HARVARD
UNIVERSITY

FINAL ENVIRONMENTAL IMPACT REPORT

HARVARD UNIVERSITY'S CAMPUS IN ALLSTON | AUGUST 2014 | EEA #14069

FINAL ENVIRONMENTAL IMPACT REPORT (FEIR)

Harvard University's Campus in Allston

Submitted to:

The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs

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1.0 PROJECT DESCRIPTION

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INTRODUCTION

This Final Environmental Impact Report (FEIR) presents Harvard's Ten-Year Institutional Master Plan (IMP) for its campus in Allston. The Ten-Year Plan comprises nine projects (seven new construction and two renovation). In addition, the Ten-Year Plan includes additional small projects that may be undertaken by Harvard Athletics (described later in this chapter) that are included for completeness. The University plans to undertake these projects and associated infrastructure and open space improvements over the next decade.

A Long-Term Vision guides near-term thinking. It provides a framework and guidelines for campus development irrespective of time. Each project in the Ten-Year Plan will contribute to the completeness of this vision.

The material included in this FEIR responds to the Secretary's Certificate on the Draft Environmental Impact Report (DEIR) dated February 14, 2014 and is the core of the IMP approved by the Boston Redevelopment Authority and Boston Zoning Commission, tailored to and supplemented to meet the requirements of MEPA.

REGULATORY REQUIREMENTS

City of Boston Review

The Institutional Master Plan (IMP) was submitted to the Boston Redevelopment Authority (BRA) by the President and Fellows of Harvard College (Harvard or the University) in accordance with Section 80D-5 of the Boston Zoning Code. On October 17, 2012 Harvard submitted an Institutional Master Plan Notification Form (IMPNF) to begin the review process for a new IMP for Harvard University's Campus in Allston. On March 29, 2013 the BRA issued a Scoping Determination outlining the issues to be addressed in an IMP. The October 2013 final IMP was a revised version of the IMP submitted by Harvard in July 2013. Revisions included additional and changed provisions agreed upon by the BRA and Harvard in advance of the October 17, 2013 BRA Board hearing. The IMP was approved by the BRA Board at the October 17 hearing and was subsequently approved by the Boston Zoning Commission on November 20, 2013.

Beyond the specific projects included in the IMP, the approval included an extensive program of community benefits. These benefits focused on integrating the University and community through educational programs, shared spaces, and pedestrian-friendly, environmentally sustainable public realm improvements both on and off campus. These commitments have been memorialized in a series of agreements between Harvard and the City, including a Cooperation Agreement, Institutional Construction Management Plan guidelines, and a Transportation Access Plan Agreement.

Based on discussions with the Harvard Allston Task Force (the "Task Force") and the BRA, and as memorialized in a signed Cooperation Agreement, a package of community benefits totaling approximately $43,000,000 will be provided as described below:

- public realm improvements, including a public realm flexible fund ($9,750,000);
- educational programs ($4,500,000);
- workforce development including jobs linkage ($4,000,000);
- the Harvard Allston Partnership Fund ($500,000);
- the Harvard Allston Housing Fund ($3,000,000);
- housing linkage funding (up to $11,000,000);
- donation of the Brookline Machine site ($2,000,000); and
- the Transformative Project ($8,250,000)[1].

In addition, through the BRA's review process the University made commitments in a number of other areas including:

- signing transportation access plan agreements, construction management plan agreements, and permanent and construction jobs agreements;
- implementing interim improvements to the grove of trees in Barry's Corner;
- conducting planning and near-term improvements for Rena Park;
- initiating early planning for the Greenway; and
- transportation-related commitments including 25 percent design for Stadium Way, evaluation of a construction support area, preparation of a special event study, preparation of an evaluation of potential future alternative locations for surface parking, further evaluation of extending transportation demand management strategies, and assisting the City with the potential implementation of a residential parking permit program.

These commitments are described in more detail in Chapter 9, Mitigation.

As each of the individual IMP projects comes forward, they will be required to undergo additional review by the BRA under the applicable Article 80 of the Boston Zoning Code. As part of that review, each IMP project will need to demonstrate its consistency with the approved IMP and, if necessary, further evaluate its project-specific impacts. This process will include additional review by other city agencies including the Boston Transportation Department, the Boston Water and Sewer Commission, the Boston Environment Department, and the Inspectional Services Department, among others. As described later in this chapter, two of the IMP projects - the Chao Center and the Baker Hall Renovation - have completed Article 80 review.

1 The goal of the Transformative Project is to create a community enrichment center for Harvard and Allston/Brighton residents offering education and training, health and wellness, HarvardX for Allston, arts and culture programming, and economic and workforce development programs. This "suite of programs" builds upon and enhances the ongoing work of the Education Portal. As such, the new enrichment center will be an amalgamation of Education Portal programming and staff supplemented by new physical space oriented towards the newly conceptualized programming approved by the Task Force and the BRA as part of the negotiations related to the Transformative Project.

MEPA Review

On April 1, 2013, Harvard submitted a Notice of Project Change (NPC) to the Massachusetts Environmental Policy Act (MEPA) Office of the Executive Office of Energy and Environmental Affairs. The NPC described the changes to the master plan that have been made since its MEPA review started with the filing of an Environmental Notification Form (ENF) in 2007. On May 10, 2013 the MEPA Office withdrew the previous MEPA Certificate for the 2007 ENF and issued a Certificate outlining the issues to be included in an Environmental Impact Report (EIR) for the revised master plan.

The May 10, 2013 Certificate also noted that the MEPA Office and Harvard should work collaboratively to revise the Special Review Procedure (SRP) that had been established in 2007. As a result of that collaboration, a revised Special Review Procedure was issued on November 20, 2013. As described in the revised SRP, Harvard will file a Draft and Final EIR. For those projects that are adequately described in the Draft and Final EIR no further review under MEPA is required. For those projects that are described more conceptually in the Draft and Final EIR, the submittal of a Project Commencement Notice will be required when more detail is available for such a project.

The DEIR was submitted in December 2013 and the Secretary issued a Certificate outlining the requirements for this FEIR on February 14, 2014. A copy of the Secretary's Certificate is included as part of *Appendix A, Responses to Comments.*

Following review and approval of this FEIR, Harvard will provide an Interim Update to MEPA proximate to the five-year anniversary of the Certificate of Adequacy on the FEIR. The Interim Update will include an update on the status of area-wide infrastructure improvements and individual development projects within the Allston Campus area and a description of any significant changes to the Allston Campus Ten-Year Master Plan from that described in the FEIR.

In accordance with the SRP and based on the information that is available, it is anticipated that two of the projects – the Chao Center and the Baker Hall Renovation – will not require further review under MEPA based on this FEIR. The other projects within the Ten-Year Plan will require the submittal of a Project Commencement Notice when more detail is available for these projects.

State Permits

The following state permits are expected to be required.

Department of Environmental Protection

- Non Major Comprehensive Plan Approval

Massachusetts Water Resources Authority

- Sewer Use Discharge Permit
- 8(M) Permit

Massachusetts Historical Commission

- Chapter 254 Approval

Figure 1: Existing Campus Map: Allston Buildings (2013)

Approved IMP Boundary

PROJECT SUMMARY

Project Program

As described in more detail in Section 1.3, the overall program consists of seven new projects and two renovation projects resulting in a total of approximately 1.4 million square feet of new construction and approximately 500,000 square feet of renovated space. In addition, the University continues to study two smaller projects in its Athletics district: construction of a small batting cage and renovations of the Newell Boat House. Analyses included in this FEIR include a number of background projects (noninstitutional and institutional projects that are already underway).

As described in more detail in *Chapter 2.0, Transportation*, the overall IMP includes creation of several new streets around Barry's Corner, elimination of some non-institutional parking spaces and the creation of additional institutional and non-institutional spaces, resulting in a net increase of 155 parking spaces.

Community Planning Context

Harvard works regularly with a Task Force of neighborhood representatives regarding Allston planning and development. The Task Force was first convened in the mid-1980's in preparation for the University's first Institutional Master Plan, filed in 1989.

In January, 2006, Boston Mayor Thomas M. Menino announced a new Harvard-Allston Task Force (the Task Force) to serve as an advisory group to the BRA as Harvard began its new institutional master planning process for the expanded Allston campus. Since 2006, Harvard has met regularly with the approximately 17-member Task Force to review and shape the elements of Harvard's Allston planning and development. Input from the Allston Task Force and the Boston Redevelopment Authority has greatly influenced the Ten-Year Plan.

1.2 Planning Process, Principles, and Long-Term Vision

The DEIR included discussion and graphics describing the planning process and planning principles that led to the development program included in this FEIR. As presented in detail in the DEIR, the Ten-Year Plan is formed in response to series of guiding principles in three broad categories: urban design, transportation and streets, and sustainability.

In addition, the DEIR included a Long-Term Vision which provides generalized and flexible parameters to guide the build out of Harvard landholdings in the longer-term. The geographic area of the Long-Term Vision includes the IMP area plus additional acreage, primarily to the south of Western Avenue. It represents planning concepts, including new streets, pedestrian connections, open space, and opportunities for growth and development that go beyond the ten-year timeline. The Long-Term Vision informs the Ten-Year Plan, ensuring that planning and development in the next decade is consistent with and guided by a longer term vision.

The Long-Term Vision was provided in the IMP and DEIR for context only and was not submitted for approval under the institutional master planning regulations. A subset of the Long-Term Vision drawings layered below was provided in the DEIR.

1.3 Ten-Year Plan Projects

PROJECT SUMMARY & LOCATIONS

Figure 2 locates the IMP projects and divides the projects into three categories: new construction, replacement, and renovation/renewal. Also identified are non-IMP projects inclusive of noninstitutional projects and institutional projects that are already underway. These non-IMP projects have either completed their own review under MEPA or don't require review under MEPA but are included as background projects in the technical analyses.

Table 1 summarizes square footage and project locations within districts.

Table 1: Ten-Year Projects

	New Construction	**SF**	**District**
1	Harvard Business School Chao Center (Kresge Hall Replacement)	90,000	Academic
2	Harvard Business School Burden Hall Replacement	140,000	Academic
3	Harvard Business School Faculty & Administrative Office Building	110,000	Academic
4	Harvard Stadium Addition/Renovation	211,000	Athletics
5	Mixed Use Facility & Basketball Venue	270,000 -340,000	Barry's Corner
6	Gateway Project	300,000	Barry's Corner
7	Hotel & Conference Center	250,000	Science & Enterprise
	TOTAL NEW CONSTRUCTION	**1.4 M**	

	Renovation		
8	Harvard Business School Baker Hall Renovation (to be renamed Esteves Hall)	78,000	Academic
9	Soldiers Field Park Housing Renovation	423,000	Academic
	TOTAL RENOVATION	**501,000**	

	Non-IMP	
A	Science Project	Science & Enterprise
B	Barry's Corner Residential & Retail Commons	Barry's Corner
C	224 Western Avenue	Barry's Corner
D	28 Travis Street	Science & Enterprise
E	Tata Hall	Academic
F	Bright Hockey/Gordon Track	Athletics

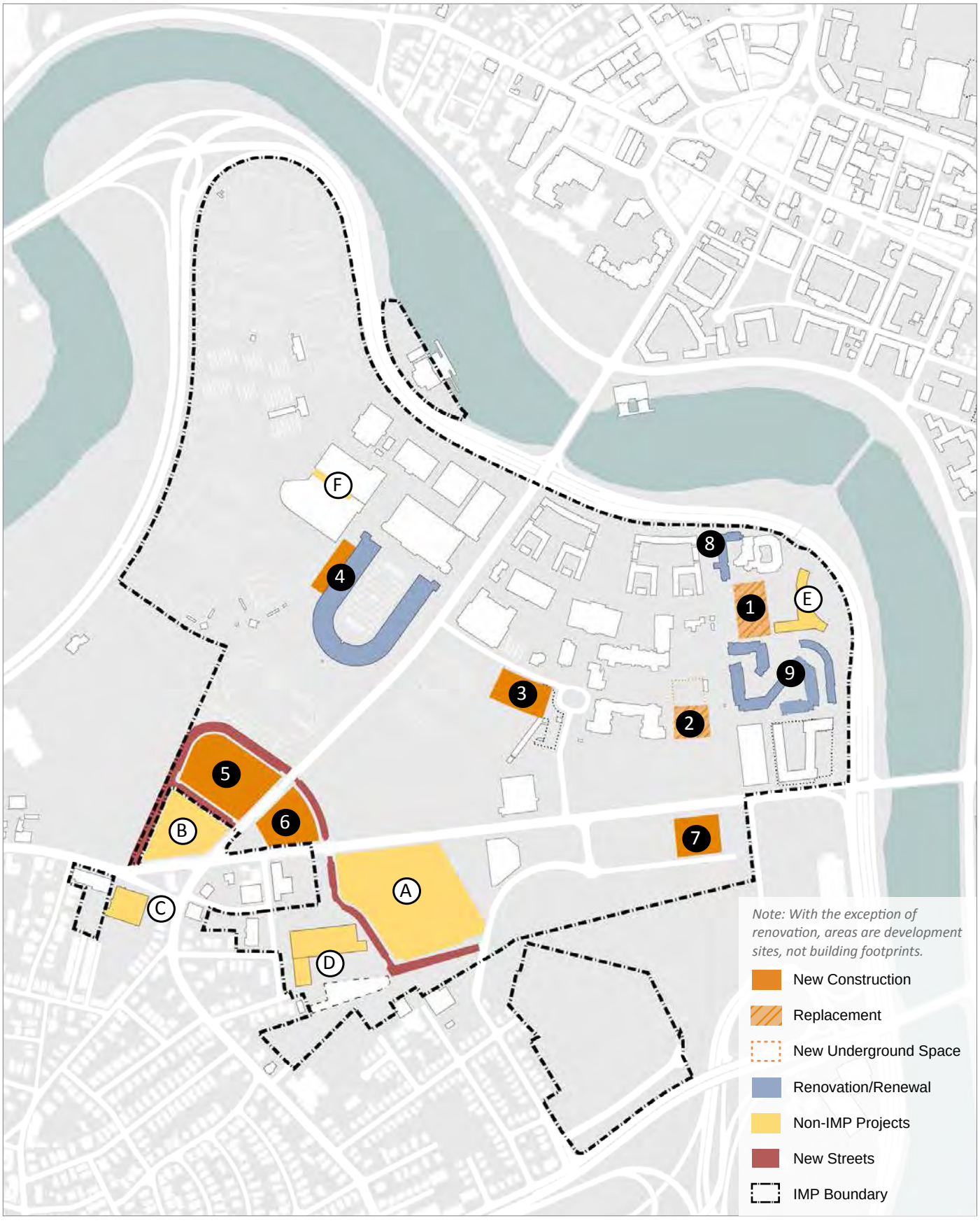


Figure 2: Proposed Institutional Projects

TEN-YEAR PLAN PHASING

Table 2 depicts the approximate timing of the building projects and the open space, infrastructure, and roadway improvements that will accompany them.

Table 2: Ten-Year Plan Phasing

Projects	Open Space/Infrastructure/Roadway Improvements
Early (2014-2018)	
224 Western (complete at submission) 28 Travis Street (complete at submission) Barry's Corner Residential & Retail Commons (underway at submission) Charlesview demolition **Chao Center** (Kresge Replacement) **Burden Replacement** **Harvard Stadium Addition/Renovation** **Baker Hall Renovation**	Barry's Corner Grove (interim) "South Campus Drive" "Ivy Lane" Rena Park
Mid (2018-2020)	
HBS Faculty and Administrative Offices **Soldiers Field Park Housing Renovation** Science project **Gateway project**	"Academic Way" (north of Western Avenue) and narrowing of intersection/elimination of traffic island at Barry's Corner "Academic Way" (south of Western Avenue) "Science Drive" (west of Rotterdam Street) Longfellow Path Rena Path Barry's Corner Grove (completed)
Late (2020-2024)	
Hotel Conference Center **Mixed Use Facility & Basketball Venue**	Greenway (early phase, eastern segment near Hotel and Conference)
IMP Projects = Bold	

IMP PROJECT DESCRIPTIONS

1. HBS Ruth Mulan Chu Chao Center

Project Elements

Within the first five years of this IMP, Harvard will replace the existing Kresge Hall with a new HBS building of approximately 90,000 square feet to be called the Ruth Mulan Chu Chao Center. Kresge Hall, dedicated in June 1953, was for many years the main dining facility for HBS. Kresge Hall is a D-shaped Georgian Revival structure with approximately 70,000 square feet of space on three floors. Following the construction of the Spangler Center in 2001, the use in Kresge focused on providing dining facilities to participants in HBS's Executive Education program rather than the broader HBS community.

The University's 1997 IMP filing proposed that during the time period of that IMP, Kresge Hall would be renovated to accommodate the growing needs of HBS's Executive Education Program. However, the IMP also noted that a renovation of Kresge would not fully meet the needs of the Executive Education Program. The section of the 1997 IMP that addressed long-term planning for HBS stated that the "alternative plan proposes demolition of Kresge and construction of a new facility just east of the existing structure. The future decision to renovate or rebuild will be based on a comparison of the costs and benefits of an entirely new, state-of-the-art facility, specifically designed to complement the expanded and newly consolidated Executive Education Program facilities." It should be noted that the Kresge building was not constructed as part of the original McKim, Mead and White design, does not strengthen East Drive, lacks handicap accessibility, and does not provide for strong pedestrian connections through to Tata Hall.

In this interim period, and while the Executive Education program has continued to grow, HBS has continued to evaluate its programmatic and space needs relative to the existing Kresge Hall. The site has emerged as a focal point for a newly designed Executive Education quadrangle also comprising Baker Hall, McArthur Hall, McCollum Center, and Tata Hall (to be completed in 2013). Harvard has concluded that a new building on the current site of Kresge Hall can provide a much needed mix of program space, which would not be feasible with a renovation of the existing facility. As such, Harvard is proposing to replace the existing Kresge Hall with a new HBS building.

The vision of the Chao Center as a gateway to Executive Education is in keeping with the consensus among planners that the new facility will be instrumental in transforming a collection of disparate buildings on the northeast quadrant of the campus into a true HBS Executive Education quadrangle.

The site is strategically positioned at the terminus of Harvard Way and serves as a prominent node of the pedestrian route between the Cambridge and Allston portions of the Harvard Campus. Such paths that extend along East Drive and cross the HBS campus diagonally through courtyards are important connectors of campus and community.

An important program element of the building is a central reception and greeting space which is planned to be the first experience participants will have with the HBS Executive Education precinct. The reception area will essentially become the "Front Door" of Executive Education at HBS and serve as a place for the HBS community, especially MBA students, to interact with participants.

Early discussions of the building's programming have focused on the fundamental HBS principle that learning happens both within and beyond the classroom. Daily life for Executive Education participants is rich with opportunities for discussion, debate, networking, and personal and professional growth. A central element of the building is a dining facility which will provide a vibrant, flexible, comfortable environment for mealtime meetings, guest speakers, and social functions. Other components of the program include:

- Classrooms of varying types that can be reconfigured in different ways.
- Smaller project rooms for team-based learning or executive coaching.
- Comfortable common spaces to accommodate events and to supplement existing lounges in Baker and McArthur Halls.

Also planned for the building are Executive Education administrative spaces, bringing together staff members, such as program delivery teams, who now work in widespread locations across campus.

Table 3: Chao Center Project Dimensions

Item	Chao Center
Site locations and approximate building footprints	HBS Campus (approximately 1 acre)
Uses	Exec Ed Dining, Administrative Offices, and Classrooms
Square feet of gross floor area	Approximately 90,000 SF
Square feet of demolition	Approximately 67,000 SF
Building heights	4 stories (3 above grade)
Parking areas	None

Urban Design and Site Planning Principles

- Locate Executive Education drop-off and vehicular functions to preserve a formal pedestrian oriented front on Harvard Way
- Ensure that the fronting facade is harmonious in scale with the Georgian legacy campus
- Reinforce the eastern leg of the pedestrian ladder, strengthening north-south pedestrian connections
- Create a cohesive composition of outdoor spaces for Executive Education with the addition of this new building
- Enhance connectivity between Tata Hall and Baker/McCollum/McArthur Halls
- Create visible entrances to open spaces and promote active uses of new quads and space on the ground floor that invite members of the community to activities and amenities
- Locate Executive Education uses along East Drive to keep automobile traffic away from Barry's Corner and the neighborhood
- Provide accessibility for people with disabilities
- Establish a stronger relationship between the Executive Education quadrant and the McKim, Mead and White campus

Figure 3 and Figure 4 depict existing and proposed site plans while Figure 5 and Figure 6 depict views of the project from Harvard Way and the Weeks Bridge, respectively.

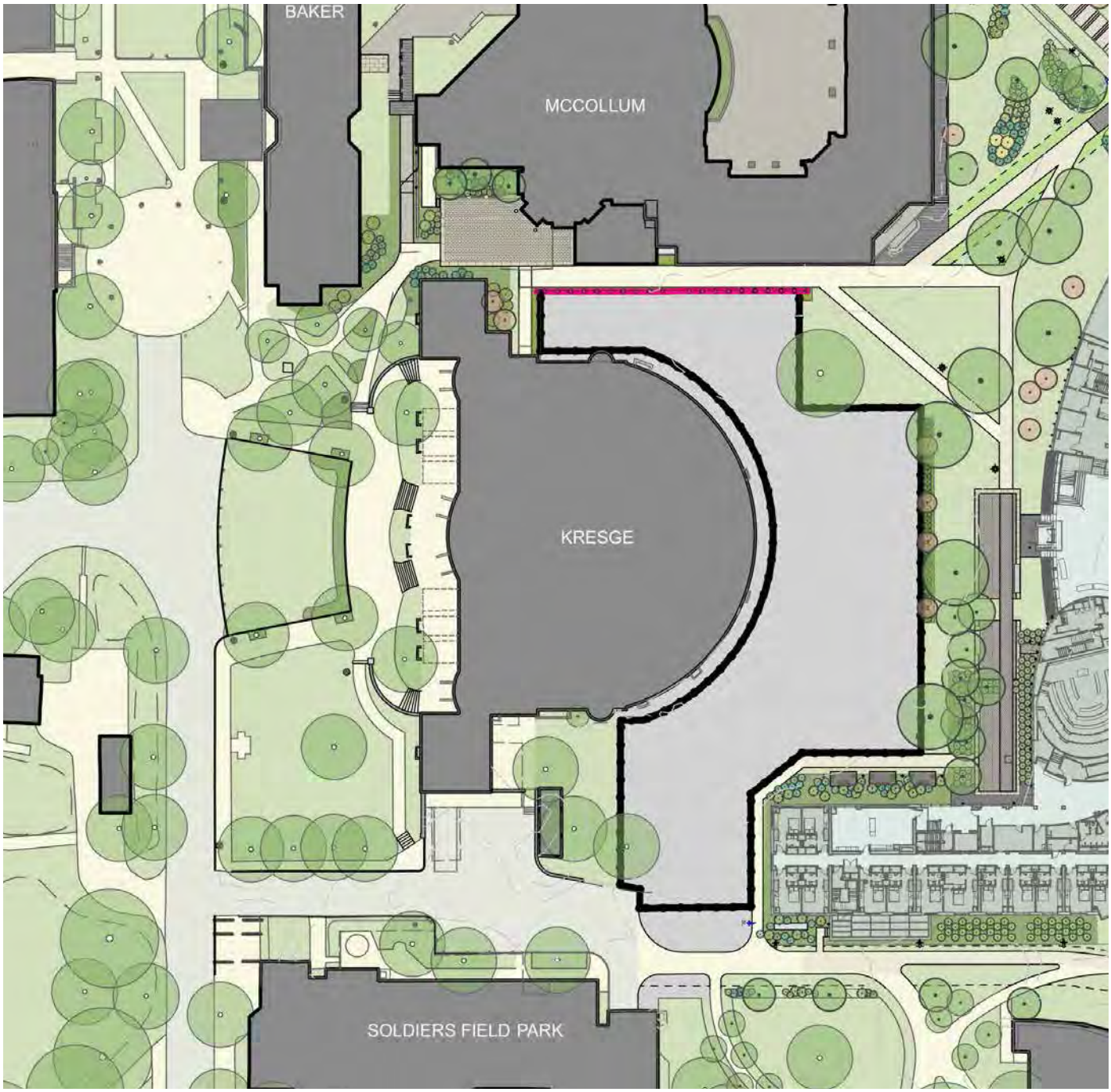


Figure 3: Chao Center Former Site Plan
Source: Reed Hilderbrand

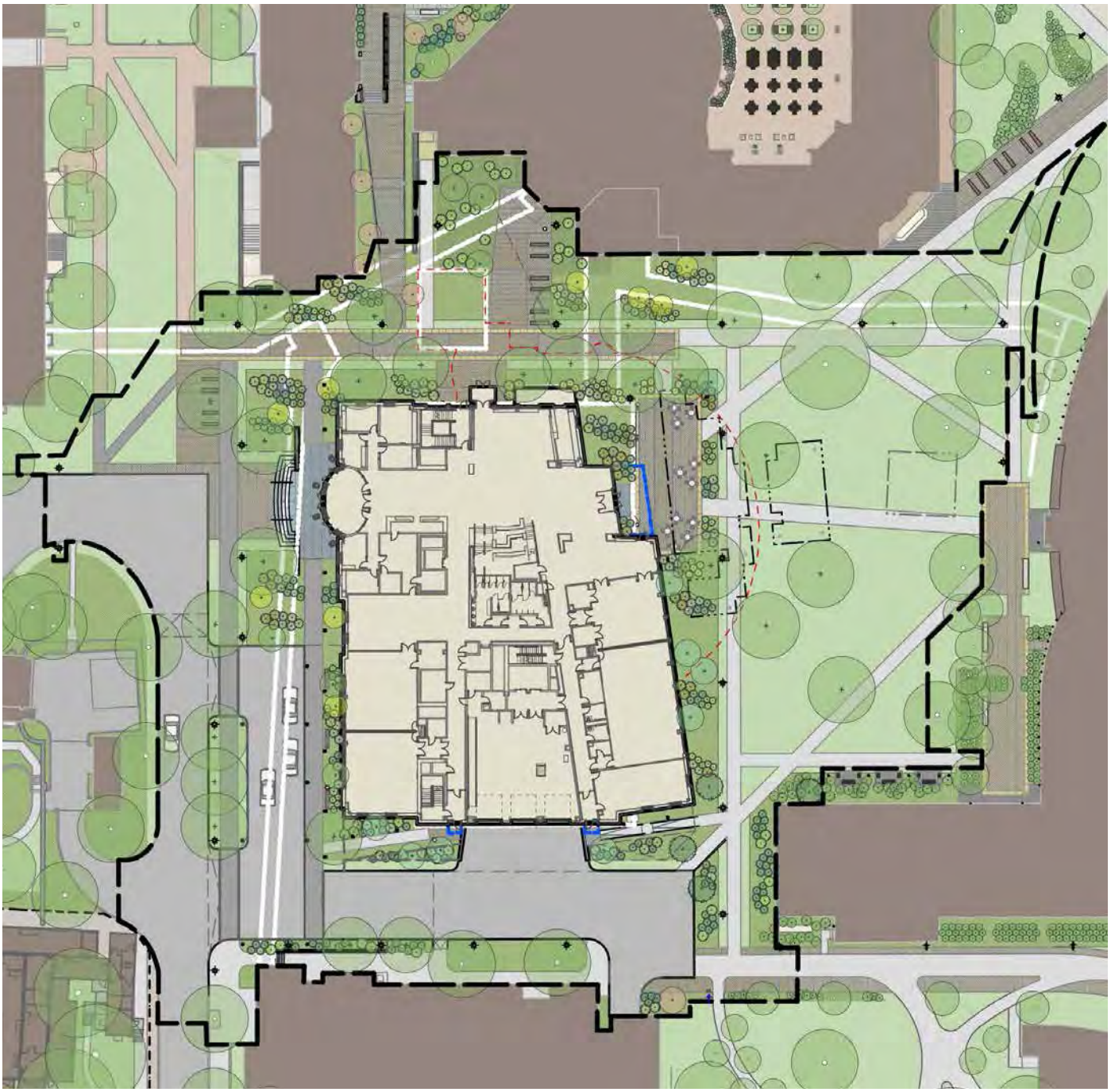


Figure 4: Chao Center Site Plan
Source: Reed Hilderbrand

Figure 5: Chao Center - Proposed View from Harvard Way
Source: Goody Clancy

Figure 6: Chao Center - Proposed View from the Weeks Bridge
Source: Goody Clancy

Permitting and Review

The Chao Center project has undergone significant public review, including:

- The project completed Article 80 Large Project Review by the BRA, including an evaluation of the project's impacts and mitigation.
- As was evaluated during the Article 80 Large Project Review process, the project will have limited impacts given that it is a replacement for an existing facility. However, the project's mitigation measures are described in more detail in *Chapter 9, Mitigation*.
- As part of the Large Project Review process, the project was favorably reviewed by the City of Boston's Interagency Green Building Committee as well as the Boston Civic Design Commission.
- The project has received Site Plan Approval from the Boston Water & Sewer Commission.
- The project has signed a Construction Management Plan and a Transportation Access Plan Agreement with the Boston Transportation Department.
- As described in more detail in *Chapter 6, Historic Resources,* the project completed the review under the Massachusetts Historical Commission's State Register Review process by signing a Memorandum of Agreement with MHC regarding the proposed demolition of Kresge Hall.
- As also described in *Chapter 6, Historic Resources,* the project successfully completed the review under the Boston Landmarks Commission's Article 85 Demolition Delay process.

2. HBS Burden Hall Replacement

Project Elements

Within the first five years of the planning horizon of this IMP, Harvard intends to build a new academic building to replace HBS's Burden Hall. Burden Hall is an approximately 29,000 square foot academic building built in 1971 and designed by the firm of Johnson/ Burgee Architects. It includes a 766 seat auditorium that is used for class capstone events, student-run conferences, faculty and guest lectures, and academic and alumni gatherings. Burden's auditorium is too small for many of the School's current gatherings, and the Hall's lack of foyer and meeting space, support facilities, and accessibility, limit the School's ability to host global events and create a first-class learning environment. Burden Hall was not built as part of the McKim, Mead and White campus, and is a windowless object building lacking a positive relationship with campus open spaces, pedestrian paths, and buildings. It is disconnected from other campus academic and student buildings, and does not contribute to a positive participant experience, or campus life. It constricts views and pedestrian connections between the HBS Central Green, the focus of the academic campus, and East Drive, an important pedestrian route.

HBS intends to replace Burden Hall with approximately 140,000 square feet of new construction, to be phased in two closely consecutive stages so that the School will have a large auditorium at all times. The first phase will consist of approximately 110,000 sf of new construction immediately south of existing Burden, on the south edge of the Central Green, east of the Spangler Center. Similar in height to Spangler, this three-story structure with two below-grade concourse levels, will house a modern, media-equipped auditorium seating approximately 1000, the size of one MBA class, and foyer, reception, meeting and service space to support world-class convening. It will connect to the Spangler Center, the center of MBA student life, and to academic buildings at the concourse (tunnel) level. Foyer and reception areas activated by social and study space will overlook the Central Green and create an attractive entrance from East Drive. As part of this project, Harvard will create the east end of the new Spangler Way, and provide for vehicular access and drop-off to the facility from East Drive. Service and deliveries will be primarily through Batten Way to Central Receiving and the tunnel system. Up to 60 parking spaces in the Spangler Lot displaced by the building construction will be relocated within the lot or to adjacent parking facilities by restriping these facilities.

The second phase of Burden Replacement will demolish Burden Hall and replace it with an approximately 30,000 sf two-story facility below grade, containing meeting and classroom space closely integrated with the new auditorium to the south. As part of this project, the Central Green will extend eastward to East Drive, joining two important campus precincts. A small pavilion on the Green is envisioned as a "jewel" in the landscape, inspired by the existing Class of 1959 Chapel, a successful complement to the Georgian-influenced buildings on campus.

Table 4: HBS Burden Replacement Project Dimensions

Item	HBS Burden Replacement
Site locations and approximate building footprints	HBS Campus (approximately 0.7 acres above grade)
Uses	Academic and Classroom Auditorium
Square feet of gross floor area	Approximately 140,000 SF
Square feet of demolition	Approximately 29,000 SF
Building heights	3 stories above grade, 1 story below grade
Parking areas	None

Urban Design and Site Planning Principles

- Complete the south edge of the Central Green to the east
- Serve as a gateway to the pedestrian zone of campus and the Central Green from East Drive
- Provide accessibility for people with disabilities
- Establish a clear relationship with the McKim, Mead and White campus and its organizing principles
- Strengthen the legibility of the Central Green and other courtyards that support a network of pedestrian paths

3. HBS Faculty and Administrative Offices

Project Elements

Within the second five years of the planning horizon of this IMP, Harvard intends to build a new HBS faculty and administrative office building. The proposed site is in the northeast corner of what is now Ohiri Field and is directly north of the i-lab/Batten Hall.

As currently planned, the building will be approximately 110,000 square feet and four stories in height. Its footprint is designed symmetrically to Spangler Center, framing the axis and major pathway to Baker Library | Bloomberg Center. Proximate to the proposed visitor drop-off court at the north end of Batten Way, the HBS Faculty and Administrative Offices building will be both a gateway building to the HBS campus and an active edge to the pedestrian zone of the Central Green.

Table 5: HBS Faculty & Administrative Offices Project Dimensions

Item	HBS Faculty & Administrative Offices
Site locations and approximate building footprints	HBS Campus (approximately 1 acre)
Uses	Faculty and Administrative Offices
Square feet of gross floor area	Approximately 110,000 SF
Square feet of demolition	0
Building heights	4 stories
Parking areas	None

Urban Design and Site Planning Principles

- Complete the south edge of the Central Green to the west
- Provide symmetry to the Spangler Center, framing the axis and major pathways to the Baker Library | Bloomberg Center
- Provide a gateway to the HBS campus at the north end of Batten Way
- Firmly root the building in the pedestrian zone of the Central Green
- Consider how the south face can engage future academic development around a quadrangle (as depicted in the Long-Term Framework on the current site of Ohiri Field)
- Frame courtyards and campus drives that support a network of pedestrian paths

4. Harvard Stadium Addition / Renovation

Project Elements

Harvard anticipates undertaking a renovation and addition to Harvard Stadium. This project will provide improved accessibility to visitors with disabilities, renovate existing areas, relocate program areas from other athletic buildings in the district, provide new program space and restore areas of the existing structure. As part of this project, it is anticipated that the total number of seats in the Stadium will be reduced.

Constructed in 1903, Harvard Stadium has hosted over one hundred years of Harvard Football and, since the installation of lights, a synthetic field and seasonal bubble in 2006 has served Harvard men and women across varsity, club and intramural programs.

The use of Harvard Stadium has greatly expanded in recent years. The University is proposing to renovate the Stadium in order to address several deficiencies:

- *Building Preservation*: This project will repair areas of deterioration, match old repairs to a consistent coloring, clean the surface and seal the concrete to avoid future deterioration.
- *Accessibility*: The renovation will increase accessibility by introducing elevator access to all levels, and provide appropriate seating opportunities including indoor seating and accessible amenities for visitors with disabilities.
- *Amenities*: Restroom and concession facilities will be expanded and upgraded in the renovation.
- *Programmatic Space*:
    - *Locker Rooms*: New spaces will be constructed with adjacent sports medicine and equipment support spaces to meet the operational needs of the football program.
    - *Press areas:* New, accessible press areas will provide appropriate space and technology for coaching staffs, broadcast teams, video production, and working media.
    - *Indoor Seating*: The renovation would introduce an enclosed seating level for approximately 350 spectators with restrooms and concession areas, function/ gathering space and a small terrace overlooking the athletic complex.
    - *Meeting/Office Space*: New spaces will be constructed to help meet the current demands of the Athletics Department.
    - *Overall Seating*: The Stadium currently seats 30,262 people; the number will be reduced to 22,333 seats after the project.

To address these needs, the project will consist of the construction of a wide, shallow addition containing approximately 46,000 square feet to the westerly side of the stadium. The addition will extend above the existing roof, with all of the other proposed improvements located within the existing building envelope.

The project will include the demolition of several small areas under the seating bowl including two storage sheds, two concession stands, two half time rooms, and men's wash room. None of these areas were part of the original construction but were added sometime in the 1950's and beyond.

Table 6: Harvard Stadium Addition/Renovation Project Dimensions

Item	Harvard Stadium Addition/Renovation
Site locations and approximate building footprints	Athletics Campus (total site approximately 6.8 acres, addition .3)
Uses	Press Areas Athletics Offices Athletic facilities
Square feet of gross floor area	Approximately 46,000 SF addition Approximately 34,200 new interior construction Approximately 130,500 SF interior renewal
Square feet of demolition	0
Building heights	4 to 6 stories
Parking areas	None

Urban Design Site Planning Principles

- Respect the historic structure and minimize impacts of an addition
- Improve pedestrian access, circulation, and accessibility
- Ensure that the visual integrity of the historic structure remains legible and intact
- Respect the strong axial relation of the Dillon Field House and internal green
- Maintain original building facade when viewed from the public way along North Harvard Street, Anderson Bridge and Barry's Corner
- Maintain profile of the interior bowl of the Stadium
- Integrate the addition and site improvements with the athletic campus

Existing Structural Conditions

Harvard Stadium is a concrete structure over one hundred years old. The building has a number of deficiencies, most of which stem from the experimental nature of concrete construction and lack of knowledge about the mechanisms of concrete deterioration in the early years of concrete's use when this structure was constructed. The fact that the Stadium is an open, exposed, and unheated building has contributed to its concrete deterioration.

A program of testing and monitoring will be established in order to understand the damage, the rate of deterioration, and the potential for future damage. The extent of repairs identified may require that the conservation and restoration work be phased. Since new construction is proposed on the west side of the Stadium, it is important that the repair to the historic concrete in this portion of the Stadium be coordinated with the new construction.

5. Mixed Use Facility & Basketball Venue

Project Elements

The University intends to build a new basketball venue – with the balance of the site accommodating additional residential and retail uses.

The Harvard basketball teams currently play in the Ray Lavietes Pavilion, located in the Briggs Cage on the northern edge of the Athletics district. The building opened in 1926 and was used for Harvard's indoor track activities. In the 1990's, the building was renovated to become the home to the Harvard men's and women's basketball teams. Lavietes Pavilion requires facility and building upgrades and at approximately 1,950 seats, it remains the smallest basketball venue in the Ivy League.

It is currently envisioned that 175 North Harvard Street – the site of the existing Education Portal – would be redeveloped for a new project that will include a basketball venue with the balance of the site accommodating institutional/mixed uses. The Education Portal will be located to 224 Western Avenue. The new basketball venue is currently envisioned to be approximately 60,000 square feet and would include approximately 3,000 seats (approximately 1,000 more than the existing Lavietes Pavilion), locker rooms, athletics offices, and concession areas. The site is large enough to allow for the basketball venue to be situated in a strong relationship with other abutting facilities and also permits other uses that will enhance and tie directly to activities along North Harvard Street.

The remainder of the site will be developed for a mixed use institutional development that is largely focused on institutional affiliate/graduate student housing. As currently proposed, the non-basketball portion of the project will include between approximately 200,000 and 250,000 square feet of residential space and approximately 10,000-30,000 square feet of ground floor retail. Recognizing that a basketball venue alone does not provide significant opportunities for active street uses outside of event days, the intent of the project is to provide a mix of uses that will activate the street and bring activity to the site and to Barry's Corner throughout the day and all year long.

Harvard will work with the BRA and the Task Force to participate in the creation of or stabilization of housing in conjunction with this IMP, and to maximize the linkage funding that is spent in the neighborhood, as well as the contributions any housing component of the Mixed Use Facility and Basketball Venue might make to the mix of neighborhood housing. Such alternatives may include a component of the housing portion of the project that is available for the broader public, as opposed to only Harvard affiliates.

When the Mixed-Use Facility and Basketball Venue proposal is submitted for Large Project Review, Harvard will continue to review with the BRA opportunities to enhance or promote non-affiliated housing as a part of community benefits associated with the IMP. Furthermore, Harvard will consider an increase in retail and other active public uses in this project should analysis at that time show they are viable and warranted.

Table 7: Mixed Use Facility & Basketball Venue Project Dimensions

Item	Mixed Use Facility & Basketball Venue
Site locations and approximate building footprints	West side of North Harvard Street Site of existing building at 175 North Harvard Street (approximately 2.7 acres)
Uses	Housing/Institutional/Office/Retail Basketball venue
Square feet of gross floor area	TOTAL – approximately 270,000 to 340,000 SF Basketball venue – approximately 60,000 SF Residential – approximately 200,000 to 250,000 SF Retail – approximately 10,000 to 30,000 SF
Square feet of demolition	50,000 SF (175 North Harvard Street plus garages)
Building heights	6 to 10 stories
Parking areas	approximately 275 spaces

Urban Design and Site Planning Principles

- Locate basketball facilities so that they relate to both Barry's Corner and the Athletics district
- Locate active mixed uses on North Harvard Street and include public spaces/plazas at entries to the facility
- Create variable massing on "Ivy Lane" opposite the Barry's Corner Residential and Retail Commons
- Extend pedestrian circulation through to Smith Field from the Grove
- Provide continuity of built form and streetscape that is compatible with and extends the design of Barry's Corner Residential and Retail Commons
- Maximize views to the Harvard Stadium
- Create an active edge on development facing Smith Field, carefully locating service entries to minimize back-of-house interference to the public realm

Project Alternatives/Site Selection Rationale

The BRA Scoping Determination required site selection rationale be provided for the Mixed Use Facility and Basketball Venue. The selection of the basketball venue site was the product of a careful analysis of various siting options within Harvard's Allston property. Central to this analysis was the goal of maintaining the University's athletics facilities within a cohesive geographic district, allowing for functional activities and connections to be optimized, and enabling students to move comfortably and safely between different athletic facilities – e.g., locker rooms, fitness venues, etc. – at various hours of the day.

The study began with an assessment of the existing conditions of the buildings and fields within the Athletics district. This assessment recognized that athletic playfields are critical components of the overall athletics program, and that their locations, sizes and clustering reflect the programmatic needs of the athletic activities that they support. The fields are heavily utilized by the University's students and others. Significant changes to this network would need to reflect the requirements of the basketball program, and would need to represent an improvement upon the dynamics of the existing field network. No sites for basketball within the Athletics district were available that would not require major reorganization and reduction of Harvard's network of playfields.

Siting options across North Harvard Street were also considered, but were not selected due to two primary factors. First, frequent crossing of busy North Harvard Street would be required, and this was not seen as desirable in terms of convenience, Athletics district coherence, and most importantly student safety. In addition, the Harvard Work Team recommendations that guide this master plan effort prioritized the Ohiri Field/Charlesview district as an area to support academic facilities.

In considering the best location for basketball, a key criterion was how best to optimize event atmosphere for athletes and Harvard community in the spirit of Ivy League competition, ensuring that the facilities work not only as competitive sites, but also as venues for the Harvard community to enjoy as meaningful stages for the excitement and camaraderie of collegiate athletic contests. This demands comfortable seating with excellent sight lines and acoustics. Major renovation of the Lavietes building, Harvard's current basketball venue, was considered and, while feasible, was not viewed as the best means of achieving the goals stated above. This 1925 facility is considered undersized, and would require extensive building system improvements, and if renovated would still not produce a basketball arena comparable to that of the planned new facility.

This overall analysis concluded that the basketball venue is most appropriate in the proposed location at the edge of the Athletics District, and that the adjacent housing and retail elements will provide an effective transition to the Barry's Corner District in terms of scale, size and use.

6. Gateway Project

Project Elements

The University plans to propose development on the existing Charlesview site. The University recognizes the importance of this site in the development of Barry's Corner, and a number of important planning principles and design guidelines have emerged from the early analysis of the site and discussions with the BRA and Task Force which will guide future development.

In terms of siting and design, the intention is to enliven Barry's Corner, enhance the pedestrian environment, and link students, faculty members, staff and the community. This concept will also respect and incorporate the existing grove of trees by providing informal seating, spaces for music or performances, and a gathering place for the community. This will provide pedestrian permeability between the Barry's Corner Grove and the Harvard campus to the northeast and east. Development on this site will also provide an important complement to the Barry's Corner Residential and Retail Commons by providing additional amenities and activity.

As currently planned, the proposed project would include approximately 300,000 square feet of space, including between 35,000 and 50,000 square feet of retail space, at between six and nine stories. An active ground floor supporting permeability would be mixed use, comprised of service, retail, and/or other institutional uses and programming. The upper floors would include institutional/mixed uses, which may include academic administrative or academic office space. The office uses will provide daytime activation that complements residential and retail uses.

Ground floor uses will be of an active public nature, including and without limitation ground floor retail. These ground floor uses will focus on activities that provide face-to-face interaction and will not comprise back-office service uses.

Harvard is open to a discussion of using the building as a possible future home for the Harvard-Allston Education Portal and/or incorporating cultural programming into the project.

