Commercial Construction Consulting. Inc.

MEDFIELD STATE HOSPITAL

CAPITAL ASSESMENT REPORT

RE-USE, REPAIRS & MAINTENANCE RECOMMENDATIONS

Prepared for the Town of Medfield

By Commercial Construction Consulting, Inc

September 2014

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I. GENERAL

The Medfield State Hospital (MSH) campus is located in Medfield, MA, two miles north of the town center situated on 247 acres of land. The core campus is approximately 90 acres, with 60 buildings of various size and condition. The campus is listed in the National, State and Medfield Register of Historic Places. The central green and its surrounding buildings represent the first state mental hospital to be built on the "cottage plan". Many of the historic buildings were built in 1896 – 1897 consisting of two & three-story heavy timber framed, masonry bearing red brick façade accented with granite and cast stone.

The campus had its own power plant on-site to produce heat and electricity. According to DCAMM, the power plant was de-commissioned in 2003, and therefore, the buildings have been without power or heat for eleven (11) years which has accelerated the rate of deterioration to the building structures.

II. PURPOSE

The purpose of the Assessment is to update a previous physical conditions assessment on the four existing sample buildings on the campus, specifically those on the historic register, to determine if the buildings that remain are in stable condition and to determine which of these buildings that may be in disrepair or structurally unsound. A comprehensive study was initiated by Division of Capital Asset Management and Maintenance (DCAMM) in 2003 which indicated that many of the buildings required immediate stabilization to prevent further damage by either dry rot or water damage. It is the intention to use the comprehensive report for the details and history of the property. This report will update the requirements to rehabilitate this property to a residential occupancy.

III. EXECUTIVE SUMMARY

Commercial Construction Consulting, Inc. was retained by the Town of Medfield to conduct a survey of four existing buildings at Medfield State Hospital (MSH) to opine on the potential re-use options. These four sample buildings were chosen out of the approximate 60 buildings of varying size and condition located on the campus. The buildings toured and inspected were:

- Chapel Building/Lee Hall – 15,593 Sq. Ft., Built in 1897
- Ward B-1 – 15,272 Sq. Ft., Built in 1896
- Ward C-2 – 17,738 Sq. Ft., Built in 1896
- Ward E-2 – 16,980 Sq. Ft., Built in 1897

We toured the property on September 18th & 25th with the assistance of DCAMM by walking the interior and exterior of the four selected buildings. Only limited destructive

testing was performed and we used an awl hand tool and moisture reader to form our opinions on the condition of the wood structure.

Overall the four buildings are in advanced stages of decay. The sampling of the four buildings represents the typical conditions for the remaining structures and as such our recommendations apply to the remaining buildings as well. The shells of the buildings are in fair to poor condition. We recommend undertaking immediate Major Façade Repairs and Renovations to prevent continuous water, rodent & structural damage. Security of the buildings should be improved as we noted many broken windows throughout which allow water & rodent infiltration. Small animal carcass & live birds were witnessed inside the buildings. Graffiti was also witnessed on interior walls which suggest that vandals are entering inside the buildings. Without temperature control or power, the buildings will continue to deteriorate at an accelerated rate. There are numerous areas of dry & wet rot at the timber structures located at roof framing, intermediate floor framing & the basements. Mold & mildew is evident throughout the properties. The majority of the wood framing is saturated with moisture as was evidenced by the moisture meter. For this reason, we opine that complete gut rehabilitation of the structure is required in order to re-use these buildings. Since this is typically cost prohibitive from an economic return on investment perspective, it is our opinion that the four buildings be demolished; however, since these buildings are listed Historic Properties (Town, State & National), these agencies may require that re-use is pursued. With that in mind we will assume that the buildings will be rehabilitated (with exception to Ward C-2 Building which is deteriorated beyond repair and is considered a safety hazard), but also show the scope and cost to demolish the structures and build like structures.

