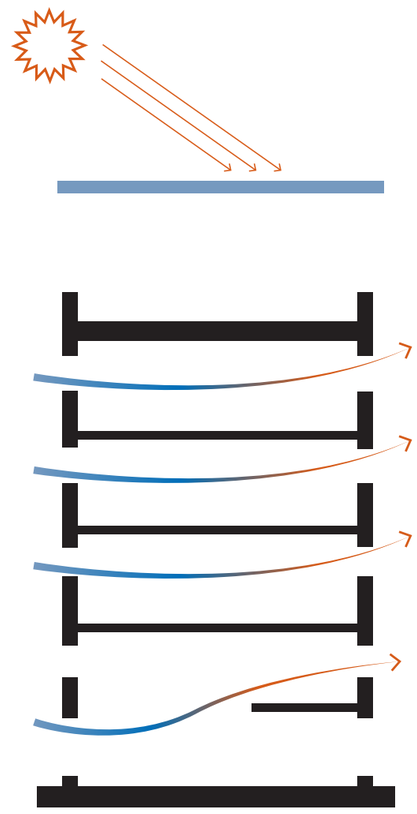


Cascade Built Hudson

Early Design Guidance

3700 South Hudson Street | DPD #3020443

NICHOLSON KOVALCHICK ARCHITECTS

310 First Avenue S, Suite 4S Seattle, WA 98104 | 206.933.1150 | www.nkarch.com

December 4, 2015

Project Information

Project Address:
3700 S Hudson St
Seattle, WA 98118

DPD Project #:
3020443

Owner:
Cascade Built
Sloan Ritchie
4111 E. Madison St. #104
Seattle, WA 98112
206.354.3455

Architect:
NK Architects
Rosa Folla
310 1st Ave S, Suite 4S
Seattle, WA 98104

Project Description

The proposed building is a 4-story apartment building with Live/Work and residential units at the ground level and a retail space on the most prominent corner of the site, South Hudson Street and 37th Avenue South. A courtyard on the east side of the building will provide a common shared open space for residents.

Project Specs

Zoning: NC2-40

Neighborhood: Columbia City Residential Urban Village

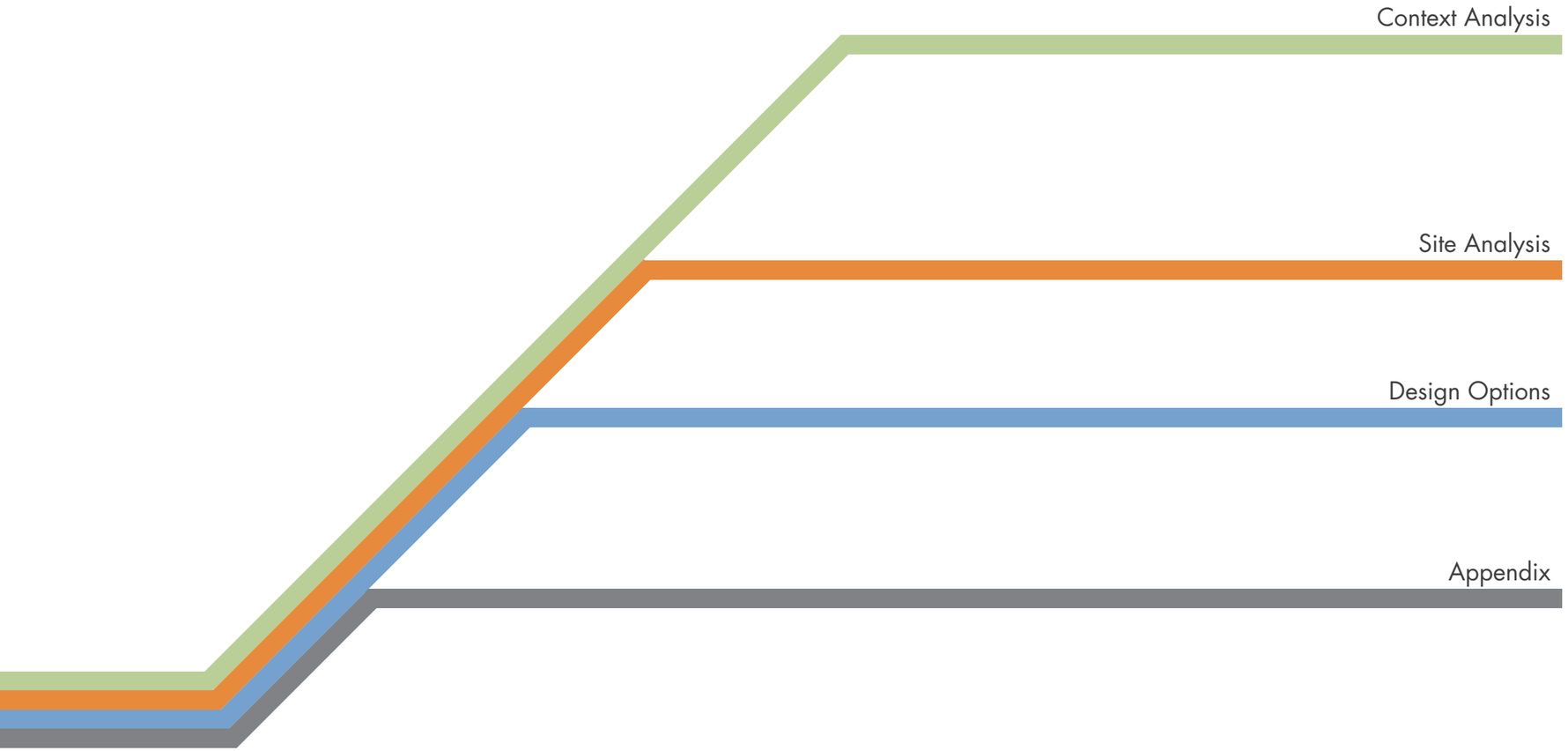
Lot Size: 4,950 SF

GSF: 17,958 SF

Proposed Units: 35

Parking Stalls provided: None

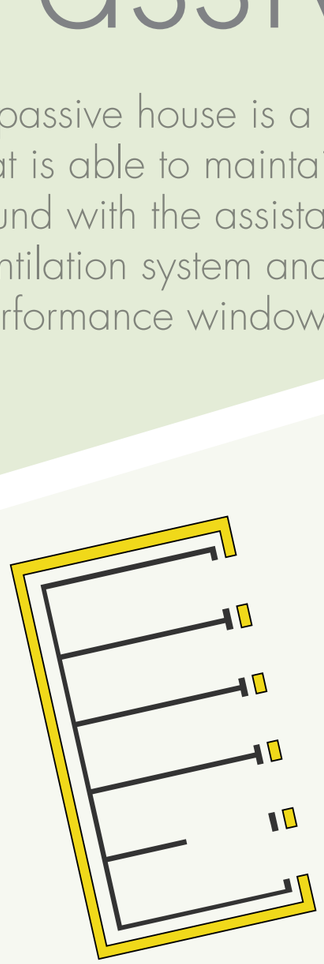
Table of Contents



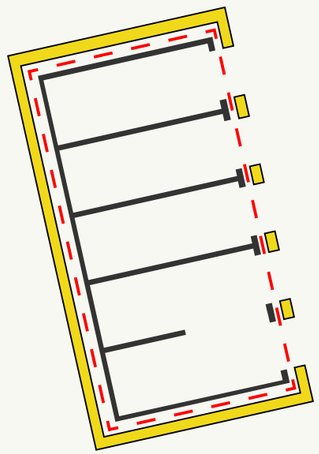
the concept of

Passive House

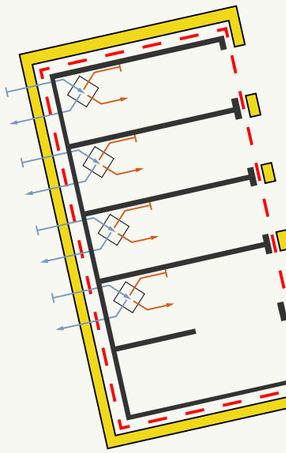
A passive house is a highly insulated, air tight building that is able to maintain consistent thermal comfort year-round with the assistance of a heat exchange ventilation system and high performance windows.



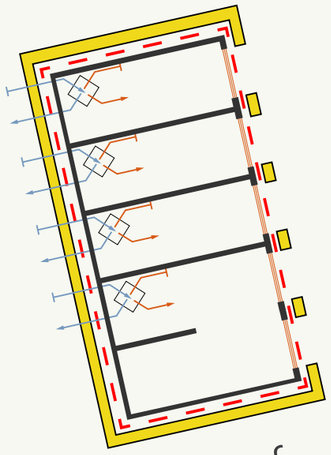
Insulation



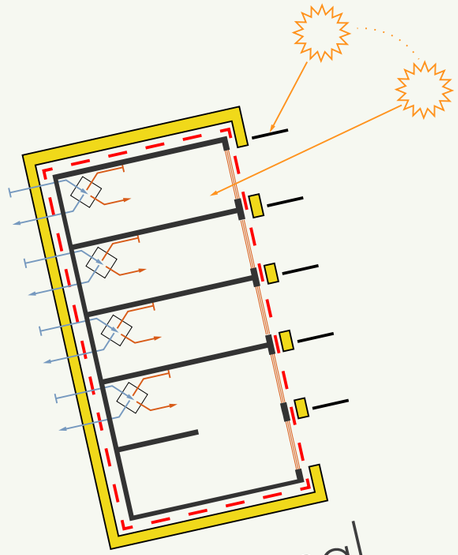
Air Tightness



Heat Recovery Ventilator (HRV)



High Performance Windows



Seasonal Shading

BENEFITS

Durability / enhanced wall assembly protects building structure

High performance / reduces energy demand

Thermal comfort / consistent temperature year round

getting to

Net-Zero Energy

Net-zero energy consumption is nearly impossible to achieve without first drastically reducing your energy demand. Passive House building strategies allow the building users the chance to reach for net-zero energy. The addition of photovoltaic solar panel systems produce energy on site and offset any energy that Passive House could not. This is the happy marriage between reduction and production.

reduce + produce

energy demand

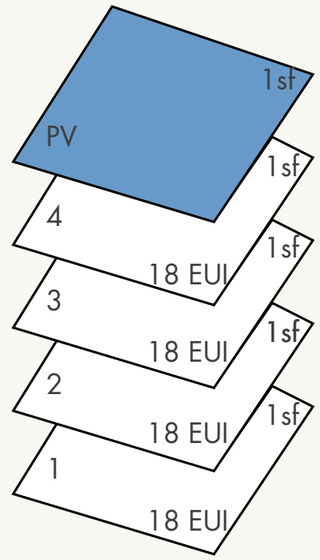
energy on-site

Photovoltaic Solar Production

Solar PV Panel Arrays today can offset the energy demand needed in a 4-story residential building

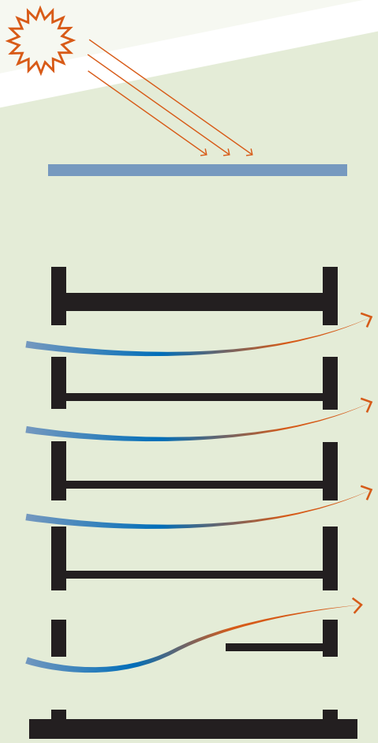
1 Square Foot Production Area = 4 Square Foot Energy Consumption

18 EUI (kBtu/sf/yr) is the estimated energy budget for a net zero ready residential building.



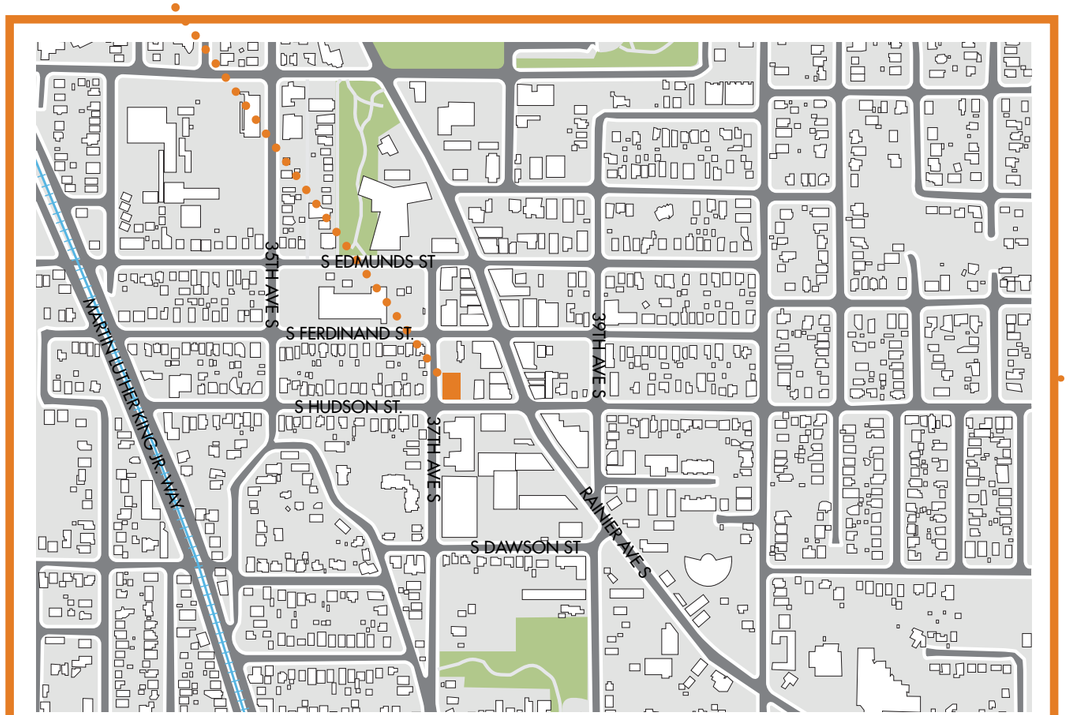
Passive Ventilation

During the warmer months, natural ventilation, in addition to providing the fresh air needed, can help lower the air temperature and eliminate the need for air conditioning.



