

HIGH PERFORMANCE ENCLOSURE DETAILS & CONSTRUCTABILITY

BCBEC 2022 CONFERENCE

Morgan McDonald

Director of Operations
Ledcor Renew

Dan Geddes

Preconstruction Business Development Manager
Flynn Canada





825 Pacific Passive House



Success Drivers

1

COLLABORATIVE TEAM

2

3

4

5

Success Drivers

1

COLLABORATIVE TEAM

2

EARLY INVOLVEMENT

3

4

5



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SHOP DRAWING WORKSHOP

4

5

Before and After Shop Drawing Workshop

- Glazing Cardinal 180/180
(0.56 SHGC, 0.65 W/m²K)
- Psi-install 0.045 W/mK

- Glazing Cardinal 366/180
(0.27 SHGC, 0.59 W/m²K)
- Psi-install 0.08 W/mK
- elevator • plumbing submittals

		1525.4		1525.4		
Space heating	Heating demand kWh/m ² yr	5	5	5	5	YES
	Heating load W/m ²	5	5	5	5	
	Heating load kWh/m ² yr	5	5	5	5	
Space cooling	Cooling & dehum. demand kWh/m ² yr	4	4	4	4	YES
	Cooling load W/m ²	4	4	4	4	
	Frequency of overheating (> 25 °C) %	0	0	0	0	YES
Airtightness	Frequency of excessively high humidity (> 12 g/g) %	0	0	0	0	YES
	Phenomenon not resolved by 1h	0.6	0.6	0.6	0.6	YES
	Non-renewable Primary Energy (PE) PE demand kWh/m ² yr	113	113	113	113	YES
Primary Energy Renewable (PER)	PER demand kWh/m ² yr	42	42	42	42	
	Generation of renewable energy (in relation to pre-2010 building footprint area)	-	-	-	-	
		1527.4		1527.4		
Space heating	Heating demand kWh/m ² yr	13	13	13	13	YES
	Heating load W/m ²	13	13	13	13	
	Heating load kWh/m ² yr	13	13	13	13	
Space cooling	Cooling & dehum. demand kWh/m ² yr	0	0	0	0	YES
	Cooling load W/m ²	1	1	1	1	
	Frequency of overheating (> 25 °C) %	0	0	0	0	YES
Airtightness	Frequency of excessively high humidity (> 12 g/g) %	0	0	0	0	YES
	Phenomenon not resolved by 1h	0.6	0.6	0.6	0.6	YES
	Non-renewable Primary Energy (PE) PE demand kWh/m ² yr	120	120	120	120	YES
Primary Energy Renewable (PER)	PER demand kWh/m ² yr	54	54	54	54	
	Generation of renewable energy (in relation to pre-2010 building footprint area)	-	-	-	-	

