



# Energy Performance: Well Codes

ENVIRONMENTAL SYSTEMS 2  
DEAN BAILEY  
PROF. MALOO  
5/3/21



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# The Design

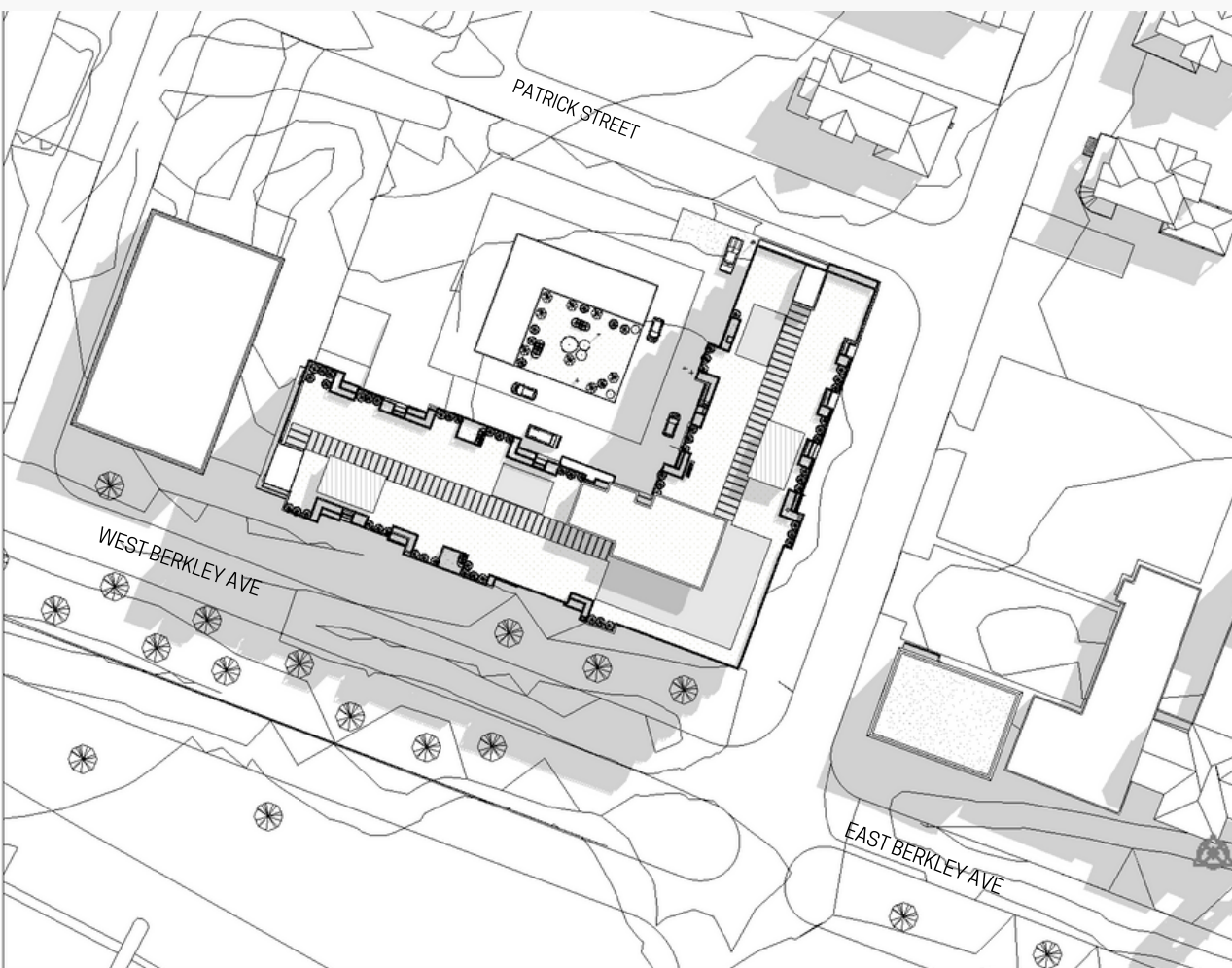
The "Berkley Porch Apartments," is a project that emphasizes, makes use of, and creates **interstitial space** in the form of balconies. It does this to **imitate the community environment** and experience, established by porches in the single family typologies that are found in the Hampton Roads, Virginia area. This building was designed with resilient responses to combat flooding in mind, and makes use of sustainable strategies to maintain itself throughout different weather conditions.



# Resilient Design

The complex is designed to provide flood safety to its residents by means of its stilted ground floor, and semi-sacrificial parking level. Shown below, is the building under two feet of flood water.

Water floods the site from the NW direction, and it flows SE, in the event of flooding.

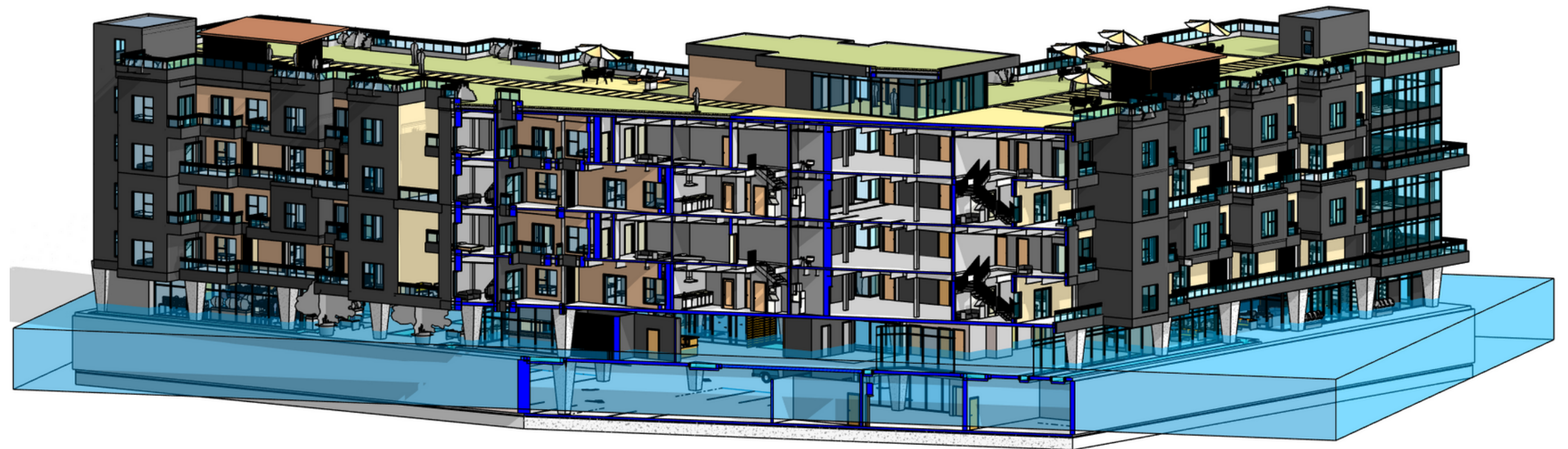
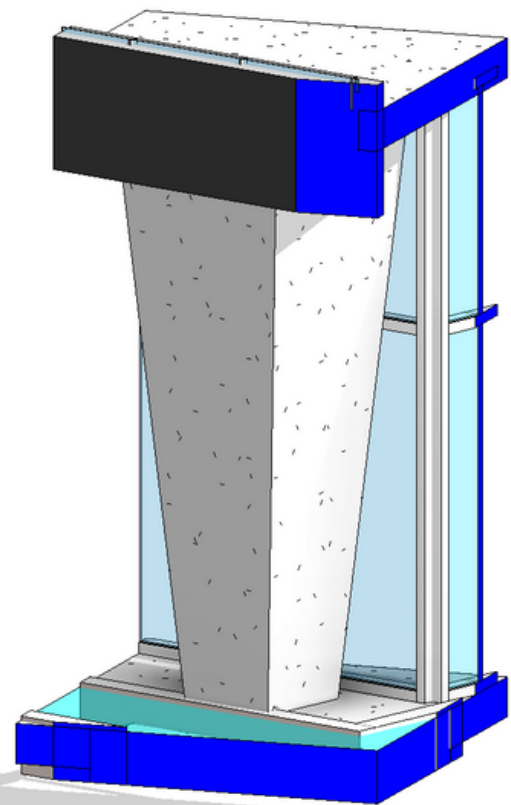
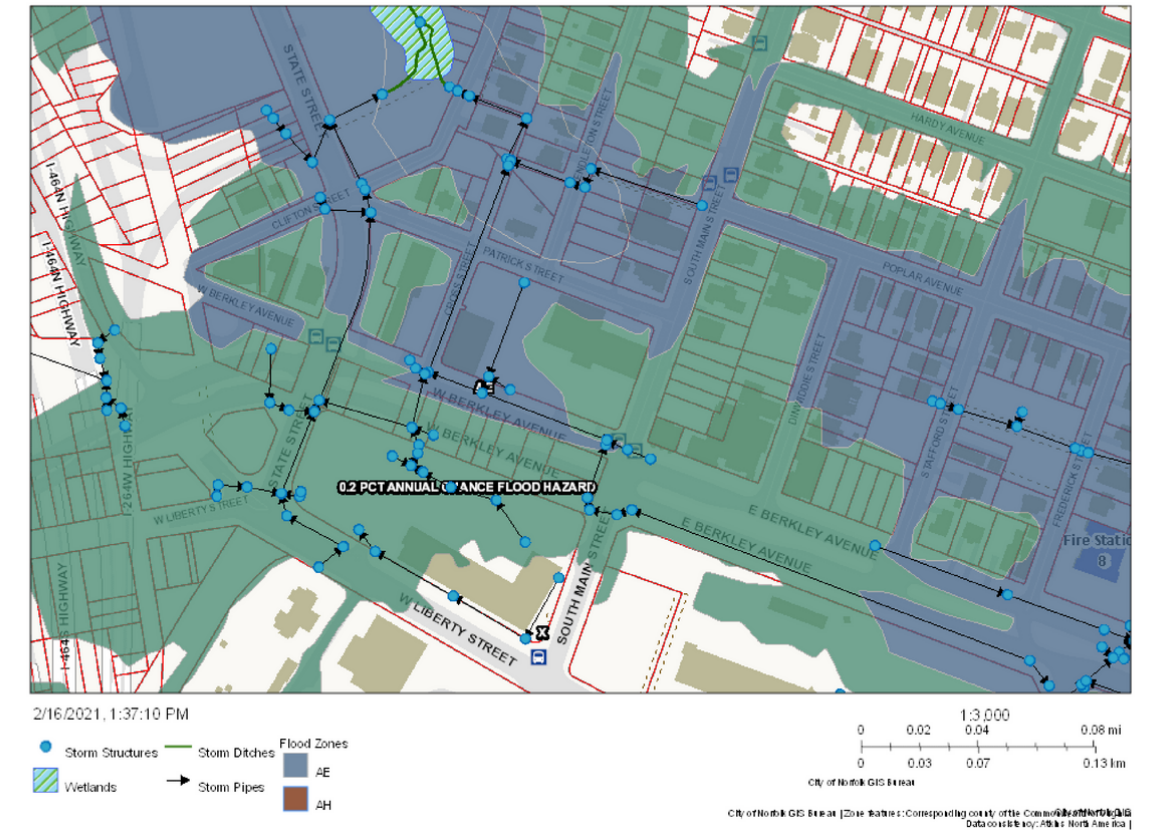


# Resilient Design

Assuming a **two foot** flood scenario, the residents would be able to avoid the water, in this stilted, composite structure (concrete and steel).

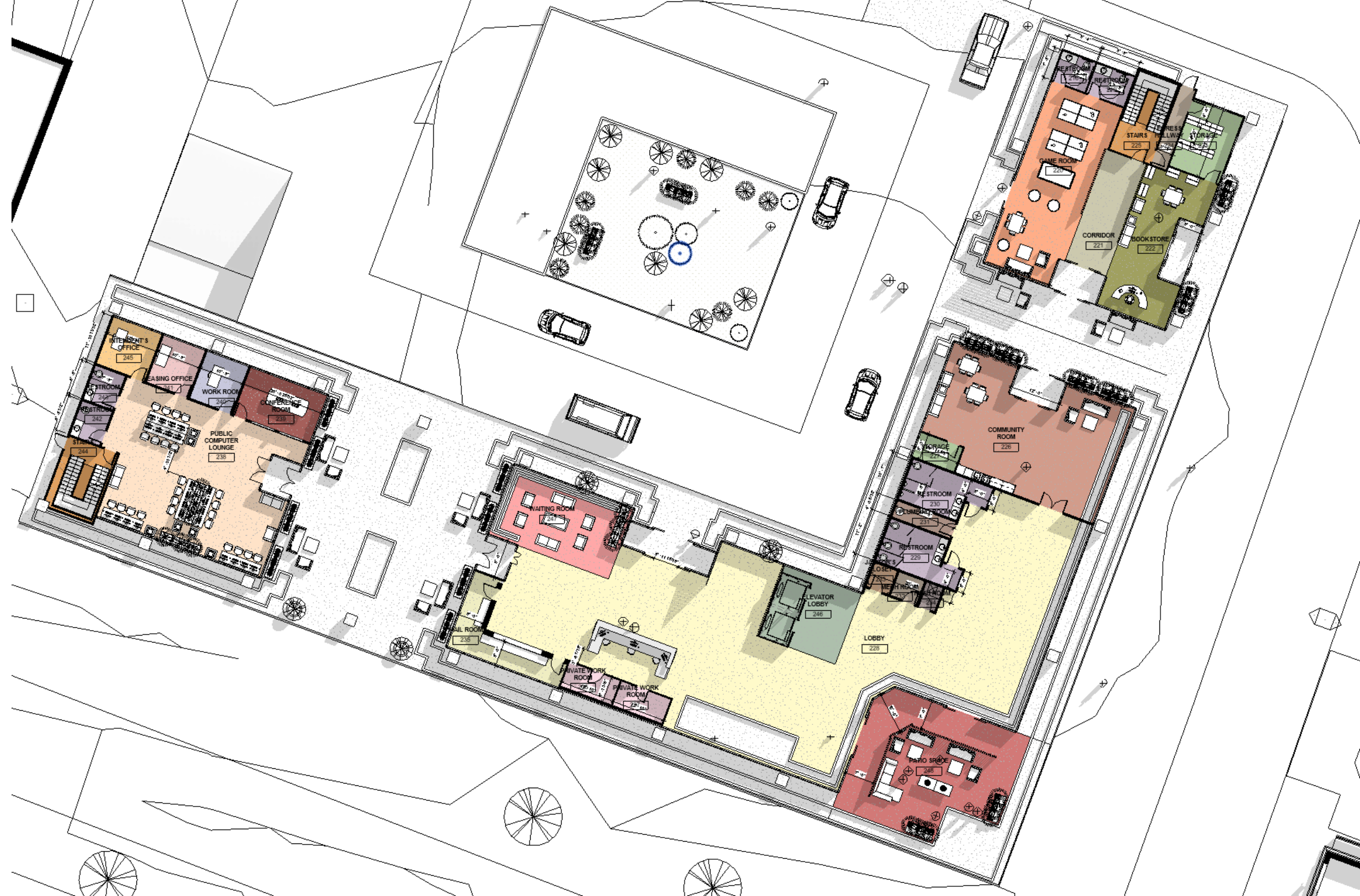
The specially shaped columns make it easier for inundation to pass through the ground floor of the building in the event of a rush of water.

FLOOD PATTERN/ STORM DRAIN MAP



# Room Legend







- BOOKSTORE
- COMMUNITY ROOM
- CONFERENCE ROOM
- CORRIDOR
- EGRESS HALLWAY
- ELEVATOR LOBBY
- GAME ROOM
- INTENDENT'S OFFICE
- JANITOR'S CLOSET
- LEASING OFFICE
- LOBBY
- MAIL ROOM
- MECH ROOM
- PATIO SPACE
- PLUMBING ROOM
- PRIVATE WORK ROOM
- PUBLIC COMPUTER LOUNGE
- RESTROOM
- STAIRS
- STORAGE
- TRASH ROOM
- WAITING ROOM
- WORK ROOM



Ground Floor Plan 1'0"=1/8"

NEXT →

# Room Legend

-  ELEVATOR LOBBY
-  MECH ROOM
-  STORAGE
-  TRASH ROOM
-  UTILITIES
-  WATER PUMP ROOM



The parking level would be sacrificial where it is not successfully dry-proofed.

