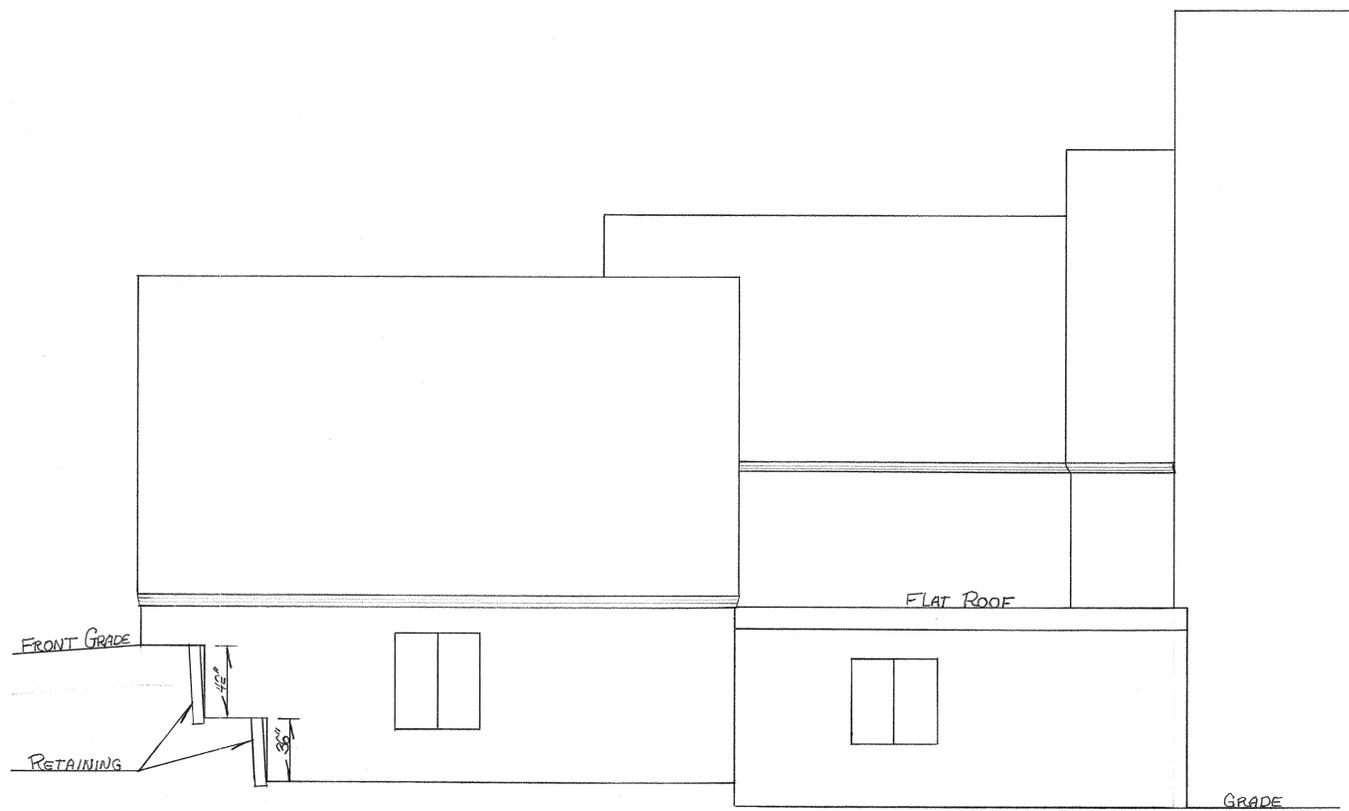
7600 EAST GRAND RIVER, STE.195  
 BRIGHTON, MI 48114  
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# S-29 PRODUCT SPECIFICATIONS

TRITON - STANDARD DETAILS

REVISED:

03-02-16 JWM



NORTH ELEVATION

SCALE: 1/4" = 1'	APPROVED BY:	DRAWN BY:
DATE:		REVISED:
1		
DRAWING NUMBER		PAGE 1/2

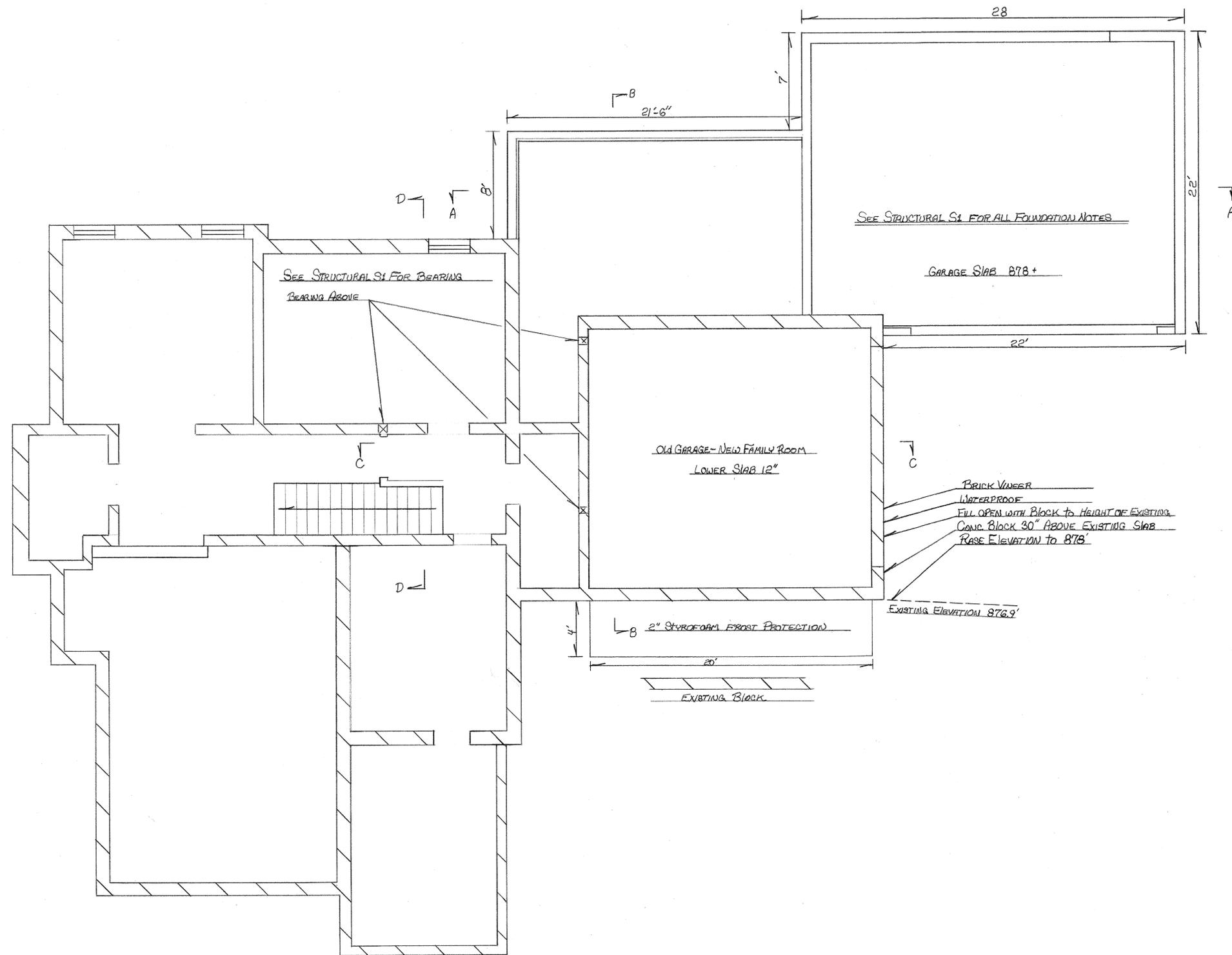


