

# USF - Cottages at Hasty Place

Grove Park Yellow Jackets



# Team Introduction

Introduction

Architecture

Construction

Envelope

Interior Design

Thermal Comfort

Energy

Financials

Conclusion



**Tyler Pilet**  
PhD High Performance Building



**Wen Yi Chang**  
MS High Performance Building



**Raunak Tibrewala**  
MS High Performance Building



**Warren Cambell**  
MS High Performance Building



**Yuran Kong**  
MS High Performance Building



**Yuhang Li**  
M. Architecture



**Dan Lu**  
MS High Performance Building



**Raj Shah**  
MS Building Construction



**Jingxin Xu**  
MS Urban Design



**Xinyi Zhang**  
MS Civil Engineering

# Faculty and Partner Profiles

## Team Advisor



**Jason Britton Brown**  
Lecturer, School of Architecture  
Georgia Tech

## Community Partners



Introduction

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# Industry Partners

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P E R K I N S  
+ W I L L



# Location

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## 3A – Urban Single-family Home

# The Changing Landscape of Atlanta

Introduction

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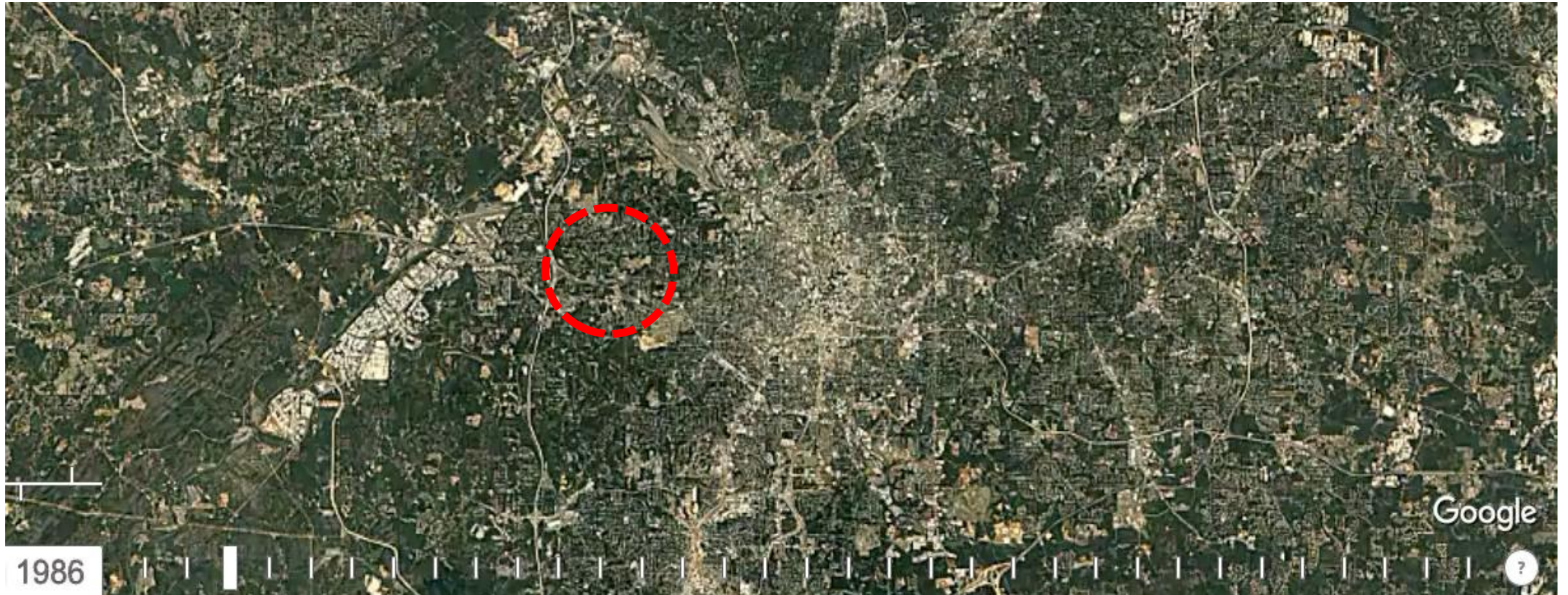
Interior Design

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# Atlanta Beltline

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Envelope

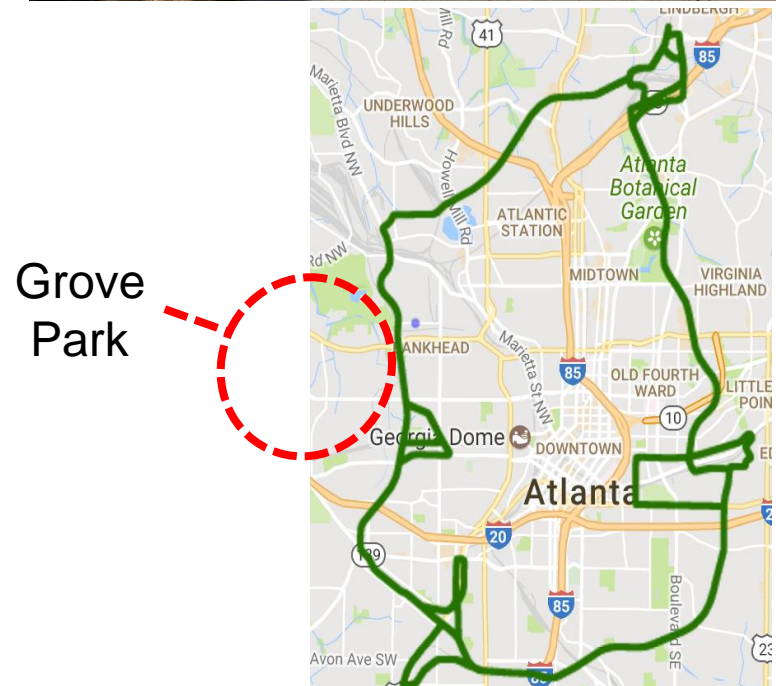
Interior Design

Thermal Comfort

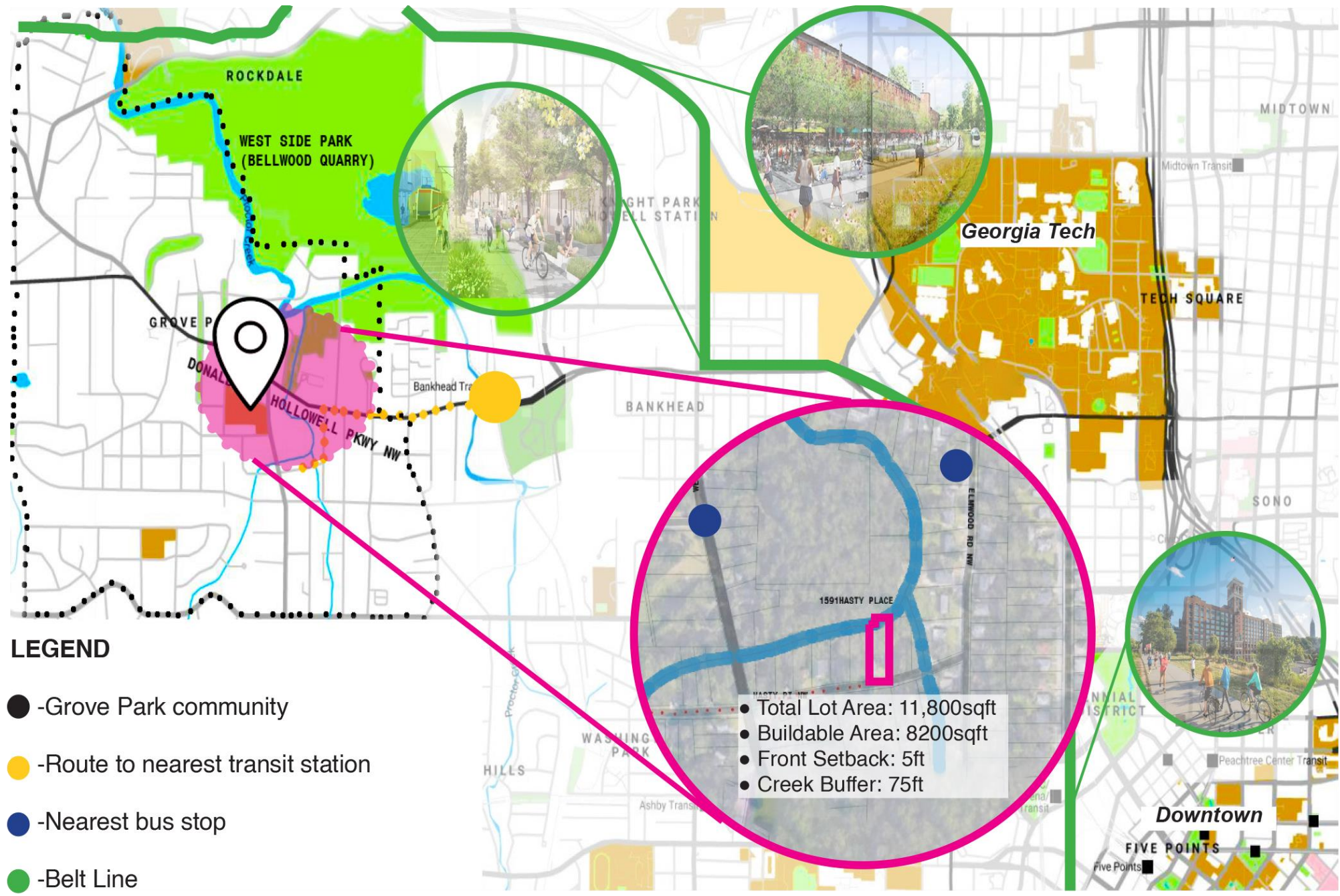
Energy

Financials

Conclusion



- Introduction
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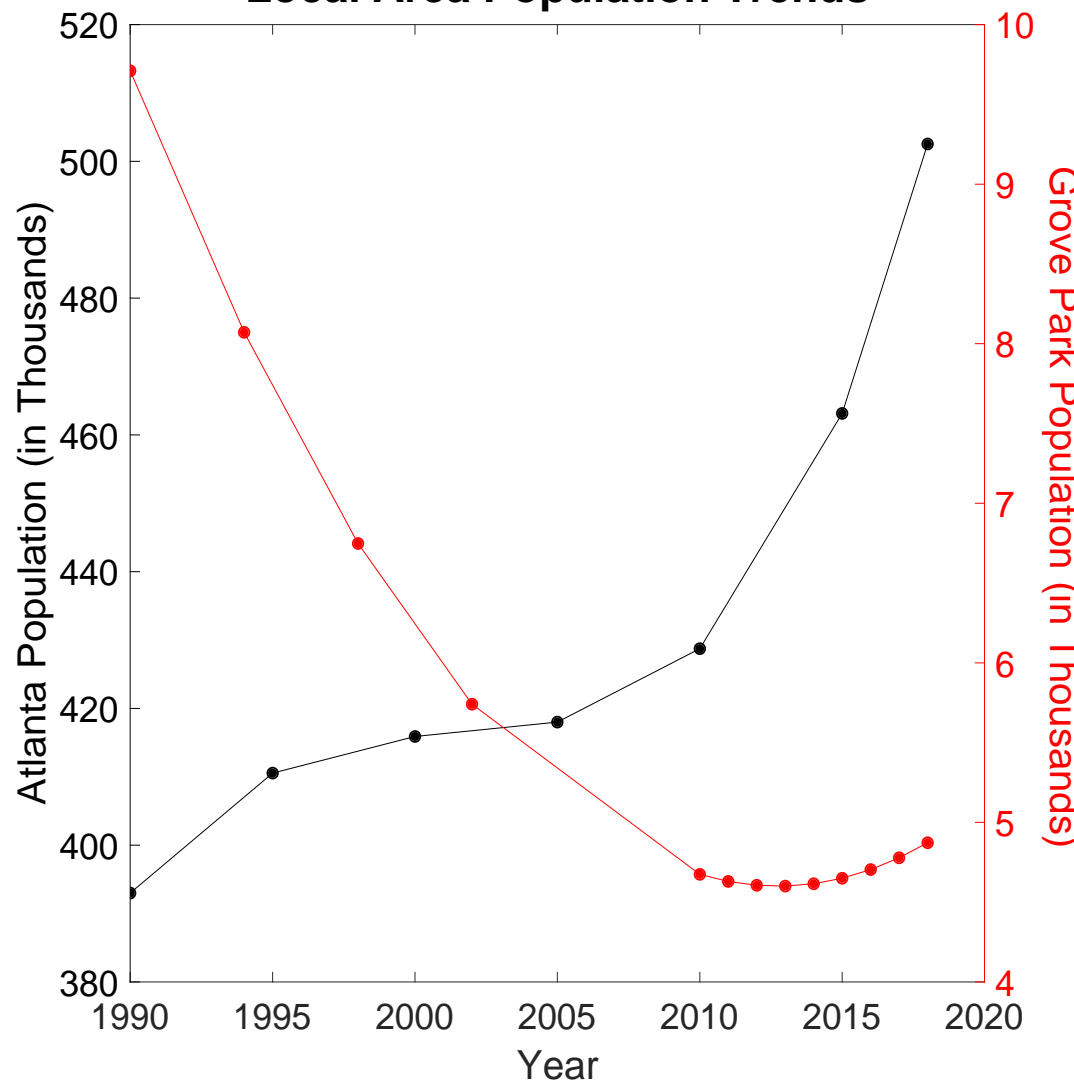




# The Reality of Change

- Introduction
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Local Area Population Trends