The buildings do not have central air conditioning systems. Heating was provided to the buildings by steam radiators located throughout each building and by two large forced hot air units located in the basement of each building with large cast iron steam coils. Air was forced through the steam coils and ducted up through the building by these two systems. The steam supply for the buildings was provided by the plant formerly located on the property that has been completely torn down. The steam was fed underground through service tunnels to the buildings. Each building has its own domestic water supply and electric water heaters and sanitary piping systems. The heating and plumbing systems and all of their components within the building are beyond their useful life. Furthermore, since the building has been abandoned for a decade and left exposed to freezing and alternately high humidity conditions, the piping has in some areas frozen and split, some sections of both steam piping and water piping have been disconnected, steam piping and steam traps have rusted and corroded beyond reasonable repair. Piping and ductwork insulation is sodden, covered with mold and falling off, if not completely off in many locations. All of the mechanical and plumbing systems and associated piping must be replaced as a part of any reuse plan for the building.

The electrical systems for each building were fed from the campus power plant which is now decommissioned. There were a number of panelboards in each building that

distributed the power to the receptacles, lighting and other miscellaneous equipment. All buildings will need a new electrical service provided by the utility and all new electrical distribution panelboards will need to be installed.

Each building had a fire alarm system with pull stations, and notification devices connected. As there was no power in the building these panels were not operating. The fire alarm systems are beyond their life expectancy and shall be replaced upon renovations.

The buildings are currently not provided with sprinkler protection. The buildings were provided with sprinkler protection at one time, but the systems have since been disconnected from the water supply and there are numerous sections of the systems where the piping has been cut and left open. The sprinkler systems in the buildings will need to be completely replaced with code compliant systems.

Upon undertaking major interior rehabilitation, the buildings will need to comply with all current code & accessibility requirements as outlined in Section VIII of this report. Likewise, all heating/cooling (HVAC), fire protection, fire alarm and electrical systems will need to be demolished & replaced to meet the current code. We will provide costs to install the aforementioned systems in each building assuming residential/multi-family occupancy. [1]

Typical façade design and construction of the campus buildings are brick masonry with stone or cast stone elements at windows and floor levels. Some corners have decorative "open" weave brick. Soffits, eaves and gables range from plain brick masonry to decorative corbels, single brick dentals, and reveals. Steep sloped roofs are original slate with copper flashing details and gutters. Chimneys are brick with concrete or stone caps. Gutters are typically hung from wood soffit boards. Windows are/were typically single glazed double hung wood framed units. Features such as porches have been removed from some buildings while remaining porches are in advanced states of deterioration. Exterior stair towers have been added to several buildings and are showing decay. The original masonry facades are in fair to very poor condition.

Although brick masonry is low in maintenance, eventually repairs and maintenance are required. Exteriors of these buildings show the results of severe deterioration due to zero maintenance performed in the last 10 to 40 years. Constant water washing over brick masonry from broken gutters, clogged gutters, and missing down leaders has eroded mortar and prematurely aged the masonry at many locations around each building, leading to larger and more costly repairs. Visible deterioration includes large and small cracks, displaced sections of walls, cracked and displaced arches over windows and doors, missing brick, loose brick, eroded and deeply eroded mortar joints, and efflorescence staining. Typically re-pointing of the mortar joints (cutting out the outer mortar ¾ inch deep or deeper to find sound mortar and installing new mortar tightly

[1] We opine that the only likely re-use of this property is residential/mutli-family. This location is not positioned well for commercial use.

packed into every joint) and replacement of individual brick will return the old masonry exteriors to almost new condition. For the three buildings that we consider salvageable we recommend 100% pointing of every mortar joint, complete reconstruction of cracked and displaced areas of brick, replacing every damaged brick, and reconstruction of chimneys.

