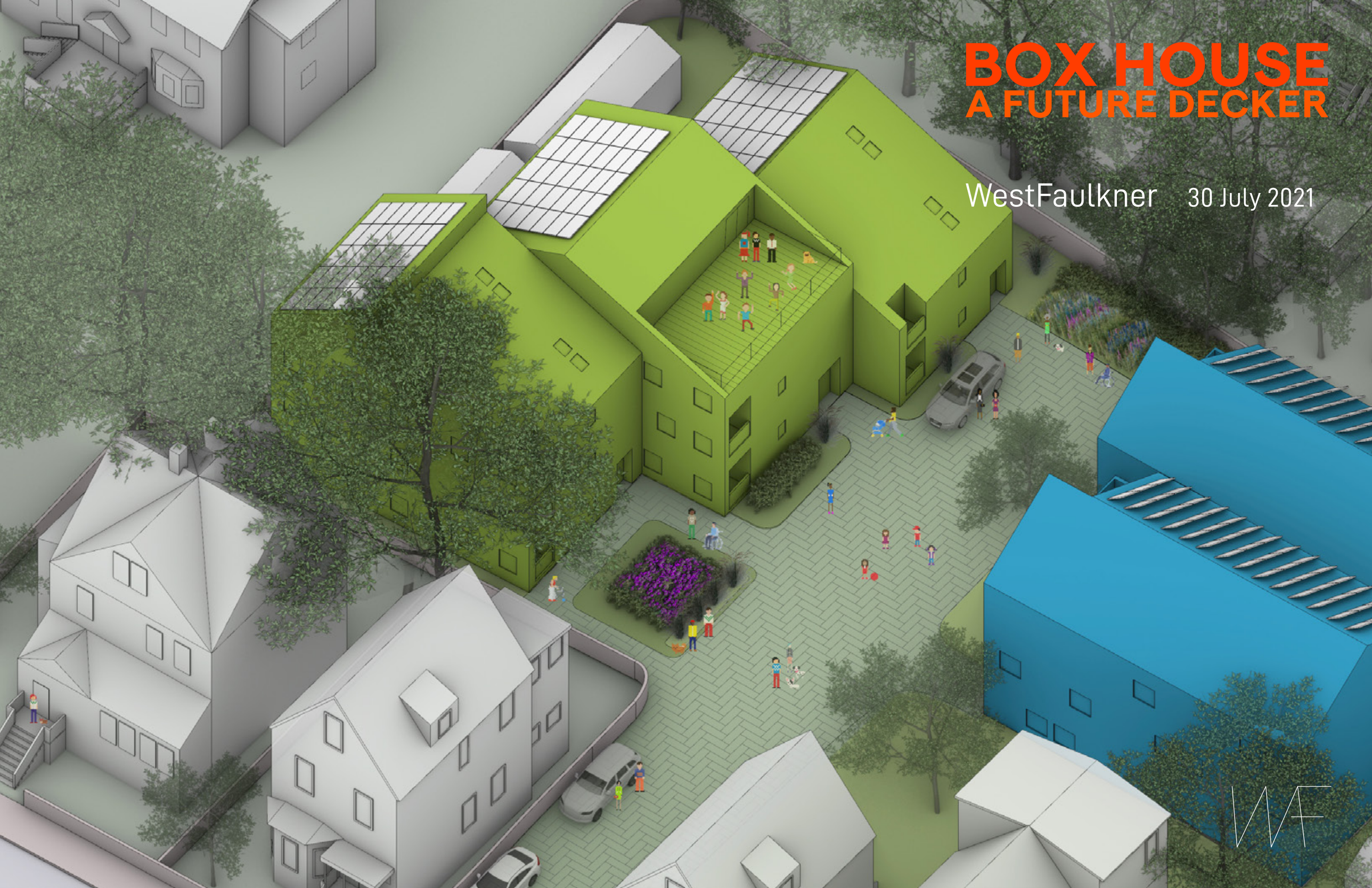
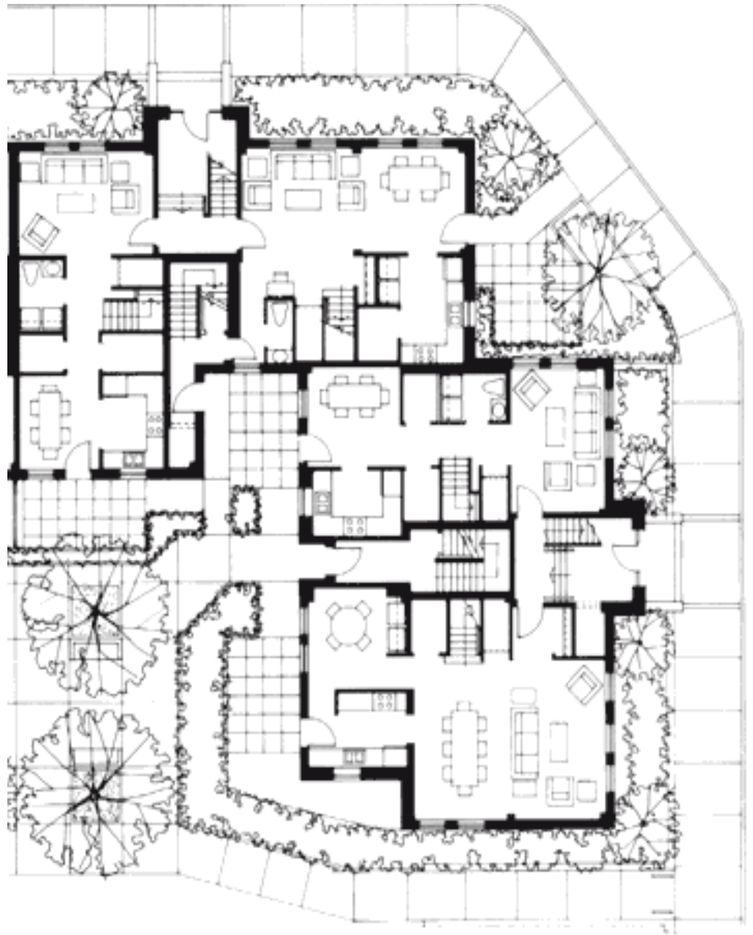
BOX HOUSE
A FUTURE DECKER

