

20 Practical Uses of Dynamo for Revit to Improve Team Efficiency

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About the speaker

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Building Information Modeling (BIM) director for the Buildings+Places Americas business line of AECOM. He is a BIM and technology evangelist with over 18 years of experience establishing global BIM workflows and standards around content, computational BIM, interoperability, and BIM consultation as a service. Mr. Anderle serves AECOM as a leader in the advancement and efficient implementation of BIM processes for a variety of project types. He manages and directs large distributed project teams to successfully implement BIM collaboration workflows, enabling global offices to work as one entity.

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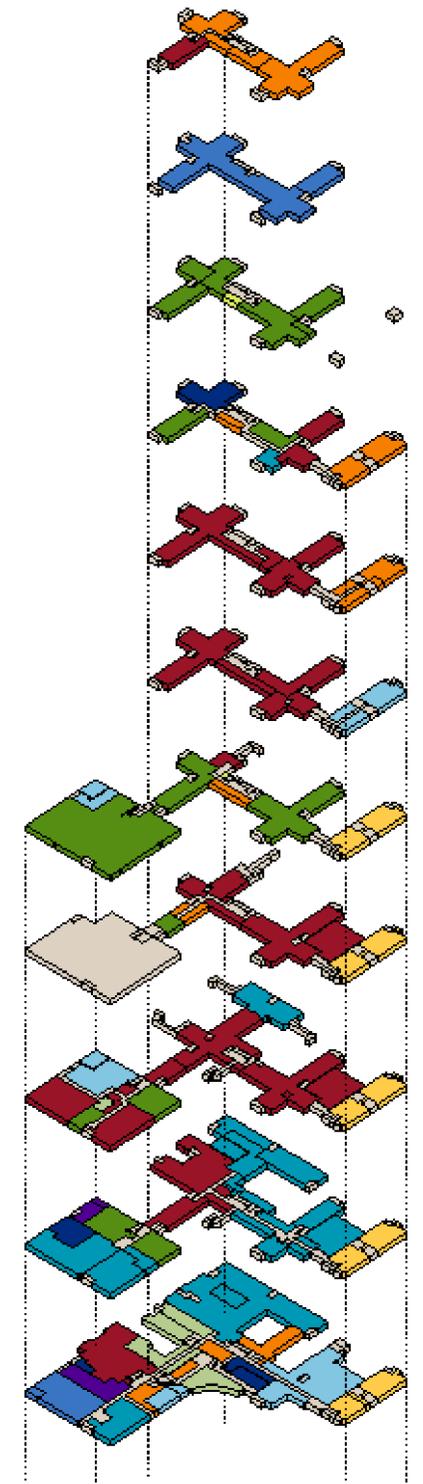
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Class Summary

Through the exploration and application of practical Dynamo-for-Revit workflow concepts, project teams can anticipate improved efficiency and productivity through various phases of the project. Dynamo provides its users with the ability to extend BIM (Building Information Modeling) by employing data and logic via a graphical algorithm editor. Because Dynamo is an open-source tool, a community of users contributes to its continuous improvement.



Learn how to generate graphs in a
clear and organized fashion
to make them intuitive for team
members to use

Learn how to apply Dynamo for
Revit for **managing data**

Learning Objectives

Discover the application of Dynamo for
Revit for **automating object
placement** and manipulation

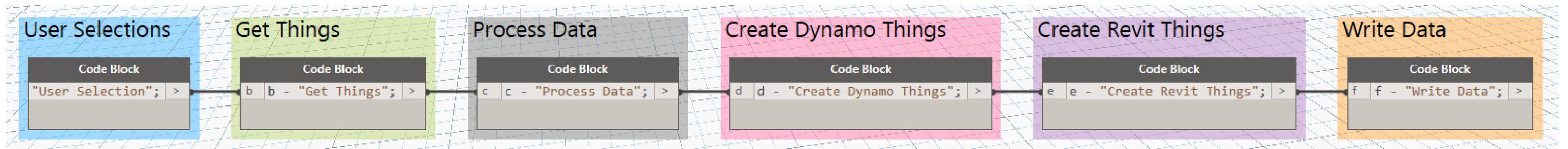
Learn how to **increase the
applicable functionality** of
graphs across multiple disciplines

“Dynamo for Revit has
immense potential to
provide efficiencies for you
and your teams.”

Matthew Anderle, AECOM



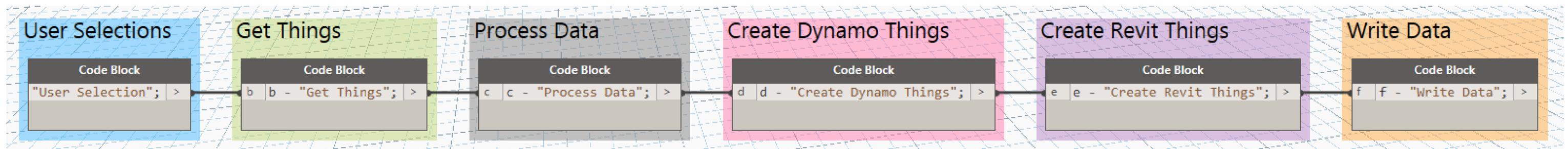
Getting Organized



Dynamo Graph Organization

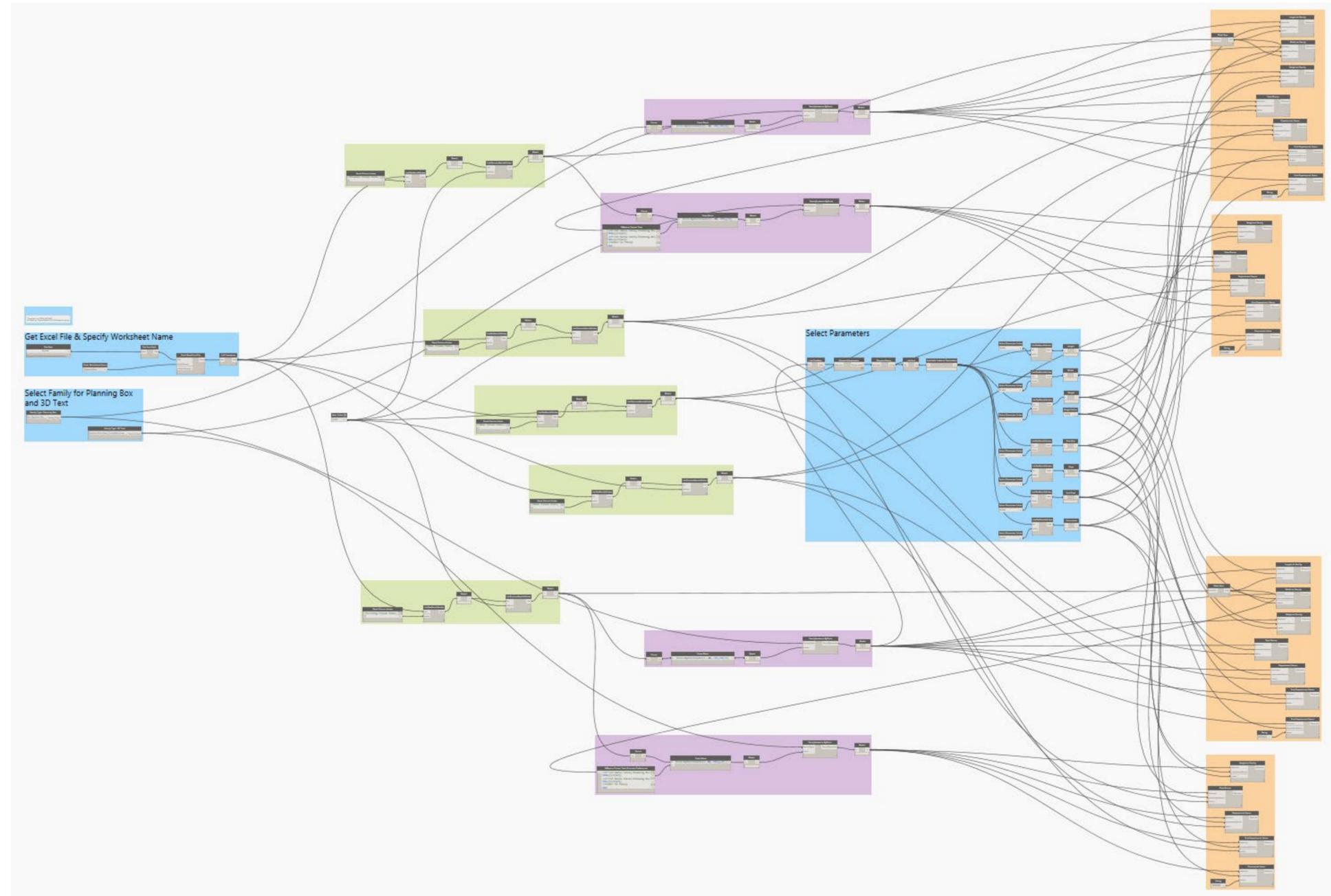
- Standard Graph Organization
- Use Node Groups
- Consistent Color Key
- Intuitive Graph Functionality

	Blue	User Selections, Settings, and Credits
	Green	Discovery and Retrieval of Information
	Gray	Processing Data
	Pink	Creating Elements in Dynamo
	Purple	Creating Elements in Revit
	Orange	Writing Data



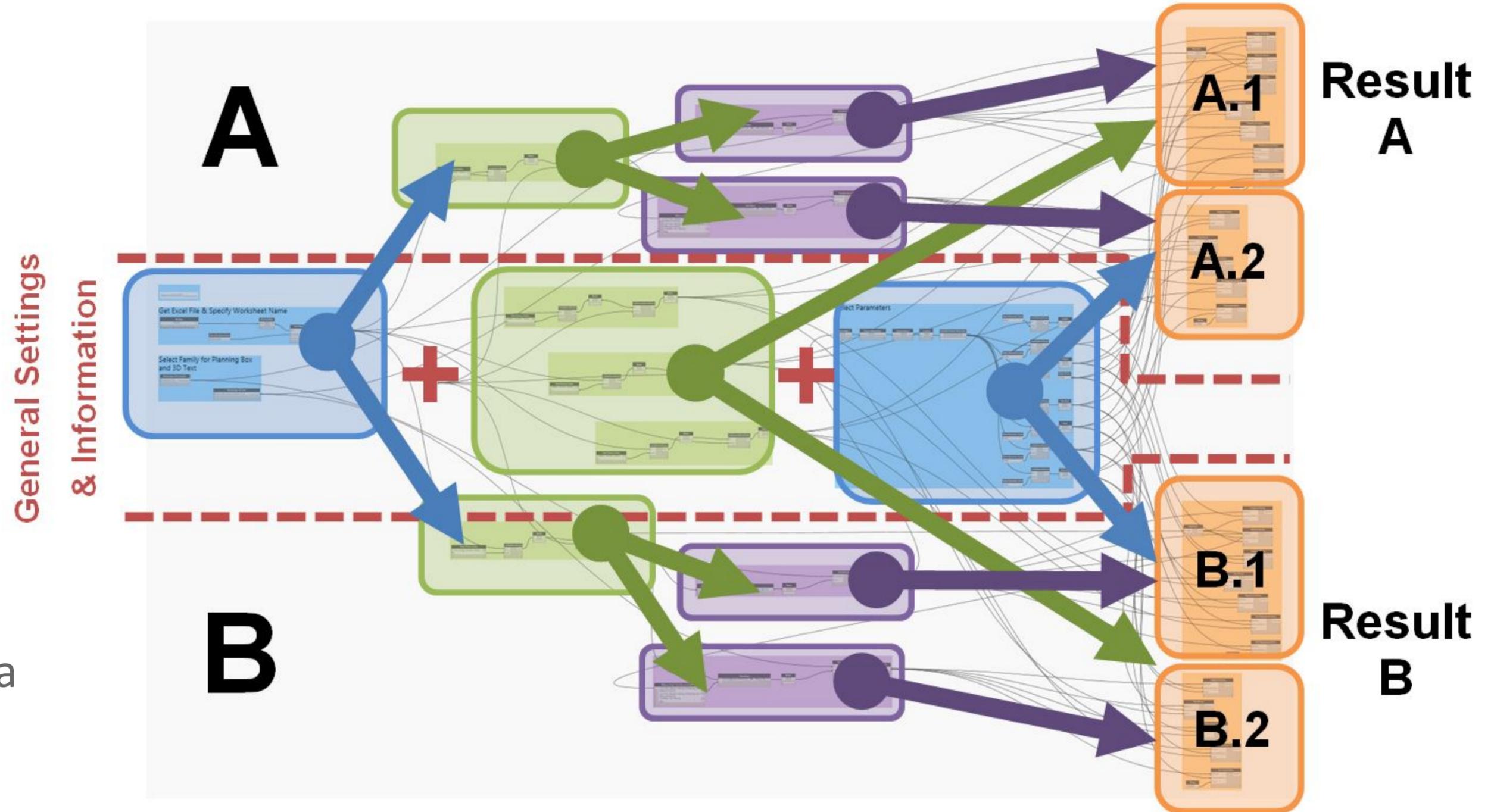
Dynamo Graph Flow

- Flow of Graph
Example #17



Dynamo Graph Flow

- Two Results
- Clear Node Functions
- Organized Result Flow
- Central Common Data