Slate roofs with copper flashing details and copper gutters will typically have a 75-100 +/- year life span in New England, with maintenance. As slate ages it loses strength and eventually will cracked shedding pieces falling to the ground. Copper nails will deteriorate over time allowing whole slates to fall from the roof. Both of these conditions are visible on the slate roofs at MSH. As slate nears the end of its useful life maintenance becomes less effective because removing a piece of broken slate will damage adjacent slates leading to more replacements and more damage. Once slate reaches 100 years old, as on these buildings the entire system (slate, underlayment, copper flashing, etc.) must be replaced. Lack of maintenance and repairs has resulted in deteriorated slate not being repaired and water penetrating to the wood roof structure. We expect that large portions of the roof structure (joists, rafters, and planking) will have to be replaced when the slate roofs are replaced.

Gutters play a very large part to the longevity of a building's façade. By collecting water and directing it to the ground without washing over the façade aging and damage to the façade is reduced. On these buildings the original gutters and down leaders are/were copper. Missing, broken, and clogged gutters and broken and missing down leaders have allowed water to back up under roofs and to over flow damaging facades. All gutters and down leaders have to be replaced when the roofing and exterior walls are replaced and repaired.

Framing for these buildings consist of hard yellow pine wood joists (2x12 joists) supported on brick masonry bearing walls with a heavy timber trussed roof system. Finishes consist of painted plaster and lathe walls and ceilings, hardwood floors, some with carpet and vinyl composite tile.

IV. Service Life

We define service life as the amount of time a component or assembly can remain in use before extensive restoration or replacement is required. Periodic maintenance is required of all building systems and will typically extend service lives of assemblies to the maximum time.

The basic criteria for extending the expected useful life of a building structure are; temperature control, light, maintenance of envelope & security. Currently with the exception of minimal security, none of these buildings are being maintained.

Brick masonry exterior walls, slate roofs, copper flashing, and wood framed systems are typically very durable low maintenance assemblies. With periodic maintenance well

designed and constructed solid load bearing brick masonry walls can provide several hundred years of useful service life. Properly designed, installed, and maintained slate roofs can last up to 100 years before they must be completely replaced. As the brick walls support the roof structure and the roofs protect the walls brick masonry and slate roofs have a symbiotic relationship. New England's weather is the leading cause of roof and brick masonry deterioration over other causes. Protecting the brick masonry from excessive water intrusion and the resulting erosion and freeze / thaw damage is critical. Aging mortar joints can allow moisture to enter walls. Symptoms of aging are mortar debonding from the brick, eroded mortar resulting in recessed mortar joints, and cracked and missing sections of mortar. Once water penetrates the brick masonry water flowing within the masonry erodes mortar creating continually growing void areas. Expanding ice within walls will fracture the masonry creating larger voids allowing increasing amounts of water to enter the wall. Water reaching embedded iron and steel will cause the metal to rust. Expanding rust product will fracture the masonry allowing more water to enter accelerating the deterioration. Water will erode copper roof components to the point of failure. Moisture absorption will cause slates to degrade and weaken resulting in slate falling from roofs. Sliding ice will tear slate off roofs. To obtain maximum service life from each component regular attention, periodic maintenance, and repairs are required. Repairs and general maintenance have not been performed on these buildings for extended periods of time; 10 to 40 years. That lack of maintenance combined with no heat or air conditioning in the buildings has resulted in the severe state of deterioration of the walls and roofs to the point of bringing one building (C2) past the point of salvage.

Once water enters into inner fabric of the buildings through deteriorated and damaged roofing, walls, and windows, it will compromise the structural integrity of the wood frame system to the point of catastrophic failure if left unattended.

V. **MAINTENANCE & REPAIRS**

For this report we define Maintenance as regularly scheduled work necessary to counteract system aging and to address physical damage caused to exterior walls and roof systems. Repairs are the large scale work necessary to replace worn our components and to replace sections of walls and roofs but not full scale replacement of entire systems. Replacement is removing entire components such as roofing or windows and installing new systems.

VI. BUILDINGS

For each building included in this survey we note the following:

- Our opinion as to the condition of each exterior system component.
- Our recommendations for envelope and structural immediate repairs.
- Our recommendations for maintenance.

