

RESILIENCE POLICY GUIDANCE
DOCUMENT

**SOFT
STORY
MODEL
ORDINANCE**
AND HANDBOOK

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 Association of Bay Area Governments

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Summary

Soft Story Mitigation Options

This report presents model ordinance provisions for a range of feasible soft story mitigation programs. The provisions are consistent with California law and coordinated with the 2016 California Existing Building Code.

The report includes background and commentary, as well as instructions for customizing the model provisions for a specific jurisdiction and notes on program implementation.

In order to fully implement the model ordinance, a jurisdiction would need to:

- Select one of the three mitigation program types presented in Appendix B.
- Confirm or revise the basic assumptions and options, as discussed in Section 3.1.
- Customize the ordinance text to suit the specific jurisdiction, as discussed in Section 3.2.

- Take steps to implement the ordinance through a soft story program, as discussed in Section 3.3.

Appendix A presents the complete model provisions for a mandatory retrofit program with a screening phase, in an editable format.

Appendix B presents the Appendix A provisions along with complete model provisions for two different program types, in a tabular format with commentary.

Appendix C provides a tool to assist jurisdiction staff in selecting, confirming, and revising the model ordinance provisions.



Section 1: Introduction

This report provides background on the development of model ordinance provisions for a soft story seismic mitigation program. It also provides guidance on how a city might customize and prepare to implement them. The model ordinance provisions themselves are presented in Appendices A and B.

The model ordinance was produced for ABAG's East Bay Corridors Initiative (ABAG, 2015) but is suitable for any California jurisdiction.

Terminology

The term "soft story" has come to mean a multi-story wood frame residential building prone to collapse under earthquake loads. Certain programs and ordinances have further defined the term by specifying, for their own purposes, the age, occupancy, number of stories, or number of units in a soft story building. In building codes and engineering standards, however, the term has a more general meaning. In these technical documents, a "soft story" is a type of irregularity that triggers special considerations for seismic evaluation and design; a structure can have a soft story irregularity regardless of its age, occupancy, structural material, or height.

To apply the term "soft story" to mean a certain subset of wood residential buildings is therefore not strictly correct. Nevertheless, this report recognizes the increasingly common use of the term as a shorthand for certain buildings. While this report uses the term in this colloquial sense, the model ordinance, which includes building code provisions, does not use the term in order to avoid confusion and conflict with its original technical meaning.

Source Material

ABAG's report, *Soft Story Retrofit Program Development*, provides general background on the nature of the soft story problem and on programs already developed by a few Bay Area cities (ABAG, 2016).

The model ordinance described in this report was developed to work with the 2016 California Existing Building Code (CEBC), which all California jurisdictions are bound to use (with local amendments) and with the authorizing legislation found in Sections 19160 through

19168 of the California Health and Safety Code.

Specific provisions were informed by experience with current Bay Area mitigation programs and by a review of ordinances and technical bulletins developed by San Francisco (Lee et al., 2013; SFDBI, 2016), Berkeley (Berkeley, 2013; Berkeley BSD, 2014), Oakland (Kalb, 2016), Alameda (Johnson, 2009), and Los Angeles (Garcetti, 2015), as well as deliberations by the Existing Buildings Committee of the Structural Engineers Association of Northern California (SEAONC).

Mitigation Options

The working assumption behind the model ordinance is that a city has already completed some building inventory, recognized its soft story risk, and developed an internal consensus to move forward with a new policy or program. For the EBCI cities, much of this preliminary work is already done:

- Section 19161 of the California Health and Safety Code, as amended in 2005, encourages local jurisdictions to initiate soft story mitigation programs. Section 19161 authorizes them to identify soft story buildings as potentially seismically hazardous.
- Multiple advocacy groups have called attention to the soft story issue (EERI-NC, 2003; SPUR, 2009; ABAG, 2016).
- ABAG has made a preliminary building count for each EBCI jurisdiction (Brechtwald, 2016).
- Ongoing work in San Francisco and Berkeley has proven the feasibility of mandatory evaluation and retrofit programs. These current programs have also given rise to a robust Bay Area market for retrofit work. Local engineers, contractors, building officials, and even lenders are now familiar with the buildings, the engineering criteria, and the construction issues.

Given this assumption, the next steps in drafting a local soft story ordinance involve answering a few questions about the city's preferences and priorities. The key questions include:

- Which buildings should be subject to a targeted mitigation program?
- Should the program focus on retrofit or allow evaluation only?

- For each building, should the work be mandatory or voluntary (perhaps with incentives)?
- Should the structural work go beyond the vulnerable first story?
- Should the work address nonstructural seismic hazards?
- Which engineering standards should apply to the work?
- Should the compliance schedule be phased, or should all buildings have the same deadlines?
- Would the city, owners, and tenants benefit from a preliminary screening phase?

Clearly, the best answer to some of these questions will depend on the answers to the others. For example, the appropriate engineering standards will depend on the scope of required work. And the more buildings subject to the program, the more likely that phased compliance will be beneficial, possibly necessary.

Sections 2 and 3 of this report address these questions and outline how a city might customize the model provisions to suit its own needs.



Section 2: The ABAG-EBCI Workshop

On September 29, 2016, ABAG held a workshop at which representatives of the EBCI cities discussed mitigation options and provided input regarding their cities' likely preferences and priorities. Nine individuals from five EBCI cities participated. Appendix D includes a copy of the worksheet used to collect their input.

The broad policy options were presented as a matrix combining the scope of a mitigation program and the nature of its enforcement (Appendix D Section 6).

- Enforcement options included voluntary, triggered (by sale or by other building alterations, for example), and mandatory.
- Program scope options ranged from notification only, to evaluation only, to retrofit of either the critical first story only or the whole building, with or without nonstructural mitigation.

After discussion, each participant was asked to select the two or three combinations that would be most preferable for their city. The two top-rated combinations were:

- *Mandatory structural retrofit of the critical story, with no nonstructural scope.* This was the first choice of four participants and the second choice of one other participant (out of six who responded in writing). These five respondents represented four different EBCI cities.
- *Mandatory structural retrofit of the critical story, plus selected nonstructural retrofit.* This was the first choice for one participant and the second choice for two others (both of whom had chosen mandatory structural-only retrofit as their top pick).

These responses suggest a clear preference, at least among the workshop participants, to take advantage of the groundwork and lessons from mandatory retrofit programs currently underway in Berkeley and San Francisco. The Berkeley and San Francisco programs are both mandatory, both require structural work in the critical first story only, and neither requires any nonstructural mitigation.

Specific program characteristics were presented as 24 ideas addressing benefits and costs to stakeholders, implementation options, and technical criteria (Appendix D,

Section 7). Participants were asked to score each idea on a 5-point normative scale. For averaging, the scores were converted to values ("Awful" = 1, "Great" = 5), with a score of 3 representing a middle or neutral position. All 24 ideas received average scores between 2.6 and 4.1, with all nine participants responding in writing.

The lowest-scoring ideas, each with an average score of 2.6, were:

- *"Include all buildings with public/commercial space, even if 0-4 units."* The presumption, based on the Berkeley and San Francisco programs, was that only buildings with at least five residential units would be subject to mandatory retrofit. The question was whether other buildings should be included if they have occupied commercial space (as opposed to parking and storage) in the critical story, the approach taken in Los Angeles. The model ordinance presented in this report suggests a default scope of "five or more dwelling units," open to customization by the implementing city.
- *"Owner costs are passed to tenants over time."* The low score suggests that workshop participants viewed soft story retrofit as a benefit more for building owners than for tenants, so the owners should bear the retrofit costs. This issue is related to questions of housing affordability and rent control. Jurisdictions with rent control typically also have pass-through rules that allow building owners to amortize the costs of building improvements and repairs through regulated rent increases. The model ordinance presented in this report does not address cost-sharing, but it does call for coordination with existing city regulations.
- *"All the program's technical details are in the ordinance itself."* The preferred approach, as suggested by this idea's low score, is to give the broad requirements in the ordinance but to leave technical details to a bulletin to be developed and published by the city's building department. The model ordinance presented in this report takes the latter approach.

The highest-scoring ideas, each with an average score of about 4.1, were:

- *"Owners have technical options for how to comply"* and, similarly, *"Engineers have technical options for how to comply."* The broad idea here is that any mandatory program should accommodate the reasonable needs of those who bear the costs and obligations. Though

not specified on the worksheet, the options might include the opportunity for owners to select their own engineer and contractor (an issue that arose early in San Francisco's program development), a lengthy compliance period to allow work to be done when most convenient for the owner, a minimal mandatory scope that leaves (or encourages) additional work as voluntary, and the allowance of different engineering standards. One participant noted that while options are beneficial, it is important to the city and to code officials that they should not have to negotiate the requirements separately with each permit application. The model ordinance presented in this report allows owners to use any qualified professionals, allows for a phased program, and lists three different documents as retrofit criteria.

- *“One city department has responsibility for the program.”* While several departments are likely to contribute to the ordinance, the model ordinance presented in this report assumes that one department – typically the city's building department – will serve as the lead agency for implementation. While preferable, this will involve some coordination in the implementation phase in cities where the planning or housing departments, for example, typically monitor or regulate work on residential buildings.

- *“A screening phase adds time but confirms scope and size of program.”* A screening phase requires building owners who might be subject to the program to submit a simple form, on a short timeline, confirming whether their building is subject to the mandate or not. Screening confirms the size of the program for purposes of allocating building department staff. Importantly, San Francisco's screening phase also helped owners understand the program and plan their work before having to face more serious decisions about hiring an engineer or applying for a construction loan. The model ordinance presented in this report includes an option for a screening phase.
- *“New residential buildings should be designed for quick reoccupancy.”* This idea (which scored 4.0) is not directly related to the retrofit of existing soft story buildings, but it does serve the same purpose of increasing the resilience of the city's housing stock over time. Retrofit of 50- or 90-year old buildings is worthwhile, but it will not make them as earthquake resistant as new buildings, especially when the retrofit scope is limited to the critical first story. To achieve real resilience improvements citywide, existing buildings must be improved, and new buildings must be built better than the current building code requires. The model ordinance presented in this report says nothing about the design objectives for new buildings.



Section 3: The Model Ordinance

Appendix B of this report presents the model ordinance provisions, with commentary, for three possible programs supported by the workshop participants:

- Mandatory evaluation only.
- Mandatory retrofit without a screening phase.
- Mandatory retrofit with a screening phase.

Each set of provisions requires structural work only in the critical “target story,” and each allows for the inclusion of nonstructural evaluation or retrofit.

By presenting three sets of provisions side by side, Appendix B allows policy makers to compare the options more effectively, with commentary that highlights some of the pragmatic differences. Appendix A of this report presents the provisions for a single program type – Mandatory structural and nonstructural retrofit with a screening phase – in a format expected to be easier to read and edit.

Each set of model ordinance provisions uses the following broad outline:

“Whereas” statements
SECTION 1. Findings
SECTION 2. Adoption of Chapter 3A into the city’s Existing Building Code
Section 301A. Administration
Section 302A. Compliance
Section 303A. Definitions
Section 304A. Structural Engineering Criteria
Section 305A. Nonstructural Engineering Criteria
Section 306A. Application of Other Provisions of This Code

To use the model ordinance provisions, a city would need to:

- Select the basic program type, typically one of the three considered in Appendix B. (A program type is a combination of a scope of work and a mode of enforcement; see Appendix D Section 6.)

- Confirm the selection of the main options, either using the defaults written into the provisions or modifying them as needed. See Section 3.1.
- Customize the model provisions with city-specific information and preferences. See Section 3.2.
- Prepare to take the additional steps needed to implement the ordinance. See Section 3.3.

3.1 The main options

This section revisits the questions posed in Section 1 of this report. These are relatively broad policy questions. More specific implementation questions are addressed in Section 3.2.

The following subsections describe the default options written into the three sets of model provisions and providing guidance to supplement the brief commentary in Appendix B. The Section numbers shown here assume that the ordinance requirements will be incorporated into the city’s building code as Chapter 3A of the city’s adopted version of the 2016 California Existing Building Code.

3.1.1. Which buildings should be subject to a targeted mitigation program?

Model ordinance default: “301A.30 Subject Buildings. This chapter shall apply to buildings constructed or permitted for construction before January 1, 1978 or designed based on an adopted version of the 1976 or earlier edition of the Uniform Building Code, that contain five or more dwelling units, and have a wood frame target story.” A “wood frame target story” is essentially what the term “soft story” has come to mean when applied to these buildings. See **Section 303A.10** for a technical definition.

Alternatives: The model ordinance definition corresponds to Health and Safety Code Section 19161(a)(2), but each city is free to define its own subject buildings to fit its own building stock and mitigation priorities. Examples:

- Oakland’s screening phase included buildings designed by codes prior to statewide adoption of the 1988 model code by setting its critical date as January 1, 1991.
- San Francisco includes only buildings that have at least two stories above the target story.
- Los Angeles includes buildings with four dwelling units

as well as buildings with ground floor commercial space even if there are fewer than four units.

3.1.2. *Should the program focus on retrofit or allow evaluation only?*

Model ordinance default: The three sets of model provisions cover both mandatory evaluation and mandatory retrofit, but they treat evaluation and retrofit as separate programs (see Alternatives). The choice is left to the jurisdiction. Retrofit is obviously more effective than mere evaluation, but it is also more expensive and disruptive. If made mandatory, it therefore requires more legislative coalition building. Even so, ongoing programs in San Francisco and Berkeley are showing that mandatory retrofit programs are feasible.

For the Evaluation Only program, model ordinance *Section 302A.30.E* includes a requirement to post a sign identifying the building as a collapse risk. This is consistent with a requirement from the initial Berkeley and the current Alameda mandatory evaluation programs (Johnson, 2009). If this provision is applied, it might be necessary to comply with city regulations regarding accessibility (including language accessibility) and landlord-tenant interactions.

Alternatives: One way to keep the required scope manageable while encouraging additional mitigation might be to mandate structural retrofit together with nonstructural evaluation. To address that program scope, the Evaluation Only provision in *Section 302A.30.C* should be renumbered and added to the Mandatory Retrofit provisions. Corresponding adjustments to the compliance schedule and submittal requirements will likely be needed.

The posting requirement in *Section 302A.30.E*, if controversial, can be removed from the ordinance. There is little evidence that a posting requirement motivates owners to retrofit or discourages tenants from renting; the requirement in *Section 301A.90* to list the buildings and record compliance on title documents is likely to be more effective (Rabinovici, 2012). Posting requirements are also difficult to enforce. The Alameda ordinance required owners to notify current and new tenants, but while such an obligation is apparently legally possible, it is nearly impossible to enforce through the building code.