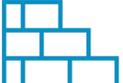
20 Dynamo Graph Examples

Grouped into Four Primary Categories

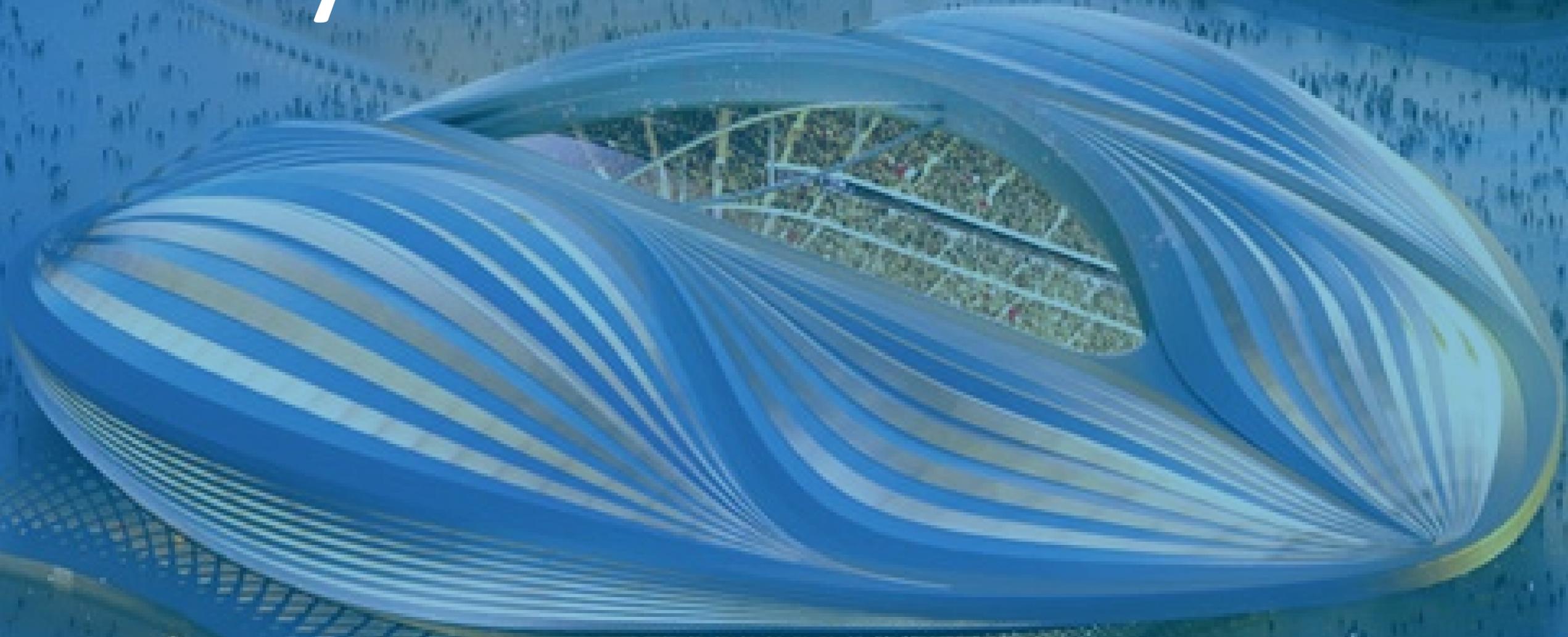
A. Output Data 

B. Visualization 

C. Process Data 

D. Creation 

Live Dynamo!



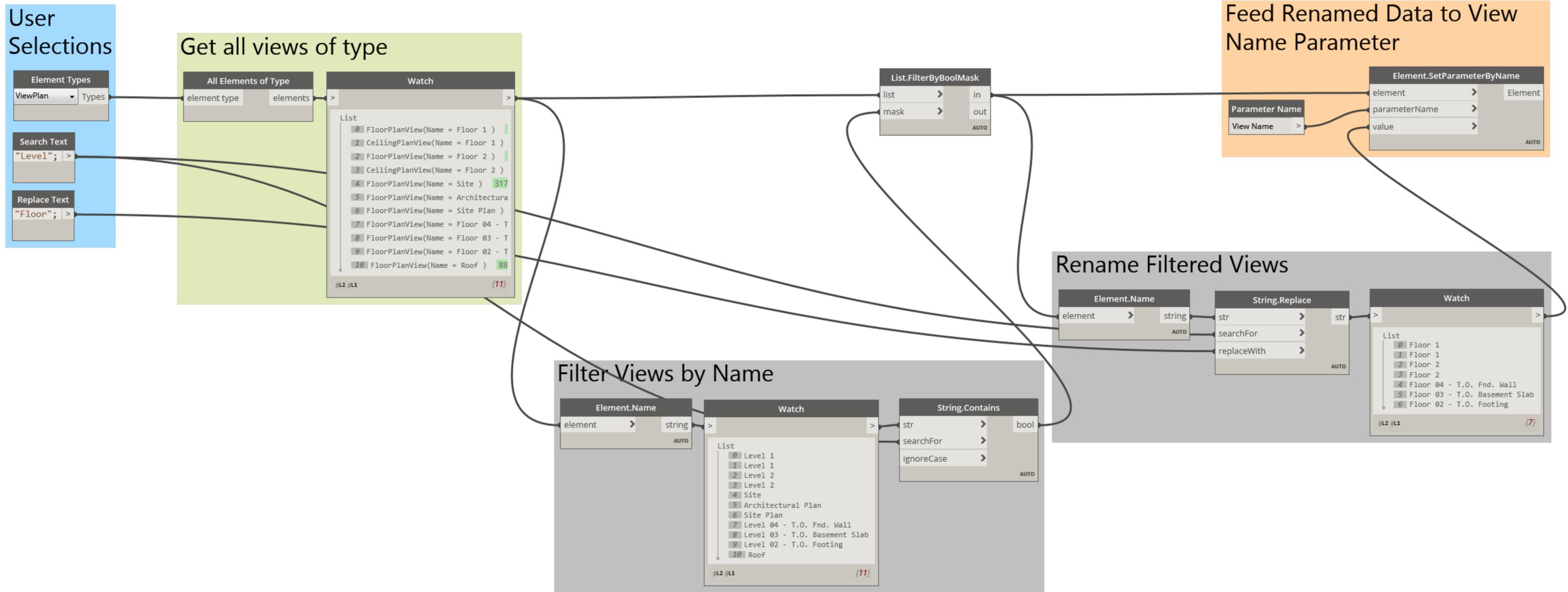
20 Graph Definitions

Use this next section to help follow along with our live presentation and take notes over the screen captures of the graphs we are discussing for your future reference.



LIVE BONUS GRAPH! Rename Views

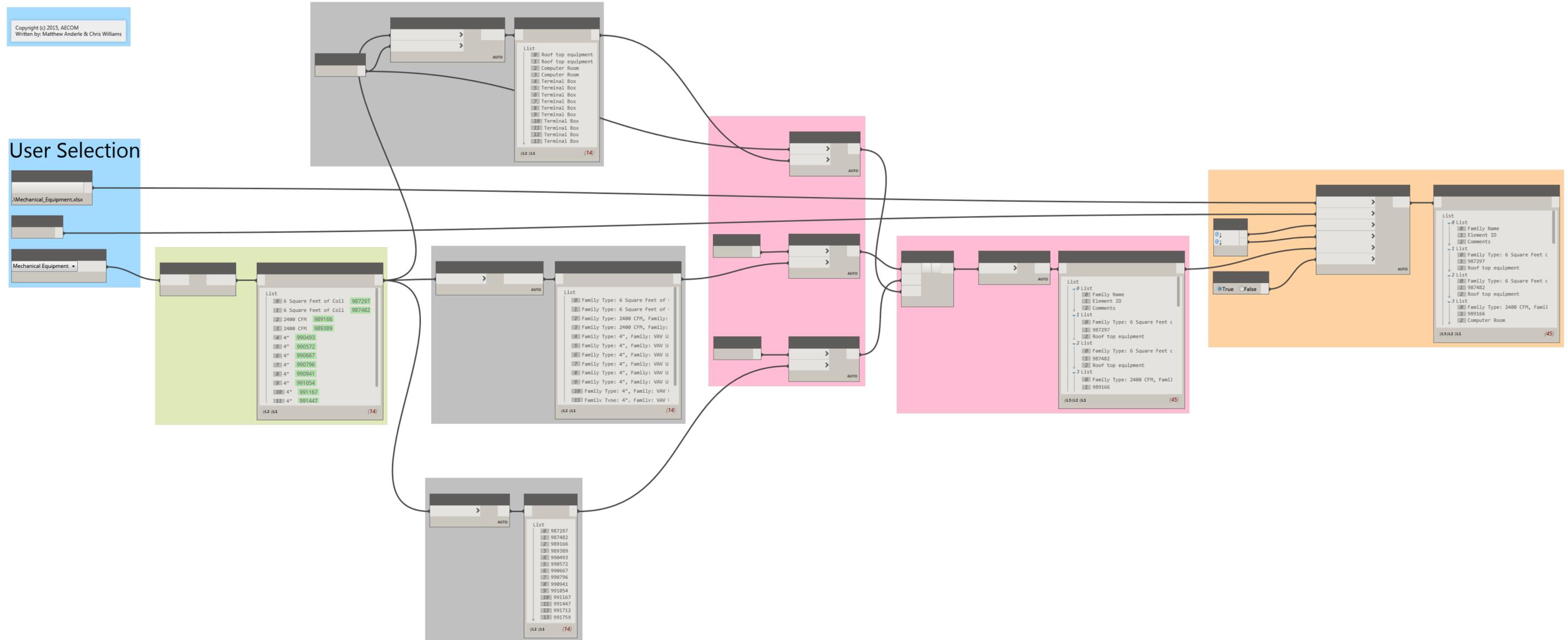
This graph searches through view types and matches the search to part of the name then replaces that part of the name with the new value.