Recognizing the importance of the Gateway Project to the success of Barry's Corner, Harvard is moving the project forward in its projected phasing from the "late" (2020-2024) category to the "mid" (2018-2020) category.

Table 8: Gateway Project Dimensions

Item	Gateway Project
Site locations and approximate building footprints	Portion of existing Charlesview site (approximately 1.2 acres, excluding Grove)
Uses	Administrative Offices, Retail, Institutional
Square feet of gross floor area	Approximately 300,000 SF, including: 250,000 to 265,000 SF of administrative office 35,000 to 50,000 SF Retail/Active Ground Floor
Square feet of demolition	0 (assumes demolition of existing Charlesview)
Building heights	6 to 9 stories
Parking areas	TBD

Urban Design and Site Planning Principles

- Create a permeable edge linking Barry's Corner to the future academic area to the northeast, and which responds to newly constructed mixed use projects at Barry's Corner
- Provide opportunities for community interface by enhancing the University's presence in Barry's Corner, including office uses complementary to housing on the west side of North Harvard Street
- Engage projects and streetscape improvements with the Grove and bring vitality to Barry's Corner
- Create an inviting public realm
- Create a visible campus gateway from points south and west, acting as a landmark and opportunity to establish an important view corridor
- Design the facade of the building to engage the public with activities and views within the building
- Plan for pedestrian circulation through the site to connect with streets and path to and from Barry's Corner
- Reinforce the focus of Barry's Corner at the Grove

7. Hotel and Conference Center

Project Elements

Within the Science and Enterprise District, the University plans to develop a hotel and conference center. It is currently planned to be located on the south side of Western Avenue, across from the Spangler Center parking lot, framing the northern edge of the future Greenway. This location would take advantage of its proximity to the campus, the Science project, and the long-term future development anticipated in the Enterprise Research Campus.

As currently envisioned, the project will include approximately 200 hotel rooms and approximately 30,000 square feet of meeting space for a total project of approximately 250,000 square feet. In addition, it is estimated that there will be approximately 125 parking spaces.

It has not been determined whether this would be a Harvard-run facility that would cater primarily to Harvard events or whether it would be developed and managed by a third-party operator who might take advantage of the proximity to the Harvard campus in Allston to attract both Harvard and non-Harvard events. If Harvard chooses to engage a third-party developer to develop and operate the Hotel & Conference Center for non-institutional use, an IMP Amendment may be required.

Table 9: Hotel & Conference Center Project Dimensions

Item	Hotel & Conference Center
Site locations and approximate building footprints	South side of Western Avenue (approximately 1 acre)
Uses	Hotel Conference Space
Square feet of gross floor area	TOTAL - approximately 250,000 SF Approximately 200 rooms Approximately 30,000 SF of meeting space, dining room, lounge
Square feet of demolition	0
Building heights	Approximately 13 stories
Parking areas	Approximately 125 spaces

Urban Design and Site Planning Principles

- Establish a height that is comparable with that of surrounding buildings, locating the tower element in a way that is compatible with this context
- To the extent feasible, minimize the impact of shadows on the public realm and in particular the sidewalk on the north side of Western Avenue
- Design open space and landscape improvements on the hotel site to link to the larger Greenway system that will be developed over time
- Act as a pivot point between East Drive and the Greenway. Create fluidity between the spaces and extend the green space north to Western Avenue to connect with the streetscape
- Ensure a variety of active uses with transparency on the ground floor facing the Greenway, and also continue the vitality planned for Western Avenue

- Create focal point at the eastern terminus of the Greenway
- Create an anchor to the eastern end of Western Avenue (opposite Barry's Corner anchor) to encourage pedestrian traffic along Western Avenue
- Build density to ensure economic viability and to enliven the street
- Minimize traffic congestion and keep traffic away from local neighborhoods and out of Barry's Corner intersection
- Locate the convening facility proximate to Burden Hall Replacement Facility

Project Alternatives/Site Selection Rationale

The BRA Scoping Determination required site selection rationale be provided for the Hotel and Conference Center. The siting of the Hotel and Conference Center places it adjacent to the planned Enterprise Campus, and reflects the University's intention to pursue the Enterprise Campus development concept. It is anticipated that the Hotel and Conference Center will provide a venue for meetings and collaboration between entities involved in the Enterprise Campus, and between those entities and members of the Harvard community.

The proposed location also provides the opportunity for a strong relationship to the Harvard Business School. Complementing the assembly functions planned by the Business School for the Burden Hall replacement site, the Hotel and Conference Center location offers a strong visual connection with the Business School and close proximity with easy pedestrian access for its students and executives, providing for potential collaboration between members of the University and members of the private sector.

The proposed Hotel and Conference Center site is highly visible from the regional Charles River corridor that is flanked by Soldiers Field Road and Memorial Drive. It is expected that a significant portion of its clientele may involve visitors with affiliations other than Harvard or the Enterprise Campus. The site of the Hotel and Conference Center would enable easy vehicular access to and from these regional roadways, keep vehicular traffic at the perimeter of the North Allston neighborhood, and establish regional identity for the facility.

The height and massing of the proposed Hotel and Conference Center at this location would provide a strong visual anchor at the northeastern end of the planned Greenway, which is planned to stretch from Ray Mellone Park and the Honan-Allston Branch Library through Harvard property toward the Charles River. It would also establish an appropriate anchor to this end of Western Avenue. The proposed height will be comparable with height that exists along the riverfront.

8. Renovations to Baker Hall (to be renamed Esteves Hall)

Project Elements

Harvard intends to renovate HBS's Baker Hall, which will be renamed Esteves Hall. Baker Hall was designed by the architectural firm of Shepley, Bulfinch, Richardson and Abbott, and opened in 1970. It is located in the northeast corner of the Academic district and serves as a residence facility for HBS's Executive Education program. The building is approximately 75,000 square feet and six stories in height and features "living groups," each made up of eight or nine bedrooms around a shared living room/lounge.

The building has not had a significant renovation since its opening, and as a result it requires both cosmetic and system upgrades in order to provide comfortable accommodations and accessibility improvements for Executive Education participants.

The landscape component of the project will include enhancements to the courtyard to encourage outdoor use, better accommodate program use, and improve accessibility. A new ramp will be added on the east side of the building to provide an accessible approach to a seven foot grade change. The entrance is planned to be greatly improved by creating a new landscaped courtyard between this building and McCollum Hall. The new courtyard and entry will connect to a new landscaped courtyard on the northern edge of the Chao Center. In addition, improvements will include new tree and garden-scale plantings, water efficient irrigation, LED lighting, and furnishings. Existing granite benches and bluestone paving will be salvaged and reused.

Table 10: Baker Hall Renovation Project Dimensions

Item	HBS Baker Hall Renovation
Site locations and approximate building footprints	HBS Campus
Uses	Executive Education Residence Hall
Square feet of gross floor area	Renovation of approximately 78,000 SF
Square feet of demolition	0
Building heights	6 stories
Parking areas	None

Figure 7 and Figure 8 depict existing and proposed site plans and Figure 9 and Figure 10 show existing and proposed views of the courtyard.

Permitting and Review

The Baker Hall renovation project has undergone public review, including the completion of Article 80 Small Project Review by the BRA.

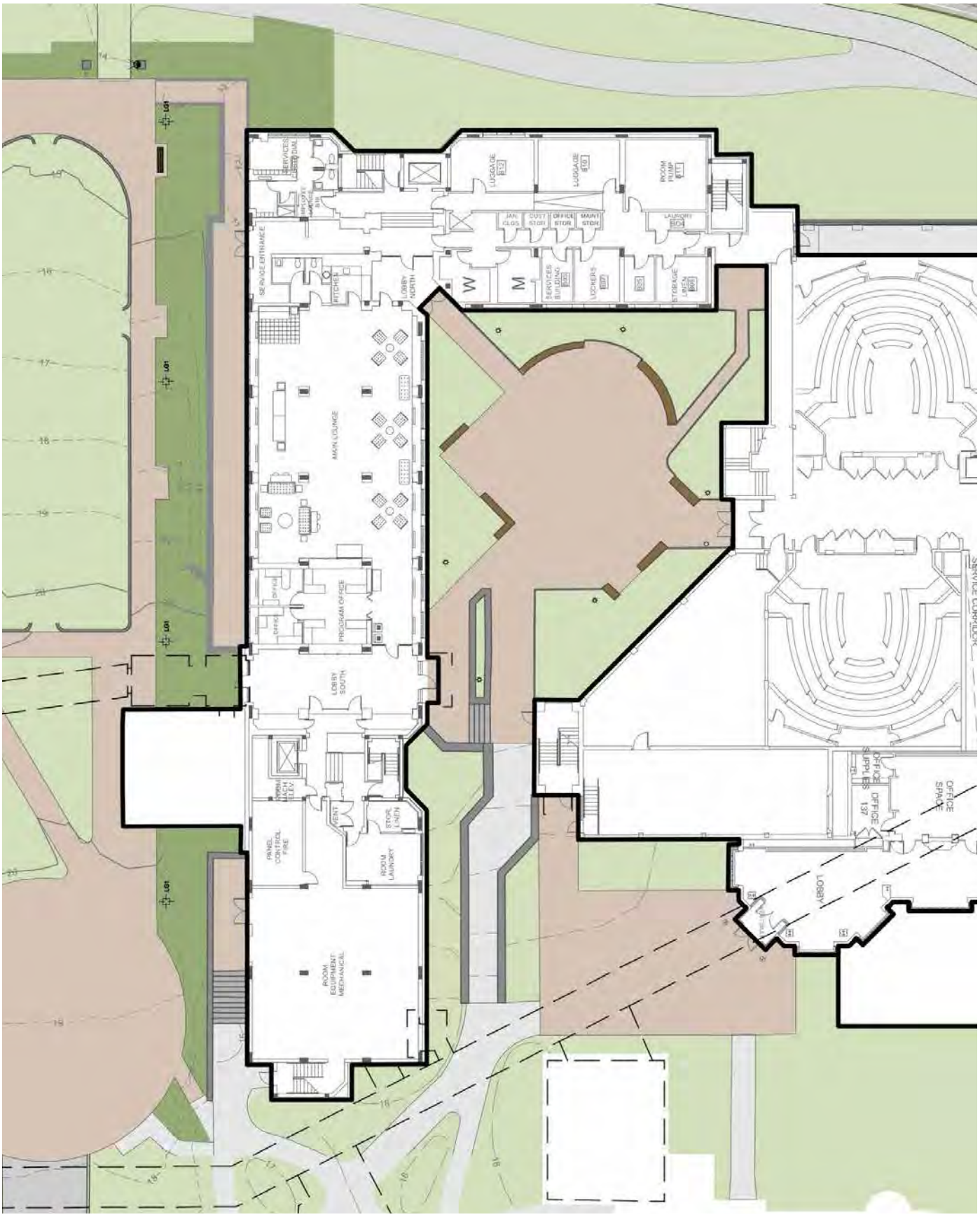


Figure 7: Baker Hall Existing Site Plan
Source: Reed Hilderbrand

Figure 8: Baker Hall Proposed Site Plan
Source: Reed Hilderbrand

Figure 9: Baker Hall- Existing Courtyard

Figure 10: Baker Hall Renovation - Courtyard View
Source: Reed Hilderbrand

9. Soldiers Field Park Housing Renovation

Project Elements

Harvard intends to renovate Soldiers Field Park Housing. These facilities were built in 1974 as housing for Harvard University graduate students. The four building complex, designed by the architectural firm of Benjamin Thompson and Associates, includes 478 units in approximately 423,000 square feet of space. The complex is located on the eastern edge of Harvard's Allston campus, between East Drive and Soldiers Field Road, south of HBS's Kresge Hall and Tata Hall (now under construction) and north of One Western Avenue. The buildings range in height from three to nine stories and are connected by a series of courtyards and pedestrian pathways which are framed by mature trees and plantings.

The complex has not been significantly renovated since opening, and as a result it requires both cosmetic and system upgrades. The University is investigating a range of options to renovate these buildings.

Table 11: Soldiers Field Park Housing Renovation Project Dimensions

Item	Soldiers Field Park Renovation
Site locations and approximate building footprints	Existing
Uses	Housing
Square feet of gross floor area	Renovation of approximately 423,000 SF
Square feet of demolition	0
Building heights	3 to 9 stories
Parking areas	None

Other Athletics Projects

During the Ten-Year Plan, Harvard also anticipates pursuing four other projects within its Athletics district. These projects are still under study and two were included in the NPC for completeness (although not included in the IMP as proposed projects).

One such study is the enhancement of facilities for the baseball and softball program. This preliminary study involves two projects: the construction of a permanent, fully enclosed batting cage for baseball and softball to replace a temporary, seasonal batting cage which is made of chain link fence and mesh netting. This new structure would likely be located near the existing facility between the existing baseball and softball fields. The second baseball project being investigated is a structure continuously wrapping the baseball field from first to third base which would incorporate spectator stands, new dugouts, restrooms under the structure, and a press box.

Second, Harvard is considering the potential renovation of and addition to the Newell Boat House to meet the current needs of the rowing program. This project is being actively investigated and is in its early planning stages. The renovation and addition would address the limitations of interior program areas, boat storage, and building systems upgrades. The project would carefully consider the need to replace the 1960's rowing tank and the building that houses it. As planning proceeds, Harvard will work closely with the Boston Redevelopment Authority and relevant State agencies with interests in the project.

There is also discussion about the a future relocation of Harvard's wrestling program. Wrestling is housed in the Malkin Athletic Center in an area substantially undersized for the current program. The possible relocation from the Malkin Athletic Center to a potential "in-fill" addition between Bright Hockey Center and Gordon Track would provide the necessary space to safely and appropriately accommodate this varsity-level program.

NON-IMP PROJECTS (UNDERWAY)

The analyses included in the DEIR and this FEIR include a number of background projects (that were not part of the 2013 IMP) which were described in detail in the DEIR and are listed below.

1. Recommencement of the Science Project

2. Barry's Corner Residential and Retail Commons Project (under construction)

3. 224 Western Avenue Renovation (completed Fall 2013)

4. 28 Travis Street (completed Fall 2013)

5. Bright Hockey Center Addition/Renovation (under construction)

6. HBS Tata Hall (complete Fall 2013)

Greenway

As presented in the DEIR, the proposed Greenway is a complex linear working landscape, which organizes adjacent urban design, infrastructure, sustainability and open space aspects of the Long-Term Vision. As an urban design strategy, the Greenway provides a positive, active landscape backbone to the Science and Enterprise district, shaping the streets, building frontages, and opportunities for varied landscape spaces. As a long-term infrastructure corridor, it shapes logical and efficient routes for energy and communications and transportation networks that promise to sustain the district's full build-out. As a civic landscape, the Greenway provides a connective tissue – a continuous park-like setting that joins residential neighborhoods, parks, public facilities, and campus spaces with the regional recreation, pedestrian and bicycle circuits along the Charles River Reservation.

The Secretary's Certificate on the DEIR requested that the FEIR include commitments to advance the establishment of the Greenway, clarify which portions of the Greenway will be constructed in conjunction with specific projects, and commit that the Greenway will be both a pedestrian/bicycle connection and a stormwater management feature.

Commitments to Greenway

The IMP includes the Greenway in the Long-Term Vision context rather than the Ten-Year Plan because the timeline for actual completion of the green space relies upon a number of factors, including the ability to access and have control of the entirety of the land. Before CSX (the current holder of the exclusive railroad easement encumbering the Allston Landing North area) may transfer control of this land to Harvard, CSX must complete agreed-upon environmental testing and remediation. This work is underway but a timeline for its completion is not finalized.

Consistent with the timeline for the completion of the remediation Harvard will engage in a discussion with the City about the interim uses of this area. Depending on the status of other ongoing construction activities, there may be a need to use a portion of this area on an interim basis for construction support in order to minimize impacts to nearby residential neighborhoods.

However, as presented in the IMP, the land is reserved for the Greenway and planning has begun for the first piece of the connective green space located in the Rena Street corridor between Rena Street and the Science project. Harvard started a public process in 2013 to identify interim improvements in this area and has committed to begin construction of implementable improvements in 2014 for the area of land known as Rena Park. This will be an important first step in establishing the western edge of the Greenway.

In addition, in conjunction with the BRA and the Task Force, Harvard has committed to exploring strategies to implement elements of the proposed Greenway in at least an interim condition.

Beyond that, Harvard proposes that the segments that comprise the Greenway ideally should be created as buildings develop along the length of the Greenway. However, given the limitations in accessing the land, the only project which is likely to occur during the Ten-Year Plan is the Hotel and Conference Center. Development of this project will incorporate another piece into the Greenway connection.

Features of the Greenway

As described in the Secretary's Certificate, the Greenway will be both a pedestrian/bicycle connection and a stormwater management feature.

The alignment of the Greenway in the Long-Term Vision provides an import east-west connection for bikes and pedestrians. The specifics of these connections will be done in coordination with the BRA and will be part of a broader planning process for the land between Western Avenue and Cambridge Street.

Contributing to long-term sustainability, the location and shape of the proposed Greenway builds on existing utility and drainage systems. The proposed alignment of the Greenway defines a continuously varied landscape space that will support below-grade storm and sewer lines; it will allow sufficient wet/dry above-grade capacity for stormwater conveyance, storage, and treatment capacity for the long-term build-out.

Like all high-performance urban landscape projects, the Greenway will evolve through adaptation and adjustment over time. Today, except for the completed Mellone Park and the upcoming improvements to the proposed Rena Park, the sites that will make up the future Greenway are primarily paved, displaying degraded urban fill conditions in many areas.

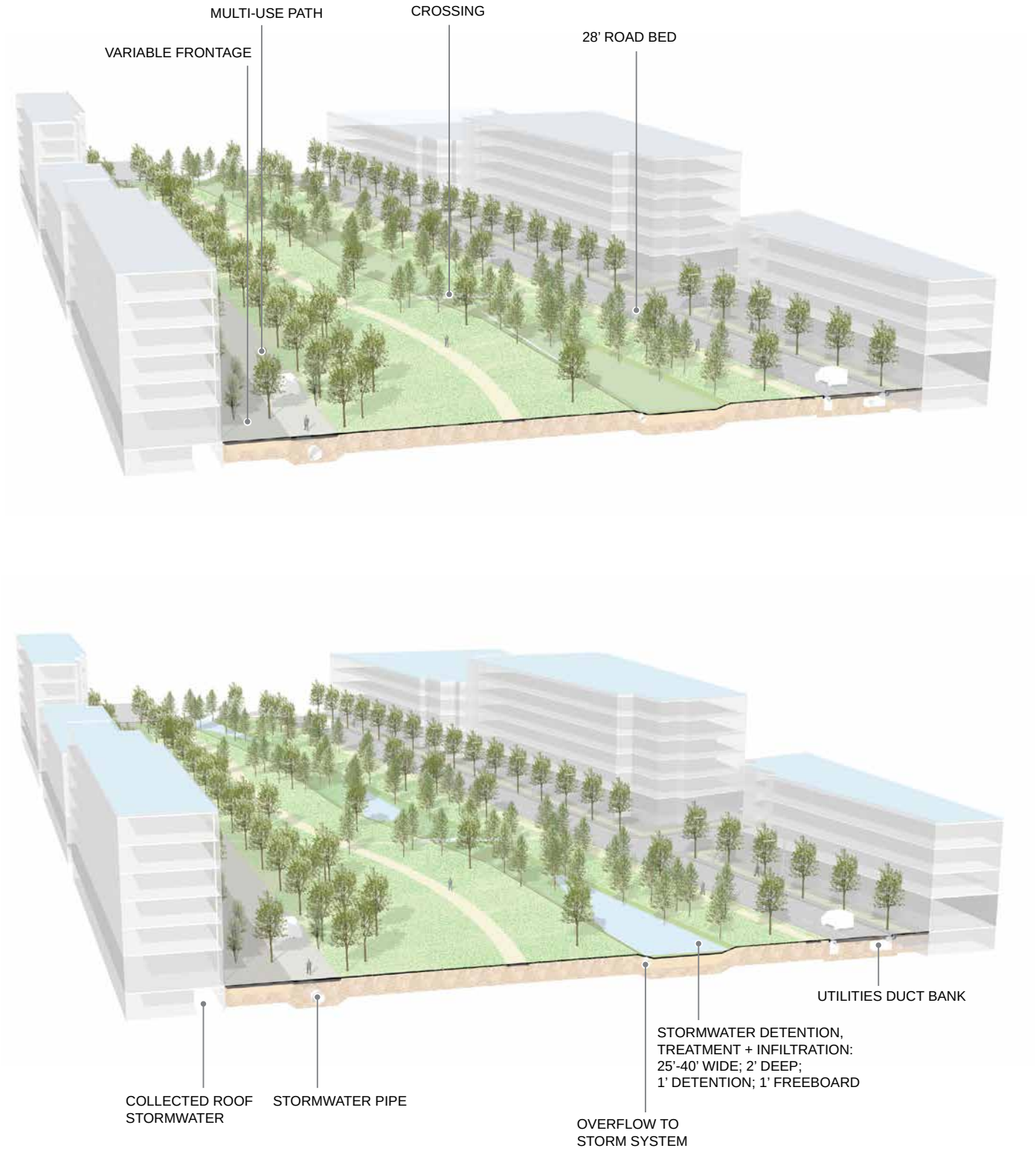


Figure 11: Long-Term Greenway Illustrative Cross Sections: Dry and Storm Conditions

Figure 12: Ten-Year Illustrative Plan

1.4 Consistency With Plans

Harvard's IMP advances the goals of a range of established local, City, regional and State-level plans. These include the 1996 Commonwealth of Massachusetts *Executive Order 385 – Planning for Growth*, the *Access Boston Plan* developed in 2000, the 2002 Massachusetts Department of Conservation and Recreation *Charles River Basin Master Plan*, the Boston Redevelopment Authority's 2005 *North Allston Strategic Framework*, the City's 2008 *Open Space Plan*, the 2008 Metropolitan Area Planning Council *MetroFuture Plan*, the 2010 Boston Transportation Department's guidelines for *Complete Streets* and MassDOT's *GreenDOT* initiative.

In 1996, pursuant to *Executive Order 385 – Planning for Growth*, the Commonwealth of Massachusetts established a statewide policy promoting sustainable economic development that does not contribute to the loss of environmental quality and resources. The policy also supports the revitalization and economic re-use of previously developed areas. Harvard's IMP is consistent with these policies. The IMP comprises approximately 1.4 million square feet of new development and approximately 500,000 square feet of renovation that will result in considerable economic benefit for the neighborhood and region, while producing a minimum of environmental impacts, as assessed and described in other sections of this FEIR. The IMP produces these economic benefits by re-using land that has for many years been the location of older commercial and industrial activities that no longer significantly contribute to the area's economic development.

The Boston Transportation Department published *Access Boston 2000-2010* ten years ago. Access Boston included five separate documents: *Boston Transportation Fact Book and Neighborhood Profiles, Pedestrian Safety Guidelines for Residential Streets, Boston Bicycle Plan, Parking in Boston*, and *Boston's Public Transportation and Regional Connections Plan*. More recently, the City of Boston has published its *Complete Streets Guidelines* and the *Boston Bike Network Plan*, which supersede elements of the *Access Boston* plan. Harvard's IMP is consistent with the multimodal focus of these plans. Harvard has coordinated with the City of Boston to implement new bike lanes in Allston, including Boston's first cycle track. The IMP creates additional links, including off-street paths, that enhance the *Boston Bike Network Plan*. The University looked to *Boston's Complete Streets Guidelines* as the template to develop the IMP design guidelines. The IMP design guidelines extend the *Complete Streets Guidelines* to include campus streets as part of an integrated street network. The IMP also includes a framework to develop Mobility Hubs on the Allston campus and technology enhancements to the traffic signal system, consistent with *Access Boston* and *Compete Streets Guidelines*.

The *City of Boston's Open Space Plan*, 2008-2014 presents a range of opportunities for open space improvement in Allston (Section 7.2.1, Community Open Space & Recreation: Allston-Brighton). Harvard's IMP is consistent with many of the City's recommended open space improvements in this area. For example, the Open Space Plan suggests a focus on pedestrian and bicycle access to and among parks. Harvard's IMP includes a strong focus on this goal, with several new streets and pedestrian routes leading to Smith Field (such as Longfellow Path), and also between Smith Field and the grove of trees at Barry's Corner, which Harvard will convert from its previous private use for the former Charlesview housing complex to public use for the Allston community. The Open Space Plan also suggests a focus on open space at Allston Landing North. Harvard's IMP presents the University's intention to create as part of the Long-Term Vision an approximately 10 acre, one-half mile long linear Greenway in that area extending from the Honan-Allston Branch Library toward the Charles River, the western anchor of which – Mellone Park – has already been constructed.

In 2002, the Massachusetts Department of Conservation and Recreation issued the *Charles River Basin Master Plan*, which the University has looked to for guidance in the preparation of its IMP. It should be noted that with the exception of the Newell Boathouse, the projects described in Harvard's IMP do not directly front the River, and the program of development projects will not significantly impact the Riverfront. However, in order to coordinate Harvard's planning with that of DCR, the University has been working closely with DCR staff in the planning and reconstruction of DCR bridges throughout this area, including reconstruction of the Anderson Bridge, Weeks Bridge, Western Avenue Bridge and River Street Bridge. Harvard's emphasis has been to seek ways to optimize pedestrian and bicycle functionality, amenity and safety throughout these improvements. Although beyond the scope of the IMP, Harvard has also been working closely with the City of Boston and Allston community representatives to fund a program of significant community improvements, several of which would improve pedestrian and bicycle access to the Charles Riverfront, including the evaluation of improved crossings of Soldiers Field Road west of Barry's Corner.

In 2005 Harvard collaborated with the City of Boston and the Allston Task Force in the preparation of the *North Allston Strategic Framework for Planning (NASFP)*. This document has been used by Harvard as a basis for much of its planning for its property in Allston, particularly in the area of Barry's Corner, where a broad range of City and neighborhood goals are advanced by the Harvard IMP. These include stronger connections to Smith Field, increased housing, new accessible open space, active ground floor uses, a strong Western Avenue street-wall, and the shaping of a pedestrian-friendly environment. The *NASFP* presents an illustrative rendering of proposed Barry's Corner development that is consistent with Harvard's plan for this area, including a "gateway" building at the corner of North Harvard Street and Western Avenue similar to that which is proposed in the IMP.

The IMP is also consistent with many of the goals and recommendations presented in the *MetroFuture Plan* produced by the Metropolitan Area Planning Council in 2008. Key areas of consistency include job growth built around education institutions, improved parkland, rebirth of industrial areas, mixed use growth, new pedestrian and bike connections, sustainable development, increased housing choices and improved community vitality. The IMP is also consistent with the *MetroFuture Plan* in terms of reusing previously developed land, preservation of historic resources, planning for climate change, and greenhouse gas reduction. Further, Harvard's IMP comprises planning that is comprehensive, long-range and that transcends municipal boundaries, all approaches supported by the *MetroFuture Plan*.

In 2010, MassDOT launched *GreenDOT,* a comprehensive environmental responsibility and sustainability initiative aimed at "greening" the state transportation system through the full range of the Department's activities. The *GreenDOT* initiative is consistent with statewide leadership on greenhouse gas emissions and sustainability issues. Harvard's Sustainability Principals are consistent with these policies, particularly in the *GreenDOT* area of planning, policy and design of multimodal transportation systems. The IMP describes Harvard's extensive transportation demand management (TDM) program which, in combination with increased shuttle bus services, improved pedestrian and bike connections, and the creation of a network of Mobility Hubs seeks to increase bicycling, transit, and walking mode share over time and promote healthy transportation options and more livable communities. The IMP incorporates Harvard's Sustainability Principles and existing Sustainability Initiatives that directly correspond with the GreenDOT broad air, energy, land, waste, materials and water goals to decrease resource use, minimize ecological impacts and improve public health.

2.0 TRANSPORTATION

The DEIR described the transportation elements of the Ten-Year Plan, including new streets, pedestrian connections, bicycle facilities, parking, shuttle enhancements, and the creation of Mobility Hubs to provide travel alternatives to single occupant commuting. The transportation elements were developed within the framework of the Long-Term Vision that addresses street typologies, and multi-modal access and circulation. In particular, the Long-Term Vision seeks to achieve the following:

- Increase permeability by creating a new north-south connector road, "Stadium Way," and a set of local, campus streets that enhance mobility and circulation by all modes
- Reflect and respect the fine-grain street network of the adjacent residential neighborhood, providing better connections to activities in Barry's Corner and important open spaces
- Improve transit access by creating new pathways to bus stops and integrating shuttle bus circulation needs into the local street network

Within this context, the Ten-Year plan identified a series of integrated transportation improvements to improve access and safety and promote a balanced transportation network that accommodates pedestrians, bicycles and transit priorities. These improvements build on the University's on-going coordination with the City of Boston, Massachusetts Department of Transportation ("MassDOT"), and Department of Conservation and Recreation (DCR) to enhance bicycle and pedestrian systems and improve transit services. Key measures include:

- Improved sidewalks and pedestrian crossings along with the creation of new pedestrian paths that are integrated with other modes (e.g., bus stops).
- New and enhanced bicycle facilities including potential upgrades to the Western Avenue cycle track.
- Expansion of shuttle service into Barry's Corner through the extension of the existing Allston Express Route and the creation of a new Harvard Square to Barry's Corner route.
- Signal timing and equipment improvements to address potential degradation in intersection operations attributable to traffic volumes from the Ten-Year Plan.
- Creation of a network of Mobility Hubs to integrate MBTA bus stops, Harvard shuttle stops, shared ride services, Hubway stations and other non-auto modes.

In addition, the Ten-Year Plan benefits from the existing Transportation Demand Management (TDM) measures that are offered under the University's CommuterChoice program (see Table 12), which are available to current and future University affiliates in Allston. These measures are integral to the University's goal of achieving an auto mode share of less than 40 percent over the ten years of the IMP.

Table 12: Overview of CommuterChoice (TDM) Program

Category	TDM Measure
Transit Passes	• 50 percent subsidy for MBTA monthly passes • Pre-tax savings on the purchase of private transit passes and commuter checks is offered as an added bonus for eligible faculty and staff • On-line monthly pass sales • Participation of 6,700 Harvard affiliates in monthly pass program
Marketing	• Transit pass program • Public transportation options and Harvard shuttle services • Bicycling services such as safe cycling classes, repair clinic, the Hubway, and the departmental bike program • Ridesharing options • Walking and bicycle maps • Links to other references and resources.
Bicycle Program	• $50 discounted annual membership in the Hubway bike sharing program • Bicycle safety training and classes • Discounted bike helmets • Harvard affiliates bike registration program in conjunction with the Harvard University Police Department • Participation in the Bicycle Benefit Act providing bicyclists up to $240/year for bicycle expenses.
Rideshare Programs	• Discounted and preferential carpool and vanpool parking in the largest garages and several surface lots • 50 percent discount on annual parking permits for carpoolers if they carpool with one other employee, and a 75 percent discount off the cost of their annual parking permit if they travel with three or more people. • Carpool partner matching and registration • Emergency ride home assistance • Zimride, an online ride sharing program that helps Harvard affiliates locate other people with similar commuting patterns or travel needs and facilitates ridesharing. • RelayRides program to match people who are willing to lend or borrow vehicles from one another.
ZipCar	• Discounted annual Zipcar membership ($25/year) to employees. • Membership for an 18+ age group. • Parking for 28 ZipCars including five in Allston • Participation of 10,000 Harvard affiliates in the program

This FEIR provides additional analysis and clarification in response to the MEPA certificate and comment letters on the DEIR. The sections that follow provide an analysis of potential traffic impacts on DCR roadways and intersections; describe the consistency of the proposed IMP transportation elements with planned infrastructure improvements projects; provide additional information about bicycle parking and Hubway station locations; provide additional information about parking demand and supply, including Electric Vehicle (EV) and Low Emissions Vehicle (LEV) accommodations; and, describe mode share goals and the proposed monitoring program.

2.1 Analysis of Transportation Impacts on DCR Roadways

This section of the FEIR presents an analysis of the transportation conditions and impacts of the Ten-Year Plan on DCR Roadways. The analysis responds to the MEPA scope and follow-up discussions with DCR and includes the following:

1. A qualitative assessment of traffic flows on the following corridors:
    - Gerry's Landing Road
    - Fresh Pond Parkway
    - Soldiers Field Road
    - Nonantum Road
2. An assessment of potential traffic volume impacts Memorial Drive/Western Avenue and Memorial Drive/River Street.
3. Level of Service analysis at the following intersections:
    - Gerry's Landing Road/Greenough Boulevard/Memorial Drive
    - Eliot Bridge/Greenough Boulevard

The analysis of the Ten-Year Plan on DCR roadways and intersections builds on the DEIR transportation analysis that described existing conditions (2013), a 2022 No Build scenario that did not include the Ten-Year Plan and a 2022 Build Scenario that added the Ten-Year Plan to the 2022 No Build scenario. The DEIR analysis was conducted in accordance with the Boston Transportation Department's (BTD's) Transportation Access Plan Guidelines (2001) and the BRA Development Review Guidelines (2006).

This section summarizes the estimates of person-trips by various modes and vehicle-trips for the Ten-Year Plan and distributes these trips over the DCR roadways and intersections. The assessments of the traffic impacts compares the Ten-Year Plan traffic volumes to existing traffic volumes. The Level of Service analysis evaluates weekday peak hour morning and evening operations at the Gerry's Landing Road/Greenough Boulevard/Memorial Drive and Greenough Boulevard/Eliot Bridge intersections for existing conditions, the 2022 No Build scenario and 2022 Build scenario

TEN-YEAR PLAN TRIP GENERATION

Four of the nine IMP projects are anticipated to generate new peak hour transportation demands. These are:

- HBS Faculty and Administrative Office Building
- Mixed Use Facility and Basketball Venue
- Gateway project
- Hotel and Conference Center

It is anticipated that the two renovation projects (the proposed Soldiers Field Park Renovation and the Baker Hall Renovation) will add little or no new typical daily or peak hour traffic volumes to the area network. The remaining three IMP projects are replacement that will add little or no new typical daily or peak hour traffic volumes to the area network. The proposed Kresge and Burden projects involve the replacement of existing buildings at the Harvard Business School campus. The proposed Harvard Stadium Addition will improve amenities but reduce the number of seats.

The proposed Basketball Venue includes the relocation of an existing facility and an increase in the number of seats from 1,950 to 3,000. The increased traffic and parking demand of this facility will not occur during the typical peak commuting hours and instead will occur in connection with facility events and will be managed as part of the University's event management strategy.

Person Trips

Person trips were estimated to assess the traffic impacts of the Ten-Year Plan. The estimates for the office, retail and hotel land uses were based on standard rates from the Institute of Transportation Engineers (ITE) Trip Generation. The residential land use represents the affiliates housing on the Mixed Use Facility & Basketball Venue site and is based on Harvard empirical data. The mode shares in Table 13 were applied to the estimated trips for each land use type. Table 14 presents the daily and weekday peak hour person trips by each land use type. The estimates for auto person-trips are before any credits are taken for shared or pass-by trips, as discussed below.

Table 13: Mode Share Assumptions

Land Use/Mode	Daily	Morning Peak Hour		Evening Peak Hour	
		Enter	Exit	Enter	Exit
Office[1]					
Auto	69%	59%	65%	65%	59%
Transit	12%	18%	12%	12%	18%
Walk/Bike	19%	23%	23%	23%	23%
Retail[1]					
Auto	52%	43%	47%	47%	43%
Transit	8%	11%	7%	7%	11%
Walk/Bike	40%	46%	46%	46%	46%
Residential/Affiliate Housing[2]					
Auto	23%	23%	23%	23%	23%
Transit	39%	39%	39%	39%	39%
Walk/Bike	38%	38%	38%	38%	38%
Hotel[1]					
Auto	52%	43%	47%	47%	43%
Transit	8%	11%	7%	7%	11%
Walk/Bike	40%	46%	46%	46%	46%

1. *Access Boston Mode Share by Purpose and Time of Day for Area 17 Allston.*
2. *Harvard empirical data for affiliate (non-undergrad) housing.*

Table 14: Ten-Year Plan Gross Person Trips by Mode and Land Use

Land Use/Mode	Daily	Morning Peak Hour			Evening Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Office[1]							
Auto	3,070	345	50	395	65	295	360
Transit	540	105	10	115	15	95	110
Walk/Bike	840	135	20	155	25	120	145
Total Office	**4,450**	**585**	**80**	**665**	**105**	**510**	**615**
Retail[1]							
Auto	2,600	30	20	50	100	95	195
Transit	400	10	5	15	15	25	40
Walk/Bike	2000	30	20	50	95	105	200
Total Retail	**5,000**	**70**	**45**	**115**	**210**	**225**	**435**
Residential/Affiliate Housing[2]							
Auto	570	0	5	5	5	5	10
Transit	980	5	10	15	10	10	20
Walk/Bike	950	5	10	15	10	10	20
Total Residential	**2,500**	**10**	**25**	**35**	**25**	**25**	**50**
Hotel[1]							
Auto	1,520	45	40	85	50	45	95
Transit	240	15	5	20	10	10	20
Walk/Bike	1,180	55	35	90	50	50	100
Total Hotel	**2,940**	**115**	**80**	**195**	**110**	**105**	**215**
Total							
Auto	7,760	420	115	535	220	440	660
Transit	2,160	135	30	165	50	140	190
Walk/Bike	4,970	225	85	310	180	285	465
Total	**14,890**	**780**	**230**	**1,010**	**450**	**865**	**1,315**

1. *Access Boston Mode Share by Purpose and Time of Day for Area 17 Allston.*
2. *Harvard empirical data for affiliate (non-undergrad) housing.*

Vehicle Trips

Table 15 presents the weekday daily and morning and evening peak hour vehicle trips associated with the Ten-Year Plan. As described in the DEIR, Vehicle trips were estimated by applying an average vehicle occupancy rate (VOR) to the auto person trip generation estimates and then accounting for shared vehicle trips and pass-by trips to retail. Shared trips account for internal trips between land uses (e.g., office to retail) and are based on recommended National Cooperative Highway Research Program guidelines (NCHRP Report 684: Enhancing Internal Trip Capture Estimation for Mixed Use Developments, Transportation Research Board, 2011). Pass-by trips account for the percent of retail traffic that attracted from traffic on the adjacent roadways, rather than new trips to and from the area. A 25-percent pass-by rate was applied for this evaluation, although ITE data indicates that a greater occurrence of pass-by traffic is possible for retail uses.

Table 15: Ten-Year Plan Vehicle Trips by Land Use

Land Use	Daily	Morning Peak Hour			Evening Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Office[1]	2,790	305	45	350	65	270	335
Retail[1]	1,080	10	5	15	35	40	75
Residential/Affiliate Housing[2]	580	0	5	5	5	5	10
Hotel[1]	850	25	20	45	30	25	55
Total	**5,300**	**340**	**75**	**415**	**135**	**340**	**475**

1. *Access Boston Mode Share by Purpose and Time of Day for Area 17 Allston.*
2. *Harvard empirical data for affiliate (non-undergrad) housing.*

Traffic Distribution

As described in the DEIR, vehicle trips were distributed over the study area roadway network using available Harvard employee zip code data and, for residential and retail uses, data from Access Boston for Zone 17 (Allston). This information is presented in Table 16.

Table 16: Vehicle Trip Distribution

Roadway (to/from)	Trip Distribution		
	Harvard Emperical[1]	Retail[2]	Residential[3]
Western Avenue (from west)	7%	15%	14%
Everett Street (from south)	5%	11%	12%
Cambridge Street (from west)	4%	7%	7%
Harvard Avenue (from south)	3%	5%	6%
I-90 East	22%	21%	18%
I-90 West	16%	14%	6%
Soldiers Field Road (from east)	15%	12%	14%
Western Avenue (from east)	4%	5%	9%
North Harvard Street (from north)	5%	5%	10%
Route 2 (from west)	19%	5%	4%

1. *Based on Harvard 2012 Employee Zip Code Data for the Allston Campus and 2007-2011 American Community Survey 5-Year Estimate Means of Transportation (Mode Share) for home-based work trips; Allston & Cambridge Mode Shares adjusted (2010 Rideshare Survey & 2012 PTDM Survey data used, respectively.*
2. *Based on Access Boston data for peak hour trips that end in Zone 17/Allston (workers).*
3. *Based on Access Boston data for peak hour trips that begin in Zone 17/Allston (residents).*

For the FEIR analysis, the trip distribution was extended to include DCR parkways upstream of the Eliot Bridge (i.e., Gerry's Landing Road, Fresh Pond Parkway, Soldiers Field Road and Nonantum Road) as well as the intersections of Memorial Drive with Western Avenue and River Street. As shown in Table 16, the Ten-Year Plan does contribute significant traffic to Soldiers Field Road west of the Eliot Bridge or Nonantum Road. Traffic volumes are higher on the Gerry's Landing Road/Fresh Pond Parkway corridor. As compared to a May 2011 traffic count of the intersection of Gerry's Landing Road/Greenough Boulevard/Memorial Drive, the additional traffic from the Ten-Year Plan represents an increase of one to two percent of peak hour traffic volumes on these roadways.

Table 17: Ten-Year Plan Weekday Peak Hour Vehicle Trips on DCR Roadways

Location	Morning Peak Hour			Evening Peak Hour		
	In	Out	Total	In	Out	Total
Gerry's Landing Road	49	11	60	18	48	66
Fresh Pond Parkway	37	7	44	13	26	39
Soldiers Field Road	1	0	1	1	1	2
Nonantum Road	1	0	1	0	1	1

The Ten-Year Plan volumes were also compared to existing (2011) traffic volumes at four DCR intersections. The 2011 traffic data reflect conditions before the construction of the Anderson Bridge. Table 17 indicates that traffic volumes at the two Eliot Bridge intersections (i.e., Gerry's Landing Road/Greenough Boulevard/Memorial Drive and Eliot Bridge/Greenough Boulevard) are significantly higher than the Western Avenue and River Street Crossings. Additional analysis is provided below of the two Eliot Bridge intersections.

Table 18: Ten-Year Plan Weekday Peak Hour Vehicle Trips at DCR **Intersections**

Intersection	Morning Peak Hour			Evening Peak Hour		
	Total Existing Approach Volumes[1]	Ten-Year Plan Volumes	Percent	Total Existing Approach Volumes[1]	Ten-Year Plan Volumes	Percent
Gerry's Landing Road/Greenough Boulevard/Memorial Drive	4,150	59	1.4%	4,830	66	1.4%
Eliot Bridge/Greenough Boulevard	4,480	79	1.8%	4,995	81	1.6%
Memorial Drive/Western Avenue	3,340	14	0.4%	3,740	5	0.1%
Memorial Drive/River Street	3,445	2	0.1%	3,275	15	0.5%

1. *MassDOT Traffic Counts, Accelerated Bridge Program, May 2011.*

Intersection Level of Service Analysis

Additional analysis was conducted at the Gerry's Landing Road/Greenough Boulevard/ Memorial Drive Eliot Bridge/Greenough Boulevard intersections. These two intersections are large, complicated, and closely spaced intersections with two to three travel lanes and no parking lanes on each departure and approach. The intersections connect multiple facilities on the DCR parkway network and provide connections between the Allston IMP area and Route 2 to the west.

Traffic volume data at the two supplemental intersections was collected in May 2011 to support the Massachusetts Department of Transportation (MassDOT) Accelerated Bridge Program (ABP). The counts were conducted during the weekday morning from 7:00 AM to 9:00 AM and weekday evening from 4:00 PM to 6:00 PM. The peak hours were determined to be 7:45 AM to 8:45 AM and 5:00 PM to 6:00 PM for the weekday morning and weekday evening, respectively. It should be noted that the peak hours used for the supplemental analysis are not necessarily the same peak hours used in the Ten-Year Plan traffic analysis in the DEIR. Signal inventories were conducted at the two supplemental intersections in July 2014.

Consistent with BTD's guidelines and the analysis conducted in the DEIR, Synchro 6 software, based on the 2000 Highway Capacity Manual (HCM), was used to model level of service (LOS) operations at the Gerry's Landing Road/Greenough Boulevard/Memorial Drive and the Greenough Boulevard/Eliot Bridge intersections. The term LOS is used to denote the different operating conditions that occur on a given roadway segment under various traffic volume loads. It is a qualitative measure that considers a number of factors including roadway geometry, speed, travel delay, and freedom to maneuver.

Level of service for signalized intersections is based on average delay for all vehicles entering the intersection, including initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For unsignalized intersections, level of service is based on stopped delay for vehicles on the side street approaches since the main street traffic is not affected by side street traffic. The level of service criteria for signalized and unsignalized intersections are presented in Table 19.

Table 19: Vehicle Level of Service Criteria for Signalized Intersections

Level of Service	Stopped Delay (seconds/vehicle)
LOS A	≤ 10
LOS B	> 10-20
LOS C	> 20-35
LOS D	> 35-55
LOS E	> 55-80
LOS F	> 80

Source: 2000 Highway Capacity Manual (HCM)

Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. Level of service is derived directly from the delay calculation. Signalized intersections with LOS D-F are commonly found in urban areas, particularly at the convergence of two or more arterial roadways.