Success Drivers

1

COLLABORATIVE TEAM

2

EARLY INVOLVEMENT

3

SHOP DRAWING WORKSHOP

4

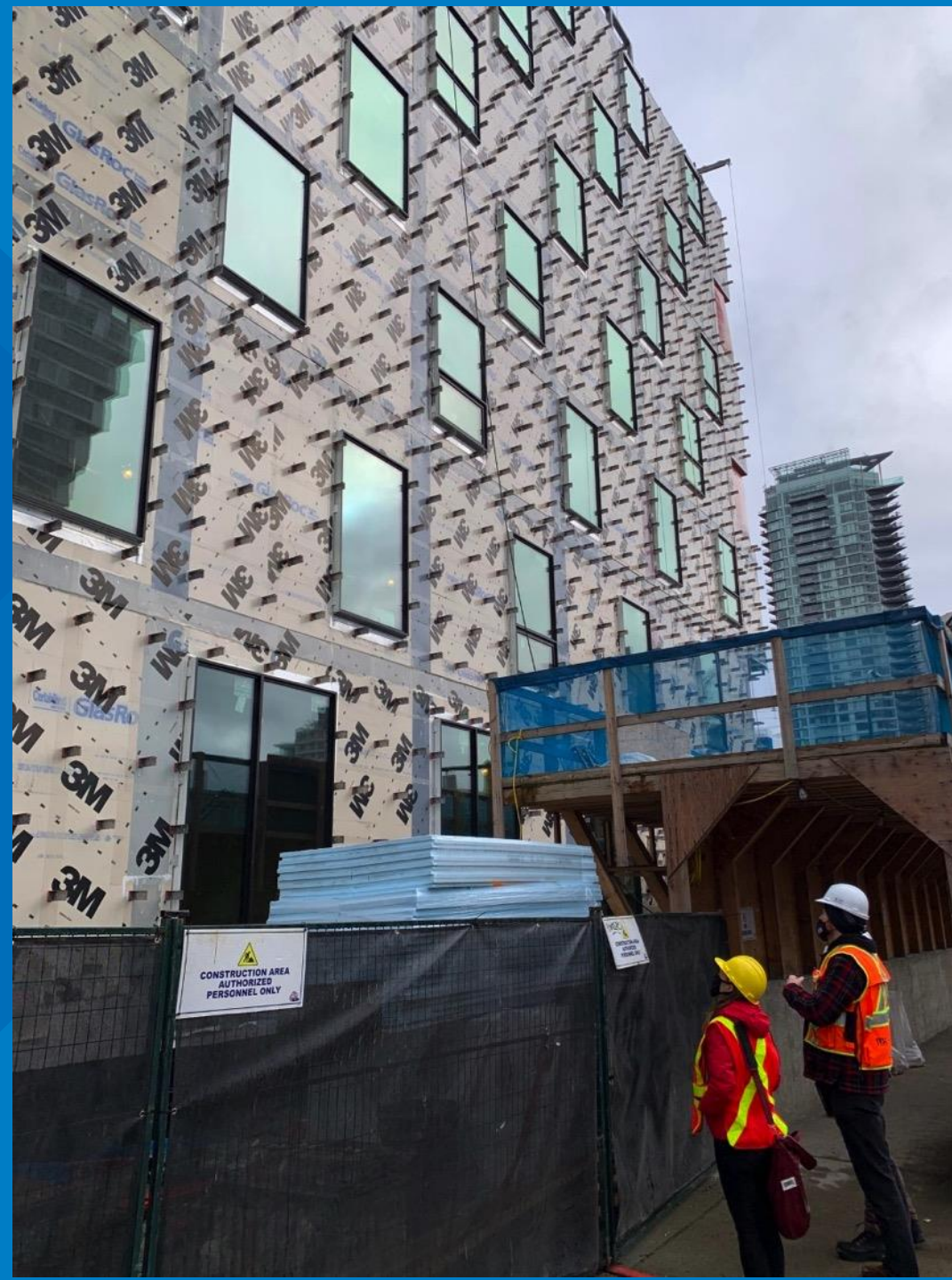
MOCK UP

5



Success Drivers

1	COLLABORATIVE TEAM
2	EARLY INVOLVEMENT
3	SHOP DRAWING WORKSHOP
4	MOCK UP
5	MID-CONSTRUCTION AIRTIGHTNESS TESTING





Success Drivers

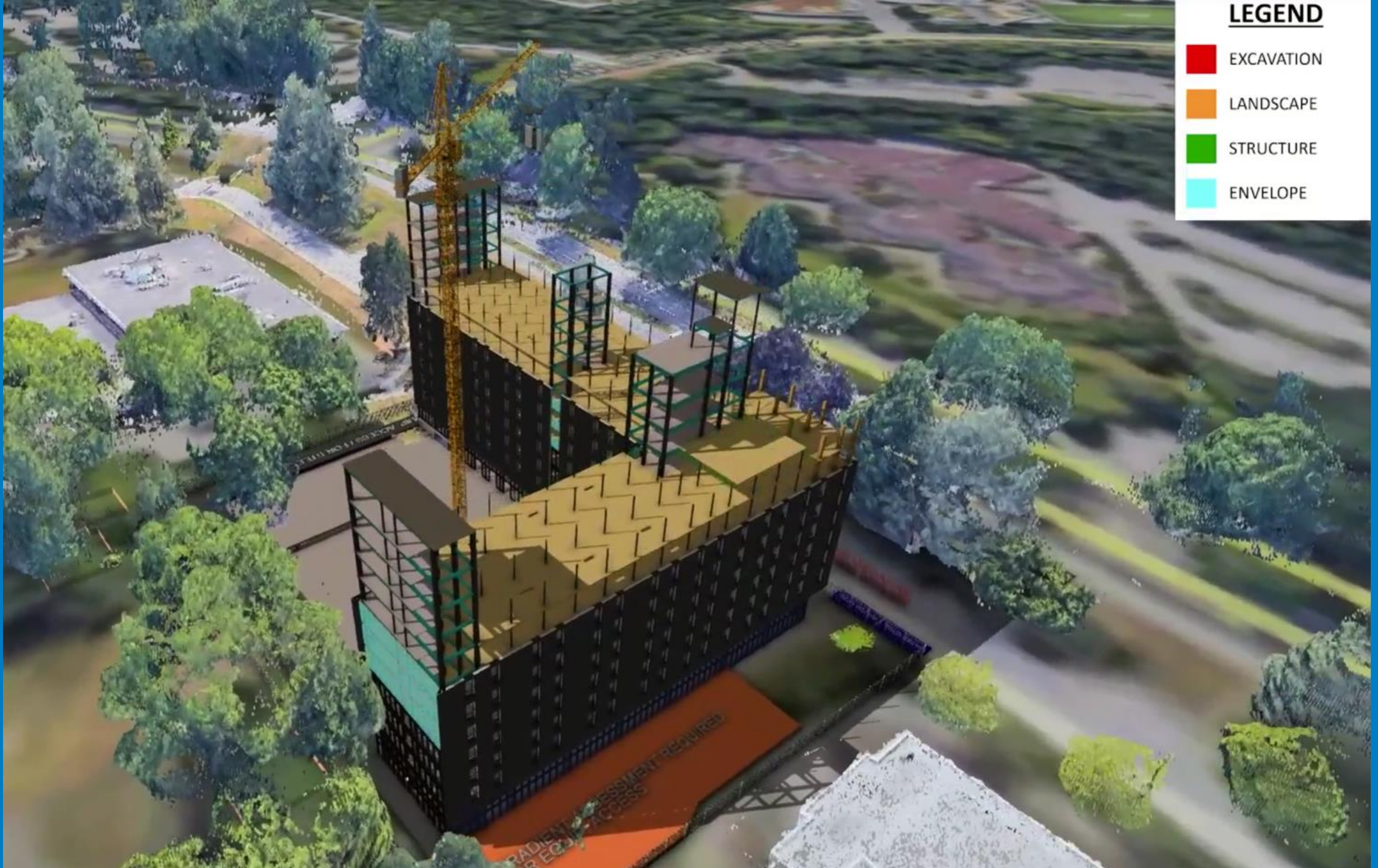
1	COLLABORATIVE TEAM
2	EARLY INVOLVEMENT
3	SHOP DRAWING WORKSHOP
4	MOCK UP
5	MID-CONSTRUCTION AIRTIGHTNESS TESTING