WestFaulkner 30 July 2021



INTRODUCTION



The debate about how best to increase the supply of low-cost housing is complicated by labor shortages and an unstable construction market. Rising prices put more distance between "affordable" and "housing," and the building boom persists as the only reasonable response. By increasing supply, surely someday we will reduce demand. Meanwhile, we look to the government for intervention, either directly or with subsidy; we hope for experts who can offer "creative funding" through tax credits, crowd sourcing, and corporate partnerships. We are even willing to sacrifice our diverse urban heartbeat in favor of anonymous mega blocks and towers of market-rate condos.

This is not the first time the region has been faced with an affordable housing problem. Between 1870 and 1910, the populations of Boston, Lowell, and Worcester nearly tripled. Urban manufacturing attracted waves of immigrant labor, putting pressure on existing housing stock. Demand was so great that basements and stables were used for living quarters. As described in Jacob Riis's How the Other Half Lives, the worst tenements were overcrowded without bathrooms, light, or ventilation. To expose the problem, reformers spotlighted a squalid Boston block that housed 1100 people, including 700 children . With the spread of streetcars, new sites opened outside of city limits where three-decker multi-family houses emerged as a low cost and easily constructed option.

Between 1880 and 1930 about 16,000 three-deckers went up in Boston, housing an estimated 192,000 people. These wooden structures were built outside of the urban cores that generally prohibited combustible light frame construction, and they were poor cousins to the statelier brick row houses of the Back Bay. But for new Bostonians, the triple decker provided both housing and a path toward home ownership. Owner-occupants could offset mortgage costs by renting out the other two units; extended families could live together. Older residents could remain in their homes, relying on modest rental income. The proximity of porches and decks were conducive to community building, and the small scale of the developments meant that people knew one another.

While neither a housing type nor a small development, Tent City is another considerable precedent. Completed in 1988, Tent City was a concrete response to a well-publicized protest against the urban renewal that was displacing lower incomer residents. Led by activist and politician Mel King, the efforts spawned an alliance of non-profit developers, agencies, and community organization to produce a new neighborhood of 269 units that is generally considered a positive model of density among ample greenspace, sidewalks, shared amenities and busy urban street. It took over 20 years to move from protests to solution, but Tent City stands as proof that Bostonians can address our housing problems as a collective.

WestFaulkner launched in 2020 with a mission for sustainable design that is beautiful, accessible, and environmentally responsible. Following up on our entry for the Triple Decker Challenge, we are grateful to the Future Decker as an opportunity to continue research on the constraints and opportunities for regional housing. We submit our ideas with humility, recognizing that if the challenges of affordable housing were easy, they would already be solved. Nonetheless, our concept for the Block House replicates much of the triple decker economic model - rental income, tax advantages, low barriers to entry for developers – while considering alternate methods of construction delivery and low embodied carbon.

Team: Maxwell Altman, Lisa Qiu, Lisa LaCharite, Katie Faulkner

Special thanks to: Travis Anderson (Placetailor), Milo Stella (Star Contracting), Howard Husock. "Rediscovering the Three-Decker House." Public Interest vol. 98. 1990.

1 Sanborn Fire Insurance Map, Boston, 1887. **2** A Three Decker, 1902. Zimmerman, Sally. Three-Deckers, "New England's Iconic Multifamily Housing," Historic New England. Fall 2013 **3&4** Tent City Boston, Goody Clancy Architects. 1988. 269 units of mixed-income housing, named to commemorate a 1969

