The Secret to Landscape Modeling with Revit

Raquel Bascones Recio

Landscape Architect, Populous.

Class summary

- Learn the basics of modeling Landscape designs with Revit. Discover how to build the most common hard and soft landscape elements and topography.

Key learning objectives

At the end of this class, you will be able to:

- Identify the difficulties of modelling landscape designs with Revit and how to remedy them
- Use Revit to build hard landscape elements
- Discover ways to model soft landscape elements
- Learn the basics of how to work with topography in Revit

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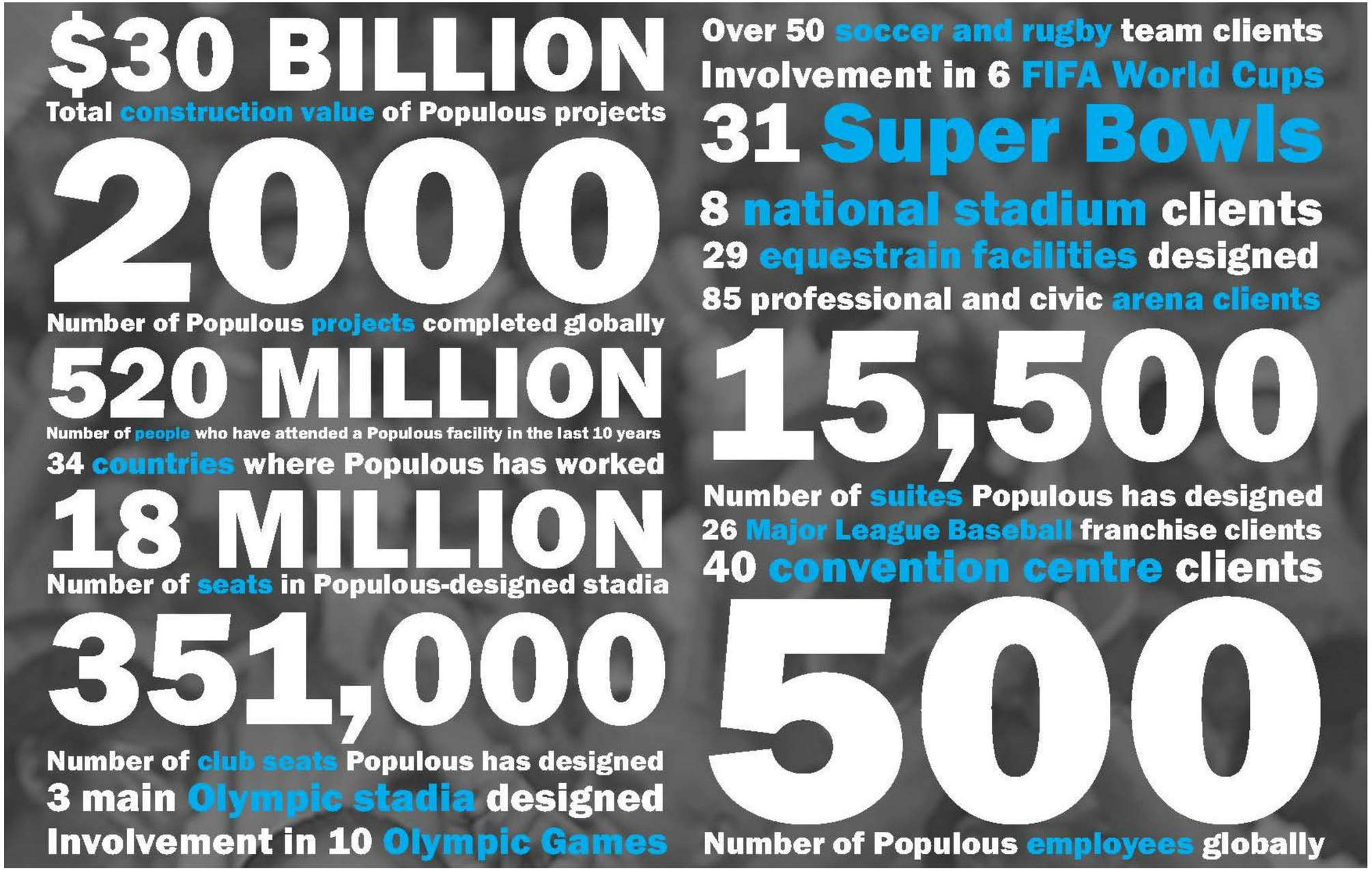
Introduction


$30 BILLION
Total construction value of Populous projects
2000
Number of Populous projects completed globally
520 MILLION
Number of people who have attended a Populous facility in the last 10 years
34 countries where Populous has worked
18 MILLION
Number of seats in Populous-designed stadia
351,000
Number of club seats Populous has designed
3 main Olympic stadia designed
Involvement in 10 Olympic Games
Over 50 soccer and rugby team clients
Involvement in 6 FIFA World Cups
31 Super Bowls
8 national stadium clients
29 equestrain facilities designed
85 professional and civic arena clients
15,500
Number of suites Populous has designed
26 Major League Baseball franchise clients
40 convention centre clients
500
Number of Populous employees globally


MILLENNIUM STADIUM
WEMBLEY STADIUM
ASCOT RACECOURSE
SILVERSTONE
WIMBLEDON
O2 ARENA
OLYMPIC STADIUM
LONDON 2012
KAZAN
UNIVERSIADE
2013
OLYMPIQUE LYONNAIS
EURO 2016
OVAL LINGOTTO
TURINO 2006
ESTADIO DE LUZ
EURO 2004
OLYMPIC STADIUM
SOCHI 2014
INCHEON
ASIAN GAMES 2014
SUPER BOWL
XX-XLIV
CAMDEN YARDS
YANKEE STADIUM
NATIONALS PARK
AT&T PARK
RELIANT STADIUM
PHOENIX CONVENTION CENTER
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CLUB DE FÚTBOL
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NANJING SPORTS PARK
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SELANGOR RACETRACK
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EDEN PARK
RUGBY WORLD CUP
2011

TOTTENHAM
HOTSPUR STADIUM
London, UK | 2018

BRISTOL ARENA

Bristol, UK | 2019

BIM for Landscape? Really?

1. Architects and Engineers working in BIM environments

2. Clients requesting BIM

3….

3. Mandatory in the United Kingdom

Betting on BIM: Inside the UK's new construction technology mandate

By Kim Slowey | April 7, 2016 print

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It's been nearly five years since Paul Morrell, then the United Kingdom's chief construction advisor, announced the plan to require all government contractors to be compliant with Level 2 Building Information Modeling (BIM), and the April 4, 2016 deadline arrived this week.

After years of preparation and a growing need to implement BIM on projects across the globe, experts in the U.S. and abroad weigh in about the possible ramifications of the new requirement. How is the mandate affecting the U.K. construction industry? And is the U.S. headed toward a similar path?

Government Construction Strategy Level 2 BIM delivers on four-year deadline

Posted by: Sarah OBeirne in Building services, Facilities Management, Industry, IT & Software, News April 4, 2016
233 Views

The successful delivery of the Government Construction Strategy (GCS) Level 2 BIM (Building Information Modelling) objectives represents *"an internationally unparalleled achievement on the journey towards the digitalisation of the built environment sector"* according to BIM Task Group chairman Mark Bew MBE.

Published by the Cabinet Office on 31 May 2011, the GCS – as well as the Low Carbon Construction Innovation & Growth Team: Final Report – outlined the key target of reducing the cost of Government construction projects by 15-20%.

Critical to reaching these targets ahead of the 4 April 2016 deadline was that all central Government departments achieved the milestone and now require tendering suppliers to demonstrate collaborative 3D Level 2 BIM maturity through defined and compliant information and data on projects.

BIM Level 2: Final Countdown for the UK Government Mandate

Ireland

General

21-03-2016

The April 2016 deadline set by the UK government for all centrally procured public sector projects in the UK to be constructed using BIM Level 2 is fast approaching, with BIM Level 3 closely following on the horizon. It is widely regarded as the 'new era' for the construction industry providing for a fully collaborative forum throughout the building life cycle; from initial design to operation and even deconstruction.

The benefits of BIM are well documented and include improved cost efficiencies, client outcomes, co-ordination and improved delivery times. Its adoption in the UK has acted as a catalyst for improved change in the way the industry approaches and operates a building project. It is clear that the benefits of adopting BIM are also felt in the wider industry with no less than 92% of organisations in the UK expecting to be using BIM within three years' time according to the 2015 NBS National BIM Survey published in April 2015.

Budget 2016: Government to push ahead on Level 3 BIM

March 2016

While the Chancellor's plans for a tax on sugary drinks may have grabbed most headlines, there was much for the construction industry to digest in the 2016 Budget - not least an explict statement of intent when it comes to developing Level 3 BIM.

The budget 2016 policy paper contains a number of action points on digital (7.49) including:

"The government will develop the next digital standard for the construction sector – Building Information Modelling 3 – to save owners of built assets billions of pounds a year in unnecessary costs, and maintain the UK's global leadership in digital construction."

(B) I M

BUILDING INFORMATION MODELING

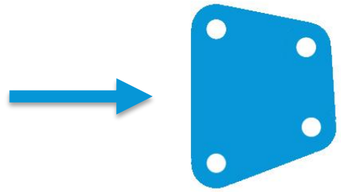
COLLABORATION

BENEFITS

- Company experience working with Revit
- Team background based on Autocad software
- Used by most Architects and Engineers
- Parametric design
- Unified software that allows to have views, sheets, 3D model and schedules in the same file
- Render and visualization capabilities

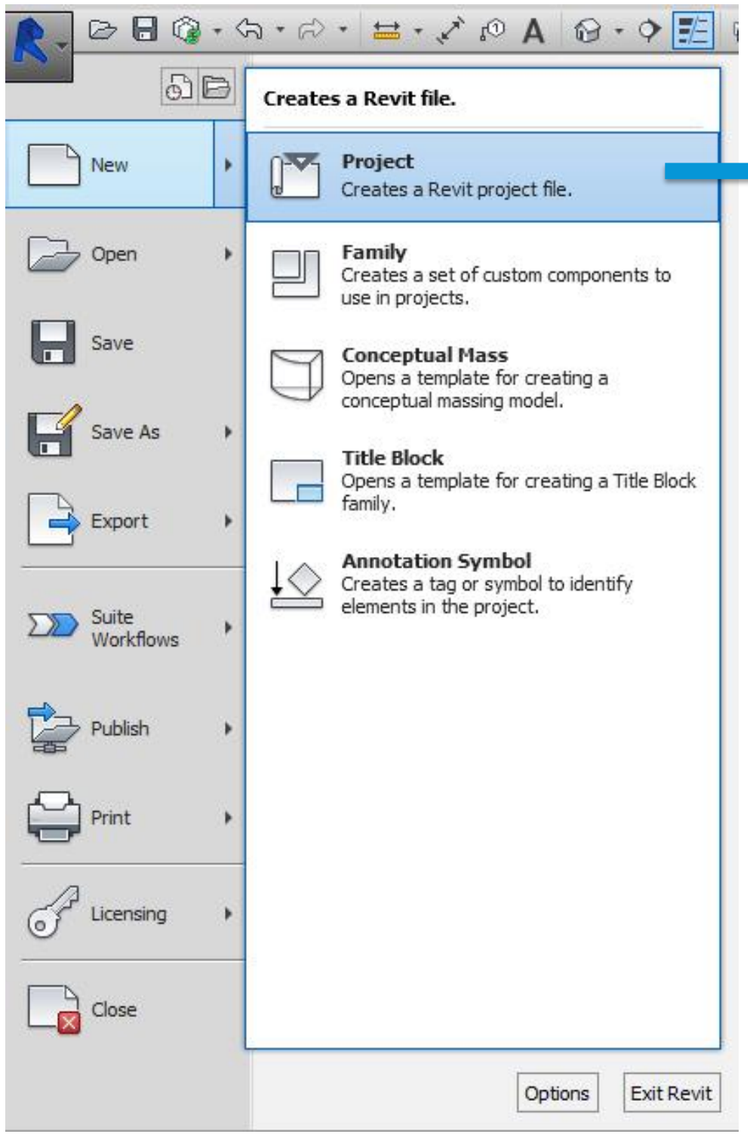
CHALLENGES

- No Landscape-specific build-in tools or workflows
- No interoperability with Autocad Civil 3D
- Difficulties working with Topography
- Many sub consultants still working on 2D information (i.e. Irrigation, Water Features)



Setting out a Landscape Revit Model

NEW PROJECT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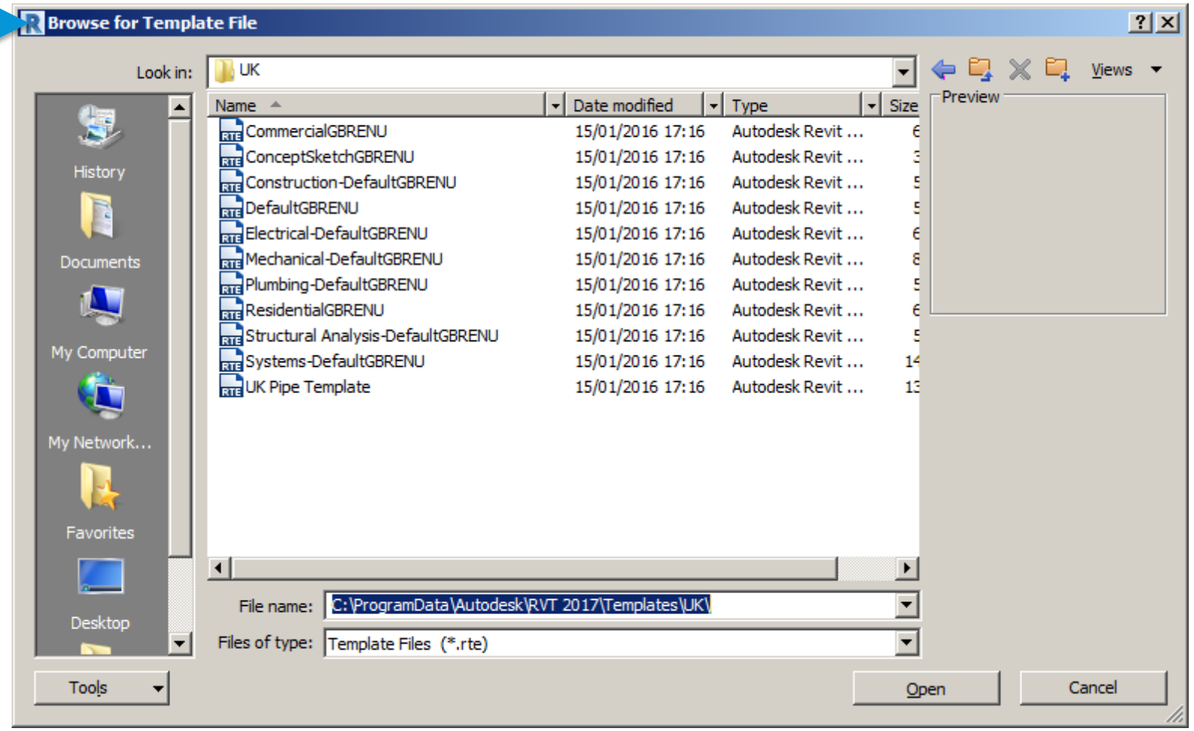
Project
Creates a Revit project file.
Family
Creates a set of custom components to use in projects.
Conceptual Mass
Opens a template for creating a conceptual massing model.
Title Block
Opens a template for creating a Title Block family.
Annotation Symbol
Creates a tag or symbol to identify elements in the project.
Options
Exit Revit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VIEWS

Floorplans (per level):

- General Arrangement
- Grading and Levels
- Hard Landscape and Furniture
- Soft Landscape

Sections:

- Site wide sections
- Detail sections

WORKSETS

Site

- S-01 Components
- S-02 Existing Topography
- S-03 Proposed Topography
- S-04 Existing Planting
- S-05 Entourage
- S-06 Masses

Hard Landscape

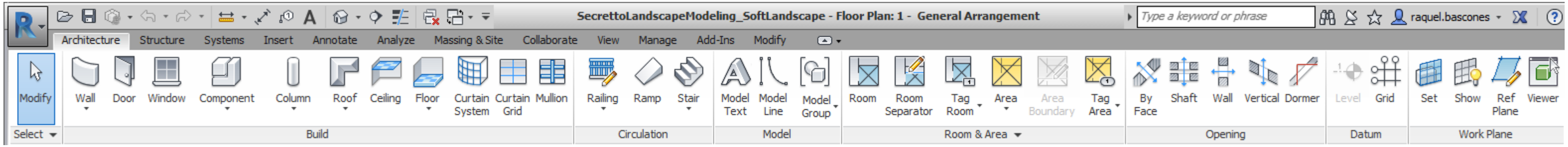
- HL-01 Paving
- HL-02 Stairs, Ramps and Railings
- HL-03 Walls and Fences
- HL-04 Furniture

Soft Landscape

- SL-01 Trees
- SL-02 Planting

Hard Landscape Elements

PAVING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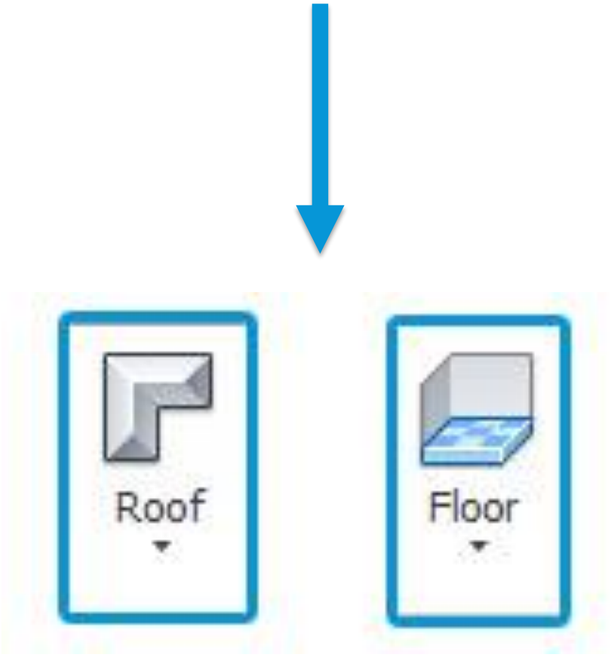
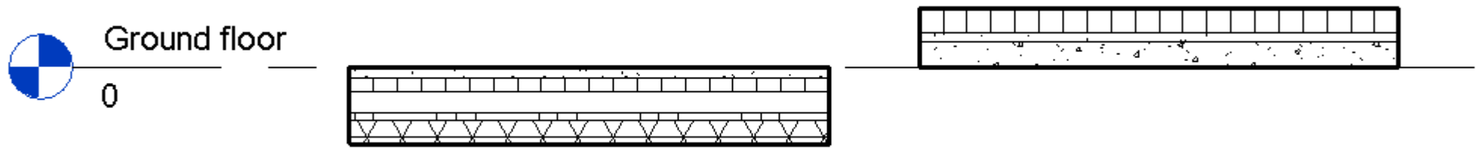

Roof
Floor

PAVING

Floor vs Roof

- Level alignment

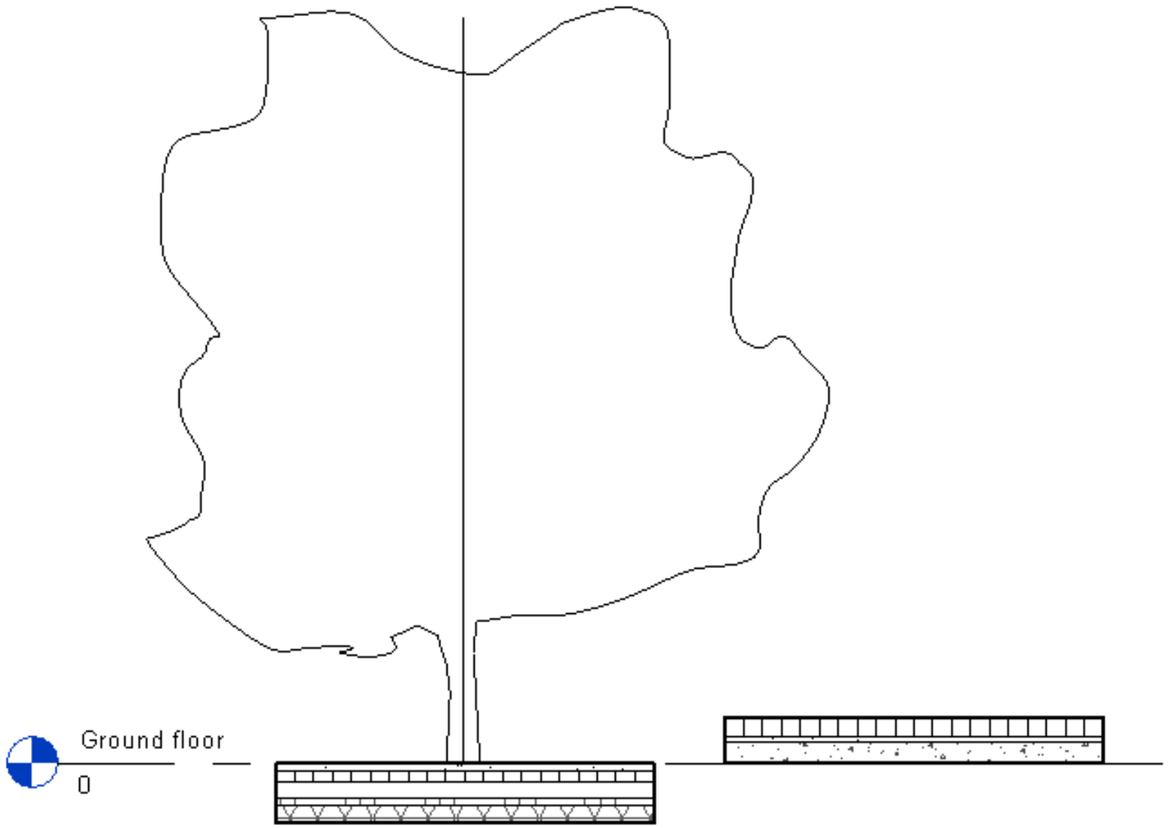


FLOOR ROOF

PAVING

- Family hosting

Floor vs Roof

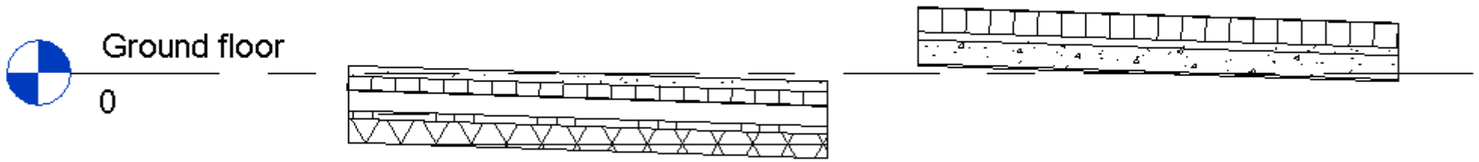


FLOOR ROOF

PAVING

Floor vs Roof

- Editing shape



FLOOR ROOF

PAVING

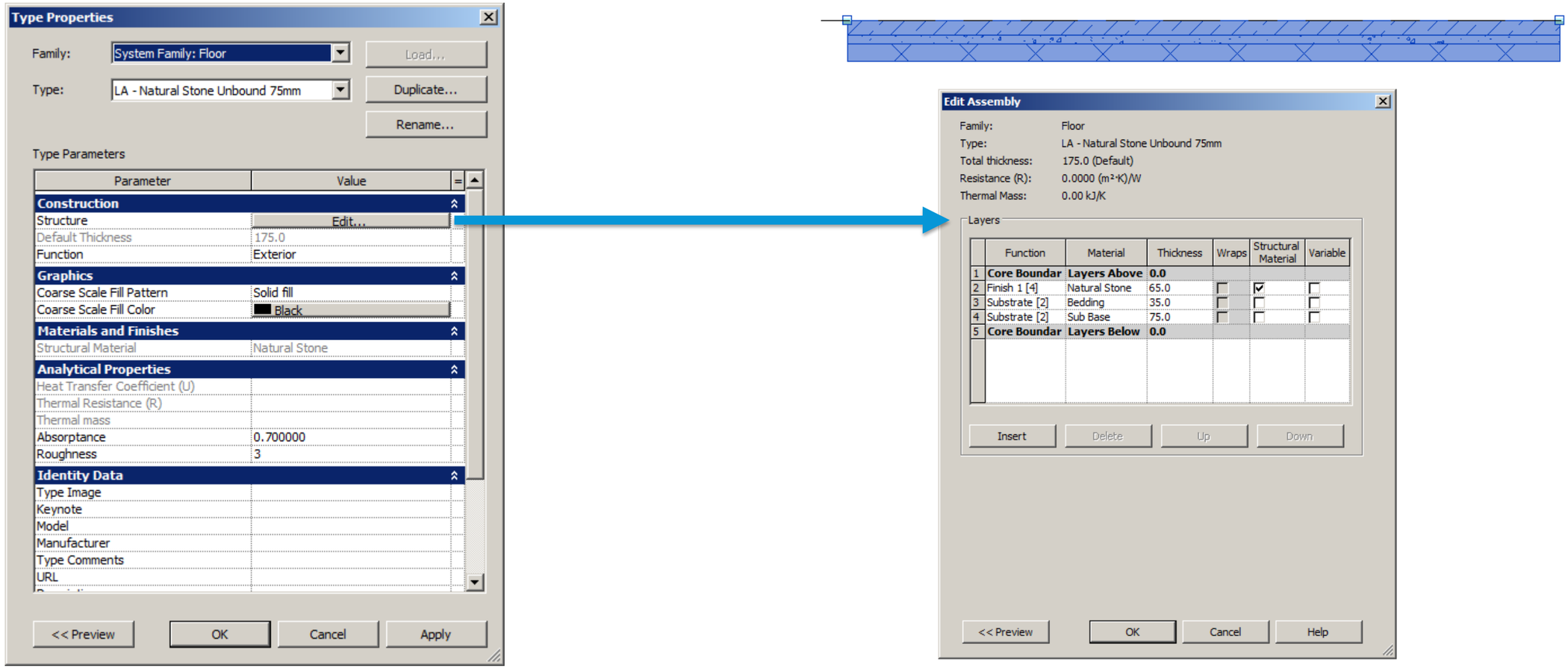
Floor vs Roof

- Coordination

EXTERNAL  INTERNAL

PAVING

Paving Floor Type



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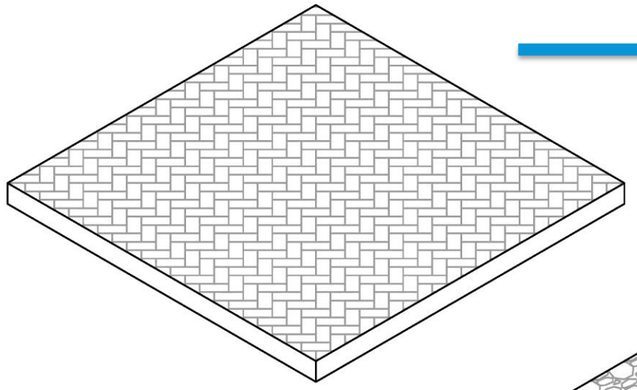
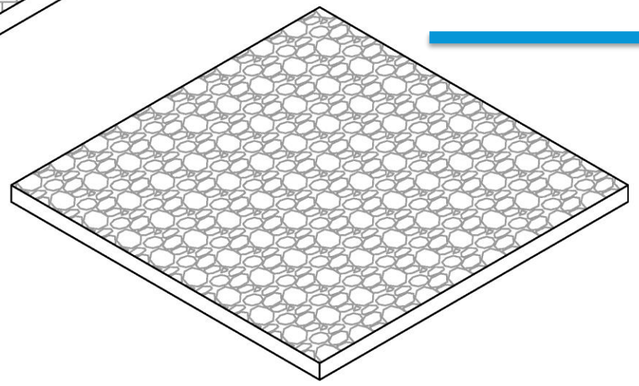
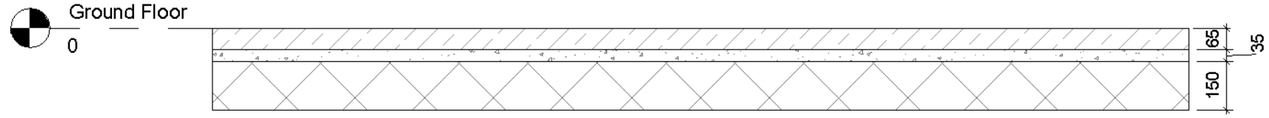
Paving Floor Type

