Building Science Summit New Zealand

Benjy Simmons

Window Performance in Design


STÄRKE
WORLD CLASS FACADES
FOR NEW ZEALAND'S MOST AMBITIOUS PROJECTS
Building Science Summit 2026

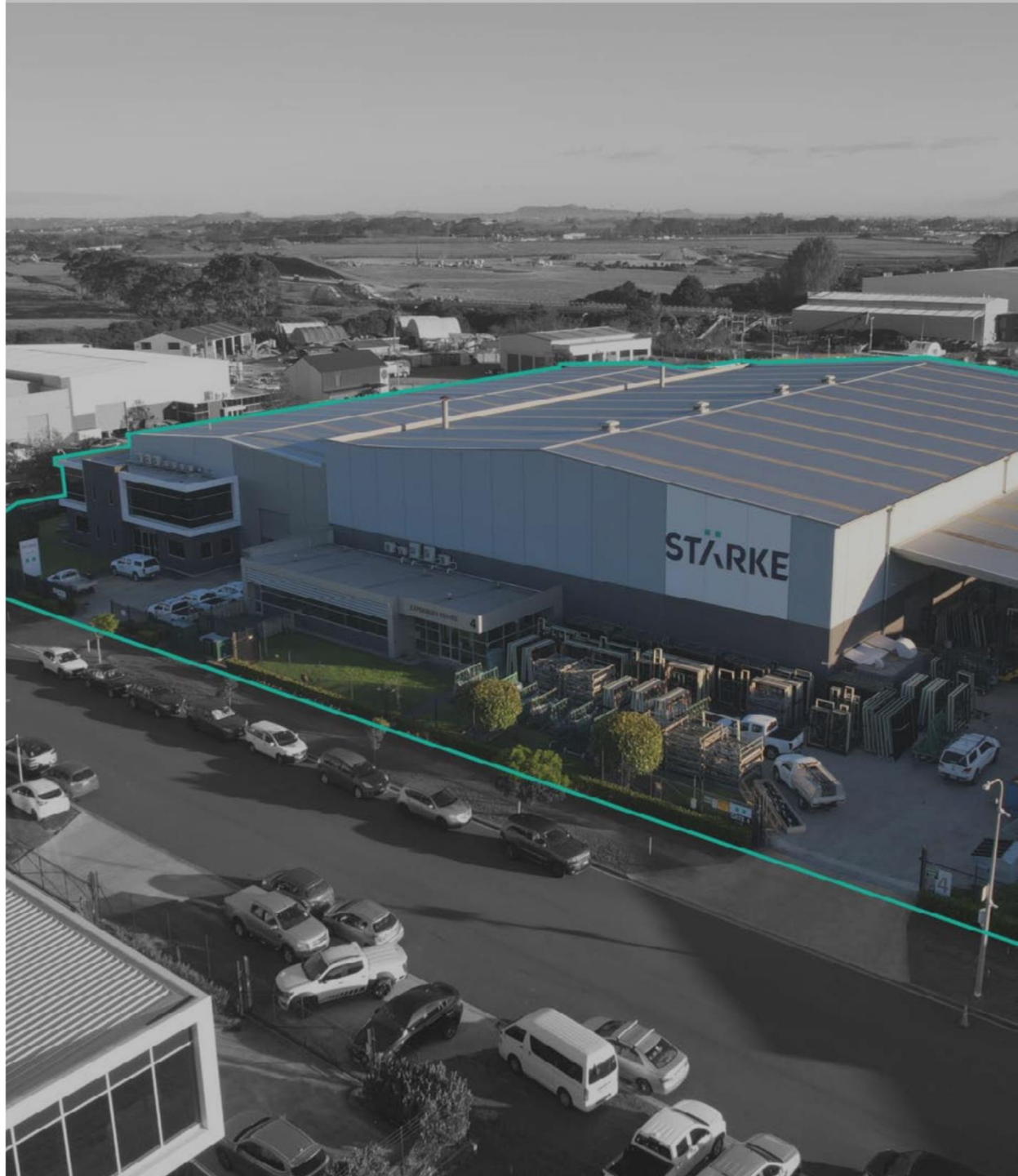
COMPANY OVERVIEW

COMPANY SIZE
65 staff, 3 manufacturing facilities

RESOURCE
End-to-end local resource & manufacturing, combined with international supply chain

HISTORY
40+ years of fabrication experience, family owned company

MINIMUM PROJECT SIZE
$500k or more from Taupo, north. $1m or more rest of country (facade value)














WE ARE LIVING IN A NEW ERA OF CONSTRUCTION

Early Construction

1800s

Sophisticated Construction

1900s

Human-centric Construction

1980-2020s

Energy Efficient, Sustainable, & Resilient Construction

TODAY

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BUILDING FACTORS HAVE CHANGED FOR GOOD

There are new expectations

ENERGY IS NO LONGER CHEAP

CARBON IS NOT DISPOSABLE

WEATHER IS BECOMING MORE EXTREME

“The facade is the hardest working element of the building”

WEATHER

ENERGY

ACOUSTIC

AESTHETIC

WELL-BEING

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WHAT ARE INDUSTRY LEADERS DOING THAT OTHERS AREN'T?

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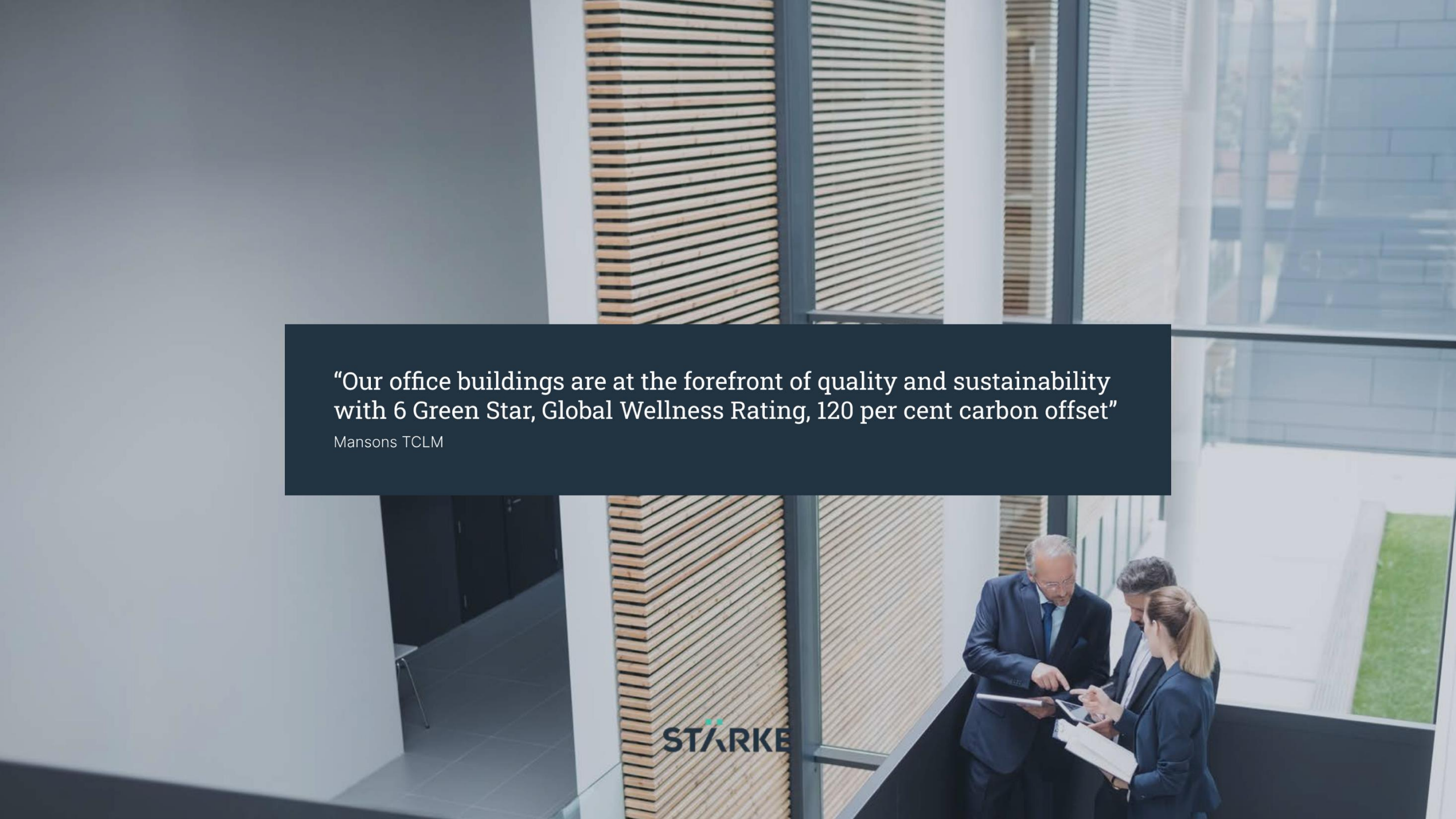
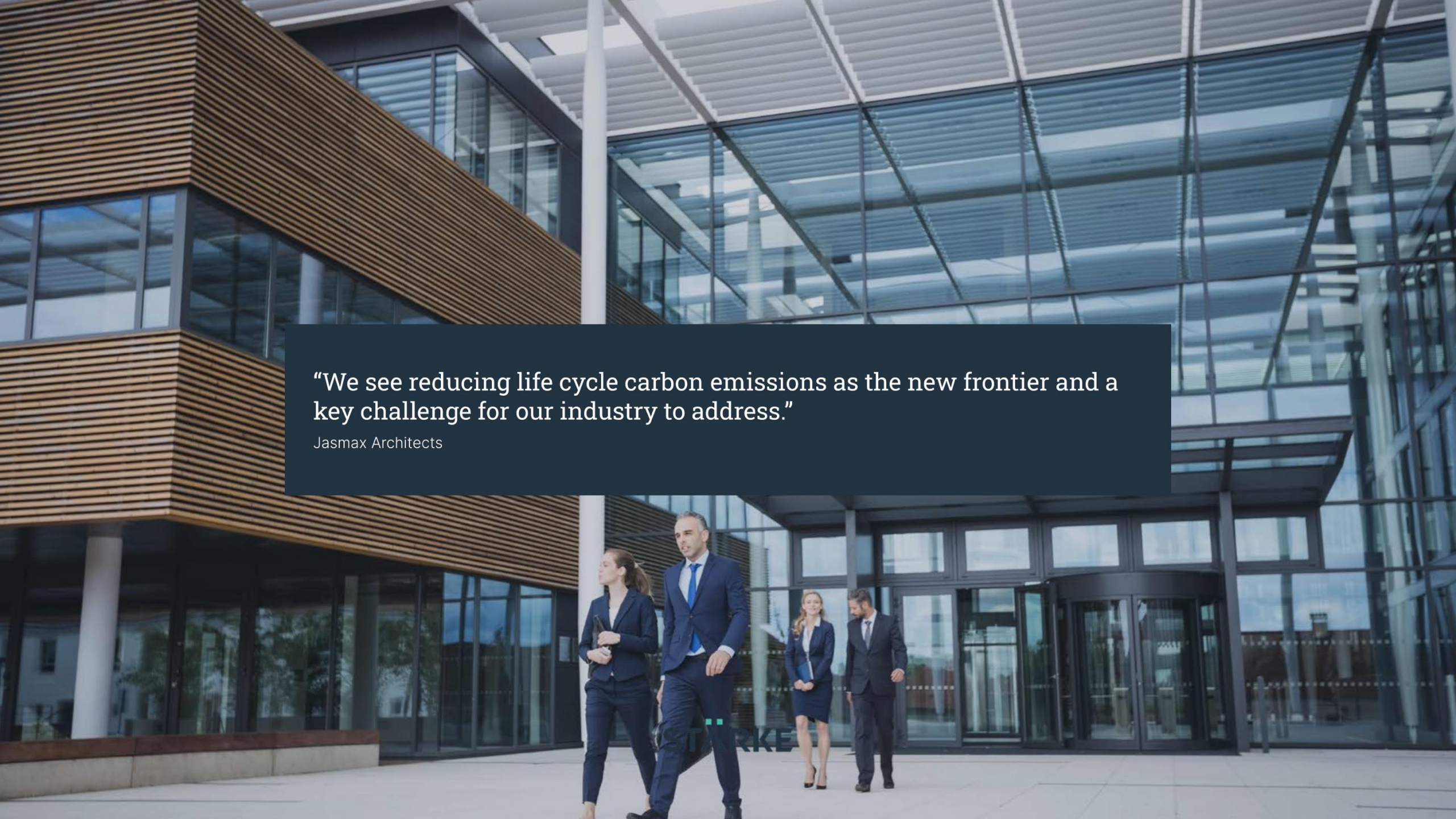
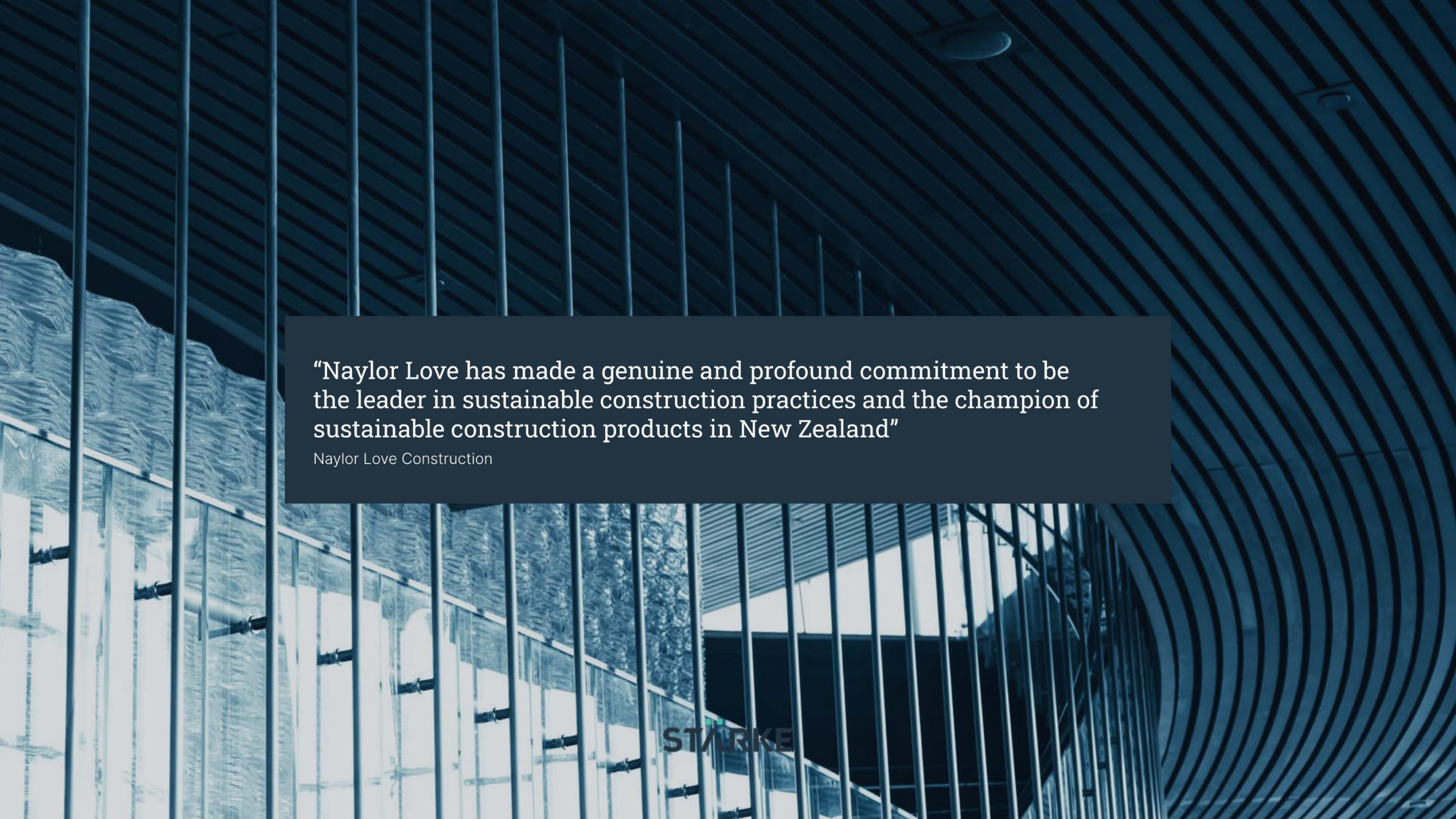


“Our office buildings are at the forefront of quality and sustainability with 6 Green Star, Global Wellness Rating, 120 per cent carbon offset”

Mansons TCLM



> “We see reducing life cycle carbon emissions as the new frontier and a key challenge for our industry to address.”
>
> Jasmax Architects



> “Naylor Love has made a genuine and profound commitment to be the leader in sustainable construction practices and the champion of sustainable construction products in New Zealand”
>
> Naylor Love Construction


“Our commitment to the World Green Building Council Net Zero Carbon Buildings Commitment, the first New Zealand property owner to do so”
Precinct Properties
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WHAT IS THE COMMON THREAD?

