Introduction and Executive Summary B

INTRODUCTION & BACKGROUND

The Needham Public School District serves approximately 5,322 students in grades, Pre-K thru 12. There are eight schools in the district: Newman Elementary School (Pk-5), Broadmeadow Elementary School (K-5), John Eliot Elementary School (K-5), Hillside Elementary School (K-5), Mitchell Elementary School (K-5), High Rock School (grade 6), Pollard Middle School (grades 7-8) and the Needham High School (grades 9-12).

Following a Town-wide Facilities Master Plan Study completed in 2006, the Permanent Public Building Committee (PPBC) along with the Town of Needham and the School District, determined that a Comprehensive Facilities Assessment should be completed for the Pollard, Mitchell and Hillside Schools as these were identified as the schools with the greatest physical needs in the school district.

The Assessment Report provided herein is for the Hillside and Mitchell schools; due to the focus of the study the Pollard Middle School report is presented separately. The Needham Facilities Master Plan identified both the Hillside and Mitchell Schools as candidates for either significant renovation or replacement by the year 2018. The Town of Needham determined, and our report concurs, that the condition of both Hillside and Mitchell are such that they are in need of improvements in the near term that would enable their continued use until such time that their long term futures can be determined. Long term renovation improvement recommendations which would extend the use of the facilities beyond 2018 are included in this report for both the Hillside and Mitchell schools as well but they are presented as an acknowledgement of the issues and needs of each school. They are also included to identify what should be done to make each building viable for the future (beyond 2018) if renovations and additions to the existing school facilities are part of the long term solution.

This Comprehensive Facilities Assessment provides the following for each school:

1. Documentation of existing conditions and physical assessment of each building and site with recommendations to address deficiencies at each school.

2. A Capital Improvement Plan for each school that summarizes the recommendations made in the reports, organizes them into 7 categories, and prioritizes them into one of two columns, near term (2011-2015), and long term (beyond 2015). The process used to determine each of the items in the capital improvement plan and their placement within the report is outlined below

    a. Each item in the capital improvement plan was identified through site visits and meetings with D&W, their consultants, principals and staff of each of the schools, and town facilities managers and their staff.

    b. Meetings were held with a working group comprised of school principals, superintendent of schools, members from the Town Public Facilities Dept. and Town Finance dept to determine which items could be addressed in the near term or may be

included in existing capital improvement budgets and schedules, and which items would be included in the long term improvements of the facilities

c. The items were categorized into 1. Health, Safety & Welfare, 2. Code Compliance, 3. Functional Use of the Building, 4. Handicap Accessibility, 5. Maintenance- Extending the Life of the Building, 6. Energy Efficiency/Energy Saving, and 7. Hazardous Materials Abatement. See Section I- Capital Improvements for a detail summary and description of these categories.

d. Some items fell into multiple categories and were placed in the category deemed most appropriate. Hazardous Materials abatement is an integral component to some of the work noted and as such, is partially carried in the cost of those items; other costs may be encountered in the scope of the work; these costs were carried as a line item allowance in Category 7 "Hazardous Materials Abatement".

e. Cost estimates were provided and placed into one of two columns: CIP 2011-2015 and Long Term Building Renovations. These cost estimates are for budgetary purposes only. Once a full scope of work is determined, a detailed review and re-assessment of the costs should be performed.

3. Recommendations for energy-efficient measures gained by upgrading or replacing equipment, systems, or building components that can reduce energy related operating costs or even reduce its carbon footprint.

4. A review of the potential future uses of each building in relationship to building systems and equipment, safety of building occupants, changes in educational programs, space use and technology in education. The possible long term building renovation recommendations developed during the course of this study support the integration of sustainable design components including, energy efficiency, recycling of materials, water conservation, renewable energy technology and environmentally friendly materials to the extent feasible.

Documentation

This report is based on information gathered by visual observations of the buildings and site reviewed by Dore & Whittier Architects, Inc. and its consultants, existing building drawings and documents provided by the Town of Needham, discussions with school staff, administration, and local officials.