SITE ANALYSIS

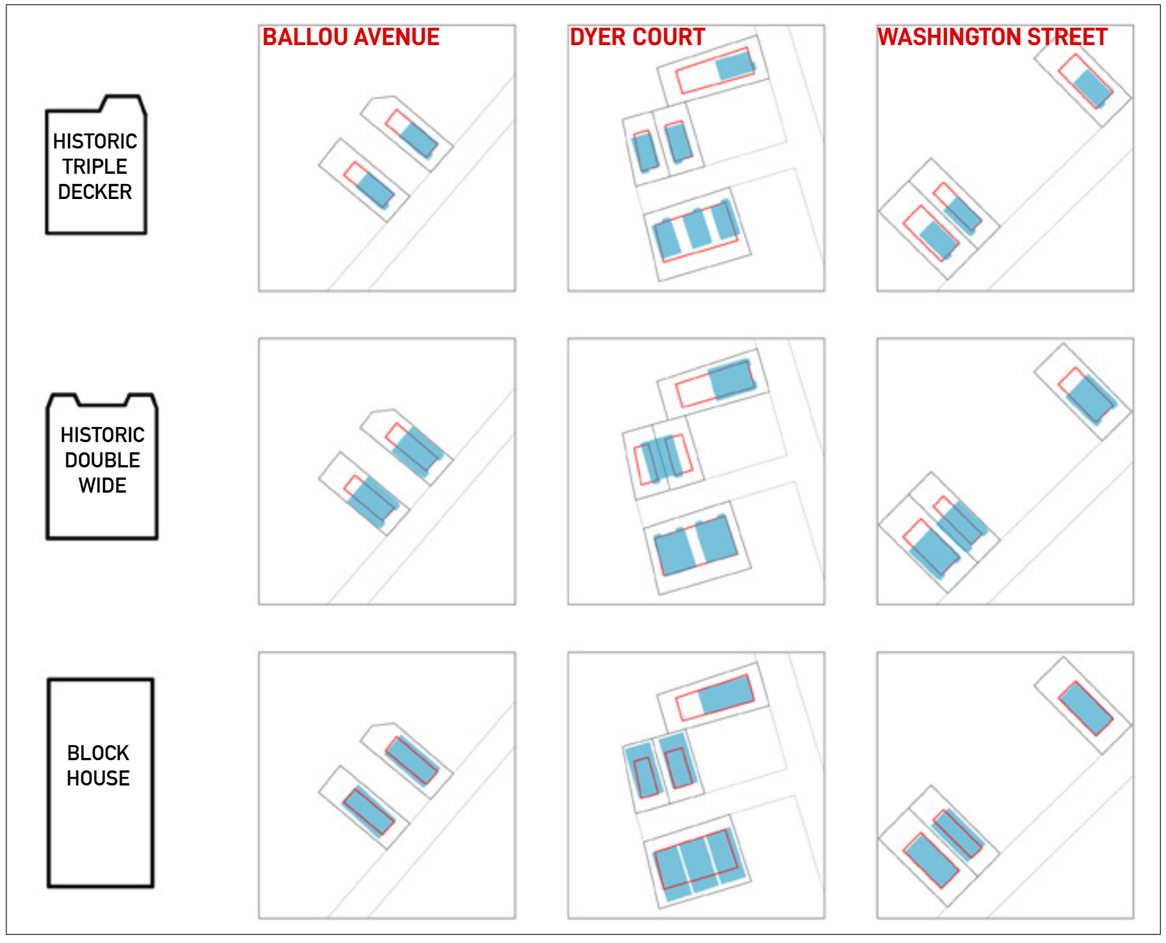
	REPLICABILITY	ACCESS TO TRANSIT	WALKABILITY	PUBLIC AMENITIES	ON-STREET PARKING	CONSTRUCTION ACCESSIBILITY	LAND VALUE	ADJACENT PROPERTY VALUE	SOLAR ROOF VIABILITY	EXISTING SOLAR ARRAY PROXIMITY	AVERAGE
Ballou Ave Mattapan 3F-5000 8,189 SF	3	3	3	3.5	5	2	2	3	4	3	3.1
Colchester ST Hyde Park 1F-6000 11,979 SF	4	1	1	1	4.5	3	3	4	3.25	5	2.9
Dyer Court Dorchester 3F-6000 21,184 SF	5	4	1	3.5	2	2.5	3	1.5	4	0.25	2.6
Geneva Ave Dorchester 2F-5000 7,647 SF	4.5	4.5	5	4	3	4	5	2	4.3	2	3.8
River ST Mattapan 2F-4000 6,984 SF	2.5	4	5	4	3	4.5	5	1.5	4	5	3.8
Washington ST Roxbury 3F-4000 15,029 SF	5	5	4	5	5	5	5	4	4	3	4.5

