

BETTER BASEMENT UNITS

A Guide for Single Family & Two to Four-Flat Owner-Occupants
To add a Safe, Sound, & Legal Basement Unit in Chicago





Dear Reader:

At Neighborhood Housing Services of Chicago (NHS), we are committed to helping families across Chicagoland access the wealth-building opportunities of homeownership. We do this through a variety of services including mortgage lending, financial counseling, and providing grants for current and potential income-qualified homeowners.

This year, we were excited to support the City of Chicago in creating a pilot program for Accessory Dwelling Units (ADUs), which makes it easier than ever to add a rental unit to your property in certain parts of the city. NHS, along with our partners, created this manual to help you understand the potential benefits, pitfalls, and costs associated with building an income unit in the basement of your single-family home or 2-4 flat property.

You might be wondering...how do I find a great contractor? How do I know if my building is even eligible for an additional unit? What are some of the costs associated with a project like this?

This manual will answer all of these questions and more. It'll walk you through the entire process - from planning, budgeting and designing to permitting and building.

In addition to what's printed here, NHS has a number of rehab grants available for income-qualified homeowners to help get an ADU project off the ground. Give us a call today to learn more and access our full line of services.

Sincerely,



Anthony Simpkins
President & CEO
Neighborhood Housing Services of Chicago

Contact NHS at www.nhschicago.org or 773-329-4111



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To add a Safe, Sound, & Legal Basement Unit in Chicago



Neighborhood Housing Services
of Chicago, Inc.

Better Basement Units: A Manual aims to provide owner-occupants and small, local landlords with the tools to better understand the planning, process, costs, and risks associated with legally building out or converting their basement into a rentable unit. Ideally, the drawings, diagrams, and project calculators should lower the barrier to entry for building out a legal and compliant basement unit. We also hope to make complex and technical construction content accessible to the average homeowner.

Ultimately, the goal is to empower readers to understand the viability of a basement unit for their building and individual financial situation.

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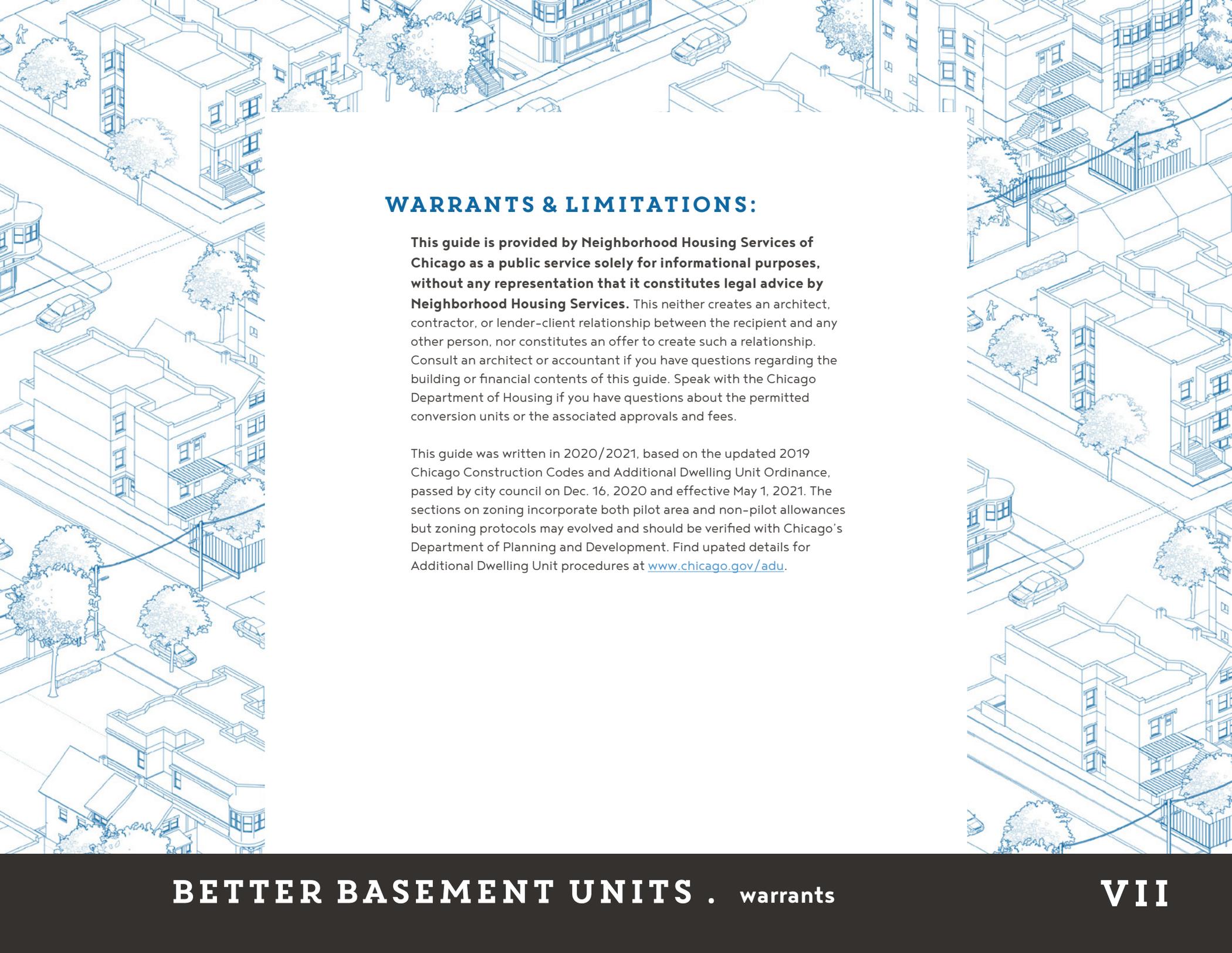


research sources from



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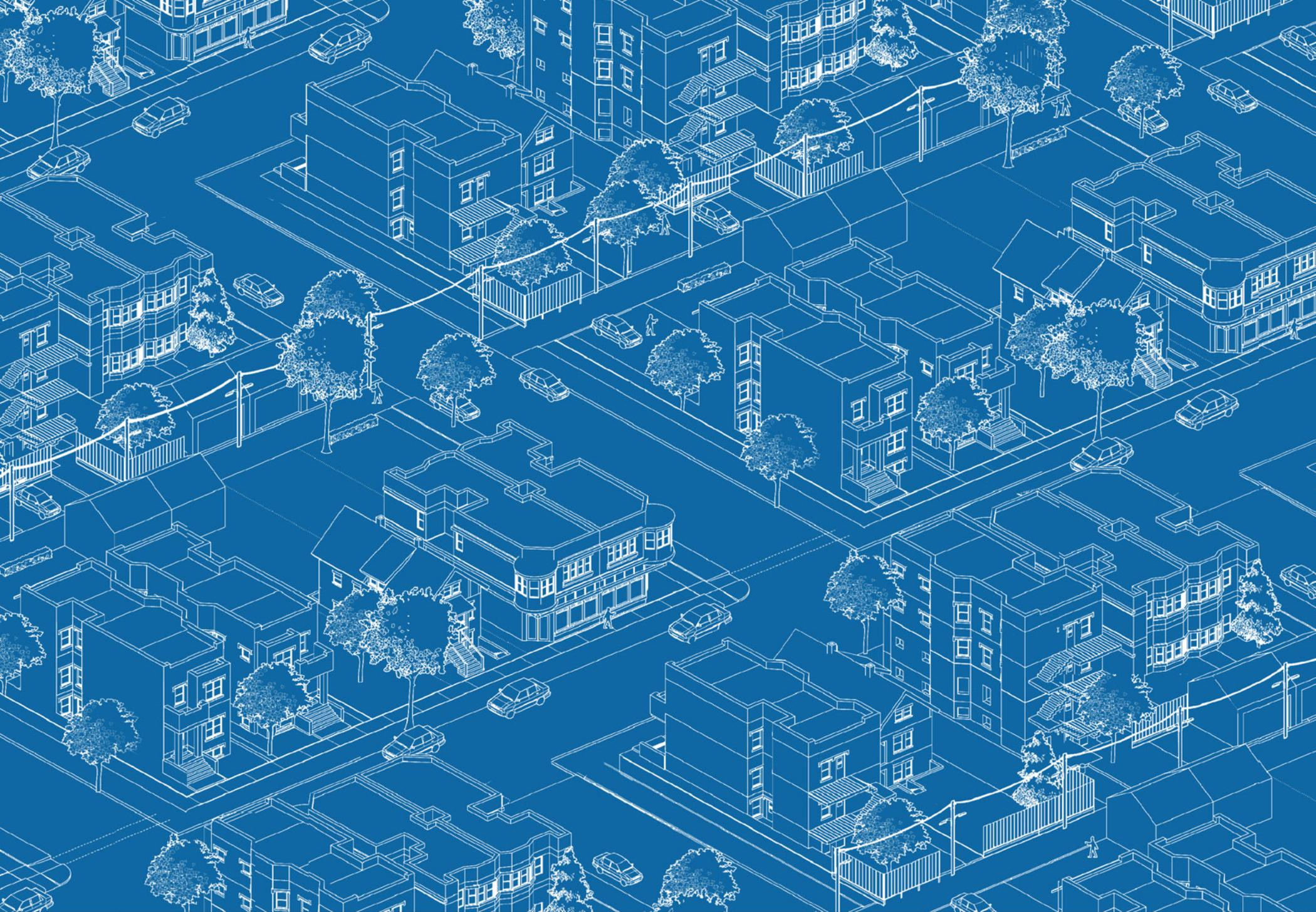
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WARRANTS & LIMITATIONS:

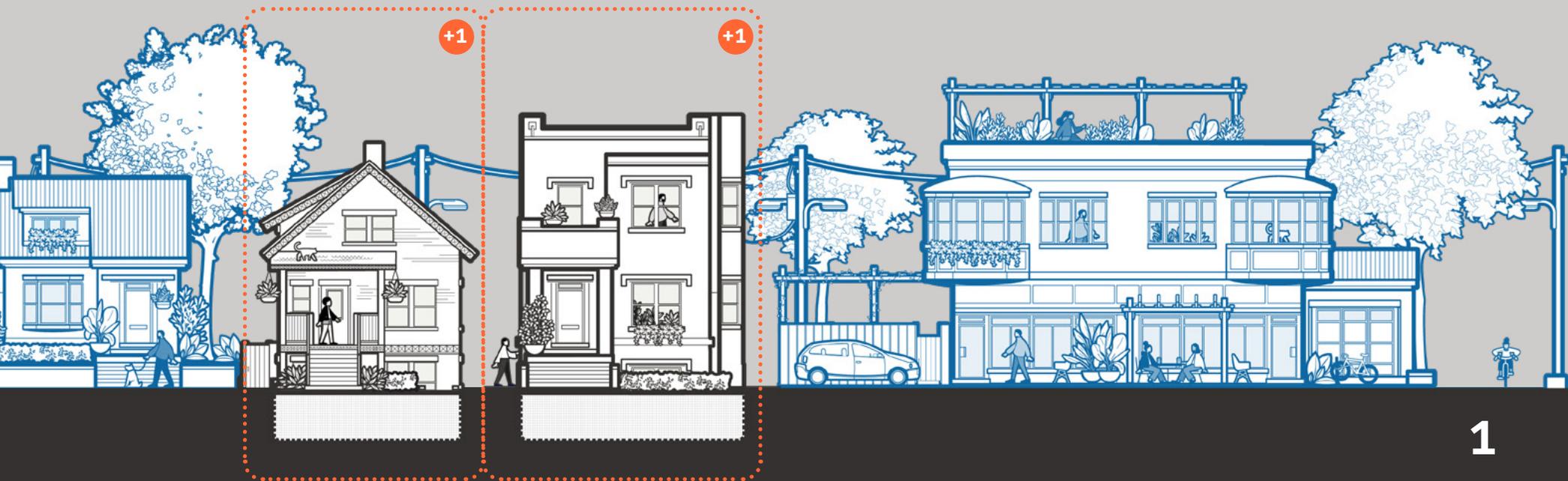
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This guide was written in 2020/2021, based on the updated 2019 Chicago Construction Codes and Additional Dwelling Unit Ordinance, passed by city council on Dec. 16, 2020 and effective May 1, 2021. The sections on zoning incorporate both pilot area and non-pilot allowances but zoning protocols may evolved and should be verified with Chicago's Department of Planning and Development. Find updated details for Additional Dwelling Unit procedures at www.chicago.gov/adu.



INTRODUCTION . basement conversion units

An Introduction to Basement Conversion Units: Why it's important to create code-compliant units for structural integrity, safety, and risk mitigation.





INTRODUCTION . additional basement units defined

Better Basement Units: A Manual aims to provide you, the owner-occupant, with the tools to better understand the planning, construction, costs, permits, and risks associated with legally converting your basement into a rental unit.



CHAPTER CONTENTS:

This introduction covers:

- **the benefits of creating a basement unit**, at a building and city scale, with a review of Chicago's ordinance allowing for 'additional' units in basements and attics,
- **why it's important for basement units to have safe and sound construction**, based on typical building hazards, and
- **how to use the manual, to navigate a basement project**, with alternate use scenarios and chapter synopses
- **the conversion process, in ten steps**, situating the manual within the longer arc of a design and construction project, with guidance on finding an architect and choosing a general contractor

WHAT ARE ADDITIONAL DWELLING UNITS (ADU'S)?

Basement rental units are one of many different types of 'Additional Dwelling Units' (ADUs). In housing policy, this acronym identifies granny or in-law flats, coach houses, and casitas. **An ADU is any small unit –with its own bathroom and kitchen– that is built upon the same site as a primary residential building. This includes units in attics, rear additions, and backyard buildings.** Other cities often use the term 'Accessory' for these small, supplemental apartments, in attached or detached positions. (See diagram next page.)

WHY WOULD YOU CREATE AN ADDITIONAL BASEMENT UNIT?

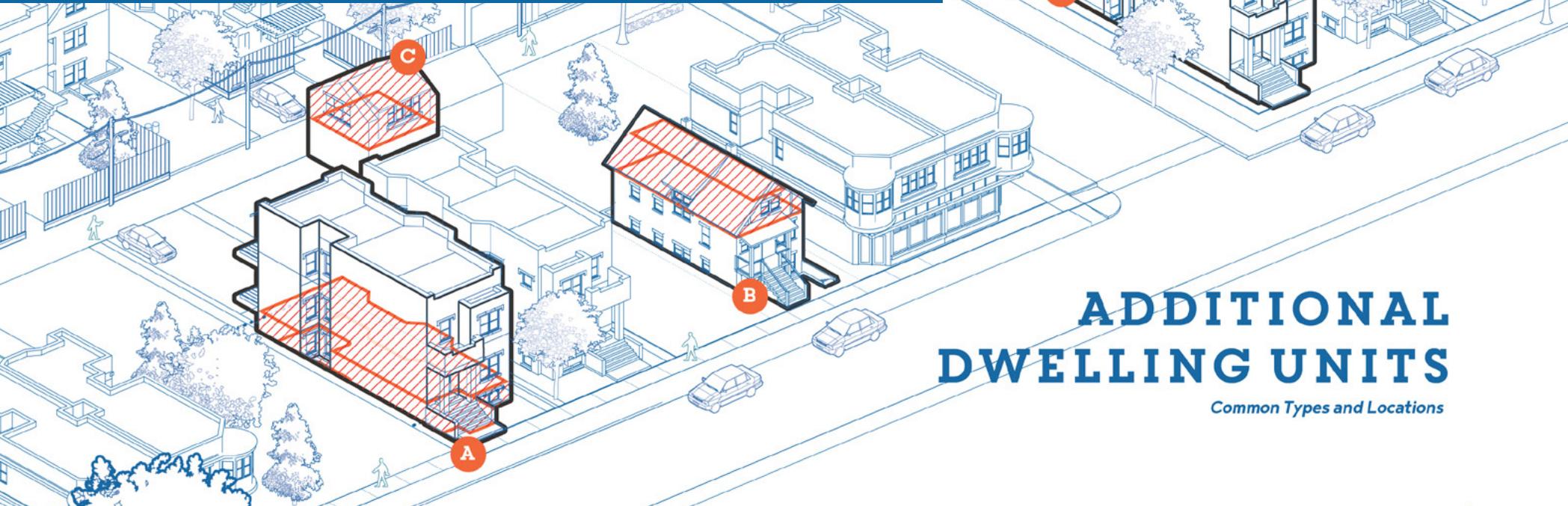
As a homeowner, there are financial reasons to consider converting a basement unit:

- **Adding Rental Income:** The rent from an additional unit can help defray maintenance, tax, and home ownership costs. By creating an affordable unit, you widen the array of potential tenants and lower the likelihood of extended vacancies.
- **Adding Overall Value & Equity to Your Home:** For those not on fixed incomes but seeking additional equity, basement improvements offer a form of property investment and improvement that does not require purchasing land (typically the largest cost for new development).
- **Avoiding Fines / Costs of Non-Compliance:** It makes financial sense to bring your existing basement unit up to code to avoid Department of Building violations and fines, rightful lease terminations, and addition to the city's 'Problem Landlords' or 'Problem Building Owners' lists, which can trigger extended vacancies.

In addition, there are a number of social benefits to creating smaller, basement units that pay collective dividends, to owners and tenants:

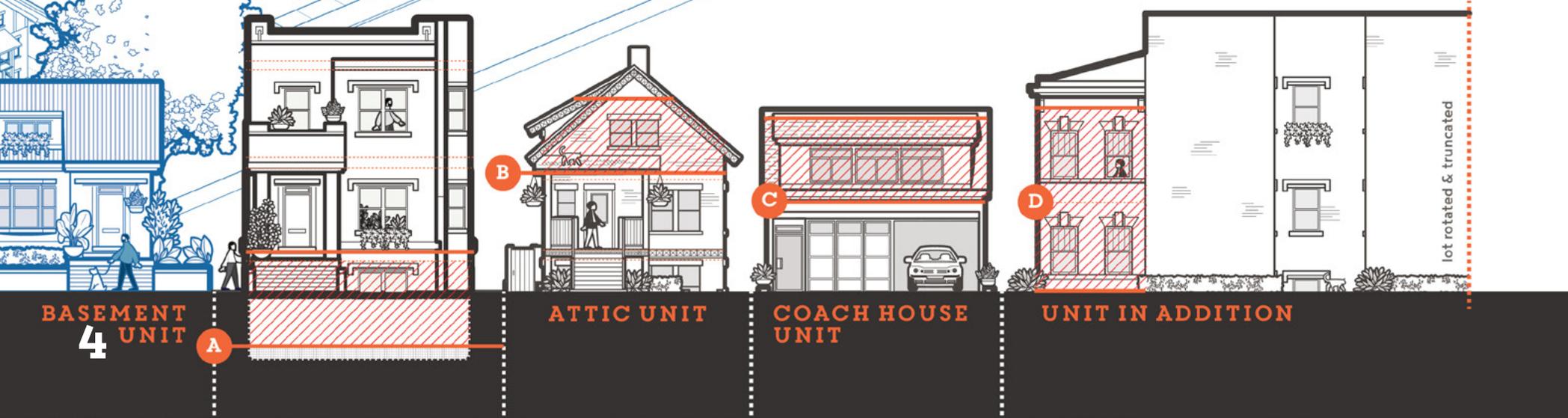
- **In-Laws, Granny, and Nanny Flats:** For those with adult children, special needs, or extensive visitors, an accessory unit can be a perfect way to tap into the social benefits of extended family and friend networks.
- **Empty-Nest Options:** Once children leave the nest, you can swap units, downsize, and age in place, using rent from the main house to offset tax increases and area appreciation.
- **Sustainable Housing:** Conversions create one form of sustainable housing because they tap into existing materials, under-utilized spaces, and build upon the infrastructural efficiencies of a single building. If you are looking at other renovations, you might

ADDITIONAL UNIT BENEFITS



ADDITIONAL DWELLING UNITS

Common Types and Locations



consider the potential of doing site-wide updates combined with a basement conversion.

- **Affordable, Transit-Oriented Development:** Tenants tap into existing transit, parks, and amenities without the economic and environmental burdens of car ownership.
- **Community Density, Diversity, and Vibrancy:** Basement units provide additional population density and invite a diversity of tenants—by age, class, and race—in areas facing graying property ownership. New tenants provide purchasing power and inject money into local economies. Further, a diverse population can create new civic demands for schools and libraries, and provide institutional continuity as the next generation of community participants and stewards.

For all the benefits noted above, basement unit conversions require diligent construction given Chicago's low elevation and the challenges of working with existing structures.

CREATING ADDITIONAL BASEMENT UNITS IN CHICAGO

On December 16, 2020, the 'Additional Dwelling Unit Ordinance' was passed by city council; with pilot areas going to effect May 1, 2021. The pilot areas allow for greater density per lot with the construction of one or more additional rental units in Two-Flat and Multi-Unit residential zones (RS-2 +). Within the official language of Chicago's ordinance, additional units are discussed as either 'carriage houses' (separate rear units) or 'conversion units' (in basement or attics). For the purposes of this manual 'additional,' or 'conversion' unit all designate a new rental unit built within your existing basement.

This manual specifically addresses basements because several Chicago residential types – Two-Flat, Cottages, even Bungalows – commonly have full height basements for conversion. In addition, illegal basement units serve some of the city's most vulnerable populations (with rent well below market rates); this guide should assist in bring such units up to code, for the health and safety of tenants, while preserving access and affordability.

This manual helps you, a potential ADU creator, capitalize on the benefits of a basement unit and realistically address construction challenges. It walks through the core requirements for a legal basement unit and lays out the key building systems necessary for safe inhabitation. It provides the tools to weigh the social, economic, and personal value of an additional basement unit with the costs, construction, and liability required. The goal is to help you assess the viability of a basement unit and understand the building systems involved, so that you can engage with financing, design, and trade professionals in pursuing a project.



CHICAGO'S HOUSING NEEDS . a short history

77,000+
FULL BASEMENTS IN RS-3 + ZONES

34%
*of Single Family Housing
in RS-3 zones*

60%
*of Two-Four Flats
in RS-3 zones*

27,000+
RENTAL UNITS LOST SINCE 2008

35%
*of rental units in
Two-Four Flats, in 2007*

29%
*of rental units in
Two-Four Flats, by 2017*

CITY DOWNZONING Post-War Urban Policy

APARTMENT DISTRICT
*family unit +
rental expansion*

RS - 2
*density rules favor
single family dwellings*

SUBPRIME MORTGAGE CRISIS Market-Driven Wealth Consolidation

FORECLOSURE
*owner +
rental unit*

PRIVATE EQUITY
*single family conversion
with rental lost*



CHICAGO'S NEED FOR AFFORDABLE, ADDITIONAL UNITS

Your decision –to convert a basement unit– should be made based on your circumstances and a desire to create housing. At the moment, Chicago lacks at least 120,000 affordable rental units, with a sizable need for accessible housing for aging and differently-abled tenants. DePaul's Housing Institute estimates that Chicago's existing housing stock could easily add 175,000 affordable basement units. Just in Two to Four-Flats, DePaul estimates over 77,000 basements could be converted, distributing more affordable housing and increased density throughout the city.

How did we get here?

MID-CENTURY DOWNZONING

After facing housing shortages during World War I, Chicago saw a housing boom during the 1920s. In 1923, the city implemented zoning, largely regulating building shapes to guarantee air and light access. Most residential areas in Chicago were designated 'apartment districts,' which permitted the development of Chicago's characteristic courtyard buildings and Two-Flats. Beyond the Loop, Old Town, and Near South Side, the majority of Chicago's current housing was developed in the interwar era.

Near the peak of urban in-migration in 1957, Chicago revised its approach to zoning. It supplemented the 1923 ordinance with an emphasis on exclusionary uses (i.e. no commercial storefronts in residential zones), density ratios (allowable units/lot area), and changed most 'apartment districts' to be single family zones, designed to limit over-crowding. This shift suppressed the creation of smaller apartments and extended family flats. Following these rules, developers focused on making stand-alone bungalows or, for commercial investors, lakefront towers and up-scale apartments. Combined with racial covenants,

redlining, and 'blockbusting' speculation, the municipal support of single family development reinforced segregation and fostered white flight, a declining city tax-base, and urban disinvestment.

SUBPRIME MORTGAGE CRISIS

In addition to zoning, the current housing shortage also has its roots in the recent, subprime mortgage crisis. Succinctly, subprime lending before 2008 focused on areas that saw minimal mid-century investment due to redlines and older multi-family housing. With a higher percentage of predatory loans, these neighborhoods were hit hardest by foreclosures after 2008. They experienced increased instability for renters and a greater number of distressed properties sold to private equity and remote investors. Nearly 27,000 rental units have disappeared from two to four-flats, due to decay, demolition, and conversion into single family homes (in gentrifying neighborhoods).

The zoning reforms of the 'Additional Dwelling Unit Ordinance' present the opportunity to increase rental housing stock with additional units and support local, owner-occupied investment in Chicago's neighborhoods. As will be discussed in 'Code Compliant Units,' the pilot areas are designed to test different regulations aimed at limiting gentrification and fostering affordable rents.



BASEMENT CONVERSIONS . doing it right



 **NOTICE**  **DEPARTMENT OF BUILDINGS**

OFF LIMITS—DO NOT ENTER

City of Chicago
Mayor Rahm Emanuel

By order of the Commissioner of the Department of Buildings pursuant to Section 13-12-120 of the Municipal Code of Chicago, or order of court under case # _____, the following area(s) is/are to **Remain Vacant and Unoccupied** until further notice.

... Any person who enters a building, structure or portion thereof in violation of a notice posted under this section shall be subject to a fine of not less than \$25.00 and not more than \$100.00. Any owner, manager, tenant or person in control of the premises who permits any person to enter in violation of a notice posted under this section shall be subject to a fine of not less than \$200.00 and not more than \$500.00 for each time a person is permitted to enter illegally."

... Any person who removes, covers, obliterates, or defaces any sign posted pursuant to Subsection (A) of this section without the necessary written permission shall be subject to a fine of up to \$500.00."

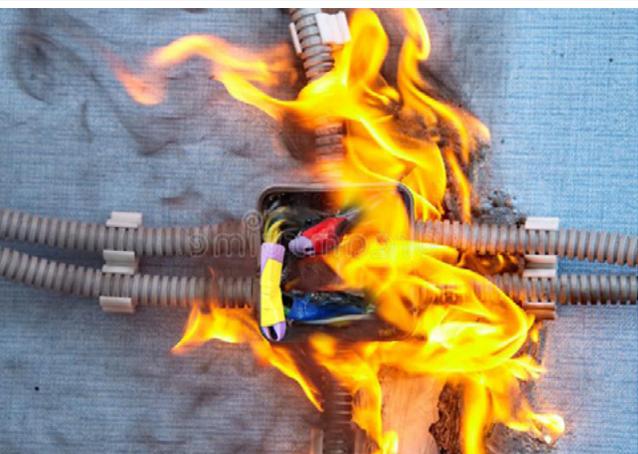
Premises address: ENTIRE PREMISES

Area(s): _____

Inspector name, typed: _____ No: _____

Date issued: _____ Phone number: _____

This notice shall not be removed without express written approval from the Department of Buildings.



CREATING SAFE, SOUND, AND LEGAL BASEMENT UNITS

Census research from Enterprise Community Partners and the DePaul Housing Institute for Housing Studies has found that a large portion of Chicago's lower-income renters live in basement units. These units are more affordable, but often noncompliant with City codes, posing serious health and safety hazards for tenants. Saying that a unit is 'illegal' under zoning regulations does not automatically make it unsafe, but trying to keep the unit 'hidden' from the City's building inspectors and tax assessors can lead to a number unintended, but consequential risks.

The tenant-owner relationships is based upon mutual extortion, making it an unstable living situation and risky source of rental income:

- tenants of illegal units, facing subpar facilities, don't have many legal recourses, but they can report the owner to Department of Buildings, risking housing loss
- this bind allows owners to forego upkeep. But, if they take tenants to eviction court, the tenant can claim the unit is illegal and initiate the reporting above.

Keeping a unit 'off the books' can thus expose it to more serious regulatory scrutiny and financial penalties, making it a very risky investment strategy: illegal units are more likely to be reported for building code violations and receive visits from building inspectors, casting scrutiny on the entire structure. In turn, this deferred scrutiny increases the likelihood of:

- **immediate building violation fines**, with the attendant costs of deconversion and rebuilding costs. Old violations will also effectively halt your ability to pull permits for other repair work.
- **city liens, for violations or back taxes**, due to inaccurate assessments and under-calculated property taxes, and, given liens,

- **legal actions (being sued) by mortgage lenders**, for the violation of mortgage clauses, by which the owner commits to the lender to maintain the property title lien free.

In addition, if the owner is 'hiding' the unit, they may only have single family, not landlord, insurance and will be exposed to full liability and medical expenses for property accidents. Likewise, owners often fail to report illegal units' rental income for taxes and thus owe back-taxes and fines to state and federal authorities

While you might shrug off these investment risks and the correction costs, it's important to consider two things:

- Losing an affordable unit, due to lackluster maintenance or even minor fines, can be devastating. Eviction, the trauma of moving, and the loss of a stable address can interfere with processing paychecks, accessing education, and maintaining community ties.
- Your personal liability with an illegal unit could also be devastating. You can be held fiscally (and criminally) responsible for accidents on the property, poor maintenance, or building failures and fostering legitimately dangerous conditions. Basement units can host a number of hazards—moisture, mold, and radon—which accelerate structural decay and exacerbate chronic health problems. An unintended, illegal basement unit can be a dangerous thing, physically, financially, and legally.

If you can cover the costs of a major civil lawsuit or extensive insurance, you have the means to finance code-compliant renovations and make your basement unit safe. If not, you should explore the home improvement loans from Neighborhood Housing Services.

For those resistant to paying for code-worthy work, the following pages examine the costs of non-compliance. While these scenarios emphasize material and safety hazards, the human costs should not be underestimated.



STRUCTURE: DAMAGE DUE TO ALTERED SUPPORT SYSTEMS

For all of the following scenarios, the assumption is that a basement has been occupied, but without renovation and adaptive updates. Keep in mind that any hazard you neglect in the basement will eventually affect the building as a whole; bad basement decisions trickle upward. **Any time you bring a system up to code, you're not just protecting your tenants—you're protecting your home and any equity held within your property.**

Consider this structural hazards scenario: Instead of replacing a bowing beam, you decide to add a number of walls to redistribute the weight from upper floors across your existing slab.

initial benefits:

- **less expensive** (frame walls are cheap)
- **efficient** (you need unit walls anyway, right?)
- **intuitive**, as temporary frames are used to stabilize structures during construction.

however, this will lead to linked structural problems:

- **extra pressure from those walls will likely crack your slab**, enabling water and radon seepage, damp rot and health issues
- **moving support locations introduces new tension and compression forces in the main level's floor and the walls above.** This is likely to appear in sloping floors, plaster and floorboard buckling—i.e. signs of accelerated structural failure.

Properly replacing a beam and adding columns only costs between \$4,000-\$7,000. But a 'cheap', quick fix multiplies your problems: slab patches (\$2,000-\$3,000), air sealing (\$3,000-\$7,000), localized wall/ceilings repairs (\$2,000-\$4,000), an engineering assessment of the structure (\$300-700) and your home insurance can cancel your policy for non-permitted work. **The 'cheap' route cost between \$7,300-\$14,700, in advance of further structural repairs.** *It's dangerous and doubles your bill. And this is the best-case 'bad' scenario; a floor collapse would compound your liabilities.*

MOISTURE: MOLD & ROT IN NON-WATERPROOFED AREAS

Consider this moisture-based hazards scenario: Instead of adding foundation drains and sealing your walls, which are mostly dry, you decide to simply finish the interior, with a mix of drywall and exposed brick. Let's assume, if you didn't seal the foundation walls, you probably didn't check for foam 'isolating' gaskets beneath your basement and upper, wooden building structure.

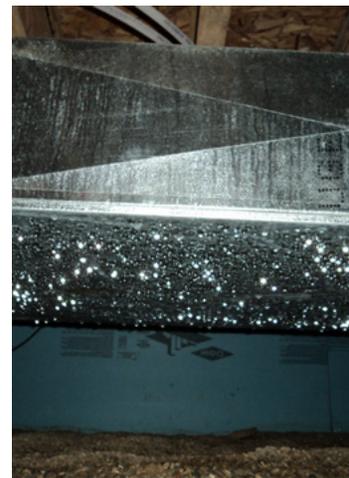
initial benefits:

- **aesthetically pleasing** (brick walls are 'trendy')
- **cost efficient** (basic labor needed for standard residential wood, fiberglass, and drywall)

however, this can lead to mold and moisture in several places:

- **without moisture barriers and drains, loose insulation will act like a sponge:** exterior groundwater will seep into the walls and, during the summer, will condense on the inside surface of your foundation. With additional moisture from downspouts, plumbing or steam-heating leaks, it is easy to create a massive (black) mold problem. The air quality, allergy, and health impact will likely make the unit unrentable.
- **the moisture in your foundation walls and surrounding ground can also migrate upward one to two feet (max), which, in a very low basement, can impact sills and basement ceiling joists.** This 'rising damp' will appear in basement walls and corners, accelerating structural decay and rot.

Properly adding foundation drains and sealing walls is not inexpensive (\$6,000-\$13,000) with limited slab work. But a 'cheap' fix creates additional problems, concentrating moisture inside your structure: to resolve this you'll need to demo interior walls (\$3,000-\$4,000), reassess structural rot (\$300-\$700), and add the drainage before then replacing, conservatively, half of your basement walls (\$15,000-\$30,000). **Even without rewiring, correcting mold, or getting repair permits, the 'cheap' route doubles or triples your costs.** *And you're facing serious health and structural issues.*





FIRE RISK: USING OLD FINISHES & EXISTING ELECTRIC SYSTEMS

Consider this fire-based hazards scenario: Your basement is already wired, with fixtures from the 1970s. You pick smaller appliances and instruct tenants to use power strips. By leaving circuits as-is, you keep the current plaster ceiling intact.

initial benefits:

- **inexpensive** (no rewiring costs, no refinishing costs)
- **limited visible impact** (can't worry about what you can't see)

however, these short cuts could create serious fire hazards:

- **your electric wiring has old, rotten insulation.** Within those conduits are potentially exposed wires, so adding new fixtures can overload the system. Internal sparks or short circuits are enough to start a nasty electrical fire.
- **your midcentury ceiling is probably fire-resistant for around 15-20 minutes.** When heated, the old plaster shrinks, falling off of the lathe and exposing the wood structure to the fire much faster than new, fire resistant drywall would. This allows the fire to climb to the upper stories very quickly.
- **if you've ignored the hazards above, your house likely lacks working smoke detectors.** In a best-case fire scenario, everyone is awake and exits the premise, with the shirts on their backs. Worst case, everyone is asleep; there are no survivors.

Properly adding ceiling fire partitions and separate electrical for a unit is pretty inexpensive (\$7,000 - \$12,000) considering the risk. But alas, the 'cheap' route amplifies risk to your tenants, your structure, and your life. **Leaving aside civil and criminal negligence, the costs incurred for ignoring fire code could amount to all the equity in your home or your life.**

VIOLATIONS: FINES, FEES, AND COSTS OF UN-PERMITTED WORK

In any of these scenarios, it's assumed that you end up dealing with the material consequence of poor construction or maintenance decisions; the cost of short-cuts is equivalent to the cost of replacement or lost property and lives. In reality, you'll also need to apply for permits for repairs and, if you are reported by a tenant, you can face a number of different fines for code violation.

Consider the mold and moisture scenario. You could be held responsible, and face any of the following violations, as well as associated fees for general violations:

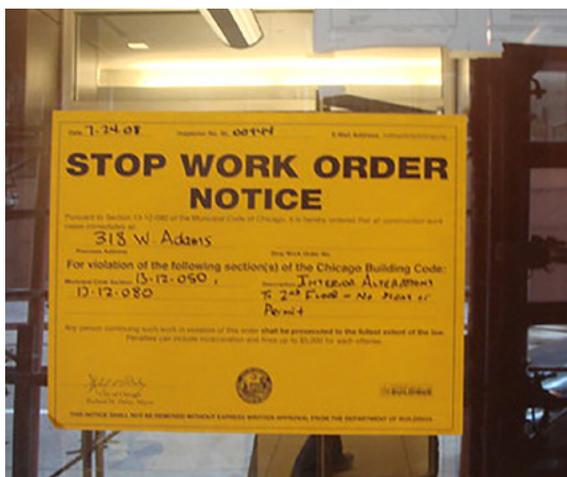
- **arrange for an inspection** (you're been reported, thus need to be inspected to determine other violations)
- **remove work performed without a permit** (the walls, finishing)
- **unsafe conditions** (extended structural rot, mold hazards in general)

and issue specific violations:

- **stop leaking water** (you need a foundation drainage system)
- **repair or replace exterior walls, plaster, paint** (three separate citations, any of which could apply to mold)

Each violation can run between \$500-\$1,000, with unpermitted work carrying subsequent fines that top out at \$3,000-\$5,000, and unsafe conditions violations (which trigger structural assessment) can cost between \$1,000-\$2,500. So you could find yourself facing around \$4,000-\$8,500 in violations on top of the costs of replacement materials and actually permitting new work.

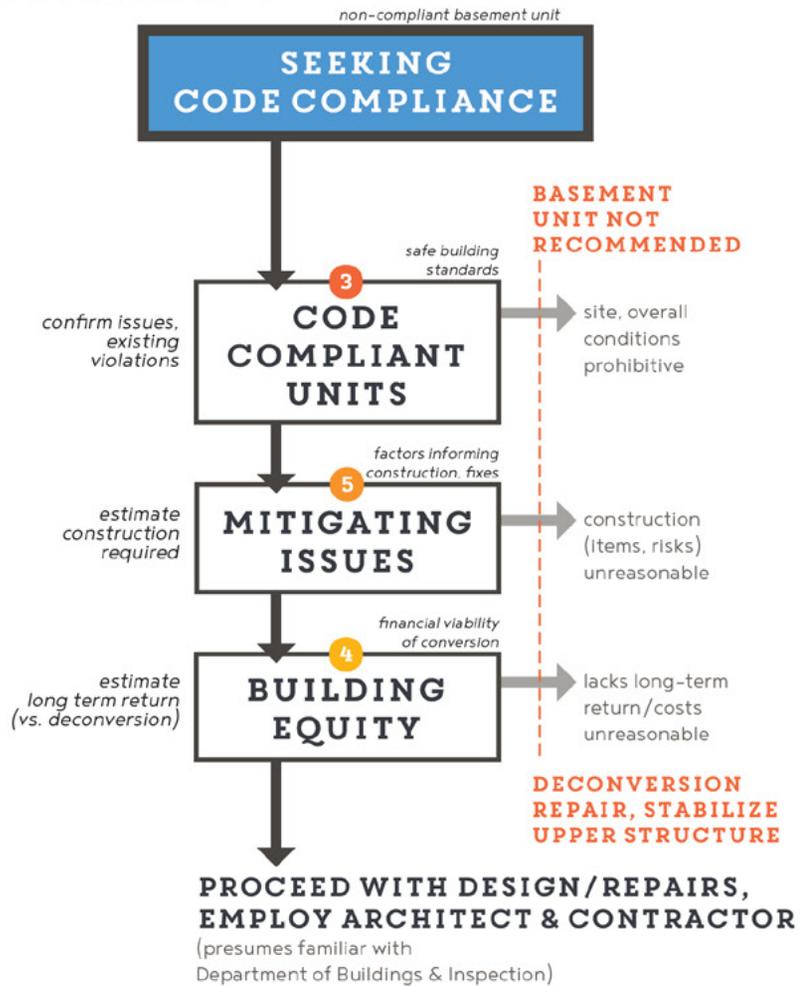
When facing code violations, you may also decide not to rebuild a unit. This would limit your losses to fines, demolition costs (\$3,000-\$4,000), and, if the unit is legal, permits for unit deconversion.



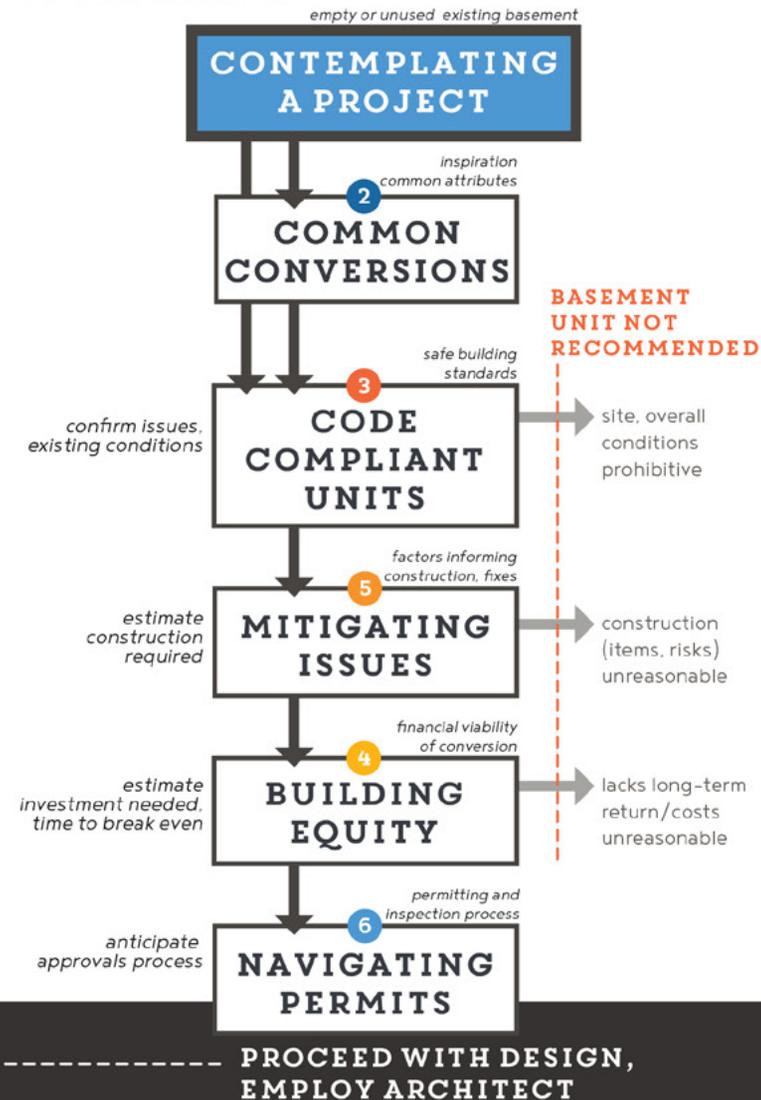


USING THIS MANUAL . help for doing it right

SCENARIO 1



SCENARIO 2



THIS MANUAL HELPS YOU DO CONVERSIONS CORRECTLY

If you're an average homeowner, the thought of converting your basement can be overwhelming; the costs and challenges feel formidable. **Where do you start?** As noted in the diagrams at left, if you're reading this, you likely fit into two general categories of owner-occupants:

- **scenario 1) someone who has an illegal basement unit that they wish to bring into compliance** (or deconvert) and has experience with the Department of Buildings, or
- **scenario 2) a homeowner with an existing, empty basement** who is interested in ADUs, but has no particular experience with design, construction, and code compliance in Chicago.

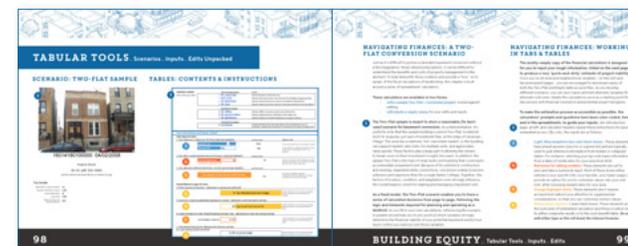
CORE CONVERSION INFO:

You can take a linear approach, skimming the manual, or dive directly into issues of concern. **In either scenario, the core contents of the manual – chapters 3, 4, 5– walk readers through:**

- 3 **Code Compliant Units:** assessing an existing basement –with or without a unit– and identifying non-compliant issues and code violations



- 4 **Building Equity:** tabulating the long-term costs and benefits—including capital investment and rental income, as well as operational overhead and maintenance reserves– to determine when/if a basement unit is profitable and financially feasible.



- 5 **Mitigating Issues:** selecting applicable approaches to 'fix' each code issue based upon property/project characteristics and tallying the likely construction and costs of a basement conversion.



Each manual chapter is broken down into ordered subsections, so you can review one code element, one financial aspect, or one construction choice at a time. Each subsection defines the topic at hand, identifies relevant technical experts for consultation, and includes illustrations to aid in visual assessment of your property and project. This approach allows you to proceed at a comfortable pace and treat each subsection as stable reference.

chapter content & tools

Each chapter also provides a mechanism to tally your observations in order to see interrelated tasks or financial implications. In 'Code Compliant Units', this includes assessment templates—for creating your own basement plan and notes—to aggregate your observations. In Mitigating Issues, decision diagrams help you trace likely construction trajectories. In Building Equity, linked spreadsheets calculate overall outcomes, pulling together your input with factors like area appreciation, interest, and affordable rental rates. **These synthesizing tools typically rely on earlier decisions, so they work best if completed in a linear matter.**

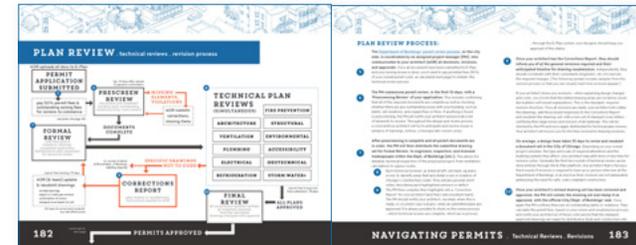
FOR THOSE NEW TO CONSTRUCTION PROJECTS:

For those new to construction, code, and conversion units (scenario 2), two additional chapters are provided, preceding and following from core decisions:

- 2 Common Conversions:** introduces common Chicago residential buildings and how their characteristics affect what can be done in a basement ADU. Potential basement unit plans are provided as a guide.



- 6 Navigating Permits:** outlines the process of applying for zoning/building permit applications, including time and permit fee estimates.



These chapters bookend the core decisions, providing inspiration and an overview of building regulation more generally.

The proposed plans, in Common Conversions, underpin examples in all the other chapters so it is helpful to review those, even if you are focusing on the main compliance and construction sections.

PROJECT STEPS . basement conversion overview

BASEMENT CONVERSION: VISUAL GUIDE TO CONSTRUCTION

If you've never done a construction project—major or minor—it's also helpful to understand the broad contours and steps required. A basement conversion is not a small undertaking; it can involve structural and slab repairs, revised utility connections, new interior partitions, and finishing. In general, renovations require higher design fees and may be just as time consuming as new construction. This is because any new element must successfully dovetail with existing structures and the constraints of working on smaller, older sites.

The next page provides a visual summary of the 10 steps involved in a medium to larger project (the last two relate to ongoing management). For each step it details:

- **the main design or construction tasks, including:**
 - avg. timeframe.
 - costs for architectural drawings and meetings.
 - design products or deliverables
 - **red highlights** identify legally binding documents—drawings, permits, contracts—as coordinated by your architect, structural engineer, or general contractor
- **general timing of loans and financial decisions**
- **manual sections that act as process reference**

For aggregated steps—the initial design process, construction documents through contract bidding, and construction itself—the graphic summarizes typical duration, costs, and scheduling variations.

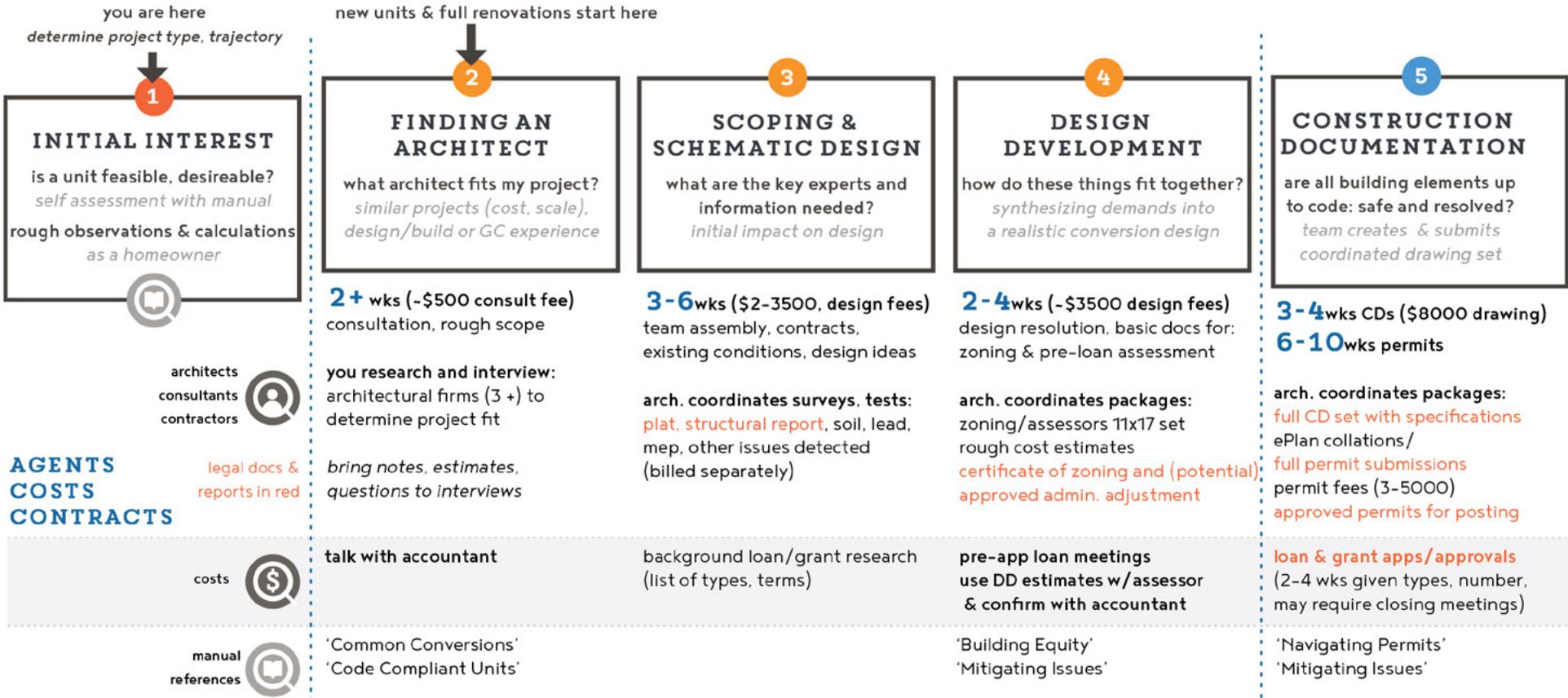
PROJECT PHASES: TEN STEPS TO A BASEMENT UNIT

The ten steps, on the next page, will be unpacked further, following the visual summary, with extended notes on finding an architect and researching a contractor and their bids. Succinctly, the steps are:

- 1 **Initial Interest:** your quick assessment of potential for basement conversion, based on manual guidance
- 2 **Finding an Architect:** researching and interviewing designers
- 3 **Scoping & Schematic design:** the initial design phases defining tasks, consultant team, site issues, and your ideas
- 4 **Design Development:** integration of basement design elements, drawings/estimates for zoning & loan applications
- 5 **Construction Documentation:** team's completion of technical drawings for permit applications and bidding
- 6 **Contractor Bidding:** working with your architect to solicit and review contractor bids to select a contractor
- 7 **Construction Prep:** your contractor schedules construction, incorporates site and environmental safety
- 8 **Construction & Inspections:** following progress on conversion with your architect, contractor and tradespeople
- 9 **Occupancy & Management:** immediate tasks, from permits to payments, to close-out the construction project and start renting your basement unit
- 10 **Maintenance:** tapping into your network of tradespeople to frame ongoing maintenance practices

THE BASEMENT CONVERSION PROCESS

10 STEPS



SUMMARY & SCHEDULE

major renovation (\$160-190k)
mid-high cost estimate
generous timing estimate

INITIAL DESIGN WORK

6 wks - 12 wks
\$7-9k design, \$2-3k tests, \$1k zoning

pricing to vary by firm scale & scheduling,
depends on your desire to expedite project and
exterior/seasonal work limitations

CD'S, BIDS, PERMITS

9 wks - 14 wks, \$5k permits
\$8-9k design/drawing
loan apps may take longer;
coordinate permit & CD fees
timing for standard plan review

deconversion (easy plan only) starts here

6

CONTRACTOR BIDDING

what does this cost – with licensed tradespeople?
confirm contractors' bids, licenses, insurances, & refs

2-4wks overlaps permits (-\$1000, coordination)

arch. coordinates:
bid package updates
3 contractor bids
general contractor's contract (value engineer as necessary)

NHS clients (opt.)
bid review & coordination
research (sub) contractors

7

CONSTRUCTION (PREPARATION)

are there demolition or enviro abatements before building?
confirm safety precautions and overall construction schedule

2-4wks (\$2-500 coordination)

arch. and gc coordinate:
overall construction schedule
dept. enviro abatement plans and permits
(tenant notice of work)

NHS clients (opt.)
general construction admin.

'Mitigating Issues'
'Navigating Permits' (inspections)

8

CONSTRUCTION (INSPECTIONS)

is the unit being built to permitted designs?
follow process; architect will document as well as inspectors

13-20wks (\$4000-7000, administration) 11 inspections

architect and gc coordinate:
inspections & approvals
work documentations
any plan / permit revisions

pay invoices (& document)

9

OCCUPANCY & UNIT MANAGEMENT

what is left to 'complete' the project and rent the unit?
pay project bills, outstanding city & county fees

you follow-up:
certificate of occupancy
tax exemptions, utility waivers
any outstanding project fees (architects' documentation)

pay outstanding invoices
check mgmt budget w/ accountant
establish deposit accounts

'Building Equity'

10

ON-GOING MAINTENANCE

looking forward:
plan for maintenance, finalize mgmt budget

you follow-up:
consult project tradespeople on maintenance, & needed reserves (mgmt training as desired)

sign maintenance contracts
establish reserves, mgmt accounts
loan payments on-going

CONSTRUCTION

15 wks – 24 wks
\$160-180k construction, \$1-2k inspections, \$4-7k admin & revisions

Schedule is set by general contractor (gc), timing will vary given season and exterior or interior work necessary. Architect/gc should keep you appraised of work / invited to site visits and inspections

UNPACKING A PROJECT:

1 INITIAL INTEREST

This manual is meant to peak your interest in a basement conversion. The 'How to Use' section, on pages 14–16, should guide you through the different chapters, to determine whether the addition of a basement unit makes sense for your building and circumstances. The manual flags expert guidance and should assist in conversations with your architect, engineer, and contractor, throughout the larger design and construction process.

If you decide to pursue a project, you should confirm financial feasibility and legal risks with a) an accountant and b) a lawyer.

- **An accountant** can review the estimates of 'Building Equity' and finesse a reasonable budget range given your fiscal resources. This ballpark number will enable your architect to realistically establish expectations and scope.
- **A lawyer** will be useful throughout, for contract negotiation, and distinguishing boiler-plate language from anomalous or risky fee structures.
 - As a landlord, you'll need a **real estate lawyer** to advise on property liabilities and navigate lease and eviction proceedings.
 - Exceptional circumstances: If your property has atypical zoning issues, you may need a **land-use zoning lawyer** (a sub-specialty of real estate) to assist in appeals.
 - Ideally, the same law professional (or a firm) practicing within real estate can guide you through contracting with architects, contractors, and permitting procedures.

If you do not have an accountant or lawyer, you should research and seek out professionals in advance of contracting an architect and beginning the design process.

2 FINDING AN ARCHITECT

If you decide to pursue a basement project, you'll want to hire an architect to direct the design process. While it may not be necessary for deconversion or a very small renovation, hiring a licensed architect can make the conversion process run a whole lot smoother. In Chicago, you will need an architect to submit for most building permits, under standard plan review. An architect will also provide a network of expertise, including trusted consultant engineers, contractors, and trade specialist.

You should begin by making and contacting a list of relevant firms to interview. Architectural practices specialize so you'll want to find practitioners who focus on residential renovations, within Chicago, and, ideally have worked on basement unit additions. Resources for finding firms include:

- American Institute of Architects (AIA) Chicago: www.aiachicago.org/find-an-architect/
- Chicago Cityscape hosts an evolving list of firms with ADU experience: www.chicagocityscape.com/adu/index.php

In addition to general renovation and basement experience, you might seek out firms that have experience as: a) general contractors, b) do design/build work or c) are self-certified to expedite permitting, for integrated quality control on your project. Based on your goals, focus on what you want to achieve and seek out firms with that experience.

Before the interview, collect the notes you made when reading through this manual; jot down all your requirements and highlight any basement problems. Think in terms of what's necessary and what's desirable in a basement unit. Don't worry about sketched solutions or plans—that's what the architect is for. Gather the initial budget, from the ranges presented in 'Building Equity,' and your realistic revisions. This will help you discuss costs upfront and avoid disappointments, facing revisions in construction documentation or bidding.

Most architects will do an initial consultation for a small fee. You should interview a few firms (3+) to get a feel for how each pursues the design process and construction administration.

Follow-up on references; if possible, speak with their sub-consultant team members and visit finished residential projects. You'll want to feel comfortable with the design team, as they'll be in your life (and active, in your basement) for up to a year.

Once you've decided, the first thing to do is tell your chosen firm and notify any others consulted. **You and your architect should agree on the following before work begins:**

- **the project scope** should include tasks and team involved. The architect should propose specific experts to address technical concerns: structural engineers, building systems experts, and others.
- **cost of architectural services** and billing structure, as your architect may charge a fixed fee per design stage, a dollar amount per square foot, a percentage of construction cost, or hourly fee based on assigned personal.

It's important that this agreement is in writing and sets out the services to be provided, major deliverables and deadlines, billing structure, and outlines the obligations of each party. You have the right to negotiate the terms in the contract and ask for clarification before signing.

If possible, you should pay for early design work out of savings. At the end of Design Development, you will have solid enough designs for an appraiser's estimate. This estimate secures financing for ongoing architectural, permitting, and construction.

THE DESIGN PROCESS:

3 SCOPING & SCHEMATIC DESIGN

After finalizing the contract, the design portion of the project will start with a 'kick-off meeting.' There the architect will refine the project goals by asking questions, listening, and trying to understand your agenda. A good architect will develop efficient solutions and propose ways to reduce costs while coming up with a design that satisfies most, if not all, of the project goals.

The schematic design process focuses on developing general layouts for you to choose between and collecting background information. If you don't have a recent, existing plat of your property, your architect may measure and create preliminary, 'as-built' plans while commissioning a survey for an updated plat. As your design team sketches rough ideas, they'll consult with experts to document additional site and building information, like getting soil cores, surveys of utility lines, and structural assessment of existing conditions. You can think of schematic design as the initial assessments in 'Code Compliance' and rough idea generation like 'Common Conversions'.

4 DESIGN DEVELOPMENT

After agreeing on a general layout, your architect will begin to resolve your basement design. This means your architect will show you fewer diagrams and more measured drawings, which communicate how different elements—walls, windows, doors—are placed to meet code requirements, site and building conditions, aesthetic ambitions, and more. By the end of design development, your architect should be able to prepare the tabloid set of drawings (with existing and proposed features) required for an administrative adjustment (zoning) application. These plans should also have enough detail for an initial cost estimate.

TECH. DRAWINGS, PERMITS, BIDS:

5 CONSTRUCTION DRAWINGS

Based on survey information, consultant input, and the materials from design development, your architect will develop detailed construction documents (CDs). Typically these are done in numbered order—50%, 75%, 90% CDs—which indicate the level of resolved detail and are collated with electric, plumbing, structural, and other expert consultant drawings. The completed, stamped construction drawing set is what your architect will submit to the Department of Buildings along with their building permit application. Your architect will also develop a text document, the specifications (specs), which articulates the building products to use and how they must be installed.

Often permit/technical review and bidding (next page) happen at the same time, so your architect will coordinate drawing revisions for the city and circulate amendments to contractors, for updating their estimates. Larger projects, with more complex construction, may do bidding later in this cycle; simpler conversions can seek formal bids earlier.

In general, CD sets are far more technical than this manual's chapters, but details from 'Mitigating Issues' are analogous to residential CD details. The chapter 'Navigating Permits' lays out the documents and process of applying for zoning and building permits, as well as meeting required construction inspections. During this process, you can anticipate at least one or two rounds of drawing revisions. Ideally the fees for this step should come out of recently secured loans and grants.

6 CONTRACTOR BIDDING

Based on construction documents and specs, your architect will seek bids from contractors for construction. (As an NHS client, you may work with their construction specialists to coordinate and choose between bids.) At minimum, you'll want three bids for your conversion,

from firms that provide reliable, conscientious, and timely work. From a permitting and inspection standpoint, selecting a reasonable bid (and reliable firm) should limit installation and inspection issues down the road. Contractor bids will look very much like the line-item estimates in 'Building Equity.' The section below outlines researching contractors, for guidance on making bid decisions with your architect.

SELECTING A CONTRACTOR

As a client, you can avoid contractor issues through a combination of due diligence in researching, selecting, and contracting with a contractor based on their bids.

You should take the following steps to avoid problems:

- **Ask the contractor for copies of the licenses they (and their subcontractors) hold.** The City of Chicago requires General Contractor Licensing. Additionally, masons, electricians, plumbers, and roofers must have appropriate specialty licensing.
- **Solicit bids from contractors with the right experience for the job.** For example, a contractor that principally does new construction may not be right for your basement adaptation project. *Your Architect should be able to recommend contractors with whom they've had similar, successful basement projects.*
- **Check that the contractor has proper insurance coverage.** At Neighborhood Housing Services of Chicago, they require any contractor working with clients to carry comprehensive liability insurance (protecting the Contractor and Homeowner) of no less than \$1,000,000 and workers compensation insurance of > \$100,000.
- **Ask the contractor for references from three similar projects. Contact the references regarding their experience.** If the project involves visible repairs (i.e., new terraces or significant structural repair), try to go see the completed work in person.

Check for complaints against contractors:

- City of Chicago Department of Buildings, report complaints: bit.ly/DOB-CG-Complaints
- City of Chicago Department of Consumer Affairs, general contractor look up: webapps1.chicago.gov/activegcWeb/
- Better Business Bureau, contractors: www.bbb.org/us/il/chicago
- Illinois Attorney General: general info bit.ly/IL-AG-Home-Repair & report complaints: bit.ly/IL-AG-Complaint

SIGNING CONTRACTS WITH A GENERAL CONTRACTOR

Just as when signing with an architect, your contract with a general contractor (and their team of licensed tradespeople) should be clear, in language you can understand, on exactly what work is to be done, when and how the payments will be made, and everything else you have agreed upon below. By law, you have **three days to cancel the contract** before it becomes binding.

Be sure to consider the following:

- **The contract states the start and completion date for all work.** The contract should say *exactly how you know whether the work will be done properly and what will happen if the work is not completed on schedule.*
- **A good contractor bid or proposal should include the following items:** a detailed scope of work; quantity (i.e., X number of windows); location; special conditions (i.e., reusing floorboards); installation methods; quality/material type; performance standard (i.e., product warranties on vapor barriers); cash allowances (for particular materials); and responsibilities of each party.
- **All bids should be in writing and specific enough that you can see what each work item costs. This is called a line-item bid.** If a contractor feels that additional repairs are needed for a

project beyond what is requested (i.e., replacing the plumbing running to a bathroom that is to be rehabbed), then these should also be listed separately so you can evaluate their cost.

- **Do not sign any estimate until you have done all necessary due diligence and selected the contractor you feel is best for the job. Do not pay for any estimates.**
- **Agree on the payment upfront.** *It is best to agree that you will pay the exact amount that includes all costs for the project rather than paying hourly.*
- **It is standard to make partial payments as the job is completed,** either based on percentage of work completed (i.e., 20%, 40%) or at previously agreed upon milestones.
- If advance payment is needed to secure particular products or materials (i.e., windows), those payments should be made directly to the vendor, with purchases in your name.

CONSTRUCTION ADMIN: 7 CONTRACTOR PREPARATION

Once you sign with a general contractor and have approved permits, your contractor will prepare for construction. This includes finalizing the overall schedule, specified in the bid documents, and setting up the construction site according to fire safety regulations and safe disposal practices. If any environmental hazards have been identified for removal, your contractor should notify all tenants of abatement work, with state-licensed abatement professionals to cleaning, clearing, and preparing the site for further construction work.

The 'Mitigating Issues' chapter of the manual provides more details on lead and asbestos abatement permits and procedures within Chicago.

8 CONSTRUCTION & INSPECTIONS

Depending on your architect's contract and their scope for construction administration, they may coordinate site visits, monitoring, and confirmation of construction progress. When problems arise, based on newly discovered conditions, you will contract with your architect (for an additional fee) to edit and amend drawings, seeking permit updates as necessary. During construction, you should reach out to both your architect and general contractor to keep you apprised of the general progression of work and make sure all required inspections are happening as scheduled. If you have a larger building (five flats, including the new unit) inspections schedules should be coordinated, with your contractor, through temporary 'Certificate of Occupancy' applications with the Department of Buildings.

Based on your contracts, you should receive periodic invoices for finished construction tasks or revised drawings. These costs should be covered by your loans/grants and built into overhead. Make sure to document all payments and the work more generally. It's important to keep good records in case there are conflicts about material installation, 'remove/rebuild' inspection orders, and ongoing work.

The manual chapter 'Navigating Permits' lays out the specific documents and the process of applying for coordinating inspections with the Department of Buildings. The list of required inspections provides a sense of construction order for basement conversion. 'Mitigating Issues' should help you to discuss any revisions to design, based on information that arises during the construction process.

Once your building passes all inspections and the work is complete, you and your architect will do a walk through, with a 'punch list,' to inspect the project and highlight outstanding details to finish before.... drumroll....you get the keys to your brand new basement unit.

AFTER CONSTRUCTION

9 OCCUPANCY, UNIT MANAGEMENT

Once construction is complete you should pay any outstanding invoices, finalize required 'Occupancy Permits,' and make sure your unit management plans are in order. This means refining rent estimates, photographing the unit for marketing (and as desired by the architect), and establishing any background banking accounts for tenant deposits, rental income, and out-going maintenance and management fees. Pulling building permits should trigger a property assessment, but it's a good time to verify or apply for applicable tax and utility exemptions.

The manual's 'Building Equity' chapter offers rough budgeting tools for apartment management tasks and links to a number of landlord resources.

10 ONGOING MAINTENANCE

With accounts in place and, hopefully, a fresh array of trusted contacts in the building industry, it makes sense to address long-term maintenance for your building. This includes getting contracts for annual, preventative work (from trusted tradespeople) as well as getting estimates on existing fixtures and systems that were not updated during conversion. You should also refine your budget for saving reserves and rental income for building maintenance.

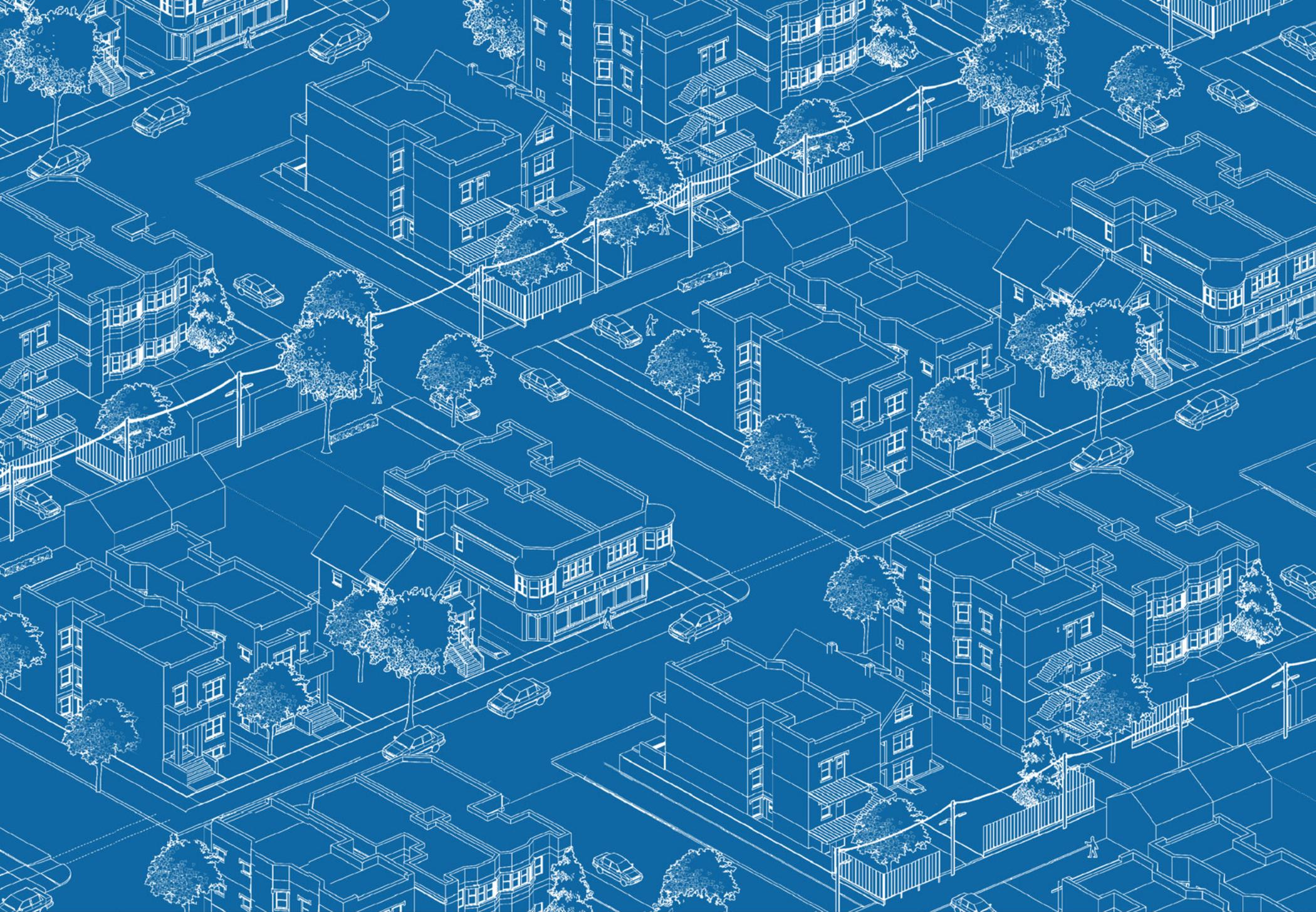
As noted above, see 'Building Equity' for maintenance budgeting tools and resources.

BASEMENT CONVERSION PROJECTS: SUMMARY VARIATIONS

The chart and ten steps described on the prior pages offer an overview of a mid-sized or large conversion project for a single family home into a Two-Flat. With costs between \$160,000-\$180,000 total, you can expect about \$20,000 in architectural fees (12%), and spending about \$10,000 in advance of securing finalized estimates and loans.

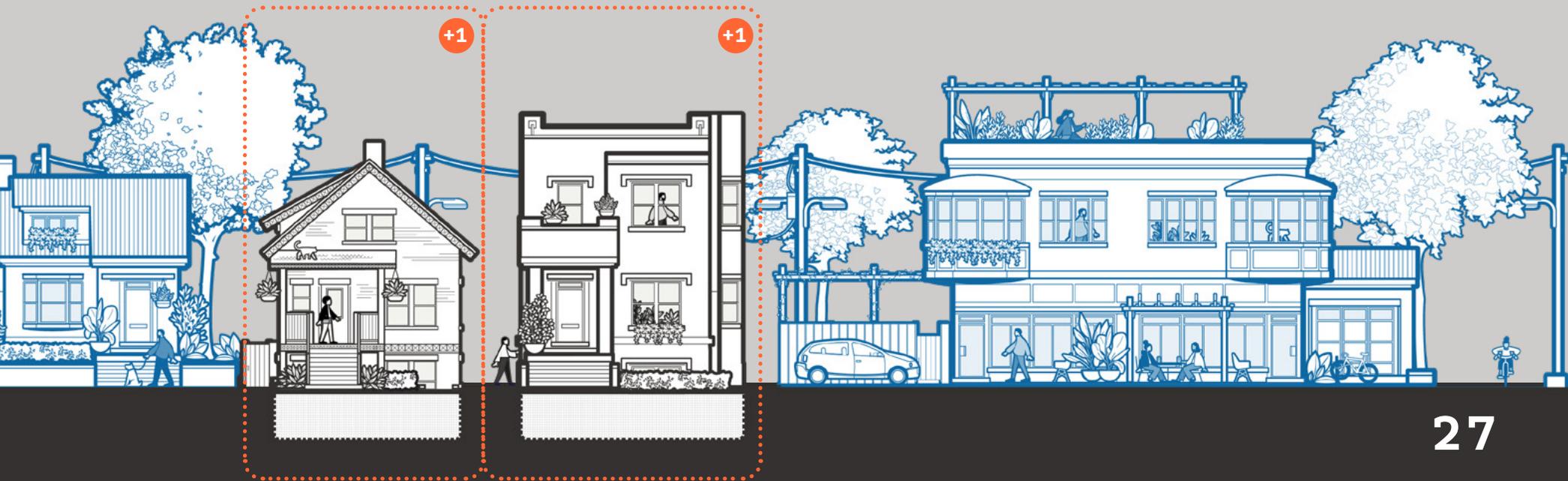
A project of this size could take between seven months and one year, keeping in mind that exterior work like drains, utility service lines and new terraces/exits need to be scheduled around the Chicago winter. If you need to expedite any of the design or construction steps, that will raise overall project costs as it requires more labor. A smaller project could cost half this amount and take four to nine months (conservatively).

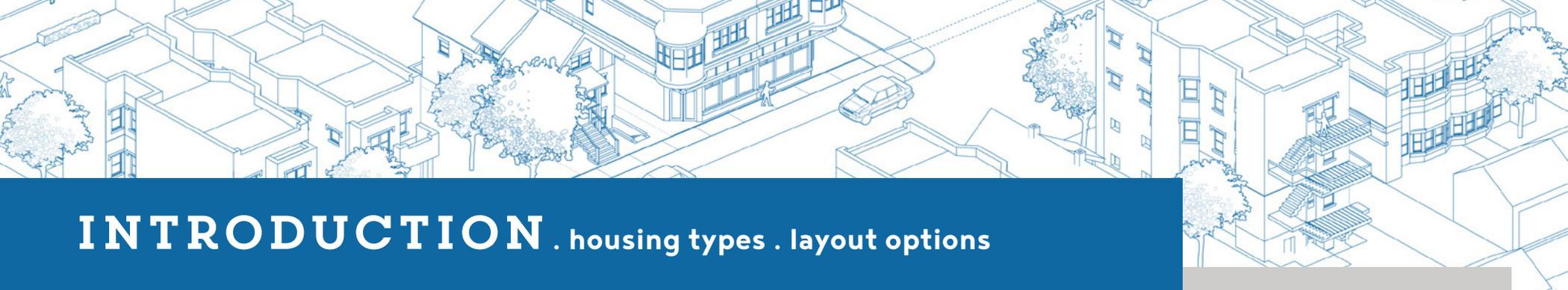
Proceed to the first chapter, 'Common Conversion' to explore common house types and how their characteristics affect potential basement units.



COMMON CONVERSIONS . examples

Typical Chicago Workers' Cottages & Two-Flats:
Working Layouts for New Basement Apartments

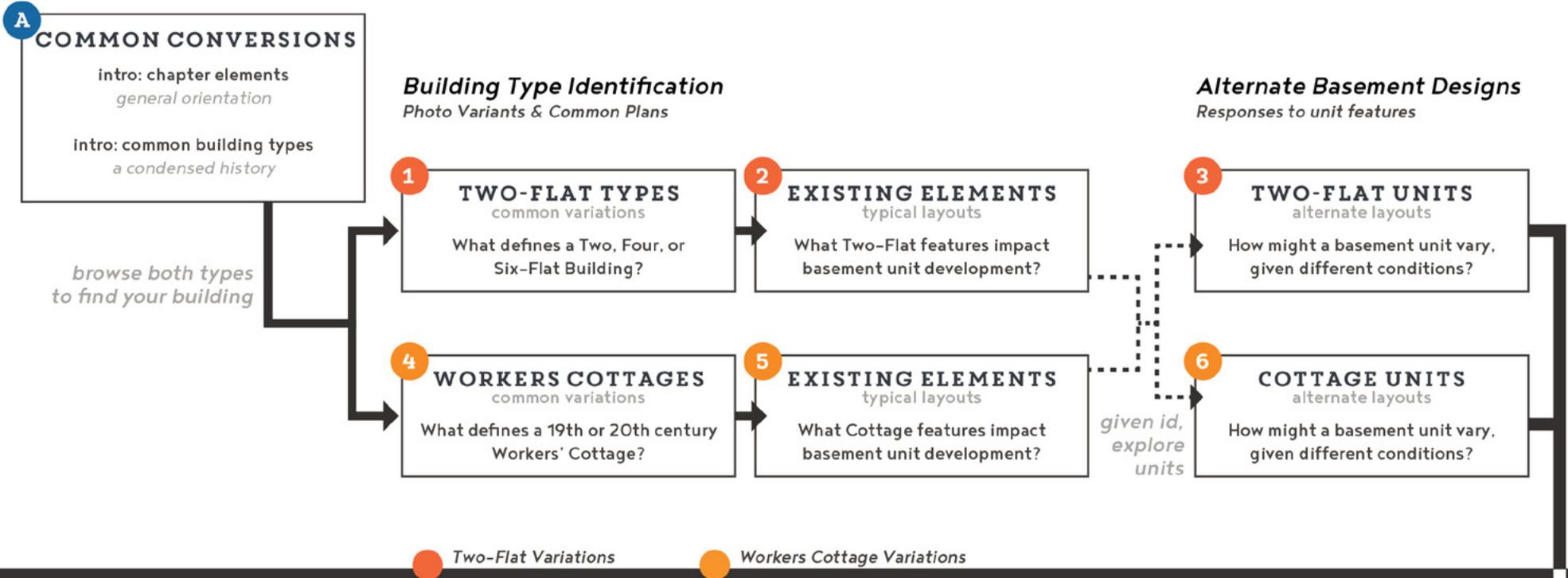




INTRODUCTION . housing types . layout options

This chapter introduces common Chicago housing—the Two-Flat and the Workers Cottage—and potential basement plans. These designs should help you anticipate the typical issues and opportunities—given age, construction, and common layouts—that you will encounter in a conversion.

NAVIGATING COMMON CONVERSIONS



CHAPTER CONTENTS:

The 'Common Conversions' chapter helps you identify your building's generic type and how its characteristics influence potential basement units. Two-Flats make up 26% of the city's housing (nearly 30% of rentals); Cottage variants are nearly as common. If your home aligns with either type, the unit designs at the chapter's end provide inspiration for adaptation and speak to the issues facing different scales of adaptation.

For each type, the following pages introduce:

- **Building Type and Visual Identification:** This spread elaborates on the variations seen in Chicago, with common unit characteristics.
- **Existing Elements and Design Considerations:** This spread shows common floorplans and outlines the major factors influencing a basement unit's layout.
- **Two Alternate Designs:** this spread shows a small and large unit conversion. Each design incorporates alternate assumptions about building systems and common spaces.

With your type identified and a generic unit in mind, the 'Code Compliant Units' chapter guides you through assessing your property to identify the safety and technical challenges to new units.

CHICAGO HOUSING TYPES:

Chicago's housing stock reflects the city's history as a center of industrial immigration, real estate speculation, and housing kits.

The housing types shown here – Two-Flats and Cottages – were built en masse between 1860 and World-War II. Based on simple, repeatable structures and standardized building materials, the regularity of these buildings makes it easy to anticipate renovation and conversion issues.