Parking Plan 1'0"=1/8" (Under Ground Floor)

NEXT →

# Room Legend

- BREEZEWAY
- CORRIDOR
- DOUBLE BED UNIT
- ELEVATOR LOBBY
- GYM
- HANDICAP UNIT
- JANITOR'S CLOSET
- MECH ROOM
- PUBLIC BREEZEWAY
- SINGLE BED UNIT
- STAIRS
- TRASH ROOM
- TRIPLE BED UNIT

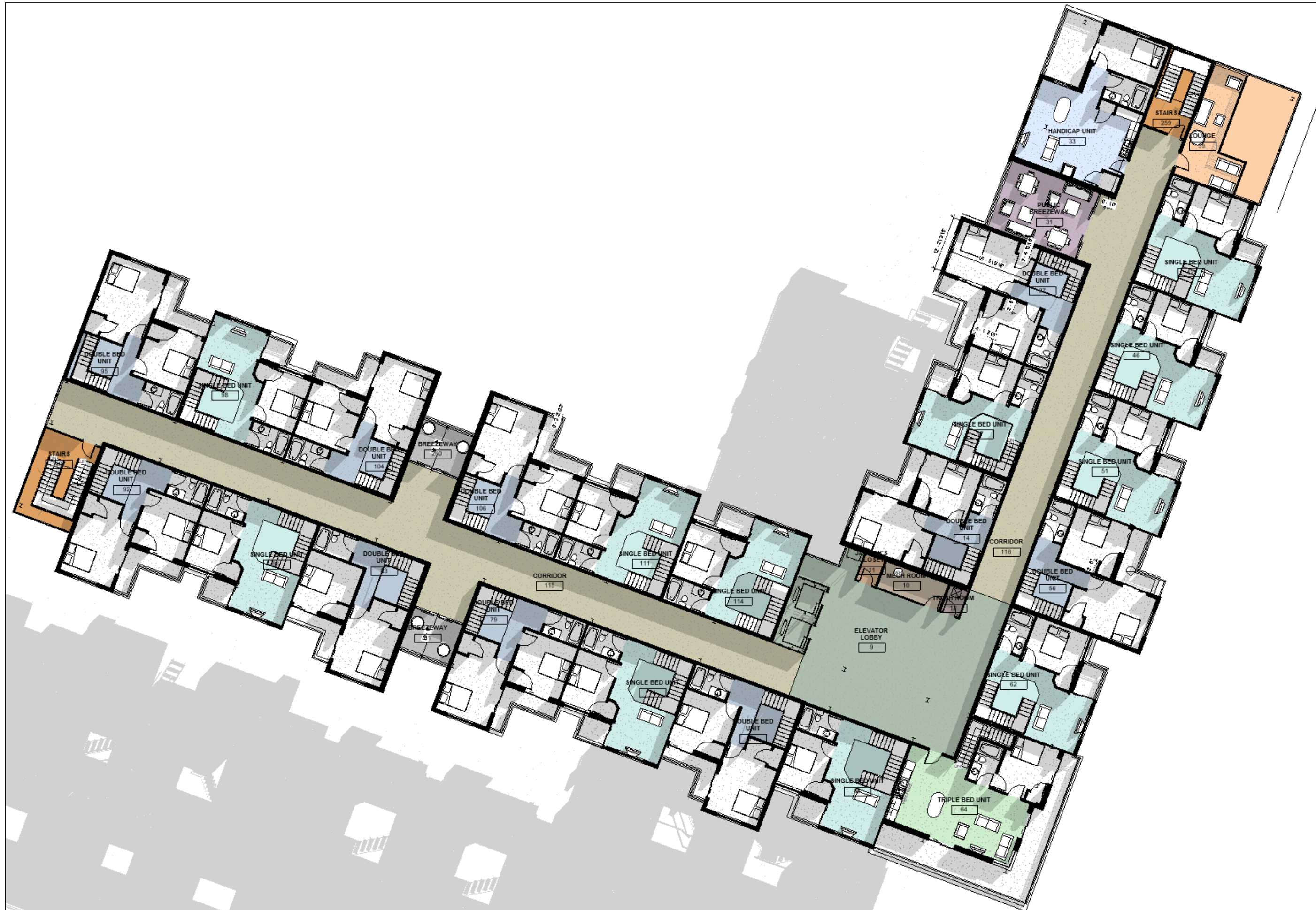


Level 1 Floor Plan 1'0"=1/8"

NEXT →

# Room Legend

- BREEZEWAY
- CORRIDOR
- DOUBLE BED UNIT
- ELEVATOR LOBBY
- GYM
- HANDICAP UNIT
- JANITOR'S CLOSET
- MECH ROOM
- PUBLIC BREEZEWAY
- SINGLE BED UNIT
- STAIRS
- TRASH ROOM
- TRIPLE BED UNIT



Level 2 Floor Plan 1'0"=1/8"

NEXT →



# Room Legend

- BREEZEWAY
- CORRIDOR
- DOUBLE BED UNIT
- ELEVATOR LOBBY
- GYM
- HANDICAP UNIT
- JANITOR'S CLOSET
- MECH ROOM
- PUBLIC BREEZEWAY
- SINGLE BED UNIT
- STAIRS
- TRASH ROOM
- TRIPLE BED UNIT



Level 3 Floor Plan 1'0"=1/8"

NEXT →

# Room Legend

- BREEZEWAY
- CORRIDOR
- DOUBLE BED UNIT
- ELEVATOR LOBBY
- GYM
- HANDICAP UNIT
- JANITOR'S CLOSET
- MECH ROOM
- PUBLIC BREEZEWAY
- SINGLE BED UNIT
- STAIRS
- TRASH ROOM
- TRIPLE BED UNIT

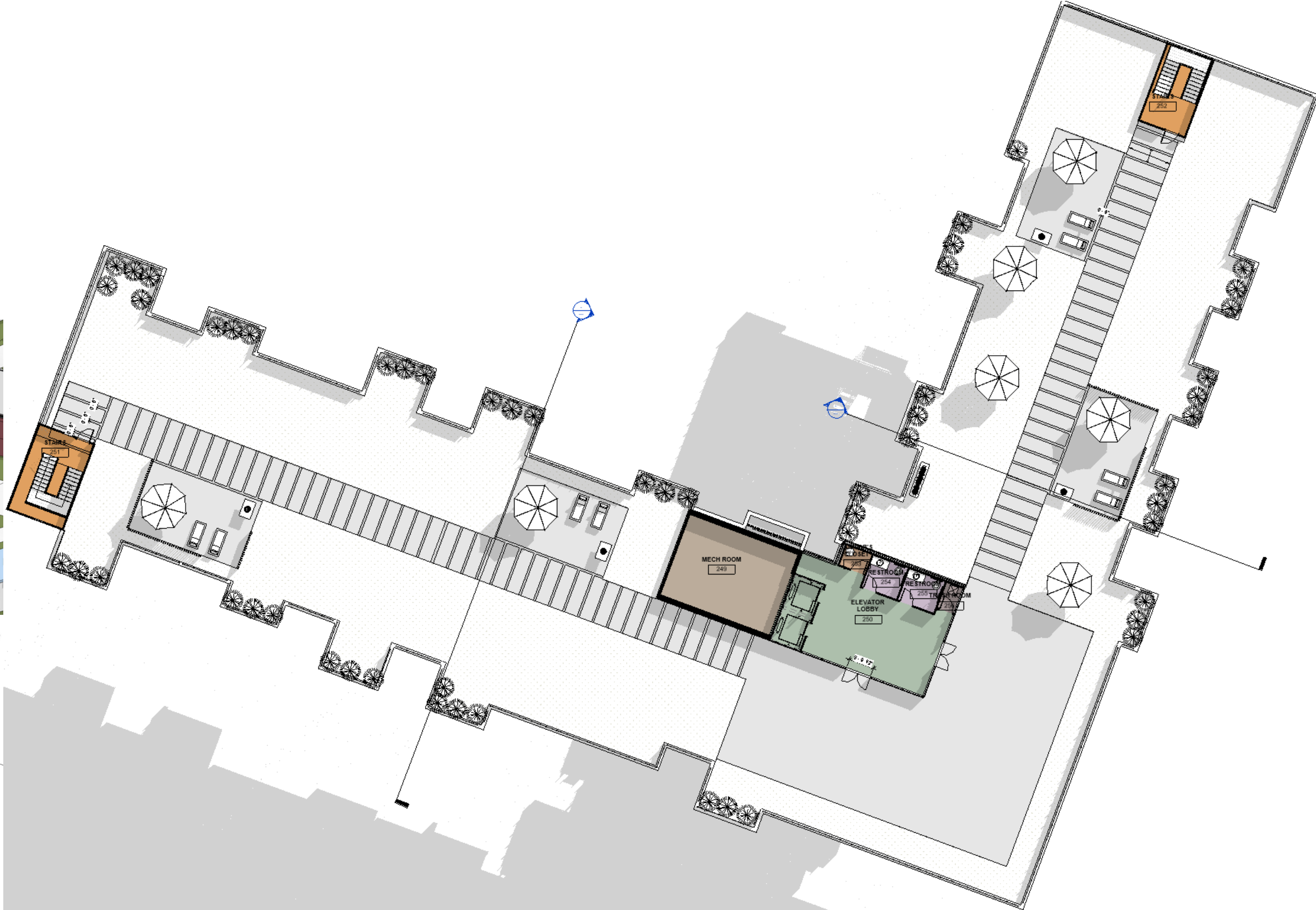
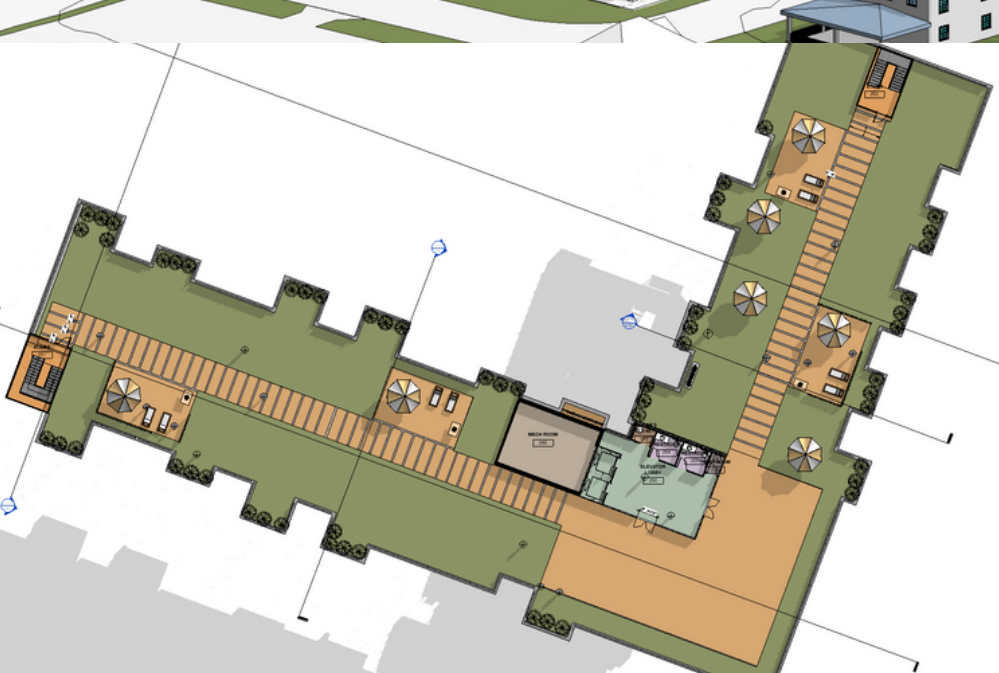


Level 4 Floor Plan 1'0"=1/8"

NEXT →

# Room Legend

- ELEVATOR LOBBY
- JANITOR'S CLOSET
- MECH ROOM
- RESTROOM
- STAIRS



Roof Plan 1'0"=1/8"

NEXT →

# WELL Building Certification



"The WELL Building Standard™ (WELL) consists of features across **the seven concepts** that comprehensively address not only the design and operations of buildings, but also how they impact and influence human behaviors related to health and well-being."

This project attempts **WELL Building Certification** which acknowledges all 7 categories.

<b>AIR</b>	Quality standards including filtration, cleaning protocols, microbe control, material safety
<b>WATER</b>	Testing and monitoring to control public water additives and system contaminants
<b>NOURISHMENT</b>	Promotion of healthy food options, nutrition labeling, safe food preparation and sourcing
<b>LIGHT</b>	Glare free and circadian lighting design, effects of surfaces & contrast, light quality, daylighting
<b>FITNESS</b>	Active design, enhanced ergonomics, activity incentives, and structured fitness programs
<b>COMFORT</b>	Physical and visual ergonomics; thermal, olfactory, and acoustic comfort
<b>MIND</b>	Organizational policies and transparency, biophilic design, flexible and adaptable spaces

[Graphic Source: International WELL Building Institute™ (IWBI™)]

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- "Decentralized HVAC means there are separate units for each residence.

### Advantages:

- if one unit goes out, not all units are affected.
- The downside is the expense of purchasing all of the individual units for each residence."
  
- The **rigid insulation** used in the walls and floors of this building will help prevent heat loss, and the **black aluminum facades** will help cut heating costs in colder months
  
- A study published in 2011 found that a WSHP system reduced overall building energy use by 8% when compared to an air-cooled chiller system and 20% compared to a water-cooled chiller system.





- The building makes use of **operable mullioned windows** within the units, and provides access to **community and private balconies**, both of which allow for access to fresh air while one is in their unit.

- Operable windows



Niagara Conservation's dual-flush UHET Stealth model combines vacuum assist technology with a .95-gallon full flush and .5-gallon half flush.

Faucets: **delta 9178t-dst kitchen sink faucet**  
Reasonably priced Water-Sense Product

- Helps prevent leaking by means of specially designed seals

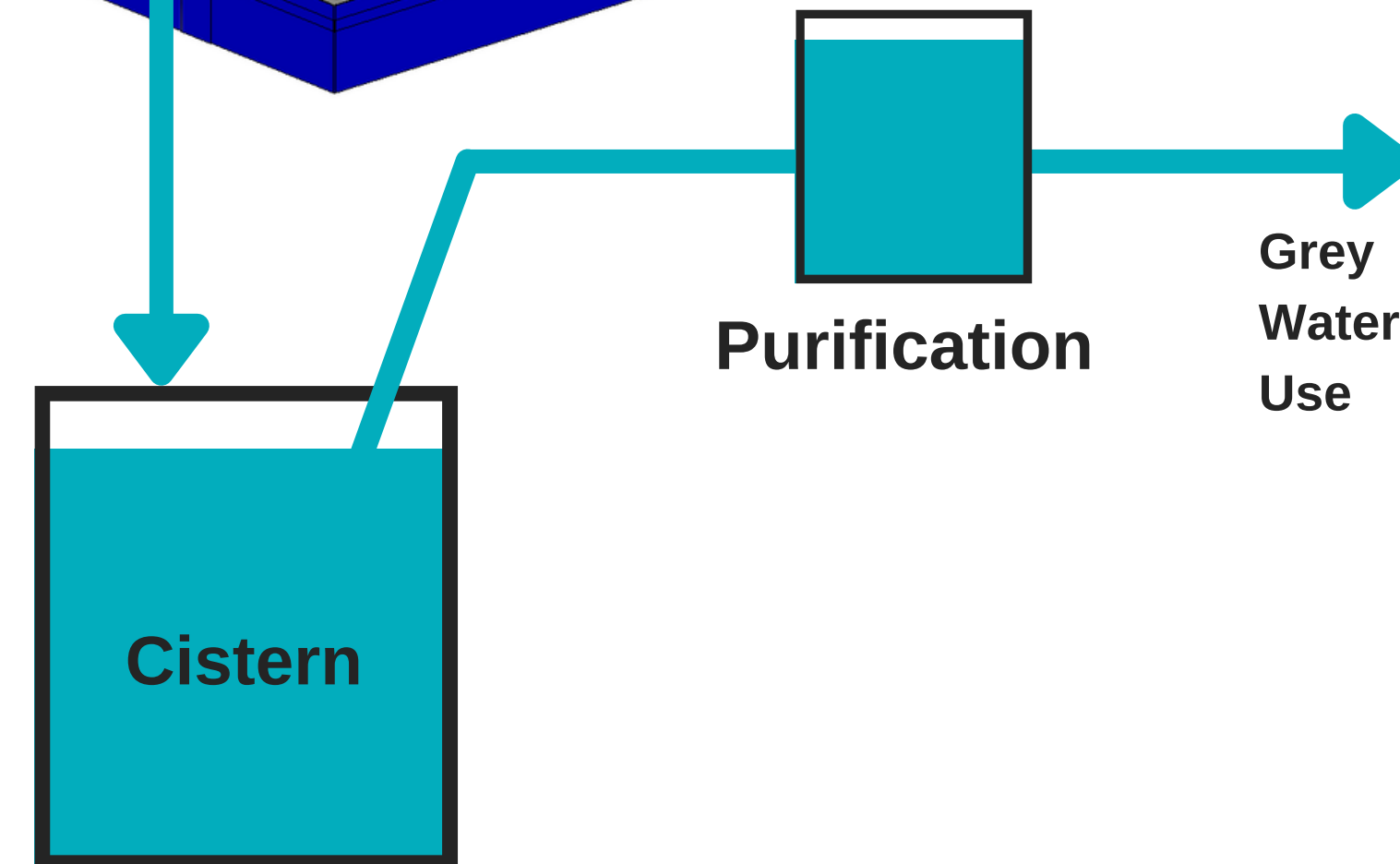
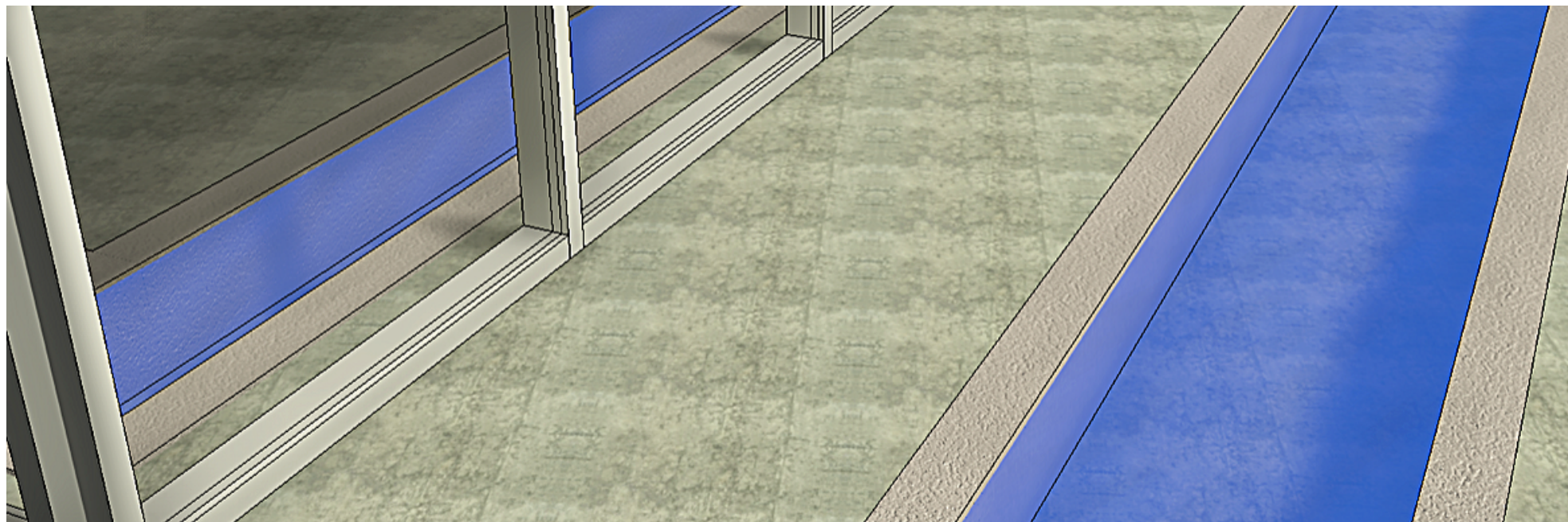
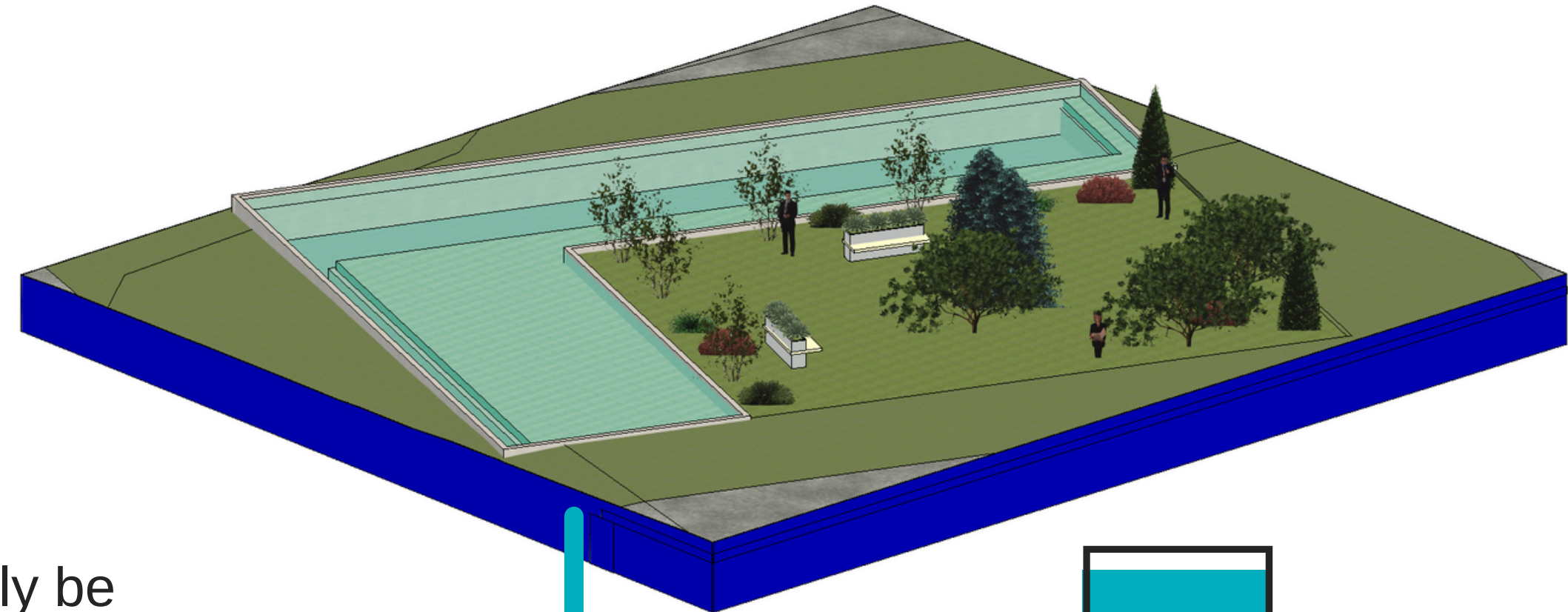