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SUSTAINABLE, RESILIENT CONSTRUCTION

&

BUILDING PERFORMANCE

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BUILDING PERFORMANCE IS NOW MANDATORY TO ATTRACT HIGH PAYING CORPORATE CLIENTS

LONGER LEASES

LOWER VACANCIES

INCREASED NET OPERATING INCOME

GREATER TENANT SATISFACTION

BETTER WELLBEING & PRODUCTIVITY

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IF BUILDING PERFORMANCE IS SO KEY, WHERE DO WE START?

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ENVELOPE FACADE FIRST

1. Begin with the end in mind
2. Early Contractor Involvement for maximum expertise, early
3. Energy modelling for full clarity
4. Design the envelope, then the mechanical system.
   Not the other way around
5. Strengthen the weakest links first for maximum performance

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FACADE COMPARISON

A Facade Strategy Study

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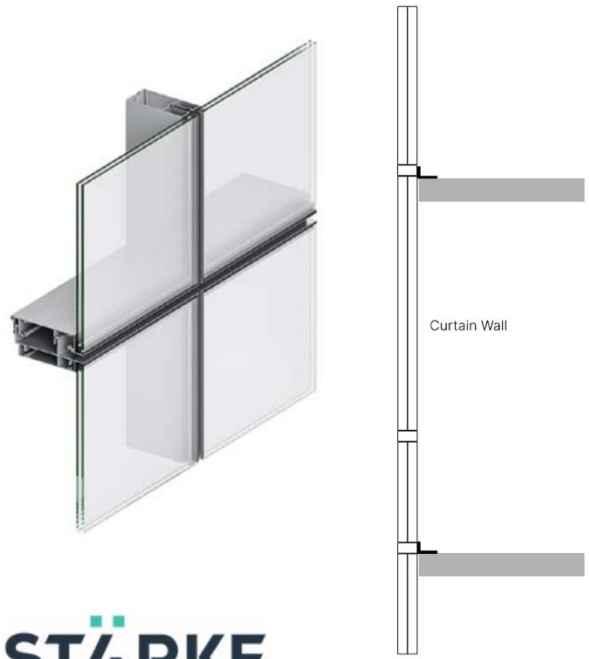
CURTAIN WALL

Unitised facade system

Considerations

- Faster installation
- No scaffolding required
- Reduced flexibility in configurations
- Less junctions
- Increased facade package size



WINDOW WALL

Stick facade system

Considerations

- More flexibility with configurations on opening units (especially with balconies)
- More junctions and water proofing costs & risk
- Slower installation
- Scaffolding required
- Smaller facade package - potential for cost savings

PUNCHED GLAZING

Traditional construction

Considerations

- Even more flexibility with configurations on opening units
- More junctions and water proofing costs & risk
- Slower installation
- Scaffolding required
- Requires secondary walls to be constructed, more time and trades onsite

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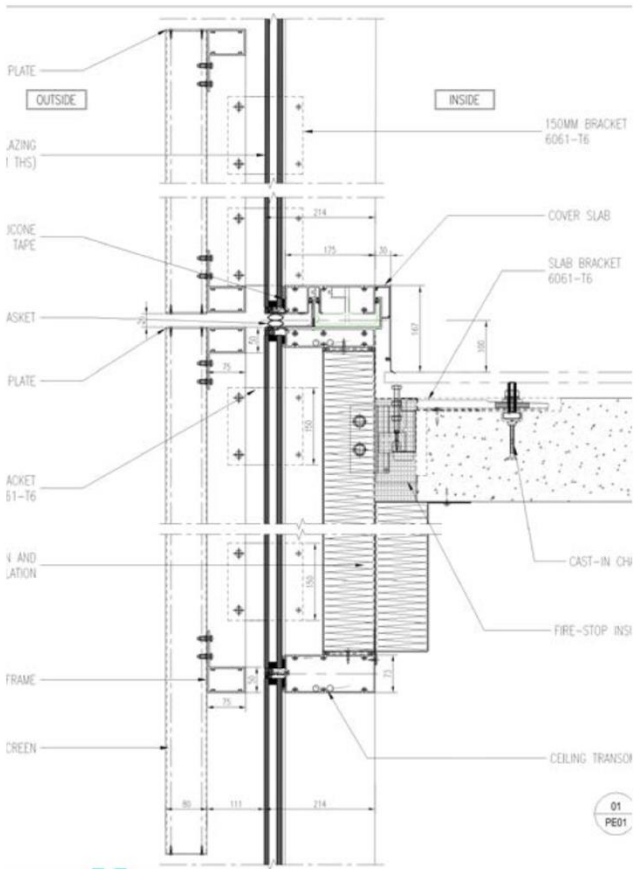
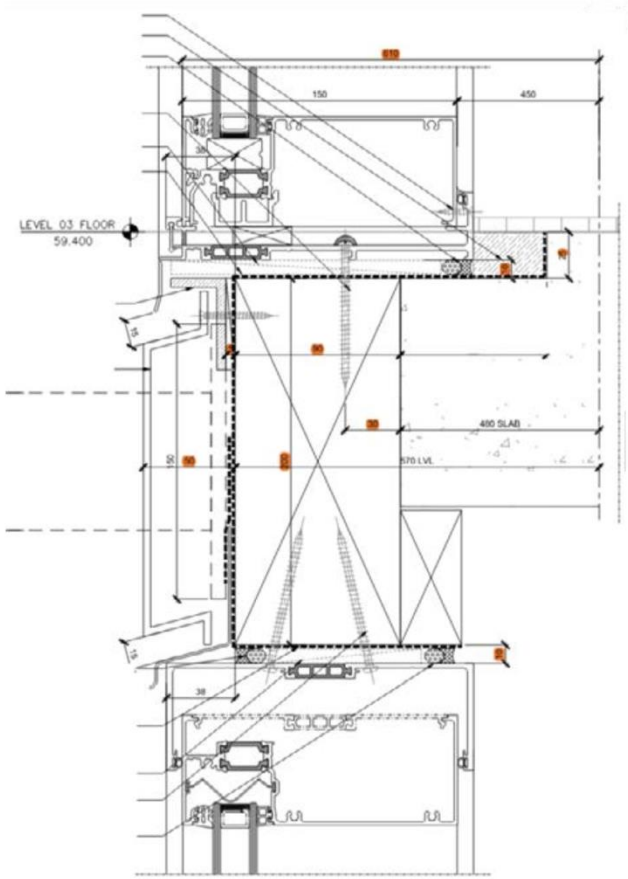
CURTAIN WALL

Unitised facade system



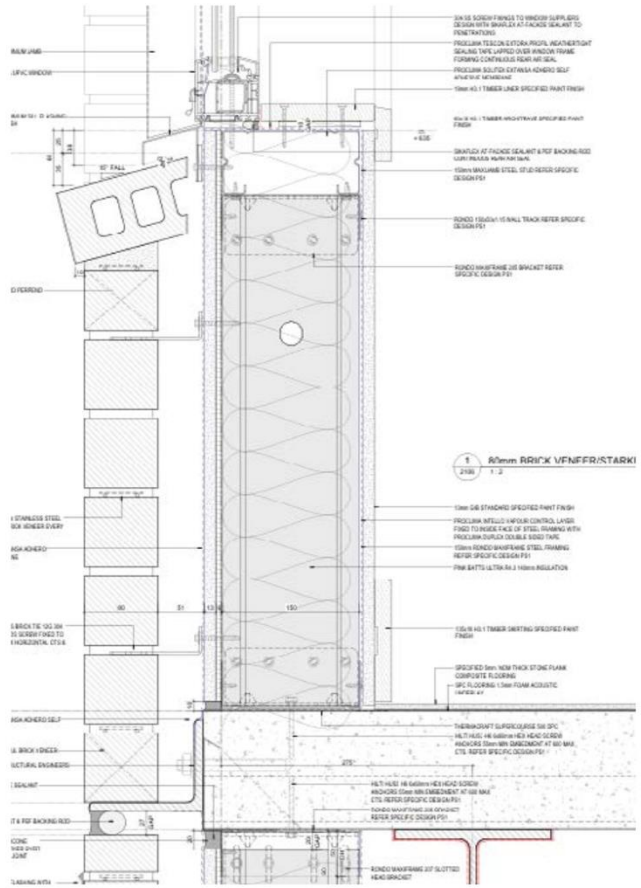
WINDOW WALL

Stick facade system



PUNCHED GLAZING

Traditional construction



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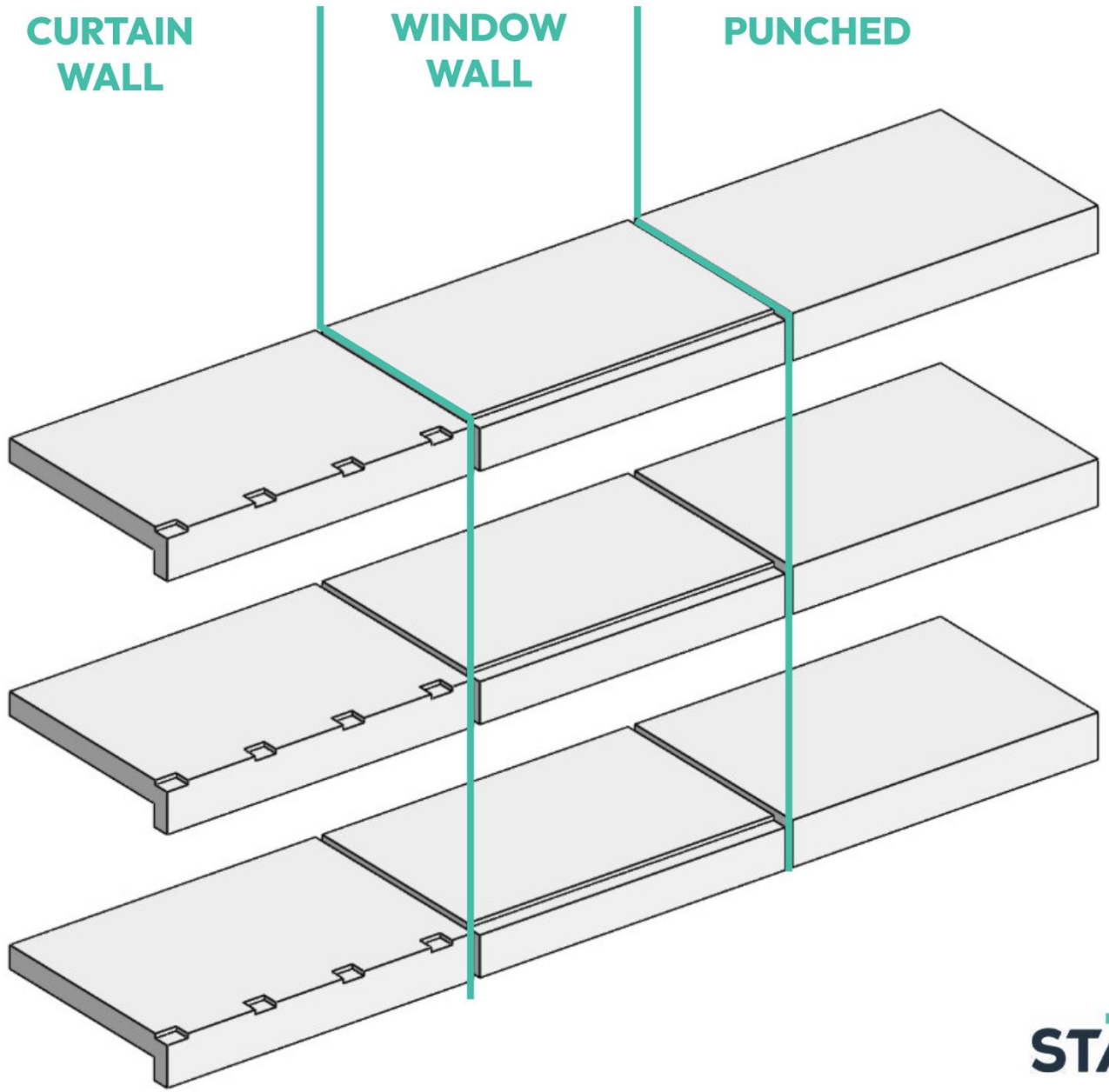
FACADE METHOD

