

20 Practical Uses of Dynamo for Revit to Improve Team Efficiency

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About the speaker

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AECOM

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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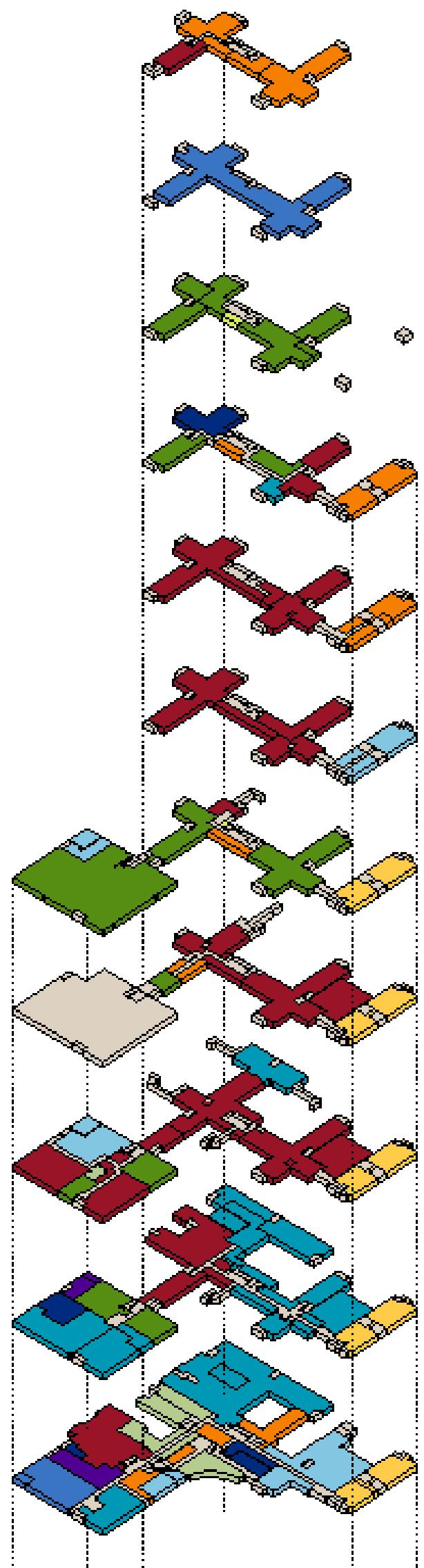
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Class Summary

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

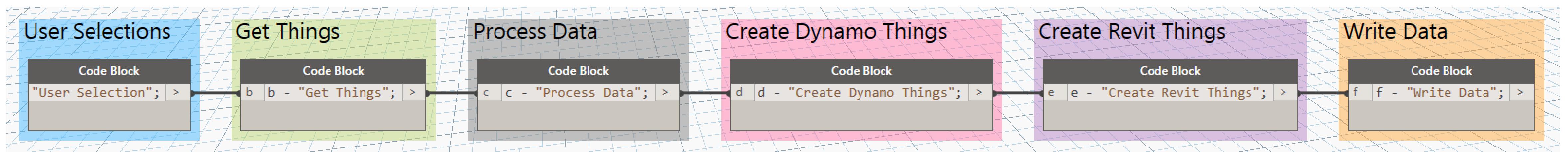
“Dynamo for Revit has immense potential to provide efficiencies for you and your teams.”

Matthew Anderle, AECOM



AECOM: Bruce Damonte

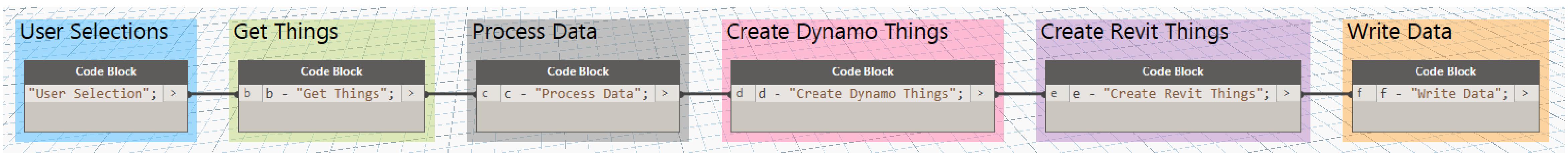
Getting Organized



Dynamo Graph Organization

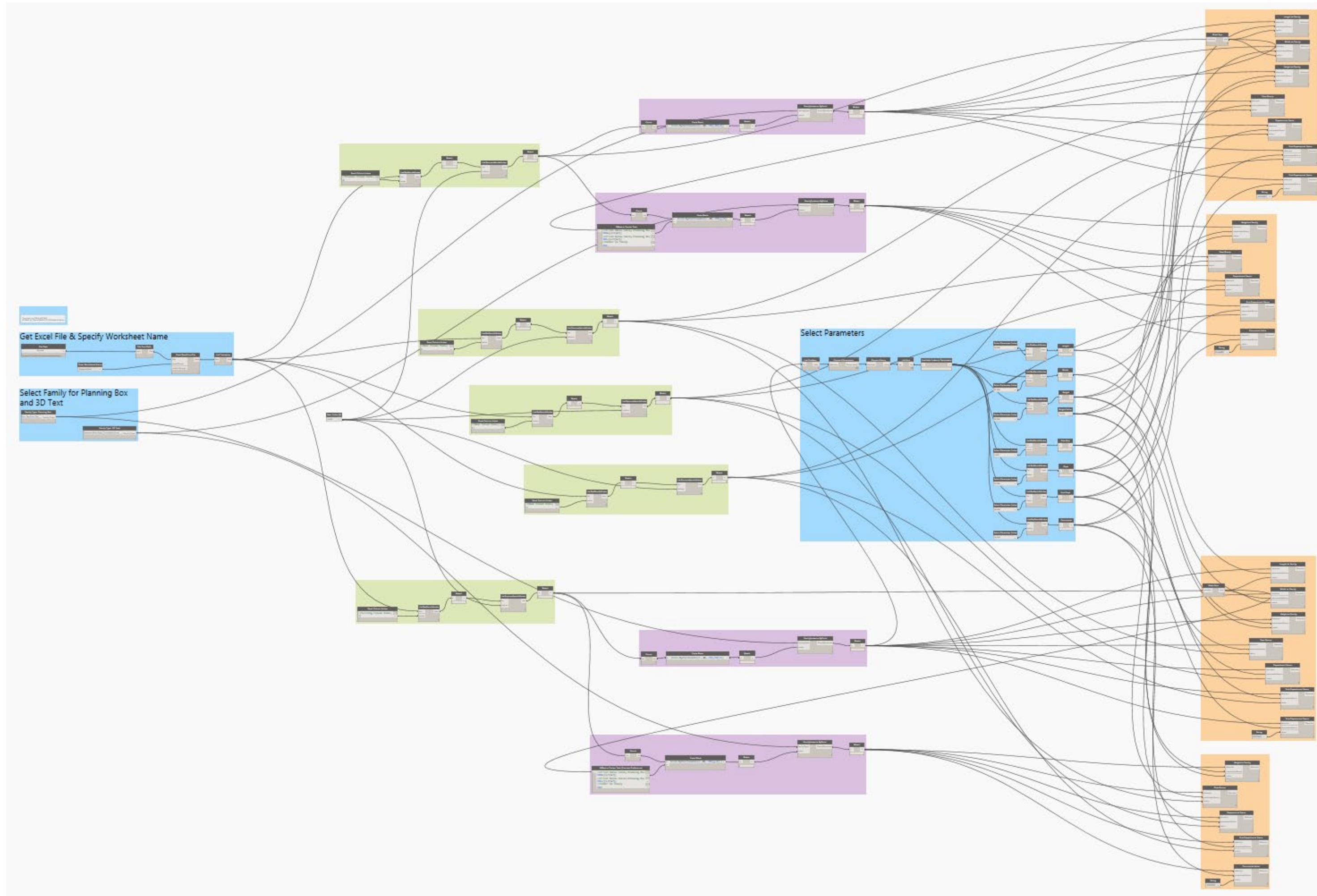
- Standard Graph Organization
- Use Node Groups
- Consistent Color Key
- Intuitive Graph Functionality