- Our recommendations for envelope and structural repairs during the term.

- Our recommendations for HVAC, Fire Protection, Electrical/Fire Alarm system replacement.

A. **Chapel/Lee Building**

Exterior brick masonry and the slate and copper roofs are original 1896 construction. Brick masonry on the Chapel is in the best condition of the 4 buildings included in this survey. The Chapel still suffers from extensive decay due to a complete lack of maintenance for the past 10+ years. 100% of the exterior solid load-bearing masonry walls require pointing. Numerous cracked and displaced brick have to be replaced. Exterior wood framing and cladding on dormers and windows is deteriorated and must be replaced. Windows are deteriorated and must be replaced including frames. The slate roof and copper flashing is original and must be replaced. Gutters are deteriorated and must be replaced along with all down leaders. Due to the advanced stage of deterioration of the slate roof we expect that 10% percentage of roof support rafters and decking will be replaced during the roof replacement work. Steel support bracing was added after the church was constructed that appears to be shoring the roof supports where they intersect the top of the side walls. This bracing will need to be replaced during the rehabilitation work.

The interior of the building is in fair condition. There is a roof leak in the Hall along the west elevation that has compromised the wood and post construction steel truss framing system.

There is another roof leak at the mezzanine level at the southwest corner that has caused wood rot to the roof truss system and damaged the wall and floor finishes.

Envelope Repairs:

- Point 100% of the exterior mortar joints.
- Replace all cracked, displaced, missing brick and stone masonry.
- Replace slate roofing including copper flashing and slate underlayment.
- Replace all deteriorated roof decking and supporting rafters.
- Replace all windows.
- Replace all exposed exterior wood sheathing and boards.
- Replace all copper gutters and downleaders including wood support lumber.
- Remove exterior wood entrances.

Structure:

Immediate Repairs:

- Demolish and re-build structural frame in its entirety.

Term Repairs:

- No items.

Maintenance (R&M):

- No items.

Interior Finishes:

- All finishes will be totally removed and replaced as part of the core demolition and build-out.
- All existing mechanical, electrical, fire alarm and fire protection systems are to be demolished, re-designed and installed as part of the anticipated redevelopment.

Photos:

Typical façade Note efflorescence stains

Typical façade Note cracks

Decorative brick and stone tower corbels

Deteriorated slate at cupola

Deteriorated & missing slate

Step crack and eroded mortar joints

Close up of gutter showing past repairs

Deteriorated dormer

View of water damaged roof framing and walls in mezzanine at south west corner.

View of water damaged roof truss system at west wall of Hall.

B. **Ward B-1**

Exterior brick masonry and the slate and copper roofs are original 1896 construction. Brick masonry exterior walls of Ward B1 are in worse condition than those on the Chapel. These exterior suffer from extensive decay due to a complete lack of maintenance for the past 10 years. 100% of the exterior solid load-bearing masonry walls require pointing. Masonry arches over the front door and a front window have cracked and displaced downward; a condition that will require extensive reconstruction of the full depth of the masonry. Around the façade there are numerous cracked and displaced brick that have to be removed and the sections of walls rebuilt. Brick has fallen from a chimney and we expect the entire chimney will require reconstruction. The "new" exterior stair tower exhibits efflorescence staining indicating water is penetrating the brick walls and decaying the mortar. Exterior wood framing and cladding on windows is deteriorated and must be replaced. Windows are deteriorated and must be replaced including frames. The slate roof and copper flashing is original and must be replaced. Gutters are deteriorated and must be replaced along with all down leaders. Due to the advanced stage of deterioration of the slate roof we expect that 25% percentage of roof support rafters and decking will be replaced during the roof replacement work.

The interior of the building is in fair to poor condition. There is water infiltration evident at the front corridor which has rotted the floor framing on the 1st & 2nd floor and is in unsafe condition. There are more examples of this type of deterioration throughout the building. Mold is evident throughout the interior. The enclosed stairwell structure located at southeast corner, which was built as an addition after the original construction, has water damage and has deteriorated past the point of rehabilitation and should be demolished and re-built.

