



Date: February 23, 2023

To: Thomas B. Modica, City Manager 

From: Christopher Koontz, Director of Development Services 

For: Mayor and Members of the City Council

Subject: **Seismic Resilience Efforts**

The February 6, 2023 7.8 magnitude earthquake near the Turkey-Syria border provides a cautionary reminder about the importance of seismic resiliency and, building and maintaining structures to earthquake-safe standards. The Development Services Department (Department) assures safety primarily through reviewing new construction against the appropriate building codes in place at the time of construction and verifying proper construction during the building inspection process. In recent years, the Department has explored additional measures that may be available and necessary to assure older, already constructed, buildings perform sufficiently during a seismic event to protect human life.

Current Seismic Resilience Efforts

In May 2021, the City of Long Beach (City) issued a Request for Proposals (RFP) to solicit qualified firms to conduct a seismic resiliency case study of the best practices of 15 communities across California. In January 2022, the City Council approved RFP DV17-111 and selected, Nabih Youssef Associates (NYA), a Los Angeles-based structural engineering company, for the Building Resiliency Program (Program) to identify buildings that are potentially vulnerable to significant damage during moderate to major earthquakes. NYA and their local partners demonstrated competence and prior experience in conducting seismic evaluations and include personnel who performed seismic evaluations for the Long Beach and Los Angeles Unified School Districts as well as California State University, Long Beach.

NYA's scope includes the five most vulnerable building types within the following categories:

- Soft, weak or open front walls, wood frame buildings (SWOF);
- Reinforced concrete or masonry buildings with flexible diaphragm;
- Non-ductile (inflexible or brittle) concrete buildings with masonry infill;
- Non-ductile (inflexible or brittle) concrete buildings; and,
- Steel moment frame buildings.

SWOF buildings were prioritized first as they are numerous in Long Beach and are at very high risk of failure in a seismic event.

Progress on the Inventory

Phase 1 of the NYA contract began in February of 2022. A SWOF building is a structure with an open front supported by posts or beams that are insufficient to withstand an earthquake. These buildings are ubiquitous in Long Beach and most commonly found in small- and medium-sized apartment buildings where at grade or tuck-under parking has weak posts with one, two or three stories of apartment or condominium units above. These buildings are often referred to as “soft story” although that term applies to a broad set of structures, whereas SWOF is a particular subset of that group of vulnerable buildings.

Photo 1: Example of a SWOF Building



NYA began identifying SWOF structures within the City that are potentially vulnerable to significant damage during moderate to major earthquakes. Under the direction of the Department’s Building and Safety Bureau the draft study was completed in December 2022.

The inventory report and associated Geographic Information System database layer will soon be ready and used to develop and recommend retrofit strategies expected to reduce the structural vulnerabilities. The report established that there are more than 1,000 SWOF structures in Long Beach that potentially require seismic upgrading. These structures constitute tens of thousands of housing units in the City and range from duplex and triplex buildings up to larger multi-unit apartment buildings, at heights ranging from two to five, or greater, stories.

Next Steps on the Inventory

The next step is finalizing a draft list of impacted buildings. Building owners will then be contacted to verify the information found within the inventory. Some buildings may have already been upgraded, but the work was not recorded in the visual inspection or permit review. Other buildings may appear soft or weak but are engineered to a sufficient standard while others may have seismic upgrade work currently underway or planned in the near future. Based on models from cities of Los Angeles and San Francisco, building owners should be given one to two years to correct any information on the inventory before the City list becomes final.

Voluntary Upgrades

Concurrent with the development of the final inventory, City staff recommends an awareness campaign to promote the voluntary seismic upgrades to existing at-risk structures. The effort is being organized by a working group within the Department. Typical upgrades to SWOF buildings involve the construction of a moment frame to reinforce the existing structure and prevent a collapse during a seismic event by correctly resisting loads through bending or “give” in the beam and columns as well as transferring rotational forces at the point of connection between the column and the beam. These upgrades do not guarantee that a building will not suffer damage during a seismic event but increase the overall likelihood that the building will perform well and will prevent damage and loss of life. One major advantage of this type of upgrade is that it can typically be performed without relocating tenants from their units, although parking may be unavailable for a short period of time during construction. It should be noted that all buildings are different and will require a specific engineering evaluation to determine the best approach to improve safety.

Photo 2: Example of a frame installation



The City can effectively encourage private owners to upgrade their buildings through outreach and marketing through making engineering and design information available, providing an efficient and friendly permit process, controlling permit fees and costs and most importantly by connecting building owners to outside funding such as from the California Earthquake Authority. In recent years the California legislature has appropriated funds specifically to fund grants to multifamily building owners for seismic upgrades. Typically, a city is required to have an underlying upgrade Ordinance and program in order for property owners to access these state funds.

Other City efforts during the voluntary upgrade period include providing clear direction on what upgrades are considered a sufficient level of safety, coordinating with insurance providers and other third parties and providing flexibility in conflicting code requirements such as parking spaces lost to structural members, nonconforming requirements and unpermitted improvements discovered during construction. While upgrade costs are typically marginal in relation to the overall value of a multifamily building, in some circumstances it may make more sense economically to completely replace a structure rather than upgrade it. Adjustments to the zoning code will be necessary to provide for no net loss of units, regardless of current density restrictions, in these limited circumstances where a rebuild rather than a retrofit is appropriate.

The Post-Voluntary Period

In cities that have adopted seismic retrofit Ordinances, the initial inventory refinement and voluntary period is followed by a deadline for mandatory upgrades. Based on the experience of other cities and the relative low cost of upgrading a building compared to its overall asset value, most building owners will complete upgrades within a reasonable period of time. After the mandatory deadline a City can impose fines and penalties and ultimately compel compliance or revoke the ability to occupy a building that does not achieve a required level of safety. The details of any mandatory approach for Long Beach have not yet been developed and will be subject to approval by the City Council.

Consideration and Next Steps

The preservation of human life through improved safety in the built environment is a core and essential function of the City's regulatory power and authority. At the same time owners of apartment buildings as housing providers oftentimes operate on thin margins and have seen costs increase in recent years due to rising interest rates and inflation, all while the collection of rent has been complicated and limited by necessary but impactful eviction and rent moratoriums. Bearing this in mind City staff, in consultation with the City Council, will develop a Program and Ordinance that focuses primarily on incentives and encouragement with a mandatory element that reflects sufficient time and flexibility to be responsive to the unique needs of housing providers and the economic conditions within the City and region.

City staff will continue to provide periodic updates to the City Council and expects to present an ordinance to the City Council in the winter of 2023 or early in 2024.

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