The LOS results of the signalized intersection analyses are summarized in Table 21 for the Existing (2012), 2022 No-Build, 2022 Build and 2022 Build with Mitigation conditions, which are the same three scenarios that were evaluated in the DEIR. The table includes delay and volume-to-capacity (v/c) ratio information for each of the intersections. The delay includes initial deceleration delay, queue move-up time, stopped delay and final acceleration delay. The v/c ratios range from "0" when there is no demand to "1.0" when demand equals capacity; values over 1.0 indicate demand that exceeds capacity.. Detailed results including delay by approach, queuing and volume to capacity ratio are presented in Appendix C along with the detailed Synchro results.

Existing Conditions

The analysis indicates that both of the supplemental intersections operate at an acceptable level-of-service (LOS) D or better during both the weekday morning and weekday evening peak hours, with the exception of Greenough Boulevard at Eliot Bridge operating at LOS F during the weekday evening peak hour. Several approaches have LOS E/F conditions and 95th percentile queue lengths exceed capacity, including:

- Eliot Bridge westbound left-turn at Greenough Boulevard (AM/PM)
- Greenough Boulevard southbound thru approach at the Eliot Bridge (AM/PM)

- Memorial Drive westbound left-turn at Gerry's Landing Road and Greenough Boulevard (AM/PM)
- Greenough Boulevard northbound thru approach at Gerry's Landing Road and Memorial Drive (PM)

Future Conditions

The 2022 No-Build and 2022 Build conditions were evaluated at the supplemental intersections using the same methodology as the DEIR analysis. The intersection of Greenough Boulevard at Eliot Bridge is projected to degrade from LOS D under 2012 Existing conditions to LOS E under 2022 No-Build and 2022 Build conditions during the weekday morning peak hour. This intersection is projected to continue to operate at LOS F during the weekday evening peak hour under both 2022 No-Build and Build conditions.

Greenough Boulevard/Gerry's Landing Road at Memorial Drive is projected to continue to operate at acceptable LOS C during the weekday morning peak hour under both 2022 No-Build and Build conditions. The intersection is projected to degrade from LOS D to LOS E between 2022 No-Build and 2022 Build during the weekday evening peak hour. Level of service and queuing issues are slightly worse at the same intersection approaches that were identified in the Existing Conditions.

Mitigation

Mitigation options were evaluated at Greenough Boulevard at Eliot Bridge and Greenough Boulevard/Gerry's Landing Road at Memorial Drive. This analysis include the intersection of Soldiers Field Road at Eliot Bridge that was previously evaluated as part of the DEIR. Two mitigation options were analyzed: an actuated option that considers actuating all three signals (no coordination is assumed) and a pre-timed/coordinated option that considers coordinating three signals with pre-timed operation. Each option also includes the following signal timing/phasing improvements:

- **Greenough Boulevard at Eliot Bridge**: Modified signal phasing to permit Greenough Boulevard southbound through movement with the Eliot Bridge westbound left/Greenough Boulevard northbound right movements. This modification resulted in decreased delay for the Greenough Boulevard southbound through movement.
- **Greenough Boulevard/Gerry's Landing Road at Memorial Drive:** Modified pedestrian walk and clearance times (based on current design standards) for the Greenough Boulevard northbound and Memorial Drive westbound crosswalks. The Gerry's Landing Road southbound crossing was assumed to be separated into two segments: one across the approach and one across the departure. Pedestrian walk and clearance times were adjusted for this revised crosswalk geometry. These modifications resulted in reduced minimum phase times and total intersection cycle length.

As shown in Table 21, although both mitigation options showed improvements to all three intersections, the Pre-Timed/Coordinated option results in slightly better operations. By pre-timing and coordinating, all three intersections are expected to operate better than 2022 No-Build conditions. This includes improvements to the Greenough Boulevard southbound thru approach at the Eliot Bridge and the Memorial Drive westbound left-turn at Gerry's Landing Road and Greenough Boulevard, which operate at LOS D in the Mitigation scenarios. This mitigation should be achievable through minor equipment and programming modifications.

Table 20: Signalized Intersection Level of Service

Intersection	Approach[1]	2012 Existing Conditions				2022 No Build Conditions				2022 Build Conditions			
		v/c[2]	Delay[2]	LOS[2]	Q[3]	v/c[2]	Delay[2]	LOS[2]	Q[3]	v/c[2]	Delay[2]	LOS[3]	Q[3]
WEEKDAY MORNING PEAK HOUR													
Greenough Blvd at Eliot Bridge	Eliot Bridge WB L	0.94	70	E	#162	0.98	77	E	#170	0.99	80	E	#172
	Greenough Blvd NB T	0.50	37	D	121	0.51	37	D	124	0.51	37	D	124
	Greenough Blvd NB R	0.73	32	C	278	0.78	34	C	302	0.81	36	D	317
	Greenough Blvd SB L	0.90	25	C	#563	0.95	30	C	#679	0.98	36	D	#717
	Greenough Blvd SB T	>1.20	>120	F	#468	>1.20	>120	F	#483	>1.20	>120	F	#483
	Overall	**0.99**	**52**	**D**		**1.04**	**57**	**E**		**1.01**	**60**	**E**	
Greenough Blvd/ Gerry's Landing Rd at Memorial Drive	Memorial Dr WB L	0.88	65	E	#224	0.91	68	E	#234	0.91	68	E	#234
	Memorial Dr WB R	0.12	39	D	43	0.08	39	D	35	0.08	39	D	35
	Greenough Blvd NB T	0.72	27	C	337	0.75	27	C	352	0.75	28	C	356
	Greenough Blvd NB R	0.09	8	A	28	0.09	8	A	31	0.09	8	A	31
	Gerry's Landing Rd SB L	0.51	33	C	206	0.52	33	C	210	0.52	33	C	210
	Gerry's Landing Rd SB T	0.65	7	A	283	0.68	7	A	318	0.71	8	A	342
	Overall	**0.74**	**24**	**C**		**0.76**	**24**	**C**		**0.78**	**24**	**C**	
Soldiers Field Road at Eliot Bridge[4]	Eliot Bridge EB T	1.20	>120	F	#487	>1.20	>120	F	#515	>1.20	>120	F	#541
	Soldiers Field Rd WB L	0.64	26	C	179	0.66	26	C	186	0.66	26	C	186
	Soldiers Field Rd WB L	0.45	29	C	106	0.47	29	C	111	0.47	29	C	111
	Overall	**0.81**	**89**	**F**		**0.83**	**101**	**F**		**0.85**	**115**	**F**	
WEEKDAY EVENING PEAK HOUR													
Greenough Blvd at Eliot Bridge	Eliot Bridge WB L	1.11	115	F	#202	1.17	>120	F	#217	1.20	>120	F	#224
	Greenough Blvd NB T	0.47	37	D	114	0.48	37	D	115	0.48	37	D	115
	Greenough Blvd NB R	0.39	25	C	136	0.42	25	C	146	0.42	25	C	148
	Greenough Blvd SB L	0.87	22	C	509	0.91	25	C	#590	0.92	27	C	#641
	Greenough Blvd SB T	>1.20	>120	F	#586	>1.20	>120	F	#603	>1.20	>120	F	#603
	Overall	**1.05**	**82**	**F**		**1.10**	**89**	**F**		**1.11**	**91**	**F**	
Greenough Blvd/ Gerry's Landing Rd at Memorial Drive	Memorial Dr WB L	0.99	84	F	#264	1.02	90	F	#273	1.02	90	F	#273
	Memorial Dr WB R	0.16	39	D	47	0.09	39	D	38	0.09	39	D	38
	Greenough Blvd NB T	1.07	71	E	#673	1.12	92	F	#729	1.16	106	F	#761
	Greenough Blvd NB R	0.04	8	A	15	0.04	8	A	15	0.04	8	A	15
	Gerry's Landing Rd SB L	0.37	30	C	150	0.38	31	C	154	0.38	31	C	154
	Gerry's Landing Rd SB T	0.63	7	A	272	0.66	7	A	296	0.67	7	A	304
	Overall	**0.92**	**44**	**D**		0.96	55	D		0.98	61	E	
Soldiers Field Road at Eliot Bridge[4]	Eliot Bridge EB T	0.84	29	C	206	0.87	31	C	#309	0.88	32	C	#313
	Soldiers Field Rd WB L	1.04	63	E	~279	1.08	77	E	#418	1.08	76	E	#414
	Soldiers Field Rd WB L	0.44	29	C	69	0.51	29	C	126	0.50	29	C	121
	Overall	**0.82**	**44**	**D**		**0.86**	**51**	**D**		**0.86**	**51**	**D**	

Source: VHB, Inc. using Synchro 6 (Build 614) software.

WB = Westbound; NB = Northbound; SB = Southbound; L = Left-turn; T = Through; R = Right-turn

LOS - Level of Service; Delay - Control delay per vehicle, expressed in seconds; v/c - Volume-to-capacity;

95th percentile queue, in feet ratio; ~ - volume exceeds capacity, queue is theoretically infinite; # - 95th percentile queue volume exceeds capacity, queue may be longer; m - volume for 95th percentile queue is metered by upstream signal.

The 2012 Existing, 2022 No-Build, and 2022 Build conditions results for the intersection of Soldiers Field Road at Eliot Bridge are from the original Ten-Year Plan DEIR analysis.

Table 21: Signalized Intersection Level of Service - Morning Peak Hour

Intersection	Approach[1]	2022 Build with Mitigation (Actuated Signals)				2022 Build with Mitigation (Pre-Timed/Coordinated)			
		v/c[2]	Delay[2]	LOS[2]	Q[3]	v/c[2]	Delay[2]	LOS[3]	Q[3]
WEEKDAY MORNING PEAK HOUR									
Greenough Blvd at Eliot Bridge	Eliot Bridge WB L	0.95	62	E	#148	0.92	65	E	#167
	Greenough Blvd NB T	0.53	31	C	110	0.63	45	D	132
	Greenough Blvd NB R	0.80	29	C	#278	0.88	43	D	#368
	Greenough Blvd SB L	1.02	42	D	#645	0.94	19	B	#692
	Greenough Blvd SB T	0.73	27	C	#281	0.80	40	D	m#340
	Overall	**0.93**	**40**	**D**		**0.92**	**34**	**C**	
Greenough Blvd/ Gerry's Landing Rd at Memorial Drive	Memorial Dr WB L	0.70	33	C	148	0.66	40	D	170
	Memorial Dr WB R	0.08	27	C	28	0.08	30	C	31
	Greenough Blvd NB T	0.92	34	C	#384	0.85	28	C	368
	Greenough Blvd NB R	0.10	7	A	29	0.10	4	A	m22
	Gerry's Landing Rd SB L	0.52	26	C	177	0.56	32	C	198
	Gerry's Landing Rd SB T	0.77	9	A	440	0.77	12	B	427
	Overall	**0.84**	**22**	**C**		**0.76**	**22**	**C**	
Soldiers Field Road at Eliot Bridge[4]	Eliot Bridge EB T	0.91	28	C	410	0.90	22	C	m396
	Soldiers Field Rd WB L	0.91	47	D	#253	0.88	45	D	#256
	Soldiers Field Rd WB L	0.54	35	C	128	0.57	41	D	136
	Overall	**0.83**	**34**	**C**		**0.83**	**30**	**C**	
WEEKDAY EVENING PEAK HOUR									
Greenough Blvd at Eliot Bridge	Eliot Bridge WB L	0.94	56	E	#172	0.91	63	E	#207
	Greenough Blvd NB T	0.58	33	C	106	0.51	43	D	131
	Greenough Blvd NB R	0.42	21	C	130	0.40	27	C	161
	Greenough Blvd SB L	0.95	29	C	#580	0.94	23	C	#715
	Greenough Blvd SB T	0.89	41	D	#401	0.85	43	D	m#473
	Overall	**0.93**	**34**	**C**		**0.90**	**35**	**C**	
Greenough Blvd/ Gerry's Landing Rd at Memorial Drive	Memorial Dr WB L	0.85	52	D	#231	0.81	53	D	#231
	Memorial Dr WB R	0.09	35	D	36	0.09	35	D	36
	Greenough Blvd NB T	1.07	71	E	#728	1.08	70	E	#712
	Greenough Blvd NB R	0.04	5	A	12	0.04	4	A	m9
	Gerry's Landing Rd SB L	0.49	37	D	170	0.50	37	D	170
	Gerry's Landing Rd SB T	0.70	8	A	371	0.71	9	A	371
	Overall	0.94	43	D		0.94	43	D	
Soldiers Field Road at Eliot Bridge[4]	Eliot Bridge EB T	0.91	37	D	#327	0.85	25	C	m290
	Soldiers Field Rd WB L	0.92	36	D	#374	0.86	35	D	382
	Soldiers Field Rd WB L	0.59	36	D	140	0.69	49	D	165
	Overall	**0.85**	**37**	**D**		**0.83**	**32**	**C**	

Source: VHB, Inc. using Synchro 6 (Build 614) software.

WB = Westbound; NB = Northbound; SB = Southbound; L = Left-turn; T = Through; R = Right-turn

LOS - Level of Service; Delay - Control delay per vehicle, expressed in seconds; v/c - Volume-to-capacity; 95th percentile queue, in feet ratio; ~ - volume exceeds capacity, queue is theoretically infinite; # - 95th percentile queue volume exceeds capacity, queue may be longer; m - volume for 95th percentile queue is metered by upstream signal.

The 2012 Existing, 2022 No-Build, and 2022 Build conditions results for the intersection of Soldiers Field Road at Eliot Bridge are from the original Ten-Year Plan DEIR analysis.

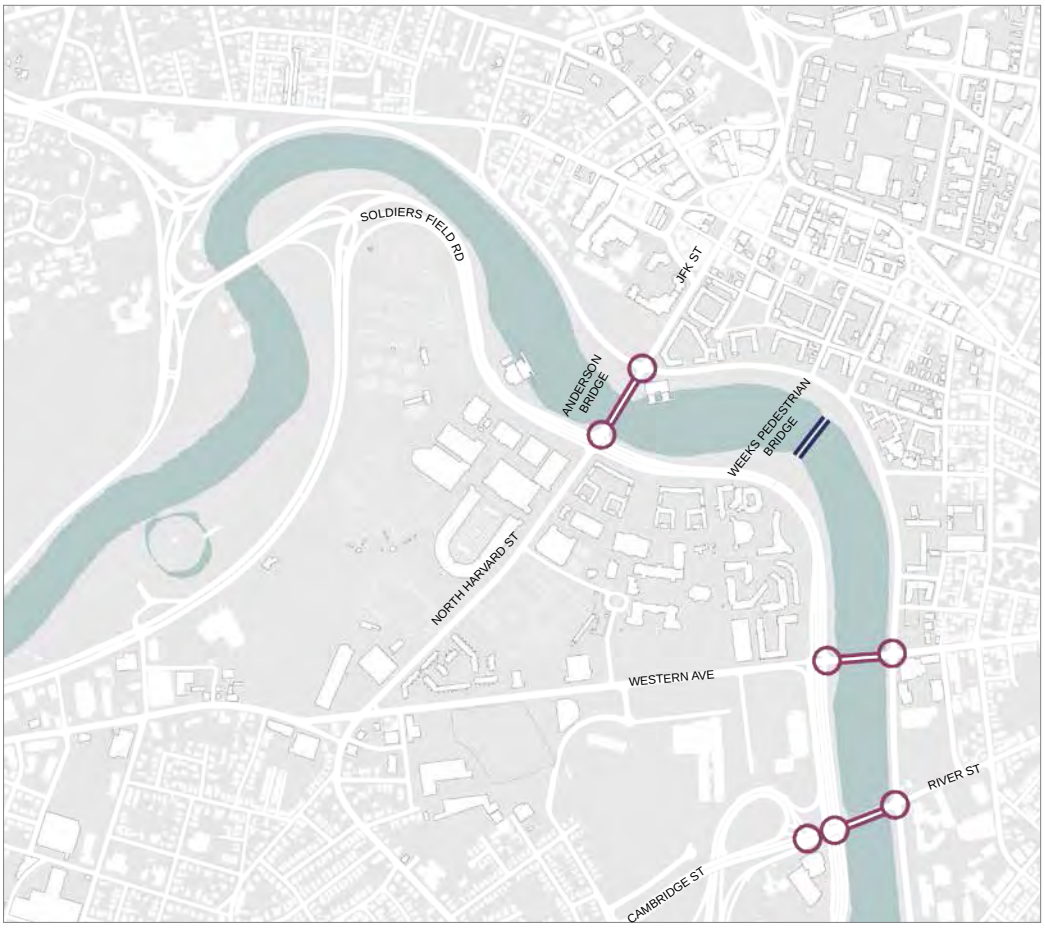


Figure 13: Planned Transportation Improvements

2.2 Consistency with Planned Infrastructure Improvement Projects

The IMP includes improvements to the pedestrian and bicycle networks that support the goals of the IMP to connect the University, community and the Charles River. This section discusses how these improvements are consistent with DCR and MassDOT Charles River bridge projects and with DCR's *Charles River Basin Connectivity Study*.

PLANNED AND ON-GOING BRIDGE PROJECTS

The Anderson Bridge and Weeks Bridge corridors will be important connections for pedestrians and bicycles traveling between the Allston and Cambridge campuses and between Allston and the river. Western Avenue will provide additional connectivity. Figure 13 illustrates the planned or on-going bridge projects on each of these corridors that include the following improvements.

- The Anderson Bridge includes new bike lanes in both directions, enhanced pedestrian crossings at the adjacent intersections, and new lighting on the bridge.
- The Western Avenue Bridge includes a new westbound cycle track and enhanced pedestrian walkways and crossings at the adjacent intersections.
- At the John Weeks Bridge, DCR will replace the stairs with new ramps to make the bridge accessible.

Harvard coordinated with MassDOT and, as appropriate, DCR on these projects and in some cases undertook projects in advance of the bridge construction that enhanced the corridors. The University upgraded sidewalks on North Harvard Street and worked with the City of Boston to install bike lanes between on North Harvard Street between Barry's Corner and the Anderson Bridge. These were the first bike lanes in Allston north of the MassPike and ultimately set the stage for the creation of bike lanes on the Anderson Bridge.

The Harvard Business School provided $150,000 to DCR to support improvements to the John Weeks Bridge. The IMP envisions a second pedestrian and bicycle corridor emerging on either side of the John Weeks Bridge. In Allston, the Harvard Business School recently tore down a wall at the end of Kresge Way (formerly East Drive), creating a new route through the campus that connects with the Sinclair Weeks Bridge and its link to the John Weeks Bridge. This connection supports the IMP vision of providing better connectivity with the river via Kresge Way. Harvard will continue to coordinate with DCR on improvements to the bridges as implementation of the Ten-Year Plan proceeds.

On Western Avenue, Harvard worked with the City of Boston to create the City's first cycle track. The IMP envisions upgrading the cycle track to offer even better bicycle opportunities along this corridor. Harvard will continue to coordinate with MassDOT and the City of Boston on the integration of these improvements with the proposed reconstruction of the Western Avenue Bridge.

CHARLES RIVER BASIN CONNECTIVITY STUDY

DCR published its Charles River Basin Connectivity Study in May 2013. Two of the sections in the study abutted the IMP area: the Arsenal Street Bridge to the Eliot Bridge (Section C) and the Eliot Bridge to Western Avenue Bridge (Section D).

Arsenal Street Bridge to Eliot Bridge

DCR has identified potential pedestrian and bicycle improvements at the Gerry's Landing Road/Greenough Boulevard/Memorial Drive and Eliot Bridge/Greenough Boulevard intersections. As discussed previously in this section, Harvard has identified potential mitigation measures at these intersections that are consistent with the Connectivity Study, including signal timing enhancements and new crosswalk and pavement markings.

The Connectivity Study also identified potential enhancements to existing or potentially new crossings of Soldiers Field Road at Telford Street, Everett Street and Smith Field. Harvard has provided funding for a study of these crossings, including a potential new at-grade crossing at Everett Street, and implementation of agreed-upon recommendations.

Eliot Bridge to Western Avenue Bridge

DCR has identified potential improvements to the path system along the southern bank including potential modifications to the crossings at the Newell Boat House driveways. Another area cited in the study is the need for improvements to the John and Sinclair Weeks Bridges to make them ADA compliant and accessible for bicycles. DCR has begun construction work to upgrade the John Weeks Bridge. Harvard will continue to coordinate with DCR on improvements to the bridges as implementation of the Ten-Year Plan proceeds.

Figure 14: Long-Term Street Typologies

Note: Street names are illustrative only; It is anticipated they may be renamed in the future.

2.3 Street Design Approach

The Ten-Year Plan includes four new streets: "South Campus Drive" (formerly identified as Smith Field Drive), "Ivy Lane" (formerly known as Grove Street), "Academic Way," and "Science Drive." The 2013 IMP organized these streets within the framework of the Long-term street typology that is shown in Figure 14 and, as shown in Figure 15, provided guidance for the future design of these roadways consistent with Boston's Complete Streets Guidelines. The FEIR is seeking approval for two projects – the Chao Center and the Baker Hall Renovation – that do not require the construction of new streets. The design of the new streets will be coordinated with the City of Boston. Future Project Commencement Notices will provide additional information when more detail is available.

STREET TYPE Street/ Blocks	FRONTAGE ZONE Preferred	Min.	Max.	PEDESTRIAN ZONE Preferred	Min.	FURNISHING ZONE 4' Plus Curb Extension	ON-STREET PARKING	BIKE ACCOMMODATION
NEIGHBORHOOD CONNECTOR								
Western Avenue								
North Side, Stadium Way to SFR*	30'	20'	40'		6'		8'	5'
North Harvard								
Stadium Way to SFR	30'	20'	50'		6'		7'	5'
NEIGHBORHOOD MAIN STREET								
Western Avenue								
Riverdale St -Stadium Way	6'	2'	10'	7'	6'		8'	5' **
South Side, Stadium Way to SFR*	6'	2'	10'	7'	6'		8'	5' **
North Harvard								
Spur Street to Stadium Way	6'	2'	10'	7'	6'		7'	5'
South Campus Drive	6'	2'	10'		6'		8'	10' ***
Spur Street	6'	2'	10'		6'		7'	5'
Ivy Lane	6'	2'	10'		6'		7'	-
Academic Way	6'	2'	10'		6'		8'	Sharrows
Stadium Way	6'	2'	10'		6'		8'	-
CAMPUS DRIVE								
Cattle Drive	40'	20'	40'		6'		8'	-
East Drive	40'	20'	50'		6'		8'	-

** Soldiers Field Road*
*** Bicycle accommodation along south side of Western Avenue between "Academic Way" and Soldiers Field Road is a 7-foot sidewalk level cycle track*
**** Shared use path north of "Ivy Lane"; 2-way buffered bike lane south of "Ivy Lane"*

Note: Names of new streets may change in the future.

Figure 15: Street Types and Sidewalk Components

2.4 Parking

This section provides information about the parking supply within the IMP area including the location and use of on-street and off-street parking spaces, parking fees for institutional parking permits, Electric Vehicle (EV) charging stations and parking for Low Emissions Vehicles (LEV).

PARKING SUPPLY

The off-street parking is either institutional or private parking; there is no off-street public parking in the IMP area. Figure 16 and Figure 17 illustrate the location of existing and future on-street and off-street parking spaces in the IMP area. Table 22 presents the off-street parking inventory by location.

Today, there are approximately 70 public on-street spaces within the IMP area on Western Avenue to the east of Barry's Corner and on North Harvard Street to the north of Barry's Corner. In the future, there will be approximately 100 public on-street spaces within the IMP area and approximately 60-70 on-street spaces controlled by Harvard University.

Table 22: Off-Street Parking Inventory

	Number of Spaces	
Institutional Parking	**Existing/Approved**	**Ten-Year Plan**
219 Western Ave./175 N. Harvard St.	45 spaces	
Teele Hall	111 spaces	111 spaces
Athletics	241 spaces	241 spaces
Spangler Lot	675 spaces	675 spaces
Soldiers Field Park Garage	645 spaces	645 spaces
One Western Ave.	617 spaces	617 spaces
25 Travis St.	55 spaces	55 spaces
1230 Soldiers Field Road	58 spaces	58 spaces
Harvard Innovation Lab (i-lab)	120 spaces	120 spaces
28 Travis Street	75 spaces	75 spaces
Science [1]	500 spaces	350 Spaces
114 Western Avenue		210 spaces
Basketball Venue and Mixed Use Project		275 spaces
Future Academic District (surface lots) [2]		250 spaces [5]
Hotel/Conference Center [3]		125 spaces
TOTAL INSTITUTIONAL PARKING SUPPLY	**3,142 SPACES**	**3,807 SPACES**
Total Non-Institutional Parking Supply [4]	510 spaces	
TOTAL	**3,652 SPACES**	**3,807 SPACES**

1. *Existing/Approved includes previously approved on-site and off-site parking; Ten-Year Plan includes previously approved on-site parking only.*
2. *Includes 150 surface spaces on the Charlesview site and 100 surface spaces on an Ohiri Field site next to HBS Central Loading.*
3. *These spaces may be non-institutional parking spaces depending on the hotel programming.*
4. *Includes 114 Western Avenue (178 spaces), Charlesview (230 spaces), and 135 Western Avenue (102 spaces).*
5. *Includes 50 spaces in a "parking reserve" that is subject to future administrative review by the BRA and BTD.*

New Institutional Parking Spaces

The Ten-Year Plan will increase the institutional parking supply by 665 parking spaces. Fifty of these spaces are part of a "parking reserve" on the former Charlesview site that is subject to future administrative review by the BRA and BTD. Of the remaining 615 parking spaces, the proposed new parking facilities will provide 490 spaces to accommodate institutional commuters, affiliate tenants and visitors and provide 125 parking spaces for use by the hotel/conference center.

Sixty of the 490 spaces are part of the 210-space parking lots at 114 Western Avenue that are necessary for the first phase of Science construction. The remainder of the 210 spaces reflect the relocation of 150 previously approved institutional parking spaces as part of Science. The 210 spaces would also replace 178 existing non-institutional spaces at 114 Western Avenue.

The location of the parking lots and garages seeks to minimize impacts on adjacent streets by taking advantage of new streets such as "Academic Way" and "South Campus Drive" to divert traffic away from Barry's Corner. The parking facilities and their driveways will be integrated into the network of pedestrian paths in the Ten-Year Plan to minimize pedestrian and vehicular conflicts and to provide suitable connections to the new and existing institutional uses.

Existing on-street parking on North Harvard Street and Western Avenue is controlled by the City of Boston. An additional 41 on-street parking spaces will be constructed on "South Campus Drive" and "Ivy Lane", which are private ways, as part of the Barry's Corner Retail and Residential Commons Project. These spaces will be available for public parking.

The Ten-Year Plan also envisions additional on-street parking on other private streets like "Academic Way" and "Science Drive". The proposed new streets will provide an opportunity to create between 60-70 new parking spaces in addition to the 41 spaces that will be constructed on the streets next to the Barry's Corner Residential and Retail Commons project. Harvard anticipates that a portion of these new on-street spaces would be publicly accessible.

The remaining 430 new spaces are distributed over the 275-space garage at the Basketball Venue and Mixed Use Project and the two Academic District lots on Ohiri Field (100 spaces) and the former Charlesview site (100 spaces not including the "reserve" spaces). These parking facilities also include 45 replacement spaces that are currently located on the 219 Western Ave./175 N. Harvard Street lot.

Institutional Commuter Parking Availability

The 475 spaces at the Basketball Venue and Mixed Use Project and the two Academic District lots will accommodate affiliate tenant parking and institutional commuter parking. The Basketball Venue and Mixed Use Project includes 200,000 to 250,000 square feet of residential space for affiliate housing. It is anticipated that approximately 125 spaces in the garage would accommodate the affiliate tenant related parking demand.

New institutional commuter parking demand would be associated with the 360,000 to 375,000 square feet of anticipated institutional office uses in the Gateway project and the HBS faculty and administrative office building. For analysis purposes, there could be approximately 1,100 employees if these building have a density of 3.0 employees/ksf. Table 23 indicated that approximately 350-400 spaces would be available in the new parking supply for new institutional commuter parking demand. This amount of parking is consistent with an auto mode share of 40 percent or less for 1,100 employees.

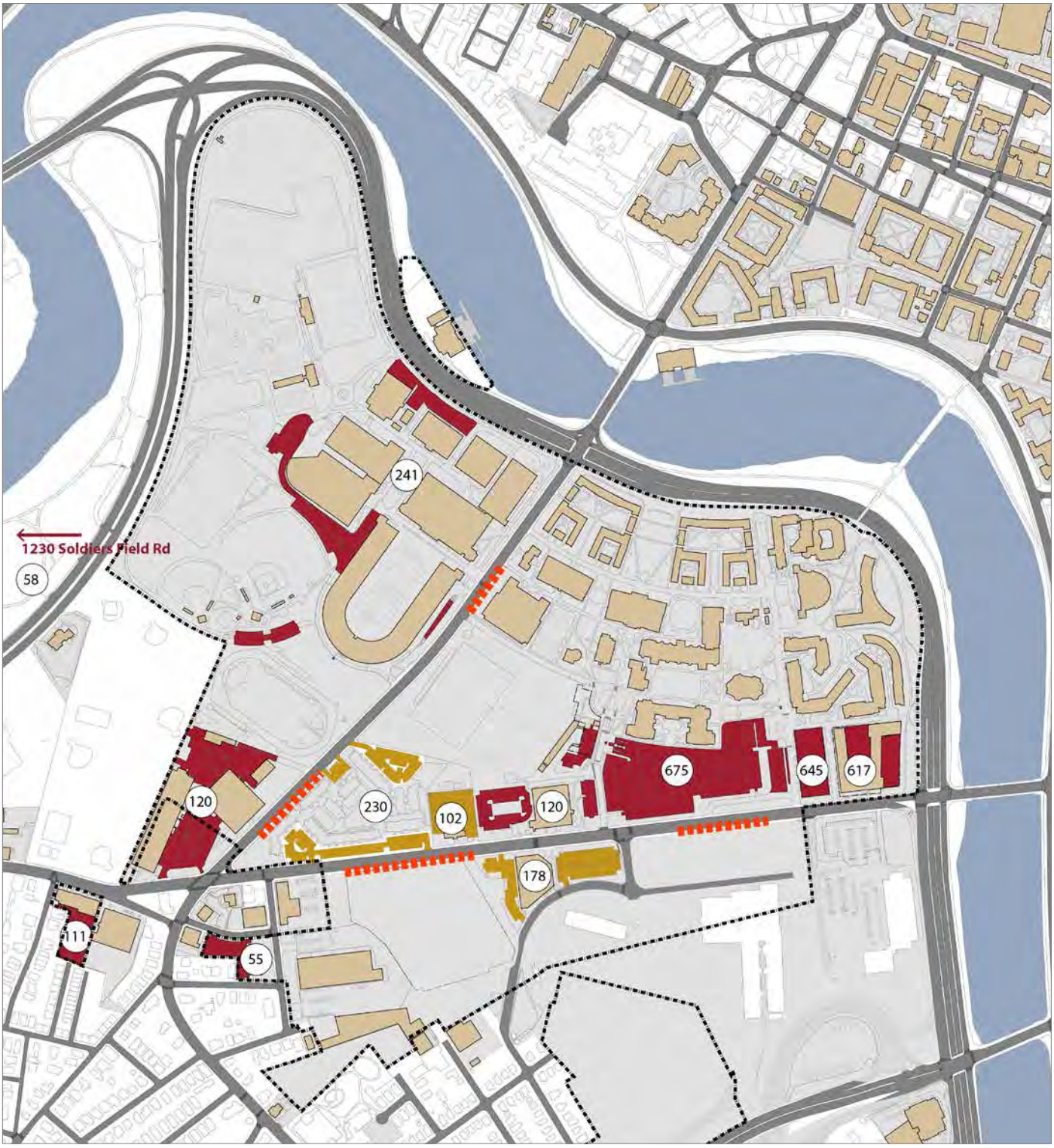


Figure 16: Existing Parking (2013)

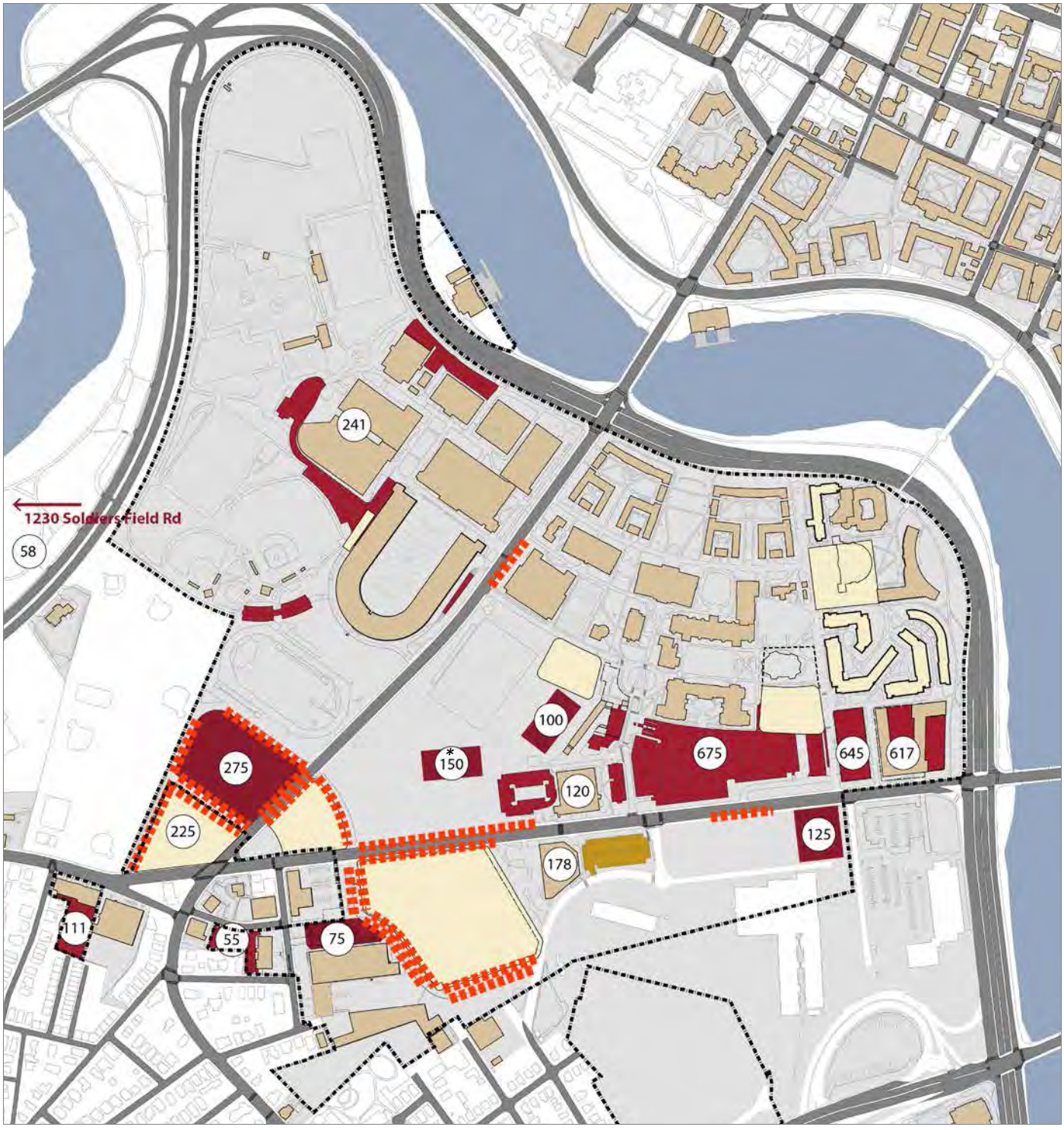


Figure 17: Ten-Year Proposed Parking

**Note: Includes 50 spaces in a "parking reserve" that is subject to future administrative review by the BRA and BTD.*

Table 23: Estimated Future New Parking Spaces Available for Commuters

Location	Supply[1]
Basketball Venue and Mixed Use Project (garage)	275 spaces
Ohiri Field (lot)	100 spaces
Former Charlesview Site (lot)	100-150 spaces
Total	**475-525 spaces**
Less Affiliate Residential (Tenant) Parking	-125 spaces
Parking Available for Institutional Commuters	**350-400 spaces**

1. *Assumes that the demand associated with the 45 institutional parking spaces currently located on the 175 North Harvard Street lot would be accommodated elsewhere in the Allston Campus institutional parking supply.*

Retail Parking Availability

The Ten-Year Plan identifies approximately 45,000-80,000 square feet of retail uses in the Gateway project and Basketball Venue and Mixed Use project. It is anticipated that up to 30-60 parking spaces would be needed to accommodate this parking need. The Ten-Year Plan envisions accommodating retail parking on the new streets where as many as 60-70 new on-street parking spaces could be provided. It is also anticipated that some of the off-street parking may be used for short-term retail and visitor parking. Harvard will coordinate with the City of Boston regarding the location and regulation of its short-term parking supply.

PERMITS AND FEES FOR INSTITUTIONAL PARKING

All University parking is controlled and administered by the Harvard University Parking Office as a University-wide resource with a permitting system and specific parking lot/garage assignments. Table 24 presents the FY15 annual parking permit fees. Additional information about permit types is presented in this section.

Table 24: Parking Permits and FY15 Monthly Fees

Permit Type	FY15 Annual Fees
Reserved Garage	$3,480
Reserved Surface	$3,276
Unreserved Garage	$1,860
Unreserved Surface	$1,740
Morning/Afternoon/3 Day Garage	$1,320
Morning/Afternoon/3 Day Surface	$1,260
Evening Commuter Garage/Surface	$96
Motorcycle Garage/Surface	$300
Tenant Garage	$3,588
Tenant Surface	$3,204

Source: Harvard Transportation & Parking

Reserved Permits

Reserved permits are granted for specific spaces reserved for commuting permit holders' exclusive use. These spaces are identified by a number (sequenced within a given lot) and may be used at all times by the permit holder.

Unreserved Permits

Unreserved permits are granted for non-assigned spaces in a designated area, and are valid from 5:00 a.m. to 3:00 a.m. Monday through Friday, and all day on weekends.

Morning Permits

Morning permits are granted for non-assigned spaces in a designated area, and are valid from 5:00 a.m. to 12:30 p.m. Monday through Friday, and all day on weekends.

Afternoon Permits

Afternoon permits are granted for non-assigned spaces in a designated area, and are valid from noon to 5:00 p.m. Monday through Friday, and all day on weekends.

3-Day Permits

3-Day permits are granted for non-assigned parking in a designated area for use from 5:00 a.m. to 3:00 a.m., three days per week. These days need to be selected by the parker and must remain constant for the year. This permit is valid all day on weekends.

Evening Commuter Permits

Evening Commuter permits are granted for non-assigned parking in a designated lot, valid between 5:00 p.m. and 7:00 a.m. Monday through Friday, and all day on weekends and University holidays. Permit issuance is determined by current availability. Commuter permits are not available to residents of Harvard University affiliated housing, and are for commuters only. Hours of parking on this permit are strictly enforced, violators subject to ticketing, towing, and revocation of parking privileges.

Motorcycle Permits

Motorcycle permits are granted for non-assigned spaces in designated areas within parking facilities. Permits are valid from 5:00 a.m. to 3:00 a.m. Motorcycles are prohibited from parking on sidewalks or in spaces designated for vehicles.

Tenant Garage Permits

Tenant Garage permits are granted for non-assigned spaces in garages that are associated with the residential facility in which the permit holder lives. This permit is available to faculty and staff members who live in University-owned facilities and do not use their vehicles to commute to campus.

Tenant Surface Permits

Tenant Surface permits are granted for non-assigned spaces in a designated surface lot. Tenant Surface permit holders must live in University-owned facilities that do not have designated parking facilities. These spaces are valid 24 hours per day, seven days per week. This permit is available to faculty and staff members who do not use their vehicles to commute to campus.

ELECTRIC VEHICLES

Electric vehicles have become more prevalent over the last several years. To accommodate this growing demand and encourage a shift to green technology, Harvard has increased the number of Electric Vehicle Charging Stations (ECS) in Cambridge and Allston from six in 2012 to 23 in 2014. Twelve stations are currently located in Allston and two more are scheduled to be installed in the fall. Each station can accommodate one vehicle.

Harvard's current supply of ECS is 0.5 percent of its parking supply in Allston. Table 25 presents a comparison of the Allston with five other institutional campuses.

Table 25: Examples of ESC at Other Institutions

Institution	ESC Spaces	Parking Supply
Harvard University (Allston)[1]	14 spaces	2,642 spaces
Boston University Medical Campus[1]	6 spaces	3,422 spaces
MIT	25 spaces	4,352 spaces
Stanford University	8 spaces	20,655 spaces
University of Michigan	11 spaces	28,000 spaces
Vanderbilt University (Central Campus)	11 spaces	8,000 spaces

1. *Includes twelve existing spaces and two new spaces that will be added in the Fall of 2014.*
2. *2013 Boston University Medical Center Institutional Master Plan/Draft Project Impact Review, Boston Medical Center Corporation and the Trustees of Boston University, September 9, 2013.*
3. *Includes four spaces under construction.*

A literature review of ECS indicated that there is a significant amount of information available from the United States Department of Energy, various states, and other private and/or institutional sources regarding the siting and design of EV supply equipment. However, recommendations regarding the number of charging stations is limited and evolving as more experiential data becomes available. The Leadership in Energy and Environmental Design (LEED) green building rating and the Boston Zoning Code were two sources that detail ratios of charging stations per overall parking supply and/or building occupants. In both cases, these ratios are designed to provide credits as part of a development review or certification process.

The provision of electric vehicle charging stations in the current version of LEED version 3 is included as an option in the "Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles" credit. The option requires installation of "alternative-fuel fueling stations for 3 percent of the total vehicle parking capacity of the site." It should be noted that LEED version 4 (anticipated to be the standard in June 2015) restructures the credits. The "Green Vehicle" credit, Option 1 dictates installation of "electrical vehicle supply equipment (EVSE) in 2 percent of all parking spaces used by the project."

Appendix A to Article 37: Green Buildings of the Boston Zoning Code outlines the Boston Green Building Credits which are used toward achieving a LEED Certifiable project. These credits state that for residential, educational/medical institutions, office/retail projects, and hotels, "on-site electric charging plug-in stations for plug-ins capable of serving one percent (1 percent) of the building occupants" should be provided.

Harvard will continue to monitor the demand for ECS and add stations as demand increases or new facilities come on line.

LOW EMISSIONS VEHICLES

Harvard provides preferential parking spaces for low-emission (LEV) and fuel-efficient vehicles in designated parking areas around campus. LEV spaces are reserved for qualifying permit holders weekdays until 10:00 am. To obtain an LEV parking hang tag, permit holders need to demonstrate that they drive a vehicle meeting the EPA SmartWay Elite certification. Fourteen LEV spaces are provided are provided in Allston. These spaces are located in the One Western Avenue Garage, the 125 Western Avenue Lot and the Spangler Lot.

2.5 Bicycle Parking

As shown in Figure 18, Harvard University has 1,402 bike parking spaces on its Allston Campus, including 334 covered and secure spaces. The University has designated areas for showers and lockers primarily at athletic facilities. All general athletic facilities are open for use by Harvard Affiliates for a nominal fee. Table 26 presents the estimated new bike parking spaces based on Boston's *Bicycle Parking Guidelines*. The new spaces would be provided for four new construction projects. The two replacement and three renovation projects are not included in the estimate. Bike parking for these projects would be included as part of the existing supply.

