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**Edward Devotion School**  
**MSBA**  
**Preliminary Design Program**

Brookline, Massachusetts

MARCH 2014

**Volume 2** of 5



**HMFH** Architects, Inc.

130 Bishop Allen Drive

Cambridge, MA 02139

t 617 432 2200

f 617 876 9775

[www.hmfh.com](http://www.hmfh.com)



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## Statement of Interest

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STATEMENT OF INTEREST RECERTIFICATION FORM

District Name:	<u>Public Schools of Brookline</u>
School Name:	<u>Edward Devotion School</u>
FY2011 SOI #:	<u>2011 0046 0015</u>
Primary SOI Contact Name:	<u>Peter Rowe</u>
Primary SOI Contact Phone Number:	<u>617-730-2424</u>

CERTIFICATIONS

The undersigned hereby certifies that, to the best of his/her knowledge, information, and belief, the statements and information contained in this Statement of Interest Recertification and in the FY2011 Statement of Interest ("SOI") that was submitted to the MSBA for consideration in FY2012 are true and accurate and that this Statement of Interest Recertification and the FY2011 Statement of Interest have been prepared under the direction of the District school committee and the undersigned are duly authorized to submit the Statement of Interest Recertification to the Massachusetts School Building Authority (the "MSBA").

Further, the undersigned hereby certifies that, to the best of his/her knowledge, information, and belief, the conditions at the school that is the subject of this Statement of Interest Recertification and the FY2011 SOI have not changed since the FY2011 SOI was submitted for consideration by the MSBA. The undersigned hereby further certifies and that the information provided to the MSBA in the FY2011 SOI is still a true and accurate statement of the problems at the school facility that is the subject of this Statement of Interest Recertification.

Further, the undersigned hereby certifies that there is no change to the status of the District's selected priority Statement of Interest for FY2011 and that the same Statement of Interest that the district selected as its priority for consideration in FY2011 is still the District's priority.

Further, the undersigned hereby certifies that there is no change to the closed school information that was submitted by the district with the FY2011 SOI.

Further, the undersigned hereby certifies that, to the best of his/her knowledge, information, and belief, the District provided the proper vote documentation, in the format prescribed by the MSBA, to the MSBA for its FY2011 SOI submission. The District hereby acknowledges and agrees that, if the District failed to provide the required vote documentation with its FY2011 SOI submission, this Statement of Interest Recertification submission will not be considered complete.

STATEMENT OF INTEREST RECERTIFICATION FORM, PAGE 1

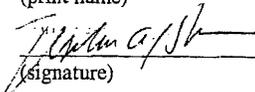
Further, the undersigned hereby acknowledges and agrees that the District must print and submit a hard copy of this Statement of Interest Recertification with the required signatures to the MSBA and that this Statement of Interest Recertification submission will not be considered complete until the MSBA receives the Statement of Interest Recertification with the required signatures in a format acceptable to the MSBA.

Further, the undersigned hereby acknowledges and agrees to provide, upon request by the MSBA, any additional information relating to this Statement of Interest Recertification and the District's FY2011 SOI that may be requested or required by the MSBA.

Further, the undersigned hereby acknowledges and agrees that the District will abide by all federal and state laws and all rules, regulations, policies, and guidelines of the MSBA and that the District has no entitlement to funds and that the awarding of a grant, if any, is at the sole discretion of the MSBA.

**LOCAL CHIEF  
EXECUTIVE OFFICER**  
*(E.g., Mayor, Town Manager,  
Board of Selectmen)*

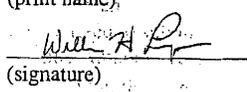
Melvin Kleckner  
(print name)

  
(signature)

11/22/11  
(date)

**DISTRICT  
SUPERINTENDENT**

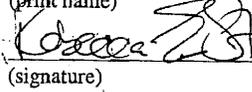
William H. Lupini  
(print name)

  
(signature)

11-21-2011  
(date)

**SCHOOL  
COMMITTEE CHAIR**

Rebecca Stone  
(print name)

  
(signature)

11-22-11  
(date)

**\* The MSBA will not consider a recertified SOI without a properly completed and submitted Statement of Interest Recertification which shall (1) provide the names of the required signatories, (2) have the original signatures of the required signatories, and (3) shall be dated by the required signatories. The recertified SOI must also meet all of the MSBA's requirements to be considered by the MSBA.**



Name of School Edward Devotion

**Massachusetts School Building Authority**

School District Brookline

District Contact William Lupini TEL: (617) 730-2403

Name of School Edward Devotion

Submission Date 1/26/2011

**Note**

The following Priorities have been included in the Statement of Interest:

1.  Replacement or renovation of a building which is structurally unsound or otherwise in a condition seriously jeopardizing the health and safety of school children, where no alternative exists.
2.  Elimination of existing severe overcrowding.
3.  Prevention of the loss of accreditation.
4.  Prevention of severe overcrowding expected to result from increased enrollments.
5.  Replacement, renovation or modernization of school facility systems, such as roofs, windows, boilers, heating and ventilation systems, to increase energy conservation and decrease energy related costs in a school facility.
6.  Short term enrollment growth.
7.  Replacement of or addition to obsolete buildings in order to provide for a full range of programs consistent with state and approved local requirements.
8.  Transition from court-ordered and approved racial balance school districts to walk-to, so-called, or other school districts.

Potential Project Scope: Renovation/ Addition

Is this SOI the District Priority SOI? YES

The MSBA ID for the District Priority SOI: 2011 Edward Devotion

District Goal for School: Please explain the educational goals of any potential project at this school

The District goals of the Devotion School project are intended to address three (3) areas of concern: 1) To renovate and add to an old building that is in need of update to meet local and national code requirements and to address programmatic needs, 2) to fully replace and modernize the heating system, electrical, and related systems to increase energy efficiency and reduce operating and repair and maintenance costs with a goal of qualifying as a high performing green school and 3) to prevent severe overcrowding expected to result from continued increasing enrollments.

District's Proposed Schedule: What is the District's proposed schedule to achieve the goal(s) stated above?

2015

Is this part of a larger facilities plan? YES

If "YES", please provide the following:

Facilities Plan Date: 2/11/2009

Planning Firm: MGT of America Inc.

Please provide an overview of the plan including as much detail as necessary to describe the plan, its goals and how the school facility that is the subject of this SOI fits into that plan:

The Town of Brookline and the Public Schools of Brookline utilize eight K-8 buildings and a three building High School Campus to serve 6,627 students Pre-School through 12 Grade. The master plan includes a comprehensive assessment of all existing facilities, consideration of district-wide educational programs (both general and special education), a demographic analysis, and a redistricting consideration/recommendations. Proposals within this plan include facility recommendations for improvements at selected facilities (i.e., Runkle, Devotion, Lynch, Baldwin, Heath, Pierce, etc). The plan includes both short- and long-term options and is consistent with local design traditions while meeting 21st century programmatic and educational needs. The plan includes a projected schedule for implementation, consistent with capital budget projections/options.

**Please provide the current student to teacher ratios at the school facility that is the subject of this SOI: 22 students per teacher.**

**Please provide the originally planned student to teacher ratios at the school facility that is the subject of this SOI: 22 students per teacher.**

**Is there overcrowding at the school facility? YES**

**If "YES", please describe in detail, including specific examples of the overcrowding.**

As total enrollment has grown in The Public Schools of Brookline during the last six years by 766 K-12 students, the population at the Edward Devotion School has grown by 98 students K-8 in the last three years (2008-11). When we include pre-K students the total current enrollment is 778 students and we expect this number to climb to over 800 by the 2013 school year.

Devotion families are pressured to apply to other Pre-K programs in the district because we cannot accommodate beyond one class and because our space is not able to adequately meet the developmental needs of pre-kindergarten children. The room is located adjacent to the grade 7/8 lockers. The square footage of the space cannot allow for the range of learning opportunities these students need.

We struggle to maintain an inclusive program for students in our Therapeutic Learning Center and our Intensive Learning Program (See program descriptions). Currently these spaces are predominantly in the basement. One class is located on the 3rd floor. We do not have adequate time out and therapeutic spaces and the students and teachers are isolated from their general education team.

As per our DESE audit, our school needs to increase the services to beginning and early intermediate English Language Learners. We do not have the space for additional teachers to properly service this sub-group. Currently there are two teachers working out of a kitchen area.

With the introduction of the Elementary World Language program we require additional space for teachers to plan, organize, store materials and deliver instruction. Our EWL teachers are currently using a staircase landing in the 1952 wing. This part of the building is not handicap accessible and the absence of an elevator means that teachers need to carry carts up and down stairs.

Support services such as speech and language and general learning centers have operated in cramped areas with shared space that produces constant interruptions. Divided rooms require students to enter one class in order to get to another.

**Has the district had any recent teacher layoffs or reductions YES**

**If "YES", how many teaching positions were affected? 6**

**At which schools in the district? High School**

**Please describe the types of teacher positions that were eliminated(i.e art, math, science, physical education, etc.):**

The reduction effected staff in a number of program areas including Career Education, Physical Ed, English, Social Studies Special Education and Guidance across two years (FY10 and FY11).

**Has the district had any recent staff layoffs or reductions YES**



Name of School	Edward Devotion
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**If "YES", how many staff positions were affected? 29**

**At which schools in the district? All eight Elementary schools and the High School**

**Please describe the types of staff positions that were eliminated (i.e guidance, administrative, maintenance, etc.):**

Special Education Aides 13.7, Library Assistants 6.4, Clerical positions 5.5, Info Tech support 1, METCO Guidance Counselor 1, Student Services Administrator 1 across two years (FY10 and FY11).

**Please provide a description of the program modifications as a consequence of these teacher and/or staff reductions, including the impact on district class sizes and curriculum.**

The major impact of the FY10 Budget reductions has been on the Elementary Library program, which has resulted in shorter hours for the Libraries to be open and for reduced service to students during open periods. Other department reductions have been absorbed through the transfer of responsibilities.

**Please provide a detailed description of your recent budget approval process including a description of any budget reductions and the impact of those reductions on the District's school facilities, class sizes and educational program.**

FY2012 Budget Development Process Calendar October, 2010 Finance Subcommittee Meeting: Budget Development Calendar October 7, 2010 Presentation of Budget Development Calendar (1st reading) October 21, 2010 School Committee vote on Budget Development Calendar (2nd reading) October - November, 2010 Prepare initial drafts of Financial Plan/Budget Guidelines/Directives October - November, 2010 Reconciliation of Staffing October - March, 2011 Ongoing review of the financial planning and budget development process for FY12 (2011-2012) and long range projections for FY2013-2016 November 8, 2010 Principals Budget Priorities and Options Review November 22, 2010 Coordinators Priorities and Options Review December 2, 2010 Presentation of Budget Guidelines and Directives to School Committee (1st reading) December 16, 2010 School Committee vote on Budget Guidelines/Directives (2nd reading) December, 2010 - February, 2011 Ongoing review of budget drafts February 17, 2011 Presentation of Superintendent's Budget Message to the School Committee. On or before February 15, 2011, submission to the Board of Selectmen and Advisory Committee. March 1, 2011 Submission of detailed Superintendent's Budget to the School Committee, with copies to the Board of Selectmen and Advisory Committee. March 10, 2011 Budget Presentation to the School Committee March 24, 2011 Public Hearing on the budget. April 7, 2011 School Committee vote on the budget April - May, 2011 Advisory Committee review and comment May, 2011 Spring Town Meeting May - September, 2011 Ongoing discussion of long-term budget priorities. May - September, 2011 In consultation with the Capital Projects Subcommittee, develop a priority list for capital; review CIP proposals for FY 2013-2018 Town CIP

## General Description

**BRIEF BUILDING HISTORY:** Please provide a detailed description of when the original building was built, and the date(s) and project scopes(s) of any additions and renovations (maximum of 5000 characters).:

The Edward Devotion School was originally built in 1922 to serve students from the Coolidge Corner and North Brookline communities. The school was expanded in 1953 with the addition of the Early Childhood wing and was substantially modified in 1974 when it was fully renovated to include an open space design. During this renovation the Auditorium was divided to become a Library on one level and an Auditorium on the second level.

**TOTAL BUILDING SQUARE FOOTAGE:** Please provide the original building square footage PLUS the square footage of any additions.:

199540

**SITE DESCRIPTION:** Please provide a detailed description of the current site and any known existing conditions that would impact a potential project at the site (maximum of 5000 characters).:

The Edward Devotion School sits on a 7.5 acre site in North Brookline. The Devotion School shares this site with the historic Edward Devotion House and two (2) Brookline public playgrounds. The site is free of known contamination or hazardous conditions.

**BUILDING ENCLOSURE:** Please provide a detailed description of the building enclosure, types of construction materials used, and any known problems or existing conditions (maximum of 5000 characters).:

The exterior of the Edward Devotion School is brick, with multiple window systems updated and replaced over the years, the last replacement in 1998. The roof is a mix of slate tiles on pitched surfaces and rubber membrane on flat surfaces.

**Has there been a Major Repair or Replacement of the EXTERIOR WALLS?:** NO

**Year of Last Major Repair or Replacement:** 1924

**Description of Last Major Repair or Replacement:**

1953 Addition

**Has there been a Major Repair or Replacement of the ROOF?:** YES

**Year of Last Major Repair or Replacement:** 1996

**Type Of ROOF:** Rubber membrane and Slate

**Description of Last Major Repair or Replacement:**

Replace rubber membrane / Slate repairs

**Has there been a Major Repair or Replacement of the WINDOWS?:** YES

**Year of Last Major Repair or Replacement:** 1998

**Type Of WINDOWS:** Double Pane

**Description of Last Major Repair or Replacement:**

Replace most windows in 1953 wing

**MECHANICAL and ELECTRICAL SYSTEMS:** Please provide a detailed description of the current mechanical and electrical systems, and any known problems or existing conditions (maximum of 5000 characters).:

The system most in need of repair is the HVAC infrastructure as the 1953 components have in many areas reached their useful life, and the 1974 components are in a section of the building where modification to space has impacted ventilation and air flow.

The electrical system is up to code, but with the newest components dating to 1974. The system is in need of replacement.



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The boilers, dating from 1990, are the newest feature of the infrastructure, one has been converted to gas and oil dual fuel capability, with the other scheduled for that capability next year.

**Has there been a Major Repair or Replacement of the BOILERS?: YES**

**Year of Last Major Repair or Replacement: 1990**

**Description of Last Major Repair or Replacement:**

Replace Boilers with two new ones.

**Has there been a Major Repair or Replacement of the HVAC SYSTEM?: YES**

**Year of Last Major Repair or Replacement: 1974**

**Description of Last Major Repair or Replacement:**

N/A

**Has there been a Major Repair or Replacement of the ELECTRICAL SERVICES AND DISTRIBUTION SYSTEM?: YES**

**Year of Last Major Repair or Replacement: 1974**

**Description of Last Major Repair or Replacement:**

Upgrade to Panel and Distribution System

**BUILDING INTERIOR: Please provide a detailed description of the current building interior including a description of the flooring systems, finishes, ceilings, lighting, etc. (maximum of 5000 characters):**

Ceilings consist of spline and dropped styles. Some are hard plastic ceilings. Most of the walls are made of plaster and brick and are painted in various colors. The flooring consists of carpeting, matting, ceramic tile and composition tile. There are various styles of lights such as fixed pendant, recessed, 2x4, 4x4 energy efficient/retro-fitted.

**PROGRAMS and OPERATIONS: Please provide a detailed description of the current programs offered and indicate whether there are program components that cannot be offered due to facility constraints, operational constraints, etc.:**

The Edward Devotion School serves the vibrant Coolidge Corner neighborhood and is the largest elementary school, with a population of approximately 780 students, including Pre-Kindergarten. The system-wide programs offered at Devotion are the English Language Learner program with a high concentration of Hebrew speakers, and the Social, Emotional and Behavioral Special Education program, which services approximately 30 students.

The Devotion School enjoys an international reputation: historically, it is the public school that President John F. Kennedy attended; academically, it welcomes students from all over the world, and socially, it reflects and respects human diversity. The Friends of Devotion, a non-profit corporation comprised of alumni and current families, is dedicated to maintaining the traditions of excellence and caring that are the hallmarks of the community.

To get a sense of the diversity of our community, Pre-K and Kindergarten classes represent 24 countries beyond the United States: Bangladesh, Canada, China, Costa Rica, Czech Republic, Dominican Republic, El Salvador, Ethiopia, Finland, Ghana, Guatemala, Guyana, Hungary, India, Israel, Italy, Korea, Japan, Panama, Portugal, Russia, Scotland, Serbia, and Trinidad.

The Devotion School vision, the force giving meaning to the staff's work, is broken into three components and is revisited throughout the year as staff affirm their commitment to teaching. The vision for the students and Devotion staff encompasses three areas.

**ACADEMIC**—We work hard so we can become smarter. We take risks as learners. We communicate effectively: orally, in writing, and through technology.

**COMMUNITY**—We make sure everyone feels physically, emotionally, and intellectually safe. We give and receive respect. We have compassion for one another. We contribute to our school, our community, and to our world. We establish and maintain healthy friendships.

**WHOLE PERSON**—We are confident in our abilities. We love to learn and strive to become life long learners.

The Edward Devotion School offers a full range of program offerings pre-k through 8th Grade. This includes self contained classroom services through Grades 6 and circulating 7th and 8th Grade students in a traditional Middle School Model. Space constrains the ability of the Public Schools of Brookline to add additional Pre-K classes, and dedicated spaces for afterschool and Extended day programs are squeezed by the requirements of program space necessary to meet the needs of the diverse mix of Regular Education, English Language Learners and Special Education students.

Therapeutic Learning Center (TLC)  
Pre-K-8 SYSTEM-WIDE PROGRAM

Brookline Public Schools provides specialized services to many students who have social-emotional disabilities that negatively impact their learning. Brookline's K-8 system-wide program for students with primary social-emotional disabilities is located at the Edward Devotion School. This program is conceived as the midpoint in the continuum of programs and placements for students with social-emotional and behavioral needs. The continuum begins in the student's home school and continues in the system-wide program at Devotion.

Intensive Learning Program  
Grades 3 through 6

Overview

The Intensive Learning Lab (ILL) serves the academic needs of children in grades three through six. All students in the ILP have previously received Special Educational Services and have Independent Educational Plans. Due to learning differences, certain students require more intensive, specialized instruction than is possible in the context of a Learning Center in order to make effective academic progress. The Intensive Learning Lab is designed to meet the needs of these special students.

The system-wide program at Devotion provides special education and supportive services to students who, due to the severity of their disability require a more specialized, intensive and structured program than can be provided in their home school. The program is comprised of 3 classrooms: K-3, 4-6, and 7-8. Each program level is staffed by an experienced special education teacher as well as paraprofessionals. Program staff provide support to the student in the general education classroom, or provide direct instruction in the system-wide program classroom. Students receive, as dictated by their IEP, speech and language therapy, occupational therapy, counseling and adapted physical education. Additionally a full-time school-based social worker and psychologist provide services as necessary.

**CORE EDUCATIONAL SPACES:** Please provide a detailed description of the Core Educational Spaces within the facility, a description the number and sizes (in square feet) of classrooms, a description of science rooms/labs including ages and most recent updates, and a description of the media center/library (maximum of 5000 characters):

The Devotion School consists of 44 original classrooms. Enrollment growth and program modifications, over the years have resulted in the sub-division of spaces into small program/service and office use.

Enrollment needs of the District require Brookline to plan for four (4) sections per Grade K-8. This is 36 sections of students. Additionally, the building needs to accommodate "specialized" classrooms for Science (2), Art, Music and Instructional Technology.

The Science Room includes laboratory tables/stations for 26 students per classroom. The building has a full size Gymnasium (with no stands for spectator viewing) and a small Gym for younger grades. The Extended day Program utilizes space for After School Programs and there is one (1) pre-school class.

**CAPACITY and UTILIZATION:** Please provide a detailed description of the current capacity and utilization of the school facility. If the school is overcrowded, please describe steps taken by the administration to address capacity issues. Please also describe in detail any spaces that have been converted from their intended use to be used as classroom space (maximum of 5000 characters):



Name of School	Edward Devotion
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The Edward Devotion School experienced its last substantial renovation in 1974. At the time significant modifications were made to existing spaces and a new open classroom addition was added.

The current library/media center and current assembly space were created by dividing a large two (2) story auditorium into separate one-story spaces, with the library media center occupying the first and the assembly space the upper area. This decision as implemented created an inadequate assembly area, with an unsloped floor and poor sitelines for assemblies and student performances. The library/media center is appropriately sized but currently lacks infrastructure for 21st Century technology applications.

The design of the school from 1974 resulted in 44 classrooms of appropriately 900 square feet, however the spaces were not of traditional self-contained design, but were instead open and adjacent. Programmatic goals since that time have resulted in the creating of enclosed spaces, some of which lack desirable levels of light and ventilation per the original design. While all meet code, many are considered inappropriate by the community.

**MAINTENANCE and CAPITAL REPAIR: Please provide a detailed description of the district's current maintenance practices, its capital repair program, and the maintenance program in place at the facility that is the subject of this SOI. Please include specific examples of capital repair projects undertaken in the past, including if any override or debt exclusion votes were necessary (maximum of 5000 characters):**

Repair and Maintenance - Repairs and maintenance in all Brookline Schools including the Devotion School is managed under the direction of the Director of Public Buildings. In FY11 the maintenance and repair budget for school buildings is \$1,830,280 including testing, preventative maintenance, ordinary maintenance and repairs with specific line items per building. Capital repairs are based on a six (6) year cycle (see present list). Present plans are to renovate the Devotion School in FY2015 at \$76M.

Past projects have included new roofing, windows, boilers, burners, new fire alarm systems, modification to sprinkler systems, IT infrastructure and additional power.

**Priority 4**

*Please describe the conditions within the community and School District that are expected to result in increased enrollment.*

The Public Schools of Brookline have been experiencing K-8 enrollment increases for the past six (6) years. During this period the total K-8 enrollment has grown 766 or 20 % and based upon available birth data and other demographic trends we expect this growth pattern to continue for at least the next four (4) years resulting in total enrollment growth of approximately 1,100 students or 30 % during the nine year (FY06-FY15) period.

The impact of the enrollment growth during the last six (6) years has increased demand on our eight K-8 schools significantly. In 2005, we operated with 3,886 students in 196 homerooms. In the current school year, we operate with 4,652 students in 224 homerooms. In FY2014, we project that we will need 239 homerooms for our projected enrollment of 5,029 students. This is an increase of 43 homerooms between 2005 and 2014. In order to create the classroom space necessary to accommodate this enrollment level we have needed to convert spaces intended for other purposes into regular classrooms, as well as bring the expanded Runkle School and Heath School projects on-line.

Each of our K-8 schools is at its capacity. Our community is experiencing an influx of students, especially at the Kindergarten level, that far exceeds what would be expected from the birth data alone. This indicates that other activities/actions are affecting the enrollment numbers. Our best data indicates that families are moving to the community, resulting in this growth over the birth rate.

As these students move up through the grades they will require that Devotion support four (4) sections at each grade level. The school's original design was an open space model and was not designed to accommodate this level of enrollment. This design also envisioned space for support programs within the vicinity of the general education classes. The current school program has moved from an open space model to a more traditional classroom space model. The design of the heating and ventilation systems was intended for the flow of air across wide spaces. The enclosure of much of the square footage has resulted in areas where temperature and air flow balance are less than ideal, per code.



Name of School Edward Devotion

**Priority 4**

*Please describe the measures the School District has taken or is planning to take in the immediate future to mitigate the problem(s) described above.*

The major examples of mitigation are the Runkle School Renovation/Addition and the Heath school Renovation/Addition projects. These projects, already funded by MSBA, will allow for additional school capacity in a geographic location that is buffered by multiple schools. Each school will become a three (3) section per grade school across all grades, with appropriate support and shared space to support the enrollment of 560 students – the enrollment which is projected for 2014.

Beyond Runkle and Heath, Brookline needs additional capacity. Mitigation activities have primarily consisted of the careful remodeling and renovation to internal spaces within each of our schools with the goal of creating the highest quality space within available constraints. We have converted multi-purpose rooms and music rooms into dedicated homerooms, resulting in itinerant Music teachers working in substandard spaces. We have reconstructed and modified adjacent office and learning spaces into full size classrooms. We have converted dedicated computer laboratories into homerooms. We have moved pre-school classes from dedicated homerooms into shared spaces with extended day programs.

The changes we have made to school spaces have been done carefully, with attention to HVAC systems and other infrastructure needs, but they have resulted in less than optimum spaces.

As we move forward through the next four (4) years, we anticipate the need to convert an additional 15 spaces into regular classrooms. The specific actions to create these 15 classrooms will require additional conversion and alternative spaces, modification of specialist space into regular classrooms and the sharing of space by multiple programs. For the long-term we believe that Devotion will need to provide some additional capacity to assist the district with the pre-K-8 enrollment growth.

**Priority 4**

*Please provide a detailed explanation of the impact of the problem described in this priority on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.*

Space at the Edward Devotion School is at a Premium as enrollment pressure has pushed to 780 students, and the district attempts to maintain reasonable class size goals. A number of areas originally designed as non-program spaces have been reconfigured for program usage. Examples are:

- 5th and 6th Grade Learning Center
- Math Specialist - share one open space
- Enrichment and Challenge Support is in a former closet
- Therapeutic Learning Center and Intensive Learning Program are located in basement rooms
- ELL teachers working in kitchen workroom
- Elementary World Language teachers work in stairwell

**Please also provide the following:**

**Cafeteria Seating Capacity:** 120

**Number of lunch seatings per day:** 8

**Are modular units currently present on-site and being used for classroom space?:** NO

**If "YES", indicate the number of years that the modular units have been in use:**

**Number of Modular Units:**

**Classroom count in Modular Units:**

**Seating Capacity of Modular classrooms:**

**What was the original anticipated useful life in years of the modular units when they were installed?:**

**Have non-traditional classroom spaces been converted to be used for classroom space?:** YES

**If "YES", indicate the number of non-traditional classroom spaces in use:** 6

**Please provide a description of each non-traditional classroom space, its originally-intended use and how it is currently used:**

Space at the Edward Devotion School is at a Premium as enrollment pressure has pushed to 780 students, and the district attempts to maintain reasonable class size goals. A number of areas originally designed as non-program spaces have been reconfigured for program usage. Examples are:

- 5th and 6th Grade Learning Center
- Math Specialist - share one open space
- ECS are in a former closet
- Therapeutic Learning Center and Intensive Learning Program are located in basement rooms
- ELL teachers working in kitchen workroom
- Elementary World Language teachers work in stairwell

**Please explain any recent changes to the district's educational program, school assignment policies, grade configurations, class size policy, school closures, changes in administrative space, or any other changes that impact the district's enrollment capacity (maximum of 5000 characters):**

None

**What are the district's current class size policies?:**

- 25 to 1
- Room Type Students/Room
- K capacity (full Day) 20
- Classroom (1-3) 20



Name of School Edward Devotion

- Classroom (4-12) 22
- Art (9-12) 22
- Music (9-12) 22
- Performing Arts 44
- Science (9-12) 22
- Voc./Industrial Tech, Foods, etc. (9-12) 22
- PE (9-12) 44
- Computer Lab (9-12) 22
- Sped. Ed. -- Severe 8
- Sped. Ed. -- Resource 12

Has the district closed, taken off-line, or converted to another, non-school use, any school facilities within the last 10 years?: NO

If "YES", please provide the name and address of any such school facility and provide a description of the reasons for removing the school from service.:

Name of School Edward Devotion

**Priority 5**

*Please provide a detailed description of the issues surrounding the school facility systems (e.g., roof, windows, boilers, HVAC system, and/or electrical service and distribution system) that you are indicating require repair or replacement. Please describe all deficiencies to all systems in sufficient detail to explain the problem.*

The 199,540 sq. ft. Edward Devotion School, which was originally built in 1924 with renovations/additions in 1953 and 1974, requires significant renovation/ upgrading. The plan would include new electrical and HVAC systems, new roofs, plumbing upgrades, and ADA work and a complete "Master Plan" renovation/addition.



Name of School	Edward Devotion
----------------	-----------------

**Priority 5**

*Please describe the measures the School District has already taken to mitigate the problem/issues described in Question 1 above.*

While upgrading classroom space and performing preventative maintenance, the Town of Brookline has continuously employed and adapted energy conservation measures appropriate to the altered spaces to lower energy consumption in all our schools.

The Town of Brookline has continuously worked through upgrades and preventative maintenance to optimize energy conservation measures to reduce energy consumption within all schools. Actions taken at Devotion include:

- Installation of motion sensors on light switches,
- Preventative maintenance on motors, switches.
- Univent preventative maintenance twice annually
- Univent modifications for better control and air quality
- Boiler replacement (1990)
- Dual burner oil/gas conversion (1990)
- Lighting fixture replacement program (2003)
- Light ballasts replacement program (2003)
- Energy efficient bulb replacement
- Pump maintenance
- Air compressor maintenance
- Temperature control service
- A/C maintenance
- Window shade service glass repair service
- Replace oil tank (1992)

Each action, some of which are individually small, adds value to our overall goal of continuously reducing energy consumption.

Name of School Edward Devotion

**Priority 5**

*Please provide a detailed explanation of the impact of the problem/issues described in Question 1 above on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.*

As buildings become pressured from enrollment growth the issue of an obsolete infrastructure complicates the ability to adapt for changing program demands. The Edward Devotion School, last renovated in 1974, is reaching the end of its useful life for many of the infrastructure systems that sustain the building.

While Brookline has many examples of good teaching and learning happening under difficult and/or challenging facility conditions, it is our goal to maintain good working buildings and to renovate on a continuous basis. For this reason the Capital Improvement Program (CIP) of the Town of Brookline has scheduled Devotion School for a complete renovation/addition in 2015. This plan, paired with a comprehensive Repair and Maintenance program, has helped to maintain the facility while we await this project.

Examples of facility challenges, as documented earlier are:

Space at the Edward Devotion School is at a Premium as enrollment pressure has pushed to 780 students, and the district attempts to maintain reasonable class size goals. A number of areas originally designed as non-program spaces have been reconfigured for program usage. Examples are:

5th and 6th Grade Learning Center

Math Specialist - share one open space

ECS are in a former closet

Therapeutic Learning Center and Intensive Learning Program are located in basement rooms

ELL teachers working in kitchen workroom

Elementary World Language teachers work in stairwell

**Please also provide the following:**

**Have the systems identified above been examined by an engineer or other trained building professionals?:** YES

**If "YES", please provide the name of the individual and his/her professional affiliation:**

Charles Simmons, Director of Town Buildings

**Please also provide the date of the inspection::** 10/1/2008



Name of School Edward Devotion

**Priority 7**

*Please provide a detailed description of the programs not currently available due to facility constraints, the state or local requirement for such programs and the facility limitations precluding the programs from being offered.*

The presence of a population of more than 780 pupils in the existing building challenges the delivery of quality support programs, including Computer Labs, Science Labs, Media Center, Gymnasium Space and cafeteria. Additionally, the goal of maintaining inclusive classrooms where students with identified special needs can be supported and welcomed is compromised.

Early childhood programs which we desire to have coexisting within our K-8 schools will be squeezed out or squeezed into unacceptable alternative location unless additional capacity is provided to allow these programs in the Devotion K-8 building

**Priority 7**

*Please describe the measures the School District has taken or is planning to take in the immediate future to mitigate the problem(s) described above.*

The Town of Brookline Building department has utilized repair and maintenance funds to continuously modify and upgrade classroom and common spaces to minimize HVAC and noise issues that negatively impact instruction. The primary goal has been to ensure that ventilation is maximized and indoor air meets code requirements.

The 1974 addition/renovation to the school created a large number of "open classroom" spaces. Repair and maintenance during the past decade has focused on enclosing these spaces. This has caused challenges with modifications to the systems which support the HVAC infrastructure.



Name of School Edward Devotion

**Priority 7**

*Please provide a detailed explanation of the impact of the problem described in this priority on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.*

As buildings become pressured from enrollment growth the issue of an obsolete infrastructure complicates the ability to adapt for changing program demands. The Edward Devotion School, last renovated in 1974, is reaching the end of its useful life for many of the infrastructure systems that sustain the building.

While Brookline has many examples of good teaching and learning happening under difficult and/or challenging facility conditions, it is our goal to maintain good working buildings and to renovate on a continuous basis. For this reason the Capital Improvement Program (CIP) of the Town of Brookline has scheduled Devotion School for a complete renovation/addition in 2015. This plan, paired with a comprehensive Repair and Maintenance program, has helped to maintain the facility while we await this project.

Examples of facility challenges, as documented earlier are:

Space at the Edward Devotion School is at a Premium as enrollment pressure has pushed to 780 students, and the district attempts to maintain reasonable class size goals. A number of areas originally designed as non-program spaces have been reconfigured for program usage. Examples are:

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ELL teachers working in kitchen workroom

Elementary World Language teachers work in stairwell

Name of School Edward Devotion

### Vote

Vote of Municipal Governing Body YES: 5 NO: 0 Date: 1/18/2011

Vote of School Committee YES: 9 NO: 0 Date: 1/20/2011

Vote of Regional School Committee YES: NO: Date:



Name of School Edward Devotion

**Form of Vote**

The following form of vote should be used by both the City Council/Board of Aldermen, Board of Selectmen/equivalent governing body AND the School Committee in voting to approve this Statement of Interest.

If a regional school district, the regional school district should use the following form of vote.

Resolved: Having convened in an open meeting on \_\_\_\_\_, the \_\_\_\_\_ [City Council/Board of Aldermen, Board of Selectmen/Equivalent Governing Body, School Committee] of \_\_\_\_\_ [City/Town/School District], in accordance with its charter, by-laws, and ordinances, has voted to authorize the Superintendent to submit to the Massachusetts School Building Authority the Statement of Interest dated \_\_\_\_\_ for the \_\_\_\_\_ [Name of School] located at \_\_\_\_\_ [Address] which describes and explains the following deficiencies and the priority category(s) for which \_\_\_\_\_ [Name of City/Town/District] may be invited to apply to the Massachusetts School Building Authority in the future

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ [Insert a description of the priority(s) checked off on

the Statement of Interest and a brief description of the deficiency described therein for each priority]; and hereby further specifically acknowledges that by submitting this Statement of Interest, the Massachusetts School Building Authority in no way guarantees the acceptance or the approval of an application, the awarding of a grant or any other funding commitment from the Massachusetts School Building Authority, or commits the \_\_\_\_\_ [Name of City/Town/District] to filing an application for funding with the Massachusetts School Building Authority.

Name of School Edward Devotion

## Closed Schools

**Question 1:** Has the District sold, closed, or otherwise removed from service a school in the last 10 years?

NO

**Question 2:** Does the District have any plans to sell, close, or otherwise remove from service a school in the next 10 years?

NO

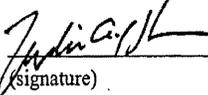


Name of School	Edward Devotion
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**CERTIFICATIONS**

The undersigned hereby certifies that, to the best of his/her knowledge, information and belief, the statements and information contained in this statement of Interest and attached hereto are true and accurate and that this Statement of Interest has been prepared under the direction of the district school committee and the undersigned is duly authorized to submit this Statement of Interest to the Massachusetts School Building Authority. The undersigned also hereby acknowledges and agrees to provide the Massachusetts School Building Authority, upon request by the Authority, any additional information relating to this Statement of Interest that may be required by the Authority.

**LOCAL CHIEF EXECUTIVE OFFICER/DISTRICT SUPERINTENDENT/SCHOOL COMMITTEE CHAIR  
(E.g., Mayor, Town Manager, Board of Selectmen)**

Chief Executive Officer	School Committee Chair	Superintendent of Schools
Melvin Kleckner	Rebecca Stone	William H. Lupina
(print name)	(print name)	(print name)
	Rebecca Stone	William H. Lupina
(signature)	(signature)	(signature)
Date 1/26/2011	Date 1/26/2011	Date 1-26-2011

Brookline

## Massachusetts School Building Authority

District Name Brookline

District Contact William Lupini TEL: (617) 730-2403

Submission Date 1/26/2011

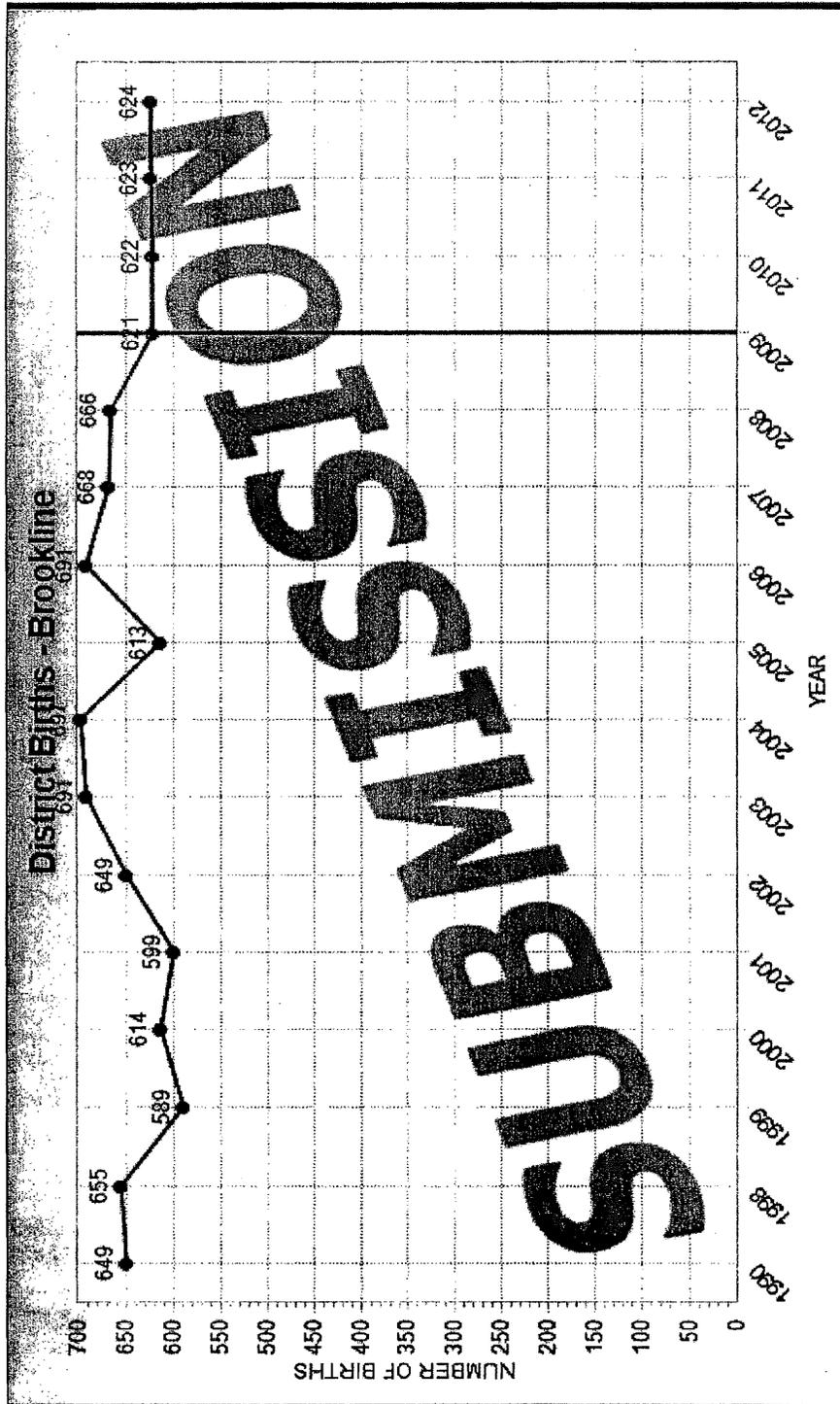
**Note**

1/26/2011

Page 1 of 8

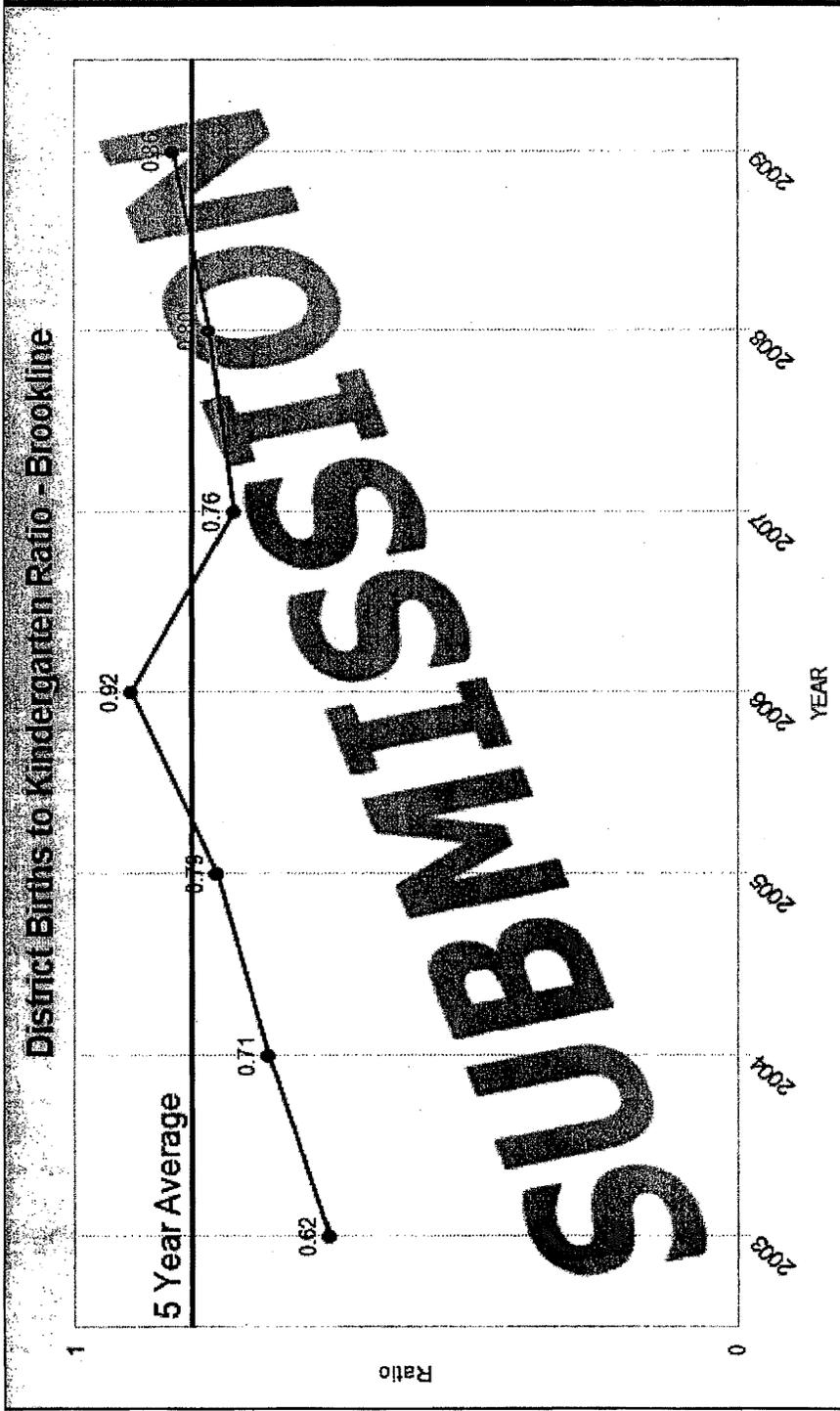


Brookline

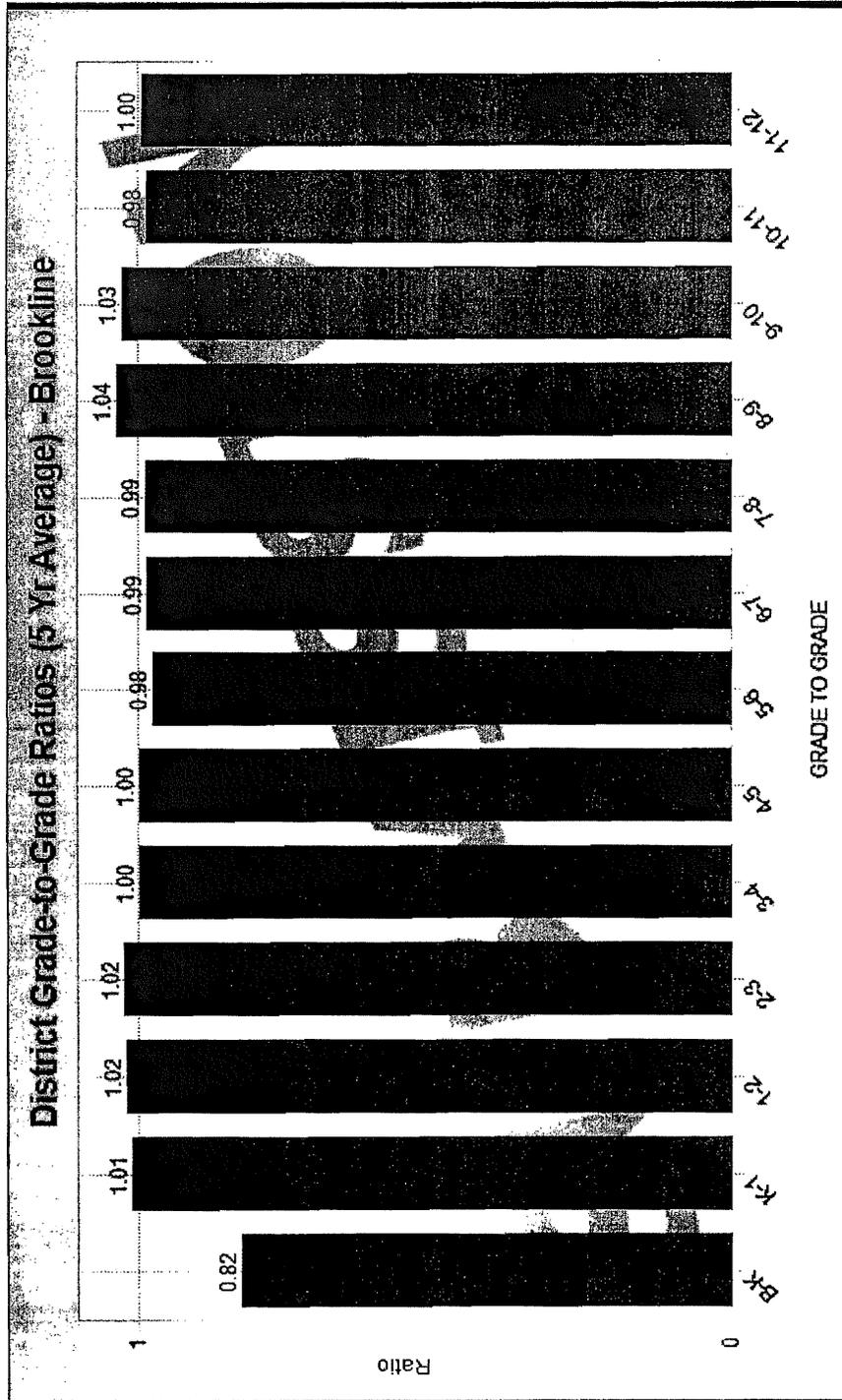


1/26/2011

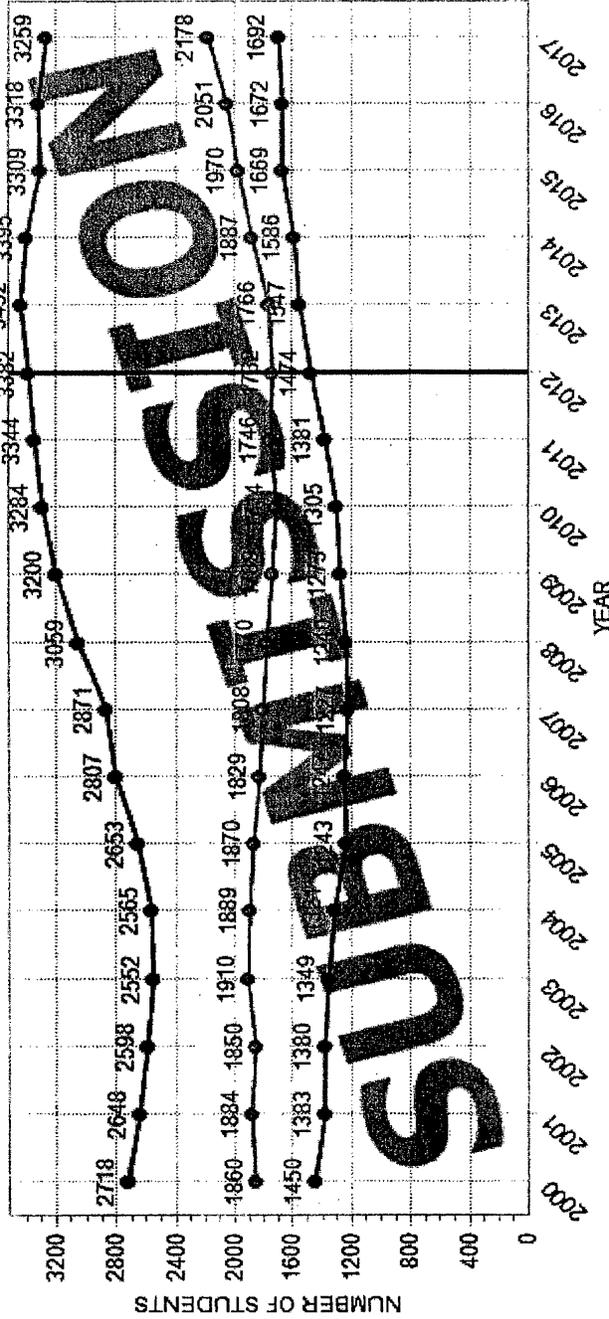
Page 2 of 8



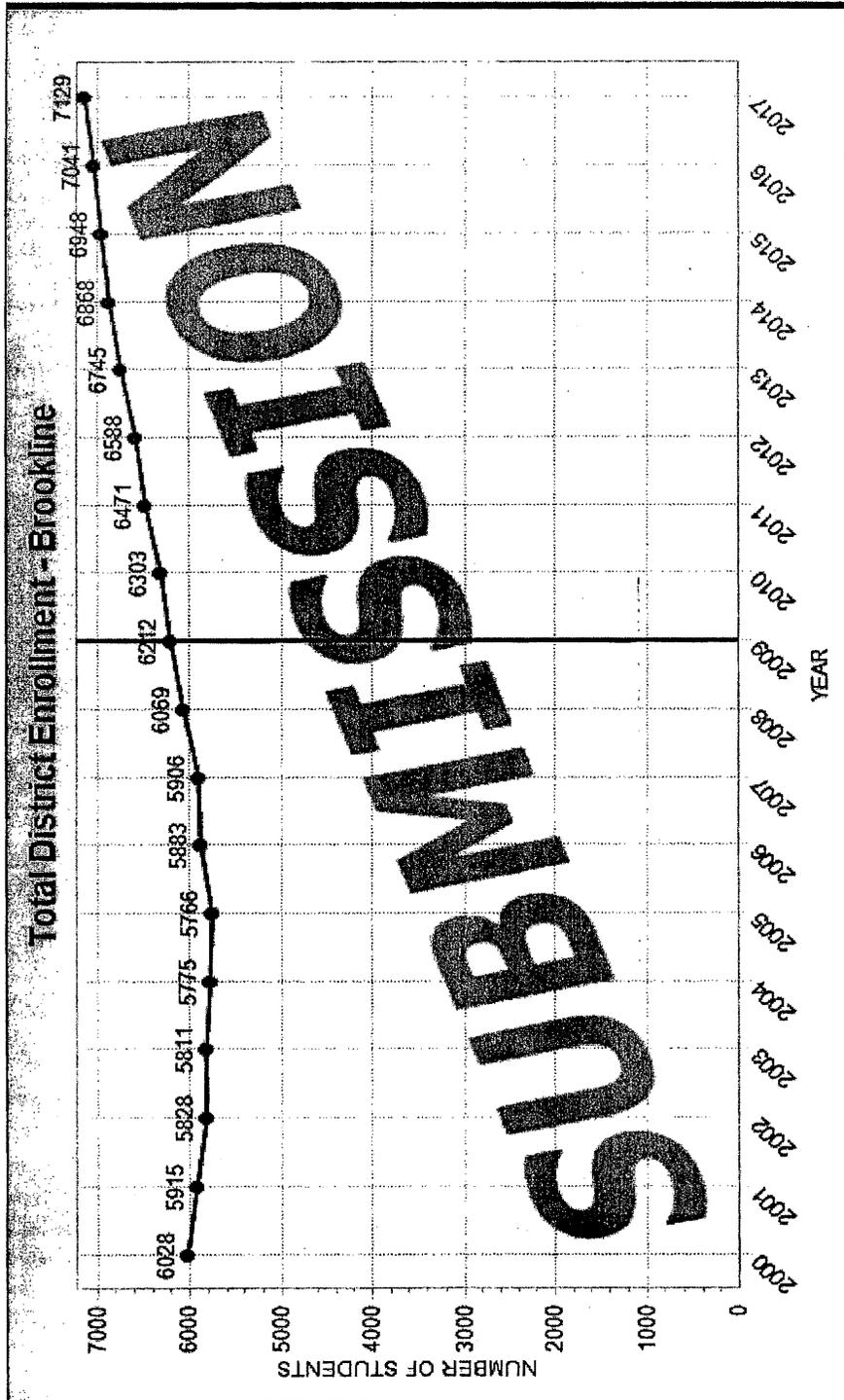
Brookline



District Enrollment by Grade Group - Brookline



Brookline



1/26/2011

Page 6 of 8

Note: For regional school districts, the italicized figures in the following table(s) represent the summarization of enrollment data from the local school districts which are members of the regional school districts.

