Prepared for the County of Santa Barbara on August 26, 2021

UNION OIL BUILDING
Facility Assessment Report

rrm design group


ORCUTT UNION PLAZA
201

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EXECUTIVE SUMMARY

Project Background – Goals and Objectives

RRM Design Group was asked to provide the County of Santa Barbara with an assessment of the potential to acquire the existing Union Oil Building located at 241 South Broadway in Orcutt with the goal of using the most prominent portion of the building as a public library. The building was originally constructed in 1949 by the Union Oil company as office space for the operations that were headquartered in Orcutt. In 1984 a two-story addition was added to the back of the existing building and connected to it. The building is currently leased to a variety of tenants including the California Department of Conservation. RRM provides this report to summarize the analysis of existing building systems and to assess replacement and repair needs based on that observation. This analysis provides supporting information to define the scope of required facility renovations that would be required to change the use of the building to a public library and office space for use by the County of Santa Barbara, either for County offices or to lease, such as to the Department of Conservation. The purpose of this report is NOT to determine compliance with or provide recommendations for compliance with the current building code per se. Per the Alquist-Priolo Special Studies Zone Act, buildings constructed prior to 1972 may remain as originally constructed, unless they undergo a major building remodel where more than 50% of the total building value is invested. In that case, the building would have to be structurally retrofited to meet the current building code. The building would need to be brought up to current standards for accessibility as a public facility.

Building Description

The original building constructed by Union Oil was 9,500 square foot ground floor, interior area in a U shape with symmetrical wings radiating out from a central lobby tower. Each wing consisted of a central corridor with offices off to each side. It appears a 900 square foot mezzanine floor was added in the central tower to house computer servers. The tower is equipped with a raised floor and dedicated HVAC systems and is accessed via a service stairway. The building is constructed of red clay brick walls with heavy timber trusses with steel tension rods with a concrete slab floor. There is a small utility basement accessed from a narrow service stairway off the rear of the building. In 1984 an addition was initiated that added 9,200 square feet more office space in a two-story wing that enclosed the U and created an enclosed central courtyard. The addition also features brick walls but it has raised wood floor construction and load bearing interior corridor walls. The total gross square footage of the building is approximately 19,600 square feet.

For comparison purposes, the existing branch library nearby leases 4,500 square feet and shared public restrooms with other building tenants.

Site and Location Context

The Union Oil Building is located in the old town section of Orcutt and abuts the core pedestrian area in Orcutt's zoning. When it was built, it is was surrounded by shops and warehouses but today the building is surrounded by restaurants and small commercial and office buildings. Currently the building is part of a larger complex of multiple buildings on one large lot. Should the County choose to pursue ownership of the building a parcel map would need to be filed creating a new separate parcel that includes the Union Oil building.

Approach

The RRM Design Team of Architect, Todd Hansen and Structural Engineer, Jessica Meadows, toured the existing facility to observe and identify areas of the building that need to be modified to accommodate structural upgrades. The mechanical and electrical assessment is based on the architect's observation of the condition of the electrical main, service panels and mechanical equipment. Most systems are assumed to need replacement based on the proposed change in use and efficiency of the building systems in relation to modern building codes. The assessment approach involved the following steps:

- Review County provided plans and documentation of the existing facility.
- Tour the facility to observe and document conditions of the existing building and systems.
- Complete an ASCE 41-17 Tier 1 and limited Tier 2 Evaluation to assess the building's seismic deficiencies.
- Observe and document code deficiencies for accessibility, energy compliance, and general California Building Code compliance.
- Develop a Conceptual Building Renovation Plan of structural upgrades and any architectural repairs or upgrades triggered by the structural retrofits or required accessibility upgrades.

- Prepare a Conceptual Project Budget based on a general per-square-foot cost for hard construction costs and anticipated softs costs for fees, construction management, utility fees, equipment fees and construction contingency. The budget also includes costs to the County for project administration, contingencies, and escalation.
- Compile and summarize the data collected and analysis into a draft document for County review, followed by a final Assessment Report.

Project Team

County of Santa Barbara

- Janette Pell, Director of General Services
- Patrick Zuroske, Assistant Director Capital Projects
- Susan Robertson, Capital Projects
- Julie Lawrence, Real Property
- Skip Grey, Assistant Director Community Services
- Susan Freeburn, Real Property
- Lynne Dible, Assistant Director Financial Services

RRM Design Group

- Mike Scott, Principal
- Todd Hansen, Architect
- Michael Doremus, Structural Engineer
- Jessica Meadows, Structural Engineer

Findings and Recommendations

This building assessment report has been prepared to help inform the County's decision-making about the Union Oil Building. Based on the analysis of existing documents, the site visit, Tier 1 and limited Tier 2 Seismic Evaluation, Conceptual Building Renovation Plan, and the Conceptual Budget Estimate, the RRM Design Team finds that:

- While the building is functional and provides adequate office space, its transformation to a public facility and all that embodies it will require significant upgrades in multiple systems.
- The building has significant structural deficiencies that will require extensive retrofitting to ensure that the building meets the thresholds set by the ASCE 41-17 with a "Basic Performance Objective" of Limited Safety Structural Performance.
- The material and labor costs is $4,425200 for the 1949 building and $2,236,800 for the 1984 building and is inclusive of structural retrofitting.
- The conceptual project budget is $6,969,690 for the 1949 building and $3,522,960 for the 1984 building, and includes escalation and soft costs.
- The seismic and ADA upgrades required for the 1984 addition may not make financial sense for the County if it has no anticipated need for the additional office space and does not wish to lease space out. One option considered would be to remove the 1984 addition entirely and make the land available for other uses, such as additional parking.
- The unique heavy timber construction of the 1949 building if exposed to view, could provide some unique large volume architectural spaces with character.

These costs are based on the proposed change in use to a public library and offices for the County and potentially other public agencies. We believe the building has the potential to provide the community of Orcutt with a facility that is unique, delightful to use and is connected with the history of the Central Coast. However, it may be more reasonable to pass on the purchase of this building and construct a new facility that meets the County's goals and current code performance criteria.

This report is not a stand-alone tool in the County's decision-making process. Rather it is one report focused on one option that should be considered relative to other options available to the County.

FACILITY/SITE VISIT PHOTOS

Exterior










FACILITY CONDITION ASSESSMENT

ARCHITECTURAL

Following the on-site building observation by the Team Architect and Structural Engineer, the facility was analyzed and the draft Seismic Analysis – ASCE 41-17 Tier 1 and limited Tier 2 Evaluation was prepared and reviewed.

Although architectural programming is not a part of this assessment, based on past experiences with branch library programs, a rough conceptual floor plan has been developed. The basic elements of the library program are:

- **Stack and Reading Spaces:** Large open spaces with floors that can take the concentrated loading of book stacks. There may be limited partitions in this area to delineate the various use areas. It is important that limited staff can maintain visual supervision of all areas from the circulation desk.
- **Back of House:** This area is where materials are processed and shipping and receiving between branches is facilitated. It is important that this area has access to the parking lot for loading and unloading library materials.
- **Public Meeting Space:** This area is used for various community gatherings, classes, and functions, such as voting. This room has a theoretical code capacity of 200. It would have dedicated storage for tables and stacking chairs on carts. It may desirable to have a small raised stage at one end of the room. This would require a dedicated platform lift to provide universal access. This room should also have separate access from the library so that the library can be secured while it is in use. Ideally this room would have direct access to the exterior and parking lot for bringing in materials.
- **Library Admin Space:** This space is for Library staff office room, and conference room. Many branches provide space for their many volunteers and their program needs as well.
- **Service Spaces:** Public restrooms at the library are typically outside the library itself so they can remain accessible to users of the public meeting space when the library is closed. Other service spaces include an electrical closet to house fire alarms, electrical sub-panels, and security alarm systems. A custodial closet is also required with a mop sink and a service sink. Ideally the various wet services are located adjacent to each other to minimize the cost of installing utilities.
- **Lobby:** The lobby of public libraries and other public buildings are frequently used for rotating public displays such a library special collections, special displays by historical, craft, or artisan groups. Display cases are glass to secure the items on display and lit from the top.

Architectural modifications will be required to expose the structural system for structural upgrades. The following architectural revisions will be required in order to accomplish the needed structural renovations:

- Removal and reinstallation of the clay tile roof with new underlayment in order to install new roof sheathing to tie to roof diaphragm together. It is proposed to install a layer of rigid insulation above the diaphragm sheathing and then an additional layer of non-structural sheathing to act as a nail base for the tiles. Currently, there is a thin layer of batt insulation laying on the ceiling and the HVAC ducts run through the unconditioned attic space. By placing the insulation at the roof level the interesting structural system may be exposed to the interior creating large volume spaces and improving the thermal efficiency of the building.
- Removal of ceilings to update roof and wall connections to shear walls in the 1949 portion of the building. Replacement of ceilings in service areas as needed.
- Removal and replacement of portions of floor slabs and flooring to support updated structural foundation systems in conjunction with new shear walls.
- Installation of masonry walls on the first and second floor to support the added elevator and provide lateral support to that portion of the building.
- Infill masonry framing at location of removed windows to provide enlarged shear wall area per structural recommendations.

ADA AND ACCESSIBILITY

Parking: There are two accessible parking spaces near the south building entrance. However, the cross slope for one of them exceeds 2%. Also, the slope in the stamped concrete walkway which acts as the access aisle has a slope of 2.5% and is therefore not compliant. Finally, there are only two accessible stalls and based on the number of parking stalls immediately around the building it should probably have four. The best long term solution without losing additional parking stalls would be to remove and replace the stamped concrete crosswalk/access aisle completely across the drive aisle and then do an asphalt overlay to reduce the cross slope in the two existing stalls. In addition, two stalls could be added by removing one stall closest to Broadway and making some modifications to the sidewalk nearby. This would provide two stalls as close as possible to the front door.

Elevator: As a private facility the second story portion of the building is not required to provide an elevator, but as a public facility an elevator to the second floor would be required. Refer to the structural section for thoughts on how this elevator shaft could be used to help solve structural issues with the 1984 portion of the building.

Accessible Entries: Currently the front entry is accessed by steps that vary in riser height from 6 1/2 to 7 inches. Steps with varying riser heights cause people to trip and fall. The code only allows 3/8 inch variation between risers in a flight of steps. The steps do not have any contrasting nosings to assist the visually impaired in locating the steps. Also, the treads of the steps are sloped to drain in excess of the 2% allowed. Finally, the handrails at the front steps do not have extensions as per ADA requirements. It is recommended that the steps be replaced with new steps and a pair of flanking ramps to maintain the symmetrical design of the front of the building.

The south entry has a switchback sloped walkway to facilitate entry at this location. Note that this walkway is sloped less than 5% and is therefore not considered a ramp and does not require ramp handrails. The stairs at the south entry appear to be fully code compliant.

The west entry is via a set of stairs that appear to be fully ADA compliant for stairs. There is a code requirement however, that each required exit from a building be fully accessible (CBC 1009.1). A ramped means of egress is required at this entry.

Door Threshold Heights: Ground floor doors do not meet accessibility requirements due to thresholds at the doorways that exceed ½" in height from the top of the threshold to the door landing on the exterior. Where new concrete is being installed on the exterior, such as at the front entry, this issue is solved. In other locations it may be possible to place a concrete topping on the exterior landing to bring it up to within ¼ inch of the finish floor. This solution could work in many locations where there is sufficient space to feather out the added concrete. It may not work at the west entry due its proximity to the stairs and the existing variability in the stair riser's heights.