Key Glazing Pathways



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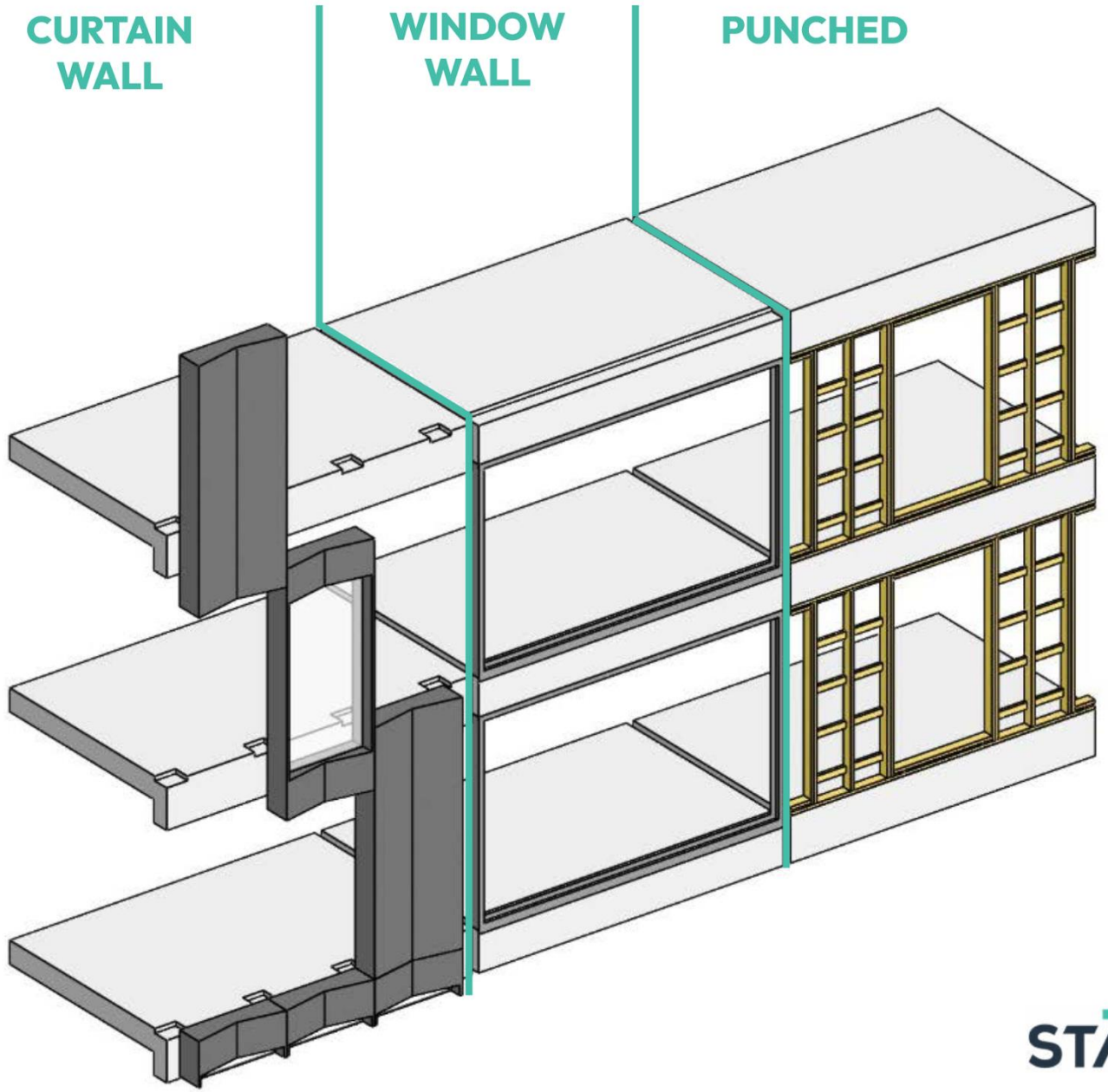
FACADE METHOD

Key Glazing Pathways



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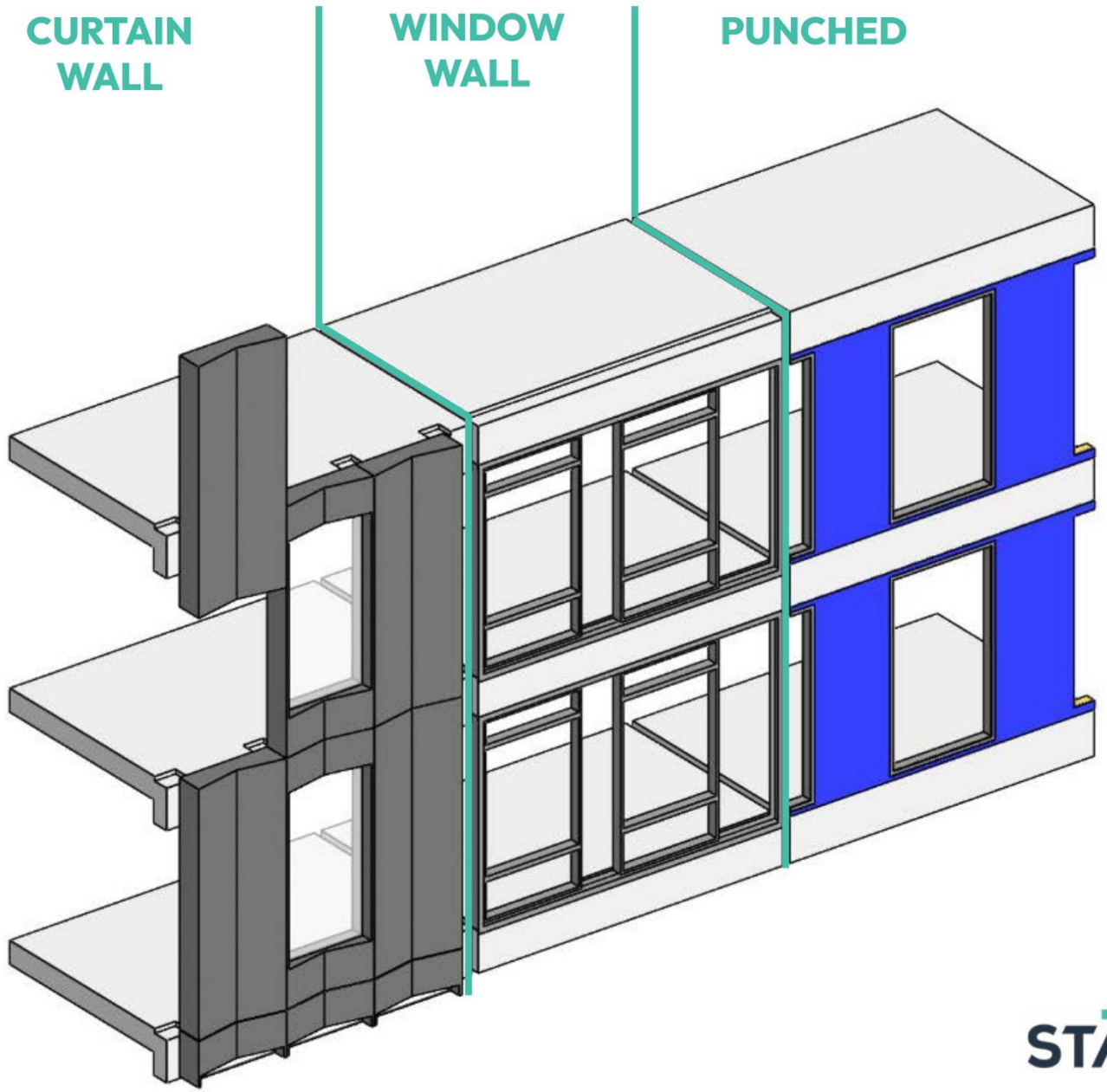
FACADE METHOD

Key Glazing Pathways



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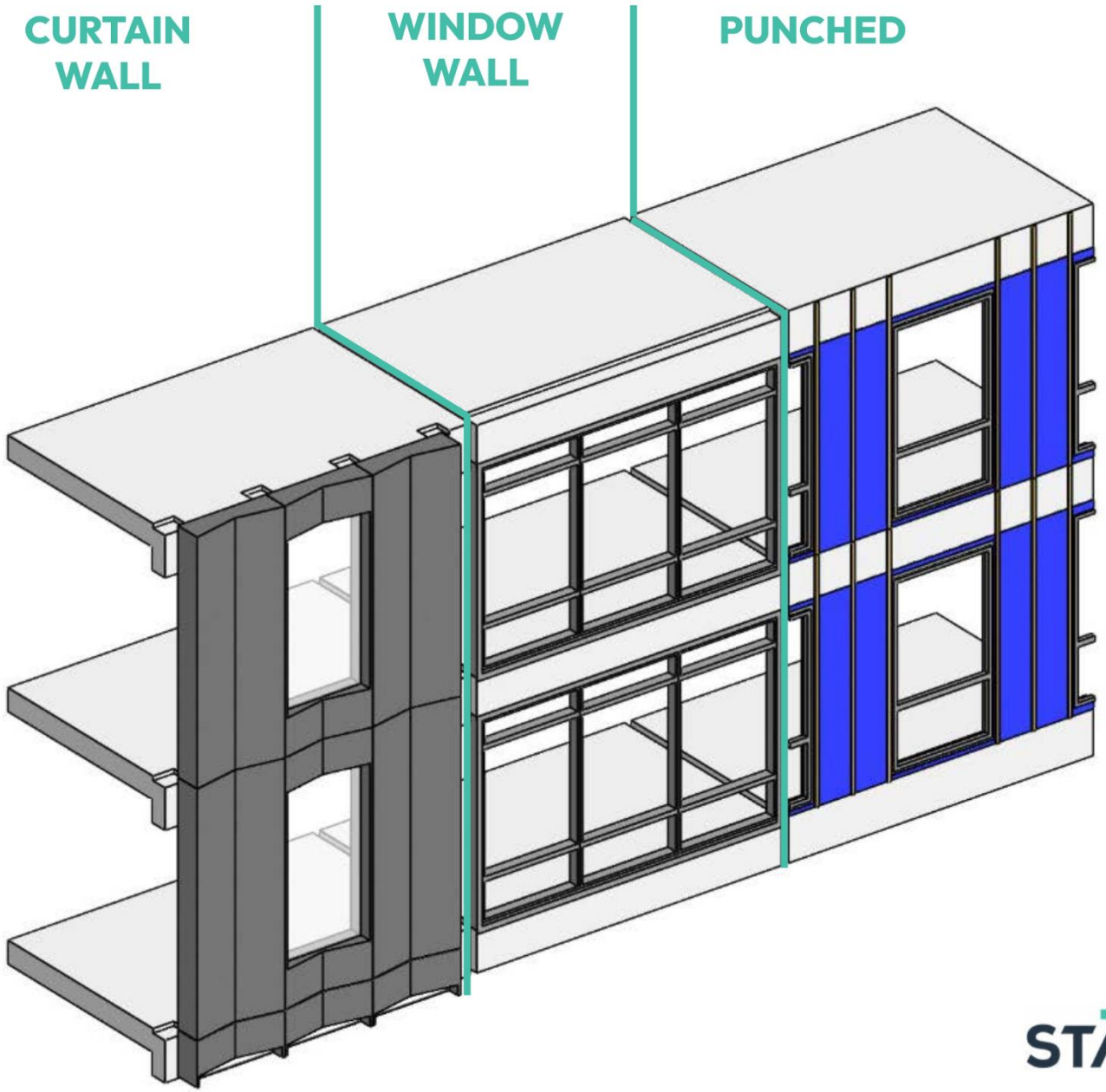
Key Glazing Pathways



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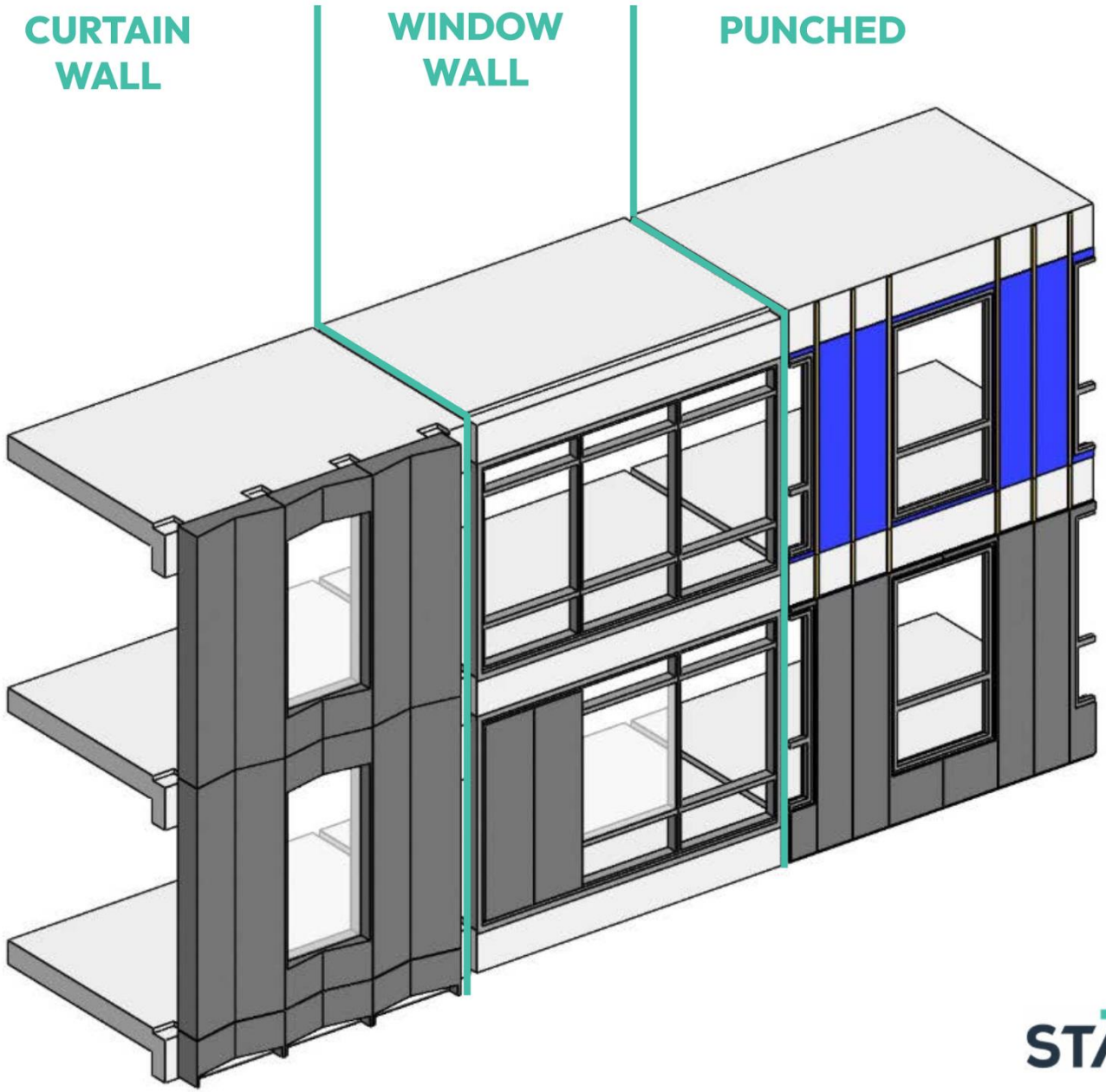
FACADE METHOD

