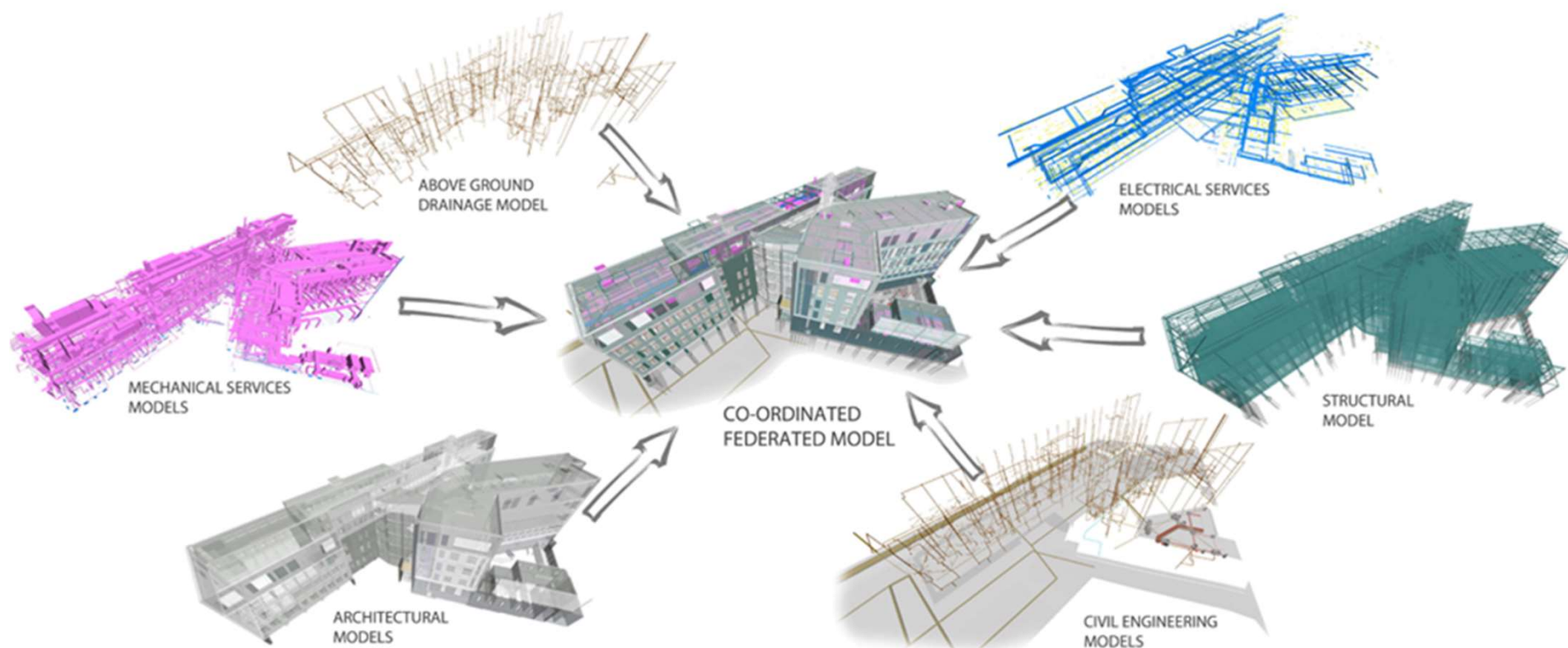


Working with Digital Technologies & BIM



www.onecreativeenvironment.com

Gavin M Traylor RIBA

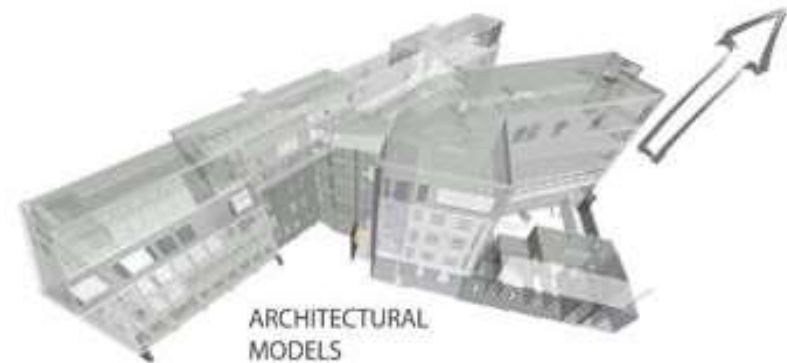


AUTODESK®
REVIT®

<https://www.autodesk.com/education/edu-software/overview? ga=2.119678017.834319708.1600961686-1615692111.1593105833&sorting=featured&page=1>

How can we create data rich intelligent models?

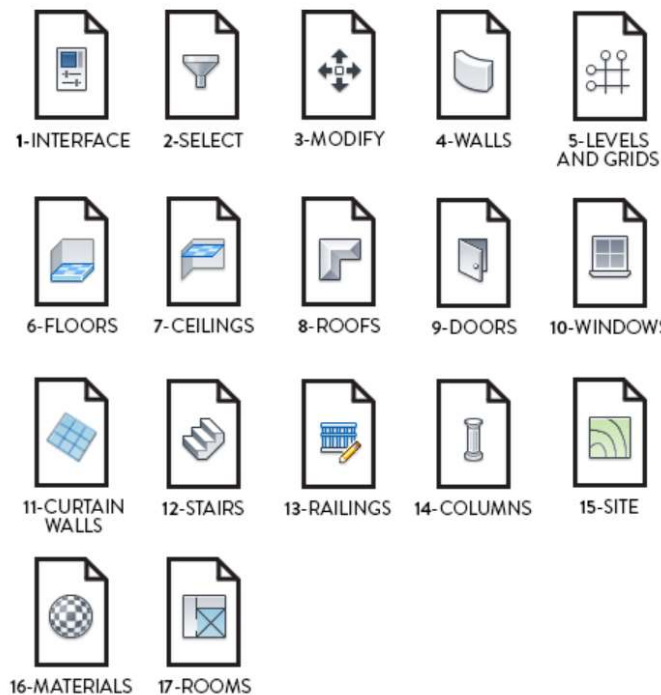
Tools such as Revit enable intelligent 3D Modelling that can be linked into a BIM Process.