Table 26: Bicycle Parking

				BTD Rate		Bicycle Parking	
	Ten-Year Projects	**Use**	**Size**	**Covered**	**Uncovered**	**Covered**	**Outdoor**
3	Harvard Business School Faculty & Administrative Office Building	Office	110,000 SF	0.3 spaces/ 1,000 SF	0.025 spaces/ daily users	33	8
5	Mixed Use Facility & Basketball Venue	Institutional	260,000-310,000 SF	0.5 spaces/ 1,000 SF	0.05 spaces/ daily users	130-155	39-47
		Retail	10,000-30,000 SF	0.3 spaces/ 1,000 sf	1.0 spaces/ 5,000 SF	4-9	2-6
6	Gateway Project	Office	250,000-265,000 SF	0.3 spaces/ 1,000 sf	0.025 spaces/ daily users	75-80	19-20
		Retail	35,000-50,000 SF	0.3 spaces/ 1,000 sf	1.0 spaces/ 5,000 SF	11-15	7-10
7	Hotel & Conference Center	Hotel	250,000 SF	0.3 space/ 1,000 SF	0.025 spaces/ daily users	75	19

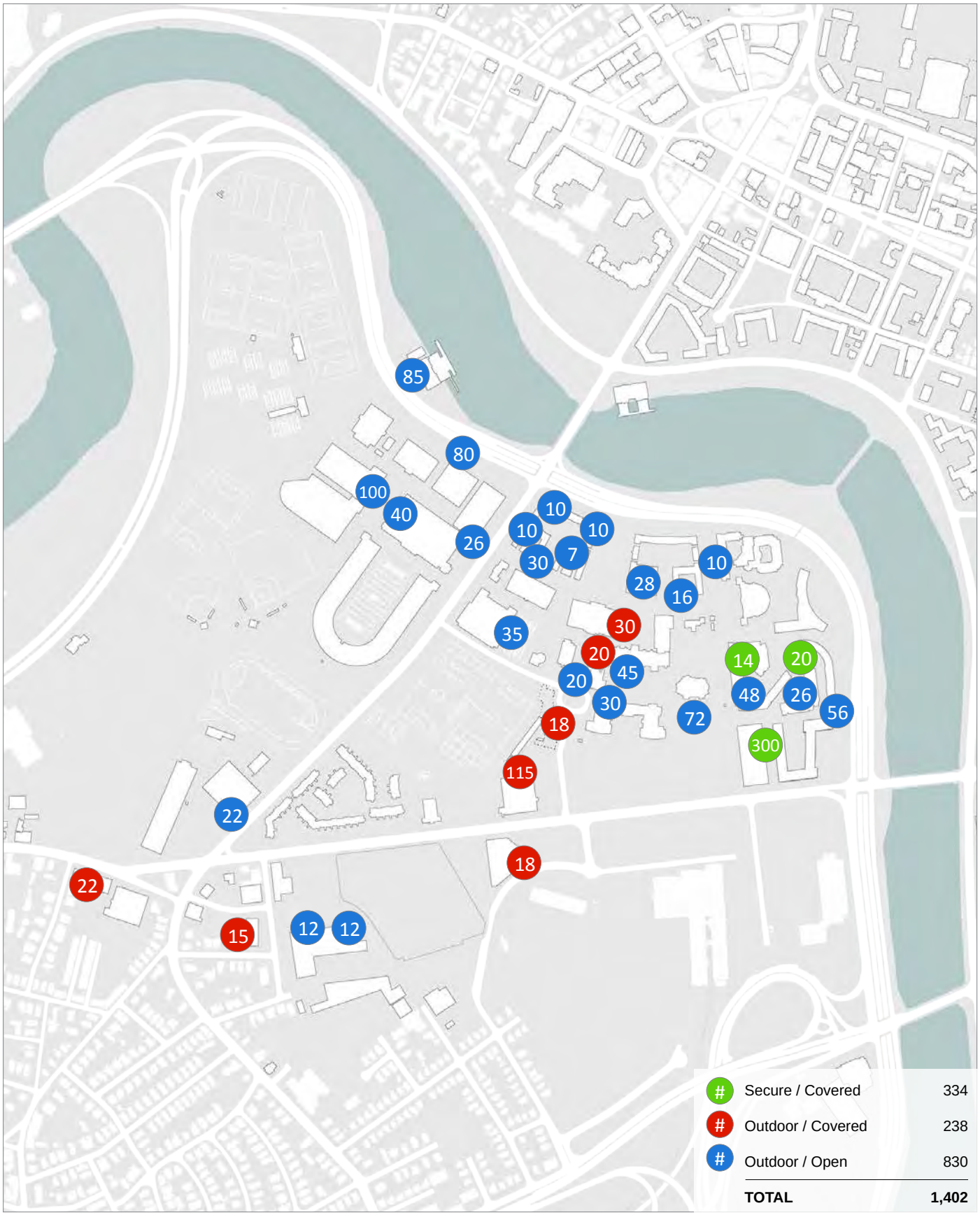


Figure 18: Existing Bike Parking (2014)

As presented in Table 26, projects that are part of the Ten-Year Plan will include an estimated 328-367 new covered spaces and 94-110 new outdoor spaces. These spaces may be provided within or adjacent to the new buildings or existing nearby facilities may be expanded to accommodate additional spaces. The amount of the new bicycle parking will be described in future project reviews. Additional spaces may be provided at the Mixed Use Facility & Basketball Venue as details about the mix of uses are determined.

2.6 Hubway Stations

Harvard has been an early supporter of the Hubway bike share system. Harvard sponsors five Hubway stations in Allston and the Longwood Medical Area and six stations in Cambridge. Harvard also provides a discounted annual Hubway membership to Harvard affiliates. Alta Bicycle Share Inc. operates the system and is responsible for maintaining the Hubway stations including repositioning bicycles to ensure an adequate balance between the number of bicycles and available docks throughout the system.

The Hubway system is modular in nature and stations can be expanded, reconfigured and relocated as necessary. To date, Harvard has worked with Alta to temporarily or permanently relocate stations in response to construction activity at station sites, including the recent relocation of the Barry's Corner Hubway Station in response to BCRRP construction. The Barry's Corner station was moved from the 219 Western Avenue parking lot to a location in front of 175 North Harvard Street that is adjacent to an MBTA bus stop.

Hubway operates during non-winter months. In the case of snow, Harvard coordinates with Alta to clear the area around the stations. Hubway is considering expanding operations into the winter in response to last year's test by the City of Cambridge that identified a potential demand for the winter service. Harvard will coordinate with Alta as further plans are developed for this service expansion.

The existing locations of the Hubway stations are well positioned to serve the Ten-Year Plan projects. Seven of the projects are within 200 yards of a station. The two remaining projects are renovation projects, the Harvard Business School Baker Hall Renovation and the Harvard Stadium Addition/Renovation. These projects are approximately 260 and 415 yards respectively from a Hubway station. Harvard does not anticipate that these projects will generate new demand for Hubway services.

Demand for bikesharing will increase as these and other projects, such as the BCRRP project and Science, come on line. Harvard will ensure that future expansion areas for Hubway stations are accommodated in the planned projects and will work with Hubway to expand these stations as future demands warrants.

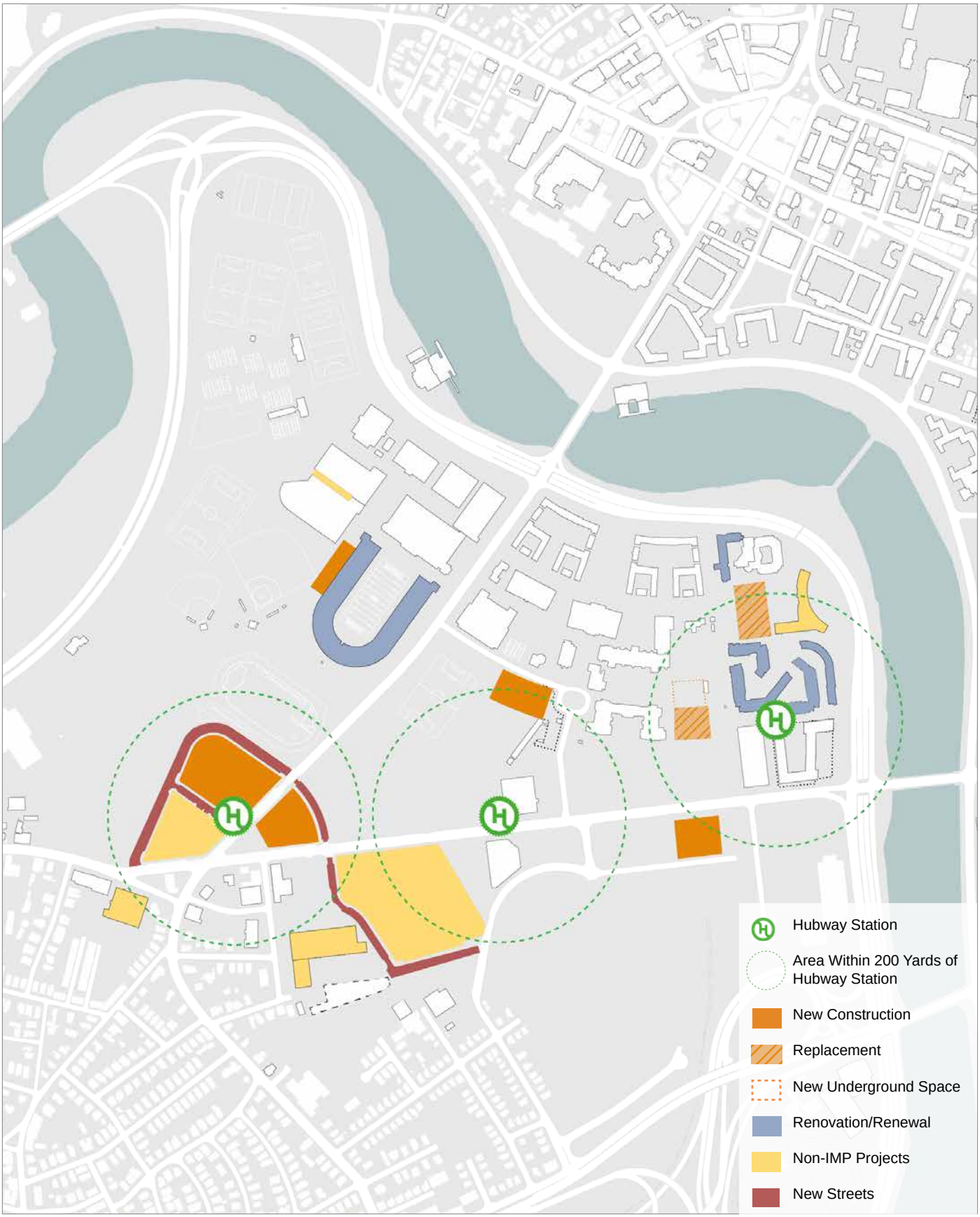


Figure 19: Existing Hubway Station Locations in IMP Area (August 2014)

2.7 Mode Share Goals and Monitoring

Harvard will set a mode share goal for the term of this IMP of under 40 percent of commuters travelling to the Allston campus by car, an aggressive target comparable to downtown Boston but one that recognizes the differences between Allston and Cambridge in terms of the commuting population and the level of transportation infrastructure.

To achieve this goal, Harvard is committed to maintaining and enhancing its TDM program with respect to the Ten-Year Plan. The existing and envisioned continued expansion of the TDM program will support alternative modes as a major component of day-to-day transportation operations supporting the IMP development program. In addition to the programmatic TDM elements that are included in Harvard's CommuterChoice program and are described earlier in this chapter, Harvard will incorporate the following elements as part of the IMP projects:

- Provide bicycle parking for new projects
- Expand Hubway stations as warranted by demand
- Add new electric charging stations
- Designate parking for High Occupancy Vehicles and Low Emissions Vehicles
- Expand shared ride car services (e.g., ZipCar)

MONITORING PROGRAM

Harvard will work with BTD as part of the annual monitoring requirement for its IMP Transportation Access Plan Agreement (TAPA) to report on the status of the mode share goal. This will include information about the supporting TDM measures in the CommuterChoice program as well as other trip reduction incentives to encourage and support non-auto use. The sections below summarize a draft monitoring program.

Annual Survey

- Survey commuters on an annual basis to estimate an Allston campus mode share and to identify factors that affect mode choice.

Parking Management

- Report the number and location of institutional parking spaces in Allston..
- Report the amount of monthly parking permit fees (i.e., rate schedule).

Transit Pass Program

- Report the status of the University's MBTA monthly pass subsidy program.
- Report the number of participants in the transit pass program.
- Describe other supportive program elements including pre-tax savings on purchase of private transit passes and commuter checks and Emergency Ride Home Program.

Ridesharing

- Report the number and location of preferential carpool spaces and vanpool spaces.
- Report the level of participation in carpool and vanpool programs.
- Describe carpool and vanpool program elements including carpool partner matching and carpool registration, discounts and, subsidies, preferential parking, and participation in programs such as Zimride.

Car-sharing

- Report the number and location of car-sharing spaces.
- Describe Zipcar membership discounts

Electric Vehicles and Low Emissions Vehicles

- Report the number and location of EV Charging Stations and LEV spaces.
- Report the number of EV and LEV permits.

Bicycles

- Report the number and location of covered and uncovered bicycle parking, the location of bike repair stations, and the location of Hubway stations
- Describe participation in Hubway Regional Bike Share program and membership fees, discounts and subsidies.
- Describe bicycle programs including reimbursements for the purchase, repair, maintenance and storage of bicycles, departmental bike program, discounts for bicycle helmets, bike registration program, and information dissemination.

Walking

- Describe Walk-to-Work programs and information distribution

Shuttle Services

- Describe routes, stops and schedule
- Report annual ridership levels
- Describe information dissemination including online tracking and phone apps

Outreach and Participation

- Describe outreach programs
- Describe participation in local, regional and national programs and events

3.0 CLIMATE CHANGE

3.1 Introduction

The MEPA Certificate required that the FEIR provide an update on the status of the University's proposed vulnerability assessment and include additional information on climate change adaptation measures.

Harvard University has reviewed the Massachusetts Climate Change Adaptation Report to assess the possible climate change impacts to the Allston campus. The Report identifies and summarizes the likely changes to the climate, climate impacts, vulnerabilities, and possible adaptation measures in Massachusetts. The Report, published in 2011 by the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) and the Climate Change Adaptation Advisory Committee, uses the most recent information and climate predictions available, including from the International Panel on Climate Change (IPCC) and other peer reviewed scientific climate change projections.

For Harvard University's Allston campus, the most impactful changes will be in air and sea surface temperature, precipitation, and sea level rise. It is reasonable to assume that the areas which are currently at risk for flooding and hurricane surge in Allston today will continue to be of concern in the future.

UNIVERSITY-WIDE APPROACH

Harvard believes universities have a special role and special responsibility in confronting the challenges of climate change and sustainability. Every member of the Harvard community has a role to play in contributing to this progress. The University will carry out research and translate the findings of that research into action. Together the Harvard community is focused on building a culture of environmental responsibility. Under the leadership of the Executive Vice President, Harvard's Office for Sustainability (OFS) works as a catalyst for change by partnering with faculty, students and staff university-wide to foster a culture of sustainability and use the campus as a living laboratory for innovation. OFS convenes the community to share best practices and develop new programs and policies that strive to serve as replicable models to inspire students and future leaders, and seek to influence the higher education, government and business sectors.

To further this, the University recently announced an approach that highlights three areas in which it is focusing special attention relative to climate change.

1. Research

Research is at the heart of the University's mission and Harvard has identified energy and environment as an institutional priority. Research across Harvard—in climate science, engineering, law, public health, policy, design and business—has an unparalleled capacity to accelerate the progression from fossil fuels to renewable sources of energy. The

University's faculty and students conduct research related to shaping and accelerating the transition to a sustainable energy system. President Faust recently created a new Climate Change Solutions Fund which will provide seed funding to spur innovative approaches to confronting climate change focused on this transition from a fossil fuel economy to a renewable one. The University will immediately make available $1 million in grants to be allocated at the outset of the coming academic year and has committed to raising additional funds.

2. Greenhouse Gas (GHG) Reduction

In 2008, the University set an ambitious goal of reducing its GHG emissions – 30 percent by 2016, inclusive of growth, from a 2006 baseline. Significant progress has been made toward meeting this goal – Harvard University's GHG emissions are down 21 percent inclusive of growth and 31 percent excluding growth. The University continues to investigate ways to further reduce emissions. Going forward, the University will:

- Continue to explore and exhaust all on-campus efficiency and reduction projects to the maximum extent possible.
- Explore mechanisms that complement aggressive on-campus efficiency efforts, including offsets, and establishing an advisory group of faculty, students and staff to evaluate and recommend complementary off-campus emissions reduction options that are additive and real.
- Create a sustainability committee led by senior faculty to shape the next generation of sustainability solutions and strategy on its campus.

3. Long-term Investment

The University has recently become a signatory to two organizations internationally recognized as leaders in developing best-practice guidelines for investors and in driving corporate disclosure to inform and promote sustainable investment.

Specifically, Harvard's endowment will become a signatory to the United Nations-supported Principles for Responsible Investment (PRI). The PRI joins together a network of international investors working to implement a set of voluntary principles that provide a framework for integrating environmental, social and governance factors into investment analysis and ownership practices aligned with investors' fiduciary duties. Harvard Management Company will manage Harvard's endowment consistent with these principles.

In addition, the University will become a signatory to the Carbon Disclosure Project's (CDP) climate change program. The CDP is an international nonprofit organization that works with investors to request that portfolio companies account for and disclose information on greenhouse gas emissions, energy use and carbon risks associated with their business activities in order to increase transparency and encourage action.

Vulnerability Assessment

As noted in the DEIR, relative to climate change, Harvard is proposing to adopt climate change adaptation procedural guidelines and climate change resilience strategies for the development of the Allston campus. These adaptation procedural guidelines are the implementation process for the climate change resilience policies. In implementing these guidelines and policies, Harvard plans to conduct a detailed Allston campus-wide vulnerability assessment and adaptation plan, and ensure that all new development is

resilient to the impacts of climate change.

The University is in the process of undertaking a vulnerability and resiliency assessment. This work will be done in coordination with the cities of Cambridge and Boston, as well as other organizations in the Commonwealth with responsibilities related to infrastructure, transportation, buildings, etc.

The scope of the vulnerability assessment includes:

1. Developing a GIS analysis of various sea-level rise scenarios detailing the impacts to Harvard's critical infrastructure in each scenario.
2. Conducting an analysis of the University's tunnel infrastructure and utilities.
3. Coordinating this work with other ongoing evaluations, including the City of Cambridge's Climate Vulnerability Assessment, the City of Boston's Green Ribbon Commission Findings, and other higher education institutions' climate vulnerability assessments.
4. Based on steps 1-3 above, developing climate change preparedness policies and standards for the entire Harvard campus, individual campuses within Harvard, internal campus districts, individual buildings, and other infrastructure.

PROJECT SPECIFIC CLIMATE CHANGE MEASURES

Harvard University and the City of Boston are aligned in their interest to ensure preparedness and address the impacts of climate change. The City of Boston has manifested this interest through the Mayor's Executive Order Relative to Climate Change in Boston and the recent convening of the Mayor's Climate Action Leadership Committee. In April 2013, the BRA released a Climate Change Preparedness Questionnaire regarding project specific strategies and actions to make projects more resilient to the effects of climate change. Projects undergoing review by the BRA are now required to provide information on climate change preparedness.

While the campus-wide vulnerability assessment mentioned previously is undertaken, efforts to minimize the impacts of climate change have focused on project-specific measures. Generally speaking, the projects described in this FEIR will comply with Harvard's Green Building Standards and as part of that process will maximize energy performance, include high-efficiency lighting and daylighting in their design, provide Energy Star office and classroom equipment, and gas-based kitchen equipment. These measures will minimize the building's energy demand, and thus its contribution of climate changing pollutants.

Building-specific measures for the two projects, for which detailed design information is available, are described in the following sections.

Chao Center

- In order to prepare for changes in ambient air temperature, the roof will be constructed with highly reflective materials and be partially vegetated, which can reduce energy use in addition to reducing the heat island effect.
- New shade trees around the new building will also reduce the local heat island effect.
- The Project will involve no addition of parking spaces, thereby minimizing the amount of new impervious pavement. In fact, the proposed Project is expected to reduce impervious area on-site by approximately five percent, plus or minus, from the existing condition, including the proposed porous pavement area.

- The building will have a high performance envelope (walls, roof, glazing) that will help minimize heat gains and also minimize the energy required to provide a comfortable indoor environment.
- Ventilation systems will incorporate enthalpy energy recovery to cool and dehumidify outdoor air by using relief air. HBS's chilled water plant will provide cooled water to the Chao Center with improved efficiency over a building-only system.
- In order to mitigate for changes in sea air temperature, the Project will include a stormwater retention/detention system to capture and recharge minimally one-inch of rainfall over the total site to mitigate the peak rate of runoff and result in a total runoff volume significantly below the existing levels. HBS is working to achieve a goal of capturing and recharging 1.5 inches of rainfall over the total site.
- For the Chao Center, basement-level utilities will be mounted on concrete pads to be protected from flooding, and the majority of the building will be equipped with sump pumps. The Proponent is considering the use of submersible electrical switchgear.

Baker Hall

The Project will be pursuing LEED Gold for Commercial Interiors. Key sustainability goals will be consistent with the University's sustainability measures and include:

- Reduce the annual discharge of stormwater run-off by 25 percent compared to the current condition;
- Reduce the annual phosphorus discharge to the Charles River by 65 percent using structural and non-structural controls;
- Decrease the peak rate and volume of stormwater discharge to the Charles River compared for the current condition for all design storms (2-, 10-, 25-, and 100-year, 24-hour storm events);
- Reduce potable water consumption by 40 percent for residence halls;
- Plant 45 percent of the vegetated areas of the site with native and adapted vegetation; and
- Provide 50 percent of the site with pervious hardscape, light-colored paver, or provide shade with trees or buildings.

The Project will upgrade the energy performance of each of the major energy consuming systems. The new building systems installed during renovation will comply with the prescriptive requirements of the current Massachusetts Energy Code (2009 IECC). As a renovation, the Boston Stretch Energy Code does not technically apply to the Project. Nonetheless, Project energy modeling, comparing the Project to the code-minimum baseline, indicates that the building will exceed Boston Stretch Energy Code requirements.

4.0 UTILITIES

4.1 Water and Wastewater

INTRODUCTION

Ten-Year Plan

The following sections describe the impacts of the Ten-Year Plan on the water and wastewater infrastructure in the area. Chapter 1.0, Project Description, Figure 2 shows the proposed IMP Area including proposed project locations and project data. Within the IMP Area, the Ten-Year Plan includes demolition of existing buildings, including some older high water using and wastewater generating buildings such as Burden Hall and Kresge Hall. The reduction in water use and wastewater generation by demolishing these older less efficient buildings will help off-set the water and wastewater requirements of the new, more efficient Harvard building space being proposed for the IMP's ten-year term. Also proposed is a significant amount of renovation that will also result in reduced water and wastewater requirements as older fixtures are replaced with new more efficient fixtures. It is estimated that the development described in the IMP and this FEIR will result in a net increase in average annual water demand of 146,900 gallons per day (gpd) and 133,600 gallons per day of wastewater generation.

These water demand and wastewater generation estimates were developed for the IMP projects using generation rates from the Massachusetts State Environmental Code (Title V), as shown in Table 27. Table 27 shows the reduction in water and wastewater flows due to the planned demolition of buildings to make way for the new building construction in the Ten-Year Plan, an estimate of the new building flow contribution/demands, and the net water and wastewater flows.

The net potable water demand in Table 27 does not include any allowance for potable water for irrigation or make-up water for evaporative cooling systems. There will be new green space associated with the IMP projects that may require irrigation to supplement rainfall. However, the proposed developed IMP Area for the new Allston campus will only result in a net increase in green areas of approximately 0.6 acres compared to existing conditions under the Ten-Year Plan. As discussed in the Water Conservation Measures paragraph at the end of this section, Harvard plans to incorporate the use of non-potable water whenever feasible to reduce the need for potable water for irrigation. Cooling system make-up water demands can vary based on the actual design of the new buildings and have not been estimated. The impacts of these potential demands are discussed further in the Water System Evaluation paragraph below.

Note that renovation projects in the IMP including the Baker Hall and Soldiers Field Park are not included in Table 27 because wastewater generation and water demands are expected to be reduced when the renovation is completed. The preliminary water demand and wastewater generation estimates will be updated, along with additional information about the potential water and wastewater infrastructure extensions or relocation needs, during the Article 80 process and Project Commencement Notice for each project.

Table 27: Ten-Year Plan Wastewater and Potable Water Estimates

Network/Land Use	Title V Flow Unit (sf) or (Bedroom)	Title V Flow Rate (GPD/1,000 sf) or (GPD/ Bedroom)	Wastewater Flow (GPD)	Water Demand (GPD)
Reduction of Existing Flow (Through Demolition)				
Kresge	67,000	75	5,025	5,528
Burden	29,000	75	2,175	2,393
175 North Harvard Street & Garages	50,000	75	3,750	4,125
Total Wastewater and Water Flow Reduction			10,950	12,045
New/Additional Flow				
Stadium Addition/Renovation[1]	50,000		0	0
HBS Chao Center (Kresge Replacement) (Dining, Offices, Classrooms)	90,000	75	6,750	7,425
Basketball Venue[2]	60,000	75	10,000	11,000
Mixed Use Facility				0
Residential (Assume 300 Units w/ 2 Bedrooms Each)	300,000	110	66,000	72,600
Retail	12,300	50	615	677
Childcare	10,000	75	750	825
Gateway Project				0
Administrative Offices	250,000	75	18,750	20,625
Retail	50,000	50	2,500	2,750
HBS Burden Replacement (Academic/ Classrooms)	92,000	75	6,900	7,590
HBS Faculty & Administrative Office	110,000	75	8,250	9,075
Hotel/Conference Center				0
Rooms	200	110	22,000	24,200
Meeting Space	26,500	75	1,988	2,186
Total Wastewater and Water Flow Added			144,503	158,953
Net New Wastewater Generation/Water Demand				
Total Wastewater and Water Flow Added			144,503	158,953
Total Wastewater and Water Flow Reduction			-10,950	-12,045
TOTAL INCREASE IN FLOW			**133,553**	**146,908**

[1] *Reduction of 7,000 seats = 21,000 GPD wastewater reduction; 46,300 sf of new office = 3,472 GPD addition; Expanded/Upgraded restrooms may increase flow; Therefore, assume ZERO flow increase*

[2] *25 GPD/participant and 3 GPD/spectator wastewater - Assume 40 players and 3,000 seats = 10,000 GPD Water demand is 1.1 times wastewater flow.*

Other Proposed Major Non-IMP Projects

Within or immediately adjacent to the IMP Area are two major proposed projects that are not included in the Ten-Year Plan; the Science project (formerly the Harvard Allston Science Complex) and the Barry's Corner Residential and Retail Commons. A discussion of the water demands and wastewater generation from these projects is included here as it will impact the same Boston Water and Sewer Commission (BWSC) system serving the IMP Area. While the program for the Science project has not been finalized, a placeholder program has been used for analysis purposes. Accordingly, the analysis of system capacity below includes the cumulative impact of the Ten-Year Plan and the two major non-IMP projects described above. For these non-IMP projects, water demand and wastewater generation estimates were developed using generation rates from the Massachusetts State Environmental Code (Title V), as shown in Table 28 and Table 29.

Table 28: Science Project and Mixed Use Wastewater and Potable Water Estimates

Network/Land Use	Title V Flow Unit (sf) or (Bedroom)	Title V Flow Rate (GPD/1,000 sf) or (GPD/ Bedroom)	Wastewater Flow (GPD)	Water Demand (GPD)
Reduction of Existing Flow (Through Demolition)				
NEDL Building, 135 Western Avenue	34,000	75	2,550	2,805
Charlesview Apartments (213 Units – Assume 2 Bedrooms Each)	426	110	46,860	51,546
Total Wastewater and Water Flow Reduction			49,410	54,351
New/Additional Flow				
Science Project	50,000		0	0
Laboratory	700,000	65	45,500	50,050
Administrative Office	160,000	75	12,000	13,200
Retail	40,000	50	2,000	2,200
Total Wastewater and Water Flow Added			59,500	65,450
Net New Wastewater Generation/Water Demand				
Total Wastewater and Water Flow Added			59,500	65,450
Total Wastewater and Water Flow Reduction			-49,410	-54,351
TOTAL INCREASE IN FLOW			**10,090**	**11,099**

Note: Water demand is 1.1 times wastewater flow.

Table 29: Barry's Corner Project Wastewater and Potable Water Estimates

Network/Land Use	Title V Flow Unit (sf) or (Bedroom)	Title V Flow Rate (GPD/1,000 sf) or (GPD/ Bedroom)	Wastewater Flow (GPD)	Water Demand (GPD)
Reduction of Existing Flow (Through Demolition)				
219 Western Avenue	94,000	75	7,050	7,755
Total Wastewater and Water Flow Reduction			7,050	7,755
New/Additional Flow				
Barry's Corner Mixed Use Housing (200-400 Units)				
325 Units (2 Bedrooms/Unit)	650	110	71,500	78,650
Retail	45,000	50	2,250	2,475
TOTAL WASTEWATER AND WATER FLOW ADDED			**73,750**	**81,125**
Net New Wastewater Generation/Water Demand				
Total Wastewater and Water Flow Added			73,750	81,125
Total Wastewater and Water Flow Reduction			-7,050	-7,755
TOTAL INCREASE IN FLOW			66,700	73,370

Note: Water demand is 1.1 times wastewater flow.

EXISTING WATER SYSTEM

Within the IMP Area, the BWSC water system directly serves existing buildings individually, except for Harvard Business School buildings which are served by a Harvard-owned piping network that receives its water supply through three BWSC master meters. Refer to Figure 20 that depicts the existing Harvard-owned, BWSC and MWRA water mains. The BWSC system receives water from the MWRA through several MWRA revenue meters. The closest MWRA meter (Meter 101) to the IMP Area is located on Spurr Street between North Harvard Street and Western Avenue. Under average conditions, about 50 percent of the flow conveyed into Allston originates from MWRA Meter 101. For reference Figure 21 shows the MWRA water main easements.

Recently, BWSC has improved the hydraulic capacity in the area by relining existing water mains on Bertram Street and replacing the old main on North Harvard Street, south of Western Avenue with a new 12-inch diameter main. In addition, Harvard recently replaced an old tuberculated 8-inch main on Travis Street with a new larger capacity 8-inch water main. This new main was turned over to BWSC upon completion. These improvements have resulted in a significant capacity increase in the area, especially in the vicinity of Barry's Corner.

WATER SYSTEM EVALUATION

The existing BWSC water system will need to meet the water demands of the Ten-Year Plan described in Table 27, as well as of the non-IMP projects described in Table 28 and Table 29. BWSC's hydraulic model of the water system was utilized to determine the net impact of all these project demands on pressures during peak hour demand and on fire protection. First,

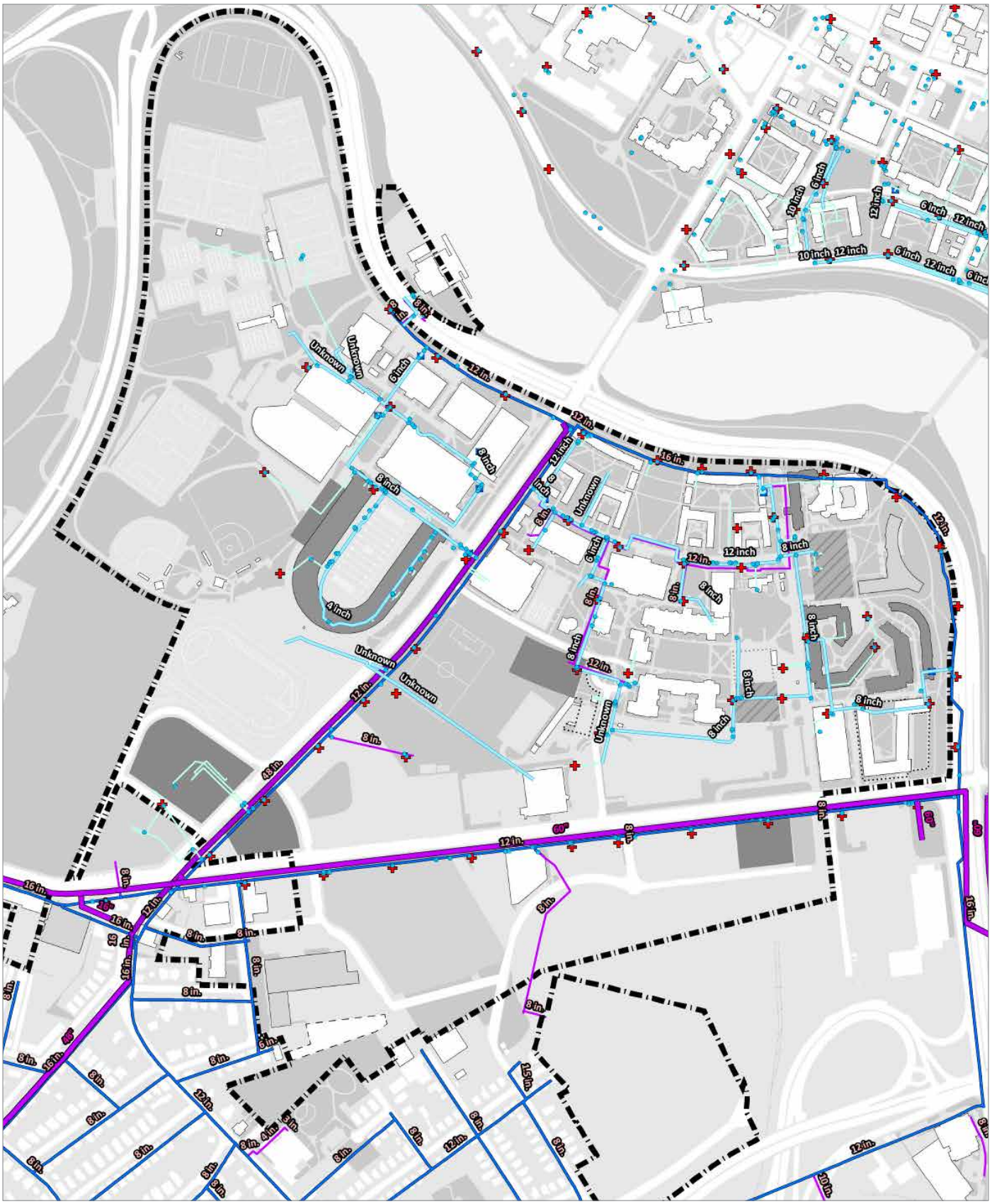
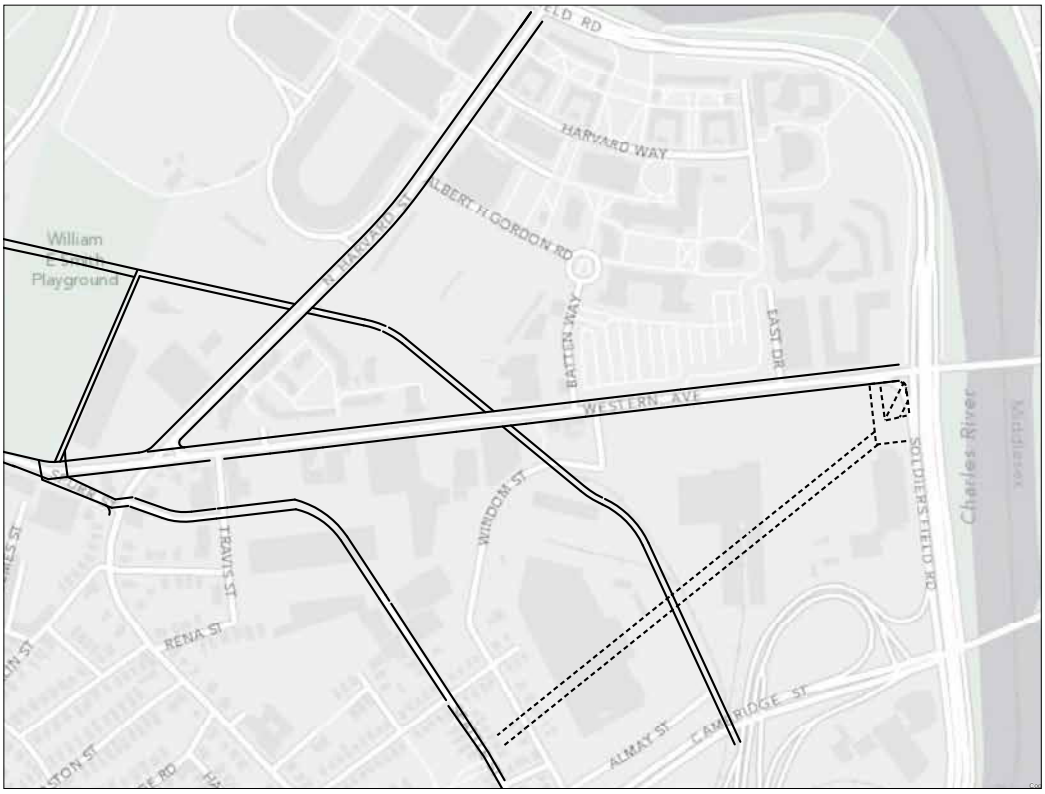


Figure 20: Existing Water Infrastructure (overlain on Ten-Year Plan)

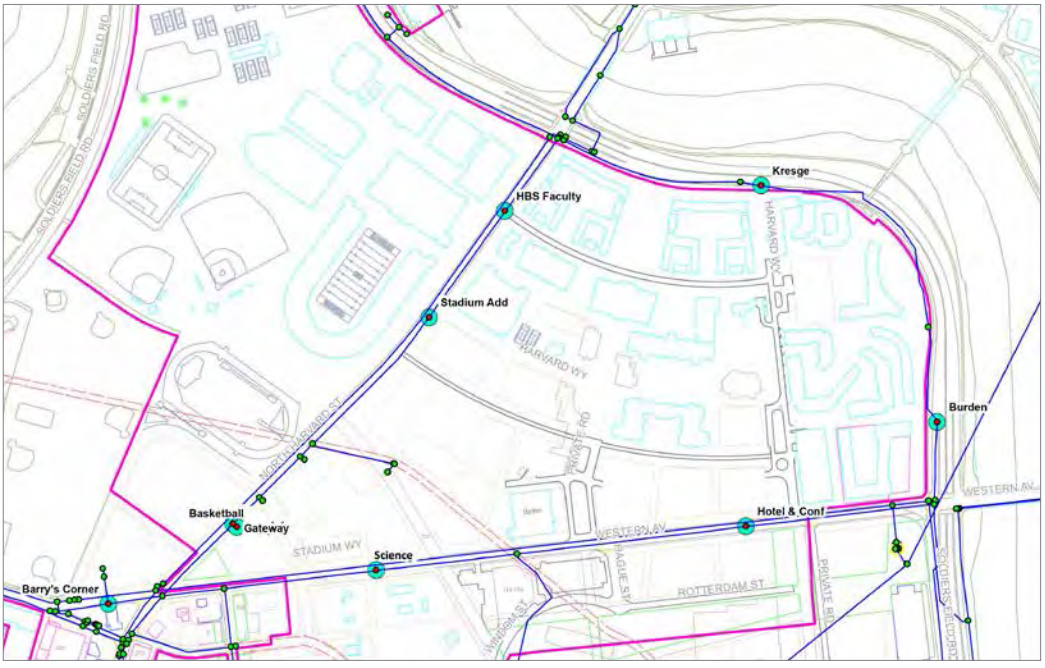


Surface Easements & Right of Ways

Subsurface Easements & Rights of Ways

Figure 21: MWRA Sanitary Sewer, Water & Tunnel Easements

0' 500' 1,000'



Water Demand Points

Pipe

IMP Boundary

Figure 22: Water Supply Evaluation

0' 500' 1,000'

the model was run simulating existing conditions to establish a baseline of pressure and fire flow delivery. Next, the water demands of all of the proposed projects, including the IMP and non-IMP projects, were added to the model. These water demands were added to the model nodes (or junctions) on the BWSC network closest to the proposed building locations. Figure 22 shows the modeled locations of these new demands.

Table 30 shows the nine projects that add new water demand; seven of the nine projects are part of the Ten-Year Plan. Also shown in Table 30 are the "before" and "after" system pressures at peak hour demand at the nine locations and the difference between the two. The impact or difference in pressure resulting from the new demands is less than 1.5 psi (pounds per square inch) at peak hour. The system pressures during peak hour with the new demands are still in the upper 60's, which is more than sufficient per MassDEP criteria. MassDEP recommends a normal system working pressure of between 60 psi and 80 psi as design criteria for water systems.

Fire protection modeling results are shown in Table 31 at the nine project locations. It is a convention to report available fire flow at 20 psi residual pressure for comparison purposes. A pressure of 20 psi is the minimum the MassDEP allows. Existing fire protection coincident with maximum day system demands ranges from 5,800 gallons per minute (gpm) at 20 psi to 11,200 gpm at 20 psi at the various locations in the IMP area. As shown in Table 31, the added water demands from the nine new projects resulted in about 4 percent to 5 percent reduction in available fire flow at 20 psi. Simulated future fire flows, however, still range from 5,500 gpm at 20 psi to 10,800 gpm at 20 psi which is more than adequate to meet the fire protection requirements in the area. In general, municipal fire flow requirements do not exceed 3,500 gpm at 20 psi. In addition, the fire flow requirements of the proposed new and renovated buildings will typically be in the vicinity of 2,500 gpm at 20 psi since the new buildings will be equipped with sprinkler systems. Accordingly, fire protection in the IMP Area will be more than sufficient to meet the needs of new and existing buildings.

With respect to water infrastructure improvements required for the Ten-Year Plan, there are seven new projects that may use existing water service connections or may require new or relocated water service connections. Three of the projects, the Burden Hall replacement, the Kresge Hall replacement (Chao Center) and the Harvard Business School Faculty and Administration building are within the Harvard Business School and would be connected to the Harvard-owned water mains. The Harvard-owned water system has three metered connections to the BWSC system. New development along Western Avenue, including the new Gateway project and the Hotel/Conference Center project can be connected to and adequately served by the existing BWSC 12-inch water main in Western Avenue. The Stadium Addition/Renovation and the Mixed Use Facility and Basketball Venue can be connected to and adequately served by the existing BWSC 12-inch water main in North Harvard Street. Based on the hydraulic analyses discussed above, no BWSC or MWRA infrastructure improvements are required to support the Ten-Year Plan.

As mentioned previously, irrigation water and make-up water for evaporative cooling have not been estimated. However, given the strong delivery capability of the BWSC water system in Allston as determined in the above analysis, it is not anticipated that infrastructure improvements will be needed to mitigate the impact of these additional potential demands.

Figure 23: Existing Sewer Infrastructure (overlain on Ten-Year Plan)

Table 30: Peak Hour Hydraulic Model Evaluation

New IMP Project	Model Junction	New Avg. Daily Demand		Peak Demand (3) gpm Avg. x 3.0	Peak Hour Service Pressure psi			% Change
		GPD (1)	gpm (2)		Before(4)	After(5)	Difference	
HBS Burden Hall[1]	1898	5,197	3.5	10.4	67.6	66.2	1.4	2%
Mixed Use Facility and Basketball Venue[1]	2061	80,977	54.0	162.0	68.9	67.6	1.3	2%
Gateway Project	2065	23,375	15.6	46.8	68.9	67.6	1.3	2%
Barry's Corner[1]	2191	73,370	48.9	146.7	69.7	68.5	1.2	2%
Science Project[1]	30,228	11,099	7.4	22.2	68.6	67.2	1.3	2%
Hotel & Conference Center	30,230	26,386	17.6	52.8	68.4	67.0	1.4	2%
Stadium Addition	30,232	-	0.0	0.0	68.1	66.8	1.4	2%
HBS Faculty & Admin	30,234	9,075	6.1	18.2	68.1	66.7	1.4	2%
HBS Chao Center[1]	30,236	1,897	1.3	3.8	66.0	64.6	1.4	2%
TOTALS		**231,376**	**154.3**	**462.8**				

[1] *Includes demand reduction due to demolition of existing buildings*

Notes: (1) GPD equals gallons per day
(2) gpm equals gallons per minute
(3) Assumes new water demand is used over 8 hour period for peaking factor of 3.0.
(4) "Before" denotes the baseline system performance before the new demands are added.
(5) "After" denotes the system performance after the new demands are added.

Table 31: Fire Flow Hydraulic Model Evaluation

New IMP Project	Model Junction	New Avg. Daily Demand		Available Fire Flow at 20 psi Residual Pressure gpm			% Change
		GPD (1)	gpm (2)	Before (3)	After (4)	Difference	
HBS Burden Hall[1]	1898	5,197	3.5	6,210	5,898	311	5%
Mixed Use Facility and Basketball Venue[1]	2061	80,977	54.0	8,502	8,117	385	5%
Gateway Project	2065	23,375	15.6	8,148	7,770	378	5%
Barry's Corner[1]	2191	73,370	48.9	11,219	10,822	397	4%
Science Project[1]	30228	11,099	7.4	7,669	7,391	278	4%
Hotel & Conference Center	30230	26,386	17.6	6,377	6,124	253	4%
Stadium Addition	30232	-	0.0	6,475	6,188	288	4%
HBS Faculty & Admin	30234	9,075	6.1	6,167	5,883	284	5%
HBS Chao Center[1]	30236	1,897	1.3	5,806	5,519	287	5%
TOTALS		**231,376**	**154.3**				

[1] *Includes demand reduction due to demolition of existing*

Notes: (1) GPD equals gallons per day
(2) gpm equals gallons per minute
(3) "Before" denotes the baseline system performance before the new demands are added.
(4) "After" denotes the system performance after the new demands are added.

WASTEWATER

The existing wastewater system is made up of pipes of various materials, size and age owned by the MWRA, the BWSC, or Harvard. Refer to Figure 23 that depicts the existing Harvard-owned, BWSC and MWRA sewer mains. For reference Figure 21 shows the MWRA wastewater pipeline easements.

