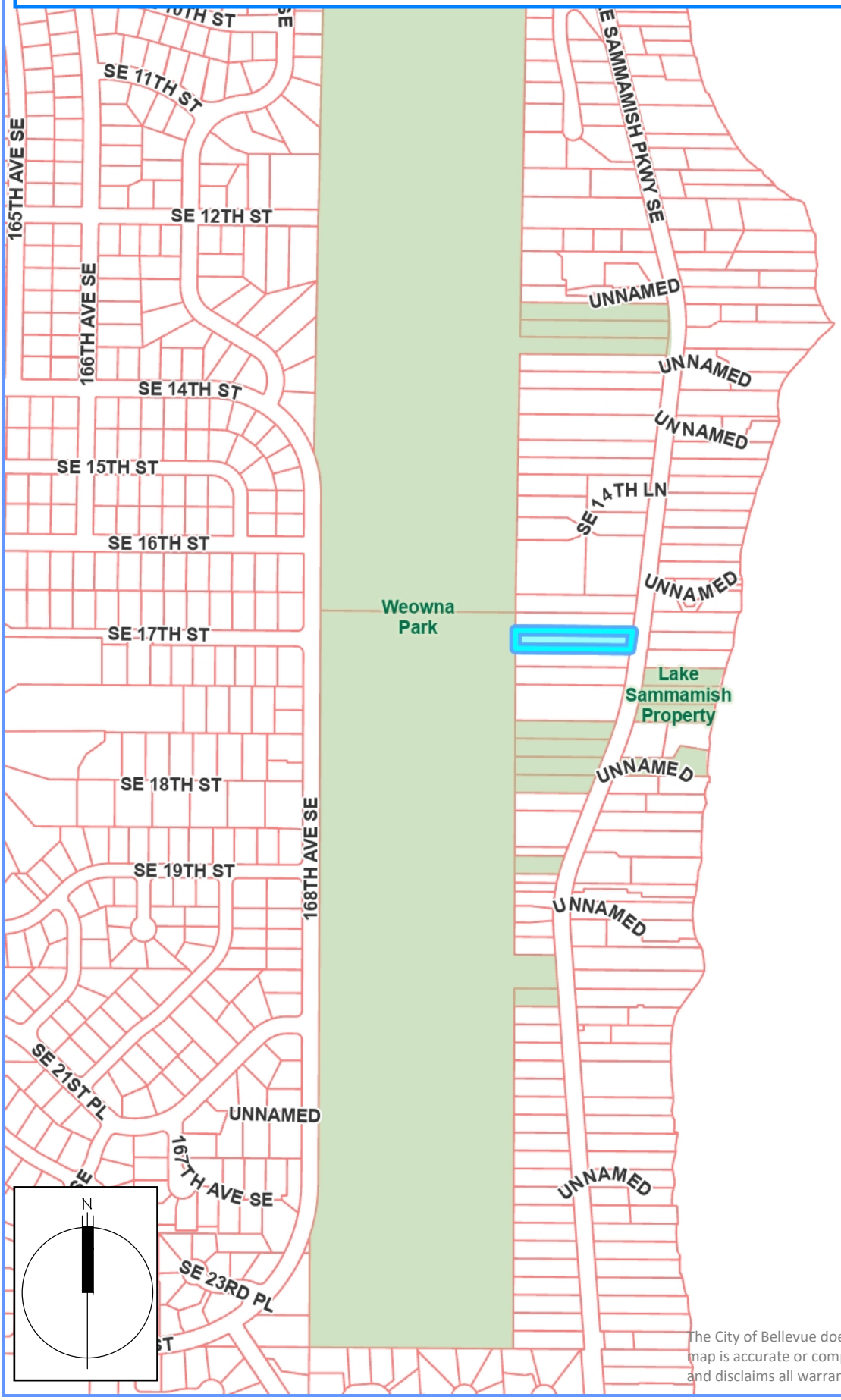
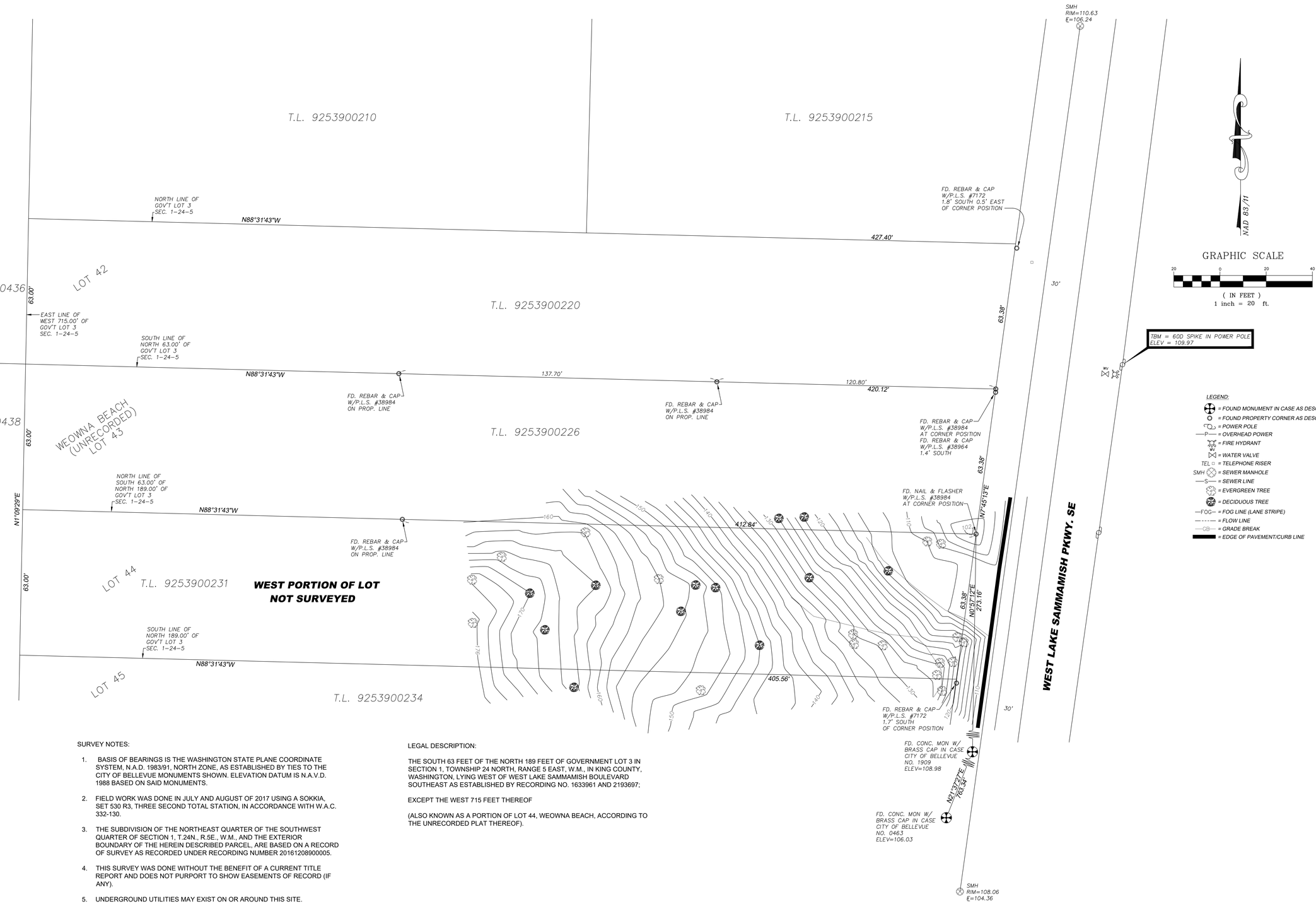
Vicinity Map





SURVEY NOTES:

1. BASIS OF BEARINGS IS THE WASHINGTON STATE PLANE COORDINATE SYSTEM, N.A.D. 1983/91, NORTH ZONE, AS ESTABLISHED BY TIES TO THE CITY OF BELLEVUE MONUMENTS SHOWN. ELEVATION DATUM IS N.A.V.D. 1988 BASED ON SAID MONUMENTS.
2. FIELD WORK WAS DONE IN JULY AND AUGUST OF 2017 USING A SOKKIA, SET 530 R3, THREE SECOND TOTAL STATION, IN ACCORDANCE WITH W.A.C. 332-130.
3. THE SUBDIVISION OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 1, T.24N., R.5E., W.M., AND THE EXTERIOR BOUNDARY OF THE HEREIN DESCRIBED PARCEL, ARE BASED ON A RECORD OF SURVEY AS RECORDED UNDER RECORDING NUMBER 20161208900005.
4. THIS SURVEY WAS DONE WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT AND DOES NOT PURPORT TO SHOW EASEMENTS OF RECORD (IF ANY).
5. UNDERGROUND UTILITIES MAY EXIST ON OR AROUND THIS SITE.

Call Before You Dig
811 OR 1-800-424-5555

LEGAL DESCRIPTION:

THE SOUTH 63 FEET OF THE NORTH 189 FEET OF GOVERNMENT LOT 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON, LYING WEST OF WEST LAKE SAMMAMISH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NO. 1633961 AND 2193697;

EXCEPT THE WEST 715 FEET THEREOF

(ALSO KNOWN AS A PORTION OF LOT 44, WEOWNA BEACH, ACCORDING TO THE UNRECORDED PLAT THEREOF).

ROBERT J. BOGDON
STATE OF WASHINGTON
13487
REGISTERED
PROFESSIONAL LAND SURVEYOR

REVISIONS	BY	DATE

BOUNDARY & TOPOGRAPHY SURVEY

PAT VULK

NE1/4 SW1/4 SEC. 1, T.24N., R.5E., W.M.
BELLEVUE KING COUNTY WASHINGTON

ENGINEERS - SURVEYORS
EASTSIDE CONSULTANTS, INC.
1320 N.W. MALL ST., SUITE B
ISSAQUAH, WASHINGTON 98027
PH:(425)392-5391 FAX:392-4676

JOB NO.	17102
DATE	8/2017
SCALE	1"=20'
DESIGNED	S.K.
DRAWN	S.K.
CHECKED	R.B.
APPROVED	.

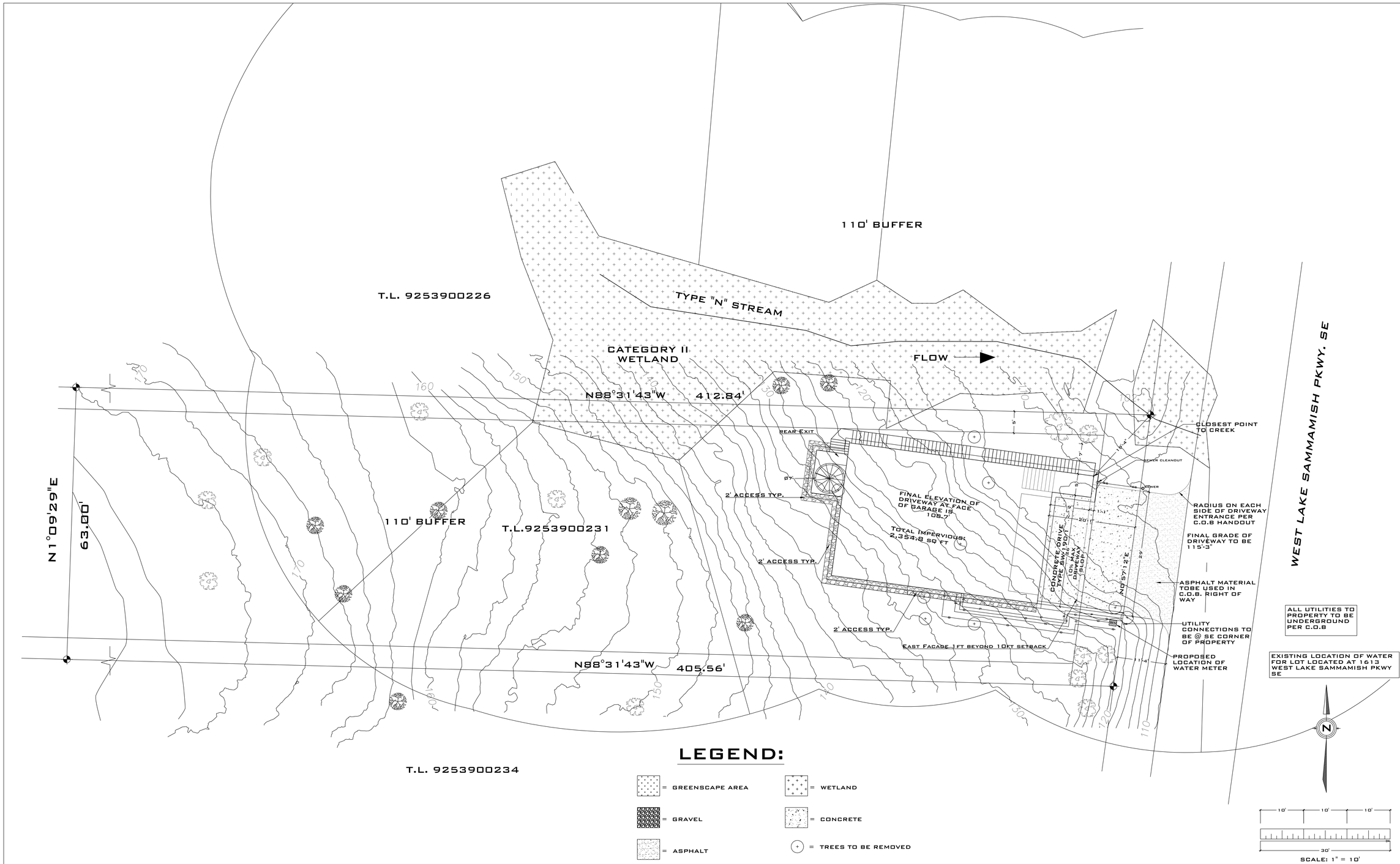
CONTENTS

COVER PAGE INFORMATION

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1; TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M. IN KING COUNTY, WASHINGTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697.

V 1.0



LEGEND:

- = GREENSCAPE AREA
- = GRAVEL
- = ASPHALT
- = WETLAND
- = CONCRETE
- = TREES TO BE REMOVED

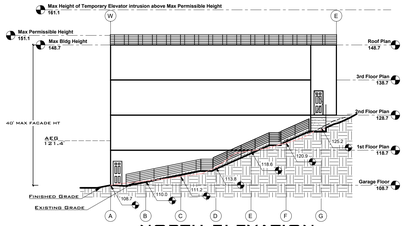
NOTES:

SITE PLAN

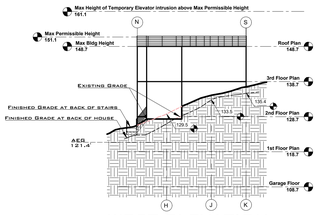
1" = 10'

PROPOSED SINGLE FAMILY RESIDENCE
FOR
PAT VULK
AT
1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

VULK ENGINEERING SERVICES
pat.vulk@gmail.com



NORTH ELEVATION
SCALE = 1:20'-0"



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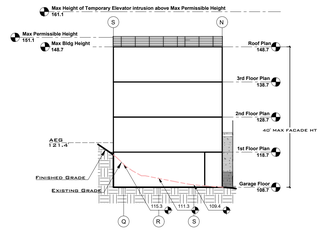

EAST ELEVATION
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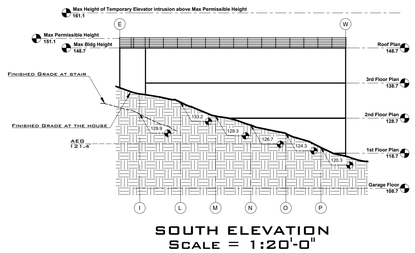
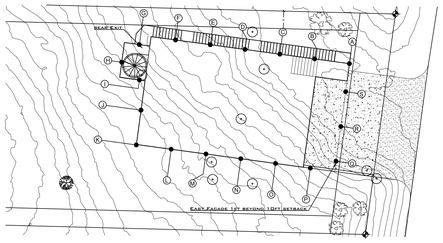


SOUTH ELEVATION
SCALE = 1:20'-0"

BUILDING HEIGHT CALCULATIONS

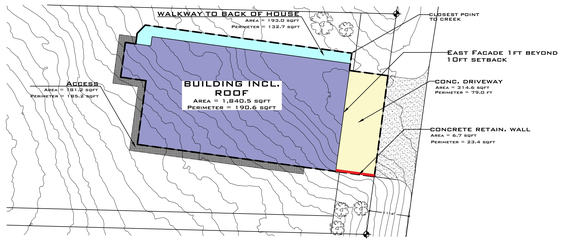
WALL LINE	LOCATION	ELEVATION
NORTH	A	108.7'
NORTH	B	110.0'
NORTH	C	111.2'
NORTH	D	113.8'
NORTH	E	118.6'
NORTH	F	120.9'
NORTH	G	125.2'
WEST	H	129.5'
South	I	129.9'
WEST	J	133.5
WEST	K	135.4'
SOUTH	L	133.2'
SOUTH	M	129.3'
SOUTH	N	126.7'
SOUTH	O	124.3'
SOUTH	P	120.3'
EAST	Q	115.3'
EAST	R	111.3
EAST	S	109.4
NESE TOTAL POINTS: 19		=2,306.5'
2,306.5'/19		
AVERAGE EXISTING GRADE OF PROPERTY		=121.4'

ELEVATION AT PEAK OF ROOF = 148.7'
AVERAGE EXISTING GRADE OF PROPERTY = 121.4'
BUILDING HEIGHT FROM AVERAGE GRADE TO PEAK OF ROOF = 27'-4"



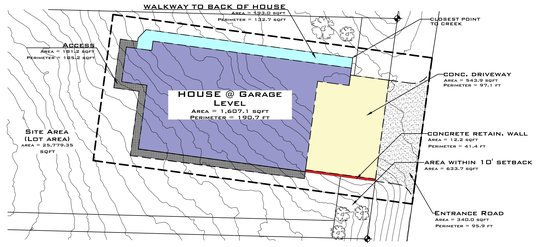
AVERAGE EXISTING GRADE CALCULATIONS

IMPERVIOUS AREA = 2,354.8 SQ.FT
SCALE = 1:20'-0"



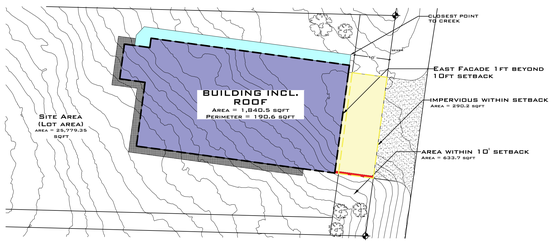
IMPERVIOUS COVERAGE CALCULATIONS

IMPERVIOUS AREA = 2,354.8 SQ.FT
SCALE = 1:20'-0"



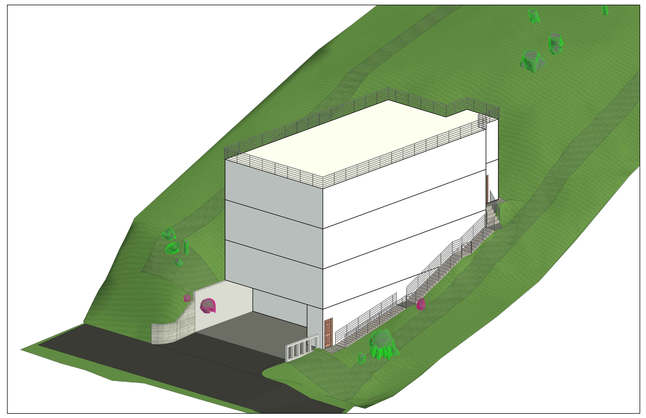
TEMPORARY DISTURBANCE AREA

IMPERVIOUS AREA = 2,354.8 SQ.FT
SCALE = 1:20'-0"



BLDG COVERAGE AND GREENSCAPE CALCULATIONS

IMPERVIOUS AREA = 2,354.8 SQ.FT
SCALE = 1:20'-0"



LAND USE INFO

SITE, IMPERVIOUS

NAME	AREA
LOT SIZE:	= 25,779.4 SQFT
IMPERVIOUS AREAS:	
BUILDING INCL. ROOF	= 1,840.5 SQFT
CONC. DRIVEWAY	= 314.6 SQFT
CONCRETE RETAIN. WALL	= 6.7 SQFT
WALKWAY TO BACK OF HOUSE	= 193.0 SQFT
TOTAL IMPERVIOUS SURFACES	= 2,354.8 SQ.FT
0% OF NON PERVIOUS SURFACES	= 9.1%

FAR CALCULATIONS

NAME	AREA
FIRST FLOOR:	= 1,840.5 SQFT
2ND FLOOR	= 1,840.5 SQFT
3RD FLOOR	= 1,840.5 SQFT
GARAGE	= 1,488.6 SQFT
TOTAL LIVING AREA	= 7,010.1 SQFT
LOT AREA:	= 25,779.4 SQFT
FAR RATIO	= 27.2%

AREA SCHEDULE (SITE, TEMPORARY DISTURBANCE AREA)

NAME	AREA	PERIMETER	COMMENTS
TOTAL TEMPORARY DISTURBANCE	= 3,851.7 SQFT	= 267.4 FT	TEMPORARY DISTURBANCE AREA
TOTAL PERMANENT IMPERVIOUS	= 2,354.8 SQFT	= 97.1 FT	TEMPORARY DISTURBANCE

GREENSCAPE CALCULATION:

NAME	AREA
IMPERVIOUS WITHIN SETBACK	= 290.2 SQFT
AREA WITHIN 10' SETBACK	= 633.7 SQFT
DRIVEWAY	= 543.7 SQFT
RETAINING WALL	= 12.2 SQFT
TOTAL IMPERVIOUS IN GREENSCAPE	= 290.2 SQFT
GREENSCAPE PERCENT	= 45.8%

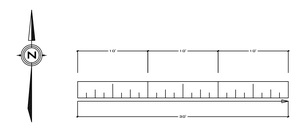
GREENSCAPE WORK QUANTITIES:

CUT 897.0 CUBIC YARD
FILL 29 YARD DRAIN ROCK
DRIVEWAY

USE EXCAVATION SPOILS TO BACKFILL FOUNDATION WALLS, ALL DIRT TO BE KEPT OR STORED ON SILT BARRIER FENCE TO BE ERECTED SO AS TO CONTAIN ANY RUN OFF THAT MAY OCCUR.

LOT COVERAGE CALCULATIONS:

NAME	AREA
LOT AREA:	= 25,779.4 SQFT
HOUSE AREA	= 1,840.5 SQFT
COVERED LOT AREA	= 7.1%



CONTENTS

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LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST,WM IN KING COUNTY, WASHINGTON; EXCEPT THE WEST 330 FEET THEREOF AND EXCEPT THE WEST LAKE SAMMAMISH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;

V 1.0

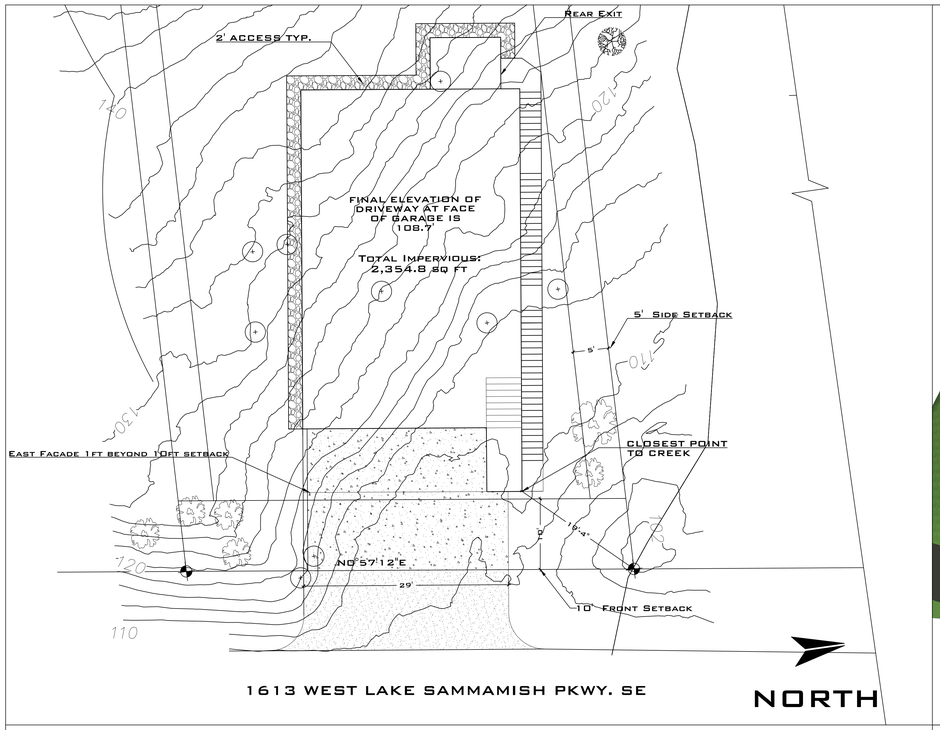
NOTES:

SITE PLAN - HEIGHT AND AREA CALCULATIONS
1" = 20'

PROPOSED SINGLE FAMILY RESIDENCE
FOR
PAT VULK
AT
1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

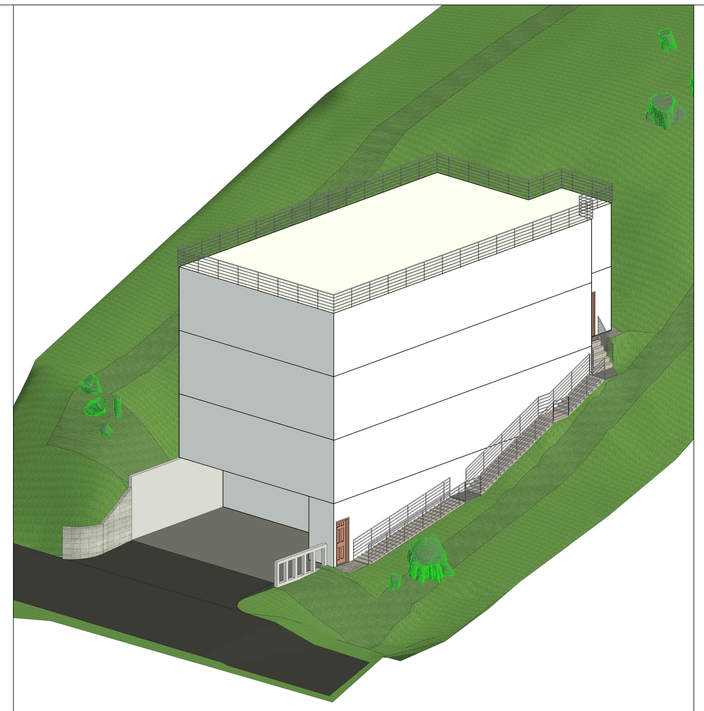
VULK ENGINEERING SERVICES
pat.vulk@gmail.com

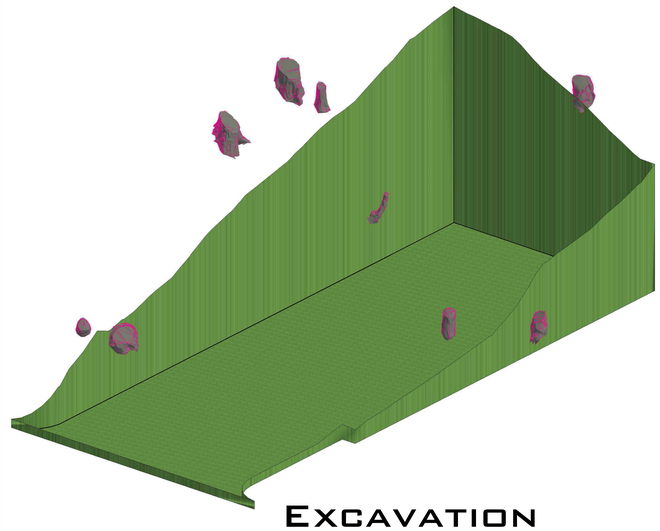
3
PAGE



1613 WEST LAKE SAMMAMISH PKWY. SE

NORTH





Excavation
897.0 yd³

CONTENTS

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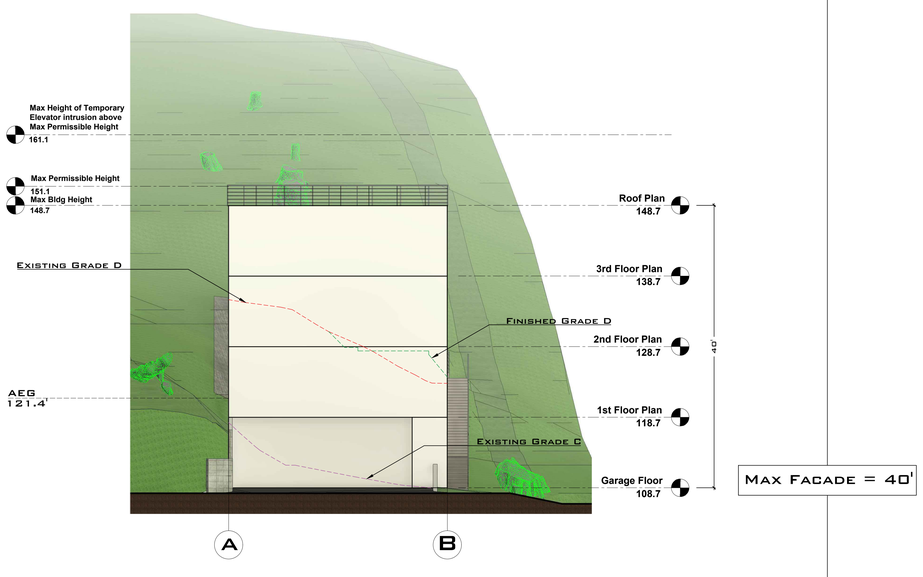
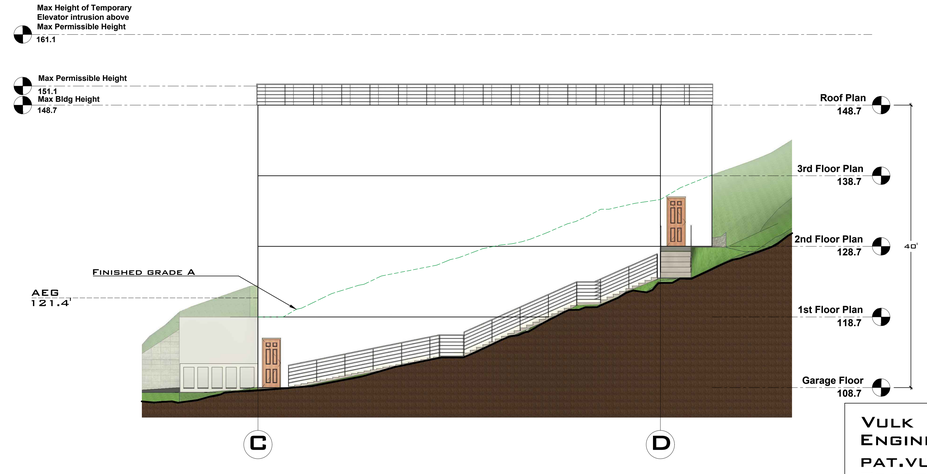
V 1.0



Max Facade = 40'

East Elevation



North Elevation

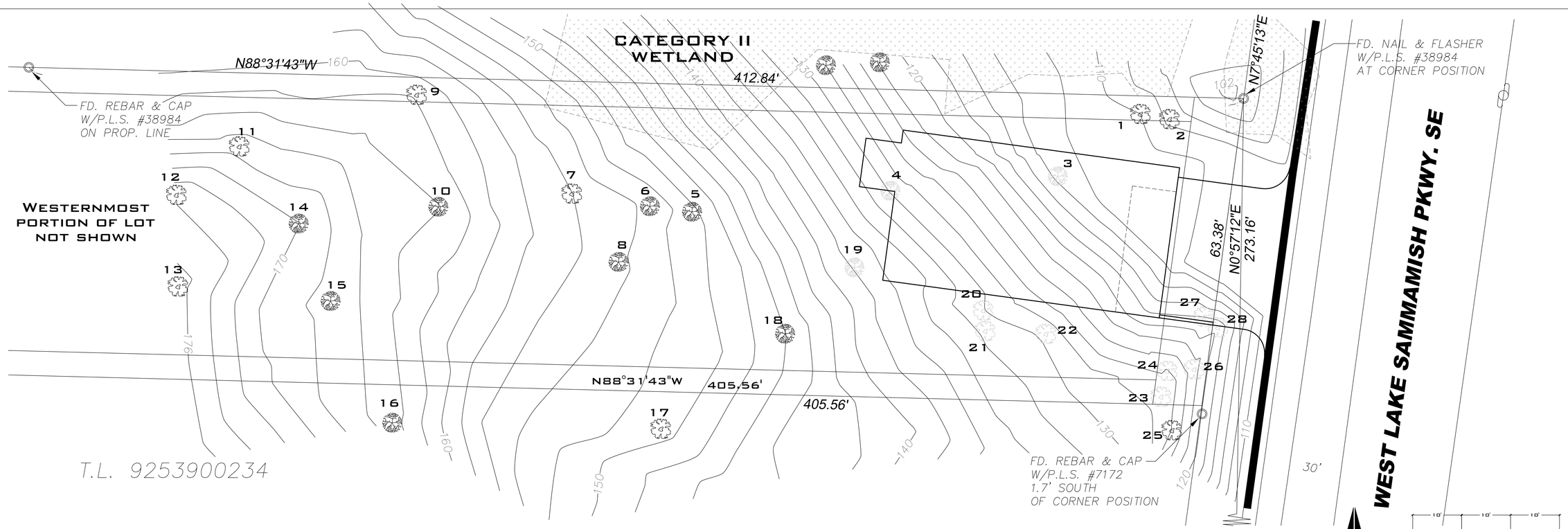
Vulk Architectural & Engineering
pat.vulk@gmail.com
Property: 1613 w lake sammamish pkwy. se

NOTES:

Site (3D)

PROPOSED SINGLE FAMILY RESIDENCE
FOR
PAT VULK
AT
1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

VULK ENGINEERING SERVICES
pat.vulk@gmail.com



	Scientific Name	Common Name	DBH(in.)	Status	Comment		Scientific Name	Common Name	DBH(in.)	Status	Comment
1	THUJA PLICATA	WESTERN RED CEDAR	63.7	Retain		16	THUJA PLICATA	WESTERN RED CEDAR	33.7	Retain	
2	THUJA PLICATA	WESTERN RED CEDAR	16.4	Retain		17	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	26.9	Retain	
3	ALNUS RUBRA	RED ALDER	17.1	Remove		18	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	26.3	Retain	
4	ACER MACROPHYLLUM	BIG LEAF MAPLE	22.5	Remove		19	ACER MACROPHYLLUM	BIG LEAF MAPLE	11.8	Remove	
5	POPULUS BALSAMIFERA	BLACK COTTONWOOD	38.1	Retain		20	THUJA PLICATA	WESTERN RED CEDAR	13.8	Remove	
6	POPULUS BALSAMIFERA	BLACK COTTONWOOD	32.6	Retain		21	THUJA PLICATA	WESTERN RED CEDAR	28.5	Remove	Habitat Log
7	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	12.2	Retain		22	THUJA PLICATA	WESTERN RED CEDAR	26.0	Remove	Habitat Log
8	ACER MACROPHYLLUM	BIG LEAF MAPLE	21.4	Retain		23	THUJA PLICATA	WESTERN RED CEDAR	24.5	Remove	
9	THUJA PLICATA	WESTERN RED CEDAR	56.9	Retain		24	THUJA PLICATA	WESTERN RED CEDAR	13.0	Remove	
10	ALNUS RUBRA	RED ALDER	16.0	Retain	Leaning	25	ACER MACROPHYLLUM	BIG LEAF MAPLE	15.4	Retain	
11	ACER MACROPHYLLUM	BIG LEAF MAPLE	23.0	Retain	MULTI-TRUNK	26	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	15.8	Remove	
12	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	18.5	Retain		27	THUJA PLICATA	WESTERN RED CEDAR	15.2	Remove	
13	THUJA PLICATA	WESTERN RED CEDAR	28.5	Retain		28	THUJA PLICATA	WESTERN RED CEDAR	20.8	Remove	
14	ALNUS RUBRA	RED ALDER	12.5	Retain		29					
15	ACER MACROPHYLLUM	BIG LEAF MAPLE	13.6	Retain	MULTI-TRUNK	30					

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TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON; EXCEPT THE WEST 30 FEET THEREOF CONVEYED TO THE CITY OF BELLEVUE FOR WEST LAKE SAMMAMISH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697.