*Then*



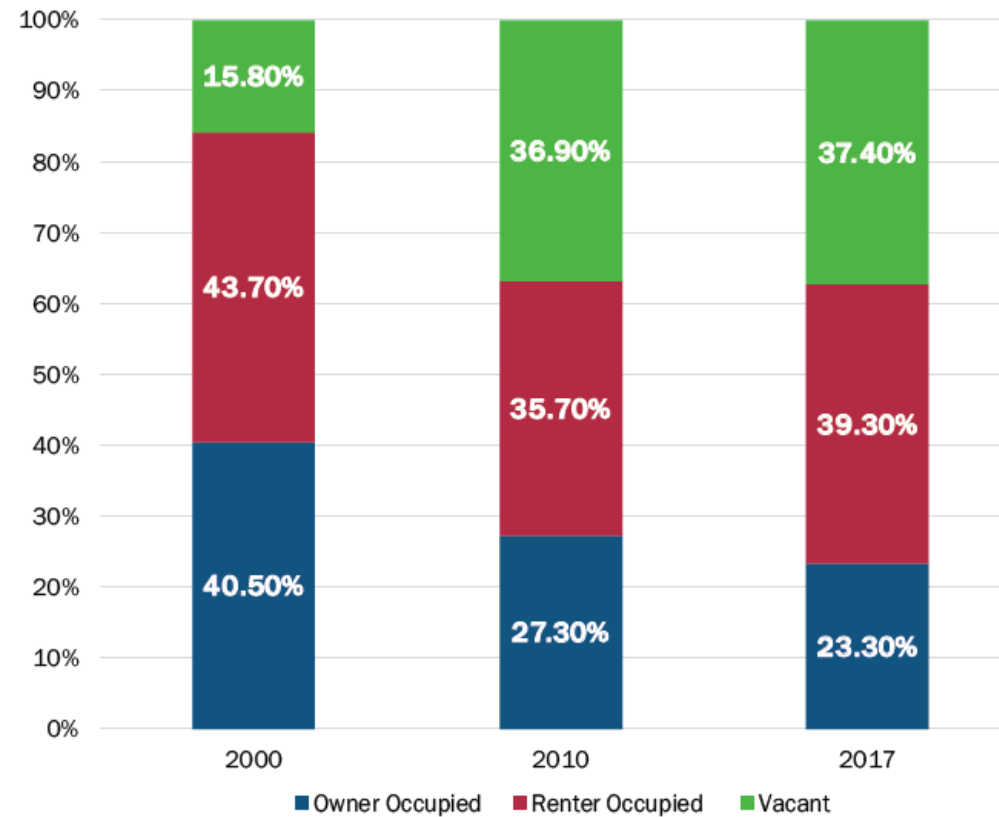
*Now*



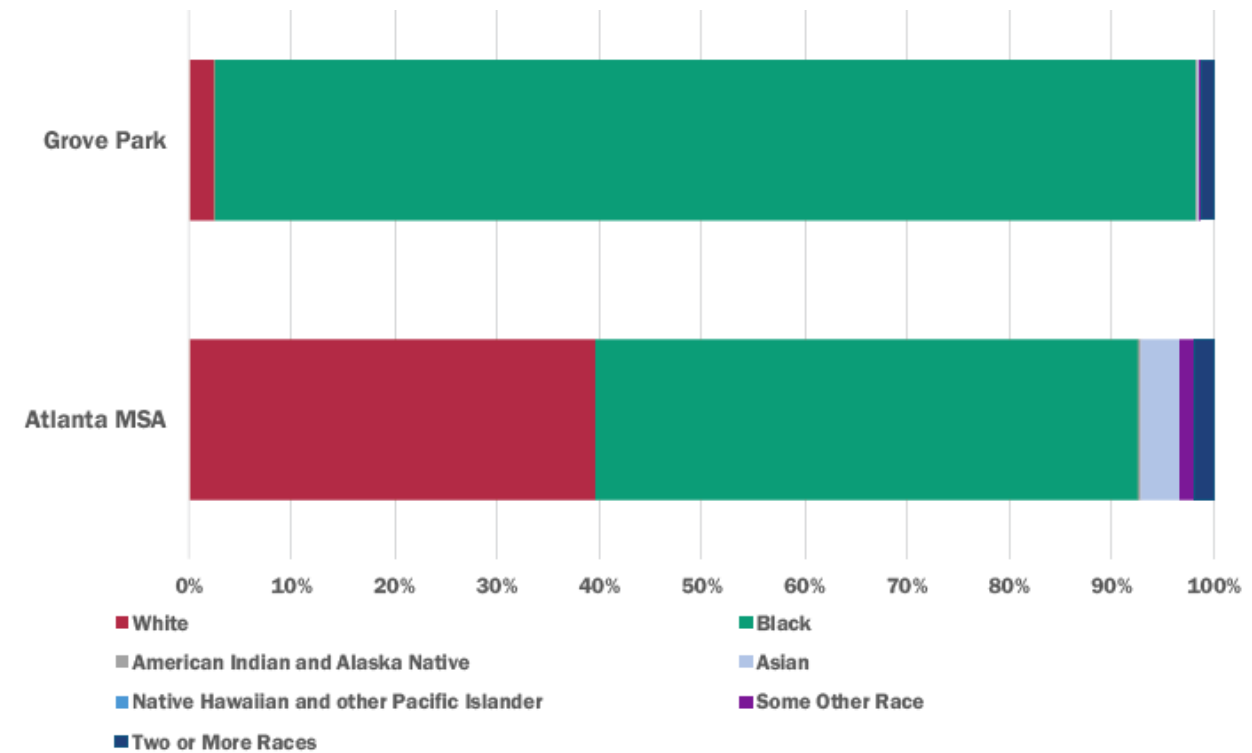
*Grove Park named highest in Atlanta energy burden by Georgia Tech policy study.*

# Grove Park Demographics

- Introduction
- Architecture
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Vacancies are 2x that of the Metro—Atlanta Area



The percentage of black residents is 3x higher in Grove Park than Metro-Atlanta

# Grove Park Incomes

Introduction

Architecture

Construction

Envelope

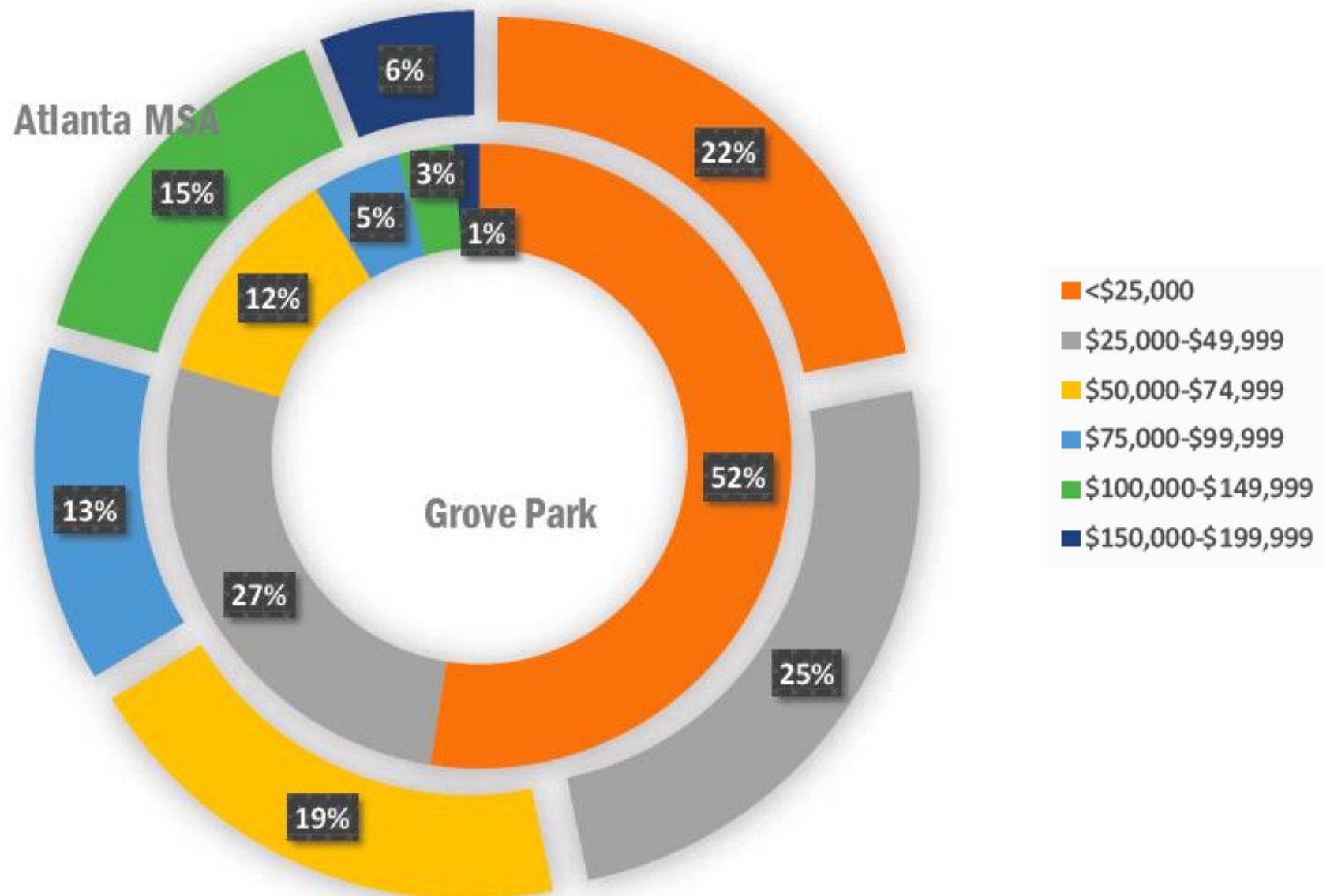
Interior Design

Thermal Comfort

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Conclusion



Median Income: \$41,000

# Resurgence in Grove Park

Introduction

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Thermal Comfort

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PURPOSE  
BUILT  
COMMUNITIES



Fred Stevens of the Grove Park Foundation

# Community-Driven Approach

Introduction

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Conclusion



Our team active in the community

*In 10-20 years, Grove Park will be*

- More diverse, multicultural, and economically stable

- Strong diverse community of working class people with families

- **Gentrified if not prevented**

# Grove Park Housing Workshop

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Financials

Conclusion

*17.6% votes*



Craftsman Style – Option 1

**32.4% votes**



Craftsman Style – Option 2

*29.4% votes*



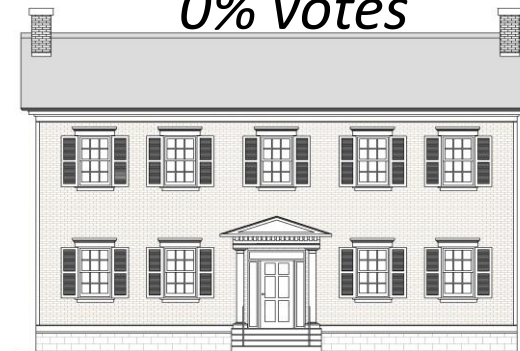
Craftsman Style – Option 3

*0% votes*



Colonial Revival Style – Option 1

*0% votes*



Colonial Revival Style – Option 2

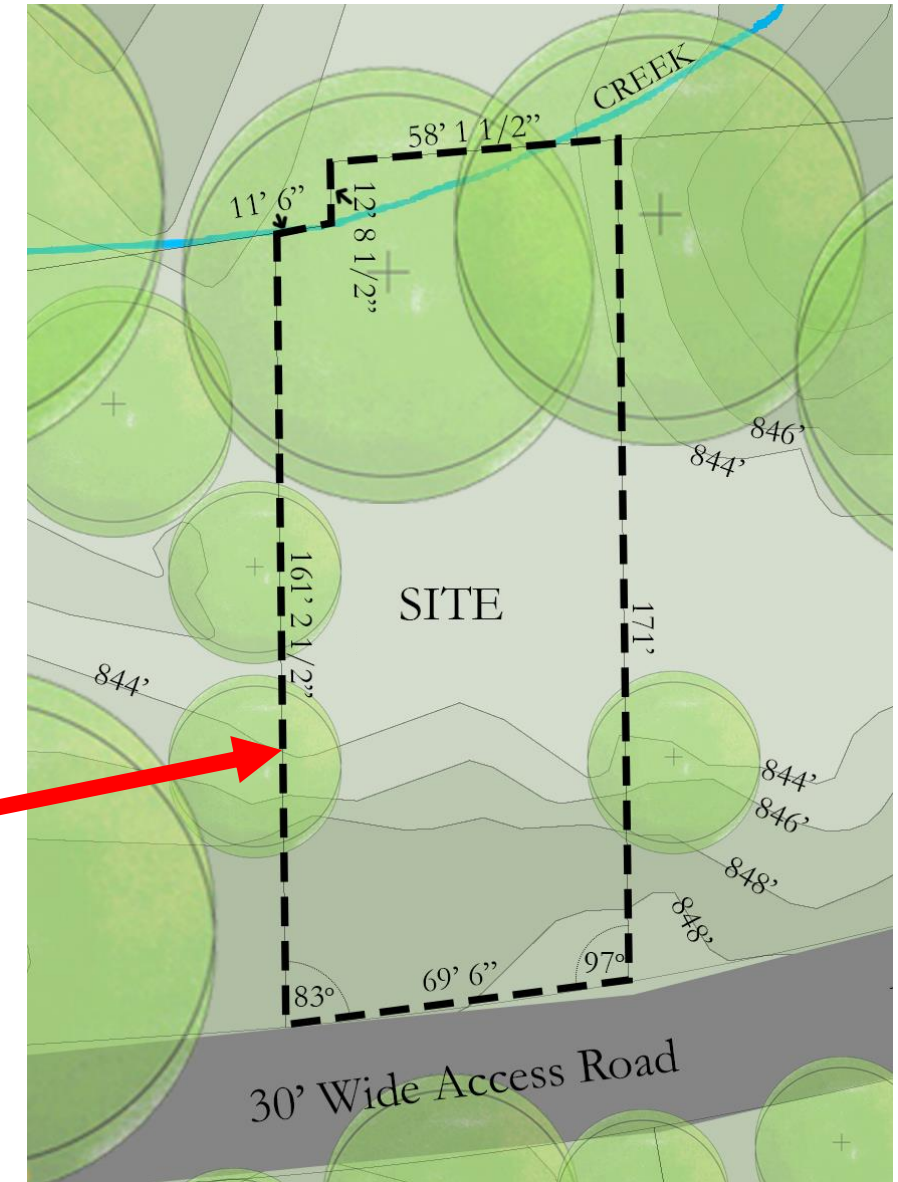
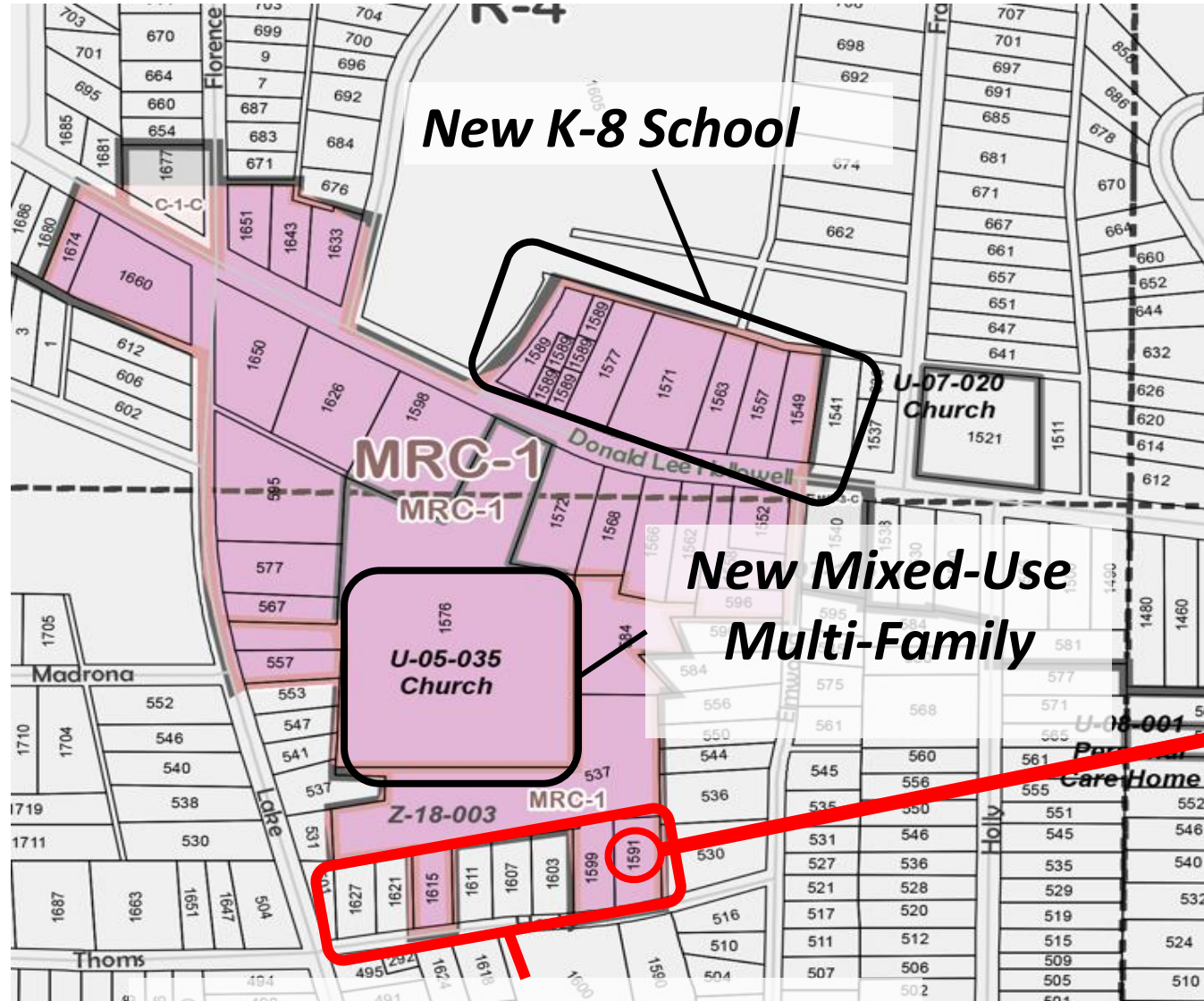
*20.5% votes*