█	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



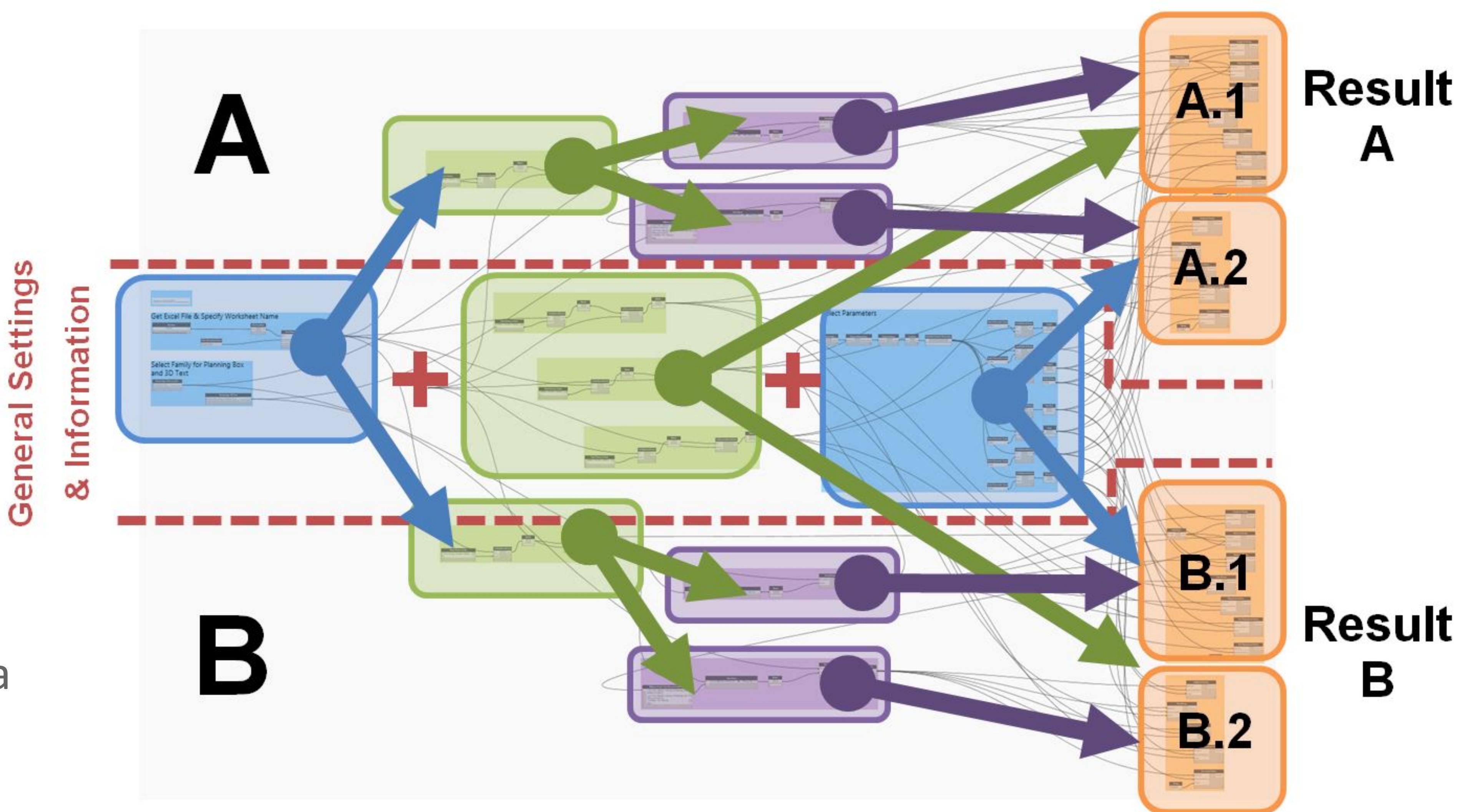
Dynamo Graph Flow

- 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



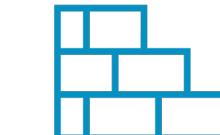
B. Visualization



C. Process Data



D. Creation

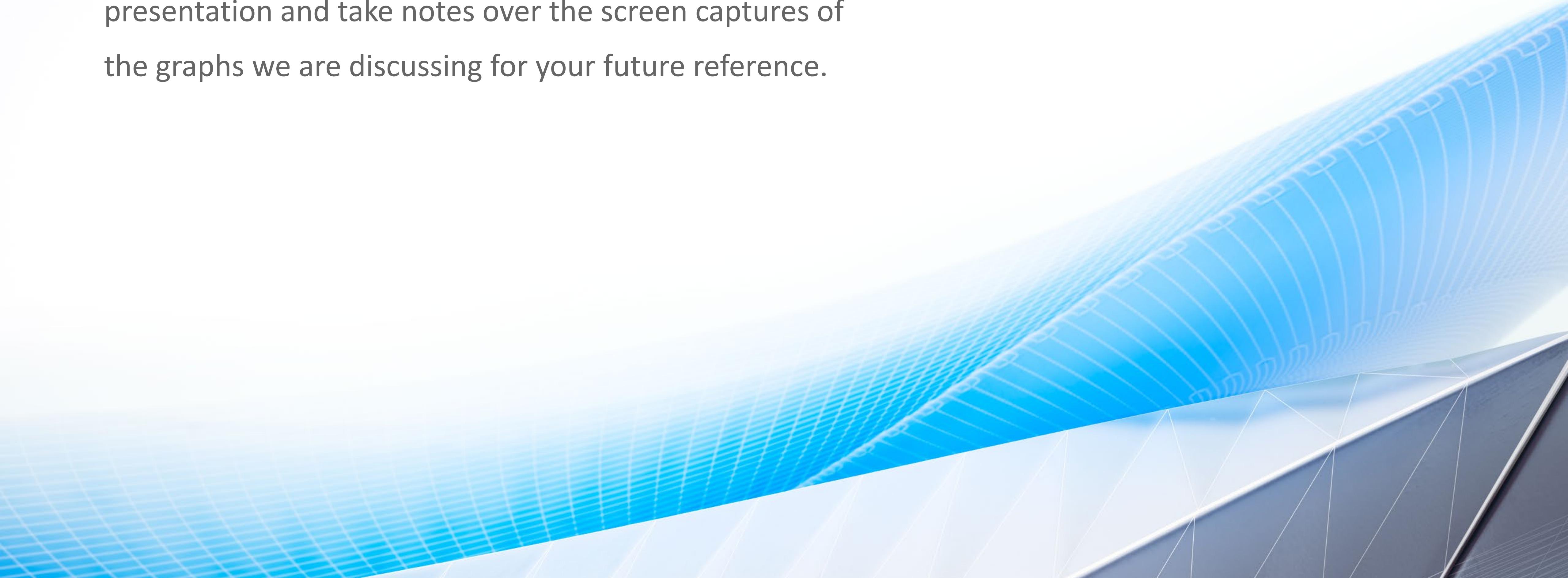


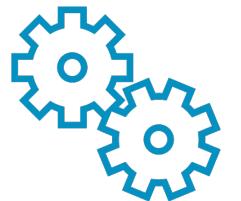
An aerial photograph of a multi-level highway interchange. The interchange features several curved ramps and overpasses, all surrounded by lush green trees and grass. The perspective is from above, looking down the length of one of the ramps.

Live Dynamo!

20 Graph Definitions

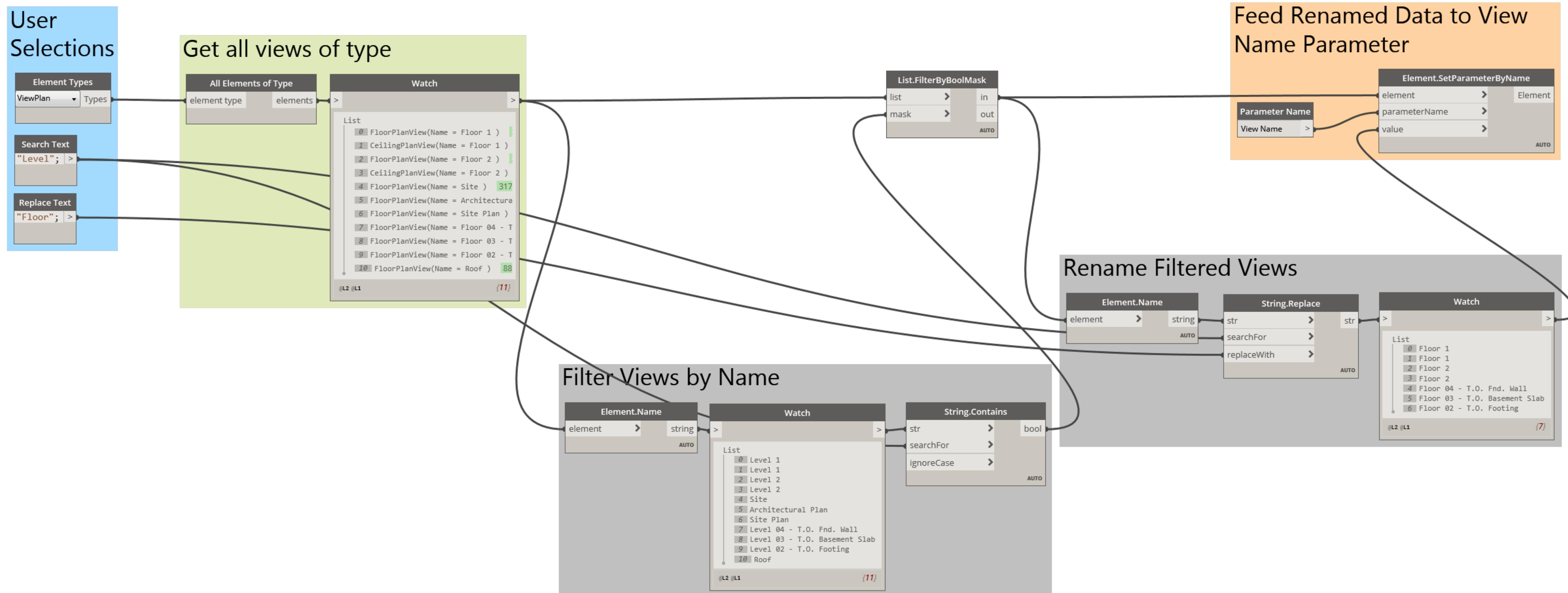
Use this next section to help follow along with our live presentation and take notes over the screen captures of the graphs we are discussing for your future reference.



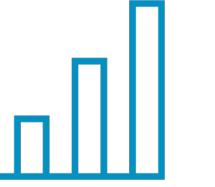


LIVE BONUS GRAPH! Rename Views

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.

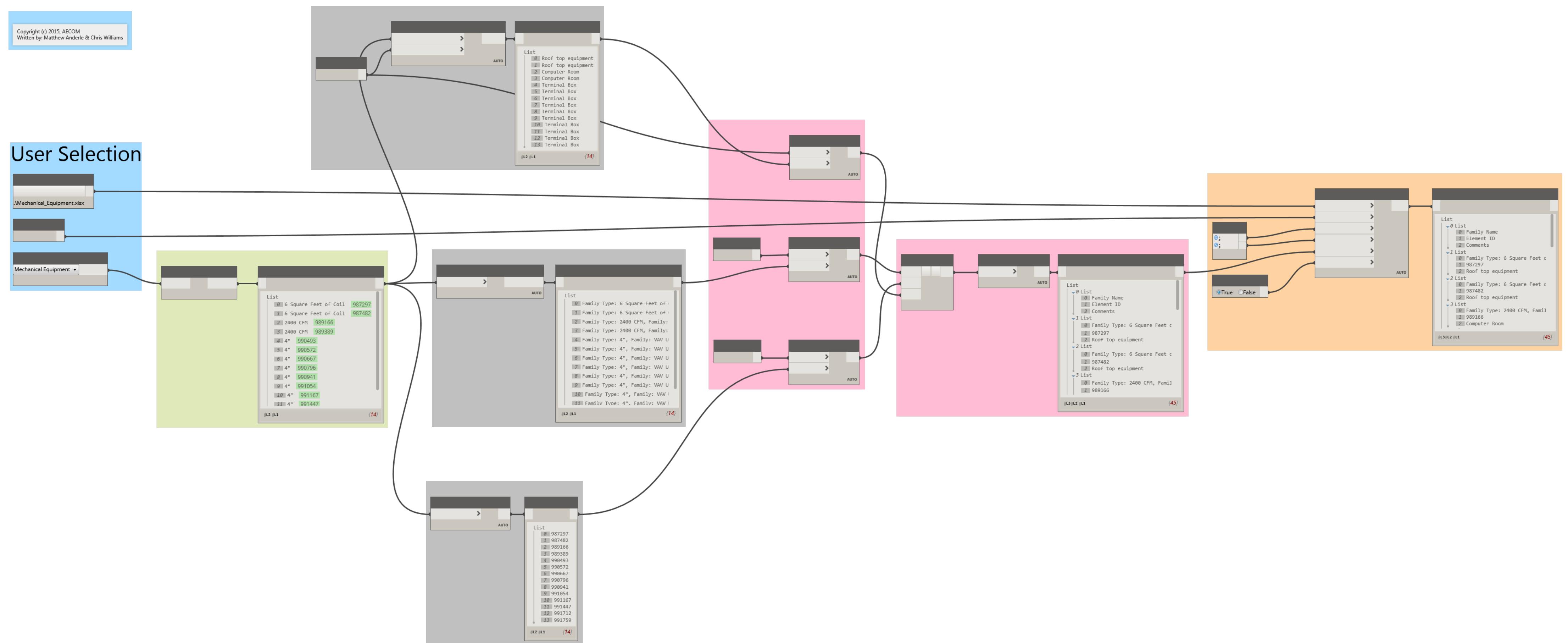


Output Data

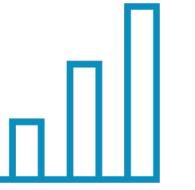


1. Equipment To Excel

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.

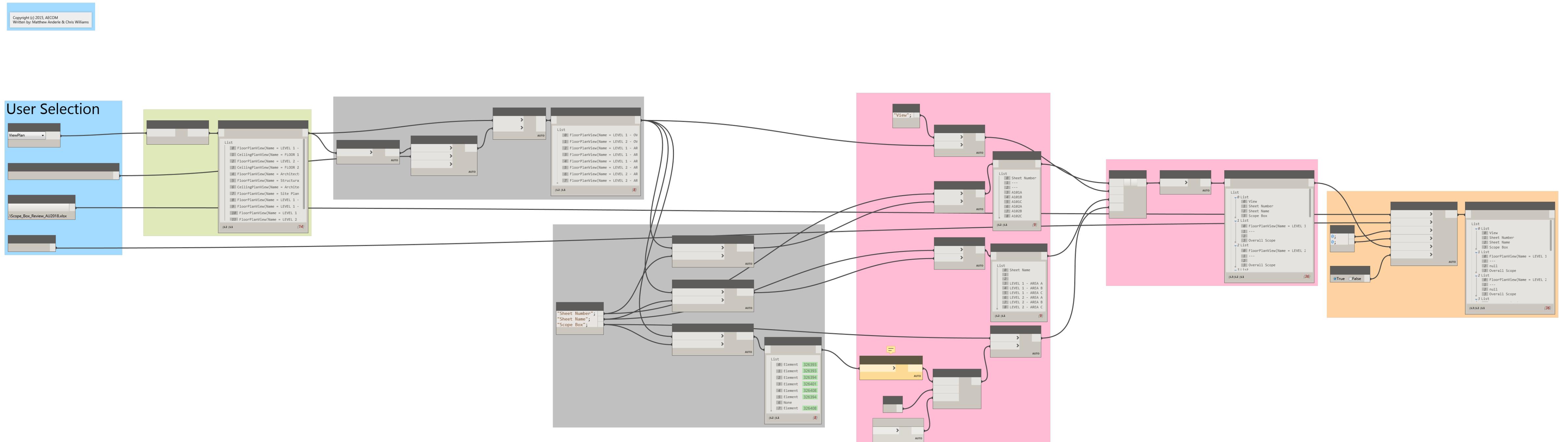


Output Data



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.