1. Equipment To Excel

This graph selects all elements of a specified category, reports a parameter, and exports to Excel with headers. This can be used to manage data output quickly for evaluation use.



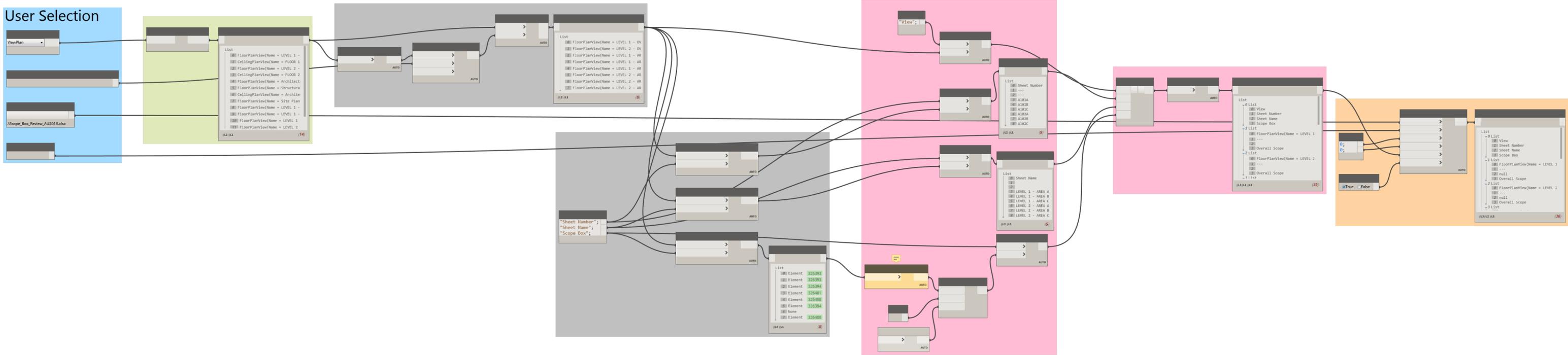


2. Scope Box Review

This graph identifies all view plans and exports sheet number, sheet name, and scope box name to an Excel file with headers. It also provides the ability to filter the view based on a string value. This graph provides project teams the opportunity to review scope box allocation by view.

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Written by: Matthew Anderle & Chris Williams

User Selection





4. Parameter Investigator

This graph reports all available instances and type parameters of a selected category and writes to Excel. This provides an efficient method of reviewing all available parameter of a given element category.

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User Selection

Available_Parameters_AI2018.xls

Furniture

60" x 30"	326673
60" x 30"	326756
60" x 30"	326815
60" x 30"	327194
60" x 30"	327239
60" x 30"	327330
60" x 30"	327615
60" x 30"	327756
60" x 30"	327815
60" x 30"	327894
60" x 30"	327957
60" x 30"	328104

Area	Category	Comments	Design Option	Family	Family and Type	Family Name	Host	Host Id	Image	Level	Level	Mark	Moves With Nearby Elements	Phase Created

"Instance Parameters";
"Type Parameters";

Assembly Code	Assembly Description	Body Material	Category	Code Name	Cost	Depth	Description	Design Option	Family Name	Handicapped Leg Material	Height	Keynote	Leg Height	Manufacturer

0;
0;

True False

List
0 List
1 Family Type: 60" x 30", Fam
2 10/29/2018 4:12:30 PM
3 List
4 Instance Parameters
5 Type Parameters
6 List
7 Assembly Code
8 List
9 Assembly Description
10 List
11 Category
12 List
13 Assembly Description
14 List
15 Category
16 List
17 Body Material
18 List
19



5. Workset Reporter

This graph selects all elements in the active view and creates an Excel file that reports every element and its associated workset. While worksets are not able to be scheduled in Revit, this graph provides a QA/QC opportunity for the project team to review model element organization.

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User Selection

.\Workset_Report_AU2018.xlsx

List

- 1 Wall 315225
- 2 Wall 315226
- 3 Wall 315227
- 4 Wall 315228
- 5 Wall 315239
- 6 Wall 315240
- 7 Wall 315241
- 8 Wall 315242
- 9 Curtain Panel 315261
- 10 Curtain Panel 315262
- 11 CurtainGridLine 315273
- 12 Curtain Panel 315274

(A2 |L1) (123)

elem + " - " + name;

"ID";
"Element";
"Workset";

List

- 0 List
- 1 ID
- 2 Element
- 3 Workset
- 1 List
- 0 315225
- 1 Wall - Generic - 8"
- 2 Workset : ARCH CORE AND SHEL
- 2 List
- 0 315226
- 1 Wall - Exterior Glazing
- 2 Workset : ARCH CORE AND SHEL
- 3 List
- 0 315227
- 1 Wall - Generic - 8"
- 2 Workset : ARCH CORE AND SHEL

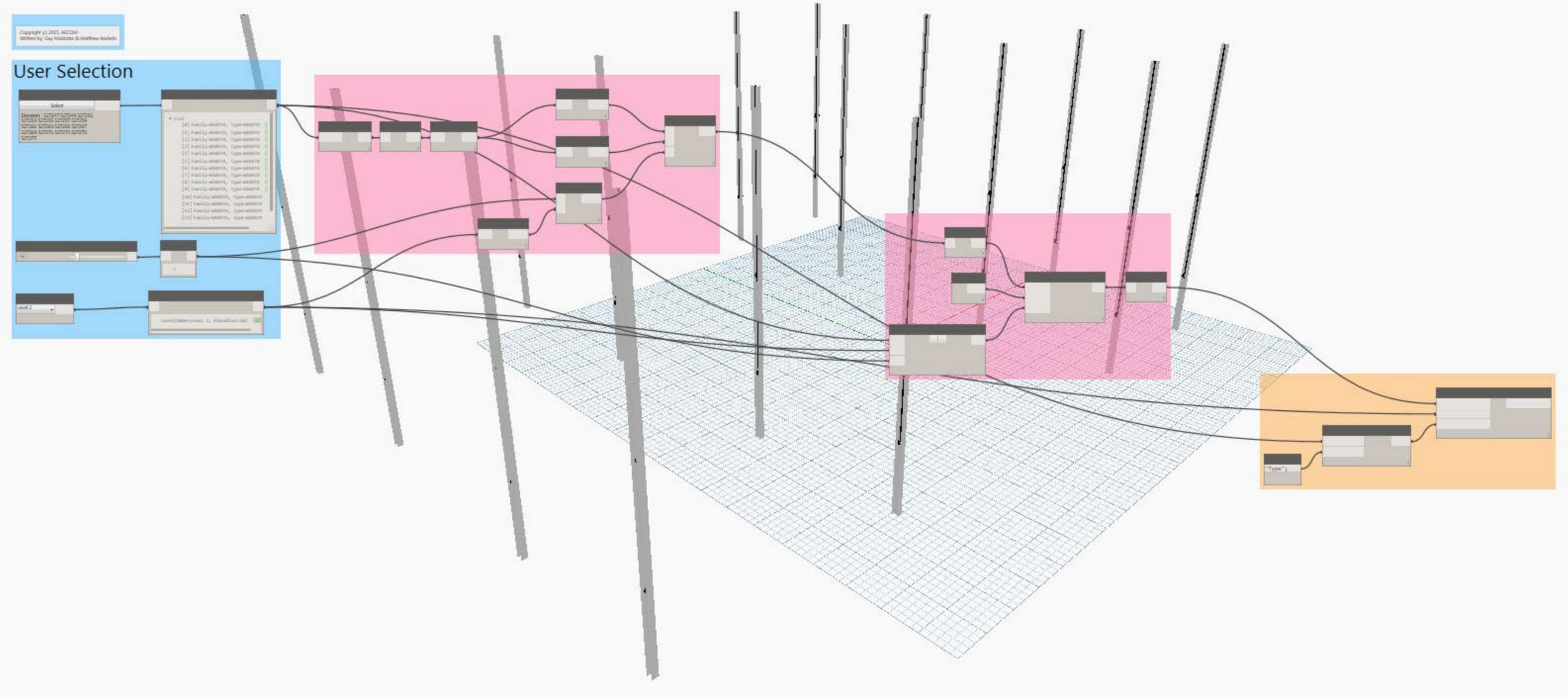
(L3 |L2 |L1) (372)

True False



6. Column Splicing

This graph utilizes a select node to Select columns, then Input a splice offset above a specified level, Set the original elevation at top before splicing, Set level of column, Set top offset of column, and Modify Revit elements. This graph adds the ability to correct multi-story columns across the project more efficiently and precisely.





7. Span-to-Depth

This graph provides a QA/QC opportunity to verify that span-to-depth ratios are being met in accordance with structural design criteria. This graph uses typical framing spans compared to beam depths and a view filter to suggest areas which may need further validation.

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Written by: Guy Mazzotta & Mathew Anderle

User Selection

Categories
Structural Framing | Category

All Elements of Category
Category | Elements

Code Block
"Type"; >

Element.GetParameterValueByName
element | var[]-[]
parameterName | >

FamilyType.Family
familyType | Family
AUTO

FamilyType.Name
familyType | string
AUTO

FamilyType.ByFamilyAndName
family | FamilyType
name | >

Code Block
"Length"; >

Code Block
"d"; >

Element.GetParameterValueByName
element | var[]-[]
parameterName | >
AUTO

Element.GetParameterValueByName
element | var[]-[]
parameterName | >
AUTO

Code Block
"Span-to-Depth"; | >

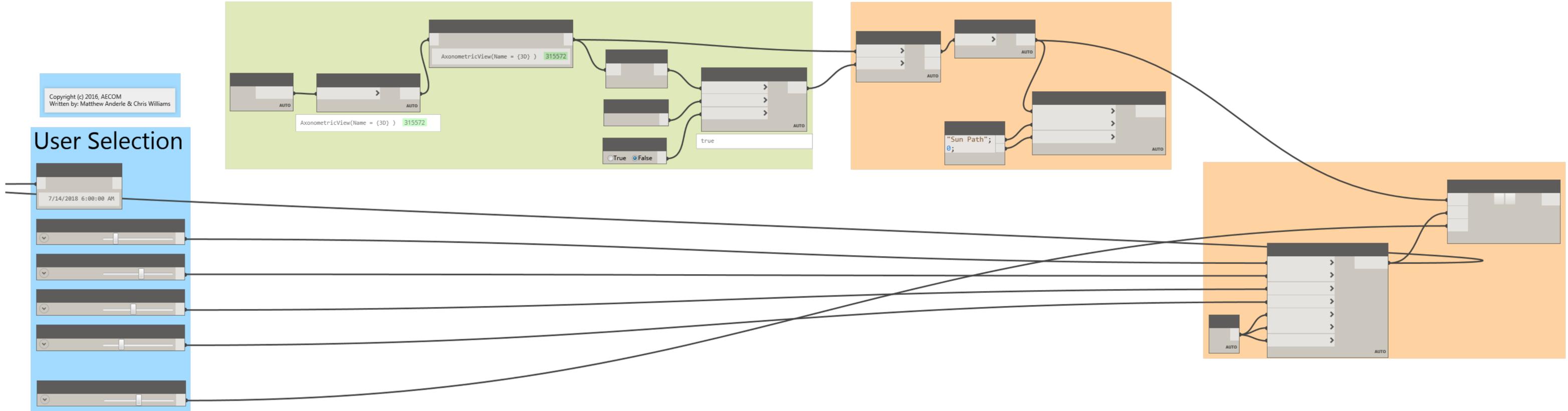
Divide: Span / Depth Ratio
x | var[]-[]
y | >
AUTO