# WATER

## Reflection Pool, Pump and Cistern

Part of this building's design makes use of reflection pools, and in ground channels that collect rainwater, floodwater and runoff, and sent them to be cleaned, and redistributed throughout the building as greywater

- To conserve energy, this method might only be implemented on the ground, and first floors.



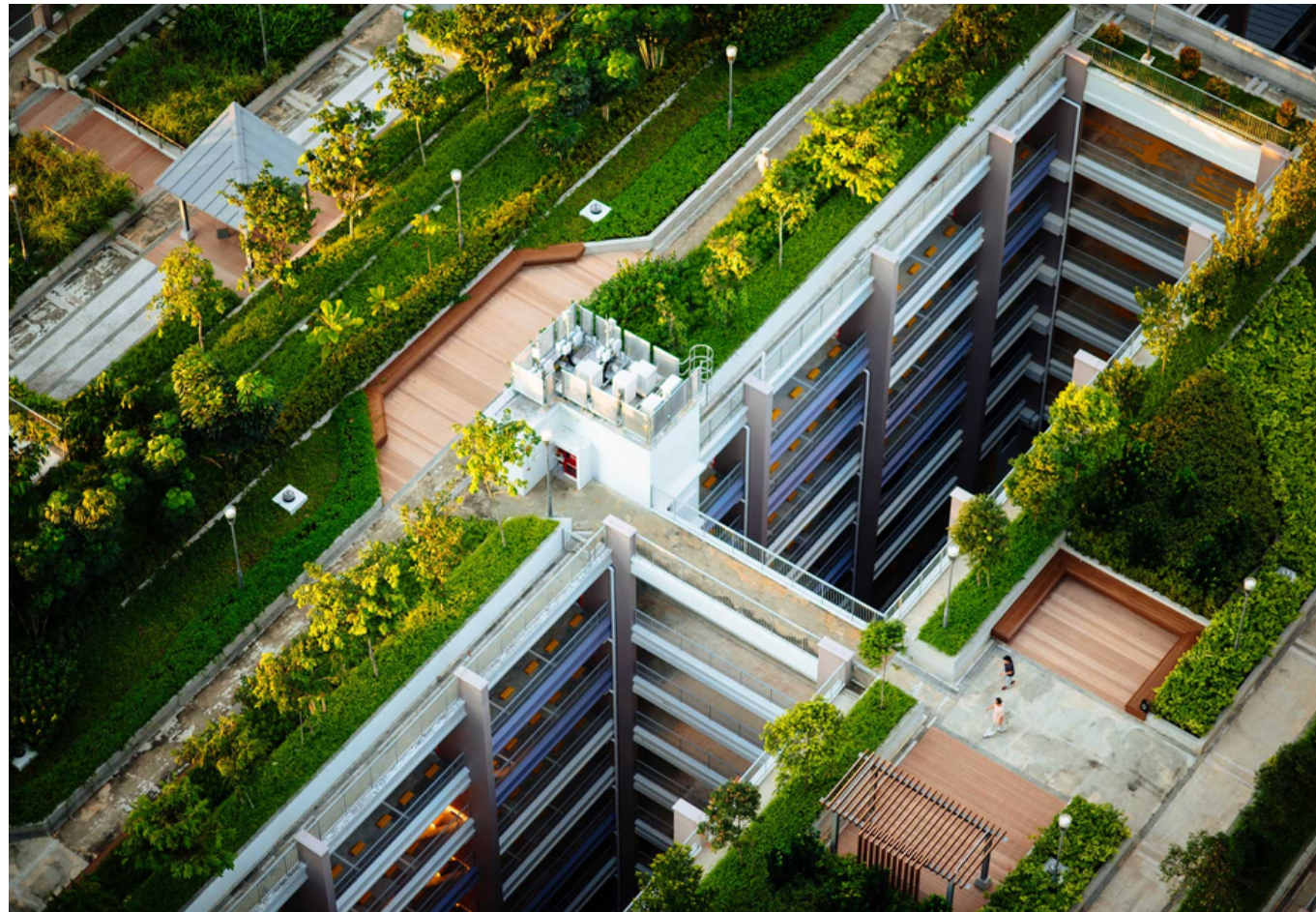


# NOURISHMENT

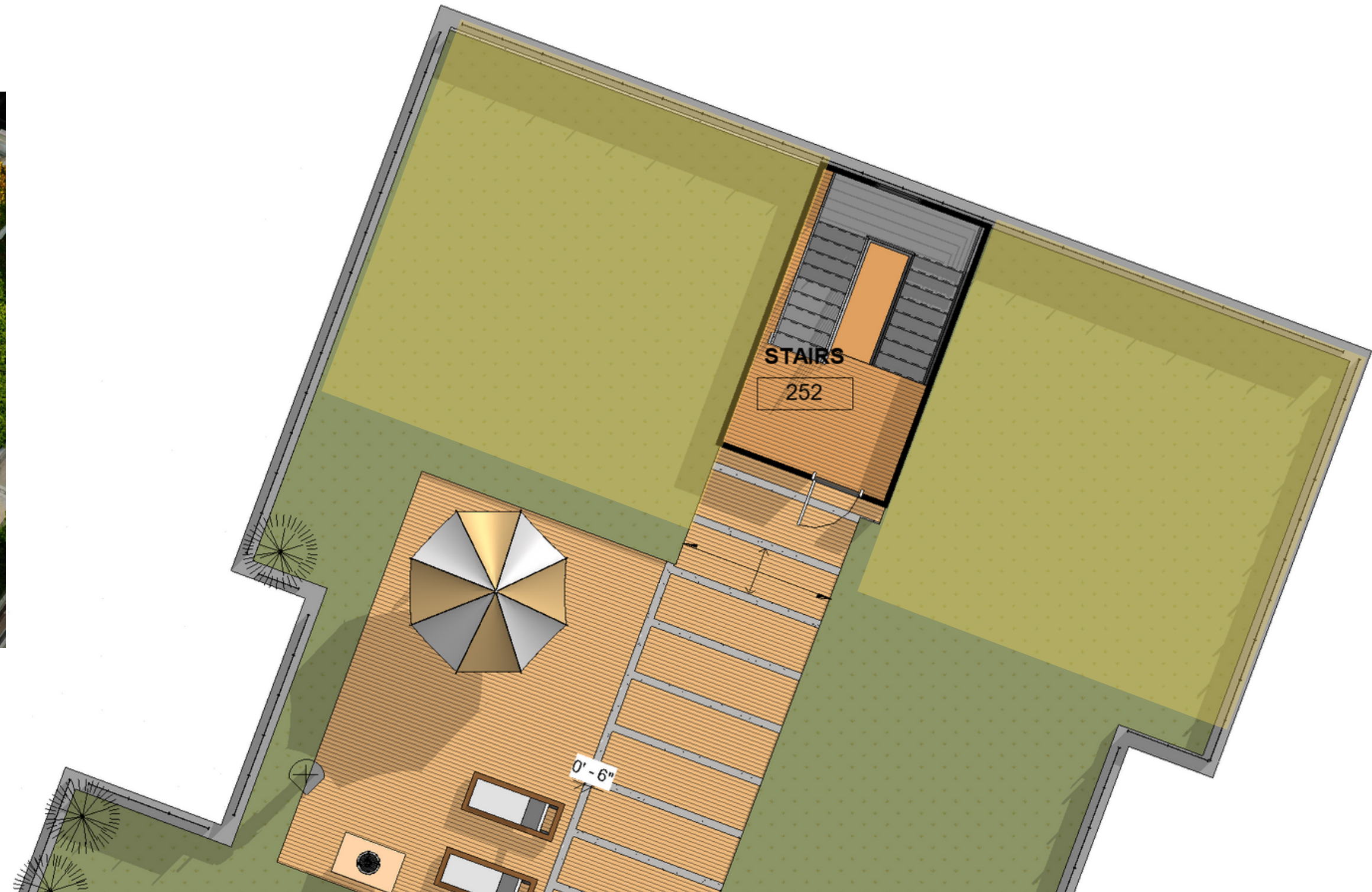


## Roof Garden

- A community garden will be installed on the roof to promote activity, and healthy eating by the residents.



- potential community garden locations

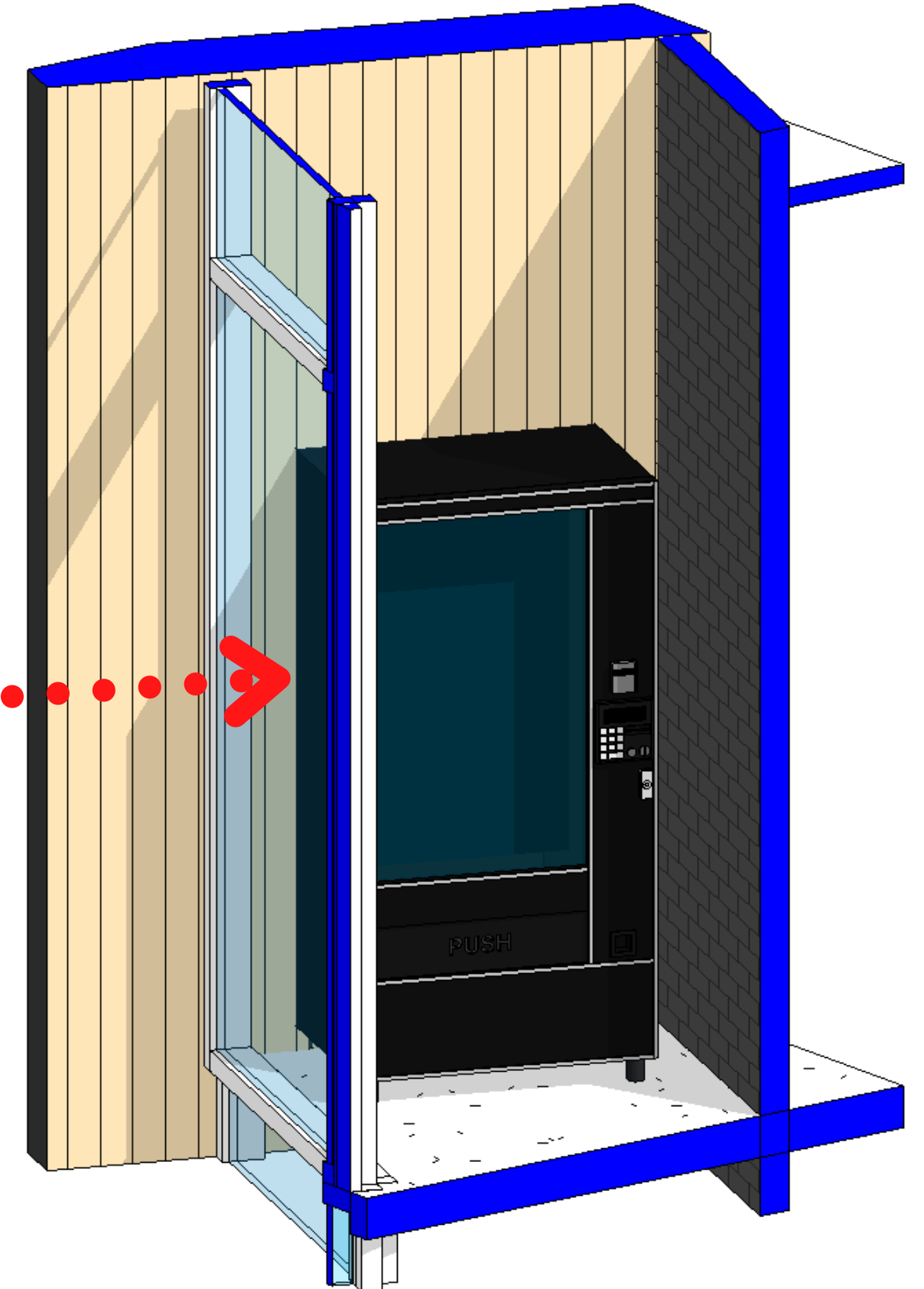
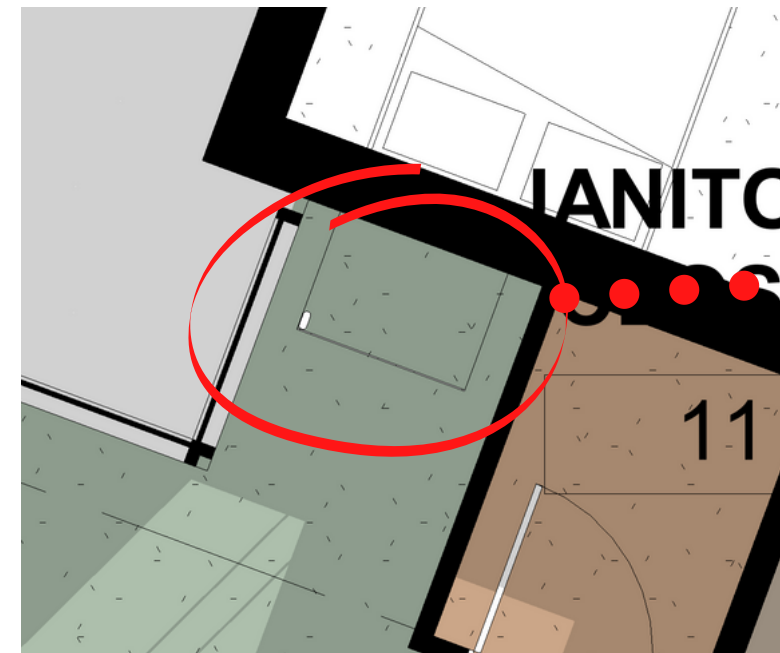


# NOURISHMENT



## Healthy Vending Machines

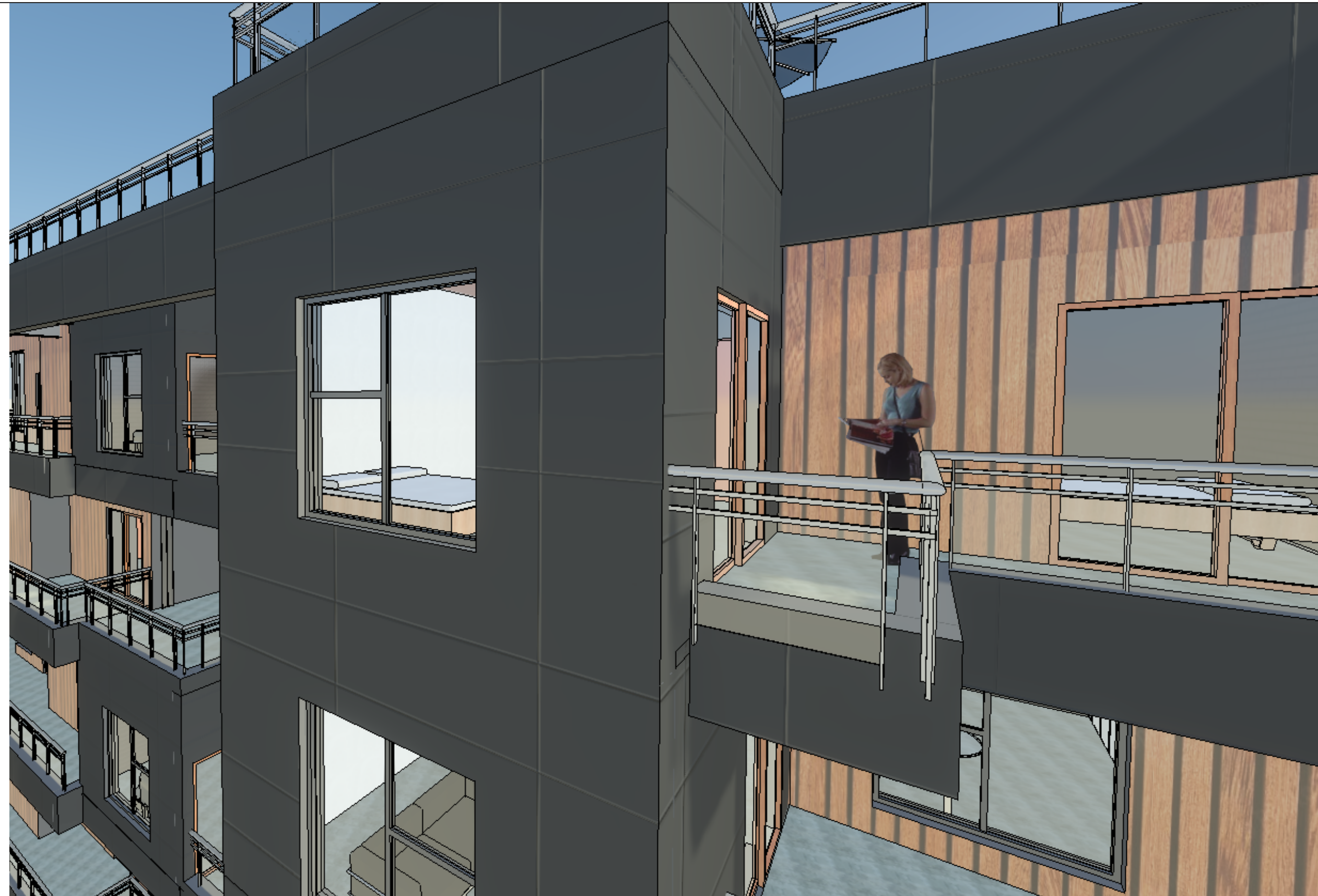
- Vending machines were included in the original design of this building. They would be filled with healthy options in accordance with WELL standards
- Visual Precedent:



### Glare Control: Black Aluminum Facades

- The Black aluminum cladding that makes up the complex's facades, will help with the absorption of harsh sun on the building's south side in particular.

