Pier 70 Building Survey

Historic Buildings
Conditions and Assessment
Carey & Co. and OLMM, Inc
May 2008

Pier 70
San Francisco, California

Historic Building
Conditions Survey and Assessment
May 22, 2008

A. Introduction

The purpose of this report is to develop conceptual-level cost estimates for building reuse that can assist the master-planning team in determining order-of-magnitude construction costs for the selected historic structures at Pier 70. Carey & Co. worked with the M. Lee Corporation, cost estimators, and OLMM, structural engineers and to a limited extent the other Pier 70 consultant teams to prepare this assessment. For the building evaluations, OLMM analyzed structural systems, and Carey & Co. studied architectural, preservation, and conservation issues. Port staff, EPS, and Roma, have assisted in identifying appropriate adaptive re-use assumptions.

B. Methodology

Carey & Co. conducted field surveys in March and April of 2008 to inspect the fifteen buildings specified by the Port of San Francisco. Port staff provided escorts for Carey & Co., OLMM and the Martin Lee Corp. The Carey & Co. survey included an examination of historic site features around the individual buildings, internal and external finishes, and specific historic elements. Based on these surveys Carey & Co. has provided a set of recommendations that includes general instructions for rehabilitation and, where appropriate, a specific set of repair instructions to aid in cost estimation.

Each item surveyed by Carey & Co. received a generalized rating. These designations are meant to serve as shorthand for understanding the overall condition of specific architectural elements. The ratings range from:

Poor:	The space or component is missing or unserviceable and requires replacement or major repair
Fair:	The space or component is worn or deteriorated and requires repair
Good:	The space or component is intact and sound and requires minor repairs
Excellent:	The space or component is serviceable condition and requires minimal or no repair

The review of existing documents included the 1944 Bethlehem Steel Company plans and information binders on specific buildings made available by the Port Of San Francisco.

To facilitate cost estimation of individual buildings, Carey & Co. architectural reports and OLMM structural reports have been integrated into one building-specific report.

Building 104

Building 104
37,641 GSF
Built: 1886
Construction Type: Brick Masonry
Main use: UIW Office Building/Industrial Relations Building
150.5' by 49.5' 60' tall
3 stories plus full and sub basement.

Designed by prominent San Francisco architects George Percy and Frederick Hamilton, this red-brick Renaissance Revival style building is two stories high with a full basement and attic. It fronts 20th Street and is the third in the line of architect-designed buildings along this street. Built in 1896, it predates the other architect designed buildings.

It has a hipped, clay tile roof and wood, one-over-one, double-hung windows. It measures 150'-6" long by 49'-6" wide and 60' tall, and contains 37,641 square feet. Originally "T"-shaped, with the primary rectangular mass on 20th Street and a projecting center bay at the rear, the rear void areas have since been infilled to create a rectangular footprint. The primary (south) façade features two-story brick arches, each containing paired, first and second story windows, which dominate the front (20th Street) and two side facades. These arches are set above a, rusticated, concrete base, dressed to imitate sandstone. Actual

sandstone accents the building as quoins, water table, keystones, windowsills, lintels and an upper-level string course. A sandstone string course separates the second floor from the attic. Deeply set, paired, rectangular windows with shouldered molded brick and terra cotta surrounds, punctuate this level. A copper modillioned cornice, in poor condition, tops the building.

A finely-detailed sandstone Renaissance-style portico at the front entrance features banded rustication, engaged Ionic columns and a projecting cornice over the arched opening. The entry recess includes a coffered, barrel-vaulted ceiling and polished marble walls. The arched sandstone door surround with voussiors frames the wood-paneled, glazed front doors with transom and sidelights. The original door hardware has been removed.

The original rear (north) projection is flanked on either side by infill additions constructed in 1941. A band of multi-lite steel sash windows with central ventilator sash are located at both the second and third stories. The original (1896) central portion features seven wood sash windows of different types and one personnel door at the ground level. The east addition also has personnel entrance doors at the ground level. Both additions have one-over-one, double hung wood windows at the ground level, and are covered with metal cladding, pressed to imitate brick on the upper two levels, and wood lap siding at the ground level. A metal fire escape attaches to the east end of the addition.

The interior of Building 104 includes three floors over a basement. The first level has linoleum floors, plaster walls and ceilings, and wood window trim. At the east end is an open office area with columns and some partial-height wood and glass partitions. The lobby at the main entrance contains World War II-era alterations including vinyl asbestos tile (VAT) flooring, wood paneling at the walls, and streamlined horizontal steel railing at the lobby stair hall. Similar-vintage alterations are found at the west end of the first floor including wood-paneled walls and built-in wood counters.