Element.SetParameterByName
element | Element
parameterName | >
value | >
AUTO



8. Slider Sun Settings

This graph identifies the presence of an axonometric view and if true, allows the user to access a slider scale which modifies sun settings based on date and time inputs for the following: Year, Month Day of the Month, 24-hour Time Period, Shadow Intensity



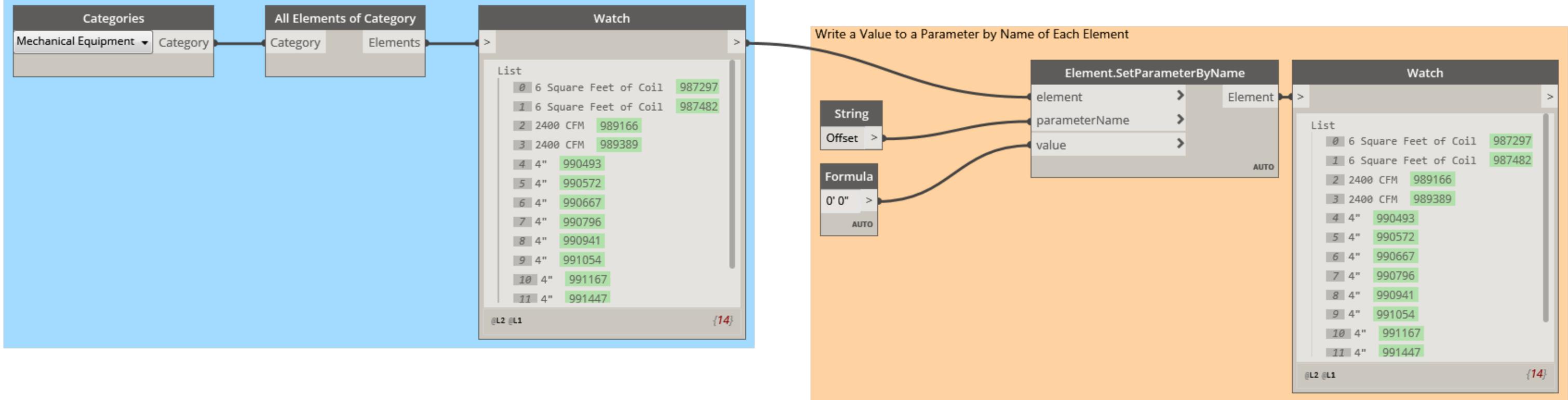


9. Write to Mechanical Equipment

This graph retrieves all elements of the category Mechanical Equipment and allows the user to input a value to a parameter providing the team an efficient means to populate large amounts of data without the need to generate schedules.

Credits
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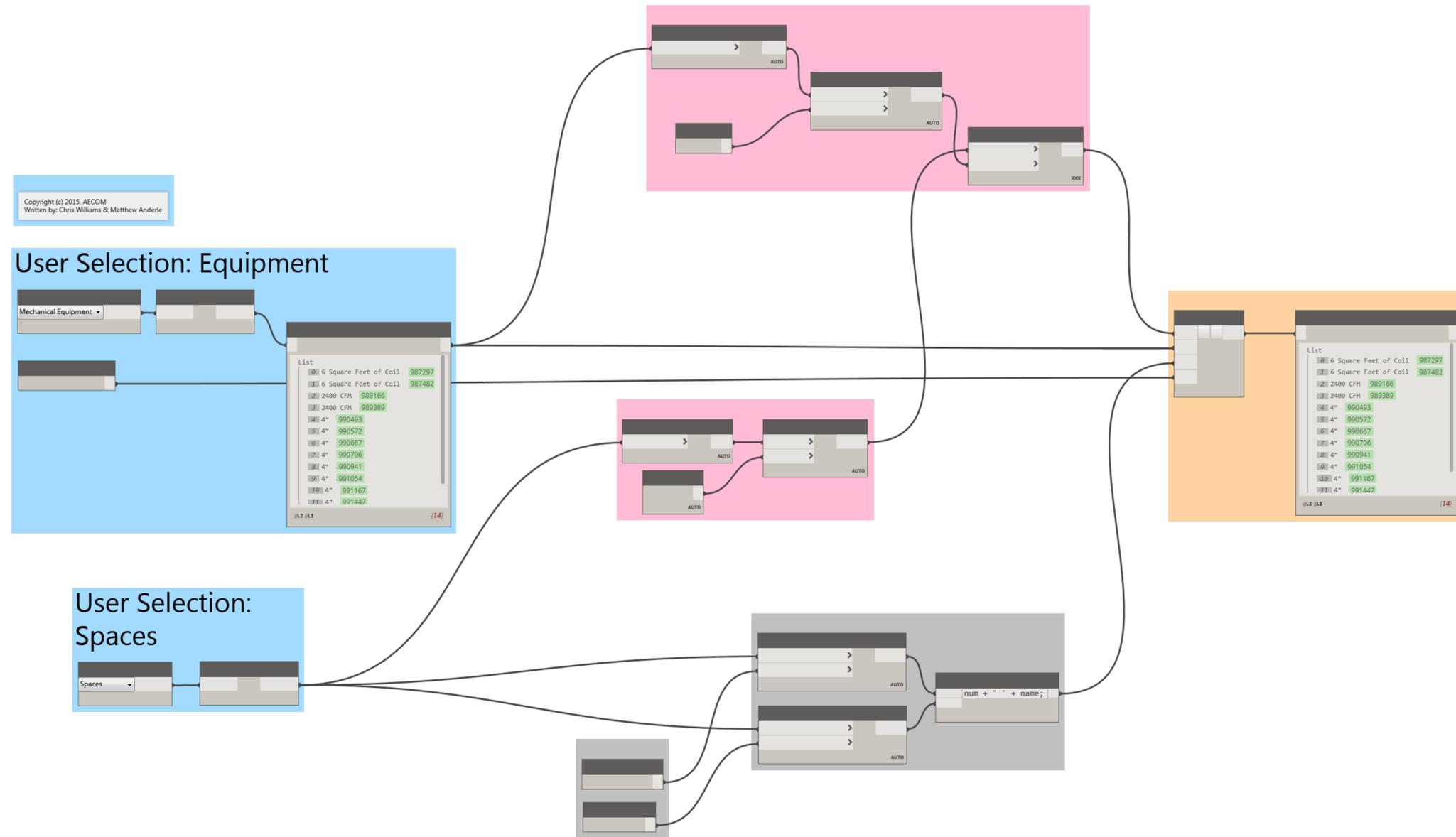
User Selection





10. Auto-Set All Equipment Locations by Space Name

This graph sets all elements of a Space or Room category, creates a bounding box of those Spaces or Rooms, and evaluates whether another category is contained within the bounding box. It populates parameters from the Space or Room to the specified element category. Use this graph to set the equipment location where room and/or space identifiers are not included in families.



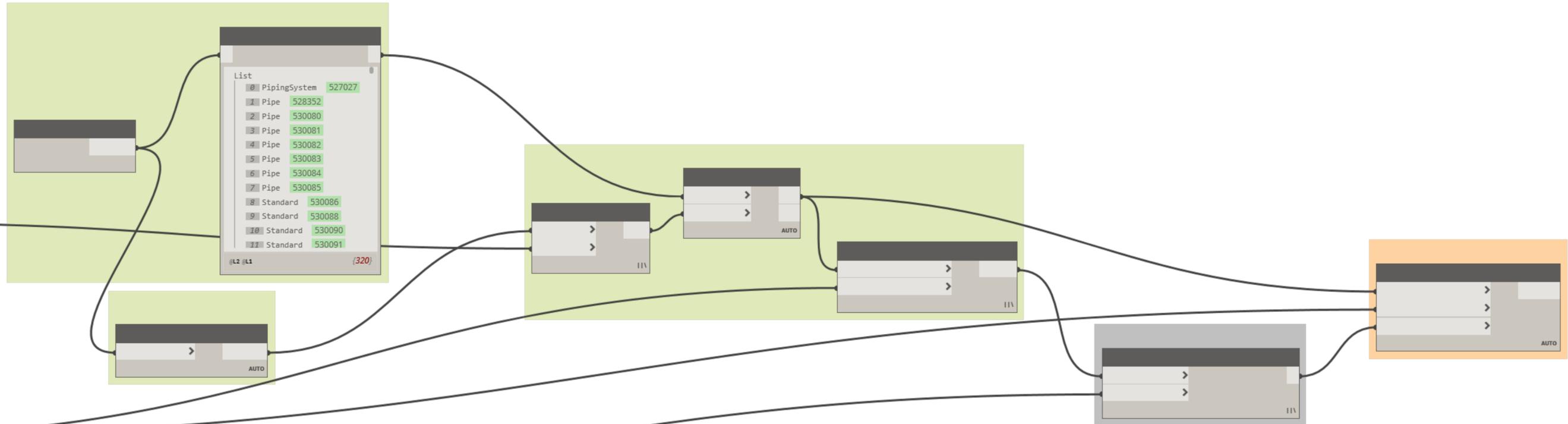
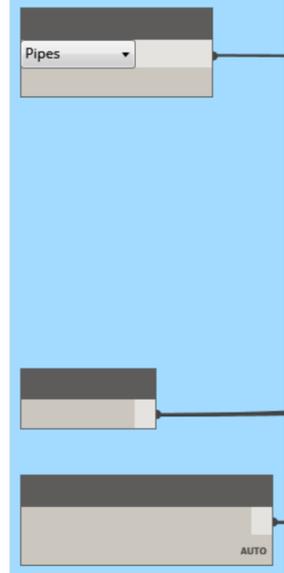


11. Pipe Height Adjust

This graph selects all elements of the Pipe category in the active view and adjusts the current offset height to a new user input offset height. This graph will quickly adjust piping distribution systems when a change in height between floors occurs.

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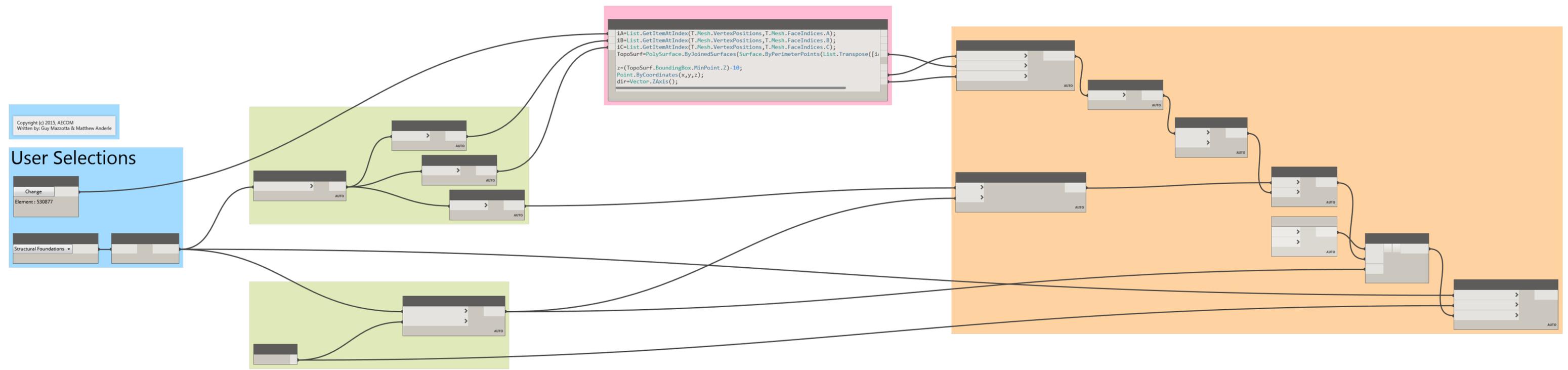
User Selections