As part of the previously approved Science project (aka, Harvard Allston Science Complex) project, Harvard has constructed new sewer facilities in Western Avenue and Travis Street. These new sewers were subsequently turned over to BWSC. A new 12-inch PVC sewer was constructed in Western Avenue near Travis Street. This sewer was connected to the new 18-inch PVC sewer in Travis Street which discharges to the MWRA's Charles River Valley Sewer (CRVS). A portion of the 4.5'x 5.12' brick CRVS was lined with cured-in-place pipe to strengthen it prior to the foundation work being performed in the vicinity of the site and to improve its capacity. The CRVS is subject to surcharge during wet weather events and overflows to the MWRA's 7'x 9.33' South Charles Relief Sewer (SCRS), which runs nearly parallel to the CRVS through this area. Based on discussion with BWSC, the BWSC sewers in Allston are separate from the stormwater system and do not accept stormwater flows.

As discussed, both the BWSC and MWRA sewers have adequate wastewater capacity in dry weather and even during most wet weather events. However, during large wet weather events, combined sewer overflows can occur in the MWRA system downstream of the IMP Area.

WASTEWATER SYSTEM EVALUATION

Similar to the water system analysis, the wastewater collection system could be impacted by the wastewater generated by the Ten-Year Plan, described in Table 27, as well as by the non-IMP projects described in Table 28 and Table 29. Under dry weather conditions and most wet weather conditions, the BWSC and MWRA systems will have sufficient capacity to convey the flows from the nine proposed projects to the Ward Street Headworks and eventually to the Deer Island Wastewater Treatment Facility. However, under more extreme wet weather conditions when combined sewer overflows (CSOs) occur in the MWRA system, the contribution of any new wastewater could add to the volume of overflow. This potential condition was anticipated by BWSC and the MassDEP. To mitigate the possible negative impact of new wastewater generation, both agencies require that Harvard offset the new wastewater generation by removing 4 gallons of infiltration/inflow from the Allston system tributary to the CRVS and the SCRS for every gallon of new wastewater generated (4:1 offset). As such, after the offsets are implemented, the overall impact of the Ten-Year Plan and the non-IMP projects will actually be a reduction in wastewater contributed to the wastewater system as compared to existing conditions.

With respect to wastewater infrastructure improvements required for the Ten-Year Plan, there are seven new projects that may use existing sewer service connections or may require new or relocated sewer service connections. Three of the projects, the Burden Hall replacement, the Kresge Hall replacement and the Harvard Business School Faculty and Administration building are within the Harvard Business School and would be connected to the Harvard-owned sewer mains. The Harvard-owned sewer system discharges to the BWSC system. New development of along Western Avenue, west of the SCRS toward the North Harvard Street intersection, including the new Gateway project, can be adequately served by the new 12-inch sewer main (installed for BWSC by Harvard) that connects to the CRVS via Travis Street. The Stadium Addition/Renovation and the Mixed Use Facility and Basketball Venue projects would connect to the existing 15-inch to 24-inch diameter BWSC

sewer mains in North Harvard Street, that in turn connect to the CRVS where it crosses North Harvard Street, south of Western Ave.

Development adjacent to Western Ave, east of where the SCRS crosses Western Avenue near address No. 125, including the Hotel/Conference Center, can be adequately served by the existing 24-inch BWSC sewer in Western Ave that discharges directly to the SCRS. These wastewater facilities are capable of accommodating the new flows generated by the projects within the Ten-Year Plan and with the proposed 4:1 I/I reduction in the project area, should not negatively impact CSOs in the MWRA system.

INFILTRATION & INFLOW MITIGATION AND REDUCTION

Harvard's IMP and the projects associated with campus development must comply with the mitigation requirements of the BWSC and the policy of the MassDEP to offset any additional wastewater flows by reducing infiltration and inflow (I/I) into the wastewater system. Demonstration of compliance with these requirements generally consists of calculating the net increase in wastewater flows based on demolition of existing buildings and the addition of new facilities for each development phase, and then identifying I/I reduction improvements to the sewer system directly tributary to the local MWRA interceptor system in Allston. The mitigation goals require that for every gallon of flow that is being put into the system as part of the new development, four gallons of I/I must be removed.

Because the Ten-Year Plan consists of both demolition of existing buildings that currently produce wastewater, as well as new, mixed use administrative and institutional buildings, the net increase in wastewater flows into the sewer system is partially offset by the elimination of existing flows. In addition, because the buildings targeted for demolition are older and contain plumbing fixtures with higher water demands, the offsets will be more substantial when sustainability targets for the new campus development require highly efficient buildings with low-flow, water-saving fixtures and systems. Table 27 shows the net increase in wastewater flows generated by the proposed Ten-Year Plan that were developed using the Title 5 unit flow rates. Any net increase of flow should be mitigated in strict compliance with MassDEP's Policy on Managing Infiltration and Inflow in MWRA Community Sewer Systems (BRP 09-01) and with BWSC policy and regulations. To achieve the 4:1 mitigation goal required based on the net increase in flow estimated for the building program for the entire Ten-Year Plan, as shown in Table 27, a total of approximately 534,200 gpd of I/I must be identified and removed from the local sewers tributary to the MWRA interceptor system in Allston.

The BWSC local sanitary sewers serving the Allston Campus discharge to the MWRA's Charles River Valley Sewer (CRVS) and the South Charles Relief Sewer (SCRS). The SCRS passes through a regulator structure which can be overtopped during large storm events sending combined flows to the Cottage Farm Pump Station and Combined Sewer Overflow Treatment Facility on the Charles River in Cambridge. Under typical dry weather and most storm events, both MWRA interceptors convey flows to the Ward Street Headworks facility in Roxbury for screening and grit removal before flows drop into the Boston Main Drainage Tunnel which passes flows to the Deer Island Treatment Facility. The CRVS/SCRS system contains combined sewers. Although a separate wastewater and stormwater system exists in the Allston area, the BWSC pipelines tributary to the MWRA system consist of aging sewers and private properties that provide an opportunity for infiltration and inflow mitigation. Under normal, dry-weather conditions, both the BWSC and the MWRA systems have ample capacity to accommodate additional sanitary sewer flows. However, during significant rain events, the increased volumes of stormwater from infiltration and inflow in the system contribute to overloading the conveyance systems, and can lead to combined

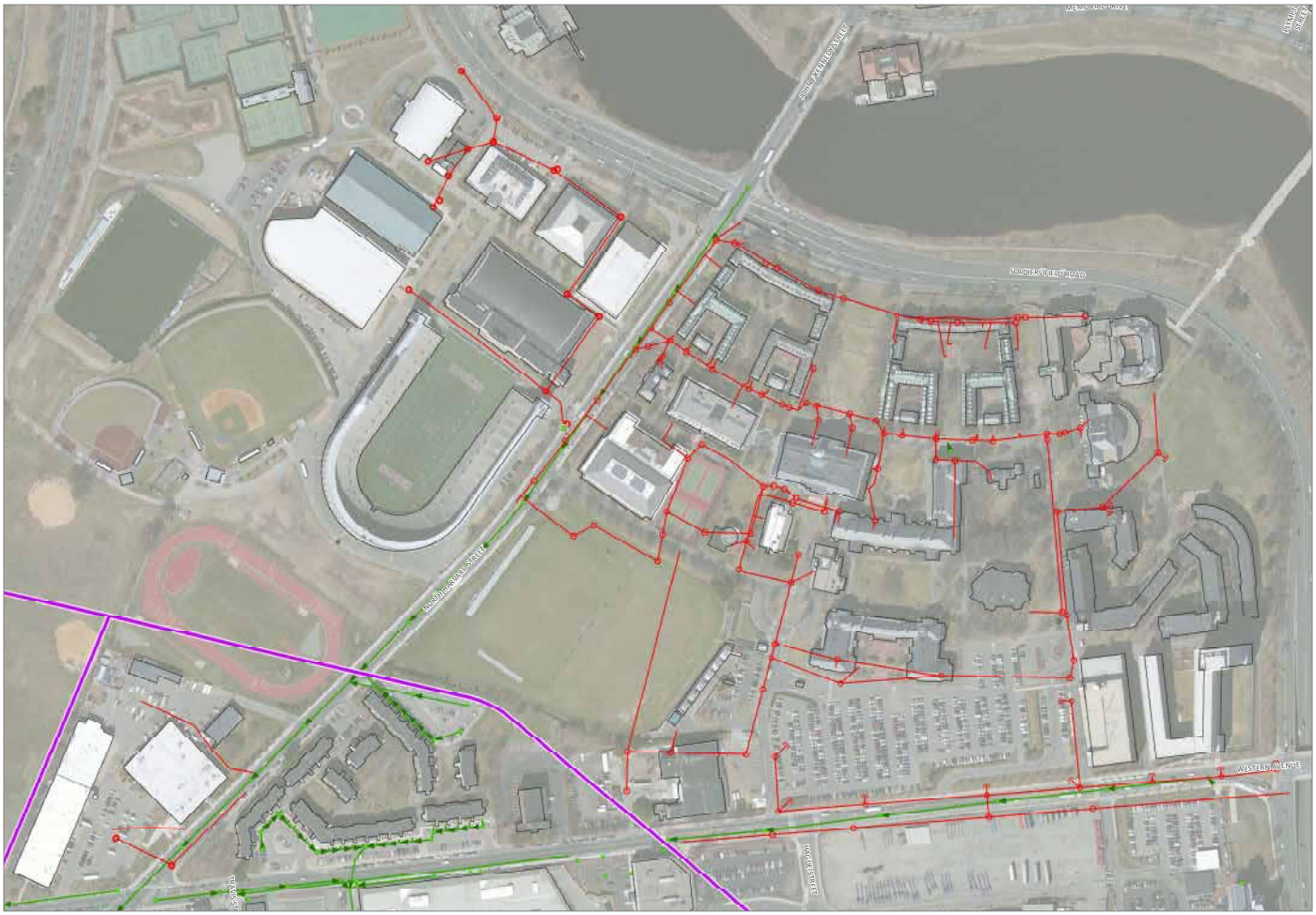


Figure 24: Existing Conditions - Harvard Owned Sanitary Sewers and Sewer Connections to MWRA

- Boston Sewer Manholes
- Manholes
- Harvard Lift Station
- Boston Sewer Mains
- Harvard University Sewer Pipes
- MWRA Sewer
- Structures

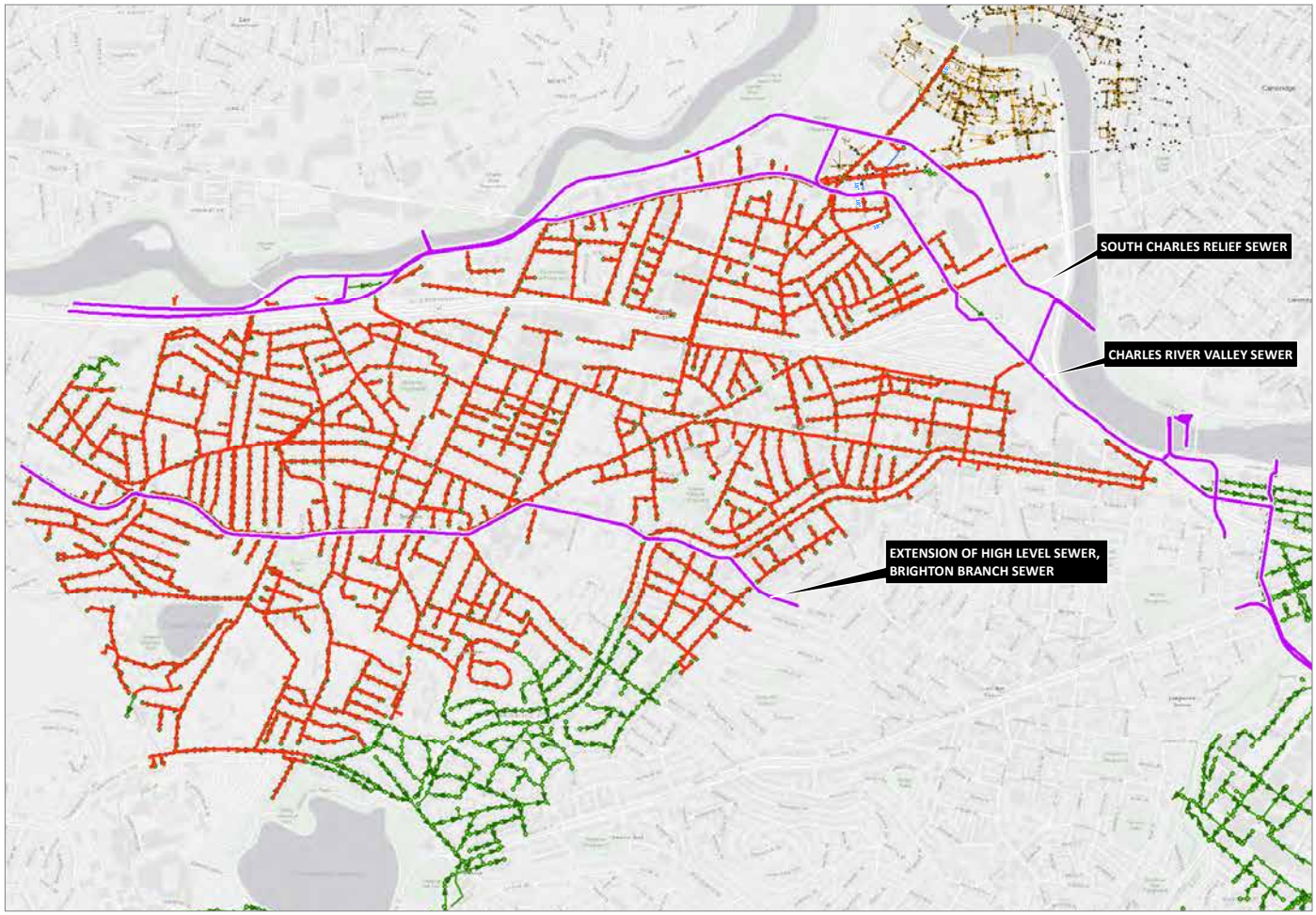


Figure 25: Sewer Connections to MWRA Line

MWRA Sewer

BWSC Pipes Contributing to MWRA sewer

Boston Sewer Main

Harvard University Sewer Main

Harvard University Sewer Service Lateral

Pipe Removal or Replacement work from “2009” and up

Harvard Lift Station

Harvard Sewer Manhole

Boston Sewer MH

sewer overflow (CSO) events; thus I/I mitigation is required to offset any new additional flow to the wastewater system.

As noted above, to comply with the mitigation requirements, Harvard must remove four times the amount of additional net flow anticipated based on the proposed development. Accordingly, Harvard University met with BWSC to discuss a two phased approach to achieving the required I/I reduction. The first phase is to address I/I within the private Harvard owned wastewater systems in Allston. Since the Harvard Business School (HBS) contains a sizable private wastewater collection system network that is aging and is a potential source of both extraneous infiltration and inflow, Harvard intends to focus their initial efforts on this private system to locate extraneous flows for subsequent removal. Since the flows generated within this private collection system discharge into the BWSC system, any reduction in flows on private property could be considered, with BWSC approval, in the net new wastewater generation calculation shown in Table 27. In this case, the overall net increase in wastewater flow discharged to the public system would be reduced based on the mitigation of I/I sources identified by Sewer System Evaluation Study (SSES) investigations on the Harvard private sewers. Therefore, Harvard proposes to perform SSES investigations initially on the private sewers shown in Figure 23. The private sewers shown in Figure 22 are to remain and are not being replaced or rehabilitated as part of the Ten-Year Plan. When I/I mitigation is achieved on the aforementioned private sewers (to remain), Harvard will petition the Commission, for credit as a net reduction of flows entering the BWSC system that can be considered by the Commission before applying the 4:1 removal goal.

As discussed above, Phase I of the I/I mitigation plan will begin with a comprehensive SSES program to determine the condition of the existing private wastewater infrastructure within the HBS campus. The SSES program will include dye-water testing and smoke testing to check for illicit connections and private inflow sources (i.e. catch basis, surface drains, roof downspouts, etc.) that divert non-sanitary flows to the wastewater system. In addition, interviews will be held with key Harvard maintenance staff to determine if sump pumps may be present in any of the old buildings and if they are directly connected to the sanitary sewer system. Inflow sources into the private Harvard system found during these investigations, not directly related to the construction for the Ten-Year Plan buildings, will be removed and documentation submitted to BWSC for review and consideration for credit as a 1:1 flow offset (i.e., a part of the net flow contribution calculation). As each new project in the Ten-Year Plan is designed and a BWSC general permit for a sewer connection and/or a site plan review obtained, Harvard must demonstrate adequate I/I mitigation compliance. Harvard's IMP consists of multiple building demolitions, renovations and new construction that will be spread out over the ten year period. Therefore, the I/I mitigation plan will be designed to be paced with the phasing of the overall new development, but could achieve more I/I removal than required for a particular project. However, per discussions with BWSC, the Commission will allow Harvard to "bank" any excess I/I that has been removed during the mitigation process prior to building construction and apply it to offset the wastewater flow contributions as each new building/renovation is completed.

At this time, it is unclear how much additional I/I flow in the BWSC system would need to be identified and removed after the removal of inflow sources identified in the initial investigation program and other private Harvard I/I source reduction programs in Allston, as described above. Therefore, a Phase II I/I mitigation plan in the public BWSC system is proposed to identify any additional flow that must be removed to satisfy the 4:1 mitigation goal: Phase II would target BWSC pipes tributary to the MWRA interceptors that traverse the proposed project area. The sewer pipes shown on Figure 25 indicate sewer pipes hydraulically connected to MWRA interceptors in the project area; the latter sewer network

would be the focus in Phase II. To make up the difference in I/I flow offsets to satisfy the 4:1 mitigation goal, as part of the Site Plan Review process for each individual project in the Ten-Year Plan, Harvard will work with the BWSC to provide resources for the identification and removal of additional I/I flow in these tributary public sewers. The Commission requires 4:1 I/I Mitigation completion for each individual project 90 days prior to building occupancy or water let-on. BWSC plans to undertake a City-Wide I/I Study starting in 2015 that will provide recommendations for I/I removal in Allston/Brighton. This new I/I plan will help guide the most effective I/I mitigation measures to be implemented in Allston. As I/I removal projects are identified in the BWSC system, Harvard will submit a list of proposed projects that would be undertaken to remove I/I for BWSC review and approval. The above two-phased I/I removal approach is also included in the draft Section 61 Findings included in Chapter 9, Mitigation.

WATER CONSERVATION MEASURES

Water conservation methods, such as low-flow fixtures, waterless urinals and grey water systems are being evaluated by Harvard on a project-by-project basis. Low-flow fixtures for sinks, showers, and laundry facilities will help to reduce water consumption for all new buildings included in the proposed campus development. In addition, waterless urinals could be utilized in public bathrooms to further reduce potable water demand. Consideration will also be given to using rain water harvesting and storage for irrigation purposes to help significantly reduce or eliminate potable water use for irrigation, and to incorporate drought tolerant native plant species in landscaping plans to further reduce demand and increase water conservation.

As described above, the existing water mains adjacent to the project site appear to have adequate capacity for the future demand. However, incorporating water conservation measures as part of the project fits in with Harvard's goals and guidelines for sustainability and Green Building (LEED) initiatives. Harvard's current Green Building Standards require new construction and major renovations to achieve LEED Gold certification. The current Green Building Standards also require, for applicable projects, a 35 percent reduction in indoor potable water use using the LEED baseline.

4.2 Stormwater

INTRODUCTION

The development of Harvard's campus in Allston is a unique opportunity to improve how stormwater is addressed. Given that so much of the study area consists of previously-developed impervious surfaces, thoughtful development of projects within the IMP Area is anticipated to provide environmental benefit in the Charles River area.

The current IMP Area footprint includes varying types of surface areas, ranging from open athletic fields to highly developed, predominantly industrial and commercial acreage. The existing infrastructure was built as individual parcels were developed. Today, the opportunity exists to reassess and implement stormwater solutions, using measures that will lead to such benefits as improved water quality of stormwater runoff to the river, reducing the volume of direct stormwater discharge to the river, and increasing water conservation by rainwater harvesting. These benefits are planned in parallel with improving surface drainage by reconfiguring drainage basins and rerouting piping alignments to more efficiently manage stormwater.

One key component to managing stormwater on-site will be the incorporation of green infrastructure into the final site designs of the individual projects to the maximum extent practicable. Green infrastructure helps to manage stormwater by mimicking natural hydrologic functions, particularly stormwater treatment and recharge to groundwater. It will also help the City of Boston meet Charles River phosphorus and pathogen removal requirements, described below. Green infrastructure facilities that will be investigated as part of the design of individual projects on the Allston campus include:

- Vegetated bioretention areas/rain gardens
- Subsurface storage and infiltration
- Green roofs
- Permeable pavers in plaza areas
- Porous asphalt in roadway/parking spaces
- Pervious concrete walkways
- Rainwater harvesting systems

The total area within the IMP Area boundary is approximately 178 acres, approximately half of which consists of impervious surfaces (buildings and paved areas) under existing conditions. The proposed developed IMP Area for the new Allston campus will result in a net increase in green areas of approximately 0.8 acres compared to existing conditions under the Ten-Year Plan and further increases the green areas are planned in the long-term. (This number is conservative in that it looks at just the IMP project sites. The actual increase in green areas will be larger as they will include areas that are not part of specific projects but these areas are not yet defined.) As part of the IMP, Harvard will continue to investigate opportunities for installing green stormwater management and water quality treatment measures within the IMP Area. The greening of the project area in concert with proposed stormwater management will also provide significant reductions in peak rates of runoff to BWSC drainage systems in Allston public ways throughout the campus, thereby reducing flooding in these neighborhoods. In particular, the proposed Greenway will greatly improve stormwater management in this highly impervious commercial/industrial area of Allston.

Stormwater management controls will be established in compliance with BWSC standards and the DEP's Stormwater Management Standards. They will also be designed to reduce phosphorus and pathogen loads to the Charles River, in accordance with Boston's anticipated EPA National Pollutant Discharge Elimination System (NPDES) permit stormwater standards.

STORMWATER STANDARDS

BWSC Standards

Any proposed connections to the existing BWSC storm drainage system will comply with BWSC Site Plan Application regulations. Site plans will show in detail how drainage from building roofs and from other impervious areas will be managed. The development of the Ten-Year Plan is expected to improve runoff water quality through treatment and infiltration. BWSC now requires treatment of one inch of runoff from the proposed impervious area of a development to meet EPA NPDES Permit requirements, described below. Project designs will include methods for retaining this volume of stormwater on project sites, by directing stormwater to water features, porous pavements and other

infiltration facilities, and landscaped areas, including vegetated bioretention areas and swales. The flows reaching the stormwater management facilities will typically be pre-treated by routing through grassed swales, deep-sump hooded catch basins and/or particle separators that, combined with the stormwater management facilities, will achieve the goal of 80 percent or greater total suspended solids (TSS) removal.

The capacity of BWSC storm drainage systems serving the Allston campus and individual project sites are expected to be adequate to meet future project demands due to the planned reduction in impervious areas and the installation of green infrastructure. Over the past several years, Harvard has constructed new drainage facilities in the area, including new 12- to 36-inch drains in Western Avenue, a 72-inch drain in the roadways around the perimeter of the Science project, and stormwater management facilities in Ray Mellone Park, including a grassed channel and leaching manhole.

State Stormwater Standards

The proposed drainage facilities will be designed in accordance with the DEP's Stormwater Management Standards to the maximum extent practicable. If impervious areas are not increased, as is the case with Harvard's IMP and two non-IMP projects, the project is a redevelopment project per the Massachusetts Stormwater regulations. For redevelopment, stormwater management standards addressing peak flow attenuation, groundwater recharge, and TSS removal must be met only to the maximum extent practicable; the remaining standards must be fully met. To meet the Massachusetts regulations, peak flow attenuation will not be required if there will be no increase in impervious area. Infiltration and stormwater management systems will be required to provide groundwater recharge and TSS removal.

EPA NPDES Permit Requirements

Since the University's runoff is tributary to the Charles River, it will be subject to Total Maximum Daily Load (TMDL) requirements for phosphorus and pathogens under Boston's anticipated NPDES permit. BWSC expects that, in the long run, the City will be required to reduce phosphorus to the Charles River by 65 percent. Phosphorus and pathogen reductions will be met by treating the inch of runoff from impervious areas of the developed sites using infiltrative/filtering BMPs, such as rain gardens/bioretention areas, subsurface storage and porous pavements. Harvard University installed a pilot bioretention planter near the Harvard Business School in 2008 to investigate the pollutant removal effectiveness of bioretention. The pilot planter produced high pollutant removal results for phosphorus and pathogens (40 to 80 percent and 90+ percent, respectively). At the master planning level, space requirements for rain gardens/bioretention to meet the treatment requirements have been identified for each site, discussed below.

DRAINAGE ANALYSIS

Figure 26 presents IMP project drainage areas, excluding the potential Construction Support Area to the south. Table 32 compares the drainage characteristics of the seven Ten-Year Plan new construction projects under existing and proposed conditions, including paved areas, roof areas and pervious areas/green space. The total drainage area of the seven projects is 31.2 acres. As shown in the table, the Ten-Year Plan development will result in a net increase of 0.8 acres of pervious area/green space. The last two columns show the water quality volume that will be treated to meet the BWSC one-inch requirement, and the approximate area that would be reserved for one-foot deep bioretention areas/rain gardens

Figure 26: Drainage Areas & Infrastructure (overlain on Ten-Year Plan)

to treat and infiltrate this volume of runoff. The total water quality volume for the Ten-Year Plan development is 1.5 acre-feet, requiring approximately 1.5 acres of bioretention areas/ rain gardens. By infiltrating this volume of water, the seven Ten-Year Plan new construction projects will meet the Charles River TMDL for phosphorus and pathogens.

The computer program HydroCAD, Version 10.00, was used to determine peak rates of runoff and total runoff volumes from the Ten-Year Plan project areas during 2-,10-, 25- and 100-year, 24-hour rainfall events. The HydroCAD program is based on the Natural Resources Conservation Service's (formerly the Soil Conservation Service) runoff curve number method.

GIS mapping was used to determine the land use, hydrologic soil group (HSG), and impervious area for each drainage area. Runoff velocities for estimating time of concentration (Tc) are based on the "SCS National Engineering Handbook, Figure 15.2 – Velocities for Upland Method of estimating Tc." Stormwater runoff in rain gardens/ bioretention areas was assumed to infiltrate within 24 hours in the model.

Precipitation data for standard storms used in the models were taken from Cornell University Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada (September 1993). The estimated precipitation depths during the 2-, 10-, 25-, and 100-year 24-hour storms are 3.25, 4.80, 5.93, and 8.47 inches, respectively. Compared to rainfall depths in Technical Paper No. 40 (Rainfall Frequency Atlas of the United States), the rainfall depths from the Cornell University study are higher for storms greater than a 10-year 24-hour storm in the Boston area, and provide a more conservative evaluation and design of existing and proposed stormwater management facilities, as well as a factor of safety for potential climate change. The design storm for each stormwater management facility is a function of the risk and safety factor needed in the design. For the design of trunk drains that control flow from large drainage areas, the 25-year design storm using Cornell data is warranted and used in the Harvard drainage system analysis to provide protection. For the design of rain gardens that collect runoff from small areas, the 90 percent storm design volume (1 inch of runoff) and peak 10-year storm rate of discharge are used. Local street drainage systems are designed to control peak rates of runoff from 10-year 24-hour storms.

Table 32 shows the modelled peak rates of runoff and total runoff volumes for each of the seven projects under existing and proposed conditions. The HydroCAD model for proposed conditions includes the estimated areas for the proposed rain gardens/bioretention areas. As shown in the table, the proposed Ten-Year Plan development will reduce peak rates of runoff by approximately 1 to 5 percent, and will reduce runoff volumes by 8 to 25 percent. Appendix D provides the calculations used in this drainage analysis.

Table 33 indicates that areas P-08 (Mixed Use/Basketball Facility) and P-12b (HBS Faculty and Administration Offices) have an increase in peak rates of runoff and volumes because there is an increase in the impervious area. However, the master planning approach demonstrates that, taking the entire project area as a whole, there will be a decrease in the peak rates of runoff and volumes to the Charles River, even though individual sites may result in increases in peak rates of runoff and volumes. Other sites in close proximity to these sites (such as the Gateway Project, P-11) will have decreases in peak rates of runoff and volumes, which will offset the increases. Also, stormwater management facilities needed for peak rate reductions on these sites can be constructed on nearby sites, if not on the sites themselves. This master planning approach, using nearby sites for stormwater management, if needed, has been confirmed with BWSC and DEP, acknowledging that all the sites drain to the Charles River, and the approach of viewing the entire project area holistically with regard to peak rates of runoff and volumes is acceptable.

Table 32: Summary of Water Quality Treatment Volumes

2013 Existing Conditions						Proposed IMP Area									
Existing Drainage Area ID	Total Drainage Area (acres)	Existing Paved Area (acres)	Roof Area (acres)	Pervious Area (acres)	Proposed Drainage Area ID	Total Drainage Area (acres)	Proposed Paved Area (acres)	Proposed New Roof Area (acres)	Roof Area to be Demolished (acres)	Net Change in Roof Area (acres)	Total Roof Area (acres)	Proposed Pervious Area/ Greenspace (acres)	Water Quality Volume with Pre-Treatment (ac-ft)	Total Water Quality Volume (ac-ft)	Stormwater Control Areas** (acres)
E-06a	10.9	5.3	0.0	5.6	P-06a Harvard Stadium Addition/ Renovation	10.9	5.1	0.2	0.0	0.2	0.2	5.6	0.43	0.44	0.44
E-08a	3.9	0.8	1.2	2.0	P-08a Mixed Use and Basketball	3.9	1.1	2.5	1.2	1.3	2.5	0.3	0.09	0.30	0.30
E-11	6.6	4.9	1.5	0.2	P-11 Gateway Project	6.6	2.9	1.2	1.5	-0.3	1.2	2.6	0.24	0.34	0.34
E-12b	4.5	0.4	0.0	4.1	P-12b HBS Faculty and Admin Offices	4.5	1.0	0.6		0.6	0.6	2.9	0.08	0.14	0.14
E-16a	1.7	0.2	0.8	0.7	P-16a Chao Center (Kresge Replacement)	1.7	0.2	0.6	0.8	-0.2	0.6	0.9	0.02	0.07	0.07
E-19a	1.2	1.2	0.0	0.0	P-19a Burden Replacement	1.2	0.3	0.7		0.7	0.7	0.2	0.03	0.08	0.08
E-29	2.4	2.4	0.0	0.0	P-29 Hotel and Conference Center	2.4	1.0	0.5	0.0	0.5	0.5	0.9	0.08	0.13	0.13
TOTALS	**31.2**	**15.2**	**3.5**	**12.6**	**TOTALS**	**31.2**	**11.6**	**6.3**	**3.5**	**2.8**	**6.3**	**13.4**	**0.97**	**1.50**	**1.50**
							15.2				3.5	12.6			
						Net change:	-3.6	6.3	3.5	2.8	2.8	0.8			

Note: BWSC requirement is 1 inch times impervious area

Table 33: Existing and Proposed Peak Rates and Volumes of Runoff

Drainage Area	24-Hour Storm Event							
	2-yr		10-Yr		25-Yr		100-Yr	
	Peak Rate of Runoff (cfs)	Volume of Runoff (af)	Peak Rate of Runoff (cfs)	Volume of Runoff (af)	Peak Rate of Runoff (cfs)	Volume of Runoff (af)	Peak Rate of Runoff (cfs)	Volume of Runoff (af)
Existing E-06a	15.9	1.5	28.9	2.7	38.6	3.7	60.6	5.8
Proposed P-06a Harvard Stadium Addition/Renovation	15.7	1.2	28.7	2.4	38.3	3.3	60.4	5.5
Existing E-08a	6.5	0.6	11.3	1.1	14.7	1.4	22.6	2.2
Proposed P-08a Mixed Use Facility and Basketball	8.9	0.7	13.6	1.2	17.0	1.5	24.5	2.3
Existing E-11	15.7	1.6	23.5	2.4	29.1	3.1	41.8	4.5
Proposed P-11 Gateway Project	12.2	0.9	20.3	1.7	26.2	2.3	39.4	3.6
Existing E-12b	4.6	0.4	9.4	0.9	13.3	1.2	22.2	2.1
Proposed P-12b HBS Faculty and Admin Offices	6.5	0.5	11.8	1.0	15.9	1.4	24.9	2.3
Existing E-16a	3.6	0.3	5.9	0.5	7.7	0.6	11.6	1.0
Proposed P-16a Chao Center (Kresge Replacement)	2.7	0.2	4.7	0.4	6.2	0.5	9.7	0.9
Existing E-19a	3.3	0.3	4.9	0.5	6.1	0.6	8.8	0.8
Proposed P-19a Burden Replacement	3.0	0.2	4.7	0.3	5.9	0.5	8.6	0.7
Existing E-29	6.7	0.6	9.9	0.9	12.2	1.1	17.5	1.6
Proposed P-29 Hotel and Conference Center	5.1	0.3	8.5	0.6	11.0	0.8	16.5	1.3
TOTAL EXISTING TO CHARLES RIVER	**56.6**	**5.3**	**93.8**	**9.0**	**121.7**	**11.7**	**185.1**	**18.0**
TOTAL PROPOSED TO CHARLES RIVER	**54.1**	**4.0**	**92.4**	**7.6**	**120.5**	**10.3**	**184.0**	**16.6**

Notes:
(1) cfs: cubic feet per second
(2) af: acre-feet

Since the properties are going to be developed over a ten-year period, detailed site plans for each site have not been developed for the FEIR. Nevertheless, Harvard is committed to fully integrating stormwater management measures into the final design of each parcel. The master planning analysis presented in the FEIR estimates the area required for rain gardens/bioretention areas needed to meet regulatory and agency stormwater management requirements and is based on what is known at this time. During final design for each site, space requirements for rain gardens/bioretention areas and other stormwater management measures will be confirmed and factored into the design. For example, the stormwater mitigation measures for the Chao Center designed to meet peak attenuation and water quality requirements include proprietary stormwater treatment devices and subsurface storage and infiltration (Figure 27). As sites go to final design, the choice and sizing of treatment BMPs will be refined and incorporated into hydrologic models to demonstrate compliance with the requirements. These calculations will be submitted to the appropriate agencies for review at that time.

In addition, as the sites adjacent to the Greenway undergo final design, the stormwater management designs will tie into the Greenway to create a well-planned public space.

Similarly, since the properties are going to be developed over a ten-year period, permits required for the construction of each site will be obtained at the time of final design and construction. For example, because detailed site plans for each site have not been developed, specific dewatering procedures have not been determined. However, all dewatering will be compliant with city, state and federal requirements at the time of construction.

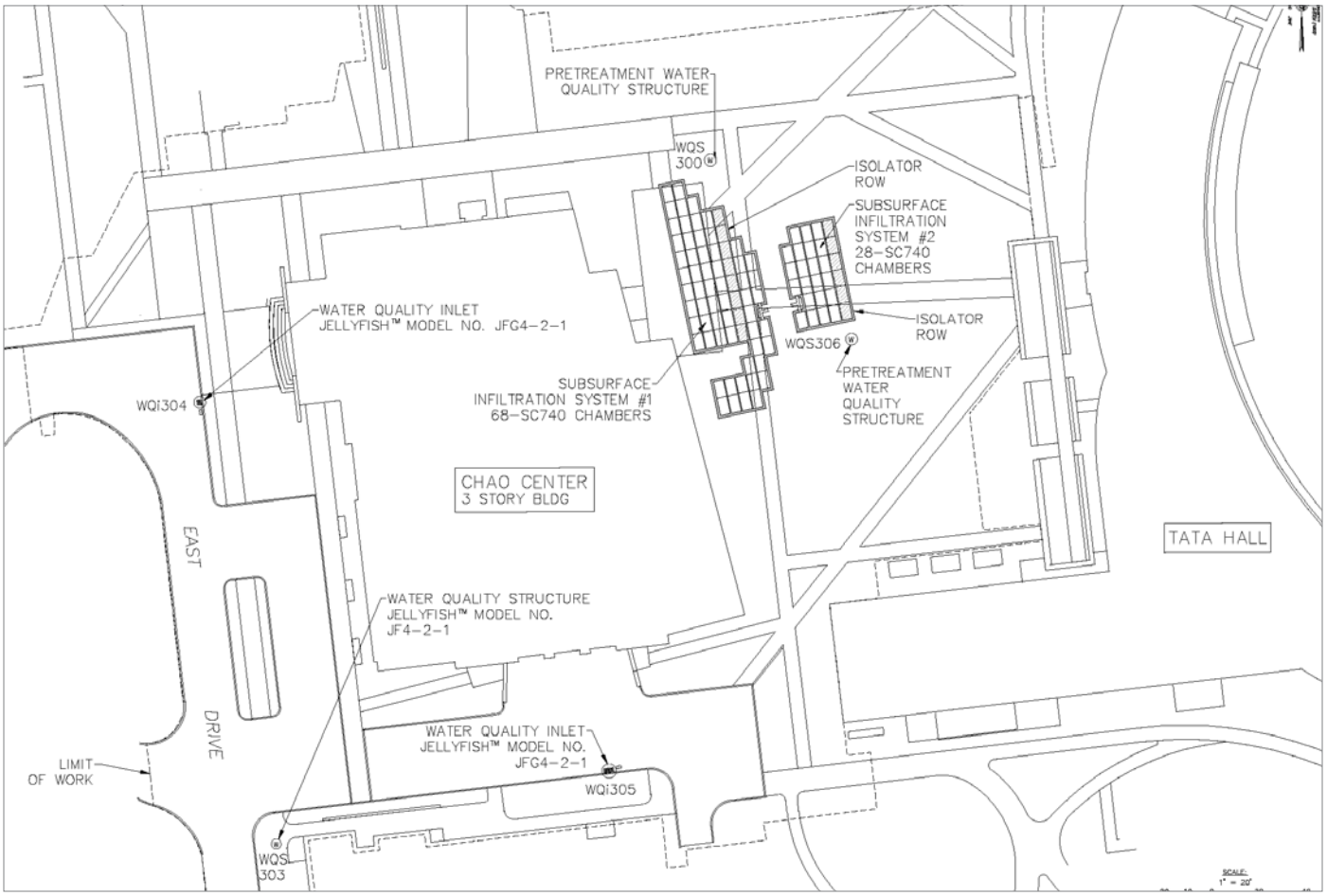


Figure 27: Chao Center Stormwater Management

Source: Nitsch Engineering

PIPE CAPACITY ANALYSIS

The BWSC drain model (an EPA Stormwater Management Model, or SWMM model) was used to assess the capacity of BWSC collector drains in public roadways in the IMP project area. The drain model has been used for numerous studies throughout Boston, most recently for a comprehensive water quality modeling effort that evaluated phosphorus and pathogen loads to the Charles River, Boston Harbor, and the Neponset River. For the Harvard University drainage capacity analysis, the model was expanded to include long-term characteristics of the proposed Allston campus.

In addition, as part of the previously proposed Science Complex project in 2007, Harvard had discussed a future phase of work whereby the newly constructed 72-inch drain line around the perimeter of the Science Complex site would be extended down Western Avenue to a new outfall to be constructed in the Charles River. This drain line was contemplated in connection with and because of Harvard's then-proposed long-term (50 year) master plan which at that time proposed nine to ten million square feet of development over a fifty year period. As requested by the BWSC in its comment letter on the IMPNF, this drain model was used to evaluate the effectiveness of such a future 72-inch drain line in relationship to the currently proposed set of IMP projects.

The BWSC drain model revealed the following:

- Under proposed conditions, the IMP projects will reduce peak rates and volumes of runoff.
- Under existing and proposed conditions, a new 72-inch drain through the campus to the Charles River will not reduce flooding in the upstream neighborhoods upstream of the Allston campus due to existing capacity issues within the upstream neighborhoods. BWSC stated that "The Commission disagrees with this finding" in the February 6, 2014 BWSC comment letter on the DEIR. To address this comment, the project team (led by CDM Smith) met with BWSC to discuss and clarify the drain modeling results. During this meeting, it was confirmed that the drain model used by Harvard University is the same as the model used by BWSC. In reviewing the modeling results, Harvard University and BWSC agreed that installation of a 72-inch drain will reduce flooding locally on Harvard University property in the Rena Park area, but the 72-inch drain will not reduce flooding in the upstream neighborhoods (upstream of Coolidge Road and Arden Street) because the drainage systems are undersized and cannot convey flow to the 72-inch drain. Since a new 72-inch drain through the campus to the Charles River will not reduce flooding in the neighborhoods upstream of the Allston campus due to existing capacity issues within the upstream neighborhoods, and is not required in connection with Harvard's projects, this drain line is not requried within the IMP ten-year term.
- If BWSC were to enlarge the upstream drain pipes, a 72-inch drain (or other large-size drain) would be needed to serve upstream neighborhoods and future campus development beyond the Ten-Year Plan in the long-term to control peak rates of runoff from a 25-year 24-hour storm. Harvard will continue to work with the BWSC to evaluate the drainage needs of this area over the term of the IMP. Harvard is planning and sizing the Greenway to accommodate a variety of public and private infrastructure, including preserving a corridor for the construction of a drain line if and when it is needed.
- The existing 36-to 42-inch drainage system through the Harvard Business School (referred to as the end of the "Shepard Brook" drain in BWSC comment letters)

has sufficient capacity to control peak rates of runoff from the HBS parcels north of Western Avenue during a 10-year 24-hour storm under existing and proposed conditions.

- The IMP projects will provide a net increase of 0.8 acres of pervious/green area, which will reduce peak rates and volumes of runoff to the BWSC's North Harvard Street drain.
- In the short term under the Ten-Year-Plan, development of a Hotel and Conference Center will replace nearly an acre of pavement with improved green areas and will reduce peak rates and volumes of runoff to the BWSC's Cambridge Street system.

Discussions with BWSC on the 72-inch drain are ongoing. This evaluation now includes the area to the north of Ray Mellone Park where an existing 36-inch drain collapsed earlier this summer. The pipe has been repaired by BWSC and Harvard will continue to work with BWSC to evaluate the drainage needs of this area over the term of the IMP. Harvard has planned and sized the Greenway to accommodate a variety of public and private infrastructure, including preserving a corridor for the construction of a drain line if and when it is needed.

OPERATION AND MAINTENANCE

The green infrastructure described in the above sections will have ongoing operational and maintenance needs in order to remain functional. All of these maintenance practices will help to protect Charles River water quality. What is described below are typical Operation and Maintenance measures. The specific measures will be determined when the particular green infrastructure is designed and implemented.

Pervious Concrete/Permeable Pavers/Porous Asphalt

Routine maintenance includes vacuum sweeping for pervious concrete and porous asphalt, brush sweeping for permeable pavers, and minor trash and debris removal. In addition, a power washer can be used to dislodge trapped particles. Vacuuming will occur during spring cleanup after the last snow event and during fall cleanup to remove dead leaves. Landscaped areas near these surfaces will be maintained to prevent the deposition of soil or organic material on these surfaces to prevent clogging. During the winter months plowed snow will not be stored on these surfaces. Similarly, sand and salt/deicing chemicals will not be applied on these surfaces during icy periods.

Periodically, these surfaces will need to be repaired. Areas subject to vehicular traffic may experience some wear and need spot replacement of the porous surface. For permeable pavers, the joint material may need to be replenished if lost during cleaning.

Rainwater Harvesting

Aside from annual tank cleaning, the primary maintenance activity for rainwater harvesting will be the replacement of the pump in the cistern every 20 years and instrumentation every 15 to 20 years.

Bioretention Areas/Rain Gardens

Bioretention areas and rain gardens require maintenance that is typical of landscaped areas. Generally, the highest maintenance period occurs during the first two years of operation as the vegetation is being established and the system begins to stabilize. During

this establishment period, watering or temporary irrigation may be required. Once the vegetation is established, maintenance decreases and becomes more routine. In addition to inspecting and removing trash on a monthly basis, the plantings will be periodically pruned and weeded to control the growth of unwanted plants. Drought-resistant, native vegetation will be used in these areas to increase the chances of survival. Zero-phosphorus fertilizers, if needed, will be used to promote growth of the plantings. The underlying mulch will be replaced on a yearly basis. Sediment accumulation may occur, causing the surface or subsurface media to become clogged. Regular inspections of the system will determine the frequency at which the sediment needs to be removed. On average, replacement or rehabilitation of the filtration media will occur every 8 years.

Subsurface Storage and Infiltratioin

Subsurface storage systems will be inspected seasonally and after major storm events, or in the case of proprietary systems, per manufacturer's recommendations, to ensure proper function. Manufacturer's guidelines will be followed and an individual maintenance plan will be developed for all systems based on routine inspections. Maintenance can include pumping and pressure washing the unit and cleaning blockage or sediment buildup with the use of vacuum trucks or boom trucks. Drainage areas will be regularly maintained to prevent the flow of trash, sediment and debris into the system. In the event that a spill of a foreign substance enters the unit, additional specialized cleaning may be required. Drainage areas will be regularly maintained to prevent the flow of trash, sediment and debris into the system. Inspections will be conducted after the first rain event and also after major storms. Repairs to inlets, outlets, control valves or other structures will be performed periodically. Safety and maintenance practices for confined spaces will be followed when appropriate.

