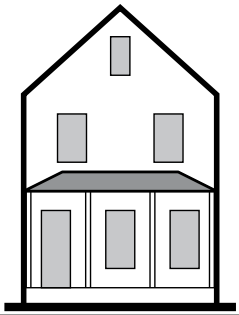
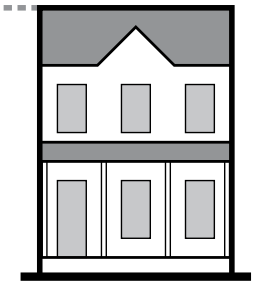
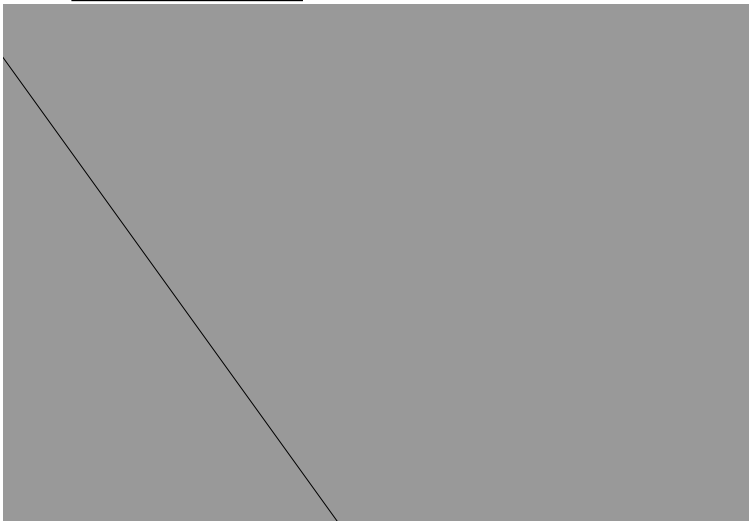
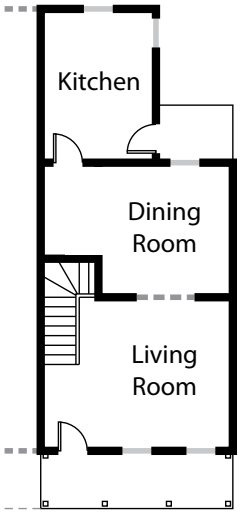
COTTAGE
FLAT FRONT WITHOUT REAR ELL
Freestanding
Open gable roof
16–20′ wide
3 bays
2–3 bedrooms
1 bathroom
full-width porch

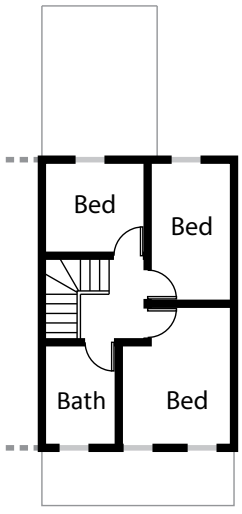


COTTAGE
FLAT FRONT WITH REAR ELL
Freestanding/semi-detached
Mansard roof, usually with center gable
16–20′ wide
3 bays
2–3 bedrooms
1 bathroom
full-width porch









COTTAGE

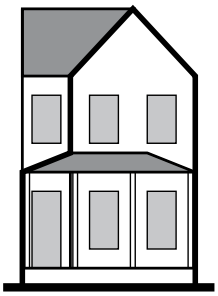
GABELED ELL

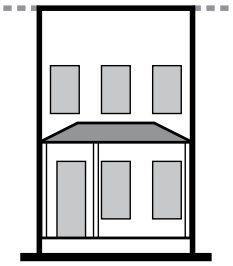
Freestanding
Intersecting gabled roof
16–20′ wide
3 bays
3 bedrooms
1 bathroom
full- or partial-width porch

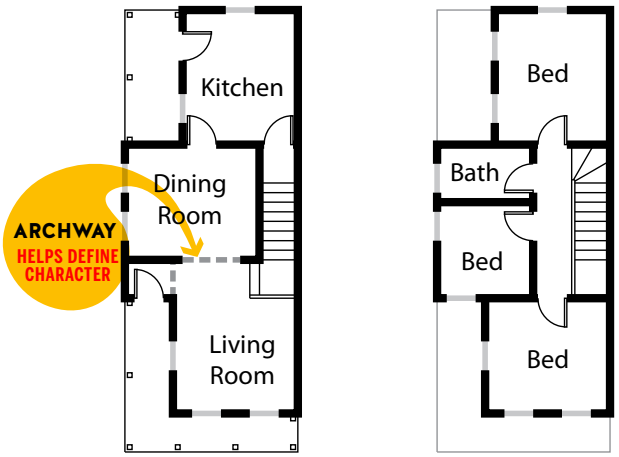
ITALIANATE

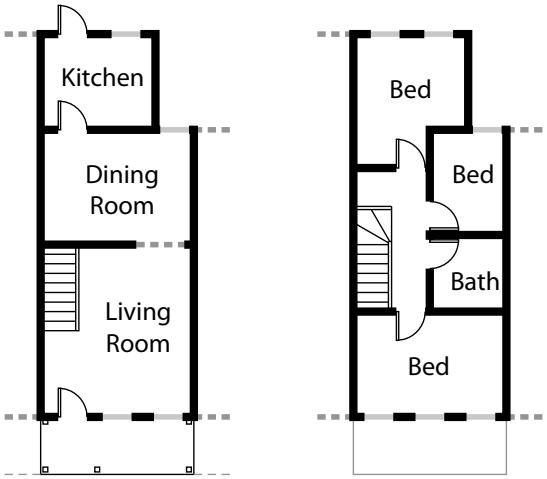
WOOD FRAME WITH FLAT FRONT

Row/Semi-detached
Sloping roof behind parapet
14–18′ wide
3 bays
2–3 bedrooms
1 bathroom
Full-width porch





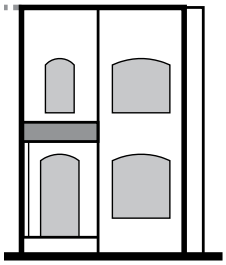


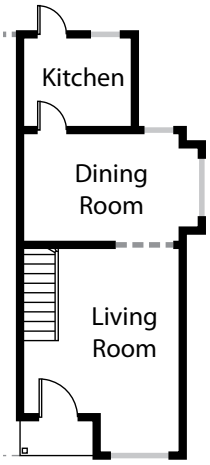


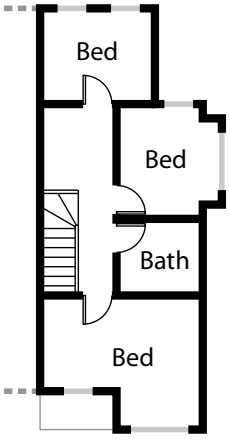
ITALIANATE

ASONRY WITH PROJECTING BAY

- Row/Semi-detached
- Sloping roof behind parapet
- 14–18′ wide
- 2 bays
- 2-3 bedrooms
- 1 bathroom
- Partial-width porch

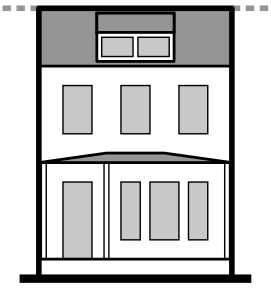


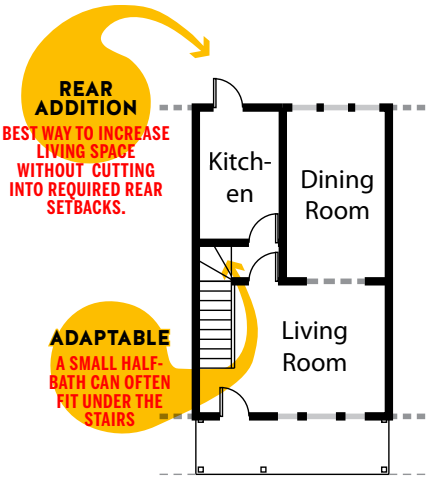


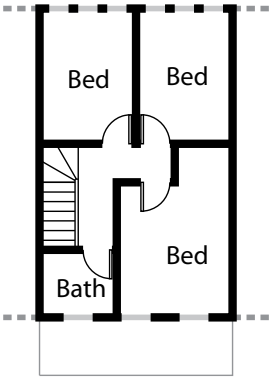


WASHINGTON ROW

- Row
- Mansard roof
- 18–22′ wide
- 3 bays
- 3 bedrooms
- 1 bathroom
- full-width porch