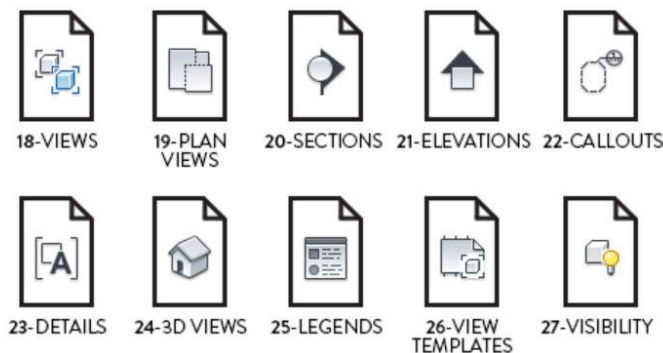
Remember a Revit Model alone is not BIM

AUTODESK[®] REVIT[®] the basics

PART 1: MODEL



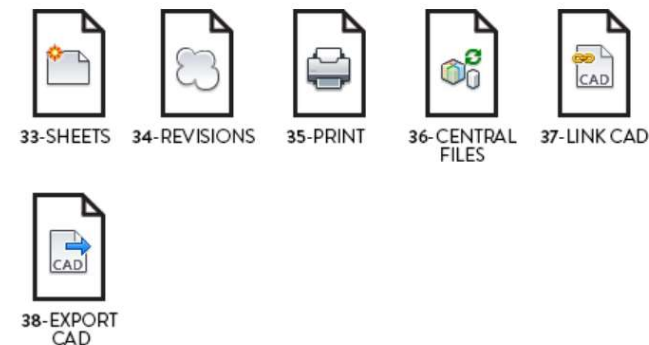
PART 2: VIEWS



PART 3: ANNOTATE



PART 4: PUBLISH AND COLLABORATE

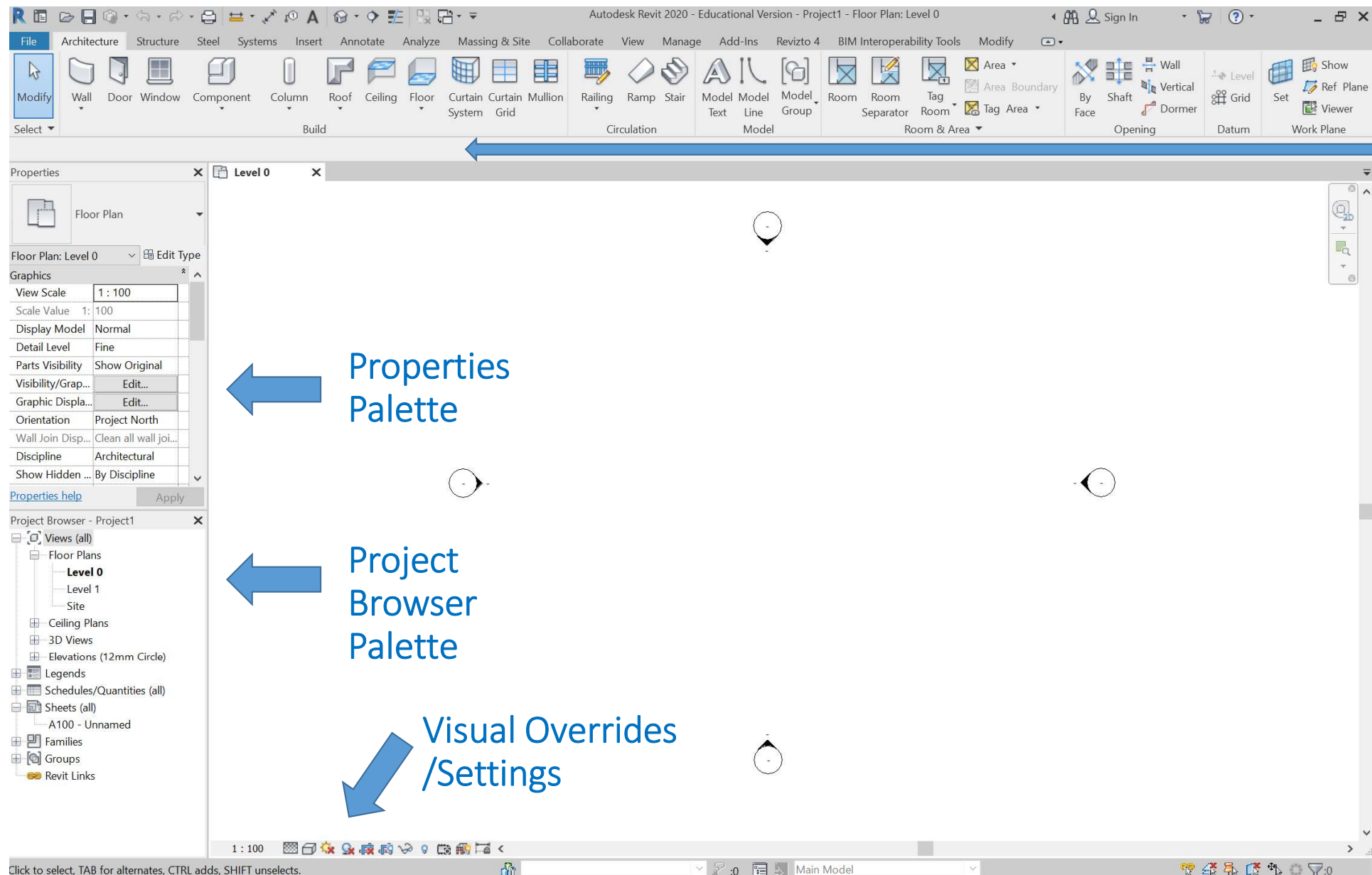


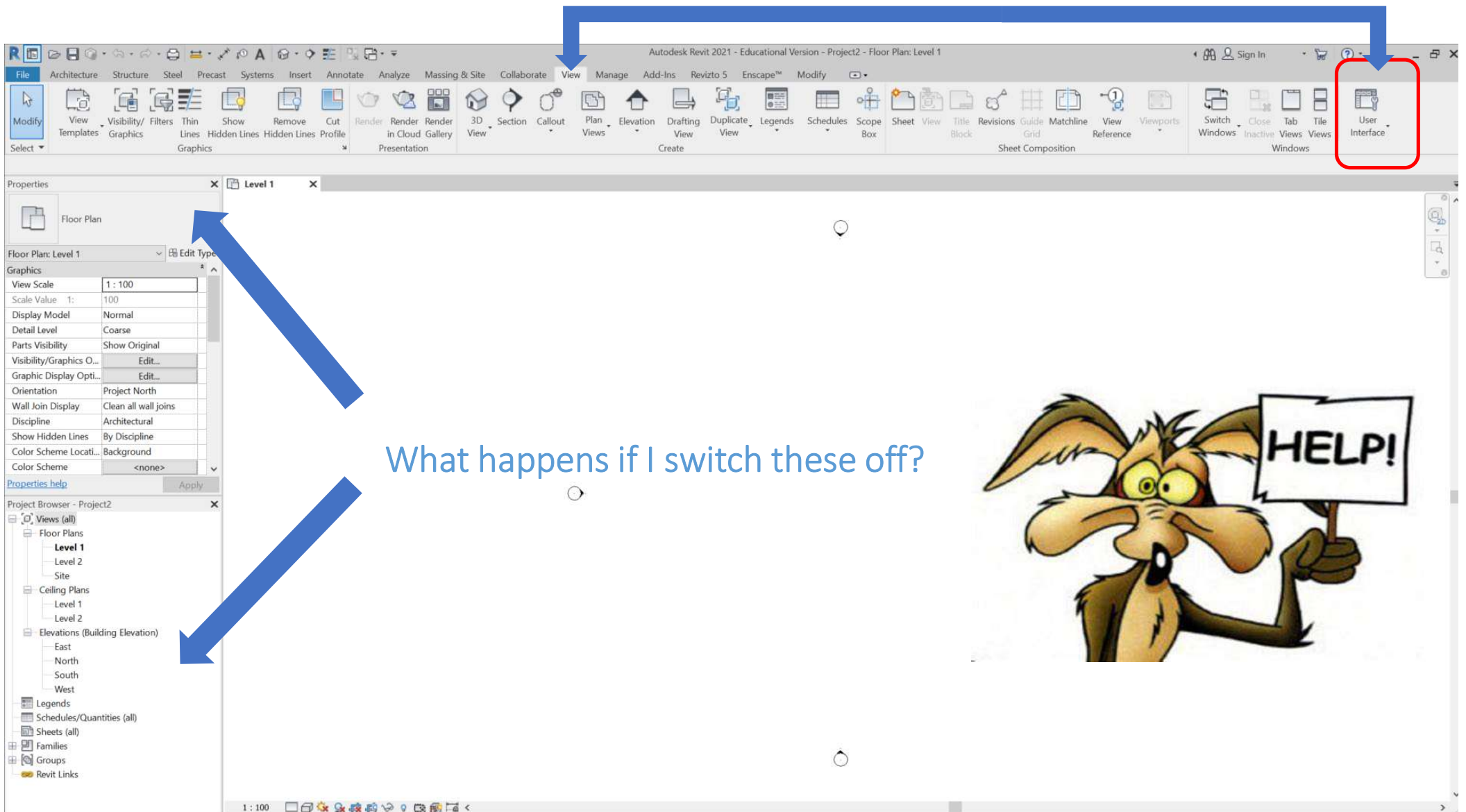
PART 5: ADVANCED TOOLS

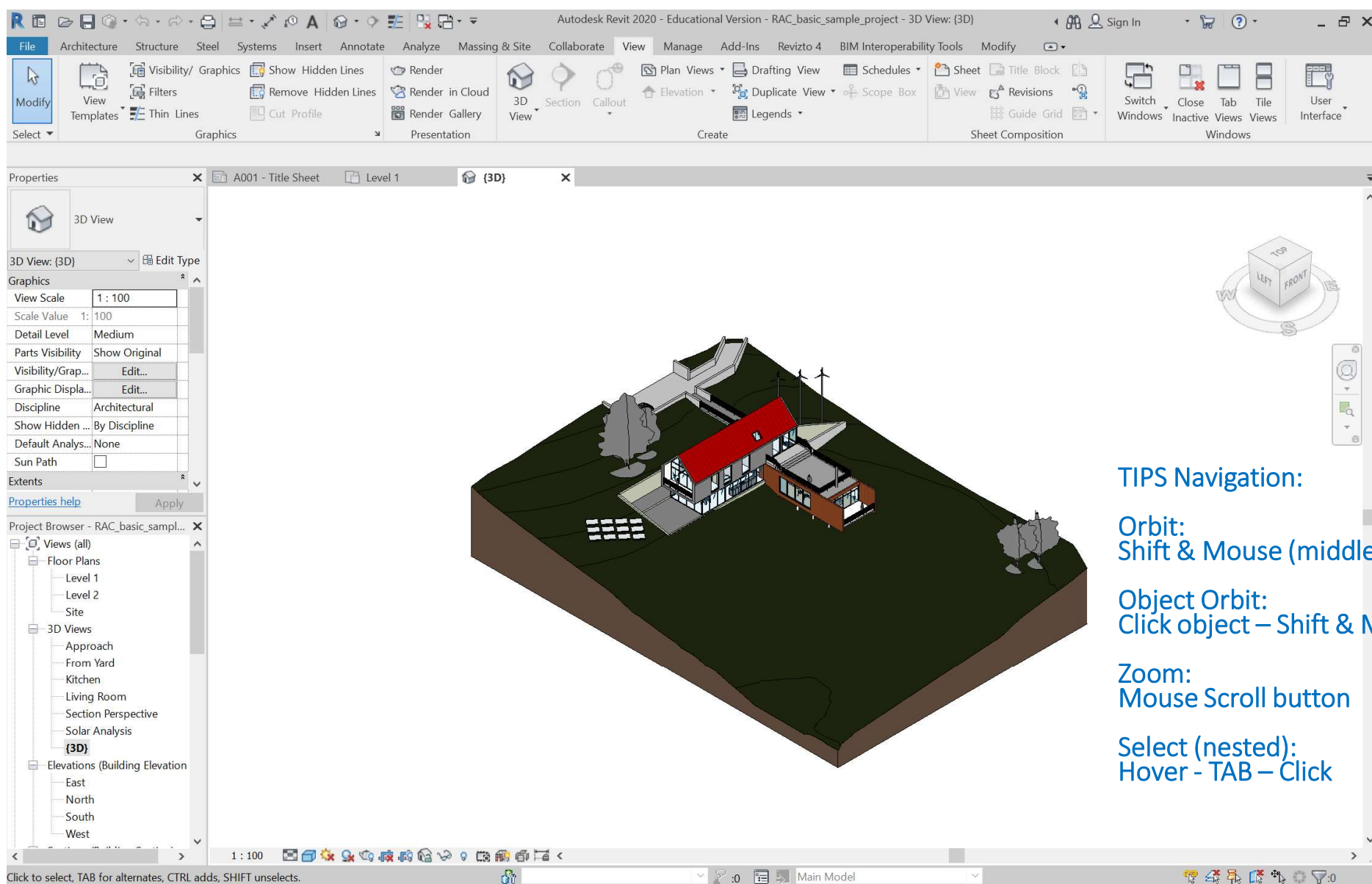


<https://revitpure.com/basics>

<https://academy.autodesk.com/>







1-INTERFACE



2-SELECT



3-MODIFY

TIPS Navigation:

Orbit:
Shift & Mouse (middle button)

Object Orbit:
Click object – Shift & Mouse (middle button)

Zoom:
Mouse Scroll button

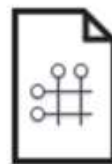
Select (nested):
Hover - TAB – Click

AUTODESK®
REVIT®

Set up Levels



4-WALLS



5-LEVELS
AND GRIDS



6-FLOORS



7-CEILINGS



8-ROOFS



9-DOORS



10-WINDOWS

Exercise 1

It's the Workshop again only this time in REVIT.
Set up your levels in Elevation view.
Distance between levels of 2500mm

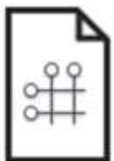
EASY?

Assume the following:

- High to Apex of roof is 5m
- Floor to ceiling height is 2.5m
- Floor slab is 300mm,
- Roof is 300mm thick
- Cill heights are 900mm
- Add Grid Lines



4-WALLS



5-LEVELS AND GRIDS



6-FLOORS



7-CEILINGS



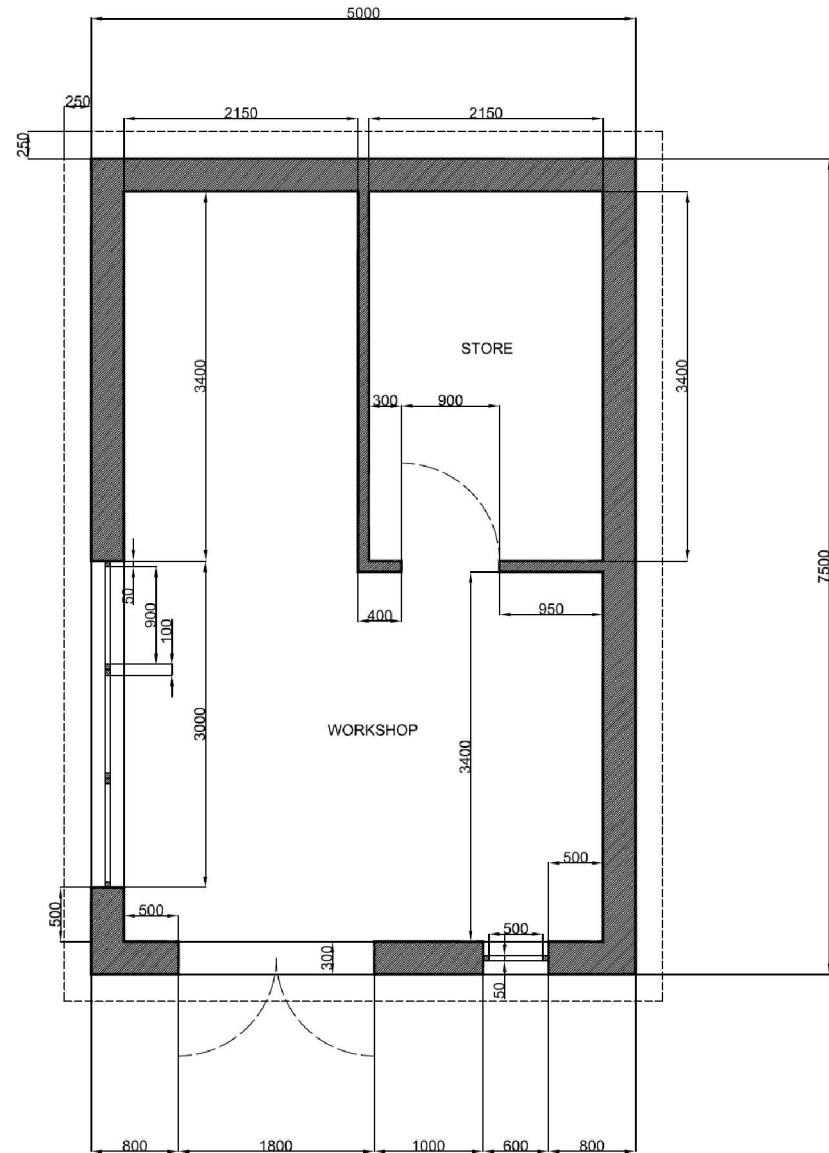
8-ROOFS



9-DOORS



10-WINDOWS



Creating /Editing



Type Properties

Family: System Family: Basic Wall

Type: Wall-Ext_102Bwk-75Ins-100LBlk-12P

Buttons: Load..., Duplicate..., Remove

Parameter	Value
Construction	
Structure	Edit...
Wrapping at Inserts	Both
Wrapping at Ends	None
Width	290.0
Function	Exterior
Graphics	
Coarse Scale Fill Pattern	<Solid fill>
Coarse Scale Fill Color	RGB 192-192-192
Materials and Finishes	
Structural Material	Concrete Masonry Units _Low Density
Analytical Properties	
Heat Transfer Coefficient (U)	0.2359 W/(m²·K)
Thermal Resistance (R)	4.2386 (m²·K)/W
Thermal mass	27.90 kJ/K
Absorptance	0.700000

[What do these properties do?](#)

Buttons: << Preview, OK, Cancel, Apply

Properties

Basic Wall
Wall-Ext_102Bwk-75Ins-100LBlk-12P

Buttons: Edit Type

Walls (1)

Parameter	Value
Location Line	Wall Centerline
Base Constraint	Level 0
Base Offset	0.0
Base is Attached	☐
Base Extension Distance	0.0
Top Constraint	Unconnected
Unconnected Height	8000.0
Top Offset	0.0
Top is Attached	☐
Top Extension Distance	0.0
Room Bounding	☒
Related to Mass	☐

Structural

Structural	☐
Enable Analytical Model	☐
Structural Usage	Non-bearing

Dimensions

Length	13700.0
--------	---------

[Properties help](#) Apply

It is the same process for all fabric objects.
Select an object you want to edit.
In the properties click 'Edit Type'
In the 'Type Properties' Window click 'Duplicate'
Click Edit.. tab

Family: Basic Wall
Type: Wall-Ext_102Bwk-75Ins-100LBk-12P 2
Total thickness: 290.0
Resistance (R): 4.2386 (m²·K)/W
Thermal Mass: 27.90 kJ/K

Editable
Properties

Sample Height: 6096.0



Layers					
EXTERIOR SIDE					
	Function	Material	Thickness	Wraps	Structural Material
1	Finish 1 [4]	Brick, Common	102.5	☒	☐
2	Thermal/Air Layer [3]	Fiberglass Batt	75.0	☒	☐
3	Core Boundary	Layers Above Wrap	0.0		
4	Structure [1]	Concrete Masonry Uni	100.0	☐	☒
5	Core Boundary	Layers Below Wrap	0.0		
6	Finish 2 [5]	Plaster	12.5	☒	☐

INTERIOR SIDE

Insert

Delete

Up

Down

Default Wrapping

At Inserts:

Both

At Ends:

None

Modify Vertical Structure (Section Preview only)

Modify

Merge Regions

Sweeps

Assign Layers

Split Region

Reveals

OK

Cancel

Help

Click the preview Tab to
show what the object make
up in plan and section.

Click 'OK' and
'Apply' in the
Type Window

View: Floor Plan: Modify typ: ▾

Preview >>



11-CURTAIN
WALLS



12-STAIRS



13-RAILINGS



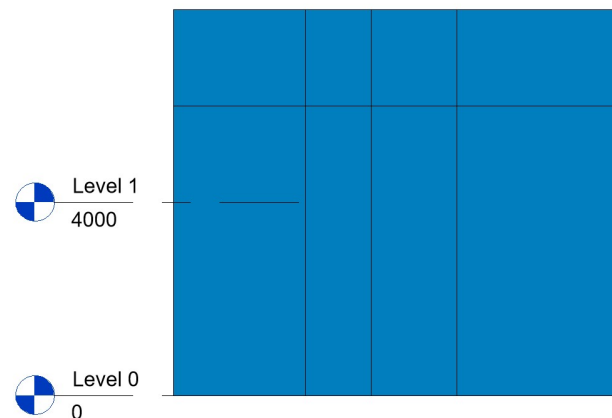
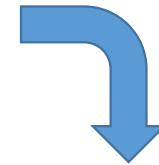
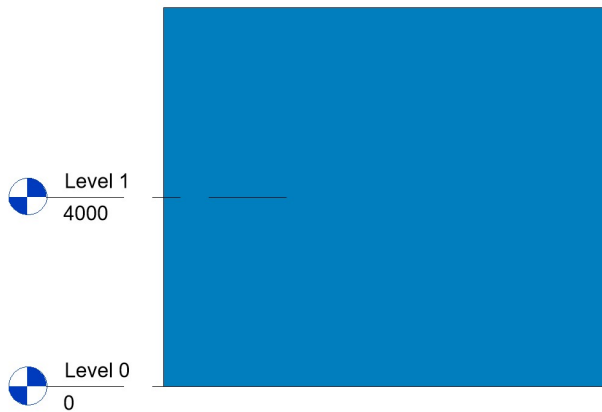
14-COLUMNS



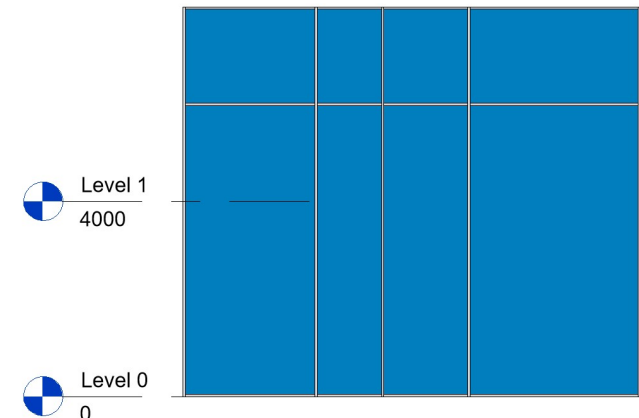
Curtain Walling – By Wall

Draw a wall to set height
(unconnected or to level)
Using Curtain Wall EMPTY

Go to elevation view – change
visibility to shaded



Add a Curtain Grid to your
curtain wall to required
horizontal and vertical
spacing.



Change grid lines to Mullions by
clicking the mullion icon.

Load appropriate Mullion families.

