

An aerial architectural rendering of a city, showing a dense grid of buildings, streets, and green spaces. A large, grey blimp with the word "utile" written on its side is flying in the sky. The scene is set against a light blue sky and a body of water with many small sailboats in the distance.

# Bridging the Gap: From Current Practice to Meeting the Stretch Code

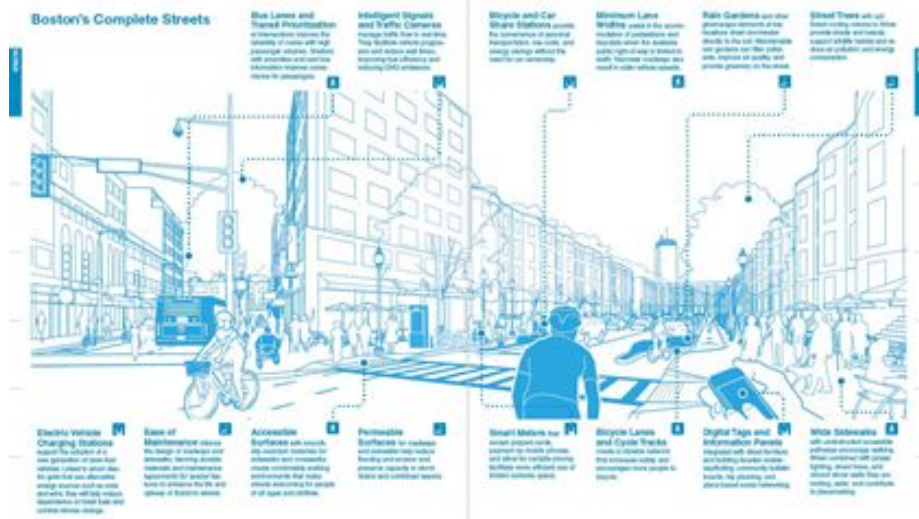
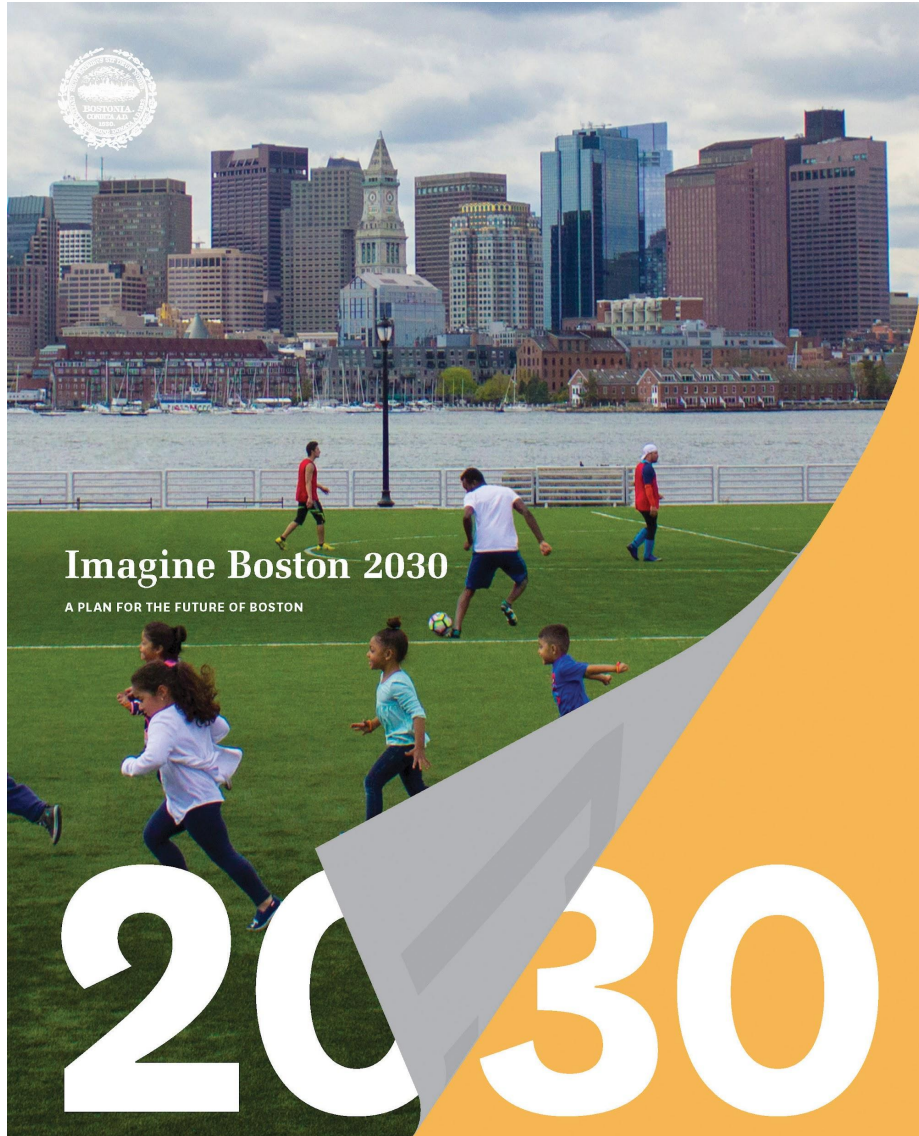
Phius Pro Forum 2024