Door Clearances and Hardware: The interior layout of the facility has adequate clearance at most interior doors for accessible usage. Some doors, however, would require adjustment of adjacent walls to provide the code required clearances at the strike side of the doors and clear areas on the pull side of the doors. This condition exists at the office on the ground floor of the addition at offices 123 and 147.

Restrooms: The ground floor restrooms in the addition were upgraded per the current owner in order to meet the requirements of the State as a tenant. And in general they do appear to be compliant. One obvious exception that would apply to both restrooms is the pairs of doors that are set up to enter or exit the rooms. There is insufficient space between doors and a wheelchair user could get trapped. The easy solution would be to remove the inner doors. In both cases this would not adversely affect privacy.

Drinking Fountains: Drinking fountains are not currently provided in the building. In the course of the remodel new dual height accessible drinking fountains should be provided.

Guard Rails: There are guardrails running completely around the sunken courtyard, as required by building code, since the drop from the edge is about 36 inches. The guardrails were constructed under the previous code provisions for rail spacing and do not meet current standards for a maximum rail spacing of 4 inches. These rails should be modified or replaced to comply with current building codes.

Decorative Light Fixtures: The 1949 building is equipped with unique decorative lighting fixtures that would present a hazard to the visually impaired who could walk into them and strike their head. To protect against this and retain the fixtures something should be placed below each one, such as a planter.

Stair Handrails: The 1984 building has stair wells at each end that have handrails that are not compliant with ADA standards as they are discontinuous and lack the required extensions at the top and bottom. Since the first riser of the stair is nearly flush with the corridor wall it may be technically infeasible to make the stair rails 100 percent compliant but they should be replaced to address as many deficiencies as possible.

HAZARDOUS MATERIAL STATEMENT

Due to the age of the facility, it is likely that hazardous materials may be found in a variety of components of the building. Prior to performing demolition, repair or renovation on any portion of the facility, a hazardous material report will be required to analyze the facility for any hazardous substances found in the materials used for original building construction. Components that may contain hazardous materials could be: paint, flooring material, flooring adhesive, wall plaster and joint compound, acoustic treatments, building insulation, pipe insulation, pipe material and other components. Following a report to identify any hazardous material, a plan to abate or remove the material as part of the demolition will be required to follow current codes.

Work in Addition to the Structural Upgrade and Associated Finish Repairs

In addition to the requirements for only the structural upgrade and finish repairs, the following are items recommended based on observation of the facility and discussions with the owner:

- **Basement Stairs:** Off the courtyard there are steps that lead down to a service basement. A fence with a gate should be installed to keep children and others from entering the stairwell. This fence could be made to match the guardrail in the courtyard.

- **Windows:** Based on the current energy code requirements and the age of the facility, the existing single-pane steel windows are recommended to be replaced with double-pane high efficiency windows throughout the exterior of the facility.

- **Basement Walls:** The walls of the service basement do not appear to have effective waterproofing on the exterior side of the walls and there is evidence of water seeping in the space and flowing to the sump. The walls of the basement should be media blasted and then parge coated with a waterproofing product such as Krystol or Xypex.

- **Finish Materials:** In areas of the 1984 building where extensive structural work will occur, such as around the new elevator shaft, it is assumed that all new carpeting and ceiling finishes will be installed. In the corridors the carpet replacement could be limited to the area of work, creating a visual as to the location of the elevator in the hallway.

MECHANICAL

In the 1949 portion of the building, due to the extensive changes in the building layout and space volumes it is anticipated that a completely new HVAC system would be installed. Units could be placed over portions of the building with ceilings and then ducts run exposed in the portions of the building where the existing trusses would be exposed. Condensers could be located on the ground in the current locations around the exterior of the building.

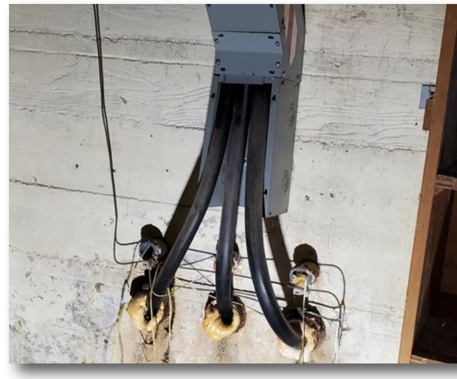
In the 1984 portion of the building, the current system has been well maintained and is working. Adding insulation to the roof creating a conditioned attic space in which all the ducts are run would improve the energy efficiency of this system. Modifications would need to be made to accommodate structural changes proposed but otherwise the system should be able to remain.

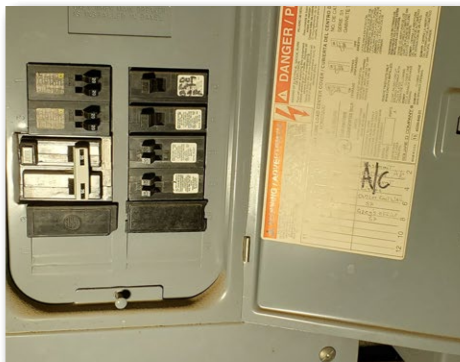
ELECTRICAL

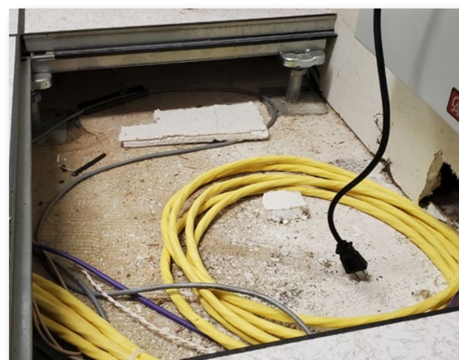
The electrical panels were located and according to the building owner were updated in the recent past and are currently functioning. Based on the extent of changes in the 1949 portion of the building, the electrical systems would likely require modification at the main switchboard. It is anticipated that new sub-panels would be installed in the 1949 building to support the new uses. Overall due to improvements in energy efficiency in HVAC and lighting the overall electrical loads for the building should be less. In the 1984 portion of the building the electrical system appears to be adequate. Due to the advances in LED lighting it may help the building reduce its energy footprint by upgrading the existing lighting to contemporary LED fixtures, which should also reduce the need for maintenance in the facility.

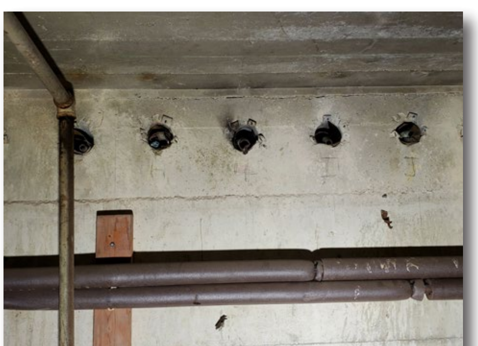
FACILITY/SITE VISIT PHOTOS

Interior









STRUCTURAL – ASCI 41-17 TIER 1 AND LIMITED TIER 2 EVALUATION

SEISMIC EVALUATION

August 9, 2021

Union Oil Building

241 South Broadway Street

Orcutt, CA 93455

Prepared for: **County of Santa Barbara**

Prepared by: Jessica Meadows, SE

Under Responsible Charge Of: Michael Doremus, SE

RRM Project #2455-01-CI21

REGISTERED PROFESSIONAL ENGINEER
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1. Scope and Intent

1.1. Introduction

Per request of the County of Santa Barbara, RRM Design Group has performed a Seismic Evaluation Report of Union Oil Building located at 241 South Broadway, in Orcutt, CA. It is our understanding that the County is considering acquiring this property and want to assess the viability of that transaction.

Figure 1: Google Maps View of Property

1.2. Purpose

The purpose of this report is to provide a seismic evaluation of the existing structure and ascertain compliance with a selected Performance Objective (for a summary of Performance Objectives see section 2.6). This report applies to the overall structural system(s) of a building, as well as its non-structural components, including ceilings and partitions.

The purpose of this report is NOT to determine compliance with or provide recommendations for compliance with the current building code. Codes for new construction are primarily intended to regulate the design and construction of new buildings; as such, they include many provisions that encourage or require the development of designs with features important for good seismic performance, including regular configuration, structural continuity, ductile detailing, and materials of appropriate quality. Many existing buildings were designed and constructed without these features and contain characteristics, such as unfavorable configuration and poor detailing, that preclude application of regulatory or building code provisions for their seismic evaluation or retrofit.

1.3. Scope

The broad scope of this report is a Tier I Screening evaluation in accordance with the 2017 publication by the American Society of Civil Engineers - *Seismic Evaluation and Retrofit of Existing Buildings* (ASCE 41-17), with retrofit solutions developed enough for a cost estimate. ASCE 41-17 is a standard intended to serve as a nationally applicable tool for design professionals undertaking the seismic evaluation or retrofit of existing buildings. Involved in a Tier I Screening are the following tasks:

- Selection of a Performance Objective
- Define Building Performance Levels
- Obtain As-Built Information
- Perform a visual observation of the structure
- Preparation of a Tier I Evaluation Report identifying seismic deficiencies
- Perform Tier 2 quick checks on deficiencies discovered in Tier I Evaluation
- Provide potential retrofit solutions

Per the Alquist Priolo Special Studies Zone Act, buildings constructed prior to 1972 may remain as originally constructed, unless they undergo a major building remodel where either the alteration or addition exceeds 50% of the building replacement cost. In that case, the building would have to be structurally retrofit to meet the current building code.

2. Site and Building Data

2.1. General Building Description

The subject property is located at 241 South Broadway in Orcutt, CA 93455. The Union Oil Building was originally constructed in 1948, with a major addition added in 1984. The current building owner purchased the property in 2003 and it has been leasing the space for various office tenants. The original building has a total square footage of 10,470 square foot. This includes a 787 square foot attic space over the main entry that currently serves as an IT room; the remainder of the building is single story. The 1984 addition added 9,225 square feet to the project, over two floors.

2.2. Structural System Description

The original building was constructed with three wythe brick walls for all exterior walls. The bricks are approximately 3¼" wide x 3" tall x 10" long and results in a total wall thickness of 12½". There are two grout layers between the bricks, each approximately 1-3/8" thick, and where the wall reinforcement was observed to be located. The roof is constructed with trusses at 15'-0"± o.c., beams that span parallel to the ridges between trusses, and 2x rafters over the beams. The trusses are composite construction using both heavy timber and steel rods. Over the rafter layer is straight sheathing for the diaphragm. In addition to the diaphragm above the rafters, the ceiling plane has horizontal steel rod cross bracing at the top of the brick walls. This cross bracing had similar painting to the steel rods within the truss assembly and is assumed to be original. At either side of the attic space there was a steel beam below the brick walls. The foundation in this portion of the building is slab on grade construction, with perimeter footings at the brick walls. The foundations were not able to be observed at the time of the visit. There were not any instances of signs of distress associated with inadequate foundations observed at the time of the site visit.

The 1984 addition was constructed with8" thick fully grouted, reinforced masonry walls. The roof is stick framed with 2x rafters supported on the exterior walls and on each of the hallway walls. The floor is framed with 2x joists and supports a 1½" layer of gypcrete. The first floor is also framed with 2x joists, supporting a 1½" layer of gypcrete, and has added cripple stud supports to reduce the joist span. The foundations are continuous, reinforced concrete footings at all exterior walls, at the hallway walls, and the cripple walls in the crawl space.