Envelope Repairs:

- Point 100% of the exterior mortar joints.
- Rebuild displaced masonry arches over the entrance and windows.
- Rebuilding chimneys
- Replace all cracked, displaced, missing brick and stone masonry.
- Replace slate roofing including copper flashing and slate underlayment.
- Replace all deteriorated roof decking and supporting rafters.
- Replace all windows.
- Replace all exposed exterior wood sheathing and boards.
- Replace all copper gutters and downleaders including wood support lumber.

Structure:

Immediate Repairs:

- Demolish and re-build structural frame in its entirety.

Term Repairs:

- No items.

Maintenance (R&M):

- No items.

Interior Finishes:

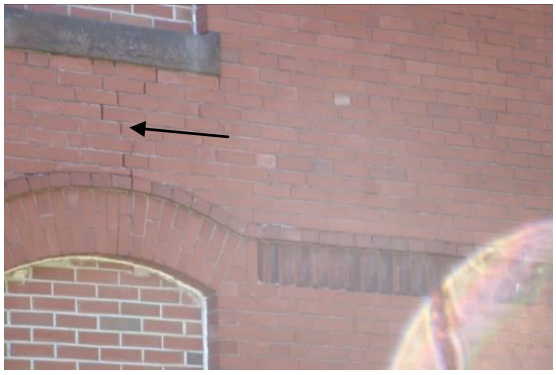
- All finishes will be totally removed and replaced as part of the core demolition and build-out.
- All existing mechanical, electrical, fire alarm and fire protection systems are to be demolished, re-designed and installed as part of the anticipated redevelopment.

Photos:

Front elevation showing deteriorated masonry arches and other cracks

Condition of chimney

Condition of slate roofing



Step cracks extending between window openings

View of water damaged ceiling, floor and wall at 1st & 2nd floor at front entrance.

View of mold on walls.

View of water saturated stairwell. Note efflorescence on exterior walls.

C. **Ward C-2**

Exterior brick masonry and the slate and copper roofs are original 1896 construction. Brick masonry facades of Ward C2 are most extensively deteriorated of the four buildings we inspected. Ward C2 suffers from extensive decay due to a complete lack of maintenance since the building was closed in 1977. We recommend demolishing this building. Test openings made during a previous condition assessment show the inner parts of the exterior walls are not fully filled with mortar; a condition that allows moisture to easily penetrate through the walls and to interior wood structure. 100% of the exterior solid load bearing masonry walls require pointing, large areas will require deep pointing were mortar joints have been deeply eroded. Numerous cracked and displaced brick have to be replaced. Exterior wood framing and cladding on dormers and windows is deteriorated and must be replaced. Windows are deteriorated and must be replaced including frames. The slate roof and copper flashing is original and must be replaced. Gutters are deteriorated and must be replaced along with all down leaders. Due to the advanced stage of deterioration of the slate roof we expect that up to 50% of roof support rafters and decking will be replaced during the roof replacement work.

The interior of the building is in poor condition. There is water infiltration and dry rot evident throughout which has caused wood rot at floor boards, structural floor joists, and floor framing on the 1st & 2nd floor and is in unsafe condition. Because of the existing failing conditions, we were only able to inspect the basement and the entrance of the 1st floor. We opine that this building is past the point of repair and should be demolished in its entirety.

Envelope Repairs:

- Demolish

Structure:

<u>Immediate Repairs:</u>

- Demolish and re-build structural frame in its entirety.

<u>Term Repairs:</u>

- No items.

Maintenance (R&M):

- No items.

Interior Finishes:

- All finishes will be totally removed and replaced as part of the core demolition and build-out.
- All existing mechanical, electrical, fire alarm and fire protection systems are to be demolished, re-designed and installed as part of the anticipated redevelopment.

