

REScheck™ Basics

PAM COLE

U.S. Department of Energy - Building Energy Codes Program

AIA Provider #: I014

AIA Course #: EC16-M03

April 14, 2016



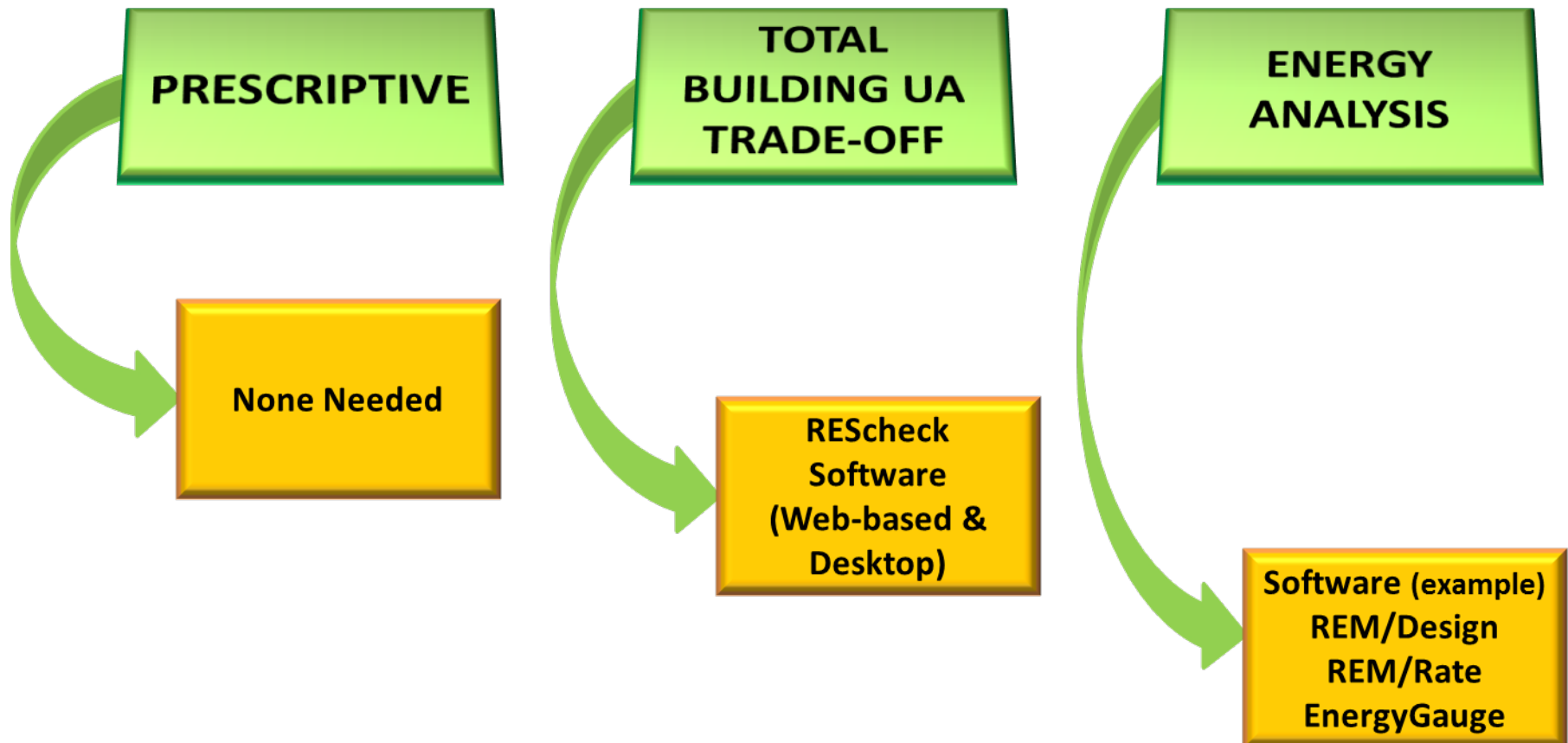
Course Description

Basics of using the REScheck software, reviewing generated compliance reports, and the latest and greatest new features.

Learning Objectives

1. Obtain an overview of the basic functions and how REScheck calculates compliance for the building envelope.
2. Be able to identify the construction specifications needed to complete a compliance calculation in the software.
3. Learn how to enter the building envelope components into the software.
4. Understand how the compliance reports are created and what they entail.

Energy Code Compliance Tools



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Building Energy Codes Program

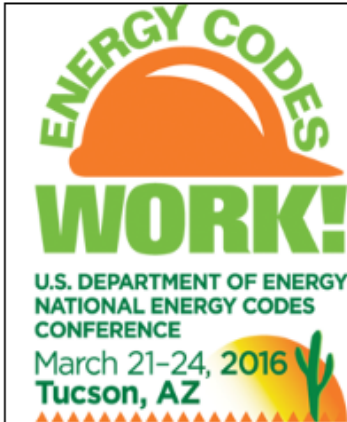
Building Energy Codes

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HIGHLIGHTS

- [2016 National Energy Codes Conference](#)
- [DOE Proposals for the 2018 IECC](#)
- [Upcoming Training Events & Available Resources](#)
- [Residential Energy Code Field Study](#)
- [Training Materials for the 2015 IECC and Standard 90.1-2013](#)


Popular Links



Tools 


[COMcheck](#) [REScheck](#)







Technical Assistance 

[Help Desk](#)

Status of State Energy Codes 

News 

- [Yes, saving energy is cheaper than making energy](#) 
Source: ACEEE, posted: 01.27.2016
- [2015 was a good year for energy efficiency. 2016 could be even better](#) 
Source: ACEEE, posted: 01.01.2016
- [Sacramento Has the Most Net-Zero Buildings of Any City in America](#) 
Source: Greentech Media, posted: 01.13.2016
- [Do Energy Codes Work?](#) 
Source: Energy Manager Today, posted: 01.04.2016
- [EERE News and Blog](#) 
Source: Energy.gov
- [DoE: Building Energy Codes are Working](#) 
Source: Energy Manager Today, posted: 01.05.2016

<https://www.energycodes.gov/rescheck>

DEVELOPMENT
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REScheck

Residential Compliance Using REScheck™

The REScheck product group makes it fast and easy for builders, designers, and contractors to determine whether new homes, additions, and alterations meet the requirements of the IECC or a number of state energy codes. REScheck also simplifies compliance determinations for building officials, plan checkers, and inspectors by allowing them to quickly determine if a low-rise residence meets the code.

REScheck is appropriate for insulation and window trade-off calculations in residential detached one- and two-family buildings and multi-family buildings three stories or less in height above grade, such as apartments, condominiums, and townhouses. REScheck works by performing a simple U-factor x Area (UA) calculation for each building assembly to determine the overall UA of a building. The UA that would result from a building conforming to the code requirements is compared against the UA for your building. If the total heat loss (represented as a UA) through the envelope of your building does not exceed the total heat loss from the same building conforming to the code, the software generates a report that declares your building is compliant with the code.

REScheck Desktop can be downloaded and installed directly to your desktop, while REScheck-Web™ is accessible directly from the website without having to download and install.

[See if your state or county can use REScheck to show compliance.](#)

REScheck™ Software

- [Windows](#)
- [Mac](#)
- [REScheck-Web](#)
- [Technical Support](#)

REScheck™ for Windows[®]

Version 4.6.2 (Build Version: 4.6.2.1)

Runs on Vista or Windows 7 in either single, multi-user, or network environments

Supported Codes:

2009, 2012 and 2015 IECC; and various state and county energy codes.

What's New:

REScheck version 4.6.2 includes support for 2014 Florida. Build version 4.6.2.1 fixes an issue with compliance index when project is "Additions" and discontinues support for Wisconsin Uniform Dwelling Code.


REScheck™ for Mac[®]

The Mac version of REScheck has been discontinued. Users are advised to use [REScheck-Web](#)

REScheck-Web

REScheck-Web simplifies residential energy code compliance by automating tradeoff calculations for the IECC and a number of state-specific codes. It performs just like the REScheck desktop version, but you don't need to download or install any software on your computer.

SUBSCRIBE TO UPDATES

To receive updates about compliance tools [subscribe to the RECP Mailing List](#) .



[Download REScheck Now!](#)



"DESKTOP"

Jones Residence.Boulder.Co.rck - REScheck 4.6.2 Code: 2015 IECC

File Edit View Options Code Tools Help

Project Envelope Mechanical Requirements

Location

State:

City:

Project Type

☒ New Construction ☐ Addition ☐ Alteration

Building Characteristics

☒ 1- and 2-Family, Detached ☐ Multifamily

Conditioned Floor Area: ft²

☐ All ducts and air handlers located within conditioned spaces

[Explanation of duct testing requirements...](#)

☐ Project includes a thermally isolated sunroom

☒ Passes

Compliance Method: UA Trade-Off Max. UA: Your UA:

Choose the state in which the building will be located.

Project Details (optional)


This information will appear on the compliance certificate.

[Edit Project Details...](#)

Title/Site/Permit

WEB

REScheck-Web - 2015 IECC - Internet Explorer

 Project title:

[Log In](#)

[Register](#) | [Forgotten Password?](#)

[New Project](#) **PROJECT** ENVELOPE MECHANICAL REQUIREMENTS [Reports](#)

Code/Location

Code: [What's my code?](#)

State:

☒ City: ☐ County:

If your location is not included here, choose a nearby location with similar weather conditions.

Building Characteristics

☒ 1- and 2-Family, Detached ☐ Multifamily

Conditioned Floor Area: ft²

☐ All ducts and air handlers are located within conditioned spaces

[Explanation of duct testing requirements](#)

☐ Project includes a thermally isolated sunroom

☐ Project includes a pool or inground spa

☐ Project includes an interior wood-burning fireplace

Project Type

☒ New Construction ☐ Addition ☐ Alteration

Project Details (optional)

[CHECK COMPLIANCE](#) «To display compliance results, click the Check Compliance button.

Compliance Method: UA-Trade Off TBD Max. UA: — Your UA: —

100%

Data Exchange

- ▶ Can exchange files between desktop and web
 - Log in to web
 - My Projects



The screenshot displays the REScheck-Web application interface within an Internet Explorer browser window. The title bar reads "REScheck-Web - 2015 IECC - Internet Explorer". The page header includes the REScheck-Web logo and a navigation bar with tabs for "PROJECT", "ENVELOPE", "MECHANICAL", and "REQ". A user is logged in as "pam.cole@pnnl.gov" with a "Log Out" link and a "My Projects" dropdown menu. The main content area is divided into two sections: "Code/Location" and "Project Type".

Code/Location

- Code:** 2015 IECC (dropdown menu) [What's my code?](#)
- State:** Arizona (dropdown menu)
- City:** Ajo (dropdown menu, selected)
- County:** Apache (dropdown menu)

If your location is not included here, choose a nearby location with similar weather conditions.