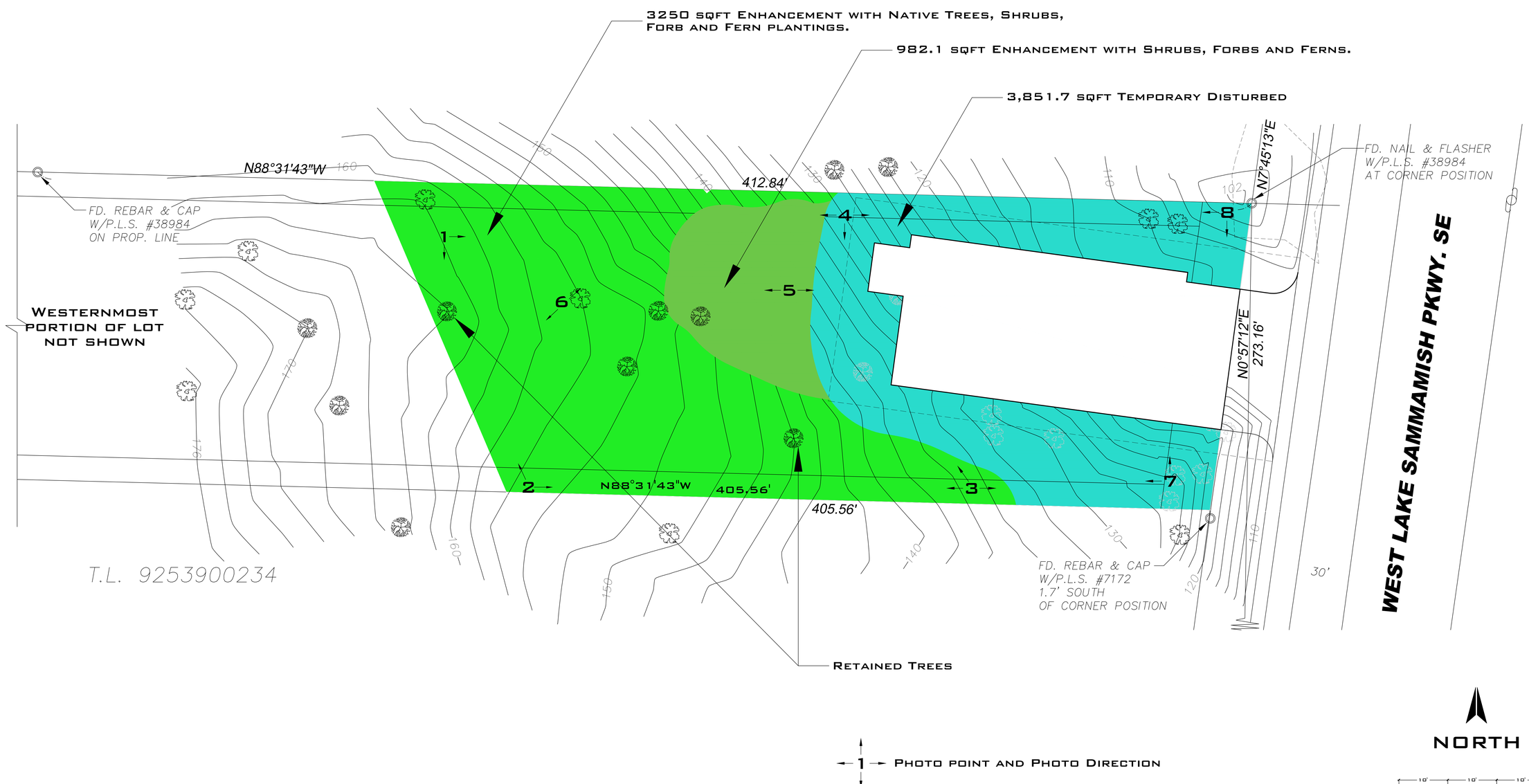
V 1.0

NOTES:

Tree Retention And Removal Plan

PROPOSED SINGLE FAMILY RESIDENCE
FOR
PAT VULK
AT
1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

VULK ENGINEERING SERVICES
pat.vulk@gmail.com



CONTENTS

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V 1.0

NOTES:

WETLAND BUFFER ENHANCEMENT AND MONITORING PLAN

PROPOSED SINGLE FAMILY RESIDENCE
FOR
PAT VULK
AT
1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

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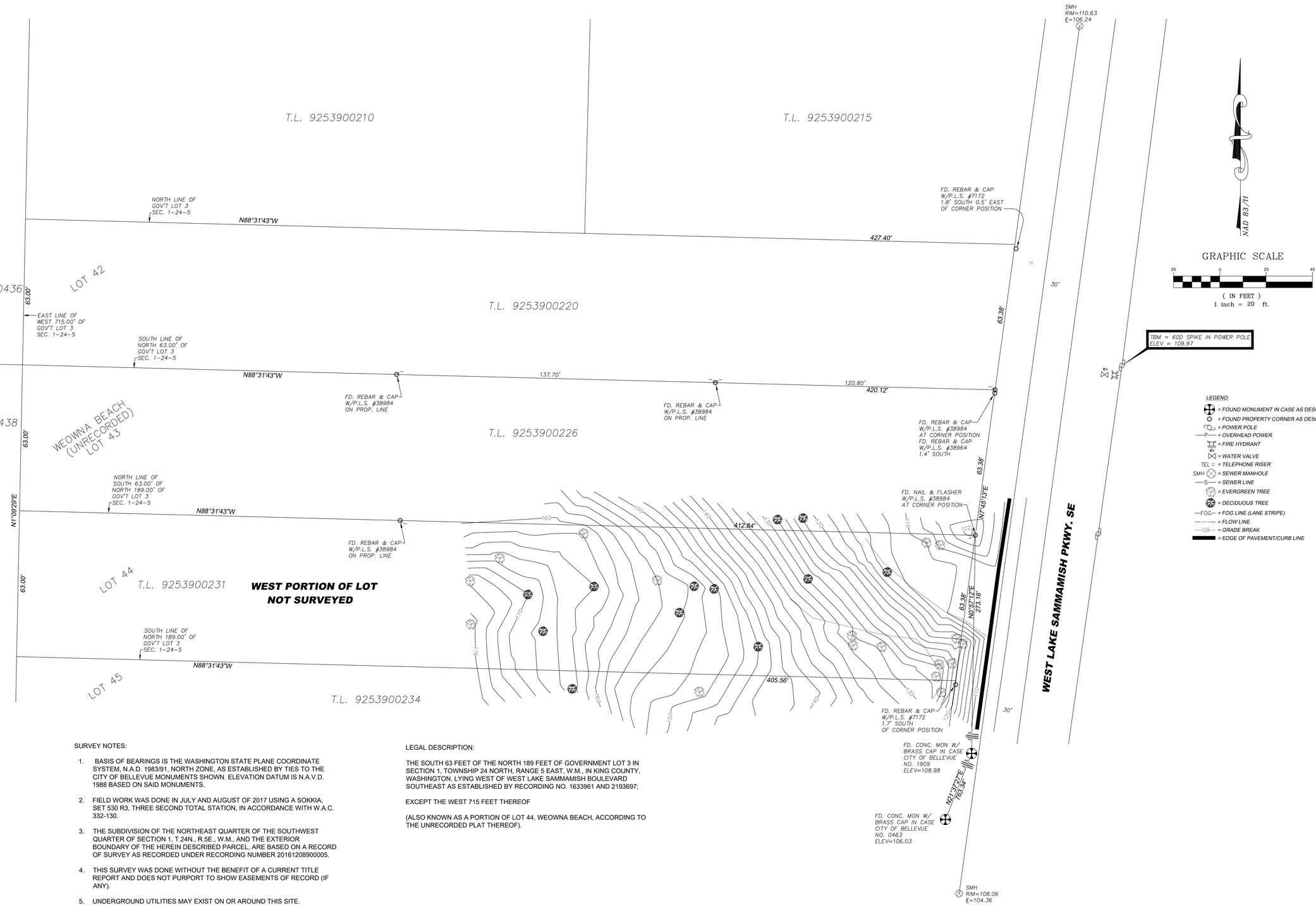

SURVEY NOTES:

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4. THIS SURVEY WAS DONE WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT AND DOES NOT PURPORT TO SHOW EASEMENTS OF RECORD (IF ANY).
5. UNDERGROUND UTILITIES MAY EXIST ON OR AROUND THIS SITE.

Call Before You Dig
811 OR 1-800-424-5555

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EXCEPT THE WEST 715 FEET THEREOF

(ALSO KNOWN AS A PORTION OF LOT 44, WEOWNA BEACH, ACCORDING TO THE UNRECORDED PLAT THEREOF).

ROBERT J. BOGDON
STATE OF WASHINGTON
23487
REGISTERED
PROFESSIONAL LAND SURVEYOR

REVISIONS	BY	DATE

BOUNDARY & TOPOGRAPHY SURVEY

PAT VULK

NE1/4 SW1/4 SEC. 1, T.24N., R.5E., W.M.
BELLEVUE KING COUNTY WASHINGTON

ENGINEERS - SURVEYORS
EASTSIDE CONSULTANTS, INC.
1320 N.W. MALL ST., SUITE B
ISSAQUAH, WASHINGTON 98027
PH:(425)392-5391 FAX:392-4676

JOB NO.	17102
DATE	8/2017
SCALE	1"=20'
DESIGNED	S.K.
DRAWN	S.K.
CHECKED	R.B.
APPROVED	.

SHEET 1 OF 7

CONTENTS

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOT 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST W.M. IN KING COUNTY, WASHINGTON, LYING WEST OF WEST LAKE SAMMAMISH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1635961 AND 2115677.

V 1.0

NOTES:

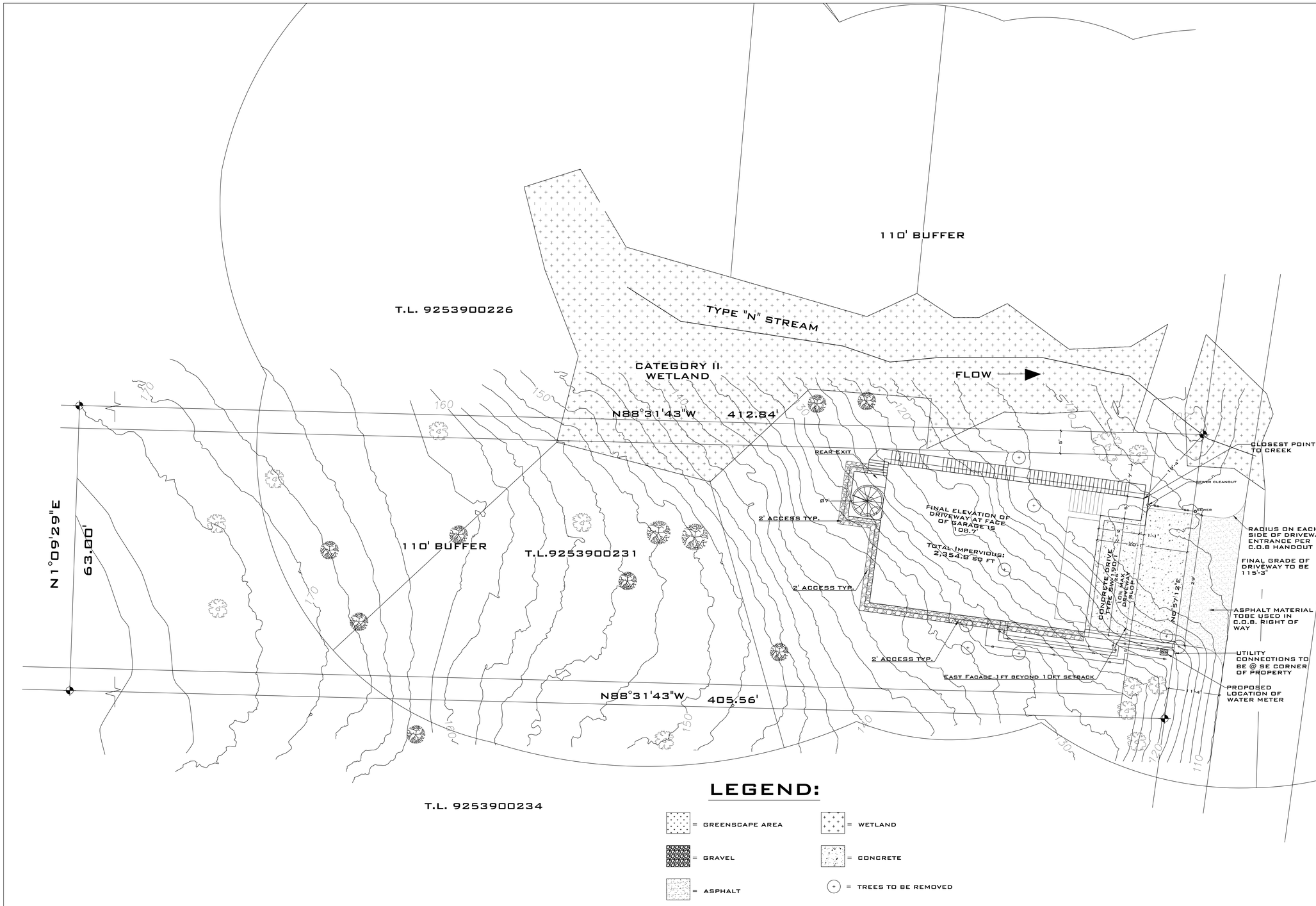
WETLAND BUFFER IMPACTS FROM PROPOSED CONSTRUCTION OF THE HOUSE.

1" = 10'

(SOURCE: TYPE N STREAMS, WETLAND BOUNDARIES AND BUFFERS BY J.S. JONES AND ASSOCIATES 2007 AND 2013)

PROPOSED SINGLE FAMILY RESIDENCE
FOR
PAT VULK
AT
1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

VULK ENGINEERING SERVICES
pat.vulk@gmail.com



LEGEND:

- = GREENSCAPE AREA
- = WETLAND
- = GRAVEL
- = CONCRETE
- = ASPHALT
- = TREES TO BE REMOVED

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V 1.0

NOTES:

SITE PLAN

1" = 10'

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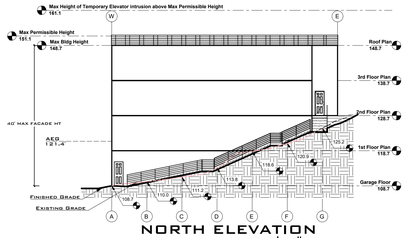
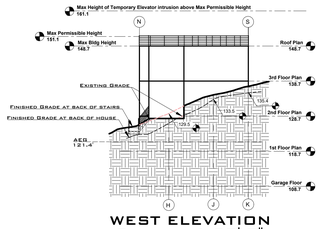
BELLEVUE WASHINGTON 98008

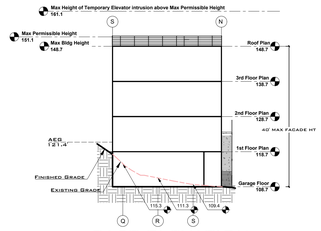
VULK ENGINEERING SERVICES
pat.vulk@gmail.com



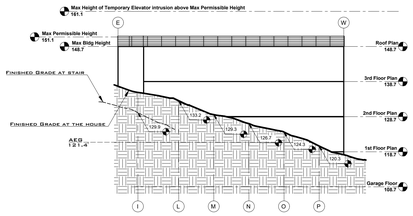
NORTH ELEVATION
SCALE = 1:20'-0"



WEST ELEVATION
SCALE = 1:20'-0"



EAST ELEVATION
SCALE = 1:20'-0"

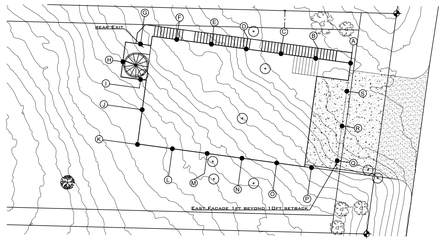


SOUTH ELEVATION
SCALE = 1:20'-0"

BUILDING HEIGHT CALCULATIONS

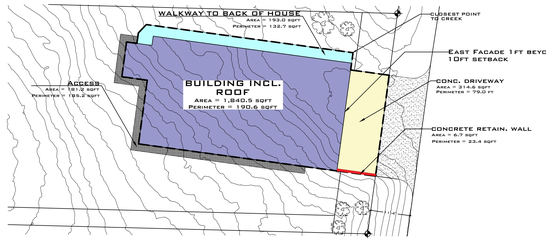
WALL LINE	LOCATION	ELEVATION
NORTH	Ⓚ	108.7'
NORTH	Ⓙ	110.0'
NORTH	Ⓘ	111.2'
NORTH	Ⓗ	113.8'
NORTH	Ⓕ	118.6'
NORTH	Ⓔ	120.9'
NORTH	Ⓓ	125.2'
WEST	Ⓐ	129.5'
South	Ⓑ	129.9'
WEST	Ⓒ	133.5'
WEST	Ⓔ	135.4'
SOUTH	Ⓕ	133.2'
SOUTH	Ⓖ	129.3'
SOUTH	Ⓗ	126.7'
SOUTH	Ⓘ	124.3'
SOUTH	Ⓙ	120.3'
EAST	Ⓚ	119.3'
EAST	Ⓙ	111.3'
EAST	Ⓘ	109.4'
NESE TOTAL POINTS: 19		=2,306.5'
2,306.5'/19		
AVERAGE EXISTING GRADE OF PROPERTY		=121.4'

ELEVATION AT PEAK OF ROOF = 148.7'
AVERAGE EXISTING GRADE OF PROPERTY = 121.4'
BUILDING HEIGHT FROM AVERAGE GRADE TO PEAK OF ROOF = 27'-4"



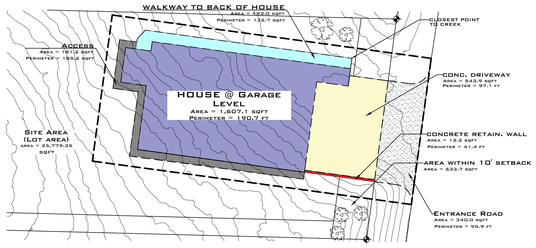
AVERAGE EXISTING GRADE CALCULATIONS

IMPERVIOUS AREA = 2,354.8 SQ.FT
SCALE = 1:20'-0"



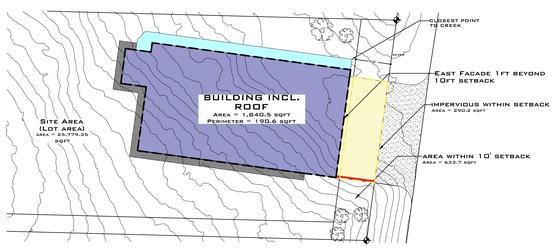
IMPERVIOUS COVERAGE CALCULATIONS

IMPERVIOUS AREA = 2,354.8 SQ.FT
SCALE = 1:20'-0"



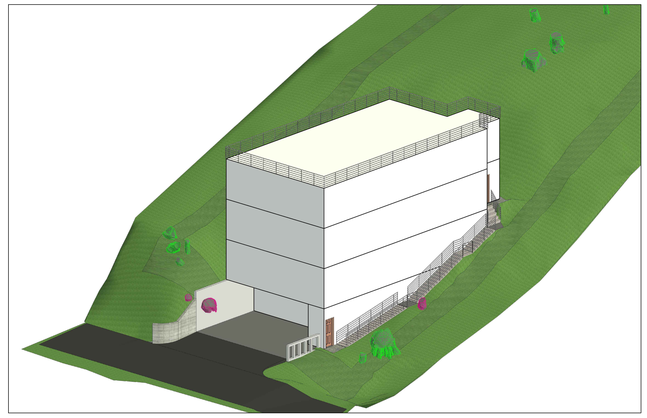
TEMPORARY DISTURBANCE AREA

IMPERVIOUS AREA = 2,354.8 SQ.FT
SCALE = 1:20'-0"



BLDG COVERAGE AND GREENSCAPE CALCULATIONS

IMPERVIOUS AREA = 2,354.8 SQ.FT
SCALE = 1:20'-0"



LAND USE INFO

SITE, IMPERVIOUS

NAME		AREA
LOT SIZE:	=	25,779.4 SQFT
IMPERVIOUS AREAS:		
BUILDING INCL. ROOF	=	1,840.5 SQFT
CONC. DRIVEWAY	=	314.6 SQFT
CONCRETE RETAIN. WALL	=	6.7 SQFT
WALKWAY TO BACK OF HOUSE	=	193.0 SQFT
TOTAL IMPERVIOUS SURFACES	=	2,354.8 SQ.FT
0% OF NON PERVIOUS SURFACES	=	9.1%

FAR CALCULATIONS

NAME		AREA
FIRST FLOOR:	=	1,840.5 SQFT
2ND FLOOR	=	1,840.5 SQFT
3RD FLOOR	=	1,840.5 SQFT
GARAGE	=	1,488.6 SQFT
TOTAL LIVING AREA	=	7,010.1 SQFT
LOT AREA:	=	25,779.4 SQFT
FAR RATIO	=	27.2%

AREA SCHEDULE (SITE, TEMPORARY DISTURBANCE AREA)

NAME	AREA	PERIMETER	COMMENTS
TOTAL TEMPORARY DISTURBANCE	= 3,851.7 SQFT	= 267.4 FT	TEMPORARY DISTURBANCE AREA
TOTAL PERMANENT IMPERVIOUS	= 2,354.8 SQFT	= 97.1 FT	TEMPORARY DISTURBANCE

GREENSCAPE CALCULATION:

NAME		AREA
IMPERVIOUS WITHIN SETBACK	=	290.2 SQFT
AREA WITHIN 10' SETBACK	=	633.7 SQFT
DRIVEWAY	=	543.7 SQFT
RETAINING WALL	=	12.2 SQFT
TOTAL IMPERVIOUS IN GREENSCAPE	=	290.2 SQFT
GREENSCAPE PERCENT	=	45.8%

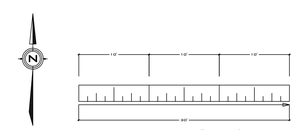
GREENSCAPE WORK QUANTITIES:

CUT 897.0 CUBIC YARD
FILL 29 YARD DRAIN ROCK
DRIVEWAY

USE EXCAVATION SPOILS TO BACKFILL FOUNDATION WALLS, ALL DIRT TO BE KEPT OR STORED ON SILT BARRIER FENCE TO BE ERECTED SO AS TO CONTAIN ANY RUN OFF THAT MAY OCCUR.

LOT COVERAGE CALCULATIONS:

NAME	AREA
LOT AREA:	= 25,779.4 SQFT
HOUSE AREA	= 1,840.5 SQFT
COVERED LOT AREA	= 7.1%



SCALE: 1" = 20'

CONTENTS

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M, IN KING COUNTY, WASHINGTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;

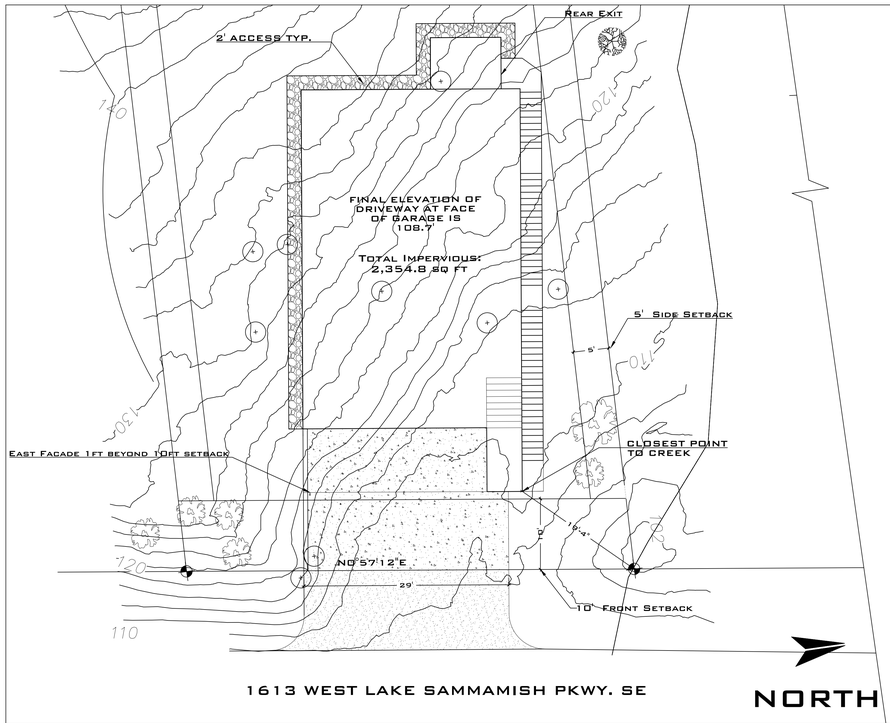
V 1.0

NOTES:

SITE PLAN - HEIGHT AND AREA CALCULATIONS
1" = 20'

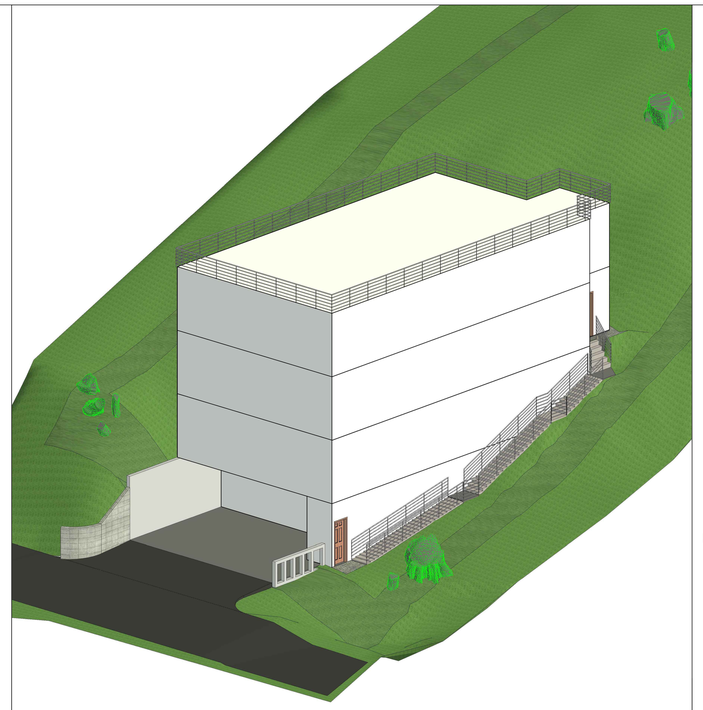
PROPOSED SINGLE FAMILY RESIDENCE
FOR
PAT VULK
AT
1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

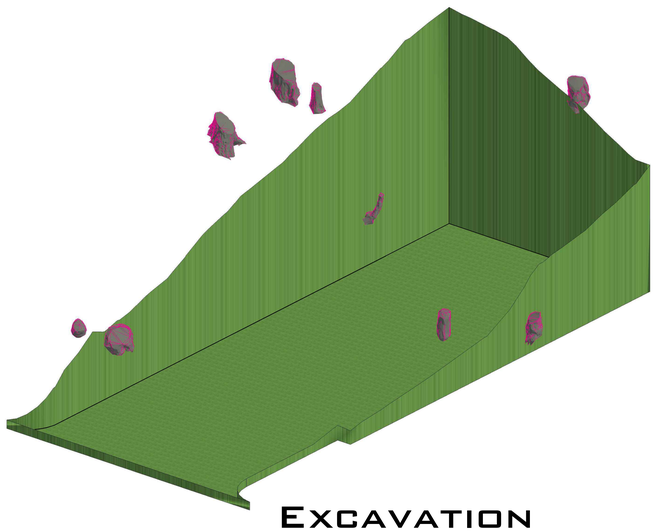
VULK ENGINEERING SERVICES
pat.vulk@gmail.com



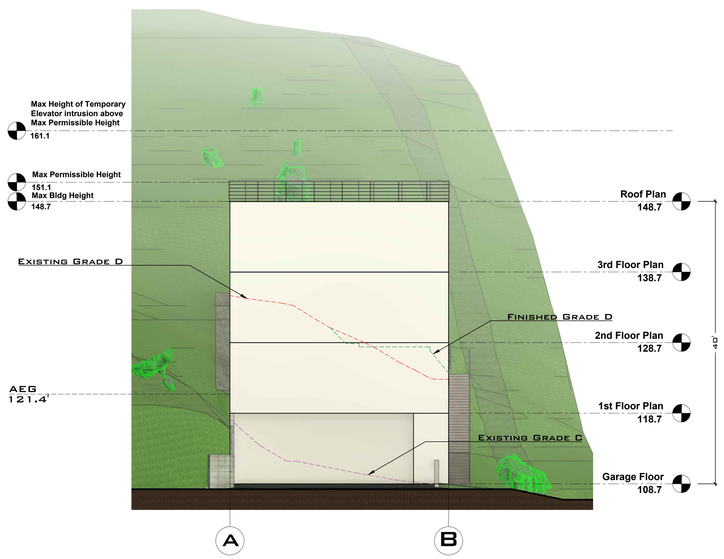
1613 WEST LAKE SAMMAMISH PKWY. SE

NORTH



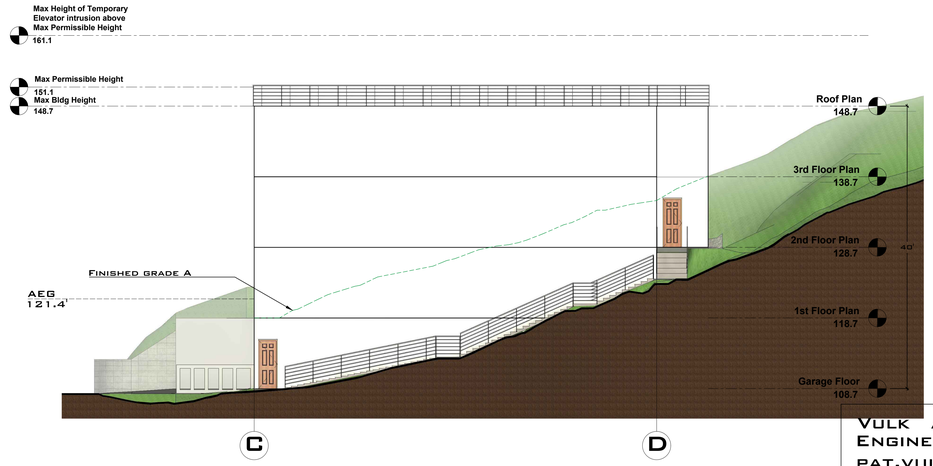


EXCAVATION
897.0 YD^3



MAX FACADE = 40'

EAST ELEVATION



NORTH ELEVATION

CONTENTS

COVER PAGE INFORMATION

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1; TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M. IN KING COUNTY, WASHINTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633561 AND 21 93697.