Project Location

Site



Neighborhood Context

① Apartments 2 blocks East of Site

② Columbia City Theater East of Site

③ Greenhouse Apartment Complex South of Site

④ Orca Alternative School Northwest of Site

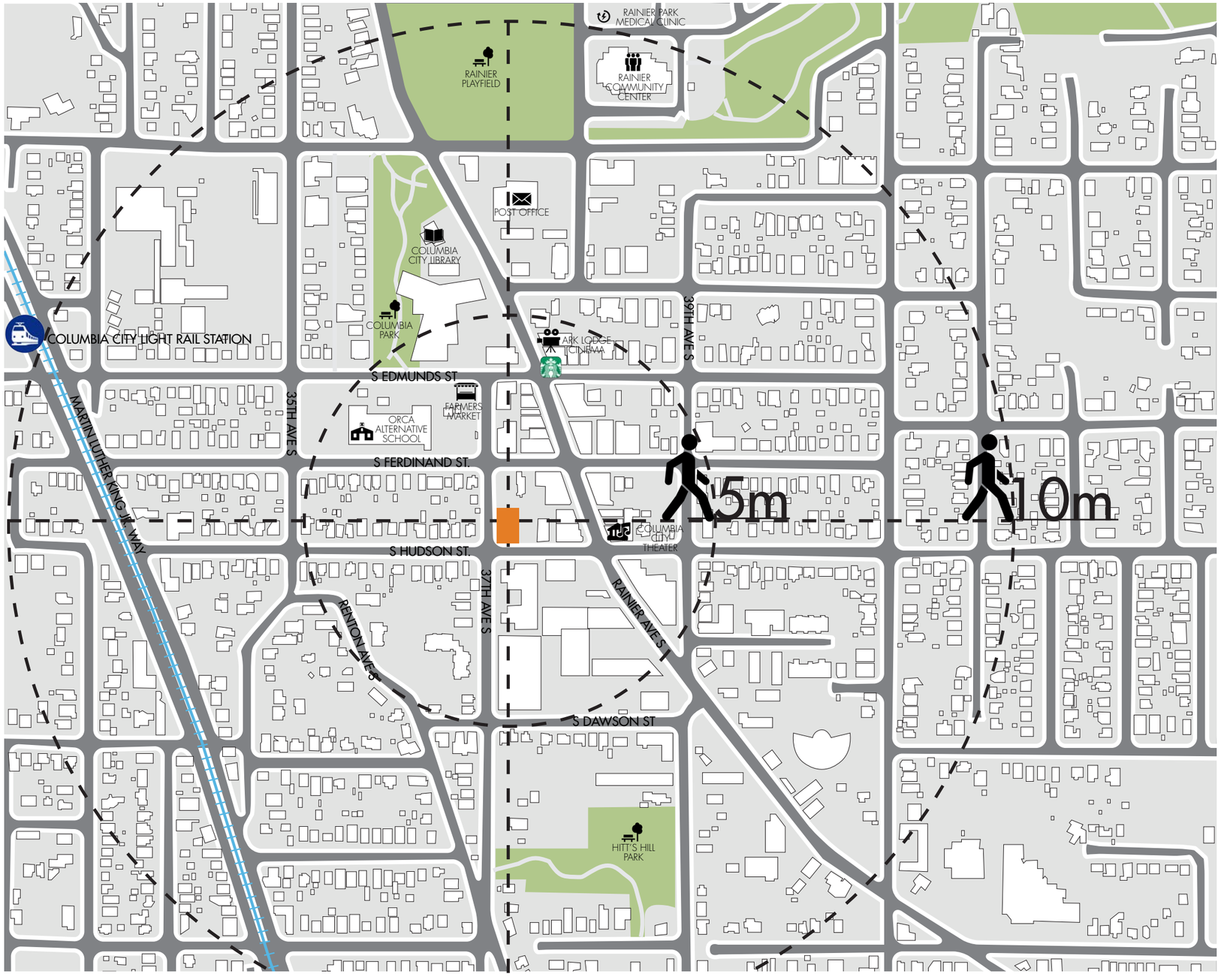
⑤ Community Area North of Site

⑥ Seattle Gymnastics Academy

⑦ PCC Grocery Store to Northwest of Site

⑧ Angeline Apartments Northwest of Site

Walkability



Columbia City Neighborhood

3700 South Hudson Street has a Walk Score of 93 out of 100. This location is a Walker's Paradise so daily errands do not require a car.

3700 South Hudson Street is a seven minute walk from the LINK at the ST LIGHT RAIL & S EDMUNDS ST stop. And an eight minute walk from the Columbia City Light Rail Station on MLK Jr. Way.

This location is in the Columbia City neighborhood in Seattle. Nearby parks include Columbia Park, Hitt's Hill Park and Rainier Playfield.

10 minutes

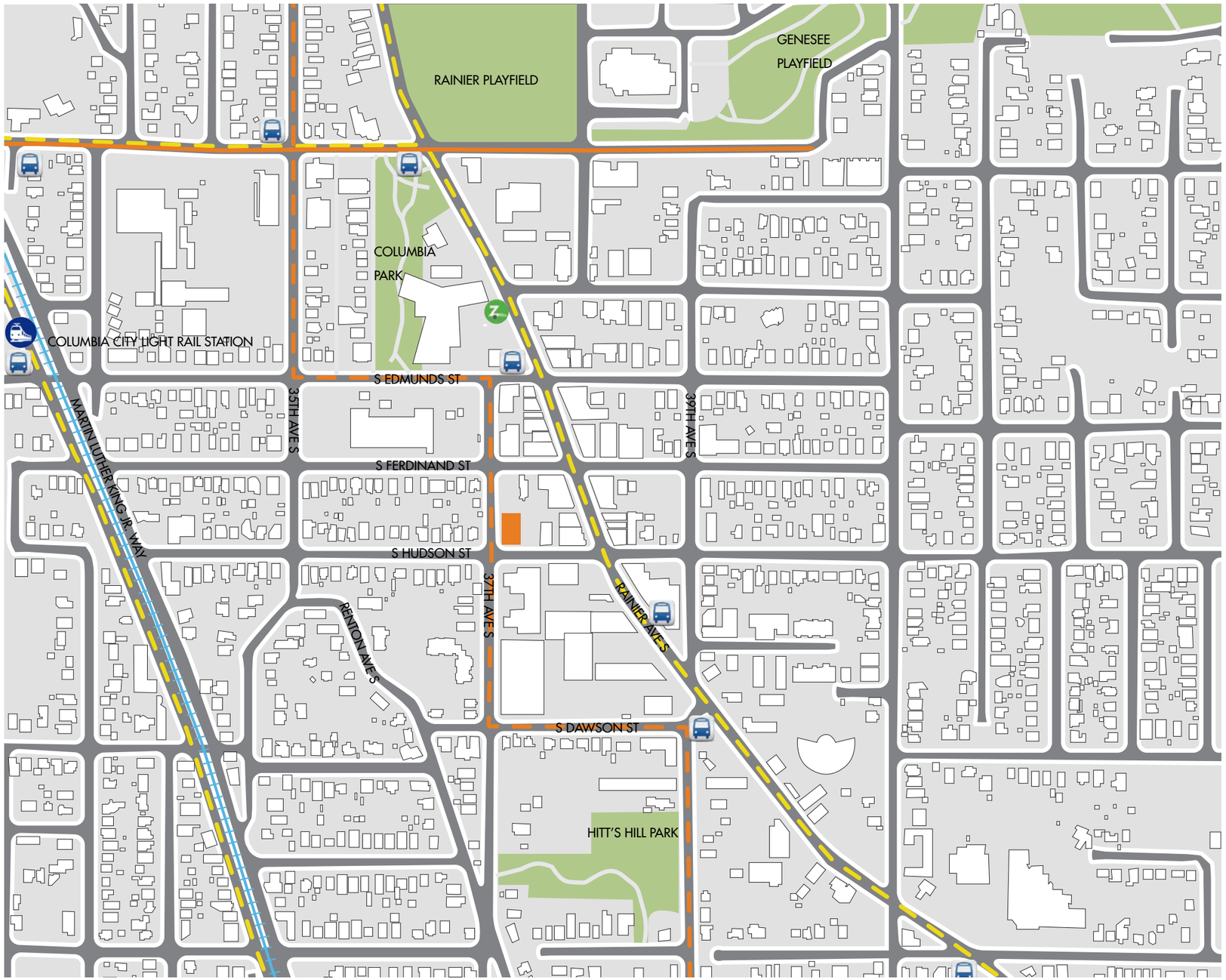
- Post Office
- Columbia Branch Library
- Columbia City Light Rail Station
- Rainier Community Center
- Rainier Playfield
- Rainier Park Medical Clinic
- Dearborn Park Elementary
- 20+ Breweries
- 60+ Restaurants

5 minutes

- Columbia City Farmers Market
- Columbia Park
- Hitts Hill Park
- Columbia City Theater
- Orca Alternative School
- Ark Lodge Cinema
- Starbucks
- 10+ Breweries
- 30+ Restaurants

Walk Score 93

Transit Network



Area Information

3700 South Hudson Street has good transit which means many nearby public transportation options. Car sharing is available from Zipcar and RelayRides.

In less than a half mile radius 5 different bus lines are accessible. The 7 goes to First Hill and Capitol Hill. The 8 up through Central District then west all the way to Downtown and Lower Queen Anne. The 9 goes south to Rainier Beach and then North to Downtown and Capitol Hill. The 50 goes west to West Seattle and Alki.

Key

- Light Rail Route
- Bike Lane
- Signed Bike Routes
- Bus Route
- Bus Stop
- Zipcar Location
- Light Rail Station
- Project Site

Transit Score 59

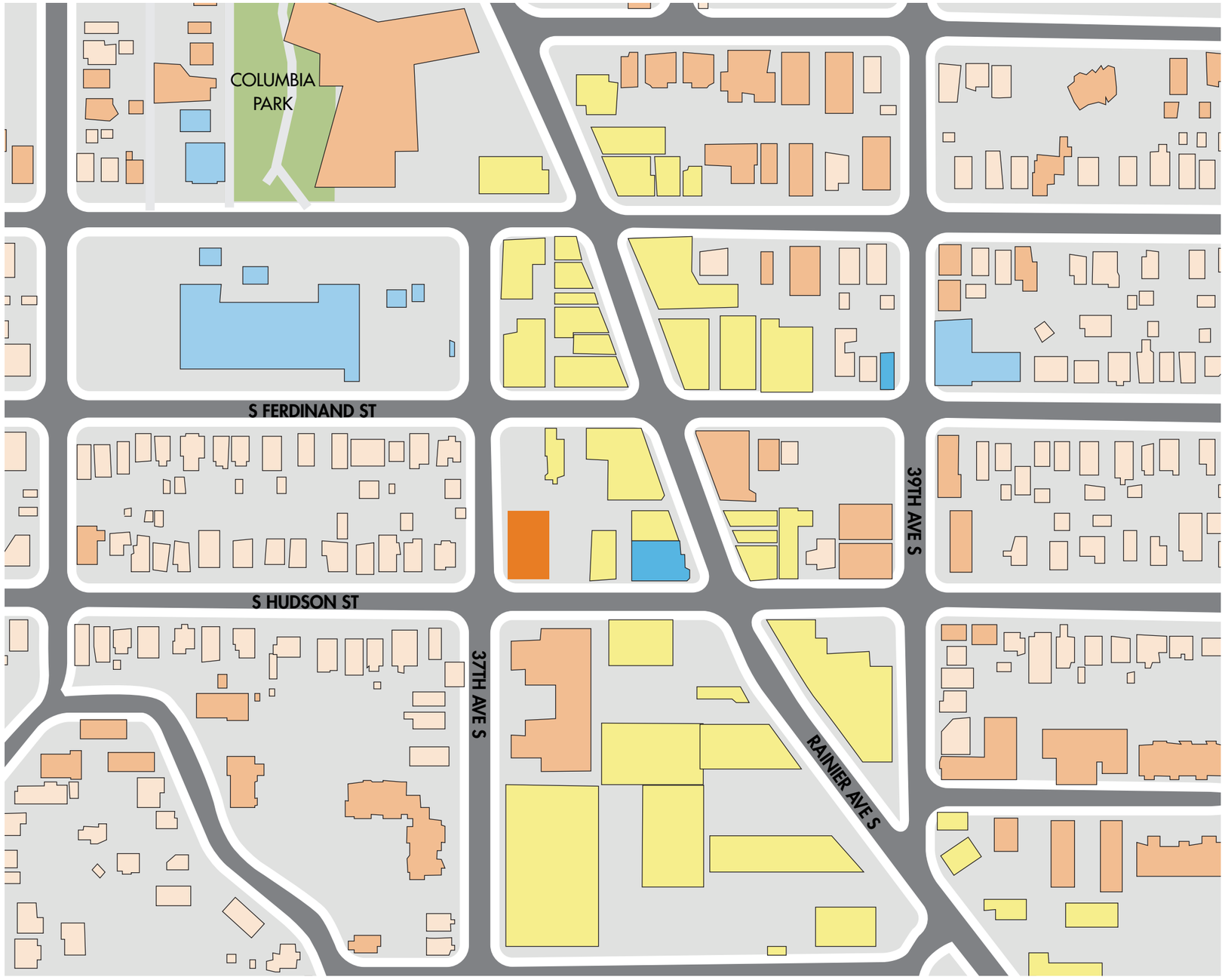
Bike Score 57

Adjacent Building Uses

The site is located in the Columbia City residential neighborhood, which is an urban village with many amenities located at walking distance. Many small businesses are located along Rainier Avenue South, just one block from the site. The height, bulk and scale of existing neighboring building does not reflect the density allowed by current zoning. The anticipated zoning height for the properties surrounding the site to the north and east is 65 ft. On the south, there is a more recent 65' apartment building. The proposed building with his 40 ft height will provide an appropriate transition to the surrounding NC2-65 zoning and the single family zoning to the east.