Key Glazing Pathways



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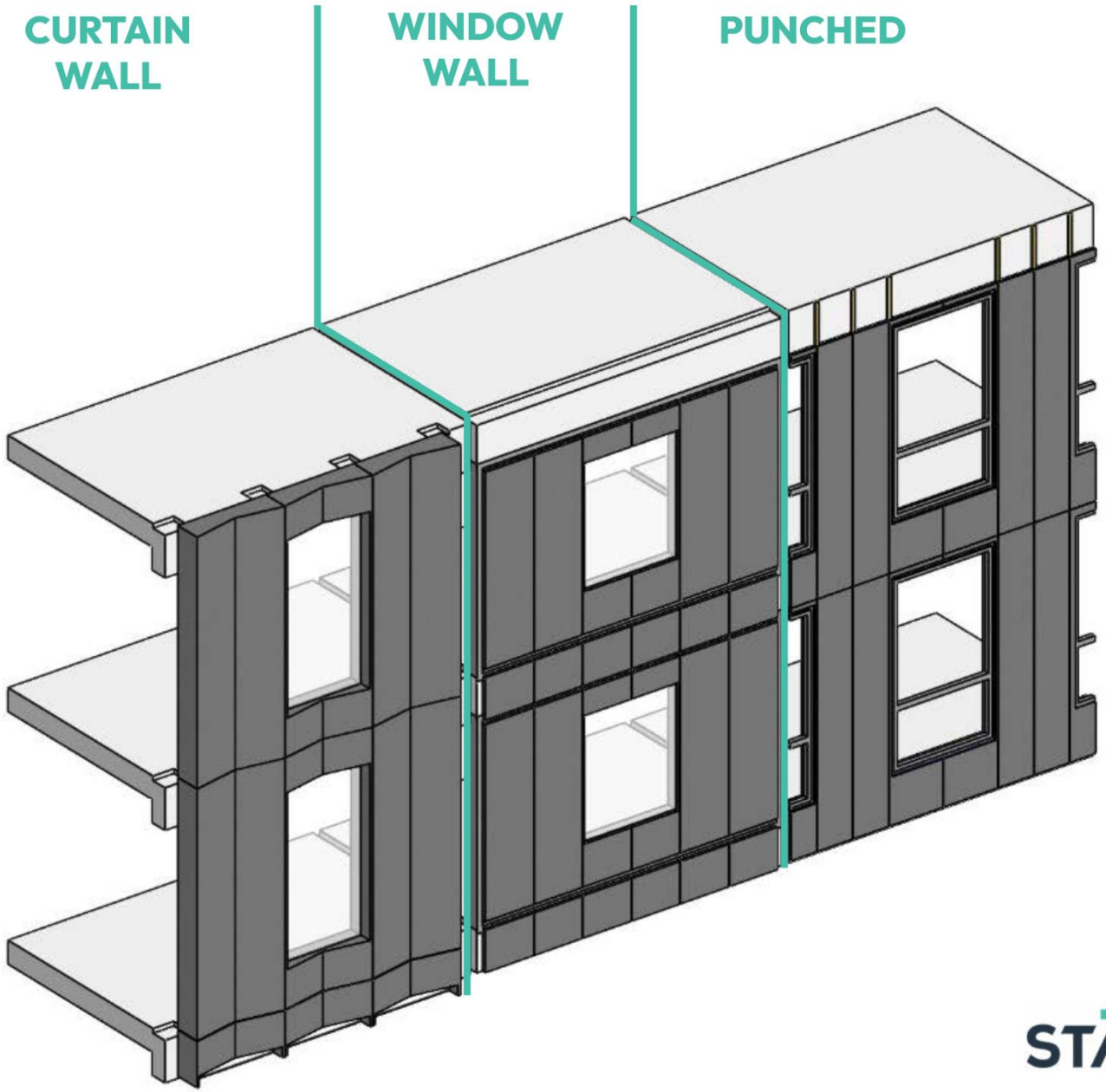
FACADE METHOD

Key Glazing Pathways



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PROJECT EXAMPLE

Generic project example, showing potential facade types

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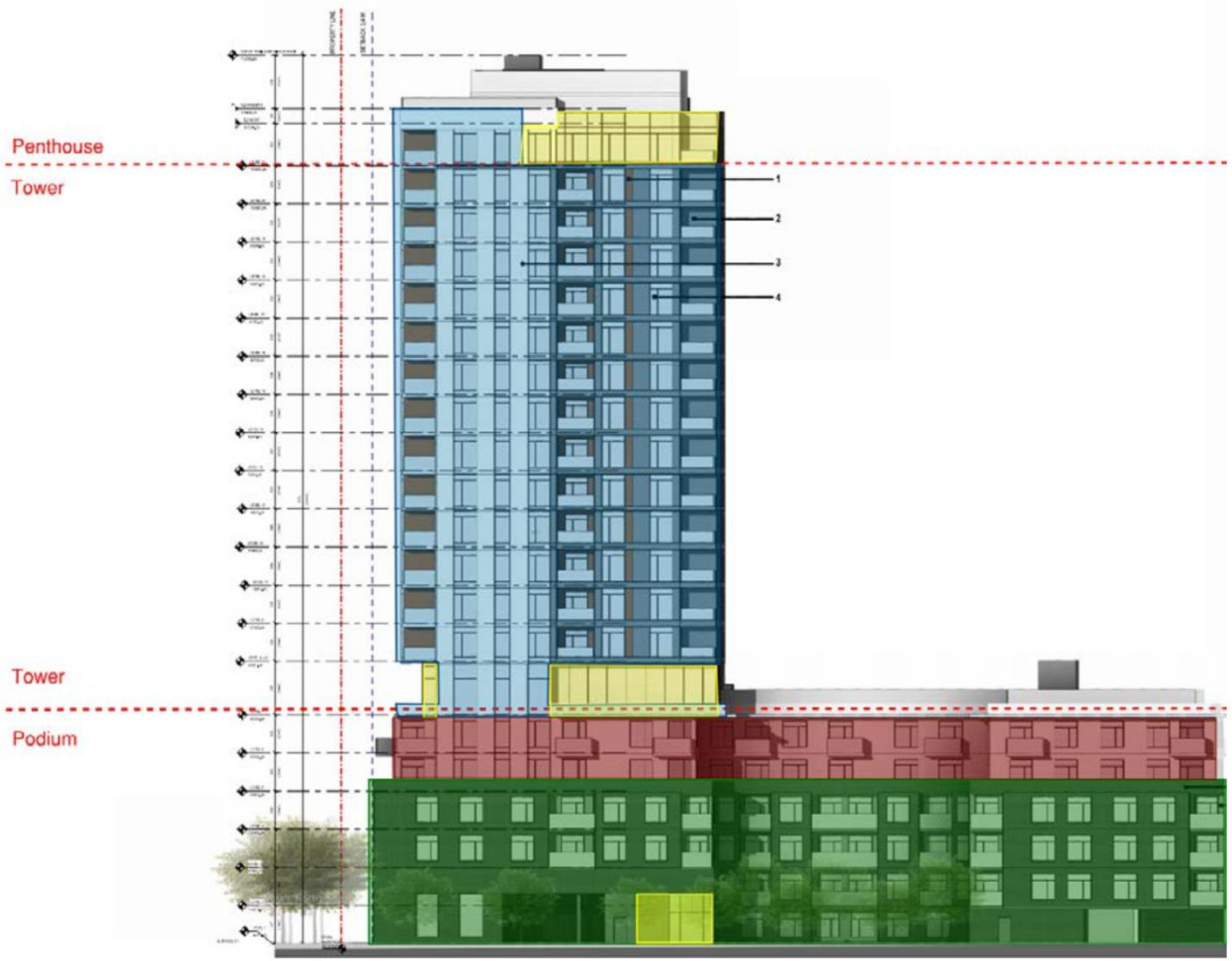
PROJECT EXAMPLE

Facade types + Installation timeline



South Elevation / Lane

General Facade Schedule

Unitised Curtain Wall
- Level 7 - 10 = February 1st-10th
- Level 10 - 15 = February 12th-25th
- Level 16 - 20 = March 1st-12th

Slimline Flush-glaze
- Level 21 = 15th-18th

Plant
- Level 22 = March 15th-18th

Podium Punched Glazing
- Level 1 - 4 = March 19th-25th

Podium Stick Glazing
- Level 5 & 6 = March 26th- April 5th

Balustrades
- Across all levels = April 6th - April 16th

Finishing Works + Special Features
Across all levels = April 6th - April 16th

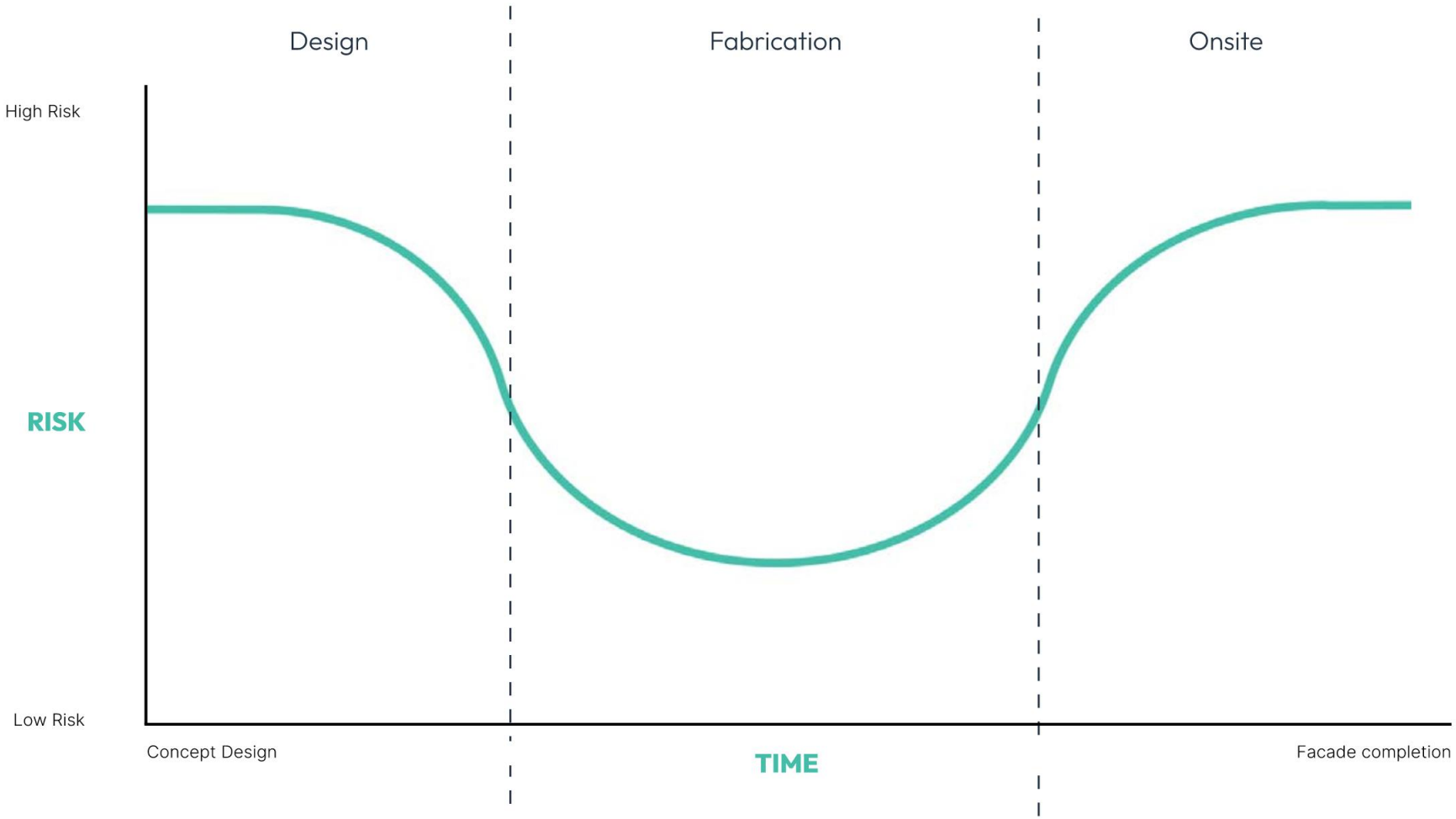
Unitised Curtain Wall

Punched Glazing

Slimline Flush-glaze

Window Wall (stick)

FACADE RISK CURVE



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FACADE SCIENCE

An in-depth look at facades influence on building science

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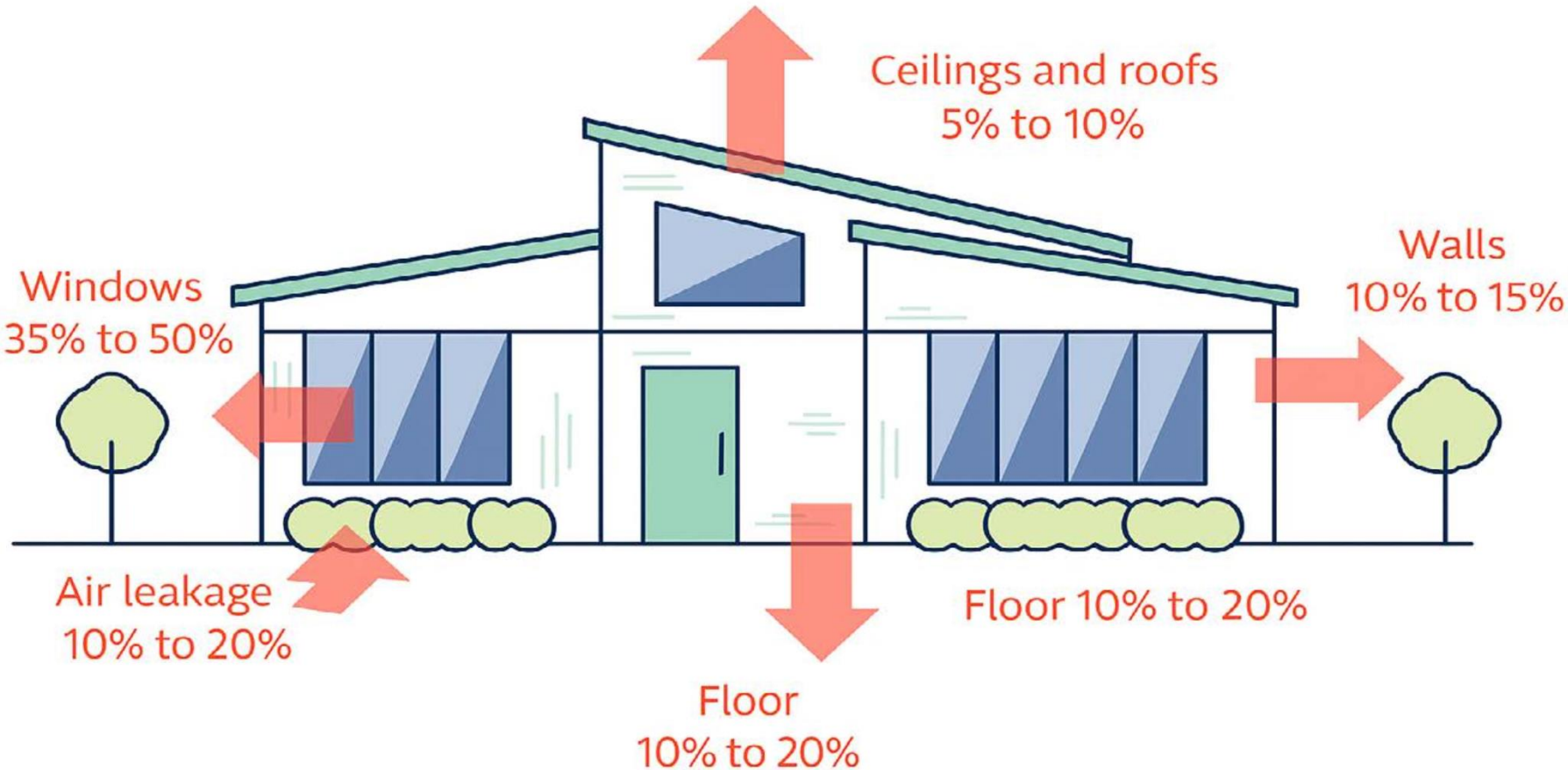
GLAZING IS THE WEAKEST LINK