VULK ARCHITECTURAL & ENGINEERING
PAT.VULK@GMAIL.COM
PROPERTY: 1613 W LAKE SAMMAMISH PKWY. SE

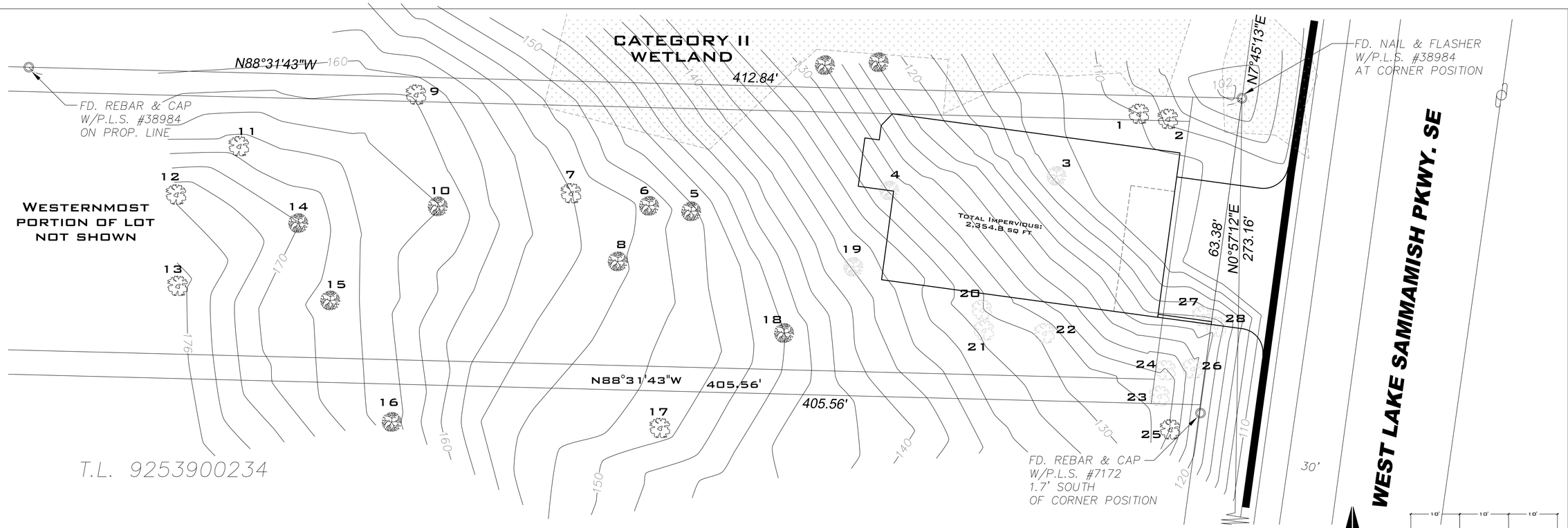
V 1.0

NOTES:

SITE (3D)

PROPOSED SINGLE FAMILY RESIDENCE
FOR
PAT VULK
AT
1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

VULK
ENGINEERING
SERVICES
pat.vulk@gmail.com



	Scientific Name	Common Name	DBH(in.)	Status	Comment		Scientific Name	Common Name	DBH(in.)	Status	Comment
1	THUJA PLICATA	WESTERN RED CEDAR	63.7	Retain		16	THUJA PLICATA	WESTERN RED CEDAR	33.7	Retain	
2	THUJA PLICATA	WESTERN RED CEDAR	16.4	Retain		17	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	26.9	Retain	
3	ALNUS RUBRA	RED ALDER	17.1	Remove		18	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	26.3	Retain	
4	ACER MACROPHYLLUM	BIG LEAF MAPLE	22.5	Remove		19	ACER MACROPHYLLUM	BIG LEAF MAPLE	11.8	Remove	
5	POPULUS BALSAMIFERA	BLACK COTTONWOOD	38.1	Retain		20	THUJA PLICATA	WESTERN RED CEDAR	13.8	Remove	
6	POPULUS BALSAMIFERA	BLACK COTTONWOOD	32.6	Retain		21	THUJA PLICATA	WESTERN RED CEDAR	28.5	Remove	Habitat Log
7	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	12.2	Retain		22	THUJA PLICATA	WESTERN RED CEDAR	26.0	Remove	Habitat Log
8	ACER MACROPHYLLUM	BIG LEAF MAPLE	21.4	Retain		23	THUJA PLICATA	WESTERN RED CEDAR	24.5	Remove	
9	THUJA PLICATA	WESTERN RED CEDAR	56.9	Retain		24	THUJA PLICATA	WESTERN RED CEDAR	13.0	Remove	
10	ALNUS RUBRA	RED ALDER	16.0	Retain	Leaning	25	ACER MACROPHYLLUM	BIG LEAF MAPLE	15.4	Retain	
11	ACER MACROPHYLLUM	BIG LEAF MAPLE	23.0	Retain	MULTI-TRUNK	26	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	15.8	Remove	
12	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	18.5	Retain		27	THUJA PLICATA	WESTERN RED CEDAR	15.2	Remove	
13	THUJA PLICATA	WESTERN RED CEDAR	28.5	Retain		28	THUJA PLICATA	WESTERN RED CEDAR	20.8	Remove	
14	ALNUS RUBRA	RED ALDER	12.5	Retain		29					
15	ACER MACROPHYLLUM	BIG LEAF MAPLE	13.6	Retain	MULTI-TRUNK	30					

CONTENTS

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON; EXCEPT THAT PORTION LYING WEST OF THE EAST LINE OF WEST LAKE SAMMAMISH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;

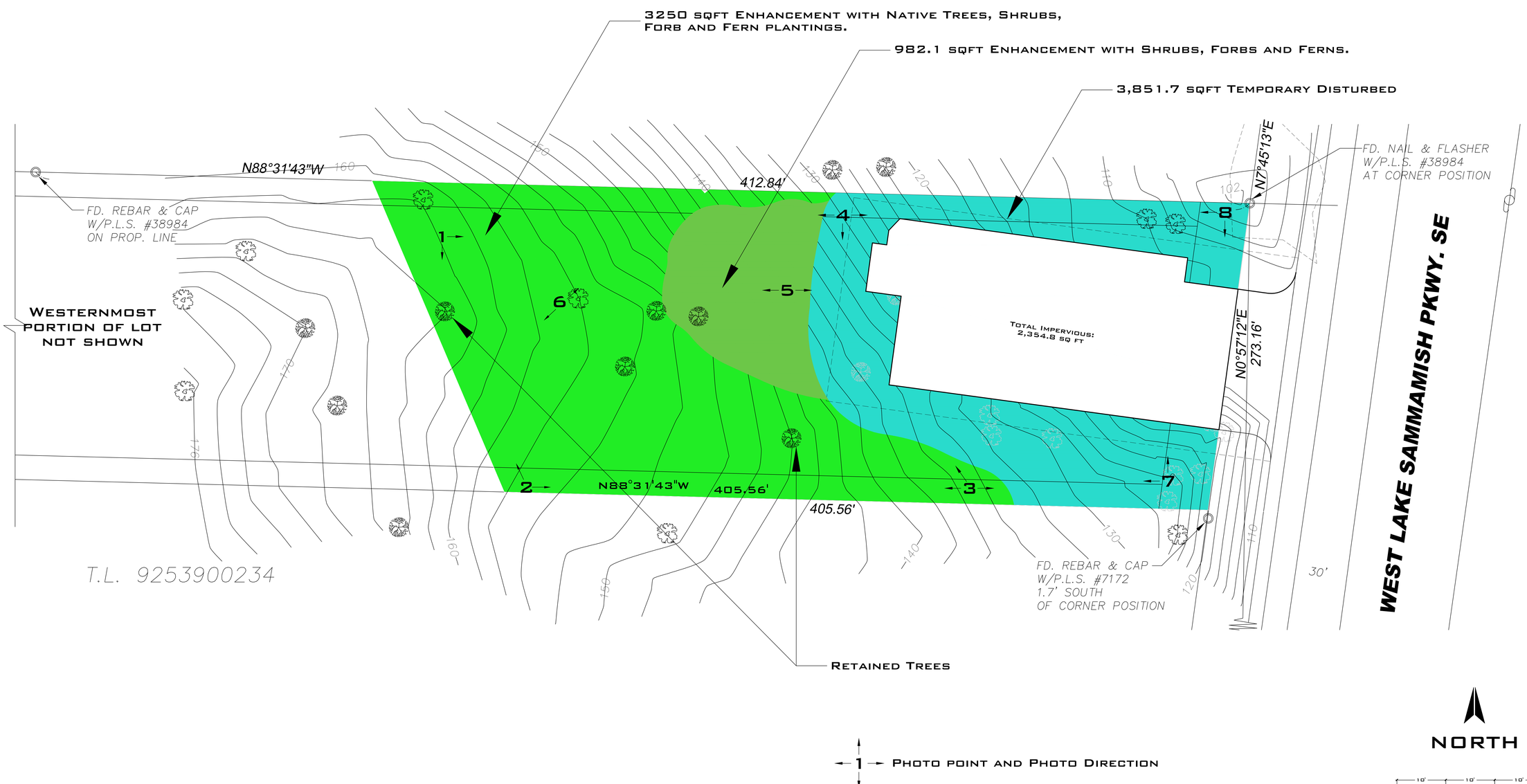
V 1.0

NOTES:

Tree Retention And Removal Plan

PROPOSED SINGLE FAMILY RESIDENCE
FOR
PAT VULK
AT
1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

VULK ENGINEERING SERVICES
pat.vulk@gmail.com



CONTENTS

COVER PAGE INFORMATION

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON; EXCEPT THE EAST 30 FEET THEREOF CONVEYED TO KING COUNTY FOR WEST LAKE SAMMAMISH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1 63396 1 AND 2 1 93697.

V 1.0

NOTES:

Wetland buffer enhancement and monitoring Plan

PROPOSED SINGLE FAMILY RESIDENCE
FOR
PAT VULK
AT
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BELLEVUE WASHINGTON 98008

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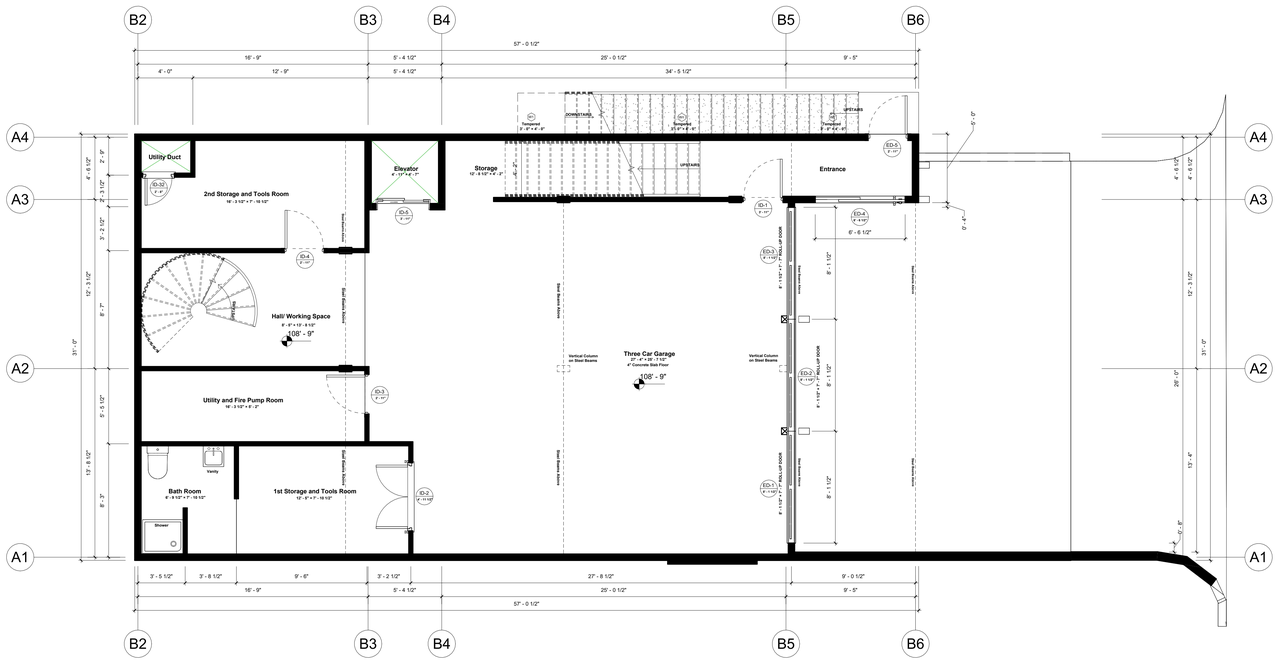

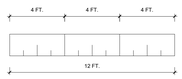

NORTH

SCALE: 1" : 1/4'

CONTENTS

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M, IN KING COUNTY, WASHINTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;

V 1.0

NOTES:

BASEMENT FLOOR PLAN

FLOOR AREA: 1,488.6 SQFT.

NOTE: 8' - 0" CEILING HEIGHT ELEVATION: 108' - 9"

1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

VULK ENGINEERING SERVICES

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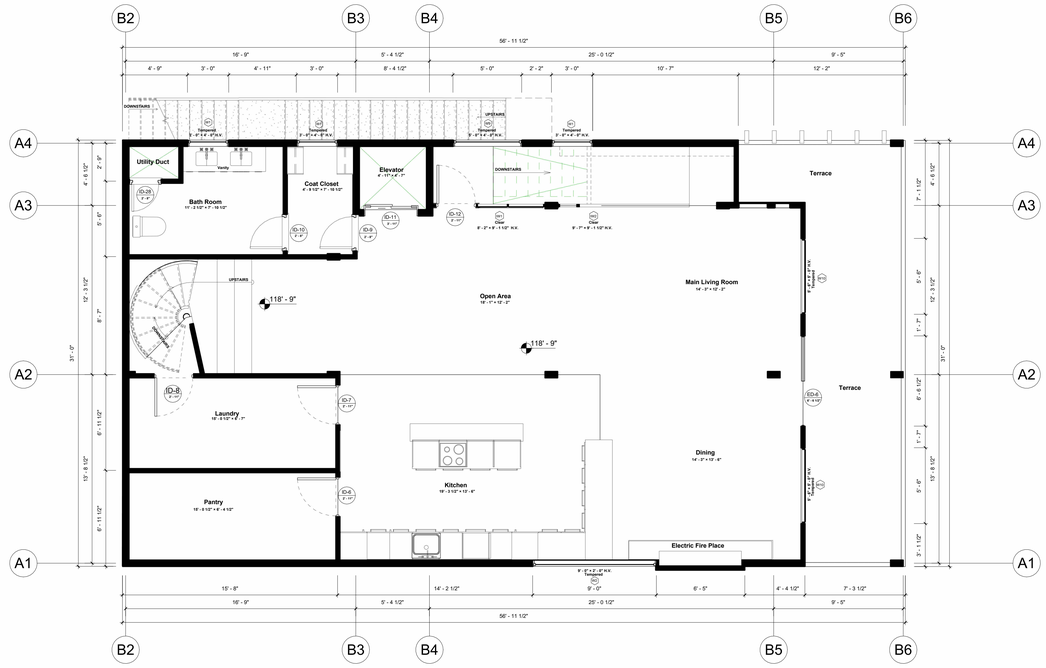

CONTENTS

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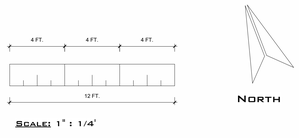
LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M, IN KING COUNTY, WASHINTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;



SCALE: 1" : 1/4'

V 1.0

NOTES:

FIRST FLOOR PLAN

FLOOR AREA: 1,840.5 SQFT.

NOTE: 9' - 1 1/2" CEILING HEIGHT ELEVATION: 118' - 9"

1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

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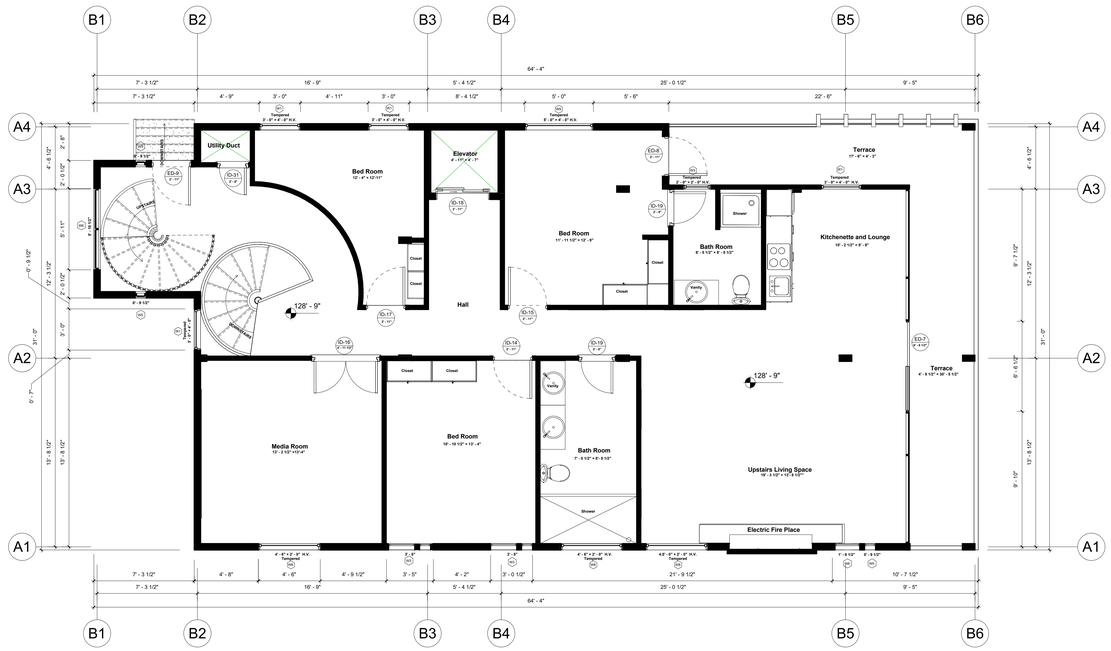

4 FT. 4 FT. 4 FT.

12 FT.

NORTH

SCALE: 1" : 1/4'

CONTENTS

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M, IN KING COUNTY, WASHINTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;

V 1.0

NOTES:

SECOND FLOOR PLAN

FLOOR AREA: 1,840.5 SQFT.

NOTE: 9' - 1 1/2" CEILING HEIGHT ELEVATION: 128' - 9"

1613 WEST LAKE SAMMAMISH PKWY SE
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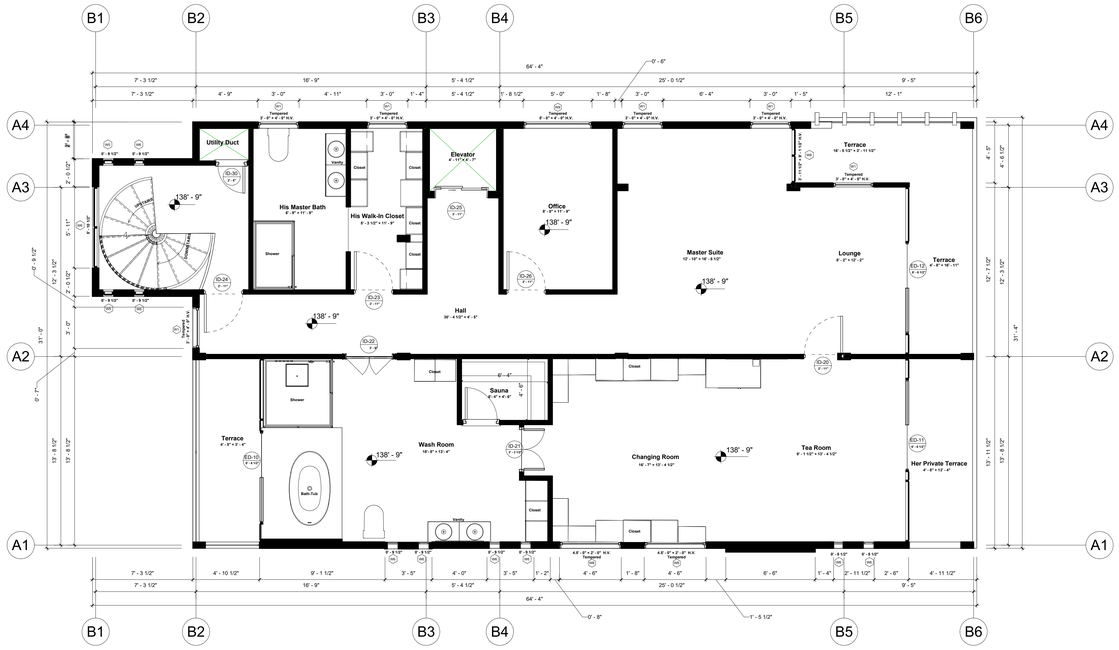

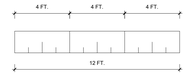

SCALE: 1" : 1/4'

CONTENTS

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M, IN KING COUNTY, WASHINTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;

V 1.0

NOTES:

THIRD FLOOR PLAN

FLOOR AREA: 1,840.5 SQFT.

NOTE: 9' - 1 1/2" CEILING HEIGHT ELEVATION: 138' - 9"

1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

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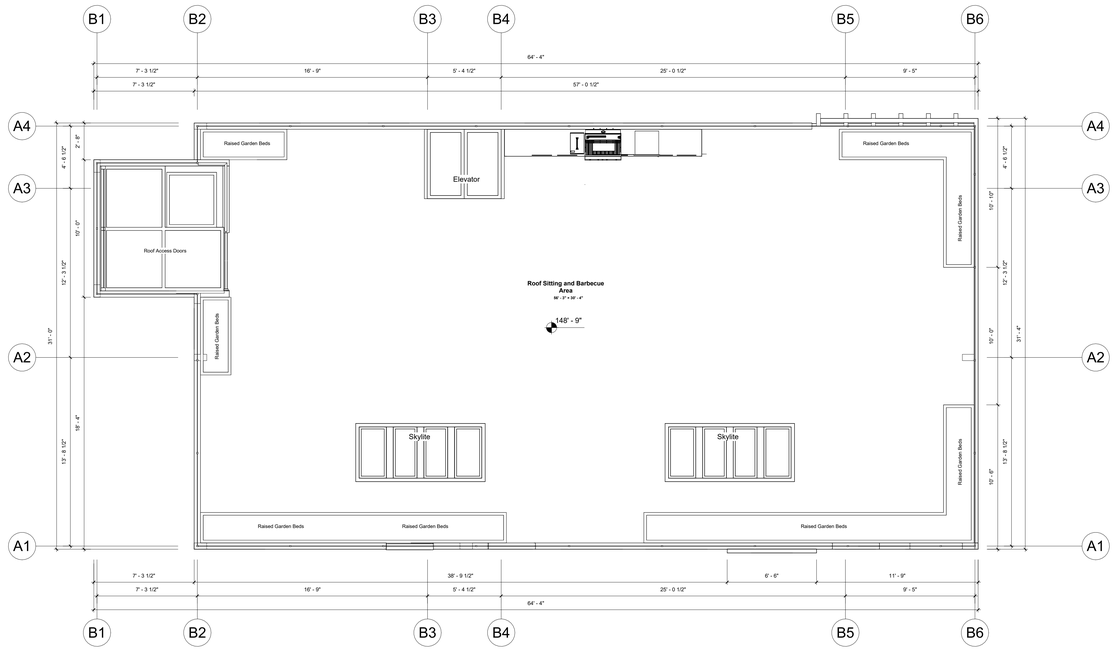

4 FT. 4 FT. 4 FT.

12 FT.

NORTH

SCALE: 1" : 1/4'

CONTENTS

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M; IN KING COUNTY, WASHINTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;

V 1.0

NOTES:

ROOF FLOOR PLAN

FLOOR AREA: 1,840.5 SQFT.

NOTE: 9' - 1 1/2" CEILING HEIGHT ELEVATION: 148' - 9"

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BELLEVUE WASHINGTON 98008

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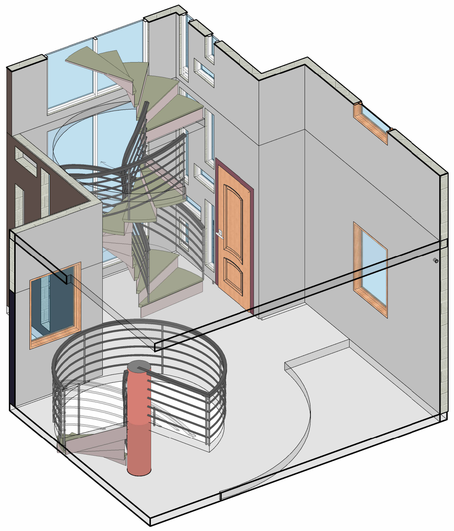
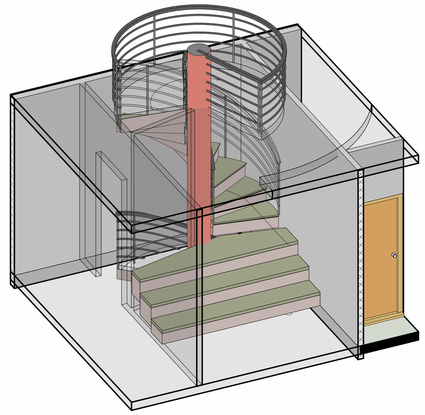
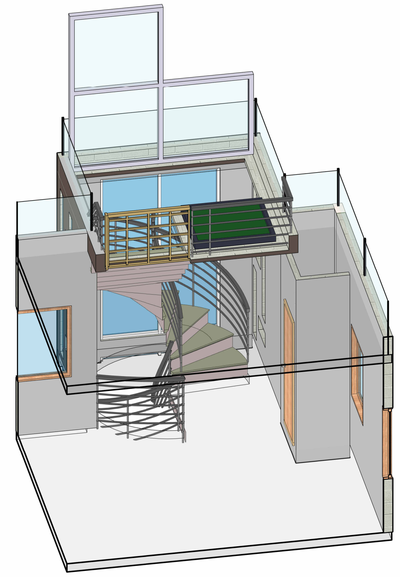


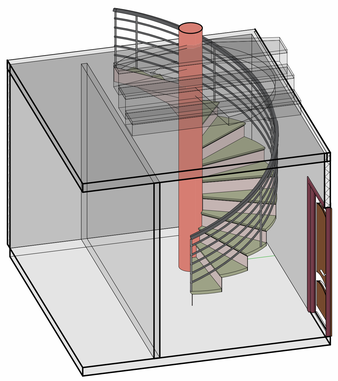
Second To Third Floor Stair



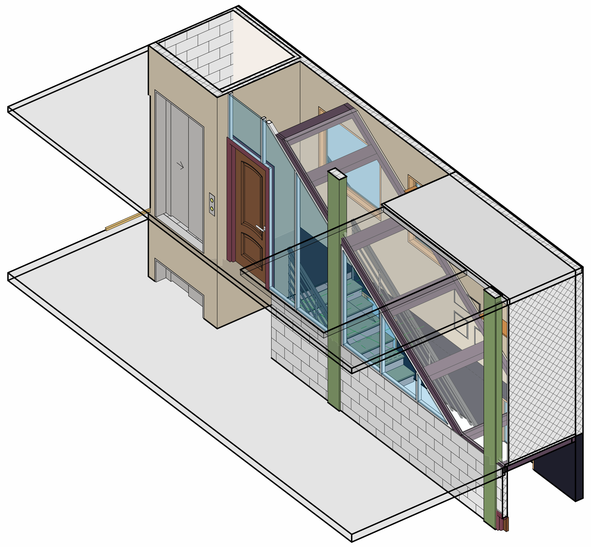
First to Second Floor Stair



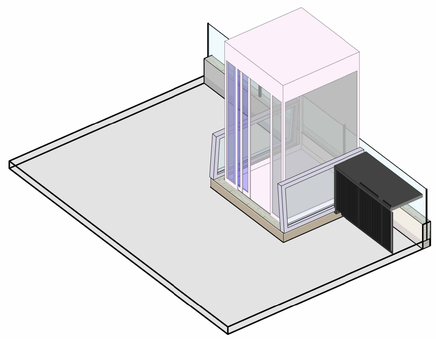
Roof Stair Acess Open



Basement To First Floor Stair



Basement To First Floor Stair



Roof Elevator Access Open

CONTENTS

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M. IN KING COUNTY, WASHINTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;

V 1.0

NOTES:

Area Detailed Views

1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

VULK ENGINEERING SERVICES

pat.vulk@gmail.com

Left Side View

Left Side View

Right Side View

Right Side View

Front View

Enterance View

CONTENTS

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M, IN KING COUNTY, WASHINTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;

V 1.0

NOTES:

Exterior Views

1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

VULK ENGINEERING SERVICES

pat.vulk@gmail.com

Basment Floor

First Floor

Second Floor

Third Floor

CONTENTS

TAX PARCEL # 9253900231

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v 1.0

NOTES:

3D View of Plan

1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

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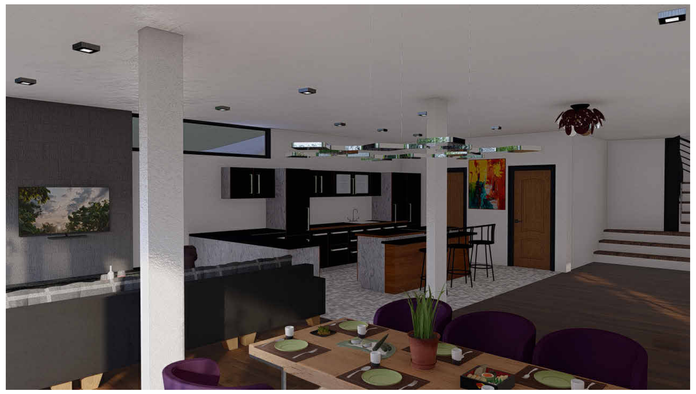
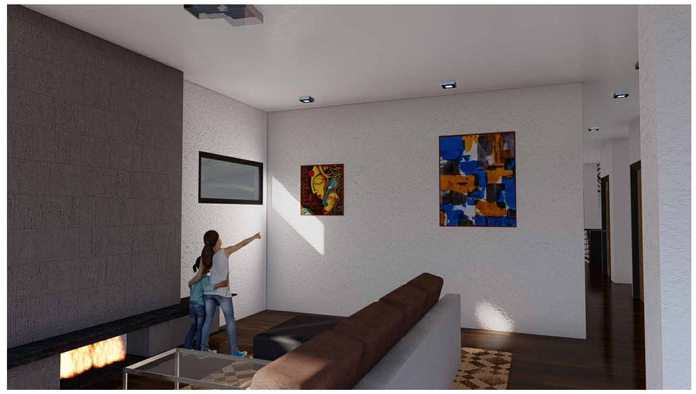
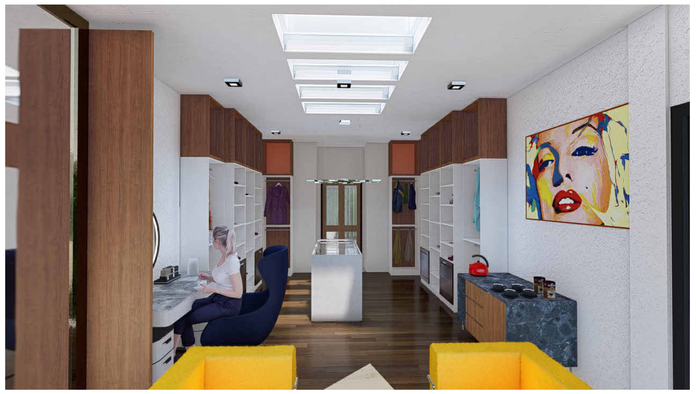


Main Living Room

Main Living Room



Upstairs Living Space



Changing Room

Wash Room

Roof Sitting Area

CONTENTS

TAX PARCEL # 9253900231

LEGAL DESCRIPTION: THE NORTH 63 FEET OF GOVERNMENT LOTE 3 IN SECTION 1, TOWNSHIP 24 NORTH, RANGE 5 EAST,W.M, IN KING COUNTY, WASHINTON, LYING WEST OF WEST LAKE SAMMAMUSH BOULEVARD SOUTHEAST AS ESTABLISHED BY RECORDING NUMBER 1633961 AND 2193697;

V 1.0

NOTES:

Interior Views

1613 WEST LAKE SAMMAMISH PKWY SE
BELLEVUE WASHINGTON 98008

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ECOLOGICAL SOLUTIONS, INC.
T 206-285-3015 | F 206-283-0323 | C 206-841-3801

4013 32nd Avenue West
Seattle, WA 98199

October 21, 2022

Mr. Pat Vulk
P.O. Box 411
Issaquah, WA 98027

Re: Conceptual Buffer Mitigation and Monitoring Plan for 1613 W Lake Sammamish Parkway SE

Dear Pat,

At your request, Ecological Solutions, Inc. (Ecological Solutions) has produced this conceptual wetland buffer and stream buffer mitigation and mitigation monitoring plan. You have proposed constructing a single family residence on your parcel located at 1613 W Lake Sammamish Parkway SE in Bellevue, Washington. This is King County tax parcel 9253900231. Based upon documentation you provided, it is my understanding that a Type N stream and Category II wetland exist on the adjacent lot to the north of your parcel. The required standard stream and wetland buffers for these environmentally sensitive areas are 50 ft. and 110 ft., respectively, according to Bellevue's critical areas land use code (LUC) 20.25H. As application of Bellevue's standard buffers would entirely encumber your property (Figure 1), your proposed development is being proposed under Bellevue's reasonable use exception code (LUC 20.25H.200). Based upon your and my correspondence with Reilly Pittman, Senior Planner with City of Bellevue (City) proposed development must comply with the Reasonable Use Exception (RUE) – Performance Standards (LUC 20.25H.205), and performance standards pertaining to geologic hazard areas (LUC 20.25H.125), streams (LUC 20.25H.080), and wetlands (LUC 20.25H.100). The RUE performance standards reference LUC 20.25H.210 through 20.25H.225. Provisions within these sections also reference the additional performance standards for streams (LUC 20.25H.085) and wetlands (LUC 20.25H.105). As noted above, performance standards for geological hazard areas are being addressed by you in a separate submittal to the City.

This conceptual stream and wetland buffer mitigation and mitigation monitoring plan is predicated on enhancing remaining buffer; it also is intended to address all relevant sections of the RUE and other applicable code sections referenced above, except geologic hazard areas. The first section of this conceptual plan summarizes existing habitat conditions, forest structure, composition and diversity. This is followed by the various elements of the conceptual mitigation plan, including quantification of potential impacts (permanent and temporary) of the proposed development, required mitigation measures (LUC 20.25H.80.A and 20.25H.100, which are identical), and how impacts of the proposed design and construction sequencing/phasing avoid and minimize potential impacts as required by code. Conceptual wetland and stream buffer mitigation, such as proposed site preparation and planting plans are described. The general concept is to enhance existing forest structure and diversity by removing non-native and invasive species and replacing these with typical native trees, shrubs, and forbs found in adjacent reference areas. Goals and objectives and proposed performance standards are presented. The last sections are proposed monitoring methods that will be used to assess attainment of proposed goals and performance standards and potential contingency measures that could be implemented, if necessary, to bring the site into conformance with applicable Critical Areas Land Use Permit (CALUP) conditions stipulated by the City. The structure of this report generally follows those in LUC 20.25H.220 Mitigation and Restoration Plan Requirements.