12. Caissons to Topography

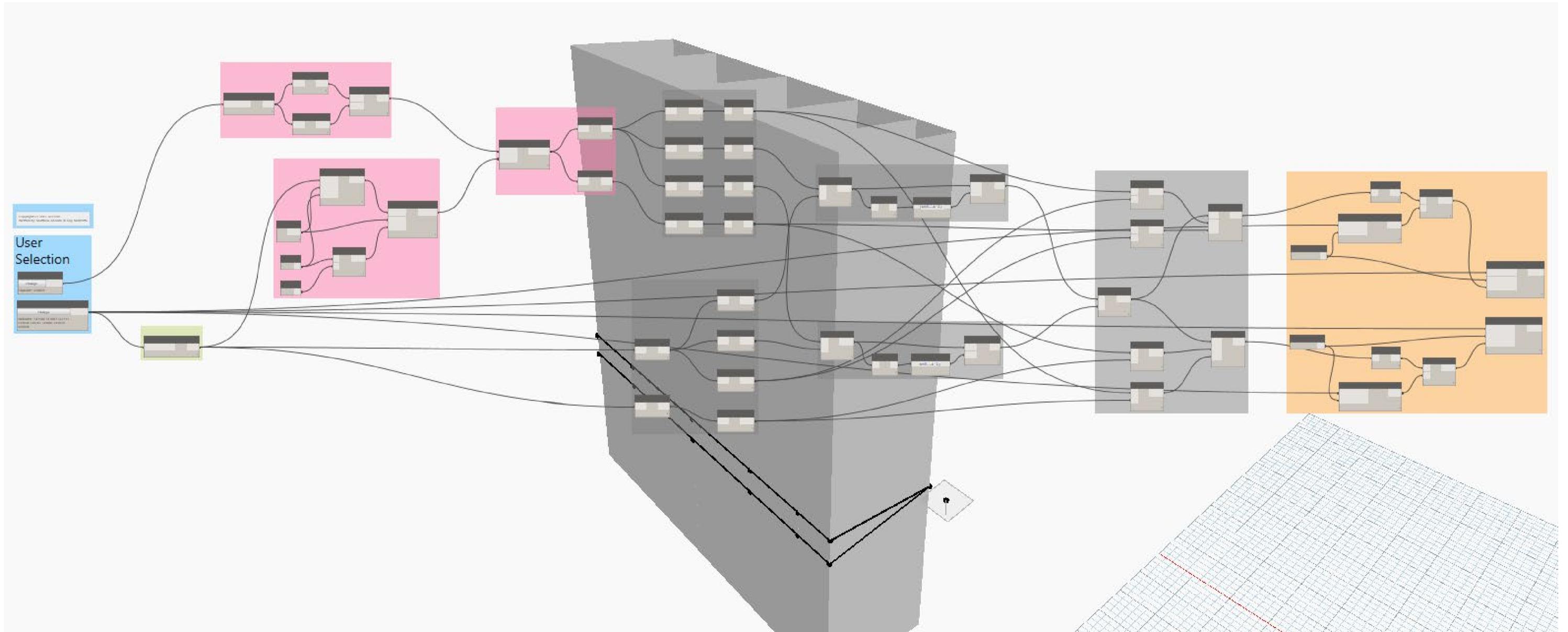
This graph allows the user to select a Revit topographic element and adjust all structural foundations depth-to-rock parameter to the selected topographic element. This graph allows the structural foundations to adapt to changes or refinement in topographical surveys quickly and accurately.





13. Match Elements to Reference Plane

This graph adjusts the start and end offsets of each structural member to a reference plane. This can be used to match sloped roofs or slabs.



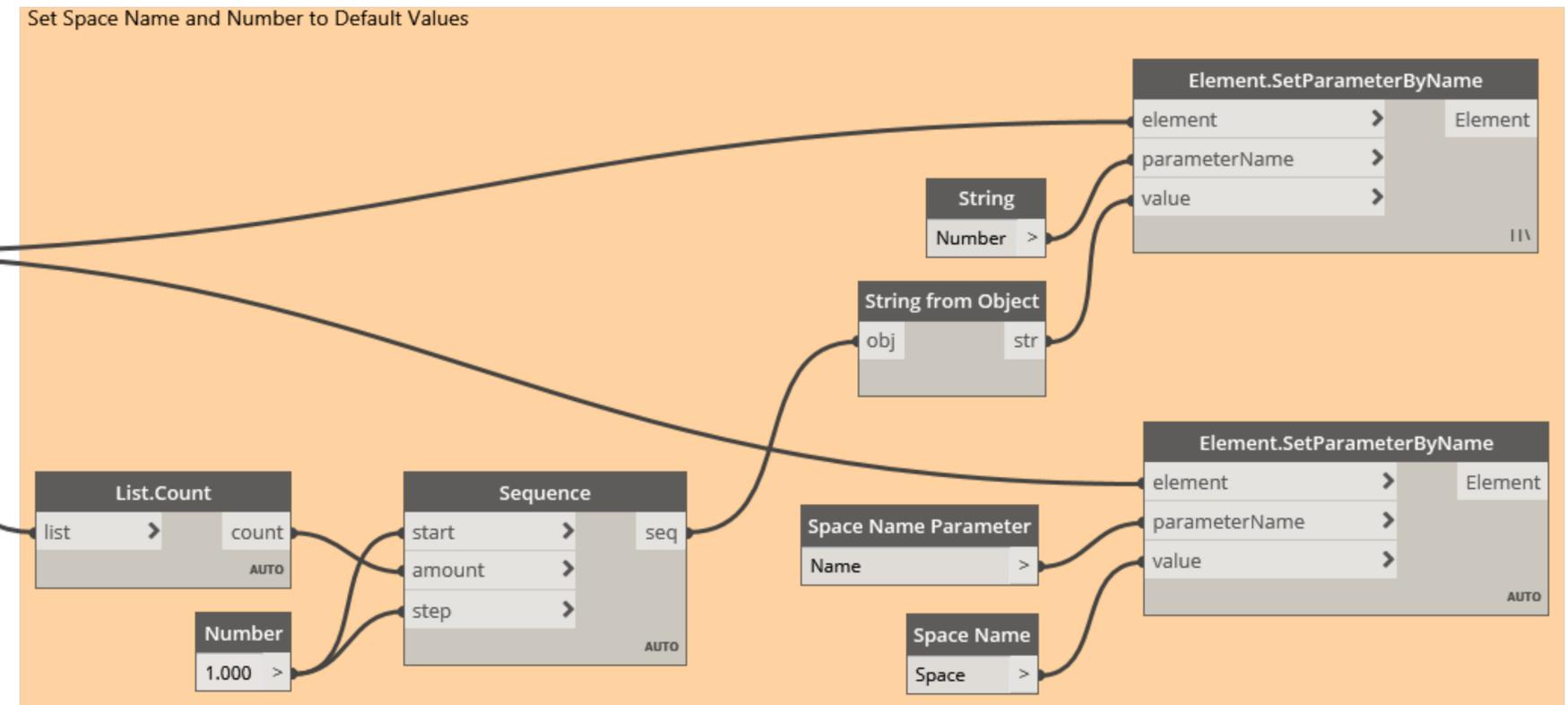
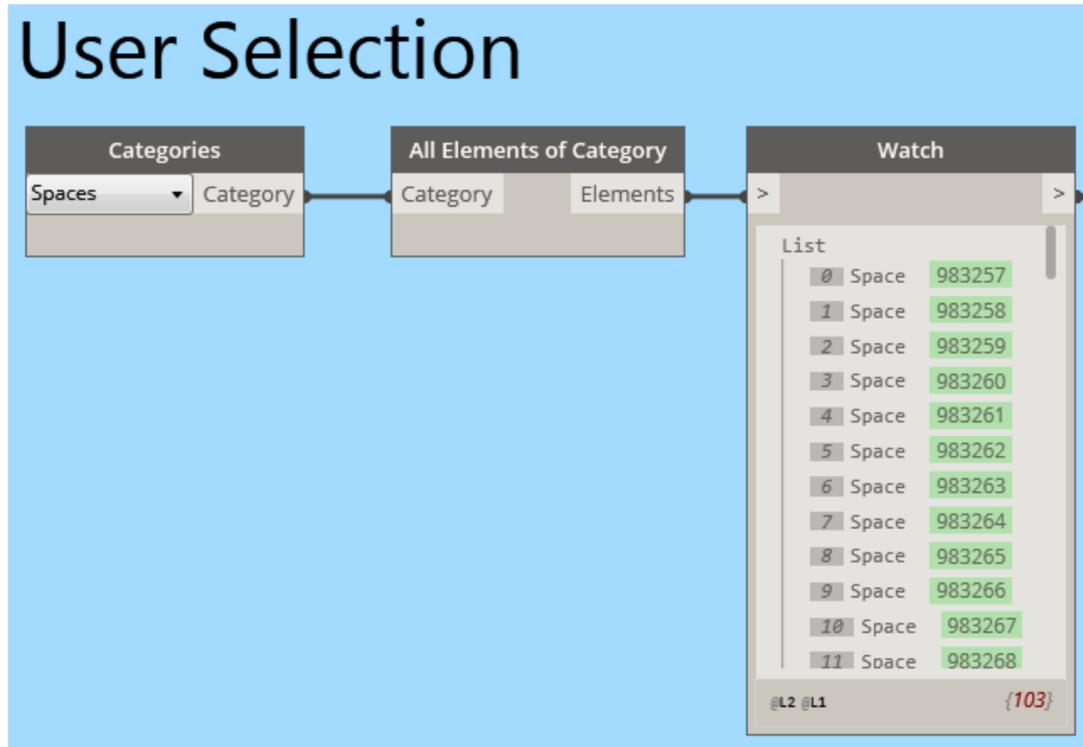


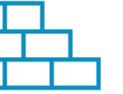
14. Space and Room Data Clear

This graph selects all Spaces and resets the name parameter to a user input value; and the number parameter with a user input starting number.

This can be used to reset spaces to a sequential numbering system and can be used as a starting graph for multiple data writing purposes.