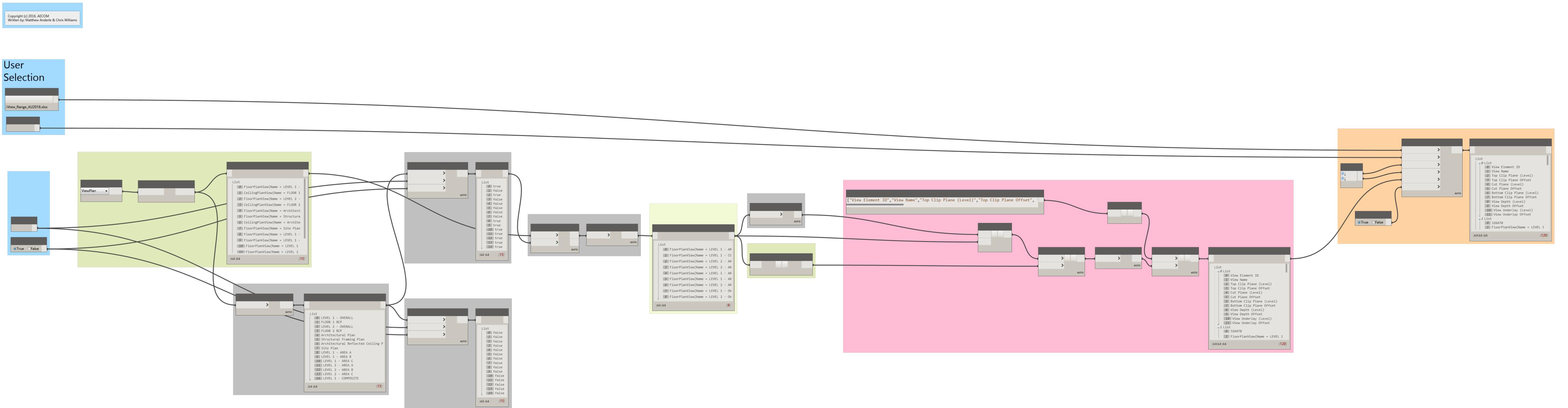


Output Data

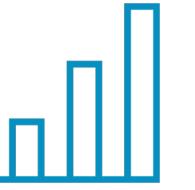


3. View Range Manager

This graph identifies all elements of view plans and exports view range parameters to an Excel file with headers. It also provides the ability to filter the view based on a string value. Accurate and consistent view configurations which are not always controlled by view templates based on team preference require review and validation to maintain visual continuity.

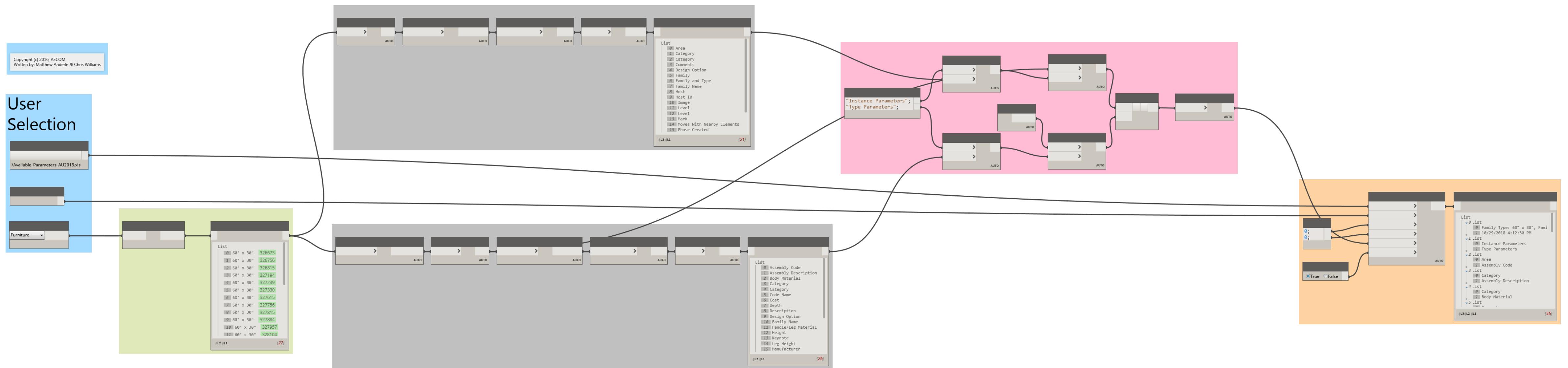


Output Data

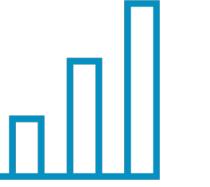


4. Parameter Investigator

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.

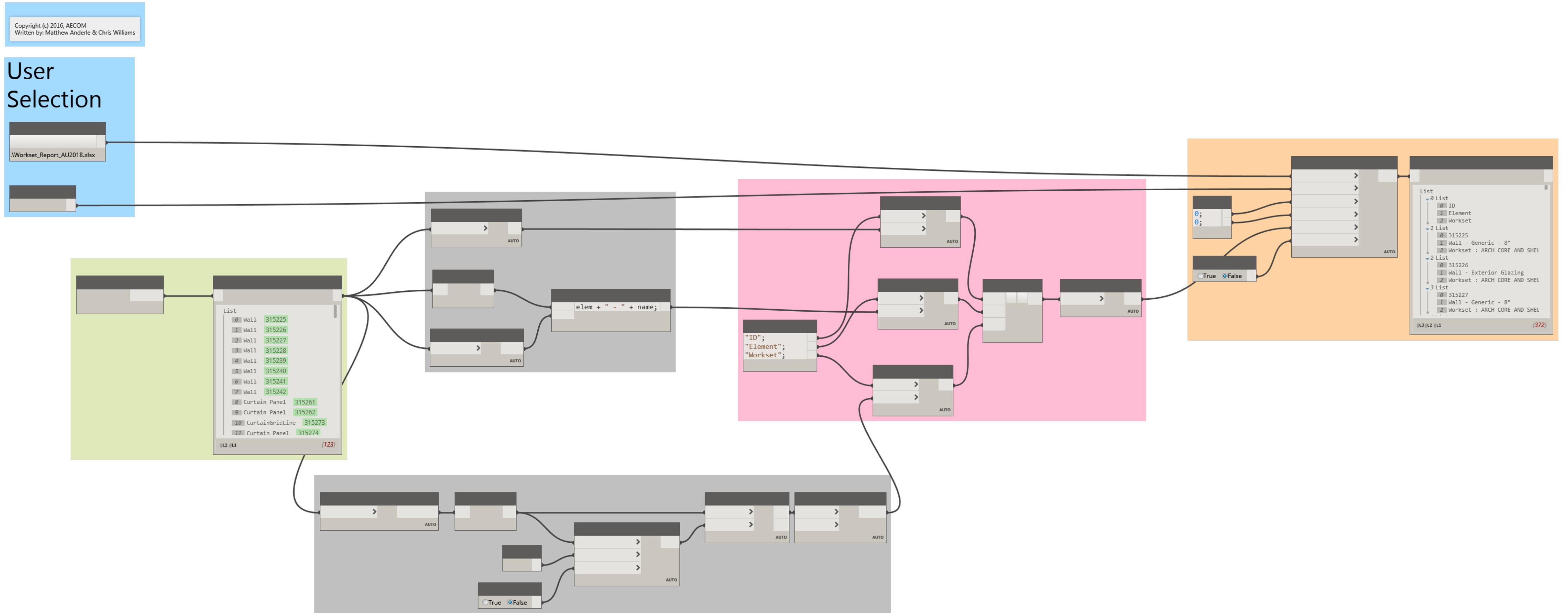


Output Data



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.

