



Staff Report for Administrative Subdivision Approval

Weber County Planning Division

Synopsis

Application Information

Application Request: Consideration and action on a request to approve a Hillside Review for the Combe residence located on lot 12R in the Cedar Cove Estates 3rd Amendment.

Type of Decision: Administrative

Agenda Date: Monday, December 04, 2017

Applicant: Notting Hill Homes, Owner
Jonathon Arrington, Agent

File Number: HSR 2017-02

Property Information

Approximate Address: 2670 E 6500 SS, Uintah, UT, 84405

Project Area: 1.27 acres

Zoning: Residential Estates (RE-20) Zone

Existing Land Use: Residential

Proposed Land Use: Residential

Parcel ID: 07-723-0012

Township, Range, Section: T5N, R1W, Section 25 NW

Adjacent Land Use

North: Residential	South: Vacant/Residential
East: Residential	West: 6500 South St.

Staff Information

Report Presenter: Tammy Aydelotte
taydelotte@co.weber.ut.us
801-399-8766

Report Reviewer: Rick Grover

Applicable Ordinances

- Weber County Land Use Code Title 108 (Standards) Chapter 14 (Hillside Development Review)
- Weber County Land Use Code Title 108 (Standards) Chapter 22 (Natural Hazards Areas)

Background and Summary

The subject lot is described as All of lot 12AR, Cedar Cove Estates 3rd Amendment, Weber County, Utah. The subdivision was approved by the Weber County Commission June 6, 2009 and was recorded with the Weber County Recorder's on January 11, 2010 as entry # 2453531. The subject property has been identified as having an average slope in excess of 25%; therefore, the lot has been identified with an "R" which mandates a Hillside Review per the Uniform Land Use code of Weber County (LUC) Title 108 Chapter 14, prior to issuance of a land use and building permit.

In 2007, Earthtec Testing and Engineering, P.C. has performed the required geotechnical investigation, as required in LUC Title 108 chapter 22, to determine if there is a geologic hazard located on the site and to assess the subsurface soils in order to better design the home for slope stability and safety purposes. In 2017, Christensen Geotechnical assessed the prior report and determined that the 2007 report is adequate and may be used for design and construction of the proposed residence. Christensen Geotechnical did, however, update the seismic design values and the slope stability assessment contained in the prior report. Information related to the construction of the dwelling, including a site plan, landscape plan, grading plan, and the geologic/geotechnical report, have been distributed to the Hillside Review Board for comment. The plans have been reviewed and approved and/or conditionally approved by all applicable review agencies.

Planning Division Review

The Planning Division Staff has determined that the requirements and standards provided by the Hillside Review Chapter have been met for the excavation and construction of the dwelling. The following submittals were required:

1. Proposed Building Plans including site plan, and grading plan (see Exhibit A)
2. Geotechnical and Geologic Investigation Report (see Exhibit B)
3. Permit with Storm water Pollution Prevention Plan

Weber County Hillside Review Board comments

The Weber County Hillside Review Board, on this particular application, made comments related to the following:

Weber County Engineering Division: The Engineering Division granted approval on November 16, 2017. The approval is subject to the applicant following all recommendations found in the applicable Geotechnical and Geological Investigation Reports.

Weber Fire District: The Fire district has granted approval on August 17, 2017 subject to the following:

1. The residence is within a development area that requires fire suppression in the home.
2. Dead end fire apparatus access roads in excess of 150 feet in length shall be provide with an approved area for turning around fire apparatus constructed with the same requirements as the roads.
3. Provide a temporary address marker at the building site during construction.
4. Fire Access via Driveways.
5. Roads shall have a maximum grade of 10% unless specifically approved as outlined by the International Fire Code.

Weber County Planning Division: The Planning Division has granted approval subject to the applicant complying with all Board requirements and conditions. This approval is also subject to the applicant strictly adhering to the recommendations outlined in the geologic and geotechnical investigation report dated September 19, 2007 provided by ETE (ETE Project No. 07-2202).

Planning Division Recommendations

Based on site inspections and review agency comments, the Planning Division Staff has determined that it is necessary to impose additional requirements and conditions as part of approving HSR 2017-02. The recommendation for approval is subject to adherence to all review agencies conditions and based on the following conditions:

1. As a condition it is understood, by the applicant, the geo-technical engineer and engineering geologist that if any geologic hazards are revealed during the excavation and construction phase of the dwelling, work on Lot 12R in the Cedar Cove Estates 3rd Amendment will cease pending the development of appropriate mitigation measures and subsequent approval by the County.

The recommendation for approval is based on the following findings:

1. The application was submitted and with the required conditions, has been deemed complete.
2. The requirements and standards found in the Hillside Development Review Procedures and Standards Chapter have been met or will be met during the excavation and construction phase of the dwelling.
3. The Hillside Review Board members reviewed the application individually and have provided their comments.
4. The applicant has met or will meet, as part of the building permit process and/or during the excavation and construction phase of the dwelling, the requirements and conditions set forth by the Hillside Review Board.
5. The Planning Division Staff has determined that the proposed improvements have been sited within the required setbacks for the RE-20 zone with the exception of the driveway and any retaining wall(s).

Administrative Approval

Administrative approval of Lot 12R in the Cedar Cove Estates 3rd Amendment Hillside Review (HRS 2017-02) is hereby granted based upon its compliance with the Weber County Land Use Code. This approval is subject to the requirements of applicable review agencies and is based on the recommendations, conditions and findings listed in this staff report.

Date of Administrative Approval: Friday, December 8, 2017

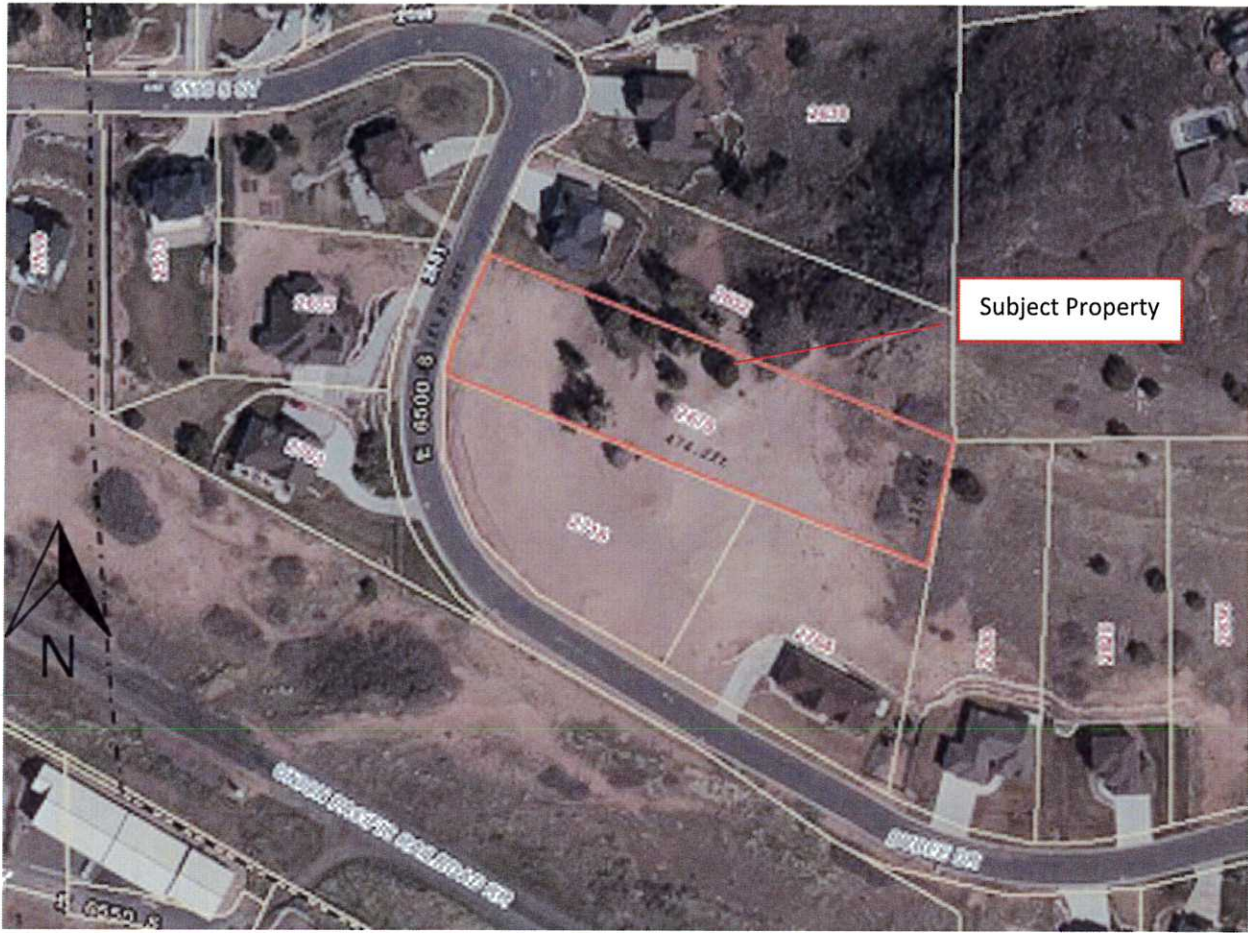


Rick Grover
Weber County Planning Director

Exhibits

- A. Proposed Building Plans including site plan, grading plan and landscape plan
- B. Geotechnical and Geologic Investigation Report

Area Map 1



SHEET INDEX

- AA01 COVER SHEET
- AA02 GENERAL NOTES
- AA03 SITE PLAN
- AA04 FRONT & REAR ELEVATIONS
- AA05 RIGHT & LEFT ELEVATIONS
- AA06 FOUNDATION PLAN
- AA07 BASEMENT PLAN
- AA08 MAIN FLOOR JOIST
- AA09 MAIN FLOOR PLAN
- AA10 ROOF/BONUS FLOOR PLAN
- AA11 ROOF PLAN
- AA12 BASEMENT ELECTRICAL
- AA13 MAIN ELECTRICAL
- AA14 ROOF/BONUS ELECTRICAL
- AA15 FLOORING
- AA16 ROOFING
- AA17 WALL SECTIONS
- SD01 STRUCTURAL DETAILS
- SD02 STRUCTURAL DETAILS
- SD03 STRUCTURAL DETAILS

PROJECT ADDRESS: _____
 CLIENT: _____
 PROJECT NAME: _____
 ARCHITECT: _____
 ENGINEER: _____
 CONTRACTOR: _____



GENERAL CONTRACTOR: _____
 ENGINEER: _____
 DATE: 08/03/2017
 REVISION: R-4E
 SCALE: N/A

COVER SHEET
 ENGINEER: _____
 PHONE NUMBER: _____
 LICENSE NUMBER: _____
 STATE OF ILLINOIS
 REGISTERED STRUCTURAL ENGINEER
 KYLE W. PRICE
 NO. 382268



CEILING HEIGHTS

(4) BONUS CEILINGS	8.09'
(2) MAIN CEILINGS	9.09'
(1) BASEMENT CEILINGS	8.79'

SEWER/SEPTIC _____
 SEWER _____

SQUARE FOOTAGES

UNFINISHED SQUARE FOOTAGE	FINISHED SQUARE FOOTAGE	TOTAL SQUARE FOOTAGE	GARAGE SLAB SQUARE FOOTAGE
(1) BASEMENT UNFINIS... 1,432.11	(2) MAIN FINISHED 1,929.51	1,492.13	3 CAR GARAGE 1,025.11
(1) COLD STORAGE 60.02	1,929.51 sq ft	1,929.51	1,025.11 sq ft
1,492.13 sq ft	3,421.64 sq ft		

GENERAL NOTES

1. THE GENERAL CONTRACTOR ASSUMES FULL RESPONSIBILITY TO VERIFY THE CONDITIONS, DIMENSIONS AND STRUCTURAL DETAILS OF THE BUILDING. THE CONTRACTOR ASSUMES FULL LIABILITY FOR ANY PROBLEMS THAT MAY ARISE TO POSSIBLE ERRORS ON THESE PLANS. USE OF THESE PLANS CONSTITUTES COMPLIANCE WITH THE ABOVE TERMS.

2. WORKMANSHIP THROUGHOUT SHALL BE OF THE BEST QUALITY OF THE TRADE INVOLVED AND THE GENERAL CONTRACTOR SHALL COORDINATE THE WORK OF THE VARIOUS TRADES TO EXPEDITE THE JOB IN A SMOOTH AND CONTINUOUS PROCESS.

3. ALL CONSTRUCTION SHALL BE IN ACCORDANCE TO THE 2015 INTERNATIONAL RESIDENTIAL CODE UNLESS OTHERWISE NOTED. ALL DETAILS, SECTIONS AND NOTES SHOWN ON THE CONTRACT DRAWINGS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR CONDITIONS ELSEWHERE.

4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF AND THE SAFETY IN AND AROUND THE JOB SITE AND OF ADJACENT PROPERTIES.

5. THE GENERAL CONTRACTOR AND/OR OWNER SHALL KEEP LOADS ON THE CONTRACT DRAWINGS AND/OR SPECIFICATIONS WITHIN THE LIMITS OF THE DESIGN BOTH DURING AND AFTER CONSTRUCTION.

6. COMPLIANCE WITH CODES AND ORDINANCES GOVERNING THE WORK SHALL BE MADE AND ENFORCED BY THE GENERAL CONTRACTOR.

7. NOTE THAT ALL WRITTEN DIMENSIONS TAKE PRECEDENCE OVER SCALE MANUFACTURER'S SPECIFICATIONS FOR INSTALLATION OF MATERIALS SHALL BE FOLLOWED.

PROJECT ADDRESS
SUBDIVISION NAME
LOT NUMBER
TAXPAYER NAME
TAXPAYER PHONE
TAXPAYER STATE

CLIENT
FIRM
CONTACT

PROJECT NAME
PROJECT NUMBER

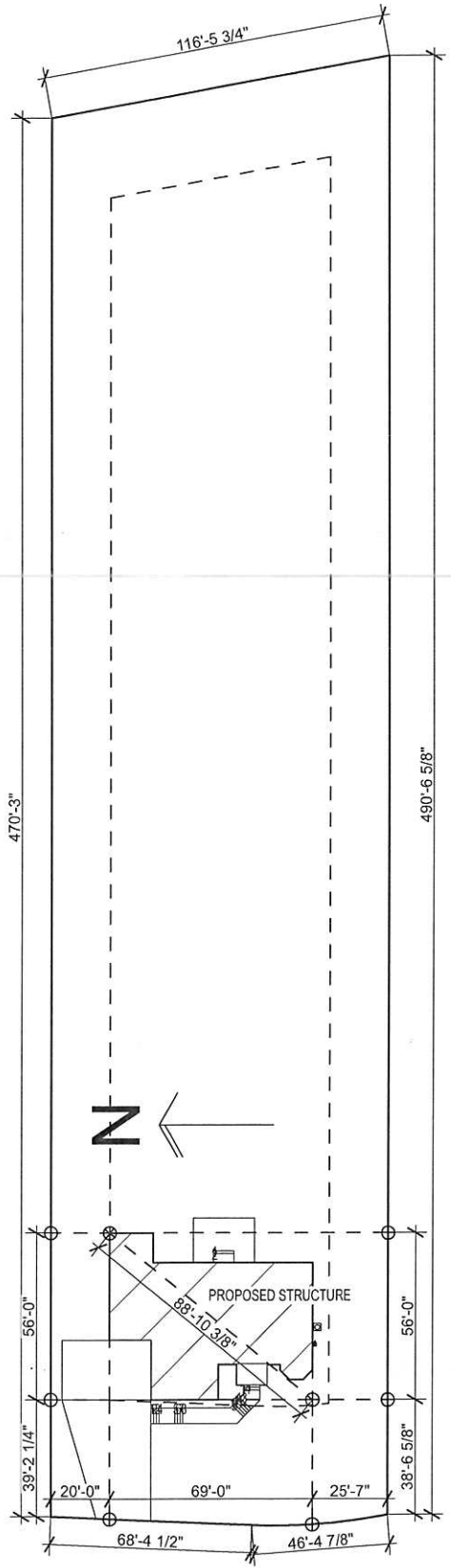


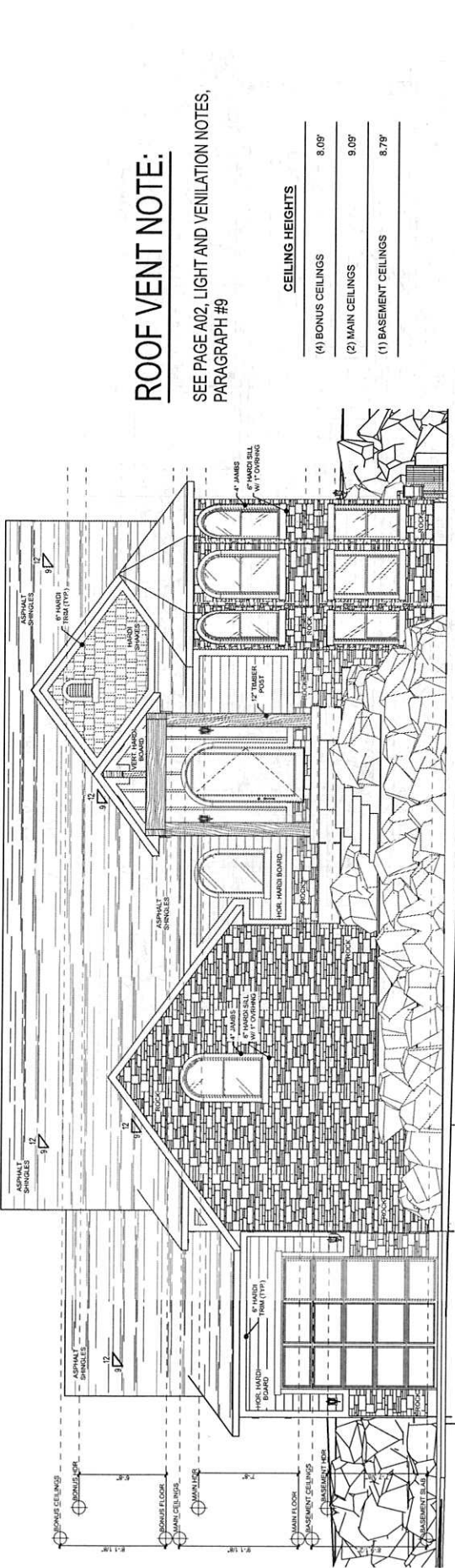
GENERAL CONTRACTOR
CONTACT (801) 668-8194
CONTACT (801) 668-8194

ENGINEER
ENGINEERING COMPANY
PHONE NUMBER

SITE PLAN

DATE: 8/3/17
REVISION: R-4E
SCALE: 1" = 20'
Page 9
AA03





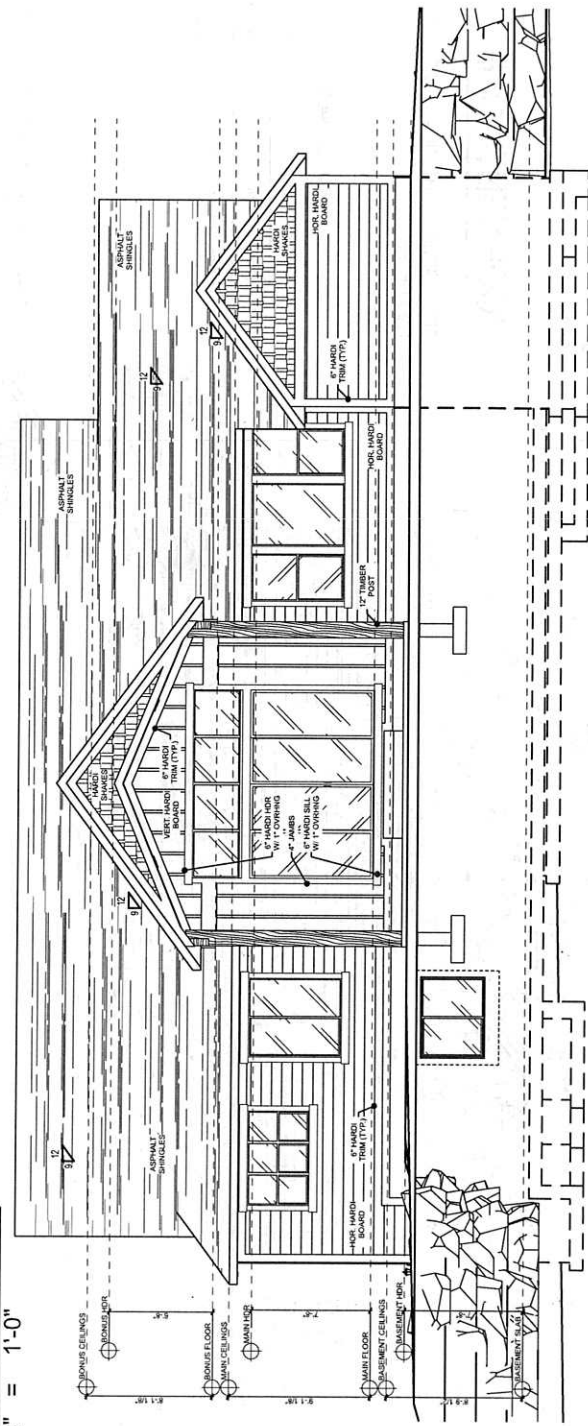
AA FRONT ELEVATION
SCALE: 1/8" = 1'-0"

ROOF VENT NOTE:

SEE PAGE A02, LIGHT AND VENTILATION NOTES,
PARAGRAPH #9

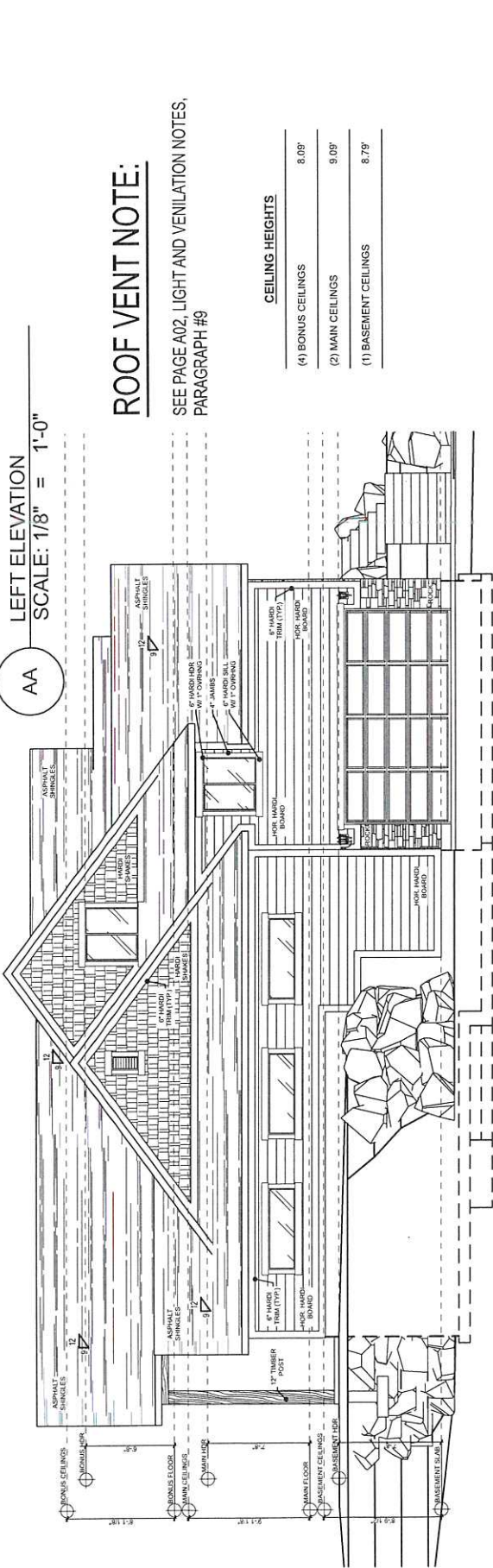
CEILING HEIGHTS

(1) BONUS CEILINGS	8.09'
(2) MAIN CEILINGS	9.09'
(1) BASEMENT CEILINGS	8.79'



AA REAR ELEVATION
SCALE: 1/8" = 1'-0"

AA LEFT ELEVATION
 SCALE: 1/8" = 1'-0"



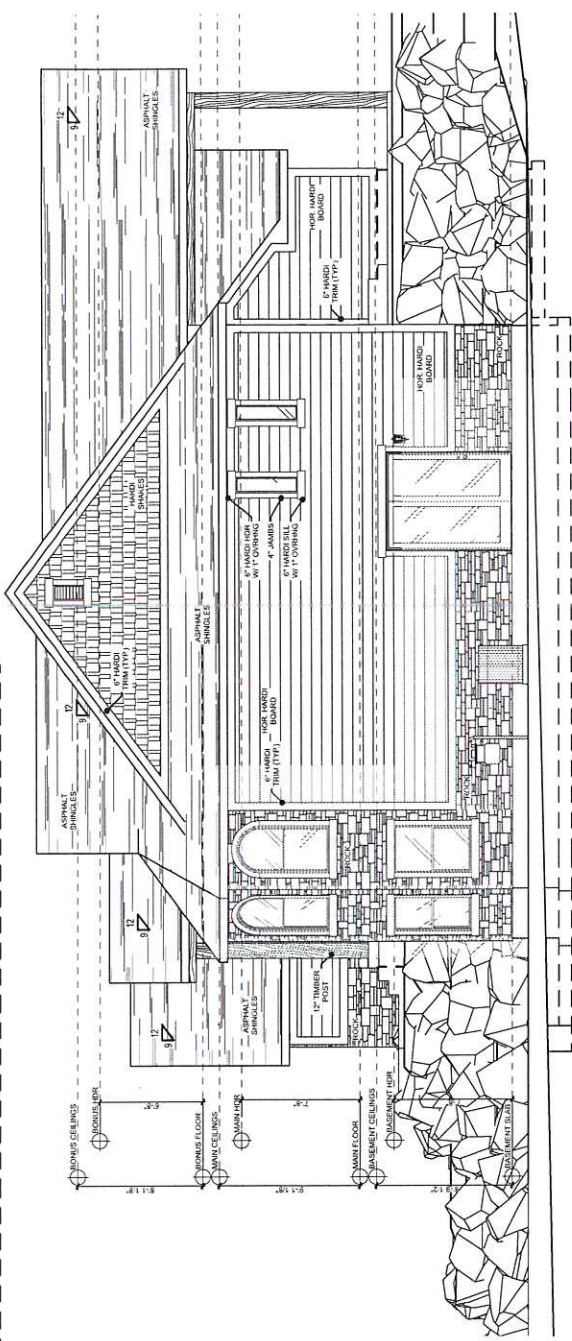
ROOF VENT NOTE:

SEE PAGE A02, LIGHT AND VENTILATION NOTES,
 PARAGRAPH #9

CEILING HEIGHTS

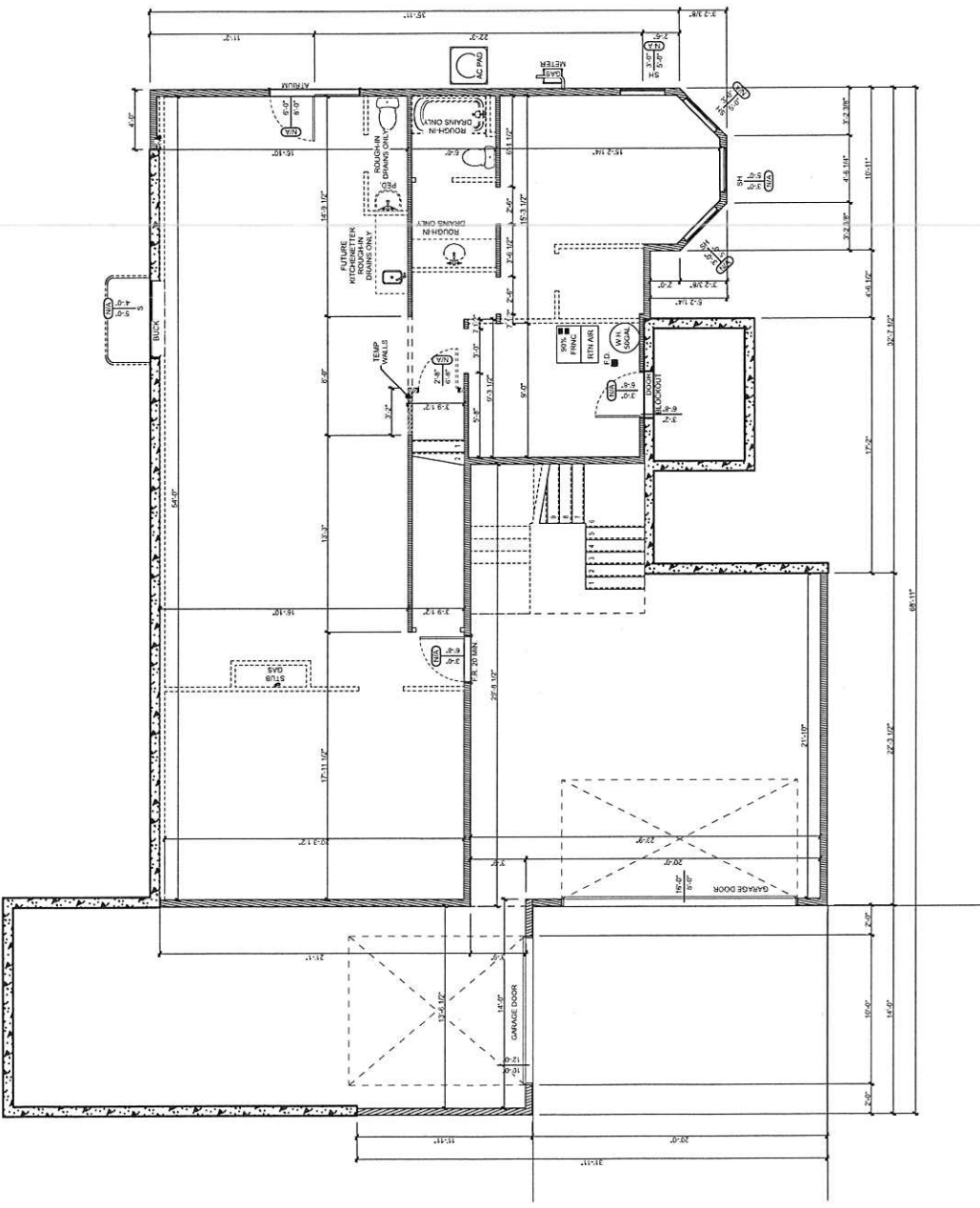
(4) BONUS CEILINGS	8.09'
(2) MAIN CEILINGS	8.08'
(1) BASEMENT CEILINGS	8.79'

AA RIGHT ELEVATION
 SCALE: 1/8" = 1'-0"



AREA FOOTAGES

UNFINISHED SQUARE FOOTAGE	FINISHED SQUARE FOOTAGE	TOTAL SQUARE FOOTAGE	GARAGE SLAB SQUARE FOOTAGE
(1) BASEMENT UNFINISHED... 1,432.11	(2) MAIN FINISHED 1,929.51	1,929.51	1,026.11
(1) COLD STORAGE 60.02	2 - FINISHED 1,929.51	1,929.51	
			3,421.64 sq ft



BASE GAS STUBS (NOT INCLUDING FURN. & W.H.)		
Object Name	Quantity	2D Symbol
GAS STUB	1	STUB

WINDOW TYPE NOTE
 ALL SLIDERS AND SINGLE HUNG WINDOWS ARE ASSUMED TO OPEN 50% UNLESS NOTED OTHERWISE INDICATED

KEY TO TYPE
 SH = SINGLE HUNG S = SLIDER
 C = CASEMENT F = FIXED
 SH2 = SINDGLE HUNG (K2) A = AWNING

DIMENSION NOTE:
 ALL EXTERIOR DIMENSIONS ARE TO THE OUTSIDE OF STUD WALL. NOT THE OUTSIDE OF THE SHEATHING.

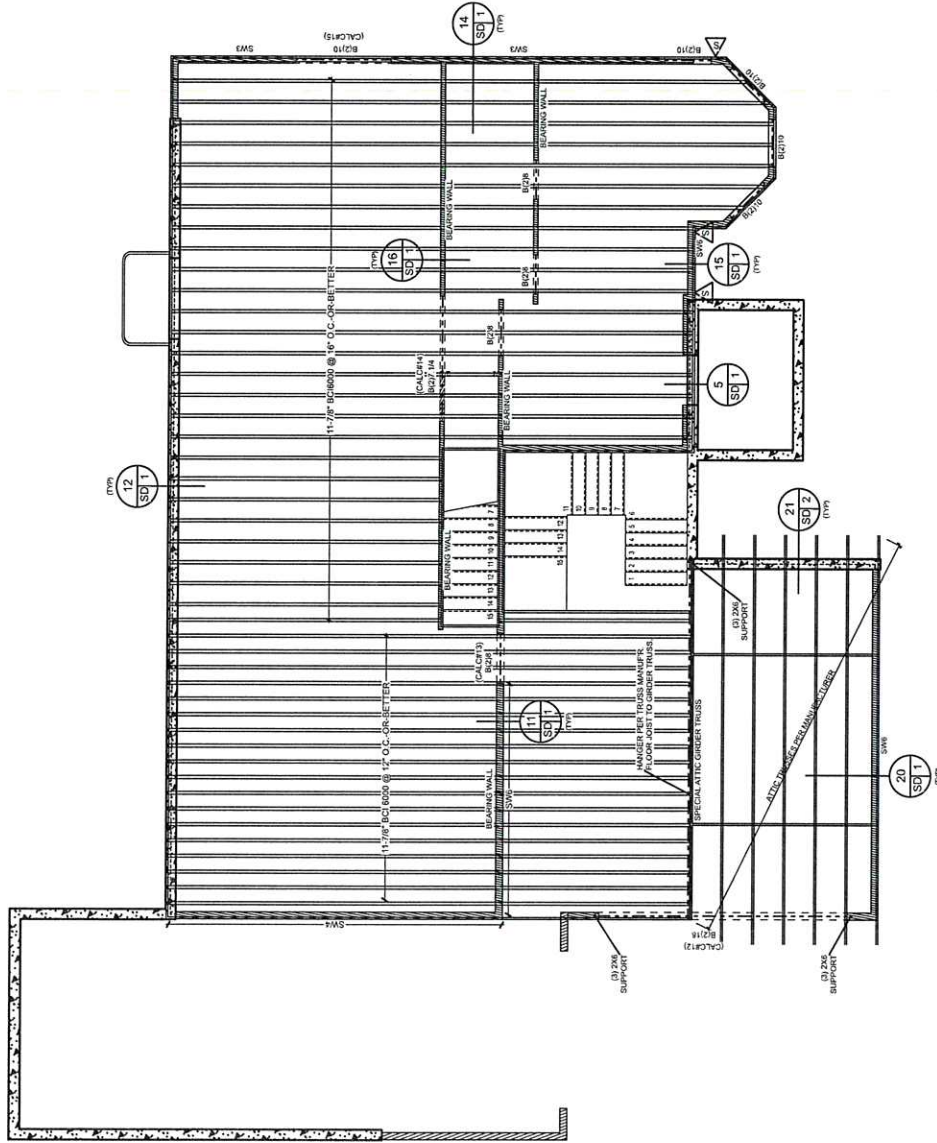
CEILING HEIGHTS

(4) BONUS CEILINGS	8.00'
(2) MAIN CEILINGS	9.00'
(1) BASEMENT CEILINGS	8.75'

SEWER/SEPTIC

FLOOR JOIST PLUMBING NOTE:

ALL FLOOR JOIST TO BE SPACED TO MISS PLUMBING AND DRAINS. IF A DISTANCE IS SPECIFIED ON THE PLAN YOU MUST START THE JOISTS FROM THE DESIGNATED START POINT WITH THE FIRST JOIST PLACED AT THE DESIGNATED DISTANCE.



DESIGNATION	BEAM DESCRIPTION	SEE NOTES 1,2,3,4,5
END TRIMMER	TYPE	
QTY.	UNID.	
B0006	(2) 2 X 10 DHP#2	1
B0007	(2) 2X12 DHP#2	1
B0008	(2) 2X12 DHP#2	1
B0009	(2) 2X12 DHP#2	1
B0010	(2) 2X12 DHP#2	1
B0011	(2) 2X12 DHP#2	1
B0012	(2) 2X12 DHP#2	1
B0013	(2) 2X12 DHP#2	1
B0014	(2) 2X12 DHP#2	1
B0015	(2) 2X12 DHP#2	1
B0016	(2) 2X12 DHP#2	1
B0017	(2) 2X12 DHP#2	1
B0018	(2) 2X12 DHP#2	1
B0019	(2) 2X12 DHP#2	1
B0020	(2) 2X12 DHP#2	1
B0021	(2) 2X12 DHP#2	1
B0022	(2) 2X12 DHP#2	1
B0023	(2) 2X12 DHP#2	1
B0024	(2) 2X12 DHP#2	1
B0025	(2) 2X12 DHP#2	1
B0026	(2) 2X12 DHP#2	1
B0027	(2) 2X12 DHP#2	1
B0028	(2) 2X12 DHP#2	1
B0029	(2) 2X12 DHP#2	1
B0030	(2) 2X12 DHP#2	1
B0031	(2) 2X12 DHP#2	1
B0032	(2) 2X12 DHP#2	1
B0033	(2) 2X12 DHP#2	1
B0034	(2) 2X12 DHP#2	1
B0035	(2) 2X12 DHP#2	1
B0036	(2) 2X12 DHP#2	1
B0037	(2) 2X12 DHP#2	1
B0038	(2) 2X12 DHP#2	1
B0039	(2) 2X12 DHP#2	1
B0040	(2) 2X12 DHP#2	1
B0041	(2) 2X12 DHP#2	1
B0042	(2) 2X12 DHP#2	1
B0043	(2) 2X12 DHP#2	1
B0044	(2) 2X12 DHP#2	1
B0045	(2) 2X12 DHP#2	1
B0046	(2) 2X12 DHP#2	1
B0047	(2) 2X12 DHP#2	1
B0048	(2) 2X12 DHP#2	1
B0049	(2) 2X12 DHP#2	1
B0050	(2) 2X12 DHP#2	1
B0051	(2) 2X12 DHP#2	1
B0052	(2) 2X12 DHP#2	1
B0053	(2) 2X12 DHP#2	1
B0054	(2) 2X12 DHP#2	1
B0055	(2) 2X12 DHP#2	1
B0056	(2) 2X12 DHP#2	1
B0057	(2) 2X12 DHP#2	1
B0058	(2) 2X12 DHP#2	1
B0059	(2) 2X12 DHP#2	1
B0060	(2) 2X12 DHP#2	1
B0061	(2) 2X12 DHP#2	1
B0062	(2) 2X12 DHP#2	1
B0063	(2) 2X12 DHP#2	1
B0064	(2) 2X12 DHP#2	1
B0065	(2) 2X12 DHP#2	1
B0066	(2) 2X12 DHP#2	1
B0067	(2) 2X12 DHP#2	1
B0068	(2) 2X12 DHP#2	1
B0069	(2) 2X12 DHP#2	1
B0070	(2) 2X12 DHP#2	1
B0071	(2) 2X12 DHP#2	1
B0072	(2) 2X12 DHP#2	1
B0073	(2) 2X12 DHP#2	1
B0074	(2) 2X12 DHP#2	1
B0075	(2) 2X12 DHP#2	1
B0076	(2) 2X12 DHP#2	1
B0077	(2) 2X12 DHP#2	1
B0078	(2) 2X12 DHP#2	1
B0079	(2) 2X12 DHP#2	1
B0080	(2) 2X12 DHP#2	1
B0081	(2) 2X12 DHP#2	1
B0082	(2) 2X12 DHP#2	1
B0083	(2) 2X12 DHP#2	1
B0084	(2) 2X12 DHP#2	1
B0085	(2) 2X12 DHP#2	1
B0086	(2) 2X12 DHP#2	1
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B0093	(2) 2X12 DHP#2	1
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B0095	(2) 2X12 DHP#2	1
B0096	(2) 2X12 DHP#2	1
B0097	(2) 2X12 DHP#2	1
B0098	(2) 2X12 DHP#2	1
B0099	(2) 2X12 DHP#2	1
B0100	(2) 2X12 DHP#2	1

SEE SHEET 003 FOR WOOD FRAMING SPECS AND NOTES.
 SWW SHEAR WALL. SEE SHEET 003.

VERTICAL FRAMING STRAP LOWER STUDS OR FLOOR BEAM OR FINISH FLOOR TO STUDS OR SIMPSON ANCHORS TO STUDS (3 TYP.)

Exhibit A Building Plans

ENGINEER: ENGINEERING COMPANY PHOENIX, ARIZONA
REGISTERED PROFESSIONAL ENGINEER: NO. 36228
PRICE: KYLE J. PRICE
DATE: 08/03/2017
REVISION: R-4E
SCALE: 1/8" = 1'-0"

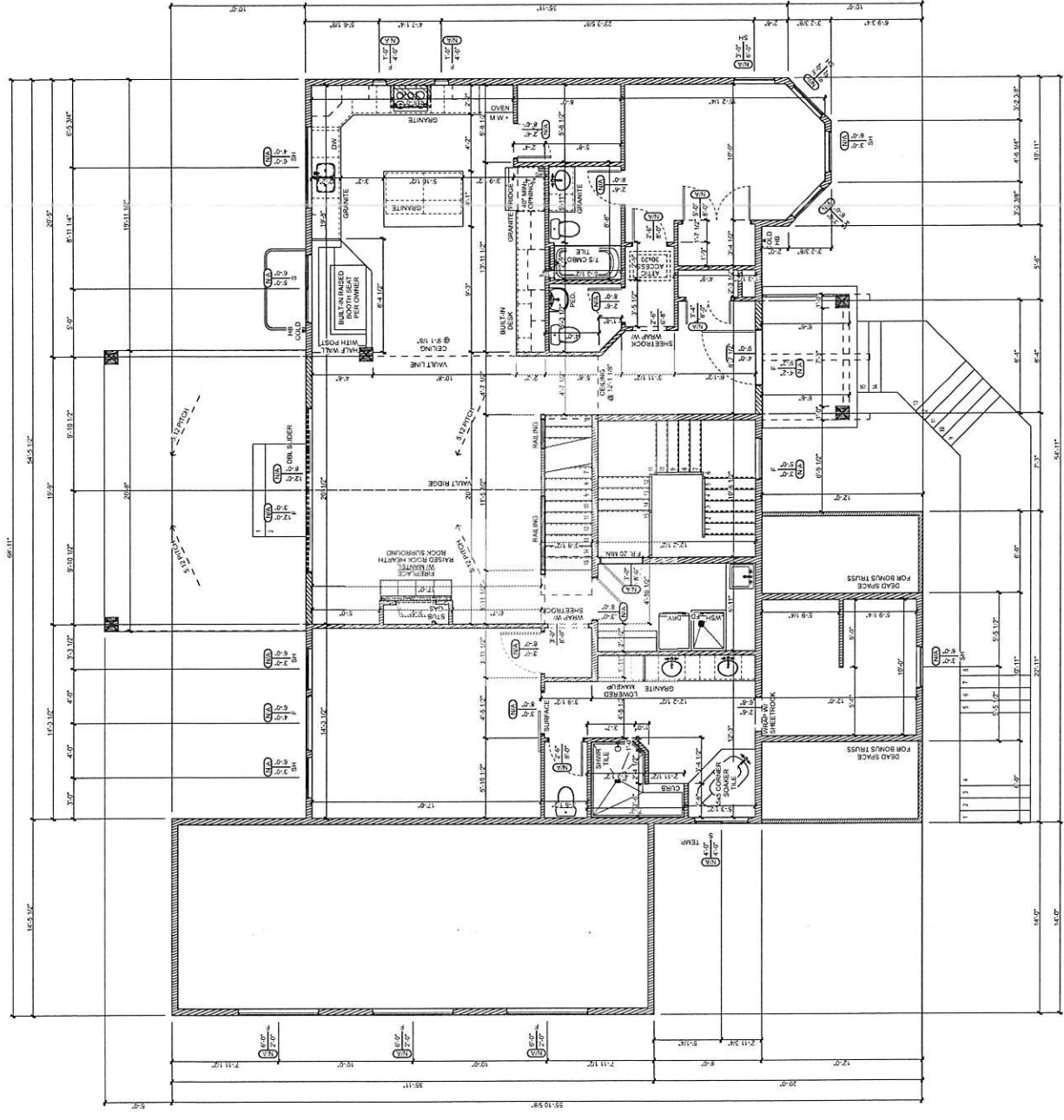
GENERAL CONTRACTOR: JAMES HOLT, 435-720-2087
PROJECT NAME: JAMES HOLT - 435-720-2087
CLIENT: JAMES HOLT
PROJECT ADDRESS:

MAIN FLOOR JOIST

AA08

ROOM FOOTAGES

Room Description	Area (sq ft)	Total Area (sq ft)
(1) UNFINISHED SQUARE FOOTAGE	1,432.11	1,929.51
(2) MAIN FINISHED	60.02	
(1) BASEMENT UNFINISHED...	1,025.11	1,929.51
(1) COLD STORAGE	1,025.11	
TOTAL SQUARE FOOTAGE	3,471.64 sq ft	
GARAGE SLAB SQUARE FOOTAGE		
3 CAR GARAGE	1,025.11	



CEILING HEIGHTS

(4) BONUS CEILINGS	8.09'
(2) MAIN CEILINGS	9.09'
(1) BASEMENT CEILINGS	8.79'

SEWER/SEPTIC

SEWER

DIMENSION NOTE:

ALL EXTERIOR DIMENSIONS ARE TO THE OUTSIDE OF STUD WALL. NOT THE OUTSIDE OF THE SHEATHING.