**Jeff Geisinger, AIA, CPHC**  
Director of Sustainable Design,  
Associate Principal

**utile**



# utile





# A Passive Building can be any size/type



**Front St.**  
Portland, ME | 100 Units  
Phius Certified (Building 2), Design Certified (Building 5)



**3371 Washington St.**  
Boston, MA | 39 Units  
Phius Design Certified, In Construction



**152-158 Broadway**  
Somerville, MA | 45 Units  
Phius Design Certified, In Construction



**1200 Montello**  
Brockton, MA | 94 Units  
Phius Design Certified, In Construction



**Scape Charlesgate**  
Boston, MA | 400 Units  
In Design



**Walnut St. Housing**  
Foxborough, MA | 200 Units  
Phius Design Certified, In Design



**1005 Broadway**  
Chelsea, MA | 38 Units  
Phius Certified



**25 Sixth St.**  
Chelsea, MA | 62 Units  
Phius Design Certified, In Construction



**1599 Columbus Ave.**  
Boston, MA | 65 Units  
Phius Design Certified, In Construction

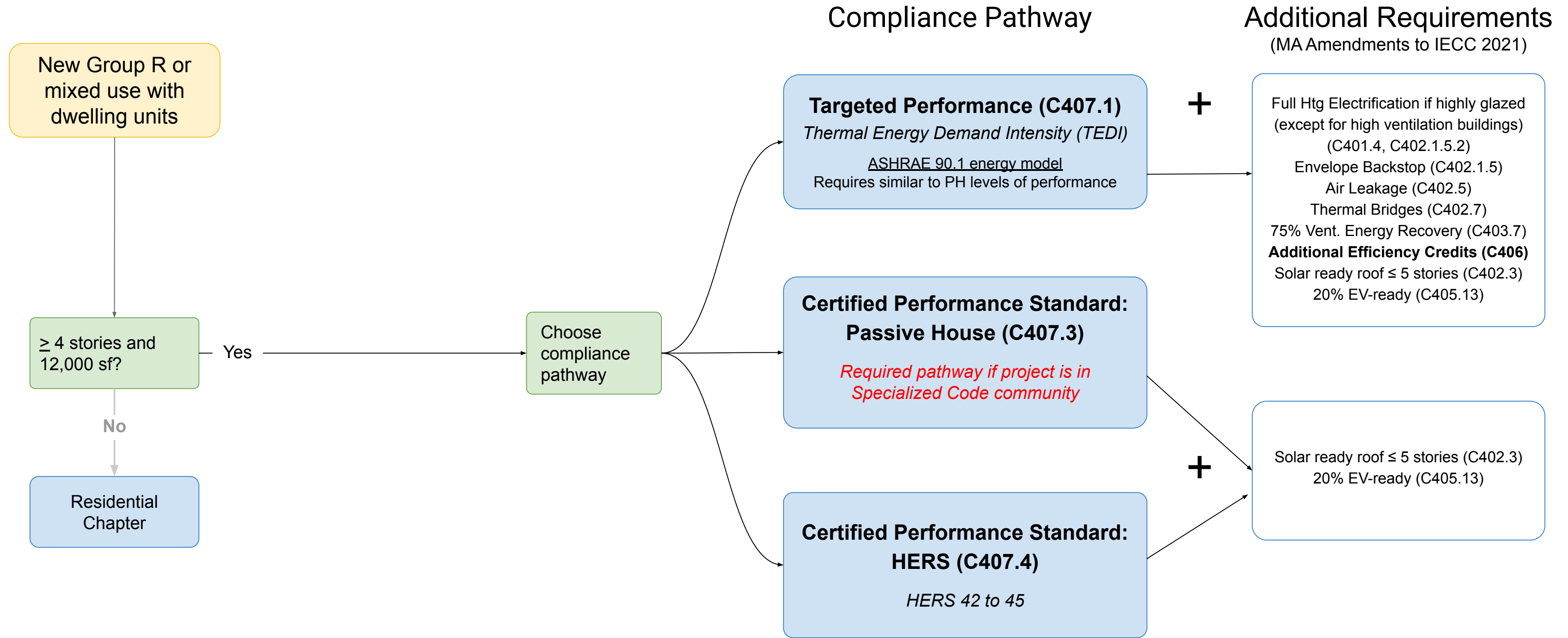


**495 On the Dot**  
Boston, MA | 331 Units  
In Design



# Stretch Code

## Commercial Energy Efficiency, **Group R occupancy**



### Legend





**C407.3.1 Compliance.** Buildings shall be pre-certified as meeting the Phius CORE 2021 or Phius ZERO 2021 Passive Building Standard – North America, or newer, demonstrated using Phius approved software, where Phius Design-Certification is demonstrated by Phius and a Certified Passive House Consultant (CPHC); or, Projects pre-certified as meeting the Certified Passive House standard using the current software and program criteria by the Passive House Institute (PHI), where PHI certification is demonstrated by a Certified Passive House Designer and a Certified Passive House Certifier.

**C407.3.2 Documentation.** Compliance with Phius or PHI shall be in accordance with C407.3.3.1 or C407.3.3.2

**C407.3.2.1 Phius Documentation.** When using WUFI Passive or other Phius-approved software:

1. Prior to the issuance of a building permit, the following item(s) must be provided to the Building Official:
  - a. A Phius 2021 (or newer) Verification Report which demonstrates project compliance with Phius 2021 (or newer) performance requirements.
  - b. A statement from the CPHC that the verification report results accurately reflect the plans submitted.
  - c. Evidence of project registration from Phius.