The second floor is a single column-free space with (non-contributing) carpeted floors, plaster walls, and a plaster ceiling. There are three private offices at the east end with mid-20th century (possible WWII) alterations including wall trim, flush doors and blond-wood wainscoting. Wood and glass partitions are also located at the east end. Stairhall features at the second floor include glass dividers and a safe with the words "National Safe & Lock Co., Cleveland, O."

The third floor contains a single large room with partial-height wood-and-glass partitions along the east, west and south sides. The linoleum flooring is in poor condition. Walls are of painted brick, and the ceiling is constructed of wood with wood trusses. The ceiling has a total of 17 skylights.

EXTERIOR

Exterior Walls

Condition: Fair

Description:

- Red brick renaissance Revival style
- Rusticated base
- Quoins

Condition:

- Localized seismic cracking
- Green efflorescence from copper

Recommendation:

- Repair 5% brick. Brick Masonry Replacement:

1. Remove and salvage sound brick / remove deteriorated bricks, retaining some to pulverize for color-matched patch materials. (Note that most masonry observed at Peir 70 is either load-bearing or non-veneer solid masonry. Brick replacement should be coordinated with the structural engineer regarding shoring requirements).
2. Replace brick, using historic bricks wherever possible. New custom bricks may be required to match the historic material.
3. Lay new brick flush with adjacent surface.
4. Apply new bedding mortar to match original color, texture, joint profile and chemical composition.

- Repoint 15% Brick. Brick Masonry Repointing:
  1. Analyze mortar to establish original composition. Specify repair mortar matching original.
  2. Rake out all loose or deteriorated mortar. Repoint with new mortar to match original color, texture, joint profile and chemical composition.
  3. Replace deteriorated sealant between door and window frames and other adjacent non-masonry cladding materials.
- Remove Stains. Brick Masonry Cleaning:
  1. Brick masonry contains efflorescence, staining from animal deposits, staining from rust, biological growth, and grime.
  2. Test clean soiled brick in an unobtrusive area using the gentlest means possible
  3. Use low pressure water washing methods (100-300psi) with a fan tip and stiff natural bristle or nylon brush. Mild detergents may be applied next. Use proprietary chemical cleaners designed for brick masonry, only if necessary.
  4. Where masonry is painted, the cleaning and stripping of paint will be required to make repairs. The presence of lead-based paint will also affect the choice of removal method.
  5. For biological growth the pressure wash may contain proprietary biocides.

Exterior Walls Behind Hospital Additions

Condition: placeholder

Description:

- Hospital addition roof slopes towards building
- Hospital addition roof drains non-functional
- At northwest hospital addition where hospital addition finish walls removed, significant vegetation growth on brick wall. Water damage present from 2nd floor to basement at NW interior wall.

Condition:

- Possible extensive water damage to brick exterior wall

Recommendation:

- Remove additional finish wall surfaces to investigate brick wall condition

Windows
Condition: Good
Description:
- Double-hung wood sash windows

Condition:
- 20% window panes destroyed
- Wood sash over 100 years old with some decay

Recommendation:
- Replace 20% window panes
- Restore 15% wood sash. Wood sash window restoration:

1. Survey existing condition of all wood windows.
2. Remove all dirt, debris, and miscellaneous attachments.
3. Remove paint to obtain clean surface.
4. Replace deteriorated wood elements in kind as required.
5. Restore window to proper operation.
6. Install new hardware, where missing, to match original.
7. Install new glazing where cracked or missing.
8. Prepare wood surfaces, prime, and paint.
9. Where wood windows are deteriorated, but repairable, remove the unit to a controlled shop condition for element replacement and / or epoxy consolidation.
10. Where severely deteriorated beyond repair, replace in-kind with a new unit.

Windows Behind Hospital Additions
Condition: Fair
Description:
- Approximately 8-10 Windows on north elevation of 1896 brick office building converted to doors for access to hospital addition.

Condition:
- Window jambs still intact
- Sill and brick wall from sill to floor removed

Recommendation:
- Restore sill and window jamb
- Restore brick wall from sill to floor
- Install new windows compatible with historic character of building.