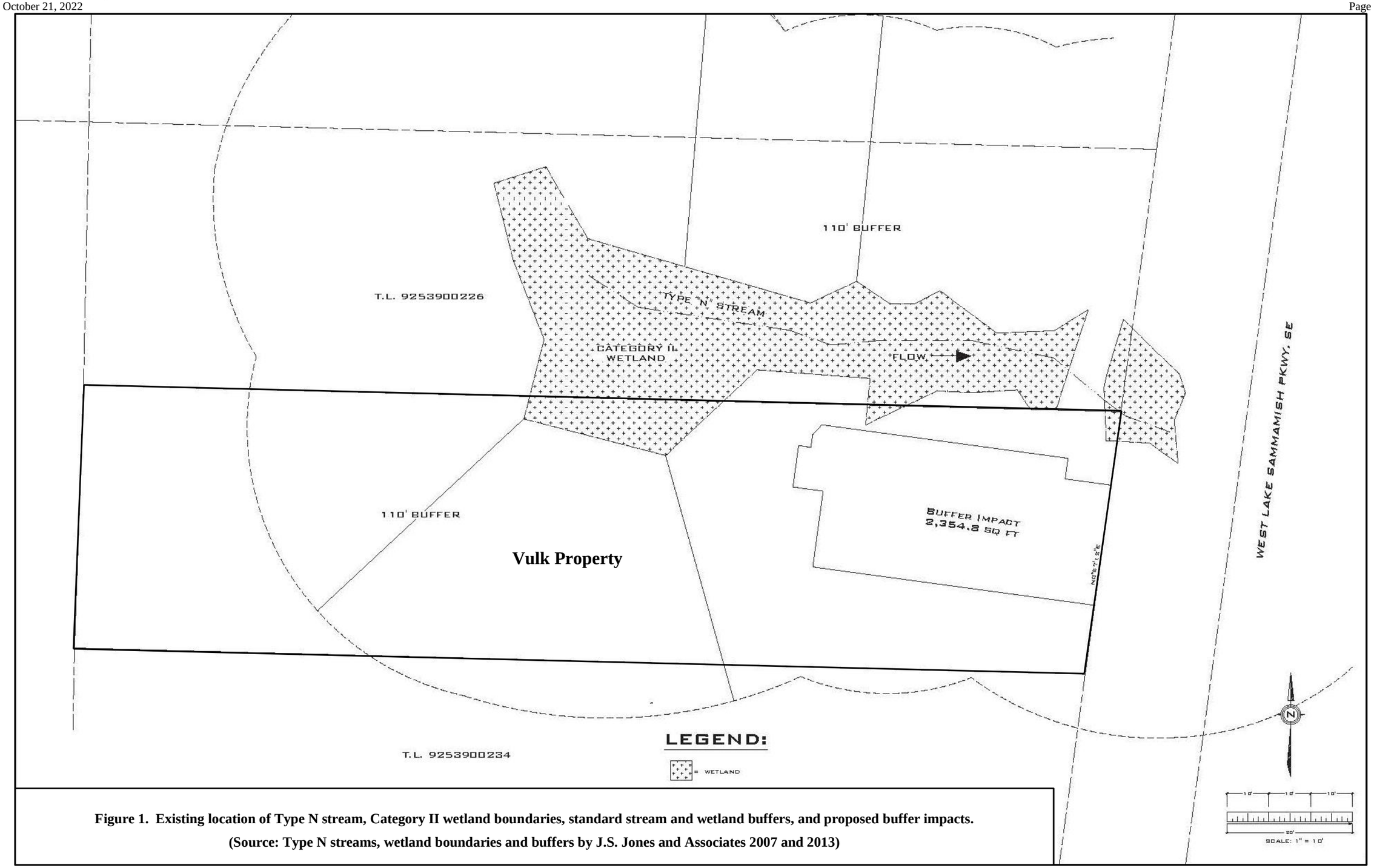


Figure 1. Existing location of Type N stream, Category II wetland boundaries, standard stream and wetland buffers, and proposed buffer impacts. (Source: Type N streams, wetland boundaries and buffers by J.S. Jones and Associates 2007 and 2013)

EXISTING CONDITIONS

As indicated in my previous reconnaissance report (Ecological Solutions 2017), habitat conditions on your property are similar to those described in the critical areas land use permit for the Howard Hui residence (two parcels to the north). It is expected that site conditions have not changed significantly and remain similar to those observed during my last site visit in August 2018. Existing tree density is low. A total of approximately 28 significant trees ≥ 8-inches diameter at breast height (DBH) are within or adjacent to the area within the eastern third of the property (~0.4 acre). This equates to a tree density of approximately 75/acre. Adding another six trees to account for the few trees < 8-inches DBH give a density of about 81/acre. Over most of the site, the mixed deciduous and coniferous forest habitat has a relatively closed canopy and rather sparsely vegetated and open understory, as shown in photographs in my 2017 habitat assessment. Denser, younger forest vegetation, occurs on the steep slope adjacent to W Lake Sammamish Parkway SE. Forest structure here is different because of the road cut and more open light conditions. Dominant canopy formers include Douglas fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), and bigleaf maple (*Acer macrophyllum*). There are also red alder (*Alnus rubra*), black cottonwood (*Populus trichocarpa*), and western hemlock (*Tsuga heterophylla*). Shrubs, forbs, and ferns are relatively sparse beneath the forest canopy. Common understory species include swordfern (*Polystichum munitum*), dull Oregon grape (*Mahonia nervosa*), trailing blackberry (*Rubus ursinus*), and beaked hazelnut (*Corylus cornuta*). Plant nomenclature follows the second edition of the *Flora of the Pacific Northwest* (Hitchcock and Cronquist 2018). Forest structure, composition, and species diversity is typical of mature, second-growth forests in urbanized areas within the Puget Lowland area.

Three non-native and invasive plant species are common understory associates within the existing forest: English ivy (*Hedera helix*), Himalayan blackberry (*Rubus bifrons*), and English holly (*Ilex aquifolium*). English ivy is the most abundant and forms some sizeable patches upslope of proposed developed areas within the wetland buffer. Himalayan blackberry, which is shade intolerant, consists primarily of a few scattered, smaller plants except for more open, disturbed areas adjacent to W Lake Sammamish Parkway SE. A number of sapling-sized English holly plants are present. This shade tolerant species is persistent and spreading in Puget Lowland forests.

Species of Local Importance

There are few priority habitats (WDFW 2008), such as snags or logs, old-growth or mature forest, caves, talus or other features present onsite or adjacent to the site that might be used by species of local importance for foraging, roosting, or breeding habitat. There are 20 habitat types on the current PHS list, many of which are known to occur in King County but few of which occur on or connected to the forested habitat on the subject property with the exception of riparian habitat and wetlands associated with the seasonal stream to the north. As indicated in my habitat assessment (2017) a search of the Washington Department of Fish and Wildlife's Priority habitat and Species (PHS) Program database found there are no known occurrences of priority species. An updated search of the PHS Program's online mapper was done September 30, 2022 and returned the same findings (Attachment C). The database search does show Weowna Park, which abuts the west side of the property and is part of a biodiversity area and corridor.

There are a few old-growth stumps onsite but large snags and downed woody debris, habitat features that contribute to species and habitat diversity are virtually absent. Some smaller, hard downed logs were observed towards the eastern boundary adjacent to W Sammamish Parkway SE. No nurse logs or larger snags in advanced stages of decay occur onsite. One relatively hard, small Douglas fir snag occurs on the western portion of the site. It is riddled with evidence of woodpecker foraging, including a couple of small, rectangular excavations that appeared to have been made by pileated woodpecker foraging. There appeared to be a small round, cavity or two that may support cavity nesting songbirds but cavity

dimensions were smaller than those reportedly used by nesting pileated woodpeckers (Lewis and Azerrad 2003). The snag is shorter and smaller diameter than those trees identified as being used by nesting pileated woodpeckers in western Washington and Oregon. According to WDFW, average diameter at breast height (DBH) of nest trees in western Washington and western Oregon reportedly are 40 and 27 inches DBH and average height 128 ft. and 87 ft., respectively (Lewis and Azerrad 2003). The Douglas fir snag onsite measured 18.5 inches DBH and is about 20-ft. tall. The snag is about 200 feet upslope of the proposed dwelling and would be preserved as part of the proposed development.

PROPOSED DEVELOPMENT AND POTENTIAL IMPACTS

Permanent and temporary impacts from proposed development are minimized and avoided as required by LUC. Removal of mixed deciduous and coniferous forest within the footprint of the proposed footprint of the house about 2,355 sq. ft. of permanent impacts (see Figure 1). In addition to permanent impacts, it is likely there would be temporary impacts from creation of temporary laydown and staging areas, which are likely to be needed to complete proposed construction. Measures use to mitigate minimize and avoid permanent and temporary impacts to stream and wetland buffers include phasing construction and implementing erosion control best management practices during construction.

Phasing construction is one of the most effective means of minimizing and avoiding potential impacts to existing critical areas buffers. There are two development phases. As you have envisioned, Phase 1 would entail excavation at the east edge of the parcel, removal of excavated earth, and preparation work for Phase 2 (construction of the house). Disturbed areas within the footprint of the house could likely be used at least temporarily for laydown areas after shoring and construction of the foundation. Additional areas within those identified as temporarily disturbed are likely to be needed for staging construction materials when installing all utilities (water, sewer, and electrical) and construction of the house. Locating proposed development on the eastern third of the property reduces habitat fragmentation and creates a contiguous block of mature forest on the western two-thirds of the property, which are connected to Weowna Park and would help to preserve the existing biodiversity area and corridor. Additional measures used to minimize and avoid permanent and temporary impacts are described in detail in the following sections.

Permanent Impacts

Proposed development would result in the removal of at least 11 significant trees (Figure 2) and associated forest vegetation within and immediately adjacent to the footprint of the development. This includes two bigleaf maple trees (11.8 to 22.5 inches DBH), a red alder (17.1 DBH), two black cottonwood (32.6 and 38.1 inches DBH), a Douglas fir (15.8 inches DBH) and seven western red cedar trees (ranging from 13 to 28.5 inches DBH). Two large black cottonwood trees (#'s 5 & 6) are within about 45 to 55 feet of the proposed house; these trees may be nearing the end of their lifespans and it may be advisable to have a certified arborist evaluate whether these two trees should be removed or not. Failure of either of these trees could result in major damage to the house and injury or death to any occupants. Note that diameters of trees to be removed are those measured at the time the tree survey was completed a few years ago. Trees are likely somewhat larger now. At least some habitat logs will be created from removed western red cedar trees (#s 21 and 22) and retained for use in the buffer enhancement plan as downed logs. Native plants will be salvaged for reuse in the buffer enhancement plan or transplanted elsewhere onsite within the buffer where possible.

Temporary Impacts

Construction of the proposed house likely will result in some temporary impacts to forest vegetation, such as from over excavation to construct foundations or temporary laydown or staging areas. These may result in temporary removal of native vegetation, damage, or mortality from such activities. Temporary

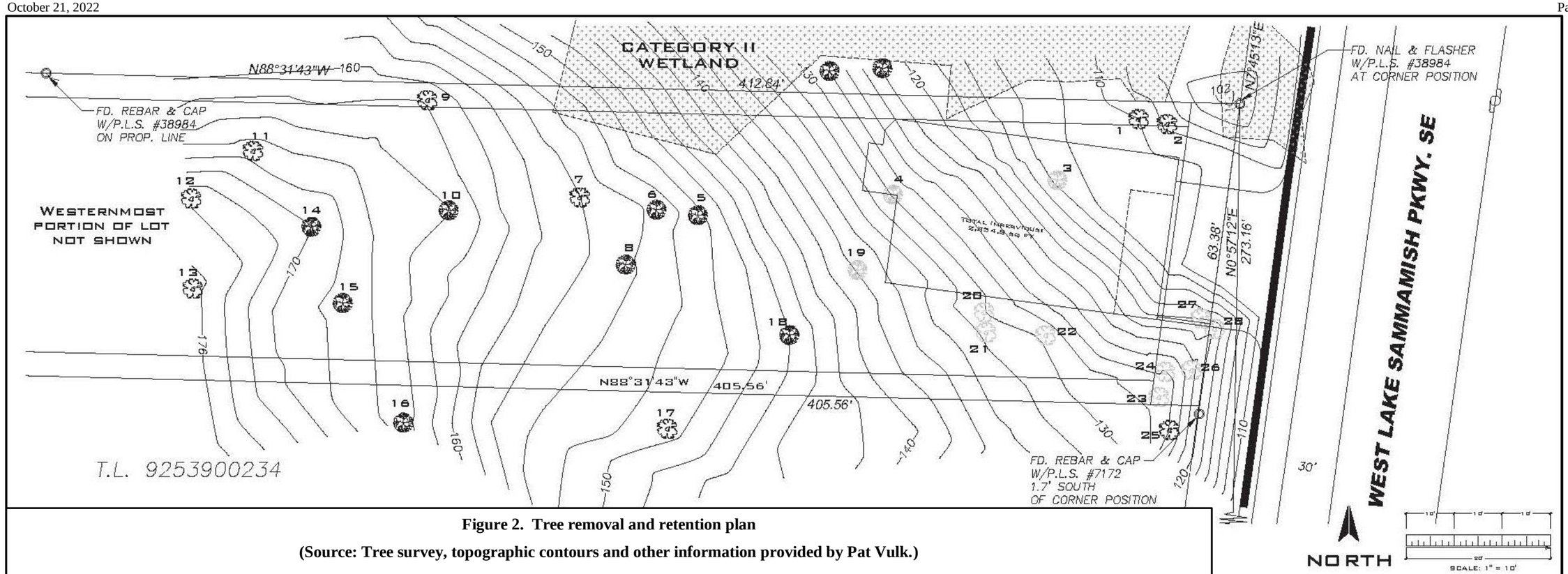


Figure 2. Tree removal and retention plan

(Source: Tree survey, topographic contours and other information provided by Pat Vulk.)

	Scientific Name	Common Name	DBH(in.)	Status	Comment		Scientific Name	Common Name	DBH(in.)	Status	Comment
1	THUJA PLICATA	WESTERN RED CEDAR	63.7	Retain		16	THUJA PLICATA	WESTERN RED CEDAR	33.7	Retain	
2	THUJA PLICATA	WESTERN RED CEDAR	16.4	Retain		17	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	26.9	Retain	
3	ALNUS RUBRA	RED ALDER	17.1	Remove		18	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	26.3	Retain	
4	ACER MACROPHYLLUM	BIG LEAF MAPLE	22.5	Remove		19	ACER MACROPHYLLUM	BIG LEAF MAPLE	11.8	Remove	
5	POPULUS BALSAMIFERA	BLACK COTTONWOOD	38.1	Retain		20	THUJA PLICATA	WESTERN RED CEDAR	13.8	Remove	
6	POPULUS BALSAMIFERA	BLACK COTTONWOOD	32.6	Retain		21	THUJA PLICATA	WESTERN RED CEDAR	28.5	Remove	Habitat log
7	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	12.2	Retain		22	THUJA PLICATA	WESTERN RED CEDAR	26.0	Remove	Habitat log
8	ACER MACROPHYLLUM	BIG LEAF MAPLE	21.4	Retain		23	THUJA PLICATA	WESTERN RED CEDAR	24.5	Remove	
9	THUJA PLICATA	WESTERN RED CEDAR	56.9	Retain		24	THUJA PLICATA	WESTERN RED CEDAR	13.0	Remove	
10	ALNUS RUBRA	RED ALDER	16.0	Retain	Leaning	25	ACER MACROPHYLLUM	BIG LEAF MAPLE	15.4	Retain	
11	ACER MACROPHYLLUM	BIG LEAF MAPLE	23.0	Retain	MULTI-TRUNK	26	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	15.8	Remove	
12	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	18.5	Retain		27	THUJA PLICATA	WESTERN RED CEDAR	15.2	Remove	
13	THUJA PLICATA	WESTERN RED CEDAR	28.5	Retain		28	THUJA PLICATA	WESTERN RED CEDAR	20.8	Remove	
14	ALNUS RUBRA	RED ALDER	12.5	Retain		29					
15	ACER MACROPHYLLUM	BIG LEAF MAPLE	13.6	Retain	MULTI-TRUNK	30					

impacts will be minimized to the maximum extent practicable through proposed construction phasing, minimizing over excavation for foundation construction through use of shoring or other methods, and consolidating temporary laydown or staging areas to the maximum extent practicable.

COMPLIANCE WITH BELLEVUE LUC REQUIREMENTS

The following sections briefly document how this proposed mitigation complies with the mitigation requirements of relevant sections of Bellevue's current LUC. As noted above, the general stream and wetland performance standards 20.25H.080.A and 20.25H.100 are identical. These performance standards are recited below. This is followed by a brief description of compliance with RUE performance standards specified in 20.25H.205 and identification of general mitigation requirements in 20.25H.210 through 20.25H.225.

Stream and Wetland Performance Standards 20.25H.080.A and 20.25H.100

There are no direct impacts to streams or wetlands from the proposed development. Impacts to remaining stream and wetland buffer will be minimized by following the performance standards below adapted from 20.25H.080.A and 20.25H.100:

1. Lights on the house shall be directed away from the stream and wetland (e.g., downward);
2. Activities that generate noise such as parking lots, generators, and residential uses, shall be located away from the stream and wetland, or any noise shall be minimized through use of design and insulation techniques;
3. Stormwater runoff from new impervious areas (e.g., roofs and driveway) shall be entirely infiltrated or treated before discharging to the stream or wetland buffer to limit potential conveyance of toxicants often found in urban runoff to the Type N stream and wetlands.
4. The outer portion of the remaining stream and wetland buffer on the north side of the proposed development shall be planted with native trees, shrubs, forbs and ferns to deter/limit domestic animal (pet) or human use.
5. Any use of pesticides, insecticides and fertilizers within 150 feet of the edge of the stream or wetland buffer shall follow the City of Bellevue's "Environmental Best Management Practices," now or as hereafter amended.

RUE 20.25H.205 – Reasonable Use Exception Performance Standards

The relatively narrow configuration of the main house and location of the proposed structures generally minimizes impacts on critical area buffers per RUE performance standard A. A narrow, tall configuration for the house in the orientation presented reduces the amount of cut needed to construct the foundation, including the pier and beam foundation needed to save the old-growth western red cedar (63.7 inches DBH) and a second smaller western red cedar (16.4 inches DBH) within the buffer of the Type N stream near the northeast corner of the house. Additionally, use of pneumatic excavation and root-pruning techniques recommended by Katie Hogan, Certified Arborist (Tree Solutions 2018), are expected to preserve the old-growth western red cedar (Attachment A) and help minimize impacts to the remaining stream buffer.

Ground floor access from W Sammamish Lake Parkway SE is located within the previously disturbed road cut. This minimizes impacts from access points on undisturbed critical area buffer consistent with RUE performance standard.B.

The driveway access is located under the main house and has no additional impacts on the critical areas buffers and thereby minimizes impacts to critical area buffers to the maximum extent possible per RUE performance standard C.

Mains for sewer, water, and electrical hook ups are expected to be confined within the footprint of the house consistent with the requirement of RUE performance standard D to consolidate disturbance for access and utility infrastructure to the maximum extent technically feasible.

Potential areas of temporary disturbance have been estimated as shown; it may be possible to stage any temporary laydown or staging areas within the footprint of the house to minimize areas of temporary disturbance. Temporary impacts will be minimized to the maximum extent practicable by phasing construction and minimizing over excavation needed to construct foundations through use of shoring or other methods. All temporary impacts to remaining wetland buffer would be restored with plantings of native vegetation as described below. Minimizing temporary impacts and restoring native vegetation in temporarily disturbed areas and remaining buffers per LUC 20.25H.210 as described in the sections below is consistent with RUE performance standards E, F and G.

Compliance with LUC 20.25H.210 et seq. – General Mitigation and Restoration Requirements

This section briefly identifies how mitigation mentioned above and below complies with the general mitigation and restoration requirements specified in LUC 20.25H.210 through 20.25H.225. The buffer enhancement and monitoring plan laid out below is required because of unavoidable impacts to stream and wetland buffers associated with the RUE and Critical Areas Land Use Permit (CALUP) application process being followed to construct the proposed development.

20.25H.215 Mitigation Sequencing

As noted above, the location and configuration of the proposed development generally avoids and minimizes impacts to stream and wetland buffers. Proposed buffer enhancement compensates for unavoidable impacts to critical area buffers consistent with code provisions requiring at least 1:1 compensation for buffer impacts. Monitoring and conceptual contingency plans are components of this plan as required.

20.25H.220 Mitigation and Restoration Plan Requirements

This conceptual buffer enhancement and monitoring plan is intended to be part of your RUE and CALUP application to the City. A more detailed mitigation plan will be prepared, if necessary. According to subsection A of this part of the code, a more detailed mitigation plan may be required before or with approval of the first permit for the proposed development if it is not waived by the Director. The applicable sections of the proposed conceptual mitigation and monitoring plan are provided in the sections below under **CONCEPTUAL BUFFER ENHANCEMENT AND MONITORING PLAN**.

CONCEPTUAL BUFFER ENHANCEMENT AND MONITORING PLAN

This conceptual buffer enhancement and monitoring plan includes the following components as required by LUC 20.25H.220: goals and objectives; detailed descriptions of proposed buffer enhancement and restoration for permanent and temporary impacts to existing buffers; measureable performance standards; monitoring and maintenance plans; and a conceptual contingency plan. Buffer enhancement and restoration will be initiated upon completion of construction or potentially concurrent with final phases of construction (e.g., finish work inside the structure).

Enhancement Plan Goals and Objectives

The overall goals and objectives of the proposed mitigation are to enhance habitat structural diversity and complexity and associated functions of the remaining wetland and stream buffer. This will be accomplished in part by removing non-native and invasive plants (English ivy, English holly, and Himalayan blackberry) and replacing them with native plants found elsewhere on the property and in forested areas within Weowna Park (a reference area). Forest canopy architecture is relatively simple onsite consisting of mature conifer and deciduous trees of generally similar age that form a more or less closed canopy. Proposed development will create gaps in the canopy allowing more light to reach the forest floor. This will enable establishment of a younger cohort of trees to replace those removed for construction along with establishing a more diverse assemblage of native shrubs, forbs, and ferns in the understory. The enhancement plan will creating multiple layers in the forest architecture and place downed (habitat) logs from removed western red cedar trees, resulting in more habitat niches that improve habitat functions for a broader array of native plants, animals, insects, and fungi.

Buffer Enhancement for Permanent Impacts

Two plant associations are proposed for buffer enhancement areas. Most of the area (3,250 sq. ft.) would be a tree, shrub, forb and fern plant association (Figure 3). An additional 982 sq. ft. of enhancement closer to the house would consist of patches of a shrub, forbs and fern association and an estimated 3,852 sq. ft. of temporarily impacted area adjacent to the house would be similarly enhanced/restored. Total proposed buffer enhancement/restoration is 8,084 sq. ft compared to a total impact of 2,355 sq. ft. Code requires a minimum of 1:1 replacement ratio for permanent buffer impacts. Proposed enhancement/restoration is a ratio of 3.43:1. Plus, the lost buffer is being replaced by a concomitant amount (2,355 sq. ft.) on the western part of the property (see Figure 1), resulting in no net loss of buffer.

Following completion of construction or concurrent with finish work inside the structures, proposed buffer enhancement and restoration for permanent impacts can proceed. Several downed logs (up to six) will be added to the forest floor on the south side of the structure from western red cedar trees removed for construction. Then invasive plants will be removed from proposed buffer enhancement and enhancement and restoration areas and native plants installed. All English ivy, English holly, and Himalayan blackberry will be grubbed by hand and removed from the site.

Tree, Shrub, Fern and Forb Plant Association

Following removal of invasive plants, native plants will be installed as depicted in Figure 3 and Table 1. All native plants shall be container stock or a mixture of container and bare root stock originating in the Puget lowlands. Trees will be replaced at a ratio of a minimum of 1.8:1. Up to a maximum of 11 trees may be removed and a total of 20 trees will be planted to replace these. To replace trees at the existing

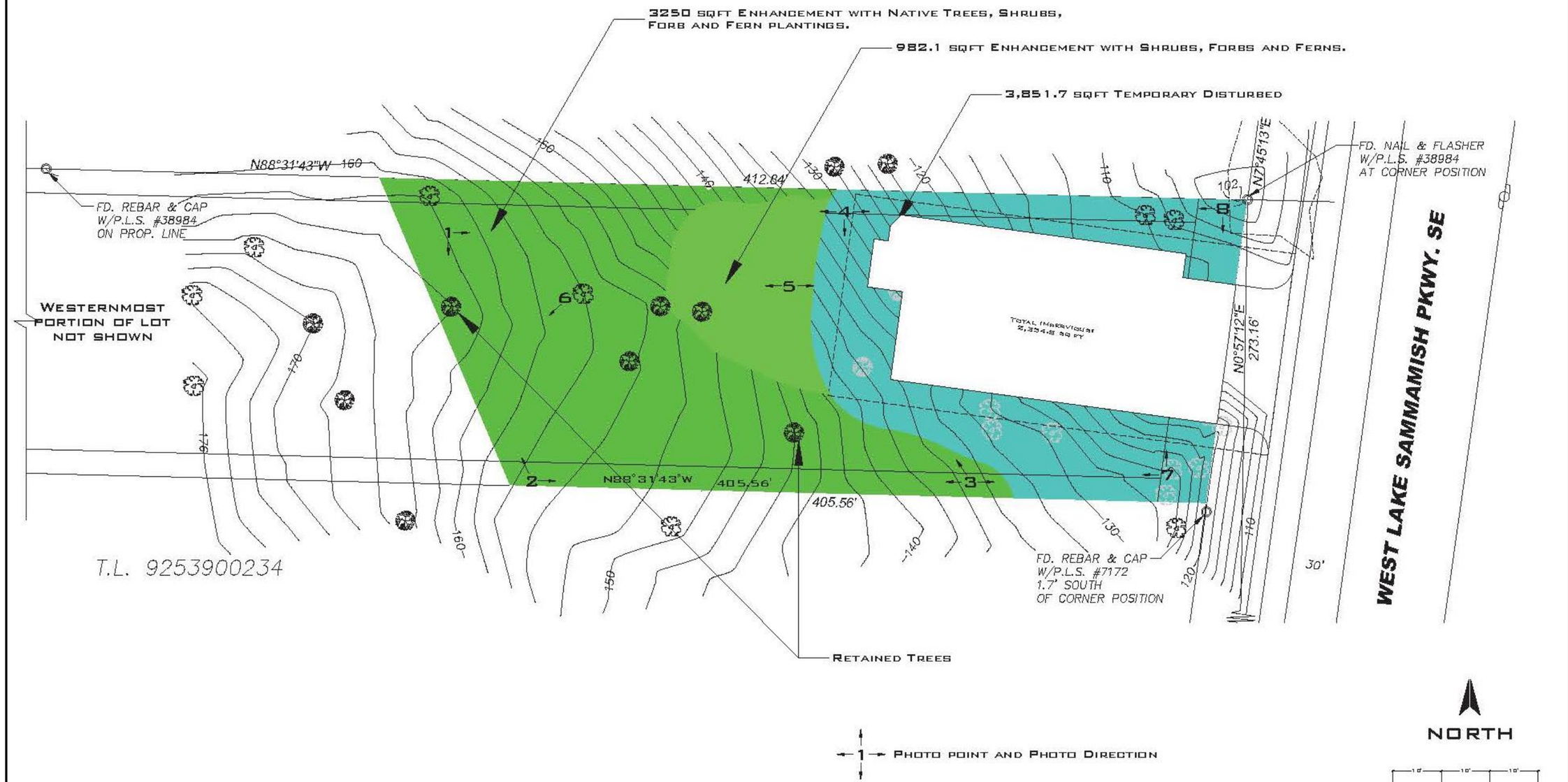


Figure 3. Buffer enhancement and monitoring plan.

density in the proposed 3,250 sq. ft. forested planting area (trees, shrubs, forbs, and ferns) shown in Figure 3 would require a total of six trees. A total of 20 trees (Douglas fir, western red cedar, and western hemlock) is proposed to be planted, which is 3.3 times the existing tree density on the eastern third of the property (see Figure 3). Thus even with some mortality, the proposed tree density in the enhanced buffer would likely be higher than the existing density. The conifer species selected would replace those removed at a ratio of at least 1.8:1 provided all those trees in the tree retention and removal plan are removed and all future tree plantings survive. Plant trees 15 to 30 ft. on center (o.c.) to create spacing similar to existing conditions. To improve survival without any temporary irrigation, all buffer enhancement and restoration plantings shall be treated with a soil moisture retention polymer, such as SoilMoist™ or equivalent, at manufacturer recommended rates. When properly used, I have found addition of SoilMoist™ improves growth and survival of plants in gravelly sandy loam soils such as those present on this site. Wood chip mulch or arborist chips a minimum of 3-inches thick will be placed in a ring about 1.5-ft. diameter (ferns and forbs) to 3-ft. diameter (trees and shrubs).

In addition to trees, native shrubs ferns, and forbs are proposed for the forested buffer enhancement area. Installation of vine maple, beaked hazelnut, Indian plum, dull Oregon grape, common snowberry, and evergreen huckleberry will create a well-developed shrub layer. Evergreen and deciduous shrubs have a mixture of growth forms and habits (relatively short, moderate, and arborescent [vine maple]) that provide a variety of cover types and food for wildlife. Vine maple, beaked hazelnut, and Indian plum should be protected from deer browsing with wire cages. Plant shrubs six to nine ft. o.c., except as noted in Table 1.

Table 1. Native plants for the 3,250 sq. ft. tree, shrub, forb, and fern buffer enhancement zone

Species		Quantity	Size	Comments
Scientific Name[1]	Common Name			
Trees				
Pseudotsuga menziesii	Douglas fir	8	1-gal. cont.	Widely spaced, similar to existing
Thuja plicata	Western red cedar	6	1-gal. cont	Widely spaced, similar to existing
Tsuga heterophylla	Western hemlock	6	1-gal. cont.	Widely spaced, similar to existing
	Total	**20**		
Shrubs				
Acer circinatum	Vine maple	5	1-gal. cont.	Solitary plants amidst other shrubs
Corylus cornuta	Beaked hazelnut	5	1-gal. cont.	Solitary plants amidst other shrubs
Mahonia nervosa	Dull Oregon grape	15	1-gal. cont.	Groups of 2 or 3, plants 3 ft. o.c.
Oemleria cerasiformis	Indian plum	5	1-gal. cont.	Solitary plants amidst other shrubs
Symphoricarpos albus	Common snowberry	5	1-gal. cont.	Solitary plants amidst other shrubs
Vaccinium ovatum	Evergreen huckleberry	10	1-gal. cont.	Groups of 2 or 3, plants 3 ft. o.c.
	Total	**45**		
Forbs and Ferns				
Blechnum spicant	Deer fern	15	1-gal. cont	Groups of 3, plants 1.5 ft. o.c.
Dicentra formosa	Pacific bleeding heart	20	1-gal. cont	Groups of 3 or 4, plants 1.5 ft. o.c.
Polystichum munitum	Swordfern	15	1-gal. cont.	Groups of 3, plants 3 ft. o.c.
Tellima grandiflora	Fringecup	25	1-gal. cont	Groups of 5, plants 1.5 ft. o.c.
	Total	**75**		
	Grand Total	**140**		

[1] Plant nomenclature follows *Flora of the Pacific Northwest* (second edition).
Plant substitutions may only be made upon approval by the City of Bellevue.

Plant small patches of ferns (deer fern and swordfern) and forbs (Pacific bleeding heart and fringecup) are proposed among the shrubs to add to the structural complexity and diversity.

Shrub, Forb, and Fern Plant Association

The second plant association of shrubs, forbs, and ferns covers a small patches totaling 982 sq. ft. (see Figure 3) west of the house. The species assemblage proposed for these areas is similar but without trees (Table 2). Tall Oregon grape, a taller, more sun-loving species replaces dull Oregon grape. An additional native forb, wild ginger is added to this association. Spacing of shrubs, ferns, and forbs is similar in these areas.

Table 2. Native plants for the 982 sq. ft. shrub, forb, and fern buffer enhancement patches

Species		Quantity	Size	Comments
Scientific Name[1]	**Common Name**			
Shrubs				
Acer circinatum	Vine maple	3	1-gal. cont.	Solitary plants amidst other shrubs
Mahonia aquifolium	Tall Oregon grape	5	1-gal. cont.	Groups of 2 or 3, plants 6 ft. o.c.
Vaccinium ovatum	Evergreen huckleberry	5	1-gal. cont.	Groups of 2 or 3, plants 6 ft. o.c.
	Total	**13**		
Forbs and Ferns				
Asarum caudatum	Wild ginger	10	1-gal. cont.	Groups of 2 or 3, plants 1.5 ft. o.c.
Blechnum spicant	Deer fern	6	1-gal. cont	Group of 3, plants 1.5 ft. o.c.
Dicentra formosa	Pacific bleeding heart	6	1-gal. cont	Groups of 3, plants 1.5 ft. o.c.
Polystichum munitum	Swordfern	6	1-gal. cont.	Solitary & group of 2, plants 3 ft. o.c.
Tellima grandiflora	Fringecup	6	1-gal. cont	Group of 3, plants 1.5 ft. o.c.
	Total	**34**		
	Grand Total	**47**		

[1] Plant nomenclature follows *Flora of the Pacific Northwest* (second edition).
Plant substitutions may only be made upon approval by the City of Bellevue.

Restoration of Temporarily Disturbed Areas

In addition to showing buffer enhancement areas, Figure 3 shows an estimated area of up to 3,852 sq. ft. of temporarily disturbed area in a band about 8 to 21-ft. wide around the proposed new development. As noted above, the amount of temporarily disturbed areas may be less than this if alternative areas can be used for temporary staging and laydown areas. Nonetheless, an area of about 8 to 21-feet wide around the entire new development is shown as possibly being temporarily disturbed. Phasing construction and consolidating temporary laydown and staging areas to within the footprint of the main house to the maximum extent practicable is expected to help minimize disturbance the amount of temporary disturbance. A mixture of native shrubs, forbs, and ferns similar to the shrub, forb, and fern association above is proposed to restore temporarily disturbed areas (Table 3). Only generally smaller stature,

evergreen shrubs are proposed in this area. Additional vertical structure could be created by adding scattered vine maple plants throughout this area. The total number of plants needed for restoration may be smaller than indicated in Table 3 depending on the nature and actual amount of temporary disturbance and whether plants are killed, temporarily damaged, or salvaged as part of temporary disturbance.

