COM*check-EZ* Software Case Studies

What is COMcheck-EZ?

- **COM*check-EZ* is a computer program that can be used to demonstrate Commercial Energy Code Compliance**
- **The Software is self-contained**
  - **Energy Code book can be used as needed for reference only**
- **Relatively simple to use and very flexible**

What Do I Need to Know?

Information you need to use COM*check-EZ*:

1. **General Understanding of Windows-based Computer Programs**
2. **Basic Information about the Builder and Project to be Constructed**
3. **Building Plans including Exterior Wall Areas, Glazing Areas, Roof/Ceiling Areas, Basement Wall Areas, etc.**
4. **Insulation R-Values, NFRC Glazing and Door U-Values, etc.**
5. **Lighting**
6. **Heating and Cooling System Efficiencies**
7. **Service Water Heating**

Components that Must Comply with the Energy Code

Building Envelope

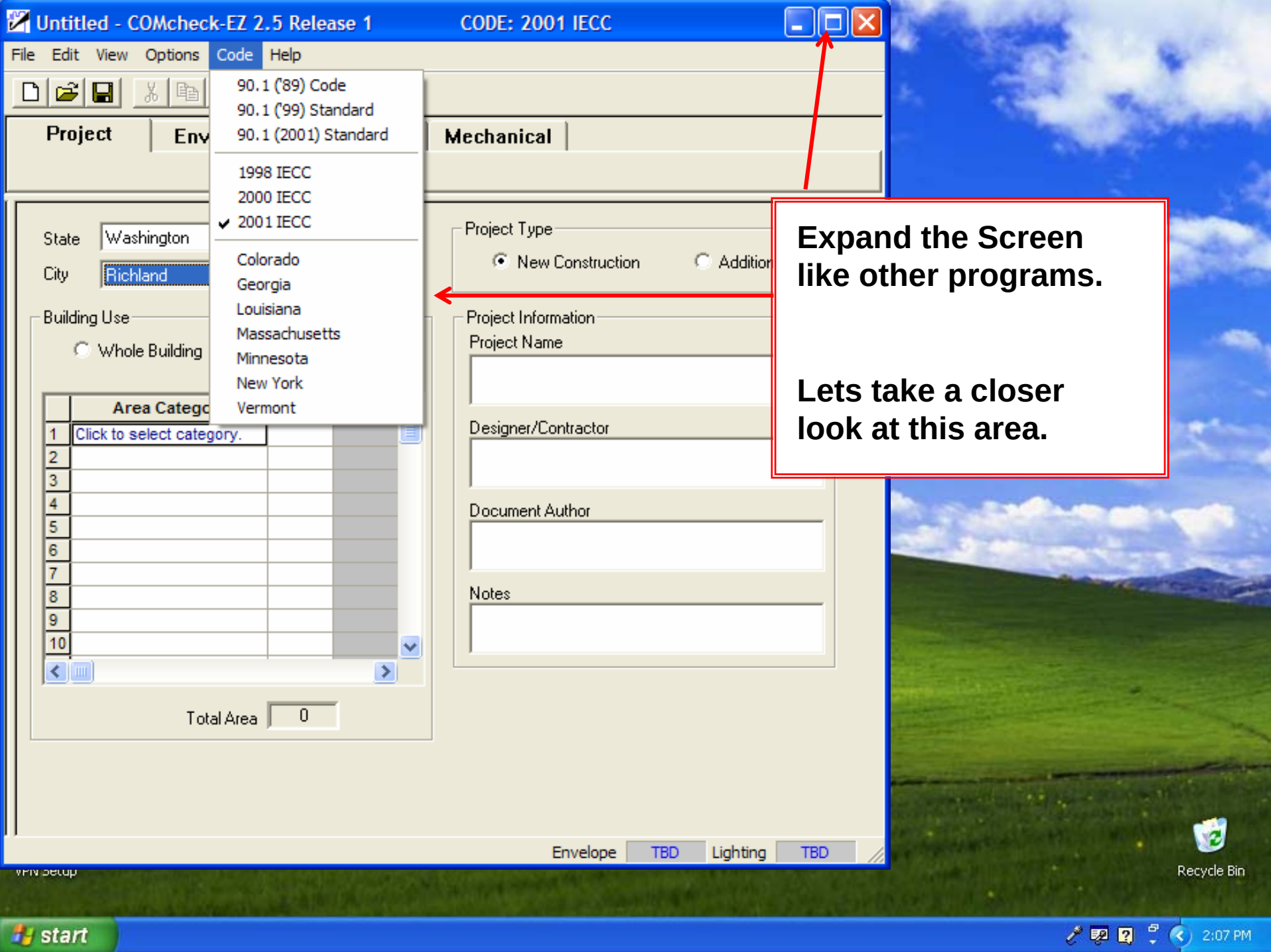
- construction assembly (materials & insulation levels)
- windows, doors & skylights

Mechanical Systems

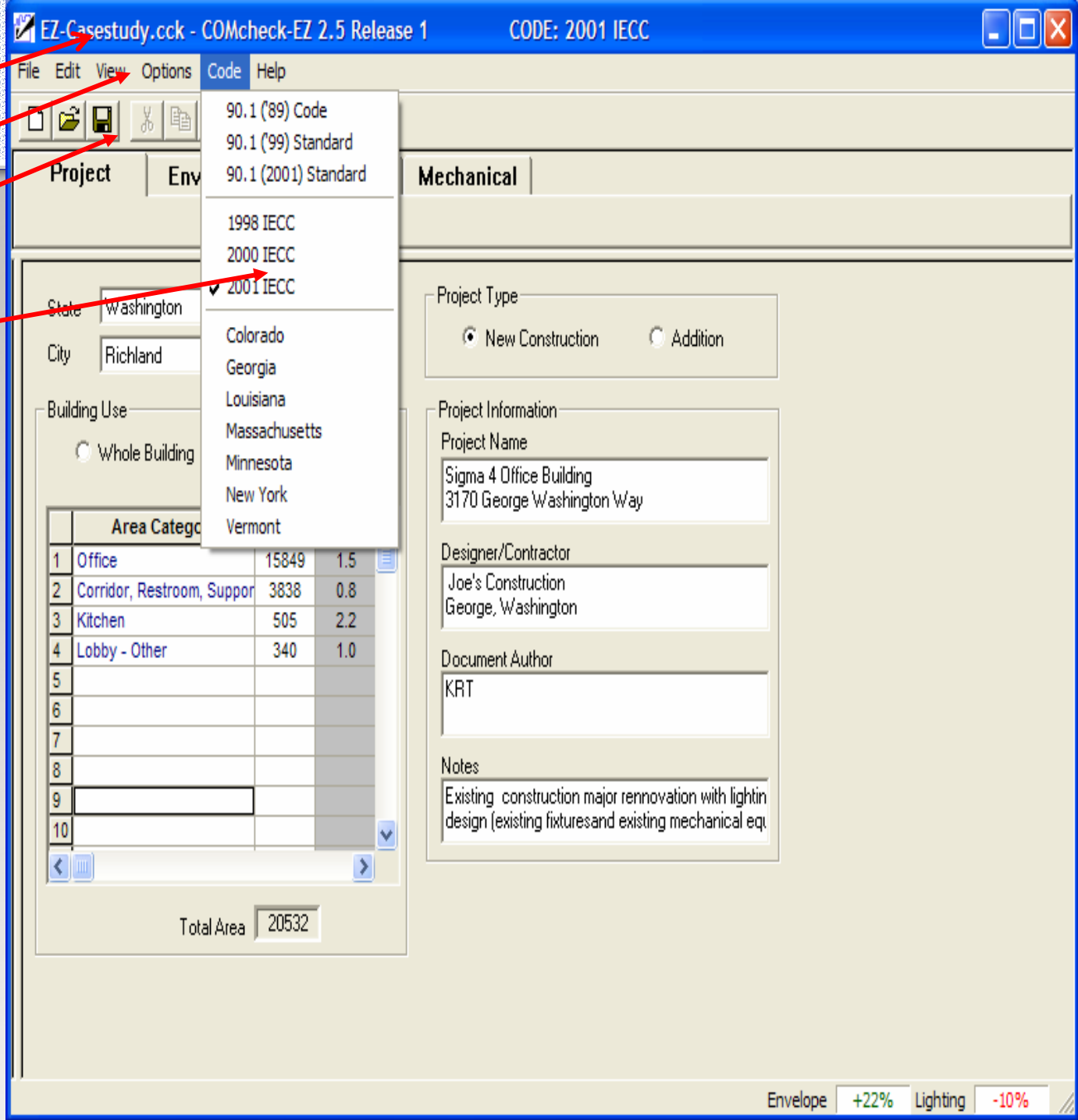
Service Water Heating

Lighting Systems

Microsoft Outlook
Software Analysis
Adobe Reader 6.0
ETR
AOL for Broadband
Internet
Instant Messenger
AdbeRdr60_...
Netscape 7.1
Microsoft Word
Netscape Mail & Newsgroups
RealOne Player
Offline PopFon Setup Instr...
VPN Setup
Recycle Bin
COMcheck-EZ™
DOE's Building Energy Codes Program
Internet Address: www.energycodes.gov
Technical Support: techsupport@becp.pnl.gov
OK
Office of Energy Efficiency and Renewable Energy • U.S. Department of Energy
start
2:07 PM


Untitled - COMcheck-EZ 2.5 Release 1
CODE: 2001 IECC
File
Edit
View
Options
Code
Help
90.1 ('89) Code
90.1 ('99) Standard
90.1 (2001) Standard
1998 IECC
2000 IECC
2001 IECC
Colorado
Georgia
Louisiana
Massachusetts
Minnesota
New York
Vermont
Project
Mechanical
State
Washington
City
Richland
Building Use
Whole Building
Area Categ
Click to select category.
Total Area
0
Project Type
New Construction
Project Information
Project Name
Designer/Contractor
Document Author
Notes
Envelope
TBD
Lighting
TBD
Expand the Screen like other programs.
Lets take a closer look at this area.
Recycle Bin
start
2:07 PM

- **Title Bar**
- **Menu Bar**
- **Toolbar**
- **Make sure the correct code is chosen.**



EZ-Casestudy.cck - COMcheck-EZ 2.5 Release 1 CODE: 2001 IECC

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

State: Washington

City: Richland

Project Type

New Construction | Addition

Building Use

Whole Building | Area Category

	Area Category	Area	W/ft2
1	Office	15849	1.5
2	Corridor, Restroom, Suppor	3838	0.8
3	Kitchen	505	2.2
4	Lobby - Other	340	1.0
5			
6			
7			
8			
9			
10			

Total Area: 20532

Project Information

Project Name

Sigma 4 Office Building
3170 George Washington Way

Designer/Contractor

Joe's Construction
George, Washington

Document Author

KRT

Notes

Existing construction major rennovation with lightin
design (existing fixturesand existing mechanical equ

Construction Type

Basic Information

Ready | Envelope +22% | Lighting -10%

EZ-Casestudy.cck - COMcheck-EZ 2.5 Release 1 CODE: 2001 IECC

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

State: Washington

City: Richland

Richland
Richmond Highlands
Ridgefield
Ritzville
Riverside (Okanogan)
Rochester
Rockford
Rock Island
Rosalia
Roslyn
Roy
Royal City
Ruston
Saint John (Whitman)
Salmon Creek
Satus
SeaTac
Seattle
Sedro-Woolley
Selah
Sequim
Shelton
Silverdale

Building

Project Type
- New Construction
- Addition

Project Information

Project Name
Sigma 4 Office Building
3170 George Washington Way

Designer/Contractor
Joe's Construction
George, Washington

Document Author
KRT

Notes
Existing construction major rennovation with lightin
design (existing fixturesand existing mechanical equ

If you can't find the building's city, choose a nearby city that has similar weather conditions.