ROOF

Membrane
Condition: poor
Description:
- Built-up roof over wood

Condition:
- Badly deteriorated; extensive water penetration

Recommendation:
- 100% roof membrane replacement
- 50% wood sub-surface replacement

Eaves

Condition: fair

Description:

- Copper soffit
- Ornamental copper panels, brackets, and dentils

Condition:

- Missing and damaged ornamentation along north elevation

Recommendation:

- Replace 15% copper ornamentation
- Restore copper soffit: Ornamental Copper and Flashing Repair:
  1. Clean metal of all staining or grime. Use gentlest means possible to avoid damaging metal substrate.
  2. If copper elements must be replaced because of loss, deterioration or damage, replace in-kind with the same material weight.
  3. Shop fabricate replacement ornamental copper elements based on a dimensional survey of existing adjacent elements.
  4. Join all copper elements using solder joints as in the original construction.
  5. Repair small holes by soldering, or for larger holes, soldered copper Dutchman patches to span the void.
  6. Attach any copper element with copper, brass or bronze (non-ferrous) hardware to avoid deterioration through galvanic action. Marine grade stainless steel fasteners may also be used.

Skylights

Condition: Poor

Description:

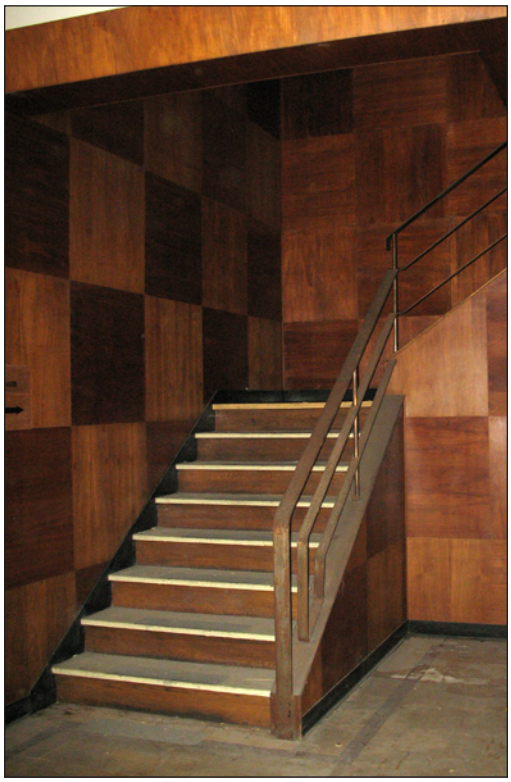
- The skylights appear covered with tar paper
- Roof not accessible

Condition:

- Significant water damage around skylights

Recommendation:

- Remove tar paper covering
- Repair roof around skylights
- Restore skylights



INTERIOR

South stairs
Condition: fair
Description:
- Late 1930s moderne stairs
- Cherry plywood panels over brick walls
- Painted steel handrails

Condition:
- Some rust on handrails

Recommendation:
- Clean plywood
- Remove rust and Repaint handrails

North stairs
Condition: Good
Description:
- Steel stringers and ornamentation with wood treads
- Cast iron ornamental risers

Condition:
- Paint chipping from steel

Recommendation:
- Refinish wood treads.
- Repaint ornamental cast-iron risers.

Doors
Condition: Good
Description:
- Approximately 40 wood interior office doors

Condition:
- Most doors still operable

Recommendation:
- Restore interior wood doors:

1. Where wood is damaged or splintered, repair using a dutchman patch of the same kind of wood with the same grain orientation. Finish to match the surround wood.
2. Maintain varnished wood with an appropriate cleaner that will not fog or solve the finish.
3. Where doors sag or are out of square, remove to a shop and re-square and glue or re pin joints on a flat surface. Make repairs without damage to the finishes.
4. Fully utilize alternative standards available under the Americans With Disabilities Act and the State Historical Building Code to preserve historic doors which do not meet current disabled access standards.

WWII Fluorescent Light Fixtures

Condition: Good

Description:

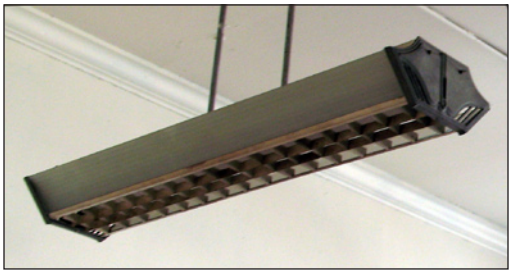
- WWII fluorescent lighting in basement and first floor

Condition:

- Appear functionally sound

Recommendation:

- General Light Fixture Repair
  1. Survey all light fixtures for deterioration, missing elements, operability and hazardous material content. Record the findings in a window survey log.
  2. Retain as many historic fixtures as possible. Repair for re-use if possible. If re-lamping is not possible, retain in place and add additional new lighting.
  3. Early fluorescent lights generally contain hazardous materials in their ballasts. If possible, retrofit the light fixtures for modern lamping, and dispose of ballasts as required by law.