Minimal Traditional Style

# Site Location and Zoning

- Introduction
- Architecture
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- Conclusion



## *Cottages at Hasty Place*

# Design Statement

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*To design an efficient two bedroom single-family home that is affordable for Grove Park Residents, while promoting thoughtful design.*



# Project Design Goals

Introduction

Architecture

Construction

Envelope

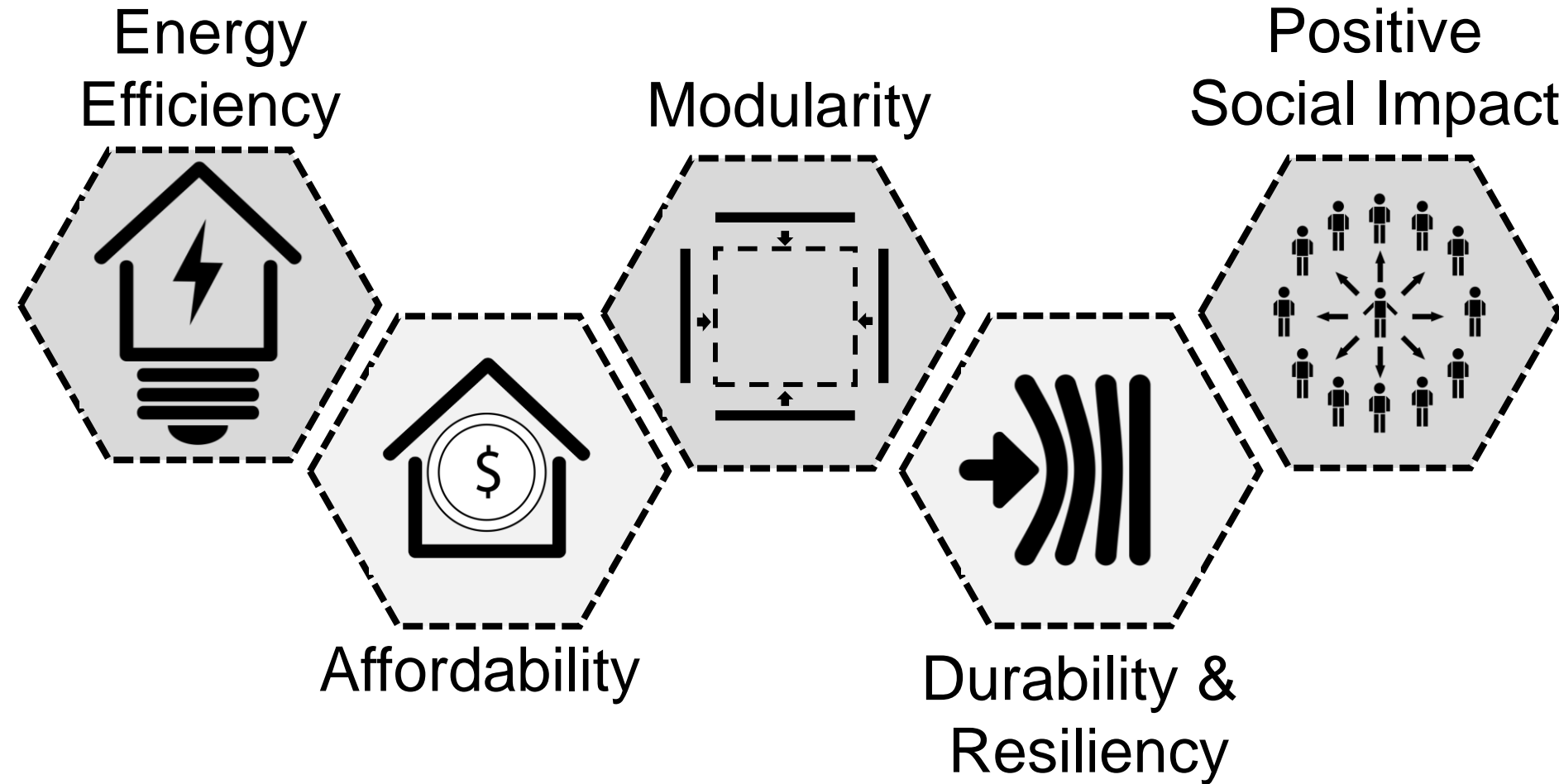
Interior Design

Thermal Comfort

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Conclusion



# Site and Climate

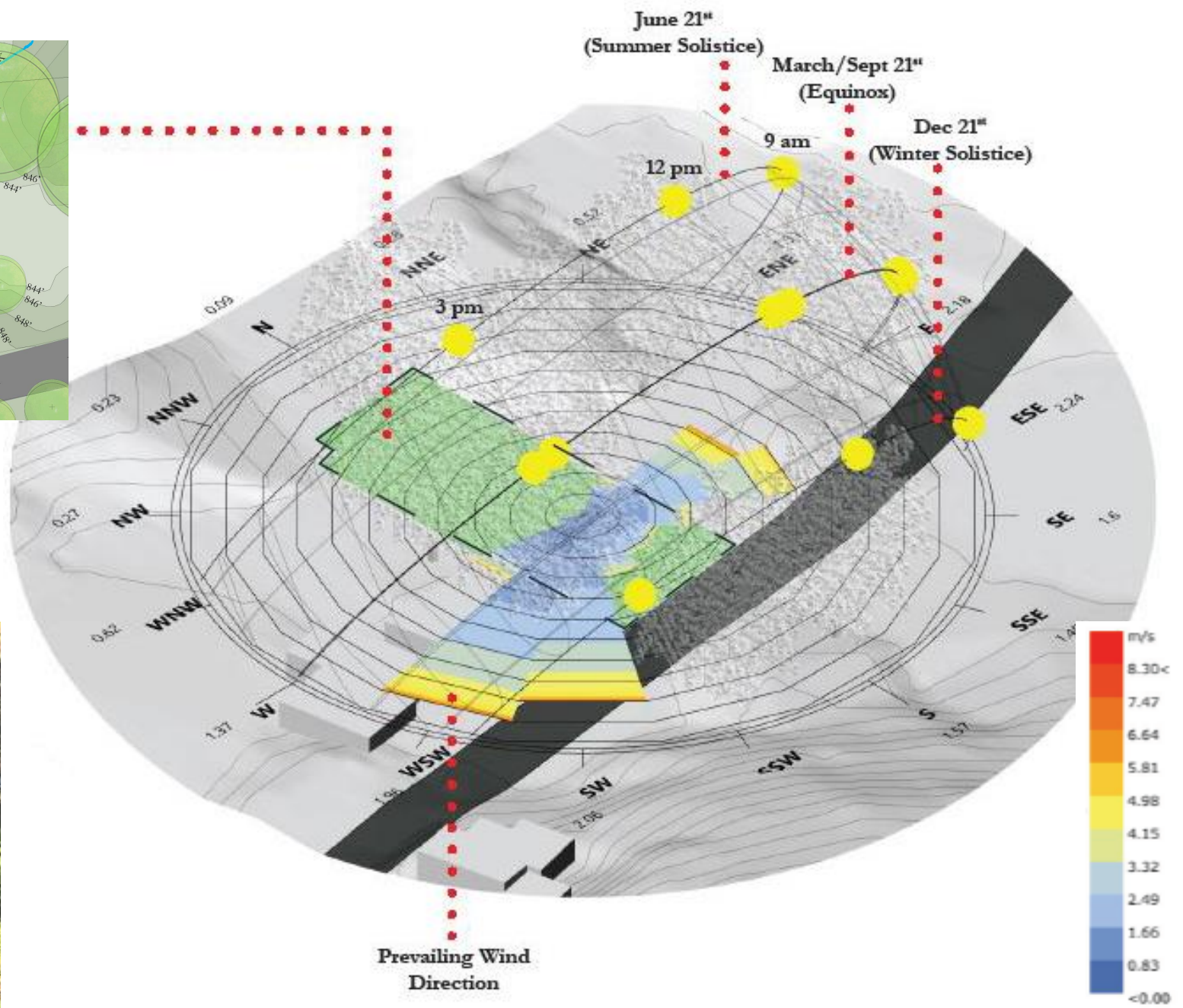
- Introduction
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- Energy
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- Conclusion



Site Section Profile



Tall Deciduous Trees



# Massing Concepts

Introduction

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Envelope

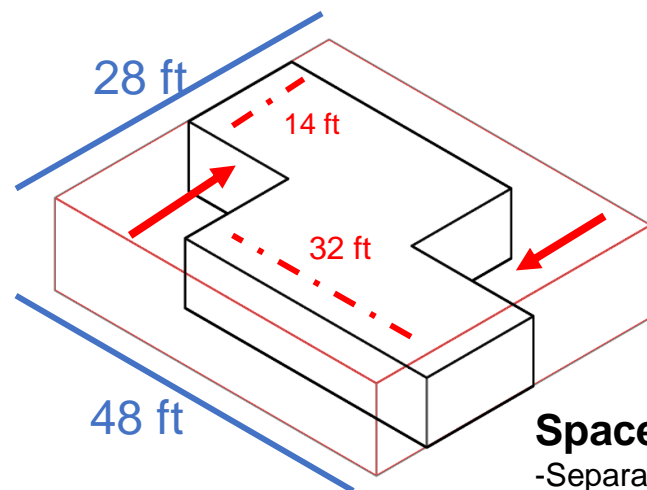
Interior Design

Thermal Comfort

Energy

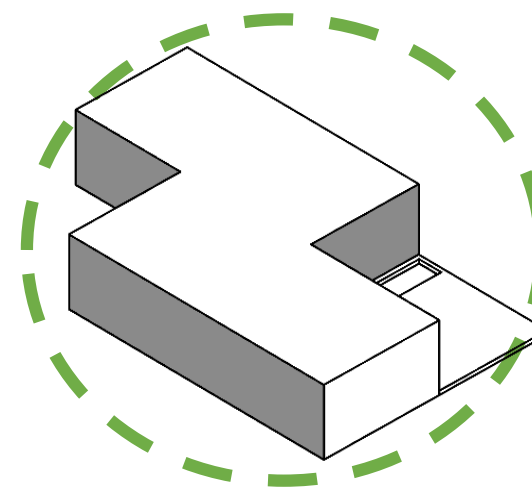
Financials

Conclusion



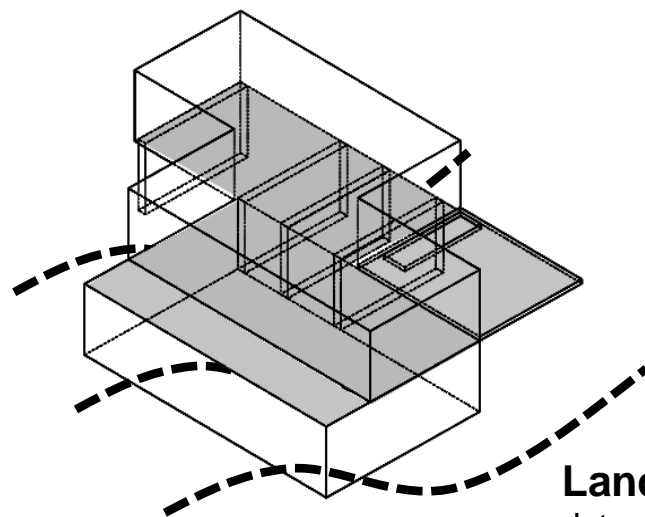
## Space Optimization

- Separate Private and Public Spaces
- Minimize Transition Spaces
- Open Plan



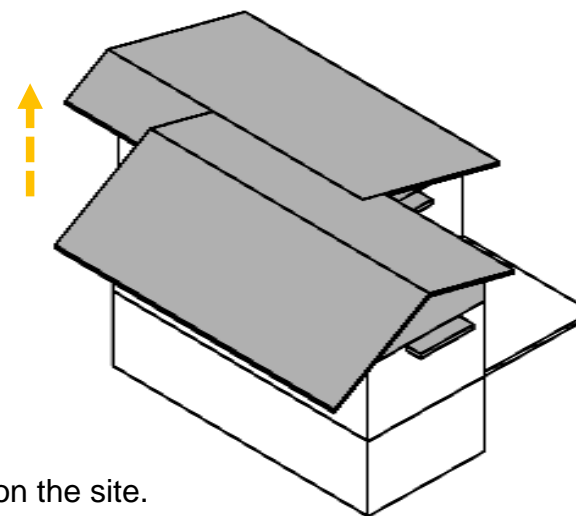
## Design of Social Spaces

- Integrate and Maximize Outdoor Spaces



## Land Centered Design

- Integrating Mass with the natural slope on the site.