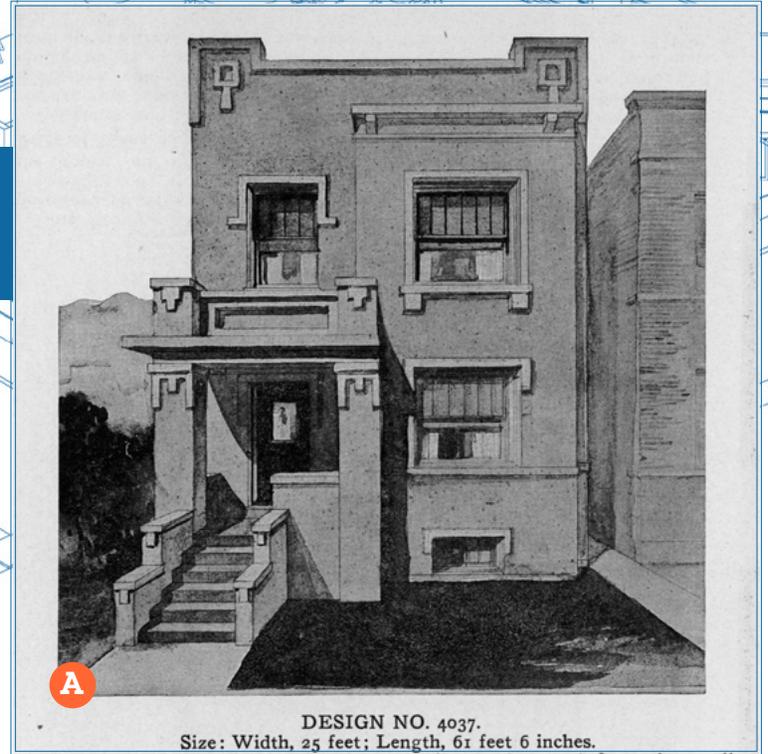
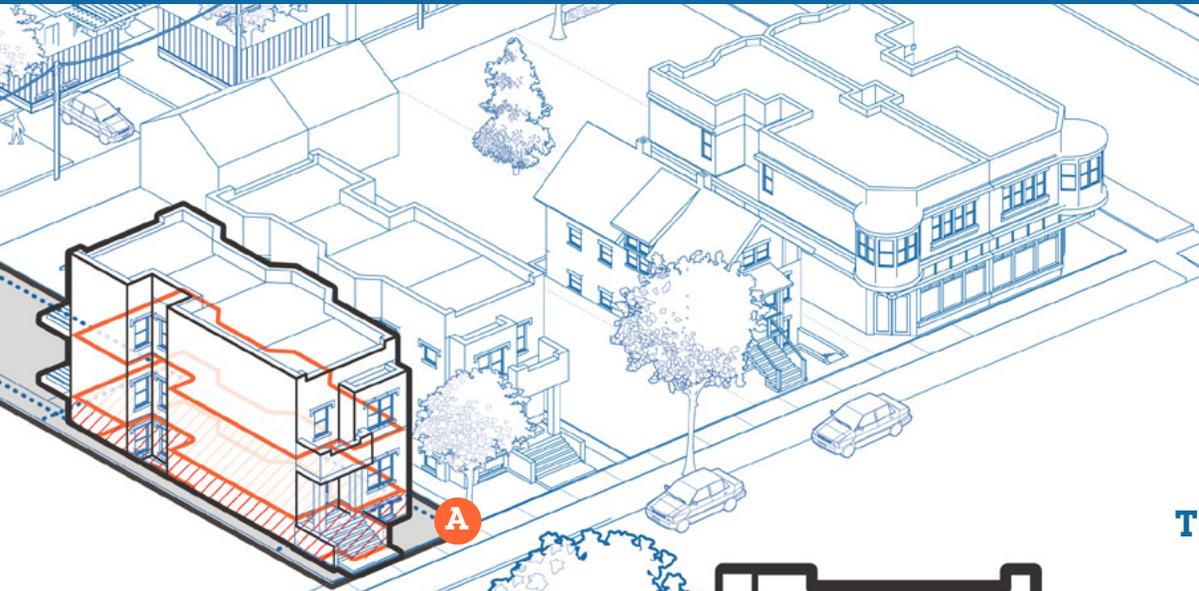
Two to Four-Flats became popular at the turn of the 20th century and are found across nearly all of Chicago (beyond the Loop). At that time, pattern books made it easy for contractors to construct simple brick and graystone buildings. The second unit enabled working-class owners to pay down mortgages and build equity, serving as a tool of upward-mobility.

In some neighborhoods, like Humboldt Park, Logan Square, and Bridgeport, Two to Four-Flats constitute between 55-70% of all housing. Historically, these buildings have the most affordable rents in Chicago when compared with larger multi-family buildings (thanks to less infrastructure and mechanical maintenance).

Workers' Cottages are a slightly earlier type of single-family, working-class architecture, which dominated from the 1860s-1900s. Ranging in exterior decoration, six-room Cottages proliferated in areas like Pilsen, Ukrainian Village, and out to Berwyn. Families finished the Cottage interiors as finances permitted. They could then expand into the attic, build out the rear and basement, or move the light, wood-frame homes as desired.

A forerunner of the interwar bungalow, variations on the Cottage type were built across the city through the early 20th century. With their narrow, rectangular plans and oft raised elevation, Cottages offer the possibility of incorporating basement units in older, denser, transit-rich sections of the city.

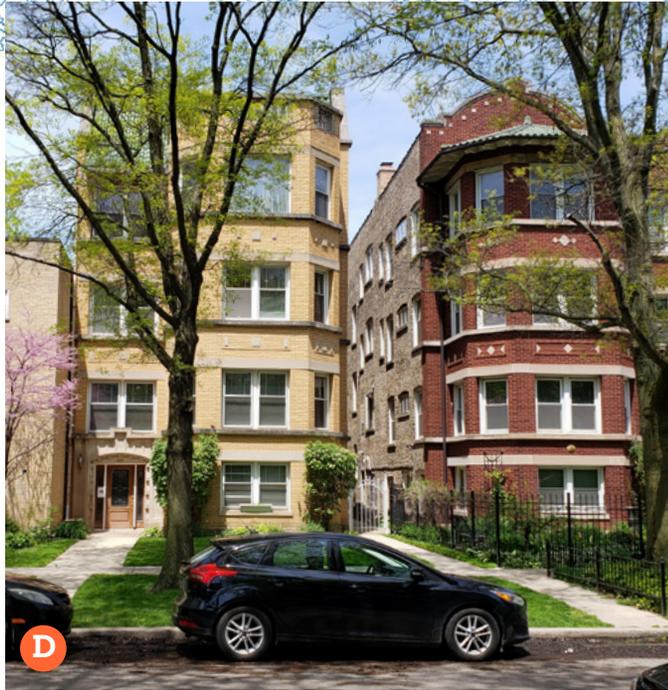
TWO-FLATS . common plans & variants



THE CHICAGO 'TWO-FLAT':

There are multiple variations on the 'Two-Flat' building. The design chosen - (a) above, to the left, and in the plans to follow - is taken from Radford's *Stores & Flat Buildings*, a Chicago pattern book from 1913. Design No. 4037 (25 x 61.5 feet) holds two Two-Bedroom units on a common 30x125 foot lot and is a mix of brick walls, wood frame, and stucco finishing. Similar designs - with additional floors - can be seen in Chicago's bay-windowed Three-Flats and Graystones (b). Two units per floor are also common in Four and Six-Flat variants (d) for use on 175 foot deep lots or mirrored on double lots. Post-war variants usually have shorter ceilings and already finished basement units (c).



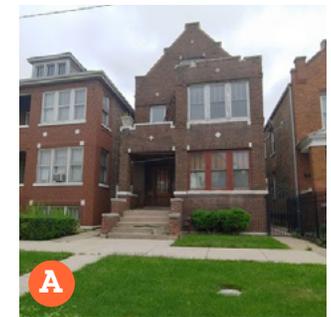
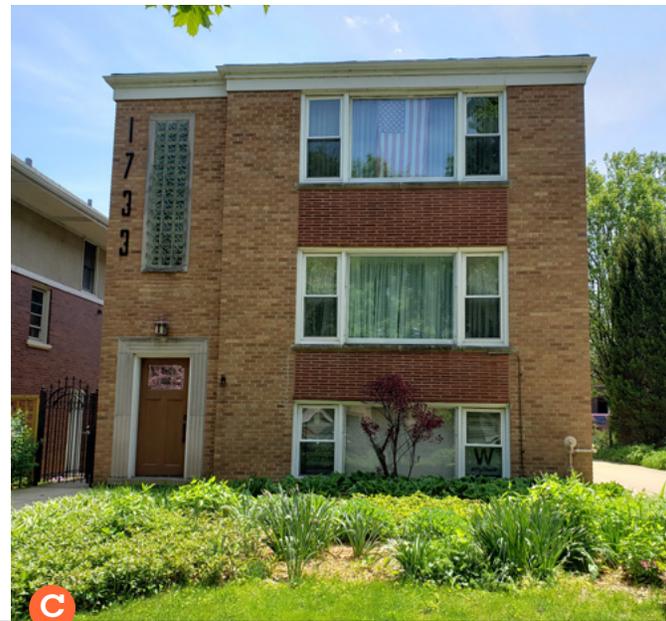


**GRAYSTONE
TO
FOUR-FLAT**
Chicago variations:
style, age, & stacking



Range of 'Two-Flat' characteristics:

- **Lots and zoning:** 30 feet or wider in zones RS-3 or greater, double-wide or deep lots common for Four to Six-Flats
- **Unit Types:** typ. two-three bedroom units in Two to Three-Flats, one to two bedroom units in Four to Six-Flats, all originally with one bathroom
- **Unit Sizes, avg.:** 780 sqft (one bedroom), 900 sqft (two bedrooms), 1400 sqft (three bedrooms)
- **Elevation:** Many Chicago designs are raised between 3-6 feet above grade (a half story), with half-sized windows allowing some light for basement units. Keep in mind that it's common to have a windowless (party) wall, along the common stairwell, which enabled building at the lot line, but limits natural light sources and future window wells.
- **Affordable Units:** *For larger buildings (five + units), at least one basement conversion unit must be rented as an affordable unit, for the first 30 years after its conversion, based on the City's ADU ordinance.*

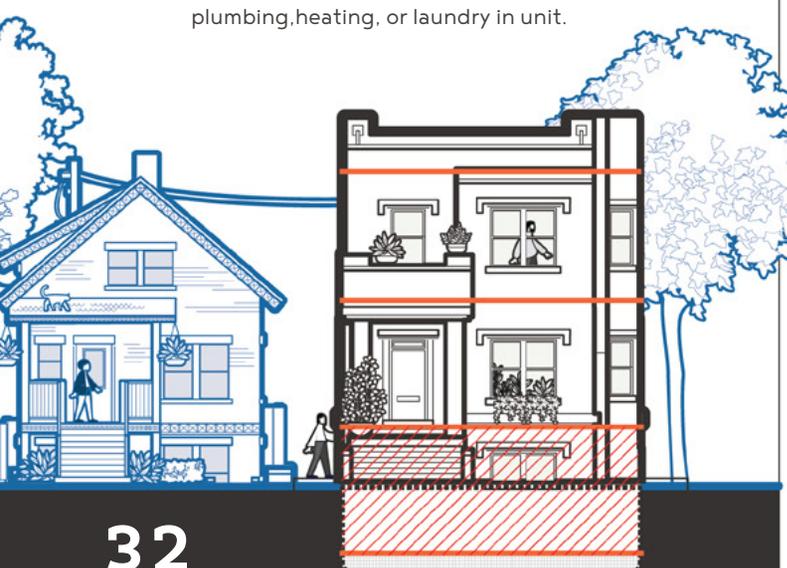




TWO-FLATS . Existing Elements & Opportunities

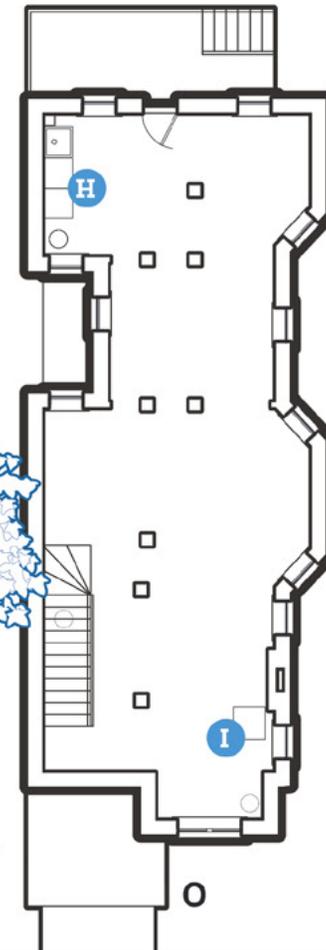
Two-Flats are typically stacked apartments, each with nearly identical layouts; rooms sit on either side of a central corridor. Building stories are connected by front and back (exterior) staircases. While designs vary, common elements influence potential basement units:

- **Structure** – Prewar units often have heavy brick walls. It’s advisable to maintain existing supports, adding basement walls within existing column rows.
- **Multi-unit services** – Two-Flat utilities are already metered and sized for multiple units; corridors and stairs are built for fire safety. Thus it is easy to align/add connections for another unit’s use.
- **Older advantages** – Pre-war Two-Flats were often elevated to avoid street and sewer flooding, with basements tall enough for conversion. Also, old pantries/closets provide space for new plumbing, heating, or laundry in unit.



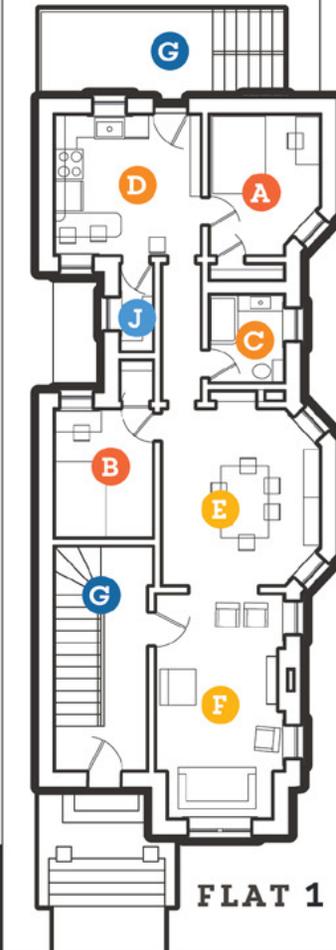
UTILITIES

- H** Laundry & Water Heater
- I** Heating (+ exhaust)
- J** alt. utility closets (in unit)



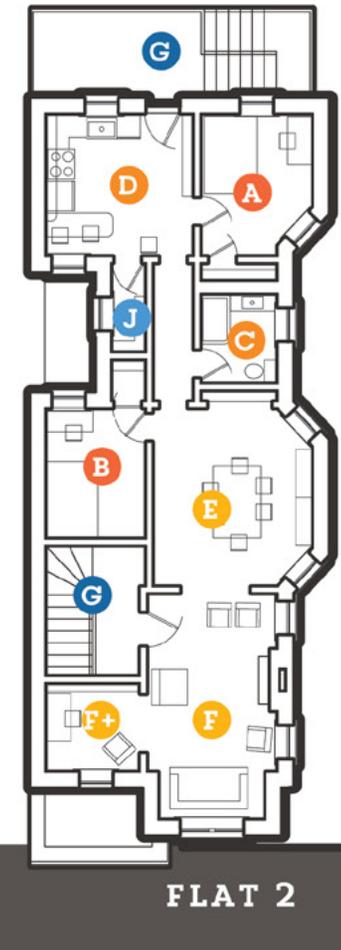
COMMON ENTRY

- G** Stairs & Areaways



EXISTING UNITS

- A B** Bedrooms
- C** Bathrooms
- D** Kitchen
- E** Dining Room
- F F+** Living Room, Study



CONSTRAINTS IN FORMING NEW UNITS

ALIGN WALLS WITH EXISTING STRUCTURE

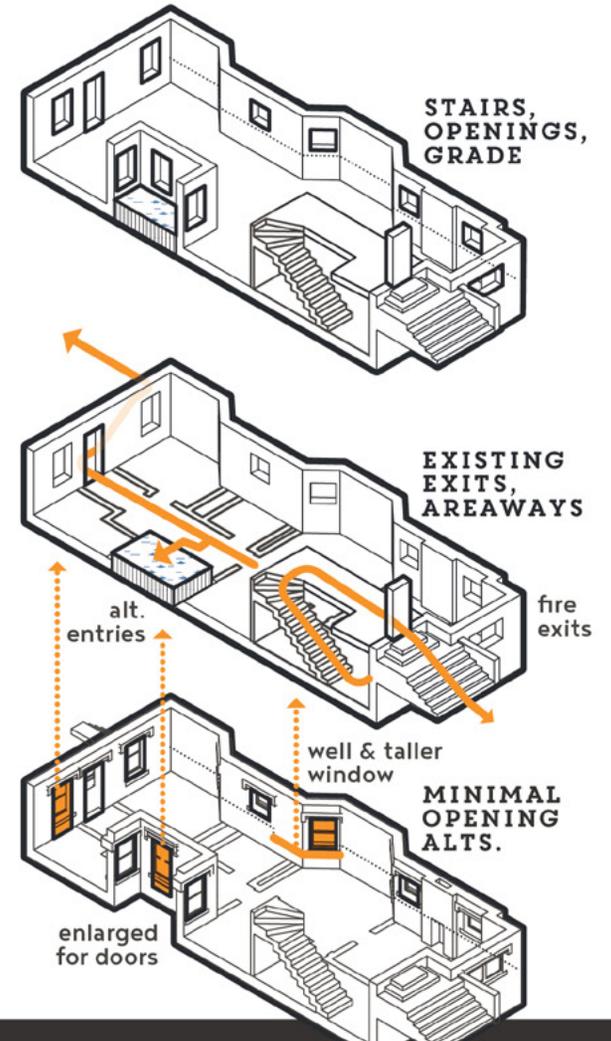
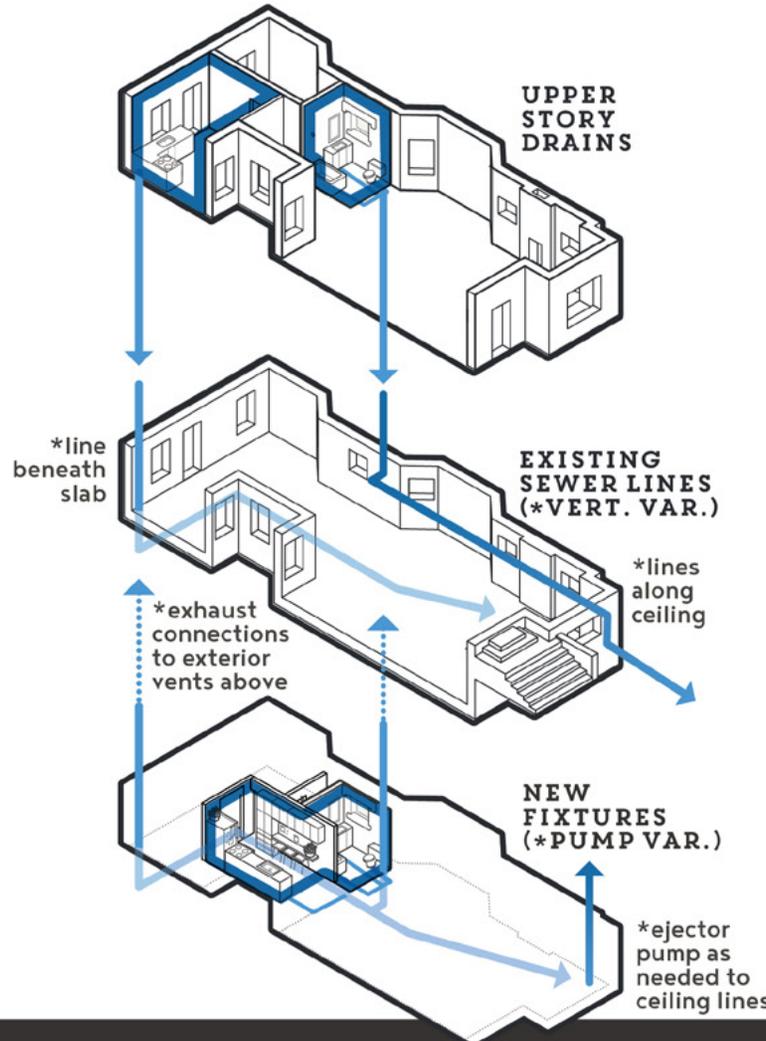
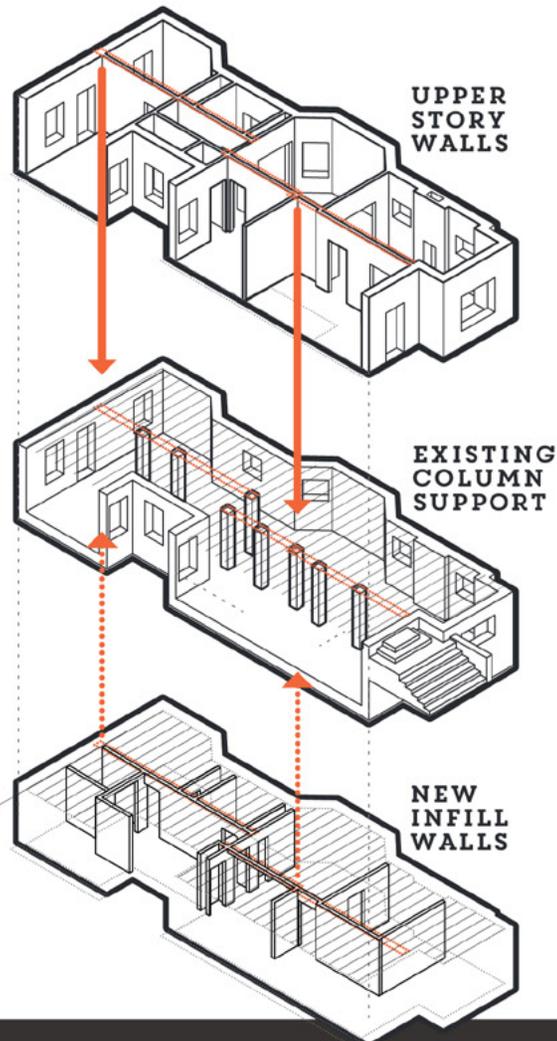
Minimize Re-Engineering of Building Loading

SITUATE UTILITIES NEAR EXISTING LINES & DRAINS

Minimize Re-Engineering of Plumbing & Heating

PLACE ROOMS TO ACCOUNT FOR EXISTING OPENINGS

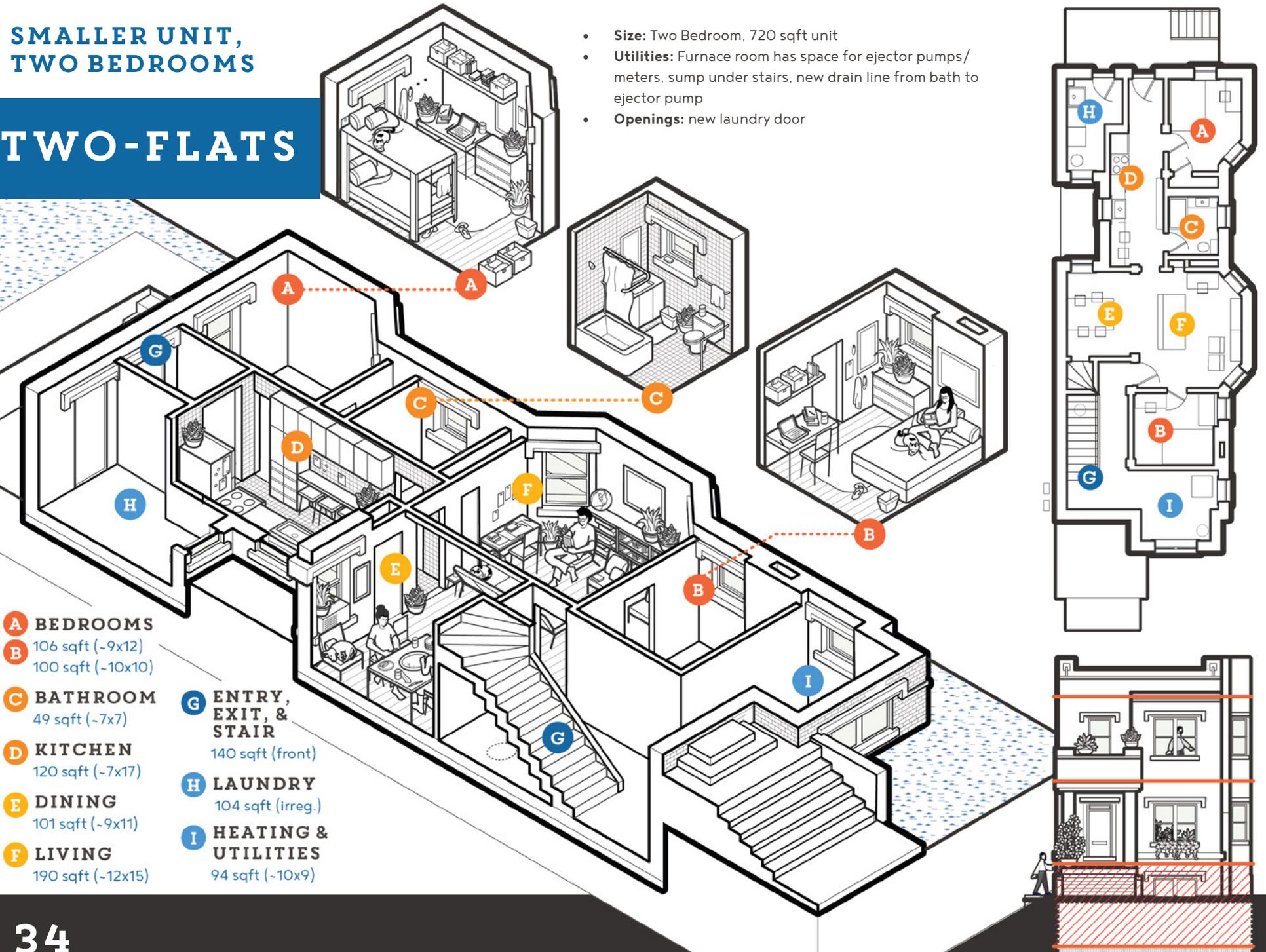
Minimize Alterations to Foundation, Add Exit Routes



SMALLER UNIT, TWO BEDROOMS

TWO-FLATS

- **Size:** Two Bedroom, 720 sqft unit
- **Utilities:** Furnace room has space for ejector pumps/ meters, sump under stairs, new drain line from bath to ejector pump
- **Openings:** new laundry door



- A BEDROOMS**
- B** 106 sqft (~9x12)
- B** 100 sqft (~10x10)
- C BATHROOM**
- C** 49 sqft (~7x7)
- D KITCHEN**
- D** 120 sqft (~7x17)
- E DINING**
- E** 101 sqft (~9x11)
- F LIVING**
- F** 190 sqft (~12x15)
- G ENTRY, EXIT, & STAIR**
- G** 140 sqft (front)
- H LAUNDRY**
- H** 104 sqft (irreg.)
- I HEATING & UTILITIES**
- I** 94 sqft (~10x9)

LARGER UNIT, TWO BEDROOMS

TWO-FLATS

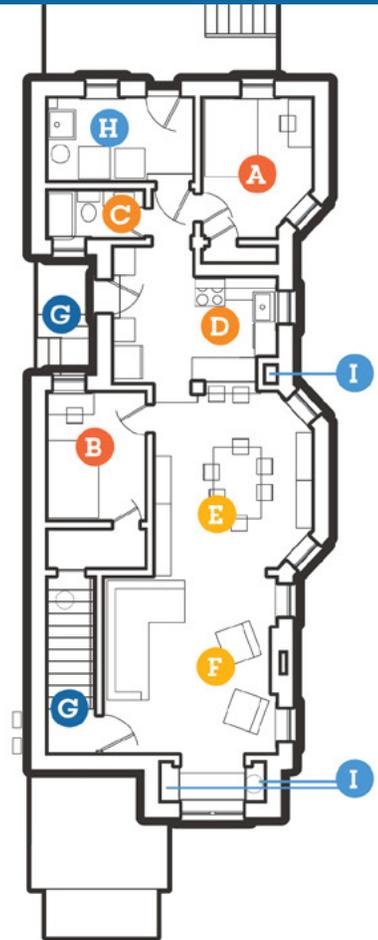
- **Size:** Two Bedroom, 900 sqft unit
- **Utilities:** larger unit - limited maintenance access; ejector pump and water meter in closets, sump under stairs (via closet), new plumbing on laundry line
- **Openings:** exit/side stair from unit kitchen

common conversions

- A BEDROOMS**
- B** 106 sqft (~9x12)
- C BATHROOM**
- D KITCHEN**
- E DINING**
- F LIVING**
- G ENTRY & STAIR**
Exterior & Interior
- H LAUNDRY & HEATING**
- I UTILITIES & CLEAN-OUTS**

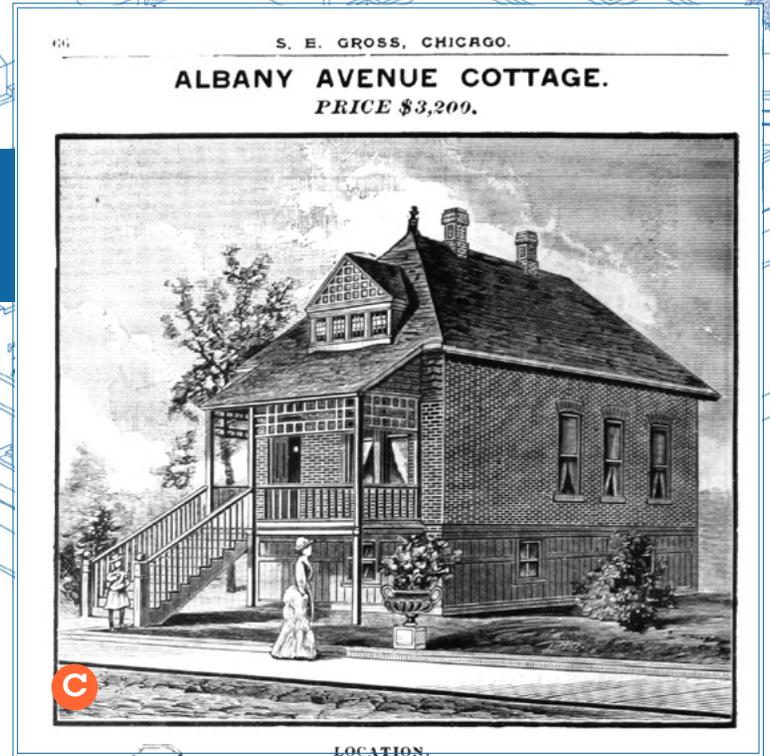
- B** 93 sqft (~9x10)
- C** 35 sqft (7x5)
- D** 140 sqft (14x10)
- E** 190 sqft (~12x15)
- F** 215 sqft (~14x15)

COMMON CONVERSIONS



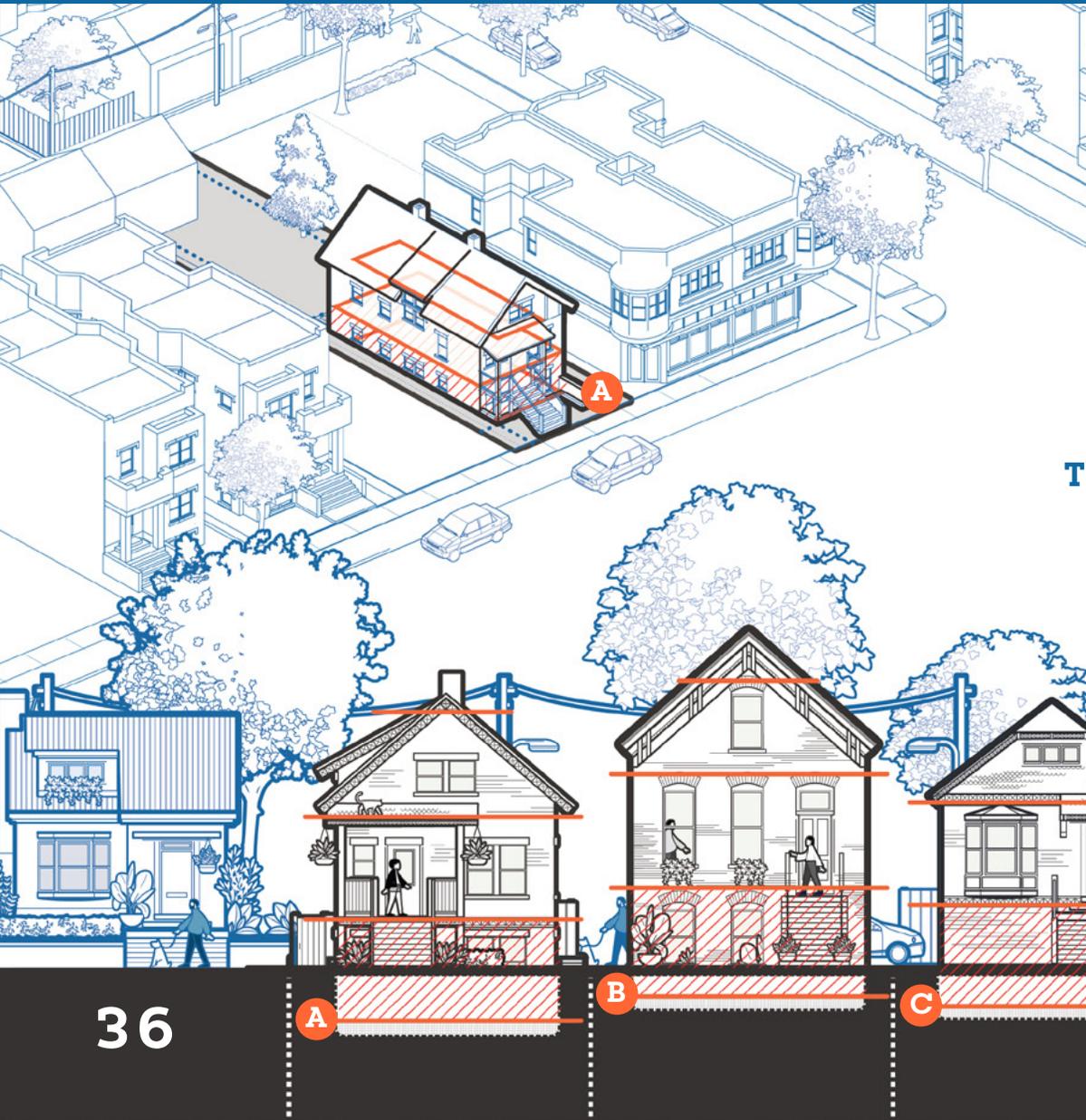
35

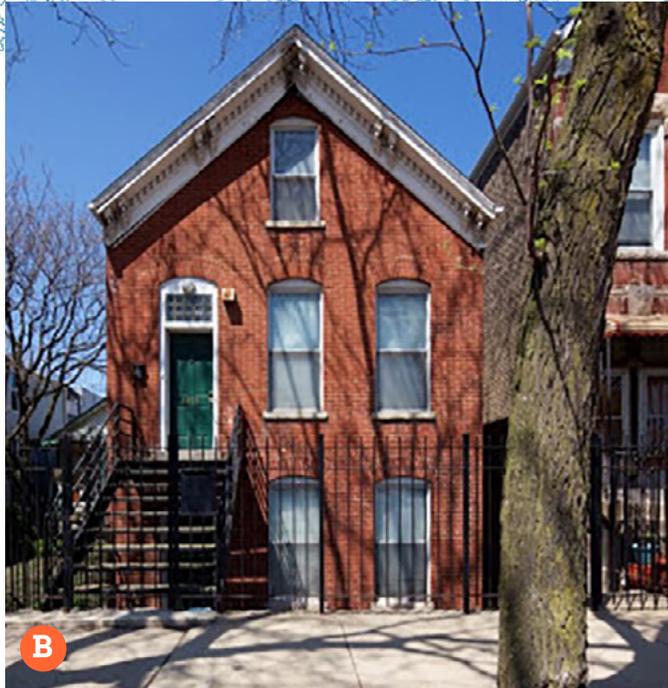
WORKERS' COTTAGES . variants



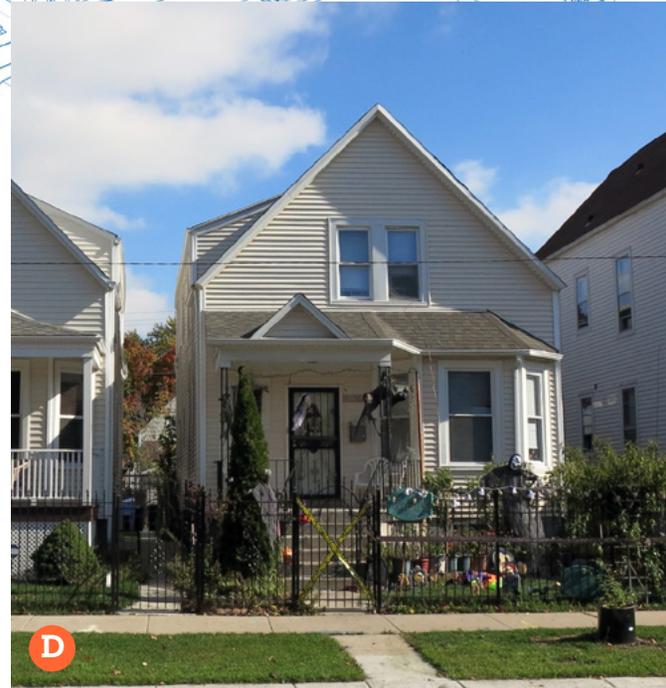
THE WORKERS' COTTAGE:

Workers' Cottages are generally 20–22 feet wide, two to three rooms deep, and have optional access for attic occupation. The design chosen - (a) to the left and in following plans - is taken from Hodgeson's *Low-Cost American Homes*, a Chicago pattern book from 1904. 'The Vixen' (20 x 42 feet) is a three to four bedroom single family home, meant for a 25x100 foot lot with varying construction materials. Diagrams include likely updates: a second bath and dashed in a second floor fire-escape, to satisfy egress requirements for multi-unit conversion. Common materials include Italianate brick Cottages (post-1872) with large windows and high ceilings (b), as well as brick and wood interwar Cottages in the city's North and South edges (d). Less common are early, wooden Cottages (above, c), which have been lost to decay and demo.





B



D

FROM BRICK TO FRAME COTTAGES

Chicago variations:
style, age, & adaptation



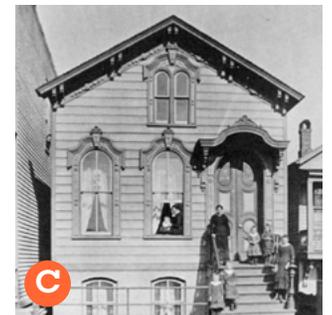
B

Range of 'Workers' Cottage' characteristics:

- **Lots and zoning:** 25 feet or wider lots in all residential zones, common on the smallest urban lots
- **Unit Types:** typ. two bedroom units in oldest, single level Cottages, two to four bedrooms in 1.5 stories, after 1870s
- **Unit Sizes, avg.:** 800 sqft (1860s two bedroom), 1380 sqft (two to four bedrooms, 1.5 story brick and frame designs, post-1872)
- **Elevation:** In older neighborhoods, raised Cottages can be 6-12 feet above grade, making basement entries and windows easy to accommodate. That said, if your building has existing basement terraces (common in Pilsen) these often mark the original height of the street, before sewers were added and streets raised (6-12 feet). This indicates your unit will need an ejector pump, to raise basement drainage up to existing sewer connections.
- **Affordable Units:** *Single family homes, under the accessory dwelling units legislation, have no affordability requirements for new conversion units, as they can only add a single unit.*



D



C



B



WORKERS' COTTAGE . Existing Elements & Opportunities

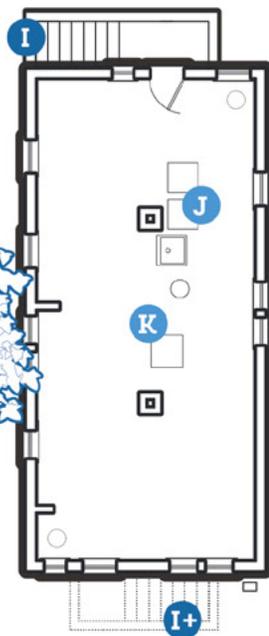
Workers' Cottages are typically 1.5 story, single family homes, with a front-facing gable. First floor rooms sit aside a central wall and attic rooms are centered under the eaves. Some have interior basement stairs while older models have exterior access only. While layouts vary, common elements will influence unit designs:

- **Structure** - With light wood construction and small spans, there's more flexibility in wall placement. It's still advisable to integrate/reinforce current column lines.
- **Services** - Cottage utilities are likely to be sized for a single unit, so conversion will require new connections, enlarged sewer lines and pumps (added \$), but this allows for flexible placement.
- **Older advantages** - Raised Workers Cottages were elevated to avoid flooding and enable expansion, with basement height, areaways, and tall windows anticipating inhabitation. Your building likely has old renovations that will impact unit development.



UTILITIES

- J** Laundry
- K** Heating & Water Heater
- L** alt. utility closets (in unit services)



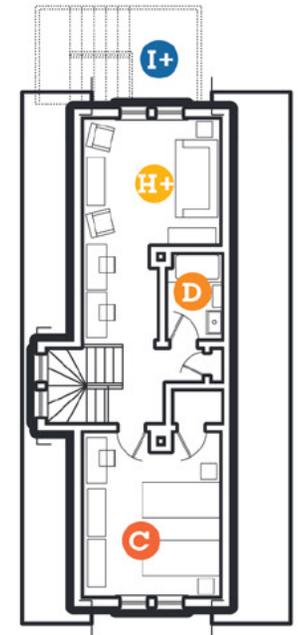
COMMON ENTRY

- I** Exterior Stairs, Areaways, Porches
- I+** Exit Routes Req. If Expanding



EXISTING UNIT

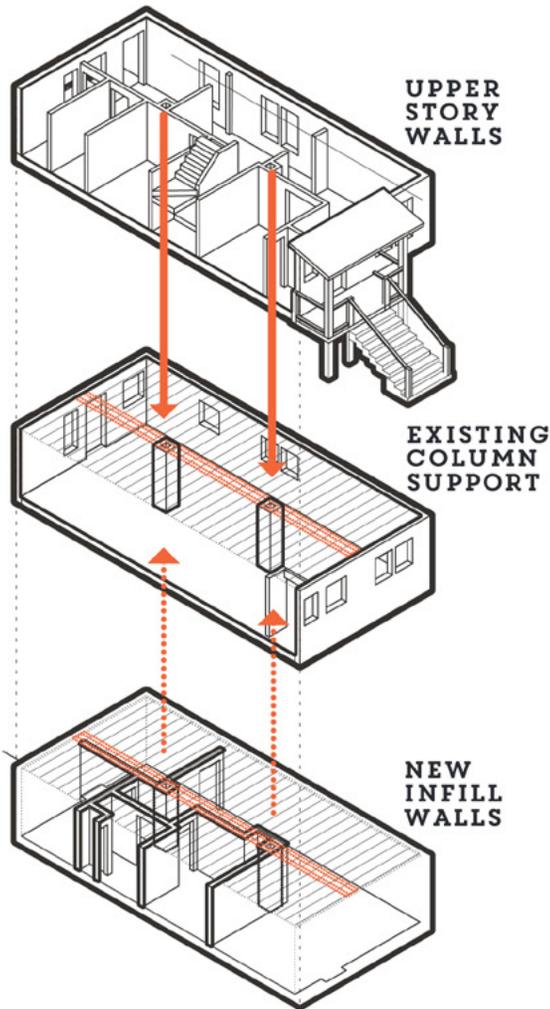
- A B C** Bedrooms
- D E** Bathrooms
- F** Kitchen, Pantry
- G** Dining Room
- H H+** Living, Study



CONSTRAINTS IN FORMING NEW UNITS

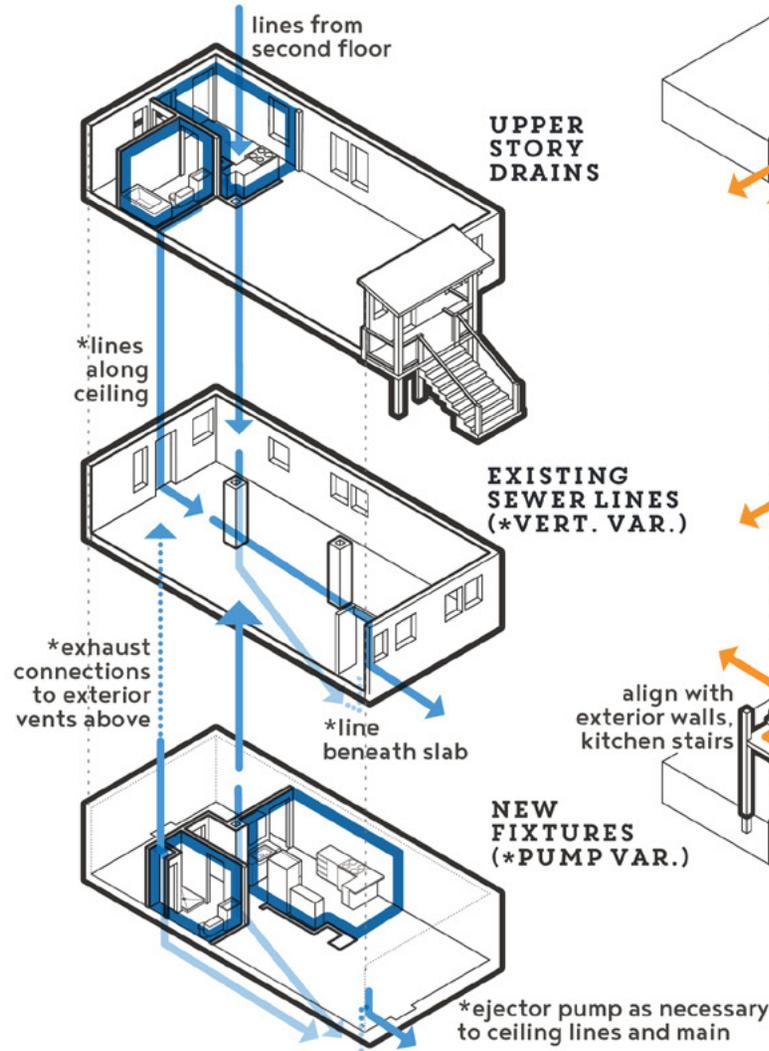
ALIGN WALLS WITH EXISTING STRUCTURE

Minimize Re-Engineering of Building Loading



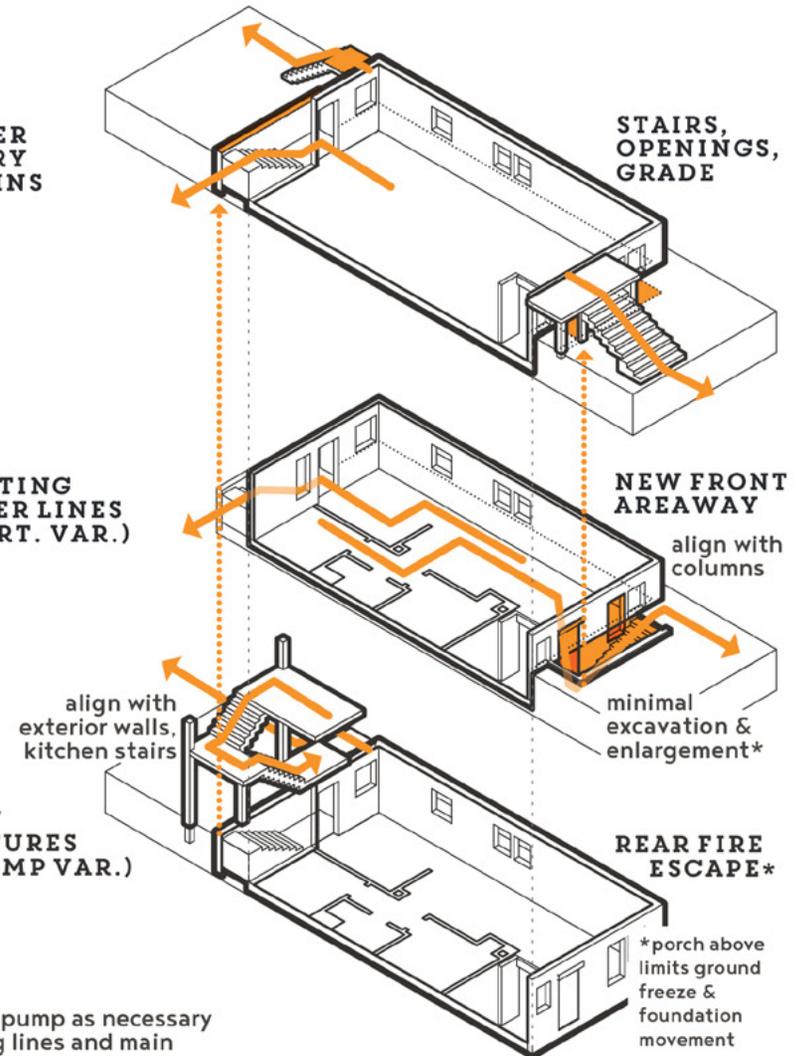
SITUATE UTILITIES NEAR EXISTING LINES & DRAINS

Minimize Re-Engineering of Plumbing & Heating



PLACE EXITS TO ACCOUNT FOR EXISTING STRUCTURE

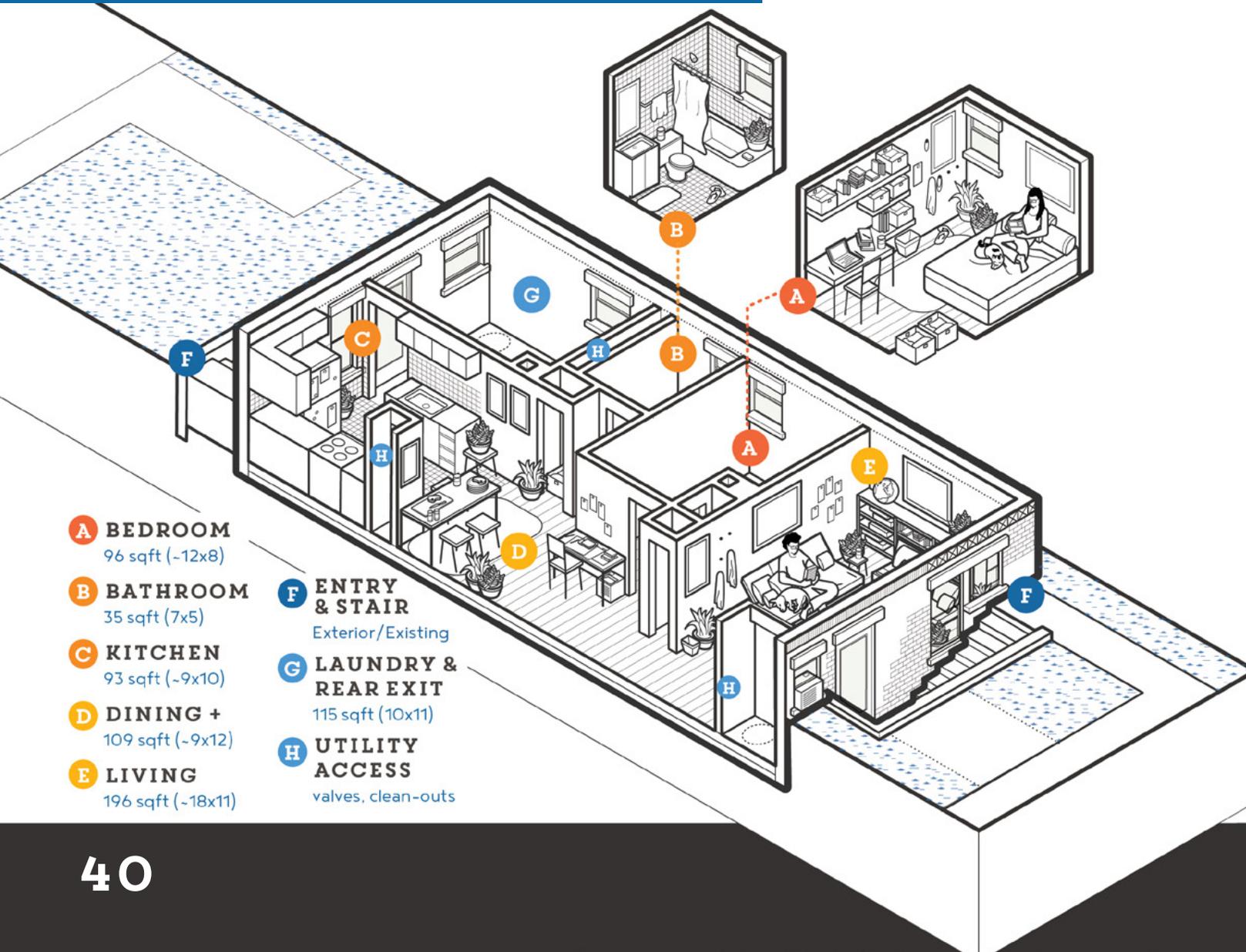
Minimize Alterations to Foundation, Add Exit Routes



SMALLER UNIT, ONE BEDROOM

WORKERS' COTTAGES

- **Size:** One Bedroom, 610 sqft unit
- **Utilities:** Furnace/Laundry room requires stacked washer/dryer to conserve space; water meter and ejector pump in utility closets at front, kitchen/bath on existing sewer vertical
- **Openings:** added front entry and stairs, enlarged windows



- A BEDROOM**
96 sqft (~12x8)
- B BATHROOM**
35 sqft (7x5)
- C KITCHEN**
93 sqft (~9x10)
- D DINING +**
109 sqft (~9x12)
- E LIVING**
196 sqft (~18x11)

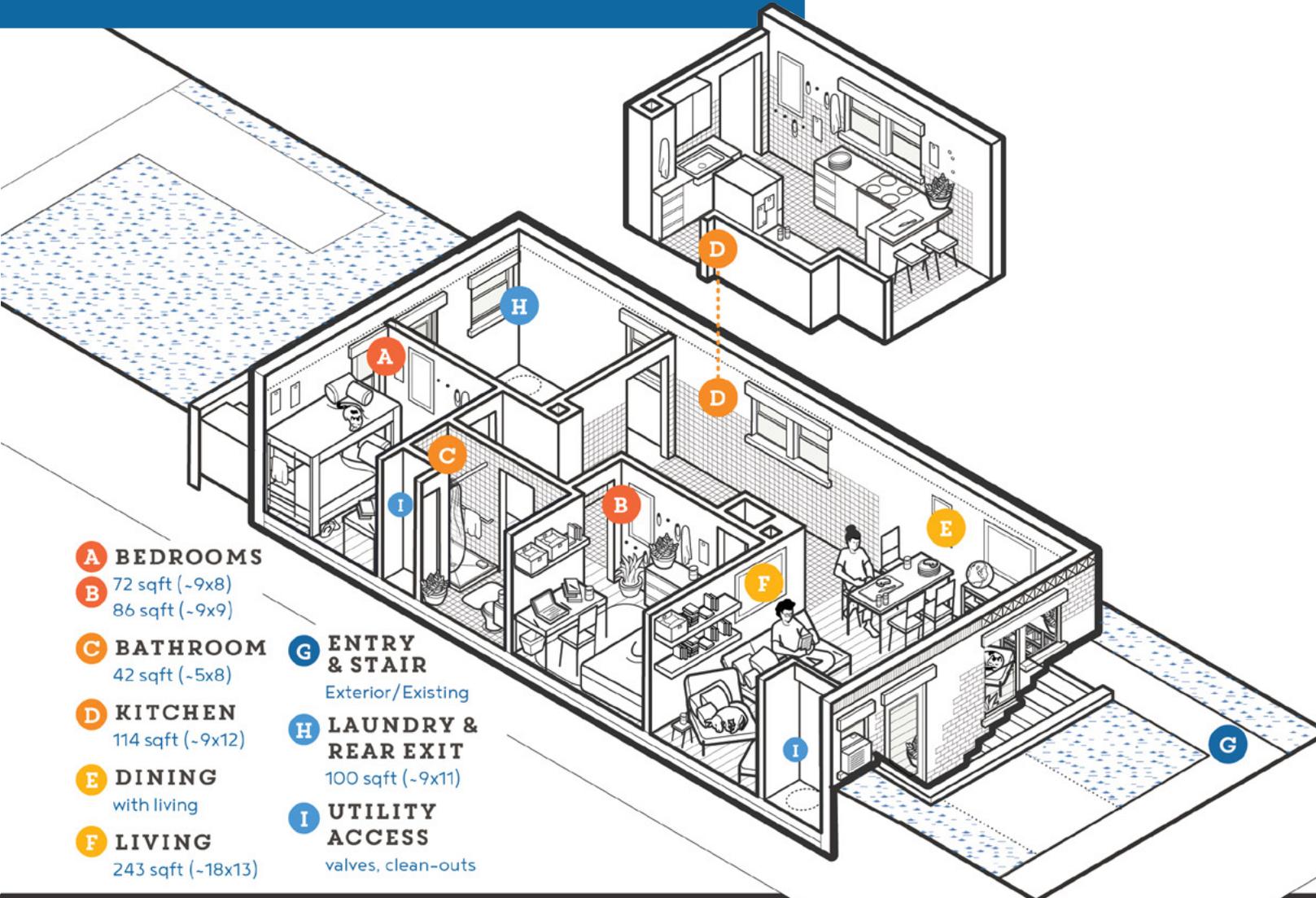
- F ENTRY & STAIR**
Exterior/Existing
- G LAUNDRY & REAR EXIT**
115 sqft (10x11)
- H UTILITY ACCESS**
valves, clean-outs



LARGER UNIT, TWO BEDROOMS

WORKERS' COTTAGES

- **Size:** Two Bedroom, 633 sqft unit
- **Utilities:** Furnace/Laundry room requires stacked washer/dryer to conserve space; water meter and ejector pump in utility closets at front, new plumbing from bath to pump
- **Openings:** added front entry and stairs, enlarged windows

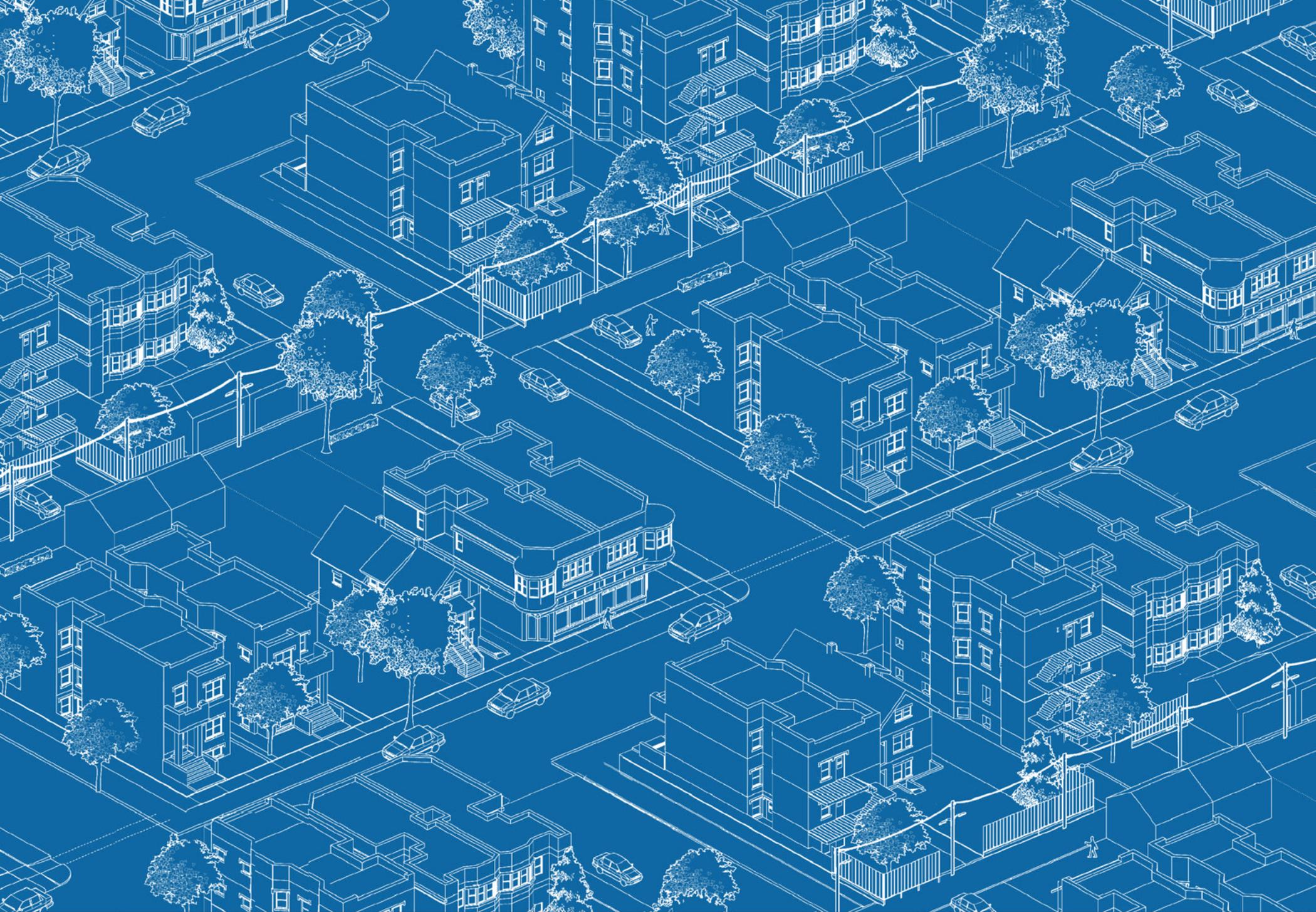


- A BEDROOMS**
- B** 72 sqft (~9x8)
- B** 86 sqft (~9x9)
- C BATHROOM**
- C** 42 sqft (~5x8)
- D KITCHEN**
- D** 114 sqft (~9x12)
- E DINING**
- E** with living
- F LIVING**
- F** 243 sqft (~18x13)
- G ENTRY & STAIR**
- G** Exterior/Existing
- H LAUNDRY & REAR EXIT**
- H** 100 sqft (~9x11)
- I UTILITY ACCESS**
- I** valves, clean-outs



41

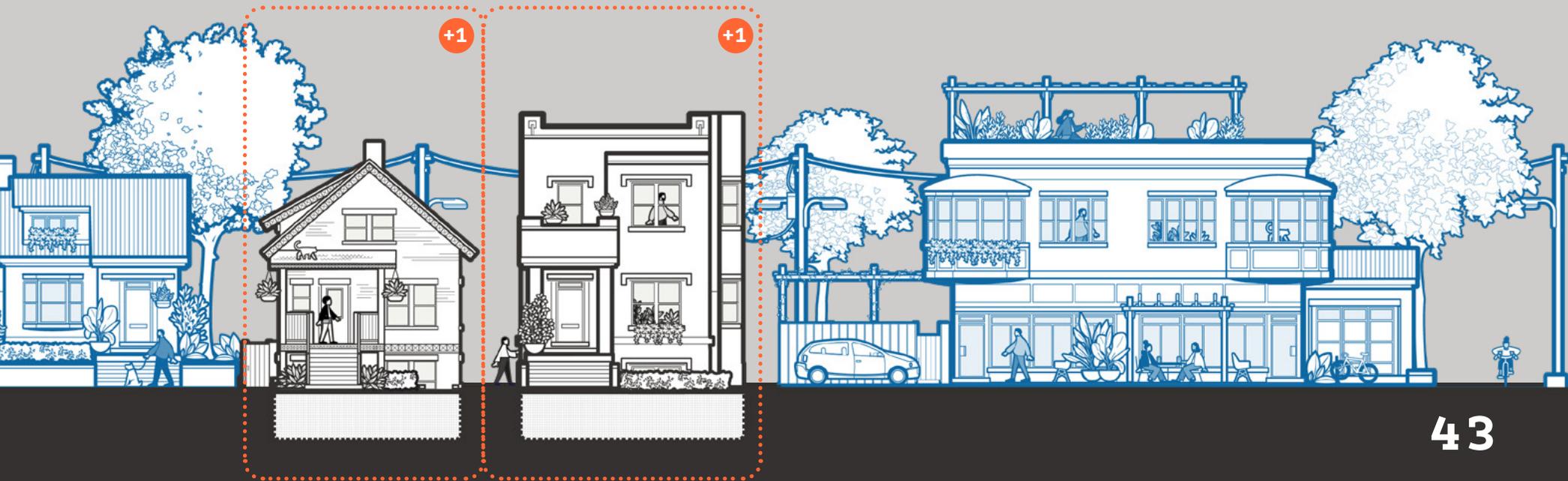
COMMON CONVERSIONS



CODE COMPLIANT UNITS . a checklist

Chicago Code Requirements & Assessment Guidance

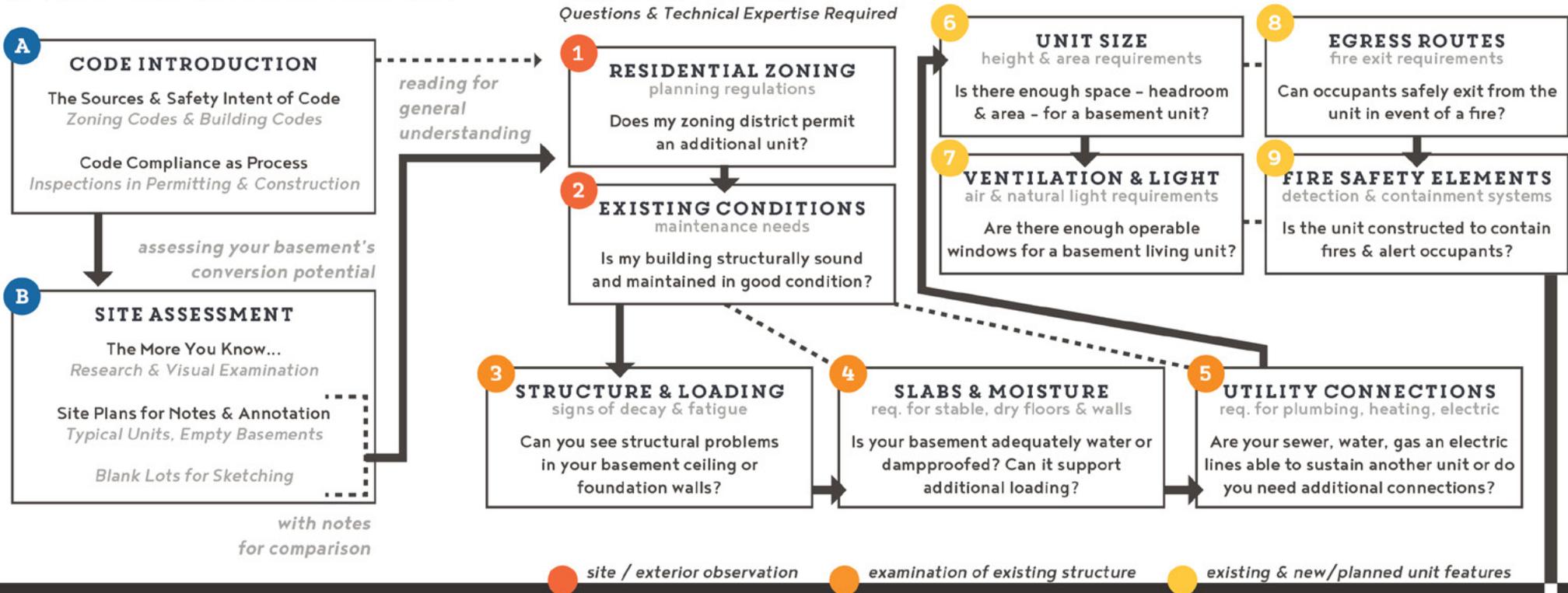
Determine Your Building's Potential for a Safe & Sound Basement Unit



INTRODUCTION . code sources . safety intents

This chapter introduces and explains relevant Chicago zoning and building codes for the conversion of a basement unit. The Code Compliance Checklist walks through common regulations, technical experts to consult, and the codes themselves (via chapter numbers and links).

NAVIGATING THE COMPLIANCE CHECKLIST



CHAPTER CONTENTS:

The 'Code Compliant Units' chapter helps you understand likely construction issues and challenges to safe inhabitation. The typical examples are based on the Two-Flat and Cottage conversions introduced in the prior chapter, with common lot sizes and Chicago construction details (i.e. brick) to anticipate issues.

In advance of the code checklist, the following pages introduce:

- **the origin and safety intent behind Chicago's Codes**, as well as pending updates
- **the process of inspection**, in determining code compliance, and
- **'template' drawings**, which you can use when observing your basement and site - taking measures, jotting down notes, tallying building aspects which require expert consultation

This section should enable you to identify issues with your existing building and planned basement unit that require technical expertise for assessment, mitigation, or design coordination. The 'Mitigating Issues' chapter will expand on the key factors behind different repairs required to meet code and provide basic budgets. Between the two sections, you should have enough information to either a) decide not to pursue a basement unit or b) start a focused and realistic conversation with an architect on designing and developing a basement unit.

CHICAGO'S CODES:

Any building within the City of Chicago is regulated under two sets of standards - the Municipal Zoning Ordinance and the Construction Codes - which establish the minimum requirements for land use and building construction. Their collaborative aim is the protection and promotion of public health, safety, and welfare.

The Zoning Ordinance, Chapter 17 of Chicago's Municipal Code, covers the zoning of land uses. It also establishes the number of units allowed per building, building height, building placement within a lot, and parking and open space requirements.

Code Updates - As of December 16, 2020, the 'Additional Dwelling Units Subsistute Ordinance' was adopted by City Council. Starting May 1, 2021 it allows for the creation of additional basement units in select pilot areas (thru May 31, 2024). This manual outlines a) the existing citywide zoning controls and b) the revised pilot rules and areas, so owner-occupants in either situation can determine basement unit potentials.

- **Get ADU ordinance and updates at:** www.chicago.gov/adu
- **Reference the Zoning Code (17) at:** bit.ly/Chicago-Zoning.

The Chicago Construction Codes, Chapter 14A-X and 18 of the Municipal Code, are a collection of codes that establish minimum standards for material and structural performance, interior finishes and fixtures, and fire safety requirements for structures and occupancy. Adapted from trade standards and the International Building Code, the full series regulates the construction, demolition, maintenance, rehabilitation, relocation, and use and occupancy of buildings, structures, and adjacent outdoor areas. The construction codes set minimum standards to protect occupants, visitors, and adjacent structures from the hazards of structural failure, fire, etc.

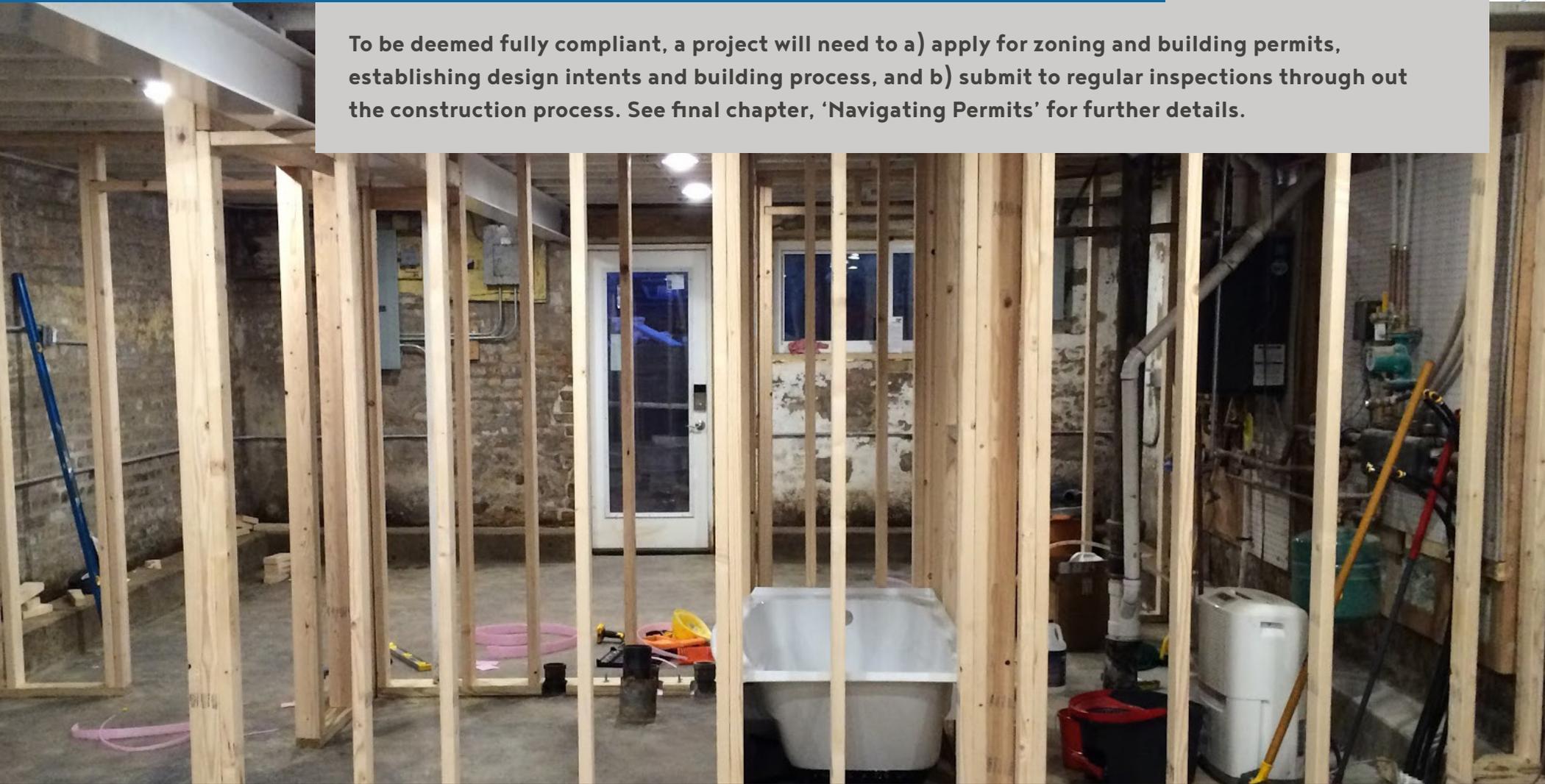
Code Updates - The Chicago Construction Codes were updated in 2019. As of August 1st 2020, all permits for new construction or alterations (without prior and ongoing phases) must be compliant with the new 2019 code. *This manual conforms to the 2019 regulations.*

- **Reference the building codes (14A-X) at ICC:** codes.iccsafe.org/codes/chicago.
- **See plumbing, mechanical (18) in the Municipal Code:** bit.ly/Chicago-Building-Infra.



INSPECTIONS . verifying construction . process . focus

To be deemed fully compliant, a project will need to a) apply for zoning and building permits, establishing design intents and building process, and b) submit to regular inspections through out the construction process. See final chapter, 'Navigating Permits' for further details.



CODE COMPLIANCE AND BUILDING INSPECTIONS

As you consider a basement project, keep in mind the larger inspection process:

Inspecting a building for code compliance doesn't happen in one swoop, but rather through a series of phased visits. Once you are granted a permit for work, you will be responsible to bring your entire building up to code. Inspectors will visit to verify that new systems have been built to code and review the condition of your existing building fabric. Multi-unit (four + flats) owners should expect annual safety inspections as well. If you take on a basement project, it is best to think of building inspection as a serial process. For instance, if you have to pour a new basement slab and update utility connections, you can expect the following visits (and more):

- Plumbing Inspection - sewage connections, trenching beneath slab ([14A-5-502.6](#))
- Slab and Under-floor Inspection - drainage assembly, and reinforcement for slab ([14A-5-502.3.2](#))
- Final Inspections - finished interior space ([14A-5-502.3.3](#))

Each inspection will take place on different dates and at varying phases of project completion. For full list and timing, see 'Navigating Permits' pg 190.

In addition to the basement unit, all the common areas and units on your property need to be maintained up to code: stairways, entries, exterior finishes, and rental apartments. These areas' conditions are included in the Compliance Checklist, pg 65-67. Building inspectors have the right to access any 'public' spaces, including all rental units.

For building inspectors, minor issues can be seen as indicators of potential problems that threaten tenant health and safety, and can create bigger project management issues. Beyond incurring fines, citations from the building department can trigger additional

inspections or construction permit revocation. The cost of maintenance lapses can be significant; \$500 fines for violations include:

- overflowing garbage ([14X-3-307.1](#))
- excessive weeds ([14X-3-302.5](#))
- missing address numbers ([14X-3-303.3](#))
- ripped or missing window screens ([14X-3-303.16](#))
- weathering/decaying paint on exterior ([14X-3-303.2](#))
- and other violations of the existing structures' maintenance code ([14X-Chapter 3](#), Property Maintenance)

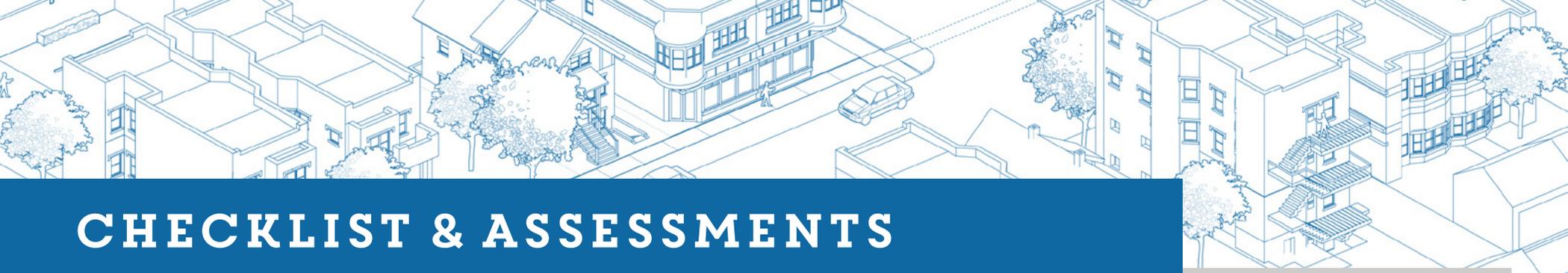
In addition, exterior issues that endanger tenants or passing pedestrians start with fines of \$1,000, such as signs of foundation deterioration and structural fatigue (pg 65-67).

If an inspector notes exterior issues, they can file violations for 'unsafe conditions.' You would have 15 days to remedy the issue, after notice of violation, before needing to re-inspect the property to avoid fines. However, re-inspection costs (\$100 each) can add up, given that 'each violation and each day that a violation continues is a separate and distinct offense.'

Broadly speaking, building inspectors will be looking for maintenance and general upkeep that demonstrate an owner's attention to building and inhabitant safety.

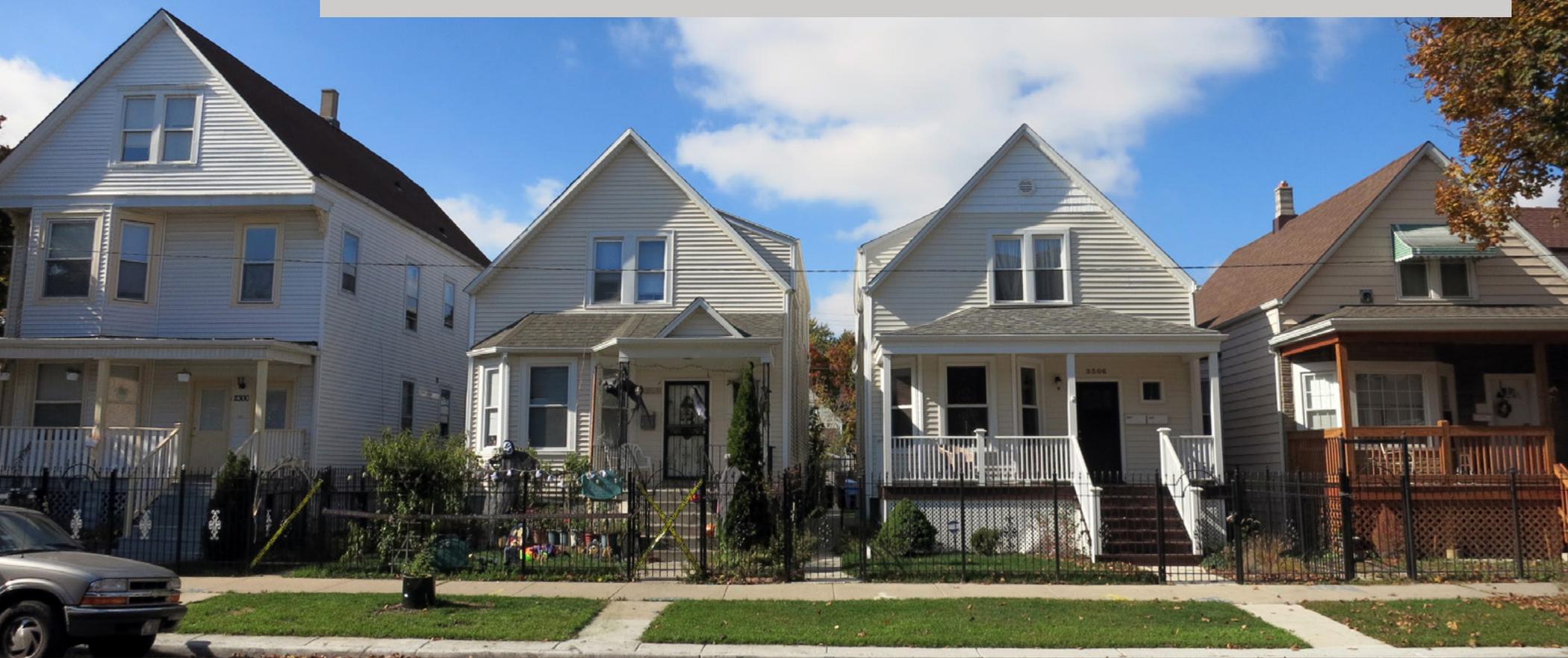
If you are uncomfortable with an inspection's scrutiny of existing building conditions, you should probably reconsider a basement project.