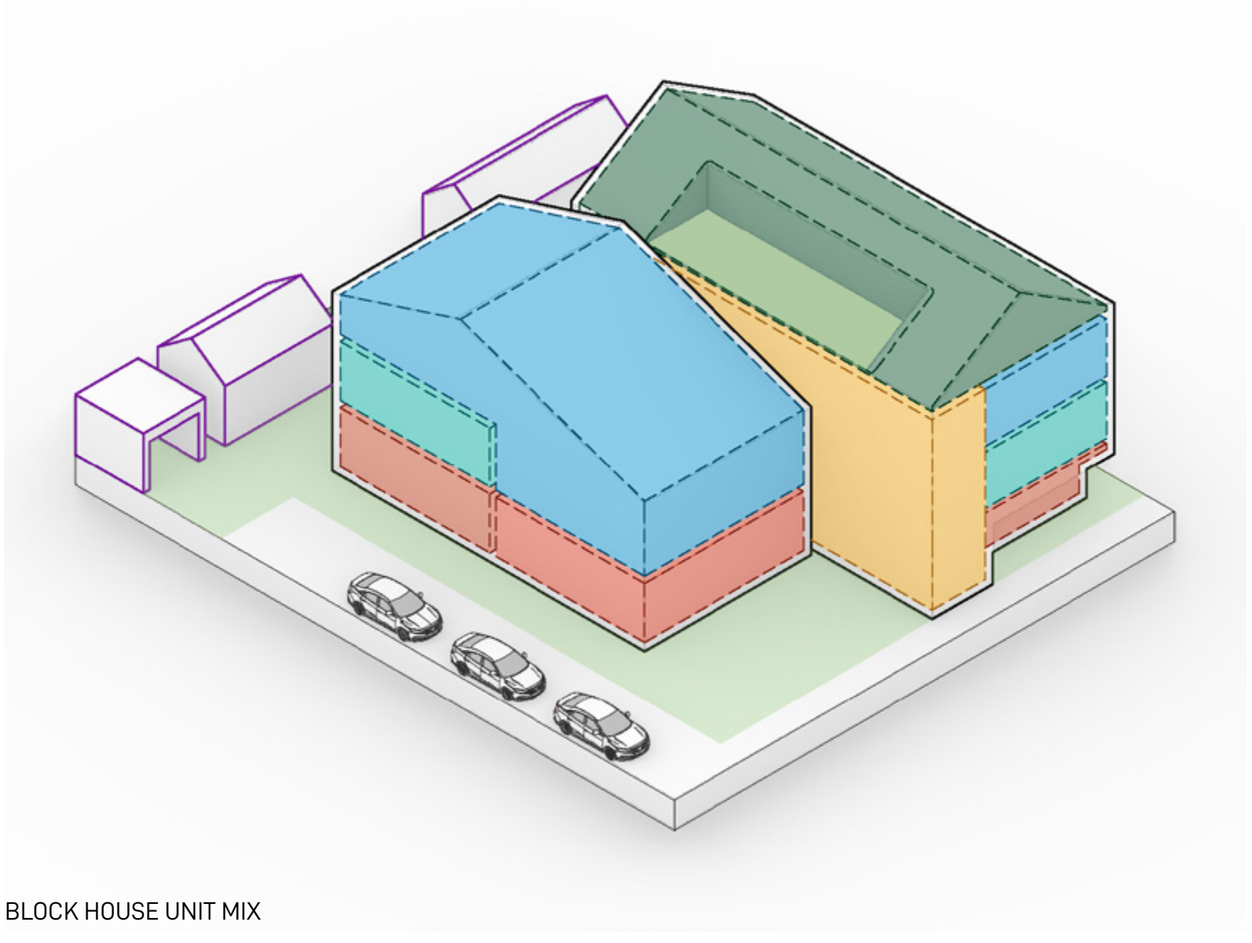
RATINGS
Sites were rated for ten criteria - logistics (replicability, access for construction, parking), quality of life (access to transit and civic space, parking, walkability), and cost. New developments would be powered by electricity, so solar orientation was important. Also considered was the likelihood that one's neighbors had installed solar panels. Overall, the lots on Washington Street scored the highest, with Dyer Court scoring the lowest. All but Colchester in Hyde Park scored highly for access to transit, although only Geneva and Washington Street are within reasonable walking distance to a subway, by far the preferred mode of public transit in Boston. Buses share the same crowded streets with the cars and are generally less reliable in terms of scheduling, making it difficult to live car-free.

In applying the Future Decker goals to the selection – **Affordability**, **Diversity of Type**, and **Healthy Neighborhoods**, we chose Dyer Court as our test site primarily due to the parcel's larger size and generous street frontage. The short road that forms the court is particularly appealing for this middle scale of housing as a building block for sustainable, healthy community. The Dorchester neighborhood context comprises three story buildings - some triple deckers and some two story houses with an attic. In combining the Dyer lots (actually located on Capen Street), a diversity of type with density could improve affordability and positively contribute to this block's sense of neighborhood.

URBAN WALKABILITY
The 2015 study The Walk-up Wake-up Call: Boston, sponsored by the George Washington School of Business, evaluated a number of neighborhoods for urban walkability. All of the neighborhoods in our evaluation were outside of their field of study except for Dudley Square (Washington Street.) The study ranked performance based on two criteria: economics and social equity. The authors considered economic performance as a combination of real estate values and tax assessment. Social equity points were given for access to economic opportunity and affordability. Our Consumers Report style rating is much less data driven. On the Wake-Up scale, our neighborhoods may have scored well on affordability but poorly on economics given that both transportation and commerce thin out away from Boston's urban core. We agree with the report's fundamental findings that Boston has significant pent-up demand for walkable urbanism as demonstrated but the significant real estate premium on those areas considered highly walkable.

SITE ANALYSIS





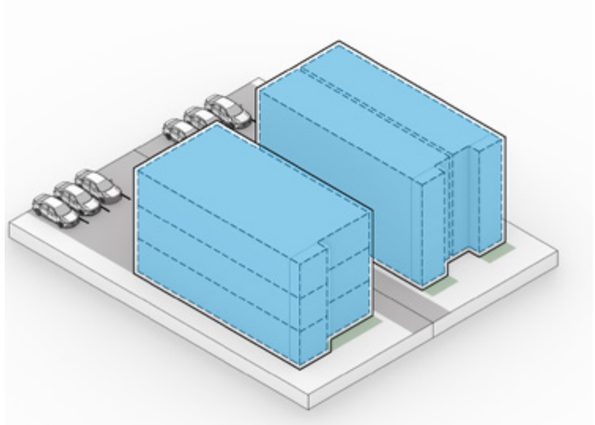
BLOCK HOUSE UNIT MIX

SETBACKS AND ZONING aside, all the proposed 13 sites accommodate the building footprint of an historic triple decker (24' x 40'). Some can accommodate its contemporary the double-wide (38' x 45'), but most of the plots do not lend themselves to efficiency for either. In the diagrams above, the red shape describes the required setbacks, overlaid with a typical footprint. None of the sites would be considered 'as of right' developments, a rarity in Boston. Any housing project planned for these City-owned lots would require zoning relief from off-street parking, FAR, and setback requirements. Multi-family buildings on the long thin parcels would do well to exceed he`int.
In short, zoning based on FAR and uniform setback may prove less effective than a form-based code aimed at increasing built area and improving the public realm. The Block House footprint is conceived with adjustability in length and width, as well as considerations for joining buildings together. We looked for opportunities to combine lots, or redefine them to both increase density and build community.