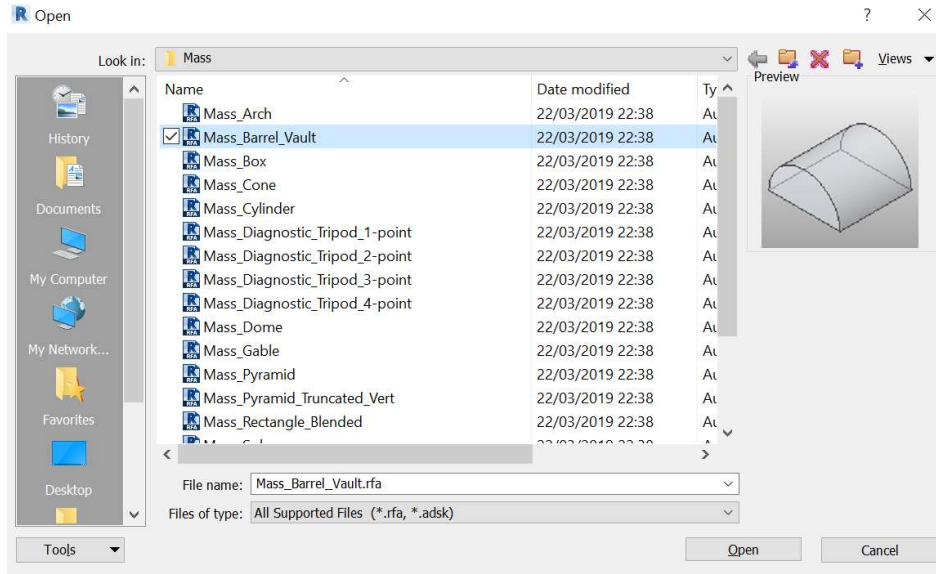


11-CURTAIN
WALLS

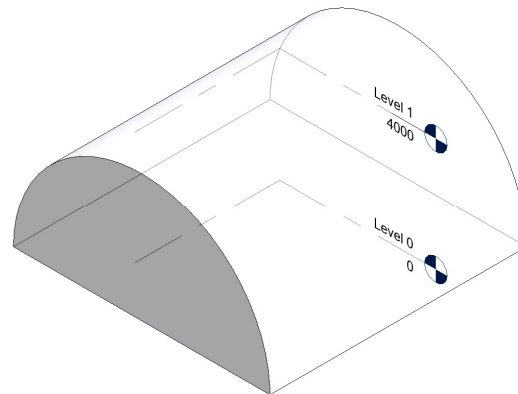


Place
Mass

Curtain System by Mass.
Under Massing & Site selected Place Mass

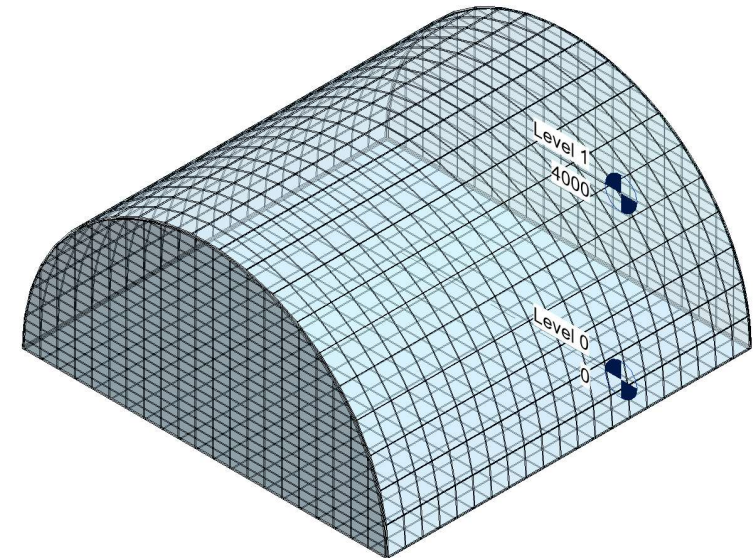


Place the Mass in the
appropriate Plan view.
Double Click the 3D view



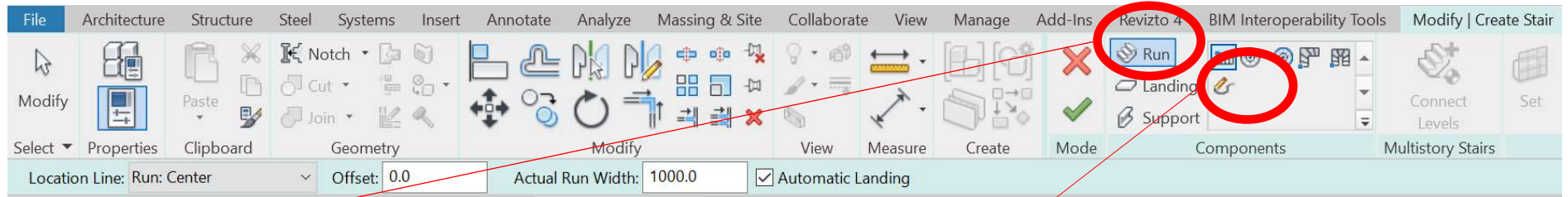
Curtain
System

Click 'Curtain System' Select all
faces of the mass. In the properties
palette change the number of grids
of the system. Once you have the
appropriate number of grids click
'Create System'





12-STAIRS



Create a Stair by Run.

Check Base level and top level in the Properties Palette. Change stair type as appropriate.

Click to start run and click to finish run once 0 risers remain.

Click the TICK



Properties

Assembled Stair
Private

Stair Edit Type

Constraints	
Base Level	Level 0
Base Offset	0.0
Top Level	Level 1
Top Offset	0.0
Desired Stair Height	2700.0
Dimensions	
Desired Number of...	16
Actual Number of ...	1
Actual Riser Height	168.8
Actual Tread Depth	250.0
Tread/Riser Start N...	1

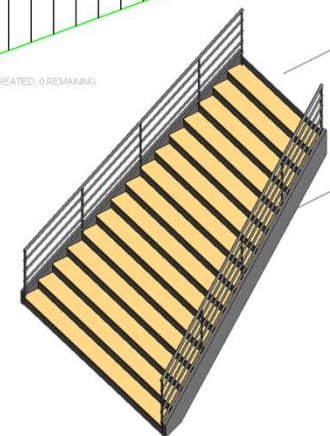
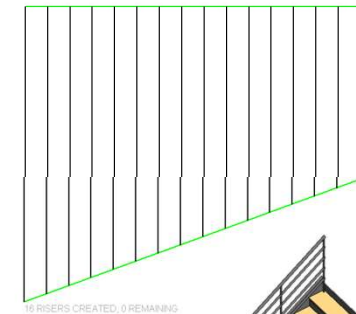
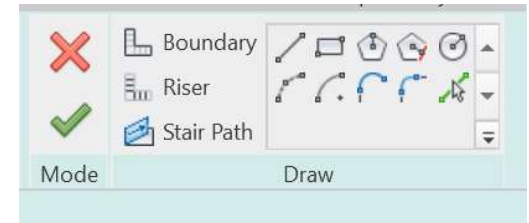
Create a Stair Sketch.

Check Base level and top level in the Properties Palette. Change stair type as appropriate.

Click Boundary (green lines) and draw boundary lines.

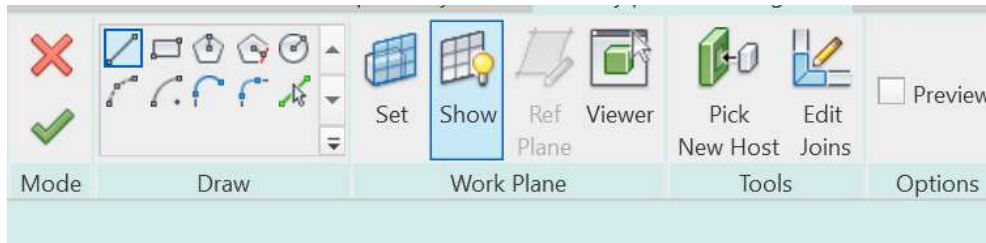
Click Riser (black lines) and draw risers until 0 risers remain.

Note: risers must touch boundary lines.





13-RAILINGS



Properties

Railing
900mm_Pipe

Railings

Constraints

Base Level	Level 0
Base Offset	0.0
Offset from Path	0.0

Dimensions

Length	0.0
--------	-----

Identity Data

Image	
Comments	
Mark	

Phasing

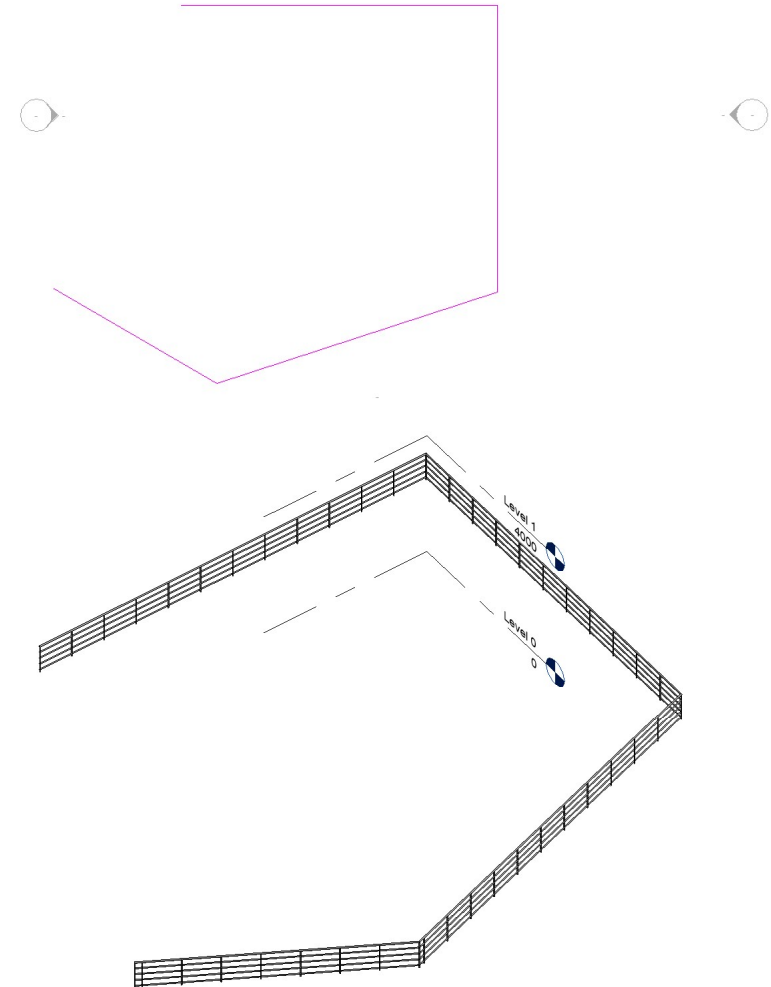
Phase Created	New Construction
---------------	------------------

Create Railings by sketching lines

Check Base level in the Properties Palette. Change railing type as appropriate.

Draw a 'Chain' of lines in the sketch (magenta)

Click the TICK



Exercise 2

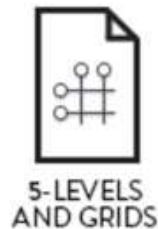
Draw a 2 storey House.

Set up your levels in Elevation view.
Distance between levels of 2700mm

Rename your levels.

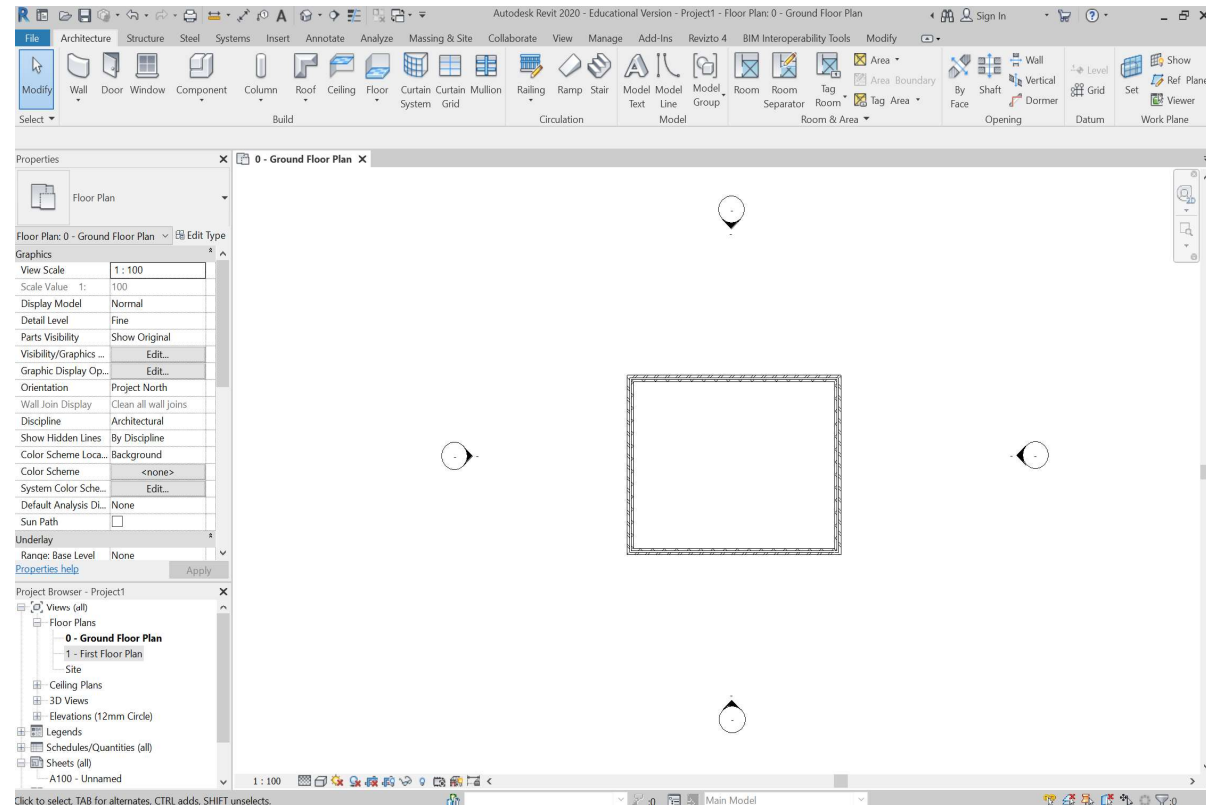
0 – Ground Floor Plan

1 – First Floor Plan



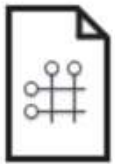
Draw a plan 10m wide by 8m deep, select or create your own wall type.

- Add internal walls to create rooms to the ground floor, such as Lounge, Kitchen diner, hallway, WC.
- Add internal walls to create rooms to the first floor, bedrooms, bathroom, landing – (make sure you leave some room for a staircase)
- Add, floors, ceilings, windows, doors and a roof.





14- COLUMNS



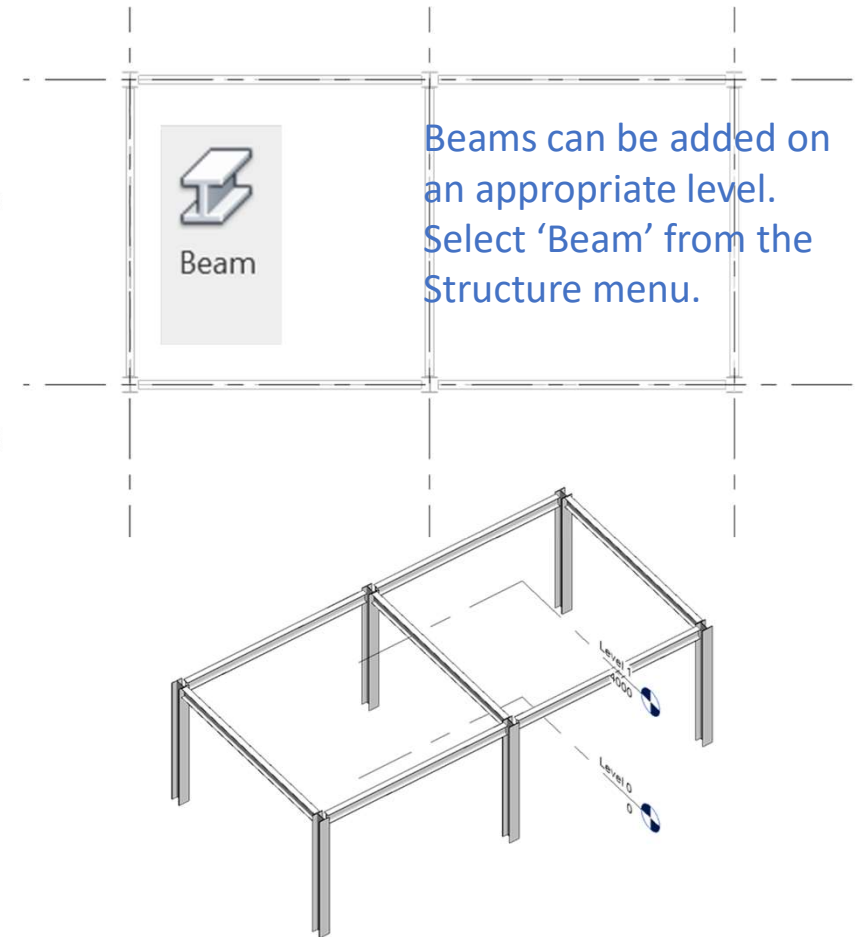
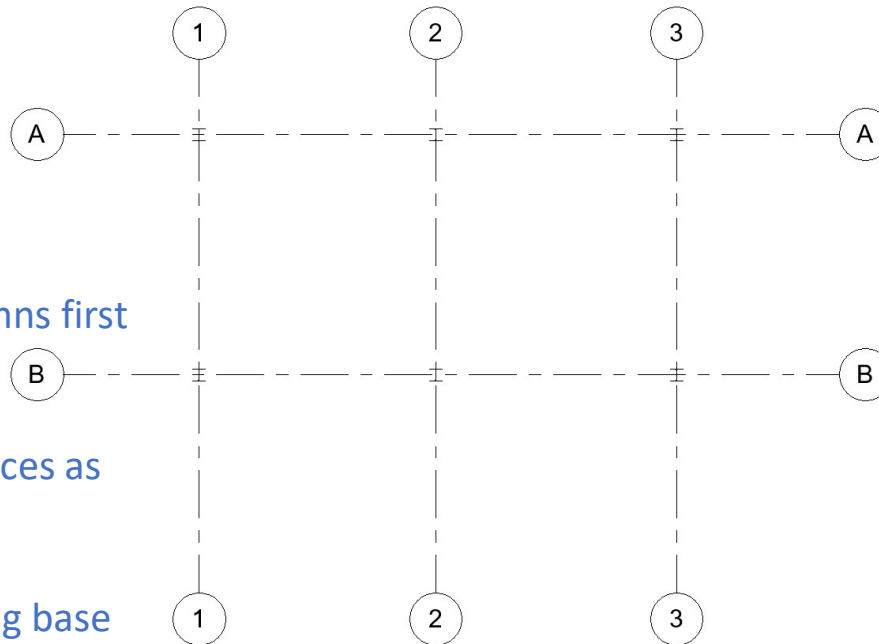
5-LEVELS AND GRIDS

Before placing Columns first
start with a GRID

Rename grid references as
appropriate.