Table 3. Native plants for restoring temporarily disturbed areas around the proposed development.

Species		Quantity	Size	Comments
Scientific Name[1]	**Common Name**			
Shrubs1				
Gaultheria shallon	Salal	24	1-gal. cont.	Groups 3 to 6 ft. o.c.
Mahonia nervosa	Dull Oregon grape	24	1-gal. cont.	Groups 3 to 6 ft. o.c.
Vaccinium ovatum	Evergreen huckleberry	15	1-gal. cont.	Groups 3 to 6 ft. o.c.
	Total	**63**		
Forbs and Ferns				
Blechnum spicant	Deer fern	20	1-gal. cont	Group of 3 to 5, plants 1.5 ft. o.c.
Dicentra formosa	Pacific bleeding heart	24	1-gal. cont	Groups of 4, plants 1.5 ft. o.c.
Polystichum munitum	Swordfern	15	1-gal. cont.	Group of 3 to 5, plants 3 ft. o.c.
Tellima grandiflora	Fringecup	24	1-gal. cont	Group of 4, plants 1.5 ft. o.c.
Tolmeia menziesii	Youth-on-age	24	1-gal. cont	Group of 4, plants 1.5 ft. o.c.
	Total	**107**		
	Grand Total	**170**		

[1] Plant nomenclature follows *Flora of the Pacific Northwest* (second edition).
Plant substitutions may only be made upon approval by the City of Bellevue.

Performance Standards

Performance standards are proposed for measuring the overall goals and objectives of improving buffer structure, function, and diversity through enhancement. Percent survival, percent cover, and diversity performance standards in Table 4 will be used to document achievement of these goals and objectives. These performance standards are consistent with the guidance in the City of Bellevue's *Critical Areas Handbook* (The Watershed Company, no date).

Monitoring and Maintenance Plans

Monitoring and maintenance will be conducted over a period of at least five years (growing seasons) following completion of planting as required by code. Percent survival of installed trees, shrubs, forbs, and ferns will be based upon the actual number of each growth form planted. Monitoring and maintenance will follow the schedule in Table 5. At a minimum, annual monitoring reports will include a summary of plant survival, cover, and diversity data collected each year. Copies of digital photographs taken from identified photopoints shown in Figure 3 also will be included to document reported findings. Each monitoring report also will provide maintenance and contingency recommendations that should be implemented as appropriate to promote achievement of the overall goals and objectives as measured by attaining specified performance standards.

Table 4. Performance standards for buffer enhancement areas				
Performance Standard	**Year 1 (2023)**	**Year 2 (2024)**	**Year 3 (2025)**	**Year 5 (2027)**
Percent survival of trees, shrubs, forbs, and ferns	80	80	80[a]	80[a]
Native plant diversity (Trees = T; Shrubs = SH; Forbs = F; Ferns = Fn)	T – 3 SH – 6 F – 4 Fn - 2	T – 3 SH – 6 F – 4 Fn - 2	T – 3 SH – 6 F – 4 Fn - 2	T – 3 SH – 6 F – 4 Fn - 2
Total percent areal cover of native or naturalized plants (i.e., trees + shrubs + forbs + ferns)[b]	25 to 40	30 to 55	40 to 60	45 to 70
Total percent areal cover of invasive species	<10	<10	<15	<15

[a] After two years it may not be possible to determine individual plants for shrub and forb species that spread rhizomatously, such as salal, snowberry, and all forb species.
[b] Total percent cover of all species will be estimated for the entire buffer enhancement area.

Table 5. Recommended maintenance and monitoring schedule.												
Activity	**2023**			**2024**			**2025**			**2027**		
	APR	**JUN**	**SEP**	**APR**	**JUN**	**SEP**	**APR**	**JUN**	**SEP**	**APR**	**JUN**	**SEP**
Maintenance												
Weeding[1]	X	X	X	X	X	X	X	X	X	X	X	X
Monitoring												
Annual[2]			X			X			X			X
Maint.Insp.[3]	X			X			X			X		

[1] Regular weeding is critical to reduce re-establishment and competition from non-native and invasive plants. Weeding may need to be initiated earlier and continued later in any given year, depending on what species are present.
[2] Annual monitoring reports shall be submitted to the City of Bellevue by December 31 each year monitoring is required.
[3] Maintenance inspections should be conducted the following spring to document recommendations in annual monitoring reports have been completed.

Assurance Devices

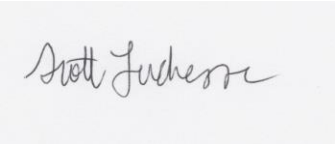
Assurance devices may be required by the City per LUC 20.40.490 to ensure that approved mitigation plans are fully implemented. These may be up to 150% of the estimated cost of implementing the mitigation. Reilly Pittman previously indicated to me that the King County Bond Quantity Worksheet was an accepted form of estimating the potential assurance device amount. Attachment B is an estimate for implementing this buffer enhancement and monitoring plan.

Contingency Plans

Contingency plans may include supplemental plantings if initial plantings do not achieved stated goals and objectives and performance standards. Contingency plans may also include creating snags out of the western red cedars near the northeast corner of the proposed main house if the trees end up dying despite following the certified arborist's recommendations. If the two western red cedars do not survive, it also may be necessary to do supplemental stream buffer plantings. Supplemental plantings also may be needed elsewhere in the buffer enhancement if performance standards are not met at the end of the monitoring period.

If I may provide any additional information or clarification on this report, please call me at (206) 841-3801.

Sincerely,



ECOLOGICAL SOLUTIONS, INC.
SCOTT LUCHESSA
Ecologist, M.Sc.

Attachments:

Attachment A – Arborist Report Recommendations
Attachment B – King County Bond Quantity Worksheet
Attachment C – PHS Program Data

Literature Cited

Ecological Solutions, Inc. 2017. Reconnaissance investigation of 1613 W Lake Sammamish Parkway SE. Prepared by Scott Luchessa, Certified Ecologist, for Mr. Pat Vulk. Ecological Solutions, Seattle, WA.

Lewis, J.C. and J.M. Azerrad. 2003. Pileated woodpecker (*Drycopus pileatus*). Washington Department of Fish and Wildlife's Priority Habitat and Species Management Recommendations Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, WA.

Hitchcock, C.L. and A. Cronquist. 2018. Flora of the Pacific Northwest. Second Edition. Edited by David E. Giblin, Ben S. Legler, Peter F. Zika, and Richard G. Olmstead. University of Washington Press, Seattle, Washington.

The Watershed Company (TWC). No date. Critical Areas Handbook: Restoring, Enhancing and Preserving. Prepared by TWC for the City of Bellevue.

Tree Solutions, Inc. 2018. Arborist report for 1613 W Lake Sammamish Parkway SE. Prepared by Katie Hogan for Pat Vulk. Tree Solutions, Seattle, WA.

Washington Department of Fish and Wildlife (WDFW). 2008. Priority habitats and species list, updated March 2022. Olympia, WA.

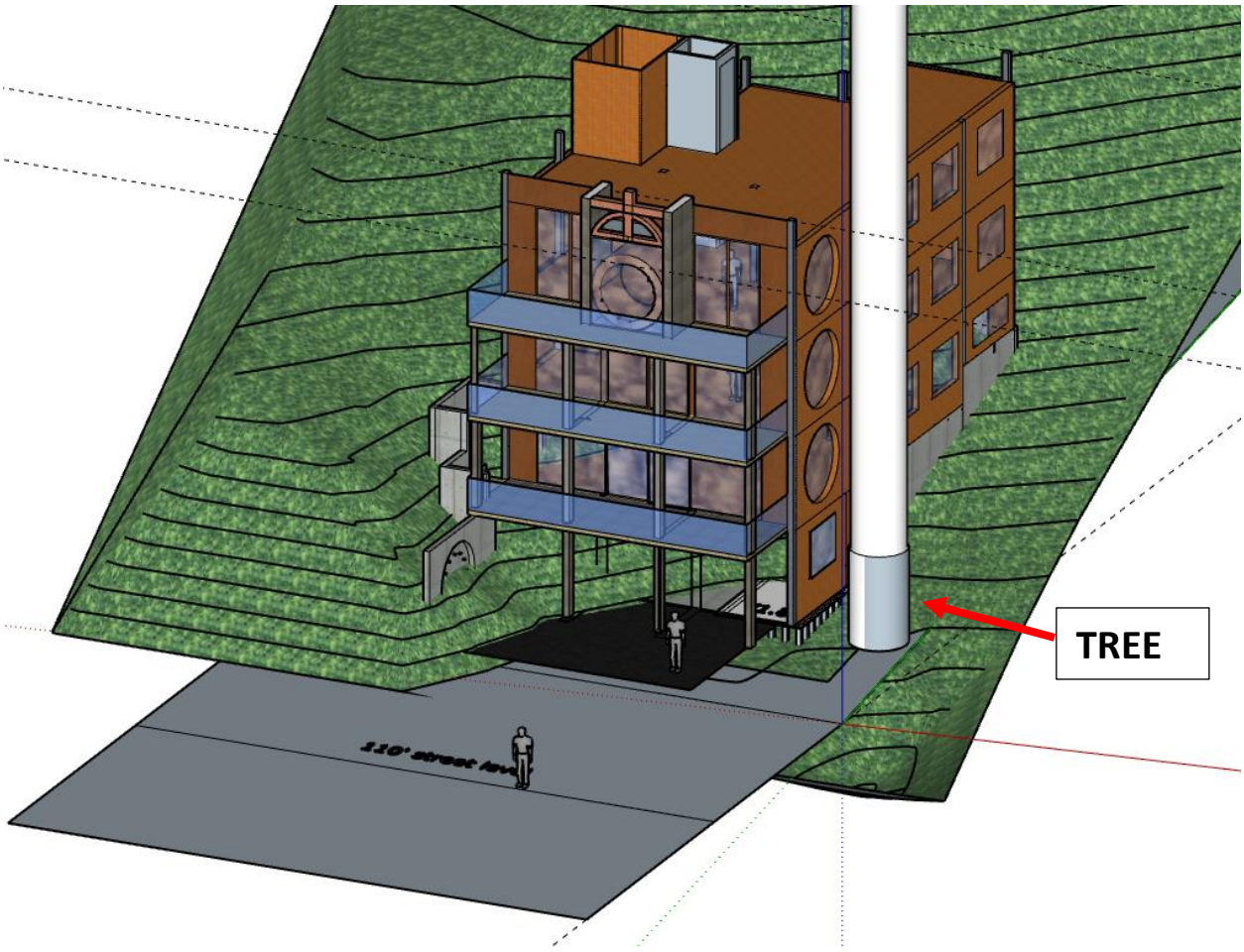
ATTACHMENT A

ARBORIST REPORT RECOMMENDATIONS

Tree Protection Specifications

- **Tree Protection Fencing:** All trees planned for retention or on neighboring properties that overhang the site shall be protected for the entire duration of the construction project. Tree protection fencing shall consist of high visibility mesh or chain link fencing installed at the extent of the tree protection area. Where trees are being retained as a group the fencing should encompass the entire area.
- **Soil Protection:** No parking, materials storage, or dumping (including excavated soils) are allowed within the tree protection area. Any heavy machinery should remain outside of the protection area unless soils are protected from the load. Acceptable methods of soil protection include applying 1- inch plywood over 3 to 4 inches of wood chip mulch, or use of Alturna mats (or equivalent product).
- **Duff/Mulch:** Retain and protect as much of the existing duff and understory as possible. Retained trees in areas where there are exposed soils shall have 4 to 6 inches of coarse arborist wood chip mulch applied to help prevent water evaporation and compaction. Keep mulch 6 inches away from the base of the tree.
- **Excavation:** Excavation done at or within the tree protection area should be carefully planned to minimize disturbance. Where feasible consider using alternative methods such as pneumatic excavation which uses pressurized air to blow soil away from the root system, directional drilling to bore utility lines, or hand excavation to expose roots. Excavation done with machinery (backhoe) in proximity of trees should be performed slowly with flat front buckets, removing small amounts of soil at a time with one person on the ground spotting for roots. When roots are encountered, excavation should stop and roots should be cleanly pruned as needed so they are not ripped or torn.
- **Root Pruning:** Root pruning should be limited to the extent possible. All roots shall be pruned with a sharp saw making clean cuts. Avoid fracturing and breaking roots with excavation equipment. Root cuts shall be immediately covered with soil or mulch and kept moist.
- **Irrigation:** Retained trees will require supplemental water if construction occurs during summer drought periods.
- **Pruning:** Any pruning required for construction and safety clearance shall be done with a pruning specification provided by the project arborist in accordance with American National Standards Institute ANSI A300 Standard Practices for Pruning. Use of an arborist with an International Society of Arboriculture Certification to perform pruning is strongly advised.

House On Existing Terrain



ATTACHMENT B

King County Bond Quantity Worksheet

King County

Department of Permitting
Environmental Review
35030 SE Douglas Str, Suite 210
Snoqualmie, WA 98065-9266
206-296-6600 TTY Relay: 711

Critical Areas Mitigation
Bond Quantity Worksheet

C24 09/09/2015
ls-wks-sensareaBQ.xls
ls-wks-sensareaBQ.pdf

Project Name: Vulk Reasonable Use Exception **Date:** 1-Oct-22 **Prepared by:** Scott Luchessa

Project Number: **Project Description:** Stream & wetland buffer enhancement

Location: Parcel 9253900231 **Applicant:** Mr. Pat Vulk **Phone:** 425.295.9533

PLANT MATERIALS (includes labor cost for plant installation)

Type	Unit Price	Unit	Quantity	Description	Cost
PLANTS: Potted, 4" diameter, medium	$5.00	Each			$ -
PLANTS: Container, 1 gallon, medium soil	$11.50	Each	357.00		$ 4,105.50
PLANTS: Container, 2 gallon, medium soil	$20.00	Each			$ -
PLANTS: Container, 5 gallon, medium soil	$36.00	Each			$ -
PLANTS: Seeding, by hand	$0.50	SY			$ -
PLANTS: Slips (willow, red-osier)	$2.00	Each			$ -
PLANTS: Stakes (willow)	$2.00	Each			$ -
PLANTS: Stakes (willow)	$2.00	Each			$ -
PLANTS: Flats/plugs	$2.00	Each			$ -
				TOTAL	**$ 4,105.50**

INSTALLATION COSTS (LABOR, EQUIPMENT, & OVERHEAD)

Type	Unit Price	Unit			Cost
Compost, vegetable, delivered and spread	$37.88	CY	4.00	arborist chips or bark mulch	$ 151.52
Decompacting till/hardpan, medium, to 6" depth	$1.57	CY			$ -
Decompacting till/hardpan, medium, to 12" depth	$1.57	CY			$ -
Hydroseeding	$0.51	SY			$ -
Labor, general (landscaping other than plant installation)	$40.00	HR			$ -
Labor, general (construction)	$40.00	HR			$ -
Labor: Consultant, supervising	$55.00	HR			$ -
Labor: Consultant, on-site re-design	$95.00	HR			$ -
Rental of decompacting machinery & operator	$70.00	HR			$ -
Sand, coarse builder's, delivered and spread	$42.00	CY			$ -
Staking material (set per tree)	$7.00	Each			$ -
Surveying, line & grade	$250.00	HR			$ -
Surveying, topographical	$250.00	HR			$ -
Watering, 1" of water, 50' soaker hose	$3.62	MSF			$ -
Irrigation - temporary	$3,000.00	Acre			$ -
Irrigation - buried	$4,500.00	Acre			$ -
Tilling topsoil, disk harrow, 20hp tractor, 4"-6" deep	$1.02	SY			$ -
				TOTAL	**$ 151.52**

HABITAT STRUCTURES*

ITEMS	Unit Cost	Unit			Cost
Fascines (willow)	$ 2.00	Each			$ -
Logs, (cedar), w/ root wads, 16"-24" diam., 30' long	$1,000.00	Each			$ -
Logs (cedar) w/o root wads, 16"-24" diam., 30'	$400.00	Each			$ -
Logs, w/o root wads, 16"-24" diam., 30' long	$245.00	Each	6.00		$ 1,470.00
Logs w/ root wads, 16"-24" diam., 30' long	$460.00	Each			$ -
Rocks, one-man	$60.00	Each			$ -
Rocks, two-man	$120.00	Each			$ -
Root wads	$163.00	Each			$ -
Spawning gravel, type A	$22.00	CY			$ -
Weir - log	$1,500.00	Each			$ -
Weir - adjustable	$2,000.00	Each			$ -
Woody debris, large	$163.00	Each			$ -
Snags - anchored	$400.00	Each			$ -
Snags - on site	$50.00	Each			$ -
Snags - imported	$800.00	Each			$ -
* All costs include delivery and installation				TOTAL	**$ 1,470.00**

EROSION CONTROL

ITEMS	Unit Cost	Unit			Cost
Backfill and Compaction-embankment	$ 4.89	CY			$ -
Crushed surfacing, 1 1/4" minus	$30.00	CY			$ -
Ditching	$7.03	CY			$ -
Excavation, bulk	$4.00	CY			$ -
Fence, silt	$1.60	LF			$ -
Jute Mesh	$1.26	SY			$ -
Mulch, by hand, straw, 2" deep	$1.27	SY			$ -
Mulch, by hand, wood chips, 2" deep	$3.25	SY			$ -
Mulch, by machine, straw, 1" deep	$0.32	SY			$ -
Piping, temporary, CPP, 6"	$9.30	LF			$ -
Piping, temporary, CPP, 8"	$14.00	LF			$ -
Piping, temporary, CPP, 12"	$18.00	LF			$ -
Plastic covering, 6mm thick, sandbagged	$2.00	SY			$ -
Rip Rap, machine placed, slopes	$33.98	CY			$ -
Rock Constr. Entrance 100'x15'x1'	$3,000.00	Each			$ -
Rock Constr. Entrance 50'x15'x1'	$1,500.00	Each			$ -
Sediment pond riser assembly	$1,695.11	Each			$ -
Sediment trap, 5' high berm	$15.57	LF			$ -
Sediment trap, 5' high berm w/spillway incl. riprap	$59.60	LF			$ -
Sodding, 1" deep, level ground	$5.24	SY			$ -
Sodding, 1" deep, sloped ground	$6.48	SY			$ -
Straw bales, place and remove	$600.00	TON			$ -
Hauling and disposal	$20.00	CY			$ -
Topsoil, delivered and spread	$35.73	CY			$ -
				TOTAL	**$ -**

GENERAL ITEMS

ITEMS	Unit Cost	Unit			Cost
Fencing, chain link, 6' high	$18.89	LF			$ -
Fencing, chain link, corner posts	$111.17	Each			$ -
Fencing, chain link, gate	$277.63	Each			$ -
Fencing, split rail, 3' high (2-rail)	$10.54	LF			$ -
Fencing, temporary (NGPE)	$1.20	LF			$ -
Signs, sensitive area boundary (inc. backing, post, install)	$28.50	Each			$ -
				TOTAL	**$ -**

OTHER

				(Construction Cost Subtotal)	**$ 5,727.02**
ITEMS	Percentage of Construction	Unit			Cost
Mobilization	10%	1			$ 572.70
Contingency	30%	1			$ 1,718.11
				TOTAL	**$ 2,290.81**

MAINTENANCE AND MONITORING

NOTE: Projects with multiple permit requirements may be required to have longer monitoring and maintenance terms. This will be evaluated on a case-by-case basis for development applications. Monitoring and maintance ranges may be assessed anywhere from 5 to 10 years.

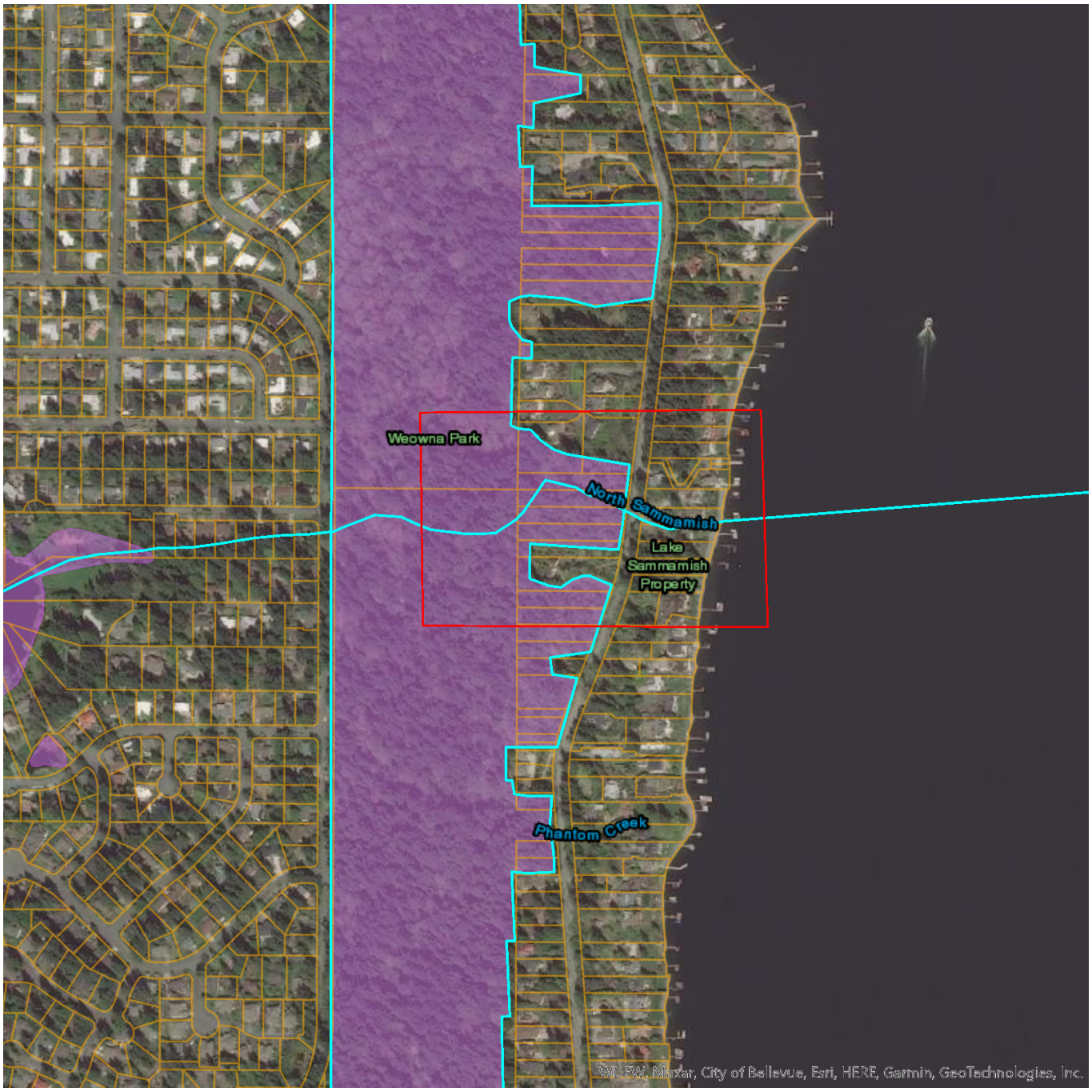
Maintenance, annual (by owner or consultant)					
Less than 1,000 sq.ft. and buffer mitigation only	$ 1.08	SF		(3 X SF total for 3 annual events; Includes monitoring)	$ -
Less than 1,000 sq.ft. with wetland or aquatic area mitigation	$ 1.35	SF		(3 X SF total for 3 annual events; Includes monitoring)	$ -
Larger than 1,000 sq. ft. but less than 5,000 sq.ft. of buffer mitigation	$ 180.00	EACH	5.00	(4hr @$45/hr)	$ 900.00
Larger than 1,000 sq. ft. but less than 5,000 sq.ft. of wetland or aquatic area mitigation	$ 270.00	EACH		(6hr @$45/hr)	$ -
Larger than 5,000 sq.ft. but < 1 acre -buffer mitigation only	$ 360.00	EACH		(8 hrs @ 45/hr)	$ -
Larger than 5,000 sq.ft. but < 1 acre with wetland or aquatic area mitigation	$ 450.00	EACH		(10 hrs @ $45/hr)	$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area mitigation	$ 1,600.00	DAY		(WEC crew)	$ -
Larger than 5 acres - buffer and / or wetland or aquatic area mitigation	$ 2,000.00	DAY		(1.25 X WEC crew)	$ -
Monitoring, annual (by owner or consultant)					
Larger than 1,000 sq.ft. but less than 5,000 wetland or buffer mitigation	$ 720.00	EACH	4.00	(8 hrs @ 90/hr)	$ 2,880.00
Larger than 5,000 sq.ft. but < 1 acre with wetland or aquatic area impacts	$ 900.00	EACH		(10 hrs @ $90/hr)	$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area impacts	$ 1,440.00	DAY		(16 hrs @ $90/hr)	$ -
Larger than5 acres - buffer and / or wetland or aquatic area impacts	$ 2,160.00	DAY		(24 hrs @ $90/hr)	$ -
				TOTAL	**$ 3,780.00**

Total	**$11,797.83**

ATTACHMENT C

WDFW PHS Program Data

Priority Habitats and Species on the Web



Report Date: 09/30/2022

PHS Species/Habitats Overview:

Occurence Name	Federal Status	State Status	Sensitive Location
Resident Coastal Cutthroat	N/A	N/A	No
Fall Chinook	N/A	N/A	No
Biodiversity Areas And Corridor	N/A	N/A	No

PHS Species/Habitats Details:

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1221306475989, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	31780
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1221306475989, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	31781
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Biodiversity Areas And Corridor	
Priority Area	Terrestrial Habitat
Site Name	BELLEVUE PARKS
Accuracy	1/4 mile (Quarter Section)
Notes	CITY AND/OR COUNTY PARKS LOCATED IN BELLEVUE. ONLY THE PORTIONS WITH DESIREABLEWILDLIFE HABITAT ARE MAPPED. LAKE HILLS PARK CONTAINS WETLANDS.
Source Record	902050
Source Dataset	PHSREGION
Source Name	MULLER, TED
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00023
Geometry Type	Polygons

GEOTECHNICAL ENGINEERING REPORT

PREPARED BY:

THE RILEY GROUP, INC.
17522 BOTHELL WAY NORTHEAST
BOTHELL, WASHINGTON 98011

PREPARED FOR:

PAT VULK
PO BOX 411
ISSAQUAH, WASHINGTON 98027

RGI PROJECT NO. 2022-673-1

VULK RESIDENCE
1613 WEST LAKE SAMMAMISH PARKWAY SOUTHEAST
BELLEVUE, WASHINGTON

JANUARY 12, 2023

Corporate Office
17522 Bothell Way Northeast
Bothell, Washington 98011
Phone 425.415.0551 ♦ Fax 425.415.0311

www.riley-group.com

RILEYGROUP

January 12, 2023

Pat Vulk
PO Box 411
Issaquah, Washington 98027

Subject: **Geotechnical Engineering Report**
Vulk Residence
1613 West Lake Sammamish Parkway Southeast
Bellevue, Washington
RGI Project No. 2022-673-1

Dear Pat Vulk:

As requested, The Riley Group, Inc. (RGI) has performed a Geotechnical Engineering Report (GER) for the Vulk Residence located at 1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington. Our services were completed in accordance with our proposal dated November 10, 2022 and authorized by you on November 30, 2022. The information in this GER is based on our understanding of the proposed construction, and the soil and groundwater conditions encountered in the borings completed by RGI at the site on December 9, 2022.

RGI recommends that you submit the project plans and specifications to RGI for a general review so that we may confirm that the recommendations in this GER are interpreted and implemented properly in the construction documents. RGI also recommends that a representative of our firm be present on site during portions of the project construction to confirm that the soil and groundwater conditions are consistent with those that form the basis for the engineering recommendations in this GER.

If you have any questions or require additional information, please contact us.

Respectfully submitted,

THE RILEY GROUP, INC.

State of Washington 2698 Licensed Geologist
1/12/23
ERIC L. WOODS

Eric L. Woods, LG
Project Geologist

KRISTINA MARIE WELLER STATE OF WASHINGTON 33182 REGISTERED PROFESSIONAL ENGINEER
1/12/23

Kristina M. Weller, PE
Principal Geotechnical Engineer

Corporate Office
17522 Bothell Way Northeast
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Summary

This Summary should be used in conjunction with the entire Geotechnical Engineering Report (GER) for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this section, and the GER must be read in its entirety for a comprehensive understanding of the items contained herein. Section 7.0 should be read for an understanding of limitations.

RGI's geotechnical scope of work included the advancement of two borings to approximate depths of 16.5 feet below existing site grades.

Based on the information obtained from our subsurface exploration, the site is suitable for development of the proposed project. The following geotechnical considerations were identified:

Soil Conditions: The soils encountered during field exploration include surficial soils comprised of very loose to medium dense silty sand with trace gravel over medium dense to very dense pre-Olympia deposits (Qpo) comprised of sand with some silt and gravel, and sand with some silt, and hard pre-Fraser deposits (Qpf) comprised of sandy silt and silt.

Groundwater: Groundwater seepage was not encountered during our subsurface exploration.

Foundations: Foundations for the proposed building may be supported on conventional spread footings bearing on competent native soil or structural fill.

Slab-on-grade: Slab-on-grade floors and slabs for the proposed building can be supported on competent native soil or structural fill.

1.0 Introduction

1.1 Overview

This Geotechnical Engineering Report (GER) presents the results of the geotechnical engineering services provided for the Vulk Residence located at 1613 West Lake Sammamish Parkway Southeast in Bellevue, Washington. The approximate location of the site is shown on Figure 1.

The recommendations in the following sections of this GER are based upon our current understanding of the proposed site development as outlined below and shown on Figure 2. If actual features vary or changes are made, RGI should review them in order to modify our recommendations as required. In addition, RGI requests to review the site grading plan, final design drawings and specifications when available to verify that our project understanding is correct and that our recommendations have been properly interpreted and incorporated into the project design and construction.

1.2 Background

The site is comprised of an elongated parcel (Parcel # 9253900231) located on an east-facing slope that descends to Lake Sammamish. Portions of the site contain Steep Slopes, Seismic Hazard Areas, and Wetlands, and a stream is located on the parcel to the north.

The hazards and associated buffers occupy a significant portion of the property, such that development within City of Bellevue regulations is not possible, and a Reasonable Use Exception will be necessary to develop on the site. A *Conceptual Buffer Mitigation and Monitoring Plan* dated October 21, 2022 was prepared by Ecological Solutions, Inc. addressing the wetland and stream buffers and buffer mitigation measures.

The site is currently undeveloped. RGI understands the site will be developed with a single family residence. The residence will be in the eastern 80 feet of the site, adjacent to West Lake Sammamish Parkway Southeast, with a total area of approximately 2,355 square feet. Based on the preliminary plans provided, cuts up to 30 feet are proposed within the building footprint, with a finish floor elevation of 108.7 feet. Retaining walls will be necessary to support the proposed cuts.

At the time of preparing this GER, building plans were not available for our review. Based on our experience with similar construction, RGI anticipates that the proposed building will be supported on perimeter walls with bearing loads of two to six kips per linear foot. Slab-on-grade floor loading of 150 pounds per square foot (psf) are expected.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of the study was to explore subsurface soil and groundwater conditions, assess the stability of the site slopes, assess the potential for liquefaction of the site soils, and provide geotechnical recommendations for developing the site with a single family residence based on the preliminary plans provided.

1.4 INVESTIGATIONS SUMMARY

On December 9, 2022, RGI performed field explorations using an acker limited access drill rig. We explored subsurface soil conditions at the site by observing the drilling of two borings to a maximum depth of 16.5 feet below existing grade. The boring locations are shown on Figure 2.

Field logs of each exploration were prepared by the geologist that continuously observed the drilling. These logs included visual classifications of the materials encountered during drilling as well as our interpretation of the subsurface conditions between samples. The boring logs included in Appendix A represent an interpretation of the field logs and include modifications based on laboratory observation and analysis of the samples.

During the field exploration, a representative portion of each recovered sample was sealed in containers and transported to our laboratory for further visual and laboratory examination. Selected samples retrieved from the borings were tested for moisture content and grain size analysis to aid in soil classification and provide input for the recommendations provided in this GER. The results and descriptions of the laboratory tests are enclosed in Appendix A.

1.5 REPORT OVERVIEW

Based on the preliminary plans, the critical site issue will be providing both temporary and permanent support of the excavation and slope above the proposed home. See the Temporary Shoring and Retaining walls section of the report for information and recommendations. Information from Boring B-2 was used to perform a liquefaction analysis. The results of the analysis are included in Appendix A. Information from both borings were used to perform stability assessments of the site slopes. The results of the analysis are included in Appendix B.

2.0 Site Conditions

2.1 LOCATION AND SURFACE CONDITIONS

The subject site is a rectangular-shaped parcel of land approximately 0.59 acres in size. The site is bound to the north, west, and south by undeveloped forest, and to the east by West Lake Sammamish Parkway Southeast.

The site is currently an undeveloped, forested parcel. The site slopes generally east with an elevation change of about 135 feet over a horizontal distance of about 400 feet. Based on the survey provided, the topographic low is in the northeast site corner at an elevation of approximately 102 feet, and the topographic high is in the southwest site corner at about 237 feet. The survey is noted as prepared in accordance with NAVD88 datum.

Slope gradients range from about 20 to 70 percent. An unpaved access road extends into the site about 40 feet from West Lake Sammamish Parkway Southeast near the northeast site corner. The site is vegetated with small- to large-diameter trees with a fern and mixed brush undergrowth.

The parcel to the south is an undeveloped, forested slope. The parcel to the north is an undeveloped, forested slope with a stream flowing east to Lake Sammamish. The property to the west is City of Bellevue's Weowna Park.

No indications of slope instability or subsurface contamination were observed.