Envelope +22% Lighting -10%

EZ-Casestudy.cck - COMcheck-EZ 2.5 Release 1 CODE: 2001 IECC

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Four Main Screens

Building Use

Whole Bldg. or

Area Category

State: Washington

City: Richland

Project Type: New Construction | Addition

Building Use: Whole Building | Area Category

	Area Category	Area	W/ft2
1	Office	15849	1.5
2	Corridor, Restroom, Suppor	3838	0.8
3	Kitchen	505	2.2
4	Lobby - Other	340	1.0
5			
6			
7			
8			
9			
10			

Total Area: 20532

Project Information

Project Name: Sigma 4 Office Building 5170 George Washington Way

Designer/Contractor: Joe's Construction George, Washington

Document Author: KRT

Notes: Existing construction major rennovation with lightin design (existing fixturesand existing mechanical equ

Compliance Results:

Ready

Envelope +22% Lighting -10%

EZ-Casestudy.cck - COMcheck-EZ 2.5 Release 1 CODE: 2001 IECC

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Roof | Skylight | Ext. Wall | Int. Wall | Window | Door | Basement | Floor

- Building
  - Roof 1
  - Exterior Wall 1
    - Window 1
    - Door 1
    - Door 2
  - Floor 1

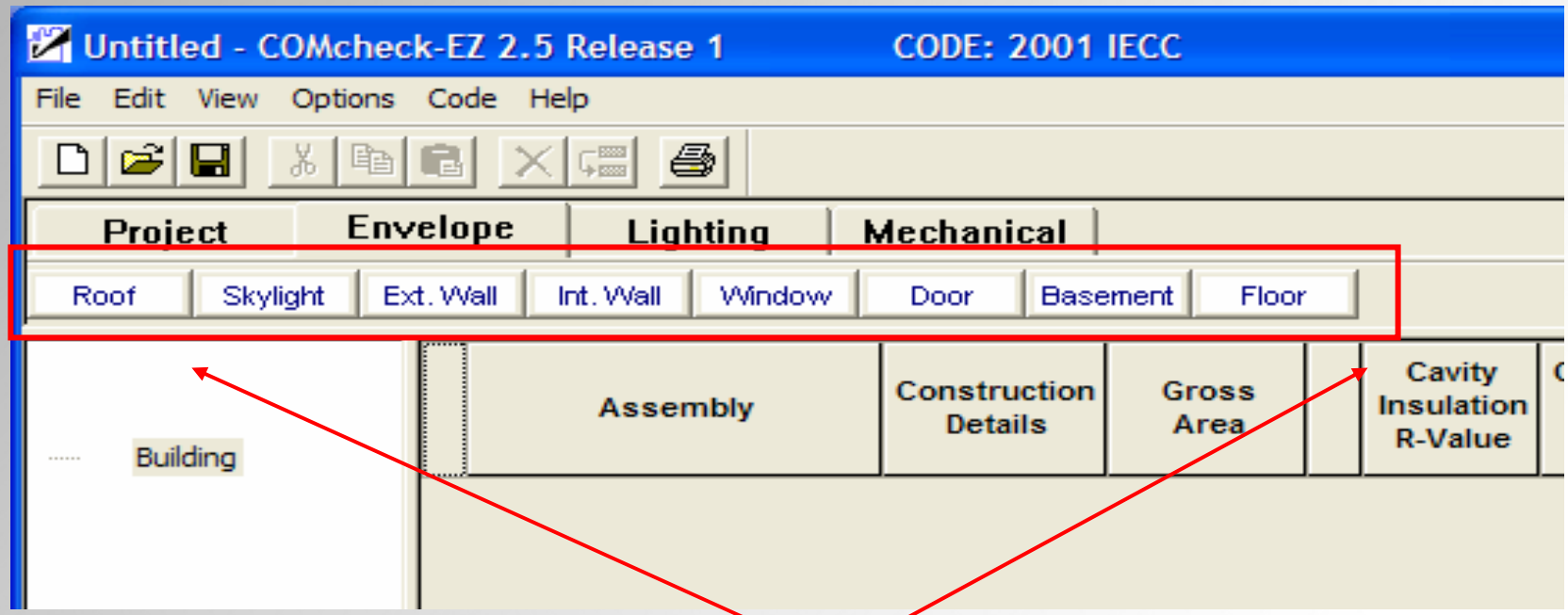
	Assembly	Construction Details	Gross Area or Slab Perimeter		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	SHGC	Projection Factor
1	Non-Wood Joist/Rafter/Truss		20532	ft2	19.0	8.0	0.040		
2	Metal Frame, 16" o.c.		8172	ft2	10.0	0.0	0.145		
3	M						0.690	0.57	0.50
4	G						0.920	0.47	0.00
5	C						0.700		
6	U								

Main Building Envelope

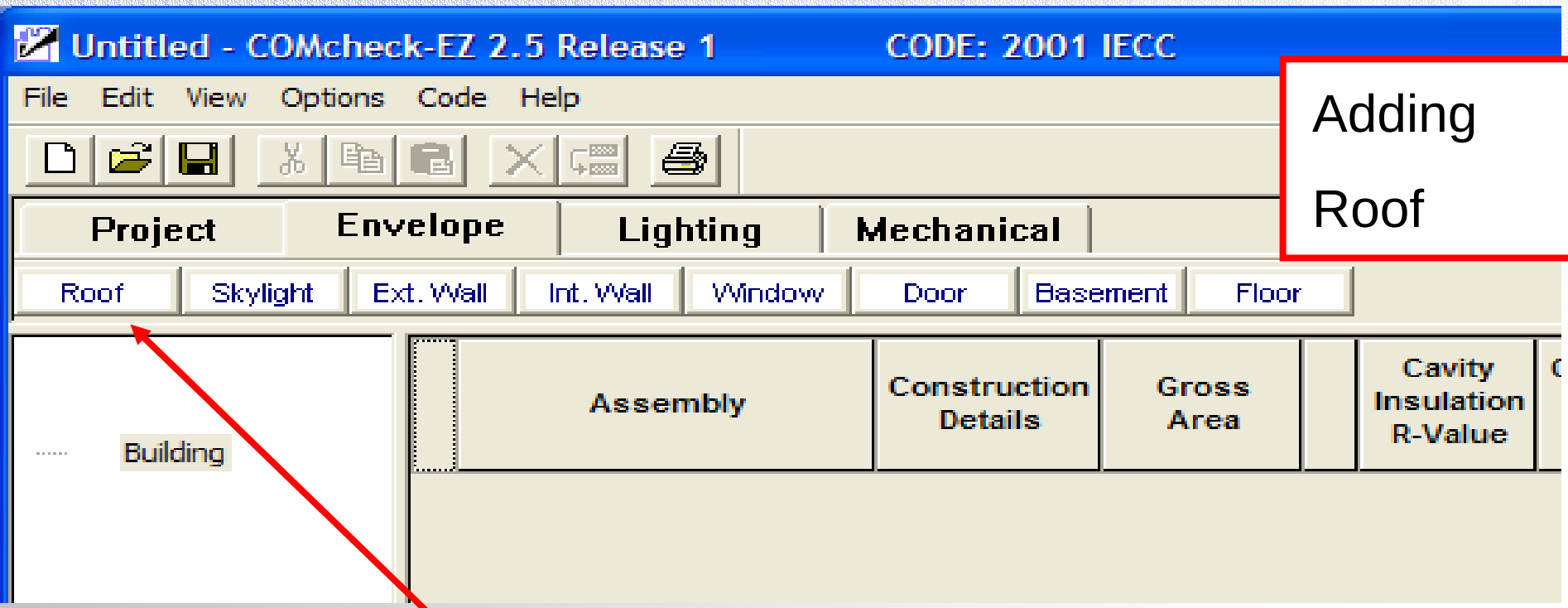
1. This is where you add square footage values for roofs, exterior walls, windows, etc.
2. This is where you add U-factors and R-values for ceilings, exterior walls, windows etc.
3. Continuous insulation is entered separately from cavity insulation.

Use the Options Menu to Add or Remove Orientation and Daylighting Control Factor. Envelope +22% Lighting -10%

Envelope Section



Building Components are added by clicking on these.



Adding Roof

Step 1:

Click on Roof

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File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Roof | Skylight | Ext. Wall | Int. Wall | Window | Door | Basement | Floor

Adding Roofs

Building
Roof 4

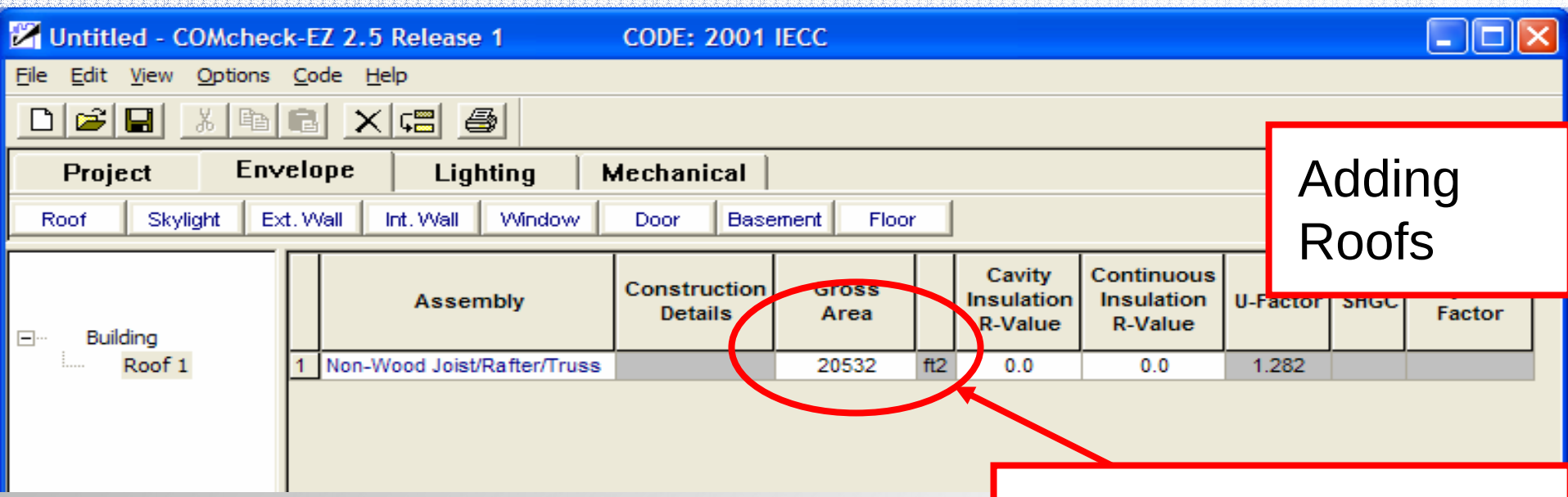
	Assembly	Construction Details	Gross Area		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	SHGC	Projection Factor
1			0	ft2					

- All-Wood Joist/Rafter/Truss
- Non-Wood Joist/Rafter/Truss
- Structural Slab
- Metal Roof without Thermal Blocks
- Metal Roof with Thermal Blocks
- Other

Step 2:

Select Roof Type (This can be repeated so that different roof types and any number of skylights can be added individually.)