Green Roofs

The operation and maintenance requirements for green roofs are similar to those for bioretention areas and rain gardens. For both extensive and intensive green roofs, the vegetation requires support during the initial establishment period. The plants require irrigation and occasional fertilization until the vegetation is fully established. Once the plants are established, irrigation should no longer be required. Weeding and mulching will be done during the establishment period, and then occasionally thereafter. Any woody plants that become established will be removed. If fertilizer is required, slow-release zero-phosphorus fertilizer will be used once per year. The drainage system on the roof will be periodically inspected to ensure its proper function. The roof membrane will also be periodically inspected for possible leaks.

5.0 AIR QUALITY AND ENERGY SYSTEMS

5.1 Summary of DEIR Air Quality Analysis

The DEIR included an air quality mesoscale analysis in order to determine the impact of emissions from mobile sources associated with the Project.

In addition, recognizing the challenge in conducting a GHG analysis for the master plan given the speculative nature of the building design for the majority of the projects within the master plan's time horizon, the Secretary's Certificate required that the DEIR include a discussion of the University's energy supply and demand, the University's approach to renewable energy evaluation, the influence that Harvard will have with tenants in complying with commitments to sustainable energy and GHG reduction, and a quantitative analysis of the GHG impacts from mobile sources.

Finally, the DEIR also included a detailed GHG analysis for the proposed Chao Center.

5.2 Summary of Mesoscale Analysis

As mentioned, the DEIR included a mesoscale analysis in order to determine the impact of emissions from mobile sources associated with the Project. As reported in the DEIR, the mesoscale analysis results show increases of about 6 percent in VOC and 4 percent in NOx emissions for the 2022 Build conditions relative to the 2022 No-Build condition. Traffic increases are the direct contributor to emissions increases from No-Build to Build conditions. However, anticipated engine improvements will reduce emissions from 2012 baseline levels, even with the traffic increases. Results show decreases of 4 percent in VOC and 1 percent in NOx for the
2022 Mitigated Build conditions relative to the unmitigated, as a result of improved intersection timing.

Reduced intersection delay times would also result in a general increase in traffic speed along roadway links. In general, NOx emission rates decrease from idle to 30 mph. Therefore, any reduction in idling time and corresponding increase in speed up to the 30 mph limit would decrease NOx emissions. Since future changes in traffic speeds are speculative, exact reductions in emissions are not quantified.

In addition, implementation of any future mitigation measures not yet determined or discussed in *Chapter 2.0, Transportation* may further reduce emissions. Through discussions with the regional transportation agency, it is anticipated that additional mitigation measures will be implemented to alleviate traffic congestion and improve flow, and thereby reduce pollutant emissions.

The NAAQS also reflect various durations of exposure. The short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

5.3 Greenhouse Gas Emissions

SUMMARY OF DEIR ANALYSIS

Following the scope provided in the Secretary's Certificate of the Notice of Project Change and subsequent discussions with the MEPA Office, the DEIR briefly described:

- Near-term building projects as well as Harvard's approach to incorporating sustainability principles, including energy use and GHG emissions reduction, in its project development process in Allston.
- The Harvard energy supply system, how the Allston Campus is integrated with that system, and what changes are anticipated as the Allston Campus develops under this Institutional Master Plan.
- Current use of renewable and alternative energy sources and the approach to integrating new such sources.
- The Allston Campus will have numerous short- and long-term tenants of various types. Harvard's approach to influencing commercial and residential tenants toward green practices, including energy use and GHG emission reductions.
- The analysis of mobile source impacts and mitigation corresponding to the IMP. Both regional traffic and fleet vehicle use are included.
- Harvard's commitments to GHG reduction are summarized. Project-specific GHG mitigation commitments will be included in the project-specific GHG analyses provided for in the Special Review Procedure.

SUMMARY OF GHG COMMITMENTS

The Proponent is committed to the following mitigation elements for the master plan projects. For individual buildings, commitments will be included in the individual project-specific GHG analyses.

- Expanding combined heat and power (CHP) facilities at Blackstone and potentially elsewhere to continue to achieve the environmental benefits of cogeneration.
- Utilizing the process of Harvard's Green Building Standards as each project proceeds to develop high efficiency, low-carbon designs.
- Utilizing and expanding the comprehensive TDM program.
- Continuing to work with the Boston Transportation Department on traffic signalization changes as described in *Chapter 2.0, Transportation,* to reduce traffic delays, reducing GHG and other pollutant emissions.
- Encouraging commercial tenants to adopt energy efficiency measures.
- Continuing to look for opportunities to replace or augment its fleet vehicles with alternative fueled vehicles with greater efficiency and lower GHG emissions.
- Developing an urban tree canopy consistent with the principles set forth in the DEIR.

The Proponent will submit a self-certification to the MEPA Office at the completion of each project. The certification will identify the GHG mitigation measures incorporated into the building and confirm that all of the required mitigation measures, or their equivalent, have been completed. Details of Harvard's implementation of operational measures will be included.

SUMMARY OF CHAO CENTER ANALYSIS

As mentioned previously, the DEIR included a detailed GHG analysis of the proposed Chao Center project. A revised GHG analysis, updated in response to the MEPA Certificate and comment letters, is included as Appendix E.

The current MA Building Code (MA Code) is the 8th edition, which incorporates building energy provisions of International Energy Conservation Code (IECC) 2009 (which references ASHRAE 90.1-2007). Boston has voluntarily adopted the optional Stretch Code (SC1), which, for large commercial buildings, requires that modeled energy use be 20 percent below a baseline model using the parameters of ASHRAE 90.1-2007.

The Board of Building Regulations and Standards (BBRS) has, in accordance with the Green Communities Act, adopted IECC 2012 (which references ASHRAE 90.1–2010). This will fully displace IECC 2009 in the MA Code on July 1, 2014. A new Stretch Code (SCII) is in development and is expected to use IECC 2012 as the baseline, thus being consistent with the MA Code. However, until SCII is adopted (currently anticipated in the second half of 2015, at the earliest), the BBRS has indicated that SC1, and hence IECC 2009 as baseline, is still in effect in Stretch Code communities. Since the Chao Center is expected to start construction before late 2015, ASHRAE 2007 has been used as the baseline for this analysis.

DOER estimates that SC2 will have requirements on the order of 12-15 percent less energy use than ASHRAE 90.1-2010. Studies have indicated that ASHRAE 2010 is 15-20 percent more stringent than ASHRAE 2007, depending somewhat on building type and climate zone. Thus SC2 may be anticipated to be approximately 27-35 percent more stringent than ASHRAE 2007. As presented in Appendix E, the proposed design for the Chao Center is 35 percent more efficient than an ASHRAE 2007 Baseline building and thus can be expected to meet or exceed the requirements of SC2 if SC2 becomes effective and applicable to this project.

5.4 Energy Systems

Existing Harvard-owned district energy systems serving all or portions of the master plan area include an electric microgrid, a steam distribution network, and a chilled water plant/ distribution system. Descriptions of these systems and facilities served by them are detailed below.

Electricity

The existing electric microgrid is primarily comprised of electrical switchgear that receives its supply from NSTAR and distribution cable running in an underground duct and manhole system to local/building electrical vaults where the voltage is transformed from distribution level to building level (typically from 13.8 kV to 480/208 V). The primary feeders (a redundant pair of 10MVA cables) are interconnected with Harvard's Blackstone CHP facility (located at 46 Blackstone Street, Cambridge) and travel across the Western Avenue Bridge to supply Harvard's Allston campus. A diagram indicating existing and certain master plan buildings served/anticipated to be served by the existing microgrid is provided below.

Since the existing microgrid is interconnected with the Blackstone CHP facility, the buildings served receive power that is a mix of external grid supply and power generated through the cogeneration process at Blackstone (specifically through the 5 megawatt backpressure steam turbine generator). The balance of master plan buildings are anticipated to be served from one or more new Harvard electrical distribution substations to be located within one or more area buildings. NSTAR will need to install new 13.8 kV electrical feeders from their existing facilities to the new Harvard electrical distribution substation(s). These substations will establish new microgrids and be the source of electrical supply for the balance of the master plan buildings, as indicated in the below diagram.

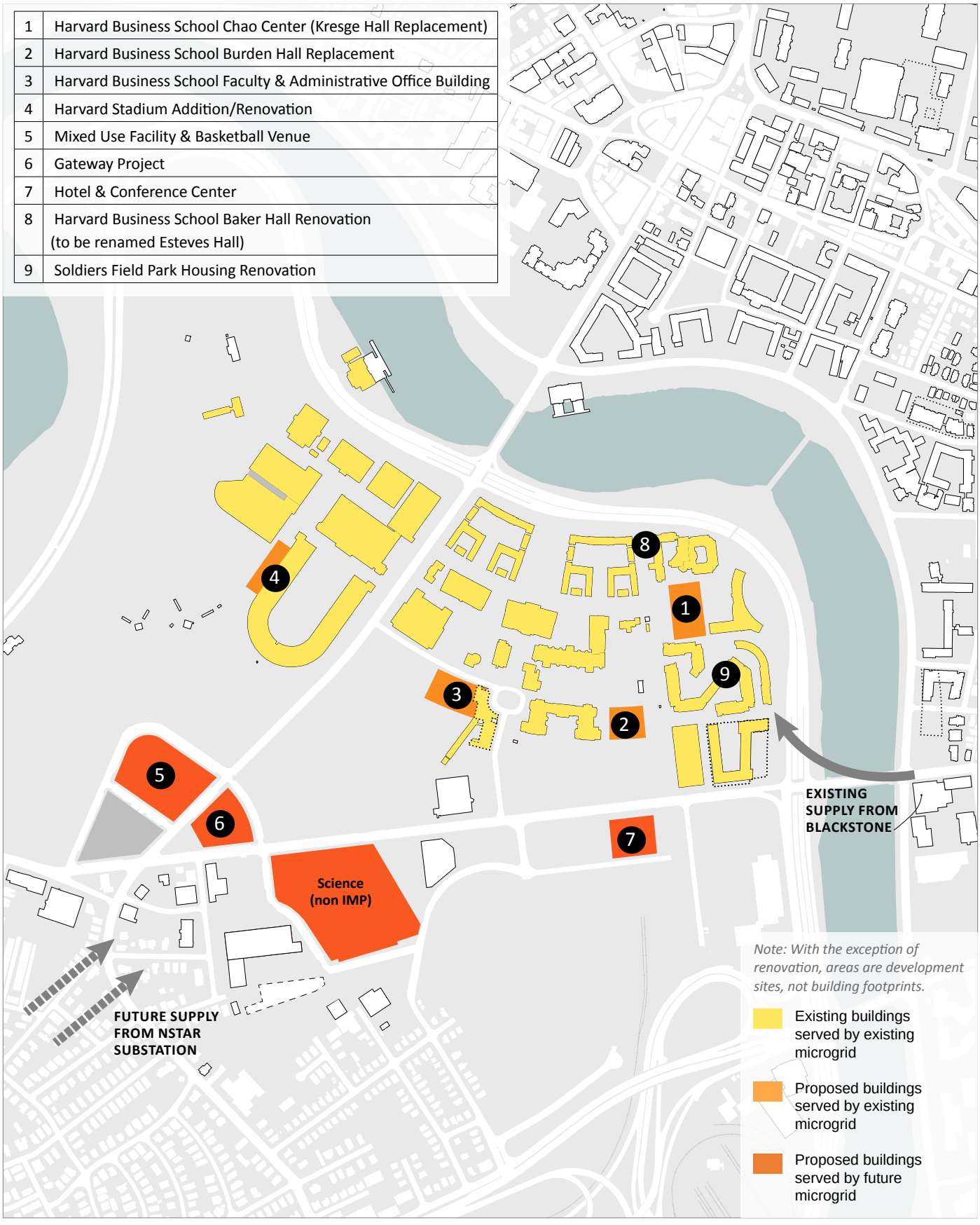


Figure 28: Electric Microgrid

Steam/Heat Energy

The existing steam distribution network is primarily comprised of distribution piping (steam and condensate) running from the steam source (the Blackstone CHP facility) to individual buildings where the heat-energy is typically converted to hot water for distribution/use within buildings. The Blackstone energy facility currently has multiple steam boilers that generate steam at 400 psig and a 5 megawatt backpressure steam turbine generator that produces electricity through the cogeneration process. The rated output of all of the boilers is 700,000 pounds per hour. Steam is supplied to Harvard's Allston campus through pipes located in the Western Avenue Bridge as well as the Weeks Memorial Footbridge. Steam is distributed at a nominal pressure of 100 psig to buildings and then reduced to low pressure and, typically, converted to heating hot water for building space conditioning needs. In certain instances, current and/or future, steam may be converted to hot water and then hot water may be distributed to area buildings (rather than steam itself). A diagram indicating existing and certain master plan buildings which currently/are anticipated to derive their heat-energy from Harvard's Blackstone CHP facility is provided below.

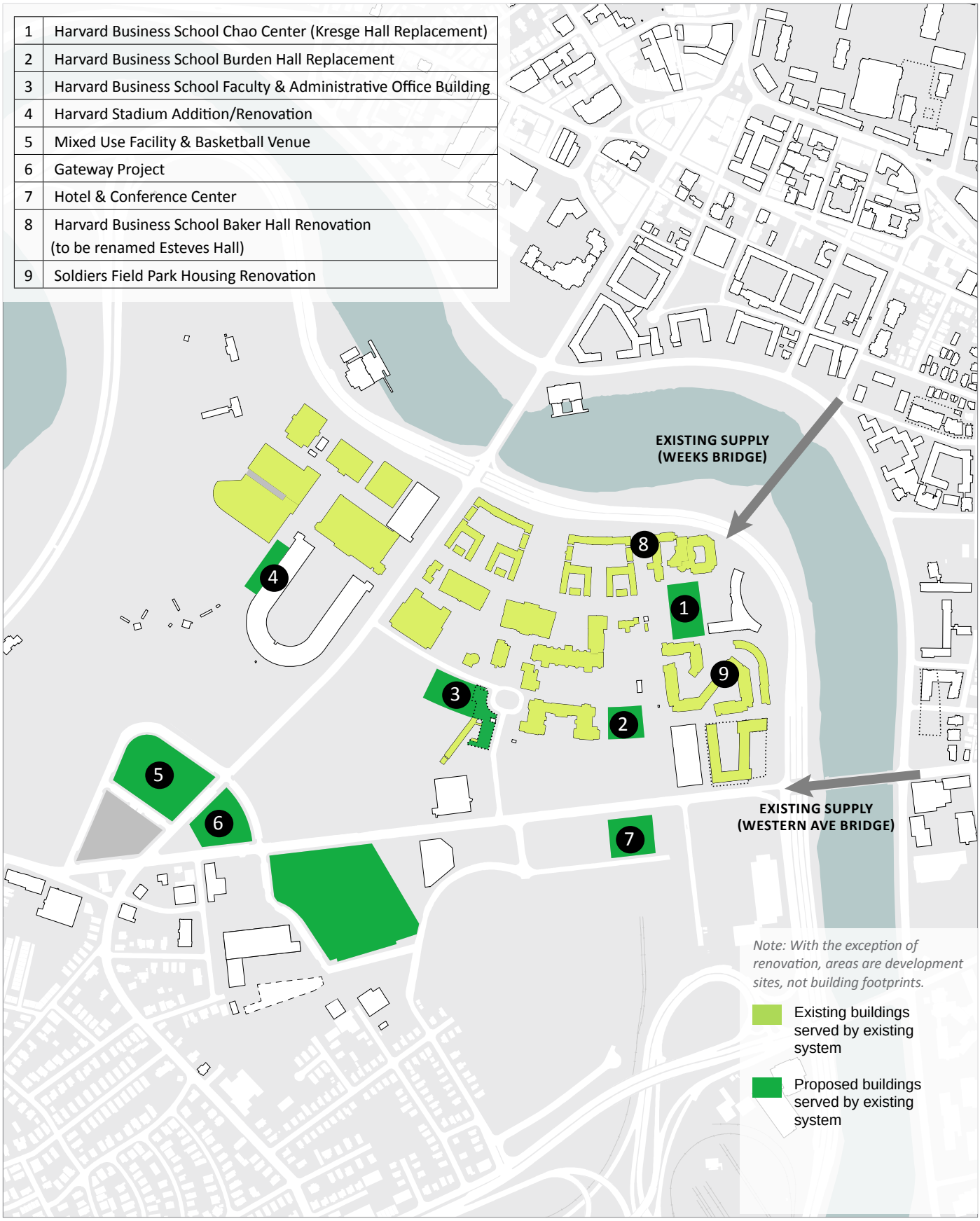


Figure 29: District Steam /Heat Energy Supply

Chilled Water

The existing district chilled water plant in Allston has multiple electric-driven chillers and distributes chilled water to a number of Harvard Business School buildings, typically for space conditioning. The total installed capacity of the chillers is 4,800 tons. This plant is supplied electric power from the existing Harvard microgrid which is interconnected with the Blackstone CHP facility. It is anticipated that available capacity from this facility will be used to serve certain buildings in the master plan. A diagram indicating existing and certain master plan buildings served/anticipated to be served by the existing district chilled water plant is provided below.

Certain other master plan buildings are anticipated to receive chilled water supply from a proposed new district chilled water plant to be located in the Science building. The proposed new district chilled water plant is envisioned to be sized to allow for future expansion, with equipment and the distribution network to be installed in phases/ increments and expanded over time. The below diagram indicates master plan buildings anticipated to be served by a new district chilled water plant.

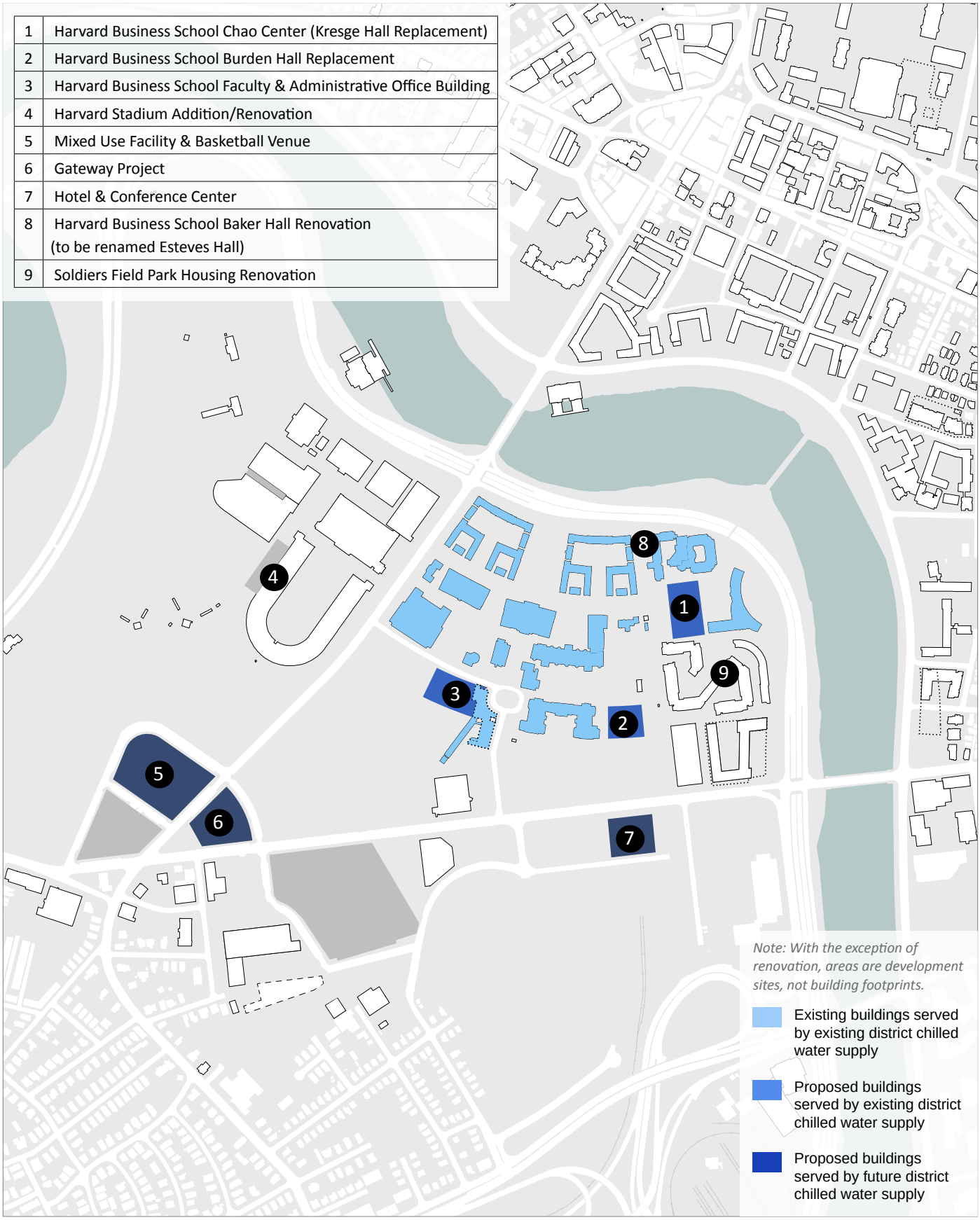


Figure 30: District Chilled Water Supply

SUMMARY OF ENERGY SUPPLY ARRANGEMENTS

A summary of the existing and anticipated district energy supply arrangements to the master plan buildings in Allston is provided in Table 34.

Table 34: Existing and Anticipated Energy Supply Arrangements

		Electricity			Heat Energy			Cooling	
	Project	Harvard Grid	Cogen[1]	NSTAR Direct	District	Cogen[2]	Local	District[3]	Local
1	Harvard Business School Chao Center (Kresge Hall Replacement)	✓	✓		✓	✓		✓	
2	Harvard Business School Burden Hall Replacement	✓	✓		✓	✓		✓	
3	Harvard Business School Faculty & Administrative Office Building	✓	✓		✓	✓		✓	
4	Harvard Stadium Addition/Renovation	✓	✓		✓	✓			✓
5	Mixed Use Facility & Basketball Venue	✓			✓	✓		✓	
6	Gateway Project	✓			✓	✓		✓	
7	Hotel & Conference Center	✓			✓	✓		✓	
8	Harvard Business School Baker Hall Renovation (to be renamed Estevez Hall)	✓	✓		✓	✓		✓	
9	Soldiers Field Park Housing Renovation	✓	✓		✓	✓			✓

[1] *Electric supply to these buildings is interconnected with the existing Blackstone cogen process (5 MW backpressure turbine). Note: The planned 7.5 MW CTG to be installed at Blackstone will supply power to a different part of campus.*

[2] *Thermal load being served or envisioned to be served by Blackstone CHP Plant.*

[3] *Buildings 1, 2, 3 and 8 will be connected to the existing HBS Chilled Water Plant. Buildings 5, 6 and 7 are anticipated to be connected to a new cooling plant envisioned in Science.*

6.0 HISTORIC RESOURCES

The DEIR included text and graphics describing the historic resources within or adjacent to Harvard's Allston Campus, provided a preliminary discussion of the potential impacts of each of the Ten-Year Plan projects on those resources, and provided a summary of an archaeological sensitivity of the Ten-Year Plan projects.

The Secretary's Certificate on the DEIR requested that the FEIR include a discussion of how the design of the Ten-Year Plan projects considers the existing historic resources and provide an update on the status of the archaeological survey. In addition to that information, this section of the FEIR provides an update on the status of the compliance with applicable historic regulatory review requirements for the first of the Ten-Year Plan projects: the Ruth Mulan Chu Chao Center.

6.1 Historic Resources

OVERVIEW

As was described in detail in the DEIR, Harvard's Allston campus includes or is located in the vicinity of several properties listed in the State and National Registers of Historic Places and/or included in the Inventory of Historic and Archaeological Assets of the Commonwealth (Inventory). In particular, the Ten-Year Plan projects include a proposed renovation of and addition to Harvard Stadium (a property listed in the State and National Registers of Historic Places and a National Historic Landmark) and replacement of Kresge Hall and Burden Hall, which are part of the Harvard Business School-Athletic Facilities Area included in the Inventory. The larger Project area is adjacent to the Charles River Basin Historic District, which is listed in the State and National Registers of Historic Places. The University is also investigating potential renovations of the Newell Boat House, a contributing property to the Charles River Basin Historic District.

6.2 Ten-Year Plan Projects

The nine projects within the Ten-Year Plan (seven new construction and two renovation projects) are described in the DEIR. This section provides a summary of Harvard's proposed compliance with historic regulatory review requirements.

As described in the DEIR, in accordance with applicable historic preservation statutes and regulations, Harvard will work cooperatively with the Massachusetts Historical Commission (MHC) and the Boston Landmarks Commission (BLC), as required, to ensure that potential impacts to historic resources are considered. As part of this, Harvard is committed to filing an MHC Project Notification Form (PNF) for each individual project that may impact historic resources and for which there is any associated state body funding or licensing. An MHC PNF will be submitted, as required, at a point in which there is enough design information to make such a filing. For projects that involve demolition of structures that are 50 years old or older, an Article 85 application will be filed with the BLC in accordance with the City of Boston's Demolition Delay ordinance. The Article 85 application will be filed at a point in which there is enough design information to make such a filing.

An MHC PNF and Article 85 application have been submitted for one of the Ten-Year Plan projects, the Ruth Mulan Chu Chao Center/Kresge Hall Replacement (described below).

Harvard Business School, Ruth Mulan Chu Chao Center/Kresge Hall Replacement

The proposed Ruth Mulan Chu Chao Center is the first of the Ten-Year Plan projects to be advanced. The project necessitates the demolition of Kresge Hall, a property included in the Inventory as part of the Harvard Business School-Athletic Facilities Area. The project is subject to review by the MHC in compliance with State Register review procedures (950 CMR 71.00) and by the BLC in compliance with the City's Demolition Delay Ordinance.

MHC STATE REGISTER REVIEW

Harvard Business School (HBS) filed an MHC PNF to initiate consultation with the MHC in August 2013. The MHC determined Kresge Hall meets the criteria of eligibility for listing in the State and National Registers of Historic Places as a contributing element of the Harvard Business School campus in accordance with National Register eligibility criteria (36 CFR 63). The MHC further determined that the demolition of Kresge Hall constituted an adverse effect pursuant to 950 CMR 71.05.

MHC and HBS consulted to consider project alternatives that would eliminate, minimize, or mitigate adverse project impacts. The MHC concluded that there were no prudent and feasible measures or alternatives which would eliminate the need for the demolition of Kresge Hall, with the understanding that steps could be taken to minimize or mitigate potential adverse project impacts. The MHC and HBS entered into a Memorandum of Agreement (MOA), outlining measures to mitigate the adverse effect to historic resources. The mitigation measures included:

- *Photodocumentation:* Prior to demolition, Kresge Hall was photographed with high-quality digital photography. The documentation is retained in the HBS architectural archives within Baker Library. In addition, original architectural plans for Kresge Hall are retained in the archives. A copy of the photographs was provided to the BLC on compact disc.
- *New Construction:* The Ruth Mulan Chu Chao Hall was designed to be sensitive to the historic McKim, Mead & White legacy campus adjacent to the Project site.

Updated project plans were shared with the MHC and BLC after they were finalized under the Boston Redevelopment Authority review process.

- *Archaeology:* HBS in coordination with Harvard University agreed to advance an archaeological survey of four projects planned as part of the Harvard University Ten-Year Plan that are located within the HBS campus, specifically Kresge Hall, Burden Hall, Baker Hall, and Ohiri Field (see *6.3 Archeology*).

BLC ARTICLE 85 REVIEW

Kresge Hall was constructed in 1953 and therefore the proposed demolition required review of the action by the BLC under the City's Demolition Delay Ordinance. An Article 85 application was submitted to the BLC in August 2013. The Commission determined the building is historically significant, following which the Commission voted to invoke the 90-day delay period. Following a presentation by HBS of the alternatives to demolition explored and of the proposed project, the Commission made a finding of "No Feasible Alternative" to the demolition with conditions.

HBS agreed to the following conditions, as outlined by the BLC:

- The project team returned to the BLC for an informational presentation of the architectural evolution of the new building.
- The existing building was photographed prior to demolition. High-quality digital photography of the exterior of the building from multiple angles was undertaken. The photodocumentation is maintained at HBS and a copy of the photographs on compact disc was provided to the BLC.
- Original plans of Kresge Hall are retained at HBS.
- Demolition was the first stage of construction.

HBS complied with and completed all of the stipulations outlined in the MHC MOA and the BLC conditions. State Register Review and Demolition Delay review of the Project is complete.

6.3 Archaeology

As described in the DEIR, in 2007, as part of the earlier master planning process, Harvard retained The Public Archaeology Laboratory Inc. (PAL) to undertake an archaeological sensitivity assessment for the larger master plan project area that was under consideration at that time. The larger master plan project from 2007 was not advanced and the PAL survey that was being undertaken as part of that planning effort was suspended. The Ten-Year Plan DEIR includes a summary of the archaeological sensitivity assessments for the projects that are the subject of the current planning effort, as identified by PAL in their 2007 preliminary assessment.

As previously noted, HBS in coordination with Harvard University has advanced an archaeological survey of the four projects planned as part of the Ten-Year Master Plan that are located within the HBS campus, specifically the Chao Center, Burden Hall Replacement, Baker Hall Renovation, and the HBS Faculty and Administrative Office Building. The goal of the reconnaissance survey is to identify archaeologically sensitive areas where potentially significant below-ground resources may be located.

The reconnaissance archaeological survey is being conducted by PAL under State Archaeologist's Permit number 3452, issued on April 15, 2014 by the MHC in accordance with 950 CMR 70, and in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716). PAL has completed the fieldwork component of the survey, which involved a walkover and close ground inspection to record existing conditions of the four HBS campus project areas. PAL is currently conducting a review of geotechnical data and historical background materials as part of the reconnaissance survey sensitivity assessment. The results of the reconnaissance survey will be submitted in a technical report in accordance with the State Archaeological permit reporting requirements under 950 CMR 70/71.

Consistent with Harvard's commitment to compliance with historic regulatory review requirements summarized in Section 6.2, as more detail on the ground-disturbing nature of each of the remaining Ten-Year Plan projects is available, additional archaeological review will be undertaken in accordance with regulatory requirements. This review will include reviewing geotechnical data (i.e., soil boring logs) and underground utilities data to identify more precise areas of potentially intact soils where below ground resources may be present.

6.4 Urban Design

The Harvard Business School-Athletics Facilities Area encompasses a large portion of Harvard's Allston campus, located to the east and west of North Harvard Street. The campus represents two approaches to campus planning. The former is the McKim, Mead & White designed complex, constructed between 1925 and 1927, which is noteworthy for the sensitivity of its siting in relation to the Charles River, with symmetrical arrangement of buildings executed in Georgian Revival design. The latter represents a segment of Harvard's Allston campus that evolved over a longer period of time, between 1900 and 1990, and is more diverse in terms of building usage, materials, architectural form, and style.

As described in the DEIR, the planning principles for the Ten-Year Plan recognize the importance of protecting the historic setting and resources within the Allston campus. The planning principles have been developed to assure that future development on the Allston campus considers the historical and architectural significance of the campus. Included in the planning principles are:

- New development should continue the tradition of a campus that is as diverse architecturally as it is academically, allowing for varied scales and materials. Vertical elements and landmarks should be included to mark special functions and key focal points. Development should strengthen the qualities that make the campus unique and also reinforce patterns and traces of history, while simultaneously meeting contemporary needs.
- Plans should acknowledge the heritage of the area by incorporating historical references, maintaining view corridors, and featuring and preserving landmarks.

7.0 CONSTRUCTION PERIOD IMPACTS

7.1 Introduction

Harvard has developed Construction Management Plan (CMP) guidelines to coordinate the preparation and implementation of the individual project CMPs. The CMP guidelines were submitted to the Boston Transportation Department (BTD) for their review prior to the submittal of the individual CMPs. The CMP guidelines describe the principles and procedures that guide development of individual Construction Management Plans; provide a mechanism to integrate and coordinate individual project CMPs including construction staging and laydown areas, truck routes, construction worker parking, and rodent control; describe common features for Construction Management Plans of individual projects, such as communication and notification protocols, construction work hours and protection of utilities; and identify Best Management Practices to address environmental, air quality, noise, and construction waste. The CMP guidelines will be regularly updated to reflect new IMP project construction activities.

Each of the individual IMP projects will be required to prepare a CMP which will be submitted to the BTD once final plans are developed for each IMP project and the construction schedules are fixed. The construction contractor will be required to comply with the details and conditions of the approved CMP.

7.2 Phasing of Projects and Infrastructure

The phasing of the IMP projects and related infrastructure is presented in *Chapter 1.0, Project Description.*

7.3 Construction Management Strategy

There are a number of principles and approaches to construction management that will guide the CMPs and mitigation measures for each of the specific projects. These are discussed in the following sections.

COMMUNICATION

In an effort to have clear, open and up-to-date communications with the neighborhood, each IMP project will utilize a communications plan consistent with other Harvard projects in Allston. A 24-hour hotline will be established upon commencement of construction activity. In addition, when construction commences, a website will provide updates on construction activities. A mitigation staff and protocol will be established and be available to address all project issues. Emergency contacts will be maintained for immediate follow-up on emergency situations. Additionally Harvard will direct the construction manager for each

project to install bulletin boards with project information, including the mitigation phone number, at each of the project sites. These bulletin boards will be maintained with current activity and schedule information.

Through the City of Boston's Construction Management Plan process Harvard participates in regular and ongoing discussions with the City and neighborhood about the coordination of current and planned construction projects in the area. This process includes participation in regular meetings of a Construction Subcommittee of the Harvard-Allston Task Force.

CONSTRUCTION WORK HOURS

Consistent with City requirements, typical construction hours for the IMP projects will be from 7:00 a.m. to 6:00 p.m., Monday through Friday. No substantial sound-generating activity will occur before 7:00 a.m. If longer hours, additional shifts, or weekend work is required, the construction manager for each project will submit a work permit request to the City's Inspectional Services Department. Notification should occur during normal business hours, Monday through Friday.

PUBLIC SAFETY, STAGING, AND ACCESS

Construction methodologies for each IMP project that ensure public safety and protect nearby buildings and individuals in the area will be employed as part of each project. Techniques such as barricades and signage will be used. Management and scheduling of construction activities will include plans for construction worker commuting and parking, routing plans for trucking and deliveries, and the control of noise and dust.

As the design of each of the projects progresses, Harvard will meet with BTD to discuss the specific location of barricades, the need for lane closures, pedestrian walkways, and truck queuing areas. These will be incorporated into the CMP which will be submitted to BTD for approval prior to the commencement of construction work for each IMP project.

Although specific construction and staging details for each project have not been finalized, Harvard and its construction managers for each IMP project will work to ensure that staging areas will be located to minimize impacts to pedestrian and vehicular flow in the neighborhood and that the staging areas are being coordinated with other construction activity in the immediate area. Access to the site and construction staging areas will be set forth in the CMP for each project.

CONSTRUCTION SUPPORT AREA

As part of the IMP process, Harvard identified a location for a potential centralized area for construction-related uses, including truck layover, materials storage, worker parking and temporary support structures. Harvard will formalize these plans with BTD through the CMP guidelines and/ or one or more TAPAs and CMPs. In addition to the Construction Support Area (CSA), Harvard anticipates that some construction staging and material laydown may occur within each of the specific project sites and at remote facilities.

Harvard and its construction managers for each IMP project will work to ensure that staging activities minimize impacts to the neighborhood and that the staging activities are being coordinated with other construction activity in the immediate area. Access to the Construction Support Area will be addressed as applicable in the CMP guidelines and the CMP for each IMP project.

Based on the site conditions and project needs, the two projects in the early phase of the IMP (namely the Chao Center and Baker Hall renovation) will mainly use their existing sites to accommodate construction staging and will not require the use of the CSA.

However, Harvard will continue to investigate the feasibility of the use of this area for other IMP projects. As noted, access to the Construction Support Area will be addressed as applicable in the CMP for each IMP project.

In addition, Harvard will continue to work with CSX as part of the ongoing remediation work that CSX is undertaking to the north and east of the proposed CSA. This work will help dictate the access and egress points to the CSA.

CONSTRUCTION WORKER TRANSPORTATION

To reduce vehicle trips to and from the construction site, construction workers will be encouraged to use non-auto modes. But recognizing that many workers will choose to drive to the site, the University anticipates that to the extent necessary Harvard parking facilities in the immediate area will be used to accommodate worker parking which will discourage parking on neighborhood streets. The specific location of construction worker parking will vary over time and will be dependent on the phasing of each IMP project. The general approach is to use available capacity in Harvard parking facilities north of Western Avenue, starting with Soldiers Field Park Garage. To the extent that additional parking may be required, Harvard will explore the use of other facilities with the City and neighborhood including the Construction Support Area, the parking lot proposed for the existing Charlesview site, 175 North Harvard Street (following the relocation of the Ed Portal), and to the extent and at such future time when it becomes available and feasible, the CSX property south of Western Avenue.

The location of parking for construction workers will be coordinated through the CMPs for each IMP project. The construction manager for each IMP project will work aggressively to ensure that construction workers are well informed of the public and Harvard-owned transportation options serving the area.

CONSTRUCTION TRUCK ROUTES AND DELIVERIES

As currently proposed, the main route for construction trucks accessing the site will be via the Massachusetts Turnpike to the Soldiers Field Road access road to Western Avenue and they will depart using the same roadways. These routes will be clarified depending on the location of each specific project. Trucks will be prohibited from using local neighborhood streets to arrive at or depart from the site.

The construction team for each project will manage deliveries to the site during morning and afternoon peak hours in a manner that minimizes disruption to traffic flow on adjacent streets. The construction teams will provide subcontractors and vendors with Construction Vehicle and Delivery Truck Route Brochures in advance of construction activity.

Harvard is evaluating a “North Allston Haul Road” through the Harvard-controlled property to provide a “fallback” truck connection, if needed, from Cambridge Street to Western Avenue via Rotterdam Street. Combined with the plan for centralized construction operations in the Construction Support Area, this can provide a solution to the challenge of managing construction traffic if the initial construction traffic approach experiences difficulties.

The potential North Allston Haul Road is a component of the Construction Support Area mentioned previously and is not required in the early stages of construction. As described,

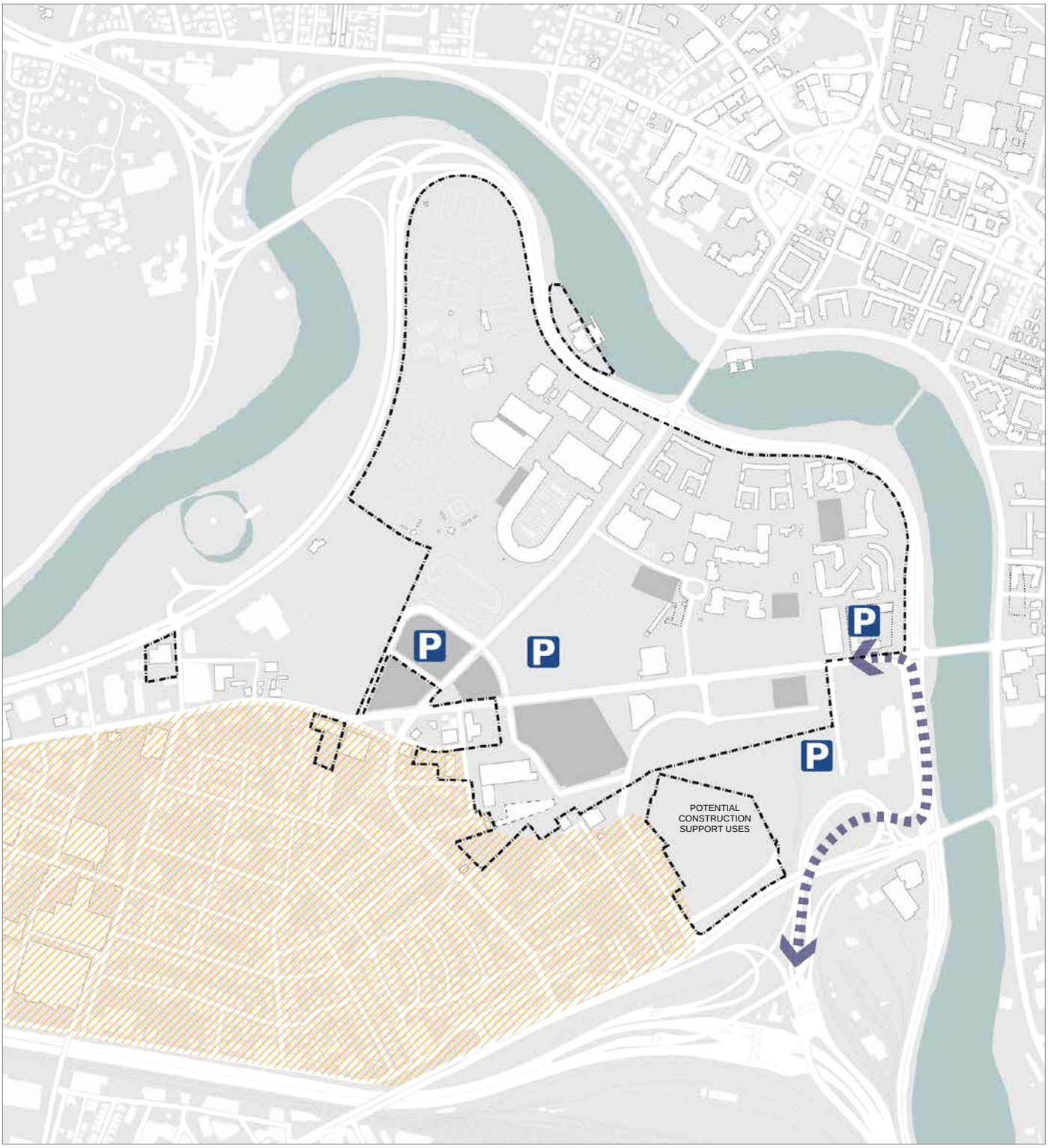


Figure 31: Potential Construction Parking

Harvard will continue to investigate the feasibility of the use of this area for other IMP projects and will report on this in subsequent Construction Management Plans filed with the City of Boston and Project Commencement Notices filed with the MEPA Office.

CONSTRUCTION EMPLOYMENT

Harvard will enter into a Boston Residents Construction Employment Plan with the City of Boston for each project. As required by this plan, Harvard will make reasonable good-faith efforts to have at least 50 percent of the total employee work hours be for Boston residents, at least 25 percent of total employee work hours be for minorities, and at least 10 percent of the total employee work hours be for women.

ENVIRONMENTAL MITIGATION

Harvard will follow City and MassDEP guidelines with regard to environmental mitigation during the construction period. As part of this process, Harvard and its construction teams will evaluate the Commonwealth's Clean Air Construction Initiative.

"Don't Dump – Drains to Charles River" plaques will be installed at any new storm drains that are replaced or installed by the projects.

STORMWATER MANAGEMENT

During the construction period for each IMP project, the University will require adherence to a series of measures to manage stormwater and incorporate appropriate erosion and sedimentation controls. The specific measures will vary for each IMP project site but will include:

1. Preparing and filing the necessary documents for construction stormwater permit coverage, including the National Pollution Discharge Elimination System (NPDES) Notice of Intent and Stormwater Pollution Prevention Plan for sites over one acre.
2. Implementing measures to prevent all erosion, siltation and sedimentation of wetlands, waterways, construction areas, adjacent areas and off-site areas. Control measures include siltation control fencing, construction entrance/exit station, and catch basin inserts.
3. Implementing control measures adjacent to or in the following work areas: soil stockpiles and on-site storage and staging areas; debris and recycling material stockpiles; and cut and fill slopes and other stripped and graded areas.

AIR QUALITY

Short-term air quality impacts from fugitive dust may be expected during excavation, demolition, and the early phases of construction of each of the IMP projects. Plans for controlling fugitive dust during excavation and construction include mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of debris by covered trucks. The construction contract for each project will provide for a number of strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts. These measures are expected to include:

- Using wetting agents on areas of exposed soil on a scheduled basis.
- Covering soil and material stock piles on site.

- Using covered trucks.
- Minimizing spoils on the construction site.
- Monitoring of actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized.
- Minimizing storage of debris on the site.
- Providing a wheel wash for vehicles leaving the project site.

Harvard requires its contractors to meet Tier 3 and Tier 4 emission standards for non-road construction equipment. If specific equipment does not meet those standards, the contractor is required to retrofit the equipment using after-engine emission controls such as oxidation catalysts or diesel particulate filters in order to meet the standard. Contractors are required to submit to Harvard a certified list of the non-road diesel-powered construction equipment that will be retrofitted with emission control devices.