3.1.3. *For each building, should the work be mandatory or voluntary?*

Model ordinance default: The three sets of model provisions are written for mandatory programs, matching the current Bay Area programs and the preferences expressed at the EBCI workshop (see Section 2).

Alternatives: As discussed in Section 2, and as shown in Appendix D Section 6, almost any mitigation scope can be left as voluntary, or encouraged as a voluntary supplement to the mandatory scope. Voluntary mitigation is already addressed in general terms by the CEBC, so it need not be addressed by special provisions in the ordinance. If incentives for voluntary work are provided, however, then minimum criteria will need to be set. Many of the model provisions can be applied to that purpose, but modifications to the model ordinance overall will also be needed.

3.1.4. *Should the structural work go beyond the vulnerable first story?*

Model ordinance default: The three sets of model provisions assume that only the “target story” need be evaluated or retrofit, matching the current Bay Area programs and the preferences expressed at the EBCI workshop (see Section 2). Of the documents listed as structural engineering criteria in *Section 304A*, two (CEBC Chapter A4 and FEMA P-807) are already designed to apply only to the target story and its adjacent load path elements. Other criteria, specifically ASCE 41, will need to be interpreted to allow its use for just the target story, as contemplated by *Section 301A.70*.

Alternatives: Most soft story programs limit the structural work to the target story. This addresses the building’s dominant deficiency while minimizing retrofit costs and disruptions for owners and tenants. Even evaluation above the target story, if properly done, can require documentation and investigation that owners and tenants might find disruptive. Even so, when the building code triggers mitigation for an extensive repair or alteration, the full building is considered, so it is not without precedent as a building regulation. To implement this alternative, modifications to the ordinance, including removal of CEBC Chapter A4 and FEMA P-807 as allowed criteria, would be needed.

3.1.5. Should the work address nonstructural seismic hazards?

Model ordinance default: As written, all three sets of model provisions include nonstructural scope to accommodate the interest expressed at the EBCI workshop (see Section 2). *Section 305A.20* and *Section 305A.30* cite the ASCE 41 “Life Safety” criteria for nonstructural evaluation or retrofit. That scope is comprehensive, however, and many engineers would consider it excessive, given the limited scope of the structural work. Therefore, it makes sense for a typical soft story program to consider a more limited nonstructural scope.

A limited nonstructural scope might be based on hazards especially common among the city’s soft story buildings, or on the cost and convenience of the work. Since the structural work is intentionally limited to the target stories, it makes sense also to limit the nonstructural work to areas that are either exposed by the structural work or areas where the work will not disrupt the normal use of the building.

Nonstructural components commonly found in the ground floors of wood frame multi-unit residential buildings, which often pose seismic hazards if not properly braced, include:

- Masonry chimneys
- Water heaters
- Furnaces
- Unreinforced masonry veneer
- Unreinforced masonry partitions
- Falling hazards within the structural work area
- Falling hazards over egress areas
- Gas lines without automatic shut-offs (though the risk of a line break is substantially reduced by completing the structural retrofit).

Including each of these items in the program scope will have costs and benefits for the owner, the tenants, and the city. Any water heaters, furnaces, or other equipment installed recently should already be properly braced or anchored. *Section 306A.10* of the model ordinance notes that it is not the purpose of the ordinance to find existing violations, but by including these items in the nonstructural scope, a city could ensure that existing

deficiencies are checked and mitigated without the normal violation process.

The benefit of including furnaces, water heaters, and chimneys extends beyond safety. A structurally retrofitted building should be safe to reoccupy after an earthquake, but it will not recover its post-earthquake housing function if heat and hot water are not available.

The benefit of including water heaters, furnaces, and other gas-fired equipment might extend beyond the building itself, as each of these items represents a fire risk to neighboring buildings and a potential demand on the fire department. On the other hand, if a soft story program only targets these risks in the city’s soft story buildings, it is not really addressing the citywide fire hazard in an effective way.

Alternatives: The instructions provided with the model provisions in Appendix B indicate which provisions to omit if nonstructural scope is not included.

While basic nonstructural mitigation (such as water heater bracing) is probably cost effective as part of a soft story program, too much nonstructural scope could raise costs and hurt compliance. Each item of nonstructural scope raises engineering fees, raises construction costs, and adds to the city’s review and inspection tasks. Also, since neither San Francisco nor Berkeley requires any nonstructural scope as part of their mandatory retrofits, adding nonstructural scope to an EBCI city program will not be leveraging the experience already gained by local engineers and contractors; rather, the EBCI city will be setting new precedents.

3.1.6. Which engineering standards should apply to the work?

Model ordinance default: *Section 305A* of the model ordinance cites one document, ASCE 41, as nonstructural engineering criteria and three documents as structural engineering criteria: ASCE 41, CEBC Chapter A4, and FEMA P-807. (The State Historical Building Code is also cited, but its use will be rare.) All three are in use on the Berkeley and San Francisco programs. Importantly, *Section 305A* and *Section 301A.70* contemplate the development of one or more technical bulletins to interpret and guide the use of each document for a specific mitigation program. The use of three alternative sets of criteria plus technical bulletins to supplement them matches both the preferences

of EBCI workshop participants (see Section 2) and the current practice in Berkeley and San Francisco (Berkeley BSD, 2014; SFDBI, 2016). See also Section 3.3 for more discussion of technical bulletins.

ABAG (2016) gives a useful short description of each of the three documents. In brief, each offers certain advantages and disadvantages to owners in terms of the decision-making information it provides, the necessary engineering effort, the resulting construction scope and cost, and familiarity to building officials. For the purposes of this report, the important points regarding application and implementation are these:

- CEBC Chapter A4 is straightforward and easy to apply to retrofit design, but because it relies on code provisions for new construction, it should not be used to evaluate existing conditions (Bonowitz and Rabinovici, 2013). Because Chapter A4 tends to be conservative, engineers using it are likely to petition the building official to allow variances or exemptions based on the less conservative or more specific criteria in the other documents. Some of these variances now have the consensus support of the SEAONC Existing Buildings Committee and can be written into the city's technical bulletins. (See Section 3.3 for additional discussion.)
- FEMA P-807 is still relatively new and unfamiliar to most building officials. While it was developed specifically for soft story programs, and thus offers some advantages to owners, it cannot be applied until the implementing city specifies a "performance objective." Berkeley and San Francisco each developed their FEMA P-807 objectives through technical studies of their typical buildings. An EBCI city could adopt the Berkeley objective, but it will not know how FEMA P-807 results will compare with CEBC Chapter A4 or ASCE 41 results unless it does a study that considers its local seismicity, site conditions, and building types.
- ASCE 41 is a national consensus standard, but it is still unfamiliar to many building officials. Unlike CEBC Chapter A4 and FEMA P-807, it is not specifically for soft story buildings, so a technical bulletin will be needed to clarify how it should apply to an evaluation or retrofit scope that considers only the target story. For the San Francisco and Berkeley programs, ASCE 41 is permitted but appears to be rarely used. However, for a program that uses ASCE 41 for nonstructural scope, it might be convenient

for owners and engineers to use ASCE 41 for the structural work as well.

- For nonstructural seismic work, ASCE 41 is the only applicable consensus standard. As noted above (see Section 3.1.5), a soft story program that includes nonstructural scope should consider customizing its ASCE 41 application.

Alternatives: Any of the three cited structural documents could be deleted from the model ordinance. The most likely reason to do so would be to avoid the extra work developing a FEMA P-807 performance objective, or developing technical bulletins, or learning a new methodology. However, since all three documents are in use in Berkeley and San Francisco, an EBCI building official can expect some engineers to propose using one of the excluded documents for the benefit of her client, under the building code's current provisions allowing alternative means and methods.

If the nonstructural work is limited to specific deficiencies (water heater bracing, for example) it should be possible to replace ASCE 41 with a simpler prescriptive requirement.

3.1.7. *Should the compliance schedule be phased, or should all buildings have the same deadlines?*

Model ordinance default: *Section 302A.40* contemplates phased compliance and is written, as an example, with three tiers based on building size and ground floor occupancy. *Section 302A.50* gives example deadlines to match the three example tiers.

Phasing can improve a mitigation program's feasibility in two ways. First, phasing can be used to give certain owners more time to comply, thereby easing the burden on them and their tenants, and increasing the chance that they will both support the program politically and comply with it in practice. To achieve this objective, buildings for which compliance will be especially expensive or disruptive should be allowed in later tiers and given helpful deadlines. For example, retrofit work in an occupied story (as opposed to a parking or storage space) requires more coordination and planning between owners and tenants and often involves more expense because of the finished spaces. *Section 302A.40* is therefore written, as an example, to define Tier 3 for buildings with occupied commercial or residential units in the target story. San Francisco has (and Oakland is considering) this type of phasing based on target story occupancy.

Second, phasing can be used to control the flow of work so as to match the resources of the building department or the local engineering and contractor community. To achieve this objective, tiers should be defined with roughly the same number of buildings in each one, and with each tier sized to suit the city's resources. Section 302A.40 as written makes no effort to do this, since the number and size of the tiers would vary for each city.

As a result of the ongoing San Francisco and Berkeley programs, the availability of interested Bay Area engineers and contractors has increased substantially. However, Berkeley's retrofit deadline is the end of 2018, and San Francisco will have the bulk of its 5000 retrofits in progress through 2019 and into 2020, so the market for engineers and contractors will probably tighten as those dates approach. An EBCI program with construction deadlines in 2021 or later should be able to not only avoid this glut, but take advantage of the waning market in San Francisco.

Phasing can also be used to prioritize certain buildings for which mitigation is deemed more urgent. Section 302A.40, as an example, assigns buildings with more than 15 residential units to Tier 1, with the shortest deadlines. Since soft story buildings are prone to first story collapse, the safety risk is highest for occupants of the critical first – or “target” – story. One might argue, therefore, that buildings with occupied target stories should be prioritized and assigned to Tier 1, regardless of how many total units are in the building. However, this strategy runs exactly opposite to the feasibility strategy, which would give these same buildings the longest deadlines. Current thinking runs mostly in favor of program feasibility. Moving these buildings from the last tier to the first tier would speed their retrofit by one or two years at most. The likelihood of a damaging earthquake striking in that short window, while real, is quite small. Also, any owner or tenant always has the option of addressing her own safety risk as urgently as she desires; the vulnerability of soft story buildings is not new and was not created by the passage of retrofit ordinances. As a public policy matter, the city must also consider the practicality of the program overall. Helping everyone comply over the long term is at least as important as forcing some owners to comply over the short term. Therefore, the model ordinance (again, as an example) addresses urgency by focusing on the total number of units in the building, not on the particular vulnerability of the occupied first story.

San Francisco has (and Oakland is considering) this type of phasing based on the number of units in the building.

But San Francisco also makes a distinction related to the occupancy in the target story. In the San Francisco program, most occupied commercial occupancies are assigned to the last tier for feasibility. Assembly and educational occupancies in the target story are assigned to the first tier for their safety risk (though only a handful of subject buildings were in these categories). Occupied residential units in the target story have no impact on the tier assignment.

Alternatives: Alternatives to the examples provided in *Section 302A.40* and *Section 302A.50* involve the elimination, addition, or redefinition of the tiers, or revision of the deadlines.

The most basic alternative would eliminate the tiers completely, putting all subject buildings on the same schedule. This is a reasonable approach if the building department can handle the implementation and if the deadlines are fair to owners and tenants. Berkeley's program, for example, has only one set of deadlines for all 300 or so of its subject buildings. Other than Oakland, most EBCI cities have few enough subject buildings that they would likely not need multiple tiers for purposes of facilitating program management.

As noted above, San Francisco assigns buildings with occupied commercial spaces in the target story to the last of its four tiers. It also allows buildings on liquefiable soil into the last tier. Soil remediation is not required by the San Francisco ordinance, but anticipating that some owners might want to consider voluntary mitigation, the city gave them the later compliance deadline. This approach might also make sense for programs that want to encourage voluntary retrofit (either additional nonstructural mitigation or structural work above the target story) in addition to the mandatory scope. As an alternative to phasing, a city might also consider discretionary deadline extensions for buildings facing especially expensive or disruptive work. Both San Francisco and Oakland have considered either defined phasing or discretionary extensions for:

- Owners and tenants with demonstrated financial hardship. (San Francisco removes the owner's pass-through allowance for tenants with financial hardship.)
- Buildings with non-profit tenants.
- New owners who inherited the building during the compliance period. Model ordinance *Section 302A.50* is generally clear that transfer of title does not warrant

a deadline extension, but transfer by inheritance can represent an unanticipated change that merits an extension.

On the other side of the ledger, while Oakland has considered assigning commercial spaces to its last tier for feasibility, it has also considered moving those buildings to the first tier if the commercial spaces are currently vacant, since a vacant space would not need the additional tie afforded by a later compliance tier.

3.1.8. *Would the city, owners, and tenants benefit from a preliminary screening phase?*

Model ordinance default: One of the three sets of model provisions includes a screening phase, matching the current San Francisco program and the preferences expressed at the EBCI workshop (see Section 2). The current Berkeley retrofit program was preceded by a mandatory evaluation phase, and Oakland has already completed a mandatory screening phase, so the model ordinance is consistent with those cities' approaches as well.

As noted in Section 2, a screening phase can benefit the building department by confirming the size of the program and by serving as an initial outreach to owners. It can benefit the owners as well, by introducing them to the program – and to local engineers – without an intimidating deadline or expense. San Francisco's program has shown that screening for thousands of buildings can be done in a year.

The main result of the screening phase is to confirm which buildings are subject to the ordinance and which are exempt. It is possible that the owner of an exempt building will misunderstand the exemption to mean that her building is seismically safe. The city's screening form should be clear that no such assurance is implied by an exemption. This clarity will help the city, the owners, and the licensed professionals who complete the forms.

Alternatives: If a city has a clear understanding of its inventory and good relationships with its building owners, and is prepared to handle individual exemption requests, a screening phase might not be needed. Appendix B includes a set of provisions for this case as well.

One reason to skip the screening phase, if it does not otherwise seem beneficial, is that screening does cost the city some money and some time to issue the notifications

and track the responses. For a large program, however, this cost is likely more than offset by the benefits of the additional contact with owners and the time the city gains to prepare for later implementation tasks.