**5 years enrollment history**

School Year	K	1	2	3	4	5	6	7	8	9	10	11	12	Total
2005-2006	484	427	437	465	423	417	413	432	398	465	465	470	470	5,766
2006-2007	549	496	423	452	452	435	406	416	425	421	474	467	467	5,883
2007-2008	495	527	514	438	449	448	408	394	425	432	443	456	477	5,906
2008-2009	552	516	556	539	452	444	444	409	387	445	432	443	450	6,069
2009-2010	596	556	516	544	539	449	435	443	395	409	466	427	437	6,212

**10 years projected enrollment**

School Year	K	1	2	3	4	5	6	7	8	9	10	11	12	Total
2010-2011	505	603	567	528	543	538	438	429	438	409	421	459	425	6,303
2011-2012	570	511	614	580	527	542	525	432	424	454	421	414	457	6,471
2012-2013	551	576	521	629	579	526	529	518	427	439	467	414	412	6,588
2013-2014	549	557	587	533	628	578	514	521	512	442	452	460	412	6,745
2014-2015	512	555	568	601	532	627	564	506	516	530	455	445	457	6,868
2015-2016	513	518	566	581	600	531	612	556	501	534	545	448	443	6,948
2016-2017	513	519	528	579	580	599	519	603	550	519	549	537	446	7,041
2017-2018	514	519	529	540	578	579	585	511	596	570	533	541	534	7,129

Note: These enrollment figures were calculated using the 5 Years Average Method (Case 1 Method).



Brookline

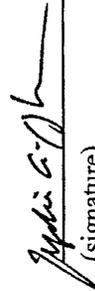
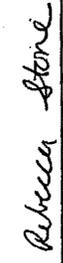
**CERTIFICATIONS**

The undersigned hereby certifies that, to the best of his/her knowledge, information and belief, the statements and information contained in this Enrollment Projection and attached hereto are true and accurate and that this Enrollment Projection has been prepared under the direction of the district school committee and the undersigned is duly authorized to submit this Enrollment Projection to the Massachusetts School Building Authority. The undersigned also hereby acknowledges and agrees to provide the Massachusetts School Building Authority, upon request by the Authority, any additional information relating to this Enrollment Projection that may be required by the Authority.

**LOCAL CHIEF EXECUTIVE OFFICER/DISTRICT SUPERINTENDENT/SCHOOL COMMITTEE CHAIR  
(E.g., Mayor, Town Manager, Board of Selectmen)**

**Chief Executive Officer      School Committee Chair      Superintendent of Schools**

Melvin Kleckner      Rebecca Stone      William H. Lapina  
(print name)      (print name)      (print name)

              
(signature)      (signature)      (signature)

Date 1/26/2011      Date 1/26/2011      Date 1-26-2011

Note: Dick  
Kdgn. enrollment  
for 2010-2011  
is actually 545 as  
submitted - why does  
it show up as 505?

No 2010-2011 enrollment  
counts ~~are~~ agree  
with our current  
year actual.

Judice  
PR



**TOWN of BROOKLINE**  
**Massachusetts**

BOARD OF SELECTMEN  
MELVIN A. KLECKNER  
Town Administrator

In Board of Selectmen

January 11, 2011

The Board considered the question of approving the Statement of Interest to the Massachusetts School Building Authority for the Edward Devotion School.

On motion it was unanimously,

VOTED:

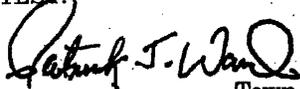
Resolved: Having convened in an open meeting on Tuesday, January 18th, 2011, the Board of Selectmen of the Town of Brookline, in accordance with its charter, by-laws, and ordinances, has voted to authorize the Superintendent to submit to the Massachusetts School Building Authority the Statement of Interest dated Friday, January 14th, 2011 for the Edward Devotion School located at 345 Harvard Street Brookline, Massachusetts 02446 which describes and explains the following deficiencies and the priority category(s) for which the Town of Brookline may be invited to apply to the Massachusetts School Building Authority in the future

- Prevention of severe overcrowding expected to result from increased enrollments;
- Replacement, renovation or modernization of school facility systems, such as roofs, windows, boilers, heating and ventilation systems, to increase energy conservation and decrease energy related costs in a school facility;
- Replacement of or addition to obsolete buildings in order to provide for a full range of programs consistent with state and approved local requirements;

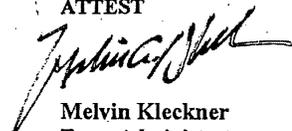
and hereby further specifically acknowledges that by submitting this Statement of Interest, the Massachusetts School Building Authority in no way guarantees the acceptance or the approval of an application, the awarding of a grant or any other funding commitment from the Massachusetts School Building Authority, or commits The Public Schools of Brookline to filing an application for funding with the Massachusetts School Building Authority.

Duly recorded and dated:

A TRUE COPY  
ATTEST

  
Town Clerk  
Brookline

ATTEST

  
Melvin Kleckner  
Town Administrator

**THE PUBLIC SCHOOLS OF BROOKLINE**  
**OFFICE OF THE SCHOOL COMMITTEE**  
**BROOKLINE, MASSACHUSETTS**  
Town Hall, 5<sup>th</sup> Floor, 333 Washington Street  
Brookline, MA 02445  
Telephone: 617-730-2430 Fax: 617-264-6451  
www.brookline.k12.ma.us



Rebecca Stone, Chair  
Alan Morse, Vice Chair  
Helen Charlupski  
Elizabeth Childs  
Glenn Cunha  
Susan Wolf Ditkoff  
Judy Meyers  
Barbara Scotto  
Henry Warren

**SCHOOL COMMITTEE VOTE**

Resolved: Having convened in an open meeting on Thursday, January 20th, 2011, the Brookline School Committee of the Town of Brookline, in accordance with its charter, by-laws, and ordinances, has voted to authorize the Superintendent to submit to the Massachusetts School Building Authority the Statement of Interest dated Friday, January 14th, 2011 for the Edward Devotion School located at 345 Harvard Street Brookline, Massachusetts 02446 which describes and explains the following deficiencies and the priority category(s) for which the Town of Brookline may be invited to apply to the Massachusetts School Building Authority in the future

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- Replacement of or addition to obsolete buildings in order to provide for a full range of programs consistent with state and approved local requirements;

and hereby further specifically acknowledges that by submitting this Statement of Interest, the Massachusetts School Building Authority in no way guarantees the acceptance or the approval of an application, the awarding of a grant or any other funding commitment from the Massachusetts School Building Authority, or commits The Public Schools of Brookline to filing an application for funding with the Massachusetts School Building Authority.

Robin Coyne  
Executive Assistant  
Brookline School Committee  
January 20, 2011

A TRUE COPY  
ATTEST

Town Clerk  
Brookline



## Massachusetts School Building Authority

Steven Grossman  
*Chairman, State Treasurer*

John K. McCarthy  
*Executive Director*

November 20, 2013

### ATTACHMENT H

Ms. Betsy DeWitt, Chair  
Brookline Board of Selectmen  
Brookline Town Hall  
333 Washington Street, 6<sup>th</sup> Floor  
Brookline, MA 02445

Re: Town of Brookline, Edward Devotion School

Dear Ms. DeWitt:

I am pleased to report that the Board of the Massachusetts School Building Authority (the "MSBA") has voted to invite the Town of Brookline (the "Town") to re-enter the Feasibility Study phase and commence the feasibility study for the Edward Devotion School.

Subsequent to the MSBA's Board of Directors initial vote on January 30, 2013 to invite the Town to conduct a feasibility study for the Edward Devotion School, a planning committee for the Town finalized an analysis of the Town's growing enrollment and available spaces at all of the Town's schools. Based on the findings of the committee, the Town asked the MSBA to consider a larger enrollment population than previously agreed upon by the MSBA prior to the Town's first invitation to Feasibility Study. In response, the MSBA requested that the Town discontinue any work of the feasibility study, postpone executing a contract with the selected designer, HMFH Architects, Inc., submit substantiating enrollment data to the MSBA, and return to the Eligibility Period to await the MSBA's enrollment review as well as a second invitation to the Feasibility Study phase from the Board. MSBA staff concluded that, based on the enrollment data provided by the Town, the study enrollment for the Edward Devotion School project should be increased from 830 students to 1,010 students.

An enrollment letter and design certification for the Edward Devotion School outlining the revised enrollment information detailed above will be sent under separate cover. The Town should execute the design certification and the Designer contract, and submit both to the MSBA no later than December 2, 2013. An original design certification and both a hard copy and an electronic copy of the Designer contract are required.



Page 2  
November 20, 2013  
Brookline Board Action Letter

I look forward to continuing to work with you as part of the MSBA's grant program. As always, feel free to contact me or my staff at (617) 720-4466 should you have any questions.

Sincerely,



John K. McCarthy  
Executive Director

Cc: Legislative Delegation  
Melvin Kleckner, Brookline Town Administrator  
Sean Cronin, Brookline Deputy Town Administrator  
Alan Morse, Chair, Brookline School Committee  
Dr. William H. Lupini, Superintendent, Brookline Public Schools  
Peter C. Rowe, Deputy Superintendent, Brookline Public Schools  
Anthony Guigli, Owner's Project Manager, Town of Brookline  
File: 10.2 Letters (Region 4)



TOWN OF BROOKLINE FY2015 PROGRAM BUDGET	CAPITAL IMPROVEMENTS PROGRAM
<b>CAPITAL IMPROVEMENTS PROGRAM</b>	
<p>Capital planning and budgeting is a critical undertaking for any government and is "central to economic development, transportation, communication, delivery of other essential services, and environmental management and quality of life", as stated in ICMA's <i>Capital Budgeting: A Guide for Local Governments</i>. In fact, without a sound plan for long-term investment in infrastructure, facilities, and equipment, a local government's ability to accomplish its goals is greatly hindered. Developing a financing plan for capital investments that fits within the overall financial framework of a community is of equal importance, as poor decisions regarding the use of debt can negatively impact a community's financial condition for many years.</p> <p>In Massachusetts, the preparation of the annual Capital Improvements Program (CIP) is mandated by State statute. Massachusetts General Law Chapter 41 provides that the Planning Board shall annually prepare and submit a CIP for a Town. In Brookline's case, Chapter 270 of the Acts of 1985, special legislation known as the "Town Administrator Act", directs the Town Administrator to prepare and recommend an annual financial plan that includes a CIP. The Deputy Town Administrator and the Director of Planning and Community Development co-chair a working group of department heads that reviews and evaluates all project requests. A number of these requests arise from public input received by boards and commissions. A more detailed description of the CIP process can be found starting on page VII-3.</p> <p>The Town has a set of formal CIP policies that define what a capital improvement project is, how projects are evaluated and prioritized, and how the CIP is financed. The complete text of these policies can be found in the Appendix of this Financial Plan. The table on the following page presents the indicators that are to be monitored per the Debt Management Policies portion of the CIP Financing Policies, along with other standard debt measurement variables.</p> <p><b>INTRODUCTION</b></p> <p>The financial underpinning of the Town's CIP is the policy that states an amount equivalent to 6% of the prior year's net revenue shall be dedicated to the CIP. This key policy places both a floor and a ceiling on the amount of debt supported by the tax levy that can be authorized, thereby limiting the impact on the Operating Budget. The goal is to have the 6% consist of both a debt-financed component and a revenue (or pay-as-you-go) component, with 4.5% for debt-financed CIP and 1.5% for pay-as-you-go CIP.</p> <p>In addition to the 6% policy, there is a Free Cash Policy, also included in the Appendix of this Financial Plan, that dedicates an amount of this revenue source to the CIP so that total CIP funding is 7.5% of prior year net revenue. In summary, the policy prioritizes the use of Free Cash so that (1) an annual Operating Budget Reserve is supported, (2) overall Fund Balance levels are maintained, (3) the Catastrophe and Liability Fund is maintained at recommended funding levels, and (4) the CIP reaches the 7.5% level*. This important funding source allows for the expansion of the pay-as-you-go component of the CIP. Without Free Cash, the Town would be unable to fund many of the projects being recommended. Lastly, from time to time, one-time revenues will be used to augment the CIP, such as the \$1 million in Overlay Reserve Surplus that is proposed for use in this CIP.</p>	
<p>* The Free Cash policy also calls for a.) supporting the Affordable Housing Trust Fund under certain circumstances and b.) supporting other trust funds related to fringe benefits and unfunded liabilities related to employee benefits, if necessary.</p>	

MEASUREMENT OF CIP FINANCING POLICIES & OTHER COMMON DEBT INDICATORS

VARIABLE	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Legal Limit for Outstanding Debt = 5% of Equalized Valuation (EQV) EQV for 1/1/12 = \$16.227 billion. Assume 2.5% annual growth. (In billions)	\$17.048	\$17.474	\$17.911	\$18.359	\$18.818	\$19.288	\$19.771
Outstanding Debt as a % of EQV	0.5%	0.5%	0.5%	0.8%	0.9%	0.9%	0.8%
General Fund Outstanding Debt as a % of EQV	0.4%	0.4%	0.4%	0.7%	0.9%	0.8%	0.8%
Net General Fund Outstanding Debt as a % of EQV	0.4%	0.4%	0.4%	0.7%	0.8%	0.8%	0.7%
Total Outstanding Debt (in millions)	\$74.8	\$75.2	\$76.5	\$129.6	\$157.3	\$153.6	\$147.2
General Fund Outstanding Debt (in millions)	\$64.0	\$65.3	\$68.1	\$121.3	\$150.7	\$146.9	\$141.4
Net General Fund Outstanding Debt (in millions)	\$61.6	\$63.2	\$66.3	\$119.9	\$149.6	\$146.0	\$140.8
Total Debt Service (in millions)	\$11.9	\$11.9	\$12.3	\$12.8	\$16.7	\$19.0	\$19.1
General Fund Debt Service (in millions)	\$9.4	\$9.6	\$9.9	\$10.6	\$14.7	\$17.4	\$17.4
Net General Fund Debt Service (in millions)	\$8.8	\$9.0	\$9.4	\$10.1	\$14.2	\$16.8	\$17.0
Total Debt Service Per Capita	\$203	\$202	\$210	\$218	\$284	\$324	\$325
General Fund Debt Service Per Capita	\$158	\$161	\$167	\$180	\$249	\$295	\$296
Net General Fund Debt Service Per Capita	\$150	\$153	\$160	\$172	\$241	\$287	\$290
Total Debt Service as a % of Revenue	4.6%	4.5%	4.6%	4.6%	5.7%	6.3%	6.1%
General Fund Debt Service as a % of General Fund Revenue	4.1%	4.1%	4.1%	4.3%	5.6%	6.4%	6.2%
Net General Fund Debt Service as a % of General Fund Revenue	3.9%	3.8%	3.9%	4.0%	5.4%	6.2%	6.1%
A. Total Outstanding Debt Per Capita as a % of Per Capita Income	1.8%	1.8%	1.8%	2.9%	3.4%	3.3%	3.1%
General Fund Outstanding Debt Per Capita as a % of Per Capita Income	1.5%	1.5%	1.6%	2.7%	3.3%	3.1%	2.9%
Net General Fund Outstanding Debt Per Capita as a % of Per Capita Income	1.5%	1.5%	1.4%	1.4%	2.9%	2.7%	2.6%
B. Total Outstanding Debt Per Capita	\$1,273	\$1,282	\$1,305	\$2,209	\$2,682	\$2,618	\$2,509
General Fund Outstanding Debt Per Capita	\$1,090	\$1,113	\$1,161	\$2,068	\$2,569	\$2,504	\$2,409
Net General Fund Outstanding Debt Per Capita	\$1,049	\$1,078	\$1,131	\$2,043	\$2,550	\$2,489	\$2,400
C. Total Outstanding Debt as a % of Assessed Value (AV)	0.5%	0.5%	0.5%	0.8%	0.9%	0.9%	0.8%
General Fund Outstanding Debt as a % of Assessed Value (AV)	0.4%	0.4%	0.4%	0.7%	0.9%	0.8%	0.8%
Net General Fund Outstanding Debt as a % of Assessed Value (AV)	0.4%	0.4%	0.4%	0.4%	0.8%	0.7%	0.7%
D. Total Debt Maturing Within 10 Years	84%	87%	82%	61%	57%	58%	60%
General Fund Debt Maturing Within 10 Years	82%	86%	80%	58%	55%	56%	59%
E. CIP Financing as a % of Prior Year's Net Revenue	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
Debt-Financed CIP as a % of Prior Year's Net Revenue	4.15%	3.99%	4.00%	3.89%	3.96%	4.44%	4.37%
Revenue-Financed CIP as a % of Prior Year's Net Revenue	1.85%	2.01%	2.00%	2.11%	2.04%	1.56%	1.63%

**Town Policies**

- A. Total Outstanding Debt Per Capita = shall not exceed 6% of Per Capita Income.
  - B. Total Outstanding Debt Per Capita = shall not exceed \$2,544 (for FY14).
  - C. Total Outstanding Debt = shall not exceed 2.5% of Assessed Value (AV).
  - D. Bond Maturities = 60% of General Fund principal shall mature within 10 years.
  - E. CIP Financing = 6% of Prior Year's Net Revenue, with a goal of 4.5% from Debt-Financed and 1.5% from Revenue-Financed.
- NOTE: Net General Fund Debt/Debt Service is total General Fund Debt/Debt Service less the share paid by the State for the Heath and Baker projects.



TOWN OF BROOKLINE FY2015 PROGRAM BUDGET		CAPITAL IMPROVEMENTS PROGRAM					
	2015	2016	2017	2018	2019	2020	
Total General Fund Revenue	236,082,975	241,404,753	250,171,754	261,880,896	271,424,207	279,764,302	
<b>LESS:</b>							
Non Appropriations	8,075,913	8,266,496	8,461,844	8,662,075	8,867,312	9,077,680	
Debt Exclusions	1,094,400	1,076,000	1,775,807	5,385,239	6,589,231	6,552,631	
Free Cash	5,084,152	4,000,000	4,100,000	4,200,000	4,350,000	4,450,000	
Overlay Reserve Surplus	1,000,000	0	0	0	0	0	
<b>Net Revenue</b>	<b>220,828,510</b>	<b>228,062,257</b>	<b>235,834,103</b>	<b>243,633,581</b>	<b>251,617,665</b>	<b>259,683,991</b>	
Prior Year Net Revenue	212,233,623	220,828,510	228,062,257	235,834,103	243,633,581	251,617,665	
<b>6% CIP FUNDING POLICY</b>							
Net Debt Financed <sup>1</sup>	8,467,357	8,838,554	8,869,657	9,335,638	10,812,044	10,993,801	
Net Debt Financed as a % of Prior Yr Net Rev	3.99%	4.00%	3.89%	3.96%	4.44%	4.37%	
Revenue Financed	4,266,661	4,411,157	4,814,079	4,814,408	3,805,971	4,103,259	
Revenue Financed as a % of Prior Yr Net Rev	2.01%	2.00%	2.11%	2.04%	1.56%	1.63%	
<b>SUB-TOTAL 6% Dedicated to CIP</b>	<b>12,734,017</b>	<b>13,249,711</b>	<b>13,683,735</b>	<b>14,150,046</b>	<b>14,618,015</b>	<b>15,097,060</b>	
Free Cash for CIP	4,148,339	3,298,726	3,407,298	3,523,921	3,640,960	3,760,769	
Overlay Reserve Surplus	1,000,000	0	0	0	0	0	
<b>FUNDS AVAILABLE FOR CIP THROUGH GEN. FUND WITHIN TAX LEVY</b>	<b>17,882,357</b>	<b>16,548,436</b>	<b>17,091,033</b>	<b>17,673,967</b>	<b>18,258,975</b>	<b>18,857,829</b>	
<b>As % of Prior Yr Net Rev</b>	<b>8.4%</b>	<b>7.5%</b>	<b>7.5%</b>	<b>7.5%</b>	<b>7.5%</b>	<b>7.5%</b>	
Debt Exclusions	1,094,400	1,076,000	1,775,807	5,385,239	6,589,231	6,552,631	
<b>TOTAL FUNDS AVAILABLE FOR CIP THROUGH GEN. FUND</b>	<b>18,976,757</b>	<b>17,624,436</b>	<b>18,866,840</b>	<b>23,059,206</b>	<b>24,848,205</b>	<b>25,410,460</b>	
<b>As % of Prior Yr Net Rev</b>	<b>8.9%</b>	<b>7.9%</b>	<b>8.2%</b>	<b>9.7%</b>	<b>10.0%</b>	<b>9.8%</b>	
<sup>1</sup> As defined in the CIP Policies, "Net Debt" is total debt service exclusive of debt service related to a Debt Exclusion and debt service funded by enterprise fund revenues.							
<b>BROOKLINE'S CIP PROCESS</b>							
The preparation of the annual CIP is mandated by statute: MGL Chapter 41 provides that the Planning Board shall prepare and submit a CIP for a Town. In Brookline's case, Chapter 270 of the Acts of 1985, special legislation known as the "Town Administrator Act", directs the Town Administrator to prepare and recommend an annual financial plan that includes a CIP. The annual process for Brookline begins with the submission of project requests by departments, which in many cases are the result of various board/commission (Park and Recreation Commission, Library Trustees, etc.) public hearings.							

The requests are then reviewed by a working group that is co-chaired by the Deputy Town Administrator and the Director of the Department of Planning and Community Development and is comprised of all department heads that have requested projects. After reviewing all project requests, a Preliminary CIP is recommended to the Town Administrator, who then presents it to the Board of Selectmen as part of a public hearing on the Town's Operating and Capital budgets in December. The Town Administrator's Preliminary CIP is then reviewed by both the Planning Board and the Capital Sub-Committee of the Advisory Committee. To the extent necessary, any modifications to the Preliminary CIP are reflected in the formal CIP publication that is published by the Planning Board. Similarly, any changes to the first year of the CIP are factored into the budget that is presented to Town Meeting by the Advisory Committee.

**PROPOSED FY15 – FY20 CIP**

The recommended FY15 – FY20 CIP calls for an investment of \$318.2 million, for an average of approximately \$53 million per year. This continues the Town's commitment to prevent the decline of its infrastructure, upgrade its facilities, improve its physical appearance, and invest in opportunities that positively impact the Operating Budget. Over the last 10 years (FY05 - FY14), the Town has authorized expenditures of \$178.8 million, for an average of nearly \$17.9 million per year. These efforts, which have been supported by the Board of Selectmen, the Advisory Committee, Town Meeting, and, ultimately, the taxpayers of Brookline, have helped address a backlog of capital projects, have dramatically improved the Town's physical assets, and have helped yield savings in the Operating Budget through investments in technology and energy efficiency.

It was a challenge to develop a balanced CIP that continues to reflect the various priorities of the Town while simultaneously addressing the overcrowding issue in the schools. The overcrowding issue has prompted the recommendation for a Debt Exclusion Override for the Devotion School, as described below. As has been widely reported, what used to be Kindergarten classes of 425 students are now classes of 630-660. As those classes move through the system, there will continue to be annual classroom space challenges in the elementary schools and a space crisis at the High School in 4-5 years. This CIP encompasses the B-Space Committee plan to address this issue in a comprehensive manner.

Absent any changes in School policies, it is not possible to fund the projects already in the capital pipeline, plus the new school expansion projects recommended by the B-Space Committee, within the Town's 7.5% Financing Policy. Therefore, it is recommended that the Devotion School project be funded outside of the Proposition 2½ tax levy limit through a voter approved Debt Exclusion Override. In addition, it is recommended that \$1 million from surpluses in the Overlay account is used in FY15 to fund the feasibility study / schematic design phase of the Driscoll School project. Finally, the Town assumes that major school expansion projects will receive a portion of their costs reimbursed by the Commonwealth of Massachusetts through the Massachusetts School Building Authority (MSBA).

The decision to recommend a Debt Exclusion for the Devotion School project is not made lightly. The B-Space Committee made its recommendations in September and the School Committee subsequently voted to support the "expand in place" approach to creating needed classroom space. As a result, this CIP incorporates three major school expansion projects:

- Devotion School – a renovation/addition project that results in a larger school (1,000+ students) than originally conceived.
- Driscoll School – new to the CIP, this project would add 12 new classrooms and make it an 800+ student school.
- High School – with the larger grades making their way through the elementary schools, they will soon be at the High School. This CIP provides funding for an addition.



TOWN OF BROOKLINE FY2015 PROGRAM BUDGET	CAPITAL IMPROVEMENTS PROGRAM
<p>Without a Debt Exclusion for the Devotion School project, this CIP does not work. The basic premise here is using the Debt Exclusion for Devotion as a way to free-up future debt service capacity for the Driscoll and High School projects. The current (FY14-FY19) CIP assumes \$54 million of Town funding for the Devotion project within the Proposition 2½ tax levy. By funding it with a Debt Exclusion, the revenue capacity previously allocated to the Devotion School becomes available for the Driscoll and High School projects. Simply stated, a Debt Exclusion Override for the Devotion School allows for the funding of all three projects.</p> <p>It should also be clearly stated that the Override Study Committee (OSC) is in the process of reviewing the B-Space recommendations. If they determine that the classroom expansion plan supported by B-Space is not required or could be scaled back, then a Debt Exclusion for the Devotion project would be revisited. Also, the Town will not be in a position to seek a Debt Exclusion until the Spring of 2015, so there will more time to study the issue.</p> <p><b>School overcrowding</b> is an issue that the Town must continue to address. Since the plans to address the issue are expensive, it places great pressure on the CIP. This FY15 – FY20 CIP includes the following items that address the overcrowding issue:</p> <ul style="list-style-type: none"> <li>• \$1.75 million is included in FY15 for <u>Classroom Capacity</u>. In both FY08 and FY10, Town Meeting appropriated \$400,000 to address space needs, followed by \$530,000 in FY11 and \$1.75 million in both FY13 and FY14. The amount requested for FY15 will go toward the final three lease/purchase payments of the Lawrence School classroom modular classroom addition (the first two payments are being paid for out of existing Classroom Capacity funds) and costs associated with any further space conversions into classrooms within existing school buildings, a process that is more complex and challenging each year as available space is reduced. If the Lawrence modular project does not move forward, then these funds would go toward alternative plans for new classroom space at Lawrence. There is also \$500,000 in FY16 for work required at the High School to start preparing the facility for the influx of students.</li> <li>• \$43 million is included for the <u>Driscoll School addition</u> project recommended by B-Space. Of that amount, \$14.7 million (35%) is assumed to be funded by the MSBA and \$27.3 million (65%) by the Town. \$1 million is included in FY15 for the feasibility / schematic design portion of the project (funded from Overlay Surplus), followed by funding for design completion and construction in FY17.</li> <li>• Last year during the preparation of the FY14- FY19 CIP, no funding was included for future work required at the <u>High School</u> to address the space issues that will present themselves as the larger classes in the elementary schools reach the high school because a concept study was underway. That concept study, which was funded in FY13, has been helpful in the development of a plan to address the overcrowding issue. A High School addition project was also recommended by the B-Space Committee and supported by the School Committee. This CIP includes \$76 million for this project, of which \$26.3 million (35%) is assumed to be funded by the MSBA and \$48.8 million (65%) by the Town. \$1.75 million is included in FY17 for the feasibility/schematic design portion of the project, followed by funding for design completion and construction in FY19.</li> <li>• Based on updated figures from the project architect (HMFH), the estimate for the <u>Devotion School Project</u> is increased to \$110 million and the MSBA participation rate assumption is reduced from 40% to 30%. This results in a \$77 million Town cost. As previously detailed, this CIP assumes a Debt Exclusion for the Devotion project.</li> </ul> <p>All of this is being addressed while continuing to address on-going infrastructure improvements including streets, sidewalks, parks/playgrounds, and water/sewer systems. The core of any CIP should be the repair of and improvement to a community's infrastructure, and that is the case with this</p>	

**TOWN OF BROOKLINE  
FY2015 PROGRAM BUDGET**

**CAPITAL IMPROVEMENTS PROGRAM**

Proposed CIP. Governmental jurisdictions across the country continue to struggle with the issue of funding infrastructure needs, especially in these economic and budgetary times. Fortunately, Brookline’s CIP policies (dedicated CIP funding) and taxpayer support (debt exclusions for Schools and an Override that included infrastructure needs) have allowed the community to fund these needs at the appropriate funding levels to maintain our capital infrastructure. For example, even with the pressure placed on the CIP by the school overcrowding issue and other high priority demands, this CIP continues the Town’s commitment to upgrading its parks, playgrounds, and other open spaces. As proposed, this CIP renovates the following parks/playgrounds:

	<b>Total</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>Future Years</b>
	<b>Amount</b>							
Pierce Playground	1,010,000	90,000	920,000					
Brookline Ave Playground	870,000		870,000					
Emerson Garden Playground	670,000		60,000	610,000				
Corey Hill Playground	600,000		40,000	560,000				
Brookline Reservoir Park	1,880,000			80,000	1,800,000			
Harry Downes Field & Playground	880,000			80,000	800,000			
Murphy Playground	780,000				60,000	720,000		
Schick Playground	770,000				70,000	700,000		
Soule Athletic Fields	550,000					50,000	500,000	
Larz Anderson Park	8,400,000					2,700,000	2,200,000	3,500,000
Kraft Family Athl. Field Turf Repl.	770,000					70,000	700,000	
Robinson Playground	990,000					90,000	900,000	
Riverway Park	425,000							425,000
Cypress Playground/Athl. Field	1,500,000						100,000	1,400,000

This CIP also includes a plan to utilize Cemetery Funds for roadwork (\$150,000 between FY15-16) and lot expansion (\$770,000 in Future Years). This is an outcome of the conversations with the Cemetery Trustees regarding the appropriate use of their separate funds. As part of the FY15 budget process, there will be continued discussions with the Trustees regarding the prudent allocation of these funds.

A few years ago, a study was made of the conditions of the **fire stations** and what was needed to maintain the integrity of the floors and building in regard to the newer, larger fire equipment. The work outlined in the report included flooring, shoring, beams, columns, and structural work. The report also included recommendations for the HVAC systems, generators, lighting, life safety, and mechanical, electrical, plumbing (MEP), along with other peripheral systems. In FY12, \$650,000 was appropriated to undertake the Structural component. The next phase for implementation was the Life Safety component. This CIP continues the plan to modify basic life safety components (e.g., smoke detectors, carbon monoxide detectors). The final phase (mechanical, electrical, plumbing) is also included, starting in FY17.

This CIP also addresses a long-standing need in the Fire Department: a modern **fleet maintenance facility**. The current maintenance facility is located in Station #1 and the shop is not large enough to allow access to many of the Department’s vehicles, leaving the mechanics no choice but to do repairs out in the street, the drill yard at Station #6, or on occasion inside another fire station. This is obviously unsafe when on the street and inefficient when working in locations away from the shop and all its tools and equipment. The limited size of the shop and its inability to house the apparatus leaves the Fire Department looking to costly outside repair vendors more often than would be necessary if the Department had an adequate facility. The plan is to construct a new facility behind Station #6. In addition, the Fire Chief has expressed his desire to modernize the Department’s training facility, which is also located at Station #6. A total of \$4.2 million is included for these projects.



TOWN OF BROOKLINE FY2015 PROGRAM BUDGET	CAPITAL IMPROVEMENTS PROGRAM															
<p>The Town has an excellent <b>fire apparatus</b> rehab/replacement schedule that calls for rehabbing engines every 10 years and ladders every 12 years and for replacing front line engines every 17 years and front line ladder trucks every 20 years. Because of this policy, the Fire Department has an excellent and young stable of engines and ladders. This CIP continues to follow the policy and replaces Ladder #2 in FY15 (\$900K), Engine #5 in FY15 (\$580K), and Engine #6 in FY19 (\$660K). It also includes \$1.2 million for rehabilitation.</p>																
<p>The <b>Village Square and Riverway Park Pedestrian/Bike Path</b> are significant public works projects that are slated for FY15 / FY16. The table below summarizes the funding plan, which shows both projects being funded 100% with non-Town funding:</p>																
	<table border="0"> <tr> <td></td> <td style="text-align: right;"><b>FY2015</b></td> <td style="text-align: right;"><b>FY2016</b></td> </tr> <tr> <td>Village Sq. Circulation Improv. - CD</td> <td style="text-align: right;">375,000</td> <td style="text-align: right;">250,000</td> </tr> <tr> <td>Village Sq. Circulation Improv. - Offsite Improvements from 2 Brookline PI</td> <td></td> <td style="text-align: right;">750,000</td> </tr> <tr> <td>Village Sq. Circulation Improv. - State Grant (TIP)</td> <td></td> <td style="text-align: right;">4,375,971</td> </tr> <tr> <td><b>Village Sq. Circulation Improv. - Total</b></td> <td style="text-align: right;"><b>375,000</b></td> <td style="text-align: right;"><b>5,375,971</b></td> </tr> </table>		<b>FY2015</b>	<b>FY2016</b>	Village Sq. Circulation Improv. - CD	375,000	250,000	Village Sq. Circulation Improv. - Offsite Improvements from 2 Brookline PI		750,000	Village Sq. Circulation Improv. - State Grant (TIP)		4,375,971	<b>Village Sq. Circulation Improv. - Total</b>	<b>375,000</b>	<b>5,375,971</b>
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Riverway Park Pedestrian/Bike Path - Federal Grant		675,000														
Riverway Park Pedestrian/Bike Path - State Grant (DCR)		300,000														
Riverway Park Pedestrian/Bike Path - State Grant (TIP)		325,000														
Riverway Park Pedestrian/Bike Path - CD		200,000														
<b>Riverway Park Pedestrian/Bike Path. - Total</b>	<b>0</b>	<b>1,500,000</b>														
<p>For a number of years the School Department has been working on the development of a plan to enhance <b>educational technology</b>. The Override Study Committee is reviewing this issue, as there is a substantial cost associated with the overall plan. The funding in this CIP (\$320,000 in FY15 + \$200,000/yr for FY's 16-20) is for the infrastructure and equipment required to start implementing the plan.</p>																
<p>This CIP includes a new \$1 million bond authorization for grounds and facility improvements at the <b>Robert T. Lynch Municipal Golf Course</b>. The funds would be used to finish cart paths on holes 14 and 15, complete bunker renovations on holes 14, 16 and 17, restoration of the 9th fairway, substantial tree pruning/elimination, and irrigation maintenance. Additionally, the clubhouse would get a much needed upgrade to the electrical and HVAC system. The debt will be phased so that debt service will remain at affordable levels. The golf course enterprise fund pays for all debt service associated with the golf course and its facilities.</p>																
<p>In addition to the 6% financing policy, Free Cash, CDBG, and State/Federal grants are the other key components of the overall financing strategy of the CIP. The Town's certified Free Cash for the fiscal year ending June 30, 2013 was \$7.08 million. The proposed allocation of Free Cash used throughout this Financial Plan follows the Town's formal Free Cash policy, which results in the following use of these funds:</p>																

VII-7



TOWN OF BROOKLINE FY2015 PROGRAM BUDGET	CAPITAL IMPROVEMENTS PROGRAM
Certification	\$7,084,861
1. Operating Budget Reserve	\$530,584
2. Unreserved Fund Balance/Stabilization Fund	\$2,000,709
3. Liability Reserve	\$234,839
4. Capital Improvements	\$3,183,504
5. <u>Affordable Housing Trust Fund</u>	<u>\$170,390</u>
Sub-Total	\$6,120,026
Amt available for Special Use (#6)	\$964,835
6. <u>Special Use:</u>	
Additional CIP	\$964,835
Amount Appropriated	\$5,084,152

By following these policies, \$3,183,504 of Free Cash is used to get from 6% of prior year net revenue to 7.5%. Then an additional \$964,835 is allocated to the CIP to help balance it. In total, \$4,148,339 of Free Cash goes toward the CIP, as recommended.

State/Federal grants total \$85.7 million over the six-year period, or 27% of all funding. Of this amount, \$33 million represents the potential State share of the Devotion School Renovation project, \$14.7 million represents the potential State share of the Driscoll School project, and \$26.3 million represents the potential State share of the BHS project.

Some of the major projects proposed in the CIP include:

- Devotion School - \$77 million of Town funding + \$33 million of State funding (FY15)
- BHS - \$50.5 million of Town funding + \$26.3M of State funding (FY17, FY19)
- Driscoll School - \$28 million of Town funding + \$14.7 million of State funding (FY15, FY17)
- Village Square - \$5.8 million (FY16) - - all outside funding
- Larz Anderson - \$4.9 million (FY19-20)
- Newton St. Landfill (Rear Landfill Closure) - \$4.6 million (FY15)
- Fire Fleet Maintenance / Training Facility - \$4.2 million (FY15, FY17)
- Classroom Capacity - \$2.3 million (FY15-16)
- Fire Sta. Renovations - \$1.9 million (FY15, FY17-20)
- Brookline Reservoir Park - \$1.9 million (FY17-18)
- Educational Technology - \$1.6 million (FY15-FY20)
- LED Streetlights - \$1.5 million (FY15-FY17)
- Riverway Park Ped/Bike Path - \$1.5 million (FY16) - - all outside funding

TOWN OF BROOKLINE FY2015 PROGRAM BUDGET	CAPITAL IMPROVEMENTS PROGRAM																																																												
<ul style="list-style-type: none"> <li>Pierce Playground - \$1 million (FY15-FY16)</li> <li>Golf Course - \$1 million (FY16) -- enterprise fund</li> </ul> <p>Continued major investments include:</p> <ul style="list-style-type: none"> <li>Parks and Open Space - \$19.7 million</li> <li>Town/School Roofs - \$7.5 million</li> <li>Fire Apparatus - \$3.3 million</li> <li>Information Technology - \$1.9 million</li> <li>Energy Conservation - \$1 million</li> </ul>	<ul style="list-style-type: none"> <li>Street and Sidewalk Rehab - \$17.5 million</li> <li>General Town/School Building Repairs - \$6.9 million</li> <li>Water &amp; Sewer Infrastructure - \$3 million -- enterprise fund</li> <li>Tree Replacement - \$1.1 million</li> </ul>																																																												
<p>Each of the past few Financial Plans have spoken to the “tightness” of the CIP resulting primarily from the costs associated with addressing the increasing school enrollment and the cost estimate for the Devotion School project. Graphs showed the split between revenue-financed and debt-financed CIP being relatively consistent from FY14 – FY17, then becoming more heavily weighted toward debt because of the Devotion School debt coming on-line. In FY18, there was less than \$800,000 of revenue-financed CIP, well below the normal levels of \$3.5 million - \$4 million. This posed significant challenges to funding “standard” revenue-financed projects such as streets/sidewalks, park projects, and smaller-scale Town/School facility upgrades. The debt exclusion override for the Devotion School project recommended in this Proposed CIP has the effect of “normalizing” the split, as shown in the graphs below. The chart goes out to FY22 to show the impact of the High School project. As you can see, taking on \$48.8 million in debt for that project results in a shift toward the debt-financed portion and away from revenue-financed CIP in FY23.</p>																																																													
<table border="1"> <caption>6% Policy - Cash vs. Debt (\$)</caption> <thead> <tr> <th>Year</th> <th>Revenue Financed (\$M)</th> <th>Debt Financed (\$M)</th> </tr> </thead> <tbody> <tr><td>2015</td><td>\$4.27</td><td>\$8.47</td></tr> <tr><td>2016</td><td>\$4.41</td><td>\$8.84</td></tr> <tr><td>2017</td><td>\$4.81</td><td>\$8.87</td></tr> <tr><td>2018</td><td>\$4.81</td><td>\$9.34</td></tr> <tr><td>2019</td><td>\$4.10</td><td>\$10.81</td></tr> <tr><td>2020</td><td>\$4.09</td><td>\$10.99</td></tr> <tr><td>2021</td><td>\$4.74</td><td>\$11.44</td></tr> <tr><td>2022</td><td>\$1.90</td><td>\$11.26</td></tr> <tr><td>2023</td><td>\$1.90</td><td>\$14.59</td></tr> </tbody> </table>	Year	Revenue Financed (\$M)	Debt Financed (\$M)	2015	\$4.27	\$8.47	2016	\$4.41	\$8.84	2017	\$4.81	\$8.87	2018	\$4.81	\$9.34	2019	\$4.10	\$10.81	2020	\$4.09	\$10.99	2021	\$4.74	\$11.44	2022	\$1.90	\$11.26	2023	\$1.90	\$14.59	<table border="1"> <caption>6% Policy - Cash vs. Debt (%ages)</caption> <thead> <tr> <th>Year</th> <th>Revenue Financed (%)</th> <th>Debt Financed (%)</th> </tr> </thead> <tbody> <tr><td>2015</td><td>2.01%</td><td>3.99%</td></tr> <tr><td>2016</td><td>2.00%</td><td>4.00%</td></tr> <tr><td>2017</td><td>2.11%</td><td>3.89%</td></tr> <tr><td>2018</td><td>2.04%</td><td>3.96%</td></tr> <tr><td>2019</td><td>1.56%</td><td>4.44%</td></tr> <tr><td>2020</td><td>1.63%</td><td>4.37%</td></tr> <tr><td>2021</td><td>1.58%</td><td>4.42%</td></tr> <tr><td>2022</td><td>1.78%</td><td>4.22%</td></tr> <tr><td>2023</td><td>0.69%</td><td>5.31%</td></tr> </tbody> </table>	Year	Revenue Financed (%)	Debt Financed (%)	2015	2.01%	3.99%	2016	2.00%	4.00%	2017	2.11%	3.89%	2018	2.04%	3.96%	2019	1.56%	4.44%	2020	1.63%	4.37%	2021	1.58%	4.42%	2022	1.78%	4.22%	2023	0.69%	5.31%
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2019	\$4.10	\$10.81																																																											
2020	\$4.09	\$10.99																																																											
2021	\$4.74	\$11.44																																																											
2022	\$1.90	\$11.26																																																											
2023	\$1.90	\$14.59																																																											
Year	Revenue Financed (%)	Debt Financed (%)																																																											
2015	2.01%	3.99%																																																											
2016	2.00%	4.00%																																																											
2017	2.11%	3.89%																																																											
2018	2.04%	3.96%																																																											
2019	1.56%	4.44%																																																											
2020	1.63%	4.37%																																																											
2021	1.58%	4.42%																																																											
2022	1.78%	4.22%																																																											
2023	0.69%	5.31%																																																											

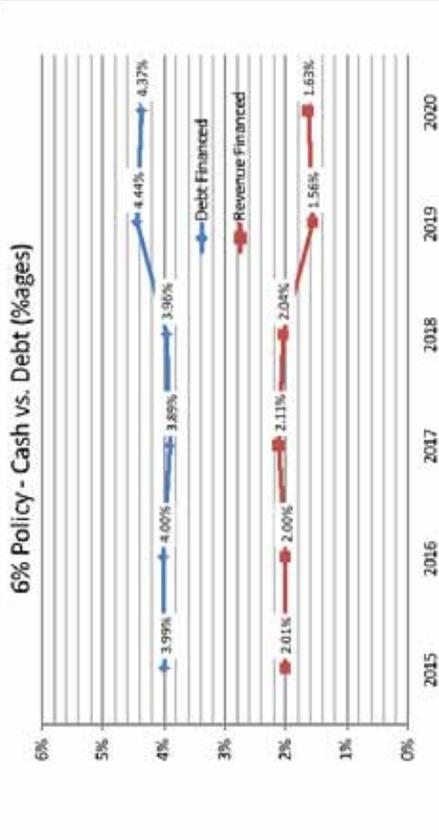
**TOWN OF BROOKLINE  
FY2015 PROGRAM BUDGET**

**CAPITAL IMPROVEMENTS PROGRAM**

The table below details the funding sources for each year of the Proposed CIP.