Click the Assembly fields to display a list of assembly choices. "Other" assembly types are editable. Envelope TBD Lighting TBD

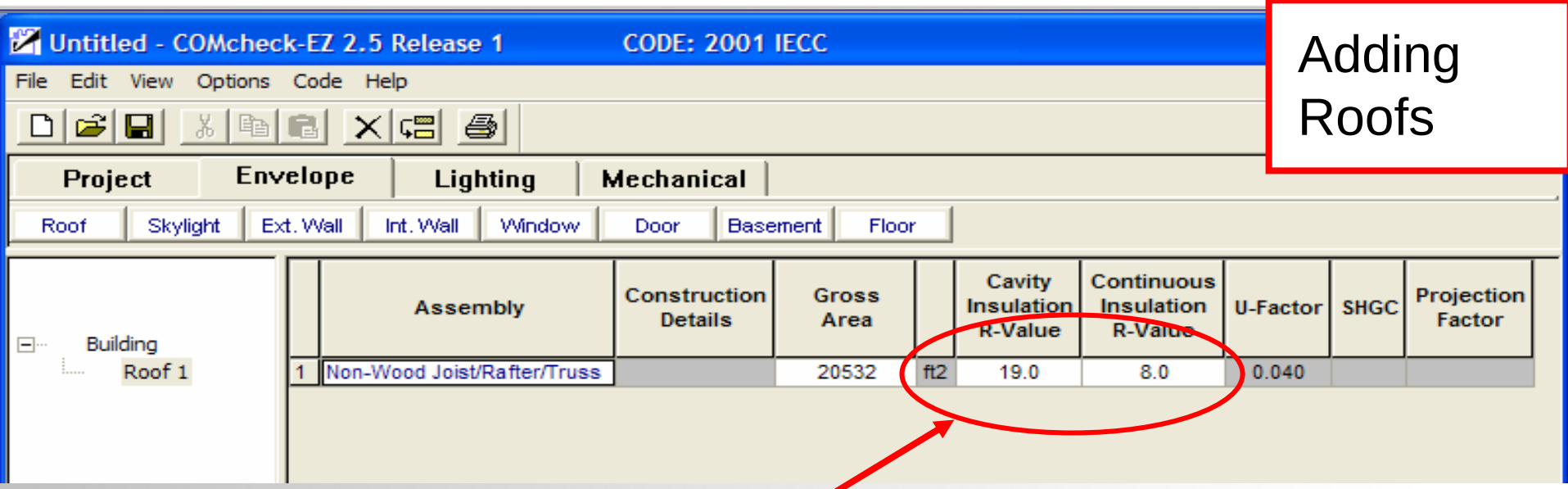


Adding Roofs

Step 3:

Add square footage (In this case 20532 square feet)

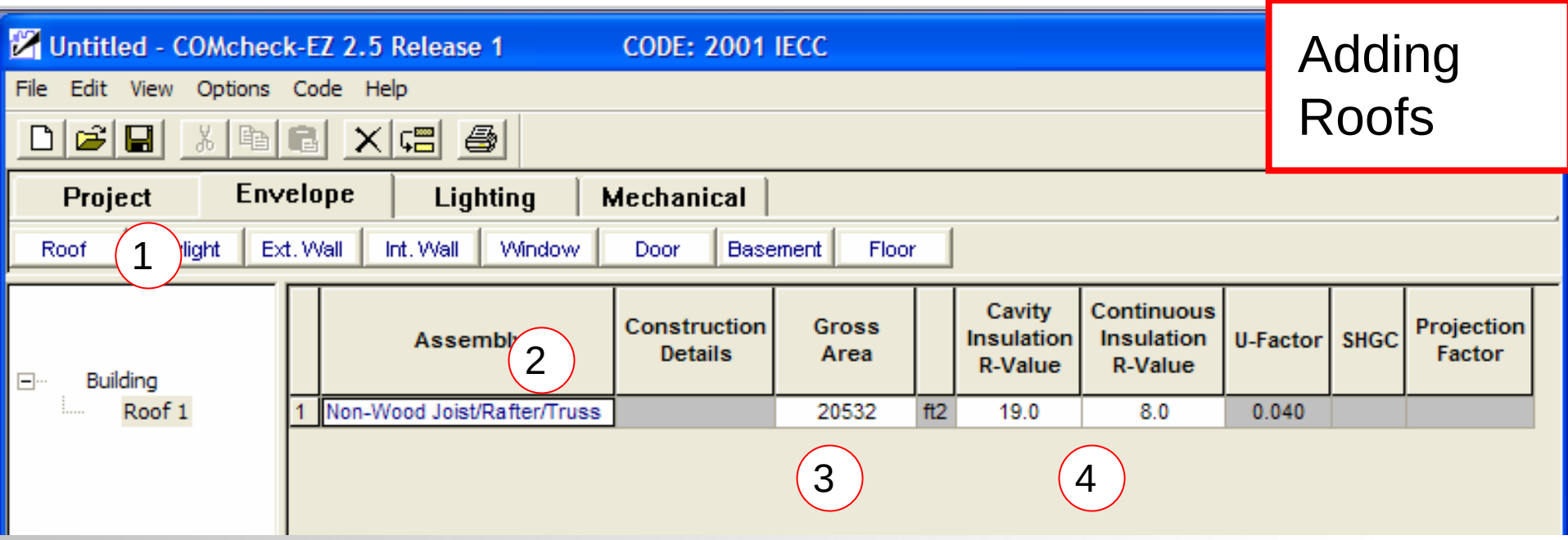
Adding Roofs



Step 4:

Add insulation R-Value (R-19 cavity and R-8.0 continuous in this example)

Adding Roofs



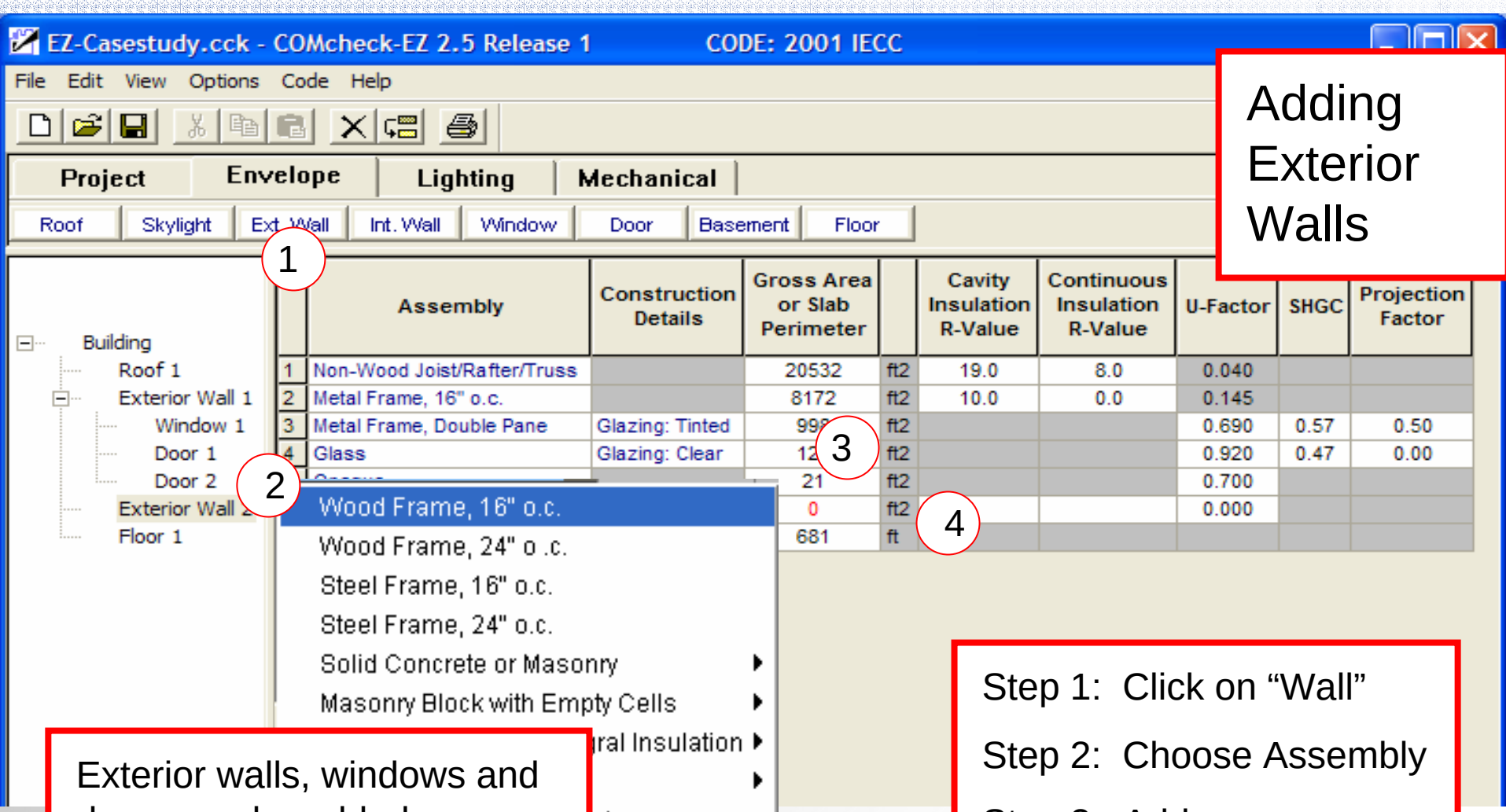
Step 1: Click on “Roof”

Step 2: Select Roof type

Step 3: Add square footage

Step 4: Add insulation R-Value

Adding Exterior Walls



Exterior walls, windows and doors can be added as a total sum or each exposure can be added separately

Step 1: Click on “Wall”

Step 2: Choose Assembly

Step 3: Add square footage

Step 4:Add the R-Values

Adding Windows

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File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Roof | Skylight | Ext. Wall | Int. Wall | Window | Door | Basement | Floor

- Building
  - Roof 1
  - Exterior Wall 1
    - Window 1
    - Door 1
    - Door 2
  - Floor 1

	Assembly	Construction Details	Gross Area or Slab Perimeter		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	SHGC	Projection Factor
1	Non-Wood Joist/Rafter/Truss		20532	ft2	19.0	8.0	0.040		
2	Metal Frame, 16" o.c.		8172	ft2	10.0	0.0	0.145		
3	Metal Frame, Double Pane	Glazing, Tinted	998	ft2			0.690	0.57	0.50
4							0.920	0.47	0.00
5							0.700		
6									

- Metal Frame
  - Single Pane
  - Double Pane
  - Double Pane with Low-E
  - Triple Pane
  - Triple Pane with Low-E
- Metal Frame with Thermal Break
- Wood Frame
- Vinyl Frame
- Other

EZ-Casestudy.cck - COMcheck-EZ 2.5 Release 1 CODE: 2001 IECC

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Roof | Skylight | Ext. Wall | Int. Wall | Window | Door | Basement | Floor

Basement Walls

- Building
  - Roof 1
  - Exterior Wall 1
    - Window 1
    - Door 1
    - Door 2
  - Basement Wall 1
  - Floor 1

	Assembly	Construction Details	Gross Area or Slab Perimeter		Cavity Insulation R-Value	Continuous Insulation R-Value	U-F		
1	Non-Wood Joist/Rafter/Truss		20532	ft2	19.0	8.0	0.040		
2	Metal Frame, 16" o.c.		8172	ft2	10.0	0.0	0.145		
3	Metal Frame, Double Pane	Glazing: Tinted	998	ft2			0.690	0.57	0.50
4	Glass	Glazing: Clear	126	ft2			0.920	0.47	0.00
5	Opaque		21	ft2			0.700		
6			0	ft2					
7		lone	681	ft					

- Solid Concrete or Masonry <= 8"
- Solid Concrete or Masonry > 8"
- CMU <=8" with Empty Cells
- CMU >8" with Empty Cells
- CMU <=8" with Integral Insulation
- CMU >8" with Integral Insulation
- Other

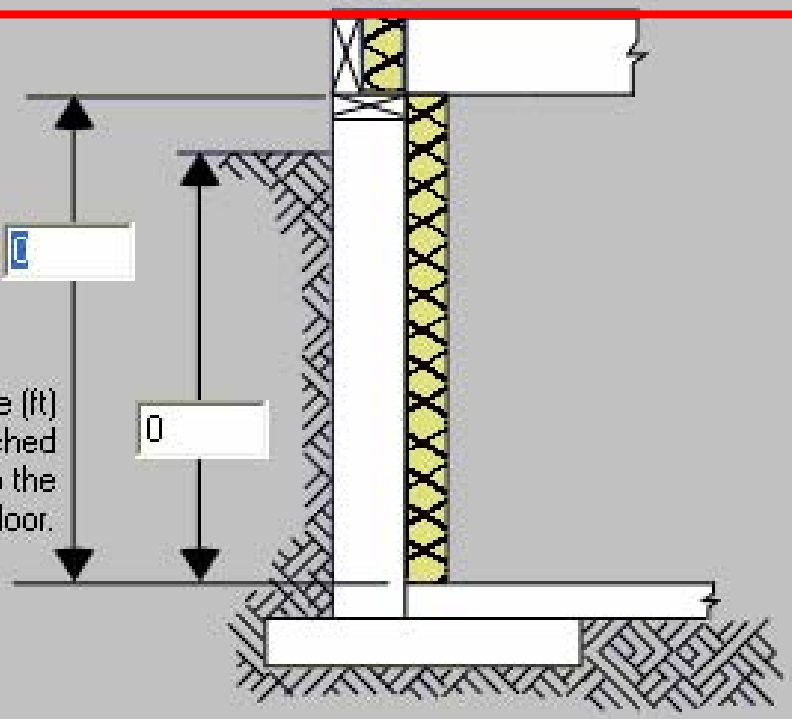
Basement Walls

Enter the specified dimensions in feet (not inches) in the boxes provided. Basement walls are walls that are partially or fully below grade. Ignore portions of walls that are more than 10 ft below grade.