For mandatory retrofit with a screening phase, *Section 302A.30.A* requires the screening form to be signed by a licensed architect or engineer. This does involve some cost to the owner. (In San Francisco, the city did not collect any filing or review fee, but owners had to engage a design professional to complete the form. The typical cost was about \$200, but some engineers and contractors offered to complete the screening form for no charge in order to make more contacts with potential clients for the work to follow.) As an alternative to the model ordinance, a city could implement a self-certified screening process that does not require the owner to pay a consultant. After all, if a building is supposed to be exempt from the program, it seems unfair to make the owner incur any expense just to prove it. However, San Francisco's experience quickly showed the value of requiring a professional. Among the first replies in late 2013 were several that owners completed themselves, incorrectly. As owners learned that the city would only accept forms submitted by a licensed professional (who has her license at stake), the quality of submittals improved dramatically. Ultimately, owners who confirmed their exempt status through the screening process were more than happy to pay a few hundred dollars to do so. Another approach would be to allow owners to claim exemptions based on the age of the building or the number of units – information that should be verifiable from other records – on their own, but require the signature of a design professional for any exemption claim based on the absence of a target story – information that requires technical knowledge and judgment.

3.2 Preparing the ordinance draft

Once the main options have been selected, the text of the model ordinance still needs to be customized with city-specific information. The table in Appendix B provides some instructions for doing this.

Appendix C provides a checklist to assist city staff in converting the model ordinance text from Appendix A or Appendix B into a city-specific ordinance.

3.2.1. “Whereas” statements and Findings

The “Whereas” statements and the Findings near the top of the ordinance should be customized for each city. The San Francisco (Lee, 2013), Berkeley (2013), and Alameda (Johnson, 2009) ordinances offer examples. As they show, different cities present this information in different ways, so each city might need to rearrange the model ordinance text as well. The model ordinance uses Whereas statements to record background data and legislative motivation; it uses Findings to record applicable legal precedents.

Whereas statements are sometimes used to record the city council’s basis for enacting the ordinance, as well as city-specific background information. In addition to the generic Whereas statements included in the model ordinance, a city might add references to:

- Data from specific building inventories, demographic studies, loss estimates, or benefit-cost analyses
- Existing policy from the housing or public safety element of the city’s general plan
- Existing policy from the city’s disaster management plan
- Results of preliminary or past mitigation programs.

The model ordinance includes six findings that respond to requirements in the California Health and Safety Code (HSC). The six findings are meant to demonstrate how and why the ordinance is in compliance with state law. To be clear, it is possible that none of the six is actually required, since finding F alone might be sufficient. Finding F references a short provision from the California Building Code that reads as follows:

1.1.8.1 Findings and Filings.

1. The city, county, or city and county shall make express findings for each amendment, addition or deletion based upon climatic, topographical or geological conditions.

Exception: Hazardous building ordinances and programs mitigating unreinforced masonry buildings.

Since the HSC recognizes soft story buildings as potentially seismically hazardous, this exception would exempt a soft story mitigation program from the requirements that findings A through E are otherwise intended to address. Even so, the six findings included in the model ordinance

are still useful as reference points.

In addition to the six findings in the model ordinance, a city might use the Findings section to:

- Make a negative declaration with respect to CEQA requirements.
- Find that all of the subject buildings are “substandard” by the definition in HSC Section 17920.3(o). See also model ordinance Section 306A.20, which addresses the same topic as it relates to building alterations.
- Find that each subject building is a “qualified building” eligible for the new CalCAP program because it is “in danger of collapse in the event of a catastrophic earthquake.” (CalCAP, 2016)

3.2.2. Coordination with other building regulations

Model ordinance *Section 306A* should be supplemented as needed to ensure that the soft story program is in coordination with other city-specific building regulations.

Section 306A.10 makes the general statement that enforcement of the soft story program is not intended to find unrelated noncompliant conditions, unless those noncompliant conditions are unsafe. In the building code, “unsafe” is a term that allows for building official judgment and discretion. The city and the building official should consider whether to augment this model provision with specific waivers or exceptions for such common noncompliant conditions as:

- Illegal units
- Work done without permits (including water heaters or other equipment installed without proper seismic bracing)
- Missing life safety improvements, such as fire, smoke, or carbon monoxide detectors
- Incomplete repairs or deferred maintenance.

In particular, if the city has its own special programs, either to abate hazards or to provide amnesty, this section of the model ordinance should be supplemented with specific references to those programs. The supplemental provisions should clarify how those requirements will or will not be enforced in the context of the soft story program.

Section 306A.30 makes the general statement that any work not related to the required scope should be done as it would be otherwise, according to the applicable

code provisions. The city and the building official should consider whether to augment this model provision with references to city-specific requirements that would apply to a voluntary alteration project. For example, some cities trigger parking requirements, energy upgrades, or other building improvements or fees when alterations are made. Some have pass-through or rent control rules that regulate how the owner's alteration costs may be shared with tenants. This model ordinance section should be supplemented, or subsections should be added to *Section 306A*, to specify whether any such triggers will apply or will be waived in the context of soft story retrofit.

Section 306A should also be supplemented with requirements or references to other incentive or assistance programs. If the city is offering any fee waivers or cost subsidies, this section could contain any rules or qualifications for those programs that the building official would enforce. For example, owners who want to participate in the state CalCAP program must receive certification of eligibility from the building official, and a provision to that effect could be added here. Rules enforced by other city or state agencies may be cited or referenced in *Section 306A*, but since section is part of the building code enforced by the building official, the rules themselves should not be here. As an example of such a program, Alameda's mandatory evaluation ordinance offers to reduce parking requirements as needed to complete voluntary retrofit work (Johnson, 2009). Similarly, San Francisco passed a separate ordinance waiving certain planning restrictions for accessory dwelling units added to retrofitted buildings; it could have been referenced from the city's soft story chapter, but enforcement still would have been by the planning department with regulations in the planning code.

Section 306A should also be supplemented as needed to coordinate with current or previous soft story screening or evaluation programs. For example, if the city had a previous screening program and now wants to implement a retrofit program, or if it had a previous voluntary program it now wants to make mandatory, the previous provisions should be clarified or revoked.

It should not be necessary to supplement the model ordinance to address general topics already covered in the city's building codes, unless special requirements or allowances are deemed appropriate for soft story mitigation. For example, by adopting (and sometimes

amending) the state codes, all EBCI jurisdictions should already have appropriate administrative provisions for:

- The definition of "building official" and the building official's authorizations
- Enforcement, including penalties
- Fees
- Required submittals, including structural calculations and construction documents
- Design approval
- Recording and maintenance of record documents
- Appeals.

3.2.3. Editorial customization

Finally, each city will need to make some editorial revisions to the model ordinance text:

- The model ordinance includes several blanks (shown as "____") where the city's name is to be inserted.
- The section numbering might need revision. The model ordinance contains provisions to be adopted into the city's existing building code. By state law, every California jurisdiction must adopt the state building codes, including the California Existing Building Code. The section numbering in the model ordinance presumes that the code language will be adopted as Chapter 3A of the city's adopted and amended version of the CEBC. Some cities make their code amendments differently, however, so each city should confirm that the numbering in the model ordinance matches the formatting of its building regulations.
- The city attorney and other city council staff will need to supplement and format the model ordinance text in accord with the city's normal practices. This is likely to include adding legislative boilerplate sections on severability, recording, effective date, and other topics.

3.3 Implementing the ordinance

Once the ordinance is approved, the city will need to take certain steps to comply with state law and to prepare for implementation.

3.3.1. Filing requirements

The building code provisions adopted through the ordinance constitute local amendments to the state building code. Since the amendments affect residential buildings, a copy must be filed with the Department of Housing and Community Development, in accordance with California Health and Safety Code Section 19165.

Normally, local amendments to the state building code should also be filed with the California Building Standards Commission, along with “express findings” justifying them. As noted in finding F, discussed in Section 3.2.1 of this report, the California Building Code waives this requirement for “hazardous building ordinances,” so a filing with the BSC should not be necessary. Nevertheless, the city attorney should determine if this filing is necessary or advisable.

If a filing is made, HSC Section 17958.5 calls for justification based on “local climatic, geological, or topographical conditions.” While these formal justifications are neither reviewed nor approved by the BSC, they are expected to be specific to the city. A justification statement for a soft story program using this model ordinance might restate the points made in the customized Whereas statements and the findings, specifically:

- The city has vulnerable soft story housing that, if not retrofitted, will jeopardize the city’s earthquake response and recovery goals.
- The CEBC does not itself require or trigger seismic retrofit except in very rare cases, so a proactive mitigation program is needed.

Amendments to the engineering criteria in CEBC Chapter A4 or ASCE 41 need not be filed if they are made through building department bulletins as contemplated by model ordinance *Section 301A.70*, especially if they are characterized as interpretations that reflect cost-beneficial improvements identified by other Bay Area programs.

3.3.2. Internal coordination and preparation

The lead agency – typically the building department – will need to coordinate work with different city and county agencies before the program becomes effective.

- Model ordinance Section 301A.90 calls for coordination between the building department, which

will track compliance for each building, and the county clerk or recorder. The purpose is to ensure that the status of each notified building (whether ultimately a subject building or not) is available to anyone performing a title search.

- Section 306A (as discussed in Section 3.2.2 of this report) is meant to coordinate between the soft story program and other city programs for regulating or improving existing residential properties. If other city agencies (for example, housing, planning, public works, or the fire department) are responsible for those other programs or for discretionary reviews of alterations to residential buildings, a procedure will be needed to coordinate their involvement in the review and approval process.
- Section 301A.70 contemplates that the building department will develop screening forms, affidavit forms, and other forms or templates to facilitate the program. If the city requires such forms to be approved by other departments (for accessibility, language requirements, etc.), the building department will need to coordinate that involvement.
- Per Section 301A.40, the building official is to notify owners of potential subject buildings within 90 days of the program’s effective date. This will require the development of mailing lists and outreach materials, possibly with the involvement of multiple city departments. See Section 3.3.3 of this report for additional discussion of the notification process.

Most important, the building department itself will need to prepare to implement the program. The process of developing consensus around the ordinance should provide information about the number and type of buildings likely to be subject to the program. Defining the tiers and deadlines in model ordinance Section 302A.40 and Section 302A.50 relies on at least a rough knowledge of the city’s residential building stock. Therefore, staffing and consultant needs should be known before the ordinance is passed, so that resources can be allocated or acquired between passage and the effective date.

Outreach to owners, tenants, engineers, contractors, and lenders will make the building department’s tasks easier.

- Because of the San Francisco and Berkeley programs, and ongoing work by the SEAONC Existing Buildings Committee, Bay Area engineers and contractors

are well versed in soft story mitigation criteria and procedures (though the contractors' role is still ramping up to the construction surge expected in 2018 and 2019).

- Lenders are also aware of these retrofit programs, but CalCAP, the state program that guarantees banks' loans to incentivize better terms for borrowers, became effective only in January 2017 (CalCAP, 2016). As noted in Section 3.2.1, any building subject to a soft story program should be eligible for CalCAP, so the building department should prepare the forms and procedures needed for that state program as well.
- Owners and tenants will have questions about the program, and as the lead agency, the building department should prepare outreach materials to assist them. Stakeholder involvement is important during the development of the ordinance, but educational outreach is most effective after it has passed, and even more so after the owners have been notified. See Section 3.3.3 for additional discussion.

The most detailed and most important product to be developed in the lead up to the program's effective date will be the technical bulletins contemplated by model ordinance *Sections 301A.70, 302A.30, 304A, and 305A*. San Francisco's Administrative Bulletin 107 (SFDDBI, 2016) and Berkeley's Framework document (Berkeley BSD, 2014) offer examples of what might be needed, depending on which engineering criteria are selected.

Technical bulletins for a soft story mitigation program should interpret and apply the department's current procedures to a mandatory mitigation program. Assumptions that apply to new construction might not apply to existing buildings; departments that routinely handle repair, alteration, and retrofit projects should already be familiar with these differences. Less familiar is the fact that conditions that apply to voluntary work, including new construction, might not apply to mandatory work. In general, a building owner forced to perform a retrofit might not have planned or budgeted as she would have for a self-initiated project. While Bay Area engineers and contractors have generally responded professionally to the Berkeley and San Francisco programs, some have begun to offer cut-rate services to accommodate reluctant owners. A building department charged with implementing a mandatory program should anticipate this and use its technical bulletins to ensure consistency and

completeness of the mandated work.

One or more technical bulletins might address the following topics, among others:

- Submittal contents and organization. To ensure consistency and completeness, and to facilitate quick reviews, the bulletin can require calculations and plans to follow certain formats. Checklists are also helpful, both for internal department use and to assist engineers preparing submittals.
- Special review or application routing procedures. To make the program easier for owners, the city might put in place special procedures to expedite reviews and approvals. San Francisco, for example, arranged for quick planning reviews and has attempted to do all structural reviews over the counter (with mixed success). Any special procedures should be spelled out clearly in advance.
- Construction quality assurance. Every California city already has code provisions for testing and inspection that should apply to soft story retrofits. However, most of those provisions are written for new construction or voluntary alteration. Some engineers involved in San Francisco projects have suggested clearer and more complete procedures that account for unusual or difficult building conditions, as well as low design fees and construction budgets.
- Construction-phase revisions. Retrofit projects routinely encounter unknown or unexpected conditions that require revisions to the approved plans, sometimes with supplemental structural calculations. The bulletin should clarify procedures for contractors, engineers, special inspectors, and even the city's building inspectors, to ensure that the revisions are properly coordinated and approved, with appropriate revisions to the construction documents.
- Interpretation and application notes on the engineering criteria. As discussed in *Section 3.1.6*, each of the engineering criteria cited by the model ordinance will need to be accompanied by interpretations or regulations. The regulations should anticipate questions about how to apply the soft story criteria, together with the city's normal building codes, to the special case of a mandatory evaluation or retrofit with limited scope. Among the topics covered by the San Francisco and Berkeley bulletins are:

- Scope, exemptions, limitations, and (where needed) objectives for each set of engineering criteria. See Section 3.1.6.
- Default site classes and adjustment factors, in part to avoid the expense of soil investigation.
- Default material strengths for existing materials.
- Waivers on the use of certain structural systems, such as ordinary steel systems, that are appropriate for retrofit but are not permitted for new construction.
- Caps on the required retrofit strength of the target story, recognizing the benefit provided by FEMA P-807 but not considered by ASCE 41 or CEBC Chapter A4.

The department should expect the technical bulletin to undergo revisions during the course of the program as lessons are learned and innovations are proposed. Since the start of San Francisco's program, for example, AB 107 has been modified to address questions about diaphragm evaluation and the application of cantilever column systems. As of January 2017, additional amendments are being considered to address issues of combined systems, moment-frame joint bracing, design review procedures, and construction quality control.

3.3.3. Notification of owners

Model ordinance *Section 301A.40* sets a 90-day deadline by which the city must notify owners. Of course, the city may modify this typical deadline.