Project Type

- ☒ New Construction
- ☐ Addition
- ☐ Alteration

My Projects (Recent tab selected)

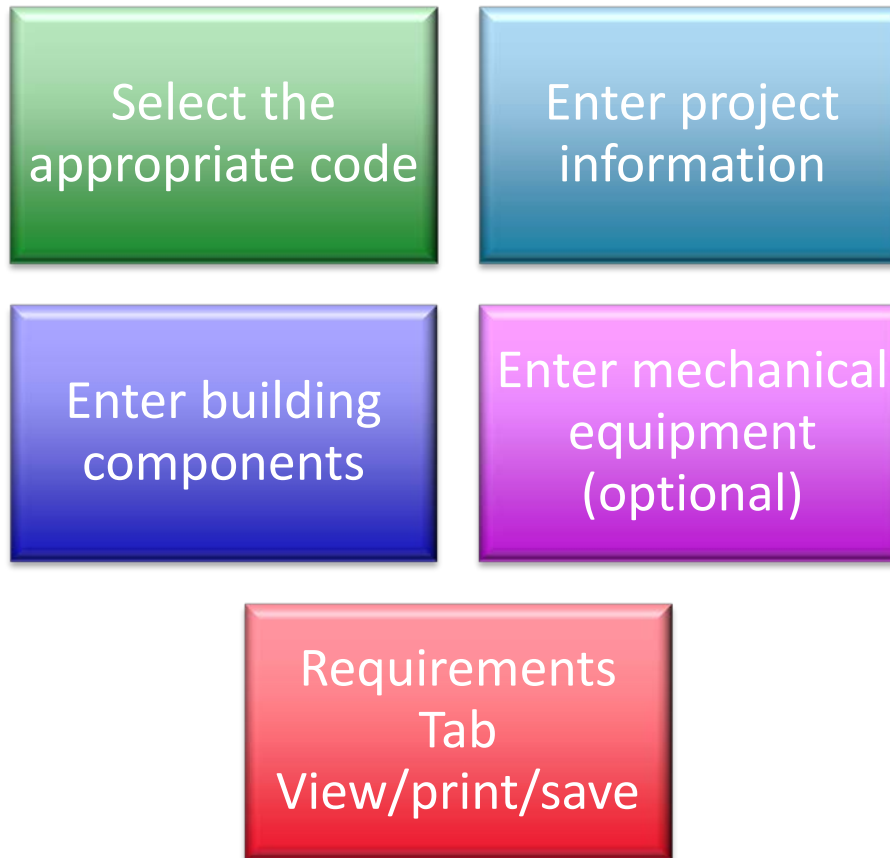
- 4 projects
- JonesResidence.Boulder**
2015 IECC Boulder, Colorado
- test22**
2009 IECC Arden, Delaware
- test Copy 2**
2009 IECC Abbeville, Alabama
- test**
2009 IECC Abbeville, Alabama

[Upload project from my computer...](#)

Footer:

- [CHECK COMPLIANCE](#) (button with checkmark icon)
- To display compliance results, click the **Check Compliance** button.
- Compliance Method: UA-Trade Off TBD Max. UA: — Your UA: —

Walkthrough REScheck Steps



Select the Appropriate Code

► Applicable to your state/ jurisdiction (Code menu)

ADOPTION PROCESS

STATE TECHNICAL ASSISTANCE

STATUS OF STATE ENERGY CODE ADOPTION

COMPLIANCE

REGULATIONS

RESOURCE CENTER

Model building energy codes and standards have the potential to save U.S. consumers an estimated \$330 billion by 2040. This equates to nearly 80 quads of cumulative full-fuel-cycle energy savings and over 6.2 billion metric tons of avoided carbon dioxide emissions. View the BECP's [national benefits assessment](#) for more information on the benefits of building energy codes

National Status At-A-Glance

The current status of energy codes and standards adoption is shown in the maps below. Status is displayed for both residential and commercial buildings for U.S. States and territories. Choose from the drop-down list to view the details for a particular state.

Select a state ▼

Commercial: Current

Residential: Current

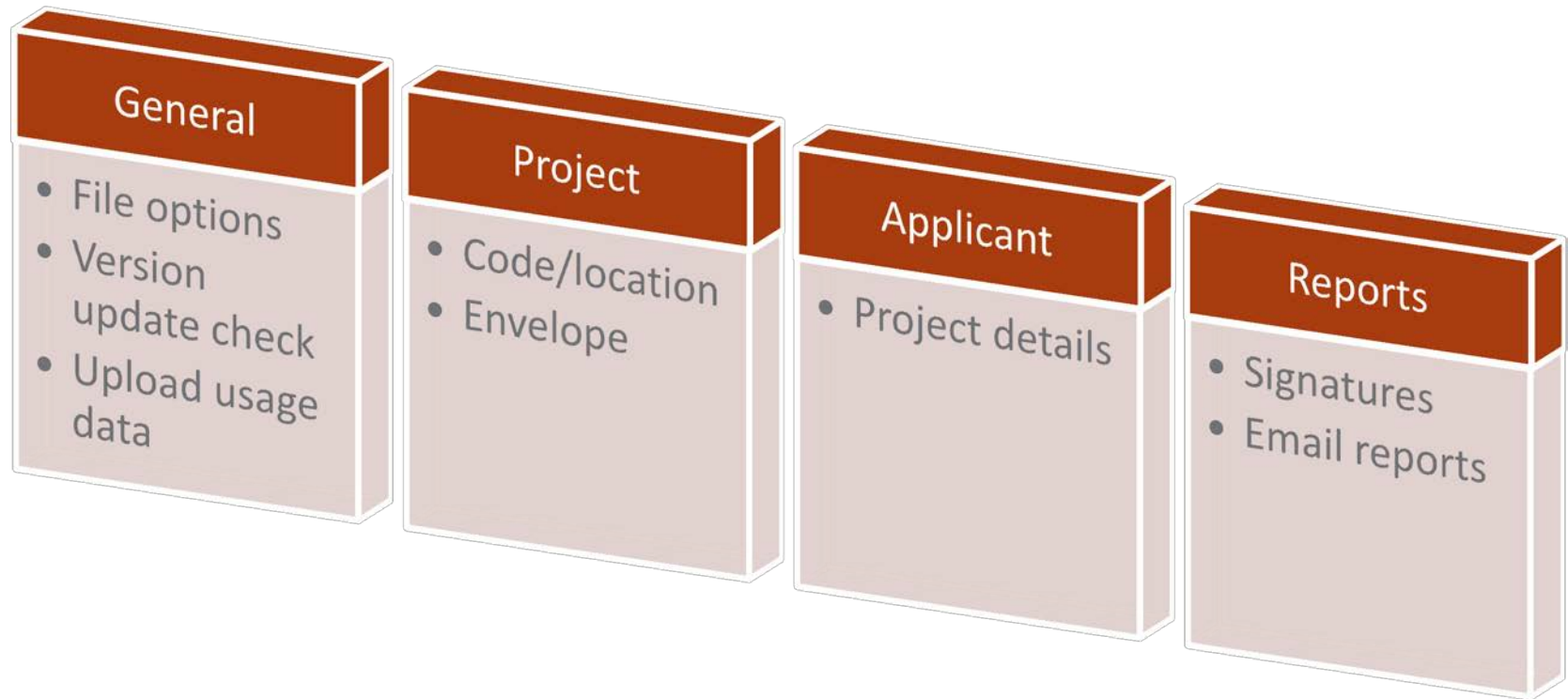
Current Residential Building Energy Code Adoption Status

3 IECC 2015, equivalent, or more energy efficient	10 IECC 2012, equivalent, or more energy efficient
28 IECC 2009, equivalent, or more energy efficient	15 Older or less energy efficient than IECC 2006, or no statewide code

* Adopted new Code to be effective at a later date

As of March 2016

Preferences



Project Information

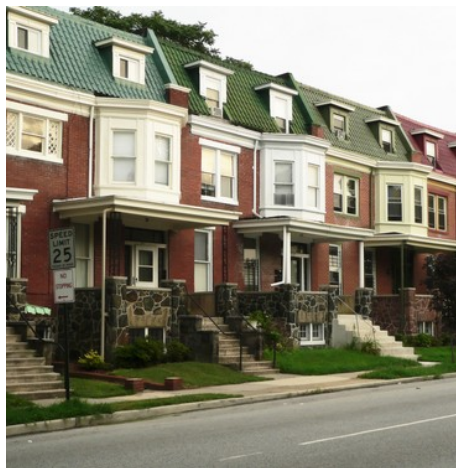
- ▶ Project Location
 - City/County
- ▶ Project Type
 - Single Family
 - Multi Family
 - Addition
 - Alteration
- ▶ Project Details
 - Optional
 - Get printed on reports



Project Information – Helpful Hints

► Multifamily if

- All multifamily buildings three stories or less in height above grade and
- Contain three or more attached dwelling units
- Examples
 - Apartments
 - Condominiums
 - Townhouses
 - Dormitories
 - Rowhouses



Project Information – Helpful Hints

- ▶ Select Addition or Alteration on Project screen
- ▶ Additions
 - Addition only
 - Addition plus existing home
- ▶ Alterations
 - Exemptions may apply

What is the Building Thermal Envelope?