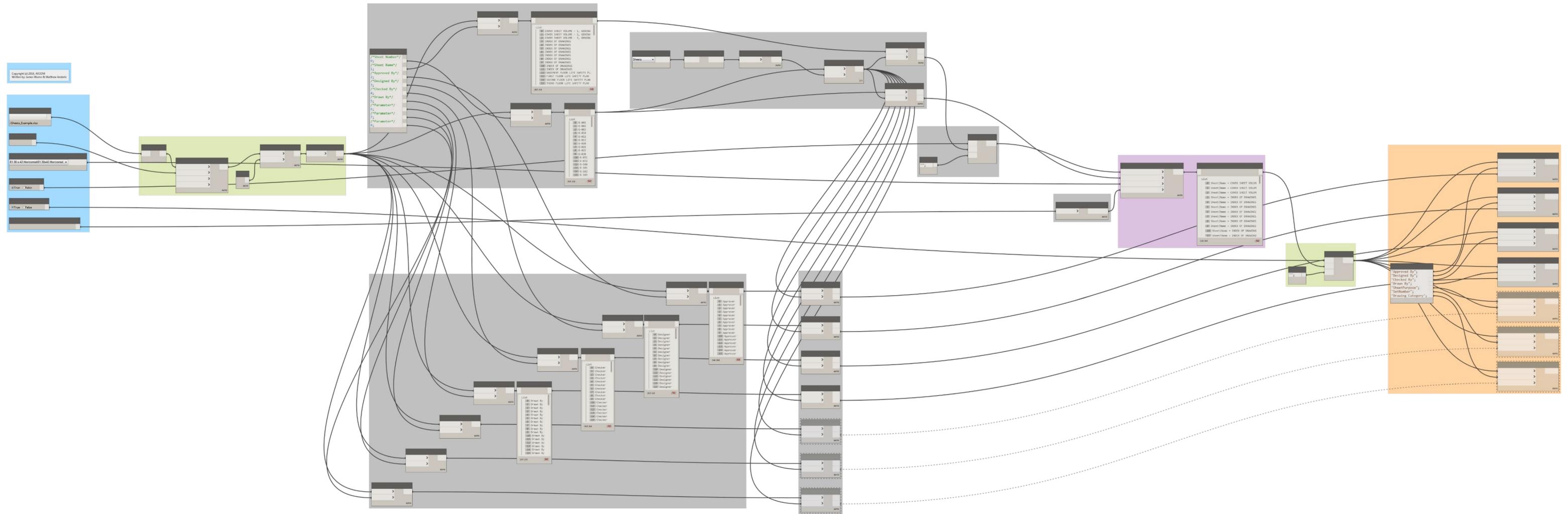
Credits
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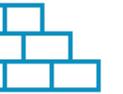




15. Sheet Creator

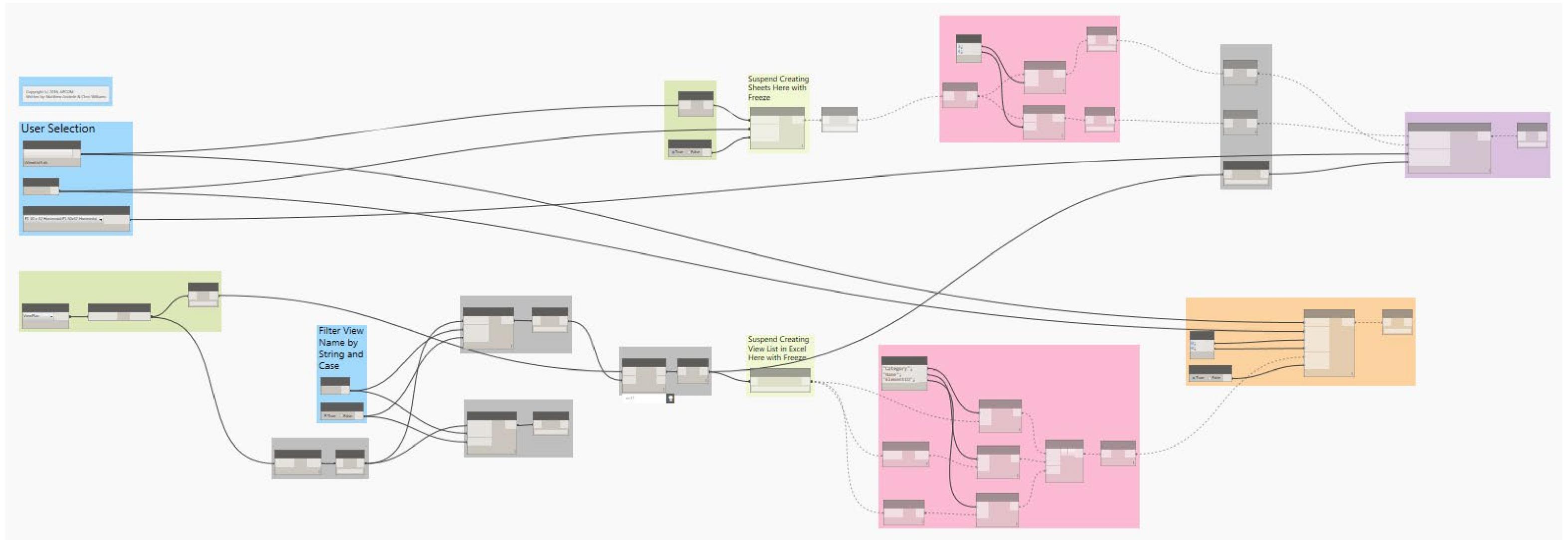
This graph references a user generated Excel file with a predefined sheet index, allows the user to select a title block family, and inputs a series of parameter values, filters any existing sheets, and creates the remaining list as new sheets in Revit. This can replace or compliment sheet set creators and provide the project team an efficient approach to sheet generation.

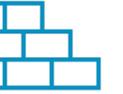




16. Place Views on Sheets

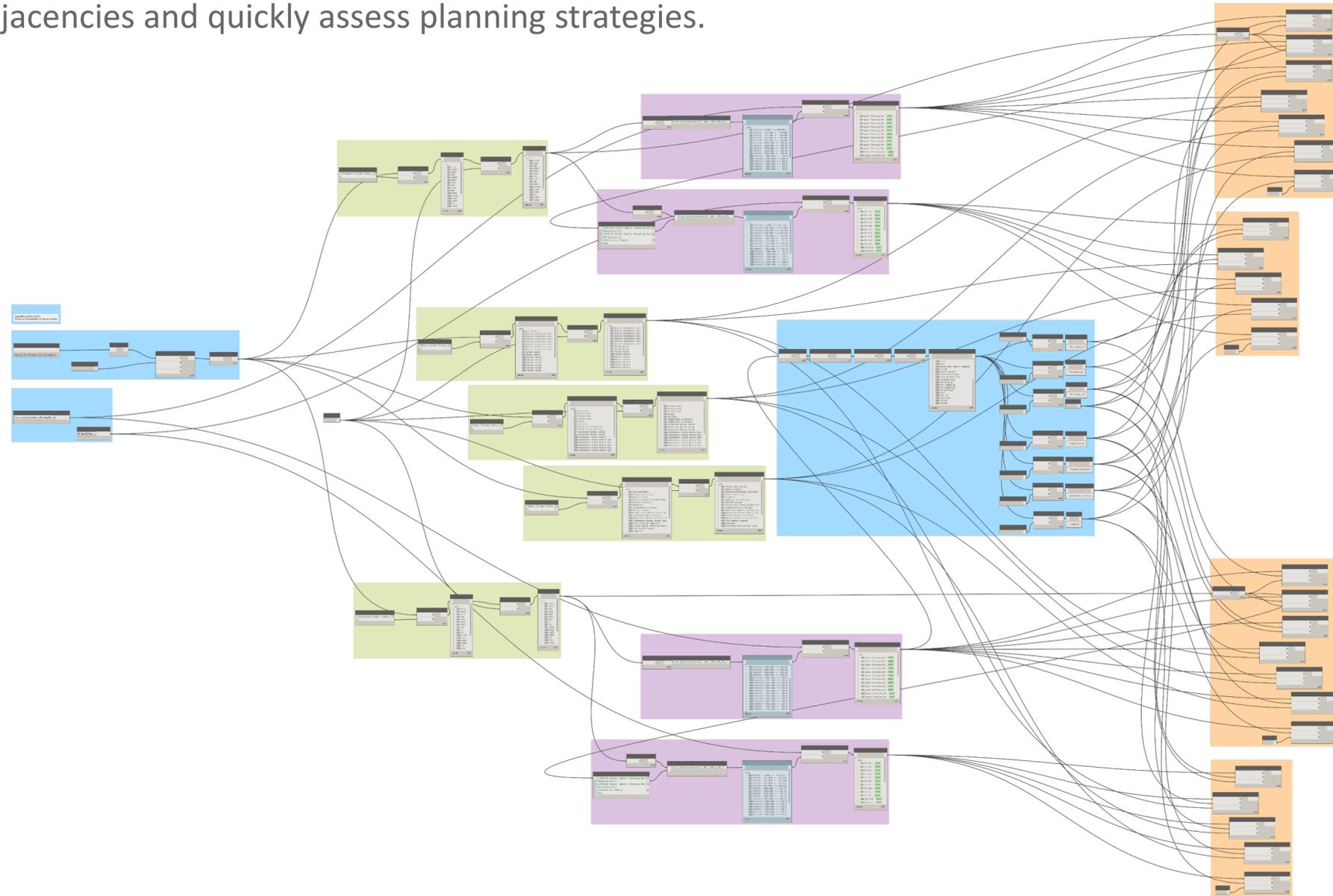
This graph has two functional paths: one which captures a view list that can be filtered by the project team and outputs the data to Excel; the other path reads the Excel file with the addition of the sheet name and number and creates new sheets with the selected title block, and places the corresponding view on the sheet.

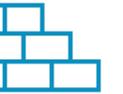




17. Excel Square Footage-to-Family Instance

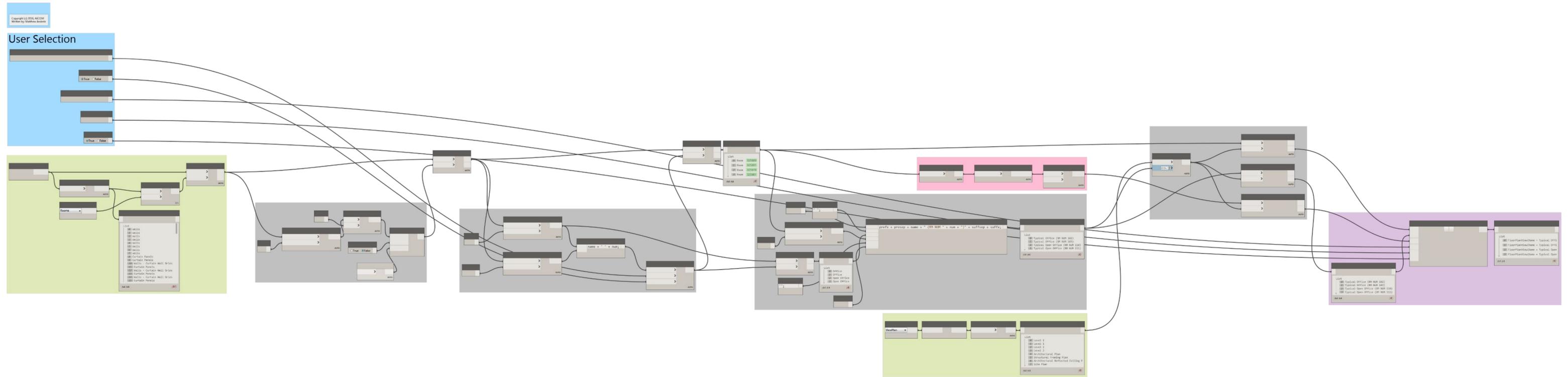
This graph reads an Excel file with design program data, which is divided into two columns: one with planned size and the other with existing size of rooms or departments based on area. This graph then places a family instance, sizing it to match the planned and existing areas. A three dimensional text family accompanies each family instance. Parameter data is then transferred from the Excel file to each family. This graph provides graphical planning tools for the project team to study program adjacencies and quickly assess planning strategies.