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

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

0



OK Cancel

EZ-Casestudy.cck - COMcheck-EZ 2.5 Release 1 CODE: 2001 IECC

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Roof | Skylight | Ext. Wall | Int. Wall | Window | Door | Basement | Floor

Adding Floors

- Building
  - Roof 1
  - Exterior Wall 1
    - Window 1
    - Door 1
    - Door 2
  - Floor 1

	Assembly	Construction Details	Gross Area or Slab Perimeter		Cavity Insulation R-Value	Continuous Insulation R-Value	U-F		
1	Non-Wood Joist/Rafter/Truss		20532	ft2	19.0	8.0	0.040		
2	Metal Frame, 16" o.c.		8172	ft2	10.0	0.0	0.145		
3	Metal Frame, Double Pane	Glazing: Tinted	998	ft2			0.690	0.57	0.50
4	Glass	Glazing: Clear	126	ft2			0.920	0.47	0.00
5	Opaque		21	ft2			0.700		
6	Unheated Slab-On-Grade	Insulation: None	681	ft					

- No Insulation
- Horizontal Insulation ▸
  - 1 ft
  - 2 ft
  - 3 ft
  - 4 ft
  - Continuous
- Vertical Insulation ▸

Slab-On-Grade should be entered in linear feet

EZ-Casestudy.cck - COMcheck-EZ 2.5 Release 1 CODE: 2001 IECC

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

T8 / T12 Fluor. | Compact Fluor. | HID | Incandescent

Building
- T8 / T12 Fluorescent 1
- T8 / T12 Fluorescent 6
- T8 / T12 Fluorescent 3
- T8 / T12 Fluorescent 4
- T8 / T12 Fluorescent 2

	Fixture ID	Fixture Description	Lamp Description/ Wattage Per Lamp	Ballast	Lamps Per Fixture	Number of Fixtures	Fixture Wattage
1	A	2 x 4 Parabolic Troffer	48" T12 40W	Magnetic	4	174	139
2	B	2 x 4 Parabolic Troffer	48" T12 40W	Magnetic	2	31	70
3	C	1 x 4 ParabolicTroffer	48" T12 40W	Magnetic	2	5	70
4	D	2 x 2 Prismatic Troffer	24" T12U 40W	Magnetic	2	53	70
5	E	2 x 4 Prismatic Troffer	48" T12 40W	Magnetic	2	11	70

Lighting components are added by clicking on these

Lighting Results

Allowed Wattage 28295

Proposed Wattage 31186

Use the Options Menu to Arrange Lighting Fixtures by Spaces.

Envelope +22% Lighting -10%

EZ-Casestudy.cck - COMcheck-EZ 2.5 Release 1 CODE: 2001 IECC

File Edit View Options Code Help

Comments/Description (Envelope)

Orientation (Envelope)

Daylight Control Factor (Envelope)

Spaces (Lighting)

Exemptions and Allowances (Lighting)

Project echanical

T8 / T12 Fluor. ent

Building

- T8 / T12 Fluorescent 1
- T8 / T12 Fluorescent 5
- T8 / T12 Fluorescent 3
- T8 / T12 Fluorescent 4
- T8 / T12 Fluorescent 2

	Fixture ID	Fixture Description	Lamp Description/ Wattage Per Lamp	Ballast	Lamps Per Fixture	Number of Fixtures	Fixture Wattage
1	A	2 x 4 Parabolic Troffer	48" T12 40W	Magnetic	4	174	139
2	B	2 x 4 Parabolic Troffer	48" T12 40W	Magnetic	2	31	70
3	C	1 x 4 ParabolicTroffer	48" T12 40W	Magnetic	2	5	70
4	D	2 x 2 Prismatic Troffer	24" T12U 40W	Magnetic	2	53	70
5	E	2 x 4 Prismatic Troffer	48" T12 40W	Magnetic	2	11	70

Lighting Options:
Spaces
Exemptions and Allowances

Allowed Wattage 28295 Proposed Wattage 31186

Envelope +22% Lighting -10%

EZ-Casestudy.cck - COMcheck-EZ 2.5 Release 1 CODE: 2001 IECC

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

T8 / T12 Fluor. | Compact Fluor. | HID | Incandescent | Add Space

- Building
  - Space 1
    - T8 / T12 Fluorescent 1
    - T8 / T12 Fluorescent 6
    - T8 / T12 Fluorescent 3
    - T8 / T12 Fluorescent 4
    - T8 / T12 Fluorescent 2

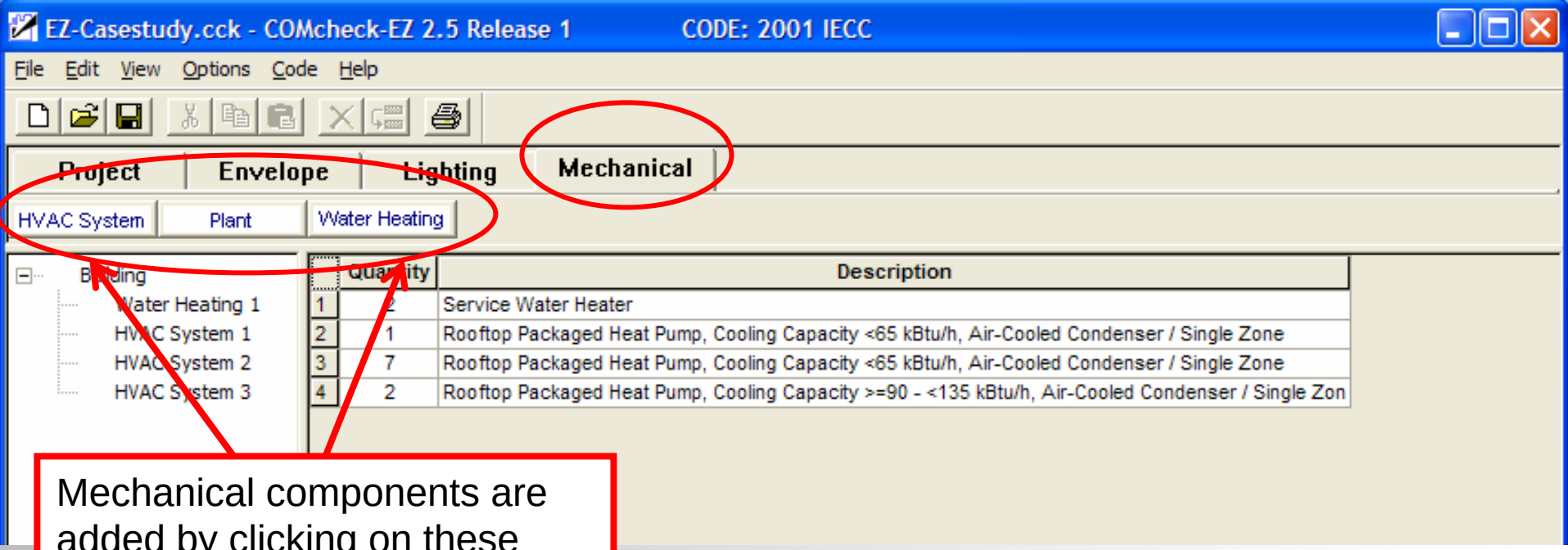
	Fixture ID	Fixture Description	Lamp Description/ Wattage Per Lamp	Ballast	Lamps Per Fixture	Number of Fixtures	Fixture Wattage	Exemption Allowance
1	Space 1							
2	A	2 x 4 Parabolic Troffer	48" T12 40W	Magnetic	4	174	139	None
3	B	2 x 4 Parabolic Troffer	48" T12 40W	Magnetic	2	31	70	None
4	C	1 x 4 ParabolicTroffer	48" T12 40W					
5	D	2 x 2 Prismatic Troffer	24" T12U 40W					
6	E	2 x 4 Prismatic Troffer	48" T12 40W					

None
Exemption
Allowance

None
Special Medical/Dental/Research
Professional Sports Arena Playing Field
Gallery/Museum/Monument Exhibits
Lighting in Residential Dwelling Units
Emergency Lighting (Automatic Control)

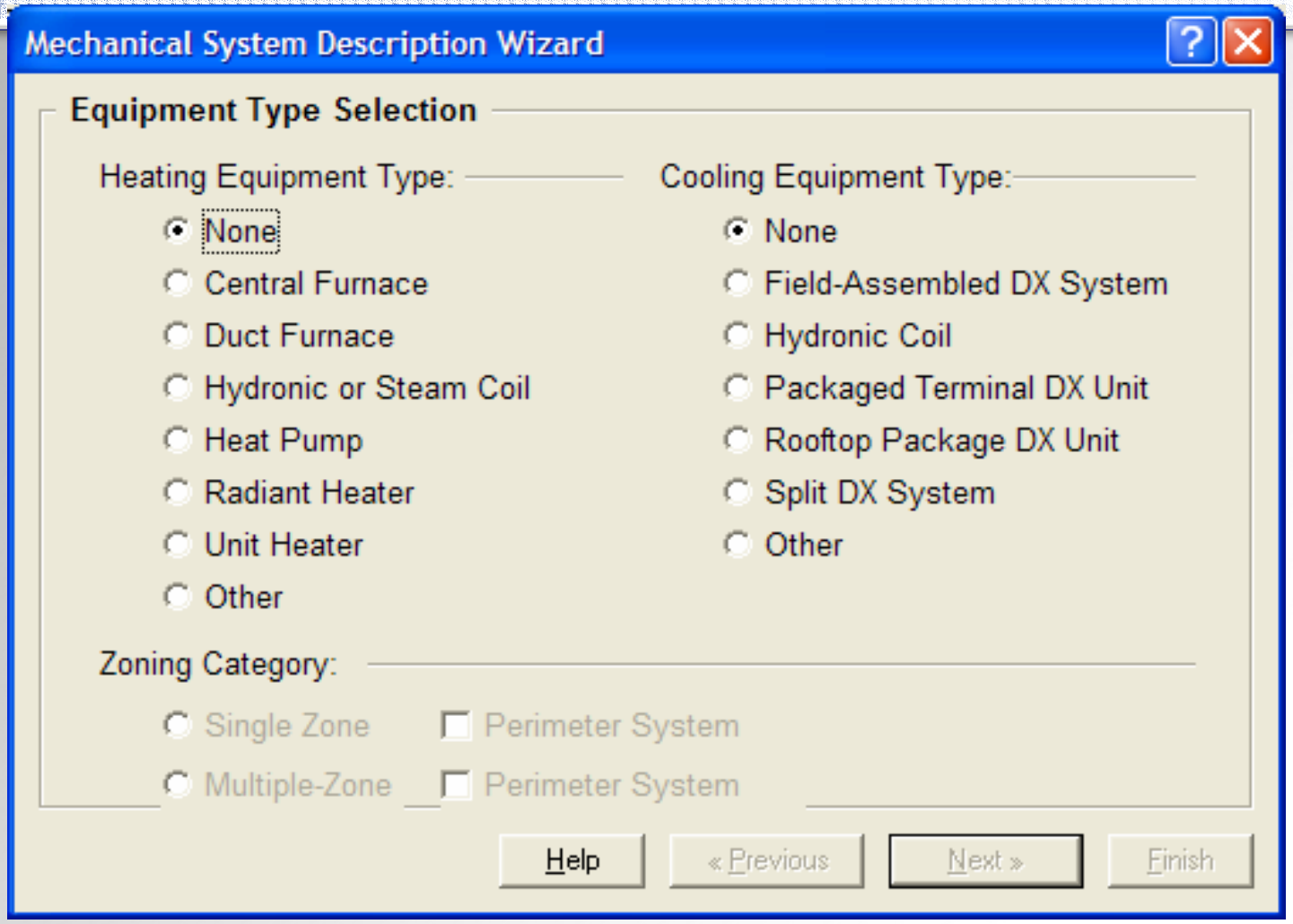
Allowed Wattage 28295 Proposed Wattage 31186