OR

- a. **A Design Certification Letter from Phius.**



# Recommendations from a CPHC

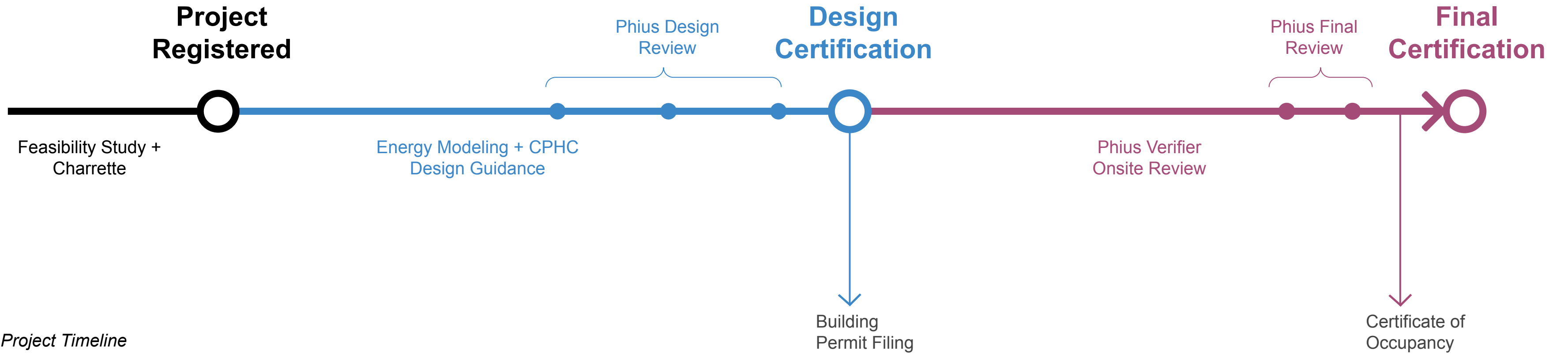
- Set a **road map** for the Phius certification process
- Work backwards from expected **permit date**, set goal to achieve Design Cert letter
- Conduct a **feasibility study** and **design charrette** as early as possible in the process
- Use the feasibility **energy model for design guidance** and refine for Design Certification
- Utilize **checklists to track program requirements** by phase for design team, consultants
- Integrate **Revit outputs** to facilitate the Design Cert process
- **Coordinate with Verifier** and track changes **proactively during construction**