Photos:

Deteriorated slate, efflorescence, and eroded mortar joints

Eroded mortar joints

Efflorescence and displaced brick

Interior wall voids

Mortar washed away due to missing down leader

View of water damaged floor joists and flooring from basement looking up to 1st floor.

View of water damage at 1st floor ceiling.

View of water wood rot at floor joists.

D. **Ward E-2**

Option 2 Remediation Requirement

Exterior brick masonry and the slate and copper roofs are original 1897 construction. Brick masonry exterior walls of Ward E2 are in approximately the same general condition as those on the Ward B1. These exterior suffer from extensive decay due to a complete lack of maintenance since the building was closed in 1977. Previous work has removed some but not all of the wood entrance stoops and porches. 100% of the exterior solid load-bearing masonry walls require pointing. Around the façade there are numerous cracked and displaced brick that have to be removed and the sections of walls rebuilt. Exterior wood framing and cladding on porches and windows is deteriorated and must be replaced. Windows are deteriorated and must be replaced including frames. The slate roof and copper flashing is original and must be replaced. Gutters are deteriorated and must be replaced along with all down leaders. Due to the advanced stage of deterioration of the slate roof we expect that 25% percentage of roof support rafters and decking will be replaced during the roof replacement work.

The interior of the building is in good to fair condition. There is water infiltration and dry rot evident in the attic space (from the roof) which has caused wood rot at floor boards, structural floor joists, and floor framing. There is moisture in the basement and evidence of some wood rot at the floor joists. The wood porch located at the south elevation is in disrepair and should be demolished.

Envelope Repairs:

- Point 100% of the exterior mortar joints.
- Remove all remaining wood porches.
- Replace all cracked, displaced, missing brick and stone masonry.
- Replace slate roofing including copper flashing and slate underlayment.
- Replace all deteriorated roof decking and supporting rafters.
- Replace all windows.
- Replace all exposed exterior wood sheathing and boards.
- Replace all copper gutters and downleaders including wood support lumber.

Structure:

<u>Immediate Repairs:</u>

- Demolish and re-build structural frame in its entirety.

Term Repairs:

- No items.

Maintenance (R&M):

- No items.

Interior Finishes:

- All finishes will be totally removed and replaced as part of the core demolition and build-out.
- All existing mechanical, electrical, fire alarm and fire protection systems are to be demolished, re-designed and installed as part of the anticipated redevelopment.

Photos:


Entrance porch removed


Deteriorated copper of slate roof


Eroded mortar


Deteriorated masonry


Conditions around windows


View of wood rot at floor boards in attic and joists in basement.

View of wood rot at floor boards in porch.

View of typical 9x9 vct floor tile.

VII. **Construction Cost Summary:**

See attached spreadsheet showing the estimated costs to:

I.

- Perform envelope repairs.
- Rehabilitate interior structure and finishes.

II.

- Perform complete demolition of building structures.
- Construct like buildings.

Assumptions for our estimates:

- Cost estimates shown are union trades. (Deduct 15% of the cost if non-union trades are retained.)
- Estimate includes asbestos & lead paint abatement.

Estimate does not include demolition of the utility tunnel adjacent to the buildings. Note: According to DCAMM, these utility tunnels contain pipes which have known asbestos pipe wrap. Upon site work, these tunnels will need to be abated and demolished. The cost to perform this work is estimated to be between $380-$400/LF for the removal of the utility tunnel. This estimate includes excavation, demolition, removal, hauling, and backfill/compaction. The number does NOT include cut/cap/make-safe of any utilities that might still remain, or over-seed/landscaping. The Cut/Cap/Make-safe and Landscaping would add about $75/lf. Conceptually you wouldn't be cutting and capping at each LF…but more likely 7 to 8 locations within a 100 foot run.

