Integrating Mass Timber Elements into Hybrid Structures

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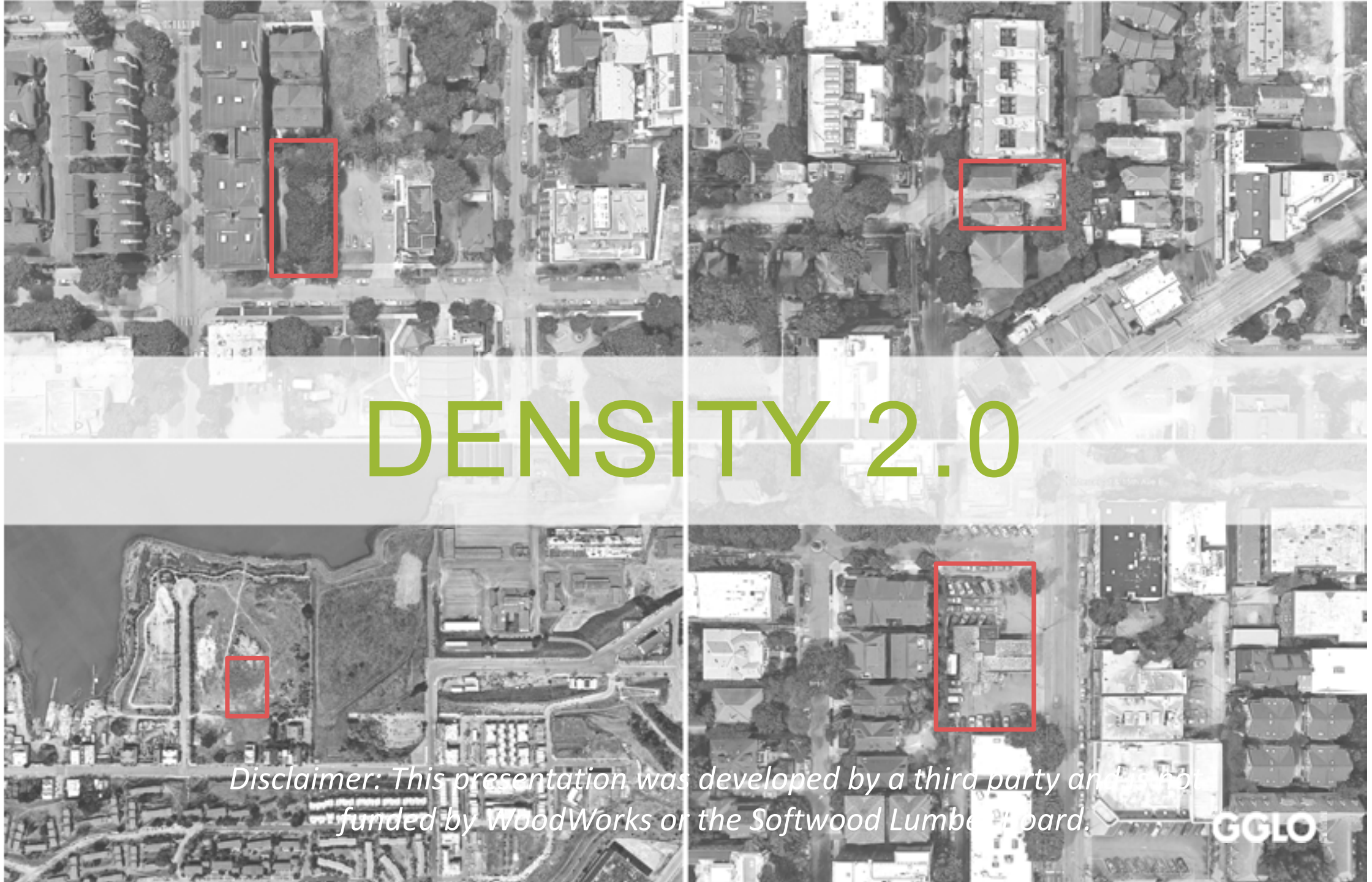
Course Description

Mass timber has well documented performance and aesthetic strengths. However, for certain project types and applications, other, more traditional, building systems such as light wood-frame and concrete can complement mass timber to achieve benefits greater than those offered by one system alone. Considerations such as spans, structural loadings, cost, and code recognition may all help drive the decision to utilize a hybrid structure—and dictate its effectiveness. Based on several project examples and scales, including the proposed Microsoft campus refresh in Redmond, WA, this session will examine the concept of pairing mass timber with other material elements to capture their combined advantages. It will demonstrate how designers can introduce mass timber in measured but purposeful ways to enhance design flexibility while increasing the aesthetic value of a project.

Learning Objectives

1. Discuss a design concept for integrating mass timber into traditional light wood-frame, multi-family project types.
2. Review methods of integrating hybrid systems in a mass timber structure in order to address limited code recognition of mass timber's lateral force-resisting capabilities.
3. Highlight the potential benefit associated with incorporating mass timber into select areas of market-rate multi-family developments, in particular the design, feasibility and livability advantages.
4. Demonstrate best practices associated with hybrid construction, emphasizing material interaction detailing.



DENSITY 2.0

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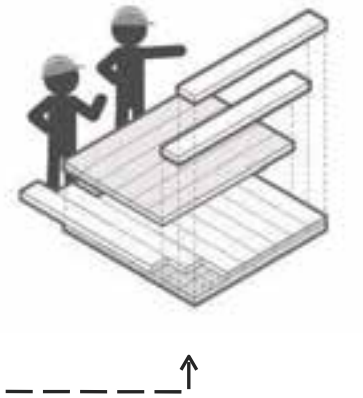
GGLO

HARVEST

- Carbon Sequestration
- Renewable & low impact

DENSITY 2.0



HARVEST

- Carbon Sequestration
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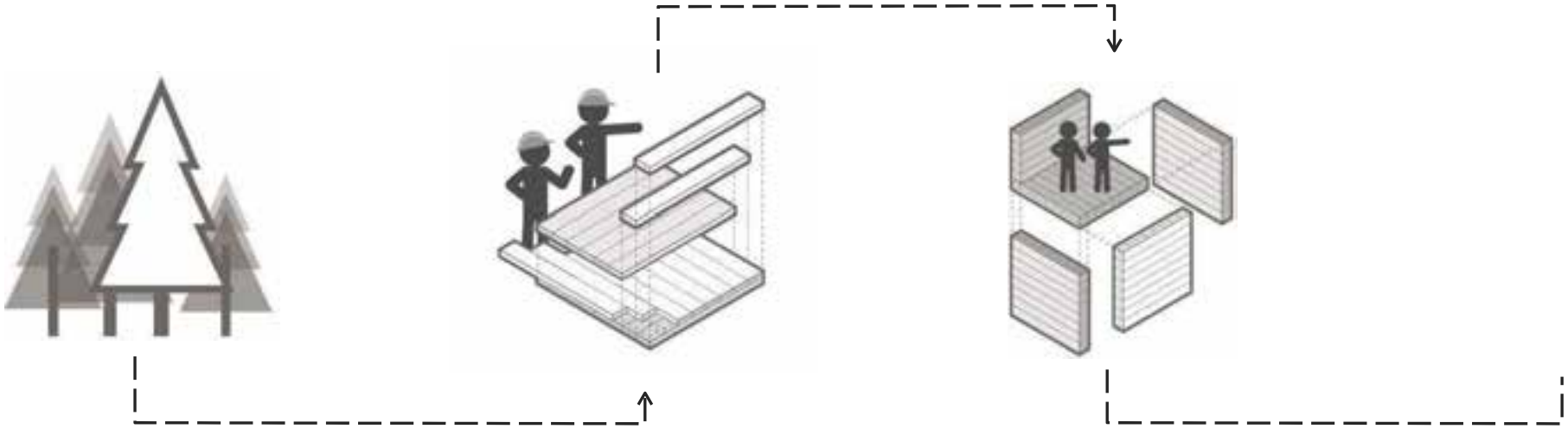
MANUFACTURE

- Rural economy activation
- Regenerative supply chain

DENSITY 2.0



HARVEST

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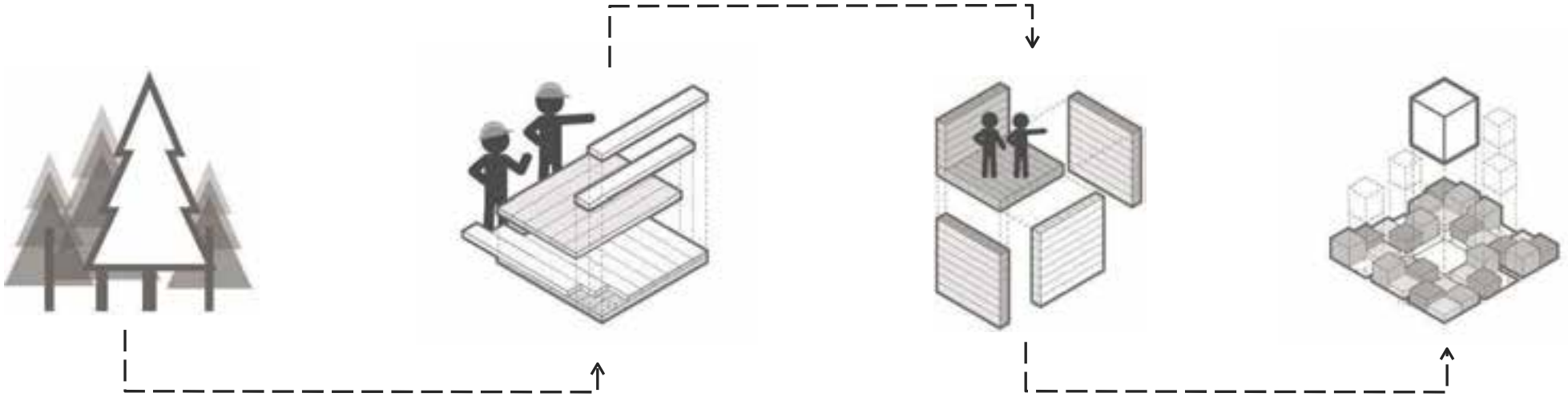
MANUFACTURE

- Rural economy activation
- Regenerative supply chain

BUILD

- High performance
- Structural properies
- Immersive biophillic wood enviroments

DENSITY 2.0



HARVEST

- Carbon Sequestration
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MANUFACTURE

- Rural economy activation
- Regenerative supply chain

BUILD

- High performance
- Structural properies
- Immersive biophillic wood enviroments

LIVE

- Dense livable cities
- Improving qualities of build enviroment while carbon banking