The recessed sides of the building are lined with wood batten that help the facade aerate



# LIGHT

- Reflected Ceiling Plans showing the organization of downlights







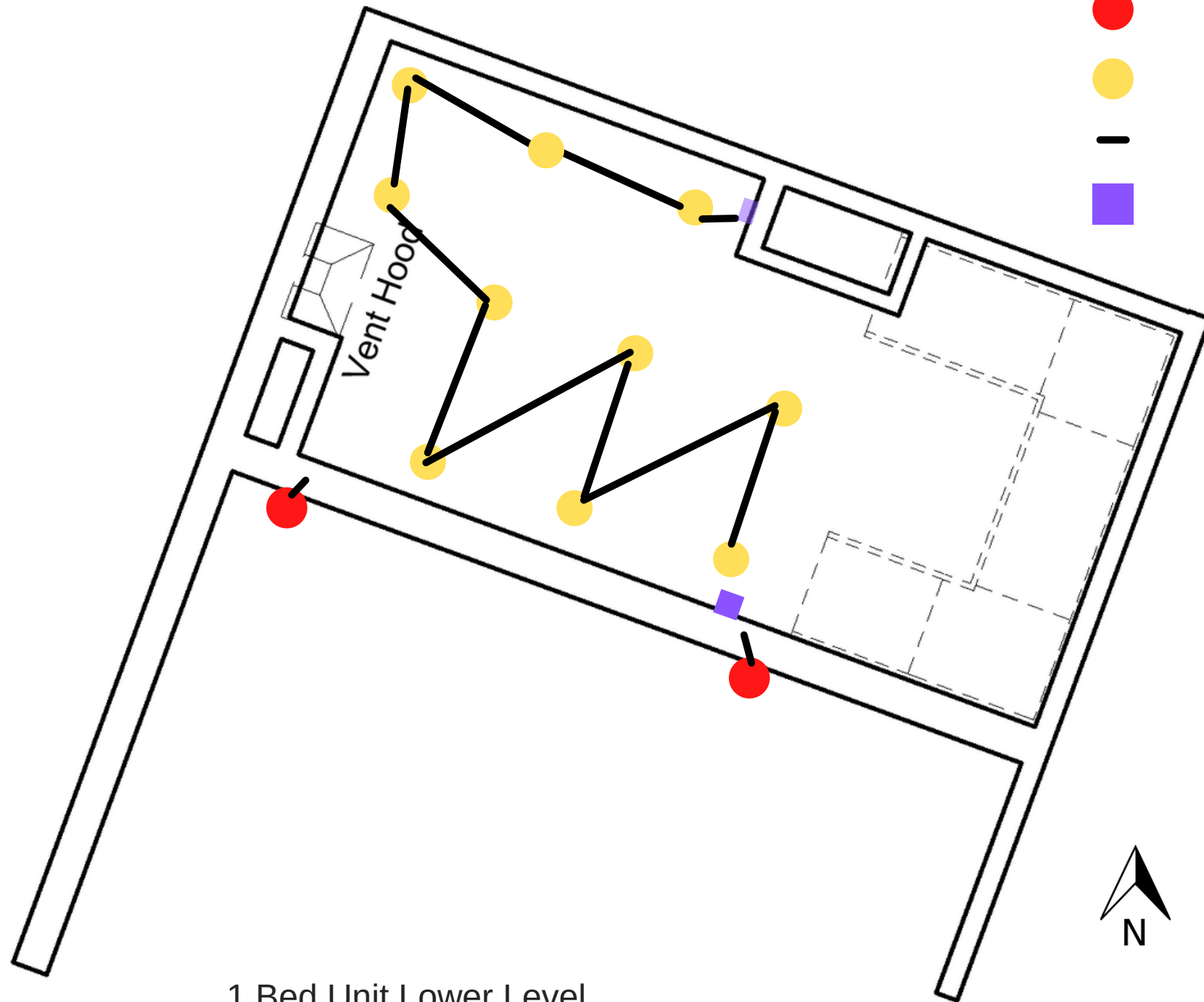
Ultra Slim 4 in. Canless Color Changing Integrated LED Recessed Trim All-in-One Downlight 650 lumens Dimmable (8-Pack)

## Black Facades, Lighting Design

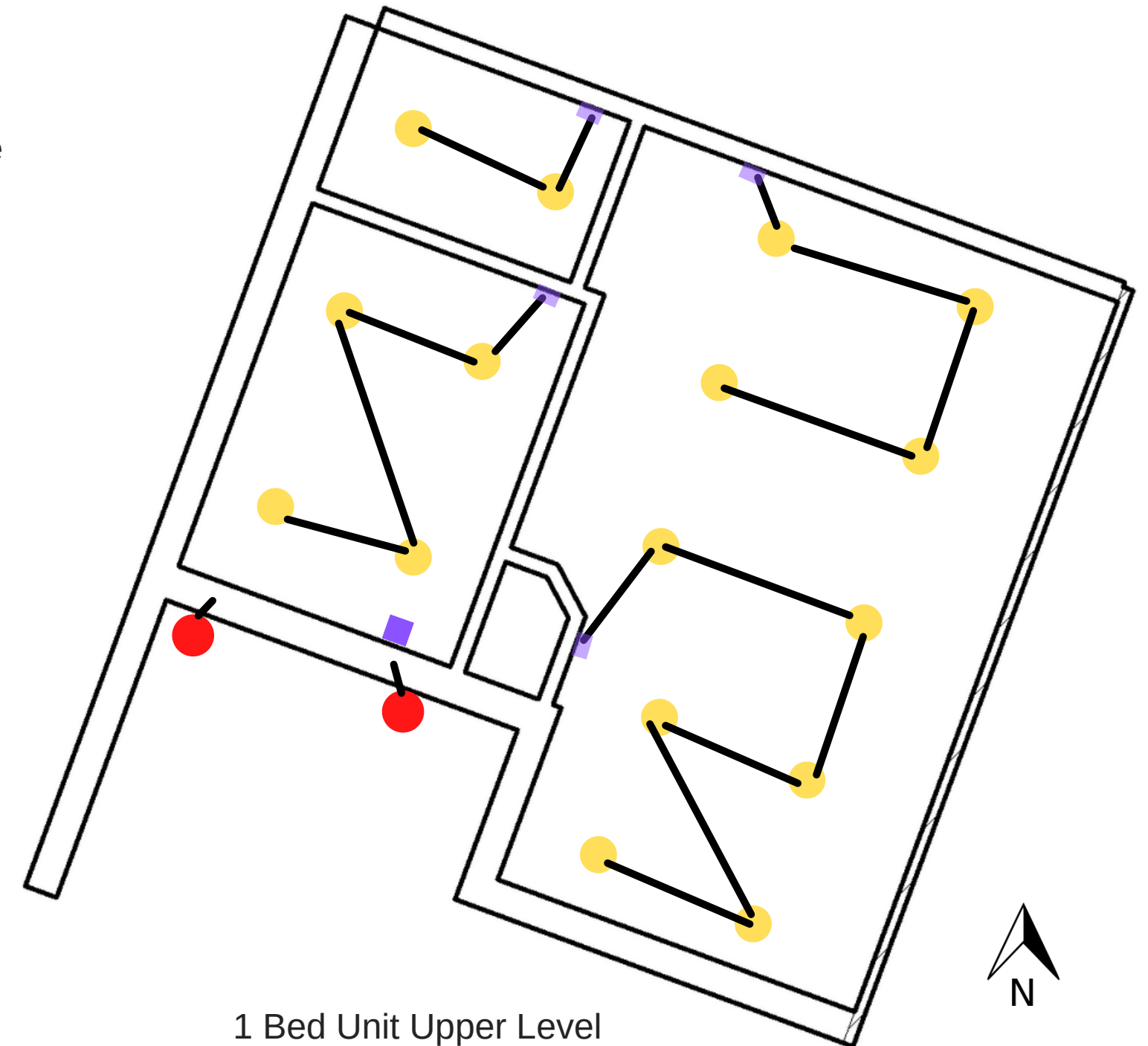


Westinghouse 15" Tall 2 Light Outdoor Wall Sconce Model:6797500

-  Wall Sconce
-  Downlight
-  Electrical Line
-  Switch



1 Bed Unit Lower Level



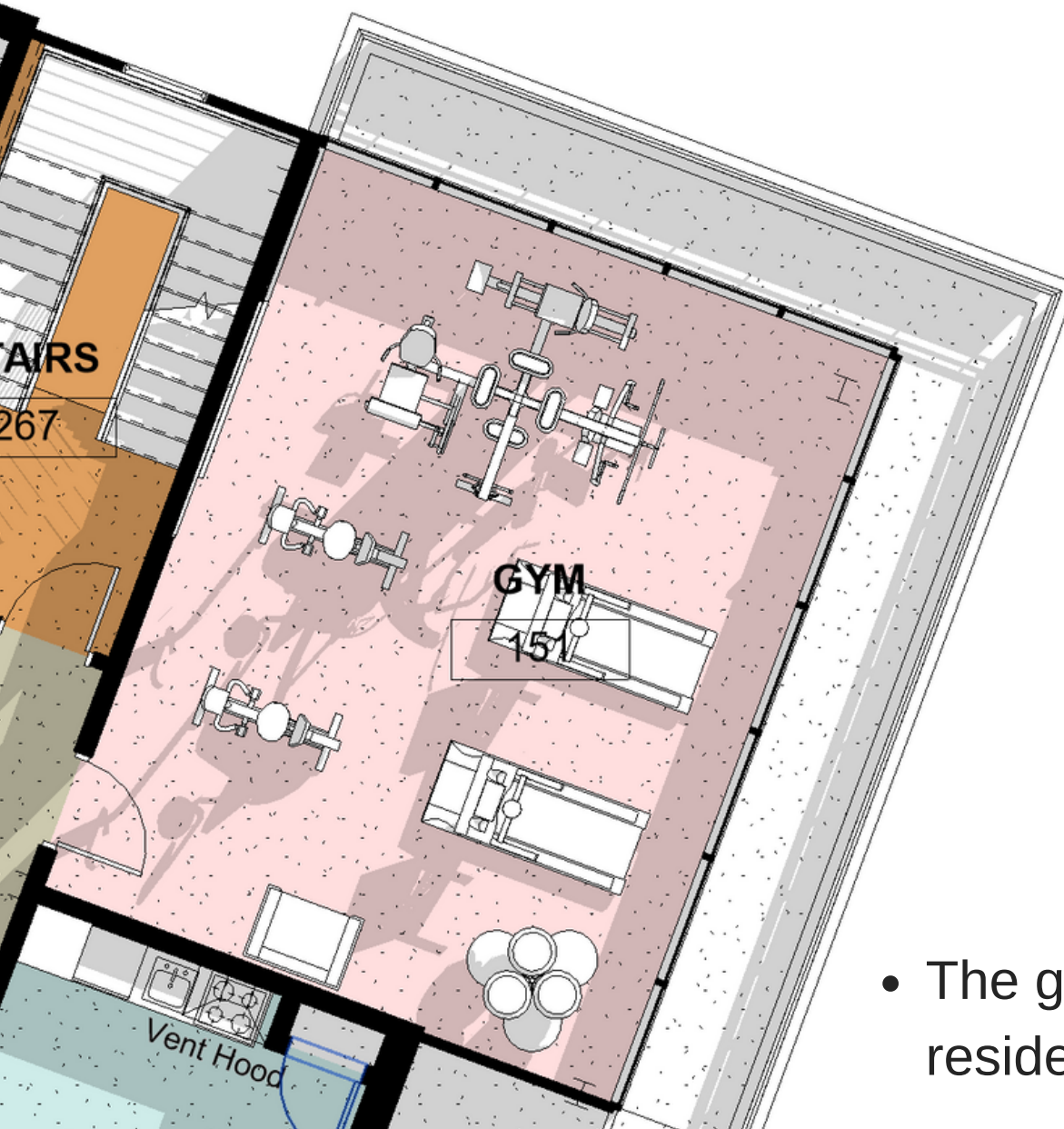
1 Bed Unit Upper Level

# FITNESS

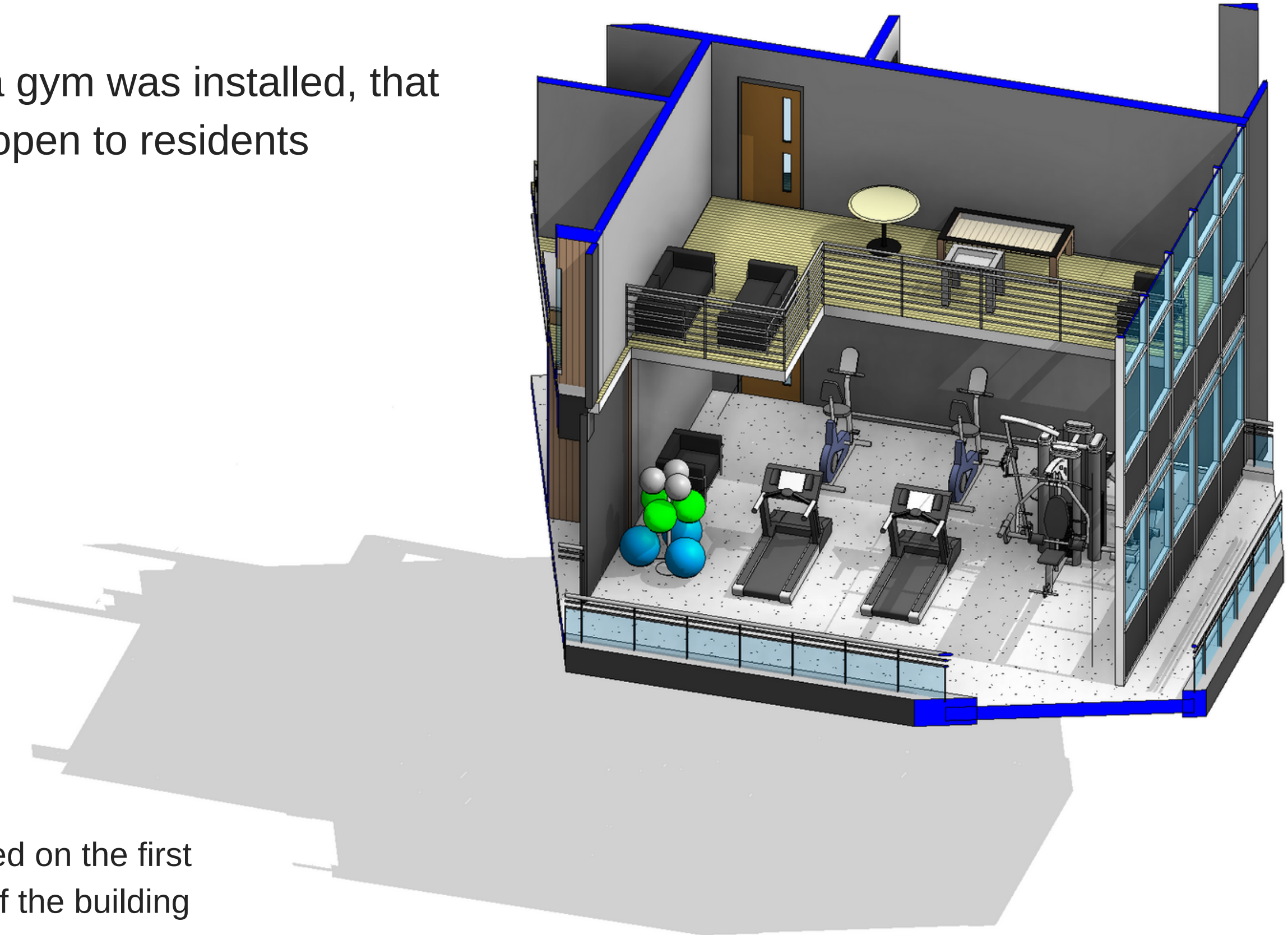


## Residents' Gym

- To promote fitness within the building, a gym was installed, that features a guest lounge, and would be open to residents throughout the week