Enter only applicable building components



Envelope Helpful Hints

- ▶ Don't have to use every button
- ▶ Can group "like" components
- ▶ Gross area (except slab-on-grade)
 - Gross *wall* area to include peripheral edges of floors (area of band joist and subfloor between floors)
- ▶ Use "Other" assembly as needed



File Edit View Options Code Tools Help

File Edit View Options Code Tools Help

Project Envelope Mechanical Requirements

Ceiling Skylight Wall Window Door Basement Floor Crawl Wall

	Component	Assembly	Gross Area		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA
	Building							
1	Skylight 1	Click here to select Asse...	0	ft2			0.0	0

Envelope Helpful Hints, con't

- ▶ Fenestration ratings – U-factor and SHGC
- ▶ Cavity R-value – used for insulation placed between structural members
- ▶ Continuous R-value – used for insulation that is continuous across the structure (e.g., rigid insulation)
- ▶ After you've entered all building thermal envelope components, hit Check Compliance
 - Look for fields with red text
 - If no compliance results, look for missing data and make sure you've made an entry for Building Use type



SHGCs and U-Factors

 National Fenestration Rating Council® CERTIFIED	World's Best Window Co. Millennium 2000+ Vinyl-Clad Wood Frame Double Glazing • Argon Fill • Low E Product Type: Vertical Slider	
ENERGY PERFORMANCE RATINGS		
U-Factor (U.S./I-P)	Solar Heat Gain Coefficient	
0.35	0.32	
ADDITIONAL PERFORMANCE RATINGS		
Visible Transmittance	Air Leakage (U.S./I-P)	
0.51	0.2	
Condensation Resistance		
51	—	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>		

Cavity vs. Continuous



Foundations – what button to use

Basement

- Basement is conditioned

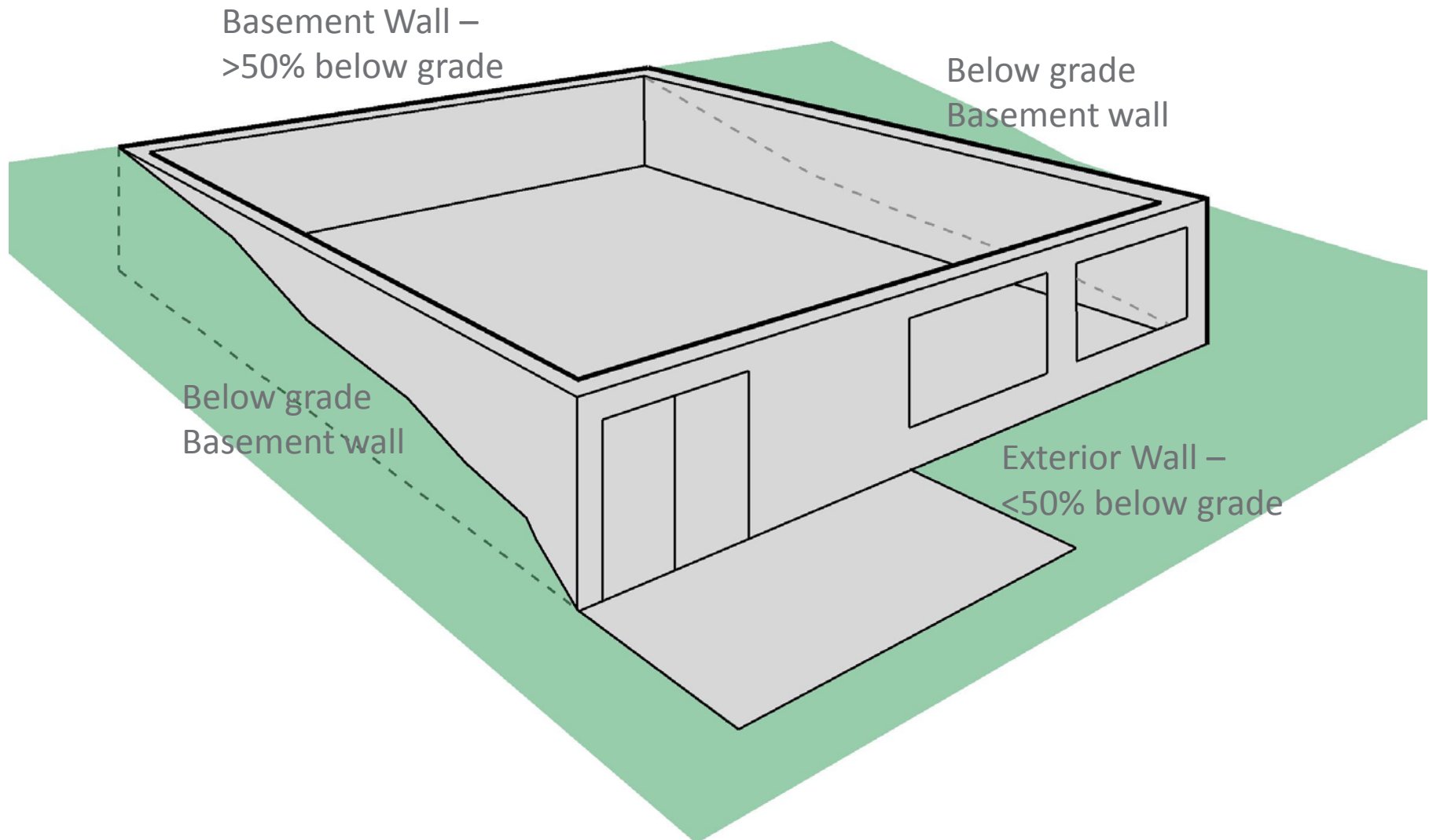
Floor

- Separates conditioned from unconditioned space

Crawl Wall

- Crawl space is not vented to the outside and floor above is NOT insulated

What's a Basement Wall?



Basements Helpful Hints

▶ Wall Height

- from top of wall to basement floor
- If not uniform, provide an average height

▶ Depth Below Grade

- Depth that the wall extends from finished, outside grade surface to basement floor
- If sloped or uneven, provide an average depth below grade



Basements Helpful Hints, con't

▶ Depth of Insulation

- Requirements are for full depth of basement wall (to 10 ft); REScheck allows trade offs
- Measure from top of wall to where insulation stops
 - For a fully insulated wall, depth of insulation would be equal to height of the wall
- If you enter insulation depth of 0, program assumes no insulation, regardless of values in the insulation fields

▶ Continuous Insulation

- Software assumes it's exterior rigid

▶ Cavity Insulation

- Software assumes you're furring out on the interior



Colors

Red

Project		Envelope		Mechanical	Requirements					
Ceiling		Skylight		Wall	Window	Door	Basement	Floor	Crawl Wall	
	Component	Assembly		Orientation	Gross Area		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA
	Building									
1	Ceiling 1	Flat Ceiling or Scissor Truss ▾			0	ft2	0.0	0.0	0.568	0

Green

▼	✓	Passes	1.0	% Better Than Code
---	---	--------	-----	--------------------

Blue

▼	⚠	No envelope assemblies specified	TBD	%
---	---	----------------------------------	-----	---

Screen Operations

MDB.Residence.rck - REScheck Code: 2009 IECC

File Edit View Options Code Tools Help

Front Faces: North

Project Envelope Mechanical Requirements

Ceiling Skylight Wall Window Door Basement Floor Crawl Wall

Component	Assembly	Orientation	Gross Area or Slab Perimeter	Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA	Wall Height (ft)	Depth Below Grade (ft)	Depth of Insulation (ft)
Building										
1 Ceiling 1	All-Wood Joist/Rafter/Truss		2415	ft2	30.0	0.0	0.035	85		
2 Exterior Wall 1	Wood Frame, 16" o.c.	Front	911	ft2	20.0	0.0	0.059	30		
3 Door 1	Opaque	Front	40	ft2			0.5	20		
4 Window main	Vinyl Frame, Double Pane	Front	369	ft2			0.35	129		
5 Exterior Wall 2	Wood Frame, 16" o.c.	Back	834	ft2	20.0	0.0	0.059	38		
6 Window 2	Vinyl Frame:Double Pane ...	Back	149	ft2			0.35	52		
7 Door 2	Solid	Back	40	ft2			0.5	20		
8 Exterior Wall 3	Wood Frame, 16" o.c.	Left Side	492	ft2	20.0	0.0	0.059	29		
9 Exterior Wall 4	Wood Frame, 16" o.c.	Right Side	632	ft2	20.0	0.0	0.059	36		
10 Window 3	Vinyl Frame:Double Pane ...	Right Side	15	ft2			0.35	5		
11 Knee Wall West	Wood Frame, 16" o.c.	Left Side	69	ft2	20.0	0.0	0.059	4		
12 Knee Wall East	Wood Frame, 16" o.c.	Right Side	84	ft2	20.0	0.0	0.059	5		
13 Basement Wall 2	Solid Concrete or Masonry	Left Side	144	ft2	19.0	0.0	0.061	9	9.0	4.5
14 Basement Wall 1	Solid Concrete or Masonry	Right Side	216	ft2	19.0	0.0	0.061	13	9.0	4.5
15 Basement Wall 3	Solid Concrete or Masonry	Front	684	ft2	19.0	0.0	0.051	35	9.0	7.0
16 Floor 1	All-Wood Joist/Truss, Ov...		783	ft2	30.0	0.0	0.033	26		
17 Floor 2	Slab-On-Grade:Unheated		93	ft		10.0	0.767	71		2.0

Fails 4.3 % Worse Than Code

Compliance Method: UA Trade-Off Max. UA 582 Your UA 607

Select the building assembly buttons above the column headers to create a list of envelope components for the building.

Compliance Bar →

Status Bar →

▶ UA

- U-factor x Area for each building assembly
- UA from building conforming to code compared against your building UA

- ▶ Performance alternative
 - Based on simulated performance of your building compared to an equivalent code building
 - Requires additional inputs (over UA approach): building orientation, minimum of four walls having unique orientations, and a minimum of one roof and floor
 - Check Compliance button
- ▶ Performance alternative considers the whole building energy performance, whereas UA trade-off method considers only the thermal conductance of envelope components

Compliance Failing – Helpful Hints

- ▶ Review building plans to ensure all components are entered correctly
- ▶ Confirm takeoffs (areas) are correct
- ▶ Confirm insulation values
 - Double check cavity vs. continuous entries
- ▶ Look at UA column (*next slide*)





Compliance Failing – Helpful Hints, con't

Jones Residence.rck - REScheck 4.6.2 Code: 2015 IECC



File Edit View Options Code Tools Help

Project Envelope Mechanical Requirements

Ceiling Skylight Wall Window Door Basement Floor Crawl Wall

	Component	Assembly	Gross Area or Slab Perimeter		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA	SHGC	Wall Height (ft)	Depth Below Grade (ft)	Depth of Insulation (ft)
7	Door 2	Solid	40	ft2			0.5	20				
8	Wall 3	Wood Frame, 16" o.c.	492	ft2	20.0	0.0	0.059	29				
9	Wall 4	Wood Frame, 16" o.c.	632	ft2	20.0	0.0	0.059	36				
10	Window 3	Vinyl Frame:Double Pa...	15	ft2			0.35	5	0.25			
11	Knee Wall We	Wood Frame, 16" o.c.	69	ft2	20.0	0.0	0.059	4				
12	Knee Wall Eas	Wood Frame, 16" o.c.	84	ft2	20.0	0.0	0.059	5				
13	Basement Wa	Solid Concrete or Mas...	144	ft2	0.0	0.0	0.418	60		9.0	4.5	0.0
14	Basement Wa	Solid Concrete or Mas...	216	ft2	0.0	0.0	0.418	90		9.0	4.5	0.0
15	Basement Wa	Solid Concrete or Mas...	684	ft2	0.0	0.0	0.267	183		9.0	7.0	0.0
16	Floor 1	All-Wood Joist/Truss:O...	783	ft2	19.0	0.0	0.047	37				
17	Floor 2	Slab-On-Grade:Unhea...	93	ft		0.0	1.042	97				0.0

50.8 % Worse Than Code

Compliance Method: UA Trade-Off Max. UA Your UA

Select the building assembly buttons above the column headers to create a list of envelope components for the building.