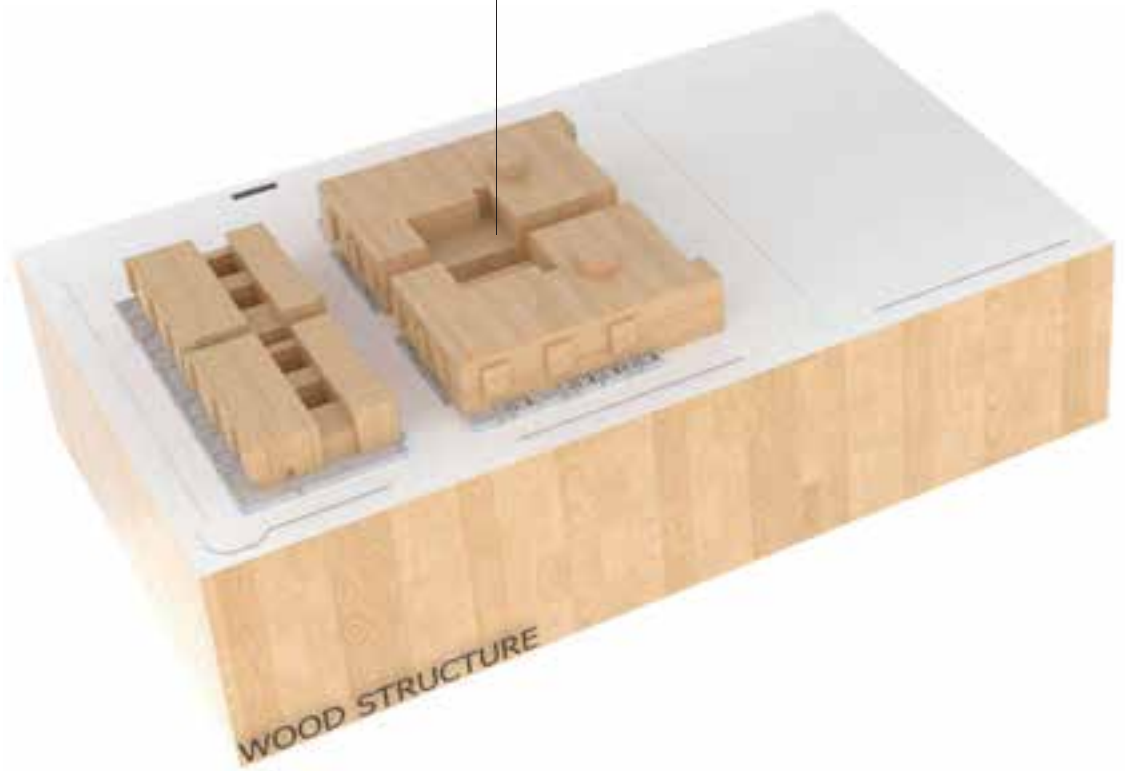
DENSITY 2.0

TYPOLOGIES

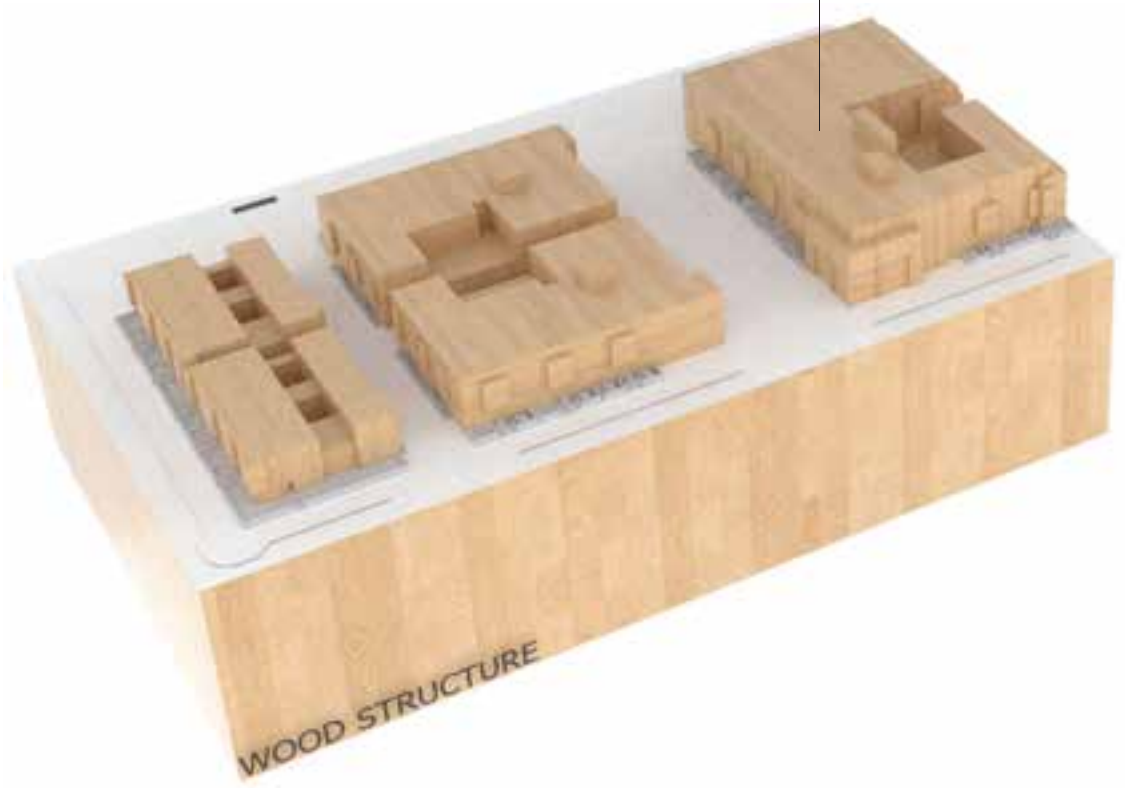

WOOD STRUCTURE

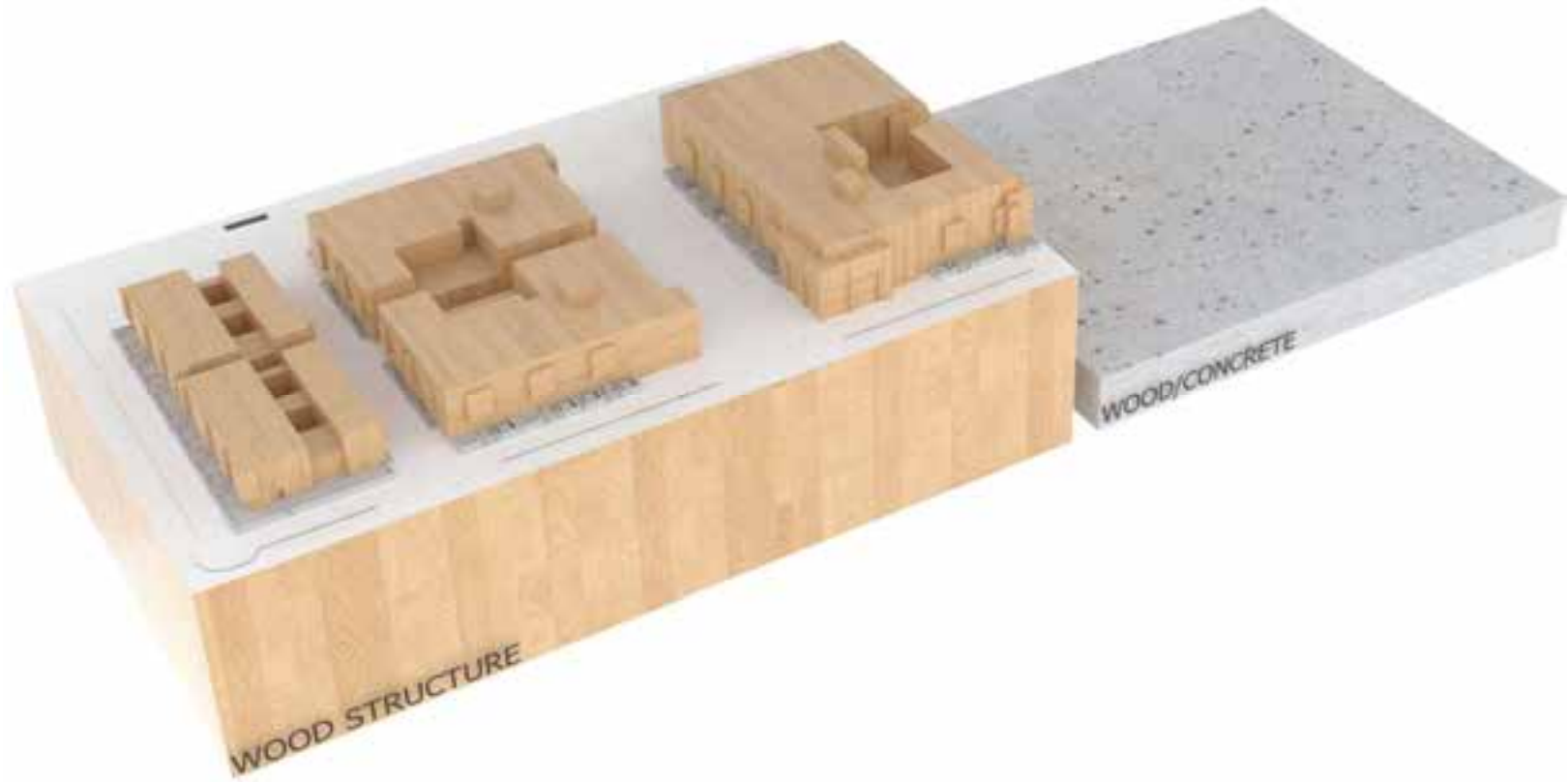
FAR 1.25

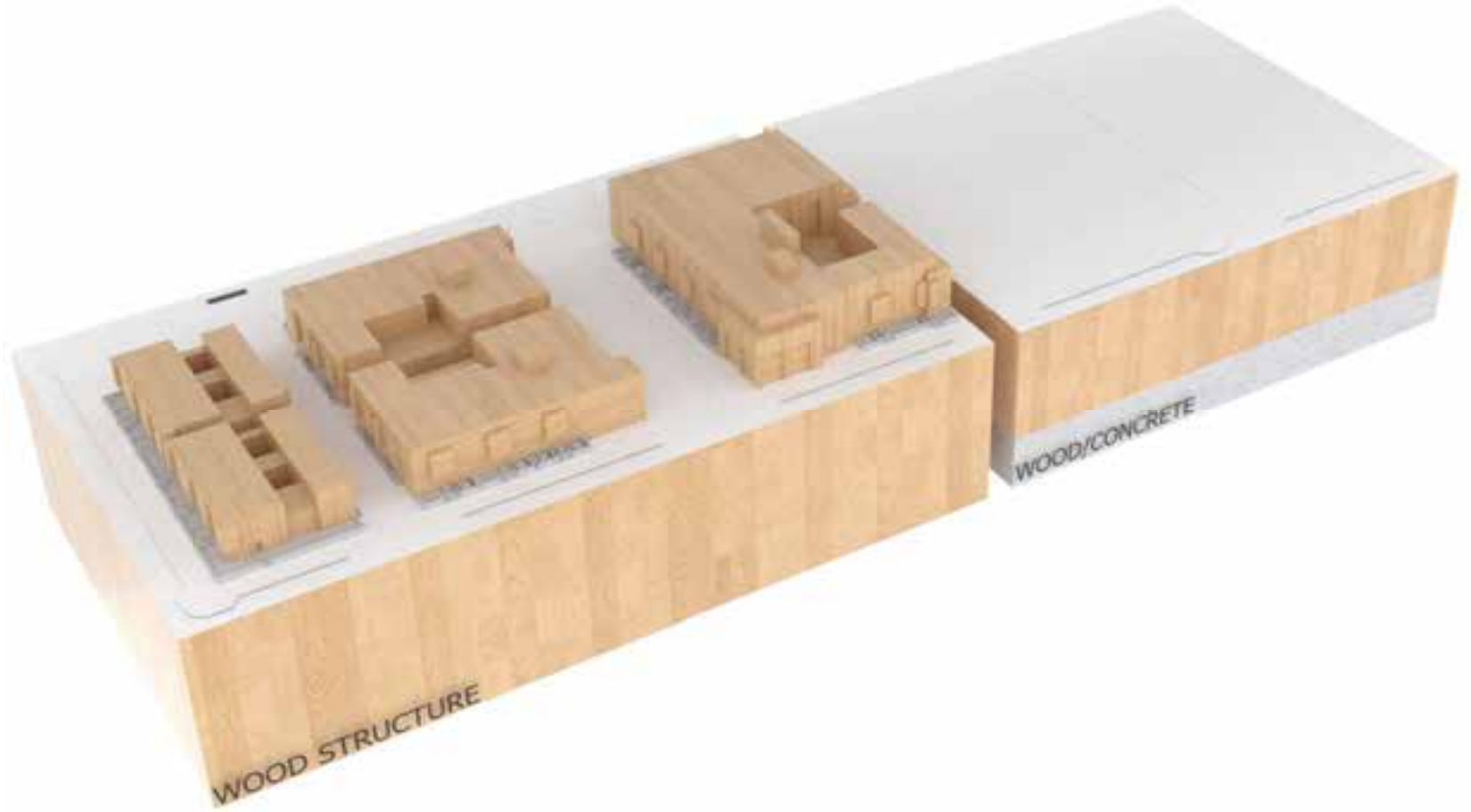
FAR 2.0

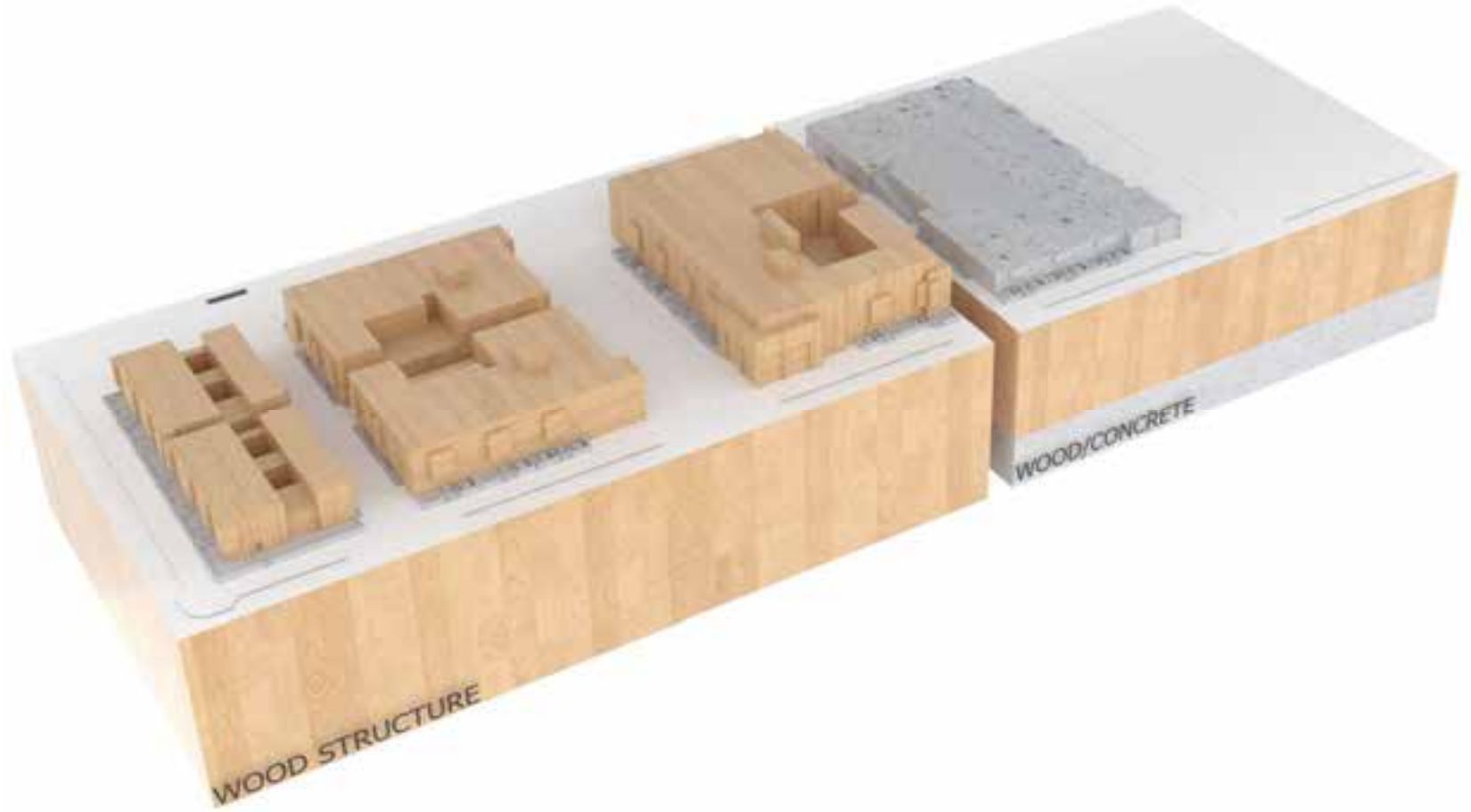


FAR 3.25