EAST ELEVATION

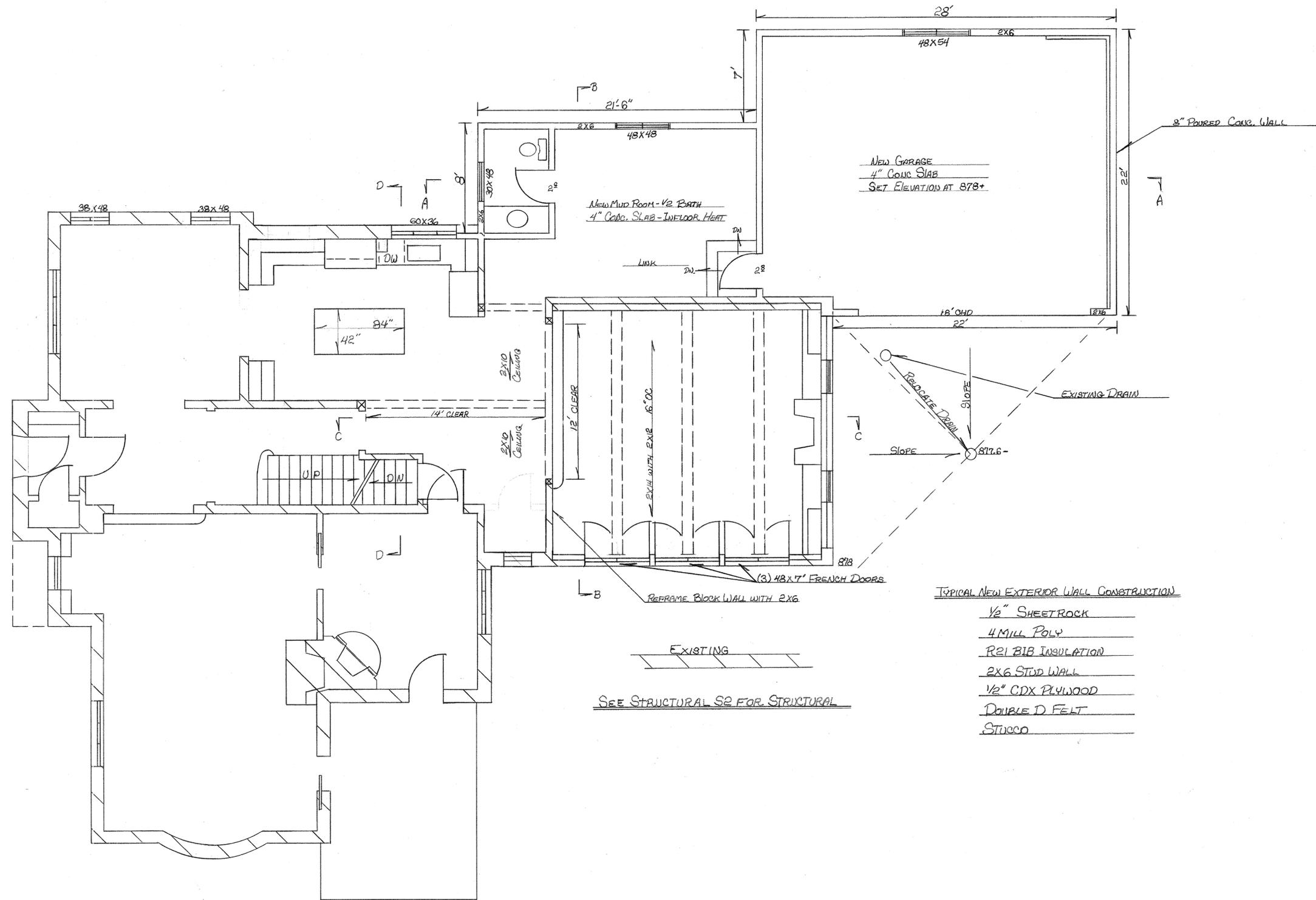


SOUTH ELEVATION

ELEVATIONS		
SCALE: 1/4" = 1'	APPROVED BY:	DRAWN BY: JB
DATE:		REVISED:
		DRAWING NUMBER