The notification process is beyond the scope of this report, but the success of the San Francisco program, which achieved nearly 100 percent compliance through its screening phase, suggests some lessons for EBCI cities (ESIP, 2014):

- A mailing list of owners is typically compiled from County Assessor records and from the city's housing department data. Enough time must be allowed to coordinate data sets to produce a reasonably reliable mailing list.
- It is not the city's responsibility (nor is it advisable) to determine in advance which buildings are "subject buildings" per model ordinance Section 301A.30. In particular, the available data is unlikely to include the number of stories or the construction materials

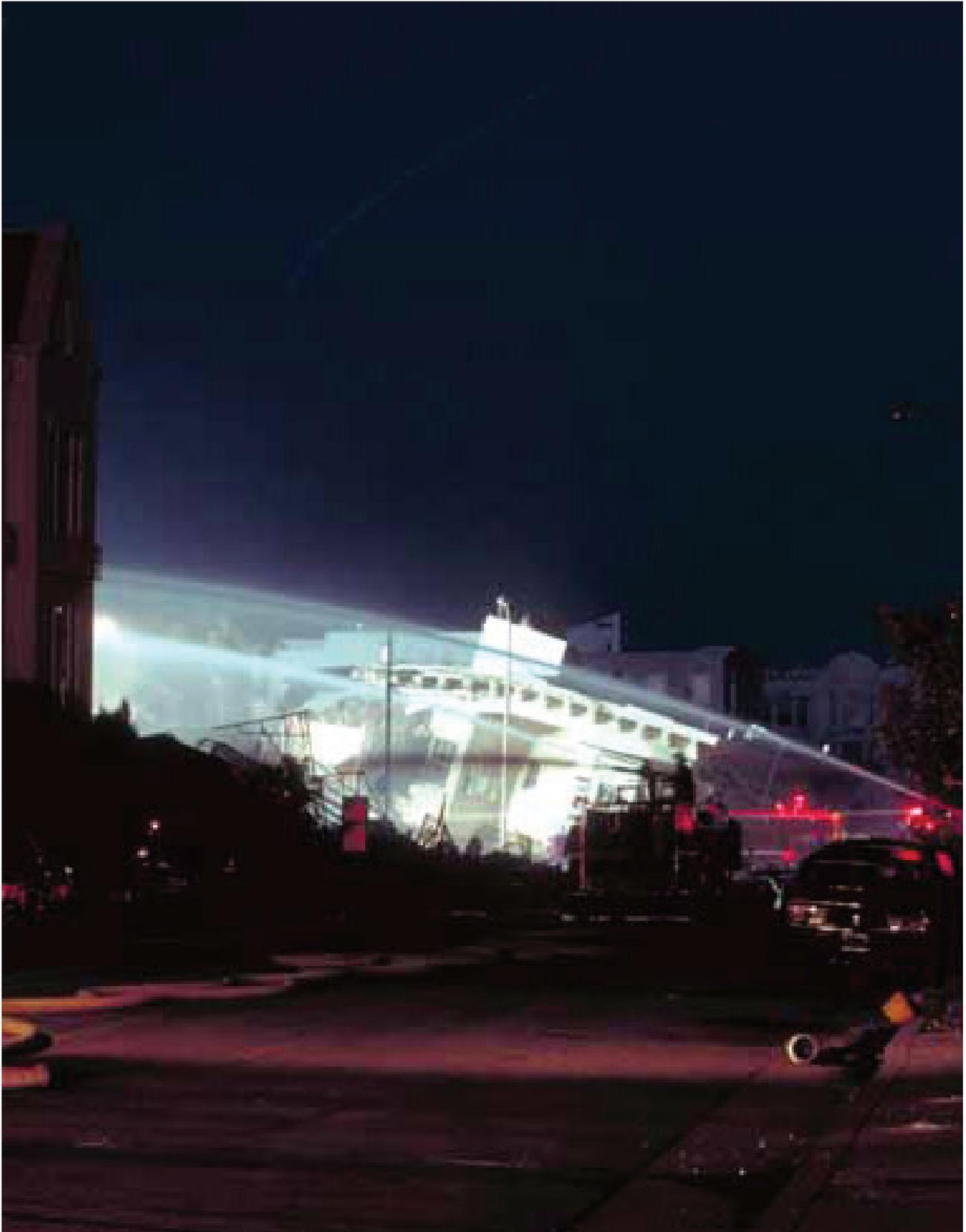
and will certainly not include anything about the presence or absence of a "target story." Instead, the best practice is to notify all owners of buildings that appear to meet the criteria based on age and number of units, and let the screening process in Section 302A.30.A sort out the exempt buildings. In a city with mostly wood frame residential buildings, this approach is unlikely to capture many concrete or masonry buildings improperly. San Francisco initially notified the owners of over 6000 buildings, and by the end of the one-year screening phase had exempted about 20 percent of those.

- Initial notifications should be informal, perhaps just a postcard with contact information.
- The more formal notification should include simplified step-by-step instructions, especially regarding the screening or eligibility confirmation process covered in model ordinance Section 302A.30.A. Of course, if a screening form is used, it must be ready before the first notifications go out, and should be included with the first formal notification.
- Public meetings to present the ordinance requirements and take questions can be very effective, especially if organized in conjunction with local organizations of building owners and tenants. Public meetings are most effective if held after the notifications have been received, so that attendees are motivated to learn and participate.
- Model ordinance Section 301A.90 requires that the list of subject buildings be available to the public, so the city should have that ready when notifications go out.
- Once the list of potential subject buildings is public, the city can expect that the media will publish it and perhaps map the addresses. Therefore, the published list should indicate clearly that it is a list of buildings potentially subject to the ordinance, not a list of hazardous or even potentially hazardous buildings. That is, the hazard, if any, is determined by the owner's engineer based on a building-specific analysis, not by the city based on tax and housing records.
- Owners are likely to receive marketing from engineers, contractors, and lenders as soon as the ordinance passes. Some of this material will look like official city notices, so the city should be ready to answer questions about it from owners or tenants.



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Appendix A: Model Ordinance Provisions for Mandatory Retrofit with Screening

Following are the model ordinance provisions for a mandatory soft story retrofit program with a screening phase. They are identical to one of the three versions of the model ordinance presented in a tabular format with commentary in Appendix B.

In order to fully implement this model ordinance, a jurisdiction would need to:

- Confirm or revise the main options, as discussed in Section 3.1 of this report.
- Customize the ordinance text, as discussed in Section 3.2 of this report.
- Take steps to implement the ordinance through a soft story program, as discussed in Section 3.3 of this report.

AN ORDINANCE AMENDING THE ____ BUILDING CODE TO REQUIRE SEISMIC RETROFIT OF CERTAIN RESIDENTIAL BUILDINGS

Whereas ____ is acknowledged to be subject to severe earthquakes in the foreseeable future; and

Whereas older multi-unit residential wood frame buildings with soft, weak, open, or otherwise vulnerable lower stories are acknowledged to be among the most earthquake collapse-prone structures in ____; and

Whereas the earthquake safety and post-earthquake recovery of housing is acknowledged as a goal of ____'s emergency response and recovery plan; and

Whereas California Health and Safety Code Section 19160(m) encourages ____ "to initiate efforts to reduce the seismic risk in vulnerable soft story residential buildings;" and

Whereas the California Existing Building Code requires seismic retrofit only in exceptionally rare cases;

Whereas it is acknowledged to be in the best interests of ____ building owners, commercial and residential tenants, and all residents to apply retrofit standards that balance the benefits of reduced earthquake losses with the costs and disruptions of seismic retrofit; and

Whereas other Bay Area cities have implemented "soft story" retrofit programs and have identified cost-beneficial improvements and interpretations of existing model codes and standards;

THE COUNCIL OF ____ DOES ORDAIN AS FOLLOWS:

SECTION 1. Findings.

- A.** California Health and Safety Code Section 19161(a) authorizes ____ to assess its earthquake hazard and to identify potentially seismically hazardous buildings.
- B.** California Health and Safety Code Section 19161(b) requires such identification to be made by a licensed architect or civil engineer or by the staff of a local building department when supervised by a licensed architect or civil engineer.
- C.** With reference to California Health and Safety Code Section 19162(b)(1), the California Building Standards Commission has published, but has not adopted, Chapter A4 of the 2016 California Existing Building Code, titled "Earthquake Risk Reduction in Wood-Frame Residential Buildings with Soft, Weak or Open Front Walls." As such, ____ is free to adopt, modify, interpret, and apply Chapter A4.
- D.** With reference to California Health and Safety Code Section 19162(b)(1), the California Building Standards Commission has adopted Section 317 of the California Existing Building Code, which allows a local jurisdiction to adopt standards for earthquake evaluation and retrofit based on the national standard known as ASCE 41, titled *Seismic Evaluation and Retrofit of Existing Buildings*.

E. FEMA has published a procedure known as FEMA P-807, titled, *Seismic Evaluation and Retrofit of Multi-Unit Wood-Frame Buildings With Weak First Stories*, with model code provisions in its Appendix B. With reference to California Health and Safety Code Section 19163(b), ____ may adopt these provisions with an appropriate performance objective as “substantially equivalent standards” relative to CEBC Chapter A4 or ASCE 41.

F. California Health and Safety Code Section 19161(a)(2) identifies the buildings that are the subject of this ordinance as “potentially hazardous buildings.” California Building Code Section 1.1.8.1 states that local ordinances and mitigation programs for such buildings are exempt from making express findings otherwise required by California Health and Safety Code Section 19163(b) citing Section 17958.5 and Section 17958.7.

SECTION 2. Chapter 3A is hereby created and added to ____’s adopted version of the 2016 California Existing Building Code, California Code of Regulations Title 24 Part 10, as follows.

**CHAPTER 3A. MANDATORY SEISMIC RETROFIT OF
CERTAIN RESIDENTIAL BUILDINGS
SECTION 301A. ADMINISTRATION**

301A.10 Title. This chapter shall be known as “Mandatory Seismic Retrofit of Certain Residential Buildings,” may be cited as such, and will be referred to herein as “this chapter.”

301A.20 Intent. This chapter is intended to promote public safety and welfare through a program of mandatory seismic retrofit of certain residential buildings vulnerable to earthquake damage and collapse. The program is intended to reduce earthquake-related deaths and injuries, improve the durability of the existing housing stock, facilitate post-earthquake emergency response, improve community stability, minimize displacement during retrofits and after an earthquake, and reduce the economic impacts of a damaging earthquake.

301A.30 Subject Buildings. This chapter shall apply to buildings constructed or permitted for construction before January 1, 1978 or designed based on an adopted version of the 1976 or earlier edition of the Uniform Building Code, that contain five or more dwelling units, and have a wood frame target story.

301A.40 Notification. Within 90 days of the effective date of this chapter, the building official shall send a written notice to the owner or owners of each known subject building informing the owner of the requirement to comply with this chapter.

Failure of the building official to send or provide a written notice to unidentified owners of subject buildings or to owners of buildings not known to be subject buildings shall not relieve the owner of a subject building from the requirement to comply with this chapter. Failure of an owner to receive a written notice shall not relieve the owner of a subject building from the requirement to comply with this chapter.

301A.50 Design Professionals. Unless specifically noted, all work intended to comply with this chapter shall be performed by appropriately licensed individuals, and all documents submitted for compliance shall be sealed by a California-licensed architect or civil engineer.

301A.60 Submittals. In addition to submittals required by other provisions of this code, the building official is authorized to develop, distribute, and require the use of certain forms, templates, and other tools as needed to facilitate compliance, review, approval, and records maintenance contemplated by this chapter. The building official is authorized to require separate submittals and permit applications for work required for compliance with the chapter and for voluntary work to be performed simultaneously.

301A.70 Technical bulletins and administrative regulations. The building official is responsible for the administration of this chapter and is authorized to develop and require compliance with one or more technical bulletins and/or administrative regulations containing interpretations, clarifications, and commentary to facilitate implementation of the engineering criteria and other requirements set forth in this chapter.

301A.80 Retention of plans. Notwithstanding any provision or exception in this code, including Exception 1 to Section 1.8.4.3.1 of the 2016 California Building Code and its successors, the building official shall retain an official copy of any approved target story evaluation reports and retrofit design plans submitted to comply with this chapter.

301A.90 Public record keeping. The building official shall maintain a listing of buildings subject to this chapter and shall make that listing readily accessible to the public. The building official shall convey that listing with a summary of the compliance status of each subject building and its parcel number to the County Clerk-Recorder once every six months.

301A.100 Conformance Period. No subject building for which permitted retrofit work is completed in compliance with this chapter shall be required by the _____ to undergo additional seismic retrofit of its seismic force-resisting system within a period of 15 years after the effective date of this chapter, except that any provisions in this code related to addition, alteration, repair, or change of occupancy shall still apply. Any such additional seismic retrofit requirements shall apply at the end of the conformance period, with schedule adjustments to be determined by the building official.

SECTION 302A. COMPLIANCE

302A.10. Reserved.

302A.20. Reserved.

302A.30 Scope for each subject building. The owner of each building subject to this chapter shall, in accordance with the schedule given in Section 302A.50, complete the following compliance scope.

A. Complete the screening. The owner shall submit a screening document sealed by a California-licensed architect or civil engineer following procedures to be prescribed by the building official. The document shall either show that the building is not a subject building per Section 301A.30 or shall confirm that the building is a subject building assigned to a certain compliance tier.

B. Complete the structural retrofit. The owner shall:

1. Obtain a building permit to retrofit the subject building in compliance with the criteria given in Section 304A; and
2. Complete or cause to be completed all permitted construction, and obtain a certificate of completion.

Alternatively, the owner may submit to the building official a seismic evaluation report demonstrating compliance of each wood frame target story with the criteria given in Section 304A.

C. Complete the nonstructural retrofit. The owner shall:

1. Obtain a building permit to retrofit the subject building in compliance with the criteria given in Section 305A; and
2. Complete or cause to be completed all permitted construction, and obtain a certificate of completion.

Alternatively, the owner may submit to the building official a seismic evaluation report demonstrating compliance with the criteria given in Section 305A.

D. Submit affidavits of compliance. The owner shall submit one or more affidavits prescribed by the building official confirming compliance with the required scope and with other administrative regulations.

302A.40 Compliance tiers. Each subject building shall be assigned to a compliance tier as follows.

Tier 1. Subject buildings with 16 or more dwelling units shall be assigned to Tier 1, unless eligible for Tier 3.

Tier 2. Subject buildings with 15 or fewer dwelling units shall be assigned to Tier 2, unless eligible for Tier 3.

Tier 3. Subject buildings with legally permitted dwelling units or business, mercantile, or assembly occupancies in a wood frame target story shall be assigned to Tier 3.