2.3. Existing Building Drawings

Existing drawings were available and are as follows:

- Union Oil Building Architectural As-Builts
  - Architectural Drawings by studio 2G Architects, LLP
- Union Oil of California dated October 26, 1984
  - Architectural Drawings by Hall, Hurley, Deutsch Architects
  - Structural Drawings by Brian L. Ward
  - Mechanical and Plumbing Drawings by Charles Mistretta and Assoc.
  - Electrical Drawings by Alvin J. Smith
  - Fire Sprinklers by S and M Sprinkler Corporation
- Union Oil of California dated May 28, 1985
  - Architectural Drawings by Hall, Hurley, Deutsch Architects

2.4. On Site Investigation and Condition Assessment

A Tier 1 screening requires an on-site investigation to be conducted to verify general conformance of existing conditions to those described in available documents, to identify significant alterations or deviations from available documents, to supplement incomplete documents, to confirm the general quality of construction and maintenance, and otherwise as needed to complete the applicable Tier 1 checklist.

RRM performed an on-site investigation of the site on July 13, 2021. The walk-through was performed by Jessica Meadows, SE (RRM Design Group) and accompanied by Project Architect Todd Hansen (RRM Design Group).

At the project site, a majority of the structural elements were covered with architectural finishes and were not visible. For the original 1948 building, the roof framing was observed from the attic spaces accessible from the IT room. At the 1984 addition, a simple walk through to verify layout was completed.

2.5. Building Type(s)

ASCE 41-17 requires that the building be classified as on or more Common Building Type listed in Table 3-1 based on the seismic force resisting system and diaphragm type. Separate building types may be used for buildings with different seismic force resisting systems in different directions.

- RM1: Reinforced Masonry Bearing Walls with Flexible Diaphragms

It should be noted that the two phases of the buildings are classified as the same construction type but will have different behaviors based on materials of construction (concrete masonry versus clay masonry). There is no seismic separation between the original brick building and the masonry building addition. Based on the 1984 drawings, it appears that no retrofit was constructed to account for this additional loading to the original building. These systems will have different behaviors during a seismic event, and there is risk of pounding between buildings. This pounding has the potential to damage the buildings and architectural finishes.

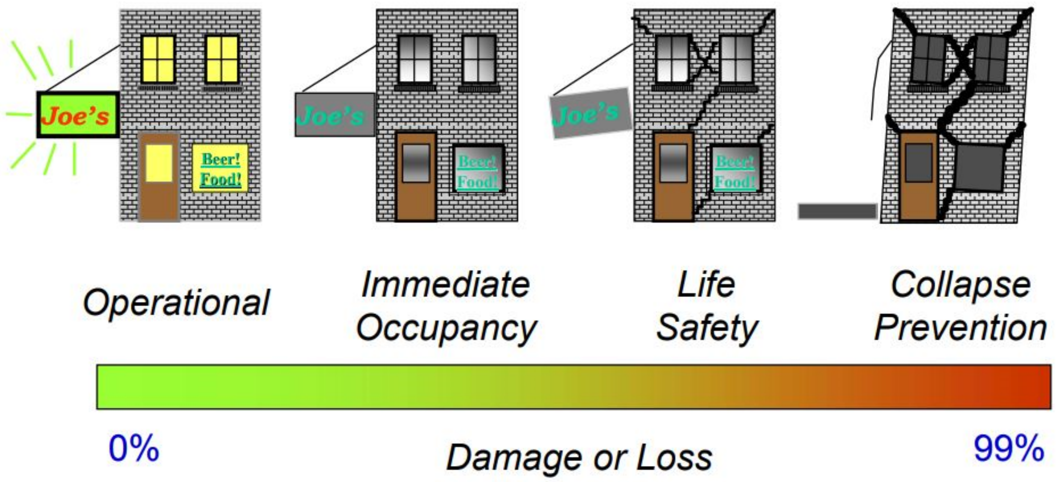
The 1984 addition also has two wood framed shear walls, upstairs, as part of the lateral force resisting system. Due to this additional system, a partial checklist was performed for W2: Wood Frames, Commercial and Industrial. Only the applicable elements were checked.

2.6. Performance Objective

For Basic Performance Objective for Existing Buildings, ASCE 41-17 defines six building performance levels. These target building performance levels are (in order from highest to lowest performance):

- Immediate Occupancy (S-1)
- Damage Control (S-2)
- Life Safety (S-3)
- Limited Safety (S-4)
- Collapse Prevention (S-5)
- Not Considered (S-6)

These performance levels are best visualized through the following Figure.



The performance levels are directly related to the extent of damage that would be sustained by the building and its systems in the seismic event. Building Performance can qualitatively be described in terms of:

- The safety afforded to building occupants during and after the event
- The cost and feasibility of restoring the building to its pre-earthquake condition
- The length of time the building is removed from service to effect repairs
- Economic, architectural and historic effects on the larger community.

Because this building is intended to function as a library and offices, it is not required for use after a seismic event, a Basic Performance Objective for Existing Buildings of Limited Safety Structural Performance has been selected. Note that this is the target Performance Level, not the Performance expected in the buildings current state. This selection is tied to the building Risk Category III in ASCE 41-17, Table 2-1 and Table 2-2. Buildings that meet the target Performance Level of Limited Safety Structural Performance are expected to sustain damage to their structural elements but continue to support the gravity loading. There is a small margin of safety against the onset of partial or total collapse. The goal of these performance objectives is to provide a safe haven for occupants during a seismic event and allow them to securely exit the building after the event has concluded. The level of Immediate Occupancy would increase the structural retrofit requirements in this report and would allow the building to be occupied immediately after the seismic event.

Once the event has occurred, and the building has been evacuated, the building shall be assessed by a licensed structural or civil engineer prior to reoccupying the building. This assessment shall include a review of the major structural building systems and the nonstructural elements. It is possible that a retrofit scheme to correct the sustained damage after the event would be cost prohibitive, and the building is recommended to be demolished. If this risk is deemed too high by the County, a higher performance objective level can be used in a Tier 3 seismic retrofit. It should be noted that a higher performance objective will result in more invasive retrofit construction and an increased cost.

In order to achieve a performance level of Limited Safety Structural Performance for a Risk Category III building the seismic hazard level shall be BSE-2E as defined in Table 2-2 of ASCE 41-17. BSE-2E is a seismic hazard with a 5% probability of exceedance in 50 years (5%/50-

year) multiplied by a risk coefficient. The resulting MCE_R ground motion, which can be larger or smaller than the 20%/50-year values, is such that new buildings designed by the IBC/CBC for that ground motion have a 1% probability of collapse in ten years.

2.7. Level of Seismicity

The level of seismicity of a building is the degree or expected seismic hazard. In accordance with ASCE 41-17, levels are categorized as very low, low, moderate, or high based on mapped acceleration values and site amplification factors.

Table 2-5. Level of Seismicity Definitions

Level of Seismicity[a]	S_{DS}	S_{D1}
Very low	<0.167 g	<0.067 g
Low	≥ 0.167 g <0.33 g	≥ 0.067 g <0.133 g
Moderate	≥ 0.33 g <0.50 g	≥ 0.133 g <0.20 g
High	≥ 0.50 g	≥ 0.20 g

[a]The higher level of seismicity defined by S_{DS} or S_{D1} shall govern.

Figure 2:ASCE 41-17 Table 2-5

The mapped value of S_{DS} = 0.74 and S_{D1}=0.45, therefore the project is located in a site with high seismicity. This is to be expected given the projects location on the Central Coast of California.

3. Tier 1 Deficiencies

3.1. General Deficiencies

3.1.1. Masonry Walls over Openings

In the 1948 building, there are no lintels over openings, and the exterior brick wythe has no vertical support. It would be traditional for the brick to be rotated over the openings to allow it to cantilever, but that construction method was not used for this building. We recommend installing a steel plate across the entire underside of the wall to support the outside brick under gravity loading. This steel plate would be installed with epoxy anchor rods or screw-type anchor.

3.1.2. Courtyard Beam Framing

The courtyard beams were observed to have a 5" square steel plate at the bottom of the beam, at mid-span, and bolt up through the plate. Each span of the original 1948 building had this retrofit solution, except one. The one without the steel hardware was observed to have noticeable deflection. This span shall be supplemented or replaced to eliminate the deflection. The retrofit solution at all other beam spans shall be reviewed and supplemented as required.

3.2. Noted Tier 1 Checklist Deficiencies

The following is a list of lateral resisting element deficiencies based on a review of the existing drawings and visual observation at the site of the existing structural elements. These deficiencies were noted in accordance with the checklists of ASCE 41-17. A full summary of the checklists can be found in the Appendix. Note that this checklist is limited to items that could be visually observed at the site or shown in the existing documentation and drawings available.

3.2.1. Basic Configuration Deficiencies

The following items pertain to the basic configuration of the building.

3.2.1.1. Load Path

It is unknown how the roof and floor diaphragms of the original construction portion of the building transfer their forces to the lateral force resisting systems. However, given the time of construction and the standard engineering principals of that time period, these connections may not be adequate for the forces prescribed by ASCE 41-17.

3.2.1.2. Adjacent Buildings

The 1984 addition to the original building was built without a seismic gap. This will cause pounding between the different structural lateral force resisting systems, as the structural behavior of each system will differ dramatically.

3.2.1.3. Weak Story

The rear of the building, at the 1984 addition, has approximately 68'-0" of reinforced masonry shear walls upstairs and only 48'-0" downstairs. This imbalance creates a weak story because the downstairs level is 30% weaker than the upstairs wall system.

It should be noted that the downstairs does have additional 30 feet of walls approximately 7'-0" offset from the main building line. However, there is not a horizontal diaphragm to tie these two wall lines together.

3.2.1.4. Soft Story

Similar condition to the weak story above, the rear of the building has too large or a stiffness change between the upper and lower levels. In addition to the length of the available shear wall being 30% less, the downstairs walls are taller by 2'-4". This increased height will make the walls more flexible downstairs and have a higher deflection. The higher the deflection, the lower the stiffness.

3.2.1.5. *Vertical Irregularities*

The building has two vertical irregularity types:

(1) At the original building, the upper brick walls of the IT room do not stack with interior brick walls downstairs. These walls are supported by steel beams with unknown support conditions. Given the time of construction and engineering standards at the time, this steel beam would not have been designed with modern overstrength factors to increase the system ductility. There is also no horizontal diaphragm to transfer the shear forces out to the nearest shear wall approximately 16'-8" away.

(2) At the 1984 addition, there are three locations where concrete beams were used to support the upstairs shear wall. Again, due to engineering standards at the time, this system would not have been designed for increased ductility. These concrete beams are not supported by pilasters and pad footings, simply supported by the typical wall section.

3.2.1.6. *Overturning*

At the 1984 addition, there is a 7'-0" shear wall pier as the rear wall line pops out at the downstairs level. While this wall taken independently would be considered above the overturning threshold presented, it is close to being in line with the masonry shear wall at the back of the stairs. Given the stiffness of this system, it is fair to treat this as a single combined line and would therefore not trigger this deficiency.

3.2.1.7. *Ties between Foundation Elements*

The 1984 addition has pad footings at the south entry canopy that are isolated and not tied into the overall main building foundation. However, these elements are connected to the building with a concrete flatwork slab. At the time of the observation, no signs of settlement or movement was observed in this area. As such, it would be acceptable to just acknowledge this condition, without a required retrofit.

3.2.2. *Building Type RM1 Deficiencies, 1948 Original Construction*

The following items pertain to the Reinforced Masonry with Flexible Diaphragms building type.

3.2.2.1. *Cross Ties*

Based on the age of construction, it is assumed that the diaphragm does not have continuity ties between the diaphragm chord elements at the roof diaphragm.

3.2.2.2. *Straight Sheathing*

The straight sheathing diaphragm have a maximum span to length ratio of approximately 2:1. This exceeds the allowed 1:1 of the Tier 1 checklist.