EXECUTIVE SUMMARY

Introduction

This Comprehensive Facilities Assessment provides an independent architectural and engineering assessment of Hillside and Mitchell Elementary Schools in Needham, Massachusetts. This study serves as a tool to assist the Town of Needham with identifying and prioritizing a capital maintenance plan as well as documenting the extent of renovations or improvements needed to determine their future viability. Through the course of this study, Dore and Whittier Architects worked closely with the Town Facilities Department and gained input from school principals and school district administration. The extensive amount of information gathered herein should be used as a resource for any future work to be done on these schools.

Facilities Overview

Both Hillside and Mitchell schools have been maintained well and are similar in many ways. However, there are differences between the two schools which have an impact on the recommendations provided and the future decisions that need to be made regarding the viability of each building and site.

Hillside and Mitchell Schools are similar in that each building has not had a significant renovation or permanent addition in over 40 years. Each building has equipment and building components that have reached the end of their useful life and are due for replacement. Some manufacturer's are no longer in business, making parts difficult to find and costly to replace. Codes have changed significantly over the last five decades and have increased requirements to provide safe, healthy, and accessible school environments. Energy Codes have been developed and enhanced over the last 10 years, demanding increased insulation in the windows, walls and roofs as well as higher efficiency mechanical and electrical equipment, plumbing fixtures and building systems components.

Hillside School

The Hillside School site, although larger than the Mitchell School site, is more restricted. Due to its location; nestled into a hillside, bordered by residences and wetlands with limited vehicular access to the site the Hillside site provides limited expansion possibilities. As an inherent nature of these existing site conditions, there is a high water table; and the school experiences significant annual flooding in the crawl space beneath the lower level slab.

The Hillside School site is part of an eighty acre parcel of land known as a "Tier 1A disposal site" per the DEP. Mircowave Development Laboratory, Inc. (MDL) has been identified by the DEP as the principal responsible party for the environmental conditions and the source of the "release" which were discovered in the late 1980s. Remediation measures were agreed to by the DEP, the Town. Additionally after the discovery of low levels of TCE in indoor air at the Hillside Elementary School in 1988 MDL installed a Crawlspace Ventilation System in the school equipped with a with real-time monitoring system. The data is reviewed by independent environmental consultants on a weekly basis along with additional independent air sampling testing conducted per EPA guidelines. Updated reports are posted on the Hillside School web site and are available to the public. While this issue is monitored and controlled, this is a factor to consider when determining the future viability and / or constraints of the Hillside School site.

Mitchell School

The Mitchell School is located on a relatively flat site in a residential neighborhood, set back from the road and centered between ball fields and a wooded area. Of the two schools, it has more potential for possible future construction and should be considered for evaluation in a future study.

Capital Improvement Plan

Identified in the Capital Improvement Plan section of this study is a summary of the recommendations for each building along with itemized costs. Each item was placed into one of the seven applicable categories and a detailed review of each item was conducted with school and Town officials. Decisions were then made as to which column each item should be placed in; CIP 2011-2015 (work to be completed within five years) or Long-Term Improvements. Defining factors for these decisions included engagement with the following questions:

a. Does the item affect the health, safety or welfare of students, and deemed as an "immediate" need or in other words, cannot wait six or more years until it is addressed?
b. Does this item have an impact on daily learning/teaching?
c. Does the potential solution for the problem trigger a larger scale scope of work that would require building renovations?
d. Are there possible ways to address or mitigate the issue in the short term, while realizing that a longer-term solution will be necessary?
e. Is the item easily addressed through the Town Facilities annual maintenance program?

Note that these items are solely addressing building conditions and do not include a review of the educational program. There were a number of space utilization issues identified that had

an impact on the function of the school (such as remedial assistance/tutoring occurring in stairways) but cost estimates could not be included in this report as this would require an educational program review, which is outside the scope of this study.