302A.50 Schedule. The owner of a subject building shall comply with each of this chapter's requirements in accordance with the deadlines given in Table 302A.50. Failure to fully comply with any deadline or to receive approval of submitted materials shall not alter other applicable deadlines. In no case shall transfer of title cause any deadline to be extended.

TABLE 302A.50. Compliance deadlines in years after the effective date of this chapter

Compliance Tier	Screening Form	Retrofit Permits	Retrofit Construction	Affidavits
Tier 1	1 year	2 years	3 years	3 years
Tier 2	1 year	3 years	4 years	4 years
Tier 3	1 year	4 years	5 years	5 years

SECTION 303A. DEFINITIONS

303A.10 Supplemental definitions. In addition to or in place of definitions given elsewhere in this code, the following definitions shall apply for purposes of this chapter.

Dwelling unit. A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation; or any individual residential unit in a building with R-1 or R-2 occupancy; or any guestroom, with or without a kitchen, in either a tourist or residential hotel or motel. Any unit occupied as a dwelling unit, whether approved or not approved for such use, shall be counted as a dwelling unit.

Target story. Either (1) a basement story or underfloor area that extends above grade at any point or (2) any story above grade, where the wall configuration of such basement, underfloor area, or story is substantially more vulnerable to earthquake damage than the wall configuration of the story above; except that a story is not a target story if it is the topmost story or if the difference in vulnerability is primarily due to the story above being a penthouse, or an attic with a pitched roof.

Wood frame target story. A wood frame target story means a target story in which a significant portion of lateral or torsional story strength or story stiffness is provided by wood frame walls.

SECTION 304A. STRUCTURAL ENGINEERING CRITERIA

304A.10 Engineering intent. The structural criteria provided in this section have been selected as appropriate to the intent of this chapter. The structural retrofit criteria are expected to significantly reduce the collapse risk of subject buildings and to increase the likelihood that a subject building will be structurally safe to repair and occupy shortly after an earthquake.

The structural criteria are intended to apply to existing wood frame target stories in order to improve building performance while limiting retrofit costs and impacts. It is not the intent of this chapter to require mitigation of all structural deficiencies, seismic or non-seismic, that might exist within or adjacent to the building. The structural criteria might not achieve the same performance as design requirements for new buildings or any full-building retrofit objective for existing buildings.

304A.20 Structural seismic evaluation. Seismic evaluation of each wood frame target story shall comply with either of the following criteria. Regardless of the criteria applied, the strength of a target story need not exceed that required to develop the strength of stories above.

A. The latest edition of Seismic Evaluation and Retrofit of Existing Buildings [ASCE/SEI 41] with a performance objective of Structural Life Safety with the BSE-1E hazard or Structural Collapse Prevention with the BSE-2E hazard, as interpreted by the building official.

B. The latest edition of Seismic Evaluation and Retrofit of Multi-Unit Wood-Frame Buildings With Weak First Stories [FEMA P-807] with a performance objective and detailed provisions as provided by the building official.

304A.30 Structural seismic retrofit. Seismic retrofit of each wood frame target story shall comply with any of the following criteria. Regardless of the criteria applied, the strength of a target story need not exceed that required to develop the strength of stories above.

A. Chapter A4 of this code, as interpreted by the building official.

B. The latest edition of Seismic Evaluation and Retrofit of Existing Buildings [ASCE/SEI 41] with a performance objective of Structural Life Safety with the BSE-1E hazard or Structural Collapse Prevention with the BSE-2E hazard, as interpreted by the building official.

C. The latest edition of Seismic Evaluation and Retrofit of Multi-Unit Wood-Frame Buildings With Weak First Stories [FEMA P-807] with a performance objective and detailed provisions as provided in a Technical Bulletin to be developed by the building official.

D. For subject buildings qualified as historic, alternate building regulations of the 2016 California Historical Building Code.

SECTION 305A. NONSTRUCTURAL ENGINEERING CRITERIA

305A.10 Engineering intent. The nonstructural criteria provided in this section have been selected as appropriate to the intent of this chapter. The nonstructural retrofit criteria are expected to reduce certain safety and reoccupancy risks and to increase the likelihood that a subject building will be safe to repair and occupy shortly after an earthquake.

The nonstructural criteria are intended to apply to specific conditions in specific areas of the building in order to improve building performance while limiting retrofit costs and impacts. It is not the intent of this chapter to require mitigation of all nonstructural deficiencies, seismic or non-seismic, that might exist within or adjacent to the building. The nonstructural criteria might not achieve the same performance as design requirements for new buildings or any full-building retrofit objective for existing buildings.

305A.20 Nonstructural seismic evaluation. Seismic evaluation of nonstructural components shall comply with at least the “Screening” provisions in the latest edition of Seismic Evaluation and Retrofit of Existing Buildings [ASCE/SEI 41] with a performance objective of Nonstructural Life Safety with the BSE-1E hazard. The building official is authorized to limit the required scope of the evaluation.

305A.30 Nonstructural seismic retrofit. Seismic retrofit of nonstructural components shall comply with the latest edition of Seismic Evaluation and Retrofit of Existing Buildings [ASCE/SEI 41] with a performance objective of Nonstructural Life Safety with the BSE-1E hazard. The building official is authorized to limit the required scope of the retrofit.

SECTION 306A. APPLICATION OF OTHER PROVISIONS OF THIS CODE

306A.10 Approval. Except for unsafe conditions and new work triggered by the required scope, the building official shall not withhold approval of submitted materials for reasons unrelated to the required scope and the engineering criteria.

306A.20 Alteration provisions. Prior to compliance with this chapter, buildings subject to this chapter shall be considered substandard buildings per California Health and Safety Code Section 17920.3(o). When considering the work required by this chapter as an alteration, the building official is authorized to waive Sections 403.4 and 403.4.1 of this code and its successor provisions.

306A.30 Existing building requirements. Unless specified otherwise, work on subject buildings that is neither required by this chapter nor triggered by compliance with this chapter shall comply with all applicable provisions of this code.



Appendix B: Model Ordinance Options and Commentary

The table below presents three versions of the model ordinance, each representing a different mitigation program:

- Mandatory evaluation only
- Mandatory retrofit without a screening phase
- Mandatory retrofit with a screening phase.

In addition, the rightmost column provides guidance to the jurisdiction in terms of nominal instructions and commentary explaining the purpose of each provision. Additional commentary and discussion is provided in the body of this report.

The commentary uses these abbreviations:

- CEBC means the 2016 California Existing Building Code, more formally known as Title 24 Part 10 of the California Code of Regulations.
- HCD means the California Department of Housing and Community Development. HCD develops state building code provisions that apply to residential buildings, including those covered by soft story ordinances.

- HSC means the California Health and Safety Code. HSC provisions require each California jurisdiction to adopt the CEBC. In addition, HSC Sections 19160 through 19168 address seismically hazardous buildings and include a number of provisions specifically intended to allow and encourage jurisdictions to address their soft story risk.

In order to fully implement this model ordinance, a jurisdiction would need to:

- Select one of the three mitigation program types.
- Confirm or revise the main options, as discussed in Section 3.1 of this report.
- Customize the ordinance text, as discussed in Section 3.2 of this report.
- Take steps to implement the ordinance through a soft story program, as discussed in Section 3.3 of this report.

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>AN ORDINANCE AMENDING THE _____ BUILDING CODE TO REQUIRE SEISMIC EVALUATION OF CERTAIN RESIDENTIAL BUILDINGS</p> <p>Whereas _____ is acknowledged to be subject to severe earthquakes in the foreseeable future; and</p> <p>Whereas older multi-unit residential wood frame buildings with soft, weak, open, or otherwise vulnerable lower stories are acknowledged to be among the most earthquake collapse-prone structures in _____; and</p> <p>Whereas the earthquake safety and post-earthquake recovery of housing is acknowledged as a goal of _____'s emergency response and recovery plan; and</p> <p>Whereas California Health and Safety Code Section 19160(m) encourages _____ to initiate efforts to reduce the seismic risk in vulnerable soft story residential buildings;"</p>	<p>AN ORDINANCE AMENDING THE _____ BUILDING CODE TO REQUIRE SEISMIC RETROFIT OF CERTAIN RESIDENTIAL BUILDINGS</p> <p>Same, plus:</p> <p>Whereas the California Existing Building Code requires seismic retrofit only in exceptionally rare cases;</p> <p>Whereas it is acknowledged to be in the best interests of _____ building owners, commercial and residential tenants, and all residents to apply retrofit standards that balance the benefits of reduced earthquake losses with the costs and disruptions of seismic retrofit; and</p> <p>Whereas other Bay Area cities have implemented "soft story" retrofit programs and have identified cost-beneficial improvements and interpretations of existing model codes and standards;</p>	<p>Same.</p> <p>Same.</p> <p>Same.</p>	<p><i>Insert name of jurisdiction.</i></p> <p><i>Edit, customize, and/or add whereas statements.</i></p> <p><i>Insert name of jurisdiction.</i></p> <p>Whereas statements are sometimes used to record the council's basis for enacting the ordinance. They can also be used to record city-specific background information.</p> <p>The statements shown are simplified, generic versions of legislative findings in HSC Section 19160.</p>
<p>THE COUNCIL OF _____ DOES ORDAIN AS FOLLOWS:</p> <p>SECTION 1. Findings.</p> <p>A. California Health and Safety Code Section 19161(a) authorizes _____ to assess its earthquake hazard and to identify potentially seismically hazardous buildings.</p>	<p>Same.</p> <p>Same, plus:</p> <p>C. With reference to California Health and Safety Code Section 19162(b)(1), the California Building Standards Commission has published, but has not adopted, Chapter A4 of the 2016 California</p>	<p>Same.</p> <p>Same.</p>	<p><i>Insert name of jurisdiction.</i></p> <p><i>Insert name of jurisdiction.</i></p> <p>For evaluation-only programs, HSC puts no limits on the criteria used, presumably because no construction work is involved.</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>B. California Health and Safety Code Section 19161(b) requires such identification to be made by a licensed architect or civil engineer or by the staff of a local building department when supervised by a licensed architect or civil engineer.</p>	<p>Existing Building Code, titled "Earthquake Risk Reduction in Wood-Frame Residential Buildings with Soft, Weak or Open Front Walls." As such, _____ is free to adopt, modify, interpret, and apply Chapter A4.</p> <p>D. With reference to California Health and Safety Code Section 19162(b)(1), the California Building Standards Commission has adopted Section 317 of the California Existing Building Code, which allows a local jurisdiction to adopt standards for earthquake evaluation and retrofit based on the national standard known as ASCE 41, titled Seismic Evaluation and Retrofit of Existing Buildings.</p> <p>E. FEMA has published a procedure known as FEMA P-807, titled, Seismic Evaluation and Retrofit of Multi-Unit Wood-Frame Buildings With Weak First Stories, with model code provisions in its Appendix B. With reference to California Health and Safety Code Section 19163(b), _____ may adopt these provisions with an appropriate performance objective as "substantially equivalent standards" relative to CEBC Chapter A4 or ASCE 41</p> <p>F. California Health and Safety Code Section 19161(a)(2) identifies the buildings that are the subject of this ordinance as "potentially hazardous buildings." California Building Code</p>		<p>For retrofit programs, HSC sets some general requirements on code provisions and design criteria (which it collectively calls "standards"), but it is not entirely clear how the HSC rules apply to mandatory mitigation programs, as opposed to normal building code provisions.</p> <p>Assuming the HSC rules do apply, the model findings state how and why the ordinance is in compliance. The findings drafted here have not been reviewed by an attorney or by any state agency.</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>SECTION 2. Chapter 3A is hereby created and added to _____'s adopted version of the 2016 California Existing Building Code, California Code of Regulations Title 24 Part 10, as follows.</p>	<p>Section 1.1.8.1 states that local ordinances and mitigation programs for such buildings are exempt from making express findings otherwise required by California Health and Safety Code Section 19163(b) citing Section 17958.5 and Section 17958.7.</p>	<p>Same.</p>	
<p>CHAPTER 3A. MANDATORY SEISMIC EVALUATION OF CERTAIN RESIDENTIAL BUILDINGS</p>	<p>CHAPTER 3A. MANDATORY SEISMIC RETROFIT OF CERTAIN RESIDENTIAL BUILDINGS</p>	<p>Same.</p>	<p><i>Insert name of jurisdiction.</i></p> <p><i>Modify to accommodate the city's organization of its own municipal code and building code regulations.</i></p> <p><i>The model provision assumes that the city's building code follows the chapter numbering of Title 24, including Part 10, the CEBC. If so, the model provisions shown here can be added as Chapter 3A. (Alternatively, they can be added as Section 324,a new final section in Chapter 3, but that will be problematic if the CEBC section numbering changes, as it is likely to do over coming cycles.)</i></p>
<p>SECTION 301A. ADMINISTRATION</p>	<p>Same.</p>	<p>Same.</p>	<p>The CEBC already contains a full set of administrative provisions. These items are specific to soft story retrofit programs.</p>
<p>301A.10 Title. This chapter shall be known as "Mandatory Seismic Evaluation of Certain Residential</p>	<p>301A.10 Title. This chapter shall be known as "Mandatory Seismic Retrofit of Certain Residential</p>	<p>Same.</p>	