Incandescent Light Fixtures

Condition: good

Description:

- Incandescent fixtures on second floor and attic

Condition:

- Appear functionally sound
- Approximately 35% fixtures missing

Recommendation:

- Clean and check wiring. General Light Fixture Repair
  1. Survey all light fixtures for deterioration, missing elements, operability and hazardous material content. Record the findings in a window survey log.
  2. Retain as many historic fixtures as possible. Repair for re-use if possible. If re-lamping is not possible, retain in place and add additional new lighting.
- Replace missing fixtures in kind

Restrooms

Condition: Fair

Description:

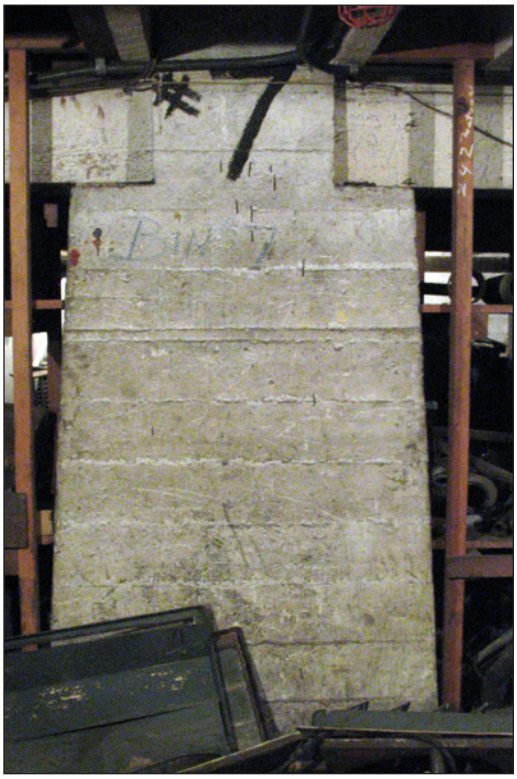
- Restrooms with historic fixtures, hardware, and steel partition walls on each floor east of primary stairwell.

Condition:

- Condition of plumbing unknown
- Fixtures and hardware intact

Recommendation:

- Restore historic restrooms



WALLS

Sub-Basement Concrete Walls and Floor
Condition: fair
Description:
- Concrete slab
- Board-formed concrete walls and monolithic concrete slab

Condition:
- Significant water penetration into sub-basement

Recommendation:
- Install new groundwater mitigation system.

Concrete Walls
Condition: Good
Description:
- Painted board-formed concrete walls in basement

Condition:
- Graffiti and chipping paint

Recommendation:
- Repaint basement concrete walls

Cast Iron Columns
Condition: Excellent
Description:
- Approximately 38 cast iron columns with painted capitals in basement and first floor

Condition:
- No significant damage to columns

Recommendation:
- Repaint columns. Ferrous Metal Corrosion and Coating Treatments:

1. Remove rust and most of the surrounding paint. Determine the extent of failure, corrosion and surface detailing before determining the removal method. Potential methods include wire brushing, grit blasting, or chemical methods. The presence of lead-based paint will also affect the choice of removal method.
2. Remove all loose, flaking and deteriorated paint and corrosion to bare metal.
3. Degrease surfaces and prime immediately.
4. Paint Selection: Option One: Spot prime with industrial corrosion inhibiting primer, followed by two coats of oil based paint. Option Two: high performance coatings, such as zinc-rich primers, and epoxy coatings should be considered to allow for longer lasting protection. Note: These coating typically require highly clean surfaces and special application conditions that can be difficult to achieve at some sites.

Steel Tension Rods
Condition: excellent
Description:

- Painted steel tension rods support hang from roof truss and support the the second floor ceiling and attic floor.

Condition:

- Paint chipping
- Two suspension rods missing since before linoleum installed (circa 1936)

Recommendation:

- Coordinate with structural engineers to see if missing rods require replacement
- Repaint steel tension rods. Ferrous Metal Corrosion and Coating Treatments:

1. Remove rust and most of the surrounding paint. Determine the extent of failure, corrosion and surface detailing before determining the removal method. Potential methods include wire brushing, grit blasting, or chemical methods. The presence of lead-based paint will also affect the choice of removal method.
2. Remove all loose, flaking and deteriorated paint and corrosion to bare metal.
3. Degrease surfaces and prime immediately.
4. Paint Selection:

   Option One: spot prime with industrial corrosion-inhibiting primer, followed by two coats of oil based paint.
   Option Two: high performance coatings, such as zinc-rich primers, and epoxy coatings should be considered to allow for longer lasting protection. Note: These coating typically require highly clean surfaces and special application conditions that can be difficult to achieve at some sites.