- ▶ Mandatory requirements
 - Air leakage
 - Building mechanical systems and equipment
 - Service water heating
 - Duct construction, insulation, testing
- ▶ For each requirement, the user
 - Notes that a code requirement is
 - Met
 - Exempt
 - Does not apply
 - Notes how compliance for applicable requirements are documented
- ▶ This information is shown on the report in the “Comments/ Assumptions” column of the Inspection Checklist

- ▶ File → View / Print Report
- ▶ Choices, choose any or all
 - Compliance Certificate
 - Inspection Checklist
 - Panel Certificate

- ▶ Implement Requirements tab
- ▶ Inspection checklists set up by phase of construction
 - Plan Review
 - Footing/Foundation
 - Rough-in
 - Final

Reports – Sample Compliance Certificate, con't



Pacific Northwest
NATIONAL LABORATORY

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REScheck Software Version 4.6.2

Compliance Certificate

Project Jones Residence - Plan 3677

Energy Code: 2015 IECC
Location: Tucson, Arizona
Construction Type: Single-family
Project Type: New Construction
Conditioned Floor Area: 6,780 ft²
Glazing Area: 18%
Climate Zone: 2 (1447 HDD)
Permit Date: March 15, 2016
Permit Number:

Construction Site:

Owner/Agent:
J.J. Jones

Verify energy code,
location, construction
type, and conditioned
floor area

Compliance: Passes using UA trade-off

Compliance: **14.6% Better Than Code** Maximum UA: **1043** Your UA: **891** Maximum SHGC: **0.25** Your SHGC: **0.25**

The % Better or Worse Than Code Index reflects how close to compliance the house is based on code trade-off rules.
It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	U-Factor	UA
Ceiling 1: Flat Ceiling or Scissor Truss	2,415	30.0	0.0	0.035	85
Wall 1: Wood Frame, 16" o.c.	911	20.0	0.0	0.059	30
Window 1: Vinyl Frame:Double Pane SHGC: 0.25	369			0.270	100
Door 1: Solid	40			0.500	20
Wall 2: Wood Frame, 16" o.c.	834	20.0	0.0	0.059	38

Reports – Sample Compliance Certificate, con't



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SHGC: 0.25					
Door 2: Solid	40			0.500	20
Wall 3: Wood Frame, 16" o.c.	492	20.0	0.0	0.059	29
Wall 4: Wood Frame, 16" o.c.	632	20.0	0.0	0.059	36
Window 3: Vinyl Frame:Double Pane with Low-E SHGC: 0.25	15			0.350	5
Knee Wall West: Wood Frame, 16" o.c.	69	20.0	0.0	0.059	4
Knee Wall East: Wood Frame, 16" o.c.	84	20.0	0.0	0.059	5
Basement Wall 1: Solid Concrete or Masonry Wall height: 9.0' Depth below grade: 4.5' Insulation depth: 0.0'	144	0.0	0.0	0.418	60
Basement Wall 2: Solid Concrete or Masonry Wall height: 9.0' Depth below grade: 4.5' Insulation depth: 0.0'	216	0.0	0.0	0.418	

Project Title: Jones Residence - Plan 3677

Report date: 03/

Data filename: J:\NationalWorkshop\2016\Pre Conference Day\Jones Residence.rck

Page 1

Verify Values are
Consistent with
Plans

	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	U-Factor	UA
Basement Wall Wall height: 9 Depth below g Insulation dep	684	0.0	0.0	0.267	183
Floor 1: All-Wood	783	19.0	0.0	0.047	37
Floor 2: Slab-On Insulation dep	93		0.0	1.042	97

Verify Compliance
Statement is Signed

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2015 IECC requirements in REScheck Version 4.6.2 and to comply with the mandatory requirements listed in the REScheck Inspection Checklist.









Done Right Construction

Name - Title







Signature

Date

Envelope Sample Inspection Checklist

2009 IECC	Foundation Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
402.1.1 [FO1] ¹ 	Slab edge insulation R-value.	R-_____ <input type="checkbox"/> Unheated <input type="checkbox"/> Heated	R-_____ <input type="checkbox"/> Unheated <input type="checkbox"/> Heated	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Envelope Assemblies table for values.
303.2, 402.2.8 [FO2] ¹ 	Slab edge insulation installed per manufacturer's instructions.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
402.1.1 [FO3] ¹ 	Slab edge insulation depth/length.	_____ ft	_____ ft	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Envelope Assemblies table for values.
402.1.1 [FO4] ¹ 	Conditioned basement wall insulation R-value. Where internal insulation is used, verification may need to occur during Insulation Inspection. Not required in warm-humid locations in Climate Zone 3.	R-_____	R-_____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Envelope Assemblies table for values.
303.2 [FO5] ¹ 	Conditioned basement wall insulation installed per manufacturer's instructions.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
402.2.7 [FO6] ¹ 	Conditioned basement wall insulation depth of burial or distance from top of wall.	_____ ft	_____ ft	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Envelope Assemblies table for values.
303.2.1 [FO11] ² 	A protective covering is installed to protect exposed exterior insulation and extends a minimum of 6 in. below grade.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
403.8 [FO12] ² 	Snow- and ice-melting system controls installed.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not Comply <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

Envelope Sample Inspection Checklist, con't

Code Section #		Value from Plans		Compliance	
					
302.1, 403.7 [PR2] ² 	Heating and cooling equipment is sized per ACCA Manual S based on loads calculated per ACCA Manual J or other methods approved by the code official.	Heating: Btu/hr ____ Cooling: Btu/hr ____	Heating: Btu/hr ____ Cooling: Btu/hr ____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
					
	Inspection Type		Value from Field		

Panel Certificate



2015 IECC Energy Efficiency Certificate

Insulation Rating	R-Value
Above-Grade Wall	20.00
Below-Grade Wall	0.00
Floor	19.00
Ceiling / Roof	30.00
Ductwork (unconditioned spaces):	_____

Glass & Door Rating	U-Factor	SHGC
Window	0.27	0.25
Door	0.50	

Heating & Cooling Equipment	Efficiency
Heating System: _____	_____
Cooling System: _____	_____
Water Heater: _____	_____

Name: _____ Date: _____

Comments

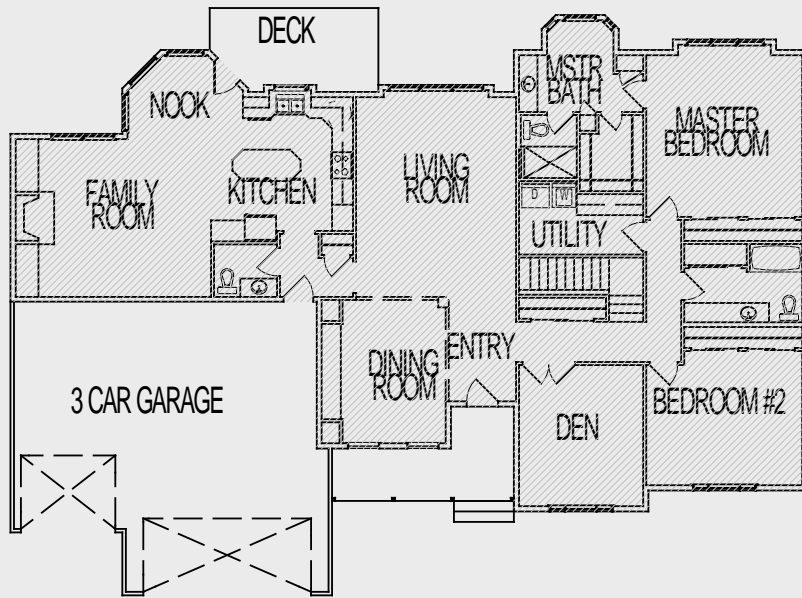
- ▶ REScheck desktop
- ▶ Calculates building areas
- ▶ Areas can be transferred into REScheck