Keeping this in mind, the conceptual estimate totals are outlined here for each school:

Hillside

Capital Improvement Plan (CIP) 2011-2015: $643,000
Long-Term Improvements: $5,013,000

Mitchell

Capital Improvement Plan (CIP) 2011-2015: $634,000
Long-Term Improvements: $7,257,000

The Capital Improvement Plan should be considered a "working document" for the Town and School District to use as a guideline for future improvements and can/should be modified as needs and changes arise.

The costs utilized in the estimates are for public school construction in Needham, Massachusetts in June 2011 dollars. These estimates were prepared for budgetary purposes and are preliminary in nature based on recent bid history and square footage calculations. These estimates should be considered "Project Costs" and include Owner's Contingencies as well as allowances for architect/engineering services, permitting, etc. Further refinement of costs will need to be evaluated as the scope of work is developed further.

These costs assume that the work is placed out to bid. Use of Public Facilities staff to address certain maintenance items (that are within limits of MGL) identified could result in significant offsets to the costs identified.

Space Utilization and Educational Programming

Both schools were noted to have a number of space use issues as observed during our walk-thru.

A few examples common to both schools were:

- Significant lack of administrative space; copiers, paper and work spaces were located in the corridors
- Significant lack of remedial/tutorial and special education spaces; small group instructional spaces were found in stairways, corridors, and storage rooms

- Lack of storage space has caused several stairways to and electrical/mechanical rooms to be filled with items; each school has constructed and continues to build outdoor sheds for additional storage

For quick comparison purposes, a review of a few spaces compared to current MSBA standards were reviewed:

Mitchell School

*square foot dimensions are based on the current enrollment of 477 students

Room type	Existing (sf)	MSBA Standard for gr. 1-5 (sf)	% over / under	
Typical classroom 1949 wing	780	950	-18%	
Typical classroom 1959 wing	870	950	-8%	
Typcial classroom 1969 wing	980	950	3%	
Library / Media	2100	2800	-25%	
Cafeteria	2400	3500	-31%	
Art	470	1000	-53%	
Music	625	1200	-48%	*existing is not dedicated space
Overall Student Capacity	**49,000 sf 477 students**	**49,000 sf 272 students**	**-42%**	

Hillside School

*square foot dimensions are based on the current enrollment of 435 students

Room type	Existing (sf)	MSBA Standard for gr. 1-5 (sf)	% over / under
Typical classroom 1959 wing	850	950	-11%
Typcial classroom 1969 wing	820	950	-14%
Library / Media	2200	2600	-15%
Cafeteria	2175	3250	-33%
Art	815	1000	-19%
Music	1020	1200	-15%
Overall Student Capacity	**47,000 sf 435 students**	**47,000 sf 261 students**	**-40%**

As each school is different in their specific building deficiencies and needs, they are similar in the way they are affected by the educational requirements, educational standards and educational philosophies that have changed since these buildings were constructed. Over the last 10-15 years changes have occurred in education that have had an impact on the learning environment including: the Massachusetts Education Reform Act, Special Education regulations and integration of student support services, the integration of computers and technology, project-based learning and team-teaching space needs, changes in student enrollment and an increased need for community, extra-curricular and after-school activity space.

Each school is faced with these similar issues but the way that each school addresses these issues will be different based on site constraints, existing building configurations, age and condition as well as the differences in the prioritizing of needs. Modifying the educational space or constructing new spaces to match the educational program will allow for improved educational function and increased learning opportunities.

Energy Efficiency and Sustainable Recommendations

Long-Term Building Renovations, expansion or replacement of systems are needed at both schools. In the long-term solution, energy efficiency/sustainable recommendations include:

- Add insulation to roof and walls, ensure proper drainage and consider light-colored roofing materials during re-roofing projects;
- Replace single-pane windows with high-performance windows, add operable windows where possible for natural ventilation;
- Consider utilizing thermal shades;
- Replace boilers with high efficiency condensing boilers;
- Upgrade HVAC systems to provide energy-recovery, VAV connected to CO2 or occupancy sensors;
- Upgrade the high-efficiency lighting fixtures and install occupancy sensors throughout; use LED Exit fixtures in all exit locations;
- Replace electrical distribution panels; consider photovoltaic installations;
- Upgrade water fixtures with low flow faucets, metered faucets, dual flush or very low flush toilets or waterless urinals;
- Collect/reuse rainwater when cost for system is justifiable;
- Consider materials with low VOC whenever possible;
- Utilize materials with recycled content and recycle/re-use construction waste to the maximum extent possible;

- Maximize incentive programs available for electrical equipment, gas systems, kitchen equipment, and renewable energy;
- Integrate student participation into any sustainable program improvement and make it a learning experience through curriculum integration.