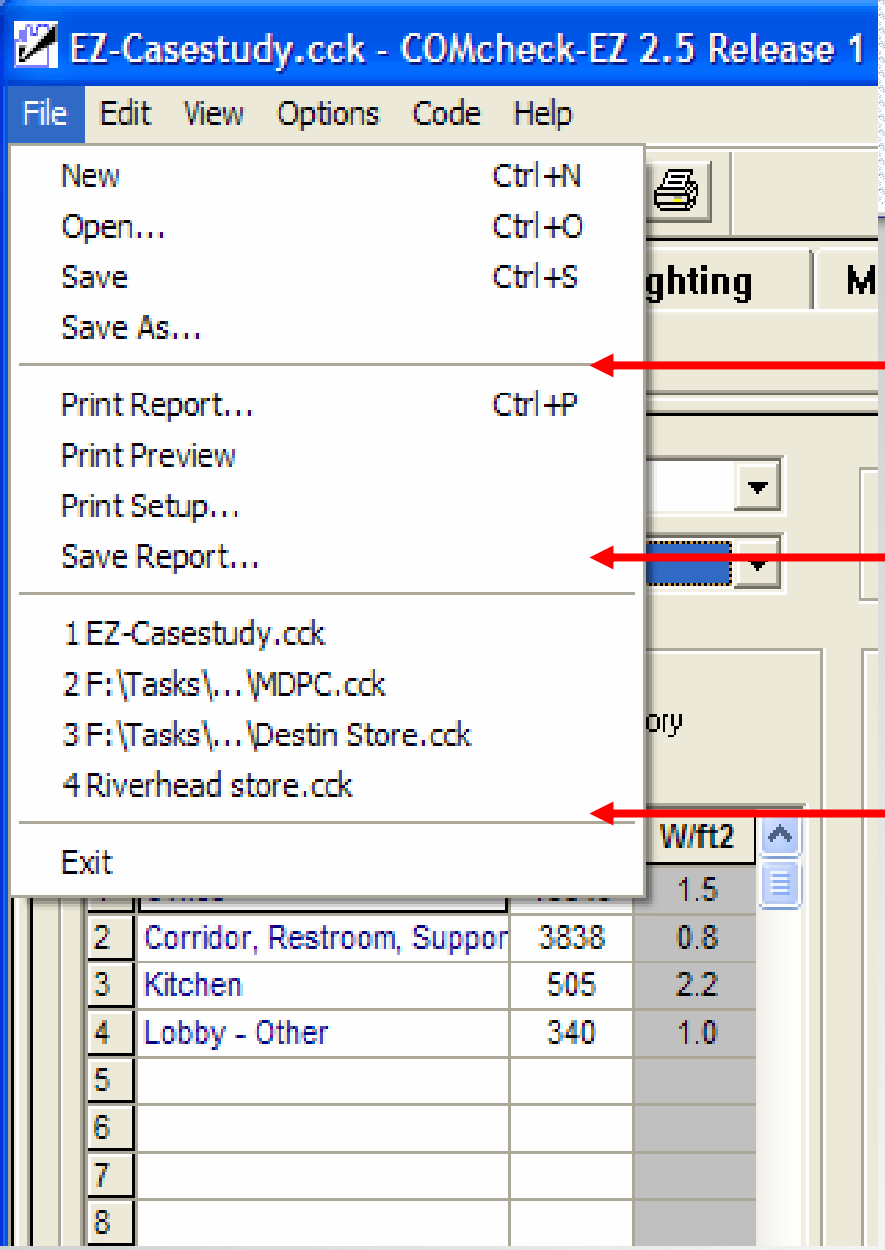
Lighting FAILS: Design 10% worse than code Envelope +22% Lighting -10%



Mechanical components are added by clicking on these

The Mechanical section generates a customized list of mandatory requirements applicable to the mechanical components you identify.


Mechanical System Description Wizard
Equipment Type Selection
Heating Equipment Type:
None
Central Furnace
Duct Furnace
Hydronic or Steam Coil
Heat Pump
Radiant Heater
Unit Heater
Other
Cooling Equipment Type:
None
Field-Assembled DX System
Hydronic Coil
Packaged Terminal DX Unit
Rooftop Package DX Unit
Split DX System
Other
Zoning Category:
Single Zone
Perimeter System
Multiple-Zone
Perimeter System
Help
« Previous
Next »
Finish

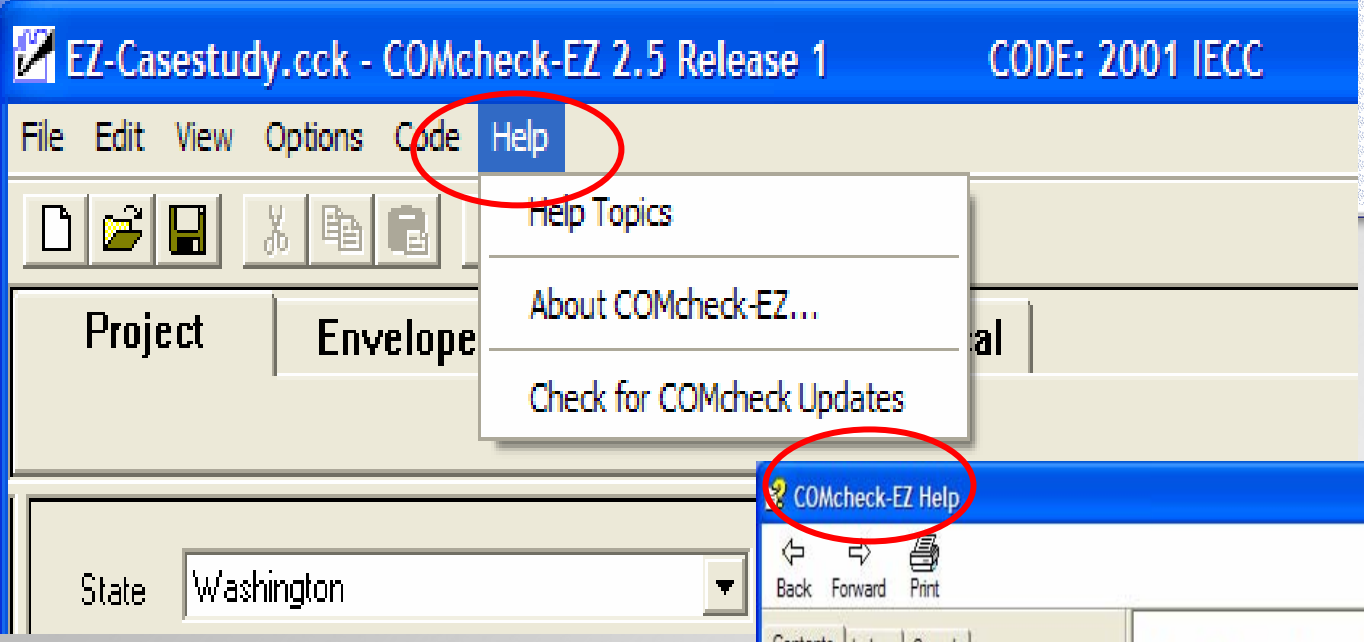


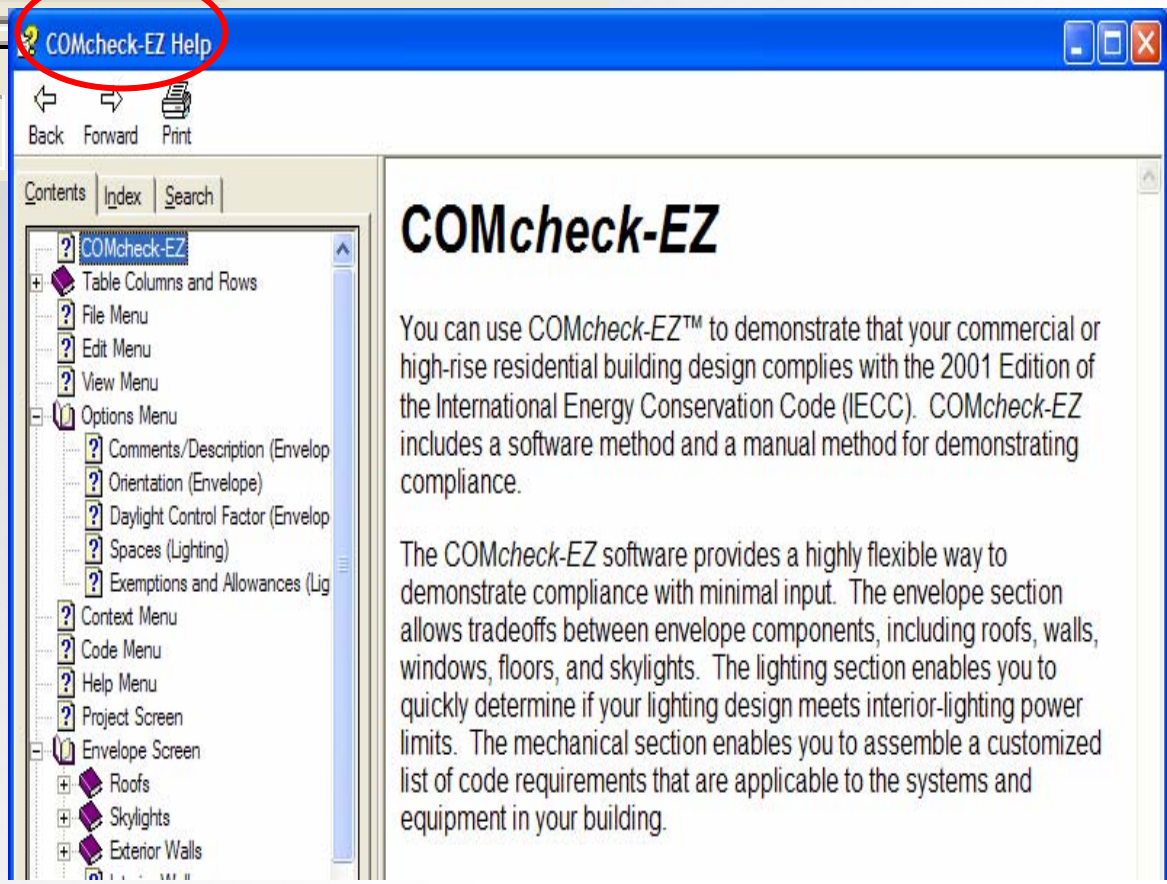
Save as many files as you like

Print and Preview reports

Last files worked on are here

Need Help?


EZ-Casestudy.cck - COMcheck-EZ 2.5 Release 1
CODE: 2001 IECC
File
Edit
View
Options
Code
Help
Help Topics
About COMcheck-EZ...
Check for COMcheck Updates
Project
Envelope
State
Washington


COMcheck-EZ Help
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View Menu
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Orientation (Envelope)
Daylight Control Factor (Envelop
Spaces (Lighting)
Exemptions and Allowances (Lig
Context Menu
Code Menu
Help Menu
Project Screen
Envelope Screen
Roofs
Skylights
Exterior Walls
COMcheck-EZ
You can use COMcheck-EZ™ to demonstrate that your commercial or high-rise residential building design complies with the 2001 Edition of the International Energy Conservation Code (IECC). COMcheck-EZ includes a software method and a manual method for demonstrating compliance.
The COMcheck-EZ software provides a highly flexible way to demonstrate compliance with minimal input. The envelope section allows tradeoffs between envelope components, including roofs, walls, windows, floors, and skylights. The lighting section enables you to quickly determine if your lighting design meets interior-lighting power limits. The mechanical section enables you to assemble a customized list of code requirements that are applicable to the systems and equipment in your building.

FOR
LEASE

•Sigma 2 Bldg. Floor Plan

Window/ Door Schedule

D1	6' x 7' Glass Entry Door - single pane tinted	3
D2	3' x 7' Opaque Entry Door	1
W1	3'0" x 4'6" aluminum, double paned, solar bronzed tint	48
W2	8'0" x 7'0" aluminum, double paned, solar bronzed tint	4
W3	6'0" x 7'0" aluminum, double paned, solar bronzed tint	3

•Sigma 2 Bldg.
Building Envelope

Roof: 20,532 sq.ft. Wood truss R-19 Insulation

Exterior Walls: 8172 sq.ft. 2 X 4 Metal Frame at 16" O.C., R-10 Insulation

Walls Perimeter = 681 ln. ft.

Windows: 998 sq.ft. Metal Frame, double pane, tinted, U-value .69, SHGC-Value .57, P.F. .50

Window/Wall Ratio = 12%

Glass Doors: 126 sq. ft. Clear Glazing, U-value .92, SHGC-Value .47

Metal Door: 21 s.f. U-value .70

Floor: 20,532 sq. ft./681 linear feet, unheated slab on grade, no insulation

2 Storage Water Heaters, Electric, 80 gal. capacity

Activity Areas

Office: 15,849 sq.ft.