Gypsum Plaster Over Brick Walls
Condition: fair
Description:

- Plaster over interior side of brick walls on first and second floors

Condition:

- Localized water damage
- More extensive water damage at NW wall and on second floor

Recommendation:

- Repair 35% plaster over brick walls: Gypsum

Flat Plaster Repair

1. Survey walls and ceilings for areas of failure
2. Where plaster is attached to a failed substrate, or is damaged from water intrusion, eliminate the water source, rebuild the substrate, and re-plaster using a three coat system
3. Repair for loose or deteriorated plaster
   a. Cut plaster back to sound, well-keyed material.
   b. Install new three-coat plaster.
   c. Finish plaster to match existing adjacent surfaces.
   d. Prepare and paint matching adjacent surfaces.
4. Repair for cracks
   a. Determine that cracking is in the plaster finish and not part of a cracked substrate.
   b. Open and undercut the crack to key the repair. Apply new gypsum finish coat or repair compound.

Painted Brick Walls

Condition: fair

Description:

- Painted brick walls in attic

Condition:

- Some seismic cracking
- Brick infill between roof joists damaged.

Recommendation:

- Coordinate with structural report
- Patch and repoint mortar. Brick Masonry Repointing:
  1. Analyze mortar to establish original composition. Specify repair mortar matching original.
  2. Rake out all loose or deteriorated mortar. Repoint with new mortar to match original color, texture, joint profile and chemical composition.
  3. Replace deteriorated sealant between door and window frames and other adjacent non-masonry cladding materials.
- Secure loose bricks. Brick Masonry Replacement:
  1. Remove and salvage sound brick / remove deteriorated bricks, retaining some to pulverize for color-matched patch materials. (Note that most masonry observed at Pier 70 is either load-bearing or non-veneer solid masonry. Brick replacement should be coordinated with the

structural engineer regarding shoring requirements).
2. Replace brick, using historic bricks wherever possible. New custom bricks may be required to match the historic material.
3. Lay new brick flush with adjacent surface.
4. Apply new bedding mortar to match original color, texture, joint profile and chemical composition.

- In order to prevent moisture from being trapped behind a non-permeable layer of historic paint, remove paint from the painted brick walls.

Partition Walls
Condition: Good
Description:
- Wood partition walls with glazing on first, second, and attic floors

Condition:
- No significant damage

Recommendation:
- Repaint wood partition walls

FLOORS

Linoleum Over Wood T&G Floor
Condition: fair
Description:
- Basement, First and Second floors and Attic primarily have linoleum over wood T&G floors

Condition:
- Aged linoleum in poor condition with cracks, tears, and water damage
- Localized water damage to wood T&G floors

Recommendation:
- Replace 100% linoleum

- Repair 10% water damaged wood floor. Wood Floor Repair:
  1. Review the survey to determine quantities of repair or replacement.
  2. Identify any sub floor deterioration and make repairs prior to making finished floor repairs.
  3. Repair materials should match the original in wood species, and dimension.
  4. March the nailing method to the existing attachment.
  5. Sand to level the floor between repairs and existing materials.

VAT Floors
Condition: Fair
Description:
- Vinyl asbestos tile floor around south stairway

Condition:
- Tile still in place

Recommendation:
- Coordinate with abatement team
- Remove 100% Vinyl Asbestos Tile

Carpet Floors
Condition: Fair
Description:
- Carpeted office floors

Condition:
- Localized water damage

Recommendation:
- Remove carpeting and restore wood floor. Wood Floor Repair
  1. Review the survey to determine quantities of repair or replacement.
  2. Identify any sub floor deterioration and make repairs prior to making finished floor repairs.
  3. Repair materials should match the original in wood species, and dimension.
  4. March the nailing method to the existing attachment.
  5. Sand to level the floor between repairs and existing materials.

CEILING

Plaster and Lath Ceiling
Condition: fair
Description:
- Plaster & Lath ceiling in basement, first, and second floors.

Condition:
- Localized water damage

Recommendation:
- Clean and repaint.
- Restore 20% plaster and lath ceiling. Gypsum Flat Plaster Repair:

1. Survey walls and ceilings for areas of failure
2. Where plaster is attached to a failed substrate, or is damaged from water intrusion, eliminate the water source, rebuild the substrate, and re-plaster using a three coat system
3. Repair for loose or deteriorated plaster
   a. Cut plaster back to sound, well-keyed material.
   b. Install new three-coat plaster.
   c. Finish plaster to match existing adjacent surfaces.
   d. Prepare and paint matching adjacent surfaces.
4. Repair for cracks
   a. Determine that cracking is in the plaster finish and not part of a cracked substrate.
   b. Open and undercut the crack to key the repair. Apply new gypsum finish coat or repair compound.