WINDOW TYPE NOTE

ALL SLIDERS AND SINGLE HUNG WINDOWS ARE ASSUMED TO OPEN 50% UNLESS NOTED OTHERWISE INDICATED

KEY TO TYPE
 SH = SINGLE HUNG S = SLIDER
 C = CASEMENT F = FIXED
 SH2 = SINGLE HUNG (2) A = AWNING

MAIN GAS STUBS (NOT INCLUDING FURN. OR W.H.)

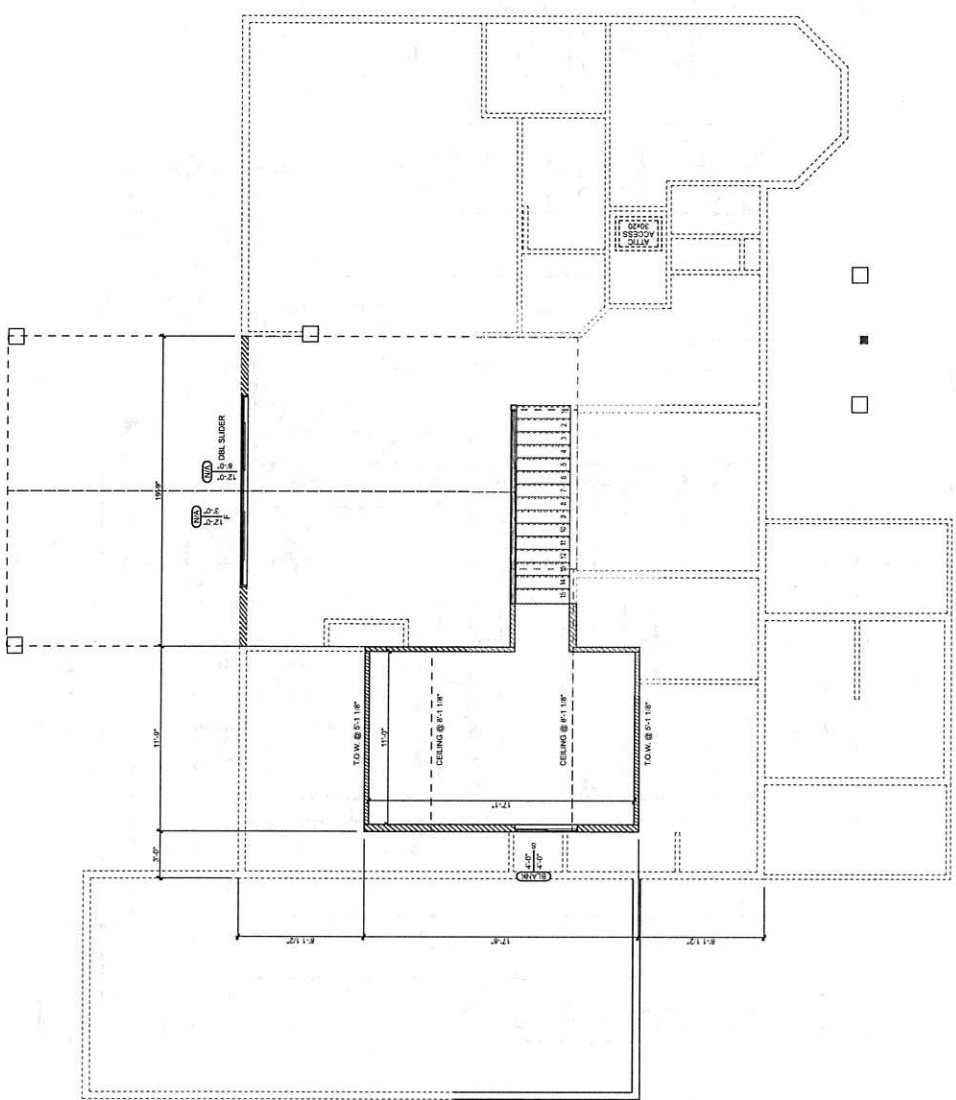
Object Name	Quantity	2D Symbol
GAS STUB	1	



AA09

ROOF/BONUS FLOOR PLANS

UNFINISHED SQUARE FOOTAGE	FINISHED SQUARE FOOTAGE	TOTAL SQUARE FOOTAGE	GARAGE SLAB SQUARE FOOTAGE
(1) BASEMENT UNFINISHED... 1,432.11	(2) MAIN FINISHED 1,929.51	1 - UNFINISHED 1,492.13	3 CAR GARAGE 1,025.11
(1) COLD STORAGE 60.02	1,929.51 sq ft	2 - FINISHED 1,929.51	1,025.11 sq ft
1,492.13 sq ft		3,421.64 sq ft	



CEILING HEIGHTS

(4) BONUS CEILINGS	8.00'
(2) MAIN CEILINGS	9.05'
(1) BASEMENT CEILINGS	8.75'

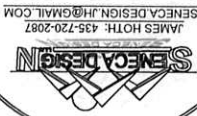
SEWER/SEPTIC

DIMENSION NOTE:

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WINDOW TYPE NOTE
 ALL SLIDERS AND SINGLE HUNG WINDOWS ARE ASSUMED TO OPEN 50% UNLESS NOTED OTHERWISE INDICATED

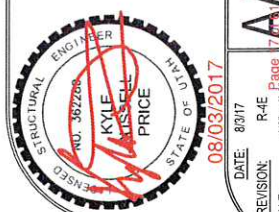
KEY TO TYPE
 SH = SINGLE HUNG
 SF = SLIDER
 C = CASSETTE
 SHZ = SINGLE HUNG (Z)
 S = SLIDER
 F = FIXED
 A = AWNING



JAMES HOHN 435-720-2082
 SENECA DESIGN JH@GMAIL.COM



PROJECT ADDRESS: _____
 CLIENT: RICH COME
 PROJECT NAME: MH-CUSTOM HOME
 GENERAL CONTRACTOR: JOYNTING HILL GROUP
 CONTACT: (801) 668-9704
 ENGINEER: ENGINEERING COMPANY
 PROJECT NUMBER: _____
AA11

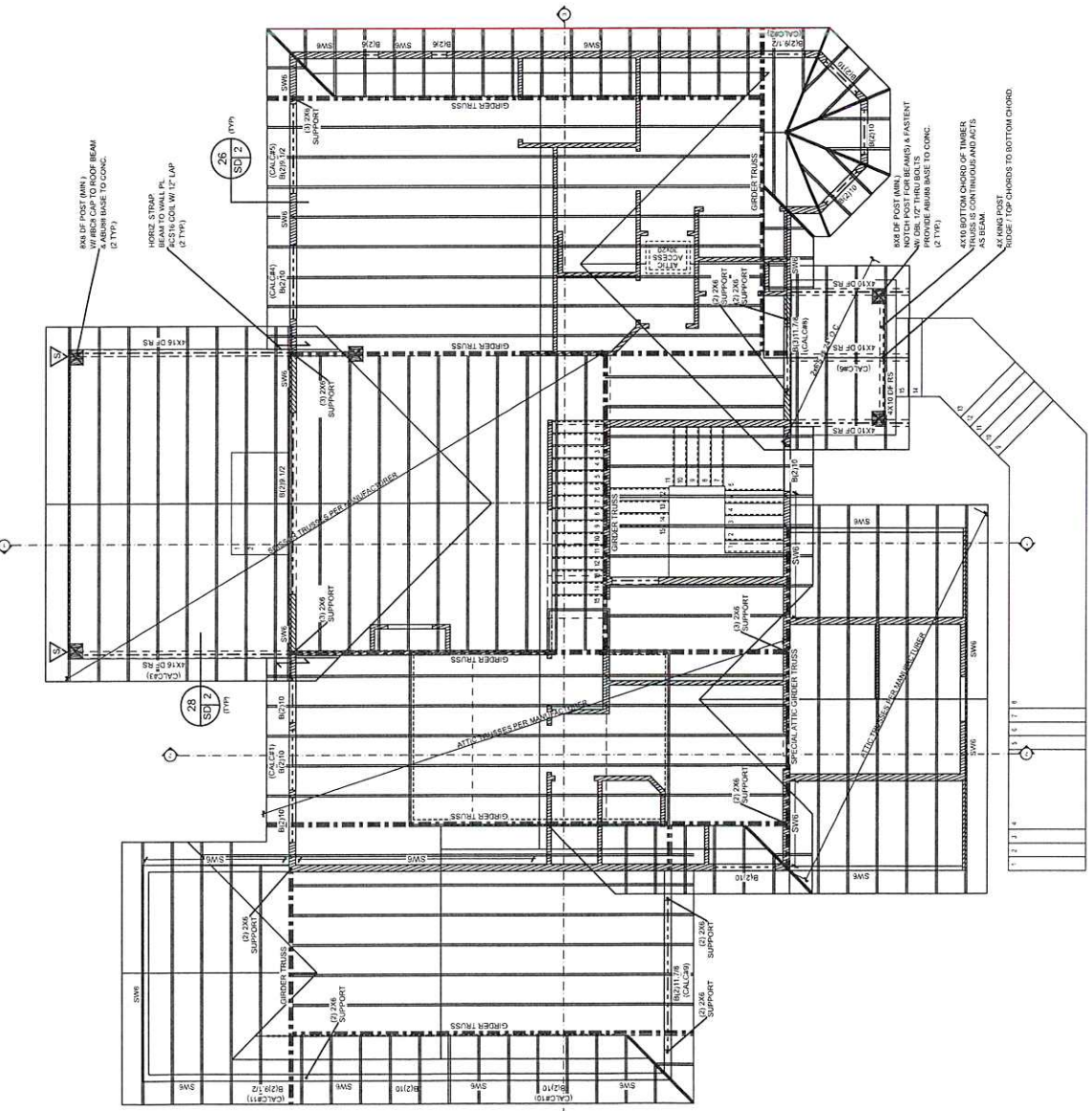


DATE: 8/3/17
 REVISION: R-4E
 SCALE: 1/8" = 1'-0"
 Page 7 of 8

SEE SHEET SD3 FOR WOOD FRAMING SPECS AND NOTES.
 SWW SHEAR WALL. SEE SHEET SD3.
 VERTICAL FRAMING STRAP LOWER BEAM END TO UPPER TRUSS END BEAM WITH GUY COL. W/ 2" LAP. (2 TYP.)

BEAM SCHEDULE EX		SEE NOTES 1.3 & 4.5
DESIGNATION	BEAM DESCRIPTION	END TRAMMER TYPE
B201-01	(1) 1.5"x3.0" X 12' U/L	1
B201-02	(2) 1.5"x3.0" X 5.12' U/L	1
B201-03	(2) 1.5"x3.0" X 12' U/L	1
B201-04	(2) 1.5"x3.0" X 7.24' U/L	1
B201-05	(2) 1.5"x3.0" X 7.14' U/L	1
B201-06	(2) 1.5"x3.0" X 6.2' U/L	1
B201-07	(2) 1.5"x3.0" X 8.12' U/L	3
B201-08	(2) 1.5"x3.0" X 12' U/L	1
B201-09	(2) 1.5"x3.0" X 12' U/L	3
B201-10	(2) 1.5"x3.0" X 12' U/L	3
B201-11	(2) 1.5"x3.0" X 12' U/L	3
B201-12	(2) 1.5"x3.0" X 12' U/L	3
B201-13	(2) 1.5"x3.0" X 12' U/L	3
B201-14	(2) 1.5"x3.0" X 12' U/L	3
B201-15	(2) 1.5"x3.0" X 12' U/L	3
B201-16	(2) 1.5"x3.0" X 12' U/L	3
B201-17	(2) 1.5"x3.0" X 12' U/L	3
B201-18	(2) 1.5"x3.0" X 12' U/L	3
B201-19	(2) 1.5"x3.0" X 12' U/L	3
B201-20	(2) 1.5"x3.0" X 12' U/L	3
B201-21	(2) 1.5"x3.0" X 12' U/L	3
B201-22	(2) 1.5"x3.0" X 12' U/L	3
B201-23	(2) 1.5"x3.0" X 12' U/L	3
B201-24	(2) 1.5"x3.0" X 12' U/L	3
B201-25	(2) 1.5"x3.0" X 12' U/L	3
B201-26	(2) 1.5"x3.0" X 12' U/L	3
B201-27	(2) 1.5"x3.0" X 12' U/L	3
B201-28	(2) 1.5"x3.0" X 12' U/L	3
B201-29	(2) 1.5"x3.0" X 12' U/L	3
B201-30	(2) 1.5"x3.0" X 12' U/L	3
B201-31	(2) 1.5"x3.0" X 12' U/L	3
B201-32	(2) 1.5"x3.0" X 12' U/L	3
B201-33	(2) 1.5"x3.0" X 12' U/L	3
B201-34	(2) 1.5"x3.0" X 12' U/L	3
B201-35	(2) 1.5"x3.0" X 12' U/L	3
B201-36	(2) 1.5"x3.0" X 12' U/L	3
B201-37	(2) 1.5"x3.0" X 12' U/L	3
B201-38	(2) 1.5"x3.0" X 12' U/L	3
B201-39	(2) 1.5"x3.0" X 12' U/L	3
B201-40	(2) 1.5"x3.0" X 12' U/L	3
B201-41	(2) 1.5"x3.0" X 12' U/L	3
B201-42	(2) 1.5"x3.0" X 12' U/L	3
B201-43	(2) 1.5"x3.0" X 12' U/L	3
B201-44	(2) 1.5"x3.0" X 12' U/L	3
B201-45	(2) 1.5"x3.0" X 12' U/L	3
B201-46	(2) 1.5"x3.0" X 12' U/L	3
B201-47	(2) 1.5"x3.0" X 12' U/L	3
B201-48	(2) 1.5"x3.0" X 12' U/L	3
B201-49	(2) 1.5"x3.0" X 12' U/L	3
B201-50	(2) 1.5"x3.0" X 12' U/L	3
B201-51	(2) 1.5"x3.0" X 12' U/L	3
B201-52	(2) 1.5"x3.0" X 12' U/L	3
B201-53	(2) 1.5"x3.0" X 12' U/L	3
B201-54	(2) 1.5"x3.0" X 12' U/L	3
B201-55	(2) 1.5"x3.0" X 12' U/L	3
B201-56	(2) 1.5"x3.0" X 12' U/L	3
B201-57	(2) 1.5"x3.0" X 12' U/L	3
B201-58	(2) 1.5"x3.0" X 12' U/L	3
B201-59	(2) 1.5"x3.0" X 12' U/L	3
B201-60	(2) 1.5"x3.0" X 12' U/L	3
B201-61	(2) 1.5"x3.0" X 12' U/L	3
B201-62	(2) 1.5"x3.0" X 12' U/L	3
B201-63	(2) 1.5"x3.0" X 12' U/L	3
B201-64	(2) 1.5"x3.0" X 12' U/L	3
B201-65	(2) 1.5"x3.0" X 12' U/L	3
B201-66	(2) 1.5"x3.0" X 12' U/L	3
B201-67	(2) 1.5"x3.0" X 12' U/L	3
B201-68	(2) 1.5"x3.0" X 12' U/L	3
B201-69	(2) 1.5"x3.0" X 12' U/L	3
B201-70	(2) 1.5"x3.0" X 12' U/L	3
B201-71	(2) 1.5"x3.0" X 12' U/L	3
B201-72	(2) 1.5"x3.0" X 12' U/L	3
B201-73	(2) 1.5"x3.0" X 12' U/L	3
B201-74	(2) 1.5"x3.0" X 12' U/L	3
B201-75	(2) 1.5"x3.0" X 12' U/L	3
B201-76	(2) 1.5"x3.0" X 12' U/L	3
B201-77	(2) 1.5"x3.0" X 12' U/L	3
B201-78	(2) 1.5"x3.0" X 12' U/L	3
B201-79	(2) 1.5"x3.0" X 12' U/L	3
B201-80	(2) 1.5"x3.0" X 12' U/L	3
B201-81	(2) 1.5"x3.0" X 12' U/L	3
B201-82	(2) 1.5"x3.0" X 12' U/L	3
B201-83	(2) 1.5"x3.0" X 12' U/L	3
B201-84	(2) 1.5"x3.0" X 12' U/L	3
B201-85	(2) 1.5"x3.0" X 12' U/L	3
B201-86	(2) 1.5"x3.0" X 12' U/L	3
B201-87	(2) 1.5"x3.0" X 12' U/L	3
B201-88	(2) 1.5"x3.0" X 12' U/L	3
B201-89	(2) 1.5"x3.0" X 12' U/L	3
B201-90	(2) 1.5"x3.0" X 12' U/L	3
B201-91	(2) 1.5"x3.0" X 12' U/L	3
B201-92	(2) 1.5"x3.0" X 12' U/L	3
B201-93	(2) 1.5"x3.0" X 12' U/L	3
B201-94	(2) 1.5"x3.0" X 12' U/L	3
B201-95	(2) 1.5"x3.0" X 12' U/L	3
B201-96	(2) 1.5"x3.0" X 12' U/L	3
B201-97	(2) 1.5"x3.0" X 12' U/L	3
B201-98	(2) 1.5"x3.0" X 12' U/L	3
B201-99	(2) 1.5"x3.0" X 12' U/L	3
B201-100	(2) 1.5"x3.0" X 12' U/L	3

OVERBUILD FRAMING:
 SHELL:
 2X6 OR 2X8 OR MIN
 2X6 @ 16" O.C. (MIN.)
 2X6 @ 16" O.C. (MIN.)
 2X6 ACROSS TRUSSES
 FACE NAIL VERT ALONG SIDE SHELL & PLATES W/ (4) 16D OR 10D GALV. AS CLIP. FACE NAIL PLATES TO TRUSSE W/ (2) 16D GALV. NAILS MIN.
 SEE DETAIL 25, SHEET SD2

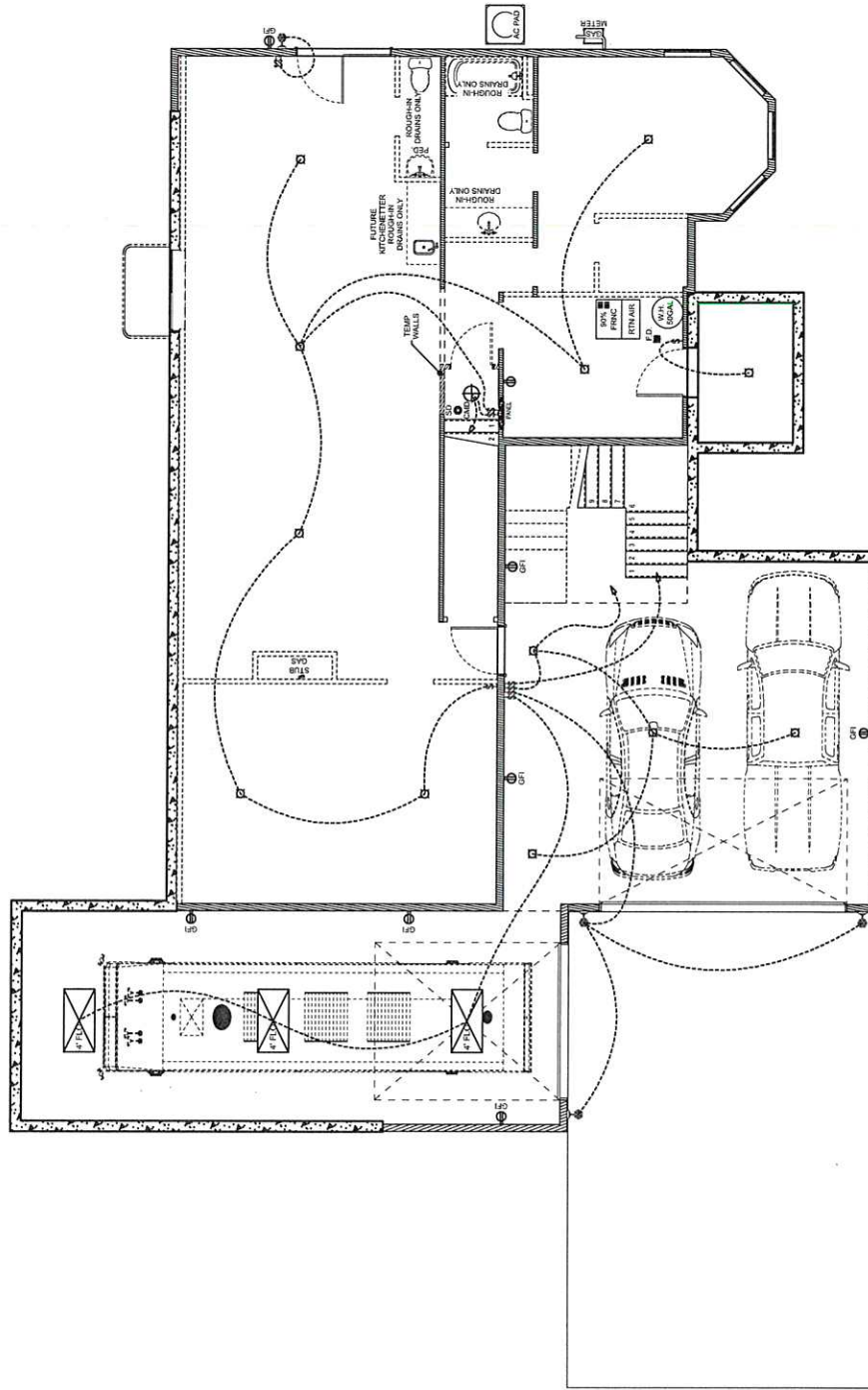


SHELVING NOTE:

- ALL STANDARD DEPTH CLOSETS (0" TO 2'-11") TO HAVE A 12" TOP SHELF.
- ALL WALK-IN DEPTH CLOSETS (3'-0"+) TO HAVE A 16" TOP SHELF
- ALL SHELVING BELOW TOP SHELF TO BE 16" STANDARD

ELECTRICAL BULB NOTE:

- ALL FLUSH MOUNT LIGHTS TO BE A MINIMUM OF A (2) TWO BULB FIXTURE.
- ALL BEDROOMS TO HAVE A 3 BULB FIXTURE, NO EXCEPTIONS