Ask yourself: would it make more sense to address existing maintenance demands (as a long term investment) than over-extend your finances in a larger alteration and conversion?



CHECKLIST & ASSESSMENTS

The following spreads contain property templates—with site plans, sections, and tagged elements—to help you quickly collect relevant details and make notes on the issues, experts and information for mitigation, as you work through the code checklist.



PROPERTY ASSESSMENT: BACKGROUND INFORMATION

The more information you have on your building and your lot the more you will be able to anticipate conversion challenges.

In addition to filling out the following templates, it would be useful to collect the following geographic and documentary information about your building:

- building age / approximate construction dates as confirmed on your property plat
- history of maintenance, renovations, and updates to building systems such as heating or plumbing
- location, in terms of: zoning districts, historic districts, transit corridors/transit-oriented development zones, Chicago's topography, flood risk zones (FEMA) or adjacent to historic stream, rivers, or marshlands
- current utility connections, capacity, and fees
- current tax assessments and historic appeals

CONSIDER THE FOLLOWING:

Building age, maintenance history, and current material condition will strongly influence whether you're facing a minor alteration or a massive construction project. Unfortunately, most homeowners have little to no written history on their property. The best way to establish basic renovation information is to look up:

- **recent tax assessments** (Cook Co. Assessor: www.cookcountyassessor.com/address-search),
- **construction permits** (Chicago Open Data: bit.ly/Chicago-Permit-Database), and
- **building footprints** (Chicago Open Data: bit.ly/Chicago-Footprints).

The first two documents will provide a record of sales, old property liens, and recent, permitted work. The City's building footprints can be searched by address to find initial construction dates. For here, you can create a timeline of your building's construction and renovation lifespan.

Location and elevation can strongly influence the viability and ease of creating a dry basement unit, given Chicago's marshland history. In advance of geotechnical testing, you can determine if your building is flood prone by casual observation and locating it on:

- **flood insurance maps** (FEMA maps: [msc.fema.gov](https://www.fema.gov)),
- **Cook Co. Geological Atlas** (ISGS atlas: bit.ly/Cook-Geologic) and determining
- **site elevation** (Chicago Open Data: bit.ly/Chicago-Elevations).

In addition, you can determine whether your home sits atop historic marshes, stream-beds, or river banks by referencing:

- **historic quadrangles** (USGS maps: bit.ly/USGS-Chicago) and
- **old insurance maps** (Sanborn Maps: bit.ly/LOC-Sanborn-Chicago).

While different soil engineering strategies can divert water and affect drainage, sitting at a low elevation in any of these areas suggests that a project may require more intensive foundation drainage and/or waterproofing work.

Even armed with the above information, you will need to consult with technical experts. This guide is to help you ask questions and identify unknowns: can I visually confirm current conditions for estimation, or do I need a structural engineer, architect, or tradespeople? When facing particularly urgent issues for consultation and remediation (like potential structural failure or wall collapse), the text will indicate this need as follows:



This is urgent. Reach out to [specific technical expert] to assess conditions.

PROPERTY ASSESSMENT: SITE DOCUMENTATION

Adapt the generic site plans + building footprints on following pages to fit your building and assist in responding to the Code Compliance checklist.

This template-based site assessment moves from exterior to interior, from inhabited floors to basement level (with anticipated features in the proposed unit in yellow). Generally the site and building footprints are drawn at 1/8"=1' in plan, section, and elevation. The coding, on the list and in the drawings, links to the Compliance Checklist through abbreviated topic name and page number. This is to prompt you to establish locations for elements like basement exits or utility connections and take visual notes on your existing building. After the generic plans, a blank spread with 1/8" grids is provided for sketching additional details. The Compliance Checklist then elaborates on the specific relationships between observed site conditions and Chicago Code requirements.

Element Key, by Code Compliance section:

- Z#** Z = Zoning - pg 58-63
- M#** M = Maintenance - pg 64-65
- L#** L = Loading & Foundations - pg 66-69
- W#** W = Waterproofing & Slabs - pg 70-71
- U#** U = Utilities - pg 72-83
- S#** S = Size & Height - pg 84-85
- V#** V = Ventilation & Light - pg 86-87
- E#** E = Egress & Fire Exits - pg 88-89
- F#** F = Fire Detection & Containment - pg 90-91

ELEMENTS TO DOCUMENT:

Site or lot:

All the following dimensions will be noted on your plat of survey. As you must submit a plat with any permit applications, order a copy for planning purposes.

Z₁

Dimensions:

- width: typical lots range from 25 and 30 to 45 feet in residential areas, with larger sites where parcels have been combined
- depth: typical lots range from 100 and 125 to 175 feet but may vary given diagonal streets and irregular alleys
- Lot location: mid-block, corner or alley abutting location,
- Lot access: street front, alley access, existing curb-cuts or driveways, note all path dimensions and locations

General Building/Open Area Footprints:

Z₂

Exterior building footprint - pull from city maps, plats, or hand measure

- Measurement and location of outdoor elements:
 - E₁** exterior stairways or porch stairs (note: second exit from third story of occupied space is required)
 - Z₃** building offsets from property lines and fences
 - Z₄** parking, decks, patios, porches (general open space) and areaways
 - U₁** visible utility connections on exterior (gas meters) or site drainage systems

Entry/First floor general plan and common spaces

- E₂** Hallways and stair measurements
 - stairway width and landings width, depth
 - railing locations, conditions, height
 - individual steps: vertical rise, horizontal run, total count of steps per floor
- E₃** common hallway width, height, and clearance minus any doors (when fully opened against the wall)
 - placement and condition of units' entry doors along hallways
- L₁** Approximate wall placement in first/entry level unit -
 - locations, wall thicknesses for considering additional columns or joist repairs in basement
 - identify wall materials if possible
- M₁** Any existing signs of structural deterioration and surface decay
 - uneven trim with gaps at baseboards,
 - non-plumb walls and plaster cracks
 - discoloration from moisture, mold
 - warped boards around areas of thermal expansion, etc.
- F₁** Existing smoke detectors (sprinklers if applicable)

Basement level - overall conditions

- S₁** Interior dimensions of existing space: width, length, clear height and variations in ceiling height with ductwork, radiators, etc.
- L₂** Foundation walls:
 - thickness, estimate with measurements at windows
 - material(s), location of change to materials in upper floors
 - height from floor to ground level
- W₁** exterior water or dampproofing - visible just above ground level - & roof drainage

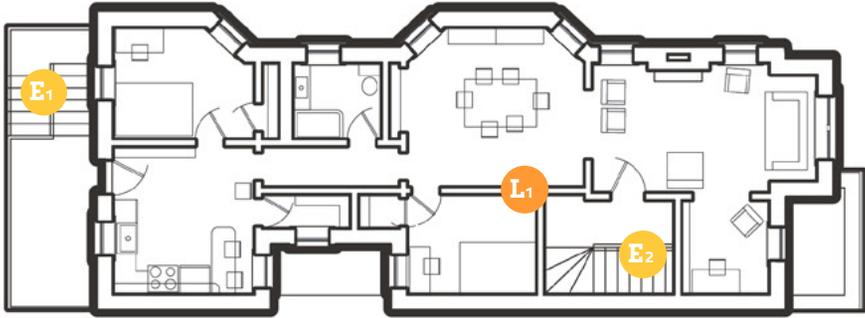
- L₃** Additional bearing columns, size, and footing size
 - supported girders, size and span
- L₄** Ceiling assembly, if visible:
 - joist sizes, spans, spacing and signs of deflection
 - existing lath/plaster or wallboard coverings
- W₂** Condition of existing floor/slab - cracks, joints, settling, slopes, existing floor drains, radon exhaust lines
- V₁** Door and window locations, size, and operability
 - any connected light wells, their dimensions
 - Utility connections and areas
- U₂** quick diameter measurements per water, sewage line (+ total fixture counts/line) for estimating capacity
- U₃** any exhaust/venting systems and their location - for heating, sewage, radon, etc.
 - appliances like heaters, water heaters, electrical breakers, etc. as well as existing pumps or subsoil drainage access

Proposed Unit (hypothetical)

- S₂** General interior dimensions/layout and wall locations
- E₄** Zones to be left in common: utility rooms, access to utilities, shared exit and entry paths, other units' storage
- V₂** Any new door/window openings
- U₄** Anticipated utility or drainage connections for kitchens, baths

property assessment continued

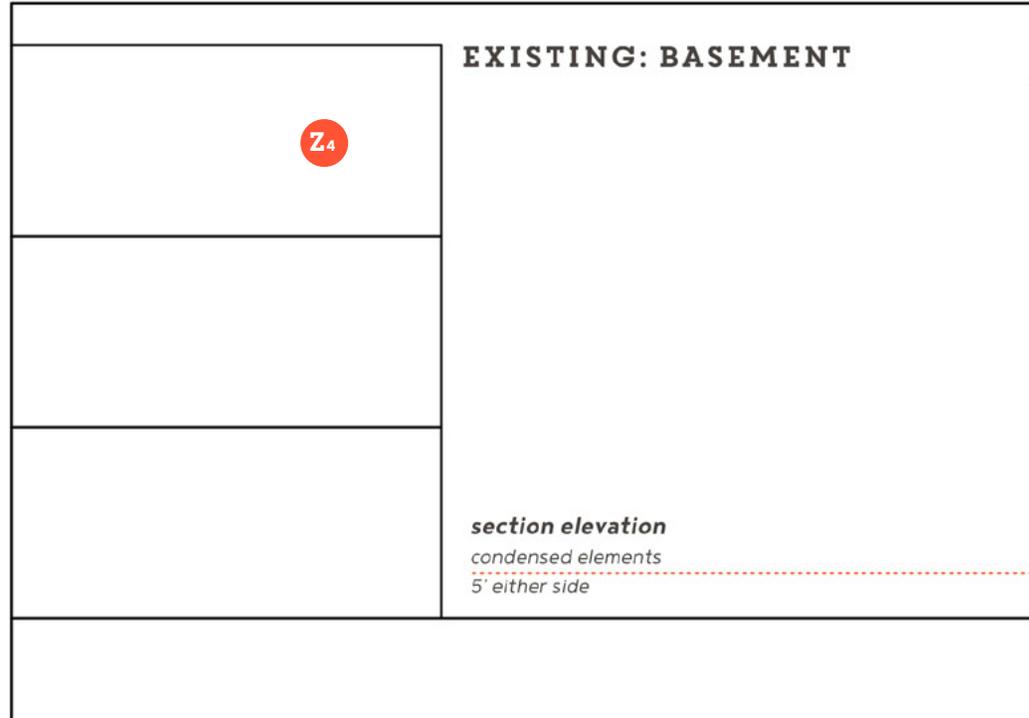
1:16 EXISTING: SECOND FLOOR APT



EXISTING: FIRST FLOOR APT



EXISTING: BASEMENT



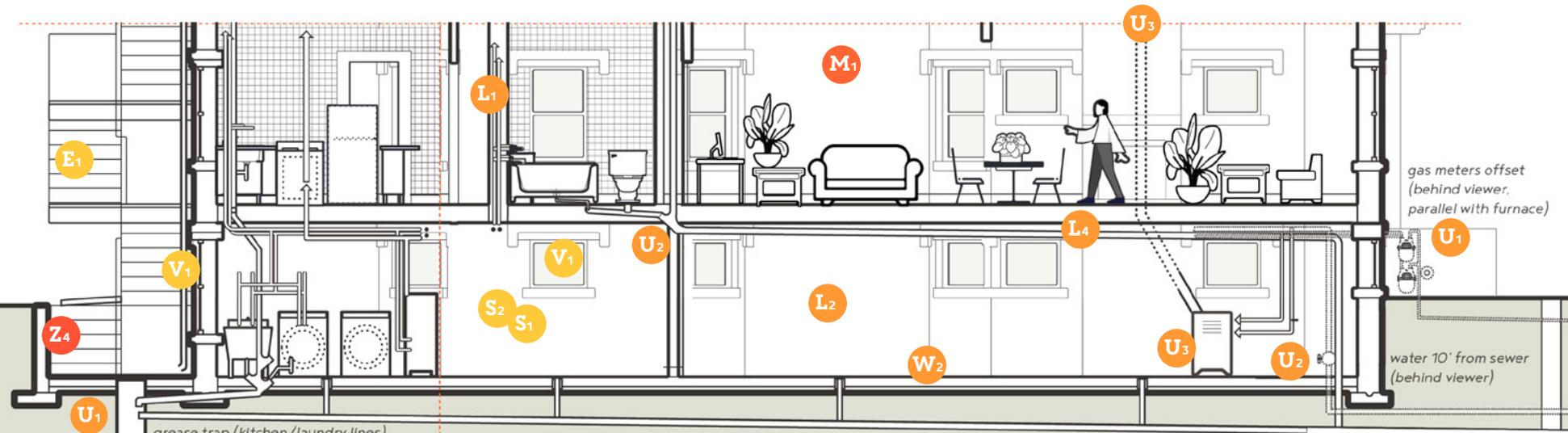
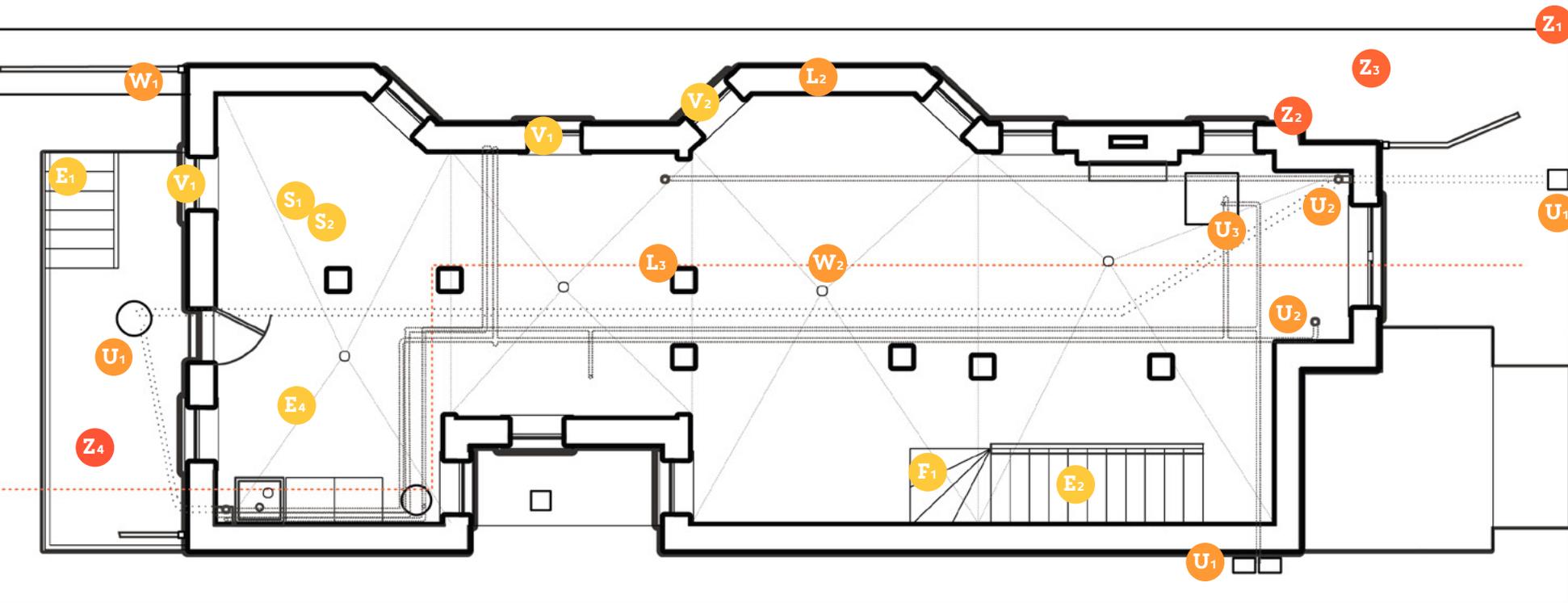
1:64



125 X 30 LOT

1:8





grease trap (kitchen/laundry lines) to line beneath floor

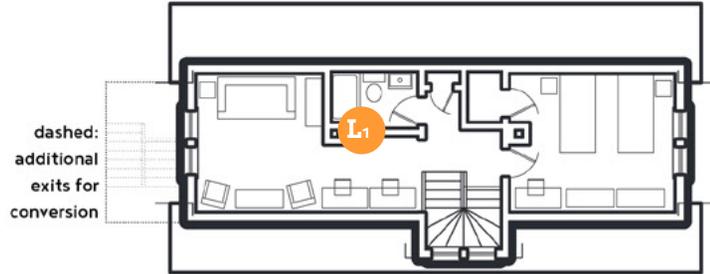
overhead (baths) lines & subfloor sewer lines connect at front, far wall

gas meters offset (behind viewer, parallel with furnace)

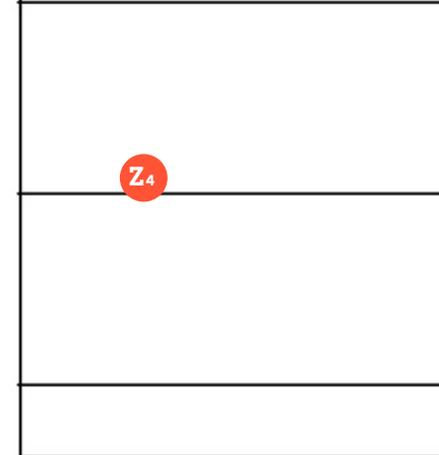
water 10' from sewer (behind viewer)

property assessment continued

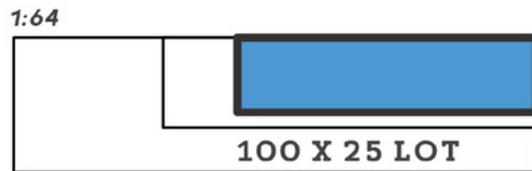
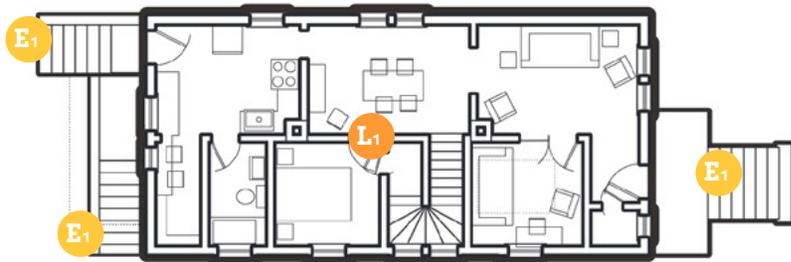
1:16 EXISTING: SECOND FLOOR OF SINGLE-FAMILY HOUSE



EXISTING: BASEMENT

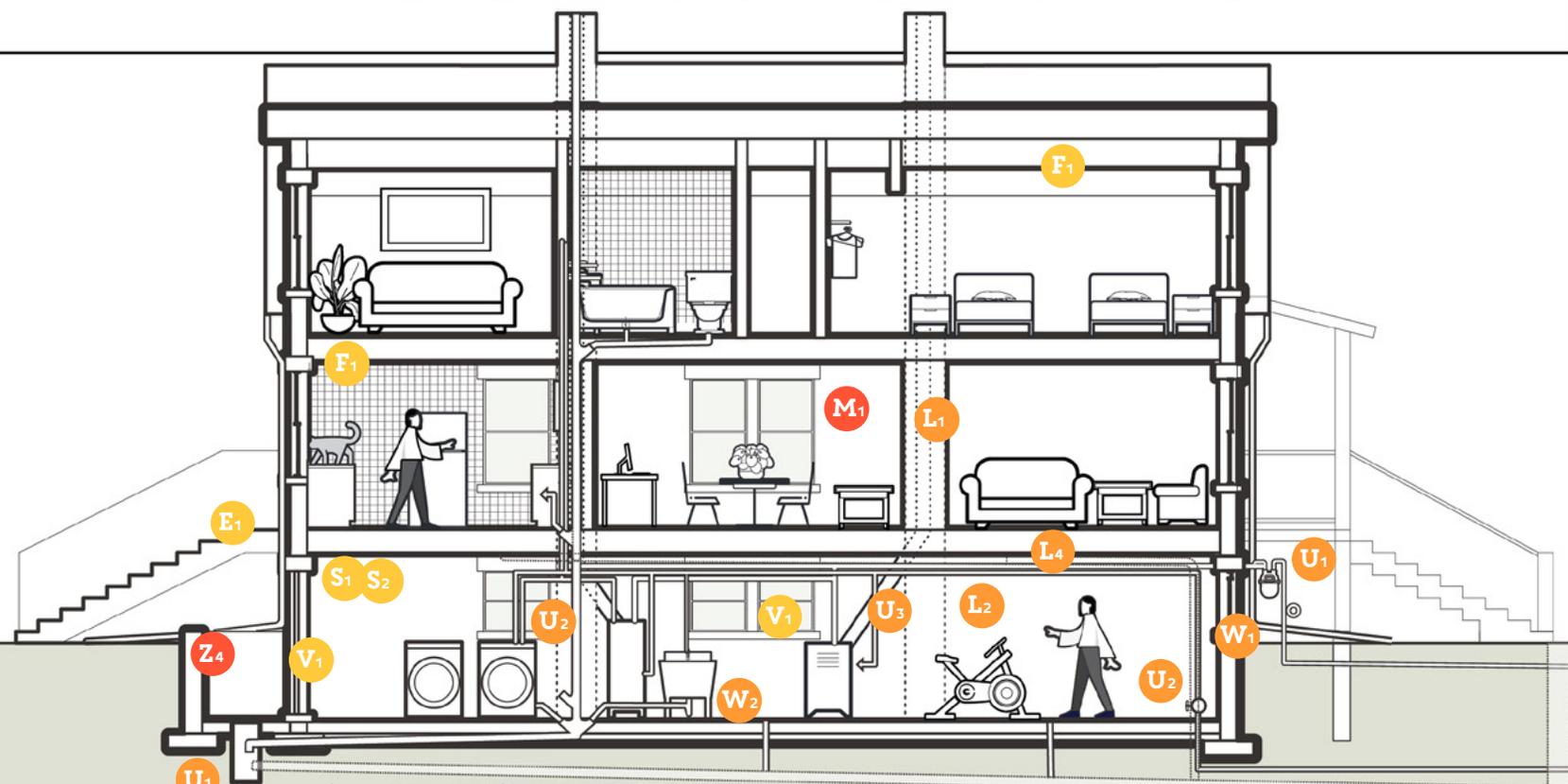
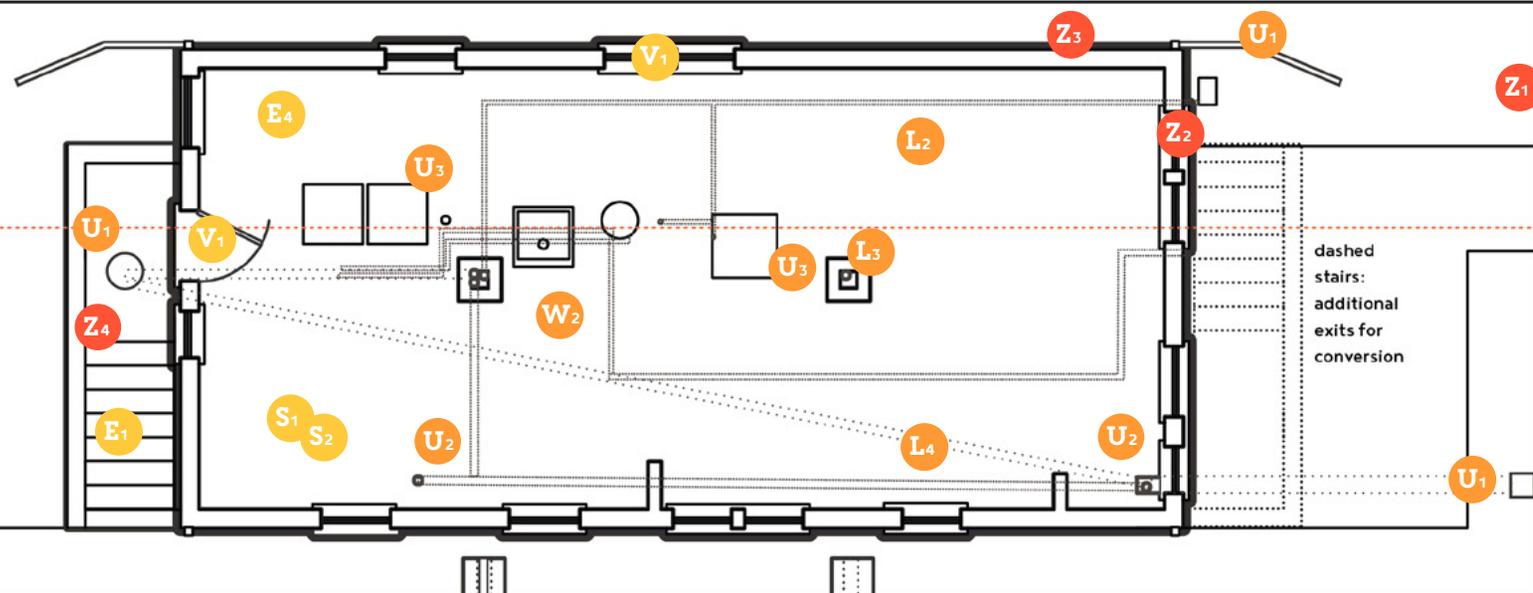


EXISTING: FIRST FLOOR OF SINGLE-FAMILY HOUSE



1:8

section elevation
condensed elements
5' either side



grease trap (kitchen/laundry lines) to line beneath floor (behind viewer)

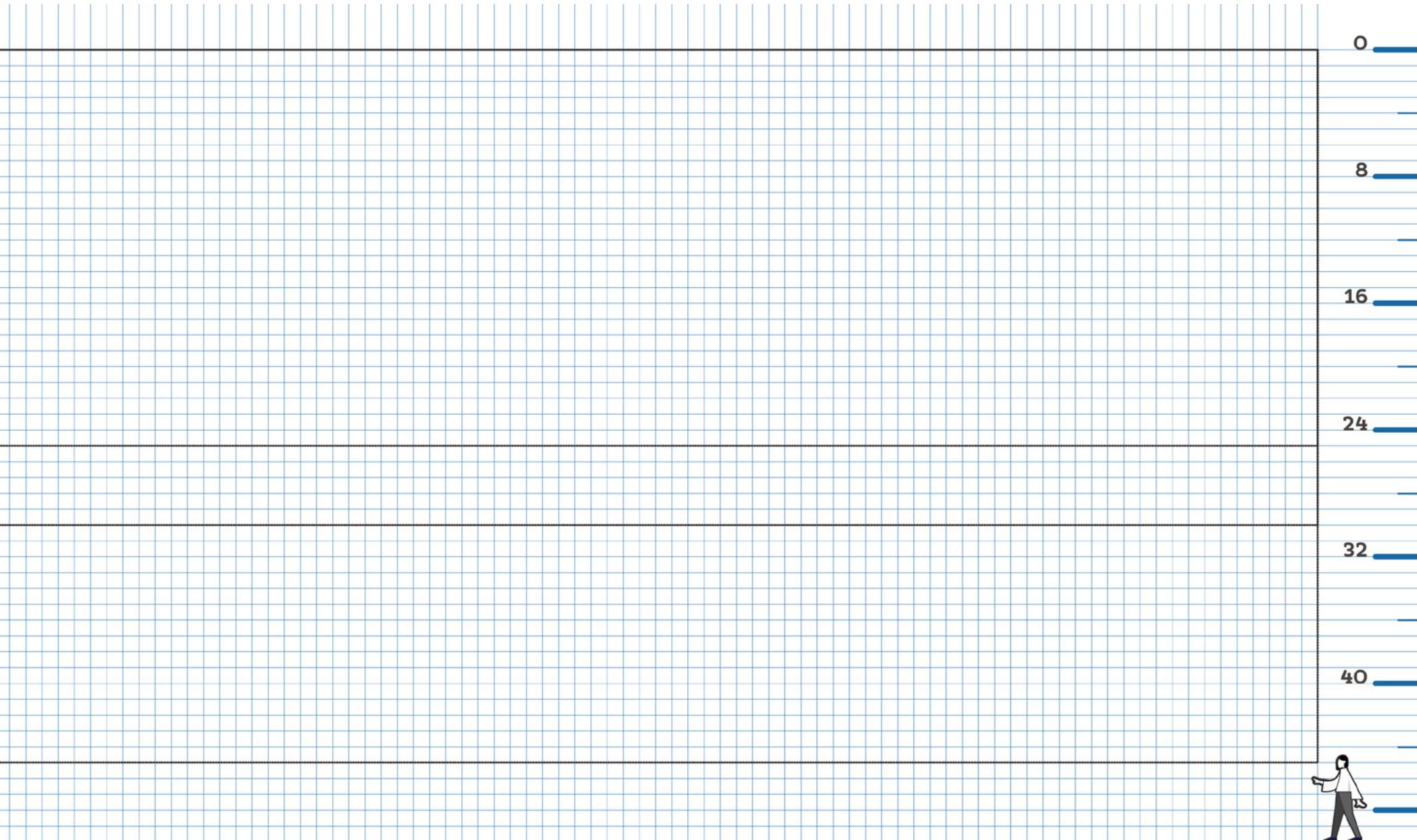
soil stacks (bath lines) overhead, connection at front (behind viewer)

property assessment continued

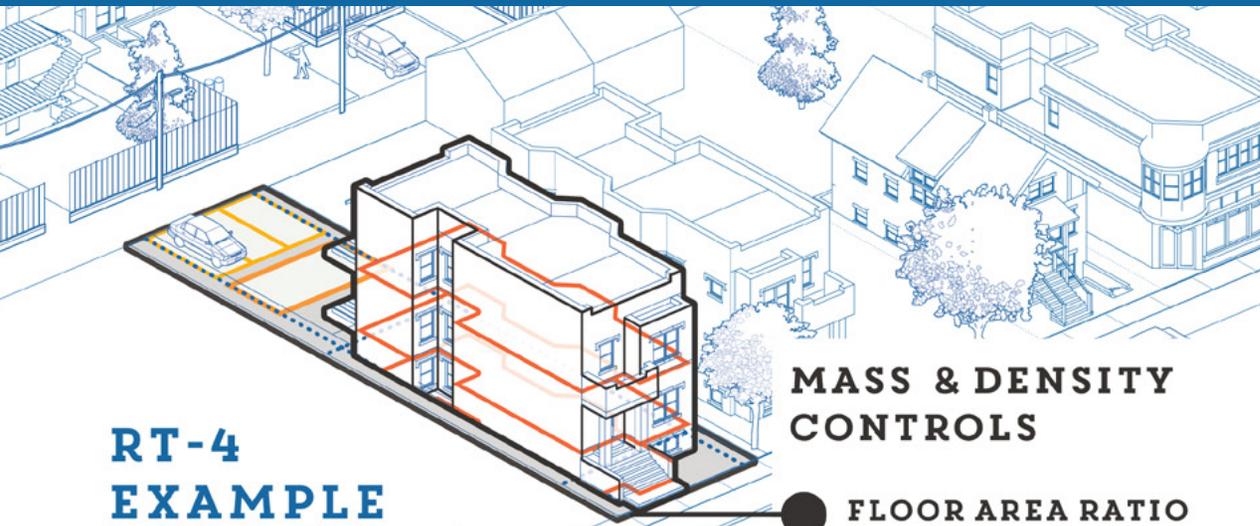
1:8 175 X 45 LOT (truncated)

125 X 30 LOT

100 X 25 LOT



RESIDENTIAL ZONES . density . open space . parking



RT-4 EXAMPLE

Two-Flat to Three Unit Conversion

MASS & DENSITY CONTROLS

FLOOR AREA RATIO (FAR)

$\frac{\text{building areas sum}}{\text{total lot area}}$

BUILDING HEIGHT

ground level to avg. roof surface

BUILDING AREA

sum horizontal areas (+ attics over 6' 9") include all stories*

LOT AREA

area of property

basement <50% above grade

*count only if renovated

PRESCRIBED RELATIONSHIPS

RT-4 ratios, lot measures in italics

/// * = not necessary in pilot ADU areas

PARKING
1 space/unit in RT-4 citywide
*no space req. for pilot unit
432 sq feet total

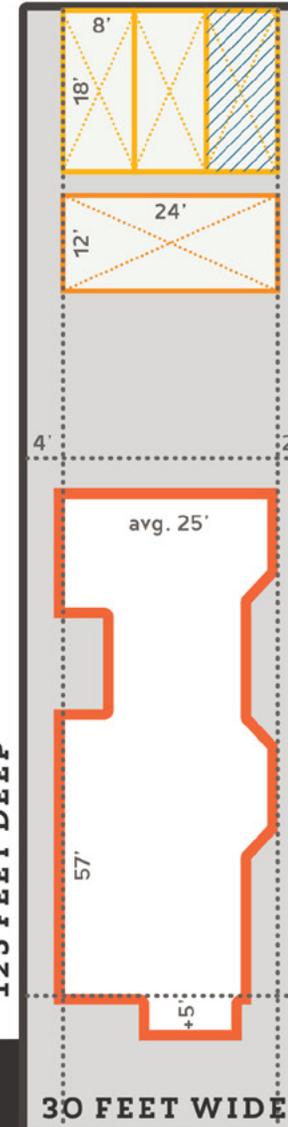
OPEN SPACE
larger value: 65 feet/unit or 6.5% of lot; 12 feet min/side
*no space req. for pilot unit
243 req. 288 sq feet shown

OFF-SETS/BULK
• 50 feet at rear, or 33%
• 15 feet or adjacent avg. at front
• 20% or 2 feet per side
4 feet + 2 feet

BUILDING & LOT AREA
1000 sq feet lot/unit
*no lot minimums/pilot unit
1330 sq feet/unit or floor
3990 sq feet building total

$\frac{3990 \text{ sq feet}}{3750 \text{ sq feet}} = 1.064 \text{ FAR}$
1.2 FAR allowed

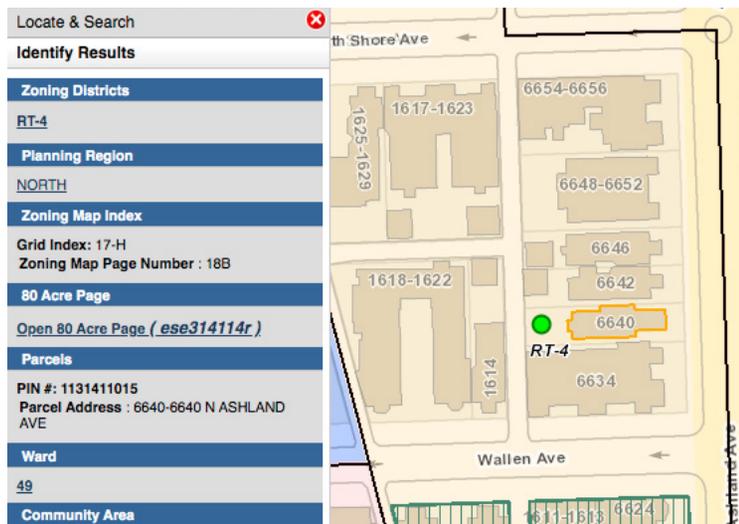
LOT AREA
1650 sq feet min
3750 sq feet



THE PRINCIPLES OF ZONING:

Chicago's initial zoning ordinance was established in 1923 and significantly revised in 1957, aiming to separate incompatible uses and direct neighborhood development. At the scale of your property, zoning regulates a) use: how many units you can have within your building, b) density: how much lot area, parking and open space (lawn, patio) each unit should have, and c) bulk: how far from the lot lines (i.e. offsets) you can build new elements. You'll need to determine your zoning district (directions below) to make sure you're able to add another unit to your building. If a unit exceeds allowed use, density, or bulk standards, you can apply to the Department of Planning and Development for an administrative adjustment (see 'Navigating Permits,' pg 182).

A **zoning district** is an area geographically demarcated by the City and coded for allowable uses. To find your district, go to the **Chicago Zoning Map** - gisapps.chicago.gov/ZoningMapWeb - and search by your address. Once you have the district code, you can confirm the uses



Lot identification on the Chicago Zoning Map

intended by the City (see tables next page). To calculate the density of units allowed on your lot - the Floor Area Ratio - you'll need to know the sum of inhabited areas in your building (left, Building Area) and divide it by area of your lot.

Your zoning designation is defined by a combination of letters (Use Group) and numbers (Use Type). The example at left is in an 'RT-4' district. Use Group R covers all residential uses; your building is most likely in an RS (detached housing) or RT (Two-Flat, Townhouse and Multi-Unit) district. Use Type ascends from 1 to 6.5 and signifies allowable density. RS-3, RT-3.5, and RT 4 allow for two or more flats per property. The zoning tables (next page) then specify additional characteristics. For an RT-4 property, this includes a maximum Floor Area Ratio of 1.2 and minimum lot area of 1650 sq feet, with 1000 sq feet of lot per unit, with additional open space, offsets, and parking requirements, as diagrammed in Prescribed Relationships.

Effective May 1, 2021, in pilot areas' zoned RS-2 +, the Additional Dwelling Unit ordinance allows for a residential property to add a 'conversion' basement unit by right. This applies to buildings over 20 years in age but cannot be built on a property with a carriage house. See pg 62.

DOCUMENTS FOR ASSESSING ZONING:

- **Zoning for your Lot:** [The Chicago Zoning Map](#)
- **Zoning Ordinance (17-2, 17-10) + Additional Dwelling Units substitute Ordinance (Amendment)** (summarized in drawings)
- **General dimensions of your lot & building floors** as a) lot areas: overall, parking spaces, and open areas, b) distances from your building to lot edges, alleys, and public sidewalks; and c) the gross area of each occupied floor + anticipated basement unit.

IS YOUR UNIT ALLOWED UNDER CHICAGO'S ZONING?

Hypothetical answers, in blue outlines, are based on RT-4 classification and the Two-Flat + basement conversion on last spread. Colors key to example; low saturation = lower density areas (less likely to allow additional units).

Use your site measurements and district classification to see if you can add another unit.

Under current zoning, single family homeowners in areas RS-3 or higher can add a unit to become a two-flat building. Given the small size of many RS-3 Chicago lots, the owners will likely need to get an administrative adjustment from the Department of Building and Planning to accommodate variances in density, parking, and open space requirements.

Likewise by 'use', Two-Flat owners in areas RT-3.5 and higher can add an extra unit to become a multi-unit building of three + flats. Again, Chicago's small lot sizes mean you may also need an administrative adjustment for bulk and density issues.

The tables on this page apply citywide, outside the ADU pilot areas. For those locations and the revised pilot rules, see the following pages, 62 and 63.

1. Does your zoning district permit multiple units or Two-Flats? [\(17-2-0207\)](#)

17-2-0207 Use Table and Standards.

USE GROUP	Zoning Districts									Use Standard	Parking Standard
	RS	RS	RS	RT	RT	RM	RM	RM	RM		
Specific Use Type	1	2	3	3.5	4	4.5	5-5.5	6-6.5			
P= permitted by-right S = special use approval req'd PD = planned development approval req'd - = Not allowed											
RESIDENTIAL											
A. Household Living											
1. Detached House	P	P	P	P	P	P	P	P			§ 17-10-0207-A
2. Elderly Housing	-	-	-	P	P	P	P	P			§ 17-10-0207-A
3. Two-Flat	-	-	P	P	P	P	P	P			§ 17-10-0207-A
4. Townhouse	-	-	-	P	P	P	P	P	§ 17-2-0500		§ 17-10-0207-A
5. Multi-Unit (3+ units) Residential	-	-	-	P	P	P	P	P			§ 17-10-0207-C
6. Single-Room Occupancy	-	-	-	-	P	P	P	P			§ 17-10-0207-B

2. Can you meet the district's minimum Open Space Requirements with a new unit? [\(17-2-0307\)](#)

District	Minimum Rear Yard Open Space (square feet per dwelling unit/% of lot area, whichever is greater)	Minimum Dimension on Any Side (feet)
RS1	400/6.5	20
RS2	400/6.5	20
RS3	225/6.5	15
RT3.5	100/6.5	12
RT4	65/6.5	12
RT4A	65/6.5	12
RM4.5	50/6.5	10
RM5	36/5.25	10

3. Does your building meet the district’s Minimum Lot Area per Unit with an additional unit? [\(17-2-0303\)](#)

District	Minimum Lot Area per Unit* (square feet)
RS1	6,250
RS2	5,000
RS3	2,500, except as expressly allowed in Sec. 17-2-0303-B
RT3.5	1,250
RT4	Dwelling units: 1,000 Efficiency units: 1,000 SRO units: 500
RM4.5	Dwelling units: 700 Efficiency units: 700 SRO units: 500
RM5	Dwelling units: 400 Efficiency units: 400 SRO units: 200
RM5.5	Dwelling units: 400 Efficiency units: 400 SRO units: 200
RM6	Dwelling units: 300 Efficiency units: 135 SRO units: 135
RM6.5	Dwelling units: 300 Efficiency units: 135 SRO units: 135

4. Is your building below the district’s revised maximum Floor Area Ratio (FAR) with an additional unit? [\(17-2-0304\)](#)

District	Maximum Floor Area Ratio*
RS1	0.50
RS2	0.65
RS3	0.90
RT3.5	1.05
RT4	1.20 (See accessible dwelling unit exceptions, Sec. 17-2-0304-B)
RT4A	1.50 for multi-unit buildings that contain no more than 19 dwelling units and in which at least 33% of the units are accessible dwelling units 1.2 for all other buildings
RM4.5	1.70
RM5	2.00
RM5.5	2.50
RM6	4.40; premium may apply - See Sec. 17-2-0304-C
RM6.5	6.60; premium may apply - See Sec. 17-2-0304-C

5. Can you meet the district’s minimum Parking Requirements with an additional unit (count the new unit)? [\(17-10-0207, 17-10-1000*\)](#)
If not, are you in an area designated for transit-oriented reductions [\(17-10-0102\)](#), or could you meet a 50% reduced requirement, by administrative adjustments, to preserve open-space as noted below?

District	Minimum Automobile Parking Ratio (per unit or gross floor area)	Minimum Bike
17-10-0207-A Parking Group A. (Detached Houses, Two-flat, Townhouses)		
RS1 and RS2	2 spaces per unit, provided that off-street parking is not required for detached houses on lots of records that are 33 feet or less in width if the subject lot does not have access to an improved alley and provided further that the Zoning Administrator is authorized to approve an administrative adjustment allowing a minimum of 1 parking space per unit if such reduction will result in more useable open space on the lot (See Sec. 17-13-1002-CC); 1 space per unit for government-subsidized units	None
RS3	2 spaces per unit for detached houses and 1.5 spaces per unit for two-flats, provided that off-street parking is not required for detached houses or two-flats on lots of records that are 33 feet or less in width if the subject lot does not have access to an improved alley and provided further that the Zoning Administrator is authorized to approve an administrative adjustment allowing a minimum of 1 parking space per unit if such reduction will result in more useable open space on the lot (See Sec. 17-13-1003-CC); 1 space per unit for government-subsidized units	None
All other districts	1 space per unit, provided that off-street parking is not required for detached houses or two-flats on lots of records that are 33 feet or less in width if the subject lot does not have access to an improved alley; 1 space per unit for government-subsidized detached houses and two-flats	None

OTHER CONSIDERATIONS:

- **Site Setbacks:** While older buildings maybe non-compliant for set-backs (and authorized as such), it is important to consider how much your lot must accommodate for construction and new elements for a basement unit. [\(17-2-0305\)](#) See foundations (pg 67) and site drainage (pg 71), window wells (pg 87), and egress (pg 89) for elements with potential set-back conflicts.
- **Non-Residential Zones:** This checklist only addresses residential use in residential districts. It does not cover live/work units or flats in Business or Commercial zones.

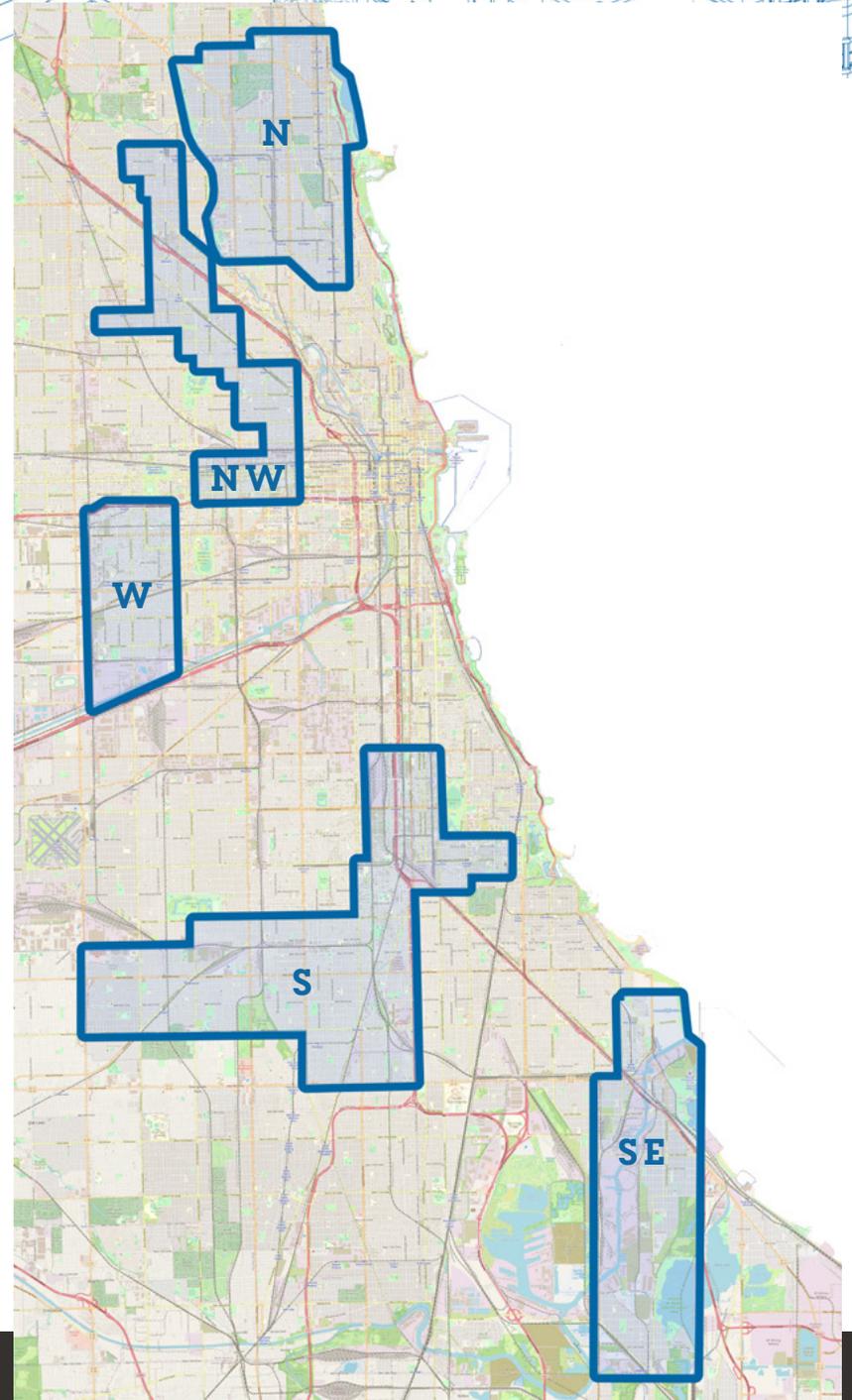
IS YOUR UNIT ALLOWED UNDER THE ADU PILOT PROGRAM?

Hypothetical answers, in blue outlines, are based on RT-4.

Use your district classification and location to see if you can add another unit. In pilot areas, conversion units can be added by right. Allowable number of units and loosened restrictions are listed on next page.

1. Are you in a pilot area? ([ADU Ordinance, p11](#)) (Grey diagonal lines = ADU area on [Chicago Zoning Map](#)) Ordinance and additional tools available on **ADU microsite:** www.chicago.gov/adu.

- **North Zone** is bounded by Devon, the lakefront, Lawrence, Clarendon, Halsted, Diversey, Lincoln, Belmont, the North Branch of the Chicago River, the North Shore Channel, Peterson, California, Granville, and Seeley.
- **Northwest Zone** is bounded by the Eisenhower Expressway, Sacramento, Fulton, Damen, Chicago, Western, Hirsch, Rockwell, North, Sacramento, Bloomingdale, Kedzie, Palmer, Kostner, Fullerton, Central Park, Belle Plaine, Lawndale, Montrose, Harding, Lawrence, Kedzie, Elston, California, Fullerton, Western, North, and Ashland.
- **West Zone** is bounded by the Eisenhower Expressway, Homan, the South Branch of the Chicago River, and 4600 West.
- **South Zone** is bounded by Cicero, 7500 South, Kedzie, 71st St., Halsted, 63rd St., 600 West 47th St., King, 60th St., Dorchester, 65th St., Cottage Grove, 67th St., the Dan Ryan Expressway, 95th St., Ashland, and 87th St.
- **Southeast Zone** is bounded by 8300 South, the city limits, Torrence, 95th St., Commercial, 83rd Pl., and Houston.



2. West, South, and Southeast Zones: ([ADU Ordinance, p13](#)) Are you an owner-occupant of the new unit's building? This is required for building with less than four units.

Have less than two other ADU's been permitted on your block in the current calendar year? Only two, per year, per block are allowed to limit rapid development and adverse rent impacts.

3. Does your zoning district permit multiple units, Two-Flats, or conversion units? ([ADU Ordinance, p9](#))

USE GROUP	Zoning Districts								Use Standard	Parking Standard
	RS	RS	RS	RT	RT	RM	RM	RM		
Use Category	1	2	3	3.5	4	4.5	5-5.5	6-6.5		
Specific Use Type										
P = permitted by right S = special use approval req'd PD = planned development approval req'd - = not allowed										
RESIDENTIAL										
A. Household Living										
1. Detached House	P	P	P	P	P	P	P	P		17-10-0207-A
2. Elderly Housing	-	-	-	P	P	P	P	P		17-10-0207-A
3. Two-Flats	-	-	P	P	P	P	P	P	17-2-0303-B	17-10-0207-A
4. Townhouse	-	-	-	P	P	P	P	P	17-2-0500	17-10-0207-A
5. Multi-Unit (3+ units) Residential	-	-	-	P	P	P	P	P		17-10-0207-C
6. Single-Room Occupancy	-	-	-	P	P	P	P	P		17-10-0207-B
7. Conversion Unit within Additional Dwelling Unit-Allowed Areas	-	P	P	P	P	P	P	P	17-2-0303-C & 17-9-0131	
8. Coach House within Additional Dwelling Unit-Allowed Areas	-	P	P	P	P	P	P	P	17-9-0201-E	

**ADU ORDINANCE DEFINITIONS
17-2-0303-C CONVERSION UNIT:**

Within Additional Dwelling Unit-Allowed Areas, in the case of building permit applications for the repair, remodeling, or alteration of residential buildings that are located in any RS2, RS3, RT or RM zoning district and that have been in lawful existence for 20 or more years, the density of such residential buildings may be increased in accordance with Section 17-9-0131 by 33% of the number of lawfully established dwellings units, other than conversion units, that have been in existence in the residential building for 20 or more years; provided, however, that if such residential building contains a single dwelling unit, the density of such residential buildings may be increased by one dwelling unit.

If this 33% calculation results in a fractional number, any fractional result of 0.5 or more must be rounded up to the next consecutive whole number.

UNITS ARE NOT SUBJECT TO:

- a) minimum lot area restrictions (#3, pg 61),
- b) open space requirements (#2, pg 60),
- c) accessory parking requirements (#5, pg 61), but
- d) cannot be on the same lot as a carriage house or used for short-term rentals (airbnb, etc.).

ADDITIONS ALLOWED (RS-2 +):

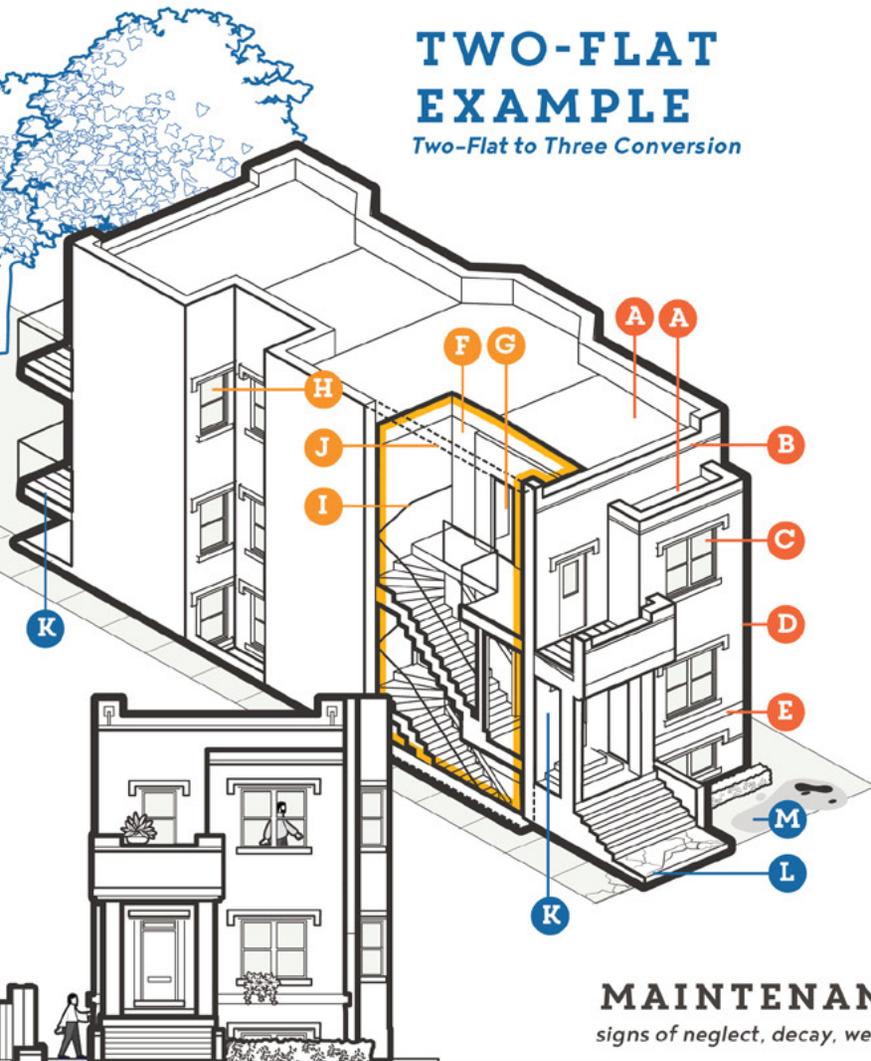
- Single Family + 1 unit = 2 units total
- Two-Flat + 1 unit = 3 units total
- Three-Flat + 1 unit = 4 units total
- Four-Flat + 1 unit = 5 units total
- Five-Flat + 2 units (1 affordable) = 7 units total
- Six-Flat + 2 units (1 affordable) = 8 units total



MAINTENANCE . grounds . exterior . common areas

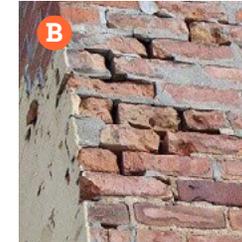
TWO-FLAT EXAMPLE

Two-Flat to Three Conversion



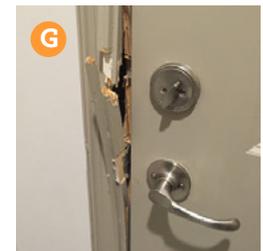
BUILDING EXTERIOR

- A** Gutters
- B** Parapets
- C** Windows
- D** Walls
- E** Trim



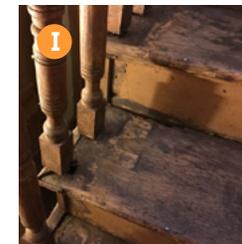
COMMON CORRIDORS

- F** Smoke alarms
- G** Doors
- H** Windows
- I** Stairs
- J** Mold, Stains



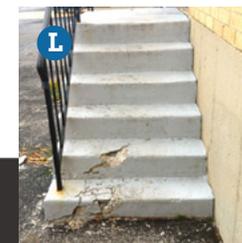
GROUNDS

- K** Porch
- L** Paths
- M** Open Areas



MAINTENANCE ISSUES

signs of neglect, decay, weathering, and deferred work



EXISTING CONDITIONS AND BUILDING MAINTENANCE:

You should be aware that any alteration of a structure that builds out a new unit must comply with the code for new construction. In addition, any existing structures that are visible to inspectors must meet the 'Minimum Requirements for Existing Structures.' That means that all the elements marked (left, Maintenance Issues) are required by code to be 'structurally sound and in good repair'.

As shown in the photographs, **structural deficiencies** can manifest as cracks (loading fatigue), the pulling apart of surfaces (inadequate anchoring), and deteriorating siding, masonry, roofs, and stairs. Even decaying paint and trim, which seems minor, can be an indicator of problems like termite infestations and structural decay (see next page).



All of these conditions would qualify as potentially unsafe. If you see similar deterioration on your building, you should hire an architect to evaluate the structure's soundness.

Whether or not you decide to add a basement unit, your building should be maintained in safe and sound condition. Tenants, neighbors, or strangers can report visible issues to the Department of Buildings, triggering a code violation and required building inspection.

WHAT YOU NEED TO ASSESS MAINTENANCE COMPLIANCE:

- **The Chicago Construction Code - Minimum Requirements for Existing Structures (14-X)** (summarized in drawings)
- **Visual observation** - walk around your site and any common spaces - hallways, stairs, the units exterior doors - document issues to repair and/or discuss with consulting architect
- **Architect to create an 'existing conditions' report if 'unsafe conditions' are found by inspectors.**

DOES YOUR BUILDING HAVE UNSAFE CONDITIONS:

potential structural problems in parenthesis ()

Homeowners can visually inspect their buildings prior to beginning any construction project, looking for the following:

Do you have visibly unsafe exterior conditions? (14X-3-303)

- Clogged gutters or downspouts (*roof/wall saturation and accelerated decay*)
- Decaying mortar or bricks on parapets or chimneys (*wall collapse and falling materials*)
- Non-weather resistant siding and masonry joints with windows or doors (*wall saturation and accelerated decay*)
- Exterior walls and foundations that are not anchored, plumb, or free of holes and cracks, windows or frames are not square or operable, floors slope (*material failures facing building weight*)
- Unpainted or peeling decorative trim (*rot and infestation*)

Are units and common spaces adequately secure, with safe exits? (14X-4-304)

- Common stairwells lack smoke alarms, have missing treads, handrails, and irregular risers, are < 36" wide (*see Egress, pg 89*)
- Building Entrances lack locks or Unit Doors are missing locks, view holes (*basic violation of tenant's rights*)
- Inoperable windows or windows lacking screens and panes. (*violation of tenant's safety rights; see Ventilation, pg 87*)
- Water-stained walls and signs of mold (*saturation and decay*)

Do you have unsafe conditions on your grounds? (14X-3-302)

- Decking, pathways, or exterior stairs show fatigue and decay (*material stress and structural failure*)
- Open areas have standing water (*water management failures, see Slab and Waterproofing, pg 71*)
- Unruly vegetation/untidy garbage areas (*infestations potential*)



STRUCTURE . loading . building supports . foundations

VISIBLE STRUCTURAL ISSUES

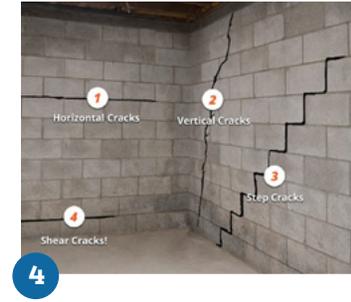
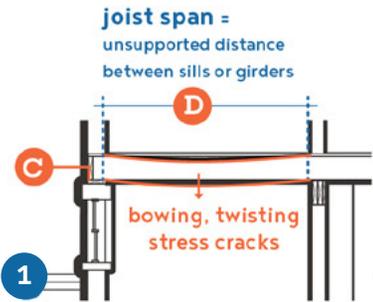
JOIST DEFLECTIONS
bowing, twisting under loads

WATER/PESTS
age + other joist/joint failures

BOWING WALLS
lateral shear, overturning

WALL CRACKS
uneven settlement, soils

MATERIAL DECAY
mortar erosion, brick crumbling

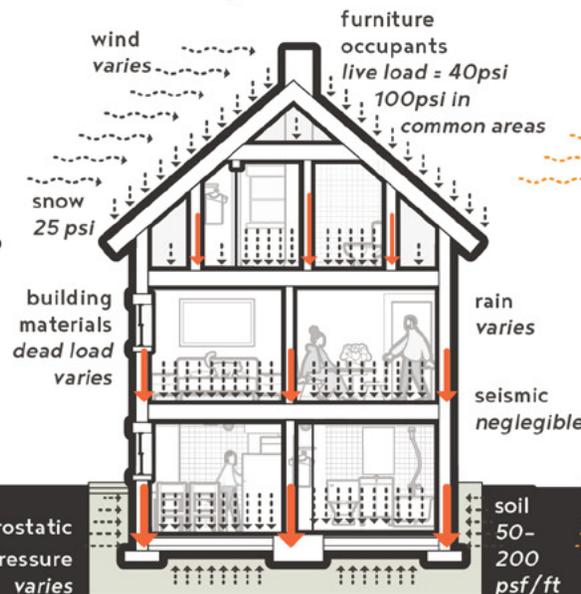


COTTAGE EXAMPLE

Cottage to Two Unit Conversion

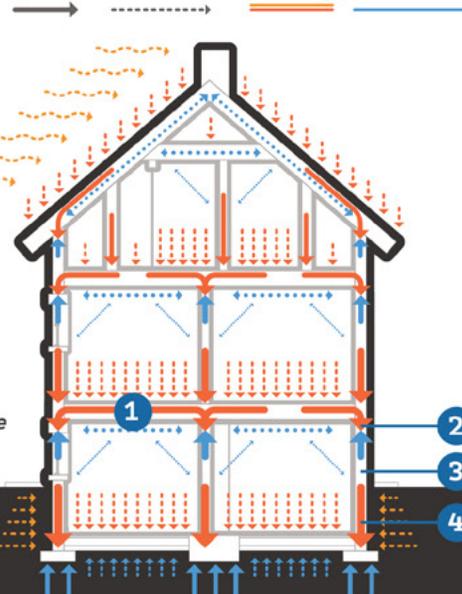
BUILDING LOADING

forces acting on a structure



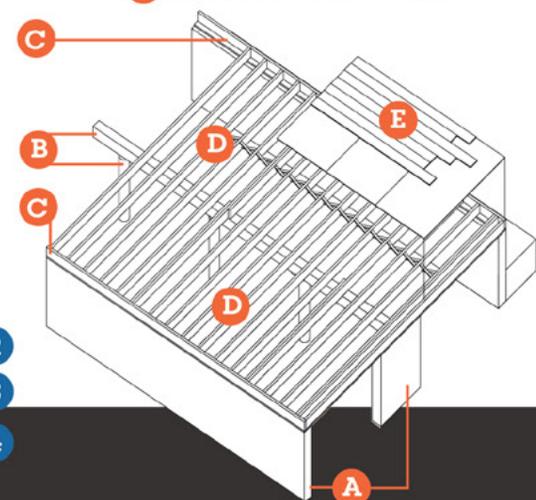
FORCE DISTRIBUTION

point & distributed loading/resistance



TYP. EXPOSED STRUCTURE
inspect from basement

- A** Foundation walls
- B** Columns & Girders
- C** Sills & Headers
- D** Joists 16" o.c., Bracing
- E** Subfloor & floor above



BASIC PRINCIPLES

GENERAL PRINCIPLES FOR LOADING AND FOUNDATIONS:

Building assemblies work together to transfer loads – like the weight of materials (dead load) or the weight of furniture and occupants (live load) – **down to the foundation and, beneath it, the ground.** Materials themselves, like soil, resist loading with compressive strength (left, Force Distribution). In addition to gravity, buildings face loading from all directions: wind, pressure exerted by soils and groundwater, and seismic tremors (left, Building Loading). Thus, a stable and safe structure requires multiple types of bracing, so joints and materials can transfer loads without twisting.

From your basement you can likely see much of the structure that is supporting your upper stories, carrying the load from floors, walls, and furniture above (left, Typ. Exposure Structure, A-E). Knowing where the first floor walls sit, you can anticipate where your basement joists are carrying greater dead loads. And, by measuring your foundations, through existing openings, you can estimate whether they are adequately sized to carry typical residential loads.

Before you add a ceiling or interior finishes, **you should thus examine the overhead joists, foundation walls and any columns or load-bearing interior walls.** Look for stains, strains, and signs of stresses (explored in the following questions) that indicate larger structural problems and material decay. ***In fact, if you see any of the defects pictured and discussed you should consult a structural engineer or architect to assess potential failures.***



WHAT YOU NEED TO CONSIDER STRUCTURAL STRESS:

- **Chicago Building Code – Chapter 16 – [Structural Design](#), Rehab Chapter 4 – [Structural Repairs](#), Chapter 18 – [Soils and Foundations](#)** (summarized in drawings)
- **Visual observation** – walk around your basement and examine walls, columns, joists, and floor above – note spans, cracks, signs of bowing and decay – record issues to discuss with your structural engineer or architect
- **Architect and/or Structural Engineer** to verify found issues – joist deflection, foundation wall cracks and overturning – and identify loading sources and mitigation options

DOES YOUR BASEMENT SHOW SIGNS OF STRUCTURAL FATIGUE:

SPANNING / BASEMENT CEILING ELEMENTS

Are there signs of excess loading on your joists or girders? Are your sills and upper walls anchored to your foundation? ([14B-16-1604.3.2308.4.2.1 new construction](#))([14R-4-405 structural repairs](#))

- Do your joists exhibit visible bowing and vertical deflection or twisting laterally (left, Joist Deflections)? Any visible bending or diagonal cracks (2, shear) are a sign of excess loading, misaligned joints or deteriorating structure.
- Are your joists spanning large distances and bowing? Long distances and excess spacing can mean each joist is carrying too much load. ([14R-4-405.2.4](#))
- If your basement includes structural columns and girders, do the horizontal pieces show signs of deflection or cracking? Do the columns have decay? ([14R-4-405.2.4](#))
- Are your sills and headers anchored to the foundation (C) to prevent uplift, lateral sliding, and transfer load to the foundation?

FOUNDATION WALLS

Are there signs of excess pressure from soils, site loads, or uneven settlement beneath the foundation?

- **3 - Do your foundation walls either tilt or bow inward?** This is a sign that the wall and its footer are failing to resist lateral soil pressure and are at risk of over-turning and collapse. This can be exacerbated by parking machinery near the foundation during construction. It can signal undersized footers, too-thin walls or inadequate anchoring between them.
- **4 - Do your foundation walls have any cracks?** These also show that the wall is failing to resist soil pressures, or point pressure from tree roots or sodden areas. Cracks may be long forming or introduced by specific events. Take note of the distribution of cracks: uneven settling will likely have cracks down a wall, across your slab and up the opposite side. Areas of point pressure, like roots or equipment over-loading, will show crack spidering around the area of impact.
- **4.1 - Horizontal cracks**, where one area juts into the center of the basement, are signs that specific vertical layers of backfilled soil are exerting uneven, excessive pressure, perhaps from undrained water or compaction.
- **4.2-3 - Vertical cracks** are signs of uneven settlement of the foundation and underlying soils. One section is adequately supported, while the other area has sunk, with cracks forming between.
- **4.4 - Shear cracks** are signs of shifting soils, along the wall surface, which are dragging blocks or bricks with them through friction.



All of these foundation cracks indicate unstable or active soils (to right, Soils: 1 or 5) potentially impacted by ground water and freeze-thaw dynamics. They could also indicate undersized or under-reinforced foundation walls. Consult with an architect or structural engineer for assessment and soil testing.

WALL & MORTAR WEATHERING

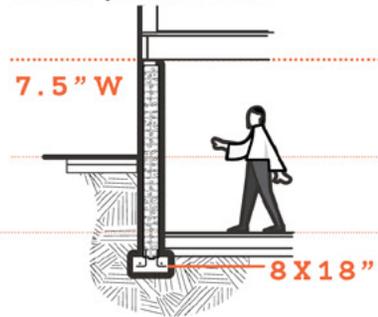
Are there signs of brick efflorescence? Are there areas of missing or cracked and crumbling mortar or spalling foundation materials (brick, concrete masonry, or stone)?

- Crumbly mortar and efflorescence both indicate that your walls are saturated with water. In brick, what you're seeing are the salts leaching out of the bricks as moisture evaporates. Sand-like mortar shows that water was unable to evaporate and broke down the inner adhesion of the materials. Both are often seen next to spalling or cracking brick and block, as those materials absorb moisture, which then expands and contracts based on thermal fluctuations.

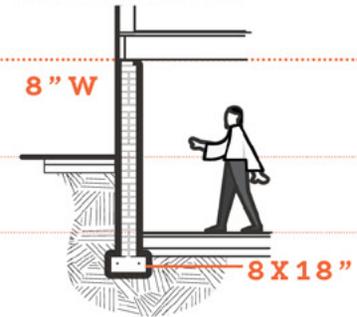


This form of decay is just as serious as foundation cracks as it also indicates groundwater and freeze-thaw dynamics. Consult with an architect or structural engineer for assessment and soil testing. (^ in diagrams = conditions confirmed through soil testing)

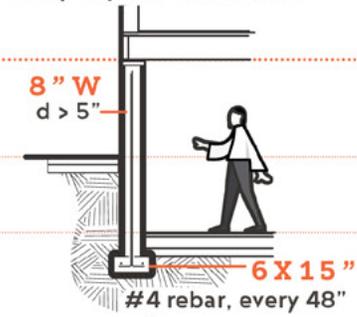
PLAIN CONCRETE
cast-in-place, no rebar



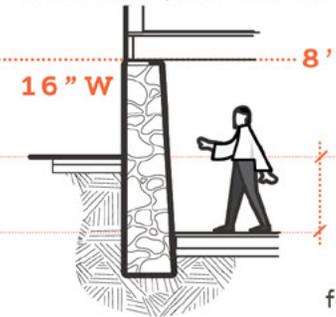
MASONRY / BRICK
with concrete footer



CMU BLOCKS
likely in post-war houses



FIELD STONE
most archaic/rare material



PRESCRIPTIVE FOUNDATIONS

quick min. measurements to pair with visual assessment of existing structure* (see last spread on loading)

D 3.5' *assumes lateral support at top and bottom

footer range shown, not calculated

COTTAGE EXAMPLE

Cottage to Two Unit Conversion



BASIC SOIL PRINCIPLES

SOIL MEASURES & CONCEPTS

measures to be aware of for foundation*

- A** Min. Foundation Footer depth = frostline = 42" deep min. to avoid heaving
- B** Water/Sewer Connections - typ. 60" min. depth, to avoid frost & footers
- C** Water Table^ - subsurface soil investigation required to determine if ground water is within 5' of lowest finished floor, impacts stability, pressure, & waterproofing options
- D** Unbalanced Backfill - height from ground level to floor (approx. soil pressure)
- E** Surface Slopes = 2% slope, away from building, to promote run-off (vs. absorption)
- F** Soil Tests - ^ = test pits/cores required, alt. full geotech survey if excavating 8' +

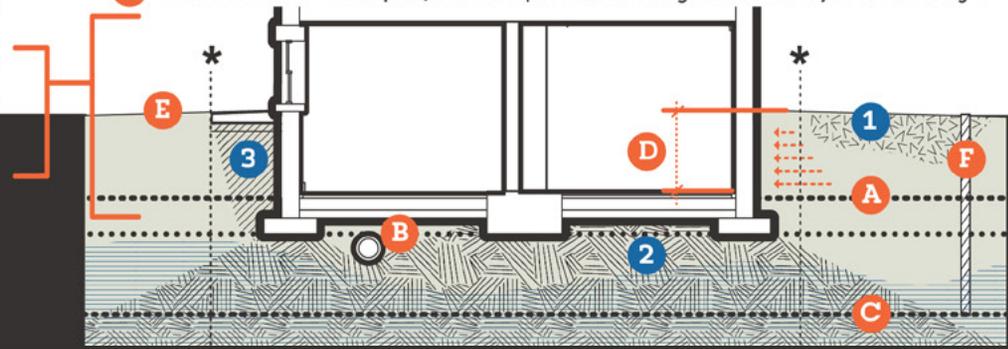
SOIL CONDITIONS

confirm soils with geotech report

- 1** Urban fill^ - mixed, unstable (<500 psi)
- 2** Undisturbed - best for foundations
- 3** Engineered - designed, compacted

SOIL TYPES

- 4** Gravel/Sand - drains, desired (3,000 psi)
- 5** Clays - holds water, unstable (1,500 psi)



* lots with tight offsets have limited areas to excavate or alter soils to address drainage or lateral soil loads



WATERPROOFING . slab structure . water control

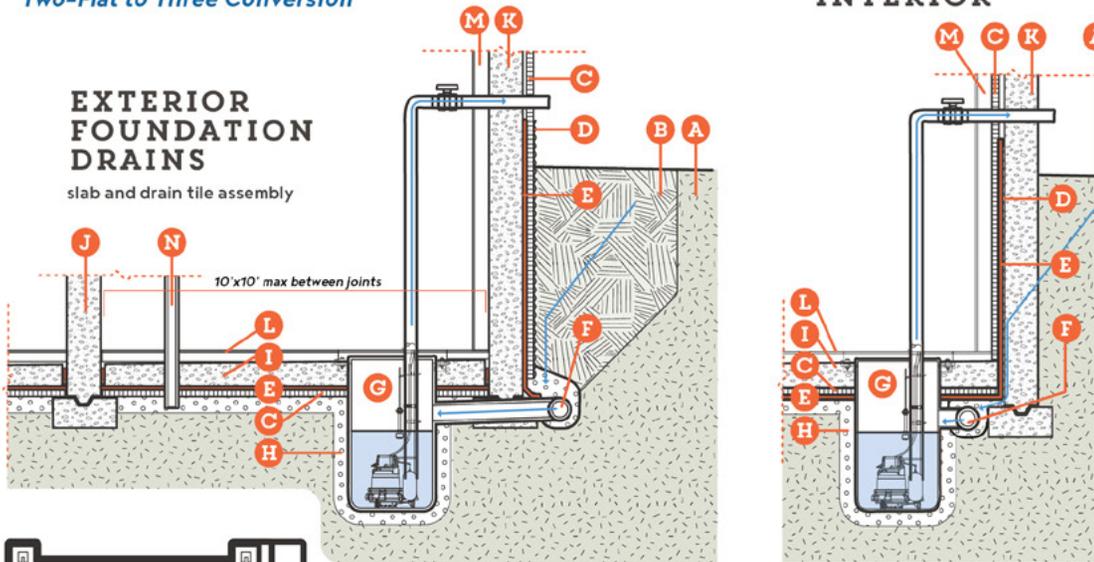
TWO-FLAT EXAMPLE

Two-Flat to Three Conversion

SLAB STRUCTURE

minimum elements + interior & exterior damproofing

INTERIOR

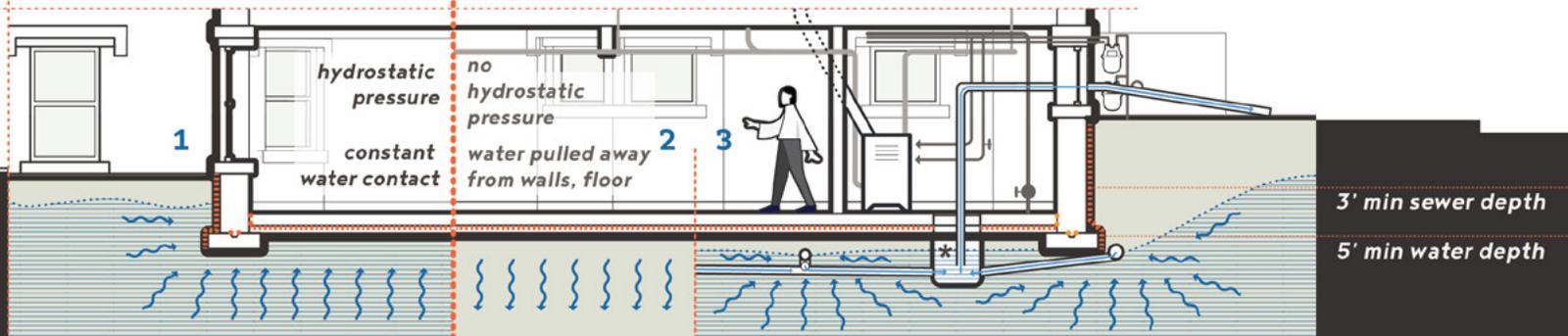


- A** undisturbed soil (2% + slope)
- B** backfilled soil (avoid downspouts to area, 2% + slope)
- C** 3" rigid foam insulation (exterior drains & under slab); 2" open cell foam or exposed walls (interior drain foundation walls)
- D** grooves or drainage board to channel moisture to drain tiles
- E** vapor-barrier (under slab), dampproofing membrane (slab, walls)
- F** drain tiles: perforated 4" pvc in gravel wrapped w/ filter fabrics, slopes to drain, with connection to sump pit
- G** sump pit and pump assembly, with air-tight cover (radon), outlet connects to storm system or permeable site area
- H** 4" crushed stone or gravel beneath slab/around sump for drainage
- I** 3.5" min concrete slab with joints for curing, loading (at columns), and thermal stress, max 10'x10' panels with 1:1.5 ratio pieces at edges
- J** columns with footer (isolation joint with slab all around)
- K** foundation wall and footer
- L** floor assembly of rigid insulation, sleepers, and subflooring
- M** wall assembly: 2x4 frame, moisture-resistant gypsum or exposed
- N** exhaust pipe to allow radon release from soil (passive or mech fan)

WATERPROOFED
basement set in ground water **1**
membranes water-stops at joints

DAMPPROOFED
basement with well-draining sandy soils **2**
or water control/perimeter drainage (standard) **3**

SUMP PUMPS*
exterior foundation drains to sump
pump and out to site (shown) or sewer



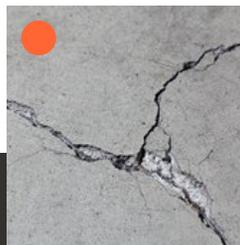
GENERAL PRINCIPLES FOR DRY, SOUND BASEMENTS:

As you examine your basement, note the condition of the floors and any lingering moisture. Look for cracks, caving, and wear in the slab (below, ● red). Often residential concrete slabs are poured as thin surfaces; they will not support new walls or furniture loads. See code-compliant slab sections, left, and replacement details, in 'Mitigating Issues,' associated with adding height (pg 136), foundation drains (pg 140), plumbing (pg 148), and radon exhaust (pg 144).

On the floors or walls, are surfaces clammy? Can you see condensation on walls or efflorescence on bricks (below, ● blue)? Are there leaks, in any weather, snaking toward the floor drains? If you 'finish' a unit despite these symptoms, this moisture is trapped in the walls and floors, accelerating rot and mold growth. To be safe for inhabitation, your basement unit should be either a) waterproofed or b) dampproofed.

Waterproofed basements are lined with thick, impermeable membranes (Waterproofed: #1; Slab Structure: B) that wrap the foundation walls and the concrete-slab for continuous enclosure. This is required when the basement sits within groundwater and has hydrostatic pressure on the foundations.

Dampproofed basements are lined with thinner materials, which often double as vapor-barriers, because they sit 'above' groundwater. This can be the result of natural drainage (Dampproofed: #2). Alternately, the foundations may have a tile drain system (exterior or interior) to intercept water, drain immediate soils and thermally isolate the interior (Dampproofed: #3, Slab Structure).



WHAT YOU NEED TO ASSESS YOUR BASEMENT SLABS & DRAINAGE:

- **Chicago Building Code – Chp 18 – [Soils and Foundations](#), Chp 19 – [Concrete](#)** (summarized in drawings)
- **Visual observation** – examine basement walls and slab for water, cracks, and wear. Record issues to discuss with technical experts.
- **Architect or Structural Engineer** to verify found issues and to calculate anticipated slab loads, structure
- **Plumber** to confirm existing drainage for adaptation; depth, path (straight or with bends), sizes of sewer connections to mains.