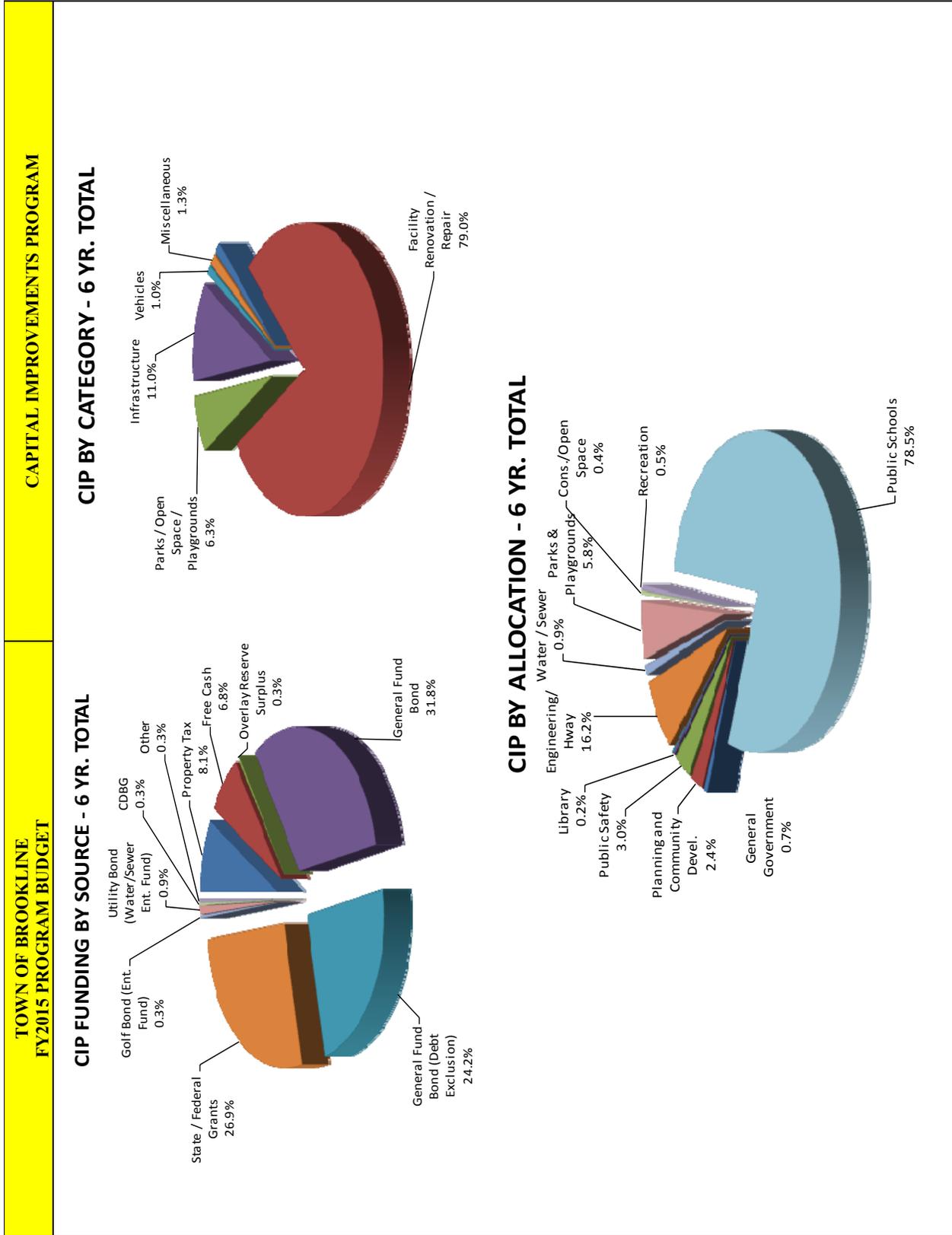
<b>GRAND TOTAL BY SOURCE (in millions)</b>	FY15	FY16	FY17	FY18	FY19	FY20	TOTAL	% OF TOTAL
Property Tax	\$4.27	\$4.38	\$4.78	\$4.77	\$3.77	\$4.08	\$26.05	8.2%
Free Cash	\$4.15	\$3.26	\$3.37	\$3.49	\$3.60	\$3.72	\$21.59	6.8%
Overlay Reserve Surplus	\$1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1.00	0.3%
General Fund Bond	\$5.50	\$3.37	\$32.60	\$0.00	\$54.95	\$4.70	\$101.12	31.8%
General Fund Bond (Debt Exclusion)	\$77.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$77.00	24.2%
State / Federal Grants	\$33.95	\$7.03	\$15.65	\$0.95	\$27.20	\$0.95	\$85.73	26.9%
Golf Bond (Ent. Fund)	\$0.00	\$1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1.00	0.3%
Utility Bond (Water/Sewer Ent. Fund)	\$0.00	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$3.00	0.9%
CDBG	\$0.38	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.83	0.3%
Other	\$0.10	\$0.80	\$0.00	\$0.00	\$0.00	\$0.00	\$0.90	0.3%
<b>TOTAL</b>	<b>\$126.34</b>	<b>\$20.29</b>	<b>\$59.39</b>	<b>\$9.21</b>	<b>\$89.53</b>	<b>\$13.45</b>	<b>\$318.21</b>	<b>100%</b>

Given the reliance on more than \$101 million of bonds supported by the General Fund within the tax levy (i.e., exclusive of the Devotion School debt that, as proposed, would be supported by a Debt Exclusion), there is an impact on the Town's operating budget. However, because the CIP complies with the Town's CIP Financing Policies, the impact on the debt service budget is offset by a decrease in the tax-financed component. As the portion of the 6% that is utilized for borrowing increases or decreases, the portion supported by the tax-financed monies moves in the opposite direction. The graph to the right shows how the 6% is apportioned between debt-financed and pay-as-you-go for each of the six years of the Proposed CIP.



The graphs on the following page summarize the FY15 – FY20 CIP by revenue source, by category, and by allocation group. As shown in the graph on the left side, 56% of the six-year CIP is funded from General Fund-supported bonds, 27% is funded by State / Federal Grants, and 15% is funded via property tax / free cash. The graph on the right breaks out the six-year CIP by infrastructure repairs (streets, sidewalks, water and sewer system), and 6% for Parks / Playgrounds. The final graph breaks out the CIP by allocation group and shows that 79% is for Schools, 16% is for Engineering / Highway, and 6% is for Parks / Playgrounds / Conservation / Open Space.





**TOWN OF BROOKLINE  
FY2015 PROGRAM BUDGET**

**CAPITAL IMPROVEMENTS PROGRAM**

It is important to note that the recommendations contained in this CIP are based upon current best estimates of future revenues, future project costs, and future outside funding assistance. The amount of Free Cash available for the CIP can fluctuate dramatically from year to year. Also, budget reductions at the Federal and State levels could require cutbacks in the recommended program for future years. The CIP recommendations would have to be revisited should the actual amount of available funding be less than anticipated and / or the project costs are greater than anticipated.

**DEBT & DEBT SERVICE**

This portion of Section VII is dedicated to the role debt plays in the CIP and its relationship to the Operating Budget. For all entities, both public and private, debt financing is a primary method of financing large capital projects, as it enables projects to be undertaken now with the costs spread out over a period of years. However, if used in an imprudent and / or poorly constructed manner, debt can have a disastrous impact on the Operating Budget and negatively impact the level and quality of services. This is why the Town's CIP Financing Policies are a vital component of the Town's overall Financial Planning guidelines. A well-planned and properly devised debt management plan is critical to maintaining the Town's positive financial condition and to maintaining the Town's much-valued Aaa bond rating.

The bond authorization process is laid out in Massachusetts General Laws (MGL), specifically Chapter 44, Sections 7 and 8. General Obligation (GO) Bonds are secured by a pledge of revenues through property taxes and are authorized by Town Meeting via a 2/3's vote. Bond Anticipation Notes (BANs) can be utilized prior to the permanent issuance of bonds and are included as part of the Town's 6% funding policy. The Town's credit was most recently reviewed on May 15, 2013 by Moody's and the Town maintained its Aaa rating. Among the reasons stated by Moody's for the Aaa rating were "the town's history of structurally balanced operations, adequate reserve levels, and strong fiscal policies", "proactive management", and a debt position that "will remain manageable".

Chapter 44, Section 10 limits the authorized indebtedness to 5% of the Town's equalized valuation (EQV). The Town's most recent EQV, approved by the State as of 1/1/2012, is \$16.632 billion. Therefore, the Town's debt limit is \$832 million. Obviously, the Town has no plans to come near this limit. In fact, the Town's CIP Financing Policies would not allow outstanding debt to reach that level, as a number of measurement variables would not be met.

Debt can be broken into "exempt debt" and "non-exempt debt". Exempt debt is paid for outside of the property tax levy limit of Proposition 2 1/2. Stated another way, it is paid for with taxes raised outside of the property tax limit. In order to have exempt debt, a Debt Exclusion Override is required, and that can only be approved by the local electorate. Non-Exempt debt, or "within-levy debt", must be raised and paid for within the property tax levy. In Brookline, one project is funded with exempt debt: the High School Renovation (\$43.8 million). The last debt service payment for that project is in FY20. As previously noted, this CIP assumes a Debt Exclusion Override for the Devotion School project.

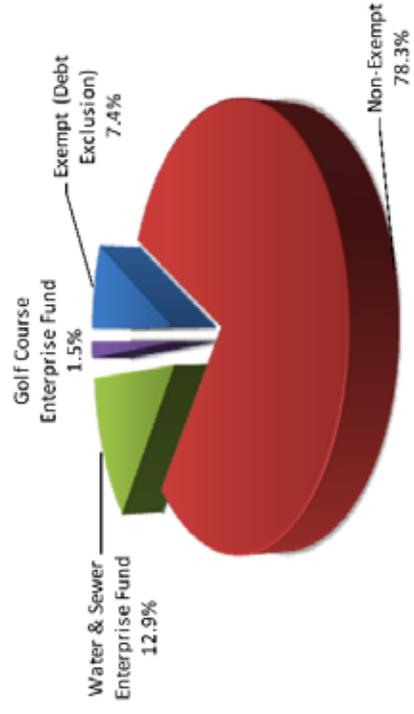
Debt is issued on behalf of the Water and Sewer Enterprise Fund and the Golf Course Enterprise Fund. The tax levy does not fund any enterprise fund debt. As previously mentioned, they are 100% cost recovery funds, so they pay for their debt service through their own revenue streams. The table on the following page breaks out outstanding debt by fund, with exempt and non-exempt debt of the General Fund separated, for each of the past six years. Looking at FY13, this shows that the Town's total outstanding debt was \$75.07 million, of which \$13.78 million (18.4%) was owed by either the State (\$2.85 million) or enterprise funds (\$10.93 million), leaving \$61.3 million of outstanding debt.

TOWN OF BROOKLINE FY2015 PROGRAM BUDGET		CAPITAL IMPROVEMENTS PROGRAM					
<b>OUTSTANDING DEBT</b>							
DESCRIPTION	FY08	FY09	FY10	FY11	FY12	FY13	
<b>Total General Fund Outstanding Debt</b>	<b>82,984,105</b>	<b>82,876,289</b>	<b>60,243,947</b>	<b>62,629,298</b>	<b>66,094,309</b>	<b>64,145,426</b>	
a.) Exempt (Debt Exclusion) <sup>1</sup>	34,553,585	31,966,160	10,839,685	9,286,963	7,831,500	6,430,000	
b.) Non-Exempt	48,430,520	50,910,129	49,404,262	53,342,335	58,262,809	57,715,426	
Minus State (SBA) Reimbursed Debt <sup>2</sup>	26,128,742	24,129,458	5,221,408	4,423,697	3,554,470	2,849,005	
<b>Net General Fund Outstanding Debt</b>	<b>56,855,363</b>	<b>58,746,831</b>	<b>55,022,539</b>	<b>58,205,600</b>	<b>62,539,839</b>	<b>61,296,421</b>	
Water & Sewer Enterprise Fund Outstanding Debt	14,892,054	14,215,027	13,278,553	12,245,702	11,521,791	10,028,654	
Golf Course Enterprise Fund Outstanding Debt	1,032,428	883,684	860,000	1,080,000	929,000	899,000	
<b>Enterprise Fund Outstanding Debt</b>	<b>15,924,482</b>	<b>15,098,711</b>	<b>14,138,553</b>	<b>13,325,702</b>	<b>12,450,791</b>	<b>10,927,654</b>	
<b>TOTAL Outstanding Debt</b>	<b>98,908,587</b>	<b>97,975,000</b>	<b>74,382,500</b>	<b>75,955,000</b>	<b>78,545,100</b>	<b>75,073,080</b>	

<sup>1</sup> The Lincoln School and High School projects were financed via a Debt Exclusion.

<sup>2</sup> The following school projects were reimbursed by the State: High School (through FY09), Lincoln (through FY12), Baker, and Heath.

**FY14 OUTSTANDING DEBT BY SOURCE**



The graph to the right depicts the FY 14 figures. As it shows, 78% of the Town's debt is covered within the levy while 7% is covered outside the levy via Debt Exclusion Overrides. The remaining 15% is covered by enterprise fund revenues.

The projected level of outstanding debt based upon the Proposed CIP is shown in the table on the following page. The increase in FY17 is due to the Devotion School project. Also, there is a graph on page VII-27 that shows both a history and a projection of outstanding debt.

TOWN OF BROOKLINE  
FY2015 PROGRAM BUDGET

CAPITAL IMPROVEMENTS PROGRAM

OUTSTANDING DEBT (PROJECTED)

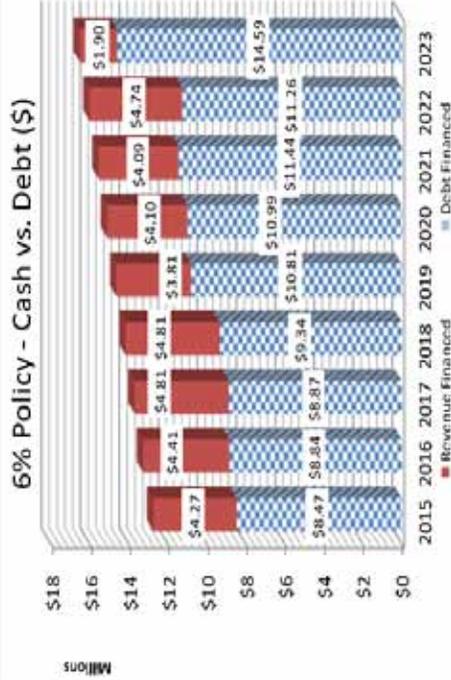
DESCRIPTION	FY14	FY15	FY16	FY17	FY18	FY19	FY20
<b>Total General Fund Outstanding Debt</b>	<b>64,039,088</b>	<b>65,282,544</b>	<b>68,082,856</b>	<b>121,318,780</b>	<b>150,737,281</b>	<b>146,880,308</b>	<b>141,354,245</b>
a.) Exempt (Debt Exclusion) <sup>1</sup>	5,510,000	4,590,000	10,542,536	59,238,529	74,031,780	71,483,308	68,849,078
b.) Non-Exempt	58,529,088	60,692,544	57,540,320	62,080,251	76,705,501	75,397,000	72,505,167
Minus State (SBA) Reimbursed Debt <sup>2</sup>	2,452,505	2,056,310	1,756,800	1,457,900	1,162,050	866,200	576,450
<b>Net General Fund Outstanding Debt</b>	<b>61,586,583</b>	<b>63,226,234</b>	<b>66,326,056</b>	<b>119,860,880</b>	<b>149,575,231</b>	<b>146,014,108</b>	<b>140,777,795</b>
Water & Sewer Enterprise Fund							
Outstanding Debt	9,655,220	8,764,182	7,464,899	7,172,942	5,550,504	5,761,129	4,451,753
Golf Course Enterprise Fund							
Outstanding Debt	1,099,000	1,151,500	1,000,000	1,117,500	1,026,750	951,000	1,375,250
<b>Enterprise Fund Outstanding Debt</b>	<b>10,754,220</b>	<b>9,915,682</b>	<b>8,464,899</b>	<b>8,290,442</b>	<b>6,577,254</b>	<b>6,712,129</b>	<b>5,827,003</b>
<b>TOTAL Outstanding Debt</b>	<b>74,793,308</b>	<b>75,198,226</b>	<b>76,547,755</b>	<b>129,609,221</b>	<b>157,314,535</b>	<b>153,592,437</b>	<b>147,181,248</b>

<sup>1</sup> The Lincoln School and High School projects were financed via a Debt Exclusion. Cur rent funding plans for the Devotion School project assumes a Debt Exclusion.  
<sup>2</sup> The Baker and Heath school projects are being reimbursed by the State.

Once debt is incurred, an amount must be set aside annually to fund the principal and interest payments, known as Debt Service. As previously noted, if debt is used in an imprudent and / or poorly constructed manner, it can have a negative impact on the Operating Budget. This is because of debt service: debt service takes away funding that would otherwise be available for other areas of the Operating Budget. If decision makers are not made aware of the impact debt service has on the Operating Budget (via long-range forecasting), then the authorization of debt is being made in a vacuum. Governmental bodies can cripple their finances if bonds are authorized and issued without a full understanding of the impact they have on the overall finances of the entity.

In Brookline, both the Long Range Financial Plan and the planning process for the CIP clearly show decision makers the impact debt service has on the Operating Budget. Since the Town's CIP Financing Policies set a limit on the overall amount of debt that can be issued -- basically the 6% policy plus the other debt management variables that are to be measured -- the impact on the Operating Budget is both known and within an expected range.

The graph to the right illustrates how the Town's 6% policy works. In each year, the amount available for the CIP is 6% of the prior year's net revenue. This amount represents the total impact on the Operating Budget. For FY15, \$12.7 million is dedicated to the CIP (\$8.5 million for net debt service and \$4.3 million for pay-as-you-go), and, therefore, unavailable for the operating budget. The graph also shows the balance between pay-as-



VII-14



**TOWN OF BROOKLINE  
FY2015 PROGRAM BUDGET**

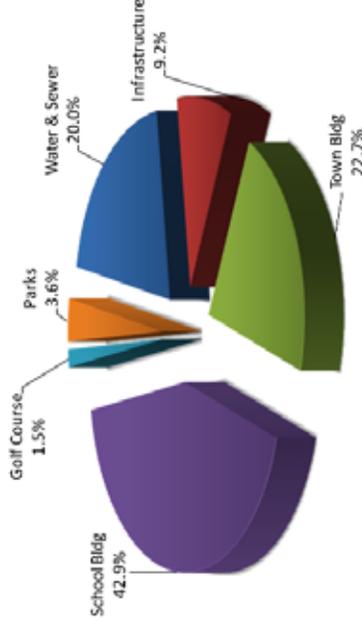
**CAPITAL IMPROVEMENTS PROGRAM**

you-go CIP and debt-financed CIP: as debt service increases, pay-as-you go capacity decreases, and vice versa. This is clearly shown in FY23, when the large increase in debt service (resulting from the BHS project coming on-line) reduces the pay-as-you-go portion of the CIP.

The graph to the right breaks out existing (FY14) debt service by expenditure type. As it shows, the largest component of debt service is for school buildings, followed by town buildings and the water and sewer system.

As was previously mentioned, debt is issued on behalf of the Water and Sewer Enterprise Fund and the Golf Course Enterprise Fund. Those debt service costs are budgeted for within both enterprise funds and are covered by enterprise fund revenues. As a result, the tax levy does not fund any enterprise fund debt service. The table below breaks out debt service by fund, with exempt and non-exempt debt of the General Fund separated, for each of the past six years. Looking at FY14, it shows that the Town's total debt service was \$11.94 million, of which \$3.1 million (26%) was reimbursed by either the State (\$556,757) or enterprise funds (\$2.54 million), leaving \$8.84 million of debt service.

**FY14 DEBT SERVICE BY EXPENDITURE TYPE**



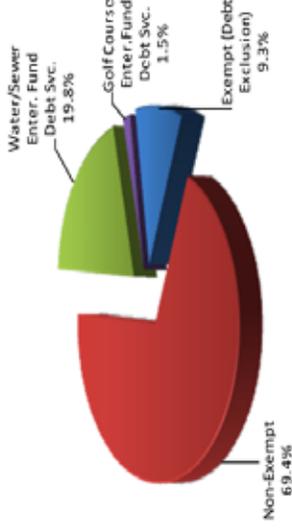
**DEBT SERVICE**

DESCRIPTION	FY09	FY10	FY11	FY12	FY13	FY14
Total General Fund Supported Debt Service	12,248,349	11,873,959	9,440,762	10,098,259	9,804,995	9,393,246
a.) Exempt (Debt Exclusion) <sup>1</sup>	4,372,943	4,347,320	1,899,453	1,730,917	1,630,808	1,112,800
b.) Non-Exempt	7,875,406	7,526,639	7,541,309	8,367,342	8,174,187	8,280,446
Minus State (SBA) Reimbursed Debt <sup>2</sup>	3,267,371	3,267,371	1,227,634	1,227,634	587,125	556,757
Net General Fund Debt Service	8,980,978	8,606,588	8,213,128	8,870,625	9,217,870	8,836,489
Water & Sewer Enterprise Fund Supported Debt Svc.	2,511,192	2,472,352	2,495,199	2,321,242	2,375,403	2,365,461
Golf Course Enterprise Fund Supported Debt Svc.	190,037	184,135	189,130	185,679	191,499	179,374
<b>Enterprise Fund Debt Service</b>	<b>2,701,229</b>	<b>2,656,487</b>	<b>2,684,329</b>	<b>2,506,921</b>	<b>2,566,902</b>	<b>2,544,835</b>
<b>TOTAL Debt Service</b>	<b>14,949,578</b>	<b>14,530,446</b>	<b>12,125,091</b>	<b>12,605,180</b>	<b>12,371,897</b>	<b>11,938,081</b>

<sup>1</sup> The Lincoln School and High School projects were financed via a Debt Exclusion.

<sup>2</sup> The following school projects were reimbursed by the State: High School (through FY09), Lincoln (through FY12), Baker, and Heath.

FY14 DEBT SERVICE BY SOURCE



The graph to the right depicts the FY14 figures. As it shows, 69% of the Town's debt service is covered within the levy while 9% is covered outside the levy via Debt Exclusion Overrides. The remaining 22% is covered by enterprise fund revenues.

The projected level of debt service based upon the Proposed CIP is shown in the table below. Also, there is a graph on page VII-26 that shows both a history and a projection of debt service.

DEBT SERVICE (PROJECTED)

DESCRIPTION	FY15	FY16	FY17	FY18	FY19	FY20	FY21
Total General Fund Supported Debt Service	9,561,757	9,914,554	10,645,463	14,720,877	17,401,274	17,446,432	16,276,375
a.) Exempt (Debt Exclusion) <sup>1</sup>	1,094,400	1,076,000	1,775,807	5,385,240	6,589,231	6,552,631	5,601,031
b.) Non-Exempt	8,467,357	8,838,554	8,869,656	9,335,637	10,812,043	10,893,801	10,675,344
Minus State (SBA) Reimbursed Debt <sup>2</sup>	556,757	556,757	556,757	556,757	556,757	434,662	434,662
Net General Fund Debt Service	9,005,000	9,357,797	10,088,706	14,164,120	16,844,517	17,011,770	15,841,713
Water & Sewer Enterprise Fund Supported Debt Svc.	2,139,383	2,215,867	1,985,264	1,819,427	1,430,165	1,466,261	1,138,725
Golf Course Enterprise Fund Supported Debt Svc.	188,049	195,868	187,450	184,988	189,060	184,439	193,468
<b>Enterprise Fund Debt Service</b>	<b>2,327,432</b>	<b>2,411,735</b>	<b>2,172,714</b>	<b>2,004,415</b>	<b>1,619,225</b>	<b>1,650,699</b>	<b>1,332,193</b>
<b>TOTAL Debt Service</b>	<b>11,889,188</b>	<b>12,326,288</b>	<b>12,818,177</b>	<b>16,725,292</b>	<b>19,020,499</b>	<b>19,097,131</b>	<b>17,608,568</b>

<sup>1</sup> The Lincoln School and High School projects were financed via a Debt Exclusion. Current funding plans for the Devotion School project assumes a Debt Exclusion.  
<sup>2</sup> The Baker and Heath school projects are being reimbursed by the State.

Great care has gone into the crafting of the Debt Management Plan for the FY15 – FY20 CIP and is detailed in the table on the following page. As mentioned at the beginning of this Section VII, this debt management plan results in the Town complying with all of its CIP Financing Policies. The table shows the amount of authorization, the amount to be borrowed, and the number of years planned for paying off the principal (term). The Town hopes to not have to borrow for the \$1.245 million for the Carlton St. Footbridge. The Town is working toward a grant for the project and if it is received, the Town will not have to issue a bond for the project. Town Meeting would then be asked to rescind the bond authorization.



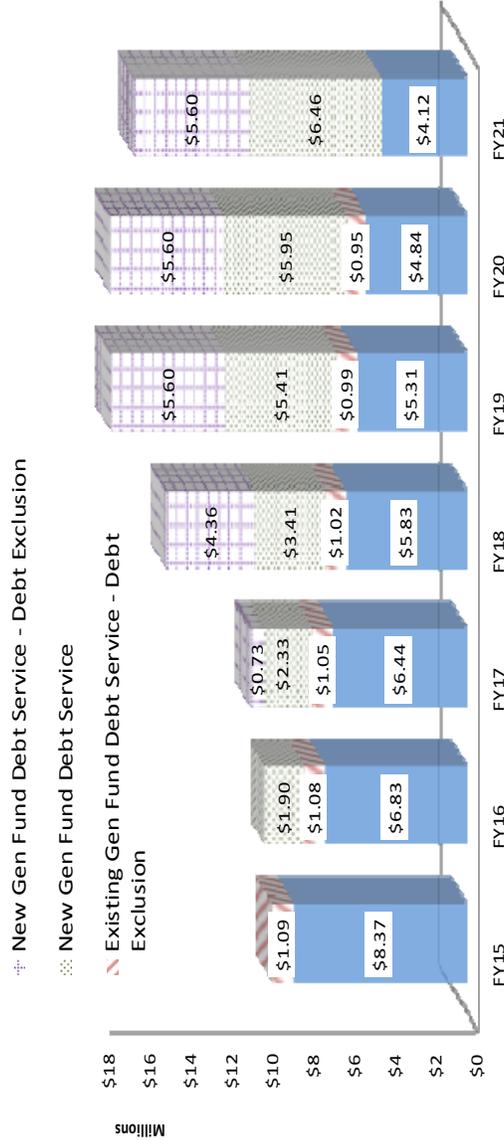
TOWN OF BROOKLINE FY2015 PROGRAM BUDGET		CAPITAL IMPROVEMENTS PROGRAM										
PROJECT	BOND AUTH.	BOND AMT	TERM	2015	2016	2017	2018	2019	2020	2021	2022	2023
Funded Within 6% CIP Policy												
Runkle School - Constr. (previously authorized)	\$17,580	\$0.500	10	\$0.068	\$0.066	\$0.064	\$0.062	\$0.061	\$0.059	\$0.057	\$0.055	\$0.054
Roof Repairs/Replacements (previously authorized)	\$1,350	\$1.350	10	\$0.182	\$0.178	\$0.173	\$0.168	\$0.163	\$0.159	\$0.154	\$0.149	\$0.144
Fisher Hill Park (previously authorized)	\$1,200	\$1.200	10	\$0.162	\$0.158	\$0.154	\$0.149	\$0.145	\$0.141	\$0.137	\$0.133	\$0.128
Old Lincoln School (previously authorized)	\$3,000	\$3.000	15	\$0.313	\$0.305	\$0.298	\$0.290	\$0.283	\$0.275	\$0.268	\$0.260	\$0.253
MSC Renovations (previously authorized)	\$2,500	\$1,500	10	\$0.203	\$0.197	\$0.192	\$0.187	\$0.182	\$0.176	\$0.171	\$0.166	\$0.161
Carlton St. Footbridge (previously authorized)	\$1,400	\$1,245	10	\$0.177	\$0.172	\$0.167	\$0.162	\$0.156	\$0.151	\$0.146	\$0.140	\$0.140
Muddy River (previously authorized)	\$0,745	\$0,745	10	\$0.104	\$0.101	\$0.098	\$0.095	\$0.092	\$0.089	\$0.086	\$0.083	\$0.083
Ladder #2 (future authorization)	\$0,900	\$0,900	10	\$0.128	\$0.124	\$0.121	\$0.117	\$0.113	\$0.109	\$0.105	\$0.101	\$0.101
Rear Landfill (future authorization)	\$4,600	\$4,600	20	\$0.449	\$0.438	\$0.427	\$0.416	\$0.405	\$0.394	\$0.383	\$0.372	\$0.372
MSC Renovations (future authorization)	\$2,500	\$1,000	10	\$0.143	\$0.138	\$0.134	\$0.130	\$0.126	\$0.122	\$0.117	\$0.113	\$0.113
Pierce Playground (future authorization)	\$0,920	\$0,920	10	\$0.131	\$0.127	\$0.123	\$0.119	\$0.115	\$0.111	\$0.107	\$0.103	\$0.103
Roof Repairs/Replacements (future authorization)	\$1,050	\$1,150	10	\$0.164	\$0.159	\$0.154	\$0.149	\$0.144	\$0.139	\$0.134	\$0.129	\$0.125
Envelope/Fenestration Repairs (future authorization)	\$1,300	\$1,300	10	\$0.185	\$0.180	\$0.174	\$0.169	\$0.163	\$0.158	\$0.152	\$0.147	\$0.142
Corey Hill + Emerson Garden (future authorization)	\$1,170	\$1,170	10	\$0.167	\$0.162	\$0.157	\$0.152	\$0.147	\$0.142	\$0.137	\$0.132	\$0.127
Driscoll School Addition (future authorization)	\$27,300	\$10,000	20	\$0.975	\$0.951	\$0.928	\$0.904	\$0.880	\$0.856	\$0.832	\$0.808	\$0.784
Driscoll School Addition (future authorization)	\$27,300	\$17,300	20	\$1.687	\$1.646	\$1.605	\$1.563	\$1.522	\$1.481	\$1.440	\$1.399	\$1.358
Fire Maintenance/Training Facility (future authorization)	\$4,125	\$4,125	20	\$0.402	\$0.392	\$0.383	\$0.373	\$0.363	\$0.353	\$0.343	\$0.333	\$0.323
High School Addition (future authorization) - BAN	\$48,750	\$5,000	1	\$0.100	\$0.100	\$0.100	\$0.100	\$0.100	\$0.100	\$0.100	\$0.100	\$0.100
Larz Anderson Park (future authorization)	\$2,700	\$2,700	15	\$0.302	\$0.302	\$0.293	\$0.285	\$0.277	\$0.269	\$0.261	\$0.253	\$0.245
Roof Repairs/Replacements (future authorization)	\$3,500	\$3,500	15	\$0.391	\$0.391	\$0.380	\$0.370	\$0.359	\$0.349	\$0.339	\$0.329	\$0.319
High School Addition (future authorization) - BAN	\$48,750	\$38,000	1	\$0.700	\$0.700	\$0.700	\$0.700	\$0.700	\$0.700	\$0.700	\$0.700	\$0.700
Roof Repairs/Replacements (future authorization)	\$2,500	\$2,500	10	\$0.356	\$0.356	\$0.346	\$0.335	\$0.325	\$0.315	\$0.305	\$0.295	\$0.285
Larz Anderson Park (future authorization)	\$2,200	\$2,200	10	\$0.314	\$0.314	\$0.304	\$0.295	\$0.285	\$0.275	\$0.265	\$0.255	\$0.245
High School Addition (future authorization) - BAN	\$48,750	\$48,750	1	\$0.910	\$0.910	\$0.910	\$0.910	\$0.910	\$0.910	\$0.910	\$0.910	\$0.910
High School Addition (future authorization)	\$48,750	\$48,750	25	\$4.388	\$4.388	\$4.388	\$4.388	\$4.388	\$4.388	\$4.388	\$4.388	\$4.388
Larz Anderson Park (future authorization)	\$2,500	\$2,500	15	\$0.279	\$0.279	\$0.279	\$0.279	\$0.279	\$0.279	\$0.279	\$0.279	\$0.279
Cypress Playground / Athl Field (future authorization)	\$1,400	\$1,400	10	\$0.200	\$0.200	\$0.200	\$0.200	\$0.200	\$0.200	\$0.200	\$0.200	\$0.200
Baldwin School (future authorization)	\$2,250	\$2,250	15	\$0.251	\$0.251	\$0.251	\$0.251	\$0.251	\$0.251	\$0.251	\$0.251	\$0.251
<b>NEW GEN FUND DEBT SERVICE (cumulative)</b>				<b>\$0.927</b>	<b>\$1.904</b>	<b>\$2.334</b>	<b>\$3.411</b>	<b>\$5.406</b>	<b>\$6.053</b>	<b>\$7.160</b>	<b>\$7.187</b>	<b>\$11.211</b>
<b>Debt Exclusions</b>												
Devotion School - Design/Constr. (future authorization)	\$77,000	\$10,000	25	\$0.727	\$0.727	\$0.727	\$0.727	\$0.727	\$0.727	\$0.727	\$0.727	\$0.727
Devotion School - Design/Constr. (future authorization)	\$77,000	\$50,000	25	\$3.637	\$3.637	\$3.637	\$3.637	\$3.637	\$3.637	\$3.637	\$3.637	\$3.637
Devotion School - Design/Constr. (future authorization)	\$77,000	\$17,000	25	\$1.237	\$1.237	\$1.237	\$1.237	\$1.237	\$1.237	\$1.237	\$1.237	\$1.237
<b>NEW DEBT EXCLUSION DEBT SERVICE (cumulative)</b>				<b>\$0.000</b>	<b>\$0.000</b>	<b>\$0.727</b>	<b>\$4.364</b>	<b>\$5.601</b>	<b>\$5.601</b>	<b>\$5.601</b>	<b>\$5.601</b>	<b>\$5.601</b>

**TOWN OF BROOKLINE  
FY2015 PROGRAM BUDGET**

**CAPITAL IMPROVEMENTS PROGRAM**

PROJECT	BOND		AMT	TERM	2015	2016	2017	2018	2019	2020	2021	2022	2023
	AUTH.	BOND											
<b>Enterprise Funds</b>													
Wastewater (previously authorized)	\$5.500	\$1,000	10		\$0.143	\$0.138	\$0.134	\$0.130	\$0.126	\$0.121	\$0.117	\$0.113	\$0.109
Wastewater (previously authorized)	\$5.500	\$1,000	10		\$0.143	\$0.143	\$0.138	\$0.134	\$0.130	\$0.126	\$0.121	\$0.117	\$0.113
Wastewater (previously authorized)	\$5.500	\$0.686	10			\$0.098	\$0.095	\$0.092	\$0.089	\$0.086	\$0.083	\$0.080	\$0.080
Wastewater (future authorization)	\$3.000	\$1,500	10				\$0.214	\$0.207	\$0.201	\$0.195	\$0.188	\$0.182	\$0.182
Wastewater (future authorization)	\$3.000	\$1,500	10					\$0.214	\$0.207	\$0.201	\$0.195	\$0.188	\$0.182
Golf Course (previously authorized)	\$2.840	\$0,350	20		\$0.033	\$0.032	\$0.032	\$0.031	\$0.030	\$0.029	\$0.028	\$0.028	\$0.027
Golf Course (previously authorized)	\$2.840	\$0,200	20		\$0.019	\$0.019	\$0.019	\$0.018	\$0.018	\$0.017	\$0.017	\$0.016	\$0.016
Golf Course (previously authorized)	\$2.840	\$0,265	20				\$0.025	\$0.025	\$0.024	\$0.024	\$0.023	\$0.022	\$0.022
Golf Course (future authorization)	\$1.000	\$0,500	20				\$0.048	\$0.046	\$0.045	\$0.044	\$0.043	\$0.042	\$0.042
Golf Course (future authorization)	\$1.000	\$0,250	20					\$0.024	\$0.023	\$0.023	\$0.022	\$0.022	\$0.022
Golf Course (future authorization)	\$1.000	\$0,250	20					\$0.024	\$0.023	\$0.023	\$0.022	\$0.022	\$0.022
<b>NEW DEBT EXCLUSION DEBT SERVICE (cumulative)</b>					<b>\$0.176</b>	<b>\$0.332</b>	<b>\$0.420</b>	<b>\$0.694</b>	<b>\$0.697</b>	<b>\$0.889</b>	<b>\$0.886</b>	<b>\$0.857</b>	<b>\$0.829</b>

As previously mentioned, when Moody's last reviewed the Town's bond rating in May, 2013, they referenced the above average amortization rate. That is an important factor in being able to take on additional debt: as old debt runs off, new debt can be taken on. The graph below shows the amortization of existing debt and the proposed new debt for the General Fund. It should be noted, however, that level debt service is being used for the Devotion School Debt Exclusion, as the Override Study Committee is planning on recommending that approach for any future debt exclusion projects.



TOWN OF BROOKLINE FY2015 PROGRAM BUDGET		CAPITAL IMPROVEMENTS PROGRAM									
DEBT SERVICE AS A PERCENTAGE OF REVENUE											
DESCRIPTION	FY12 (Act)	FY13 (Act)	FY14 (Proj)	FY15 (Proj)	FY16 (Proj)	FY17 (Proj)	FY18 (Proj)	FY19 (Proj)	FY20 (Proj)	FY21 (Proj)	
Total General Fund Supported Debt Service	10,098,259	9,804,995	9,393,246	9,561,757	9,914,554	10,645,463	14,720,877	17,401,274	17,446,432	16,276,375	
a.) Exempt (Debt Exclusion) <sup>1</sup>	1,730,917	1,630,808	1,112,800	1,094,400	1,076,000	1,775,807	5,385,240	6,589,231	6,552,631	5,601,031	
b.) Non-Exempt	8,367,342	8,174,187	8,280,446	8,467,357	8,838,554	8,869,656	9,335,637	10,812,043	10,893,801	10,675,344	
Minus SBA Reimbursements	1,227,634	587,125	556,757	556,757	556,757	556,757	556,757	556,757	434,662	434,662	
Net General Fund Debt Service	8,870,625	9,217,870	8,836,489	9,005,000	9,357,797	10,088,706	14,164,120	16,844,517	17,011,770	15,841,713	
Water & Sewer Enterprise Fund Supported Debt Svc.	2,321,242	2,375,403	2,365,461	2,139,383	2,215,867	1,985,264	1,819,427	1,430,165	1,466,261	1,138,725	
Golf Course Enterprise Fund Supported Debt Svc.	185,679	191,499	179,374	188,049	195,868	187,450	184,988	189,060	184,439	193,468	
<b>TOTAL Debt Service</b>	<b>12,605,180</b>	<b>12,371,897</b>	<b>11,938,081</b>	<b>11,889,188</b>	<b>12,326,288</b>	<b>12,818,177</b>	<b>16,725,292</b>	<b>19,020,499</b>	<b>19,097,131</b>	<b>17,608,568</b>	
General Fund Revenue	211,969,506	226,053,760	229,066,953	236,082,975	241,404,753	250,171,754	261,880,896	271,424,207	279,764,302	287,117,571	
General Fund Revenue Without SBA Reimbursement	210,741,872	225,466,635	228,510,196	235,526,218	240,847,996	249,614,997	261,324,139	270,867,450	279,329,640	286,682,909	
Water & Sewer Enterprise Fund Revenue	25,014,615	26,393,790	26,928,495	26,826,419	27,719,611	28,730,001	29,763,860	30,643,570	32,018,906	33,406,866	
Golf Course Enterprise Fund Revenue	1,198,944	1,225,168	1,210,000	1,331,923	1,344,173	1,356,546	1,369,042	1,381,663	1,394,410	1,407,285	
<b>TOTAL Revenue of Funds Supporting Debt Svc.</b>	<b>238,183,065</b>	<b>253,672,718</b>	<b>257,205,448</b>	<b>264,241,317</b>	<b>270,468,538</b>	<b>280,258,300</b>	<b>293,013,798</b>	<b>303,449,440</b>	<b>313,177,618</b>	<b>321,931,722</b>	
General Fund Debt Service as a % of General Fund Revenue	4.8%	4.3%	4.1%	4.1%	4.1%	4.3%	5.6%	6.4%	6.2%	5.7%	
Net General Fund Debt Service as a % of General Fund Revenue <sup>2</sup>	4.2%	4.1%	3.9%	3.8%	3.9%	4.0%	5.4%	6.2%	6.1%	5.5%	
Water & Sewer Enterprise Fund Debt Service as a % of Revenue	9.3%	9.0%	8.8%	8.0%	8.0%	6.9%	6.1%	4.7%	4.6%	3.4%	
Golf Course Enterprise Fund Debt Service as a % of Revenue	15.5%	15.6%	14.8%	14.1%	14.6%	13.8%	13.5%	13.7%	13.2%	13.7%	
<b>TOTAL Debt Service as a % of Total Rev. Supporting Debt Svc.</b>	<b>5.3%</b>	<b>4.9%</b>	<b>4.6%</b>	<b>4.5%</b>	<b>4.6%</b>	<b>4.6%</b>	<b>5.7%</b>	<b>6.3%</b>	<b>6.1%</b>	<b>5.5%</b>	

A common indicator used to measure debt service levels is comparing it to revenue, since it is those revenues that are needed to pay the principal and interest payments. For general funds, ratings agencies tend to consider ratios of between 5% - 10% as being prudent. The table below shows debt service as a percent of revenue for the General Fund, Water and Sewer Enterprise Fund, and the Golf Course Enterprise Fund. As it shows, total debt service is projected at 4.6% in FY14 but will increase to 6.3% in FY19 when the majority of debt service associated with the Devotion School project kicks in. When looking solely General Fund-supported debt, the figure drops to 4.1% in FY14, reaching a high of 6.4% in FY19.

<sup>1</sup> The Lincoln School and High School projects were financed via a Debt Exclusion. Current funding plans for the Devotion School project assumes a Debt Exclusion.  
<sup>2</sup> Excludes both the debt service (expense) reimbursed by the State for school projects and the reimbursement from the State (revenue).

**IMPACT ON OPERATING BUDGET**

The "Debt and Debt Service" section discussed the impact of debt service on the Operating Budget. Another potential impact of a CIP on a community's Operating Budget is an increase or decrease in operating expenses. For example, adding another facility in the community will add costs for utilities and building operation / maintenance. Conversely, undertaking energy conservation projects will help reduce costs in the Operating Budget. The proposed CIP contains a number of projects that will impact the Operating Budget, both positively and negatively. They are listed below:

- Technology Applications – projects undertaken by the Information Technology Department (ITD) are focused on improving efficiencies in numerous departments. While it is difficult to put a dollar figure on savings, past applications have proven to yield savings in the Operating Budget, including a reduction in headcount. On the other hand, new technologies often come with increased maintenance contracts.
- Fire Apparatus Rehab/Replacement – rehabilitating fire apparatus extends the life of the vehicles and also helps reduce repair and maintenance costs. Also, once replaced with a new vehicle, repair and maintenance costs are reduced.
- Fire Department Fleet Maintenance Facility – a new facility will increase operating costs (utilities and repair/maintenance). Conversely, vehicle maintenance costs will decrease since the Department will be able to undertake more repairs in-house rather than sending the vehicle to a contractor for the work to be performed.
- Coolidge Corner Library Rear Windows – these nine large panels of glass windows in the rear of the building date from the original construction in 1970. The glass is not insulated and is loose in a number of areas. New windows are certain to help reduce energy consumption.
- LED Streetlights – the conversion of the Town's 3,600 streetlights from high-pressure sodium lamps to LED's is projected to reduce the electricity budget for streetlights by approximately 2/3's (\$225,000 / yr) once fully-implemented.
- Wastewater System Improvements - these projects will help prevent costly system failures, lower MWRA wholesale costs by reducing extraneous flows, and make more efficient use of annual operating funds.
- Playground Projects - as playgrounds are renovated and new or improved water play features are included as part of the project, water/sewer costs will increase.
- Golf Course – the proposed improvements to the course and facilities will help improve its playability and make it a more sought-after course, thereby increasing revenue.
- Devotion / Driscoll / High School projects – these projects are certain to increase the size of the facilities, so additional utility costs are to be expected. However, increases will be minimized to the greatest extent possible by including energy efficient systems and "green" components.
- Town / School Energy Management Systems and Energy Conservation - these on-going items are meant to yield savings in the operating budget. With large increases in utility prices over the past few years, it is imperative that monies be invested to decrease energy consumption in buildings. Programs would include, but are not limited to, lighting retrofit and controls, energy efficient motors, insulation, and temperature equipment. This program would augment existing gas and electric utility conservation programs. Monies would also go toward more efficient heating and cooling equipment.
- Town / School Emergency Generator Replacement, Elevator Replacement, Roof Replacement, Masonry Repairs, and Fenestrian - these items represent an approach to systematically replace various core facility needs that only become more expensive to maintain if not replaced in a timely manner. They also help eliminate the need for larger expenditures that might arise if allowed to deteriorate.

**RECOMMENDED PROJECTS**

The following pages contain the FY15 – FY20 CIP as proposed by project. Commencing on page VII-28 is a project description for each project.