Key

- Medical
- Institutional
- Commercial
- Single Family
- Multifamily
- Project Site

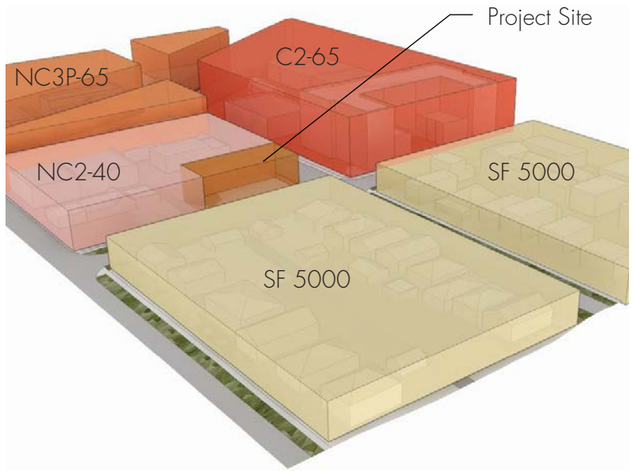


Zoning

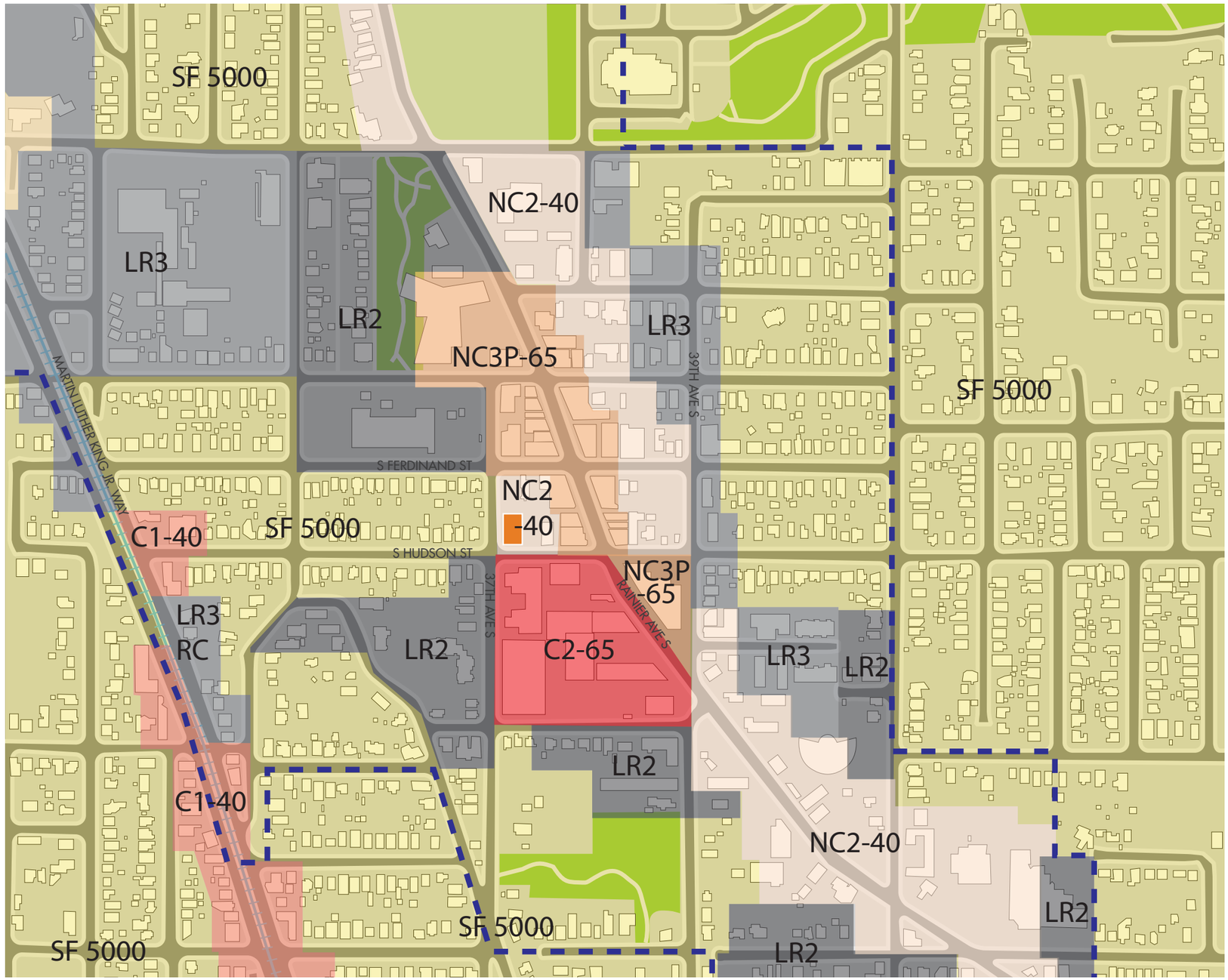
NC2-40: Mid-size shopping areas that serve the surrounding residential neighborhood with a full range of retail services, such as medium grocery stores, drug stores, coffee shops, and medical/dental facilities. Building types are single-purpose commercial structures, multi-story mixed use, and residential structures. Non-residential uses typically occupy the street front. Height is limited to 40 feet. Maximum size is 25,000 square feet for most commercial uses; multi-purpose retail sales buildings are limited to 50,0000 square feet.

Key

- SF 5000
- LR3
- LR2
- NC2-40
- NC3P-65
- C2-65
- C1-40
- Project Site
- Columbia City Residential Urban Area Outline



Columbia City Residential Urban Area Outline



Site Survey

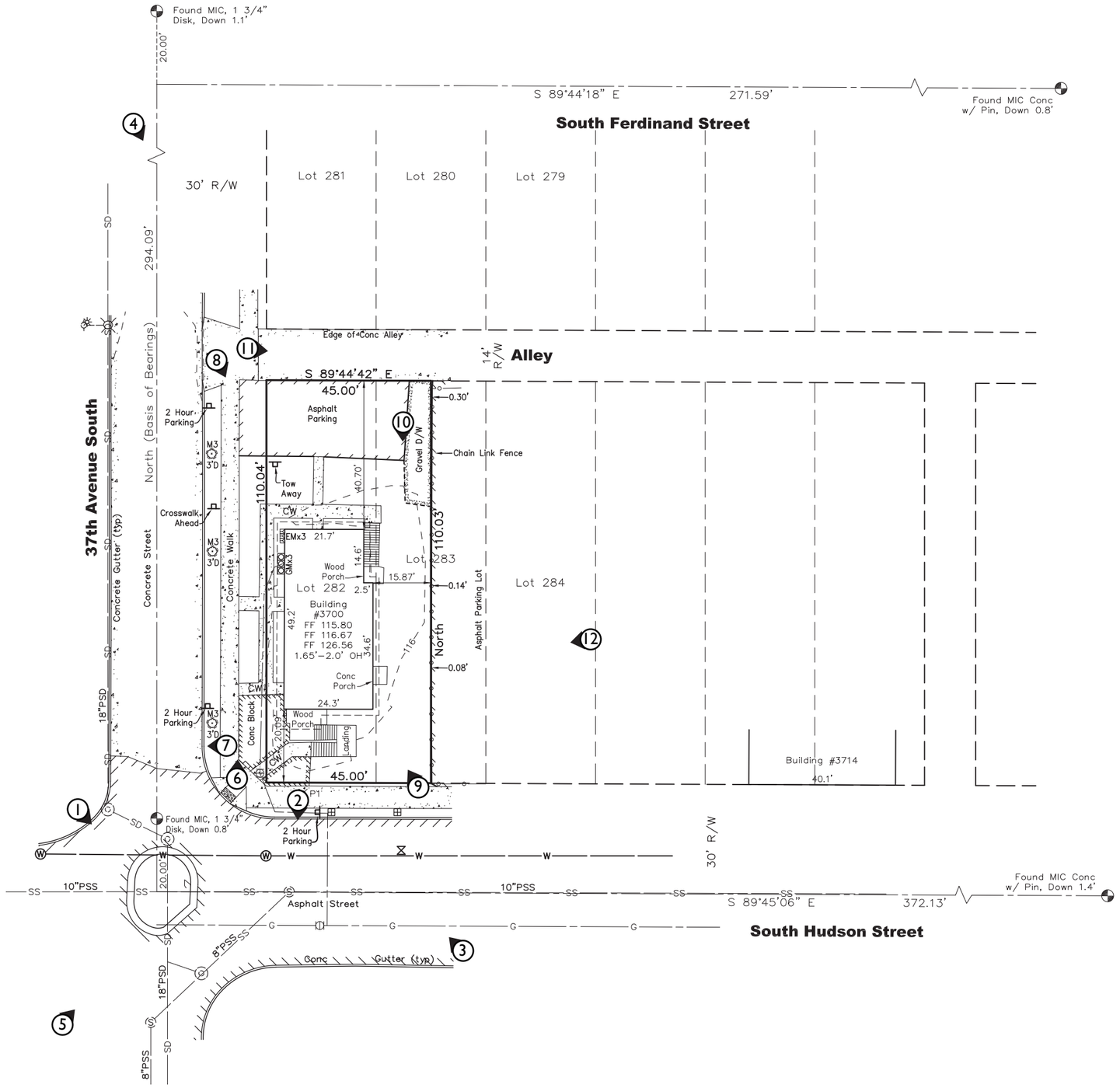
Legal Description
COLUMBIA 282 & W 1/2 OF 283
Plat Block: 16
Plat Lot: 282-283

Uses
There is 1 existing structure on the site. 3700 South Hudson Street is a 3 story multifamily duplex with an asphalt parking lot in the rear.

Topography
The site has very little topographic distinction.

Access
There is pedestrian access via concrete sidewalks along South Hudson Street and 37th Avenue South. Vehicular access is currently via the alley at the north property line.

View and Solar Access
Views are of the adjacent single family neighborhood and over the nearby 1 or 2 story commercial buildings to Rainier Avenue.