Typical heat loss in the winter for a standalone home insulated to current requirements



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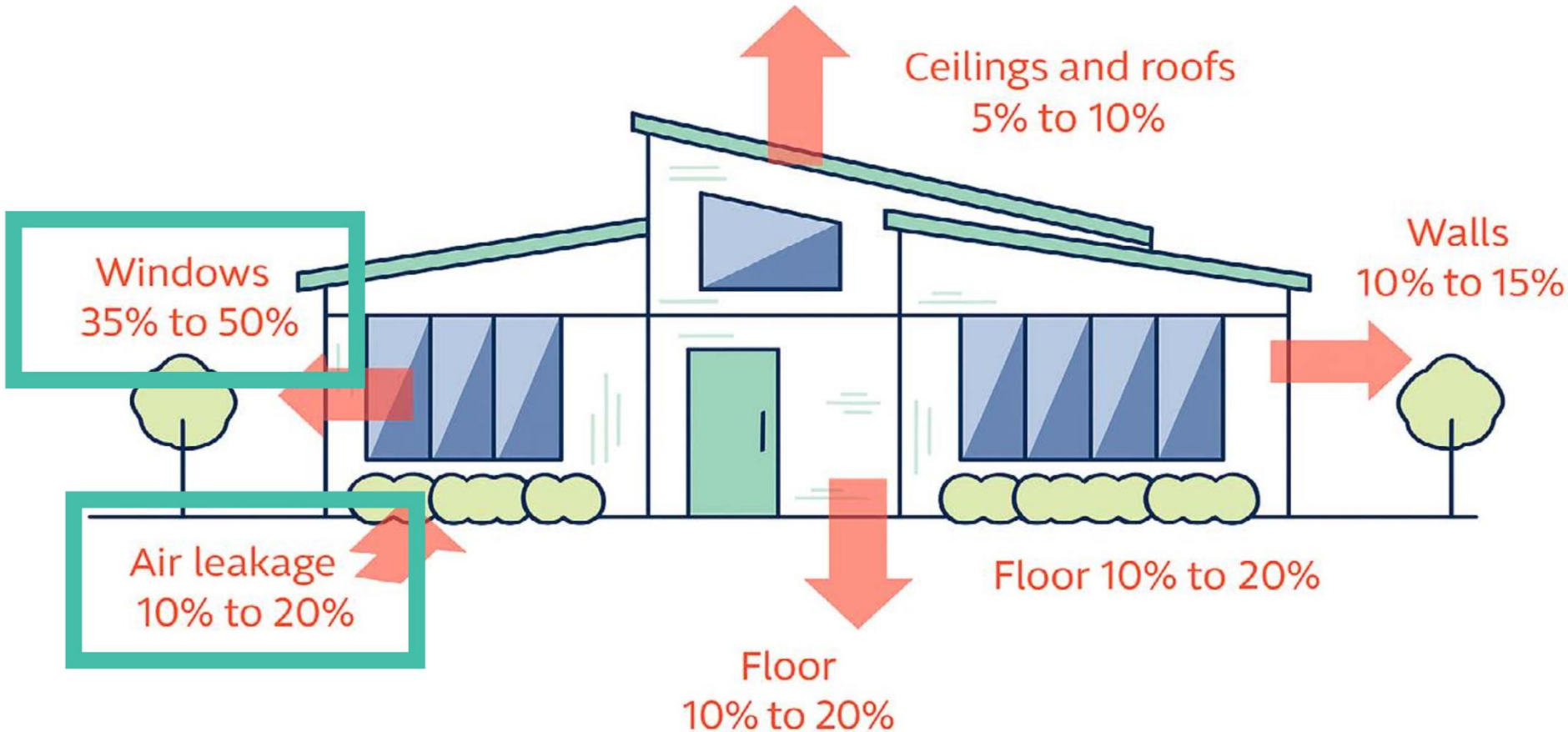

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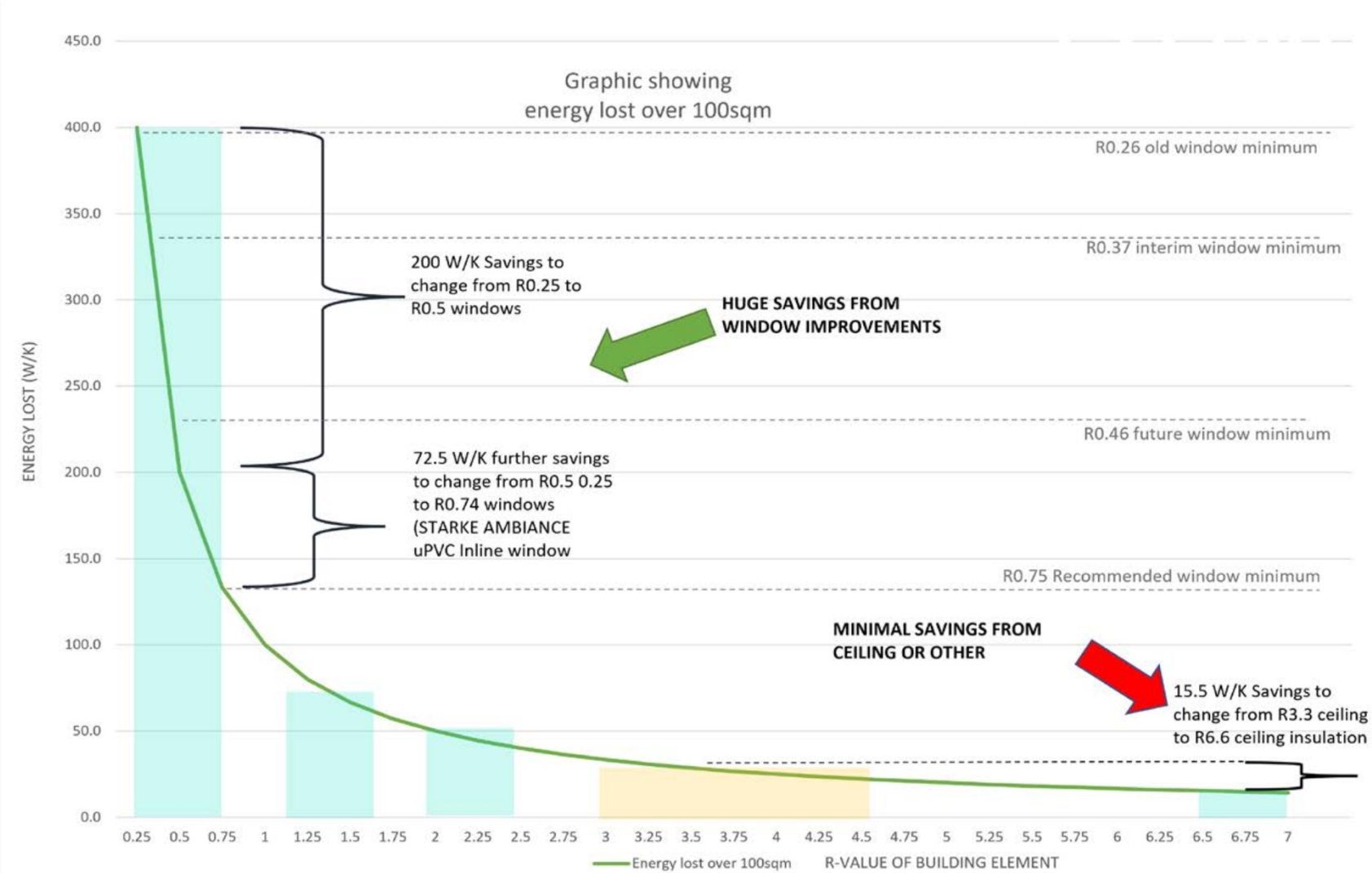

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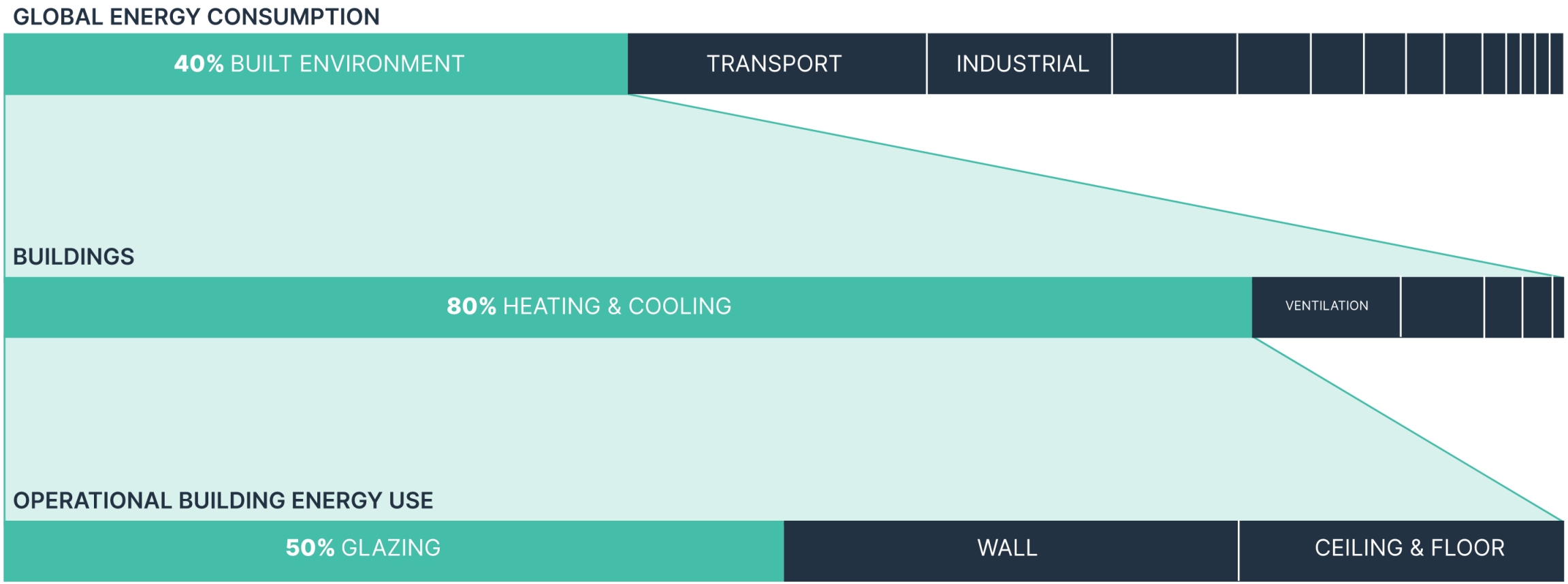

Architecture 2030, Why The Built Environment
US Energy Information Administration, Use of Energy Explained
ResearchGate, Heat loss rate from key building elements

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GLAZING PERFORMANCE DEVELOPMENT

1950 — EUROPE + NORTH AMERICA — 2020

Wooden single Glazing

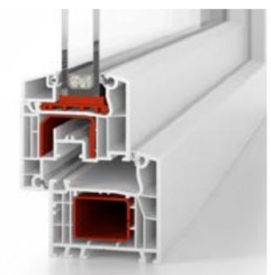
35mm aluminum

40mm aluminum

45mm thermally broken aluminum

50mm thermally broken aluminum

70mm thermally broken aluminum



70mm uPVC

85mm wood aluminium

1950 — NEW ZEALAND — 2020

*As of the 2020 H1 changes

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WHAT MAKES GOOD GLAZING?

HEAT LOSS

1. The R value of the **frame**
2. The R value **glass**

Different glass can be put with different frames to get the values you desire

HEAT GAIN

1. The G value of the glass dictates what % of solar heat gain is allowed into the building
2. Generally a decimal such as 0.65, but can be represented as a percentage, i.e. 65%

Common values range from 0.35 (very good) to 0.9 (not very good)