- The gym is located on the first residential floor of the building

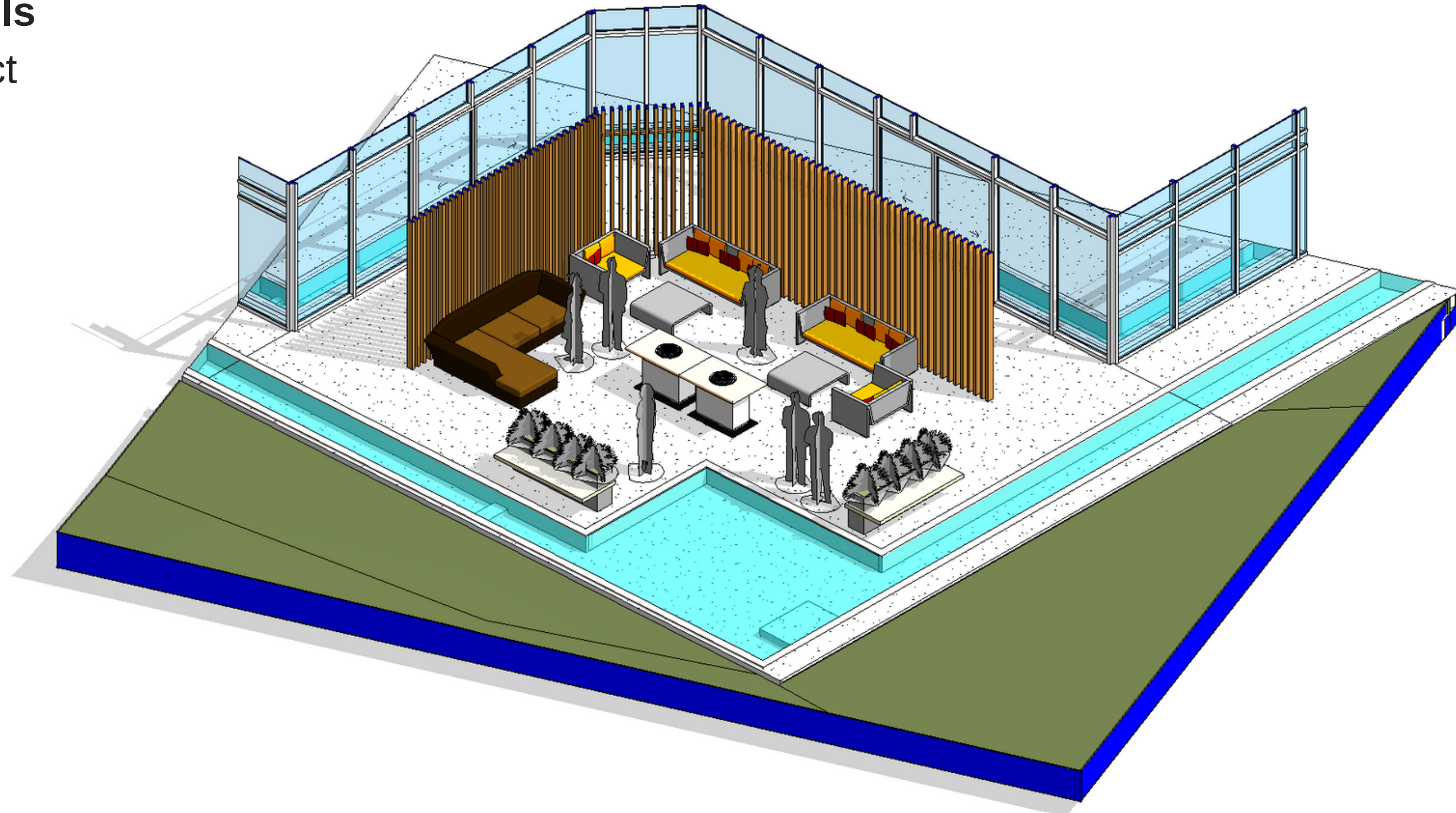
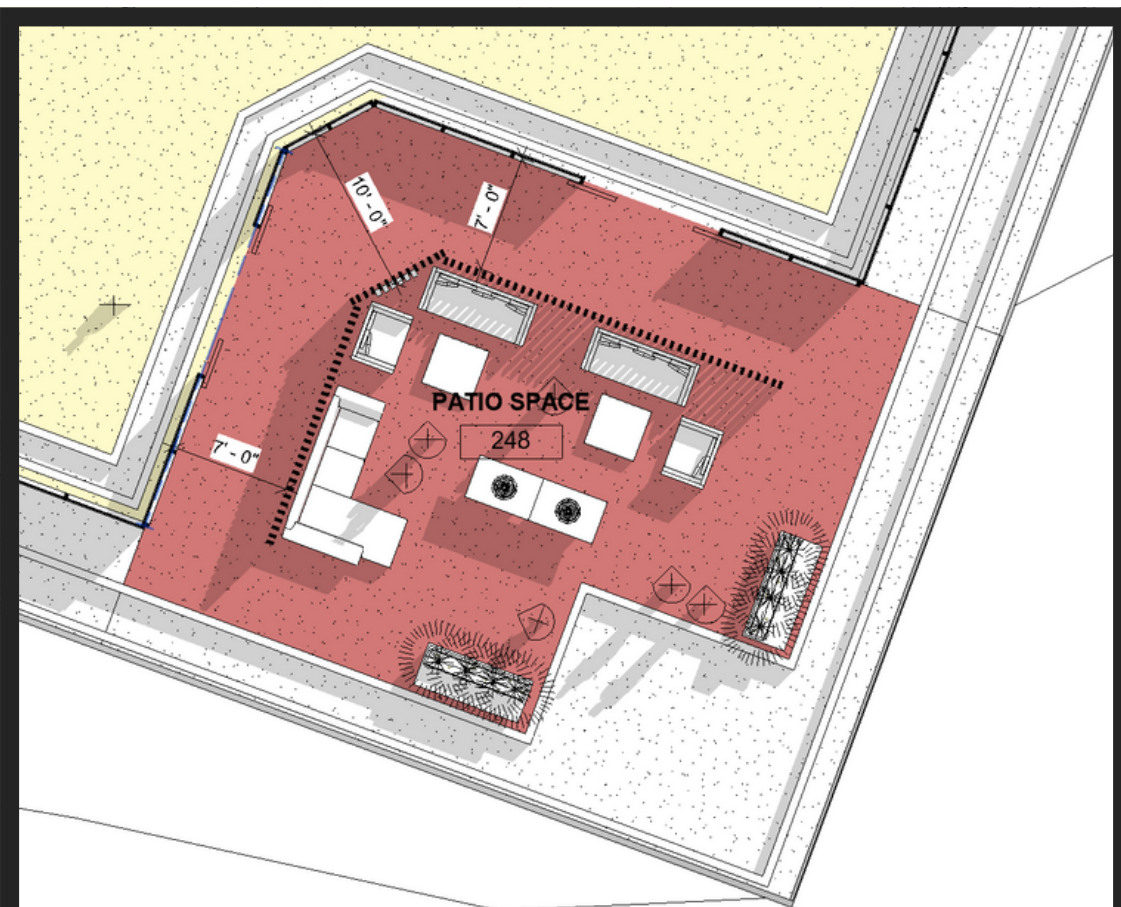


# COMFORT



## Community Reflection Pool/ Green Walls

- The creation of **lounges, porches and reflection pools** play into the "comfort," aspect of WELL by providing restful spaces and visuals
- Reflection pool community porch (ground floor)



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# COMFORT



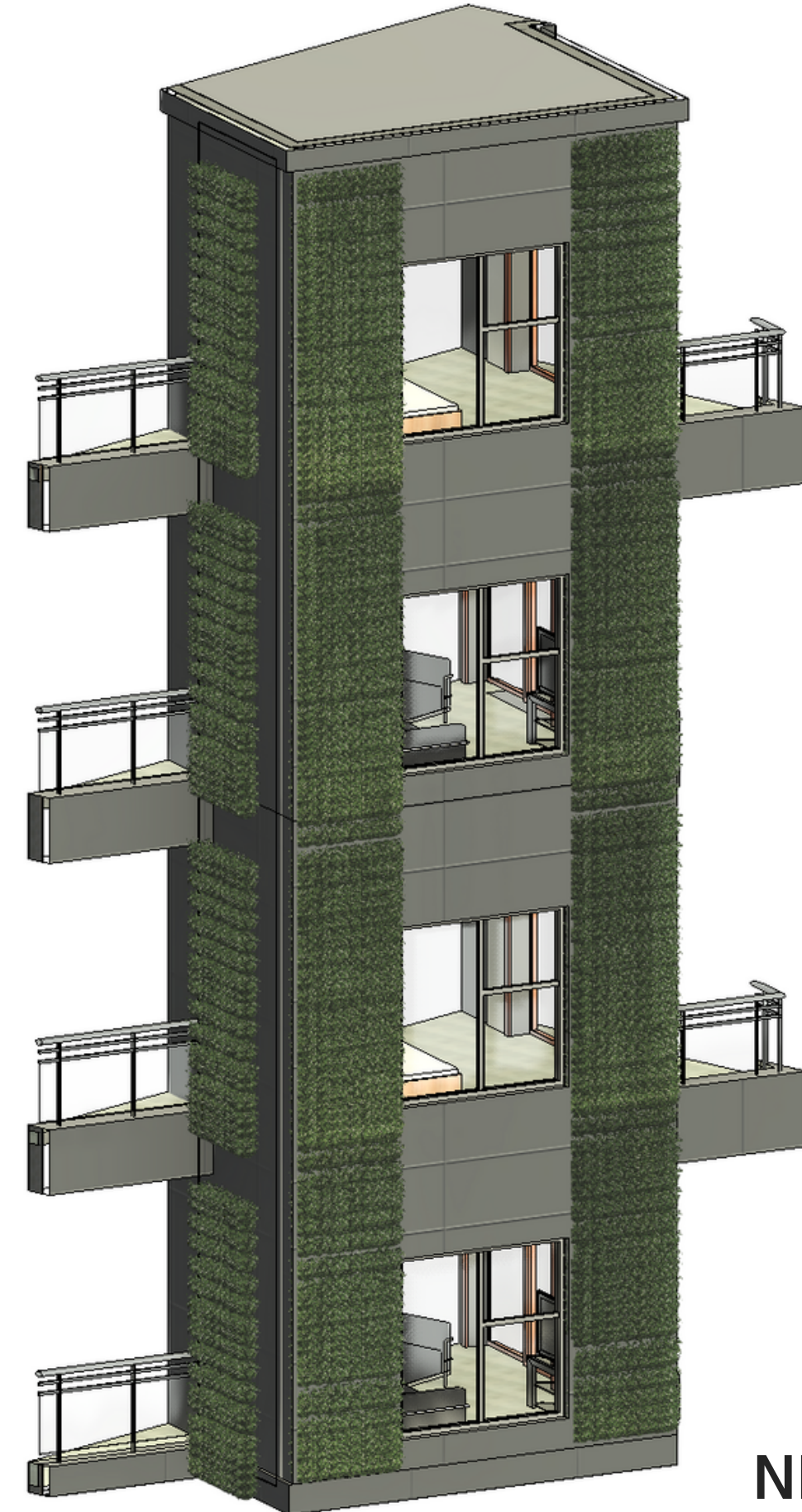
## Community Reflection Pool/ Green Walls

- Green walls on the facades of protruding faces on this building could help with the absorption of rain water, and help regulate the temperature on the dark colored facade elements.



- Plants would have to be specially selected for light conditions, in order to be effective
- Green walls would have to be placed where residents could easily interact with them (balconies, porches, etc.)

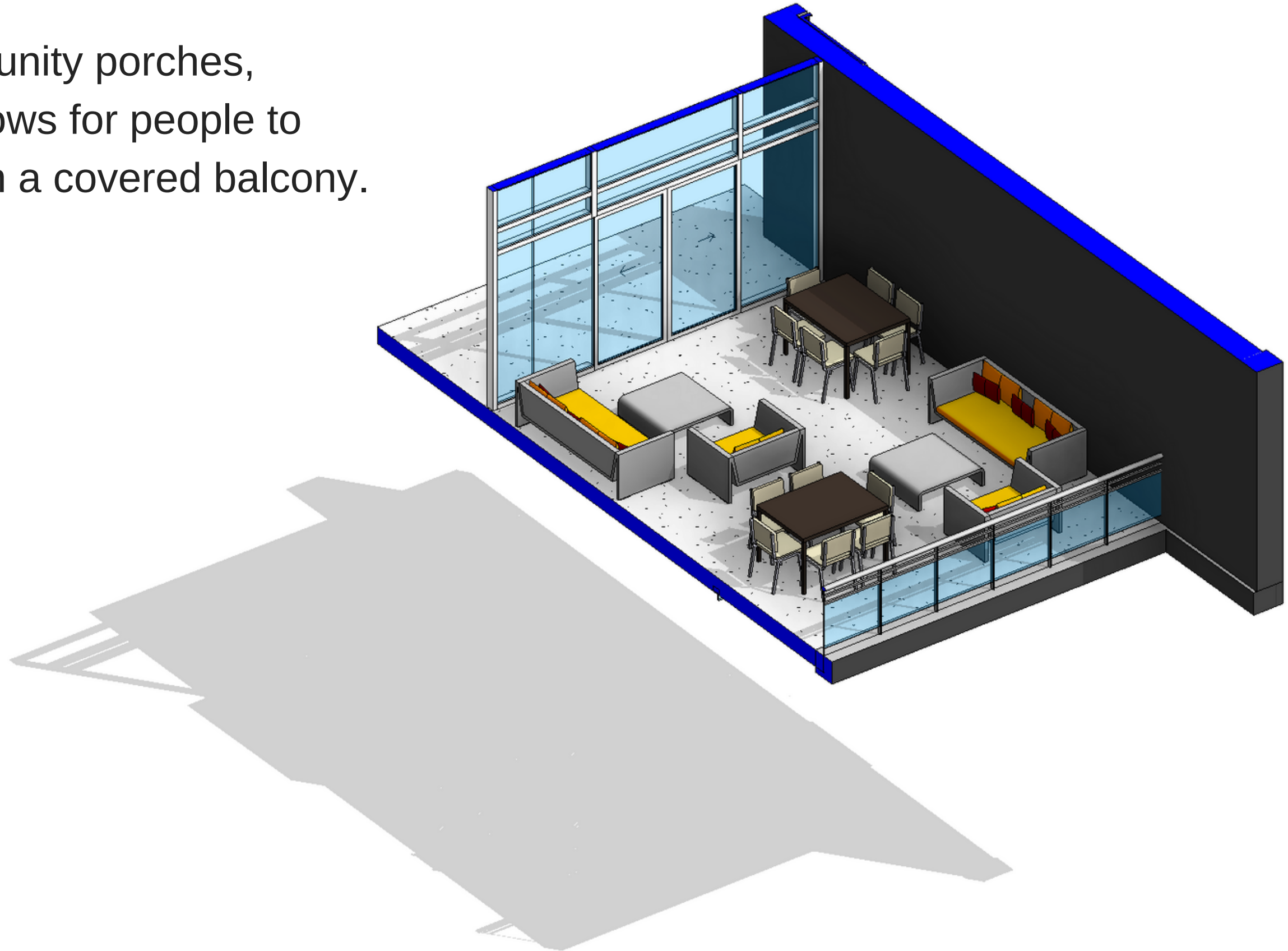
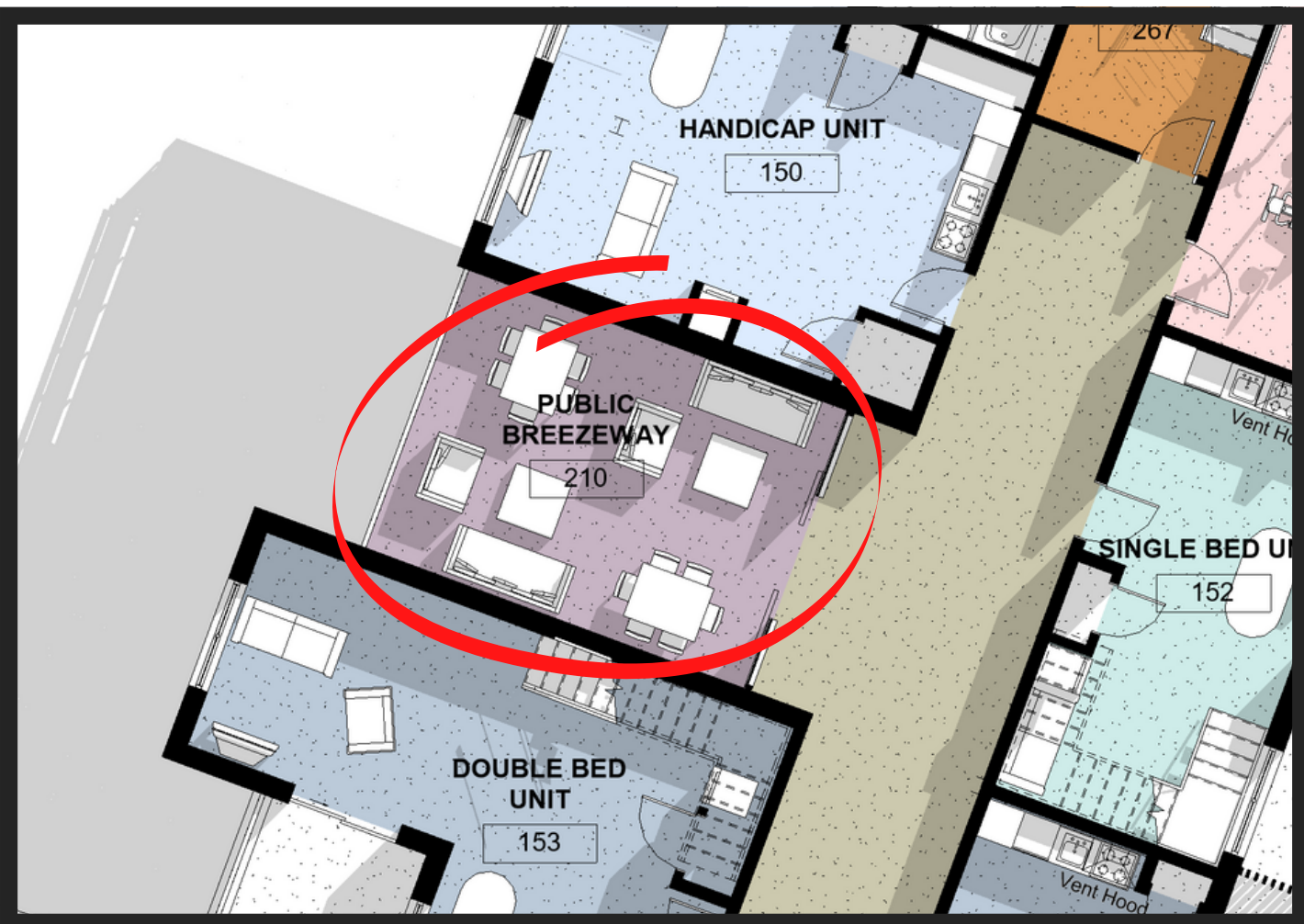
- Green wall developments can help reduce noise levels, conserve energy spent on heating and cooling, promote the longevity of facade materials, purify the air, and provide a natural aesthetic to the building