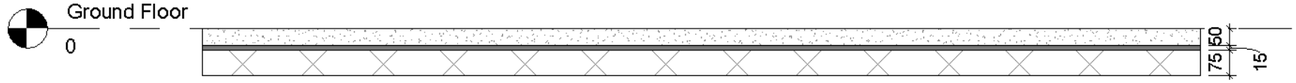


Natural Stone
Bound Paving



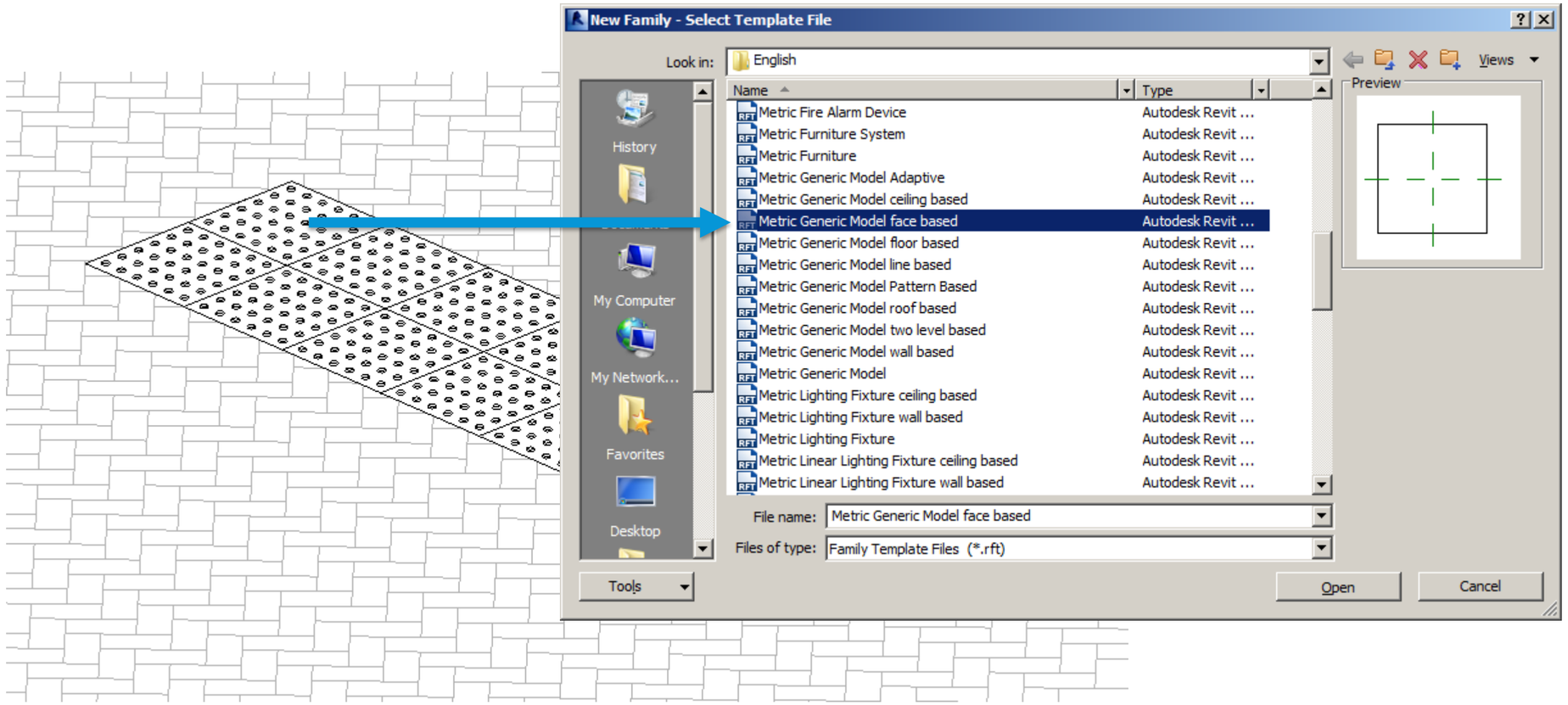
Self Binding Gravel





PAVING

Warning, Hazard or Tactile Paving



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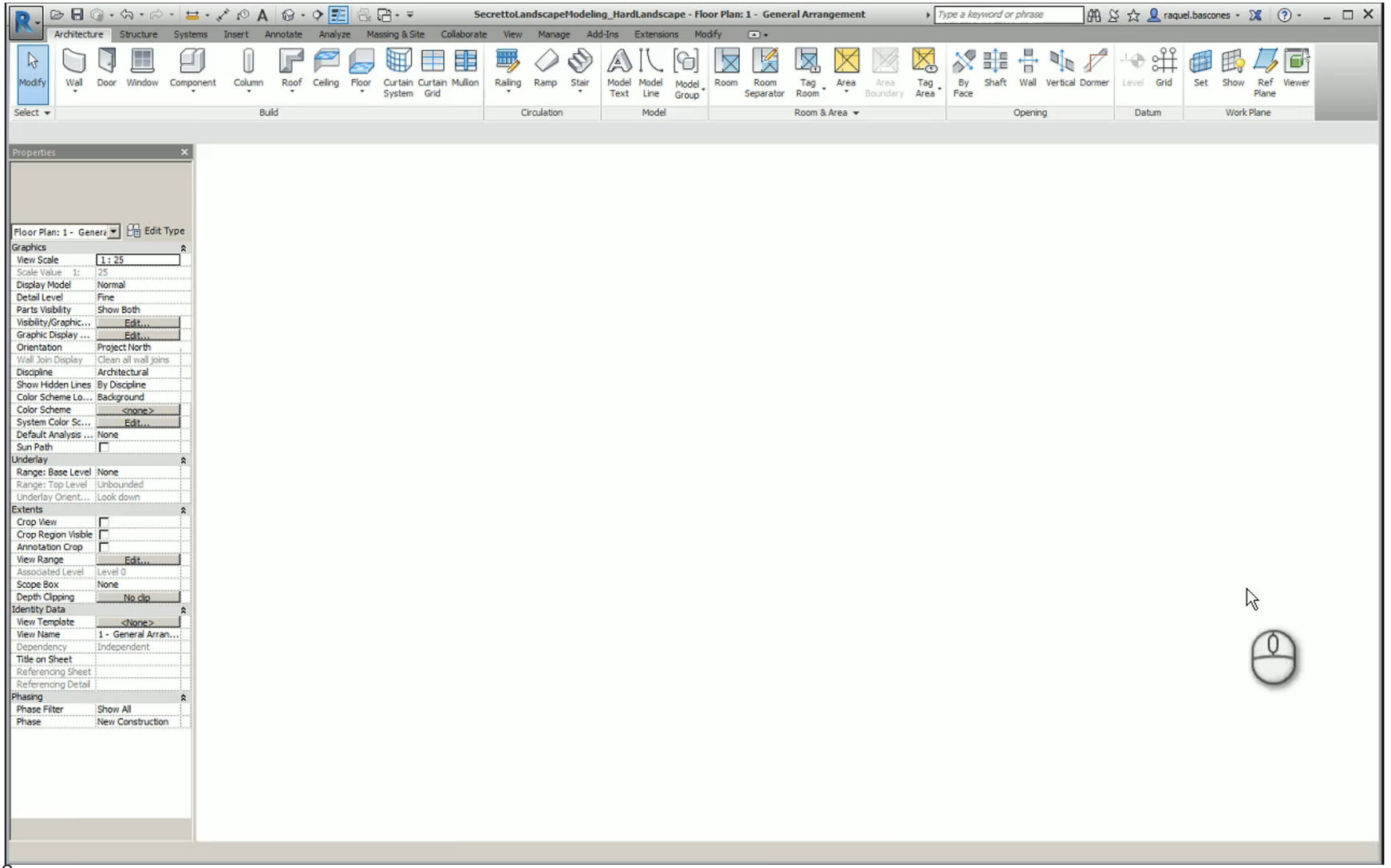


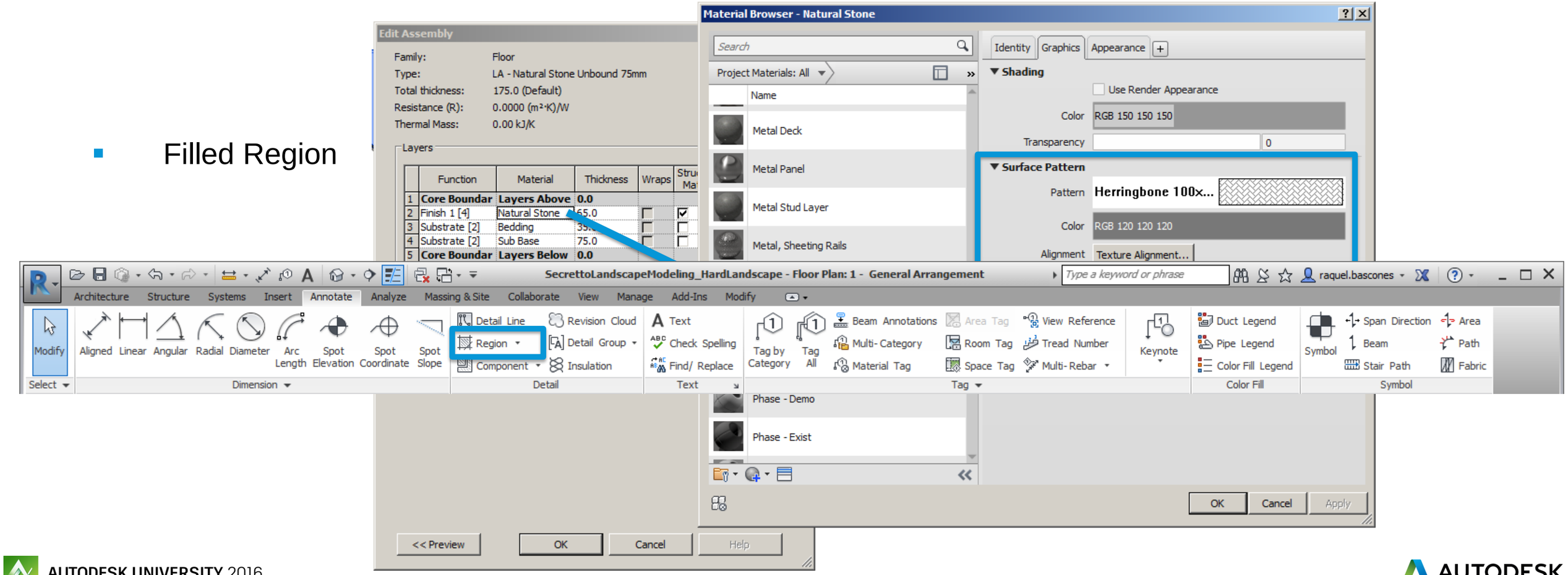
PAVING

Representing paving

PAVING

Representing paving

- Material Surface Pattern
- Filled Region



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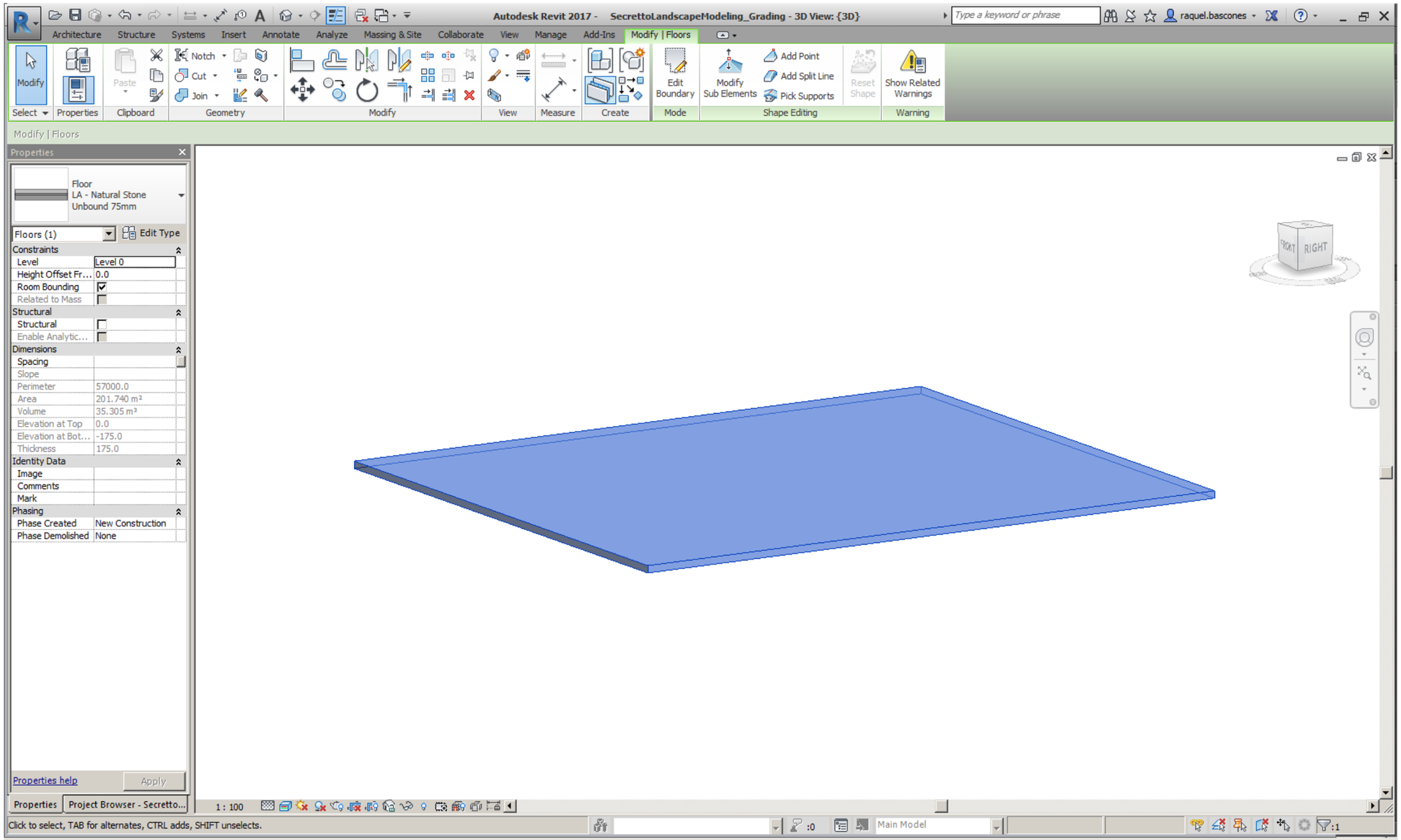

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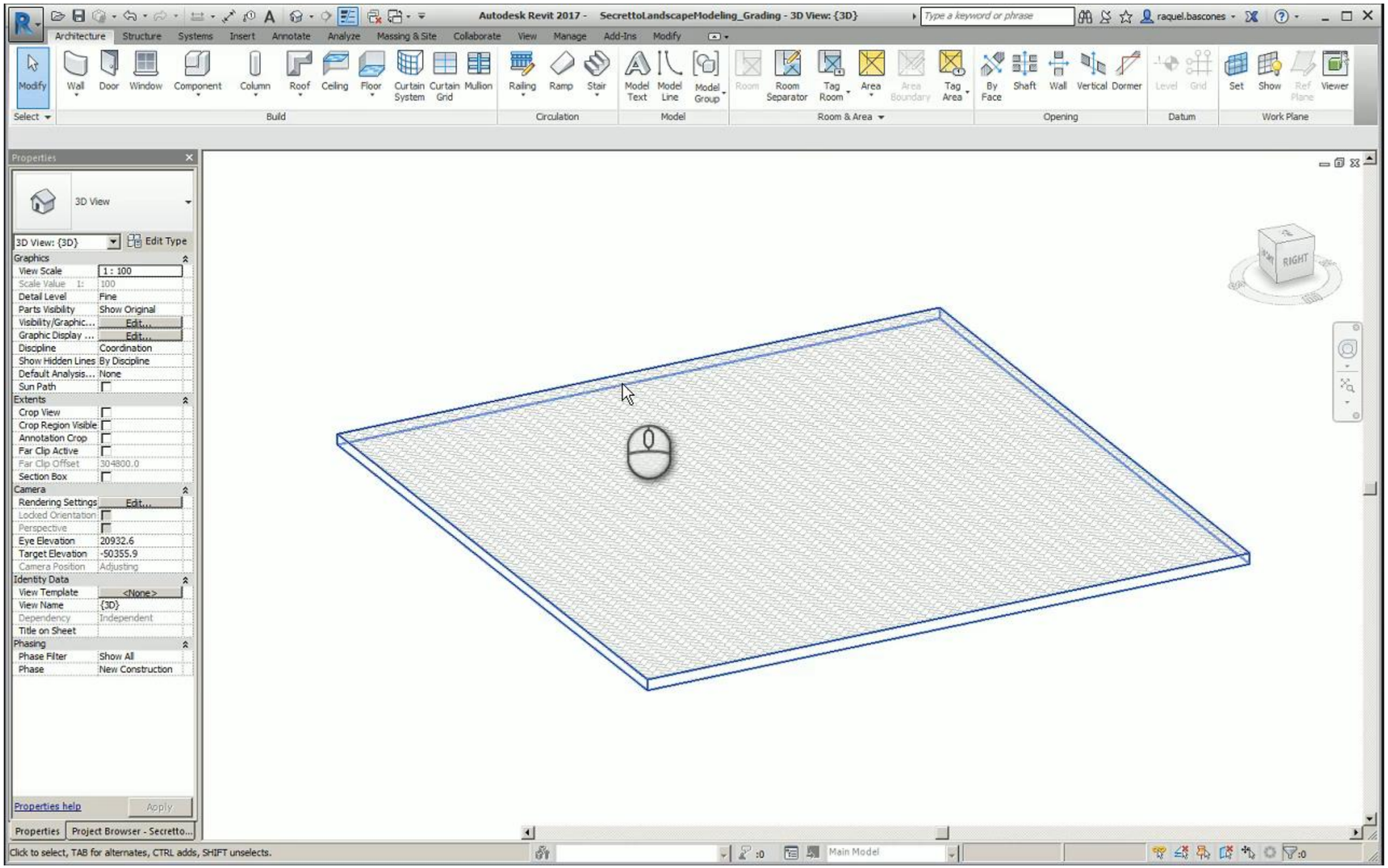

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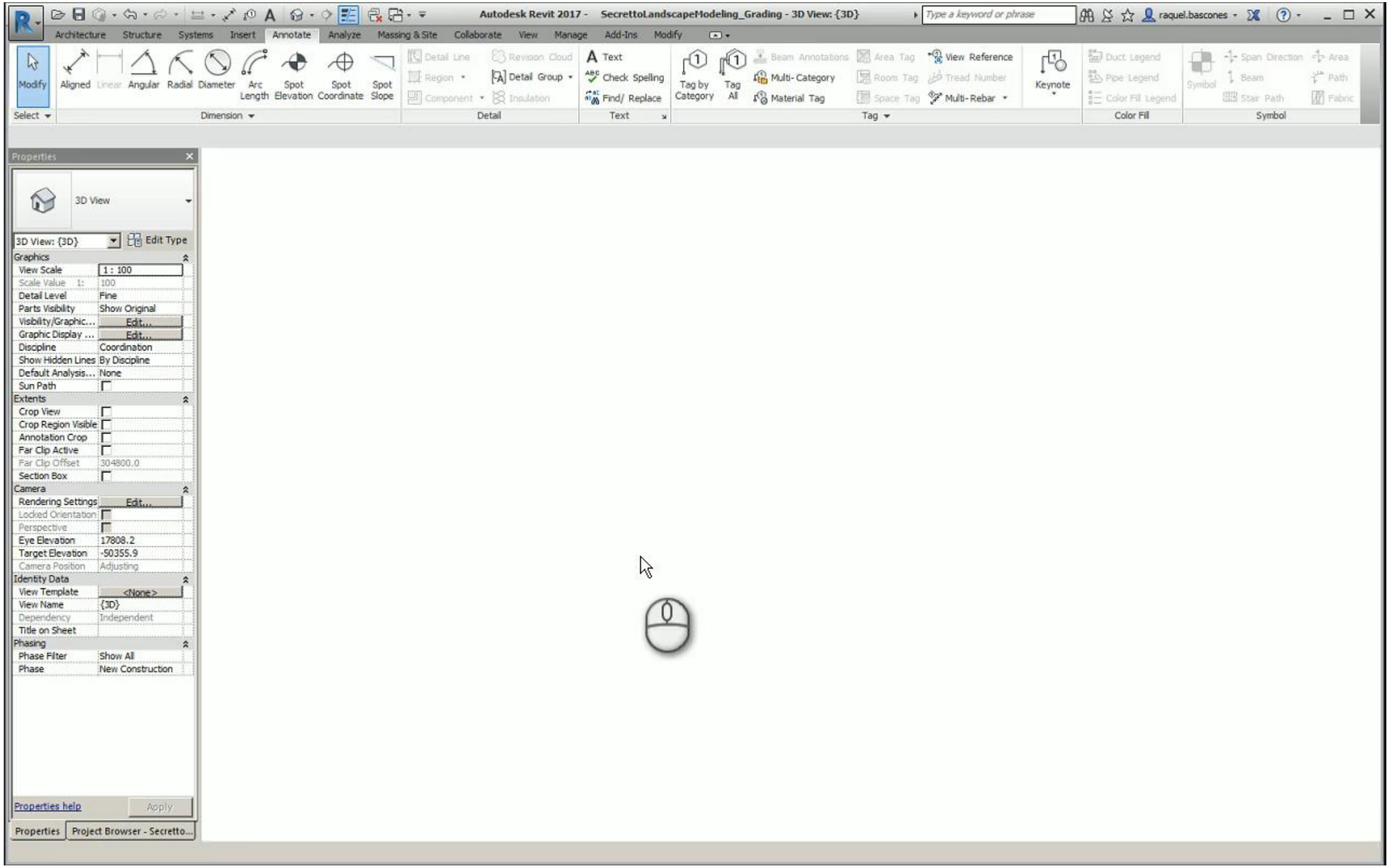

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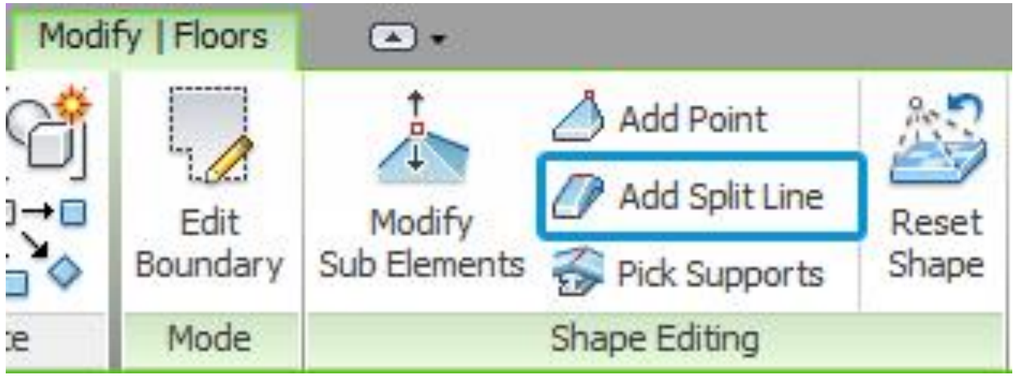

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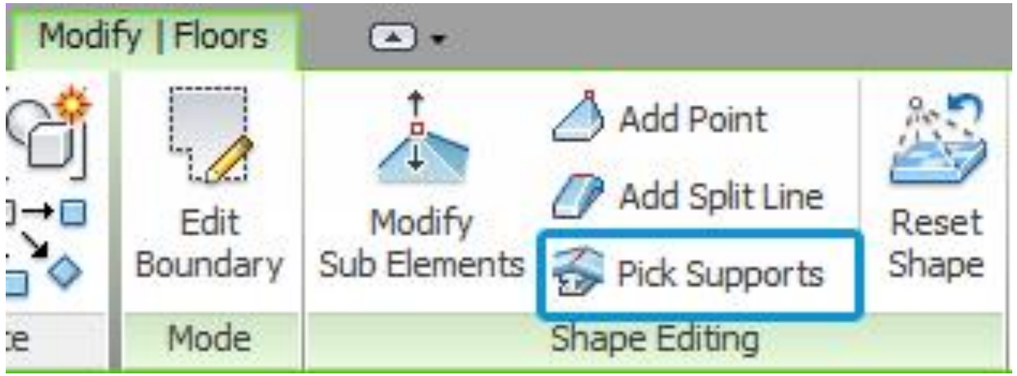

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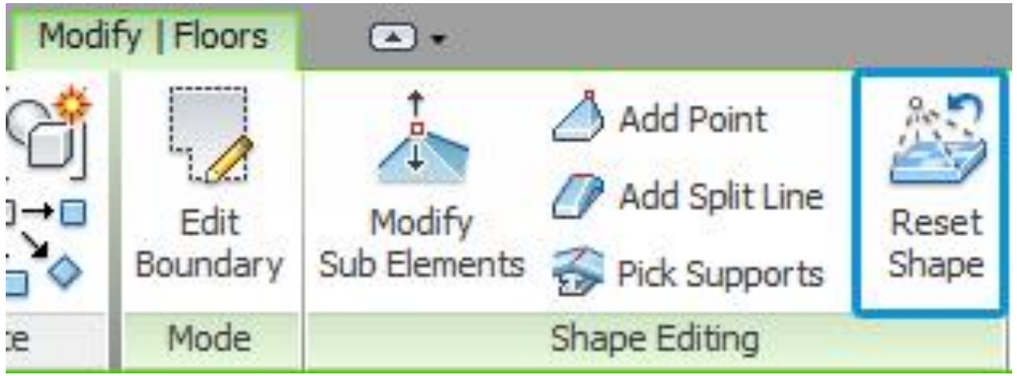

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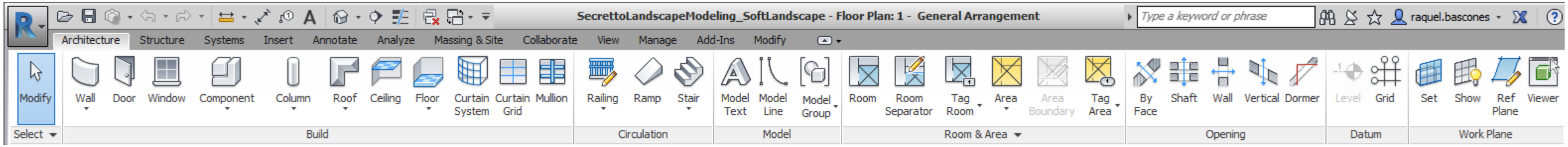
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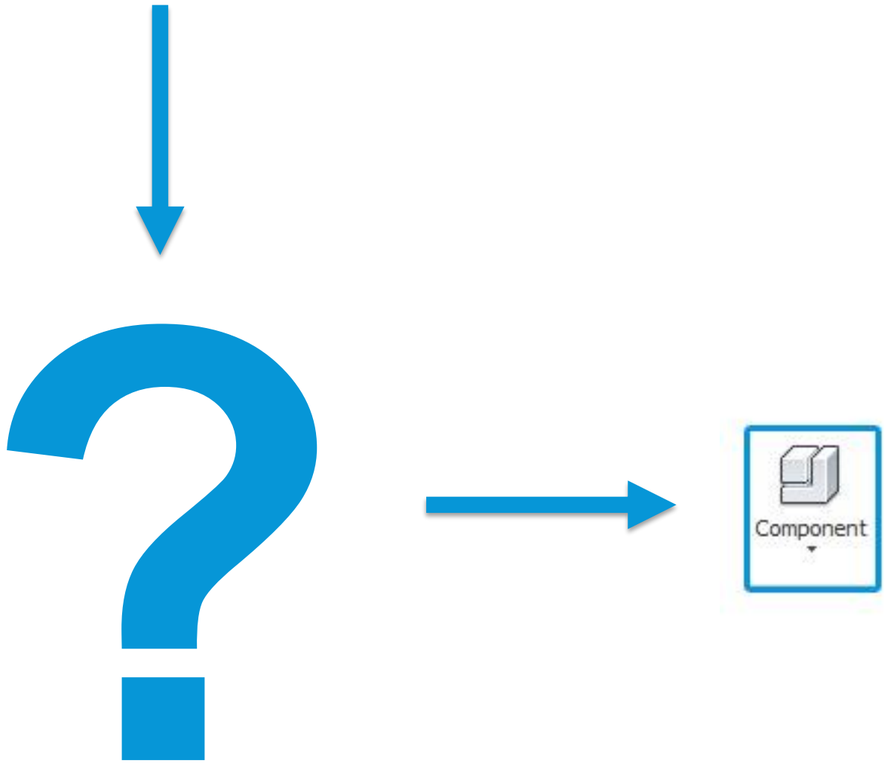
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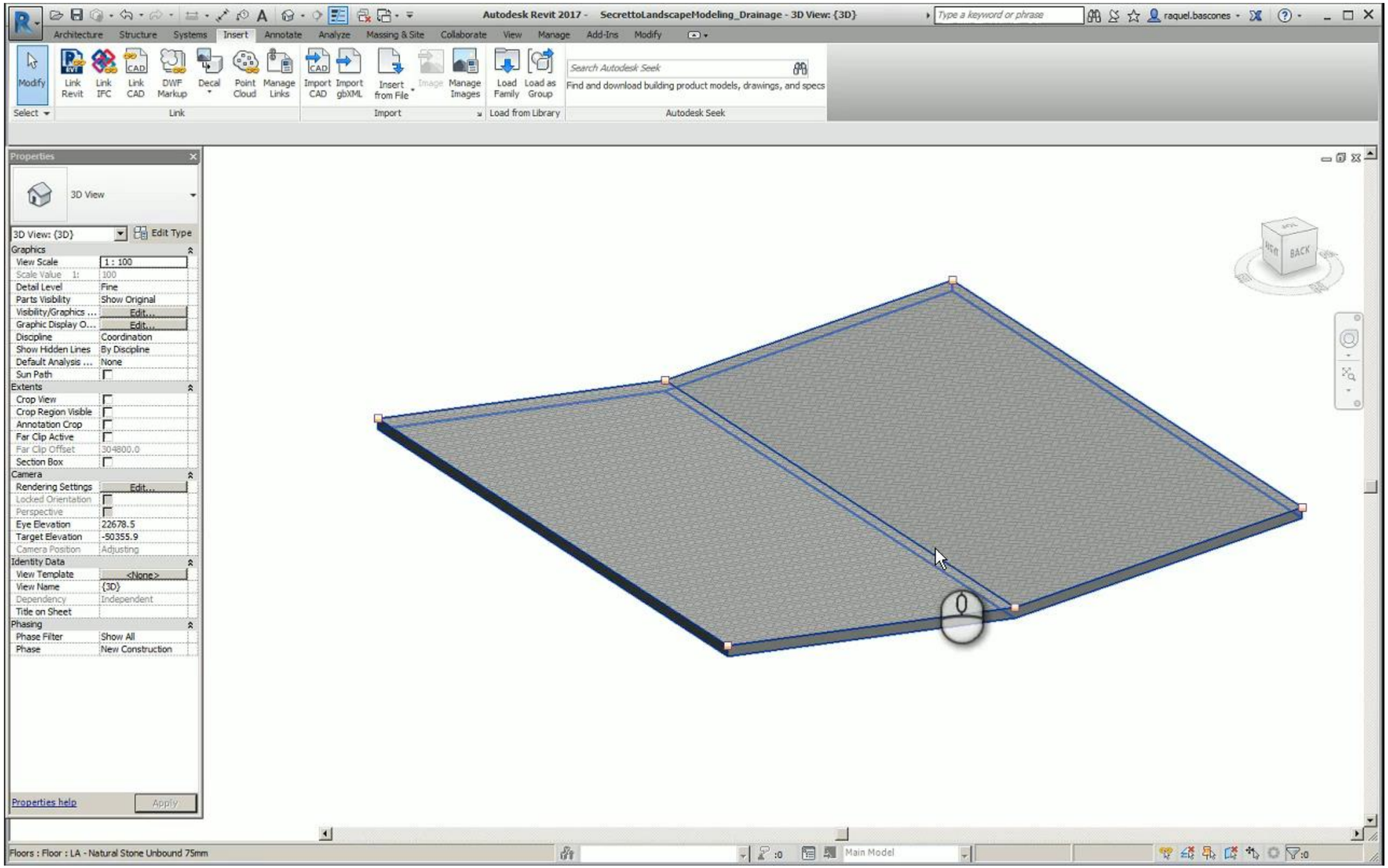
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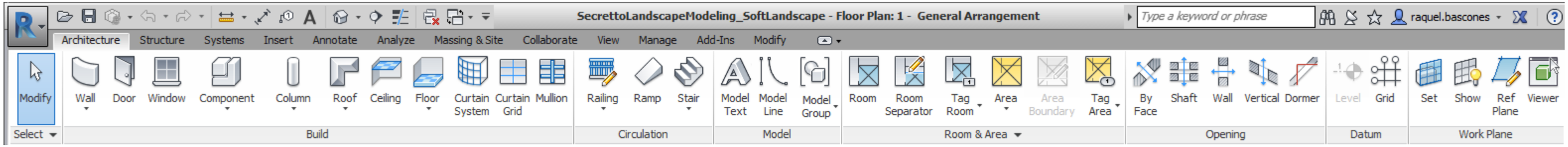
Floors : Floor : LA - Natural Stone Unbound 75mm
Main Model