Click Column - noting base
level in the properties palette.

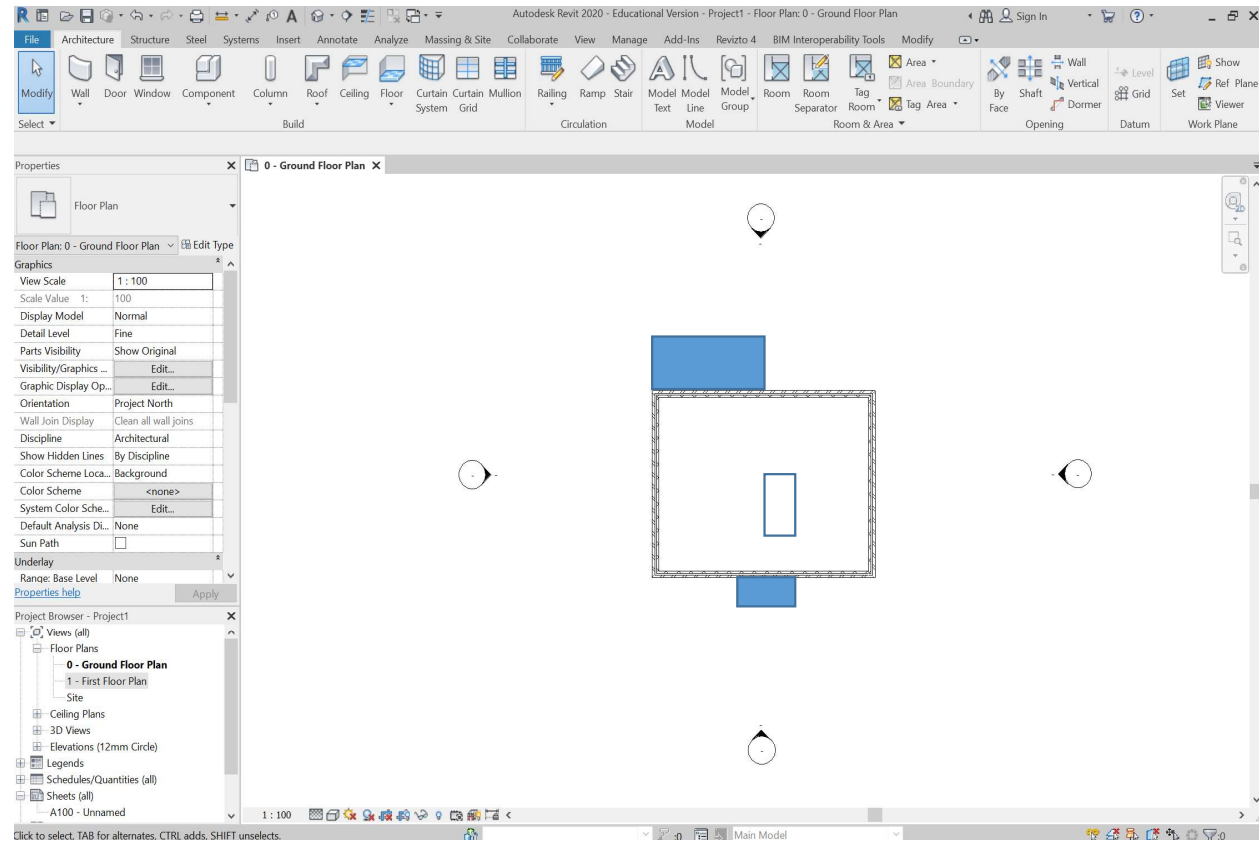
In the sub menu select 'Height'
and Top Constraint (eg Level 1)



Exercise 3

In Your two storey house

- Add the staircase
- Add a porch with two columns and roof.
- Add a conservatory made from Curtain walls / Curtain roof





15-SITE



16-MATERIALS



17-ROOMS



18-VIEWS



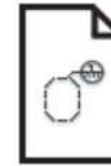
19-PLAN
VIEWS



20-SECTIONS



21-ELEVATIONS



22-CALLOUTS



23-DETAILS



24-3D VIEWS



25-LEGENDS



26-VIEW
TEMPLATES



27-VISIBILITY



15-SITE

True North and Project North

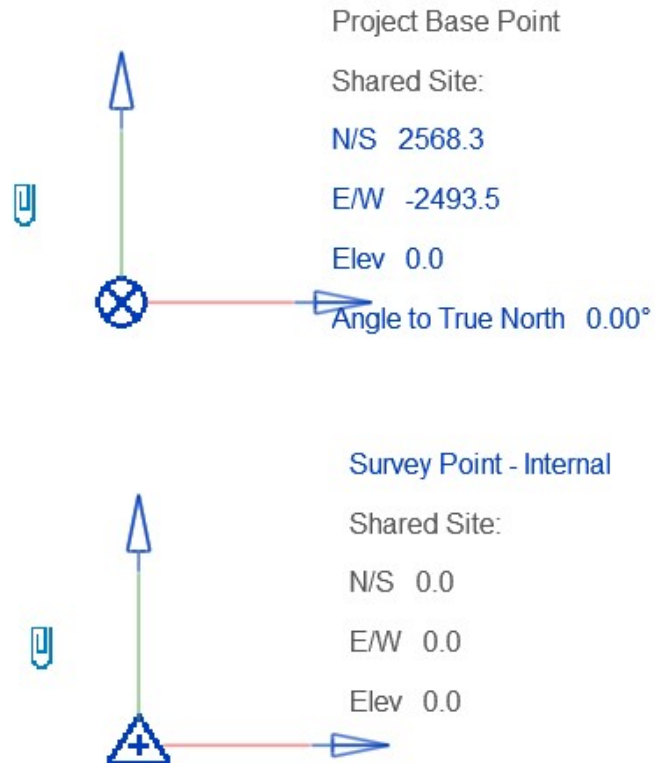


Understanding the use of the coordinate system in Revit is essential for BIM.

Shared coordinates / Project Base point from the outset enable consultants to coordinate information.

Although it helps coordination, it does not help presentation.

Revit can use True and Project North to orientate plans.





15-SITE

Properties

Floor Plan

Floor Plan: Site Edit Type

Graphics

View Scale	1 : 100
Scale Value 1:	100
Display Model	Normal
Detail Level	Coarse
Parts Visibility	Show Original
Visibility/Graphics Ov...	Edit...
Graphic Display Opti...	Edit...
Orientation	Project North
Wall Join Display	Clean all wall joins
Discipline	Architectural
Show Hidden Lines	By Discipline

[Properties help](#) Apply

Properties

Floor Plan

Floor Plan: Site Edit Type

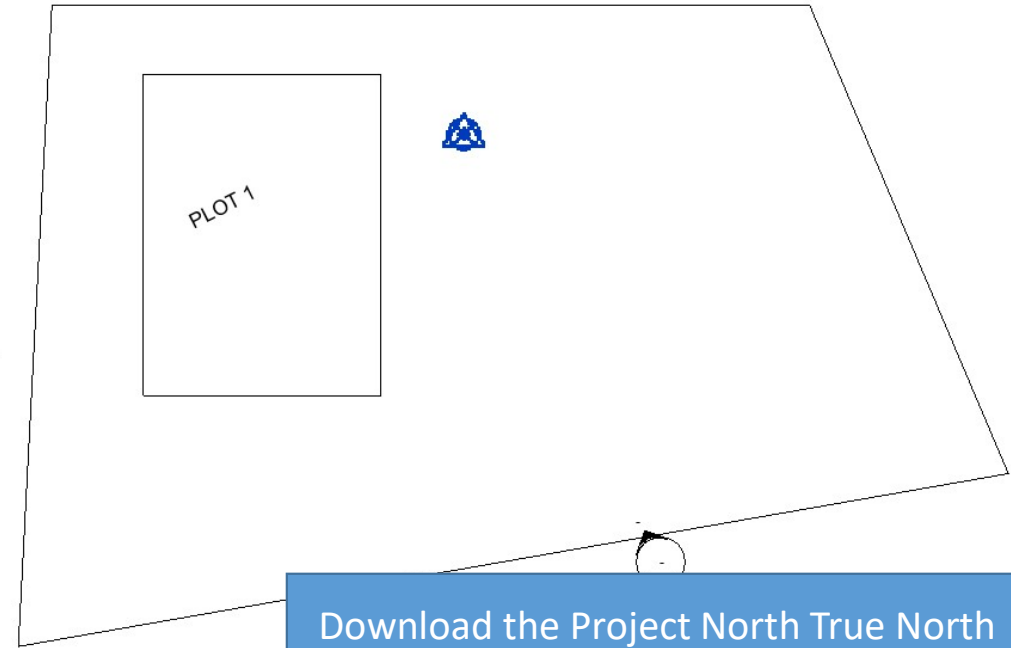
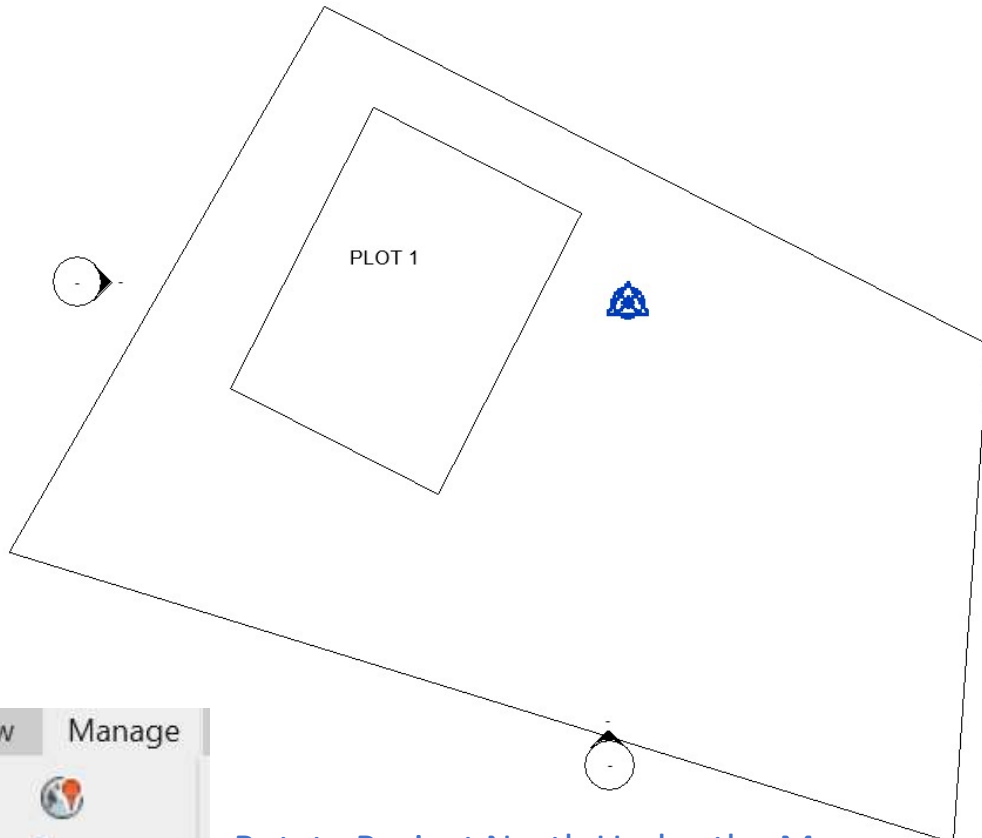
Graphics

View Scale	1 : 100
Scale Value 1:	100
Display Model	Normal
Detail Level	Coarse
Parts Visibility	Show Original
Visibility/Graphics Ov...	Edit...
Graphic Display Opti...	Edit...
Orientation	True North
Wall Join Display	Clean all wall joins
Discipline	Architectural
Show Hidden Lines	By Discipline

[Properties help](#) Apply

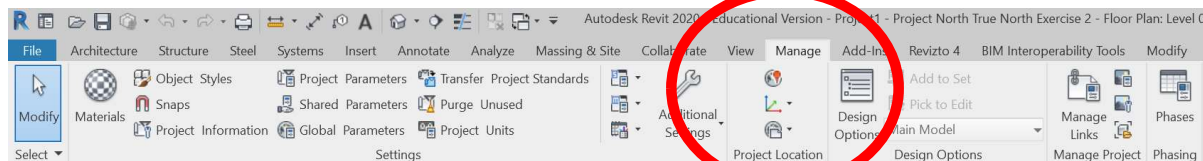
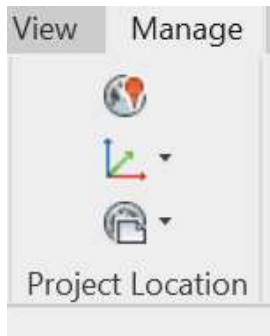
TRUE NORTH

PROJECT NORTH



Rotate Project North Under the Manage menu

Download the Project North True North Exercise Projects 1 & 2 Teams Files



Topographical Surface – Use of Digimap



15-SITE

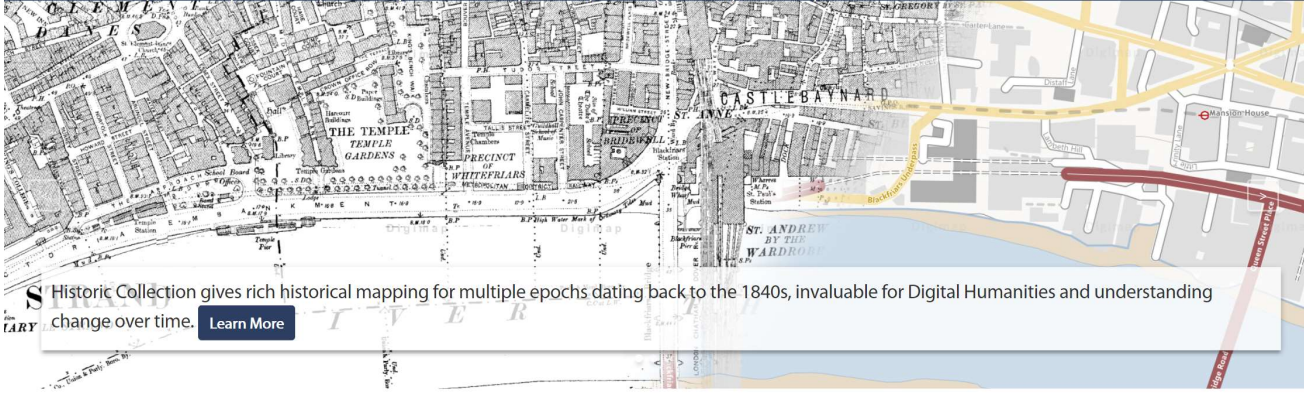
<https://digimap.edina.ac.uk>

**Digimap**[®]

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Please log in to access applications. [How?](#) [Log In »](#)

Ordance SurveyHistoricGeologyMarineEnvironmentAerialLidarGlobalSociety



S Historic Collection gives rich historical mapping for multiple epochs dating back to the 1840s, invaluable for Digital Humanities and understanding change over time. [Learn More](#)

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What are we offering?