BASEMENT ELECTRICAL SCHEDULE

Symbol	Description	Qty
[Panel Symbol]	ELECTRICAL PANEL	1
[Light Symbol]	LIGHT - FLUSH MOUNT	3
[Light Symbol]	LIGHT - FLUSH MOUNT	1
[Light Symbol]	LIGHT - RECESSED	12
[Light Symbol]	LIGHT COUCH LIGHT	4
[Plug Symbol]	PLUG - 110V	1
[Plug Symbol]	PLUG - 110V	7
[Switch Symbol]	SWITCH - 1	2
[Switch Symbol]	SWITCH - 2	2
[Switch Symbol]	SWITCH - 4	1

DATE: 8/31/17
 REVISION: R-4E Page 6
 SCALE: 1/8" = 1'-0"

AA12

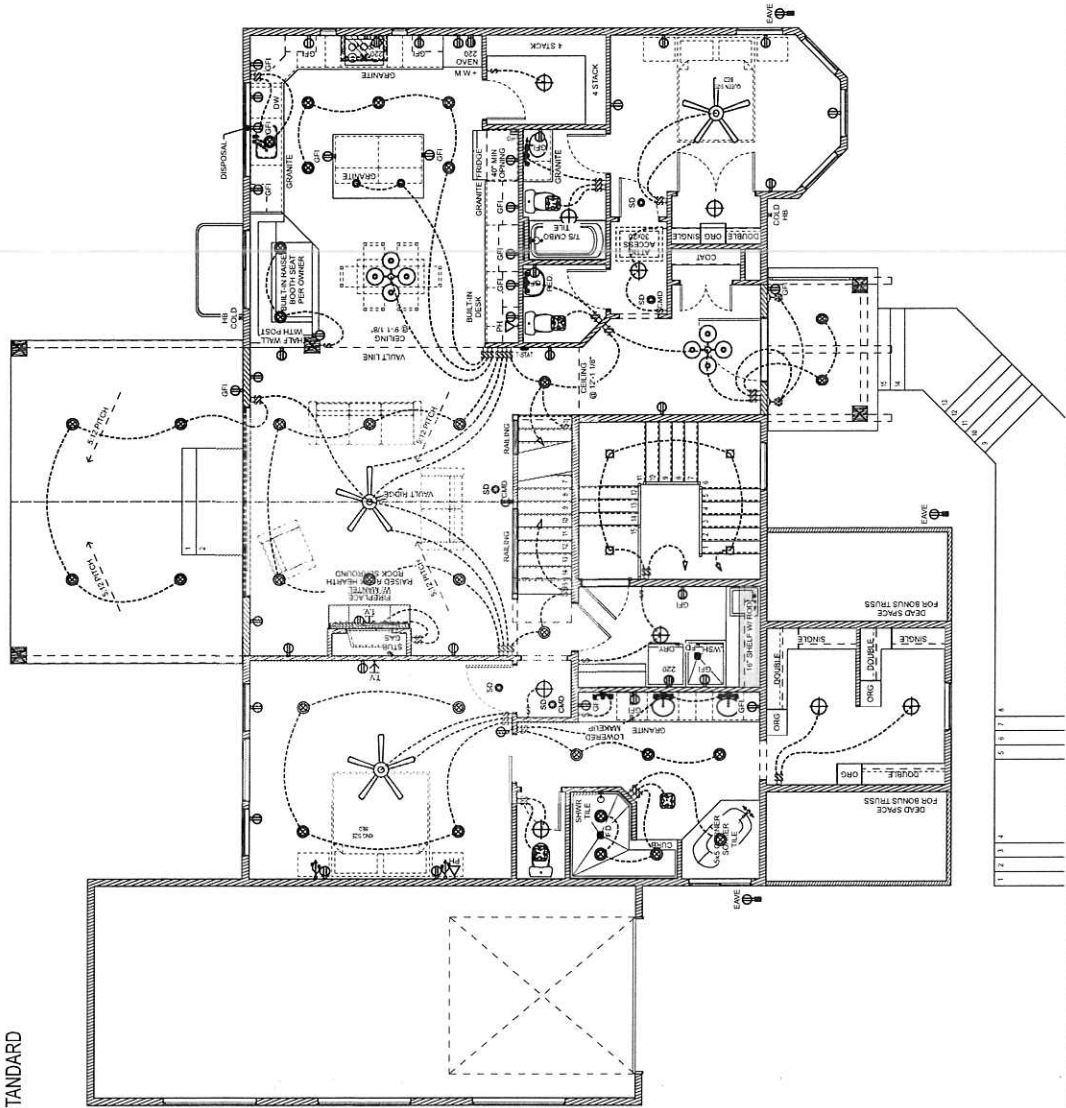
SHELVING NOTE:

- ALL STANDARD DEPTH CLOSETS (0" TO 2'-11") TO HAVE A 12" TOP SHELF.
- ALL WALK-IN DEPTH CLOSETS (3'-0"+) TO HAVE A 16" TOP SHELF
- ALL SHELVING BELOW TOP SHELF TO BE 16" STANDARD

ELECTRICAL BULB NOTE:

- ALL FLUSH MOUNT LIGHTS TO BE A MINIMUM OF A (2) TWO BULB FIXTURE.
- ALL BEDROOMS TO HAVE A 3 BULB FIXTURE, NO EXCEPTIONS

Symbol	Description	Qty
[Symbol]	BATHFAN	4
[Symbol]	LIGHT-CEILINGFAN	3
[Symbol]	LIGHT-CHANGELER	2
[Symbol]	LIGHT-FLUSHMOUNT	9
[Symbol]	LIGHT-KEYLESS	4
[Symbol]	LIGHT-PENDANT	2
[Symbol]	LIGHT-RECESSED	30
[Symbol]	LIGHT-STRIP LIGHT 3	5
[Symbol]	LIGHT-COACH LIGHT	2
[Symbol]	LOW VOLT. PHONE	2
[Symbol]	LOW VOLT. TV	2
[Symbol]	PLUG - 110V/50	2
[Symbol]	PLUG - 110V	24
[Symbol]	PLUG - 200V	3
[Symbol]	PLUG - 200V	3
[Symbol]	PLUG - 240V	3
[Symbol]	PLUG - GFI	19
[Symbol]	SWITCH - 1	9
[Symbol]	SWITCH - 2	11
[Symbol]	SWITCH - 3	5
[Symbol]	SWITCH - 4	2
[Symbol]	THERMOSTAT	1



SHELVING NOTE:

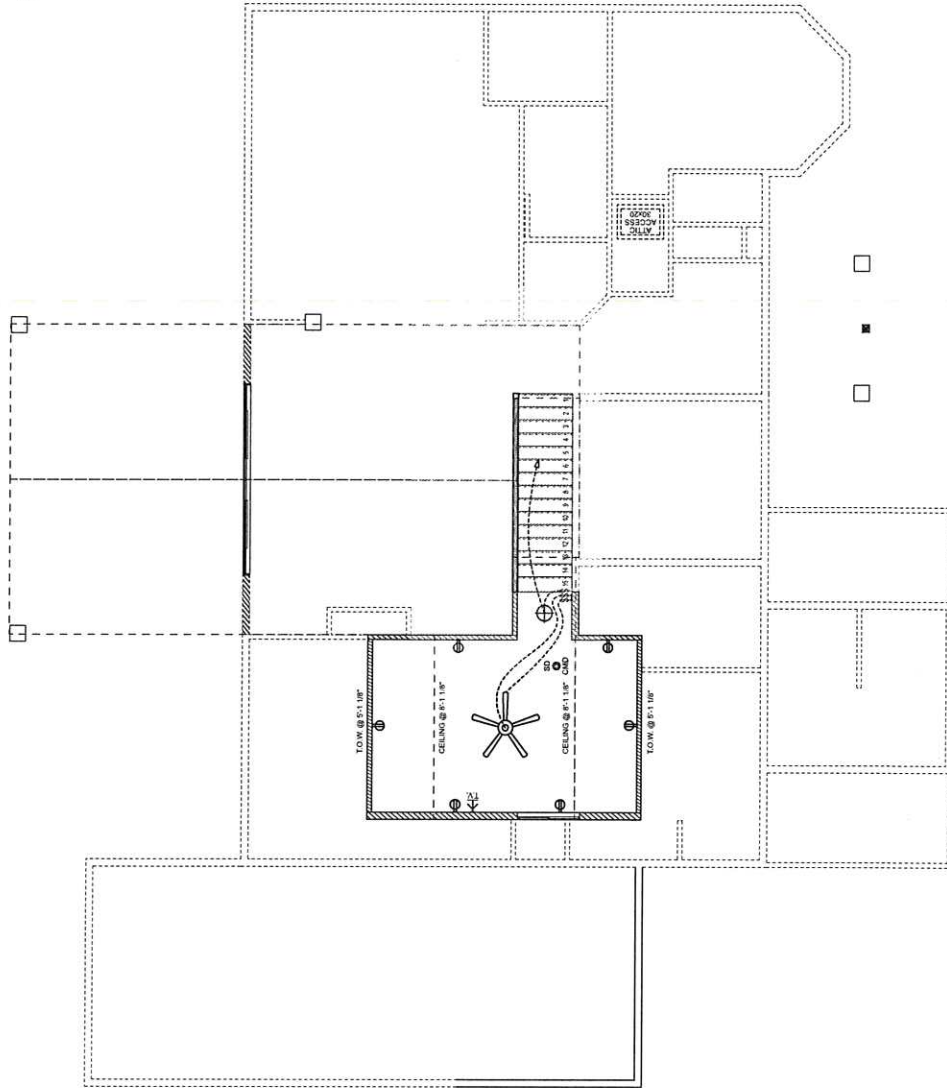
- ALL STANDARD DEPTH CLOSETS (0" TO 2'-11") TO HAVE A 12" TOP SHELF.
- ALL WALK-IN DEPTH CLOSETS (3'-0"+) TO HAVE A 16" TOP SHELF
- ALL SHELVING BELOW TOP SHELF TO BE 16" STANDARD

ELECTRICAL BULB NOTE:

- ALL FLUSH MOUNT LIGHTS TO BE A MINIMUM OF A (2) TWO BULB FIXTURE.
- ALL BEDROOMS TO HAVE A 3 BULB FIXTURE, NO EXCEPTIONS

ROOFIBONUS ELECTRICAL SCHEDULE

Symbol	Description	Qty
	LIGHT - CEILING/FAN	1
	LIGHT - FLUSHMOUNT	1
	LOW VOLT - TV	1
	PLUG - 110v	4
	SWITCH - 3	1

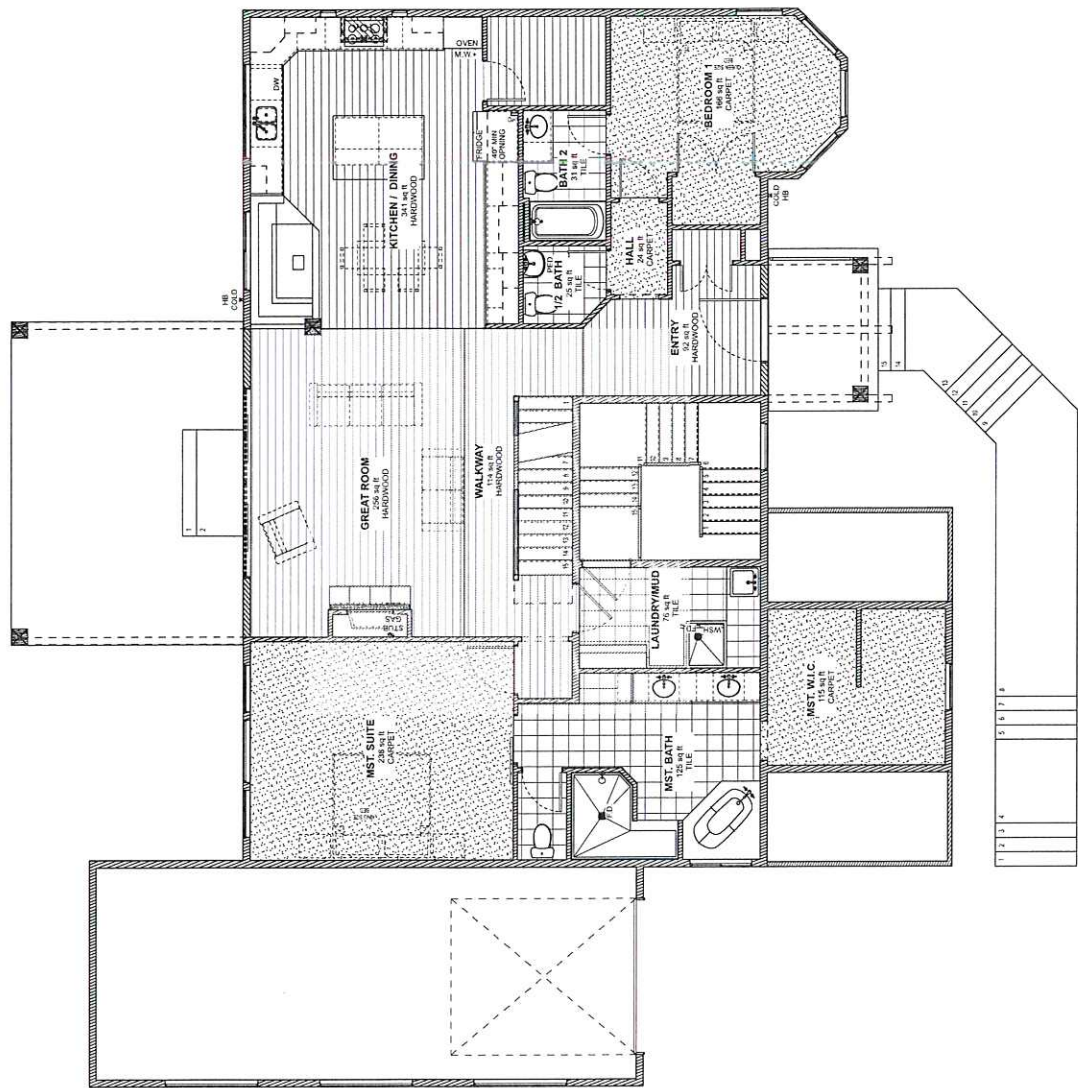


FLOORING NOTE:

NOTE: ALL FLOORING SQ. FT. IS APPROXIMATE
 ACTUAL SQ. FT. MAY VARY.
 NOTE: FLOORING TOTALS DO NOT INCLUDE ANY
 TUB OR SHOWER SURROUNDS

MAIN FLOORING

MAIN CARPET	
BEDROOM 1	166.40
HALL	23.98
MST. SUITE	238.00
MST. W.I.C.	115.10
STAIRS TO BASEMENT...	94.28
	637.76 sq ft.
MAIN HARDWOOD	
ENTRY	91.89
GREAT ROOM	256.35
KITCHEN / DINING	340.58
WALKWAY	113.69
	802.51 sq ft.
MAIN TILE	
1/2 BATH	25.49
BATH 2	31.48
LAUNDRY/MUD	75.89
MST. BATH	125.34
	258.20 sq ft.
	1,698.47 sq ft



PROJECT ADDRESS
SUBDIVISION NAME
LOT NUMBER
2870 BREEZE DRIVE
SOUTH OGDEN UT

CLIENT

PROJECT NAME

SENECA DESIGN J.H. @GMAIL.COM
JAMES HOHT 435-533-1111

GENERAL CONTRACTOR

ENGINEER
ENGINEERING COMPANY
PHONE NUMBER

ROOF/BONUS FLOORING

DATE: 8/3/17
REVISION: R-4E
SCALE: 1/8" = 1'-0"

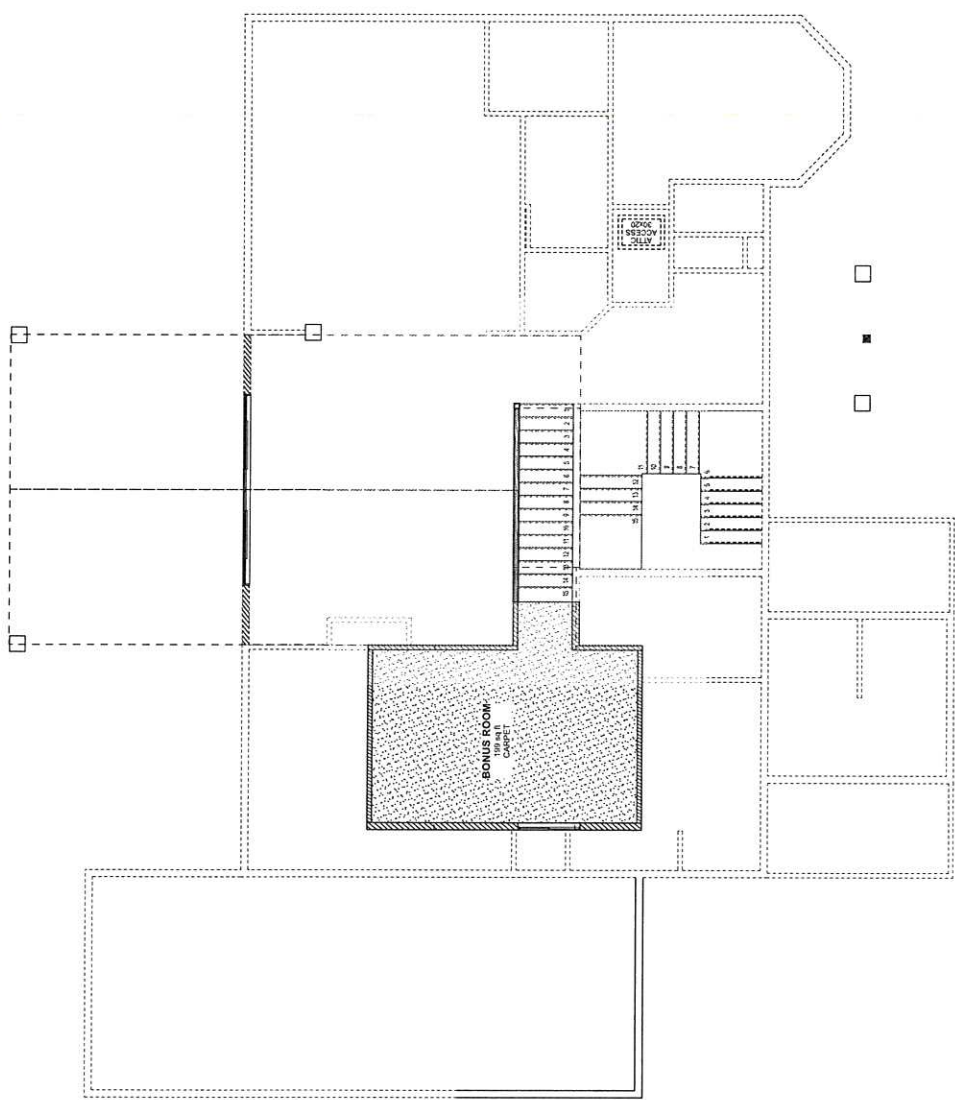
AA16

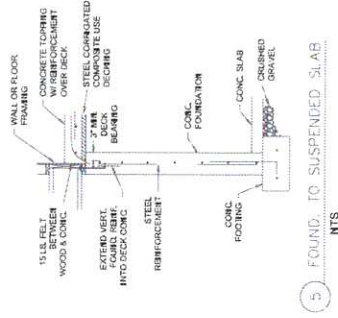
FLOORING NOTE:

NOTE: ALL FLOORING SQ. FT. IS APPROXIMATE
ACTUAL SQ. FT. MAY VARY.
NOTE: FLOORING TOTALS DO NOT INCLUDE ANY
TUB OR SHOWER SURROUNDS

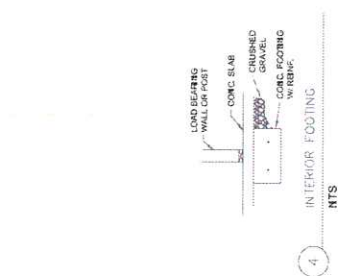
ROOF/BONUS FLOORING

ROOF/BONUS CARPET	198.65
BONUS ROOM	84.11
STAIRS TO MAIN	282.76 sq ft

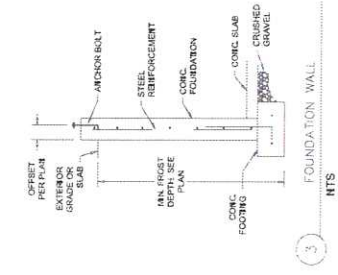




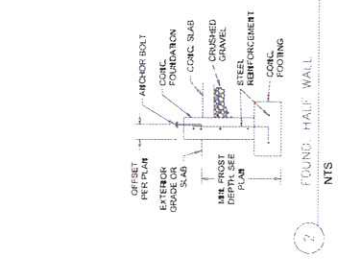
5 FOUND. TO SUSPENDED SLAB
NTS



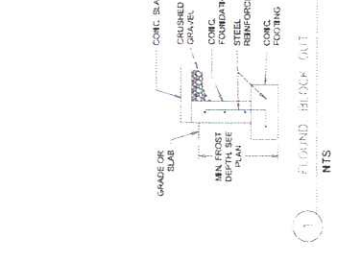
4 INTERIOR FOOTING
NTS



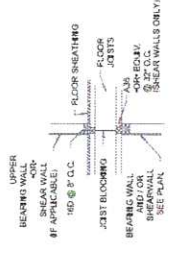
3 FOUNDATION WALL
NTS



2 FOUND. HALF WALL
NTS



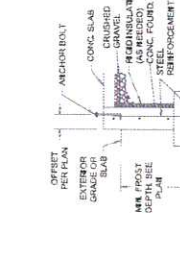
1 FLAGGED BLOCK GAIT
NTS



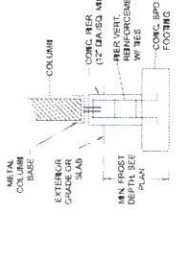
9 INTERIOR SHEAR WALL
NTS



8 NO DETAIL
NTS

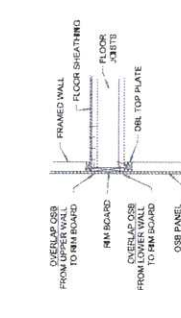


7 FOUNDATION WALL
NTS

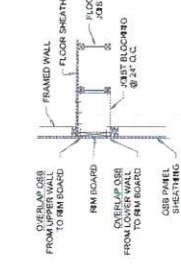


6 SPOT FOOTING & PIER
NTS

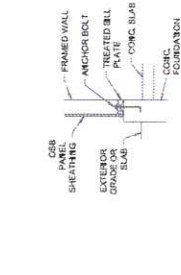
10 NO DETAIL
NTS



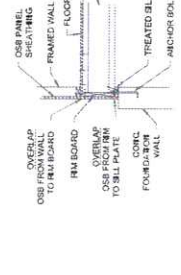
15 WALL TO JOIST TO WALL
NTS



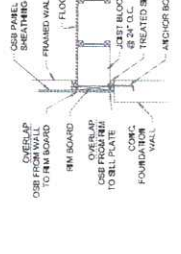
14 FOUND. TO PARALLEL JOIST
NTS



13 FOUND. TO WALL
NTS



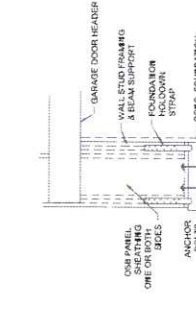
12 FOUND. TO PERPENDICULAR JOIST
NTS



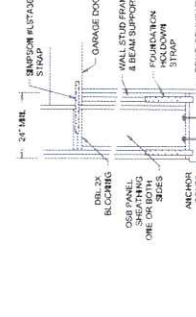
11 FOUND. TO PARALLEL JOIST
NTS



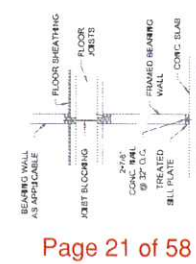
08/03/2017



17 GARAGE RETURN WALL
NTS



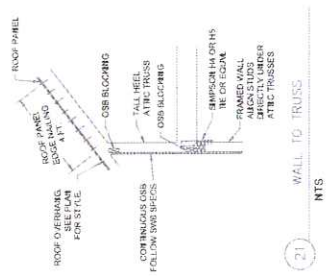
16 INTERIOR BEARING WALL
NTS



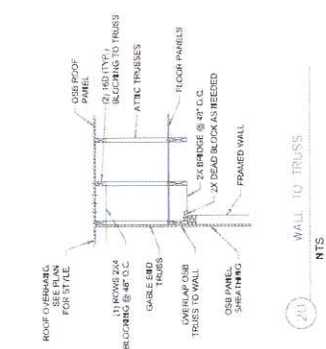
18 NO DETAIL
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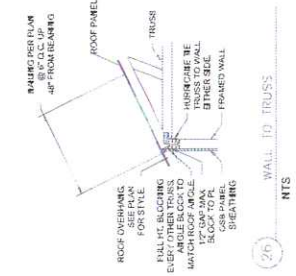
19 NO DETAIL
NTS