3.2.2.3. *Spans*

The straight sheathing diaphragm have a maximum span of approximately 70'-0". This far exceeds the allowed 40'-0" of the Tier 1 checklist.

3.2.2.4. *Stiffness of Wall Anchors*

The existing building does not have repetitive out of plane wall anchors. There are steel cross braces across in some areas, with a large spacing between the cross braces and the wall connection points. The connection between these braces and the wall was not visible at the time of the observation.

3.2.3. *Building Type RM1 Deficiencies, 1984 Addition*

The following items pertain to the Reinforced Masonry with Flexible Diaphragms building type.

3.2.3.1. *Openings at Exterior Masonry Shear Wall*

At the two stairwells, the exterior shear walls have unsupported lengths that exceed the defined 8'-0" maximum.

3.2.4. *Building Type W2 Deficiencies, 1984 Addition*

The following items pertain to the Wood Frames, Commercial and Industrial

3.2.4.1. *Shear Stress Check*

The 1984 addition relies on two wood framed shear walls at the upper level. These walls have approximately 4,000 pounds per lineal foot of force. This is far above the allowable shear loading for a plywood sheathed wall.

4. Schematic Recommended Structural Retrofit

4.1. Load Path

While there is no Tier 2 check for this deficiency, this can be partially addressed when the original building is re-sheathed (refer to Sections 4.6 and 4.7). This would involve boundary nailing at the diaphragm extent and additional anchor bolts from the sill plate on top of the brick wall. ¾" diameter anchor rods would be installed with structural epoxy and an embedment of 10" into the wall. Spacing requirement is 12" o.c. Shear transfer clips from the blocking to the sill plate would also be required.

4.2. Adjacent Buildings

Since the two buildings were built without a seismic gap, there are minimal options to remedy this deficiency. If the client could not accept a certain threshold of building damage due to pounding, it may be possible to add a seismic joint between the two structures, in the area of the courtyard. However, this construction effort would be extensive and require a new line of beams, columns and pad footings.

4.3. Weak Story

At the rear of the building, there are three options to address this deficiency:

A. Infill (2) 4'-0" windows in the downstairs main wall line.

B. Add a minimum length of 6'-8" of 8" reinforced masonry shear wall downstairs, in line with the shear wall above. New wall requires connection to the floor diaphragm and a new foundation support.

C. Construct a horizontal diaphragm to connect the main rear wall to the single-story walls that are offset.

4.4. Soft Story

Like the weak story deficiency, there are three options to address this deficiency:

A. Infill (1) 4'-0" window in the downstairs main wall line.

B. Add a minimum length of 11'-8" of 8" reinforced masonry shear wall downstairs, in line with the shear wall above. New wall requires connection to the floor diaphragm and a new foundation support.

C. Construct a horizontal diaphragm to connect the main rear wall to the single-story walls that are offset and fill in a single downstairs window anywhere on the combined wall line.

4.5. Vertical Irregularities

At the 1948 building, stiff wall elements shall be added below the steel beams. These walls would be 12" reinforced masonry walls, and a minimum length of 20'-0" on each side. New footings would be required at these wall elements.

In the 1984 addition, there are three locations where a concrete beam is supporting a masonry shear pier above. One of the concrete beams has a span of 5'-4" and does not require retrofit. The other two span much further at lengths of 16'-0" and 20'-8". The longer beams are adequate for bending, shear, and deflection. The ends of the beam simply integrate into the 8" masonry walls without a proper column support. The retrofit solution at these locations would be to add a proper vertical support by increasing the wall section to make a pilaster, along with a new pad footing in the crawl space. Pilaster would be doweled into the face of the masonry wall and have vertical bars and #4 ties, full height.

4.6. Straight Sheathing

The sheathing on the original portion of the building will need to be removed and replaced with a plywood diaphragm. This diaphragm shall be blocked, and require 10d nailing at 2-3-12" o.c. This applies to both the main roof, and the roof above the IT room.

4.7. Spans

The replacement of the sheathing noted in Section 4.1.6 above will correct this deficiency. In addition to the sheathing replacement, struts shall be added in each direction, at the interior corners. These struts will require a substantial tie to the brick wall to properly transfer the seismic forces and engage these walls as part of the lateral force resisting system. The struts can be located directly below the roof sheathing, or as horizontal ceiling element with a solid sheathed stud wall up to the roof plane. The tie to the wall would be achieved with steel plates and ¾" diameter epoxy bolts to the brick wall face and ¾" diameter through bolts to the strut.

4.8. Stiffness of Wall Anchors

The original brick walls shall be anchored to the roof rafters at 48" o.c., maximum. This connection shall be a steel angle at each face of rafter with (2) ¾" diameter anchor rods epoxied to the brick wall below, at each angle leg. Anchors shall be epoxied with a minimum of 10" embedment. The angles connect to the rafter with (2) ¾" diameter through bolts. Rafter would receive diaphragm boundary nailing at new sheathing.

4.9. Openings of Exterior Masonry Shear Walls

Where the exterior masonry walls on the addition are away from the floor diaphragm, a whaler beam shall be added to strengthen the wall for out of plane loading. This whaler would be a W10 wide flange beam, and may be located below the stair framing as to conceal the new member. Beam would be installed with the flange against the interior face of the masonry wall, with epoxy bolts at 16" o.c. each side of web, staggered. Epoxy bolts to be ¾" diameter and have an embedment of 5".

4.10. Shear Stress Check

There are four options to remedy this deficiency:

A. Add (9) 15'-0" wood shear wall lengths in the transverse direction to relieve load on the existing wood shear walls. These walls would require a wood shear wall directly below on the first floor. It is assumed that the current walls are not framed to the underside of the roof sheathing, and as such a new cripple wall would be required above the current top plate elevation. A continuous foundation below each wall would be required. Holdown straps across the floor, and holdown anchors to the new concrete footing. Sheathing would be ½" thick, at each face. This would require extensive architectural layout considerations to stack these walls upstairs and downstairs.

B. Remove the wood shear walls at the upstairs level and construct masonry walls in their place. These walls would have to have a raked top of wall elevation. The diaphragm would need a new strut in line with the masonry wall to deliver the seismic force. In addition, the existing diaphragm would require additional nailing throughout. Walls to be 8" thick fully grouted, reinforced masonry. The new heavy wall construction would also trigger out of plane wall support ties at 48" o.c. perpendicular to the wall face. Connection would utilized horizontal holdowns and anchor bolts embedded in the grout.

C. Add (2) 12'-0" long x 8" thick reinforced masonry walls in the transverse direction. Walls would be required to stack with equal walls on the first floor. Continuous foundation support would be required in the crawl space.

D. Add steel braced frame, transverse to the ridge. This braced frame would be two stories, and require pad footings at each column and a grade beam between.

Appendix

A.1. (Table 17-2) TIER 1 COLLAPSE PREVENTION BASIC CONFIGURATION CHECKLIST

Very Low Seismicity				
Building System				
General				
C	NC	N/A	U	LOAD PATH: The structure shall contain a complete, well-defined load path, including structural elements and connections, that serves to transfer the inertial forces associated with the mass of all elements of the building to the foundation. (Commentary: Sec. A.2.1.1. Tier 2: Sec. 5.4.1.1)
C	NC	N/A	U	ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity. (Commentary: Sec. A.2.1.2. Tier 2: Sec. 5.4.1.2)
C	NC	N/A	U	MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Commentary: Sec. A.2.1.3. Tier 2: Sec. 5.4.1.3)
Building Configuration				
C	NC	N/A	U	WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction shall not be less than 80% of the strength in the adjacent story above. (Commentary: Sec. A.2.2.2. Tier 2: Sec. 5.4.2.1)
C	NC	N/A	U	SOFT STORY: The stiffness of the seismic-force-resisting system in any story shall not be less than 70% of the seismic-force-resisting system stiffness in an adjacent story above or less than 80% of the average seismic-force-resisting system stiffness of the three stories above. (Commentary: Sec. A.2.2.3. Tier 2: Sec. 5.4.2.2)
C	NC	N/A	U	VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation. (Commentary: Sec. A.2.2.4. Tier 2: Sec. 5.4.2.3)
C	NC	N/A	U	GEOMETRY: There are no changes in the net horizontal dimension of the seismic-force-resisting system of more than 30% in a story relative to adjacent stories, excluding one-story penthouses and mezzanines. (Commentary: Sec. A.2.2.5. Tier 2: Sec. 5.4.2.4)
C	NC	N/A	U	MASS: There is no change in effective mass more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Commentary: Sec. A.2.2.6. Tier 2: Sec. 5.4.2.5)
C	NC	N/A	U	TORSION: The estimated distance between the story center of mass and the story center of rigidity is less than 20% of the building width in either plan dimension. (Commentary: Sec. A.2.2.7. Tier 2: Sec. 5.4.2.6)
Moderate Seismicity: Complete the Following Items in Addition to the Items for Very Low Seismicity.				
Geologic Site Hazards				
C	NC	N/A	U	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft under the building. (Commentary: Sec. A.6.1.1. Tier 2: 5.4.3.1)
C	NC	N/A	U	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Commentary: Sec. A.6.1.2. Tier 2: 5.4.3.1)
C	NC	N/A	U	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Commentary: Sec. A.6.1.3. Tier 2: 5.4.3.1)

High Seismicity: Complete the Following Items in Addition to the Items for Low Seismicity.				
Foundation Configuration				
C	NC	N/A	U	OVERTURNING: The ratio of the least horizontal dimension of the seismic-force-resisting system at the foundation level to the building height (base/height) is greater than 0.6 Sa. (Commentary: Sec. A.6.2.1. Tier 2: Sec. 5.4.3.3)
C	NC	N/A	U	TIES BETWEEN FOUNDATION ELEMENTS: The foundation has ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Site Class A, B, or C. (Commentary: Sec. A.6.2.2. Tier 2: Sec. 5.4.3.4)
C = Compliant	NC = Non-compliant	N/A = Not Applicable	U = Unknown	

A.2. (Table 17-34) TIER 1 COLLAPSE PREVENTION STRUCTURAL CHECKLIST FOR BUILDING TYPES RM1: REINFORCED MASONRY BEARING WALLS WITH FLEXIBLE DIAPHRAGMS AND RM2: REINFORCED MASONRY BEARING WALLS WITH STIFF DIAPHRAGMS

1948 ORIGINAL CONSTRUCTION

Low and Moderate Seismicity				
Seismic-Force Resisting System				
C	NC	N/A	U	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Commentary: Sec. A.3.2.1.1. Tier 2: Sec. 5.5.1.1)
C	NC	N/A	U	SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in^2 . (Commentary: Sec. A.3.2.4.1. Tier 2: Sec. 5.5.3.1.1)
C	NC	N/A	U	REINFORCING STEEL: The total vertical and horizontal reinforcing steel ratio in reinforced masonry walls is greater than 0.002 of the wall with the minimum of 0.0007 in either of the two directions; the spacing of reinforcing steel is less than 48 in., and all vertical bars extend to the top of the walls. (Commentary: Sec. A.3.2.4.2. Tier 2: Sec. 5.5.3.1.3)
Flexible Diaphragms				
C	NC	N/A	U	CROSS TIES: There are continuous ties between diaphragm chords (Commentary: Sec. A.4.1.2. Tier 2: Sec. 5.6.1.2)
C	NC	N/A	U	OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length. (Commentary: Sec. A.4.1.4. Tier 2: Sec. 5.6.1.3)
C	NC	N/A	U	OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft long. (Commentary: Sec. A.4.1.6. Tier 2: Sec. 5.6.1.3)
C	NC	N/A	U	STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered. (Commentary: Sec. A.4.2.1. Tier 2: Sec. 5.6.2)
C	NC	N/A	U	SPANS: All wood diaphragms with spans greater than 24 ft. consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)
C	NC	N/A	U	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft and aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)
C	NC	N/A	U	OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5)
Connections				
C	NC	N/A	U	STIFFNESS OF WALL ANCHORS: Anchors of concrete or masonry walls to wood structural elements are installed taut and are stiff enough to limit the relative movement between the wall and the diaphragm to no greater than 1/8 in. before engagement of the anchors. (Commentary: Sec. A.5.1.4. Tier 2: Sec. 5.7.1.2)
C = Compliant	NC = Non-compliant	N/A = Not Applicable	U = Unknown	