BCIT Tall Timber Student Housing

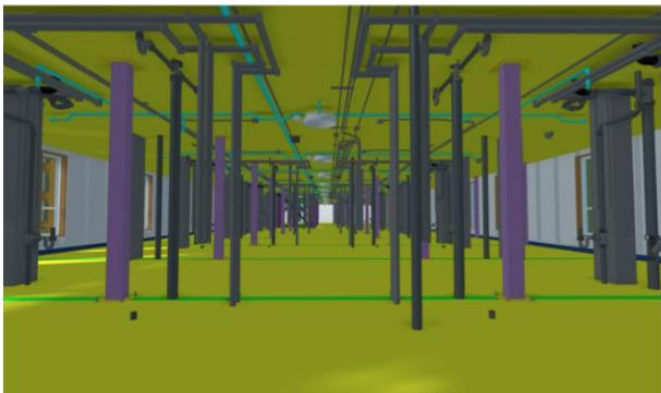
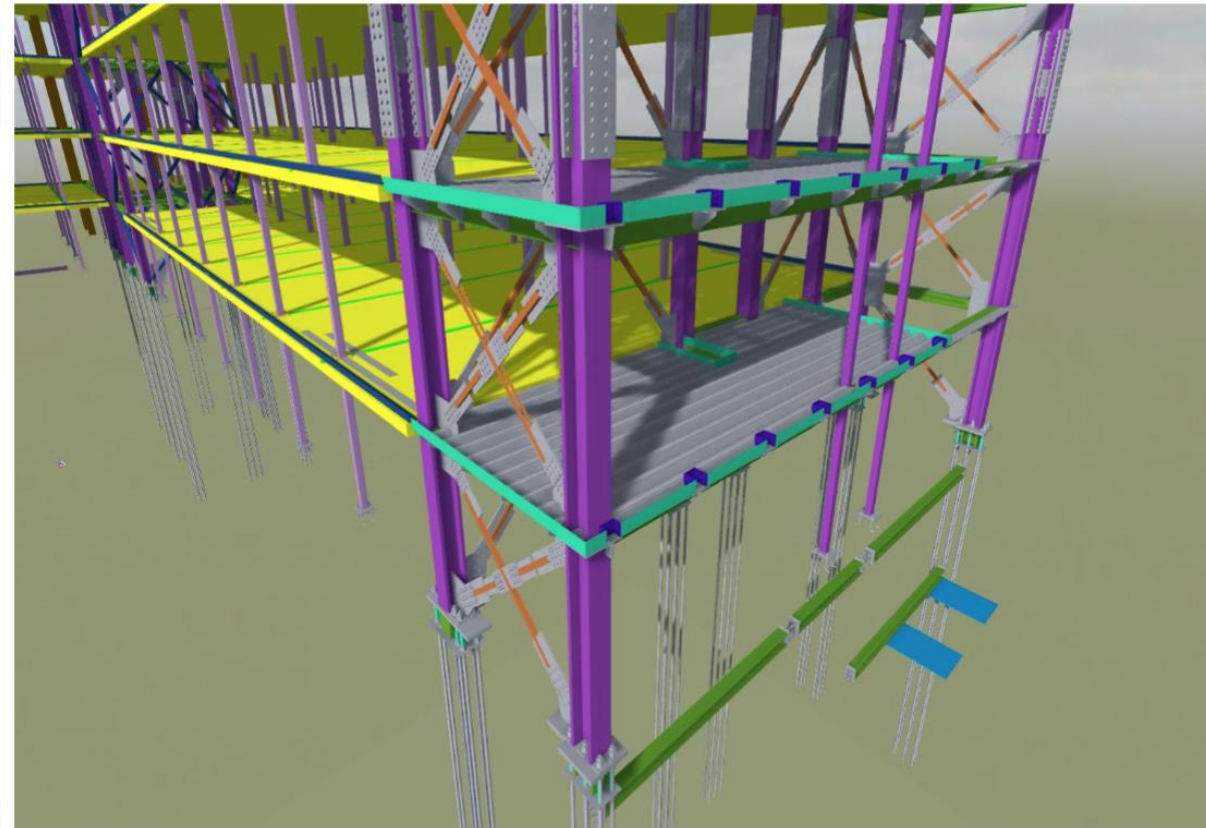
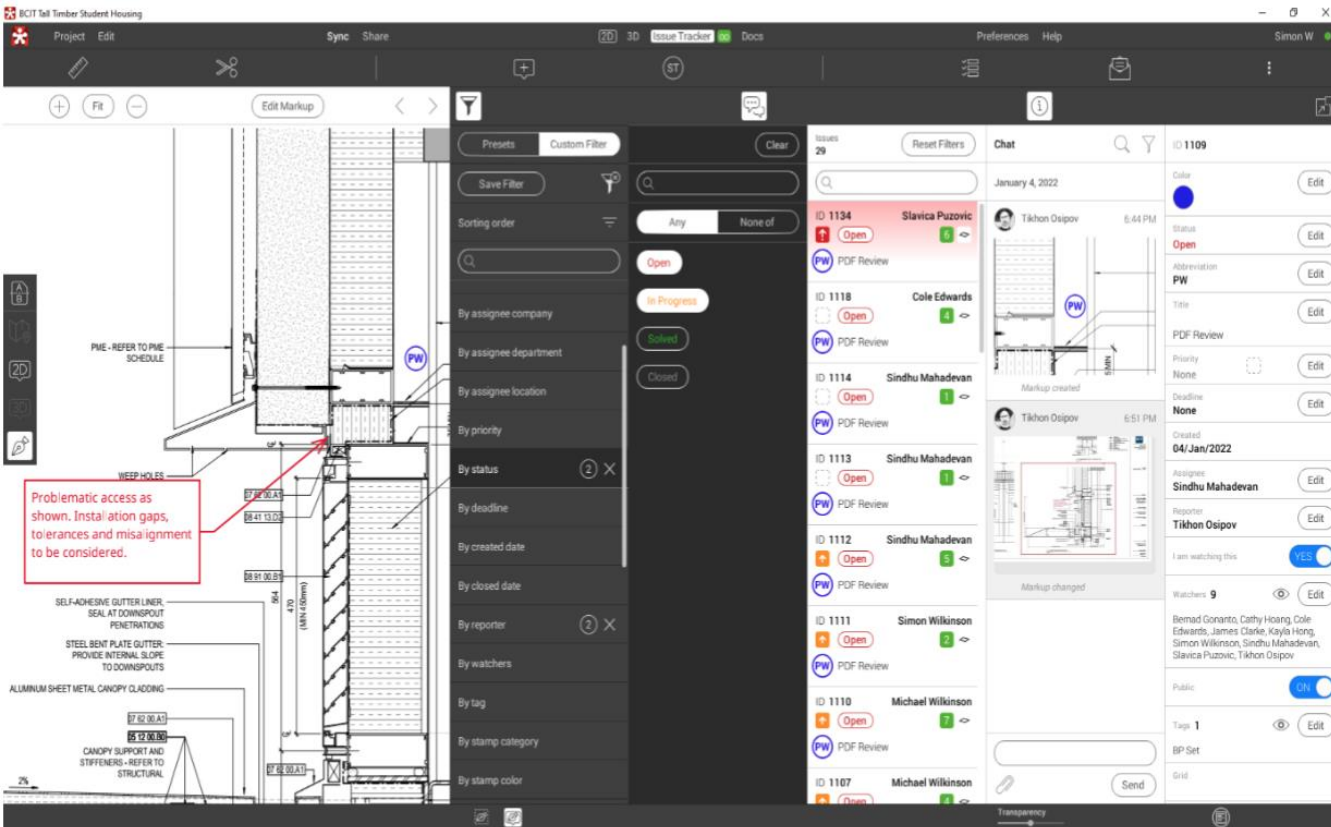


LEGEND

- EXCAVATION
- LANDSCAPE
- STRUCTURE
- ENVELOPE



Design-Assist Collaboration





FLYNN GROUP OF COMPANIES

The Total Building Envelope

High Performance Enclosure Details & Constructability
Subcontractor process and perspective



Pretender process

- Review of architectural drawings and specifications to optimize labor and material costs
- Reviewed specified membranes, from a field perspective to achieve airtightness
- Reviewed specified thermal clip and looked at alternate options.
- Selected clip and provided thermal model after structural calculations





Membrane selection

- The preconstruction and estimating team consulted with senior personnel in the field on choice of membrane, to select the product that everyone felt would be the most airtight for detailing and installation purposes
- 3M 3015 was chosen, even though it has a slower install compared to other primerless membranes
- Leaned on previous experience to make estimating choices for the best possible outcome regarding air tightness.





Thermal Clips

- In all instances, less is more
- Stronger clips mean less clips to install, and less thermal bridging
- Adjustable clips are most preferred, to flatten out deviation in the substrate
- Horizontal application of substructure is most preferred, allowing clips to be set at rockwool widths, to drastically reduce cutting 2 layers of insulation on site
- EJOT was selected due to its diagonal brace picking up deadload, reducing number of clips
- Thermal model was submitted with the tender package, with alternate price provided, deduct on construction costs
- Thermal performance was improved allowing reduction in insulation thickness from 10" to 8" for further savings
- This could of allowed for larger floor plate on the narrow building if caught in time