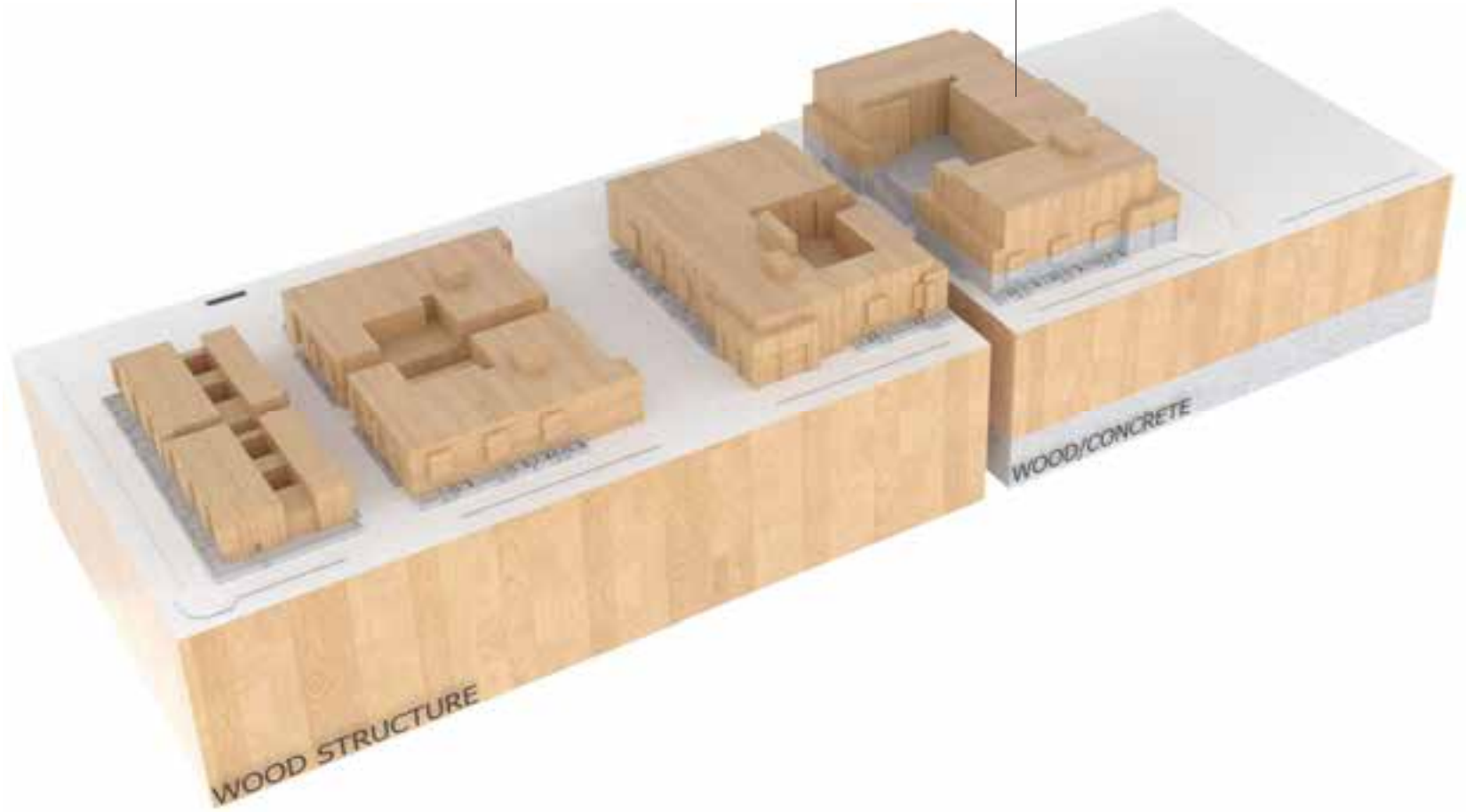


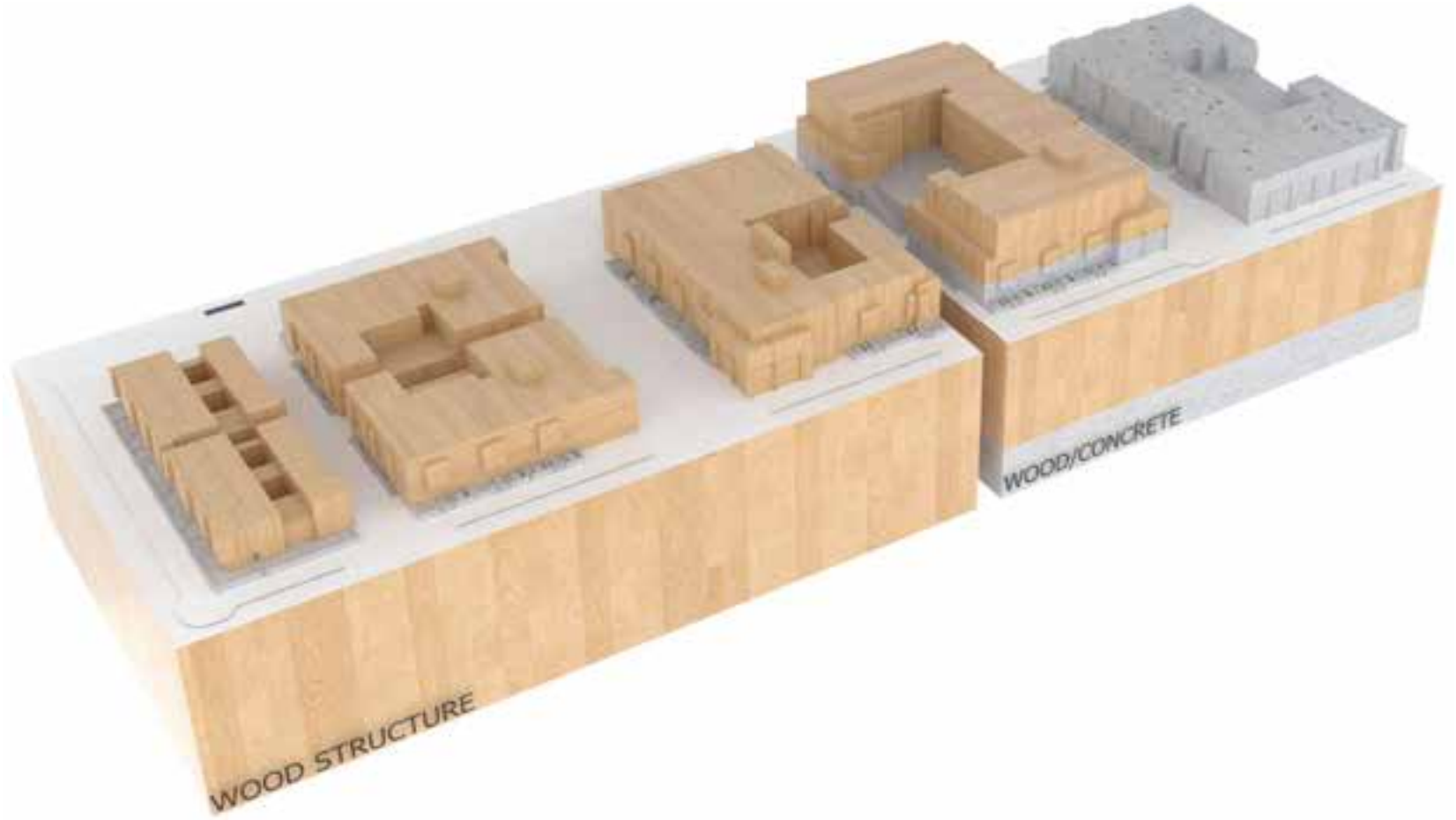

WOOD/CONCRETE
WOOD STRUCTURE

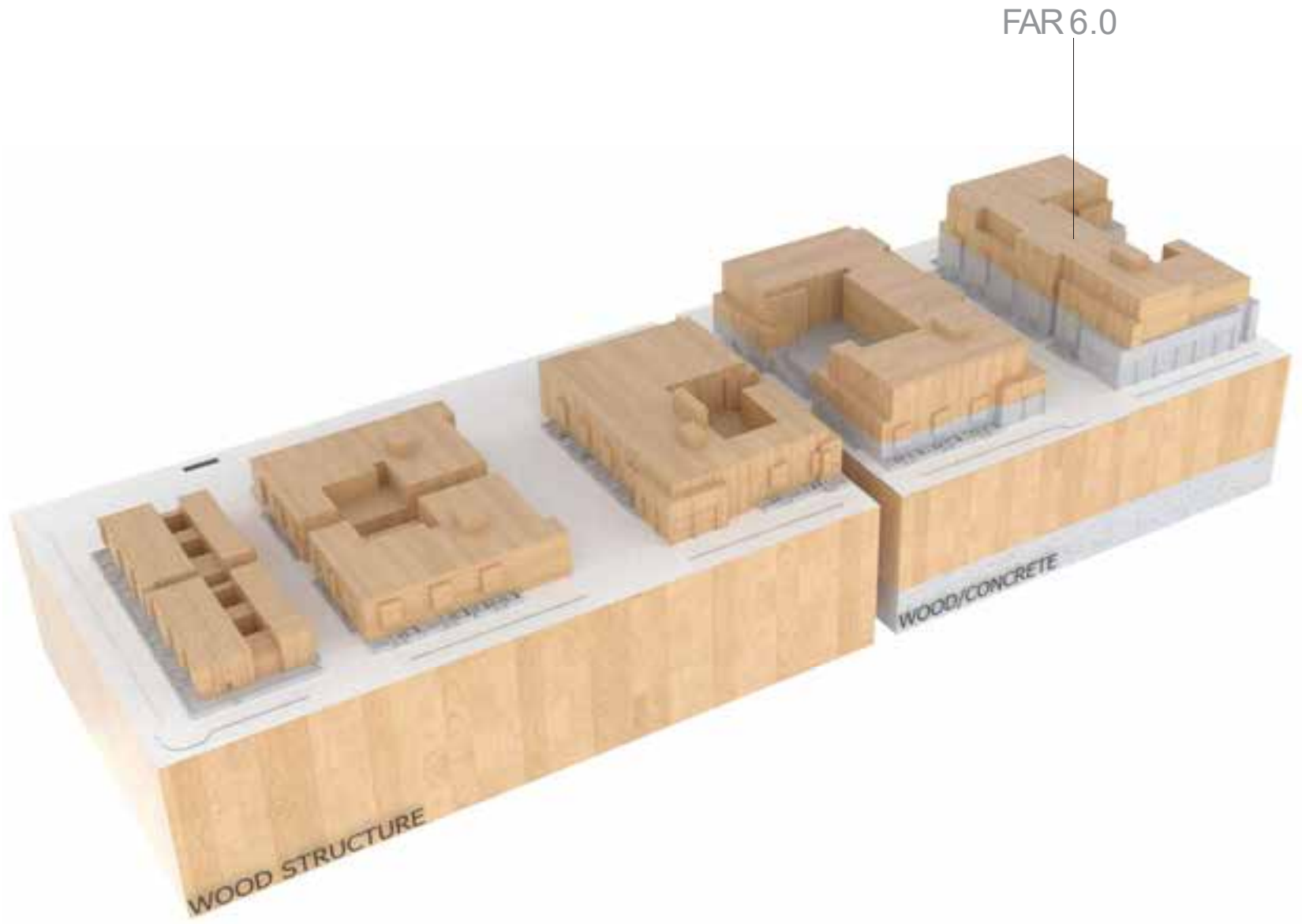

WOOD STRUCTURE
WOOD/CONCRETE

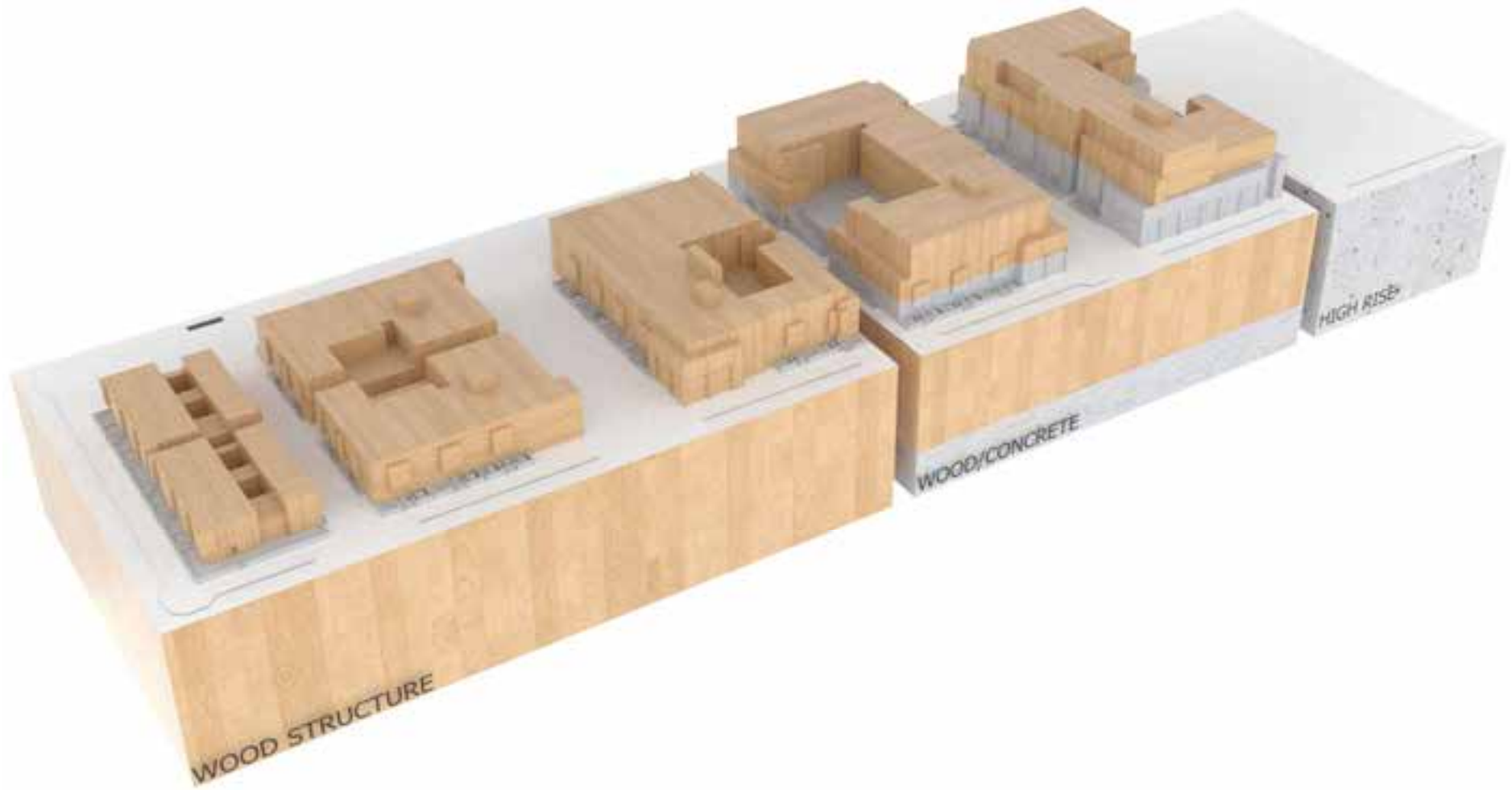

WOOD STRUCTURE
WOOD/CONCRETE