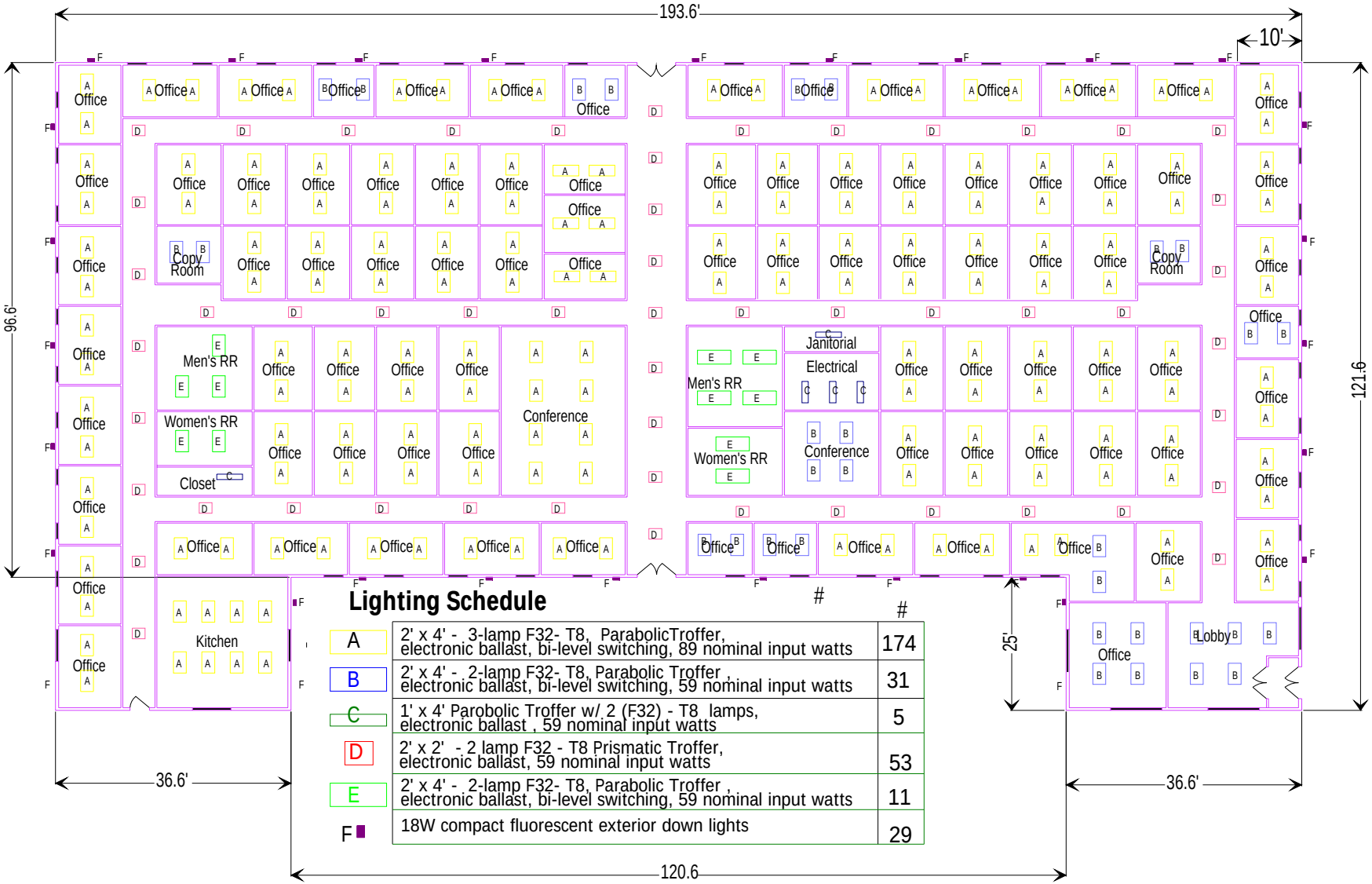
Halls/Corridors/Transitions: 3338 sq.ft.

Restrooms: 500 sq.ft.

Kitchen: 505 sq.ft.

Lobby: 340 sq.ft.

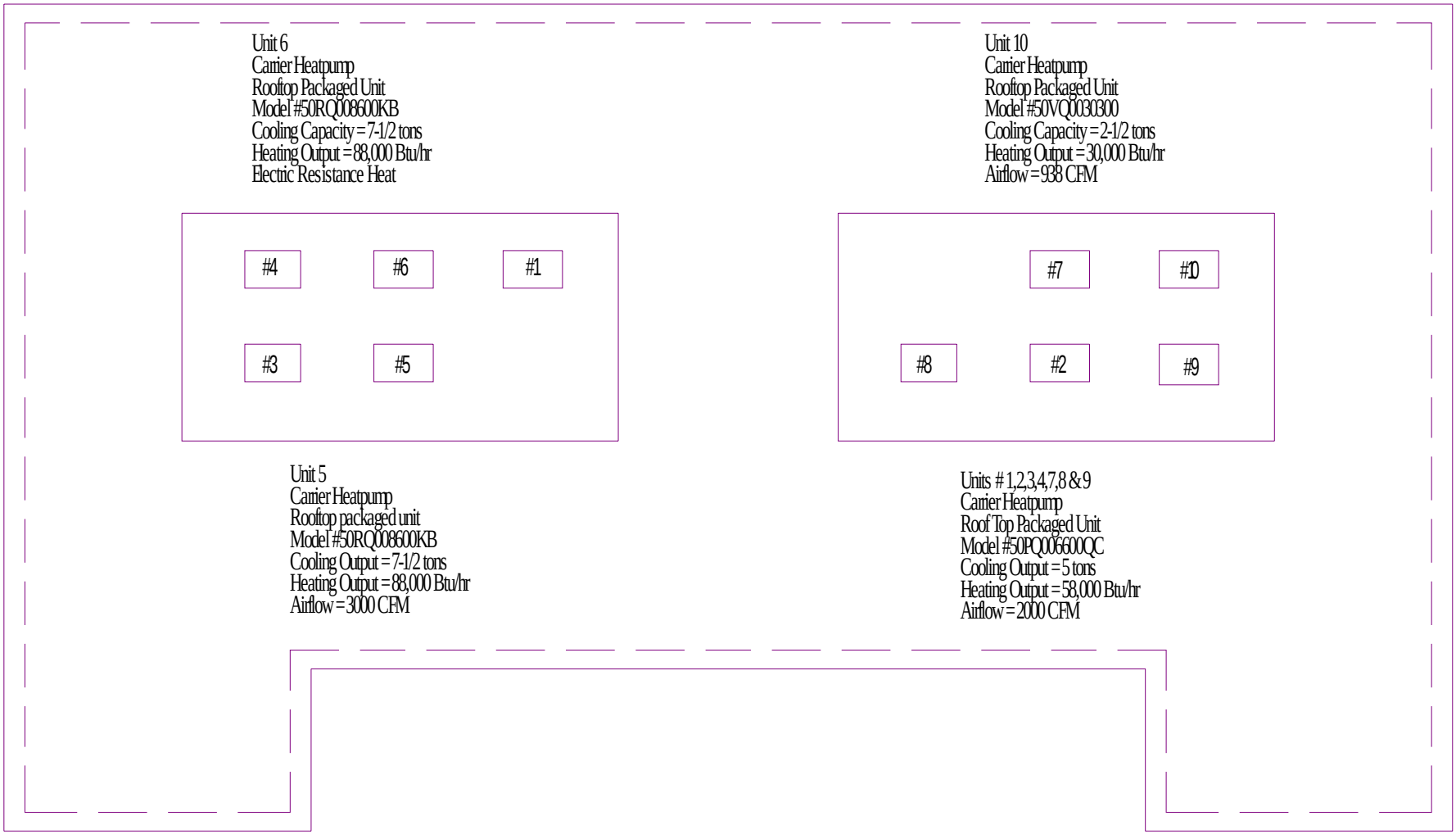
•Sigma 2 Bldg.
Lighting Plan – Existing Lighting



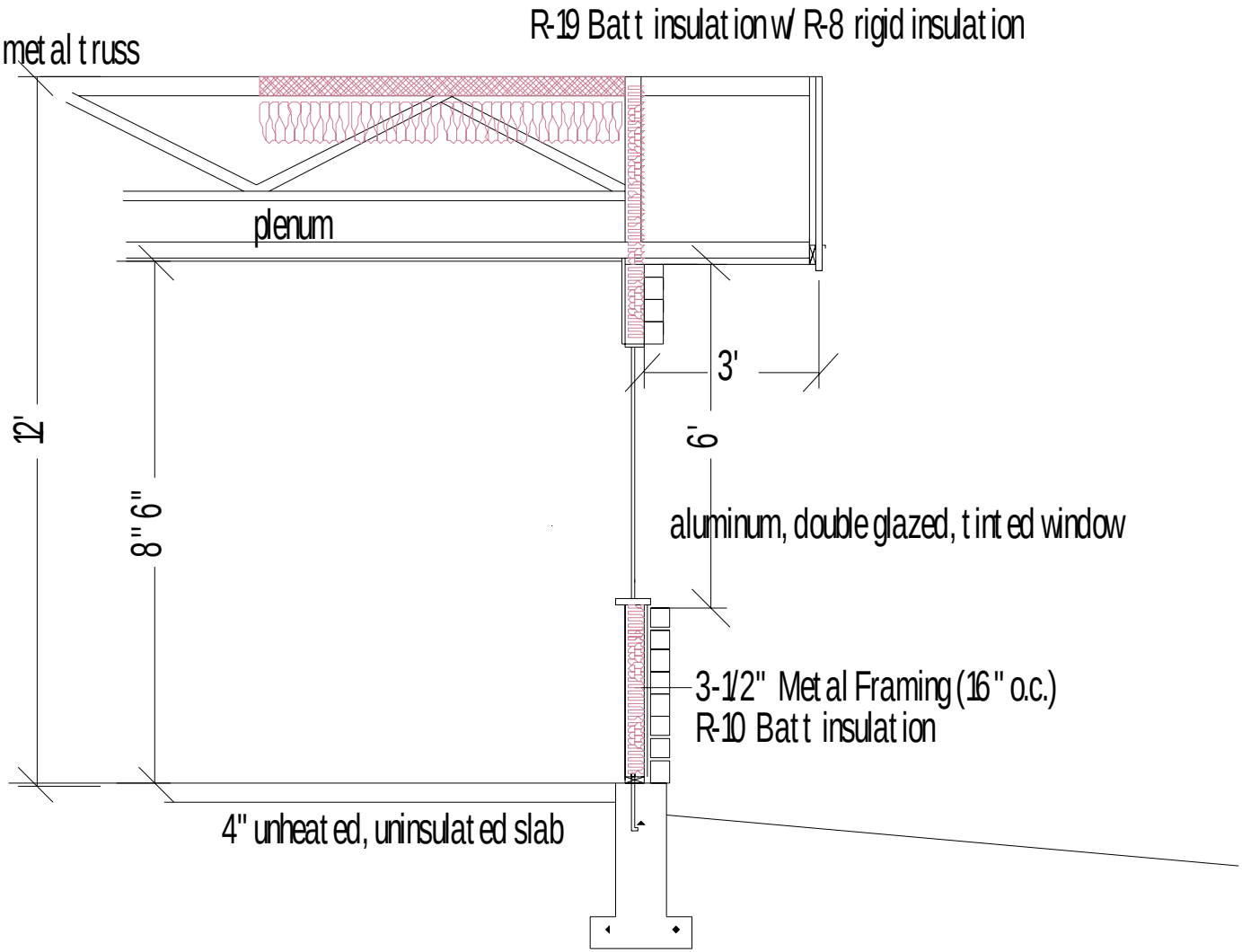
Lighting Schedule

		#
A	2' x 4' - 3-lamp F32- T8, ParabolicTroffer, electronic ballast, bi-level switching, 89 nominal input watts	174
B	2' x 4' - 2-lamp F32- T8, Parabolic Troffer , electronic ballast, bi-level switching, 59 nominal input watts	31
C	1' x 4' Parobolic Troffer w/ 2 (F32) - T8 lamps, electronic ballast , 59 nominal input watts	5
D	2' x 2' - 2 lamp F32 - T8 Prismatic Troffer, electronic ballast, 59 nominal input watts	53
E	2' x 4' - 2-lamp F32- T8, Parabolic Troffer , electronic ballast, bi-level switching, 59 nominal input watts	11
F	18W compact fluorescent exterior down lights	29