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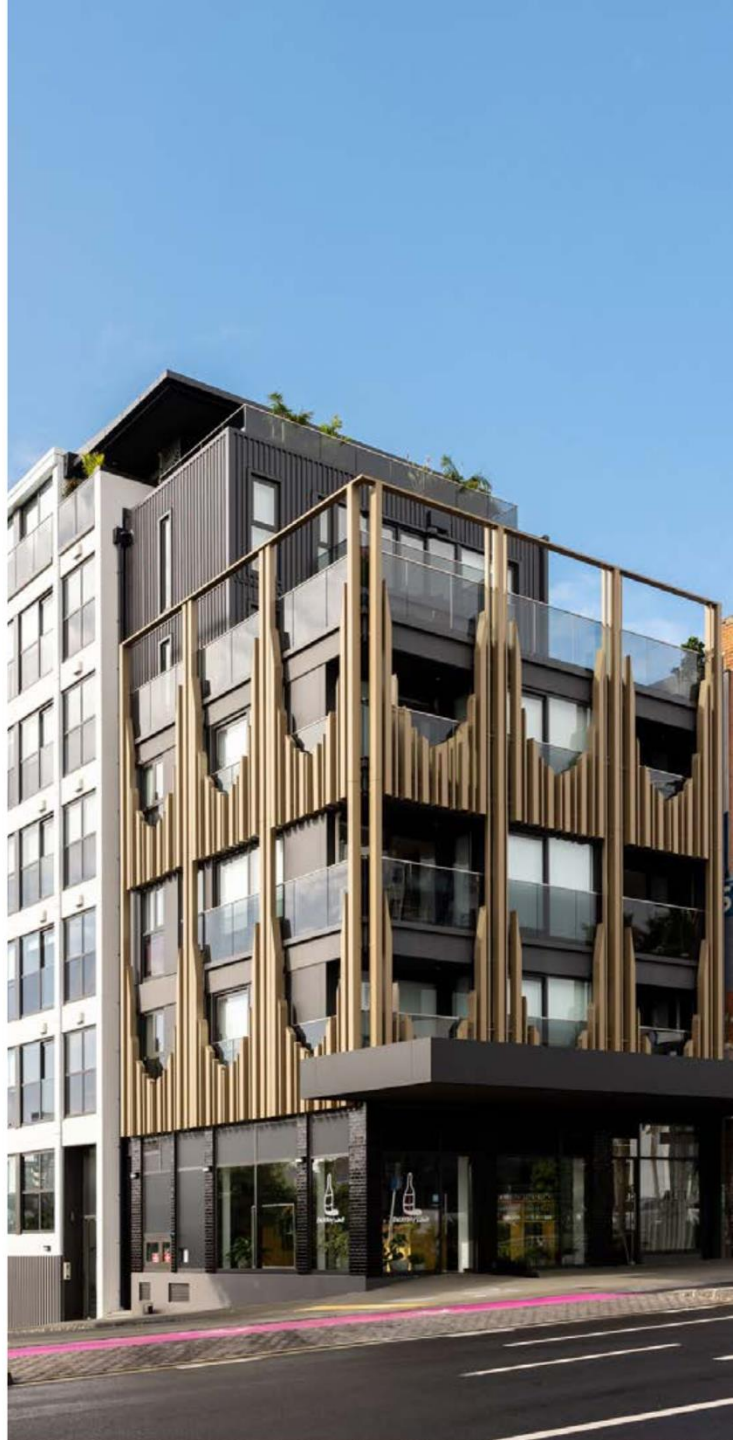
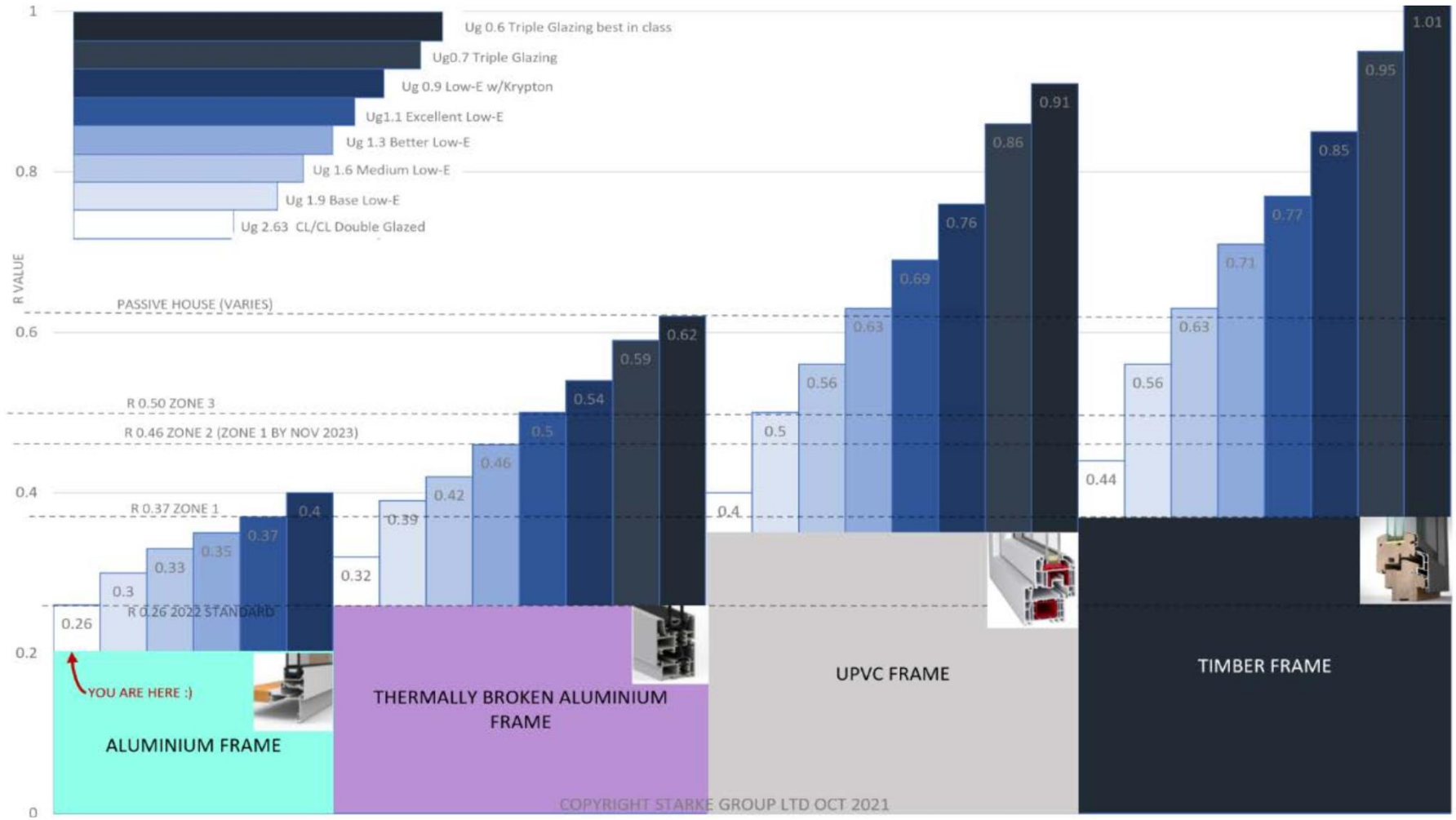


R VALUE PERFORMANCE GUIDE

Window R value performance guide as per NZBC H1/AS1 table E.1.1.1

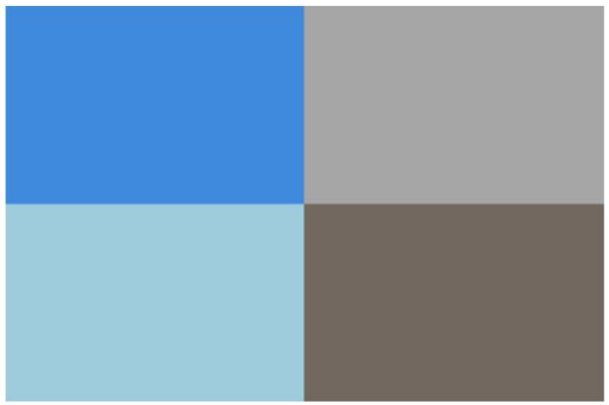


H1 COMPLIANCE METHOD

BAD

SCHEDULE METHOD

- Guaranteed to be over-engineered
- Most expensive compliance method
- Most carbon intensive
- R6.6 in ceiling risks overheating



BETTER

CALCULATION METHOD

- Value-engineer the envelope
- With uPVC & Low-e, unlikely to need many other changes, particularly in Zones 1 & 2
- Spend money & carbon where you need to only
- You still risk negative building outcomes

BEST

MODELING METHOD

- Value-engineer the envelope further
- With uPVC & Low-e, unlikely to need many other changes, particularly in Zones 1 & 2
- Spend money & carbon where you need to only
- Eliminate negative building outcomes.

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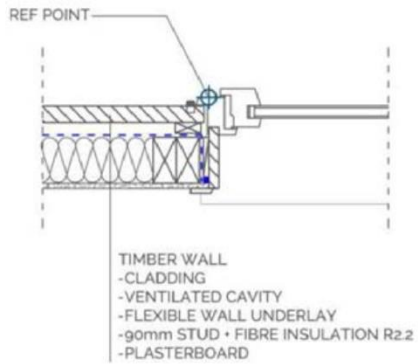
WINDOW FRAME POSITION

80% of gains are from getting at least the front faces of the facade aligned

Junction



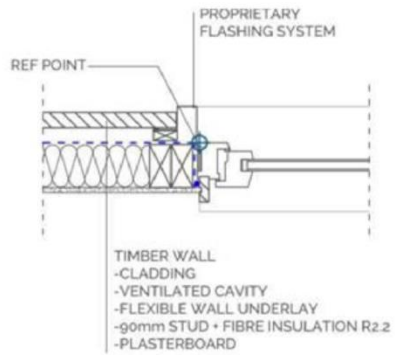
65 WISI Window Side (Jamb) - uPVC current practice install frame face flush with cladding

RESULTS TABLE

Ψ	EXTERIOR REFERENCE AREA (PH)	INTERNAL REFERENCE AREA
	0.088 W/(mK)	0.088 W/(mK)
f_{RSI}	0.607	
Cost	Not calculated	
Carbon	Not calculated	

This detail represents a typical current practice install of a uPVC window flush with the ventilated cladding. Excessive heat loss occurs due to the uPVC frame leaking heat to the ventilated cavity.

Junction



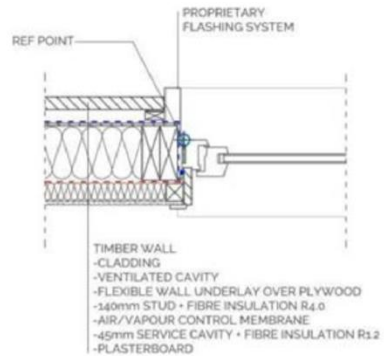
66 WISI Window Side (Jamb) - uPVC recessed frame face flush with thermal envelope exterior

RESULTS TABLE

Ψ	EXTERIOR REFERENCE AREA (PH)	INTERNAL REFERENCE AREA
	0.054 W/(mK)	0.054 W/(mK)
f_{RSI}	0.649	
Cost	Not calculated	
Carbon	Not calculated	

Recessed install of a uPVC-framed window jamb on a ventilated cavity with the face of the window flush with the outside of the thermal envelope. This is a significant improvement over fixing flush with the cladding.

Junction



67 WISI Window Side (Jamb) - uPVC recessed frame to middle of 140/45 wall

RESULTS TABLE

Ψ	EXTERIOR REFERENCE AREA (PH)	INTERNAL REFERENCE AREA
	0.040 W/(mK)	0.040 W/(mK)
f_{RSI}	0.640	
Cost	Not calculated	
Carbon	Not calculated	

Recessed install of a uPVC-framed window jamb on a ventilated cavity with the window centred in the thermal envelope thickness. This is only a slight improvement over fixing flush with the outside of the thermal envelope.

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EXTERNAL INSULATION

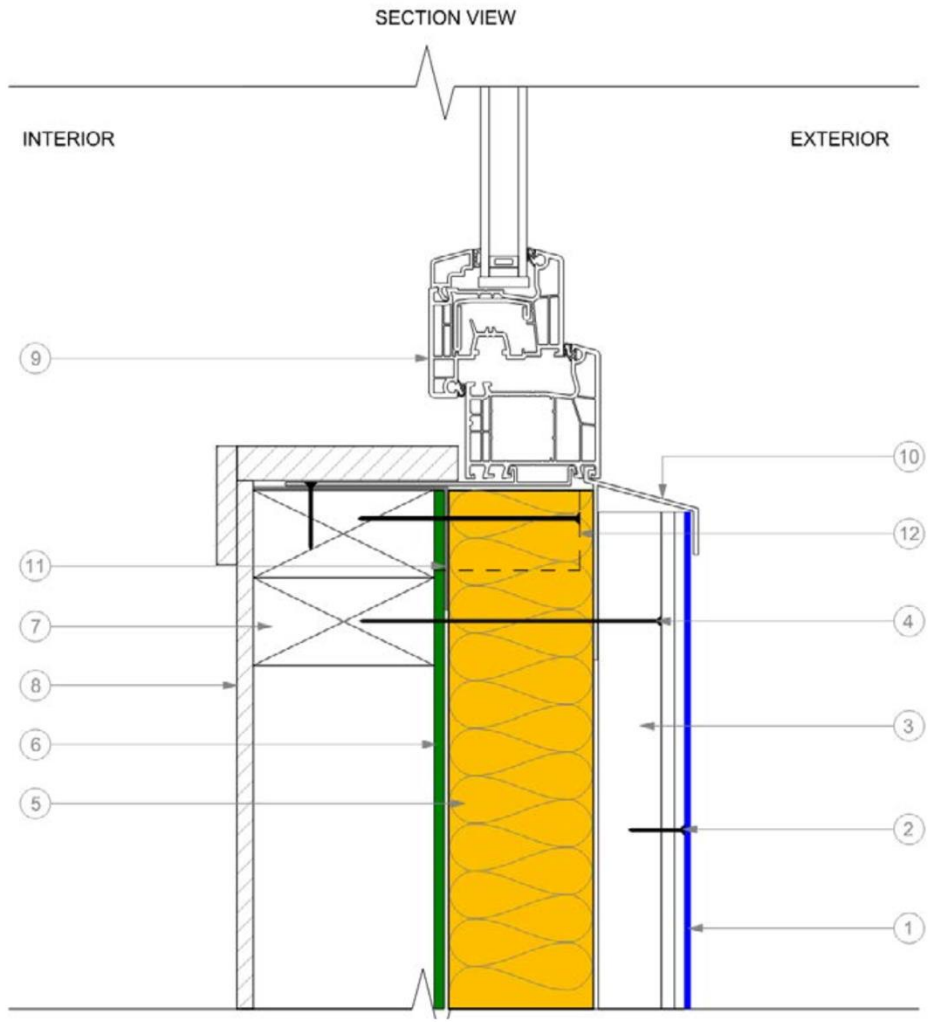
External insulation windows and E2 installation

KEY

1. Cladding
2. Cladding Fixing
3. Cavity Batten
4. Cavity Batten Fixing
5. Insulation (Enetherm PIR or Rockwool
6. WRAP (high performance underlay and/or rigid air barrier)
7. Timber Framing
8. Internal Lining
9. Thermally Broken Window Frame (STARKE UPVC)
10. Sill Flashing
11. Butyl Flashing tape (or equivalent)
12. Window Support Bracket