TOWN OF BROOKLINE FY2015 PROGRAM BUDGET		CAPITAL IMPROVEMENTS PROGRAM														
TOWN OF BROOKLINE CAPITAL IMPROVEMENT PROGRAM: FY2015 - FY2020		REVENUE CODES (RC):														
CATEGORY CODES (CC):		REVENUE CODES (RC):														
1 = New Facility Construction 4 = Infrastructure 2 = Facility Renovation / Repair 5 = Vehicles 3 = Parks/Open Space/Playgrounds 6 = Miscellaneous		A = Property Tax/Free Cash/Overlay Surplus D = Golf Budget G = Utility Bond I = Re-Appropriation of Funds B = General Fund Bond E = Golf Bond H = CDBG K = Debt/Exclusion Override C = State / Federal Aid F = Utility Budget I = Other														
CC	Total	Prior Year (FY14)	FY2015 Amount	FY2015 RC	FY2016 Amount	FY2016 RC	FY2017 Amount	FY2017 RC	FY2018 Amount	FY2018 RC	FY2019 Amount	FY2019 RC	FY2020 Amount	FY2020 RC	Future Years Amount	Future Years RC
<b>GENERAL GOVERNMENT</b>																
2	150,000	25,000			50,000 A				75,000 A							
6	100,000				25,000 A				25,000 A						25,000 A	
6	2,251,000	256,000	270,000	A	270,000 A		275,000 A		280,000 A				300,000 A		300,000 A	
6	250,000				250,000 A											
	2,751,000	281,000	270,000		595,000		275,000		380,000				300,000		325,000	
<b>PLANNING &amp; COMMUNITY DEVELOPMENT</b>																
4	625,000		375,000	H	250,000 H											
4	750,000				750,000 I											
4	4,375,971				4,375,971 C											
4	440,000	50,000	65,000	A	50,000 A				100,000 A				60,000 A		60,000 A	
4	125,000														125,000 A	
4	675,000				675,000 C											
4	625,000				625,000 C											
4	200,000				200,000 H											
4	40,000	40,000														
2	85,000	85,000														
	7,940,971	175,000	440,000		6,925,971		-		100,000				60,000		185,000	
<b>PUBLIC SAFETY</b>																
5	1,200,000				275,000 A								400,000 A			
5	900,000		900,000	B												
5	510,000	510,000														
5	580,000		580,000	A												
5	660,000														660,000 A	
2	2,140,000	245,000	325,000	A			320,000 A		420,000 A				525,000 A			
1	4,165,000		40,000	A			4,125,000 B									
	10,155,000	755,000	1,845,000		275,000		4,445,000		945,000				925,000		-	

TOWN OF BROOKLINE  
FY2015 PROGRAM BUDGET

CAPITAL IMPROVEMENTS PROGRAM

TOWN OF BROOKLINE CAPITAL IMPROVEMENT PROGRAM: FY2015 - FY2020

CC	CATEGORY CODES (CCI): 1 = New Facility Construction 2 = Facility Renovation / Repair 3 = Parks/Open Space/Playgrounds 4 = Infrastructure 5 = Vehicles 6 = Miscellaneous	REVENUE CODES (RCI): A = Property Tax/Free Cash/Overlay Surplus B = General Fund Bond C = State / Federal Aid D = Golf Budget E = Golf Bond F = Utility Budget G = Utility Bond H = CDBG I = Other J = Re-Appropriation of Funds K = Debt Exclusion Override	Prior Year (FY14)	FY2015		FY2016		FY2017		FY2018		FY2019		FY2020		Future Years				
				Total	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC
	<b>LIBRARY</b>			50,000	A															
2	Coollidge Corner Feasibility/Concept Study			50,000	A															
2	Coollidge Corner - Elev./ Rear-Windows / Carpet			500,000				500,000	A											
6	Library Furnishings			110,000				110,000	A											
2	Library Interior Painting / Facelift			110,000				110,000	A											
	Library Total			770,000				720,000												
	<b>PUBLIC WORKS</b>																			
	<b>Transportation</b>																			
4	Traffic Calming / Safety Improvements			300,000				50,000	A											
4	Bicycle Access Improvements			70,000	A															
4	Dean / Chestnut Hill Ave Signal			260,000				260,000	A											
4	MBTA Traffic Signalization			50,000	A															
4	Woodland Rd / Hammond St. Study			45,000																
	Public Works - Transportation Sub-Total			725,000				50,000												
	<b>Engineering/Highway</b>																			
4	Street Rehab - Town			13,200,000	A			1,590,000	A											
4	Street Rehab - State			7,601,256	C			950,157	C											
4	Sidewalk Repair			2,474,000	A			297,000	A											
4	LED Streetlights			2,085,000	A			515,000	A											
4	Parking Lot Rehab.			205,000				205,000	A											
4	Newton St. Landfill - Rear Landfill Closure			4,600,000	B															
2	Transfer Station Floor			70,000																
2	Municipal Service Ctr Renov			2,500,000																
	Public Works - Engineering/Highway Sub-Total			32,735,256				3,352,157												
	<b>Water / Sewer</b>																			
2	Water Dept. Garage - Roof Repl			260,000																
4	Wastewater System Improvements			3,000,000				3,000,000	G											
	Public Works - Water / Sewer Sub-Total			3,260,000				3,000,000												



TOWN OF BROOKLINE FY2015 PROGRAM BUDGET		CAPITAL IMPROVEMENTS PROGRAM													
TOWN OF BROOKLINE CAPITAL IMPROVEMENT PROGRAM: FY2015 - FY2020		REVENUE CODES (RC):													
CATEGORY CODES (CC):		REVENUE CODES (RC):													
1 = New Facility Construction		A = Property Tax/Free Cash/Overlay Surplus													
4 = Infrastructure		D = Golf Budget													
2 = Facility Renovation / Repair		E = Golf Bond													
5 = Vehicles		F = Utility Budget													
3 = Parks/Open Space/Playgrounds		G = Utility Bond													
		H = CDBG													
		I = Other													
		J = Re-appropriation of Funds													
		K = Debt Exclusion Override													
CC	Prior Year (FY14)	FY2015 Amount	FY2016 Amount	FY2017 Amount	FY2018 Amount	FY2019 Amount	FY2020 Amount	Future Years Amount	FY2015 RC	FY2016 RC	FY2017 RC	FY2018 RC	FY2019 RC	FY2020 RC	Future Years RC
<b>Parks and Playgrounds</b>															
3	Brookline Ave Playground	87,000	870,000	A											
3	Brookline Reservoir Park	1,880,000		80,000	1,800,000	A									
3	Corey Hill Playground	600,000	40,000	A	560,000	B									
3	Cypress Playground/Athl. Field	1,500,000					100,000	A							1,400,000
3	Emerson Garden Playground	670,000	60,000	A	6,100,000	B									
3	Fisher Hill - Field/Playground - Town	1,200,000													
3	Fisher Hill - Field/Playground - Grant	400,000													
3	Brookline Reservoir Gatehouse Roof	250,000	250,000	A											
3	Br. Res. Gatehouse Carpentry, Stairs, Masonry -	400,000	400,000	C											
3	Harry Downes Field & Playground	880,000			80,000	A									
3	Kraft Family Athl. Field Turf Repl.	770,000							70,000	A					
3	Larz Anderson Park	9,060,000	660,000						2,700,000	B					3,500,000
3	Murphy Playground	780,000			60,000	A			720,000	A					
3	Pierce Playground	1,010,000	90,000	A	920,000	B									
3	Riverway Park	425,000													425,000
3	Robinson Playground	990,000							90,000	A					
3	Schick Playground	770,000			70,000	A			700,000	A					
3	Soule Athletic fields	550,000							50,000	A					
3	Playground Skatespot	220,000													
3	Park Playgrounds Rehab/Upgrade	2,420,000	295,000	A	300,000	A	305,000	A	305,000	A	310,000	A	305,000	A	310,000
3	Town/School Ground Rehab.	740,000	85,000	A	90,000	A	90,000	A	95,000	A	100,000	A	95,000	A	100,000
3	Tennis Courts / Basketball Courts	530,000	100,000		230,000	A									100,000
2	Comfort Stations	200,000							100,000	A					50,000
	Public Works - Parks and Playground Sub-Total	27,202,000	2,877,000		3,180,000		2,020,000		3,130,000		4,730,000		4,910,000		5,885,000
<b>Conservation/Open Space</b>															
3	Tree Removal/Repl	1,420,000	170,000	A	175,000	A	175,000	A	180,000	A	180,000	A	180,000	A	185,000
3	Old Burial Ground	100,000													100,000
3	Walnut Hills Cemetery	1,020,000	100,000	I	50,000	I									770,000
	Public Works - Conser /Open Space Sub-Total	2,540,000	270,000		225,000		175,000		180,000		180,000		180,000		1,055,000
	Public Works Total	66,462,256	9,345,157		6,807,157		9,109,157		6,292,157		7,938,157		8,175,157		10,070,157



**TOWN OF BROOKLINE  
FY2015 PROGRAM BUDGET**

CATEGORY CODES (CC):		TOWN OF BROOKLINE CAPITAL IMPROVEMENT PROGRAM: FY2015 - FY2020																
		Prior Year (FY14)	FY2015		FY2016		FY2017		FY2018		FY2019		FY2020		Future Years			
CC	Total	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	
<b>RECREATION</b>																		
2	Swimming Pool - Showers/Pool Repointing	600,000		600,000	A													
3	Golf Course Improvements	1,000,000		1,000,000	E													
2	Tappan St. Gym Enhancements	30,000		30,000	A													
	Recreation Total	1,630,000		1,630,000														
<b>SCHOOL</b>																		
6	Furniture Upgrades	680,000		70,000	A			80,000	A	90,000	A	100,000	A	110,000	A	120,000	A	
6	School Technology	1,995,000		320,000	A			250,000	A	250,000	A	250,000	A	250,000	A	250,000	A	
2	Town/School ADA Renovations	580,000		65,000	A			70,000	A	75,000	A	75,000	A	80,000	A	80,000	A	
2	Town/School Elevator Renov. Program	1,125,000		250,000	A			250,000	A	125,000	A							
2	Town/School Emer Generator Repl	125,000																
2	Town/School Energy Conservation Projects	1,375,000		160,000	A			170,000	A	175,000	A	180,000	A	185,000	A	190,000	A	
2	Town/School Energy Management System	1,000,000		200,000	A			150,000	A	650,000	A	250,000	A	250,000	A	250,000	A	
2	Town/School Blig Envelope/Penetration Rep	5,180,000		730,000	A			1,300,000	B					750,000	A	1,000,000	A	
2	Town/School Roof Repair/Repl. Program	8,875,000		375,000	A			1,150,000	B					3,500,000	B	2,500,000	B	
2	Town/School Blig Security / Life Safety Sys	1,250,000		300,000	A			125,000	A	130,000	A	140,000	A	110,000	A			
2	High School Addition - Town Share (65%)	50,500,000						1,750,000	A									
2	High School Addition - State Share (35%)	26,250,000																
2	Baldwin School Renovations	2,250,000																
2	Driscoll School Addition - Town Share (65%)	28,300,000		1,000,000	A			27,300,000	B									
2	Driscoll School Addition - State Share (35%)	14,700,000						14,700,000	C									
2	Devotion Rehab - Town Share (70%)	77,000,000		77,000,000	K													
2	Devotion Rehab - State Share (30%)	33,000,000		33,000,000	C													
2	Old Lincoln School Renovations	3,000,000		3,000,000														
2	Pierce - Elec. Distrib. Upgrade	375,000		375,000														
2	Classroom Capacity	4,000,000		1,750,000	A			500,000	A									
	School Total	261,560,000		115,010,000				4,055,000		1,495,000		80,245,000		3,985,000		4,140,000		
	<b>GRAND TOTAL</b>	<b>351,269,227</b>		<b>126,340,157</b>				<b>59,394,157</b>		<b>9,212,157</b>		<b>89,528,157</b>		<b>13,445,157</b>		<b>14,720,157</b>		

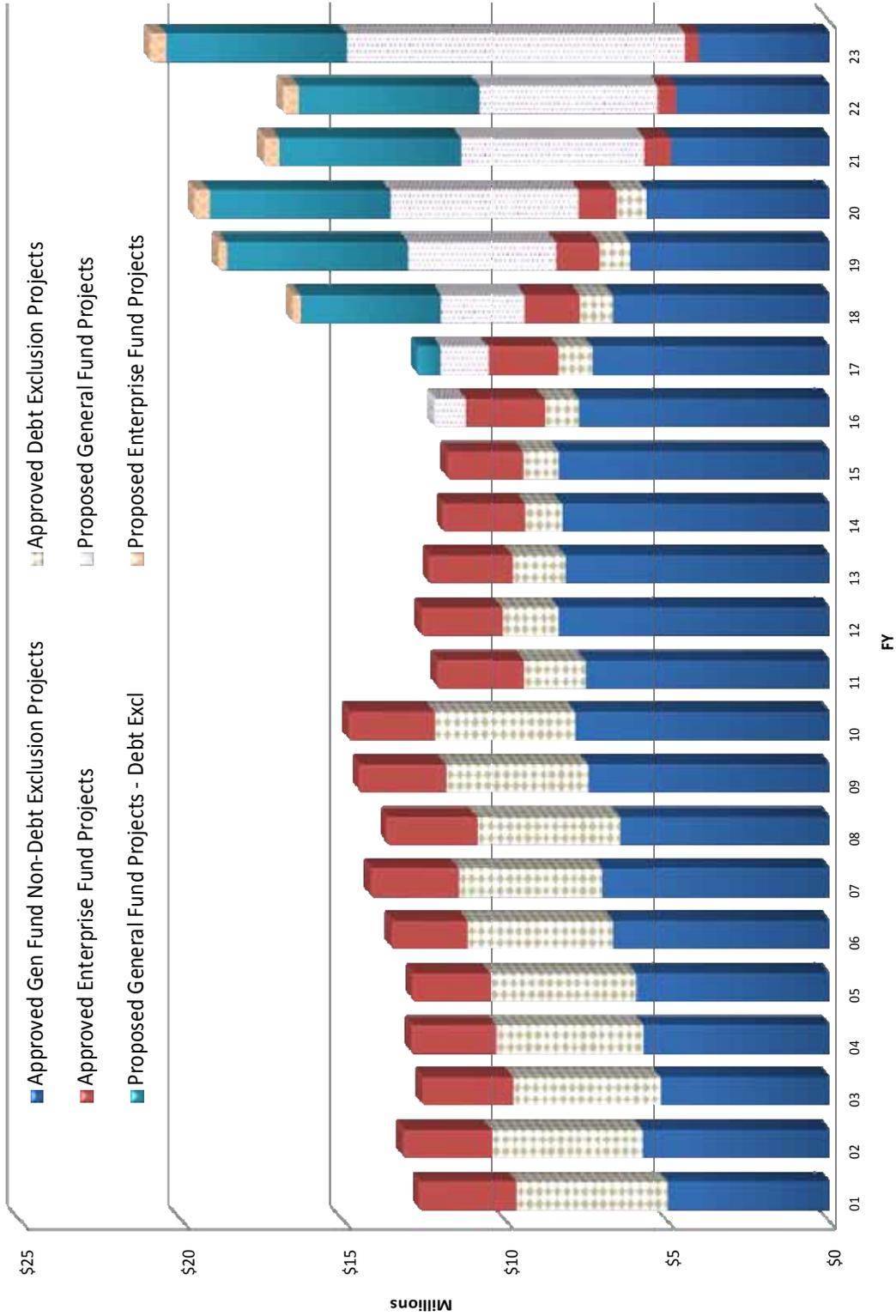
**CAPITAL IMPROVEMENTS PROGRAM**

**TOWN OF BROOKLINE CAPITAL IMPROVEMENT PROGRAM: FY2015 - FY2020**

CATEGORY CODES (CC):		REVENUE CODES (RC):																					
		A = Property Tax/Free Cash/Overlay Surplus		B = General Fund Bond		C = State / Federal Aid		D = Golf Budget		E = Golf Bond		F = Utility Budget		G = Utility Bond		H = CDBG		I = Other		J = Re-Appropriation of Funds		K = Debt Exclusion Override	
CC	Total	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC	Amount	RC
<b>RECREATION</b>																							
2	Swimming Pool - Showers/Pool Repointing	600,000		600,000	A																		
3	Golf Course Improvements	1,000,000		1,000,000	E																		
2	Tappan St. Gym Enhancements	30,000		30,000	A																		
	Recreation Total	1,630,000		1,630,000																			
<b>SCHOOL</b>																							
6	Furniture Upgrades	680,000		70,000	A			80,000	A	90,000	A	100,000	A	110,000	A	120,000	A						
6	School Technology	1,995,000		320,000	A			250,000	A	250,000	A	250,000	A	250,000	A	250,000	A						
2	Town/School ADA Renovations	580,000		65,000	A			70,000	A	75,000	A	75,000	A	80,000	A	80,000	A						
2	Town/School Elevator Renov. Program	1,125,000		250,000	A			250,000	A	125,000	A												
2	Town/School Emer Generator Repl	125,000																					
2	Town/School Energy Conservation Projects	1,375,000		160,000	A			170,000	A	175,000	A	180,000	A	185,000	A	190,000	A						
2	Town/School Energy Management System	1,000,000		200,000	A			150,000	A	650,000	A	250,000	A	250,000	A	250,000	A						
2	Town/School Blig Envelope/Penetration Rep	5,180,000		730,000	A			1,300,000	B					750,000	A	1,000,000	A						
2	Town/School Roof Repair/Repl. Program	8,875,000		375,000	A			1,150,000	B					3,500,000	B	2,500,000	B						
2	Town/School Blig Security / Life Safety Sys	1,250,000		300,000	A			125,000	A	130,000	A	140,000	A	110,000	A								
2	High School Addition - Town Share (65%)	50,500,000						1,750,000	A														
2	High School Addition - State Share (35%)	26,250,000																					
2	Baldwin School Renovations	2,250,000																					
2	Driscoll School Addition - Town Share (65%)	28,300,000		1,000,000	A			27,300,000	B														
2	Driscoll School Addition - State Share (35%)	14,700,000						14,700,000	C														
2	Devotion Rehab - Town Share (70%)	77,000,000		77,000,000	K																		
2	Devotion Rehab - State Share (30%)	33,000,000		33,000,000	C																		
2	Old Lincoln School Renovations	3,000,000		3,000,000																			
2	Pierce - Elec. Distrib. Upgrade	375,000		375,000																			
2	Classroom Capacity	4,000,000		1,750,000	A			500,000	A														
	School Total	261,560,000		115,010,000				4,055,000		1,495,000		80,245,000		3,985,000		4,140,000							
	<b>GRAND TOTAL</b>	<b>351,269,227</b>		<b>126,340,157</b>				<b>59,394,157</b>		<b>9,212,157</b>		<b>89,528,157</b>		<b>13,445,157</b>		<b>14,720,157</b>							

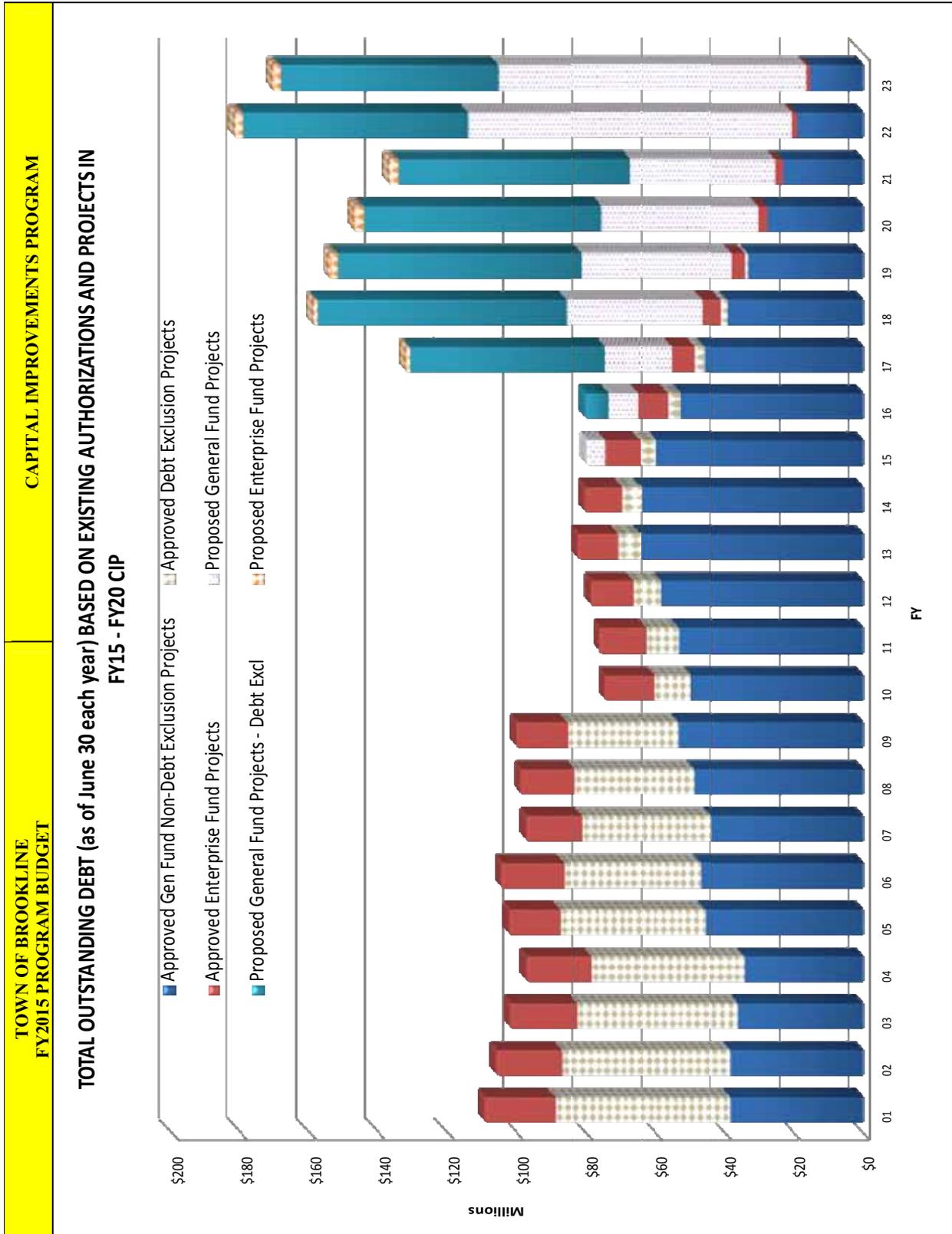
TOWN OF BROOKLINE FY2015 PROGRAM BUDGET		TOWN OF BROOKLINE CAPITAL IMPROVEMENT PROGRAM: FY2015 - FY2020											
CATEGORY CODES (LCO):		REVENUE CODES (RC):											
1 = New Facility Construction 2 = Facility Renovation / Repair 3 = Parks/Open Space/Playgrounds		A = Property Tax / Free Cash / Overlay Surplus B = General Fund Bond C = State / Federal Aid D = Golf Budget E = Utility Budget F = Utility Bond G = CDBG H = Other I = Re-Approp. of Existing Funds J = Re-Appropriation of Funds K = Debt Exclusion Override											
CC	Prior Year (FY14)	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	Future Years	RC	RC	RC	RC	RC
	Total	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
<b>GRAND TOTAL BY SOURCE</b>													
A = Property Tax / Free Cash / Overlay Surplus	63,072,000	9,415,000	7,642,000	8,149,000	8,262,000	7,378,000	7,795,000	5,850,000	90%	8%	58%	40%	40%
B = General Fund Bond	116,315,000	5,000,000	3,370,000	32,595,000	55%	54,950,000	61%	4,700,000	0%	35%	49%	49%	49%
C = State / Federal Grants	88,027,227	33,950,157	7,026,128	15,650,157	26%	27,200,157	30%	950,157	10%	30%	7%	950,157	7%
D = Golf Budget	-	-	0%	-	0%	-	0%	-	0%	0%	0%	-	0%
E = Utility Budget	1,000,000	-	1,000,000	5%	-	-	0%	-	0%	0%	0%	-	0%
F = Utility Bond	260,000	-	-	-	0%	-	0%	-	0%	0%	0%	-	0%
G = CDBG	3,000,000	-	-	3,000,000	5%	-	0%	-	0%	0%	0%	-	0%
H = Other	825,000	375,000	450,000	2%	-	-	0%	-	0%	0%	0%	-	0%
I = Re-Approp. of Existing Funds	1,770,000	100,000	800,000	4%	-	-	0%	-	0%	0%	0%	-	0%
J = Re-Approp. of Existing Funds	-	-	-	0%	-	-	0%	-	0%	0%	0%	-	0%
K = Debt Exclusion Override	77,000,000	77,000,000	61%	-	0%	-	0%	-	0%	0%	0%	-	0%
<b>Grand Total</b>	<b>351,269,227</b>	<b>126,340,157</b>	<b>20,288,128</b>	<b>59,394,157</b>	<b>9,212,157</b>	<b>89,528,157</b>	<b>13,445,157</b>	<b>14,720,157</b>					
<b>GRAND TOTAL BY ALLOCATION</b>													
General Government	2,751,000	270,000	595,000	3%	275,000	0%	380,000	4%	300,000	0%	2%	325,000	2%
Planning and Community Development	7,940,971	440,000	6,925,971	34%	-	0%	100,000	1%	55,000	0%	0%	60,000	0%
Public Safety	10,155,000	1,845,000	2,750,000	1%	4,445,000	7%	945,000	10%	965,000	1%	7%	925,000	7%
Library	770,000	50,000	-	0%	720,000	1%	-	0%	-	0%	0%	-	0%
DPW - Transportation	725,000	80,000	50,000	0%	310,000	1%	50,000	1%	50,000	0%	0%	50,000	0%
Engineering/Highway	32,735,256	7,905,157	3,352,157	17%	3,604,157	6%	2,932,157	32%	2,978,157	3%	23%	3,080,157	21%
Water / Sewer	3,260,000	260,000	-	0%	3,000,000	5%	-	0%	-	0%	0%	-	0%
Parks & Playgrounds	27,202,000	470,000	3,180,000	16%	2,020,000	3%	3,130,000	34%	4,730,000	5%	37%	5,885,000	40%
Conservation/Open Space	2,540,000	270,000	225,000	1%	175,000	0%	180,000	2%	180,000	0%	1%	1,055,000	7%
Recreation	1,630,000	-	1,630,000	8%	-	0%	-	0%	-	0%	0%	-	0%
Public Schools	261,560,000	115,010,000	4,055,000	20%	44,845,000	76%	1,495,000	16%	80,245,000	90%	30%	4,140,000	28%
<b>Grand Total</b>	<b>351,269,227</b>	<b>126,340,157</b>	<b>20,288,128</b>	<b>59,394,157</b>	<b>9,212,157</b>	<b>89,528,157</b>	<b>13,445,157</b>	<b>14,720,157</b>					
<b>GRAND TOTAL BY CATEGORY</b>													
1 New Facility Construction	4,165,000	40,000	-	0%	4,125,000	7%	-	0%	-	0%	0%	-	0%
2 Facility Renovation / Repair	266,150,000	114,925,000	5,065,000	25%	45,545,000	18%	1,650,000	19%	80,200,000	90%	31%	3,820,000	26%
3 Parks / Open Space / Playgrounds	29,892,000	740,000	3,755,000	19%	2,095,000	4%	3,310,000	36%	4,910,000	5%	38%	6,890,000	47%
4 Infrastructure	41,746,227	8,425,157	10,328,128	51%	6,914,157	12%	3,083,157	33%	3,140,157	3%	23%	3,315,157	23%
5 Vehicles	3,850,000	1,480,000	275,000	1%	-	0%	525,000	6%	660,000	1%	3%	-	0%
6 Miscellaneous	5,466,000	730,000	865,000	4%	715,000	1%	645,000	7%	675,000	1%	5%	695,000	5%
<b>Grand Total</b>	<b>351,269,227</b>	<b>126,340,157</b>	<b>20,288,128</b>	<b>59,394,157</b>	<b>9,212,157</b>	<b>89,528,157</b>	<b>13,445,157</b>	<b>14,720,157</b>					
<b>6-Year Total</b>	<b>318,207,913</b>												

DEBT SERVICE BASED ON EXISTING AUTHORIZATIONS AND PROJECTS IN FY15 - FY20 CIP



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**FY 2015-2020 CIP PROJECT DESCRIPTIONS**

NOTE: The figures included in this report are based on the best available cost estimates at the time of the development of the CIP and are subject to change due to revised estimates and bids.

**GENERAL GOVERNMENT**

**1. GARAGES - FLOOR SEALANT & WATER/OIL SEPARATORS**

In order to maintain the integrity of the concrete floors in garages, proper maintenance is required, including removing and refinishing the seal coat on those floors. The floors can deteriorate over time due to chemicals, normal wear and tear, cracks and unforeseen conditions. This project would remove and clean the surface of those floors, make any concrete patches, and provide a seal coat to maintain the floor, which should last for 5 - 10 years.

All new garages should have water/oil separators. This program would add to or modify existing systems and add new systems, thereby allowing the Town to meet the environmental needs of the DEP and EPA.

Estimated Cost: \$150,000

Time Schedule: Prior Year -- \$25,000 Property Tax / Free Cash  
 FY 2016 -- \$50,000 Property Tax / Free Cash  
 FY 2018 -- \$75,000 Property Tax / Free Cash

**2. TOWN BUILDING FURNITURE**

This item allows for the replacement of aging furniture at Town Hall and other non-school buildings.

Estimated Cost: \$100,000

Time Schedule: FY 2016 -- \$25,000 Property Tax / Free Cash  
 FY 2018 -- \$25,000 Property Tax / Free Cash  
 FY 2019 -- \$25,000 Property Tax / Free Cash  
 Future Years -- \$25,000 Property Tax / Free Cash

**3. TECHNOLOGY APPLICATIONS**

This annual appropriation is for funding the projects included in the Information Technology Department's Long-Term Strategic Plan, which serves as the framework for the selection and management of technology expenditures and is updated periodically by the Chief Information Officer (CIO). Moreover, additional projects that meet the short-term objectives set by the CIO and appropriate committees provide the guidance for the Town's approach to technology management. Primary focus areas for IT investments include Infrastructure lifecycle replacement, Enterprise Applications/Better Government initiatives, School Technology, and Public Safety enhancements. Special consideration is given to projects that reduce operating expenses and / or create efficiencies.

Estimated Cost: \$2,251,000

Time Schedule: Prior Year -- \$256,000 Property Tax / Free Cash  
 FY 2015 -- \$270,000 Property Tax / Free Cash  
 FY 2016 -- \$270,000 Property Tax / Free Cash  
 FY 2017 -- \$275,000 Property Tax / Free Cash  
 FY 2018 -- \$280,000 Property Tax / Free Cash  
 FY 2019 -- \$300,000 Property Tax / Free Cash  
 FY 2020 -- \$300,000 Property Tax / Free Cash  
 Future Years -- \$300,000 Property Tax / Free Cash

**4. DATA ROOM UPGRADES**

The Town's utilization of technology to operate, educate and communicate will continue to increase and, subsequently, the need for guaranteed stability and reliability in the information technology infrastructure will be of paramount importance. The current operation relies upon four primary data centers in which over \$1,000,000 of IT equipment is located. In order to maintain efficient and consistent operation of this critical infrastructure, investment in adequate power and cooling is essential for 7 day per week/24 hour per day availability. This project requests the necessary monies to ensure proper power and cooling capabilities as outlined by an outside consultant and jointly agreed upon by the Building and IT departments.

Estimated Cost: \$250,000

Time Schedule: FY 2016 -- \$250,000 Property Tax / Free Cash



**PLANNING AND COMMUNITY DEVELOPMENT**

**5. VILLAGE SQUARE CIRCULATION IMPROVEMENTS**

This significant public works project involves reconfiguration of the existing circulation system in Brookline Village at Washington Street, Route 9, Walnut Street, High Street, and Pearl Street. The existing jughandle used to provide access to Washington Street from Route 9 eastbound would be removed and replaced with a new four-way intersection at Pearl Street. Signals would be relocated and upgraded and a new ADA-compliant surface-level pedestrian crosswalk with walk signal would cross Route 9 just west of Pearl Street as part of a new four-way intersection, replacing the existing pedestrian bridge that crosses Route 9. In addition, lighting and landscaping improvements will be made in the area, improving the overall aesthetics of this portion of Route 9 and Brookline Village.

The funding for the project is assumed to come from four sources:

1. \$375,000 in CDBG funding for the removal of the closed pedestrian bridge
2. \$250,000 in CDBG funding for the local construction match
3. \$750,000 as part of the 1% of off-site improvements related to the re-development of 2 Brookline Place site by Children's Hospital
4. \$4.376 million grant from the State's Transportation Improvement Program (TIP), programmed in Federal Fiscal Year 2015

Estimated Cost: \$5,750,971

Time Schedule:	FY 2015 -- \$375,000	Federal Grant (CDBG)
	FY 2016 -- \$4,375,971	State Grant
	FY 2016 -- \$250,000	Federal Grant (CDBG)
	FY 2016 -- \$750,000	Other (1% Off-Site Improvements from 2 Brookline Place)

**6. COMMERCIAL AREAS IMPROVEMENTS**

This annual appropriation is intended to fund projects detailed in the Economic Development Division's Strategic Plan, which serves as the framework for the selection and management of Commercial Area Improvements and is updated periodically by the Economic Development Advisory Board (EDAB). Additionally, projects that are short-term in nature and need urgent attention are expected to arise from time to time and should be addressed in order to protect our high-functioning commercial areas. Maintaining healthy, local commercial areas affects the quality of life and adds much needed support to the Town's tax base. Annual investment toward easy to use and attractive streets, pedestrian amenities, and other civic spaces makes our commercial areas more enjoyable to live, shop, dine, and work.

Estimated Cost: \$440,000

Time Schedule:	Prior Year -- \$50,000	Property Tax / Free Cash
	FY 2015 -- \$65,000	Property Tax / Free Cash
	FY 2016 -- \$50,000	Property Tax / Free Cash
	FY 2018 -- \$100,000	Property Tax / Free Cash
	FY 2019 -- \$55,000	Property Tax / Free Cash
	FY 2020 -- \$60,000	Property Tax / Free Cash
	Future Years -- \$60,000	Property Tax / Free Cash

**7. ROUTE 9 ZONING ANALYSIS**

This project would involve a study of the land use and zoning on Route 9. The purpose would be to evaluate the zoning of the area, existing traffic conditions, and make recommendations to implement the Town's Comprehensive Plan relative to Route 9. The study would involve a public participation component, an economic feasibility component, and a traffic analysis component.

Estimated Cost: \$125,000

Time Schedule:	Future Years -- \$125,000	Property Tax / Free Cash
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**8. RIVERWAY PARK PEDESTRIAN / BICYCLE PATH IMPROVEMENTS**

There has been interest for years in a safer crossing for pedestrians and bicycles at Route 9 and the Riverway. Since the DPW completed the construction of a bike/pedestrian path in Olmsted Park, there has been increased use of this park by pedestrians and bicyclists. The path ends at the intersection with Washington Street with no means of crossing Washington Street except at the Brookline Avenue intersection. The State Department of Conservation and Recreation (DCR) commissioned a study to look at viable methods of crossing Washington Street, both in Brookline and Boston.

The Gateway East Public Realm plan developed a preferred solution for this crossing, involving a widening of the median, reconfiguring existing traffic lanes, and a marked crossing. The Selectmen-appointed Emerald Necklace Crossing Committee came to consensus on a preferred crossing alternative for a signalized crossing at Olmsted Park and River Road at Route 9. The design process is still underway and once design plans are complete, the project will access funds from a federal transportation bill earmark (\$675,000) for construction. In addition, \$625,000 in State grants and \$200,000 in CDBG funds are anticipated in FY16 for construction.

Estimated Cost: \$1,540,000

Time Schedule:	Prior Year -- \$40,000	Property Tax / Free Cash
	FY 2016 -- \$675,000	Federal Grant
	FY 2016 -- \$200,000	Federal Grant (CDBG)
	FY 2016 -- \$625,000	State Grant



**9. HISTORIC BUILDINGS REHAB - DEVOTION HOUSE AND PUTTERHAM SCHOOL**

The Devotion House was in need of structural stabilization and window repair. At the same time, one of the windows/sash at Putterham School needed to be replaced. Funding for these projects (\$85,000) was approved in FY14.

Estimated Cost: \$85,000  
 Time Schedule: Prior Year -- \$85,000 Property Tax / Free Cash

**PUBLIC SAFETY**

**10. FIRE APPARATUS REHAB**

The Town's policy is to replace front-line fire engines every 17 years and front-line ladder trucks every 20 years. While this replacement schedule serves the Town very well, funding needs to be appropriated every 10 years to rehab engines and every 12 years to rehab ladder trucks.

The breakout of the proposed funding is as follows:

- Engine #1 = \$200,000(FY16)
- Reserve Engine #5 = \$75,000(FY16)
- Tower 1 (Bronto) = \$525,000 (FY18)
- Current Engine #5 (will become Engine #4) = \$400,000 (FY20)

By rehabbing Reserve Engine #5, the Town will have two reserve fire engines that have been rehabbed and in good working order. Additionally, with the replacement of Ladder# 2 in FY15, the Department's compliment of spare apparatus will be sufficient (once replaced, Ladder #2 will become a spare).

Tower 1 was purchased in 2006 and will be 12 years old in 2018, the point at which the Town policy requires refurbishment. The current estimate for the rehab, based on past Ladder truck refurbishments, the complexity of Tower 1 and its foreign design, is \$500,000. While we should plan for this expense, as the time draws near, consideration must be given to a cost/benefit analysis of a rehab verses the cost of a new traditional style Tower Ladder.

Estimated Cost: \$1,200,000

Time Schedule: FY 2016 -- \$275,000 Property Tax / Free Cash  
 FY 2018 -- \$525,000 Property Tax / Free Cash  
 FY 2020 -- \$400,000 Property Tax / Free Cash

**11. LADDER #2 REPLACEMENT**

The Town's policy is to replace front-line ladder trucks every 20 years. Ladder #2 will be 20 years old in FY15.

Estimated Cost: \$900,000

Time Schedule: FY 2015 -- \$900,000 General Fund Bond

**12. ENGINE #3 REPLACEMENT**

In FY14, \$510,000 was appropriated for the replacement of Engine #3. Purchasing a new Engine #3 in FY14, earlier than the replacement policy calls for, allowed for current Engine #3 to become a spare. It replaced Reserve Engine #1, which was 20 years old. If this plan was not followed, Reserve Engine #1 would have been close to 30 years old when able to be replaced, an untenable situation. This approach improved both the front-line and reserve apparatus of the Fire Department.

Estimated Cost: \$510,000

Time Schedule: Prior Year -- \$510,000 Property Tax / Free Cash

**13. ENGINE #5 REPLACEMENT**

Under this plan, a new Engine #5 would be purchased at a cost of \$580,000. Quint #5, purchased in 2010 and located at Station 5 in Coolidge Corner, would be relocated to Station 4 on Boylston Street, replacing Engine #4 and saving a previously proposed \$1,250,000 in FY17. Quint #5 would be better utilized in the Station 4 neighborhood, as the streets are typically wider, there are fewer medical calls, and most importantly, the operation of a Quint in a single company station is more effective than operating it in tandem with a Ladder company as is currently the practice.

Estimated Cost: \$580,000

Time Schedule: FY 2015 -- \$580,000 Property Tax / Free Cash

**14. ENGINE #6 REPLACEMENT**

Keeping with the current policy of engine replacement at 17 years, Engine #6 will need to be replaced in FY19. The estimated cost for replacement is \$660,000.

Estimated Cost: \$660,000



Town of Brookline, MA

Capital Improvements Program, 2015-2020

Time Schedule: FY 2019 -- \$660,000 Property Tax / Free Cash

**15. FIRE STATION RENOVATIONS**

A study was made of the conditions of the fire stations and what was needed to maintain the integrity of the floors and building in regard to the newer, larger fire equipment. The work outlined in the report includes flooring, shoring, beams, columns, and structural work. The report also includes recommendations for the HVAC systems, generators, lighting, life safety, and mechanical, electrical, plumbing (MEP), along with other peripheral systems.

The report broke the work into three categories: (1) structural, (2) life safety systems, and (3) MEP. The recommended approach was to fund all required structural work in the first year (\$625,000 was approved in FY12), then fund life safety systems by stations as prioritized by the Fire Chief (FY13 – FY15), and then undertake the MEP work (starting in FY17). The estimates for remaining work at each station are as follows:

	<u>Life Safety</u>	<u>MEP</u>
Sta 1 (Brookline Village)		\$320,000 (FY17)
Sta 4 (Rt. 9/Reservoir Rd)		\$305,000 (FY19)
Sta 5 (Babcock St)	\$195,000 (FY15)	\$225,000 (FY21)
Sta 6 (Hammond St)	\$130,000 (FY15)	\$300,000 (FY20)
Sta 7 (Washington Sq)		<u>\$310,000 (FY18)</u>
TOTAL	<u>\$325,000</u>	<u>\$1,4670,000</u>

In addition to the \$310,000 in FY18 for Station #7, there is \$110,000 included for modifications to the locker room and for the creation of a second means of egress.

Estimated Cost: \$2,140,000

Time Schedule: Prior Year -- \$245,000 Property Tax / Free Cash  
 FY 2015 -- \$325,000 Property Tax / Free Cash  
 FY 2017 -- \$320,000 Property Tax / Free Cash  
 FY 2018 -- \$420,000 Property Tax / Free Cash  
 FY 2019 -- \$305,000 Property Tax / Free Cash  
 FY 2020 -- \$525,000 Property Tax / Free Cash

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**16. FIRE DEPARTMENT FLEET MAINTENANCE AND TRAINING BUILDING**

The ideal conclusion of this project would be twofold: (1) to create an apparatus maintenance facility that meets the needs of the Brookline Fire Department and provides a safe working environment for the employees and (2) to revamp the current training site into a safe, modern, and up-to-date facility.

The current maintenance facility is located in Station #1. The service area (shop) is on the first floor with storage and office space located in the basement. At this time the service elevator, used to transport supplies to the basement for storage, has been condemned. Because of that, there are tires weighing several hundred pounds virtually inaccessible in the basement. The actual shop area is above the basement area. Currently, the shop floor requires replacement and/or reinforcement if work in the area is to continue. Additionally, the shop is not large enough to allow access to many of the Department's vehicles, leaving the mechanics no choice but to do repairs out in the street, the drill yard, or, on occasion, inside another fire station. This is obviously unsafe when on the street and inefficient when working in locations away from the shop and all its tools and equipment. The limited size of the shop and its inability to house the apparatus leaves the Department looking to costly outside repair vendors more often than would be necessary if the department had an adequate facility.

The Department's training facility is located at Station #6. A modernized training facility would have a classroom with the technology necessary for the delivery of essential training. The Station would also be upgraded with a new Self Contained Breathing Apparatus (SCAB) filling station, to be utilized not only for the filling of air depleted while training, but also for air used during the course of regular firefighting activities. This would eliminate the need for Engine #6 to travel outside their first due response area in order to fill cylinders. The Training Division would acquire appropriate and sufficient equipment to aid in the administration of hands-on training programs without depleting the equipment from front line companies. This will leave companies fully complimented and better able to return to service and respond to emergencies while at the Training Facility. Lastly, a new drill yard would contain a modern, fully NFPA-compliant, live-fire training building. The existing tower, which is in poor condition, will be removed.

The \$40,000 in FY15 is to fund a feasibility study. In FY17, \$4.125 million is included for design (\$375,000) and construction (\$3.75 million).

Estimated Cost: \$4,165,000

Time Schedule: FY 2015 -- \$40,000 Property Tax / Free Cash  
 FY 2017 -- \$4,125,000 General Fund Bond

**LIBRARY**

**17. COOLIDGE CORNER BRANCH LIBRARY FEASIBILITY/CONCEPT STUDY**

Last year, the Coolidge Corner Branch Library circulated 417,356 items, making it the busiest branch library in the state. In fact, the usage of this branch library alone is higher than total library circulation in all but 36 libraries in the state, including several affluent Boston



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suburbs. The library was originally opened in 1957 and was added onto in 1970. Since then it has seen repairs and renovations to the HVAC system and the façade.

As a result of the heavy use, it is clear that the branch is showing its age and falls short of meeting the needs of library users. A Space Allocation Report, completed in the Fall of 2012, identified the need for an additional 3,000-5,000 square feet of space, including a larger children’s room, small and large group meeting space, and more public computers.

Last year, the Waldo Street Area Study Committee identified the branch library as one of the possible participants in the redevelopment of the Durgin/Waldo parcels. The site could offer several advantages that call into question how much money the Town should spend to repair and upgrade the current facility. The current FY14 – FY19 CIP includes the following:

FY15	Installation of windows and an elevator/HP lift	\$500,000
FY16	Replacement of the roof (part of the Roof/Repair/Repl. item)	\$415,000
FY16	Fenestration repairs (part of the Envelope/Fenestration Repairs item)	\$220,000

The Library Trustees are requesting that the above allocations be placed on hold until further study and consideration can take place. \$50,000 is being requested to complete a Feasibility/Concept Study. This study would determine if the current facility can be adapted to meet current and projected needs. It may also evaluate the value of the existing building if it were to be sold as part of a larger development project. The library has submitted a Letter of Intent to apply for a planning grant from the Massachusetts Board of Library Commissioners. If funded, this grant will fund the development of a written building program for the branch, a required step if the Town hopes to qualify for a construction grant.

Estimated Cost: \$50,000

Time Schedule: FY 2015 -- \$50,000 Property Tax / Free Cash

**18. COOLIDGE CORNER LIBRARY - ELEVATOR (ADA) / REAR WINDOWS/CARPETING**

The Coolidge Corner Library is presently only fully accessible at the front main entrance. On the lower level in the rear is a meeting room and toilets, and this room is not handicap accessible from the upper level; the only access is through a rear door. In order to make the library fully accessible, a lift is proposed for installation at the rear of the library, which would allow access directly below. The proposed plan is to build a structure to house a permanent lift outside, which is estimated to cost \$245,000, of which \$20,000 is for design and \$225,000 is for the elevator. By installing the lift on the exterior of the existing building, the library can remain open during the construction and the library will avoid having to discard a significant number of books due to the loss of space caused by the new equipment and resulting ADA code restrictions.

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There are nine large panels of glass windows in the rear of the building dating from the original construction in 1970. The glass is not insulated and is loose in a number of areas. All the glass would be replaced with operable windows that can be locked for security purposes. \$155,000 is included for plans and specs (\$15,000) and the windows (\$140,000).

The majority of the carpet was installed in 1997 and is now more than 15 years old. This project will replace approx. 15,000 sq. feet of carpet at an estimated cost of \$100,000.

As explained in the previous item, the Waldo Street Area Study Committee identified the branch library as one of the possible participants in the redevelopment of the Durgin/Waldo parcels. The site could offer several advantages that call into question how much money the Town should spend to repair and upgrade the current facility. Therefore, the Library Trustees have requested \$50,000 to complete a Feasibility/Concept Study and have requested that the projects detailed in this item be placed on hold until further study and consideration can take place.

Estimated Cost: \$500,000

Time Schedule: FY 2017 -- \$500,000 Property Tax / Free Cash

**19. LIBRARY FURNISHINGS**

This request of \$110,000 will be used to replace furnishings and equipment at all three libraries. The furnishings at the Main Library will be 15 years old in 2018. While the tables are expected to last 25 years or more, most of the wood and all of the upholstered chairs will have to be replaced.

Estimated Cost: \$110,000

Time Schedule: FY 2017 -- \$110,000 Property Tax / Free Cash

**20. LIBRARY INTERIOR FACELIFT/PAINTING AND REPAIRS**

This project will allow for repairs to the heavy traffic areas of all three libraries. It will provide for the painting of the interior of the libraries every 6-7 years; the replacement of carpeting and other flooring and ceiling tiles, as needed; and the ability to make minor electrical repairs and lighting upgrades. Each library would be done in sections to avoid having to close each facility.

Estimated Cost: \$110,000

Time Schedule: FY 2017 -- \$110,000 Property Tax / Free Cash



**TRANSPORTATION**

**21. TRAFFIC CALMING / SAFETY IMPROVEMENTS**

At this time there are no traffic calming projects that have been reviewed and approved by the Transportation Board; however, the Transportation Division received a request for traffic calming on Fisher Avenue. It is anticipated that whatever measures are approved, they will be constructed simultaneously with the reconstruction of Fisher Avenue.

Heath Street from Hammond Pond Parkway to the Town line will be studied for traffic calming once the Chestnut Hill Square project in Newton is substantially complete.

Estimated Cost: \$300,000

Time Schedule: FY 2016 -- \$50,000 Property Tax / Free Cash  
 FY 2017 -- \$50,000 Property Tax / Free Cash  
 FY 2018 -- \$50,000 Property Tax / Free Cash  
 FY 2019 -- \$50,000 Property Tax / Free Cash  
 FY 2020 -- \$50,000 Property Tax / Free Cash  
 Future Years -- \$50,000 Property Tax / Free Cash

**22. BICYCLE ACCESS IMPROVEMENTS**

The \$30,000 requested for FY15 is for pavement markings along Cypress Street and School Street. The goal of this project is to provide appropriate on-street pavement treatments to connect the regional bicycle route.

Estimated Cost: \$70,000

Time Schedule: Prior Year -- \$40,000 Property Tax / Free Cash  
 FY 2015 -- \$30,000 Property Tax / Free Cash

**23. DEAN ROAD/CHESTNUT HILL AVE TRAFFIC SIGNAL UPGRADE**

The traffic signal at the intersection of Dean Road and Chestnut Hill Avenue is the last of the older electronic traffic signals that needs to be upgraded. \$35,000 is for design while the \$225,000 is for the signal upgrades.

Estimated Cost: \$260,000

Time Schedule: FY 2017 -- \$260,000 Property Tax / Free Cash

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**24. MBTA TRAFFIC SIGNALIZATION**

Today, trains filled with up to 260 MBTA customers must wait as six brand-new signals give right-of-way to private vehicles, slowing MBTA service, frustrating passengers, and diminishing the transit riding experience. Brookline residents and businesses appreciate and depend on the C Line and other Green Line branches for essential mobility in our dense urban neighborhoods. According to the most recent available data, the MBTA C-Line serves over 14,000 riders per day, with over 35% of the commuters living along the Beacon Street corridor using public transit as their primary form of transportation.

Since 2008, Transportation Board members and staff have expressed the desire to work collaboratively with the MBTA to address unnecessary delays and help make the service function as intended. The current management team of the MBTA is responsive to these types of service improvements and is currently taking steps to make it feasible for the Town to implement a Transit Signal Prioritization (TSP) program along the C Line by 2017. (TSP is a tool that improves the ability of transit vehicles and automobiles to safely and effectively share limited roadway space.)

At the Spring 2013 Town Meeting, a resolution was passed requesting that the Department of Public Works (DPW) place in their FY15 capital budget funds to study TSP on the Beacon Street corridor. In response, DPW is seeking \$50,000 to hire a consultant to study the new MBTA proposed communication system, study our traffic control system on Beacon Street, determine the technology needed to implement the system, and provide a report to the Town that includes a cost-benefits analysis of upgrading the Town-owned traffic signal controllers and associated equipment on Beacon Street to allow for the prioritization of MBTA C-Line trolleys. This project will be overseen by DPW staff and the Transportation Board. Any resulting project will be submitted to Town Meeting for approval in a later CIP request.

Estimated Cost: \$50,000

Time Schedule: FY 2015 -- \$50,000 Property Tax / Free Cash

**25. WOODLAND RD./HAMMOND ST. SAFETY IMPROVEMENT STUDY**

Woodland Road at Hammond Street is a large intersection that handles significant traffic in the morning, particularly when Beaver Country Day School is in session. Because the pavement width on Hammond Street is 54' (typical width is 27'+/-), vehicles tend to travel at high rates of speed, which makes it difficult to cross the street for both pedestrians and other vehicles. \$45,000 was appropriated in FY14 to identify and quantify the issues, evaluate and recommend a solution, and estimate the cost of the conceptual solution.

Estimated Cost: \$45,000

Time Schedule: Prior Year -- \$45,000 Property Tax / Free Cash



**ENGINEERING/HIGHWAY**

**26. STREET REHABILITATION - TOWN**

In 1992, the Department of Public Works (DPW) undertook a comprehensive study of its roads and implemented a pavement management system. The system was designed to bring Town-owned streets to a sufficient level of repair such that the roads could be maintained without undertaking costly full reconstruction. From 1992 to 1997, the Town made some progress in this regard, but funding was inconsistent. Starting in 1997, the Town began allocating \$1 million per year to streets, in addition to Chapter 90 funding from the State.

The Override Study Committee (OSC), which undertook their study in CY07-08, determined that the Town had underfunded road and sidewalk maintenance and construction. Its analysis showed that while funding for road construction activities remained level, construction costs increased approximately 35% between 1997 and 2007, reducing the amount of work that could be completed each year.

Based on the recommendations of the OSC, the 2008 Override approved by the voters included \$750,000 for streets and sidewalks, to be increased annually by 2.5%. In FY15, the appropriation is recommended at \$1.55 million (the original \$1 million base plus the \$300,000 added in FY09 increased annually by 2.5%).

Estimated Cost: \$13,200,000

Time Schedule:

Prior Year --	\$1,510,000	Property Tax / Free Cash
FY 2015 --	\$1,550,000	Property Tax / Free Cash
FY 2016 --	\$1,590,000	Property Tax / Free Cash
FY 2017 --	\$1,630,000	Property Tax / Free Cash
FY 2018 --	\$1,670,000	Property Tax / Free Cash
FY 2019 --	\$1,710,000	Property Tax / Free Cash
FY 2020 --	\$1,750,000	Property Tax / Free Cash
Future Years --	\$1,790,000	Property Tax / Free Cash

**27. STREET REHABILITATION - STATE**

The State provides monies under its Chapter 90 program for improvements to certain streets. About 1/3 of Brookline's streets are eligible for 100% State reimbursement. This money supplements the funding appropriated from Town funds for street rehabilitation. An annual \$200 million statewide Chapter 90 program is assumed.