2.2 GEOLOGIC SETTING

Review of the *Geologic Map of the East Half of the Bellevue South 7.5' x 15' Quadrangle, Issaquah Area, King County, Washington,* Derek B. Booth, etc. (2012) indicates that the eastern edge of the site is mapped as Deposits of pre-Olympia Age (Map Unit Qpo), which is interbedded sand, gravel, and silt. The eastern portion of the site is mapped as Undifferentiated sedimentary deposits of pre-Fraser glaciation age (Qpf), which is silt and clay deposits. The western portion of the site is mapped as Advance outwash deposits (Qva), which is sand and gravel deposited by meltwater streams. These descriptions are generally similar to the findings in our field explorations.

2.3 SUBSURFACE SOIL CONDITIONS

The soils encountered during field exploration include surficial soils comprised of very loose to medium dense silty sand with trace gravel over medium dense to very dense pre-Olympia deposits (Qpo) comprised of sand with some silt and gravel, and sand with some silt, and hard pre-Fraser deposits (Qpf) comprised of sandy silt and silt.

More detailed descriptions of the subsurface conditions encountered are presented in the boring logs included in Appendix A. Sieve analysis was performed on three selected soil samples. Grain size distribution curves are included in Appendix A.

2.4 GROUNDWATER CONDITIONS

Groundwater seepage was not encountered during our subsurface exploration. Wet soils were encountered in the surficial soils and pre-Olympia sand deposits. It should be recognized that fluctuations of the groundwater table will occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the explorations

were performed. In addition, perched water can develop within seams and layers contained in fill soils or higher permeability soils overlying less permeable soils following periods of heavy or prolonged precipitation. Therefore, groundwater levels during construction or at other times in the future may be higher or lower than the levels indicated on the logs.

2.5 SUBSURFACE CONTAMINATION

No evidence of contamination was observed in the borings. We have no knowledge of environmental reports competed for the site.

3.0 Discussion and Conclusions

Based on the subsurface conditions encountered and the proposed development plans, the site is suitable for the proposed construction from a geotechnical standpoint. Support of the excavation can be provided with either soldier piles and tiebacks or soil nails.

Discussion and conclusions regarding the above issues and site grading are provided in the following sections. Additional geotechnical design considerations are provided in the Recommendations section. These recommendations should be incorporated into the final design drawings and construction specifications.

3.1 SLOPE STABILITY

Based on the definition in the Bellevue Land Use Code, portions of the site meet the criteria of Steep Slopes. The site is occupied by an east-facing slope that descends about 135 feet in elevation at gradients of 20 to 70 percent. Reconnaissance of the slopes showed no indications of previous slide activity. No seeps or springs were observed on the slope face. Much of the site slopes at gradients of 40 percent or greater and meets the criteria of Steep Slopes.

RGI performed a slope stability analysis by using a computer program, Slide version 6.0, which was developed by Rocscience. The safety factor for the critical surfaces was calculated by the Bishop Method. The analyses were performed for the slopes under current and proposed static and seismic conditions. The location of the slope stability profile is shown on Figure 2.

The analysis shows marginally stable conditions of 1.4 for static and 0.9 for seismic for the existing conditions. The analysis shows stable conditions of 2.1 for static and 1.5 for seismic for the proposed conditions. Based on the analysis and provided the recommendations in this report are followed, the proposed development will not have an adverse effect on the slopes or surrounding properties.

Based on our understanding of the project, disturbed areas will be re-vegetated and the wetland buffer will be enhanced as part of the project. An erosion and sedimentation control plan should be implemented during construction.

3.2 SEISMIC CONSIDERATIONS

3.2.1 SEISMIC DESIGN CRITERIA

Based on the International Building Code (IBC), RGI recommends the follow seismic parameters for design.

Table 1 IBC

Parameter	2018 Value
Site Soil Class[1]	D[2]
Site Latitude	47.5958
Site Longitude	-122.1116
Short Period Spectral Response Acceleration, S_S (g)	1.316
1-Second Period Spectral Response Acceleration, S_1 (g)	0.459
Adjusted Short Period Spectral Response Acceleration, S_{MS} (g)	1.316
Adjusted 1-Sec Period Spectral Response Acceleration, S_{M1} (g)	0.845[3]
Numeric seismic design value at 0.2 second; S_{DS}(g)	0.877
Numeric seismic design value at 1.0 second; S_{D1}(g)	0.563[3]

1. Note: In general accordance with Chapter 20 of ASCE 7-16. The Site Class is based on the average characteristics of the upper 100 feet of the subsurface profile.

2. Note: ASCE 7-16 require a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope of our services does not include the required 100 foot soil profile determination. Borings extended to a maximum depth of 16.5 feet, and this seismic site class definition considers that similar soil continues below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.

3. Note: In accordance with ASCE 11.4.8, a ground motion hazard analysis is not required for the following cases:

- Structures on Site Class E sites with S_S greater than or equal to 1.0, provided the site coefficient Fa is taken as equal to that of Site Class C.
- Structures on Site Class D sites with S_1 greater than or equal to 0.2, provided that the value of the seismic response coefficient Cs is determined by Eq. 12.8-2 for values of $T \leq 1.5Ts$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5T_s$ or Eq. 12.8-4 for $T > TL$.
- Structures on Site Class E sites with S_1 greater than or equal to 0.2, provided that T is less than or equal to T_s and the equivalent static force procedure is used for design.

The above exceptions do not apply to seismically isolated structures, structures with damping systems or structures designed using the response history procedures of Chapter 16.

3.2.2 LIQUEFACTION

Liquefaction is a phenomenon where there is a reduction or complete loss of soil strength due to an increase in water pressure induced by vibrations from a seismic event. Liquefaction mainly affects geologically recent deposits of fine-grained sands that are below the groundwater table. Soils of this nature derive their strength from intergranular

friction. The generated water pressure or pore pressure essentially separates the soil grains and eliminates this intergranular friction, thus reducing or eliminating the soil's strength.

Review of the *Liquefaction Susceptibility Map of King County, Washington* by Stephan P. Palmer, etc. (2004) indicates the eastern edge of the site is mapped as having Moderate to High Liquefaction Susceptibility, while the remainder of the site is mapped as Very Low. RGI reviewed the results of the field and laboratory testing and assessed the potential for liquefaction of the site's soil during an earthquake. Since the site is underlain by glacially consolidated deposits and lacks an established shallow groundwater table, RGI considers that the possibility of liquefaction during an earthquake is low.

The eastern edge of the site is mapped as having Moderate to High Liquefaction Susceptibility and meets the criteria of a Seismic Hazard Area. Based on soils encountered at Boring B-1, most of the proposed building footprint will not be susceptible to liquefaction. The loose, wet silty sand encountered at B-2 could be susceptible if a water table was present. Analysis of liquefaction at B-2 with a water table at 2.5 feet in depth showed minimal settlement at 0.08 inches. The results are attached in Appendix A.

3.3 Site Work

The earthwork is expected to include installing retaining structures, excavating the building foundations and preparing slab subgrades. The proper planning for site erosion control, temporary slope inclinations, and the sequencing of retaining wall installation will be very import to the successful completion of the proposed project. Recommendations for erosion control, temporary slopes and retaining structure design are provided in the Recommendations section of this report.

3.4 Infiltration

The site is mapped as infiltration infeasible on the City of Bellevue GIS. Based on the surface and subsurface conditions, infiltration is not feasible on the site.

3.5 Retaining Structures

RGI anticipates that an excavation ranging up to about 30 feet deep will be needed at the site to accommodate the proposed building and substructure. In our opinion, soldier piles and tiebacks or soil nails can be used in a cantilevered configuration for shoring the proposed excavation sidewalls at the site. These retaining structures will likely provide permanent support for the slopes above the site.

3.6 Rockeries & Modular Block Walls

Rockeries and modular block walls may be used for grade changes outside of building areas. Walls more than 4 feet in height typically require a separate building permit. RGI can design gravity or reinforced modular block walls over 4 feet in height once the location and height

of the walls is determined. Rockeries and modular block landscaping walls are not retaining structures and should be limited to no more than 4 feet in height. Rockeries should be construction in accordance with the Association of Rockery Contractor guidelines. Rockeries and modular block walls periodically require maintenance and should be located appropriately. The construction of rockeries and modular block walls should be observed by the geotechnical engineer to confirm the soil conditions are suitable, drainage is installed and the materials used are suitable for the construction.

3.7 FOUNDATION SUPPORT

Following site preparation, shoring installation and excavation to grade, the proposed building foundation can be supported on conventional spread and continuous footings bearing on competent native soil or structural fill. Based on the glacially consolidated soils encountered on the site, native soils suitable for the support of the proposed foundations will be encountered at foundation subgrade. These conditions should be confirmed prior to foundation forming by an RGI representative.

4.0 Recommendations

Based on our study, the site is suitable for the proposed construction from a geotechnical standpoint. Support of the excavation can be provided with either soldier piles and tiebacks or soil nails. Foundations for the proposed building can be supported on conventional spread footings bearing on medium dense to dense native soil or structural fill. Slab-on-grade floors can be similarly supported.

Detailed recommendations regarding the above issues and other geotechnical design considerations are provided in the following sections. These recommendations should be incorporated into the final design drawings and construction specifications.

4.1 SITE GRADING AND EARTHWORK

We expect the site grading to consist of excavations and grading to allow the mobilization of equipment for installing shoring for the proposed excavation, installation of the shoring including excavations to foundation grade, backfill of foundations and walls, and preparation of slab subgrades.

4.1.1 EROSION AND SEDIMENT CONTROL

Potential sources or causes of erosion and sedimentation depend on construction methods, slope length and gradient, amount of soil exposed and/or disturbed, soil type, construction sequencing and weather. The impacts on erosion-prone areas can be reduced by implementing an erosion and sedimentation control plan. The plan should be designed in accordance with applicable city and/or county standards.

RGI recommends the following erosion control Best Management Practices (BMPs):

- Scheduling site preparation and grading for the drier summer and early fall months and undertaking activities that expose soil during periods of little or no rainfall
- Retaining existing vegetation whenever feasible
- Establishing a quarry spall construction entrance
- Installing siltation control fencing or anchored straw or coir wattles on the downhill side of work areas
- Covering soil stockpiles with anchored plastic sheeting
- Revegetating or mulching exposed soils with a minimum 3-inch thickness of straw if surfaces will be left undisturbed for more than one day during wet weather or one week in dry weather
- Directing runoff away from exposed soils and slopes
- Minimizing the length and steepness of slopes with exposed soils and cover excavation surfaces with anchored plastic sheeting
- Decreasing runoff velocities with check dams, straw bales or coir wattles
- Confining sediment to the project site
- Inspecting and maintaining erosion and sediment control measures frequently (The contractor should be aware that inspection and maintenance of erosion control BMPs is critical toward their satisfactory performance. Repair and/or replacement of dysfunctional erosion control elements should be anticipated.)

Permanent erosion protection should be provided by reestablishing vegetation using hydroseeding and/or landscape planting. Until the permanent erosion protection is established, site monitoring should be performed by qualified personnel to evaluate the effectiveness of the erosion control measures. Provisions for modifications to the erosion control system based on monitoring observations should be included in the erosion and sedimentation control plan.

4.1.2 Stripping and Subgrade Preparation

Stripping efforts should include removal of pavements, vegetation, organic materials, and deleterious debris from areas slated for building, pavement, and utility construction. The borings encountered about six inches of topsoil and rootmass. Deeper areas of stripping may be required in heavily vegetated areas of the site.

Subgrade soils that become disturbed due to elevated moisture conditions should be overexcavated to reveal firm, non-yielding, non-organic soils and backfilled with compacted structural fill. In order to maximize utilization of site soils as structural fill, RGI recommends that the earthwork portion of this project be completed during extended periods of warm and dry weather if possible. If earthwork is completed during the wet season (typically November through May) it will be necessary to take extra precautionary measures to protect subgrade soils. Wet season earthwork will require additional

mitigative measures beyond that which would be expected during the drier summer and fall months.

4.1.3 EXCAVATIONS

All temporary cut slopes associated with the site and utility excavations should be adequately inclined to prevent sloughing and collapse. The site soils consist of very loose to medium dense silty sand with trace gravel surficial soils, medium dense to very dense sand with some silt and varying gravel pre-Olympia deposits, and hard sandy silt and silt pre-Fraser deposits.

Accordingly, for excavations more than 4 feet but less than 20 feet in depth, the temporary side slopes should be laid back with a minimum slope inclination of 1.5H:1V (Horizontal:Vertical) in the loose soils and 1H:1V in the medium dense soils. If there is insufficient room to complete the excavations in this manner, or excavations greater than 20 feet in depth are planned, using temporary shoring to support the excavations should be considered. Shoring recommendations are provided in the following section of this GER.

For open cuts at the site, RGI recommends:

- No traffic, construction equipment, stockpiles or building supplies are allowed at the top of cut slopes within a distance of at least five feet from the top of the cut
- Exposed soil along the slope is protected from surface erosion using waterproof tarps and/or plastic sheeting
- Construction activities are scheduled so that the length of time the temporary cut is left open is minimized
- Surface water is diverted away from the excavation
- The general condition of slopes should be observed periodically by a geotechnical engineer to confirm adequate stability and erosion control measures

In all cases, however, appropriate inclinations will depend on the actual soil and groundwater conditions encountered during earthwork. Ultimately, the site contractor must be responsible for maintaining safe excavation slopes that comply with applicable OSHA or WISHA guidelines.

4.1.4 STRUCTURAL FILL

RGI recommends fill below the foundation and floor slab, behind retaining walls, and below pavement and hardscape surfaces be placed in accordance with the following recommendations for structural fill. The structural fill should be placed after completion of site preparation procedures as described above.

The suitability of excavated site soils and import soils for compacted structural fill use will depend on the gradation and moisture content of the soil when it is placed. As the amount of fines (that portion passing the U.S. No. 200 sieve) increases, soil becomes increasingly

sensitive to small changes in moisture content and adequate compaction becomes more difficult or impossible to achieve. Soils containing more than about 5 percent fines cannot be consistently compacted to a dense, non-yielding condition when the moisture content is more than 2 percent above or below optimum. Optimum moisture content is that moisture that results in the greatest compacted dry density with a specified compactive effort.

Non-organic site soils are only considered suitable for structural fill provided that their moisture content is within about two percent of the optimum moisture level as determined by ASTM D1557. The site soils are moisture sensitive and may require moisture conditioning prior to use as structural fill. If the on-site soils are or become unusable, it may become necessary to import clean, granular soils to complete site work. Prior to use, an RGI representative should observe and test all materials imported to the site for use as structural fill. Structural fill materials should be placed in uniform loose layers not exceeding 12 inches for large compaction equipment and 6 inches for small equipment and compacted to 95 percent of the maximum dry density. The soil's maximum density and optimum moisture should be determined by ASTM D1557. Placement and compaction of structural fill should be observed by RGI.

4.1.5 Wet Weather Construction Considerations

RGI recommends that preparation for site grading and construction include procedures intended to drain ponded water, control surface water runoff, and to collect shallow subsurface seepage zones in excavations where encountered. It will not be possible to successfully compact the subgrade or utilize on-site soils as structural fill if accumulated water is not drained prior to grading or if drainage is not controlled during construction. Free water should not be allowed to pond on the subgrade soils. RGI anticipates that the use of berms and shallow drainage ditches, with sumps and pumps in utility trenches, will be required for surface water control during wet weather and/or wet site conditions.

4.2 Temporary Shoring and Retaining Walls

Based on the preliminary site plan, temporary and permanent support will be necessary for the proposed excavations. We expect the shoring will provide permanent support for the soils and the basement walls will be formed directly against the permanent shoring walls.

Based on our explorations, RGI anticipates that the on-site excavation will encounter primarily hard pre-Fraser silt deposits and medium dense to very dense pre-Olympia sand deposits. These soils can be readily excavated with conventional earthworking equipment. Although our explorations did not reveal boulders within the native soils, such obstacles could be present at random locations within these deposits.

Our explorations encountered no groundwater below grade at the time of drilling and we do not expect groundwater will impact the proposed shoring. Ideally, the site excavation would be performed in the summer months.

4.2.1 SOLDIER PILE AND TIEBACK SHORING

In our opinion, soldier piles can be used in either a cantilevered or a tied-back configuration for shoring the proposed excavation sidewalls at the site. The following geotechnical comments and recommendations are provided concerning soldier piles.

Soldier Pile Embedment

All soldier piles must have sufficient embedment below the final excavation level to provide adequate kick-out resistance to horizontal loads, as calculated by the design engineer. RGI recommends providing a minimum embedment of 10 feet below the excavation base directly in front of each pile. For cantilevered soldier piles, RGI further recommends that the embedment depth not be less than the exposed wall height.

Drilling Conditions

Our subsurface explorations revealed that the site is underlain by layers of dense to very dense sands and stiff to hard silts. These soils can likely be drilled with a conventional auger, but the very dense and hard layers will undoubtedly yield slow drilling rates. Although none of our explorations encountered cobbles or boulders, it should be realized that such obstructions could exist at random locations within these deposits.

Applied Loads

All soldier piles at the subject site should be designed to resist the various lateral loads applied to them. For a temporary shoring wall, RGI expects that these lateral loads will consist of active or at-rest pressures including the slopes above the walls. For a shoring wall that has adequate drainage, RGI does not expect that hydrostatic pressures will need to be considered. Our recommended design pressures are presented graphically on Figures 3 through 5 and are discussed in the following paragraphs.

- Active Earth Pressures: Cantilevered walls and tied-back walls that have only one row of tiebacks can be designed using active earth pressures modeled as the equivalent fluid densities shown on Figures 3 and 4. Tied-back walls that have two or more rows of tiebacks should be designed using the trapezoidal pressure distribution shown on Figure 5. From the backslope level to the foreslope level, these active pressures should be applied over the soldier pile spacing; below the foreslope level, the pressures need be applied over just one pile diameter.
- Structural Surcharge Pressures: Lateral earth pressures acting on the soldier piles should be increased to account for any structural loads located within a horizontal distance equal to half the wall height. If existing footings or other structural loads

are found to exist within this distance, RGI should be contacted to calculate the appropriate surcharge pressures.

- Seismic Surcharge Pressures: The walls will permanently support the soil loads so should include a 7H seismic surcharge.
- Hydrostatic Pressures: If groundwater is allowed to collect behind the shoring wall, a net hydrostatic pressure of 45 pcf would act against the portion of wall above the foreslope level and below the saturation level. However, if adequate drainage is provided behind the shoring wall, we expect that hydrostatic pressures will not develop.
- Resisting Forces: Lateral resistance can be computed by using an appropriate passive earth pressure acting over the embedded portion of each soldier pile, neglecting the upper 2 feet. This passive pressure should be applied over a lateral distance equal to the pile spacing or twice the pile diameter, whichever is less. For a level foreslope (measured perpendicular to the wall face), RGI recommends using a maximum allowable passive pressure modeled as an equivalent fluid density of 400 pounds per cubic foot (pcf).
- Soldier Pile Bearing and Friction Resistance: The resistance to vertical loads from tieback and underpinning may be calculated using an allowable end bearing of 15 kips per square foot (ksf) and an allowable friction of 1.0 ksf in the hard silt expected at the base of the piles.
- Pile Deflections: Lateral deflections for a soldier pile can be calculated from the horizontal modulus of subgrade reaction, which generally increases with depth. As a reasonable approximation, however, a uniform modulus of 250 kips per cubic foot (kcf) or 145 pounds per cubic inch (pci) can be used.

4.2.2 LAGGING

RGI recommends that lagging be installed between all adjacent soldier piles to reduce the potential for soil caving, backslope subsidence, and hazardous working conditions. Our geotechnical comments and recommendations about lagging are presented below.

Lagging Materials

In our opinion, either conventional wooden timbers or reinforced shotcrete panels could be utilized as lagging at the site, but the former would likely be much less expensive. For permanent shoring wall applications, RGI typically recommends that all wooden timber lagging be pressure-treated. However, because the on-site shoring wall serves only a temporary function, pressure-treated wooden lagging is not necessary.

Lateral Pressures

Due to soil arching effects, temporary lagging that spans 8 feet or less need be designed for only 50 percent of the lateral earth pressure previously recommended for soldier pile design. Permanent lagging, on the other hand, should be designed for 75 percent of this same lateral earth pressure. In both cases, these values assume that adequate drainage is provided behind the lagging, as discussed below.

Lagging Backfill

RGI recommends that any voids behind the lagging be backfilled with a material sufficiently pervious to allow groundwater flow and prevent a build-up of hydrostatic pressure. For this reason, permeable materials such as granular excavation spoils, clean sand, or pea gravel are suitable as backfill material, whereas silty soils, cement grout, controlled-density fill, or other less-permeable materials are not suitable.

Drainage System

RGI recommends that all lagging backfill material connect to a continuous horizontal drain located in front of the wall. This can be accomplished either by extending gravel under the lagging or by providing gaps between the lagging boards. If concrete or shotcrete walls are to be placed against wooden lagging, prefabricated vertical drainage strips (such as MiraDRAIN 6000®) should be attached to each lagging bay.

4.2.3 TIEBACKS

RGI anticipates that tieback anchors might be needed to support any soldier pile walls having an exposed height greater than about 15 feet. Our tieback comments and recommendations are summarized below and are illustrated on the attached Figures 4 and 5.

Conflicts and Easements

Because tiebacks typically extend about 30 to 60 feet behind the excavation face, conflicts with underground utilities and adjacent structures often arise. The project structural engineer should carefully consider the locations of such obstructions when laying out all tiebacks. Furthermore, temporary easements will be required for any tiebacks that extend beyond the site's property boundaries.

Installation Methods

All tiebacks should be installed in a manner that minimizes caving and associated ground subsidence. Typically, this involves drilling with a full-length casing or continuous flight auger, as well as pumping grout from the bottom of each tieback hole with a tremie. If desired, the shoring contractor can use secondary pressure-grouting techniques to reduce auger diameters and develop greater adhesion values.

No-Load Zone

The anchor portion of all tiebacks must be located a sufficient distance behind the retained excavation face in order to develop resistance within a stable soil mass. We specifically recommend that the anchorage be obtained behind a "no-load zone" defined by a plane set back from the wall face a horizontal distance equal to 25 percent of the wall height and projected upward at a 60-degree angle from the excavation base level. This configuration is shown on Figure 8.

Anchor Length and Spacing

The anchor portion of all tiebacks must have sufficient embedment below the backslope surface and behind the no-load zone to provide adequate pull-out resistance to lateral loads, as calculated by the design engineer. RGI recommends providing a minimum anchor depth of 10 feet and a minimum anchor length of 20 feet. To avoid interactions between adjacent tiebacks, RGI further recommends that a clear spacing of at least 5 feet be maintained along the anchor zones.

Estimated Adhesion

If properly grouted, RGI estimates that an allowable concrete/soil adhesion of 1,500 psf can be assumed for the anchor portion of a tieback located within the stiff to hard silts. Secondary pressure-grouting techniques may be necessary to achieve the adhesions. The actual design values will depend on the installation method and should be confirmed by load-testing all tiebacks in the field.

Load Testing and Lock-Off

Field testing of temporary tiebacks is necessary to confirm design assumptions, verify the integrity of individual tiebacks, and provide information regarding their short-term creep characteristics. Our recommended tests are described below. After testing, each tieback should be locked off at 100 percent of its design load.

- Performance Tests: A performance test load should be applied to selected production tiebacks at the site. RGI specifically recommends testing at least one tieback on each side of the excavation. The test load should equal 200 percent of the design capacity and the 150 percent load should be held for at least 60 minutes.
- Proof Tests: A proof test load should be applied to every production tieback at the site. The test load should equal 130 percent of the design capacity and be held for at least 10 minutes.

4.2.4 SOIL NAIL WALLS

Based on the soil conditions, soil nail walls either in a permanent or temporary condition can be used for support of the slopes above the site. Vertical nail elements may be needed for additional lateral support.

Soil nailing stabilizes vertical excavations by reinforcing the soil mass with passive inclusions (soil nails). Soil nails typically consist of 3/4- to 1-3/8-inch-diameter steel bars that are centrally grouted in 6- to 8-inch-diameter augered holes. The nails are normally spaced at 4 to 6-foot centers.

Following the installation of a row of nails, the excavation face is covered with a shotcrete facing that is reinforced with either welded wire mesh or rebar. The nails are then secured to the shotcrete wall with a steel plate and bolt assembly. Once grout strengths are achieved, the excavation continues below the wall and the construction sequence is repeated until the bottom of the excavation is reached.

Soil Nail Design

Based on the soils encountered at the site, RGI recommends using the following soil parameters for soil nailing design:

Table 2 Soil Nail Design Parameters

Soil Parameter	Unit Weight (pcf)	Friction Angle	Cohesion (psf)	Shaft Resistance (psf)
Pre-Fraser deposits	105	35	500	1,500

Excavation and wall construction sequencing should not exceed a height of 6 feet. Care must be taken to prevent caving during initial excavation in loose fill. Temporary protection such as soil berms and flash coating should be considered. The shaft resistance assumes open hole tremie grouting. Soil nail verification tests should be performed to verify the soil resistance before construction.

Conflicts and Easements

Because soil nails typically extend about 30 to 40 feet behind the excavation face, conflicts with underground utilities and adjacent structures often arise. The project structural engineer or shoring designer should carefully consider the locations of such obstructions when laying out all tiebacks. Furthermore, temporary easements will be required for any nails that extend beyond the site's property boundaries

4.2.5 Construction and Survey Monitoring

Because shoring requires specialized installation and earthwork techniques to maintain stable conditions during and after construction, RGI strongly recommends that an RGI representative be retained to continuously monitor all construction activities. This would include observation and documentation of installation procedures and construction materials.

A monitoring program must be implemented to verify the performance of the shoring system and possible excavation effects on neighboring properties and streets. The first step in this program should consist of surveying building feature elevations and documenting the condition of the existing properties, streets and adjacent buildings. This documentation should include a photographic record. Monitoring points should be set by a licensed surveyor on the adjacent streets and structures at a maximum of 25 foot intervals with a minimum of two on each side of the excavation.

Monitoring of the shoring system should occur two times per week as the excavation proceeds and then once every two weeks once the excavation is completed. A registered land surveyor should be retained to establish the baseline data and obtain the bi-weekly readings. Monitoring data can be obtained by the project contractor. Monitoring should continue until the permanent new lower walls are adequately braced and should include surveying the vertical and horizontal alignment of the top of every other soldier pile or at 15 foot intervals on the Ultrablock shoring. The project's structural and geotechnical engineers should review the monitoring data weekly.

4.3 ROCKERIES & MODULAR BLOCK WALLS

Rockeries and modular block walls may be used for grade changes outside of building areas. Walls more than 4 feet in height typically require a separate building permit. RGI can design gravity or reinforced modular block walls over 4 feet in height once the location and height of the walls is determined. Rockeries and modular block landscaping walls are not retaining structures and should be limited to no more than 4 feet in height. Rockeries should be construction in accordance with the Association of Rockery Contractor guidelines. Rockeries and modular block walls periodically require maintenance and should be located appropriate. The construction of rockeries and modular block walls should be observed by the geotechnical engineer to confirm the soils conditions are suitable, drainage in installed and the materials used are suitable for the construction.

4.4 RETAINING WALLS

RGI expects the below grade level basement walls will be formed directly against the permanent shoring. RGI recommends cast-in-place concrete walls be used.

4.4.1 PERMANENT BASEMENT WALLS

The basement walls formed against permanent cantilever soldier pile and tieback shoring should be designed for the 75 percent of the earth pressures provided on Figures 3 through 5. Permanent basement walls formed against soil nail shoring should be designed for the values in Table 3 below. Basement walls formed against the permanent shoring should be provided with drainage. A typical drainage system for walls formed against shoring is attached as Figure 6.

4.4.2 RETAINING WALL DESIGN

The magnitude of earth pressure development on retaining walls will partly depend on the quality of the wall backfill. RGI recommends placing and compacting wall backfill as structural fill. Wall drainage will be needed behind the wall face. Typical drainage is attached as Figure 7.

The proposed building and rating wall foundations can be supported on conventional continuous spread footings bearing on competent native soil or structural fill. Loose, organic, or other unsuitable soils may be encountered. If unsuitable soils are encountered, they should be overexcavated and backfilled with structural fill. If the higher bearing capacity is used, the foundations should either be deepened to the bearing layer or backfilled with lean mix concrete.

With wall backfill placed and compacted as recommended, level backfill and drainage properly installed, RGI recommends using the values in the following table for design.

Table 3 Retaining Wall Design

Design Parameter	Value
Allowable Bearing Capacity - Structural Fill Dense native soils	2,000 psf 4,000 psf
Active Earth Pressure (unrestrained walls)	35 pcf
At-rest Earth Pressure (restrained walls)	50 pcf

For seismic design, an additional uniform load of 7 times the wall height (H) for unrestrained walls and 14H for restrained walls should be applied to the wall surface. Friction at the base of foundations and passive earth pressure will provide resistance to these lateral loads. Values for these parameters are provided in the following section of this GER.

4.5 STRUCTURE AND FOUNDATIONS

Following site preparation and grading, the proposed building foundation can be supported on conventional spread footings bearing on competent native soil or structural fill. Loose, organic, or other unsuitable soils may be encountered in the proposed building footprint. If unsuitable soils are encountered, they should be overexcavated and backfilled with structural fill. If loose soils are encountered, the soils should be moisture conditioned and compacted to a firm and unyielding condition.

Perimeter foundations exposed to weather should be at a minimum depth of 18 inches below final exterior grades. Interior foundations can be constructed at any convenient depth below the floor slab. Finished grade is defined as the lowest adjacent grade within 5

feet of the foundation for perimeter (or exterior) footings and finished floor level for interior footings.

Table 4 Foundation Design

Design Parameter	Value
Allowable Bearing Capacity	2,000 psf[1]
Friction Coefficient	0.30
Passive pressure (equivalent fluid pressure)	300 pcf[2]

1. psf = pounds per square foot
2. pcf = pounds per cubic foot

The allowable foundation bearing pressures apply to dead loads plus design live load conditions. For short-term loads, such as wind and seismic, a 1/3 increase in this allowable capacity may be used. At perimeter locations, RGI recommends not including the upper 12 inches of soil in the computation of passive pressures because they can be affected by weather or disturbed by future grading activity. The passive pressure value assumes the foundation will be constructed neat against competent soil or backfilled with structural fill as described in Section 4.1.4. The recommended base friction includes a safety factor of about 1.5. The passive pressure contains a reduction factor.

With spread footing foundations designed in accordance with the recommendations in this section, maximum total and differential post-construction settlements of 1 inch and 1/2 inch, respectively, should be expected.

4.6 FLOORS

RGI recommends that the concrete slab be placed on top of medium dense native soil or structural fill. Immediately below the floor slab, RGI recommends placing a four-inch thick capillary break layer of clean, free-draining sand or gravel that has less than five percent passing the U.S. No. 200 sieve. This material will reduce the potential for upward capillary movement of water through the underlying soil and subsequent wetting of the floor slab. Where moisture by vapor transmission is undesirable, an 8- to 10-millimeter thick plastic membrane should be placed on a 4-inch thick layer of clean gravel. For the anticipated floor slab loading, we estimate post-construction floor settlements of 1/4- to 1/2-inch.

4.7 UTILITIES

Utility pipes should be bedded and backfilled in accordance with American Public Works Association (APWA) specifications. For site utilities located within the right-of-ways, bedding and backfill should be completed in accordance with City of Bellevue specifications. At a minimum, trench backfill should be placed and compacted as structural

fill, as described in Section 4.1.4. Where utilities occur below unimproved areas, the degree of compaction can be reduced to a minimum of 90 percent of the soil's maximum density as determined by the referenced ASTM D1557.

4.8 DRAINAGE

4.8.1 SURFACE

Final exterior grades should promote free and positive drainage away from the building area. Water must not be allowed to pond or collect adjacent to foundations or within the immediate building area. For non-pavement locations, RGI recommends providing a minimum drainage gradient of 3 percent for a minimum distance of 10 feet from the building perimeter. In paved locations, a minimum gradient of 1 percent should be provided unless provisions are included for collection and disposal of surface water adjacent to the structure.

4.8.2 SUBSURFACE

RGI recommends installing perimeter retaining walls and foundation drains as shown on Figures 6, 7 and 8. The foundation drains and roof downspouts should be tightlined separately to an approved discharge facility. Subsurface drains must be laid with a gradient sufficient to promote positive flow to a controlled point of approved discharge.

5.0 Additional Services

RGI is available to provide further geotechnical consultation throughout the design phase of the project. RGI should review the final design and specifications in order to verify that earthwork and foundation recommendations have been properly interpreted and incorporated into project design and construction.

RGI is also available to provide geotechnical engineering and construction monitoring services during construction. The integrity of the earthwork and construction depends on proper site preparation and procedures. In addition, engineering decisions may arise in the field in the event that variations in subsurface conditions become apparent. Construction monitoring services are not part of this scope of work. If these services are desired, please let us know and we will prepare a cost proposal.

6.0 Limitations

This GER is the property of RGI, Pat Vulk, and his designated agents. Within the limits of the scope and budget, this GER was prepared in accordance with generally accepted geotechnical engineering practices in the area at the time this GER was issued. This GER is intended for specific application to the Vulk Residence project in Bellevue, Washington, and for the exclusive use of Pat Vulk and his authorized representatives. No other warranty,

expressed or implied, is made. Site safety, excavation support, and dewatering requirements are the responsibility of others.

The scope of services for this project does not include either specifically or by implication any environmental or biological (for example, mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, we can provide a proposal for these services.

The analyses and recommendations presented in this GER are based upon data obtained from the explorations performed on site. Variations in soil conditions can occur, the nature and extent of which may not become evident until construction. If variations appear evident, RGI should be requested to reevaluate the recommendations in this GER prior to proceeding with construction.

It is the client's responsibility to see that all parties to the project, including the designers, contractors, subcontractors, are made aware of this GER in its entirety. The use of information contained in this GER for bidding purposes should be done at the contractor's option and risk.