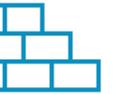




18. Create Room Plans Cropped to the Room

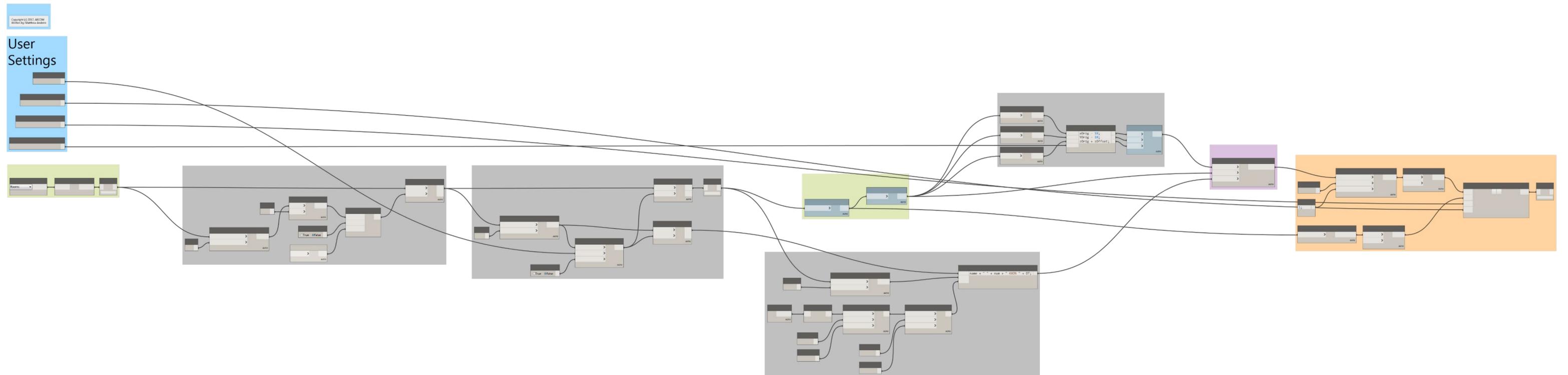
This graph captures all rooms in a view and filters that list against user defined name or number queries and generates a new floor plan with a crop region set to a user defined offset value. A view template can also be applied at the time of view creation. Project teams can use this graph to quickly generate typical room floor plan views and apply a common view template.

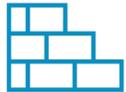




19. Create Room Axonometric Views Section Boxed to the Room

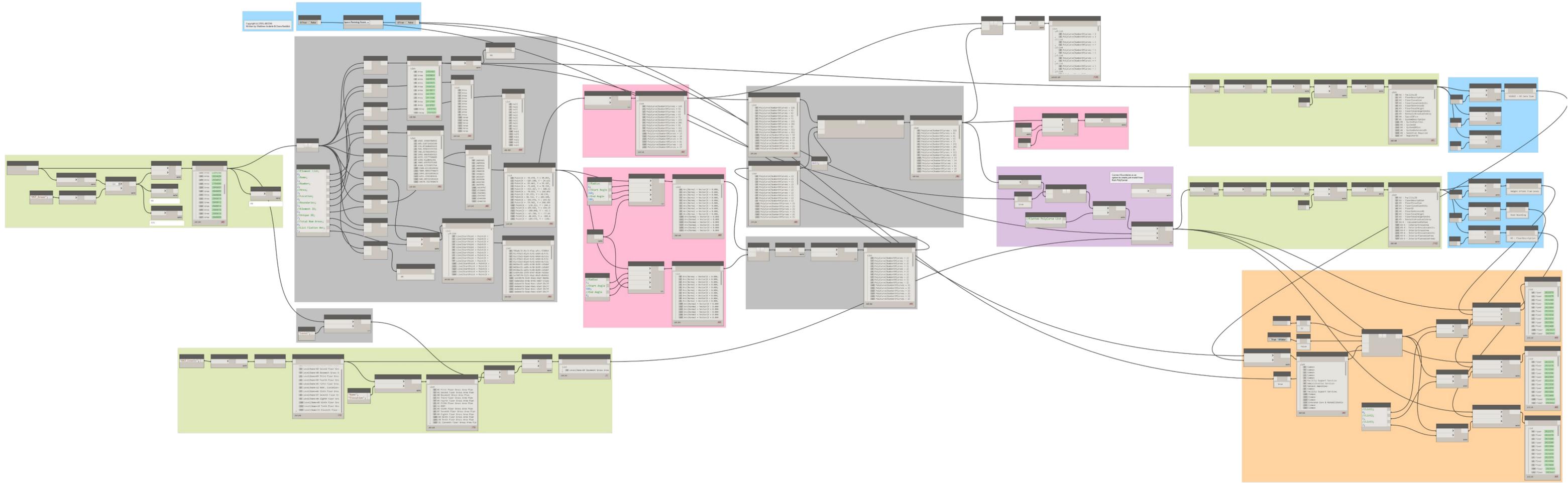
This graph captures all rooms in a view and filters that list against user defined name or number queries and generates a new axonometric view, section boxed to a user defined extent outside the room, with user defined offset values for eyepoint height. A view template can also be applied at the time of view creation. Project teams can use this graph to quickly generate typical room axonometric views and apply a common view template.

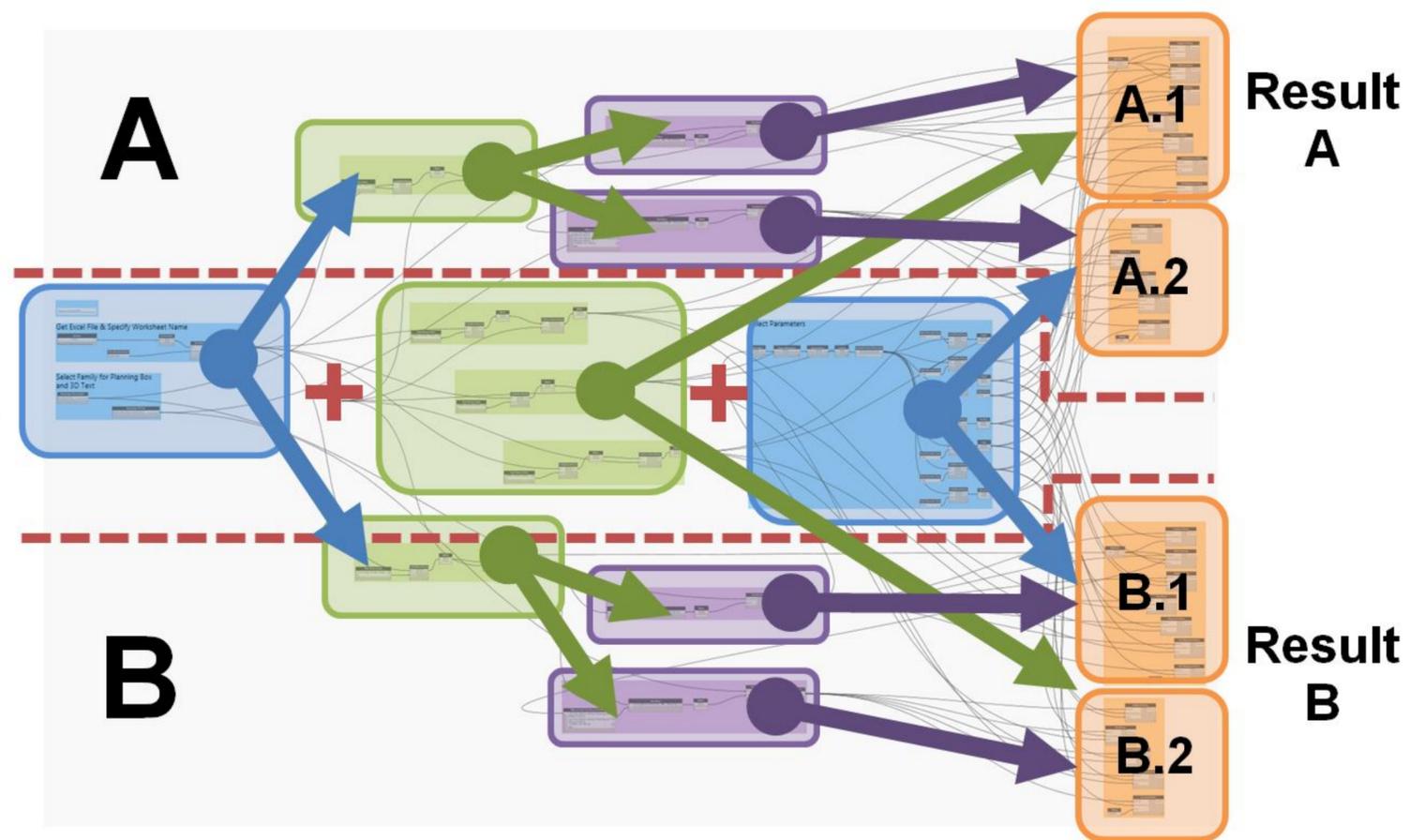




20. Area Boundary-to-Floor Element

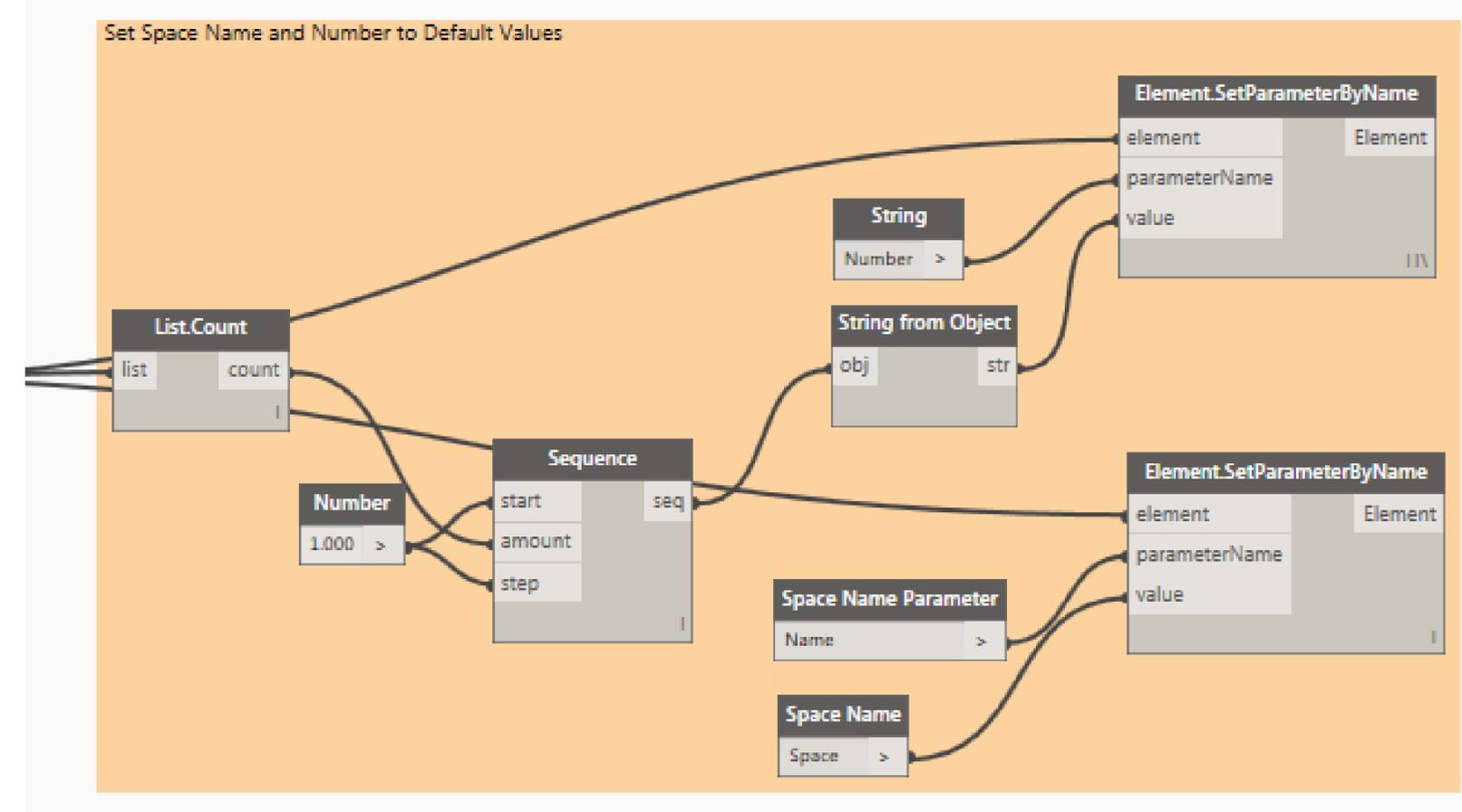
This graph identifies areas per level, generates boundary curves in Dynamo, and converts those boundaries into new floor element objects while transferring data from the original area object to the corresponding floor. This allows the project team to visually represent area stacking diagrams in three dimensional views. The use of view filters against departmental parameter data can quickly color code these stacking diagrams.