AS OF RIGHT DEVELOPMENT conformance requires that Dyer Court parcels meet zoning 3F - 6000, which means that the City expects a three-family dwelling to be built on each lot, with a maximum area of 6000 square feet. Building height can be no more than three stories; no higher than 35 feet. Each unit requires an off-street parking space, and there are prescribed setbacks for the front, rear, and side yards.

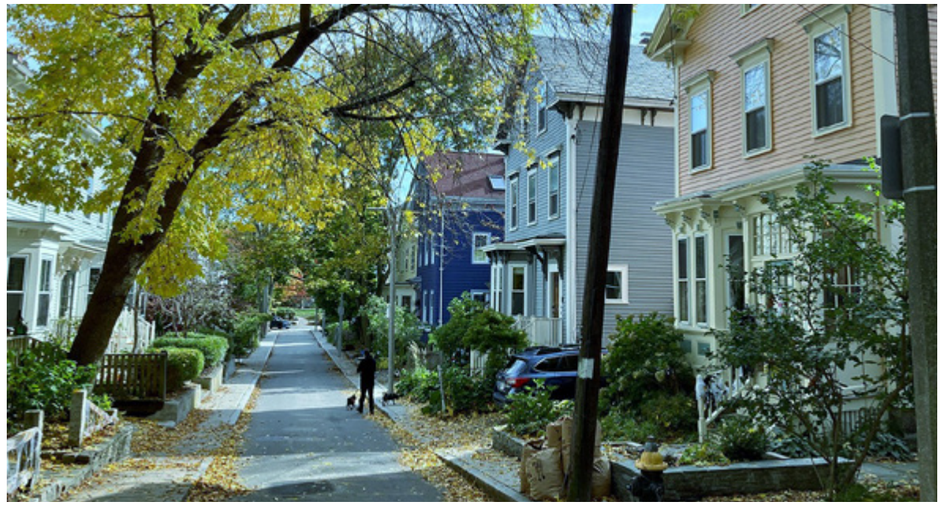
BLOCK HOUSING considers the four parcels of Dyer Court in aggregate. Three of them effectively form a collective, sharing the private way between them for parking, play area, and socializing, with the fourth developed for a larger structure. The planted areas are shared for community garden, play space, or other use. We anticipate the following applications to the Zoning Board of Appeals

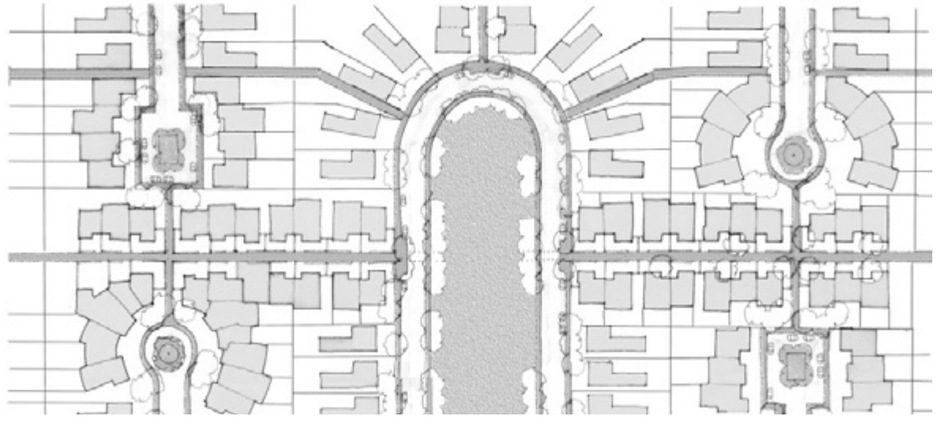
- Reduce the required front yard setback from 20 feet to zero
- Increase of the allowable number of units from 3 (4 conditional) to as many as 6, with allowable elevation increased from 35 feet to 60 feet
- Reduce the minimum lot area for each additional dwelling from 3000 to zero to allow for both larger and smaller units
- Increased FAR from 0.8
- Reduced parking requirements to .25 per unit
- Reduce rear yard setbacks to 10 feet.



AS OF RIGHT ENVELOPE

THE COURT





CONSIDERING THE CUL-DE-SAC
Porches, decks, and stoops in proximity enable neighbors to connect. All ground floor units are accessible. There are no basements. Entrances are at grade, so the Front Door and spaces around it are important for both ease of use and mutual respect as a shared threshold. While some curbside parking is accommodated, the court is not a through street. Cars share the road as a residential plaza. Located outside of Codman Square, the Dyer Court sites are one block away from Dorchester's busy Norfolk Street. Nearby bus routes (#22, #23), the Fairmont Line, and Ashmont Station (Red Line) - a 20 minute walk- provide options for public transit. The neighborhood is both bikeable and walkable, but there are few grocery options nearby. Therefore we assume parking is desirable/required.

That the neighborhood plan resembles a suburban cul-de-sac is intentional. The narrow side street offers a quiets and safe place for children to play. The discontinuous street is conducive to neighborliness and promotes a sense of security and well-being.