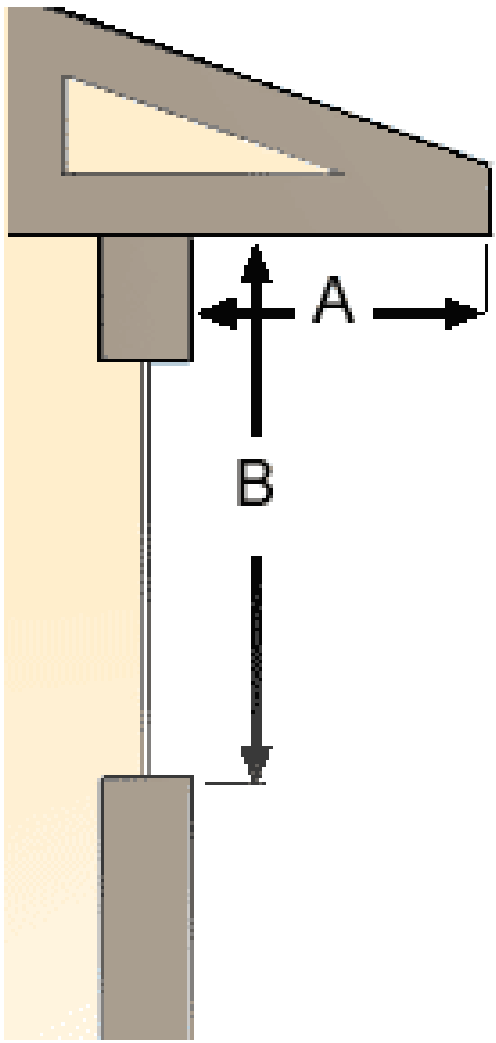
•Sigma 2 Bldg. Mechanical Plan



Building Section



Overhang/Projection Factor (PF)

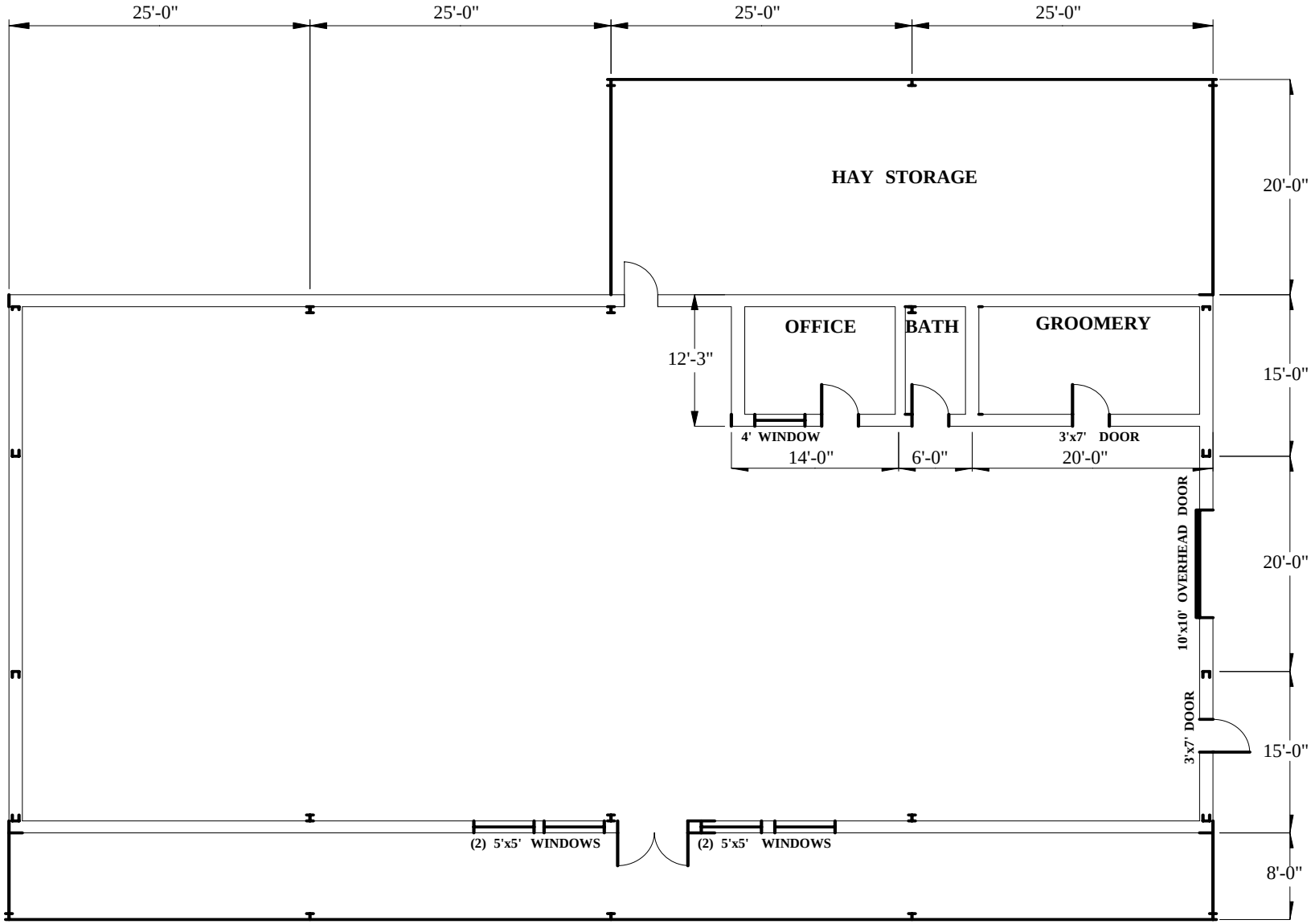


PF= A/B

PF=0.5

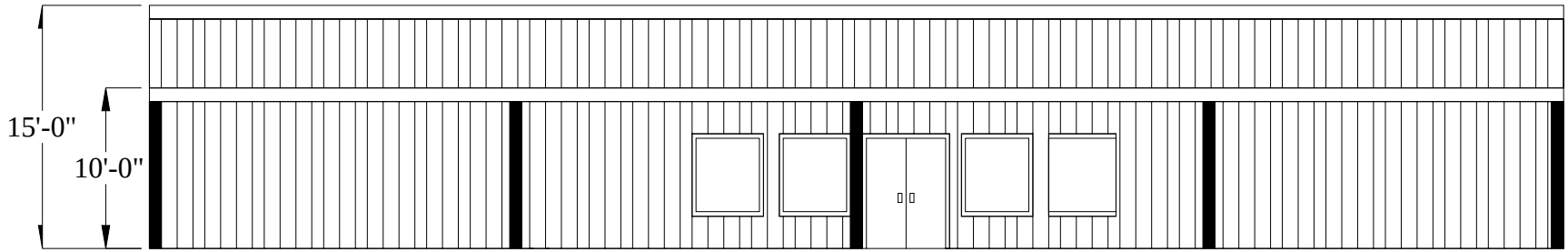
Red Mountain Feed & Irrigation

•Red Mountain Feed & Irrigation Floor Plan



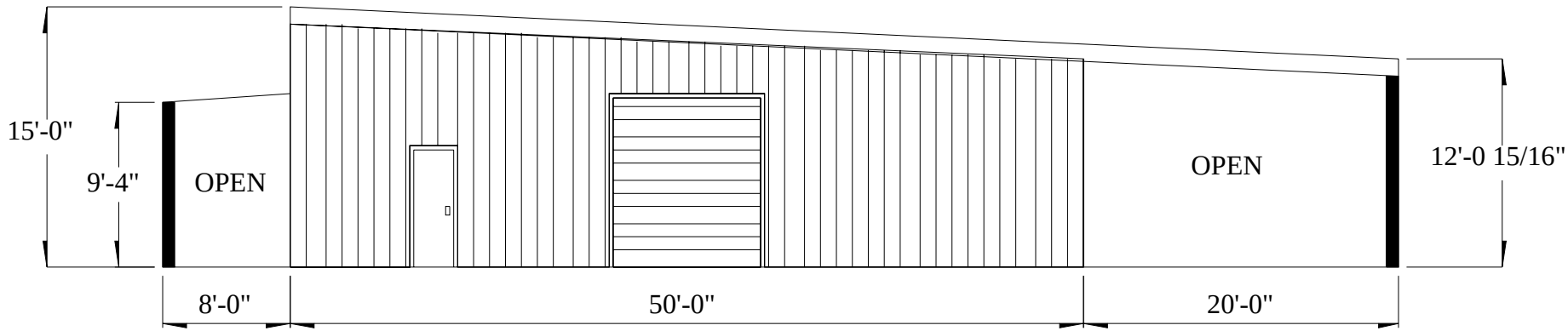
Inside Office/Bathroom

Storage

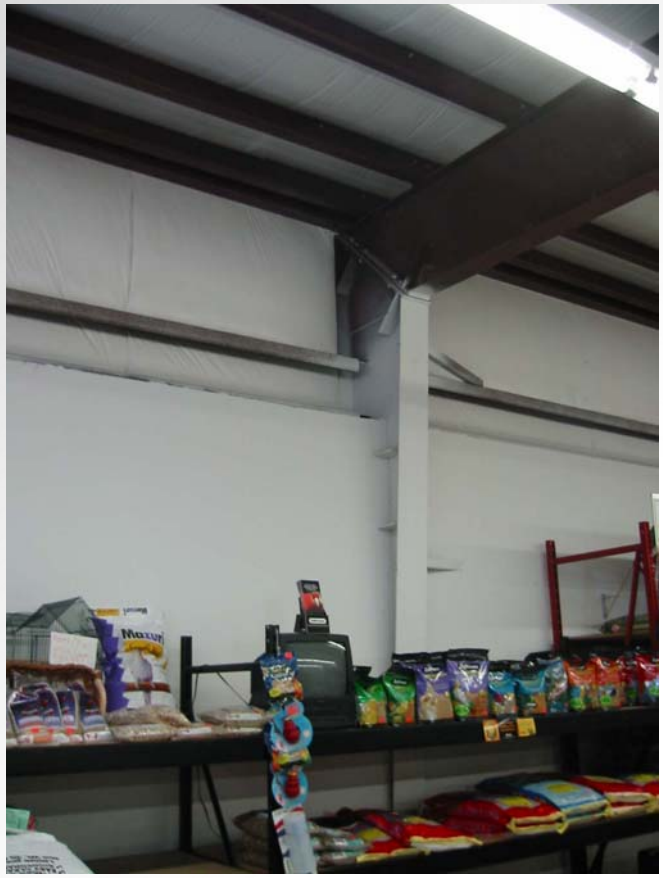


Exterior Walls: 3,954 sq.ft.

- 10’ High: R10 between girt & metal wall + 2x4 R11 metal studs, 0.071 u-factor, heat capacity=1 (2,176 sq. ft.)
- 5’ High: R10 between girt & metal wall (928 sq. ft.)