		PAGE 1



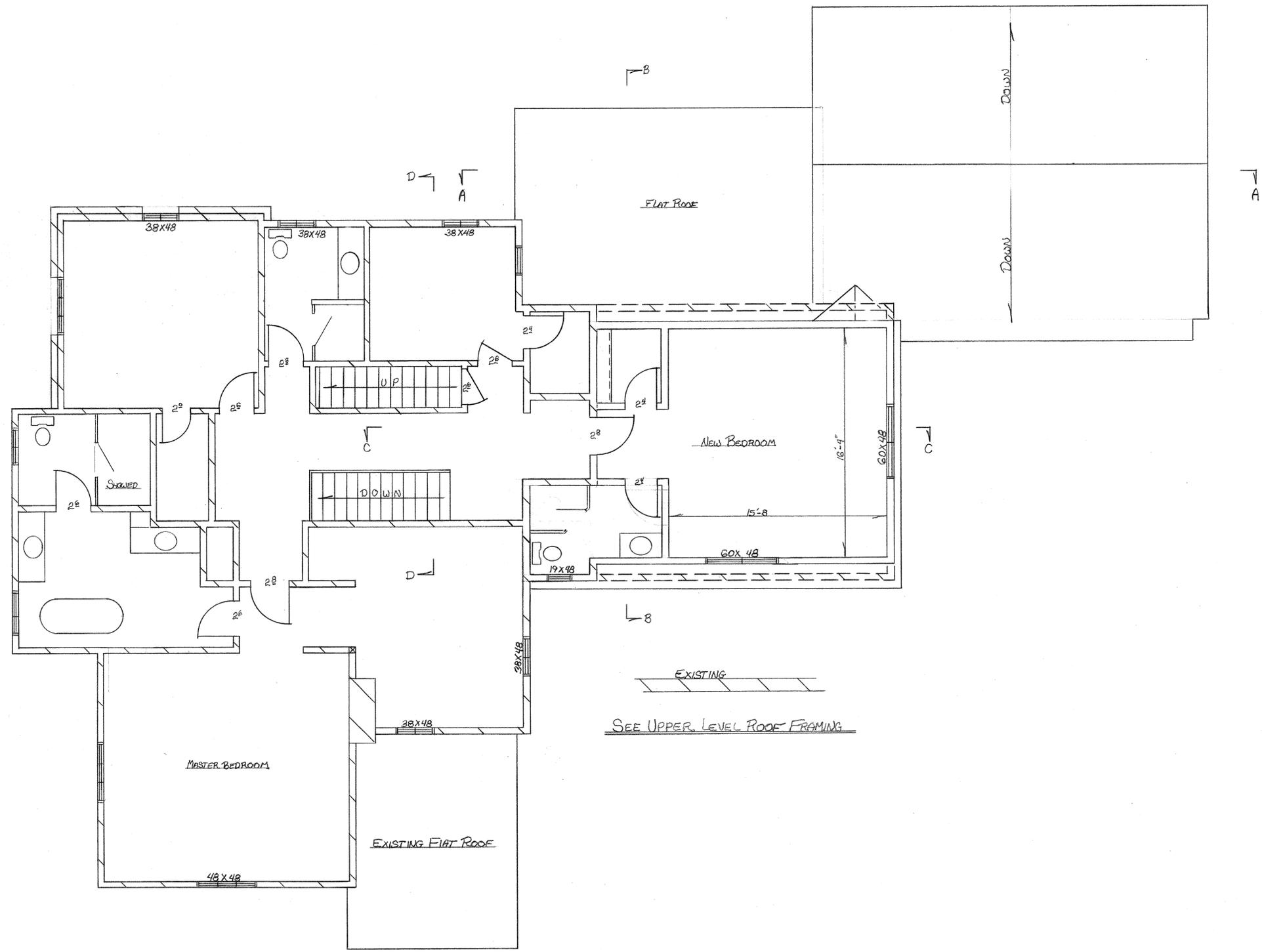
<u>Basement</u>		
SCALE: 1/4" = 1'	APPROVED BY:	DRAWN BY: JFB
DATE:		REVISED:
DRAWING NUMBER		PAGE 2