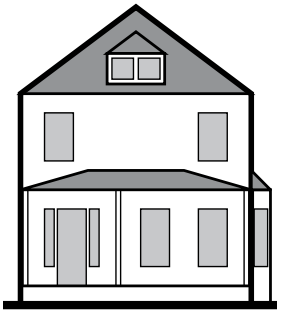


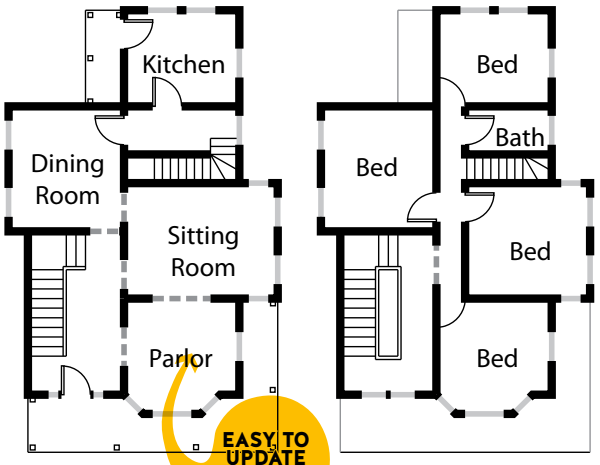


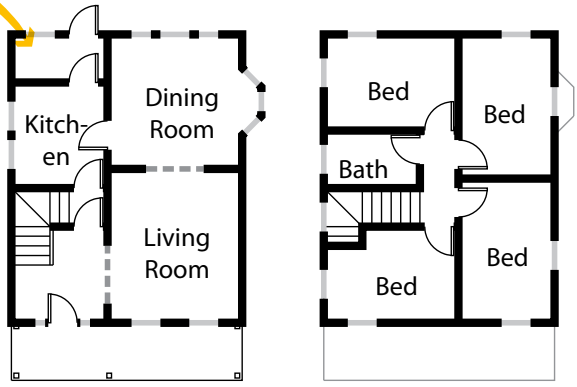


QUEEN ANNE
Freestanding
Mixed roof types
Irregular, asymmetrical form
24–32′ wide
3–4 bedrooms
1–2 bathrooms
Full- or partial-width porch

AMERICAN FOURSQUARE
Freestanding
Hipped roof
20–22′ wide
2–3 bays
3 bedrooms
1–2 bathrooms
full- or partial-width porch







BUILDING TYPES

AN OVERVIEW OF COMMON TYPES OF HOUSING, DESIGNED TO HELP DEVELOPERS OF NEW HOUSING UNDERSTAND WHAT WORKS BEST IN THE CHASE NEIGHBORHOODS.

BUILDING TYPES ROWHOUSE

Skylights can boost energy efficiency by bringing natural light to the interior of long rowhouse units with no side windows

Characteristics

Attached single-family units are part of a connected row with shared dividing walls between units. This highly flexible unit type is directly adaptable to fill in lots as narrow as 16´ and as wide as 30´across, with depths of at least 80´.

HEIGHT

Rowhouses are typically two stories tall, although some existing buildings are 28´ to 30´ tall due to factors such as topography, a raised first floor, or a large floor-to-ceiling dimension. Floor levels for proposed infill houses should always match adjacent units, although the need to create accessibility from the sidewalk may sometimes require a lower first-floor height to accommodate an entrance ramp.

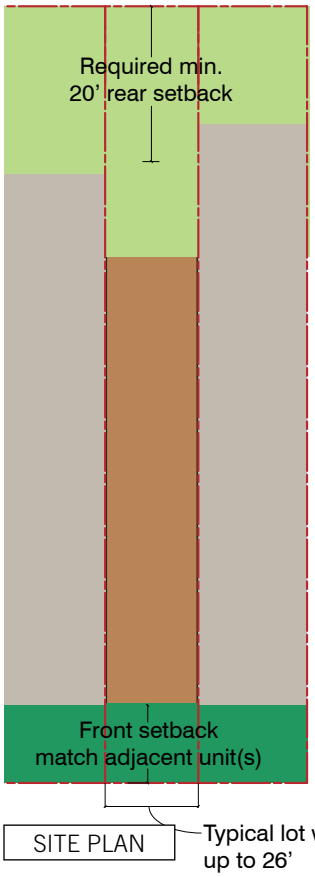
SETBACKS

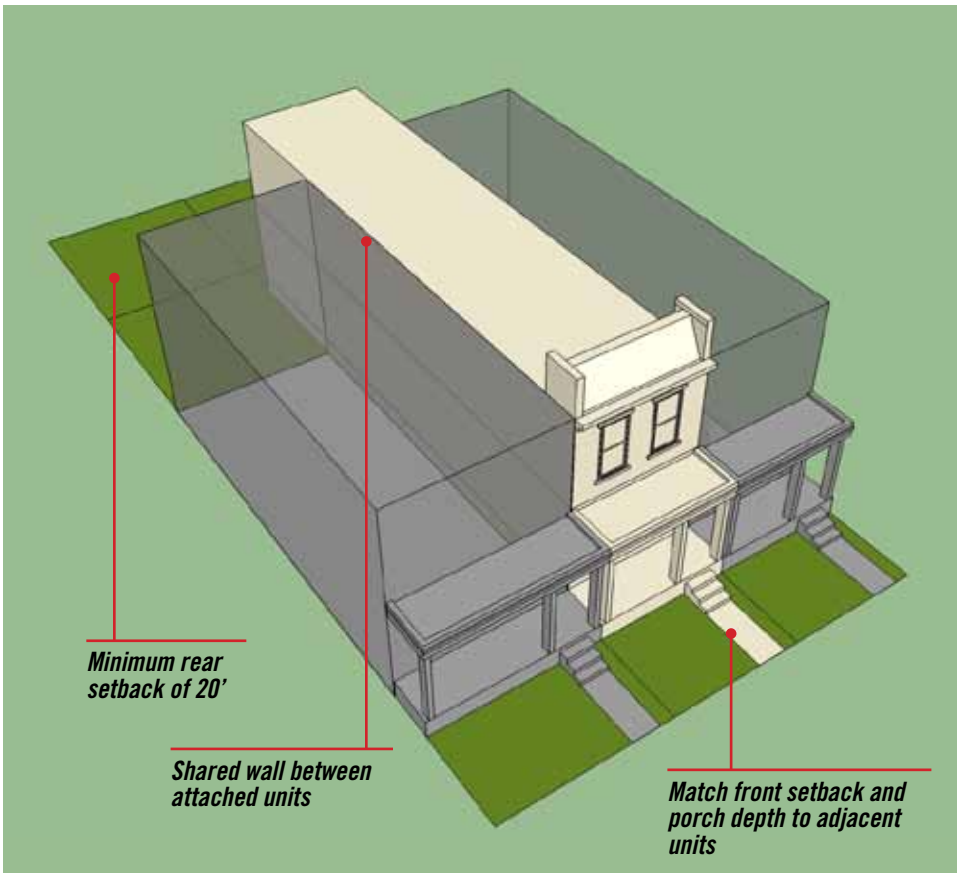
- The front setback on a new unit should fall within the range of existing setbacks on the same side of the street in the block where the building is proposed.
- Existing zoning requires a minimum rear setback of 20´ in existing R-2 and R-3 zones.
- Parcels at the end of a row must also have a side setback, which should fall within the range of the front setbacks of adjacent units.

BUILDING ELEMENTS AND COMPOSITION

Ideally, buildings should maintain compatibility with the overall architecture of the street. The location and composition of doors, windows and porches should reflect the architectural character of the street. On corner units, the front porch should wrap around the structure to address both streets. Acceptable roof forms include flat roofs with parapets, gable roofs, and mansard roofs, depending on the street character. Consider providing roof-accessed terraces for units with flat roofs.[1] Stretches of blank walls without openings should be less than 8´ along street-facing facades.

[1] *Roof terraces may not be visible from the street in historic districts.*





PARKING

Where rear alleys exist, a rowhouse may provide off-street parking behind the building. Where alleys do not exist, parking may be limited to available on-street parking spaces. The front of the building or the front setback should never include parking.