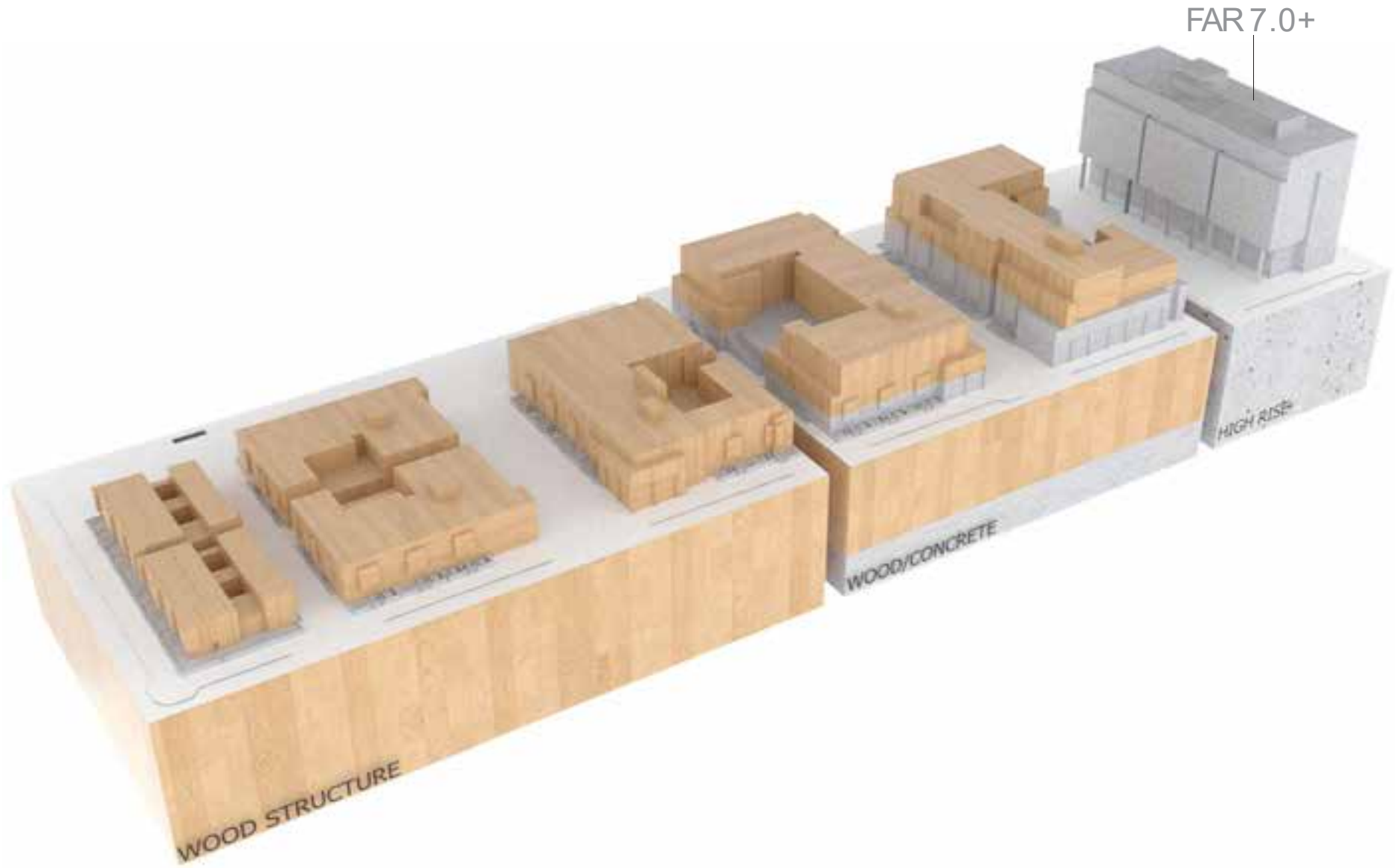
FAR 4.75

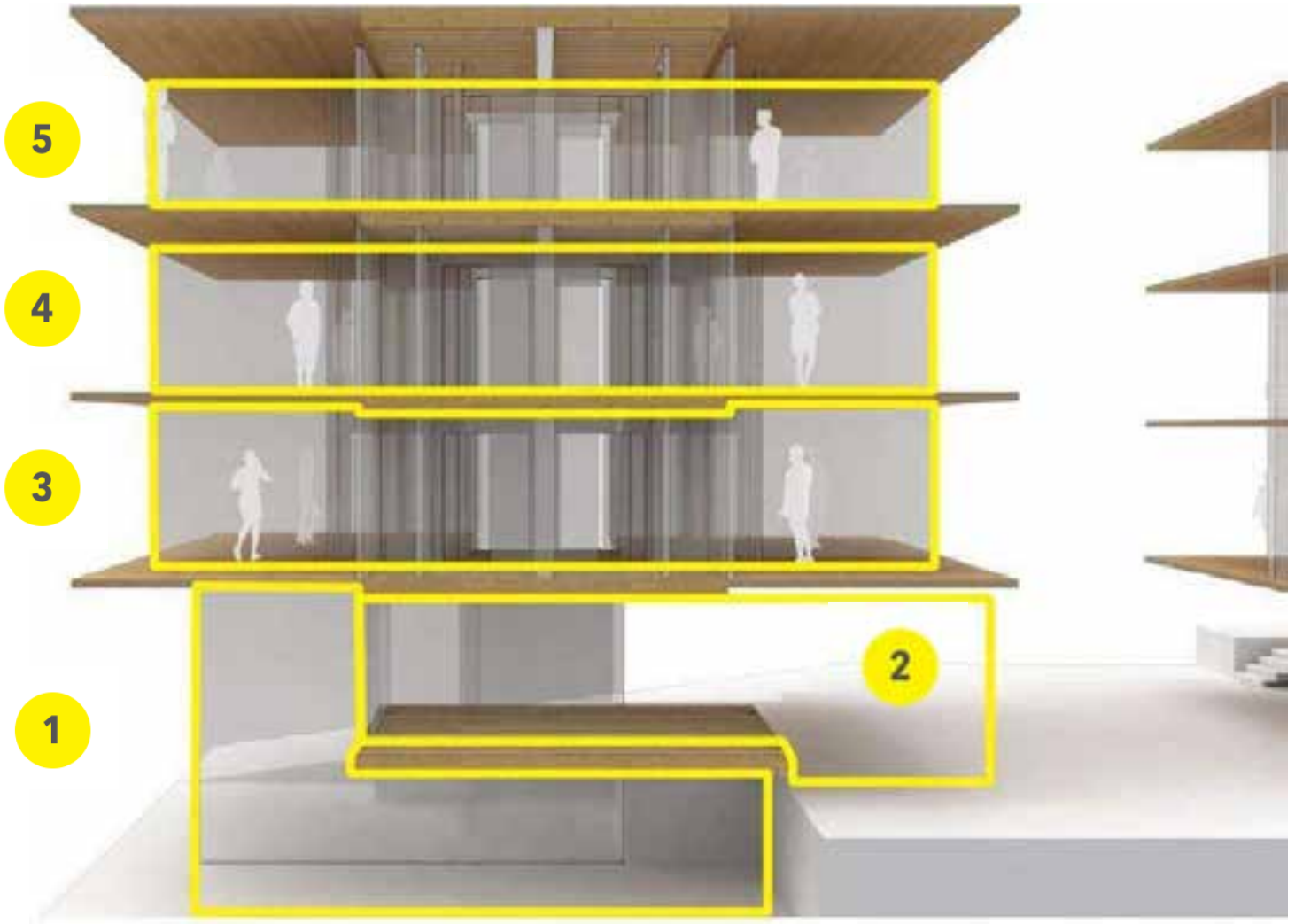



WOOD STRUCTURE
WOOD/CONCRETE


FAR 6.0
WOOD/CONCRETE
WOOD STRUCTURE

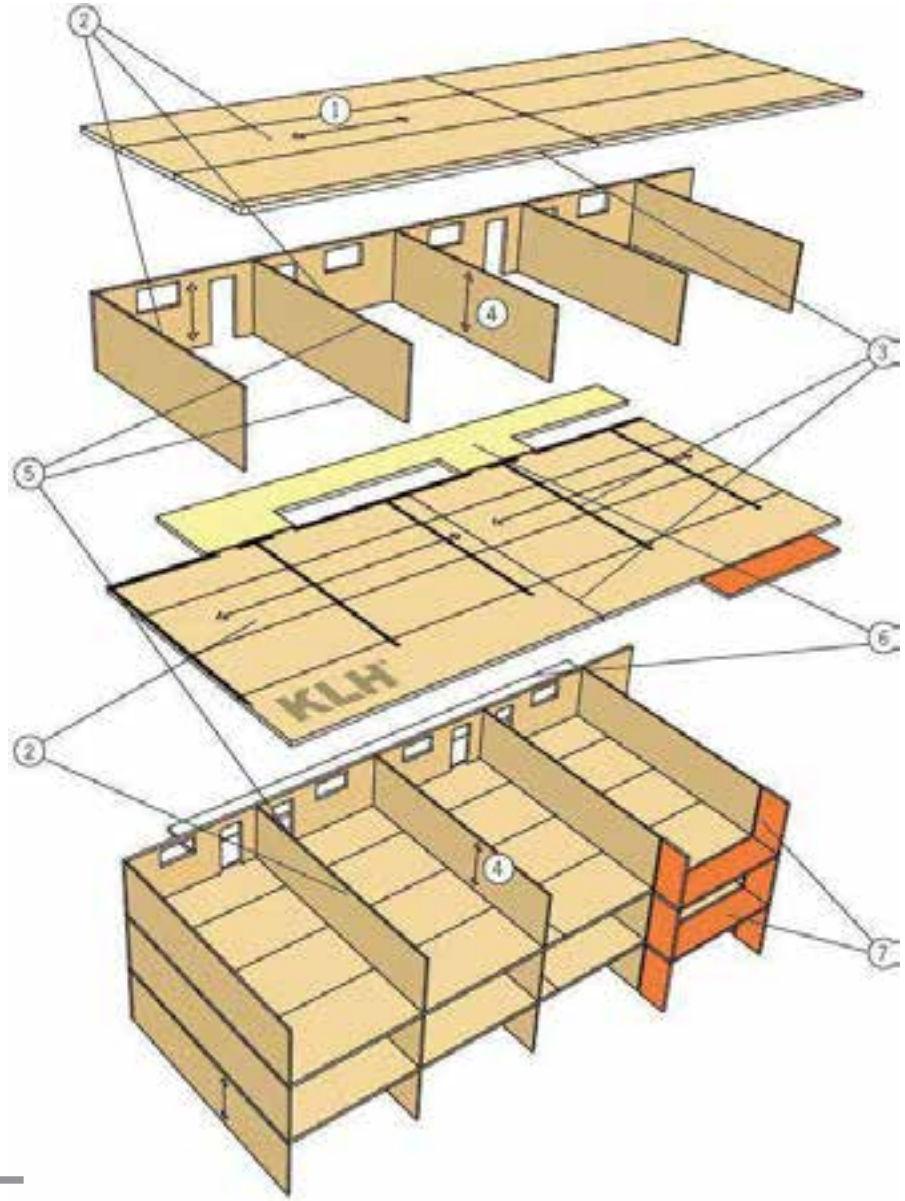

WOOD STRUCTURE
WOOD/CONCRETE
HIGH RISE


FAR 7.0+
HIGH RISE
WOOD/CONCRETE
WOOD STRUCTURE