KERBS (CURBS)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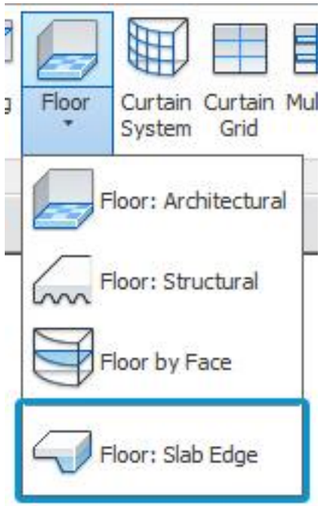
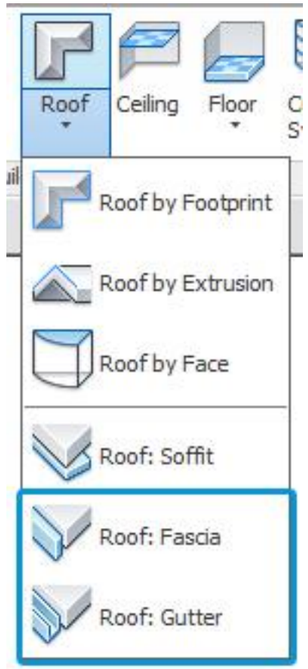
KERBS (CURBS)

Floors



Roofs



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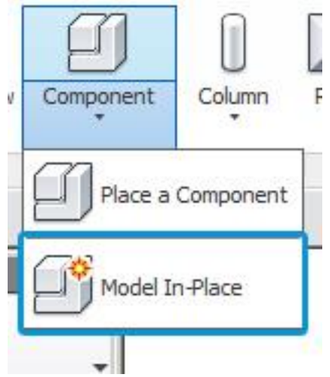

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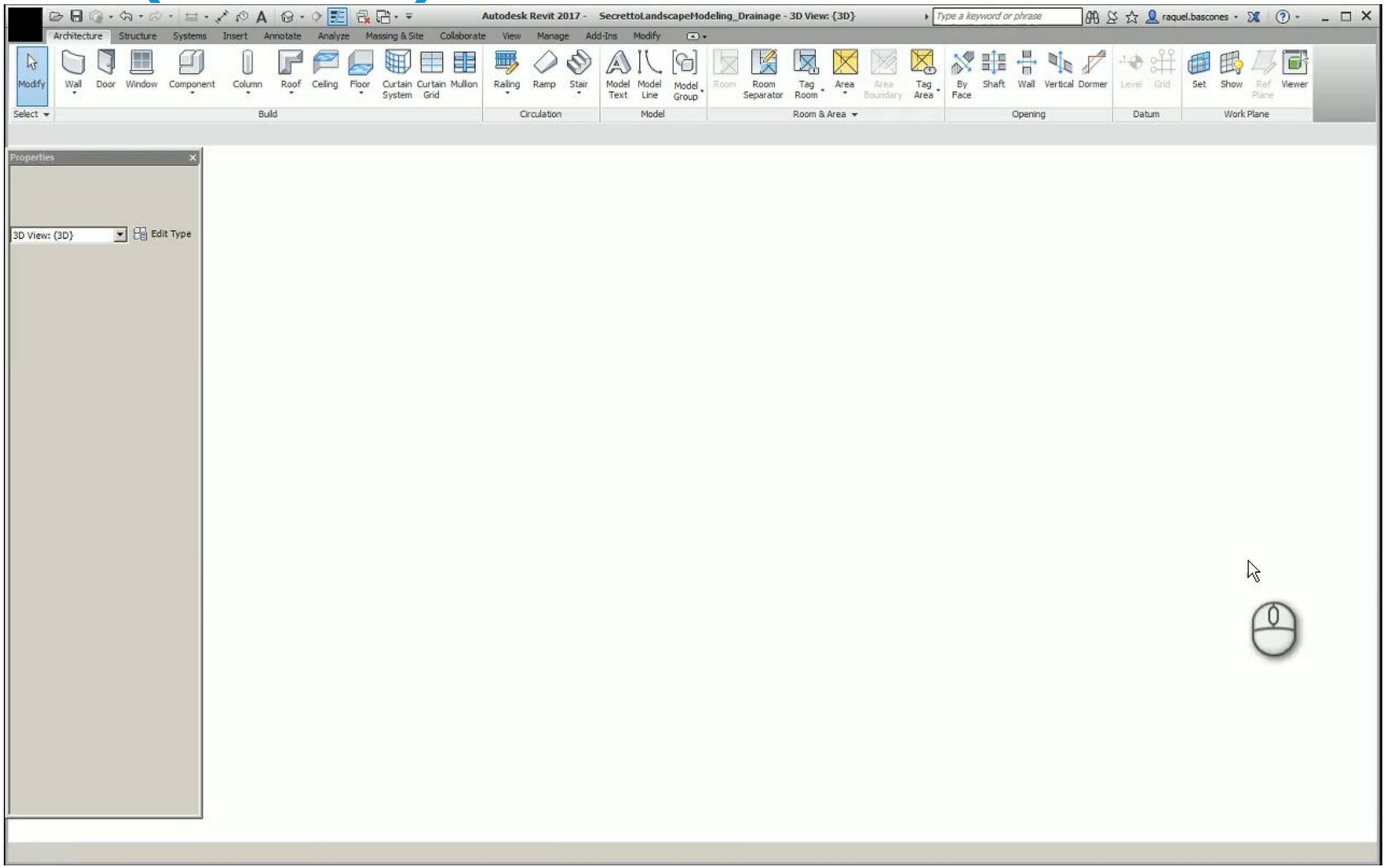
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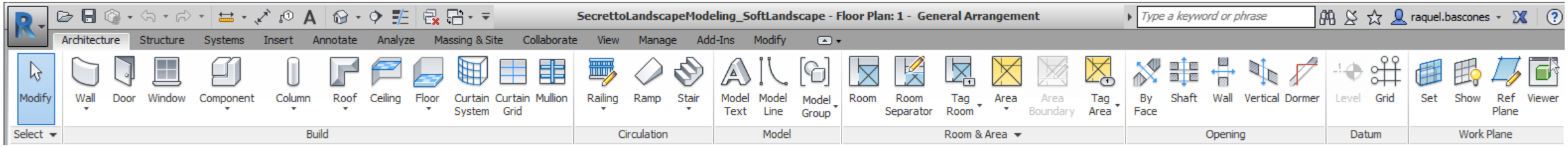
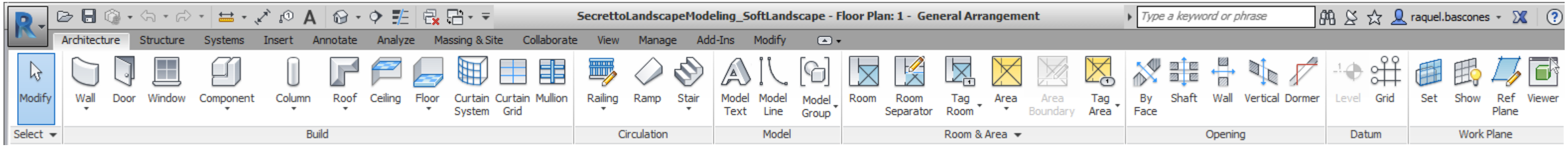
Select
Build
Circulation
Model
Room & Area
Opening
Datum
Work Plane
Properties
3D View: {3D}
Edit Type

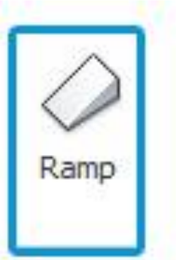
STAIRS


SecrettoLandscapeModeling_SoftLandscape - Floor Plan: 1 - General Arrangement
Type a keyword or phrase
raquel.bascones
Architecture
Structure
Systems
Insert
Annotate
Analyze
Massing & Site
Collaborate
View
Manage
Add-Ins
Modify
Modify
Wall
Door
Window
Component
Column
Roof
Ceiling
Floor
Curtain System
Curtain Grid
Mullion
Railing
Ramp
Stair
Model Text
Model Line
Model Group
Room
Room Separator
Tag Room
Area
Area Boundary
Tag Area
By Face
Shaft
Wall
Vertical
Dormer
Level
Grid
Set
Show
Ref Plane
Viewer
Select
Build
Circulation
Model
Room & Area
Opening
Datum
Work Plane


Stair

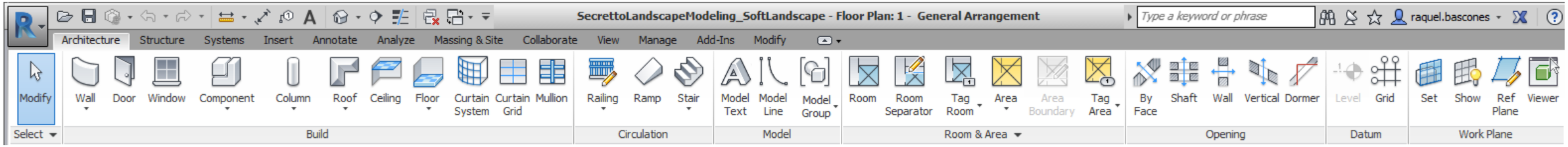
RAMPS





- Ramp cannot have two slopes

RAILINGS


SecrettoLandscapeModeling_SoftLandscape - Floor Plan: 1 - General Arrangement
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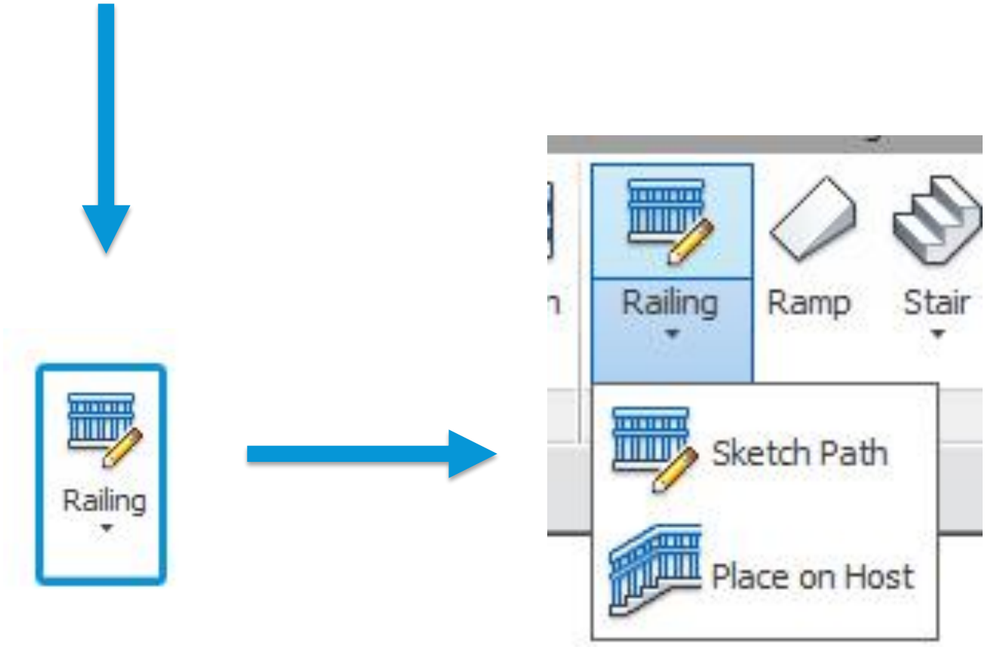
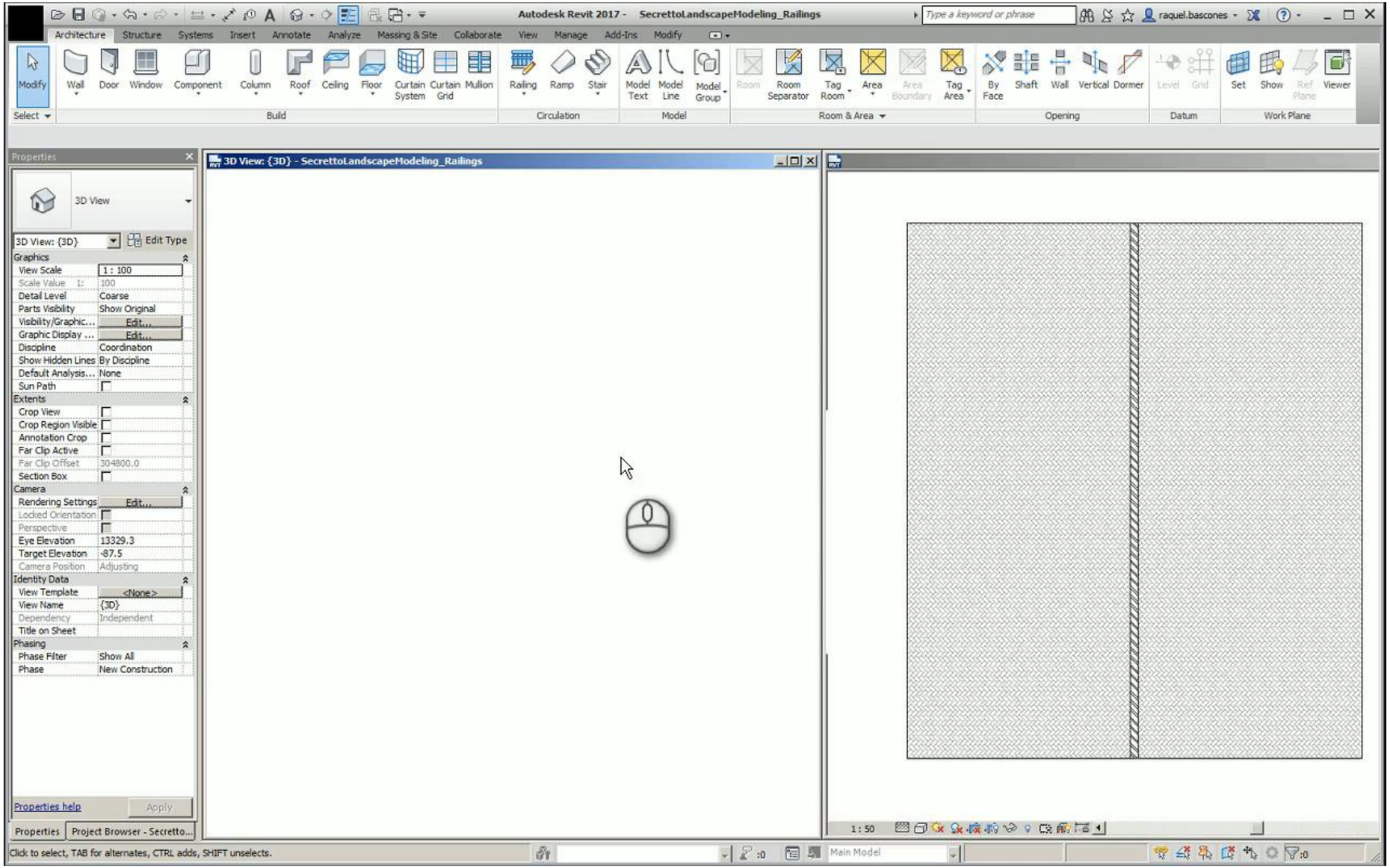
Model
Room & Area
Opening
Datum
Work Plane


Railing
Railing
Ramp
Stair
Sketch Path
Place on Host

RAILINGS


Autodesk Revit 2017 - SecrettoLandscapeModeling_Railings
Architecture
Structure
Systems
Insert
Annotate
Analyze
Massing & Site
Collaborate
View
Manage
Add-Ins
Modify
Modify
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Door
Window
Component
Column
Roof
Ceiling
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Mullion
Railing
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Level
Grid
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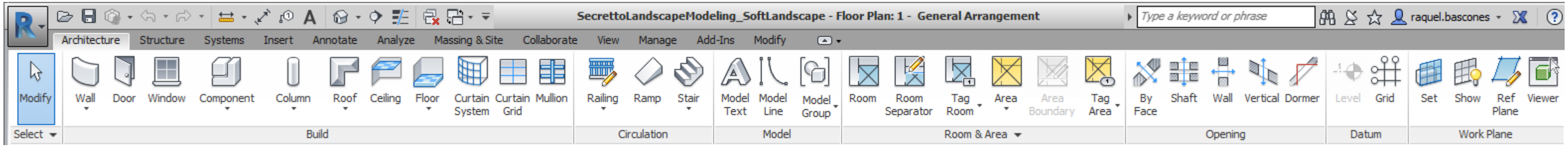
Show
Ref Plane
Viewer
Select
Build
Circulation
Model
Room & Area
Opening
Datum
Work Plane
Properties
3D View
3D View: {3D}
Edit Type
Graphics
View Scale 1 : 100
Scale Value 1: 100
Detail Level Coarse
Parts Visibility Show Original
Visibility/Graphic... Edit...
Graphic Display ... Edit...
Discipline Coordination
Show Hidden Lines By Discipline
Default Analysis... None
Sun Path
Extents
Crop View
Crop Region Visible
Annotation Crop
Far Clip Active
Far Clip Offset 304800.0
Section Box
Camera
Rendering Settings Edit...
Locked Orientation
Perspective
Eye Elevation 13329.3
Target Elevation -87.5
Camera Position Adjusting
Identity Data
View Template <None>
View Name {3D}
Dependency Independent
Title on Sheet
Phasing
Phase Filter Show All
Phase New Construction
Properties help
Apply
Properties
Project Browser - Secretto...
3D View: {3D} - SecrettoLandscapeModeling_Railings
1 : 50
Main Model
Click to select, TAB for alternates, CTRL adds, SHIFT unselects.

WALLS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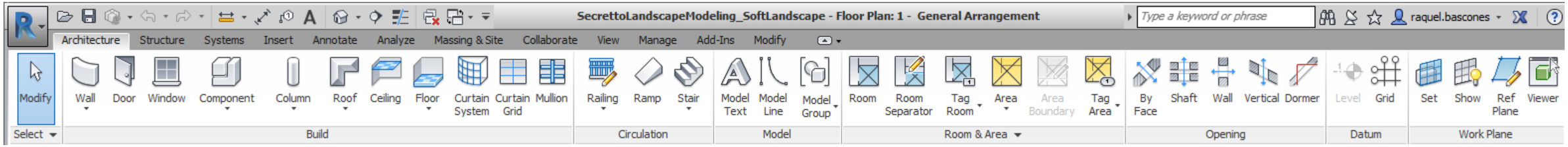
Room & Area
Opening
Datum
Work Plane


Wall

FENCES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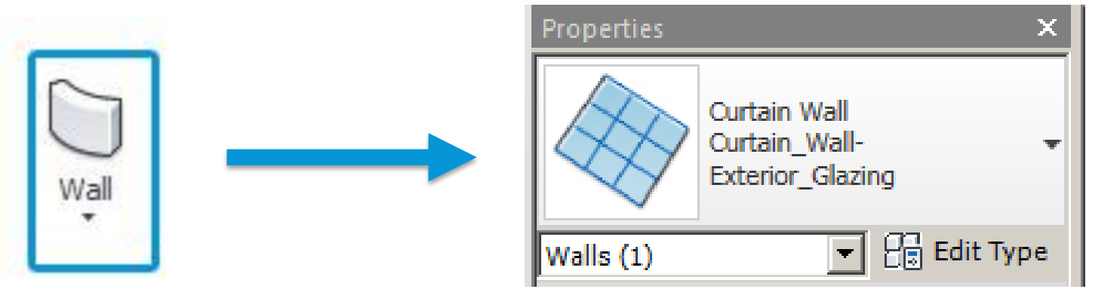
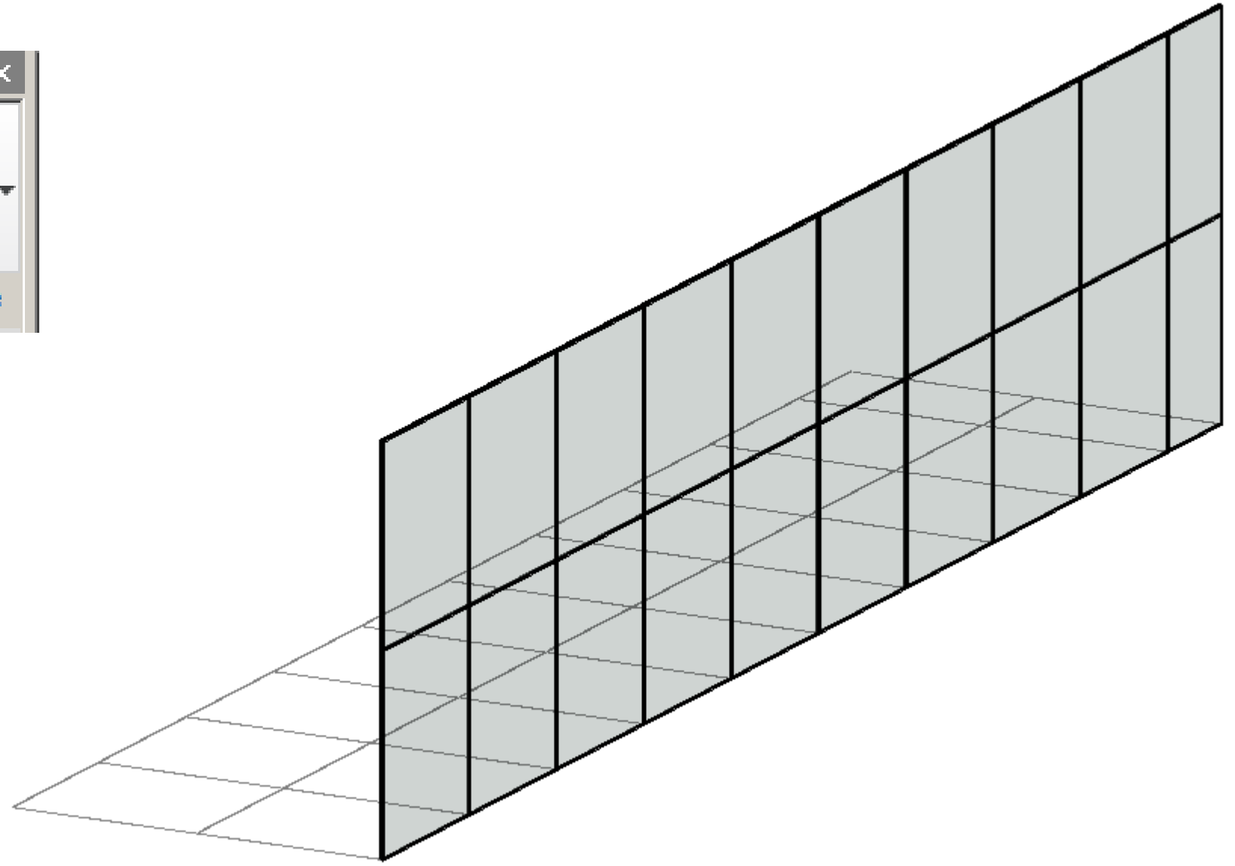
Viewer
Select
Build
Circulation
Model
Room & Area
Opening
Datum
Work Plane


Wall

FENCES

Using curtain walls as fences

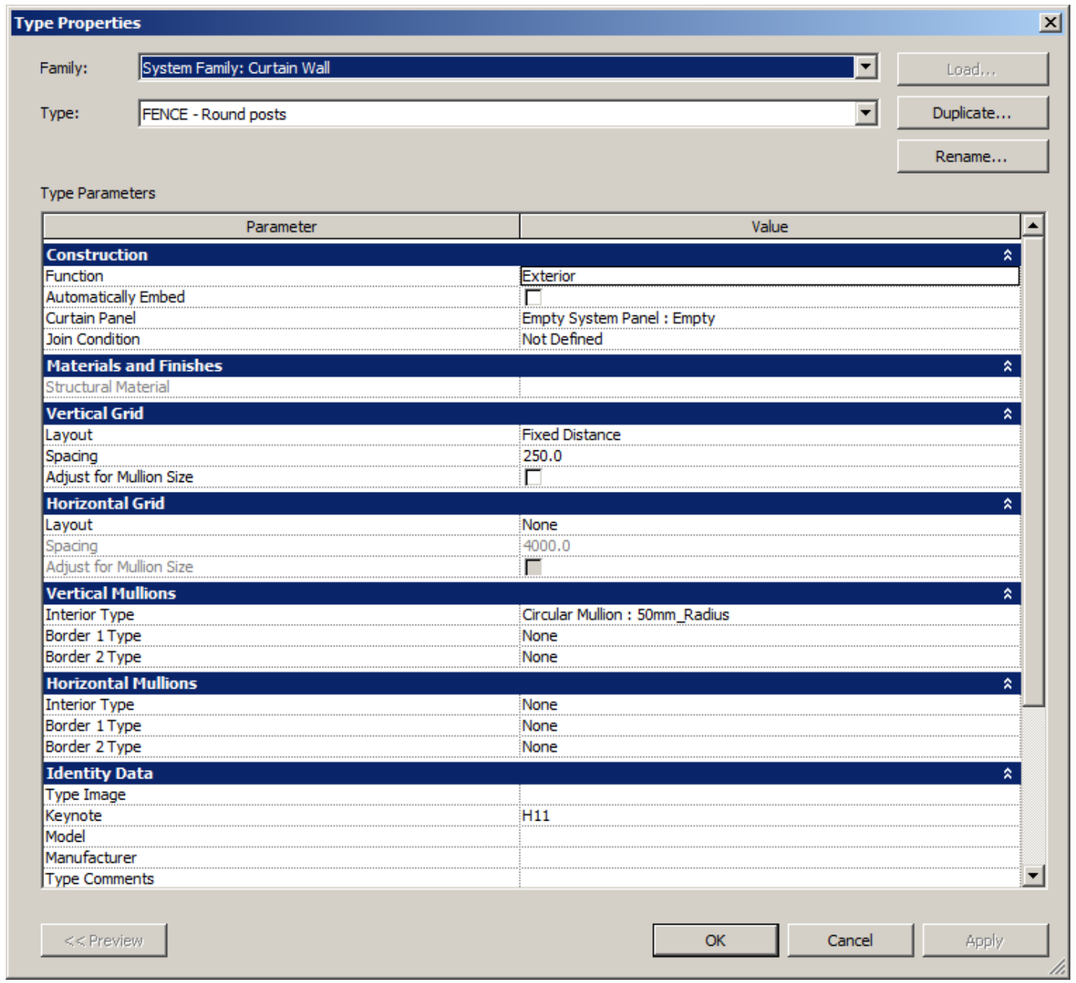


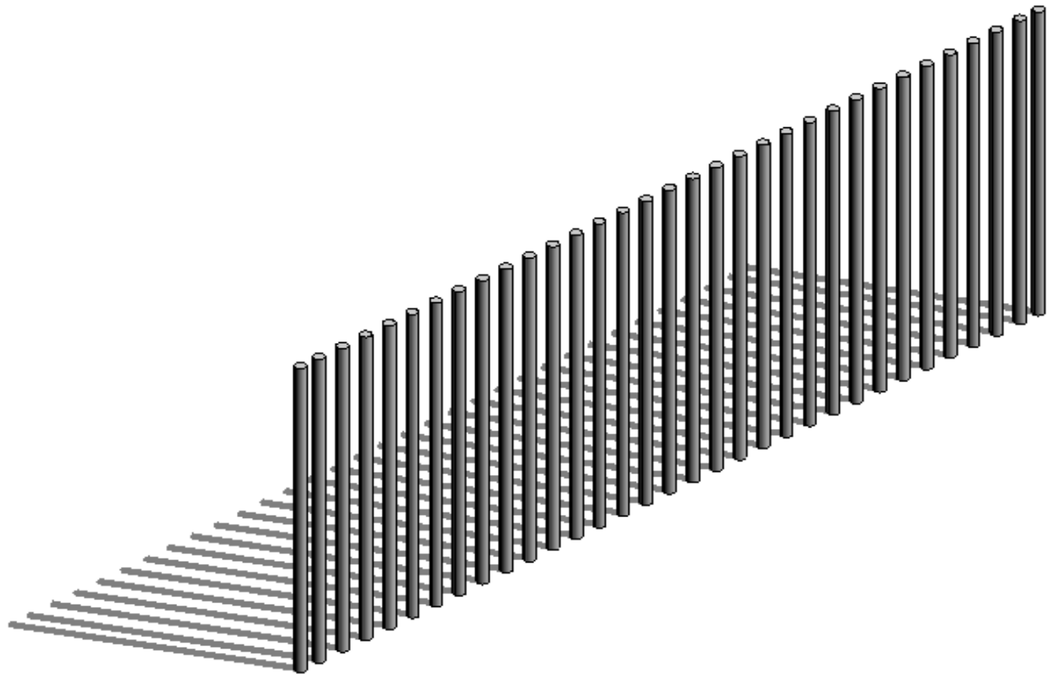


- Horizontal and vertical mullions: Any profile
- Panels: Any wall type or Empty panel