GREEN DESIGN

- Because rowhouses share side walls in most cases, only the front and back rooms get full natural lighting and ventilation, particularly in houses more than 36´ deep. Skylights or light-wells, however, can deliver natural light to the central portion of the house, making new construction more energy-efficient than historic prototypes without altering massing and facade composition.
- The same shared walls that limit interior lighting also greatly improve insulation, making heating and cooling easier and cheaper in a rowhouse than in a semi-detached or fully detached unit.

Units with flat rooftops can include rooftop terraces with access from the unit, if the terraces are properly concealed.

ROWHOUSE

Typical Layout

A typical three-bed, three-bath unit on a 16- to 19-foot-wide lot is one room wide and ranges from 40´ to 60´ deep. The first floor contains the living room, the kitchen and dining space, and one bedroom, with two bedrooms located on the second floor. Three-bed units wider than 14´ can be converted to accessible units without any need for stair lifts.

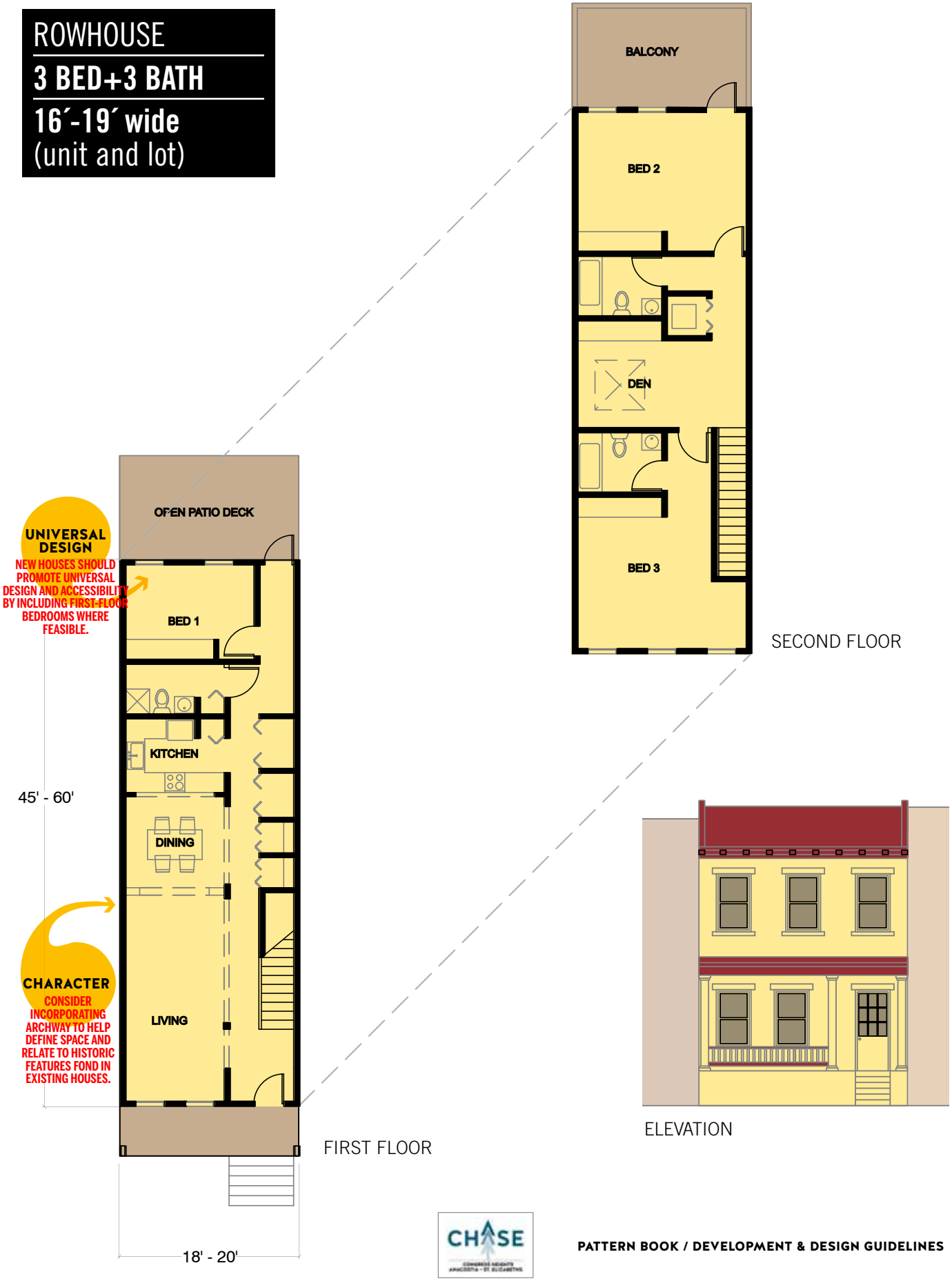
Sample Lot: 16´× 100´

DWELLING UNIT	
Stories	2
Building height	20´–26´
Units	1
Bed/bath	3-bed/3-bath
First floor	1,100 sf
Second floor	900 sf
Total gross area *(includes covered porch and patio)*	2,000 sf
SETBACKS	
Front setback	Match adjacent unit
Side setbacks	—
Rear setback	20´ minimum
LOT COVERAGE	
Lot area	1,600 sf
Ground coverage	1,100 sf
Coverage ratio	68%
NOTES	
> Suitable for modular construction	

ROWHOUSE

3 BED+3 BATH

16´-19´ wide
(unit and lot)



ROWHOUSE

Typical Layout

A typical five-bed, two-and-one-half-bath unit on a 20- to 26-foot-wide lot is a single room wide, and ranges from 45´ to 55´ deep. The first floor contains the living and dining rooms, the kitchen, and one bedroom, with four bedrooms on the second floor. Units wider than 14´ can easily be made accessible without the need for stair lifts.

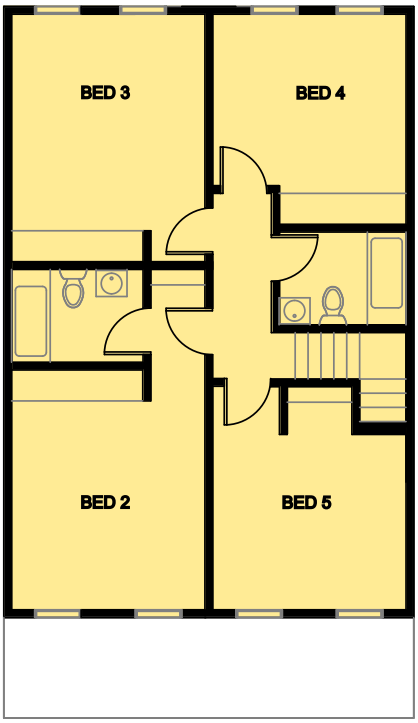
Sample Lot: 26´× 80´

DWELLING UNIT	
Stories	2
Building height	20´–26´
Units	1
Bed/bath	5-bed/3-bath
First floor	1,200 sf
Second floor	1,050 sf
Total gross area *(includes front porch and back patio)*	2,250 sf
SETBACKS	
Front setback	Match adjacent unit
Side setbacks	—
Rear setback	20´ minimum
LOT COVERAGE	
Lot area	2,080 sf
Ground coverage	1,200 sf
Coverage ratio	58%
NOTES	
> Suitable for modular construction	

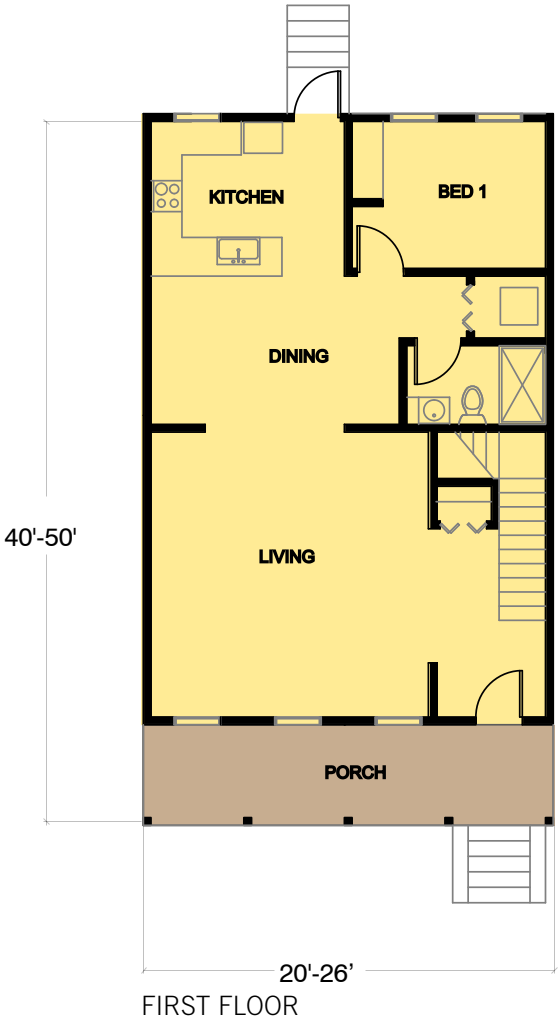
ROWHOUSE

5 BED+3 BATH

20´-26´ wide
(unit and lot)