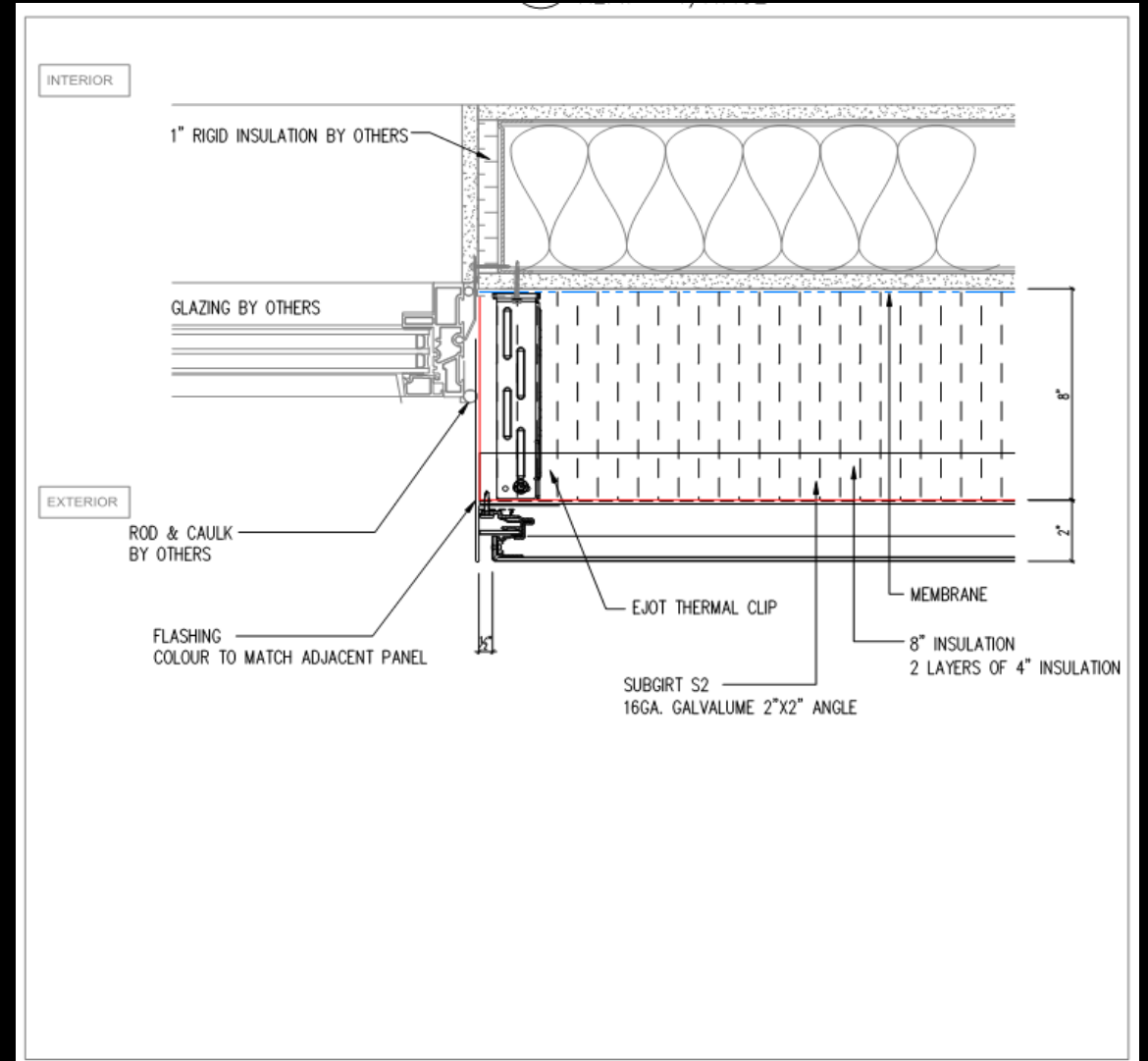
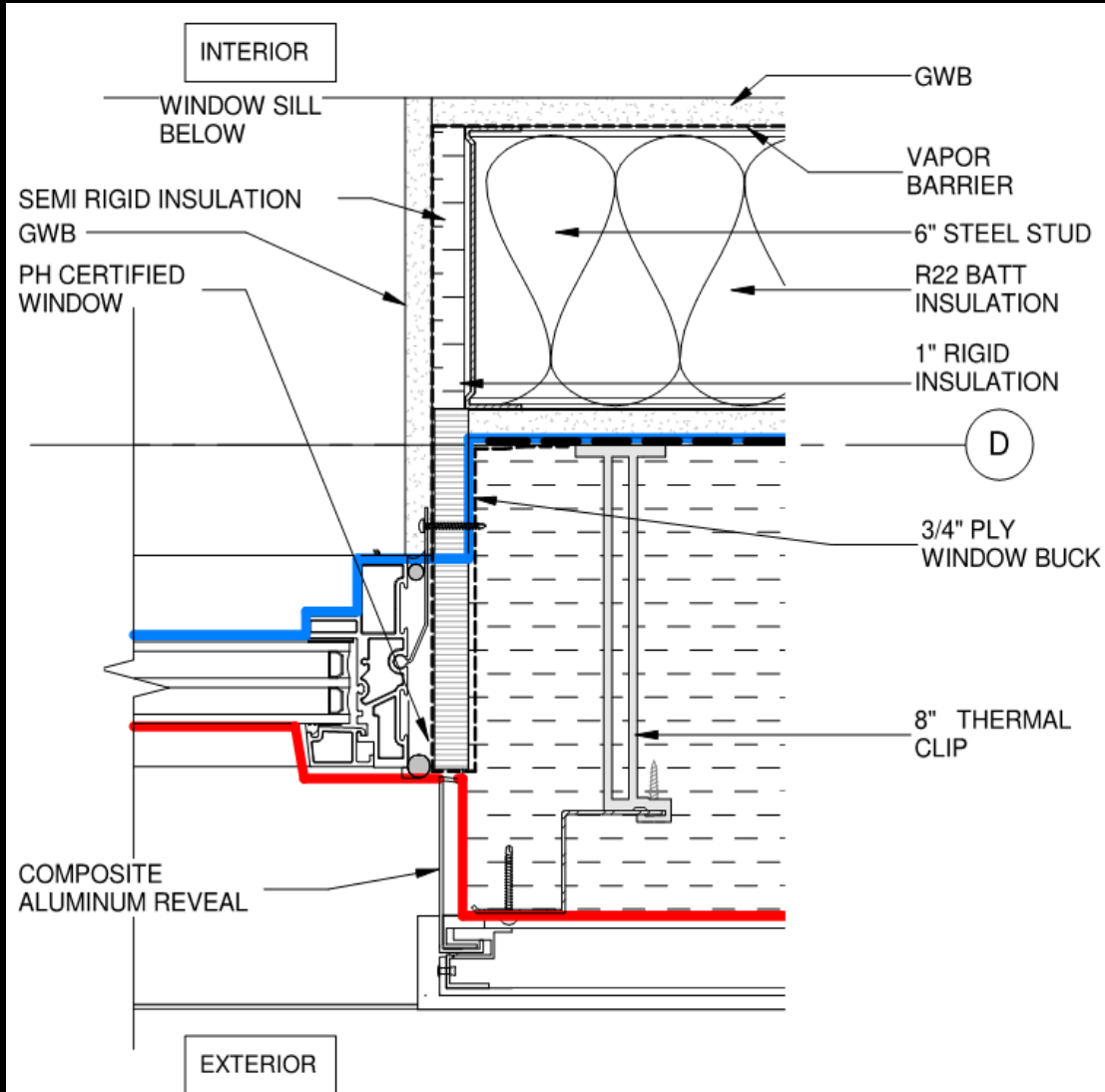