Future Considerations and Options

Through the course of the study of the buildings, sites and option development we have outlined here a number of recommendations or options to be considered for future planning:

1. **Consider reducing number of students at Hillside: Use MSBA guidelines to determine maximum students for Hillside, adjust district programming to accommodate reduced population at Hillside (and probable increase at Mitchell), renovate/modify Hillside to meet educational needs of new population and address other facility needs as outlined in the report.**
   - This option would reduce traffic and congestion while keeping a neighborhood school in use;;
   - It would allow the continued use of the existing playfield, which is an important asset used not only by students but also by residents in the surrounding area.
   - It would allow for removal of modular classrooms.
   - Existing site and environmental-related issues will need to be resolved and mitigated in any future plan for the Hillside School site.
   - Some compromises due to site constraints may be necessary.

2. **Consider Consolidation of both the Mitchell and Hillside schools on Mitchell Site:**

   This option relies on either the construction of a new school on the site or the renovation and addition to existing Mitchell School and assumes removing Hillside as an elementary school. The consolidation of both schools on the Mitchell site will:

   - Provide updated (21st century) learning facility for both school districts
   - Allow for the possible expansion of playing fields at the Hillside school site
   - Provide an energy efficient, fully accessible, technologically updated facility with a life expectancy of 40 -50 years

   Investigation of feasibility of this site for this purpose along with permitting, traffic and construction impacts and phasing will be necessary.

3. Consider New School on New Site

- This will allow for the least construction phasing impact to educational function of the existing schools and eliminate o phasing costs during construction
- Site availability/suitability, permitting, traffic study, and related items associated with a new site will need to be considered.
- Possible uses for Hillside and Mitchell schools and sites would need to be addressed

4. Consider Alternative Use for Hillside School

- Due to limited site constraints and the extent of needed renovations/improvements to site and building, consideration should be made to possibility of converting building to an alternative use.
- Another option is to demolish portions or all of the building and convert site for playground or community use.

5. Consider Full-Day Kindergarten

- In any future planning including enrollment projections, should take into consideration the possibility for full-day Kindergarten and the impact that it would have on the building(s) design needs, site circulation, and total building square footage. .

Additional Considerations

In any long-range facilities plan, flexibility should be integrated into the construction of new or renovated facilities to accommodate for potential changes in the way children are taught in the future.

Consideration should be given to the number of times children transition from school to school, construction periods, and the impact to students during construction.

It is important to note that this facilities assessment is a “working plan”. It is subject to adjustment and modification as changes in the community occur. These changes could include: local and state economy, local and regional growth patterns, building codes, educational space standards and guidelines, and other unknown factors.

CODE REVIEW / CONSIDERATIONS

There are three principal laws, codes, or regulations which may significantly impact decisions made by the Town of Needham in its plans and considerations for future capital improvements to be made to the schools which are the subject of this study. They are:

- ❑ Massachusetts General Laws, Chapter 148, Section 26G, which requires the installation of automatic sprinklers under certain circumstances and conditions.
- ❑ The Massachusetts Architectural Access Rules (521 CMR), which requires that buildings be equipped with features to provide access to the handicapped under certain circumstances and conditions.
- ❑ The Massachusetts State Building Code (780 CMR), which regulates repairs, alterations, and additions to existing buildings.

An overview of the applicable provisions and triggering mechanisms associated with these three provisions follows, the "assessed value" of each of these building is important to note since a percentage of the value is often used as a trigger for upgrading or requiring additional work.