SECOND FLOOR



FIRST FLOOR

ELEVATION

BUILDING TYPES
SEMI-DETACHED

Characteristics

Semi-detached single-family units are part of a two-unit, connected structure with a shared dividing wall between units. This highly flexible unit type is directly adaptable to infill lots as narrow as 16´ and as wide as 35´, with depths of at least 80´.

HEIGHT

Semi-detached units are typically two stories tall, although some existing units are 28´ or 30´ tall due to factors such as topography, a raised first floor, or a large floor-to-ceiling dimension. Floor levels for proposed infill houses should always match adjacent units, although the need to create accessibility from the sidewalk may sometimes require a lower first-floor height to accommodate an entrance ramp.

SETBACKS

- The front setback on a new unit should fall within the range of existing setbacks on the same side of the street in the block where the building is proposed.
- Existing zoning requires a minimum rear setback of 20´ in existing R-2 and R-3 zones.
- Parcels at the end of a street must also have a side setback, which should fall within the range of the front setbacks of adjacent units.

BUILDING ELEMENTS AND COMPOSITION

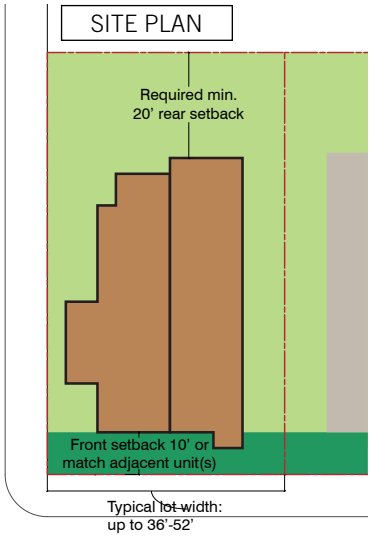
Design buildings to maintain compatibility with the overall architecture of the street. The location and composition of doors, windows and porches should reflect the architectural character of the street. On corner units, the front porch should wrap around the structure to address both streets. Acceptable roof forms include flat roofs with parapets, gable roofs, and mansard roofs, depending on the street character. Consider

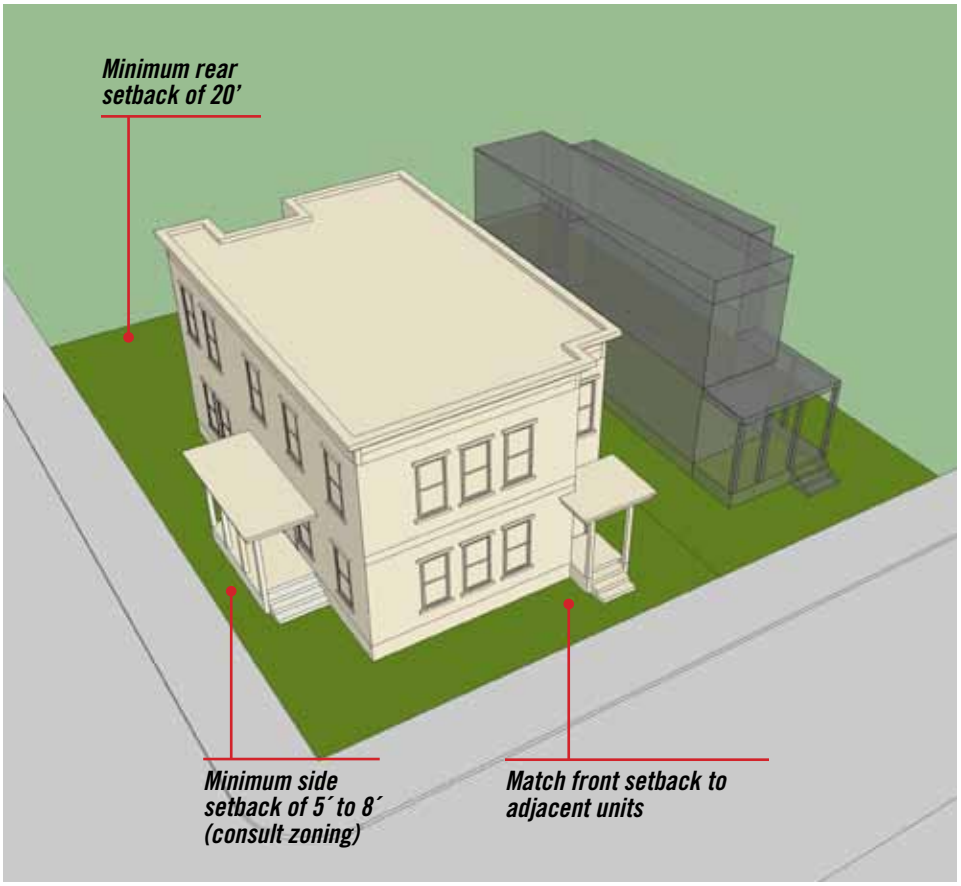
providing rooftop terraces with direct access from the unit for units with flat roofs. Stretches of blank walls without openings should be less than 8´ along street-facing facades.

PARKING

Where rear alleys exist, a unit may provide off-street parking behind the building. Where alleys do not exist, parking may rely on available on-street spaces. The front of the unit or the front setback should never include parking.