Case Study – REScheck Software

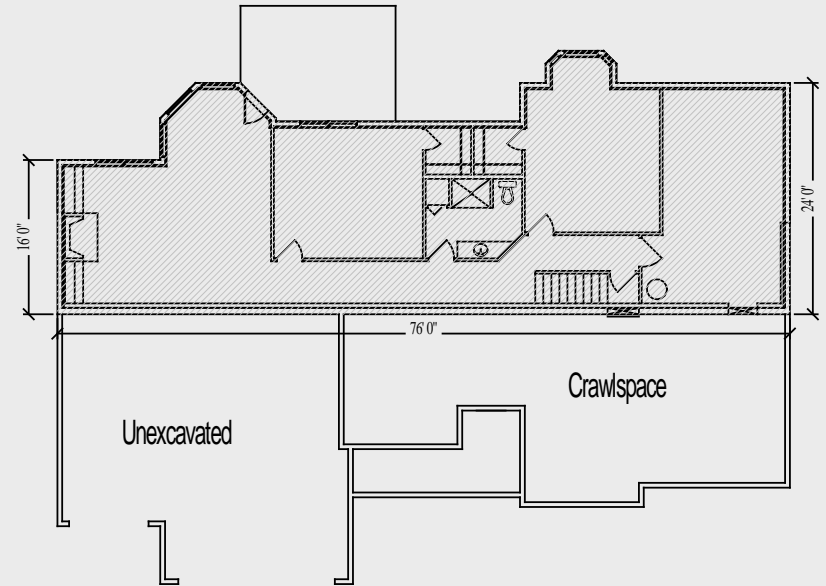


Jones Residence

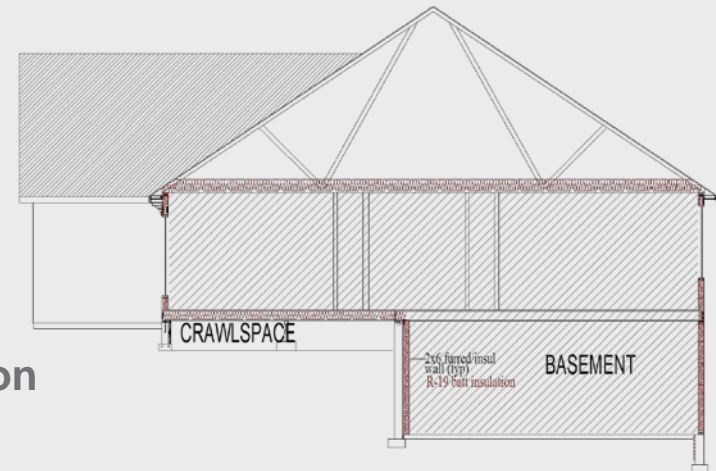
► Building Envelope



Conditioned Main Floor



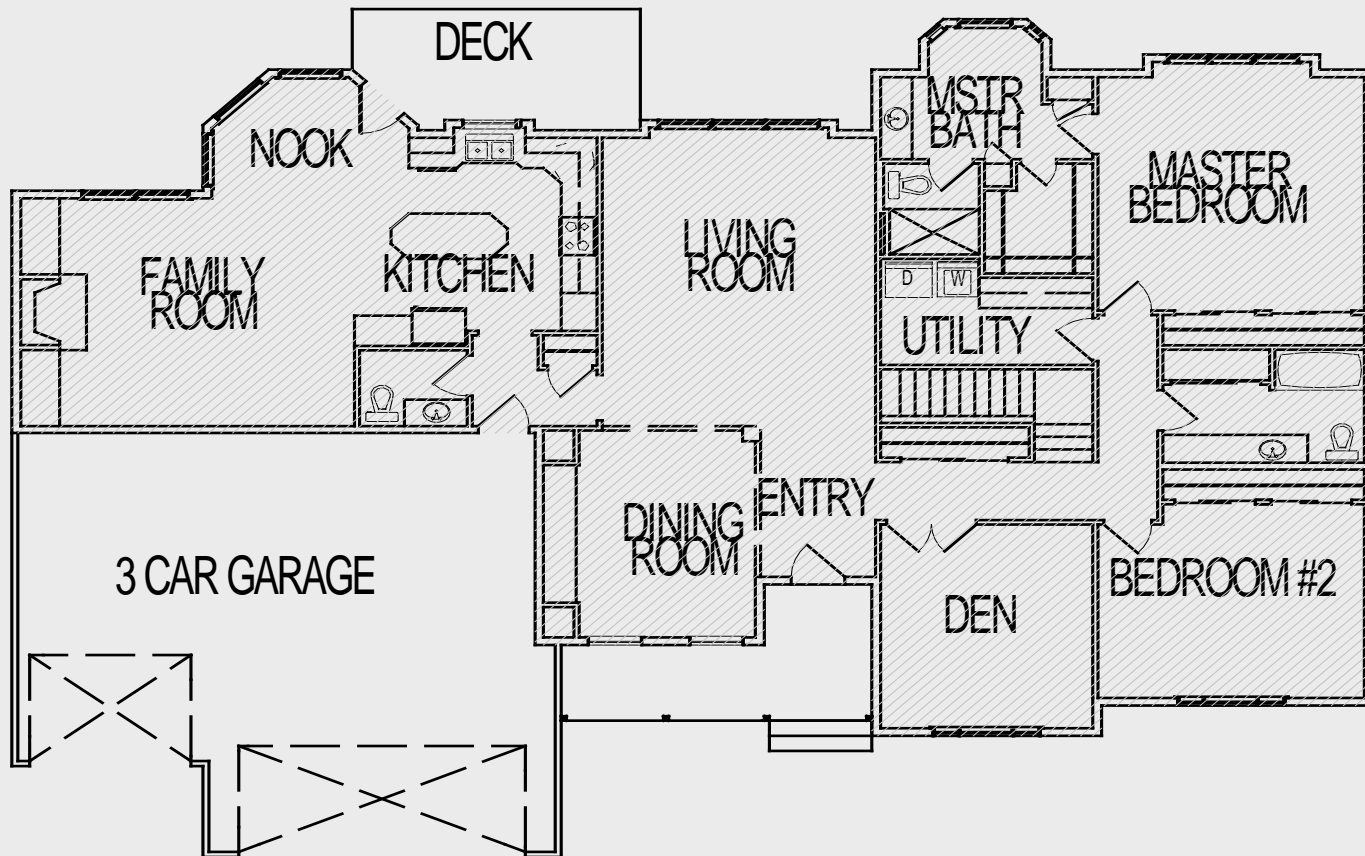
Conditioned Basement



Building Section

► Ceiling Area

Ceiling Area - 2415 sf



► Exterior Wall Areas

12' Exterior Walls – **689 sf**

North – 221 sf

South – 234 sf

East – 52 sf

West – 182 sf

3' knee walls (between 9'&12' sections) – **153 sf**

West – 69 sf

East – 84 sf

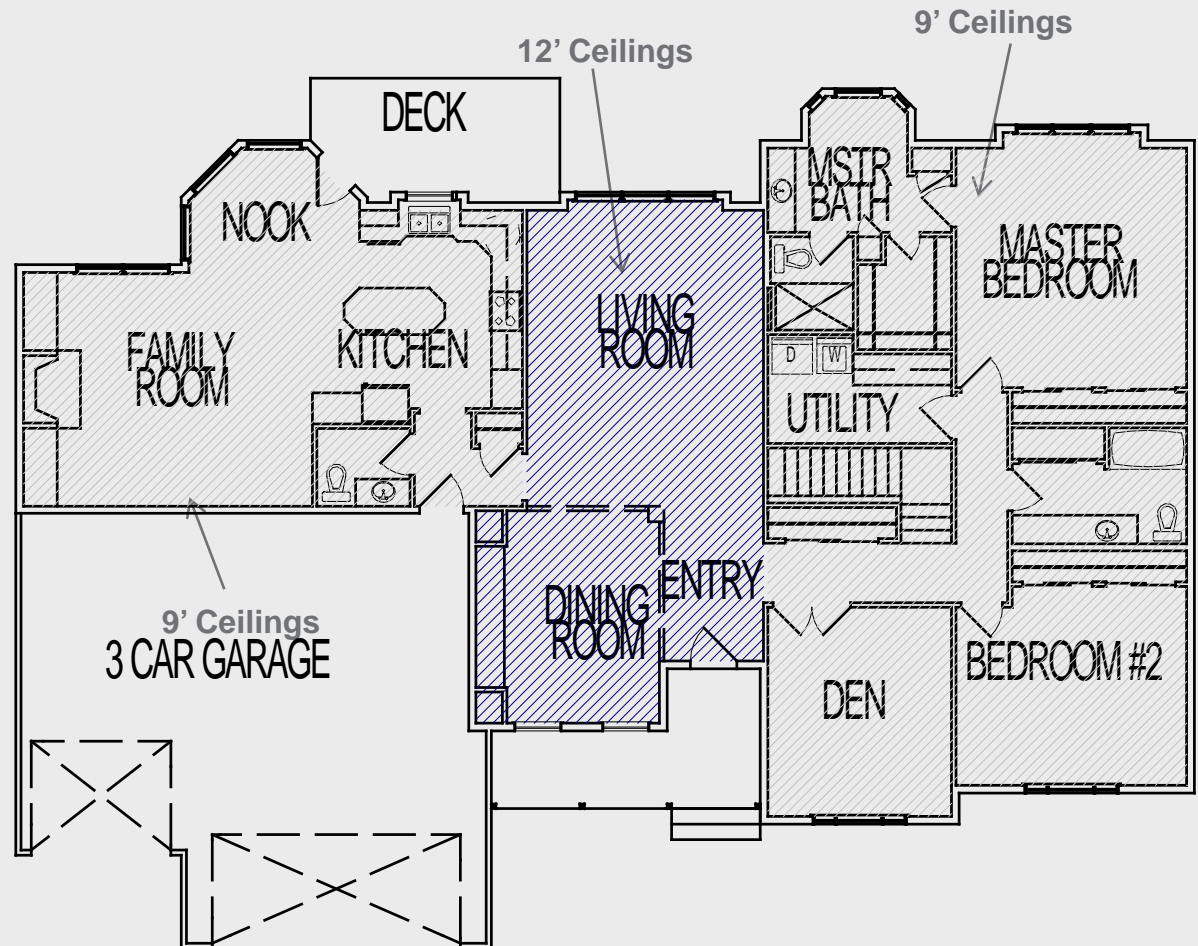
9' Exterior Walls – **2180 sf**

North – 690 sf

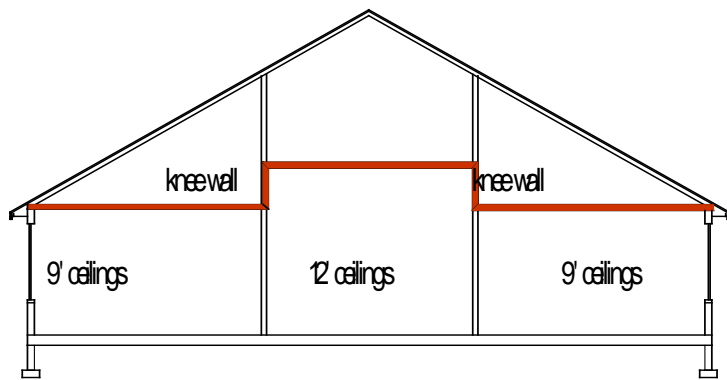
South – 600 sf

East – 440 sf

West – 450 sf

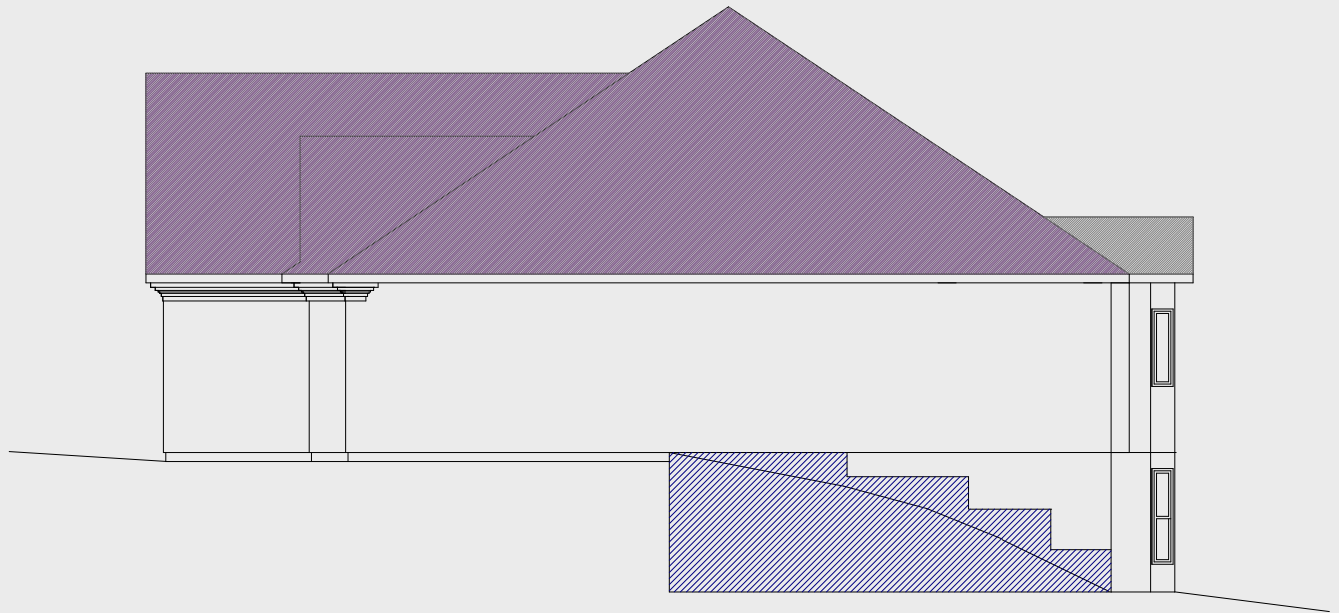


Knee Wall Insulation



No, No... Never cut the batts too short