LAYERS

- Water Shedding
- Water, Air & Vapour Control
- Thermal

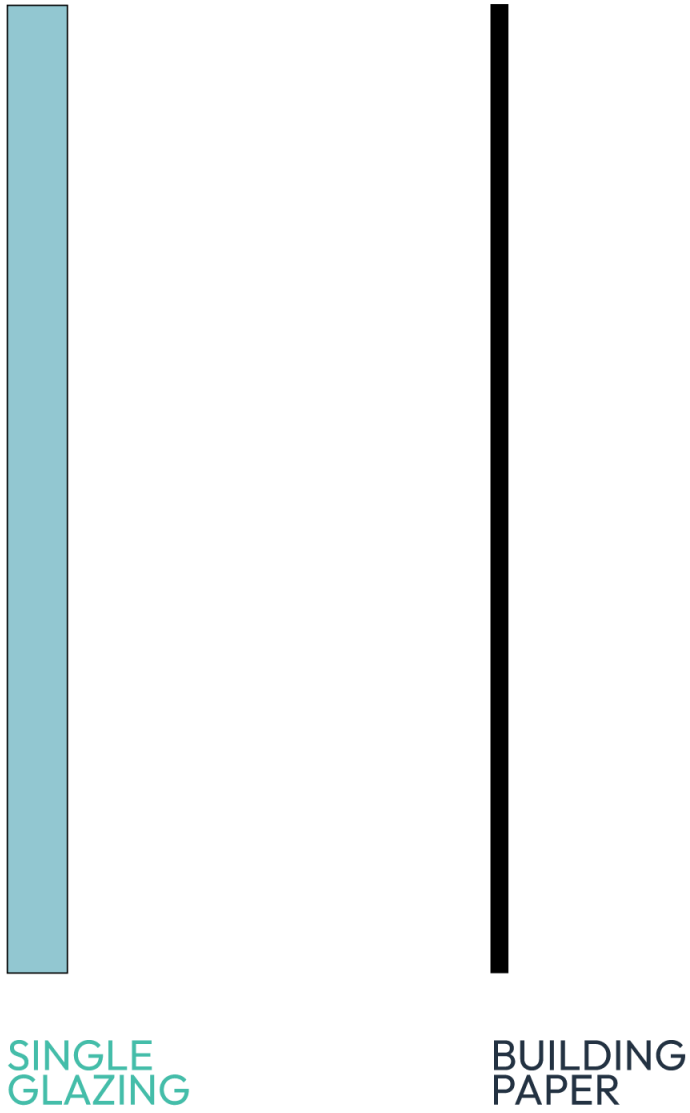


GLASS

Glass Specification Considerations

SINGLE GLAZING

Glass Spec - 01



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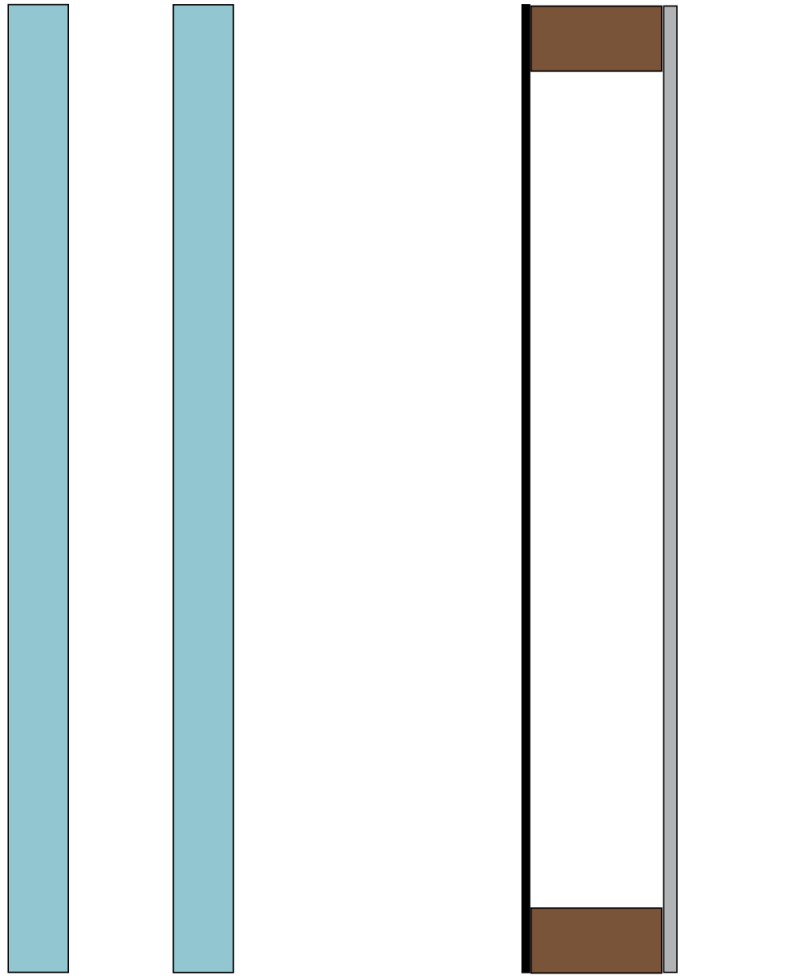
DOUBLE GLAZED

Glass Spec - 02



DOUBLE GLAZING

UNINSULATED FRAMING

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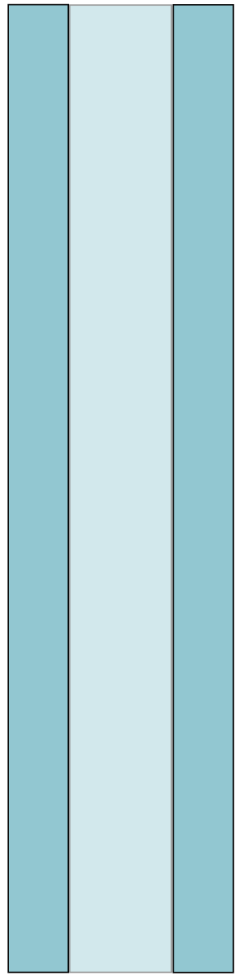
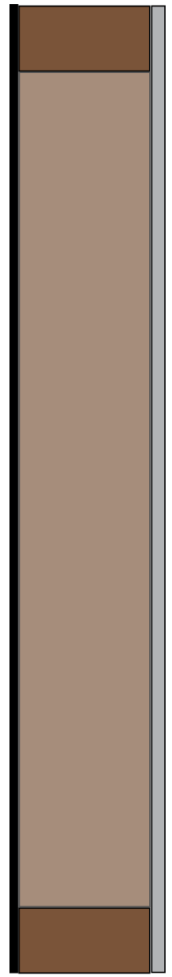
DOUBLE GLAZED & ARGON

Glass Spec - 03



DOUBLE GLAZING
+ ARGON

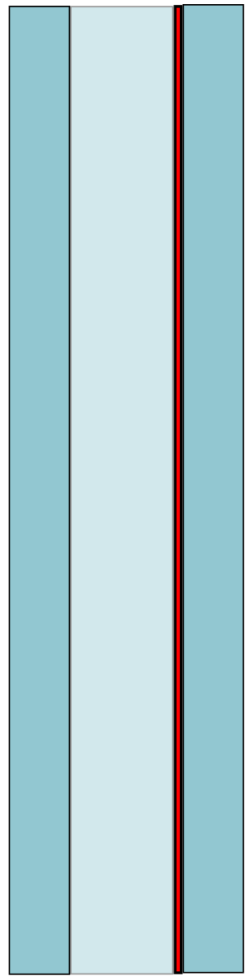


INSULATED
FRAMING

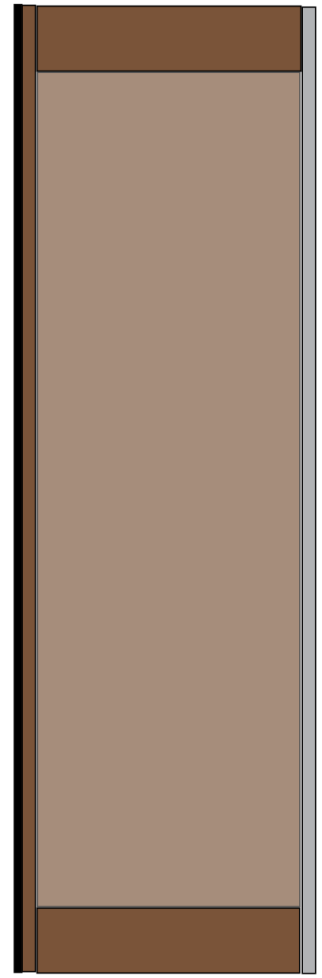
STARKE

DOUBLE GLAZED + ARGON & LOW-E

Glass Spec - 04



DOUBLE GLAZING
+ ARGON
+ LOW-E



140 FRAMING
+ RAB

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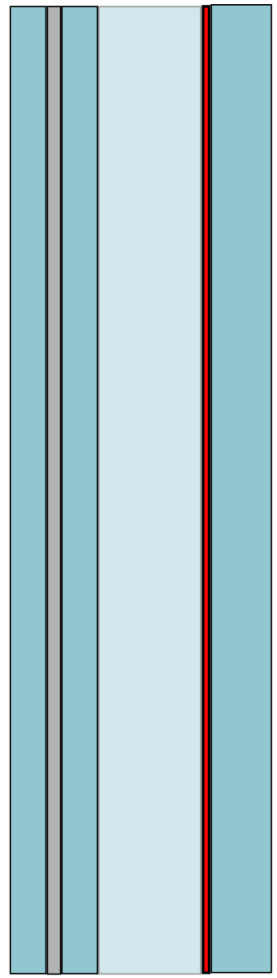
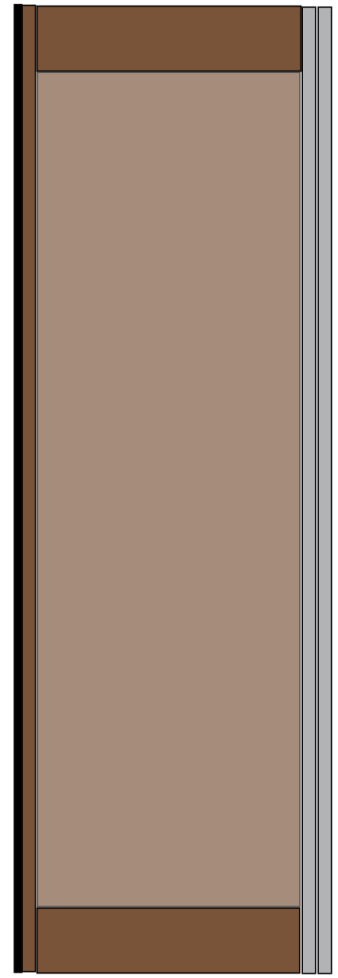
DOUBLE GLAZED + ARGON, LOW-E, & LAMINATE

Glass Spec - 05



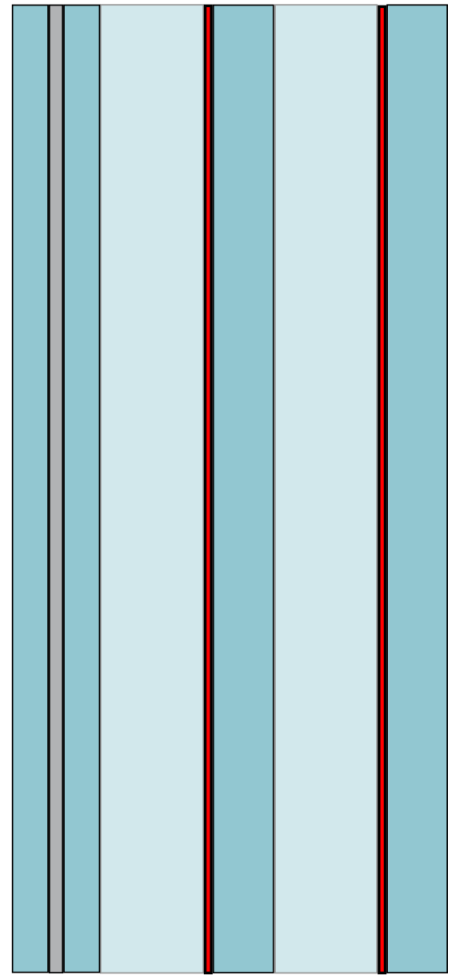
DOUBLE GLAZING
+ ARGON
+ LOW-E
+ LAMINATE



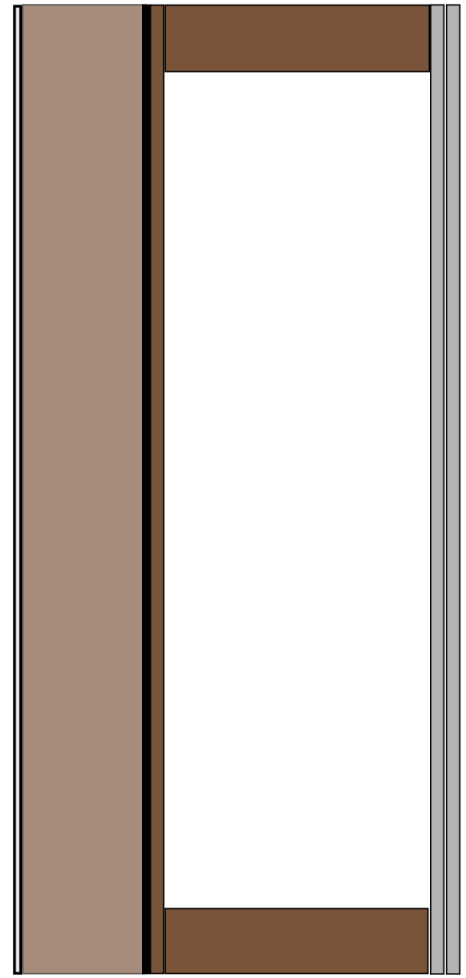
140 FRAMING
+ RAB
+ Double GIB

TRIPLE GLAZED + ARGON, LOW-E, & LAMINATE

Glass Spec - 06

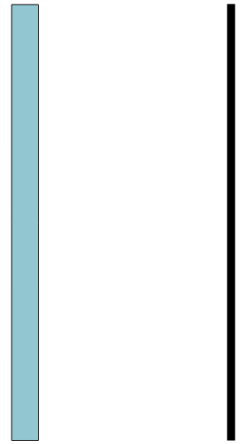


TRIPLE GLAZING
+ ARGON
+ LOW-E
+ LAMINATE



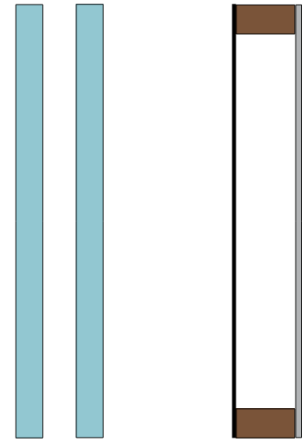
140 FRAMING
+ RAB
+ Double GIB
+ EXTERNAL INSULATION

OVERVIEW



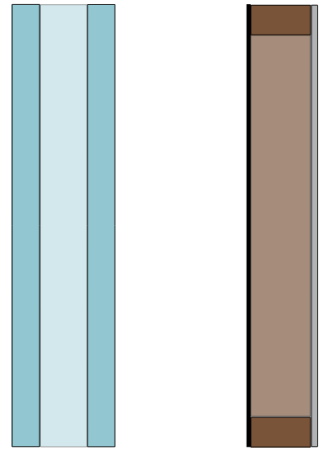
SINGLE GLAZING

BUILDING PAPER



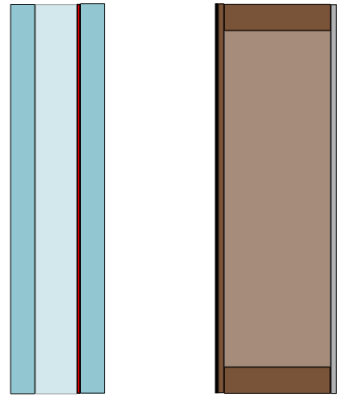
DOUBLE GLAZING

UNINSULATED FRAMING



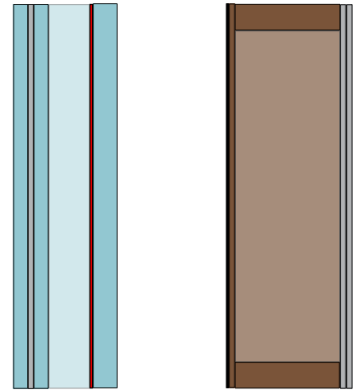
DOUBLE GLAZING + ARGON

INSULATED FRAMING



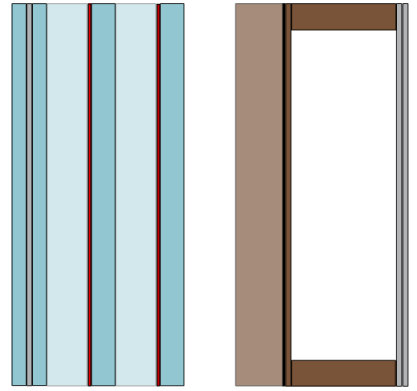
DOUBLE GLAZING + ARGON + LOW-E

140 FRAMING + RAB



DOUBLE GLAZING + ARGON + LOW-E + LAMINATE

140 FRAMING + RAB + Double GIB



TRIPLE GLAZING + ARGON + LOW-E + LAMINATE

140 FRAMING + RAB + Double GIB + EXTERNAL INSULATION

STARKE


NORTHCOTE COLLEGE
STARKE

FACADE VALUE
$6m

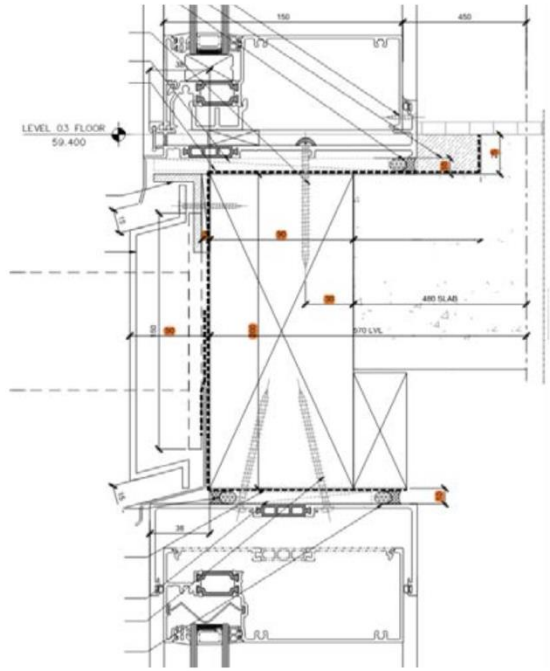
SCOPE
2000sqm of STÄRKE/ALSPEC Thermaframe Thermally Broken Aluminium 150mm commercial glazing. Fabricated locally.