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A.3. (Table 17-34) TIER 1 COLLAPSE PREVENTION STRUCTURAL CHECKLIST FOR BUILDING TYPES RM1: REINFORCED MASONRY BEARING WALLS WITH FLEXIBLE DIAPHRAGMS AND RM2: REINFORCED MASONRY BEARING WALLS WITH STIFF DIAPHRAGMS

1984 ADDITION

Low and Moderate Seismicity				
Seismic-Force Resisting System				
C	NC	N/A	U	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Commentary: Sec. A.3.2.1.1. Tier 2: Sec. 5.5.1.1)
C	NC	N/A	U	SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in^2 . (Commentary: Sec. A.3.2.4.1. Tier 2: Sec. 5.5.3.1.1)
C	NC	N/A	U	REINFORCING STEEL: The total vertical and horizontal reinforcing steel ratio in reinforced masonry walls is greater than 0.002 of the wall with the minimum of 0.0007 in either of the two directions; the spacing of reinforcing steel is less than 48 in., and all vertical bars extend to the top of the walls. (Commentary: Sec. A.3.2.4.2. Tier 2: Sec. 5.5.3.1.3)
Flexible Diaphragms				
C	NC	N/A	U	CROSS TIES: There are continuous ties between diaphragm chords (Commentary: Sec. A.4.1.2. Tier 2: Sec. 5.6.1.2)
C	NC	N/A	U	OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length. (Commentary: Sec. A.4.1.4. Tier 2: Sec. 5.6.1.3)
C	NC	N/A	U	OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft long. (Commentary: Sec. A.4.1.6. Tier 2: Sec. 5.6.1.3)
C	NC	N/A	U	STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered. (Commentary: Sec. A.4.2.1. Tier 2: Sec. 5.6.2)
C	NC	N/A	U	SPANS: All wood diaphragms with spans greater than 24 ft. consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)
C	NC	N/A	U	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft and aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)
C	NC	N/A	U	OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5)
Connections				
C	NC	N/A	U	STIFFNESS OF WALL ANCHORS: Anchors of concrete or masonry walls to wood structural elements are installed taut and are stiff enough to limit the relative movement between the wall and the diaphragm to no greater than 1/8 in. before engagement of the anchors. (Commentary: Sec. A.5.1.4. Tier 2: Sec. 5.7.1.2)
C = Compliant	NC = Non-compliant	N/A = Not Applicable	U = Unknown	

A.4. (Table 17-6) TIER 1 COLLAPSE PREVENTION STRUCTURAL CHECKLIST FOR BUILDING TYPES W2: WOOD FRAMES, COMMERCIAL AND INDUSTRIAL (PARTIAL)

1984 ADDITION

Low and Moderate Seismicity				
Seismic-Force Resisting System				
C	NC	N/A	U	SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: Structural panel sheathing = 1,000 plf Diagonal sheathing = 700 plf Straight sheathing = 100 plf All other conditions = 100 plf (Commentary: Sec. A.3.2.7.1. Tier 2: Sec. 5.5.3.1.1)
C	NC	N/A	U	NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces (Commentary: Sec. A.3.2.7.2. Tier 2: Sec. 5.5.3.6.1)
C	NC	N/A	U	WALL CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Commentary: Sec. A.3.2.7.6, Tier 2: Sec.5.5.3.6.3)
High Seismicity				
C	NC	N/A	U	WOOD SILL BOLTS: Sill bolts are spaced at 6 ft or less with acceptable edge and end distance provided for wood and concrete. (Commentary: Sec. A.5.3.7. Tier 2: Sec. 5.5.3.3)
C = Compliant	NC = Non-compliant	N/A = Not Applicable	U = Unknown	

A.5. (Table 17-38) TIER 1 NONSTRUCTURAL CHECKLIST – HAZARDS REDUCED

High Seismicity				
Hazardous Materials				
C	NC	N/A	U	HAZARDOUS MATERIAL EQUIPMENT: Equipment mounted on vibration isolators and containing hazardous material is equipped with restraints or snubbers (Commentary: Sec. A.7.12.2. Tier 2: Sec. 13.7.1)
C	NC	N/A	U	HAZARDOUS MATERIAL STORAGE: Breakable containers that hold hazardous material, including gas cylinders, are restrained by latched doors, shelf lips, wires or other methods. (Commentary: Sec. A.7.15.1. Tier 2: Sec. 13.8.3)
C	NC	N/A	U	HAZARDOUS MATERIAL DISTRIBUTION: Piping or ductwork conveying hazardous materials is braced or otherwise protected from damage that would allow hazardous material release. (Commentary: Sec. A.7.13.4. Tier 2: Sec. 13.7.3 & 13.7.5)
C	NC	N/A	U	SHUTOFF VALVES: Piping containing hazardous material, including natural gas, has shutoff valves or other devices to limit spills or leaks. (Commentary: Sec. A.7.13.3. Tier 2: Sec. 13.7.3 & 13.7.5)
C	NC	N/A	U	FLEXIBLE COUPLINGS: Hazardous material ductwork and piping, including natural gas piping, have flexible couplings. (Commentary: Sec. A.7.15.4. Tier 2: Sec. 13.7.3 & 13.7.5)
C	NC	N/A	U	PIPING OR DUCTS CROSSING SEISMIC JOINTS: Piping or ductwork carrying hazardous material that either crosses seismic joints or isolation planes or is connected to the independent structures has couplings or other details to accommodate the relative seismic displacements. (Commentary: Sec. A.7.13.6. Tier 2: Sec. 13.7.3, 13.7.5, 13.7.6)
Partitions				
C	NC	N/A	U	UNREINFORCED MASONRY: Unreinforced masonry or hollow-clay tile partitions are braced at a spacing of at most 10 ft in Low or Moderate Seismicity, or at most 6 ft in High Seismicity. (Commentary: Sec. A.7.1.1. Tier 2: Sec. 13.6.2)
C	NC	N/A	U	HEAVY PARTITIONS SUPPORTED BY CEILINGS: The tops of masonry or hollow-clay tile partitions are not laterally supported by an integrated ceiling system. (Commentary: Sec. A.7.2.1. Tier 2: Sec. 13.6.2)
Ceilings				
C	NC	N/A	U	SUSPENDED LATH AND PLASTER: Suspended lath and plaster ceilings have attachments that resist seismic forces for every 12 st. ft. of area. (Commentary: Sec. A.7.2.3. Tier 2: Sec. 13.6.4)
Cladding and Glazing				
C	NC	N/A	U	CLADDING ANCHORS: Cladding components weighing more than 10 pounds per sq. ft. are mechanically anchored to the structure at a spacing equal to or less than the following: for Life Safety in High Seismicity, 4 ft. (Commentary: Sec. A.7.4.1. Tier 2: Sec. 13.6.1)
C	NC	N/A	U	MULTI-STORY PANELS: For multi-story panels attached at more than one floor level, panel connections are detailed to accommodate a story drift ratio by the use of rods attached to framing with oversize holes or slotted holes of at least the following: for Life Safety in High Seismicity and for Position Retention in any seismicity, 0.02, and the rods have a length-to-diameter ratio of 4.0 or less. (Commentary: Sec. A.7.4.4. Tier 2: Sec. 13.6.1)
C	NC	N/A	U	PANEL CONNECTIONS: Cladding panels are anchored out of plane with a minimum number of connections for each wall panel as follows: for Life Safety in Moderate Seismicity, 2 connections; for Life Safety in High Seismicity and for Position Retention in any seismicity, 4 connections. (Commentary: Sec. A.7.4.5. Tier 2: Sec. 13.6.1.4)
C	NC	N/A	U	BEARING CONNECTIONS: Where bearing connections are used, there is a minimum of two bearing connections for each cladding panel. (Commentary: Sec. A.7.4.6. Tier 2: Sec. 13.6.1.4)
C	NC	N/A	U	INSERTS: Where concrete cladding components use inserts, the inserts have positive anchorage or are anchored to reinforcing steel. (Commentary: Sec. A.7.4.7. Tier 2: Sec. 13.6.1.4)
Masonry Veneer				
C	NC	N/A	U	UNREINFORCED MASONRY BACKUP: There is no unreinforced masonry backup. (Commentary: Sec. A.7.7.2. Tier 2: Sec. 13.6.1.1 & 13.6.1.2)

Parapets, Cornices, Ornamentation, and Appendages				
C	NC	N/A	U	URM PARAPETS OR CORNICES: Laterally unsupported unreinforced masonry parapets or cornices have height-to-thickness ratios no greater than the following: for Life Safety in Low and Moderate Seismicity, 2.5; for Life Safety in High Seismicity and for Position Retention in any seismicity, 1.5. (Commentary: Sec. A.7.8.1. Tier 2: Sec. 13.6.5)
C	NC	N/A	U	CONCRETE PARAPETS: Concrete parapets with height-to-thickness ratios greater than 2.5 have vertical reinforcement. (Commentary: Sec. A.7.8.3. Tier 2: Sec. 13.6.5)
C	NC	N/A	U	APPENDAGES: Cornices, parapets, signs and other ornamentation or appendages that extend above the highest point of anchorage to the structure or cantilever from components are reinforced and anchored to the structural system at a spacing equal to tor less than 6 ft. This evaluation statement item does not apply to parapets or cornices covered by other evaluation statements. (Commentary: Sec. A.7.8.4. Tier 2: Sec. 13.6.6)
Masonry Chimneys				
C	NC	N/A	U	URM CHIMNEYS: Unreinforced masonry chimneys extend above the roof surface no more than the following: for Life Safety in Low or Moderate Seismicity, 3 times the least dimension of the chimney; for Life Safety in High Seismicity and for Position Retention in any seismicity, 2 times the least dimension of the chimney. (Commentary: Sec. A.7.9.1. Tier 2: Sec. 13.6.7)
C	NC	N/A	U	ANCHORAGE: Masonry chimneys are anchored at each floor level, at the topmost ceiling level and at the roof. (Commentary: Sec. A.7.9.2. Tier 2: Sec. 13.6.7)
Contents and Furnishings				
C	NC	N/A	U	INDUSTRIAL STORAGE RACKS: Industrial storage racks or pallet racks more than 12 ft high meet the requirements of ANSI/RMI MH 16.1 as modified by ASCE 7, Chapter 15. (Commentary: Sec. A.7.11.1. Tier 2: Sec. 13.8.1)
C = Compliant	NC = Non-compliant	N/A = Not Applicable	U = Unknown	

References

1.1. Referenced Standards

The following Design and Reference Standards were used in the creation of this report