Estimated Cost: \$7,601,256

Time Schedule:

Prior Year --	\$950,157	State Grant
FY 2015 --	\$950,157	State Grant

FY 2016 -- \$950,157 State Grant  
 FY 2017 -- \$950,157 State Grant  
 FY 2018 -- \$950,157 State Grant  
 FY 2019 -- \$950,157 State Grant  
 FY 2020 -- \$950,157 State Grant  
 Future Years -- \$950,157 State Grant

**28. SIDEWALK REPAIR**

The Department of Public Works developed a sidewalk management program. Some sidewalks are reconstructed as part of the street reconstruction program; those that are not are funded under this program. The Override Study Committee (OSC), which undertook their study in CY07-08, determined that the Town had underfunded road and sidewalk maintenance and construction. Based on the recommendations of the OSC, the 2008 Override approved by the voters included \$750,000 for streets and sidewalks, to be increased annually by 2.5%. Of the FY09 override amount, \$50,000 was appropriated for sidewalks. In FY15, the appropriation is recommended at \$290,000 (the original \$200,000 base plus the \$50,000 added in FY09 increased annually by 2.5%).

Estimated Cost: \$2,474,000

Time Schedule:

Prior Year --	\$283,000	Property Tax / Free Cash
FY 2015 --	\$290,000	Property Tax / Free Cash
FY 2016 --	\$297,000	Property Tax / Free Cash
FY 2017 --	\$304,000	Property Tax / Free Cash
FY 2018 --	\$312,000	Property Tax / Free Cash
FY 2019 --	\$318,000	Property Tax / Free Cash
FY 2020 --	\$330,000	Property Tax / Free Cash
Future Years --	\$340,000	Property Tax / Free Cash

**29. LED STREETLIGHT REPLACEMENT PROGRAM**

The Town owns and maintains approximately 3,600 streetlights that were purchased from NStar in 2001. The majority of the lights use the "cobra head" style fixture with high-pressure sodium lamps ranging from 100 watts to 400 watts. The annual energy cost budgeted for unmetred streetlights totals approximately \$365,000. DPW implemented two pilot programs that replaced 104 high-pressure sodium lamps with more efficient LED lamps ranging from 55 to 75 watts to determine both the acceptability by the public and the reduction of energy usage. In addition to reduced energy use and a cleaner, more directed light (less light pollution), industry standards are that the bulb life of the sodium lamps (six years) can be stretched to 20 years for the LED's. This technology is no longer considered cutting edge and a number of communities in Massachusetts are striving to make this the new standard for their lighting systems, and it appears as though the price has plateaued.



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This project will replace the high-pressure lamps with LED's over a four-year period. Based on industry standards, each LED saves \$62 per year in energy costs. With 3,600 streetlights, that equates to \$223,200 in savings in the utility budget per year. The total cost of the project is \$2.1 million, resulting in a 10-year payback period. With the life expectancy of LED's at 20 years, that means after paying off the purchase cost in the first 10 years, each of the next 10 years results in annual savings of \$223,200, or \$2.16 million over that second 10-year period. Grant funding and rebate programs will be sought to reduce the Town's cost and reduce the payback period. \$540,000 was approved in FY14 for the first of four phases and \$515,000 is requested for each of the next three years to complete the project.

Estimated Cost: \$2,085,000

Time Schedule: Prior Year -- \$540,000 Property Tax / Free Cash  
 FY 2015 -- \$515,000 Property Tax / Free Cash  
 FY 2016 -- \$515,000 Property Tax / Free Cash  
 FY 2017 -- \$515,000 Property Tax / Free Cash

**30. PARKING LOT REHABILITATION**

Since its construction in 1965, the Centre Street parking lot has not had any substantial maintenance work done. Repairs have been more reactive and of the "band-aid" type. The rehabilitation work will consist of removing and resetting curbing, repaving, new signage, pavement line painting, replacing sidewalks, landscaping, and street light modifications. Should the Coolidge Corner Theatre expansion project move forward, this rehabilitation work would be coordinated with the parking lot improvements behind the theater.

Estimated Cost: \$205,000

Time Schedule: FY 2017 -- \$205,000 Property Tax / Free Cash

**31. NEWTON STREET LANDFILL - REAR LANDFILL CLOSURE**

The capping of the front landfill and the partial capping of the rear landfill is complete. \$4.6 million is the estimated cost to complete the capping of the rear landfill, along with the construction of the DPW operations area. Grading of the rear landfill will be modified to accommodate acceptance of soil contaminated with ash from the Martha's Lane, Kensington Circle, and Arlington Road neighborhood.

Estimated Cost: \$4,600,000

Time Schedule: FY 2015 -- \$4,600,000 General Fund Bond

**32. TRANSFER STATION CONCRETE FLOOR REPAIR**

The existing concrete floor at the Transfer Station was cracked and exposed the reinforcing steel. Without repair, it was a matter of time before the heavy equipment ripped up the floor. \$70,000 was appropriated in FY14 to fix the floor.

Estimated Cost: \$70,000

Time Schedule: Prior Year -- \$70,000 Property Tax / Free Cash

**33. MUNICIPAL SERVICE CENTER RENOVATIONS**

The Municipal Service Center (MSC) was built in 1999 at 870 Hammond Street to house the Highway and Sanitation Division. Several years after the completion of the facility, the reinforced concrete structural floor on the upper level vehicle storage area showed signs of deterioration from what was believed to be from exposure to salts and fuels from the heavy equipment traffic. The floor was repaired and sealed with the condition that resealing should occur every 5-7 years. This involved removal of the remaining sealants, shot blasting, floor prep, and reapplication of a new epoxy sealant. As a cost savings measure and part of a reorganization of services, the Parks and Open Space Division of the DPW relocated to the MSC in the summer of 2009. The move provided better services and an improved operating environment for the employees of the Division, as their facility at Larz Anderson was substandard. However, the reorganization also created the need for additional vehicle and equipment storage at the MSC. In order to maximize the use of available space, the buildings at Larz Anderson continue to be used to house off-season vehicles and equipment.

Because of the floor conditions and the need to house additional parks equipment, a potential alternative plan to spending tax dollars frequently for repairs to the floor was considered. In FY09, \$40,000 was approved by Town Meeting for a study of space and facility needs of both the Parks and Open Space Division and the Building Department's maintenance craftsmen. The study suggested that the underlying cause of the MSC floor deterioration was due to the marginal sizing of the structural systems supporting the floor, causing the slab to move under heavy equipment loading. The obvious solution was to reconfigure the upper floor space to remove heavy equipment traffic and storage from the structural floor to significantly reduce the loading on the floor and relocate the existing shop space on the non-structural slab to provide additional space for heavy equipment storage. The floor could then be repaired permanently without the fear of future damage occurring due to slab movement.

Estimated Cost: \$2,500,000

Time Schedule: Prior Year -- \$2,500,000 General Fund Bond



**WATER/SEWER**

**34. WATER DEPARTMENT GARAGE - ROOF REPLACEMENT**

In 2008, the Town conducted a study in order to develop a long-term roof repair and replacement schedule. The plan includes the Water Department facility on Netherlands Road in FY2014.

Estimated Cost: \$260,000

Time Schedule: Prior Year -- \$260,000 Water and Sewer Enterprise Fund Budget

**35. WASTEWATER SYSTEM IMPROVEMENTS**

This on-going project provides funding for the rehabilitation of the wastewater collection system (sanitary sewer) based on the recommendations of the Wastewater Master Plan completed in 1999. Construction projects to correct sewer system deficiencies have been identified and categorized as: 1) structural improvements, 2) sewer and storm drain separation, 3) infiltration reduction, 4) hydraulic capacity restoration, and 5) cleaning and television inspection to identify areas for further investigation and/or maintenance. Projects are designed, grouped, and constructed with the overall goals of eliminating sewerage backups into homes and businesses, preventing costly system failures, lowering MWRA wholesale costs by reducing extraneous flows, and making more efficient use of annual operating funds. Funding for this project should enable completion of the currently identified system deficiencies.

Estimated Cost: \$3,000,000

Time Schedule: FY 2017 -- \$3,000,000 Water and Sewer Enterprise Fund Bond

**PARKS/PLAYGROUNDS**

**36. BROOKLINE AVENUE PLAYGROUND**

Brookline Avenue Playground is a four-acre park located in North Brookline. The playground equipment located behind the Lynch Center serves the neighborhood, the community overall and the Brookline Early Education Program (BEEP). The play area was last renovated in 1994 and is in need of complete replacement including new play equipment, safety surfacing, water play and accessibility improvements. This project also includes renovation of the athletic field that serves soccer, football, youth baseball, and softball. Funding for the project is estimated to total \$957,000, with \$87,000 appropriated in FY14 for design and \$870,000 planned for FY16 for construction.

Estimated Cost: \$957,000

Time Schedule: Prior Year -- \$87,000 Property Tax / Free Cash (Design)

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FY 2016 -- \$870,000 Property Tax / Free Cash (Construction)

### 37. BROOKLINE RESERVOIR PARK

Brookline Reservoir Park is a multigenerational community park located along Route 9 between Lee and Warren Streets in the middle of town. It is a man-made body of water approximately 1-mile in circumference with a walking/jogging stonedust track that circles the reservoir. The interior basin of the Reservoir is a stone riprap wall and is in need of repointing, regrouting and replacement of stones. The stonedust path is in need of repair, for both accessibility and safety. In addition to repairing the stone basin, the design review process and restoration project will include consideration of plantings, park furniture, screening from Route 9, comfort station and pathway/access/entry/overlook points. Funding for the project is estimated to total \$1,880,000, with \$80,000 in FY17 for design and \$1.8 million in FY18 for construction.

Estimated Cost: \$1,880,000

Time Schedule: FY 2017 -- \$80,000 Property Tax / Free Cash (Design)  
FY 2018 -- \$1,800,000 Property Tax / Free Cash (Construction)

### 38. COREY HILL PLAYGROUND

Corey Hill Park is located at the crest of Summit Avenue. The southern parcel contains an active play equipment area and lawn and the northern parcel contains an attractive overlook of Boston, lawn area, sundial, and seating. The playground, last renovated in 1989, is in need of complete replacement including site grading and accessibility improvements. This project will replace all playstructures at the site and review the layout and design of the active playground portion of the park. Site masonry work, benches, walkways, planting, and other site amenities will be included with this renovation. Funding for the project is estimated to total \$600,000, with \$40,000 in FY16 for design and \$560,000 in FY17 for construction.

Estimated Cost: \$600,000

Time Schedule: FY 2016 -- \$40,000 Property Tax / Free Cash (Design)  
FY 2017 -- \$560,000 General Fund Bond (Construction)

### 39. CYPRESS PLAYGROUND & ATHLETIC FIELD

Cypress Playground is a 5.22 acre park located in the heart of Brookline, adjacent to the High School, Tappan Gym and Kirrane Aquatic Center. The park has two softball fields that are shared with a rectangular natural turf field for all sports. A large seating area and full basketball court are located at the far side of the athletic playing fields. The park has a spray pool, picnic area, play equipment for tots and children and a sledding hill.

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This renovation includes new play equipment for 2-5 and 5-12 year old children, repair of a perimeter retaining wall, new curbing, updated water play, pathways, drainage improvement, new basketball court, updated picnic area and seating, plantings, new irrigation, infield and athletic field renovation. The \$100,000 in FY20 is for design while the \$1.4 million in Future Years is for construction.

Estimated Cost: \$1,500,000

Time Schedule: FY 2020 --\$100,000 Property Tax / Free Cash  
Future Years --\$1,400,000 General Fund Bond

**40. EMERSON GARDEN PLAYGROUND**

Emerson Garden is a park located along Davis Avenue and Emerson Street with a circuitous walking path, seating, playground and lawn area. The play equipment for tots and older children, last renovated in 1995, is in need of replacement, new perimeter fencing is required, and accessibility needs improvement. The playground review will include consideration of picnic/passive areas, review of spray pool utilities, park furniture, and rehabilitation of the landscaped areas. The design review process will revisit layout, grading, accessibility, safety, and functionality of the park. Funding for the project is estimated to total \$670,000, with \$60,000 in FY16 for design and \$610,000 in FY17 for construction.

Estimated Cost: \$670,000

Time Schedule: FY 2016 --\$60,000 Property Tax / Free Cash (Design)  
FY 2017 --\$610,000 General Fund Bond (Construction)

**41. FISHER HILL FIELD/PLAYGROUND CONSTRUCTION**

In FY08, the Town approved a \$1.35 million bond for Phase 1 (acquisition and make the property safe and accessible) of the Fisher Hill Reservoir / Playground project, a unique and exciting project that will transform an old, unused reservoir site into a scenic amenity and public park that incorporates an athletic field, passive recreation and open space. In FY13, the Town approved \$3.25 million for the next phase of the project -- the conversion of the reservoir into a modern, 10-acre urban park. Funding for this came from the sale of the Town's reservoir site on the opposite side of Fisher Avenue, which has been transformed into a mixed-income housing development. Lastly, in FY14 a \$1.2 million bond was approved, as cost estimates were revised and additional funding was required. The FY13 and FY14 appropriations, plus a \$400,000 state grant and a fund-raising effort, will enable the creative reuse of the site from an inaccessible state surplus property into a new 10-acre public park in the dense urban town of Brookline.

Estimated Cost: \$1,600,000

Time Schedule: Prior Year -- \$1,200,000 General Fund Bond  
Prior Year -- \$400,000 State Grant

**42. BROOKLINE RESERVOIR GATEHOUSE ROOF**

The Parks and Open Space Division of the Dept. of Public Works and the Building Department are working with the Preservation Commission to preserve and potentially reuse this nationally significant 1848 granite and iron building, which is located along Route 9 and Warren Street. The gatehouse and Reservoir Park are listed on the National Register of Historic Places. A 2009 engineering study by Structures North determined that its masonry is in good condition and its roof structure could be rehabilitated, despite damage to the truss ends from failed built-in gutters (now covered). In 2010, temporary shoring secured the roof from heavy snow loads and North Bennet Street School students restored the doors and some windows. A master planning process for the Reservoir Park will consider possible uses for its upper interior level.

This funding is to restore the ends of the trusses, re-secure them to the original iron roof with which they are structurally integrated, and replace the present pre-WWI standing-seam steel roof. The engineering study budgets approximately \$20,000 for interior demolition, \$135,000 for structural work, and \$95,000 for a new metal roof. At least \$50,000 of this might be offset by an MHC matching grant. If the gatehouse is designated a National Historic Landmark, it would be eligible to compete for "Save America's Treasures" funding.

The Study also addressed carpentry, stair, and masonry repairs, the estimate for which is \$400,000. This work is predicated upon the receipt of outside funding.

Estimated Cost: \$650,000

Time Schedule: FY 2016 -- \$250,000 Property Tax / Free Cash  
 FY 2016 -- \$400,000 State / Federal Grant

**43. HARRY DOWNES FIELD & PLAYGROUND**

While the oval and track at Harry Downes Field, located at Pond Avenue and Jamaica Road, were renovated in 2006, the play area, softball field and comfort station/storage space are in need of renovation. The playground area was last renovated in 1993. This budget item is intended to replace the play equipment and park furniture, install a water play/spray pool amenity, renovate the softball field, and assess the comfort station/field house. Funding for the project is estimated to total \$880,000, with \$80,000 in FY17 for design and \$800,000 in FY18 for construction.

Estimated Cost: \$880,000

Time Schedule: FY 2017 -- \$80,000 Property Tax / Free Cash (Design)  
 FY 2018 -- \$800,000 Property Tax / Free Cash (Construction)



**44. KRAFT FAMILY ATHLETIC FIELD SYNTHETIC TURF REPLACEMENT**

The Kraft Family Athletic Field is nearing 15 years old. The synthetic turf carpet has a warranty of 8 years and an anticipated life cycle of 12 years. The carpet has suffered several tears requiring repair and the field is in need of regrading. The project involves removing the existing carpet, laser grading the subbase, replacing the synthetic turf and installing new infill. In FY19, \$70,000 is included for design while \$700,000 is in FY20 for construction.

Estimated Cost: \$770,000

Time Schedule: FY 2019 -- \$70,000 Property Tax / Free Cash (Design)  
FY 2020 -- \$700,000 Property Tax / Free Cash (Construction)

**45. LARZ ANDERSON PARK**

Larz Anderson Park is the former estate of Larz Anderson and his wife Isabel Weld Perkins Anderson, an elite social couple of the early 20th century. With over 60 acres, Larz Anderson Park is the largest park in Brookline, is listed on the National and State Registers of Historic Places and is the flagship park of the Town with many architecturally significant buildings, structures and fences, athletic fields, play equipment, picnic areas, walking paths, an ice rink, significant trees, a water body, sweeping slopes and views of the City of Boston.

The entire access roadway through the park from Newton Street to Avon Street is failing and is in need of replacement. The FY14 funding (\$660,000) will complete this designated work by renovating the main roadway and installing support drainage structures and swales. Pedestrian pathways through the park are also in need of repair/replacement. In addition, this funding will rehabilitate the pathways and stairs in the park that are currently in poor condition.

The FY19 request (\$2.7 million) is for replacement of the deteriorating Temple of Love and Fountain. A detailed conditions assessment of the structure, including sampling and lab tests, found that the concrete used to manufacture the various components of the Temple are cracking, principally due to freeze-thaw damage resulting from corrosion and expansion of steel reinforcement bar and/or mesh. The extensive network of cracks on the cornice, ledges and dome represent a progressive condition that is irreversible and not repairable on a long-term basis. The assessment looked at the Town's options for maintenance, stabilization and replacement. Due to the condition of the concrete, replacement is the recommended course of action.

The \$2.2 million budget in FY20 is for the Italianate Garden and the Maintenance Yard. Larz Anderson Park shows many traces of the three major cultural influences on the Anderson's tastes, aesthetics and lifestyle: Italy, Japan and England. The Andersons had a vision for their Brookline home that would take them nearly 20 years to realize. They hired the landscape architect and artist Charles A. Platt to design a sunken Italian garden at the top of the hill that would embody their love of Italy. The Italian Garden infrastructure that remains is in poor and unstable condition. The request for improvements is to make structural repairs to the walks, stairs and walls, restore the gazebo on the east side of the garden (to match the restoration of the west side that was completed several years ago), removal of invasive vegetation and replacement with appropriate planting. \$1.1 million is budgeted for this project.

Just below the Italian Garden was the Agricultural and Horticultural area for the Anderson Estate. Isabel and Larz had greenhouses, a hen house, a rose garden, garden shed, and maintained extensive agricultural operations to support themselves and their staff. These operations, later to be replaced by the Parks and Open Space Maintenance Garages, were surrounded by significant concrete/stucco walls. The massive walls have shifted significantly and are cracking and deteriorating. The walls and access gate/door are in need of complete replacement (similar to the replacement of the perimeter wall on Goddard Avenue that was completed several years ago). \$1.1 million is budgeted for this project.

Estimated Cost: \$9,060,000

Time Schedule: Prior Year -- \$660,000 Property Tax / Free Cash  
 FY 2019 -- \$2,700,000 General Fund Bond  
 FY 2020 -- \$2,200,000 General Fund Bond  
 Future Years -- \$3,500,000 General Fund Bond

**46. MURPHY PLAYGROUND**

Murphy Playground, located between Kent, Bowker and Brook Streets, is a bowl shaped park with a noticeable grade change, retaining walls on three sides, play areas and a sloped open grass area. The park was last renovated in 1992 and is in need of renovation, including new play equipment for tots and older children, new perimeter fencing, improved accessibility, restoration of the field, rehabilitation of pathways, landscape improvements, review of picnic/passive areas, and review of spray pool utilities. The design review process will revisit layout, grading, accessibility, safety, and functionality of the park. Funding for the project is estimated to cost \$780,000, with \$60,000 for design in FY18 and \$720,000 for construction in FY19.

Estimated Cost: \$780,000

Time Schedule: FY 2018 -- \$60,000 Property Tax / Free Cash (Design)  
 FY 2019 -- \$720,000 Property Tax / Free Cash (Construction)

**47. PIERCE PLAYGROUND**

Pierce Playground, last renovated in 1991, is located between School Street and Harvard Avenue. The park serves as a community park, neighborhood park and school ground. The park has an upper-level with play equipment and a lower-level with a ball field, with a steep slope in between. The playground is in need of a full renovation that will include drainage improvements; play equipment for both younger children and school-aged children; upgraded utilities, water play, basketball, and site furniture; a rehabilitated field; and repair to pathways, masonry and fencing. Funding for this project is estimated to total \$1.01 million, with \$90,000 in FY15 for design and \$920,000 in FY16 for construction.



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Estimated Cost: \$1,010,000

Time Schedule: FY 2015 -- \$90,000 Property Tax / Free Cash (Design)  
 FY 2016 -- \$920,000 General Fund Bond (Construction)

**48. RIVERWAY PARK**

This is a continuing project of the Olmsted Park/Riverway Improvements program. This appropriation is for the reconstruction of the riverbanks that have eroded in some places by as much as 10 feet, replacement of failing or hazard trees, edge planting, lawn restoration, rebuilding the path system, and re-grading to prevent future erosion. The project was originally anticipated to be implemented in FY2003; however, with the Brookline/Boston/Commonwealth of Massachusetts/US Army Corps of Engineers joint restoration of the Muddy River, this phase of restoration will be coordinated with the overall flood mitigation, environmental quality, and historic preservation work that is currently being designed and permitted.

Estimated Cost: \$425,000

Time Schedule: Future Years -- \$425,000 Property Tax / Free Cash

**49. ROBINSON PLAYGROUND**

Robinson Playground is a 2.38 acre park located between Cypress, High and Franklin Streets in a dense neighborhood. The playground facilities include a youth baseball/softball field, paved basketball court, multi-use court play area, playground equipment, and water play.

The renovation includes new playground equipment for older and younger children; water play, new irrigation and field renovation; basketball and multi-use court improvements; pathway and drainage improvements; and fence replacement. The \$90,000 in FY19 is for design while the \$900,000 in FY20 is for construction.

Estimated Cost: \$990,000

Time Schedule: FY 2019 -- \$90,000 Property Tax / Free Cash (Design)  
 FY 2020 -- \$900,000 Property Tax / Free Cash (Construction)

**50. SCHICK PLAYGROUND**

Schick Park, located on Addington Road, is in need of a full site renovation to meet new safety and accessibility requirements. Renovations will include new play equipment for older and younger children, repointing the stone walls, repair of the wooden picnic shelter, field renovation, fencing, paving and site furniture. The estimated project cost is \$770,000, with \$70,000 in FY18 for design and \$700,000 in FY19 for construction.

Estimated Cost: \$770,000

Time Schedule: FY 2018 -- \$70,000 Property Tax / Free Cash (Design)  
FY 2019 -- \$700,000 Property Tax / Free Cash (Construction)

#### 51. SOULE ATHLETIC FIELDS & SITE RENOVATION

The Soule Early Education Center is located on Hammond Street. The athletic fields on site serve daycare programs, athletic leagues, camps, and residents of all ages and abilities. The circulation and stormwater management of the site are in need of redesign and renovation. Funds will provide for design and construction for increased capacity and improvements to parking areas, pathway connections, linkage between the Baldwin School and the Soule site, storm drainage improvements, and the construction of new athletic fields. The estimated project cost is \$550,000, with \$50,000 in FY19 for design and \$500,000 in FY20 for construction.

Estimated Cost: \$550,000

Time Schedule: FY 2019 -- \$50,000 Property Tax / Free Cash (Design)  
FY 2020 -- \$500,000 Property Tax / Free Cash (Construction)

#### 52. PLAYGROUND SKATE SPOT

The Town has a significant number of skateboarders and no skateboard park facilities. This lack of facilities results in increased pressure on public and private spaces by skateboarders who utilize these places for recreation. As a result, the safety of both skateboarders and other pedestrians is compromised by skating in unsanctioned regions. Without skateparks, Brookline skaters are forced to skate in areas that may not be safe or in places that are not designed for skaters.

Estimated Cost: \$220,000

Time Schedule: FY 2016 -- \$20,000 Property Tax / Free Cash  
FY 2017 -- \$200,000 Property Tax / Free Cash

#### 53. PARKS AND PLAYGROUNDS REHABILITATION & UPGRADE

This is an on-going town-wide program for the repair and replacement of unsafe and deteriorating playground, fence, and field facilities or components. Items funded under this program include fences, backstops, retaining walls, picnic furniture, turf restoration, bench replacements, playstructures, safety surfacing, and drainage improvements. This program avoids more expensive rehabilitation that would be necessary if these items were left to deteriorate.

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Estimated Cost: \$2,420,000

Time Schedule:  
 Prior Year -- \$295,000 Property Tax / Free Cash  
 FY 2015 -- \$295,000 Property Tax / Free Cash  
 FY 2016 -- \$300,000 Property Tax / Free Cash  
 FY 2017 -- \$300,000 Property Tax / Free Cash  
 FY 2018 -- \$305,000 Property Tax / Free Cash  
 FY 2019 -- \$305,000 Property Tax / Free Cash  
 FY 2020 -- \$310,000 Property Tax / Free Cash  
 Future Years -- \$310,000 Property Tax / Free Cash

**54. TOWN/SCHOOL GROUNDS REHAB**

Town and School grounds require on-going structural improvements and repair. These funds will be applied to create attractive and functional landscapes and hardscape improvements including plant installation, regrading, reseeding, tree work, new concrete or asphalt walkways, trash receptacles, bike racks, drainage improvements, retaining walls, and repairs to stairs, treads, railings, benches, or other exterior structures. This program avoids more expensive rehabilitation that would be necessary if these items were left to deteriorate.

Estimated Cost: \$740,000

Time Schedule:  
 Prior Year -- \$85,000 Property Tax / Free Cash  
 FY 2015 -- \$85,000 Property Tax / Free Cash  
 FY 2016 -- \$90,000 Property Tax / Free Cash  
 FY 2017 -- \$90,000 Property Tax / Free Cash  
 FY 2018 -- \$95,000 Property Tax / Free Cash  
 FY 2019 -- \$95,000 Property Tax / Free Cash  
 FY 2020 -- \$100,000 Property Tax / Free Cash  
 Future Years -- \$100,000 Property Tax / Free Cash

**55. TENNIS COURTS/BASKETBALL COURTS**

The Town has over 19 basketball courts and 36 hard-surface tennis courts. Over time, the court surfaces begin to deteriorate, crack, and weather. In order to maintain the integrity, safety, and playability of the courts, the Town needs to plan for the phased reconstruction/renovation/resurfacing of the courts.

Estimated Cost: \$530,000

Time Schedule: Prior Year -- \$100,000 Property Tax / Free Cash

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FY 2016 -- \$230,000 Property Tax / Free Cash  
 FY 2020 -- \$100,000 Property Tax / Free Cash  
 Future Years -- \$100,000 Property Tax / Free Cash

**56. COMFORT STATIONS**

These funds are programmed for the renovation of the comfort stations located in various parks.

Estimated Cost: \$200,000

Time Schedule: Prior Year -- \$50,000 Property Tax / Free Cash  
 FY 2017 -- \$100,000 Property Tax / Free Cash  
 Future Years -- \$50,000 Property Tax / Free Cash

**CONSERVATION/OTHER OPEN SPACE**

**57. TREE REMOVAL AND REPLACEMENT**

The tree removal and replacement program represents the Town's effort to balance street tree removals with plantings. As trees mature or are impacted by storm damage or disease, it is critical to remove these before they become public safety hazards. New tree plantings are also critical, as they directly impact the tree-lined character of the community, improve stormwater quality, provide oxygen, reduce heat impact in the Summer, and improve the overall quality of life in Brookline. In addition, funding is included for on-going management work in the four conservation properties (Hall's Pond Sanctuary, Amory Woods Sanctuary, D. Blakely Hoar Sanctuary, and the Lost Pond Sanctuary) and parks. Storm damage, disease, and old age continue to reduce tree canopies. The funds will be utilized to remove hazard trees and provide structural, health, and safety pruning to prolong the life and viability of our significant trees. New trees will be planted in anticipation of the ultimate loss of existing mature trees.

Estimated Cost: \$1,420,000

Time Schedule: Prior Year -- \$170,000 Property Tax / Free Cash  
 FY 2015 -- \$170,000 Property Tax / Free Cash  
 FY 2016 -- \$175,000 Property Tax / Free Cash  
 FY 2017 -- \$175,000 Property Tax / Free Cash  
 FY 2018 -- \$180,000 Property Tax / Free Cash  
 FY 2019 -- \$180,000 Property Tax / Free Cash  
 FY 2020 -- \$185,000 Property Tax / Free Cash  
 Future Years -- \$185,000 Property Tax / Free Cash



**58. OLD BURIAL GROUND**

The Old Burying Ground, located on Walnut Street, is Brookline's first cemetery. Although the cemetery dates back to 1717, its appearance today reflects the ideals of the 19th century rural cemetery movement. The cemetery is listed as part of the Town Green National Register Historic District and has been featured in a publication by the Massachusetts Department of Environmental Management entitled "Preservation Guidelines for Historic Burial Grounds and Cemeteries". Research completed by both landscape architects and specialists in monument conservation indicates that the Town has much work to do in restoring the perimeter walls, markers and footstones, tombs, and monuments, as well as landscape improvements.

Estimated Cost: \$100,000

Time Schedule: Future Years -- \$100,000 Property Tax / Free Cash

**59. WALNUT HILLS CEMETERY**

The Walnut Hills Cemetery was established by the Town in 1875. Designed to preserve the natural features and effects for the landscape, the Cemetery provides visitors with a place of solace, natural beauty and quiet charm. The Walnut Hills Cemetery was listed in the National and State Registers of Historic Places in 1985.

In 2004, the Town completed a master plan for the Cemetery in order to set the parameters necessary to meet town cemetery needs of the future while maintaining the visual, service, quality and other features that make the Cemetery such a valuable historic cultural resource for the Town. The Walnut Hills Cemetery Trustees and staff recently completed the development of a new interment area at the Cemetery that will serve the Town's needs for the next decade. The Town has completed a conditions assessment of the roadways through the Walnut Hills Cemetery and recommends a program of replacement, resurfacing and repair. The goal is to maintain the historic vehicular circulation system by implementing a program to phase in pavement improvements to resurface the drives and to reconstruct poor areas. The Cemetery has also identified other areas for future design and development within the Cemetery for future needs.

The challenge for the Town, staff and Trustees is to satisfy the various demands of today and to prepare for the future. With that challenge, the financing plan for these capital improvements is to use Cemetery Funds. The \$250,000 total between FY14 – FY16 is for the above referenced roadway work and will be funded from the Sale of Lots/Service fund (SW01). Current plans for the \$770,000 in Future Years, which is intended for lot expansion, is to use a combination of SW01 and an expendable trust fund (TW23) that is under the purview of the Trustees and does not require appropriation by Town Meeting. Meetings with the Trustees will continue, and they will include discussions regarding potential changes to how revenues received for the sale of lots is currently split.

Estimated Cost: \$1,020,000

Time Schedule: Prior Year -- \$100,000 Other (Cemetery Funds)

FY 2015 -- \$100,000 Other (Cemetery Funds)  
 FY 2016 -- \$50,000 Other (Cemetery Funds)  
 Future Years -- \$770,000 Other (Cemetery Funds)

## **RECREATION**

### **60. SWIMMING POOL - SHOWER RENOVATION/POOL REPOINTING**

The Evelyn Kirrane Aquatics Center, located on Tappan Street, consists of three pools. The pool structure needs to have the concrete repointed to prevent foundation cracks and leaks, as it has required increased repair and maintenance over the past few years. If a larger-scale project of this type is not undertaken, structural issues could arise in the future. \$350,000 is included in FY16 for this project.

The locker rooms require new showers and tiles and lockers on both the men's and women's sides. The areas have heavy use throughout the year and require constant maintenance and upkeep. The project will include replacement of showers and tiles and renovation of the surrounding areas. \$250,000 is included in FY16 for this project.

Estimated Cost: \$600,000

Time Schedule: FY 2016 -- \$600,000 Property Tax / Free Cash

### **61. GOLF COURSE IMPROVEMENTS**

Originally built in 1933, the Robert T. Lynch Municipal Golf Course has undergone a series of renovations over the past decade, but many more are needed both on the course and in the clubhouse. The proposed \$1 million would be used to finish cart paths on holes 14 and 15, complete bunker renovations on holes 14, 16 and 17, restoration of the 9th fairway, substantial tree pruning and elimination on course, and irrigation maintenance. Additionally, the clubhouse would get a much needed upgrade to the electrical and HVAC system. Phasing the debt service associated with a \$1 million bond will allow for debt service to remain at historical and affordable levels.

Estimated Cost: \$1,000,000.

Time Schedule: FY 2016 -- \$1,000,000 Golf Course Enterprise Fund Bond

### **62. TAPPAN ST. GYM ENHANCEMENTS**

The Tappan St. Gym building has thousands of square feet of space that could be used differently to accommodate the changing needs of the community. Working with the School Department, the project would create a link between the Evelyn Kirrane Aquatics Center and the gym facility and redesign the Tappan St. first floor office spaces for better oversight of visitors during off-school hours. The \$30,000 is for design and construction.

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Estimated Cost: \$30,000

Time Schedule: FY 2016 --\$30,000 Property Tax / Free Cash

**SCHOOL**

**63. SCHOOL FURNITURE**

This is a continuous program to upgrade furniture in all schools, which absorbs significant wear and tear annually. This program will replace the most outdated and worn items.

Estimated Cost: \$680,000

Time Schedule: Prior Year --\$50,000 Property Tax / Free Cash  
 FY 2015 --\$60,000 Property Tax / Free Cash  
 FY 2016 --\$70,000 Property Tax / Free Cash  
 FY 2017 --\$80,000 Property Tax / Free Cash  
 FY 2018 --\$90,000 Property Tax / Free Cash  
 FY 2019 --\$100,000 Property Tax / Free Cash  
 FY 2020 --\$110,000 Property Tax / Free Cash  
 Future Years --\$120,000 Property Tax / Free Cash

**64. SCHOOL TECHNOLOGY**

In FY14, \$175,000 appropriated to move forward in three key areas:

- Complete the Wireless Infrastructure Project – \$94,900 will complete the purchase of wireless access points, wiring and switches at the remaining elementary schools (Driscoll, Lawrence and Devotion) for enterprise wireless implementation.
- Outfit Special Education LLD Classrooms – \$40,100 will allow the new Language Based Learning Disabilities (LLD) program classrooms at Brookline High School to be outfitted with the classroom technology (Smartboards, laptops and applications) to allow students to experience the appropriate Instructional Model for their individual needs. These classrooms will also serve as mainstream classrooms during other periods.
- Rollout of Evaluation System - \$40,000 – expand the FY13 pilot of Teachpoint, a professional staff evaluation system. This funding will allow for a full rollout of the new evaluation system for all professional staff utilizing the Teachpoint application on iPads and laptops, allowing on-line classroom observation and immediate Evaluator/Evalutee feedback and document sharing.

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The School Department is in the final stages of proposing a technology plan designed to establish the appropriate infrastructure, building capacity in instruction, and improve efficiency in administrative functions within the PSB. Both the School Committee and Override Study Committee will be reviewing the specific proposals, as there is a substantial cost and programmatic benefit associated with the overall plan. The funding in this Preliminary CIP is to provide access through infrastructure and appropriate devices.

The funding in FY15 – FY20 is to upgrade and maintain instructional technology system-wide. In addition, investments will assist in meeting classroom instruction goals, the implementation of a learning management system, and/or a one-to-one device initiative for students at Brookline High School.

Estimated Cost: \$1,995,000

Time Schedule: Prior Year -- \$175,000 Property Tax / Free Cash  
 FY 2015 -- \$320,000 Property Tax / Free Cash  
 FY 2016 -- \$250,000 Property Tax / Free Cash  
 FY 2017 -- \$250,000 Property Tax / Free Cash  
 FY 2018 -- \$250,000 Property Tax / Free Cash  
 FY 2019 -- \$250,000 Property Tax / Free Cash  
 FY 2020 -- \$250,000 Property Tax / Free Cash  
 Future Years -- \$250,000 Property Tax / Free Cash

**65. TOWN/SCHOOL BUILDING - ADA RENOVATIONS**

This annual program of improvements is requested in order to bring Town and School buildings into compliance with the Americans with Disabilities Act (ADA), which requires that the Town make public buildings accessible to all.

Estimated Cost: \$580,000

Time Schedule: Prior Year -- \$65,000 Property Tax / Free Cash  
 FY 2015 -- \$65,000 Property Tax / Free Cash  
 FY 2016 -- \$70,000 Property Tax / Free Cash  
 FY 2017 -- \$70,000 Property Tax / Free Cash  
 FY 2018 -- \$75,000 Property Tax / Free Cash  
 FY 2019 -- \$75,000 Property Tax / Free Cash  
 FY 2020 -- \$80,000 Property Tax / Free Cash  
 Future Years -- \$80,000 Property Tax / Free Cash



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**66. TOWN/SCHOOL BUILDING - ELEVATOR RENOVATIONS**

When a building is renovated, most elevators are upgraded (new controls, motors, cables, refurbishment of the car, etc.) Some elevators are also partially upgraded to meet the requirements of the existing building codes. The buildings that have not been renovated have elevators that are close to 40 years old. Maintenance is an issue and parts are increasingly difficult to find. This project would upgrade those cars and lifts with new equipment.

Estimated Cost: \$1,125,000

Time Schedule: Prior Year -- \$250,000 Property Tax / Free Cash  
 FY 2015 -- \$250,000 Property Tax / Free Cash  
 FY 2016 -- \$250,000 Property Tax / Free Cash  
 FY 2017 -- \$250,000 Property Tax / Free Cash  
 FY 2018 -- \$125,000 Property Tax / Free Cash

**67. TOWN/SCHOOL BUILDING - EMERGENCY GENERATOR REPLACEMENT**

Buildings are required by the Massachusetts Building Code to provide for emergency egress in case of a power failure. This is done by either emergency lights on batteries or through the use of a generator. The funding in FY14 supported the replacement of generators and/or installation of emergency lights or circuits at the Pierce School.

Estimated Cost: \$125,000

Time Schedule: Prior Year -- \$125,000 Property Tax / Free Cash

**68. TOWN/SCHOOL BUILDING - ENERGY CONSERVATION**

With continued volatility in utility costs, it is imperative that monies be invested to decrease energy consumption in Town and School buildings. Programs include, but are not limited to, lighting retrofit and controls, energy efficient motors, insulation, and heating and cooling equipment. In addition, water conservation efforts will be explored. This program augments existing gas and electric utility conservation programs. A new area of focus is building commissioning. Many years ago, a building's HVAC system was set up by multiple contractors and then signed off by the design engineer. Sometimes there would be control issues, leading to complaints or high energy usage. The Building Department, for all new projects, hires a Commissioning Agent. Recommissioning of certain buildings is suggested in order to confirm that the equipment was designed, installed and set up properly.

Estimated Cost: \$1,375,000

Time Schedule: Prior Year -- \$150,000 Property Tax / Free Cash

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FY 2015 -- \$160,000 Property Tax / Free Cash  
 FY 2016 -- \$165,000 Property Tax / Free Cash  
 FY 2017 -- \$170,000 Property Tax / Free Cash  
 FY 2018 -- \$175,000 Property Tax / Free Cash  
 FY 2019 -- \$180,000 Property Tax / Free Cash  
 FY 2020 -- \$185,000 Property Tax / Free Cash  
 Future Years -- \$190,000 Property Tax / Free Cash

**69. TOWN/SCHOOL BUILDING - ENERGY MANAGEMENT SYSTEM**

This project is to upgrade the energy management systems in Town and School buildings. A few of the larger buildings have older (30 years) energy management systems that have exceeded their life expectancy and replacement parts are no longer available. These systems would be replaced and upgraded with new web-based systems integrated into the Town's existing computer network. Other systems would be upgraded with newer software or firmware. The Building Department will continue to work with the Information Technology Department on these projects. Software upgrades are needed at the High School, Lawrence, Pierce and Baker Schools in the next few years.

Estimated Cost: \$1,000,000

Time Schedule: Prior Year -- \$150,000 Property Tax / Free Cash  
 FY 2016 -- \$200,000 Property Tax / Free Cash  
 FY 2017 -- \$150,000 Property Tax / Free Cash  
 FY 2019 -- \$250,000 Property Tax / Free Cash  
 Future Years -- \$250,000 Property Tax / Free Cash

**70. TOWN/SCHOOL BUILDING - ENVELOPE /FENESTRATION REPAIRS**

In FY12, \$250,000 was appropriated for costs associated with repairs to the outside envelope of all Town and School buildings, including a visual inspection of the exterior of all buildings that will help prioritize these repairs. The outside envelope of facilities includes masonry, bricks and mortar, flashing, dental work, coping stones, metal shelves, and tower work. Some of these structures are over 100 years old and have never had exterior work done to them.

As part of the Town's program to convert to heating systems that burn both oil and natural gas, new liners are required to be installed in those buildings with the dual-fuel burners. The liner is required under the plumbing and gas code. Chimneys will be inspected and repaired if appropriate; if not, a new metal liner will be installed to connect to the gas burning equipment in the building.

A number of buildings have windows, door entrances, and other wall openings (fenestration) that are in need of repair/replacement. This causes water to penetrate into buildings behind walls and ceilings, causing security and safety problems. The plan is to develop a long-range strategy to repair/replace these openings, prioritizing them as required.



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The \$730,000 in FY15 is for work at the Old Lincoln School, Soule Rec Gym, and the Eliot Rec Center.

Estimated Cost: \$5,180,000

Time Schedule:  
 FY 2015 -- \$730,000 Property Tax / Free Cash  
 FY 2016 -- \$1,300,000 General Fund Bond  
 FY 2018 -- \$650,000 Property Tax / Free Cash  
 FY 2019 -- \$750,000 Property Tax / Free Cash  
 FY 2020 -- \$750,000 Property Tax / Free Cash  
 Future Years -- \$1,000,000 Property Tax / Free Cash

**71. TOWN/SCHOOL BUILDING - ROOF REPAIR/REPLACEMENT PROGRAM**

A master plan for repair and replacement of roofs on all Town and School buildings was prepared by a consultant. The plan includes a priority list and schedule and calls for \$29.3 million over a 20-year period, with \$7.5 million required within the six-year period of this FY15 – FY20 CIP. Facilities addressed within this time frame include the following:

<b>FY15</b>	<b>FY16</b>	<b>FY19</b>	<b>FY20</b>
Baker School	C.C. Library	Golf Course Clubhouse	Fire Sta. #1
Larz Anderson Carriage House	Fire Sta. #7	Heath School	Muni. Svc. Ctr.
Soule Gym	Harry Downes Fieldhouse	Lawrence School	Phys Ed Bldg
	Larz Anderson Carp. Shop	Lincoln School	
	Larz Anderson Electrical Shop	Pierce Primary	
	Larz Anderson Skate Pavilion		
	Public Safety HQ		

Estimated Cost: \$8,875,000

Time Schedule:  
 Prior Year -- \$1,350,000 General Fund Bond  
 FY 2015 -- \$375,000 Property Tax / Free Cash  
 FY 2016 -- \$1,150,000 General Fund Bond  
 FY 2019 -- \$3,500,000 General Fund Bond  
 FY 2020 -- \$2,500,000 General Fund Bond

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**72. TOWN/SCHOOL BUILDING - SECURITY/LIFE SAFETY SYSTEMS**

Over the last number of years, there have been several large capital projects that improved the security situation of Town and School buildings. This program will extend the effort and improve areas where security may be lacking. In general, the plan calls for making all doors around the perimeter of a building more secure by replacing the doors, frames, door handles, and locks with electronic locks that may only be opened with a keypad and/or on a specific schedule. Only the front main entrance of the building would allow for general access. At the front door, a speaker and doorbell will be added to connect to the building's existing intercom or phone system for use by visitors. The lighting around each building will be improved and placed on a timer. A small camera system connected to a computer will be added at the main entrance to monitor access to the building.

School buildings will be a priority. Most schools are reasonably secure, but based on an assessment by the Police Department, security can and should be improved. These funds would also be used to continue the on-going process of replacement and installation of new and upgraded burglar alarms, fire alarm systems, sprinkler systems, emergency lighting, and egress signs.

Estimated Cost: \$1,250,000

Time Schedule:	Prior Year -- \$345,000	Property Tax / Free Cash
	FY 2015 -- \$300,000	Property Tax / Free Cash
	FY 2016 -- \$100,000	Property Tax / Free Cash
	FY 2017 -- \$125,000	Property Tax / Free Cash
	FY 2018 -- \$130,000	Property Tax / Free Cash
	FY 2019 -- \$140,000	Property Tax / Free Cash
	FY 2020 -- \$110,000	Property Tax / Free Cash

**73. HIGH SCHOOL ADDITION**

The Enrollment growth that Brookline's Elementary Schools have experienced during the past eight years will begin to affect Brookline High School (BHS) in FY15 (September, 2014). At that point, BHS enrollment is expected to grow by approximately 100 students per year from 1,800 students to 2,500 students by 2022 – a growth of more than 700 students in eight years. This enrollment level presents a capacity challenge because the High School was renovated to accommodate 2,100 – 2,200 students and enrollment will reach approximately 2,200 by 2018 and approximately 2,500 by FY22. In FY13, \$50,000 was approved for a concept study to review all possible options for addressing the capacity needs of BHS. Those monies were spent to hire an architect to assist the B-Space Committee with the BHS issue.

In consideration of the recommendations for school expansion contained in the B-Space report to address continued enrollment growth, to align with the Public Schools of Brookline Strategic Plan and Vision, and to preserve Brookline's commitment to excellence and equity, the Brookline School Committee voted a set of actions that included engaging in further study regarding the B-Space recommendation to maximize the use, whether by efficiency and/or expansion, of Brookline High School. The process, to be completed during the 2013-2014



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school year, will be led by the Superintendent and Headmaster and will benefit from a consultant to help guide the research and constituent engagement. This process will analyze the pedagogical and administrative implications of optimally serving up to 2,500 high school students in Brookline. This may include new or revamped programs, staffing and administrative structures, and facilities use. The plan and educational program for an expansion of high school capacity should follow a process of engagement and deliberation of options with current BHS faculty and students, the Brookline community, the School Committee, Public School of Brookline leadership, as well as input from the research on current best practices in curriculum, instruction, and pedagogy for secondary schools. This process will take into account, but not be limited to, the options presented in the HMFH High School Concept Study.

\$1.75 million is included in FY17 for the Feasibility / Schematic Design phase of the project, followed by \$75 million in FY19, of which 65% (\$48.75 million) is paid for by the Town and 35% (\$26.25 million) by the Massachusetts School Building Authority (MSBA).

Estimated Cost: \$76,750,000

Time Schedule: FY 2017 -- \$1,750,000 Property Tax / Free Cash (Feasibility / Schematic Design)  
 FY 2019 -- \$48,750,000 General Fund Bond (Design Completion / Construction)  
 FY 2019 -- \$26,250,000 State Grant (MSBA) (Design Completion / Construction)

**74. BALDWIN SCHOOL RENOVATIONS**

The Baldwin School, which was built in the 1930's as a library, needs to be renovated. The heating system is over 70 years old and many pipes are failing due to age. The monies for this project would replace the piping and HVAC system and convert the system to forced hot water, thereby allowing for better control, more even temperatures, zoning, and energy savings. The electrical system is also in need of upgrade. In addition, the building is not fully accessible. This project would install an elevator that would connect the top and bottom floors and work would be done on the front entrance to make it accessible. The building also has its original windows, which are wooden, single pane, and leak air. This project would replace those windows with energy efficient, thermal pane style windows. The slate roof also needs repairs along with the gutters.

As part of the school enrollment / space issue, the Baldwin School will be looked at in terms of better utilization of the facility. The building could end up housing some segment of the student population. As a result, funding for any renovations has been pushed back.

Estimated Cost: \$2,250,000

Time Schedule: Future Years -- \$2,250,000 General Fund Bond

**75. DRISCOLL SCHOOL ADDITION**

In consideration of the recommendations for school expansion contained in the B-Space report to address continued enrollment growth, to align with the Public Schools of Brookline Strategic Plan and Vision, and to preserve Brookline's commitment to excellence and equity, the

Brookline School Committee voted a set of actions that included a Driscoll School renovation and expansion to accommodate four sections per grade, with class sizes conforming to School Committee policy. The target occupancy is September, 2018. This action will achieve the first full renovation of the Driscoll School since it was built in 1911. The project will also address the building's common space shortages. Close attention will have to be paid to the operational implications of adding roughly 25-30% new capacity to the building on an aggressive timeline that will need to be followed to achieve this occupancy date, including pursuing potential partnership with Massachusetts School Building Authority (MSBA).

\$1 million is included in FY15 for the Feasibility / Schematic Design phase of the project, followed by \$42 million in FY17, of which 65% (\$27.3 million) is paid for by the Town and 35% (\$14.7 million) by the MSBA. The School Department plans on submitting a Statement of Interest (SOI) to the MSBA in the Spring of 2014. After that milestone, there will be a clearer picture of the possibility of MSBA participation.