- The 2011 Assessed Value of the Mitchell School (building only) at the time of this report is $6,931,400
- The 2011 Assessed Value of the Hillside School (building only) at the time of this report is $9,292,200

Massachusetts General Laws, Chapter 148, Section 26G:

This law was originally a local option law which was amended to apply throughout the Commonwealth of Massachusetts, effective January 1, 2010. It states that:

> "Every building or structure, including any additions or major alterations thereto, which totals, in the aggregate, more than 7,500 gross square feet in floor area shall be protected with an adequate system of automatic sprinklers in accordance with the provisions of the state building code. No such sprinkler system shall be required unless sufficient water and water pressure exists. For purposes of this section, the gross square footage of a building or structure shall include the sum total of the floor areas for all floor levels, basements, sub-basements and additions, in the aggregate, measured from outside walls, irrespective of the existence of interior fire resistive walls and ceilings. This section shall not apply to buildings used for agricultural purposes as defined in section 1A of chapter 128.
>
> In such buildings or structures, or in certain areas of buildings and structures, where the discharge of water would be an actual danger in the event of fire, the head of the fire

> department shall permit the installation of such other fire suppressant systems as are prescribed by the state building code in lieu of automatic sprinklers. Automatic suppressant or sprinkler systems shall not be required in rooms of a telephone central office equipment building when such rooms or areas are protected by an automatic fire alarm system. Sprinkler systems shall not be required in open-air parking structures, defined as: buildings, structures, or portions thereof, used for parking motor vehicles and having not less than twenty-five per cent of the total wall area open to atmosphere at each level, utilizing at least two sides of the structure. This section shall not apply to buildings or additions used for residential purposes.
>
> The head of the fire department shall enforce the provisions of this section.
>
> Whoever is aggrieved by the head of the fire department's interpretation, order, requirement, direction or failure to act under the provisions of this section, may, within forty-five days after the service of notice thereof, appeal from such interpretation, order, requirement, direction or failure to act to the automatic sprinkler appeals board as provided in section two hundred and one of chapter six. The board may grant a reasonable waiver from the provisions of this section, or may allow the installation of a reasonable alternative or modified system of automatic sprinklers upon reviewing the characteristics of buildings that have architectural or historical significance."

On October 14, 2009, in anticipation of the statewide implementation of this law, the automatic sprinkler appeals board referenced in the last paragraph of the statute, published an advisory to provide guidance concerning compliance with the law. The advisory addresses the triggering mechanisms which cause the law to apply, including what constitutes a "major alteration" as cited in the first sentence of the law. The advisory cites case law in finding that a sprinkler system is required when the "extra cost of installing sprinklers would be moderate in comparison to the total cost of the work contemplated". The advisory also indicates that a review of how much of a building is affected by the work is an indication of whether or not a major alteration is occurring, and concludes that alterations are major in scope when (1) such work affects thirty-three (33) % or more of the total gross square footage of the building, calculated in accordance with section 26G, or (2) when the total cost of the proposed work (excluding sprinkler installation costs) is equal to or greater than thirty-three (33) % of the assessed value of the building as of the date of permit application. The advisory also considers the nature of the proposed work, and concludes that major alterations are work which makes the effort to install sprinklers substantially less than if the building were intact, including, but not limited to, such operations as: demolition of ceilings or installation of suspended ceilings; removal and/or installation of sub-flooring, rather than merely the installation or replacement of carpet or finished flooring; demolition and/or reconstruction or repositioning of walls, stairways or doors; and removal or relocation of a significant portion of the building's HVAC, plumbing or electrical systems involving the penetration of walls floors or ceilings.

The advisory also notes that, if specific permitted alterations or modifications are not considered major in and of themselves, but are one phase of a series of modifications to be conducted over a reasonably

short period (5 years or less), it may be reasonable to conclude that such work is part of a long range project resulting in major alterations to the entire building, and thus triggering compliance with the law.