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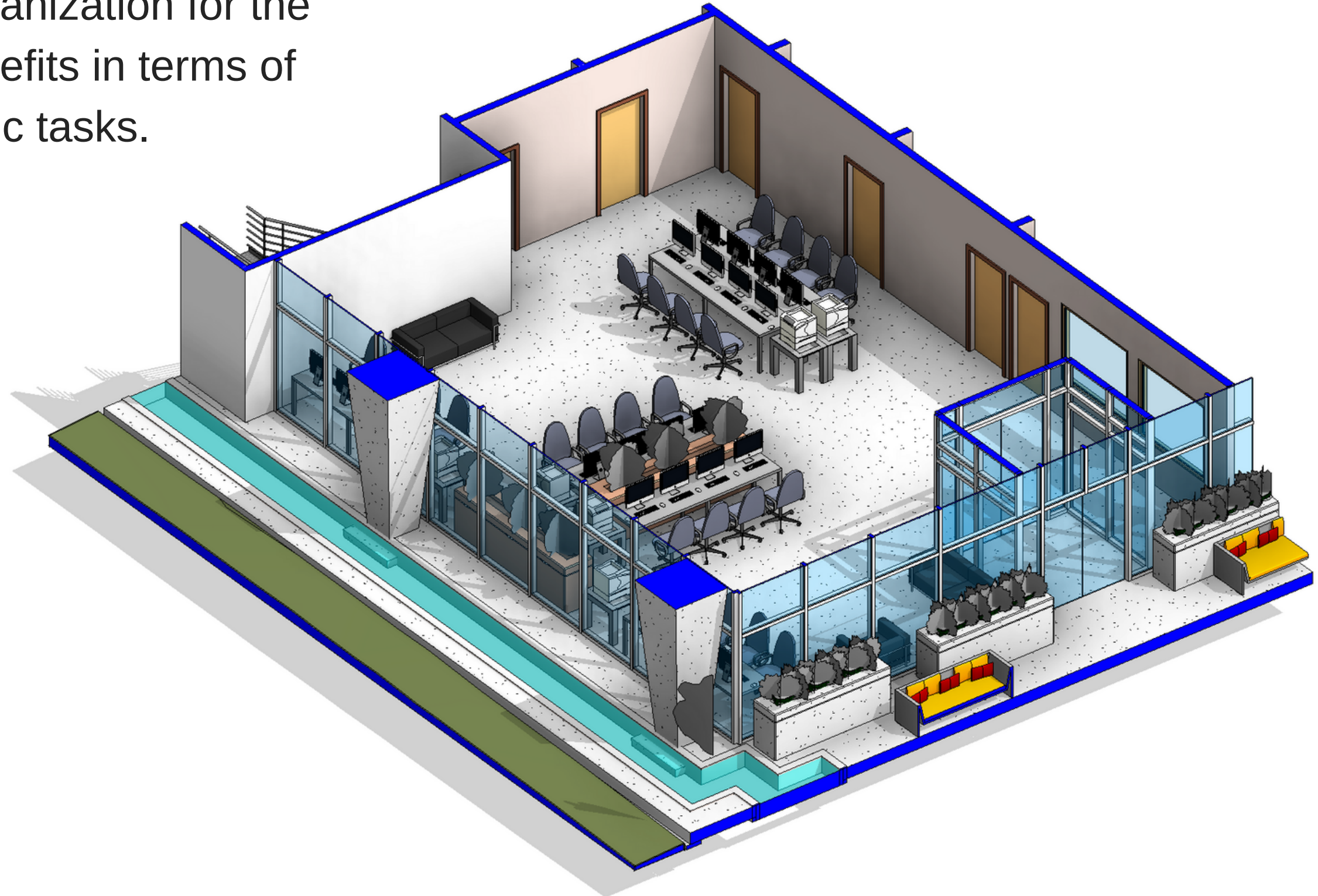
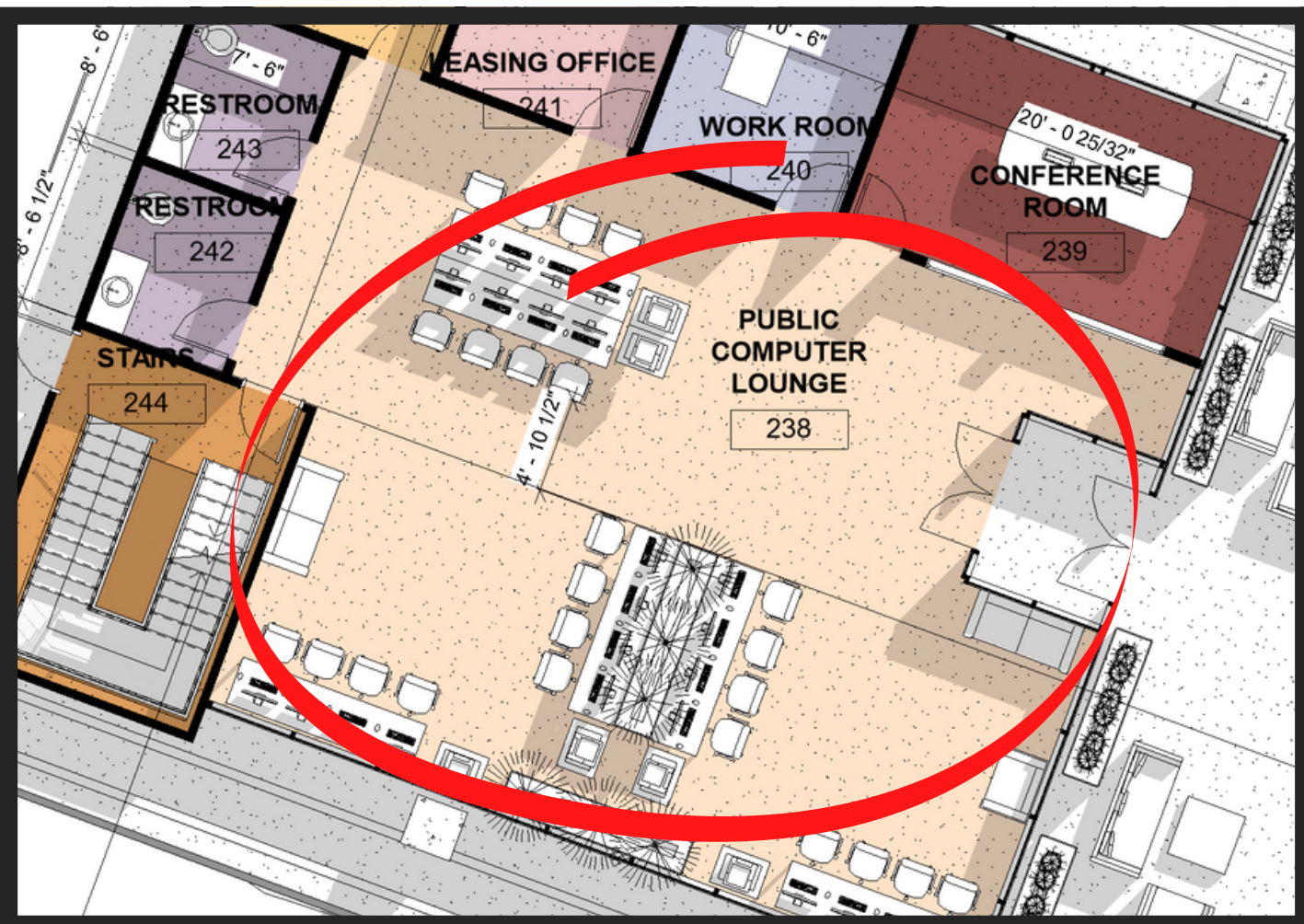
- Spaces of peace are created in community porches, adjacent to the dwelling units. This allows for people to breathe and look out during the day on a covered balcony.





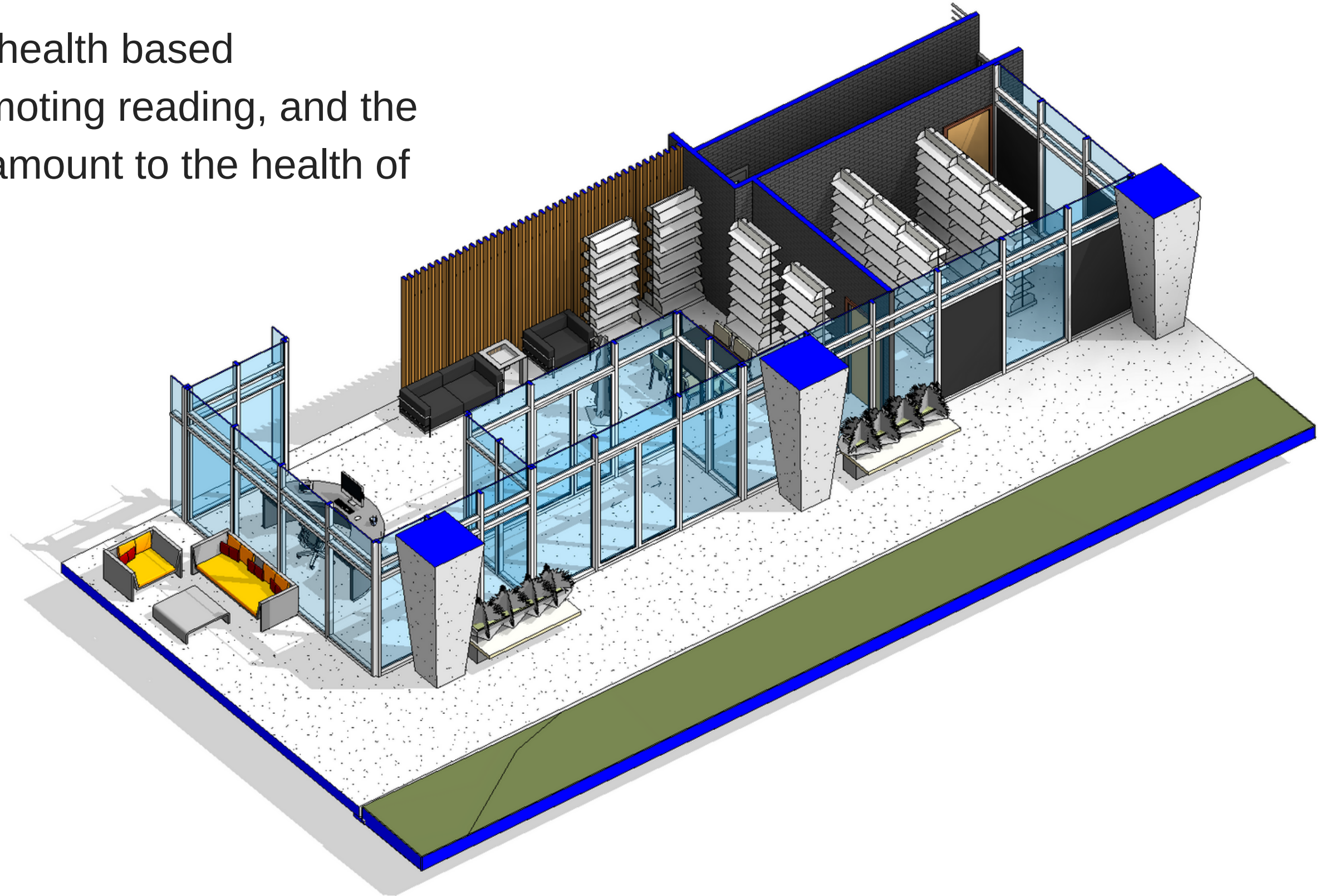
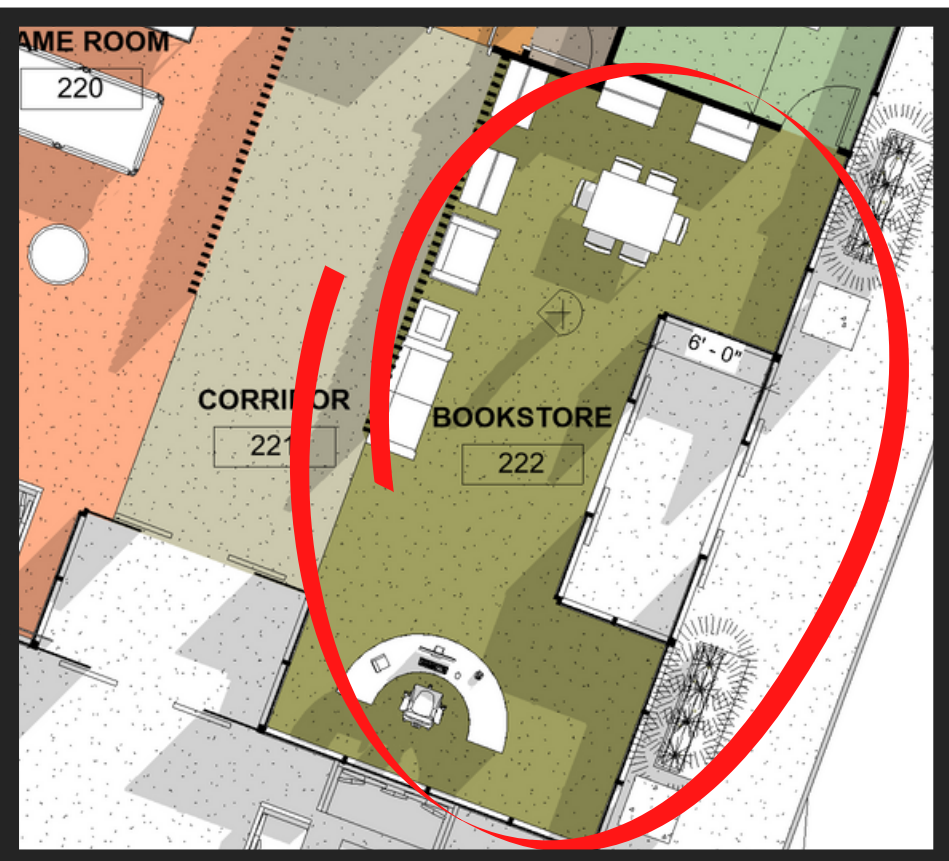


- The computer lab creates an aura of organization for the residents and provides quality of life benefits in terms of opportunities to print, and other electronic tasks.





- The complex's **book store** creates health based opportunities for the residents. Promoting reading, and the general care of one's person is paramount to the health of the mind.



# ENERGY USAGE

## Appliance List

This building has 50 units in total. This means that each unit has:

- 1 Washer
- 1 Dryer
- 1 AC Unit
- 1 Fridge
- 1 Stove
- 1 Oven
- 1 Dishwasher

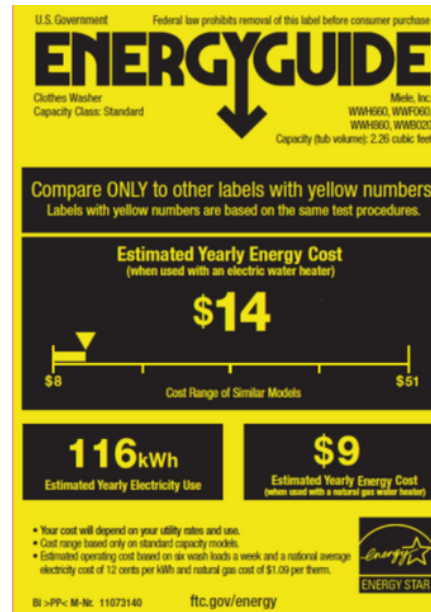


Miele WDB020



Miele PDR908 HP

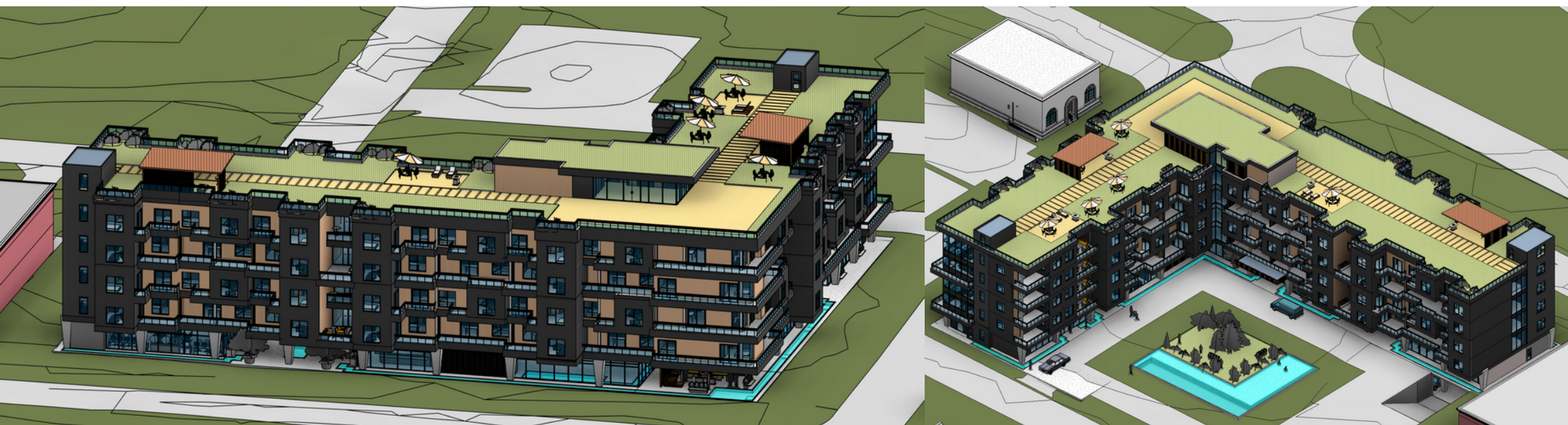
These energy star rated washer and dryer were rated as some of the most energy efficient in-house appliances in the world, and some of the most silent.