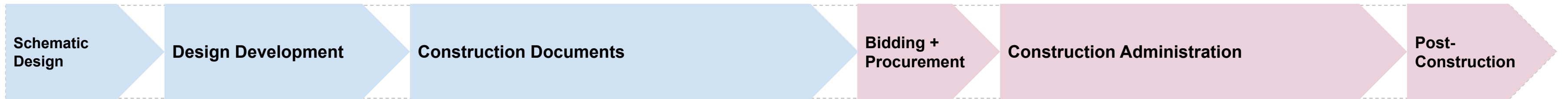


# Phius Submission Timeline

*Phius Project Certification Steps*



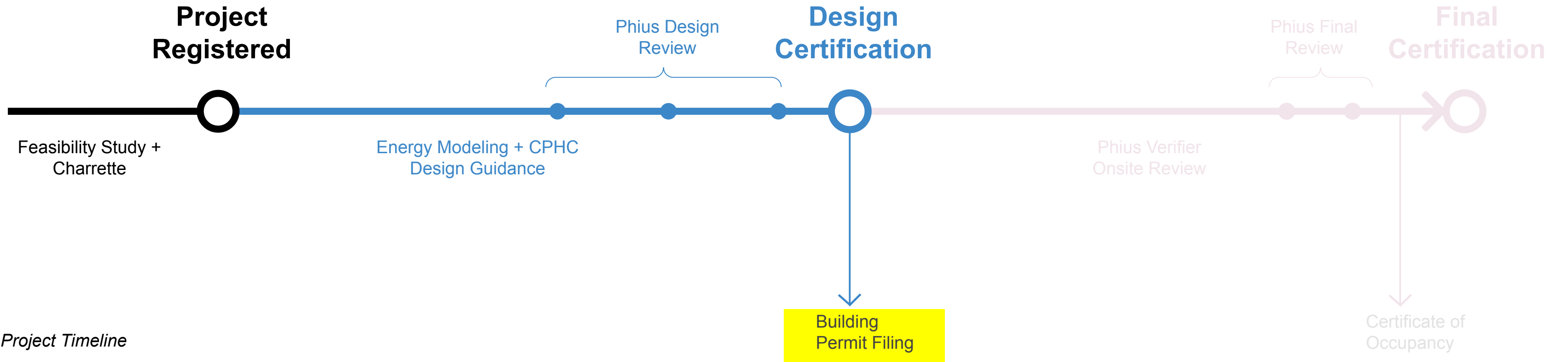
*Project Timeline*



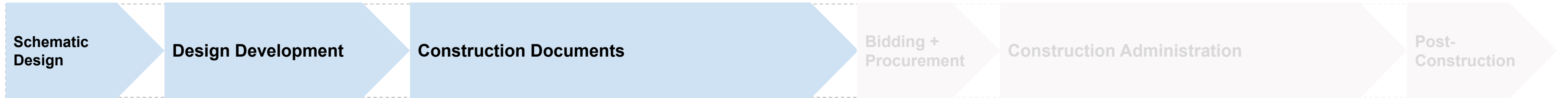


# Phius Submission Timeline

*Phius Project Certification Steps*

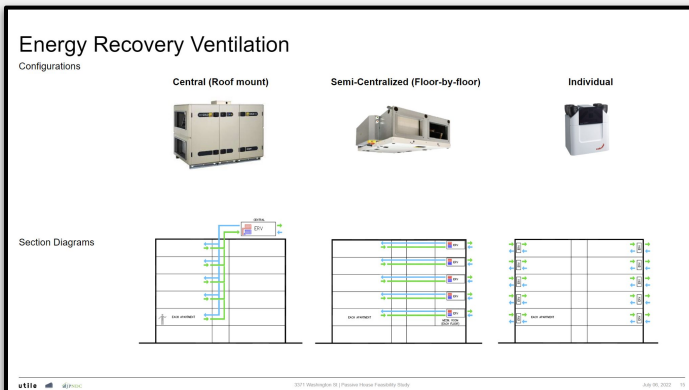
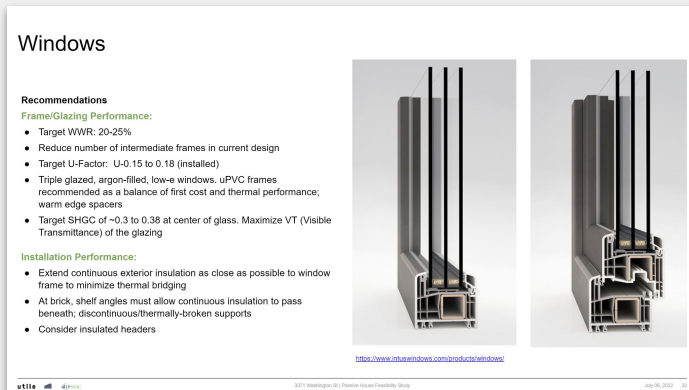
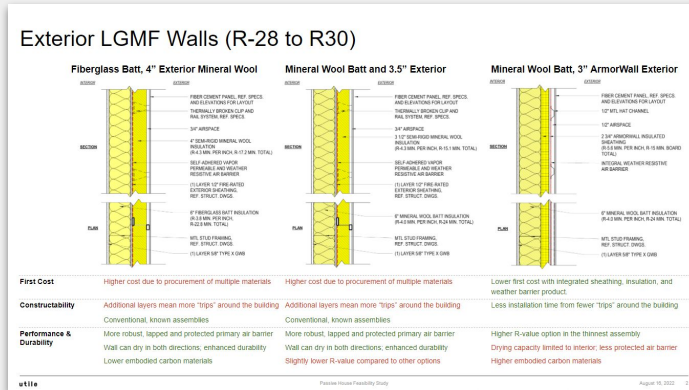
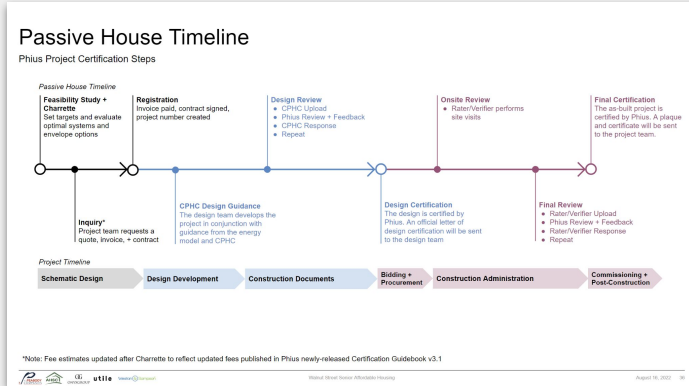


*Project Timeline*





# Feasibility Study



## Energy Recovery Ventilation Configurations

Central (Roof mount)



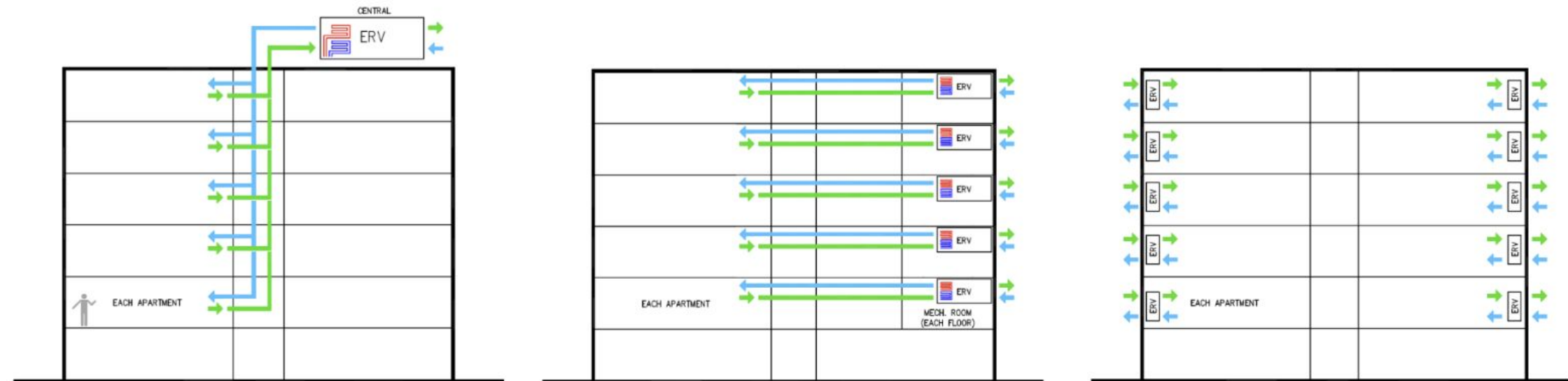
Semi-Centralized (Floor-by-floor)



Individual



## Section Diagrams





# Feasibility Study - Charrette

**Goal:** Reach consensus around Phius criteria, assemblies, and systems configurations to achieve Phius criteria with the integrated team:

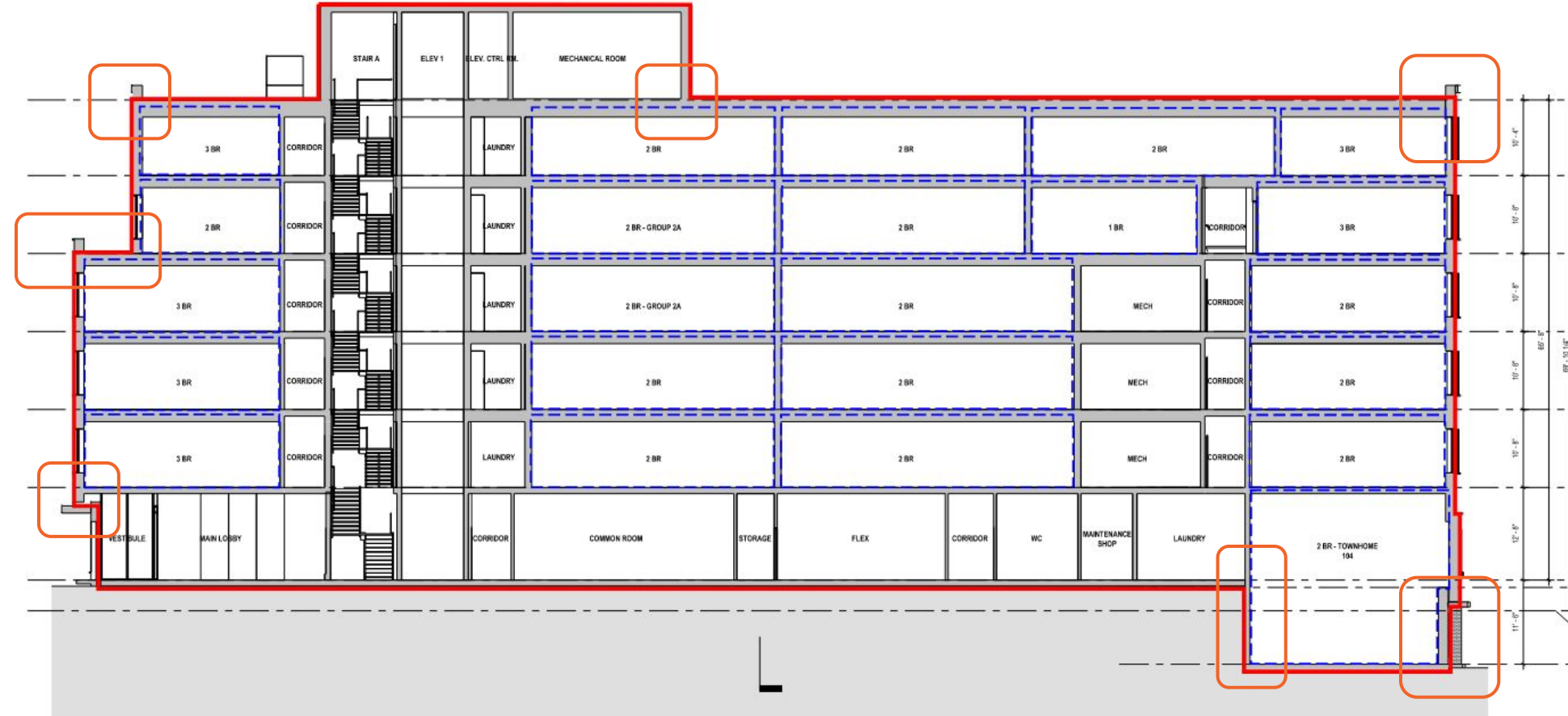
- Owner
- CPHC
- Designer/ architect
- MEP Engineer (systems selection, requirements)
- Structural Engineer (scope of thermal breaks)
- CM or Pre-construction Advisor (cost and constructability)