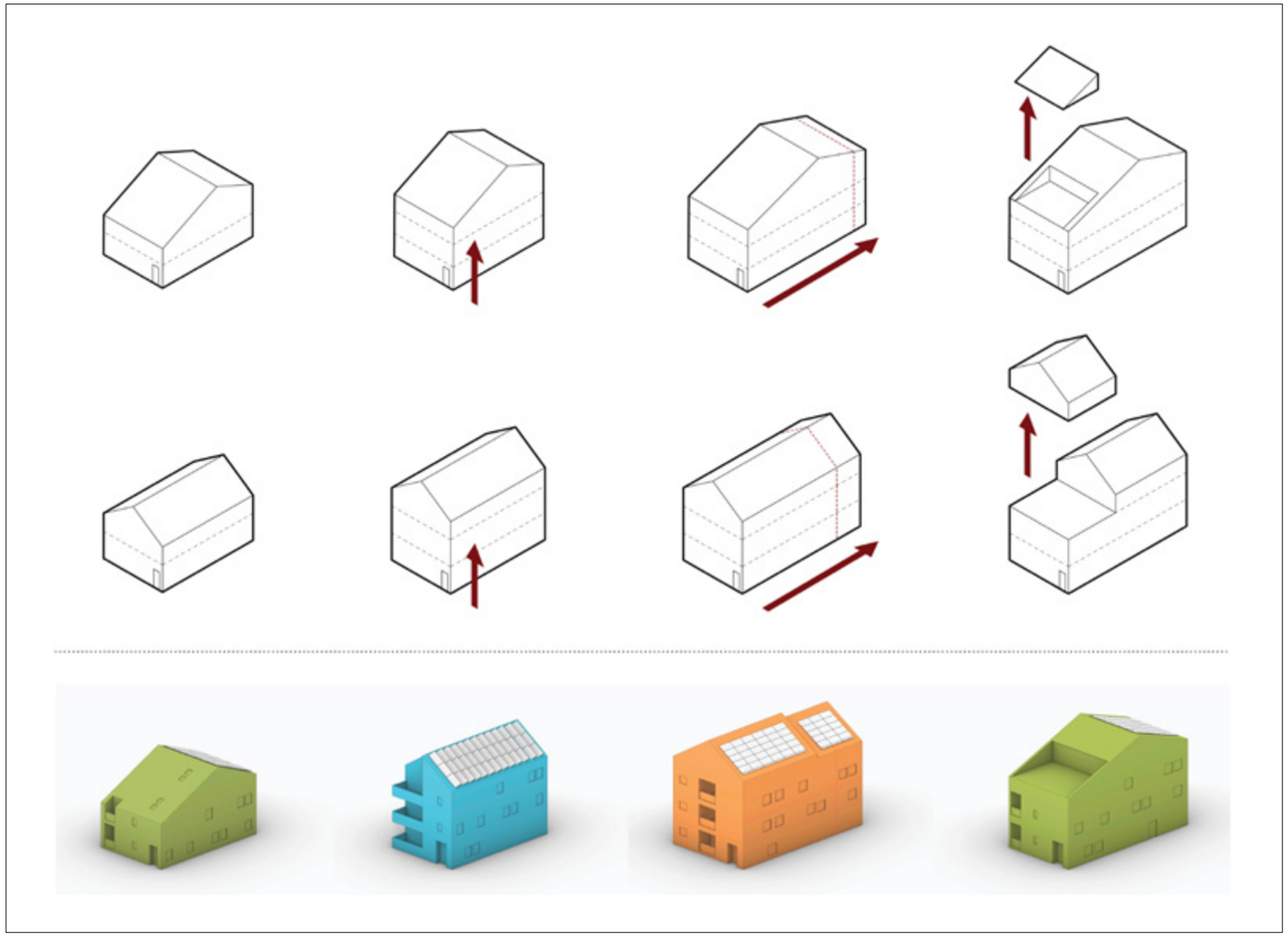
Six 3-story multi-family buildings are located on the four sites of Dyer Court, and single story accessory units are provided when space allows, for home office, workshops, or storage. The Block House footprint recognizes that people may need to grow into their homes or reduce their living space at different times of life. A single 3-bedroom apartment can be converted into two 1-bedroom units if needed. Upper level decks can be built out as finished space over time.

The clustered development is an efficient use of land. Greenspace area is maximized for community gardening. Stormwater can be better managed than on a though street. Utility connections are minimized, runs are shorter, and residents can share in the benefits of electricity savings by combining the solar output of their rooftop PV arrays.

Image Top:
Hubbard Street, Jamaica Plain. A narrow one-way street that is popular for kids as first time bicyclists and skateboarders. It is a destination neighborhood for Halloween given its porches and stoops. Residents have a sense that they owe the street.

Image Bottom:
Southworth, Michael; Ben-Joseph, Eran. "Reconsidering the Cul-de-Sac." Access. University of California. Spring. 2004.

THE BLOCKS



THE BLOCK HOUSE adopts the fundamental premise of the triple decker as an owner-occupied multifamily building that does not require extraordinary capital, or at least relative to the complex financial stacks of larger housing developments. The can be assembled by a small team. Different blocks sizes are offered to diversify unit types and building footprints. When a site is large enough, single story accessory buildings can serve as workshops, home offices, and/or storage.

