

# FIRE DEPARTMENT BUILDING UPDATE

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FEBRUARY 11, 2019



# BUILDING “STRUCTURAL SYSTEMS” UPDATE

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- In late March, 2017, the City obtained the services of James Ashley-Cole, P.E. to provide a limited visual observation of the structure at the fire station building due to:
  - Past problems with the roof
  - Event where lighting fixture had fallen from the ceiling in an office



# BUILDING IMPROVEMENTS

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- In April, 2017, the City began preparations to amend the budget and to begin the necessary improvements and repairs for more critical components of the building structure to make the building “occupiable” (per structural report) until a new fire station could be built.
  - Estimated Total Cost of All recommended Phase I Improvements = \$250,000



# BUILDING IMPROVEMENTS

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- During 2017/2018 winters, additional roof problems began occurring after the roof replacement project (completed about 5 years ago?)
- In August, 2018 a contractor making improvements to the building created a situation where the building had to be vacated due to presence of airborne asbestos
- City Determined Costs to Improve Building will actually cost much more than anticipated.



# THE SITUATION TODAY

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- Current known conditions with “reasonable assumptions”
  - The structure is **not** in eminent danger of collapse, however, portions of the structure are in danger of failure during design conditions (seismic event, or a significant rain-on-snow/wind event)
  - The existing structure has experienced a significant seismic event and multiple weather events without known critical structural failures, therefore, it is “*reasonable to assume*” *the building is not in danger of collapsing due to its own weight.*

# THE SITUATION TODAY

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- With known conditions of exposed structural components, it is “reasonable to assume”:
  - It is likely that additional deficiencies will be discovered when architectural coverings are removed to improve known deficiencies



# PERFORMANCE STANDARDS FOR FIRE STATIONS

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## **It is not financially feasible to renovate the existing building to meet Essential Facility criteria**

- The American Society of Civil Engineers (ASCE) recommends performance objectives for existing buildings.
- ASCE 41-13 is the Basic Performance Equivalent to New Building Standards (BPON) based on the appropriate Risk Category that would be assigned to the building based on the current Building Code or ASCE 7. (Page 8, 4<sup>th</sup> Paragraph)
- For the Chehalis Fire Station Building, the Risk Category is Level IV, Seismic Hazard Level BSE-1N (I-A).
- **This standard requires an essential facility to have Immediate Occupancy Structural Performance and Operational Nonstructural Performance in the event of a significant seismic event.**

# THE SITUATION TODAY (CONT.)

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- It is my professional recommendation to abandon the idea of “improving” the existing fire station to re-occupy as an essential facility due to:
  - Cost to renovate and retrofit “known deficiencies” within the existing structure
    - When architectural coverings are removed, it is likely other deficiencies will be identified
  - Logistical operations issues:
    - Public rights-of-ways should not be used for routine fire station maintenance and operations
    - Proximity to the R/R mainline.
- I would be reluctant to recommend any further improvements to this structure at this time until the ultimate “purpose” is known (what codes to design the improvements for).



# STRUCTURAL SYSTEMS SUMMARY

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- Un-reinforced Masonry (URM) Perimeter Walls
  - No insulation or vapor barrier in the walls
  - Does not appear to be any positive anchors between the URM perimeter walls, the second floor, or the roof
    - No positive in-plane seismic anchors between the URM walls and the roof or floor diaphragm
  - URM parapets are not braced to the roof
    - The presence of tall unbraced parapets above the apparatus bay doors is disconcerting
  - The floor is no longer in contact with the URM wall in the apparatus bay

# STRUCTURAL SYSTEMS SUMMARY (CONT.)

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- Roof Structure

- Significant corrosion is present in the steel reinforcing angle at the side of the second floor window adjacent to roof leak.
  - Constant saturation has weakened the mortar joints in the vicinity of the leak
  - Condition of the wood roof and floor framing in the vicinity of the leaks have likely been compromised by degradation due to wood rot.
  - Staining on skip sheathing observed on Auditorium roof rafters
    - Indication of prolonged leaks
    - High potential for degradation due to wood rot in the skip sheathing and roof framing.



# STRUCTURAL SYSTEMS SUMMARY (CONT.)

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- Roof Structure (Cont.)
  - No insulation or ventilation in the roof
  - Roof rafters are likely over stressed considering:
    - Required Factor of Safety is 1.2 for an essential facility
    - Building Code requires a low sloped roof to be designed for an additional 5PSF snow surcharge
      - Accounting for rain on snow