Site Features

① Greenhouse Apartments Looking Southeast

② Greenhouse Apartments Looking South From Site

③ Looking Northwest Across Hudson at Site

④ Looking Southwest Down 37th toward Site

⑤ Looking Northeast Across Intersection at Site

⑥ Looking North on Southwest corner of Site

⑦ Looking West Across 37th from Site

⑧ Looking Southeast on Northwest corner of Site

⑨ Looking Northwest on Southeast corner of site

⑩ Looking South on Northeast corner of Site

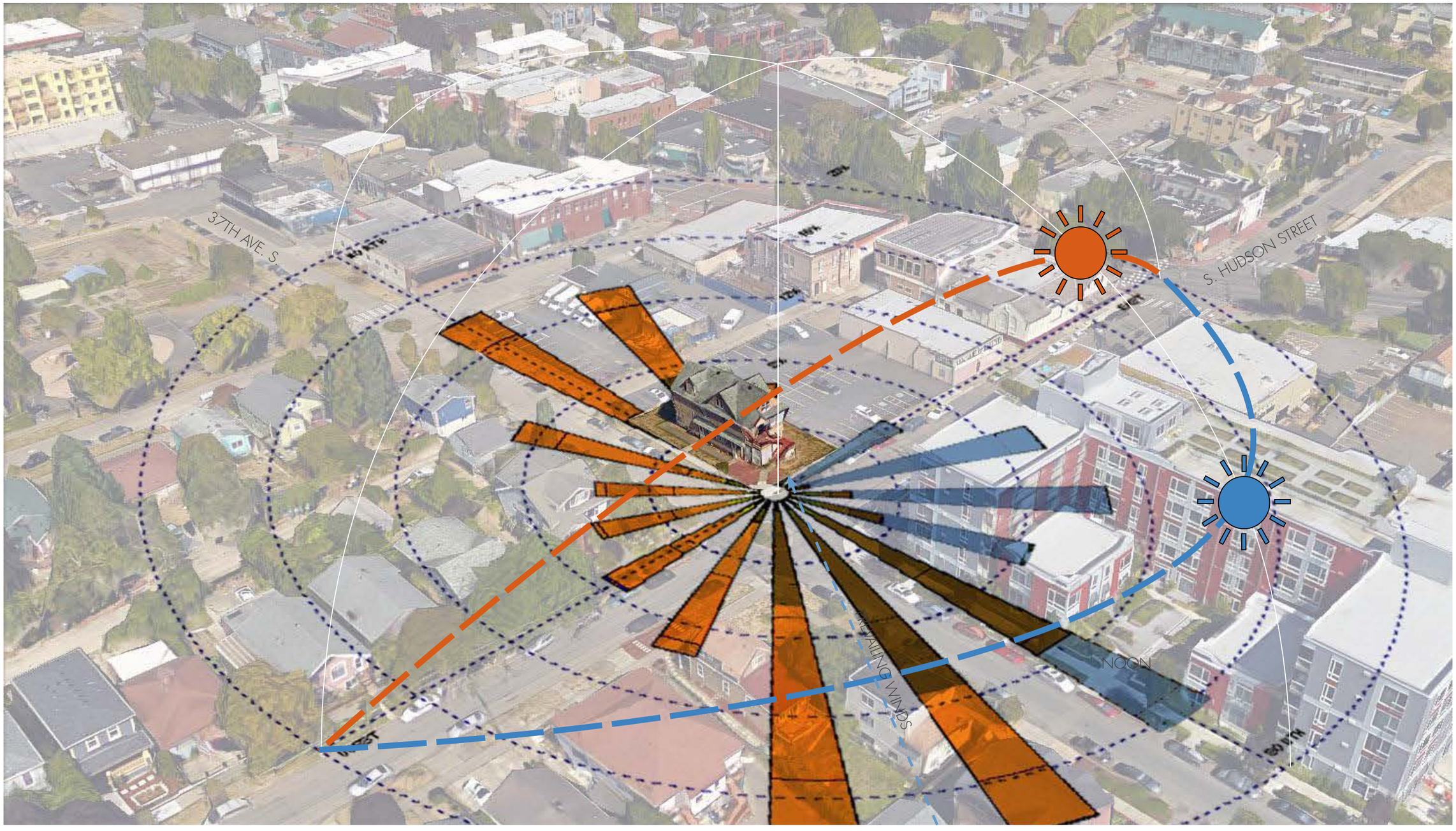
⑪ Looking East at Alley North of Site

⑫ Looking West at East side of Site

Environment

Summer Sun/Wind Path

Winter Sun/Wind Path



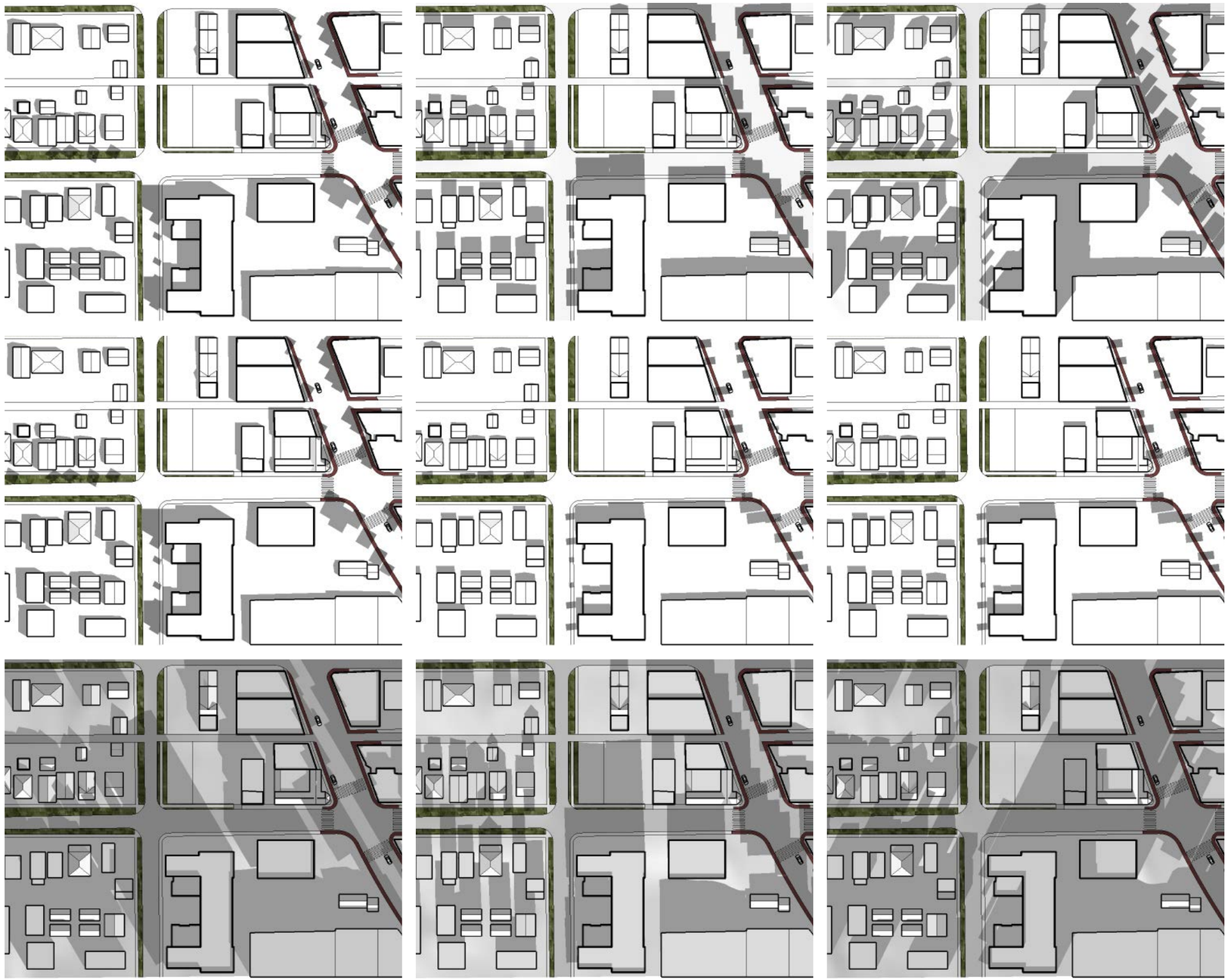
Existing Shadows

10am

12pm

2pm

June 21

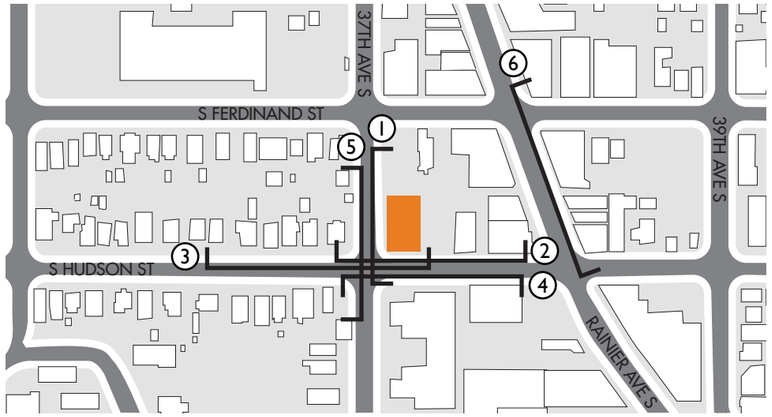


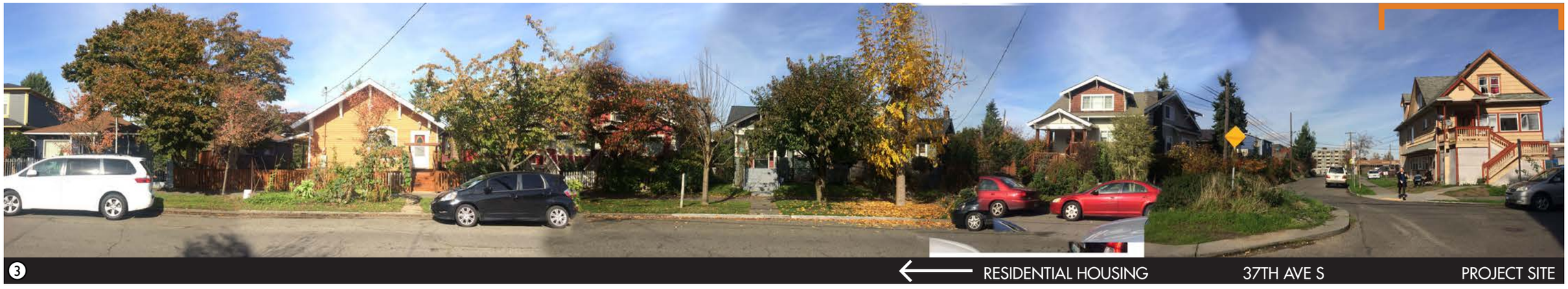
March/September 21

December 21

Site Analysis

Streetscape Montage





Streetscape Montage

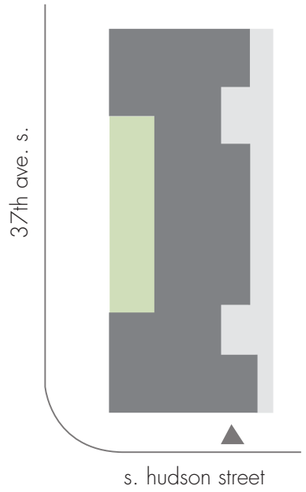
4 HUDSON BUILDING GREENHOUSE APARTMENTS 37TH AVE S

5 S HUDSON ST RESIDENTIAL HOUSING →

6 S FERDINAND ST LOTTIE'S LOUNGE JUS BAR COMMERCIAL SHOPS BREWERY COLUMBIA CITY THEATER TUTTA BELLA PIZZARIA

Options Compared

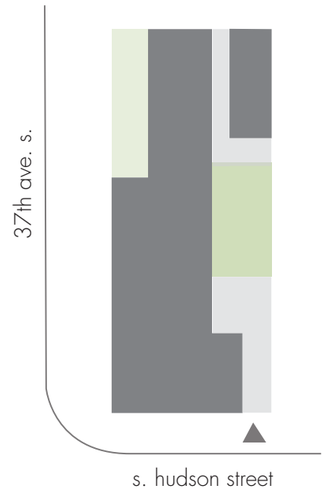
Building area
Outdoor shared amenity
Outdoor private amenity



OPT 1

Code Compliant
Street-Facing Courtyard

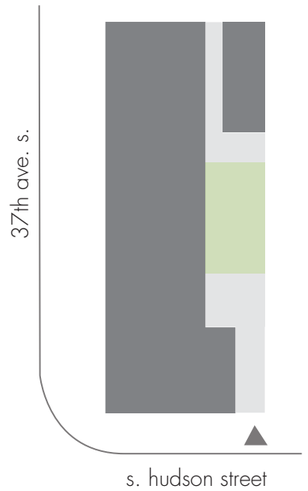
GSF:	17,319 SF
Residential Units:	32
Live/Work Units:	3
Total Units:	35



OPT 2

Code Compliant
Interior Courtyard, Residential Setback

GSF:	17,616 SF
Residential Units:	32
Live/Work Units:	3
Total Units:	35



OPT 3

Preferred Option with Departures
Interior Courtyard

GSF:	17,958 SF
Residential Units:	32
Live/Work Units:	3
Total Units:	35

Shadows Compared

All Design Options are compared at March/September 21

10am | 12pm | 2pm

Option 1

Option 2

Option 3 Preferred

Option 1 Massing Diagrams

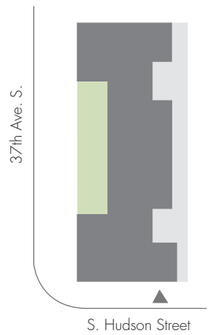
GSF:	17,319 SF
Residential Units:	32
Live/Work Units:	3
Total Units:	35
PV Array:	3040 sf

Pros:

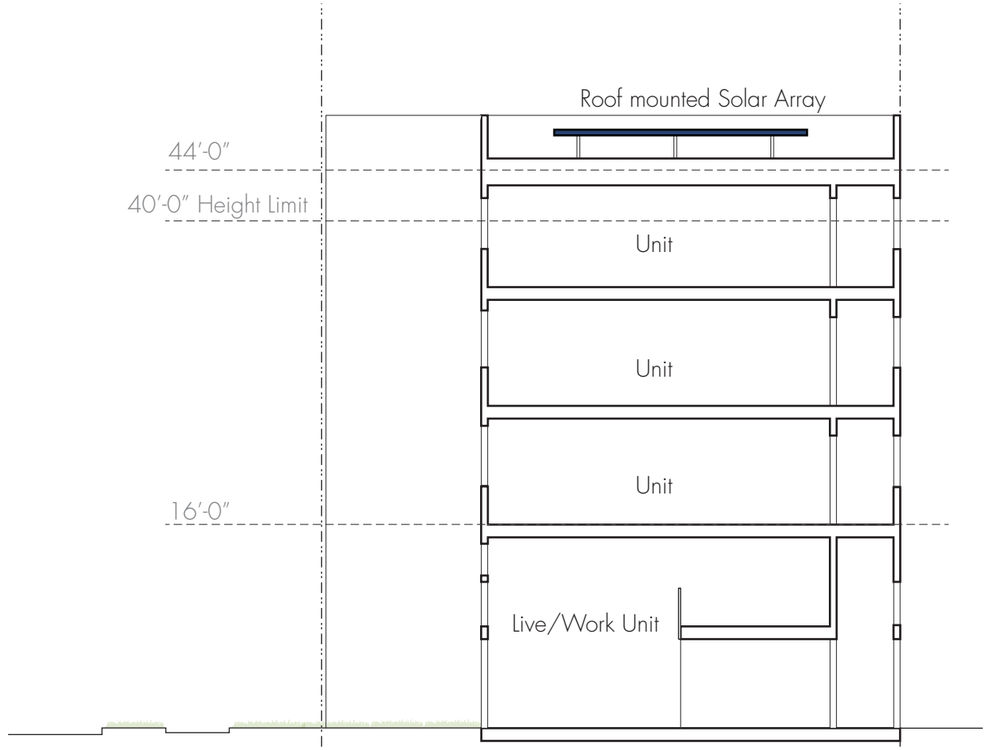
- Landscaped entry located on 37th Avenue South
- No departures

Cons:

- No shared courtyard/open space for residents
- No cross ventilation for the units.