Drum Capacity (cu-ft) ⓘ	4.6
Combined Energy Factor (CEF) ⓘ	9.75
Type ⓘ	Electric
Estimated Annual Energy Use (kWh/yr) ⓘ	245

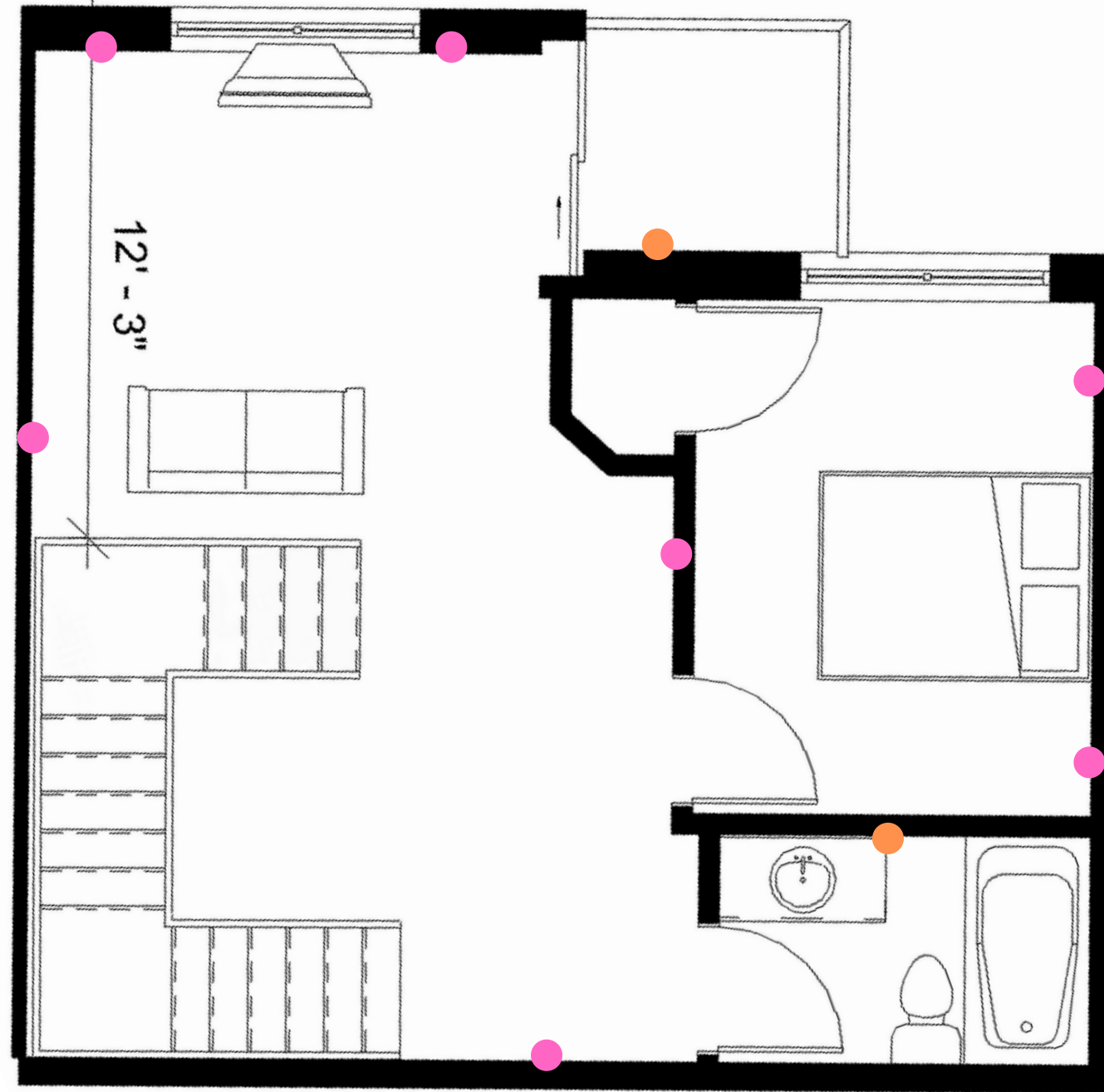
### Features

- o Heat pump technology - ventless dryer that maximizes time and energy savings
- o Sleek full touchscreen display – M Touch Flex reduces buttons or dials
- o 4D filtration system
- o 35 programs – up to 5 customizable
- o Commercial grade built for residential use

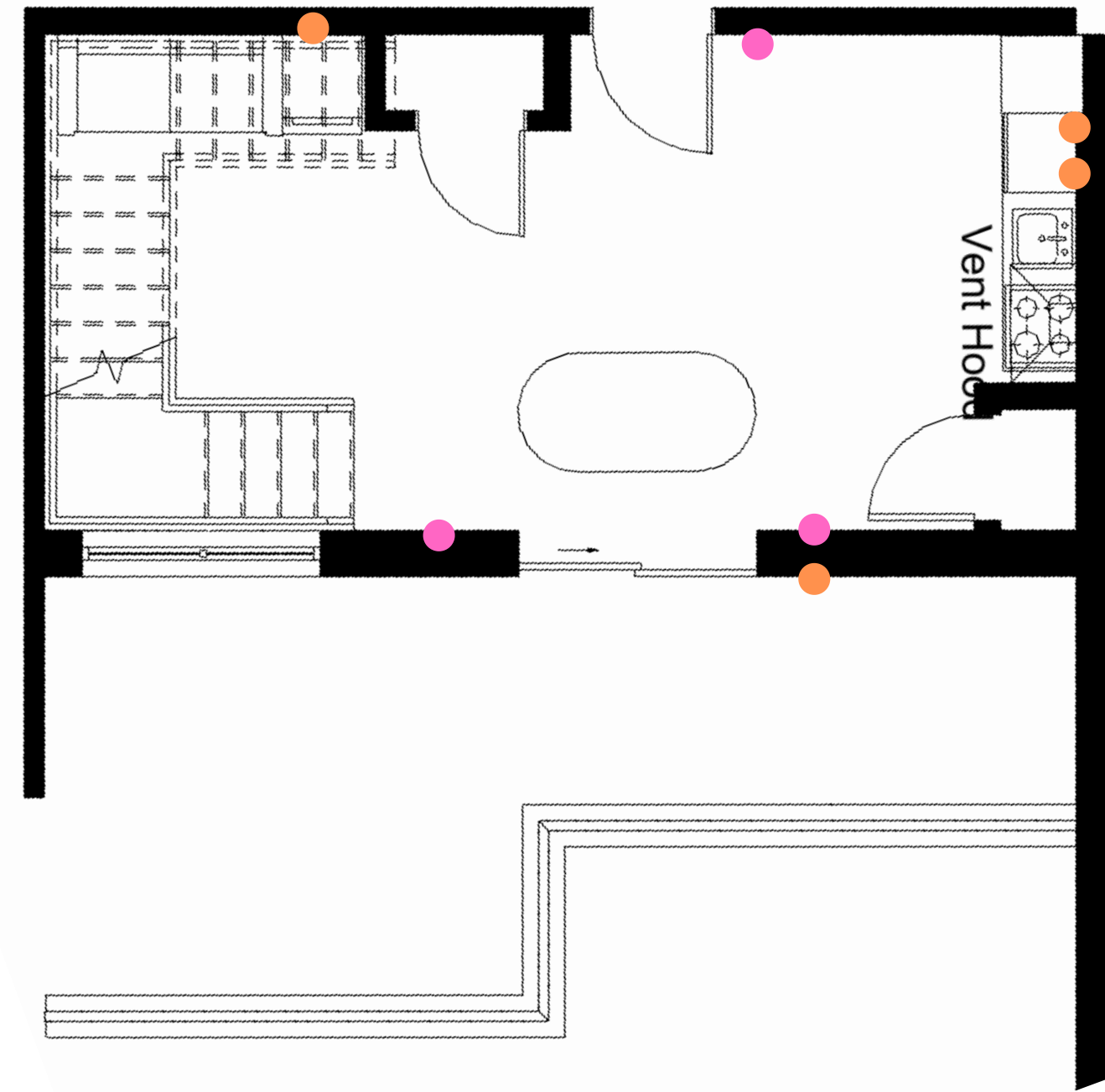


# LEVEL 1 FLOOR PLAN

The units are all two level, with one level dedicated towards living, and one toward sleeping.  
Electrical mains are located in the hallways.



1 Bed (Upper)

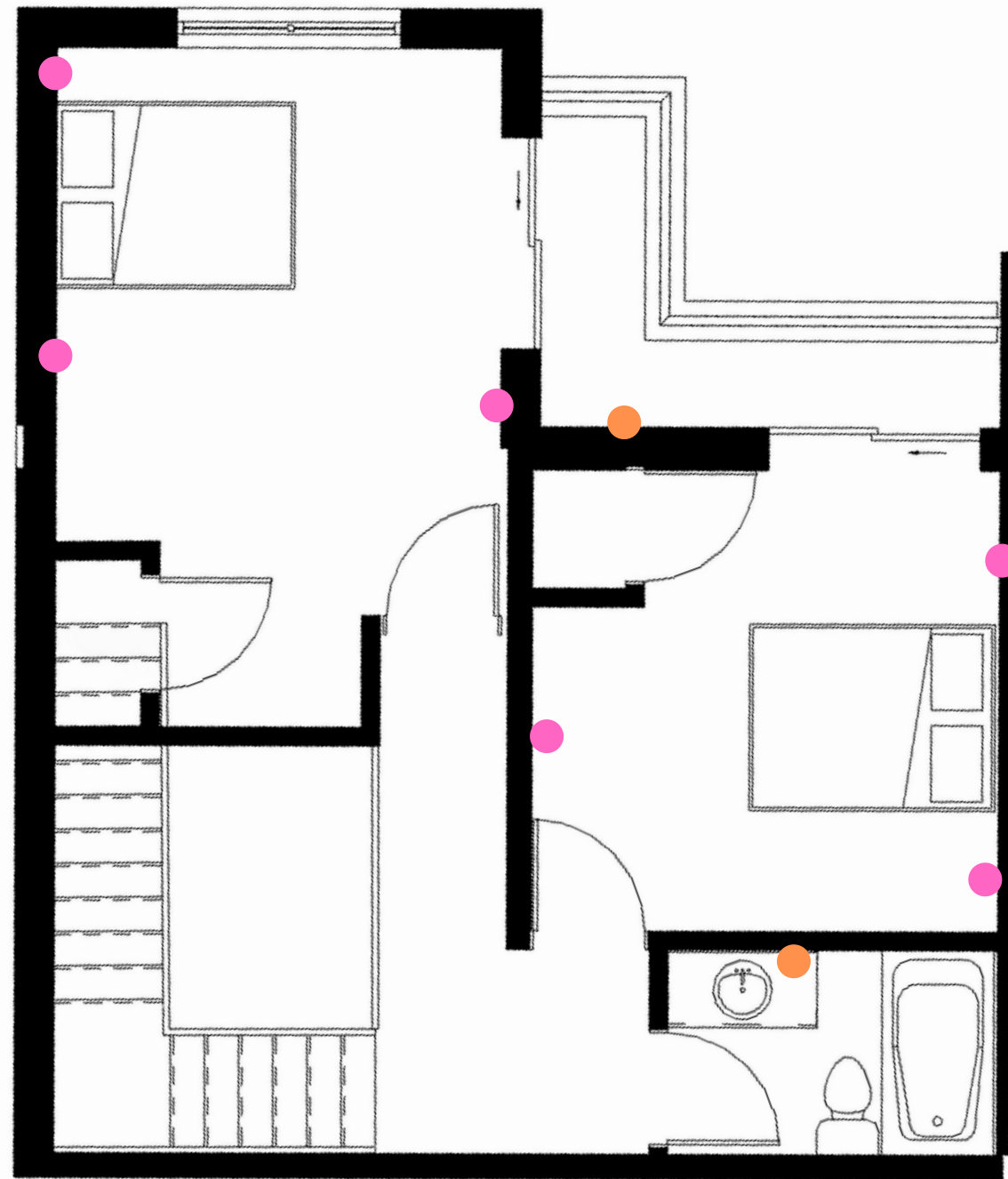


1 Bed Lower

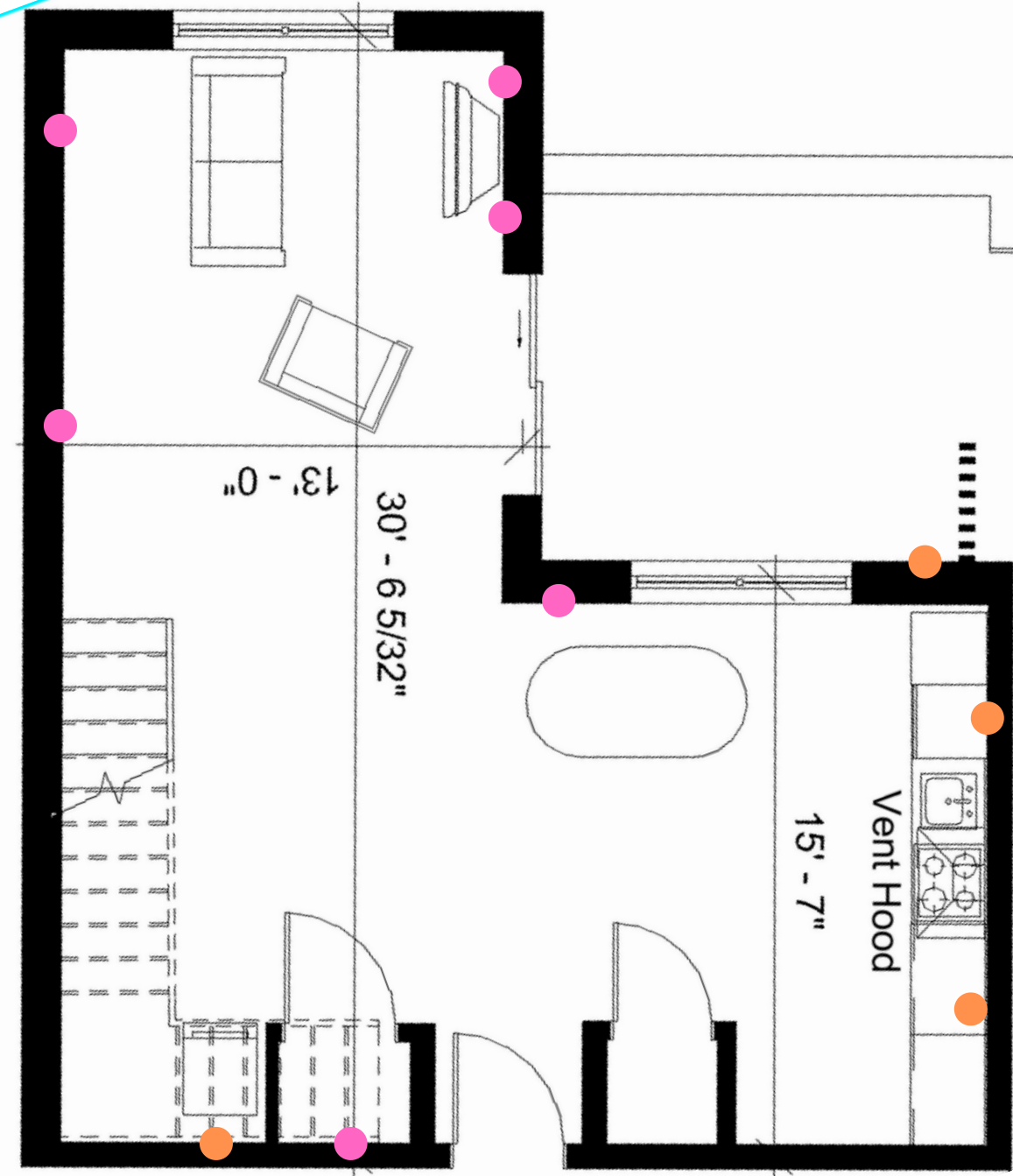
- GFI
- GFCI

# LEVEL 2 FLOOR PLAN

The units are all two level, with one level dedicated towards living, and one toward sleeping.  
Electrical mains are located in the hallways.