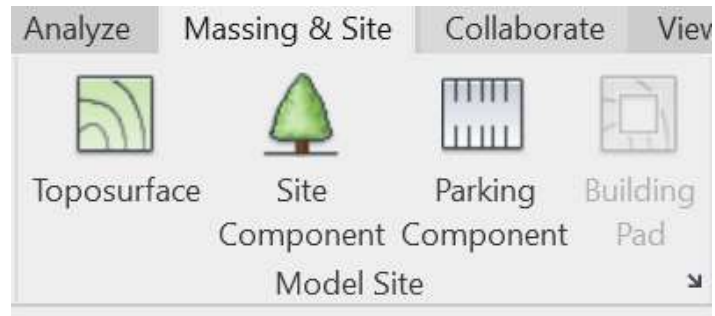
Digimap offers access to a range of datasets for the purposes of education and research. Create or interrogate a map online by selecting an appropriate base map, adding annotations and customising the content, use measurement and query tools to learn more about any study area. Download the raw spatial data in a wide range of formats for use in local GIS, CAD or image processing software.

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Digimap is available to members of subscribing higher and further education institutions in the UK. Individual registration is required, but the service is free at the point of use. More information about subscription fees can be found on our [website](#).



15-SITE



Topography can be created by placing points of the correct elevation value or from an imported site survey.

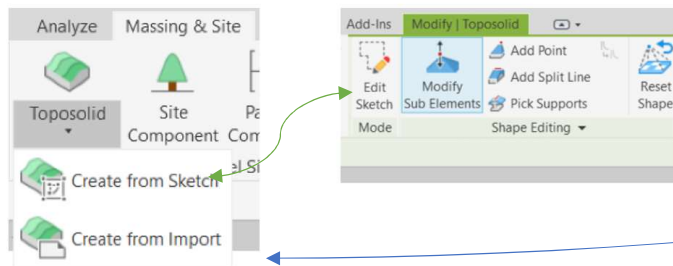
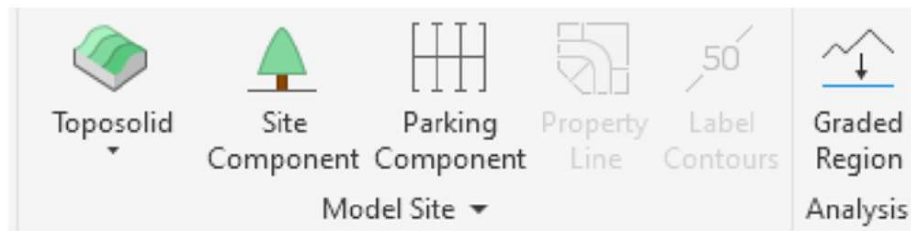
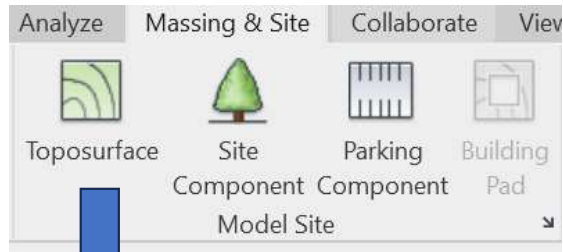
Use the digimap contours plan to create a toposurface for your house.





15-SITE

Revit 2024: Toposurface – replaced by Toposolid



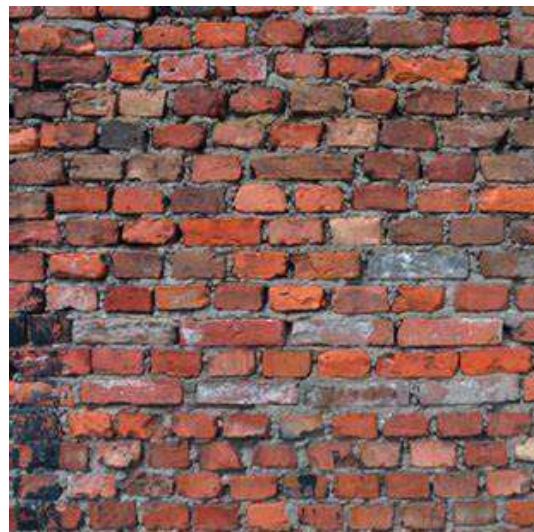
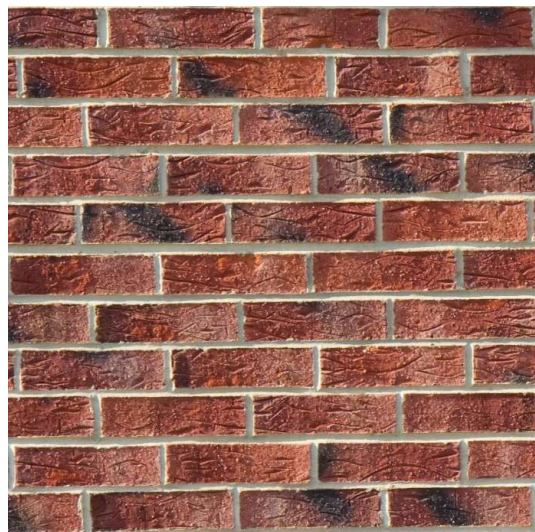
Topography can be created by placing points of the correct elevation value or from an imported site survey.

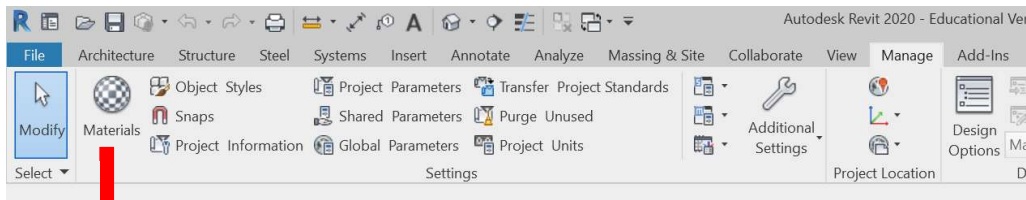
Use the digimap contours plan to create Toposolid. Download the sample file and Insert the Toposolid exercise from the Teams Files.