5
4
3
2
1

HYBRID SYSTEM

CRITIQUE: ALL-CLT SYSTEM



IMPERMEABLE

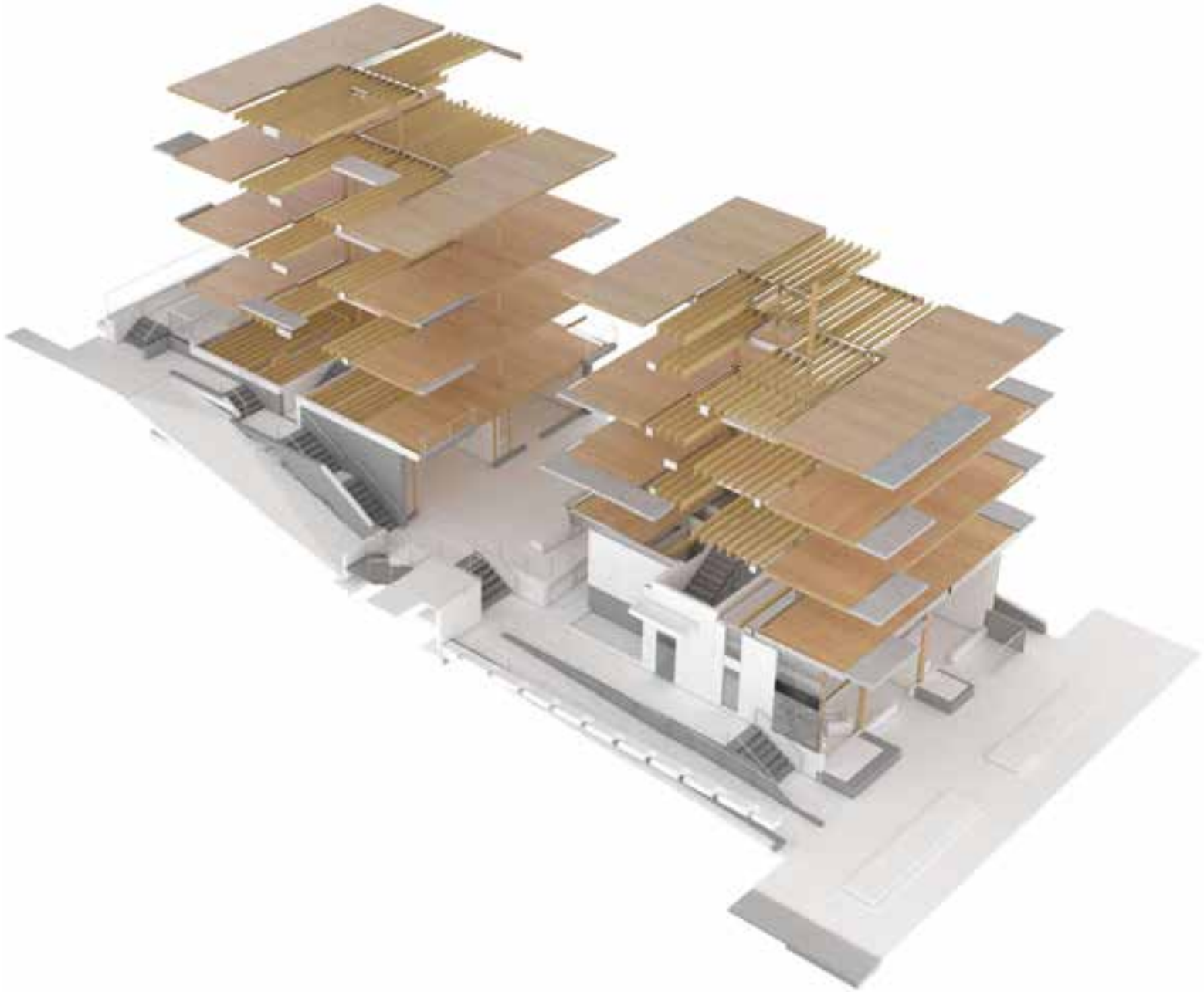
EFFECTIVE FRAMEWORK FOR OTHER TRADES


MERGE

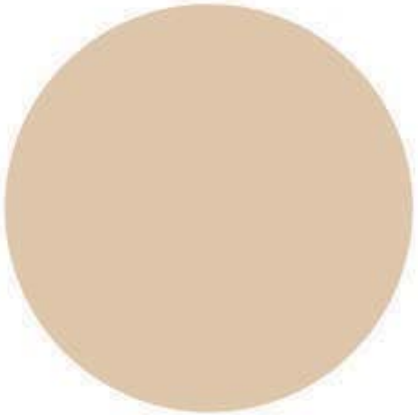
CASE STUDIES

CADENCE 21

GGLO CADENCE kpff KLH



All Open Framing