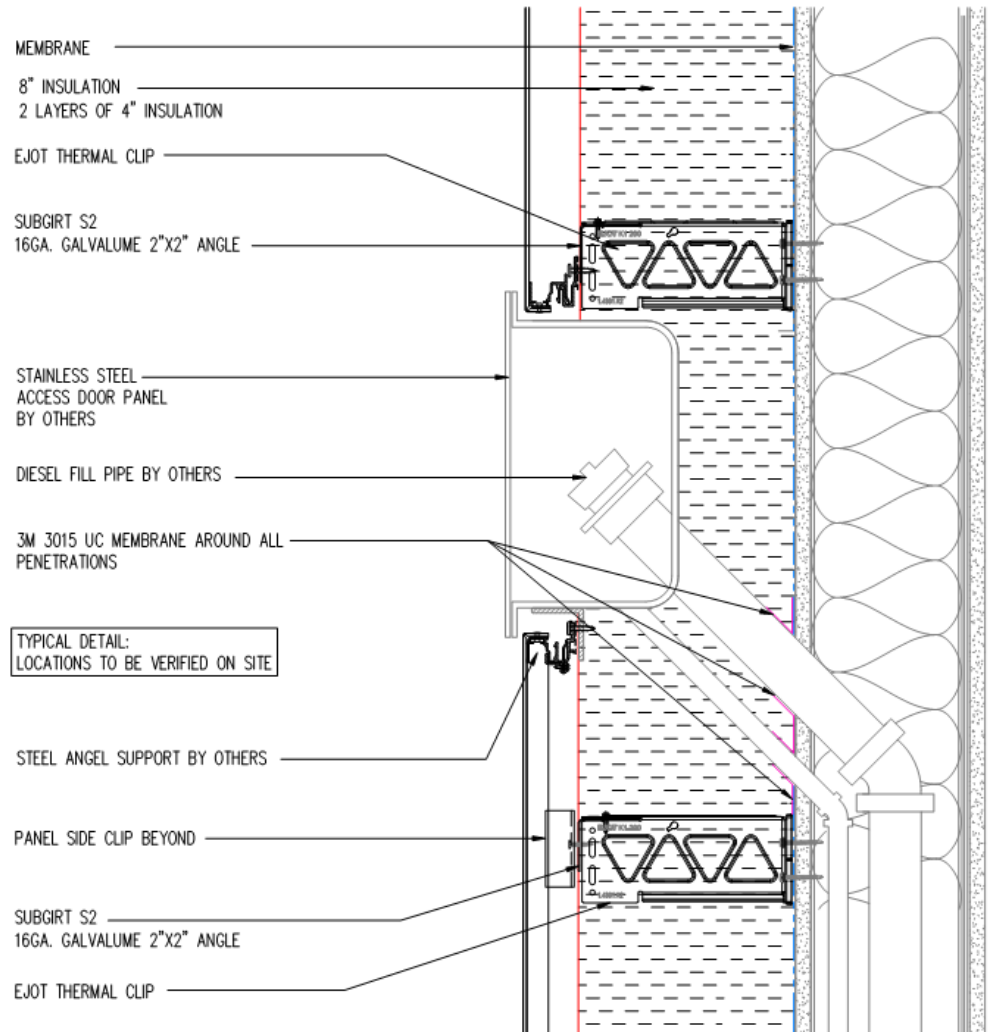
Window detailing

- The original window details had plywood bucks at jamb head and sill conditions
- Wrapping the air barrier around the plywood posed additional detailing work at a high skill level to achieve the air barrier
- The team worked towards removing the bucks to simplify membrane application

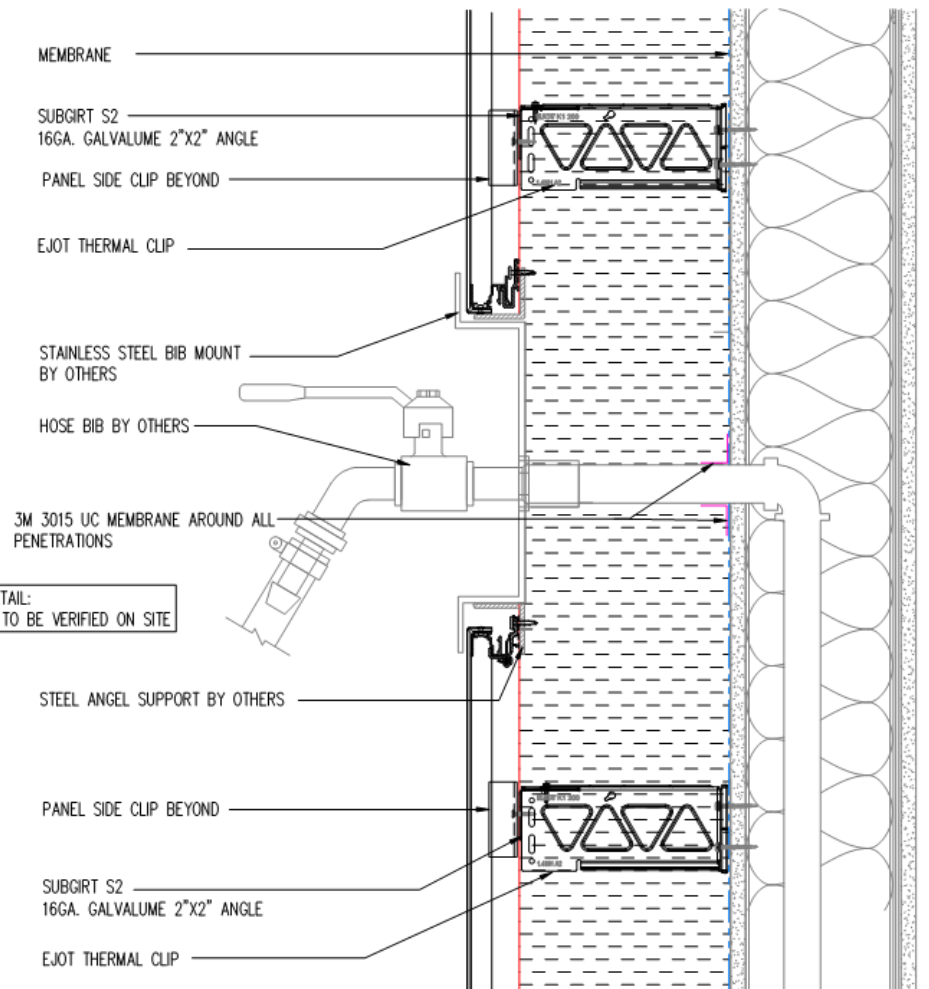


Window Detailing





6 ACM PANEL AT DIESEL FILL BOX (SECTION)
REF.: 1/A7.03



7 ACM PANEL AT HOSE BIB DETAIL (SECTION)
REF.: 2/A7.03



Site Execution

- Interim air testing at the correct time
- Other projects have conducted interim testing too late in the construction schedule
- Issues were found and corrected, prior to finishes and insulation installed
- Careful planning required to conduct the test without interfering with the construction schedule
- Air barrier was reviewed by site staff daily, documented and repaired as necessary





Repeating process and fostering early collaboration

- 825 pacific was unique in the fact that it was everyone's first time attempting a passive house commercial project
- All team members were more invested than other typical projects
- Preplanning and collaborative design process aided in a successful project on time with very little change order regarding the exterior envelope
- How do we continue to collaborate at this level moving forward, to execute high performance buildings