# Feasibility Study - Early Identification of Challenges



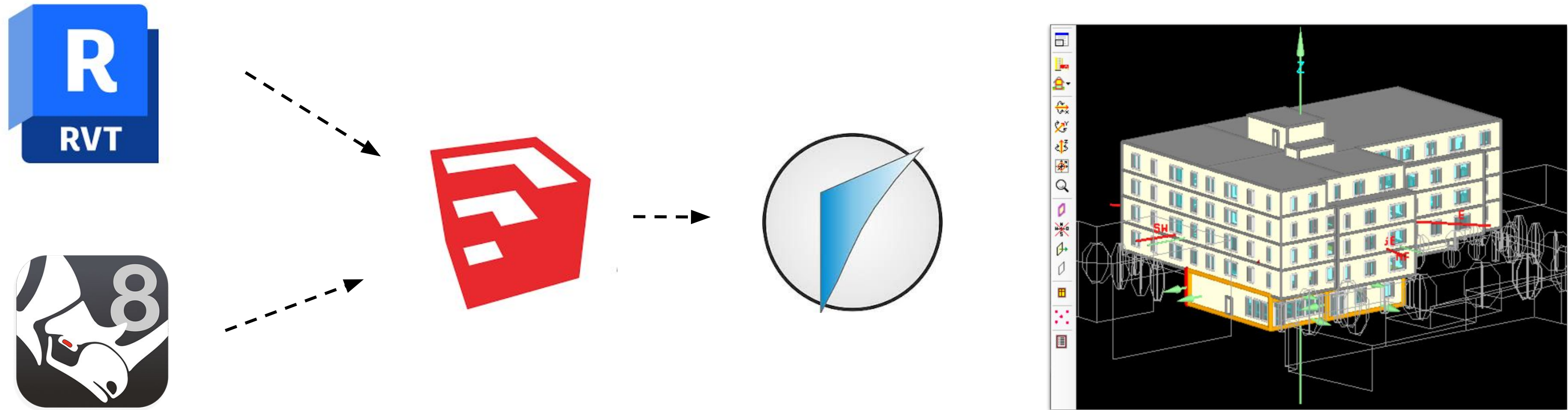
Ground Floor Plan



1 OVERALL BUILDING SECTION - E-W  
1/8" = 1'-0"



# Feasibility Study - Set up initial WUFI Passive Model





# Energy modeling through the process

**Project** Scope: **Passive house verification** | English/IP/Outer dimensions/Phius CORE 2021 | Assign data

**Visualized components:**

- Component 1: Slab on Grade - F1A
- Component 2: Slab - Elevator Pit
- Component 3: Walls - Below Grade
- Component 4: Walls - Ground Flr CMU - X3B, X3C
- Component 5: Walls - Ground Flr LGMF - X2B.1, X2B.2, X2C.1**
- Component 6: Walls - Wood Framed - X1A.1, X1A.2
- Component 7: Walls - Wood Framed - X1A.3
- Component 8: Walls - CMU - X3A
- Component 9: Walls - Trash Room - SA2-6B
- Component 10: Roof - R1A, R2A, R2B
- Component 11: Floor - F2A, F2B
- Component 12: Floor - F3B Over Trash

**Assigned assembly:**

Name	R [hr ft² °F/Btu]
_Wall - 6" metal stud w/ mineral wool batt, 3" semi-rigid mineral wool	26.671

**Available assemblies:**

Name	R [hr ft² °F/Btu]
_Slab - 5" concrete, 3" Low GWP XPS	15.495
_Slab - 12" concrete	1.261
_Wall - 2x6 w/ dense-pack cellulose, 3" semi-rigid mineral wool	32.683
_Floor - CompositeSlab at Podium	0.604
_Wall - 2x6 w/ dense-pack cellulose, 3" semi-rigid mineral wool, 2hr	33.242
_Wall - 8" CMU with 3" exterior mineral wool	14.387
_Wall - 8" CMU with 3" exterior mineral wool	14.387
_Wall - 2x6 LGMF w/ 6" fiberglass batt at semi-conditioned space	13.579

**Inhomogenous layers:**

Thermal resistance: 26.671 / 14.623 hr ft² °F/Btu (EN ISO 6946 / homogenous lay)

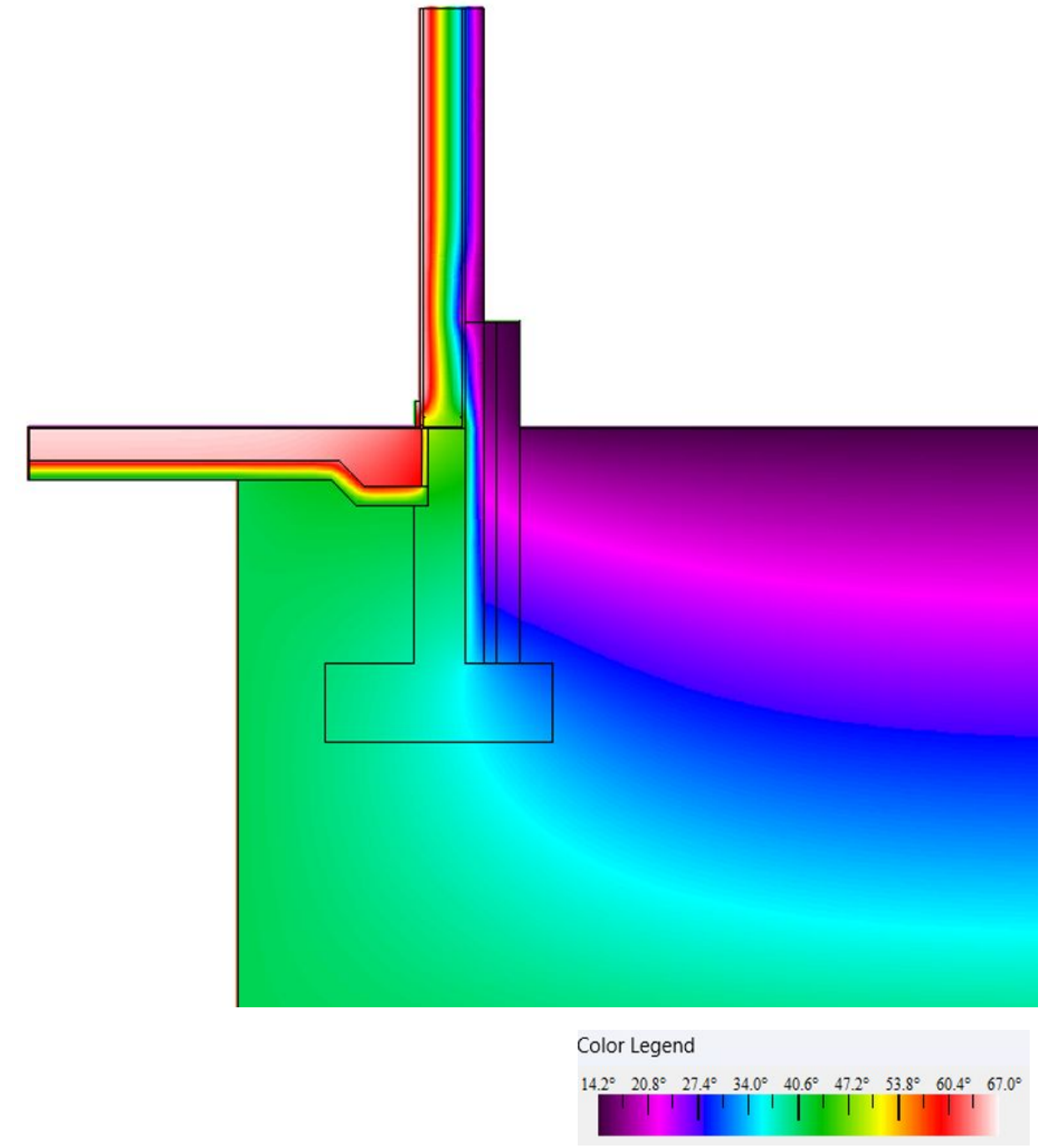
Heat transfer coefficient (U-value): 0.036 Btu/hr ft² °F