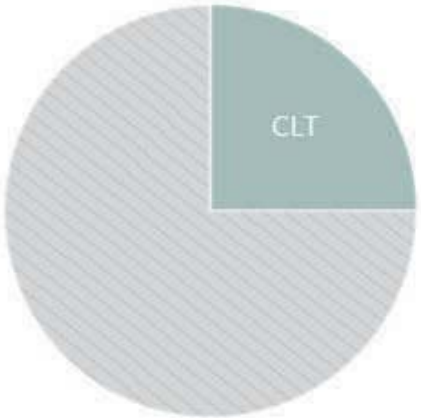


Material & Labor Costs
$238,000

8.5% Of Const. Cost

Conventional Framing ($17/ft)

50% CLT Floor System



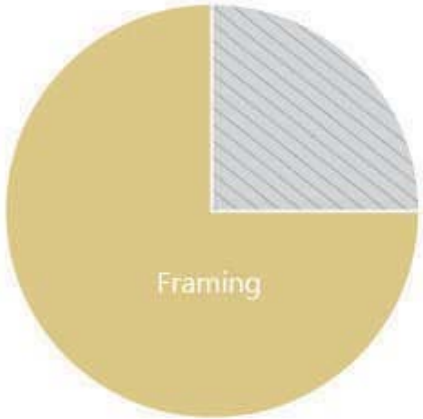
- $130,000 Materials
- $30,000 Labor

$160,000

11.6% O f Const. Cost

Hybrid System ($24/ft)