SERVICES & SOLUTIONS
ECI, Design, Engineering, Modelling, PS1, Shop Drawings, Local fabrication, Installation

HOW STARKE ADDED VALUE
Faced with strict thermal compliance and budget constraints, Northcote College's new Technology Building needed an innovative façade solution. STARKE delivered by leveraging our international supply chain, we introduced New Zealand's first thermally broken window wall system—**meeting stringent thermal compliance and cutting costs by 30%.**

This innovation not only made the design feasible but bought costings back within budget, allow the project to proceed.

In ECI engagement STARKE provided a true end-to-end façade solution that turned a stalled project into a success.

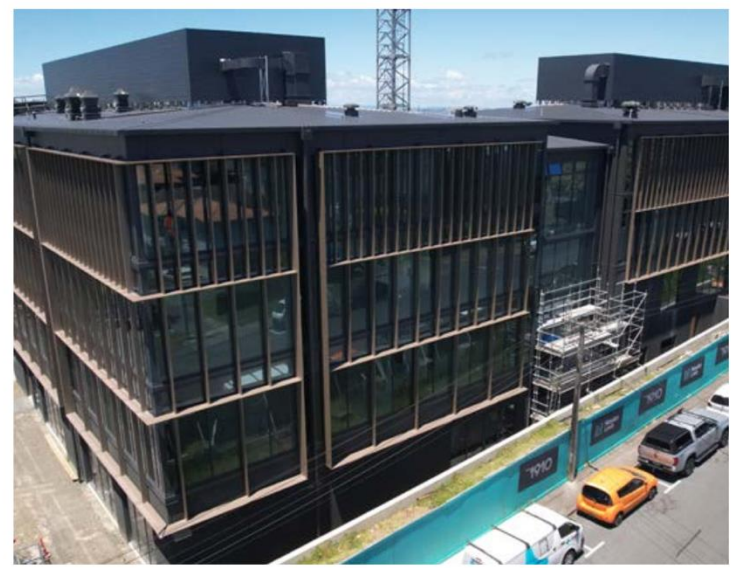


PROJECT PARTNERS

Naylor Love

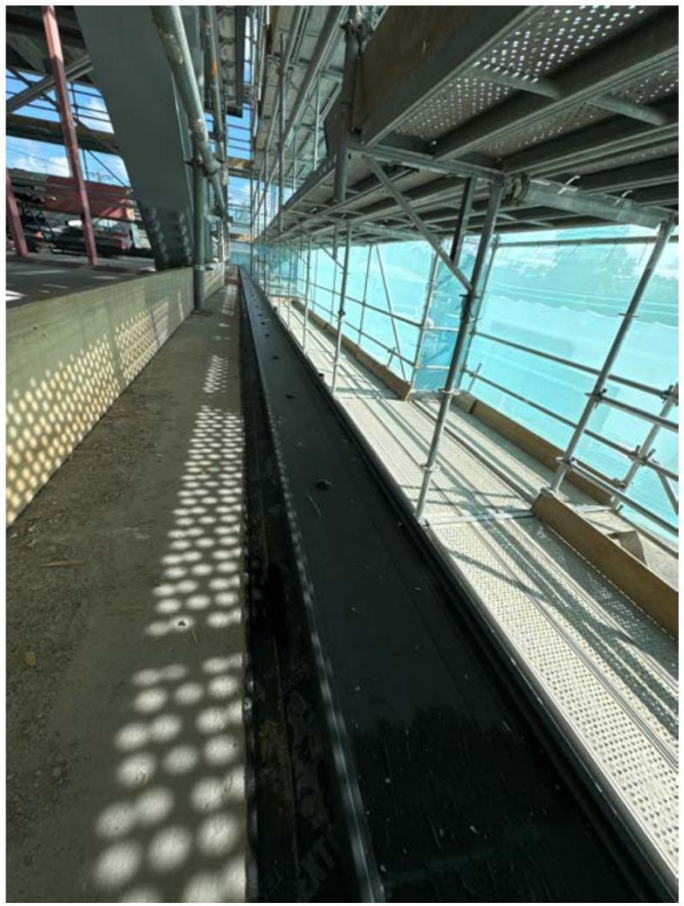
IGNITE

Ministry of Education
Te Tāhuhu o te Mātauranga

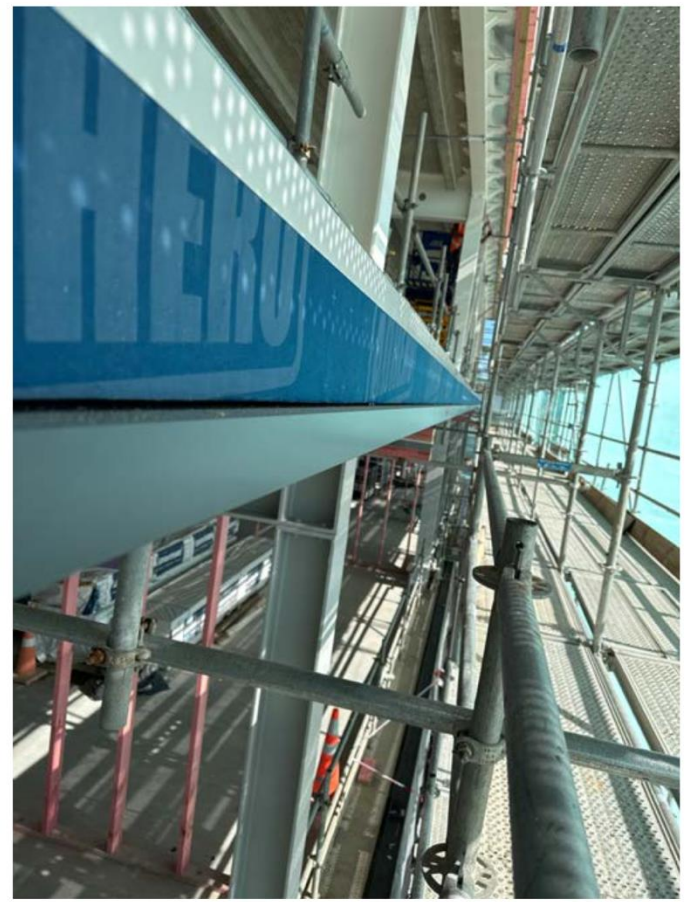


METHODOLOGY

01



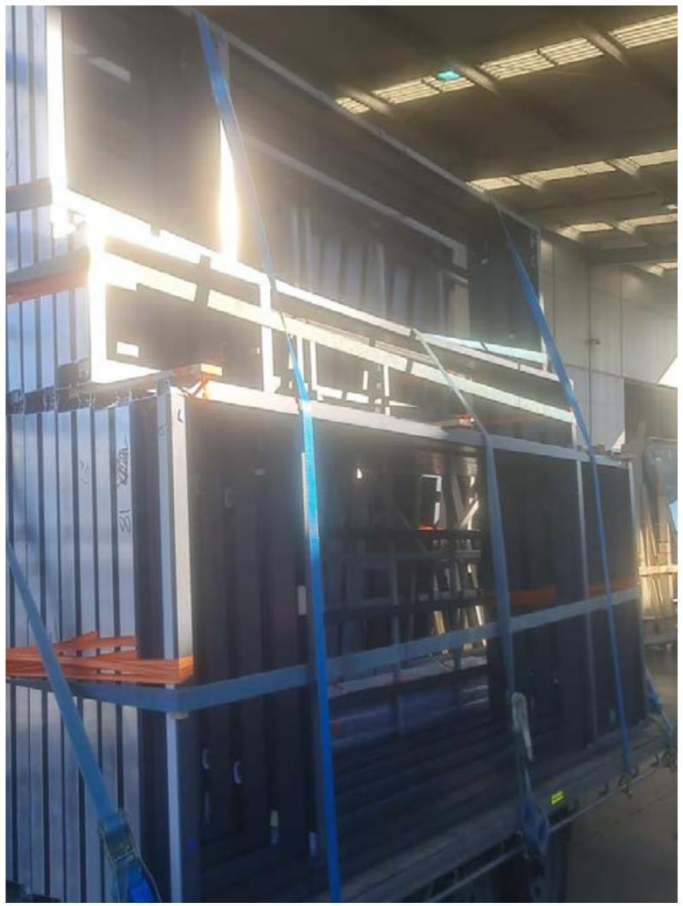
02



03

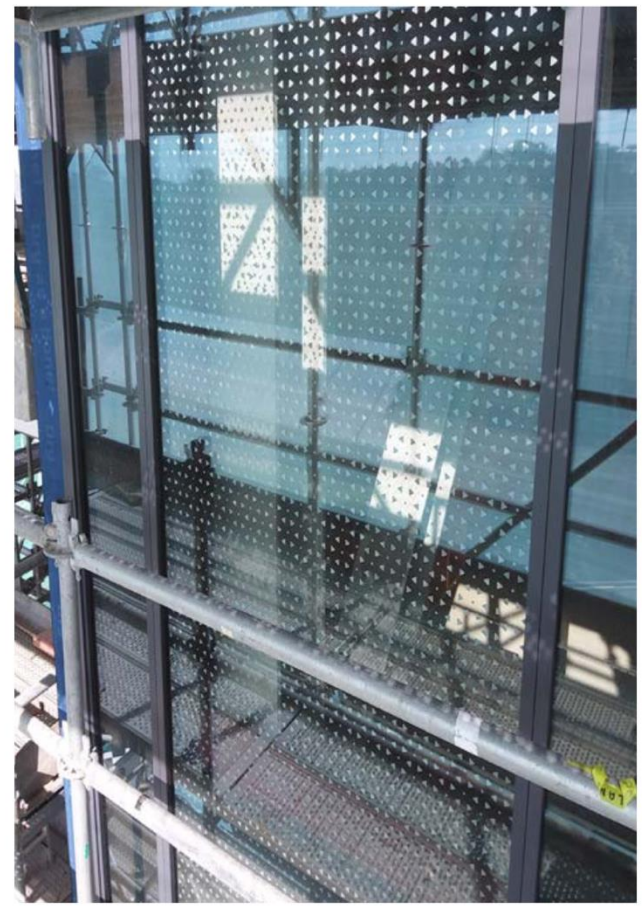
METHODOLOGY

04



05

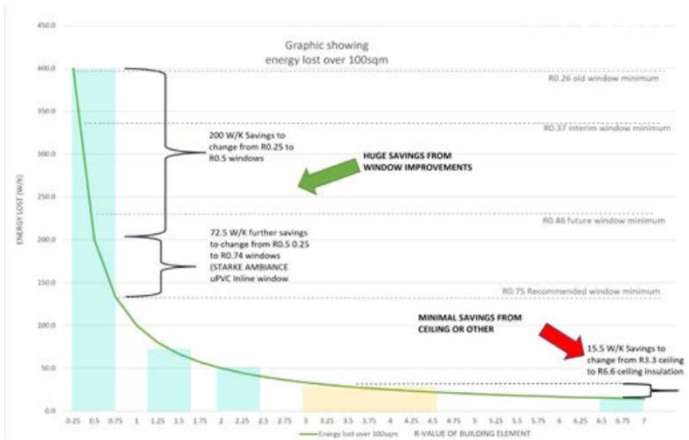
06



SUMMARY

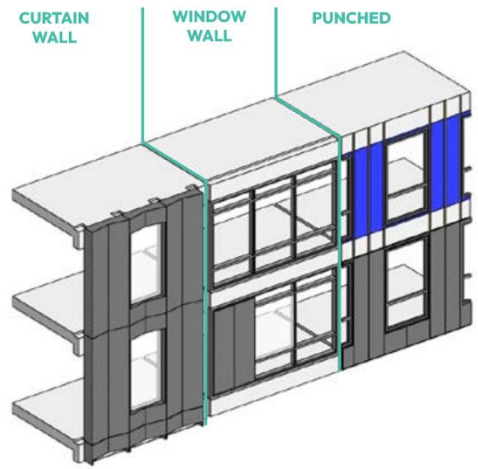
POINT 1

“Building Envelope Is more important than ever”



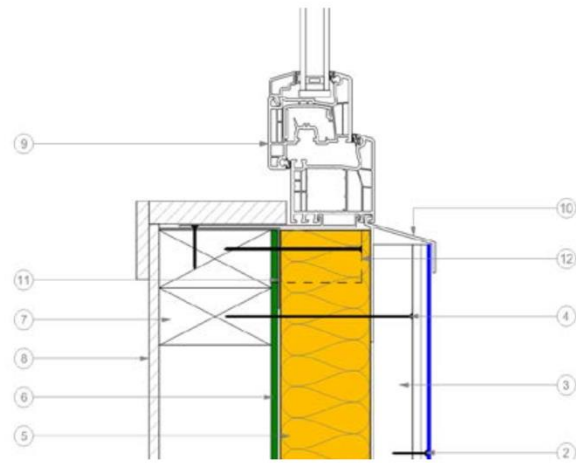
POINT 2

“Get good advice early”



POINT 3

“Its more technical than you might realise!”



THANK YOU

Building Science Summit New Zealand

Shaping the Future of Building Performance & Sustainability