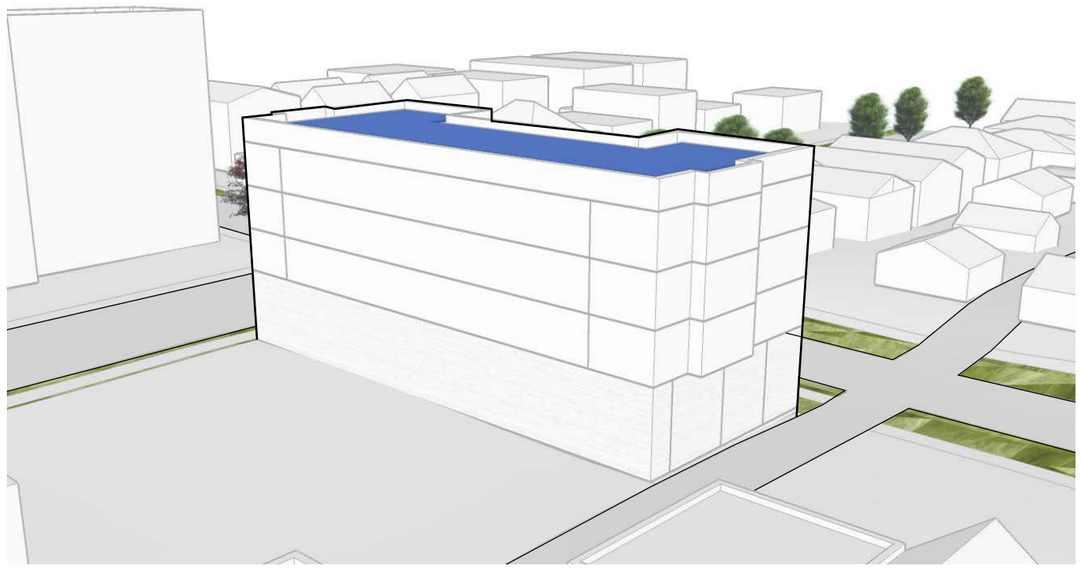


Option 1 arranges all the units around an entry courtyard on 37ft Ave South. Both the Live/Work Units and the residential units at first floor level will have an entry on 37th Ave South. The entry for the rest of the units is located on the south on South Hudson Street. The circulation space of the building is provided in an enclosed corridor on the east side of the building.



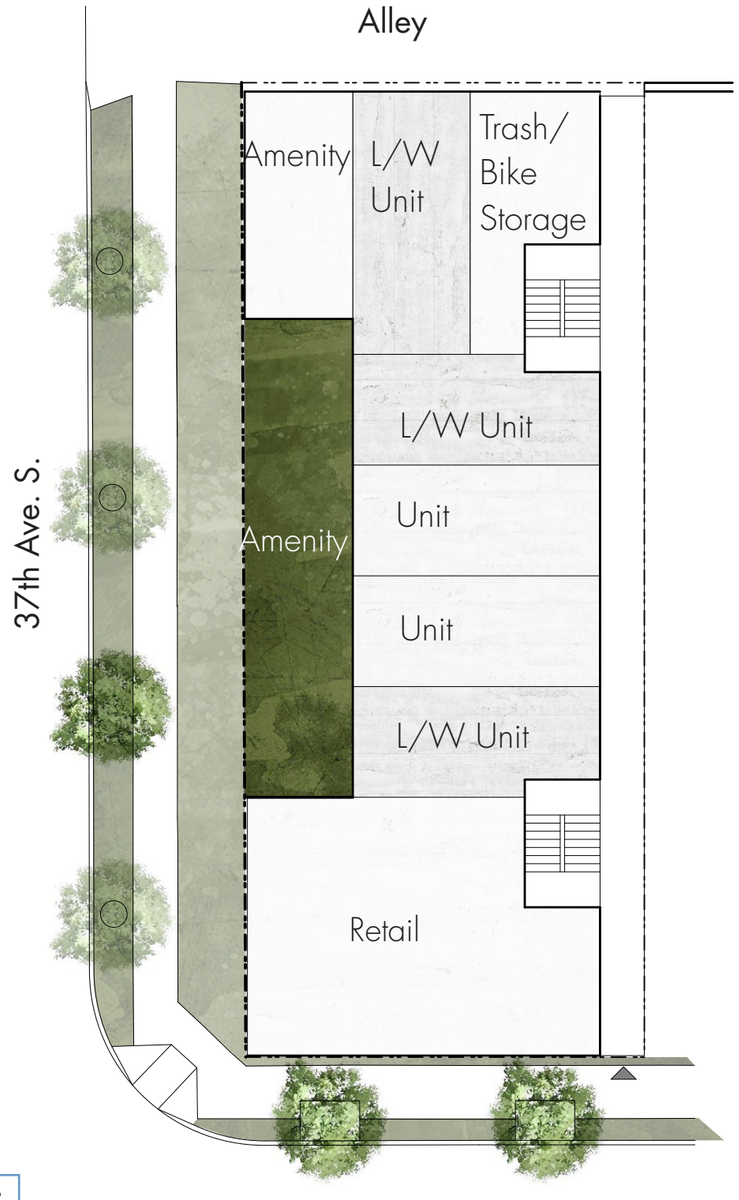
OPT 1

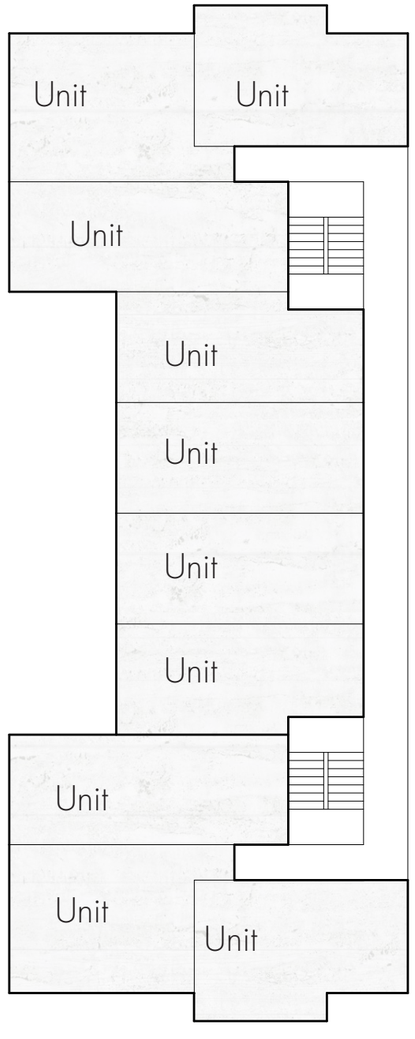
Southwest Corner

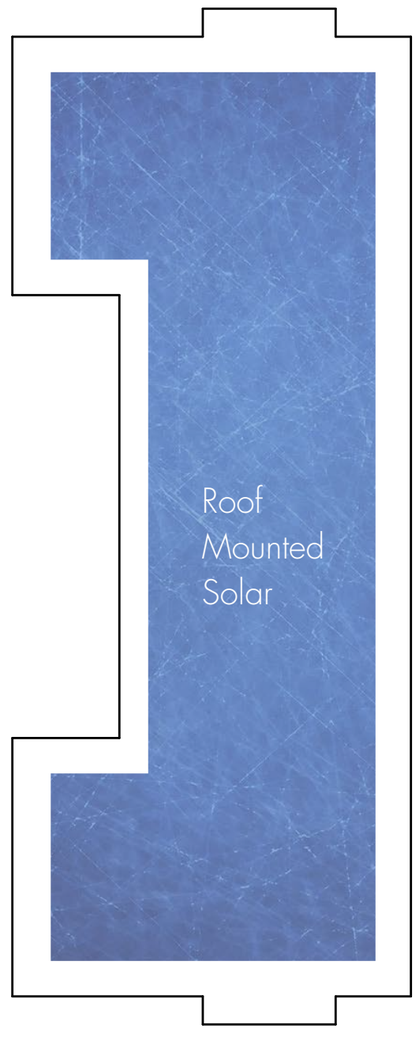


Northeast Corner

Option 1 Plans







OPT 1

Option 2

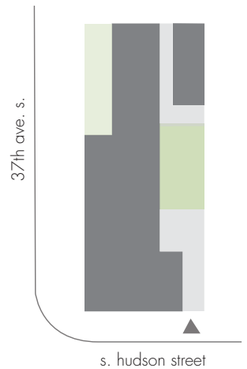
GSF:	17,616 SF
Residential Units:	32
Live/Work Units:	3
Total Units:	35
PV Array:	3257 sf

Pros:

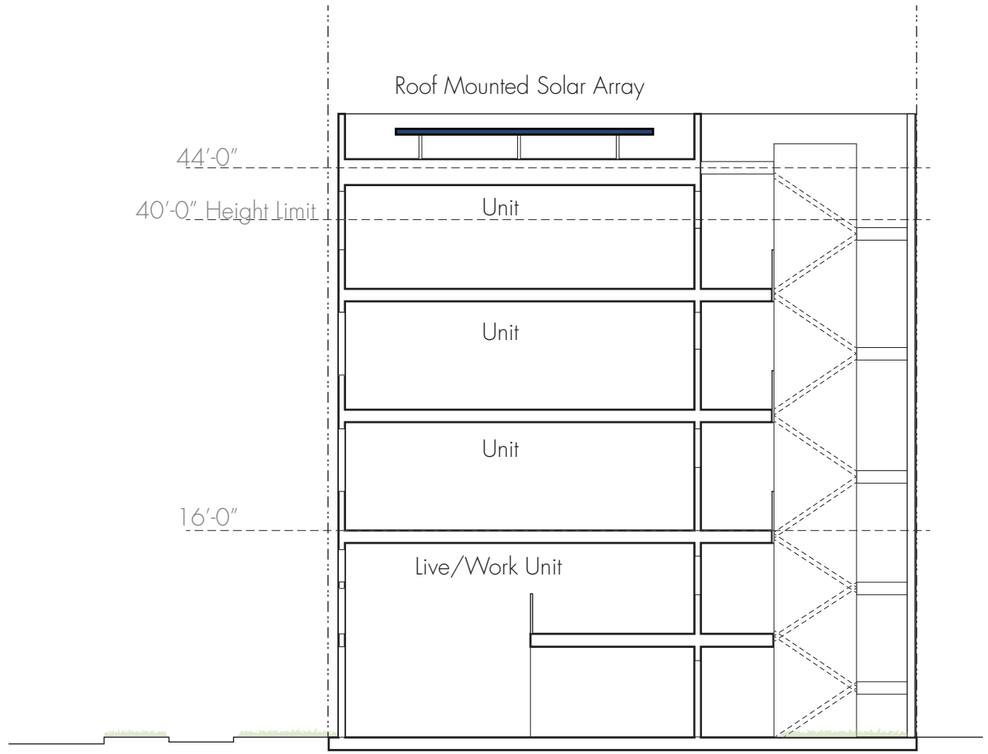
- Common shared courtyard on the east side of the building
- Open corridor on the east provides cross ventilation for the units

Cons:

- Setback at first floor interrupts the continuity of the facade on 37th Ave S.
- PV Array area provided will not be sufficient to reach net zero energy



Option 2 arranges all the units around a courtyard on the east side of the building creating an common open space that can be used by all residents. The main entry access for all the units is located on the south on South Hudson Street. A 10' required setback provides an open private space for two residential units located at first floor. The open corridor on the east side of the building creates an opportunity for east-west cross ventilation of the units.