► Basement Walls – below grade



>50% below grade = below grade concrete basement wall

Ways to Insulate Basement Walls

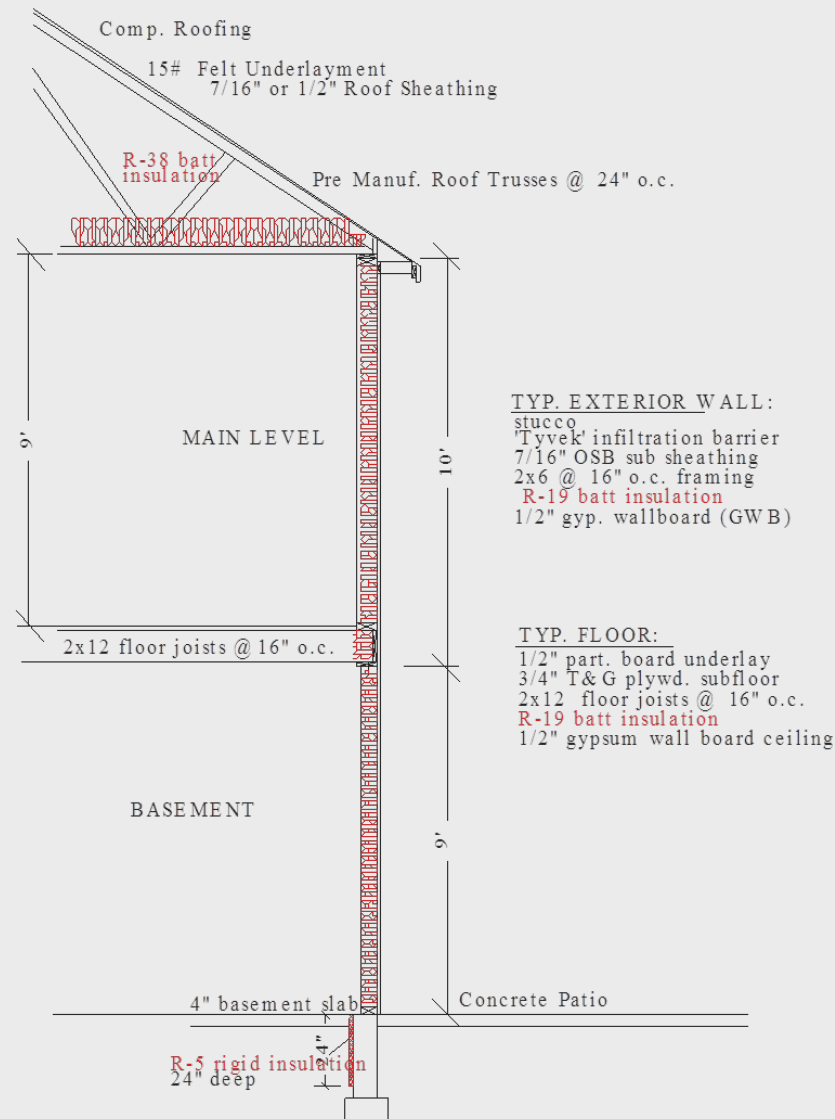


Interior Studs w/batts



Exterior Rigid Foam

► Including Rim Joists in the Exterior Wall Area



BASEMENT SECTION @ EXTERIOR WOOD WALL

► Basement Wall Areas

Above Grade Bsmt Walls (exterior wood) = 837 sf (93' x 9')
(entered as wood frame wall. not a basement wall)

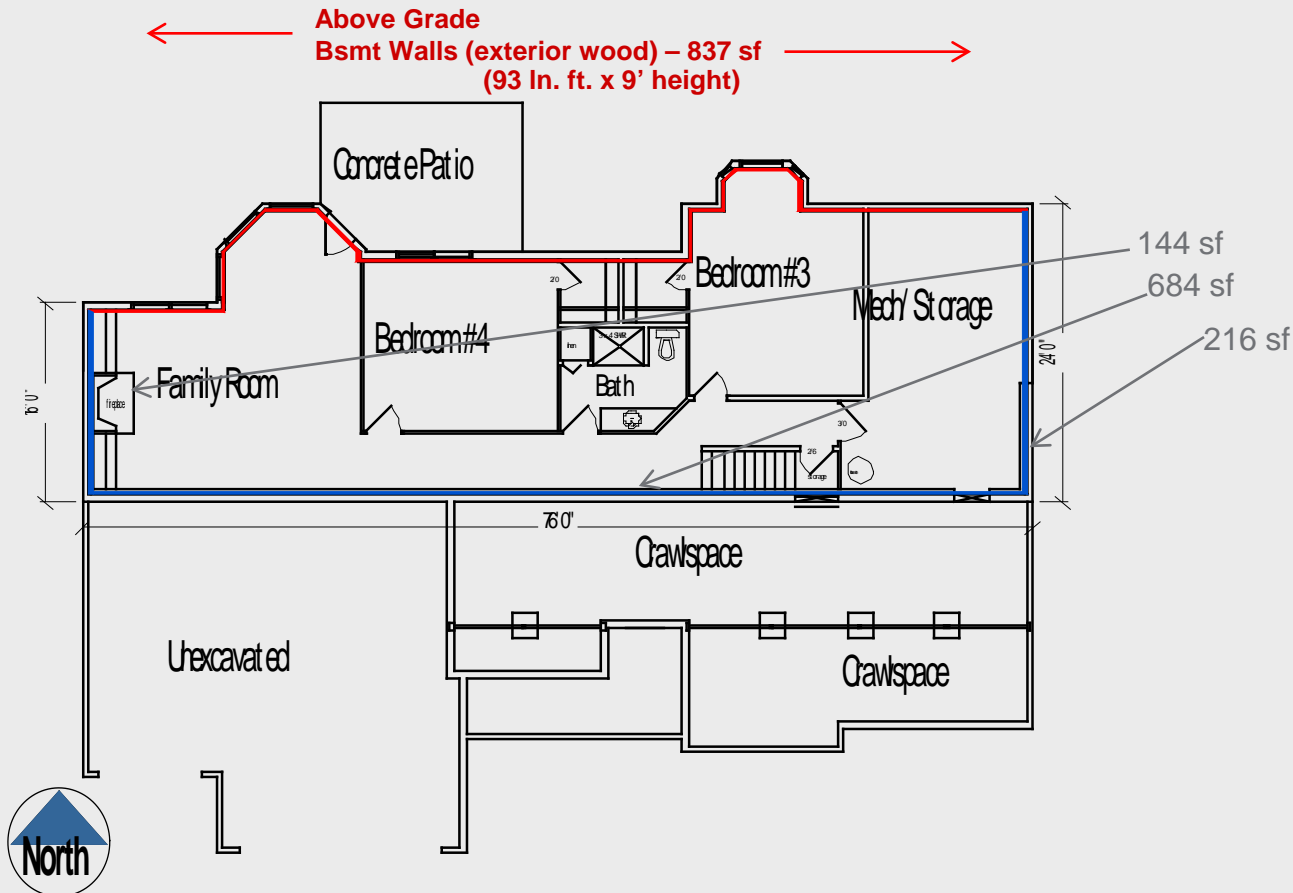
Below Grade Bsmt Walls = 1044 sf

Side basement walls = 360 sf

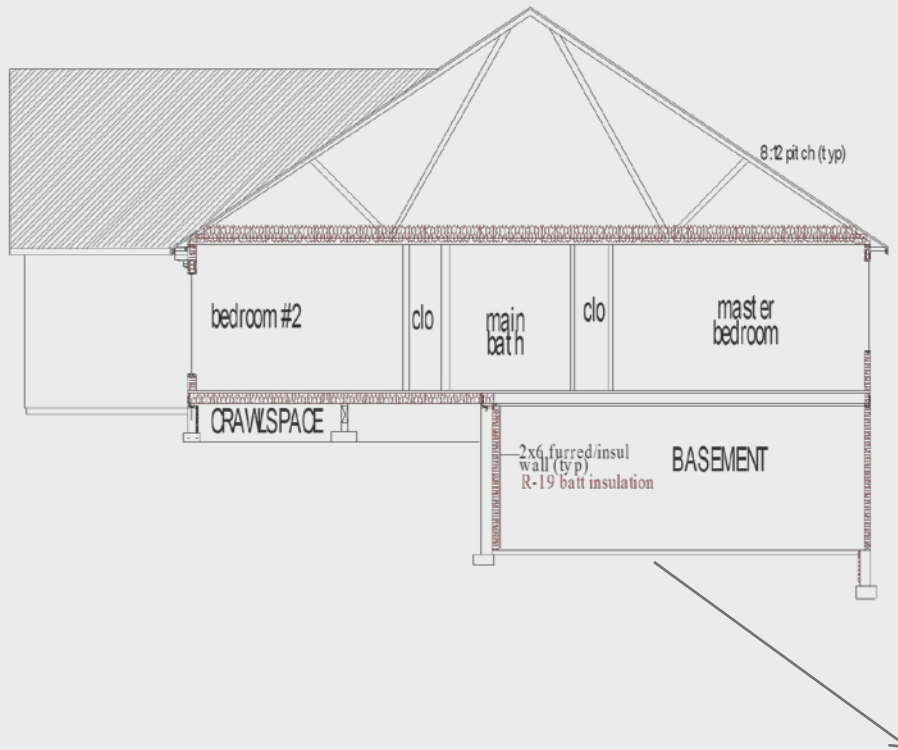
West Wall – 144 sf

East Wall – 216 sf

Back basement wall = 684 sf (76'x9')



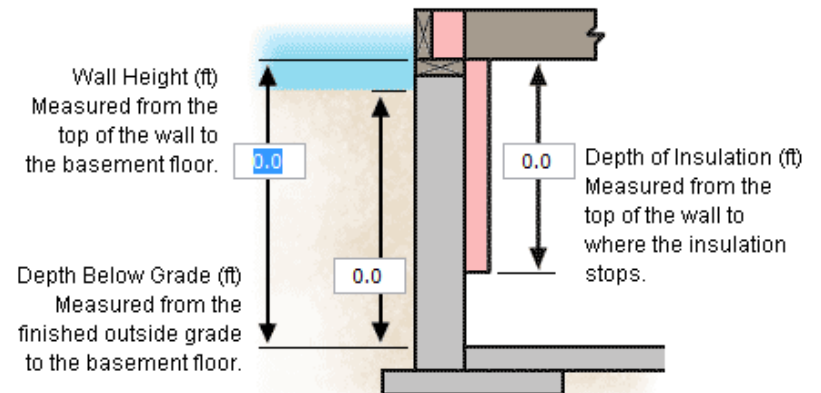
► Basement Walls



“back” below grade basement wall
(entire back wall is adjacent to
crawlspace)