IS YOUR BASEMENT SOUND, DRY, AND RADON FREE:

Is your slab intact and adequate for new loads (Slab Structure I)? [\(14B-19-1907\)](#)

- Does it have joints to allow for settling?
- Are there changes – in drainage, loading – requiring replacement?

Does your slab have a vapor-barrier beneath (Slab Structure E, N)?

- Are there venting pipes to exhaust radon away from occupants? (To learn more about the carcinogenic risks of radon and exhaust systems, see 'Mitigating issues' pg 144) [\(14B-19-1907\)](#)

Is your basement visibility dry or are there stains or high-water marks from flooding? Is there damp or waterproofing in place (left, Waterproofed; Dampproofed)? [\(14B-18-1805\)](#)

- Creating a dry basement will depend on soils, elevation, and geotechnical testing to confirm groundwater control options. See 'Mitigating Issues' (pg 140) for how interior and exterior drainage integrates with sump pumps and site grading.

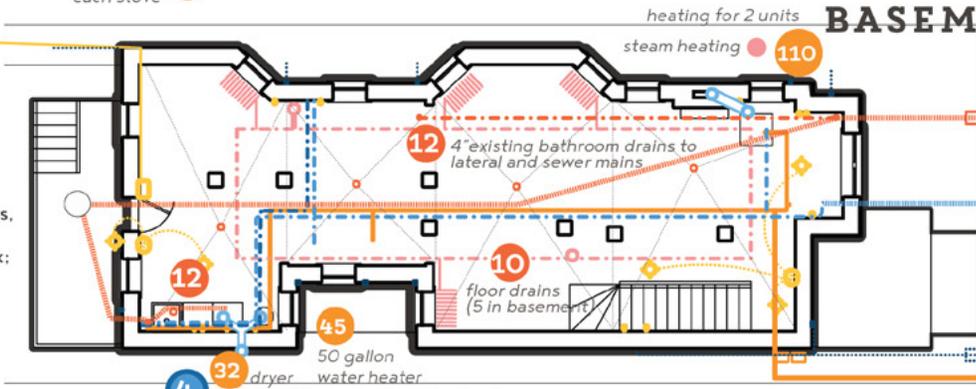
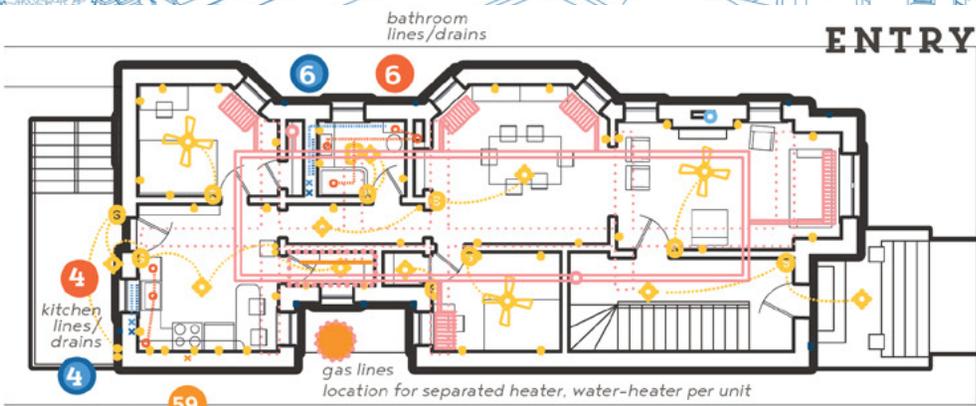


UTILITIES

BUILDING SYSTEMS

typ. lines, notes on sizing

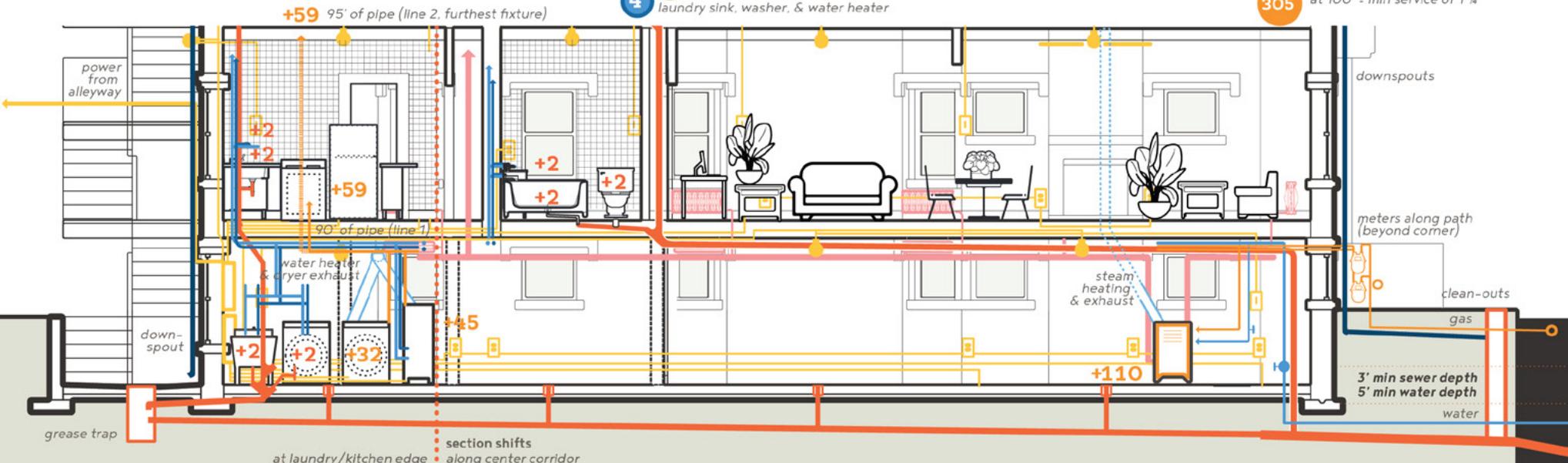
- | | | | |
|--------------------------|--|--|--------------|
| Plumbing* | | Load by fixtures | |
| hot water | | drainage value | # |
| cold water | | fixture value | # |
| sewage/storm | | ft3/hr gas use | # |
| Heating | | Location | |
| gas | | wall cavity | x (vertical) |
| steam / ductwork | | exposed | — |
| exhaust | | buried | ▬▬▬▬▬ |
| Electric* | | overhead | |
| lights/fans | | *plumbing: each unit requires, a bathroom sink, toilet, shower/tub, and kitchen sink; laundry per building | |
| outlets/switches | | *electric: unit requires its own meter + public meter for shared areas | |
| breaker boxes | | | |
| light-switch connections | | | |



ENTRY

BASEMENT

- total building sewer drainage value (4" drains, at 1/8 slope)
- water connection = drainage minus floor drains (1.5-1.75" service line, given 100' steel or copper interior lines)
- 6" downspouts to storm/sewer system and yard where possible
- at 100' - min service of 1 1/4"



PRINCIPLES FOR UTILITY CONNECTIONS & SERVICES:

A basement unit needs working plumbing, an adequate number of outlets and lights, and thorough heating to maintain a comfortable environment of 68F (at -7F outdoors). Building systems like heating, plumbing, sewage, and electricity should be considered spatially—what can/can't be appended efficiently—and in terms of load or capacity—number of fixtures enabled by size or volume of supply. You'll want to minimize the impact to existing units, so be prepared to work around vertical drainage and potentially align sewer additions along existing overhead lines.

Older buildings are more likely to have **inadequate capacity and will require additional lines or resizing sewer/water connections to City utilities** (see 'Mitigating Issues', pg 148). You'll want to incorporate the costs of adding additional meters and lines into your overall estimate (\$15,000-\$20,000). Segregating systems and/or supplementing existing systems can help avoid underpayment, enable tenants to use utility subsidy programs, and meet livability codes. That said, old buildings often have steam heat or similar systems designed to service all units. Consider how to add supplemental systems to meet code and separate lines, like adding a forced-air heater in the basement, without disturbing the upper stories of existing steam distribution.

It's also important to understand **the elevation and location of sewer lines**—either overhead (runs across the basement ceiling) or below the slab (beneath the basement floor). If your sewer connections are overhead, you will need an ejector pump to meet your existing sewage connections. For either system, you'll need to vent any new connections to release sewer gas and provide maintenance access, like clean-outs and traps (see ejector pump and access details in 'Mitigating Issues,' pg 148). Your other drainage lines—roof downspouts, areaway drains, and foundation drains—will need a sump pump to lift and carry water away from your foundations (see details in 'Mitigating Issues,' pg 140).

WHAT YOU NEED TO ASSESS UTILITY LINES AND LOADS:

- **Chicago Building Code – Chp 12 – [Interiors](#), Chicago Electrical Code – [14E](#), Chicago – Building Infrastructures Code – Chp 18 – [Plumbing](#) and [Mechanical](#) Codes**
- **Visual observation** – Note the location of utility connections, meters, and size of any exposed pipes. Determine location and capacity of any heating, electric, or plumbing appliances and fixtures.
- **Architect and/or Contractor in coordination with plumber/electrician/heating specialist** to assess existing systems and potential for adaptation.



As a building owner you can do rough estimates by noting existing connections, meters, fixtures, and lines, as shown in the plumbing, electric, and heating diagrams and tables on the following pages. You will need an architect to consult with plumbers, electricians, and heating specialists to fully assess the condition of your existing systems and develop an integrated strategy for additional loading and utility connections.

WHAT CAPACITY/ CONNECTIONS DO YOU NEED FOR A NEW UNIT:

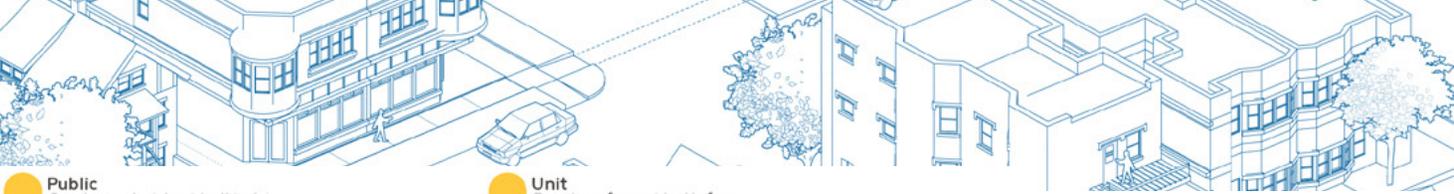
Have you consulted with an electrician about needed capacity? (diagram next page)

- Anticipate connecting kitchen appliances and two-four sets of outlets and lights in all rooms, with GFCI outlets in wet areas.
- Given any new layout, occupants will need to access their meters and breakers for maintenance.

storm/
sewer

sewer
mains

utility connections . electric



ELECTRIC

typ. lines, notes on sizing

Electric*

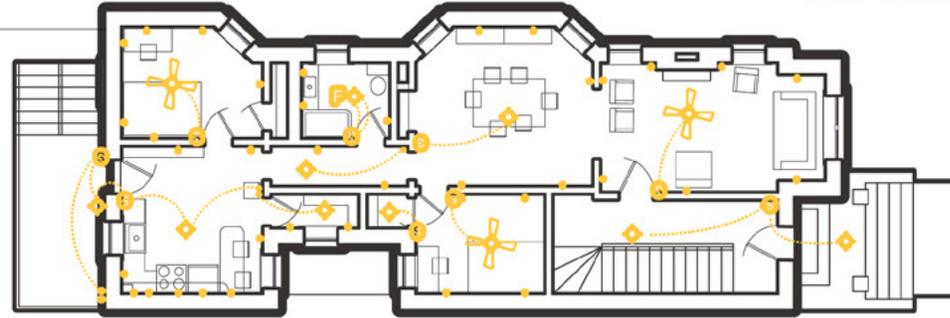
- lights
- fans
- outlets
- breaker boxes
- switches
- light-switch connections

*each unit requires:
its own meter +
public meter for shared areas

Public
2 exterior lights, 1 hall light,
2 exterior outlets, all smoke/gas detectors

Unit
3 ceiling fans, 1 bath fan,
9 overhead lights, 3-6 outlets/room

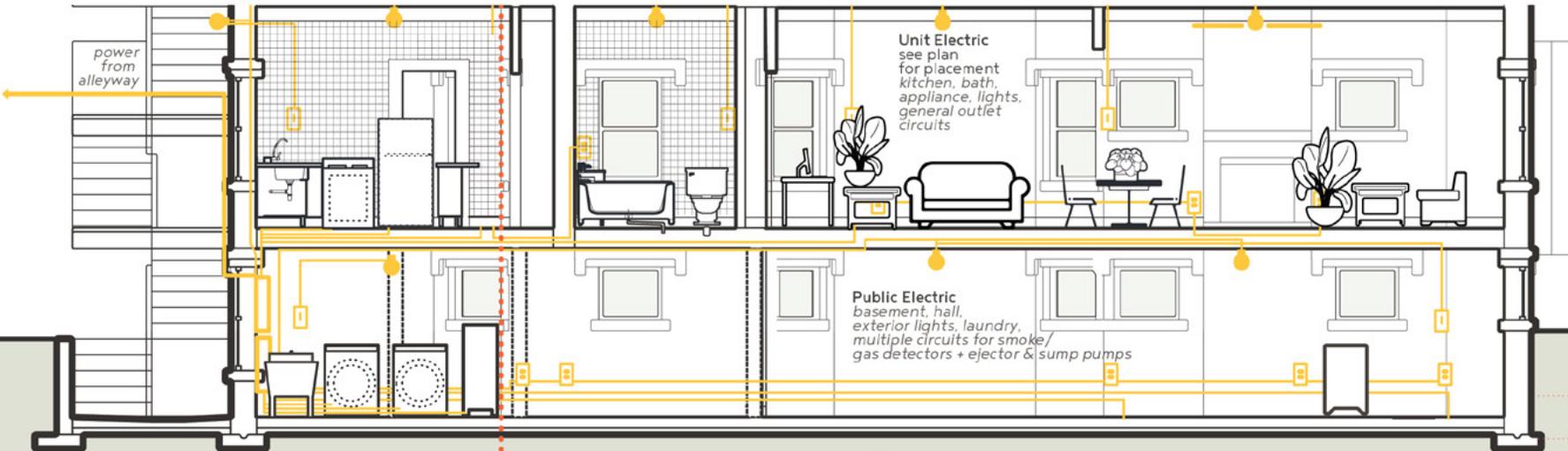
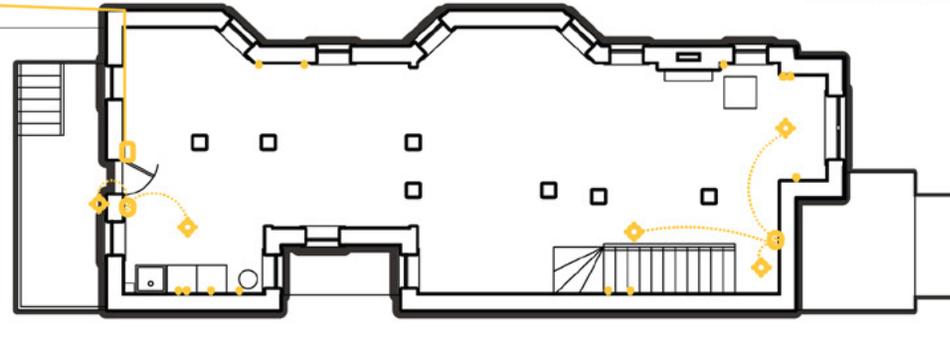
ENTRY



Public
1 breaker box, 5 lights, 12 outlets, + pumps/detectors

Units
1 breaker box each

BASEMENT



Unit Electric
see plan
for placement
kitchen, bath,
appliance, lights,
general outlet
circuits

Public Electric
basement, hall,
exterior lights, laundry,
multiple circuits for smoke/
gas detectors + ejector & sump pumps

section shifts
at laundry/kitchen edge along center corridor

! Not an Electric Schematic
Diagram only to show separation of unit & public lines,
emphasize need for multiple circuits

- For any multi-unit building, you will need one metered electric service for each unit and one for the public areas – hallways, laundry, stairwells, and fire-escapes.
- With old buildings that lack separated electric, it's common to replace the entire building's wiring. Tracing and disentangling old wiring is time consuming and oft confirms the need for replacement. See 'Mitigating Issues' for new line options (pg 152).

Have you consulted with a plumber about the capacity and location of the sewer system? (diagram next page)

- Given an additional kitchen sink, dishwasher, and bathroom fixtures, do you know the current height and diameter of your sewer connections, to anticipate capacity and the need for pumps ([18-29-710](#), [18-29-712](#))?
- Will your new unit incorporate additional clean-outs, backflow valves, and access panels to facilitate system maintenance and avoid sewage overflows in the lowest level ([18-29-708](#), [18-29-715](#))?
- Confirm the location, elevation, and direction of your lateral connection – from your basement lines to the sewer main. Any extra elbows in the pipe can act as obstacles.

Have you consulted with a plumber about the capacity and location of the water system (diagram next page)?

- Because a new unit requires a full kitchen and bath, you will need an additional or enlarged water connection. This likely won't be flagged on your permits. Make sure to incorporate line (and meter) addition to avoid belated installation (with all the implied site, slab, and finishing work). See *the fixture and pipe sizing calculation at the end of this section*.
- Older, single family homes may not be metered. You will want to add meters to new units, but, as with sewage, you can use this method to anticipate the bills/loading for each unit. See the Municipal Code 11-12, Water Supply and Service ([11-12-260](#)).

Does the plan for your basement unit account for the interconnection of different building infrastructure/services?

Most building systems involve multiple connections and negotiation with walls and structure. Consider the following examples:

- Fossil-fuel burning heaters (water heaters, forced-air units) require intakes, exhausts, and heat distribution systems. (See ventilation in 'Mitigating Issues', pg 147 C)
- Drainage pumps typically connect to your storm/sewer mains but also require two power circuits, which act as fail-safes ([18-29-712](#)). (See drainage and plumbing in 'Mitigating Issues', pg 140/144)



Because of such interconnections, planning a new unit should be done with professionals, given their assessment of existing building systems.

The sample 'Two-Flat' system diagrams as well as the system sizing tables (next page) are meant to help you feel comfortable integrating existing details and calculations, in order to actively engage your plumber, contractor, or heating specialist. Fully calculating the system sizing, esp. for water, will need to take into account additional details like pipe types (for friction), the highest fixture elevation, and total system length for estimating pressure.

ELECTRIC LOADS:

In an electric system, current flows from a power source through a circuit—with appliances and lights that use that power—to a neutral line which carries residual current to the ground. Switches and breakers serve to break circuits and stop electric flow to specific elements or entire lines. Each electric meter tracks the watts pulled in for your unit.

Akin to sizing plumbing or gas loads (on the following pages), your electric system is sized to support a set number of appliances per circuit (each rated for wattage). The flow of electric current (in amperes, per circuit breaker) * the differential power (120 or 240V) = total power wattage available per circuit. For safety, most circuits use 60-80% (max) of the available wattage and are properly grounded. Your electrician will calculate the power drawn and used when adding metered service and circuits. See 'Mitigating Issues' for an example circuit calculation, pg 154.

utility connections . plumbing

PLUMBING

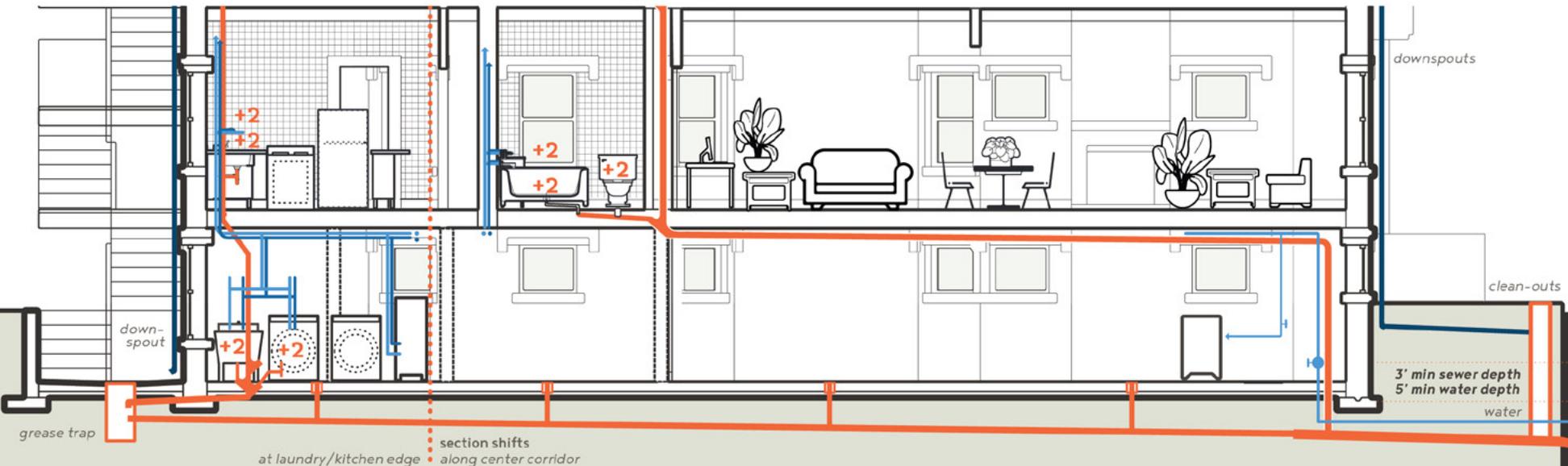
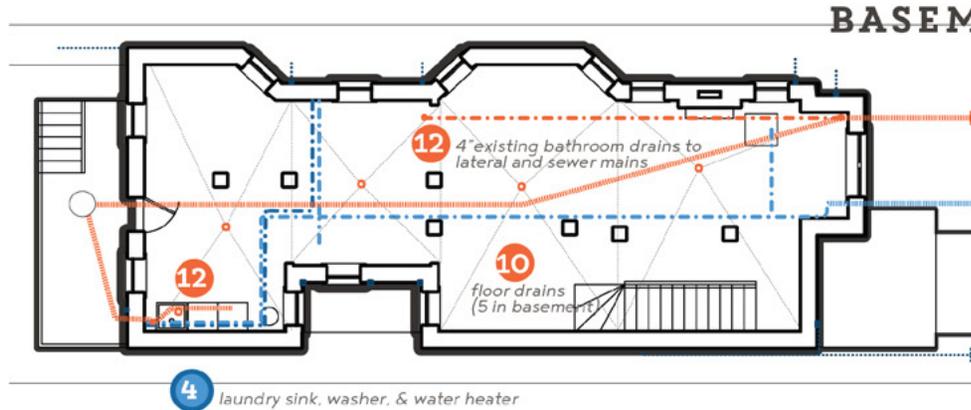
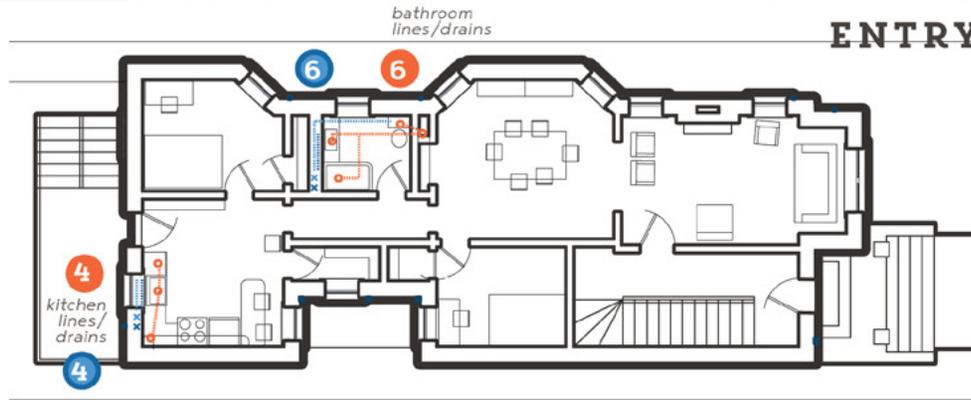
typ. lines, notes on sizing

Plumbing*

hot water		drainage value	#
cold water		fixture value	#
sewage			
foundation/storm		Location	
alt (found. drains)		wall cavity	x (vertical)
catch-basins/ pump-to-storm lines		exposed	
		buried	
		overhead	

*each unit requires:
a bathroom sink,
a toilet,
a shower/tub, and
kitchen sink;

laundry per building



PLUMBING LOADS:

You can make an informal tally of plumbing capacity. Make a rough count of all the plumbing fixtures (tubs, toilets, sinks) attached to each of your major vertical drainage pipes and find their drainage values on Table 18-29-709.1 (sewage) or Table 18-29-604.10.1 (water) on this page.

- **For sewers,** measure the pipe size and confirm capacity estimates on Table 18-29-710 A and B, next page. Could you install additional fixtures, given allowed unit values and required 4" pipe beneath ground? Add roof drainage (18-29-1108.1) to get a rough sense of your needed drainage capacity (table next page).
- **For water,** turn to page 79 to tally your fixture total and convert the value into demand (in gallons per minute) on Table 18-29-604.10.2. Find the connection size equivalent for a 100' system (for steel or copper pipes). As with the zoning example, highlights match the proposed Two-Flat conversion. (Detailed instruction can be found in Chicago Plumbing Code 18-29, Appendix A: bit.ly/Chicago-Water-Calc.)

WATER FIXTURE LOADS

Table 18-29-604.10.1

Fixture Type	Occupancy Use	Valve Type	Fixture Units
Water closet	Private	Flush tank	3
Lavatory	Private	Faucet	1
Bath tub	Private	Faucet	2
Shower head	Private	Mixing valve	2
Bathroom group	Private	Flush valve for closet	8
Bathroom group	Private	Flush tank for closet	4
Separate shower 109	Private	Mixing valve	2
Kitchen sink	Private	Faucet	2
Laundry trays (1 to 3)	Private	Faucet	2
Combination fixture	Private	Faucet	3
Laundry washer	Private	Faucet	2
Bidet	Private	Faucet	2
Dishwasher	-	-	2
Drinking fountain	-	-	1/2
Laundry washer	Public	8 lbs	3
Laundry washer	Public	15 lbs	4

SEWER FIXTURE LOADS

Table 18-29-709.1

Fixture Type	Drainage Fixture Unit Value as Load Factors	Minimum Size of Trap (inches)
Automatic clothes washers, commercial a	3	2
Automatic clothes washers, residential	2	2
Bathroom group consisting of water closet, lavatory, bidet and bathtub or shower	6	-
Bathroom b (with or without overhead shower or whirlpool attachments)	2	1 1/2
Bidet	2	1 1/4
Combination sink and tray	2	1 1/2
Dental lavatory	1	1 1/4
Dental unit or cuspidor	1	1 1/4
Dishwashing machine, c domestic	2	1 1/2
Drinking fountains	1/2	1 1/4
Emergency floor drain	0	2
Floor drains	2	2
Kitchen sink, domestic	2	1 1/2
Kitchen sink, domestic with food waste grinder and/or dishwasher	2	1 1/2
Laundry tray (1 or 2 compartments)	2	1 1/2
Lavatory	1	1 1/4
Shower compartment, domestic	2	2
Sink	2	1 1/2
Urinal	4	Footnote d
Urinal, 1 gallon per flush or less	2 e	Footnote d
Wash sink, (circular or multiple) each set of faucets	2	1 1/2
Water closet, flushometer tank, public or private	4 e	Footnote d
Water closet private installation	4	Footnote d
Water closet public installation	6	Footnote d

For SI: 1 inch = 25.4 mm, 1 gallon = 3.785 L.

a For traps larger than 3 inches, use Table 709.2.

b A showerhead over a bathtub or whirlpool bathtub attachments does not increase the drainage fixture unit value.

c See Section 709.2 for methods of computing unit value of fixtures not listed in Table 709.1 or for rating of devices with intermittent flows.

FIXTURES: WATER =

FIXTURES: SEWER =

CALCULATED SIZES/VALUES =



LOAD PER ANY BRANCH

Table 18-29-710A

Diameter of Pipe (inches)	Maximum Number of Drainage Fixture Units Connected to any Portion of the Building Drain or the Building Sewer, Including Branches of the Building Drain ^a			
	Slope per Foot			
	1/6 inch	1/8 inch	1/4 inch	1/2 inch
1 1/4	–	–	1	1
1 1/2	–	–	3	3
2	–	–	21	26
2 1/2	–	–	24	31
3	–	36	42	50
4	–	180	216	250
5	–	390	480	575
6	–	700	840	1,000
8	1,400	1,600	1,920	2,300
10	2,500	2,900	3,500	4,200
12	2,900	4,600	5,600	6,700
15	7,000	8,300	10,000	12,000

*new & old sizing for Two-Flat capacity (34, 44)

For SI: 1 inch = 25.4 mm, 1 inch per foot = 0.0833 mm/m.

a The minimum size of any building drain serving a water closet shall be 3 inches.

LOAD PER HORIZONTAL BRANCHES

Diameter of Pipe (inches)	Any Horizontal Fixture Branch	Maximum Number of Fixture Units that may be Connected to:		
		One Stack of 3 Stories in Height or 3 Intervals	More than 3 Stories in Height	
			Total for Stack	Total at One Story or Branch Interval
1 1/2	3	4	8	2
2	6	10	24	6
2 1/2	12	20	42	9
3	20	30	60	16
4	160	240	500	90
5	360	540	1,100	200
6	620	960	1,900	350
8	1,400	2,200	3,600	600
10	2,500	3,800	5,600	1,000
12	3,900	6,000	8,400	1,500
15	7,000	–	–	–

*bath and kitchen horizontals (2"), new & old stacks for 3 Story Two-Flat capacity (34, 44)

For SI: 1 inch = 25.4 mm.

a Does not include branches of house drain.

STORM DRAINAGE EQUIVALENCE*

Table 18-29-1108.1

No. of Fixture Units	Equivalent Area (sq. ft.)	No. of Fixture Units	Equivalent Area (sq. ft.)*
1	165	31	2,820
2	325	32	2,870
3	475	34	2,955
5	750	38	3,125
6	875	40	3,200
7	1,000	42	3,270
8	1,115	44	3,340
9	1,225	46	3,400
10	1,330	48	3,465
11	1,435	50	3,350
12	1,530	55	3,530
13	1,620	60	3,790
14	1,710	65	3,900
15	1,800	70	4,000
16	1,880	75	4,090
17	1,960	80	4,175
18	2,040	85	4,250
19	2,110	90	4,320
20	2,180	95	4,390
21	2,250	100	4,450
22	2,310	105	4,500
23	2,360	110	4,550
24	2,440	115	4,600
25	2,500	120	4,645
26	2,550	125	4,690
27	2,600	130	4,725
28	2,660	140	4,800
29	2,710	145	4,830
30	2,770	150	4,850

* may direct to yard or storm/sewer system, confirm drainage connections

FIXTURES: SEWER =

CALCULATED SIZES/VALUES =

WATER: LOAD TO DEMAND CONVERSION

Table 18-29-604.10.2

For Systems Predominantly Flush Tanks		For Systems Predominantly for Flush Valves	
Load	Demand	Load	Demand
1	1.5	1	-
2	2.5	2	-
3	3.3	3	-
4	4.0	4	-
5	4.8	5	15.0
6	5.5	6	17.5
7	5.7	7	19.7
8	6.9	8	22.2
9	7.5	9	24.5
10	8.2	10	27.0
11	8.8	11	27.8
12	9.5	12	28.5
13	10.1	13	29.5
14	10.8	14	30.1
15	11.4	15	31.0
16	12.0	16	31.8
17	12.5	17	32.6
18	13.0	18	33.5
19	13.5	19	34.2
20	14.2	20	35.0
25	17.0	25	38.2
30	19.4	30	41.5
35	21.8	35	43.6
40	24.3	40	46.0
45	26.8	45	48.2
50	29.0	50	50.5

old
new

WATER: 100' SYSTEM (SAMPLE)

Pipe Sizing Criteria Schedule 40 Steel S-40 Steel

Design: 3'/100' PD, 10 fps max vel High: 5'/100' PD, 12 fps max vel Maxim: 7'/100' PD, 15 fps max v

old
new

Nominal Pipe Size	Outside Diameter (in)	Wall Thickness (in)	Inside Diameter (in)	P.D. per 100 ft	Design		High		Maxim			
					Velocity (ft/sec)	Flow (gpm)	Velocity (ft/sec)	Flow (gpm)	Velocity (ft/sec)	Flow (gpm)		
0.38	0.675	0.091	0.493	3.0	0.9	0.5	5.0	1.7	1	7.0	2.5	1.5
0.50	0.840	0.109	0.622	3.0	1.6	1.5	5.0	2.1	2	7.0	2.6	2.5
0.75	1.050	0.113	0.824	3.0	2.1	3.5	5.0	2.7	4.5	7.0	3.3	5.5
1.00	1.315	0.133	1.049	3.0	2.4	6.5	5.0	3.2	8.5	7.0	3.7	10
1.25	1.660	0.140	1.380	3.0	2.6	12	5.0	3.7	17	7.0	4.5	21
1.50	1.900	0.145	1.610	3.0	3.2	20	5.0	4.3	27	7.0	5.1	32
2.00	2.375	0.154	2.067	3.0	3.8	40	5.0	4.8	50	7.0	5.7	60
2.50	2.875	0.203	2.469	3.0	4.3	65	5.0	5.7	85	7.0	6.5	97
3.00	3.500	0.216	3.068	3.0	4.8	110	5.0	6.3	145	7.0	7.6	175
3.50	4.000	0.226	3.548	3.0	5.3	160	5.0	7.0	200	7.0	8.5	250
4.00	4.500	0.237	4.026	3.0	5.8	230	5.0	7.6	300	7.0	8.8	350
5.00	5.563	0.258	5.047	3.0	6.4	400	5.0	8.3	520	7.0	10.3	640
6.00	6.625	0.280	6.065	3.0	7.7	690	5.0	10.0	900	7.0	12.2	1,100

old
new*

Nominal Pipe Size (ins)	Type K Copper		Type L Copper		Type M Copper		Pipe Sizing Criteria		
	Outside	Inside	Outside	Inside	Outside	Inside	Velocity Ft/sec	Loss in PD'/100'	Flow GPM
0.25	0.375	0.305	0.375	0.315					
0.38	0.5	0.402	0.5	0.43	0.5	0.45	1.0	3	0.5
0.50	0.625	0.527	0.625	0.545	0.625	0.569	1.5	3	1
0.75	0.875	0.745	0.875	0.785	0.875	0.811	2.0	3	3
1.00	1.125	0.995	1.125	1.025	1.125	1.055	2.5	3	7
1.25	1.375	1.245	1.375	1.265	1.375	1.291	3.0	3	12
1.50	1.625	1.481	1.625	1.505	1.625	1.527	3.5	3	17
2.00	2.125	1.959	2.125	1.985	2.125	2.009	4.0	3	35
2.50	2.625	2.435	2.625	2.465	2.625	2.495	4.5	3	70
3.00	3.125	2.907	3.125	2.945	3.125	2.981	5.0	3	110
3.50	3.625	3.385	3.625	3.425	3.625	3.459	5.5	3	160
4.00	4.125	3.857	4.125	3.905	4.125	3.935	6.0	2.5	225
5.00	5.125	4.805	5.125	4.875	5.125	4.907	6.5	2.5	380
6.00	6.125	5.741	6.125	5.845	6.125	5.881	7.0	2.2	575

*1.75 would be adequate

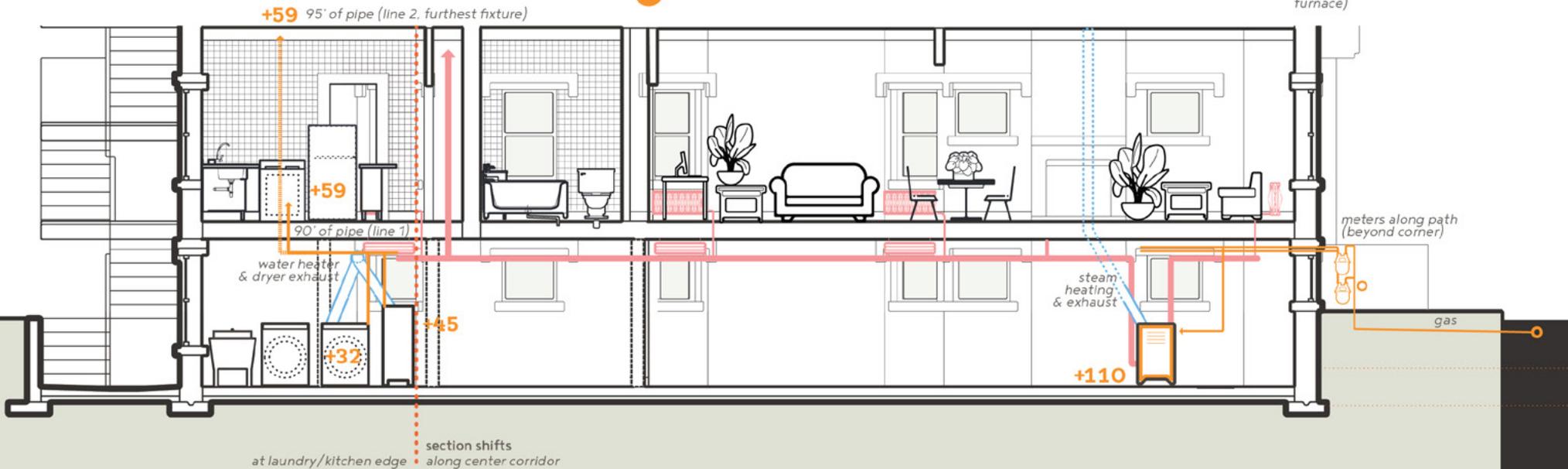
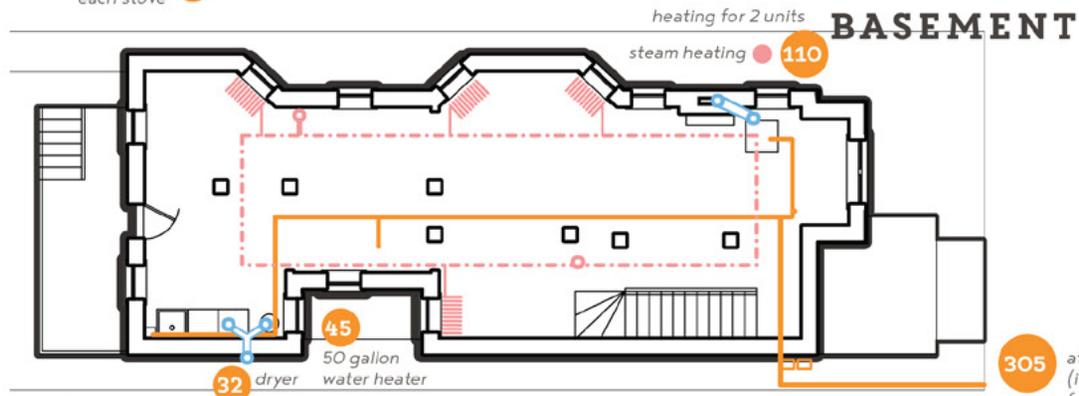
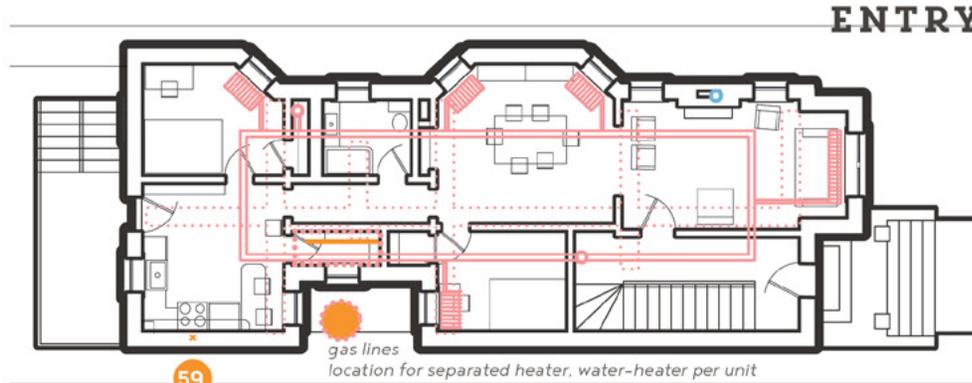
FIXTURES: WATER =
CALCULATED SIZES=

utility connections . heat . gas

HEATING

typ. lines, notes on sizing

- | | | |
|-----------------------|--|-------------------------------|
| Heating* | | Load by fixtures |
| gas lines | | ft ³ /hr gas use # |
| exhaust | | Location |
| steam lines | | wall cavity x (vertical) |
| alt. placements | | fixture & |
| alt. ducts (per unit) | | in floor |
| | | overhead |



GAS LOADS:

Akin to plumbing, gas is distributed through a series of pressurized pipes, as diagrammed on pg 80. Broadly speaking, gas lines step down in size. A larger capacity and diameter pipe supplies the meters. This splits to serve distinct unit lines and branches internally, with each new section serving fewer appliances, thus requiring less fuel and smaller diameter piping.

As with water flow, you can estimate existing gas flow and current pipes' capacity to support extra appliances. Make a rough count of your gas appliances (range, dryer, etc.) and find their typical fuel usage in cubic feet, on **Table Appliance Fuel Usage**. Sum these values to estimate current gas usage, in cubic feet. To calculate the necessary connection size, measure the distance from your meter to the furthest gas appliance. In the example, this would be the second floor gas range which is approximately 95' from the meter. Find this length on the **Table Gas Pipe Capacity** (round up as necessary) and find the

column, moving right, that matches or just exceeds the usage sum (305 ft³/hr in the example). At the top of the column is your estimated gas connection size, at the meter.

If your current piping matches the nominal pipe size and your fixture usage sum is less, you likely have capacity for heating upgrades or new appliances. Use the **Table Appliance Fuel Usage** to estimate viable additions. (Tables and detailed instructions available at: bit.ly/Gas-Calc)

GAS PIPE CAPACITY

NOMINAL:	PIPE SIZE (inch)									
	½	¾	1	1¼	1½	2	2½	3	4	
ACTUAL ID:	0.622	0.824	1.049	1.380	1.610	2.067	2.469	3.068	4.025	
LENGTH (feet)	CAPACITY IN CUBIC FEET OF GAS P									
10	172	360	678	1390	2090	4020	6400	11300	23100	
20	118	247	466	957	1430	2760	4400	7780	15900	
30	95	199	374	768	1150	2220	3530	6250	12700	
40	81	170	320	657	985	1900	3020	5350	10900	
50	72	151	284	583	873	1680	2680	4740	9660	
60	65	137	257	528	791	1520	2430	4290	8760	
70	60	126	237	486	728	1400	2230	3950	8050	
80	56	117	220	452	677	1300	2080	3670	7490	
90	52	110	207	424	635	1220	1950	3450	7030	
100	50	104	195	400	600	1160	1840	3260	6640	
125	44	92	173	355	532	1020	1630	2890	5890	
150	40	83	157	322	482	928	1480	2610	5330	
175	37	77	144	296	443	854	1360	2410	4910	
200	34	71	134	275	412	794	1270	2240	4560	
250	30	63	119	244	366	704	1120	1980	4050	
300	27	57	108	221	331	638	1020	1800	3670	

APPLIANCE FUEL USAGE

APPLIANCE	INPUT Btu/h. (Approx.)	Cubic Feet of Gas Per Hour
Space Heating Units		
Warm air furnaces:		
Single family	100,000	91
Multifamily, per unit	60,000	55
Hydronic boilers:		
Single family	100,000	91
Multifamily, per unit	60,000	55
Water-Heating Appliances		
Water heater, automatic:		
Storage 30 to 40 gal. tank	35,000	32
Water heater, automatic Storage 50 gal. tank	50,000	45
Water heater, automatic instantaneous:		
Capacity at 2 gal./minute	142,800	130
Capacity at 4 gal./minute	285,000	259
Capacity at 6 gal./minute	428,400	389
Water heater, domestic		
Circulation or side-arm	35,000	32
Cooking Appliances		
Range, freestanding, domestic	65,000	59
Built-in oven/ broiler, domestic	25,000	23
Built-in counter-top range, domestic	40,000	36
Other Appliances		
Clothes dryer, domestic	35,000	32
Gas fireplace – direct vent	40,000	36
Gas log unit	80,000	73



Reminder: All rough utility estimates should be followed by strenuous professional assessments to confirm capacity and work required for a new unit.

SAMPLE NEW UNIT, UTILITIES ADJUSTMENTS:

Building upon the existing systems, this spread suggests likely adaptations and interventions in a Two-Flat basement. As much as possible, placement of new plumbing fixtures have aligned with existing water and sewer lines for service, drainage, and exhausting sewage gas. Assuming separated service between public spaces, first, and second floor units, the existing basement electric circuit is kept for public use and a new system is added for the basement unit interior. Heating connections are left as is, with overhead steam-lines and radiators, which are common in older, multi-flat units.

storm/
sewer

sewer
mains



UNIT SIZING . height requirements . room areas

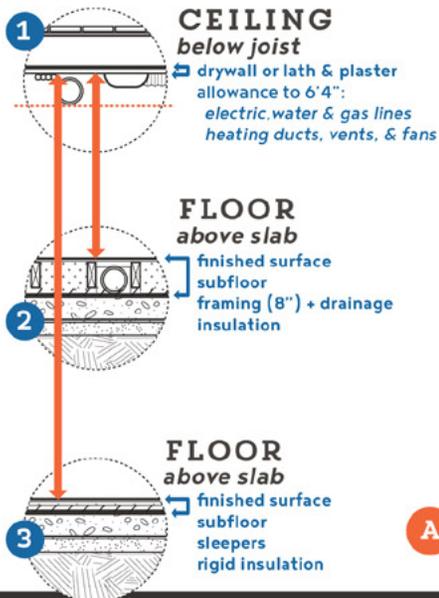
MIN. ROOM AREAS (SQ FT)

COTTAGE EXAMPLE

Cottage to Two Unit Conversion

MEASURING ROOM HEIGHT

finished floor to underside of ceiling

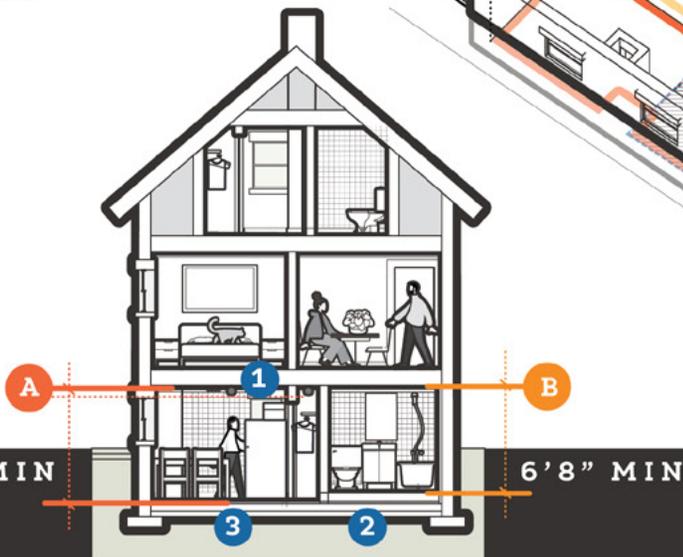


MINIMUM REQ. ROOM HEIGHTS

typical clearance and allowances

- A BASEMENT UNIT OVERALL**
7' ceiling height
6'4" for pipes on < 33% area
6' 8" egress paths

- B BATHROOM ALLOWANCE**
6'8" ceiling height
assumes raised floor



- A EGRESS/EXITS**
3 feet clear pathways
- B BATHROOM**
no area min.
35 sqft shown
- C KITCHEN**
2.5-3 feet min
corridor at counters
100 sqft shown
- D DINING**
60 sqft area min.
70 sqft shown
- E BED/LIVING**
70 sqft area min.
107 sqft shown
- F LARGEST ROOM**
120 sqft area min.
or
180 with dining
206 sqft living room
+ 50 sqft study area
shown

PRINCIPLES BEHIND HEIGHT AND SIZE REQUIREMENTS:

It is critical to make sure your basement has enough height and area for a decent and legal apartment. The required dimensions are minimums meant to avoid overcrowding.

Unfinished basement height should be nearly 8 feet, on average, to allow for upright posture, accommodate building materials, and avoid pipes acting as obstacles to movement (Minimum Req. Room Heights). As you measure, leave a foot margin for insulation and finishing on floors and ceilings (Measuring Room Heights). ([14B-12-1207](#))

Room areas should be between 60-120 square feet (min.), ideally fitting between existing, load-bearing structures like columns and walls. Make sure to leave common areas, for access to breaker boxes, meters, and laundry, as you carve out space. ([14B-12-1207](#))

For comparison, measure your existing units to understand room sizes. On your slab, use chalk to 'draw' out walls (~6" thick), doors, and typical furniture; can you navigate comfortably in these imagined spaces? Ultimately your architect will work to refine and develop any new unit's layout and coordinate building systems updates.

WHAT YOU NEED TO ASSESS SIZING:

- **Chicago Building Code - Chp 12 - [Interiors](#)**
- **Measurements** - current basement size, with interior dimensions wall to wall, floor to ceiling
- **Sketch of new unit with room designations** - see also air/light, egress, utility connections, and structure, which may impact layout
- **Architect** to ultimately draw and stamp the final plans for your new unit, in order to apply for construction permits

DO YOU HAVE THE SPACE FOR A NEW UNIT:

Does your basement have adequate ceiling heights for a new unit (Minimum Req. Room Heights)? ([14B-12-1207.2 - exception 1](#))

Does your planned kitchen have decent workspace at the counters (Min. Room Areas: C)? ([14B-12-1207.1](#))

- If accessibility is a concern, 30-36" workspaces should include lower cabinets, grab bars, and wheelchair turning radii. See Accessibility Code for Dwelling Units ([14B-11-1107](#)).
- The kitchen (or living) may also include the 60 sqft dining area.

Are your main living, sleeping, and dining rooms adequate to meet the minimal area standards at left (Min. Room Areas: D, E, F)? ([14B-12-1207.3](#))

- The required bathroom fixtures - a sink, toilet, shower/tub - will determine the minimal areas in a bathroom. (Min. Room Areas: B)



LIGHT + AIR . illumination minimums . ventilation options

**MIN. LIGHT (L)
& AIR (V) REQ.**
% area per room

COTTAGE EXAMPLE

Cottage to Two Unit Conversion

NATURAL AIR & LIGHT EXPOSURES

*supplement w/ mechanical or electric**

LIGHT EXPOSURE:

$$\text{Direct} = \frac{\text{sum}(X)}{Z_1} = 8\%$$

$$\text{Indirect} = \frac{\text{sum}(X)}{(Z_1 + Z_2)} = 8\% \text{ avg.}$$

VENTILATION:

$$\text{Direct} = \frac{\text{sum}(.5X)}{Z_1} = 4\%$$

$$\text{Indirect} = \frac{\text{sum}(.5X)}{(Z_1 + Z_2)} = 4\% \text{ avg.}$$

MEASUREMENTS:

light area:

X 100% window area glazed surface

ventilation area:

.5X 50% window area open casements

exterior light wells:

Y 1 Y height : 1.5 Y length sunken area

directly lit room:

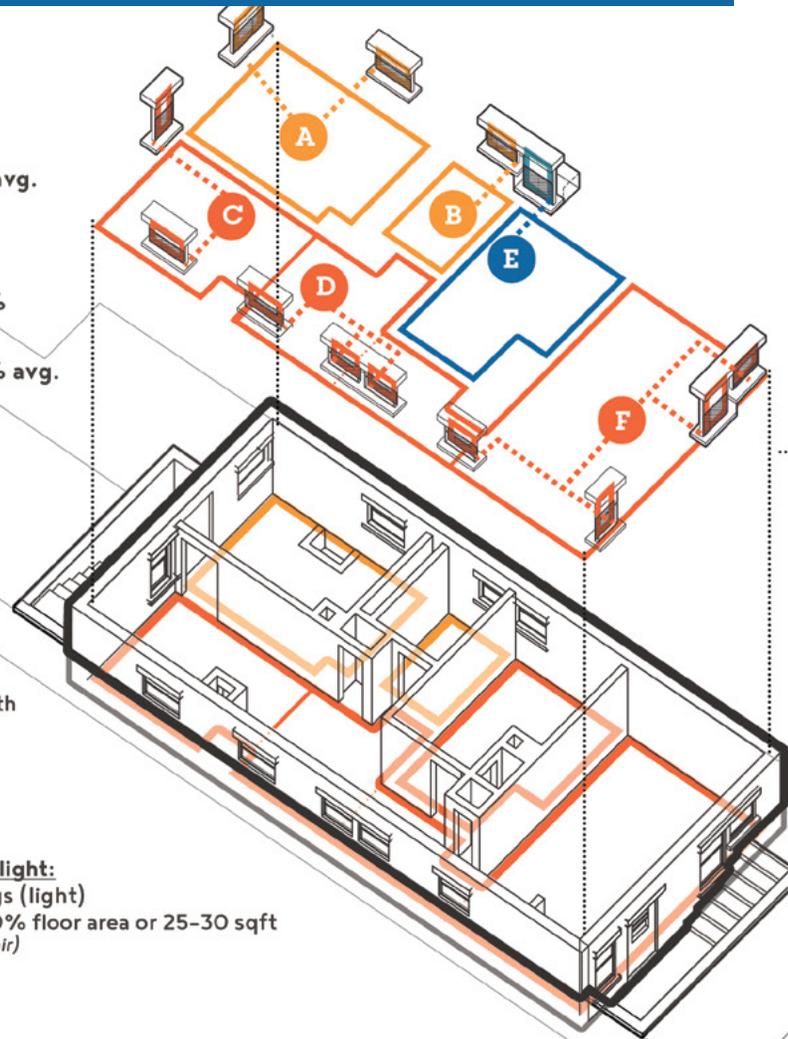
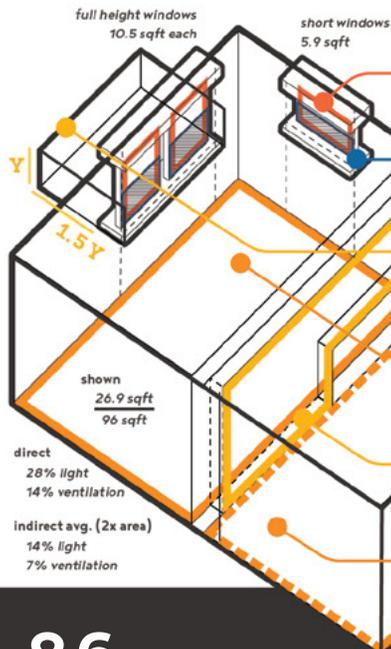
Z₁ 100% floor area floor

openings for indirect light:

must have 9'6" ceilings (light)
opening must be 8-10% floor area or 25-30 sqft open or louvred areas (for air)

indirectly lit room:

Z₂ 100% floor area floor



- A LAUNDRY / BATHROOM**
mechanical vents req.
1.5% area to exhaust by fan
16% (L) shown in bath
17% (L) shown in laundry
- E BEDROOMS**
8%(L), 4%(V) req.
9.8% (L) shown
requires light well

ALL OTHER AREAS

- C KITCHEN, LIVING, DINING + STUDY**
8%(L), 4%(V) req.
per room or adj. avg.
15% (L) shown in kitchen
14% (L) shown in living
15% (L) avg in dining +

*consult a heating & ventilation professional to measure air changes per hour (5 changes min) and scope mechanical ventilation system.

PRINCIPLES BEHIND LIGHT AND VENTILATION REQUIREMENTS:

It is imperative that any new basement unit meets or exceeds the code's ventilation and lighting requirements (left, **Min. Light & Air**). Sheltered at/below grade, basements often have small windows, poor air circulation, and excess humidity. Combined, these factors foster condensation and mold. Adequate ventilation and light combats mold and mildew, and improves quality of life. Your architect will confirm air and light calculations and coordinate with specialists. That said, you can anticipate potential issues and estimate for compliance by making a few measurements using the metrics noted below.

Natural light is easy to estimate. (left, Calculating Air & Light Exposure) Measure the area of windows currently in your basement and pair them with anticipated room sizes. For adequate daylight, the area of windows in any room must be at least 8% of the floor area (note indirect light/adjacent room options for high ceiling areas)([14B-12-1204.2.4](#)). An electrician can estimate artificial light levels for access stairwells and new rooms.

To estimate **natural ventilation**, imagine all the measured windows open (50% area for air flow) and calculate as you did above ([14B-12-1202.5](#)). Do you have 4% of air-flow area per each room area? To informally check for excess humidity, tape tinfoil to the walls (all edges) and, after two days, check for water. Moisture on the wall indicates waterproofing issues; moisture on the exposed side shows condensation. As air movement, condensation, and evaporation rely on cross-ventilation (facing windows) and air-pressure dynamics, you should hire a ventilation professional to confirm the rate of **passive air change**—how long it takes for all new air to enter a space with windows closed—and advise on mechanical ventilation and dehumidification.

See openings section, in 'Mitigating Issues' for constraints in adding foundation windows (pg 156).

WHAT YOU NEED TO ASSESS AIR, LIGHT:

- **Chicago Building Code - Chp 12 - [Interior Environment](#)**
- **Measurements and layout used for sizing +** measurement of ground level and offsets, as limits window well sizes
- **Mechanical/Heating professional** to perform blower tests ([14B-12-1202.1 exception 1](#)) and install vents, **Electrician** to assess artificial light levels
- **Architect** to confirm calculations, coordinate w/ tech.professionals

DO YOU HAVE AIR AND LIGHT FOR A NEW UNIT:

Does your basement have adequate natural light for residential use (Min. Light & Air)? ([14B-12-1204.2.4](#))

- 8% for all rooms, or 8% average if counting indirect lighting

Have you confirmed adequate artificial light with an electrician? ([14B-12-1204.3](#))

- Room lights must provide 10 footcandles, at 30" h
- Stairwell lights must provide 1 footcandle on treads

Does your basement have adequate natural ventilation, in all seasons (Min. Light & Air)? ([14B-12-1202.5](#))

- 4% for all areas, calculated by room or averages
- 5 air-changes per hour by infiltration

Do your new bathroom(s), kitchen, and laundry rooms have mechanical ventilation? ([14B-12-1202.1](#))

- Fans must have openings of 1.5% * area of the room they ventilate.

If you need to increase window areas, do you have space for window wells (Exterior Light Wells)? ([14B-12-1204.2.6](#))

- Can you add light wells (1.5:1 ratio) within your lot?



EGRESS ELEMENTS . fire safety . paths . exits . discharge

TWO-FLAT EXAMPLE

Two-Flat to Three Conversion

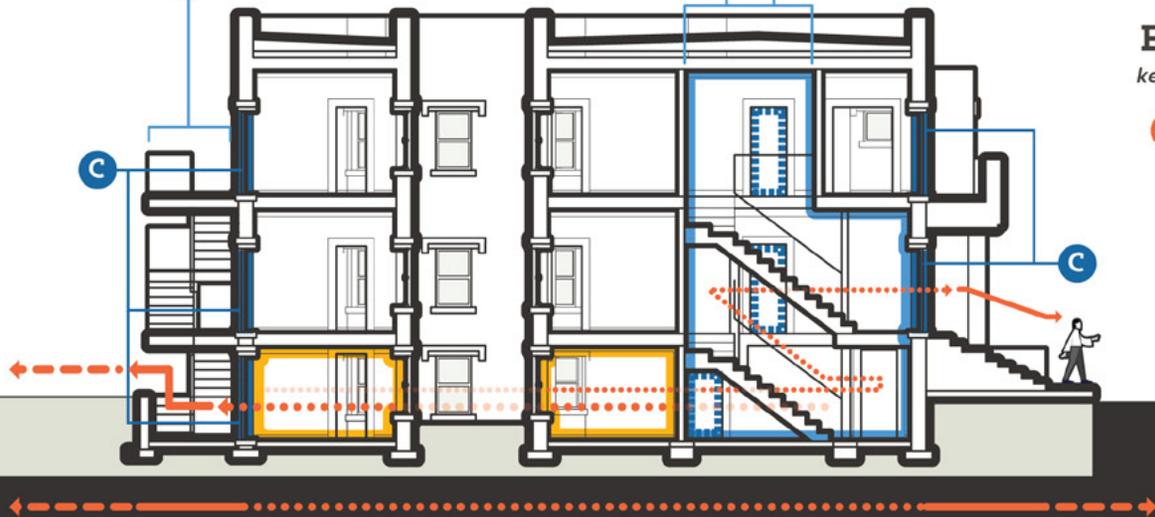
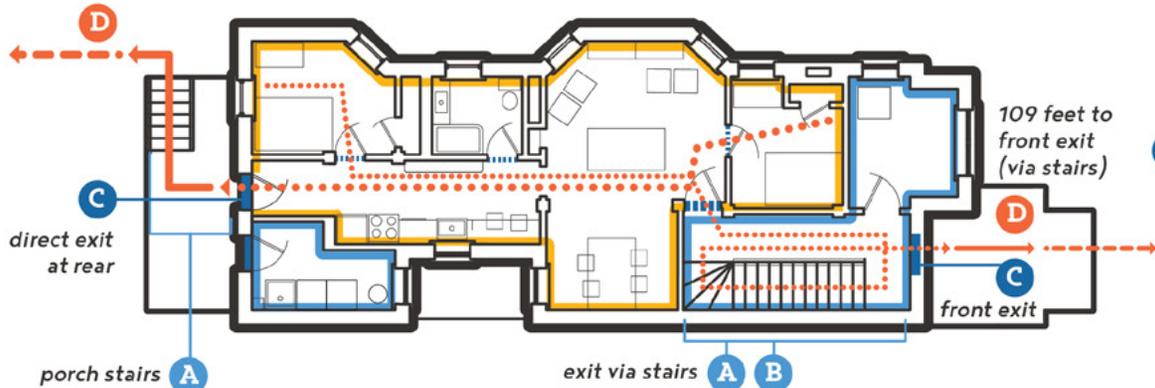
58 feet to direct exit at rear
(from front bedroom)
travel distance < 60 feet

TRAVEL PATHS & MAX DISTANCES

travel paths, common areas, basement unit

EGRESS ROUTES MEASURING & SIZING

Dimensions for clear passage (R-5 residential buildings)



- A STAIRS**
interior + exterior
passage: 36" wide
handrails: one + side, 34-36" high
step rise: 8" max, run: 9" min
landings: 36" x 36" min, 42" rail
 - B CORRIDORS**
width + clearance
passage: 36" wide (44" pref.)
height: 6' 8" min. clear 27" to ceiling
openings: min. 4' between doors or sequential thresholds
 - C DOORS**
openings direction of swing not specified for R-5 residential
- | | | |
|---|---|---------------------------------|
| <p>exterior exit
2" thick
1-2hr fire resistance</p> | <p>unit exit
2" thick
1hr fire resistance</p> | <p>interior rooms
80" h</p> |
|---|---|---------------------------------|

EGRESS COMPONENTS

key elements (annotated below section, below plan)

- D** **EGRESS ROUTES**
1 travel path must ≤ 60 feet*, from furthest corner to exterior
Paths cannot pass through bedrooms or baths, given locking doors
*without sprinklers (75 feet with sprinklers)
- **EXIT**
Door to exterior & path to ground level, at opposite unit ends
1 exit per unit, if unit < 800 sqft & has exterior exit door
otherwise 2 exits/occupied level, by stairs or direct exits
- > **DISCHARGE**
from exit path at ground level to sidewalk/alley property exit
gates must be non-locking in egress direction

GENERAL PRINCIPLES OF EGRESS (I.E. FIRE EXIT) SYSTEMS:

Fire safety is a key aspect of building code. As you layout your new unit, you'll want to make sure all rooms allow for egress, i.e. that all occupants can efficiently leave the building in an emergency. Broadly, the code requires paths within halls or stairs that are a) built of fire resistant materials (see next page) and b) facilitate the unobstructed movement of occupants outward.

As noted in 'Egress Components,' an egress system has three parts to consider:

- **Egress routes:** pathways to an exit from within a building, passing through units, common areas, and stairs. The code specifies 'travel distance' as the longest distance allowed between the opposite corner of a unit to an exterior exit, as a human would walk.
- **Exits:** building exits are located on the exterior walls and release occupants to the outside. Exits can include exterior stairs, which connect with the ground, or 'horizontal' exits that release occupants at grade.
- **Discharge:** pathways from an exit to the street or alley at the edges of a property. Residential discharge paths can have locking gates at the edges of a property.

WHAT YOU NEED TO ASSESS EGRESS:

- **Chicago Building Code - Chp 10 - [Means of Egress](#)** (summarized in drawings)
- **Measurements and layout used for sizing** to determine egress pathways and travel distances (see also air/light, utility connections, and structure as those elements may impact paths and hallway placement)

DO YOU HAVE NEEDED FIRE EXITS:

Does your basement unit have a direct exit, from within the unit, or two exits via common hallways? ([14B-10-1006.2.1](#), [14B-10-1006.3.2](#), [14B-10-1006.3.3](#))

- If planning additional exit doors, they are required to be at opposite ends of residential buildings.
- The same physical concerns apply to adding doors to foundations, as when adding windows (with 3' exit landings in place of window well requirements).

Is at least one route of travel under 60' (no sprinklers) or 75' (with sprinklers):

- Measure the distance of travel from the furthest corner of the furthest room opposite the exit.
- For paths on stairs, measure on a diagonal, parallel to the steps, along the staircase center.
- Routes of egress can not cut through bedrooms or bathrooms from other rooms (as those rooms typically have locking doors).

Are all the passages and doors along your egress route adequately sized - both within unit and in common spaces (Egress Route Sizing)? ([14B-10-1003.3.1](#), [14B-10-1003.5](#))

- If space does not permit, you may retain older, steeper stairs but with adequate railings and clear space.
- If your basement is lower than adjacent exits and areaways, it is permissible to have two steps up (max) to exit a story.

As you consider the impacts, beyond a single unit, ask yourself the following:

- Are the egress systems in your building adequate for all residential units?
- Have you considered how new, exterior exit doors might integrate with your foundation walls and site?



FIRE SAFETY . smoke & gas detection . fire-resistant materials

TWO-FLAT EXAMPLE

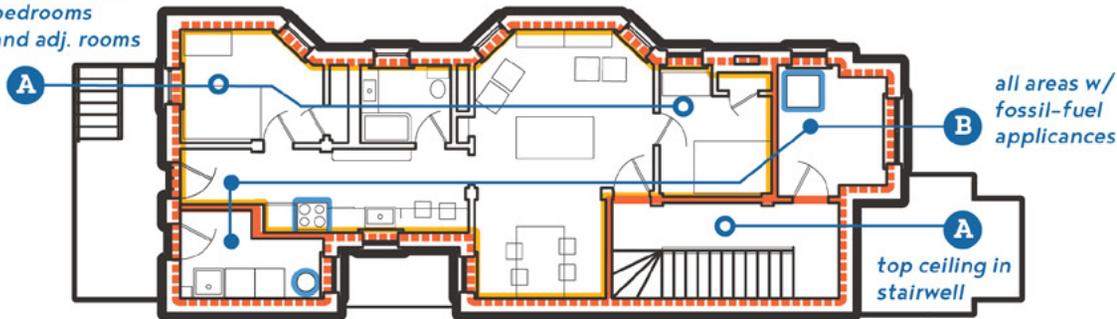
Two-Flat to Three Conversion

FIRE PARTITIONS & SMOKE DETECTORS

partitions, furnace/water heater*, unit

smoke only ●
smoke, carbon monoxide ●

6' min. from kitchen,
3' min. from bath
bedrooms
and adj. rooms



ionization alarm:
10' or 20' from cooking appliances



XH100
Heat Alarm

10 year life and warranty

Heat detector, ideal for kitchens
and bathrooms

photo-electric alarm:
6' from cooking appliances



XS100
Optical Smoke Alarm

10 year life and warranty

Optical sensor, ideal for bedrooms
and lounges

carbon monoxide (integrated w/ smoke):



PARTITION FIRE RESISTANCE TO SLOW FIRE SPREAD

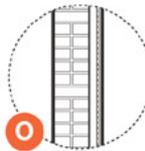
typ. materials + primer/paint finish (your walls may vary)

smoke & carbon monoxide: ceiling mount or upper wall



EXTERIOR WALLS

horizontal containment



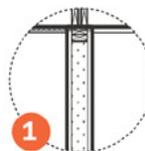
assuming old walls:
2 brick courses* in
american bond
shallow wood frame
lath with 1/2" plaster
*exceeds 2hr

2 HR fire resistance
c3' lot off-sets

1 HR fire resistance
3'-30' lot off-sets

OUTER WALLS BASEMENT UNIT

horizontal fire partition

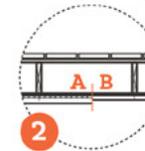


assuming new walls:
2 layers 5/8" gypsum*
(2hr) or 2 layers 3/8"
gypsum (1hr)
2x4 wood studs
repeat gypsum*

1 HR fire resistance

CEILING BASEMENT UNIT

vertical fire partition



w/ double wood floor
above joists:
A - existing ceiling
3/8" lath*, 1/2" plaster
B - new construction
1/2" gypsum*
*Type X fire resistant

1 HR fire resistance

MATERIAL ELEMENTS AND ALARMS FOR FIRE SAFETY:

In addition to egress, the building code also addresses fire hazards through containment, suppression, and detection systems – ‘fire walls’, sprinklers, and alarms. As you consider a new unit, you’ll want to incorporate, at minimum, containment and detection systems. *Small multi-unit residences and Two-Flats are not required to have sprinkler systems.*

Containment consists of dividing the building into different zones and building walls or partitions to slow the spread of fire. The partitions are classified by their fire resistance, recorded in ‘burn-time’ or the duration it takes for materials to fail in a fire. In principle, the one or two-hour rated partitions—required between units, ceilings, and surrounding egress corridors—allow time for occupants to hear fire alarms and safely exit.

Fire detection takes the form of smoke detectors. These must be incorporated in your new unit and basement utility areas. While detector placement is fairly simple, alarms should be wired into the building electrical system and connected—if one sounds, they all sound—with placement near the ceiling. If absent, detectors should be added to the existing apartments and stairwells and connected together.

Carbon monoxide alarms should be added near fossil-fuel appliances, such as furnaces, water heaters, and gas stoves. Inefficient or blocked exhaust can put your family at risk for carbon monoxide (CO) poisoning. Carbon monoxide detectors are either stand-alone units or incorporated with smoke detectors and should be installed at ceiling or upper wall height.

WHAT YOU NEED TO ASSESS FIRE SAFETY:

- **Chicago Building Code – Chp 7 – Fire and Smoke Protection, Chp 8 – Interior Finishes, Chp 9 – Fire Protection and Life Safety Systems** (summarized in drawings)
- **Measurements and layout used for sizing**, to determine detector placements and verify adequate space for fire partitions
- **Architect** to confirm anticipated fire partition assemblies and create drawings to apply for construction permits

IS YOUR NEW UNIT DESIGNED TO DETECT AND CONTAIN FIRE:

Does your new unit contain integrated smoke alarms at specified distances from/in bedrooms, bathrooms, and shared stairways (Fire Partitions & Smoke Detectors) ? ([14B-9-907.2.10.2](#))

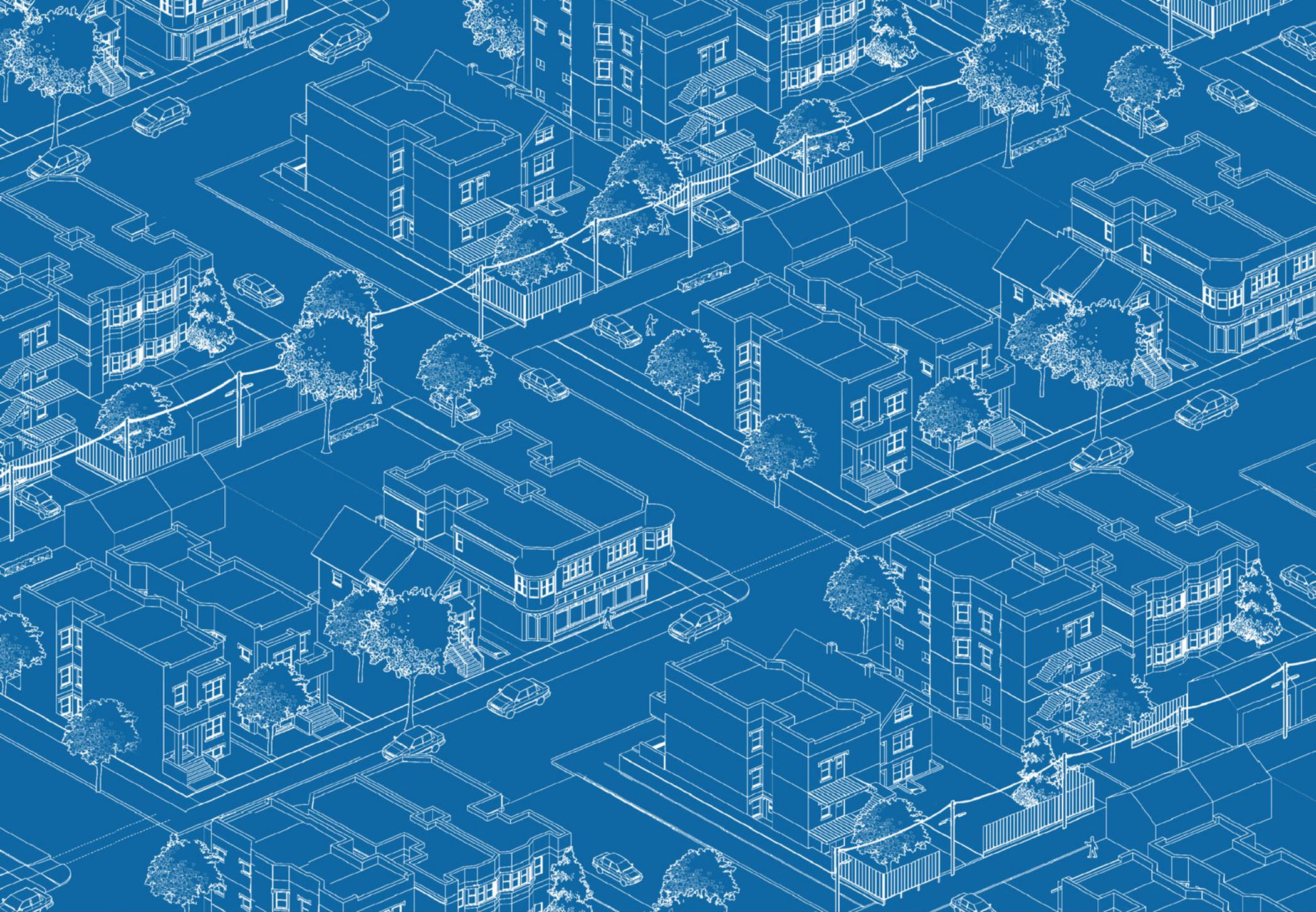
Note the three types of smoke detectors—heat, smoke, optical—and req. distances from kitchen areas. Does your unit plan accommodate this? ([14B-9-907.2.10.3](#))

Does your new unit contain integrated alarms near fuel-burning appliances (Fire Partitions & Smoke Detectors) ? ([14B-9-915.916](#))

- This includes carbon-monoxide alarms for gas ovens, furnaces, and water heaters.

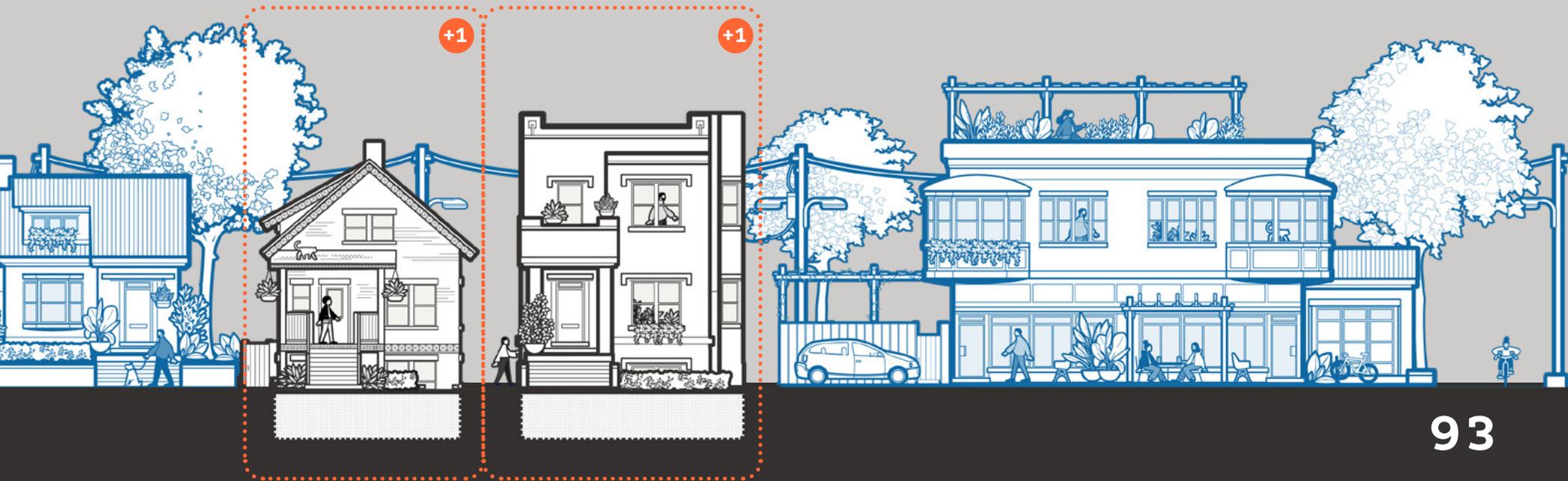
Are all the doors and walls along your egress route adequately sized – 5-6” thick for one or two-hour fire partitions? Have you incorporated partition sizing into the calculation of the unit’s exterior walls and ceiling, esp. regarding unit height (Partition Fire Resistance) ? ([14B-7-708 partitions, 721 – prescriptive assemblies](#))

- See prescriptive fire assemblies at [14B-7-721, table 721.1\(2\)](#)



BUILDING EQUITY . running the numbers

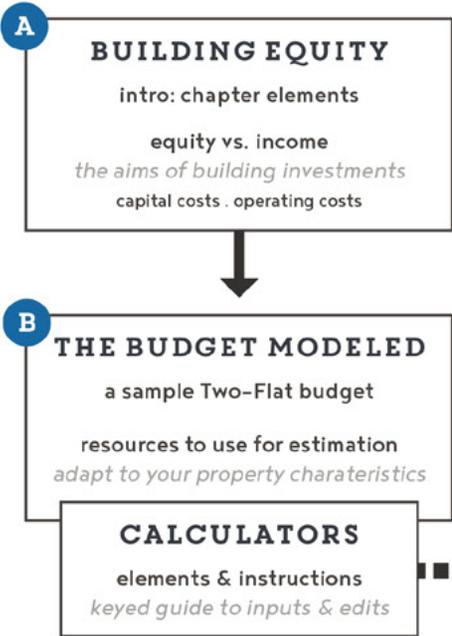
Typical Chicago Workers' Cottages & Two-Flats:
Cost-Benefit Analysis for Basement Conversions



INTRODUCTION . cost-benefit analysis . figuring finances

This chapter introduces the costs of converting a basement unit and managing your building responsibly. Calculators are included so you can estimate whether creating an affordable basement rental makes sense for you.

NAVIGATING BUILDING EQUITY



CAPITAL COSTS

complete calculators in order, from 1 to 7, to fill in 'break-even' estimate

- 1 CONSTRUCTION**
conversion & permit costs
What might a conversion cost?
- 2 HOME LOANS**
financing (improv. & mortgage)
What loan makes sense?
- 3 RENTAL INCOME**
pricing your basement unit
What's reasonable rent?
- 4 PROPERTY TAXES**
property valuations
How will updates impact taxes?

OPERATING COSTS

- 5 UTILITIES**
covering unit + common areas, lights
What do common & split utilities cost?
- 6 INSURANCE & MGMT**
risk coverage, legal, marketing, admin
How can you cover risks for units?
- 7 MAINTENANCE**
routine, preventative, reserves
How can you plan & save for repairs?

Summary Cost/Benefit Table

Estimate based on calculators 1-7

- 8 BREAK-EVEN CALCS**
40yr projection of assets & liabilities
Is this project reasonable, financially?
When would a unit 'break-even'?