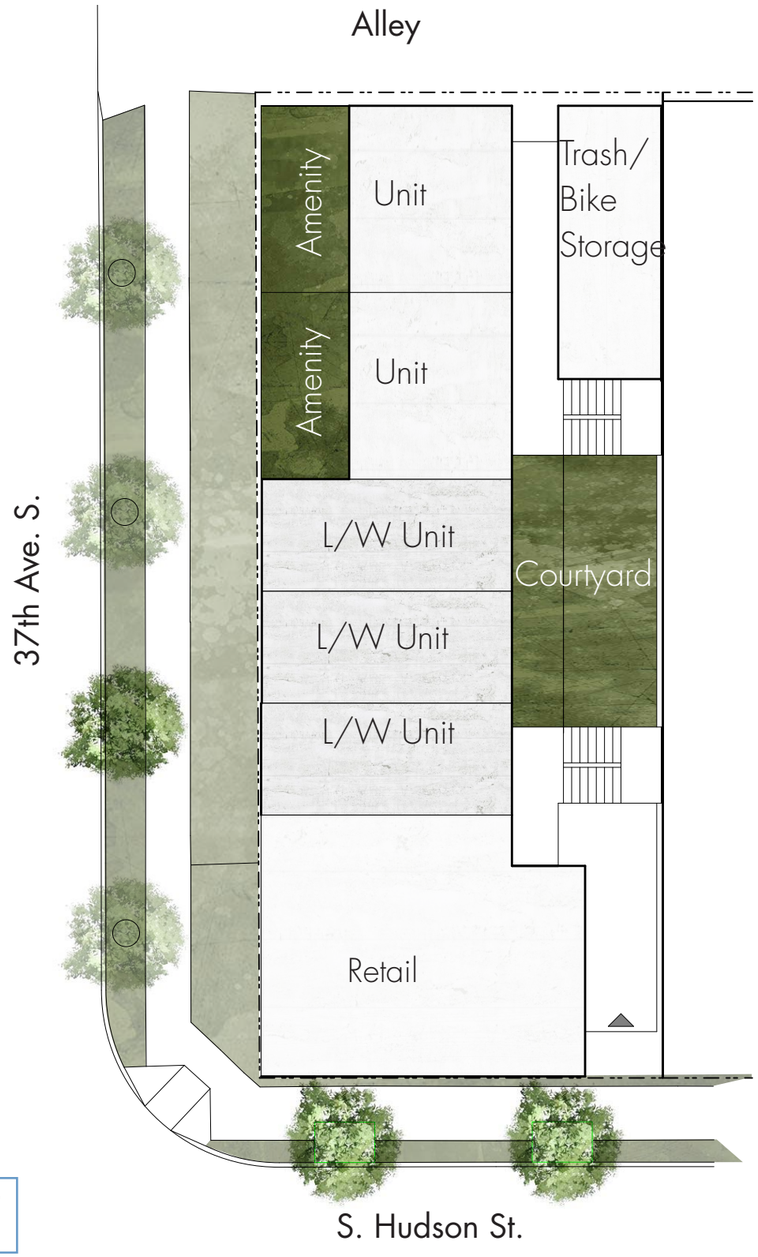


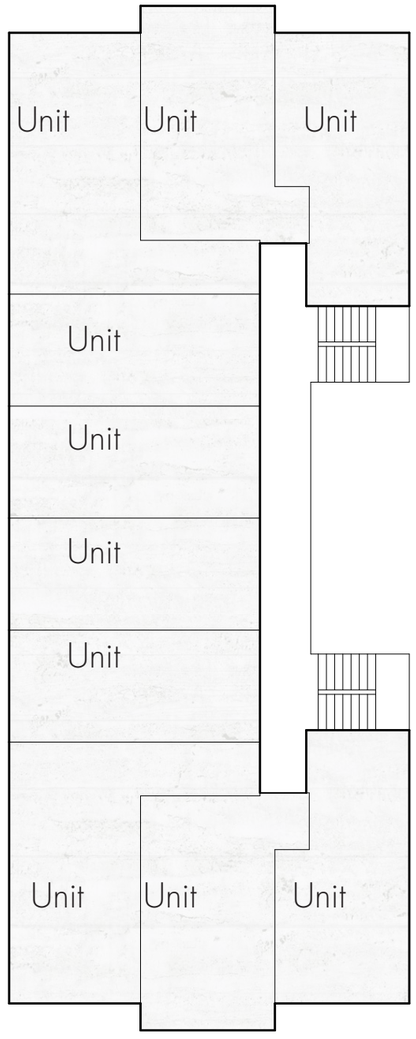
Southwest Corner

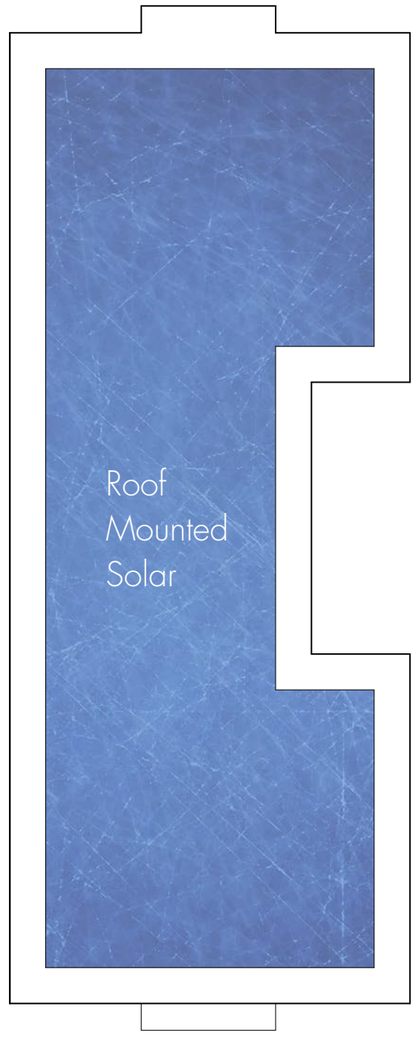
Northeast Corner

OPT 2

Option 2 Plans







OPT 2

Option 3 Massing Diagrams

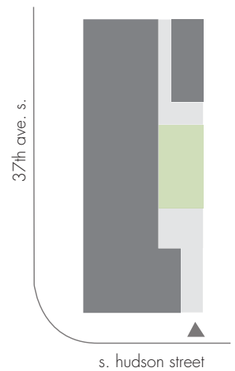
GSF:	17,958 SF
Residential Units:	32
Live/Work Units:	3
Total Units:	35
PV Array:	4600 sf

Pros:

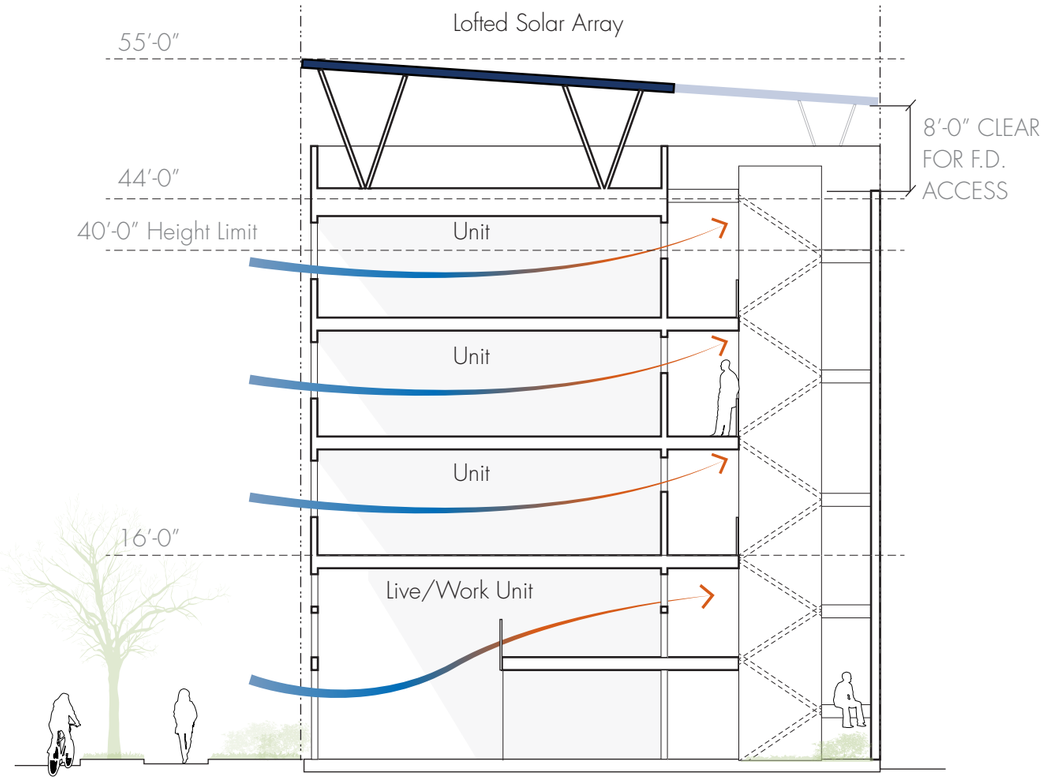
- Common shared courtyard on the east side of the building
- Open corridor on the east provides cross ventilation for the units
- PV Array area provided will be sufficient to reach net zero energy

Cons:

- Requires departures



Option 3 also arranges all the units around a courtyard on the east side of the building creating a common open space that can be used by all residents. The main entry access for all the units is located on the south on South Hudson Street. No required setback is provided for two residential units located at first floor so the mass of the building can continue and wrap around the corner at 37th ave south and the alley. The open corridor on the east side of the building creates an opportunity for east-west cross ventilation of the units. A retail space is located on the most prominent corner, South Hudson street and 37th Avenue South.



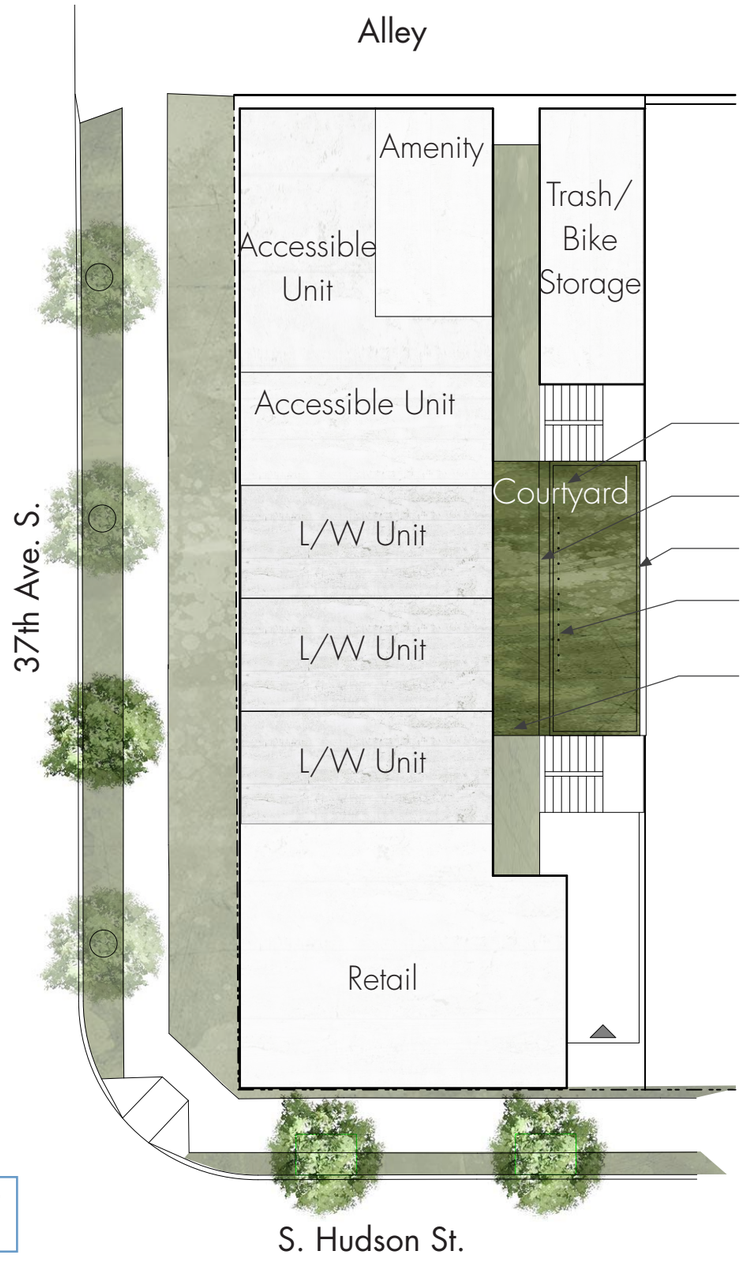
PREFERRED

OPT 3

Southwest Corner

Northeast Corner

Option 3 Plans



PREFERRED

OPT 3

bioswale planter / major landscape feature

integrated seating at planter edge

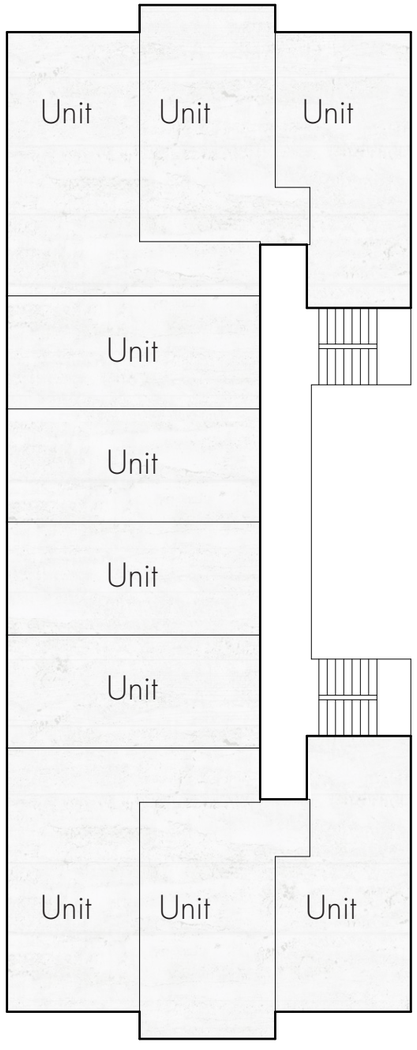
wall edge with landscape or art feature

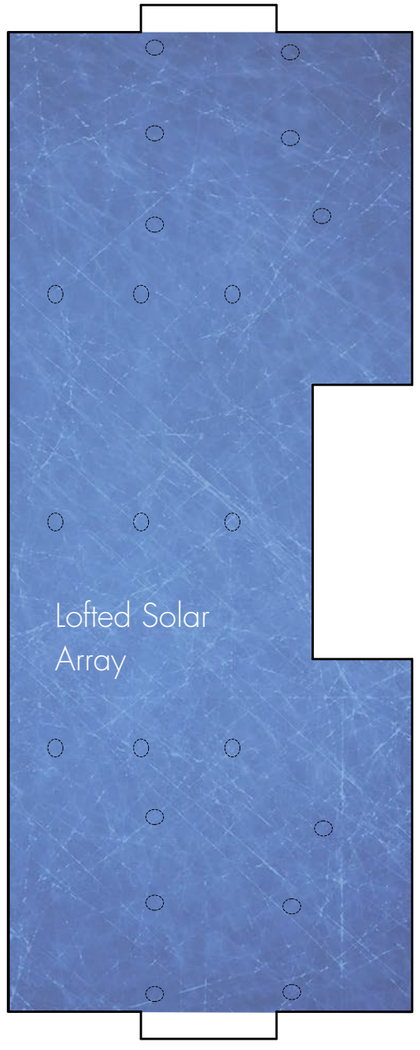
rain chains or screening element integrated with walkways above

well designed covered walkway with opportunities for planters defining doorways, screening, pavers and lighting

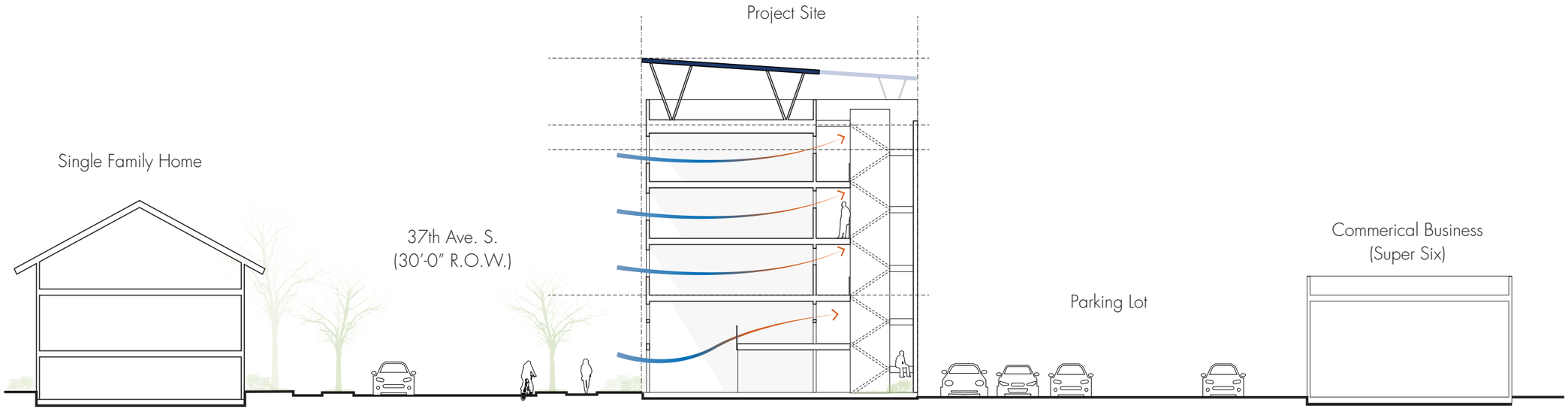
Why an Interior Courtyard?