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>Buildings.” may be cited as such, and will be referred to herein as “this chapter.”</p> <p>301A.20 Intent. This chapter is intended to promote public safety and welfare through a program of mandatory seismic evaluation of certain residential buildings. The program is intended to identify certain buildings vulnerable to earthquake damage and collapse.</p>	<p>Buildings.” may be cited as such, and will be referred to herein as “this chapter.”</p> <p>301A.20 Intent. This chapter is intended to promote public safety and welfare through a program of mandatory seismic retrofit of certain residential buildings vulnerable to earthquake damage and collapse. The program is intended to reduce earthquake-related deaths and injuries, improve the durability of the existing housing stock, facilitate post-earthquake emergency response, improve community stability, minimize displacement during retrofits and after an earthquake, and reduce the economic impacts of a damaging earthquake.</p> <p>Same.</p>	<p>Same.</p>	
<p>301A.30 Subject Buildings. This chapter shall apply to buildings constructed or permitted for construction before January 1, 1978 or designed based on an adopted version of the 1976 or earlier edition of the Uniform Building Code, that contain five or more dwelling units, and have a wood frame target story.</p>	<p>Same.</p>	<p>Same.</p>	<p>Adjust critical date, applicable code, and other criteria, if necessary.</p> <p>HSC Section 19161(a)(2) lists “woodframe, multiunit residential buildings constructed before January 1, 1978” as part of its quasi-definition of the soft story type of “potentially hazardous buildings.” Even so, each city may choose cutoff dates and other building characteristics that fit its own building stock.</p> <p>See the commentary at 303A.10 regarding “dwelling units” and “wood frame target story.”</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>301A.40 Notification. Within 90 days of the effective date of this chapter, the building official shall send a written notice to the owner or owners of each known subject building informing the owner of the requirement to comply with this chapter.</p> <p>Failure of the building official to send or provide a written notice to unidentified owners of subject buildings or to owners of buildings not known to be subject buildings shall not relieve the owner of a subject building from the requirement to comply with this chapter. Failure of an owner to receive a written notice shall not relieve the owner of a subject building from the requirement to comply with this chapter.</p>	<p>Same.</p>	<p>Same.</p>	<p><i>Adjust the 90-day notification schedule, if necessary.</i></p> <p>This will depend on the capacity of the lead agency to prepare once the ordinance goes into effect. Ninety days is a typical timeframe. The capacity of property owners to prepare should be reflected in the deadlines in Section 302A.50, not here.</p>
<p>301A.50 Design Professionals. Unless specifically noted, all work intended to comply with this chapter shall be performed by appropriately licensed individuals, and all documents submitted for compliance shall be sealed by a California-licensed architect or civil engineer.</p>	<p>Same.</p>	<p>Same.</p>	<p>HSC Section 19161(b), citing the Business and Professions Code, specifically allows architects, civil engineers, and structural engineers to evaluate these buildings.</p> <p>It is not necessary to specify that a structural engineer is qualified to do this work. Every California-licensed structural engineer is also a civil engineer by definition.</p>
<p>301A.60 Submittals. In addition to submittals required by other provisions of this code, the building official is authorized to develop, distribute, and require the use of certain forms, templates, and other tools as needed to facilitate</p>	<p>301A.60 Submittals. In addition to submittals required by other provisions of this code, the building official is authorized to develop, distribute, and require the use of certain forms, templates, and other tools as needed to facilitate</p>	<p>Same.</p>	

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>compliance, review, approval, and records maintenance contemplated by this chapter.</p> <p>301A.70 Technical bulletins and administrative regulations. The building official is responsible for the administration of this chapter and is authorized to develop and require compliance with one or more technical bulletins and/or administrative regulations containing interpretations, clarifications, and commentary to facilitate implementation of the engineering criteria and other requirements set forth in this chapter.</p>	<p>compliance, review, approval, and records maintenance contemplated by this chapter. The building official is authorized to require separate submittals and permit applications for work required for compliance with the chapter and for voluntary work to be performed simultaneously.</p> <p>Same.</p>	<p>Same.</p>	<p>Technical bulletins are common and useful. They allow inevitable and necessary interpretations to be made as the program is developed and implemented, without the need to amend approved legislation or code provisions. Officially, these must be characterized as interpretations, since local building code modifications or amendments must be approved by ordinance.</p> <p>This provision reflects the assumption that the building department will be the lead agency.</p> <p>The term “building official,” as used here, is already defined in California Building Code Section 202 to include the building official’s designee or “duly authorized representative.” Thus, “building official” effectively means “building department staff.”</p>
<p>301A.80 Retention of plans. Notwithstanding any provision or exception in this code, including Exception 1 to Section 1.8.4.3.1 of the 2016 California Building Code and its successors, the building official shall retain an official copy of any approved target story evaluation</p>	<p>301A.80 Retention of plans. Notwithstanding any provision or exception in this code, including Exception 1 to Section 1.8.4.3.1 of the 2016 California Building Code and its successors, the building official shall retain an official copy of any approved target story evaluation</p>	<p>Same.</p>	<p>The cited exception generally exempts a building department from retaining plans for any residential building up to two stories over a basement. That exception should be set aside for purposes of tracking and managing this program.</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase
<p>reports submitted to comply with this chapter.</p> <p>301A.90 Public record keeping. The building official shall maintain a listing of buildings subject to this chapter and shall make that listing readily accessible to the public. The building official shall convey that listing with a summary of the compliance status of each subject building and its parcel number to the County Clerk-Recorder once every six months.</p> <p><i>Omit.</i></p>	<p>reports and retrofit design plans submitted to comply with this chapter.</p> <p><i>Same.</i></p>	<p><i>Same.</i></p>
<p>301A.100 Conformance Period. No subject building for which permitted retrofit work is completed in compliance with this chapter shall be required by the _____ to undergo additional seismic retrofit of its seismic force-resisting system within a period of 15 years after the effective date of this chapter, except that any provisions in this code related to addition, alteration, repair, or change of occupancy shall still apply. Any such additional seismic retrofit requirements shall apply at the end of the conformance period, with schedule adjustments to be determined by the building official.</p>	<p>301A.100 Conformance Period. No subject building for which permitted retrofit work is completed in compliance with this chapter shall be required by the _____ to undergo additional seismic retrofit of its seismic force-resisting system within a period of 15 years after the effective date of this chapter, except that any provisions in this code related to addition, alteration, repair, or change of occupancy shall still apply. Any such additional seismic retrofit requirements shall apply at the end of the conformance period, with schedule adjustments to be determined by the building official.</p>	<p><i>Insert name of jurisdiction.</i></p> <p>This provision increases public buy-in by assuring owners that they will not be subject to multiple programs one after another. As shown here, the deferral would apply only to retrofits, not to evaluations.</p> <p>The provision is consistent with HSC Section 19166, which provides the 15-year waiver to any seismically hazardous building retrofitted with HSC-consistent criteria. However, this provision is recommended to clarify three points about the 15-year period on which the HSC provision is unclear – when it starts, whether other building code regulations apply throughout, and what is required when it ends.</p> <p>The conformance period represents a temporary deferral, not a permanent waiver. Any additional</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>SECTION 302A. COMPLIANCE</p>	<p><i>Same.</i></p>	<p><i>Same.</i></p>	<p>retrofit mandated during the conformance period would still apply but would be deferred to the end of the conformance period.</p>
<p>302A.10 Scope for each notified owner. Each owner notified in accordance with Section 301A.40 shall submit documentation demonstrating that the building is not a subject building per Section 302A.20 or shall comply with the scope for a subject building per Section 302A.30.</p>	<p><i>Same as Evaluation Only.</i></p>	<p><i>Omit.</i></p>	<p>A program with a screening phase does not need this item, since the screening itself is mandatory and will determine whether the building is a subject building.</p>
<p>302A.20 Scope for each non-subject building. The owner of each building thought to be exempt from this chapter may submit documentation showing that the building is not a subject building per Section 301A.30. The documentation shall be sealed by a California-licensed architect or civil engineer and shall comply with procedures to be prescribed by the building official. The building official shall timely notify the owner of approval or non-approval of the exemption.</p> <p>302A.30 Scope for each subject building. The owner of each building subject to this chapter shall, in accordance with the schedule given in Section 302A.50, complete the following compliance scope</p>	<p><i>Same.</i></p>	<p><i>Omit.</i></p>	<p>A program with a screening phase does not need this item, since the screening itself is mandatory and will determine whether the building is a subject building. See Section 302A.30.A.</p> <p>Section 301A.70 allows the building department to create forms and procedures for this declaration, and Section 301A.50 requires the submittal to be sealed by a licensed professional.</p> <p>There is no need for a deadline for exemptions.</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>A. Demonstrate eligibility for a later compliance tier. This scope item is optional. The owner may submit documentation demonstrating that a building is eligible for a later compliance tier per Section 302A.40. The building official shall timely notify the owner of the approved compliance tier.</p>	<p><i>Same as Evaluation Only.</i></p>	<p>A. Complete the screening. The owner shall submit a screening document sealed by a California-licensed architect or civil engineer following procedures to be prescribed by the building official. The document shall either show that the building is not a subject building per Section 301A.30 or shall confirm that the building is a subject building assigned to a certain compliance tier.</p>	<p><i>For Evaluation Only and Mandatory Retrofit without Screening: Omit if only one compliance tier is used.</i></p> <p><i>For Mandatory Retrofit with Screening Phase: Edit as needed if only one compliance tier is used.</i></p>
<p>B. Complete the structural evaluation. The owner shall submit a written seismic evaluation report based on the criteria given in Section 304A.</p>	<p><i>Omit.</i></p>	<p><i>Omit.</i></p>	<p>This model provision presumes the evaluation report will be subject to review and approval by the building official. However, in an evaluation-only program, the city has no authority to compel retrofit, so any actual risk reduction is left to the owner's discretion. Therefore, if the city does not have the capacity or the desire to review and approve each report, the wording of this provision might be changed to "The owner shall commission and receive a written seismic evaluation report based on ..." Compliance would then be achieved by affidavit (scope item D), not by review and approval.</p>
<p>C. Complete the nonstructural evaluation. The owner shall submit a written seismic evaluation report based on the criteria given in Section 305A.</p> <p><i>Omit.</i></p>	<p><i>Omit.</i></p> <p>B. Complete the structural retrofit. The owner shall:</p> <ol style="list-style-type: none"> 1. Obtain a building permit to retrofit the subject building in 	<p><i>Omit.</i></p>	<p><i>Omit if nonstructural scope is not considered.</i></p> <p>See the commentary for scope item B.</p> <p>The evaluation alternative allows an owner to avoid retrofit by showing that the building already complies. This alternative applies both to</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>D. Submit affidavits of compliance. The owner shall submit one or more affidavits prescribed by the building official confirming compliance with the required scope and with other administrative regulations.</p>	<p>compliance with the criteria given in Section 304A; and</p> <p>2. Complete or cause to be completed all permitted construction, and obtain a certificate of completion.</p> <p>Alternatively, the owner may submit to the building official a seismic evaluation report demonstrating compliance of each wood frame target story with the criteria given in Section 304A.</p> <p>C. Complete the nonstructural retrofit. The owner shall:</p> <ol style="list-style-type: none"> 1. Obtain a building permit to retrofit the subject building in compliance with the criteria given in Section 305A; and 2. Complete or cause to be completed all permitted construction, and obtain a certificate of completion. <p>Alternatively, the owner may submit to the building official a seismic evaluation report demonstrating compliance with the criteria given in Section 305A.</p> <p>D. Submit affidavits of compliance. The owner shall submit one or more affidavits prescribed by the building official confirming compliance with the required scope and with other administrative regulations.</p>	<p>Same.</p>	<p>buildings originally constructed with adequate strength and to buildings recently retrofitted. By applying also to recent retrofits, this provision is consistent with HSC Section 19166, which grants any retrofitted building a 15-year waiver with respect to new retrofit ordinances.</p>
<p>Omit.</p>	<p>C. Complete the nonstructural retrofit. The owner shall:</p> <ol style="list-style-type: none"> 1. Obtain a building permit to retrofit the subject building in compliance with the criteria given in Section 305A; and 2. Complete or cause to be completed all permitted construction, and obtain a certificate of completion. <p>Alternatively, the owner may submit to the building official a seismic evaluation report demonstrating compliance with the criteria given in Section 305A.</p> <p>D. Submit affidavits of compliance. The owner shall submit one or more affidavits prescribed by the building official confirming compliance with the required scope and with other administrative regulations.</p>	<p>Same.</p>	<p>Omit if nonstructural scope is not considered.</p>
<p>D. Submit affidavits of compliance. The owner shall submit one or more affidavits prescribed by the building official confirming compliance with the required scope and with other administrative regulations.</p>	<p>Same.</p>	<p>Same.</p>	<p>Omit if no affidavits are used.</p> <p>Affidavits can be used to collect additional information or to confirm compliance with additional regulations. For example, such regulations might require the owner to acknowledge the limits of the retrofit, or to receive certain information from the city, or to</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>E. Posting. For any subject building that does not satisfy the criteria given in Section 304A, the owner shall post a sign not smaller than 8 inches by 8 inches in a clearly visible location within 10 feet of each main entrance stating, in at least 30-point type, the following: "Earthquake Warning: This building is prone to collapse or life-threatening structural damage in the event of an earthquake."</p> <p>302A.40 Compliance tiers. Each subject building shall be assigned to a compliance tier as follows.</p> <p>Tier 1. Subject buildings with 16 or more dwelling units shall be assigned to Tier 1, unless eligible for Tier 3.</p> <p>Tier 2. Subject buildings with 15 or fewer dwelling units shall be assigned to Tier 2, unless eligible for Tier 3.</p> <p>Tier 3. Subject buildings with legally permitted dwelling units or business, mercantile, or assembly occupancies in a wood frame target story shall be assigned to Tier 3.</p>	<p>Omit.</p>	<p>Omit.</p>	<p>make disclosures to current or prospective tenants. Compliance by affidavit can also be used where the city prefers not to review and approve certain submittals, including even the mandatory evaluation reports.</p> <p>Posting, or placarding, is only appropriate for evaluation-only programs.</p>
<p>302A.40 Compliance tiers. Each subject building shall be assigned to a compliance tier as follows.</p> <p>Tier 1. Subject buildings with 16 or more dwelling units shall be assigned to Tier 1, unless eligible for Tier 3.</p> <p>Tier 2. Subject buildings with 15 or fewer dwelling units shall be assigned to Tier 2, unless eligible for Tier 3.</p> <p>Tier 3. Subject buildings with legally permitted dwelling units or business, mercantile, or assembly occupancies in a wood frame target story shall be assigned to Tier 3.</p>	<p>Same.</p>	<p>Same.</p>	<p>Omit if only one compliance tier is used. Revise as needed if more or fewer than 3 tiers are used. Customize tier definitions.</p> <p>Compliance tiers are useful for large programs. They allow the city to prioritize certain buildings and to give more time to complex cases. Most important, they spread the work over a longer time, easing the management effort for the building department and helping to avoid spikes in demand for owners, engineers, and contractors.</p> <p>The tier definitions shown are merely examples. Each city should customize its own tier definitions.</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>302A.50 Schedule. The owner of a subject building shall comply with each of this chapter's requirements in accordance with the deadlines given in Table 302A.50. Failure to fully comply with any deadline or to receive approval of submitted materials shall not alter other applicable deadlines. In no case shall transfer of title cause any deadline to be extended.</p> <p>TABLE 302A.50. Compliance deadlines in years after the effective date of this chapter</p> <ul style="list-style-type: none"> • Structural evaluation <ul style="list-style-type: none"> Tier 1: 1 year Tier 2: 2 years Tier 3: 3 years • Nonstructural evaluation <ul style="list-style-type: none"> Tier 1: 1 year Tier 2: 2 years Tier 3: 3 years • Affidavits <ul style="list-style-type: none"> Tier 1: 1 year Tier 2: 2 years Tier 3: 3 years • Posting <ul style="list-style-type: none"> Tier 1: 1 year Tier 2: 2 years Tier 3: 3 years 	<p><i>Same.</i></p> <p>TABLE 302A.50. Compliance deadlines in years after the effective date of this chapter</p> <ul style="list-style-type: none"> • Retrofit permits <ul style="list-style-type: none"> Tier 1: 2 years Tier 2: 3 years Tier 3: 4 years • Retrofit construction <ul style="list-style-type: none"> Tier 1: 3 years Tier 2: 4 years Tier 3: 5 years • Affidavits <ul style="list-style-type: none"> Tier 1: 3 years Tier 2: 4 years Tier 3: 5 years 	<p><i>Same.</i></p> <p>TABLE 302A.50. Compliance deadlines in years after the effective date of this chapter</p> <ul style="list-style-type: none"> • Screening form <ul style="list-style-type: none"> All tiers: 1 year • Retrofit permits <ul style="list-style-type: none"> Tier 1: 2 years Tier 2: 3 years Tier 3: 4 years • Retrofit construction <ul style="list-style-type: none"> Tier 1: 3 years Tier 2: 4 years Tier 3: 5 years • Affidavits <ul style="list-style-type: none"> Tier 1: 3 years Tier 2: 4 years Tier 3: 5 years 	<p>Multiple compliance tiers are less important for evaluation-only programs, but this model ordinance includes the option.</p> <p><i>Edit into table format. [Narrow columns in this document make table format difficult.]</i></p> <p><i>Edit for number of tiers</i></p> <p><i>Edit for structural-only scope.</i></p> <p><i>Edit for affidavits per 302A.30.D.</i></p> <p><i>Edit for preferred deadlines.</i></p> <p>Deadlines should be set to achieve the benefits intended by the tier definitions. As noted above, those benefits should balance convenience, feasibility, and urgency for owners, tenants, and the building department. The deadlines shown here are merely examples. Evaluation can be done more quickly than retrofit and requires much less building department involvement. See also the commentary at Section 302A.40.</p>
<p>SECTION 303A DEFINITIONS</p>	<p><i>Same.</i></p>	<p><i>Same.</i></p>	<p><i>Same.</i></p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>303A.10 Supplemental definitions. In addition to or in place of definitions given elsewhere in this code, the following definitions shall apply for purposes of this chapter.</p> <p>Dwelling unit. A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation; or any individual residential unit in a building with R-1 or R-2 occupancy; or any guestroom, with or without a kitchen, in either a tourist or residential hotel or motel. Any unit occupied as a dwelling unit, whether approved or not approved for such use, shall be counted as a dwelling unit.</p> <p>Target story. Either (1) a basement story or underfloor area that extends above grade at any point or (2) any story above grade, where the wall configuration of such basement, underfloor area, or story is substantially more vulnerable to earthquake damage than the wall configuration of the story above; except that a story is not a target story if it is the topmost story or if the difference in vulnerability is primarily due to the story above being a penthouse, or an attic with a pitched roof.</p>	<p>Same.</p> <p>Same.</p> <p>Same.</p>	<p>Same.</p> <p>Same.</p> <p>Same.</p>	<p>Since this ordinance language is meant to become building code language, "this code" refers to the jurisdiction's building code.</p> <p>The first part, through "... sanitation," is the 2016 California Building Code definition. The balance of the definition, following examples from San Francisco and Oakland, extends the definition to include hotels, dormitories, fraternities, or other communal housing units.</p>
<p>Target story. Either (1) a basement story or underfloor area that extends above grade at any point or (2) any story above grade, where the wall configuration of such basement, underfloor area, or story is substantially more vulnerable to earthquake damage than the wall configuration of the story above; except that a story is not a target story if it is the topmost story or if the difference in vulnerability is primarily due to the story above being a penthouse, or an attic with a pitched roof.</p>	<p>Same.</p>	<p>Same.</p>	<p>This is the term now used by San Francisco, Berkeley, and Oakland. While it requires some judgment, it is preferable to the term "soft story." "Soft story" has come to mean certain wood frame residential building types, but it is actually a term already defined in the building code to mean something different. Therefore, to avoid confusion, these model code provisions do not use the term "soft story."</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>Wood frame target story. A wood frame target story means a target story in which a significant portion of lateral or torsional story strength or story stiffness is provided by wood frame walls.</p> <p>SECTION 304A. STRUCTURAL ENGINEERING CRITERIA</p>	<p>Same.</p>	<p>Same.</p>	<p>This is the key definition, as used to identify the subject buildings in Section 301A.30.</p>
<p>304A.10 Engineering intent. The structural criteria provided in this section have been selected as appropriate to the intent of this chapter. The structural evaluation criteria are expected to identify subject buildings that are especially prone to collapse due to the presence of a wood frame target story.</p> <p>It is not the intent of this chapter to require identification of all potential structural deficiencies, seismic or non-seismic, that might exist within or adjacent to the building.</p>	<p>304A.10 Engineering intent. The structural criteria provided in this section have been selected as appropriate to the intent of this chapter. The structural retrofit criteria are expected to significantly reduce the collapse risk of subject buildings and to increase the likelihood that a subject building will be structurally safe to repair and occupy shortly after an earthquake. The structural criteria are intended to apply to existing wood frame target stories in order to improve building performance while limiting retrofit costs and impacts. It is not the intent of this chapter to require mitigation of all structural deficiencies, seismic or non-seismic, that might exist within or adjacent to the building. The structural criteria might not achieve the same performance as design requirements for new buildings or any full-building retrofit objective for existing buildings.</p>	<p>Same.</p>	<p>For any of the listed criteria, Section 301A.70 contemplates that the building department will produce a technical bulletin or other document that interprets the base document. Separate from the general intent of the ordinance and of new Chapter 3A, this provision helps engineers and code officials understand the basis for the selected criteria and provides wording the engineer can use to communicate with clients.</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>304A.20 Structural seismic evaluation. Seismic evaluation of each wood frame target story shall comply with either of the following criteria. Regardless of the criteria applied, the strength of a target story need not exceed that required to develop the strength of stories above.</p> <p>A. The latest edition of Seismic Evaluation and Retrofit of Existing Buildings [ASCE/SEI 41] with a performance objective of Structural Life Safety with the BSE-1E hazard or Structural Collapse Prevention with the BSE-2E hazard, as interpreted by the building official.</p> <p>B. The latest edition of Seismic Evaluation and Retrofit of Multi-Unit Wood-Frame Buildings With Weak First Stories [FEMA P-807] with a performance objective and detailed provisions as provided by the building official.</p>	<p>Same.</p>	<p>Same.</p>	<p>This section is necessary even for retrofit programs because, per scope item 302A.30.B, the owner has the option of showing that the building already complies by evaluation and is therefore exempt from retrofit.</p> <p><i>Omit FEMA P-807 if the city is not prepared to develop customized performance objectives and code-language provisions required by that document.</i></p> <p>Section 301A.70 contemplates that interpretations and application notes for the listed criteria will be needed and will be developed and published by the lead agency.</p> <p>ASCE 41 needs interpretation to simplify its use and to allow it to be applied to a target story-only evaluation.</p> <p>FEMA P-807 needs both code language provisions and a specified performance objective tailored to the local seismicity and building stock, as explained in Appendix B of that FEMA document.</p> <p>CEBC Chapter A4 is not appropriate for evaluation.</p>
<p><i>Omit.</i></p>	<p>304A.30 Structural seismic retrofit. Seismic retrofit of each wood frame target story shall comply with any of the following criteria. Regardless of the criteria applied, the strength of a target</p>	<p>Same.</p>	