Financial Guidance

Resources, Classes, & Counselors

- 9 MGMT GUIDANCE**
resources & expertise
Community Investment Corporation's Courses
- 10 LOAN GUIDANCE**
resources & expertise
Neighborhood Housing Services Counseling

Thematic Calculators: Capital Investment & Operating Overhead

Summary Table (outcomes from others)

CHAPTER CONTENTS:

This 'Building Equity' chapter introduces the larger costs of converting a basement unit and operating as a responsible landlord. The following pages outline common project prices (capital investments) as well as the oft overlooked costs of management and maintenance (operating costs). As these sums are ultimately interwoven, this chapter provides both thematic overviews and rough calculations in a series of linked spreadsheets.

- Each thematic page outlines the core elements to consider and the variables that impact capital or operating costs (#1-8 at left). *The icon on the left highlights additional resources to refine your estimate, and expert guidance - whose official reports, quotes, and numbers supersede these initial calculations.*
- The sequential calculators offer a rough, early estimate of: a) whether you can afford to finance a basement conversion and b) when your property investment will 'break-even' (bit.ly/ln-Fill). By inserting your initial property and project information, you can trace the elements and issues reflected in the annual cost-benefit analysis (#8 at left). Instructions on editing and inserting values begin on page 99, with specific entries elaborated in tandem with the thematic discussion (#1-8 at left). A Two-Flat sample version of the calculations is for reference (bit.ly/Two-Flat).
 - The linked calculators should be done in order, as values estimated in earlier sheets feed into later calculations.
 - The linked calculators are not meant to replace expert guidance; they are meant for rough estimations. If you lack an architect, contractor, and their official estimates, the calculators can help you understand whether it makes financial sense to begin planning a basement conversion (and thus hire professionals above).



HOW TO THINK LIKE A RESPONSIBLE LANDLORD

If you're converting a single-family home into two units, you need to shift your planning perspective. You need to approach a basement conversion as a landlord or owner-occupant. This means skillfully operating within both the demands of the marketplace and the laws that regulate the rental industry; competing for suitable tenants and, at the same time, complying with fair housing laws and municipal code. To successfully operate as a responsible landlord, you must plan for day-to-day operations and overhead as much as how and where to finance your basement conversion and what improvements you need to make.

LONG-TERM EQUITY VS. INCOME

As you will notice from the Two-Flat estimate, converting a basement unit builds long-term equity in your property, slowly paying down debts and liabilities as your asset (the building) appreciates in value. Rent is not 'extra' income, but rather should respond to affordable area prices, your payment needs, and a desire to maintain long-term tenants. Depending on your existing mortgage debts and local prices, annual rental income and costs may not balance out for multiple years. As seen in the Two-Flat estimate, it could take a decade (minimum) for you to break-even on your initial investment. If you're seeking to speculate on real-estate and anticipate resale in seven years, a basement addition is only likely to recuperate value that quickly in a **best-case scenario**. Typical drainage, foundation, and infrastructural adjustments are a sizable investment, which require a long-term commitment.

Consider the following:

- **Your Assets:** Are you in a position to take on those long-term financial risks (and rewards) given other debt and savings?
- **Your Timeline:** Are you committed to spending another decade (or more) in your property (and community), as your building accrues equity?
- **Your Priorities:** What are your overall financial goals for a basement conversion? Those priorities will be necessary to guide decisions—on designs, labor, rent, and maintenance—across the planning process and ongoing operations.

The content of the calculators—such as line-item costs for roof repairs or advertising units—should prompt you to consider the time commitments of serving as a landlord. As you ‘run the numbers,’ it is tempting to replace maintenance contracts with ‘sweat-equity,’ and overestimating your energy and expertise. To correct this tendency, test multiple budgets and review the linked property management planning tools at the end of the chapter.

Ask yourself: do the commitments, costs, and benefits of being a landlord balance out in your estimation?

CAPITAL INVESTMENTS:

This financial introduction begins with the ‘up-front’ and capital costs of basement conversion, with concepts and calculators for:

- 1) construction & permits, as shaping,**
- 2) home improvement loan terms,**
- 3) rental income, and**
- 4) your tax assessment & building appreciation.**

As a homeowner, you are probably familiar with these big-ticket items. We begin with them because, even without the operational costs of building management, it may not make financial sense to pursue a large construction project based on your existing debts or surrounding rates of neighborhood appreciation.

1) Construction Costs: The most obvious cost of a basement conversion project is the cost involved in design, permitting, and construction itself.

2) Loan Terms: After construction, the manual reviews how to pay for the project – from savings or with typical, fixed-interest loans.

3) Rental Income: Setting the rent on your basement unit requires research into your local rental market and your desire to provide an affordable unit.

4) Taxes and Property Appreciation: As you consider how home renovations add long-term value to your property, it’s important to capture how this translates into higher taxes.

OPERATING COSTS:

The second half of this chapter focuses on the operational costs of managing a building, including:

- 5) utility bills
- 6) insurance and administrative fees, and
- 7) maintenance and savings reserves for major repairs.

Most likely, you pay many of these fees as a homeowner, like insurance premiums or water bills. But you probably haven't considered how having tenants affects water use, general liability, and multiplies the need for appliance repairs and routine cleaning. The calculators' line-items provide a sense of the distributed tasks of marketing, management, and administration; each section outlines your responsibilities as a landlord. Although these overhead tasks and costs seem like 'little things,' it is best to plan and budget for these elements so you're not surprised by \$15,000–\$20,000 of annual overhead, split between saving for future building repairs and the annual costs of insurance, routine maintenance, and utilities.

5) Utility Bills: As you update your property, you will add multiple meters—water, gas, and electric—so disentangling utility and energy bills should be fairly easy.

6) Insurance and Administration: As a landlord, you have a number of responsibilities to tenants and greater liability for potential accidents in your building.

7) Maintenance: The final section sorts maintenance into a series of routine tasks—occurring weekly, monthly, or on an annual preventative cycle—and a set of emergency reserve estimates to cover major repairs.

'BREAK-EVEN' SUMMARY & FINANCIAL RESOURCES

The final section holds the summary calculations and resources for navigating building financing and management.

8) Break-Even: This calculator pulls together the prior sections – your estimated income, appreciation benefits, loan and overhead costs – in order to estimate the annual net-increase in your building's value.

9) Resources and Guidance: The final sections link outward – to Neighborhood Housing Services, Community Investment Corporation, and others – so you can work with their financing and management experts as you start planning a basement conversion.



CALCULATORS . Scenarios . Inputs . Edits Unpacked

SCENARIO: TWO-FLAT SAMPLE

TABLES: CONTENTS & INSTRUCTIONS



1601418010000 04/02/2008

Property Details

16-01-418-010-0000

2629 W AUGUSTA BLVD • CHICAGO, IL • West Chicago

Tax Details

PROPERTY CLASSIFICATION	211
SQUARE FOOTAGE (LAND)	3,250
NEIGHBORHOOD	30
TAXCODE	77001
NEXT SCHEDULED REASSESSMENT	2021



Calculator Contents

click on title to go to sheet

	Core Financing Numbers	content
1	Chi_Construction	Estimates Basement Construction Costs
2	Loan_Terms	Estimates Home-Improvement-Loan Payments (& outstanding mortgage payments)
3	Chi_Rental Rates	Estimates Annual Rental Income, based on Area Market & Affordable Rates
4	Chi_Taxes	Estimates Annual Tax Increase, based on Construction Investment & Area Sales Market
Operational Overhead		
5	Chi_Utilities	Estimates Utilities Costs, given common areas & split meters
6	Chi_Insurance Admin	Estimates Landlord Insurance, Marketing, & other Admin costs
7	Chi_Maintenance	Estimates Routine & Preventative Maintenance, Emergency Reserves
Cost-Benefit Summation		
8	Cost-Benefit	Compares Benefits (rent & value appreciation) with Costs (payments, taxes, & overhead) to calculate time to break even on investment, given loan & mortgage terms

User Interactions and Inputs, Keyed

Input types & Colors

	1. User checks box or selects from Pull-Down (light blue highlights)	resulting choice	note on use:
1	Check for Yes: <input checked="" type="checkbox"/> Pick your Area: Chicago--Portage	TRUE Chicago--Portage Park/Jefferson Park	used to add checklist item or pick between 2 options used to select from predetermined options, mostly to calibrate for areas/neighborhoods or unit attributes
2	Monthly Rent: <input type="text" value="\$1,400"/> <i>optional or suggested edits</i>	\$1,400	values from assessment, bills, existing rent, mostly calibrates calculations to your building and existing experience with utilities, taxes, loans
3A	See Generated Tables for Affordable Monthly Rents.	n/a	alert panel that highlights additional considerations/concerns, typically in an orange-outlined panel at the end of that page

Result/Reference types & Colors

4A	\$16,800 Annual Rental Income (12 x monthly rent)	no edits needed from user, should automatically calculate value given input above & internal variables
4B	\$4,200 Anticipated Vacancy Losses (25% of annual rent)	no edits needed from user, should automatically calculate value given input above & linked ref. tables
3B	maintenance reserves per unit <input type="text" value="\$1,680"/>	no edits needed from user, should automatically calculate value given input above & linked ref. tables
4C	\$10,920 gross rental income (minus vacancy, maintenance) \$910.00 monthly breakdown	no edits needed from user, should automatically calculate value given input above & linked ref. use in combination with other types

NAVIGATING FINANCES: A TWO-FLAT SCENARIO

Just as it's difficult to picture a desirable basement conversion without a few visual options, it can be difficult to understand the benefits and costs of property management in the abstract. To demystify those numbers and provide a 'tour' of the fiscal calculations of landlording, this chapter is built around a series of spreadsheet 'calculators.'

These calculators are available in two forms:

- a sample Two-Flat + Conversion (view only: bit.ly/Two-Flat)
- blank or empty form for your input
(sign into google to edit copy: bit.ly/In-Fill)

The Two-Flat sample is meant to show a reasonable (to best-case) scenario for basement conversion. As a demonstration, it's useful to note that the sample building is a brick Two-Flat, located at 2629 W. Augusta, just east of Humboldt Park, at the edge of Ukrainian Village (randomly selected, not NHS-affiliated). This area has a relatively 'hot' real estate market, so the building can support market-rate rents and appreciates value quickly. These factors play a large part in allowing the owners to break-even on their investment within a decade. In addition, the sample Two-Flat is the type of small multi-unit building that could easily accommodate a basement unit. Because of its solid brick construction and separated utility connections, conversion is likely to be less extensive and expensive than for a single family Cottage. Together, the factors of location, condition, and adaptation costs strongly influence the overall balance-sheet.

As a completed sample, the Two-Flat scenario enables you to trace a series of decisions from page to page, following the logic and elements required for operating as a landlord. As you fill in your own calculations, referencing the scenario should help you to pinpoint a) which variables strongly determine the financial viability of your project and b) how much control you exercise over those variables.

NAVIGATING FINANCES: WORKING IN THE CALCULATORS

The mostly-empty copy of the calculators is designed for you to add your information, listed next page, to produce a very quick estimate of project viability. Once you've set area and neighborhood variables - on the rent and tax assessment pages - you are encouraged to download copies of both the Two-Flat and Empty table as excel files. As you develop different scenarios, you can save copies and test alternate variables for alternate outcomes. These estimates provide a starting point for discussion with financial counselors and potential designers.

0 To make the estimation process as accessible as possible, the calculators' prompts and questions have been color-coded, here and in the spreadsheets, to guide your inputs. (An introductory page, at left, and table headers repeat these instructions for ease of access.) *Numbers (1-4C here) restart on each calculator, but colors are consistent across all sections. The inputs are as follows:*

- 1 Light-Blue dropdown bars and check-boxes:** These elements have preset answers (yes/no or a given list) and are typically used to pull reference information from hidden or collapsed tables. For instance, selecting your zip code loads information from a table of rental rates for your area from HUD.
- 2 Red boxes for adding numbers:** These elements are set to zero and take a numerical input. Most of these boxes either reference your specific info—your tax bills, your water usage—or provide an option for you to customize values, like your unit rent, after reviewing market rates for your area.
- 3 Orange Highlight Alerts:** These elements don't require an input but redirect your attention to supplemental considerations, so that you can customize red box values.
- 4 Yellow boxes and bars / plain black boxes:** These elements are the outcomes of embedded calculation and those in yellow link to either composite results or to the cost-benefit table. **Do not edit either type as this will break the internal formulas.**

FINANCIAL INFORMATION . inputs + estimates

Uniform Residential Loan Application

The information reported is to be completed by the applicant and borrower. It is to be completed only once for the loan. It is not to be used for multiple transactions.

COMPANY ABZ

Homeowners Declarations Page

Date issued: May 1, 2017

Homeowner's Declaration

I, the undersigned, declare that I am the owner of the property described in this declaration and that I am not a tenant, lessee, or licensee of the property.

COVERSAGES AND APPLICABLE BENEFITS

Section 1 - Property

Coverage A - Dwelling protection (dwelling)

Coverage B - Other structures protection

Coverage C - Personal property protection

Coverage D - Loss of use (Additional living expenses)

Section 2 - Liability

Coverage E - Liability protection

Coverage F - Sewer lateral coverage

Small Residential Income Property Appraisal Report

This is a description of your coverage. Please refer to your policy.

2019 First Installment Property Tax Bill

1) \$1,943.97

2) \$2,892.79

3) \$2,892.79

4) \$1,973.13

5) \$2,892.79

TAXING

ASSessor's OFFICE

Find a Property

Enter 14 digit PIN

Search by Address

House Number

Direction

Street Name

Search by Neighborhood

Township

Neighborhood

Property Class

Chicago-Joliet-Naperville, IL HUD Metro FMR Area Small Area FY 2020 Fair Market Rents

All Housing Choice Voucher programs operated in the Chicago-Joliet-Naperville, IL HUD Metro FMR Area will use Small Area FMRs as defined by ZIP codes.

For FMR information for other programs, please click [here](#).

Cook County, IL is part of the Chicago-Joliet-Naperville, IL HUD Metro FMR Area, which consists of the following counties: Cook County, IL; DuPage County, IL; Kane County, IL; Lake County, IL; McHenry County, IL; and Will County, IL. All information here applies to the entirety of the Chicago-Joliet-Naperville, IL HUD Metro FMR Area.

In metropolitan areas, HUD defines Small Areas using ZIP Codes within the metropolitan area. Using ZIP codes as the basis for FMRs provides tenants with greater ability to move into "Opportunity Neighborhoods" with jobs, public transportation, and good schools. They also provide for multiple payment standards within a metropolitan area, and they are likely to reduce need for extensive market area rent reasonableness studies. Lastly, HUD hopes that setting FMRs for each ZIP code will reduce overpayment in lower-rent areas.

NOTE: ZIP Code areas are defined by the postal service to facilitate the efficient delivery of mail. Because of this, ZIP code areas may cross city, county, and in some limited instances, state lines. Consequently, ZIP codes which cross county lines may lie within more than one metropolitan area, or cover parts of one or more nonmetropolitan counties and part of a metropolitan area.

ZIP Code	Efficiency	One-Bedroom	Two-Bedroom	Three-Bedroom	Four-Bedroom
60002	\$870	\$970	\$1,130	\$1,440	\$1,710
60004	\$1,120	\$1,260	\$1,460	\$1,850	\$2,210
60005	\$1,000	\$1,120	\$1,300	\$1,650	\$1,970
60006	\$930	\$1,050	\$1,220	\$1,550	\$1,850
60007	\$1,010	\$1,140	\$1,320	\$1,680	\$2,000
60008	\$1,100	\$1,240	\$1,440	\$1,830	\$2,180
60009	\$930	\$1,050	\$1,220	\$1,550	\$1,850
60010	\$1,390	\$1,570	\$1,820	\$2,310	\$2,750

PEOPLES GAS

Customer Service: 800.556.6001
24-Hour Gas Emergencies: 800.556.6002
En Español: 800.556.6003
TDD Line: 800.556.6007

ComEd

Service from 12/18/19 through 1/22/20 (in part)

Total Amount Due by 5/1/20: \$100.51

TOTAL USAGE (gwh)

2019

CURRENT CHARGES SUMMARY

See reverse side for details

ComEd provides your energy.

FOR BILLING QUESTIONS, PLEASE CALL 312-744-4426

City of Chicago Department of Finance-Utility Billing

PAUL SAMPLE

ACCOUNT NUMBER: 733961-029944

BILL DATE: Aug 24-2016

DUE DATE: Sep 14-2016

Utility Service Address: 2020 SAMPLE STREET 56600-0066

Bill Summary for this Metered Account for billing period Jun-19-2016 thru Aug-16-2016

Previous Balance: \$111.74
Adjustment: \$2.30
Payments: \$111.74
Current Water: \$106.75
Current Sewer: \$100.75
Current Garbage: \$19.20
Current Property: \$1.34

Total Due: \$233.64

ACCOUNT NUMBER: 733001-2290-88

DUE DATE: Sep 14-2016

TOTAL DUE: \$233.64

Amount Enclosed: \$

NAVIGATING FINANCES: RESOURCES AND REFERENCES

Many of the calculators can be run with generic values—Chicago averages, copies of the Two-Flat scenario data, or Cottage conversion costs—but adding your own information will produce a better estimate. In advance of running through the tables, you should gather the information below, in black, as listed by calculator. Red values list formal documents for proceeding with planning and financial guidance. As is detailed on the thematic pages, this is preliminary information only; there are multiple additional facets to considering property investment and management. The following offer a concrete place to begin.

The information should be added to the calculators in sequential order, from Construction to Maintenance, to allow each estimate to build upon earlier information. All seven calculators must be complete—with generic data or your data—to enable ‘Cost-Benefit’ to accurately calculate.

1 Construction:

- a general idea of main construction elements required for your basement conversion
- this list should be refined as you go through the mitigation chapter
- preliminary architectural plans and specs, for evaluation by an appraiser

2 Home Improvement Loans:

- basic background for your existing mortgage
- anticipated loan terms
- your credit rating, assets and debts, income-debt ratio
- loan quotes

3 Rent Rates:

- zip code search of HUD market rates: bit.ly/HUD-market-rate
- City’s affordable rental rates: bit.ly/DOH-Affordable
- existing rents, if you have other units
- comparative research on rental units in your area

4 Taxes and Property Appreciation:

- Cook Co. Assessment: www.cookcountyassessor.com/address-search
- your neighborhood (for average appreciation) from DePaul’s Housing Price Index: price-index.housingstudies.org
- anticipated building valuation by an appraiser

5 Utilities:

- your average meter readings from past bills (water, gas, electric, and any specific rates)
- an understanding of what resources would be shared in your building

6 Insurance & Administration:

- your current insurance coverage
- a landlord policy quote for your revised building

7 Maintenance:

- your current contracts for building and ground services (if applicable)
- estimates for capital and preventative repairs

8 Cost-Benefit:

- your investment priorities and break-even goals



CALCULATOR 1

CONSTRUCTION COSTS . Initial Investment

LINE-ITEM CATEGORIES

- 2 Permits Preparation**
 - Demolition, Deconversion
 - Lead, Asbestos Handling
- Grounds & Building Exterior**
 - Site - Drainage, Grading, & Surfaces
 - Window Replacement
 - Doors & Exits
- Structure, Slab, & Drainage**
 - Structural Repairs
 - Slabs
 - Barriers & Drainage System
- Utilities**
 - Gas
 - Water
 - Sewage & Ejector Pump
 - Electric
- Ventilation & Fixtures**
 - Heating/Vents & Radon,
 - Laundry
 - Kitchen
 - Bath
- Egress & Access**
 - New Stairs
- Fire Partitions**
 - Framing, plaster, etc.
- Interior Finishing**
 - Living Room
 - Dining
 - Kitchen ←
 - Bedroom 1
 - Bedroom2
 - Bath

TABLE: 1-CHI_CONSTRUCTION

1

1. Range of Bids and Conversion Scenarios

3. Pick Estimate Price Range select based on soft, deferred maintenance in your building

4. Show Scenario for Comparison

	mid, two-flat	Scenario shown	
	\$ 94,955.00	Scenario Costs	
	\$ 117,561.71	Scenario Cost with 12% for architectural service, 10% overruns (& r	
<small>edit elements included below</small>	mid	Your Estimate level	
	\$ -	Your Estimate Costs	
	\$ -	6. Manual Estimate Edit 6 <small>for quick speculation or your independe</small>	
	\$ -	Your Costs with 12% for architectural service, 10% overruns (& mis	

7. Use Scenario or Your Inputs for calculations: **\$ 117,561.71** referenced cost for loans, taxes, cost-benefit

5

2. Basement Conversion - Common Line-Items, Priced

elements	cost	Used for Two-Flat	5. create your list
Permits & Construction Preparation			
<small>check/uncheck list (true/false)</small>			
City Permits			
Overall Building Permits	\$ 4,500.00	<input checked="" type="checkbox"/>	<input type="checkbox"/> \$ -
<small>situation dependent</small>			
Illegal Unit Deconversion	\$ -	<input type="checkbox"/>	<input type="checkbox"/> \$ -
Lead Cleaning/Handling in Renovation	\$ 200.00	<input checked="" type="checkbox"/>	<input type="checkbox"/> \$ -
Asbestos Handling in Renovations	\$ -	<input type="checkbox"/>	<input type="checkbox"/> \$ -
General Demolition Costs			
Catch Basin demolition (drainage rework)	\$ 475.00	<input checked="" type="checkbox"/>	<input type="checkbox"/> \$ -
Basement demolition (partial floor/walls)	\$ -	<input type="checkbox"/>	<input type="checkbox"/> \$ -
<small>scenario comments:</small>			
lead removal, overall permits and misc. drain adaptations	\$ 5,175.00	sum	your sum \$ -

ESTIMATING PROJECT COSTS: CONSTRUCTION ESTIMATES

The most obvious cost of a basement conversion project is the cost involved in design, permitting, and construction itself. The initial calculator 'Chi_Construction' provides a rough estimate of these costs, in advance of designing your basement project or getting professional bids. The estimate here feeds into loan calculations, revised home value, and the overall cost-benefit calculation.



If you're in the process of designing and planning a unit already, your architect should be able to give you far more specific estimates. They will calibrate costs to your design based on the specific alterations, the square and linear footage of work and materials, anticipated labor/material bids from contractors, and installation practices. Professional plans and construction estimates will be necessary for official appraisal of renovation value, loan applications, revised insurance quotes, and potential tax appeals.

CALCULATOR CONTENTS

For those wishing to develop a quick and dirty estimate, 'Chi_Construction' includes two parts:

- 1 **Bid range and comparable construction scenarios**, in the upper section, are meant to allow you to explore the line-item information through a more orderly and less overwhelming interface. Those drop-down options should allow you to switch back and forth between ranges/scenarios as you select line-items (below).
- 2 **The construction line-item prices**, in the lower table, are from a series of 2018 bids on basement projects, by Neighborhood Housing Services. The final calculations—of architectural overhead and 10% over-run margins—also include a percentage addition to cover inflation from 2018-2020.

- 3 **As you explore construction costs and select elements that need altered (in the line-items), keep in mind what lies behind the upper options of high, mid, and low bids.** Some of those price differences represent profit, but the greater portion represents the skilled labor required for construction, the quality of materials used, and the time that is required to complete a job safely and with care. It can be tempting to use low bids. For basements—where a rushed job could lead to leaks, mold, and the need for additional renovation—you don't want to skimp on labor, time or materials. Start your estimates in the 'mid' range to be realistic and, after running all the calculations, test 'high' and 'low' options to understand their impact.
- 4 **Based on your upper scenario selection, at the bottom-center you will see the construction costs of either a typical Cottage conversion or a Two-Flat addition, as illustrated in the 'Common Conversions' chapter.** These scenarios offer a quick reading of the likely level of investment for common buildings and provide an approximate starting point for crafting your own estimate from the list of potential construction items. The list of potential elements and costs is broken down following the same categories introduced in the 'Code Compliant Units' chapter. The scenario's checked line-items are summed within each category and the final composite estimate, at the bottom of the page, is shown in 'Scenario Costs' at the top.
- 5 **On the right side of the line-item list are empty check boxes for your estimate: check those items you anticipate needing based on the 'Code Compliant Units' and 'Mitigating Issues' chapters.** When in doubt, reference the scenarios for comparison. For those items you check, prices shown at the far right and are summed by category. As in the scenarios, the final summary of costs is then linked to 'Your Estimated Costs' at the top of the page. Just beneath that box is an input (#6) where you can add either an independent estimate or test rough numbers as you explore the cost-benefit outcomes. An additional line calculates inflation, architectural overhead (12%), and over-run margins (10%) for the checklist (or your 'test' amount). Finally you can toggle to determine which option should be referenced by the other calculators/tables (#7).

CALCULATOR 2

LOANS & INTEREST . Financing Your Investment

PROPERTY VALUATION: APPRAISAL REPORTS

TABLE: 2-LOAN TERMS

Small Residential Income Property Appraisal Report File #

The purpose of this summary appraisal report is to provide the lender/client with an accurate, and adequately supported, opinion of the market value of the subject property.

Property Address: City State Zip Code
 Borrower: Owner of Public Record County

Legal Description
 Assessor's Parcel # Tax Year R.E. Taxes \$
 Neighborhood Name Map Reference Census Tract

Occupant Owner Tenant Vacant Special Assessments \$ PUD HOA \$ per year per month
 Property Rights Appraised Fee Simple Leasehold Other (describe)
 Assignment Type Purchase Transaction Refinance Transaction Other (describe)

Lender/Client Address
 Is the subject property currently offered for sale or has it been offered for sale in the twelve months prior to the effective date of this appraisal? Yes No
 Report data source(s) used, offering price(s), and date(s).

I did I did not analyze the contract for sale for the subject purchase transaction. Explain the results of the analysis of the contract for sale or why the analysis was not performed.

Contract Price \$ Date of Contract Is the property seller the owner of public record? Yes No Data Source(s)
 Are there any financial assistance (loan charges, sale concessions, gift or downpayment assistance, etc.) to be paid by any party on behalf of the borrower? Yes No
 If Yes, report the total dollar amount and describe the terms to be paid.

Note: Race and the racial composition of the neighborhood are not appraisal factors.

Neighborhood Characteristics		2-4 Unit Housing Trends		2-4 Unit Housing		Present Land Use %	
Location	<input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input type="checkbox"/> Rural	Property Values	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Declining	PRICE	AGE	One Unit	%
Build-Up	<input type="checkbox"/> Over 75% <input type="checkbox"/> 25-75% <input type="checkbox"/> Under 25%	Demand/Supply	<input type="checkbox"/> Shortage <input type="checkbox"/> In Balance <input type="checkbox"/> Over Supply	\$ (000)	(yrs)	2-4 Unit	%
Growth	<input type="checkbox"/> Rapid <input type="checkbox"/> Stable <input type="checkbox"/> Slow	Marketing Time	<input type="checkbox"/> Under 3 mths <input type="checkbox"/> 3-6 mths <input type="checkbox"/> Over 6 mths	Low	High	Multi-Family	%
Neighborhood Boundaries				High	Commercial		%
				Pred.	Other		%

Neighborhood Description

Market Conditions (including support for the above conclusions)

Note: Race and the racial composition of the neighborhood are not appraisal factors.

Neighborhood Characteristics		2-4 Unit Housing Trends		2-4 Unit Housing		Present Land Use %	
Location	<input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input type="checkbox"/> Rural	Property Values	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Declining	PRICE	AGE	One Unit	%
Build-Up	<input type="checkbox"/> Over 75% <input type="checkbox"/> 25-75% <input type="checkbox"/> Under 25%	Demand/Supply	<input type="checkbox"/> Shortage <input type="checkbox"/> In Balance <input type="checkbox"/> Over Supply	\$ (000)	(yrs)	2-4 Unit	%
Growth	<input type="checkbox"/> Rapid <input type="checkbox"/> Stable <input type="checkbox"/> Slow	Marketing Time	<input type="checkbox"/> Under 3 mths <input type="checkbox"/> 3-6 mths <input type="checkbox"/> Over 6 mths	Low	High	Multi-Family	%
Neighborhood Boundaries				High	Commercial		%
				Pred.	Other		%

Neighborhood Description

Market Conditions (including support for the above conclusions)

Dimensions Area Shape View

Specific Zoning Classification Zoning Description

Zoning Compliance Legal Legal Nonconforming (Grandfathered Use) No Zoning Illegal (describe)
 Is the highest and best use of the subject property as improved (or as proposed per plans and specifications) the present use? Yes No If No, describe

Utilities Public Other (describe) Public Other (describe) Off-site Improvements—Type Public Private

Electricity Water Street
 Gas Sanitary Sewer Alley
 FEMA Special Flood Hazard Area Yes No FEMA Flood Zone FEMA Map # FEMA Map Date

Are the utilities and off-site improvements listed for the market area? Yes No. If No, describe

1 Estimate Home Improvement Loan Payments **Sources & Assumptions**

1. Set Base Year for loan: see CHL_Construction to adjust cost estimates

Total design, build, and permitting costs \$ 117,561.71

Loan downpayment, or cash paid \$ 23,512.34 most construction loans require 20% down

\$ - 2. enter downpayment amount if not 20%, or leave blank

amount borrowed, excluding interest \$ 94,049.37 **Total financed**

3. Enter Loan term in years: These cell are ignored if you're not financing.

3.B Enter Loan APR: Enter percentage

4. Select Payment frequency

number of payment periods used in Cost-Benefit

effective rate

\$ 468.07 **Payment Amount/Payment Period (used in Cost-Benefit)**

Sources: <http://www.experijlot.com/2011/09/21/excel-mortgage-calculator/>

5. Estimate Remaining Mortgage Payments **Sources & Assumptions**

Set Base Year for loan: enter price, if still paying off mortgage; set to zero if mortgage is paid or there was no financing

Original Sale Price for building (mortgage) \$ 250,000.00

Loan downpayment, or cash paid \$ 50,000.00 most mortgages require 20% down

\$ - enter downpayment amount if not 20%, or leave blank

amount borrowed, excluding interest \$ 200,000.00 **Total financed**

Enter Loan term in years: These cell are ignored if you're not financing.

Enter Loan APR: Enter percentage

Select Payment frequency

number of payment periods

remaining number of payment periods used in Cost-Benefit

effective rate assumes full year of repayments for base year, adjust (add) if starting later in year

\$ 1,002.68 **Mortgage Payment Amount/Payment Period (used in Cost-Benefit)**

Sources: <http://www.experijlot.com/2011/09/21/excel-mortgage-calculator/>

Consumer Price Index (general inflation rate for Cost-Benefit annual increases)

current average for 2020, alt. inflation ref. use as alternative to 10 year avg, given 2020 downturn

expand group to see linked table from Bureau of Labor Statistics https://www.bls.gov/regions/midwest/news-release/consumerpriceindex_chicago.htm

10-year average of CPI for Chicago, inflation reference stable estimation (year-on-year average)

expand group to see linked table from Bureau of Labor Statistics https://www.bls.gov/regions/midwest/data/consumerpriceindexhistorical_chicago.t

FINANCING BASEMENT WORK: LOAN TERMS, PAYMENTS, & PREP

Once you know the rough cost of construction, the next task is to consider how to pay for the project – from savings or with a loan. The calculator ‘Loan_Terms’ provides a quick calculation of payments for a home improvement loan along with optional, existing mortgage payments. For each loan, it takes into account the amount borrowed (financed), rate it was lent at (APR), and the length of these loans. This snapshot-of annual debt payments and equity gain–should help you determine whether a conversion makes sense with your resources and investment strategy.

Broadly speaking, if you have good credit and a steady income you should be able to qualify for a fixed-rate home improvement loan.

Talk with an accountant confirm the general financial feasibility tabulated here. In general, you’ll need to provide paperwork for a loan, documenting your:

- **Existing Assets and Debts**, including current equity in your building (the portion paid off) and outstanding mortgage debt.
- **Credit Score and Annual Income**, so that lenders can get an idea of your overall debt-to-income ratio

For new construction and additions, it is common practice to have an appraiser estimate the likely value of your planned project. As shown in the **Appraisal Report** at left (for Two to Four-Flat buildings: bit.ly/Appraisal-Form), an appraiser will evaluate your project based on:

- the **specific construction characteristics** and finishes, with depreciation factors for the age and condition of the structure (middle & bottom)
- an analysis of the **capitalization rate** of the building, if it were solely used as an income property, and

- a **market study of similar properties** sold within a 1 mile radius of your building in the last 6 months (not shown), in order to understand your revised property value.

This helps establish the likely return on any money invested and thus the financial risk of the project.



If you have project plans and estimates from your architect and/or general contractor, you should be able to get an initial appraisal based on those specifications, for incorporation with loan applications. Talk with the loan originators at Neighborhood Housing Services to learn more about your renovation financing options. Talk with your accountant about the financial risks (and equity) of your existing assets and potential basement conversion project.

CALCULATOR CONTENTS

In advance of an appraisal and focused financial guidance, use the ‘Loan Terms’ calculator to estimate payment amounts and your overall annual costs for financing construction. This calculator loads the prior pages’ construction cost estimate. To begin, set the current year (#1), which will feed into new vs. existing mortgage payment calculations.

- 1 If you’re paying for construction with savings (not financing), set your downpayment to the full amount of construction (#2); this will zero out payments and capture your lack of project debt. Otherwise, if you’re borrowing money, set the loan terms to match your loan (#3.A-B: years, APR). Toggle payment frequency (#4) to match your repayment schedule and this will calculate your required repayments. Repeat the process for any outstanding mortgage on your property (#5). Both the loan payments and mortgage payments (with timing variables and total loan amounts) are incorporated in the ‘Cost-Benefit’ analysis in order to estimate your total annual debt-payments.

CALCULATOR 3

RENTAL INCOME . Affordability & Calibration

ZILLOW RESEARCH: CHICAGO 'GARDEN UNITS'

Zillow

Save Share More

\$980/mo 1 bd | 1 ba | -- sqft

211 S Campbell Ave, Chicago, IL 60612

Request a tour Request to apply

Overview Facts and features Rent Estimate Price and tax history Nearby sc

Add work destination

Overview

Days listed 27 | Contacts 113

*Email, please, for fastest response*Available July !!
 Wonderful rehabbed one bedroom, one bathroom GARDEN unit in Tri-Taylor area featuring updated kitchen, spacious living area, tiled floors, good sized bedroom, updated bathroom, laundry room in building, central heat and air. Close to Blue Line and Medical District!Pet Friendly! All Tenants Must Secure Renter's Insurance For Lease Duration. Tenant sets up electricity and natural gas.No Security Deposit, One-Time Nonrefundable Move-In Fee! Solid Credit,
[Read more](#)

TABLE: 3-CHI_RENTAL RATES

1A *adjust zipcode, year, and unit size to see area rents*

1.A Set your zipcode:

1B Pick the year: use 2020 for consistent data; if data is yet to be posted it will result in N/A and \$0 in Rent rates below

1.B Set Unit Size:

area & market characteristics

avg 3yr rent increase (Fair Market)	4.86%	used for average annual rent increase
Fair Market Rate by unit & zipcode	\$1,550	
Affordable Mid (50%MF) by unit size	\$1,024	

gross rent (subtract utilities in composite sheets)

2 2.A Set basement rent to: \$1,024 (averaged value between market & affordable)

2B 2.B If other, add rent here \$0

2B \$1,024 **Monthly Basement Rent used in Income Calc (below)**

3 3.A Do you have other unit(s):

3.B Set Other Unit(s) Size: \$1,550 (defaults to market rent per unit)

3D 3.D to add existing rent, add here \$0

3D \$1,550 **Monthly Upper Unit Rent used in Income Calc (below)**

*make sure to comply with ADU affordability requirements (for 5+ units)

Anticipating Vacancy & Operational Income

sources - Vacancy & Typ. Operational Income <https://www.cicchicago.com/wp-content/uploads/2020/06/PropertyManagementTrainingToolkit.pdf>
see Toolkit Appendix, 6 Flat sample Budget, pg 37

adjust drop-downs and misc income based on experience

Rent - Vacancy income

3C 3.C # of existing rental units: **total units for utility & maintenance costs** 3

excluding new basement & owner-occupied unit

Monthly rent for all units	\$2,574	
Annual Rental Income for all Units	\$30,885	
Anticipated Vacancy Loses (25%) !!	-\$7,721	

Final Income (with Misc) below (truncated)

\$23,164 Annual Rent All Units w/ Vacancy Hedge

Linked Market & Affordability Tables

Fair Market Rate Overall

FY2020 SAFMRs By Unit Bedrooms

Efficiency	One-Bedroom	Two-Bedroom	Three-Bedroom	Four-Bedroom
\$1,190	\$1,340	\$1,550	\$1,970	\$2,340

Chicago MFI (Income levels)

FY 2020 Income Limit Area

Median Family Income	FY 2020 Income Limit Persons in Family		
	1	2	3
\$91,000	Very Low (50%) Incom 31,850	36,400	40,950
	Extremely Low Incom 19,150	21,850	24,600
	Low (80%) Income Li 51,000	58,250	65,550

*Chicago-Joliet-Naperville, IL HUD Metro FM

ESTABLISHING RENTAL RATES: WHAT'S AFFORDABLE IN CHICAGO

Setting the rent on your basement unit requires research into your local market and consideration of the relationship you wish to cultivate with tenants. The calculator 'Chi_Rental Rates' helps you explore rental rates in your area and calibrate rental income to building amenities and units. You don't want to have a vacant, overpriced apartment or a unit priced below its earning potential. Ideally, long term tenants who can afford their rent will be more pleasant co-habitants and reduce turn-over, vacancy, and extra legal and maintenance costs. As basement units are typically less desirable than elevated units, it's particularly important to compare with other basement units in your area and price your unit affordably.

CALCULATOR CONTENTS

- 1 To start your income estimates, the 'Chi_Rental Rates' calculator begins by referencing HUD's Fair Market Rental rates ([bit.ly/ HUD-market-rate](https://www.hud.gov/officeofresearch/rentalrates/)), an annual survey of average area rents, which is searchable by zip code and calibrated to unit size (#1.A-B). It also pulls in HUD's Median Family Income (FMI) ([bit.ly/HUD-MFI](https://www.hud.gov/officeofresearch/medianfamilyincome/)), as the reference for Chicago's affordable units (60% FMI with -30% of monthly income as rent). You then select which level -market, affordable, or averaged-makes sense for your basement unit (#2.A) and other rentals(#3.A-C). This assumes basement units command less rent. Spaces are left so you can add your own values based on the local research or negotiated rent, with friends, family, or existing tenants you'd like to retain (#2.B, #3.D). To be conservative, the model includes three months vacancy (for move-out, cleaning, and marketing of units) as basements often experience higher turnover and lower desirability.
- 2
- 3
- 2B
- 3D

The lower half of the calculator then tallies these sources to establish building size and annual rental income. It also (not shown) adds miscellaneous income, like laundry change or parking rent, to estimate the final, overall income for your building. *This preliminary annual estimate of rental income links to the 'Cost-Benefit' analysis.*

OTHER CONSIDERATIONS

To finesse your estimate, you can conduct a (virtual) market survey of comparable units via Zillow, Domu, and Craigslist. If possible review the rents at a minimum of six to eight properties that are within your immediate market area (compare and contrast garden and upper units). Pick buildings and units that are of similar age and have comparable updates. As it allows for the search of active and past listings, Zillow may be the easiest way to see the history of past listings at a building and how long listings have been advertised. If an ad was up for months, the unit is likely overpriced. If a unit appears to have been rented within a month, then it's probably priced well for the area.

You may want to visit those buildings that most closely resemble the apartments you are offering. Questions to ask:

- Do they have similar amenities, like laundry or outdoor space?
- Are they offering similar appliances/modern bathrooms?
- Are they on a busy boulevard or a quiet tree-lined street?
- Are they close to public transportation or do they offer parking?
- Is heat included or extra, electric (etc.)?

All of these differences will have an impact on the value of your particular apartment in its market.

The rent you should charge should be based on the strengths and weaknesses of your new unit and amenities-compared to similar properties-and finessed to build stable tenant relationships.

Resist the temptation to raise rents during your initial estimates of project costs and benefits.

*Note: If you are converting multiple basement units in a Five to Six-Flat Building (under the new ADU ordinance) at least one basement unit must be rented as an affordable unit for the first 30 years. Reference the City's **Affordability Tables** to confirm rent caps: [bit.ly/DOH-Affordable](https://www.chicago.gov/officeofresearch/affordability/).*

CALCULATOR 4

TAX IMPACTS . Assessment & Appreciation

TWO-FLAT EXAMPLE (Search by address)

Typical Two-Flat Assessment in Logan Sq Area, Chicago

16-01-418-010-0000

Assessed Valuation 2629 W AUGUSTA BLVD • CHICAGO, IL • West Chicago

	2020 Assessor Valuation	2019 Board of Review Certified
LAND ASSESSED VALUE	\$8,287	\$8,287
BUILDING ASSESSED VALUE	\$34,405	\$34,405
TOTAL ASSESSED VALUE	\$42,692	\$42,692

Exemption History (Use values for current year)

- 2018 Homeowner, Senior Citizen, and Senior Freeze exemption was applied to the property this year.
- 2017 Homeowner, Senior Citizen, and Senior Freeze exemption was applied to the property this year.
- 2016 Homeowner, and Senior Citizen exemption was applied to the property this year.
- 2015 Homeowner, and Senior Citizen exemption was applied to the property this year.

Characteristics

ESTIMATED MARKET VALUE	\$426,920	3	BASEMENT ¹	Full and Unfinist
ESTIMATED MARKET VALUE	\$426,920		ATTIC	None
DESCRIPTION	Two to six apartments,		CENTRAL AIR	No
RESIDENCE TYPE	Two Story		NUMBER OF FIREPLACES	0
USE	Multi Family		GARAGE SIZE/TYPE ²	2 car detached
APARTMENTS	2		AGE	120
EXTERIOR CONSTRUCTION	Frame		BUILDING SQUARE FOOTAGE	1,804
FULL BATHS	2		ASSESSMENT PHASE	2020

TABLE: 4-CHI_TAXES

ESTIMATE THE TAX IMPACTS OF BASEMENT CONVERSION

Incorporating Average Renovation Returns (Basement) into Property Tax Impacts

3. Input the Fair Market Value of your home <https://www.cookcountyassessor.com/address-search>
see Cook Co. Assessment Lookup

Assessor Value (AV=10% Fair Market) \$42,692

Estimate rough investment returns

1.A Assume low returns on reno cost	<input type="checkbox"/>	65%
1.B Or assume high returns on reno cost <small>(check or uncheck low returns)</small>	<input checked="" type="checkbox"/>	75%

Building Value + (Construction Costs * Return Rate Selected)

\$515,091 Revised Building Value with Conversion

Update estimate, given area & appraisal leave empty if using rough value above

Compare your project to Median Area Sales, Below

Estimated Assessor Value	\$51,509	<small>(AV=10% of revised Fair Market)</small>
Illinois Equalized Assessed Value	\$149,938	<small>(EAV=2.9109 * AV)</small>

Add Your Tax Exemptions check (as true or false) reference link below for qualifications

4. homeowner (EAV-10k)	<input checked="" type="checkbox"/>	-\$10,000
5. senior citizen (EAV-8k)	<input type="checkbox"/>	-\$8,000
6. disabilities (EAV-2k)	<input type="checkbox"/>	-\$2,000
7. returning veteran (EAV-5k)	<input type="checkbox"/>	-\$5,000
8. home improve. (4yr freeze)	<input checked="" type="checkbox"/>	no impact for 75,000 of construction costs shows in Cost-Benefit, not here

EAV minus total Exemptions \$159,938

ADJUSTED EAV * 6.786% (for 2019) (Typically in January/July Billing cycles)

\$10,853	9. Property Taxes Anticipated	9
\$9,112	Property Taxes Without Addition (reference)	
\$1,742	Difference in Annual Taxes (reference)	
19.11%	Difference as Percent Change (reference)	
1.98%	simplified tax rate (reference)	

10%*2.9109*.06786 w/o exemptions

Expand References Links to Cook Co. Assessor's Office

expand sources for Estimated Renovation Returns

2. Pick your Chicago Neighborhood:

Double check area boundaries at: <https://price-index.housingstudies.org/>

INSTITUTE FOR HOUSING STUDIES AT DEPAUL UNIVERSITY



\$550,000	Median Area Sale Value*
5.46%	Area Appreciation, 5yr Average* (to Cost-Benefit)
1	Multiplier for 4-6 Flats? (based on units from Chi_Rent) <small>(1.33 or 1.5 to capture square-footage for extra story / rear units)</small>
93.65%	Your Revised Value as % of Area Median Sale

Ideally you don't want to exceed the median sales for the area (too much), but a full market assessment will consider construction quality, capitalization, and comparison with area properties in order to determine your building's value.*

CALCULATING YOUR TAXES: PROPERTY ASSESSMENT DECODED

As you consider how home renovations add long-term value to your property, it's important to capture how this translates into higher taxes. If you currently take a number of tax exemptions, a basement conversion can increase your property taxes significantly. The calculator 'Chi_Taxes' determining likely tax increases for your property.

CALCULATOR CONTENTS

Valuing your Basement Renovation, *in advance of appraisal:*

- 1 **Renovation Value to be Assessed** This model starts with the estimated construction costs for an ADU addition (from 'Chi_Construction') and lets you pick high or low (75%,60%) recuperation of construction as part of the property value.
- 2 **Value Appreciation in relation to Neighborhood** This model estimates the five year appreciation average for Chicago areas from DePaul's **Housing Price Index** (price-index.housingstudies.org). As the index tracks single family sales, this is a rough proxy based on relative square footage, meant to give an initial sense of whether your renovation is too expensive, i.e. far above the median. *Appreciation rates link into the final cost-benefit analysis.*



Once you have rough construction plans and costing, an appraiser can accurately estimate the addition of value and area appreciation. (See appraisal discussion in loan section.) The measures above are rough proxies; replace them with the appraiser's estimate.

Assessment Values to calculate taxes and tax increase:

- 3 **Fair Market Value:** The Cook County Assessor's Office establishes the Fair Market Value of your unit based on building characteristics and neighborhood. Construction permits will trigger reassessment but you can also appeal for assessment. Look up your valuation at www.cookcountyassessor.com/address-search.

- **Equalized Assessment Value:** This multiplier is meant to make property taxes roughly equal across the state. For 2019, this is 2.9109*Assessment Value (i.e. 10% of Fair Market Value).

Exemptions: Exemption application and renewal procedures vary; some are automatic; others require forms). (See Cook Co. exemption pages: www.cookcountyassessor.com/exemptions.) Checked exemptions are subtracted from Equalized Assessment Value in the current calculator:

- 4 **Homeowners (EAV-10k):** Homeowners or owner-occupiers can deduct \$10,000 from their Equalized Assessment Value.
- 5 **Senior Credit (EAV-8k):** Seniors qualify to deduct \$8,000 from their Equalized Assessment Value (auto-renews) and can apply to permanently freeze their taxes.
- 6 **Disability (EAV-2k):** Persons with disabilities can apply to reduce their Equalized Assessment Value by \$2,000.
- 7 **Returning Veteran (EAV-5k):** Returning Veterans can apply to reduce their Equalized Assessment Value by \$5,000.
- 8 **Home Improvement (4yr tax-freeze for >75k of improvement):** This is triggered by construction permit applications and allows the deduction of the first \$75,000 of improvements, with qualifiers. *If checked, these rebates are applied to 'Cost-Benefit'.*
 - Browse additional exemptions as desired.

9

Cook Co. Tax Rate (6.786% for 2019): The Cook Co. rate for Chicago residents is calculated based on the city's annual Corporate, Parks, Schools, Water District, and Forest Preserve budgets (plus other funds).

The tax rate for 2019 is 6.786%, which is multiplied by your Equalized Assessed Value minus any Exemptions. The final outcome is your tax bill, as split into two annual payments. (Learn more at: www.cookcountytreasurer.com.) Over the last decade, the tax rate has fluctuated between 4-7% and may increase. These tables assume a fixed rate for ease of calculation. *This annual tax value is linked into the 'Cost-Benefit' analysis, with increases tied to the consumer price index.*

- **Simplified Tax Rate:** This composite rate is calculated without exemptions, for estimating tax on annual appreciation.

CALCULATOR 5

UTILITY COSTS . Water . Sewer . Common Electric

SAMPLE METERED BILL



City of Chicago
Department of Finance-Utility Billing
P.O. Box 6330
Chicago, Illinois 60680-6330

CUSTOMER NAME	ACCOUNT NUMBER	BILL DATE	DUE DATE
PAUL SAMPLE	733001-2299-44	Aug-24-2016	Sep-14-2016

Utility Service Address: 2020 SAMPLE STREET 60600-0066

Bill Summary for this Metered Account for billing period Jun-15-2016 thru Aug-16-2016

Previous Balance	\$111.74
Adjustments	\$0.00
Payments	\$111.74
Current Water	\$106.75
Current Sewer	\$106.75
Current Garbage	\$19.00
Penalty	\$1.14

This is a Metered Account.
Little leaks cause big bills.
Check for and repair leaks.
You must pay for all metered water.

Total Due \$233.64

MESSAGE CENTER

Please see important information on the back of this bill regarding your utility bill and payment options.

FOR BILLING QUESTIONS, PLEASE CALL 312-744-4426

TABLE: 5-CHI_UTILITIES

adjust usage and confirm shared utilities to calculate costs

1A

1.A Estimate with Typical Use Numbers for Chicago/Midwest uncheck to select 'use your bill/meter readings'

	3.A heated by: (pick one)	3.A rates	units	fees
all monthly	Water (gallons)	6480	\$4.08 per 1000 gallons	none
per unit	Electric (kWhr)	511.92	0.113202 per kWhr	12.77
	Gas (Therms)	73.10	0.485528 per therm	35.71

usage sources at bottom

1B

1.B or Use your bill/meter readings^

	3.B heated by: (pick one)	3.B rates	units	fees
all monthly	2.A Water (gallons)	0	\$4.08 per 1000 gallons	none
per unit	2.B Electric (kWhr)	0	0.113202 per kWhr	12.77
	2.C Gas (Therms)	0	0.485528 per therm	35.71

rates at bottom

4

4 Using typical inputs & gas heat

Per unit that equals		monthly	annual	annual additions per unit		
				laundry	common lights	shared heat (gas)
Water	\$26.44	\$317.26	\$53.93			
Sewer*	\$26.44	\$317.26				
Garbage*	\$9.50	\$114.00				
Electric	\$70.72	\$848.64		\$106.08		
Gas	\$71.20	\$854.43			\$503.69	

Units Total (with ADU): 3

5

5. Pick a split/metered scenario:

Landlord reimbursed for city utilities, covers laundry, lights, he

\$3,939.03 annual costs to Cost-Benefit

Usage Scenarios

	common	owner	total
Landlord covers city utilities & shared laundry, lights; no gas & electric beyond their use	\$2,725.61	\$1,703.07	\$4,428.68
Landlord covers city utilities, heating, & shared usage; no gas & electric beyond their use	\$4,236.69	\$1,703.07	\$5,939.77
Landlord reimbursed for city utilities, covers laundry, lights, their gas & electric	\$480.04	\$2,451.59	\$2,931.64
Landlord reimbursed for city utilities, covers laundry, lights, heat, their gas & electric	\$1,991.13	\$1,947.90	\$3,939.03

*senior exemptions (zero sewer fees) are not applicable for multi-unit buildings (2 or more units) buildings with 5+ units will need to contract for their own garbage pick-up (4 or less are serviced by the city), see Chi_maintenance to estimate

^single family homes may be unmetered, if so use the county averages (at top) for utilities (high and low average from EIA midwest consumption numbers (2015 average))

RATE SOURCES (2020)

click to expand at left

AVERAGE USAGE (2015, 2010)

click to expand at left

4

ESTIMATING UTILITIES: WATER, SEWER, GARBAGE, POWER

As you update your property, you will add multiple meters—water, gas, and electric—so disentangling utility and energy bills should be fairly easy. This calculator incorporates likely additional costs for common areas and overall usage, providing different scenarios for split utilities so you can estimate recurrent costs.

In terms of additional costs for a multi-unit building, you should anticipate new charges to cover the common area electricity, additional water usage from shared laundry facilities, and, if heating from a steam system, increased gas bills for the finished basement. As the property owner, you will receive combined bills (#2) from the City for each metered water line, with sewage charges and garbage collection fees (for four-flats or less). As a multi-unit owner you are no longer eligible for sewer-rate reductions or cancellation. Your tenants' gas and electric accounts should be entirely separate and billed directly in their name.

It is your decision as to whether and how to pass water, sewer, and garbage costs along to tenants, in pro-rated rent or variable monthly payments. Likewise, shared heating costs are commonly incorporated into overall rent calculations. If you have a larger building (Five or Six-Flat) and must rent one of your basement conversions as an affordable unit, you are required to calibrate combined rent and utility costs so that they fall beneath the city's affordable thresholds.

CALCULATOR CONTENTS

The 'Chi_Utilities' calculator estimates annual, building-wide utility costs, to incorporate into your overhead calculations:

- 1 At the top you have the choice to estimate monthly costs based on a) averaged monthly volumes (water, electric, gas) for Cook Co. from the Energy Info Administration or b) you can add your own meter readings, from a typical month for one unit

(#1.A-B). If using your past bills/meter readings, try to input an averaged value as heating and air-conditioning costs vary widely, given the Chicago climate (#2.A-C). For both average and custom values check to indicate whether using electric or gas for heating, as utilities charge lower rates for higher anticipated volumes (#3.A-B). The rates shown for both options are taken from 2020 rates for City of Chicago, ComEd, and People's Gas and are available at the bottom of the table.

- 2
- 3
- 4 The center section uses the selected monthly usage numbers (average or custom inputs) to calculate monthly and annual costs for one unit (the owner-occupied unit) and likely shared costs per unit. Laundry is typically 17% of a household's water usage; common lighting is set to 12.5%; heating is assumed to be nearly 66% of gas usage. Your actual usage may vary but this provides a rough starting value to multiply by the total number of units in the building.
- 5 The bottom section offers four scenarios representing different levels of utility coverage by the landlord to be incorporated in the cost-benefit analysis. The most extensive and expensive is to absorb all city utility costs, shared heating, and common laundry/electric. The most minimal strategy is to pass city utility fees along to tenants and keep heating, gas, and electric all separate, covering only laundry and common lighting. Pick the scenario that most closely matches your anticipated separation of meters and building systems.

Broadly speaking, these calculations, over the long-term, are likely to slightly under-estimate the full annual cost of utilities.

Gas and electric rates can be volatile as they are tied into energy costs and respond to climatic swings. In addition, the City of Chicago's rates are tied into the cost of capital improvements. *This calculator, which feeds into the 'Cost-Benefit' analysis, anticipates annual increases at the rate of inflation, which is low and steady compared to the factors above.* See the [City's water and sewer rates \(bit.ly/Chicago-Water-Rates\)](http://bit.ly/Chicago-Water-Rates) and your gas and electric bills to calibrate based on prior rates and usage.



CALCULATOR 6

INSURANCE & MANAGEMENT . Risk . Admin

MANAGEMENT RIGHTS & RESPONSIBILITIES

Chicago Rents Right

Good Tenants, Good Landlords, Great Neighborhoods!
For more information, please call 312-742-RENT (7368)



Lori E. Lightfoot
Mayor of Chicago

CITY OF CHICAGO
RESIDENTIAL LANDLORD AND
TENANT ORDINANCE SUMMARY



At initial offering, this Summary of the ordinance must be attached to every written rental agreement and also upon initial offering for renewal. The Summary must also be given to a tenant at initial offering of an oral agreement, whether the agreement is new or a renewal. Unless otherwise noted, all provisions are effective as of November 6, 1986. (Mun. Code Ch. 5-12-170)

IMPORTANT: IF YOU SEEK TO EXERCISE RIGHTS UNDER THE ORDINANCE, OBTAIN A COPY OF THE ENTIRE ORDINANCE TO DETERMINE APPROPRIATE REMEDIES AND PROCEDURES. CONSULTING AN ATTORNEY WOULD ALSO BE ADVISABLE. FOR A COPY OF THE ORDINANCE, VISIT THE CITY CLERK'S OFFICE ROOM 107, CITY HALL, 121 N. LASALLE, CHICAGO, ILLINOIS.

IMPORTANT NOTICE

A message about porch safety: The porch or deck of this building should be designed for a live load of up to 100 lbs. per square foot, and is safe only for its intended use. Protect your safety. Do not overload the porch or deck. If you have questions about porch or deck safety, call the City of Chicago non-emergency number, 3-1-1.

WHAT RENTAL UNITS ARE COVERED BY THE ORDINANCE? (MUN. CODE CH. 5-12-010 & 5-12-020)

- Rental units with written or oral leases (including all subsidized units such as CHA, IHDA, Section 8 Housing Choice Vouchers, etc.) EXCEPT
 - Units in owner occupied buildings with six or fewer units.
 - Units in hotels, motels, rooming houses, unless rent is paid on a monthly basis and unit is occupied for more than 32 days.
 - School dormitory rooms, shelters, employee's quarters, non-residential rental properties.
 - Owner occupied co-ops and condominiums.

WHAT ARE THE TENANT'S GENERAL DUTIES UNDER THE ORDINANCE? (MUN. CODE CH. 5-12-040)

- The tenant, the tenant's family and invited guests must comply with all obligations imposed specifically upon tenants by provision of the Municipal Code, applicable to dwelling units, including section 7-28-859:
- Buying and installing working batteries in smoke and carbon monoxide detectors within tenant's apartment.
 - Keeping the unit safe and clean.
 - Using all equipment and facilities in a reasonable manner.
 - Not deliberately or negligently damaging the unit.
 - Not disturbing other residents.

LANDLORD'S RIGHT OF ACCESS (MUN. CODE CH. 5-12-060)

- A tenant shall permit reasonable access to a landlord upon receiving two days notice by mail, telephone, written notice or other means designed in good faith to provide notice.
- A general notice to all affected tenants may be given in the event repair work on common areas or other units may require such access.
- In the event of emergency or where repairs elsewhere unexpectedly require access, the landlord must provide notice within two days after entry.

SECURITY DEPOSITS AND PREPAID RENT (MUN. CODE CH. 5-12-080 AND 5-12-081)

- A landlord must give a tenant a receipt for a security deposit including the owner's name, the date it was received and a description of the dwelling unit. The receipt must be signed by the person accepting the security deposit.
- However, if the security deposit is paid by means of an electronic funds transfer, the landlord has the option to give an electronic receipt. The electronic receipt must describe the dwelling unit, state the amount and date of the deposit, and have an electronic or digital signature. (eff. 10-8-10)
- However, the landlord may accept the payment of the first month's rent and the security deposit in one check or one electronic funds transfer.

TABLE: 6-CHI_ADMIN INSURANCE

Quickly estimate of Landlord Insurance Premiums / Liability Costs

2

Enter your current Insurance Premium: *Chicago average, update**

Pro-rated by additional area to be insured (given answers from Chi_rent):
basement unit (smaller) 0.66 existing unit(s) 2
\$2,195 updated for square footage

3

Pick Existing Insurance type

landlords adds avg. 20% to premiums: liability and medical coverage on property
\$2,633 updated for landlord coverage/liabilities

4

Add personal property for your unit: *Chicago average, update**

formerly covered in homeowners
\$100 misc processing & registration fees

\$2,983 reasonable estimate, annual premium

get a quote to calibrate premium estimates to your building, its value, and your neighborhood

quote from existing insurer, for updated policy

estimate or (if available) quote feeds management total below

1

1.A Marketing and Leasing*

edit and update values as desired

	cost/unit annual	source
advertising (3 weeks)	30	Zillow rates
broker fees	0	none assumed
security deposit interest	22	CIC mgmt toolkit
misc leasing/app paperwork	30	
marketing sum (costs * rental units)	164	

1.B Administration (self-managed)*

update values; replace with your lawyer, accountant (etc.) hourly fees

	cost annual	source
misc printing & copying	100	CIC mgmt toolkit
legal - collections, evictions	450	"
book-keeping audit	450	"
administrative sum	1000	

Overall revision
line-items & costs

\$4,147 Net Est. Management & Insurance Costs

COVERING RISKS & MANAGEMENT OF RENTALS

As a landlord, you have a number of responsibilities to tenants and greater liability for potential accidents in your building. This calculator estimates the management and insurance costs of running a multi-unit building. While relatively minor, these fees are necessary to find renters and avoid larger litigation costs in the wake of accidents and tenant disputes.

If you're not a Two-Flat owner, the costs and task of management can feel nebulous. A quick way to get a sense of your responsibilities is to review Chicago's Residential Landlord and Tenant Ordinance (bit.ly/Chicago-RTLO). As a small building (< six units), it's not legally binding for your unit, but it offers a template for typical management tasks, including:

- placing security deposits into interest-earning saving accounts
- setting reasonable late payment fees (and legal caps of fees)
- setting rights of access and maintenance standards
- resolving tenant-landlord disputes and means of recourse



It's advisable that you both read the ordinance summary and pass it along to tenants, so everyone is on the same page.

To flesh out a full plan and robust budget for managing your building, you should reference the Community Investment Corporation's Property Management Manual (bit.ly/CIC-Property-Manual). Their extensive guide covers marketing apartments, setting up tenant selection procedures, enforcement and eviction processes, and speaks to the relative cost-efficiencies of managing larger vs. smaller buildings.

Having spent time and money, creating a new unit and finding tenants, it is essential to have the proper insurance to protect your basement investment. A landlord policy offers two broad types of coverage. It protects a) the physical structures on the property in case

of a loss/damage and includes b) liability coverage, should a tenant/visitor slip and fall. As you update to a landlord policy, it should have:

- **Dwelling Coverage** for the physical rental property: It is the cost to replace the existing structure.
- **Other Structures** for any other buildings like garages or sheds.
- **Personal Property** for your personal items: furniture, home goods, and computers. (Tenants will need renters insurance.)
- **Loss of Use** for any rental income you could lose. Set this to equal your annual gross rents.
- **Medical Payments** for any medical bills you may be responsible for.
- **Liability Coverage** for injury or lawsuits brought against the property (min. \$500,000 coverage).

CALCULATOR CONTENTS

In terms of budget estimation, the 'Chi_Admin Insurance' table translates the bare minimum of tasks into low estimates,

- 1 assuming you will manage the building yourself (#1.A-B). What you see in the sheet, like the costs of marketing units on Zillow, or legal fees for a real estate lawyer, are meant as a best-case scenario facing evictions and rental turn-around. Consider, for instance, the 'public' face of showing units: do you need unit photos, cleaning, painting, or a paid broker to help show the apartment? That's just part of the management cycle. Double-check and update costs as needed.

Landlord's insurance is more expensive than homeowners and you can anticipate paying about 20% more a year for a landlord

- 2 policy. For approximate numbers, input your existing policy (#2) and type (#3). For quick estimate purposes, this calculates a landlord's
- 3 policy - with personal property (#4) separated from building and liability costs - as 120% of homeowners rates, with rough increases for
- 4 finished basement units. For an accurate estimate, get an updated quote from your current insurer. Net costs from management and insurance feed into the 'Cost-Benefit' analysis.

CALCULATOR 7

MAINTENANCE . Routine . Preventative . Emergency Reserves

CALCULATING RESERVES

3. Emergency Reserves
update based on trade expert estimates

substantial capital projects

	cost		
major roof repair	\$ 12,000.00		
major hvac repair	\$ 3,000.00		
major plumbing repair	\$ 4,000.00		
sum	\$ 19,000.00	5	\$ 3,800.00

typical emergency replacement costs

	cost	cycle	annual saving
ejector & sump pumps	\$ 1,300.00	annual	\$ 1,500.00
appliance - laundry	\$ 1,000.00	annual	\$ 1,200.00
appliance - kitchen	\$ 800.00	annual	\$ 1,000.00
with install of each	\$ 200.00		
			\$ 7,500.00

Rule of thumb is to earmark 15% min. of monthly rent for emergency reserves & capital projects. 30.33%
 That may not be adequate for older buildings or small multi-units

Original prices are from the initial construction estimates. To update, you should get building-specific estimates from trade experts and set realistic replacement timelines based on the age/lifespan of existing building elements.

7-CHI_MAINTENANCE - ROUTINE & PREVENTATIVE

1.A Routine: Service Contracts Building & Grounds
update based on existing contracts

	cost	by unit or bldg	task cycle	sum	notes
trash collection	\$ 150.00	unit	weekly	\$ 450.00	only applicable over 4 units
extermination	\$ 40.00	unit	monthly	\$ 120.00	
janitorial service	\$ 230.00	unit	weekly	\$ 690.00	
commons/laundry/grounds					
ground/lawn work	\$ 350.00	building	weekly	\$ 350.00	
snow removal	\$ 130.00	building	winter var	\$ 130.00	
				\$ 1,290.00	Routine Contracts

1.B Routine: Supplies, Parts, & Materials
update based on experience with inventory

	cost	by unit or bldg	task cycle	sum	notes
janitorial supplies	\$ 25.00	unit	n/a	\$ 75.00	<i>See table for full list of maintenance tasks (Truncated for display)</i>
ground & fertilizer supplies	\$ 140.00	building	weekly	\$ 140.00	
mower, blower, etc. repairs	\$ 28.00	unit	annual	\$ 84.00	
misc. - lights, other	\$ 22.00	unit	n/a	\$ 66.00	
intercom repairs	\$ 10.00	unit	n/a	\$ 30.00	

2. Preventative: Seasonal & Annual Repairs
update based on existing contacts & experience

	cost	by unit or bldg	task cycle	sum	notes
parking/site resurfacing	\$ 30.00	unit	semi-annual	\$ 90.00	
hvac - filter replacements	\$ 7.00	unit	annual	\$ 21.00	
carpet cleaning	\$ 22.00	unit	annual	\$ 66.00	
carpet repair or replacement	\$ 22.00	unit	annual	\$ 66.00	
paint supplies - gal. per	\$ 22.00	unit	annual	\$ 66.00	
common area paint (2 gal.)	\$ 45.00	building	annual	\$ 45.00	
roof repairs - patching*	\$ 350.00	building	annual	\$ 350.00	
porch and structural repairs*	\$ 350.00	building	annual	\$ 350.00	
hvac repairs - by contractor*	\$ 210.00	building	annual	\$ 210.00	
boiler, traps, radiator valves, water heater draining					
plumbing - by contractor*	\$ 210.00	building	bi-annual	\$ 210.00	
catch-basins, gutters, downspouts, drain routings					
electric work - by contractor*	\$ 100.00	building	annual	\$ 100.00	
fixture additions, etc.					
painting - by contractor*	\$ 70.00	unit	annual	\$ 210.00	
appliances - by contractor*	\$ 70.00	building	annual	\$ 70.00	
				\$ 1,854.00	Preventative Maintenance Total

***get specific estimates from trade experts**

Original prices are from the CIC Toolkit - sample budget with inflation - for a six-unit building. You should anticipate higher fees for routine contracts, as you have less bargaining power.

\$ 3,917.00 Routine & Preventative Sum

Rule of thumb is to earmark 8-12% of monthly rent for maintenance. 15.84%
 That may not be adequate for affordable areas or small multi-units

PLANNING MAINTENANCE: COSTS, CYCLES, AND RESERVES

If you've gotten this far in the manual, you've probably realized there is no such thing as a maintenance-free building. The purpose of maintenance is to keep the property safe, clean, and in good working condition. Regular repairs and annual assessments should halt decay and deterioration before it takes root – in common spaces, structural systems, mechanical systems, appliances and the building grounds. For estimation purposes, the table 'Chi_Maintenance' sorts maintenance into a series of routine tasks—occurring weekly, monthly, or as annual prevention—and a set of emergency repair and replacement costs, which can be covered by a reserve of savings.

As an owner-occupant, you may decide to do some of these services yourself, like lawn care or gutter cleaning. Even if you contribute labor, it is important to plan and schedule your maintenance in advance, to cover the cost of materials and synchronize seasonal tasks, like changing heater filters or checking radiator valves.

CALCULATOR CONTENTS

Conceptually, the main maintenance table includes:

- 1 **Routine maintenance contracts & materials:** Often accomplished by outside labor, these tasks correct problems that result from continuing wear on the property and equipment, accidents or abuse. This includes non-emergency repairs to the building, the equipment and the grounds such as performing snow removal, lawn care, sweeping, cleaning windows, and hallway vacuuming. Update by line-item.
- 2 **Preventive Seasonal/Annual repairs & materials:** This includes regularly scheduled upkeep on all areas of the property and equipment, esp. for heat/cooling. It allows trade experts to catch problems early and prevents expensive replacements to the building systems and structure. Update by line-item.

- Your costs, for routine contracts and annual service, will likely vary from the generic rates above, which are derived from Community Investment Corporation's manuals. As a small multi-unit building you are unlikely to have much bargaining power when hiring for lawn care or cleaning, and thus may pay more. **For a more accurate estimate of routine maintenance costs, update the current line-items based on trade-experts connections and existing contracts.** See Community Investment Corporation's **Property Management Manual** for more on developing a maintenance plan (bit.ly/CIC-Property-Manual).

- 3 **The final, reserve table outlines recommended savings for emergency repairs and capital building projects.** While not as extensive as the routine list, you can anticipate that these funds will be used to cover long-term up-keep, like inevitable roof repair and furnace replacement. These funds should also be used to handle tenants' (or your own) urgent or emergency maintenance requests, like replacing broken fridges or immediately fixing broken water pipes.

- Your costs for emergency and capital repairs will likely vary from the rates listed, which are derived from the initial NHS construction cost estimates. You may want to add additional items to the emergency replacement list based on your building. **For an accurate accounting of capital repair costs, get trade experts' estimates of replacement cost and remaining lifespan (to time your incremental savings).** *All maintenance costs & reserve recommendations are summed and incorporated in the 'Cost-Benefit' analysis.*

In addition to developing a maintenance budget and plan for yourself, it is helpful to remind tenants of their responsibilities to keep trash areas clean, notify you about extermination needs, and track concerns (moisture, slow drains, etc.) so you can address issues before they become expensive emergencies or code violations.

CALCULATOR 8

COST-BENEFIT SUMMARY . Break-Even Calcs

TABLE: 8-COST-BENEFIT BREAK-EVEN

1 CAN YOUR AFFORD THIS PROJECT? WHEN WOULD YOU 'BREAK EVEN'?
 1. Roughly Estimated Time to Break Even on Investment - given current inputs from each calculator page

When does the cumulative net value of the conversion (from the balance of benefits & costs) equal the amount of cash invested in a basement conversion?
Without Financing (or Interest)

Costs for Construction: starting from the Construction total, Chi_Construction (C218)

7 Years to Break Even
when is cumulative net value = or > than construction costs? (compares above with column U at bottom of page)

When does the cumulative net value of the conversion (from the balance of benefits & costs) equal the amount invested in a financed basement conversion?
With Financing (and Loan Interest)

Total Costs for Loan: Loan starting from the Construction total, with interest paid over lifetime, Loan_Terms (D78*D80) & downpayment

8 Years to Break Even
when is cumulative net value = or > than construction costs? (compares above with column U at bottom of page)

Quick Summary of Value growth over time

Time Horizon in Cumulative Years	YEAR 10	YEAR 20	YEAR 30	YEAR 40
NPV of Net Benefits (Cumulative)	\$ 208,580.01	\$ 748,116.22	\$ 1,784,661	\$ 3,374,481

2 Annual Benefits of ADU addition to Building

Rent & Operational Income see source tabs to adjust estimates based on market research

All Rental Income: starting value of all rents, from bottom of Chi_Rental Rates (E488)

Yearly Increase: annual increase based on area average annual increase, Chi_Rental Rates (E442)

simplified annual calculation: $Next\ years\ rent = prior\ years\ rent * (prior\ years\ rent * annual\ avg.\ increase)$

Annual Appreciation on Building with ADU

Bldg + ADU value: based on recuperated basement conversion costs, Chi_Taxes (D73 or D75)

Appreciation percent: annual appreciation based on 5-yr average, by Chicago Neighborhoods, Chi_Taxes (D135)

use apprec. above: check to use area estimates, uncheck for more conservative estimate of real estate growth

moderated appreciation: average of inflation and area appreciation

5.46% Appreciation Chosen

simplified annual calculation: $Next\ years\ building\ value = prior\ years\ building\ value + (prior\ years\ building\ value * chosen\ annual\ apprec)$

Total Annual Benefits = Rent Income + Annual Appreciation

Annual Costs of Building Ownership & Management

Loan Payments (ADU) see sources to adjust estimates, based on revised loan APR or loan length

Loan Payment: starting value from Loan Rates (D80) * yearly payments, update originals to make sure length, simplified annual calculation: Payments are fixed, per calculations on 'loan_terms'.

Continues, by theme (truncated).

3

YEAR	BENEFITS			4. TOTAL BENEFITS ANNUALLY	COSTS						5. TOTAL COSTS ANNUALLY	NET VALUE	
	Rent Income	Building value	Annual Appreciation		Loan Payments	Existing Mortgage Payments	Property Taxes	Utilities*	Insurance & Admin	Maintenance		ANNUAL NET VALUE (NOMINAL)	CUMULATIVE NET VALUE (NPV)
Year 1 2020	\$24,730	\$515,091	\$0	\$24,730	\$29,129	\$12,032	\$9,112	\$3,939	\$4,147	\$11,417	\$58,359	(\$33,630)	(\$33,630)
Year 2 2021	\$25,930	\$543,215	\$28,124	\$54,054	\$5,617	\$12,032	\$9,112	\$3,997	\$4,209	\$11,586	\$34,967	\$19,088	(\$14,604)
Year 3 2022	\$27,189	\$572,875	\$29,660	\$56,849	\$5,617	\$12,032	\$9,112	\$4,057	\$4,271	\$11,758	\$35,088	\$21,760	\$6,217
Year 4 2023	\$28,510	\$604,154	\$31,279	\$59,789	\$5,617	\$12,032	\$9,112	\$4,117	\$4,335	\$11,932	\$35,212	\$24,577	\$29,389
Year 5 2024	\$29,894	\$637,141	\$32,987	\$62,881	\$5,617	\$12,032	\$11,471	\$4,178	\$4,399	\$12,109	\$37,697	\$25,184	\$52,787
Year 6 2025	\$31,345	\$671,928	\$34,788	\$66,133	\$5,617	\$12,032	\$11,505	\$4,240	\$4,464	\$12,288	\$37,857	\$28,276	\$78,674
Year 7 2026	\$32,867	\$708,616	\$36,687	\$69,554	\$5,617	\$12,032	\$11,541	\$4,302	\$4,530	\$12,470	\$38,022	\$31,532	\$107,121
Year 8 2027	\$34,463	\$747,306	\$38,690	\$73,153	\$5,617	\$12,032	\$11,578	\$4,366	\$4,597	\$12,655	\$38,190	\$34,963	\$138,203
Year 9 2028	\$36,136	\$788,109	\$40,803	\$76,939	\$5,617	\$12,032	\$11,618	\$4,431	\$4,665	\$12,843	\$38,363	\$38,576	\$171,995
Year 10 2029	\$37,891	\$831,140	\$43,031	\$80,921	\$5,617	\$12,032	\$11,659	\$4,497	\$4,734	\$13,033	\$38,539	\$42,382	\$208,580

BREAK-EVEN ESTIMATES: BENEFITS, COSTS, & NET VALUES

The final calculation table, 'Cost-Benefit Break-Even', takes the results of your prior estimations—of capital and operating costs—and sums them to determine your annual profit or debt and year-by-year cumulative net value. For the most part this table compiles automatically. There aren't many places to insert data or add custom values; rather, they should be adjusted in the prior seven thematic tables.

CALCULATOR CONTENTS

For ease of use, the layout is broken into three pieces:

- 1 The top section includes the key outcomes of your calculation, the break even values and a optimistic snapshot of decade-by-decade increases in value.
- 2 The middle explains where all the inputs are linked from, so you can flip back and forth between tabs as you seek to edit inputs.
- 3 The bottom sections hold all the annual cost-benefit summations, which track year-by-year profits and value accumulation.

At the top, the key outcome to examine is the break-even value. This tells you how many years it will take for the cumulative net value (of your building and rental income) to equal or exceed either the cost of construction (with or without financing), as derived from the bottom calculations. Consider your goals to contextualize this number: if you anticipate selling the building in five years it only makes sense to do a project that breaks even by year five. If you're going to be there for the next 15 years, breaking even in 12 years is entirely reasonable. The 'value growth over time' provides a quick read out of longer term value accumulation. This over-estimates value, as appreciation rates are unlikely to stay stable over 40 years.

As described at the middle and shown at the bottom, the annual determination of nominal net value is calculated by adding your annual benefits:

- 4
 - rental income
 - annual appreciation of building value
- 5 and subtracting your total annual costs:
 - home-improvement-loan payments
 - mortgage payments
 - property taxes
 - utilities
 - insurance & management costs, and
 - maintenance costs. & reserve savings.

Year-to-Year calculation, for the next year's benefit or cost in each column, is simply the prior year's value increased by inflation. The exceptions are in appreciations, loan payments, and taxes. **Appreciation** is set to start once the renovation is complete, so it begins in the second year, based your neighborhood's average five year appreciation rate. **Loan payments** start with both the down payment and monthly payments and then, from the second year on, only include the monthly payments. **Taxes** are frozen for the first four years (the home improvement exemption) and then are based on the appreciated building value. (*This likely over-estimates your taxes, as the assessment cycle is much slower, but also serves as a useful hedge against unanticipated rate changes.*)

In broad terms, the idea is to make sure that your gains in value (as liquid rent or fixed real-estate) are larger than your operating costs and loan liabilities, so that your annual (nominal) net value is positive. Once you've managed to eliminate your initial construction loan debt and balance your accumulate net value with your total construction costs (break-even), then annual net value additions are generating positive profit.

FINDING FINANCING . Resources & Expert Advice

NEIGHBORHOOD HOUSING SERVICES: FINANCIAL ASSISTANCE & EDUCATION

Home > Fix My Home > Home Repair Loans

Need Home Repair or Improvement?

Neighborhood Lending Services, Inc. (NLS) has the loans and services you need to get the job done right.

General Home Improvements <ul style="list-style-type: none">New kitchenNew roofNew sidingCentral air-conditioning, etc.	Energy Efficiency Improvements <ul style="list-style-type: none">Comprehensive air sealingInstalling new or increasing insulationUpdating to a more efficient furnace or boiler
Home Safety Improvements <ul style="list-style-type: none">Correcting dangerous electrical problemsUpdating hazardous heating systems	Vintage Home Improvements <ul style="list-style-type: none">Masonry: pointing and repairRestoring original wood windowsRepairing decorative metal cornices

What is NLS?

Neighborhood Lending Services is an Illinois state-licensed, nonprofit mortgage lender that offers affordable, fixed-rate home improvement loans for large or small needs.

Eligibility

- We lend in neighborhoods throughout the City of Chicago, Eight/Northeast Kane County and south suburban Cook County
- Income eligibility and other restrictions may apply
- Make an appointment to meet with a Loan Originator

Repayment Terms

- Repayment terms up to 20 years, with affordable interest rates and no prepayment penalties
- Forgivable loans are available together with Home Improvement loans to help with home repairs
- Income eligibility and other restrictions may apply

How To Apply for a Loan

[Apply for your loan online](#)

or

Call 773-329-4111 to speak with a Loan Originator

Support NHS Chicago

[Donate Now](#) [Create Your Account](#)

Connect With Us

NHS Chicago
1279 N. Milwaukee Avenue, 4th Floor
Chicago, Illinois 60642
(773) 329-4111

NHLS 4276722

Home > Learn Now > Workshops

Workshops & Education

Whether you are interested in buying a home or are an existing homeowner, Neighborhood Housing Services of Chicago (NHS) provides a variety of workshops to empower you to make smart decisions.

Financial Fresh Start (Financial Capability)

Our two-hour financial education workshop helps you:

- Develop a spending plan
- Reduce your debt
- Increase your credit score

These are online courses taught by a live instructor via Zoom.

Thursday June 4
6PM - 8PM One 2-hour session
[Register Here](#)

Thursday June 18
6PM - 8PM One 2-hour session
[Register Here](#)

Home Buyer Education Webinars

Learn about the home buying process such as the basics of budgeting, improving credit, understanding the closing process and down payment assistance programs.

These are online courses taught by a live instructor via Zoom.

Tuesdays June 9, 16, 23, and 30
6PM - 8PM, Eight-hour course delivered in four 2-hour sessions
[Register Here](#)

Saturdays June 13th and June 20
9AM - 1PM, Eight-hour course delivered in two 4-hour sessions
[Register Here](#)

A Home Buyer Education certificate of completion, required to qualify for some down payment assistance programs, is valid for one year from date of completion.

Additional Workshops for Homeowners and Homebuyers

We also offer a variety of other workshops for current and future homeowners, such as estate planning, insurance and taxes, and trolley tours of neighborhoods and homes for sale. To view these offerings, click here.