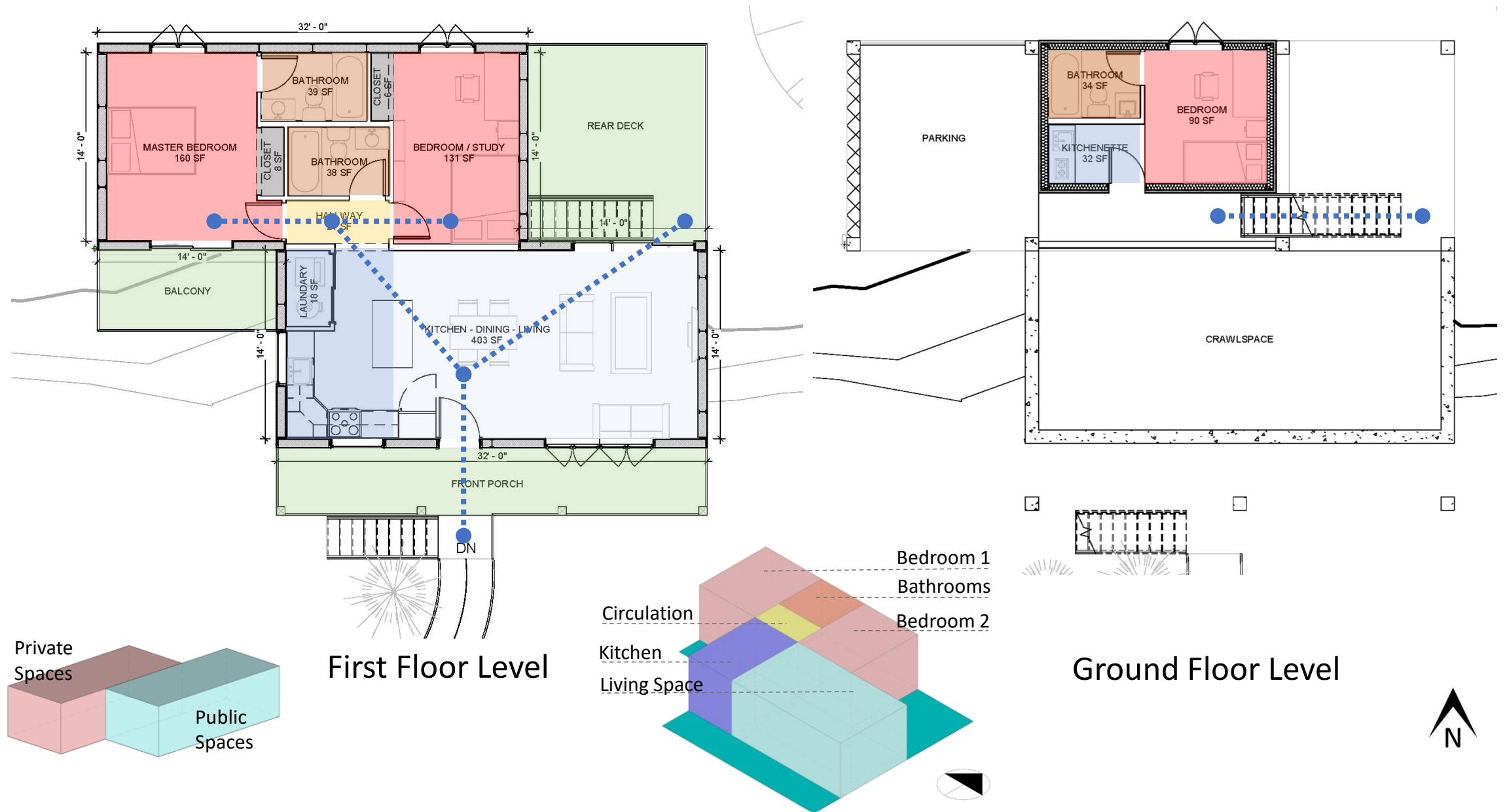


## High Performance Building

- Minimize Thermal Loads and EUI
- Optimize Daylight Performance
- Efficient integration of building systems

# Floor Layout

- Introduction
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# Design Front View



# Design Native Xeriscaping

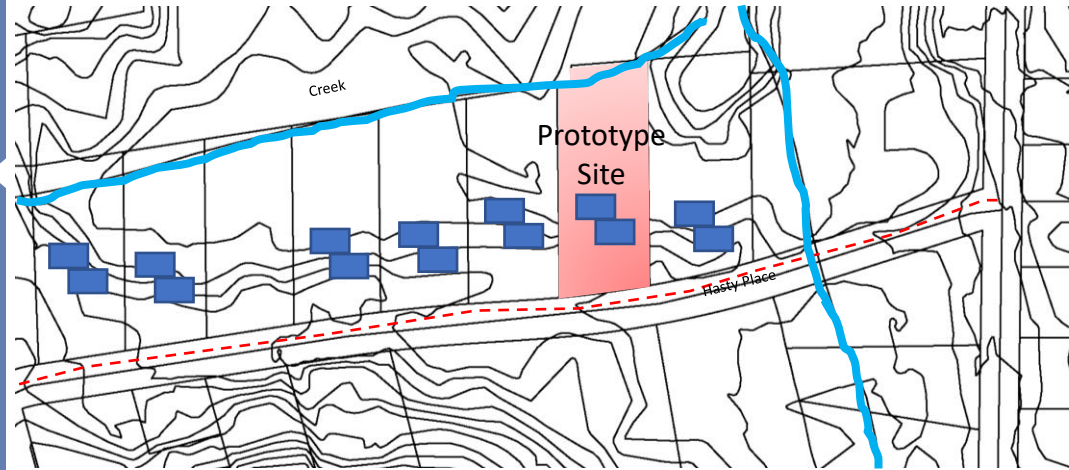


# Community Rain Garden

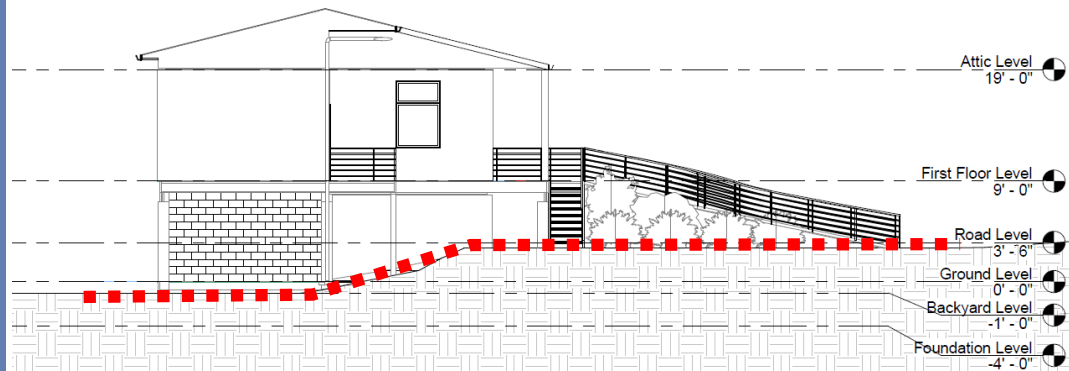


# Site Design

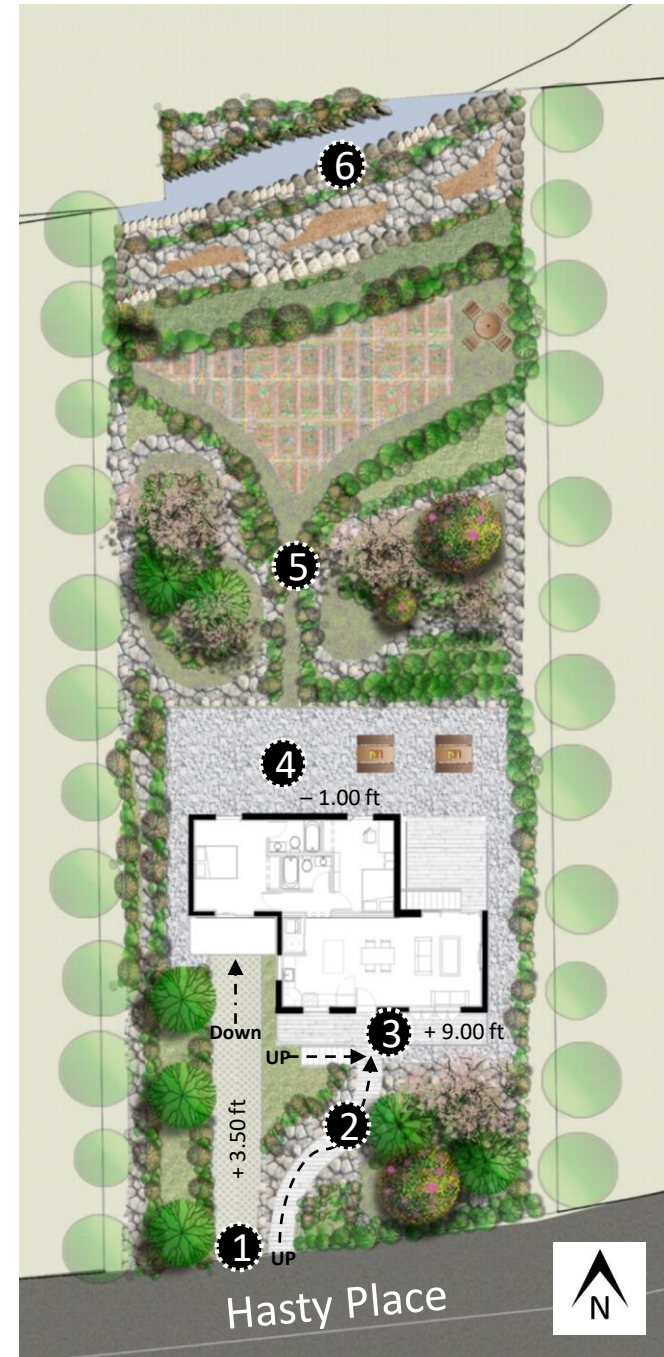
- Introduction
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- Construction
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Repeating Prototype



Site Section Profile



## Legend

1. Driveway and Entrance
2. Ramp up to the Front Porch
3. Front Porch
4. Outdoor Family Activity Area
5. Shared Community Garden
6. Creek



# Landscape Strategies

Introduction

Architecture

Construction

Envelope

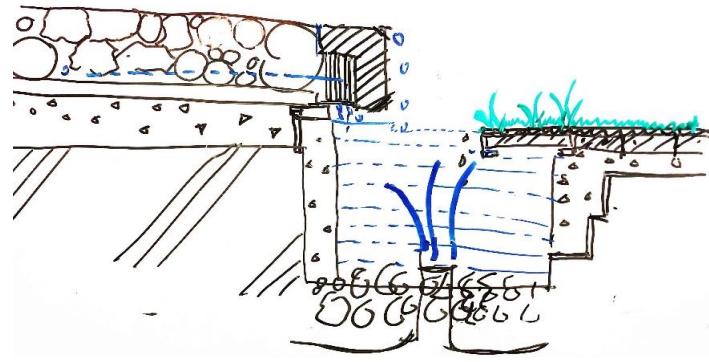
Interior Design

Thermal Comfort

Energy

Financials

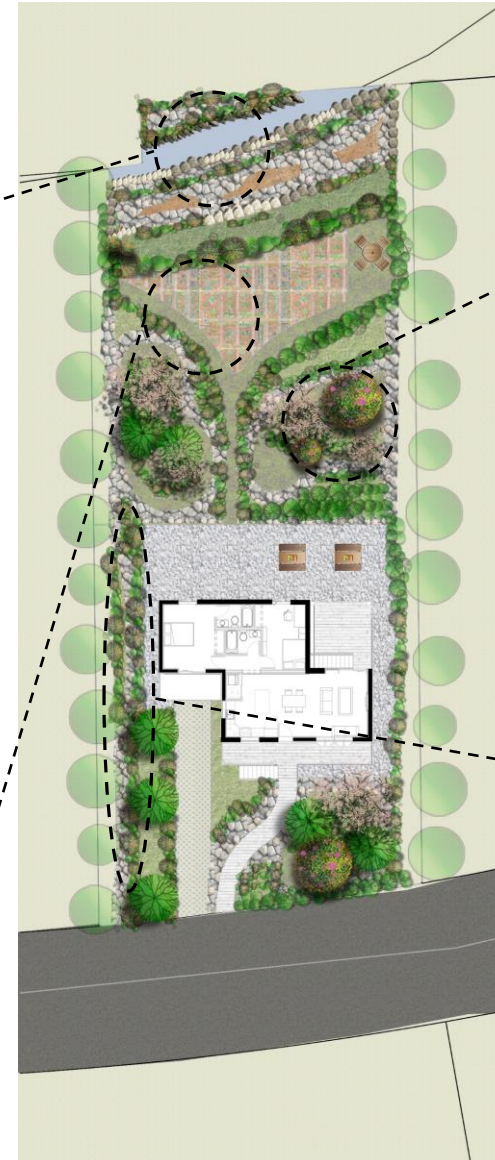
Conclusion



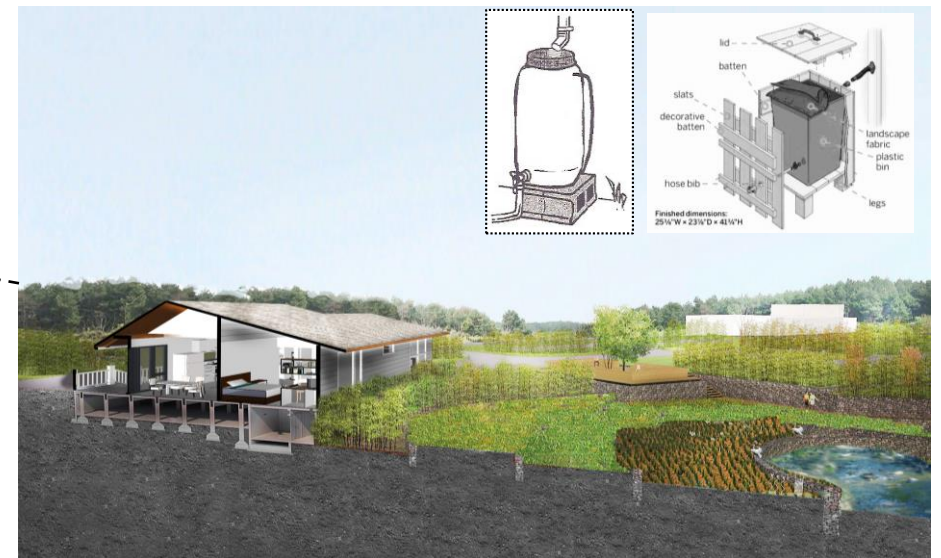
**Gravel Rain Reserve System Detail**



**Vegetable Garden**



**Rain Garden**



**Rain Recycling System**

# Community Garden Design



# Community Farming Space



# SIPs Panel Construction

Introduction

Architecture

Construction

Envelope

Interior Design

Thermal Comfort

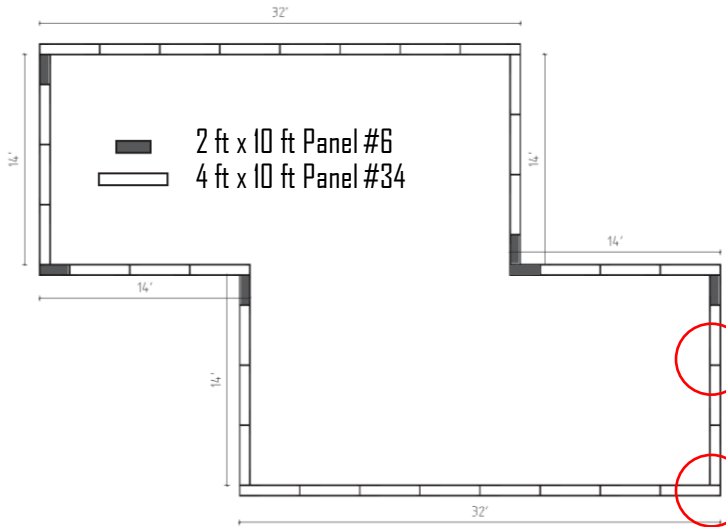
Energy

Financials

Conclusion

## Ease of Construction

1) Panel Size- Easy to built with.