The interior courtyard offers a private place for residents to gather, but most importantly it allows light and air from two sides of the unit. This is important for cross ventilation inside units. If the courtyard were facing 37th Avenue South, the building would require an enclosed corridior upagainst the property line. The street-facing courtyard would also not recieve the benefit of being activated people moving through the building's corridors and stairs the same way the interior courtyard does.





Option 3 Site Sections



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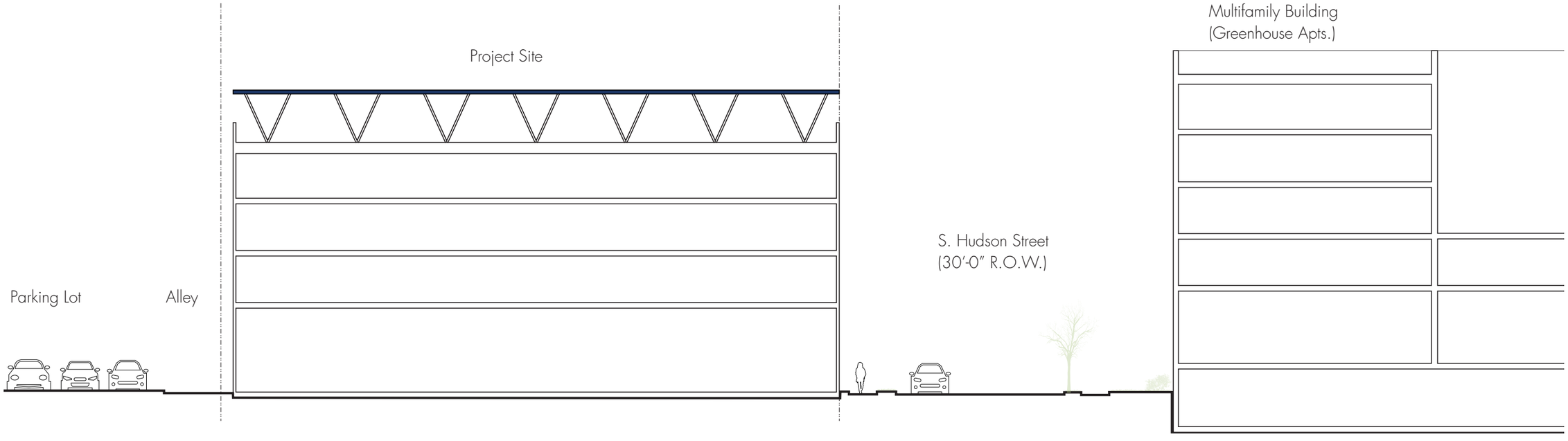
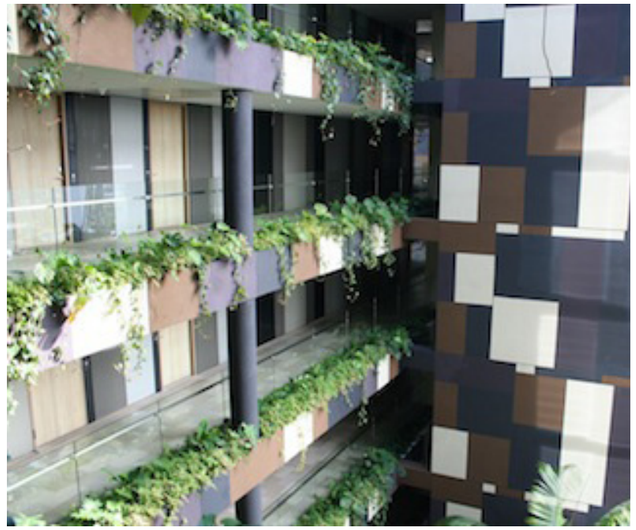
OPT 3



Option 3 Courtyard Inspiration



Design Guidelines

Context and Site

CS1 Natural Systems and Site Features

CS1.A: Energy Use

The proposed building will use significantly less energy compared to a standard code building. Passive house strategies will be employed including continuous insulation through entire envelope without thermal bridging, continuous airtight layer to prevent infiltration of outside air and loss of conditioned air, high performance windows and continuous balanced heat and moisture recovery ventilation system. All these passive strategies will significantly lower the energy demand of the building and will allow the building to reach net zero energy with the addition of a solar PV panel system on the roof.

CS1.B: Sunlight & Natural Ventilation

Solar gain is managed with high performance windows and shading devices on the west and south facade. The goal is to exploit the sun's energy for heating purposes and to minimize it in cooling seasons. The high performance window along with the airtightness of the envelope will provide a more uniform interior temperature and an high level of comfort. The east-west orientation of the units and the open corridor on the west side of the building will provide natural cross ventilation for the units on each floor. During the warmer months, the natural ventilation, in addition to providing the fresh air needed, can help lower the air temperature eliminating the need for mechanical ventilation.

CS1.D: Plants & Habitat

Existing street trees will be protected and new trees (species to be approved by SDOT) will be planted in accordance with city standards along South Hudson Street and 37th Ave South. In order to mitigate the relationship between the at grade residential units and the public sidewalk, landscaping will be introduced in the 7'-6" space in the right-of-way between the sidewalk and property line.

CS2 Urban Pattern & Form

CS2.B: Adjacent Sites, Streets & Open Spaces

Primary pedestrian access to the project will be from the public sidewalk along South Hudson Street which will be activated by retail storefronts in the corner. The 10' distance that exist from the building mass to the pedestrian walkway on 37th Avenue South will provide enough separation and privacy from the public realm. Landscape planting and other site features proposed in this ROW space will enhance the pedestrian experience and provide physical separation from the building mass.

CS2.D: Height, Bulk, Scale

The height, bulk and scale of existing neighboring building does not reflect the density allowed by current zoning. The anticipated zoning height for the properties surrounding the site to the north and east is 65 ft. On the south, there is a more recent 65' apartment building. The proposed building with his 40 ft height will provide an appropriate transition to the surrounding NC2-65 zoning and the single family zoning to the east.

Design Concept

DS1 Project Uses & Activities

DS1.A: Arrangement of Interior Uses

The residential units are arranged so that every unit has an unobstructed view either to the west, south or north. Two amenity spaces complement the building and offer residents an outdoor gathering place on the east courtyard and also an indoor activity area on the north side of the building. Retail space is located in the more prominent and visible corner of the site, S. Hudson Street and 37th Ave South.

DS1.B: Vehicular Access & Circulation

The proposes building has no provisions for parking.

DS1.C: Parking & Service Uses

Trash and recycling areas will be accessed from the alley and concealed within the building. The alley facade will be incorporated into the overall design of the building as a secondary facade.

DS2 Architectural Concept

DS2.A: Massing

Secondary architectural elements like bay windows proposed for the project will help reduce the perceived mass on 37th Avenue south and South Hudson Street.

DS2.B: Architectural & Facade Composition

The facade will be composed of a careful system of materiality and fenestration. The building is wider than is tall so that horizontal volume will be broken up using materiality transitions, fenestrations and other facade articulations.

DS2.C: Secondary Architectural Features

Windows will add rhythm and depth as well as contribute toward energy efficiency, and canopies will provide street-level scale and detail while also offering weather protection.

DS3 Open Space Concept

DS3.B: Open Space Uses & Activities

The residents will have access to an outdoor space or shared courtyard located on the east that will provide amble outdoor spaces for an enhanced living experience. The east courtyard provides a shared gathering space for the residents. Another enclosed space in the north side of the building is provided for community gathering and other activities.

Design Guidelines, Continued

Public Life

PL1 Connectivity

PL1.A: Network of Open Spaces

An active sidewalk with commercial uses and an entry courtyard for public and private mixing and threshold definition will add life to the pedestrian experience.

PL1.B: Walkways & Connections

The project will address the public open space of the sidewalk by connecting the neighboring commercial uses with a pedestrian experience that is filled with similar site features and character.

PL1.C: Outdoor Uses & Activities

The sidewalk will be larger than typical due to the property line's relationship with the right-of-way. There will be an opportunity for an additional planting strip and site furniture.

PL3 Street-Level Interaction

PL3.A: Entries

The residential entry is articulated by the inset entry courtyard, retail entries will be called out with signage and canopies, the leasing office will be able to see out onto the entry courtyard for security.

PL3.B: Retail Edges

The sidewalk provides the opportunity for a significant buffer between the building and the street. See Landscape Buffer Exhibit.

PL3.C: Residential Edges

Glazed storefront windows allow pedestrians to interact visually with the buildings at the ground level.

PL4 Active Transportation

PL4.A: Entry Locations & Relationships

The building entrance is public and located on the active street.

PL4.B: Planning Ahead for Bicyclists

Bike storage will be provide within the parking garage levels and accessed from the alley, away from the faster vehicular travel of the street.

PL4.C: Planning Ahead for Transit

Transit is easily accessed from the adjacent Alaska Street. The building entrance and active sidewalk experience encourage access to transit.

Zoning Standards

Chapter 23.47A - Commercial

Design Team Response

23.47A.004: Permitted and Prohibited uses
Uses per Table 23.47A.004

Residential uses, live/work and retail uses proposed are allowed under table 23.47A.004.

23.47A.005: Street Level Uses
The proposed is not within a pedestrian designated zone or along a principal pedestrian street.

Per Section 23.47A.005 there are no restrictions on the uses at street level. The proposed use at street level are retail, residential and Live/Work.

23.47A.0048 Street Level Development Standards
Blank segments of the street-facing façade between 2 feet and 8 feet above the sidewalk may not exceed 20 feet in width

The total of all blank façade segments may not exceed 40% of the width of the façade of the structure along the street.

Street-level, street-facing facades shall be located within 10 feet of the street lot line, unless wider sidewalks, plazas, or other approved landscaped or open spaces are provided.

60% of the street-facing façade between 2 feet and 8 feet above the sidewalk shall be transparent.

Nonresidential uses shall extend an average depth of at least 30 feet and a minimum depth of 15 feet from the street-level, street-facing façade.

Nonresidential uses at street level shall have a floor-to-floor height of at least 13 feet.

For purposes of calculating 80% of a structure's street-level façade, the width of a driveway at street level, not to exceed 22 feet, may be subtracted from the width of the street-facing façade if the access cannot be provided from an alley

At least one of the street-level, street-facing facades containing a residential use shall have a visually prominent pedestrian entry; and

The floor of a dwelling unit located along the street-level, street-facing façade shall be at least 4 feet above or 4 feet below sidewalk grade or be set back at least 10 feet from the sidewalk.

The proposed design will address all the requirements regarding blank facades, transparency, extent of non-residential uses, floor-to-floor height of non residential uses.

The proposed design departs from the code in regards to the dwelling units located along the street level. The proposed floor of the residential units located along 37th Avenue South is not 4 feet above or 4 feet below sidewalk grade or set back at least 10 feet from the sidewalk. See diagrams on page 32 for rationale.

23.47A.010: Maximum size of non-residential use

The maximum size of non-residential use, as determined by Table A,23.47A.004, is 25,000 sf.
Uses per Table 23.47A.004

The proposed non-residential uses is under the 25,000 sf maximum.

Zoning Standards, Continued

Design Team Response

23.47A.012: Structure Height As designated in the land use map: 40 feet base height above average grade 4 foot additional w/13 foot floor-to-floor commercial space on ground level or if a residential first floor is raised 4 feet above grade.	Proposed maximum structure height (w/o roof features):44' Street level floor-to-floor height to be 15'-0".
23.47A.012C2: Rooftop features Insulation material, rooftop decks and other similar features, or soil for landscaping located above the structural roof surface, may exceed the maximum height limit by up to two feet if enclosed by parapets or walls that comply with this subsection 23.47A.012.C.2.	Insulation material on the roof will exceed the maximum height limit up to two feet and will be enclosed by a parapet.
23.47A.012C3-4: Solar collector In zones with mapped height limits of 30 or 40 feet, solar collectors may extend up to 4 feet above the otherwise applicable height limit, with unlimited rooftop coverage. Solar collectors may extend up to 15 feet above the applicable height limit, as long as the combined total coverage of all features gaining additional height listed in this subsection 23.47A.012.C.4, including weather protection such as eaves or canopies extending from rooftop features, does not exceed 20 percent of the roof area, or 25 percent of the roof area if the total includes stair or elevator penthouses or screened mechanical equipment.	The proposed PV solar array extends 15' above the applicable height limit but it will depart form code regarding the percentage of the roof covered. See diagrams on page 33 for rationale.
23.47A.013: Floor Area Ratio (FAR) Limits Per table A, 23.47A.013 the maximum FAR for NC2-40 zone is 3.0. Per Table C, 23.47A.03 the minimum FAR for a height of 40' is 1.5.	Proposed 17,958 sf is within the maximum and minimum FAR requirements.
23.47A.014 Setback Requirements No setbacks required.	Some setbacks still proposed. 1'-0" alley dedication and residential entry setbacks.
23.47A.014 Landscaping and screening standards Landscaping with a green factor score of 0.3 or greater is required for new structures containing more than 4,000 sf of non-residential use.	Green factor 3.0 or greater is proposed.
23.47A.024 Amenity Area Amenity areas are required in an amount equal to 5 percent of the total gross floor area in residential use.	The amenity areas provided (courtyard on the east and enclosed space to teh north)will meet or exceed the minimum requirements.
23.47A.024 Parking Location and Access	No parking is required in the Columbia City Residential Urban Village