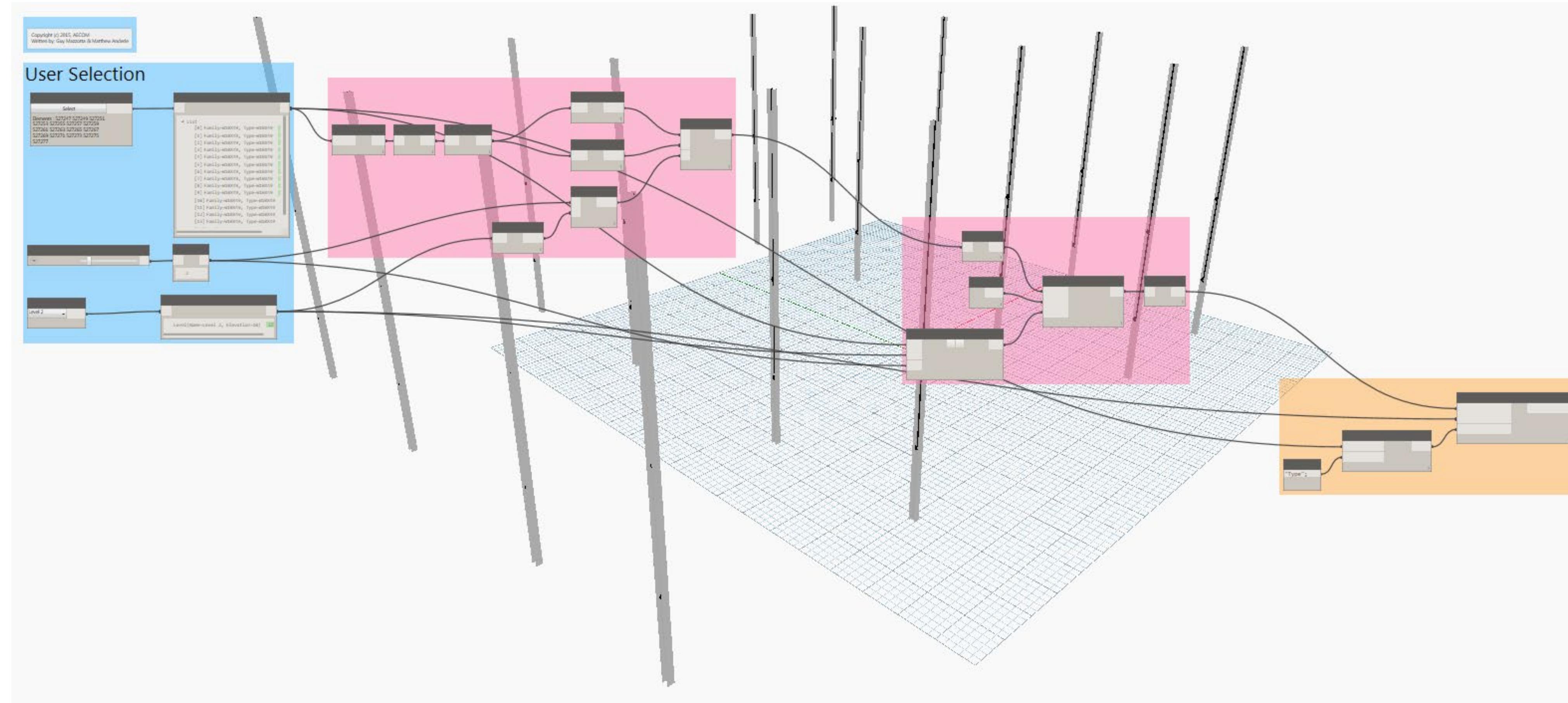




Visualization

6. Column Splicing

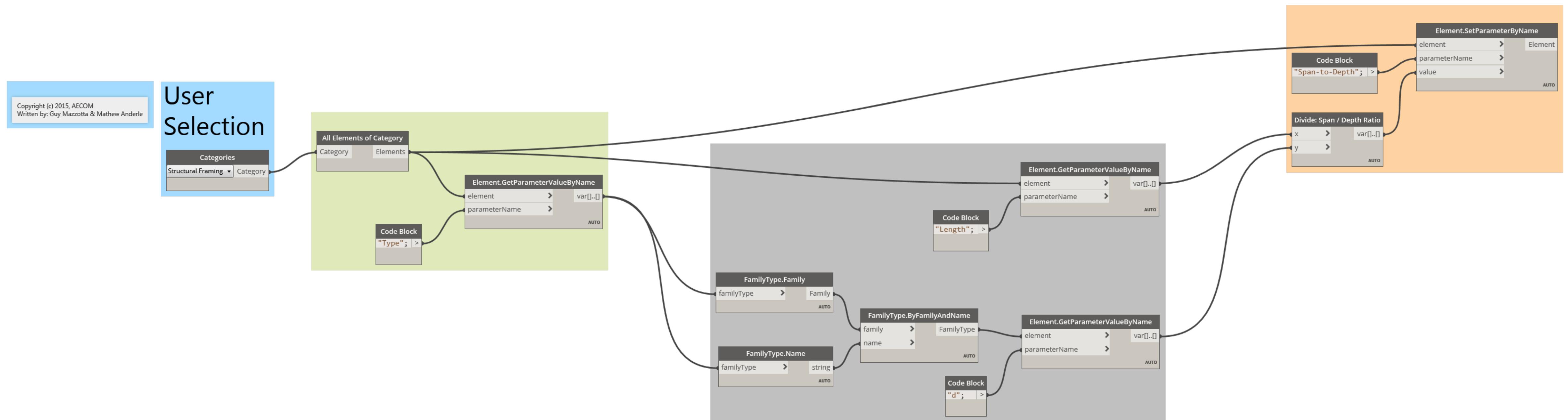
This graph utilizes a select node to Select columns, then Input a splice offset above a specified level, Set the original elevation at top before splicing, Set level of column, Set top offset of column, and Modify Revit elements. This graph adds the ability to correct multi-story columns across the project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





7. Span-to-Depth

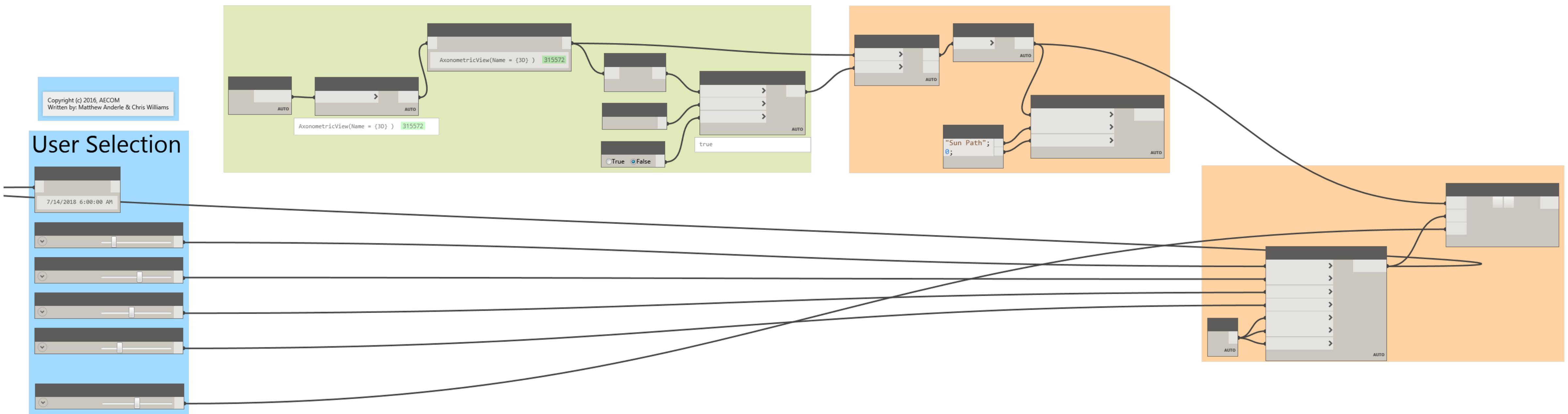
This graph provides a QA/QC opportunity to verify that span-to-depth ratios are being met in accordance with structural design criteria. This graph uses typical framing spans compared to beam depths and a view filter to suggest areas which may need further validation.





8. Slider Sun Settings

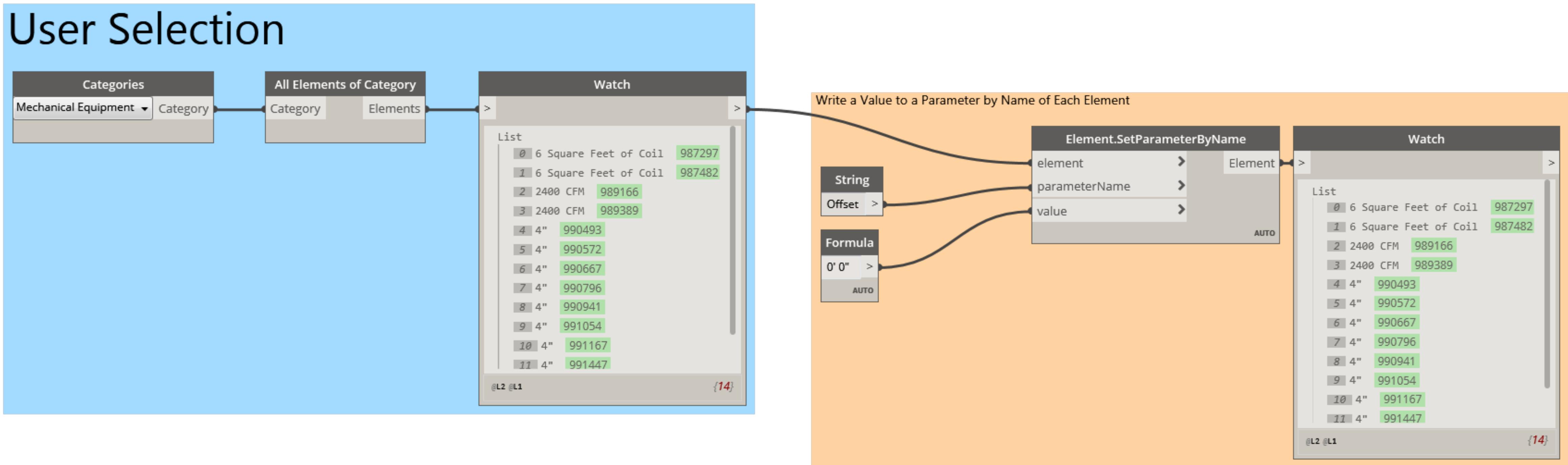
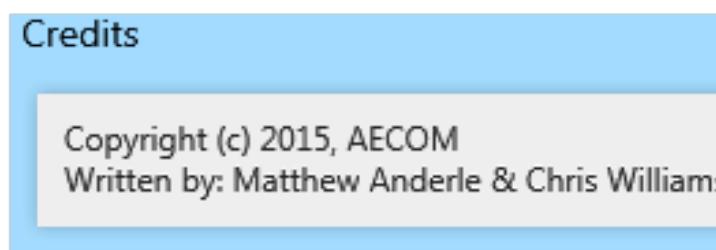
This graph identifies the presence of an axonometric view and if true, allows the user to access a slider scale which modifies sun settings based on date and time inputs for the following: Year, Month Day of the Month, 24-hour Time Period, Shadow Intensity

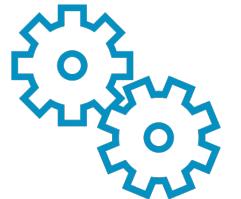




9. Write to Mechanical Equipment

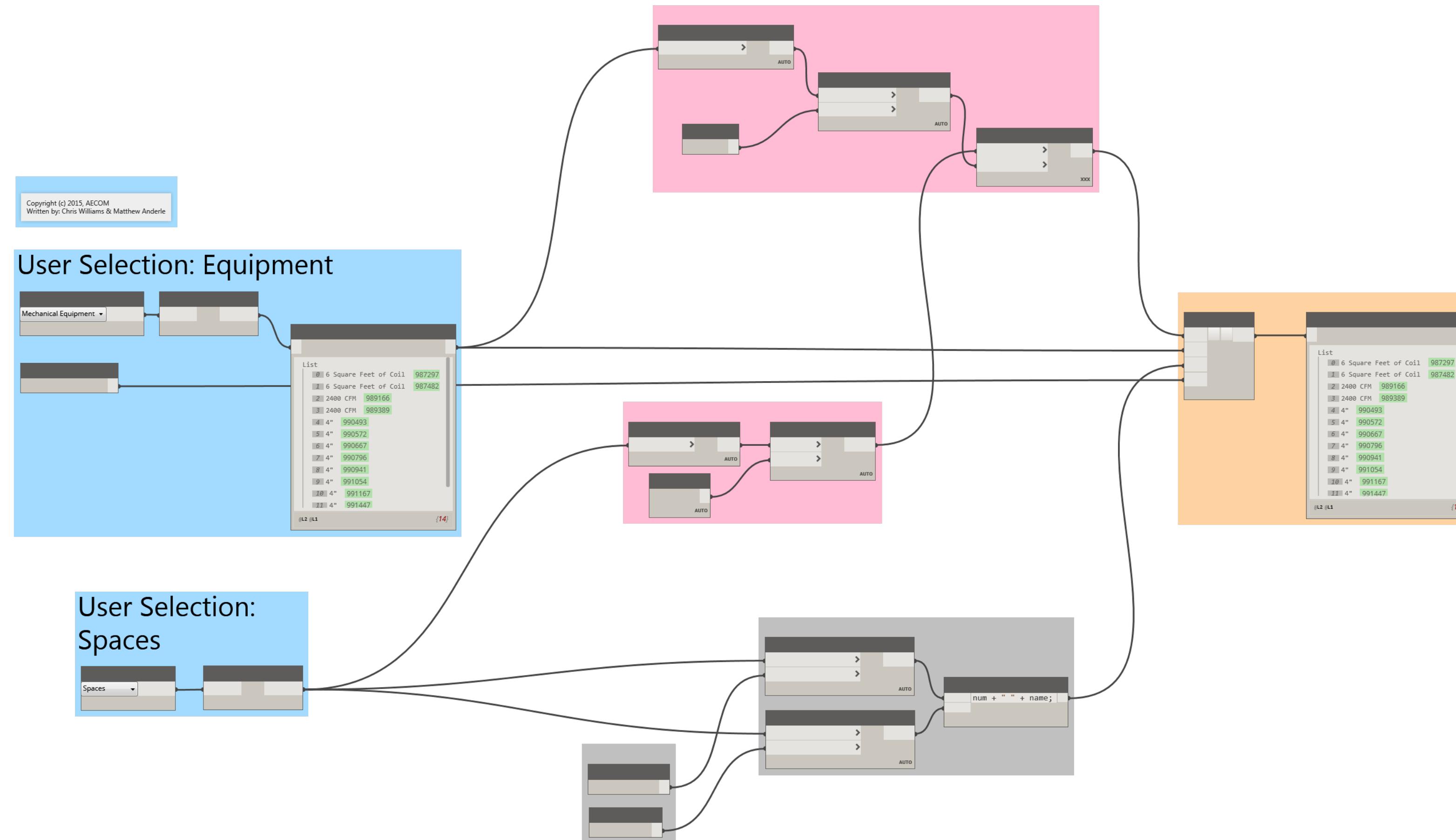
This graph retrieves all elements of the category Mechanical Equipment and allows the user to input a value to a parameter providing the team an efficient means to populate large amounts of data without the need to generate schedules.