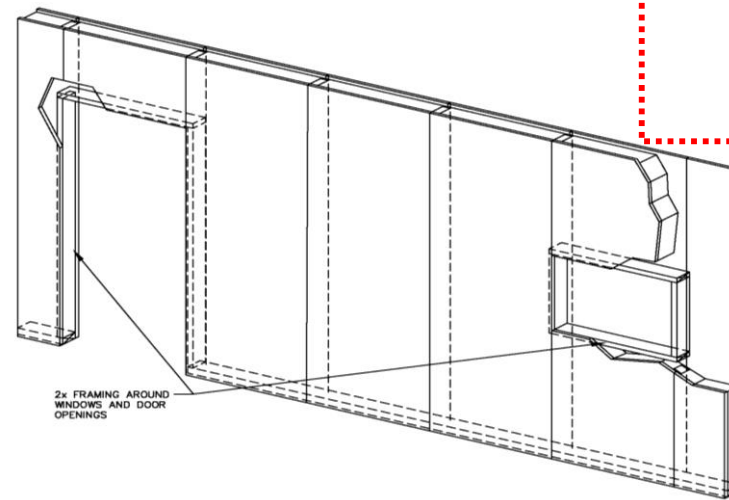


2) Fits into the construction process of our partner, Atlanta Habitat for Humanity.

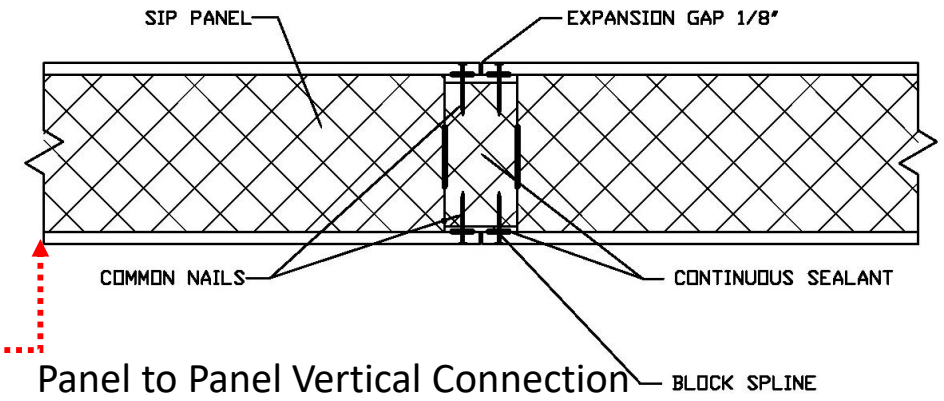


## Energy Efficient

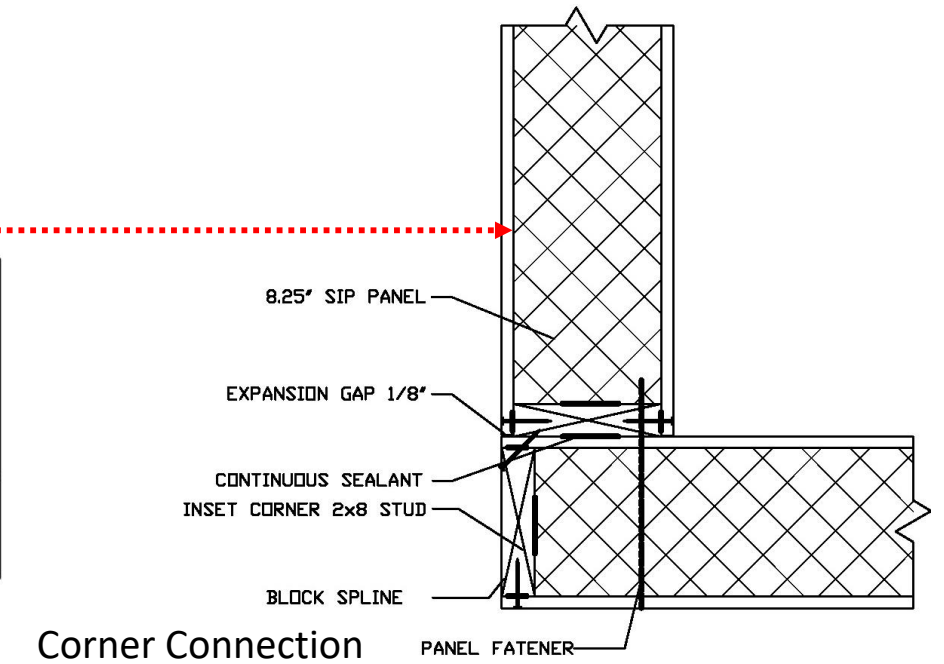
- 1) Consistent R-value
- 2) Less Thermal Breaks
- 3) Air-Tight Envelope



Openings in the Assembly



Panel to Panel Vertical Connection



Corner Connection

# Construction Sequence

Introduction

Architecture

Construction

Envelope

Interior Design

Thermal Comfort

Energy

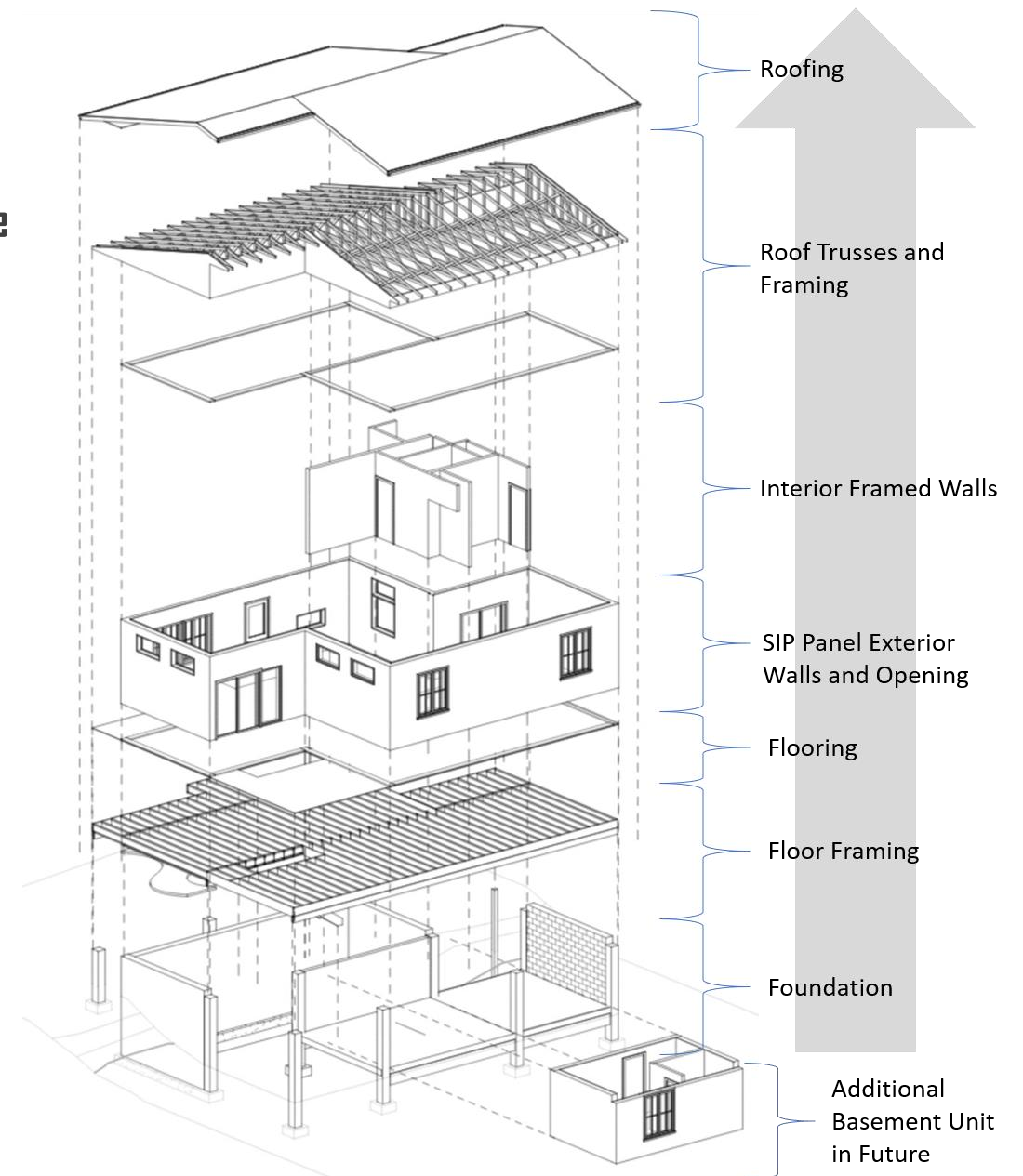
Financials

Conclusion

## Improvements in Atlanta Habitat for Humanity Construction Timeline

	<i>Current Process</i>	<i>Proposed Process</i>
<i>Week 1</i>	<i>Lift exterior walls</i>	<i>Lift panelized walls</i>
<i>Week 2</i>	<i>Build interior walls</i>	<i>Build interior walls</i>
<i>Week 3</i>	<i>Roof construction</i>	<i>Roof Construction</i>
<i>Week 4</i>	<i>Wall insulation and exterior cladding</i>	<i>Roofing and facade trimming</i>
<i>Week 5</i>	<i>Roofing and facade trimming</i>	<i>Cabinet installation and painting</i>
<i>Week 6</i>	<i>Cabinetry, crawl space MEP, and insulation</i>	<i>Landscaping</i>
<i>Week 7</i>	<i>Exterior and interior painting</i>	
<i>Week 8</i>	<i>Landscaping</i>	

Time Saved



# Envelope Durability

Introduction

Architecture

Construction

Envelope

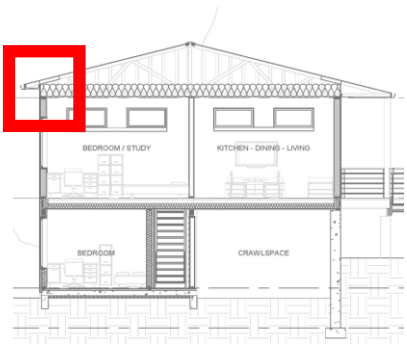
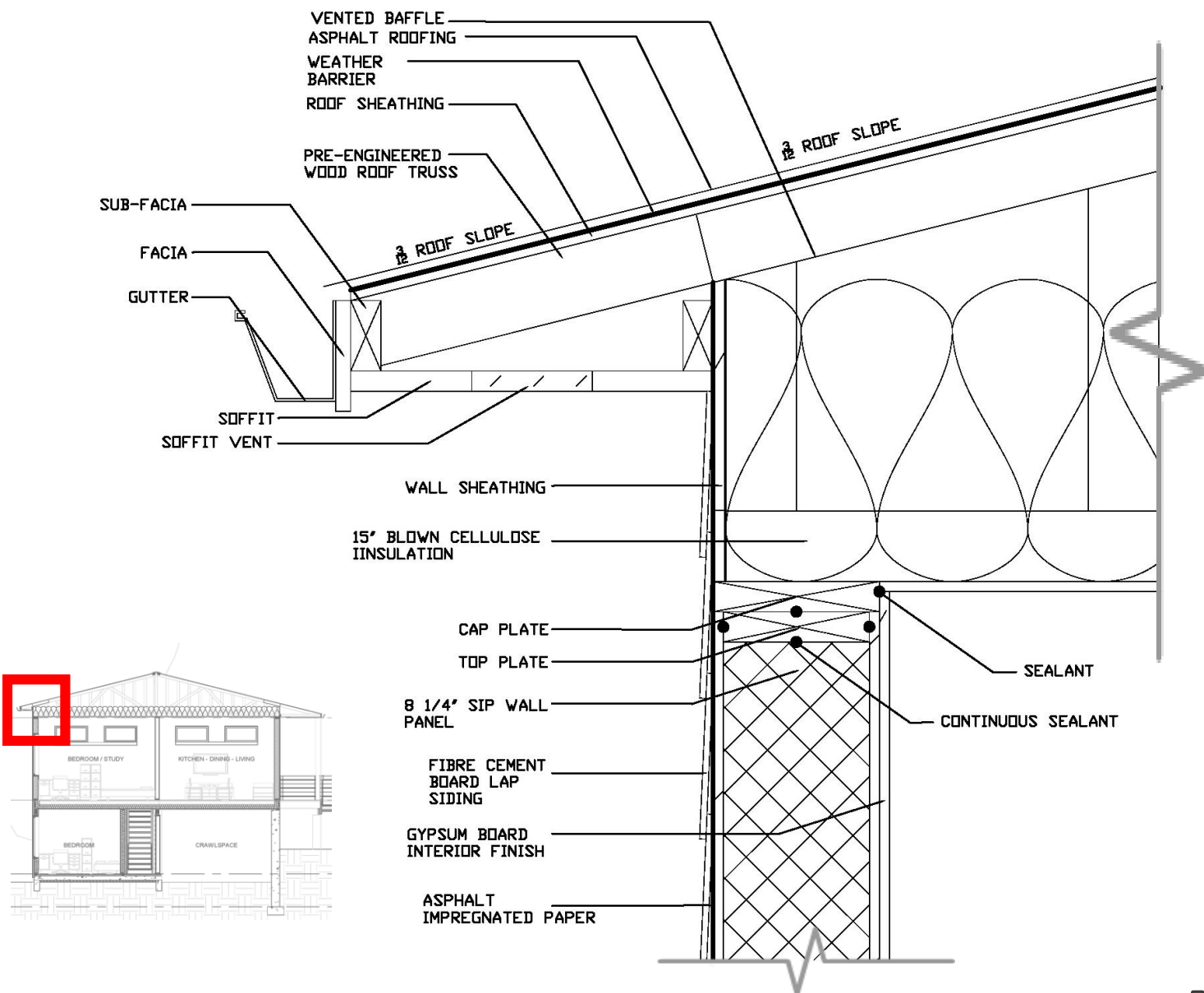
Interior Design

Thermal Comfort

Energy

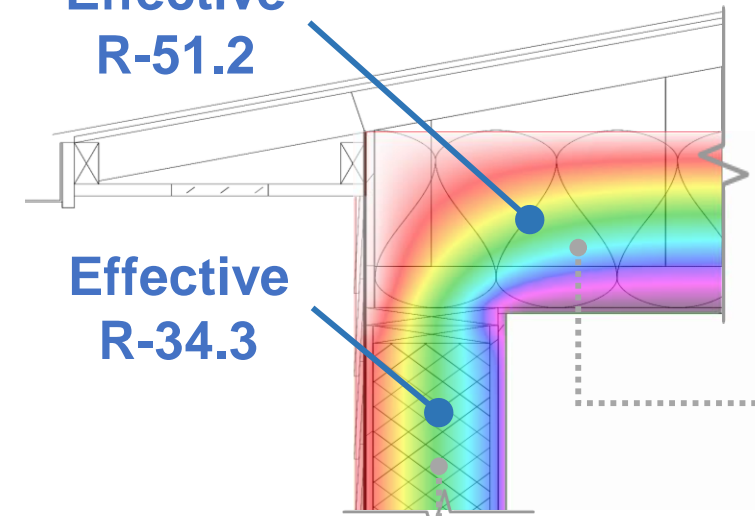
Financials

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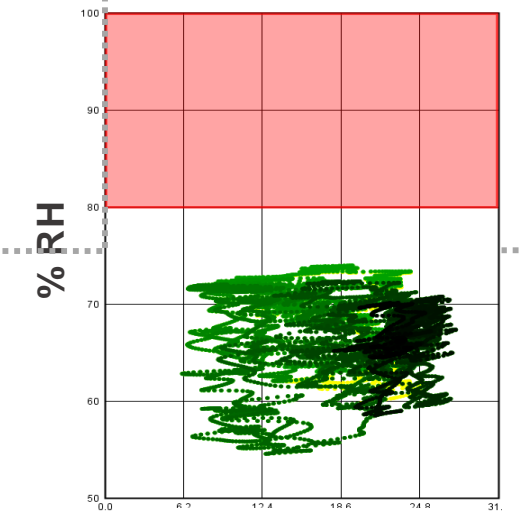
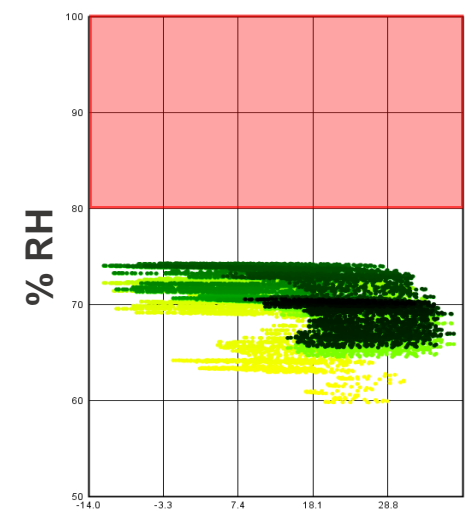
Effective R-51.2