Trusses
Condition: good
Description:
- Painted heavy-timber wood trusses

Condition:
- Extensive water staining

Recommendation:
- Repaint heavy-timber wood trusses

Attic Ceiling
Condition: poor

Description:
- Exposed roof diaphragm planks

Condition:
- Extensive water staining
- 50% roof diaphragm planks require replacement as discussed in the Roof section

Recommendation:
- Repaint attic ceiling

ACCESSIBILIITY

The basement sits at grade and has doors that would permit wheelchair users to access the interior without ramps. An elevator would be necessary to access the upper floors. It does not appear possible to retrofit the front door without damaging the building's historic integrity.

Reuse Scenario:

- Continues as office use
- Demolish World War II additions and one-story annex
- Commercial in basement that has access to 20th street.

PORT OF SAN FRANCISCO · PIER 70 · BUILDING 104
SEISMIC REVIEW

Prepared by:

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1.1 Introduction

This report summarizes the findings and recommendations of a qualitative seismic and structural assessment of the Port of San Francisco Building 104. The structural assessment included a site visit, review of available architectural drawings, available previous reports and structural/seismic assessment in accordance with Tier 1 of the ASCE/SEI 31-03. The purpose of this assessment is to note decay of existing structural materials (when readily visible), to identify potential seismic deficiencies, and to develop recommendations for further investigations, analyses and retrofit.

1.2 List of Available Documents

1. "Seismic Evaluation and Concept Level Retrofit Design for Building 104" by URS, dated January 2002.

2. "Geotechnical Evaluation Building No. 104", by URS, dated 12/18/2001.

3. Structural Drawings (15 sheets), by Bello & Associates, not dated.

1.3 Site Visit

A site visit of the building was performed on April 4, 2008. We were accompanied by the staff of Carey & Co. during this visit. The main purpose of the site visit was to visually assess the physical condition of the building and, in particular, focus on the lateral force resisting elements. Following items were assessed during the site visit:

1. Type and materials of building construction.
2. Presence of lateral bracing elements.
3. Visible cracks or distress in structure and signs of settlements

The site visit did not include any measurements, testing, or removal of finishes.

1.4 Basis of Assessment

The Standard ASCE/SEI 31-03, American Society of Civil Engineers, *"Seismic Evaluation of Buildings,"* 2003, was used as the basis of our qualitative seismic evaluation. There are two seismic performance levels defined in ASCE/SEI 31-03: Life Safety Performance and the Immediate Occupancy Performance. We have based our evaluation on the Life Safety Performance level which is typical for buildings of this type and which is defined as "the building performance that includes significant damage to both structural and nonstructural components during a design earthquake, though at least some margin against either partial or total collapse remains. Injuries may occur, but the level of risk for life-threatening injury and entrapment is low." The basic structural checklist from ASCE/SEI 31-03 for this building is attached as Appendix A.

1.5 Review of Existing Drawings, Reports and Site Observations

Building 104 was constructed in three phases: 4-story with a basement in 1896, 3-story annex at north side in 1941, and 1-story annex at the east side in 1943. The original 1896 building was designed by prominent San Francisco architects George Percy and Frederick Hamilton.

The 1896 building consists of 4-story unreinforced masonry (URM) shear wall / wood framing structure with a basement. It measures 150'-6" long by 49'-6" wide and 60'-0" tall and a small stair area to the north, and contains about 37,600 square feet.

The roof vertical load carrying system of original building consists of 1x6 straight sheathing supported by 2x joists spanning between 4x10 beams, which in turn are supported on heavy wood trusses. The trusses bear on masonry pilasters. Portions of the roof sheathing have completely deteriorated and leaked rainwater onto floor, resulting in some water damage on 3rd floor finishes as shown on Photo 7. There is some significant charring and deterioration of the roof trusses as seen in Photo 5. Existing roof framing may require strengthening and/or new framing to support existing dead loads plus current code live loads. No significant additional load should be added to the roof prior to repairing the damaged structure.

The typical floor vertical load carrying system of original building consists of 1x6 straight sheathing supported by approximate 11 inch deep joists at 16" on center, which in turn are support either by masonry bearing walls or floor beams. In the stair area, vertical loads are resisted by 8" concrete slabs supported by the masonry bearing walls.

The 3-story north annex is a wood frame structure. It was constructed north of original building in 1941. The roof framing consists of 1x6 straight sheathing supported by 2x trusses spaced at 24" on center, which in turn are supported by wood beams on posts at the north end and on a ledger bolted to the original building at the south end. The floor framings consist of 1x4 diagonal sheathing supported by approximate 11 inch deep joists at 16" on center, spanning between north-south steel beams. The steel beams are supported on wood posts at the north end, and on original building URM wall at the south end.