Basement Walls

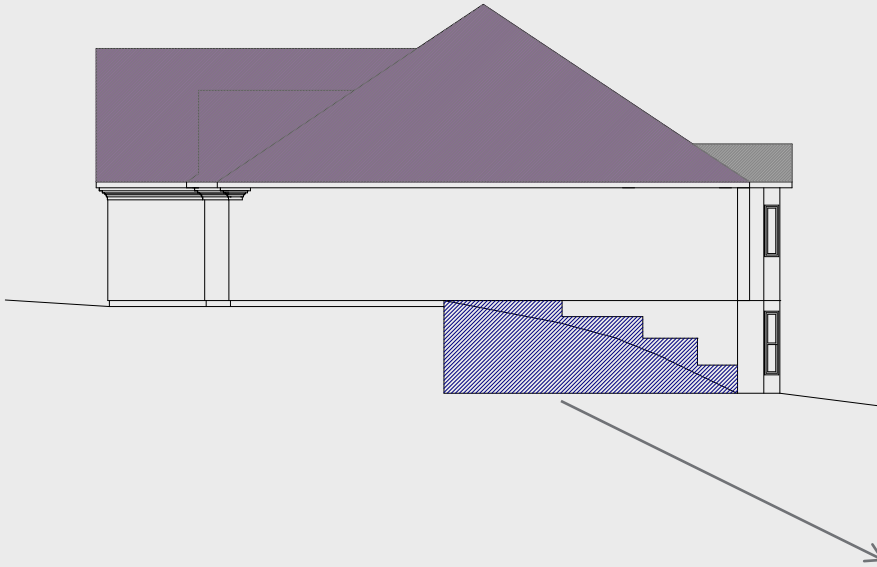
Enter the specified dimensions in feet (not inches) in the boxes provided.
A basement wall less than 50% below grade is considered an above-grade wall
and must be entered using the Wall button.



OK

Cancel

► Basement Walls



“side” below-grade basement walls

Basement Walls [X]

Enter the specified dimensions in feet (not inches) in the boxes provided.
A basement wall less than 50% below grade is considered an above-grade wall and must be entered using the Wall button.

Wall Height (ft)
Measured from the top of the wall to the basement floor.

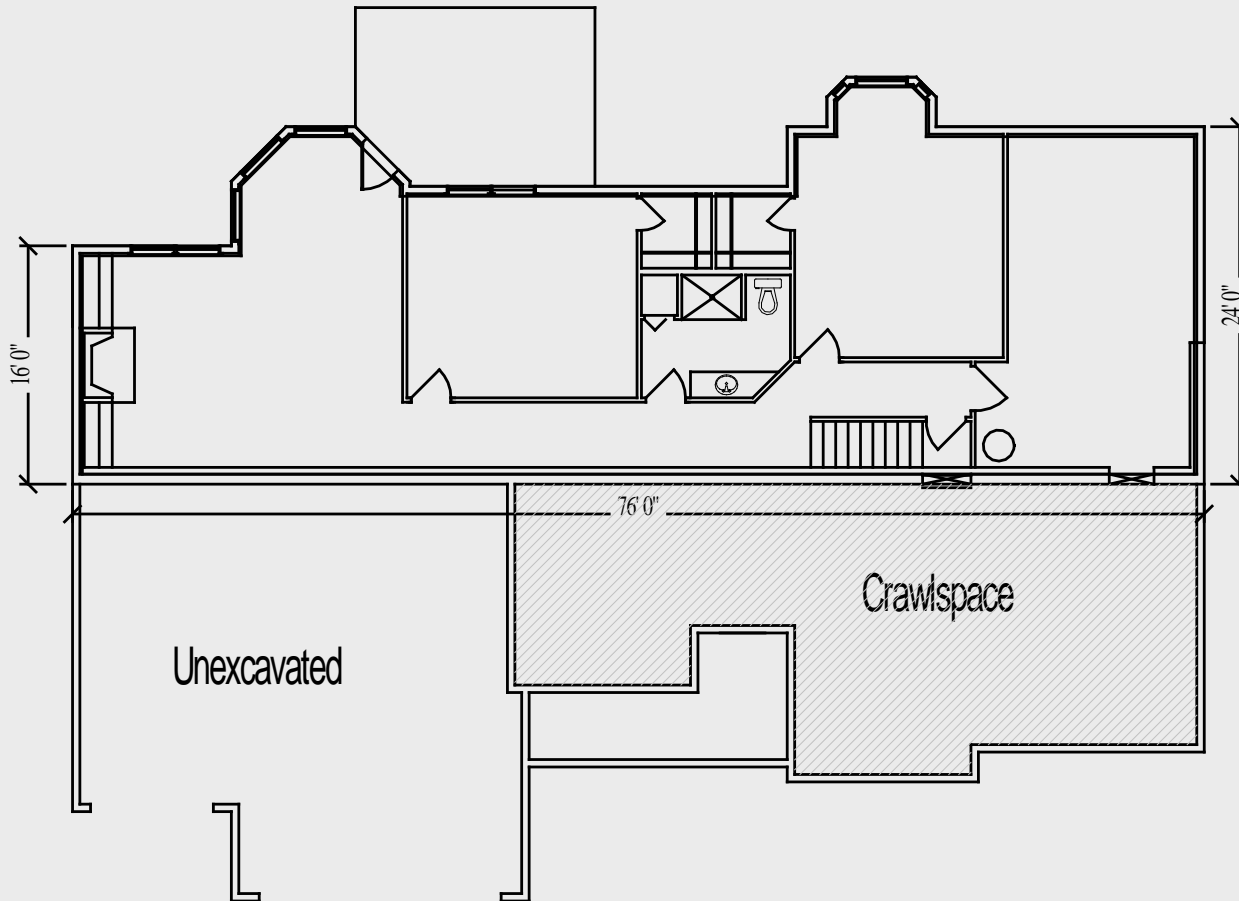
Depth Below Grade (ft)
Measured from the finished outside grade to the basement floor.

Depth of Insulation (ft)
Measured from the top of the wall to where the insulation stops.

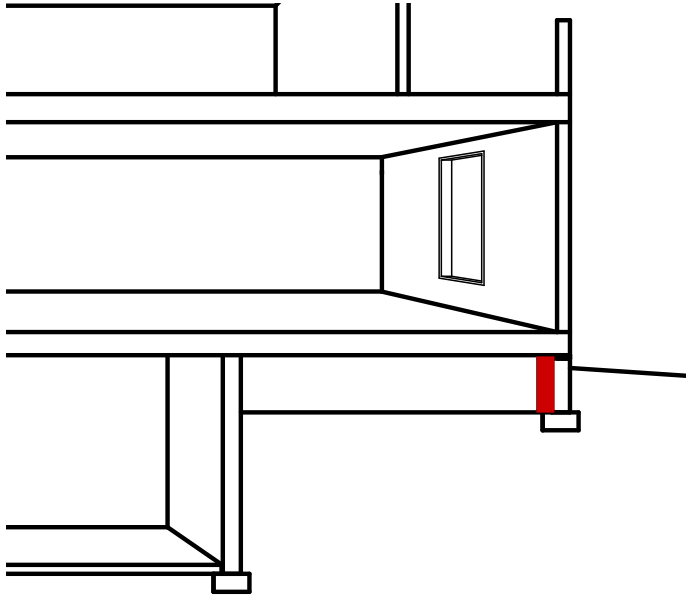
OK Cancel

► Floor Area

Crawlspace Area – 783 sf



Crawlspace Wall Insulation



Example of an Insulated crawlspace wall =

- no foundation vents to the exterior
- + mechanically vented/conditioned

This case study does NOT have a conditioned crawlspace



Crawlspace Walls in REScheck

Project		Envelope		Mechanical		Requirements									
Ceiling		Skylight		Wall		Window		Door		Basement		Floor		Crawl Wall	
	Component	Assembly	Gross Area		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA	Wall Height (ft)	Depth Below Grade (ft)	Depth of Insulation (ft)	Depth Below Inside Grade (ft)	Depth Below Inside Grade (ft)		
1	Crawl 1	Solid Concrete or Masonry	0	ft2	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		

Unventilated Crawl Space Walls

The crawl space wall option applies only to walls of unventilated crawl spaces. Enter the specified dimensions in feet (not inches) in the boxes provided.

The diagram illustrates a cross-section of a crawl space wall. The wall is shown as a vertical structure with a footing at the base. The following dimensions are indicated with arrows and input boxes:

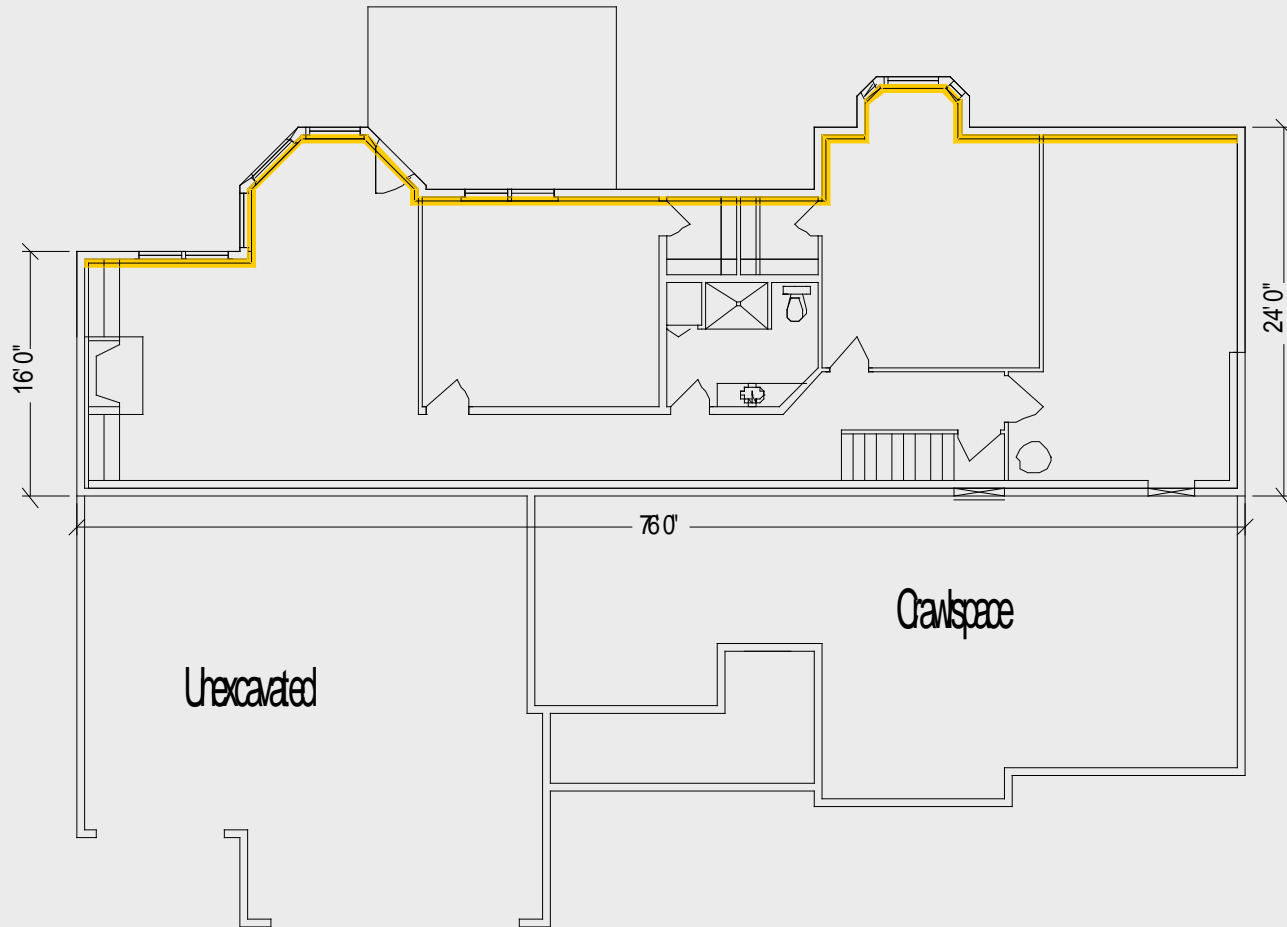
- Wall Height (ft):** Measured from the top of the wall to top of the footing. (Input: 0.0)
- Depth Below Grade (ft):** Measured from outside grade to the top of the footing. (Input: 0.0)
- Depth of Insulation (ft):** Include the total vertical plus horizontal distance. (Input: 0.0)
- Depth Below Inside Grade (ft):** Measured from inside grade to the top of the footing. (Input: 0.0)