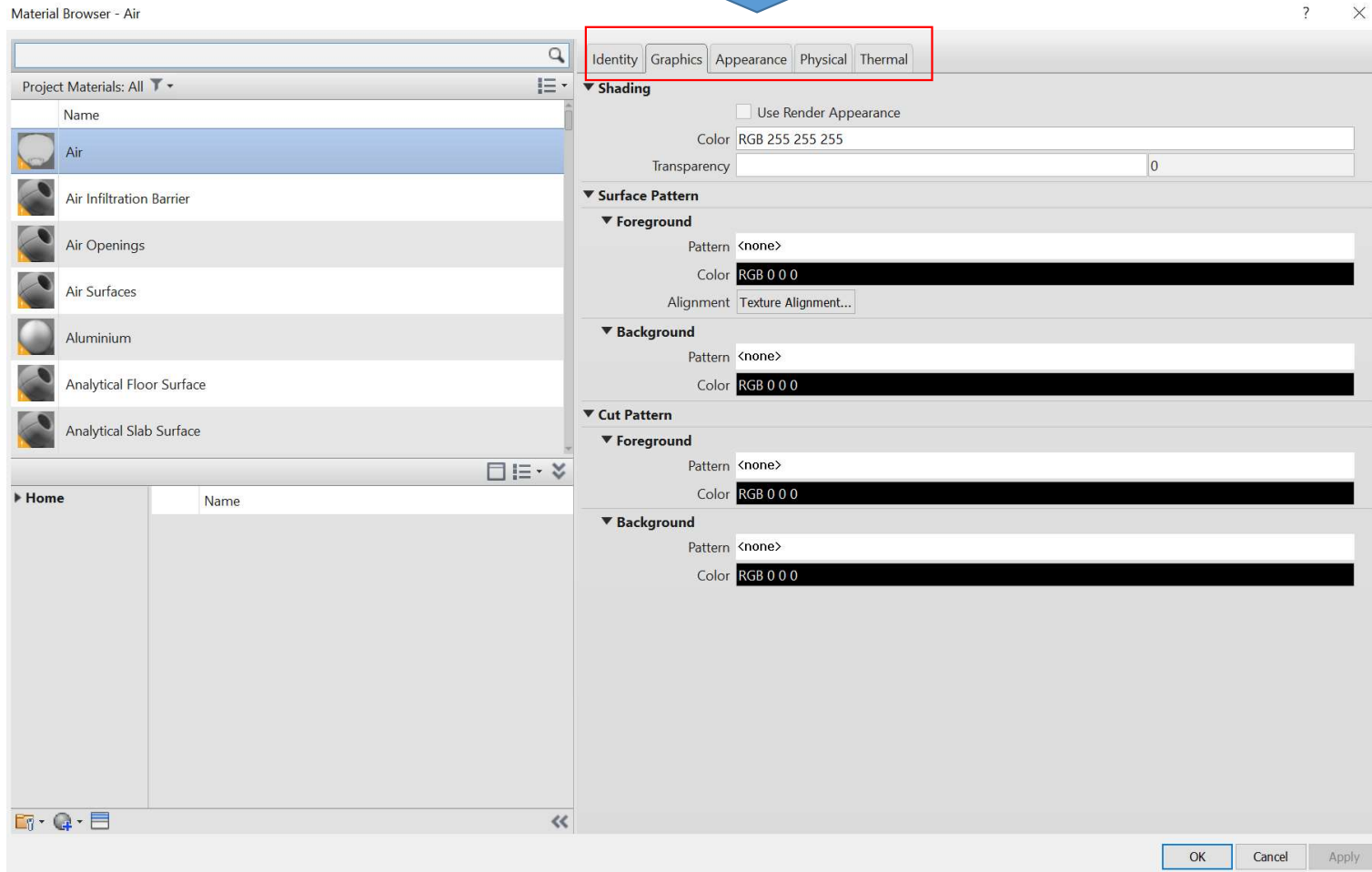


16-MATERIALS

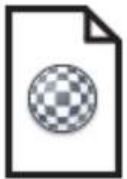




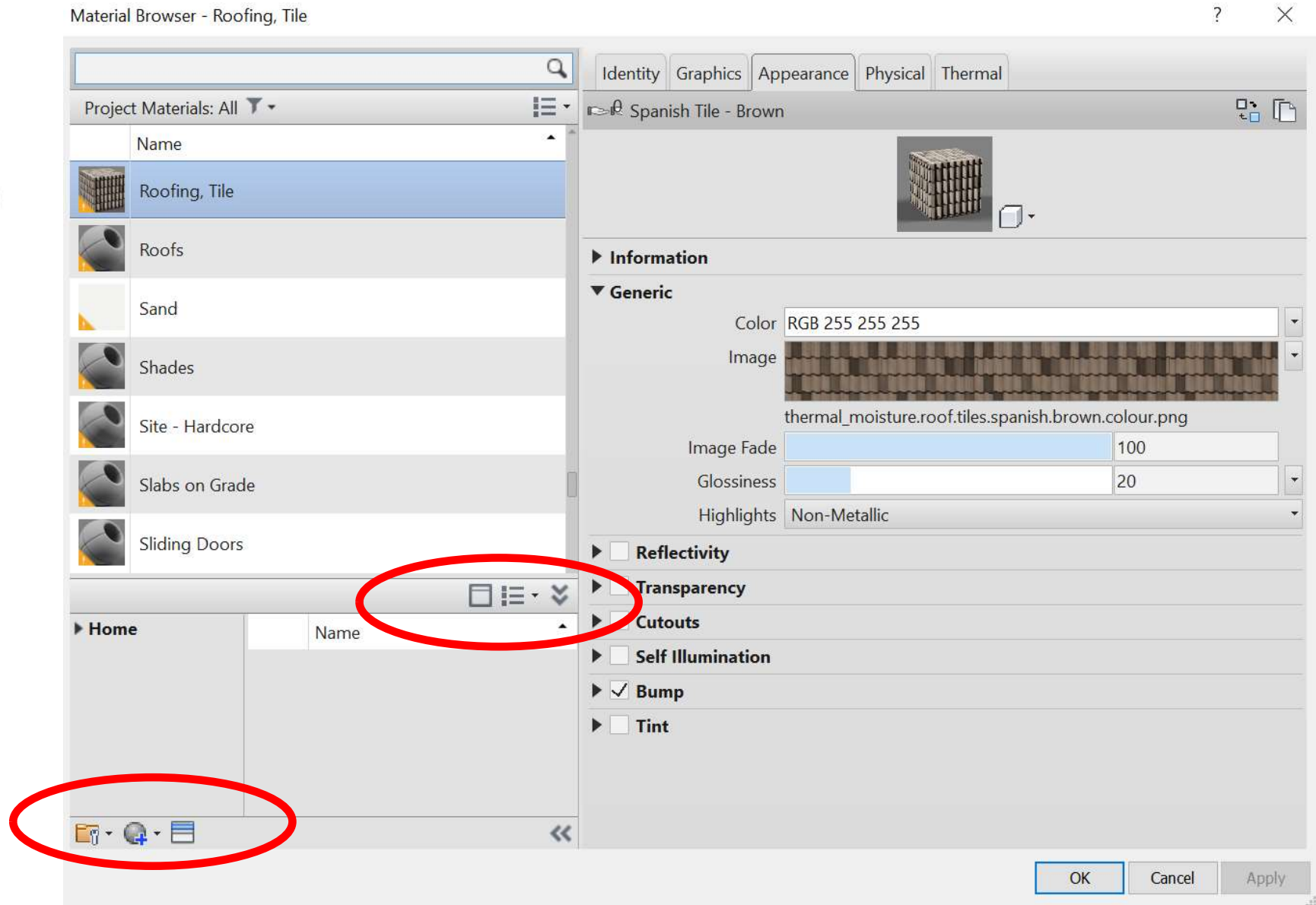
Properties of the Material



Materials
Loaded within
the project



16-MATERIALS



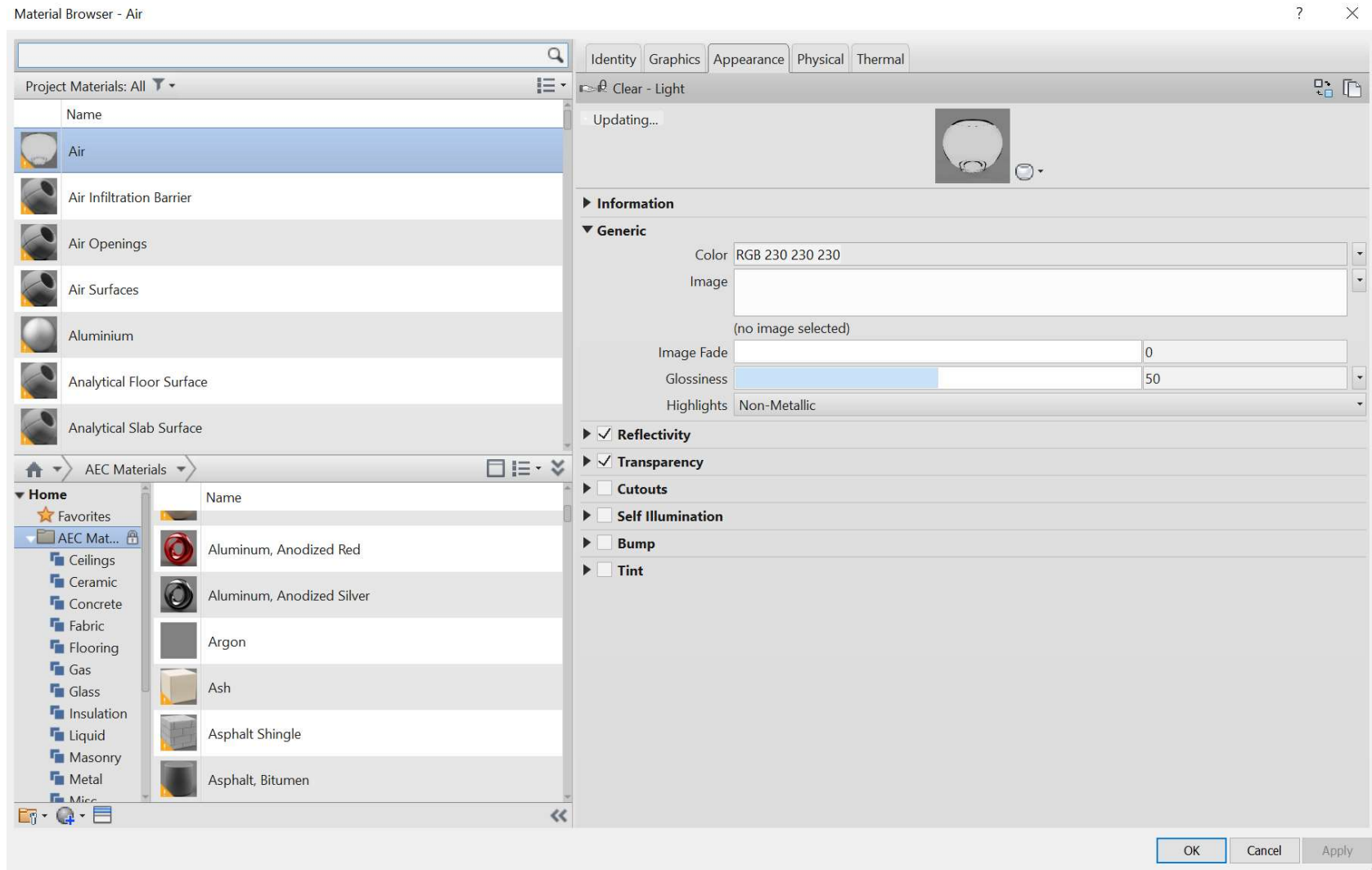


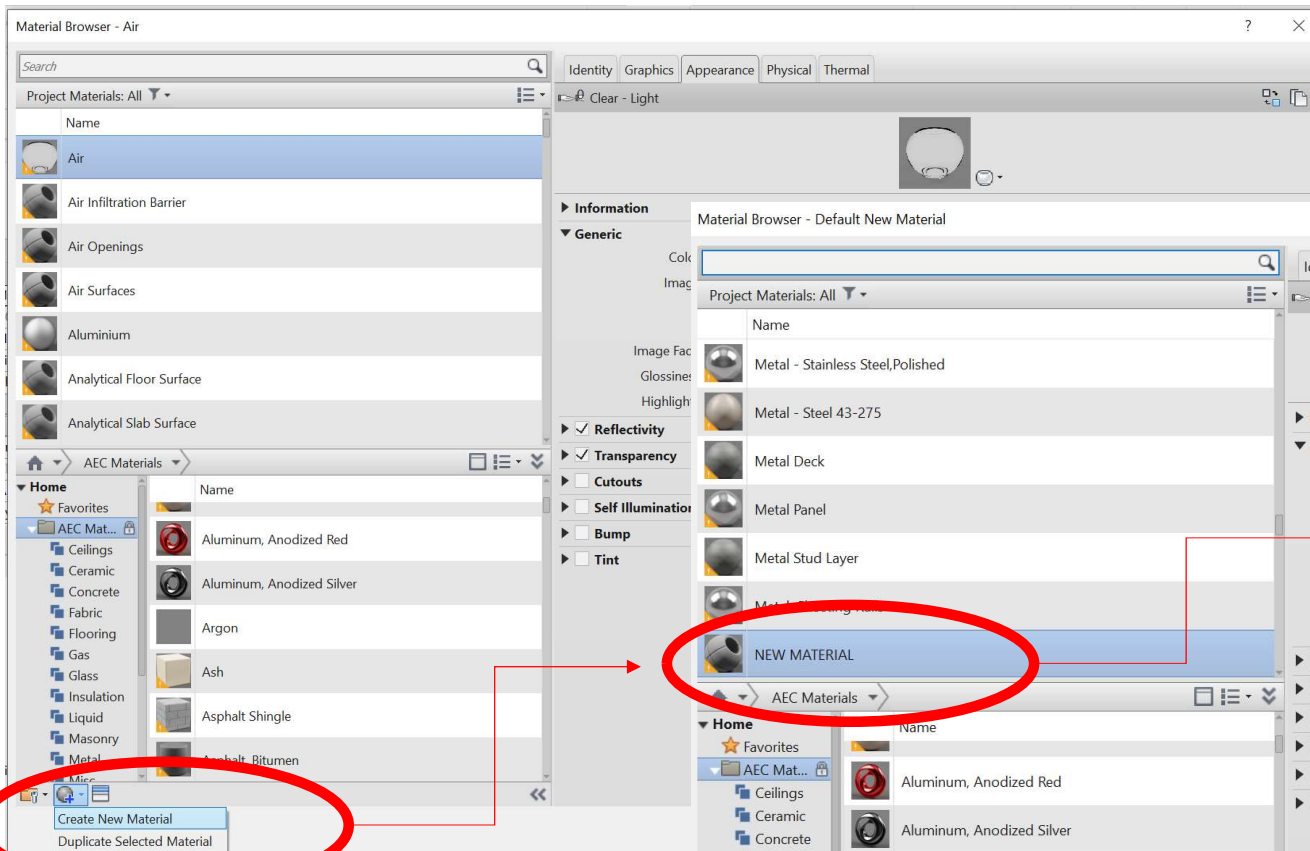
16-MATERIALS

Open the Home
Menu to view
AEC Materials
Library



Additional
Materials can be
loaded in to the
project.

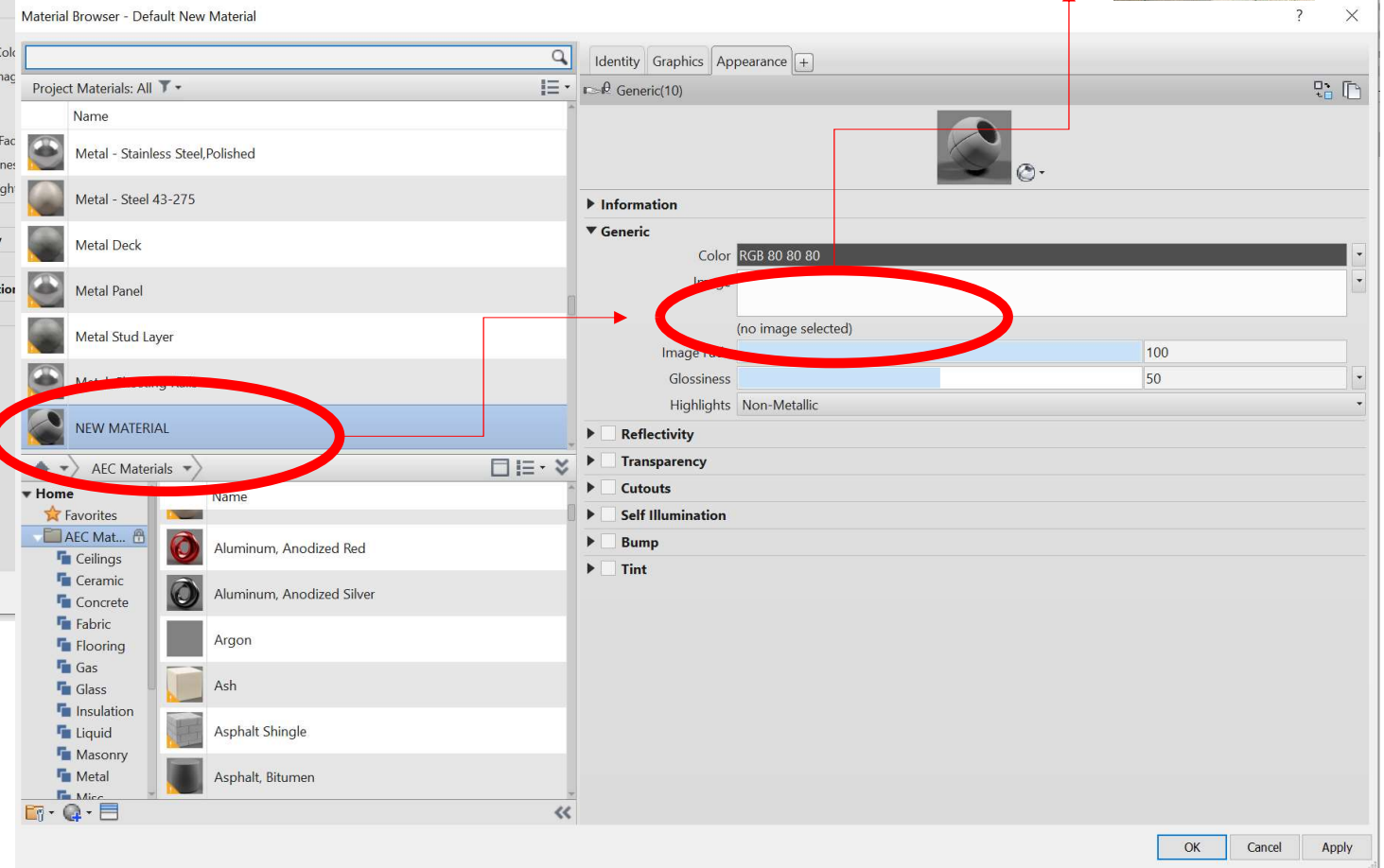
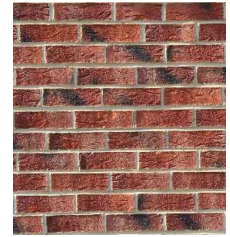




Create a New Material and Rename it.
Images for the material can be added

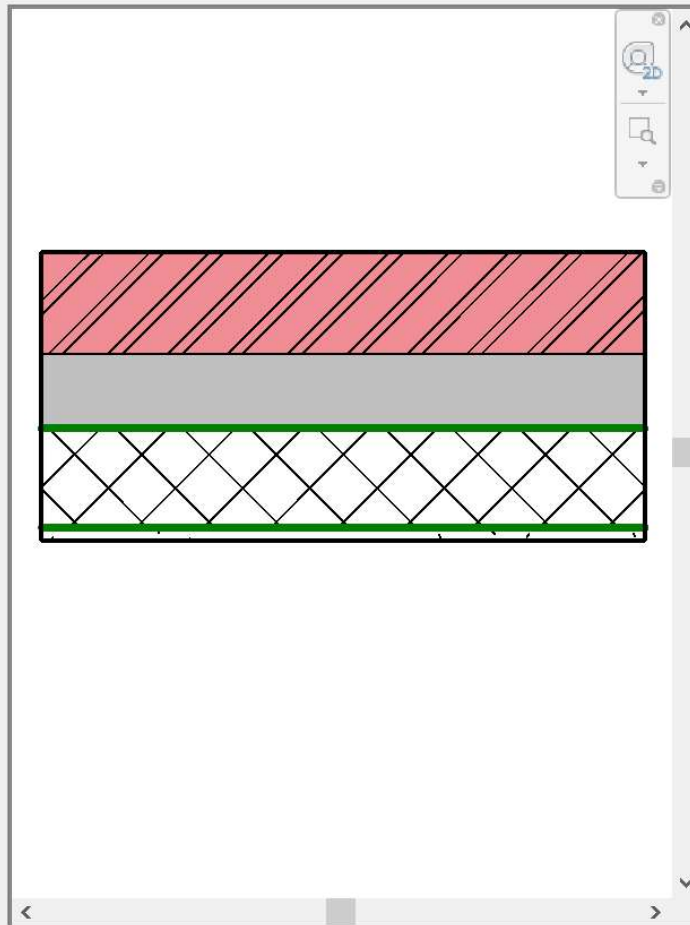


Load your
own image of
the material





Edit Assembly



Family: Basic Wall
Type: Wall-Ext_102Bwk-75Ins-100LBk-12P 2
Total thickness: 290.0
Resistance (R): 4.2386 (m²·K)/W
Thermal Mass: 27.90 kJ/K

Sample Height: 6096.0

Layers

EXTERIOR SIDE

	Function	Material	Thickness	Wraps	Structural Material
1	Finish 1 [4]	Brick, Common	102.0	☒	☒
2	Thermal/Air Layer [3]	Fiberglass Batt	75.0	☒	☐
3	Core Boundary	Layers Above Wrap	0.0		
4	Structure [1]	Concrete Masonry Uni	100.0	☐	☒
5	Core Boundary	Layers Below Wrap	0.0		
6	Finish 2 [5]	Plaster	12.0	☒	☐

INTERIOR SIDE

Insert

Delete

Up

Down

Default Wrapping

At Inserts:

Both

At Ends:

None

Modify Vertical Structure (Section Preview only)

Modify

Merge Regions

Sweeps

Assign Layers

Split Region

Reveals

OK

Cancel

Help

View: Floor Plan: Modify typ

Preview >>



18-VIEWS



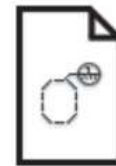
19-PLAN
VIEWS



20-SECTIONS



21-ELEVATIONS



22-CALLOUTS



23-DETAILS



24-3D VIEWS



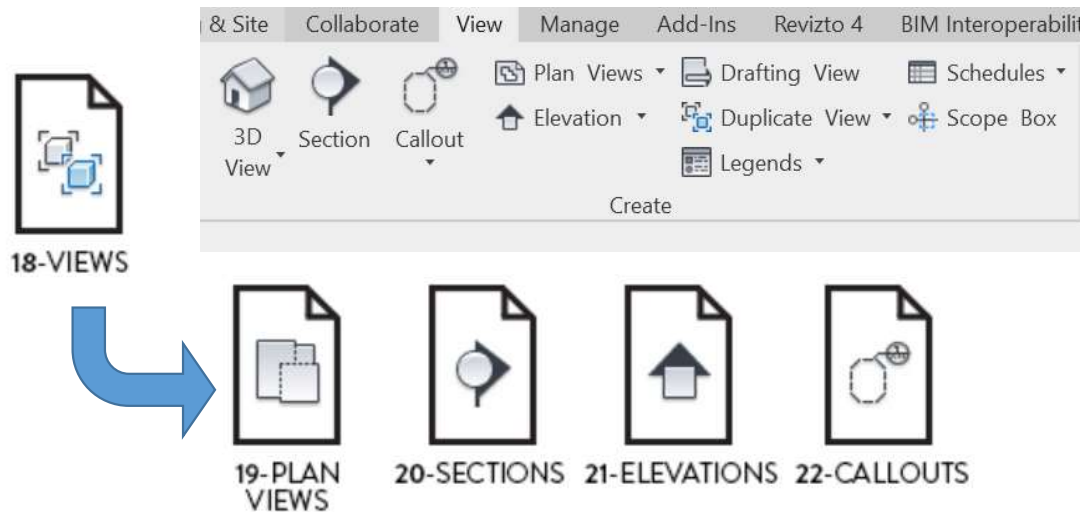
25-LEGENDS



26-VIEW
TEMPLATES



27-VISIBILITY



Revit allows you to create multiple views of your project. As you are working on one model, Revit coordinates all the information which can be presented in a varies levels of scale and detail.