Estimated Cost: \$43,000,000

Time Schedule: FY 2015 -- \$1,000,000 Overlay Reserve Surplus  
 FY 2017 -- \$27,300,000 General Fund Bond  
 FY 2017 -- \$14,700,000 State Grant (MSBA)

**76. DEVOTION SCHOOL REHABILITATION**

The 148,633 sq. ft. Edward Devotion School, originally built in 1924 with renovations/additions in 1952 and 1974, requires a major renovation/addition. An architectural firm (HMFH) was hired to undertake a Concept Study and developed a range of options for a renovation/addition project. The enrollment of the Devotion School has grown from 664 students in FY08 to 840 students in FY14, a 28% increase in six years. While this growth is reflective of enrollment growth town-wide, the expectation is that enrollment demand in North Brookline will continue for the foreseeable future. The original premise of a renovation to the Devotion School to serve 700 students was initially revised to a model that would serve a population of approximately 850 students, in a mixed configuration of four and five sections per grade. Continued growth to the school age population in North Brookline has led to the decision to build the school to a full five section school at each grade.

In March, 2012 the Town was approved by the Massachusetts School Building Authority (MSBA) to enter the "Eligibility Period", which culminated with an appropriation of \$1.75 million for the feasibility study / schematic design stage at the November, 2012 Special Town Meeting. On January 30, 2013, the MSBA approved a Feasibility Study Agreement (FSA) with the Town, which allows for the hiring of an Owner's Project Manager (OPM) and an architectural firm. The FSA states that the Town will be reimbursed 35.84% of the \$1.75 million for this phase of the project (feasibility study / schematic design). In April, 2013 the Town issued a Request For Services (RFS) and selected HMFH as the Feasibility/Schematics design architect. Due to the B-Space Committee review process, MSBA held off on approving a scope of services contract between the Town and HMFH. Since one of the B-Space recommendations was to increase the design capacity of the Devotion School to 1,010 students from the previously approved capacity of 830 students, the MSBA requested that Brookline return to the November, 2013 MSBA Board for re-approval of the project, after which Brookline could proceed to finalize a contract with HMFH.



Town of Brookline, MA

Capital Improvements Program, 2015-2020

The architects will work with the Devotion School Building Committee and with the community to craft a design that meets the educational program needs of the school, addresses neighborhood concerns, and contributes to the overall plan to address the increase in enrollment that has placed stress on school buildings across the district. That schematic design would then go to the MSBA for approval.

At that point, the Town would seek an appropriation for the completion of the design work and for all costs associated with the construction project. The current estimate is \$110 million, with an assumed 30% reimbursement rate from the MSBA, resulting in a Town share of \$77 million. This CIP assumes a Debt Exclusion Override to fund the Devotion School project. Such action is required because of both the increased cost estimate for this project and the new projects recommended by the B-Space Committee, which were endorsed by the School Committee: additions to the Driscoll School and High School. In order to free-up debt capacity and use that capacity to fund those two projects, a Debt Exclusion Override is required. The Override Study Committee (OSC) is reviewing the recommendations of the B-Space Committee, so the need for a Debt Exclusion Override will continue to be studied.

Estimated Cost: \$110,000,000

Time Schedule: FY 2015 -- \$77,000,000 General Fund Bond – Debt Exclusion  
 FY 2015 -- \$33,000,000 State Grant (MSBA)

**77. OLD LINCOLN IMPROVEMENTS/MODIFICATIONS**

In FY14, \$3 million was appropriated to update some of the building equipment and make the Old Lincoln School usable as school space for the next few years.

Estimated Cost: \$3,000,000

Time Schedule: Prior Year -- \$3,000,000 General Fund Bond

**78. PIERCE SCHOOL – ELECTRIC DISTRIBUTION UPGRADE**

The Pierce School has an outdated electrical system and \$375,000 was appropriated in FY14 for a new system.

Estimated Cost: \$375,000 Property Tax / Free Cash

Time Schedule: Prior Year -- \$375,000

**79. CLASSROOM CAPACITY**

The Public Schools of Brookline have been experiencing K-8 Elementary enrollment increases for the last nine years. K-8 Elementary enrollment has grown by 1,342 students (35%) in the nine years between FY05 and FY14. There are now 5,228 K-8 students compared with less than 3,900 in FY05. Representatives from involved boards/committees (Selectmen, School Committee, Building Commission,

Advisory Committee, Planning Board) and Town/School staff have been engaged in discussions regarding the best options for addressing the space needs of the elementary schools. In January, 2013, the Brookline School Population and Capacity Exploration (B-Space) Committee, a joint committee of the Selectmen and the School Committee that includes various citizen representatives, was convened and charged with “gathering and analyzing data, and guiding a community discussion on programming and space planning that will accommodate rapid and unabated enrollment growth and support the educational goals of the Public Schools of Brookline”.

In order to address this serious issue, various mitigation measures have been taken, the most significant being the Runkle School Renovation/Addition and the Heath School Addition. Other mitigation measures have primarily consisted of the careful remodeling and renovation to internal spaces within each of the schools, with the goal being the creation of the highest quality space within available constraints. Over the past few years, the following appropriations have been made to fund the costs associated with creating the additional classroom spaces for the Schools:

\$400,000 (FY08 + FY10)      \$530,000 (FY11)      \$1.75 million (FY13 + FY14)

The amount requested for FY15 (\$1.75 million) will go toward the final three lease/purchase payments of the Lawrence School classroom modular classroom addition (the first two payments are being paid for out of existing Classroom Capacity funds) and costs associated with any further space conversions into classrooms within existing school buildings, a process that is more complex and challenging each year as available space is reduced. If the Lawrence modular project does not move forward, then these funds would go toward alternative plans for new classroom space at Lawrence. The \$500,000 in FY16 is for work required at the High School to start preparing that facility for the influx of students.

Estimated Cost:      \$4,000,000

Time Schedule:      Prior Year -- \$1,750,000 Property Tax / Free Cash  
FY 2015 -- \$1,750,000 Property Tax / Free Cash  
FY 2016 -- \$500,000 Property Tax / Free Cash

### Proposed Systems Narratives for Options

Civil Engineering	109
Landscape	119
Structural	125
Fire Protection	137
Plumbing	149
Mechanical	165
Electrical	191





**EVALUATION OF ALTERNATIVES - CIVIL**  
**Edward Devotion School, Brookline, Massachusetts**  
**Nitsch Project #9915 – March 13, 2014**

Nitsch Engineering has reviewed the proposed addition and renovation Options 0, 1.1, 1.4, 2, and 3.2 as they relate to site utilities and site permitting considerations. Nitsch Engineering’s evaluation of the proposed options is outlined below.

**SITE SUMMARY TABLE**      ○ Minimal      ○ Moderate      ● Major

	OPTION 0	OPTION 1.1	OPTION 1.4	OPTION 2	OPTION 3.2
<b>SITE UTILITY CONSIDERATIONS</b>					
Stormwater	○	○	○	○	●
Water	○	○	○	○	○
Sanitary Sewer	○	○	○	○	●
Private Utilities (gas, electric, communications)	○	○	○	○	●

## **SITE OPTION 0 – MAINTAIN EXISTING BUILDING**

Option 0 includes maintaining the existing building, underground parking garage, vehicular areas, and play areas. Renovations may be made to the existing building. Existing basketball and tennis courts and the Devotion Playground will be maintained.

Option 0 will have minimal impacts to site stormwater, water service, site sanitary sewer, and private utilities.

### **Stormwater**

The renovation of the existing building will not require construction of a new stormwater management system. New deep sump catch basins and stormwater quality structures are recommended for vehicular pavement areas that may be renovated. Video inspection is recommended for reuse of an existing drain line extending to the site from Harvard Street. Drain services from Devotion Street will be maintained.

The building renovations are not expected to affect existing site conditions; therefore existing impervious and pervious cover may remain the same. Stormwater infiltration systems will not be required under the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Standards.

### **Water**

Water service is available from Stedman and Harvard Street. Existing water lines service the building along Stedman Street and will be maintained. Fire hydrants are located along Stedman and Harvard Street, and may also be maintained.

### **Sanitary Sewer**

The existing sewer service connects to a sanitary sewer main in Stedman Street. The sewer service connection in Stedman Street may be maintained. Video inspection is recommended to determine if existing sewer services are adequate for reuse. Sewer services from Devotion Street to the Devotion House will be maintained.

### **Private Utilities**

The existing site gas, electric, and communication services extend from Stedman Street, and may be maintained. Existing gas service from Harvard Street to the Edward Devotion House may be maintained. See the Mechanical and Electrical evaluations for information regarding capacity and function of private utilities.

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### **SITE OPTION 1.1 – MAINTAIN 1913 BUILDING PLUS ADDITIONS**

Option 1.1 includes maintaining the 1913 building, and maintaining or reconstructing the existing underground parking garage, along with the construction of new additions centrally located within the site. This option includes the construction of new play areas, and a new access driveway to the existing Edward Devotion house which will remain. Existing basketball and tennis courts will be maintained. The existing Devotion Playground at the central portion of the site will be replaced with a portion of the proposed building additions, along with walkways and play areas.

Option 1.1 will have moderate impacts to site stormwater, site water service, site sanitary sewer, and private utilities.

#### **Stormwater**

The new site configuration will require construction of a new stormwater management system. New deep sump catch basins, bioretention basins/swales, and stormwater quality structures will be needed for vehicular pavement areas. Video inspection is recommended for reuse of an existing drain line extending to the site from Harvard Street. Drain services from Devotion Street will be maintained.

The proposed site configuration appears to result in an increase in impervious area. The project will require stormwater detention or infiltration systems to mitigate the increased peak rate of runoff resulting from the increase in impervious area to meet MassDEP Stormwater Standards.

#### **Water**

Water service is available from Stedman and Harvard Street. Existing water lines service the building along Stedman Street and will be maintained. Fire hydrants are located along Stedman and Harvard Street, and may be maintained.

#### **Sanitary Sewer**

The existing sewer service connects to a sanitary sewer main in Stedman Street. The sewer service connection in Stedman Street is proposed to be replaced. Video inspection is recommended to determine if existing sewer services are adequate for reuse. Sewer services from Devotion Street to the Devotion House will be maintained.

#### **Private Utilities**

The proposed option may require alterations to the site gas, electric, and communications services. The existing private utility services extend from Stedman Street, and may be relocated. Existing gas service from Harvard Street to the Edward Devotion House may be maintained. See the Mechanical and Electrical evaluations for information regarding capacity and function of private utilities.

## **SITE OPTION 1.4 – MAINTAIN 1913 BUILDING PLUS ADDITIONS**

### **General**

Option 1.4 includes maintaining the 1913 building and maintaining or reconstructing the existing underground parking garage, along with the construction of new additions in the central and southern portions of the site. This option includes the construction of new play areas, and a new access driveway to the existing Edward Devotion house which will remain. Two of the three existing basketball courts and all existing tennis courts will remain. The existing Devotion Playground at the central portion of the site will be used for a portion of the proposed building additions, along with walkways and play areas.

Option 1.4 will have moderate impacts to site stormwater, site water service, site sanitary sewer, and private utilities.

### **Stormwater**

The new site configuration will require construction of a new stormwater management system. New deep sump catch basins, bioretention basins/swales, and stormwater quality structures will be needed for vehicular pavement areas. Video inspection is recommended for reuse of an existing drain line extending to the site from Harvard Street. Drain services from Devotion Street will be maintained.

The proposed site configuration appears to result in an increase in impervious area. The project will require stormwater detention or infiltration systems to mitigate the increased peak rate of runoff resulting from the increase in impervious area to meet MassDEP Stormwater Standards.

### **Water**

Water service is available from Stedman and Harvard Street. Existing water lines service the building along Stedman Street and will be maintained. Fire hydrants are located along Stedman and Harvard Street, and may be maintained.

### **Sanitary Sewer**

The existing sewer service connects to a sanitary sewer main in Stedman Street. The sewer service connection in Stedman Street is proposed to be replaced. Video inspection is recommended to determine if existing sewer services are adequate for reuse. Sewer services from Devotion Street to the Devotion House will be maintained.

### **Private Utilities**

The proposed option may require alterations to the site gas, electric, and communications services. The existing private utility services extend from Stedman Street, and may be relocated. Existing gas service from Harvard Street to the Edward Devotion House may be maintained. See the Mechanical and Electrical evaluations for information regarding capacity and function of private utilities.

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## **SITE OPTION 2 – MAINTAIN 1913 BUILDING PLUS ADDITIONS AND MORE FLOORS**

### **General**

Option 2 includes maintaining the 1913 building and maintaining or reconstructing the existing underground parking garage, along with the construction of new additions reaching six-stories in height and centrally located within the site. This option includes the construction of new play areas, and a new access driveway to the existing Edward Devotion house which will remain. Two of the three existing basketball courts and all existing tennis courts will remain. The existing Devotion Playground at the central portion of the site will be used for a portion of the proposed building additions, along with walkways and play areas.

Option 2 will have minor impacts to site stormwater, and moderate impacts to site water service, site sanitary sewer, and private utilities.

### **Stormwater**

The new site configuration will require construction of a new stormwater management system. New deep sump catch basins and stormwater quality structures will be needed for vehicular pavement areas. Video inspection is recommended for reuse of an existing drain line extending to the site from Harvard Street. Drain services from Devotion Street will be maintained.

The proposed site configuration appears to result in a decrease in impervious area. Stormwater infiltration systems will not be required under the MassDEP Stormwater Standards.

### **Water**

Water service is available from Stedman and Harvard Street. Existing water lines service the building along Stedman Street and will be maintained. Fire hydrants are located along Stedman and Harvard Street, and may be maintained.

### **Sanitary Sewer**

The existing sewer service connects to a sanitary sewer main in Stedman Street. The sewer service connection in Stedman Street is proposed to be replaced. Video inspection is recommended to determine if existing sewer services are adequate for reuse. Sewer services from Devotion Street to the Devotion House will be maintained.

### **Private Utilities**

The proposed option may require alterations to the site gas, electric, and communications services. The existing private utility services extend from Stedman Street, and may be relocated. Existing gas service from Harvard Street to the Edward Devotion House may be maintained. See the Mechanical and Electrical evaluations for information regarding capacity and function of private utilities.

### **SITE OPTION 3.2 – NEW CONSTRUCTION**

Option 3.2 includes the construction of a new four-story building and underground parking garage centrally located within the site. The existing building and parking garage will be removed. This option includes the construction of new play areas, and a walkway to the existing Edward Devotion house which will remain. Existing tennis courts will remain, and existing basketball courts will be removed. The existing Devotion Playground at the central portion of the site will be replaced with buildings, walkways, and a below grade parking garage. A surface parking area will be constructed at the southeast corner of the site.

Option 3.2 will have major impacts to site stormwater, site sanitary sewer, and private utilities, and moderate impacts to site water service.

#### **Stormwater**

The new site configuration will require construction of a new stormwater management system. New deep sump catch basins, bioretention basins/swales, and stormwater quality structures will be needed for vehicular pavement areas. Video inspection is recommended for reuse of an existing drain line extending to the site from Harvard Street. Due to the location of the proposed building, drain services within Devotion Street will need to be relocated.

The proposed site configuration appears to result in an increase in impervious area. The project will require stormwater detention or infiltration systems to mitigate the increased peak rate of runoff resulting from the increase in impervious area to meet MassDEP Stormwater Standards.

#### **Water**

Water service is available from Stedman and Harvard Street. Existing water services the building along Stedman Street. Water service connections will be relocated to serve the new building location. Fire hydrants are located along Stedman and Harvard Street, and may be maintained.

#### **Sanitary Sewer**

The proposed option will require relocation of the site sanitary sewer service to serve the new building location. Sewer services from Devotion Street to the Devotion House will be maintained.

#### **Private Utilities**

The proposed option will require alterations to the site gas, electric, and communications services. The private utility services extend from Stedman Street. Connections for utilities in Stedman Street will need to be relocated to serve the new building location. Existing gas service from Harvard Street to the Edward Devotion House may be maintained. Overhead power lines above the Devotion Playground will likely need to be relocated. See the Mechanical and Electrical evaluations for information regarding capacity and function of private utilities.



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### **SITE PERMITTING REQUIREMENTS**

The project will require permitting under the United States Environmental Protection Agency's (EPA) National Pollution Discharge Elimination System (NPDES) Program. In Massachusetts, the USEPA issues NPDES permits to operators of regulated construction sites. Regulated projects are required to develop and implement stormwater pollution prevention plans in order to obtain permit coverage. The NPDES permit is obtained approximately one week prior to the start of site construction.

The increase of students on the site will increase the flow to the existing sanitary sewers. The proposed flow from the site will be greater than 15,000 gallons per day, and will therefore be required to file a one-time certification statement with MassDEP within 60 days after the connection starts to be used.

The project will likely be required to review by the Planning Board through the Site Plan Review Process. Site Plan Review typically begins at the end of the Design Development phase of the project, and extends 2-4 months depending on the site and community constraints.



Devotion School  
3.1.6 Preliminary Evaluation of Alternatives  
Submitted by CRJA  
March 12, 2014

### **Purpose of Report**

The purpose of this report is to provide a preliminary evaluation of the site organization and programming provided in the four alternatives, Options 1.1, 1.4, 2 and 3.2, which will be submitted to the MSBA for review. Evaluation of site organization and programming is based primarily on comparison to existing outdoor spaces and in consideration of topographic constraints, environmental factors, such as solar orientation, and in anticipation of compliance with ADA and MAAB requirements. Additionally, this evaluation considers impacts on the historic character of the Devotion House, on urban design and whether pedestrian and vehicular circulation needs are addressed. CRJA's understanding of the current site functions, needs and opportunities for improvement is based on information obtained in meetings with the Devotion School principal and staff, on 2/4/14, and with the Director of the Town of Brookline's Parks and Open Space Division, on 3/10/14. At present, specific program requirements have not been confirmed for athletic facilities. Accordingly, the site layout for each alternative reflects the design team's effort to fit as many existing fields and play courts as possible, while addressing the abovementioned functional and aesthetic needs.

### **Existing Conditions**

The Devotion School occupies a large corner parcel at the intersection of Harvard Street and Stedman Street in Brookline. Harvard Street is a busy, two way commercial thoroughfare, whereas Stedman Street is a narrow, one way (south bound) residential street. The site slopes from its southwestern boundary on Harvard Street and from its southeastern perimeter, toward the northern extent of the property. The overall grade change from south to north is approximately 19 feet.

The existing school is comprised of a combination of buildings constructed in 1913, 1954 and 1974. This building complex is set back significantly from Harvard Street, behind the historic Edward Devotion House. The 1913 building is centered on the Harvard Street frontage, directly behind the historic Devotion House. The 1913 structure is flanked by the 1954 and 1974 additions, on its east and west sides, respectively. The most significant building massing is behind the 1913 structure, and along Stedman Street.

Despite the significant massing of the building complex, the overall character of the school property is that of a green community park. The historic Devotion House and its landscape with two tall canopy trees anchor the heart of the Harvard Street frontage. The remaining site is divided roughly into four programmatic zones:

- **Neighborhood Common** (along Harvard Street, includes a shaded seating area with benches and game tables; an expansive lawn in front of the Devotion House, serves as a kind of urban "beach" as well as location for occasional art exhibition and farmer's market type events.)
- **Playground Spaces** (extending along the eastern perimeter of the site from Harvard Street to the rear of the building, are programmed separately with play equipment for older and younger children. The school encounters some overlap (and perhaps some tension) with outside daycare organizations and members of the public, with pre-school aged children, who wish to use the play spaces fronting Harvard Street during normal school hours. Play equipment is outdated and ground plane surfacing does not meet code for accessibility.)

Devotion School

### 3.1.6 Preliminary Evaluation of Alternatives

Submitted by CRJA

March 12, 2014

- **Playing Fields** (between the rear of the building and the former Devotion Street easement, there is a combined little league sized baseball field and youth soccer field. The field is overly compacted, drains poorly and cannot support turf in large areas.)
- **Community Basketball and Tennis Courts** (property, between the former easement and the northern boundary, includes three full basketball courts and three tennis courts. Pavement and surrounding chain link fences are in disrepair and in need of replacement; transition spaces do not meet code for accessibility. The Director of Parks and Open Space indicates that the fence belongs to the City.)

Access to the school is predominately by foot. While this foot traffic comes from all directions, interviews with the school administration indicate that a significant population originates from the north, walking along Stedman. During site visits, CRJA observed smaller groups of pedestrians accessing the site via walkway connections from Babcock Street to Devotion Street and its pathway extension along the former easement to Stedman and from the walk on the north side of the tennis courts. Some members of the public have expressed their desire in writing (or in meetings) for the proposed building solutions to retain this east/west access across the site. Interviews with school administrators indicate that the Devotion Street path extension presents a security challenge, due to the intrusion of the public during school hours, while the elevated pathway ridge forms a barrier to engaging students to use the basketball courts during play time.

Upon arrival at the school, students and their parents/caregivers may enter the school from multiple entrances. The primary entrance is the front door to the 1913 building, facing Harvard Street. This entrance, which includes a flight of stairs, is not universally accessible.

Vehicular drop off and pick up is separated by car and by bus. Drop off/pick up by car is provided on Stedman Street. Bus service picks up and drops off students on the horseshoe driveway behind the Devotion House. Access to the underground parking garage and to the at-grade, service area/loading dock are both on Stedman Street. The secondary garage entrance is closed due to poor sight lines between parked cars; the loading dock is not properly oriented for south bound, one way traffic. Refer to the Traffic Engineers' evaluation for an assessment of the vehicular access and circulation issues.

#### **Preliminary Evaluation of Alternatives**

As noted above, the site plans for each of the proposed alternatives strive to include as many of the existing outdoor programmed spaces as possible while addressing other functional and aesthetic considerations. These considerations are itemized on an overall matrix Review of Options. The following narrative expands on that evaluation of options, looking at four guiding principles for the site:

- Historic Character
- Urban Design
- Vehicular and Pedestrian Circulation
- Site Programming and Organization

#### **Option 1.1**

This option retains the 1913 building while replacing the 1954 and 1974 wings with a three story addition to the north.



Devotion School

3.1.6 Preliminary Evaluation of Alternatives

Submitted by CRJA

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- **Historic Character:** The Devotion House location remains unchanged and the large canopy trees behind it will not be impacted by site development. However, this historic zone will be impacted by the addition of a U9 sized youth soccer field on the southeast side of Devotion House. Fencing, with extended vertical ball netting, will need to be considered for the protection of the students as well as the historic property.
- **Urban Design:** Building massing on Harvard and Stedman Streets will be less intrusive than current conditions. The generous space for a community green and seating area will be retained.
- **Vehicular and Pedestrian Circulation:** Drop-off and pick-up by car will be provided along Stedman Street. The site diagram currently shows a pull off zone for approximately 14 cars. Traffic analysis indicates that this space will need to be expanded to the northeast, on Stedman, to accommodate a total of 28 cars. Students transported by bus will be dropped-off and picked-up at the curbside on Harvard Street. This program will require a change in the City parking ordinance. Access to the garage will remain on Stedman Street. This curb cut may also serve the loading and service area.

Pedestrian access will continue to be provided from multiple directions. However, access from Devotion Street will require a ramped condition and re-alignment of the walk to Stedman. This option affords fairly generous upper and lower level entry plazas, from Harvard and Stedman Streets, respectively, which should support the necessary number of parents and caregivers who wait for students outside the building.

- **Site Programming and Organization:** This option provides an opportunity for good distribution of age related play spaces but the overall square footage for play space is slightly less than existing conditions. Presently, the school grounds include approximately 41,000 SF in play space. On the plus side, Option 1.1 offers significantly more space for outdoor learning spaces and community/teaching gardens than is currently provided. In terms of playing fields, this option provides less than the current site. A U9 sized soccer field can be accommodated, but the site cannot fit a little league baseball field. In general, with the exception of the soccer field, all of these outdoor spaces will enjoy good solar orientation. The play space along Stedman, on the north side of the building will be partially shaded. If space were not so constrained, the soccer field should be rotated to a true north/south orientation.

The Option 1.1 site diagram does not impact the existing number of basketball or tennis courts. However, due to site constraints, the Devotion path extension will need to be regraded, in order to accommodate a level play area on the north side of the proposed building addition. This re-grading will necessitate removal of the allee of large canopy trees.

#### Option 1.4

This option retains the 1913 building while providing a three story addition that wraps the rear and southeast side of the 1913 building.

## Devotion School

### 3.1.6 Preliminary Evaluation of Alternatives

Submitted by CRJA

March 12, 2014

- **Historic Character:** The Devotion House location remains unchanged and the large canopy trees behind it will not be impacted by site development. Additionally, this is the only option which does not place sports fields on the Harvard Street side of the site.
- **Urban Design:** Building massing on Harvard and Stedman Streets will be less intrusive than current conditions, especially on along Stedman Street since the proposed option shifts the new addition to the south/southeasterly direction, massing more adjacent to Zaftig's building and the denser urban character on Harvard Street. The generous space for a continuous green frontage along Harvard Street has been provided.
- **Vehicular and Pedestrian Circulation:** Drop-off and pick-up by car and bus will be handled similar to the solution for Option 1.1. The same adjustment to the car pull off lane will be required. Access to the garage and service also matches Option 1.1.

Pedestrian access matches Option 1.1, with the exception that the Devotion Street path extension will need to be re-located even farther toward the north, in order to accommodate space for the soccer field. As with Option 1.1, the gathering spaces at primary entrances on Harvard and Stedman Streets are generous and should accommodate the required number of waiting parents and caregivers.

- **Site Programming and Organization:** As with Option 1.1, this option provides an opportunity for good distribution of age related play spaces and overall, accommodates more square footage for play space than existing conditions. Option 1.4 also offers an enhanced community/teaching garden space between the historic Devotion House and the 1913 building. In general, most of these outdoor spaces will receive good solar orientation. Two play spaces on the north side of the building will be partially shaded.

The Option 1.4 site diagram eliminates one of the existing basketball courts, but the tennis courts remain unchanged. Again, due to site constraints, the Devotion path extension will need to be re-located, in order to accommodate the soccer field. This re-grading/re-location of the path will necessitate removal of the allee of large canopy trees.

## Option2

This option retains the 1913 building while providing a four story addition to the north.

- **Historic Character:** The Devotion House location remains unchanged and the large canopy trees behind it will not be impacted by site development. However, this option includes a U9 sized soccer field on the south side of the Devotion House. This option includes two soccer fields. If the field located on the north side of the building is sufficient, then the field adjacent to Devotion House could be converted to a less active purpose that might provide a more suitable adjacency to the Devotion House.
- **Urban Design:** Building massing is concentrated into a tower behind the 1913 building. This reduces building massing both on Harvard and Stedman, compared to existing conditions. The central community green is provided in this option, but flanking space is allocated for school play space or as already mentioned, athletic field purposes.

Devotion School

3.1.6 Preliminary Evaluation of Alternatives

Submitted by CRJA

March 12, 2014

- **Vehicular and Pedestrian Circulation:** Drop-off and pick-up by car and bus will be handled similar to the solutions for other options. The same adjustment to the car pull off lane will be required, as indicated for Option 1.1. Access to the garage and service also match Option 1.1.

Pedestrian access also matches Option 1.1 and 1.4, with the exception that the Devotion Street extension path will need to be re-located even farther toward the north, in order to accommodate space for the playing fields. The gathering spaces at primary entrances on Harvard and Stedman Streets are significantly less generous than shown in Options 1.1 and 1.4. This condition could be adjusted for the Harvard Street entrance by reducing some space allocated to the play area along Stedman. However, the lower level entry plaza on Stedman is somewhat constrained by the baseball outfield, but there appears to be some room for expansion.

- **Site Programming and Organization:** Despite the more concentrated building solution provided in Option 2, the overall play space allocation is about 25% less than existing conditions. This deviation is driven in large part by the inclusion of a second soccer field on the Harvard Street side of the school. If this second field is not required, then play space would exceed existing conditions. Other than the square footage allocation issue, this option provides an opportunity for segregation of play spaces by age, but school staff may prefer to have these spaces in closer proximity to one another. As with Options 1.1 and 1.4, this option offers an enhanced community/teaching garden space between the historic Devotion House and the 1913 building. As for solar orientation, the height of this building solution will shade the play spaces and fields on the north side of the building. The extent of this shading will need to be further evaluated.

This Option 2 site diagram eliminates one of the existing basketball courts, but the tennis courts remain unchanged. As with Option 1.4, the Devotion path extension will need to be re-located, in order to accommodate the combined baseball and soccer fields. This re-grading/re-location of the path will necessitate removal of the allee of large canopy trees.

### Option 3.2

This option replaces the existing building complex with all new construction.

- **Historic Character:** The Devotion House location remains unchanged, but the placement of a combined baseball and U11 sized soccer field may impact the two large canopy trees behind the house. Presence of the playing fields and associated fencing will impact the backdrop for the Devotion House. Landscape mitigation measures will need to be studied. Of course, if baseball is not required or the soccer field size could be reduced to a U9, this impact would be diminished.
- **Urban Design:** Building massing will be pulled significantly away from Harvard Street, to concentrate toward the northeast end of the site. This solution provides a somewhat pinched condition on the southeastern and northwestern sides of the site, which impact site organization and quality of available sunlight.

Devotion School

3.1.6 Preliminary Evaluation of Alternatives

Submitted by CRJA

March 12, 2014

As for the Harvard Street frontage, this option provides the most continuous community green space of all four options. This generous green space in front of the Devotion House would offset the introduction of athletic fields behind the house.

- **Vehicular and Pedestrian Circulation:** Drop-off and pick-up by car and bus will be handled similar to the solutions for other options. The same adjustment to the car pull off lane will be required, as indicated for each of the other schemes. However, since the new building is set farther up Stedman Street (away from Harvard), the extended drop off zone may need to extend beyond school property.

Pedestrian access continues to be provided from all directions. However, the entry walk from Harvard Street is significantly longer than other options. The gathering space for Harvard Street entrance is sizable and offers fairly good visibility. Whereas the Stedman Street entrance is slightly more constrained by the site and may need further study to ensure that the waiting population is adequately accommodated. As with all other schemes, the Devotion Street path extension will need to be relocated and trees will need to be removed.

- **Site Programming and Organization:** Option 3.2 offers the most significant impact on existing community play facilities. As shown, the basketball courts will need to be removed entirely, in order to accommodate playground space. Even with displacement of these community facilities, the overall play space will be slightly less than existing conditions. This deviation is offset by the addition of outdoor classroom spaces and an enlarged community/teaching garden. As for playing fields, this option essentially matches existing athletic space, with the combined baseball/soccer configuration. As for solar orientation, the play space at the northeastern end of the site will be partially shaded by the building.





2150 Washington Street  
Newton MA 02462

T 617-527-9600  
F 617-527-9606

offices in:  
Newton MA  
Manchester NH  
Atlanta GA

[www.fbra.com](http://www.fbra.com)

## **EDWARD DEVOTION SCHOOL**

Brookline, Massachusetts

### **Preliminary Design Program – Structural Report**

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#### **INTRODUCTION**

*Foley Buhl Roberts & Associates, Inc. (FBRA)* is collaborating with *HMFH Architects, Inc. (HMFH)* and their consultants in the evaluation of renovation, renovation/addition and new construction options for the Edward Devotion School in Brookline. The purpose of this Structural Report is to outline the basis of the structural design, describe the proposed structural systems and summarize the anticipated scope of structural work in the existing building. This report should be used in conjunction with the Architectural documents and those of the other disciplines in preparing the preliminary cost estimate.

The Edward Devotion School is located at 345 Harvard Street in Brookline, MA. The present school consists of the original building, along with the 1954 and 1974 additions on the east and west sides, respectively. The Edward Devotion School is the largest elementary school in Brookline and is home to over 700 Pre-K through 8<sup>th</sup> Grade students. The facility was constructed on a sloping site (downwards to the north and west, approximately one story) and has a gross floor area of approximately 162,051 square feet on three levels. Increased enrollments have created overcrowded conditions in the school and building systems are in need of replacement.

Structural systems and conditions in the original building (Central Wing – Circa 1913), the East Wing (1954) and the West Wing (1974) are described in the March 10, 2014 *Existing Conditions Structural Report*, prepared by FBRA.

With reference to the March 7, 2014 Concept Diagrams prepared by HMFH, five (5) options are being considered, as summarized below:

#### **Option 0:**

Option 0 is the full renovation of the existing facility, including the Central, East and West Wings. No new construction is proposed. The total floor area of this option is approximately 162,051 square feet.

#### **Option 1.1:**

Option 1.1 is a renovation/addition scheme; including 40,906 square feet of renovated space in the Central Wing (original building) and 147,528 square feet of new additions. Proposed new construction includes a Gymnasium (east side), a Recreation Room and Stair Tower (west side) and a four-story classroom wing located to the north of the Central Wing (presently fields). The existing East and West Wings and the 1954 Gymnasium addition to the original building will be demolished and removed to facilitate the proposed new building/site construction, which also includes a 19,262 square feet underground parking garage in the general area of the current parking garage below the West Wing. The roof of the new parking garage will be a green space/play area. The total floor area of Option 1.1 (excluding parking) is 188,434 square feet.

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#### **Option 1.4:**

Option 1.4 is also a renovation/addition scheme; including 40,906 square feet of renovated space in the Central Wing (original building) and 144,839 square feet of new additions. Proposed new construction includes a Gymnasium (north side), a Recreation Room and Stair Tower (west side), with a three and four-story classroom wing located to the east of the Central Wing (present location of the (1954) East Wing). The existing East and West Wings and the 1954 Gymnasium addition to the original building will be demolished and removed to facilitate the proposed new building/site construction, which also includes a 19,262 square feet underground parking garage in the general area of the current parking garage below the West Wing. The roof of the new parking garage will be a green space/play area. Option 1.4 is configured in a manner which avoids the relatively small areas of (corridor) structure that are required for Option 1.1. The total floor area of Option 1.4 (excluding parking) is 185,745 square feet.

#### **Option 2:**

Option 2 is another renovation/addition scheme; including 40,906 square feet of renovated space in the Central Wing (original building) and 146,791 square feet of new additions. A five-story, east-west rectangular bar, constructed at the north end of the Central Wing (following the removal of the 1954 Gymnasium addition) is proposed. The Gym and the Kitchen/Cafeteria are located at the Ground Floor level along with Day Care and Pre-School spaces. The upper four floors are primarily K-8 Classrooms. Stair/Corridor structures will be constructed along the east and west sides of the original building. As in the other options, the existing East and West Wings will be demolished and removed to facilitate the proposed new building/site construction. Option 2 also includes a 19,262 square feet underground parking garage in the general area of the current parking garage below the West Wing, similar to the other options. The roof of the new parking garage will be a green space/play area. The total floor area of Option 2 (excluding parking) is 187,697 square feet.

#### **Option 3.2:**

Option 3.2 is an all new construction scheme, in which the entire existing school (including the original Central Wing) is demolished and removed to accommodate the new building/site construction. A new, four-story building is proposed, to be constructed to the north of the existing building, in the area of the present fields. The new building will include 21,525 square feet of below grade parking at the Ground Floor level. The Kitchen/Cafeteria is located at this level as well. The Gymnasium and Small Gym spaces are located along the south end of the building, at the Second Floor level, over the Administration and Band/Music spaces at the First Floor. The balance of the First and Second Floor levels is primarily dedicated to Classroom space. The Media Center is located at the Third Floor, along with additional Classroom spaces. The total floor area of Option 3.2 (excluding parking) is 187,234 square feet.

### **BASIS OF DESIGN – NEW CONSTRUCTION (ALL OPTIONS):**

The basis of the structural for new construction in Options 1.1, 1.4, 2 and 3.2 are described in this section.

#### **Codes and Design Standards**

*Building Code:* Massachusetts State Building Code (780 CMR) - Eighth Edition.

*Concrete:* ACI 318 and ACI 301; latest editions.



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*Structural Steel:* AISC “Specification for Structural Steel Buildings” and AISC “Code of Standard Practice”.

*Steel Deck:* Steel Deck Institute (SDI) – Referenced Standards

**Design Loads/Parameters***Live Loads:*

Classrooms (with partition allowance):	70 PSF
Corridors:	80 PSF
Open plan areas:	100 PSF
Stairs:	100 PSF
Mechanical Areas:	150 PSF

*Snow Loads:*

Basic Ground Snow Load (Brookline):	40 PSF
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*Wind Loads:*

Wind Speed (Brookline):	105 MPH
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*Seismic Parameters (Brookline):*

Spectral Response – Short Periods:	$S_S = 0.280g$
Spectral Response – 1-Second Periods:	$S_D = 0.068g$
Seismic Use Group:	III
Seismic Design Category:	B
Site Class:	D
Structural System:	Building Frame System
Lateral Load Resisting System:	Steel Braced Frames ( <i>Not Specifically Detailed for Seismic Resistance</i> )
Response Modification Factor (R):	3.0
System Overstrength Factor ( $\Omega_0$ ):	3.0
Deflection Amplification Factor ( $C_d$ ):	3.0

**Foundations:**

The foundation design will be based on an allowable bearing capacity of 6.0 kips per square foot (3.0 tons per square foot) on natural soils (glacial outwash deposit) or on compacted structural fill, per the recommendations of McPhail Associates, LLC in their *Preliminary Foundation Engineering Report* dated March 3, 2014. Groundwater was encountered at a depth of 16.9 feet below the ground surface in one observation well; however, the groundwater level will vary across the site and change seasonally. The McPhail Associates report recommends that perimeter and underslab drainage systems be installed at lowest level floor areas that are constructed below the exterior finished grade.

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#### **Construction Classification:**

New construction will typically be Type IIA Construction (Noncombustible, Protected). Floor construction (except slabs on steel deck) and roof construction require applied fireproofing to achieve the required fire resistance rating. Note that the height of the five-story, Option 2 addition may exceed 70 feet, which would result in a high rise classification. If the addition were to be six stories in height, this would certainly be the case; the additional height may also require the construction to be classified as Type IB. In all options, the new construction will be fully sprinklered.

#### **Sustainable Design Considerations:**

Sustainable design considerations will be incorporated in the building design; it is intended that the new construction will be LEED Certified.

#### **STRUCTURAL SYSTEMS DESCRIPTIONS – NEW CONSTRUCTION (ALL OPTIONS)**

Structural systems descriptions for new construction in Options 1.1, 1.4, 2 and 3.2 are described in this section. The anticipated scope of structural work in the existing building (Options 0, 1.1, 1.4 and 2) is described in the following section. An Outline Structural Specification is also included at the end of this report.

**Structural Bays/Spans:** Structural bays/spans will vary; however, the typical structural bay will be square or rectangular; approximately 750 square feet to 900 square feet in area. Floor or roof construction over the Gymnasium in each option will clear span.

**Story Heights/Floor Elevations:** The typical story height is 13'- 6", matching the existing building.

**Foundations:** Foundations for all options will be conventional spread footings. The preliminary foundation design is based on an allowable bearing capacity of 6.0 kips per square foot (3.0 tons per square foot) on natural soils (glacial outwash deposit) or on compacted structural fill, per the recommendations of McPhail Associates, LLC in their *Preliminary Foundation Engineering Report* dated March 3, 2014.

**Drainage:** Groundwater was encountered at a depth of 16.9 feet below the ground surface in one observation well; however, the groundwater level will vary across the site and change seasonally. The McPhail Associates report recommends that perimeter and underslab drainage systems be installed at lowest level floor areas that are constructed below the exterior finished grade.

**Lowest Level Floor Construction** will typically be a 5" thick concrete slab on grade, reinforced with welded wire fabric. The slab will be underlain by a heavy duty vapor barrier, 2" of rigid insulation and 6" of imported, compacted gravel. Saw cut control joints (1¼" deep) will be provided in each direction along each column line. Full depth isolation joints will be constructed around columns.

**Upper Level Floor Construction:** Composite structural steel framing: 4" thick (minimum), normal weight concrete topping slab on a 2" deep, 18 gauge, composite type, galvanized steel floor deck (6" minimum total slab thickness), reinforced with welded wire fabric, spanning to composite structural steel beams. Floor construction over Gymnasium spaces (Options 1.1 and 1.4 (partial) and Option 2) will be similar, with a concrete slab on cellular acoustic composite steel floor deck supported by clear spanning steel girders.



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Exposed steel floor framing over the Gymnasium will be classified as Exposed to View Structural Steel (E.V.S.S.). All E.V.S.S. will be surface prepped and shop painted with a primer that is compatible with the finished paint. Primary floor structural members over the Gymnasium that are exposed to view will require intumescent paint to achieve the required fire resistance rating.

All composite steel beams and girders will be *unshored*. Composite action will be achieved by field welding  $\frac{3}{4}$ " diameter x  $4\frac{1}{2}$ " long headed shear studs through the deck, to the top flanges of the beams and girders. To avoid compromising composite action, conduit or other, similar embedded items *should not* be placed in the concrete slab on steel deck construction. Slabs on composite steel floor deck will be placed at the required elevation, adding concrete to compensate for the deflection of the (unshored) steel framing (assume an approximate average of  $\frac{3}{4}$ " additional concrete required over the bay area).

**Typical Roof Construction:** Typical roof construction consists of a 3" deep, 20 gauge, Type DR galvanized steel roof deck spanning to wide flange steel beams. Steel beams are typically supported by wide flange steel girders, which span to wide flange steel columns.

Steel roof deck over the Gymnasium (Options 1.1 and 1.4 (partial) and Option 3.2) will be the cellular acoustic type, 3" deep; 20/20 gauge (Galvanized). Steel deck typically spans to steel purlins, which are supported by clear spanning steel girders.

Exposed steel roof framing over the Gymnasium will be classified as Exposed to View Structural Steel (E.V.S.S.). All E.V.S.S. will be surface prepped and shop painted with a primer that is compatible with the finished paint. Primary roof structural members over the Gymnasium that are exposed to view will require intumescent paint to achieve the required fire resistance rating.

Where practical, roof drainage will be achieved by sloping the steel to the internal drains. Some areas of tapered insulation should be anticipated, in areas where it is not practical to slope the steel.

Concrete slabs on composite steel deck will be provided below rooftop mechanical units, for acoustical purposes. Screens will be provided around rooftop equipment for acoustic and aesthetic purposes.

**Steel Framing Connections:** Type 2 simple framing connections (shear only); double clip angles typically.

**Columns:** Typical columns will be wide flange steel sections.

**Lateral Force Resisting System:** Lateral (wind and seismic) forces will be resisted by steel bracing, for reasons of economy, stiffness, reduced structural depth and smaller column sizes. Bracing members will be square or rectangular HSS sections. Brace configurations may include chevrons, inverted chevrons ("V"), or single diagonals in short bays, as required by architectural considerations. The bases of all braced frames will be tied together below the lowest level slab on grade with 2'-0" x 2'-0" reinforced concrete grade beams.

**Expansion (Seismic) Joints:** New additions will be separated from the existing building by an expansion/seismic joint, allowing the new construction and the existing building to be considered as structurally independent. A (double) fire wall will likely be required at the expansion joint in Options 1.1, 1.4 and 2; accordingly, additional fire protection will typically not be required in the existing building and the new additions will be classified as Type IIA construction.

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**Exterior Walls:** Exterior walls will typically be masonry veneer, with areas of glazed curtainwall and architectural panels. A galvanized, light gauge steel stud backup wall (16 gauge minimum thickness) will be constructed at masonry veneer areas. Vertical slip joints will be provided in the metal stud backup system at each level. Due to the height of the brick in certain areas (greater than 30 feet), a galvanized steel relieving angle will be required. The outside face of masonry will be located approximately 20" from the column centerline. Intermediate, HSS Steel girts will be provided at the Gymnasium exterior, to laterally support the wall construction.

**Parking Structure:** A below grade parking structure (19,262 square feet in area) with a rooftop green space/play area above is proposed in Options 1.1, 1.4 and 2; the location and footprint of the proposed structure is similar to the existing parking garage at the Ground Floor level of the 1974 West Wing. Parking is located at the Ground Floor level within the building footprint in Option 3.2 (all new construction).

The floor above the existing parking garage in the West Wing is structured with precast, prestressed hollow core concrete planks (8" and 10" deep, with a concrete topping slab) supported by interior, reinforced concrete beams and columns and by reinforced concrete bearing walls at the building perimeter. FBRA has reviewed the structural feasibility re-using this structure as a green space/play area with parking below, in lieu of demolishing this construction and building a new parking structure. Structural issues relating to the re-use of the existing structure include the following:

- The existing concrete plank floor slab is level; a concrete topping slab would be required to achieve pitch for drainage, as this will now be an exterior condition.
- The plank and supporting reinforced concrete beams have been designed for school use (50 psf Classroom live load) and cannot not support the additional weight a sloped topping slab, soil/paving and a 100 psf (public) live load.
- The existing foundation walls were likely designed for a 40 pcf equivalent fluid pressure and no seismic loading (not required in 1974). These walls do not have sufficient strength to resist a 60 pcf equivalent fluid pressure (as recommended in the McPhail Associates report) in addition to the seismic loads required by the current Building Code.
- The top of the existing slab is at Elevation 60.0 feet; the civil/landscape site design would need to accommodate this elevation.

In light of the above, FBRA recommends that the preliminary cost estimate be based on the assumption that the existing structure and foundations will be completely removed and that a new parking garage structure will be constructed. The new garage would consist of a 12" thick, waterproofed, reinforced concrete flat slab, supported by interior reinforced concrete columns and footings and by reinforced concrete foundation walls (14" thick) at the building perimeter. The floor slab would be a concrete slab on grade (pitched to drains), placed on a layer of compacted, non-frost susceptible granular fill. Guard rails may be required along the west (Stedman Street) side, depending on final grades. Note that it may be feasible to re-use the existing, interior reinforced concrete columns and footings in the present garage if the Architectural layout for the new garage is ultimately designed to be compatible with the locations of these elements.

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**ANTICIPATED SCOPE OF STRUCTURAL WORK – EXISTING BUILDING**

Renovations, alterations, repairs and additions to existing buildings in Massachusetts are governed by the provisions of the Massachusetts State Building Code (MSBC – 8<sup>th</sup> Edition) and the Massachusetts Existing Building Code (MEBC). These documents are based on amended versions of the 2009 *International Building Code (IBC)* and the 2009 *International Existing Building Code (IEBC)*, respectively.

The MEBC defines three (3) compliance methods for the repair, alteration, change of occupancy, addition or relocation of an existing building. The method of compliance is chosen by the Design Team (based on the project scope and cost considerations) and cannot be combined with other methods.

Regardless of the compliance method chosen, the MEBC currently requires that buildings with unreinforced masonry walls be evaluated with respect to the provisions of Appendix A1 of the IEBC (applicable to this building). An assessment of masonry shear stresses, wall slenderness, parapets, wall anchorage, diaphragm anchorage, etc. is required; and the existing building must be capable of resisting at least 75% of the seismic loading required by the Code for new construction.

The *Work Area Compliance Method* (IEBC Chapters 4 through 12) is based on a proportional approach to compliance, where upgrades to an existing building are triggered by the type and extent of work. This method would likely be the most appropriate method of compliance for this project. The Work Area Compliance Method includes requirements for three levels of alterations, in addition to requirements for repairs, changes in occupancy, additions, historic buildings or moved buildings. A complete seismic evaluation of the existing building is required for the following: Level 2 alterations where the demand to capacity ratio of lateral load resisting elements has been increased by more than 10%, all Level 3 alterations, a change in occupancy to a higher category and where structurally attached additions (vertical or horizontal) are planned. A full renovation of the Edward Devotion School (i.e. any individual wing) would be classified as a Level 3 alteration. As all wings of the school have interior and perimeter unreinforced masonry walls, compliance with the requirements of IEBC Appendix A1 is also required.

Structural systems and conditions in the original building (Central Wing – Circa 1913), the East Wing (1954) and the West Wing (1974) are described in the March 10, 2014 *Existing Conditions Structural Report*, prepared by FBRA. With reference to that report, the anticipated scope of structural work in the existing building (Option 0 - Central, East and West Wings and Options 1.1, 1.4 and 2 – Central Wing only) is described below.

**Central Wing – Circa 1913 (All Renovation and Renovation/Addition Options)**

- Conduct a seismic analysis/evaluation of the existing building to determine if adequate lateral load capacity is available (masonry walls) to resist 75% of the seismic loading required by the Code for new construction. Such an evaluation is beyond the scope of this report; however, FBRA suggests that seismic upgrades, such as the addition of reinforced masonry shear walls and/or the reinforcing of existing masonry walls may be required to meet this requirement. Floor and roof construction will need to be anchored to existing interior and perimeter masonry walls at all locations/levels (at approximately 4'-0" o.c.). Cantilevered elements (chimneys, etc., as applicable) will need to be braced. The cost of this work should be included in the preliminary cost estimate (potentially \$10.00/SF to \$15.00/SF over the gross floor area of the building).
- Repointing of brick and stone joints is required in certain locations.