Support NHS Chicago

[Donate Now](#) [Create Your Account](#)

LOAN & PROJECT GUIDANCE

If you're contemplating a basement conversion project and want to learn more about the construction process or home improvement financing options, make an appointment with Neighborhood Housing Services (NHS). NHS is a nonprofit neighborhood revitalization organization committed to helping homeowners and strengthening neighborhoods throughout Chicago and South Suburban Cook County. Neighborhood Lending Services (NLS), an NHS-affiliated corporation, is Illinois's largest nonprofit lender for homeowners and new home buyers. Whether you are interested in free Home Buyer Education classes or a fixed-rate loan to buy a home or fix up your home, NHS has the expert help you need.

For those borrowing through NHS, they can assist with construction services, education, and loan origination. Taken together, NHS helps their clients to:

- Develop a detailed scope of work for your basement
- Assist in finding qualified contractors and procuring project estimates
- Answer questions throughout construction and inspects work for quality assurances
- Identify lead and material issues for mitigation, in collaboration with the Chicago Home Safety Partnership
- Provide energy, fire-safety, and code audits to help you reduce your building's safety risks and environmental footprint
- Determine eligibility, terms, and rates for NLS's non-profit loans, as well as forgivable loans and ADU/maintenance grants (as available) from the City of Chicago Dept. of Housing and Illinois.

Additional educational materials on energy efficient renovations and accessible additions can be found at Enterprise Community Partners (ECP, links right). Because Two to Four-Flat buildings are relatively small multi-unit buildings (compared to Chicago's apartment towers), there aren't major subsidies or special tax rebates directed at single building

owner-occupants. For those investing at a larger scale, see Community Investment Corporation, next page, as well as ECP's financing.

NHS COURSES & COUNSELING:

- **Financial Education:** NHS's financial workshops empower you, as a buyer or homeowner, to make smarter decisions and develop realistic budgets for your home investments. Register for courses at: www.nhschicago.org/learn/workshops
- **Construction Services:** If borrowing through NHS, construction services can help you navigate the entire home repair process, from finding contractors to making sure your home is safe, secure, and passes inspection. Learn more at: www.nhschicago.org/fix/construction-services
- **Loan Applications:** NHS's loan originators can help determine your financing options and whether your project is eligible for alternate funding sources. Talk with your accountant first to determine your existing resources and long-term goals. Learn more at: www.nhschicago.org/fix/home-repair-loans/

OTHER EDUCATION RESOURCES:

- **Multifamily Green Retrofit Toolkit, ECP:** This toolkit includes sample projects, screening questionnaires, and other tools to help you assess whether your property is a good candidate for an energy-efficient retrofit, which could be productively combined with conversion work. Access at: bit.ly/ECP-Multifamily-Retrofit
- **Agging In Place Design Guidelines, ECP:** Although not identical to ADA requirements, CEP's Agging In Place Design Guidelines offer an easy-to-understand approach to integrating accessibility into your potential basement unit. Read at: bit.ly/ECP-Aging-In-Place



MANAGING PROPERTY . Resources & Expert Advice

COMMUNITY INVESTMENT CORPORATION: MANAGEMENT EDUCATION

The screenshot shows the CIC homepage with a navigation menu including 'About CIC', 'Loans', 'Programs', 'Properties for Sale', 'Policy', 'News & Events', and 'Contact'. The main content area features a large image of a young girl in a pink winter jacket and hat, with the text: 'We improve neighborhoods and lives. An innovative, human-centered approach to lending for affordable rental housing. WATCH OUR VIDEO'. Below this is a 'Loans' section with the heading 'What type of loan do you need?' and sub-categories: 'Multifamily', 'Energy Retrofits', '1-4 Unit', and 'Mezzanine Debt'. The 'Multifamily' category is highlighted, with text: 'Flexible financing to acquire, rehab, and refinance multifamily buildings with five or more units.' and a 'GET STARTED' button. At the bottom, there is a 'Property Management Training' section with the text: 'Whether you own 6 units or 600 units – or maybe you’re just getting started – CIC has a workshop for you.' and a '+

The screenshot shows the 'Property Management Training' page. The header includes the CIC logo and navigation links. The main heading is 'Best-in-industry workshops and training.' followed by a paragraph: 'Rental building owners know that it takes more than financing to have a successful rental project. That’s why CIC offers best-in-industry workshops and trainings to help current and aspiring owner-operators grow and strengthen their business.' Below this, it states 'Workshop \$50 | Single topic \$25 or free | Event'. There are five columns of on-demand learning options:

- On-Demand Learning:** PMT Certificate Program Online Learning, Take at Your Own Pace. Includes 'INFO' and 'REGISTER' buttons.
- On-Demand Replay:** Showing Your Rental Units Virtually Webinar, 1 hour. Includes 'INFO' and 'WATCH NOW' buttons.
- On-Demand Replay:** Maintenance Management Webinar, 1 hour. Includes 'INFO' and 'WATCH NOW' buttons.
- On-Demand Replay:** Your Questions, Answered: Payroll Protection Program for Multifamily Building Owners Webinar, 1 hour. Includes 'INFO', 'WATCH NOW', and 'POWERPOINT' buttons.
- On-Demand Replay:** Landlord Legal Update, Summer 2020 Webinar, 1 hour. Includes 'INFO', 'WATCH NOW', 'POWERPOINT', and 'COVID-19 UPDATE' buttons.

At the bottom of the grid is a pagination indicator: '(● ○ ○ ○)'.

The screenshot shows the 'Property Management Materials Resources and Downloads' section. It is divided into three columns:

- CIC Workshop Materials:** A practical guide with accompanying forms & resources for developing a property-specific toolkit. Includes links for 'Residential Property Management Procedures Manual', 'Property Management Training Appendix and Toolkit', and 'Local Builder and Developer Groups'.
- CIC On-Demand Video Library:** Access all of CIC’s on-demand topical webinars and rewatch at your convenience. Includes links for 'Landlord Responsibilities: COVID-19 Protection Ordinance Review', 'Applications to Lease-Up', 'Lending in the “New Normal” Market', and 'Showing Your Vacant Units During COVID-19'.
- Further Resources on Best Practices:** The latest guidance, documents, and resources to help you manage your property. Includes links for 'Chicago RLTO Summary', 'General Landlord Responsibilities', 'Evictions', 'Maintenance and Repairs', 'Security Deposit Interest Rates', and 'Chicago Illinois'.

MANAGEMENT GUIDANCE

If you're contemplating a basement conversion project and want to learn more about building management and maintenance, Community Investment Corporation (CIC) provides educational materials. CIC is the Chicago metropolitan area's leading lender for the acquisition, rehabilitation, and preservation of affordable rental housing. CIC financing provides much-needed investment in credit-starved communities and ensures affordable housing for Chicago's workforce. CIC's Property Management Training Program provides owners and managers with the information and skills they need to successfully operate multifamily housing.

In particular, you can sign up for a property management training workshop, which:

- Prepares landlords with the knowledge to better market, manage and maintain residential rental property;
- Covers topics, such as marketing, fair housing, the landlord/tenant ordinance, insurance, nuisance abatement, real estate tax issues, maintenance and budgeting;
- Can be done online, through a series of thematic sessions; and
- Is accompanied by the Residential Property Management Procedures Manual and Appendix Toolkit, which includes sample budgets, legal and market resources for operating as a landlord in Chicago.

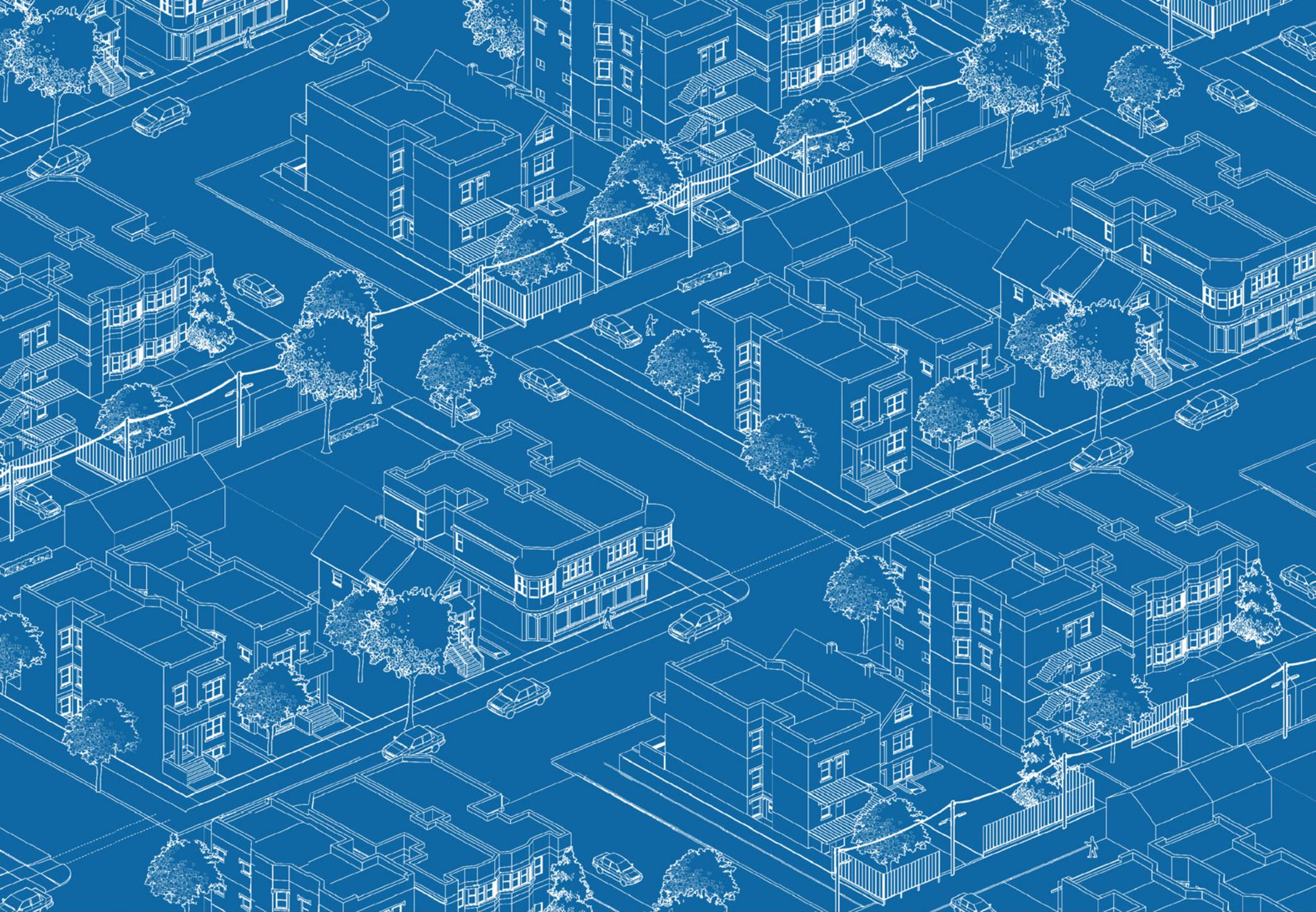
CIC also has a number of templates, forms, and booklets to streamline the process of maintenance/rehab construction and communicating with tenants. If you're looking for specific area real estate and apartment associations, see their resources page. Additional educational materials on energy efficient maintenance and operations can be found at Enterprise Community Partners (ECP, links right). As a lender, CIC also finances affordable Two to Four-Flat housing at development scale, with loans for nine + building cluster investments.

CIC COURSES & COUNSELING:

- **CIC's course and workshop schedule:** for online and in-person courses. See upcoming trainings: www.cicchicago.com/programs/property-management-training
- **Residential Property Management Procedures Manual:** A practical guide for developing a property-specific procedures manual. Read at: bit.ly/CIC-Property-Manual
- **Property Management Training Appendix and Toolkit:** Includes sample documents and forms useful for property management. Read at: bit.ly/CIC-Property-Toolkit

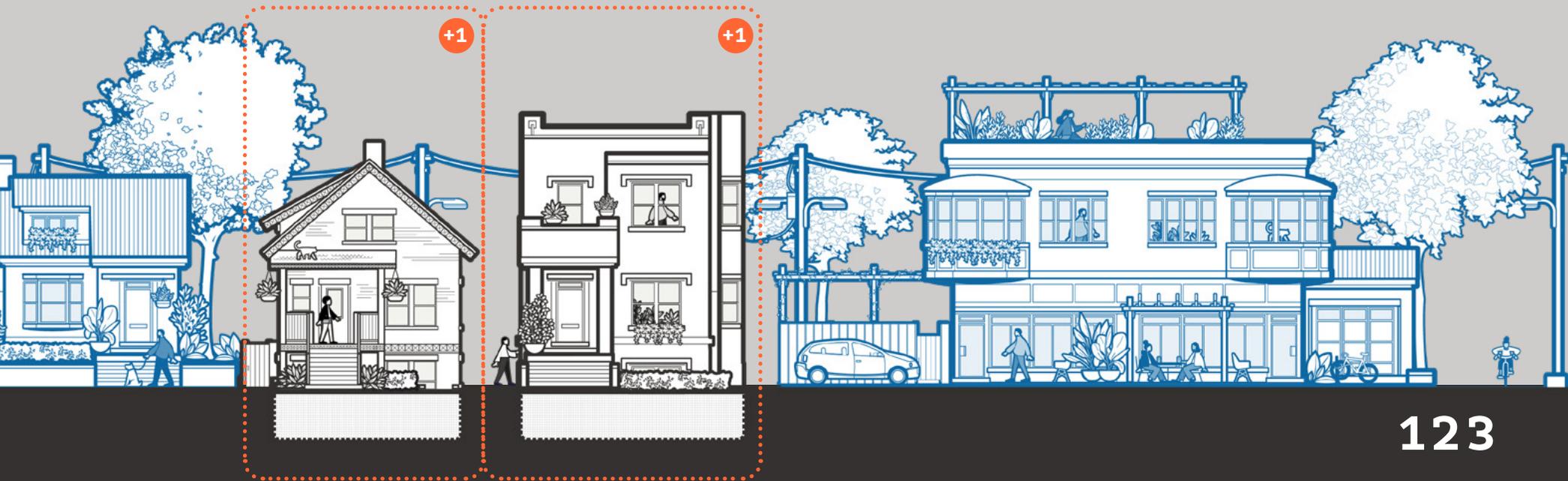
OTHER MANAGEMENT TOOLS:

- **Green Operations and Maintenance Tools, ECP:** ECP's green operations manuals provide templates and forms for a maintenance program and are designed to ensure that green design intentions are codified into operations and maintenance guidelines. Aimed at larger buildings, they are instructive to review for refining your maintenance plan. Access at: bit.ly/ECP-Green-Maintenance



MITIGATING ISSUES . construction options

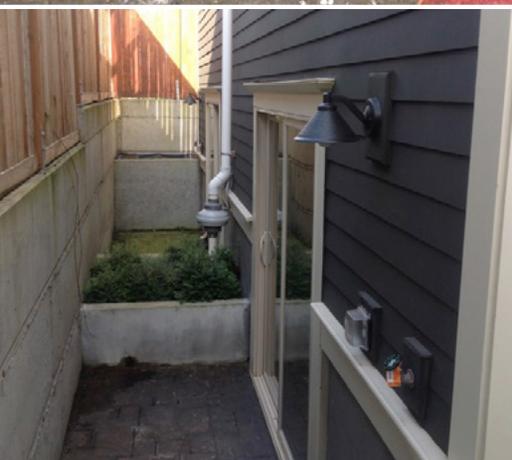
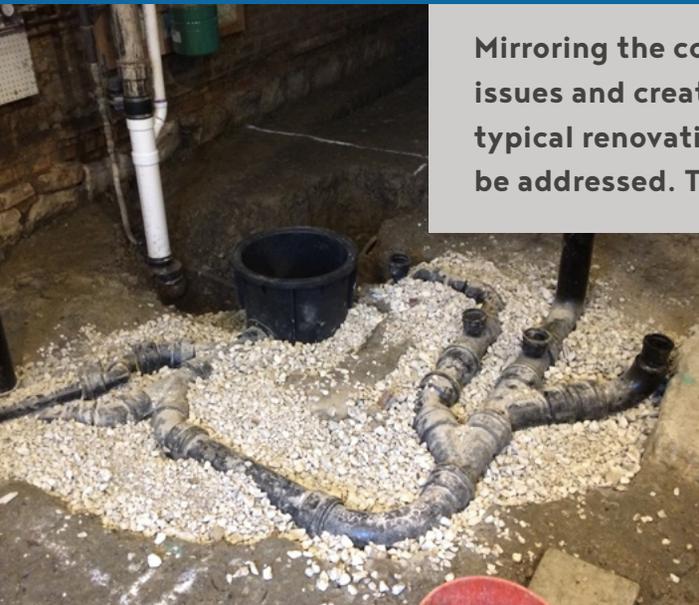
Addressing Code and Construction Issues:
Principles and Approaches to Constructing Safe Basement Units





INTRODUCTION . compliance issues . mitigation approaches

Mirroring the compliance checklist, this chapter outlines different approaches to mitigating code issues and creating safe units, identifying a) the circumstances dictating alternate approaches, b) typical renovation or repair budgets, and c) interdependent building systems which may also need to be addressed. The final section outlines conversion scenarios and budgets for small vs. large projects.



CHAPTER CONTENTS:

This 'Mitigating Issues' chapter helps you identify, in broad terms, the applicable approach and estimated costs involved in fixing any building element or system that is not code compliant.

For every code element introduced in the 'Code Compliant Units' chapter there are one or more sections that outline the contextual variables—site soils, property offsets, existing infrastructure—that will drive your architect's or engineer's recommendations for repair and the estimated cost of your basement conversion.

Each mitigation section includes the follow :

- **Thumbnails for Visual Identification:** These photos show existing elements, common tests, and construction in process. They are spread between the introductory identification and specific fixes, to enable you to visually inspect ongoing work.
- **Decision Diagrams:** Each section begins with text and a flowchart that identifies the key information which will inform your decisions facing compliance. Sometimes the factors are spatial—like offsets and their impact on drainage and fire resistance. Some are derived from specific testing; soils, air changes, radon levels. Sometimes decisions will hinge on engineering assessments or personal preferences. The more you understand the decision factors, the more you can engage with your architect or engineer and their guidance during the design process.
- **Additional elements for coordination:** For each alternate approach to mitigation shown, a series of bullet points list the physical elements which will require coordinated planning and execution.
- **Alternate approaches:** The second half of each section shows the most common approaches to correcting tissues. These drawings are fairly generic basement sections. Your basement will vary by starting foundation materials, elevation, etc. The sections, diagrams, and cost ranges are provided to give you



a general sense of the layered construction systems; the construction documents provided by your architect will be tailored to your basement's circumstances. These details are provided to 1) help you navigate those ultimate drawings and 2) allow for rough cost estimation. **Interventions that are particularly risky and expensive—and thus not advised—are marked with the icon at left.** *These approaches are not listed in the generic estimate tables, specifically because of their overwhelming risk. They may be necessary for structural stability, instead of conversion.*

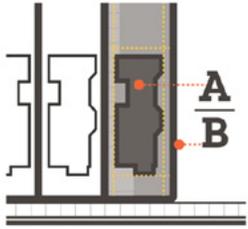
- **NHS makes no guarantee as to details' completeness (they are simplified representations when compared with CDs and specs).** *Given site and conditions variability, NHS cannot guarantee that your basement mitigation directly aligns with the generic systems shown. The drawings are tools for rough estimation and education only.*

In addition to the individual mitigation sections, the chapter ends with two construction scenarios that elaborate on chosen approaches and costs. The first conversion—from a single family Cottage to a Two-Flat—is a larger project due to common revisions to meet code and address structural repairs. The second conversion—from a Two-Flat to a Three-Flat—is a smaller project, with fewer major interventions. For each scenario, an introduction and table outline the assumed conditions and costs. On the following pages a composite decision diagram highlights the contextual decisions behind the project as a whole.

To navigate the larger chapter turn to the next page, 126. The diagram outlines the alliance between code compliance issues and mitigation sections.

CODE COMPLIANCE

issues to correct



ZONING

See permits, next chapter.

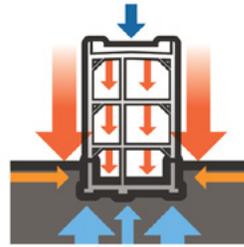


MAINTENANCE

Q1 CONSTRUCTION PREPARATION:
deconversion, demolition & safety concerns

pg 128-131

Overlaps with all others.



STRUCTURE

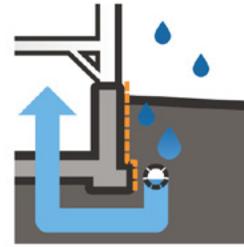
(LOADING, FOUNDATIONS)

Q2 STRUCTURAL CONCERNS:
joist, beam, & foundation repairs

pg 132-135

Foundation repairs and column replacements should be coordinated with slab work, vapor and waterproofing.

Joists and beam updates should be coordination with overhead plumbing, ventilation, and fire-resistant ceiling finishing.



WATERPROOF

(SLABS)

Q4 AREA DRAINAGE:
water & damproofing assemblies + site drainage

pg 140-143

Slab, vapor and moisture barrier and drainage should be coordinated with any height excavations, utility connections, and required radon exhaust systems.



UTILITIES

Q6 SEWER, WATER CONNECTION:
service lines, meters, backflow protection, ejector pumps

pg 148-151

Q7 ELECTRIC, GAS CONNECTION:
public lines, electric age, heating options, meters

pg 152-155

Utility work should be coordinated with slab work and pipes/conduits should be coordinated with ventilation and finishing.

MITIGATION

factors determining correction approach, alternate typ. fixes (initial elements to address + coordination required; estimates)

line variations for visual clarity only

EXAMPLES

COTTAGE CONVERSION

single family to two units
(two bedroom unit)

TWO-FLAT CONVERSION

two units to three units
(smaller two bedroom unit)

COTTAGE ADAPTATION ESTIMATE

steps, choices, cost range
pg 164-167

TWO-FLAT ADAPTATION ESTIMATE

steps, choices, cost range
pg 168-171



UNIT SIZE
(HEIGHT, AREA)



AIR & LIGHT



EGRESS
(FIRE EXITS)



FIRE SAFEY
(MATERIALS, MONITORS)

Q3
BASEMENT HEIGHT:
excavation, slab structure

pg 136-139

All slab and excavation-based height additions should address issues under waterproofing, radon, and revised utility connections.

Low profile finishes should be coordinated with ventilation & finishing.

Q8
OPENINGS & EGRESS:
windows, doors, exit structure

pg 156-159

Q5
AIR SAFETY:
randon exhaust systems
overall ventilation & fans

pg 144-147

All new openings should be coordinated with structure, vapor & moisture barriers, and comply with external opening allowances based on site-offsets (fire safety).

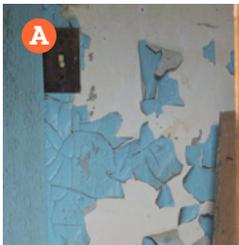
Q9
FIRE RESISTANCE FINISHING:
ceiling, wall materials

pg 160-163

Fire resistance of partitions depends on site offsets and egress routes. Materials should coordinate with ventilation, electric, and plumbing at foundation walls and between overhead beams and joists.

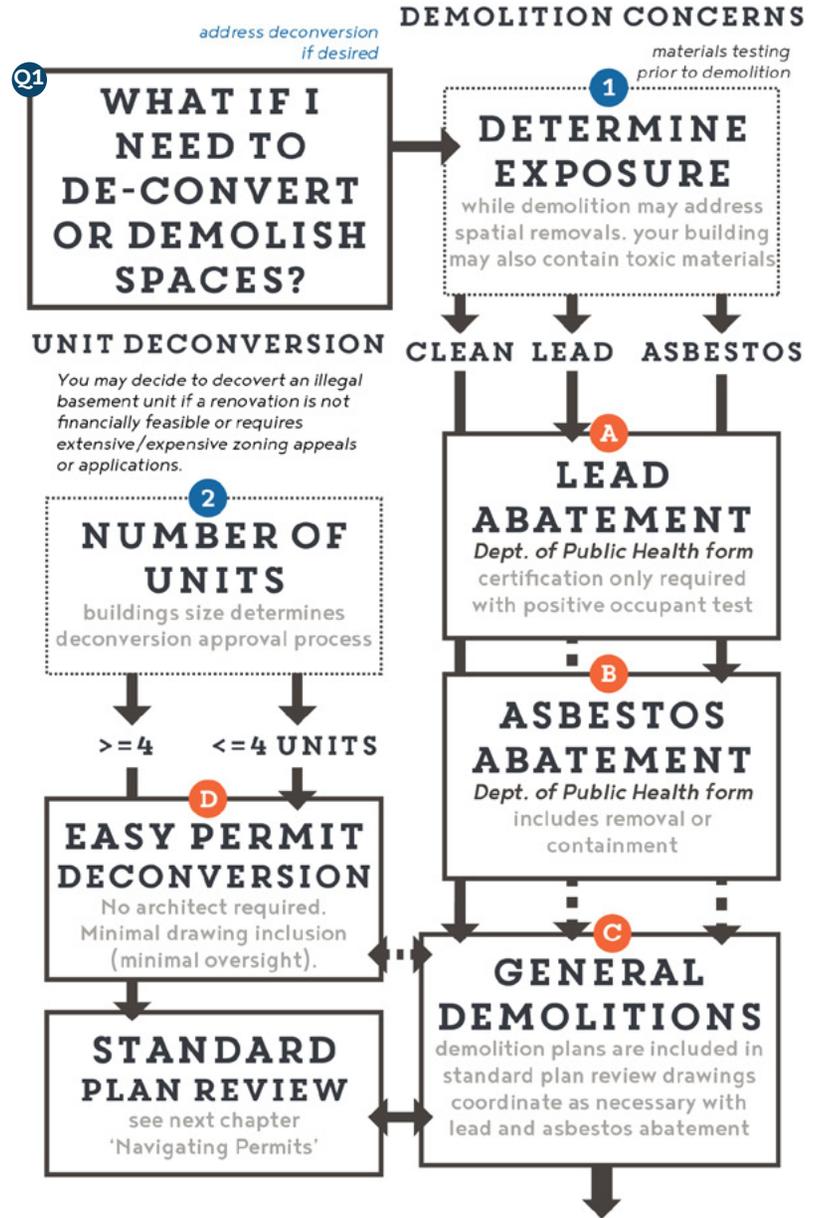


PREPARATION . safe construction



Reference: Issues identified

- A** older white lead paint, pre-1978
- A** peeling interior paint—dangerous for creating ingestible/breathable lead particles
- B** old asbestos wrapped pipes (steam heating system)
- B** asbestos in loose vermiculite insulation (more common in attics)



CONSTRUCTION PREPARATION:

If you are considering a basement conversion or are looking to de-convert a current illegal unit, you may be facing interior demolition of older interior partitions and indeterminate finishes. For the safety of your family, tenants, and the contractors' crew, you should have material samples tested to determine what environmental cleanup is needed. Environmental permits are submitted after your building or deconversion permits, but for safety, tenant communication, and coordination purposes it's best to assess any toxins and risks early.

Exposure: To detect lead, you can start with a simple home kit, like 3m leadcheck swabs, and follow up with formal lead paint inspection (with paint test and XRF scanning) by a state-licensed lead inspector. For asbestos, all testing should be handled by a professional. If lead is found, your contractor should follow clean-up procedures recommended by the EPA, to avoid tenant exposure. If a child/tenant tests positive for lead, you would be required to submit a Lead-Based Paint Renovation, Repair, and Painting form (LRRP) to the Department of Public Health. If asbestos is present and friable (crumbling) a professional should perform asbestos abatement, coordinated with the city by submitting the "National Emission Standards for Hazardous Air Pollutants" (NESHAP) form.

Deconversion & Demolition: If you have decided not to convert an old, illegal unit, into a legal dwelling, you will need to apply for unit deconversion with the Department of Buildings. The complexity of this depends on your building size: five or six unit buildings must submit deconversion through the Standard Plan review (see 'Navigating Permits'). Broadly, a standard plan set includes demolition plans—what to keep, what to eliminate—for existing structures; the easy permit requires a very simplified schematic version of that information.

MITIGATION COORDINATION:

A. SAFETY: LEAD PAINT REMOVAL

Lead paint is common in older buildings. Lead particulate and paint chips, if ingested by children, cause lead poisoning and developmental damage. Lead is typically either covered and contained—away from accessible surfaces—or removed during demolition to avoid future hazards. (Learn more at EPA: www.epa.gov/lead and the Department of Public Health: bit.ly/Chicago-Lead.)

Related construction required:

- cleaning is done in tandem with preparatory demolition
- city certification is only required if occupants test positive, but federal safety protocols should guide cover/cleaning practices

B. SAFETY: ASBESTOS REMOVAL

Asbestos was once a common insulating material and may be found wrapping old pipes or in floor and sheathing materials. When airborne it can be inhaled and causes lung cancer. As with lead, intact asbestos can be covered and contained. If crumbling, it should be removed during renovations to lessen the risk of accidental disturbance and fiber release. (Get NESHAP forms at: bit.ly/Chicago-NESHAP)

Related construction required:

- cleaning is done in tandem with preparatory demolition

C. DEMOLITION

General demolition is done at the start of construction or phased by building system to align with repairs and replacements.

Related construction required:

- Architect and contractor will coordinate this larger process and incorporate environmental hazards removals as necessary
- For demolition, under an Easy Permit Deconversion, your contractor should coordinate the required work

D. UNIT DECONVERSION

Deconversion enables a building owner to avoid future zoning violations and fines, when an illegal unit is unable to be converted.

Related construction required:

- not all unit elements need to be removed—Walls can stay and bathrooms are permitted (without full tub or shower).

A. SAFETY: LEAD PAINT REMOVAL



COST VARIES BY EXTENT

Properly done lead abatement is easy to recognize as it requires the use of plastic tarp for containment, ventilator masks for work safety, and vacuums to remove dusty, contaminated air. Testing is typically inexpensive (under \$500) but abatement costs will depend on the extent and complexity of the area. LRRP certification is required if a building occupant test positive & work includes window replacement, work that disturbs 6 square feet + of interior paint or 20 square feet + of exterior paint.

B. SAFETY: ASBESTOS REMOVAL



\$300 permit costs COST VARIES BY EXTENT

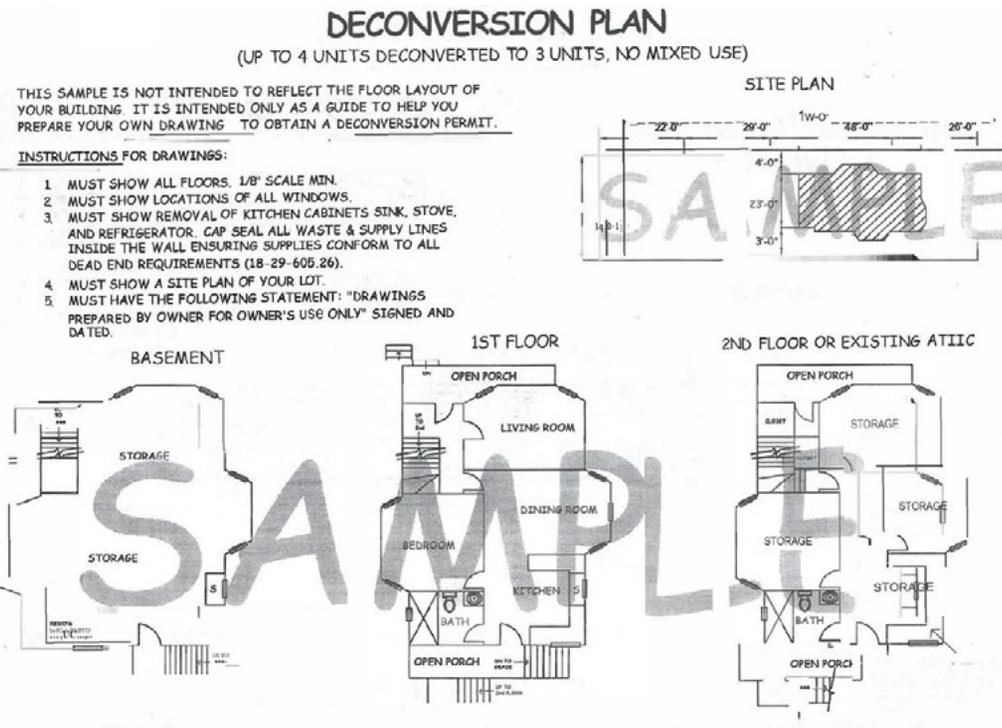
Asbestos abatement looks similar to lead—with ventilators, plastic containment bags, and air tubes—as removal protocols seek to contain dust and stop particulate dispersal. Testing is reasonable (under \$250–\$750) but abatement costs will depend on the extent and complexity of the area. Removals tend to be more focused, on specific pipes or insulation, in contrast with the wider area attention required for lead paint abatement.

C. INTERIOR DEMOLITION



\$200-\$550 minor removals, single element or area
\$2,500-\$4,000 old partitions and extensive areas
 General demolition, esp. for deconversion or an empty basement, can be minimal (cabinet removals and capping plumbing). For larger projects, your contractor should coordinate 1) disposal needs, 2) any specific abatement protocols (left), and 3) the temporary structures or transitional services required during demolition and construction. The site should be regularly cleaned to limit fire hazards and nuisance dust. Costs vary by extent.

D. UNIT DECONVERSION

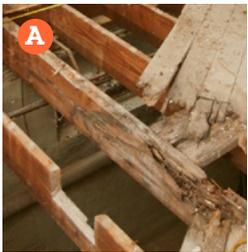


\$750 permit via standard plan review (does not include demolition)

Deconversion permits are fairly inexpensive and, for small buildings, do not require the same planning resources as a conversion. The schematic shown above is provided by the city, to show and list the typical level of detail required (for four or fewer units total, pre-deconversion). Given the site drawings and notes done for the 'Code Compliance' assessments, you could certainly make similar plans. Note that in this sample, attic deconversion simply requires kitchen & plumbing removal, without complex structural/room alterations.

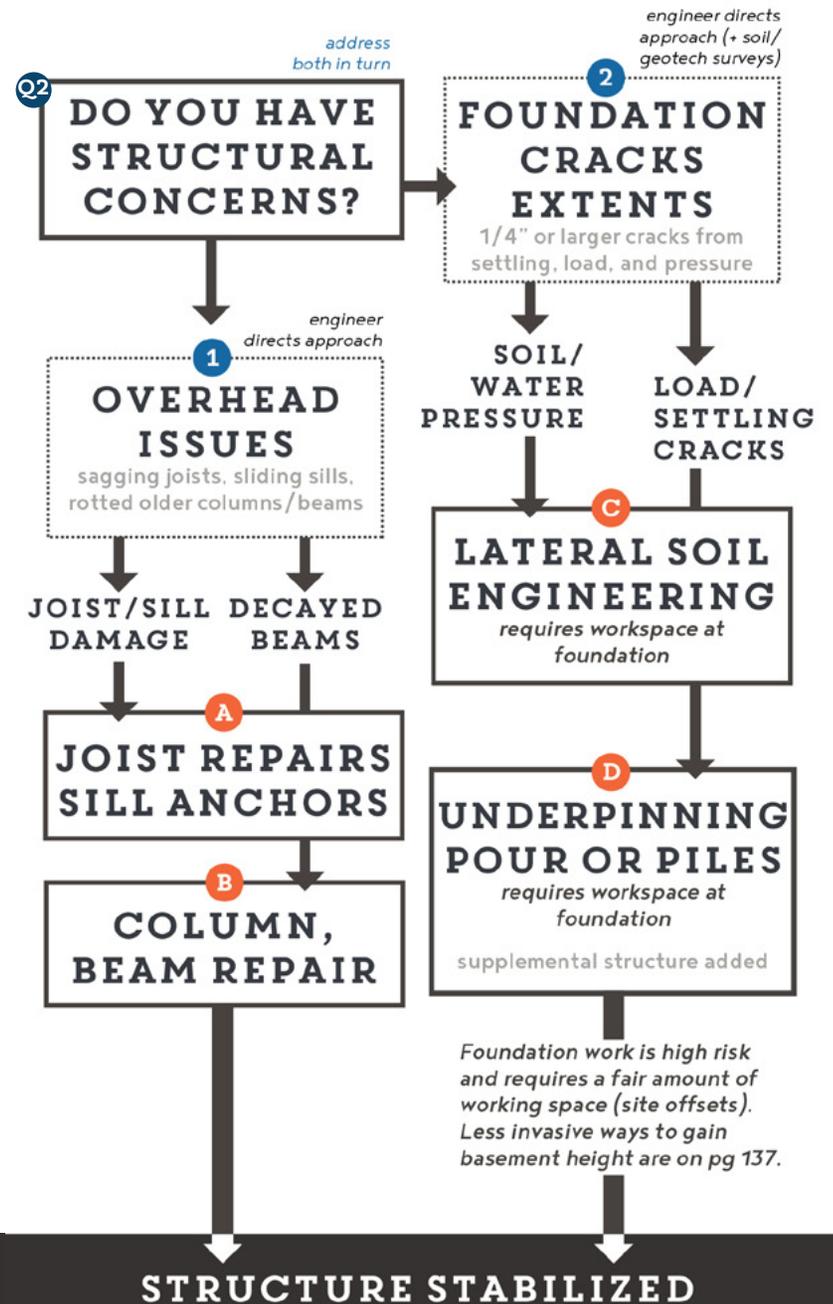


STRUCTURAL ISSUES . existing



Reference: Issues identified

- A** joist decay from water damage & termites, cuts for plumbing
- B** column rotted from moisture (temporary hydraulic jack at base)
- C** bowing & spider cracks indicating soil/water pressure on foundation
- C** soil cores from site, to determine sources of foundation pressure
- D** settling addressed by underpinning with helical screws anchored to footer
- D** settling addressed by underpinning (in sections) with mass concrete pours (adds height, but is high risk)



STRUCTURAL REPAIR APPROACHES:

If you have structural failures or damage in your basement ceiling or your foundation walls, your architect or structural engineer will assess the issues and direct mitigation.

For overhead areas: visual assessment, material samples, and deflection measurements will guide your architect or engineer's recommendations for ceiling joists, sill anchors, and the beam and column system. You may need to remove existing floorboards or plaster to assess the extent and repair approaches. In addition to some of the typical repair approaches on the next page, you should anticipate adding temporary support structures—braces, jacks, wooden framing—to limit the amount of stress and movement to your overall structure during the repair process.

For foundations: if there are large cracks ($>1/4''-1/2''$) which are growing, your architect or engineer should take soil cores or dig test pits—with visual and material samples—to identify the source of loading issues and recommend drainage, soil engineering, or grading/planting resolution. For lesser cracks, you will likely be instructed to take periodic measurements to assess rate of movement/deterioration. For major settling, your architect or engineer may suggest underpinning, replacing unstable soils with supplemental structure. There are several underpinning approaches, which vary based on your foundation materials and work areas. Your architect and engineer will direct this process as it is high risk; under no circumstances should you attempt 'quick' foundation repairs without professional guidance.

The next column describes the additional factors/elements to be coordinated with particular structural repairs (including design and installation considerations). The following details show typical components and cost ranges, to help you estimate and visually confirm satisfactory repair work.

MITIGATION COORDINATION:

A. JOIST & SILL REPAIRS

Additional joists can be added to shore up floors and address minor loading issues. Sill anchors should be retrofitted on wooden frame buildings to avoid the structure sliding off the foundation.

Related construction required:

- address in tandem with beam & foundation repairs,
- frame out interior stairs, utility, and exhaust openings in tandem
- coordinate with ventilation ducts, new openings (sills/anchors)

B. COLUMN & BEAM REPLACEMENT

Replacing rotten wooden columns/beams with metal elements can both stabilize your building and allow larger open spans.

Related construction required:

- address in tandem with other structural issues
- beam height + ducts must work with fire egress height req.
- coordinate footers (at lowest, sewer line depth) and slab joints

C. LATERAL SOILS ENG. (WALL REPAIR)

Water, root, and excessive soil loading impacts on the foundation should be addressed by fixing the underlying issues and rebuilding damaged areas. This will require space around the foundation for implementation.

Related construction required:

- Remediation should be integrated with drainage, utility work
- All repairs should be careful to brace upper structure and use tie-backs or keep soil at repose during sitework
- Excavation permits req. if within 10' of property line or $>12'$ deep

D. UNDERPINNING FOUNDATION

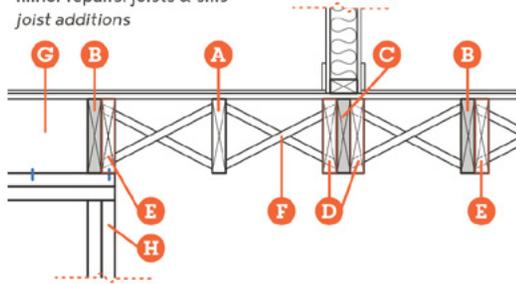
Major settling issues require adding support beneath your footers, to act in place of irregular/moving soils. This is expensive, risky work. If you just need ceiling height, see pg 137.

Related construction required:

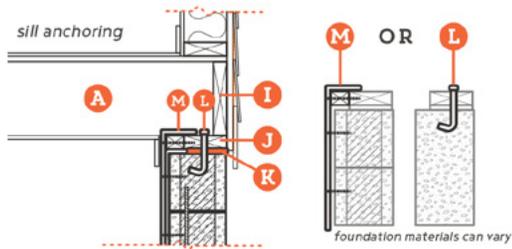
- coordinate with drainage, utility, and slab replacement
- movement during underpinning can crack walls and damage upper floors—anticipate extra finishing costs across building
- see repair remark under 'C. Lateral Soils Engineering' above

A. JOIST & SILL REPAIRS

minor repairs: joists & sills
joist additions



sill anchoring



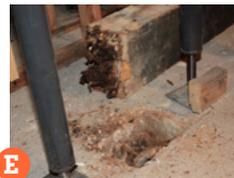
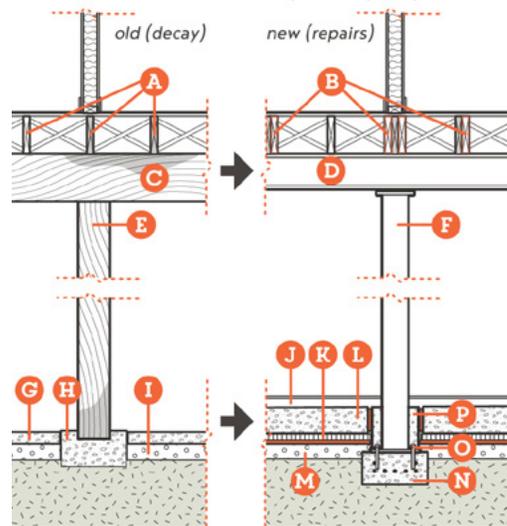
- A** ok existing joists (depth varies, 16" or 24" o.c.)
- B** damaged (water, etc.)
- C** damaged (loads)
- D** supplemental joist supports under walls
- E** new joists, bolted laterally
- F** updated cross-bracing (as necessary)
- G** lateral 'blocking' for opening/ new wall frames
- H** header
- I** header
- J** pressure treated sill
- K** 1/4" foam gasket as moisture barrier to stop water wicking up from foundation
- L** sill anchor (original) set in grout, concrete, or epoxy
- M** sill anchor (retrofit) bolted/nailed from side

COST VARIES BY EXTENT

Costs vary by damage and design of new openings/wall and loading connections. Sill work should anchor your wooden frame building to its foundation, while stopping water from migrating into the wooden frame. (Sill anchors aren't necessary in stone/brick; your joists may slot into walls without sills/headers. Architect will provide details.)

B. COLUMN & BEAM REPLACEMENT

(center) beam replacement
to address common rot, increase spans to open up areas



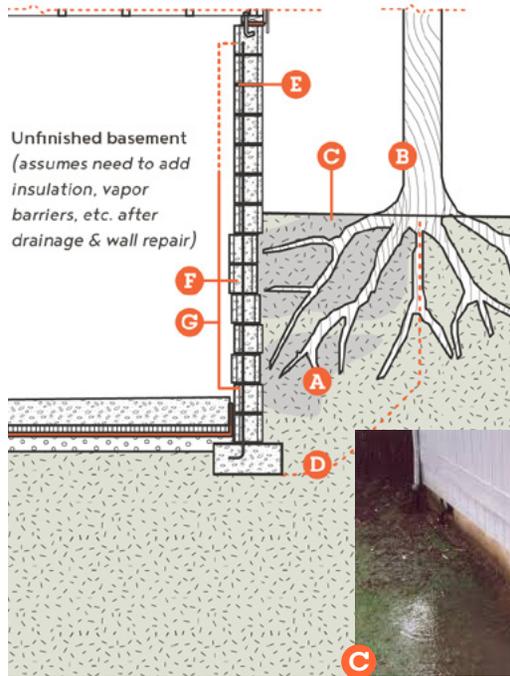
- A** existing joists
- B** supplemental joists
- C** old beam (with rot)
- D** new i-beam
- E** old column (base rot)
- F** new steel column
- G** slab w/o barriers
- H** old footer
- I** old gravel
- J** finished floor
- K** continuous moisture/vapor barriers
- L** 4" + new slab
- M** drainage: crushed stone
- N** new footer
- O** reinforcement with bolts for column anchoring
- P** collar with isolation joints at new slab

\$3,500-\$6,500 (replacement of beam & new columns)

Beam and column replacement should support joists and the structure above, potentially carrying additional loads or spanning additional space between columns. Cost will vary based on materials (number of columns needed, I-beam or timber profiles used) and complexity of your structure (single center beam or multiple bays, each with a beam).

C. LATERAL SOILS ENG., WALL REPAIRS

foundation repair - lateral pressure issues
remove and re-engineer area soils, drainage,
(roots) to avoid repeated damage, rebuild wall sections



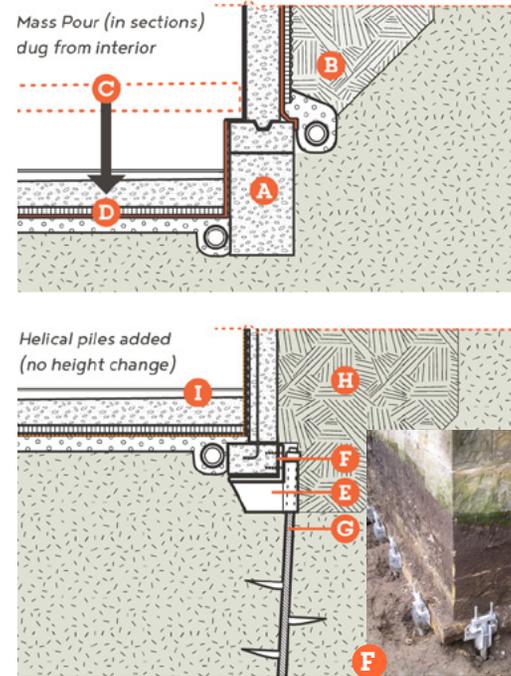
- A** extra pressure areas
- B** source of root pressure (following water)
- C** standing water
- D** excavation/work area
- E** mortar decay / lack of grouting can lead to weaker walls
- F** specific pressure displacements/bowing
- G** potential repair areas (to be done in sections, with structure braced)

\$2,000 soil report, testing **\$800-\$2,400** roots removal
\$4,000-\$20,000 wall repairs vary (minor to major)

Repairs and costs will vary by extent. They should address external pressure and internal structure. See drainage for structurally healthy wall sections, pg 141.

D. UNDERPINNING FOUNDATION

foundation repair - underpinning
addresses settling by removing/replacing areas of weak soil
(high risk)

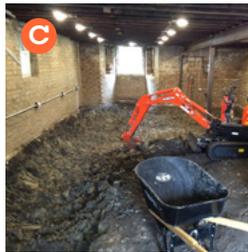


- A** concrete underpinning
- B** existing drains (reconnect)
- C** original slab height
- D** new slab profile (see interior tile drains)
- E** beam support under footers
- F** anchoring to existing footer
- G** helical piles (to stable soil)
- H** work area for hydraulics
- I** no height change for slab

\$20,000-\$40,000 concrete is less, helical piles more
Underpinning should only be done if absolutely necessary to prevent structural failure. Digging beneath your foundation has the potential to destabilize your entire house and should be done in small sections, with extensive supplemental support. It may void your home insurance so discuss extensively with your engineer before pursuing underpinning.

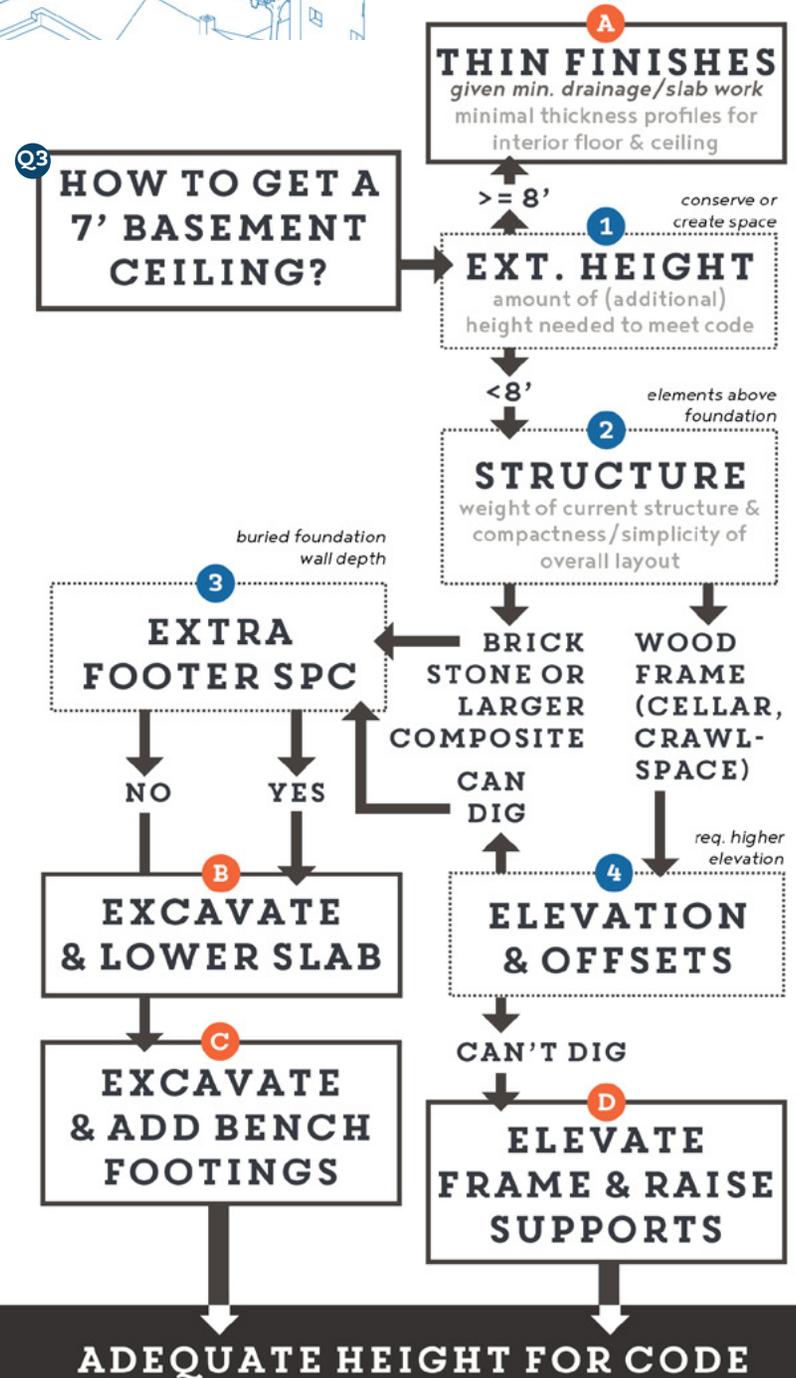


CEILING HEIGHT . slab & elevation



Reference: Issues & Process

- A** low profile floors (concrete, radiant heat & polish) pre-pour
- B** removing old, thin slab for min. depth adjustment (and sewer-line work)
- C** excavation of major height (power and manual work) with undisturbed soil at footer edges, for benched footers
- C** benched footings poured (frame in place) with interior tile drains (pre-geotextile) in place
- D** structure raised on cribbing, note holes in original foundation for I-beams prior to hydraulic lifting
- D** structure raised on cribbing (after hydraulic lifting is done), awaiting new foundation piers or cellar walls (high risk)



HEIGHT INCREASE APPROACHES:

During structural assessment, your architect or engineer should measure—by sonar, cut, or core—existing elevations for footers, walls, and slabs, as well as current and potential ceiling heights. If you have low basement ceilings, your options to create a 7' tall basement will be determined by the 1) existing height, 2 & 3) the structure of your foundation and upper structure, and 4) the perimeter space around your building (offsets).

1. Existing Height: Basement excavation is costly, given the amount of manual labor and tight spaces involved. If you have a slightly short structure—8' to 8'6" from soil to joists—you can avoid digging costs and foundation damage risks by using thin assemblies (more rigid insulation, less loose, etc.). The easiest route is to simply conserve space.

2 & 3. Existing Structure—Foundation & Upper Stories: Typically, to get extra height, you'll want to excavate within your basement. Your wall and column footer may be much deeper than your thin slab and you can lower and repour the slab assembly with minor excavation. If you need multiple feet of depth, without disturbing your foundation or upper structure, you can excavate down and create bench footers. Both of these approaches are labor intensive but far less risky than raising a structure. Be mindful of the potential need for window wells and egress areas as you develop designs for a lower basement unit.

4. Elevation & Perimeter Offsets: If you can't dig down and have a simple frame structure and external workspace, it is possible to hydraulically lift your building and build walls up to meet a new elevation. This a common approach in sea-level rise mitigation, but, as with underpinning, is high risk because it moves the main structure.

MITIGATION COORDINATION:

A. THIN FINISHES (NO EXCAVATION)

Thinner finishes can remove the need for greater basement excavation but must maintain air/moisture/fire barriers.

Related construction required:

- coordinate slab work with radon, utilities, and drainage work
- insulate/enclose ceilings (around ducts) as fire partitions
- insulate & damp-proof slab/walls to work with drainage

B. EXCAVATE & REPLACE SLAB ONLY

Some houses have deeper footers, where thin slabs were belatedly added to mud floors. It is common to excavate this minor depth (plus drainage) and repour the slab. Make sure to isolate the slab from walls & footers.

Related construction required:

- coordinate elevations & slab work with beams/columns, radon, utilities, drainage work and new exits/basement doors
- insulate & damp-proof slab to be consistent with drainage

C. EXCAVATE & POUR BENCH FOOTERS

To gain significant height, without touching the foundation, you can excavate the floor (with a repose slope at edges) and pour bench footers. This can gain significant height and is less invasive than underpinning.

Related construction required:

- coordinate elevations & slab work with beams/columns, radon, utilities, drainage work and new exits/basement doors
- connect existing drains with interior drains & sump pump

D. ELEVATE FRAME (+NEW SUPPORTS)

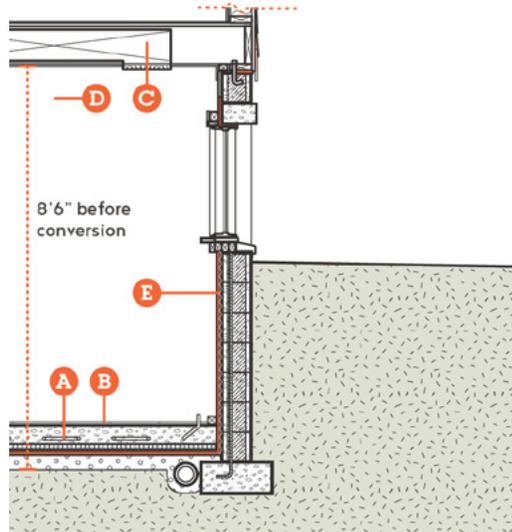
Akin to traditional house moving, it is possible to raise a simple building on I-beams and hydraulic jacks if you have space and cannot excavate.

Related construction required:

- See slab comments above and note on cracks in underpinning.
- Requires extensive work space for I-beam maneuvering and additional jack supports/placement.
- The temporary crib supports will likely crack existing slabs so anticipate repairs, if not replacement. As with underpinning, you are likely to void your insurance.

A. THIN FINISHES (NO EXCAVATION)

conserve height with thin finishing profiles for 8'6" basements and above (soil to joist)



- A** 4-5" slab with integrated radiant heat
- B** tile for heat transfer (with underlaid membrane at joints, alt. would be polished concrete finish)
- C** ventilation ducts within (mostly) joists for minimal height—make sure to insulate for efficiency, fire resistance
- D** beams nested in walls to minimize height impact
- E** drain tiles & exposed surface to avoid excess condensation

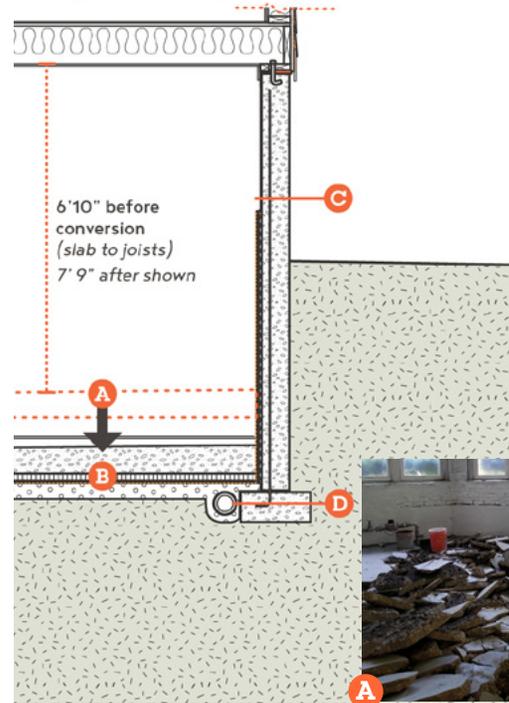


\$2,000-\$3,000 basic slab pour, not inclusive of heat

Thin slab replacement is done to conserve height while adding insulation, moisture/radon protection, adequate thickness to support unit loads, and, potentially, supplemental services like radiant heat. Cost will vary based on size, complexity of area/joints, and integration of heat. See ventilation and finishing for ceiling and wall approaches to space conservation.

B. EXCAVATE & REPLACE SLAB ONLY

create height by lowering slab only (unlikely to have much space to gain)



- A** original slab height
- B** new position, isolated (by vertical sand/gravel) over foundation footers, joints 10' x10' or 1:1.5 ratio at columns
- C** typical exposed wall assembly with drainage tiles & moisture barriers to 1' above ground
- D** typical 4" perforated PVC pipe with drainage boards, geotextiles, & gravel for interior tile drainage (p140)



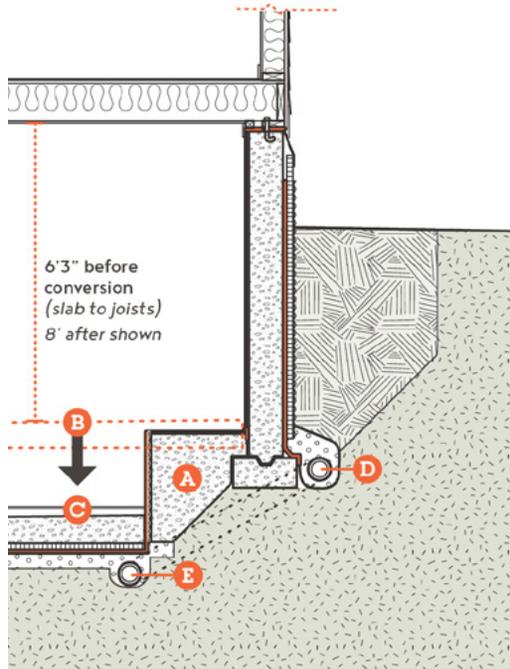
\$2,500-\$4,000 demolition of existing structures + slab

\$2,000-\$3,000 basic slab pour

Minor slab excavation and replacement is done to create height while adding insulation, moisture/radon protection, and adequate thickness to support unit loads. As in approaches A and C, it should be coordinated with water, sewer, and MEP updates, which have sub-slab components. Cost will vary based on size, complexity of area, joints, and final finishing.

C. EXCAVATE & POUR BENCH FOOTERS

create height by digging out a 'bench foundation'
gain vertical space without disturbing existing structure
(reasonable route, labor intensive)



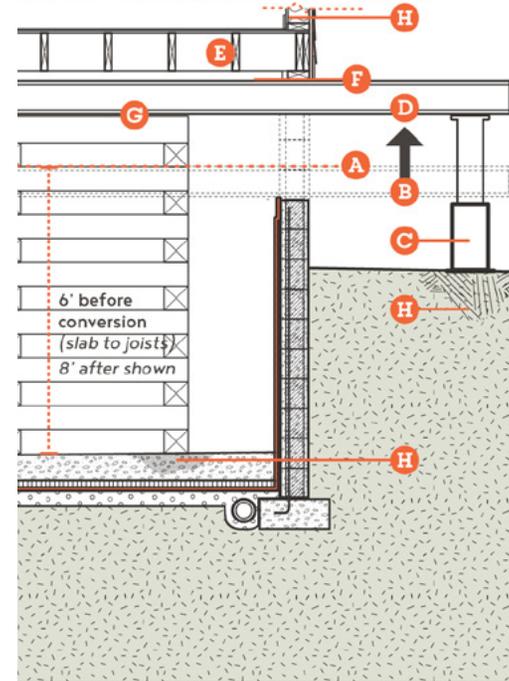
- A** new bench footer, with undisturbed soil at angle of repose, reinforce as necessary
- B** original slab height
- C** new slab position (see B in 'Excavate & Replace')
- D** original exterior tile drains to be connected with:
- E** new interior drains and sump pump



\$12,000-\$21,000 excavation & bench footer creation
Major excavation and addition of bench footings is done to create significant ceiling height while laterally supporting existing footers (slabs conform to comments in minor excavation, approach B). Existing exterior foundation drains should be connected to new, interior perimeter drainage and sump pump systems. Cost will vary based on size, depth (digging method/labor), and complexity of area excavated as well as jointing and finishing desired.

D. ELEVATE FRAME (+NEW SUPPORTS)

create height by raising frame (akin to moving a house)
gain vertical space by lifting simple buildings
(high risk, disconnect/revise all utility connections)



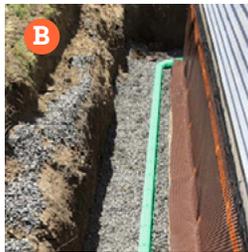
- A** original wall height (hole at top)
- B** I-beam inserted under joists (perpendicular)
- C** hydraulic jacks for lifting (requires workspace)
- D** final I-beam height
- E** original joists, new location-shim as necessary for lift
- F** final sill/wall height-build up
- G** temporary supports (timber cribs)
- H** likely areas of stress



\$3,000-\$14,000 hydraulic lifting & stabilization
\$10,000+ edits and alterations to extend basement walls
Raising a building is a high risk maneuver and requires significant additions to the foundation walls as well as likely repairs to upper walls and areas of temporary cribbing impacts. Cost will vary based on size and complexity of structure.

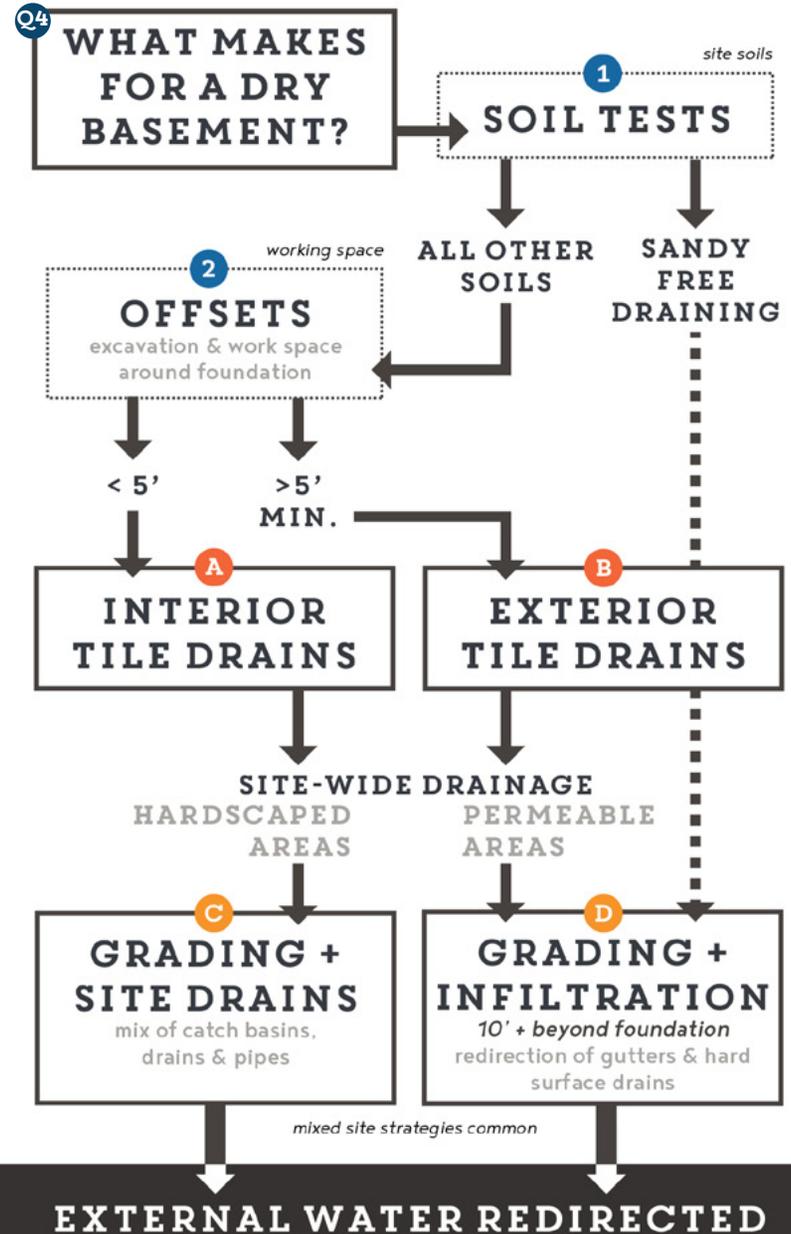


AREA DRAINAGE . water management



Reference: Installation Process/Pieces

- A** Drains—4" PVC with weep holes—next to gravel trench (geotextile sleeve on section at bottom, in trench)
- B** exterior drain pipe (pre-geotextile) adjacent to drainage-board/damp-proofing covered foundation wall
- A** sump pump with new concrete patching over interior tile drains, drainage board visible above edges
- C** exterior soft strategy - open channel (rocks to diminish water velocity) from downspout to permeable areas
- D** exterior hard strategy (mixed)—downspout to PVC line with emitter to release water at lawn
- D** exterior hard strategy—downspout to basin (to larger piped drainage/ stormwater system)



SITE DRAINAGE APPROACHES:

Your approach to creating a dry basement will be determined by your building site, given **1) soil composition and natural drainage and 2) building offsets and perimeter work areas.**

1. Soil Composition/Soil Test: Your architect or engineer should do soil cores/test pits to determine existing drainage potential. If you're lucky, your site has sandy soils which drain without assistance. That said, any mix of sand with loam or clay will trap groundwater and require a drainage system to move flows away from your foundation.

2. Offsets/Perimeter Space: Where you place drainage is determined by your working space. If there is room to work (ideally 10' offset) external excavation can be done to place tile drainage, vapor/damp-proofing, and insulation on the outside of your foundation walls, preserving interior space. If you lack external room (less than 5'), you can add tile drainage at the inside of footings. In this scheme, water flows through the foundation walls, down drainage boards to gravel and drains. Moisture and condensation are stopped by moisture/vapor barriers and rigid insulation on the inner foundation wall edge, before reaching any finishing materials. In both cases, water flows to perforated PVC drains which, as shown on the next page, connect to sump pumps to be raised to lawn or the combined storm & sewer system (cso) for disposal. In the rare case that your foundation is higher in elevation than the cso connection, tile drains may simply connect and drain by gravity (1-2% slopes).

In addition to the intensive installation of tile drains, you should keep water out of the area next to your foundation by using soft strategies—slopes to promote run-off and remote infiltration areas for downspouts— as well as hard conduit connections to the cso system, like catch-basins, trench and french drains, and maintenance clean-outs.

MITIGATION COORDINATION:

A. INTERIOR TILE DRAINS (FOUNDATION)

If you have water coming through your foundation, but no space to address on the outside, you will need to add interior drains and a sump pump to intercept those flows.

Related construction required:

- coordinate with slab patching (at edges) or replacement, radon venting, and utility connections (to the cso)
- combine with siteworks redirecting surface water (C, D below)

B. EXTERIOR TILE DRAINS (FOUNDATION)

If you have water coming through your foundation and space to work on the outside, you can add exterior drains.

Related construction required:

- perform in tandem with foundation repairs (as necessary)
- coordinate with slab patching (at sump), radon & damp-proofing membranes/venting, and utility connections (to the cso)
- combine with siteworks redirecting surface water (C, D below)
- requires excavation permit if within 10' of site boundary

C. SITE GRADING & SOFT SYSTEMS

In addition to foundation drains, your larger site should be graded to move water away from the foundation (2%+ slope). Collection areas, for permeable absorption, should be at least 10' from the building.

Related construction required:

- combine with foundation drains & 'hard' drainage below
- coordinate with any new doors, areaways, and window wells needed for egress, light, and ventilation

D. SITE GRADING & HARD SYSTEMS

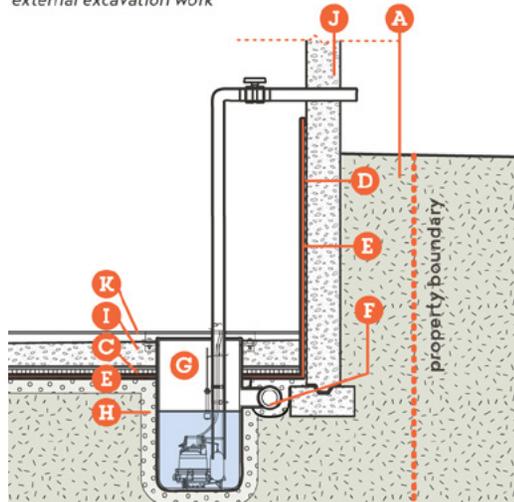
In addition to permeable areas, you should use catch-basins and extra french/trench/area drains and pipes to redistribute water and connect downspouts and cso systems.

Related construction required:

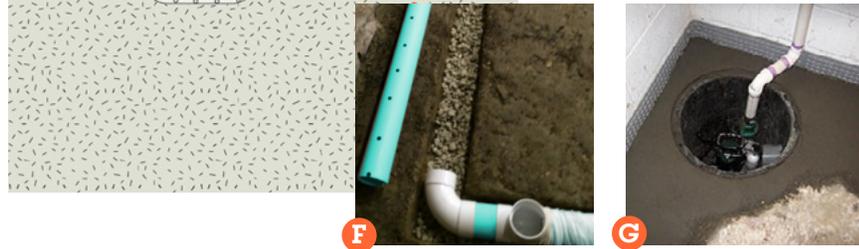
- same comments as 'C. site grading & soft systems' above

A. INTERIOR TILE DRAINS (FOUNDATION)

internal tile drainage with a sump pump
sites without space for
external excavation work



- A** site—no work space
- D** drainage board—1' above grade
- E** water barrier—1' above grade
- vapor/water barriers
continuous below slab
- F** 4" PVC perimeter drains,
geotextile wrap on placed pipe
- G** sump pump
- H** 4" gravel drainage
- I** 4"+ concrete slab, with joints
- J** foundation wall
- K** finished floor
- L** exposed walls



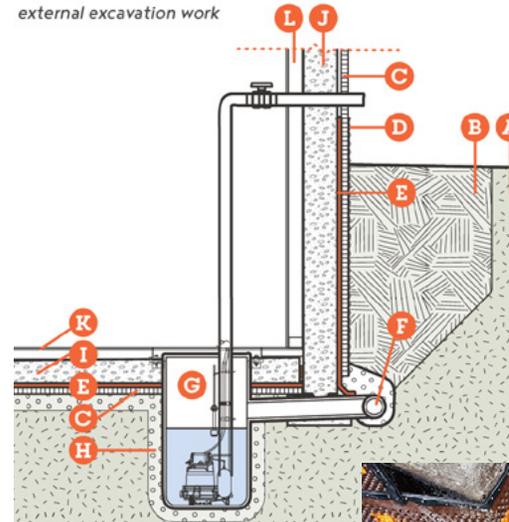
\$3,500-\$6,000 drainage plane, insulation for slab

\$6,000-\$10,000 sump pump & tile installation

Interior tile drainage allows water to pass through your foundation, with drainage board directing it down to sub-slab drains. Water/vapor barriers minimize leaks and insulation limits internal condensation in finished walls. Costs vary by size of area to be drained, combined slab work, and sump pump size/disposal connections.

B. EXTERIOR TILE DRAINS (FOUNDATION)

external tile drainage with a sump pump
sites that have space for
external excavation work



- A** site—excavation space
- B** backfilled area, gravel at
drainage pipe
- C** rigid insulation to top of
wall—limits condensation
in walls (L)
- D** D-E see labels for
interior drainage
- E** D-E see labels for
interior drainage
- F** 4" PVC perimeter drains
wrapped in filter fabric
- G** G-L see labels for interior
drainage, finish may vary



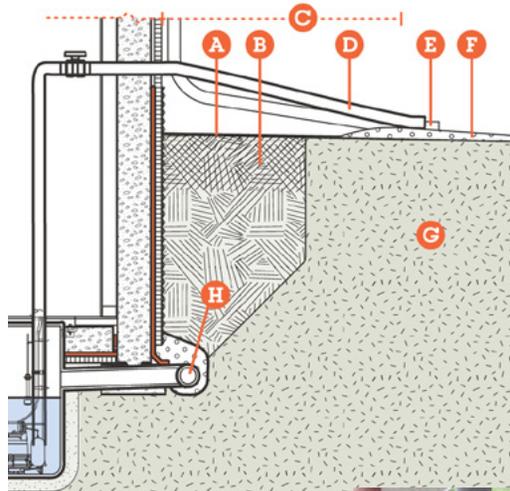
\$6,000-\$10,000 sump pump & tile installation

\$3,000-\$7,000 air-dampproofing membranes

Exterior tile drainage, with external moisture barriers and insulation, drain water from soils adjacent to the foundation while minimizing internal condensation in the foundation and finished walls. Insulation minimizes thermal changes so areas above grade are protected from freeze/thaw. Costs vary by size of area to be excavated/drain, foundation wrapping, and sump pump size/disposal connections.

C. SITE GRADING & SOFT SYSTEMS

soft systems: sump pump, downspouts, permeable surfaces
sites with space (5'+) for absorption beyond foundation
(may be mixed with hard systems)



- A** 2% slope minimum for water to flow away from building
- B** engineered backfill
- C** min 5-10' distance before water release & absorption
- D** outlet for 2" sump pump pipe with backflow valve
- E** downspout outlet
- F** gravel or ceramic to slow water velocity/prevent erosion
- G** permeable area
- H** exterior tile drain assembly

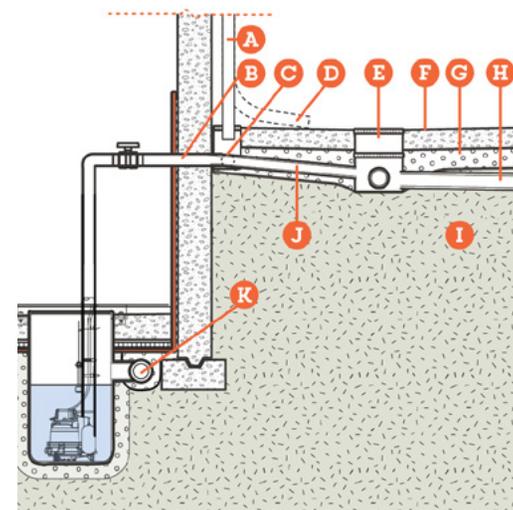


VARIES BY GRADING EXTENT

In addition to foundation drains, your site grading, sump pump and downspout discharges should be located to minimize water near the foundation. 2% downward slope should encourage rain to runoff to other areas. Open release of water should only occur in permeable areas 5-10' away from the foundation (for slow migration, evaporation, or plant absorption.) Costs vary by extent.

D. SITE GRADING & HARD SYSTEMS

hard systems: sump pump, downspouts, area drains
sites without space (5'+) for absorption or with paved areas
drainage to cso system (may be mixed with soft systems)



- A** downspout
- B** 2" sump pump pipe with discharge to surface drainage system and cso
- C** direct connection (beyond) to drainage system and cso
- D** alt. downspout to hard area
- E** larger 9" area drain (6"-12" var.)
- F** 1% slope, concrete (4" thick)
- G** gravel bedding
- H** 4" drain pipe to storm/cso system via gravity
- I** undisturbed soils
- J** internal system connections



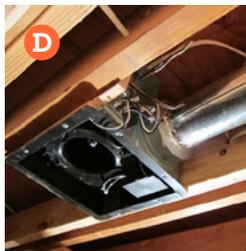
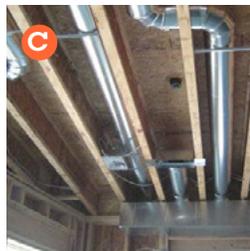
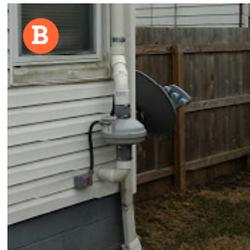
\$1,300-\$2,300 per area drain

\$1,600-\$2,200 areaway additions

In combination with soft strategies, you should integrate 'hard' conduits (slope 1% min) to facilitate drainage from impermeable areas to the cso system or permeable zones. Elements like trench and area drains should be placed near basement entries to eliminate potential flooding. Costs vary by number of drains, connections, and clean-outs.



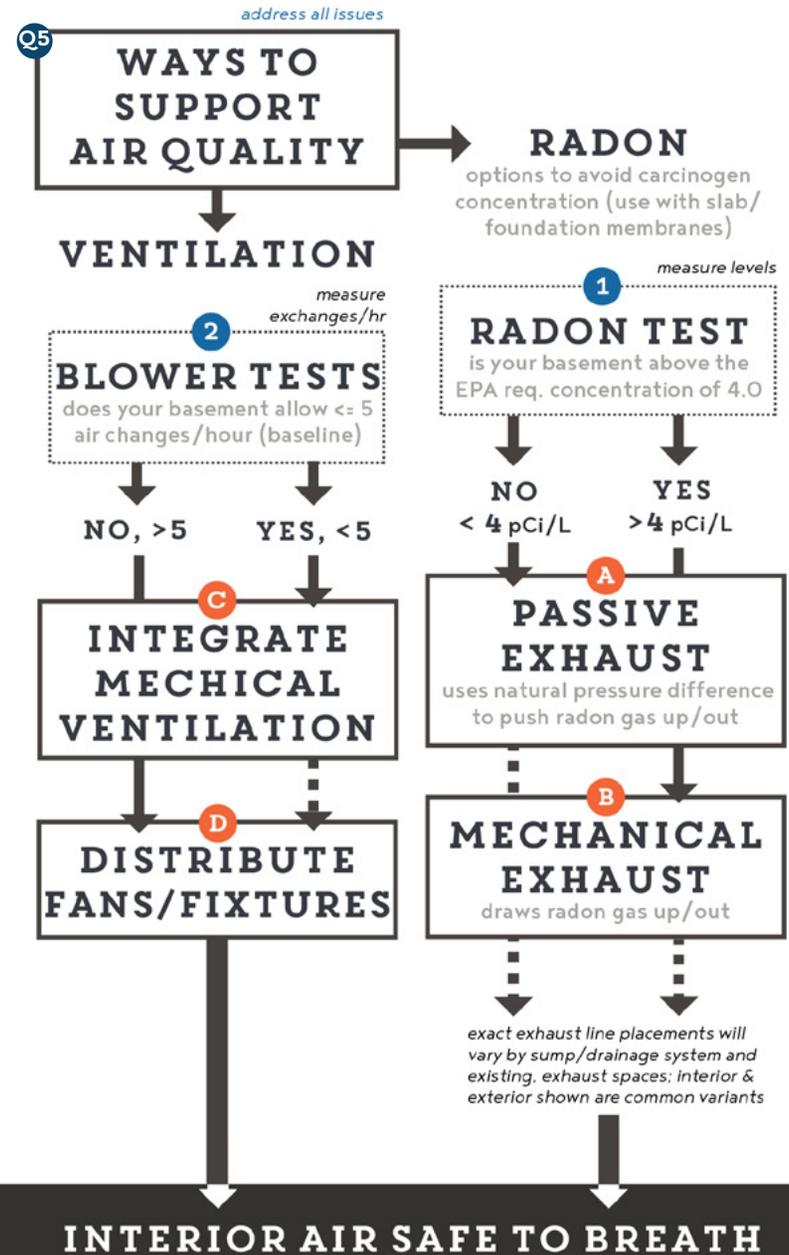
AIR SAFETY . radon . ventilation



Reference: Test & Elements identified

- 1 radon detection—smaller domestic detector for basement installation
- A passive radon vent (PVC pipe), note detection monitor (red) and warning signage (radioactive sign)
- B mechanical radon vent, with vent fan and wiring visible on house exterior
- 2 blower test to determine air-tightness and, in combo with natural vent., determines ventilation system needs
- C typical low profile system of ventilation/heat duct work
- D fan installation, required in bathrooms, for focused air/moisture abatement

Radon is a naturally occurring radioactive gas produced by the breakdown of thorium and uranium in soil, rock, and water. It is the only gas that has radioactive isotopes, under standard conditions, and is considered a health hazard due to its radioactivity level.