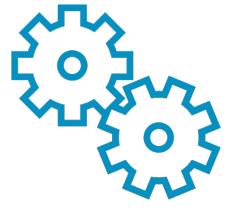




10. Auto-Set All Equipment Locations by Space Name

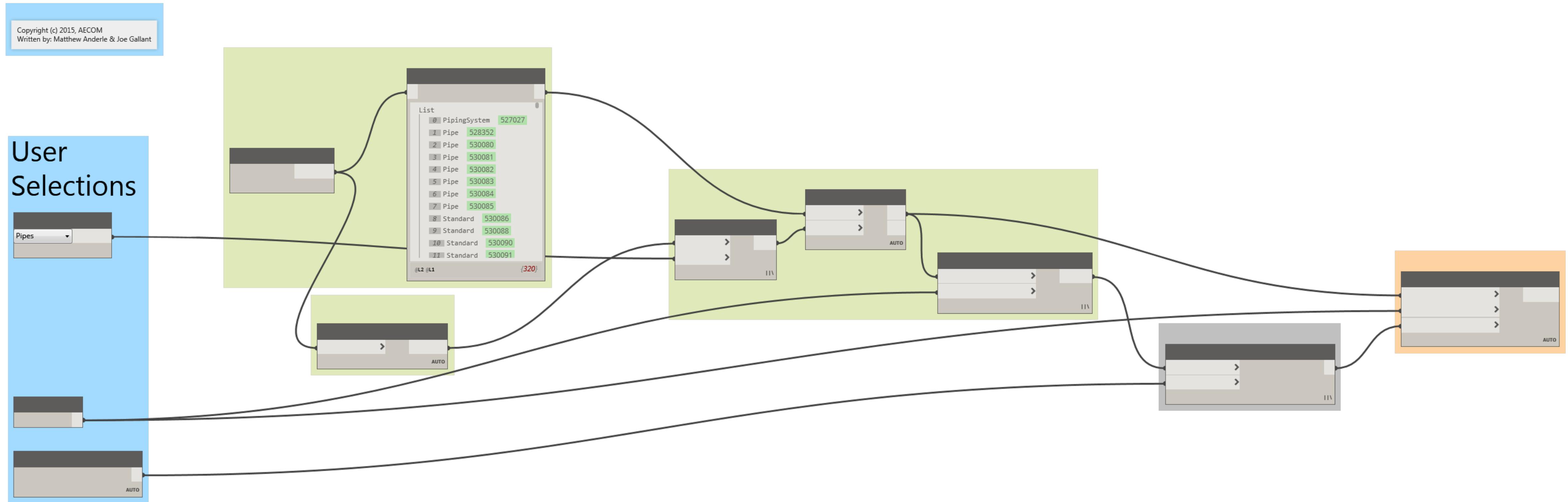
This graph sets all elements of a Space or Room category, creates a bounding box of those Spaces or Rooms, and evaluates whether another category is contained within the bounding box. It populates parameters from the Space or Room to the specified element category. Use this graph to set the equipment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

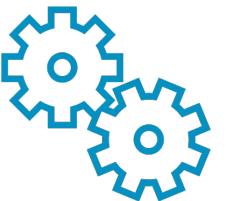




11. Pipe Height Adjust

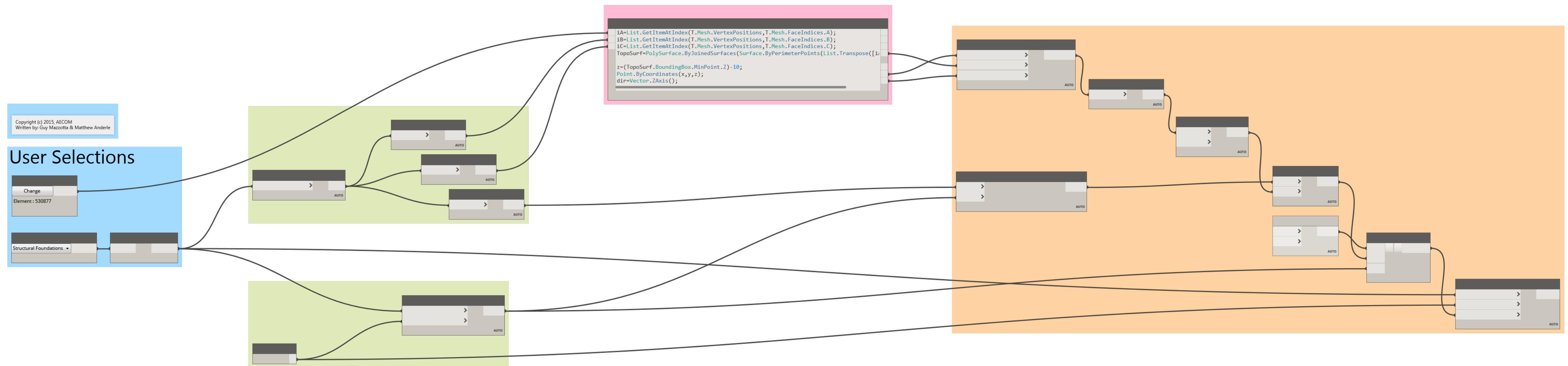
This graph selects all elements of the Pipe category in the active view and adjusts the current offset height to a new user input offset height. This graph will quickly adjust piping distribution systems when a change in height between floors occurs.

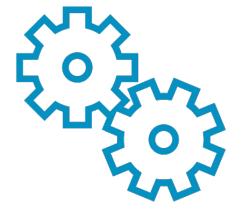




12. Caissons to Topography

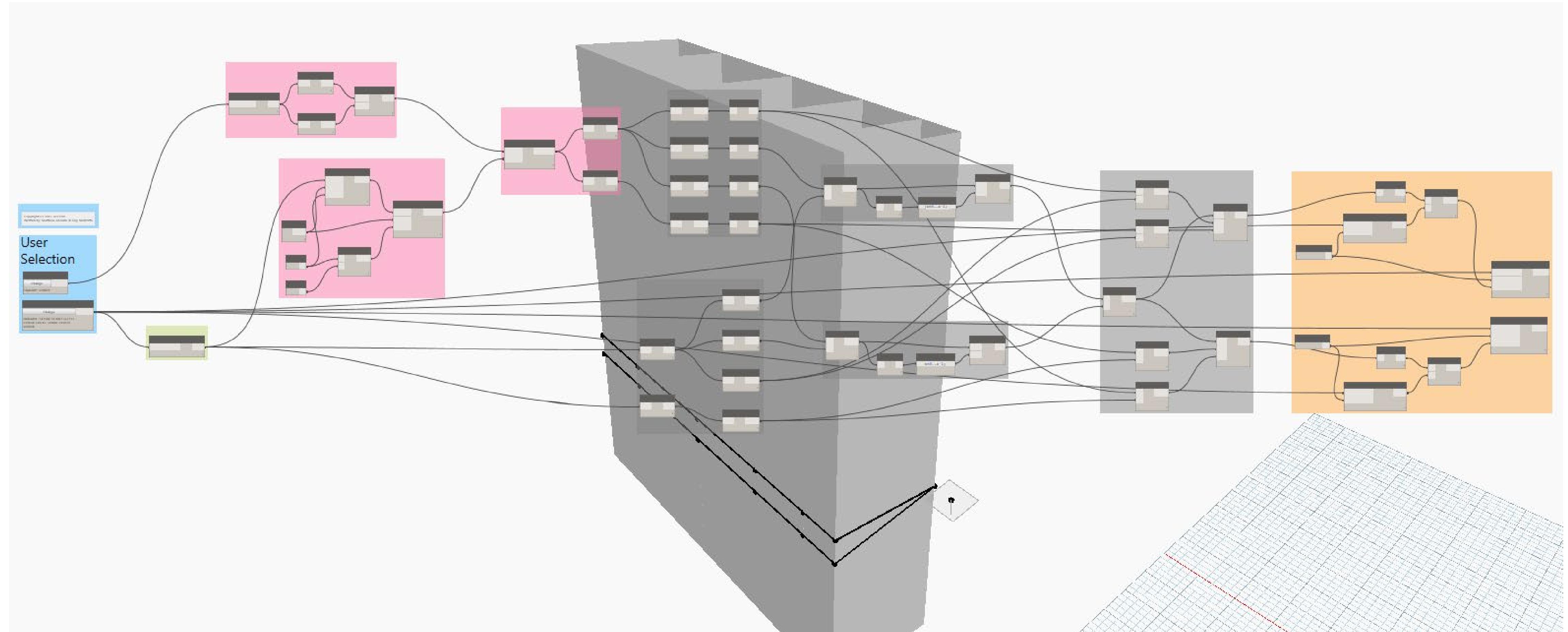
This graph allows the user to select a Revit topographic element and adjust all structural foundations depth-to-rock parameter to the selected topographic element. This graph allows the structural foundations to adapt to changes or refinement in topographical surveys quickly and accurately.





13. Match Elements to Reference Plane

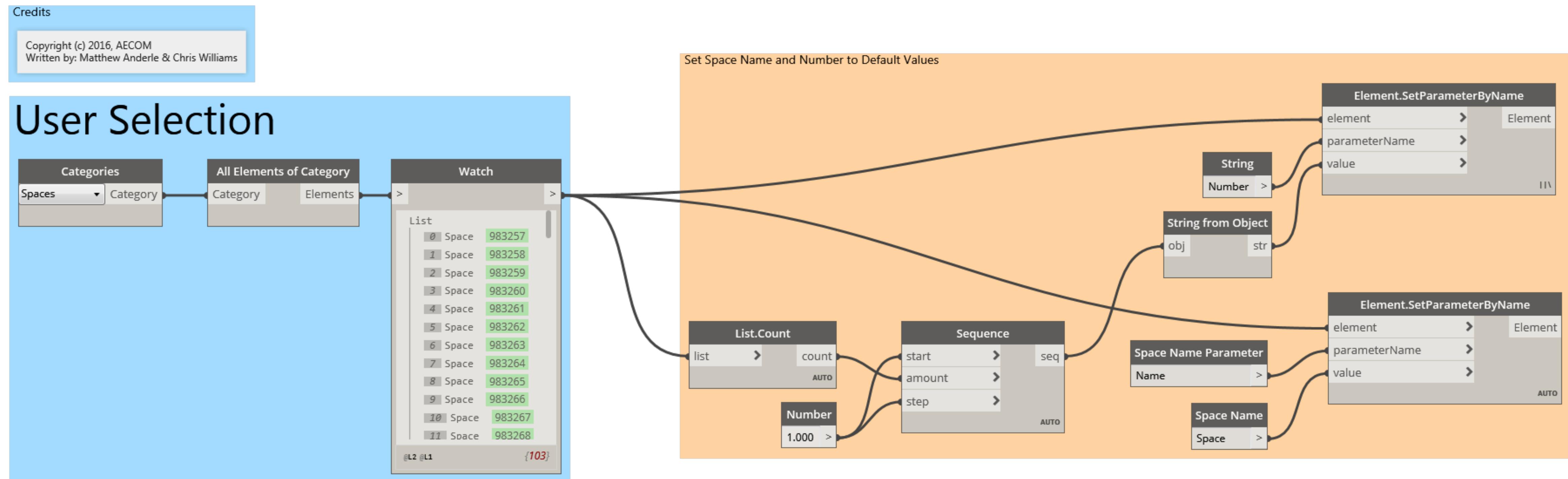
This graph adjusts the start and end offsets of each structural member to a reference plane. This can be used to match sloped roofs or slabs.