Departure Requests

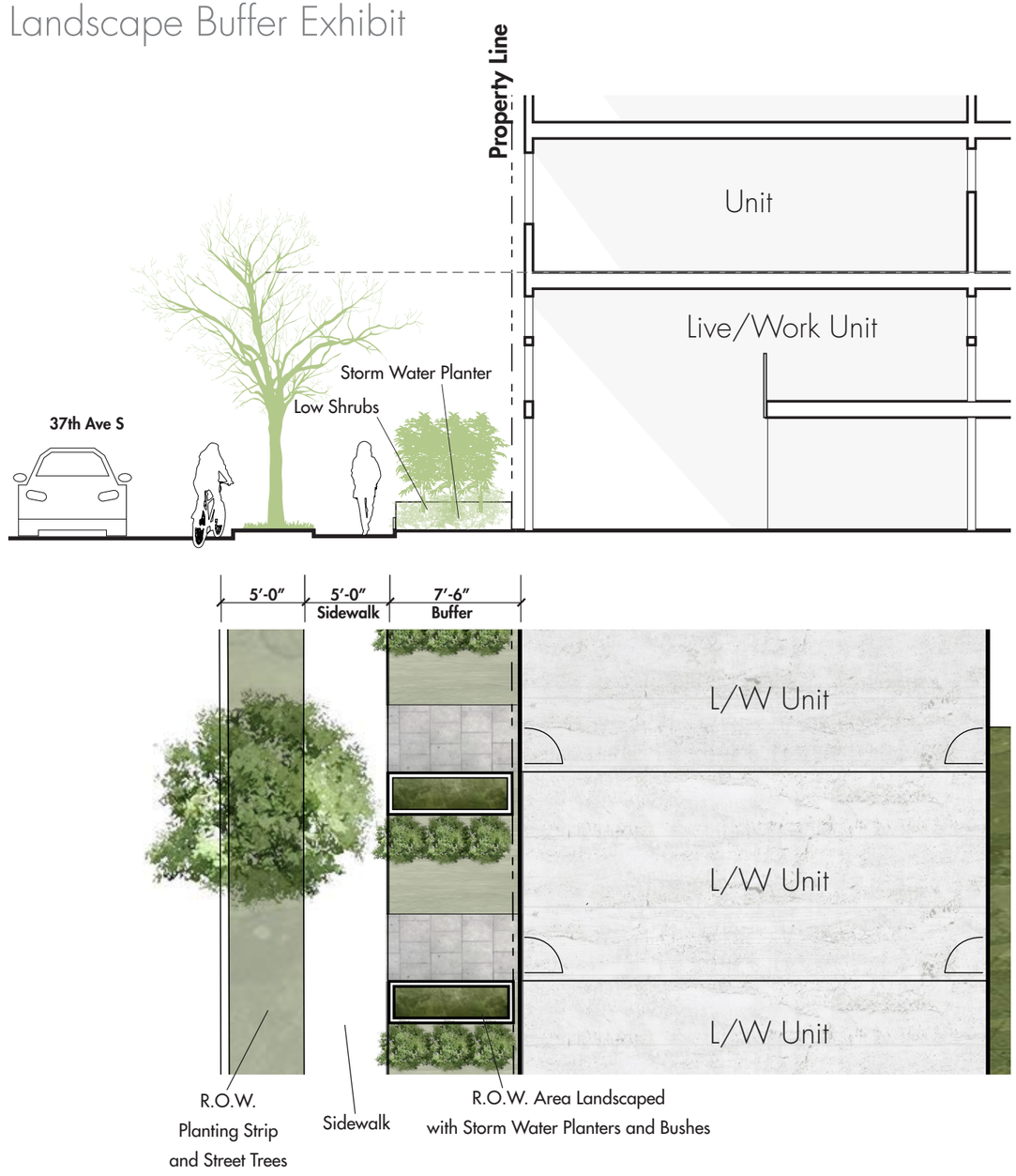
Residential Setback

Zoning code requires that residential units at grade be setback 10 feet from the sidewalk. In order reduce the number of residential units at grade we have proposed live/work units on the ground level whenever possible. A full 10 foot setback at grade will disrupt the continuity of the facade at on 37th Avenue South and the alley. In order to achieve the spirit of this requirement the existing 7'-6" space between the sidewalk and property line will be enhanced as a landscape buffer with planters and shrubs. This will provide enough `distance between a unit's entry door and the public sidewalk. The units windows will be able to be screened with the greenery in the 7'6" buffer.

Departure Table

NC3 - 40 Zoning Code	Requirements	Departure	Explanation
23.47A.0048 Street Level Development Standards. Residential Setback	The floor of a dwelling unit located along the street level, street facing facade shall be at least 4 feet above or 4 feet below sidewalk grade or be setback at least 10 feet from sidewalk.	Floor at first floor level is at sidewalk grade and no setback is provided from sidewalk.	See text & graphics on Pg. 32
23.47A.012C3-4 Solar Collectors	Solar collectors can rise 15'-0" above the applicable height limit as long as total coverage of all site features (canopies, eaves, etc.) does not exceed 20% roof area.	Proposed lofted solar panel array is within the 15'-0" above applicable height limit but will require 100% roof area coverage.	See text & graphics on Pg. 33

Landscape Buffer Exhibit



Departure Requests

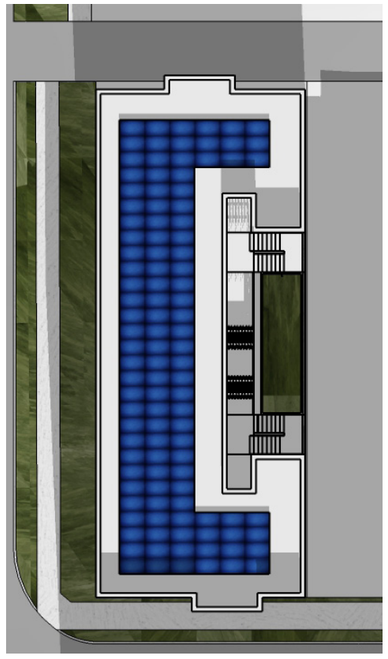
Solar Collector Coverage

In order to meet the project's goal of achieving net-zero energy, the maximum amount of roof area must be dedicated to the production of electricity via solar power. If the panels were to be roof mounted, a 4'-0" wide fire department access path would be needed around the edge of the panel array. This would limit the amount of power production possible on this building footprint.

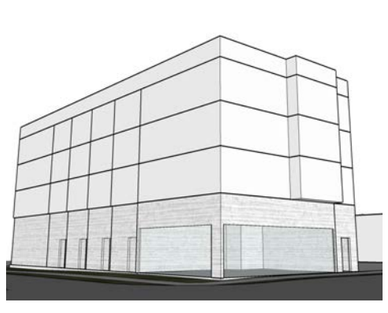
In order to avoid insetting the array by 4'-0" around the perimeter, a lofted solar array is proposed. This lofted array would utilize the entire building footprint and would allow for 8'-0" of clear head height above the roof for access. A departure from the existing 20% roof coverage limitation is required to achieve net-zero energy.

Roof Mounted

Approx. # of Panels:	108 Panels
Total Solar Area:	1923 SF
Total % Roof Coverage:	52%

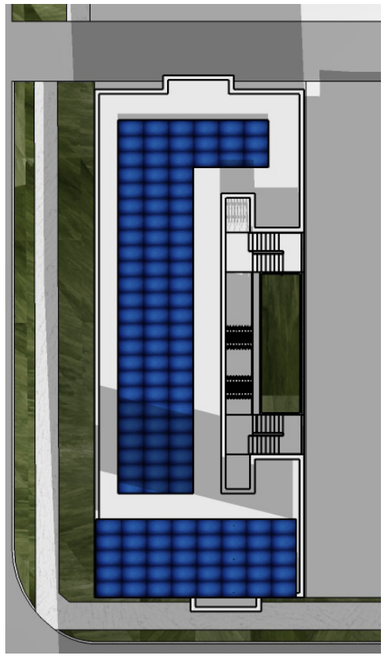


Note Unrealistic Condition: Panels are Shaded by Parapet to the South



Hybrid - South Elevated

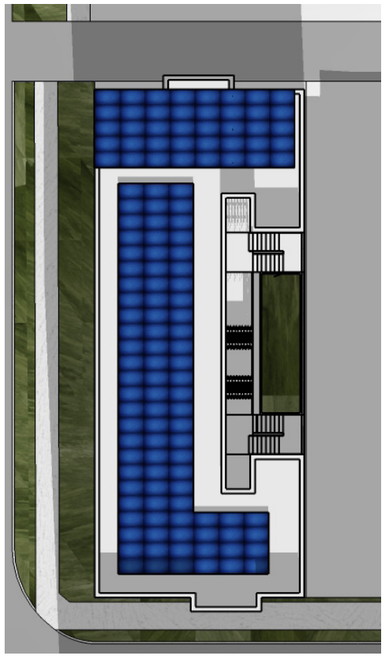
Approx. # of Panels:	121 Panels
Total Solar Area:	2152 SF
Total % Roof Coverage:	59%
Elevated:	19%
Roof Mounted:	40%



Note Unrealistic Condition: Panels are Shaded by Elevated to the South

Hybrid - North Elevated

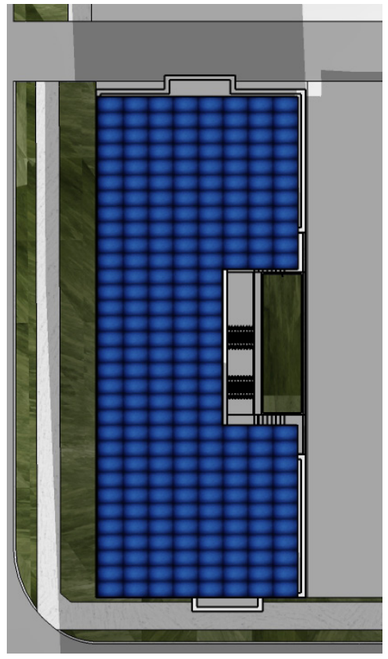
Approx. # of Panels:	130 Panels
Total Solar Area:	2261 SF
Total % Roof Coverage:	61%
Elevated:	19%
Roof Mounted:	42%



Note Unrealistic Condition: Panels are Shaded by Parapet to the South

Elevated Panels

Approx. # of Panels:	263 Panels
Total Solar Area:	4029 SF
Total % Roof Coverage:	100%



Note: Panels Cover Stair Cores

Notes:

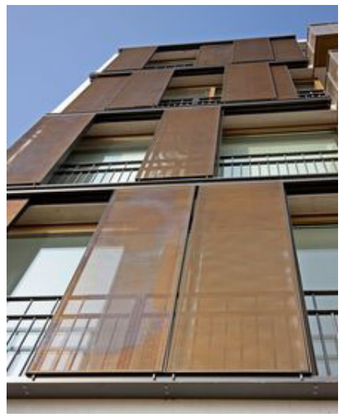
1. Shadows are during Dec. 21st at 12:00PM because this time of year has the highest electrical demand and shading of the panels is critical. Shaded panels can cause the entire array to function at a reduced rate.
2. Roof area is 3688 SF; 20% roof coverage is 738 SF
3. Panels are drawn at standard size of 40" x 64" or approx. 18 SF per panel.
4. Panels are drawn with no allowance for framing or other structural needs that will develop with more design. This means the number of panels shown is liberal and the actual number possible when constructed will be reduced.

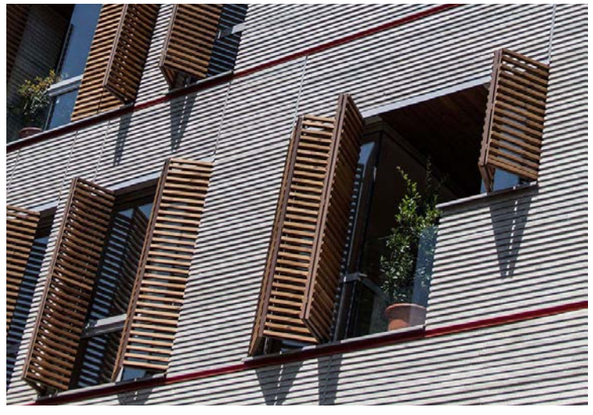
Shading & Passive House Examples

When constructing a passive house building it is critical to manage the solar gains on west and south facing walls, because direct solar exposure can cause overheating in an airtight, well insulated unit during summer months.

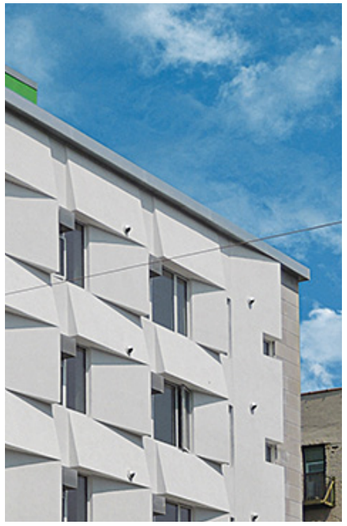
The design and location of these architectural elements will be dictated by Passive House Energy Modeling and shading calculations. Strategies under consideration include: horizontal overhangs on the south facade, sliding or folding shutters and vertical fins on the west elevation.

Well-designed sun control and shading devices can dramatically reduce building peak heat gain and cooling requirements and improve the natural lighting quality of building interiors.
Shading elements offer the opportunity of differentiating one building facade from another and can provide interest and articulation to the overall design of the building.





Passive House Townhome - NY



Passive House Apartment Bldg- NY

Passive House Apartment Bldg- Philadelphia

NK Projects

STREAM BELMONT

ARTHOUSE

APERTURE - BUILT GREEN 3-STAR TARGET

BROADSTONE KOI - LEED-NC CERTIFIED TARGET

H2O APARTMENTS