AIR SAFETY APPROACHES:

Your approach to interior air quality will be determined by 1) the natural rate of radon release in your area (geology and soils) and 2) the relative internal moisture condensation and air circulation of your basement.

1. Radon Seepage: Radon comes from the breakdown of uranium in soil, rock and water and gets into the air you breathe (see EPA: www.epa.gov/radon). It is the second highest cause of lung cancer, after smoking. There is no safe level of radon exposure. As basements are the lowest area of a house, with relative low air pressure (vs. soil and outdoors), they can act as a vacuum. Unsealed floor and wall cracks, uncovered sumps, and loose fitting drains allow radon to seep in and concentrate in the air. For this reason all renovations are required to add vapor-barriers and sub-slab exhaust for all basements. You should purchase a radon test, available at hardware stores, to determine the current radon level in your basement. If higher than 4 pCi/L, you must install a mechanical system (also encouraged for 2-4 pCi/L).

2. Air Circulation and Moisture: Basements tend to be naturally insulated and often have less ambient air change, leading to extra moisture, wall condensation, and mold growth. For existing buildings, a blower test is done to determine air tightness. A high powered fan pulls air out of the house, lowering the air pressure inside and an airflow manometer measures the rate of infiltration through the structure. Conservatively, if your design has minimal natural ventilation and new vapor barriers (for radon), you should integrate mechanical ventilation—with intake and exhaust fans—to achieve a minimum of .35 air changes per hour and stable air pressure. If you achieve 5+ air changes, you can combat moisture and mold by installing mechanical vents in baths (req.), kitchens, and still areas like closets. Dehumidifiers can help reduce residual moisture. Existing mold should be treated with antifungals in tandem with increased ventilation and dehumidification.

MITIGATION COORDINATION:

A. RADON—MECHANICAL EXHAUST

For high radon levels (4 pCi/L), mechanical radon exhaust systems use a fan to pull radon out of the sub-slab area (accelerating the process in B. below). Passive systems can be converted to active by adding fans.

Related construction required:

- coordinate placement with slab repair/replacement and
- vapor/moisture barriers for drainage systems
- all sump pumps should be air-tight to avoid radon leaks

B. RADON—PASSIVE EXHAUST

For low radon levels (<4 pCi/L), the passive exhaust system relies on higher air pressure at the foundation to push radon toward low pressure areas in the environment above, where it can dissipate at the top of the exhaust pipe.

Related construction required:

- see comments under 'A. Radon-Mechanical Exhaust'

C. VENTILATION—CENTRAL SYSTEM

If lacking adequate natural ventilation (or having excessive air-tightness), basements are required to have mechanical ventilation. While it is common to find exhaust only and intake only (single direction fans) in older duct systems, those pressure imbalances can exacerbate radon issues. A system with dual fans (in and out) is recommended for balanced air circulation.

Related construction required:

- coordinate with MEP/heating additions and natural ventilation
- coordinate depth/duct design with joist and beam layouts

D. VENTILATION—DISTRIBUTED

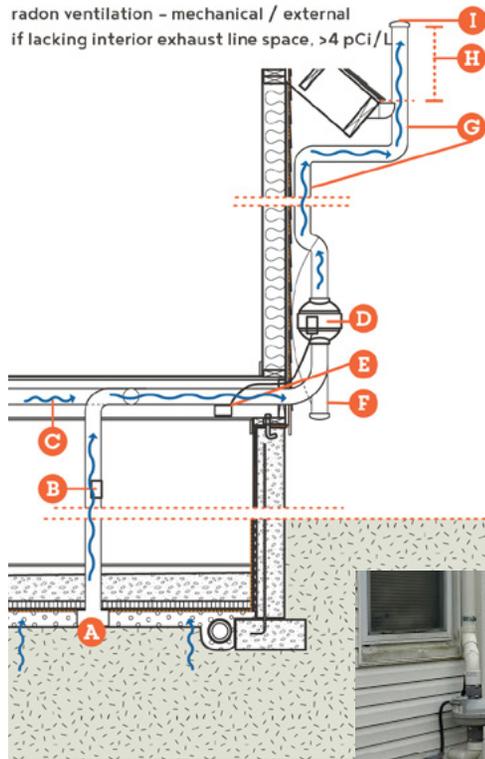
Even without central systems, wet rooms like bathrooms must have focused fans, to vent humidity and moisture to the exterior.

Related construction required:

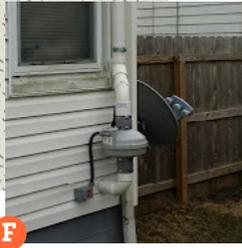
- coordinate placement with plumbing (water/sewer shafts), fixtures, and joists
- coordinate with centralized ventilation as needed (exhaust)

A. RADON - MECHANICAL

radon ventilation - mechanical / external
if lacking interior exhaust line space, >4 pCi/L



- A** 4" PVC pipe open to drainage area beneath vapor barrier & slab
- B** radon level monitor
- C** additional vent pipes (from sump pump or ext. drains)
- D** fan wired inside
- E** interior circuit & monitor connection
- F** water bypass/condensation area for clean-out
- G** brace on building
- H** 1' taller (min.) than roof
- I** rain cap on top opening



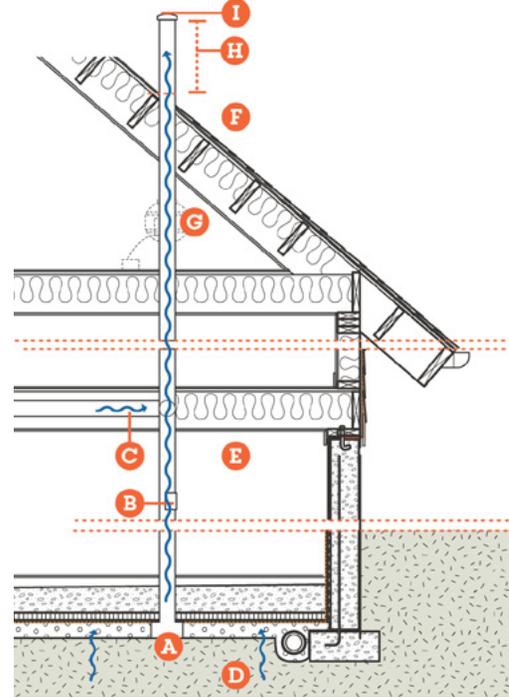
\$3,000-\$7,000 slab & wall sealing/dampproofing

\$500-\$2,500 piping, fan, and exhaust

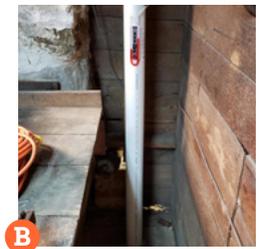
Mechanical exhaust supplements the natural vacuum of passive exhaust with a constant fan—typ. on house exterior or in rafter spaces—that is linked to constant power and basement-level monitors. Costs vary by extent of vapor-barrier (slab and wall work) and complexity of pipe system.

B. RADON - PASSIVE EXHAUST

radon ventilation - passive / internal
using interior exhaust line space, <4 pCi/L



- A** see mechanical system for A-C
- C** for A-C
- D** high pressure source of radon seepage (direct leaks stopped at vapor barrier)
- E** low pressure area of concentration (ceiling)
- F** mid-low pressure outside (for natural vacuum)
- G** optional fan addition
- H** 1' taller (+) than roof
- I** rain cap on top opening



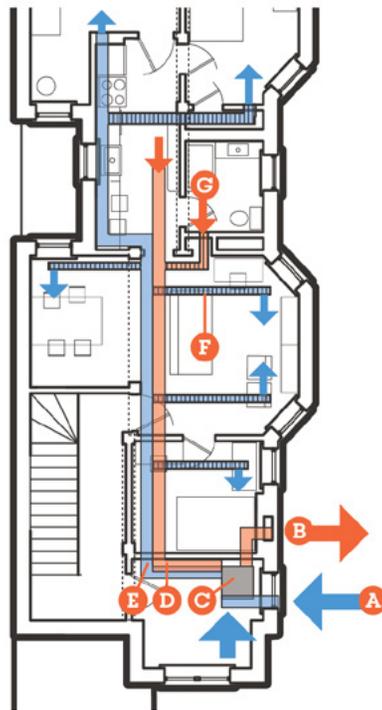
\$3,000-\$7,000 slab & wall sealing/dampproofing

\$500-\$2,500 piping and exhaust

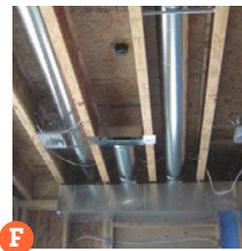
A passive exhaust system is fairly simple: a sealed 4" PVC pipe runs from beneath your vapor-barriers and slab (plus sump area) to exhaust at min. 1' foot above your roof and highest level of occupation. Installation should be done with slab and drainage work. Cost vary by extent of vapor-barrier (slab and wall work) and complexity of the pipe system. Fans themselves (for mechanical conversion) only cost around \$500.

C. VENTILATION—CENTRAL SYSTEM

unit-wide ventilation given low air exchanges



- A** fresh air intakes (exterior & interior)
- B** stale air exhaust, chimney
- C** heat exchange, AC, or heater to temper air with 2 fans (in, out)
- D** exhaust return line
- E** fresh air distribution line (system to be sized by heating specialist)
- F** smaller laterals to vents in bedrooms, living areas
- G** return vents in kitchen, bath

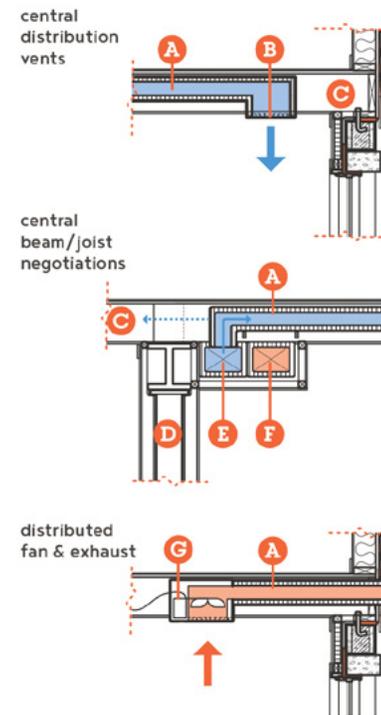


\$1,200-\$4,600 full unit ductwork (with single unit furnace)

You are likely familiar with ventilation in combination with air conditioning (AC) and forced air heating. With or without these options, a balanced ventilation system should provide fresh air, with: intake fan(s), insulated ducts, and distribution vents in bedrooms and main living areas. On the exhaust end, it will include return vents in bathrooms and kitchens, which link to exhaust fans and exterior release. In-line dehumidifiers, heat exchangers, and AC can all be integrated to adjust unit temperature and humidity levels. Costs vary by system complexity.

D. VENTILATION—DISTRIBUTED FIXTURES

central vs. distributed fans (humidity control)



- A** insulated duct (6")
- B** fresh air vent
- C** placed between joists
- D** system adjacent to beams, add lateral lines over beams as needed
- E** main fresh air duct (galvanized steel + insulation, 2x2 framed & finished)
- F** main return/exhaust duct
- G** bath fan wired with lights
- H** exhaust vented at header, with vent cover

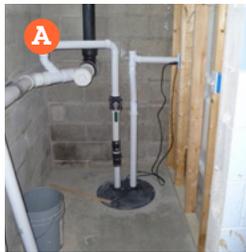
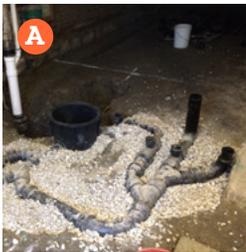


\$300-\$700 per fan (bath or kitchen)

If you have adequate natural ventilation, by code, and > 5 air changes, you must still install individual bathroom fans for localized humidity control. Similar fans can be added—insulated and ducted to the exterior— as well as dehumidifiers in other problem areas like kitchens and closets with low air flow and/or high moisture content. Individual fans are inexpensive but require power and venting areas. Be wary of creating unbalanced pressure.

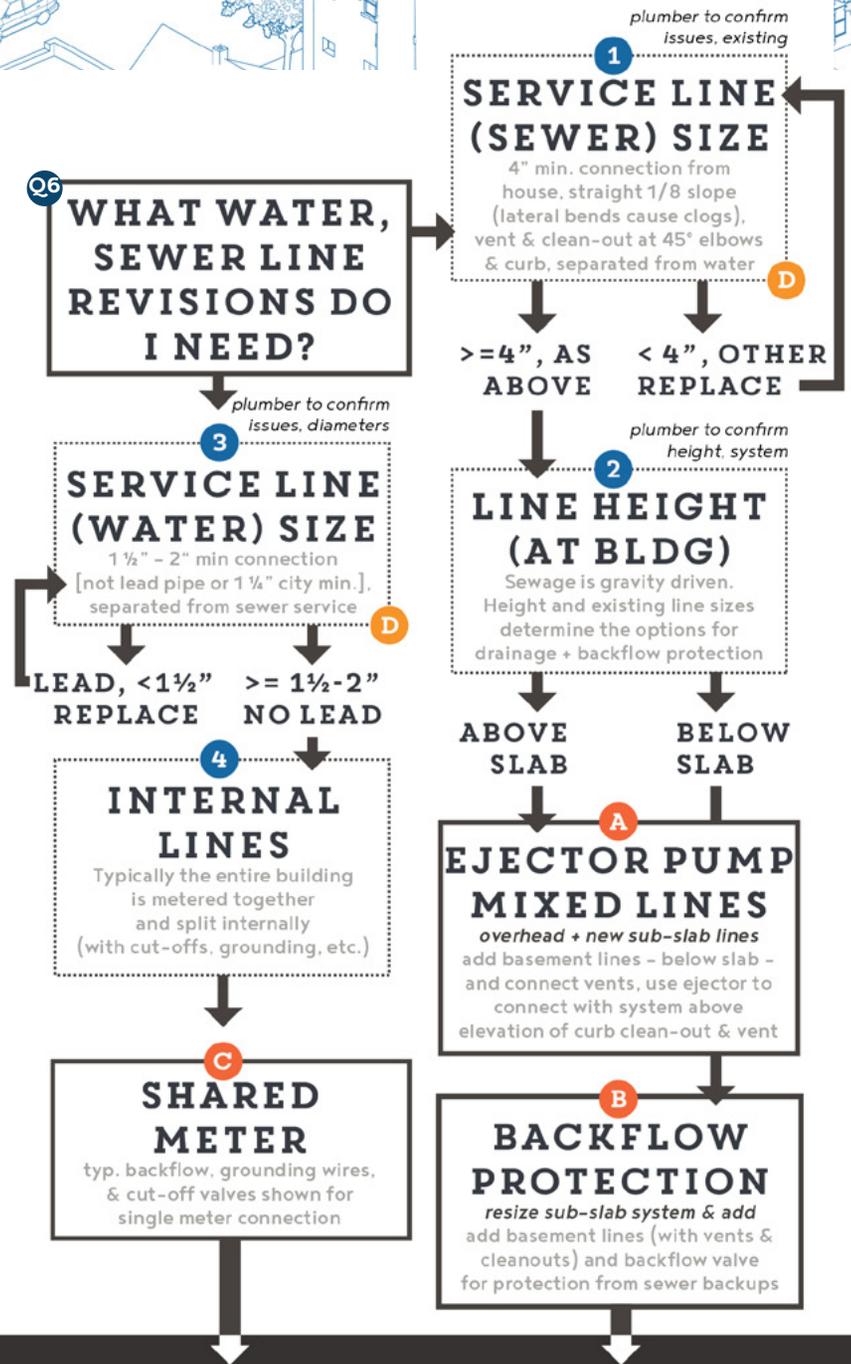


SEWAGE & WATER . sizing . backflow



Reference: Element, Issues identified

- A** under-slab bathroom lines in place, connecting to ejector pump basin
- A** ejector pump with vent (r), cut-off valve and overhead connection to lateral lines (laundry -> service lines)
- B** sub-slab sewer lines with backflow protection valve, connecting to upper lines & low sewer service line
- C** water connection at meter, with grounding wires visible
- D** common sewer vent & clean-out seen at property edge / connection joint with city service
- D** old lead water service line (note bulge) for water, at cut-off valve in advance of meter



PLUMBING UPDATE APPROACHES:

Your approach to sewer and water updates will be determined by **1) the size (volume) and condition of your service connections running from your building to city mains at the curb, 2) the elevation of your sewer service, as a system of gravity-based flows, and 3) your preference for separate or combined metering of units' water.**

1. Sewer connections (volume, slope, angle): Your plumber will advise on the needed size and slope of your sewer's service connections based on anticipated fixtures and service line length. At minimum, you must have lines of 4" dia. (for multiple units), 1% slope, ideally lacking lateral bends, and with a clean-out and vent at the curb.

2. Sewer height (relative to slab and curb vent/clean-out): Your plumber should also advise on adding an ejector pump and/or backflow protection based on the elevation of your sewer connection. Any fixtures, drains, or connections that are beneath the elevation of your curb clean-out will require backflow protection (see drawings A and B for integration, next page).

3. Water connections (volume, flow/pressure, pipe materials): Your plumber will advise on the needed size for water service connections based on anticipated fixtures, overall elevation (highest fixture to raise water to), pipe materials' friction, and overall plumbing system length. Sizes at left are from approx. calculations in 'Code Compliant Units', pg 77. Older buildings are also likely to have lead lines, which must be replaced.

4. Water meters (standard metering and line details): Meters can be added before or after lines are split for individual units and will depend on whether you want to separate and track tenant usage (with separate water heaters, in-unit washers, etc.).

MITIGATION COORDINATION:

A. SEWER -HIGH—EJECTOR PUMP

For all sewer updates, you may need to add larger pipes, as discussed in 'Code Compliant Units,' straighten service lines (D below) and add clean-outs to eliminate backups. If your sewer lines connect above the slab, you can add sub-slab drainage with an ejector pump. See drawings to coordinate elevation, venting, and backflow protection.

Related construction required:

- coordinate pump placement, new lines, and drainage slopes with existing vents, elevations, slab, and drainage work
- make sure water and sewer connections are separated (5' min.)

B. SEWER—LOW—LINES + VALVES

See note in A on service connections. If your sewer lines connect below slab, you can revise pipe sizing for new fixtures and add backflow protection valves to prevent basement flooding (selectively patch slab).

Related construction required:

- see comments on A above and D below

C. WATER CONNECTIONS

Most likely you will need to replace/enlarge old lead service connections for adequate water flow/pressure (install system filters to be safe). It is your choice how to split units' water (separate or single meter) as long as you have required cut-off values and backflow protection.

Related construction required:

- coordinate connections to avoid sewer lines and foundation drainage infrastructure
- make sure to incorporate MEP decisions in overall line layouts

D. PROPERTY/CURB CONNECTIONS

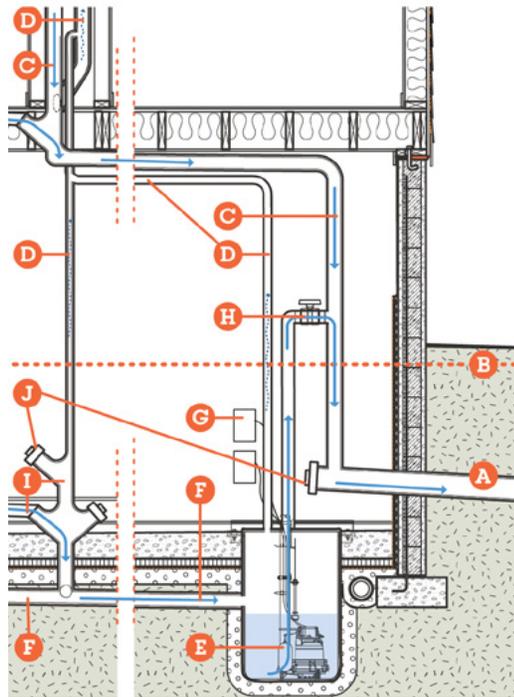
This reference highlights the cut-offs and vents required on service lines at the property edge, connecting to water and sewer mains. Lines should be kept straight (no lateral bends), separated (to avoid contamination), and vented (for sewer gas).

Related construction required:

- in areas with combined sewage & storm water systems (cso), hard site drainage should send water to the sewer main.

A. SEWER—HIGH—EJECTOR PUMP

sewer ejector pump, exhaust, & overhead connections
for connections above slab level (more likely)



- A** 4" min. service line (3' below grade)
- B** height of vent at property (backflow valves protect elements below this line)
- C** drainage stack - overhead to service connection
- D** sewer gas vents (to vent stack and exterior exhaust)
- E** ejector pump
- F** sub-slab lines to pump
- G** power & backup (2 circuits)
- H** pump connection & backflow valves
- I** lateral lines to sink, toilets
- J** clean-outs

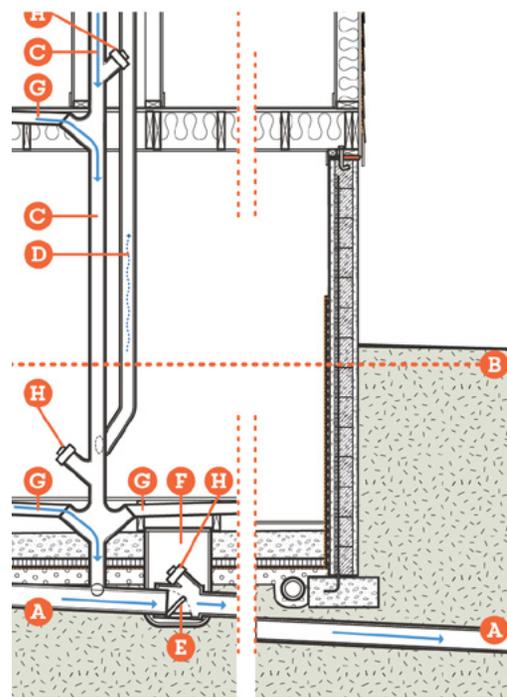


\$2,000-\$7,000 pump, \$4,000-\$5,000 lines

An ejector pump collects and grinds sewage from low lines (F). It pumps this mixture up—above the main's clean-out/overflow elevation (B)—to joint the main drainage stack. This, along with backflow valves (H), protects your basement from sewer flooding. Clean-outs on the drainage stack, as well as exhaust and vent stacks should be incorporated as shown. Costs vary by size of pumped area, slab work for new lines and vents, and ejector pump connections.

B. SEWER—LOW—BACKFLOW VALVES

sewer sizing, backflow protection, & exhaust
for connections below slab level (less likely)



- A** 4" min. service line below slab
- B** height of vent at property (backflow protection needed below this line)
- C** existing drainage stack
- D** vent stack (connections above fixture traps)
- E** backwater valve
- F** access hatch (sealed against radon leaks)
- G** horizontal drainage lines (to sinks, toilets, etc.)
- H** clean-outs

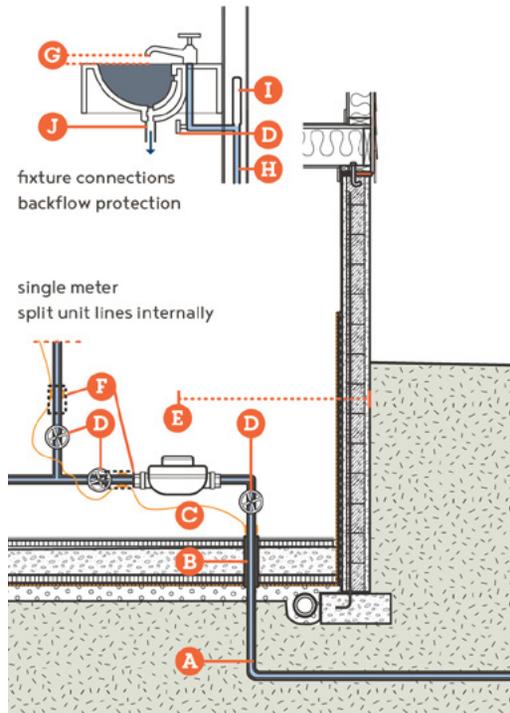


\$4,000-\$5,000 lines & exhaust, \$800 cleaning

For the rare case of low, sub-slab sewer lines, you can add a backwater valve on your main sewer connection, in advance of basement drains or main drainage stacks. This will protect your basement from sewer flooding due to clogged pipes. Clean-outs and vent stacks should be incorporated as shown. Costs vary by amount of slab work needed to add pipe capacity/size and install the new lines themselves.

C. WATER CONNECTIONS

water with single meter, internally split



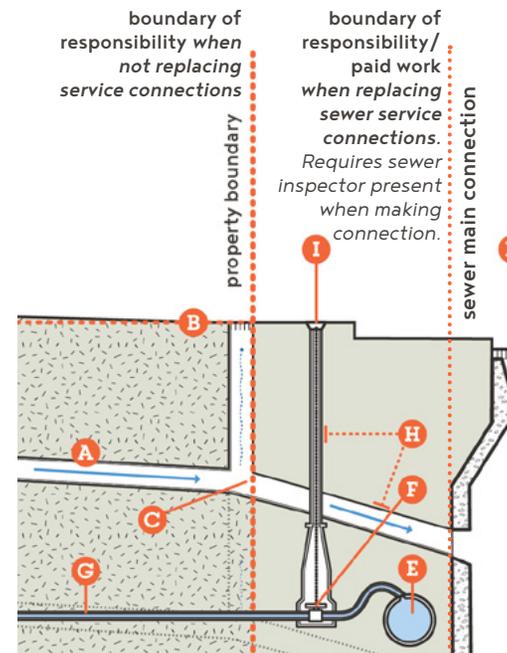
- A** water service line
- B** water-tight sleeve
- C** 'jump line' grounding wire (by passes meter)
- D** 'full-open' shutoff valves:
 - before & after meters
 - vertical risers (>2 story bldg)
 - on supply for all fixtures, water heaters, unit pipes
- E** meter, max 2' from wall
- F** backflow protection valves on irrigation, sprinkler, hose lines
- G** backflow protection: air gap at faucet/sink lip
- H** in-wall supply (alt. above)
- I** air chamber (pressure buffer)
- J** to drain, trap, and sewer lines

\$1,700-\$5000 water lines
\$1,000-\$4,000 per meter

At minimum, you should install a new service connection sized for adequate water flow and pressure, given the addition of bath and kitchen fixtures. Older houses are often not metered in Chicago, so you can anticipate adding at least one meter on your grounded service line, with cut-off valves and backflow protection both before and after the meter. Costs vary by size of system and number of meters.

D. PROPERTY CONNECTION REFERENCE

sewer & water connections at curb
 common cut-offs, backflow, & venting protections



- A** higher sewer line elevation, owner responsibility boundary varies (lower line elevation, dashed black)
- B** vent/clean-out serves as overflow
- C** service connection, note on sewer boundaries
- D** sewer main (at manhole)
- E** water main (pressurized)
- F** curb valve (water shut-off) in sidewalk, 18-24" to curb
- G** water service line connecting to meters (typ. min. 1 1/2" for domestic)
- H** water and sewer should have 10' lateral separation (different trenches)
- I** surface cap and rod to turn shut-off valve

\$15,000-\$21,000 per new service connection

New service connections are expensive but commonly required for single family homes, given their smaller starting water and sewer capacity. See rough sizing calcs on p77. Most likely, you will need to install a new water service connection, sized for both water flow and pressure with additional fixtures. In addition water and sewer should be in separated trenches, each with straight, appropriately-sloped lines with appropriate cut-offs, vents/clean-outs and traps at fixtures to avoid sewage clogs and gas backflow.



ELECTRIC & GAS . options . updates



Reference: Issues & Elements identified

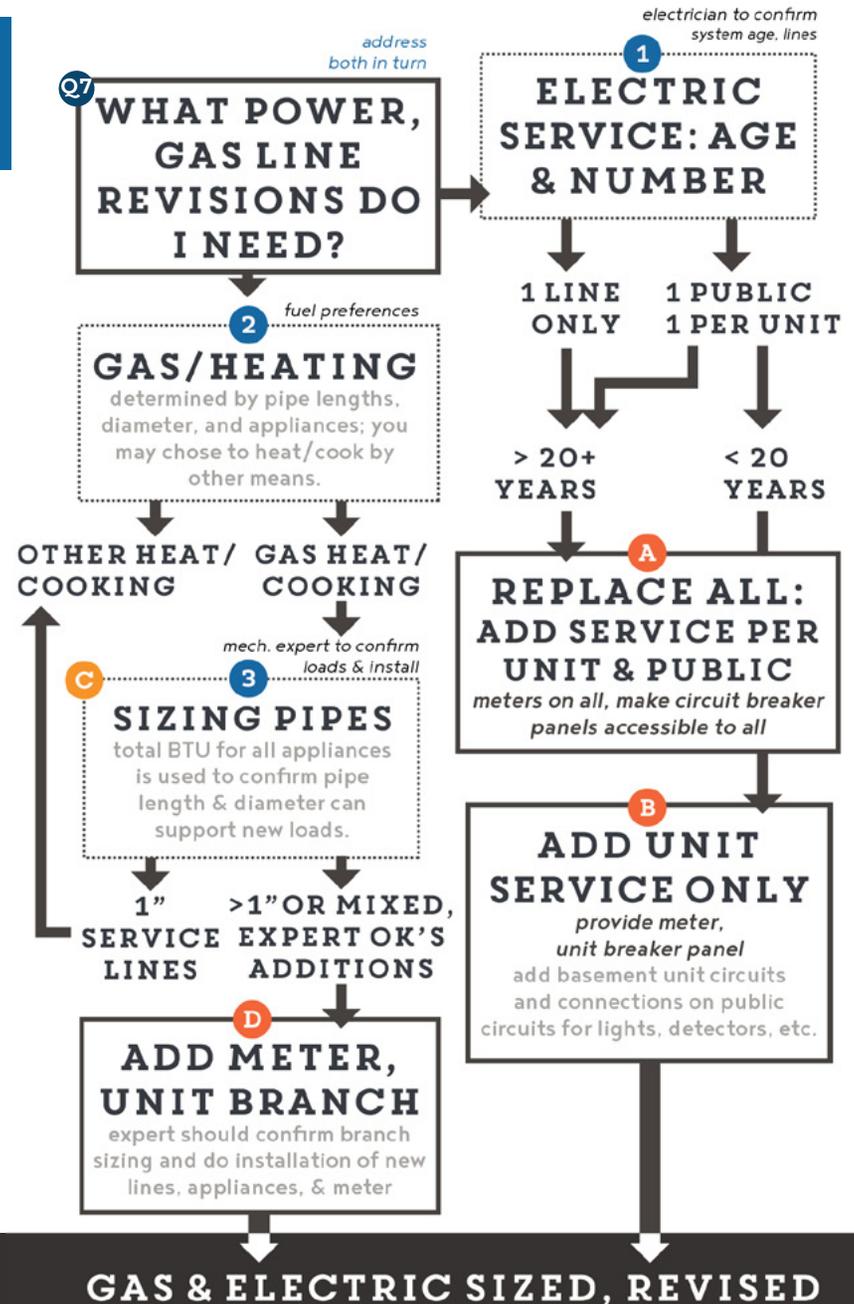
- A** dangerously old wiring, frayed/decayed insulation on circuits
- A** outlets (L to R):
 - GFCI outlet: 15amp, + breaker reset buttons,
 - basic grounded outlets: 15amp, third hole
 - old ungrounded: two holes - no longer legal, replace



- B** breaker panel, enclosed, per new electric service (see annotations next page)
- B** roughed-in electric conduits -in advance of fixtures, and wall cover



- D** common single meter, note pressure regulator at left, private shut-off valves on split lines at right
- D** testing for gas leaks at connection near shut-off valves



ELECTRIC & GAS APPROACHES:

Your approach to electric and gas updates will be determined by **1) the age of wiring and the number of current electric services, and 2-3) the size and loading on your gas line. Because cooking and heating can be done with electricity, there's no immediate code reason to update a smaller external gas line, which is adequate for single family use, but not split, multi-unit service.**

1. Number & Age of Electric Service connections:

- **Number:** Your building should have separate, metered electric service per each unit and common or public metered service for hallways, utility rooms, exterior lights, and the circuits powering smoke detectors and pumps. This allows each service to be shut off (at the breaker box) for work and repairs. It's typical to have 100 to 200-amp and 120/240 volt circuits per service connection. Units with electric heat and electric appliances (instead of gas) may require up to 300-amp. Your electrician will calculate loads.
- **Age:** Because electric insulation decays over time and energy demands are higher than in the past, you should replace electric circuits every 20 years to avoid overloading wires (with electronics, air conditioning). In general, it costs less to add new wiring (per unit) than to trace, test, and replace specific deficiencies.

2. Fuel Preferences: Given environmental preferences, you may not be considering gas additions. In terms of costs, it can make sense to add electric appliances if you wish to avoid adding a meter or updating the gas company's external line.

3. Capacity/Size of Service Lines: Adding a meter and a new branch line for gas appliances can be inexpensive, as a unit may only need a single range connection (often 1/2" line). The following page unpacks the estimate from 'Code Compliant Units,' so you can calculate your needs. A heating and ventilation professional should estimate your building's gas usage, confirm service line size and capacity. In general, single family homes are more likely to have small service pipes, which may be inadequate for multiple units and new appliances.

MITIGATION COORDINATION:

A. ELECTRIC: ALL NEW SERVICES

Graphic explains circuits structure and current flow, from source to ground (akin to water + sewer). Photos show rough & finished electric installations.

For electric, tenants must have access to their breaker panels and public area panels. For whole house replacements, you will need to patch ceilings and walls within your existing unit(s).

Related construction required:

- coordinate additional public circuits to a) enable safe backup power to sump pumps, ejector pumps, and radon fans; b) enable the hardwiring of required smoke detectors in units and common areas; and c) provide adequate exterior lighting
- your electrician should determine required amperage per metered service, particularly if using electric heating, air conditioning, and cooking appliances

B. ELECTRIC: SINGLE NEW SERVICE

Graphic unpacks breaker panel, so you can follow organization of installed circuits per each unit.

Related construction required:

- see public circuit note in 'A. Electric: All New Lines'
- same unit amperage calculation applies as above

C. GAS: ESTIMATING LINE SIZES

A rough estimate of current and potential gas pipe sizing is possible, as shown in 'Code Compliance Units', pg 81. This schematic guidance should be supplemented by professional calculations.

D. GAS: BRANCH LINE & METER

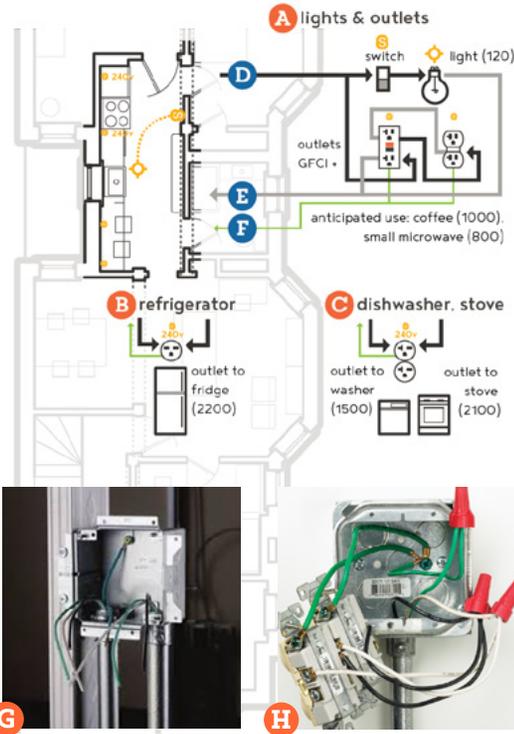
Gas lines are relatively easy to alter and adapt, akin to water piping. Updates (and system shut-offs) by your heating and ventilation specialist should be timed to minimize redundancy and maximize safety.

Related construction required:

- Gas lines are small, so they are unlikely to impact height or finishing profiles. See tables under C. for length/flow relation
- Coordinate updates with surrounding construction.

A. ELECTRIC: ALL NEW METERED SERVICES CIRCUIT DIAGRAM (KITCHEN)

electric - circuit loading examples (wattage/appliance)

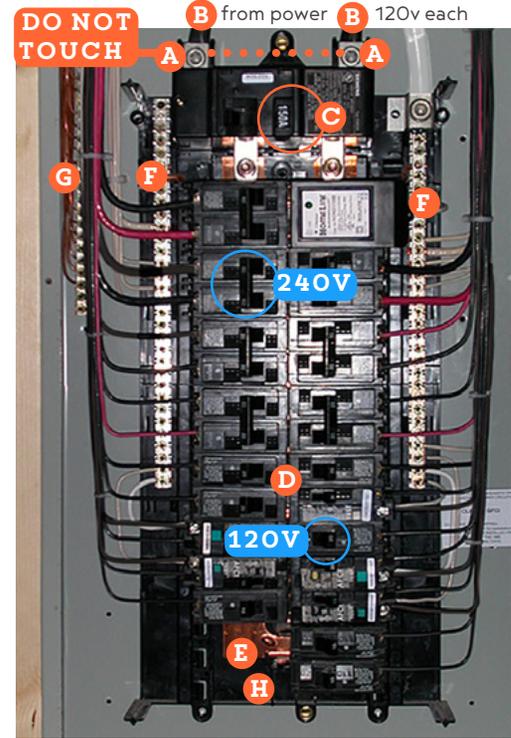


\$20,000-\$35,000 lines for existing unit, public, basement

For each new unit's electric service, your electrician will calculate the anticipated electric loads, akin to the calculation of kitchen appliance loading above. (Find wattage here: bit.ly/Wattage-Worksheet) Large appliances are typically located on separate circuits, with 240 volts supply; outlets and lights on 120 volt circuits. The sum of unit circuits dictates the total unit amperage, per metered electric service.

B. ELECTRIC: EACH METERED SERVICE— BREAKER PANEL

electric- single new line (150amp, 120, 240v)

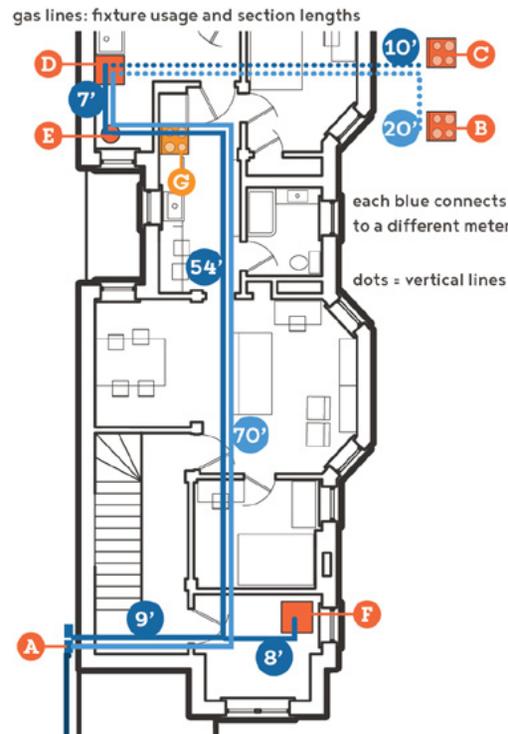


- A** Main lugs: always live. **NEVER TOUCH THEM.**
- B** Main cables (black): always live. Avoid touching them.
- C** Main breaker: Main disconnect; switch off before removing panel cover! (amps noted on switch)
- D** Breakers. The hot wire (red or black) from each circuit connects to a breaker. Each breaker allows a specific amperage to flow and will 'break' the line given excess loading.
- E** Breaker bus. (behind) Distributes power from the main breaker to the circuit breakers.
- F** Neutral bus. All neutral (white) wires connect here. These and the grounding lines (copper) connect to the main ground line, enabling electric flow.
- G** Rough Electric: wires in conduit between outlets but not connected.
- H** Breaker spaces: room for breakers, amps permitting.

\$5,000-\$8,000 new electric for unit only

Each unit breaker panel should be fully enclosed, with circuits labeled and amps noted on breaker switches. *The exposed view is for explanatory purposes only.* Contemporary electric service, per unit, is at least 100-200-amps, with 120/240 volt lines. The power is metered (and can be locked for shut off) and then enters at the breaker box, with a main breaker for disconnection. Total amperage is subdivided into separate circuits, each calculated to meet specific area's/appliances' loading.

C. GAS—ESTIMATING LINE SIZES



steel pipe		capacity needed in ft ³ /hr					
NOMINAL:	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
ACTUAL ID:	0.622	0.824	1.049	1.380	1.610	2.067	2.459
LENGTH (feet)							
10	172	360	678	1390	2090	4020	6400
20	118	247	466	957	1430	2760	4400
30	95	199	374	768	1150	2220	3530
40	81	170	320	657	985	1900	3020
50	72	151	284	583	873	1680	2680
60	65	137	257	528	791	1520	2430
70	60	126	237	486	728	1400	2230
80	56	117	220	452	677	1300	2080
90	52	110	207	424	635	1220	1950
100	50	104	195	400	600	1160	1840

Calculate segment pipe sizes from the end of line, moving toward the meter. Match capacity, on chart, based on the row for the furthest fixture, and add 5' for flexible connections. Any segment of pipe needs capacity for the remaining fixtures on the same branch.

A meters, one per line, with pressure regulation (details to the right)

line to second floor unit

B furthest fixture = stove (59 ft³/hr) @ 95ft pipe (20'+70'+5') = 3/4" pipe

main line, to first floor

C furthest fixture = stove (59 ft³/hr) @ 85ft pipe = 3/4" pipe segment

D drier (32 ft³/hr) + 59 = 91 ft³/hr = 3/4" pipe segment

E water heater (45 ft³/hr) + 91 = 136 ft³/hr = 1" segment

F updated furnace (165 ft³/hr) = 1" pipe segment

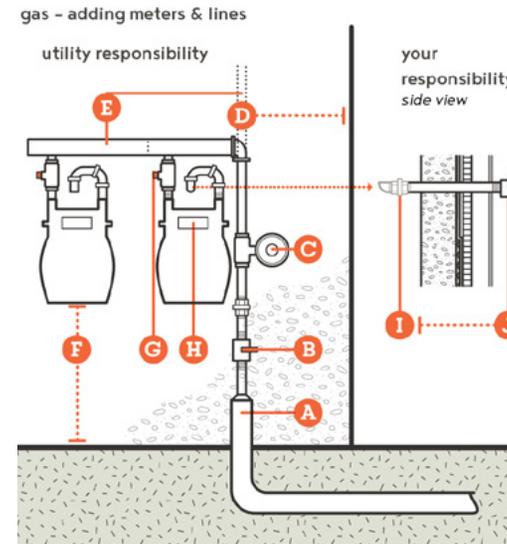
final segment = all fixtures (301 ft³/hr) = 1 1/4" pipe

entire building

G all fixtures (360 ft³/hr) @ 95ft pipe = 1 1/4" service

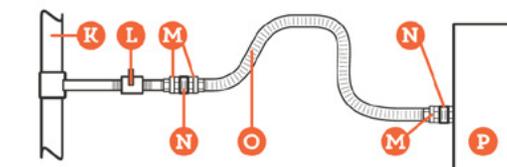
• add electric range; *no load*

D. GAS—METERS & LINE CONNECTIONS



- A** main service connection, perpendicular to street
- B** shut-off valve on riser pipe
- C** regulator (pressure control) and relief vent
- D** meters w/in 4' of building corner (>3' to electric, no windows above)
- E** expansion areas (for new meters)
- F** 2', ground to meter top
- G** lock valve (for control of individual meters)
- H** meter itself
- I** gas pipe to interior
- J** customer shut-off valve, on rigid steel pipe, clamped along wall/ joists
- K** rigid steel gas line—2 segments shown with lateral connection
- L** safety shut-off valve per connected fixture
- M** line coupling, nuts at connection ends (female)
- N** threaded connectors (male)—sized to maintain req. flow capacity to appliance (typ. 1/2")
- O** stainless steel connection
- P** gas fixture/appliance

interior line branch connections, per fixture (not to scale)

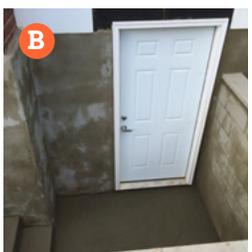


\$7,00-\$1,800 new line, meter added

Expanding on the 'Code Compliant Unit' samples and instructions, the diagram at left calculates segment size requirements. A meter should be added for all new lines, with pressure regulation, safety valves, and spacing as shown above. All fixture lines must have cut-offs and tightened connections to avoid leaks. Costs vary by branches/fixtures added.



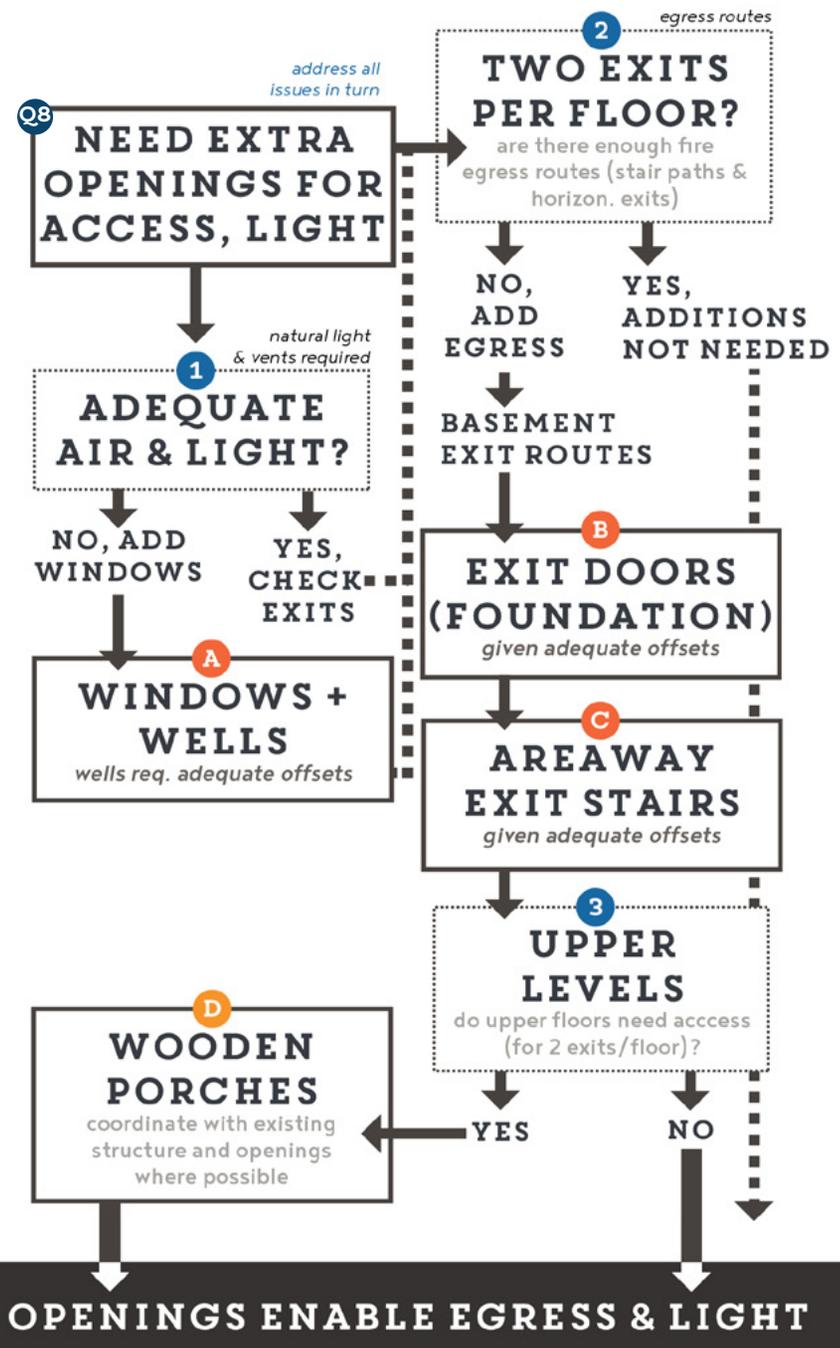
EXITS/OPENINGS . light . access stairs



Reference: Elements & Installations

- A1** basement window with short, corrugated light well
- A2** basement window from interior, with deeper cmu light well
- B** basement exit (short) with thin metal lintel at sill (during construction)
- C1** new entryway, with CMU in place—before grouting or pour of stairs
- C2** finished stair with drain in 3' entry landing, handrail at stair
- D** typ. external stairs with structure tied to building and supported on piers

General Note: Stairs, as in D, or a porch roof should be built over new areaways, in addition to insulating exterior walls. The overhead protection creates a microclimate which collects heat escaping from the building. This heat keeps the area around the foundation and old footers (no longer insulated by soil) from experiencing frost heave and thus limits foundation movement, cracks, and structural damage.



ACCESS/EGRESS APPROACHES:

Your addition of new exits and window openings will be determined by code and 1) the vertical space and lateral offsets limiting window and wells dimensions as well as 2) placement of 80" tall doors and egress areaways, landings, and steps. As multi-units must have two exits per floor, single family conversions 3) need a rear fire-escape for upper floor travel paths.

1. Light & Windows—height and lateral space for wells: Your architect will advise on the available wall and lot space required to meet code requirements for light. Given foundation loading, it often makes more sense to dig window wells, if you have the space, than to have larger horizontal spanning lintels. The area of openings, on building sides, will be limited by allowed open areas according to fire code.

2. Egress Doors—floor height and clear passage/step limits As with windows, your architect will advise on placement and elevation in coordination with structure and thermal envelope, as well as aligning with areaways/landings, exterior drains, and clear passage/step requirements. Entry and exit areaways within a property's off-sets will require an administrative adjustment for zoning.

3. Egress areaways—offsets, landings, and step requirements: Your architect will advise on exit areaways and/or landing locations as determined by site-offsets and the coordination between stair parameters, elevation to ascend, and exterior drainage systems.

4. Egress upper level—porches: Your architect will advise on placement of new porches, typ. aligning stair paths to reach/enlarge windows to doors and bridge from building structure to pier/footings aligned with planned retention and drainage systems. Your overall placement will be limited by rear-offset and open space requirements.

MITIGATION COORDINATION:

A. WINDOW ADDITIONS (+ WELLS)

Based on site area, you may be able to add window wells and taller windows to meet your light & air requirements. If not, you can add shorter windows (within structural reason, as advised by your architect).

Related construction required:

- coordinate flashing and sealing of frames to continue vapor barriers & thermal envelope req. for drainage & radon protection
- coordinate well drainage with foundation drainage
- coordinate lintels/height with any sill/anchoring work
- coordinate area with fire code (3-15' offsets = 15-45% openings with fire-resistant materials)

B. EXIT DOORS AT AREAWAY

Direct exits help satisfy fire code (two exits per floor) and their structure is fairly simple. Key element to coordinate is matching elevation/height with existing sills (top) and areaway drainage (bottom).

Related construction required:

- see all the remarks under 'A. window additions'
- a single step, under 8" high, is allowed on interior side of exit—use to increase height and avoid flooding (if areaway drains fail)
- coordinate with 'C. landings, areaways, stairs' (below)
- add roof for thermal protection if lacking 'D. fire-escape' (below)

C. LANDINGS, AREAWAYS, STAIRS

A second exterior stair/areaway addition is common for Cottage conversions, as it eliminates the need for an interior stair and hallway.

Related construction required:

- coordinate retention walls and drains with drainage
- coordinate placement with new doors and existing walkways

D. UPPER LEVEL PORCHES

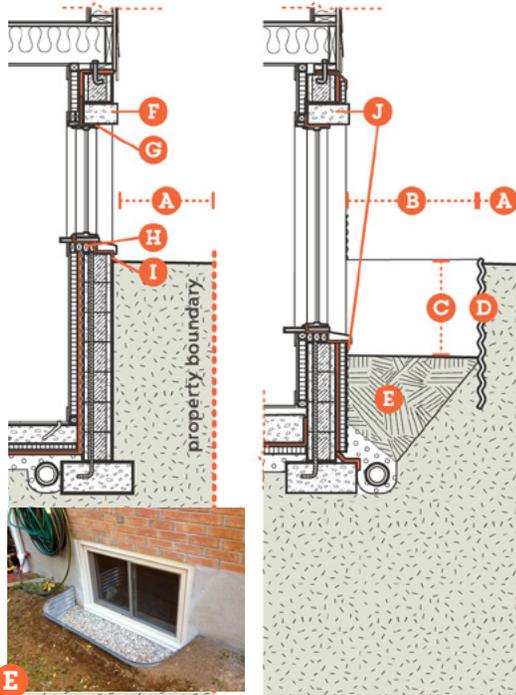
A porch addition is common for single family conversions, as code requires two exits per floor (no matter the associated unit).

Related construction required:

- coordinate structure with building frame, existing porches/stairs
- coordinate foundations with other site walls and drainage

A. WINDOW ENLARGEMENT + WELLS

common window profiles
with and without space for wells, drainage areas



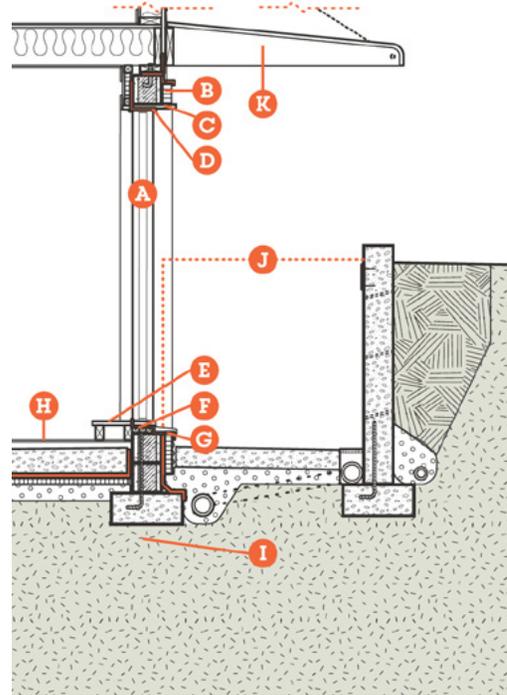
- A** <=2' from property edge
- B** 3' wide window well
- C** 2' deep window well (by 1:1.5 ratio in code)
- D** corrugated retention edge
- E** gravel drains to drainage system/sump pump
- F** lintel (bridges foundation opening, depth varies by material)
- G** flashing above frame
- H** window & frame sit on foundation wall, min. 6" above adj. ground
- I** flashing below bottom sill & drip area (to prevent leaks, extend barriers & keep continuous enclosure)
- J** same system for tall or short windows

\$300-\$1,000 window **\$2,500+** egress window & well

Windows—for light and air—can be added to your foundation as long as there is adequate structural support or bridging of openings with reinforced lintels. It is important that a) flashing and sealing around the frame maintains the air, water, and thermal barriers of your radon and drainage system and thus b) provides continuity of fire resistance/protection. All window wells should be integrated with your foundation drainage, through basins or free draining materials like gravel. Costs vary by fixture, foundation alterations, and retention/soil work at wells.

B. EXIT DOORS AT AREAWAY

common exit profile
notes on adapted surface exposure, height issues



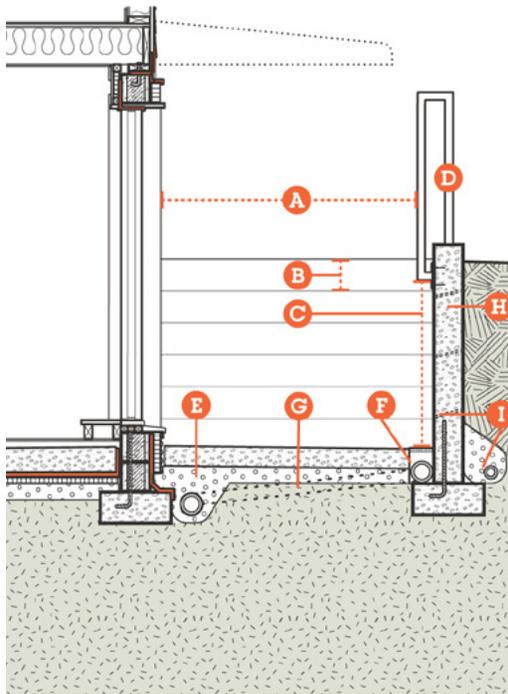
- A** 2" door (fire req.)
- B** foundation, with ext. insulation (taller spaces)
- C** lintel, variable depth
- D** flashing above frame
- E** 1 step to mediate height, 8" max
- F** frame rests on foundation wall (see window notes)
- G** flashing below (see window notes)
- H** finished interior height
- I** soils around footers, less insulated than before
- J** soil volume removed (lost insulation)
- K** porch awning (or fire-escape) above to create microclimate and trap heat to stabilize footer, limit frost heave

\$600-\$800 per door (without excavation)

All thermal, structural, and fire resistance aspects of windows equally apply to door openings. In addition, anywhere you're exposing foundation walls you should make sure to add insulation and enclosure like a porch awning to avoid thermal shock and frost heave impacting your foundation/footering structures. See areaways, right, for comments on steps and drainage. Fire door costs are fairly stable; surrounding work (areaway, foundation cuts) will determine price.

C. LANDINGS, AREAWAYS, & STAIRS

areaway stairs additions – in ground
notes on clear passage and stair parameters



- A** min 36" egress clearance (72" here, stair alignment)
- B** 8" max step height, 9" max depth
- C** 34-36" railing at stairs
- D** 42" to landing/grade railings
- E** drainage beneath areaway/in gravel (see tile drains)
- F** connects to trench drains
- G** vertical posts (3' min depth coord. w/ walls)
- H** retaining walls (CMU, concrete, etc.)
- I** weep holes and base pvc pipe (connects to drains)

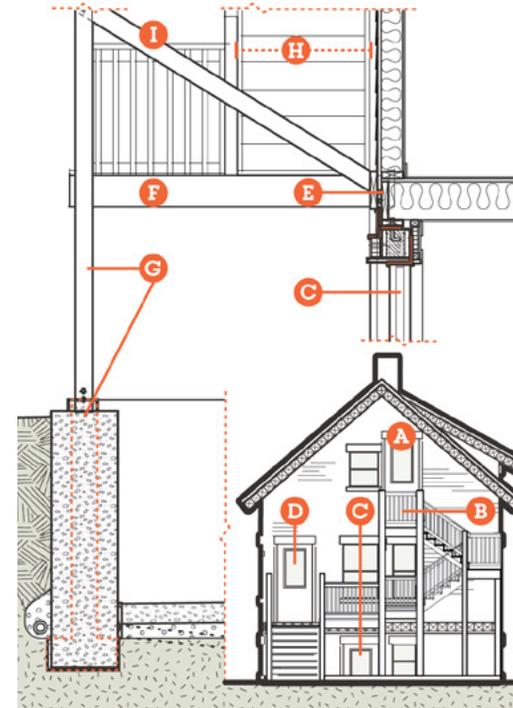


\$1,500-\$2,200 per areaway,
\$1,500-\$3,000 stairs

Exterior areaways and stairs should be incorporated to meet egress requirements. Landings must be 3' x 3' min, with no more than 1 step up from any interior passage. Coordinate door height and areaway drainage to avoid flooding. 34-36" railings at stairs, 42" railings at landings, and 36" clear passages are required but enlarge as needed to work with other egress. Cost varies by size of area, drainage, and excavation.

D. UPPER LEVEL PORCHES

external porch additions – upper floors
notes on alignment with existing and stair parameters



- A** new second floor exit
- B** overall porch structure
- C** basement exit, covered areaway
- D** 1st floor exit, porch steps
- E** header anchored to exterior building fire wall
- F** landing joist (hung at headers, bolted to piers)
- G** vertical posts (3' min depth coord. w/ walls)
- H** min 36" stairs, 42" railings
- I** diagonal bracing (higher than shown for passage)

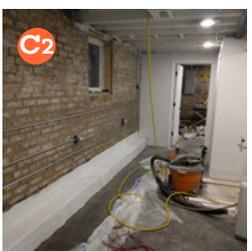
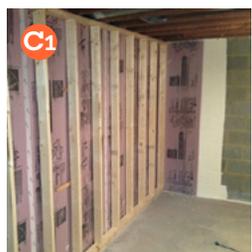
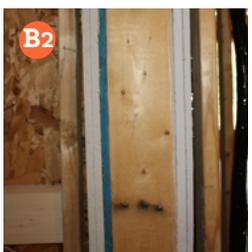
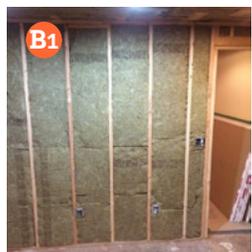


\$1,500-\$3,000 per level

Landings must be 3' x 3' min, with steps no > 8" high and < 9" deep. Systems can be free standing structures or attached to protected exterior walls (pref. brick, concrete, or CMU). Fire-retardant wood and/or heavy timber structures are safer and allow more flexibility in placement, size/area along perimeter (over 50%), and can incorporate decks (up to 150sqft/unit). Costs will vary by system size and complexity.

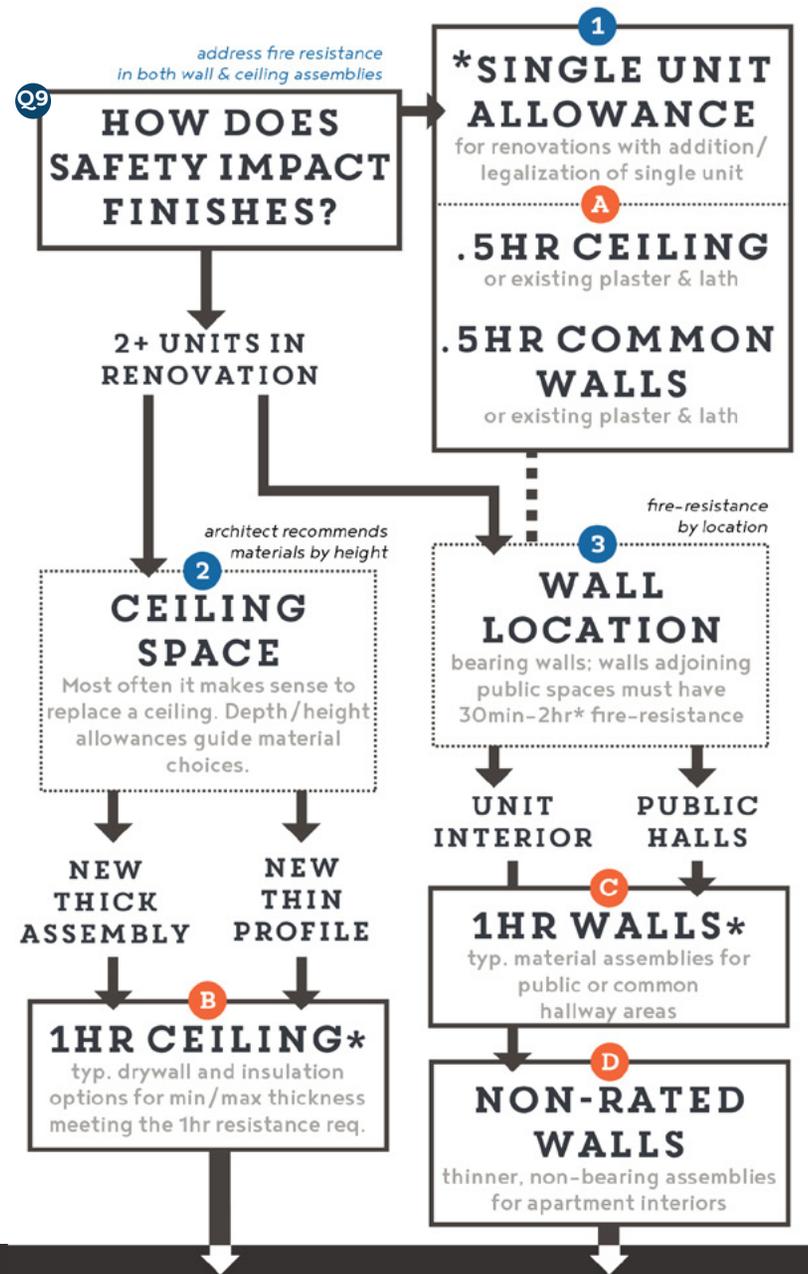


FINISHES . fire partitions . internal walls



Reference: Elements & Installations

- A** gypsum board installation on joists (second layer to be perpendicular)
- B1** mineral wool with framing
- B2** dual gypsum layers (Type X fire resistant) on wood frame
- C1** rigid foundation insulation and vapor barriers behind finishing frame
- C2** exposed brick foundation—repointed brick, electric in conduits on surface
- D** typical exposed 2x4 frame, note framing around ducts, overhead electric, fire-blocking in end walls



FINISHING APPROACHES:

Your basement unit will incorporate common wall assemblies (next page), with location and foundation material dictating the degree of fire-resistance necessary (0-2hr). Those burn-time requirements necessitate different materials/thicknesses for framing, drywall, insulation, and treatment of openings.

Understanding those differences and your overall room count can help you estimate finishing costs.

1. *Renovations with a Single Unit Addition-.5hr partitions: For renovations that add (or legalize) a single unit, ceiling and common wall burn time are reduced to 30 minutes or, if original surfaces are present, the existing resistance of plaster and lath walls/ceilings. [\(14R-3-309.1\)](#) Additional units result in all areas (ceiling, common walls) reverting to 1hr fire-resistances of 2 and 3 below. For the unit's interior walls see D.

2. Ceiling-1hr fire partition*: Your architect will advise on your specific ceiling assembly, given ductwork and height requirements. Typical new and archaic assemblies are shown with ductwork. Diagram shows where resistance is measured from when estimating burn-times.

3. Common Area Walls-1hr fire partition*: As with the ceiling, your architect will advise on specific assemblies. Drawing shows typical frame walls of different thickness-5 ½" to 4"-that take advantage of fire-resistant gypsum, mineral insulation, and pressure-treated, fire retardant wood.

D. Interior Unit Walls-non-rated: Your architect will advise on specific room assemblies, as interior unit walls do not have req. resistance. Exposed framing is shown so you are familiar with basic wall structure.

MITIGATION COORDINATION:

A. *SINGLE UNIT ALLOWANCE - .5HR

Single unit additions, when renovating a building, are permitted to reuse intact plaster and lath or use new 30 minute partitions on ceilings and common walls. The annotations next page list alternate materials/thicknesses relative to profiles in B and C.

Related construction required:

- see note on coordination in B and C below.

B. CEILING AS 1HR FIRE PARTITION*

All new ceilings (for two + units) should be 1hr fire-resistant assemblies to keep fire from climbing up the structure. More generally, elements like fire stops (in D. non-rated walls), blocking between joists (at top plate connections) and mineral insulation enclose and cellularize air-space within the wall, so the frame does not act as an open chimney.

Related construction required:

- coordinate with electric, ventilation, overhead plumbing, and all joist/beam repairs

C. WALLS AS 1HR FIRE PARTITION*

New walls (for two + units) between common areas and units must be 1hr assemblies, in order to protect passage along fire egress routes. Measured from either side, these assemblies can be symmetrical, as shown, or mix equivalent 1hr drywall, panel, and attachment assemblies.

Related construction required:

- coordinate with any in-wall plumbing, electric, or vents.
- partition placement overall should be coordinated between egress route reqs., openings, and unit size reqs.

D. NON-RATED WALLS (INTERIOR)

Interior unit walls, if not bearing weight, do not have resistance requirements. Drawing of frame is to show overall elements & structure.

Related construction required:

- coordinate thickness with plumbing, electric, and vent needs.
- coordinate layout/openings with room size and egress needs.

A. SINGLE UNIT ALLOWANCE - .5HR

CEILING ALTS. (B)

Existing components (unchanged/ indeterminate) not incorporated in calculation of fire resistance.

- A** indeterminate
- B** unchanged
- C** indeterminate
- D** unchanged
- E** 5/8" gypsum (or 1/2" + 3/8" if patching and layering) - 30 minutes.
- F** varies
- G** indeterminate
- H** indeterminate, but should approximate lath in B.2
- I** indeterminate, but should approximate plaster in B.2

WALL ALTS. (C)

Existing components (unchanged/ indeterminate) not incorporated in calculation. Alts. focus on single wall side.

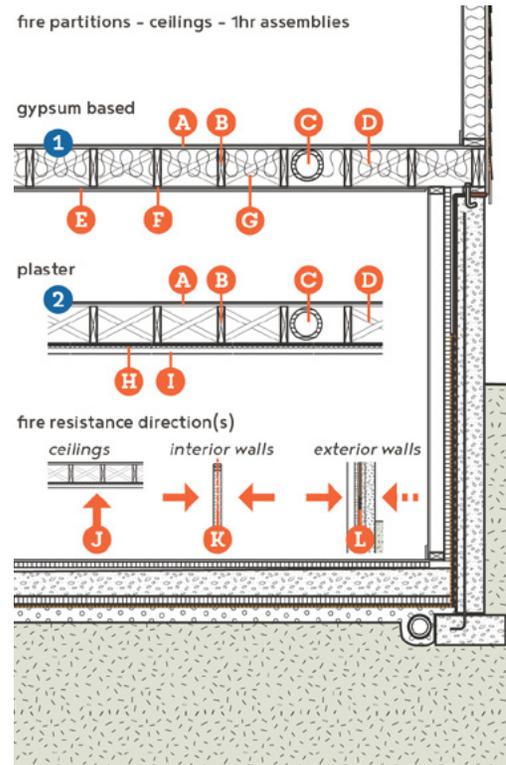
- A** unchanged
- B** unchanged
- C** 2 layers of 1/2" gypsum
- D** drywall nails 8" o.c.
- E** Unlikely to find robust frame and/or internal insulation. See alts for gypsum and thin wall types (C.1, C.3).
- J** unchanged
- K** unchanged
- L** 5/8" Type X gypsum
- M** cement coated nails 7" o.c.

COST VARIES, see B & C

The reduced partition requirement should accommodate incorporation of existing assemblies (like the structurally sound flooring and joists of your 1st floor unit or the frames and plaster on current utility room walls) in combination with new gypsum or intact lath & plaster surface. As you can focus on a single side of the assembly only (vs. both sides of a wall) to meet code, this should reduce the costs/labor of finishing. Your architect/engineer/building official will be able to inspect existing materials and calculate additional resistance needed ([14B-7-722](#)).

B. CEILING AS 1HR FIRE

fire partitions - ceilings - 1hr assemblies

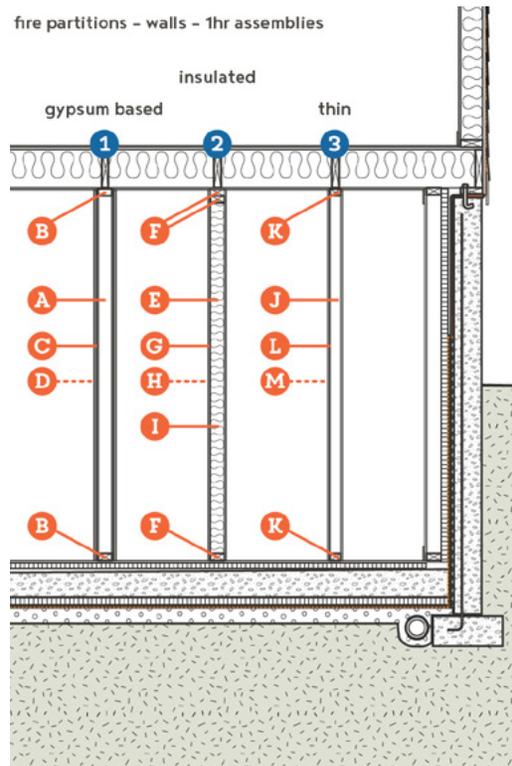


- A** double wood floor (15/32" sheathing ply + finished)
- B** joists: 16" on center spacing (o.c.) (depth varies by span)
- C** 6" insulated ducts
- D** cross braces (in all)
- E** 1/2" Type X gypsum (if 24" o.c. use 2 layers 5/8")
- F** drywall screws at 6" o.c.
- G** mineral wool (adds 15 min)
- H** 3/8" Type X gypsum lath (perpendicular to joists)
- I** 1/2" gypsum plaster **resistance measured from likely fire direction**
- J** ceiling: from below
- K** walls: both side, symmetrical
- L** exterior: both sides under 10', interior only over 10' offset

\$4,200-\$5,200 drywall & painting

For ceilings, you should have continuous enclosure between floors in your 1hr fire partition materials, with minimal openings for stairways and egress connections. In addition ducts should be insulated and each unit, if using forced air, should have it's own ventilation systems to avoid fire jumping between ducts. Mineral wool insulation may be incorporated for additional fire resistance and thermal efficiency. Talk with an acoustical professional about dampening sound. Costs vary by ceiling areas to be patched or replaced.

C. WALLS AS 1HR FIRE PARTITIONS



- A** 2x4 wood stud, 16" o.c.
- B** single top/bottom plates
- C** 2 layers of 3/8" gypsum
- D** drywall nails 8" o.c.
- E** 2x4 wood stud, 16" o.c. (varies with steel studs)
- F** double top + bottom plate
- G** 5/8" Type X gypsum + sheathing
- H** Type S drywall screws 1' o.c.
- I** mineral wool insulation
- J** 2x3 fire-retardant studs, 24" o.c.
- K** single top/bottom plates
- L** 5/8" Type X gypsum
- M** cement coated nails 7" o.c.

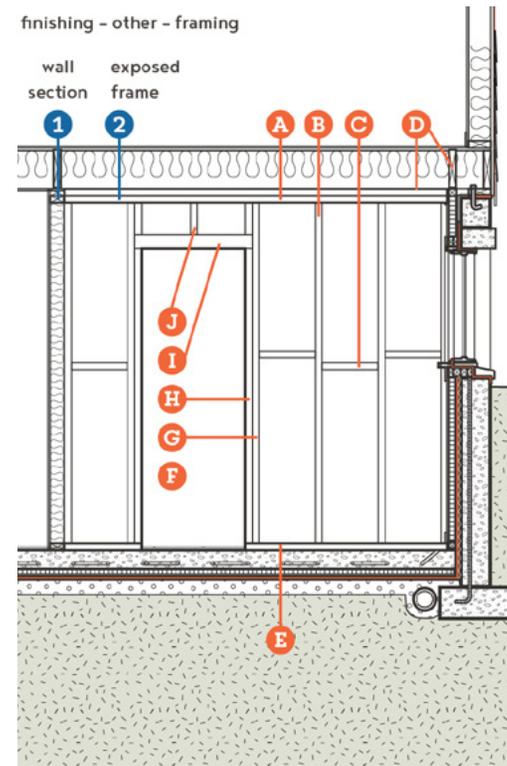


2

\$6,000-\$11,000 partition walls for entire unit

Fire partitions, along egress hallways, can be very simple structures of minimal width, 4-5.5". Double layer, Type X gypsum is relatively inexpensive compared to the costs of mineral wool or fire retardant wood studs. Your architect can elaborate on the gypsum and insulation options to be used in combination with steel studs. Assemblies also typically include fire-blocking and hallway outlets, lights, and smoke detectors.

D. NON-RATED WALLS (INTERIOR)



- A** double top plates
- B** 2x4 stud, 16" o.c.
- C** fire-blocking (minimized continuous air pockets)
- D** attach to joist or blocking
- E** bottom plate, anchor
- F** door opening
- G** king stud
- H** jack stud
- I** headers (to match stud depth)
- J** cripple stud



2

\$6,500-\$13,500 drywall/interior walls overall

\$2,400-\$5,450 finishing per room-bed/dining/living

\$6,250-\$12,000 kitchen, **\$4,000-\$7,800** bath

Inner unit walls are not required to be fire resistant. That said you might consider adding insulation or thicker gypsum for thermal performance. The above provides a general schema of the internal structure within your walls. Wall and finishing costs will vary by area and complexity of room/duct enclosures and fixtures (kitchen/bath).



SCENARIO: COTTAGE . major project . one to two units

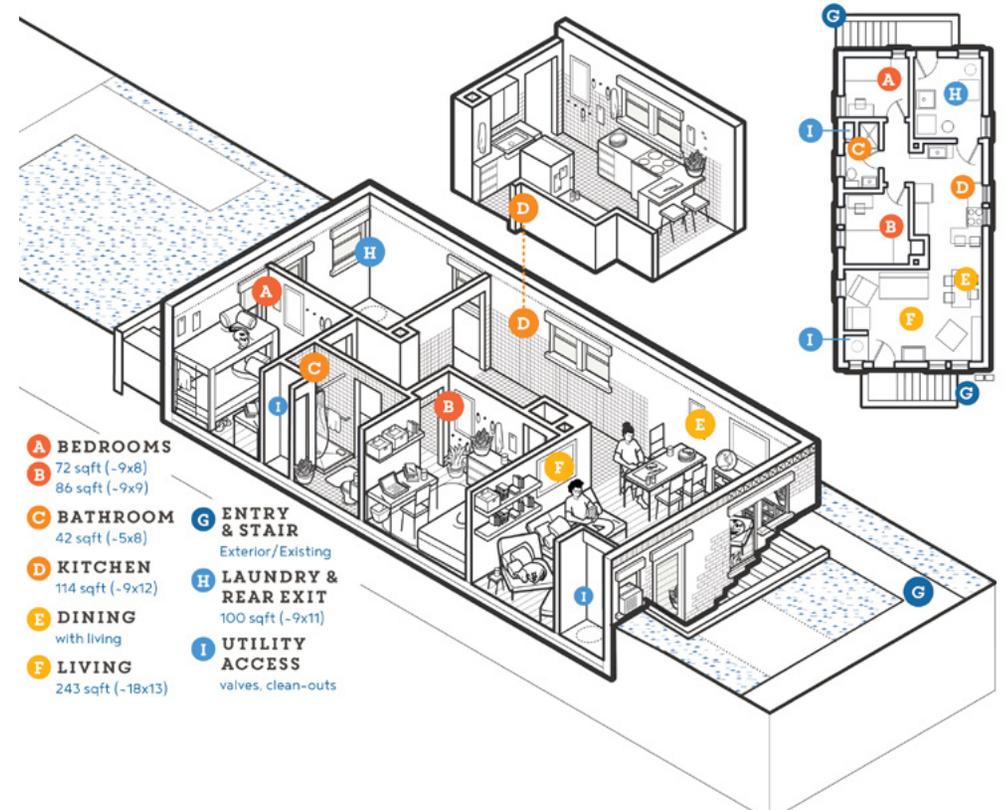
CONVERSION ASSUMPTIONS:

This Cottage conversion creates a 633 sqft, two bedroom basement apartment. It offers a good example of a larger adaption, which is necessary to convert an older single family home to a multi-unit building.