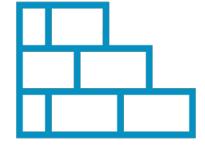




14. Space and Room Data Clear

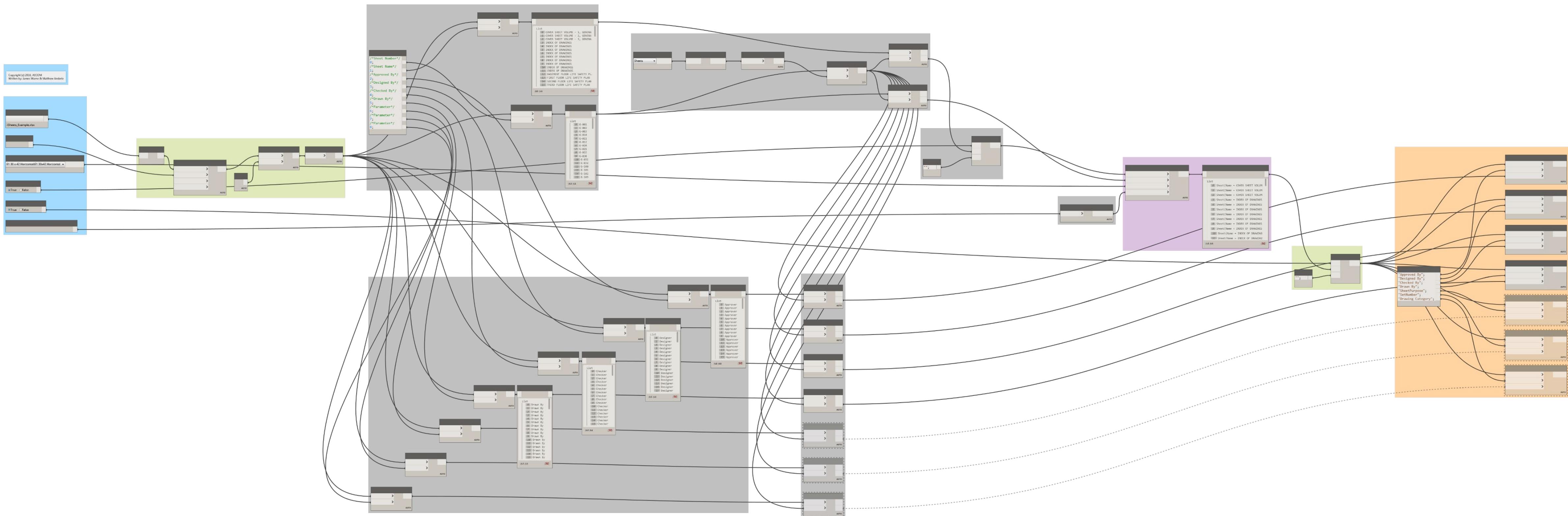
This graph selects all Spaces and resets the name parameter to a user input value; and the number parameter with a user input starting number. This can be used to reset spaces to a sequential numbering system and can be used as a starting graph for multiple data writing purposes.

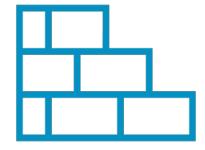




15. Sheet Creator

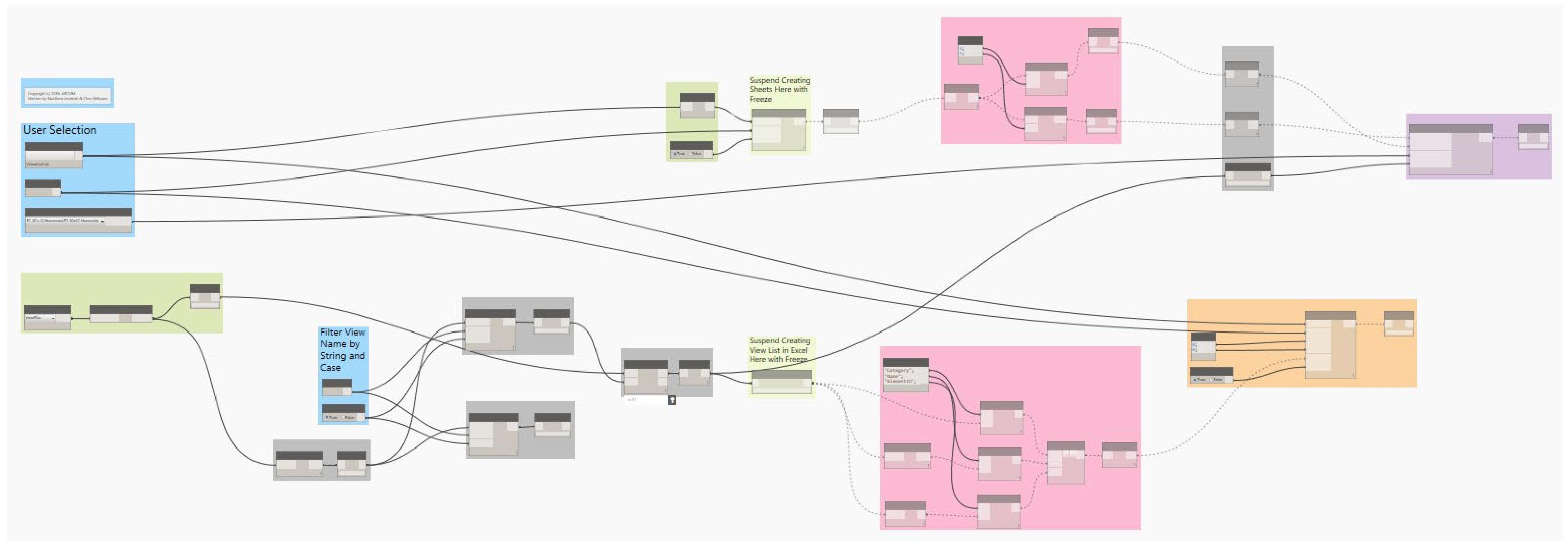
This graph references a user generated Excel file with a predefined sheet index, allows the user to select a title block family, and inputs a series of parameter values, filters any existing sheets, and creates the remaining list as new sheets in Revit. This can replace or compliment sheet set creators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

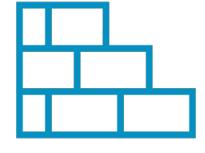




16. Place Views on Sheets

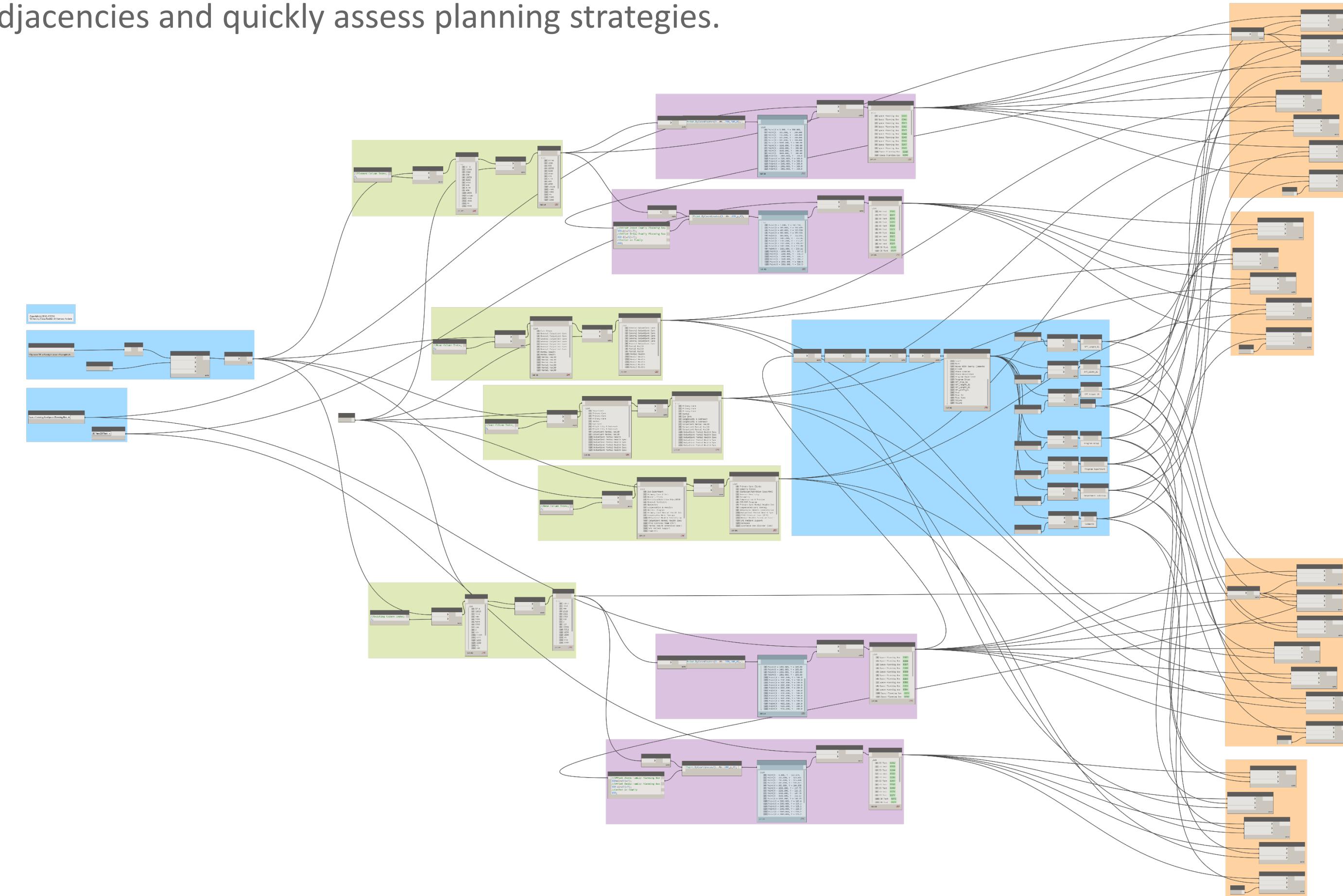
This graph has two functional paths: one which captures a view list that can be filtered by the project team and outputs the data to Excel; the other path reads the Excel file with the addition of the sheet name and number and creates new sheets with the selected title block, and places the corresponding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

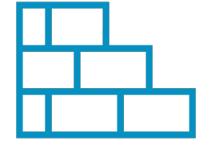




17. Excel Square Footage-to-Family Instance

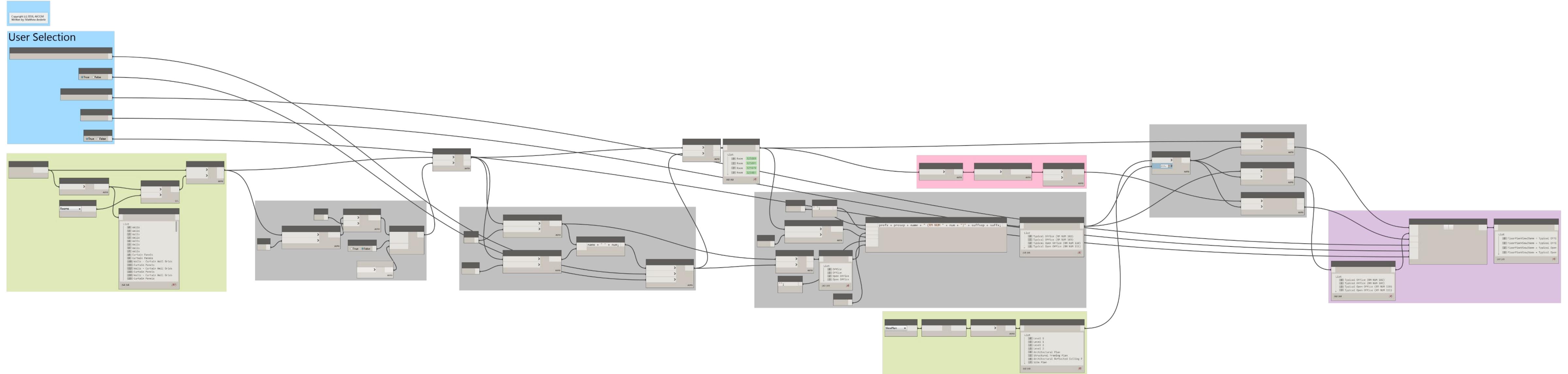
This graph reads an Excel file with design program data, which is divided into two columns: one with planned size and the other with existing size of rooms or departments based on area. This graph then places a family instance, sizing it to match the planned and existing areas. A three dimensional text 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.