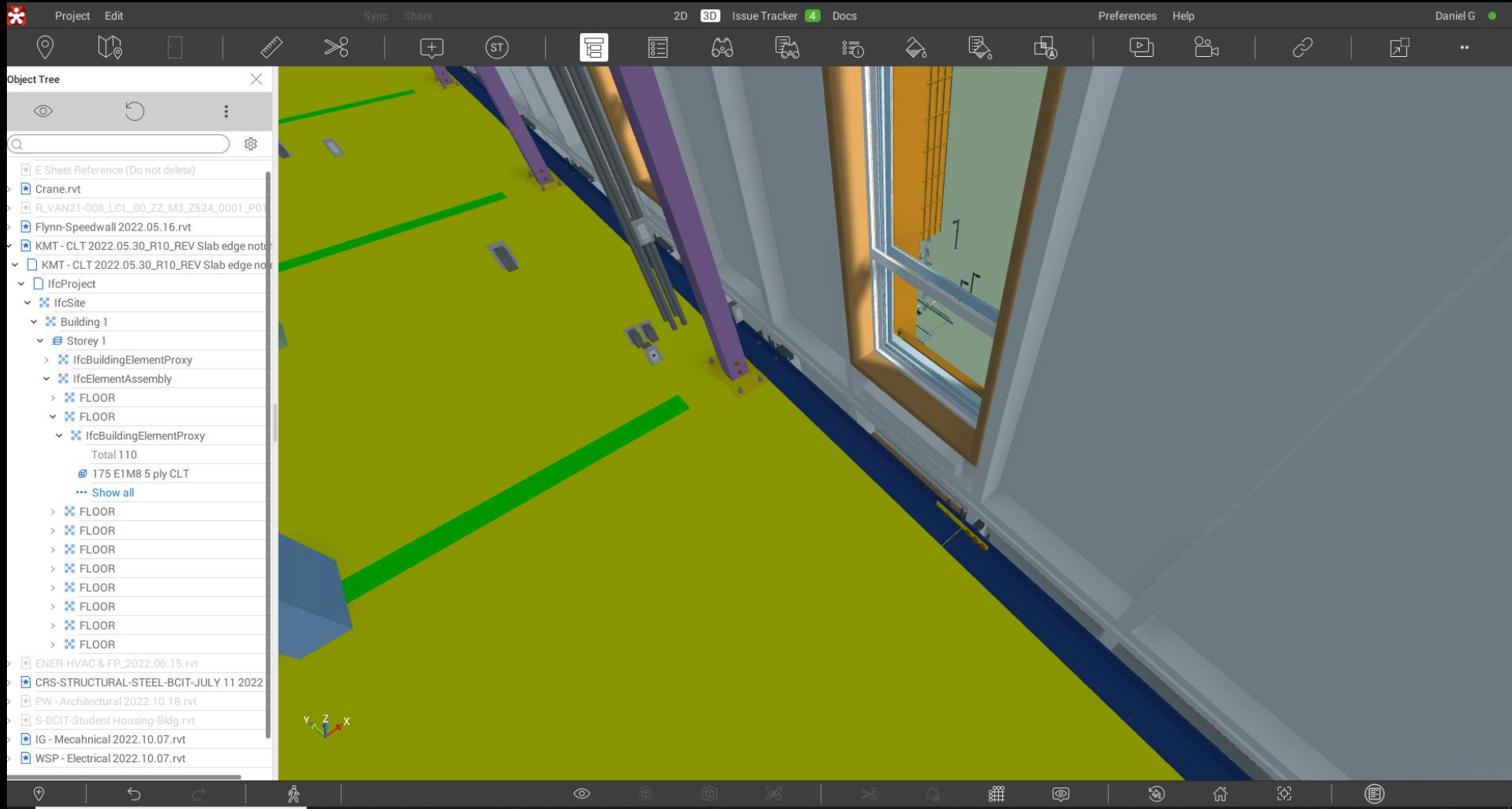


BCIT





Full Clash detection in Revisto





BCIT Tall Timber Student Housing



Project Edit

Sync Share

2D

3D

Issue Tracker 3

Docs

Preferences Help

Daniel G



Fit



Edit Markup



Presets Custom Filter



Search

All issues

Current issues

L7 - Issue List (Major)

L8 - Issue List (Major)

BIM Architectural Minor List

BIM Meeting critical, major ...

BIM Meeting Structural

BIM MEP Minor List

L1 - Issue List (Major)

20220111 BIM Structural ...

BIM MEP Critical/Major List

Watched by me

L3 - Issue List (Major)

BIM Meeting Electrical

L2 - Issue List (Major)

L4 - Issue List (Major)

Foundation - Issue List (Ma...

2022.04.12 - MEP Open Is...

BIM Structural Minor List

Open Issues

Roof - Issue List (Major)

BIM Critical Issue List

Issues: 1591

Search

ID 1137 Daniel Geddes

SOLVED

L10 Flynn

ID 1015 sindhu.mahadevan@per...

SOLVED

PDF Review

ID 1000 Jamie Sullivan

SOLVED

L2 Flynn

ID 925 Kelvin Siu

SOLVED

L2 Electrical

ID 1680 Jonathan Gutierrez

OPEN

Basement Mechanical - Light x Duct Conflict

ID 1679 Jonathan Gutierrez

OPEN

Basement Mechanical

ID 1678 Jonathan Gutierrez

OPEN

L12 Mechanical

ID 1677 Jonathan Gutierrez

OPEN

Chat



Changed priority from None to Major

Daniel Geddes 7:00 PM



Markup changed

Daniel Geddes 7:02 PM

Gusset and anchor connection for PME required, Deadload location. required similar locations.

April 19, 2022

cole.edwards@ledcor... 9:57 AM

Updated in trade models

cole.edwards@ledcor... 9:57 AM

Changed status from Open to Solved

May 3, 2022

bernad.gonanto@ledcor... 1:24 PM

Added watcher: carlos.cano@ledcor.com

Message

ID 1137

Color Orange

Status SOLVED

Abbreviation 10N

Title L10 Flynn

Priority Major

Deadline None

Created 02/Feb/2022

Assignee Daniel Geddes

Reporter Daniel Geddes

I am watching this

Watchers (7) Bernad Gonanto, Carlos Prados Cano, cathy.hoang@ledcor.com, C...