FENCES

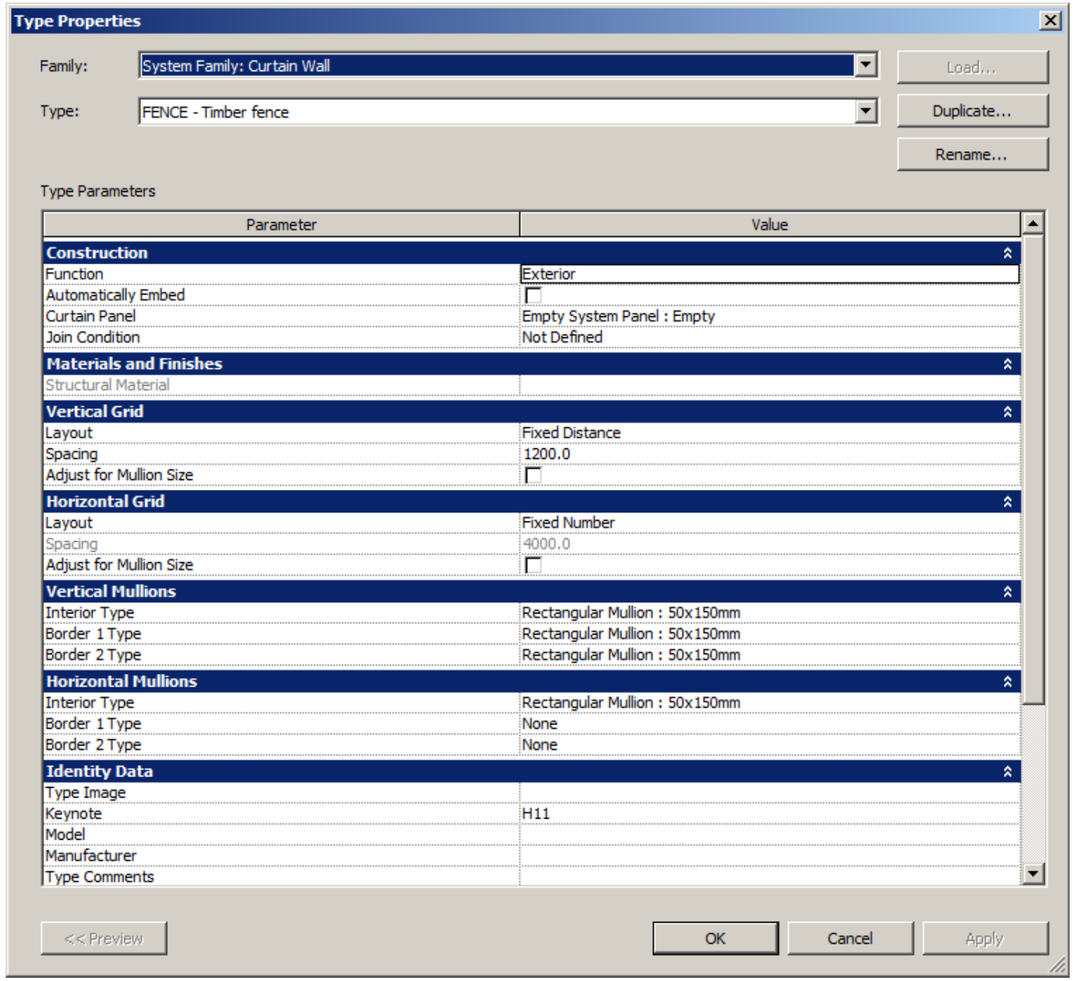
Using curtain walls as fences

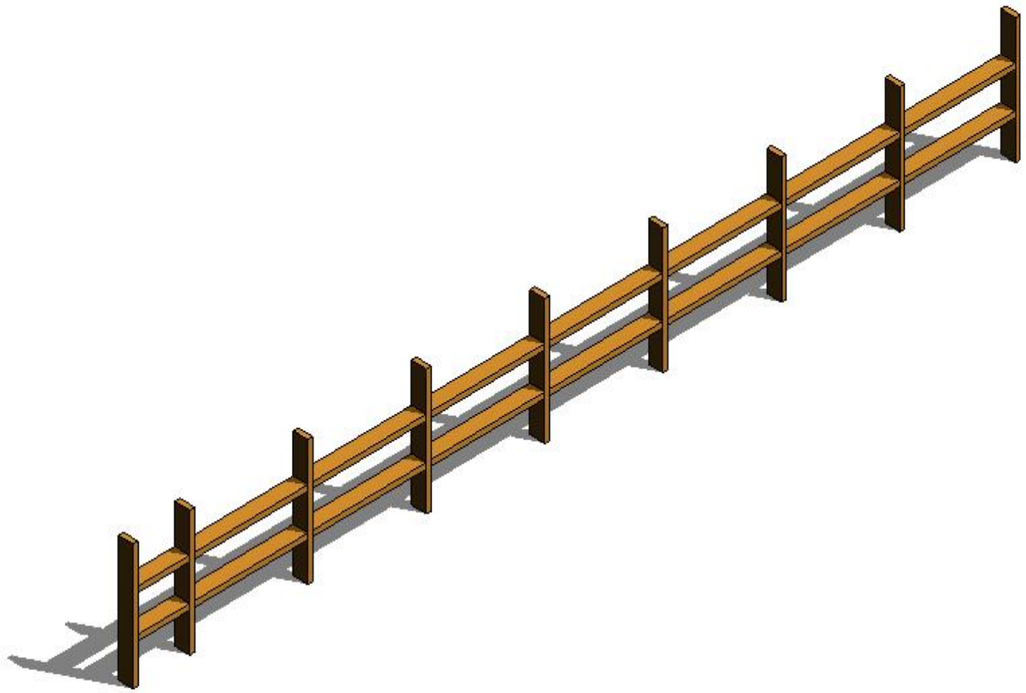




FENCES

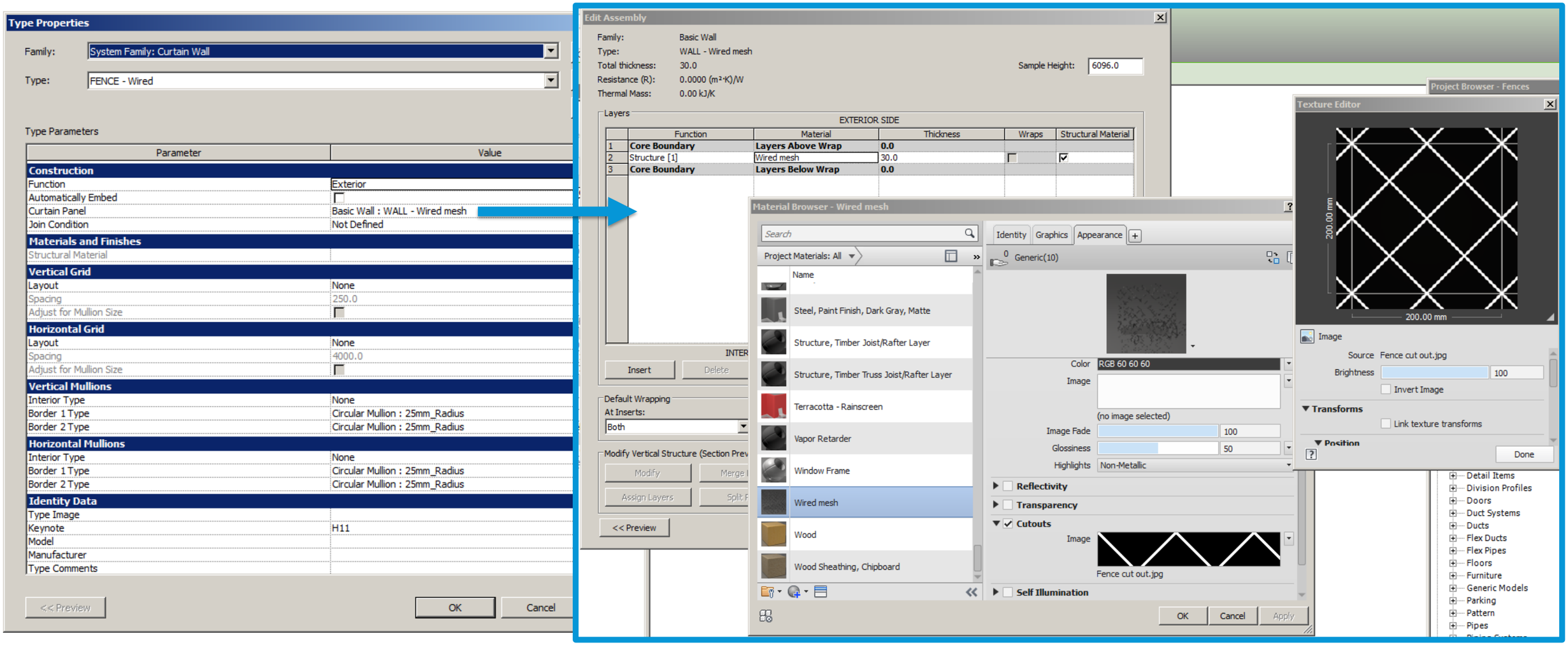
Using curtain walls as fences





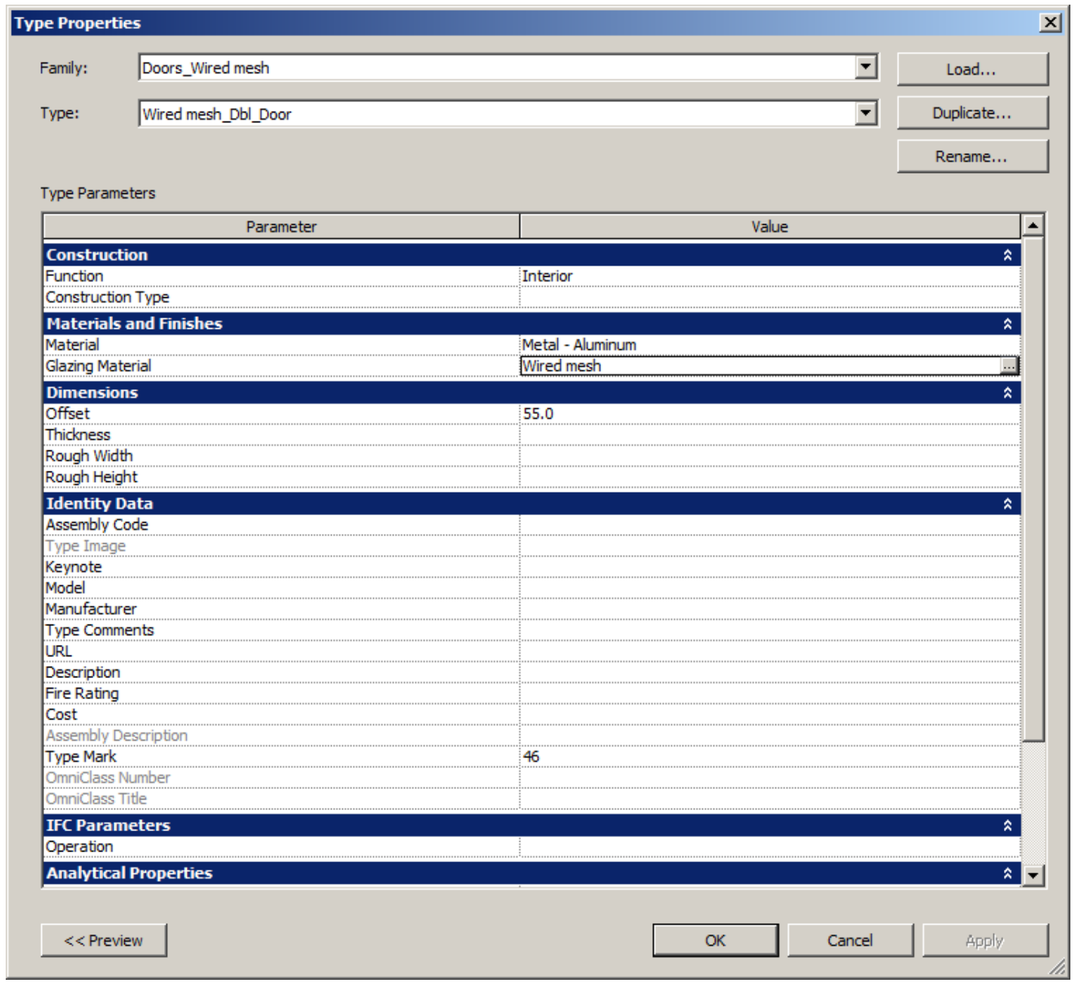
FENCES

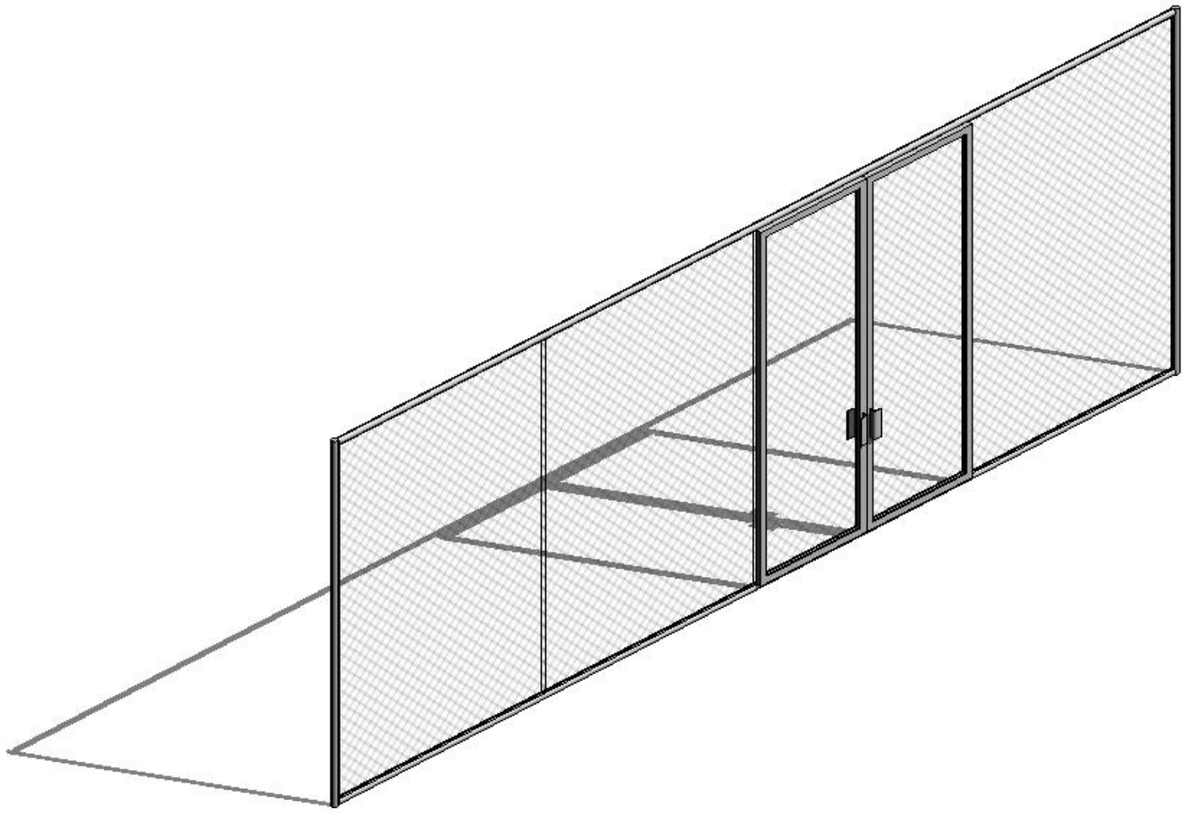
Using curtain walls as fences



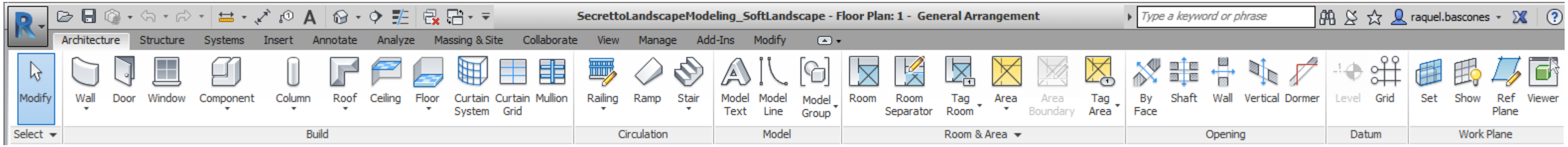
GATES

Using curtain walls doors as gates

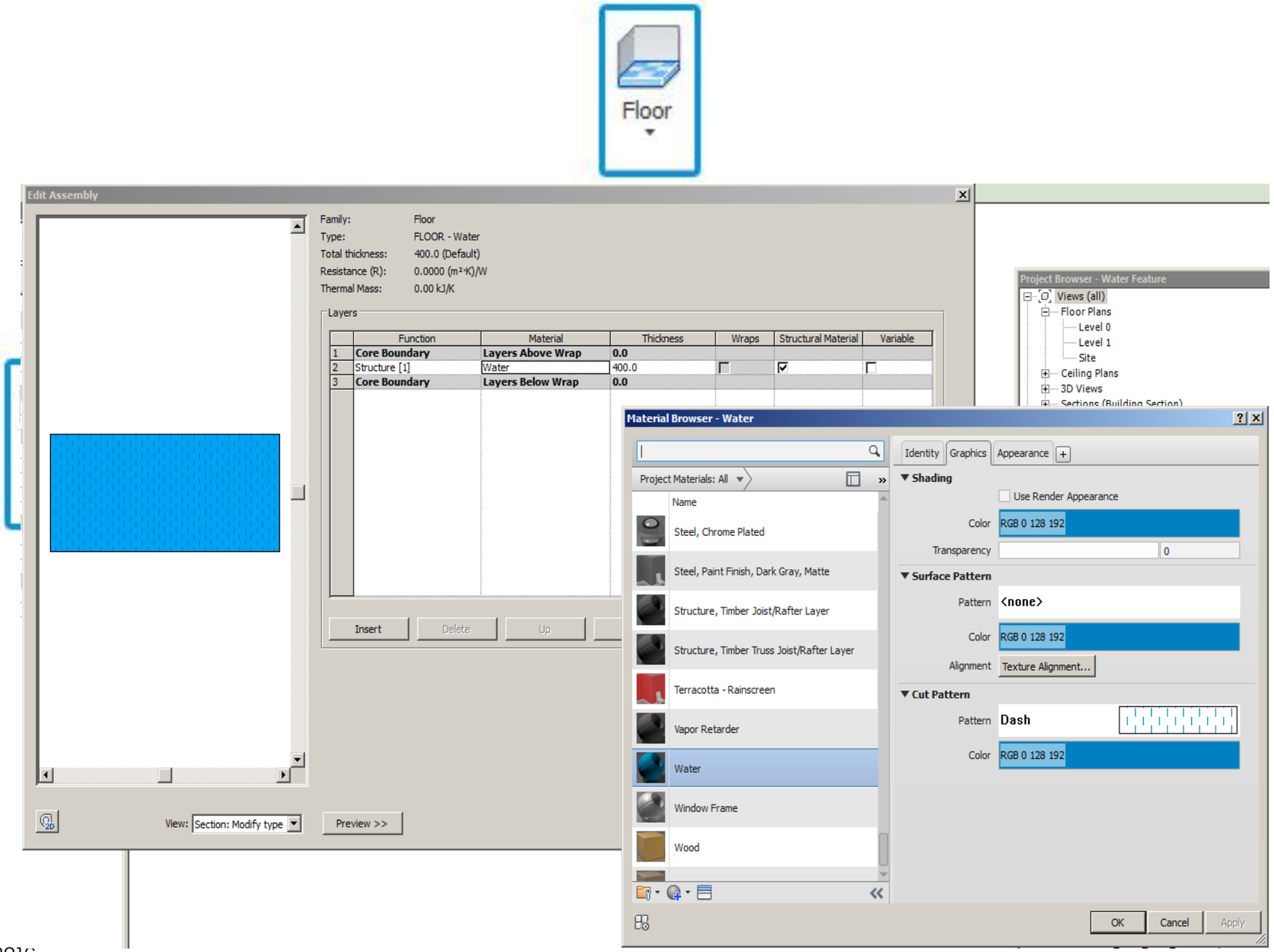




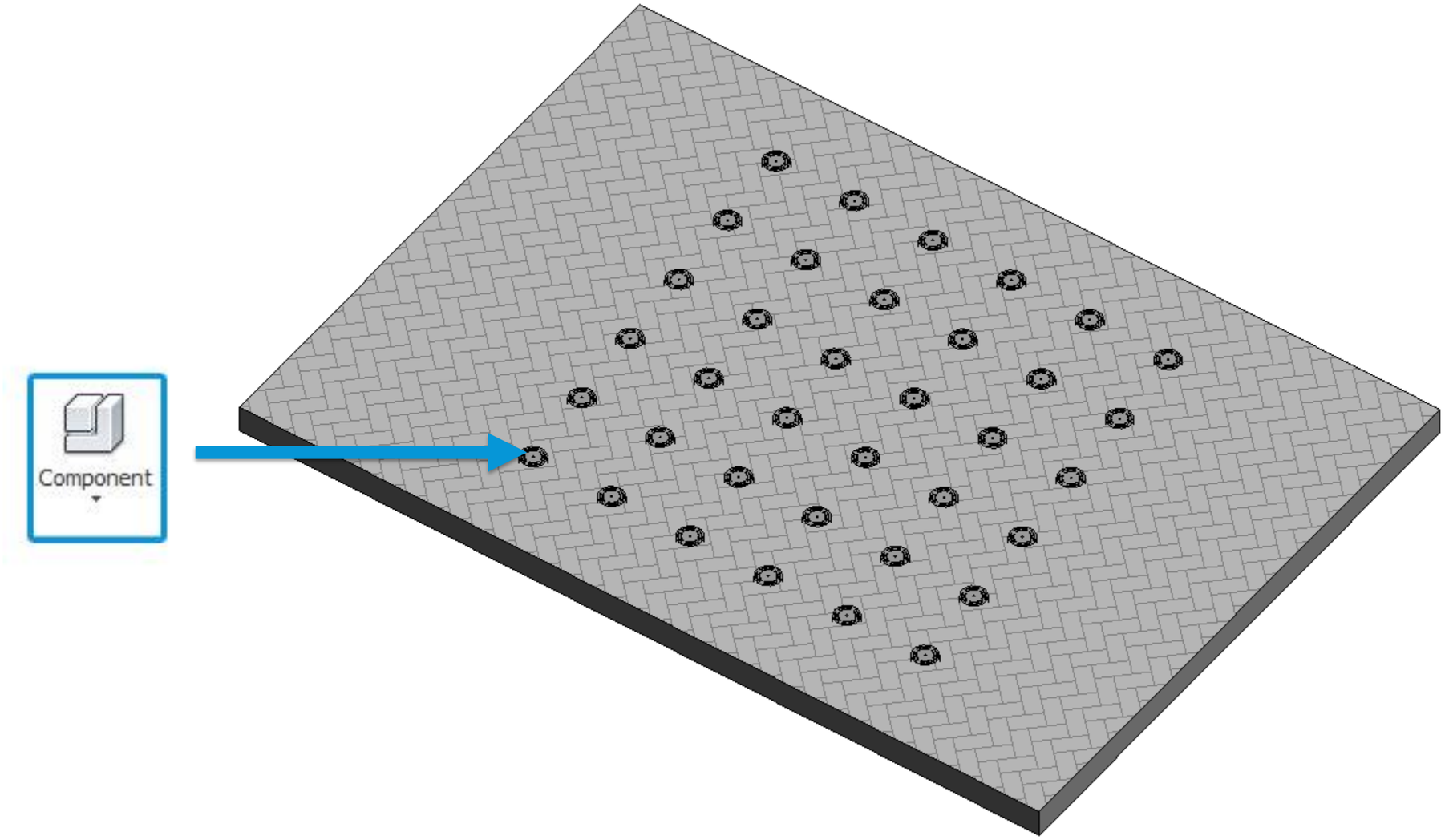
WATER FEATURES



WATER FEATURES

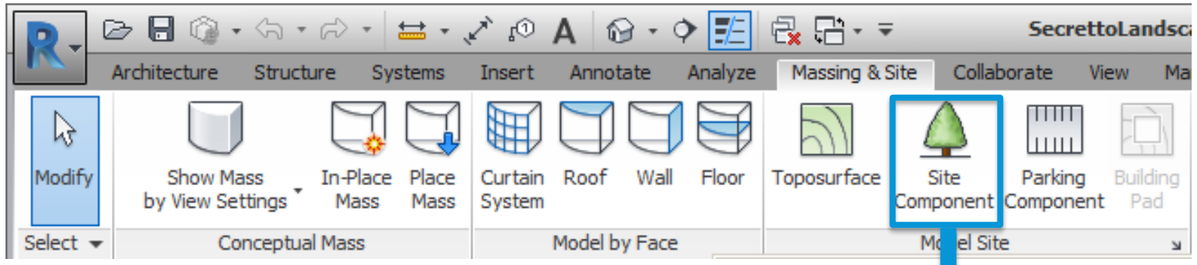


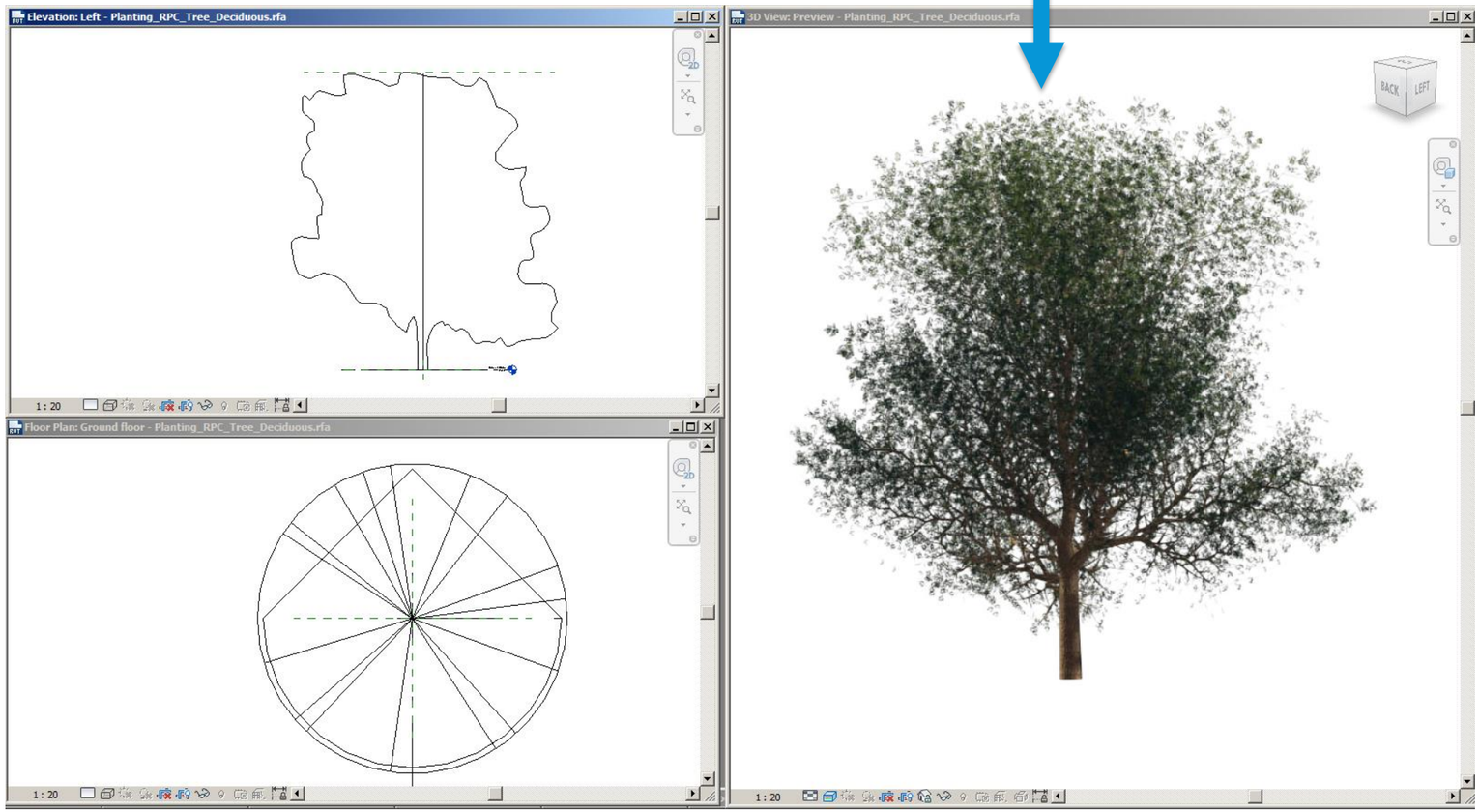
WATER FEATURES



Soft Landscape Elements

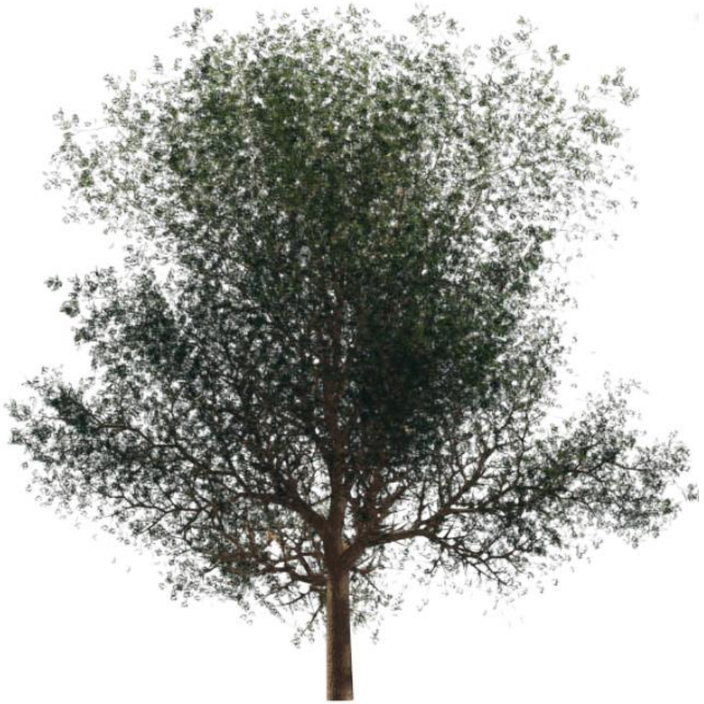
MODEL AND REPRESENTATION





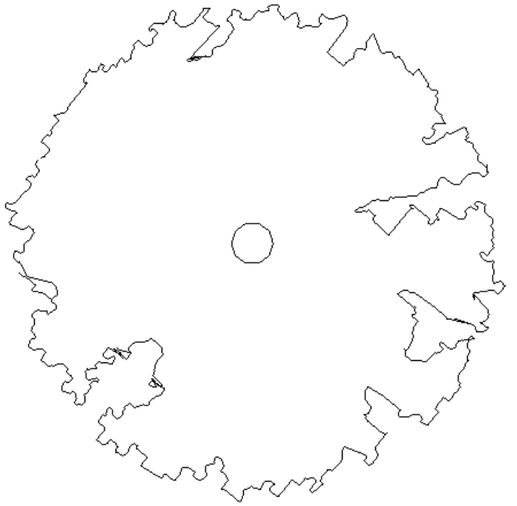
TREE PLANTING

RPC

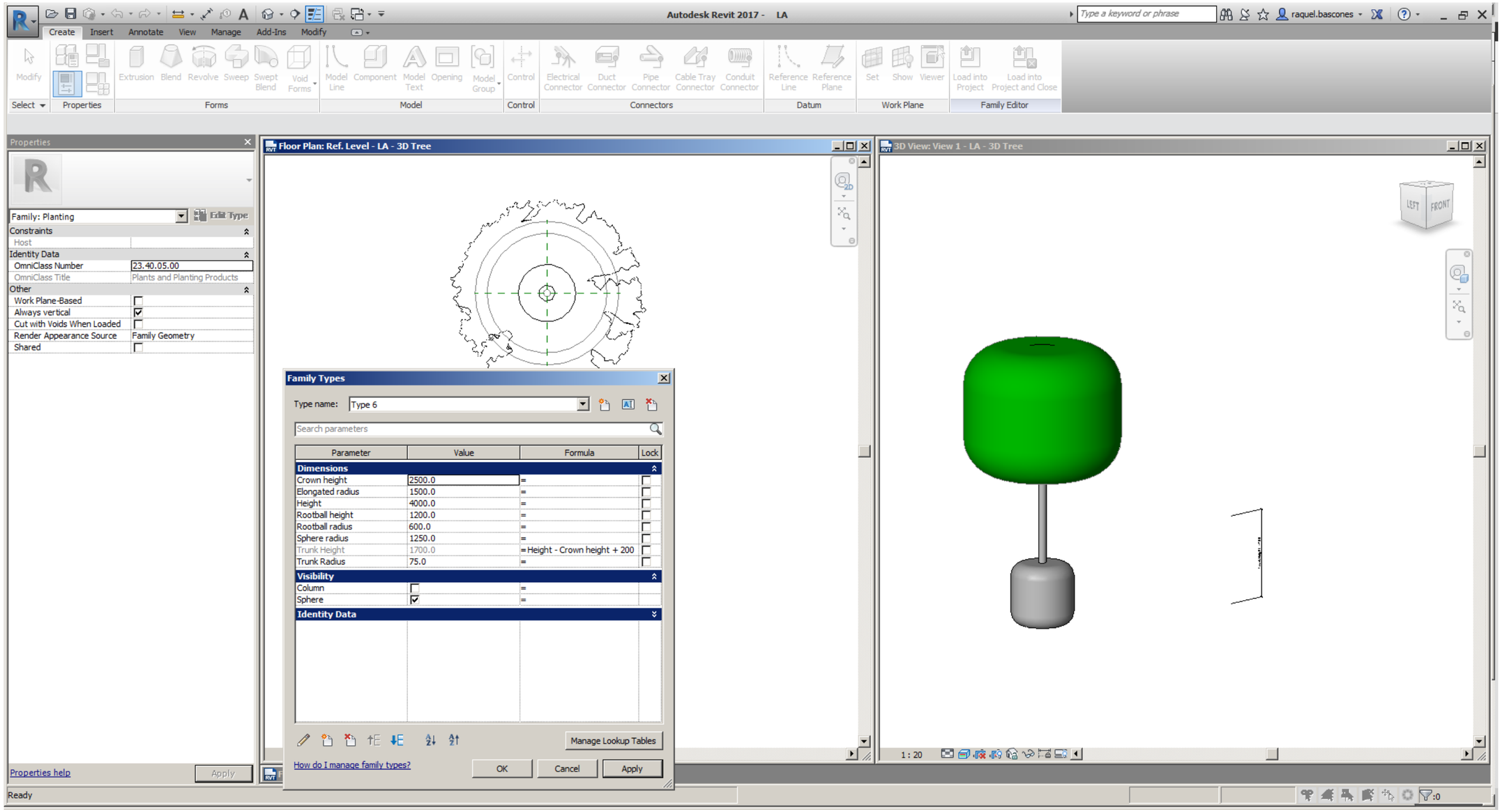


3D Trees

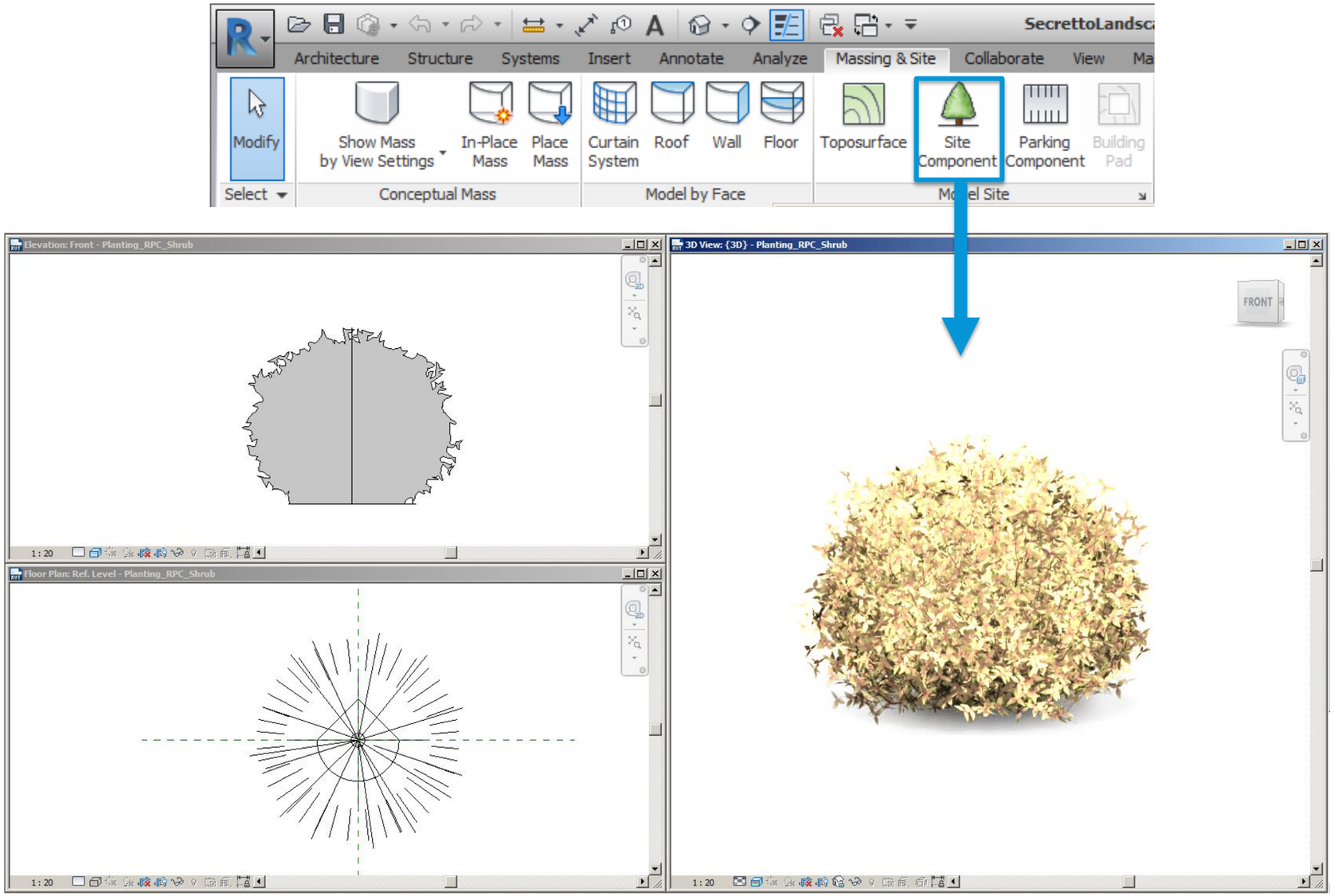
2D Trees



TREE PLANTING



UNDERSTORY PLANTING



PLANTING

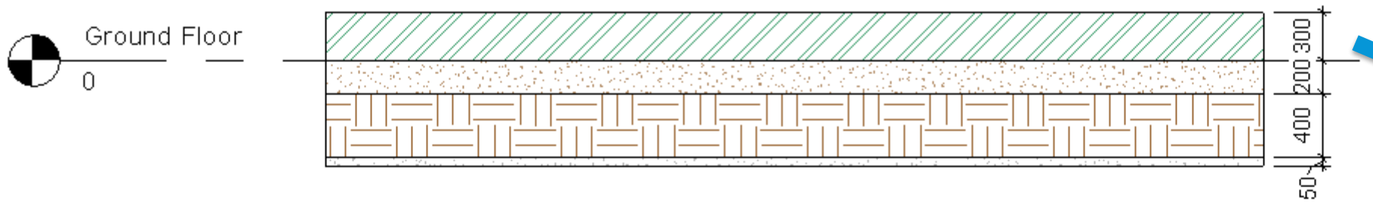
Specimen Shrubs

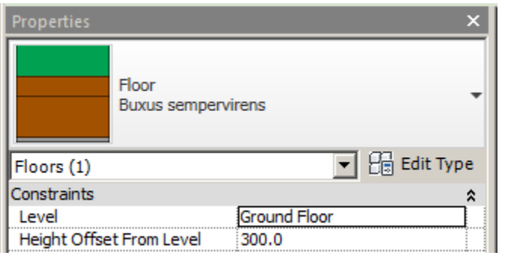
Understory planting

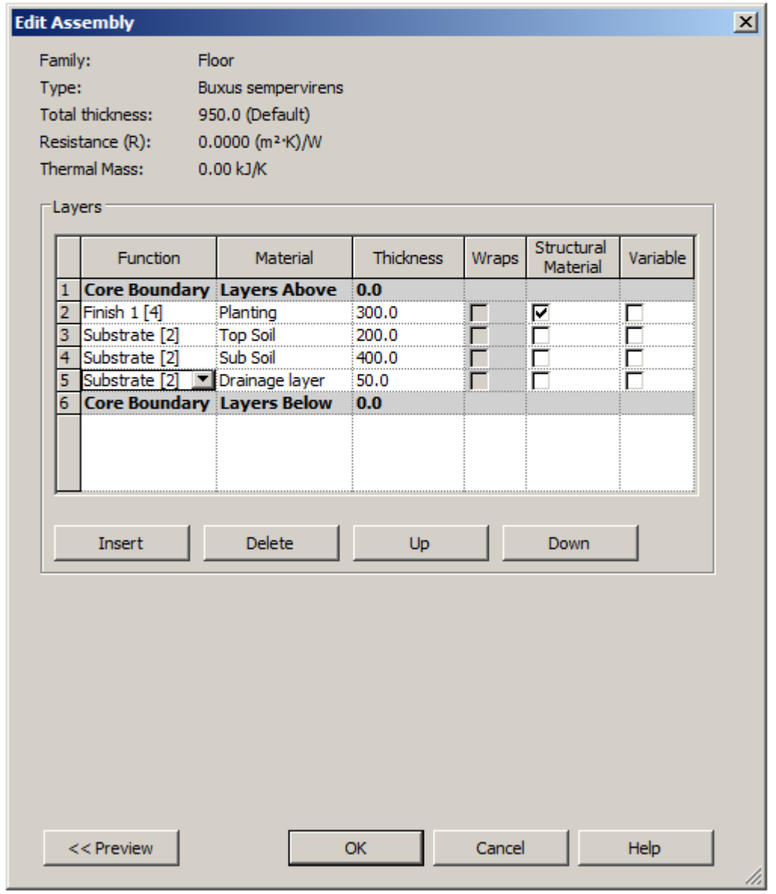
Data

- Height
- Layers
- Soil depth
- Area

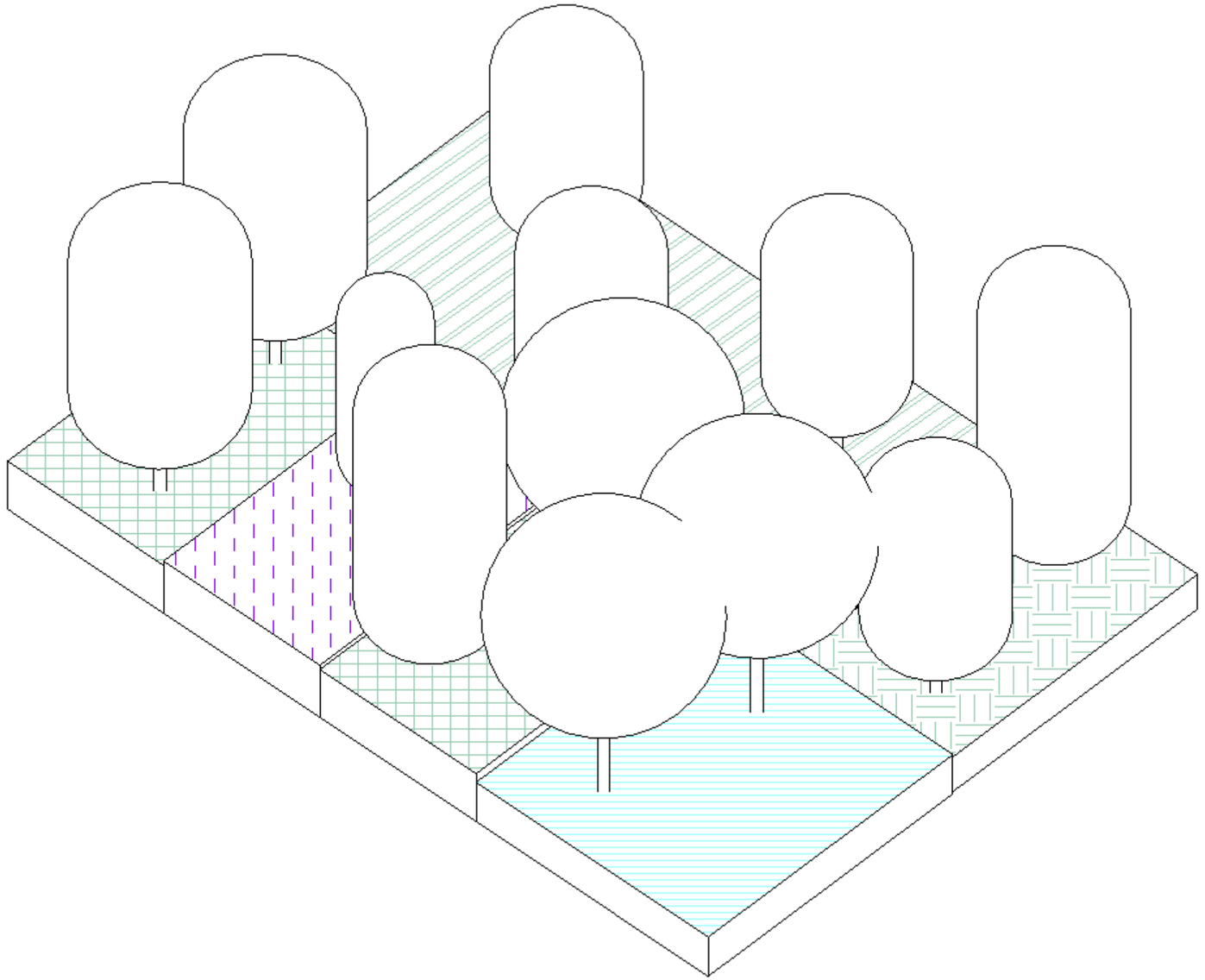
UNDERSTOREY PLANTING



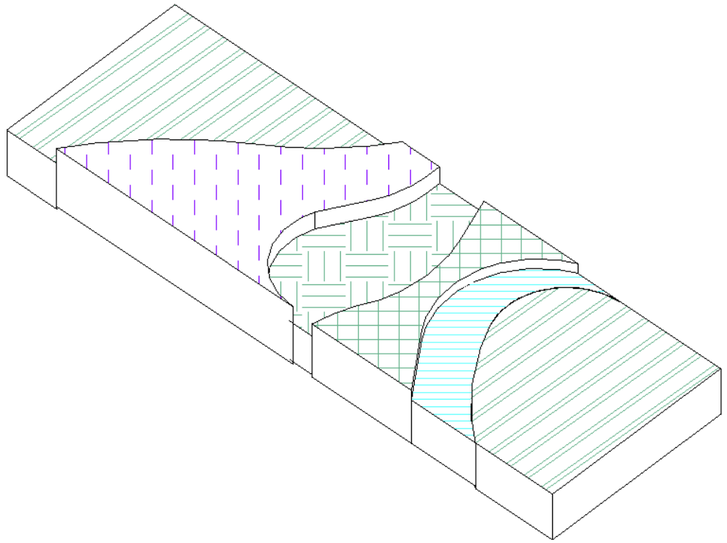


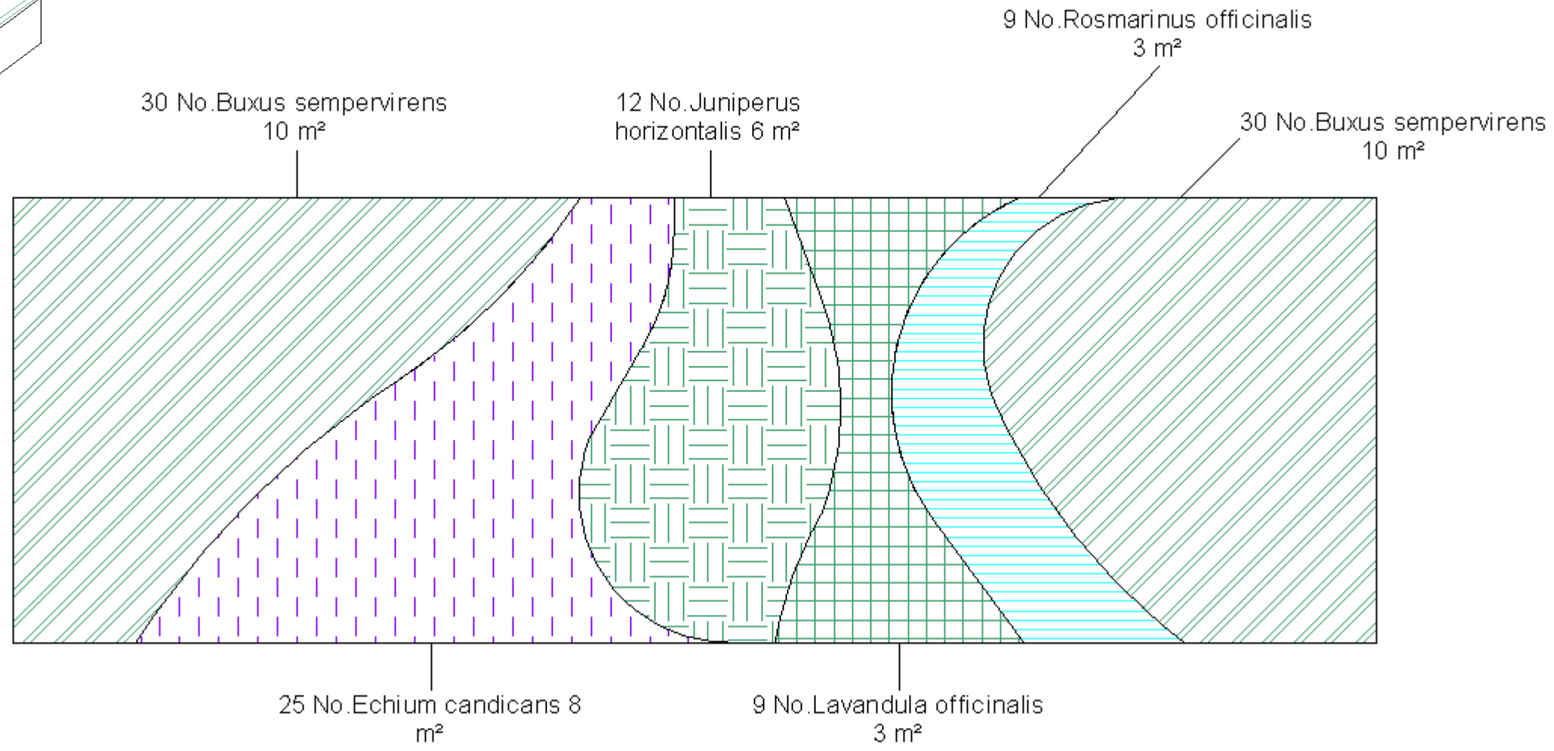


UNDERSTOREY PLANTING

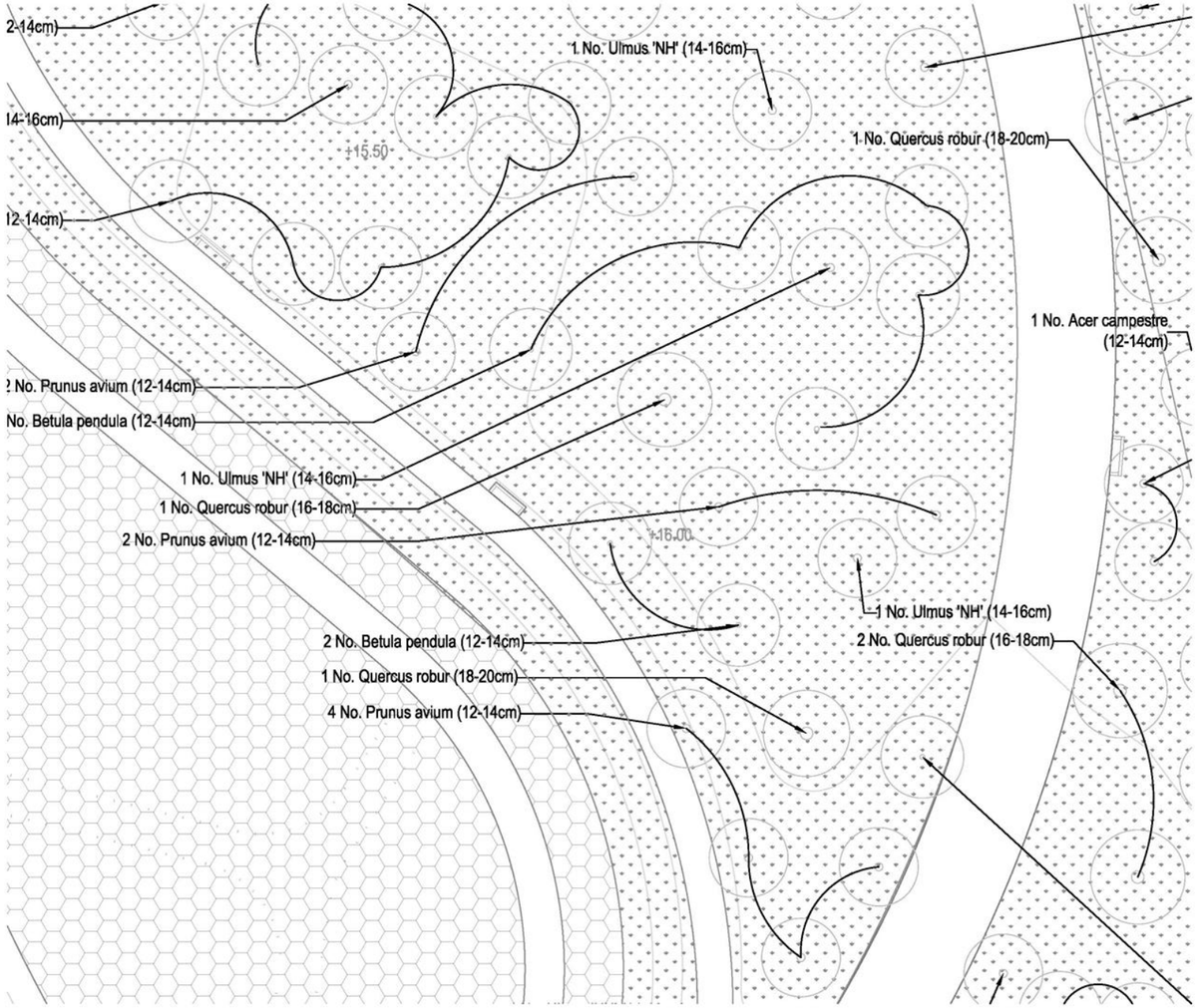


UNDERSTOREY PLANTING





PLANTING PLANS



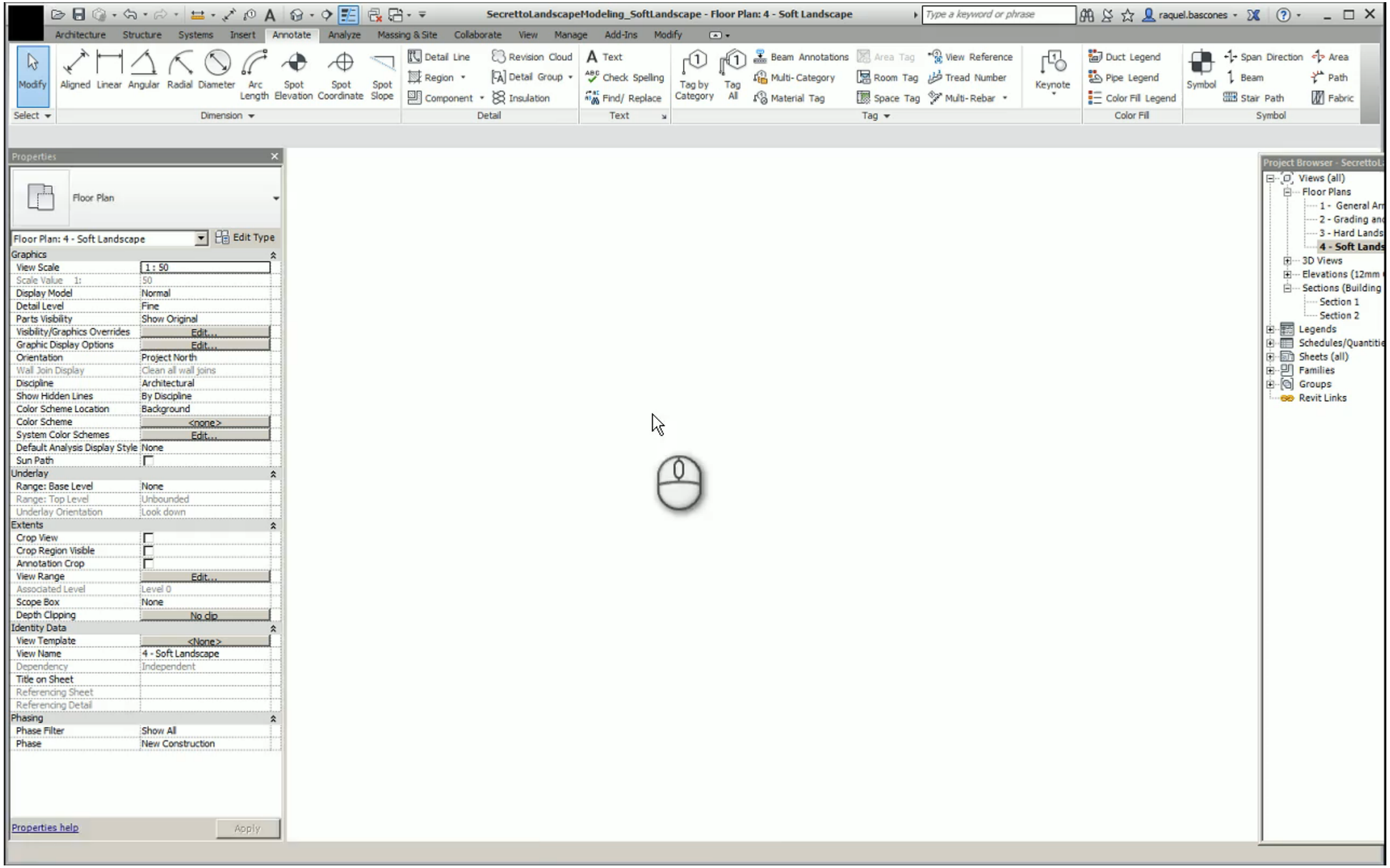