USGS, 2020, Issaquah, Washington
USGS, 2020, Mercer Island, Washington
7.5-Minute Quadrangle

Approximate Scale: 1"=1000'

0 500 1000 2000

N

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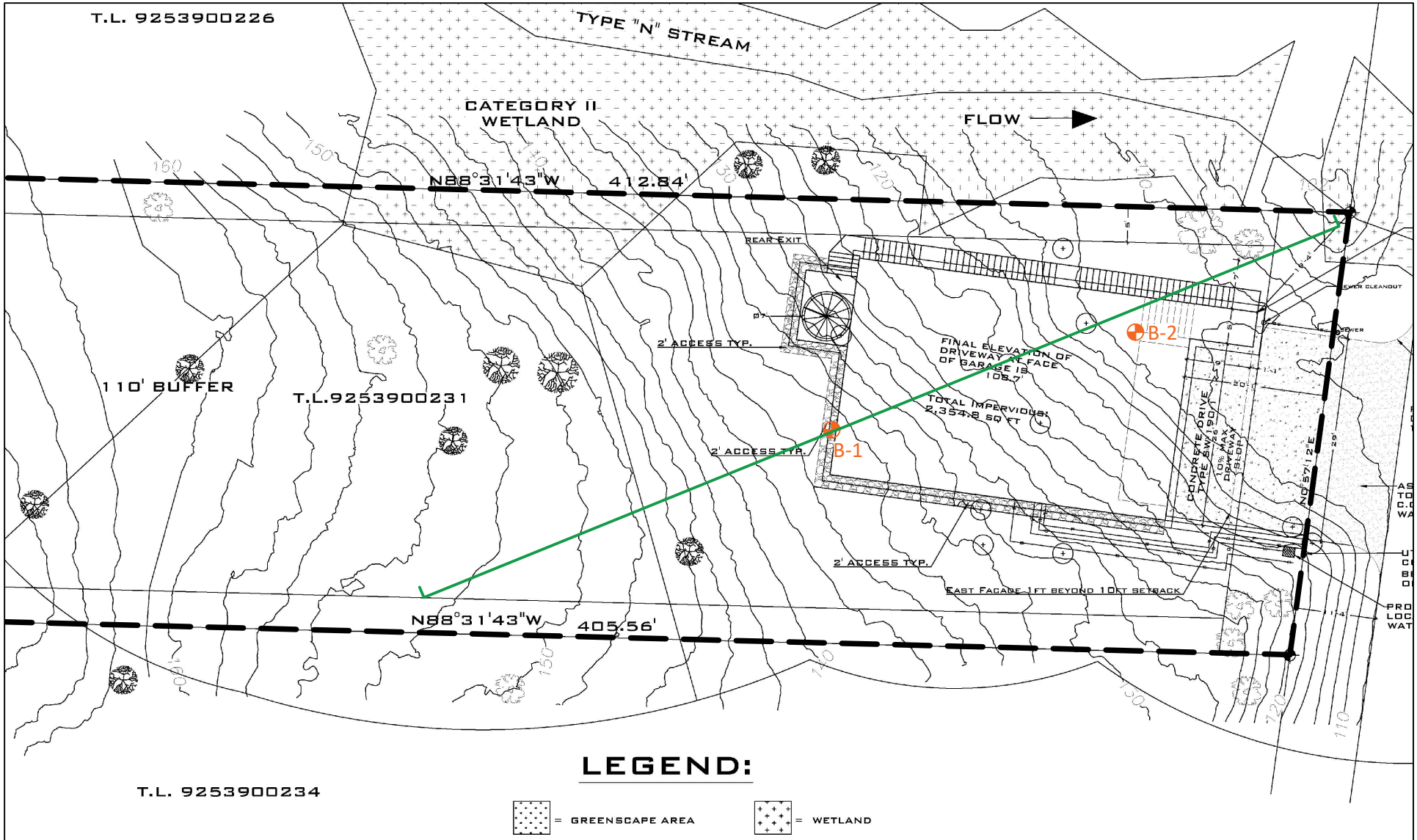
Vulk Residence		Figure 1
RGI Project Number: 2022-673-1	Site Vicinity Map	Date Drawn: 12/2022
Address: 1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington 98008		



= Cross section location
= Boring by RGI, 12/09/22
= Site boundary

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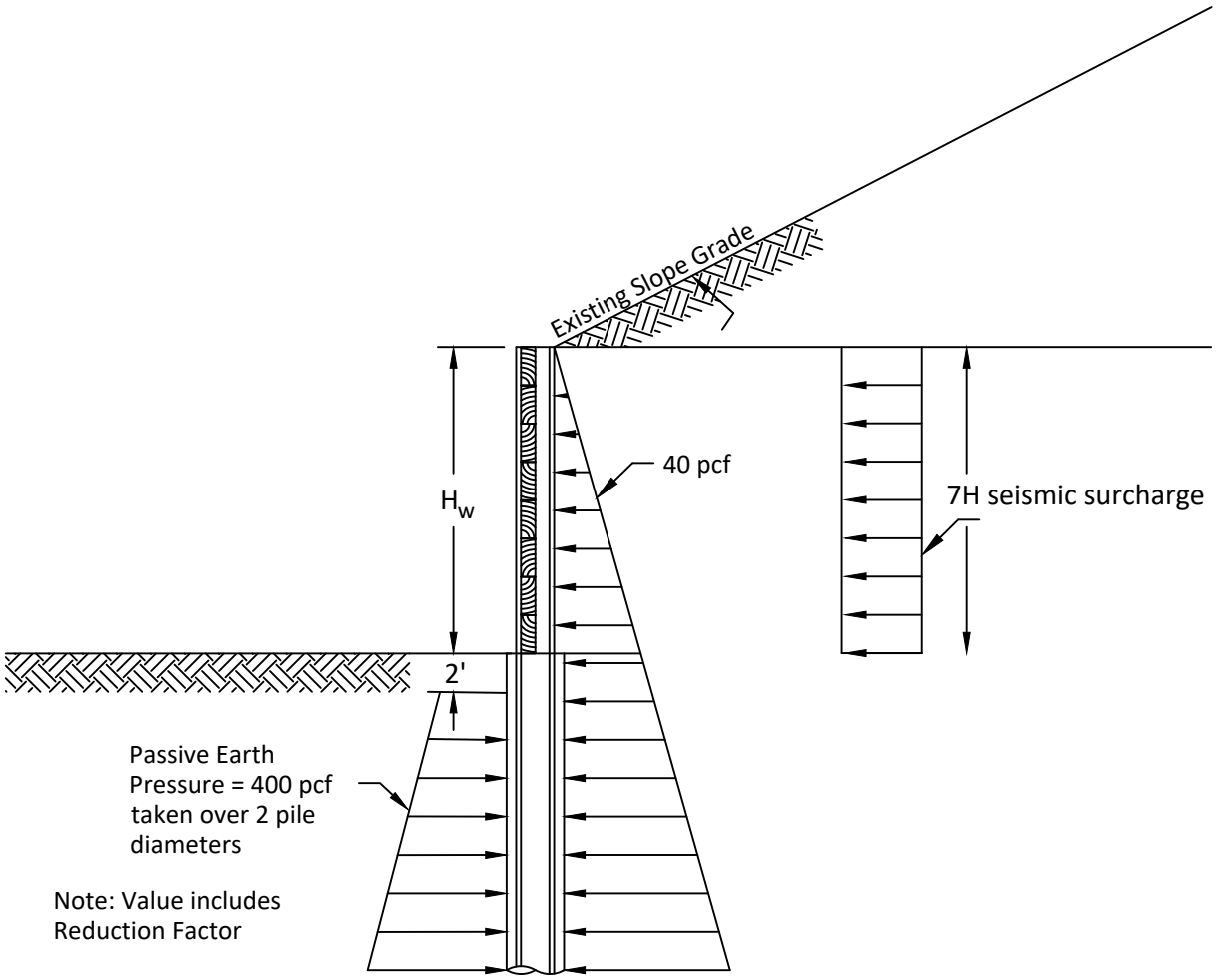
Vulk Residence		Figure 2
RGI Project Number: 2022-673-1	Geotechnical Exploration Plan	Date Drawn: 12/2022
Address: 1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington 98008		



Notes:
1. Apparent earth pressure and surcharge act over the pile spacing above the base of the excavation.
2. Passive earth pressure acts over 2 times the concreted diameter of the soldier pile, or the pile spacing whichever is less.
3. Passive pressure includes a reduction factor.
4. Additional surcharge from footings of adjacent buildings should be included.
5. This pressure diagram is appropriate for temporary or permanent soldier pile walls. Permanent walls should have the seismic pressure added to the full wall height.

Not to Scale

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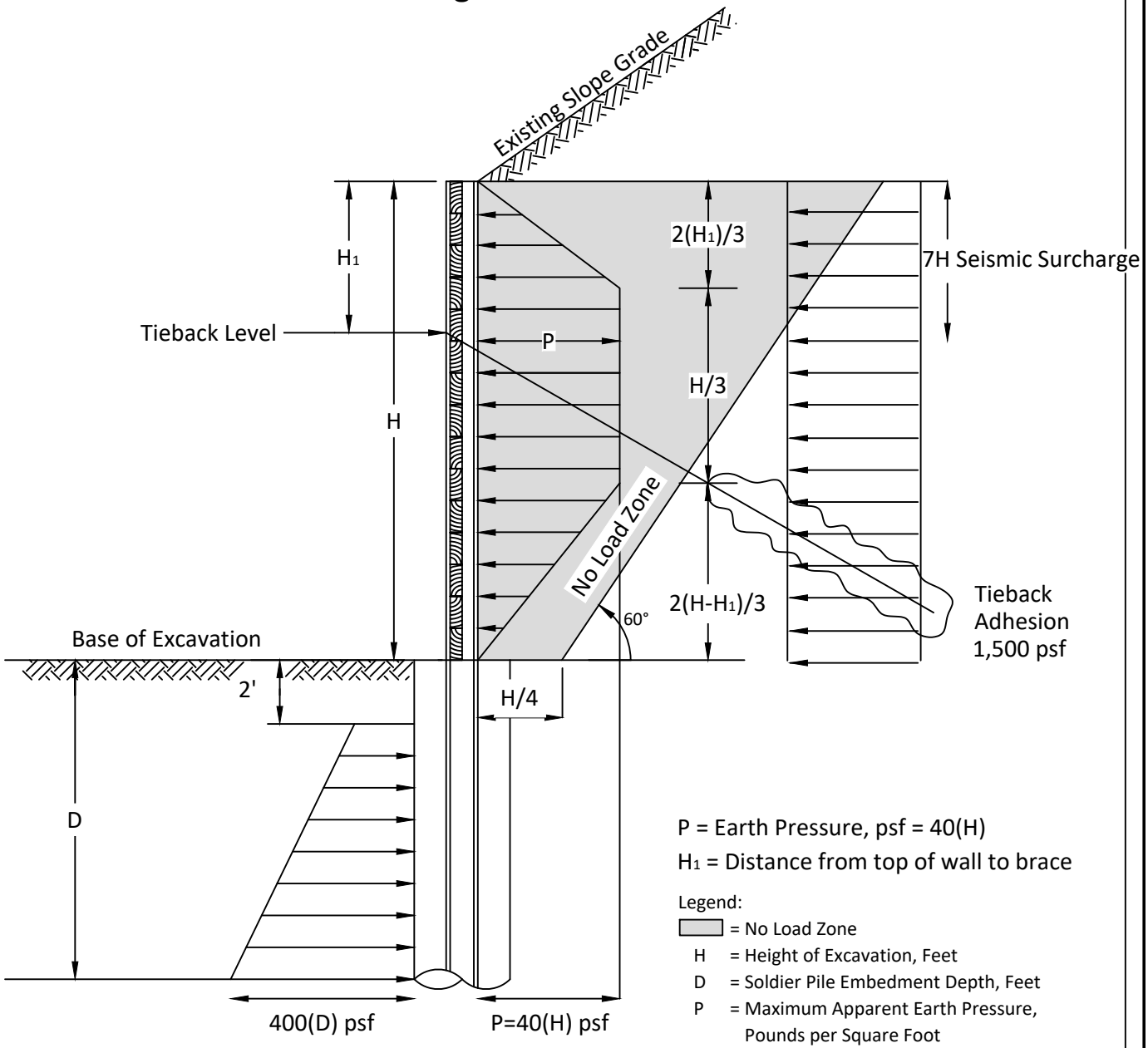
Vulk Residence		Figure 3
RGI Project Number: 2022-673-1	Soldier Pile Pressure Diagram	Date Drawn: 12/2022
Address: 1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington 98008		

WEST WALL
Earth Pressure Diagram Parameters
for Single Tieback Wall



Notes:
1. Apparent earth pressure and surcharge act over the pile spacing above the base of the excavation.
2. Passive earth pressure acts over 2 times the concreted diameter of the soldier pile, or the pile spacing whichever is less.
3. Passive pressure includes a reduction factor.
4. This pressure diagram is appropriate for temporary and permanent soldier pile and tieback walls.
5. Allowable end bearing 15 ksf and 1,000 psf friction on the buried portion of the pile.

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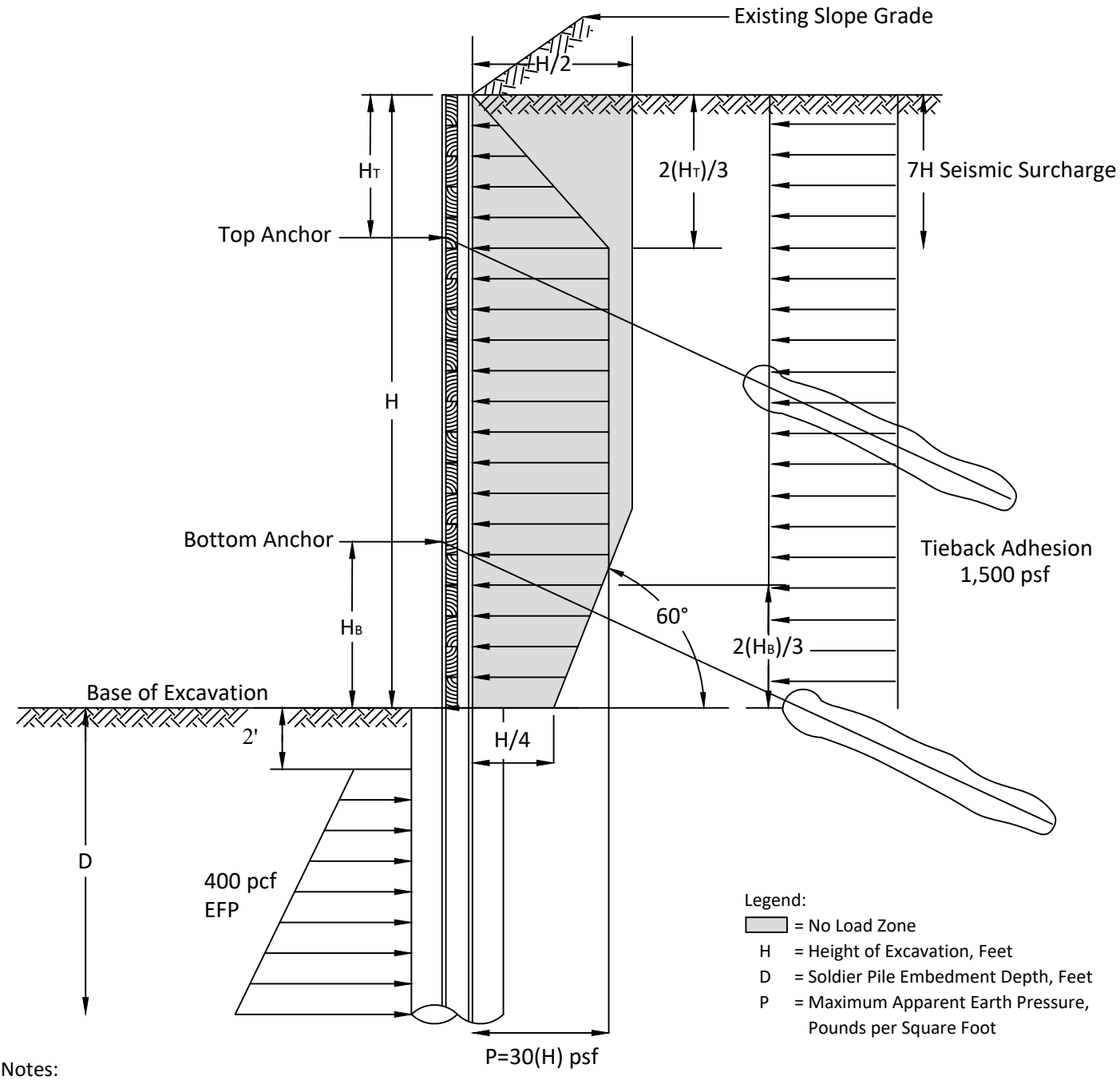
Vulk Residence		Figure 4
RGI Project Number: 2022-673-1	Earth Pressure - Single Tieback	Date Drawn: 12/2022
Address: 1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington 98008		

Tieback Solider Pile/Lagging Shoring Wall
Two or More Rows of Tiebacks



Notes:
1. Apparent earth pressure and surcharge act over the pile spacing above the base of the excavation.
2. Passive earth pressure acts over 2 times the concreted diameter of the soldier pile, or the pile spacing whichever is less.
3. Passive pressure includes a reduction factor.
4. This pressure diagram is appropriate for temporary and permanent soldier pile and tieback walls.
5. Allowable end bearing 15 ksf and friction 1,000 psf on the embedded portion of the soldier pile.

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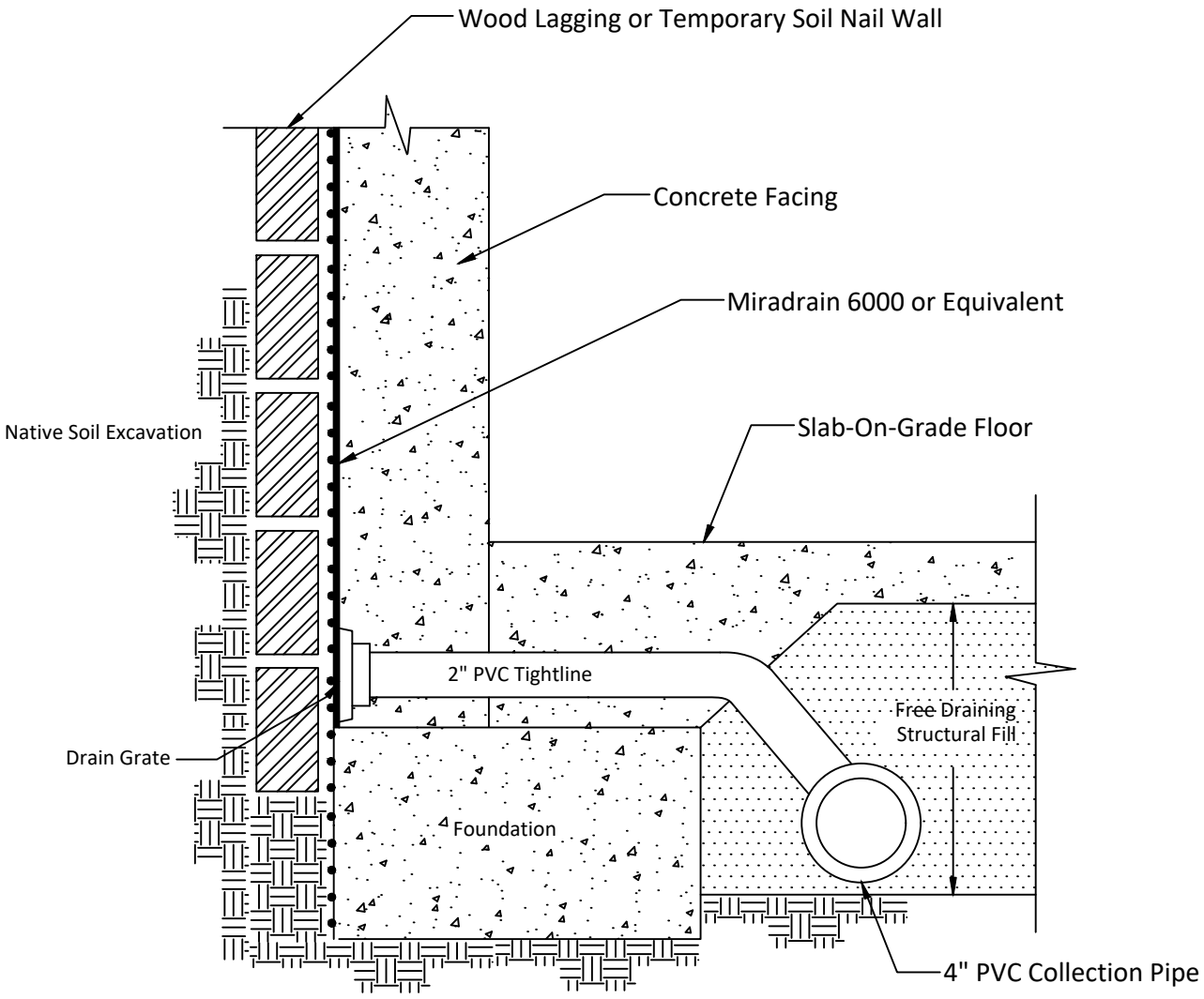
Vulk Residence		Figure 5
RGI Project Number: 2022-673-1	Earth Pressure - Multiple Tieback	Date Drawn: 12/2022
Address: 1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington 98008		



Note: Drain Though Wall Should be Installed at Middle of Lagging, or at 10 foot intervals in the soil nail wall.

Not to Scale

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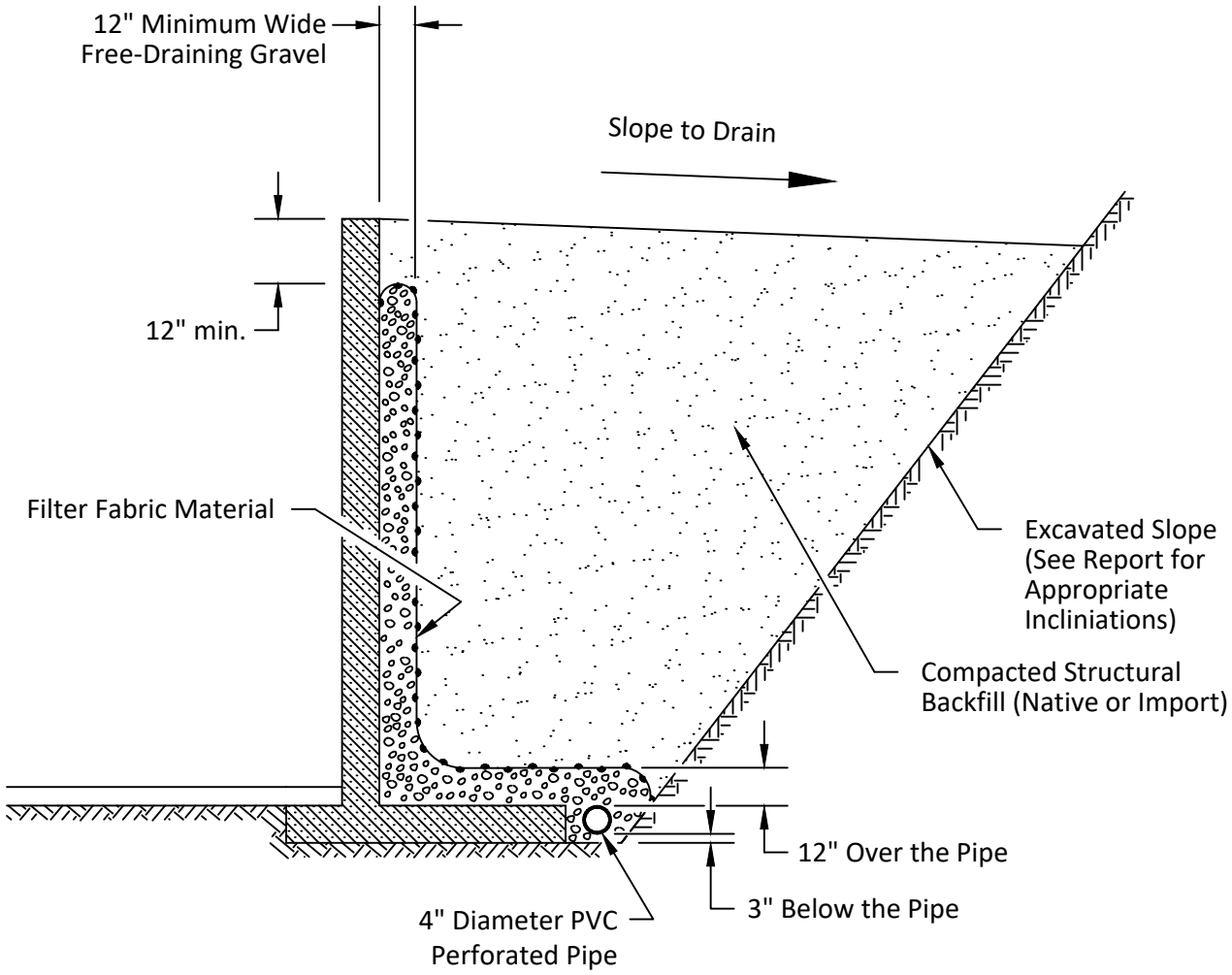
Vulk Residence		Figure 6
RGI Project Number: 2022-673-1	Basement Wall Drainage Detail	Date Drawn: 12/2022
Address: 1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington 98008		



Not to Scale

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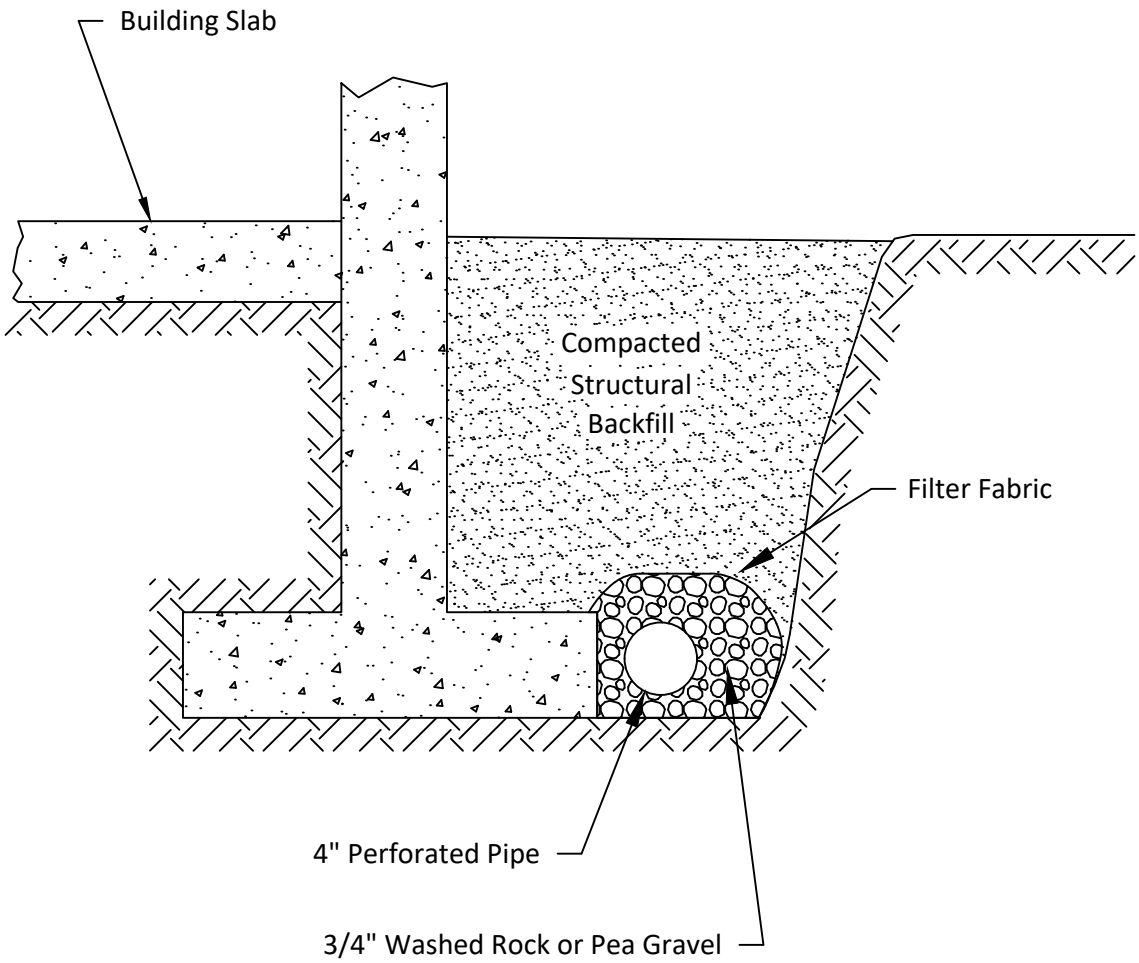
Vulk Residence		Figure 7
RGI Project Number: 2022-673-1	Retaining Wall Drainage Detail	Date Drawn: 12/2022
Address: 1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington 98008		



Not to Scale

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Vulk Residence		Figure 8
RGI Project Number: 2022-673-1	Typical Footing Drain Detail	Date Drawn: 12/2022
Address: 1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington 98008		

APPENDIX A
FIELD EXPLORATION AND LABORATORY TESTING

On December 9, 2022, RGI performed field explorations using an acker limited access drill rig. We explored subsurface soil conditions at the site by observing the drilling of two borings to a maximum depth of 16.5 feet below existing grade. The boring locations are shown on Figure 2. The boring locations were approximately determined by measurements from existing property lines and paved roads.

A geologist from our office conducted the field exploration and classified the soil conditions encountered, maintained a log of each test exploration, obtained representative soil samples, and observed pertinent site features. All soil samples were visually classified in accordance with the Unified Soil Classification System (USCS).

Representative soil samples obtained from the explorations were placed in closed containers and taken to our laboratory for further examination and testing. As a part of the laboratory testing program, the soil samples were classified in our in house laboratory based on visual observation, texture, plasticity, and the limited laboratory testing described below.

Moisture Content Determinations

Moisture content determinations were performed in accordance with ASTM D2216-10 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass (ASTM D2216) on representative samples obtained from the exploration in order to aid in identification and correlation of soil types. The moisture content of typical sample was measured and is reported on the boring logs.

Grain Size Analysis

A grain size analysis indicates the range in diameter of soil particles included in a particular sample. Grain size analyses was determined using D6913-04(2009) Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis (ASTM D6913) on three of the samples.