100% Wall / 50% Framed Floor

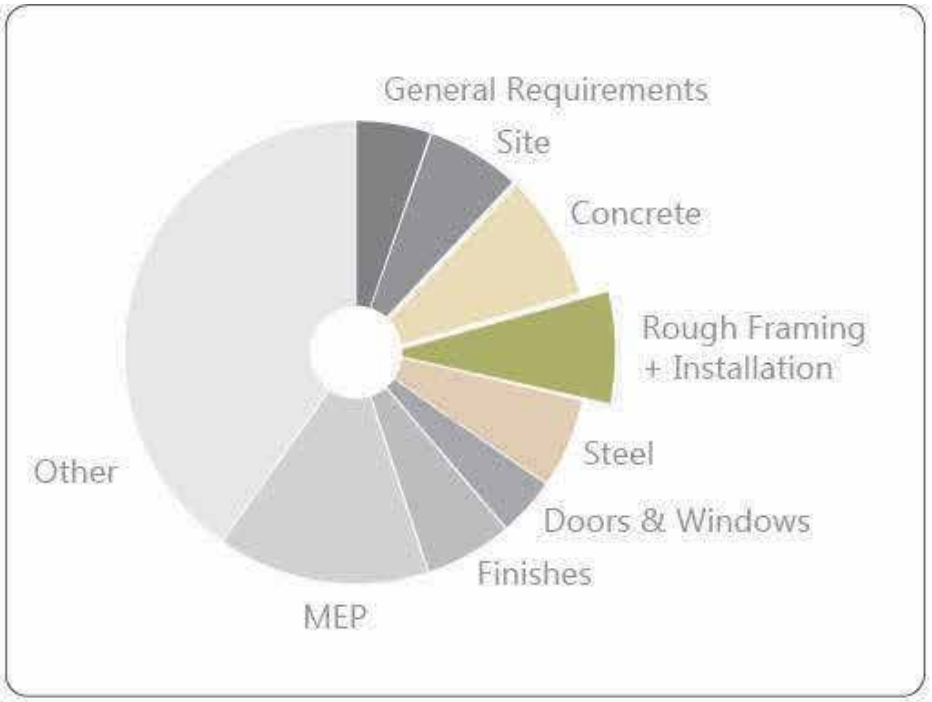


Material & Labor Costs
$178,000

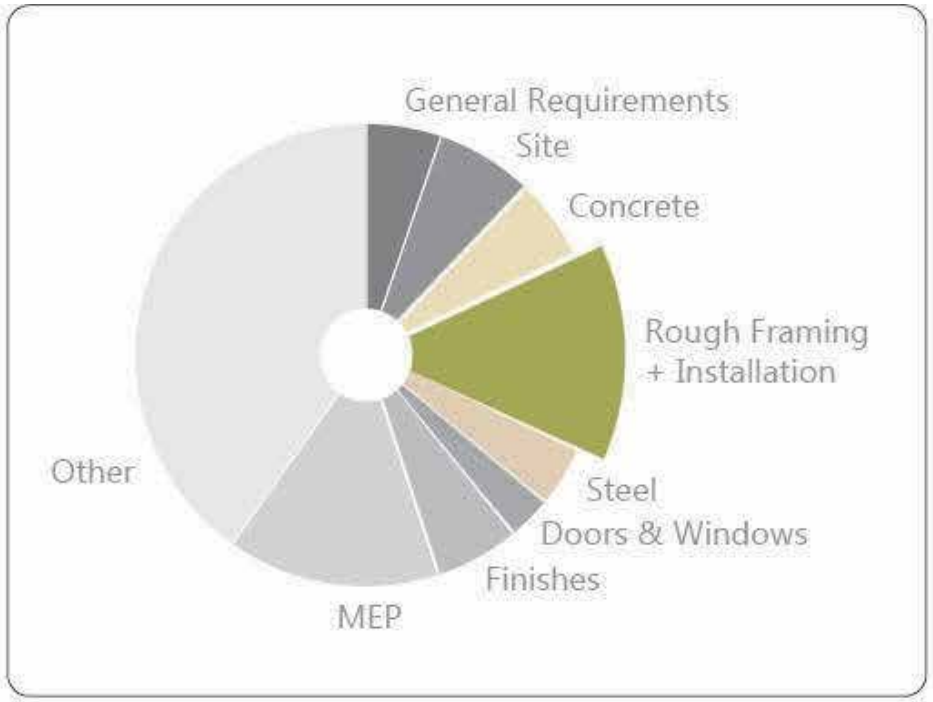
Rough Framing Total

Material & Labor Costs
$338,500

ROUGH FRAMING COST



CONVENTIONAL FRAMING

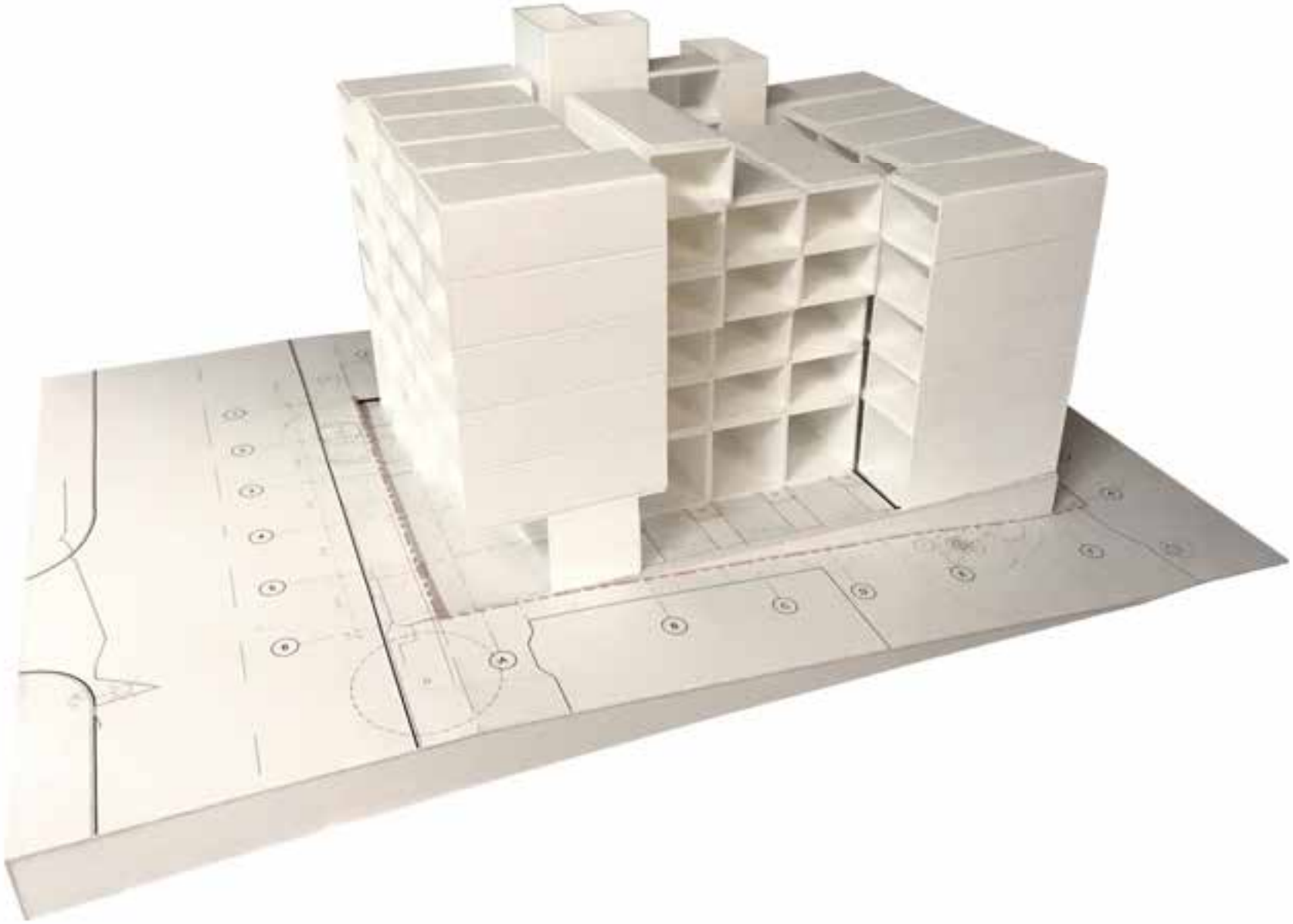


HYBRID FRAMING

CONSTRUCTION COST