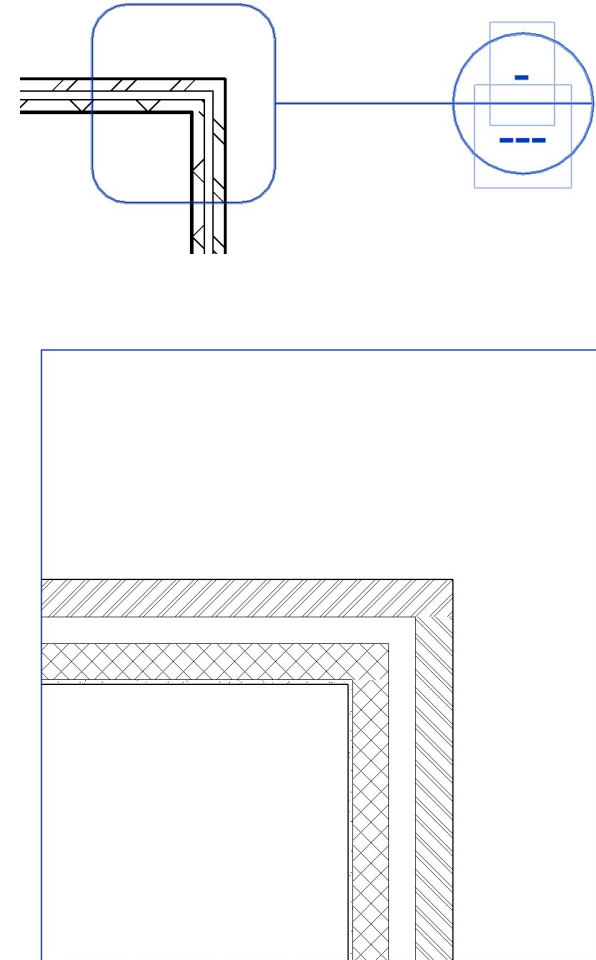
EG.

Ground Floor General arrangement plan 1:100

Ground Floor Setting out plan 1:50

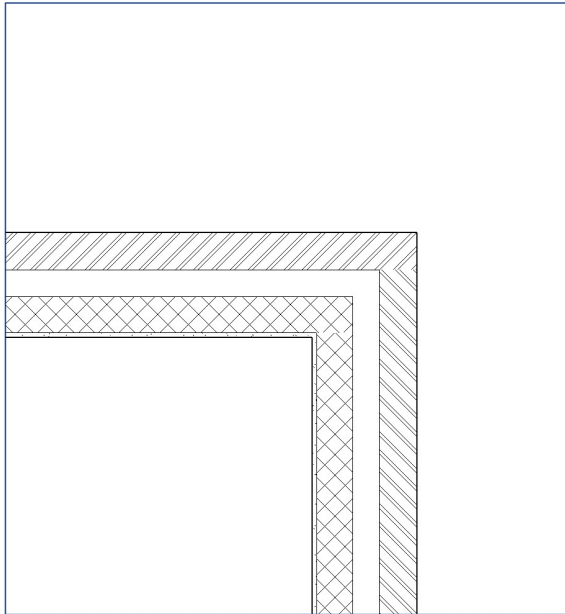
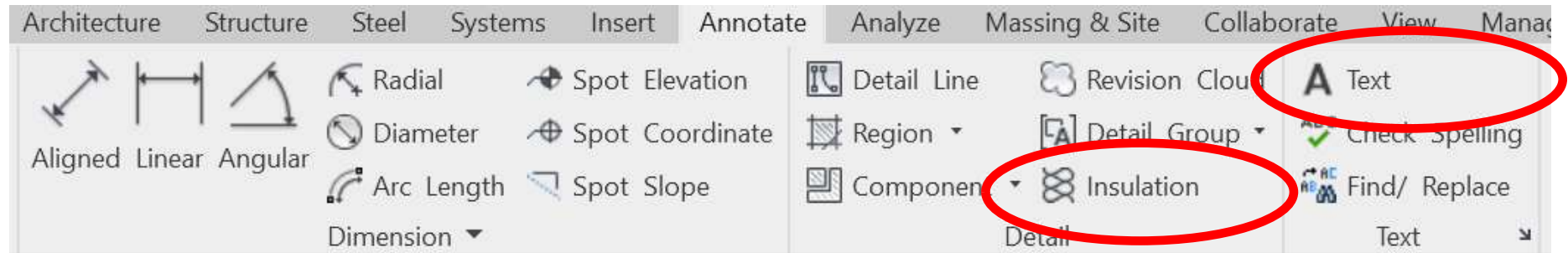
Callout detail of wall junction on plan 1:10

Views can be duplicated 'with detail' allowing multiple representations of the same view.

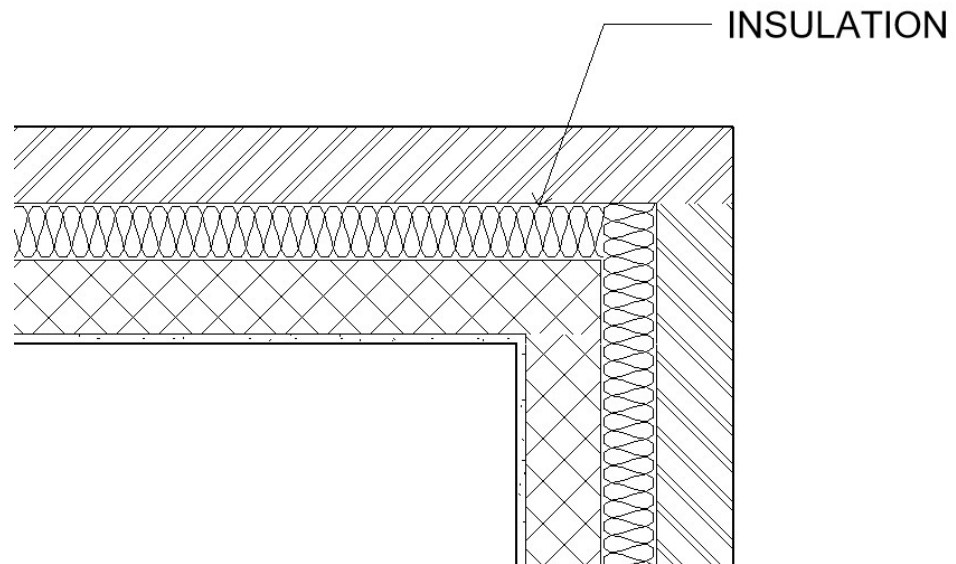




23-DETAILS

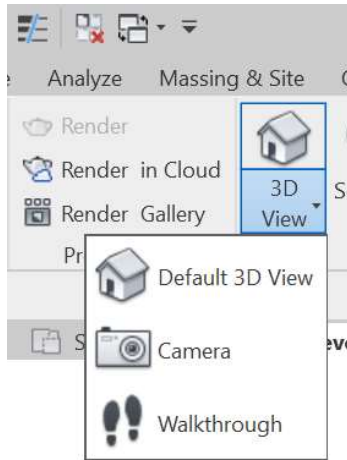


Create a Callout Detail for your house and add some annotations.



Adding further information to Details

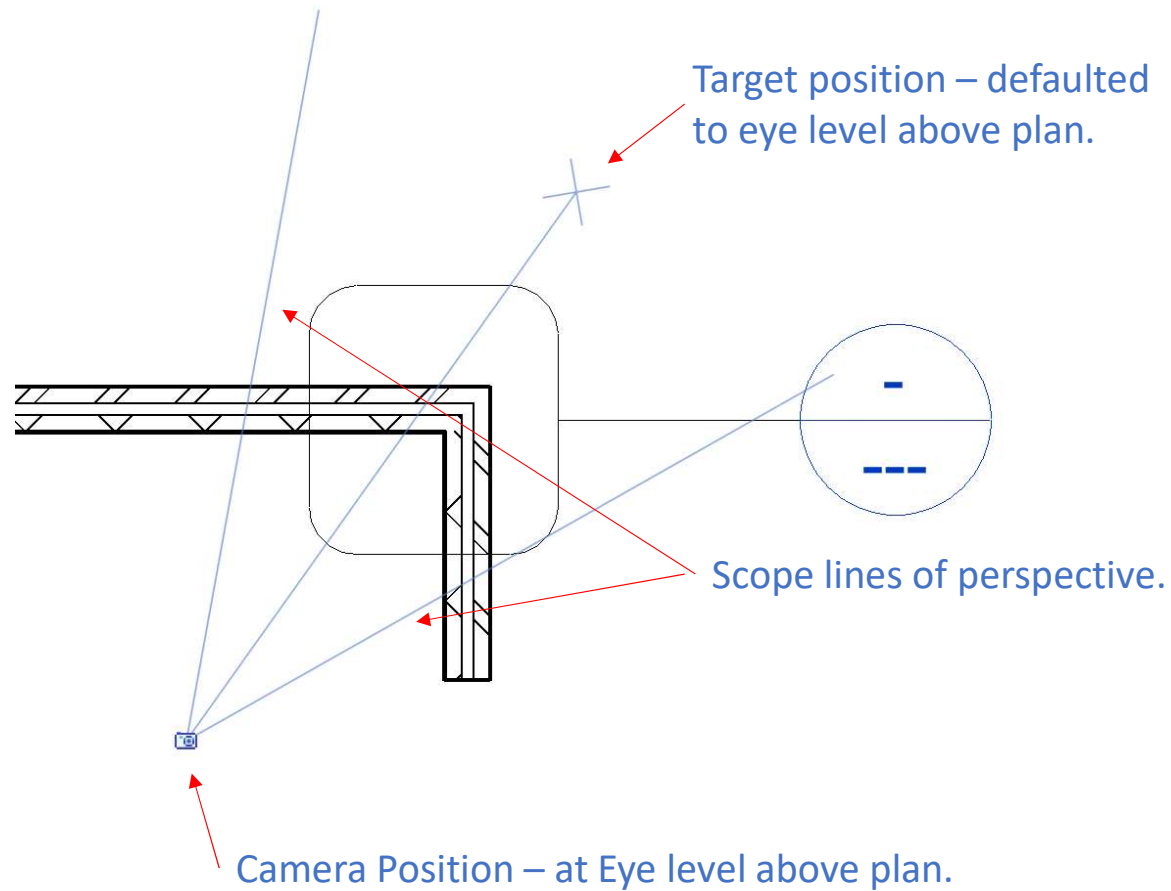
24-3D VIEWS



Place Camera Views in PLAN

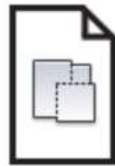
Click to place camera and drag to show the scope of the perspective view.

A new view will appear in the Project Browser Palette





18-VIEWS



19-PLAN
VIEWS



20-SECTIONS



21-ELEVATIONS



22-CALLOUTS



23-DETAILS



24-3D VIEWS



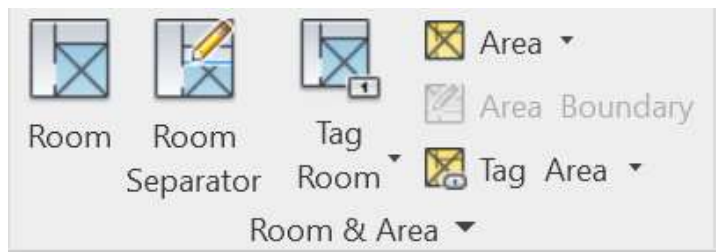
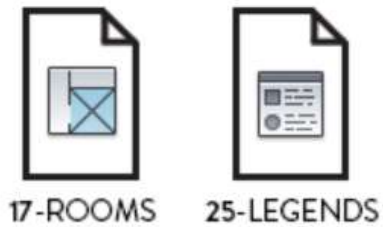
25-LEGENDS



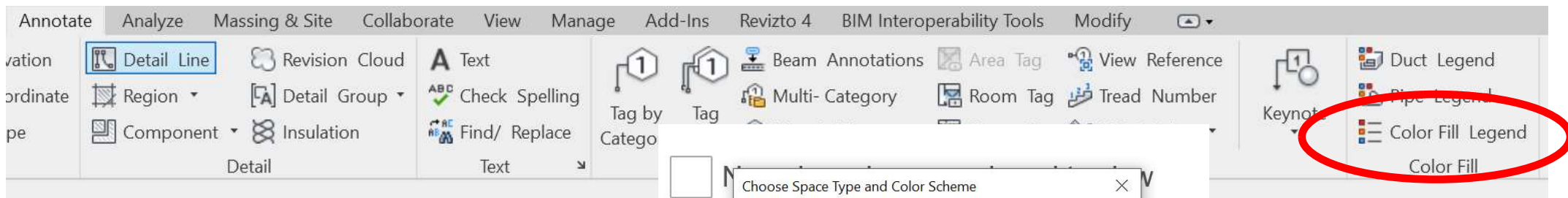
26-VIEW
TEMPLATES



27-VISIBILITY



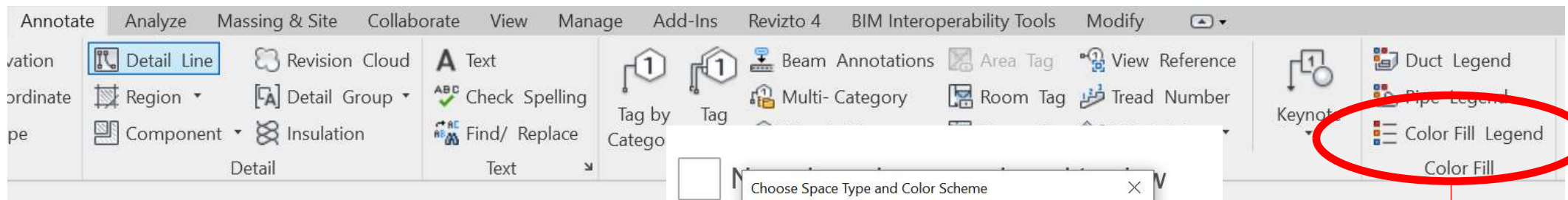
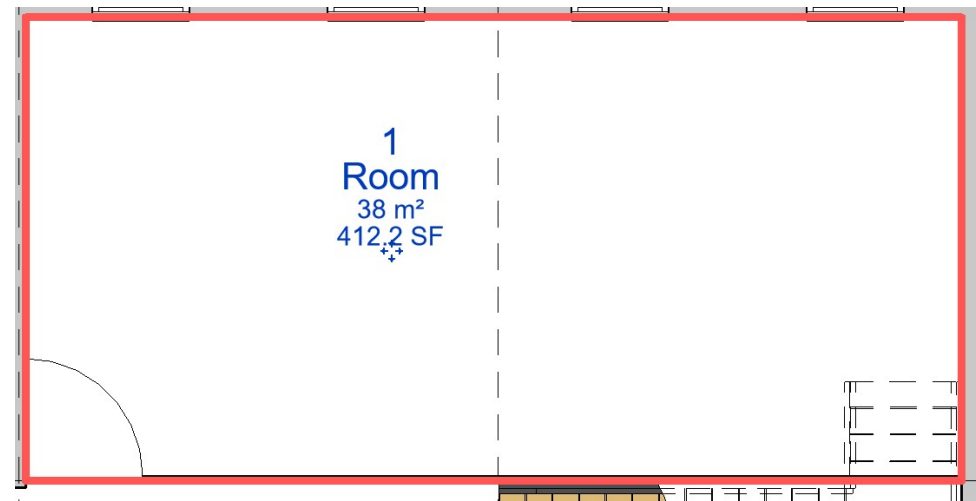
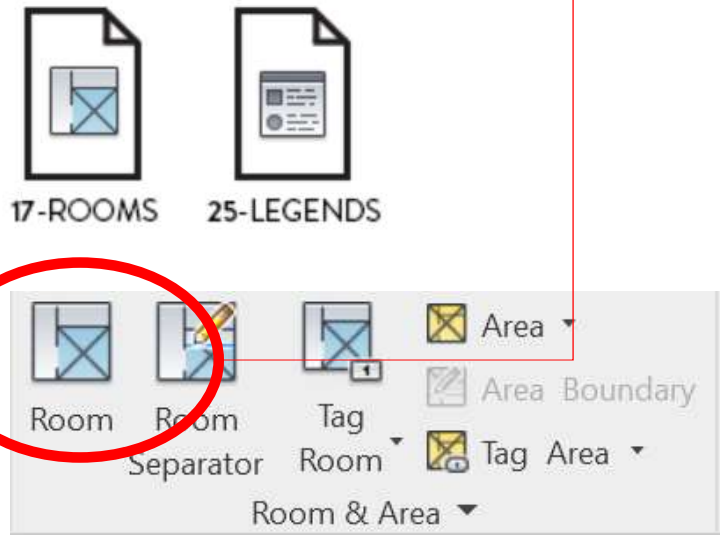
Add rooms to your House Plan from the Architecture Menu



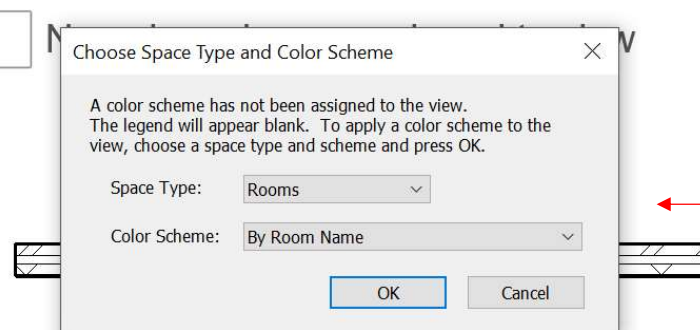
Add a colour fill legend to your house Plan from the Annotate Menu

17-ROOMS 25-LEGENDS

Add rooms to your Plan from the Architecture Menu



Add a colour fill legend to your Plan from the Annotate Menu





Properties

Floor Plan

Floor Plan: Level 0

Graphics

View Scale	1 : 100
Scale Value 1:	100
Display Model	Normal
Detail Level	Fine
Parts Visibility	Show Original
Visibility/Graphics Ov...	Edit...
Graphic Display Opti...	Edit...
Orientation	Project North
Wall Join Display	Clean all wall joins
Discipline	Architectural
Show Hidden Lines	By Discipline

Properties help

Apply

Visibility/Graphic Overrides for Floor Plan: Level 0

Visibility Properties

Model Categories

Annotation Categories

Analytical Model Categories

Imported Categories

Filters

☒ Show model categories in this view

Filter list: <show all>

If a category is unchecked, it will not be visible.