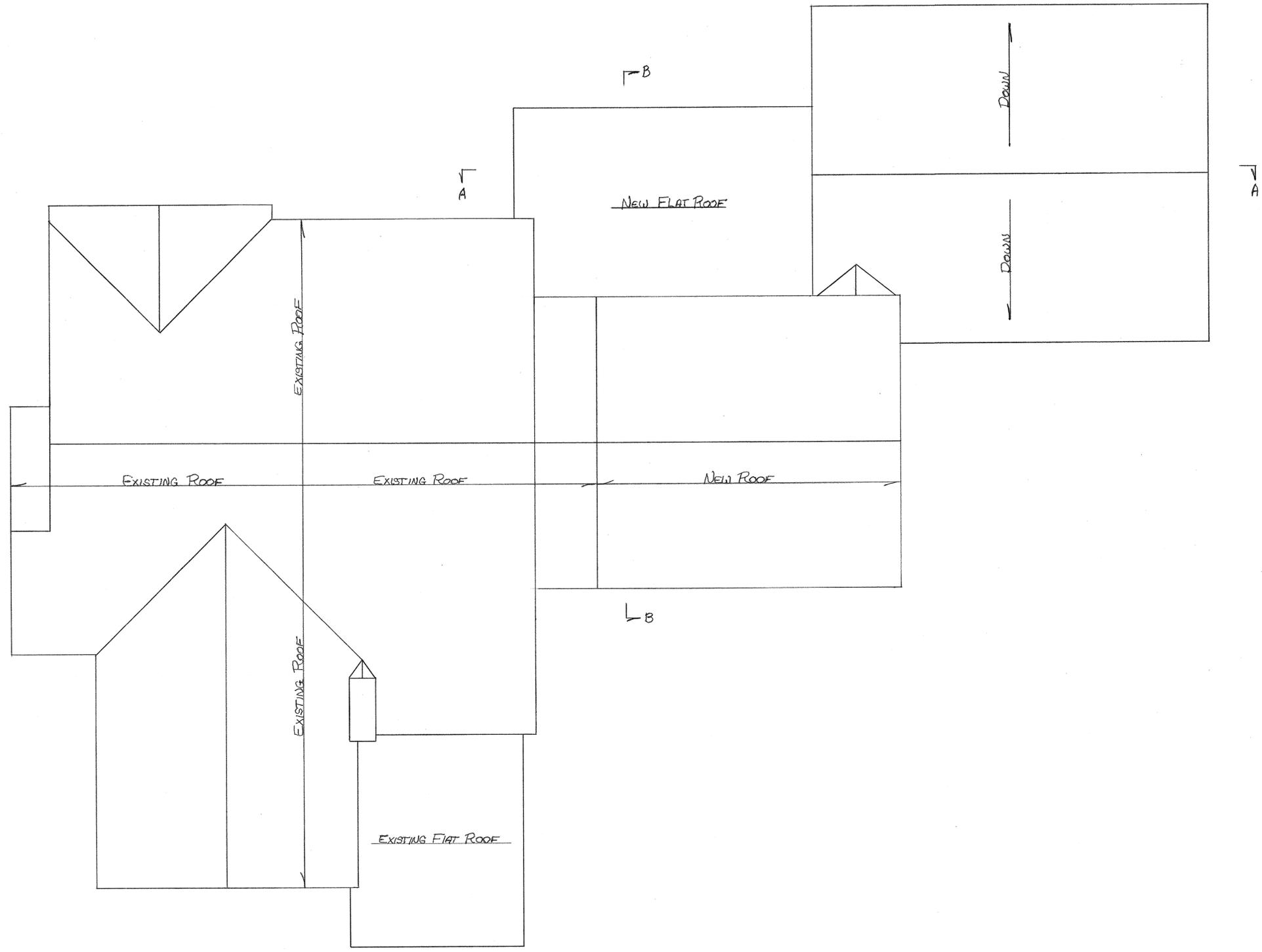
- TYPICAL NEW EXTERIOR WALL CONSTRUCTION
- 1/2" SHEETROCK
  - 4 MILL POLY
  - R21 B18 INSULATION
  - 2X6 STUD WALL
  - 1/2" CDX PLYWOOD
  - DOUBLE D FELT
  - STUCCO

SEE STRUCTURAL S2 FOR STRUCTURAL

1 <sup>ST</sup> FLOOR		APPROVED BY:	DRAWN BY JB
SCALE: 1/4" = 1'			REVISED
DATE: 7-18-16			
1 <sup>ST</sup> FLOOR		DRAWING NUMBER	PAGE 3



2 <sup>ND</sup> FLOOR		
SCALE: 1/4" = 1'	APPROVED BY:	DRAWN BY:
DATE:		REVISED:
DRAWING NUMBER		PAGE 4



<u>ROOF PLAN</u>		
SCALE: 1/4"=1'	APPROVED BY:	DRAWN BY:
DATE:		REVISED:
DRAWING NUMBER		PAGE 5