PLANTING PLANS

Representing understory planting

- Material Surface Pattern

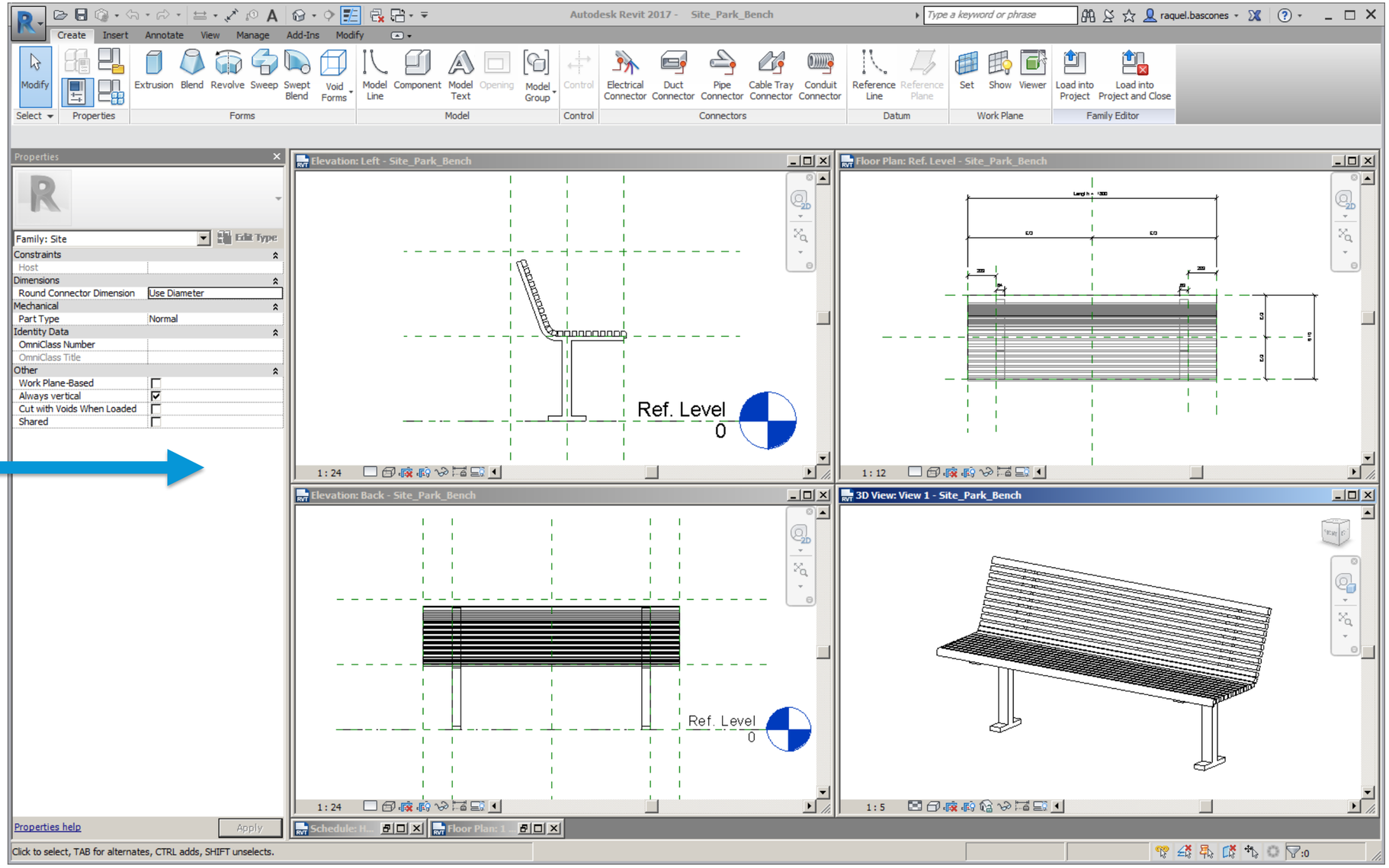
- Filled Region

PLANTING PLANS



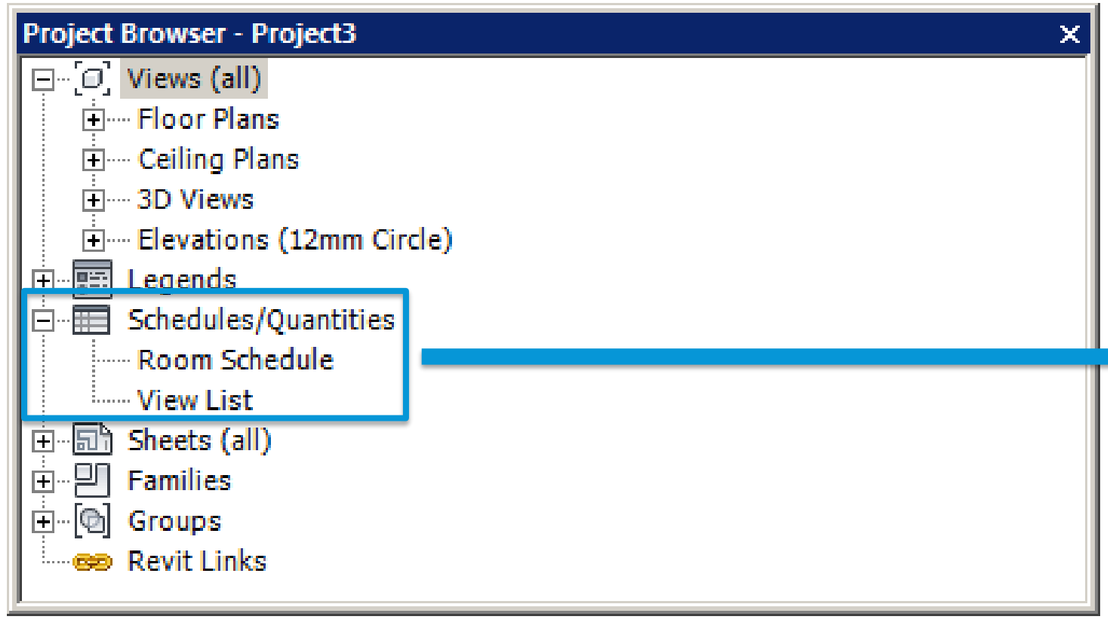
Urban Furniture

URBAN FURNITURE



Schedules

SCHEDULES



Hard Landscape

Soft Landscape

Furniture

HARD LANDSCAPE SCHEDULE

Paving

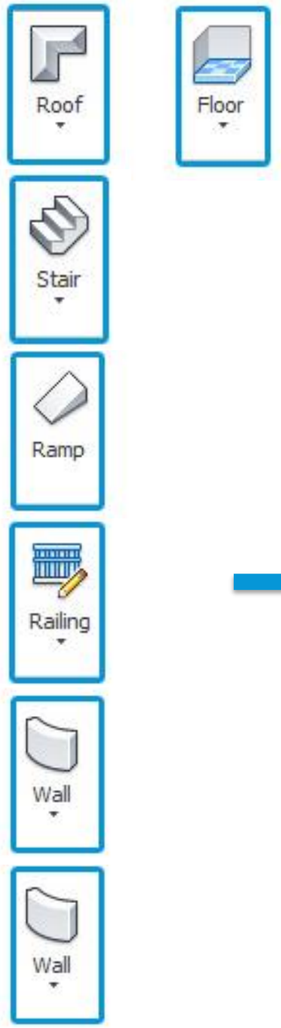
Stairs

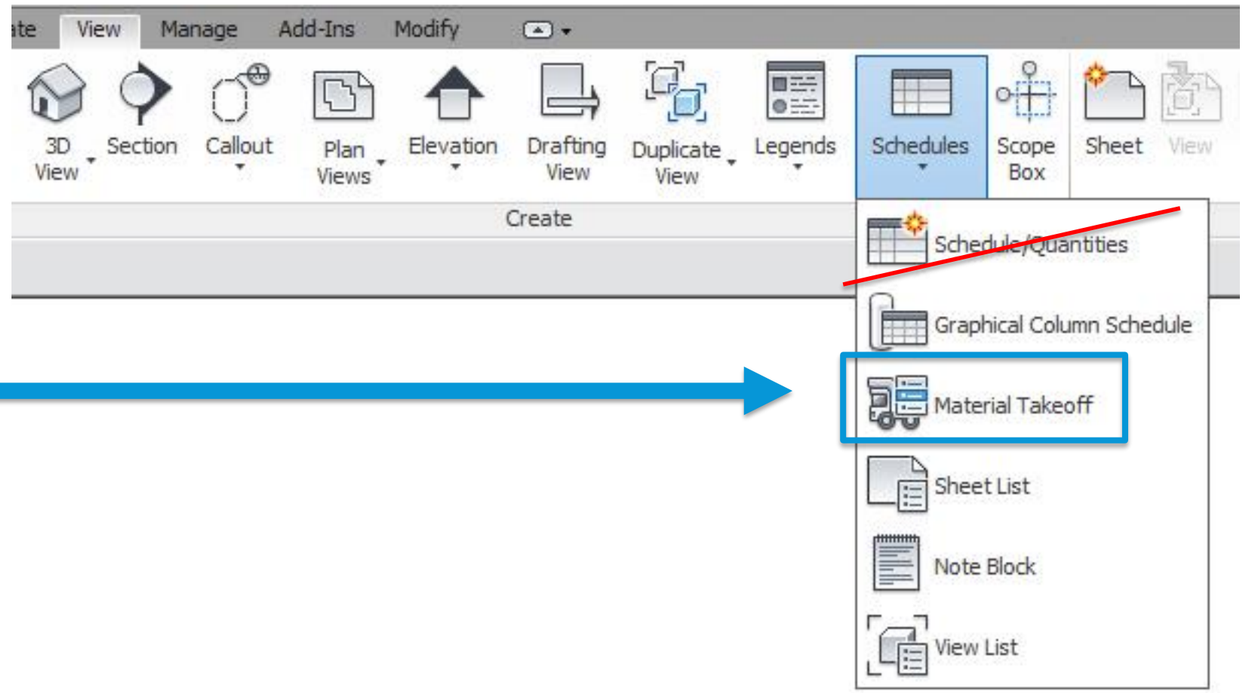
Ramps

Railings

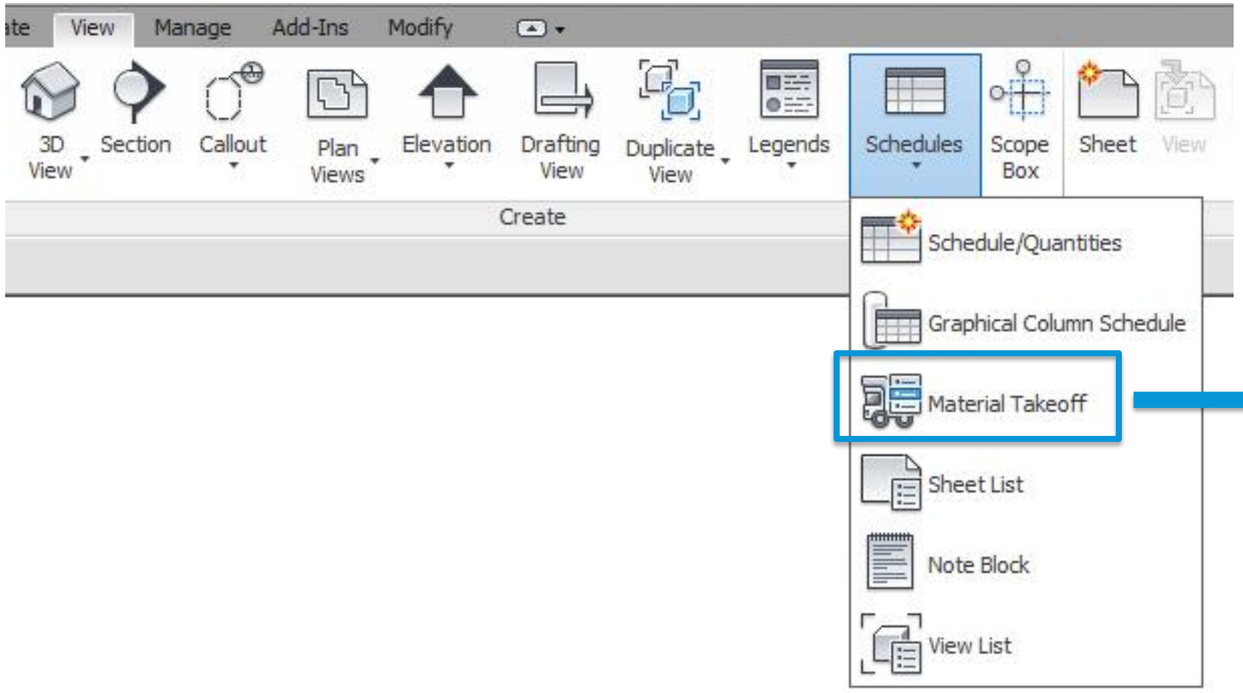
Walls

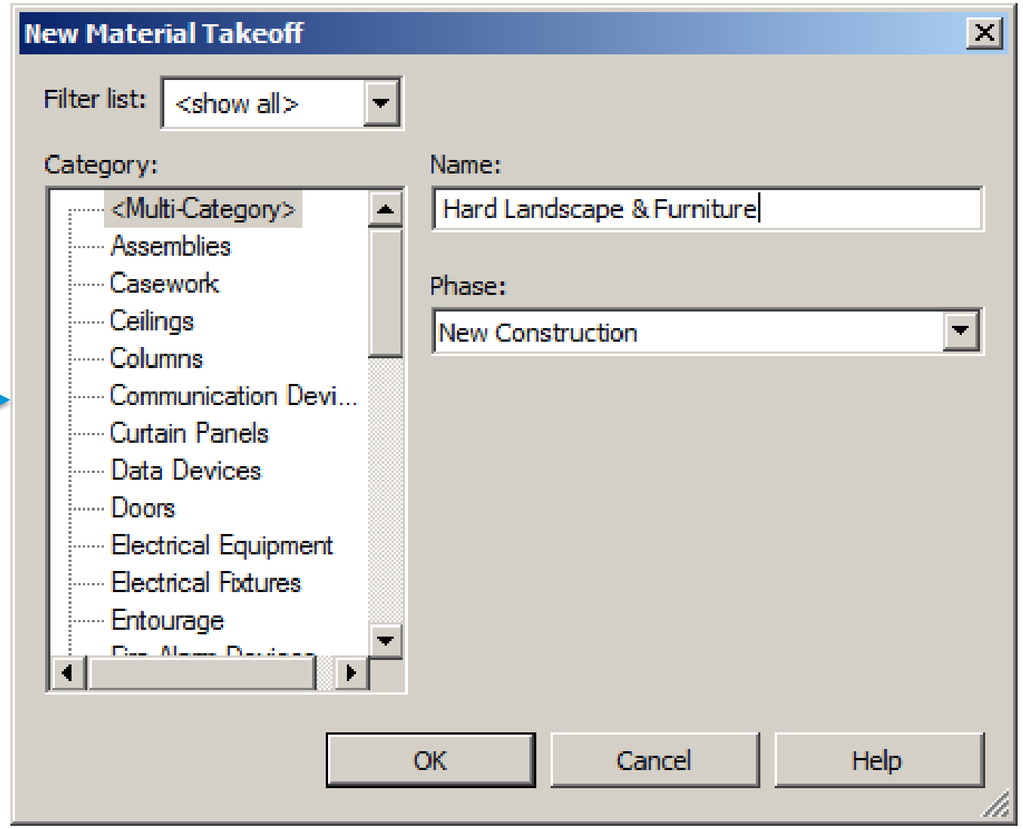
Fences & Gates





HARD LANDSCAPE SCHEDULE

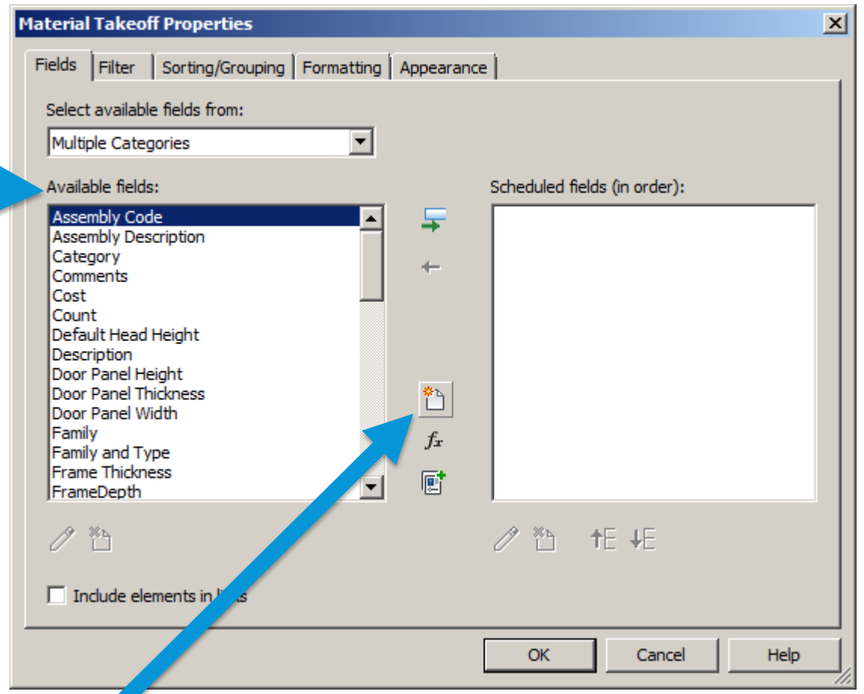




HARD LANDSCAPE SCHEDULE

Data

- Material
- Size
- Joints (if applicable)
- Colour
- Finish
- Quantities/Area
- Model
- Manufacturer



OPTIONS

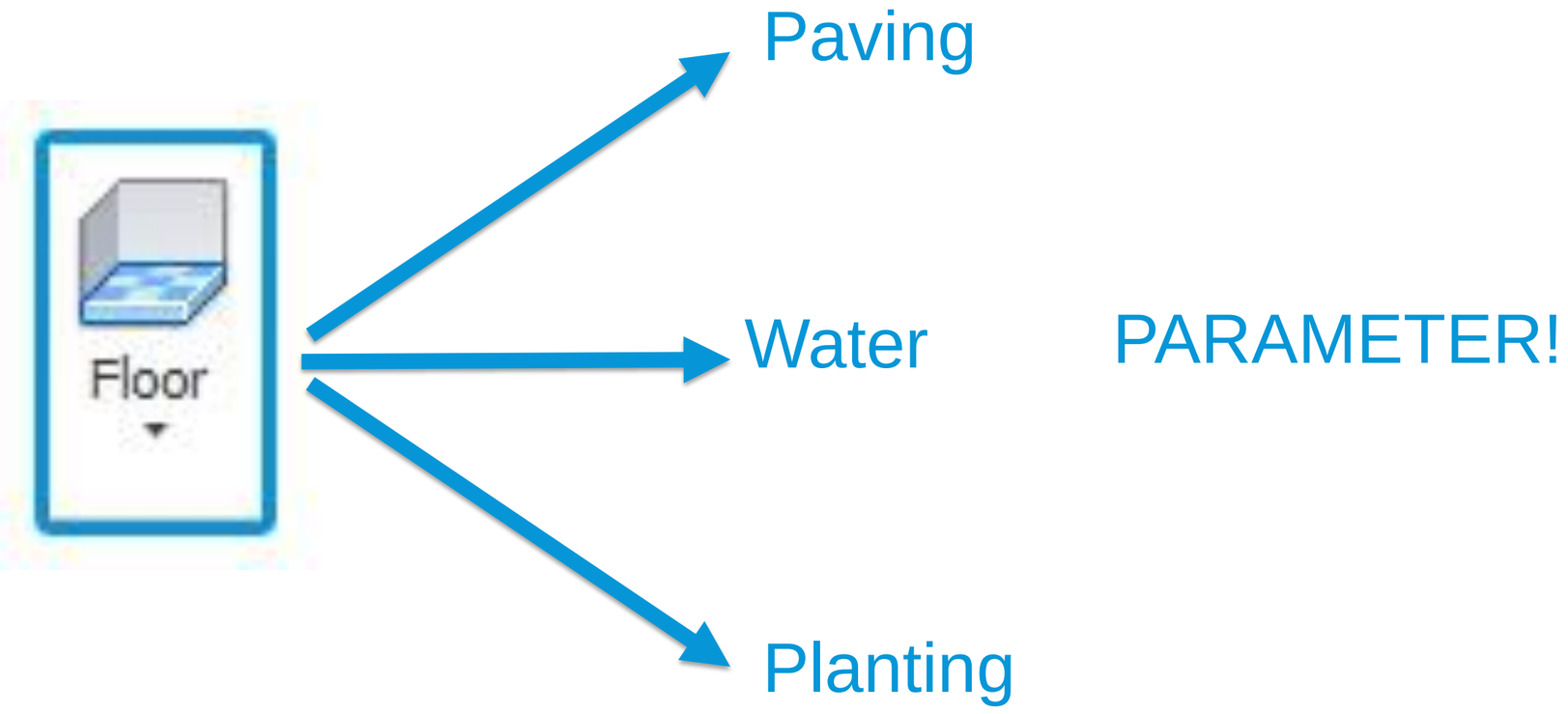
- Create new parameter
- Rename existing parameter

HARD LANDSCAPE SCHEDULE

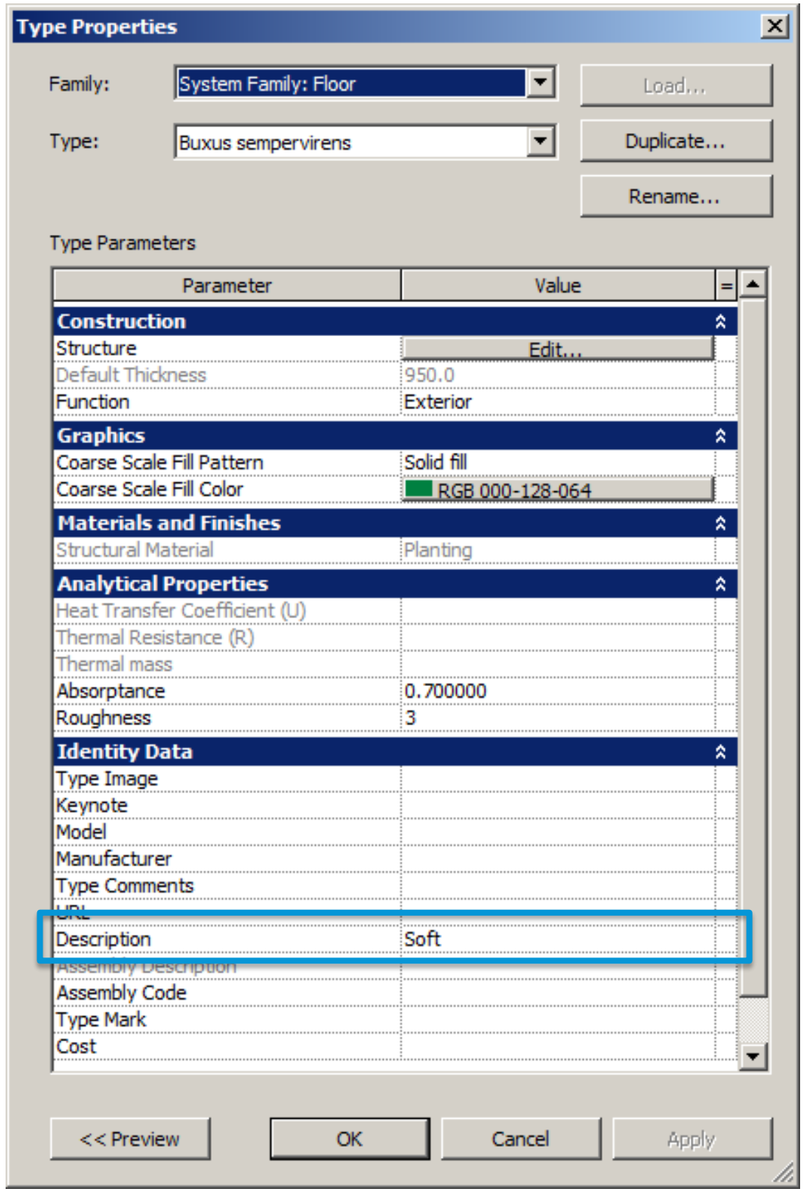
<Hard Landscape>

A	B	C	D	E	F	G	H	I	J
Comments	Cost	Manufacturer	Material: Area	Model	Type	Frame Thickness	Type Comments	Type Image	Type Mark
			71 m²		Buxus sempervire				
			71 m²		Buxus sempervire				
			71 m²		Buxus sempervire				
			71 m²		Buxus sempervire				
			20 m²		Lavandula officinali				
			20 m²		Lavandula officinali				
			20 m²		Lavandula officinali				
			20 m²		Echium candicans				
			20 m²		Echium candicans				
			20 m²		Echium candicans				
			20 m²		Lavandula officinali				