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- Areaways and below grade exterior stairwells should be cleaned of debris and plant material to ensure proper drainage.
- Further review and evaluation of the clock tower is recommended.
- Roof drainage (downspouts), foundation drainage and surface drainage adjacent to the building should be evaluated and improved.
- Snow drift loading on the northern, flat roof should be evaluated. The preliminary cost estimate should carry an allowance for the reinforcing of existing flat roof construction in snow drift areas.
- Accessibility issues will need to be addressed (refer to Architectural documents); including the potential addition of elevators, lifts, ramps, etc. as may be appropriate.

#### **East Wing – 1954 (Option 0 Only)**

- Conduct a seismic analysis/evaluation of the existing building to determine if adequate lateral load capacity is available (masonry walls) to resist 75% of the seismic loading required by the Code for new construction. Such an evaluation is beyond the scope of this report; however, FBRA suggests that seismic upgrades, such as the addition of reinforced masonry shear walls and/or the reinforcing of existing masonry walls may be required to meet this requirement. Floor and roof construction will need to be anchored to existing interior and perimeter masonry walls at all locations/levels (at approximately 4'-0" o.c.). Cantilevered elements (chimneys, etc., as applicable) will need to be braced. The cost of this work should be included in the preliminary cost estimate (potentially \$10.00/SF to \$15.00/SF over the gross floor area of the building).
- Repointing of brick is required in certain locations. Repair of cracked and or spalled brick is also required in limited locations.
- Areaways and below grade exterior stairwells should be cleaned of debris and plant material to ensure proper drainage.
- Steel windows are rusting and should be replaced.
- Cleaning and coating of exposed steel columns supporting entry canopies is required.
- Snow drift loading on the flat roof at the northern section of the East Wing should be evaluated. The preliminary cost estimate should carry an allowance for the reinforcing of existing flat roof construction in snow drift areas.
- Accessibility issues will need to be addressed (refer to Architectural documents); including the potential addition of elevators, lifts, ramps, etc. as may be appropriate.



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**West Wing – 1974 (Option 0 Only)**

- Conduct a seismic analysis/evaluation of the existing building to determine if adequate lateral load capacity is available (masonry walls) to resist 75% of the seismic loading required by the Code for new construction. Such an evaluation is beyond the scope of this report; however, FBRA suggests that seismic upgrades, such as the addition of reinforced masonry shear walls and/or the reinforcing of existing masonry walls may be required to meet this requirement. Floor and roof construction will need to be anchored to existing interior and perimeter masonry walls at all locations/levels (at approximately 4'-0" o.c.). Cantilevered elements (chimneys, etc., as applicable) will need to be braced. The cost of this work should be included in the preliminary cost estimate (potentially \$10.00/SF to \$15.00/SF over the gross floor area of the building).
- Repointing of brick is required in certain locations. Repair of cracked and or spalled brick is also required in limited locations.
- Caulking is required at control joints in the brick veneer.
- Steel relieving angles at each floor level should be cleaned and coated with a zinc-rich paint.
- Site walls and railings have deteriorated significantly; FBRA recommends that this construction be removed and rebuilt.
- Areaways and below grade exterior stairwells should be cleaned of debris and plant material to ensure proper drainage.
- Accessibility issues will need to be addressed (refer to Architectural documents); including the potential addition of elevators, lifts, ramps, etc. as may be appropriate.

**OUTLINE STRUCTURAL SPECIFICATION:****Concrete:**

- All concrete shall be normal weight, 4,000 psi at 28 days, except foundation walls and footings, which shall be normal weight, 3,000 psi and exterior (exposed) concrete (paving) which shall be normal weight, 4,500 psi.
- Portland Cement: ASTM C150, Type I or II.
- Fly Ash: ASTM C618, Class F. Replacement of cement content with fly ash is limited to 20% (by weight). Fly ash is not permitted in exterior, exposed concrete, slabs on grade or slabs on steel deck.
- All concrete shall be proportioned with 3/4" maximum aggregate, ASTM C 33, except 3/8" maximum aggregate shall be used at toppings less than 2" thick (e.g. metal pan stairs).
- All reinforcing shall be ASTM A 615 deformed bars, Grade 60.
- All welded wire fabric shall conform to ASTM A 185.

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- Reinforcing bars, steel wire, welded wire fabric, and miscellaneous steel accessories shall contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with Submittal Requirements.
- Concrete products manufactured within 500 miles (by air) of the project site shall be documented in accordance with Submittal Requirements.
- Cure all concrete by moisture retention methods, approved by Architect; curing compounds shall not be used.

#### **Reinforced Concrete Masonry (Elevator Shafts):**

- Masonry construction shall conform to ACI 530/ASCE 5/TMS 402 “Building Code Requirements for Masonry Structures”, latest edition.
- Masonry strength,  $f'm$  shall not be less than 1350 psi.
- Requirements for load bearing block strength shall be as required for specified masonry strength ( $f'm$ ) but shall not be less than 2000 psi on the net area of the block.
- Grout shall conform to ASTM C476, Type Fine, and shall be of strength required for specified masonry strength ( $F'm$ ) but not less than 3000 psi.
- Mortar for reinforced masonry shall conform to ASTM C 270 Type S and shall be of strength required for specified masonry strength ( $f'm$ ) but not less than 1800 psi.
- Reinforcing bars shall conform to ASTM A 615 Grade 60 deformed bars. Lap all continuous bars 48 diameters and provide bar positioners. Assume No. 5 bars at 2'-8" o.c. vertically and horizontal bond beams with 2 – No. 5 continuous at 4'-0" o.c.
- Joint reinforcing shall be 9 gauge ladder type conforming to ASTM A 82. Provide prefabricated corners and tees. Walls shall be reinforced horizontally with joint reinforcing at 16 inches on centers unless otherwise noted.
- Reinforcing bars, steel wire and miscellaneous accessories shall contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with Submittal Requirements.
- Elevator shaft walls shall be 100% solid grouted (all cores); low lift grouting.
- Masonry products manufactured within 500 miles (by air) of the project site shall be documented in accordance with Submittal Requirements.



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**Structural Steel:**

- Structural steel shapes shall conform to ASTM A 992,  $F_y = 50$  ksi.
- Steel tubes (HSS) shall conform to ASTM A 500, Grade B,  $F_y=46$  ksi.
- Structural steel plates and bars shall conform to ASTM A 36,  $F_y = 36$  ksi.
- Steel members shall contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.
- Steel manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.
- Anchor Bolts: Anchor bolts at column base plates shall conform to ASTM F1554 – Grade 36 and shall be headed type. Provide a minimum of four (4),  $\frac{3}{4}$ " diameter anchor bolts at all columns; additional bolts and/or larger diameter will be required at bracing locations.
- Bolted connections shall be ASTM A 325, Type N (bearing) bolts, except slip-critical bolts shall be used at lateral brace beam connections.
- Shear connectors shall be  $\frac{3}{4}$ " diameter,  $4\frac{1}{2}$ " long, headed Nelson studs conforming to ASTM A 108.
- Shop and field welding shall be AWS D1.1 E70XX electrodes.
- Surface treatment for typical structural steel: SSPC Surface Preparation No. 3 (Power Tool Cleaning). Structural steel shall be left unprimed.
- Surface treatment for Exposed to View Structural Steel in the Gymnasium (E.V.S.S.) shall be SSPC Surface Preparation No. 6 (Commercial Blast Cleaning). Structural steel shall receive one coat of shop primer that is compatible with the finish paint.
- All exterior, exposed structural steel shall be hot-dipped galvanized.

**Steel Deck:**

- Typical steel roof deck shall be 3" deep, 20 gauge, Type DR, conforming to ASTM A653, Grade 33 (minimum), galvanized in accordance with ASTM A 653, coating class G-60.
- Acoustic steel roof deck (Gymnasium) shall be 3" deep, 20/20 gauge cellular type, conforming to ASTM A653, Grade 33 (minimum), galvanized in accordance with ASTM A 653, coating class G-60. Acoustic steel deck shall be shop treated and painted with a primer that is compatible with the finish paint.
- Steel floor deck shall be 2" deep, 18 Gauge, composite type, conforming to ASTM A 653, Grade 33, galvanized in accordance with ASTM A 653, coating class G-60.
- All steel floor deck and roof deck accessories (pour stops, finish strips, closures, etc.) shall be the same finish as the deck; 18 gauge minimum.

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- Steel deck shall contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.
- Steel deck manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.
- Provide 14 gauge sump pans at roof drains.

**End of Preliminary Design Program - Structural Report**



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### **FIRE PROTECTION SYSTEMS**

#### **NARRATIVE REPORT - OPTION 0 (Base Repair)**

The following is the Fire Protection System Narrative, which defines the scope of work and capacities of the Fire Protection System as well as the Basis of Design.

1. CODES
  - A. All work installed under Section 210000 shall comply with the MA Building Code, IBC 2009 and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.
2. DESIGN INTENT
  - A. The work of Section 210000 is as described in this narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.
3. GENERAL
  - A. In accordance with the provisions of the Massachusetts Building Code 780 CMR, a renovated school building of this size must be protected throughout with an automatic sprinkler system.
4. DESCRIPTION
  - A. The existing building is partially protected with an automatic sprinkler system. The existing fire service and double check valve assembly will be re-used. New wet alarm valve complete with electric bell will be provided. The existing fire department connection meeting local thread standards will remain. Existing sprinklers will be demolished.
  - B. The existing building will be protected with a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 square feet as required by NFPA 13-2007. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.
  - C. All areas of the building, including all finished and unfinished spaces, will be sprinklered. All electrical rooms/closets are to be sprinklered. The elevator shaft and elevator machine room are not sprinklered.
  - D. All sprinkler heads will be quick response, pendent and/or sidewall in hung ceiling areas and upright in unfinished areas.
  - E. Fire Protection Systems are designed in accordance with NFPA 13-2007, NFPA 14-2007 and NFPA 72-2010. The system includes a combination standpipe/sprinkler system throughout the building.

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5. BASIS OF DESIGN

- A. The mechanical rooms, kitchen, science classrooms, storage rooms and parking areas are considered Ordinary Hazard Group 1; all other areas are considered light hazard.
- B. Required Design Densities:

Light Hazard Areas	0.10 GPM over 1,500 s.f.
Ordinary Hazard Group 1	0.15 GPM over 1,500 s.f.
- C. Sprinkler spacing (max.):

Light Hazard Areas:	225 s.f.
Ordinary Hazard Areas:	130 s.f.
- D. A flow test will be conducted to verify if a fire pump will be required for the project.

6. PIPING

- A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.

7. FITTINGS

- A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

8. JOINTS

- A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads. Joints on piping, 2 in. and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet sprinkler system as recommended by manufacturer.

9. DOUBLE CHECK VALVE ASSEMBLY

- A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two spare sets of gaskets and repair kits.



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- B. Double check valve detector assembly shall be of one of the following:
1. Watts Series 757-OSY
  2. Wilkins 350A-OSY
  3. Conbraco Series 4S-100
  4. Or equal

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## **FIRE PROTECTION SYSTEMS**

### **NARRATIVE REPORT - OPTION 1.1 and 1.4 (Renovation/Addition)**

The following is the Fire Protection System Narrative, which defines the scope of work and capacities of the Fire Protection System as well as the Basis of Design.

1. CODES
  - A. All work installed under Section 210000 shall comply with the MA Building Code, IBC 2009 and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.
2. DESIGN INTENT
  - A. The work of Section 210000 is as described in this narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.
3. GENERAL
  - A. In accordance with the provisions of the Massachusetts Building Code 780 CMR, a renovated school building with addition of this size must be protected throughout with an automatic sprinkler system.
4. DESCRIPTION
  - A. The system will include a new 8" fire service, fire pump (if required), double check valve assembly, wet alarm valve complete with electric bell, and a fire department connection meeting local thread standards.
  - B. The system will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 square feet as required by NFPA 13-2007. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.
  - C. All areas of the building, including all finished and unfinished spaces, will be sprinklered. All electrical rooms/closets are to be sprinklered. The elevator shaft and elevator machine room are not sprinklered. Existing sprinklers will be demolished.
  - D. All sprinkler heads will be quick response, pendent and/or sidewall in hung ceiling areas and upright in unfinished areas.
  - E. Fire Protection Systems are designed in accordance with NFPA 13-2007, NFPA 14-2007 and NFPA 72-2010. The system includes a combination standpipe/sprinkler system throughout the building.

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5. BASIS OF DESIGN

A. The mechanical rooms, kitchen, science classrooms, storage rooms, and parking areas are considered Ordinary Hazard Group 1; all other areas are considered light hazard.

B. Required Design Densities:

Light Hazard Areas	0.10 GPM over 1,500 s.f.
Ordinary Hazard Group 1	0.15 GPM over 1,500 s.f.

C. Sprinkler spacing (max.):

Light Hazard Areas:	225 s.f.
Ordinary Hazard Areas:	130 s.f.

D. A flow test will be conducted to verify if a fire pump will be required for the project.

6. PIPING

A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.

7. FITTINGS

A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

8. JOINTS

A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads. Joints on piping, 2 in. and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet sprinkler system as recommended by manufacturer.

9. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two spare sets of gaskets and repair kits.

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- B. Double check valve detector assembly shall be of one of the following:
1. Watts Series 757-OSY
  2. Wilkins 350A-OSY
  3. Conbraco Series 4S-100
  4. Or equal



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**FIRE PROTECTION SYSTEMS**

**NARRATIVE REPORT - OPTION 2 (Renovation/Addition)**

The following is the Fire Protection System Narrative, which defines the scope of work and capacities of the Fire Protection System as well as the Basis of Design.

1. CODES
  - A. All work installed under Section 210000 shall comply with the MA Building Code, IBC 2009 and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.
2. DESIGN INTENT
  - A. The work of Section 210000 is as described in this narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.
3. GENERAL
  - A. In accordance with the provisions of the Massachusetts Building Code 780 CMR, a renovated school building with addition of this size must be protected throughout with an automatic sprinkler system.
4. DESCRIPTION
  - A. The system will include a new 8" fire service, fire pump, double check valve assembly, wet alarm valve complete with electric bell, and a fire department connection meeting local thread standards. If building is determined to be a high-rise a second fire department connection will be provided.
  - B. The system will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 square feet as required by NFPA 13-2007. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain. If the building is determined to be a high-rise combined risers will be interconnected on each floor level.
  - C. All areas of the building, including all finished and unfinished spaces, will be sprinklered. All electrical rooms/closets are to be sprinklered. The elevator shaft and elevator machine room are not sprinklered. Existing sprinklers will be demolished.
  - D. All sprinkler heads will be quick response, pendent and/or sidewall in hung ceiling areas and upright in unfinished areas.
  - E. Fire Protection Systems are designed in accordance with NFPA 13-2007, NFPA 14-2007 and NFPA 72-2010. The system includes a combination standpipe/sprinkler system throughout the building.

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5. BASIS OF DESIGN

- A. The mechanical rooms, kitchen, science classrooms, storage rooms, and parking areas are considered Ordinary Hazard Group 1; all other areas are considered light hazard.
- B. Required Design Densities:

Light Hazard Areas	0.10 GPM over 1,500 s.f.
Ordinary Hazard Group 1	0.15 GPM over 1,500 s.f.
- C. Sprinkler spacing (max.):

Light Hazard Areas:	225 s.f.
Ordinary Hazard Areas:	130 s.f.
- D. System design will include an electric driven fire pump, 750 GPM. If building option is determined to be a high-rise building, fire pump with be rated for 1,000 GPM.

6. PIPING

- A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.

7. FITTINGS

- A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

8. JOINTS

- A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads. Joints on piping, 2 in. and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet sprinkler system as recommended by manufacturer.

9. DOUBLE CHECK VALVE ASSEMBLY

- A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two spare sets of gaskets and repair kits.



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- B. Double check valve detector assembly shall be of one of the following:
1. Watts Series 757-OSY
  2. Wilkins 350A-OSY
  3. Conbraco Series 4S-100
  4. Or equal

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**FIRE PROTECTION SYSTEMS**

**NARRATIVE REPORT - OPTION 3.2 (New Construction)**

The following is the Fire Protection System Narrative, which defines the scope of work and capacities of the Fire Protection System as well as the Basis of Design.

1. CODES
  - A. All work installed under Section 210000 shall comply with the MA Building Code, IBC 2009 and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.
2. DESIGN INTENT
  - A. The work of Section 210000 is shown on the drawings and specifications. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.
3. GENERAL
  - A. In accordance with the provisions of the Massachusetts Building Code 780 CMR, a new school building greater than 12,000 square feet must be protected with an automatic sprinkler system.
4. DESCRIPTION
  - A. The system will include a new 8" fire service, fire pump (if required), double check valve assembly, wet alarm valve complete with electric bell, and a fire department connection meeting local thread standards.
  - B. The system will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 square feet as required by NFPA 13-2007. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.
  - C. All areas of the building, including all finished and unfinished spaces, will be sprinklered. All electrical rooms/closets are to be sprinklered. The elevator shaft and elevator machine room are not sprinklered.
  - D. All sprinkler heads will be quick response, pendent and/or sidewall in hung ceiling areas and upright in unfinished areas.
  - E. Fire Protection Systems are designed in accordance with NFPA 13-2007, NFPA 14-2007 and NFPA 72-2010. The system includes a combination standpipe/sprinkler system throughout the building.



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5. BASIS OF DESIGN

A. The mechanical rooms, kitchen, science classrooms, storage rooms, and parking areas are considered Ordinary Hazard Group 1; all other areas are considered light hazard.

B. Required Design Densities:

Light Hazard Areas	0.10 GPM over 1,500 s.f.
Ordinary Hazard Group 1	0.15 GPM over 1,500 s.f.

C. Sprinkler spacing (max.):

Light Hazard Areas:	225 s.f.
Ordinary Hazard Areas:	130 s.f.

D. A flow test will be conducted to verify if a fire pump will be required for the project.

6. PIPING

A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.

7. FITTINGS

A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

8. JOINTS

A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads. Joints on piping, 2 in. and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet sprinkler system as recommended by manufacturer.

9. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two spare sets of gaskets and repair kits.

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- B. Double check valve detector assembly shall be of one of the following:
1. Watts Series 757-OSY
  2. Wilkins 350A-OSY
  3. Conbraco Series 4S-100
  4. Or equal



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**PLUMBING SYSTEMS**

**NARRATIVE REPORT - OPTION 0 (Base Repair)**

The following is the Plumbing System Narrative which defines the scope of work and capacities of the Plumbing System as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative.

1. CODES
  - A. All work installed under Section 220000 shall comply with the MA Building Code, IBC 2009, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.
2. DESIGN INTENT
  - A. The work of Section 220000 is as described in this narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.
3. GENERAL
  - A. The plumbing systems that will serve the project are cold water, sanitary waste and vent system, grease waste system, special waste system, storm drain system, and natural gas system.
  - B. The existing building is serviced by municipal water service and municipal sewer service.
  - C. All plumbing in the building will conform to accessibility codes and to water conserving sections of the plumbing code.
  - D. Installation of all work is to be coordinated with the phasing plans for the project.
4. DRAINAGE SYSTEM
  - A. Soil, waste, and vent piping system is provided to connect to all fixtures and equipment. System runs will connect to existing piping in building and terminate with stack vents through the roof.
  - B. A separate grease waste system starting with connection to an exterior concrete grease interceptor running thru the kitchen and servery area fixtures and terminating with a vent terminal through the roof. The grease interceptor is provided under Division 33 scope.
  - C. Storm drainage system will be provided to drain all flat roofs with new roof drains piped through the building to a point 10 ft. outside the building.
  - D. Drainage systems piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type 'L' copper.

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- E. The existing drainage piping will be reused if adequately sized for intended use. Integrity of existing piping will be confirmed via video inspection.
- F. A separate special waste system shall be provided starting with a connection to an exterior limestone chip acid neutralizer, running thru the building and to the science classroom fixtures terminating with vent terminals through the roof. Special waste and vent piping will be Schedule 40 electric heat fused polypropylene piping, fittings and traps, flame retardant above grade and non-flame retardant below ground.

5. WATER SYSTEM

- A. The existing 4 in. domestic water service and meter will be re-used.
- B. Cold and hot water distribution piping will be provided to new fixtures. New reduced pressure backflow preventers will be provided on the hot and cold water supply to the science area for cross connection protection as required by code. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building. Existing cold and hot water domestic water piping will be demolished.
- C. Domestic hot water heating will be provided by two high efficiency natural gas fired water heaters with storage tank and a thermostatically controlled mixing device to control water temperature to the fixtures.
- D. Water temperature will be 140 deg. to serve the kitchen and 120 deg. to serve general use fixtures. A pump will recirculate hot water from the piping system loop for each temperature system.
- E. Water piping will be type 'L' copper with wrought copper sweat fittings, silver solder. All piping will be insulated with 1 in. thick high density fiberglass.
- F. A new tepid (70 deg. F – 90 deg. F) water loop will be provided to the emergency shower/eyewash fixtures as required by code. This loop will be circulated.

6. NATURAL GAS SYSTEM

- A. Natural gas service is provided for the building. The existing gas system will be modified to serve the heating boilers, domestic water heater, science classrooms, rooftop equipment, kitchen cooking equipment, and generator.
- B. New gas piping will be Schedule 40 black steel pipe with threaded gas pattern malleable fittings for 2 in. and under and butt welded fittings for 2½ in. and larger.

7. FIXTURES

- A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.
- B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.



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- C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, Eljer, or equal. Supports shall be Zurn, Smith, Josam or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.
- D. Fixtures shall be as described in this narrative.
  - 1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet, sensor operated 1.28 gallon per flush-flush valve.
  - 2. Urinal: Sensor operated 0.125 gallon flush valve urinal, wall hung, and vitreous china.
  - 3. Lavatory: Wall hung/countertop ADA lavatory. Infra-red, sensor mixing faucet.
  - 4. Sink: ADA stainless steel countertop sink with gooseneck faucet. Sediment traps are to be provided art areas.
  - 5. Drinking Fountain: Hi-low wall mounted electric water cooler, stainless steel basin with bottle filling stations.
  - 6. Janitor Sink: 24 x 24 x 10 Terrazzo mop receptor.
  - 7. Emergency showers and eyewashes shall comply with ANSI Z-358.1-2009.
- 8. DRAINS
  - A. Drains are cast iron, caulked outlets, nickalloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.
- 9. VALVES
  - A. Locate all valves so as to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.
- 10. INSULATION
  - A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP, 850 degrees snap-on system.
- 11. CLEANOUTS
  - A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

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12. ACCESS DOORS

- A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

13. WATER HEATER

- A. Natural gas fired, condensing, high efficiency units with storage tank.



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**PLUMBING SYSTEMS**

**NARRATIVE REPORT - OPTION 1.1 and 1.4 (Renovation/Addition)**

The following is the Plumbing System Narrative which defines the scope of work and capacities of the Plumbing System as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative.

1. CODES
  - A. All work installed under Section 220000 shall comply with the MA Building Code, IBC 2009, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.
2. DESIGN INTENT
  - A. The work of Section 220000 is as described in this narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.
3. GENERAL
  - A. The plumbing systems that will serve the project are cold water, sanitary waste and vent system, grease waste system, special waste system, storm drain system, and natural gas system.
  - B. The existing building is serviced by municipal water service and municipal sewer service.
  - C. All plumbing in the building will conform to accessibility codes and to water conserving sections of the plumbing code.
  - D. Installation of all work is to be coordinated with the phasing plans for the project.
4. DRAINAGE SYSTEM
  - A. Soil, waste, and vent piping system is provided to connect to all fixtures and equipment. System runs from 10 ft. outside the building and terminates with stack vents through the roof.
  - B. A separate grease waste system starting with connection to an exterior concrete grease interceptor running thru the kitchen and servery area fixtures and terminating with a vent terminal through the roof. The grease interceptor is provided under Division 33 scope.
  - C. Storm drainage system is provided to drain all flat roofs with roof drains piped through the building to a point 10 ft. outside the building. Under drain piping (if necessary) is to be provided to a point 10 ft. outside the building. The pre-cast drainage structures are to be provided under Division 33 scope.

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- D. Drainage systems piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type 'L' copper.
- E. In existing buildings, existing drainage piping may be reused if adequately sized for intended use. Integrity of existing piping will be confirmed via video inspection.
- F. A separate special waste system shall be provided starting with a connection to an exterior limestone chip acid neutralizer, running thru the building and to the science classroom fixtures terminating with vent terminals through the roof. Special waste and vent piping will be Schedule 40 electric heat fused polypropylene piping, fittings and traps, flame retardant above grade and non-flame retardant below ground.

#### 5. WATER SYSTEM

- A. The existing building is serviced by an existing 4 in. domestic water service and meter. Water service and meter will be reused.
- B. Cold and hot water distribution piping will be provided. New reduced pressure backflow preventers will be provided on the hot and cold water supply to the science area for cross connection protection as required by code. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building. Existing cold and hot water domestic water piping will be demolished.
- C. Domestic hot water heating will be provided by two high efficiency natural gas fired water heaters with storage tank and a thermostatically controlled mixing device to control water temperature to the fixtures.
- D. Water temperature will be 140 deg. to serve the kitchen and 120 deg. to serve general use fixtures. A pump will recirculate hot water from the piping system loop for each temperature system.
- E. Water piping will be type 'L' copper with wrought copper sweat fittings, silver solder. All piping will be insulated with 1 in. thick high density fiberglass.
- F. A new tepid (70 deg. F – 90 deg. F) water loop will be provided to the emergency shower/eyewash fixtures as required by code. This loop will be circulated.

#### 6. NATURAL GAS SYSTEM

- A. Natural gas service will be provided for the building and will serve the heating boilers, domestic water heater, science classrooms, rooftop equipment, kitchen cooking equipment, and generator.
- B. Gas piping will be Schedule 40 black steel pipe with threaded gas pattern malleable fittings for 2 in. and under and butt welded fittings for 2½ in. and larger.

#### 7. FIXTURES

- A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

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- B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.
- C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, Eljer, or equal. Supports shall be Zurn, Smith, Josam or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.
- D. Fixtures shall be as scheduled as described in this narrative.
  - 1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet, sensor operated 1.28 gallon per flush-flush valve.
  - 2. Urinal: Sensor operated 0.125 gallon flush valve urinal, wall hung, and vitreous china.
  - 3. Lavatory: Wall hung/countertop ADA lavatory. Infra-red, sensor mixing faucet.
  - 4. Sink: ADA stainless steel countertop sink with gooseneck faucet. Sediment traps are to be provided art areas.
  - 5. Drinking Fountain: Hi-low wall mounted electric water cooler, stainless steel basin with bottle filling stations.
  - 6. Janitor Sink: 24 x 24 x 10 Terrazzo mop receptor.
  - 7. Emergency showers and eyewashes shall comply with ANSI Z-358.1-2009.
- 8. DRAINS
  - A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.
- 9. VALVES
  - A. Locate all valves so as to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.
- 10. INSULATION
  - A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP, 850 degrees snap-on system.
- 11. CLEANOUTS
  - A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

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12. ACCESS DOORS

- A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

13. WATER HEATER

- A. Natural gas fired, condensing, high efficiency units with storage tank.



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**PLUMBING SYSTEMS**

**NARRATIVE REPORT - OPTION 2 (Renovation/Addition)**

The following is the Plumbing System Narrative which defines the scope of work and capacities of the Plumbing System as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative.

1. CODES
  - A. All work installed under Section 220000 shall comply with the MA Building Code, IBC 2009, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.
2. DESIGN INTENT
  - A. The work of Section 220000 is shown as described in this narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.
3. GENERAL
  - A. The plumbing systems that will serve the project are cold water, sanitary waste and vent system, grease waste system, special waste system, storm drain system, and natural gas system.
  - B. The existing building is serviced by municipal water service and municipal sewer service.
  - C. All plumbing in the building will conform to accessibility codes and to water conserving sections of the plumbing code.
  - D. Installation of all work is to be coordinated with the phasing plans for the project.
4. DRAINAGE SYSTEM
  - A. Soil, waste, and vent piping system is provided to connect to all fixtures and equipment. System runs from 10 ft. outside the building and terminates with stack vents through the roof.
  - B. A separate grease waste system starting with connection to an exterior concrete grease interceptor running thru the kitchen and servery area fixtures and terminating with a vent terminal through the roof. The grease interceptor is provided under Division 33 scope.
  - C. Storm drainage system is provided to drain all flat roofs with roof drains piped through the building to a point 10 ft. outside the building. Under drain piping (if necessary) is to be provided to a point 10 ft. outside the building. The pre-cast drainage structures are to be provided under Division 33 scope.

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- D. Drainage systems piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type 'L' copper.
- E. In existing buildings, existing drainage piping may be reused if adequately sized for intended use. Integrity of existing piping will be confirmed via video inspection.
- F. A separate special waste system shall be provided starting with a connection to an exterior limestone chip acid neutralizer, running thru the building and to the science classroom fixtures terminating with vent terminals through the roof. Special waste and vent piping will be Schedule 40 electric heat fused polypropylene piping, fittings and traps, flame retardant above grade and non-flame retardant below ground.

#### 5. WATER SYSTEM

- A. The existing building is serviced by an existing 4 in. domestic water service and meter. Water service and meter will be reused.
- B. Cold and hot water distribution piping will be provided. New reduced pressure backflow preventers will be provided on the hot and cold water supply to the science area for cross connection protection as required by code. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building. Existing cold and hot water domestic water piping will be demolished.
- C. Domestic hot water heating will be provided by two high efficiency natural gas fired water heaters with storage tank and a thermostatically controlled mixing device to control water temperature to the fixtures.
- D. Water temperature will be 140 deg. to serve the kitchen and 120 deg. to serve general use fixtures. A pump will recirculate hot water from the piping system loop for each temperature system.
- E. Water piping will be type 'L' copper with wrought copper sweat fittings, silver solder. All piping will be insulated with 1 in. thick high density fiberglass.
- F. A new tepid (70 deg. F – 90 deg. F) water loop will be provided to the emergency shower/eyewash fixtures as required by code. This loop will be circulated.

#### 6. NATURAL GAS SYSTEM

- A. Natural gas service will be provided for the building and will serve the heating boilers, domestic water heater, science classrooms, rooftop equipment, kitchen cooking equipment, and generator.
- B. Gas piping will be Schedule 40 black steel pipe with threaded gas pattern malleable fittings for 2 in. and under and butt welded fittings for 2½ in. and larger.

#### 7. FIXTURES

- A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

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- B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.
  - C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, Eljer, or equal. Supports shall be Zurn, Smith, Josam or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.
  - D. Fixtures shall be as described in this narrative.
    - 1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet, sensor operated 1.28 gallon per flush-flush valve.
    - 2. Urinal: Sensor operated 0.125 gallon flush valve urinal, wall hung, and vitreous china.
    - 3. Lavatory: Wall hung/countertop ADA lavatory. Infra-red, sensor mixing faucet.
    - 4. Sink: ADA stainless steel countertop sink with gooseneck faucet. Sediment traps are to be provided art areas.
    - 5. Drinking Fountain: Hi-low wall mounted electric water cooler, stainless steel basin with bottle filling stations.
    - 6. Janitor Sink: 24 x 24 x 10 Terrazzo mop receptor.
    - 7. Emergency showers and eyewashes shall comply with ANSI Z-358.1-2009.
8. DRAINS
- A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.
9. VALVES
- A. Locate all valves so as to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.
10. INSULATION
- A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP, 850 degrees snap-on system.
11. CLEANOUTS
- A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

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12. ACCESS DOORS
  - A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.
13. WATER HEATER
  - A. Natural gas fired, condensing, high efficiency units with storage tank.



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**PLUMBING SYSTEMS**

**NARRATIVE REPORT - OPTION 3.2 (New Construction)**

The following is the Plumbing System Narrative which defines the scope of work and capacities of the Plumbing System as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative.

1. CODES

- A. All work installed under Section 220000 shall comply with the MA Building Code, IBC 2009, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

- A. The work of Section 220000 is as described in this narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.

3. GENERAL

- A. The plumbing systems that will serve the project are cold water, sanitary waste and vent system, grease waste system, special waste system, storm drain system, and natural gas system.
- B. The new building will be serviced by municipal water service and municipal sewer service.
- C. All plumbing in the building will conform to accessibility codes and to water conserving sections of the plumbing code.

4. DRAINAGE SYSTEM

- A. Soil, waste, and vent piping system is provided to connect to all fixtures and equipment. System runs from 10 ft. outside the building and terminates with stack vents through the roof.
- B. A separate grease waste system starting with connection to an exterior concrete grease interceptor running thru the kitchen and server area fixtures and terminating with a vent terminal through the roof. The grease interceptor is provided under Division 33 scope.
- C. Storm drainage system is provided to drain all flat roofs with roof drains piped through the building to a point 10 ft. outside the building. Under drain piping (if necessary) is to be provided to a point 10 ft. outside the building. The pre-cast drainage structures are to be provided under Division 33 scope.

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- D. Drainage systems piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type 'L' copper.
- E. A separate special waste system shall be provided starting with a connection to an exterior limestone chip acid neutralizer, running thru the building and to the science classroom fixtures terminating with vent terminals through the roof. Special waste and vent piping will be Schedule 40 electric heat fused polypropylene piping, fittings and traps, flame retardant above grade and non-flame retardant below ground.

#### 5. WATER SYSTEM

- A. A 4 in. domestic water service from the municipal water system will be provided to the building. A meter, strainer and backflow preventer (if required) will be provided.
- B. Cold and hot water distribution piping will be provided. New reduced pressure backflow preventers will be provided on the hot and cold water supply to the science area for cross connection protection as required by code. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.
- C. Domestic hot water heating will be provided by two high efficiency natural gas fired water heaters with storage tank and a thermostatically controlled mixing device to control water temperature to the fixtures.
- D. Water temperature will be 140 deg. to serve the kitchen and 120 deg. to serve general use fixtures. A pump will recirculate hot water from the piping system loop for each temperature system.
- E. Water piping will be type 'L' copper with wrought copper sweat fittings, silver solder. All piping will be insulated with 1 in. thick high density fiberglass.
- F. A new tepid (70 deg. F – 90 deg. F) water loop will be provided to the emergency shower/eyewash fixtures as required by code. This loop will be circulated.

#### 6. NATURAL GAS SYSTEM

- A. Natural gas service will be provided for the building and will serve the heating boilers, domestic water heater, science classrooms, rooftop equipment, kitchen cooking equipment, and generator.
- B. Gas piping will be Schedule 40 black steel pipe with threaded gas pattern malleable fittings for 2 in. and under and butt welded fittings for 2½ in. and larger.

#### 7. FIXTURES

- A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

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- B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.
- C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, Eljer, or equal. Supports shall be Zurn, Smith, Josam or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.
- D. Fixtures shall be as described in this narrative.
  - 1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet, sensor operated 1.28 gallon per flush-flush valve.
  - 2. Urinal: Sensor operated 0.125 gallon flush valve urinal, wall hung, and vitreous china.
  - 3. Lavatory: Wall hung/countertop ADA lavatory. Infra-red, sensor mixing faucet.
  - 4. Sink: ADA stainless steel countertop sink with gooseneck faucet. Sediment traps are to be provided art areas.
  - 5. Drinking Fountain: Hi-low wall mounted electric water cooler, stainless steel basin with bottle filling stations.
  - 6. Janitor Sink: 24 x 24 x 10 Terrazzo mop receptor.
  - 7. Emergency showers and eyewashes shall comply with ANSI Z-358.1-2009.
- 8. DRAINS
  - A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.
- 9. VALVES
  - A. Locate all valves so as to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.
- 10. INSULATION
  - A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP, 850 degrees snap-on system.
- 11. CLEANOUTS
  - A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

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12. ACCESS DOORS

- A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

13. WATER HEATER

- A. Natural gas fired, condensing, high efficiency units with storage tank.

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**HVAC SYSTEMS**

**NARRATIVE REPORT – OPTION 0 (Renovation)**

**REPAIR OPTION**

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative.

1. CODES

All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC 2012 with MA Amendments, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

3. BASIS OF DESIGN: (MASS CODE)

Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

Outside: Winter 5 deg. F, Summer 91 deg. F DB 74 deg. F WB

Inside: 70 deg. F +/- 2 deg F for heating, 75 deg. F +/- 2 deg F (55% RH) for cooling for areas with air conditioning, 78 deg. F +/- 2 deg. F (<60% RH) for areas with displacement/dehumidification\*(see Displacement Ventilation note below). Unoccupied temperature setback will be provided (60 deg F heating (adj.), 85 deg F cooling/dehumidification (adj.).

Outside air is provided at the rate in accordance with ASHRAE guide 62.1-2010 and the International Mechanical Code as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. SYSTEM DESCRIPTION

Considering that the existing HVAC system is generally in poor condition and beyond its useful expected service life, we recommend a new high efficiency HVAC system, described as follows, shall be installed to replace the existing HVAC system.

A. Central Heating Plants: **LEED for Schools Credit EP2 & EC1**

Heating for the entire building will be through the use of a high efficiency gas-fired condensing boiler plant.

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The new boiler plant shall be provided with (3) 5000 MBH output boilers and (2) end suction base mounted primary & standby pumps with a capacity of 800 gpm each will be located in the mechanical room. Boilers shall each be sized for approximately 45% of the building heating load. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided.

The boiler plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. The boiler plants shall supply a maximum hot water temperature of 180 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the power plants. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will be depending on the location of building intake air locations and adjacent roofs.

**B. Central Cooling Plant: *LEED for Schools Credit EP2 & EC1***

A high efficiency central chilled water cooling plant consisting of a 310 ton high efficiency turbocor (oil-less compressor design) water cooled chilled, primary and standby chilled water pumps with VFDs, each with a capacity of 670 gpm, accessories, controls and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building. The chilled water system will consist of a 35% propylene glycol solution. A glycol make-up feed unit system shall be provided.

An induced draft counter-flow cooling tower system, equipped with filtration and chemical treatment system and condenser water pump set and controls shall be provided as part of the chilled water system.

**D. Classroom Heating and Ventilation (*General Classrooms, Art & Music, SPED, Music/Band Classrooms*) :**  
***LEED of Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1***

It is proposed that new displacement ventilation systems are installed to serve the majority of classroom areas in the Renovation and Addition Building Classroom areas under this Option, where possible within existing building architectural and structural constraints.

If this option is selected a full HVAC system life cycle cost should be provided to evaluate a minimum of three HVAC system replacement options.

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New air handling units with supply and return fan with VFDs, energy recovery wheels, hot water heating and chilled water cooling with modulating capacity control, sensible reheat wheel or hot pipe, and MERV 13 filtration will be provided to serve the new displacement ventilation system. Supply air will be provided to the space through new insulated, galvanized steel supply duct distribution system and shall be connected to wall mounted displacement ventilation diffusers located within the classrooms. Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. Supplemental hot water fin tube radiation or ceiling radiant heating will be provided along exterior walls.

It is estimated that the following air handling equipment will be required to serve these Classroom areas:

(2) Two air handling units with a capacity of 20,000 CFM (CHW Cooling, HW Heating with Energy Recovery).

Displacement Ventilation\*:

The displacement ventilation system for the classroom wings are intended to provide a maximum cooling temperature during peak cooling periods of approximately 78°F, however, the ventilation air provided will be extremely dry which will be the result of utilizing refrigeration equipment and hot gas reheat to reduce vapor pressure to an extremely low condition of approximately 50 grains of moisture per pound of air and reheating the air to a supply temperature of approximately 68°F which will be distributed to each space. The extremely dry condition of the supply air provides the perception of a condition that is cooler than is actually occurring due to the evaporation of moisture to the adjacent air from the occupants of the space.

Considering maximum cooling requirements occur primarily during the months of July and August when the majority of the academic areas are not in use, it would suggest maintaining slightly higher temperatures may not present a discomfort, however, will relate to a substantial operating cost savings and a reduced installation cost.

An additional major benefit of utilizing dry air within the building will be the overall reduction of vapor pressure typically present in outside ventilation air during summer months. This reduction in vapor pressure will dramatically reduce the amount of moisture entering the building and the potential of condensation resulting in moisture, and a direct relationship with the formation of mold.

Classrooms Requiring Full Air Conditioning:

Classrooms that require full air conditioning will be provided with supplemental cooling active chilled beam induction units.

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- E. Gymnasium:  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The gymnasium will be served by an air-handling unit of the recirculation design. The unit will be approximately 7,500 CFM and will include supply and return fans with VFDs, 450 MBH heating and 21 Ton cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct with drum louvers to project the air to the floor. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each air-handling unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air handling unit by a low wall return air register.

- F. Small Gymnasium:  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The gymnasium will be served by an air-handling unit of the recirculation design. The unit will be approximately 3,200 CFM and will include supply and return fans with VFDs, 240 MBH heating and 9 Ton cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct with drum louvers to project the air to the floor. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each air-handling unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air-handling unit by a low wall return air register.

- G. Multi-Purpose Room (and adjacent areas):  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Multipurpose room will be provided with a new air-handling unit of the recirculation design. The unit capacity will be approximately 5,800 CFM and will include supply and return fans with VFDs, hot water heating section with modulating capacity control, 17 ton chilled cooling system and MERV 13 filtration. Supply air ventilation to the Multi-purpose room will be provided to the space through the galvanized steel supply duct that will connect to an overhead duct distribution system. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 800 ppm. As levels drop generally relating to a reduction in population the air-handling unit outside air damper will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the units by low wall return air registers.



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## I. Administration Areas:

**LEED for Schools Credit EO2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

Spatial heating and air-conditioning for the Administration area and Guidance offices will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants.

The ventilation air handling unit capacity will be approximately 3,000 CFM and will include supply and return fan with VFDs, 150 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 10 ton capacity chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

## J. Library/Computer Lab

**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Media Center and adjacent office and Computer Lab spaces will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants.

The ventilation air handling unit capacity will be approximately 4,200 CFM and will include supply and return fan with VFDs, 180 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 14 ton capacity chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

A split system high efficiency AC system should be provided for the computer classroom, for availability of Air Conditioning during the heating season.

## K. Cafeteria, Seryery and Staff Lunch Areas

**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Cafeteria area will be served by an air-handling unit capable of providing 100% outside air. The units will be approximately 4,500 CFM and will include supply and return fan with VFDs, 450 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 15 ton chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population. It is proposed that spatial heating and air-conditioning for in this area will be provided with variable air volume boxes with temperature and CO2 controls. Perimeter hot water radiation heating equipment shall be provided for exterior zones.

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L. Kitchen:  
***LEED for Schools Credit EP2***

The kitchen areas shall be provided with new kitchen exhaust air fan and make-up air handling unit with hot water heating. The kitchen will be heated by an heating and ventilation air-handling units with hot water heating.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the kitchen equipment vendor. This system installation shall be field installed and coordinated with the ATC and Electrical contractors

M. Lobby, Corridor, and Entry Way Heating

New hot water convectors, cabinet unit heaters and fin tube radiation heating equipment shall be installed to provide heating to these areas. Corridors shall be ventilated from adjacent air handling unit systems.

N. Custodial Support Areas

Custodial support areas will be heated and ventilated by a heating and ventilation unit. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the loading dock. All custodial closets will be exhausted by exhaust air fan systems.

O. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The main IDF room will be air conditioned by high efficiency ductless AC cooling units.

P. Parking Garage:

The Parking garage shall be provided with a new exhaust air fan system for ventilation, and will be heated by hot water make up air handling units and horizontal type ceiling suspended and ducted unit heaters.

A new gas detection system shall be installed to control the exhaust air fan system operation.

Q. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

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R. Automatic Temperature Controls – Building Energy Management System

A new DDC (direct digital control) automatic temperature control and building energy management system shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

The control system shall be proprietary as manufactured by Johnson Controls.

## HVAC SYSTEMS

### NARRATIVE REPORT – OPTION 1.1 & 1.4 (Addition/Renovation)

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative.

#### 1. CODES

All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC 2012 with MA Amendments, county, and federal codes, laws, statutes, and authorities having jurisdiction.

#### 2. DESIGN INTENT

The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

#### 3. BASIS OF DESIGN: (MASS CODE)

Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

Outside: Winter 5 deg. F, Summer 91 deg. F DB 74 deg. F WB

Inside: 70 deg. F +/- 2 deg F for heating, 75 deg. F +/- 2 deg F (55% RH) for cooling for areas with air conditioning, 78 deg. F +/- 2 deg. F (<60% RH) for areas with displacement/dehumidification\*(see note below). Unoccupied temperature setback will be provided (60 deg F heating (adj.), 85 deg F cooling/dehumidification (adj.).

Outside air is provided at the rate in accordance with ASHRAE guide 62.1-2010 and the International Mechanical Code as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

#### 4. SYSTEM DESCRIPTION

##### A. Central Heating Plants: **LEED for Schools Credit EP2 & EC1**

Heating for the entire building will be through the use of a high efficiency gas-fired condensing boiler plant.

The new boiler plant shall be provided with (3) 4,500 MBH output boilers and (2) end suction base mounted pumps primary and standby with a capacity of 720 gpm each will be located in the mechanical room. Boilers shall each be sized for approximately 45% of the building heating load. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided.

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The boiler plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. The boiler plants shall supply a maximum hot water temperature of 180 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the power plants. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will be depending on the location of building intake air locations and adjacent roofs.

B. Central Cooling Plant: **LEED for Schools Credit EP2 & EC1**

A high efficiency central chilled water cooling plant consisting of a 300 ton high efficiency turboco (oil-less compressor design) water cooled chilled, primary and standby chilled water pumps with VFDs, each with a capacity of 700 gpm, accessories, controls and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building. The chilled water system will consist of a 35% propylene glycol solution. A glycol make-up feed unit system shall be provided.

An induced draft counter-flow cooling tower system, equipped with filtration and chemical treatment system and condenser water pump set and controls shall be provided as part of the chilled water system.

D. Classroom Heating and Ventilation (*General Classrooms, Art & Music, SPED, Vocational & Technology Classrooms*) :  
**LEED of Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

It is proposed that new displacement ventilation systems are installed to serve the Renovation and Addition building Classroom areas under this Option.

New air handling units with supply and return fan with VFDs, energy recovery wheels, hot water heating and chilled water cooling with modulating capacity control, and MERV 13 filtration will be provided to serve a new displacement ventilation system. Supply air will be provided to the space through new insulated, galvanized steel supply duct distribution system and shall be connected to wall mounted displacement ventilation diffusers located within the classrooms. Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. Supplemental hot water fin tube radiation or ceiling radiant heating will be provided along exterior walls.

It is estimated that the following air handling equipment will be required to serve these Classroom areas:

(4) Four air handling units (AHU-1, AHU-2, AHU-3, AHU-4) with a capacity of 8,500 CFM (35 Tons Cooling, 360 MBH Heating).

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Displacement Ventilation\*:

The displacement ventilation system for the classroom wings are intended to provide a maximum cooling temperature during peak cooling periods of approximately 78°F, however, the ventilation air provided will be extremely dry which will be the result of utilizing refrigeration equipment and hot gas reheat to reduce vapor pressure to an extremely low condition of approximately 50 grains of moisture per pound of air and reheating the air to a supply temperature of approximately 68°F which will be distributed to each space. The extremely dry condition of the supply air provides the perception of a condition that is cooler than is actually occurring due to the evaporation of moisture to the adjacent air from the occupants of the space.

Considering maximum cooling requirements occur primarily during the months of July and August when the majority of the academic areas are not in use, it would suggest maintaining slightly higher temperatures may not present a discomfort, however, will relate to a substantial operating cost savings and a reduced installation cost.

An additional major benefit of utilizing dry air within the building will be the overall reduction of vapor pressure typically present in outside ventilation air during summer months. This reduction in vapor pressure will dramatically reduce the amount of moisture entering the building and the potential of condensation resulting in moisture, and a direct relationship with the formation of mold.

Classrooms Requiring Full Air Conditioning:

Classrooms that require full air conditioning will be provided with supplemental cooling active chilled beam induction units.

- E. Gymnasium:  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The gymnasium will be served by (air handling unit of the recirculation design. The unit will be approximately 6,500 CFM and will include supply and return fans with VFDs, 400 MBH heating and 18 Ton cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct with drum louvers to project the air to the floor. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each air-handling unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air handling unit by a low wall return air register.

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- F. Small Gymnasium:  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The gymnasium will be served by (air handling unit of the recirculation design. The unit will be approximately 2,500 CFM and will include supply and return fans with VFDs, 200 MBH heating and 7.5 Ton cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct with drum louvers to project the air to the floor. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each air-handling unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air-handling unit by a low wall return air register.

- G. Multi-Purpose Room (and adjacent areas):  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Multi-purpose room will be provided with a new air-handling unit of the recirculation design. The units will be approximately 6,000 CFM and will include supply and return fans with VFDs, hot water heating section with modulating capacity control, 17 ton chilled water cooling system and MERV 13 filtration. Supply air ventilation to the Multi-purpose room will be provided to the space through the galvanized steel supply duct that will connect to an overhead duct distribution system. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 1000 ppm. As levels drop generally relating to a reduction in population the air-handling unit outside air damper will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the units by low wall return air registers.

Return air will be drawn back to the units by low wall return air registers.

- I. Administration Areas:  
**LEED for Schools Credit EO2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

Spatial heating and air-conditioning for the Administration area and Guidance offices will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants.