Thickness: 10.25 in

**Data state/results** | Show warnings | Calculate WUFI shading (control)

Heating demand:	3.91 kBtu/ft²yr	0 1 2 3 4 5 6 7 8 9	✓
Cooling demand:	2.32 kBtu/ft²yr	0 1 2 3 4 5 6 7 8 9	✓
Heating load:	3.45 Btu/hr ft²	0 1 2 3 4 5 6	✓
Cooling load:	2.59 Btu/hr ft²	0 1 2 3 4 5 6	✓
Source energy:	4,009 kWh/Person yr	0 2000 4000 6000 8000 10000	✓
Site energy:	19.13 kBtu/ft²yr	0 3.33 6.67 10 13.33 16.67 20	✓

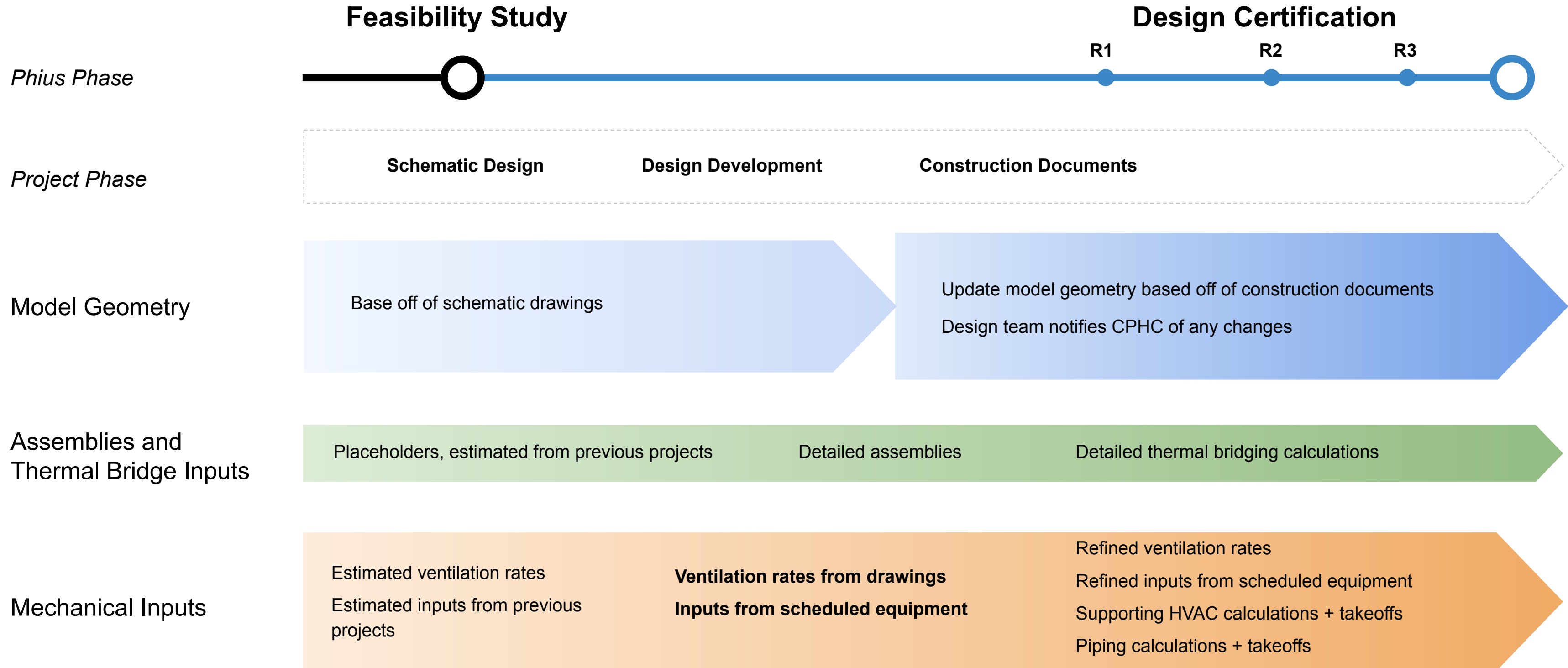
WUFI Passive energy model



Thermal bridging analysis of a typical foundation detail



# Energy modeling through the process





# Utilize checklists to track program requirements

CPHC Design QC Checklist - rev

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	A	B	C	D	E	F	G
1		<b>utile</b>					
2		<b>Phius Design Stage QC Checklist - ARCHITECTURE</b>					Based on PHIUS Certification Guidebook ("CGv2.1"):
3		Project					<a href="https://www.phius.org/phius-certification-for-buildings-products/project-certification/docum">https://www.phius.org/phius-certification-for-buildings-products/project-certification/docum</a>
4				Phase needed			
5				SD/DD	CD		<b>Notes / Action Needed</b>
6							
7		<b>Drawings</b>					
8		<b>Site Plan</b>					
9		<input type="checkbox"/> Building orientation					
10		<input type="checkbox"/> Location and height of neighboring buildings or structures					
11		<input type="checkbox"/> Location and height of trees or ground levels that cast lateral shadows					Provide approx heights of new and existing trees on site plan
12		<input type="checkbox"/> Changes in topography					Provide on site plan or provide note referring to consultant drawing where topography is owned
13		<b>Interior Conditioned Floor Area (iCFA) and Volume</b>					
14		<input type="checkbox"/> Set up a dedicated drawing to show iCFA calculations. See CGv2.1 Section 4.4.1.4					Create an iCFA sheet with tables. See 1599 Columbus or 1005 Broadway example.
15		<input type="checkbox"/> General floor plans show floor areas associated with all rooms, both units and common areas - provide room tags with Name, Number, and Area typically					This is needed so that the CPHC can properly input areas into the energy can verify these input areas from the drawings.
16		<b>Thermal envelope</b>					
17		<input type="checkbox"/> Create a "thermal and air performance" diagram sheet in G series, similar to performance criteria drawing. Passive House envelope (thermal and air control layers) must be clearly identified. Best accomplished using section or elevation drawings with exterior dimensions.					See 1599 Columbus or 1005 Bway for reference. Use the same performar projects used.
18		<b>Naming Conventions and Annotation</b>					
19		<input type="checkbox"/> Labels in drawing match labels in WUFI Energy Model					WUFI model to use G-series assembly names. notify JG if dwgs are updat
20		<input type="checkbox"/> Clear window and door schedule with frame size and rough openings					
21		<input type="checkbox"/> Window surround/reveal dimensions					See 1005 Bway for precedent
22		<input type="checkbox"/> All details must be fully annotated with dimensions and call-outs for specific materials. e.g. call out insulation type rather than nothing 'rigid'					This is so the insulation type can be matched with the insulation specs pro resistance can be verified