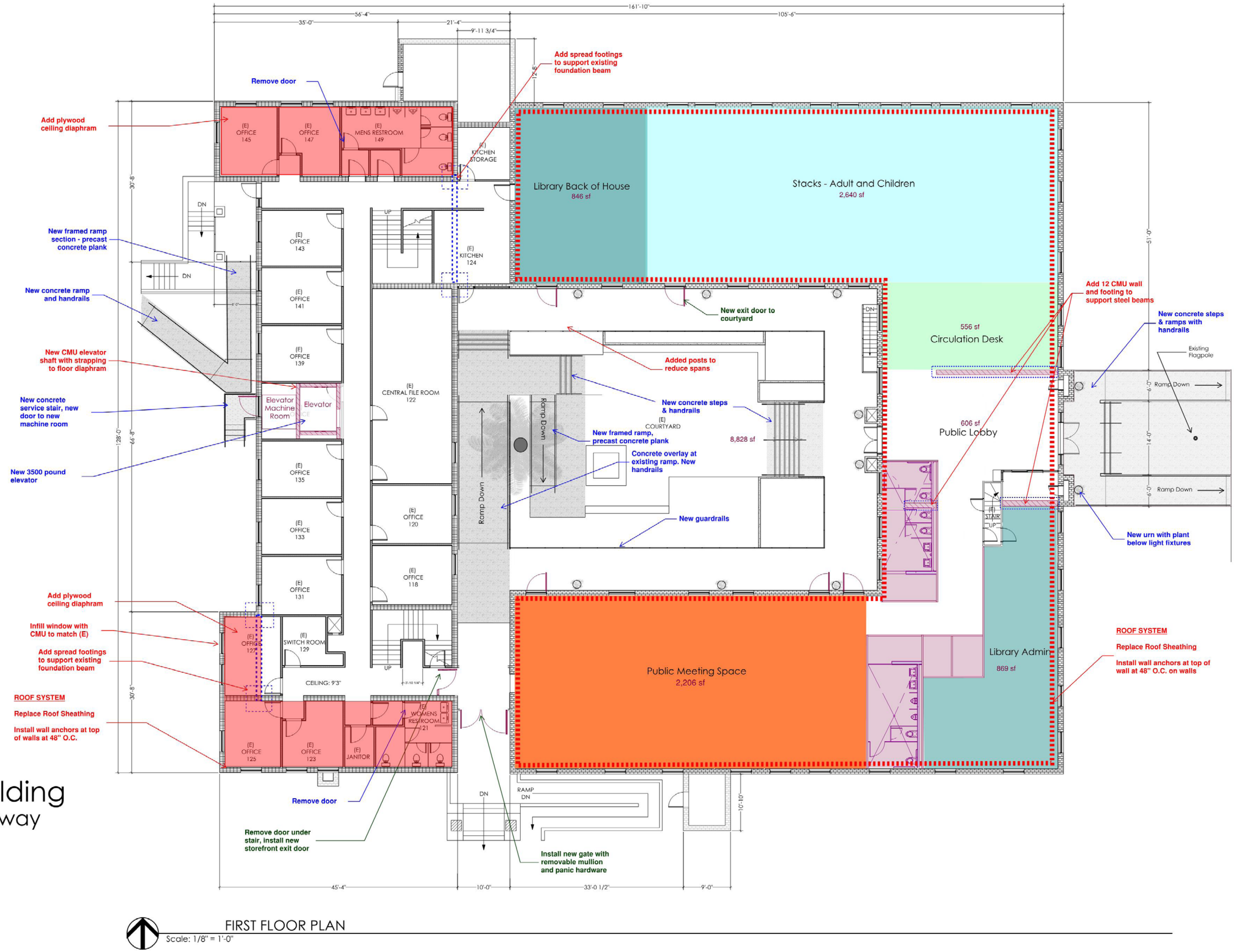
- ASCE 41-17, "Seismic Evaluation and Retrofit of Existing Buildings" by the American Society of Civil Engineers

CONCEPTUAL BUILDING RENOVATION PLAN NARRATIVE

A potential conceptual building plan was developed for the library and public meeting spaces in the 1949 portion of the building based on typical library programs as previously noted. The building plan places the public meeting space closest to the rear entry to facilitate bringing in materials at the entry, from voting equipment to catering. At the same time there are deliveries and shipping of library materials to other branches on a regular basis so the library back of house also needs convenient access to the back entry, which can be achieved via the walkway around the courtyard. See the conceptual floor plans on at the following pages.

UP NEXT:
FIRST FLOOR PLAN PROPOSAL
SECOND FLOOR PLAN PROPOSAL
SITE PLAN PROPOSAL

CONCEPTUAL RENOVATION PLAN - FIRST FLOOR PLAN PROPOSAL



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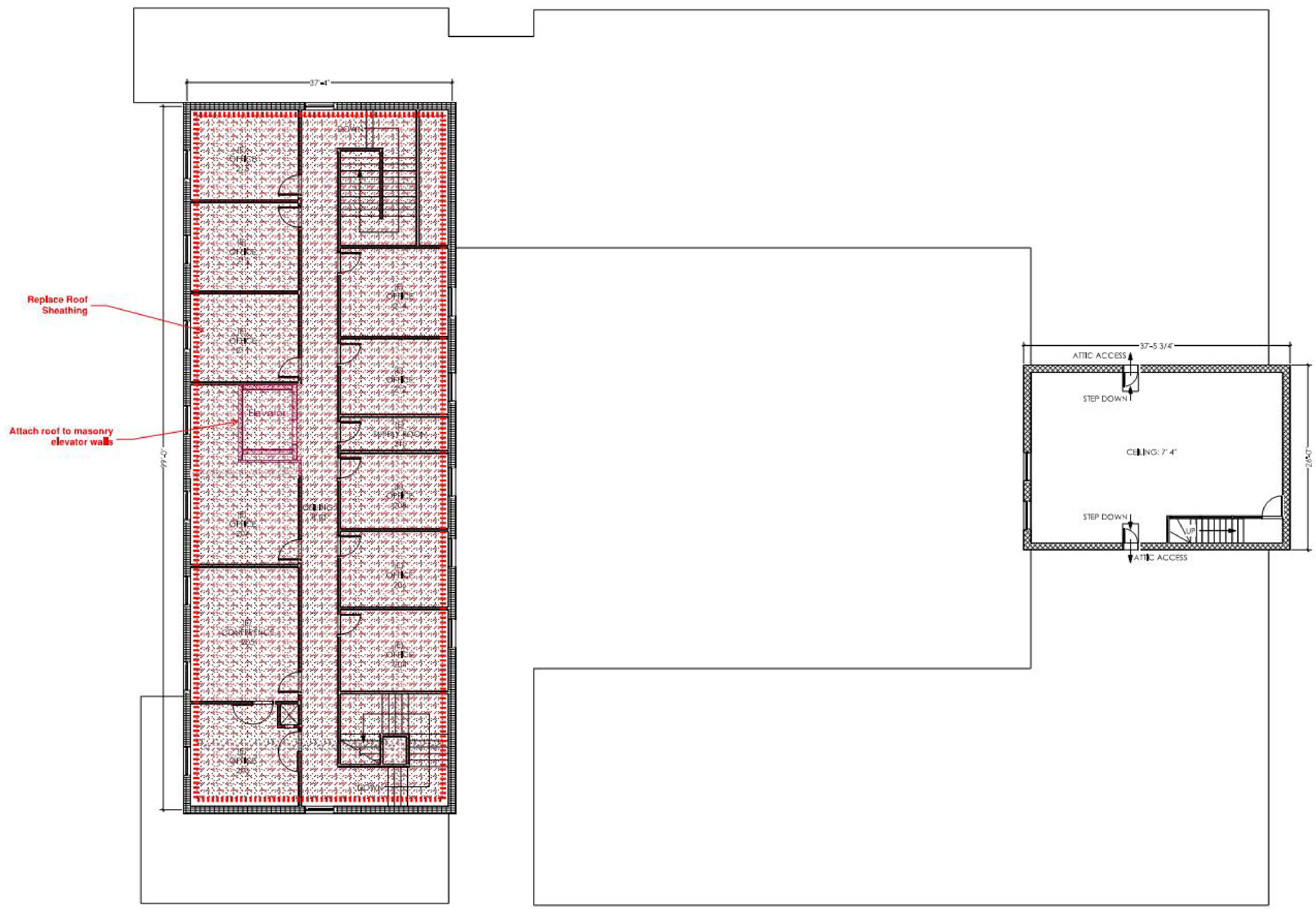
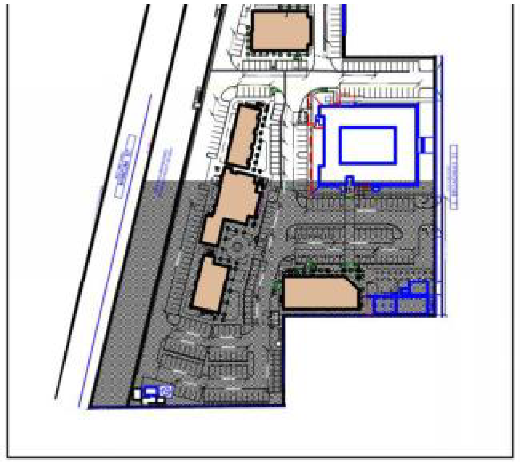
CONCEPTUAL RENOVATION PLAN - SECOND FLOOR PLAN PROPOSAL



SECOND FLOOR PLAN

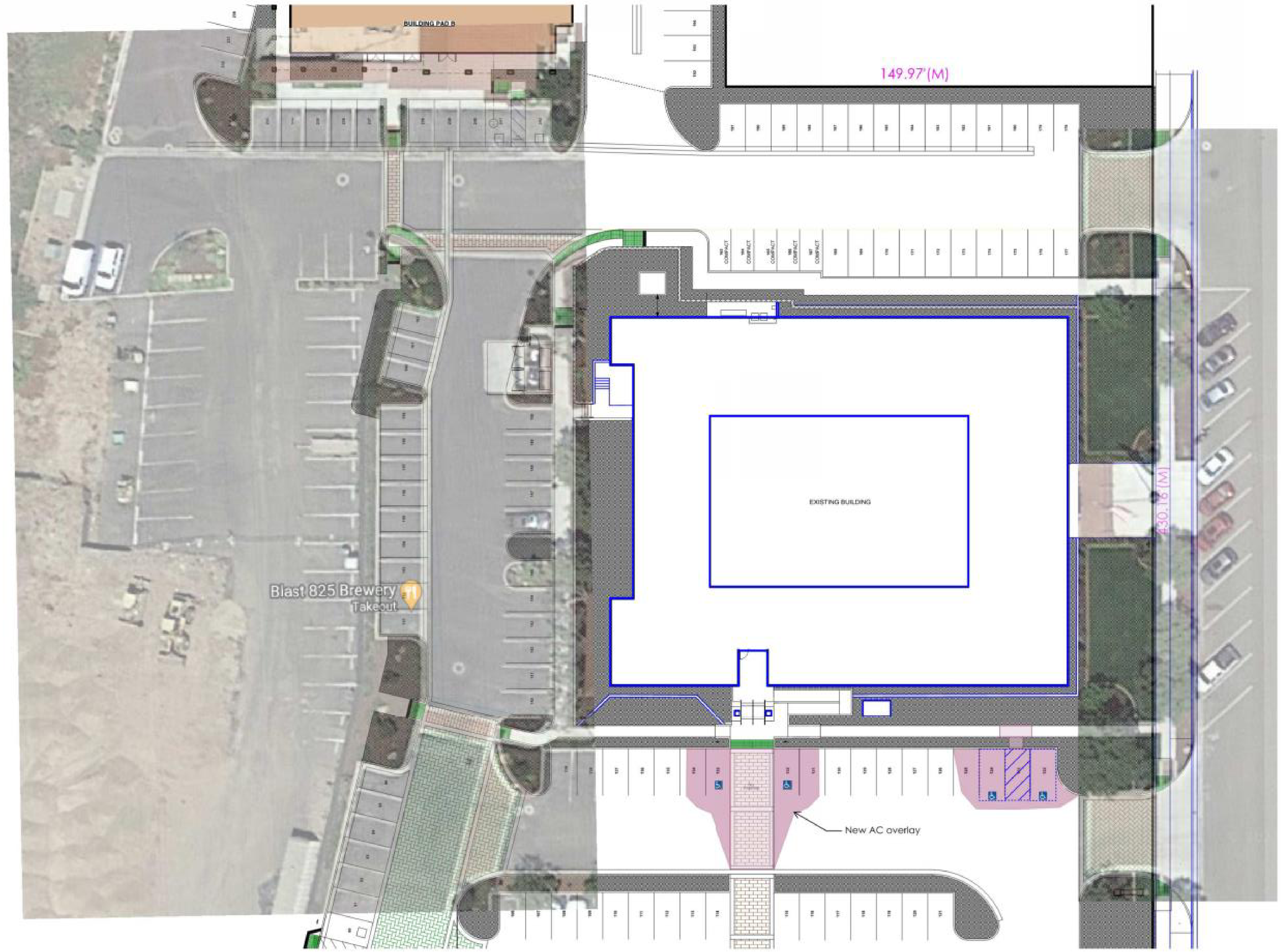
Scale: 1/8" = 1'-0"