Massachusetts Architectural Access Rules (521 CMR):

The Massachusetts Architectural Access Rules (hereinafter "the rules"), are a regulation which is considered a specialized code as defined in Massachusetts General Laws, Chapter 143, Section 96, and as such they are incorporated by reference into the state building code. The rules are enforced by the local building inspector in a city or town, and may also be enforced by the architectural access board, which promulgates and amends the rules. Chapter 3 of the rules sets forth the jurisdiction of the rules, which apply to construction, reconstruction alterations, remodeling, additions and changes of use to public buildings or facilities. A public building is defined (in pertinent part) in Chapter 5 of the rules as "a building privately or publicly finances that is open to and used by the public, including but not limited to ...educational buildings..." and also as "a building constructed by the Commonwealth or any political subdivision thereof with public funds and open to public use...".

Chapter 3 of the rules sets specific triggers for compliance, based upon the nature and scope of the work, dollar cost of the work, and the cost of the work as a percentage of the full and fair cash value of the building.

If the work to be performed amounts to less than 30% of the full and fair cash value of the building, and the work costs less than $ 100,000, then only the work performed is required to comply with the rules. If the work to be performed amounts to less than 30% of the full and fair cash value of the building, and the work costs $ 100,000 or more, then the work performed is required to comply with the rules, and an accessible public entrance and an accessible toilet room, telephone, and drinking fountain (if toilets, telephones and drinking fountains are provided) must be provided per the standards contained in the rules. Certain alterations are exempted unless their costs exceed $ 500,000 or unless work is being performed on an entrance or toilet, including: curb cuts; alteration work limited solely to electrical mechanical or plumbing systems, the abatement of hazardous materials, or the retrofit of automatic sprinklers where such work does not involve the alteration of elements or spaces required to be accessible; roof repair or replacement, window repair or replacement, repointing and masonry repair; and work relating to septic system repairs, site utilities, and landscaping.

If the work performed, including the exempted work, amounts to 30% or more of the full and fair cash value of the building, the entire building is required to comply. Where the cost of constructing an addition amounts to more than 30% of the full and fair cash value of the existing building, both the addition and the existing building must be fully accessible.

Massachusetts State Building Code (780 CMR):

The Massachusetts State Building Code is a mandatory, statewide building code applicable to construction, repair, alteration, relocation, and change of occupancy of buildings and structures. Presently, the eighth edition of the building code is in effect, and is based upon the provisions of the 2009 International Building Code (IBC) with Massachusetts amendments. Chapter 34 of the code is the

portion of the code that regulates repair, alteration, and change of use for buildings and structures. In the eighth edition, Chapter 34 of the IBC has been deleted, and has been replaced with the provisions of the 2009 International Existing Buildings Code (IEBC) with Massachusetts amendments. Hereinafter, all references to the IEBC in this overview refer to the 2009 IEBC with Massachusetts amendments, unless otherwise specifically noted. The IEBC requires that existing buildings be specifically investigated and evaluated. The required evaluation includes, but is not limited to, the building's design gravity loads, lateral load capacity, egress capacity, fire protection systems, fire resistive construction, interior environment, hazardous materials, and energy conservation. Specific requirements are included for analysis of seismic force resisting systems, for consideration of the cumulative effects of alterations additions or changes of occupancy upon structural elements, and for additional requirements applicable to masonry walls under certain conditions. The analysis and effect of these specific structural requirements are included in the portion of this report which includes other structural observations and recommendations.

The IEBC offers three possible compliance method options to be used for repairs, alterations, changes of occupancy, additions or relocations for existing buildings. The choice of compliance method option is to be made by the building owner/permit applicant. However, the three compliance options are separate and distinct, and are not permitted to be combined in any way. The options are: the prescriptive compliance method; the work area compliance method; and the performance compliance method.