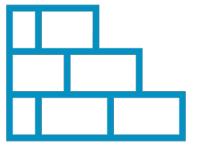




18. Create Room Plans Cropped to the Room

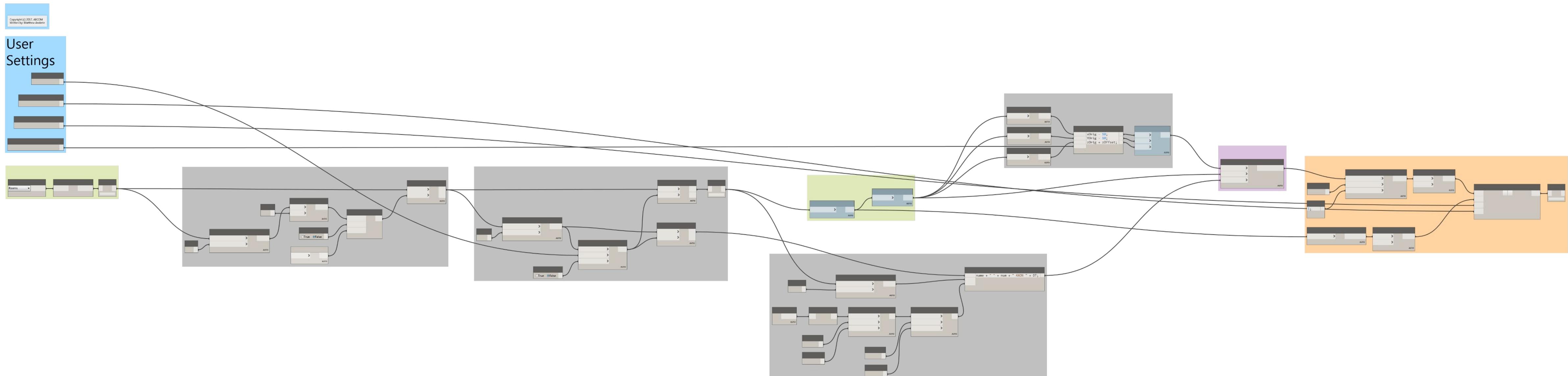
This graph captures all rooms in a view and filters that list against user defined name or number queries and generates a new floor plan with a crop region set to a user defined offset value. A view template can also be applied at the time of view creation. Project teams can use this graph to quickly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

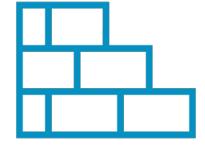




19. Create Room Axonometric Views Section Boxed to the Room

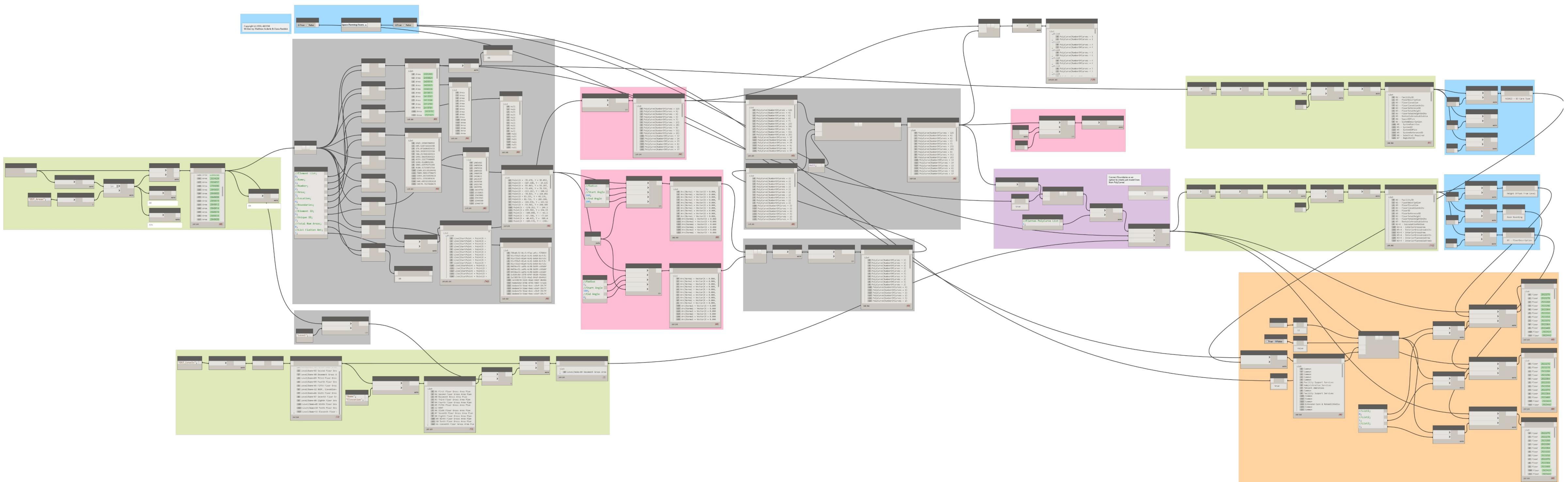
This graph captures all rooms in a view and filters that list against user defined name or number queries and generates a new axonometric view, section boxed to a user defined extent outside the room, with user defined offset values for eyepoint height. A view template can also be applied at the time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



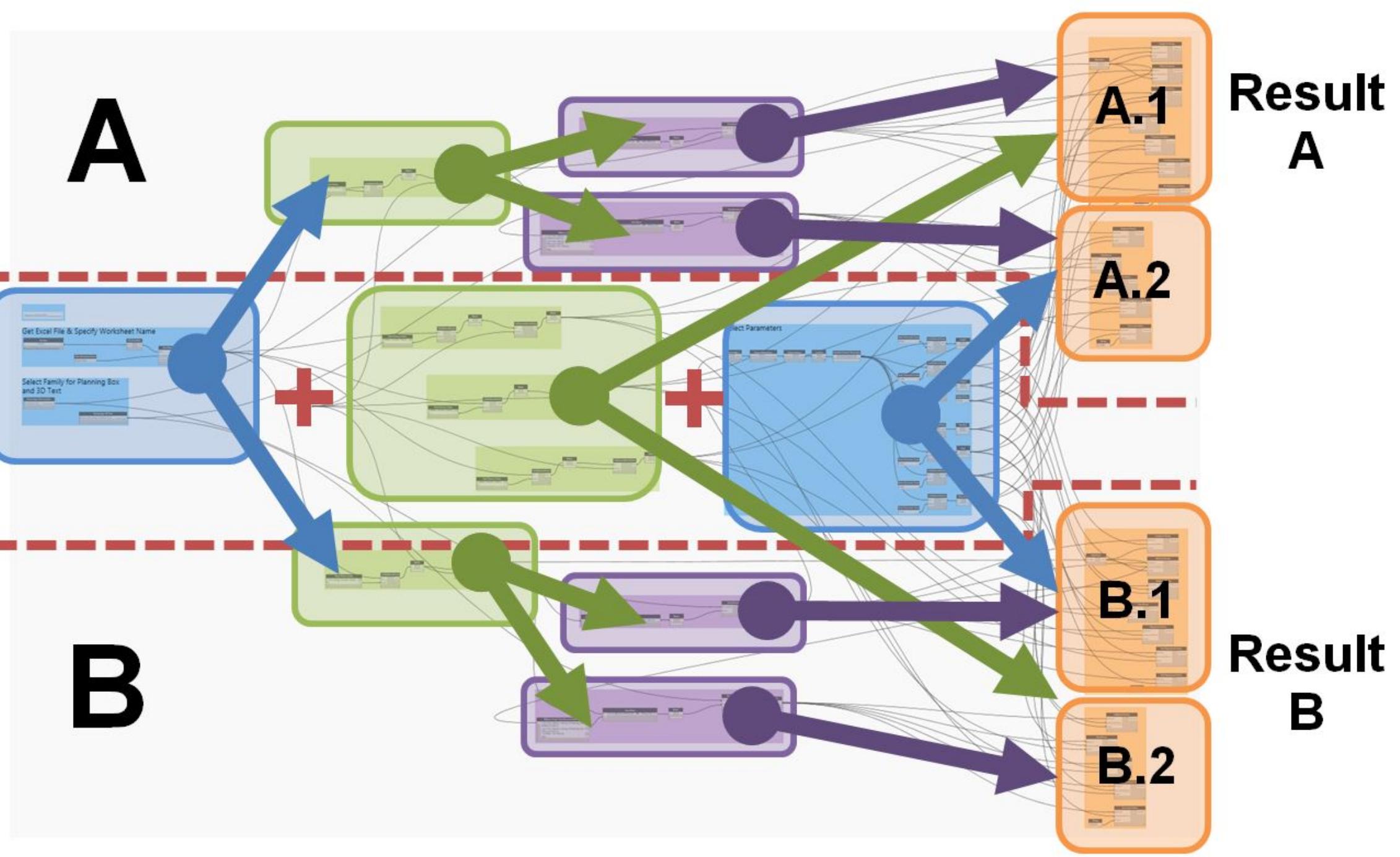


20. Area Boundary-to-Floor Element

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.