CONCEPTUAL RENOVATION PLAN - SITE PLAN PROPOSAL



LEGEND

- ASPHALT PAVING.
- LANDSCAPED AREAS.
- STAMPED CONCRETE. COLOR: 550 BRICK RED.
- STAMPED CONCRETE COLOR: 550 BRICK RED.
- INTERLOCKING PAVERS. COLOR: RED CHARCOAL BLEND BY AIR VOL BLOCK
- TRUNCATED DOMES N COLOR TO MATCH BRICKFORM. 550 BRICK RED (OR S.M.)
- INDICATES CONCRETE SIDEWALK.



SITE PLAN
Scale: 1" = 20'-0"

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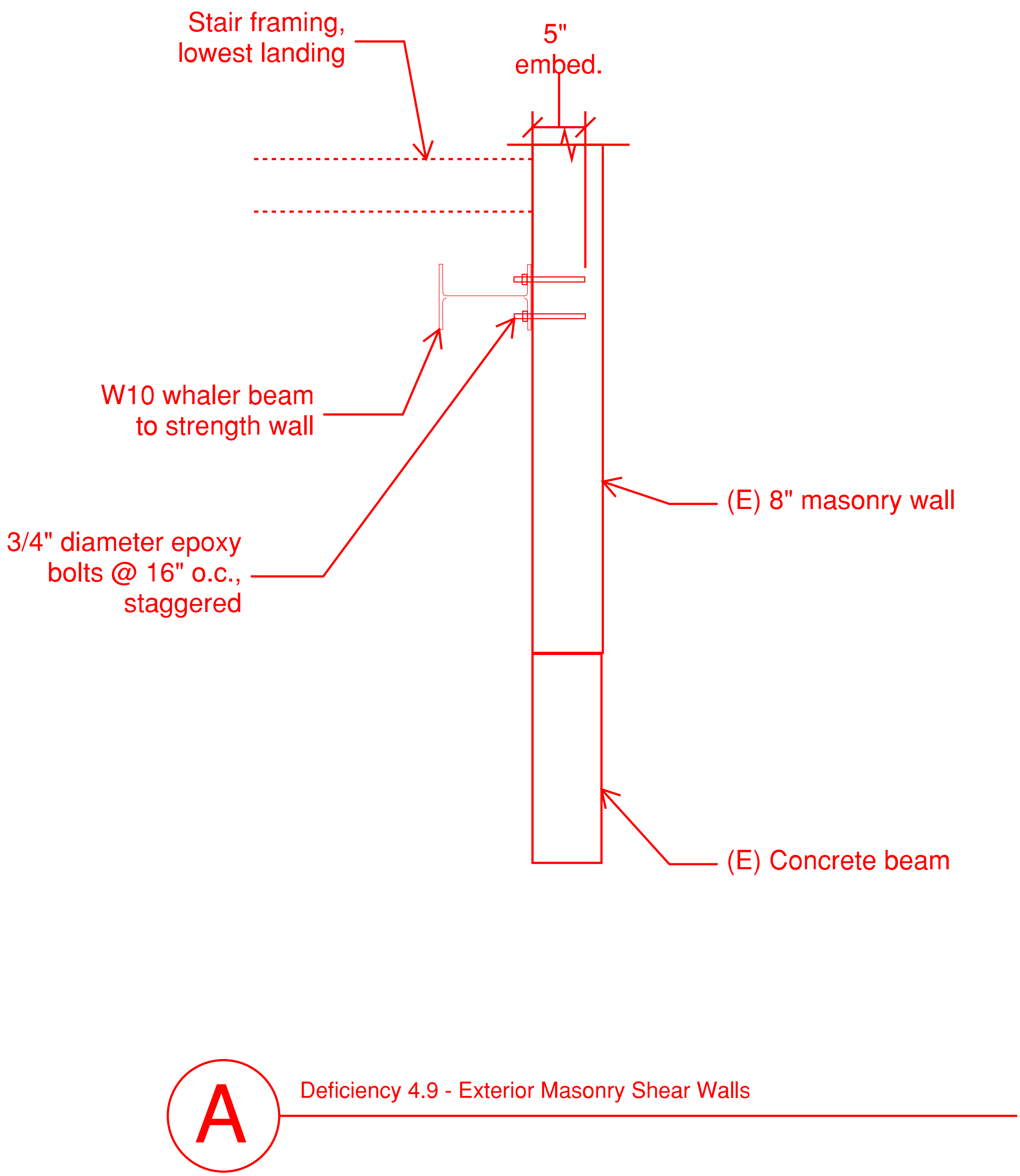
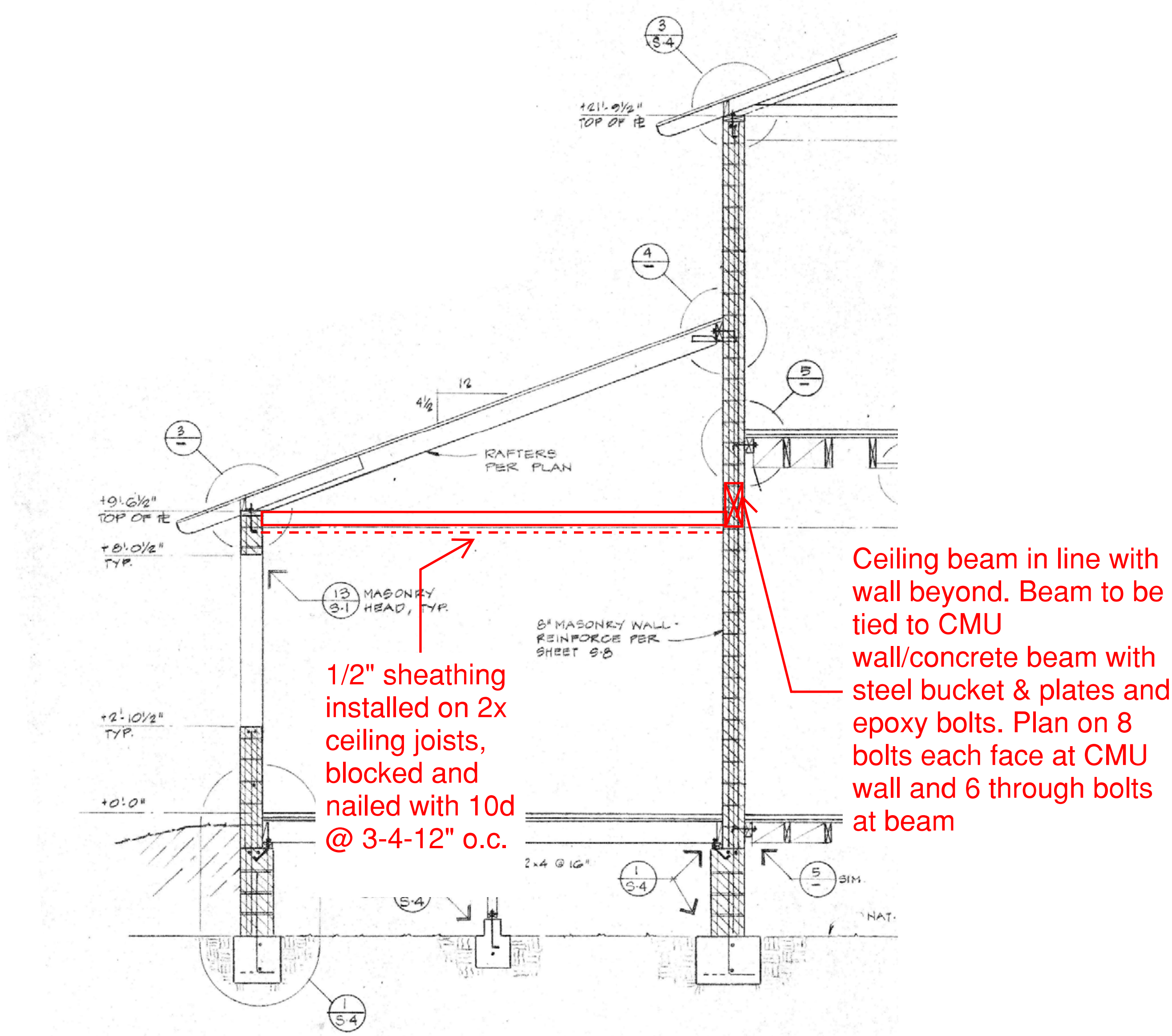
CONCEPTUAL RENOVATION PLAN - STRUCTURAL SKETCHES FOR COST ESTIMATOR