# STRUCTURAL SYSTEMS SUMMARY (CONT.)

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- Main Structure

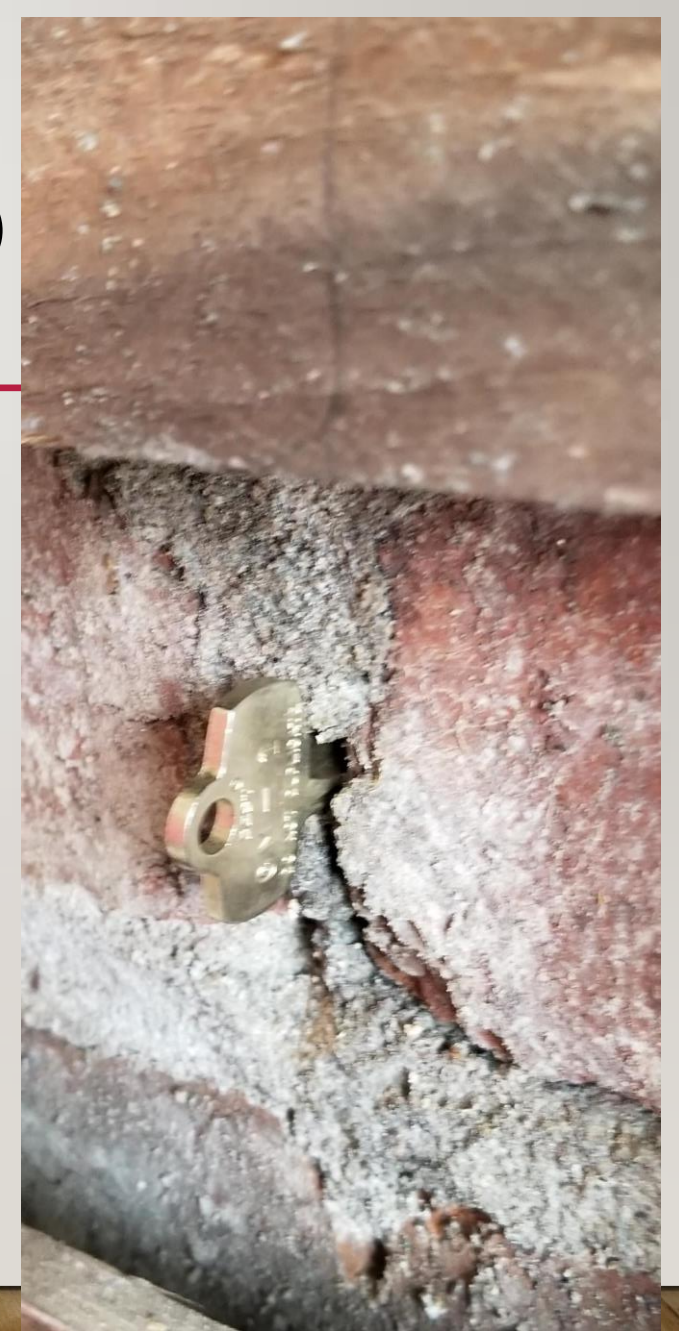
- Does not appear to be any positive connections (bolts or lag screws) between the steel wide flange (WF) beams, the girders, or the columns.
- The roof and floor girders are supported on the URM masonry pilasters with beam pockets without the benefit of positive connections such as seismic straps or bolts.
- Plaster and lath ceilings have failed due to saturation
- T-Bar ceilings have recently failed



# STRUCTURAL SYSTEMS SUMMARY (CONT.)

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- Main Structure (Cont.)
  - Longitudinal shrinkage cracks exceed more than 1/3 depth of member – effects structural capacity
  - Stairway guardrail is loose and failing
  - Masonry and mortar rot/degradation



# STRUCTURAL SYSTEMS SUMMARY (CONT.)

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It is the opinion of the engineer that:

- The preparation of an analysis of the structural components of the building would most likely indicate unacceptable levels of over stress in several structural systems
  - As compared to the current Building Code and Uniform Code of Abatement of Dangerous Building
- The probable cost to retrofit the building to achieve compliance with the importance factors for an essential facility will likely exceed the cost to provide a new facility.

# STATION ALTERNATIVES

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- Interim station off of Louisiana Ave.
  - Between Wal-Mart and Home Depot
  - Cost estimates ranged from \$530K to \$740K
- Basement at City Hall as a Long-term Interim Station
  - Cost to Install Signal to control traffic on Market is \$150 to \$200K
  - Additional costs associated with reconfiguring the basement and other parts of City Hall
  - Vehicles would be outside and deteriorate at a faster rate
    - Additional costs associated with getting a temporary bay for the fire engines
  - Challenging quarters for Firefighters
  - Disruptive to the public

# STATION ALTERNATIVES CONTINUED

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- Lewis County District 6
  - It is available now, thanks to the District's willingness to help
  - It is a safe and professional station
  - It is cost effective as long as District 6 is willing to rent us the space to share
  - The downside:
    - Response times are up an average of 30 seconds, potentially higher to the North part of town
    - Long-term, the City's insurance rating will be impacted
    - Not a permanent solution
    - Some investment in the LCFD station needed to accommodate Chehalis over a period that could be several years while a new fire station is built.



# THE SITUATION TODAY

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- The City needs to build a new fire station
  - Will need to evaluate the likelihood of annexation/consolidation based on the planned feasibility study.
  - Evaluate sites based on need for Chehalis only, which could be a modest headquarters, or risk building a satellite station farther north hoping that annexation takes place.
  - Continue to review potential sites that come available on the private sector

# QUESTIONS/COMMENTS

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