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>Omit.</p>	<p>story need not exceed that required to develop the strength of stories above.</p> <p>A. Chapter A4 of this code, as interpreted by the building official.</p> <p>B. The latest edition of <i>Seismic Evaluation and Retrofit of Existing Buildings</i> [ASCE/SEI 41] with a performance objective of Structural Life Safety with the BSE-1E hazard or Structural Collapse Prevention with the BSE-2E hazard, as interpreted by the building official.</p> <p>C. The latest edition of <i>Seismic Evaluation and Retrofit of Multi-Unit Wood-Frame Buildings With Weak First Stories</i> [FEMA P-807] with a performance objective and detailed provisions as provided in a Technical Bulletin to be developed by the building official.</p> <p>D. For subject buildings qualified as historic, alternate building regulations of the 2016 California Historical Building Code.</p>	<p>Same.</p>	<p>Omit ASCE 41 and FEMA P-807 if only more conservative code-based provisions are acceptable.</p> <p>Omit FEMA P-807 if the city is not prepared to develop customized performance objectives and code-language provisions required by that document.</p> <p>In item A, “this code” means the CEBC, Title 24 Part 10. CEBC Chapter A4 needs interpretation to reflect lessons learned by local engineers from work on the Berkeley and San Francisco programs.</p> <p>As noted above, Section 301A.70 contemplates that interpretations and application notes for the listed criteria will be needed and will be developed and published by the lead agency.</p>
<p>SECTION 305A. NONSTRUCTURAL ENGINEERING CRITERIA</p>	<p>Same.</p>	<p>Same.</p>	<p>Omit if nonstructural scope is not considered.</p> <p>For any of the listed criteria, Section 301A.70 contemplates that the building department will produce a technical bulletin or other document that interprets the base document.</p>
<p>305A.10 Engineering intent. The nonstructural criteria provided in this section have been selected as appropriate to the intent of this chapter. The nonstructural</p>	<p>305A.10 Engineering intent. The nonstructural criteria provided in this section have been selected as appropriate to the intent of this chapter. The nonstructural retrofit</p>	<p>Same.</p>	<p>Separate from the general intent of the ordinance and of new Chapter 3A, this provision helps engineers and code officials understand the basis for the selected criteria and</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>evaluation criteria are expected to identify certain safety and reoccupancy risks.</p> <p>The nonstructural criteria are intended to apply to specific conditions in specific areas of the building. It is not the intent of this chapter to require identification of all potential nonstructural deficiencies, seismic or non-seismic, that might exist within or adjacent to the building.</p>	<p>criteria are expected to reduce certain safety and reoccupancy risks and to increase the likelihood that a subject building will be safe to repair and occupy shortly after an earthquake.</p> <p>The nonstructural criteria are intended to apply to specific conditions in specific areas of the building in order to improve building performance while limiting retrofit costs and impacts. It is not the intent of this chapter to require mitigation of all nonstructural deficiencies, seismic or non-seismic, that might exist within or adjacent to the building. The nonstructural criteria might not achieve the same performance as design requirements for new buildings or any full-building retrofit objective for existing buildings.</p> <p><i>Same.</i></p>	<p><i>Same.</i></p>	<p>provides wording the engineer can use to communicate with clients.</p>
<p>305A.20 Nonstructural seismic evaluation. Seismic evaluation of nonstructural components shall comply with at least the “Screening” provisions in the latest edition of Seismic Evaluation and Retrofit of Existing Buildings [ASCE/SEI 41] with a performance objective of Nonstructural Life Safety with the BSE-1E hazard. The building official is authorized to limit the required scope of the evaluation.</p> <p><i>Omit.</i></p>	<p>305A.30 Nonstructural seismic retrofit. Seismic retrofit of nonstructural components shall comply with the latest edition of</p>	<p><i>Same.</i></p>	<p>This section is necessary even for retrofit programs because, per scope item 302A.30.C, the owner has the option of showing that the building already complies by evaluation and is therefore exempt from retrofit.</p> <p>See the commentary at Section 305A.30 regarding the scope of evaluation.</p>
			<p>This provision, as well as Section 305A.20, contemplates that the jurisdiction will define its items of interest in a technical bulletin or</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p>SECTION 306A. APPLICATION OF OTHER PROVISIONS OF THIS CODE</p>	<p>Seismic Evaluation and Retrofit of Existing Buildings [ASCE/SEI 41] with a performance objective of Nonstructural Life Safety with the BSE-1E hazard. The building official is authorized to limit the required scope of the retrofit.</p> <p><i>Same.</i></p>	<p><i>Same.</i></p>	<p>other interpretation of ASCE 41.</p> <p>The nonstructural scope may be set to match a defined performance level in ASCE 41 or may be limited, perhaps to especially common and hazardous items or to items within the structural work area.</p>
<p>306A.10 Approval. Except for unsafe conditions and new work triggered by the required scope, the building official shall not withhold approval of submitted materials for reasons unrelated to the required scope and the engineering criteria.</p>	<p><i>Same.</i></p>	<p><i>Same.</i></p>	<p>In addition to the provisions shown, jurisdiction-specific waivers or clarifications regarding current (that is, already existing) building or planning regulations should be added here.</p> <p>This section may also be used to revise or coordinate with previous seismic mitigation programs that affected the subject buildings.</p> <p>This provision is intended to reassure owners that the program will not be used to hunt for miscellaneous noncompliance.</p>
<p>306A.20 Alteration provisions. Prior to compliance with this chapter, buildings subject to this chapter shall be considered substandard buildings per California Health and Safety Code Section 17920.3(o). When considering the work required by this chapter as an alteration, the building official is authorized to waive Sections 403.4 and 403.4.1 of this code and its successor provisions.</p>	<p><i>Same.</i></p>	<p><i>Same.</i></p>	<p>The first sentence avoids a possible challenge to this ordinance on grounds that HSC Section 17958.8 (as reflected in CEBC Section 403.1.1) prohibits ordinances that require upgrades to residential buildings. That section makes an exception for "substandard" buildings, which include seismically deficient buildings.</p>

Mandatory Evaluation Only	Mandatory Retrofit without a Screening Phase	Mandatory Retrofit with a Screening Phase	
<p><i>Omit.</i></p>	<p>306A.30 Existing building requirements. Unless specified otherwise, work on subject buildings that is neither required by this chapter nor triggered by compliance with this chapter shall comply with all applicable provisions of this code.</p>	<p><i>Same.</i></p>	<p>means those sections of the CEBC as adopted and modified by the city. This provision makes clear that all other code provisions for existing buildings still apply regardless of the previous allowances. This will become an issue, for example, if an owner intends to make other alterations, repairs, or additions during the compliance period.</p>

Appendix C: Checklist for Preparing the Ordinance Draft

The following checklist is intended as an aid to jurisdictions seeking to convert the model ordinance text from Appendix A or Appendix B into a city-specific ordinance. The section numbering corresponds to the model ordinance text as presented in Appendices A and B. The Reference Section refers to the section of the body of this report where the topic is discussed.

For each listed item, the user should either check the box in the Model Ordinance column to indicate that the model provision is acceptable or should check the box in the Alternative column and describe the city's preferred approach there.

