Summary
Per your request, I have reviewed the 1991 Lawhead Report regarding the condition and functionality of the South Fire Station. Since I am not familiar with functional design considerations for fire stations with regard to the user’s needs, I cannot comment about the report findings that the station is outdated and obsolete (with respect to the user’s needs). However, with regard to the building’s condition from a structural standpoint, I agree with the Structural Engineer’s determination that substantial seismic upgrades are required. The engineer’s recommended improvements are necessary since the construction materials and method of construction for the Fire Station give rise to an increased vulnerability for structural damage during a seismic event.

It should be emphasized that the seismic upgrades recommended by the engineer are only improvements and should not be mistaken for bringing the structure up to the seismic design strength requirements of the present building code. Therefore, this option to only upgrade/improve the structure might be considered a less desirable option for a fire station (considering it is an essential facility housing emergency response equipment and Fire Department personnel that are expected to be in service after a seismic event).

It appears that when you consider these structural concerns along with some of the other report findings (such as outdated electrical and mechanical systems, poor insulation, etc.), the preferred option could be the total building replacement option.

Additional Background (if you’re interested)
The structural engineering consultant for the 1991 Lawhead Report concluded that the existing lateral elements do not conform to current code for lateral design and that the lateral system should be upgraded. Specific deficiencies reported included poor roof diaphragm strength, inadequate roof diaphragm ties to the exterior walls, lack of adequate shear walls, and extensive cracking of the block walls.
Reportedly, the Fire Station was constructed 1962 with walls constructed of pumice block laid in stack bond (a weaker method) and having less than required steel reinforcement. This construction material and method is considered to have a lessened capacity to resist seismic forces. If the reinforcement is severely lacking, then the building strength could be similar to that of an unreinforced masonry (URM) building. Historically, URM buildings are notorious for the severe structural damage they have incurred during major earthquakes (see provided attachment with additional information about URM buildings).

As you may be aware, an important lesson learned from previous earthquakes was that damage to the high wall construction at the fire station apparatus bays sometimes resulted in the emergency vehicles becoming trapped in the fire station; rendering the emergency equipment and personnel out of service at this critical time. The frequency of occurrence was enough to result in numerous seismic improvements to fire truck bays all along the west coast. In my opinion, the high bay construction, heavy masonry walls and inferior construction techniques at the south fire station render the station vulnerable to a similar outcome.
Earthquake vulnerability of Un-Reinforced Masonry (URM) Buildings

Although the Fire Station structure reportedly has some reinforcement, it was considered under-reinforced by the structural engineer and appears to share some of the poor construction practices responsible for much of the earthquake damage to URM buildings.

URM buildings are notorious for their vulnerability to earthquakes and have accounted for the greatest damage of any building construction type. The weakness of URM buildings is alarming, even ground motions that fail to shake items off desktops have caused extensive damage to URM buildings.

Older URM buildings typically have inferior mortar, inadequate anchorage of the heavy masonry walls to the floor and roof framing members, and lack necessary bracing of the parapet walls. Their typical construction technique failed to adequately tie the roof and floor framing to the walls, so when these heavy masonry walls are put in motion by earthquake forces, the walls can separate from the roof and floors, collapsing downward and threatening the life safety of building occupants. Similarly, when masonry facades and parapet walls are put in motion by an earthquake their heavy weight will often overcome the resisting mortar strength, resulting in tons of masonry dangerously showering down to the sidewalks and streets below.

A commonly heard misconception is, “well, the building made it through the last quake”, however, actual studies found that much damage from the 1965 earthquake was to buildings thought to be weakened by the 1949 earthquake. For example, mortar cracks developed by the Nisqually earthquake resulted in a reduced capacity to resist forces from the next earthquake. Until retrofitted, these URM buildings remain at higher risk, potentially weakening after each earthquake and as the mortar continues to deteriorate.