East annex is a one-story wood frame structure. It was constructed at the northeast corner of original building in 1943. The roof framing consists of 1x8 straight sheathing supported by east-west 2x8 roof joists spaced at 16" on center, which in turn are supported by wood stud walls.

Photo 1 Above: View of North Side Showing 1941 North Annex

Photo 2 Below: View of East Side Showing 1941 North Annex and 1943 East Annex

The lateral force resisting system of the original building consists of floor and roof wood diaphragms and URM walls at exterior and around the interior stairways.

The existing lateral force resisting system appears to have many seismic deficiencies. The existing diaphragms, consisting of 1x6 straight sheathing appear inadequate for seismic lateral forces. The URM shear walls appear exceeding height-to-thickness ratio. The exterior URM walls have many windows which can create an inadequate seismic load resisting system which could lead to substantial damage during a seismic event and possibly could precipitate partial collapse of the structure. The exterior URM walls have some diagonal and vertical cracks in multiple locations. The URM shear walls do not appear to be detailed to resist out-of-plane loads. The anchorage of the URM walls to the roof and floor diaphragms for out-of-plane seismic loads appears inadequate. The consequences are that the heavy URM walls can pull away from the roof /floor framing, causing roof/floor framing to lose vertical support. The roof trusses and floor beams bear on URM pilasters, but do not appear to have positive connections to URM wall.

Finally, the lateral load path for shear transfer between north annex and original building appears inadequate.

Photo 3 Above: View of South Side

Photo 4 Below: View of North Wall Showing Stair/Restroom Area and 1941North Annex

The building was previously analyzed and evaluated in 2002 by URS. The evaluation found that the building has several specific weaknesses that would prevent the building from meeting the Life Safety Performance Level based on the requirement of Chapter 16C of the San Francisco Building Code. URS report also presented seismic strengthening concepts for the building.

Based on information contained in existing reports and drawings, the foundations consist of continuous reinforced concrete strip footing at the perimeter and interior walls, and reinforced concrete spread footings at the interior columns. Since the basement is below grade, the perimeter walls act as retaining walls. No signs of earthquake induced cracking or settlement was observed in the basement floor slabs.

1.6 Conclusions and Recommendations

Given the vintage of the building, many structural elements will not meet the provisions of the current building code. Main seismic deficiencies from our review are summarized below.

1. The existing diaphragms appear inadequate for seismic loads.
2. The exterior URM walls have many windows which can create an inadequate seismic load resisting system which could lead to substantial damage during a seismic event and

Photo 5 Above: Roof Truss (1896 Original

Photo 6 Below: Deteriorated Roof Sheathing (1896 Original Building)

possibly could precipitate partial collapse of the structure.

3. The anchorage of the URM walls to the roof and floor diaphragms for out-of -plane load appears inadequate.
4. The roof trusses and floor beams bear on URM pilasters, but do not appear to have positive connections to URM pilasters.
5. The lateral load path for shear transfer between north annexes and original building appears inadequate.

In our professional opinion any proposed renovation or modernization of the building should include the following:

1. A detailed seismic evaluation of the building to quantitatively estimate the seismic deficiencies and to develop seismic retrofit measures.
2. Since structural drawings and geotechnical report for the building are not complete, the seismic evaluation would also require some site measurements and validation of geotechnical report by URS.
3. For preliminary planning and cost-estimating purpose, the seismic strengthening may consist of:

Photo 8 Above: Typical Framing at 2nd Floor (North Annex)

Photo 7 Below: Deteriorated 3rd Floor Finish (1896 Original Building)

- Add plywood sheathing to floor and roof to increase shear strength of diaphragm.
- Strengthen the URM walls with shotcrete walls or add new steel braced frames to resist seismic forces in four sides. New shotcrete walls or steel braced frames will require new foundations to provide adequate support for seismic loads.
- Add new ties to connect roof /floor diaphragms and URM walls for out-of-plane seismic loads.
- Add new ties anchors to connect the roof trusses or floor beams and URM wall.
- Add new ties to connect the North Annex diaphragms and 1896 building. Add new anchors into existing ledgers to adequately transfer seismic loads into 1896 building

1.7 Limitations and Disclaimer

This report includes a qualitative seismic assessment of the building. It should be noted that no structural drawings for the building was available. Obvious seismic deficiencies identified visually during site visits or by review of available architectural drawings are summarized in this report.