Model Ordinance Section and Model Provision	Alternative	Reference Section
Program type (select one) <input type="checkbox"/> Mandatory evaluation only <input type="checkbox"/> Mandatory retrofit without a screening phase <input type="checkbox"/> Mandatory retrofit with a screening phase	<input type="checkbox"/> Preferred program scope and mode of enforcement:	3.1.2 3.1.3 3.1.8
<input type="checkbox"/> Include nonstructural scope	<input type="checkbox"/> Exclude nonstructural scope	3.1.5
Legislative editing	<input type="checkbox"/> Add:	3.2.3
Ordinance Title <input type="checkbox"/>	<input type="checkbox"/>	3.2.3
Whereas statements <input type="checkbox"/>	<input type="checkbox"/> Revise <input type="checkbox"/> Add:	3.2.1 3.3.1
Findings <input type="checkbox"/> Findings A and B <input type="checkbox"/> Findings C – F (for retrofit programs)	<input type="checkbox"/> Revise <input type="checkbox"/> Add:	3.2.1 3.3.1
Section numbering <input type="checkbox"/> CEBC Chapter 3A	<input type="checkbox"/>	3.2.3
301A.10 Title <input type="checkbox"/>	<input type="checkbox"/>	
301A.20 Intent <input type="checkbox"/>	<input type="checkbox"/>	
301A.30 Subject Buildings <input type="checkbox"/> Constructed or permitted before January 1, 1978 <input type="checkbox"/> Designed with a code earlier than the 1976 UBC <input type="checkbox"/> Five or more dwelling units <input type="checkbox"/> Wood frame target story	<input type="checkbox"/> Age <input type="checkbox"/> Design code <input type="checkbox"/> Number of units <input type="checkbox"/> Potential deficiency <input type="checkbox"/> Number of stories Preferred definition:	3.1.1

Model Ordinance Section and Model Provision	Alternative	Reference Section
301A.40 Notification <input type="checkbox"/> 90-day deadline <input type="checkbox"/> Failure to send or receive	<input type="checkbox"/> 90-day deadline <input type="checkbox"/> Failure to send/receive Preferred provision:	3.3.2 3.3.3
301A.50 Design Professionals <input type="checkbox"/>	<input type="checkbox"/>	
301A.60 Submittals <input type="checkbox"/>	<input type="checkbox"/>	
301A.70 Technical bulletins and administrative regulations <input type="checkbox"/>	<input type="checkbox"/>	3.3.2
301A.80 Retention of plans <input type="checkbox"/>	<input type="checkbox"/>	
301A.90 Public record keeping <input type="checkbox"/> Public listing of subject buildings <input type="checkbox"/> Coordination with county clerk-recorder	<input type="checkbox"/> Public listing <input type="checkbox"/> Coordination Preferred provision:	3.3.2 3.3.3
301A.100 Conformance period (for retrofit programs only) <input type="checkbox"/>	<input type="checkbox"/>	Appx B
302A.10 Scope for each notified owner (no screening) <input type="checkbox"/>	<input type="checkbox"/>	
302A.20 Scope for each non-subject building (no screening) <input type="checkbox"/>	<input type="checkbox"/>	
302A.30 Scope for each subject building <input type="checkbox"/>	<input type="checkbox"/>	3.1.8 3.3.2
302A.30.A Eligibility for later tier (no screening) <input type="checkbox"/>	<input type="checkbox"/>	3.1.8 3.3.3
302A.30.A Complete the screening (n/a if no screening) <input type="checkbox"/>	<input type="checkbox"/>	3.1.8 3.3.3
302A.30.B Complete the structural evaluation <input type="checkbox"/> Submit report for approval	<input type="checkbox"/> Commission a report but submit only affidavit of compliance	
302A.30.C Complete the nonstructural evaluation <input type="checkbox"/> Submit report for approval	<input type="checkbox"/> Commission a report but submit only affidavit of compliance	
302A.30.B Complete the structural retrofit <input type="checkbox"/>	<input type="checkbox"/>	
302A.30.C Complete the nonstructural retrofit <input type="checkbox"/>	<input type="checkbox"/>	
302A.30.D Submit affidavits of compliance <input type="checkbox"/>	<input type="checkbox"/>	

Model Ordinance Section and Model Provision	Alternative	Reference Section
302A.30.E Posting <input type="checkbox"/> General requirement <input type="checkbox"/> Sign details	<input type="checkbox"/> General requirement <input type="checkbox"/> Sign details	3.1.2
302A.40 Compliance tiers <input type="checkbox"/> Three tiers <input type="checkbox"/> Tier definitions	<input type="checkbox"/> Number of tiers <input type="checkbox"/> Tier definitions Preferred number and definitions:	3.1.7
302A.50 Schedule <input type="checkbox"/> Three tiers <input type="checkbox"/> Deadlines	<input type="checkbox"/> Number of tiers <input type="checkbox"/> Deadlines Preferred deadlines:	3.1.7 3.1.8
303A.10 Supplemental definitions <input type="checkbox"/> Dwelling unit <input type="checkbox"/> Target story <input type="checkbox"/> Wood frame target story	<input type="checkbox"/> Dwelling unit <input type="checkbox"/> Target story <input type="checkbox"/> Wood frame target story <input type="checkbox"/> Other: Preferred definitions:	
304A.10 Engineering intent <input type="checkbox"/>	<input type="checkbox"/>	3.1.4
304A.20 Structural seismic evaluation <input type="checkbox"/> Main provision; cap on required strength <input type="checkbox"/> A. ASCE 41, LS in BSE-1E or CP in BSE-2E <input type="checkbox"/> B. FEMA P-807, PO to be determined	<input type="checkbox"/> Other criteria:	3.1.6 3.3.2
304A.30 Structural seismic retrofit <input type="checkbox"/> Main provision; cap on required strength <input type="checkbox"/> A. CEBC Chapter A4 <input type="checkbox"/> B. ASCE 41, LS in BSE-1E or CP in BSE-2E <input type="checkbox"/> C. FEMA P-807, PO to be determined <input type="checkbox"/> D. California Historical Building Code	<input type="checkbox"/> Other criteria:	3.1.6 3.3.2
305A.10 Engineering intent (nonstructural) <input type="checkbox"/>	<input type="checkbox"/>	3.1.5
305A.20 Nonstructural seismic evaluation <input type="checkbox"/> ASCE 41, LS in BSE-1E	<input type="checkbox"/> Other criteria:	3.1.5 3.1.6 3.3.2
305A.30 Nonstructural seismic retrofit <input type="checkbox"/> ASCE 41, LS in BSE-1E	<input type="checkbox"/> Other criteria:	3.1.5 3.1.6 3.3.2

Model Ordinance Section and Model Provision	Alternative	Reference Section
306A.10 Approval <input type="checkbox"/>	Add exceptions: <input type="checkbox"/>	3.2.2
306A.20 Alteration provisions <input type="checkbox"/>	<input type="checkbox"/>	3.2.1 Appx B
306A.30 Existing building requirements <input type="checkbox"/>	Add: <input type="checkbox"/> Waivers <input type="checkbox"/> Incentives <input type="checkbox"/> References to related programs	3.2.2

Appendix D: EBCI Soft Story Workshop Worksheet

The following eight pages comprise the worksheet used at the September 29, 2016 ABAG-EBCI workshop discussed in Section 2 of this report.

EBCI Soft Story Worksheet					
Name			City		
Years living in/near your city			Agency		
Years working for your city			Position		
Expertise with housing issues		<input type="checkbox"/> Expert <input type="checkbox"/> <input type="checkbox"/> Comfortable <input type="checkbox"/> <input type="checkbox"/> Novice	Expertise with recovery or emergency planning		<input type="checkbox"/> Expert <input type="checkbox"/> <input type="checkbox"/> Comfortable <input type="checkbox"/> <input type="checkbox"/> Novice
1. The status quo in your community					
		Do you...		Are you confident?	
		Disagree?	Agree?	Not at all	Very
Our city is about as well prepared for a big earthquake as our residents and businesses can reasonably expect.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notes:					
Our city is doing everything to prepare for a big earthquake that our residents and businesses can reasonably expect.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notes:					
When a big earthquake comes, our city will respond better and recover faster than most other East Bay cities.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notes:					
Our housing is in pretty good shape, so any dislocations or emergency housing needs will be manageable.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notes:					
Our "soft story" multi-unit buildings are a small enough part of our housing stock that the associated losses will be acceptable.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notes:					
Our "soft story" buildings are not one of our top earthquake readiness problems.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notes:					
Our unreinforced masonry mitigation program went pretty smoothly.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notes:					
David Bonowitz, S.E					

EBCI Soft Story Worksheet

2. Policy Drivers

Assume:

In your city, "soft story" buildings (collapse-prone wood-frame multi-family housing) pose a risk that merits a public policy initiative.

Question:

Why? What is your city lacking that you, as a city leader, want to achieve?

Rank the top 3 of the following as policy drivers for you (1 = strongest driver):

- Safety, primarily for tenants
- Asset protection, primarily for owners
- Housing stability, primarily for tenants
- Protection for vulnerable groups
- Recovery for the city (preserving revenue, resources, services)
- Coordination with long-term planning (neighborhood development, revitalization)
- Economic stimulus (new construction spending for retrofit)
- Good will (Get good publicity, avoid bad publicity)
- Compliance with existing city policy or plans
- Responsiveness to stakeholder demands/actions
- East Bay policy coordination
- Other: _____

Basis (evidence, experience, existing policy, etc.):

David Bonowitz, S.E

EBCI Soft Story Worksheet

3. Policy obstacles

Assume:

In your city, "soft story" buildings (collapse-prone wood-frame multi-family housing) pose a risk that merits a public policy initiative.

Question:

In your city, what is most likely to block that policy initiative?

Rank the top 3 of the following as policy obstacles in your city (1 = toughest obstacle):

- Disbelief among city leaders (they do not accept the assumption above)
- Disbelief among stakeholders (owners or tenants)
- Lack of a legislative champion, or general legislative backlog
- Owner cost objection
- Tenant cost objection (owners' costs raise rents)
- Owner liability objection (especially pre-retrofit)
- Low prioritization, bad political timing
- Technical complication or uncertainty (engineers, scientists, contractors at odds)
- Inconsistency with neighboring cities
- Over-regulation of housing or buildings in general
- Mistrust of government programs or city's competence
- Perception of unfairness to certain owners (some buildings affected, others not)
- Perception of unfairness to certain tenants
- Other: _____

Basis (evidence, experience, etc.):

Comments on possible mitigating strategies for:

Disbelief/low prioritization:

High owner costs:

High tenant costs:

Disruption during construction:

Mistrust of government:

David Bonowitz, S.E

EBCI Soft Story Worksheet

4. Policy opportunities

Question:

What is your city lacking that **key stakeholders – owners, tenants, citizens** – want to achieve? What priorities will generate their support?

Rank the top 3 of the following as policy drivers for your **stakeholders** (1 = strongest driver):

Your rank (from Part 2)	Stakeholders' priorities
___	___ Safety, primarily for tenants
___	___ Asset protection, primarily for owners
___	___ Housing stability, primarily for tenants
___	___ Protection for vulnerable groups
___	___ Recovery for the city (preserving revenue, resources, services)
___	___ Coordination with long-term planning (n'bhd development, revitalization)
___	___ Economic stimulus (new construction spending for retrofit)
___	___ Good will (Get good publicity, avoid bad publicity)
___	___ Compliance with existing city policy or plans
___	___ Responsiveness to stakeholder demands/actions
___	___ East Bay policy coordination
___	___ Other: _____

Basis (evidence, experience, existing policy, etc.):

EBCI Soft Story Worksheet

5. Policy-making logistics

Following are the basic steps for creating a local seismic mitigation program. For a likely “soft story” program for multi-family residential buildings in your city, indicate:

- How smoothly your city tends to execute these tasks
- Whether you tend to rely on model legislation or routinely amend the model code
- Which step you think you might complete after 6 months of work, and after 12 months.

	Often stalls	Works great	Never customize	Always customize	Timeline
Generate background data (e.g. inventory) Notes:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Encourage and collect community input Notes:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Study issues and options with city agencies, departments Notes:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Develop basic consensus among city leadership Notes:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Develop ordinance language, including code provisions Notes:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Introduce, pass, and sign legislation Notes:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Start implementing program through lead agency Notes:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Implementation steps will vary with different programs. Typically, they include developing procedures and tools to:

- Educate stakeholders about the legislation
- Identify affected buildings and owners
- Send official notice to affected owners or tenants
- Ensure consistent technical understanding
- Ensure complete and consistent submittals
- Track and review submittals
- Assure quality in design (plan check)
- Assure quality in construction (field inspection)

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EBCI Soft Story Worksheet

6. Policy options

What is the likelihood of recognizing and prioritizing “soft story” mitigation in the next update of your city’s general plan and hazard mitigation plan?

	Very unlikely	Already done	Do you need ABAG assistance with this?
Update General Plan (Public safety element, Housing element)	□ □ □ □ □		
Notes:			
Update hazard mitigation plan	□ □ □ □ □		
Notes:			

Given the policy drivers, obstacles, opportunities, and logistics described above for a “soft story” mitigation program in your city, indicate the top 2 or 3 combinations of program type (voluntary, triggered, or mandatory) and program scope (from notice to retrofit) that you would like to move forward. 1 = strongest preference or recommendation

Less effort More effort		Less effective ← → More effective		
		Voluntary	Triggered	Mandatory
	Notice to owners	NA		
	Placarding only			
	Evaluation only			
	Target story structural retrofit only			
	Target story structural retrofit, selective nonstructural mitigation			
	Full building structural retrofit and nonstructural mitigation			
	Full building structural, nonstructural, and geologic mitigation			

Comments on:

Incentives:

Triggers:

Subsidies:

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EBCI Soft Story Worksheet				
7. Program characteristics & criteria				
Assume: Your city is going forward with your top recommendation from Part 6.				
Question: Considering political feasibility, ease of implementation, and effectiveness, how important are these aspects of the program to your city?				
		Awful idea		Great idea
All the program's technical details are in the ordinance. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
One city department has responsibility for the program. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The lead department can change or interpret the basic requirements. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Owners and engineers have technical options for how to comply. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The technical criteria are uniform from building to building. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The program seeks high performing buildings, with higher costs. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The program minimizes cost, allows low performance (but not collapse). Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The program seeks simplicity, with possibly higher costs. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The resulting performance (safety, collapse rate) is quantified. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The scope of work is based on practicality, cost-effectiveness. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The program allows lower performance to minimize impact on tenants. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The program rules are the same (or close) from city to city. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Implementing the program requires no new staffing. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The "soft story" program leads to programs for other buildings. Notes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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