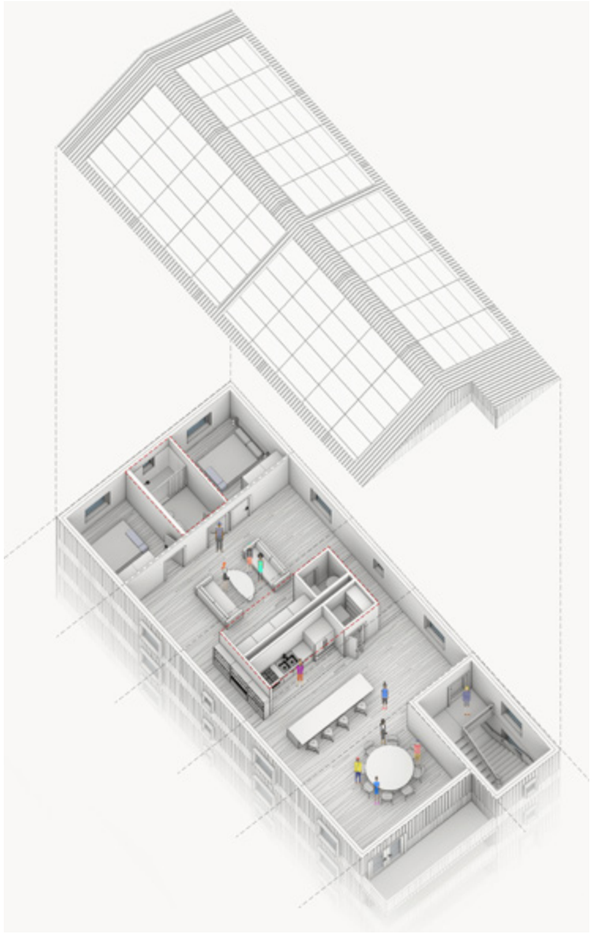
Configured from standardized "cartridges," the units are constructed to anticipate future renovation and expansion. Plumbed kitchen and bath modules are combined with more flexible bedroom and living areas allowing for the addition of bedrooms or the reconfiguration of living space. Meant to support long term occupancy, these minimal layouts allow owners/occupants to choose how to configure their homes.

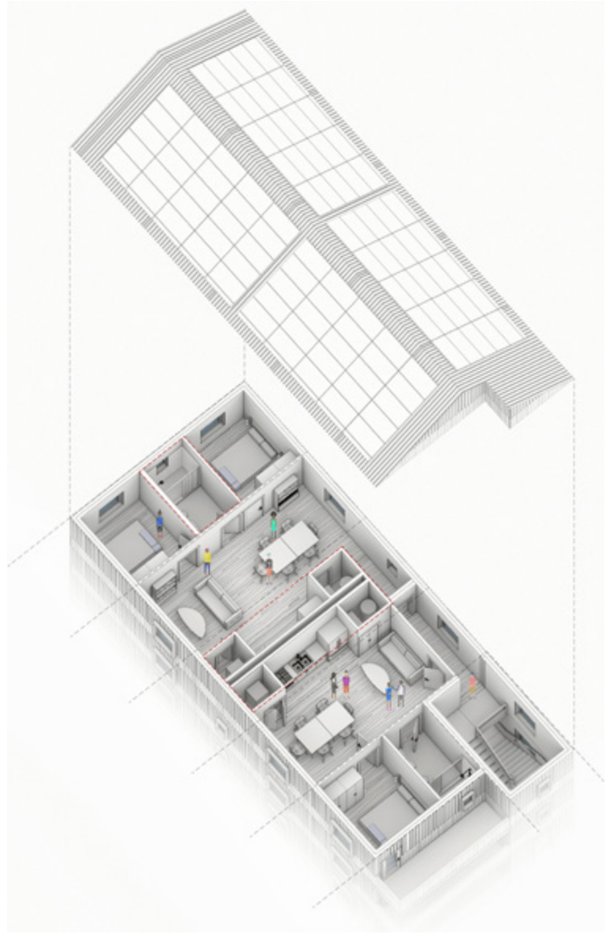
As evidenced by the 13 unique plots of this ideas competition, infill building sites are generally non-standard, and some are considered unbuildable if they do not meet mandated minimums. Blockhouse is conceived as a modular approach. Sleeping, living/dining, and kitchen "cartridges" are assembled to create 1-, 2-, and 3-bedrooms units, and there is some ability to expand or contract unit sizes. The footprints vary in width from 30-35 feet, and the length ranges from 48 to 60 feet.

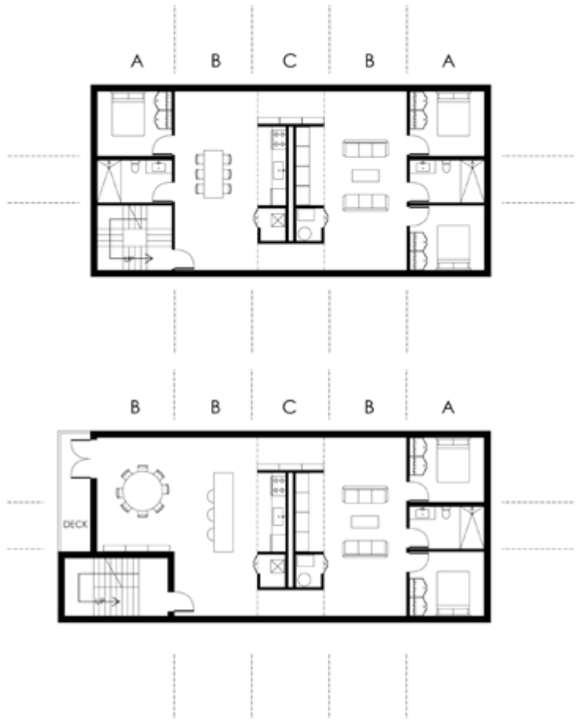
The matrix above shows the two basic gable configuration of a building at both 2- and 3- stories, at varied lengths. Balconies and roof decks are planned at front, side, or rear of a unit. Varied stair configurations allow buildings to be joined for greater density as row houses.