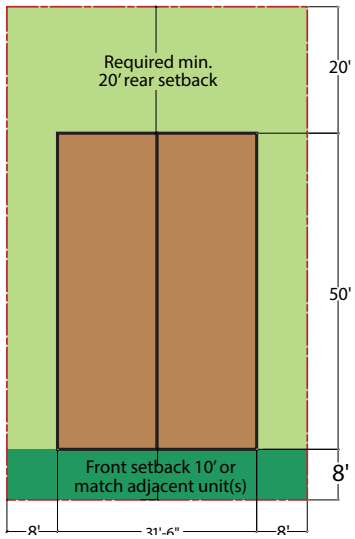
SEMI-DETACHED CORNER UNIT

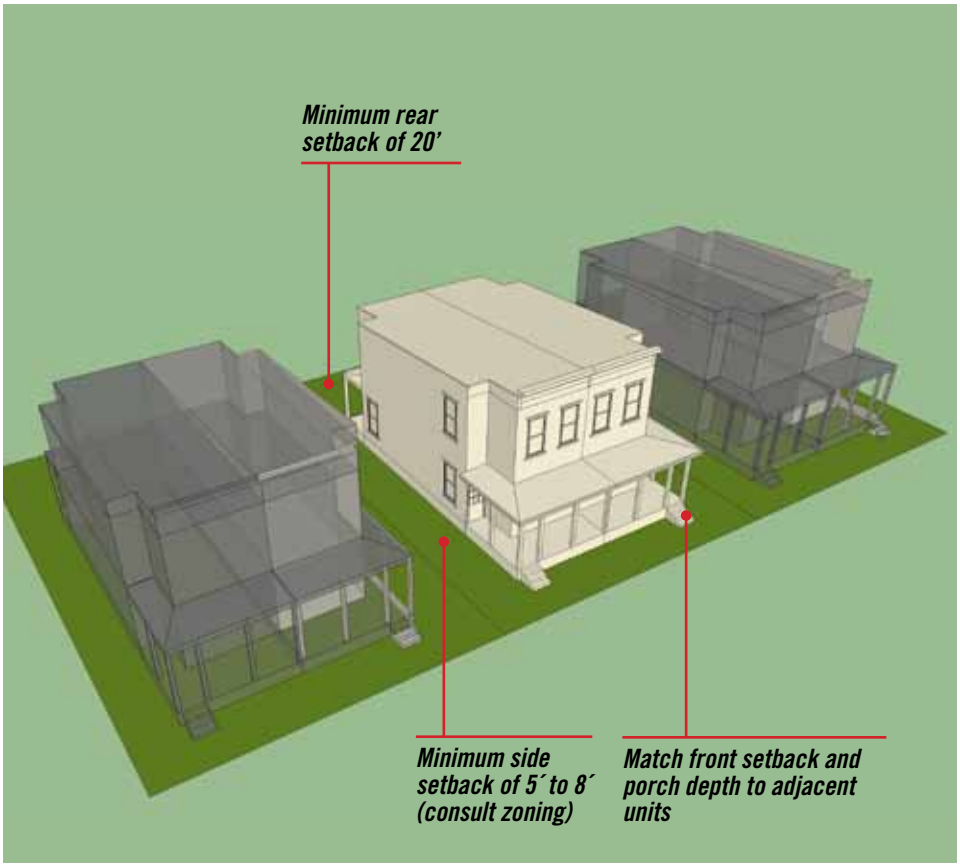




SEMI-DETACHED MID-BLOCK UNIT

SITE PLAN





SEMI-DETACHED CORNER UNIT

Typical Layout

These two units are designed so a front door faces each street. A typical two-bed/two-bath unit on a 60-foot-wide lot is a single room wide and ranges from 46′ to 60′ deep. The first floor contains the living room and eat-in kitchen, with two bedrooms located above.

A typical four-bed/three[-bath unit is two rooms wide. The first floor contains the living and dining/family rooms, kitchen, and one bedroom, with three bedrooms and a loft space on the second floor.

Sample Lot: 60′× 100′

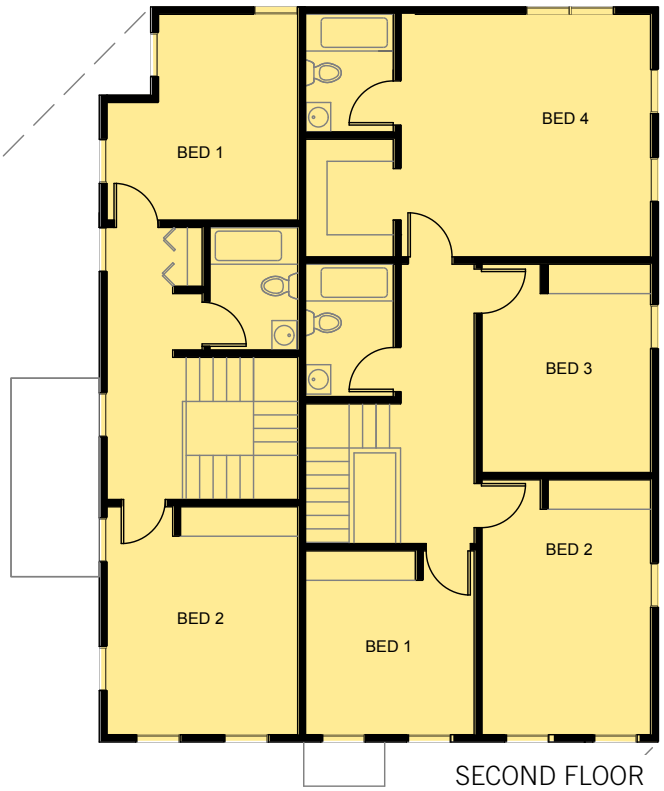
DWELLING UNIT	
Stories	2
Building height	20′–26′
Units	2
Unit 1 (2-bed+2-bath)	
First floor	760 sf
Second floor	670 sf
Total gross area*	1,430 sf
Unit 2 (4-bed+3-bath)	
First floor	1,230 sf
Second floor	1,200 sf
Total gross area*	2,430 sf
** includes front porch and back patios*	
SETBACKS	
Front setback	Match adjacent unit
Side setbacks	8′ minimum
Rear setback	20′ minimum
LOT COVERAGE	
Lot area	6,000 sf
Ground coverage	3,860 sf
Coverage ratio	64%
NOTES	
> Suitable for modular construction > Appropriate for R2 and R3 zones	

SEMI-DETACHED CORNER UNIT

2-4 BED+2-3 BATH

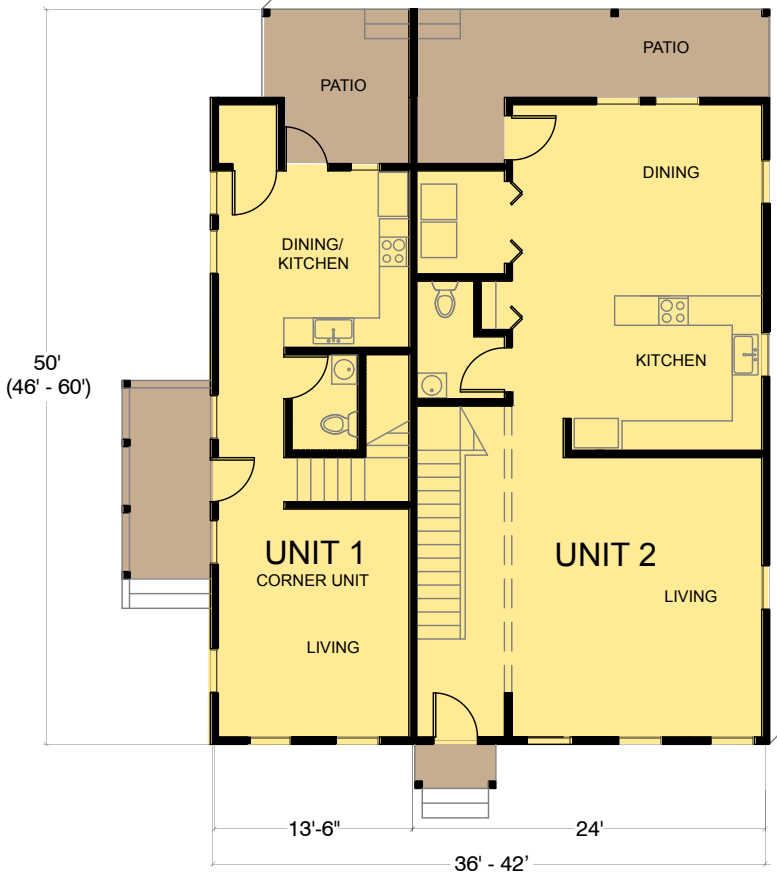
36´-42´ WIDE*

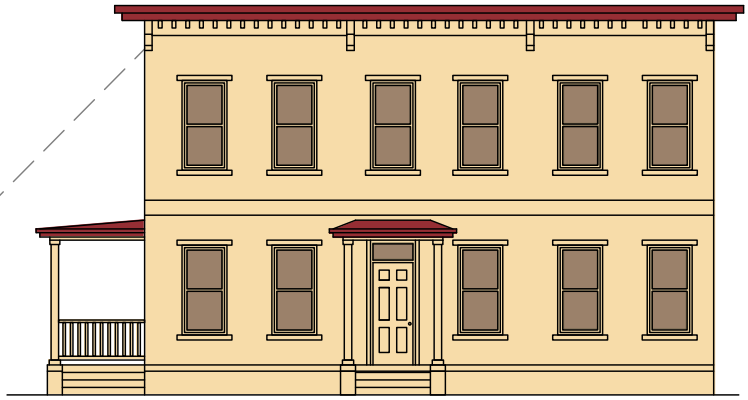
* Since this unit typically is built in pairs, the width shown spans two units. Each unit has a yard, and together they fill the lot.



SECOND FLOOR

FIRST FLOOR





ELEVATION

SEMI-DETACHED MID-BLOCK UNIT

Typical Layout

The front doors of both units face the same street in this mid-block configuration. A typical two-bed/two-bath unit on a 55- to 65-foot-wide lot is one room wide, and ranges from 44´ to 52´ deep. The first floor contains the living and dining rooms and an eat-in kitchen, with two bedrooms located on the floor above.

A typical four-bed/three-bath unit is two rooms wide. The first floor contains the living and dining/family rooms, a kitchen and one bath, with three bedrooms located on the floor above.