Medfield State Hospital Code & Accessibility Assessment

Upon the planned rehabilitation of the four buildings we toured, the following Codes & Accessibility requirements will be triggered:

APPLICABLE CODES

Code Type	Applicable Code (Model Code Basis)
Building	780 CMR: Massachusetts Building Code (8th Edition) (2009 International Building Code, amended) (2009 International Existing Building Code, amended)
Fire Prevention	527 CMR: Massachusetts Fire Prevention Regulations (effective Jan 1, 2015: NFPA-1 (2012) with MA amendments)
Accessibility	521 CMR: Massachusetts Architectural Access Board Regulations (2006) ADA: Americans with Disabilities Act (2010 ADAAG)
Electrical	527 CMR 12.00: Massachusetts Electrical Code (2014 National Electrical Code, amended)
Elevators	524 CMR: Massachusetts Elevator Code (2004 ASME A17.1, amended)
Energy	2012 International Energy Conservation Code, amended
Mechanical	2009 International Mechanical Code
Plumbing	248 CMR: Massachusetts Plumbing Code (2005)

This code analysis is a summary of the requirements of the Massachusetts State Building Code, 8th Edition, which are triggered by the proposed renovations of the existing building. The Eighth Edition is based on the International Building Code (IBC) 2009 and, in lieu of the IBC Chapter 34, the International Existing Building Code (IEBC) 2009; both with MA amendments.

MA changes to the Scope and Administrative provisions of the IEBC will be applicable for this project, regardless of the method of evaluation chosen. Certain provisions are outlined below.

780 CMR Section 1101.1 Scope. It is the intent of this chapter to provide means for the preservation of historic buildings as certified by the Massachusetts Historical Commission. There is no obligation for owners of historic buildings to use the provisions of this chapter. This chapter shall preempt all other regulations of 780 CMR governing the reconstruction, renovation, alteration, change of use and occupancy, repair, maintenance and additions for the conformity of historic buildings and structures to 780 CMR, with the exception of 780 CMR, section 113 for appeals, or unless otherwise specified. In case of fire or other casualty to a historic building, said building may be rebuilt, in total or in part, using such techniques and materials as area necessary to restore

it to its original condition and use group. If a building or structure as a result of proposed work would become eligible for certification as a historic building and Massachusetts Historical Commission so certifies by affidavit, and such affidavit is submitted to the building official with the permit application, then the building official shall have the authority to allow the work to proceed under the provisions of this chapter.

The section of historic buildings is not required to owners; however, this section may be required by building officials for historic buildings.

Work Area Compliance Method

The premise behind the three levels of work is, besides requiring that all new equipment and systems meet the code for new construction, that additional building improvements are required above and beyond the scope of work otherwise proposed.

Alterations -- Level 1: Level 1 alterations covers removal and replacement of existing materials, elements, equipment or fixtures using like materials that serve the same purpose.

Alterations – Level 2: Level 2 alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration of any system, or the installation of any additional equipment.

Alterations – Level 3: Level 3 alterations apply when the work area exceeds 50 percent of the aggregate area of the building.

Change of Use – Where the work area changes use, requirements for that work area apply as well as requirements for Level 3.

The project is a change of use, which requires full compliance with all provisions for Level 1, Level 2, and Level 3. The provisions of Chapters 6, 7, 8, and 9 apply for this project.

Structural

606.1 General. Where alteration work includes replacement of equipment that is supported by the building or where a reroofing permit is required, the provisions of this section shall apply.

707.1 General. Structural elements and systems within buildings undergoing Level 2 alterations shall comply with this section.

807.1 General. Where buildings are undergoing Level 3 alterations including structural alterations, the provision of this section shall apply.

Analysis: When the renovation involves replacement of equipment that is supported by the building or where a reroofing permit is required, the structural requirement shall comply with Section 606. In addition, the work involves the structural elements and system alterations; it should comply with Section 707.1 and 807.1.

907.3 Seismic loads. Existing buildings with a change of occupancy shall comply with the seismic provisions of Sections 907.3 and 907.3.2

907.3.1 Compliance with the International Building Code Level seismic forces. Where a building or portion thereof is subject to a change of occupancy that results in the building being assigned to a higher occupancy category based on 780 CMR Table 1604.5, the building shall comply with seismic forces as specified in Section 101.5.4.1 for the new occupancy category.