General Settings & Information

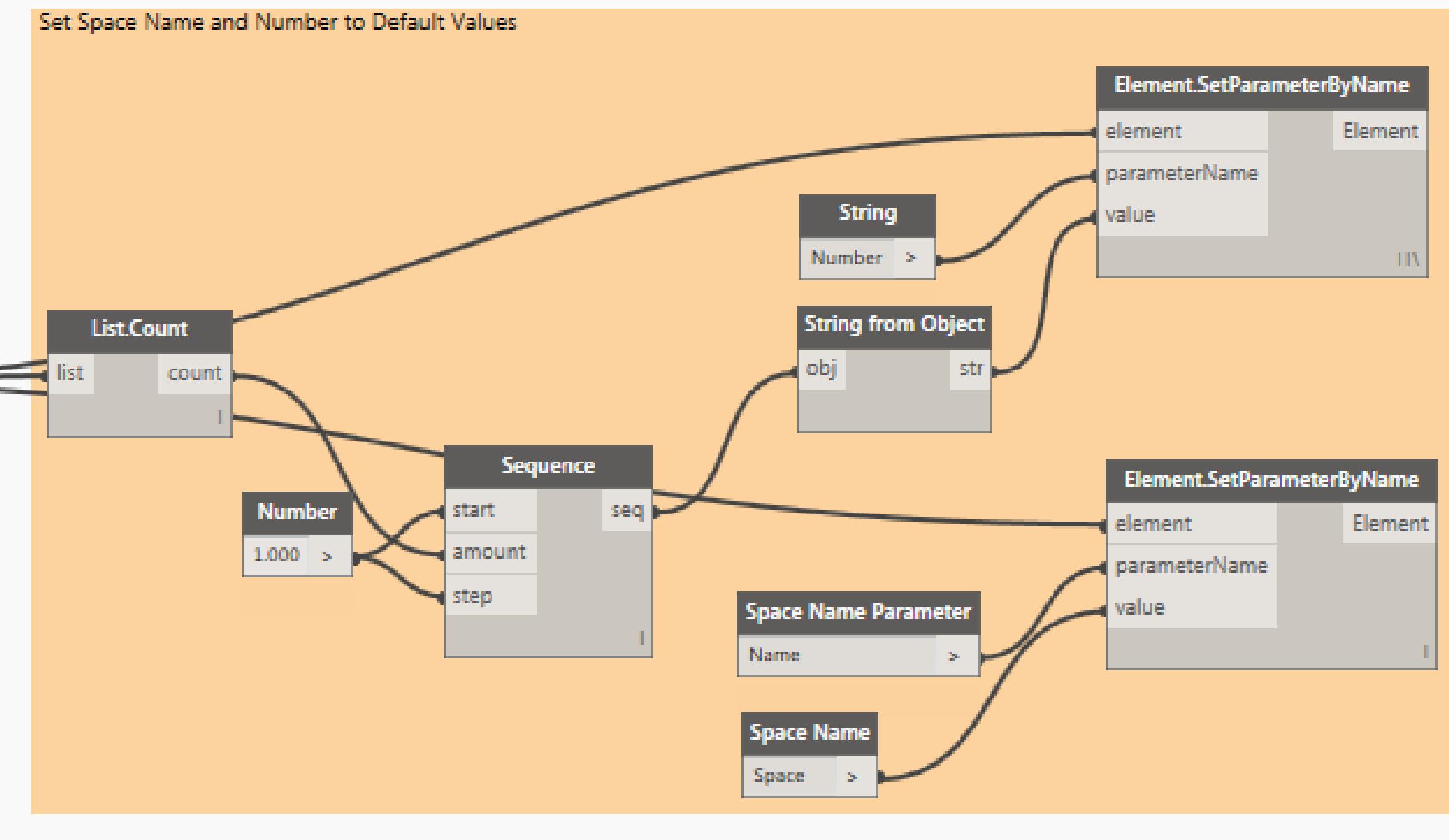


A

B

Result A

Result B

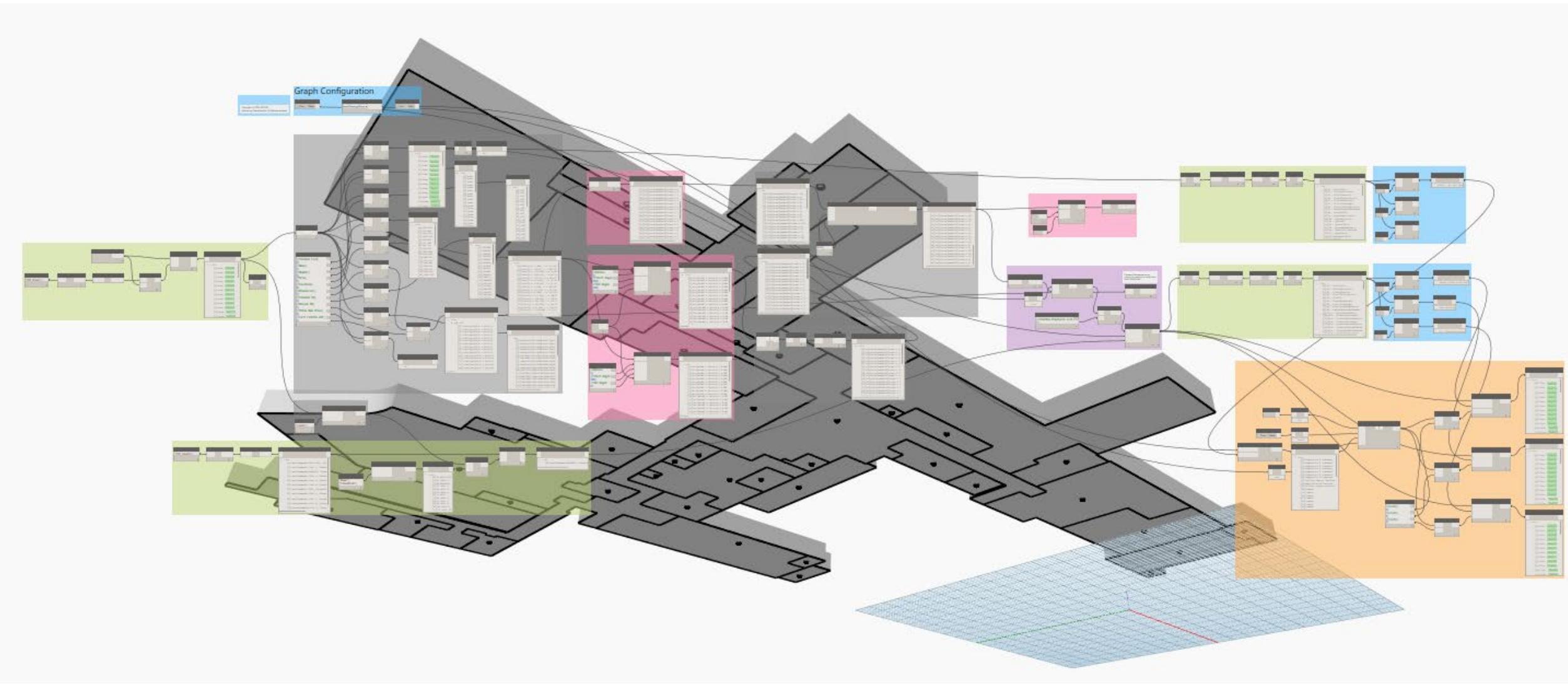


Organize Graphs

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

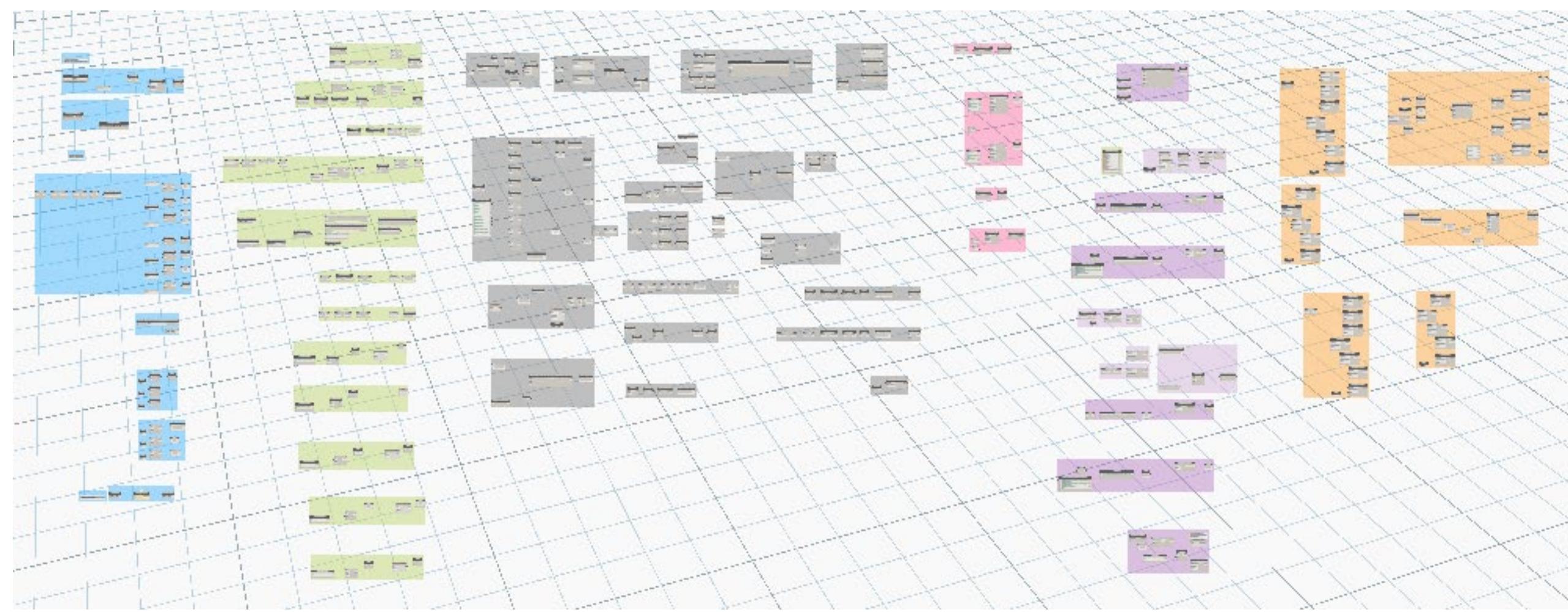
Manage Data

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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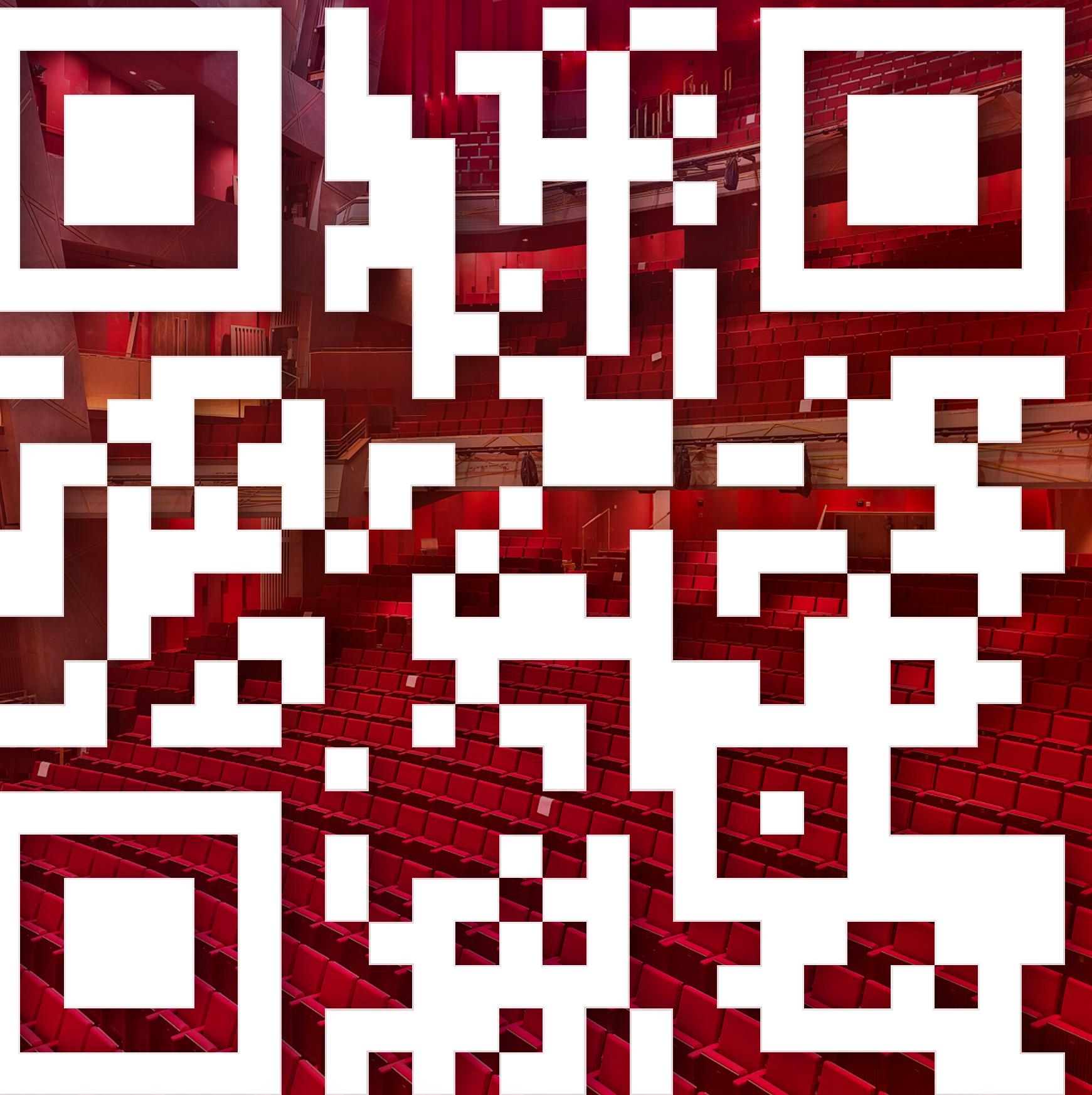
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