Sample Lot: 60´100´

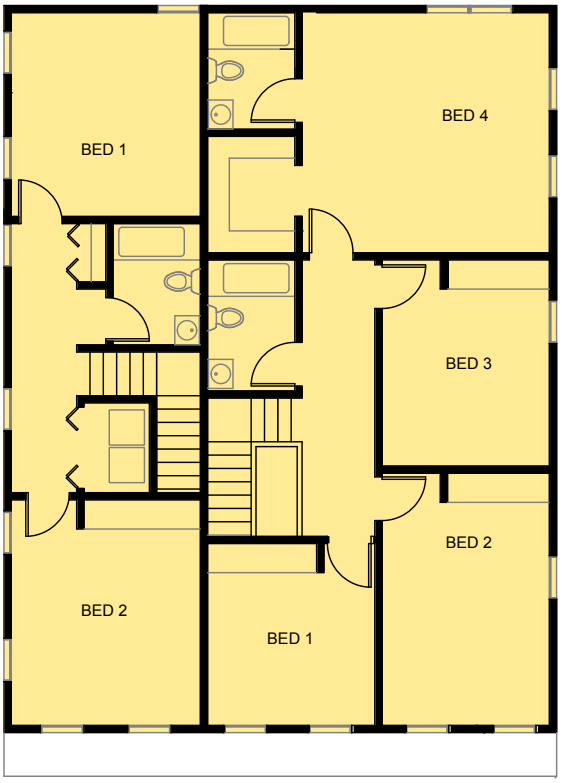
DWELLING UNIT	
Stories	2
Building height	20´–26´
Units	2
Unit 1 (2-bed+2-bath)	
First floor	790 sf
Second floor	640 sf
Total gross area*	1,430 sf
Unit 2 (4-bed+3-bath)	
First floor	1,210 sf
Second floor	1,010 sf
Total gross area*	2,220 sf
** includes front porch and back patios*	
SETBACKS	
Front setback	Match adjacent unit
Side setbacks	8´ minimum
Rear setback	20´ minimum
LOT COVERAGE	
Lot area	6,000 sf
Ground coverage	3,650 sf
Coverage ratio	61%
NOTES	
> Suitable for modular construction > Appropriate for R2 and R3 zones	

SEMI-DETACHED MID-BLOCK UNIT

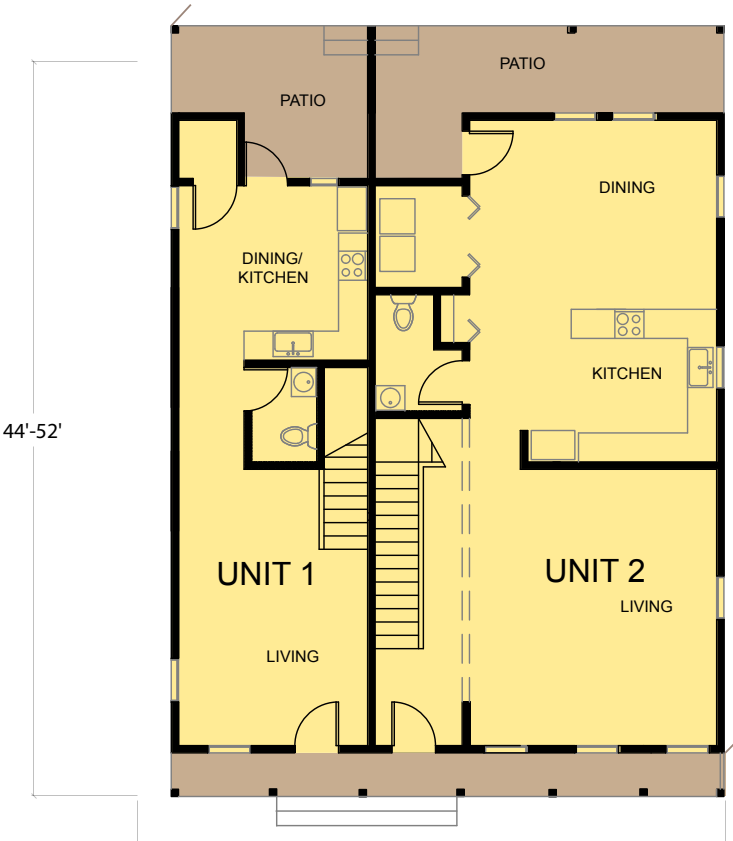
2-4 BED+2-3 BATH

36´-42´ WIDE*

* Since this unit typically is built in pairs, this width is for two. Each unit has a yard, and together they typically fill the lot.



SECOND FLOOR



FIRST FLOOR

ELEVATION

BUILDING TYPES DETACHED

Characteristics

Free-standing, detached single-family units allow windows on all sides. This highly flexible unit type requires a larger lot; it should measure at least 36´ wide and at least 72´ deep.

HEIGHT

Typically one to two stories tall, some existing detached single-family units include a third story within a mansard roof or using dormer windows within a pitched roof. Floor levels for proposed infill houses should always match adjacent units, although the need to create accessibility from the sidewalk may sometimes require a lower first-floor height to accommodate an entrance ramp.

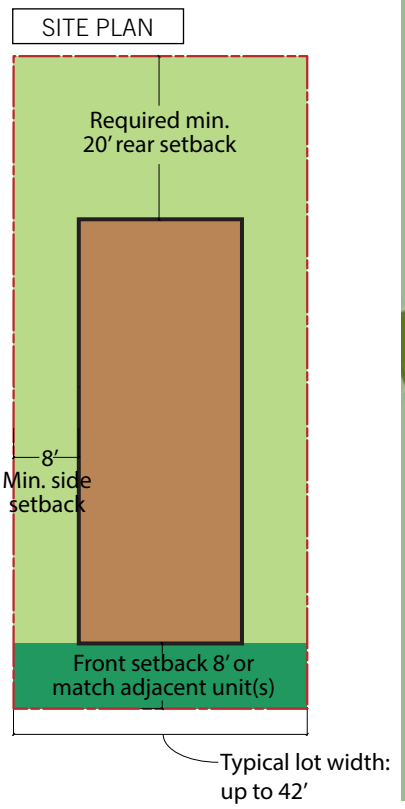
SETBACKS

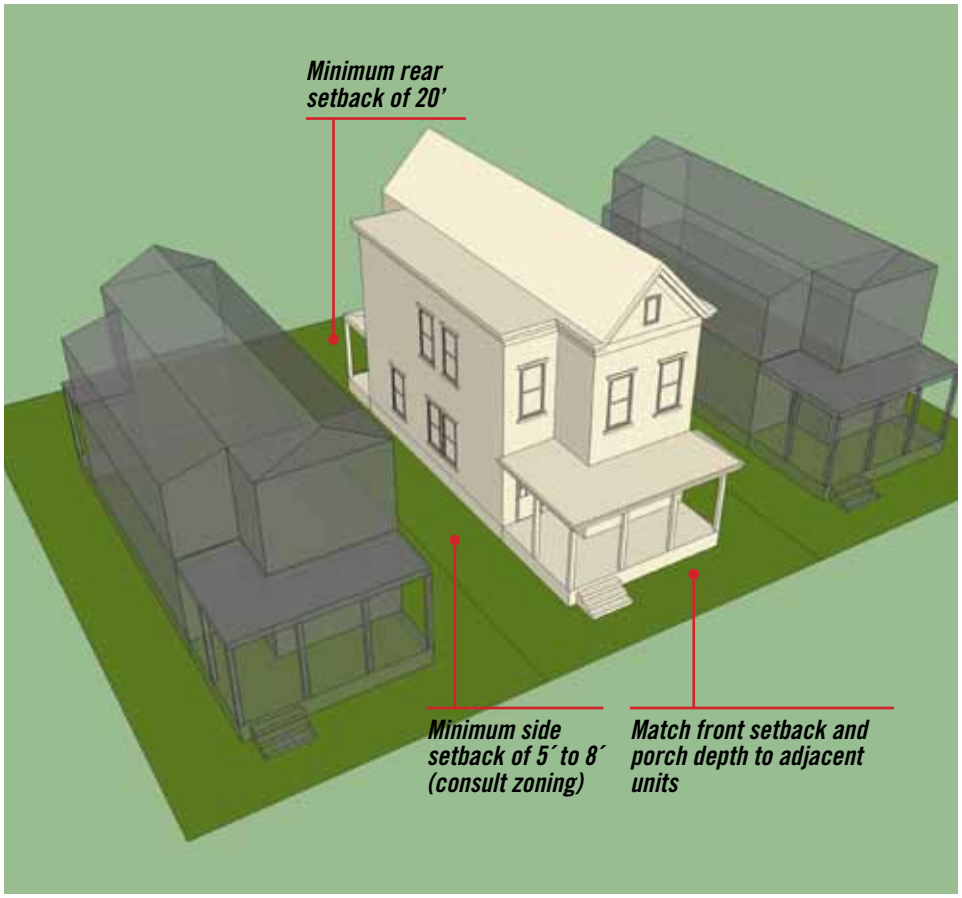
- The front setback on a new unit should fall within the range of existing setbacks on the same side of the street in the block where the building is proposed.
- Existing zoning requires a minimum rear setback of 20´ in existing R-2 and R-3 zones.
- Required minimum side setbacks are either 5´ or 8´, depending on the zoning category that governs the property.