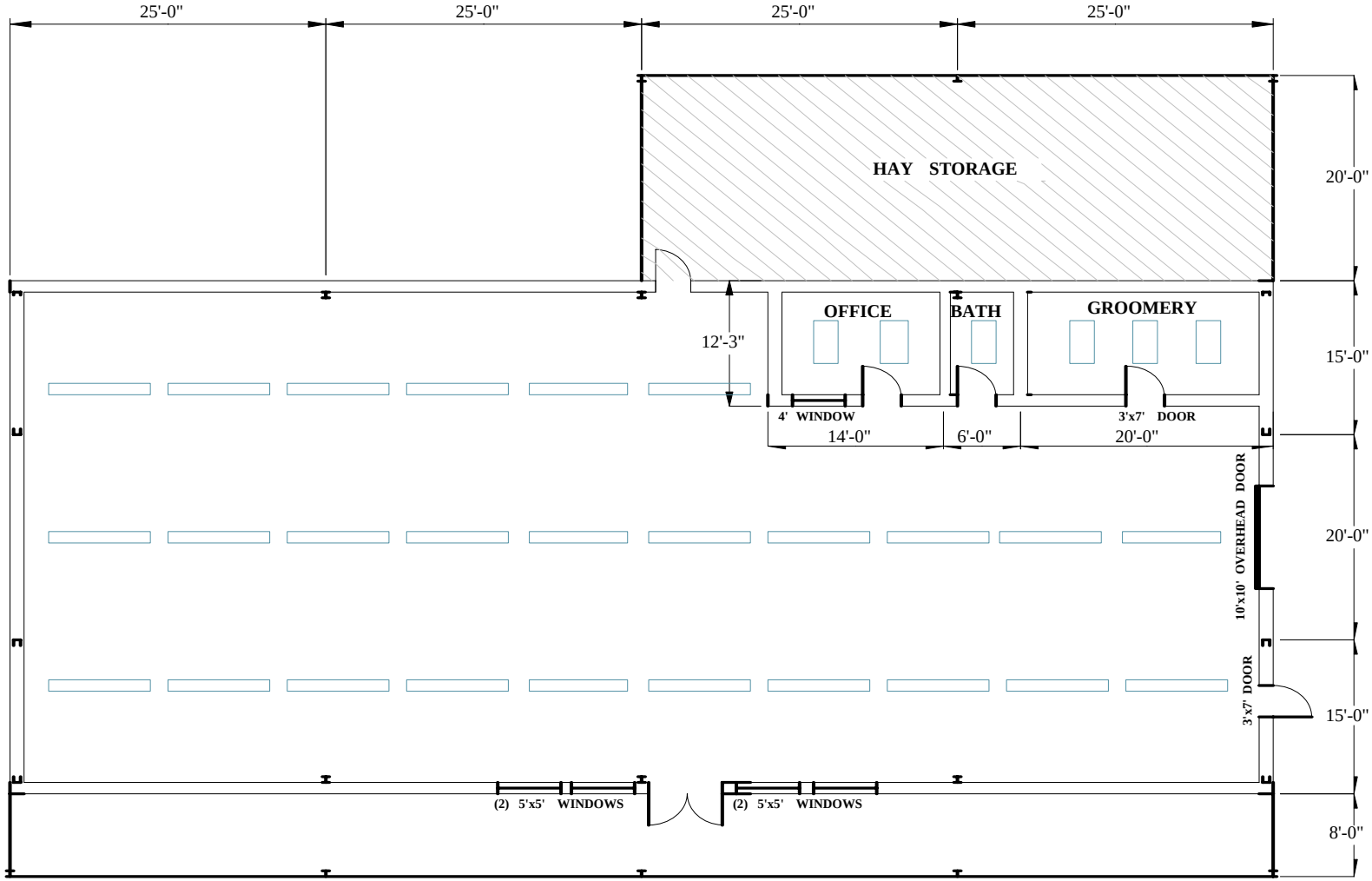


Walls



Lighting

•Red Mountain Feed Lighting Plan



Lighting Schedule
8' Industrial Fluorescent, 2 F96T12 Slimline Lamps & Energy Saving Magnetic Ballast
43 Fixtures, 173 watts/fixture
2'x4" Troffer 2 F32T8 lamps and GEB, 6 Fixtures, 59 watts/fixture

Heating System

Pellet Stove

Unit Heater

•Red Mountain Feed Building Envelope

Roof: 5,000 sq.ft. Metal w/1" Styrofoam thermal block, R-13 Insulation

Exterior Walls: 6,397 sq.ft.

Windows: 144 sq.ft. Metal Frame, double pane, tinted, U-factor .75, SHGC .88, PF .33

Glass Doors: 42 sq. ft., Metal Frame, U-factor .92, SHGC .87, PF, .33

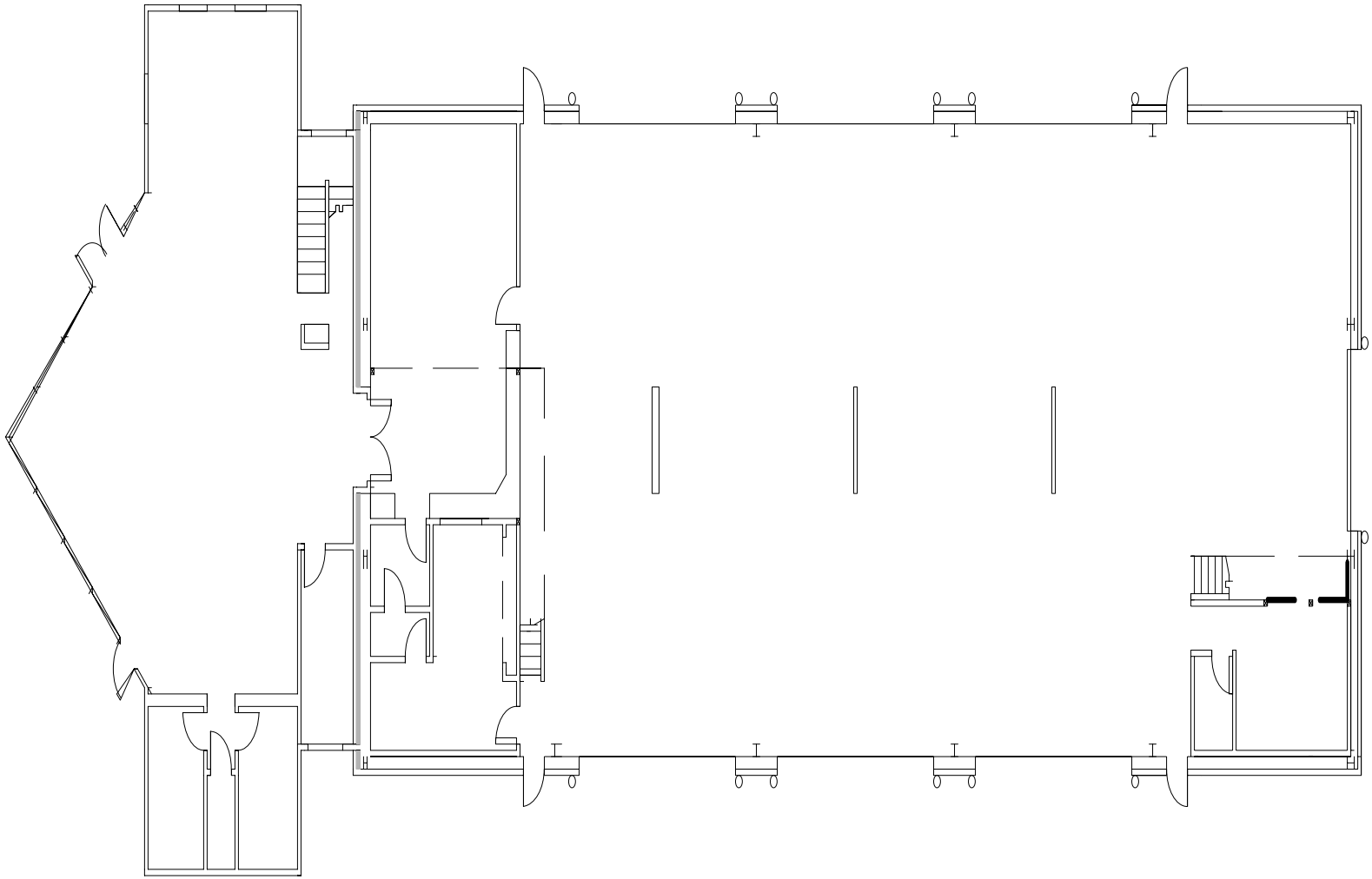
Window/Wall Ratio = 2.9%

Doors: 100 sq. ft.Overhead Metal, U-value .60, other metal-42', u-value 1.20

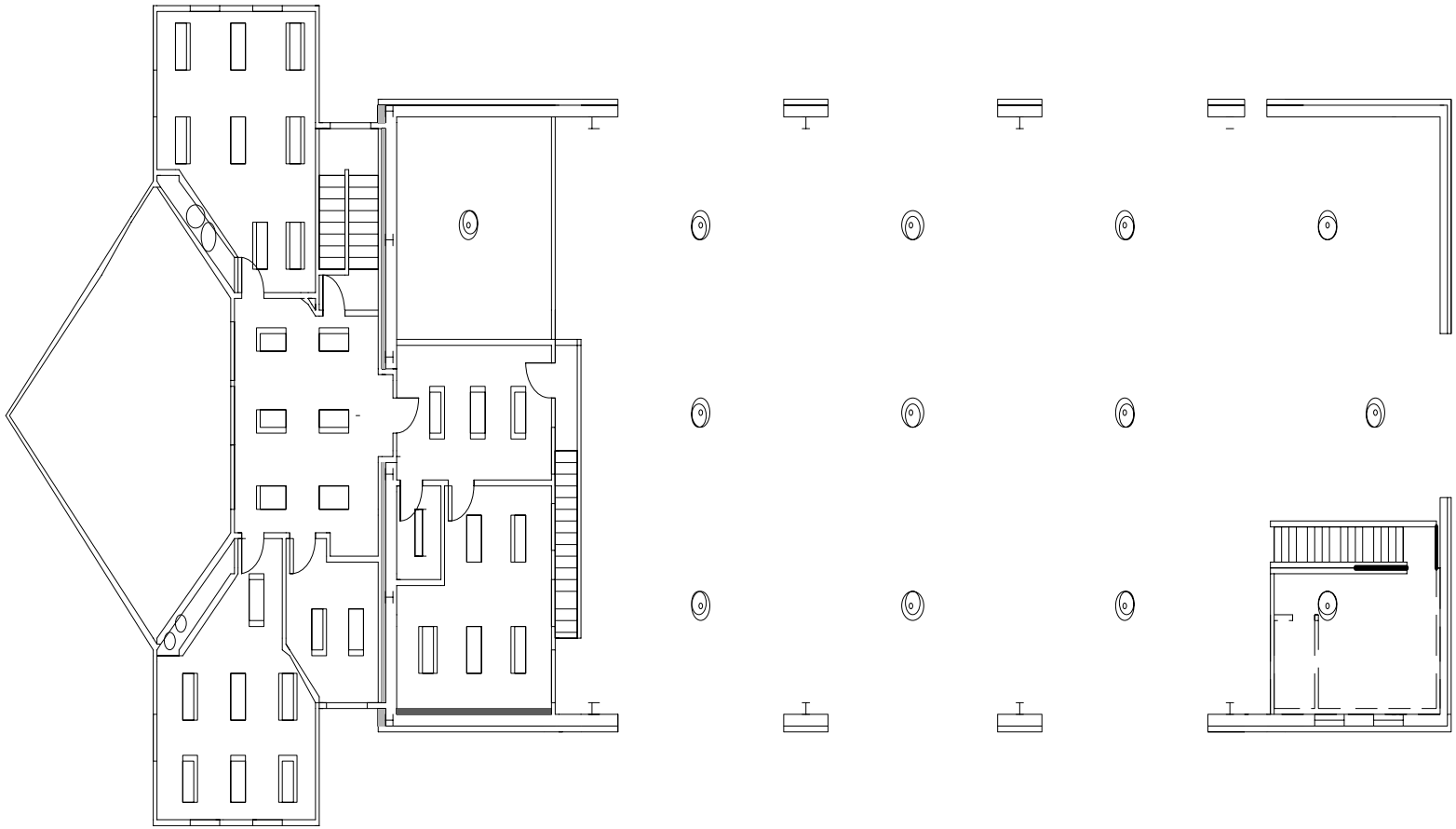
Floor: 5000sq.ft./300 linear feet, unheated slab on grade, R10 2' vertical

TRI-CITIES BATTERY
Auto Repair

•Tri-Cities Battery
Building Envelope/1st Floor



•Tri-Cities Battery Lighting Plan/1st Floor



•Tri-Cities Battery Building Envelope

Roof: 9,316 gross sq. ft.

•Simple Saver System, 7,290 sq. ft., R24, U-factor 0.042

•Metal w/no thermal block, 1,053 sq. ft., R38

•Wood Vaulted, 973 sq. ft., R30,

Exterior Walls:

•2x6 Wood Stud, 2,196 sq. ft., R19 + R3 EIFS

•2x6 Metal Stud, 24 o.c., sq. ft. 4,667, R19

Windows:

•Dbl. pane, fixed, 471 sq. ft., U-factor .72, SHGC .60, PF .25 (store front)

•Dbl. pane, fixed, 208 sq. ft., U-factor .75, SHGC .60, PF .25

Glass Doors/Overhead: 971 sq. ft., U-factor .75, SHGC .88, PF .2

•**Doors**: Metal insulated, 84 sq. ft., U-factor .60 (main)

•Metal insulated, 1073 sq. ft., U-factor .60 (overhead)

Floor: 5000sq.ft./300 linear feet, unheated slab on grade, R10 2' vertical