Exceptions:

1. Any occupancy being changed to Group A, E, I-1, R-1, R-2 or R-4 occupancies for buildings less than six stories in height and in Seismic Design Category A, B or C.

Analysis: Per Table 1604.5, IBC, Group I-2 occupancies having surgery or emergency treatment facilities, are classified as Occupancy Category IV; whereas residential buildings has less than 5,000 occupant load are classified as Occupancy Category II. Since the new occupancy category has less hazard, this section doesn't applicable to this project.

New Construction

Level 1, IEBC 602.4: All new work shall comply with materials and methods requirements in the IBC, IECC, and IMC, as applicable.

Analysis: The new fixtures, finishes, and replacement equipment must meet the provisions of the code for new construction. The provisions of Level 1 will be met.

Level 2, IEBC 701.3: All new construction elements, components, systems and spaces shall comply with the requirements of the IBC.

Analysis: Fixtures, finishes, and replacement equipment and materials must meet the provisions of the code for new construction. In the event the provisions for new construction cannot be met, Compliance Alternatives may be proposed.

Accessibility Code (521 CMR)

521 CMR, Massachusetts Architectural Access Board

The Massachusetts Architectural Access Board (MAAB) promulgates accessibility regulations for all buildings within Massachusetts, which are accessible to the public. Portions of the building that are open to the public may be required to meet the 521

CMR. For existing buildings the required level of compliance with 521 CMR is dependent upon the amount of work done in the building as follows:

1. Work amounting to greater than 30% of the full and fair cash value (100% equalized assessed value) of the building. The building is required to comply with the requirements of 521 CMR in full (521 CMR 3.3.2).

2. Work amounting to less than 30% of the full and fair cash value but greater than $100,000. All new work must comply and, in addition, an accessible public entrance and accessible toilet room, telephone and drinking fountain (if public toilets, telephones and drinking fountains are provided) are required (521 CMR 3.3.1(b)).

3. Work amounting to less than $100,000. Only the work being performed is required to comply (521 CMR 3.3.1(a)).

In determining whether the cost of the proposed work exceeds 30% of the existing building value, the 100% equalized assessed value of the existing building as recorded in the Assessor's Office at the time the building permit is issued must be used (521 CMR 5.38).

Period of Work The cost of all work performed on a building in any 36-month period must be added together in determining the applicability of MAAB accessibility regulations (521 CMR 3.5).

When the work cost exceeds 30% or greater than $100,000, the building is required to comply with the requirements of 521 CMR.

780 CMR 1007.2.1 Elevators required. In buildings where a required accessible floor is four or more stories above or below a level of exit discharge, at least one required accessible means of egress shall be an elevator complying with Section 1007.4

ADA 206.2.3 Multi-Story buildings and facilities. At least one accessible route shall connect each story and mezzanine in multi-story buildings and facilities.

EXCEPTIONS:

4. In residential facilities, an accessible route shall not be required to connect stories where residential dwelling units with mobility features required to comply with 809.2 through 809.4, all common use areas serving residential dwelling units with mobility features required to comply with 809.2 through 809.4, and public use areas serving residential dwelling units are on an accessible route.

521 CMR Section 9.3, in multiple dwellings that are for rent, hire, lease, or sale but are not equipped with an elevator, only units on the ground floor must be constructed as Group 1 Dwelling Units.

9.4 Group 2 Dwelling Units. In multiple dwellings that are for rent, hire, or lease (but not for sale) and contain 20 or more units, at least 5% of the dwelling units must be Group 2A units.

Analysis: When the work cost exceeds 30% or greater than $100,000, the building is required to comply with the requirements of 521 CMR. An elevator is not required in this project only if all common use and public use areas are on the first floor with an accessible route. Only units on the ground floor are required to be constructed as Group 1 dwelling units and it may also require Group 2 dwelling units.