Effective R-34.3



SIP Wall Durability

Ceiling Durability



Temperature

Temperature

# Envelope Durability

Introduction

Architecture

Construction

Envelope

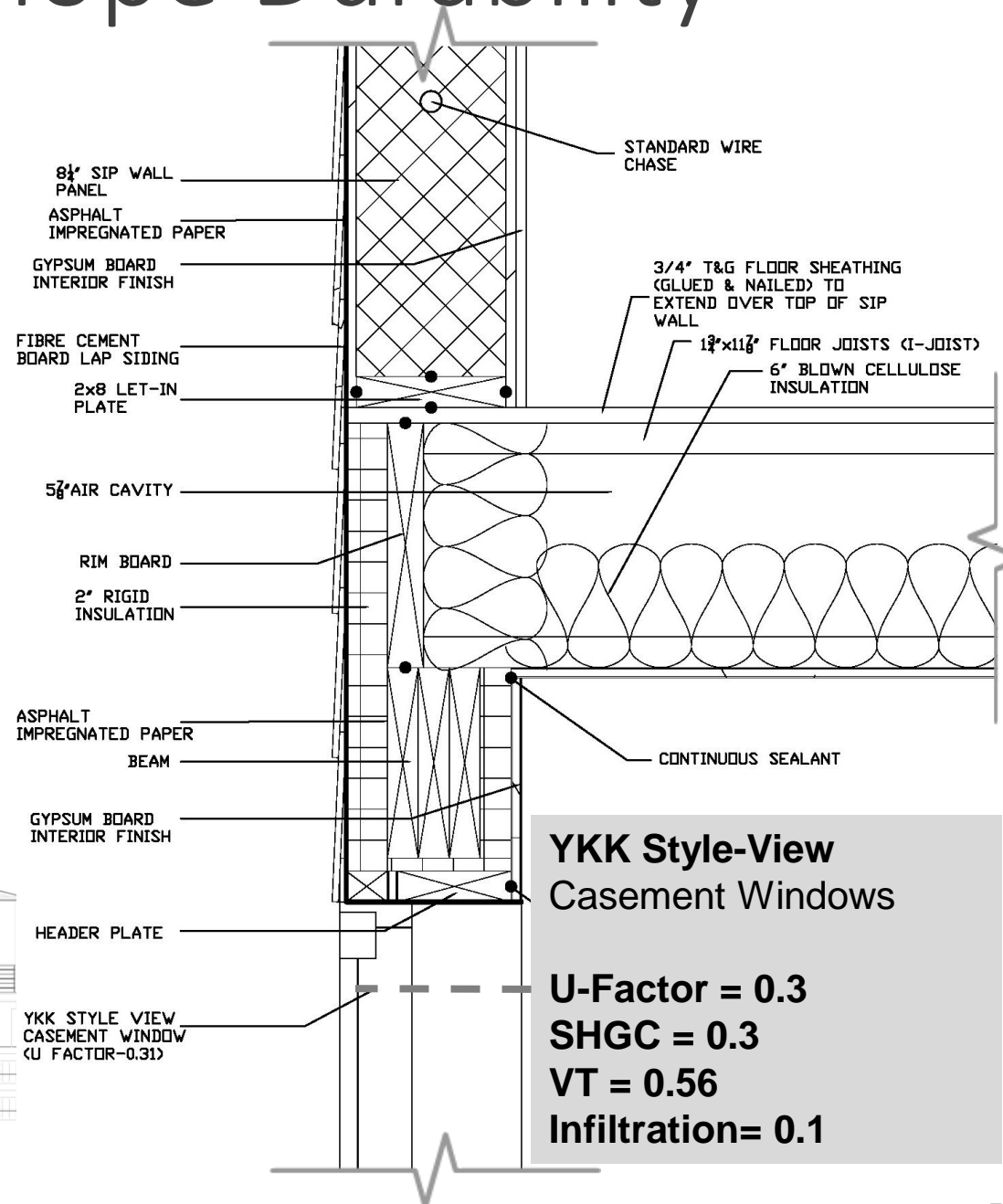
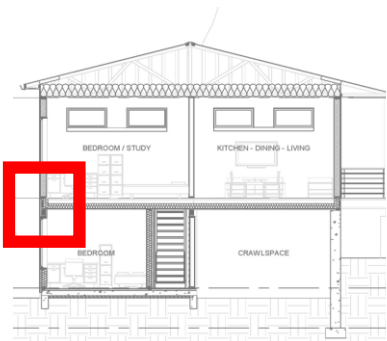
Interior Design

Thermal Comfort

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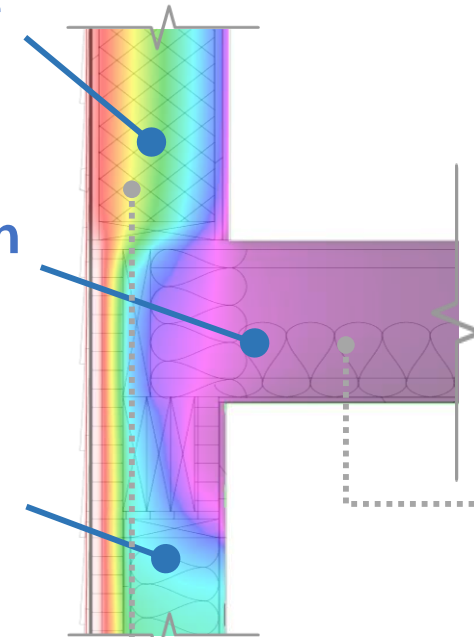
**YKK Style-View Casement Windows**

**U-Factor = 0.3**  
**SHGC = 0.3**  
**VT = 0.56**  
**Infiltration = 0.1**

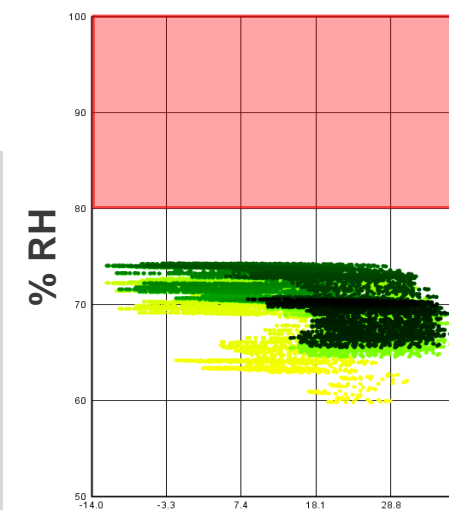
Effective R-34.3

Effective R-24.3 with Warm Floor

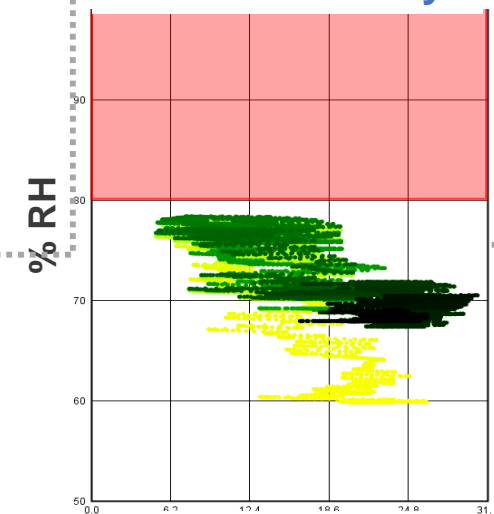
Effective R-33.3



SIP Wall Durability



Floor Durability



# Envelope Durability

Introduction

Architecture

Construction

Envelope

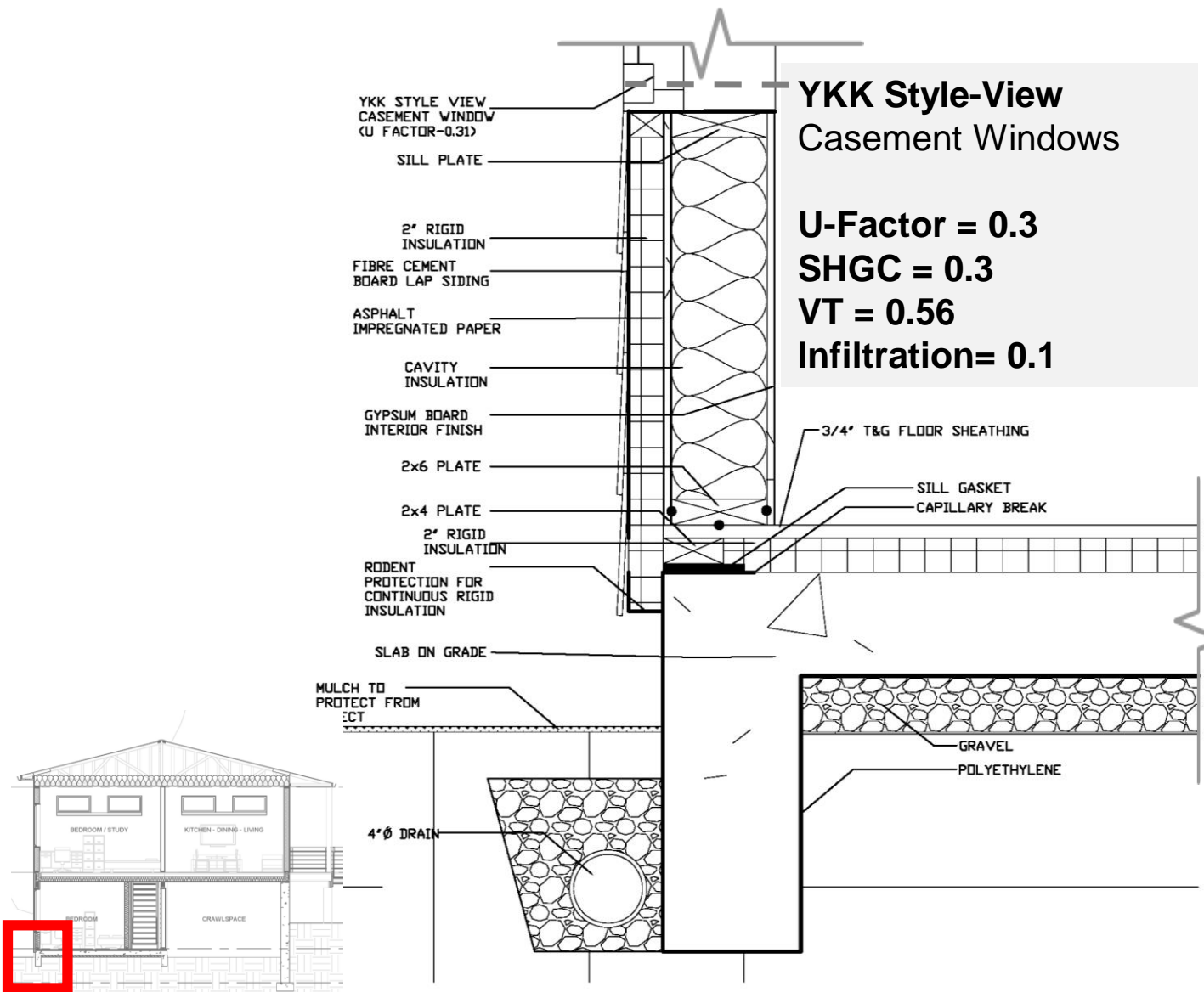
Interior Design

Thermal Comfort

Energy

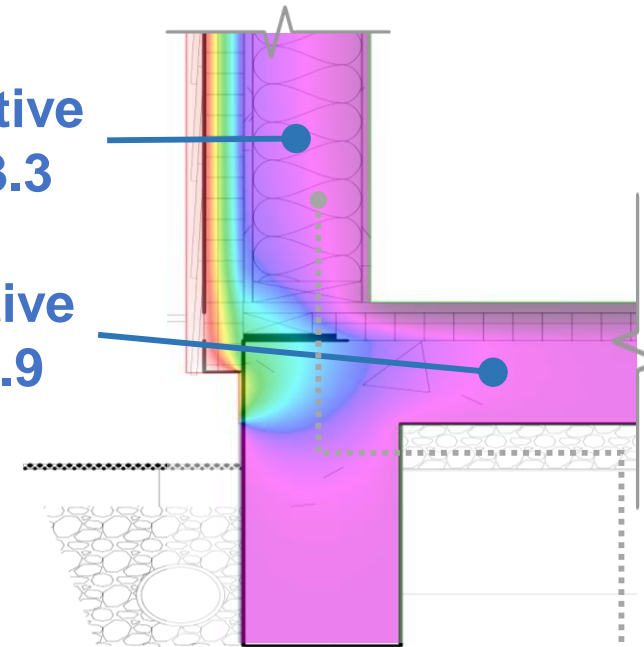
Financials

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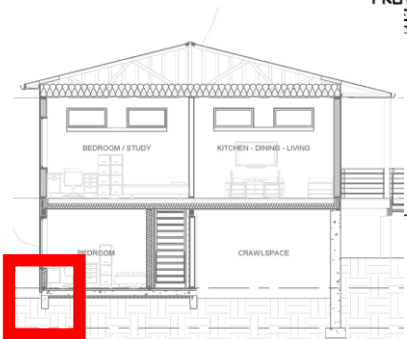
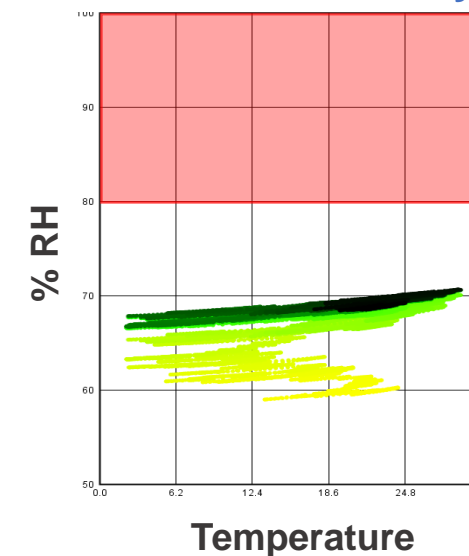