Buttons: OK, Cancel

► Slab Perimeter

← Slab Perimeter – 93 linear feet →

Line represents the slab edge to be calculated in linear feet



Slabs in REScheck

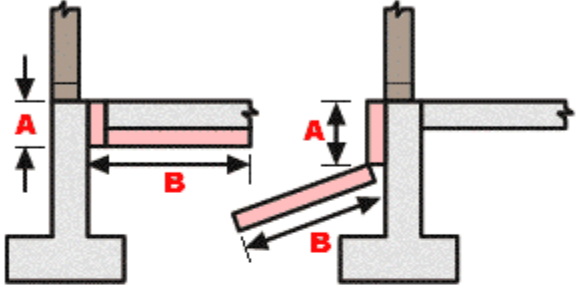
Project		Envelope		Mechanical		Requirements							
Ceiling		Skylight		Wall		Window		Door		Basement		Floor	
Component		Assembly		Gross Area		Cavi		Insula		R-Val			
Building													
1	Floor 1	Click here to select Asse...		0	ft2								
		All-Wood Joist/Truss ▶											
		Steel Frame, 16" o.c. ▶											
		Steel Frame, 24" o.c. ▶											
		Slab-On-Grade		Unheated									
		Structural Insulated Panels		Heated									
		Other (U-Factor Option) ▶											



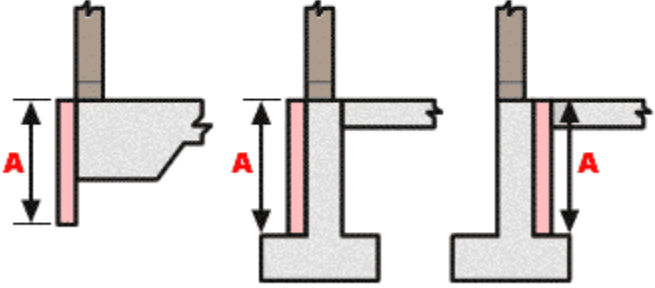
- Depth of Insulation - Enter the depth (ft) of the insulation you intend to install as measured from the top of the slab to where the insulation stops. This distance should include the total vertical plus horizontal distance. Refer to the illustration below of acceptable configurations. If you enter a depth of 0, the program assumes no insulation is to be installed.

Slab-On-Grade Floors

Enter the depth of the insulation (ft.), including the total vertical and horizontal distance:



Horizontal Insulation ($A + B = \text{Insulation Depth}$)



Vertical Insulation ($A = \text{Insulation Depth}$)

OK Cancel

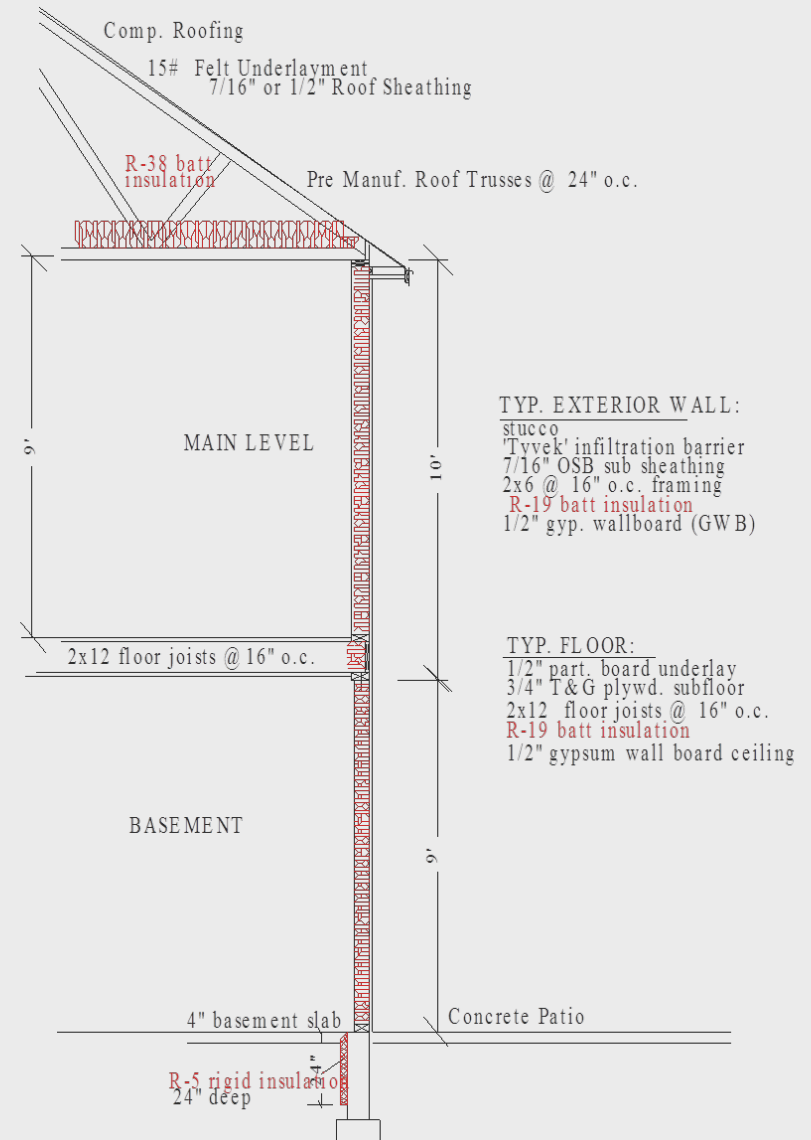
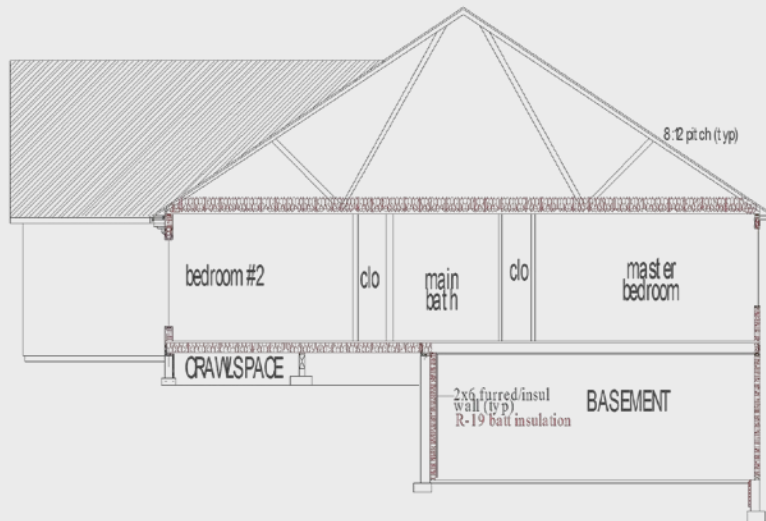
► Insulation Levels

Roof/Ceiling

Walls (above and below grade)

Floor over vented crawl space

Slab-on-grade



► Window/ Door Area

Glass Doors <50% glass - 40 sf; U-factor = 0.50

North – 40 sf

Window Area - 533 sf

North – 369 sf

South – 149 sf

West – 15 sf

U-factor = 0.35

U-factor = 0.27

SHGC = .25

Opaque Doors - 40 sf; U-factor = 0.50

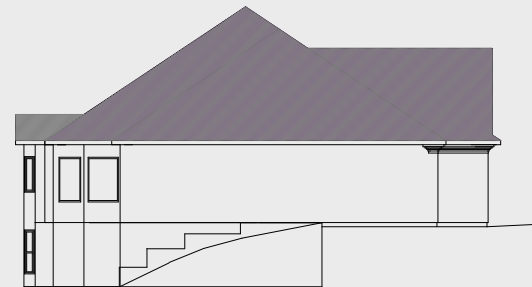
South – 40 sf



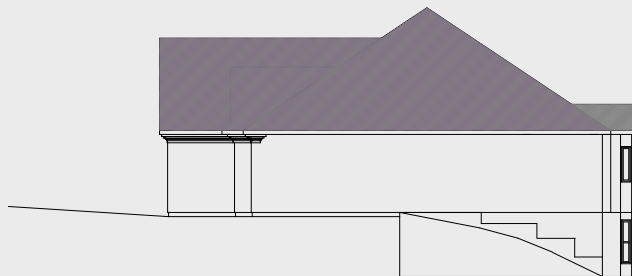
South




North



West




East




REScheck™

DOE's Building Energy Codes Program
Internet Address: www.energycodes.gov
Technical Support: techsupport@becp.pnl.gov



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Drawing Pad

THANK YOU!

Pam Cole

pam.cole@pnnl.gov

Building Energy Codes Program

www.energycodes.gov

BECP help desk

<http://www.energycodes.gov/resource-center/help-desk>