However, users of this report must accept the fact that deficiencies may exist in the structure that could not be identified in this limited evaluation. Our services have consisted of providing professional opinions, conclusions, and recommendations based on generally accepted structural engineering principles and practices existing at this time.

Appendix A

Basic Structural Checklist for
BUILDING TYPE URM: Unreinforced Masonry Bearing Walls with Flexible Diaphragms (ASCE/SEI 31-03)
Tier 1 Assessment

Legend:

C: Complies
NC: Does not Comply
N/A: Not Applicable or Not Known

BUILDING SYSTEM

C	**NC✓**	**N/A**	LOAD PATH: The structure shall contain a minimum complete load path for Life Safety and Immediate Occupancy for seismic force effects from any horizontal direction that serves to transfer the inertial forces from the mass to the foundation. (Tier 2: Sec. 4.3.1.1)
C	**NC✓**	**N/A**	ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building shall be greater than 4 percent of the height of the shorter building for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.3.1.2)
C	**NC**	**N/A✓**	MEZZANINES: Interior mezzanine levels shall be braced independently from the main structure, or shall be anchored to the lateral-force-resisting elements of the main structure. (Tier 2: Sec. 4.3.1.3)
C✓	**NC**	**N/A**	WEAK STORY: The strength of the lateral-force-resisting system in any story shall not be less than 80% of the strength in an adjacent story above or below for Life-Safety and Immediate Occupancy. (Tier 2: Sec. 4.3.2.1)
C✓	**NC**	**N/A**	SOFT STORY: The stiffness of the lateral-force-resisting system in any story shall not be less than 70% of the stiffness in an adjacent story above or below or less than 80% of the average stiffness of the three stories above or below for Life-Safety and Immediate Occupancy. (Tier 2: Sec. 4.3.2.2)
C✓	**NC**	**N/A**	GEOMETRY: There shall be no changes in horizontal dimension of the lateral-force-resisting system of more than 30% in a story relative to adjacent stories for Life Safety and Immediate Occupancy, excluding one-story penthouses. (Tier 2: Sec. 4.3.2.3)
C✓	**NC**	**N/A**	VERTICAL DISCONTINUITIES: All vertical elements in the lateral-force-resisting system shall be continuous to the foundation. (Tier 2: Sec. 4.3.2.4)
C✓	**NC**	**N/A**	MASS: There shall be no change in effective mass more than 50% from one story to the next for Life Safety and Immediate Occupancy. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 4.3.2.5)

metal connection hardware shall be deterioration, broken, or loose.(Tier 2: Sec. 4.3.3.1)

C **NC✓** **N/A** MASONRY UNITS: There shall be no visible deterioration of masonry units. (Tier 2: Sec. 4.3.3.7)

C **NC** **N/A✓** MASONRY JOINTS: The mortar shall not be easily scraped away the joints by hand with a metal tool, and there shall be no areas of eroded mortar. (Tier 2: Sec. 4.3.3.8)

C **NC✓** **N/A** UNREINFOCED MASONRY WALL CRACKS: There shall be no existing diagonal cracks in the wall elements greater than 1/8 inch for Life Safety and 1/16 inch for Immediate Occupancy, and shall not form an X pattern. (Tier 2: Sec. 4.3.3.11)

LATERALFORCE RESISTIGN SYSTEM

C✓ **NC** **N/A** REDUNDANCY: The number of lines of shear walls in each principal direction shall be greater or equal to 2 for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.2.1.1)

C **NC✓** **N/A** SHEAR STRESS CHECK: The shear stress in the unreinforced masonry shear walls, calculated using the Quick Check procedure of Section 3.5.3.3, shall be less than 30psi for clay units and 70 psi for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.2.5.1)

CONNECTIONS

C **NC✓** **N/A** WALL ANCHORAGE: Exterior concrete or masonry walls that are dependent on the diaphragm for lateral support shall be anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connection shall have adequate strength to resist the connection force calculated in Quick Check procedure of Section 3.5.3.7 (Tier 2: Sec. 4.6.1.1)

C **NC✓** **N/A** WOOD LEDGERS: The connection between the wall panels and the diaphragm shall not induce cross-grain bending or tension in the wood ledgers. (Tier 2: Sec. 4.6.1.2)

C **NC✓** **N/A** TRANSFER TO SHEAR WALL: Diaphragm shall be connected for transfer of loads to the shear walls for Life Safety and the connections shall be able to develop the lesser of the shear strength of the walls or diaphragms for Immediate Occupancy. (Tier 2: Sec. 4.6.2.1)

C **NC** **N/A✓** GIRDER/COLUMN CONNECTION: There shall be a positive connection utilizing plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 4.6.4.1)