The air handling unit will be approximately 3,000 CFM and will include supply and return fan with VFDs, 150 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 12.5 ton capacity chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

- J. Media Center/Computer Lab  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Media Center and adjacent office and Computer Lab spaces will be provided with an

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air-handling unit capable of providing 100% outside air and variable air volume operation. The unit will be approximately 4,000 CFM and will include supply and return fan with VFDs, 200 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 15 ton capacity chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space which will satisfy building code requirements based on population. It is proposed that spatial heating and air-conditioning for zones will be provided by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units. Ventilation air to these perimeter areas will be provided by the associated air handling ventilation unit, with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants.

K. Cafeteria and Staff Lunch Areas  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Cafeteria area will be served by an air-handling unit capable of providing 100% outside air. The units will be approximately 4,200 CFM and will include supply and return fan with VFDs, 400 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 10 ton chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space which will satisfy building code requirements based on population. It is proposed that spatial heating and air-conditioning for in this area will be provided with variable air volume boxes with temperature and CO2 controls. Perimeter hot water radiation heating equipment shall be provided for exterior zones.

L. Kitchen:  
**LEED for Schools Credit EP2**

The kitchen areas shall be provided with new kitchen exhaust air fan and make-up air handling unit with hot water heating. The kitchen will be heated by an heating and ventilation air-handling units with hot water heating.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the kitchen equipment vendor. This system installation shall be field installed and coordinated with the ATC and Electrical contractors

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M. Lobby, Corridor, and Entry Way Heating

New hot water convectors, cabinet unit heaters and fin tube radiation heating equipment shall be installed to provide heating to these areas. Corridors shall be ventilated from adjacent air handling unit systems.

N. Custodial Support Areas

Custodial support areas will be heated and ventilated by a heating and ventilation unit. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the loading dock. All custodial closets will be exhausted by exhaust air fan systems.

O. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The main IDF room will be air conditioned by high efficiency ductless AC cooling units.

P. Parking Garage:

The Parking garage shall be provided with a new exhaust air fan system for ventilation, and will be heated by hot water make up air handling units and horizontal type ceiling suspended and ducted unit heaters.

A new gas detection system shall be installed to control the exhaust air fan system operation.

Q. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

R. Automatic Temperature Controls – Building Energy Management System

A new DDC (direct digital control) automatic temperature control and building energy management system shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

The control system shall be proprietary as manufactured by Johnson Controls.

## HVAC SYSTEMS

### NARRATIVE REPORT – OPTION 2 (Addition/Renovation)

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative.

#### 1. CODES

All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC 2012 with MA Amendments, county, and federal codes, laws, statutes, and authorities having jurisdiction.

#### 2. DESIGN INTENT

The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

#### 3. BASIS OF DESIGN: (MASS CODE)

Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

Outside: Winter 5 deg. F, Summer 91 deg. F DB 74 deg. F WB

Inside: 70 deg. F +/- 2 deg F for heating, 75 deg. F +/- 2 deg F (55% RH) for cooling for areas with air conditioning, 78 deg. F +/- 2 deg. F (<60% RH) for areas with displacement/dehumidification\*(see Displacement Ventilation note below). Unoccupied temperature setback will be provided (60 deg F heating (adj.), 85 deg F cooling/dehumidification (adj.).

Outside air is provided at the rate in accordance with ASHRAE guide 62.1-2010 and the International Mechanical Code as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

#### 4. SYSTEM DESCRIPTION

##### A. Central Heating Plants: **LEED for Schools Credit EP2 & EC1**

Heating for the entire building will be through the use of a high efficiency gas-fired condensing boiler plant.

The new boiler plant shall be provided with (3) 4,700 MBH output boilers and (2) end suction base mounted primary & standby pumps with a capacity of 750 gpm each will be located in the mechanical room. Boilers shall each be sized for approximately 45% of the building heating load. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided.

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The boiler plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. The boiler plants shall supply a maximum hot water temperature of 180 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the power plants. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will be depending on the location of building intake air locations and adjacent roofs.

B. Central Cooling Plant: **LEED for Schools Credit EP2 & EC1**

A high efficiency central chilled water cooling plant consisting of a 320 ton high efficiency turbocor (oil-less compressor design) water cooled chilled, primary and standby chilled water pumps with VFDs, each with a capacity of 750 gpm, accessories, controls and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building. The chilled water system will consist of a 35% propylene glycol solution. A glycol make-up feed unit system shall be provided.

An induced draft counter-flow cooling tower system, equipped with filtration and chemical treatment system and condenser water pump set and controls shall be provided as part of the chilled water system.

D. Classroom Heating and Ventilation (*General Classrooms, Art & Music, SPED, Music/Band Classrooms*):  
**LEED of Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

It is proposed that new displacement ventilation systems are installed to serve the Renovation and Addition Building Classroom areas under this Option.

New air handling units with supply and return fan with VFDs, energy recovery wheels, hot water heating and chilled water cooling with modulating capacity control, sensible reheat wheel or hot pipe, and MERV 13 filtration will be provided to serve the new displacement ventilation system. Supply air will be provided to the space through new insulated, galvanized steel supply duct distribution system and shall be connected to wall mounted displacement ventilation diffusers located within the classrooms. Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. Supplemental hot water fin tube radiation or ceiling radiant heating will be provided along exterior walls.

It is estimated that the following air handling equipment will be required to serve these Classroom areas:

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(4) Four air handling units with a capacity of 9,000 CFM (35 Tons Cooling, 360 MBH Heating).

Displacement Ventilation\*:

The displacement ventilation system for the classroom wings are intended to provide a maximum cooling temperature during peak cooling periods of approximately 78°F, however, the ventilation air provided will be extremely dry which will be the result of utilizing refrigeration equipment and hot gas reheat to reduce vapor pressure to an extremely low condition of approximately 50 grains of moisture per pound of air and reheating the air to a supply temperature of approximately 68°F which will be distributed to each space. The extremely dry condition of the supply air provides the perception of a condition that is cooler than is actually occurring due to the evaporation of moisture to the adjacent air from the occupants of the space.

Considering maximum cooling requirements occur primarily during the months of July and August when the majority of the academic areas are not in use, it would suggest maintaining slightly higher temperatures may not present a discomfort, however, will relate to a substantial operating cost savings and a reduced installation cost.

An additional major benefit of utilizing dry air within the building will be the overall reduction of vapor pressure typically present in outside ventilation air during summer months. This reduction in vapor pressure will dramatically reduce the amount of moisture entering the building and the potential of condensation resulting in moisture, and a direct relationship with the formation of mold.

Classrooms Requiring Full Air Conditioning:

Classrooms that require full air conditioning will be provided with supplemental cooling active chilled beam induction units.

E. Gymnasium:

***LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1***

The gymnasium will be served by an air-handling unit of the recirculation design. The unit will be approximately 6,500 CFM and will include supply and return fans with VFDs, 400 MBH heating and 18 Ton cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct with drum louvers to project the air to the floor. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each air-handling unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air handling unit by a low wall return air register.

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F. Small Gymnasium:  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The gymnasium will be served by an air-handling unit of the recirculation design. The unit will be approximately 2,500 CFM and will include supply and return fans with VFDs, 200 MBH heating and 7.5 Ton cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct with drum louvers to project the air to the floor. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each air-handling unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air-handling unit by a low wall return air register.

G. Multi-Purpose Room (and adjacent areas):  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Multipurpose room will be provided with a new air-handling unit of the recirculation design. The units will be approximately 5,000 CFM and will include supply and return fans with VFDs, hot water heating section with modulating capacity control, 14 ton chilled cooling system and MERV 13 filtration. Supply air ventilation to the Multi-purpose room will be provided to the space through the galvanized steel supply duct that will connect to an overhead ductwork distribution system. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 800 ppm. As levels drop generally relating to a reduction in population the air-handling unit outside air damper will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the units by low wall return air registers.

I. Administration Areas:  
**LEED for Schools Credit EO2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

Spatial heating and air-conditioning for the Administration area and Guidance offices will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants.

The ventilation air handling unit capacity will be approximately 3,000 CFM and will include supply and return fan with VFDs, 150 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 9 ton capacity chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

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J. Library/Computer Lab  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Media Center and adjacent office and Computer Lab spaces will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants.

The ventilation air handling unit capacity will be approximately 3,500 CFM and will include supply and return fan with VFDs, 150 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 10 ton capacity chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

K. Cafeteria, Servery and Staff Lunch Areas  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Cafeteria area will be served by an air-handling unit capable of providing 100% outside air. The units will be approximately 4,200 CFM and will include supply and return fan with VFDs, 400 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 12 ton chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space which will satisfy building code requirements based on population. It is proposed that spatial heating and air-conditioning for in this area will be provided with variable air volume boxes with temperature and CO2 controls. Perimeter hot water radiation heating equipment shall be provided for exterior zones.

L. Kitchen:  
**LEED for Schools Credit EP2**

The kitchen areas shall be provided with new kitchen exhaust air fan and make-up air handling unit with hot water heating. The kitchen will be heated by an heating and ventilation air-handling units with hot water heating.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the kitchen equipment vendor. This system installation shall be field installed and coordinated with the ATC and Electrical contractors

M. Lobby, Corridor, and Entry Way Heating

New hot water convectors, cabinet unit heaters and fin tube radiation heating equipment shall be installed to provide heating to these areas. Corridors shall be ventilated from adjacent air handling unit systems.

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**N. Custodial Support Areas**

Custodial support areas will be heated and ventilated by a heating and ventilation unit. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the loading dock. All custodial closets will be exhausted by exhaust air fan systems.

**O. Utility Areas:**

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The main IDF room will be air conditioned by high efficiency ductless AC cooling units.

**P. Parking Garage:**

The Parking garage shall be provided with a new exhaust air fan system for ventilation, and will be heated by hot water make up air handling units and horizontal type ceiling suspended and ducted unit heaters.

A new gas detection system shall be installed to control the exhaust air fan system operation.

**Q. Testing, Adjusting, Balancing & Commissioning:**

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

**R. Automatic Temperature Controls – Building Energy Management System**

A new DDC (direct digital control) automatic temperature control and building energy management system shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

The control system shall be proprietary as manufactured by Johnson Controls.

**S. Elevator and Stairwell Pressurization Systems:**

For all stairwells and elevators over 5 stories, provide a stairwell and elevator pressurization system for each stair and elevator. Stairwell and elevator system fan and associated controls shall be power by emergency powered circuits.

**HVAC SYSTEMS**

**NARRATIVE REPORT – OPTION 3.2 (New Construction)**

**NEW BUILDING**

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative.

1. CODES

All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC 2012 with MA Amendments, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

3. BASIS OF DESIGN: (MASS CODE)

Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

Outside: Winter 5 deg. F, Summer 91 deg. F DB 74 deg. F WB

Inside: 70 deg. F +/- 2 deg F for heating, 75 deg. F +/- 2 deg F (55% RH) for cooling for areas with air conditioning, 78 deg. F +/- 2 deg. F (<60% RH) for areas with displacement/dehumidification\*(see Displacement Ventilation note below). Unoccupied temperature setback will be provided (60 deg F heating (adj.), 85 deg F cooling/dehumidification (adj.).

Outside air is provided at the rate in accordance with ASHRAE guide 62.1-2010 and the International Mechanical Code as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. SYSTEM DESCRIPTION

A. Central Heating Plants: **LEED for Schools Credit EP2 & EC1**

Heating for the entire building will be through the use of a high efficiency gas-fired condensing boiler plant.

The new boiler plant shall be provided with (3) 3,500 MBH output boilers and (2) end suction base mounted primary and standby pumps with a capacity of 560 gpm each will be located in the mechanical room. Boilers shall each be sized for approximately 45% of



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the building heating load. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided.

The boiler plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. The boiler plants shall supply a maximum hot water temperature of 160 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the power plants. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will be depending on the location of building intake air locations and adjacent roofs.

B. Central Cooling Plant: **LEED for Schools Credit EP2 & EC1**

A high efficiency central chilled water cooling plant consisting of a 300 ton high efficiency turbocor (oil-less compressor design) water cooled chilled, primary and standby chilled water pumps with VFDs, each with a capacity of 650 gpm, accessories, controls and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building. The chilled water system will consist of a 35% propylene glycol solution. A glycol make-up feed unit system shall be provided.

An induced draft counter-flow cooling tower system, equipped with filtration and chemical treatment system and condenser water pump set and controls shall be provided as part of the chilled water system.

D. Classroom Heating and Ventilation (*General Classrooms, Art & Music, SPED, Music/Band Classrooms*):  
**LEED of Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

It is proposed that new displacement ventilation systems are installed to serve the Building classroom areas under this Option.

New air handling units with supply and return fan with VFDs, energy recovery wheels, hot water heating and chilled water cooling with modulating capacity control, sensible reheat wheel or hot pipe, and MERV 13 filtration will be provided to serve the new displacement ventilation system. Supply air will be provided to the space through new insulated, galvanized steel supply duct distribution system and shall be connected to wall mounted displacement ventilation diffusers located within the classrooms. Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the air handling unit by an insulated galvanized sheetmetal return air ductwork distribution system. Supplemental hot water fin tube radiation or ceiling radiant heating will be provided along exterior walls.

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It is estimated that the following air handling equipment will be required to serve these Classroom areas:

(4) Four air handling units with a capacity of 9,000 CFM (35 Tons Cooling, 360 MBH Heating).

Displacement Ventilation\*:

The displacement ventilation system for the classroom wings are intended to provide a maximum cooling temperature during peak cooling periods of approximately 78°F, however, the ventilation air provided will be extremely dry which will be the result of utilizing refrigeration equipment and hot gas reheat to reduce vapor pressure to an extremely low condition of approximately 50 grains of moisture per pound of air and reheating the air to a supply temperature of approximately 68°F which will be distributed to each space. The extremely dry condition of the supply air provides the perception of a condition that is cooler than is actually occurring due to the evaporation of moisture to the adjacent air from the occupants of the space.

Considering maximum cooling requirements occur primarily during the months of July and August when the majority of the academic areas are not in use, it would suggest maintaining slightly higher temperatures may not present a discomfort, however, will relate to a substantial operating cost savings and a reduced installation cost.

An additional major benefit of utilizing dry air within the building will be the overall reduction of vapor pressure typically present in outside ventilation air during summer months. This reduction in vapor pressure will dramatically reduce the amount of moisture entering the building and the potential of condensation resulting in moisture, and a direct relationship with the formation of mold.

Classrooms Requiring Full Air Conditioning:

Classrooms that require full air conditioning will be provided with supplemental cooling active chilled beam induction units.

E. **Gymnasium:**  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The gymnasium will be served by an air-handling unit of the recirculation design. The unit will be approximately 6,500 CFM and will include supply and return fans with VFDs, 400 MBH heating and 18 Ton cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct with drum louvers to project the air to the floor. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each air-handling unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air handling unit by a low wall return air register.

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F. Small Gymnasium:  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The gymnasium will be served by an air-handling unit of the recirculation design. The unit will be approximately 2,500 CFM and will include supply and return fans with VFDs, 200 MBH heating and 7.5 Ton cooling with modulating capacity control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct with drum louvers to project the air to the floor. As levels of carbon dioxide drop generally relating to a reduction in population a variable frequency drive located in each air-handling unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air-handling unit by a low wall return air register.

G. Multi-Purpose Room (and adjacent areas):  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Multipurpose room will be provided with a new air-handling unit of the recirculation design. The units will be approximately 5,000 CFM and will include supply and return fans with VFDs, hot water heating section with modulating capacity control, 14 ton chilled cooling system and MERV 13 filtration. Supply air ventilation to the Multi-purpose room will be provided to the space through the galvanized steel supply duct that will connect to an overhead supply air distribution system. In addition, carbon dioxide controls will be installed which will monitor the overall level of carbon dioxide at a threshold level of 800 ppm. As levels drop generally relating to a reduction in population the air-handling unit outside air damper will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the units by low wall return air registers.

I. Administration Areas:  
**LEED for Schools Credit EO2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

Spatial heating and air-conditioning for the Administration area and Guidance offices will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants.

The ventilation air handling unit capacity will be approximately 3,000 CFM and will include supply and return fan with VFDs, 150 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 9 ton capacity chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

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J. Library/Computer Lab  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Media Center and adjacent office and Computer Lab spaces will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the boiler and chilled water power plants.

The ventilation air handling unit capacity will be approximately 3,500 CFM and will include supply and return fan with VFDs, 150 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 10 ton capacity chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

K. Cafeteria, Servery and Staff Lunch Areas  
**LEED for Schools Credit EP2, EC1, EC5, IEQP1, IEQC1, 2, 3.1, 3.2, 5, 6.2 & 7.1**

The Cafeteria area will be served by an air-handling unit capable of providing 100% outside air. The units will be approximately 4,200 CFM and will include supply and return fan with VFDs, 400 MBH hot water heating section with modulating capacity control, MERV 13 filtration, 12 ton chilled water cooling section, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space which will satisfy building code requirements based on population. It is proposed that spatial heating and air-conditioning for in this area will be provided with variable air volume boxes with temperature and CO2 controls. Perimeter hot water radiation heating equipment shall be provided for exterior zones.

L. Kitchen:  
**LEED for Schools Credit EP2**

The kitchen areas shall be provided with new kitchen exhaust air fan and make-up air handling unit with hot water heating. The kitchen will be heated by an heating and ventilation air-handling units with hot water heating.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the kitchen equipment vendor. This system installation shall be field installed and coordinated with the ATC and Electrical contractors

M. Lobby, Corridor, and Entry Way Heating

New hot water convectors, cabinet unit heaters and fin tube radiation heating equipment shall be installed to provide heating to these areas. Corridors shall be ventilated from adjacent air handling unit systems.

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N. Custodial Support Areas

Custodial support areas will be heated and ventilated by a heating and ventilation unit. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the loading dock. All custodial closets will be exhausted by exhaust air fan systems.

O. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The main IDF room will be air conditioned by high efficiency ductless AC cooling units.

P. Parking Garage:

The Parking garage shall be provided with a new exhaust air fan system for ventilation, and will be heated by hot water make up air handling units and horizontal type ceiling suspended and ducted unit heaters.

A new gas detection system shall be installed to control the exhaust air fan system operation.

Q. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

R. Automatic Temperature Controls – Building Energy Management System

A new DDC (direct digital control) automatic temperature control and building energy management system shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

The control system shall be proprietary as manufactured by Johnson Controls.



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**ELECTRICAL SYSTEMS**

**NARRATIVE REPORT FOR OPTION 0 (Base Repair)**

The following is the Electrical system narrative, which defines the scope of work and capacities of the Power and Lighting System as well as the Basis of Design. The electrical systems shall be designed and constructed in accordance with **LEED for Schools**.

1. CODES

All work installed under Division 26 shall comply with the Massachusetts State Building Code, IBC 2009 Appendix 115AA - Stretch Energy Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Division 26 is as described in this narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the electrical work and all items incidental thereto, including commissioning and testing.

3. SEQUENCE OF OPERATIONS AND INTERACTIONS

- A. Classroom and corridor lighting will be controlled via “smart panels”, which is achieved through programming self-contained solenoid operated circuit breakers. The control of the circuit breakers shall be by automatic means such as an occupancy sensor in each classroom. The system will be interfaced with the DDC control system for schedule functions. The controllability shall be in conformance with **LEED for Schools IEQ Credit 6.1**. The occupancy sensor shall have auxiliary contacts for DDC input functions.
- B. Exterior lighting will be controlled by photocell “on” and “smart panel” for “off” operation. The parking area lighting will be controlled by “zones” and have dual level control.
- C. Emergency and exit lighting will be run through life safety panels to be “on” during normal power conditions as well as power outage conditions. The emergency lighting system will have time control so that lights are “on” only when building is occupied.

4. DESCRIPTION OF THE SYSTEMS

A. Electrical Distribution System:

- 1. Service ratings are designed for a demand load of 10 watts/s.f. The service capacity will be sized for 2000 amperes with 100 percent rating at 277/480 volt, 3 phase, 4 wire. New lighting and power panels will be provided to accommodate respective loads. The equipment will be located in dedicated rooms or closets.
- 2. The new electrical main service will be located in the existing main electrical room. The main electrical room will be constructed as part of Phase One.

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B. Interior Lighting System:

1. Classroom lighting fixtures shall consist of pendant-mounted direct/indirect fluorescent luminaires with T5HO lamps and electronic dimming ballasts. The fixtures will be pre-wired for dimming control where natural daylight is available and also for multi-level switching. Two daylight zones will be provided in each classroom.
2. Office lighting fixtures will consist of recessed indirect fluorescent luminaires with T5HO lamps and electronic ballasts. Offices on the perimeter with windows shall have daylight dimming controls similar to classrooms. The classroom power density will be targeted for less than 0.6 watts/sq. ft.

In general lighting power density will be 30-40 percent less than IECC 2009. The power density reduction relates to **LEED for Schools Credit EAC1**.

3. Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming foot candle level will be in compliance with **LEED for Schools Credit IEQ 6.1**
4. Gymnasium lighting will be comprised of direct fluorescent fixtures with slots for an up-light component with T5HO lamps and electronic ballasts. The fixtures will be provided with protective wire guards. The light level will be designed for approximately 50 foot candles.  
  
Daylight dimming will be provided within 15 ft. of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.
5. Corridor lighting will be comprised of recessed lighting similar to offices. The corridor light level will be designed for approximately 15 foot candles. Corridor lighting will be on time clock control and only "on" during occupied hours. The corridor lighting will have two level controlled by schedule on DDC system.
6. Cafeteria lighting will be recessed indirect fluorescent fixtures with electronic ballasts. The light levels will be designed for approximately 20 foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 ft. of glazing
7. Multipurpose Room theatrical lights with a dimming system will be provided for performances. House lighting in Multipurpose Room will be dimmable fluorescent and controlled by theatrical house dimming system. Theatrical border lights shall be LED with "RGB" control.
8. Kitchen and servery lighting will consist of recessed 2 ft. x 4 ft. acrylic lensed gasketed troffers with aluminum frame doors with three T5 lamps and electronic ballasts. Light levels will be approximately 50 foot candles.

9. Each area will be locally switched and designed for multi-level controls. Each classroom, office space and toilet room will have an occupancy sensor to turn lights off when unoccupied. Daylight sensors will be installed in each room

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where natural light is available for dimming of light fixtures. The control system shall be in accordance with **LEED for Schools Credit IEQ 6.1**.

10. The entire school will be controlled with an automatic lighting control system using the DDC control system for programming lights on and off.

C. Emergency Generator Power:

1. An exterior 200 kw natural gas emergency generator with sound attenuated enclosure will be provided. Light fixtures and LED exit signs will be installed to serve all egress areas such as corridors, intervening spaces, toilets, stairs, and exit discharge exterior doors. The administration area lighting and selected receptacles will be connected to the emergency generator.
2. The generator will be sized to include fire safety systems, boilers and circulating pumps, refrigeration equipment, communications systems, etc.

D. Site Lighting System

1. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the entry drive and drop-off area. The fixtures shall be per *Town of Brookline standards*. The exterior lighting will be connected to the automatic lighting control system for photocell on and timed off operation. Fixtures for the underground parking shall be low profile, suspended 'LED' fixtures. The site lighting fixtures will be dark sky compliant. The illumination level is 0.50 fc for parking areas. The site lighting system shall be in conformance with **LEED for Schools Credit SSC8**.
2. Building perimeter fixtures will be 'LED' wall-mounted, cut-off over exterior doors for exit discharge.

E. Wiring Devices:

1. Each classroom will have a minimum of two duplex receptacles per teaching wall and two double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle, also on a dedicated circuit.
2. Office areas will generally have one duplex outlet per wall. At each workstation a double duplex receptacle will be provided.
3. Corridors will have a cleaning receptacle at approximately 25 ft. intervals.
4. Exterior weatherproof receptacles with lockable enclosures will be installed at exterior doors.
5. A system of computer grade panelboards with double neutrals and transient voltage surge suppressors will be provided for receptacle circuits.

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6. Certain plug loads such as copiers, printers, and electric water coolers will be controlled by the DDC system for shutdown on a schedule basis.

F. Fire Alarm System:

1. A fire alarm and detection system will be provided with battery back-up. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.
2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.
3. The sprinkler system will be supervised for water flow and tampering with valves.
4. Speaker/strobes will be provided in egress ways, classrooms, assembly spaces, open areas and other large spaces. Strobe-only units will be provided in single toilets and conference rooms.
5. Manual pull stations will be provided at exit discharge doors and at each egress stairwell not located at grade level.
6. The system will be remotely connected to automatically report alarms to fire department via an approved method by the fire department.

G. Uninterruptible Power Supply (UPS):

1. One 30kw, three-phase centralized UPS systems will be provided with battery back-up.
2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers, communication systems, etc. during a prolonged power outage.
3. The UPS systems will also be connected to the standby generator.

5. TESTING REQUIREMENTS

The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's representative present:

- Lighting and power panels for correct phase balance.
- Emergency generator.
- Lighting control system (interior and exterior).
- Fire alarm system.
- Security system.

Testing reports shall be submitted to the engineer for review and approval before providing to the Owner.

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**6. OPERATION MANUALS AND MAINTENANCE MANUALS:**

When the project is completed, the Electrical Contractor shall provide operation and maintenance manuals to the Owner.

**7. RECORD DRAWINGS AND CONTROL DOCUMENTS:**

When the project is complete, an as-built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

**8. COMMISSIONING**

The project will be commissioned per Section 018100 of the specifications.

**9. CCTV**

A Closed Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end MDF room and will be rack-mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders NVR's will record all cameras and store this information for 21 days at 15 images per second (virtual real time).

The location of the cameras is generally in corridors and exterior building perimeter. The exterior cameras are pan-tilt-zoom type.

The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

**10. INTRUSION SYSTEM**

An intrusion system will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, and door contacts at each exterior door.

The system can be partitioned into several zones. Therefore, it is possible to use the Gym area while the remainder of the school remains alarmed.

The system will include a digital transmitter to summons the local police department in the event of an alarm condition

The intrusion system will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

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11. CARD ACCESS

A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer.

The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end user to quickly identify alarm conditions and lock/unlock doors.

The system is modular and may be easily expanded to accommodate any additional devices.

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**ELECTRICAL SYSTEMS**

**NARRATIVE REPORT – OPTION 1.1 and 1.4 (Addition/Renovation)**

The following is the Electrical system narrative, which defines the scope of work and capacities of the Power and Lighting system as well as the Basis of Design. The electrical systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative. This project shall confirm to LEED Silver rating.

1. CODES

All work installed under Division 26 shall comply with the Massachusetts State Building Code, IBC 2009 Appendix 115AA - Stretch Energy Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Section 260000 is indicated in this narrative report. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. SEQUENCE OF OPERATIONS AND INTERACTIONS

- A. Classroom and corridor lighting will be controlled via “addressable relays”, which is achieved through programming. The control of the relays shall be by automatic means such as an occupancy sensor in each classroom. The controllability shall be in conformance with **LEED for Schools IEQ Credit 6.1**.
- B. Exterior lighting will be controlled by photocell “on” and “schedule” for “off” operation. The vehicle circulation area lighting will be controlled by “zones” and will have dimming-level control.
- C. Emergency and exit lighting will be run through life safety panels to be on during normal power conditions as well as power outage conditions.

4. DESCRIPTION OF THE SYSTEMS

A. Electrical Distribution System:

- 1. New construction service ratings are designed for a demand load of 10 watts/s.f. The service capacity will be sized for 2000 amperes with 100% rating at 277/480 volt, 3 $\phi$ , 4wire. New lighting and power panels will be provided to accommodate respective loads. The service capacity will be sized for 20% spare capacity.

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B. Interior Lighting System:

1. Classroom lighting fixtures consist of pendant mounted indirect fluorescent luminaires with T5HO lamps and electronic ballasts. The fixtures will be pre-wired for dimming control where natural daylight is available and also for multi-level switching. Office lighting fixtures will consist of similar fixtures to classrooms. Offices on the perimeter with windows shall have daylight dimming controls. In existing building recessed volumetric fixtures will be used with T5HO lamps and electric ballasts.

In general lighting power density will be 30-40 percent less than IECC 2009. The power density reduction relates to **LEED for Schools Credit EAC1**.

2. Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming footcandle level will be in compliance with **LEED for Schools IEQ 6.1**.
3. Gymnasium lighting will be comprised of direct LED fixtures with dimming drivers. The fixtures will be provided with protective wire guards. The light level will be designed for approximately 30 foot candles.  
  
Daylight dimming will be provided within 15 feet of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.
4. Corridor lighting will be comprised of linear indirect lighting using LED light source. The corridor light level will be designed for approximately 15 foot candles. Corridor lighting will be on a schedule through the DDC system control and only "on" during occupied hours. The corridor lighting will have two level control.
5. Cafeteria lighting will be pendant mounted/indirect fluorescent fixtures with electronic ballasts. The light levels will be designed for approximately 20 foot candles.
6. Multipurpose Room theatrical lights with a dimming system will be provided for performances. House lighting in Multipurpose Room will be dimmable fluorescent and controlled by theatrical house dimming system. Theatrical border lights shall be LED with "RGB" control.
7. Kitchen and Served lighting will consist of recessed 2 ft. x 2 ft. lensed gasketed LED panels. Light levels will be approximately 50 foot candles.
8. Library lighting will consist of indirect fluorescent fixtures with T5HO lamps and electronic ballasts. Light levels will be approximately 30 foot candles.

9. Each area will be locally switched and designed for multi-level controls. Each classroom, office space and toilet rooms will have an occupancy sensor to turn lights off when unoccupied. Daylight sensors will be installed in each room where natural light is available for dimming of light fixtures.
10. The entire school will be controlled with an automatic lighting control system



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using the DDC control system for schedule programming of lights.

C. Emergency Lighting System:

1. An exterior 200 kw natural gas fuelled indoor emergency generator with sound attenuated housing will be provided. Light fixtures and LED exit signs will be installed to serve all egress areas such as corridors, intervening spaces, toilets, stairs and exit discharge exterior doors. The administration area lighting will be connected to the emergency generator.
2. The generator will be sized to include life safety systems, boilers and circulating pumps, communications systems and kitchen refrigeration.

D. Site Lighting System

1. Fixtures for area lighting will be pole-mounted cut-off 'LED' luminaries in the drop-off and walkway areas. The fixtures shall be per Town of Brookline standards. Pole heights will be below 20 ft. Fixtures for the underground parking shall be low profile, suspended 'LED' fixtures. The exterior lighting will be connected to the automatic lighting control system for photocell on and timed off operation. The site lighting fixtures will be dark sky compliant. The illumination level is 0.5 foot candle minimum for parking areas in accordance with Illuminating Engineering Society. The site lighting system shall be in conformance with **LEED for Schools Credit SSC8**.
2. Building perimeter fixtures will be wall mounted cut-off over exterior doors for exit discharge.

E. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit. Refer to drawings.
2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.
3. Corridors will have a cleaning receptacle at approximately 25 foot intervals.
4. Exterior weatherproof receptacles will be installed at exterior doors.
5. A system of computer grade panelboards with double neutrals and transient voltage surge suppressors will be provided for receptacle circuits.

F. Fire Alarm System:

1. A fire alarm and detection system will be provided with 60 battery back-up. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.

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2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.
3. The sprinkler system will be supervised for water flow and tampering with valves.
4. Speaker/strobes will be provided in egress ways, classrooms, assembly spaces, open areas and other large spaces. Strobe only units will be provided in single toilets and conference rooms.
5. Manual pull stations will be provided at exit discharge doors.
6. The system will be remotely connected to automatically report alarms to fire department via an approved method by the fire department.

G. Uninterruptible Power Supply (UPS):

1. One (1) 30kw, three (3) phase centralized UPS systems will be provided with battery back-up.
2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers, communication systems, etc. during a prolonged power outage.
3. The UPS systems will also be connected to the stand by generator.

H. Lightning Protection System:

1. A system of lightning protection devices will be provided.
2. The lightning protection equipment will include air terminals, conductors, conduits, fasteners, connectors, ground rods, etc.

5. TESTING REQUIREMENTS

The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's representative present:

- Lighting and power panels for correct phase balance.
- Emergency generator.
- Lighting control system (interior and exterior).
- Fire alarm system.
- Security system.
- Lightning protection system.

Testing reports shall be submitted to the engineer for review and approval before providing to the Owner.

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6. OPERATION MANUALS AND MAINTENANCE MANUALS:

When the project is completed, the Electrical Contractor shall provide operation and maintenance manuals to the Owner.

7. RECORD DRAWINGS AND CONTROL DOCUMENTS:

When the project is completed, an as-built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

8. COMMISSIONING

The project shall be commissioned per Section 018000 of the specifications.

9. RENEWABLE ENERGY PROVISIONS

Provisions for a renewable energy system will consist of a 30 kw grid connected photovoltaic PV system intended to reduce the facilities demand for electricity by three percent. The photovoltaic system will operate in conformance with the green schools initiative. System will consist of roof mounted photovoltaic modules, weather station, data acquisition system and inverters. Interactive display terminals will be provided for students and for public awareness of the benefits of renewable energy. The system will be modular in design which will allow for future additions. The wind turbines relate to **LEED Credit EAC2**.

10. SITE UTILITIES

The Electric, Telephone and Cable TV utilities will be underground for each system provided.

11. CCTV

A Closed Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time).

The location of the cameras is generally in corridors and exterior building perimeter. The exterior cameras are pan-tilt-zoom type.

The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

12. INTRUSION SYSTEM

An intrusion system will consists of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.

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The system can be partitioned into several zones. Therefore, it is possible to use the Gym area while the remainder of the school remains alarmed.

The system will include a digital transmitter to summons the local police department in the event of an alarm condition

The intrusion system will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

13. CARD ACCESS

A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer.

The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.

The system is modular and may be easily expanded to accommodate any additional devices.

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**ELECTRICAL SYSTEMS**

**NARRATIVE REPORT – OPTION 2 (Renovation/Addition)**

The following is the Electrical system narrative, which defines the scope of work and capacities of the Power and Lighting system as well as the Basis of Design. The electrical systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative. This project shall confirm to LEED Silver rating.

1. CODES

All work installed under Division 26 shall comply with the Massachusetts State Building Code, IBC 2009 Appendix 115AA - Stretch Energy Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Section 260000 is indicated in this narrative report. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. SEQUENCE OF OPERATIONS AND INTERACTIONS

- A. Classroom and corridor lighting will be controlled via “addressable relays”, which is achieved through programming. The control of the relays shall be by automatic means such as an occupancy sensor in each classroom. The controllability shall be in conformance with **LEED for Schools IEQ Credit 6.1**.
- B. Exterior lighting will be controlled by photocell “on” and “schedule” for “off” operation. The vehicle circulation area lighting will be controlled by “zones” and will have dimming-level control.
- C. Emergency and exit lighting will be run through life safety panels to be on during normal power conditions as well as power outage conditions.

4. DESCRIPTION OF THE SYSTEMS

A. Electrical Distribution System:

- 1. New construction service ratings are designed for a demand load of 10 watts/s.f. The service capacity will be sized for 2000 amperes with 100% rating at 277/480 volt, 3 $\phi$ , 4wire. New lighting and power panels will be provided to accommodate respective loads. The service capacity will be sized for 20% spare capacity.

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B. Interior Lighting System:

1. Classroom lighting fixtures consist of pendant mounted indirect fluorescent luminaries with T5HO lamps and electronic ballasts. The fixtures will be pre-wired for dimming control where natural daylight is available and also for multi-level switching. Office lighting fixtures will consist of similar fixtures to classrooms. Offices on the perimeter with windows shall have daylight dimming controls. In existing building recessed volumetric fixtures will be used with T5HO lamps and electric ballasts.

In general lighting power density will be 30-40 percent less than IECC 2009. The power density reduction relates to **LEED for Schools Credit EAC1**.

2. Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming footcandle level will be in compliance with **LEED for Schools IEQ 6.1**.
3. Gymnasium lighting will be comprised of direct LED fixtures with dimming drivers. The fixtures will be provided with protective wire guards. The light level will be designed for approximately 30 foot candles.

Daylight dimming will be provided within 15 feet of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.

4. Corridor lighting will be comprised of linear indirect lighting using LED light source. The corridor light level will be designed for approximately 15 foot candles. Corridor lighting will be on a schedule through the DDC system control and only "on" during occupied hours. The corridor lighting will have two level control.
5. Cafeteria lighting will be pendant mounted/indirect fluorescent fixtures with electronic ballasts. The light levels will be designed for approximately 20 foot candles.
6. Multipurpose Room theatrical lights with a dimming system will be provided for performances. House lighting in Multipurpose Room will be dimmable fluorescent and controlled by theatrical house dimming system. Theatrical border lights shall be LED with "RGB" control.
7. Kitchen and Served lighting will consist of recessed 2 ft. x 2 ft. lensed gasketed LED panels. Light levels will be approximately 50 foot candles.
8. Library lighting will consist of indirect fluorescent fixtures with T5HO lamps and electronic ballasts. Light levels will be approximately 30 foot candles.
9. Each area will be locally switched and designed for multi-level controls. Each classroom, office space and toilet rooms will have an occupancy sensor to turn lights off when unoccupied. Daylight sensors will be installed in each room where natural light is available for dimming of light fixtures.
10. The entire school will be controlled with an automatic lighting control system

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using the DDC control system for schedule programming of lights.

C. Emergency Lighting System:

1. An exterior 200 kw natural gas fuelled indoor emergency generator with sound attenuated housing will be provided. Light fixtures and LED exit signs will be installed to serve all egress areas such as corridors, intervening spaces, toilets, stairs and exit discharge exterior doors. The administration area lighting will be connected to the emergency generator.
2. The generator will be sized to include life safety systems, boilers and circulating pumps, communications systems and kitchen refrigeration.

D. Site Lighting System

1. Fixtures for area lighting will be pole-mounted cut-off 'LED' luminaries in the drop-off and walkway areas. The fixtures shall be per Town of Brookline standards. Pole heights will be below 20 ft. Fixtures for the underground parking shall be low profile, suspended 'LED' fixtures. The exterior lighting will be connected to the automatic lighting control system for photocell on and timed off operation. The site lighting fixtures will be dark sky compliant. The illumination level is 0.5 foot candle minimum for parking areas in accordance with Illuminating Engineering Society. The site lighting system shall be in conformance with **LEED for Schools Credit SSC8**.
2. Building perimeter fixtures will be wall mounted cut-off over exterior doors for exit discharge.

E. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit. Refer to drawings.
2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.
3. Corridors will have a cleaning receptacle at approximately 25 foot intervals.
4. Exterior weatherproof receptacles will be installed at exterior doors.
5. A system of computer grade panelboards with double neutrals and transient voltage surge suppressors will be provided for receptacle circuits.

F. Fire Alarm System:

1. A fire alarm and detection system will be provided with 60 battery back-up. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.

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2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.
3. The sprinkler system will be supervised for water flow and tampering with valves.
4. Speaker/strobes will be provided in egress ways, classrooms, assembly spaces, open areas and other large spaces. Strobe only units will be provided in single toilets and conference rooms.
5. Manual pull stations will be provided at exit discharge doors.
6. The system will be remotely connected to automatically report alarms to fire department via an approved method by the fire department.

G. Uninterruptible Power Supply (UPS):

1. One (1) 30kw, three (3) phase centralized UPS systems will be provided with battery back-up.
2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers, communication systems, etc. during a prolonged power outage.
3. The UPS systems will also be connected to the stand by generator.

H. Lightning Protection System:

1. A system of lightning protection devices will be provided.
2. The lightning protection equipment will include air terminals, conductors, conduits, fasteners, connectors, ground rods, etc.

5. TESTING REQUIREMENTS

The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's representative present:

- Lighting and power panels for correct phase balance.
- Emergency generator.
- Lighting control system (interior and exterior).
- Fire alarm system.
- Security system.
- Lightning protection system.

Testing reports shall be submitted to the engineer for review and approval before providing to the Owner.

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**6. OPERATION MANUALS AND MAINTENANCE MANUALS:**

When the project is completed, the Electrical Contractor shall provide operation and maintenance manuals to the Owner.

**7. RECORD DRAWINGS AND CONTROL DOCUMENTS:**

When the project is completed, an as-built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

**8. COMMISSIONING**

The project shall be commissioned per Section 018000 of the specifications.

**9. RENEWABLE ENERGY PROVISIONS**

Provisions for a renewable energy system will consist of a 30 kw grid connected photovoltaic PV system intended to reduce the facilities demand for electricity by three percent. The photovoltaic system will operate in conformance with the green schools initiative. System will consist of roof mounted photovoltaic modules, weather station, data acquisition system and inverters. Interactive display terminals will be provided for students and for public awareness of the benefits of renewable energy. The system will be modular in design which will allow for future additions. The wind turbines relate to **LEED Credit EAC2**.

**10. SITE UTILITIES**

The Electric, Telephone and Cable TV utilities will be underground for each system provided.

**11. CCTV**

A Closed Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time).

The location of the cameras is generally in corridors and exterior building perimeter. The exterior cameras are pan-tilt-zoom type.

The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

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12. INTRUSION SYSTEM

An intrusion system will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.

The system can be partitioned into several zones. Therefore, it is possible to use the Gym area while the remainder of the school remains alarmed.

The system will include a digital transmitter to summons the local police department in the event of an alarm condition

The intrusion system will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

13. CARD ACCESS

A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer.

The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.

The system is modular and may be easily expanded to accommodate any additional devices.



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**ELECTRICAL SYSTEMS**

**NARRATIVE REPORT – OPTION 3.2 (New Construction)**

The following is the Electrical system narrative, which defines the scope of work and capacities of the Power and Lighting system as well as the Basis of Design. The electrical systems shall be designed and constructed for **LEED for Schools** where indicated on this narrative. This project shall confirm to LEED Silver rating.

1. CODES

All work installed under Division 26 shall comply with the Massachusetts State Building Code, IBC 2009 Appendix 115AA - Stretch Energy Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Section 260000 is indicated in this narrative report. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. SEQUENCE OF OPERATIONS AND INTERACTIONS

- A. Classroom and corridor lighting will be controlled via “addressable relays”, which is achieved through programming. The control of the relays shall be by automatic means such as an occupancy sensor in each classroom. The controllability shall be in conformance with **LEED for Schools IEQ Credit 6.1**.
- B. Exterior lighting will be controlled by photocell “on” and “schedule” for “off” operation. The vehicle circulation area lighting will be controlled by “zones” and will have dimming-level control.
- C. Emergency and exit lighting will be run through life safety panels to be on during normal power conditions as well as power outage conditions.

4. DESCRIPTION OF THE SYSTEMS

A. Electrical Distribution System:

- 1. New construction service ratings are designed for a demand load of 10 watts/s.f. The service capacity will be sized for 2000 amperes with 100% rating at 277/480 volt, 3 $\phi$ , 4wire. New lighting and power panels will be provided to accommodate respective loads. The service capacity will be sized for 20% spare capacity.

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B. Interior Lighting System:

1. Classroom lighting fixtures consist of pendant mounted indirect fluorescent luminaires with T5HO lamps and electronic ballasts. The fixtures will be pre-wired for dimming control where natural daylight is available and also for multi-level switching. Office lighting fixtures will consist of similar fixtures to classrooms. Offices on the perimeter with windows shall have daylight dimming controls. In existing building recessed volumetric fixtures will be used with T5HO lamps and electric ballasts.

In general lighting power density will be 30-40 percent less than IECC 2009. The power density reduction relates to **LEED for Schools Credit EAC1**.

2. Lighting levels will be approximately 30 foot candles in classrooms and offices. The daylight dimming footcandle level will be in compliance with **LEED for Schools IEQ 6.1**.
3. Gymnasium lighting will be comprised of direct LED fixtures with dimming drivers. The fixtures will be provided with protective wire guards. The light level will be designed for approximately 30 foot candles.

Daylight dimming will be provided within 15 feet of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.

4. Corridor lighting will be comprised of linear indirect lighting using LED light source. The corridor light level will be designed for approximately 15 foot candles. Corridor lighting will be on a schedule through the DDC system control and only "on" during occupied hours. The corridor lighting will have two level control.
5. Cafeteria lighting will be pendant mounted/indirect fluorescent fixtures with electronic ballasts. The light levels will be designed for approximately 20 foot candles.
6. Multipurpose Room theatrical lights with a dimming system will be provided for performances. House lighting in Multipurpose Room will be dimmable fluorescent and controlled by theatrical house dimming system. Theatrical border lights shall be LED with "RGB" control.
7. Kitchen and Served lighting will consist of recessed 2 ft. x 2 ft. lensed gasketed LED panels. Light levels will be approximately 50 foot candles.
8. Library lighting will consist of indirect fluorescent fixtures with T5HO lamps and electronic ballasts. Light levels will be approximately 30 foot candles.
9. Each area will be locally switched and designed for multi-level controls. Each classroom, office space and toilet rooms will have an occupancy sensor to turn lights off when unoccupied. Daylight sensors will be installed in each room where natural light is available for dimming of light fixtures.
10. The entire school will be controlled with an automatic lighting control system

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using the DDC control system for schedule programming of lights.

C. Emergency Lighting System:

1. An exterior 200 kw natural gas fuelled indoor emergency generator with sound attenuated housing will be provided. Light fixtures and LED exit signs will be installed to serve all egress areas such as corridors, intervening spaces, toilets, stairs and exit discharge exterior doors. The administration area lighting will be connected to the emergency generator.
2. The generator will be sized to include life safety systems, boilers and circulating pumps, communications systems and kitchen refrigeration.

D. Site Lighting System

1. Fixtures for area lighting will be pole-mounted cut-off 'LED' luminaries in the parking, drop-off, and walkway areas. The fixtures shall be per Town of Brookline standards. Pole heights will be below 20 ft. Fixtures for the underground parking shall be low profile, suspended 'LED' fixtures. The exterior lighting will be connected to the automatic lighting control system for photocell on and timed off operation. The site lighting fixtures will be dark sky compliant. The illumination level is 0.5 foot candle minimum for parking areas in accordance with Illuminating Engineering Society. The site lighting system shall be in conformance with **LEED for Schools Credit SSC8**.
2. Building perimeter fixtures will be wall mounted cut-off over exterior doors for exit discharge.

E. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit. Refer to drawings.
2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.
3. Corridors will have a cleaning receptacle at approximately 25 foot intervals.
4. Exterior weatherproof receptacles will be installed at exterior doors.
5. A system of computer grade panelboards with double neutrals and transient voltage surge suppressors will be provided for receptacle circuits.

F. Fire Alarm System:

1. A fire alarm and detection system will be provided with 60 battery back-up. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.

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2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.
3. The sprinkler system will be supervised for water flow and tampering with valves.
4. Speaker/strobes will be provided in egress ways, classrooms, assembly spaces, open areas and other large spaces. Strobe only units will be provided in single toilets and conference rooms.
5. Manual pull stations will be provided at exit discharge doors.
6. The system will be remotely connected to automatically report alarms to fire department via an approved method by the fire department.

G. Uninterruptible Power Supply (UPS):

1. One (1) 30kw, three (3) phase centralized UPS systems will be provided with battery back-up.
2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers, communication systems, etc. during a prolonged power outage.
3. The UPS systems will also be connected to the stand by generator.

H. Lightning Protection System:

1. A system of lightning protection devices will be provided.
2. The lightning protection equipment will include air terminals, conductors, conduits, fasteners, connectors, ground rods, etc.

5. TESTING REQUIREMENTS

The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's representative present:

- Lighting and power panels for correct phase balance.
- Emergency generator.
- Lighting control system (interior and exterior).
- Fire alarm system.
- Security system.
- Lightning protection system.

Testing reports shall be submitted to the engineer for review and approval before providing to the Owner.

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6. OPERATION MANUALS AND MAINTENANCE MANUALS:

When the project is completed, the Electrical Contractor shall provide operation and maintenance manuals to the Owner.

7. RECORD DRAWINGS AND CONTROL DOCUMENTS:

When the project is completed, an as-built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

8. COMMISSIONING

The project shall be commissioned per Section 018000 of the specifications.

9. RENEWABLE ENERGY PROVISIONS

Provisions for a renewable energy system will consist of a 30 kw grid connected photovoltaic PV system intended to reduce the facilities demand for electricity by three percent. The photovoltaic system will operate in conformance with the green schools initiative. System will consist of roof mounted photovoltaic modules, weather station, data acquisition system and inverters. Interactive display terminals will be provided for students and for public awareness of the benefits of renewable energy. The system will be modular in design which will allow for future additions. The wind turbines relate to **LEED Credit EAC2**.

10. SITE UTILITIES

The Electric, Telephone and Cable TV utilities will be underground for each system provided.

11. CCTV

A Closed Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time).

The location of the cameras is generally in corridors and exterior building perimeter. The exterior cameras are pan-tilt-zoom type.

The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

12. INTRUSION SYSTEM

An intrusion system will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.

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The system can be partitioned into several zones. Therefore, it is possible to use the Gym area while the remainder of the school remains alarmed.

The system will include a digital transmitter to summons the local police department in the event of an alarm condition

The intrusion system will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

13. **CARD ACCESS**

A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer.

The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.

The system is modular and may be easily expanded to accommodate any additional devices.