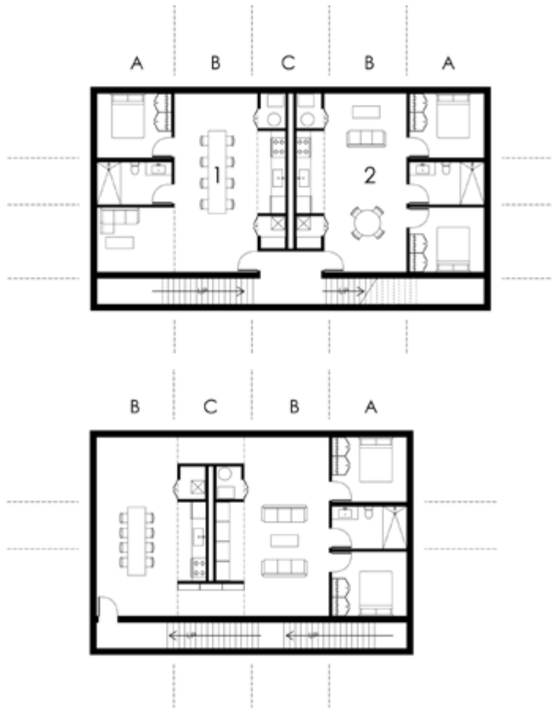
The site plan above shows the characteristic front stoops of the surrounding blocks. The proposed Future Deckers have neither these small staircases nor the basements that hold them up. Contemporary housing models often lack such features, but it remains important to find other means to celebrate thesholds and the liminal spaces between public and private. As Block House moves from an idea to a design, the entry porch will be a priorty.

CONFIGURATIONS









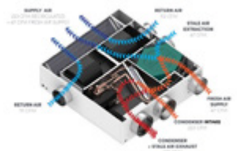
The rectangular footprint of a Block House unit is constructed as series of 12 foot wide cartridges of three types, with multiple combinations possible. For example, the two drawings above show the same unit as (1) two-bedroom, and (2) one-bedroom units. The plans to the right demonstrate that the same foot print could become a three-bedroom unit.

Bedroom/Bath/Core (A): Located at either end of a building, this cartridge contains stair core, bathroom, and bedroom. The bathroom pod has some complexity for renovation while the stair, balcony, and bedroom dimensions are the same. What could start as a stair core and generous outside deck can be renovated as a bathroom and bedroom. In the subsequent design phase, we will look at bathroom systems for modularity and ease of installation, recognizing that it is more expensive and difficult to add plumbing.

Living/Dining (B): This is an open plan area. Intended for living and dining space. There is no plumbing in this cartridge, but there are versions of a B module that contains the stair core.

Kitchen/Systems (C): This is the most complex and costly of the cartridges, with both the kitchen infrastructure and the mechanical closets. Design development will look to optimize the distribution of water, electricity and air for both flexibility and efficiency. We assume compact systems powered by electricity, with Mini-split Heat Pumps, a Solar Hot Water Heater and an Energy Recovery Ventilator organized on a spine.

HEATING + COOLING



1. ROOFTOP PHOTOVOLTAIC PANELS provide approximately 100,000 kWh/year. The Owner's meter picks up the water heater and ERV, both predictable loads, with net excess is available to a third-party purchaser (e.g. City of Boston). Sizable tax incentives combined with significant energy production means that it is possible to pay back the cost of the solar array within 3-5 years. The net present value of the future energy savings on a large development significantly offsets the initial construction investment.

2. TRIPLE PANE WINDOWS

3. DENSE PACK CELLULOSE @ WALLS AND FLOORS

4. DUCTED ERV w/ INTEGRATED HEAT PUMP eliminates the need for exterior condensers. They perform well in area volumes less than 15,000 cubic feet (e.g. 30'x48' footprint with 8'-6" ceilings). Ideal for moderate size units with relatively low heating and cooling loads.

5. SOLAR ASSISTED HEAT PUMP relies on the inherent temperature differential between exterior and interior air. An exterior thermal panel can be mounted vertically on any wall, generating enough energy to heat domestic water.

6. CONCRETE-FREE SLAB sits on highly compacted gravel fill and pea stone with robust floor framing over R-40 rigid foam and a continuous moisture barrier. This unconventional method of building a slab on grade dramatically reduces the amount of foundation concrete, improving the building's overall embodied carbon score.

In an effort to move toward **NET ZERO**, energy recovery ventilators (ERVs) and solar water heaters replace the gas fired boilers and water heaters typical in multifamily building of the same size, and requiring about 90% less energy. The roof structure accommodates photovoltaic panels, so that the site energy use is net positive. Larger developments can take a Solar District approach, aggregating buildings for a combined output. A tight envelope (R40 walls, R60 Roof) sealed and with continuous air barrier helps reduce overall demand for heating and cooling. Efficient appliances with occupant feedback help reduce operational energy consumption.