Visibility	Projection/Surface			Cut		Halftone	Detail Level
	Lines	Patterns	Transparency	Lines	Patterns		
☒ Air Terminals	Override...		Override...			☐	By View
☒ Areas						☐	By View
☒ Cable Tray Fittings						☐	By View
☒ Cable Trays						☐	By View
☒ Casework						☐	By View
☒ Ceilings						☐	By View
☒ Columns						☐	By View
☒ Communication Devices						☐	By View
☒ Conduit Fittings						☐	By View
☒ Conduits						☐	By View
☒ Curtain Panels						☐	By View
☒ Curtain Systems						☐	By View
☒ Curtain Wall Mullions						☐	By View
☒ Data Devices						☐	By View
☒ Detail Items						☐	By View
☒ Doors						☐	By View
☒ Duct Accessories						☐	By View
☒ Duct Fittings						☐	By View
☒ Duct Insulations						☐	By View

All

None

Invert

Expand All

Categories that are not overridden are drawn according to Object Style settings.

Object Styles...

Override Host Layers

☐ Cut Line Styles

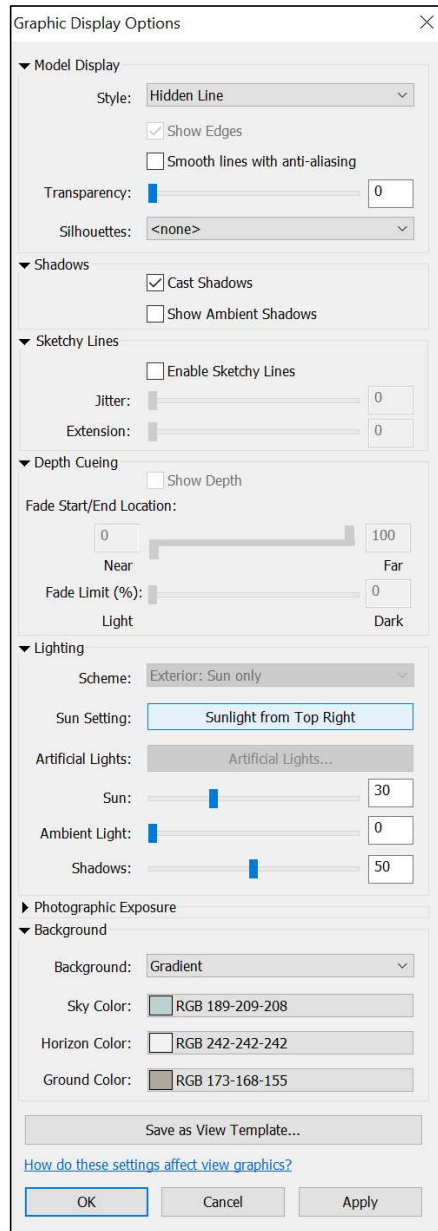
Edit...

OK

Cancel

Apply

Help



Change transparency / emphasise lines

Cast shadows and add ambient shadows to view

Shows sketchy lines

Adding Depth and Fade to view

Adjusting lighting and intensity of light

Add a generic background to view

PART 3: ANNOTATE



28-LINES



29-TAGS



30-TEXT

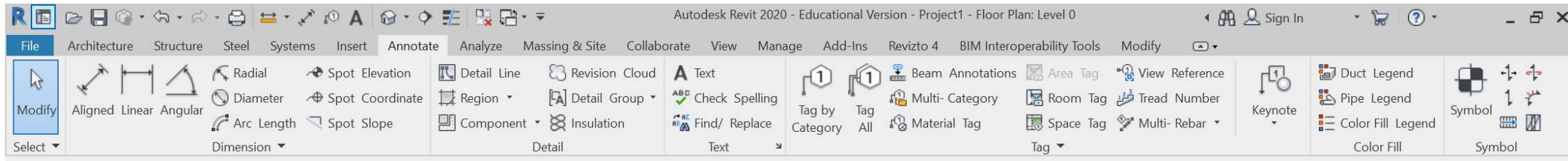


31-REGIONS



32-DIMEN-
SIONS

Annotate menu



Dimensions

Details Text

Regions

Details Lines

Detailed Component

Insulation

Revision Clouds

Tags

Rooms

Windows

Doors

Spaces

Legends

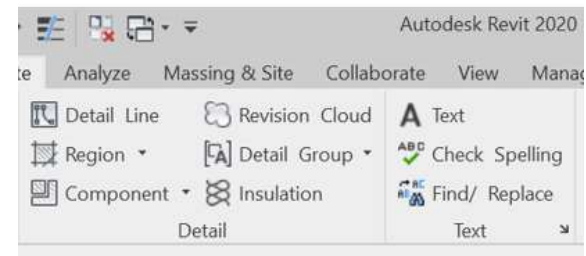
Colour fill

By Room

By Department

Symbols

North Points



Details Text

Regions

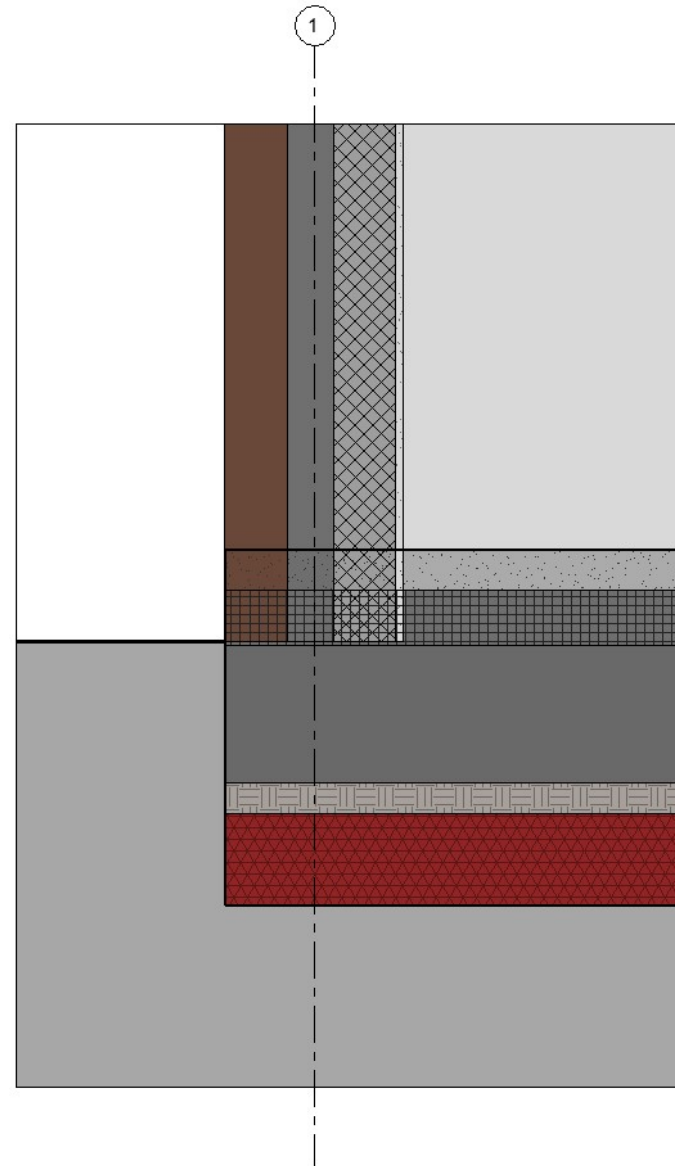
Details Lines

Detailed Component

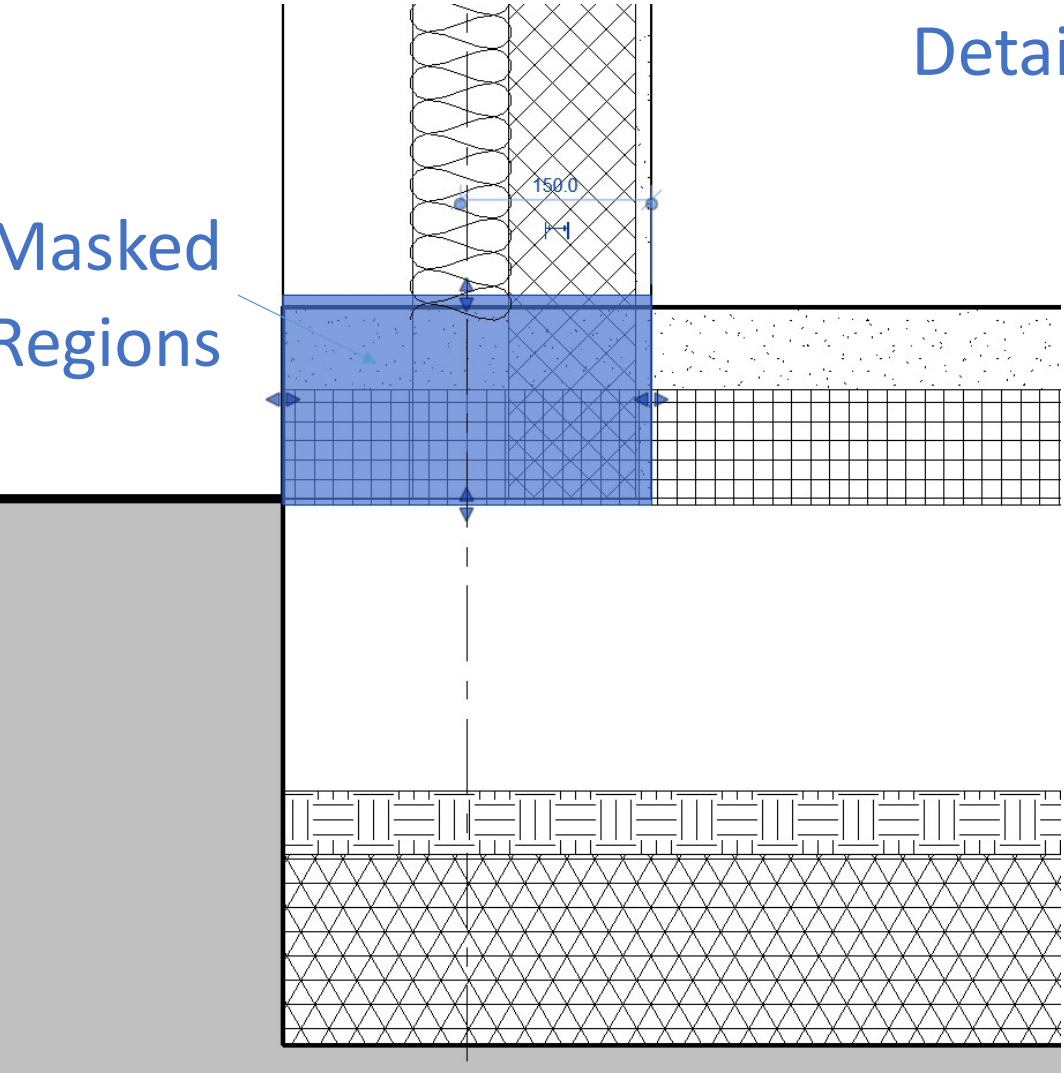
Insulation

Revision Clouds

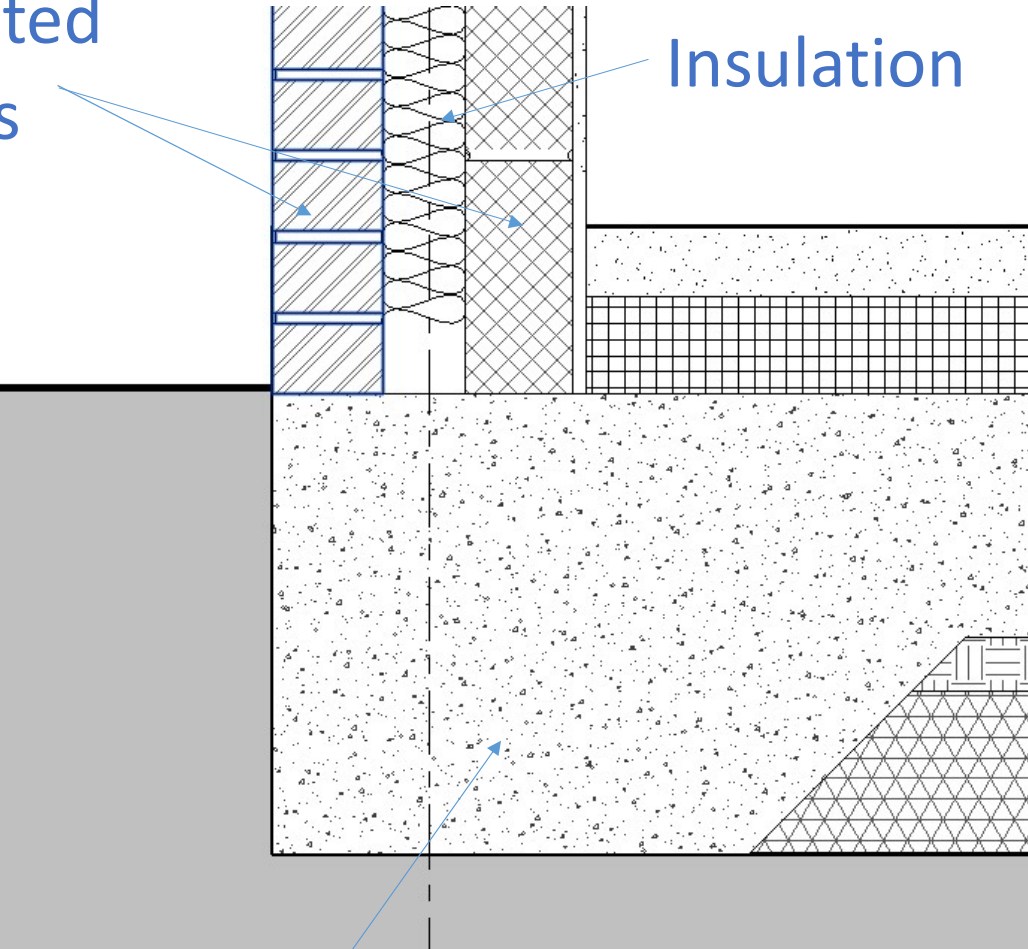
Adding 2D data



Masked
Regions



Repeated
Details



Insulation

Filled
Regions