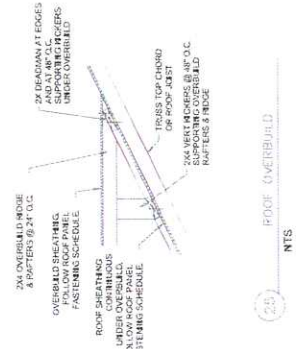
20 WALL TO TRUSS
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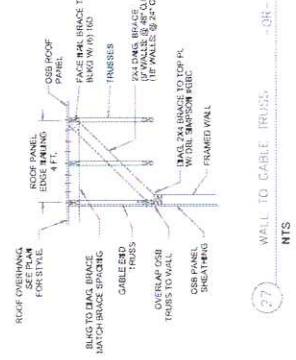
21 WALL TO TRUSS
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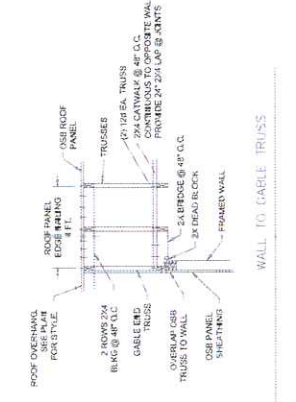
22 WALL TO TRUSS
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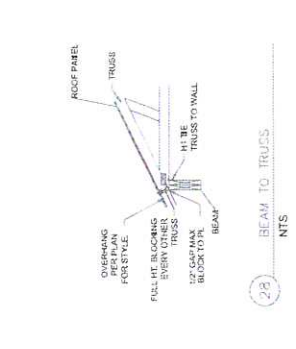
23 WALL TO TRUSS
 NTS



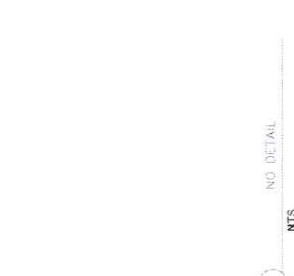
24 WALL TO TRUSS
 NTS



25 WALL TO TRUSS
 NTS



26 BEAM TO TRUSS
 NTS



27 WALL TO TRUSS
 NTS



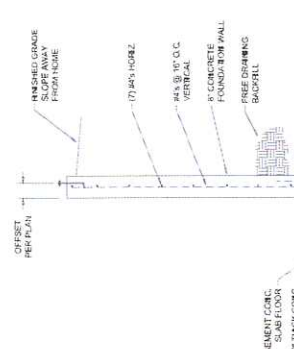
28 WALL TO TRUSS
 NTS



29 WALL TO TRUSS
 NTS



30 WALL TO TRUSS
 NTS



31 WALL TO TRUSS
 NTS



REPORT

SUPPLEMENTAL GEOLOGIC HAZARDS RECONNAISSANCE

CEDAR COVE SUBDIVISION LOT 12

2670 EAST BYBEE DRIVE

OGDEN, WEBER COUNTY, UTAH



Prepared for

Corey Combe
2181 East Combe Road
Ogden, UT 84403

October 2, 2017

Prepared by

Western Geologic, LLC
2150 South 1300 East, Suite 500
Salt Lake City, Utah 84106



Voice: 801.359.7222
Fax: 801.990.4601
Web: www.westerngeologic.com

Exhibit B Geologic & Geotechnical Reports



WESTERN GEOLOGIC, LLC
2150 SOUTH 1300 EAST, SUITE 500
SALT LAKE CITY, UT 84106 USA

Phone: 801.359.7222

Fax: 801.990.4601

Email: cnelson@westerngeologic.com

October 2, 2017

Corey Combe
2181 East Combe Road
Ogden, UT 84403

SUBJECT: Supplemental Geologic Hazards Reconnaissance
Cedar Cove Subdivision Lot 12
2670 East Bybee Drive
Ogden, Weber County, Utah

Dear Mr. Combe:

This report presents results of a supplemental engineering geology and geologic hazards review and reconnaissance conducted by Western GeoLogic, LLC (Western GeoLogic) for Lot 12 in the Cedar Cove Subdivision in unincorporated Weber County, Utah, Utah (Figure 1 – Project Location). The Project consists of a 1.27-acre parcel identified as Weber County Assessor's parcel number 07-723-0012. The Project is on west- to south-facing slopes overlooking the Weber River about 3,600 feet west of Broad Hollow at the western base of the Wasatch Range, and is in the NE¼ Section 26, Township 5 North, Range 1 West (Salt Lake Base Line and Meridian). Elevation of the site ranges between about 4,660 and 4,750 feet above sea level. It is our understanding that the property is currently planned for development of one residential home in the western part of the parcel.

PURPOSE AND SCOPE

The purpose and scope of this investigation is to identify and interpret surficial geologic conditions at the site to identify potential risk from geologic hazards to the Project. This investigation is intended to: (1) provide preliminary geologic information and assessment of geologic conditions at the site; (2) identify potential geologic hazards that may be present and qualitatively assess their risk to the intended site use; and (3) provide recommendations for additional site- and hazard-specific studies or mitigation measures, as may be needed based on our findings. Such recommendations could require further multi-disciplinary evaluations, and/or may need design criteria that are beyond our professional scope. No hazard-specific evaluations or subsurface exploration were conducted for this report or within the scope of our study.

The following services were performed in accordance with the above stated purpose and scope:

- A site reconnaissance conducted by an experienced certified engineering geologist to assess the site setting and look for adverse geologic conditions;

Exhibit B Geologic & Geotechnical Reports

- Review of readily-available geologic maps, reports, and air photos; and
- Evaluation of available data and preparation of this report, which presents the results of our study.

The engineering geology section of this report has been prepared in accordance with Bowman and Lund (2016) and current generally accepted professional engineering geologic principles and practice in Utah, and meets specifications provided in Chapter 27 of the Weber County Land Use Code within the above stated scope. We do not include discussion of radon hazard potential, as recommended in Bowman and Lund (2016), because radon gas poses an environmental health hazard and indoor levels are heavily influenced by several post-construction, non-geologic factors. The hazard from radon should be evaluated by long-term testing following construction.

PREVIOUS STUDIES

A prior geologic hazards reconnaissance report was prepared for the Project by Western GeoLogic in September 2007 (Western GeoLogic, 2007). Our prior report identified earthquake ground shaking, surface fault rupture, liquefaction, and landslides as geologic hazards posing a potential risk to the site. With regard to these hazards, we recommended a design-level geotechnical engineering study be conducted prior to construction to address soil foundation conditions, evaluate the potential for liquefaction and shallow groundwater as needed, and evaluate stability of slopes at the site. Western GeoLogic (2007) further identified the site as being in an area of "Moderate" radon hazard potential, but this hazard is no longer addressed in our reports as noted above.

Western GeoLogic (2007) was incorporated as an appendix to a geotechnical engineering evaluation prepared for the Project by Earthtec Testing & Engineering (ETE, 2007). ETE's (2007) report discusses and provides recommendations regarding General Site Grading, Structural Fill and Compaction, Backfill, Excavation, and Permanent Cut and Fill Slopes (Section 8.0); Slope Stability (Section 10.0); Seismic Design and Liquefaction (Section 11.0); Foundation Design and Settlement (Section 12.0); Lateral Earth Pressures (Section 13.0); Floor Slabs (Section 14.0); and Surface Drainage (Section 15.0). ETE (2007) hand augered one test hole at the Project to a depth of 10 feet and encountered only poorly graded sand with silt; one soil sample was obtained at a depth of 5.0 feet for lab analysis (as reported in Table 1 and Section 8.0). No groundwater was encountered in the test hole to the explored depth. ETE (2007) also conducted a slope stability evaluation for the site that found static and pseudo-static factors of safety of 1.585 and 1.258 (respectively), as discussed in Section 10.0.

Portions of this report have been excerpted from Western GeoLogic (2007) for clarity and consistency, and appended where needed for site-specific discussions.

HYDROLOGY

The U.S. Geological Survey (USGS) topographic map of the Ogden Quadrangle (Figure 1) shows no surface-water impoundments, springs, or active drainages at the property. No springs, seeps, or wetland areas were also observed at the Project or in the vicinity in 2007 or in our field reconnaissance. Slopes at the site appeared very dry in both 2007 and currently. The nearest spring on Figure 1 is Hamre Spring about 1,250 feet northeast of the site.

The subsurface hydrology in the area is dominated by the East Shore aquifer system. This aquifer system is comprised of a shallow, unconfined water table zone, and the deeper, often confined, Sunset and Delta aquifers (Feth and others, 1966). The depth to the shallow unconfined aquifer varies somewhat depending on topography and climatic and seasonal fluctuations. It is influenced by seepage from irrigation systems, and infiltration from precipitation and urban runoff. The Sunset aquifer (typical depth 250-400 feet) and Delta aquifer (typical depth 500-700 feet) provide water that generally meets the standards for public drinking water supply. Based on topography the regional groundwater flow is expected to be to the west and then south into the Weber River floodplain.

Elevation of the shallow aquifer varies somewhat based on seasonal and climatic fluctuations. No evidence of groundwater was observed in the slopes at the site, and depth to groundwater is unknown but is likely greater than 30 feet. No groundwater was also encountered in ETE's (2007) test hole to a depth of 10 feet. However, groundwater levels may vary annually from climatic fluctuations, and also seasonally from snowmelt runoff and man-made sources such as landscape irrigation. Seasonal variations would be typical for an alpine environment. Perched conditions may also be found above less-permeable, fine-grained lacustrine sediments underlying the site that could cause locally shallower groundwater levels.

GEOLOGY

Surficial Geology

The site is located about 3,600 feet west of the mouth of Broad Hollow at the western base of the Wasatch Range, a major north-south trending mountain range marking the eastern boundary of the Basin and Range physiographic province (Stokes; 1977, 1986). Surficial geology of the site is mapped by Coogan and King (2016; Figure 2) as mainly younger Quaternary landslide deposits (unit Qmsy). The hatched scarp on Figure 2 north of the site marks an embayment in the deltaic sediments characteristic of a prehistoric earthflow. Such failures are commonly found in the downcut slopes bordering the Weber River floodplain in the area.

Coogan and King (2016) describe surficial geologic units in the site area on Figure 2 as follows:

Qh, Qh? - *Human disturbances (Historical)*. Mapped disturbances obscure original deposits or rocks by cover or removal; only larger disturbances that pre-date the 1984 aerial photographs used to map the Ogden 30 x 60- minute quadrangle are shown; includes engineered fill, particularly along Interstate Highways 80 and 84, the Union Pacific Railroad, and larger dams, as well as aggregate operations, gravel pits, sewage-treatment

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facilities, cement plant quarries and operations, brick plant and clay pit, Defense Depot Ogden (Browning U.S. Army Reserve Center), gas and oil field operations (for example drill pads) including gas plants, and low dams along several creeks, including a breached dam on Yellow Creek.

Qaf, Qafy, Qaf3, Qaf3?, Qaf4, Qaf4?, Qaf5 - Alluvial-fan deposits (Holocene and Pleistocene). Mostly sand, silt, and gravel that is poorly bedded and poorly sorted and that is not close to late Pleistocene Lake Bonneville and is geographically in the Huff Creek and upper Bear River drainages; variably consolidated; includes debris flows, particularly in drainages and at drainage mouths (fan heads); generally less than 60 feet (18 m) thick. Qaf with no suffix used where age uncertain or for composite fans where portions of fans with multiple ages cannot be shown separately at map scale; toes of some fans have been removed by human disturbances, so their age cannot be determined.

Where possible, subdivided into relative ages, indicated by letter and number suffixes (like Qa and Qat suffixes) and relative ages only apply to the local drainage, with unit Qafy being the lowest (youngest) fans and unit 3 may or may not post-date Lake Bonneville. Relative ages of these fans are partly based on heights above present drainages at drainage-eroded edge of fan. The relative age is queried where the age is uncertain, generally due to the height not fitting into the typical order of surfaces. The various deposits listed, Qafy and Qaf3 through Qaf5, are 20 to 140 feet (6-40 m) above and west of Saleratus Creek, and also above Yellow Creek and the Bear River. Qafy fans are active, impinge on present-day floodplains, divert active streams, and overlie low terraces.

Qal, Qal1, Qal2, Qal2? - Stream alluvium and flood-plain deposits (Holocene and uppermost Pleistocene). Sand, silt, clay, and gravel in channels, flood plains, and terraces typically less than 16 feet (5 m) above river and stream level; moderately sorted; unconsolidated; along the same drainage Qal2 is lower than Qat2 and has likely been subject to flooding, at least prior to dam building; present in broad plains along the Bear, Ogden, and Weber Rivers and larger tributaries like Deep, Cottonwood, East Canyon, Lost, and Saleratus Creeks, along Box Elder, Heiners, and Yellow Creeks, and in narrower plains of larger tributary streams; locally includes muddy, organic overbank and oxbow lake deposits; composition depends on source area, so in back valleys typically contains many quartzite cobbles recycled from the Wasatch Formation; mostly Holocene, but deposited after regression of Lake Bonneville from the late Pleistocene Provo shoreline; width in Morgan Valley is combined flood plain of Weber River and East Canyon and Deep Creeks; 6 to 20 feet (2-6 m) thick and possibly as much as 50 feet (15 m) along Weber River and thinner in the Kaysville quadrangle; greater thicknesses (>50 feet [15 m]) are reported in Morgan Valley (Utah Division of Water Rights, well drilling database), but likely include Lake Bonneville and older Pleistocene deposits.

Suffixes 1 and 2 indicate ages where they can be separated, with 1 including active channels and 2 including low terraces 10 to 20 feet (3-6 m) above the Weber and Ogden Rivers, and the South Fork Ogden River that may have been in the flood plain prior to damming of these waterways. Qal2 queried in low terraces above Bear River, Saleratus Creek, and Dry Creek where deposits may not be in the flood plain.

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Qac - *Alluvium and colluvium (Holocene and Pleistocene)*. Unsorted to variably sorted gravel, sand, silt, and clay in variable proportions; includes stream and fan alluvium, colluvium, and, locally, mass-movement deposits too small to show at map scale; typically mapped along smaller drainages that lack flat bottoms; more extensive east of Henefer where Wasatch Formation (Tw) strata easily weather to debris that "chokes" drainages; 6 to 20 feet (2-6 m) thick. Some deposits are "perched" on benches 80 feet (25 m) and more above present-day drainages like Left Fork Heiners Creek (Heiners Creek quadrangle) and Harris Canyon (Henefer quadrangle). In the Devils Slide quadrangle, some deposits are "perched" on benches about 60 to 130 feet (18-40 m) above Quarry Cottonwood Canyon indicating the alluvium is at least partly Lake Bonneville age and older (see Qab and Qao in tables 1 and 2).

Qat2, Qat3 - *Stream-terrace alluvium (Holocene and Pleistocene)*. Sand, silt, clay, and gravel in terraces inset into late Pleistocene Weber River delta above Weber River flood plain; moderately to well-sorted, pebble and cobble gravel and gravelly sand with subangular to rounded clasts; unconsolidated to weakly consolidated; upper surfaces slope gently downstream; locally includes thin and small mass-movement and alluvial-fan deposits; subdivided into relative ages, indicated by number suffixes, with 2 being the lowest/youngest terraces and 3 divided by a scarp on the map into an upper and lower terrace; terraces 20 to 50 feet (6-16 m) above the Weber River; exposed thickness less than 20 to 50 feet (6-16 m) (after Yonkee and Lowe, 2004). These terraces do not fit into table 1 or 2 because they post-date the regression of Lake Bonneville from the Provo shoreline and appear to be graded to lake levels below the Gilbert shoreline.

Qms, Qms?, Qmsy, Qmsy?, Qmso, Qmso? - *Landslide deposits (Holocene and upper and middle? Pleistocene)*. Poorly sorted clay- to boulder sized material; includes slides, slumps, and locally flows and floods; generally characterized by hummocky topography, main and internal scarps, and chaotic bedding in displaced blocks; composition depends on local sources; morphology becomes more subdued with time and amount of water in material during emplacement; Qms may be in contact with Qms when landslides are different/distinct; thickness highly variable, up to about 20 to 30 feet (6-9 m) for small slides, and 80 to 100 feet (25-30 m) thick for larger landslides. Qmsy and Qmso queried where relative age uncertain; Qms queried where classification uncertain. Numerous landslides are too small to show at map scale and more detailed maps shown in the index to geologic mapping should be examined.

Qms without a suffix is mapped where the age is uncertain (though likely Holocene and/or late Pleistocene), where portions of slide complexes have different ages but cannot be shown separately at map scale, or where boundaries between slides of different ages are not distinct. Estimated time of emplacement is indicated by relative-age letter suffixes with: Qmsy mapped where landslides deflect streams or failures are in Lake Bonneville deposits, and scarps are variably vegetated; Qmso typically mapped where deposits are "perched" above present drainages, rumpled morphology typical of mass movements has been diminished, and/or younger surficial deposits cover or cut Qmso. Lower perched Qmso deposits are at Qao heights above drainages (95 ka and older) and the higher perched

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deposits may correlate with high level alluvium (QTa₁) (likely older than 780 ka) (see table 1). Suffixes y and o indicate probable Holocene and Pleistocene ages, respectively, with all Qmso likely emplaced before Lake Bonneville transgression. These older deposits are as unstable as other slides, and are easily reactivated with the addition of water, be it irrigation or septic tank drain fields.

Qmc - *Landslide and colluvial deposits, undivided (Holocene and Pleistocene)*. Poorly sorted to unsorted clay- to boulder-sized material; mapped where landslide deposits are difficult to distinguish from colluvium (slopewash and soil creep) and where mapping separate, small, intermingled areas of landslide and colluvial deposits is not possible at map scale; locally includes talus and debris flow and flood deposits; typically mapped where landslides are thin ("shallow"); also mapped where the blocky or rumpled morphology that is characteristic of landslides has been diminished ("smoothed") by slopewash and soil creep; composition depends on local sources; 6 to 40 feet (2-12 m) thick. These deposits are as unstable as other landslide units (Qms, Qmsy, Qmso).

Qct - *Colluvium and talus, undivided (Holocene and Pleistocene)*. Unsorted clay- to boulder-sized angular debris (scree) at the base of and on steep, typically partly vegetated slopes; shown mostly on steep slopes of resistant bedrock units; 6 to 30 feet (2-9 m) thick.

Qlf, Qlf?, Qlfb, Qlfb? - *Fine-grained lacustrine deposits (Holocene and upper Pleistocene)*. Mostly silt, clay, and fine-grained sand deposited near- and off-shore in Lake Bonneville; typically mapped as Qlf below the Provo shoreline (P) because older transgressive (Qlfb) deposits are indistinguishable from younger regressive deposits; mapped as Qlfb above the Provo shoreline because these deposits can only be related to the Bonneville shoreline (B) and transgression; grades upslope with more sand into Qls or Qlsp; typically eroded from shallow Norwood Formation in Ogden and Morgan Valleys and at least 12 feet (4 m) thick near Mountain Green. Qlf and Qlfb queried where grain size is uncertain.

In the Kaysville quadrangle, Qlf deposits that are below the Gilbert (G) shoreline are at least partly the same age as this shoreline (Holocene-latest Pleistocene) and post-date late Pleistocene Lake Bonneville. Qlf deposits below the Holocene (H) highstand shoreline are Holocene. Both ages of deposits are generally less than 15 feet (5 m) thick.

Deeper water fine-grained deposits overlie older shoreline and delta gravels (Qlf/Qdlb) at the mouths of several drainages along the Weber River. These gravels were deposited above the Provo shoreline during transgression of Lake Bonneville to the Bonneville shoreline (see unit Qdlb).

Qadp, Qadp? - *Provo-shoreline and regressive alluvial and deltaic deposits (upper Pleistocene)*. Cobbly gravel, sand, silt, and clay deposited above (subaerial) and in Lake Bonneville (subaqueous); typically mapped where shorelines are obscure, so that line cannot be drawn between alluvial fan and delta; mapped below/near the Provo shoreline and related to the Provo and slightly lower regressional shorelines; deposits prominent east

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of Brigham City, at mouth of North Ogden Canyon, and on bench north of the Weber River; deposited as delta foreset beds with original dips of 30 to 35 degrees that allow separation from mixed lacustrine deposits (Qd1p); deltaic deposits at least 40 feet (12 m) thick and contain subrounded to well-rounded pebble and cobble gravel in a matrix of sand and silt with interbeds of sand and silt; capped by gently dipping alluvial-fan and stream topset beds that are less than 16 feet (5 m) thick, are poorly to moderately sorted, silty to sandy, subangular to well-rounded pebble and cobble gravel, and contain subangular to angular clasts in a matrix of sand and silt with interbeds of sand and silt (see units 1pd and alp of Personius, 1990).