2 Bed (Upper)

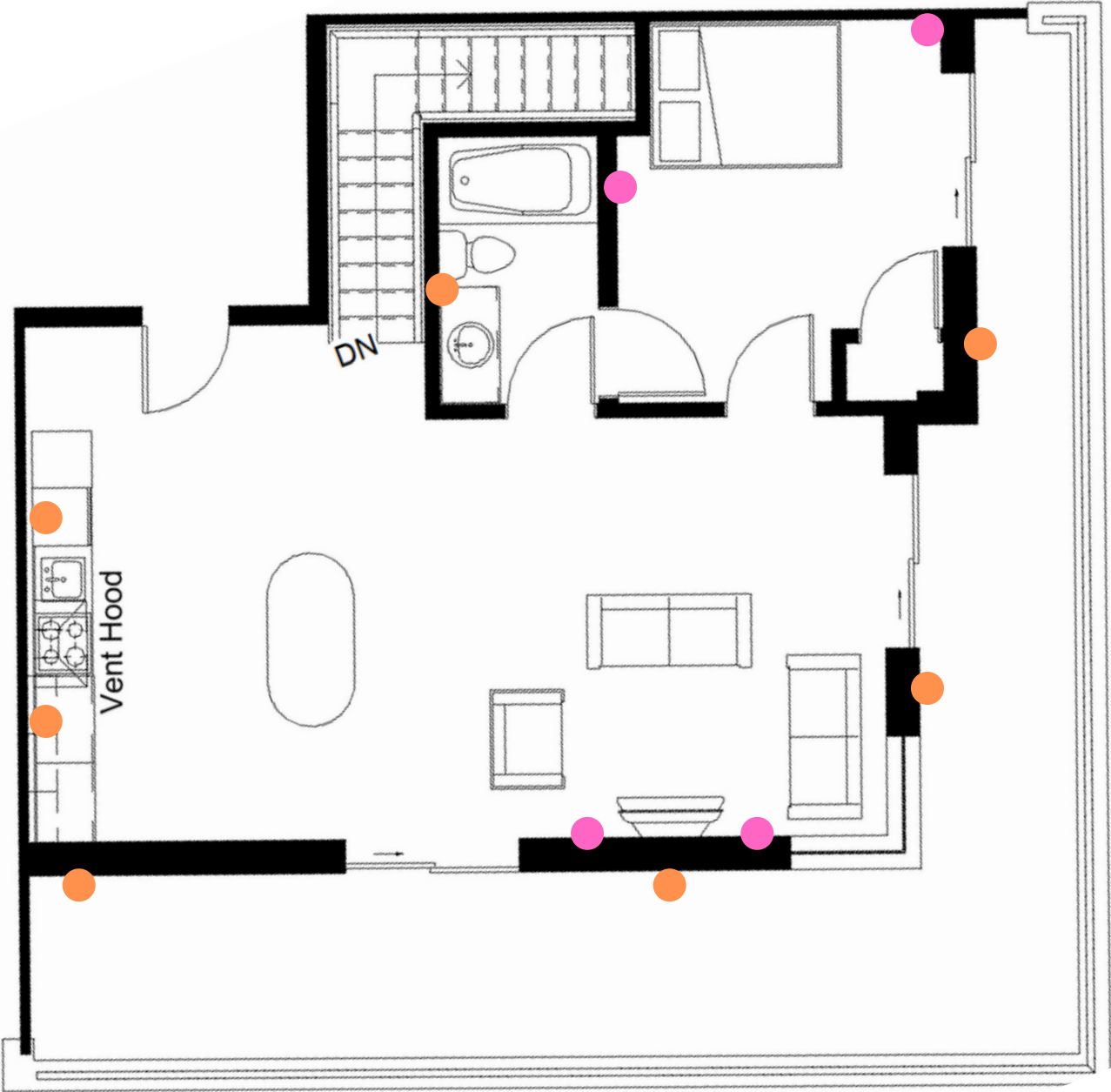


2 Bed Lower

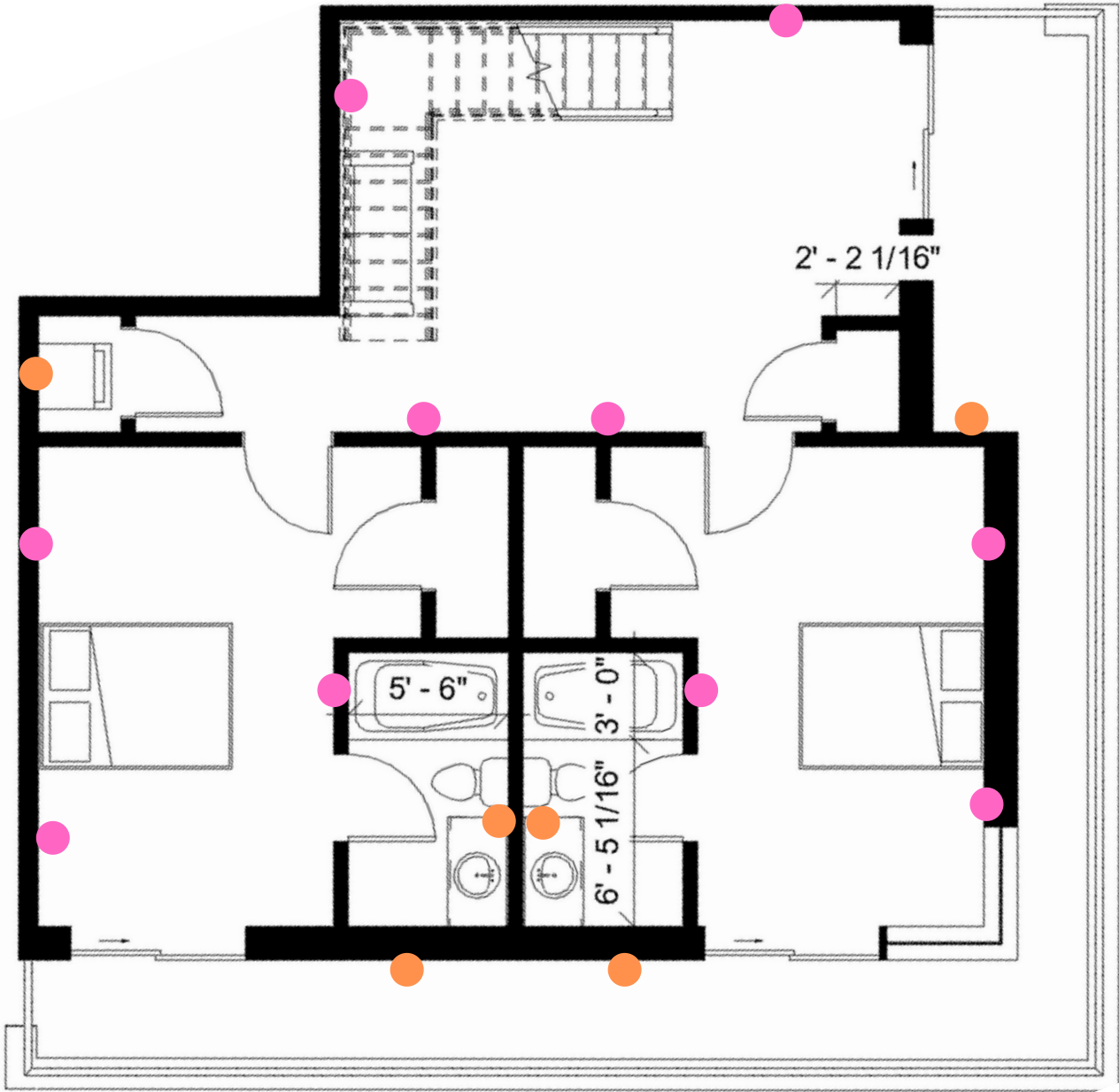
- GFI
- GFCI

# LEVEL 3 FLOOR PLAN

The units are all two level, with one level dedicated towards living, and one toward sleeping.  
Electrical mains are located in the hallways.



3 Bed Upper



3 Bed Lower

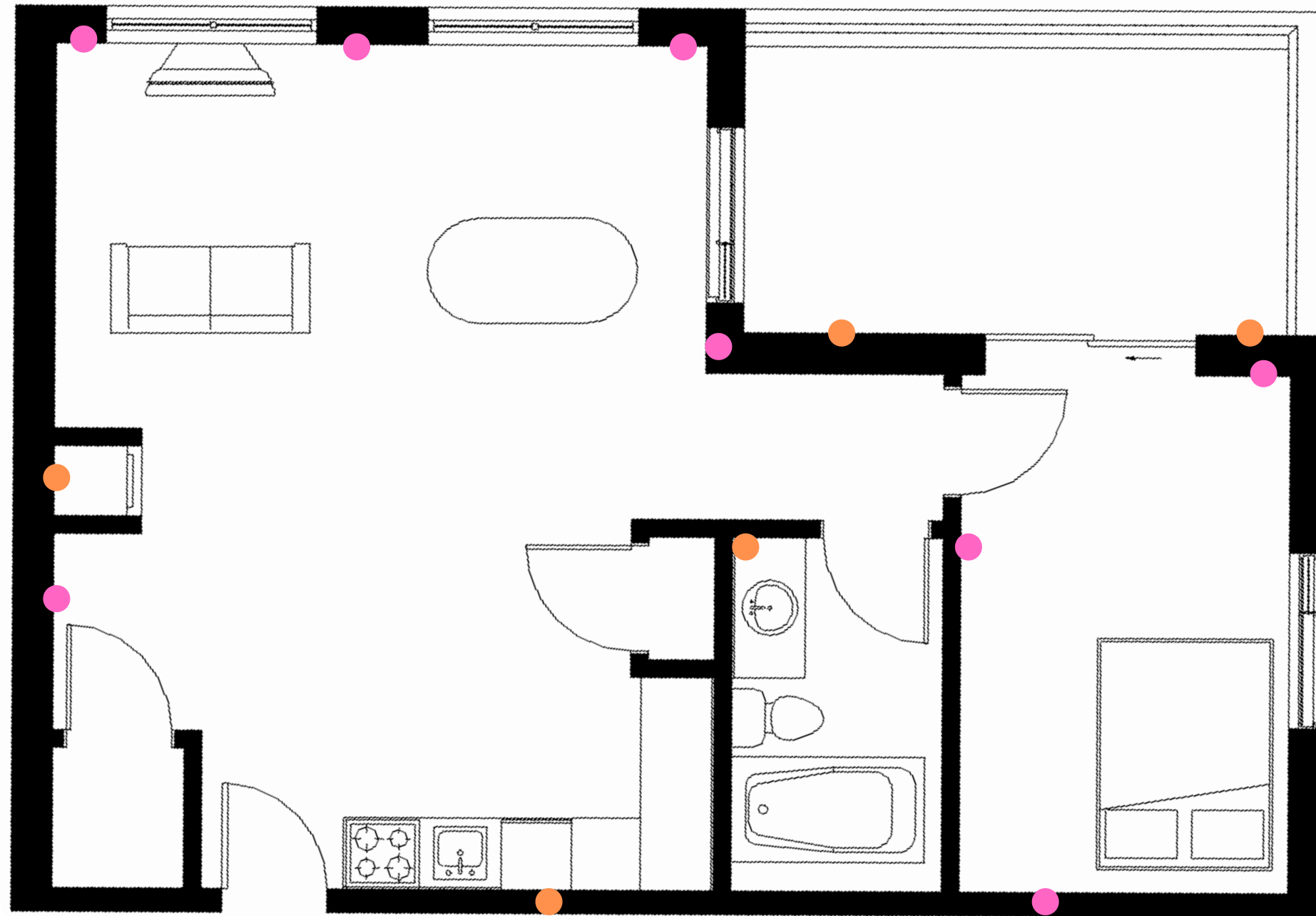


● GFI

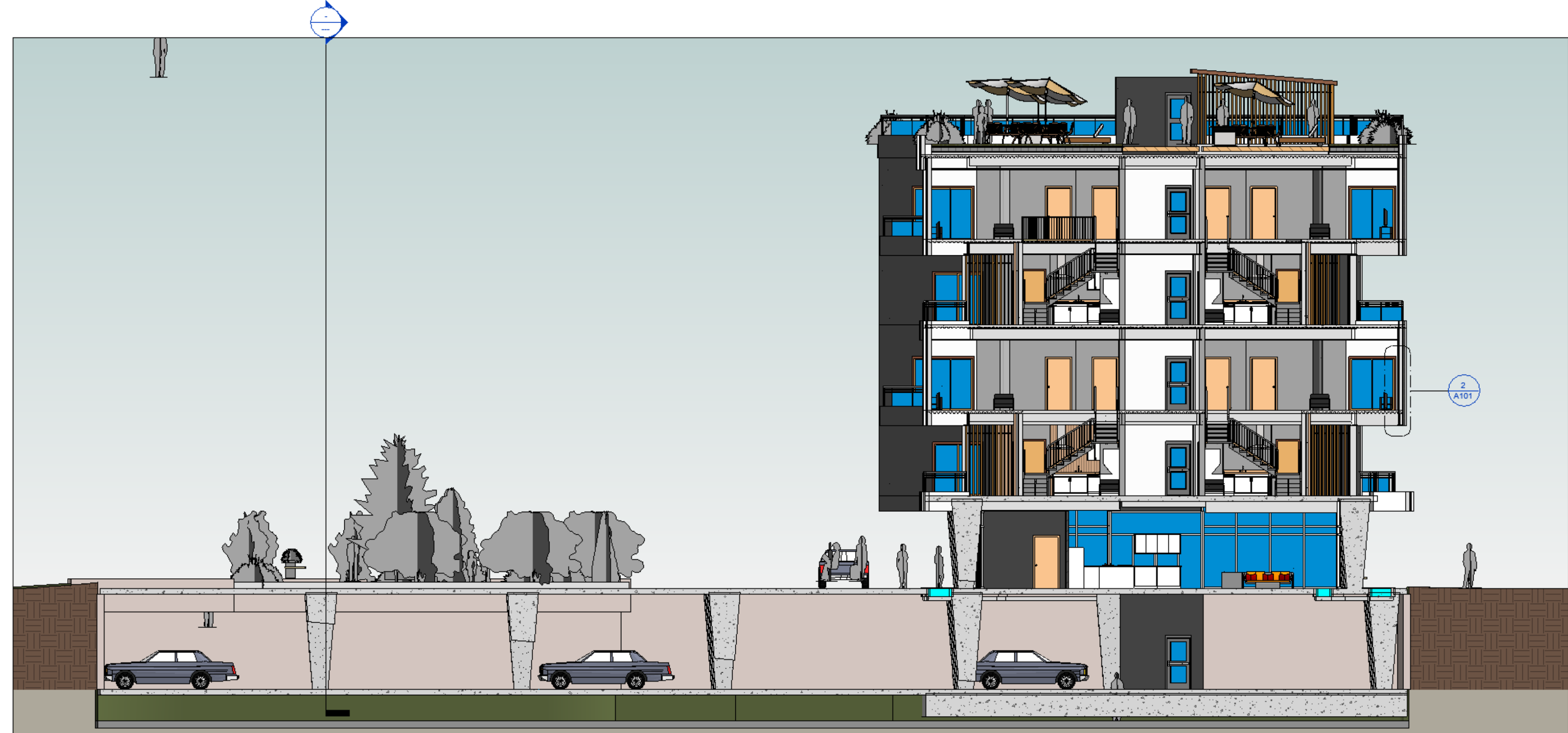
● GFCI

# HANDICAP UNIT PLAN

The units are all two level, with one level dedicated towards living, and one toward sleeping.  
Electrical mains are located in the hallways.



- GFI
- GFCI

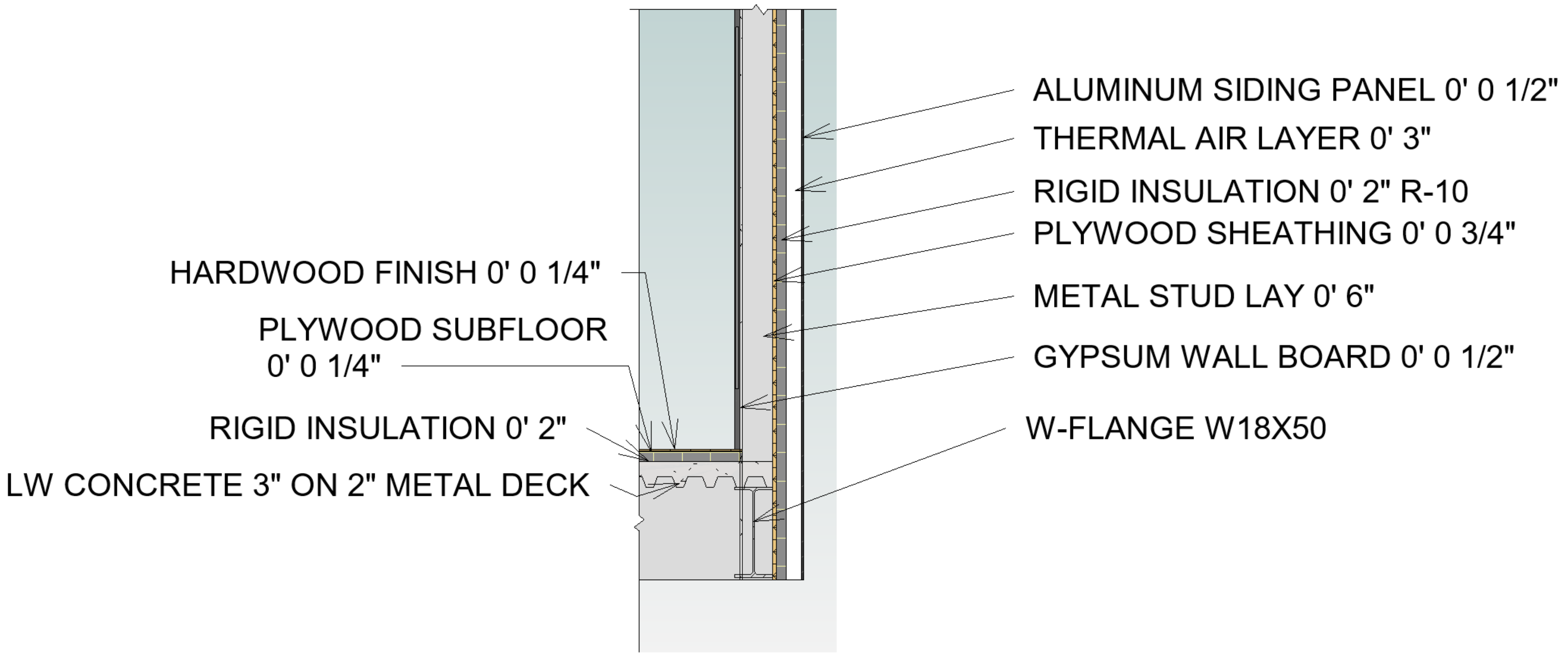


1 Section 2  
1/8" = 1'-0"

Shaded Building Section

NEXT →





2 Section 2 - Callout 1  
 1/4" = 1'-0"



North Elevation  
1'0"=1/8"

South Elevation  
1'0"=1/8"



East Elevation  
1'0"=1/8"



West Elevation  
1'0"=1/8"

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# THANK YOU