Project Name: **Vulk Residence** Project Number: **2022-673-1** Client: **Pat Vulk**	Boring No.: **B-1** **Sheet 1 of 1**

Date(s) Drilled: **12/9/2022**	Logged By: **ELW**	Surface Conditions: **Ferns/ Mixed Brush**
Drilling Method(s): **Hollow Stem Auger**	Drill Bit Size/Type: **6" Auger**	Total Depth of Borehole: **16.5 feet bgs**
Drill Rig Type: **Acker**	Drilling Contractor: **CN Drilling**	Approximate Surface Elevation: **135**
Groundwater Level: **Not Encountered**	Sampling Method(s): **SPT**	Hammer Data : **140 lb, 30" drop, rope and cathead**
Borehole Backfill: **Cuttings**	Location: **1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington**	

Elevation (feet)	Depth (feet)	Sample Type	Sample ID	Sampling Resistance, blows/ft	Recovery (%)	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Moisture (%)
135	0							6" topsoil	
				2		SM		Tan silty SAND with trace gravel, very loose, wet (Surficial Soil)	18
								Becomes loose	
				6					16
130	5					ML		Tan sandy SILT, hard, moist (Pre-Fraser - Qpf)	
								58% fines	
				39					16
						ML		Gray SILT, hard, moist (Pre-Fraser - Qpf)	
								Contains sand interbeds	
				41					20
125	10							Contains sand interbeds	
				67					20
120	15							Becomes tan	
				39					24
								Becomes gray	
								Boring terminated at 16.5'	

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Project Name: **Vulk Residence**
Project Number: **2022-673-1**
Client: **Pat Vulk**

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Boring No.: **B-2**
Sheet 1 of 1

Date(s) Drilled: **12/9/2022**	Logged By: **ELW**	Surface Conditions: **Grass**
Drilling Method(s): **Hollow Stem Auger**	Drill Bit Size/Type: **6" Auger**	Total Depth of Borehole: **16.5 feet bgs**
Drill Rig Type: **Acker**	Drilling Contractor: **CN Drilling**	Approximate Surface Elevation: **111**
Groundwater Level: **Not Encountered**	Sampling Method(s): **SPT**	Hammer Data : **140 lb, 30" drop, rope and cathead**
Borehole Backfill: **Cuttings**	Location: **1613 West Lake Sammamish Parkway Southeast, Bellevue, Washington**	

Elevation (feet)	Depth (feet)	Sample Type	Sample ID	Sampling Resistance, blows/ft	Recovery (%)	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Moisture (%)
111	0							6" topsoil	
				16		SM		Brown silty SAND with trace gravel, medium dense, moist (Surficial Soils)	13
								Becomes loose, wet	
				9					12
106	5								
				17					13
								Gray silty SAND with trace gravel, medium dense, wet (Pre-Olympia - Qpo)	
				29				18% fines	16
101	10					SP-SM		Brown SAND with some silt and gravel, medium dense, wet (Pre-Olympia - Qpo)	
				25				Contains silty sand interbeds	20
96	15					SP-SM		Brown SAND with some silt, very dense, moist to wet (Pre-Olympia - Qpo)	
				59				8% fines	14
								Boring terminated at 16.5'	

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Project Name: **Vulk Residence**

Project Number: **2022-673-1**

Client: **Pat Vulk**

Key to Log of Boring

Sheet 1 of 1

Elevation (feet)	Depth (feet)	Sample Type	Sample ID	Sampling Resistance, blows/ft	Recovery (%)	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Moisture (%)
1	2	3	4	5	6	7	8	9	10

COLUMN DESCRIPTIONS

1. Elevation (feet): Elevation (MSL, feet).
2. Depth (feet): Depth in feet below the ground surface.
3. Sample Type: Type of soil sample collected at the depth interval shown.
4. Sample ID: Sample identification number.
5. Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
6. Recovery (%): Core Recovery Percentage is determined based on a ratio of the length of core sample recovered compared to the cored interval length.
7. USCS Symbol: USCS symbol of the subsurface material.
8. Graphic Log: Graphic depiction of the subsurface material encountered.
9. MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
10. Moisture (%): Moisture, expressed as a water content.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

MATERIAL GRAPHIC SYMBOLS

SILT, SILT w/SAND, SANDY SILT (ML)

Silty SAND (SM)

Poorly graded SAND with Silt (SP-SM)

TYPICAL SAMPLER GRAPHIC SYMBOLS

Auger sampler

Bulk Sample

3-inch-OD California w/ brass rings

CME Sampler

Grab Sample

2.5-inch-OD Modified California w/ brass liners

Pitcher Sample

2-inch-OD unlined split spoon (SPT)

Shelby Tube (Thin-walled, fixed head)

OTHER GRAPHIC SYMBOLS

Water level (at time of drilling, ATD)

Water level (after waiting, AW)

Minor change in material properties within a stratum

Inferred/gradational contact between strata

Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

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GRAIN SIZE ANALYSIS
ASTM D421, D422, D1140, D2487, D6913

PROJECT TITLE	Vulk Residence		**Exploration Type**	B-1	
PROJECT NO.	2022-673-1		**Depth**	5'	
TECH/TEST DATE	PL/CC	12/14/2022	**Date Received**	12/9/2022	

WATER CONTENT (Delivered Moisture)

Wt Wet Soil & Tare (gm)	(w1)	578.3
Wt Dry Soil & Tare (gm)	(w2)	501.1
Weight of Tare (gm)	(w3)	16.0
Weight of Water (gm)	(w4=w1-w2)	77.2
Weight of Dry Soil (gm)	(w5=w2-w3)	485.1
Moisture Content (%)	(w4/w5)*100	16

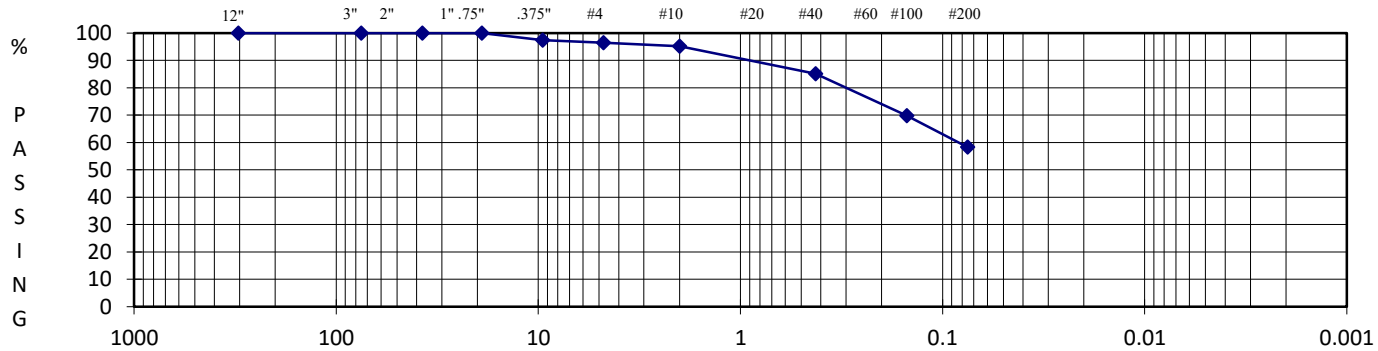
Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		501.1
Tare Weight (gm)		16.0
Total Dry Weight (gm)	(W6)	485.1

% COBBLES	**0.0**
% C GRAVEL	**0.0**
% F GRAVEL	**3.6**
% C SAND	**1.2**
% M SAND	**10.1**
% F SAND	**26.8**
% FINES	**58.3**
% TOTAL	**100.0**
D10 (mm)	
D30 (mm)	
D60 (mm)	
Cu	
Cc	

SIEVE ANALYSIS

	Wt Ret +Tare	(Wt-Tare)	Cumulative (%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	
12.0"	16.0	0.00	0.00	100.00	cobbles
3.0"	16.0	0.00	0.00	100.00	coarse gravel
2.5"					coarse gravel
2.0"					coarse gravel
1.5"	16.0	0.00	0.00	100.00	coarse gravel
1.0"					coarse gravel
0.75"	16.0	0.00	0.00	100.00	fine gravel
0.50"					fine gravel
0.375"	28.3	12.30	2.54	97.46	fine gravel
#4	33.3	17.30	3.57	96.43	coarse sand
#10	39.0	23.00	4.74	95.26	medium sand
#20					medium sand
#40	88.0	72.00	14.84	85.16	fine sand
#60					fine sand
#100	162.4	146.40	30.18	69.82	fine sand
#200	218.1	202.10	41.66	58.34	fines
PAN	501.1	485.10	100.00	0.00	silt/clay



DESCRIPTION	Sandy Silt
USCS	ML

Prepared For:
Pat Vulk

Reviewed By:
ELW

RILEYGROUP

THE RILEY GROUP, INC.
17522 Bothell Way NE
Bothell, WA 98011

PHONE: (425) 415-0551
FAX: (425) 415-0311

GRAIN SIZE ANALYSIS
ASTM D421, D422, D1140, D2487, D6913

PROJECT TITLE	Vulk Residence		**Exploration Type**	B-2	
PROJECT NO.	2022-673-1		**Depth**	7.5'	
TECH/TEST DATE	PL/CC	12/14/2022	**Date Received**	12/9/2022	

WATER CONTENT (Delivered Moisture)

Wt Wet Soil & Tare (gm)	(w1)	554.1
Wt Dry Soil & Tare (gm)	(w2)	478.1
Weight of Tare (gm)	(w3)	15.8
Weight of Water (gm)	(w4=w1-w2)	76.0
Weight of Dry Soil (gm)	(w5=w2-w3)	462.3
Moisture Content (%)	(w4/w5)*100	16

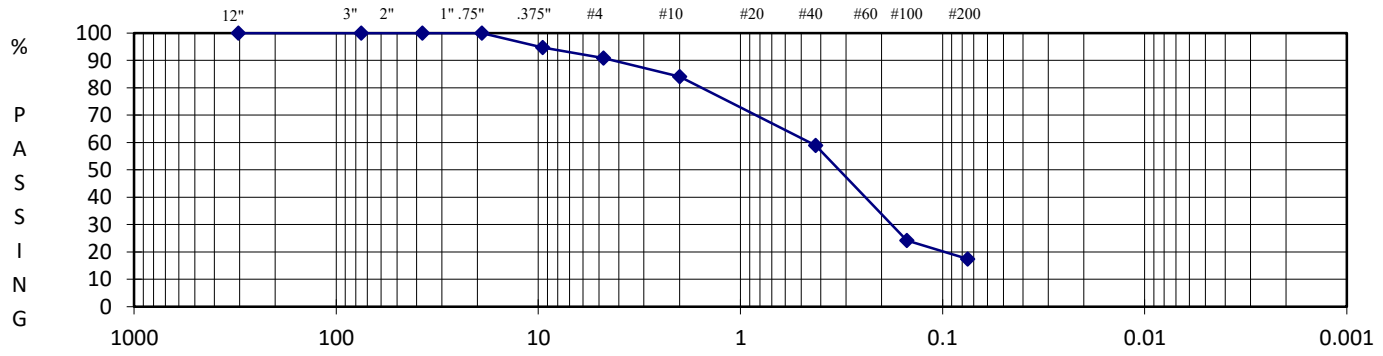
Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		478.1
Tare Weight (gm)		15.8
Total Dry Weight (gm)	(W6)	462.3

% COBBLES	**0.0**
% C GRAVEL	**0.0**
% F GRAVEL	**9.1**
% C SAND	**6.7**
% M SAND	**25.2**
% F SAND	**41.5**
% FINES	**17.5**
% TOTAL	**100.0**
D10 (mm)	
D30 (mm)	
D60 (mm)	
Cu	
Cc	

SIEVE ANALYSIS

	Wt Ret +Tare	(Wt-Tare)	Cumulative (%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	
12.0"	15.8	0.00	0.00	100.00	cobbles
3.0"	15.8	0.00	0.00	100.00	coarse gravel
2.5"					coarse gravel
2.0"					coarse gravel
1.5"	15.8	0.00	0.00	100.00	coarse gravel
1.0"					coarse gravel
0.75"	15.8	0.00	0.00	100.00	fine gravel
0.50"					fine gravel
0.375"	40.0	24.20	5.23	94.77	fine gravel
#4	58.1	42.30	9.15	90.85	coarse sand
#10	89.1	73.30	15.86	84.14	medium sand
#20					medium sand
#40	205.7	189.90	41.08	58.92	fine sand
#60					fine sand
#100	366.1	350.30	75.77	24.23	fine sand
#200	397.4	381.60	82.54	17.46	fines
PAN	478.1	462.30	100.00	0.00	silt/clay



DESCRIPTION	Silty SAND with trace gravel
USCS	SM

Prepared For:
Pat Vulk

Reviewed By:
ELW

RILEYGROUP

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Bothell, WA 98011

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GRAIN SIZE ANALYSIS
ASTM D421, D422, D1140, D2487, D6913

PROJECT TITLE	Vulk Residence		**Exploration Type**	B-2	
PROJECT NO.	2022-673-1		**Depth**	15'	
TECH/TEST DATE	PL/CC	12/14/2022	**Date Received**	12/9/2022	

WATER CONTENT (Delivered Moisture)

Wt Wet Soil & Tare (gm)	(w1)	539.2
Wt Dry Soil & Tare (gm)	(w2)	473.6
Weight of Tare (gm)	(w3)	16.1
Weight of Water (gm)	(w4=w1-w2)	65.6
Weight of Dry Soil (gm)	(w5=w2-w3)	457.5
Moisture Content (%)	(w4/w5)*100	14

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

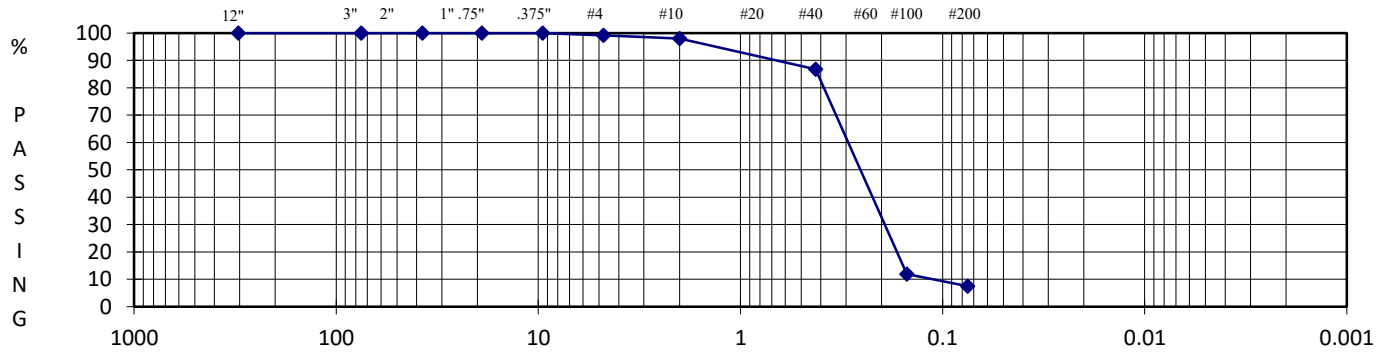
Weight Of Sample (gm)		473.6
Tare Weight (gm)		16.1
Total Dry Weight (gm)	(W6)	457.5

% COBBLES	**0.0**
% C GRAVEL	**0.0**
% F GRAVEL	**0.8**
% C SAND	**1.1**
% M SAND	**11.3**
% F SAND	**79.3**
% FINES	**7.5**
% TOTAL	**100.0**

D10 (mm)	0.1
D30 (mm)	0.19
D60 (mm)	0.3
Cu	3.0
Cc	1.2

SIEVE ANALYSIS

	Wt Ret +Tare	(Wt-Tare)	Cumulative (%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	
12.0"	16.1	0.00	0.00	100.00	cobbles
3.0"	16.1	0.00	0.00	100.00	coarse gravel
2.5"					coarse gravel
2.0"					coarse gravel
1.5"	16.1	0.00	0.00	100.00	coarse gravel
1.0"					coarse gravel
0.75"	16.1	0.00	0.00	100.00	fine gravel
0.50"					fine gravel
0.375"	16.1	0.00	0.00	100.00	fine gravel
#4	19.8	3.70	0.81	99.19	coarse sand
#10	25.0	8.90	1.95	98.05	medium sand
#20					medium sand
#40	76.6	60.50	13.22	86.78	fine sand
#60					fine sand
#100	419.0	402.90	88.07	11.93	fine sand
#200	439.3	423.20	92.50	7.50	fines
PAN	473.6	457.50	100.00	0.00	silt/clay



DESCRIPTION	SAND with some silt
USCS	SP-SM

Prepared For:
Pat Vulk

Reviewed By:
ELW

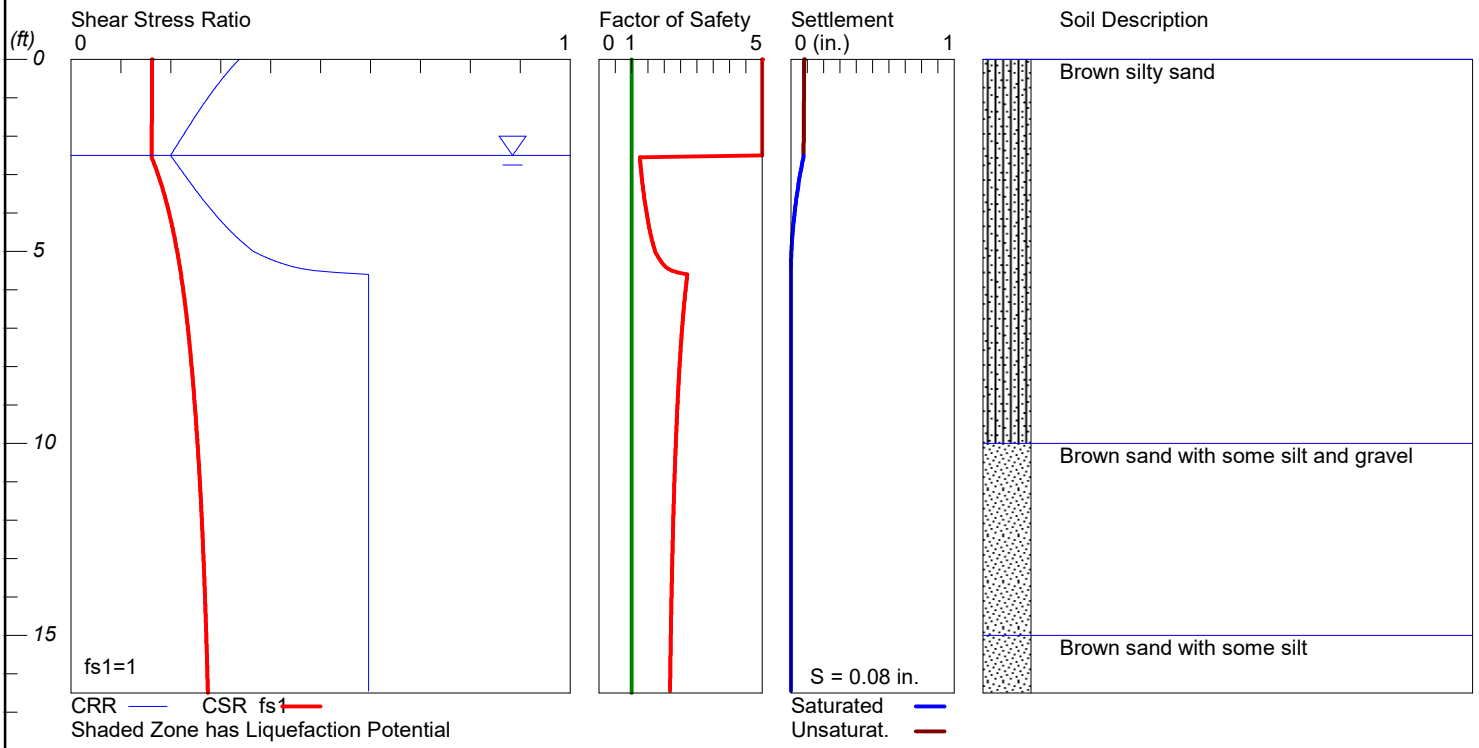
RILEYGROUP

LIQUEFACTION ANALYSIS

Vulk Residence

Hole No.=B-2 Water Depth=2.5 ft Surface Elev.=111

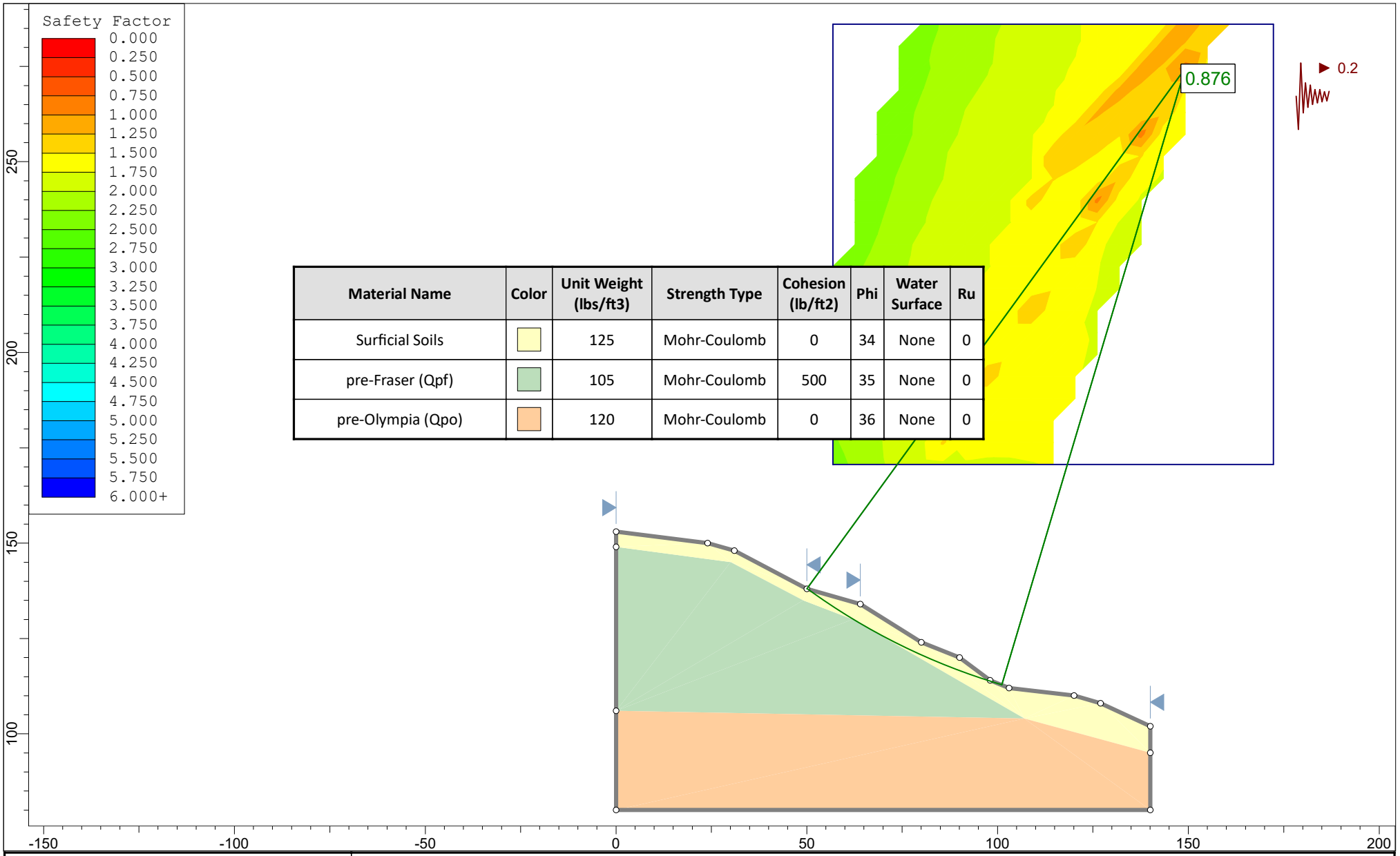
Magnitude=7
Acceleration=0.25g



APPENDIX B
SLOPE STABILITY

RGI performed the slope stability analysis by using a computer program, Slide version 6.0, which was developed by Rocscience. The safety factor for the critical surfaces was calculated by the Bishop Method. The analyses were performed for the slopes under existing static and seismic conditions.

For seismic analysis, peak ground acceleration (PGA) was determined to be 0.564g based on ASCE 7-10 Standard. Following the procedure recommended in NCHRP Seismic Analysis and Design of Retaining Walls, Buried Structures, Slopes, and Embankments (Report 611) and FHWA LRFD Seismic Analysis and Design of Transportation Geotechnical Features and Structural Foundations Manual (2011), a seismic coefficient of 0.20 was determined which is used in the pseudo-static slope stability analysis.

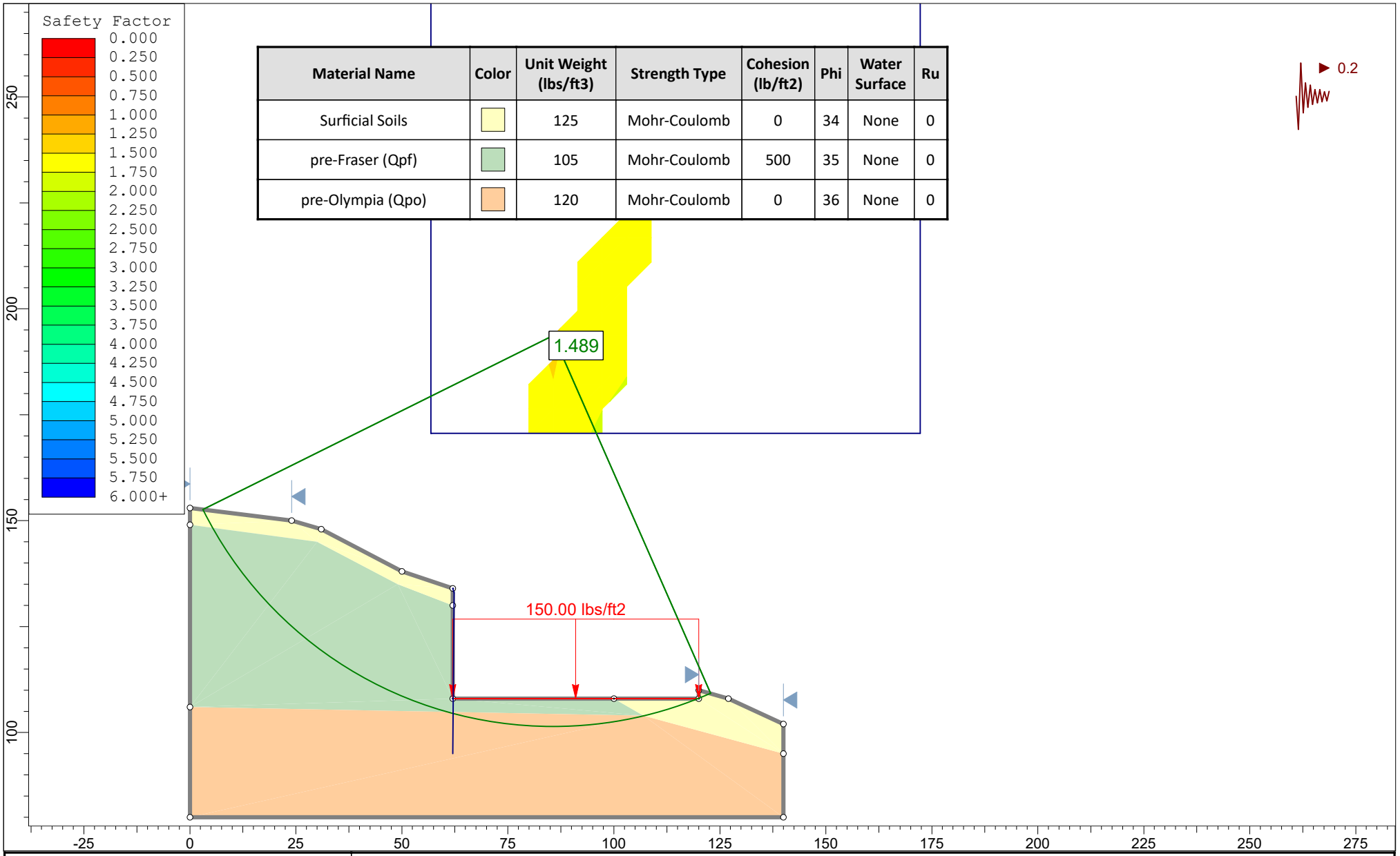


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Surficial Soils		125	Mohr-Coulomb	0	34	None	0
pre-Fraser (Qpf)		105	Mohr-Coulomb	500	35	None	0
pre-Olympia (Qpo)		120	Mohr-Coulomb	0	36	None	0

rocscience

SLIDEINTERPRET 6.009

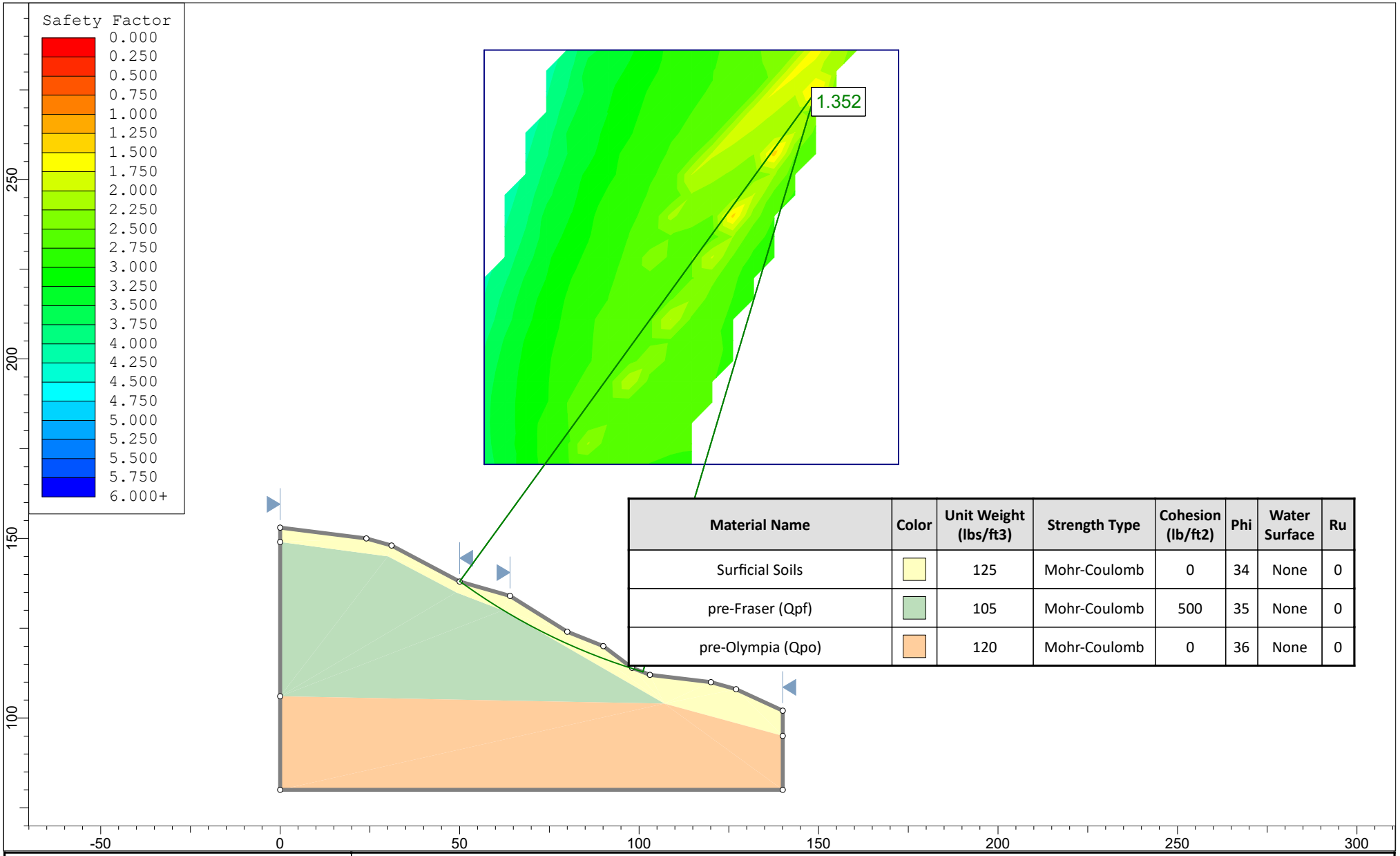
Project	Vulk Residence			
Analysis Description	Existing Seismic			
Drawn By	ELW	Scale	1:417	Company: Riley Group, Inc.
Date	1/3/2023, 12:55:15 PM			File Name: 2022-673-1 Existing Seismic.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Surficial Soils		125	Mohr-Coulomb	0	34	None	0
pre-Fraser (Qpf)		105	Mohr-Coulomb	500	35	None	0
pre-Olympia (Qpo)		120	Mohr-Coulomb	0	36	None	0

rocscience	Project	Vulk Residence		
	Analysis Description	Proposed Seismic		
	Drawn By	ELW	Scale 1:375	Company Riley Group, Inc.
	Date	1/3/2023, 12:55:15 PM		File Name 2022-673-1 Proposed Seismic.slim

SLIDEINTERPRET 6.009

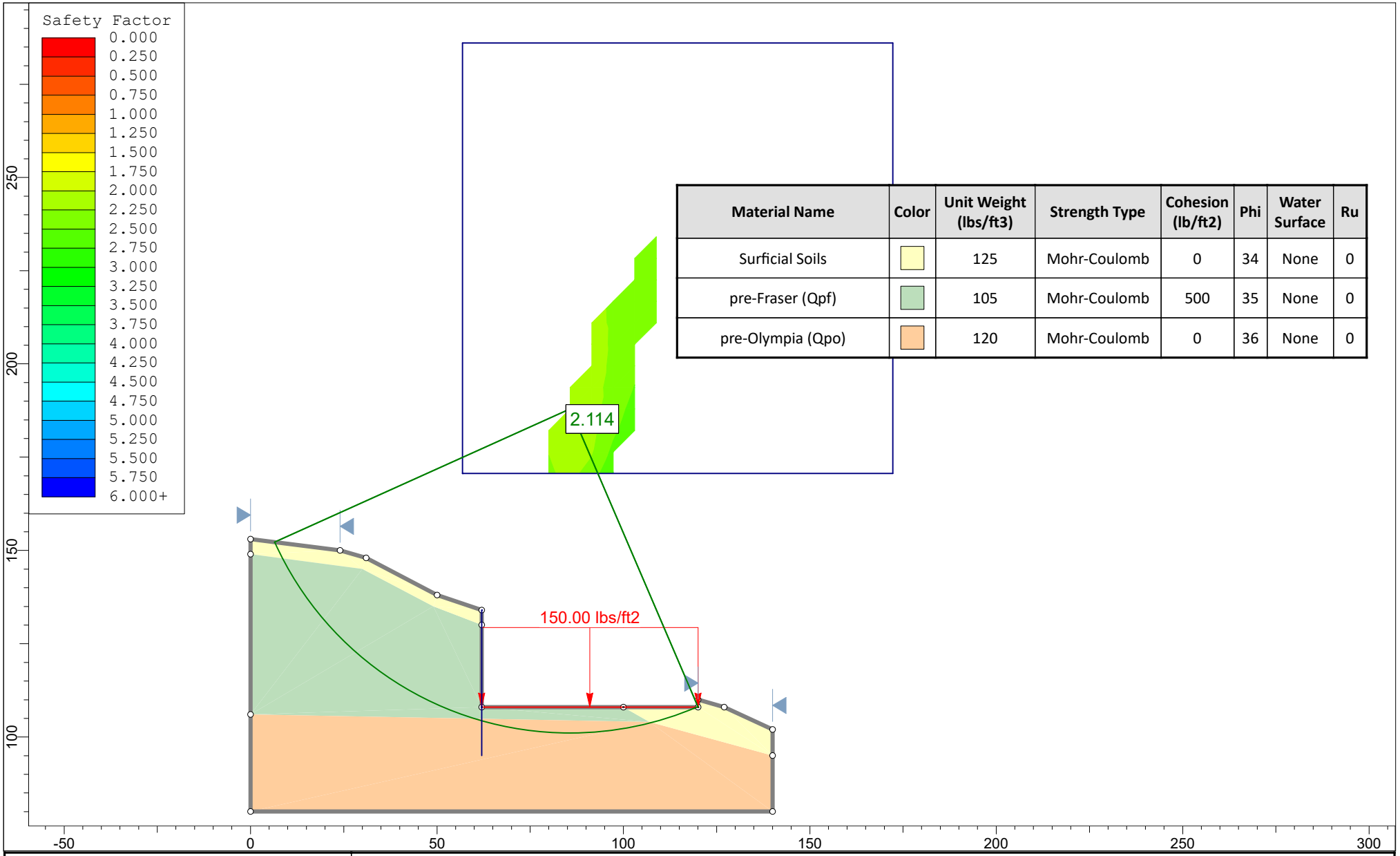


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Surficial Soils		125	Mohr-Coulomb	0	34	None	0
pre-Fraser (Qpf)		105	Mohr-Coulomb	500	35	None	0
pre-Olympia (Qpo)		120	Mohr-Coulomb	0	36	None	0

rocscience

SLIDEINTERPRET 6.009

Project	Vulk Residence				
Analysis Description	Existing Static				
Drawn By	ELW	*Scale*	1:443	*Company*	Riley Group, Inc.
Date	1/3/2023, 12:55:15 PM			*File Name*	2022-673-1 Existing Static.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Surficial Soils		125	Mohr-Coulomb	0	34	None	0
pre-Fraser (Qpf)		105	Mohr-Coulomb	500	35	None	0
pre-Olympia (Qpo)		120	Mohr-Coulomb	0	36	None	0

rocscience

SLIDEINTERPRET 6.009

Project	Vulk Residence		
Analysis Description	Proposed Static		
Drawn By	ELW	*Scale* 1:427	*Company* Riley Group, Inc.
Date	1/3/2023, 12:55:15 PM		*File Name* 2022-673-1 Proposed Static.slim