It consists of:

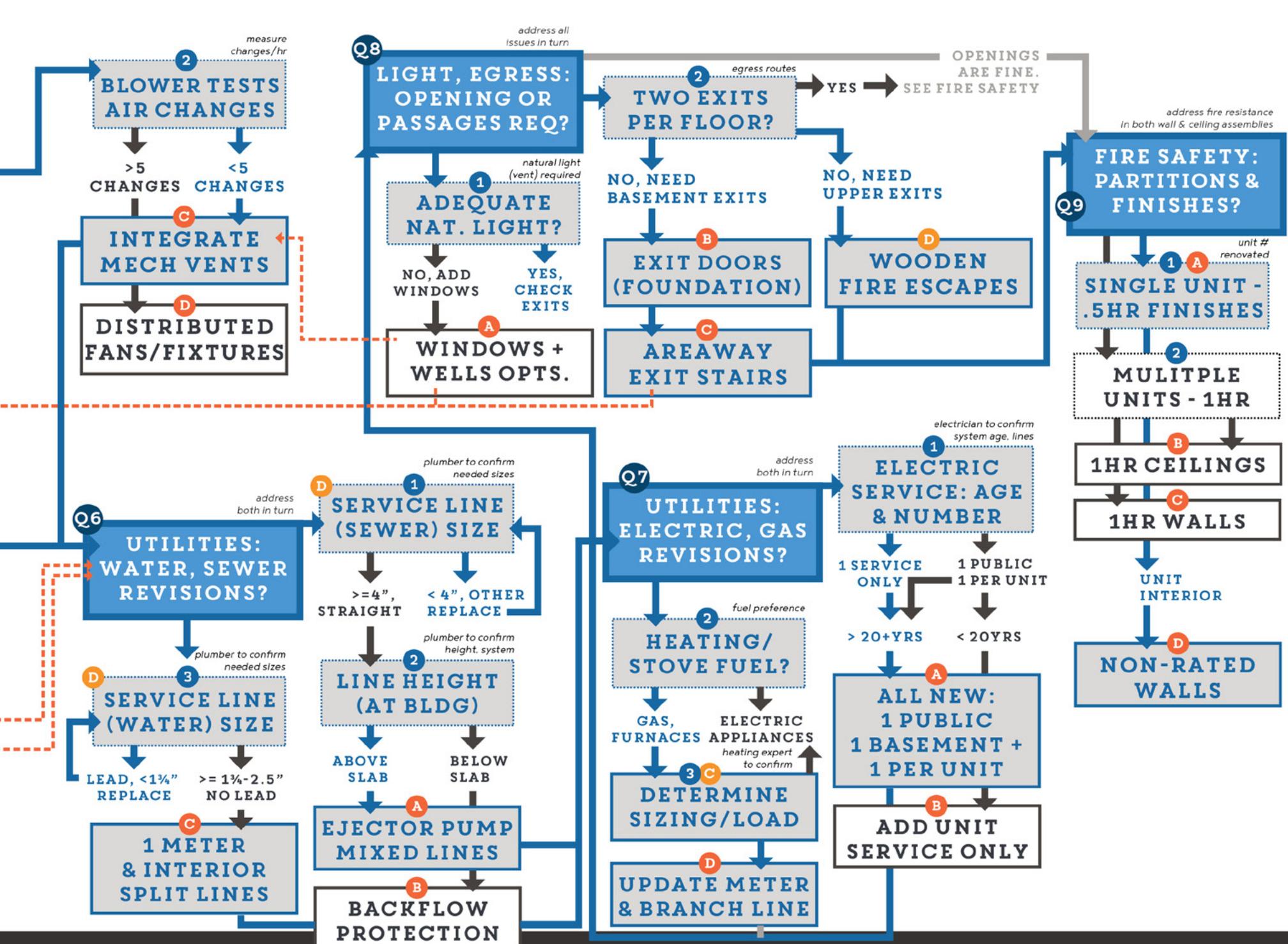
- 1. construction preparation:** safe lead and asbestos removals in advance of construction, plus basic permits
- 2. structural work:** old beam spanning between small chimney cores needs to be replaced to support joists
- 3. height/slab work:** unlikely to have an adequately thick slab, lower floor level as much as possible (without excavation) and use thin tile floors
- 4. drainage:** small lot requires the installation of interior drainage and sump pump, integrate with newly created areaway drains; sump pump is piped to rear yard for infiltration
- 5. air quality:** vapor barriers and exhaust need to be added (with slab), heat & duct work should be added (from common area at rear) for fresh air, directly vent bath fans to the exterior
- 6. water/sewer:** resized water line is necessary for new fixtures, basement sewer lines are connected to a new, larger ejector pump which meets the service line near front entry
- 7. electric/gas:** gas separated for water heater, furnace use. full house replacement of old electric as well as new unit lines.
- 8. exits/openings:** addition of front door and entry stairway, addition of fire-escape for 2nd floor.
- 9. finishing/fire-resistance:** minimal wall partitions, full replacement of ceiling partition and full apartment worth of drywall, paint, doors, and trim.

COMMON CONVERSIONS, PAGE 41



Estimate of Work: Cottage, Two-Bedroom Unit Conversion			
	low	mid	high
City Permits			
Q1 Overall Building Permits <i>(permit specific fees)</i>	\$ 4,000.00	\$ 4,500.00	\$ 6,750.00
Lead Clearance	\$ 300.00	\$ 400.00	\$ 500.00
Asbestos Testing	\$ 300.00	\$ 300.00	\$ 450.00
General Demolition Costs			
<i>none required</i>			
Site - Drainage, Passages, General Work			
Q4 New surface sidewalks	\$ 800.00	\$ 1,720.00	\$ 1,800.00
Area drains around site	\$ 1,280.00	\$ 1,600.00	\$ 2,300.00
Q8 New concrete areaway at entry	\$ 1,650.00	\$ 2,160.00	\$ 2,200.00
Window Replacement			
Operable Windows (4 new, 600-1800 each)	\$ 2,400.00	\$ 4,800.00	\$ 7,200.00
Doors & Exits			
New metal entry door (door, opening)	\$ 575.00	\$ 600.00	\$ 780.00
Interior, main structure			
Structure & Loading			
Q2 Main beam replacement (center columns, girde)	\$ 3,900.00	\$ 5,500.00	\$ 6,480.00
Slab, Waterproofing & Vapor Barriers			
Q3 Slab replacement	\$ 2,600.00	\$ 10,000.00	\$ 11,300.00
Barriers & Drainage/Sump System			
Q3 Air seal envelope (w/ slab patching)	\$ 2,700.00	\$ 6,000.00	\$ 7,150.00
Drainage plane and foam insulation (for full slab)	\$ 3,400.00	\$ 3,500.00	\$ 6,200.00
Q3 Sump pump and tiles (full perimeter system)	\$ 5,950.00	\$ 8,900.00	\$ 10,200.00
Utility connections & lines			
Gas			
Q7 New gas line interior piping	\$ 700.00	\$ 980.00	\$ 1,800.00
Water			
New water supply - service connection	\$ 15,800.00	\$ 18,000.00	\$ 21,500.00
Q6 Interior water pipes	\$ 3,500.00	\$ 4,800.00	\$ 5,250.00

Sewage and Ejector Pump			
Q6 Interior horizontal lines for waste & venting	\$ 4,200.00	\$ 4,500.00	\$ 4,900.00
Ejector pump added	\$ 1,750.00	\$ 2,100.00	\$ 7,050.00
Electric			
Q7 rewire new and old units, line addition	\$ 19,800.00	\$ 31,400.00	\$ 33,200.00
Ventilation & Plumbing Fixtures			
Heating and Centralized Ventilation			
Q5 Basement furnace and ductwork (full house)	\$ 8,000.00	\$ 9,400.00	\$ 10,200.00
Radon Exhaust - active (retrofit to new piping)	\$ 500.00	\$ 1,500.00	\$ 2,500.00
Revised Laundry Facilities			
New hot water tank	\$ 675.00	\$ 1,350.00	\$ 1,600.00
New Laundry hook ups & tub	\$ 775.00	\$ 900.00	\$ 1,475.00
Kitchen (default fixtures)			
Kitchen sink	\$ 250.00	\$ 300.00	\$ 380.00
light over sink	\$ 120.00	\$ 180.00	\$ 350.00
Q5 range hood	\$ 345.00	\$ 375.00	\$ 550.00
Bath (default fixtures)			
plumbing fixtures	\$ 1,195.00	\$ 1,700.00	\$ 2,300.00
lav light	\$ 120.00	\$ 180.00	\$ 350.00
Q5 exhaust fan	\$ 325.00	\$ 400.00	\$ 650.00
Egress & Unit Access (see also exterior)			
Q8 new interior stair (approx. cost/story exterior)	\$ 1,550.00	\$ 1,600.00	\$ 3,350.00
Interior finishes & Fire Partitions			
Q9 Ceilings			
plaster ceiling (1hr partition)	\$ 1,400.00	\$ 2,600.00	\$ 4,100.00
paint ceiling	\$ 700.00	\$ 975.00	\$ 1,100.00
Q9 Walls			
partition walls - wooden studs	\$ 6,300.00	\$ 6,400.00	\$ 11,500.00
drywall 1/2" (interior)	\$ 6,500.00	\$ 8,080.00	\$ 13,500.00
drywall 5/8" (1hr fire partition)	\$ 3,500.00	\$ 4,250.00	\$ 5,200.00
Finishing costs by rooms			
<i>see 'Building Equity' for room by room estimate</i>			
	low	medium	high
Project Sums	\$ 126,065.00	\$ 175,820.00	\$ 230,555.00



SCENARIO: TWO-FLAT . medium . two to three units

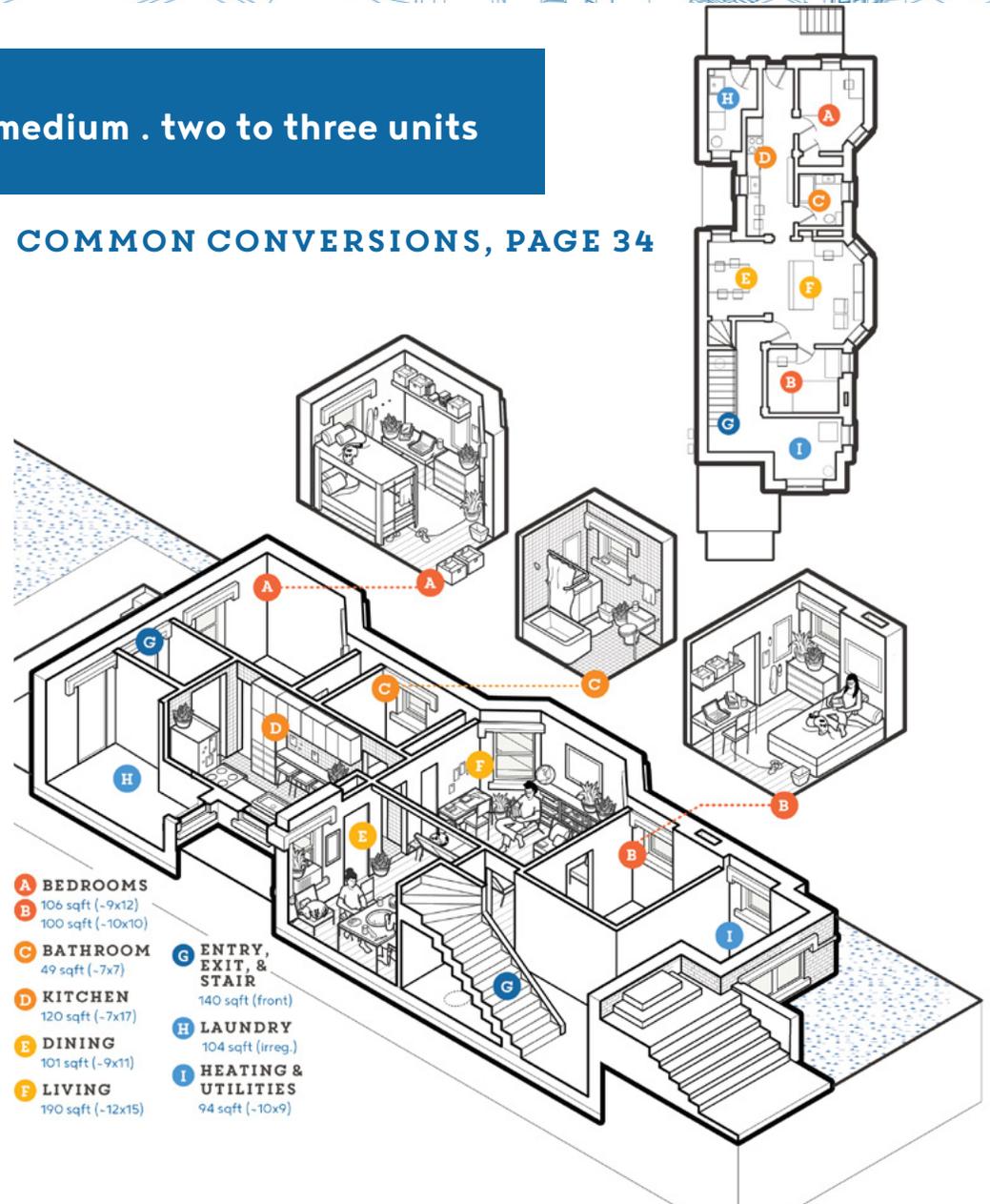
CONVERSION ASSUMPTIONS:

This Two-Flat conversion creates a 720 sqft, two bedroom basement apartment. It offers a good example of a small-mid-sized budget which is necessary for adding another unit to a multi-unit building.

It consists of:

- 1. construction preparation:** safe lead removal in advance of construction, plus basic permits
- 2. no structural work:** brick walls (above) are likely to have original steel spanning beams and columns
- 3. height/slab work:** height is fine, slab will need patching and resealing of existing barriers during drainage and sewage work
- 4. drainage:** larger lot and offset allow for exterior drainage and sump pump, excess slab drains removed, and sump pump connected to front storm system for disposal
- 5. air quality:** likely to have passive radon exhaust at front, minor fans for fresh air, directly vent bath/kitchen to the exterior
- 6. water/sewer:** water service line is adequate to fixtures, basement sewer lines are connected to a new, larger ejector pump which meets the service line in the common front area
- 7. electric/gas:** gas connection is fine. only gas work is adjusted furnace lines; uses electric cooking; electric is only added to the new unit; existing public and upper units' lines are fine.
- 8. exits/openings:** no additional stairs or fire-escapes are necessary. Laundry door is enlarged from existing window.
- 9. finishing/fire-resistance:** larger fire partitions added at front and rear common areas, some replacement of ceiling plaster and full apartment worth of drywall, paint, doors, and trim.

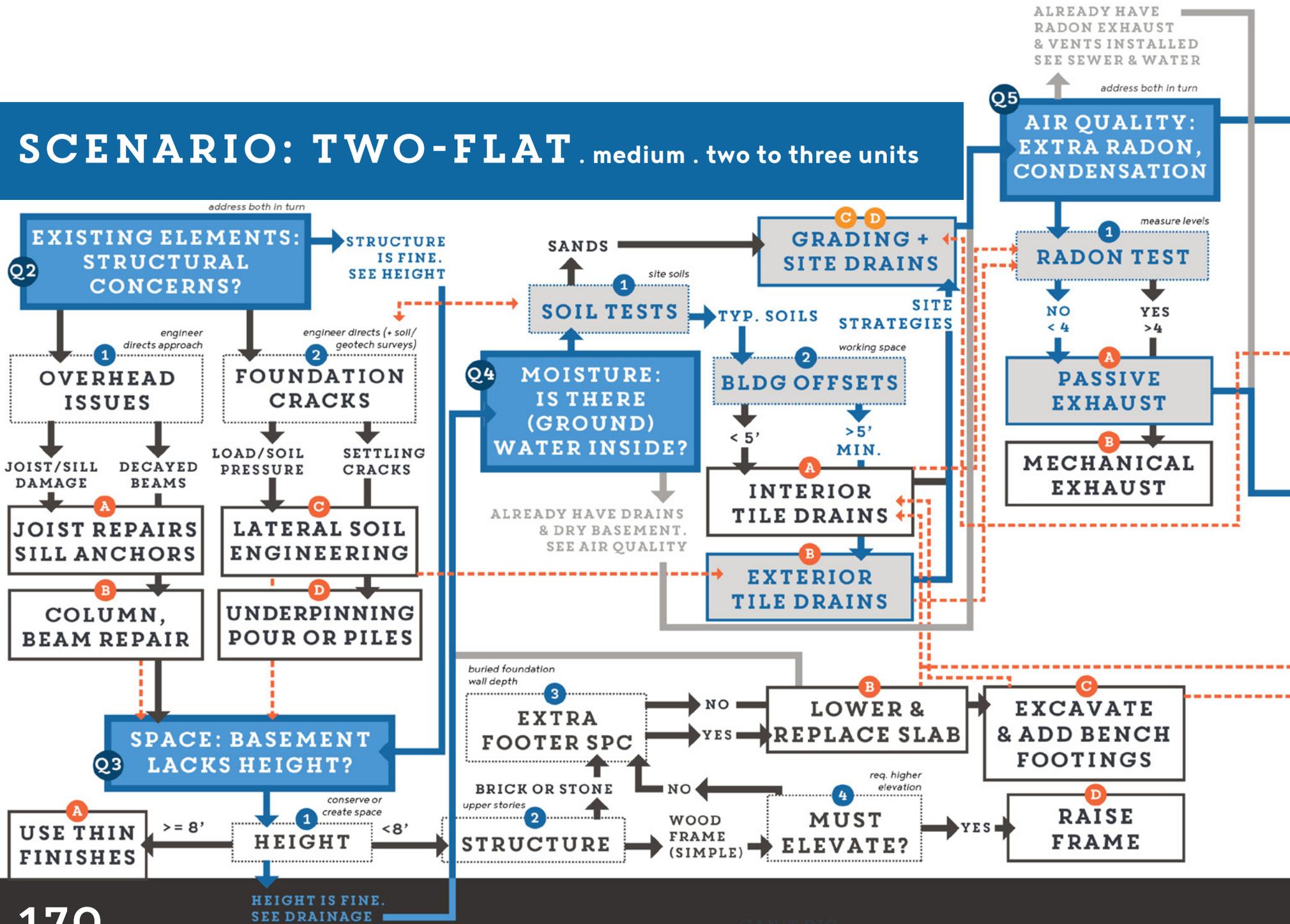
COMMON CONVERSIONS, PAGE 34

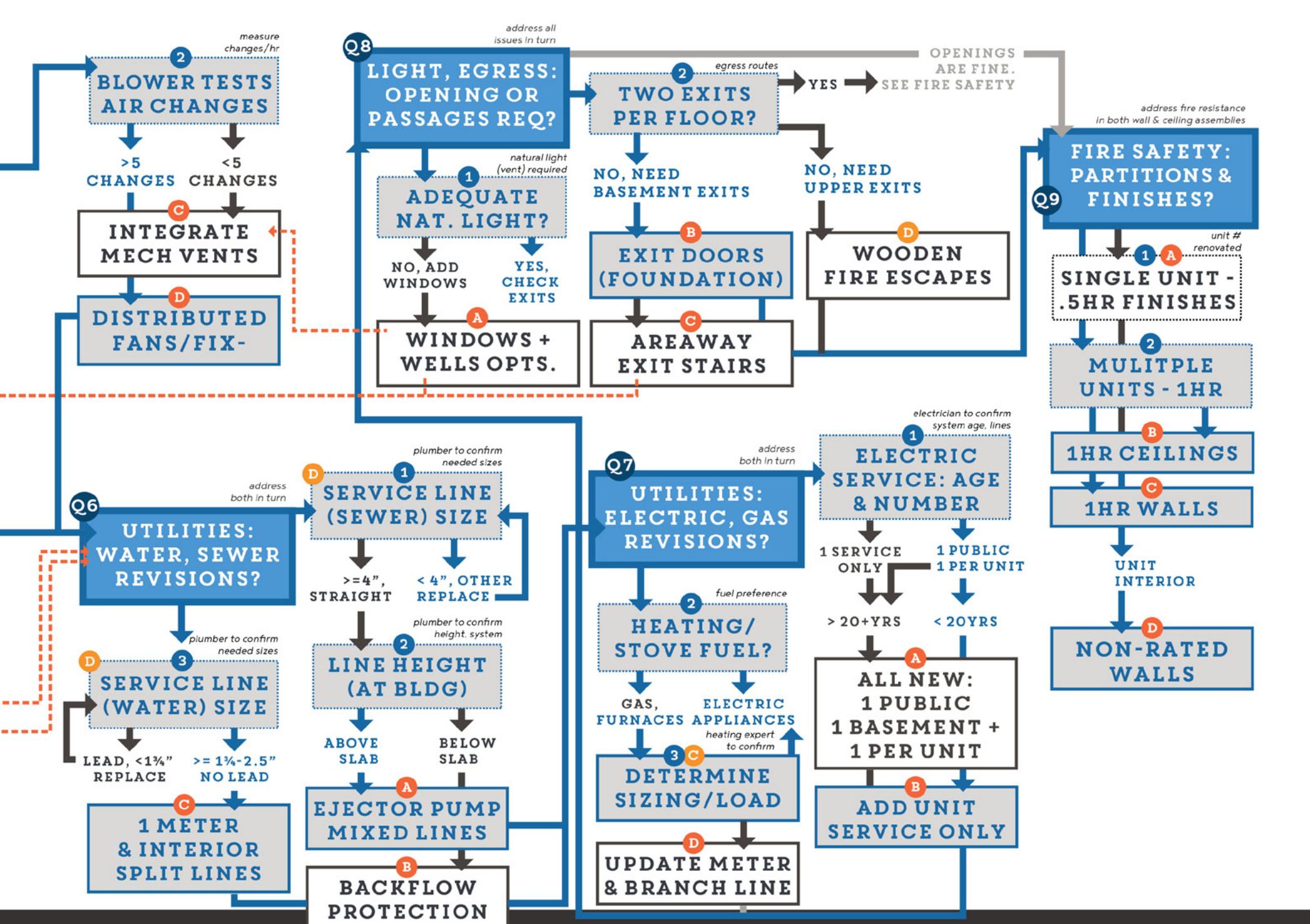


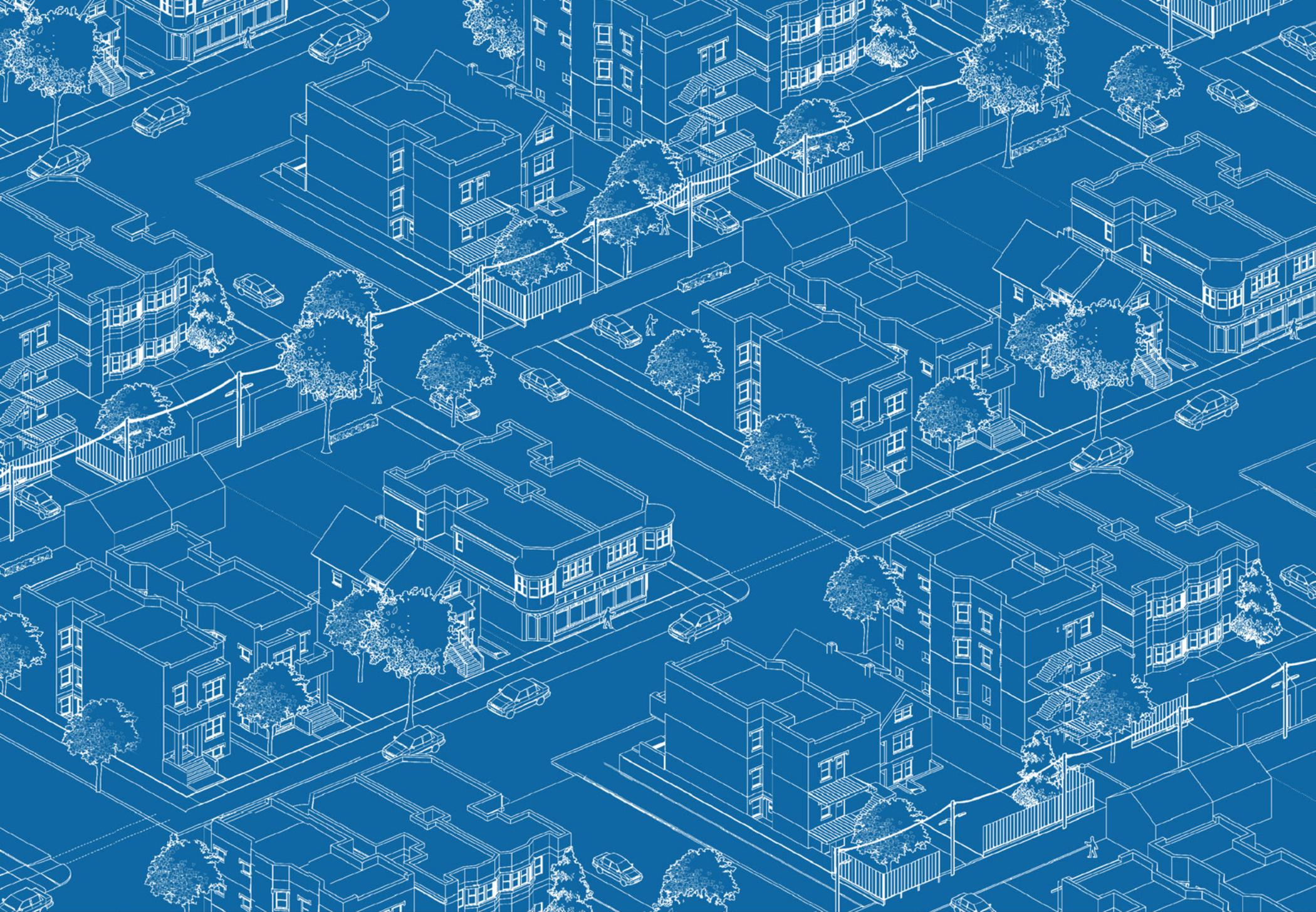
Estimate of Work: Two-Flat, Two-Bedroom Unit Conversion				
	low	mid	high	
City Permits				
Q1 Overall Building Permits	\$ 4,000.00	\$ 4,500.00	\$ 6,750.00	
	<i>(permit specific fees)</i>			
Lead Clearance	\$ 300.00	\$ 400.00	\$ 500.00	
General Demolition Costs				
Q4 Catch Basin demolition	\$ 200.00	\$ 475.00	\$ 550.00	
Site - Drainage, Passages, General Work				
Q4 New surface sidewalks	\$ 800.00	\$ 1,720.00	\$ 1,800.00	
Area drains around site	\$ 1,280.00	\$ 1,600.00	\$ 2,300.00	
Window Replacement				
<i>none required</i>				
Doors & Exits				
<i>none required</i>				
Interior, main structure				
Structure & Loading				
<i>none required</i>				
Slab, Waterproofing & Vapor Barriers				
Q3 Slab repair (patches)	\$ 2,000.00	\$ 2,500.00	\$ 2,800.00	
Barriers & Drainage/Sump System				
Q3 Air seal envelope (w/ slab patching)	\$ 2,700.00	\$ 6,000.00	\$ 7,150.00	
Q5 Sump pump and tiles (full perimeter system)	\$ 5,950.00	\$ 8,900.00	\$ 10,200.00	
Utility connections & lines				
Gas				
Q7 New gas line interior piping	\$ 700.00	\$ 980.00	\$ 1,800.00	
Water				
Q6 Interior water pipes	\$ 3,500.00	\$ 4,800.00	\$ 5,250.00	

Sewage and Ejector Pump			
Q6 Interior horizontal lines for waste & venting	\$ 4,200.00	\$ 4,500.00	\$ 4,900.00
Ejector pump added	\$ 1,750.00	\$ 2,100.00	\$ 7,050.00
Electric			
Q7 rewire new apartment	\$ 4,950.00	\$ 7,850.00	\$ 8,300.00
Ventilation & Plumbing Fixtures			
Heating and Centralized Ventilation			
Q5 Furnace and ducts (basement)	\$ 1,200.00	\$ 1,600.00	\$ 4,600.00
Radon Exhaust - active (retrofit to new pipe)	\$ 500.00	\$ 1,500.00	\$ 2,500.00
Revised Laundry Facilities			
<i>none required</i>			
Kitchen (default fixtures)			
Kitchen sink	\$ 250.00	\$ 300.00	\$ 380.00
light over sink	\$ 120.00	\$ 180.00	\$ 350.00
Q5 range hood	\$ 345.00	\$ 375.00	\$ 550.00
Bath (default fixtures)			
plumbing fixtures	\$ 1,195.00	\$ 1,700.00	\$ 2,300.00
lav light	\$ 120.00	\$ 180.00	\$ 350.00
Q5 exhaust fan	\$ 325.00	\$ 400.00	\$ 650.00
Egress & Unit Access (see also exterior)			
<i>none required</i>			
Interior finishes & Fire Partitions			
Ceilings			
paint ceiling	\$ 700.00	\$ 975.00	\$ 1,100.00
Walls			
partition walls - wooden studs	\$ 6,300.00	\$ 6,400.00	\$ 11,500.00
Q9 drywall 1/2" (interior)	\$ 6,500.00	\$ 8,080.00	\$ 13,500.00
drywall 5/8" (1hr fire partition)	\$ 3,500.00	\$ 4,250.00	\$ 5,200.00
Finishing costs by rooms			
<i>see 'Building Equity' for room by room estimate</i>			
	low	medium	high
Project Sums	\$ 71,590.00	\$ 96,135.00	\$ 136,770.00

SCENARIO: TWO-FLAT . medium . two to three units







NAVIGATING PERMITS . process & docs

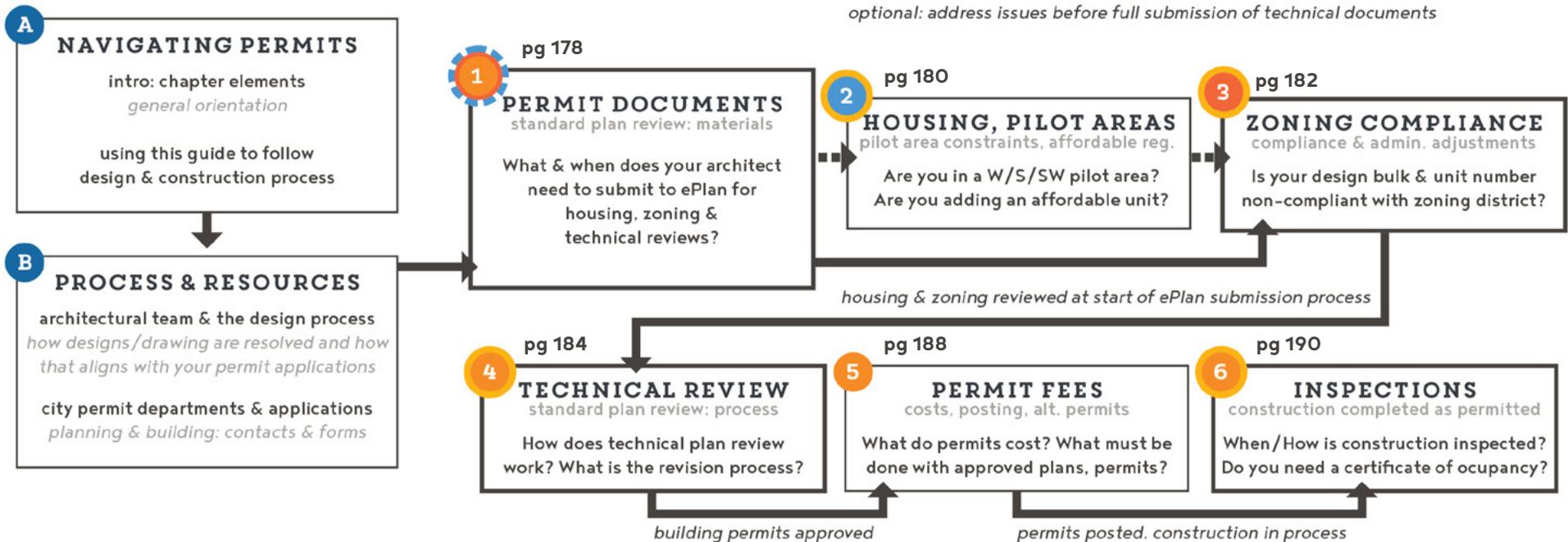
Housing, Zoning, & Building Permits for Basement Conversion in
Single Family & Two to Four-Flat Buildings



INTRODUCTION . permit agents & agencies . applications

This chapter outlines the different agents, city departments, and construction documents required for getting construction permits in Chicago. Flow charts provide pathways through the permit(s) submission process, based on your responses (yes/no) and the City's decisions (approved/denied).

NAVIGATING THE PERMITTING PROCESS



Department of Housing

Department of Planning and Development

Department of Buildings

Review & Approval Steps/Cycles

CHAPTER CONTENTS:

'Navigating Permits' introduces the process of applying for housing, zoning, and building permits in Chicago. The core section is composed of a series of diagrams, which outline the typical fees, required forms, applicants (predominantly your architect), city department of application, and common turn-around times. Structured around project questions – 'does your basement project have a new subgrade terrace?' – and 'yes/no' decision arrows, each diagram maps out a permit pathway, with rejection, revision, and approval cycles. This should enable you to follow your architect and contractor's progression through the permitting process in ADU pilot areas and citywide:

1 Permit Process – Standard Plan Review Documents:

- Citywide: This section lays out the documents required for a 'Standard Plan Review' permit submission to the Department of Buildings. It also elaborates on the order of operations between the city's E-Plan submission process for housing, zoning, and building permit approvals.

2 Housing:

- Pilot Areas: These diagrams walk you through applying for a Conversion Certificate and, for those adding multiple ADU's (5+ unit original buildings), registering affordable units with the Department of Housing.

3 Zoning:

- Citywide: These diagrams walk you through ordering a Zoning Compliance Certificate and, as needed, applying to the Department of Planning and Development for minor allowances with an Administrative Adjustment.

4 Plan Review – Technical Reviews & Revisions:

- Citywide: This diagram walks you through the Department of Buildings' technical review process (architectural, fire, electric, plumbing, geotechnical, etc.) and the sorts of mark-up, revision, and resubmission processes that your architect will lead your design team through.

5 Approved Permits – Fees and Posting:

- Citywide: This section reviews the Department of Buildings' permit application fee system and the permit posting protocol, so you can anticipate the total costs of a permit application (as estimated by the city). It also elaborates on the Self-Certified Permit application process, where your architect may qualify to 'self-certify' the technical plans for your project (and absorb that liability).

6 Construction Inspections:

- Citywide: This final diagram leads you through the City's required inspections – meant to verify that all building work is done as described in your permits – and reviews the steps required if you fail or miss a required inspection.

This guide is not meant to spur independent applications to Chicago's Department of Planning and Development or Department of Buildings. Rather, these diagrams help you anticipate the costs, timing, and review cycles involved in obtaining construction permits and completing work to code.

During these stages, your architect should notify you of how technical updates or alternate installation strategies impact your final basement design, the costs for revised drawings, materials and approaches, and the timeline to project completion. As noted in the 'Finances' chapter, your estimates should include a 10% margin to accommodate the time/labor of drawing revisions and any potential schedule lag, which results from the repair/replacement of failed construction components. (See the 'Introduction,' pg 22, for your legal recourse facing inept construction work and contractor negligence.)

Before turning to permitting itself, the remainder of this introduction outlines the major city agencies and application forms your architect will work with for certificates and permits.



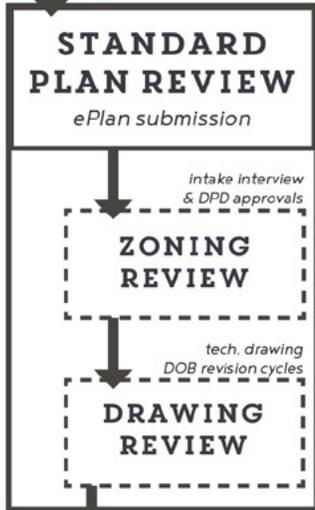
PERMIT SCENARIOS . city agencies . resource links

SCENARIO 1

no anticipated zoning issues

NEW UNIT COMPLIES WITH ZONED USE/BULK (NOT IN PILOT AREAS)

pg 178, 182(a), 184+



include: plat of survey, certif. of zoning compliance (p182) in ePlan submission

**PERMITS ISSUED
INSPECTIONS PASSED
CERTIF. OF OCCUPANCY**

SCENARIO 2

issues: down-zoned areas; bulk & density exceptions

UNIT NON-COMPLIANT WITH DOWN-ZONED USE OR MINOR BULK ISSUES

pg 178, 182+



process can be done at end of DD, if desired

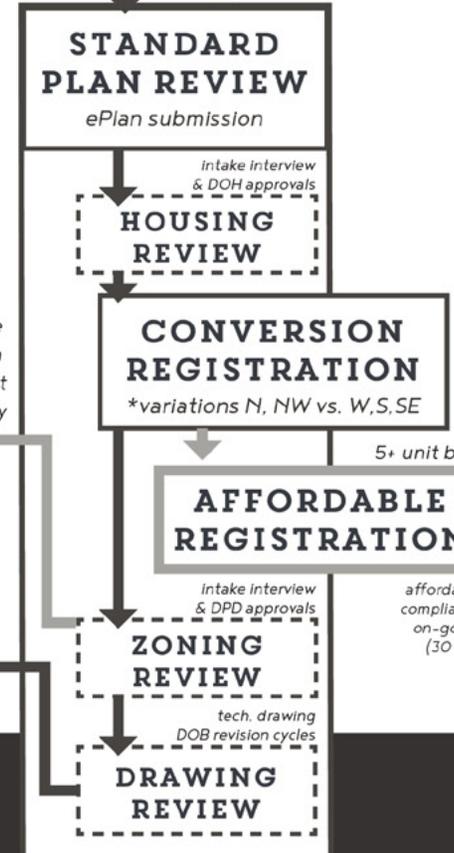
CITYWIDE (NON-PILOT)

SCENARIO 3

pilot conversion unit registration with DOH

ADU / CONVERSION UNIT BY RIGHT (IN PILOT AREA*)

pg 178, 180+



if there are bulk issues an admin. adjustment may be necessary

affordable compliance on-going (30 yrs)

ADU PILOT AREAS

DESIGN IN RELATION TO PERMITS:

Permit approvals can be spread over time, based on anticipated issues (non-pilot scenarios 2, left) or condensed into a single submission (default approach). Their sequence - moving from general building character to technical details - parallels the design process. Inspections enforce permitted work, confirming alignment of constructions and design.

Key design stages, for permits and inspections, include:

- **Design Development (DD)**, provides general plans for admin. adjustments (advanced DPD submissions in scenario 2, opt.).
- **Construction Documentation (CD)**, consists of producing a full set of construction document, submitted to standard plan review and revisions (all scenarios; with sequential review by DOH, then DPD, before review by DOB).
- **Construction or Construction Administration (CA)**, your contractor will direct construction and schedule inspections. Your architect can be contracted to monitor work and provide revised plans/permits. (all scenarios)

Your architect, who will lead you through design and permitting, needs to be an Architect of Record (AOR). This means they are licensed in Illinois to stamp construction drawings as legal, binding documents, directing your basement conversion. Your architect of record will consult with engineers (structural, electric, etc.) for system calculations and may manage the bidding process. During construction, additional drawings and design revision are typically done under separate contracts (with additional fees).

CITY OFFICES & CONTACTS:

The process of applying for permits is consolidated in the City's use of the **E-Plan application system**. Depending on the project, you and your architect may meet with a) the Department of Housing, (ADU pilots), b) the Department of Planning and Development, and c) the Department of Buildings. Forms and contacts are linked at right.

DOH - DEPT. OF HOUSING

Housing reviews: www.chicago.gov/city/en/depts/doh.html

physical location: Rm 1006, City Hall

general contact: (312) 744-4190, submissions, questions & directions

- **ADU Ordinance:** bit.ly/Chicago-ADU-Ordinance
- **ADU microsite (Conversion, Affordability):** www.chicago.gov/adu

DPD - DEPT. OF PLANNING & DEVELOPMENT

Zoning reviews: www.chicago.gov/city/en/depts/dcd.html

physical location: Rm 905, City Hall

general contact: (312) 744-5777, submissions, questions & directions

- **Certificate of Zoning Compliance:** bit.ly/Chicago-Zoning-Compliance
- **Administrative Adjustment:** bit.ly/Chicago-Admin-Adjustment
- **Zoning Map:** gisapps.chicago.gov/ZoningMapWeb
- **Zoning Administrator:** bit.ly/Chicago-Zoning-Administrator

DOB - DEPARTMENT OF BUILDINGS

Building permits, inspection: www.chicago.gov/city/en/depts/bldgs.html

physical location: Rm 900, City Hall

general contact: (312) 744-3449, submissions, questions & directions

- **Standard Plan Review:** bit.ly/Chicago-Standard-Plan-Review
- **Self-Certification:** bit.ly/Chicago-Self-Certification
- **Inspections:** bit.ly/Chicago-Inspections
- **E-Plan:** bit.ly/Chicago-E-Plan
- **Permit Costs:** bit.ly/Chicago-Permit-Costs
- **Senior Fee Waivers:** bit.ly/Chicago-Fee-Waivers

PERMIT PROCESS . standard plan submissions

ALL SCENARIOS

DESIGNS READY FOR STANDARD PLAN REVIEW

Led by your Architect of Record (AOR), in collaboration with:

- general contractor
 - electrician
 - plumber
 - and energy/heating expert.
- A permit expeditor may apply in place of architect.

AOR schedules:

HOUSING REVIEW ZONING REVIEW

confirms that proposed project is in compliance with ADU pilot (as applicable) and zoning

scenario 3

HOUSING

next page

scenario 1, 2

ZONING

page 182

Architect can submit to E-Plan for Housing & Zoning reviews prior to submission of complete technical package

Apply to the Department of Buildings, via E-Plan:
\$300 permit fee deposit/zoning fee (see page 188 for full fees)

1 BUILDING PERMIT APPLICATION REQUIRED MATERIALS:

application forms, including:
 architect of record information
 owner information
 (potential) expeditor information
 contractor information
 pin (property identification number)

plat of survey (< 60 days old)

construction drawings - which includes:

architectural floorplans with demolition, existing, & proposed work noted

wall sections

elevations

light & ventilation schedule

exiting plan

with technical elements (by building systems):

structural plans for building loading
structural calculations, stamped

electric permit application with
electrical plans for location of all equipment

single line service diagram (per each line)
 load calculations for entire building

plumbing plans with all fixtures
plumbing riser diagrams of supply and sewage size/value calculations

mechanical plans for ventilation and heating

ventilation schedule with calculations per room
ventilation equipment schedule with mechanical equipment specs

energy conservation code statement or 'need not comply' form

ADA/MOPDisabilities Project Data Form

1B elements which vary by project :
excavation permit app for working within 10' of property boundary

driveway alterations like curb cuts

geotechnical or soil borings report

existing structures report

new porch or fire-escape plans

CONVERSION & ZONING APPROVED

ADD ALL CONSTRUCTION DOCUMENTS

APPLICATION READY FOR TECHNICAL REVIEW

KEY TO PROCESS DIAGRAMS

Question: project/site conditions affect permit route

Application Action
 (\$-- application cost)
 req. elements or documents
 time to process

APPROVALS/NO ISSUES

proceed to the next step in zoning or standard plan review

DENIALS/ISSUES
 requires revision or appeals cycle before proceeding

CERTIFICATE OR PERMIT

CONSTRUCTION PERMIT OPTIONS:

If you visit the Department of Buildings' website, you'll notice that there are a number of permit options. **This guide follows the 'Standard Plan Review' because it's the most common process, given the scale of work required for a basement conversion.** (See resources at: bit.ly/Chicago-Standard-Plan-Review.)

The other option you might pursue, based on your architect's qualifications, is the Self-Certified Permit process, elaborated on page 189. In this route, your designer qualifies with the city and assumes responsibility for all technical reviews. This has the benefit of streamlining the review process, saving time and money during permitting itself. The potential downside is that if you are unhappy with your architect's work or their construction administration, the major city oversight occurs during inspections. If your design team can correct an error on paper it will save you the cost of materials, labor, and re-inspection fees/fines that required for site-based corrections.

During schematic design, your architect should search the Dept. of Buildings' violation data to determine likely renovation issues; they should double check and help you resolve these issues before beginning the permit application. *Violations, debt, and liens will disqualify your application from review under either system.*

STANDARD PLAN REVIEW DOCS:

For standard plan review or self-certification, your architect will be responsible for creating an E-Plan account for the digital collation and coordination of drawing submissions and revisions. This must be done by a licensed architect, engineer, or permit expeditor. Once your architect has an account, they will be notified to pay the zoning permit fee (\$300) and begin uploading documents.

- 1** The Standard Plan Review Documents, broadly speaking, mirror the elements discussed in 'Code Compliant Units'. This is because the permitting process is designed to verify the

detailing and design of buildings to protect public health, safety, and general welfare. (Download the **Standard Plan Review Checklist** for detailed submission requirements: bit.ly/Chicago-Standard-Plan-Checklist.)

- 1A** **Your architect can initiate the housing (pilots) and zoning review process after uploading a) the application forms themselves and b) the architectural drawings – floorplans, site plans, sections, elevations, details, and egress/fire safety plans – in advance of full upload of technical systems.** These materials are copied to the Department of Housing and, then, the Department of Planning and Development for review and an approval appointments. This allows the architectural team to continue compiling technical elements - like electric, plumbing, etc.. (See steps here: bit.ly/Chicago-Standard-Plan-Steps.) Alternately, your architect may simply submit the full packet, go through applicable DOH and DPD approval and progress to the technical plan review process (pg 184).

- 1B** **Most of the required documents, at left, will be familiar from earlier sections. To clarify, there are a few new items you may not anticipate, in bullets below, as well as some specialized drawings that will not be required for your submission. Of the elements listed by the city, you are unlikely to need:**

- refrigeration / food prep plans (for commercial spaces)
- landscape ordinance elements (commercial/parking lots)
- storm-water management plans (typically larger lots)

You may need to confirm the following additions:

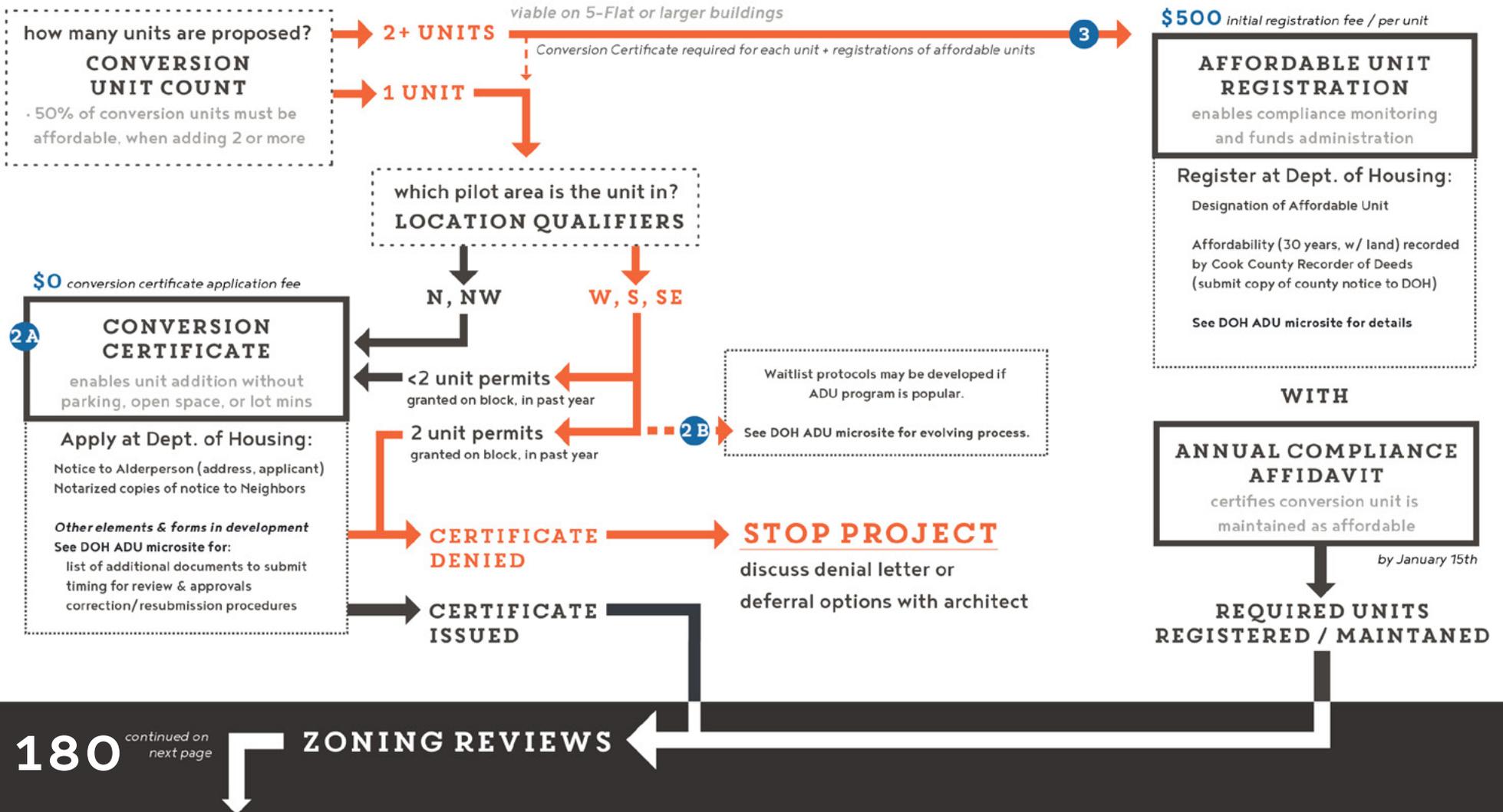
- ADA/MODP data form (explaining accessibility /exemptions)
- Energy Conservation Compliance plans (for heating, insulation, and energy use, from environmental specialist)
- porches and below-grade areaways (if adding egress routes)
- site elements like driveway cuts (for zoning approvals)
- and background structural and geotechnical reports.



ADU PILOT AREAS . conversion & affordability regs.

SCENARIO 3

ADU PILOT AREAS OWNER-OCCUPANT



HOUSING APPLICATIONS, TIMING:

The 'Additional Dwelling Units Ordinance' requires that owners in pilot areas obtain a 'Conversion Certificate' from the Department of Housing (DOH) for basement conversion units, before they can qualify for building permits. Buildings adding multiple conversion units must also register their affordable unit (i.e. 60% AMI as discussed in 'Building Equity', pg 107) in advance of receiving building permits.

Currently, DOH is finalizing application procedures for the ADU pilot areas. In 2024, DOH will report on the pilots and may revise qualifications. The graphic at left and the following summary are for general orientation only. **The most reliable source of up-to-date information is the Department of Housing's ADU microsite at www.chicago.gov/adu.**

For those applying for 'Conversion Certificates,' housing reviews will be the first step in a Standard Plan Review, during the submission of a full ePlan package. Applications to the Department of Housing are relatively inexpensive (\$0 for conversion, \$500 per affordable unit). See the ADU microsite for the updated list of 'Conversion Certificate' forms and documents. *Affordable units are not required in buildings originally containing from one to four flats. Given typical readership, the affordable registration requirements are thus provided for exception cases.*

CONVERSION CERTIFICATE. PILOT

- 2 If you are in a pilot area zoned RS-2 or higher and do not have a carriage house, you can add a conversion (basement) unit by right (see pilot maps, pg 62). All new conversion units must have accompanying 'Conversion Certificates.' The certificate flags your project, so that when the Department of Planning and Development reviews the density, parking, and open space proposed, they seek alignment with ADU allowances. While application forms and checklists are still being developed, there three main elements required:

- 2A • As a homeowner, you will need to inform your neighbors (within 100') and alderman and attach certified notice copies to your Conversion Certificate application. The background application may include preliminary design drawings and will use address to confirm participation in ADU pilot program and, in the zones below, confirm compliance with anti-gentrification controls:
- 2B •
 - **Pilot Zones W/S/SE:** All conversion units must be in an owner-occupied building, if building has 3 or fewer units.
 - **Pilot Zones W/S/SE:** No more than two (2) conversion units can be permitted on the same block, both sides of the street, within the same year. As of now, permits will be issued on a first-come, first-served basis. If the ADU program is popular, DOH may develop a lottery system for applicants.

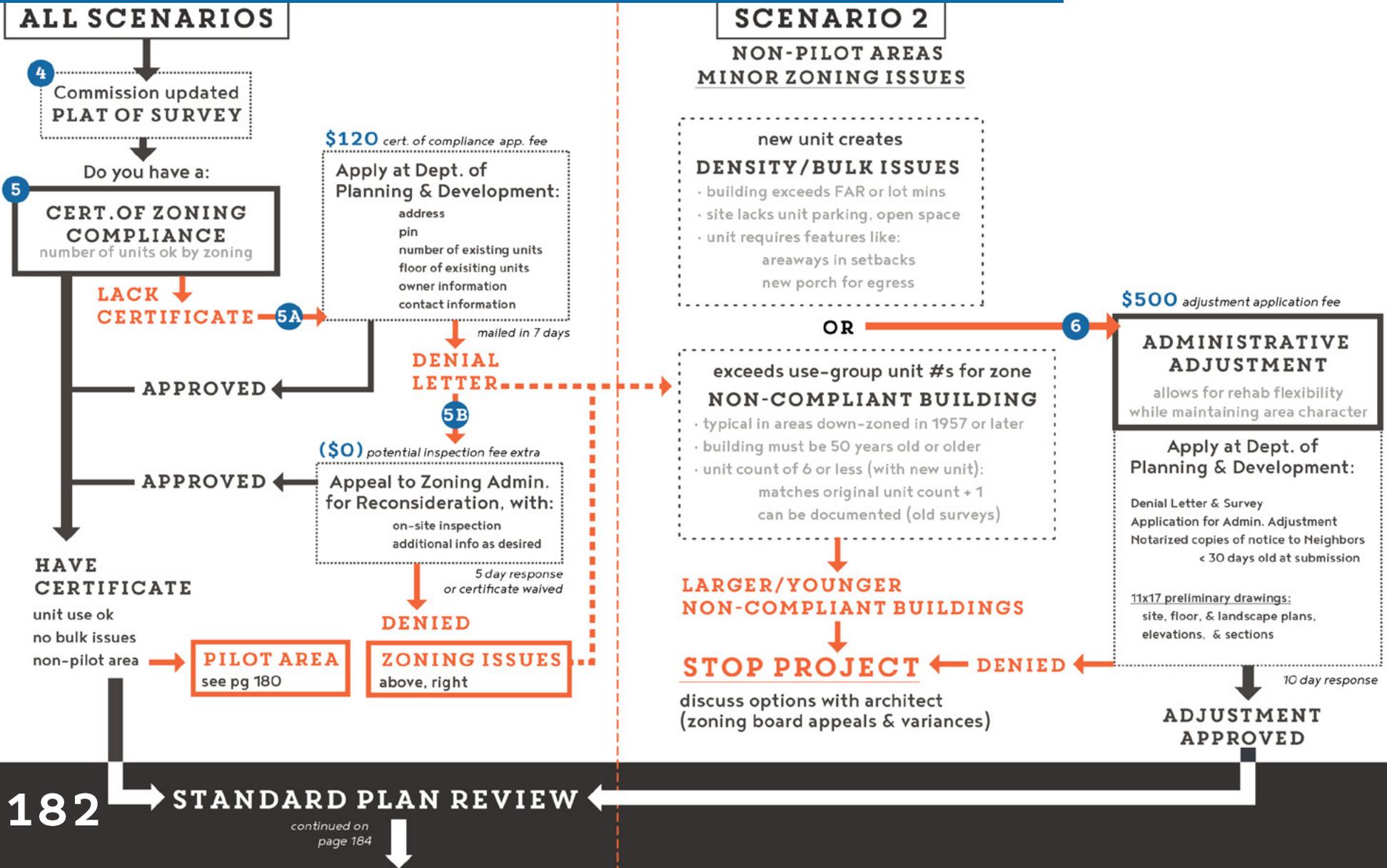
If your 'Conversion Certificate' is approved, you may still have minor zoning issues based on design/bulk reqs. Your architect and DPD will advise on how to meet outstanding zoning issues before your project goes to technical review. If denied for reasons other than the W/S/SE block restrictions, your architect should advise on project viability in general.

AFFORDABLE REGISTRATION . PILOT

- 3 For buildings with five units in the ADU pilot areas, it is possible to add two conversion units, of which one conversion must be affordable. This unit must be keep affordable for 30 years (no matter the owner) and the owner must notify the Cook County Recorder to note the affordable unit on their deed. Copies of this notice, documents identifying the specific unit, contact information, and a \$500 fee (for admin.) are required when registering the unit with the Department of Housing. After permitting and construction, an annual affidavit is required to maintain registration. See ADU microsite for registration details.



ZONING APPROVALS . certificates . preliminary work



ZONING CERTIFICATES, TIMING:

Broadly speaking, you can pursue zoning approvals after design development, to avoid delays, or as an initial step in the Standard Plan Review process. The most common applications to the Department of Planning and Development including certificates of compliance, denial appeals, or administrative adjustments. They are relatively inexpensive (\$100-\$500) and have roughly two week turn-around times. The documents needed - a plat of survey, preliminary design drawings - coincide with what your architect should be commissioning/creating in schematic and design development phases.

All applicants for building permits will need a plat of survey and their certificate of zoning compliance for submission with Standard Plan Review (scenario 1). Owner-occupants who lack a certificate of compliance or are seeking some flexibility in zoning allowances will likely need an administrative adjustment (scenario 2). For instance, single family houses may add a unit in RS-3 areas outside the ADU pilots, to become a Two-Flat. But smaller lots will require flexibility on areaways for egress, lower lot area minimums/unit, and/or reduced open space.

ZONING COMPLIANCE . ALL SCENARIOS

4 As you start the design process, you should contract with a surveyor for an updated plat of survey. This document lays out the legal dimension of your lot and building position; a copy will be required for all building permit submissions (all permit scenarios).

5 You should dig out your certificate of zoning compliance, received when purchasing your building. The certificate states the number of residential dwelling units at the property that are legal under the Chicago Zoning Ordinance.

5A If you do not have a certificate of compliance, you can order one from the Department of Planning and Development (bit.ly/Chicago-Zoning-Compliance). Be forewarned, just because you have a Two-Flat in good condition does not mean you're compliant; much of the city has been down-zoned over recent years.

5B Compliance appeals are free and enable you to add additional context and review your property with the zoning administrator (bit.ly/Chicago-Zoning-Administrator).

- Even if you know you're non-compliant, you need to apply so you can use the denial letter in other zoning applications.

ZONING ADJUSTMENT . SCENARIO 2

If you are non-compliant by use or have new unit features that conflict with density/bulk standards of your zone - you'll need an administrative adjustment to get permits for your basement unit (bit.ly/Chicago-Admin-Adjustment). An administrative adjustment is for minor modifications, like increasing floor area ratios, allowing elements that exceed lot offsets, or, for older buildings, confirming that the number of units were legal at the time of construction (50+ years ago).

- For basement work, you are likely to have details - subgrade terraces (within your front offset) or new porches for egress - that require an adjustment. Work with your architect to confirm these elements/issues, as they will provide annotated drawings and submit, on your behalf, the administrative adjustment application.
- As a homeowner, you will need to inform your neighbors (within 100') and alderman of your proposed zoning adjustment and attach certified notice copies to your adjustment application.
- This notice requirement parallels that of Conversion Certificates for ADU pilots (scenario 3, last page). If you are in a pilot zone and still anticipate bulk issues, you should prepare and submit notices for both DOH and DPD reviews.

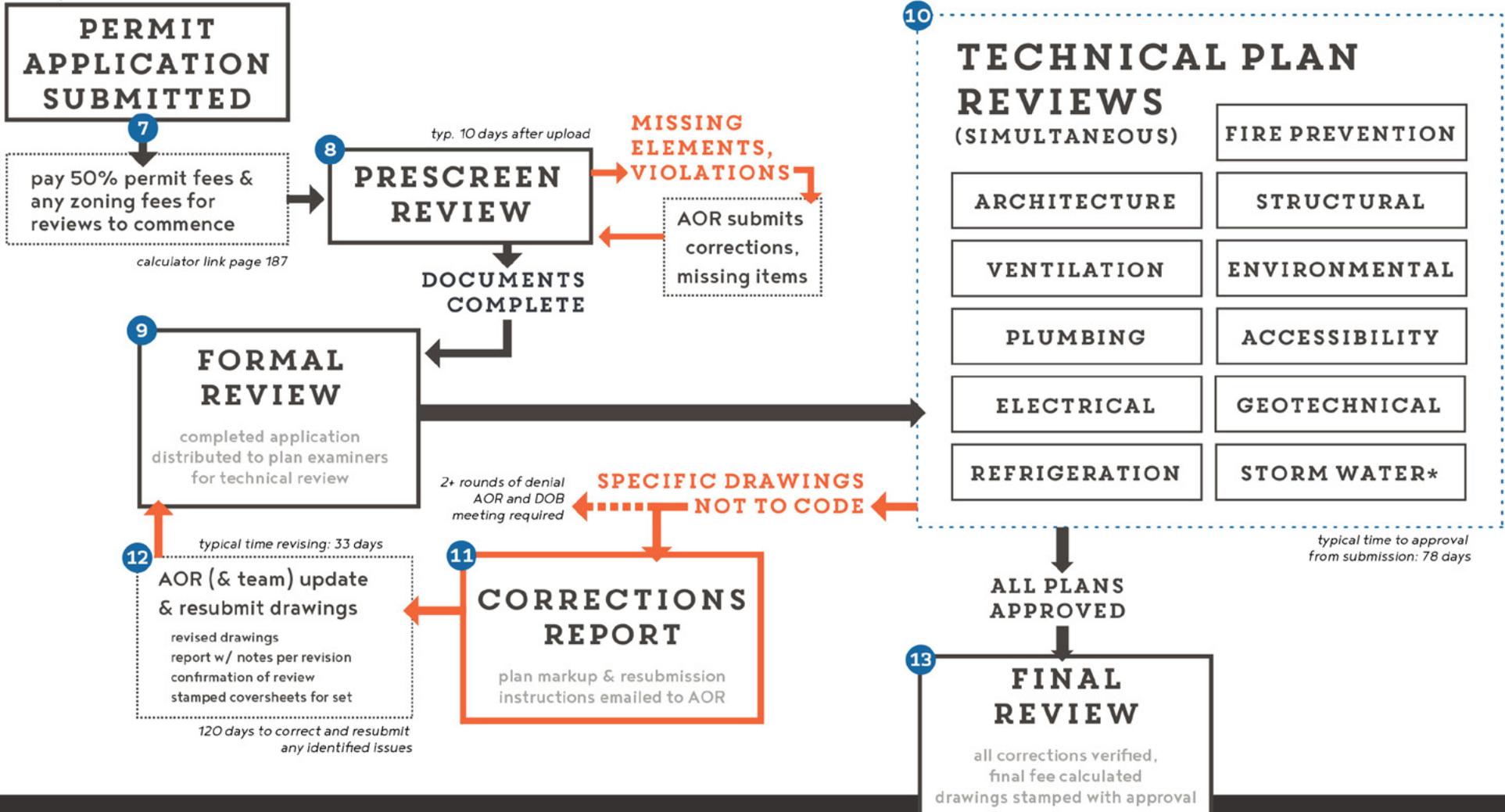
Once your adjustment is approved (in advanced or during Standard Plan Review), your project is eligible for technical review and construction permits (next page).

If you are non-compliant and are denied an adjustment, talk with your architect about options. There are more intense procedures for changing your zoning allowances which require community hearings, and legal representation. (See this **Community Law Association Zoning Guide** for other appeal options www.clccrul.org/community-land-use-guide.)



PLAN REVIEW . technical reviews . revision process

AOR uploads all docs to E-Plan



PLAN REVIEW PROCESS:

- 7 **The Department of Buildings' permit review process is coordinated by an assigned project manager (PM), who communicates to your architect (AOR) all decisions, revisions, and approvals.** (See steps: bit.ly/Chicago-Standard-Plan-Steps.) Once all documents have been submitted to E-Plan and your zoning review is done, you'll need to pay prorated fees (50% of your overall permit costs, as calculated next page) to initiate the technical reviews.
- 8 **The PM commences permit review, in the first 10 days, with a 'Prescreening Review' of your application.** This includes confirming that all of the required documents are complete and checking for any outstanding issues with your building, such as debts, violations, and unpaid fees or fines. If anything is found, the PM will notify your architect and provide a list of elements to resolve. Throughout the design and review process, a conscientious architect will try to anticipate and resolve issues in advance of notices or bureaucratic review cycles.
- 9 **After prescreening is complete and all permit documents are in order, the PM will then distribute the submitted drawing set for Formal Review, to engineers, inspectors, and licensed tradespeople within the Dept. of Buildings.** This allows for detailed, technical inspection of the proposed project, from ventilation calculations to egress routes.
- 10 Each technical reviewer, as listed at left, will mark-up plans, in red, to identify areas that lack detail or are in violation of Chicago's construction codes. They will also provide short notes, describing each highlighted omission or defect.
- 11 The PM then compiles their highlights into a 'Correction Report' for your architect (and their subconsultant team). The PM should notify your architect, via email, when this is ready, or, in a best-case scenario, when all submitted plans are approved. It is always possible to check on the review process - which technical reviews are complete, which are in process - through the E-Plan system; your designer should keep you apprised of this status.

- 12 **Once your architect has the Corrections Report, they should inform you of a) the general revisions required and their anticipated timeline for drawing resubmission.** Independently, they should coordinate with their consultants (engineers, etc.) to execute the required changes. *(The following spread includes samples from this revision process so that you can visually track how revisions appear.)*

If your architect shows you revisions, you'll note that the edited drawing areas are circled by cloud-like bubbles with keyed explanations. This is the standard, required revision structure. Once all revisions are made, your architect will collate the drawings, add those keyed responses to the Corrections Report and resubmit the drawing-set, with a new set of stamped cover letters, certifying their legal review and revision of all materials. This will be checked by the PM and once again distributed for technical plan reviews. Your architect will invoice you for the time involved in drawing revisions.

On average, a design team takes 33 days to revise and resubmit a document set in the City of Chicago. Depending on your overall project schedule, the type and scale of required alterations and the building systems they affect, your architect may allot more or less time for revision cycles. Generally the first two rounds of technical review can be done entirely through the E-Plan platform. Any architect that is facing a third round of revisions is required to have an in-person interview at the Department of Buildings, in as much as their revisions are not adequately addressing the need for safe, code-compliant construction.

- 13 **Once your architect's revised drawing set has been reviewed and approved, the PM will collate the drawing set and stamp it as approved with the official City/Dept. of Buildings' seal.** Once again the PM confirms there are no outstanding debts or violations. They calculate the permit fees, based on your review and resubmission process, and notify your architect a) of those costs and b) that the stamped, approved drawings are ready for distribution (bids and construction site copies).

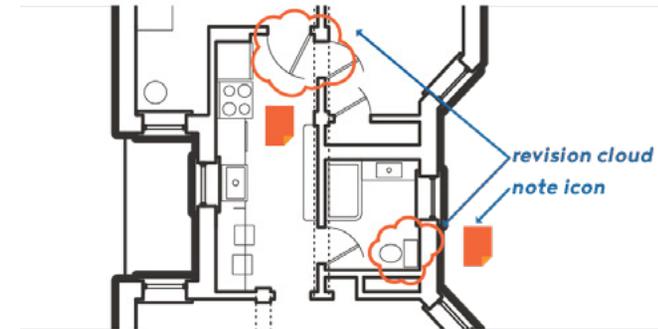
DRAWING REVISIONS: VISUAL SAMPLES

During the review process, your architect is not likely to show you the full CD drawing set, which can be extensive. Instead, they will most likely walk you through specific changes. To aide in following those select updates, the schematic samples at right provide a snapshot of how a typical drawing will be annotated with a) revision mark-up, by the Department of Buildings' technical experts, and b) revised details, from your architect and design team.

For additional details on plan review and revisions, see the city's guide (for architects) on navigating the E-Plan interface and revision submission processes: bit.ly/Chicago-E-Plan-Guide

A. EXAMPLE E-PLAN MARK-UP

E-Plan Markup on Specific Sheets



E-Plan Markup Indicators & Notes

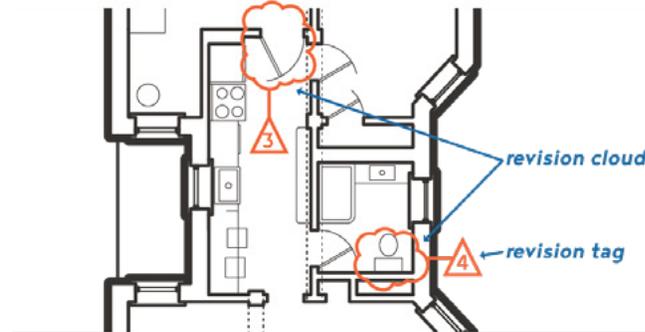
CYCLE	DEPARTMENT	REVIEWED BY	STATUS & NOTES
1	PLUMBING	KEVIN KENNY KEVIN.KENNY@CITYOFCHICAGO.ORG	CORRECTIONS REQUIRED correction notes PLAN REVIEW AND/OR ASSIGNMENT COMPLETE
1	FIRE	ANIS SIDDIQUI ANIS.SIDDIQUI@CITYOFCHICAGO.ORG	CORRECTIONS REQUIRED A1,XXX BASEMENT CONVERSION FLOORPLAN (FILE NAME) MODIFY UNIT DOOR TO PERMIT OBSTACLE-FREE EGRESS FROM ADJACENT ROOMS PER CODE SECT. PLAN REVIEW AND/OR ASSIGNMENT COMPLETE



The city's E-Plan interface provides notes from each reviewer and indexed CD pages marked with a red pen icon to guide your architect's revisions. At the scale of individual drawing sheets, the element to be revised is surrounded by a red outlined 'revision cloud' and/or a small red note. Between the note comments –on code conflict, absent detail or supporting drawings, or missing elements– and drawing annotations, your design team should understand the issues at stake.

B. REVISED FOR RE-SUBMISSION

Updated with Revision Clouds & Numbered Schedule



On Plan Title Page / Sheet title block

Revisions		
ID	Date	Description
1	1/3/20	Porch stair: rise & run revisions
2	1/3/20	Area drain addition
3	1/8/20	Revised Door Swing, for Egress Route
4	2/5/20	Revised Fixture & Wet Wall Details

revision schedule

In plans revised for resubmission, the update area should include resolved changes, the revision cloud and numbered tags, for inclusion in the revision schedule. This schedule is included on each page, with revision descriptions, to guide the reviewer to changes. It is also incorporated in the cover of the construction set to record the totality of alterations. Revisions are numbered sequentially and dated, so that you can distinguish between rounds of resubmission.

Within E-Plan, your architect is expected to upload revised drawings, submit revision comments and check a box, acknowledging their submission of revisions.



APPROVED PERMITS . fees . posting

ALT. STRATEGY: SELF-CERTIFIED PERMIT PROCESS

Architect of Record takes responsibility for all technical reviews (pg 184, steps 9-12). Documents required are as follows:

housing approvals (see ADU microsite)
conversion certificates done in advance

zoning approvals
must be done in advance

self-certified architect information
certificate of completion for self-cert.
professionals of record self-cert. statement,
stamped by architect
certificate of \$1million in liability insurance

owner information
owner/tenant cert. statement

hold harmless letter

structural peer review, stamped by structural
engineer who is a registered structural peer
reviewer

See the city's list of Self-Certified architects if interested.

HURRAH! PAY FEES AND POST PERMITS ON YOUR CONSTRUCTION SITE

what are your permit fees?

Do you qualify for a
senior fee waiver?

- over 65,
- owned and occupied the building for the last 10 yrs,
- rehab/altering a building with between 1-3 units (w/ new unit),
- income is less than 80% of Chicago's Medium Family Income

**DON'T
QUALIFY**

**QUALIFY
FOR WAIVER**
tell your architect

\$(ESTIMATE)

Calculate estimate on
Department of Building's
Permit Site

assume type II (brick)
or type IV (wooden frame)
non-phased construction for calc.

\$1768 (TWO-FLAT EXAMPLE)

Example calculated:

renovation,
a1/a2: 3-unit building
type II (non-combustible)
facade work (no)
phased construction (no)
scope: increase in dwelling units

cost =

cost/sqft * scope review factor * area
.52 * 1 * 3400 sqft

permit estimate = \$1768

before zoning, misc fees

where should you post permits?

The building permit certificate or a copy must be posted in a visible place upon the exterior of the premises for which it is issued and must remain posted until the work is completed and inspected, as discussed on the next page.

what else should be kept on the construction site?

A copy of the approved construction documents, marked as "Reviewed for Code Compliance," must be kept at the site of work, while work is in progress. They should be available for inspection by the building official and other city officials charged with administration of the Construction Codes.

CALCULATING PERMIT COSTS:

Once the construction permits have been approved by the Department of Buildings, you will need to pay the outstanding balance on your permit fees, so your architect can:

- download the official, permitted plans - to be held on-site for inspections and
- collect the official permits, which you must post in a highly visible area on your worksite.

Permit fees are assessed by the city, based on a general equation incorporating building type, scale of construction to be done, and total area of your building, as elaborated in the bottom, Two-Flat example.

To have your permit fees waived (bit.ly/Chicago-Fee-Waivers), you must:

- be a senior
- fixed income of < 80% of Chicago's Median Family Income (see 'BuildingEquity', MFI amounts pg 106).
- have been an owner and occupant of your building for over a decade
- have fewer than four units, inclusive of the proposed basement unit.

If you qualify for a senior waiver, make sure to remind your AOR at the beginning of the E-Plan submission process, to avoid unnecessary deposit and prorated fees during the review process.

If you do not qualify for the senior waiver, you can estimate your likely permit fees by using the Department of Buildings' Fee

Calculator: bit.ly/Chicago-Permit-Costs. To calibrate the estimate to your building, you should input your construction type as:

- Type-II (non-flammable/protected) for solid brick walls and insulated floors or
- Type IV (flammable) for lightweight wooden frame construction and use your total building square-footage (with renovation) for the area multiplier.

This calculation provides a rough estimate, as the Department of Buildings also charges a one-time fees for permit appeals and after-the-fact permitting of emergency repairs and construction changes.

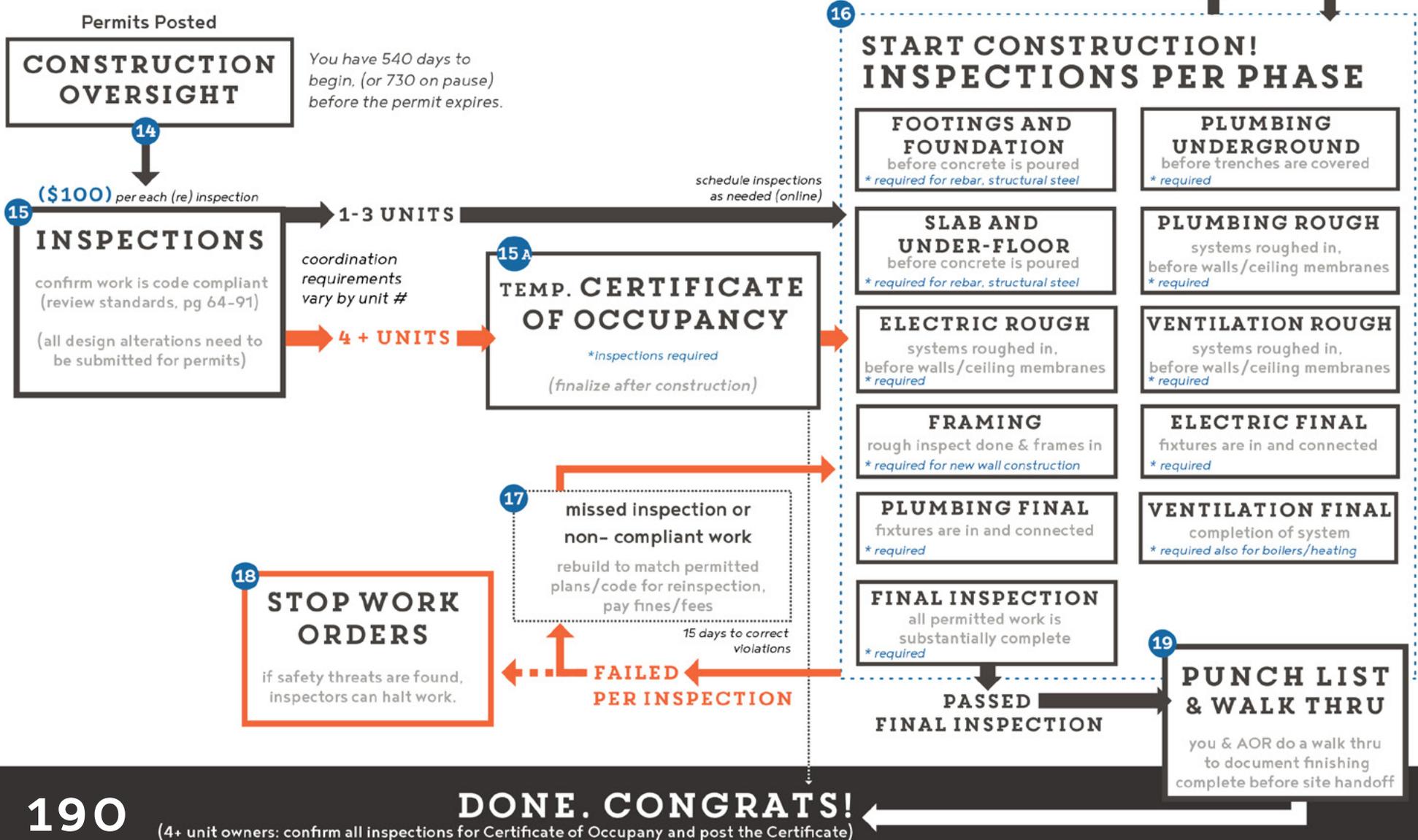
ALTERNATE PERMIT PROCESSES:

As noted earlier and shown at the left, based on your architect's qualifications you can choose to follow the Self-Certified Permit process (overview at: bit.ly/Chicago-Self-Certification). The architect is not required to submit a full set of technical plans for review. Instead, given their assumption of liability, they are required to submit extensive documentation of their completion of the certification process, their insurance coverage, and their licensing. In terms of technical oversight, they must have a structural engineer - who is licensed for peer review - check and certify that their drawings are compliant. As the property owner, you add a certification statement that acknowledges the architect's liability and holds the city faultless for future technical issues.

Under the Self-Certified process, the review cycle is shorter. First your architect must submit general information for a) Housing reviews, for pilot areas, and b) Zoning Approvals to the Department of Planning and Development and receive confirmation in advance of submitting the Self-Certified Application. Second, the city's Project Manager does a prescreening, for completeness of application and outstanding violations, skips the technical reviews, and confirms structural peer reviews before calculating fees and approving the permit.



WORK INSPECTIONS . construction & compliance



CONSTRUCTION COMPLIANCE:

- 14** As noted in 'Code Compliant Units,' city oversight doesn't end once you post your permits. Throughout the construction process, building inspectors will visit your work-site to confirm that building elements and installation techniques are completed as drawn and permitted by the City.
- 15**

- If your building has three or fewer units, your architect and/or general contractor should schedule appointments—by trade or issue—through the City's inspection portal: bit.ly/Chicago-Inspection-Portal.

- 15A** If your building has four or more units, including the basement unit, you will be required to post a certificate of occupancy (partial or temporary during construction) as well as submit to a more formal list of construction and annual safety inspections. See **Certificate of Occupancy forms** and **inspection list**: bit.ly/Chicago-Certificate-Occupancy.

For each construction inspection, your architect or general contractor must be present, as well as involved tradespersons with the permitted copies of the project plans. Your work crew must provide safe access to all elements designated for inspection.

INSPECTION PROCESS:

- 16** The building inspections required during a construction project are to be completed sequentially and timed to allow inspectors to see work in progress. ([14A-5-502.3](#), [2.5.2.6.2.8](#)) For instance, the underground plumbing inspections should occur once trenches have been dug, drainage and pipes have been placed, but before any backfill soils cover the system. Think of each inspection like an x-ray, meant to expose the interior building system to scrutiny before they're covered in concrete, plaster, and concealing paint. Certain types of inspection – foundation and slabs – have specific timing. For these, inspectors need to review the materials within or beneath concrete (rebar or sewer lines and interior tile drains) prior to pouring and confirm that the concrete mix on-site meets the standards from the permitted documents.

Generally, most building systems will require a rough inspection – such as when basic wiring is in place and visible prior to wall completion – and a final inspection – when all fixtures are in place and the entire system should function as intended post-construction. Your architect and/or general contractor should keep you apprised of the construction and inspection schedule, so you can check on continuing process and because you as the building owner (in tandem with your agent, ie. contractor) can receive building violations and fines for an unsafe job-site and inadequate work ([14A-3-301.12](#)).

REPLACE & RE-INSPECT CYCLE:

Ideally, you've hired a conscientious contractor and reliable trades-people. A good architect, contracted for construction administration, will also hold construction teams to a high standard, as they're invested in seeing their designs executed well and avoiding future liability for faulty or unsafe work. Even in the best scenarios, the construction process often unearths conditions that cause delays and overruns.

- 17** All of those contingencies aside, you should be concerned if your contractor either fails to schedule inspections or is repeatedly told by building inspectors to repair and replace elements. Repeating inspections costs time, materials, and labor. But this also indicates internal communication issues – between your architect and contractor – as well as cut-corners and incompetent work. While it's not too hard to repair some violations within the 15 day re-inspection window, repeat violations and fines can lead to the city closing your construction site with a 'stop-work' order. Under such an order, you and your architect would need to meet with the Department of Buildings and figure out how work can be safely completed. See the 'Introduction' section on legal recourse when dealing with poor contractors, pg 22-28.
- 18**
- 19** Once your building passes all inspections and the work is complete, you and your architect should do a walk through, with a 'punch list,' to inspect the project and highlight outstanding details to finish before.... drumroll....you get the keys to your brand new basement unit. If a four or more unit building, you should confirm that you've completed all inspections for the Certificate of Occupancy and order a copy to post.