Effective R-33.3

Effective R-10.9



Stud Wall Durability





# Envelope Durability

Introduction

Architecture

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Envelope

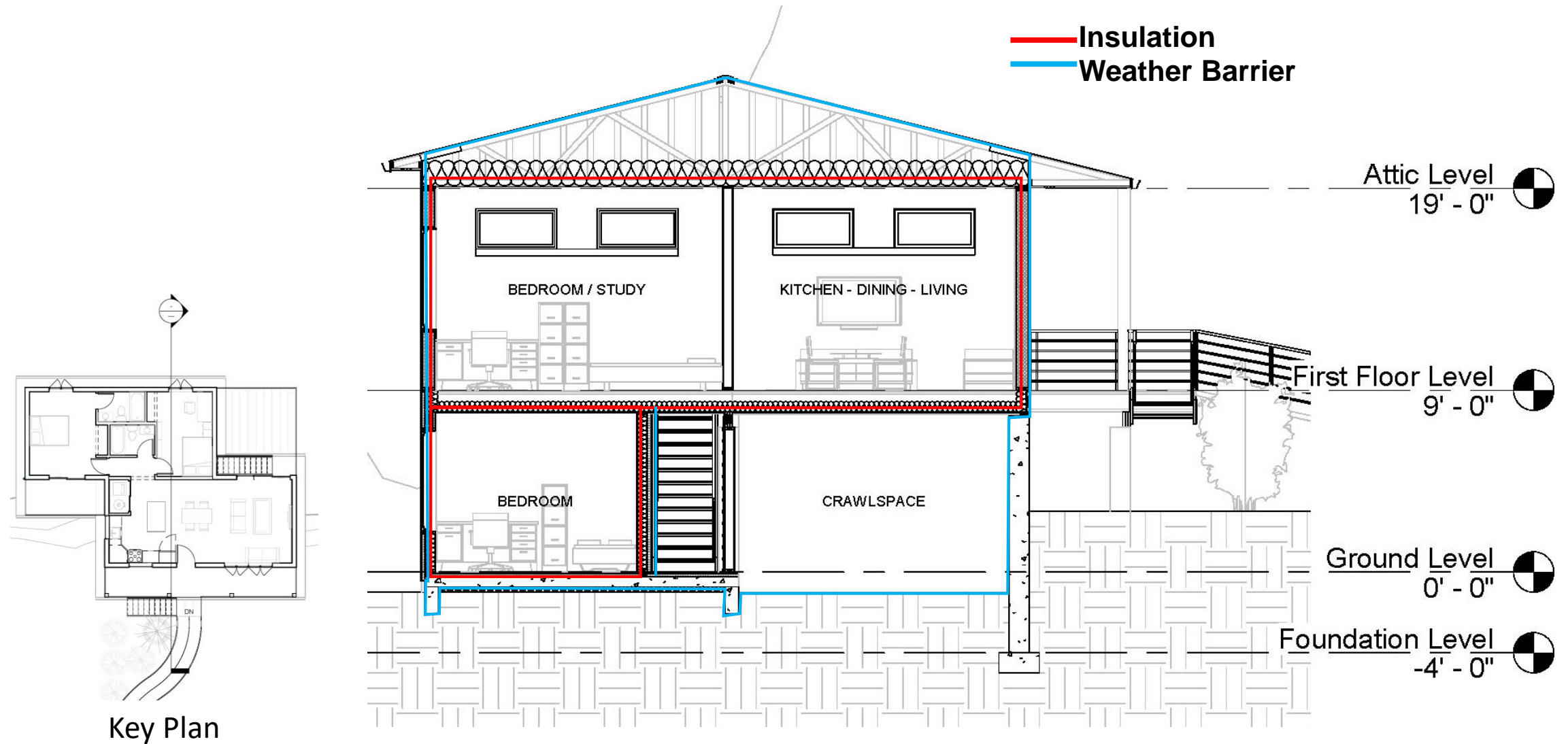
Interior Design

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# Daylighting Performance

Introduction

Architecture

Construction

Envelope

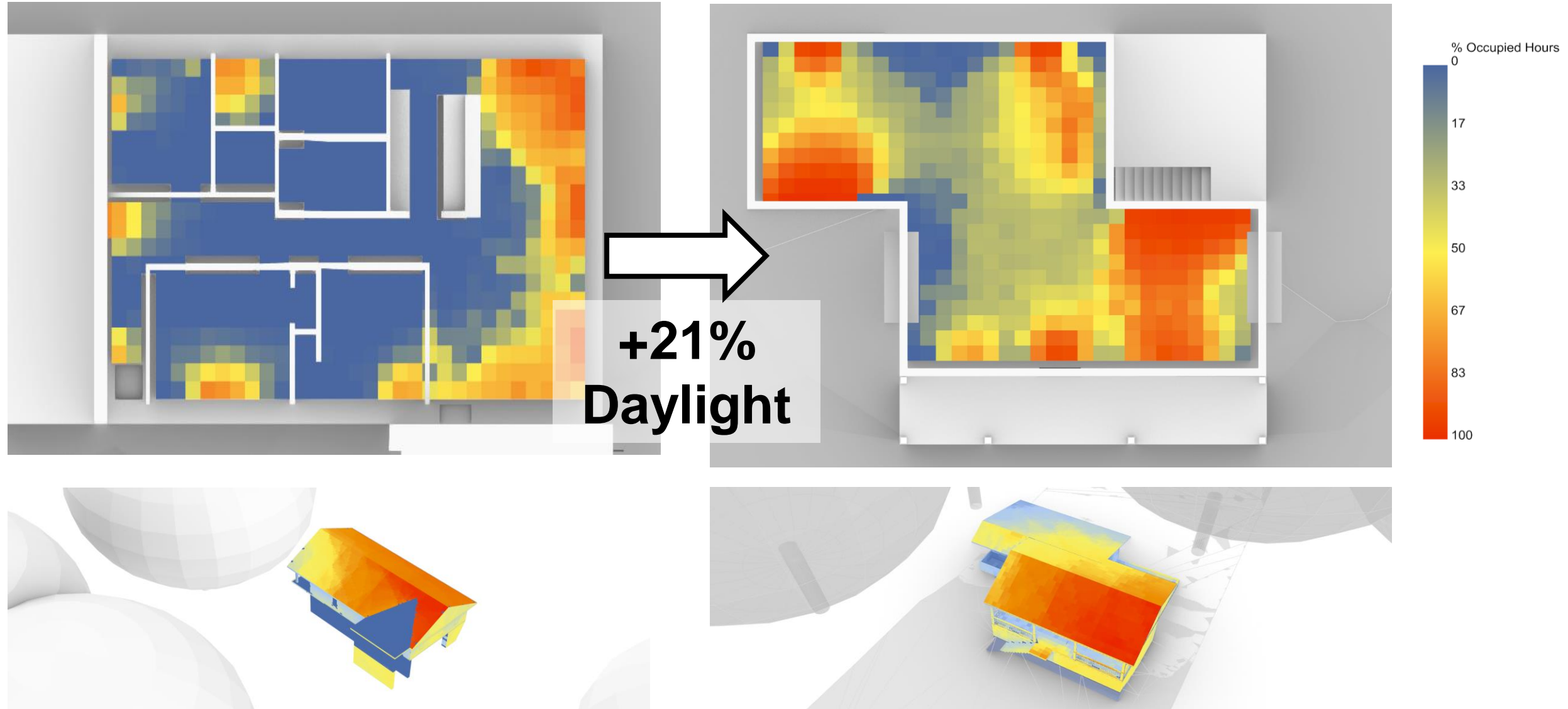
Interior Design

Thermal Comfort

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# Bedroom Interior Design

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Architecture

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Interior Design

Thermal Comfort

Energy

Financials

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Led Surface lighting



Master bedroom

Led lightbulb



Led surface lighting



# Study Interior Design

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Architecture

Construction

Envelope

Interior Design

Thermal Comfort

Energy

Financials

Conclusion



# Public Space Interior Design

Introduction

Architecture

Construction

Envelope

Interior Design

Thermal Comfort

Energy

Financials

Conclusion



Living Area



# Space Conditioning Summary

## Multi-Split Combo

Introduction

Architecture

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Interior Design

Thermal Comfort

Energy

Financials

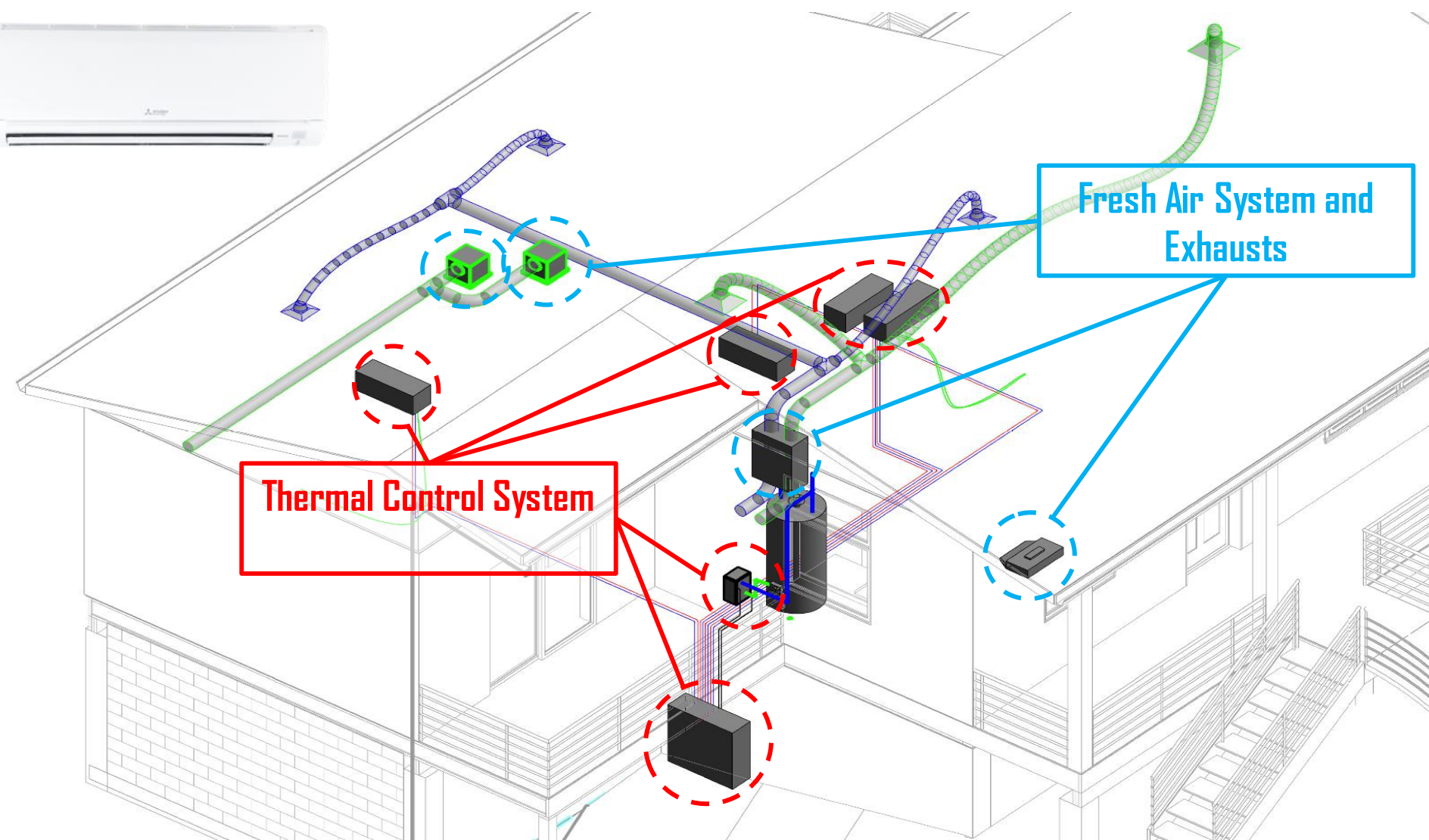
Conclusion



Energy Recovery Ventilator

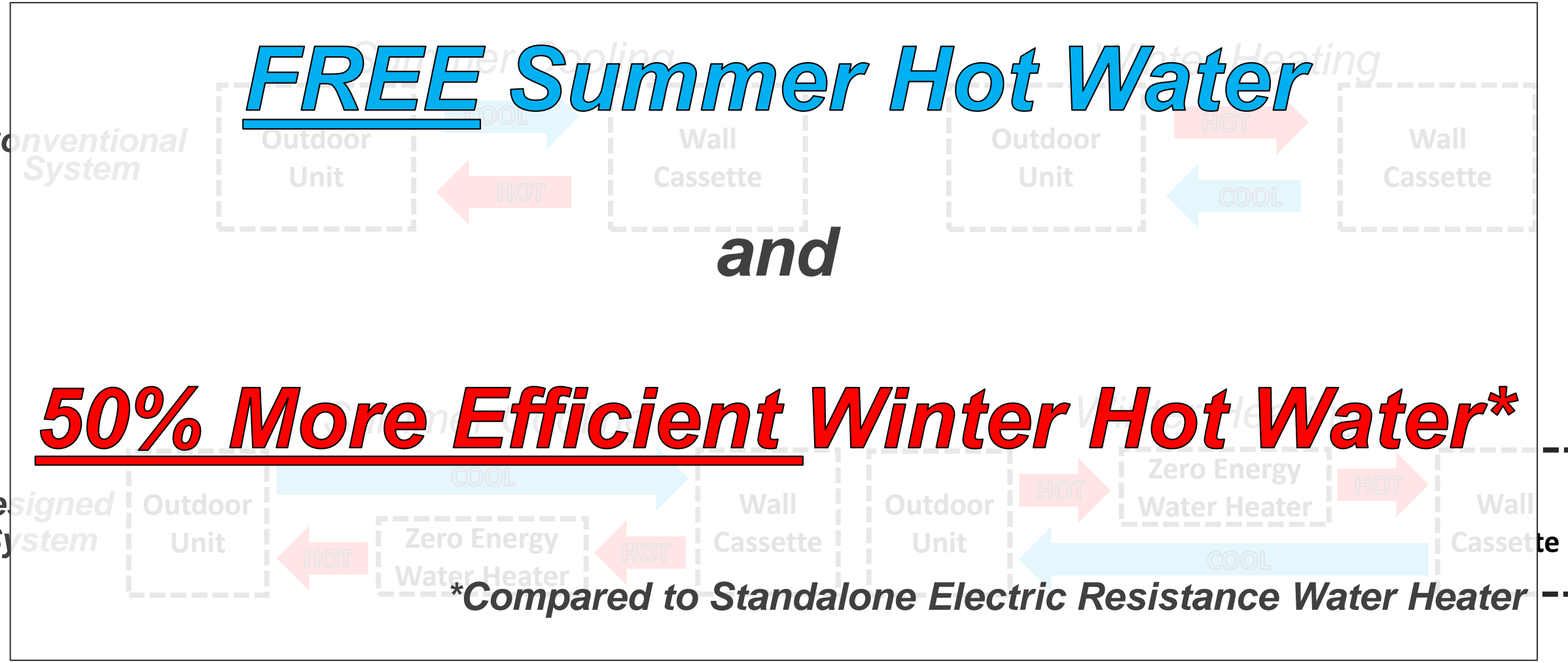


Domestic Hot Water



# Energy Recovery Water Heating

- Introduction
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# Solar Power System