NOISE

Harvard is committed to mitigating noise impacts from the construction of the IMP projects. Increased sound levels, however, are an inherent consequence of construction activities. Construction work will comply with the requirements of the City of Boston Noise Ordinance. Every reasonable effort will be made to minimize the noise impact of construction activities. Mitigation measures are expected to include:

- Instituting a proactive program to ensure compliance with the City of Boston noise limitation policy.
- Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers.
- Replacing specific construction operations and techniques by less noisy ones where feasible.
- Selecting the quietest of alternative items of equipment where feasible.
- Turning off idling equipment.
- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

CONSTRUCTION WASTE

Harvard and its construction teams will take an active role with regard to the reprocessing and recycling of construction waste. The disposal contracts for each project will include specific requirements that will ensure that construction procedures allow for the necessary segregation, reprocessing, reuse and recycling of materials when possible. For those materials that cannot be recycled, solid waste will be transported in covered trucks to an approved solid waste facility, per MassDEP Regulations for Solid Waste Facilities, 310 CMR 16.00. This requirement will be specified in the disposal contracts for each project. Construction will be conducted so that materials that may be recycled are segregated from those materials not recyclable to enable disposal at an approved solid waste facility.

As noted in the comment letter from the DEP, if significant portions of any demolition materials contain asbestos, these materials are special waste and will be handled in

accordance with the DEP's Solid Waste Management regulations.

During the pre-planning stage of any project, Harvard requires its contractors to develop a Waste Management Plan identifying the types and volumes of construction and demolition material, and solid waste expected to be recycled, reused and disposed during the course of the project; method(s) of collection and transportation of the materials off-site; and the facilities where the materials will be processed and/or disposed. The contractor must receive approval of the Waste Management Plan prior to the start of construction. Any deviations from this Waste Management Plan require approval from Harvard.

At the completion of the project, the Contractor is required to submit a Waste Management Report to Harvard that provides record of the type and quantity of waste (by weight of each material salvaged, reused, recycled or disposed) with copies of all the recycling and disposal receipts. Projects meeting LEED standards are required to submit documentation on a more frequent basis.

PROTECTION OF UTILITIES

Existing site drainage and private infrastructure located within or adjacent to the project sites will be protected during construction. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer and drain facilities will be reviewed by Boston Water and Sewer Commission as part of its Site Plan Review process.

RODENT CONTROL

A rodent extermination certificate will be filed with each building permit application to the City. Rodent inspection monitoring and treatment will be carried out before, during, and at the completion of all construction work in compliance with the City's requirements. Rodent extermination prior to work start-up will consist of treatment of areas throughout the site. During the construction process, regular service visits will be made.

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8.0 OTHER ENVIRONMENTAL ISSUES

8.1 Tidelands

As described in the DEIR, portions of the IMP Area contain filled tidelands potentially subject to M.G.L. Chapter 91. Figure 32 is a high level graphic depicting the historic high water mark in the vicinity of the master planning area and identified one potential project, the Newell Boathouse renovation, as subject to review under Chapter 91. The MEPA Certificate and the comment from MassDEP requested additional information on the potential project elements within jurisdictional filled tidelands, specifically the existing Soldiers Field Park Housing, and a more detailed review of their need for licensing or other approval by MassDEP. The following section provides the requested information to the extent available.

The IMP Area includes several locations where filled tidelands extend landward from the Charles River onto the project site and within the footprint of two potential projects (Newell Boathouse Renovation and Soldiers Field Park Renovation) and minor off-site transportation improvements. Figure 33 of this FEIR provides a more detailed mapping of the filled tidelands in the vicinity of the IMP Area.

While the nature and scopes of these projects are still in the early planning stages, the jurisdictional status of the filled tidelands is well documented. The following provides a brief cartographic and licensing history of each potential project area and provides a preliminary assessment of the anticipated MassDEP review under Chapter 91.

NEWELL BOATHOUSE

The Newell Boathouse was constructed about 1900 subsequent to the issuance of Massachusetts Harbor and Land Commissioners License No. 2275 on September 12, 1889. This license authorized the construction of the existing boathouse, docks and an earthen dike to separate the building from the Charles River. Based on the project team's review of License 2275 in the context of the MassCZM/DEP Chapter 91 Historic Shoreline Report and MassGIS published estimated historic high water mark, it appears that the boathouse was built in substantial compliance with the approved plans with regard to footprint and placement of fill and structures within and adjacent to the Charles River.

The cartographic record and the presumed historic high water mark also indicate the presence of a filled tidal creek approximately 50 feet upstream of the boathouse site. The creek appears to have been filled sometime after 1896 and coincided with the early construction of Soldiers Field Road adjacent to the boathouse site.

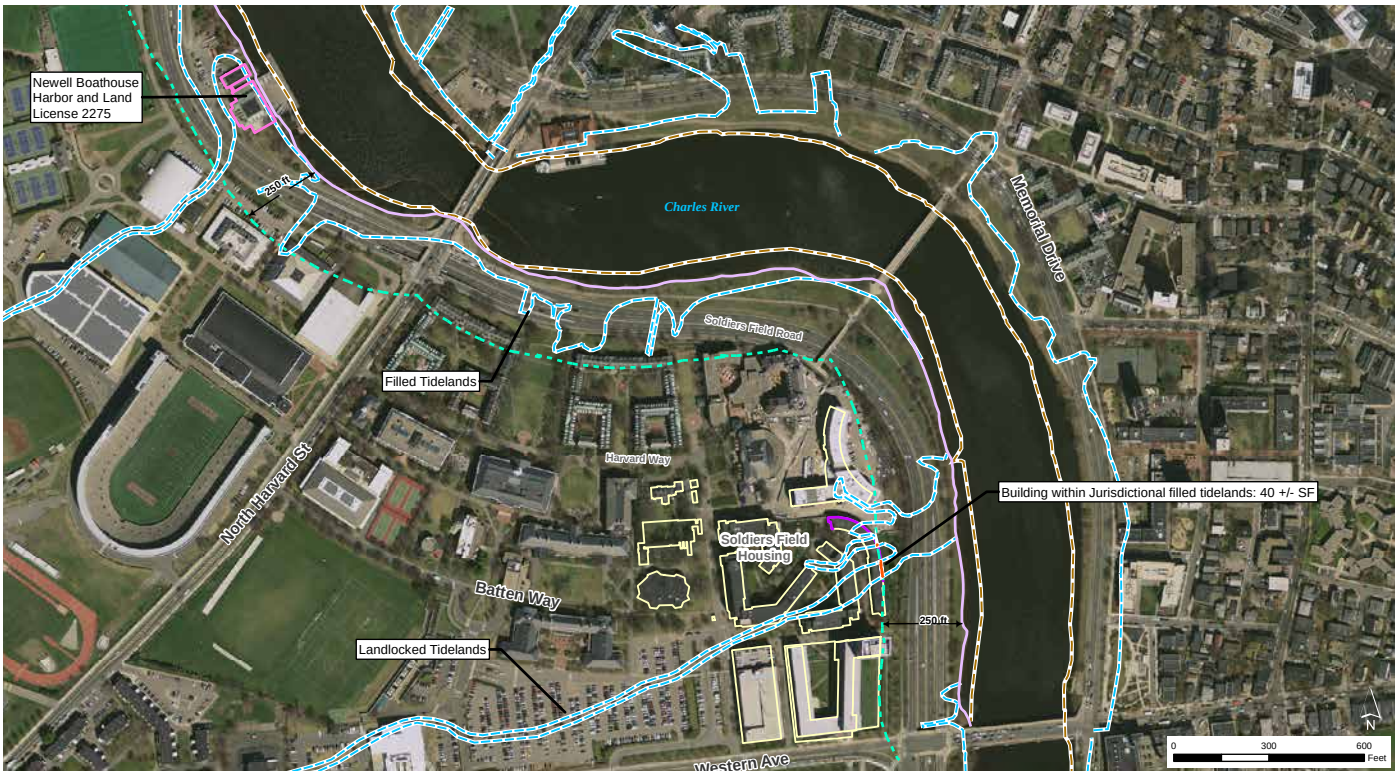

Figure 32: Chapter 91 Jurisdiction

Source: Vanasse Hangen Brustlin
Data: Base (MassGIS 2013)
** Building Edge Line (DGT Survey Group, 2011)*
*** Building Footprints (Harvard GIS, 2014)*

- Building Edge*
- Building Footprints**
- Newell Boathouse
- Limit of Chapter 91 Jurisdiction
- Jurisdictional Filled Tidelands
- DEP Historic High Water
- DEP Historic Low Water

The extent of the Newell Boathouse renovations is presently in the planning stages at the University and the limits of work and potential for alterations to the boathouse site have not been determined. However, any alterations at the site that would expand the footprint of the existing structures or fill, or include a change in use, are presumed to require review by MassDEP under the Massachusetts Waterways Regulations in the form of a request for minor project modification or amendment to the existing license. The University will consult with MassDEP Waterways staff as to the required approval(s) when the scope of the project is determined.

SOLDIERS FIELD HOUSING

The existing Soldiers Field Housing project is located, in part, on filled tidelands adjacent to the Charles River upstream of Western Avenue. The limits of fill based on the MassCZM/ DEP Historic Shoreline Report are shown in the context of existing conditions on Figure 33. The majority of the filled tidelands present at the site are landlocked and exempt from licensing under 310 CMR 9.02 and 310 CMR 9.04 because they are located more than 250 feet landward of the existing flowed tidelands of the Charles River and are separated from the river by Soldiers Field Road – a public way in existence on January 1, 1984. Based on the project team's review of the historic high water mark, existing ordinary high water of the Charles River and the location of the existing building using actual field survey, it is estimated that approximately 40 square feet of the existing building is located on jurisdictional filled tidelands.

The filled tidelands at the site appear to have been filled during the original construction of Soldiers Field Road about 1910 or during its first major reconstruction by the Metropolitan District Commission in 1936. The 1910 Metropolitan District Commission Annual Report (page 55) contains the following:

> *Charles River Reservation - The roadway along the southerly side of the river from Cambridge Street to North Harvard Street, and along the northerly side from Mt. Auburn Street near the Cambridge Hospital westerly about 2,500 feet, have been built to subgrade. The material required for the filling of these sections was about 100,000 cubic yards, and was furnished from the excavations of the Cambridge Subway at a very moderate cost to the Commonwealth, on account of the fact that places for the disposal of this material near the site of the work was scarce. Although funds were not available for the completion of these sections of the river drives, by taking advantage of this opportunity to obtain the filling material for the rough grading a great saving has been made from the amount which the work would cost in the future, when it would be necessary to obtain it by contract.*[1]

This section of Soldiers Field Road was reconstructed under MDC Parks Engineering Contract No. 256 in 1936. By 1954, the tidelands at the site were entirely filled. The area remained undeveloped until the construction of a parking lot between 1969 and 1971 and the eventual construction of existing building in 1976. Based on these records, the project team has concluded, subject to confirmation by MassDEP, that the fill at the site was authorized by MDC contract.

1 Source: Sean M. Fisher, Archivist Office of Cultural Resources, Massachusetts Department of Conservation and Recreation, email communication July 15, 2011.

The project team's review of the licensing records maintained by MassDEP did not identify a waterways license for the existing Soldiers Field Park Housing. However, the continued use of the building is exempt from licensing under the provisions of 310 CMR 9.05(3) which states that no license or permit is required for

> *(b) continuation of any existing, unauthorized use or structure located on private tidelands lawfully filled in accordance with a license or grant, provided that no unauthorized structural alteration or change in use has occurred on such tidelands subsequent to January 1, 1984 or in violation of an express condition of said license or grant;*

The existing Soldiers Field Park Housing buildings were constructed in 1976 with no expansions or alterations of the footprint within the very limited scope of jurisdictional filled tidelands. Therefore, the project team concluded that the existing structure and use is exempt from licensing. However, any future alterations to the existing building footprint or change in use within jurisdictional filled tideland would be subject to review under 310 CMR 9.05. As the University is still in the very early planning stages for potential improvements to the Soldiers Field Park Housing site, it is not possible to identify the appropriate regulatory vehicle for seeking approval under Chapter 91 at this time. The University understands MassDEP policies and procedures in implementing the Waterways Regulations would indicate that a new license could be required for any portion of a substantial reconstruction or replacement of the existing structure located within jurisdictional filled tidelands.

Figure 33: Soldiers Field Housing Filled Tidelands Jurisdiction (Chapter 91)

Source: Vanasse Hangen Brustlin
Data: Base (MassGIS 2013)
** Building Edge Line (DGT Survey Group, 2011)*
*** Building Footprints (Harvard GIS, 2014)*

TRAFFIC, BICYCLE AND PEDESTRIAN IMPROVEMENTS

Chapter 2 of the DEIR identified potential transportation improvements within and adjacent to the IMP planning area as depicted on Figure 13 contained therein. The Secretary's Certificate requested additional information regarding the location of these potential improvements within jurisdictional filled tidelands.

The limits of Chapter 91 jurisdiction along the Charles River are limited to filled tidelands within 250 feet of the existing ordinary high water mark due to the presence of Soldiers Field Road, a public way in existence on January 1, 1984. The majority of the transportation improvements listed in Chapter 2 are not subject to review under Chapter 91 because they are:

- Located greater than 250 feet from the existing ordinary high water mark of the Charles River;
- Consist of signal timing and modifications to existing roads such as striping, reconfiguration of lanes or within existing pavement or do not represent a structural alteration or change in use requiring a license or permit under 310 CMR 9.05.

MassDOT planned improvements to the Charles River bridges and adjacent intersections will be located within geographic areas subject to Chapter 91 as defined by 310 CMR 9.04. However, these improvements are MassDOT projects, will not be permitted or designed by Harvard University, and are outside the IMP planning area. They are included in the master planning process to adequately address the existing and future infrastructure in the project area. The IMP does not anticipate any new construction or change in use related to traffic, bicycle or pedestrian improvements planned by the University within jurisdictional filled tidelands.

8.2 Hazardous Waste

The DEIR included a list of the Release Tracking Numbers (RTNs) associated with the Ten-Year Plan, their current status and responsible party, and a figure with the corresponding RTN general area of applicability.

The DEIR also reported that CSX Transportation Corporation (CSX Transportation) is completing a Phase II Comprehensive Site Assessment under the MCP, for the property located south of Western Ave at approximate street address 100 Western Ave. The Disposal Site Boundary extends further south of the IMP boundary. Contamination has been found in both soil and groundwater at the Disposal Site. Soil contamination includes metals, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, petroleum hydrocarbons and chlorinated solvents. Groundwater contamination includes chlorinated solvents, polynuclear aromatic hydrocarbons and metals.

The Secretary's Certificate on the DEIR asked that the FEIR provide an update on the status of the Phase II Comprehensive Site Assessment being undertaken by the CSX Transportation. The Phase II Comprehensive Site Assessment Report was submitted to MassDEP on behalf of CSX Transportation on March 28, 2014. The Phase III Remedial Action Plan and Completion Statement report was submitted to MassDEP on behalf of CSX Transportation on March 28, 2014. The final Phase IV Remedy Implementation Plan was submitted on July 25, 2014.

In addition, the Secretary's Certificate on the DEIR asked that the FEIR provide information regarding potential MCP-regulated actions or proposed site assessments at the proposed Construction Staging Area (CSA).

With the exception of a very small part of the 115 Cambridge Street property (aka Sears lot) that is part of the CSX Allston Landing North MCP site mentioned previously, there are no planned remedial actions or site assessments at the CSA at this time.

9.0 MITIGATION AND DRAFT SECTION 61 FINDINGS

9.1 Introduction

The Secretary's Certificate on the DEIR required that the FEIR include a separate chapter that summarizes proposed mitigation measures and includes draft Section 61 Findings for each State Agency that will issue permits for the project.

Beyond the specific mitigation measures described in the following sections, the approval of the IMP by the City of Boston included an extensive program of community benefits. These benefits focused on integrating the University and community through educational programs, shared spaces, and pedestrian-friendly, environmentally sustainable public realm improvements both on and off campus. These commitments have been memorialized in a series of agreements between Harvard and the City, including a Cooperation Agreement, Institutional Construction Management Plan guidelines, and a Transportation Access Plan Agreement.

Based on discussions with the Harvard Allston Task Force (the "Task Force") and the BRA, and as memorialized in a signed Cooperation Agreement, a package of community benefits totaling approximately $43,000,000 will be provided as described below:

- Public realm improvements, including a public realm flexible fund ($9,750,000);
- Educational programs ($4,500,000);
- Workforce development including jobs linkage ($4,000,000);
- The Harvard Allston Partnership Fund ($500,000);
- The Harvard Allston Housing Fund ($3,000,000);
- Housing linkage funding (up to $11,000,000);
- Donation of the Brookline Machine site ($2,000,000); and
- The Transformative Project ($8,250,000)[1].

1 The goal of the Transformative Project is to create a community enrichment center for Harvard and Allston/Brighton residents offering education and training, health and wellness, HarvardX for Allston, arts and culture programming, and economic and workforce development programs. This "suite of programs" builds upon and enhances the ongoing work of the Education Portal. As such, the new enrichment center will be an amalgamation of Education Portal programming and staff supplemented by new physical space oriented towards the newly conceptualized programming approved by the Task Force and the BRA as part of the negotiations related to the Transformative Project.

In addition, through the BRA's review process the University made commitments in a number of other areas including:

- signing transportation access plan agreements, construction management plan agreements, and permanent and construction jobs agreements;
- implementing interim improvements to the grove of trees in Barry's Corner;
- conducting planning and near-term improvements for Rena Park;
- initiating early planning for the Greenway; and
- transportation-related commitments including 25 percent design for Stadium Way, evaluation of a construction support area, preparation of a special event study, preparation of an evaluation of potential future alternative locations for surface parking, further evaluation of extending transportation demand management strategies, and assisting the City with the potential implementation of a residential parking permit program.

The community benefits and mitigation measures described in this chapter represent significant area-wide commitments that have been made as part of the IMP. Based on discussions with the community and the BRA there was a desire to provide a broad range of benefits that was not tied to the timetable for development of specific IMP projects. Many of these benefits - such as the Public Realm Flexible Fund and the Harvard Allston Partnership Fund - involve committees that include neighborhood representation that assist in determining how and where these resources will be allocated.

Any additional project-specific mitigation measures will be included in the Project Commencement Notice required for each project.

In addition, as requested in the Secretary's Certificate on the DEIR, following the completion of construction of each project, Harvard will provide a certification to the MEPA Office signed by an appropriate professional indicating that all of the mitigation measures or their equivalent proposed in the FEIR have been incorporated into the project.

9.2 Phasing and Implementation

The MEPA Certificate requested more detailed information on the phasing and implementation of the mitigation measures.

Table 35 depicts the approximate timing of the building projects and the open space, infrastructure, and roadway improvements that will accompany them.

Table 35: Ten-Year Plan Phasing

Projects	**Open Space/Infrastructure/Roadway Improvements**
Early (2014-2018)	
224 Western (underway at submission) 28 Travis Street (underway at submission) Barry's Corner Residential & Retail Commons Charlesview demolition **Chao Center (Kresge Replacement)** **Burden Replacement** **Harvard Stadium Addition/Renovation** **Baker Hall Renovation**	Barry's Corner Grove (interim) "South Campus Drive" "Ivy Lane" Rena Park
Mid (2018-2020)	
HBS Faculty and Administrative Offices **Soldiers Field Park Housing Renovation** Science project **Gateway project**	"Academic Way" (north of Western Avenue) and narrowing of intersection/elimination of traffic island at Barry's Corner "Academic Way" (south of Western Avenue) "Science Drive" (west of Rotterdam Street) Longfellow Path Rena Path Barry's Corner Grove (completed)
Late (2020-2024)	
Hotel Conference Center **Mixed Use Facility & Basketball Venue**	Greenway (early phase, eastern segment near Hotel and Conference)
IMP Projects = Bold	

9.3 Project-Specific Mitigation

As noted previously, there are two IMP Projects – the Chao Center and Baker Hall – for which there is detailed design information available. As replacement and renovation projects respectively, the Chao Center and Baker Hall projects have limited environmental impacts. The project-specific sustainability and mitigation measures for those two projects are described in the following sections.

CHAO CENTER

The Chao Center has been registered with the U.S. Green Building Council ("USGBC") and is targeting numerous credits which enable the Project to be LEED Certifiable in accordance with Article 37 of the Boston Zoning Code. The project team is striving for the Chao Center to meet the Gold Certification threshold with 71 projected credit points. The following sections summarize the sustainability measures that are incorporated in the project design.

Sustainable Sites

- The proposed project site is located on a previously developed urban site on the HBS campus. The existing Kresge Hall will be demolished to make way for this new building.
- The project site is in a university campus close to several public transportation options including bus and shuttle services. There is no new parking associated with this development as the campus parking is located centrally, serving all campus buildings.
- Secure bicycle racks for the Chao Center will be located on the project site, within 200 yards of the building entrance for at least 5 percent of the building occupants (total 25 bike parking spaces). Showers and changing rooms will be provided in nearby Tata Hall for 0.5 percent of full time equivalent occupants. Several guest rooms with showers will be set aside in Tata Hall for use by Chao Center bicycle users.
- The site's vegetated areas, along with the stormwater infiltration chambers, contribute to a reduction in stormwater discharge rate and quantity. The design currently meets the intent of this credit and it is a LEED regional priority credit for the location.
- The Project includes a partially vegetated roof and a high-albedo roof membrane with an SRI of 78 minimum. Together, the vegetated roof and the high albedo roof cover at least 75 percent of the roof area and meet the LEED credit requirements.

Water Efficiency

- Through the use of low flow and high efficiency plumbing fixtures, the Project will implement water use reduction strategies that use 20 percent less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.
- The permanent irrigation system designed for the site and roof vegetated areas will meet the 50 percent criteria for water use reduction.
- Specified fixtures include high efficiency toilets and urinals and low flow lavatory faucets. These fixtures will achieve at least 30 percent savings in potable water use, but higher performance is not possible since stormwater harvesting and reuse for toilet flushing is not included in the Project.

Energy and Atmosphere

- The building systems will be designed to optimize energy performance and will not use refrigerants that are harmful to the environment. The owner has engaged third-party Commissioning Agents to confirm the building systems and exterior enclosure are installed and function as intended and designed.
- The Project will demonstrate a minimum 10 percent improvement compared to the baseline building performance calculated using the performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007. The results of the whole building energy simulation performed for the Project indicate a 34 percent energy cost savings compared to the ASHRAE standard.
- HBS will purchase green power with a two-year renewable energy contract to provide 100 percent of the building's electricity from renewable sources, which exceeds the credit criteria of 35 percent for a two-year contract.

Materials and Resources

- Storage of collected recyclables will be accommodated throughout the building. A composting system is also incorporated into the design of the dining program.
- Prior to the start of demolition, the Contractor prepared a Construction Waste Management plan. The Contractor plans to divert as much demolition debris and construction waste from area landfills as possible with a minimum requirement to achieve at least 75 percent diversion and a goal of 95 percent diversion.
- The project team is investigating the use of at least 2.5 percent of purchased material to be rapidly renewable, based on overall Project material costs. However, given the program of this project, the applicability of the types of materials meeting this criteria is limited and it is unlikely that this credit will be met.

Indoor Environmental Quality

- The air quality will be monitored during the construction phase of the Project and likely prior to occupancy. Low emitting materials will be used throughout construction to maintain and improve air quality. The building occupants will have control over their indoor environment through access to individual lighting controls.
- The building mechanical systems are designed to meet or exceed the requirements of ASHRAE Standard 62.1-2007 sections 4 through 7 and/or applicable building codes.
- The building will be a non-smoking environment.
- The Project HVAC design incorporates permanent CO2 sensors and measuring devices to provide feedback on the performance of the HVAC system. Devices will be programmed to generate an alarm when the conditions vary by 10 percent from a set point.
- The design provides individual lighting controls for regularly occupied spaces. The controls also include vacancy/occupancy sensors and daylight dimming controls. Multi- occupant user spaces such as classrooms will have multi-level lighting controls for modifying light levels as necessary for the various uses.
- The design provides controls for multi-occupant spaces, but not for each individual office space. The credit requirements will not be met for this project.

- The project is designed to meet ASHRAE 55-2004 Thermal Comfort Conditions for Human Occupancy. The HVAC system is designed to provide thermal comfort.
- HBS intends to develop a thermal comfort survey to be distributed after occupancy. A plan for corrective action will be developed if the survey indicates that more than 20 percent of occupants are dissatisfied with the thermal comfort in the building.

Innovation & Design Processes

- HBS has a campus green housekeeping plan that is implemented in all its buildings. The plan meets LEED for Existing Buildings: Operations & Maintenance ("EB:O+M") requirements for green cleaning.
- HBS requires all campus buildings to implement a green education program. Strategies that have been discussed so far are informational touchscreens, occupant outreach, and green building tours.
- The project will implement a comprehensive occupant recycling program that minimizes waste and includes composting. The requirement for this ID credit is to achieve at least a 40 percent overall recycling rate during operation.

BAKER HALL RENOVATION

As a renovation project, Baker Hall has limited impacts and therefore limited mitigation measures associated with it. That said, there are a number of benefits associated with the project that are intended to reduce environmental impacts. The Project will be pursuing LEED Gold for Commercial Interiors. Key sustainability goals will be consistent with the University's sustainability measures and include:

Stormwater

- Reduce the annual discharge of stormwater run-off by 25 percent compared to the current condition;
- Reduce the annual phosphorus discharge to the Charles River by 65 percent using structural and non-structural controls; and
- Decrease the peak rate and volume of stormwater discharge to the Charles River compared for the current condition for all design storms (2-, 10-, 25-, and 100-year, 24-hour storm events).

Energy

- Energy use index (EUI) of 48kBtu/sf/year (or better).

Water

- Reduce potable water consumption by 40 percent for residence halls.

Site & Landscape

- Plant 45 percent of the vegetated areas of the site with native and adapted vegetation;
- Provide 50 percent of the site with pervious hardscape, light-colored paver, or provide shade with trees or buildings; and
- Provide secure bicycle racks for 5 percent of peak day users (students, faculty and staff) and changing areas with showers for 0.5 percent of peak day users.

Indoor Environmental Quality

- Improve opaque wall and roof insulation R-values (See R-values for new construction);
- Improve thermal performance with high performance glazing;
- Provide individual thermal and lighting controls; and
- Source sustainable materials and furniture with third party certifications.

Construction & Materials

- Divert 85 percent of construction waste from landfills; and
- Source sustainable materials to meet the campus targets.

Operations & Maintenance

- Create and follow a Measurement and Verification plan as per LEED NC Energy and Atmosphere credit 5 for all buildings for at least 5 years after building completion; and
- Create a preventive maintenance program for mechanical systems.

9.4 General Mitigation

Transportation

The Ten-Year Plan includes a comprehensive set of multimodal transportation improvements as described below.

Roadway/Intersection Improvements

As described in Table 36, the Ten-Year Plan includes specific actions to improve future conditions at Barry's Corner and to mitigate degradations in level of service at five intersections operating at LOS E or F. In addition, the traffic mitigation plan includes interconnecting traffic signals along North Harvard Street and providing communications improvements to link the North Harvard Street intersections ("Academic Way" to Cambridge Street) and Cambridge Street intersections (Windom Street to Harvard Avenue) to the City Traffic Management Center.

In addition, at Barry's Corner, the Barry's Corner Residential and Retail Commons Project will improve striping, retime the signals to accommodate concurrent rather than exclusive pedestrian crossings, and relocate the bus stop in the southbound direction on North Harvard Street further from the intersections. This improvement will require approval by the City of Boston.

Table 36: Roadway/Intersection Improvements

Location	Description	Benefits	Jurisdiction
"Academic Way"	• New roadway connecting North Harvard Street with Western Avenue to the east of Barry's Corner.	• Traffic reduction at Barry's Corner. • Location of new Mobility Hub with shuttle bus services. • New pedestrian and bicycle connections.	Harvard University and City of Boston
North Harvard Street at Western Avenue (Barry's Corner)	• Signal optimization and coordination with adjacent intersections. • New communications and video equipment to monitor traffic. • Bus stops relocations. • Elimination of the traffic island on the northeast corner and extension of the curb into the intersection.	• Improved traffic operations and systems management • Improved pedestrian crossings. • Better bus stop locations and amenities	City of Boston MBTA (bus stop relocations)
"Academic Way" at Western Avenue	• New traffic signal that will be coordinated with the adjacent Barry's Corner intersection.	• Improved traffic operations and pedestrian mobility.	City of Boston
Everett Street at Western Avenue	• "No Left Turn" restriction for Western Avenue eastbound traffic.	• Improved traffic operations.	City of Boston
Soldiers Field Road at Eliot Bridge	• Signal timing modifications.	• Improved traffic operations.	DCR
Greenough Boulevard at Eliot Bridge	• Signal timing modifications.	• Improved traffic operations and pedestrian mobility.	DCR
Greenough Boulevard/Gerry's Landing Road at Memorial Drive	• Signal timing modifications.	• Improved traffic operations and pedestrian mobility.	DCR
Western Avenue at Hague Street and Batten Way	• Signal timing modifications.	• Improved traffic operations.	Harvard University and City of Boston
Cambridge Street at Franklin Street/ and Harvard Avenue	• New communications and video equipment to monitor traffic.	• Improved traffic operations	City of Boston

1. *Prior to installing the traffic signal, Harvard will fully evaluate the intersection with updated traffic volume data to confirm that warrant(s) are fully met.*

Bicycle Improvements

The Ten-Year Plan includes further expansion to the bicycle network serving North Allston. These improvements will further increase the density of the bicycle network and improve the livability of the area for residents, commuters and Harvard affiliates. In addition to improving options for commuters, the new facilities will link people with open space and provide new low-stress cycling options. The proposed elements include:

- A new multi-use path along "South Campus Drive" that will accommodate bikes and create a new off-street cycling route around Barry's Corner with access to Smith Field. This facility will be constructed by Samuels and Associates in coordination with the Barry's Corner Residential and Retail Commons project.
- Bicycle facilities on "Academic Way" that will link Rena Park with Smith Field and create another route option to cycle around Barry's Corner.
- New multi-use paths in Rena Park that will create a cycling gateway to the park and the future Greenway.
- Upgrades to Western Avenue that formalize the existing cycle track. New projects on Western Avenue (e.g., Science) that are adjacent to the existing cycle track will move it from the street to a section separated by curbing from the parking lane.
- Expansion of the Hubway stations as demand increases.
- Provisions of covered off street bike parking at each new building with accessible public spaces that are convenient to building entrances.

Improvements to Western Avenue will require City of Boston approval. Harvard will review and coordinate the other elements with the City of Boston as appropriate.

New/Enhanced Shuttle Bus Service

As described in Chapter 2, Transportation, the Ten-Year Plan includes expansion of Harvard's shuttle bus service into Barry's Corner and increased service between Harvard Square and Barry's Corner. The construction of "Academic Way" creates the opportunity to extend the existing Allston Express service into Barry's Corner. The Allston Express service, which operates on 15 minute headways (i.e., one bus every 15 minutes) on weekdays, would be supplemented by a new Barry's Corner to Harvard Square service that would travel along North Harvard Street, making stops at Barry's Corner, Cotting Hall, Eliot Street in Cambridge and Harvard Square. This new service would operate on ten minute headways on weekdays. The shuttle system will serve Harvard affiliates including undergraduates, graduate student, staff and faculty. Neighborhood residents and employees of the Barry's Corner Residential and Retail Commons will be able to use the shuttle.

Transportation Demand Management

As described in Chapter 2, Transportation, Harvard has an extensive Transportation Demand Management (TDM) program that is an important tool in managing vehicular travel to the campus. Harvard is committed to maintaining and enhancing this program with respect to the Ten-Year Plan. The existing and envisioned continued expansion of the TDM program will support alternative modes as a major component of day-to-day transportation operations supporting the IMP development program. In addition to the programmatic TDM elements, Harvard will incorporate the following elements as part of the IMP projects:

- Provide bicycle parking for new projects
- Expand Hubway stations as warranted by demand
- Add new electric charging stations
- Designate parking for High Occupancy Vehicles and Low Emissions Vehicles
- Expand shared ride car services (e.g., ZipCar)

As described in Chapter 2, Transportation, Mobility Hubs are a promising approach to organize these transportation alternatives as the IMP area is developed. Mobility Hubs are points of multimodal access that provide a range of transportation options for travelers as part of a larger interconnected network. These facilities do not rely on the construction of significant transportation infrastructure. Instead, the focus is on providing different mode options that accommodate convenient use including transfers between modes. Harvard will coordinate the development of Mobility Hubs with the City of Boston and the MBTA as appropriate.

OPEN SPACE

There are a number of open space elements that will be implemented as part of the community benefits package. These include:

Barry's Corner Grove

Harvard has made immediate interim improvements to the existing grove of trees located on the former Charlesview site on the northeast corner of Western Avenue and North Harvard Street, known as the "Grove." These improvements began in the Spring of 2014 and the Grove is currently open. When the adjacent site is planned for the development of the IMP Project referred to as the Gateway Project, Harvard will work with the BRA to design and implement a more permanent condition for the Grove site.

Rena Park

In June 2014, Harvard recommenced the planning process for Rena Park that began in 2013. As part of this process, Harvard, in conjunction with the BRA, will identify implementable near-term improvements that will begin construction in 2014.

Soldiers Field Road Crossings

Harvard will participate in the evaluation of improving pedestrian and bicycle access between the Charles River Reservation and adjacent residential neighborhoods through crossings of Soldiers Field Road. This task will include an initial study phase to be conducted in 2014 followed by an implementation phase.

In the feasibility study phase, Harvard will work with the Department of Conservation and Recreation ("DCR") and the City of Boston to develop a scope and implement a study of pedestrian and bicycle crossings along Soldiers Field Road between Market Street and the Eliot Bridge. The study will describe existing conditions and evaluate the feasibility of providing at-grade crossings at up to three locations. The findings of the study will be reviewed by DCR, the City of Boston, the Task Force, and the community.

For the implementation phase, the steps will be determined based on the review by and recommendations of the City of Boston and the Task Force, and will be decided by DCR which owns and operates the roadway system and adjacent parkland.

Flexible Fund

As part of the Task Force and community discussion of community benefits related to the IMP, the Task Force developed goals for public realm improvements which stated, in part:

> *"We envision a community transformed by a vibrant public realm of civic and cultural activity; ample open space for passive and active recreation; well-maintained, landscaped streets and parks; and a community enhanced by sustainable goals, thoughtful transportation modes, arts and culture."* – Harvard-Allston Task Force

Harvard will allocate $5,350,000 over the ten-year term of the IMP to finance projects that contribute to the above-stated vision. Possible public realm projects include contributions to Smith Field, streetscape improvements on Cambridge Street and Lincoln Street, the extension of Telford Street, street trees, etc.

During an initial planning period of up to two years (2014-2016), Harvard will work with the BRA to:

- Participate with the BRA, Task Force, and community in neighborhood planning sessions to discuss opportunities for public realm improvements;
- Form an Executive Committee made up of representatives from Harvard, the BRA, relevant City agencies, a member of the Task Force, and a resident from North Allston/ North Brighton. The Executive Committee will be appointed by the Director of the BRA in consultation with Harvard;
- Develop an application and Request for Proposals process that includes descriptions of types of projects (i.e. parks, cultural, public art, etc.); the process may include a two-tiered grant structure for small capital projects (less than $50,000) and larger capital projects (greater than $50,000).
- With the Executive Committee, develop an advisory process with recommendations that are reviewed and approved by the BRA Board, with further approval by other regulatory or permitting entities as necessary;
- With the Executive Committee, develop review criteria, which shall include the following:
    - All projects must be improvements to public property and not located primarily on Harvard property; and
- A City agency must be a proponent or sponsor of each proposed public realm project (either in support or managing).

Greenway

In conjunction with the BRA and the Task Force, Harvard will explore strategies to implement elements of the proposed Greenway in at least an interim condition. This planning process will be carried out in 2014, with the goal of identifying desirable and feasible elements, along with a timeline for their implementation. The goal of the planning process will be to identify implementable improvements that increase pedestrian permeability consistent with public safety concerns related to ongoing construction support and site remediation activities.

Beyond those public realm improvements identified previously, each of the IMP Projects will include open space and public realm improvements such as pathways, plazas, and other publicly accessible amenities. The specific elements of these public realm improvements will be part of the design and review of each IMP Project.

WATER, SEWER AND STORMWATER

Infiltration and Inflow

The projects within the Ten-Year Plan must comply with the mitigation requirements of the Boston Water and Sewer Commission (BWSC) and the policy of the Massachusetts Department of Environmental Protection (MassDEP) to offset any additional wastewater flows by reducing infiltration and inflow (I/I) into sewer systems.

As described in more detail in Chapter 4, Utilities, Harvard met with BWSC to discuss a two phased approach to achieving the required I/I reduction. The first phase is to address I/I within the private Harvard owned wastewater systems in Allston. Since the Harvard Business School (HBS) contains a sizable private wastewater collection system network that is aging and is a potential source of both extraneous infiltration and inflow, Harvard intends to focus their initial efforts on this private system to locate extraneous flows for subsequent removal. Since the flows generated within this private collection system discharge into the BWSC system, any reduction in flows on private property could be considered, with BWSC approval, in the net new wastewater generation. In this case, the overall net increase in wastewater flow discharged to the public system would be reduced based on the mitigation of I/I sources identified by Sewer System Evaluation Study (SSES) investigations on the Harvard private sewers. Therefore, Harvard proposes to perform SSES investigations initially on the private sewers shown, which are to remain and are not being replaced or rehabilitated as part of the Ten-Year Plan. When I/I mitigation is achieved on the aforementioned private sewers, Harvard will petition the BWSC for credit as a net reduction of flows entering the BWSC system that can be considered by the BWSC before applying the 4:1 removal goal.

At this time, it is unclear how much additional I/I flow in the BWSC system would need to be identified and removed after the removal of inflow sources identified in the initial investigation program and other private Harvard I/I source reduction programs in Allston, as described above. Therefore, a Phase II I/I mitigation plan in the public BWSC system is proposed to identify any additional flow that must be removed to satisfy the 4:1 mitigation goal: Phase II would target BWSC pipes tributary to the MWRA interceptors that traverse the proposed project area. To make up the difference in I/I flow offsets to satisfy the 4:1 mitigation goal, as part of the Site Plan Review process for each individual project in the Ten-Year Plan, Harvard will work with the BWSC to provide resources for the identification and removal of additional I/I flow in these tributary public sewers. The Commission requires 4:1 I/I Mitigation completion for each individual project 90 days prior to building

occupancy or water let-on. BWSC plans to undertake a City-Wide I/I Study starting in 2015 that will provide recommendations for I/I removal in Allston/Brighton. This new I/I plan will help guide the most effective I/I mitigation measures to be implemented in Allston. As I/I removal projects are identified in the BWSC system, Harvard will submit a list of proposed projects that would be undertaken to remove I/I for BWSC review and approval.

Water Conservation

Water conservation methods, such as low-flow fixtures, waterless urinals and grey water systems are being evaluated by Harvard on a project-by-project basis. Low-flow fixtures for sinks, showers, and laundry facilities will help to reduce water consumption for all new buildings included in the proposed campus development. In addition, waterless urinals could be utilized in public bathrooms to further reduce potable water demand. Consideration will also be given to using rain water harvesting and storage for irrigation purposes to help significantly reduce or eliminate potable water use for irrigation, and to incorporate drought tolerant native plant species in landscaping plans to further reduce demand and increase water conservation. Incorporating water conservation measures as part of the project fits in with Harvard's goals and guidelines for sustainability and Green Building/LEED initiatives. Harvard's current Green Building Standards require new construction and major renovations to achieve LEED Gold certification. The current Green Building Standards also require, for applicable projects, a 35 percent reduction in indoor potable water use using the LEED baseline.

Stormwater

Stormwater management controls will be established in compliance with BWSC standards and the DEP's Stormwater Management Standards. They will also be designed to reduce phosphorus and bacteria loads to the Charles River, in accordance with Boston's anticipated EPA National Pollutant Discharge Elimination System (NPDES) permit.

AIR QUALITY AND GREENHOUSE GAS EMISSIONS

The Proponent is committed to the following mitigation elements for the master plan projects. For individual buildings, commitments will be included in the individual project-specific GHG analyses. In addition, the University is committed to:

- Expanding combined heat and power (CHP) facilities at Blackstone and potentially elsewhere to continue to achieve the environmental benefits of cogeneration.
- Utilizing the process of Harvard's Green Building Standards as each project proceeds to develop high efficiency, low-carbon designs.
- Utilizing and expanding the comprehensive TDM program.
- Continuing to work with the Boston Transportation Department on traffic signalization changes as described in Chapter 2, Transportation, to reduce traffic delays, reducing GHG and other pollutant emissions.
- Encouraging commercial tenants to adopt energy efficiency measures.
- Continuing to look for opportunities to replace or augment its fleet vehicles with alternative fueled vehicles with greater efficiency and lower GHG emissions.
- Developing an urban tree canopy consistent with the principles set forth in the DEIR.

The Proponent will submit a self-certification to the MEPA Office at the completion of each

project. The certification will identify the GHG mitigation measures incorporated into the building and will illustrate the degree of GHG reductions from a Baseline case, as Baseline is defined in that building's specific GHG emissions analysis, and how such reductions are achieved. Details of Harvard's implementation of operational measures will be included.

HISTORIC AND ARCHAEOLOGICAL RESOURCES

In accordance with applicable historic preservation statutes and regulations, Harvard will work cooperatively with the Massachusetts Historical Commission (MHC) and the Boston Landmarks Commission (BLC), as required, to ensure that potential impacts to historic resources are considered. As part of this, Harvard is committed to filing an MHC Project Notification Form (PNF) for each individual project that may impact historic resources and for which there is any associated state body funding or licensing. An MHC PNF will be submitted at a point in which there is enough design information to make such a filing. For projects that involve demolition of structures that are 50 years old or older, an Article 85 application will be filed with the BLC in accordance with the City of Boston's Demolition Delay ordinance. The Article 85 application will be filed at a point in which there is enough design information to make such a filing.

As more detail on the ground-disturbing nature of each of the specific IMP projects is available, additional archaeological review will be undertaken, consistent with the recommendations described in Chapter 6, Historic Resources.

CONSTRUCTION PERIOD IMPACTS

As described in detail in Chapter 7, Construction Period Impacts, Harvard has developed Institutional Construction Management Plan (CMP) guidelines to coordinate the preparation and implementation of the individual project CMPs. The ICMP guidelines were submitted to the Boston Transportation Department (BTD) for their review prior to the submittal of the individual CMPs. The ICMP guidelines describe the principles and procedures that guide development of individual Construction Management Plans; provide a mechanism to integrate and coordinate individual project CMPs including construction staging and laydown areas, truck routes, construction worker parking, and rodent control; describe common features for CMPs of individual projects, such as communication and notification protocols, construction work hours and protection of utilities; and identify Best Management Practices to address environmental, air quality, noise, and construction waste. The ICMP guidelines will be updated regularly to reflect new IMP project construction activities.

Following review of the ICMP guidelines, each of the individual IMP projects will be required to prepare a CMP which will be submitted to the BTD once final plans are developed for each IMP project and the construction schedules are fixed. The construction contractor will be required to comply with the details and conditions of the approved CMP.

The elements of the ICMP guidelines are outlined in the following sections and described in more detail in Chapter 7, Construction Period Impacts.

9.5 Proposed Section 61 Findings

The Secretary's Certificate on the DEIR requires that Section 61 Findings be prepared for all required state permits. M.G.L. c. 30, s. 61 requires that "[a]ll authorities of the commonwealth ... review, evaluate, and determine the impact on the natural environment of all works, projects or activities conducted by them and ... use all practicable means and measures to minimize [their] damage to the environment. ... Any determination made by an agency of the commonwealth shall include a finding describing the environmental impact, if any, of the project and a finding that all feasible measures have been taken to avoid or minimize said impact." The finding required by Section 61 "shall be limited to those matters which are within the scope of the environmental impact report, if any, required ...[on a project]." M.G.L. c. 30, s. 62A.

MEPA Regulations provide (301 CMR 11.07(10)) that the Secretary may require that an EIR present a draft Section 61 Finding for each State Agency that will issue permits for the project. The Secretary has so required for this project.

The following state permits are expected to be required for the Project.

Department of Environmental Protection

- Non Major Comprehensive Plan Approval

Massachusetts Water Resources Authority

- Sewer Use Discharge Permit
- 8(M) Permit

The following pages include a draft Section 61 Finding listing the mitigation measures and timing for the mitigation related to the required state permits.

It is important to note that many of the mitigation measures, public realm improvements, and community benefits that are described previously in this chapter are not tied to any state permits and therefore are not included in the following draft Section 61 Findings.

SECTION 61 FINDING

Project Name: Harvard University's Campus in Allston

Project Location: Boston

Project Proponent: Harvard University

EEA Number: 14069

Date Noticed in Monitor: [to be determined]

The potential environmental impacts of Harvard University's Campus in Allston have been characterized and quantified in the NPC, DEIR, and FEIR which are incorporated by reference into this Section 61 Finding. Throughout the planning and environmental review process, the proponent has been working to develop measures to mitigate significant impacts of the projects. With the mitigation proposed and carried out in cooperation with state agencies, the [Agency] finds that there are no significant unmitigated impacts.