23		<b>Detailed Drawings - Show thermal and air continuity, and constructability for:</b>					
24		<input type="checkbox"/> All unique junctions of the thermal envelope					

+ ☰ QC Checklist ARCH ▾ 1 QC Checklist- MEP ▾ Roles Matrix ▾



# Conduct drawing review for Phius documentation

Contract Document G-Series	Feasibility Study	Design Certification	
		R1 Submission	Round 2, 3...
iCFA	X	X	X
Thermal Envelope Diagram	X	X	X
Exterior Assemblies	X	X	X
<b>Contract Document A-Series</b>			
Room Tags and Schedules for Int. Gain Calcs	X	X	X
Typical Exterior Details		X	X
Window Schedule, Surround Dim's		X	X
Thermal Bridge Mitigation, Details		X	X
Unique Conditions Exterior Details		X	X
<b>Consultants</b>			
MEP drawings meet Phius requirements		X	X
Structural includes thermal breaks as required		X	X

X Required for CPHC inputs  
 X Required for CPHC inputs +  
 PHIUS Review







# Coordinate with Verifier + Track changes during construction

The screenshot displays the WUFI Passive V.3.5.0.1 software interface. The top menu includes File, Input, Options, Database, and Help. The main window is titled "Passive house verification" and shows a list of building components on the left, including various slabs, roofs, and window types. The right pane is divided into "General", "Window parameters", and "Solar protection" tabs. The "Window parameters" tab is active, showing a table of assigned window types and their U-values. Below this, there are "Available window types" with options to New, Delete, Copy, or Insert. A "Basic data" table provides further window specifications. At the bottom, a "Data state/results" section shows energy demand and load metrics with corresponding bar charts and status indicators (green checkmarks for heating and cooling, red X for site energy).

Assigned window type	Name	Uw [Btu/hr ft² °F]
	Intus Supera Operable - ClimaGuard 1.0+ Glass - High STC	0.1926

Available window types	Uw [Btu/hr ft² °F]
Intus Supera Placeholder	0.1786
storefront placeholder	0.3965
Intus Supera Operable	0.1849
Storefront Placeholder	0.3373
Intus Supera - Fixed	0.1774
Logic 70mm - Tilt Turn - loE 272 Glass	0.214
Storefront - Kawneer Trifab 601UT w/ Guardian SN-68 + Technoform Spa	0.3956
Intus Supera - Fixed - ClimaGuard 1.0+ Glass	0.1619

Basic data	Uw-mounted [Btu/hr ft² °F]	Uw
Uw-mounted	0.1926	0.1926
Frame factor		0.6846
Glass U-value	0.117	

Metric	Value	Status
Heating demand:	3.41 kBtu/ft²·yr	✓
Cooling demand:	2.26 kBtu/ft²·yr	✓
Heating load:	2.95 Btu/hr ft²	✓
Cooling load:	2.17 Btu/hr ft²	✓
Source energy:	5,228 kWh/Person yr	✗
Site energy:	19.21 kBtu/ft²·yr	✗





An aerial architectural rendering of a city, showing a dense grid of buildings and streets. The buildings are rendered in white and light gray, with some green spaces interspersed. In the upper right, a large, dark gray blimp with the word "utile" written on its side is flying over the city. The background shows a body of water with many small sailboats and a larger ship. The overall style is clean and modern, with a focus on urban planning and architecture.

**Thank you!**

**Jeff Geisinger**  
geisinger@utiledesign.com