			20 m²		Lavandula officinali				
			20 m²		Lavandula officinali				
			30 m²		Rosmarinus officin				
			30 m²		Rosmarinus officin				
			30 m²		Rosmarinus officin				
			20 m²		Juniperus horizont				
			20 m²		Juniperus horizont				
			20 m²		Juniperus horizont				
Grey Granite Unbo			71 m²		Grey Granite Unbo				
Grey Granite Unbo			71 m²		Grey Granite Unbo				
Grey Granite Unbo			71 m²		Grey Granite Unbo				
Self Binding Gravel			20 m²		Self Binding Gravel				
Self Binding Gravel			20 m²		Self Binding Gravel				
Self Binding Gravel			20 m²		Self Binding Gravel				
Ceramic Tile			20 m²		Ceramic Tiles				
Ceramic Tile			20 m²		Ceramic Tiles				
Ceramic Tile			20 m²		Ceramic Tiles				
Porous Concrete P			20 m²		Porous Concrete P				
Porous Concrete P			20 m²		Porous Concrete P				
Porous Concrete P			20 m²		Porous Concrete P				
Basalt			30 m²		Basalt Bound 50m				
Basalt			30 m²		Basalt Bound 50m				
Basalt			30 m²		Basalt Bound 50m				
Asphalt			20 m²		Asphalt				
Asphalt			20 m²		Asphalt				
Asphalt			20 m²		Asphalt				
Litter Bin			2 m²		Plastic				
Litter Bin			2 m²		Plastic				
Litter Bin			2 m²		Plastic				
Litter Bin			2 m²		Plastic				
Bench Type 1			1 m²		1800mm_Length				
Bench Type 1			4 m²		1800mm_Length				
Bench Type 1			1 m²		1800mm_Length				
Bench Type 1			4 m²		1800mm_Length				
Bench Type 2			1 m²		2400mm_Length				

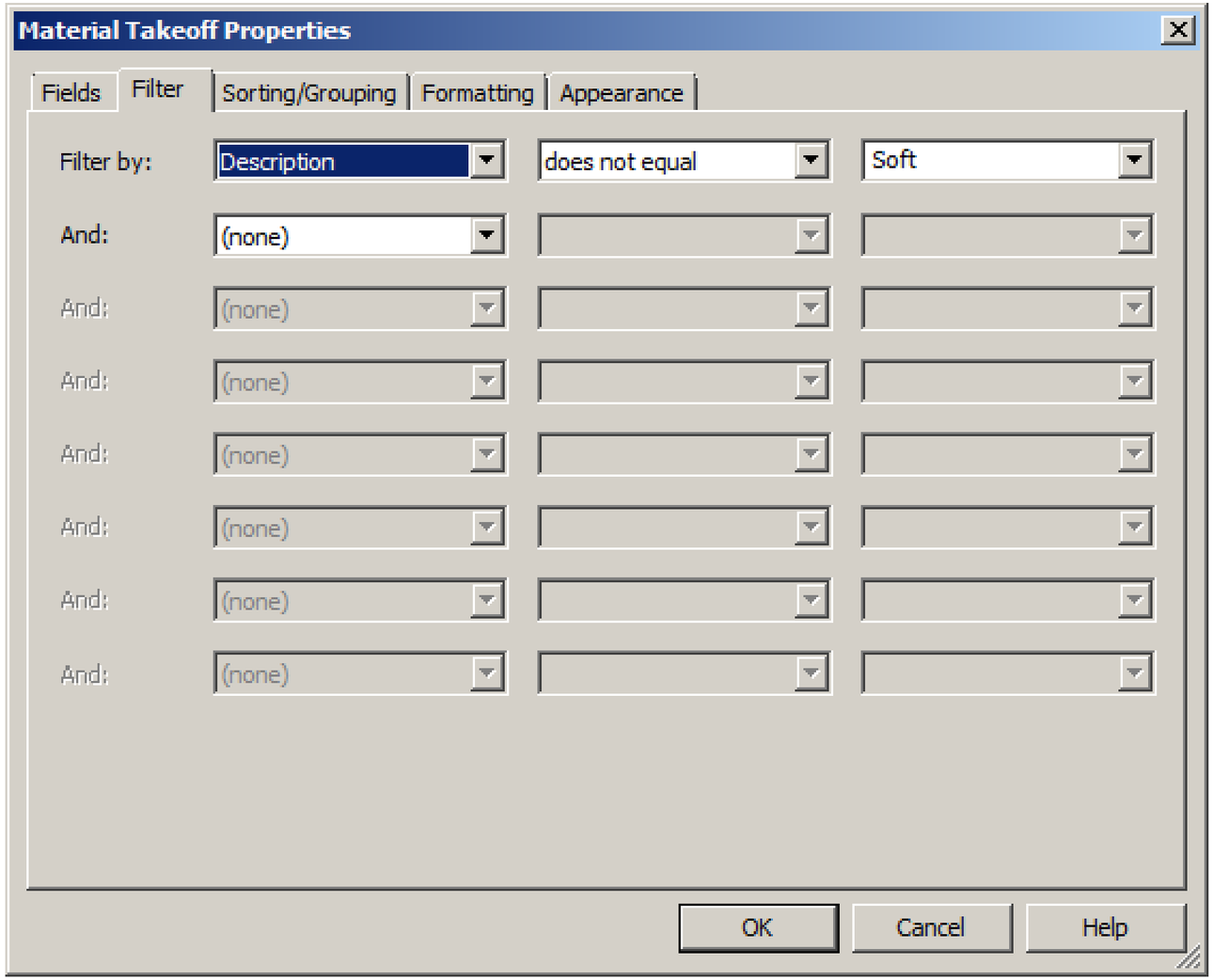
HARD LANDSCAPE SCHEDULE



PARAMETER!