BUILDING ELEMENTS AND COMPOSITION

Design buildings to maintain compatibility with the overall architecture of the street. The location and composition of doors, windows and porches should reflect the architectural character of the street. On corner units, the front porch should wrap around the structure to address both streets. Acceptable roof forms include flat roofs with parapets, gable roofs, and mansard roofs, depending on the street character. Consider providing roof-accessed terraces for units with flat roofs. Stretches of blank walls without openings should be less than 8´ along street-facing facades.

DETACHED MID-BLOCK UNIT





PARKING

Where rear alleys exist, a unit may provide off-street parking behind the building. Where alleys do not exist, parking may be limited to available on-street parking spaces.

DETACHED CORNER UNIT

Typical Layout

A two-bed, one-and-one-half-bath unit on a 16- to 18-foot-wide lot is a single room wide and ranges from 44′ to 52′ deep. The first floor contains the living and dining/family rooms and kitchen, with two bedrooms located on the second floor.

Sample Lot: 16′× 80′

DWELLING UNIT	
Footprint	16′x50′
Stories	2
Building height	20′–24′
Units	1
Bed/bath	2-bed/1.5-bath
First floor	800 sf
Second floor	650 sf
Total gross area *(includes covered porch)*	1,450 sf
SETBACKS	
Front setback	Match adjacent unit
Side setbacks	8′ minimum
Rear setback	20′ minimum
LOT COVERAGE	
Lot area	1,280 sf
Ground coverage	800 sf
Coverage ratio	63%
NOTES	
> Suitable for modular construction > Appropriate for R2 and R3 zones	

DETACHED CORNER UNIT

2 BED+1.5 BATH

14´-18´ WIDE

ELEVATION

DETACHED MID-BLOCK UNIT

Typical Layout

A typical three-bed/two-bath house on a 34- to 42-foot-wide lot is a single room wide and ranges from 44′ to 60′ deep. The first floor contains the living/dining room, kitchen, and one bedroom, with two bedrooms located above.

A straight set of stairs connects the two levels.

Sample Lot: 36′× 80′

DWELLING UNIT	
Footprint	20′x52′
Stories	2
Building height	20′–24′
Units	1
Bed/bath	2-bed/1.5-bath
First floor	1,040 sf
Second floor	860 sf
Total gross area *includes front porch and back patio*	1,900 sf
SETBACKS	
Front setback	Match adjacent unit
Side setbacks	5′–8′ minimum
Rear setback	20′ minimum
LOT COVERAGE	
Lot area	2,880 sf
Ground coverage	1,040 sf
Coverage ratio	36%
NOTES	
> Suitable for modular construction > Appropriate for R2 and R3 zones	

DETACHED MID-BLOCK UNIT

3 BED+2 BATH

16´-22´ WIDE


ELEVATION

DETACHED MID-BLOCK UNIT

Typical Layout

Based on the "American Foursquare" house style, this prototype is a four-bed, three-bath, family unit on a 35- to 45-foot-wide lot. A typical design has four rooms—two rooms wide by two rooms deep—on each floor. The first floor contains the living room, kitchen/dining room, and one bedroom, with three bedrooms and a study on the second floor.

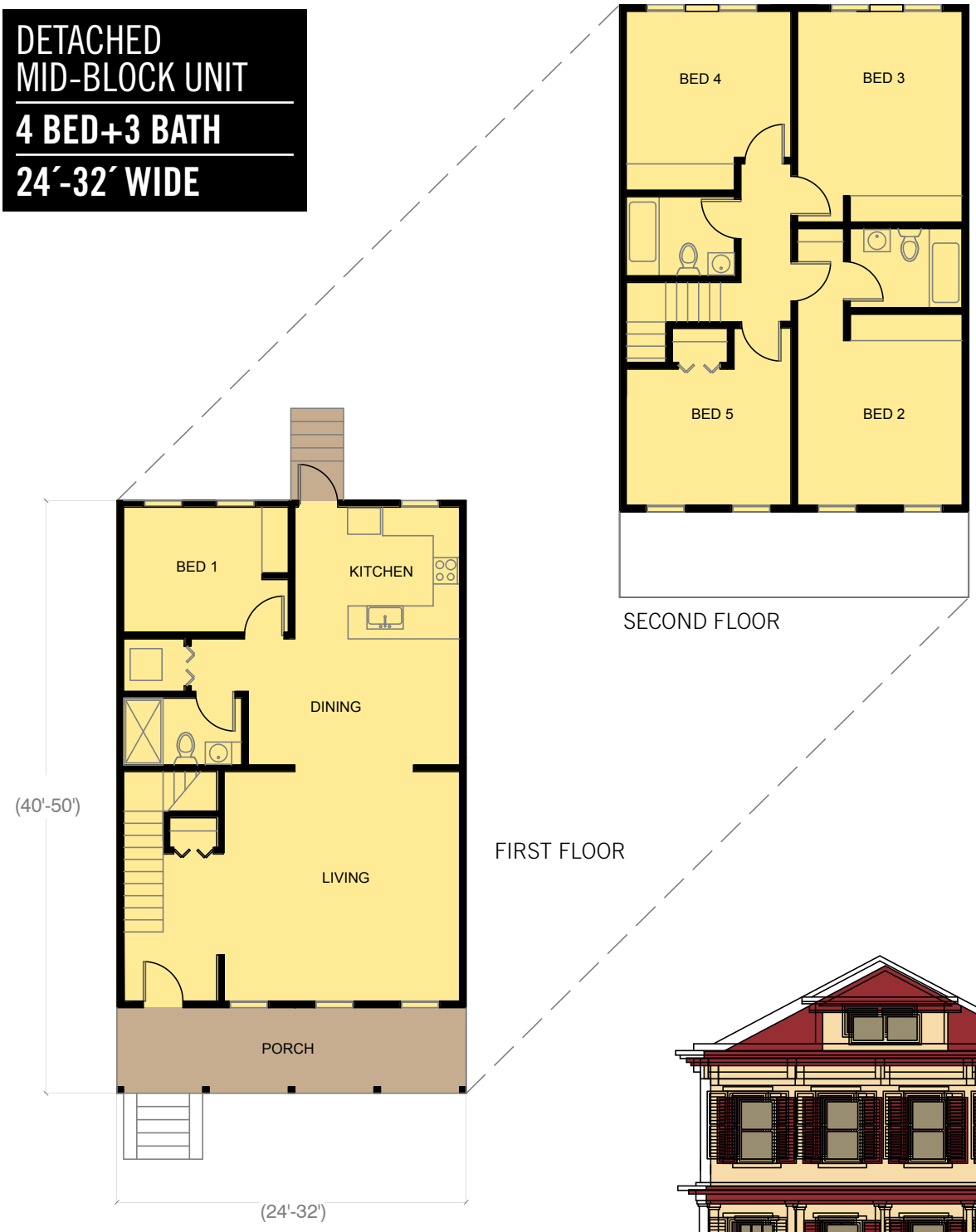
Sample Lot: 42′× 80′

DWELLING UNIT	
Stories	2
Building height	20′–24′
Units	1
Bed/bath	4-bed/3-bath
First floor	1,200 sf
Second floor	1,000 sf
Total gross area	2,200 sf
*** includes front porch, back patio*	
SETBACKS	
Front setback	Match adjacent unit
Side setbacks	8′ minimum
Rear setback	20′ minimum
LOT COVERAGE	
Lot area	3,360 sf
Ground coverage	1,200 sf
Coverage ratio	37%
NOTES	
> Suitable for modular construction > Appropriate for R2 and R3 zones	