Introduction

Architecture

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Envelope

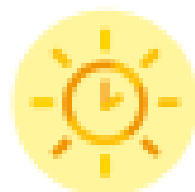
Interior Design

Thermal Comfort

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Conclusion



1507 Usable hours of sunlight per year on site

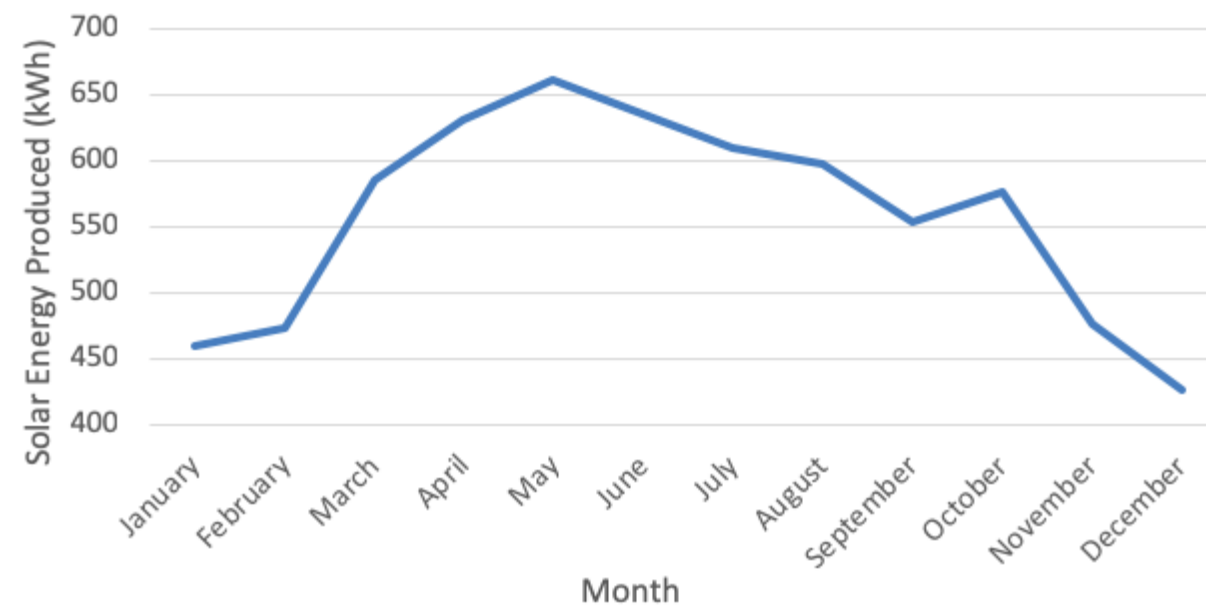


0.17 Acres of usable space with 70 kW maximum PV capacity

**Panels:** Canadian Solar CS6K-305MS

**Inverters:** Enphase IQ7-60-2-US

Monthly Solar Energy Production



Solar Array:	Per Cottage	Community-Scale
Size:	5 kW	40+ kW
Modules:	17	132



# Energy Analysis

Introduction

Architecture

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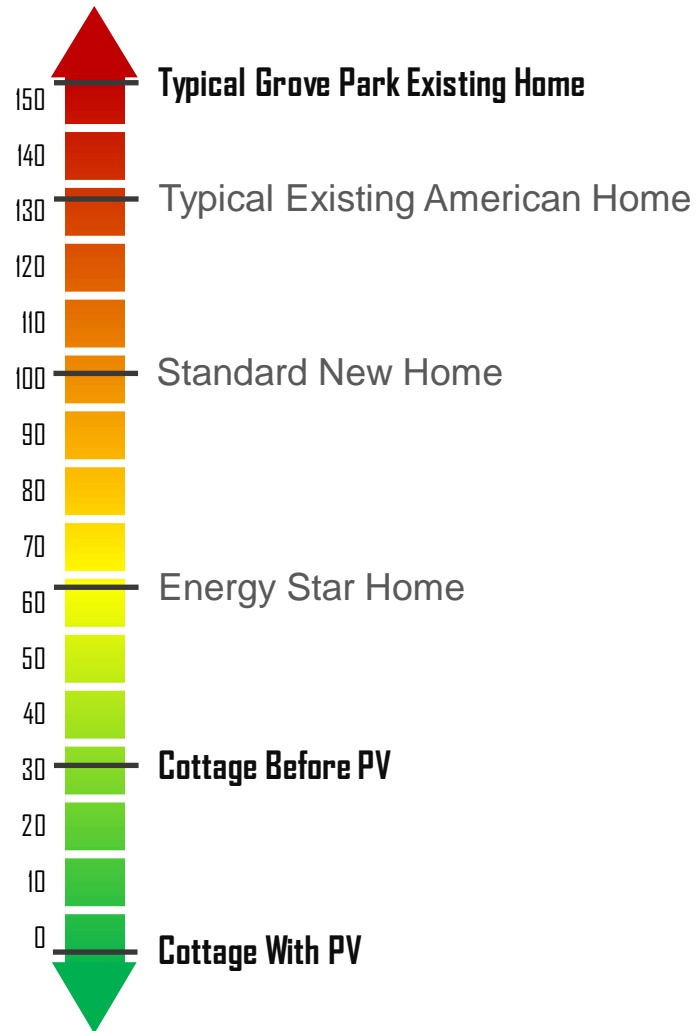
Thermal Comfort

Energy

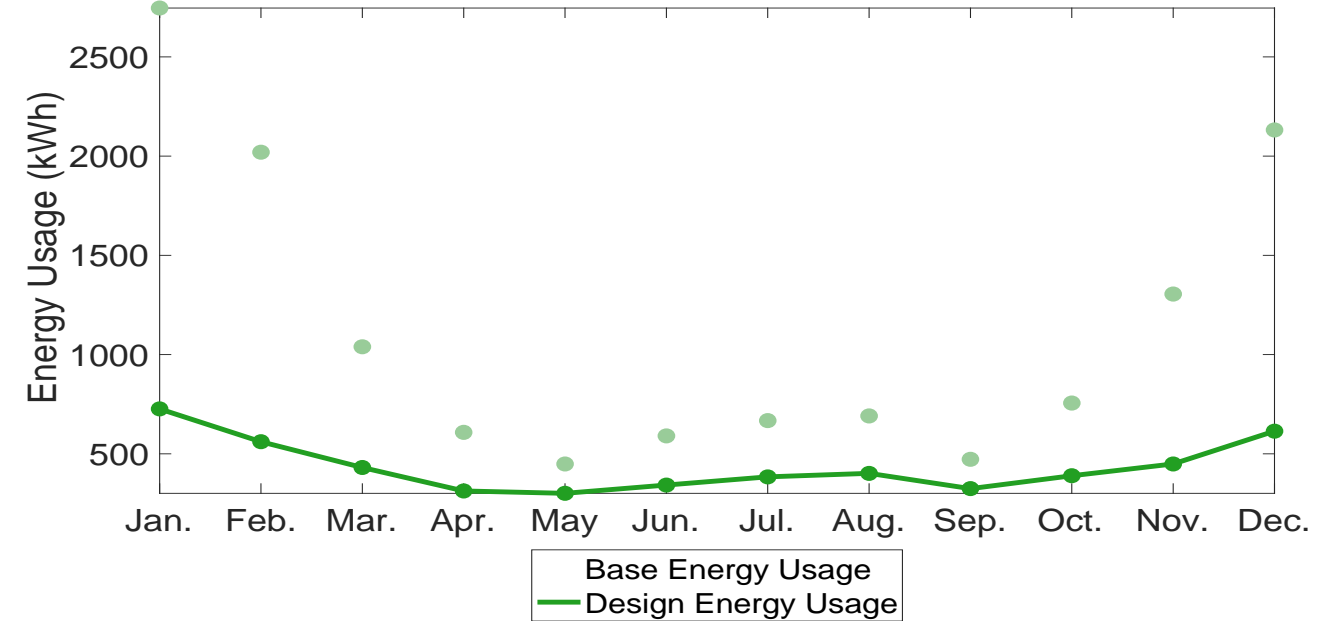
Financials

Conclusion

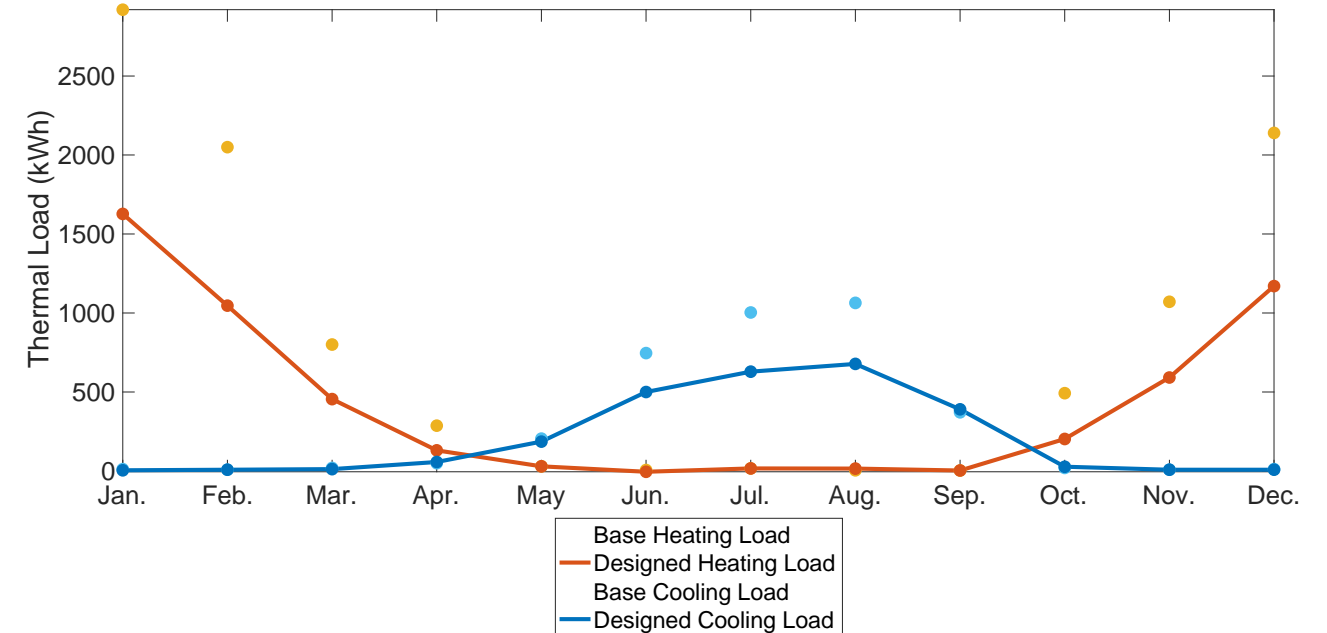
## HERS Rating Index



## Design Energy Use Reduction



## Design Thermal Load Reduction



# Financial Summary

Introduction

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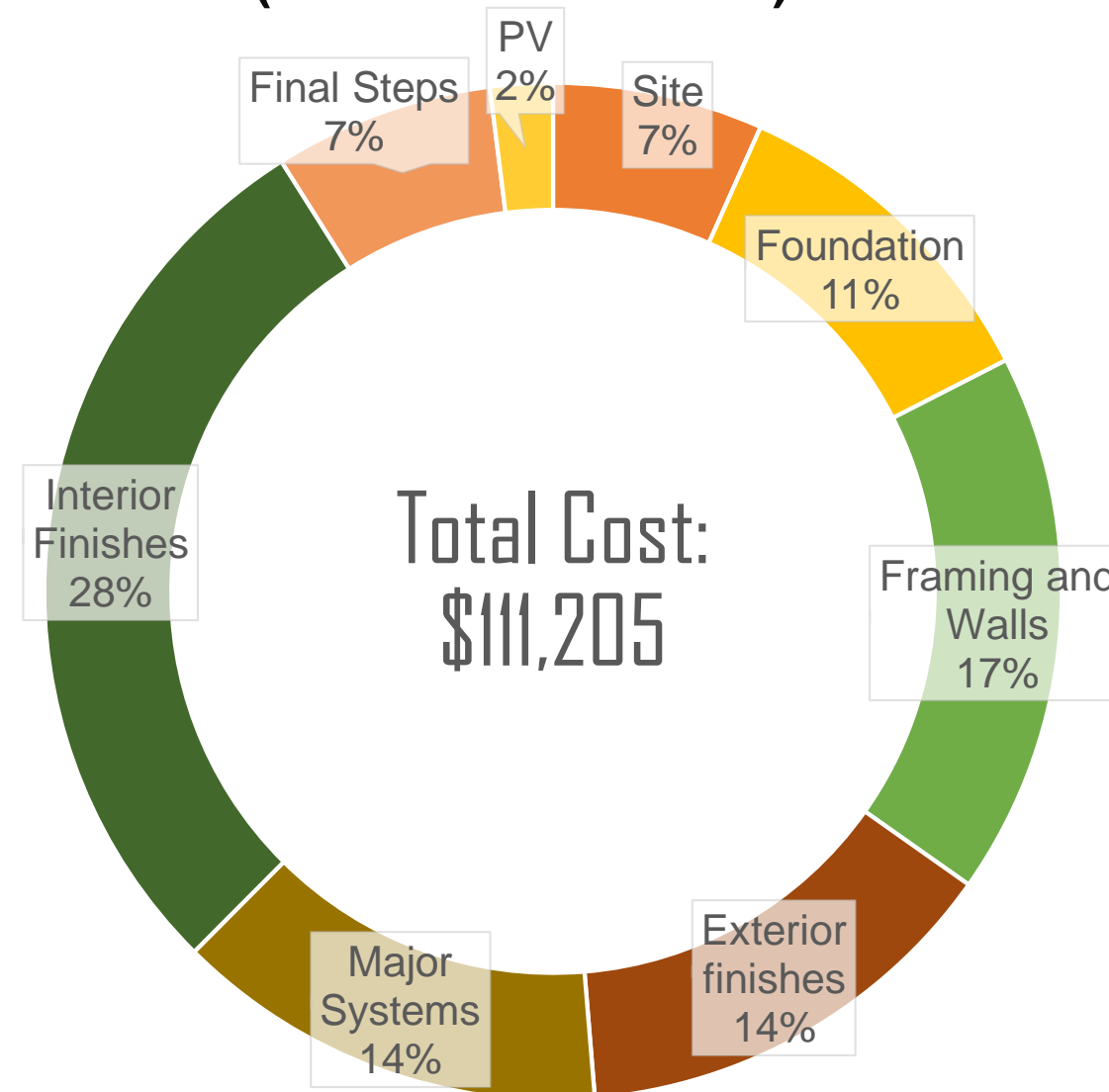
Financials

Conclusion

Construction	Cost
Construction Cost with Un-Finished Ground Floor Unit	\$103953
Construction Cost with Finished Ground Floor Unit	\$111205

	Net Income	Home Debt to Income Ratio
Unrented Unit	\$41,000	30%
Rented Unit	\$48,200	25%

**Summary of Costs  
(With Additional Unit)**





# Resilience