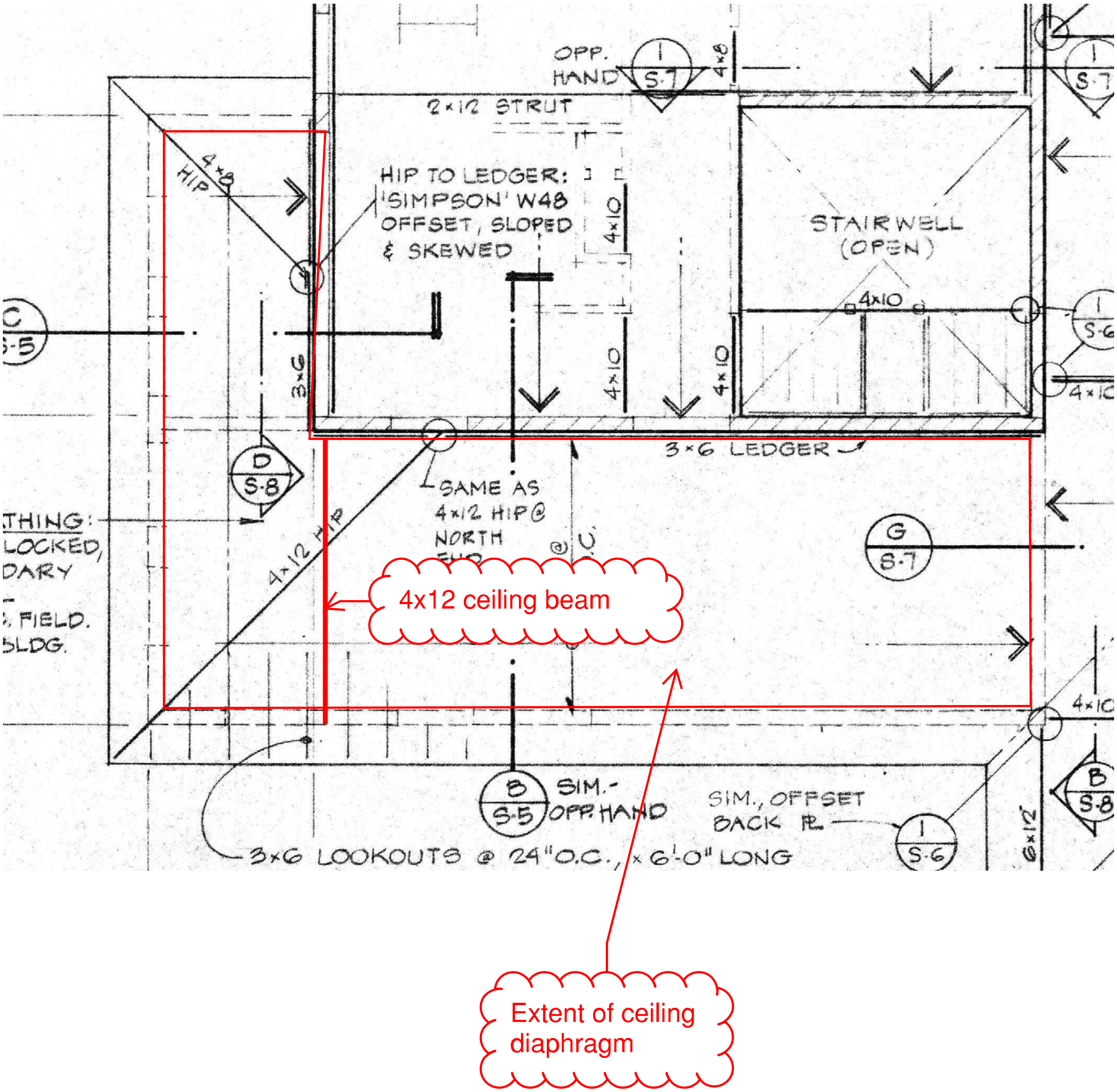
CONCEPTUAL RENOVATION PLAN - STRUCTURAL SKETCHES FOR COST ESTIMATOR



B

Deficiency 4.4 & 4.3 - Soft and Weak Story

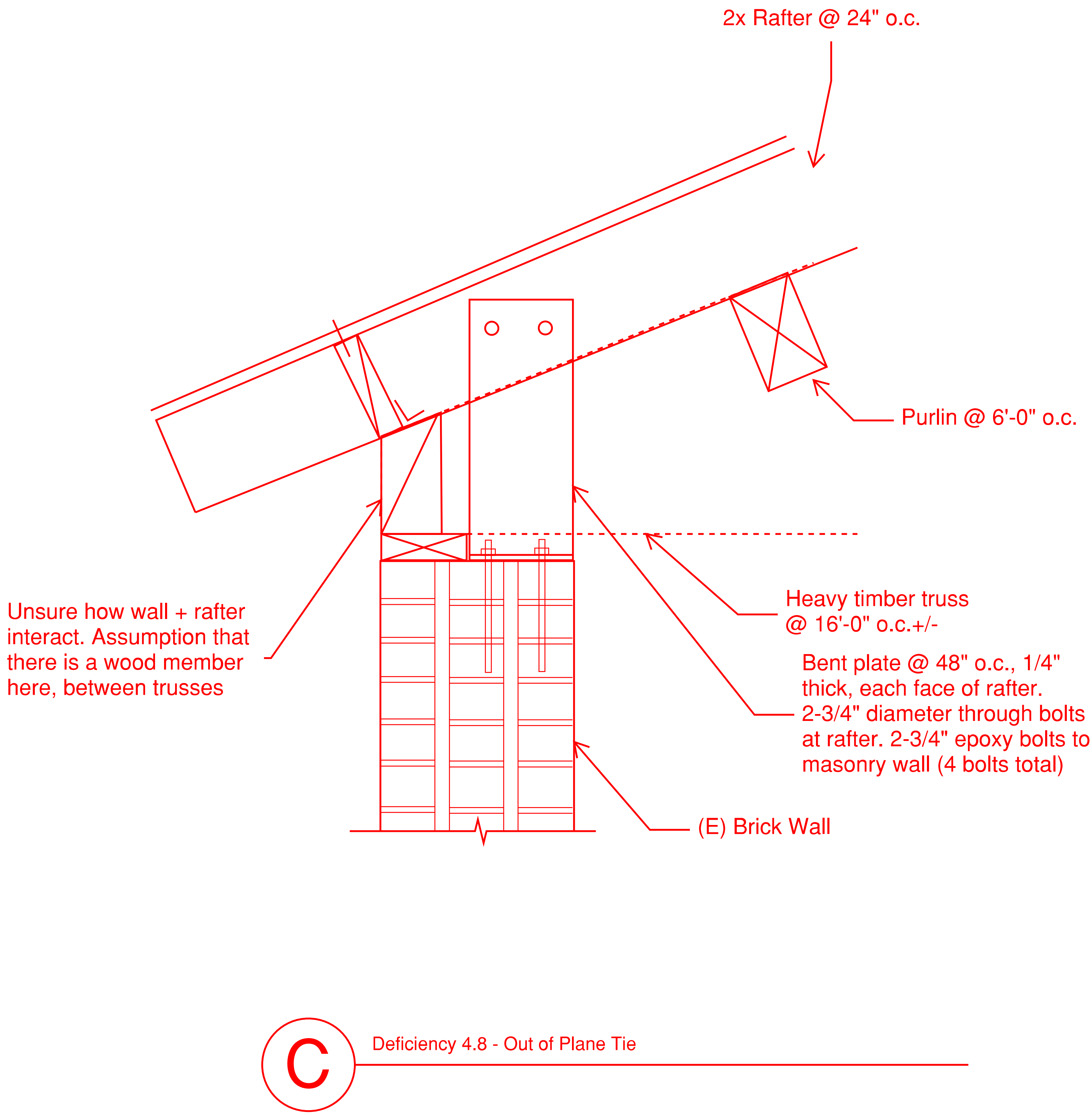
CONCEPTUAL RENOVATION PLAN - STRUCTURAL SKETCHES FOR COST ESTIMATOR



Plan Extent of Ceiling Diaphragm

Similar at opposite end of building

CONCEPTUAL RENOVATION PLAN - STRUCTURAL SKETCHES FOR COST ESTIMATOR



CONCEPTUAL PROJECT BUDGET

Staple Construction has reviewed the conceptional diagrams and sketches of the architectural and structural analysis of the facility and provided a rough order of magnitude cost budget of the construction cost for the structural upgrades to the facility and the architectural repairs that are required to complete those upgrades. The cost include structural upgrades, new elevator, accessibility upgrades, mechanical upgrades, electrical upgrades and roofing replacement due to structural upgrades. The cost provided by Staples construction is for construction cost alone and does include a 20% design contingency. Below is the project budget that applies a standard escalation of 7% to mid point of construction based on current market conditions and a standard budget of 30% to 50% for soft costs. Soft costs include, design and permitting costs, materials testing and inspection cost, administrative costs, construction contingency and utility fees.

	1949 Building	1984 Building
Construction Cost - *From Staples Const.* *20% Design Contingency Included*	$4,425,200.00	$2,236,800.00
Escalation - 7% per year *To midpoint of const. 2.5 years*	$774,410.00	$391,440.00
Soft Cost 30% to 50% of Const Cost	$1,770,080.00	$894,720.00
Total Project Budget	**$6,969,690.00**	**$3,522,960.00**
	$10,492,650.00	

UP NEXT:

STAPLES ROUGH ORDER OF MAGNITUDE (ROM)

STAPLES CONSTRUCTION

August 25, 2021

Mr. Todd Hansen
Senior Architect
RRM Design Group
3765 S. Higuera, Suite 102
San Luis Obispo, CA 93401

RE: ROUGH ORDER OF MAGNITUDE (ROM) COST BUDGET FOR UNION OIL BUILDING / ORCUTT LIBRARY MODIFICAITONS

Dear Todd,

Thank you for the opportunity to provide a ROM budget for the above referenced project. Per the preliminary plans (site plan, first floor plan, and second floor plan) and associated reports (seismic evaluation report dated 8/9/21 with accompanying structural sketches and Executive Summary), we suggest the follow budget for each key area of improvement.

1949 Building		
Item/Description	Budget	Notes/Comments
Remove & Reinstall Roofing	$ 829,200	
Roof & Wall Connections	$ 321,600	
New Lateral Systems	$ 75,600	
Remove and Replace Doors & Windows	$ 194,400	
Accessible Entries	$ 110,400	Front & Courtyard
Guardrails at Courtyard & Support Posts	$ 123,600	
Decorative Light Fixtures	$ 24,000	
Basement Stairs & Walls	$ 31,200	
New Fire Suppression System	$ 136,800	
Mechanical Improvements	$ 296,400	
New Electrical Service	$ 236,400	
Electrical Improvements	$ 362,400	
Remaining Tenant Improvement Allowance	$ 658,800	
Library Tenant Improvement Allowance	$ 330,000	
Allowance for Exterior Façade Clean-up	$ 494,400	
Abatement Allowance	$ 200,000	No Report Provided
Totals	$ 4,425,200	

STAPLES CONSTRUCTION

1984 Building		
Item/Description	High Range	Notes/Comments
Remove & Reinstall Roofing	$ 499,200	
Structural Retrofits	$ 114,000	
New Elevator	$ 417,600	
Remove and Replace Doors & Windows	$ 118,800	
Accessible Entries	$ 55,200	Rear Entry
Restrooms & Drinking Fountains	$ 8,400	
Stair Handrails	$ 30,000	
Renovated Fire Suppression System	$ 50,400	
Mechanical Improvements	$ 261,600	
Electrical Improvements	$ 319,200	
Remaining Tenant Improvement Allowance	$ 362,400	
Totals	$ 2,236,800	

1984 Building - Complete Demolition		
Item/Description	High Range	Notes/Comments
Complete Building Demolition	$ 290,400	
Totals	$ 290,400	

Cost based on the following construction information/clarifications:

- All soft cost (design/engineering, plan check fees, permit costs, etc.) are not included in the above budgeted values.
- Prevailing wages and payment & performance bond are included.
- All work to be performed as a single project based on the most efficient workflow/schedule during standard working hours.
- Budgeted values above are based on current construction cost. The Owner may find it prudent to carry a value of labor and material escalation. Historically a 4.5% - 5.5% year-to-year range is expected. 2021 has been an unusual year and will likely exceed this range.
- The Owner may want to consider adding a project contingency on all soft and hard cost presented as part of this project evaluation package.

Based on the limited information available at this time, these budget ranges reflect a reasonable starting point to aid in your decision-making process. There are a lot of variables that can impact the overall cost of your project, working on defining those variables and then assigning a cost is typically the next stages we perform, especially if you are in the process of feasibility review and exploring financing options. Please call with any questions or if we can be of further service.

Corporate Office ■ 1501 Eastman Avenue, Ventura, California 93003 ■ t 805.658.8786 ■ f 805.658.8785 ■ CA License #710039

STAPLES CONSTRUCTION

Sincerely,

STAPLES CONSTRUCTION CO., INC.

Christopher Harris

Christopher Harris
Estimator/Project Manager, Ventura

CH/ch

Corporate Office ■ 1501 Eastman Avenue, Ventura, California 93003 ■ t 805.658.8786 ■ f 805.658.8785 ■ CA License #710039