HARD LANDSCAPE SCHEDULE



HARD LANDSCAPE & FURNITURE SCHEDULE

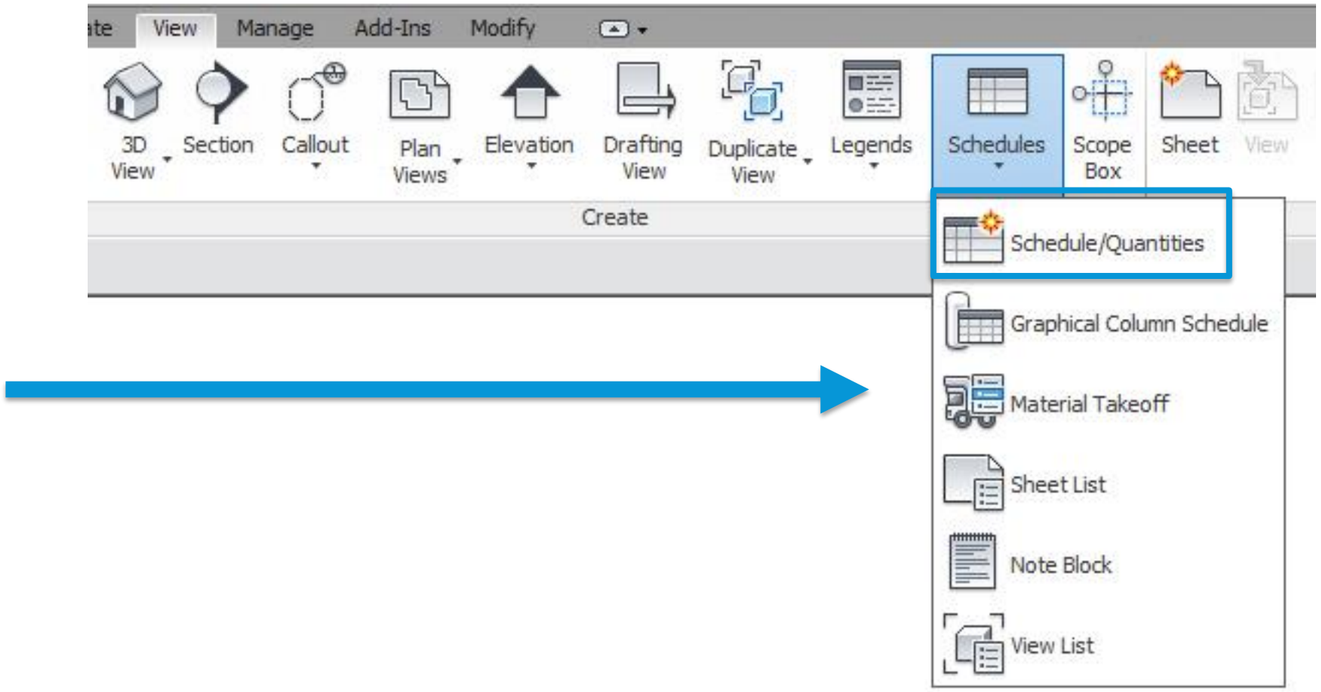
<Hard Landscape & Furniture>								
A	B	C	D	E	F	G	H	I
Name	Material	Size	Area	Joint	Manufacturer	Model	Colour	Comments
FENCE								
Wired Fence								
FURNITURE								
Bench Type 1								
Bench Type 2								
Litter Bin			2 m²					
GATE								
Wired Fence Double Gate								
PAVING								
Asphalt			20 m²					
Basalt			30 m²					
Ceramic Tile			20 m²					
Grey Granite Unbound			71 m²					
Porous Concrete Pavers			20 m²					
Self Binding Gravel			20 m²					

SOFT LANDCAPE SCHEDULE

Trees

Specimen Shrubs

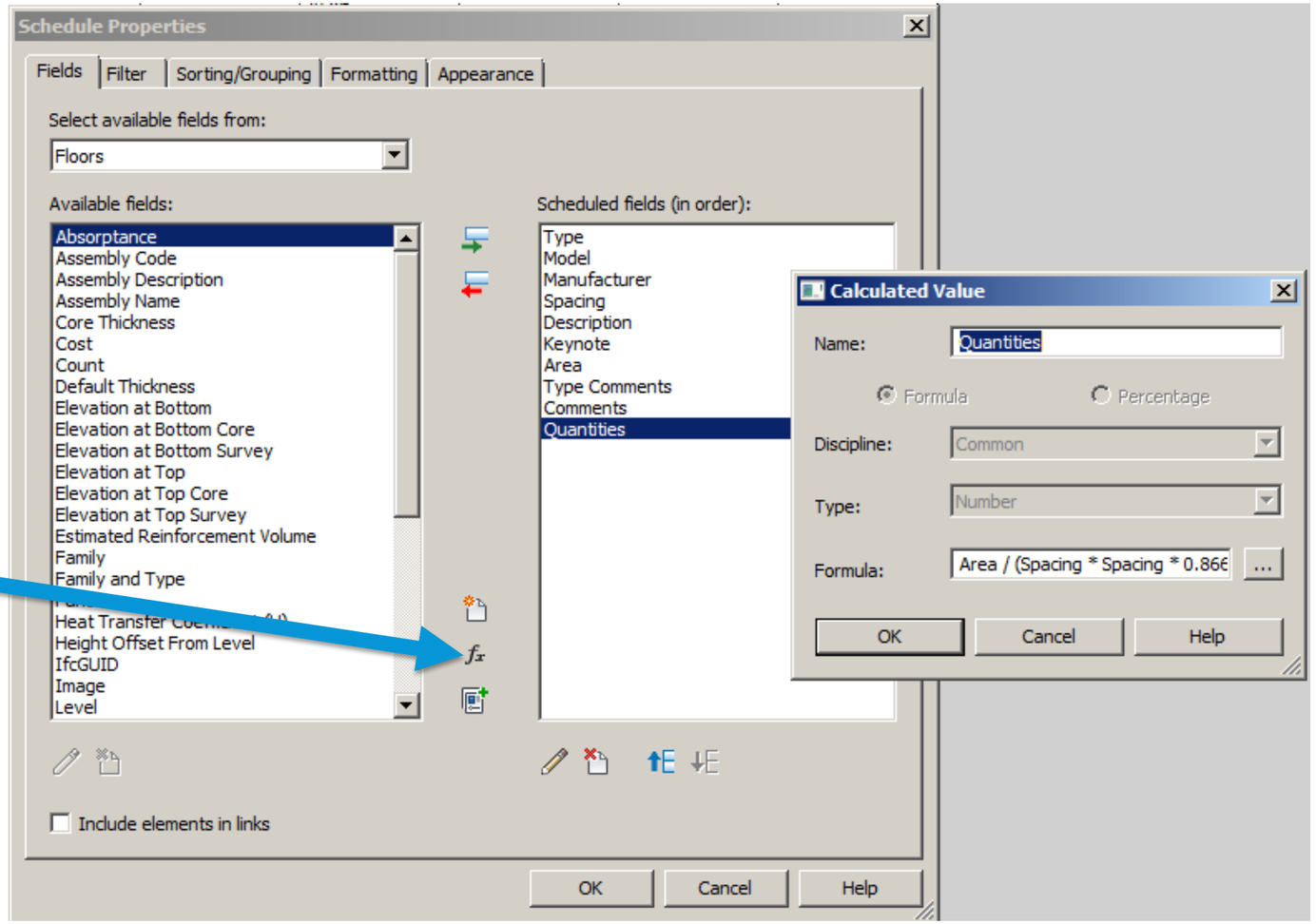
Understorey planting



SOFT LANDSCAPE SCHEDULE

Understorey planting

- Area
- Spacing → NEW
- Quantities



Triangular pattern: Area/Spacing*Spacing*0.866
Square pattern: Area/Spacing*Spacing

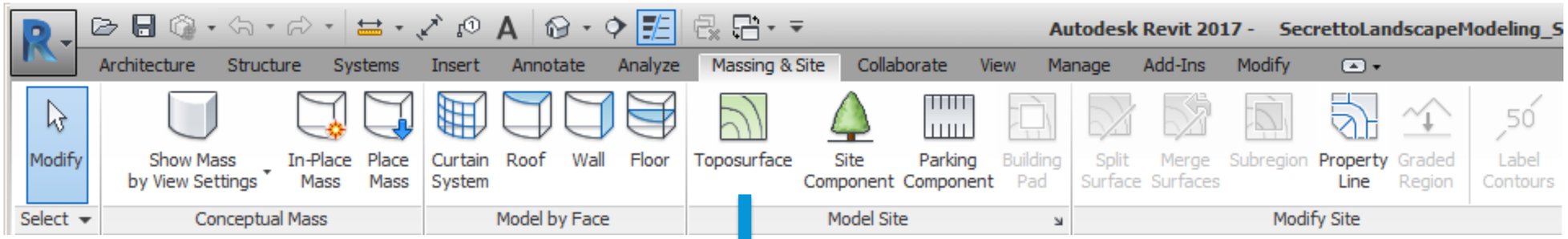
Topography

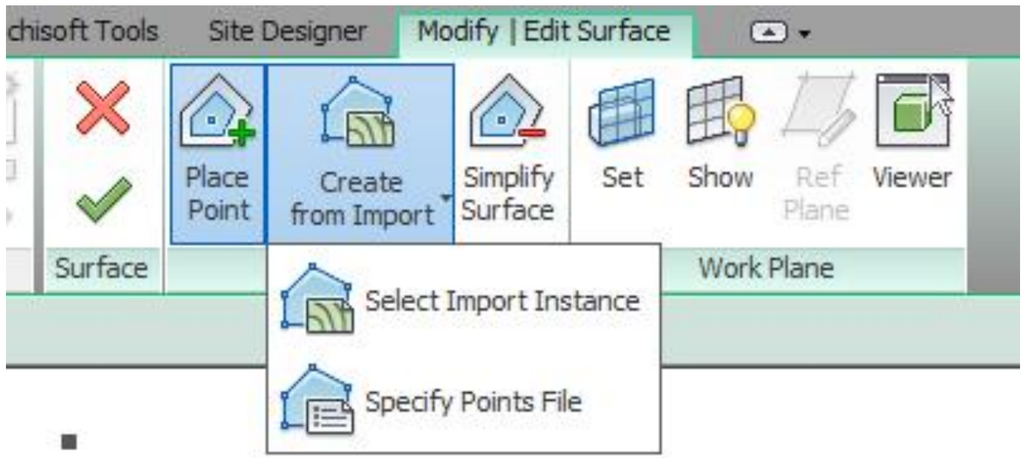
TOPOGRAPHY

Challenges

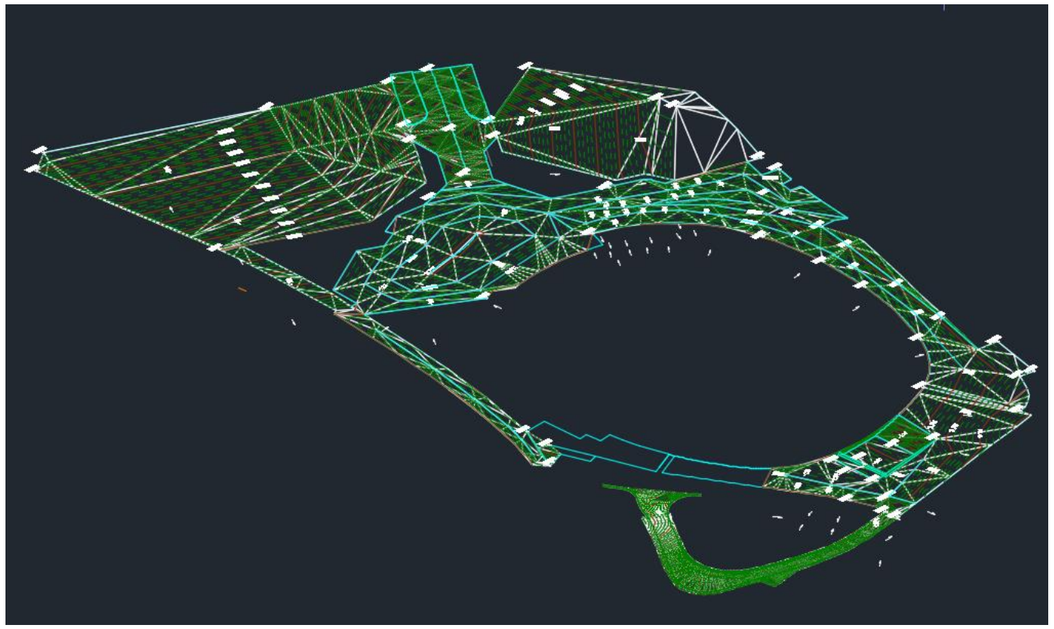
- Toposurfaces are made with one **single material** that extends to infinite. There is no way to control layers, materials or depths. You can only change the colour at the top surface (material).
- Only few **families** (mostly entourage families) can be hosted by a Toposurface
- No **voids** can be opened
- No specific tools to model **water bodies**
- No interaction with hard landscape elements
- Revit creates Toposurface based on **triangles** not contours
- No **interoperability** between Revit and Civil 3D
- Toposurface can't be **smoothed**
- No **grading** tools

CREATING TOPOSURFACES

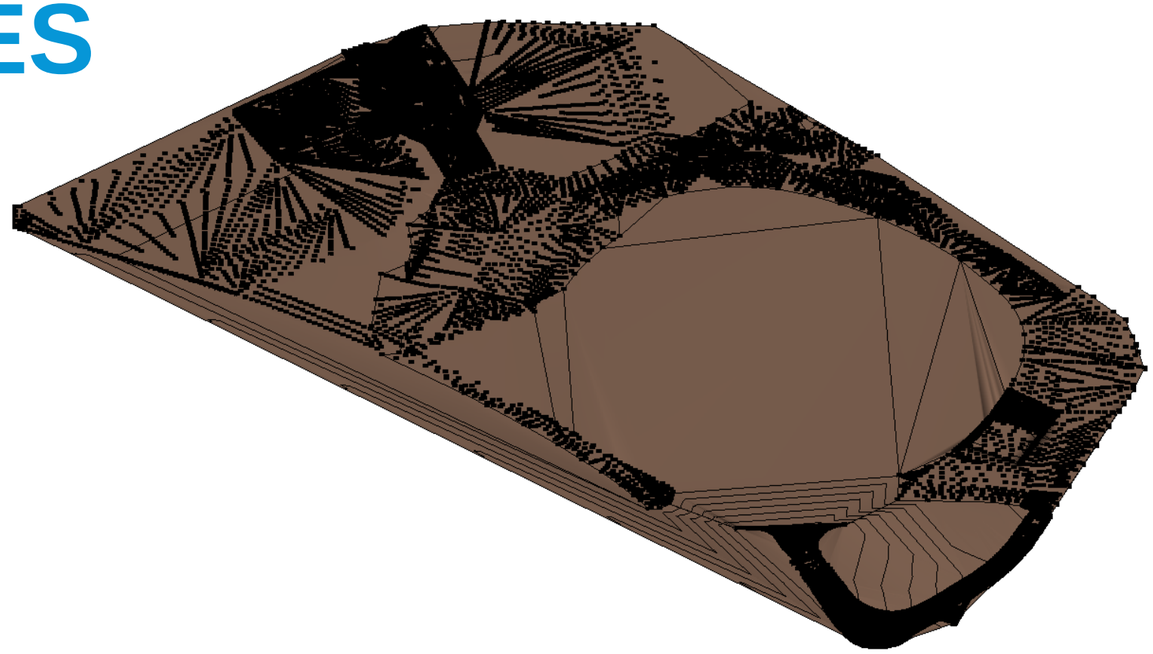




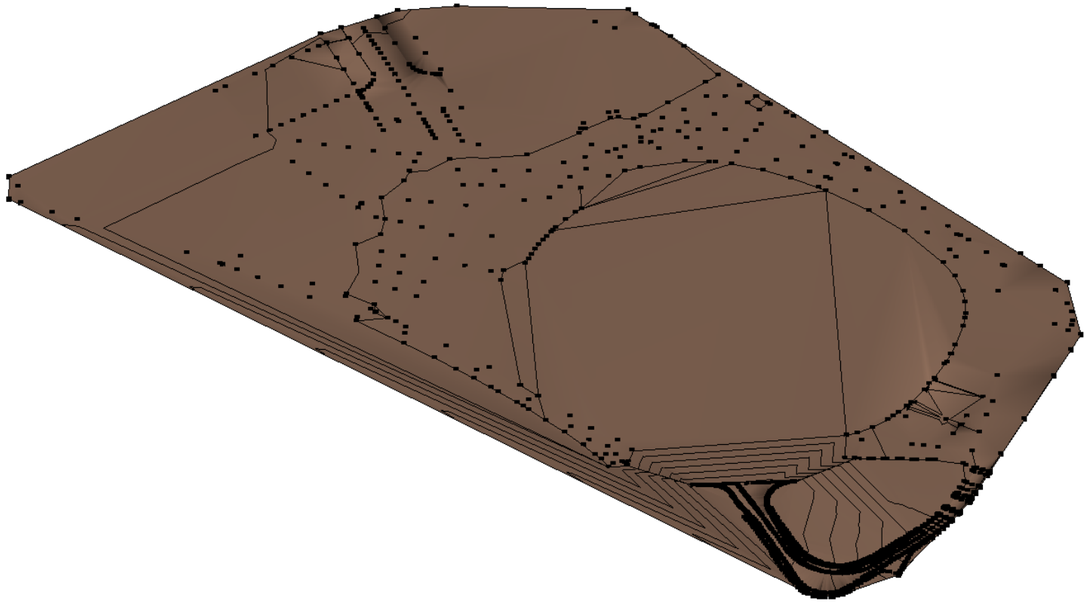
CREATING TOPOSURFACES



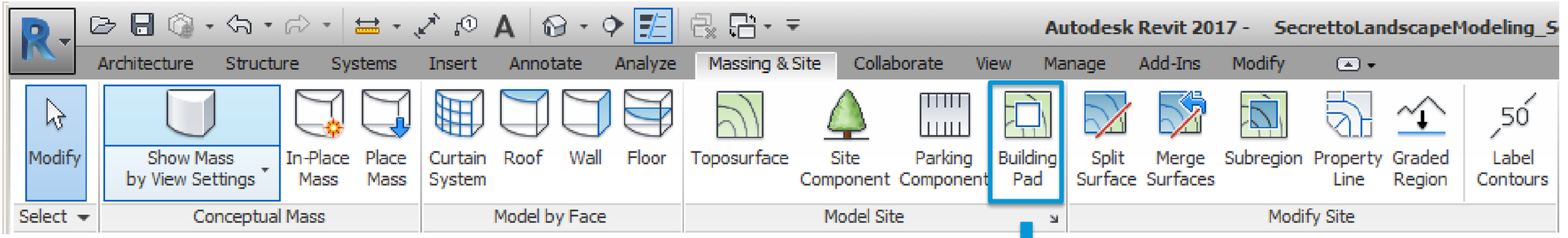
Contours



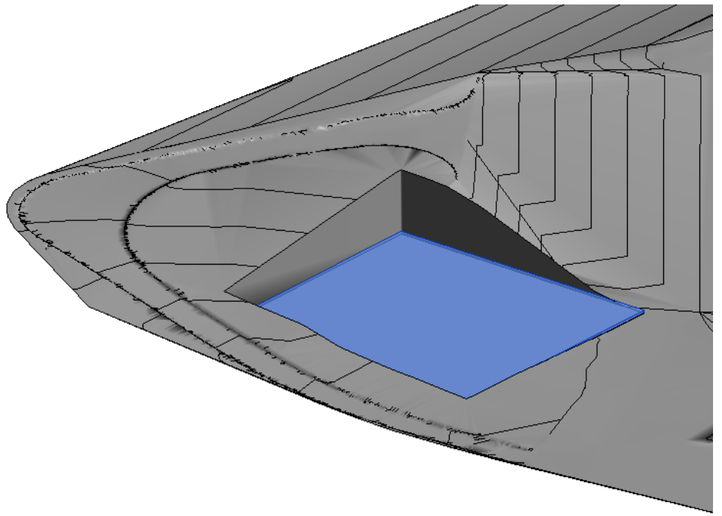
Triangles



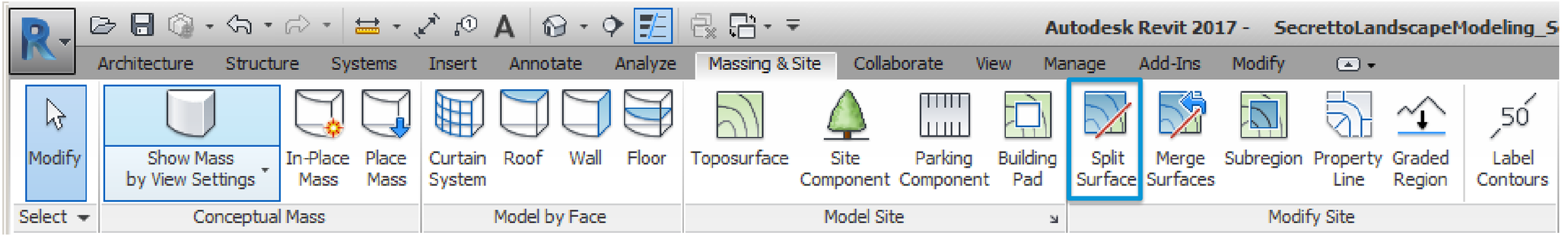
SITE TOOLS

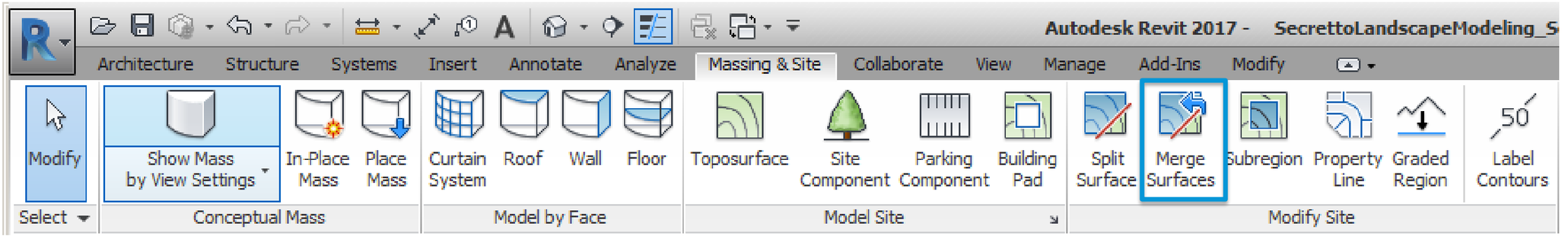


- Only one direction sloping
- No control on borders (vertical walls)



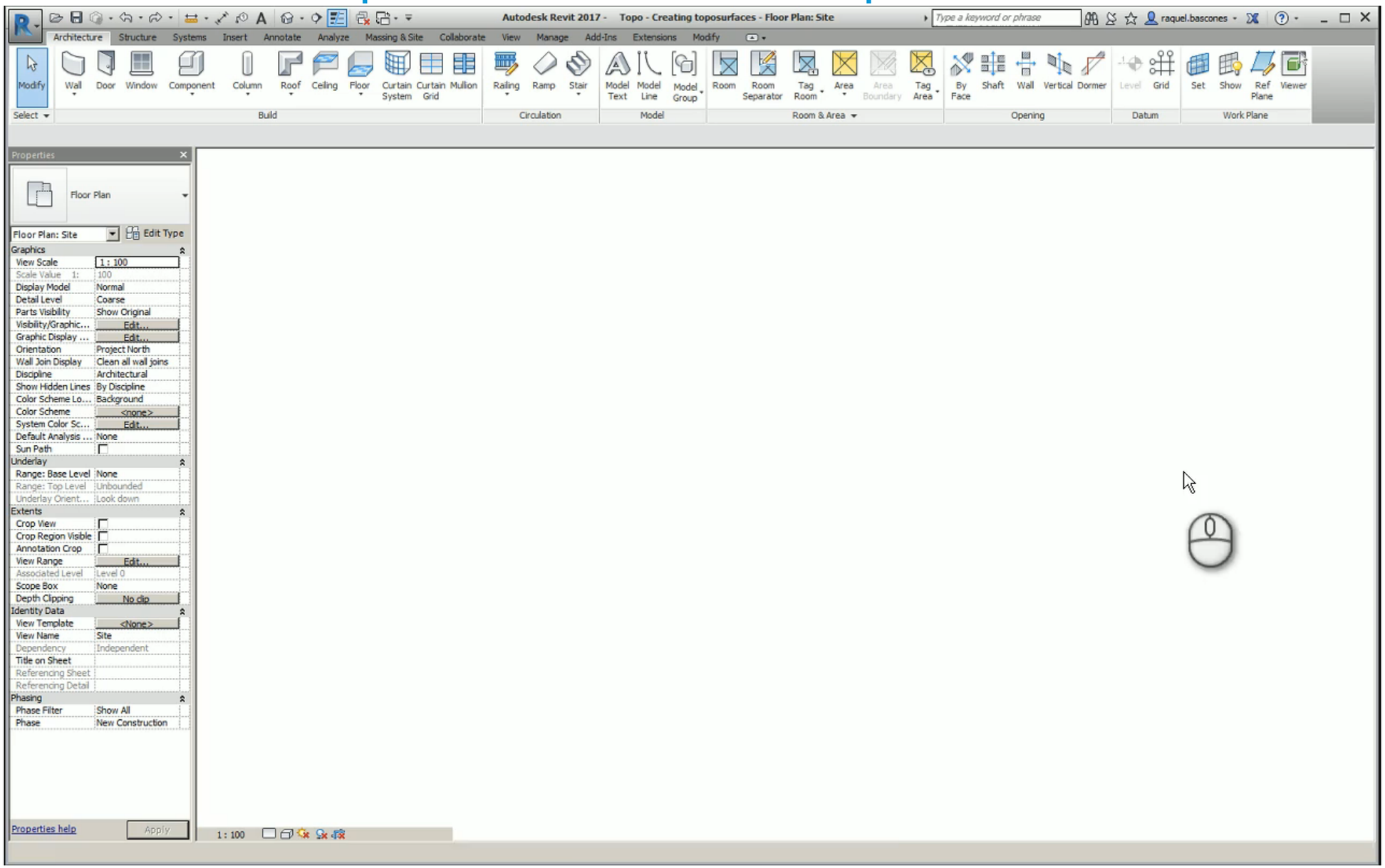
SITE TOOLS



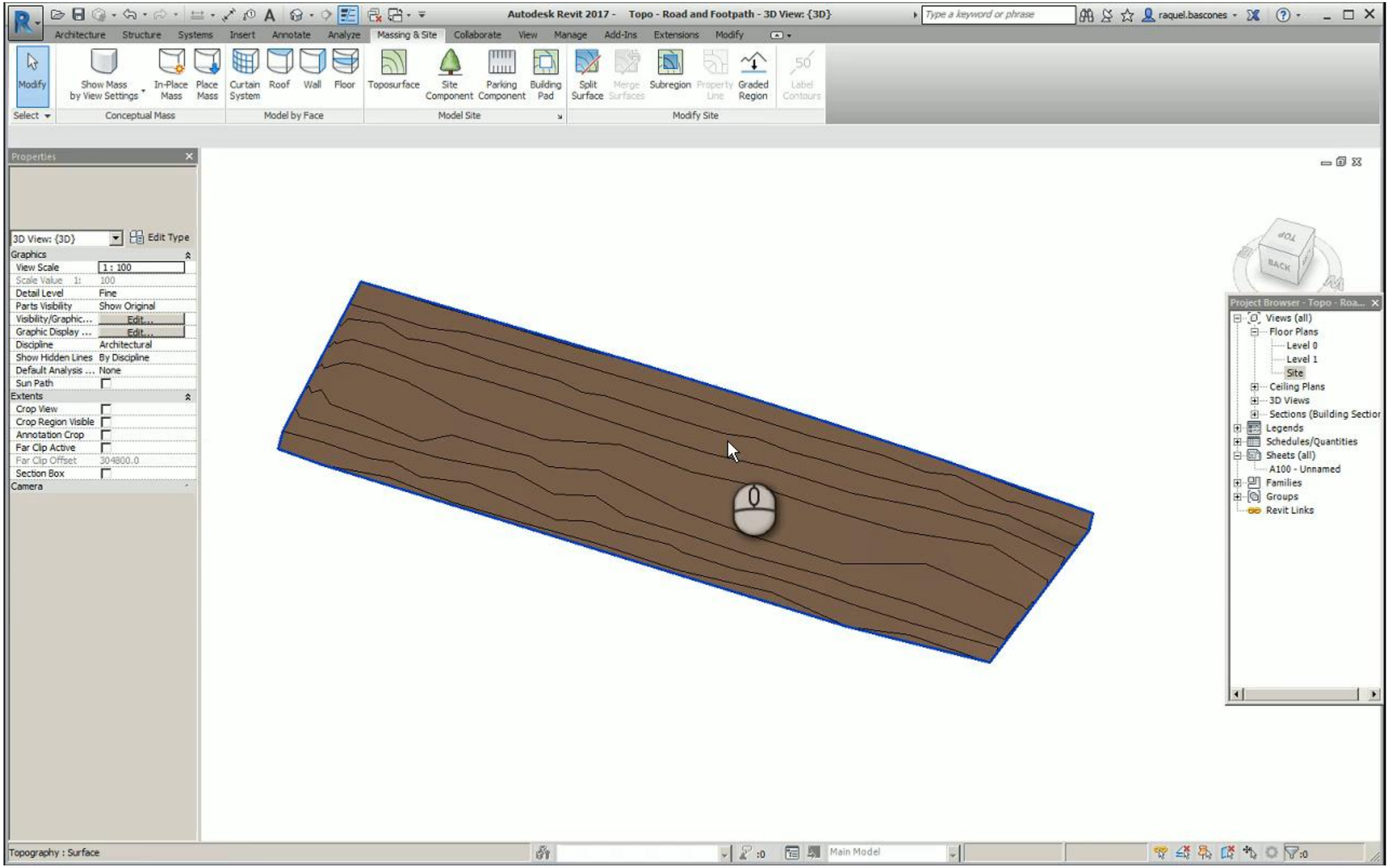


- Refine toposurfaces boundaries
- Create roads, kerbs and footpaths

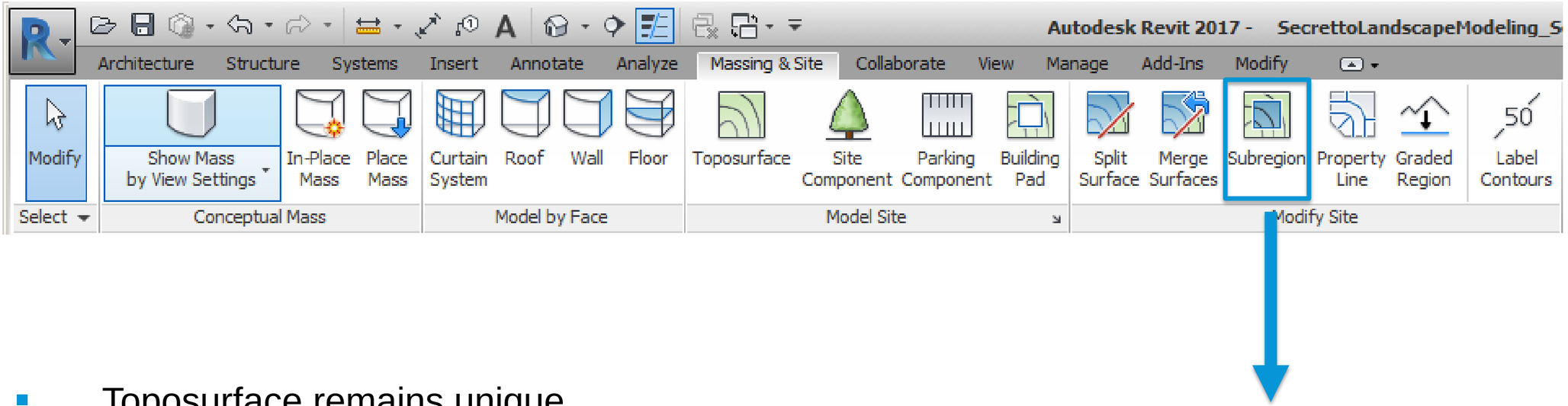
SITE TOOLS Split Surface: Refine Toposurfaces' Boundaries