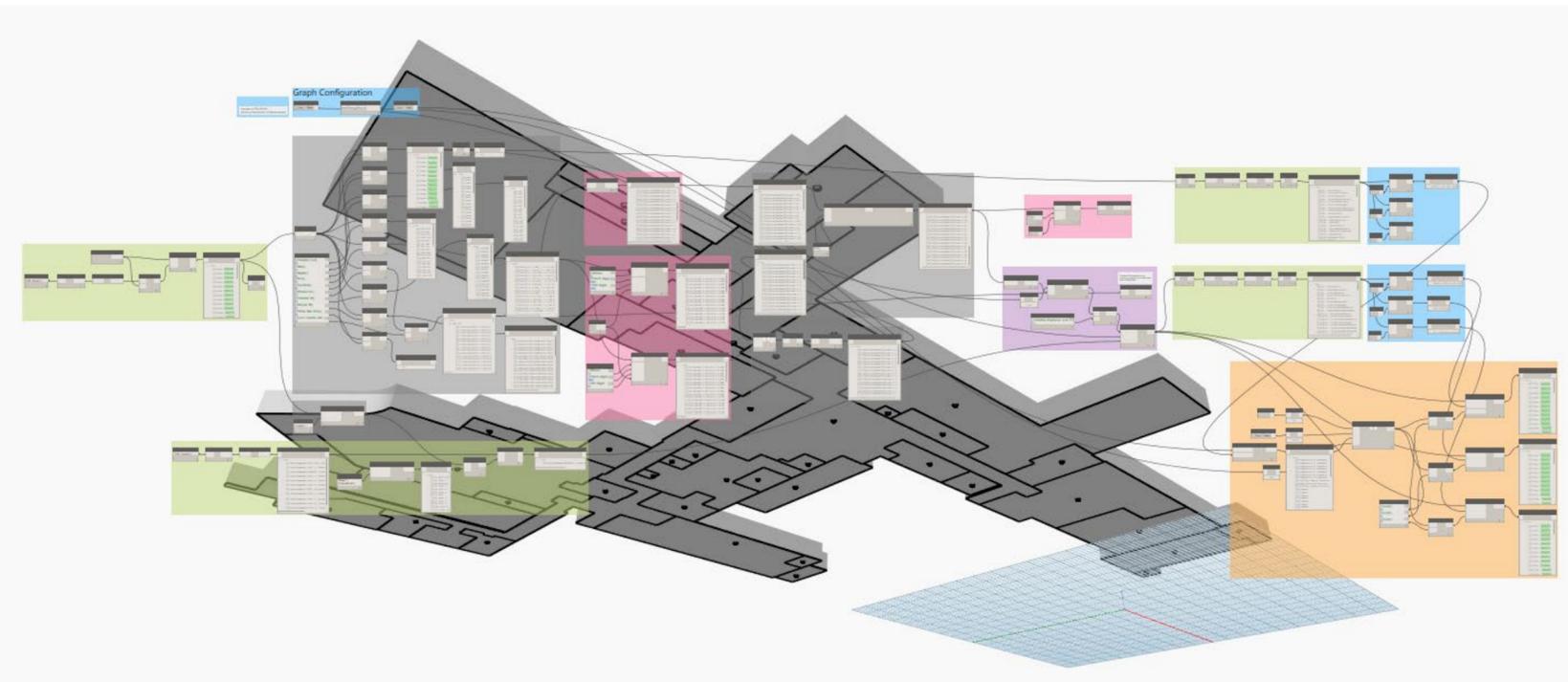
Organize Graphs

We looked at several ways to keep graphs organized including grouping nodes of a particular function, color coding groups, and flow of graphs.



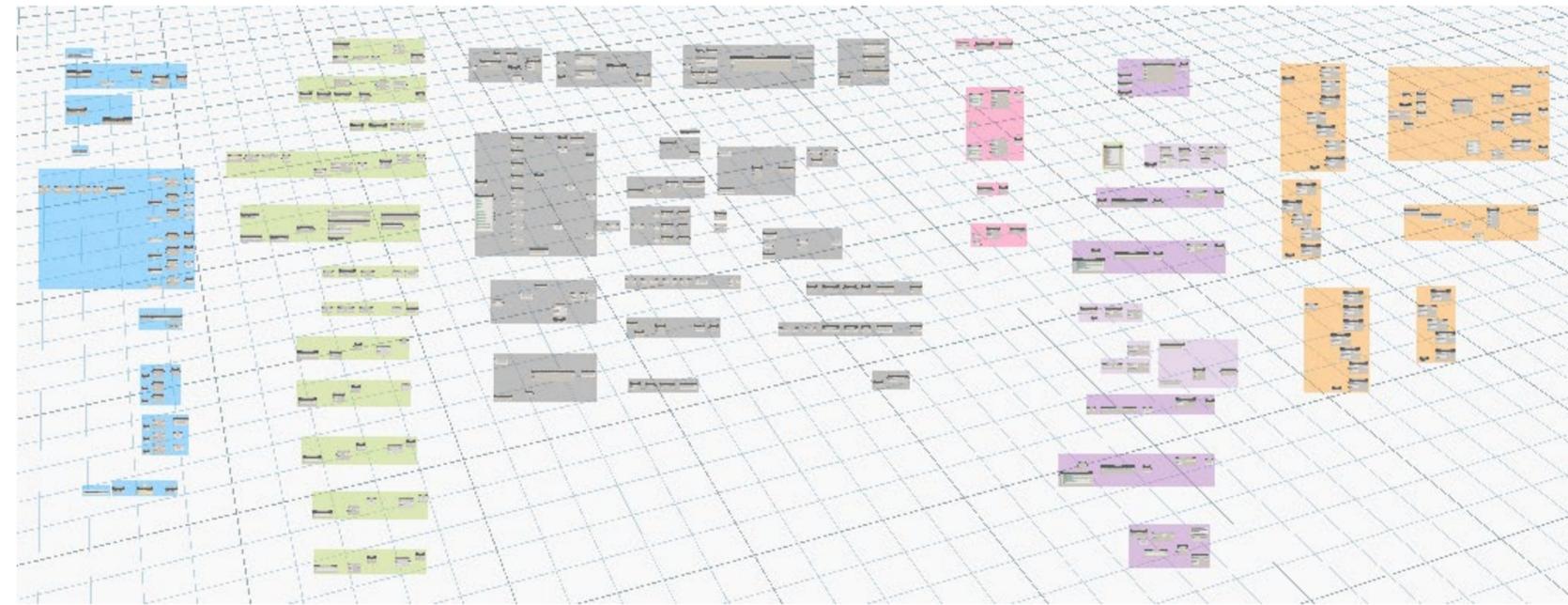
Manage Data

We looked at multiple solutions to report data out to Excel for QA/QC purposes, and also ways to import data into Revit Elements.



Create with Dynamo

We looked at several methods to create and place Elements in Revit, both by creating from information in Excel, and by selecting objects in Revit to then place new Elements.



Graph Diversity

We discussed a Graph Library, and demonstrated in our Live Demo Bonus Graph how we used certain Nodes to allow team members to apply a graph for a variety of purposes with options.

Questions & Answers

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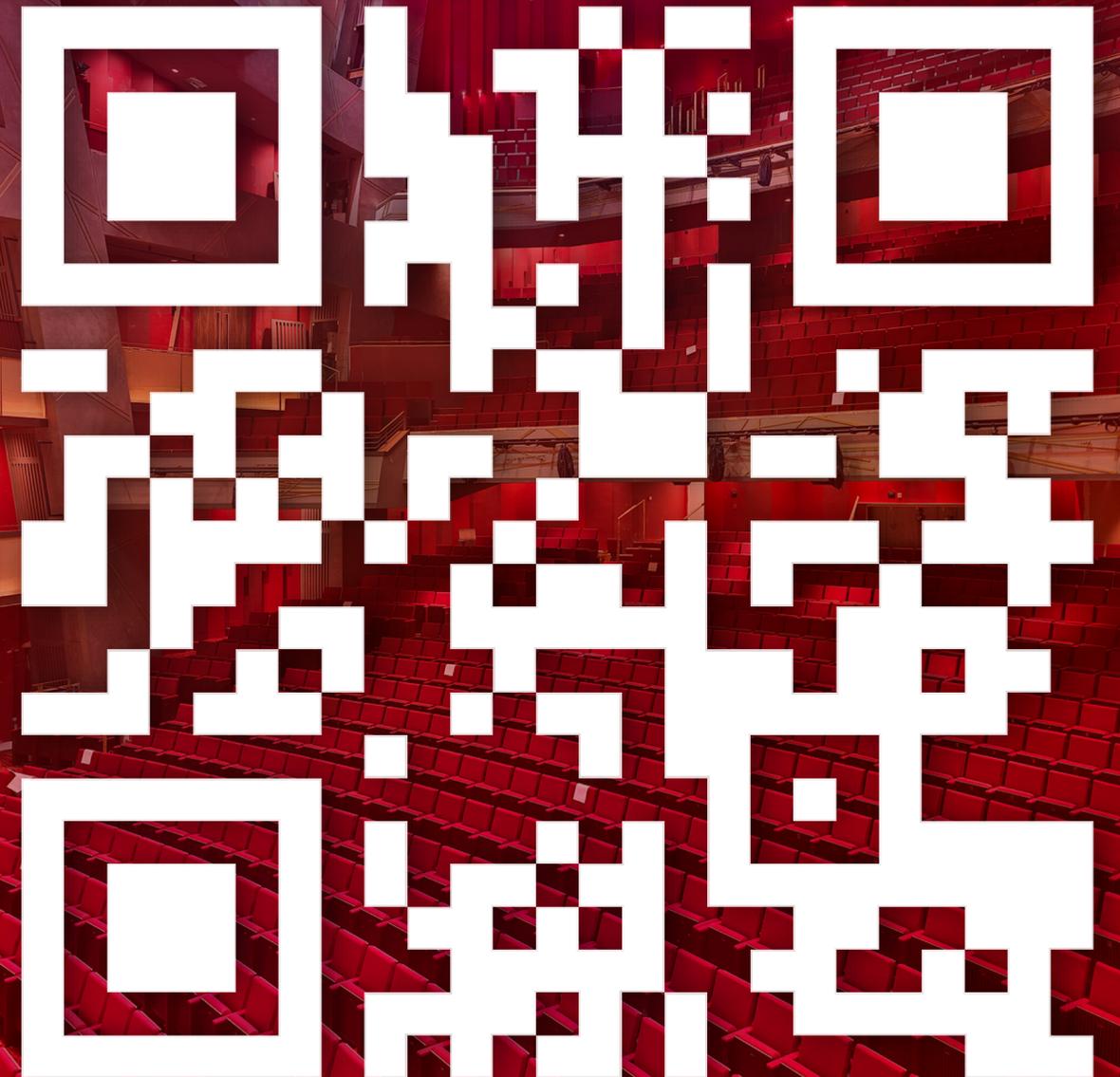
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