East of Brigham City at the mouth of Box Elder Canyon these deposits have been extensively excavated for sand and gravel. King estimates these deposits are about 200 feet (60 m) thick (from topographic contours) south of the mouth of Box Elder Creek, while Smith and Jol (1992) implied they are 400 feet (120 m) thick to the west of the Ogden map area.

The Provo shoreline fan-delta sediments were eroded from Bonneville-shoreline lacustrine and alluvial deposits, contain 20 to 70 percent rounded recycled Lake Bonneville clasts (Personius, 1990), and were redeposited during and soon after the Bonneville flood, which occurred during the drop of Lake Bonneville to the Provo shoreline. The Qadp unit probably includes Provo-stillstand deltaic deposits, sub-Provo-stillstand (regressional) alluvial-fan and lacustrine-deltaic deposits that contain abundant reworked materials from the Provo-shoreline delta, and locally overlying alluvial-fan deposits. Personius (1990) noted that deposits at the mouth of Box Elder Canyon are a fan-delta. A fan-delta is built when an alluvial fan enters a lake or ocean, and includes both the fan and the delta.

Qlg, Qlg?, Qlgp, Qlgb, Qlgb? - *Lake Bonneville gravel and sand (upper Pleistocene).* Mostly interbedded pebble and cobble gravel and sand deposited along beaches and slightly offshore; varies from clast supported to only rare gravel clasts in a matrix of sand and silt; grades downslope and, locally, laterally into finer grained deposits (Qls, Qlsp, Qlsb); mapped as Qlg downslope from topographic slope break of Provo and regressive beaches (Qlgp) because gravel and sand may be related to Lake Bonneville transgression on this gentler slope; also mapped as Qlg where Provo shoreline not distinct or relationships to shorelines uncertain; Qlg and Qlgb queried where grain size or unit identification uncertain; up to about 100 feet (30 m) thick in gravel pits but less than 20 feet (6 m) thick on most valley slopes. Constructional landforms (beach ridges, bars, and spits) and transgressive (t) shorelines limited in Ogden map area.

Qlgp is mapped in beaches near and below the erosional bench at the Provo shoreline (P); gravel typically subrounded to rounded, but locally along bedrock mountain fronts marked by a carbonate-cemented, poorly sorted, angular pebble to boulder gravel in a sandy matrix.

Qlgb is mapped in beaches mostly just downslope from Bonneville shoreline (B), typically an eroded bench, and above Provo shoreline; deposited during transgression to and occupation of the Bonneville shoreline; clasts typically subrounded to rounded but contains

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subangular to angular clasts on steep bedrock mountain fronts; mountain front Bonneville shoreline benches covered by locally mappable (> 6 feet [2 m] thick) colluvium and talus (Qmt, Qc, Qct).

Xfcb, Xfcb? - *Biotite-rich schist (Paleoproterozoic)*. Medium-gray to dark-brown, strongly foliated, biotite-rich schist with widespread garnet and sillimanite; displays alternating biotite-rich and quartz-feldspar-rich bands that are rotated into complex fold patterns; cut by garnet-bearing pegmatite dikes; also contains some thin layers of amphibolite, quartz-rich gneiss, and granitic gneiss; gradational contacts with migmatitic gneiss.

Citations, tables, and/or figures referenced above are not provided herein, but are in Coogan and King (2016).

Seismotectonic Setting

The property is located west of the western base of the Wasatch Range. The Wasatch Range is a major north-south trending mountain range marking the eastern boundary of the Basin and Range physiographic province (Stokes, 1977, 1986). The Basin and Range province is characterized by a series of generally north-trending elongate mountain ranges, separated by predominately alluvial and lacustrine sediment-filled valleys and typically bounded on one or both sides by major normal faults (Stewart, 1978). The boundary between the Basin and Range and Middle Rocky Mountains provinces is the prominent, west-facing escarpment along the Wasatch fault zone (WFZ) at the base of the Wasatch Range. Late Cenozoic normal faulting, a characteristic of the Basin and Range, began between about 17 and 10 million years ago in the Nevada (Stewart, 1980) and Utah (Anderson, 1989) portions of the province. The faulting is a result of a roughly east-west directed, regional extensional stress regime that has continued to the present (Zoback and Zoback, 1989; Zoback, 1989).

The WFZ is one of the longest and most active normal-slip faults in the world, and extends for 213 miles along the western base of the Wasatch Range from southeastern Idaho to north-central Utah (Machette and others, 1992). The fault zone generally trends north-south and, at the surface, can form a zone of deformation up to several hundred feet wide containing many subparallel west-dipping main faults and east-dipping antithetic faults. Previous studies divided the fault zone into 10 segments, each of which rupture independently and are capable of generating large-magnitude surface-faulting earthquakes (Machette and others, 1992). The central five segments of the fault (Brigham City, Weber, Salt Lake, Provo, and Nephi) have each produced two or more surface-faulting earthquakes in the past 6,000 years (Black and others, 2003).

The Weber segment of the WFZ extends for about 35 miles from the southern edge of the Plain View salient near North Ogden to the northern edge of the Salt Lake salient near North Salt Lake (Machette and others, 1992). North of the Weber River, the WFZ forms a complex zone of multiple west- and east-dipping fault traces. The nearest faults in this zone are two east-dipping antithetic traces about 475 to 600 feet east of the property. The main west-dipping fault trace is located about 800 feet east of the site. Several paleoseismic studies have been conducted on the Weber segment to evaluate its Holocene earthquake history. Nelson and others (2006) report

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finding evidence for four large-magnitude earthquakes at the Garner Canyon and East Ogden sites, including what they infer was a partial segment rupture (with 1.6 feet of displacement) around 500 years ago. This partial segment rupture was not evident at the Kaysville site of McCalpin and others (1994), although chronologic intervals for the remaining three earthquakes were similar. DuRoss and others (2009) indicate that paleoseismic data from the 2007 Rice Creek site support a preferred scenario of six surface-faulting earthquakes in Holocene time, with four events since about 5,400 years ago, and confirm Nelson and others' (2006) partial segment rupture timing.

The site is also in the central portion of the Intermountain Seismic Belt (ISB), a generally north-south trending zone of historical seismicity along the eastern margin of the Basin and Range province extending from northern Arizona to northwestern Montana (Sbar and others, 1972; Smith and Sbar, 1974). At least 16 earthquakes of magnitude 6.0 or greater have occurred within the ISB since 1850; the largest of these earthquakes was a M_s 7.5 event in 1959 near Hebgen Lake, Montana. However, none of these earthquakes occurred along the Wasatch fault or other known late Quaternary faults (Arabasz and others, 1992; Smith and Arabasz, 1991). The closest of these events was the 1934 Hansel Valley (M_s 6.6) event north of the Great Salt Lake.

Lake Bonneville History

Lakes occupied nearly 100 basins in the western United States during late-Quaternary time, the largest of which was Lake Bonneville in northwestern Utah. The Bonneville basin consists of several topographically closed basins created by regional extension in the Basin and Range (Gwynn, 1980; Miller, 1990), and has been an area of internal drainage for much of the past 15 million years. Lake Bonneville consisted of numerous topographically closed basins, including the Salt Lake and Cache Valleys (Oviatt and others, 1992).

Timing of events related to the transgression and regression of Lake Bonneville is indicated by calendar age estimates of significant radiocarbon dates in the Bonneville Basin (Oviatt, 2015). Approximately 30,000 years ago, Lake Bonneville began a slow transgression (rise) to its highest level of 5,160 to 5,200 feet above mean sea level. The lake rise eventually slowed as water levels approached an external basin threshold in northern Cache Valley at Red Rock Pass near Zenda, Idaho. Lake Bonneville reached the Red Rock Pass threshold and occupied its highest shoreline, termed the Bonneville beach, around 18,000 years ago. During the transgression and highstand, major drainages that emanate from within the Wasatch Range (such as the Weber River) formed large deltaic complexes in the lake at their canyon mouths. Headward erosion of the Snake River-Bonneville basin drainage divide then caused a catastrophic incision of the threshold and the lake level lowered by roughly 360 feet in fewer than two months (Jarrett and Malde, 1987; O'Conner, 1993). The Project is located below the elevation for the lake highstand, which is mapped on Figure 2 about 2,400 feet east of the Project (blue line and B). The Provo shoreline is not mapped in the area, but roughly corresponds to the terrace crest north of the site (Figure 1, 4,800-foot elevation contour).

Following the Bonneville flood, the lake stabilized and formed a lower shoreline referred to as the Provo shoreline between about 16,500 and 15,000 years ago. Climatic factors then caused the lake to regress rapidly from the Provo shoreline, and by about 13,000 years ago the lake had

eventually dropped below historic levels of Great Salt Lake. Oviatt and others (1992) deem this low stage the end of the Bonneville lake cycle. Drainages that fed Lake Bonneville began downcutting through stranded deltaic complexes and near-shore deposits as the lake receded from the Provo shoreline. Great Salt Lake then experienced a brief transgression around 11,600 years ago to the Gilbert level at about 4,250 feet before receding to and remaining within about 20 feet of its historic average level (Lund, 1990).

SITE CHARACTERIZATION

Empirical Observations

On September 29, 2017, Mr. Bill D. Black of Western GeoLogic conducted a supplemental reconnaissance of the property. Weather at the time of the site reconnaissance was clear and sunny with temperatures in the low 60's (°F). A photographic record of the site reconnaissance is provided in the Appendix. The site is on west- to south-facing slopes overlooking the Weber River floodplain about 0.8 miles northwest of the mouth of Weber Canyon. Native vegetation at the site is sparse and generally consists of low grasses with scattered oak brush and cedar trees.

The site straddles a low ridge on the north and east sides of Bybee Drive that is mantled by sandy surficial sediments displaying small dunes. The western part of the property along Bybee Drive (the proposed home area) is nearly flat, but slopes steepen eastward to around an overall steepness of about 2:1 to 3:1 (horizontal to vertical). Interbedded gravelly sand and silt deltaic lenses were evident in the south-facing slopes in the eastern part of the site. Western GeoLogic (2007) reports hand excavating one 3.5-foot-deep test pit at the slope base east of Bybee Drive in the area of the proposed home. This test pit reportedly exposed poorly to well-bedded sands resembling the nearby bedded deltaic sediments. ETE's (2007) test hole reportedly also exposed similar sediments. No surficial evidence for recent or ongoing slope instability, debris flows, seeps, springs, active drainages, surface faults, or other geologic hazards was observed at the site.

Except for several homes to the north, west, and south developed after 2007, and evidence for a recent wildfire that burned much of the amphitheater north of the Project, no other differing conditions were observed or noted in our reconnaissance from those previously reported. The wildfire reportedly occurred in September 2017 and engulfed over 600 acres, including several homes in the area.

Air Photo Observations

High-resolution orthophotography from 2012 (Figure 3A) and 0.5-meter bare earth DEM LIDAR from 2013-2014 (Figure 3B) were reviewed to obtain information about the geomorphology of the Project area. The site is below the crest of a south-facing terrace on slopes that have been impacted by a prehistoric flow failure; the Project straddles the south flank of this failure (Figures 3A-B). This area has old river terraces that are part of a discontinuous landslide complex along the Weber delta from Weber Canyon to Washington Terrace (unit Qmsy, Figure 2). The river terraces are remnants of the former Weber River floodplain stranded by downcutting through the Weber delta after the retreat of Pleistocene Lake Bonneville. The

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deltaic sediments forming the terraces have experienced instability from a variety of causes in both prehistoric and historic time. However, undeformed, sub-horizontal deltaic beds were observed in the eastern part of the site during our reconnaissance, and are evident on Figures 3A-B further north and east. Undeformed deltaic sands were also observed in Western GeoLogic's (2007) hand-excavated test pit. All the above evidence suggests the site is in a zone of depletion where the deltaic sediments failed and flowed downslope to a lower accumulation (depositional) zone further west and southwest.

No other evidence of geologic hazards was observed on the air photos at the site or in the area.

GEOLOGIC HAZARDS

Assessment of potential geologic hazards and the resulting risks imposed is critical in determining the suitability of the site for development. Table 1 below shows a summary of the geologic hazards reviewed at the site, as well as a relative (qualitative) assessment of risk to the Project for each hazard. A "high" hazard rating (H) indicates a hazard is present at the site (whether currently or in the geologic past) that is likely to pose significant risk and/or may require further study or mitigation techniques. A "moderate" hazard rating (M) indicates a hazard that poses an equivocal risk. Moderate-risk hazards may also require further studies or mitigation. A "low" hazard rating (L) indicates the hazard is not present, poses little or no risk, and/or is not likely to significantly impact the Project. Low-risk hazards typically require no additional studies or mitigation. We note that these hazard ratings represent a conservative assessment for the entire site and risk may vary in some areas. Careful selection of development areas can minimize risk by avoiding known hazard areas.

Table 1. *Geologic hazards summary.*

Hazard	H	M	L	...Hazard Rating
Earthquake Ground Shaking	X			
Surface Fault Rupture		X		
Liquefaction and Lateral-spread Ground Failure			X	
Tectonic Deformation		X		
Seismic Seiche and Storm Surge			X	
Stream Flooding			X	
Shallow Groundwater			X	
Landslides and Slope Failures		X		
Debris Flows and Floods			X	
Rock Fall			X	
Problem Soil			X	

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Earthquake Ground Shaking

Ground shaking refers to the ground surface acceleration caused by seismic waves generated during an earthquake. Strong ground motion is likely to present a significant risk during moderate to large earthquakes located within a 60 mile radius of the project area (Boore and others, 1993). Seismic sources include mapped active faults, as well as a random or "floating" earthquake source on faults not evident at the surface. Mapped active faults within this distance include the East and West Cache fault zones; the Brigham City, Weber, Salt Lake, and Provo segments of the Wasatch fault zone; the East Great Salt Lake fault zone; the Morgan fault; the West Valley fault zone; the Oquirrh fault zone; and the Bear River fault zone (Black and others, 2003).

The extent of property damage and loss of life due to ground shaking depends on factors such as: (1) proximity of the earthquake and strength of seismic waves at the surface (horizontal motions are the most damaging); (2) amplitude, duration, and frequency of ground motions; (3) nature of foundation materials; and (4) building design (Costa and Baker, 1981). Based on 2015 IBC provisions, a site class of D (stiff soil), and a risk category of II, USGS calculated uniform-hazard and deterministic ground motion values with a 2% chance of exceedance in 50 years are as follows:

Table 2. Seismic hazards summary.
(Site Location: 41.1430 ° N, -111.9125 ° W)

S_S	1.266 g
S_I	0.479 g
$S_{MS} (F_a \times S_S)$	1.266 g
$S_{MI} (F_v \times S_I)$	0.728 g
$S_{DS} (2/3 \times S_{MS})$	0.844 g
$S_{DI} (2/3 \times S_{MI})$	0.486 g
Site Coefficient, F_a	= 1.000
Site Coefficient, F_v	= 1.521

Given the above information, earthquake ground shaking poses a high risk to the site. Based on IRC design codes, ETE (2007; Section 11.2) recommends using a design acceleration of 1.18g, based on an S_S of 1.77 and F_a site coefficient of 1.0. This recommended value is significantly higher than that currently recommended in the 2015 IBC (S_{DS} of 0.844g above).

Surface Fault Rupture

Movement along faults at depth generates earthquakes. During earthquakes larger than Richter magnitude 6.5, ruptures along normal faults in the intermountain region generally propagate to the surface (Smith and Arabasz, 1991) as one side of the fault is uplifted and the other side down dropped. The resulting fault scarp has a near-vertical slope. The surface rupture may be expressed as a large singular rupture or several smaller ruptures in a broad zone. Ground displacement from surface fault rupture can cause significant damage or even collapse to structures located on an active fault.

The nearest mapped faults to the site are two discontinuous, east-dipping antithetic traces of the Weber section of WFZ about 475 to 600 feet east of the Project on Figure 2. No evidence of surface faulting such as fault scarps or lineaments was evident at the property or on air photos, but at this distance the eastern roughly 25 feet of the site would be in the Surface Fault Rupture Special Study Zone on Weber County hazard maps. Based on this, the risk from surface faulting is rated as moderate. Given that the proposed home location is in the western part of the lot, no further evaluation following guidelines in Bowman and Lund (2016) appears needed.

Liquefaction and Lateral-spread Ground Failure

Liquefaction occurs when saturated, loose, cohesionless, soils lose their support capabilities during a seismic event because of the development of excessive pore pressure. Earthquake-induced liquefaction can present a significant risk to structures from bearing-capacity failures to structural footings and foundations, and can damage structures and roadway embankments by triggering lateral spread landslides. Earthquakes of Richter magnitude 5 are generally regarded as the lower threshold for liquefaction. Liquefaction potential at the site is a combination of expected seismic (earthquake ground shaking) accelerations, groundwater conditions, and presence of susceptible soils.

Loose, sandy sediments were observed in the slopes at the site that could be susceptible to liquefaction. However, liquefaction potential is also dependent on groundwater depth, which is likely greater than 30 feet deep. Based on the above, the existing hazard from liquefaction at the site is rated as low. Weber County GIS mapping shows the site is in a low to moderate liquefaction hazard zone (zone 4). Given that the site was on the margin of a prehistoric earthflow possibly from a liquefaction-induced failure, conducive soil conditions were present, and perched groundwater could also be present, Western GeoLogic (2007) recommended liquefaction hazards be addressed in the Project geotechnical engineering report. However, ETE (2007) did not address this hazard, presumably because no perched groundwater was encountered in their shallow test hole and their stability analyses indicated that slopes had satisfactory global factors of safety.

Tectonic Deformation

Tectonic deformation refers to subsidence from warping, lowering, and tilting of a valley floor that accompanies surface-faulting earthquakes on normal faults. Large-scale tectonic subsidence may accompany earthquakes along large normal faults (Lund, 1990). Tectonic subsidence is believed to mainly impact those areas immediately adjacent to the downthrown side of active normal faults. Western GeoLogic (2007) indicated the site is about 500 feet west of the WFZ, and at this distance the property could experience a few degrees of seismic tilting. Based on this, the risk from tectonic deformation is rated as moderate. However, tectonic subsidence is not typically a life-safety issue or considered for single-family residential structures.

Seismic Seiche and Storm Surge

Earthquake-induced seiche presents a risk to structures within the wave-oscillation zone along the edges of large bodies of water, such as the Great Salt Lake. Given the elevation of the subject property and distance from large bodies of water, the risk to the subject property from seismic seiches is rated as low.

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Supplemental Geologic Hazards Reconnaissance

Cedar Cove Subdivision Lot 12 - 2670 East Bybee Drive - Ogden, Weber County, Utah

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Stream Flooding

Stream flooding may be caused by direct precipitation, melting snow, or a combination of both. In much of Utah, floods are most common in April through June during spring snowmelt. High flows may be sustained from a few days to several weeks, and the potential for flooding depends on a variety of factors such as surface hydrology, site grading and drainage, and runoff.

No active drainages are mapped crossing the site or were observed during our reconnaissance. Given the above, we rate the risk from stream flooding as low. However, Western GeoLogic (2007) noted sheet and rill flow could pose a seasonal concern. Surface drainage is discussed in Section 15.0 of ETE's (2007) report.

Shallow Groundwater

No springs are shown on the topographic map for the Ogden quadrangle at the site, and no springs, seeps, or wetland areas were observed in our reconnaissance. Groundwater at the site is likely greater than 30 feet deep, although perched conditions above less-permeable sediments may be beneath the site. Groundwater depth can also fluctuate based on seasonal and climatic variations in up-gradient runoff infiltration, and may decrease as water is added from sources such as landscape irrigation. Western GeoLogic (2007) did not anticipate shallow groundwater would pose a significant concern to the proposed development, and no groundwater was encountered in ETE's (2007) test hole to an explored depth of 10 feet.

Landslides and Slope Failures

Slope stability hazards such as landslides, slumps, and other mass movements can develop along moderate to steep slopes where a slope has been disturbed, the head of a slope loaded, or where increased groundwater pore pressures result in driving forces within the slope exceeding restraining forces. Slopes exhibiting prior failures, and also deposits from large landslides, are particularly vulnerable to instability and reactivation.

The site straddles the eastern margin of a prehistoric earthflow. Lineaments from bedded lacustrine deltaic sediments are evident in slopes east and north of the site (Figures 3A-B), and bedded deltaic sediments were also observed by Western GeoLogic (2007) in a hand-excavated test pit in the area of the proposed home. The surficial and air photo evidence suggest that the site is in a zone of depletion where sediments failed and moved downslope to the southwest to a lower (depositional) accumulation zone. No evidence for recent or ongoing slope instability was observed in 2007 or during our supplemental reconnaissance.

Based on the above, Western GeoLogic (2007) rated the risk from landslides in the western part of the site as high, but indicated the eastern part would have a lower hazard. The hazard is therefore rated as moderate. Western GeoLogic (2007) recommended a geotechnical engineering slope-stability evaluation be conducted prior to building, which is addressed in Section 10.0 of ETE's (2007) report. ETE (2007) indicated their analyses showed suitable global factors of safety, but recommended an engineered retaining structure be employed if the proposed home would be closer than 20 feet to the slope toe.

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Supplemental Geologic Hazards Reconnaissance

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Debris Flows

Debris flow hazards are typically associated with unconsolidated alluvial fan deposits at the mouths of large range-front drainages, such as those along the Wasatch Front. The site is not in any mapped alluvial deposits or drainages, and no evidence of debris-flow features was observed in 2007 or in our supplemental reconnaissance. Based on the above, the hazard from debris flows at the site is rated as low.

Rock Fall

No bedrock outcrops were observed at the site or in higher slopes that could present a source area for rock fall clasts. Based on the above, we rate the hazard from rock falls as low.

Swelling and Collapsible Soils

Soil conditions and specific recommendations for site grading, subgrade preparation, and footing and foundation design are provided in ETE (2007).

CONCLUSIONS AND RECOMMENDATIONS

The only geologic hazard posing a high relative risk to the site is earthquake ground shaking. The risk from surface fault rupture, tectonic deformation, and landslides is rated as moderate. Western GeoLogic (2007) identified earthquake ground shaking, surface fault rupture, liquefaction, and landslides as geologic hazards posing a potential risk, and recommended a design-level geotechnical engineering study be conducted prior to construction to address soil foundation conditions, evaluate the potential for liquefaction and shallow groundwater as needed, and evaluate stability of slopes at the site. These recommendations appear to have been addressed in ETE (2007), except with regard to liquefaction. We note that the risk from this hazard varies with the presence of shallow groundwater, which was not observed by ETE (2007).