CADENCE 19

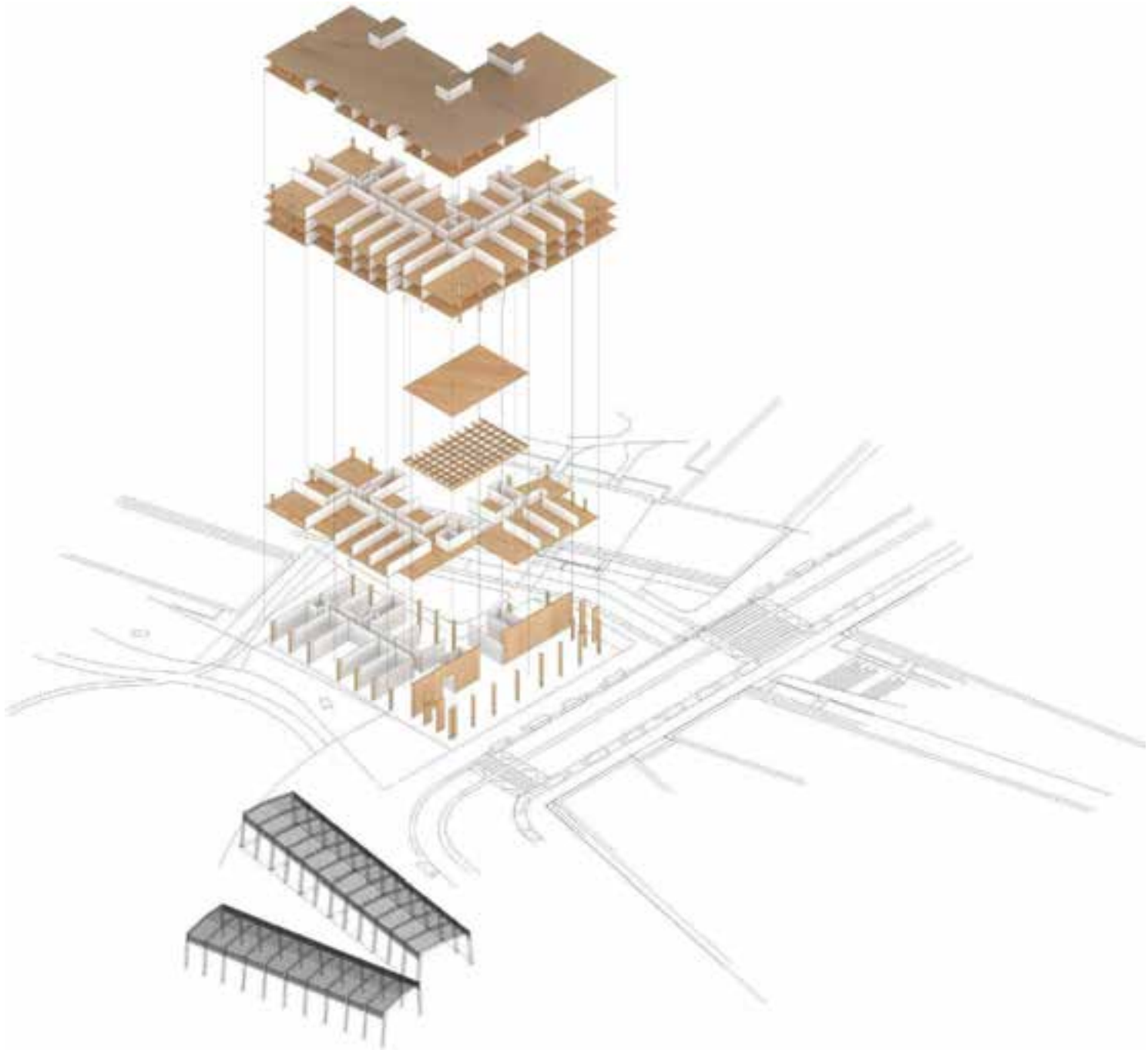
GGLO CADENCE kpff GUERDON

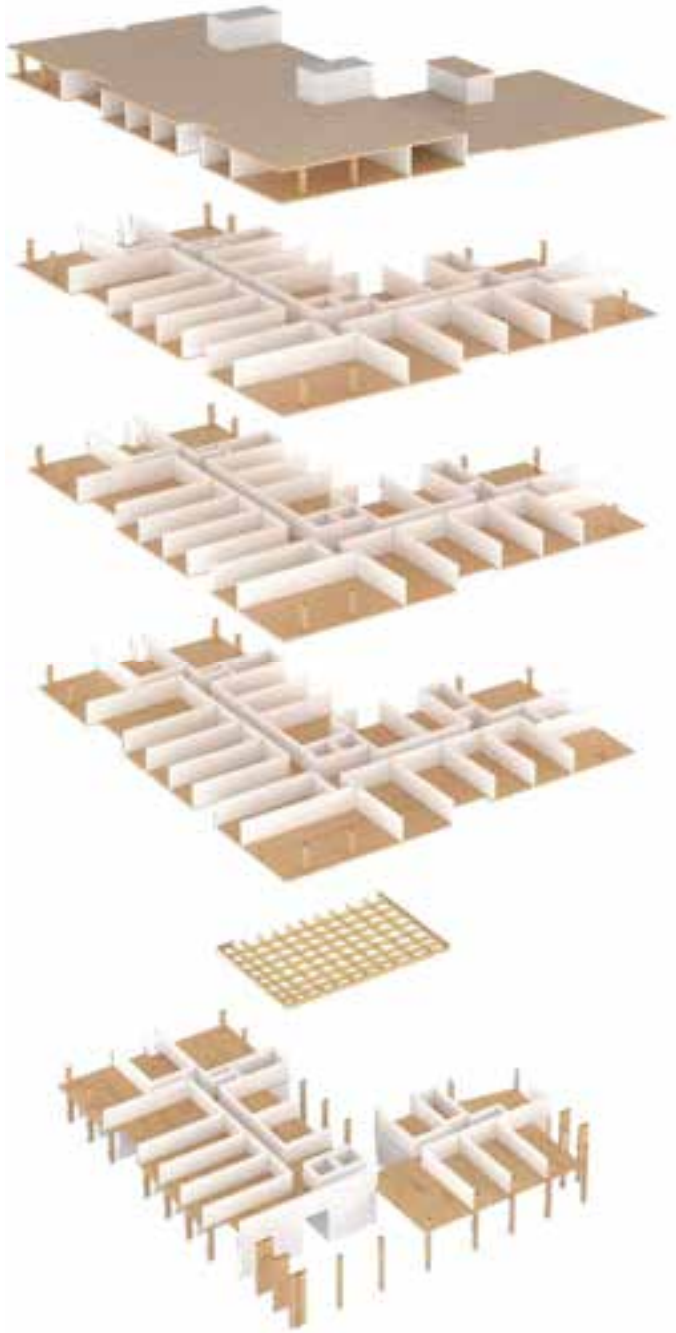


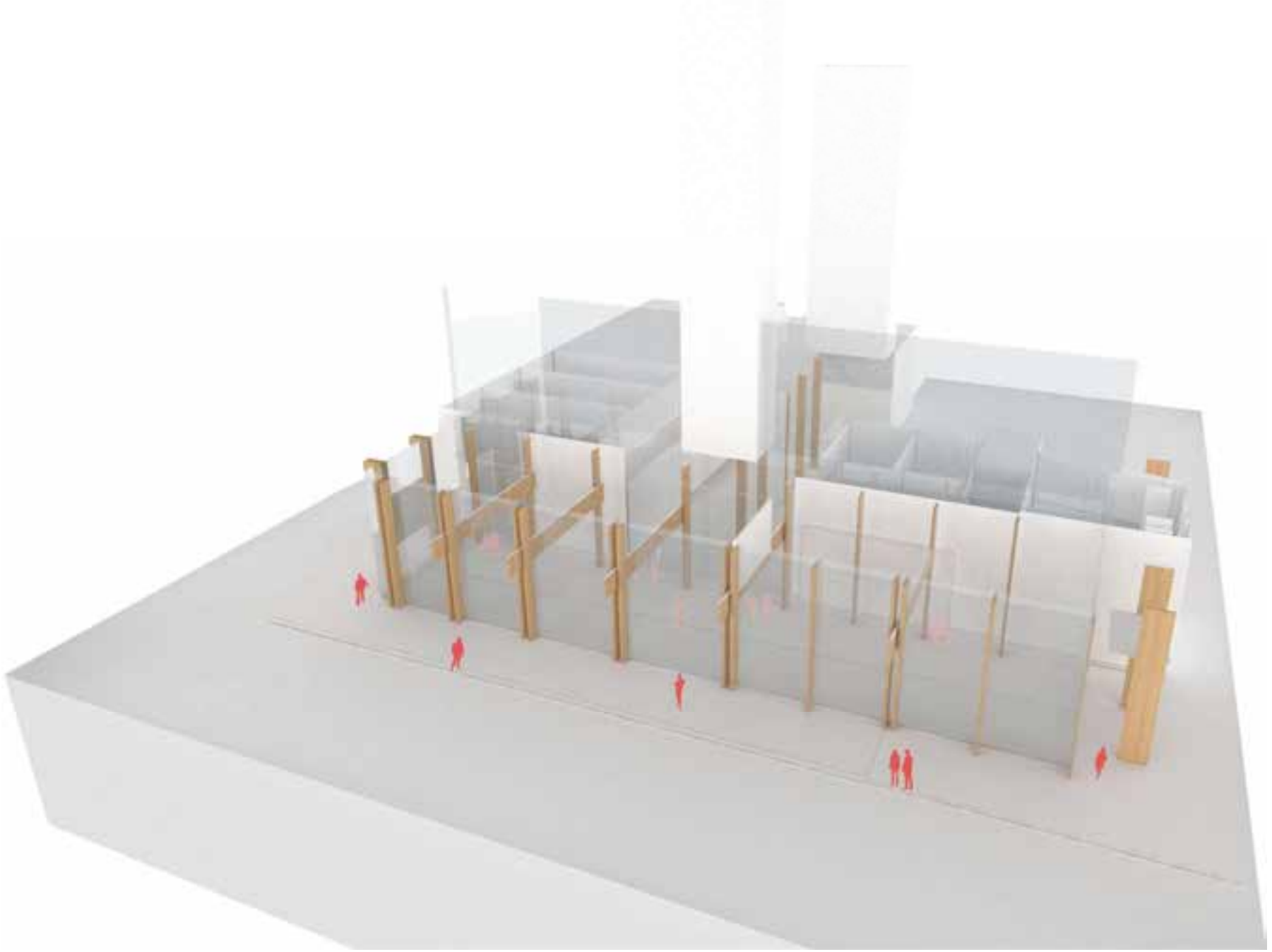

21”
6”

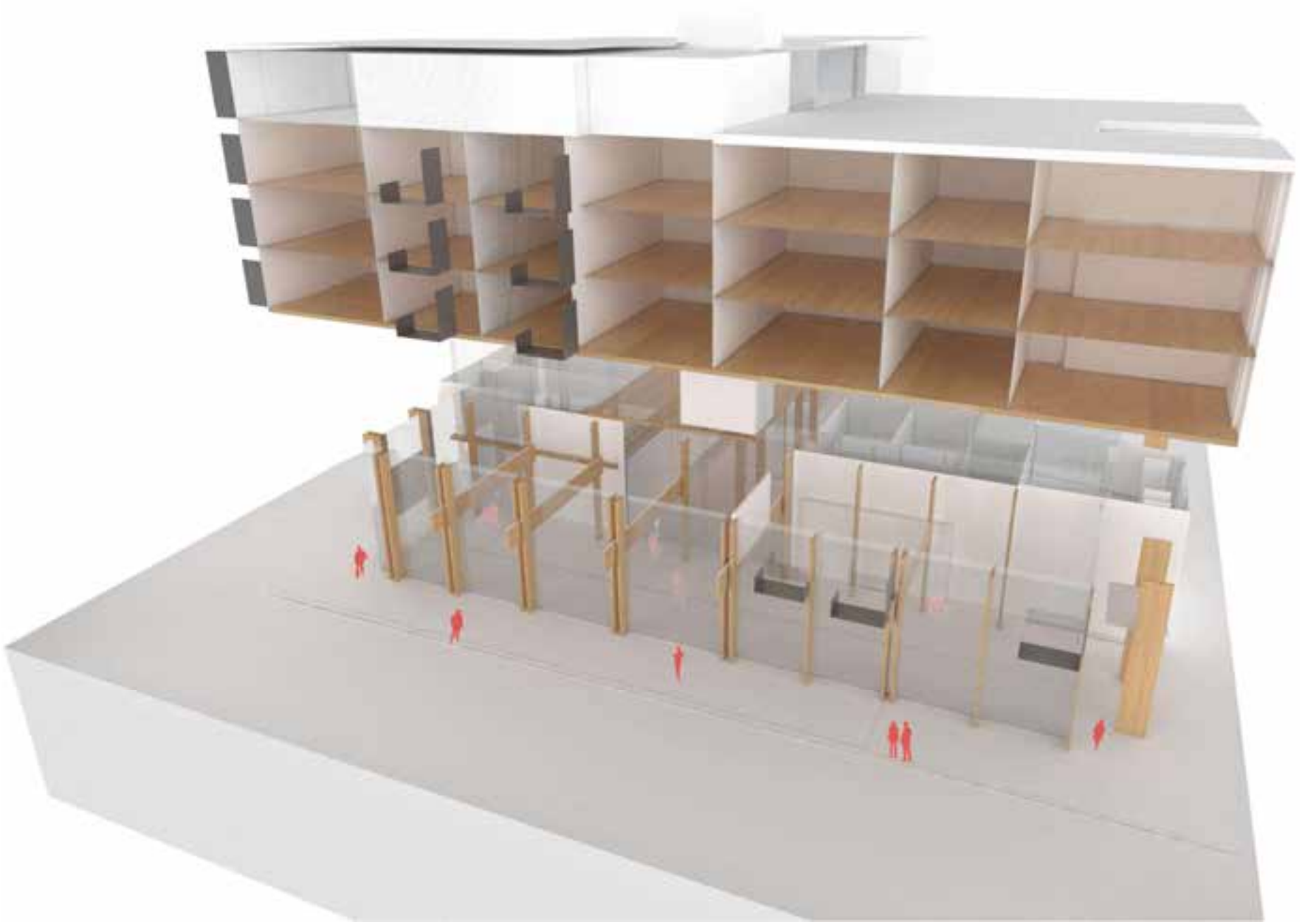
INDIA BASIN

DRAFT

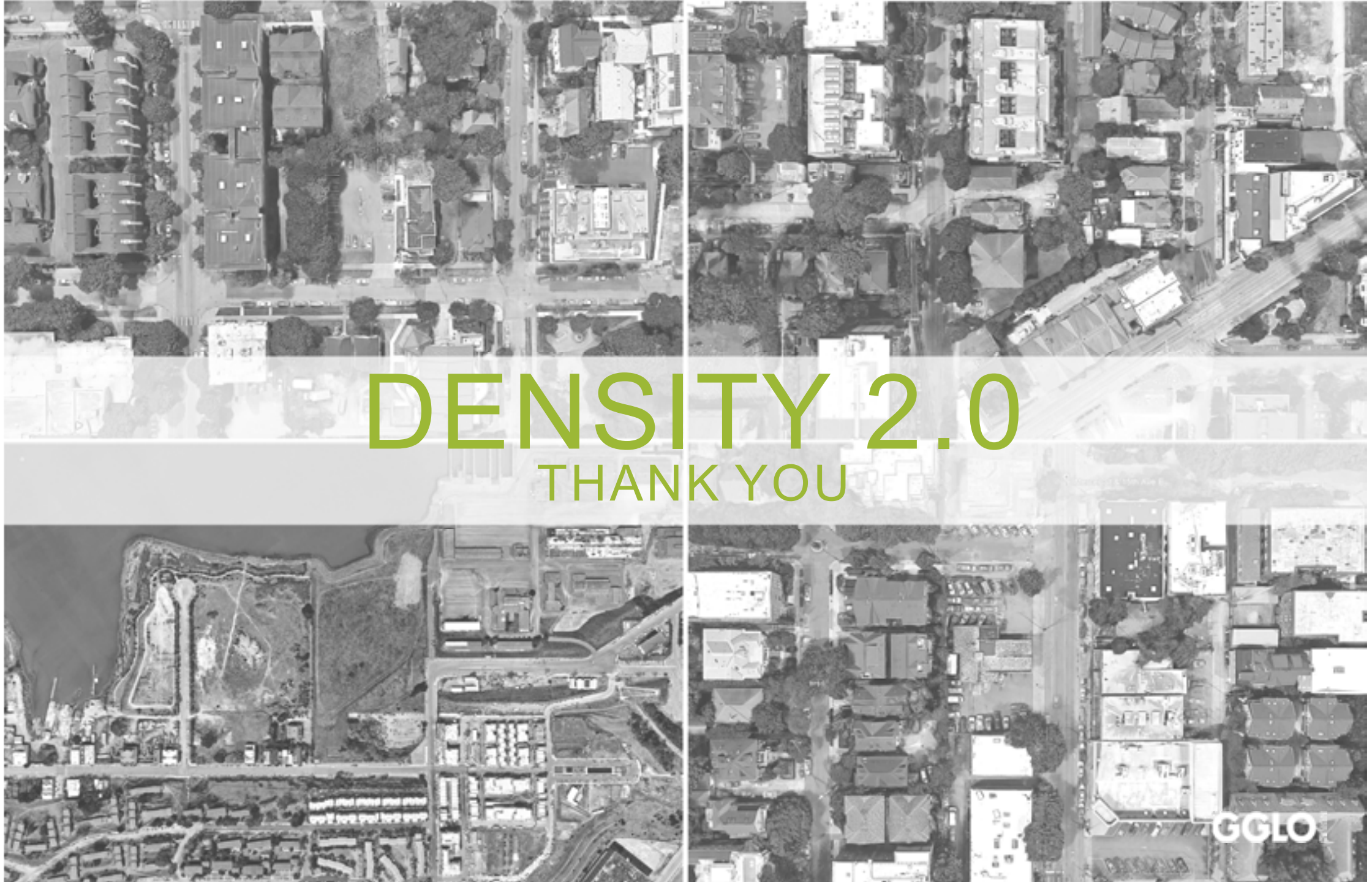








CADENCE 15



DENSITY 2.0

THANK YOU

GGLO