DETACHED MID-BLOCK UNIT

4 BED+3 BATH

24´-32´ WIDE



ELEVATION

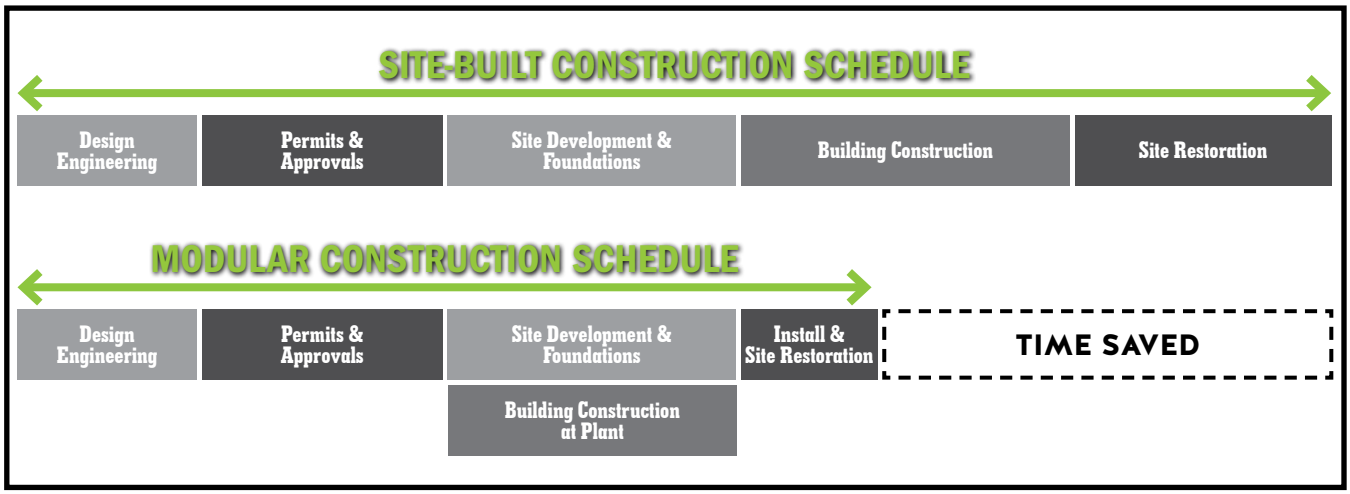
MODULAR CONSTRUCTION

The CHASE study evaluated modular construction for its ability to increase infill housing development in the CHASE neighborhoods. The potential advantages and disadvantages that the evaluation identified vary, based on project goals and conditions. Anyone pursuing infill development in the CHASE area should consider using modular techniques if it appears that the project could benefit from modular housing's advantages.

ADVANTAGES

Modular or "factory" construction offers several potential advantages over conventional techniques:

- **Lower costs** resulting from shorter construction time, controlled building conditions, and other factors described below.
- **Time savings.** Weather does not affect factory construction, and site preparation work can take place while modules are being built, shortening total construction time by up to 50% in urban areas. The time savings means houses reach the market faster and would produce visible evidence of change in the CHASE neighborhoods more quickly.
- **Efficiency of scale.** Building multiple houses at once in a factory yields lower per-unit costs than building each house individually on site.
- **Improved sustainability.** Factory construction not only reduces material waste in construction, it produces more tightly sealed buildings. With less air infiltration than site-built houses, modular homes deliver lower energy costs for the people who live in them.
- **Higher-quality structures.** Modular construction must meet or exceed the same local building codes as site-built housing. Construction in a controlled factory environment eliminates weather damage that site-built houses can sustain and improves construction quality. Because each module has its own floor, ceiling, and walls—essentially doubling sound insulation when modules and entire units are connected to each other—modular construction reduces sound transmission in rowhouses and from room to room within a unit.
- **Neighborhood-friendly qualities.** Like traditional site-built housing, modular housing



SOURCE: WWW.MODULAR.ORG

designs can reflect local character. The technique greatly reduces construction-site impacts—including noise, dust, and debris—and module assembly can occur in one day. As noted earlier, a shorter construction schedule produces block-transforming results sooner than traditional methods.

- **Better job-site security.** Factory-built modules can be assembled on-site in a day and secured with plywood over the windows. This greatly reduces the risk and cost of construction-site theft and vandalism.

DISADVANTAGES

Modular construction may also present some disadvantages:

- **Fewer local jobs.** Modular construction produces fewer local jobs than on-site construction, since much of the work occurs in a factory. Assembly and finishing do require local workers, but the create fewer total jobs. Given the CHASE Action Agenda emphasis on local job creation, this may stand as a significant drawback. Nevertheless, if modular construction adds housing that otherwise would not exist, it may still represent a strong net advantage for the CHASE neighborhoods in the form of increased housing choice, greater affordability, neighborhood stabilization, new support for local retailers, and other aspects.
- **Learning curve for designers and builders.** Assuring a smooth work flow requires better communication and coordination between the builder, design architect, and trades handling on-site connections (such as mechanical, electrical, and plumbing). This is especially important for those unfamiliar with modular techniques.
- **Financing.** Lenders may know little about modular housing or have misconceptions about its quality. Work with lenders to ensure fair evaluations and sales comps that include traditional site-built houses.
- **Difficulty of delivering completed modules.** The route to each site must be carefully evaluated for feasibility of transporting building modules for installation. Transporting modules will require the developer to obtain permits and apply for traffic restrictions.

CREATING LOCAL JOBS WITH MODULAR CONSTRUCTION

Other communities have successfully addressed the local-jobs issue. As one example, the Southwest Michigan Builders Association reached a deal with a modular builder to send local residents to train in the builder's factory and learn to install modules on site (SMBA provided transportation tand from the factory). The residents who successfully completed the program were hired by local contractors to complete the work and continued as full-time workers with the contractors.

Technical Considerations for Modular Construction

CRITICAL DIMENSIONS OF MODULES

- **Width:** A floor width of 15´2˝ is the most common to maximize area per module (leading to a maximum 16´ overall module width, which includes roof overhang). Widths as small as 8´ are possible but less efficient.
- **Height:** An 11´6˝ height is typical to keep total height of modules being transported by trailer, under 13´6˝. Heights of up to 13´ are possible.
- **Length:** Up to 70´, usually in 2' increments. Consult local regulations for maximum trailer lengths, which is 55´ in the District).
- **Ceiling-to-floor thickness:** Approximately 20˝ between the bottom of the ceiling of the lower module and surface of the floor in the module above it. Each module has a floor and a ceiling, producing a double thickness where they meet.

DESIGN

- Type V wood-frame construction is most common.
- Within the constraints of the site and the zoning requirements for setbacks, design for the maximum amount of interior floor area in each module to reduce the number of modules needed, which in turn cuts transportation and installation costs.
- Site-built pieces such as porches, stoops, and bay windows can be added to factory-built modules for more design flexibility.
- Room widths greater than the module width can be created using open spans of up to 11´ without additional support, or 16´ with additional support.
- A finished interior ceiling height of 9´ is typical. A 9´6˝ tray ceiling is also common and is the maximum height possible in a module with a total height of 11´6˝.
- A roof pitch of up to 12/12 can be accommodated with a hinged roof system that allows for transport. Trusses can also be site-built and hoisted into place, often for less than transporting bulky roofs from the factory. Flat roofs are often more expensive and require special attention to waterproofing issues.
- Siding and flooring can be factory-installed but are typically installed on-site to avoid damage during transport and on-site assembly.
- Design the module with exterior cladding dimensions in mind (for example, brick and siding dimensions) to simplify finishing.
- Contain equipment such as plubminga nd mechanical in one module to simplify on-site connections between modules.

TRANSPORTATION

- Evaluate the entire route from factory to site to minimize overhead obstructions such as power lines, overpasses, and traffic lights and to determine if streets are wide enough for a truck's turning radius, especially in an urban setting like the CHASE neighborhoods. Module widths may need to be adjusted to account for these limitations.
- Include the costs of permits and the potential added expense of off-hour transport for oversized modules. The District requires a police escort for loads greater than 12´ wide or 13´6˝ tall (height measured on the trailer), and it limits maximum trailer length to 55´.