Development at the site should follow ETE's (2007) recommendations. Care should also be taken that site grading does not destabilize slopes in this area without prior geotechnical analysis and grading plans, and that proper drainage is maintained. We further recommend Western GeoLogic (2007), ETE (2007), this report, and all future geologic and geotechnical reports regarding the property be made available to architects, building contractors, and in the event of a future property sale, real estate agents and potential buyers.

This report should be referenced for information on technical data only as interpreted from observations and not as a warranty of conditions throughout the site. The report should be submitted in its entirety, or referenced appropriately, as part of any document submittal to a government agency responsible for planning decisions or geologic review. Incomplete submittals void the professional seals and signatures we provide herein. Although this report and the data herein are the property of the client, the report format is the intellectual property of Western GeoLogic and should not be copied, used, or modified without express permission of the authors.

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Cedar Cove Subdivision Lot 12 - 2670 East Bybee Drive - Ogden, Weber County, Utah
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LIMITATIONS

This investigation was performed at the request of the Client using the methods and procedures consistent with good commercial and customary practice designed to conform to acceptable industry standards. The analysis and recommendations submitted in this report are based upon the data obtained from site-specific observations and compilation of known geologic information. This information and the conclusions of this report should not be interpolated to adjacent properties without additional site-specific information. In the event that any changes are later made in the location of the proposed site, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or approved in writing by the engineering geologist.

This report has been prepared by the staff of Western GeoLogic for the Client under the professional supervision of the principal and/or senior staff whose seal(s) and signatures appear hereon. Neither Western GeoLogic, nor any staff member assigned to this investigation has any interest or contemplated interest, financial or otherwise, in the subject or surrounding properties, or in any entity which owns, leases, or occupies the subject or surrounding properties or which may be responsible for environmental issues identified during the course of this investigation, and has no personal bias with respect to the parties involved.

The information contained in this report has received appropriate technical review and approval. The conclusions represent professional judgment and are founded upon the findings of the investigations identified in the report and the interpretation of such data based on our experience and expertise according to the existing standard of care. No other warranty or limitation exists, either expressed or implied.

The investigation was prepared in accordance with the approved scope of work outlined in our proposal for the use and benefit of the Client; its successors, and assignees. It is based, in part, upon documents, writings, and information owned, possessed, or secured by the Client. Neither this report, nor any information contained herein shall be used or relied upon for any purpose by any other person or entity without the express written permission of the Client. This report is not for the use or benefit of, nor may it be relied upon by any other person or entity, for any purpose without the advance written consent of Western GeoLogic.

In expressing the opinions stated in this report, Western GeoLogic has exercised the degree of skill and care ordinarily exercised by a reasonable prudent environmental professional in the same community and in the same time frame given the same or similar facts and circumstances. Documentation and data provided by the Client, designated representatives of the Client or other interested third parties, or from the public domain, and referred to in the preparation of this assessment, have been used and referenced with the understanding that Western GeoLogic assumes no responsibility or liability for their accuracy. The independent conclusions represent our professional judgment based on information and data available to us during the course of this assignment. Factual information regarding operations, conditions, and test data provided by the Client or their representative has been assumed to be correct and complete. The conclusions presented are based on the data provided, observations, and conditions that existed at the time of the field exploration.

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Supplemental Geologic Hazards Reconnaissance

Cedar Cove Subdivision Lot 12 - 2670 East Bybee Drive - Ogden, Weber County, Utah

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It has been a pleasure working with you on this project. Should you have any questions, please call.

Sincerely,
Western GeoLogic, LLC

Reviewed by:



Bill. D. Black, P.G.
Senior Engineering Geologist



Craig V. Nelson, P.G.
Principal Engineering Geologist

ATTACHMENTS

- Figure 1. Location Map (8.5"x11")
- Figure 2. Geologic Map (8.5"x11")
- Figure 3A. 2012 Air Photo (8.5"x11")
- Figure 3B. LIDAR Image (8.5"x11")
- Appendix. Photographic Record of Site Reconnaissance

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Western Geologic Project No. 4487

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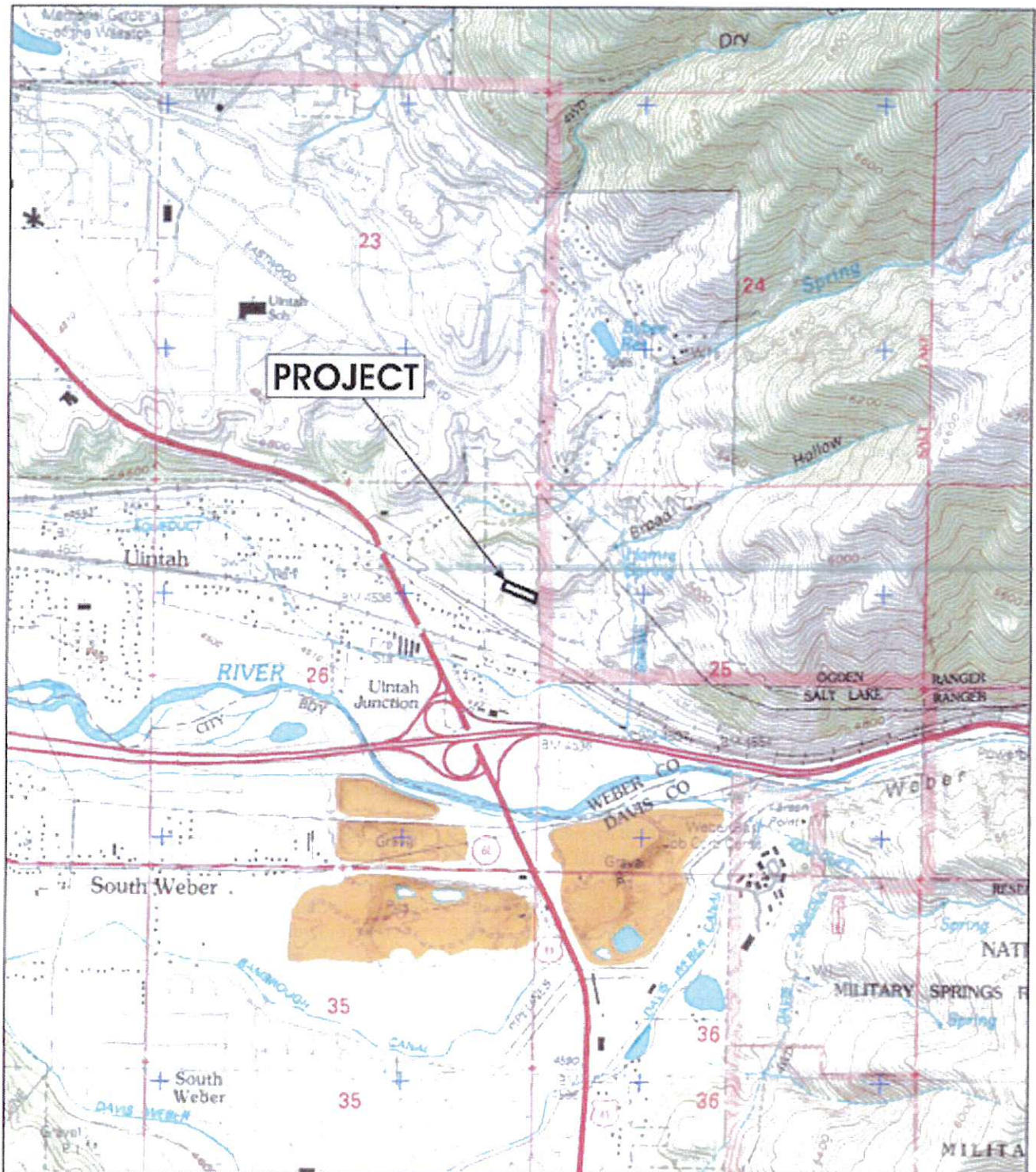
Supplemental Geologic Hazards Reconnaissance

Cedar Cove Subdivision Lot 12 - 2670 East Bybee Drive - Ogden, Weber County, Utah

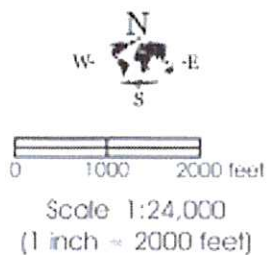
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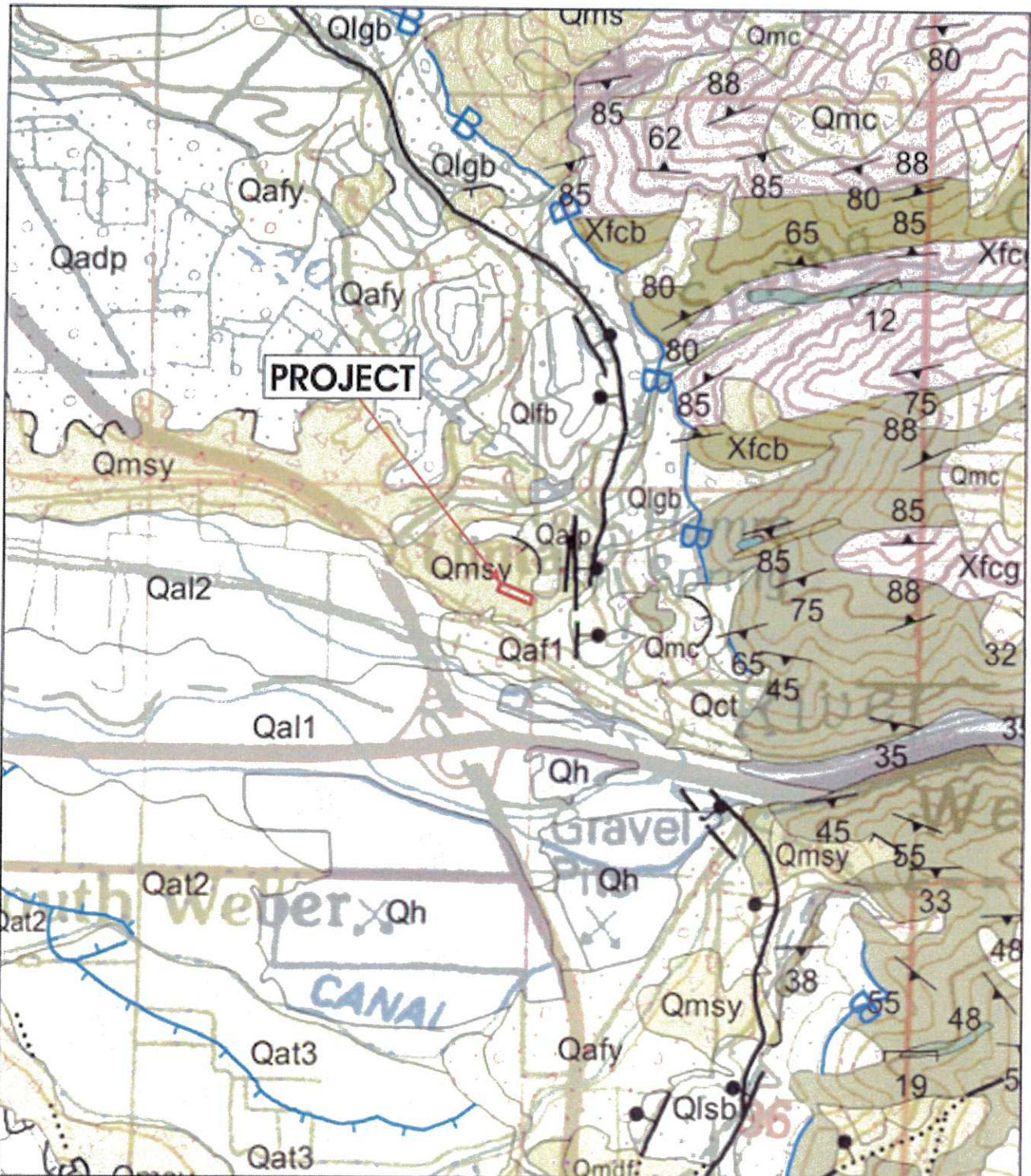
Source: U.S. Geological Survey 7.5 Minute Series Topographic Maps, Utah - Ogden, 1998.
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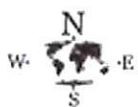
LOCATION MAP

**SUPPLEMENTAL GEOLOGIC
 HAZARDS RECONNAISSANCE**
 Cedar Cove Subdivision Lot 12
 2670 East Bybee Drive
 Ogden, Weber County, Utah

FIGURE 1



Source: Coogan and King (2016); original map scale 1:100,000. See text for explanation of nearby surficial geologic units.



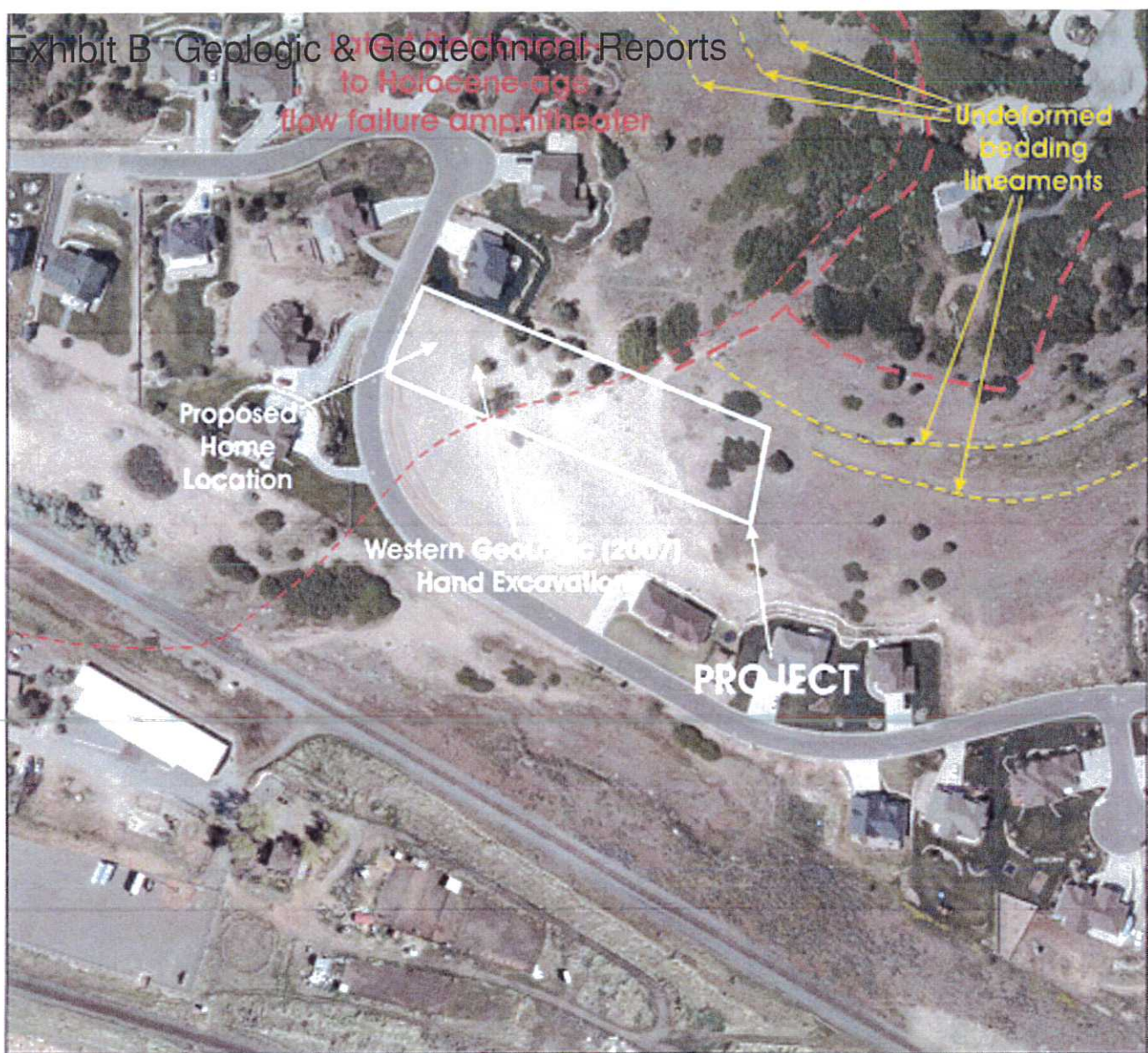
0 1000 2000 feet
 Scale 1:24,000
 (1 inch = 2000 feet)

GEOLOGIC MAP

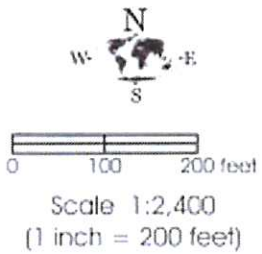
SUPPLEMENTAL GEOLOGIC HAZARDS RECONNAISSANCE

Cedar Cove Subdivision Lot 12
 2670 East Bybee Drive
 Ogden, Weber County, Utah

FIGURE 2



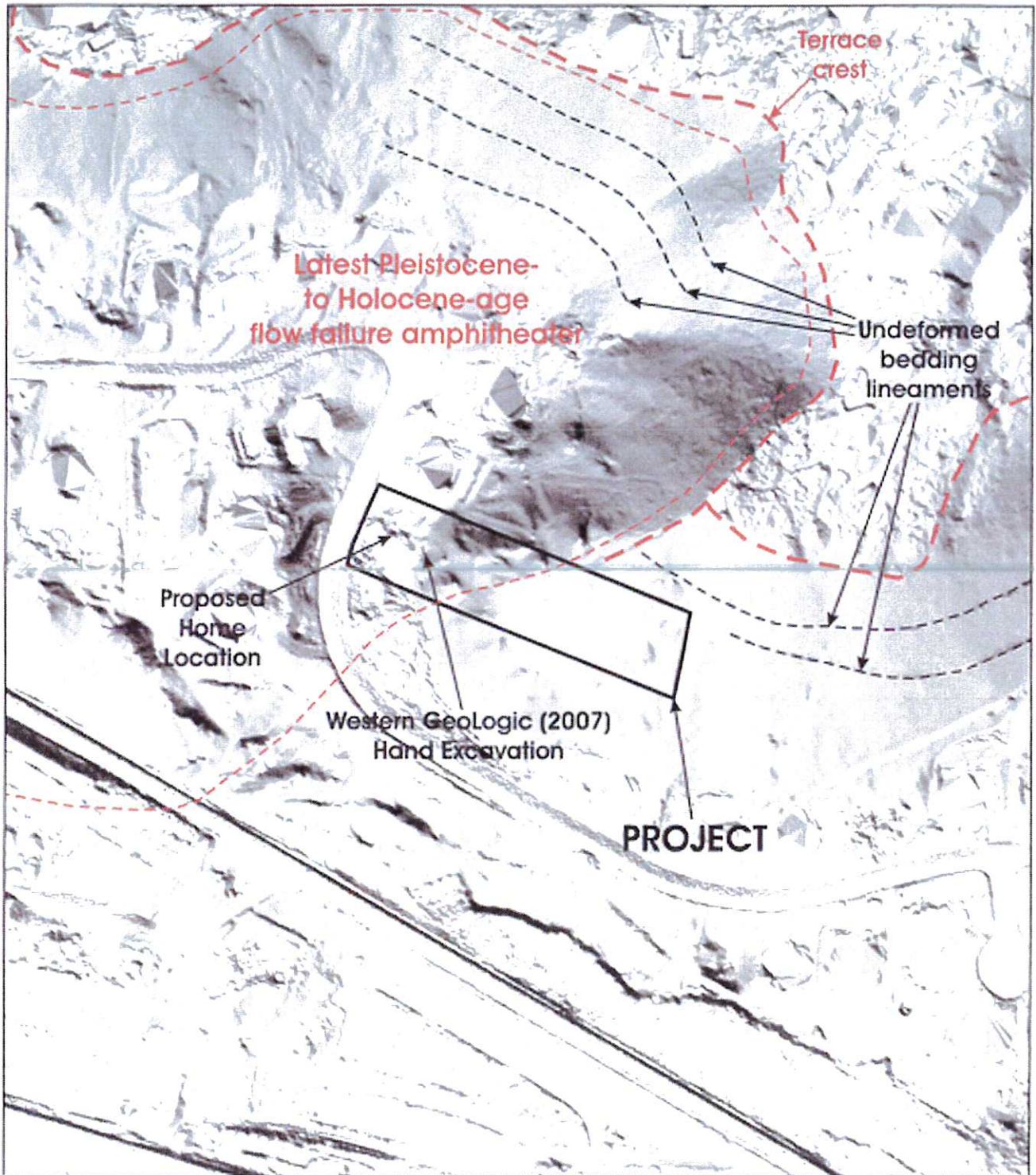
Source: Utah AGRC, High Resolution Orthophoto, 0.5-foot resolution, 2012.



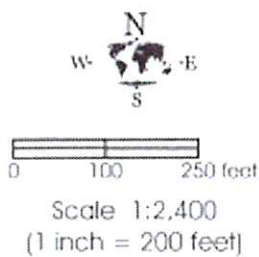
2012 AIR PHOTO
SUPPLEMENTAL GEOLOGIC HAZARDS RECONNAISSANCE Cedar Cove Subdivision Lot 12 2670 East Bybee Drive Ogden, Weber County, Utah
FIGURE 3A

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Source: Utah AGRC, 0.5-meter LIDAR Bare Earth DEM, 2013/2014.



LIDAR IMAGE
SUPPLEMENTAL GEOLOGIC HAZARDS RECONNAISSANCE Cedar Cove Subdivision Lot 12 2670 East Bybee Drive Ogden, Weber County, Utah
FIGURE 3B

Exhibit B Geologic & Geotechnical Reports

Photographic Record of Site Reconnaissance
Cedar Cove Subdivision Lot 12 - 2670 East Bybee Drive
Ogden, Weber County, Utah

Photo 1. View north across proposed home area toward amphitheater



Photo 2. Typical surficial soils



Exhibit B Geologic & Geotechnical Reports

Photographic Record of Site Reconnaissance Lot 25 Elkhorn Subdivision Phase 2 - 3529 North Elkridge Trail Eden, Weber County, Utah

Photo 3. View north toward burned area



Photo 4. Bedded lacustrine deltaic sediment exposed on slope in east part of site.



Exhibit B Geologic & Geotechnical Reports

Photographic Record of Site Reconnaissance
Lot 25 Elkhorn Subdivision Phase 2 - 3529 North Elkrige Trail
Eden, Weber County, Utah

Photo 5. View east toward Weber Canyon



Photo 6. View west of western part of site and adjacent home



October 26, 2017

Rich Combe
 6140 Sharon Circle
 Ogden, Utah 84403

**Subject: Geotechnical Consultation
 Cedar Cove Lot 12
 Weber County, Utah
 CG Project No.: 130-001**

Mr. Combe,

At your request, the Christensen Geotechnical has reviewed the geotechnical engineering report "Geotechnical Study, Cedar Cove Lot 12, Weber County, Utah" by Earthtec Testing & Engineering (Earthtec) dated September 19, 2007. The purpose of the review was to assess whether the existing report is adequate for the design and construction of a proposed single family residence on the subject lot. This letter was prepared this to present our opinion regarding the review of this report.