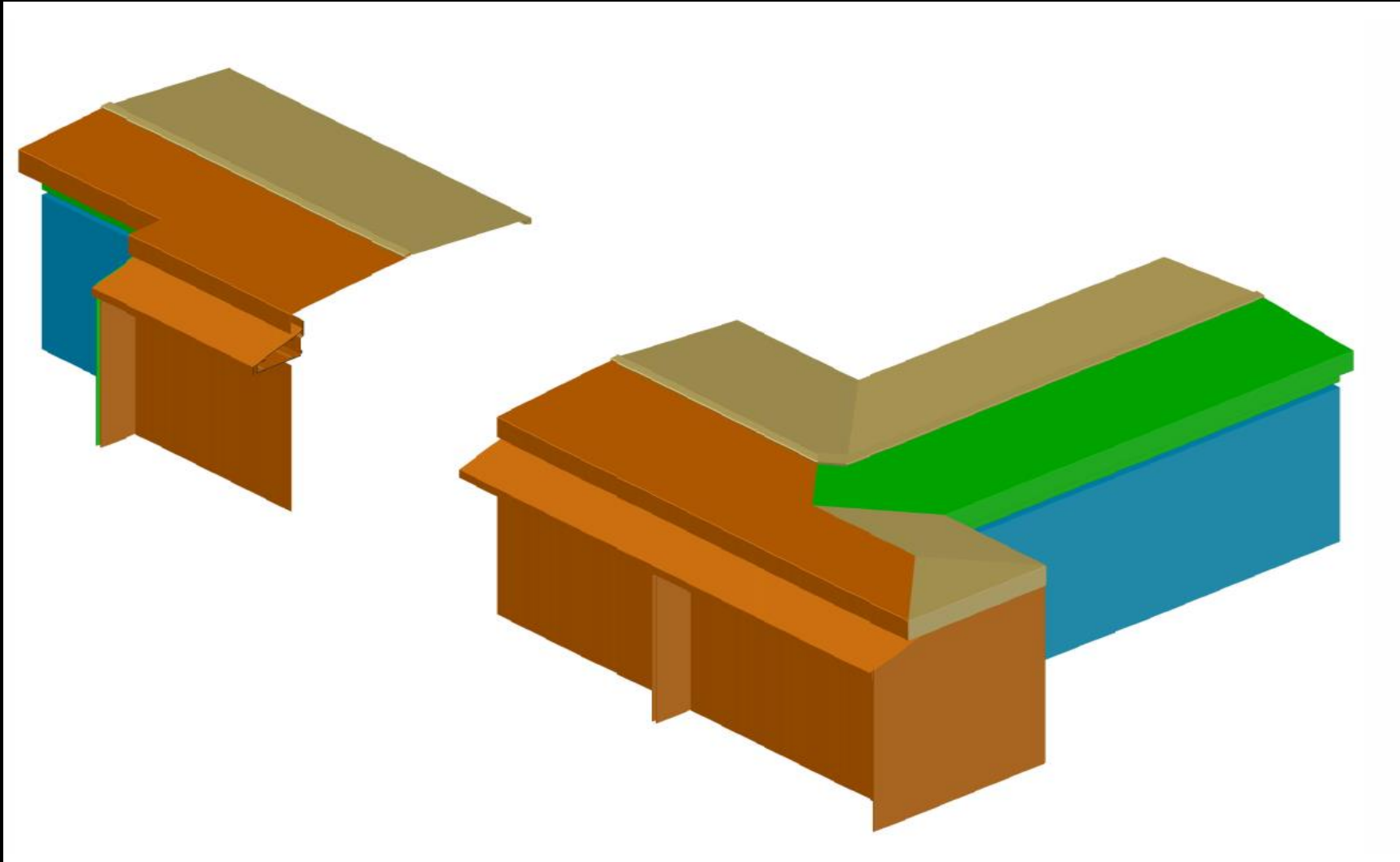
Public

Tags (1) BP Set

Grid

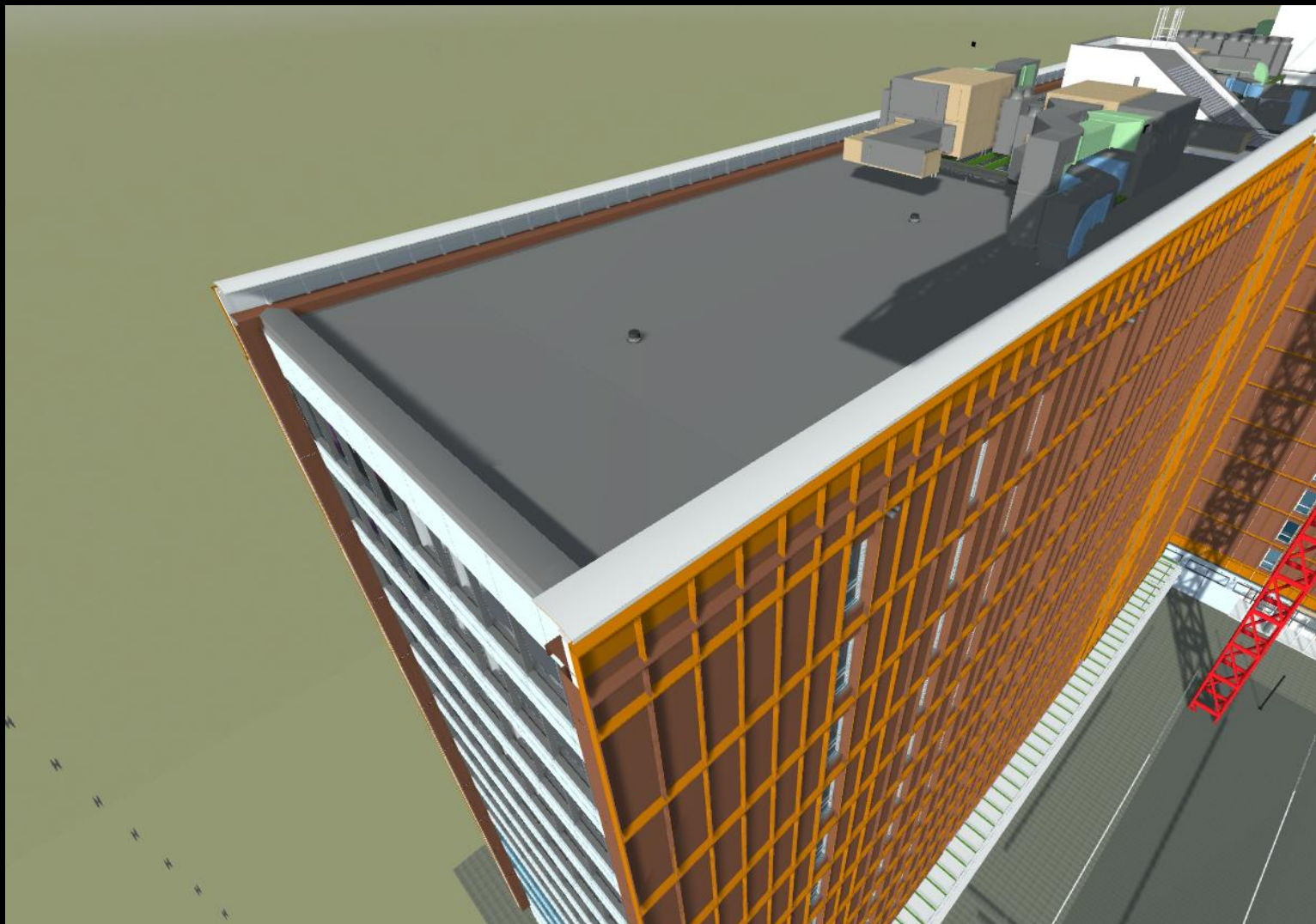
Level

Parapets

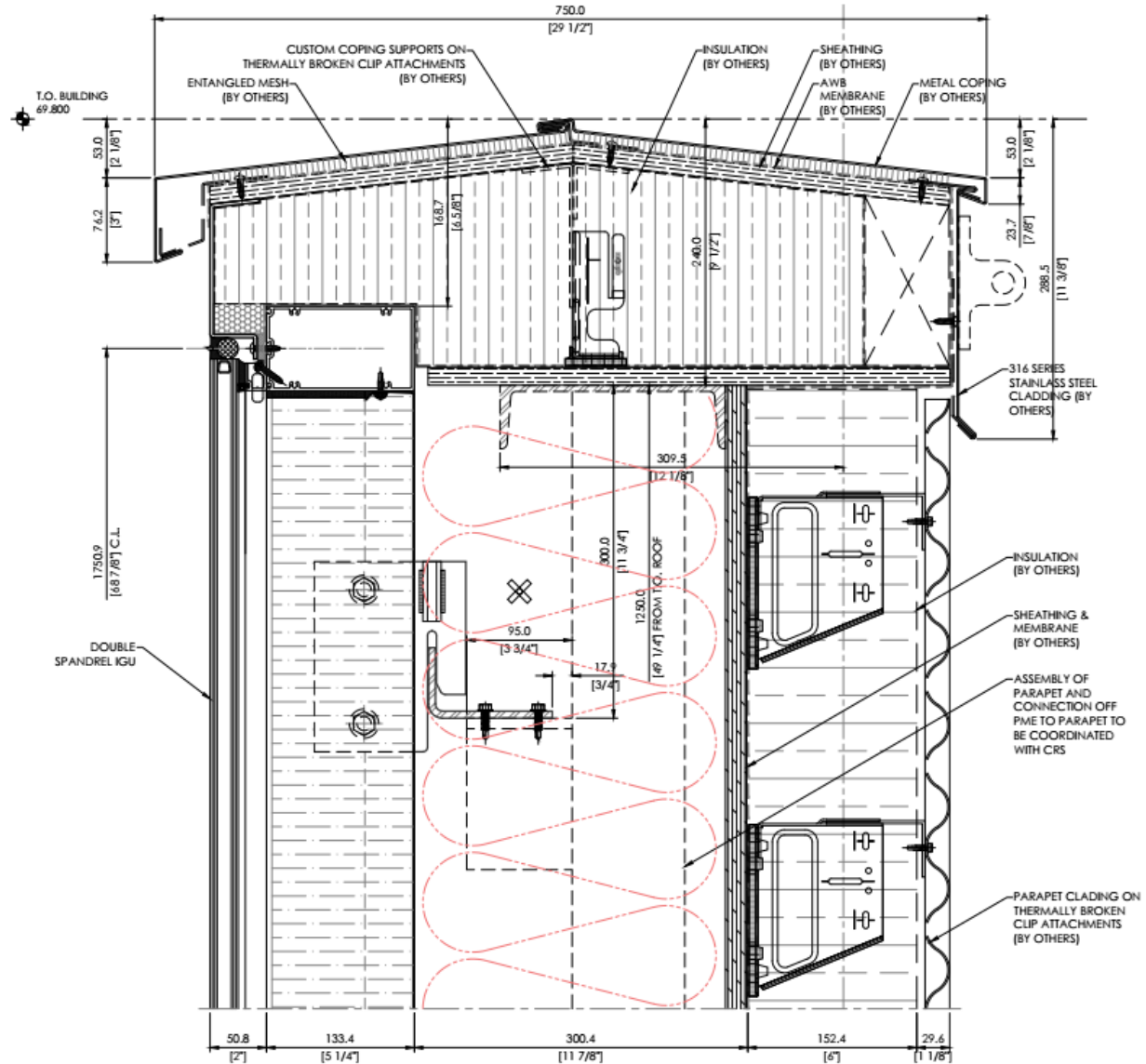