Presently the prescriptive compliance method requires existing buildings which are undergoing repair, alteration, change of use or relocation to comply with Chapter 3 of the IEBC as one means of compliance. However, on April 12, 2011, the Massachusetts Board of Building Regulations and Standards (BBRS), the agency which promulgates and amends the Massachusetts State Building Code, voted to adopt an emergency amendment to IEBC Sec. 101.5.1 which would restrict the use of the prescriptive compliance method to only those existing buildings which were designed and constructed to the provisions of either the sixth edition or more recent editions of the Massachusetts State Building Code or which can demonstrate equivalency to same. That emergency amendment is not yet effective, as it has not yet been published in the Massachusetts Register. However, the amendment is representative of the intent of the BBRS regarding the intended limitations to the use of the prescriptive method, and will become effective if published in the Massachusetts Register.

The work area method requires existing buildings which are undergoing repair, alteration, change of use or relocation to comply with Chapter 4 through 12 of the IEBC as applicable as another means of compliance. These chapters contain provisions which are based upon a proportional approach to compliance, with upgrades which are triggered by the type and extent of the work. Chapter 4 of the IEBC contains provisions for the classification of work into different categories, including repairs, alterations (levels 1, 2 and 3), changes of occupancy, additions, special provisions for historic buildings, and relocated buildings. Repairs are regulated by Chapter 5 of the IEBC. The general concept is to allow repairs so long as they do not make a building less conforming than prior to the repair. Existing materials are generally allowed to remain, unless they are determined to be hazardous or dangerous (e.g. asbestos, lead-based paint, glazing in hazardous locations). Repairs to the means of egress are required to maintain the level of protection previously provided or intended. Structural repairs are

required for any structural damage, with the extent of repairs dictated by the substance and extent of the damage.

Alterations are further categorized in one of three levels. Level 1 alterations are the most basic alterations, generally consisting of the removal and replacement or the covering of existing materials, elements, equipment or fixtures. Level 1 alterations are required to comply with IEBC Chapter 6. Level 2 alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of additional equipment. Level 2 alterations are required to comply with IEBC Chapters 6 and 7. Level 3 alterations are those alterations where the work area exceeds 50% of the aggregate area of the building. The work area is that portion or portions of the building consisting of all reconfigured spaces as shown on the construction plans, excluding those portions of the building where only incidental work is to be performed or where work not intended by the owner is specifically required by the building code. Level 3 alterations are required to comply with IEBC Chapters 6, 7 and 8.

Changes of occupancy, defined as changes in the purpose or level activity within a building that involve a change in application of the requirements of the code, are required to comply with Chapter 9 of the IEBC. Depending on the nature and type of the change of occupancy, compliance may be required with new construction requirements or with less stringent requirements set forth in the IEBC.

Additions, which are defined as an extension or increase of the floor area, number of stories or height of an existing building, are required to comply with IEBC Chapter 10. Chapter 10 requires additions to comply with height and area limits which apply to new construction (from Chapter 5 of the IBC). Specific structural and fire protection requirements are also specified for additions in Chapter 10.

Chapter 11 of the IEBC regulates historic buildings which undergo repairs, alterations, changes of occupancy, or additions. Historic buildings are those which are so certified by the Massachusetts Historical Commission. Although there is no obligation for owners of historic buildings to use Chapter 11, the use of Chapter 11 for a historic building preempts other building code regulations governing repairs, alterations, changes of occupancy, or additions involving historic buildings.

Moved or relocated buildings are subject to the requirements of Chapter `12 of the IEBC.

In Massachusetts, compliance involving electrical work, plumbing and gas fitting work, elevators, and handicapped accessibility defaults to the requirements of the applicable specialized code, including, but not limited to the Massachusetts Electrical Code (527 CMR 12), the Massachusetts Plumbing and Fuel Gas Code (248 CMR), Massachusetts Elevator Code (524 CMR), and the Massachusetts Architectural Access Rules (521 CMR). With the exception of the access rules which have their own provisions with respect to the scope of their jurisdiction (noted earlier in this section), the other specialized codes generally apply on a component basis in that work on non-compliant equipment or systems requires that equipment or system to be upgraded to current standards. Specifics as to the requirements of these codes, where applicable, is discussed by the various other specialists contributing to this report.