In general, it is our opinion that the existing Earthtec report is adequate and may be used for design and construction of the proposed single family residence; however, the seismic criteria presented in the Earthtec report are based on 2006 IRC values. The seismic design values and the slope stability assessment which used the peak ground acceleration (PGA) have therefore been updated in this letter.

The State of Utah and Utah municipalities have adopted the 2015 International Building Code (IBC) for seismic design. The IBC seismic design is based on seismic hazard maps depicting probabilistic ground motions and spectral response which has been developed by United States Geological Survey (USGS). Seismic design values, including the design spectral response, may be calculated for a specific site using the USGS Seismic Design Maps web-based application and the project site's approximate latitude and longitude and Site Class. Based on the field exploration presented in the Earthtec report, it is our opinion that this location is best described as a Site Class D which represents a "stiff soil" profile. The spectral acceleration values obtained from the USGS web-based application are shown below.

Table 2: IBC Seismic Response Spectrum Values

Site Location: Latitude = 41.14298° N Longitude = -111.91251° W			
Spectral Period (sec)	Response Spectrum Spectral Acceleration (g)		
0.2	S _s =1.266g	S _{M5} =1.266g	S _{D5} =0.844g
1.0	S ₁ = 0.479g	S _{M1} =0.728g	S _{D1} =0.486g

Using these values, the peak ground acceleration (PGA) is estimated to be 0.51g.

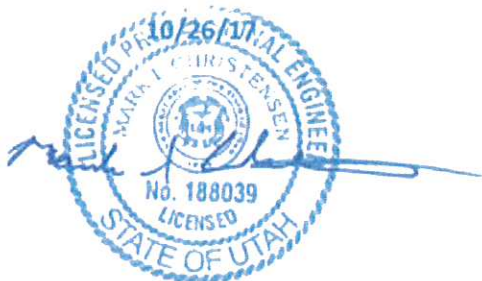
Exhibit B Geologic & Geotechnical Reports

Based on conversations with you, we understand a retaining wall on the order of 4 feet in height will be constructed at the toe of the existing slope on the lot. No other significant changes to the slope are planned. The global stability of the slope was assessed with the Slide computer program by Rocscience and the bishops simplified method of slices. The soil strength used in our analyses was based on a direct shear test performed on a soil sample collected from the slope. The profile used was based on the Earthtec profile presented in their geotechnical report. The slope was assessed under static and pseudo static conditions. The pseudo static condition is used to assess stability during a seismic event. As indicated above, the peak ground acceleration at the site is estimated to be 0.51g. As is common practice, half of the PGA was used in our analysis. Factors of safety of 1.5 and 1.0 are typically considered acceptable for residential construction. The results of our analyses indicate a static factor of safety greater than 1.5. The pseudo static stability of the slope was assessed to be less than 1.0. Due to the low factor of safety, a deformation analysis was performed using the Bray and Tavasrou 2007 method. This analysis estimated 9 inches of slope deformation during a large seismic event. Given the estimated 9 inches of deformation, it is our opinion that the 20 foot setback from the toe of the slope as recommended in the Earthtec geotechnical report is adequate and should be followed. The results of our slope stability assessment may be found on Plates 3 and 4.

Based on our review and analyses, it is our opinion that Earthtec 2007 geotechnical report for the subject lot is adequate and may be used for design and construction of the proposed single family residence. For seismic design, the updated IBC values presented in this letter should be used. This letter was prepared in accordance with the generally accepted standard of practice at the time this letter was written. No other warranty, expressed or implied, is made.

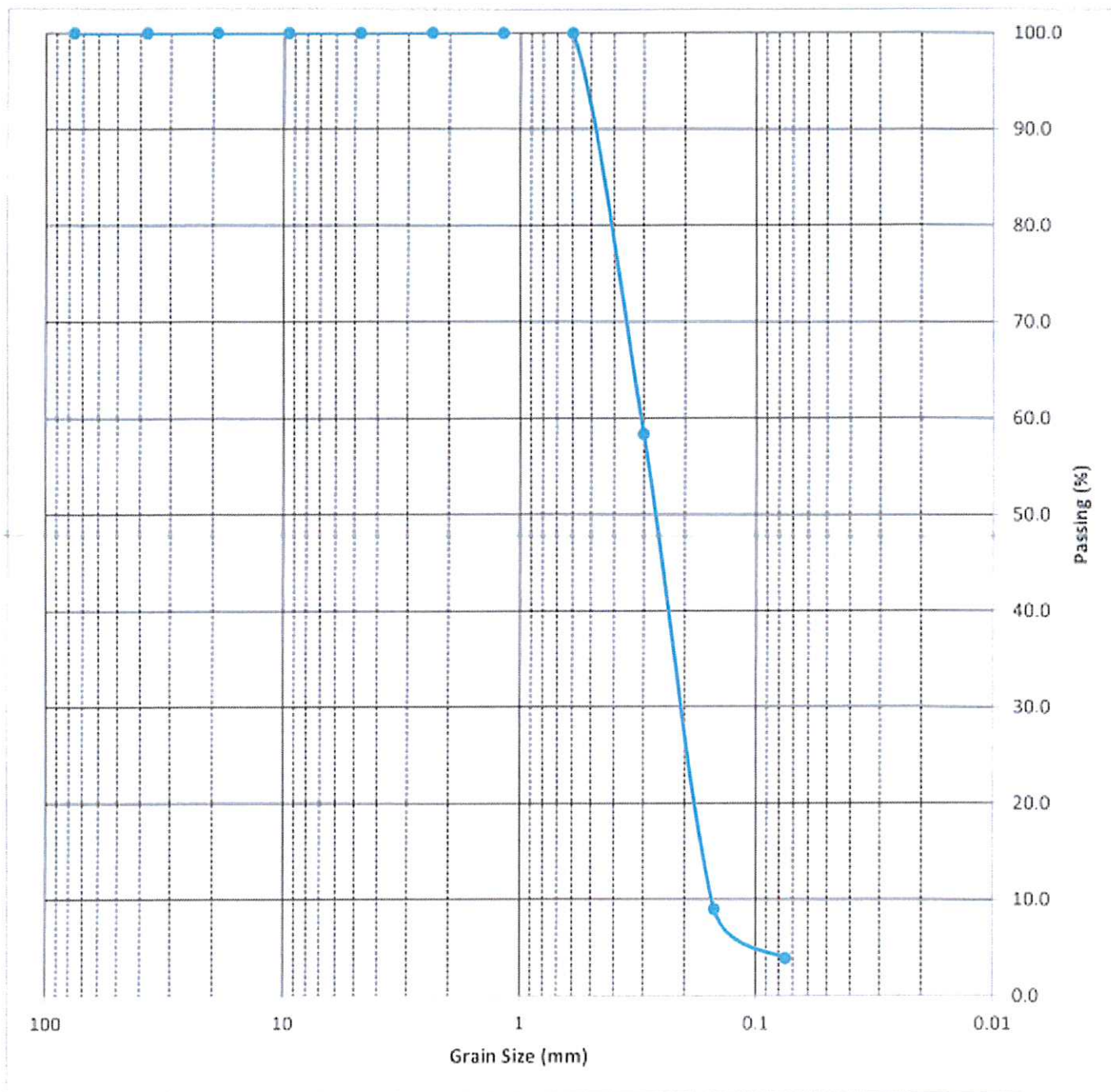
We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please call.

Sincerely,
Christensen Geotechnical



Mark I. Christensen, P.E.
Principal

Exhibit B Geologic & Geotechnical Reports Grain Size Distribution



Location	Depth		Classification	% Gravel	% Sand	% Silt and Clay
Site Slope	1 ft	•	Poorly Graded SAND (SP)	0.0	96.1	3.9


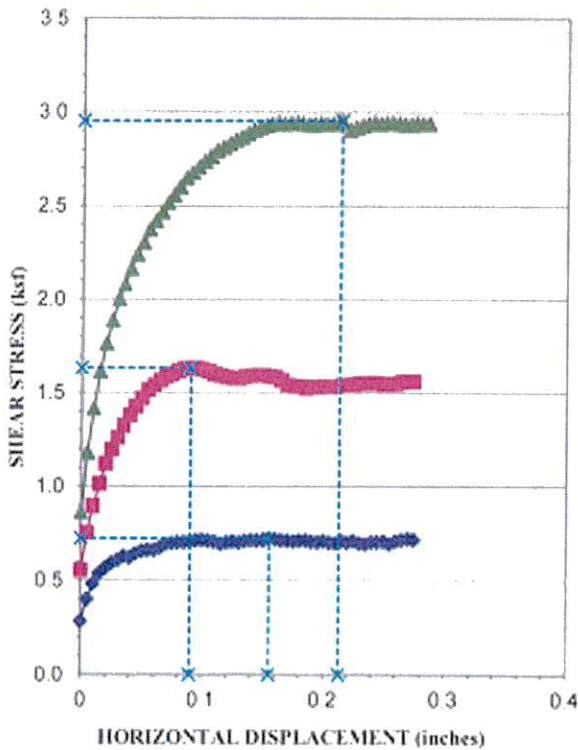
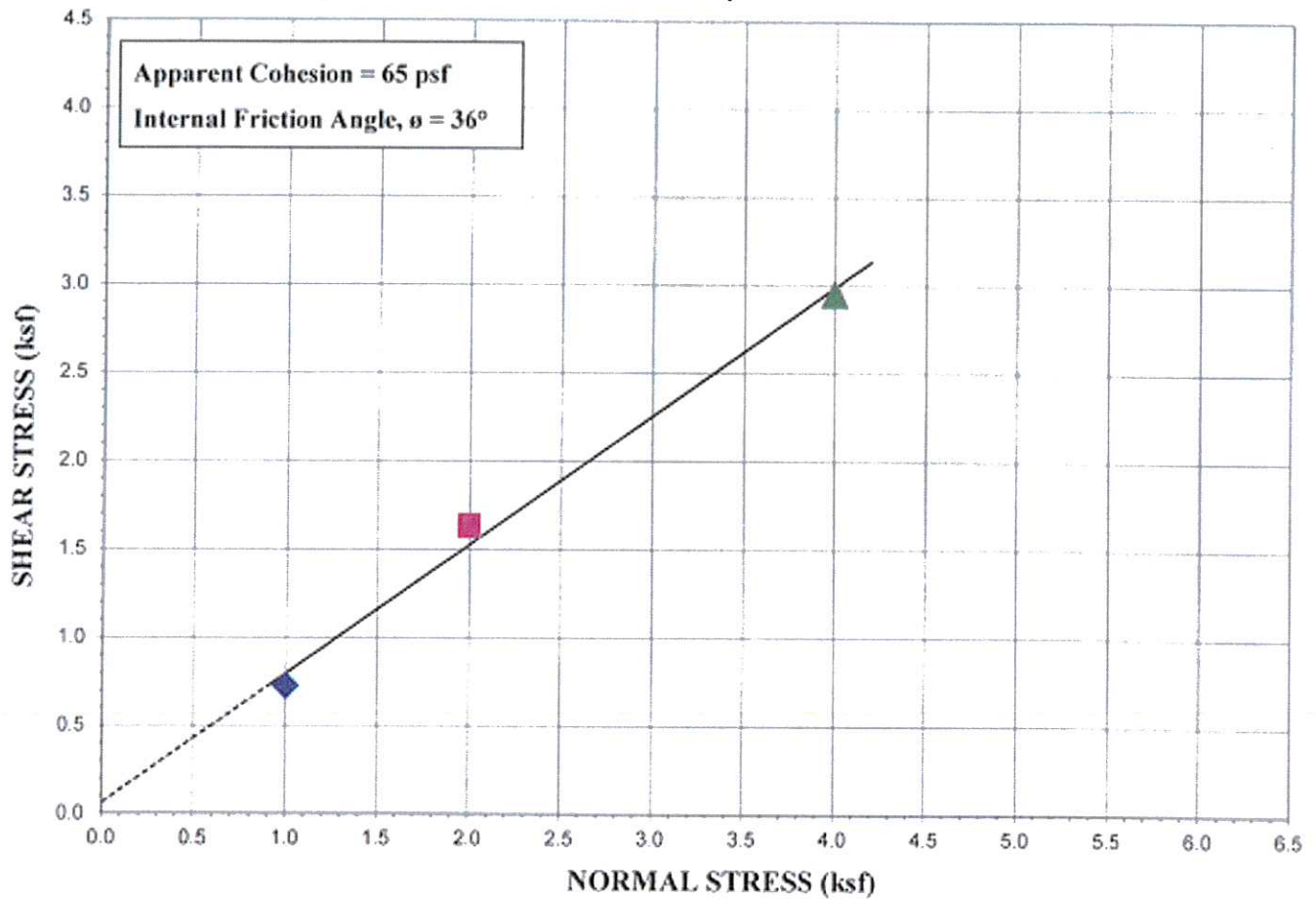
	Rich Combe Cedar Cove Lot 12 Weber County, Utah Project No.: 130-001	Plate 1
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Exhibit B Geologic & Geotechnical Reports



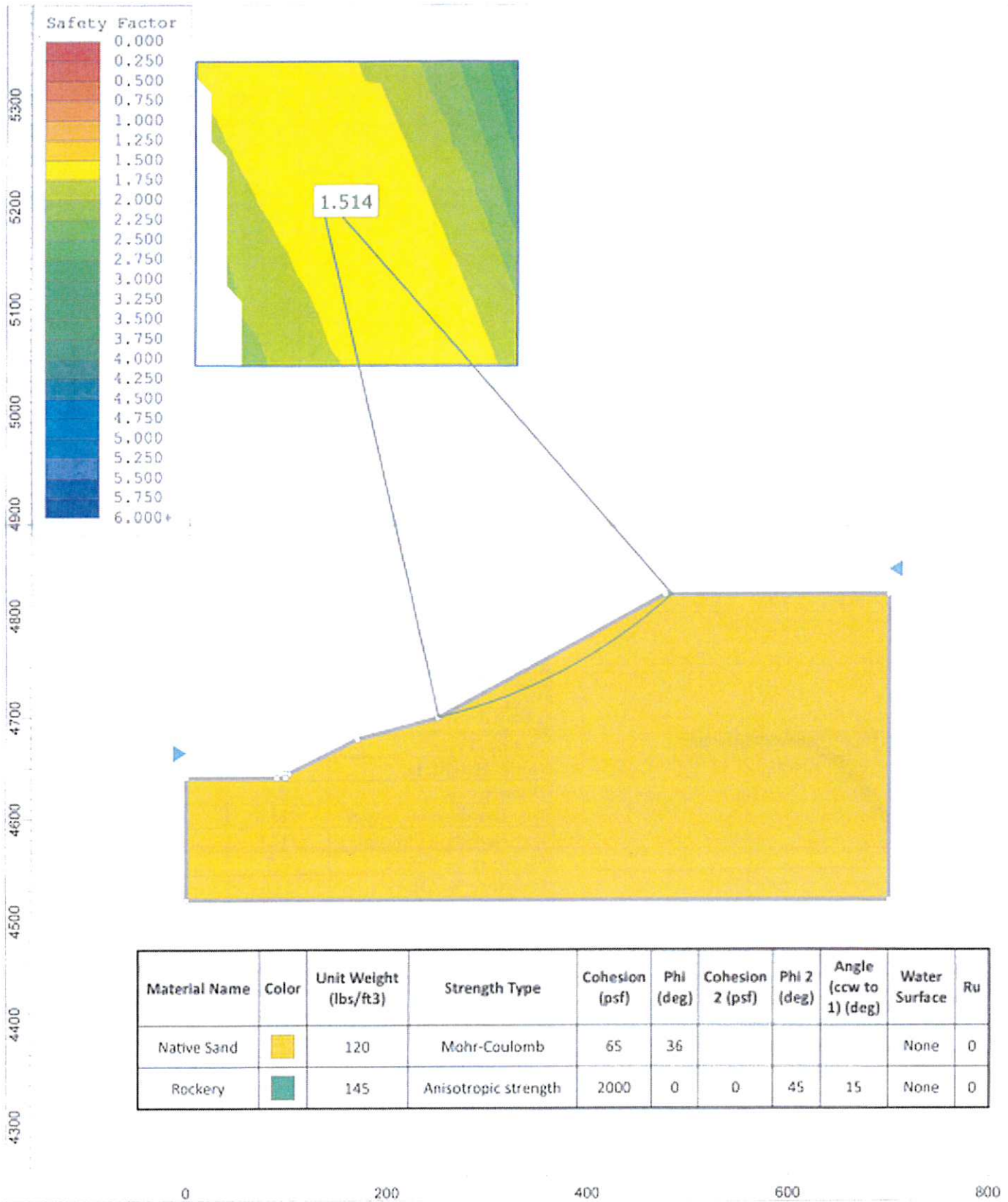
Location:	TP-1	Depth:	6.0 ft
Type of Test:	Consolidated Drained/Saturated		
Test No. (Symbol)	1 (◆)	2 (■)	3 (▲)
Sample Type:	Undisturbed		
Initial Height, in.	1	1	1
Diameter, in.	2.4	2.4	2.4
Dry Density Before, pcf	114.6	114.7	115.0
Dry Density After, pcf	112.8	113.5	113.3
Moisture % Before	4.7	4.7	4.7
Moisture % After	23.6	22.2	22.8
Normal Load, ksf	1.0	2.0	4.0
Shear Stress, ksf	0.72	1.63	2.95
Strain Rate	0.00007685		
Sample Properties			
Cohesion, psf	65		
Friction Angle, ϕ	36		
Liquid Limit, %	NP		
Plasticity Index, %	NP		
Percent Gravel	0		
Percent Sand	96.1		
Percent Passing No. 200 sieve	3.9		
Classification	SP		



Rich Combe
Cedar Cove Lot 12
Weber County, Utah
Project No.: 130-001

Plate
2

Exhibit B Geologic & Geotechnical Reports



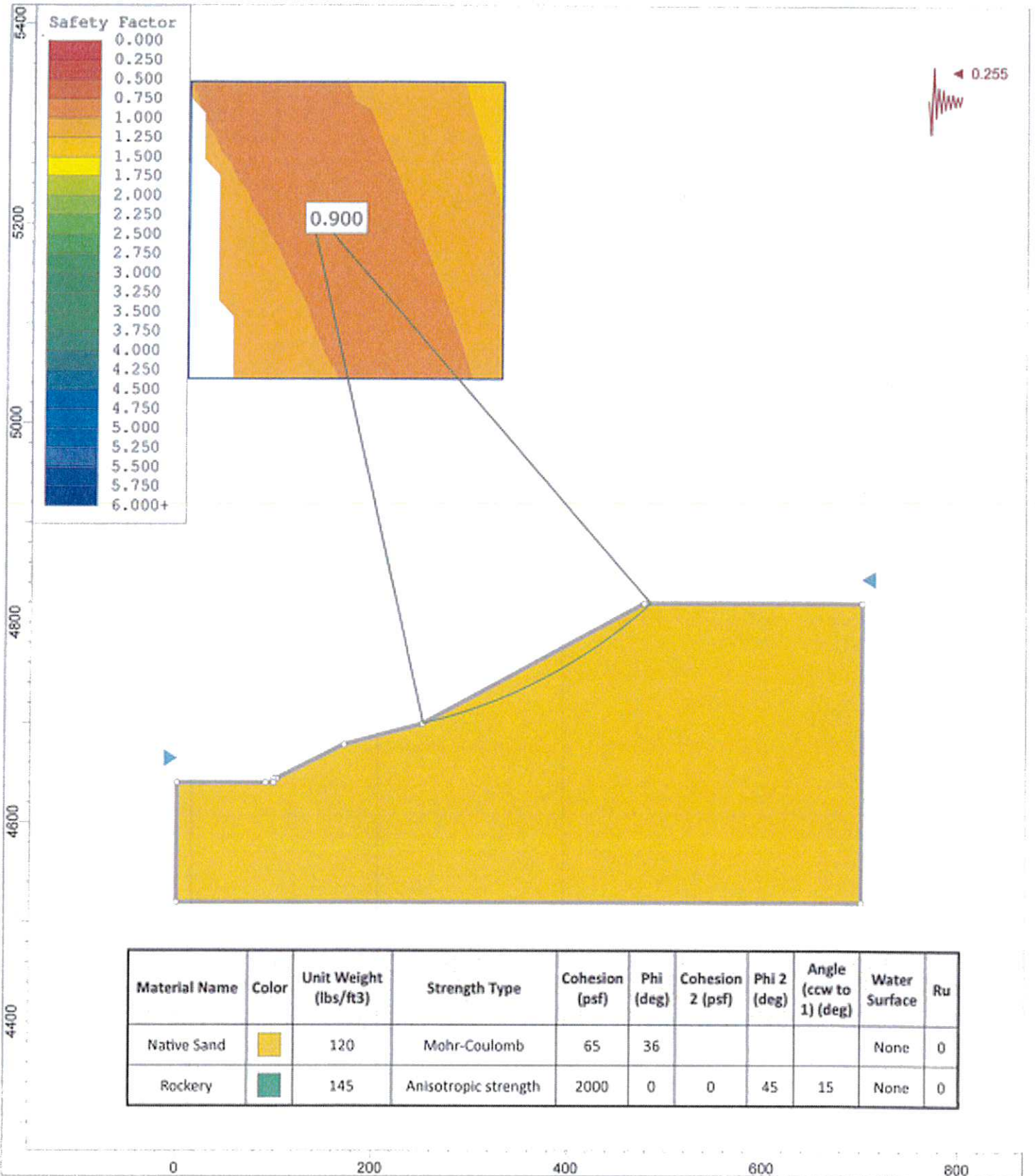
Static Stability



Rich Combe
 Cedar Cove Lot 12
 Weber County, Utah
 Project No.: 130-001

Plate
3

Exhibit B Geologic & Geotechnical Reports



Pseudo Static Stability



Rich Combe
 Cedar Cove Lot 12
 Weber County, Utah
 Project No.: 130-001

Plate
4

Invoice



8143 S 2475 E
 South Weber, UT 84405

Date	Invoice #
10/26/2017	179

Bill To
Rich Combe 6140 Sharon Circle Ogden, Utah 84403

Project No.	Terms	Project
130-001	Due on receipt	Cedar Cove Lot 12 Weber County, Utah

Description	Quantity	Rate	Amount
Engineering Consultation - Cedar Cove Lot 12	1	1,400.00	1,400.00
Total			\$1,400.00