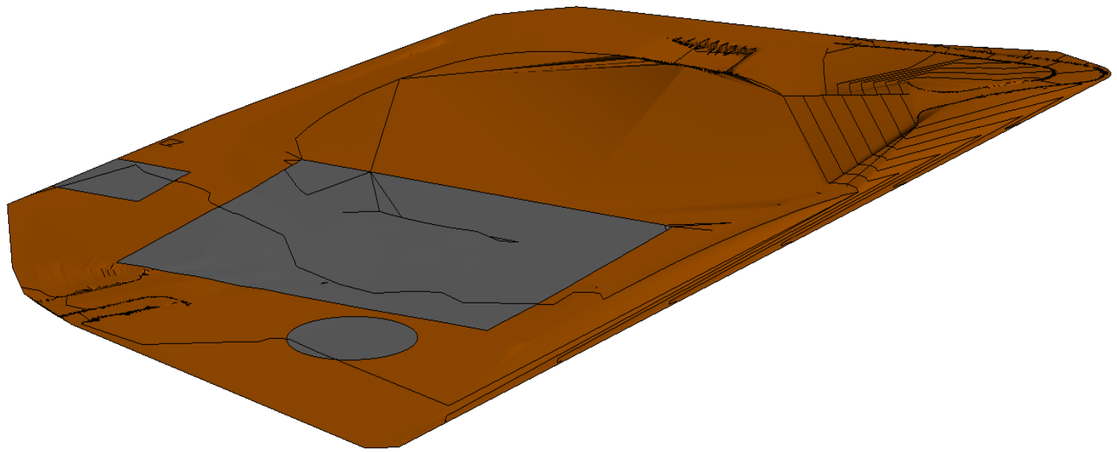
SITE TOOLS Split Surface: Create roads, kerbs and footpaths



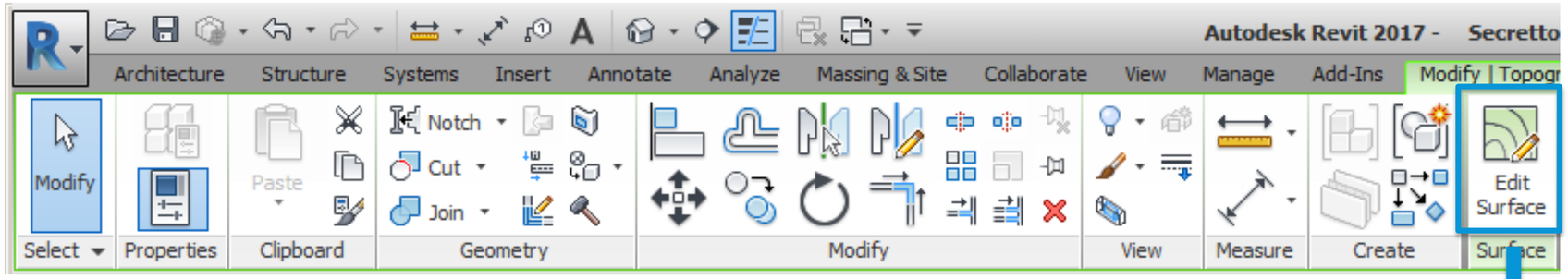
SITE TOOLS

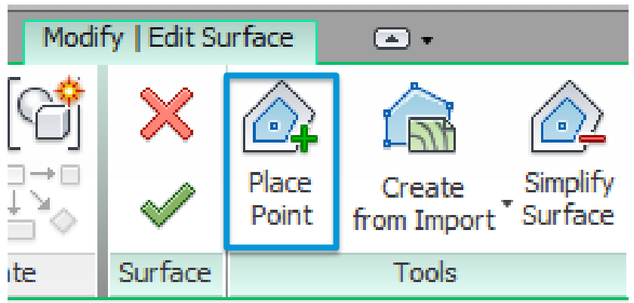


- Toposurface remains unique
- Availability to change the surface material

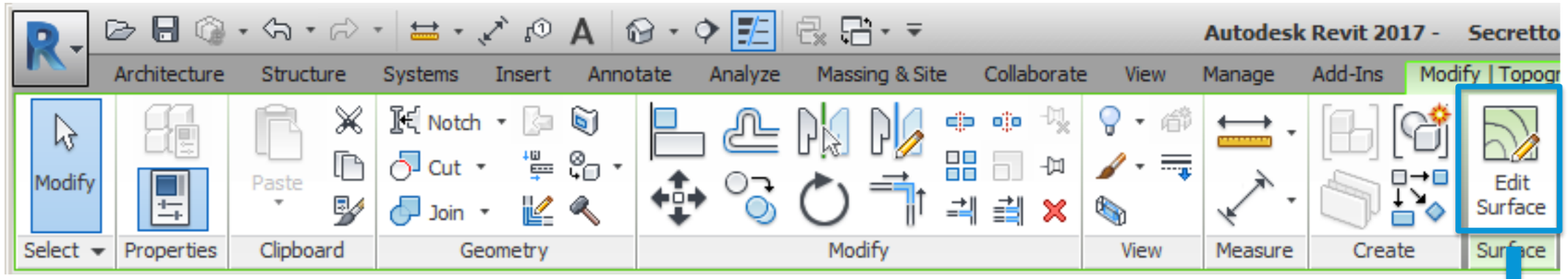


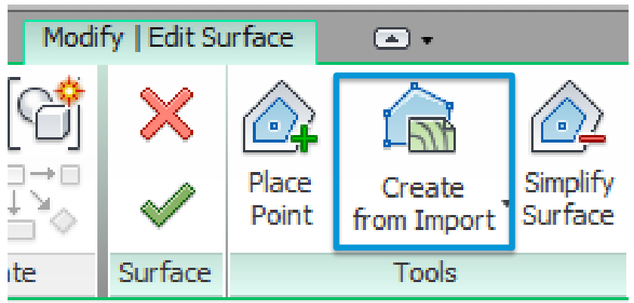
MODIFYING TOPOSURFACES



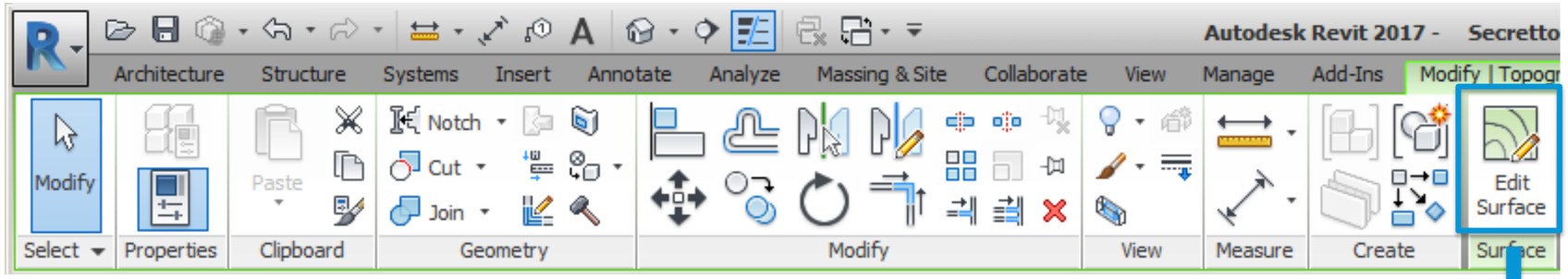


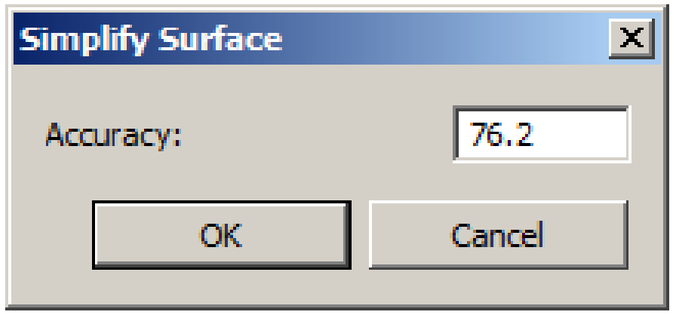
MODIFYING TOPOSURFACES

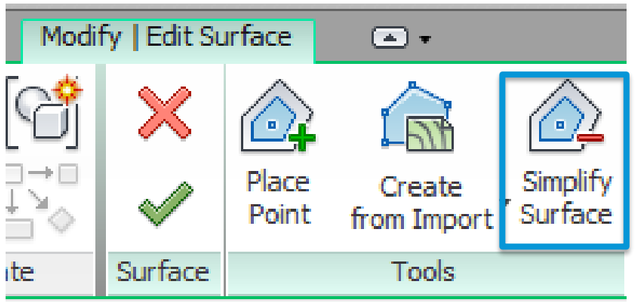




MODIFYING TOPOSURFACES

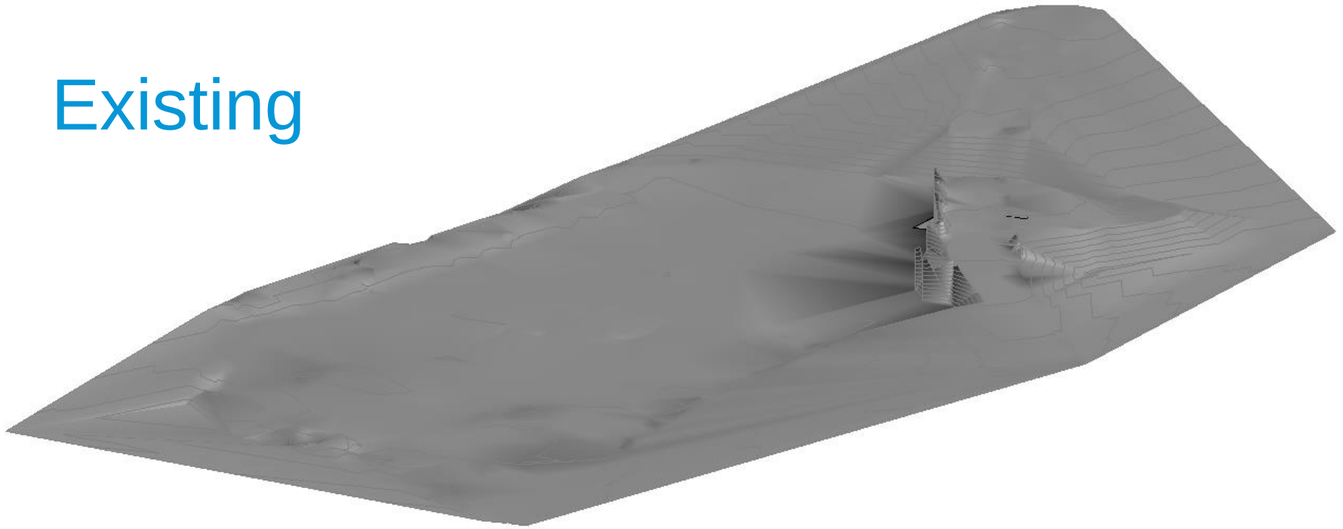




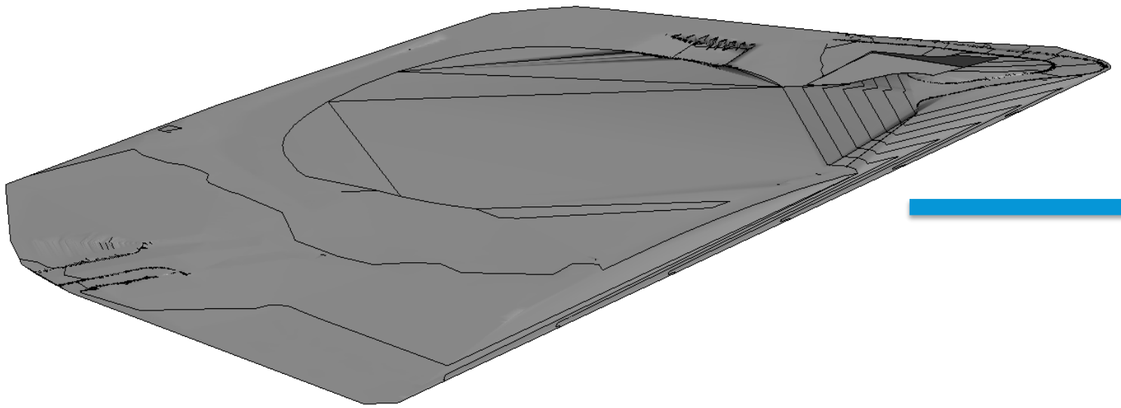


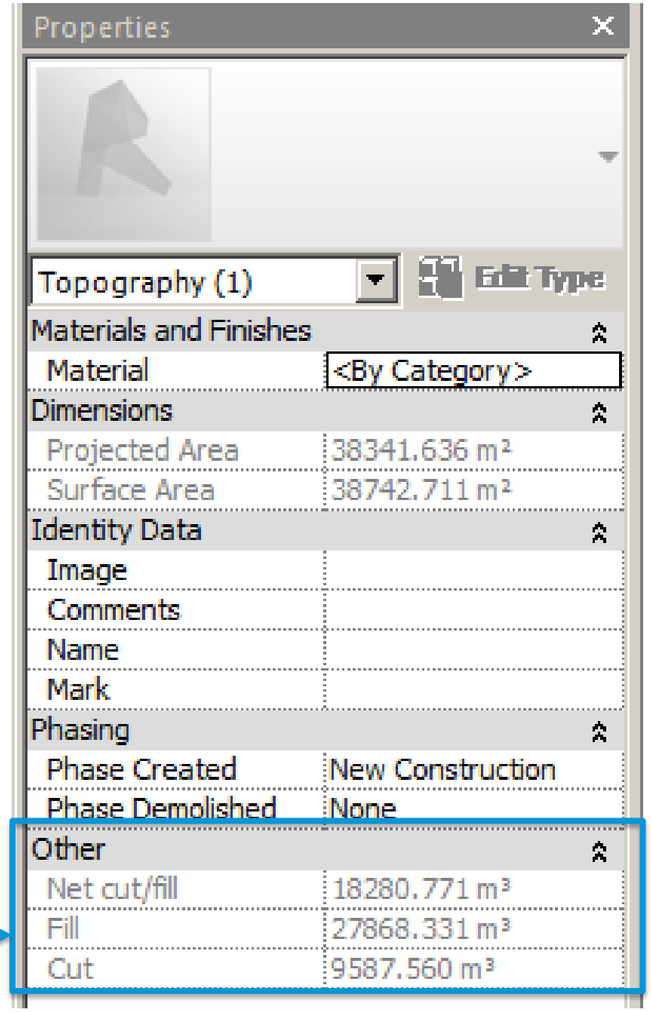
CUT & FILL

Existing



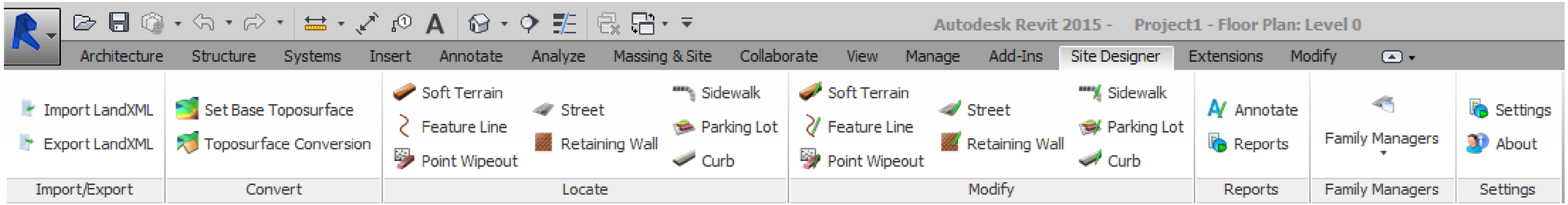
New construction



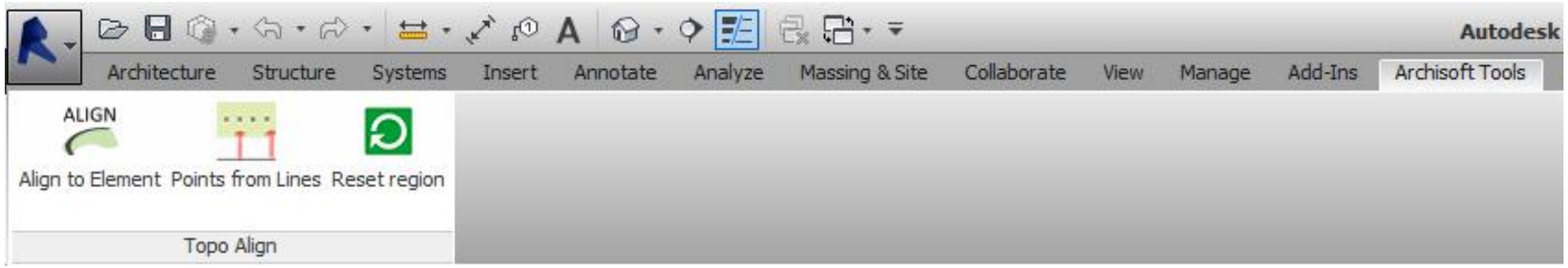


Add-ins

SITE DESIGNER

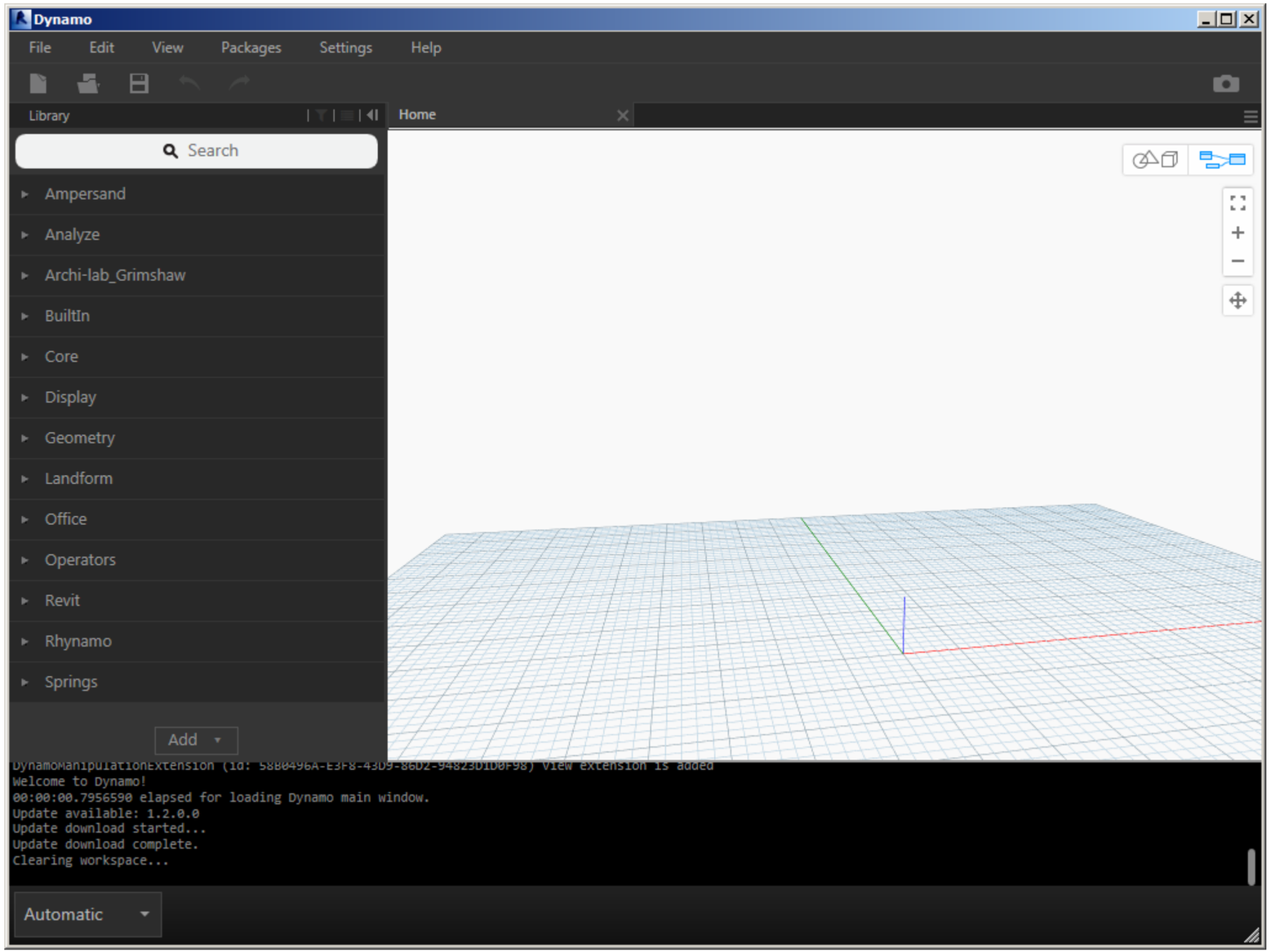


TOPO ALIGN



- **Align to Element:** Adjust toposurface to edge or floor geometry
- **Points from Lines**: Add points on toposurface along model lines

DYNAMO BIM

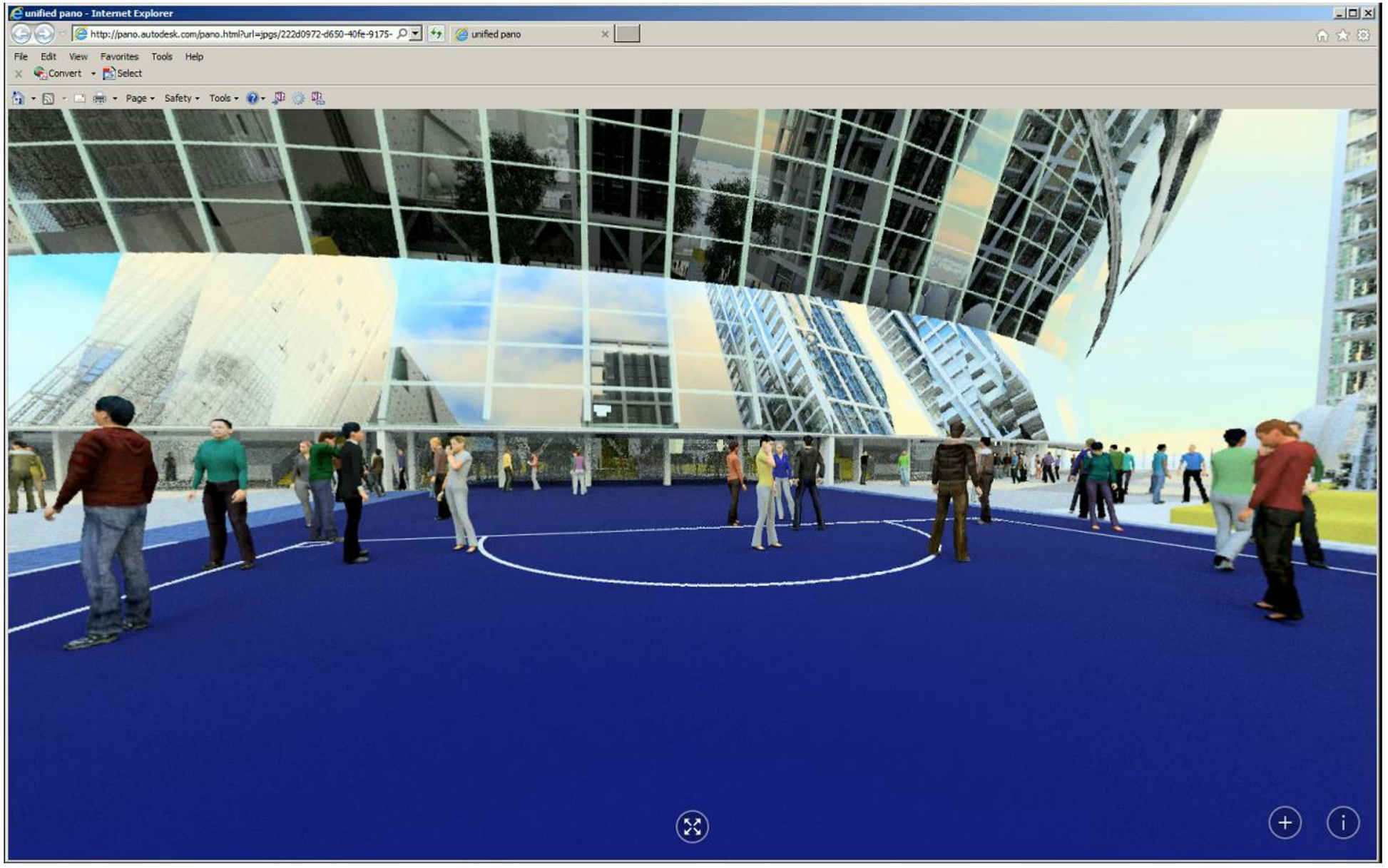


- **Hardscape (Floors) that follows topography**
- **Automatic creation of planting lines**
- **Parametric placement of families**
- **Topography from Rhino elements**
- **Fence follows toposurface**
- **Sheet and View management**

Render & Visualization

VIRTUAL REALITY

VIRTUAL REALITY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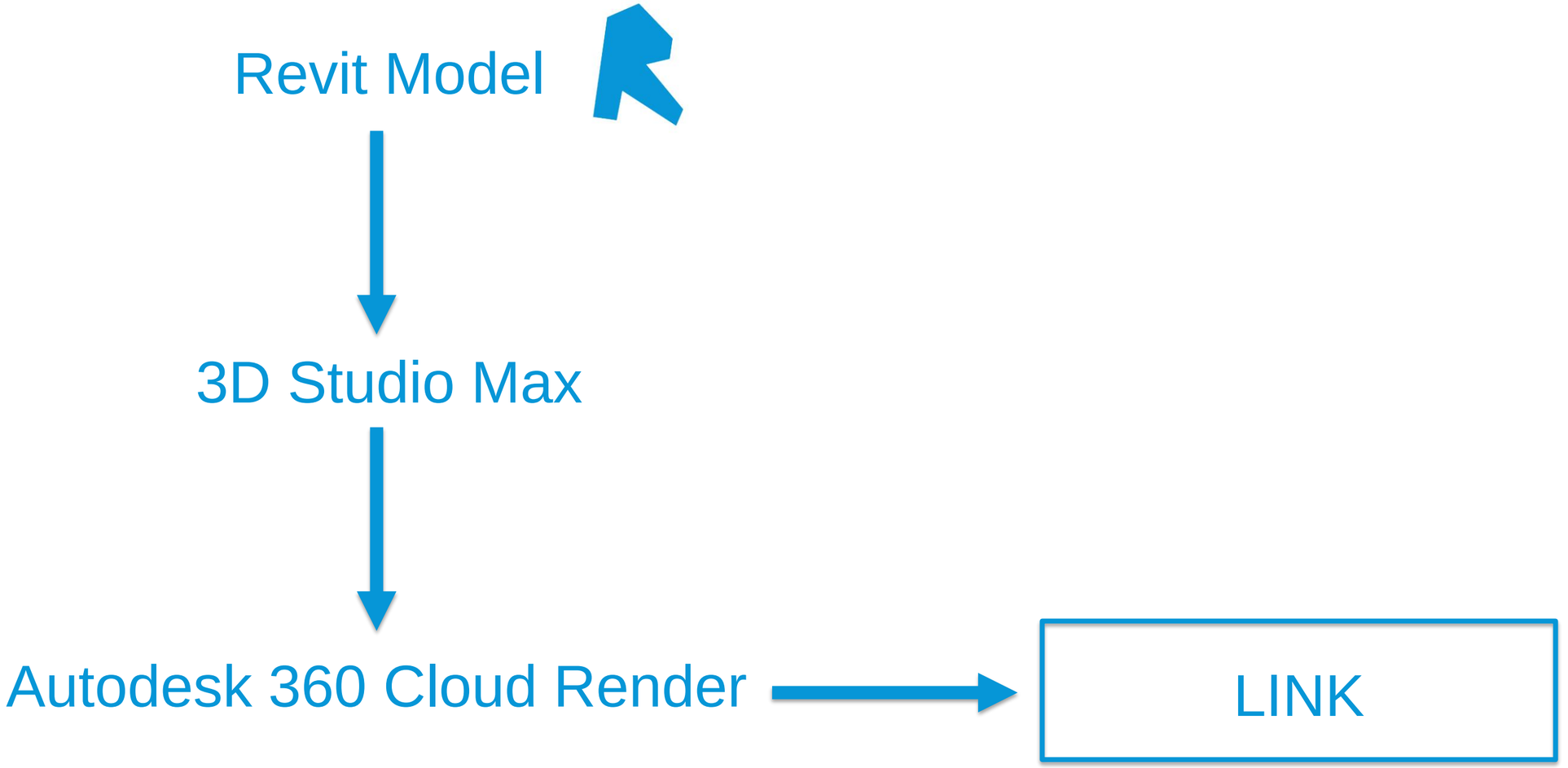
File Edit View Favorites Tools Help
Convert Select
Page Safety Tools

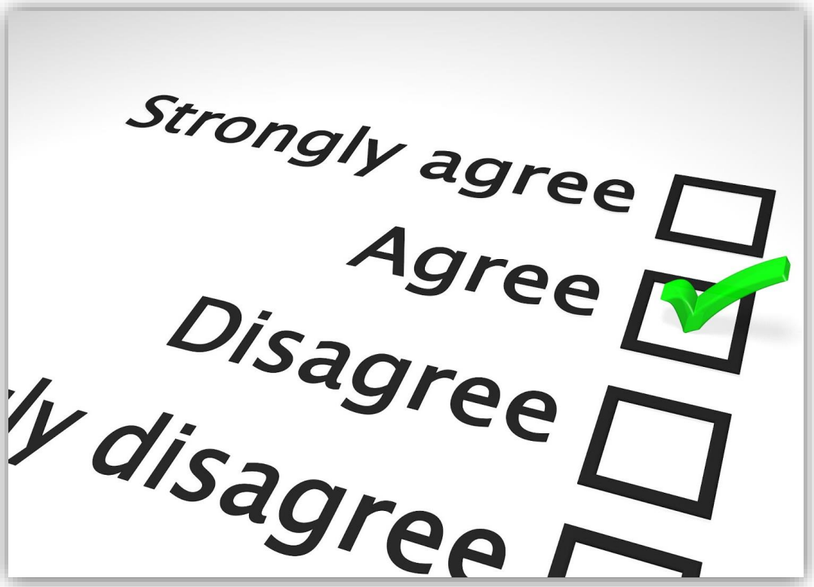
VIRTUAL REALITY



Q&A

How did I do?

- Your class feedback is critical. Fill out a **class survey** now.
- Use the AU mobile app or fill out a class survey online.
- Give feedback after each session.
- AU speakers will get feedback in real-time.
- **Your feedback results in better classes and a better AU experience.**



Thanks!

raquel.bascones@populous.com

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