

1. Executive Summary

This final report summarizes the design of a prototype Continuous Care Retirement Community (CCRC) for construction on the west coast of the United States using the existing Ingleside at King Farm King design as a model. The prototype design will be relocated to a high seismic zone in California utilizing steel frame construction, slab on metal deck system, and special concentric braced frames.

The prototype CCRC will have to be redesigned to resist the high seismicity of the west coast region. Not only will seismic activity affect the outcome of the design, but local codes, and the Southwestern U.S. climate will affect it as well. Both the State of California and Los Angeles City has their own design requirements. Such as energy consumption by new buildings, and amendments to ASCE-07 to design for a more conservative allowable building drift and seismic expansion joint separations. The amendments are to account for abnormally large earthquakes due to the cities proximity to blind thrust faults and soft basin soil resulting in a magnified earthquake due to direct shear impacts upon the buildings.

The first breadth study includes the research and analysis of implementing an extensive green roof and the usage of Autoclaved Aerated Concrete for precast architectural panels to appeal to California's energy conservation codes. These two design decisions are integrated into the second breadth study focusing on the evaluation of the building facade's thermal and moisture resistance performance. The design parameters as a result of the breath studies are integrated into the structural depth study. Such as how the cladding system and reduced building weight affects the energy dissipation of the building during an earthquake, and how the loads from the roof gardens affects possibilities of soft stories and member sizes in a seismic analysis.

Better performance usually comes with a cost, however there are paybacks that out weights the dollar amount. In the case of retrofitting a building for seismic resistance, the reward could be the reduction in lives lost, medical costs, loss of tenants, loss of assets within the building, and loss of building functions. Other benefits include reduction in insurance premiums, increase in property value, and higher income from tenants.

Redesigning a prototype design of Ingleside at King Farm for Los Angeles, California will be costly due to the special requirements by codes to make the building safer during and right after a seismic event. Indirect damage includes fires caused by seismic activity, which can weaken the structural system and cause structural failures. In the case of extremely high seismic activity, such as the Northridge Earthquake in 1994 due to a combination of direct shear and poor soil conditions, retrofitting the building design and to resist seismicity can result in significant savings due to decrease in damages and delayed building functions, and more importantly, increasing the safety and survival rate of the occupants.