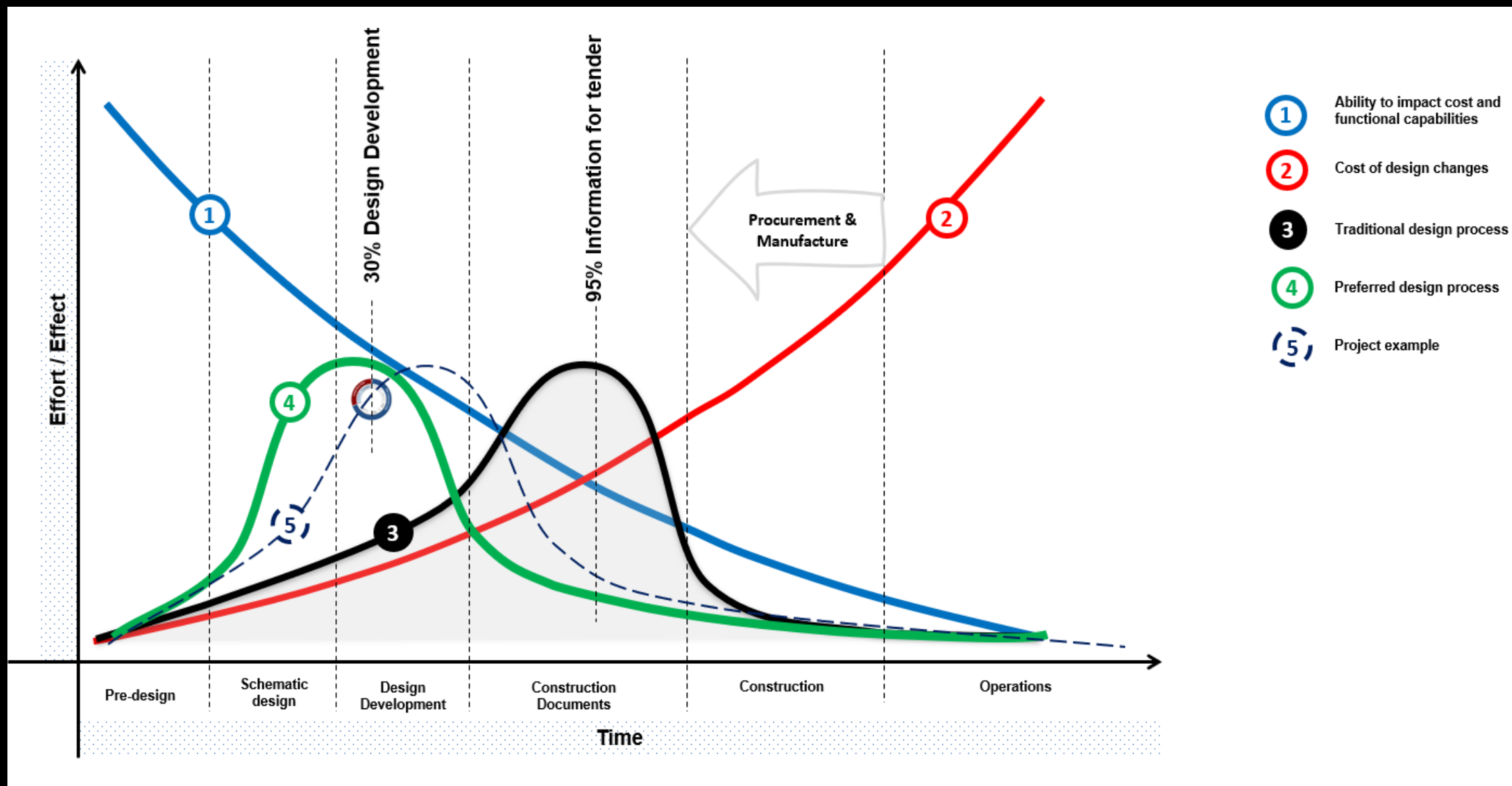
Parapets



Parapets



The Benefits



THANK YOU

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