The proponent recognizes that the identification of effective mitigation, and implementation of that mitigation throughout the life of the projects, is central to its responsibilities under the Massachusetts Environmental Policy Act (MEPA). The proponent has accordingly prepared the annexed Table of Mitigation that specifies, for each potential state permit category, the mitigation that the proponent will provide.

Now, therefore, [Agency], having reviewed the MEPA filings for Harvard University's Campus in Allston, the mitigation measures already implemented, and those further mitigation measures set forth on the annexed Table of Mitigation Measures, finds pursuant to M.G.L. C. 30, S. 61 that with the implementation of the aforesaid measures, all practicable and feasible means and measures will have been taken to avoid or minimize potential damage from the projects to the environment.

Table of Mitigation Measures

Mitigation/Responsible Party	Timing	Cost
General MEPA Requirements		
Harvard will submit a GHG analysis for each individual project. Each GHG analysis will provide a clear summary of GHG reduction measures to be adopted as part of the project, including a summary table of predicted energy use, GHG emissions in tons per year of CO2 for stationary and mobile sources, and a commitment to provide a separate self-certification document.	Prior to the issuance of any State permits for that project	Part of project cost
Harvard will submit a certification to the MEPA Office indicating that all of the mitigation measures or their equivalent have been incorporated into the project.	Following the construction of each project	Part of project cost
Harvard has committed to exploring strategies to implement elements of the proposed Greenway in at least an interim condition. Harvard started a public planning process in 2013 to identify interim improvements to the area of land known as Rena Park. This will be an important first step in establishing the western edge of the Greenway. Additional segments that comprise the Greenway will be created as buildings develop along the length of the Greenway. The only project which is likely to occur during the Ten-Year Plan is the Hotel and Conference Center. Development of this project will incorporate another piece into the Greenway connection.	Planning for Greenway will occur in 2014. Additional segments will be implemented as land is available and tied to building development.	Part of project cost
Non Major Comprehensive Air Plan Approval		
Harvard is committed to expanding combined heat and power (CHP) facilities at Blackstone and potentially elsewhere to continue to achieve the environmental benefits of cogeneration. If boilers are used for individual IMP projects, emissions will meet DEP performance standards for boilers. Installation of any IMP project's emergency generators will incorporate Best Available Control Technology (BACT). Sources of pollutants (e.g. boilers, emergency diesel generator) will be properly equipped and maintained.	Part of design of each project	Part of project cost

Sewer Use Discharge Permit		
The projects will comply with the mitigation requirements of the BWSC and the policy of the MassDEP to offset any additional wastewater flows by reducing infiltration and inflow (I/I) into sewer systems. The FEIR described a two-phased approach to I/I evaluation, including a first phase that looks at internal Harvard infrastructure and second phase that works with BWSC as part of its City-wide I/I study.	Part of design of each project	Part of project cost
Water conservation methods, such as low-flow fixtures, waterless urinals and grey water systems will be evaluated by the design teams on a project-by-project basis.	Part of design of each project	Part of project cost
Stormwater management controls for each project will be established in compliance with BWSC standards and the DEP's Stormwater Management Standards. They will also be designed to reduce phosphorus and bacteria loads to the Charles River, in accordance with Boston's anticipated EPA National Pollutant Discharge Elimination System (NPDES) permit.	Part of design of each project	Part of project cost
As each site goes into final design, detailed stormwater management calculations will be provided to demonstrate compliance with regulatory requirements.	Part of design and included in the PCN for each project	Part of project cost
Existing site drainage located within or adjacent to the project sites will be protected during construction. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer and drain facilities will be reviewed by BWSC as part of its Site Plan Review process.	Part of design of each project	Part of project cost
8(M) Permit		
If projects have the potential to impact MWRA easements or property, Harvard will identify site-specific mitigation measures and file 8(M) Permit application.	Evaluation of potential to impact MWRA facilities will be part of planning of each project	Part of project cost

APPENDIX A:
RESPONSE TO COMMENTS

APPENDIX A: RESPONSE TO COMMENTS

MEPA Certificate and Comment Letters Received on the DEIR

MEPA Certificate
Department of Conservation and Recreation
Department of Environmental Protection – NERO
Department of Energy Resources
Massachusetts Department of Transportation
Massachusetts Historical Commission
Massachusetts Water Resources Authority
Boston Water and Sewer Commission
City of Cambridge
Charles River Watershed Association and the Metropolitan Area Planning Council
Stevan Goldin

The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Deval L. Patrick
GOVERNOR

Richard K. Sullivan Jr.
SECRETARY

Tel: (617) 626-1000
Fax: (617) 626-1181
http://www.mass.gov/envir

February 14, 2014

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT NAME:	Harvard University's Campus in Allston (f/k/a Harvard University – Allston Campus 20-Year Master Plan)
PROJECT MUNICIPALITY:	Boston
PROJECT WATERSHED:	Boston Harbor
EEA NUMBER:	14069
PROJECT PROPONENT:	Harvard University
DATE NOTICED IN THE MONITOR:	January 8, 2014

As Secretary of Energy and Environmental Affairs, I hereby determine that the Draft Environmental Impact Report (DEIR) submitted on this project **adequately and properly** complies with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00). The Proponent must prepare and submit for review a Final Environmental Impact Report (FEIR) in response to the Scope provided below and in accordance with the Special Review Procedure (SRP) established for the project (November 20, 2013).

Project Description

According to the DEIR, the project area includes Harvard's Allston campus located predominantly on land bounded by Soldiers Field Road and Western Avenue, with North Harvard Street separating two distinct areas of the existing campus, the Harvard Business School (HBS) and the athletic area. An Institutional Master Plan (IMP) was reviewed and approved by the Boston Redevelopment Authority (BRA) and Boston Zoning Commission in October and November 2013, respectively.

Harvard has proposed a series of projects to be completed within a ten-year time frame (the Ten-Year Plan) to realize strategic goals in both academic and community development. The specific projects listed in the DEIR include:

Early (2014-2018)

1. **HBS, Kresge Hall Replacement/Chao Center** – Replacement of the existing Kresge Hall with a 90,000-sf HBS building to provide a dining facility for HBS's Executive Education program. The building, to be called the Ruth Mulan Chu Chao Center (Chao Center), will also include classroom space, offices for faculty and staff, function rooms, and a kitchen.
2. **Harvard Stadium Addition/Renovation** – Renovation of Harvard Stadium, including an overall reduction in seating from 30,262 to 23,333, improved accessibility features, and a 46,000-sf addition to the westerly side of the stadium to be used for building amenities, club seating, accessibility-related space, and meeting and office space. This project includes approximately 34,200 sf of new interior construction and approximately 130,500 sf of interior renewal.
3. **Renovation of HBS Baker Hall** (to be renamed Esteves Hall) – renovation of the 75,000-sf Baker Hall, which serves as a residential facility for HBS's Executive Education program.
4. **HBS, Burden Hall Replacement** – Replacement of HBS's existing Burden Hall with two buildings totaling 140,000 sf of new space.

Mid Projects (2018-2020)

5. **HBS Faculty and Administrative Office Building** – Construction of a new 110,000-sf faculty and administrative office building to be located on the existing Ohiri Field directly north of the I-lab/Batten Hall.
6. **Gateway Project** – Construction of approximately 300,000-sf of mixed-use space (i.e., ground floor service, retail and/or other institutional uses and programming and upper floor(s) institutional/mixed uses including administrative or academic office space) at the existing Charlesview site on North Harvard Street. Approximately 35,000 to 50,000 sf of space will be retail/active ground floor uses.
7. **Renovation of Soldiers Field Park Housing** – Renovation of the four building, 478-unit, 423,000-sf Soldiers Field Park Housing complex currently used for graduate student housing.

Late Projects (2020-2024)

8. **Athletics Department, Basketball Venue and Institutional/Mixed Use Facility** – Construction of approximately 270,000 to 340,000 sf of mixed use space including: a new 60,000-sf, 3,000-seat basketball venue with locker rooms, athletics offices, and concession areas; approximately 200,000 to 250,000 sf of residential space; and approximately 10,000 to 30,000 sf of retail space.

9. **Hotel and Conference Center –** Construction of a 250,000-sf hotel and conference center including approximately 200 hotel rooms and 30,000-sf of meeting space on the south side of Western Avenue across from the HBS Spangler parking lot.

Small Projects Under Consideration

10. **Batting Cage** – Construction of a 5,000-sf permanent fully enclosed batting cage for baseball and softball located near the existing temporary batting cage between the baseball and softball fields.
11. **Newell Boat House Renovations –** Renovation of Newell Boat House to allow for the replacement of rowing equipment and the modification of space in which the equipment is housed.

The demolition of the existing Charlesview building in Barry's Corner is proposed during the Early Projects phase, while the Harvard Allston Science Project is proposed to be undertaken during the Mid-Project Phase.

The following open space, infrastructure and roadway improvement phasing was outlined in the DEIR:

- Barry's Corner Grove (interim) – Early
- "South Campus Drive" – Early
- "Ivy Lane" – Early
- Rena Park – Early
- "Academic Way" (north of Western Avenue) and narrowing of intersection/elimination of traffic island at Barry's Corner – Mid
- "Academic Way" (south of Western Avenue) – Mid
- "Science Drive" (west of Rotterdam Street) – Mid
- Longfellow Path – Mid
- Rena Path – Mid
- Barry's Corner Grove (completed) – Mid
- Greenway (early phase, eastern segment near Hotel and Conference Center) - Late

The DEIR also described a series of non-IMP projects underway or recently completed in the Allston area that are considered background projects to the Ten-Year Plan. These include: the, Barry's Corner Residential and Retail Commons, which was reviewed under a separate voluntary MEPA process (EEA No. 15036), 224 Western Avenue (Harvard Ceramics), 28 Travis Street, Bright Hockey Center Addition/Renovation, and HBS Tata Hall. As I noted in the Certificate on the NPC, I strongly encourage Harvard to consider filing voluntarily with the MEPA Office for future Harvard-sponsored projects in Allston that are not within the IMP review area. While these projects on their own may not exceed MEPA review thresholds or require State Agency Actions, they are likely related to the overall fabric of the neighborhood and will interact with the projects proposed as part of the Ten-Year Plan.

Jurisdiction and Permitting

This project is subject to MEPA review and required the preparation of a mandatory EIR because it requires State Agency Actions and exceeds several MEPA review thresholds including:

ENF and Mandatory EIR Threshold:

- Generation of 3,000 or more unadjusted new adt on roadways providing access to a single location (301 CMR 11.03(6)(a)(6));

ENF Thresholds:

- New discharge or expansion in discharge to a sewer system of 100,000 or more GPD of sewage, industrial wastewater, or untreated stormwater (301 CMR 11.03(5)(b)(4(a));
- Generation of 2,000 or more new adt on roadways providing access to a single location (301 CMR 11.03(6)(b)(13)); and
- Demolition of all or any exterior part of any Historic Structure listed in or located in any Historic District listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth.

The project, as presented in the DEIR, requires a Sewer Connection Permit (BRP WP 74) and Non Major Comprehensive Plan Approval from the Massachusetts Department of Environmental Protection (MassDEP), a Sewer Use Discharge Permit and 8(m) Permit from the Massachusetts Water Resources Authority (MWRA), and Chapter 254 Review with the Massachusetts Historical Commission (MHC). The project is subject to the MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol. Also, the project will require a National Pollutant Discharge Elimination System (NPDES) Construction General Permit from the United States Environmental Protection Agency (U.S. EPA).

Some portions of the project may receive Financial Assistance in the form of tax-exempt bond financing from the Commonwealth. Because the project is being undertaken with State Financial Assistance, MEPA jurisdiction for this project is broad and extends to all aspects of the project that are likely, directly or indirectly, to cause Damage to the Environment as defined in the MEPA regulations.

Changes Since the Filing of the Notice of Project Change

Since the filing of the NPC in April 2013 the proposed project has been refined or changed as follows:

- The overall project program was revised to include 1.4 million sf of new construction and 500,000 sf of renovated space;
- The IMP boundary was expanded to reflect the addition of a potential Construction Support Area (CSA) south of Western Avenue. The total IMP Area (or project area) was increased by 34 acres for a total of area of 189 acres;
- The Gateway Project at Barry's Corner has been moved forward in the proposed phasing plan from the 2020-2024 period to the 2018-2020 period.

Review of the DEIR

The DEIR included a description of each component proposed as part of the Ten-Year Plan and described any changes to the project since the filing of the NPC. In some instances, particularly for those projects to be undertaken very early in the Ten-Year Plan, more detail was provided for project elements, whereas those projects in middle and later portions of the Ten-Year Plan were described in more conceptual terms. The DEIR identified applicable statutory and regulatory standards and requirements, and generally described how the project will meet these standards or included commitments to design and construct the project accordingly. The DEIR included a list of required State Permits, Financial Assistance, or other State approvals and provided an update on the status of the City of Boston IMP process and MEPA review. No additional information was provided on the potential receipt of Financial Assistance as part of the project.

While the DEIR provided conceptual site design information for the individual project elements of the Ten-Year plan, supporting graphics only noted the relationship of each development area to the broader Harvard Allston campus. Existing and conceptual post-development conditions plans were generally not provided in the DEIR at a readable scale for each element of the Ten-Year Plan. Plans did not identify key environmental resources including, but not limited to, wetlands, waterways and tidelands, stormwater, water and wastewater infrastructure, vehicle, pedestrian and bicycle accommodations, open space, landscaped areas, and impervious areas at a site specific scale.

The DEIR discussed the project's consistency with local, City, regional, and State-level planning documents and initiatives including: Executive Order 385 (Planning for Growth), the North Allston Strategic Framework for Planning, the proposed IMP, the Boston Open Space Plan, the Charles River Master Plan, Access Boston (the Boston Transportation Department's (BTD) citywide transportation plan), and MetroFuture. The DEIR noted that the project would be consistent with the multimodal focus of the City of Boston's *Complete Streets Guidelines* and *Boston Bike Network Plan* that supersede elements of the Access Boston plan. Design guidelines developed in conjunction with the IMP project used the *Complete Streets Guidelines* as a template and will extend these design standards to campus streets to complete an integrated roadway network. The DEIR also acknowledged the ongoing collaboration between Harvard and the Department of Conservation and Recreation (DCR) in the planning and reconstruction of the Anderson Bridge, Weeks Bridge, Western Avenue Bridge and River Street Bridge to optimize pedestrian and bicycle functionality, amenity, and safety.

The DEIR provided an extensive discussion of Harvard's commitment to sustainability and green building programs. The DEIR described three principles that guide its approach to sustainability. These include:

1. To demonstrate respect for nature and society, sustainability considerations should be an integral part of planning, construction, renovation, and operation of buildings on campus;
2. To ensure long-term sustainable campus development, campus-wide master planning, and target-setting should include environmental and social goals; and

3. To align the organization's core missions with sustainable development, facilities, research, and education should be linked to create a "living laboratory" for sustainability.

Consistent with these principles, the DEIR discussed various achievements to date including the certification of 88 campus buildings in accordance with the Leadership in Energy and Environmental Design (LEED) program run by the United State Green Building Council. The DEIR described existing sustainability initiatives at Harvard's three campuses (Cambridge, Allston, Longwood) and the parameters of its Greenhouse Gas Inventory. Finally, the DEIR discussed how the University's sustainability principles have been applied to the Ten-Year Plan. These principles were considered at the early stages of project planning and have been integrated throughout the project.

The DEIR discussed the relationship between Harvard's Long-Term Vision for the Allston campus and the Ten-Year Plan. The Long-Term Vision encompasses a geographic area that includes the IMP Area plus additional acreage, primarily south of Western Avenue. It represents planning concept, including new streets, pedestrian connections, open space, and opportunities for growth and development beyond the ten-year timeline. The DEIR included Long-Term Vision drawings that provide context for the subset of projects proposed in the Ten-Year Plan with regard to potential open space networks, streets, bicycle and pedestrian circulation, view corridors and focal points, urban tree canopy, and land use. The most notable component of the Long-Term Vision in relationship to the shorter-term Ten-Year Plan is the establishment of an approximately ten-acre publicly accessible Greenway extending from Ray Mellone Park toward the Charles River. The Greenway is envisioned as both a continuous park-like connector and a long-term infrastructure corridor for stormwater and utility purposes.

Alternatives Analysis

As directed in the Certificate on the NPC, the DEIR included a modified alternatives analysis to assist in the evaluation of project-related impacts. It provided graphics and supporting tabular summaries of existing/no-build conditions, including an identification of the location, current use, and square footages and parking accommodations, for all Harvard-owned properties within the project area. The DEIR also included a graphic identifying other Harvard-owned parcels outside the proposed project area, as well as the general identification of land uses (i.e., residential, commercial, etc.) within the larger Allston neighborhood and extending over the Charles River into Cambridge.

The DEIR indicated that the only institutional uses requiring relocation by the projects in the Ten-Year Plan are those included at 175 North Harvard Street. Specifically, the Harvard Allston Ed Portal will be relocated to a University-owned building at 224 Western Avenue. The Ten-Year Plan includes the demolition of Kresge Hall and Burden Hall on the HBS campus, the former Charlesview Housing complex in Barry's Corner and the NEDL building. The DEIR also noted that the 28 Travis Street project included institutional uses relocated from 219 Western Avenue to facilitate construction of the Barry's Corner project by others. While the Request for Advisory Opinion for the 28 Travis Street project implied that relocation of these uses to Travis Street is temporary in nature, it appears from the DEIR that these institutional uses will be accommodated at this site on a permanent basis.

The DEIR provided a summary of the planning process for the Ten-Year Plan and Long-Term Framework, including a discussion of planning objectives, work team recommendations, University goals, and guiding principles, that influenced the decision to propose the construction and phasing of the elements identified in the Ten-Year Plan.

Land

As noted previously, the Ten-Year Plan projects will be designed in a manner consistent with the sustainability principles established by the University and the Long-Term Vision. This includes the incorporation of new passive or active open spaces and connections to the Charles River and its associated parks through the campus from the adjacent neighborhoods.

The DEIR described the existing location and owner of open space (either active or passive) within the Allston neighborhood. Implementation of the Ten-Year Plan will not require a disposition or change of use of public parkland protected pursuant to Article 97. With the exception of the Newell Boathouse, the Ten-Year Plan projects will not directly front the Charles River; however, the campus connections over the River and neighborhood connections to the River are important project elements. The DEIR noted that Harvard has looked to DCR's *Master Plan for the Charles River Basin* for guidance in the preparation of the IMP. Harvard has also been working with the City of Boston and the Allston community to fund a program of significant community improvements, several of which would improve pedestrian and bicycle access to the Charles Riverfront.

Transportation

The DEIR included a Traffic Impact and Access Study (TIAS) prepared in accordance with *EEA/Massachusetts Department of Transportation (MassDOT) Guidelines for EIR/EIS Traffic Impact Assessments*, Boston Transportation Department's (BTD) *Transportation Access Plan Guidelines* (2011), and the *BRA Development Review Guidelines* (2006). The Ten-Year Plan projects are estimated to generate approximately 5,300 average daily trips (adt).

Signalized intersections evaluated as part of the TIAS include the following:

- Western Avenue at Telford Street/Telford Street Extension;
- Western Avenue at Everett Street;
- Soldiers Field Road at Everett Street;
- Western Avenue at North Harvard Street (Barry's Corner);
- North Harvard Street at Franklin Street/Kingsley Street;
- Western Avenue at Hague Street/Batten Way;
- North Harvard Street at Soldiers Field Road EB;
- North Harvard Street/Anderson Memorial Bridge at Soldiers Field Road WB;
- Western Avenue at Soldiers Field Road EB;
- Western Avenue at Soldiers Field Road WB;
- Cambridge Street at I-90 Ramp/Hotel driveway;
- Cambridge Street at Soldiers Field Road EB;
- Cambridge Street at Soldiers Field Road WB;
- Cambridge Street at Windom Street;

- Cambridge Street at North Harvard Street;
- Cambridge Street at Franklin Street and Harvard Avenue;
- Soldiers Field Road at Eliot Bridge;
- North Harvard Street at "Academic Way"/"South Campus Drive"; and
- Western Avenue at "Academic Way".

Unsignalized intersections evaluated as part of the TIAS include the following:

- North Harvard Street at Bertram Street/Spurr Street;
- North Harvard Street/Bayard Street/Rena Street;
- Western Avenue at Travis Street;
- Hague Street at Rotterdam Street;
- North Harvard Street at Gordon Road;
- North Harvard Street at "South Campus Drive";
- North Harvard Street at "Ivy Lane";
- Western Avenue at "Academic Way"; and
- Rotterdam Street at "Science Drive".

The Certificate on the NPC stated that given the phased approach to constructing the Ten-Year Plan, the analysis should consider build alternatives with and without mitigation corresponding to the first five years (2018) and the second five years (2023) of Ten-Year Plan, in addition to an analysis of the No-Build Condition. The DEIR presented an analysis of existing conditions and a No-Build and Build Condition for a 2020 scenario consistent with the completion of the Ten-Year Plan. The DEIR concluded that the 2022 No-Build scenario would generally reflect transportation conditions in the first five years of the Ten-Year Plan. None of the comments received on the DEIR disagreed with this conclusion.

The TIAS included a discussion of existing roadway geometry, traffic controls, daily and peak period traffic flow, vehicular crash information data, traffic operations and levels of service (LOS), parking, public transportation (including the Harvard Shuttle), pedestrian and bicycle facilities, and loading/service accommodations. The DEIR compared the existing street, pedestrian and bicycle network conditions to those conceptually presented in the Long Term Vision and described overall transportation goals and objectives of this visioning framework. According to the DEIR, this Long Term Framework was developed with consideration for other previous planning efforts that affected the IMP area, such as the North Allston Strategic Planning Framework. Proposed transportation improvements described in the Brighton/Guest Street Planning Study were addressed in the TIAS.

In the existing condition, several study area intersections operate at LOS E or F, representing significant delays and overall poor operations. These intersections include:

- Western Avenue at Everett Street (LOS E in PM)
- North Harvard Street/Anderson Memorial Bridge at Soldiers Field Road WB (LOS E in PM);
- Western Avenue at Soldiers Field Road WB (LOS E in AM);

- Cambridge Street at Soldiers Field Road EB (LOS E in AM; and
- Soldiers Field Road at Eliot Bridge (LOS F in AM).

Several of these intersections will be upgraded as part of other development and transportation improvements projects in the area. No unsignalized intersections currently operate at LOS E or F.

The analysis of the 2020 No-Build Condition incorporated predicted traffic volumes from planned and/or approved developments near the IMP area, as well as planned transportation improvements in the study area. Key background projects for the 2020 No-Build Condition include the bridge and intersection improvements by MassDOT as part of the Accelerated Bridge Program (ABP) at the Anderson, Western Avenue, River Street and Cambridge Street bridges; DCR accessibility improvements to the John Weeks bridge; the non-IMP projects noted previously, and City of Boston bike network improvements.

In the 2020 No-Build Condition, several study area intersections operate at LOS E or F. These intersections include:

- Western Avenue at Everett Street (LOS F in AM, LOS E in PM);
- Western Avenue at North Harvard Street (Barry's Corner) (LOS E in AM, LOS F in PM);
- Western Avenue at Soldiers Field Road EB (LOS F in AM and PM);
- Western Avenue at Soldiers Field Road WB (LOS E in AM and F in PM);
- Cambridge Street at I-90 Ramp/Hotel driveway (LOS F in PM);
- Cambridge Street ta Soldiers Field Road WB (LOS F in AM and F in PM);
- Cambridge Street at Franklin Street and Harvard Avenue (LOS F in PM);
- Soldiers Field Road at Eliot Bridge (LOS F in AM).

All unsignalized intersections would operate at LOS D or better.

The TIAS evaluated a 2020 Build Condition representing future transportation conditions in the study area with the transportation demands and proposed improvements of the Ten-Year Plan, including proposed campus circulation and parking access; displacement of existing trips; the projection and distribution of site generated traffic volumes associated with the Ten-Year Plan; and proposed parking, transit, bicycle, and loading/service conditions. The TIAS incorporated mode share data provided by BTD for Area 17 (Allston) and empirical data from Harvard (where appropriate).

I commend Harvard for proposing a series of transportation improvements to substantially enhance access and safety and create a transportation network that accommodates and promotes pedestrian, bicycle and transit uses. Proposed improvements include:

- The construction of "Academic Way" and "Science Drive";
- Traffic signal improvements in Barry's Corner and new traffic signals on "Academic Way";
- New pedestrian paths, enhanced crossings, and upgraded sidewalks;

- New and enhanced bicycle facilities and parking;
- Upgraded shuttle bus service between Barry's Corner and Harvard Square; and
- Consolidation of MBTA bus stops.

The proposed improvements will complement commitments associated with the Barry's Corner Retail and Residential Commons project to upgrade traffic signals at Barry's Corner and construct "South Campus Drive" and "Ivy Lane."

After the Charlesview site is cleared, "Academic Way" will be constructed between North Harvard Street and Western Avenue, including improvements to the two new intersections. The remainder of "Academic Way" south of Western Avenue and "Science Drive" will be constructed as part of the Science project. "Stadium Way" is not included as part of the Ten-Year Plan. However, Harvard will proceed with the design of Stadium Way to the 25% design stage within 24 months of the effective date of the IMP. The DEIR also identified the location of five Mobility Hub locations in Allston to be completed within the timeframe of the Ten-Year Plan projects. Each mobility hub will be located on one or two MBTA bus routes and/or Harvard shuttle routes. Mobility hubs will also include a combination of Hubway stations, electric car charging stations, car sharing services (e.g. Zipcar) and taxi stands. The IMP design guidelines extend the City of Boston's Complete Streets guidelines to include campus streets as part of an integrated street network.

In the 2020 Build Condition, several study area intersections operate at LOS E or F. These intersections include:

- Western Avenue at Everett Street (LOS F in AM and PM);
- Western Avenue at North Harvard Street (Barry's Corner) (LOS E in PM);
- Western Avenue at Hague Street/Batten Way (LOS E in AM and PM);
- North Harvard Street/Anderson Memorial Bridge at Soldiers Field Road WB (LOS E in PM);
- Western Avenue at Soldiers Field Road EB (LOS F in AM and PM);
- Western Avenue at Soldiers Field Road WB (LOS E in AM and LOS F in PM);
- Cambridge Street at Soldiers Field Road WB (LOS F in AM and PM);
- Cambridge Street at Franklin Street and Harvard Avenue (LOS F in PM);
- Soldiers Field Road at Eliot Bridge (LOS F in AM); and
- Western Avenue at "Academic Way" (NB approach LOS E in PM, SB approach LOS F in PM) (Unsignalized).

The Ten-Year Plan includes mitigation measures to improve future traffic conditions from the 2020 Build Condition. As presented in the DEIR, these proposed improvements include:

- Diversion of traffic flows around Barry's Corner and improved pedestrian crossings through the construction of "Academic Way."
- Signal optimization and coordination of the Barry's Corner traffic signal with the proposed new traffic signal at "Academic Way" and North Harvard Street. This includes upgrading communications and video monitoring equipment at this location.

- Interconnection of traffic signals along North Harvard Street and provision of communication improvements to link the North Harvard Street intersections ("Academic Way" to Cambridge Street) and Cambridge Street (Windom Street to Harvard Avenue) to the City of Boston's Traffic Management Center.
- Implementation of a "No Left Turn" restriction at the Western Avenue eastbound approach of the Western Avenue at Everett Street intersection in the AM and PM peak hours.
- Implementation of signal timing modifications at the Soldiers Field Road at Eliot Bridge intersection;
- Implementation of signal timing modifications at the Western Avenue at Hague Street and Batten Way intersection; and
- Installation of video detection equipment at the Cambridge Street at Franklin Street and Harvard Avenue intersections.

The DEIR concluded that the following intersections would continue to operate at LOS E or F in the 2020 Build with Mitigation Condition:

- Western Avenue at Everett Street (LOS F in AM and LOS E in PM);
- Western Avenue at North Harvard Street (Barry's Corner) (LOS E in PM);
- Western Avenue at Soldiers Field Road EB (LOS F in AM and PM);
- Western Avenue at Soldiers Field Road WB (LOS F in PM);
- North Harvard Street/Anderson Memorial Bridge at Soldiers Field Road WB (LOS E in PM);
- Cambridge Street at Soldiers Field Road WB (LOS F in AM and PM);
- Cambridge Street at I-90 Ramp/Hotel driveway (LOS F in PM)
- Cambridge Street at Franklin Street and Harvard Street (LOS F in PM)

All unsignalized intersections would operate at LOS D or better.

Public Transit and Harvard Shuttle

The DEIR included an analysis of the existing public transit system within the project area and estimated project-related impacts. The Ten-Year Plan project area is served by several MBTA bus routes (Routes 64, 66, 70, 70A, and 86). The DEIR identified each bus route origin and destination, Allston service areas, peak period headways, and average weekday ridership. Future transit trips were estimated for the Ten-Year Plan projects, the Science project, and the Barry's Corner Residential and Retail Commons project. Collectively, these projects will have an impact on ridership levels on the routes serving the project area. Proposed bus stop relocation projects in the study area were identified, noting their benefit to overall intersection and transit operations. MBTA subway service via the Red Line is located one mile from Barry's Corner, with connections available via several of the bus routes. Commuter rail lines pass south of the project area through Beacon Yard. While there are currently no commuter rail stations in the area, New Balance has agreed to fund and construct a new commuter station to the west of Everett Street as part of their Boston Landing (f/k/a New Brighton Landing) project (EEA #14909).

The DEIR evaluated bus system capacity for the routes that will service the Ten-Year Plan projects (including the Barry's Corner and Science projects). These projects are expected to generate 415 new transit trips during the AM peak hour and 330 new transit tips during the PM peak hour. This analysis concluded that all MBTA routes (with the exception of Route 64) would see some increase in volume-to-capacity ratios due to project-generated trips. Route 66, Route 86 and Routes 70/70A ridership would also increase due to project-generated trips. The DEIR also noted that high frequency routes, specifically Route 66, are likely subject to bunching due to traffic delay, resulting in individual buses with higher volume-to-capacity ratios than the average hourly volume-to-capacity ratios indicated in the bus system capacity analysis.

The DEIR described the proposed expansion of Harvard's shuttle bus service between Barry's Corner and Harvard Square. The shuttle system will serve Harvard affiliates including undergraduates, graduate students, staff and faculty. Neighborhood residents and employees of the Barry's Corner Residential and Retail Commons will also be able to use this shuttle. The DEIR included a graphic depicting the current Allston Express shuttle route and the proposed Harvard Express route. The proposed Harvard Express route would operate on ten minute headways on weekdays and travel along North Harvard Street, making stops at Barry's Corner, Cotting Hall, Eliot Street in Cambridge and Harvard Square. Predicted ridership data and capacity analyses for the Allston Campus Express and Harvard Square Express shuttles indicate sufficient capacity and acceptable volume-to-capacity ratios during peak hours in the 2022 Build Condition. Direct shuttle service between the Allston and Longwood campuses is not anticipated due to the potential lack of demand from the Ten-Year Plan uses, but will monitor the potential need to expand the Longwood shuttle if necessary in the future. Furthermore, there are no plans to provide shuttle service to the proposed commuter rail station on Everett Street (Allston Landing) at this time, but Harvard will monitor the status of this station and its service to determine whether future service is appropriate.

Bicycle and Pedestrian Accommodations

The DEIR discussed existing on- and off-street bicycle accommodations within the study area, including a graphic that identified the type of accommodation, proposed accommodations, and the responsible party for their implementation. The DEIR noted those projects to be undertaken in conjunction with the City of Boston's Bike Network Master Plan, or as part of MassDOT and DCR improvement projects on the river bridges.

The DEIR discussed the results of a bicycle LOS analysis for the 2012 Existing, 2022 No-Build and 2022 Build Conditions at signalized intersections with consideration for BTD mode share and bicycle trip distribution assumptions. The majority of approaches operate at acceptable LOS (LOS D or better) during the morning and evening peak hours under all conditions, with the following exceptions:

- Weekday Morning
    - Franklin Street eastbound at North Harvard Street (Existing, No-Build, and Build Conditions);
    - Kingsley Street westbound at North Harvard Street (Existing, No-Build, and Build Conditions);
    - Cambridge Street eastbound at I-90 ramps (Existing Condition);

  - Cambridge Street eastbound at Soldiers Field Road eastbound ramp (No-Build and Build Conditions);
  - South Campus Drive (Build Condition); and
  - Academic Way (Build Condition)
- Weekday Evening
  - Franklin Street eastbound at North Harvard Street (Existing, No-Build, and Build Conditions);
  - Cambridge Street eastbound at I-90 ramps (Existing Condition);
  - Cambridge Street eastbound at Soldiers Field Road eastbound ramp (No-Build and Build Conditions); and
  - Windom Street southbound at Cambridge Street (No-Build and Build Conditions)

I note that as part of the MassDOT river bridge projects, bicycle facilities will be added at the Cambridge Street eastbound approach to Soldiers Field Road (there are no facilities currently). The additional of new bicycle signals and the proportion of green time allocated to bicycles will improve bicycle safety, but result in a higher bicycle delay as noted above.

The DEIR identified existing pedestrian circulation patterns connecting Harvard in Allston to Cambridge, estimated walk times, route hierarchies, impenetrable boundaries, and the specific Long-Term Vision pedestrian goals and conceptual network. The DEIR characterized existing pedestrian accommodations within the study area (e.g., pedestrian signals, crosswalks, etc.,) and noted pedestrian infrastructure deficiencies. The DEIR discussed the results of a pedestrian operations analysis that focused on pedestrian crossings at signalized intersections for the 2012 Existing, 2022 No-Build and 2022 Build conditions with consideration for BTD mode share and pedestrian trip distribution assumptions. Pedestrian LOS analyses identified poor pedestrian LOS (LOS E or F) at the intersection of Western Avenue at North Harvard Street (Barry's Corner). Proposed mitigation measures will improve LOS in the 2022 Build condition to LOS D or better during both the AM and PM peak period. Three bridge intersections at Soldiers Field Road (North Harvard Street and Cambridge Street) currently operate at LOS E or F for certain pedestrian movements, but will not degrade between the 2022 No-Build and 2022 Build Condition. Multimodal improvements to these intersections are underway by MassDOT and include a number of safety improvements that don't necessarily address the existing LOS deficiencies.

The DEIR indicated that street design will emphasize pedestrian priority and amenity, including generous sidewalks, pedestrian-scale lighting, significant furnishing zones, appropriately located bus stops, and various other amenities. Several upgrades to pedestrian crossings, sidewalks and signal improvements will also be made as part of MassDOT's reconstruction of the river bridges, the Barry's Corner Retail and Residential Commons project, and accessibility improvements to the Weeks Bridge by DCR.

Pedestrian and bicycle enhancements proposed in conjunction with the Ten-Year Plan projects include:

- Creation of a new multi-use path along "South Campus Drive" that will accommodate pedestrians and bikes. The path will create a new off-street cycling route around

Barry's Corner with access to Smith Field. This enhancement is proposed in conjunction with the Barry's Corner Retail and Residential Commons Project.
- Construction of pedestrian and bicycle facilities on "Academic Way" that will link Rena Park with Smith Field.
- Upgrades to Barry's Corner, including the intersection geometry improvements, removal of the existing pedestrian island, and improvements to the existing grove of trees to enhance and promote public use of the space.
- Construction of new multi-use paths in Rena Park that will create a gateway to the park and the future Greenway;
- Upgrades to Western Avenue including sidewalk reconstruction and formalization of the existing cycle track.
- Expansion of the Hubway stations as demand increases.
- Provisions for covered off-street bike parking and accessible public bike parking spaces that are convenient to building entrances.
- Signal timing adjustments at North Harvard Street at Franklin Street and Kingsley Street to reduce delay and provide acceptable LOS for all users.

Parking

The DEIR included an assessment of parking within the IMP area. According to the DEIR, all University parking is controlled and administered by the Harvard University Parking Office as a University-wide resource with a permitting system and specific parking lot/garage assignments. Parking for eligible staff and faculty costs $1,596 per year for unreserved surface parking and $1,706 per year for unreserved garage parking. Students living on-campus who park in the Soldiers Field Park Garage or One Western Avenue Garage pay $3,192 per year for garage parking and $3,000 for surface parking. Visitor parking is provided in the Spangler Lot and at designated multi-space meter locations. The DEIR illustrated the location and number of existing off-street institutional (2,642 spaces) and non-institutional (510 spaces) parking spaces in the IMP area.[1] The DEIR also noted the presence of limited on-street parking along North Harvard Street, Western Avenue, and Cambridge Street (270 spaces). Most of the adjacent neighborhood residential streets were classified as either unregulated parking or residential permit holders only.

The Ten-Year Plan includes a total of 3,807 off-street institutional parking spaces, including 50 spaces in a "parking reserve" that is subject to future review by the BRA and BTD. Approximately 125 of these spaces may be designated as non-institutional spaces depending on the programming of the proposed Hotel and Conference Center. Institutional spaces will continue to be managed as a University-wide resource and are expected to accommodate the anticipated growth in demand by Harvard residents, commuters and visitors as part of the Ten-Year Plan. The new institutional parking spaces will accommodate parking demand from four Ten-Year Plan projects: the new Faculty and Administrative Office Building at HBS; the Mixed Use Facility and Basketball Venue; the Gateway Project at Barry's Corner; and the Hotel and Conference Center on Western Avenue. The proposed new streets will also create an opportunity for between 60-70 new, on-street parking spaces in addition to the 41 on-street

[1] These non-institutional parking spaces include those located at 114 Western Avenue, Charlesview and 135 Western Avenue and will become institutional spaces as part of the Ten-Year Plan.

spaces proposed in conjunction with the Barry's Corner Residential and Retail Commons project. These new on-street spaces are anticipated to be publicly accessible. Harvard will continue to use a shared parking approach to manage event-related parking demand, as these events typically occur at night and on weekends when commuter parking demand is low.

Harvard currently implements a Transportation Demand Management (TDM) program across its campuses. The DEIR identified the following components of Harvard's Commuter Choice TDM program:

- 50 percent subsidies for MBTA monthly passes;
- Pre-tax savings on the purchase of private transit passes and commuter checks for eligible faculty and staff;
- Online monthly pass sales;
- Marketing efforts that focus on the transit pass program, public transportation options and Harvard shuttle services, bicycling services such as safe cycling classes, repair clinics, the Hubway, departmental bike programs, ridesharing options, walking and bicycle maps, and links to other references or resources;
- $50 discounted annual membership to the Hubway bike sharing program;
- Discounted bike helmets;
- Bike registration with the Harvard University Police Department;
- Participation in the Bicycle Benefit Act providing bicyclists with up to $240/year for bicycle expenses;
- Discounted and preferential carpool and vanpool parking in the largest garages and several surface lots;
- Carpool partner matching and registration;
- Emergency ride home assistance;
- Zimride, an online ride sharing program that helps Harvard affiliates locate other people with similar commuting patterns or travel needs to facilitate ridesharing;
- RelayRides program to match people who are willing to lend or borrow vehicles from one another;
- Discounted Zipcar membership ($25/year) for employees;
- Parking for 28 Zipcars including five spaces in Allston;
- Two electric vehicle car charging stations at the i-Lab in Allston (125 Western Ave.); and
- Approximately 26 preferred parking spaces for Low Emissions Vehicles at ten locations on the Cambridge and Allston campuses.

According to the DEIR, Harvard will set a mode share goal for the Ten-Year Plan projects of under 40 percent of commuters travelling to the Allston Campus by car. To achieve this goal, the aforementioned TDM program will be maintained and enhanced on the Allston Campus. This includes the provision of bicycle parking for new projects, expansion of Hubway stations as warranted, addition of new electric charging stations, designation of parking for high-occupancy and low emissions vehicles, and expansion of shared ride car services (e.g., Zipcar).

Harvard intends to submit an Institutional Transportation Access Plan Agreement (TAPA) to BTD. This TAPA will include a monitoring program to be developed and approved by BTD. The DEIR noted that Harvard expects this monitoring program to include an ongoing transportation parking analysis program.

Air Quality

The DEIR included an air quality analysis to demonstrate project compliance with applicable City of Boston, State and federal air quality requirements. The DEIR contained the results of a mesoscale analysis to evaluate the ozone precursors: volatile organic compounds (VOC) and nitrogen oxides (NO_x).

A mesoscale analysis was performed to ensure that the proposed project will not adversely impact the existing State Implementation Plan (SIP), which tracks how the State intends to maintain compliance with the National Ambient Air Quality Standards (NAAQS) or plans for reductions in emissions to obtain compliance in the future. The methods and parameters for the mesoscale analysis followed those approved by MassDEP and used both traffic data from the traffic analysis and MOBILE 6.2 to predict the change in regional ozone precursor emissions due to the redevelopment of the project site. The mesoscale analysis concluded that regional VOC and NO_x levels would decline between 2012 Existing Conditions and 2022 No-Build Conditions primarily due to anticipated improvements in vehicle technology which will lower emission rates. However, due to an increase in vehicular traffic and the addition of new roads and intersections (Academic Way), the analysis shows an increase of approximately 0.8 tons per year (tpy) in VOC and 0.5 tpy in NO_x emissions for the 2022 Build Condition compared to the 2022 No Build Condition. The Proponent has committed to the implementation of infrastructure and traffic management improvements to minimize the potential impacts of the project to the transportation system (i.e. intersection, signal timing, and roadway improvements) and a TDM program. The mesoscale analysis evaluated the potential VOC and NO_x emissions in a 2022 Build with Mitigation scenario that incorporated proposed infrastructure/operational improvements and TDM measures. The 2022 Build with Mitigation Condition predicted that VOC emissions will be reduced by 0.6 tpy, and NO_x emissions will be reduced by 0.2 tpy from the 2022 Build Condition (i.e., with no mitigation measures implemented). The project will conform with the Clean Air Act Amendments, as it does not create a new violation of the NAAQS, an increase in the frequency or severity of any existing violations, nor a delay in the attainment of the NAAQS.

I remind the Proponent that stationary sources, such as new furnaces, fuel burning equipment, and/or boilers as well as emergency generators, may require MassDEP air permits.

Water and Wastewater

The DEIR contained an estimate of wastewater generation and potable water use based upon MassDEP TitleV flow guidance. The DEIR included this information in a tabular format that categorized generation and demand by project and use, noting reductions in existing flow through demolition in addition to those associated with new construction. No allowances were provided in this table for irrigation or cooling system make-up water. The DEIR also noted wastewater generation and water demand estimates for the Science project and Barry's Corner

Residential and Retail Commons project as these will impact the same BWSC system serving the Ten-Year Plan.

The DEIR included a description and supporting graphic that characterized the existing water supply system and identified ownership of the infrastructure (including MWRA easements within the project area). Harvard used BWSC's hydraulic model of the water system to determine the net impact all project demands on pressures during peak hour demand and on fire protection. The DEIR concluded that there is adequate hydraulic capacity to serve proposed uses, fire protection and emergency connections and no BWSC or MWRA infrastructure improvements are needed to mitigate the impact of project-related demand. Water conservation measures such as low-flow fixtures, waterless urinals and grey water systems are being evaluated by Harvard on a project-by-project basis. Consideration will also be given to using rainwater harvesting and storage for irrigation purposes along with the incorporation of drought-tolerant native plant species in landscaping plans. Given the University's requirements for new construction and major renovations to achieve LEED Gold certification, a 35% reduction in indoor potable water use can be anticipated.

The DEIR included a description and supporting graphic that characterized the existing wastewater system, noting ownership of various portions of the system by the MWRA, BWSC and Harvard and the location of MWRA easements. The DEIR discussed components of the Ten-Year Plan that may use existing sewer connections or may require new or relocated sewer service connections. The DEIR described the new sewer facilities in Western Avenue and Travis Street recently constructed by Harvard as part of the Science Project (subsequently turned over to BWSC). According to the DEIR, the BWSC sewers in Allston are separate from the stormwater system and do not accept stormwater flows. However, during large wet weather events, combined sewer overflows (CSOs) can surcharge in the MWRA system downstream of the IMP area. The DEIR concluded that the existing wastewater system is capable of accommodating the Ten-Year Plan projects.

Harvard will also comply with MassDEP's Policy on Managing Infiltration and Inflow (I/I) in MWRA Community Sewer Systems (BRP 09-01) and with BWSC policy and regulations, both for the overall Ten-Year Plan and on a project-by-project basis. The DEIR noted that the demolition of older existing structures with less efficient water and wastewater fixtures will offset some of the new flows. Sewer improvements and resulting I/I mitigation will be performed in hydraulically related sewer systems as described in the DEIR.

Wetlands, Waterways and Tidelands

According to the DEIR, the project site itself does not include any wetland resource areas or land under the jurisdiction of Chapter 91 (310 CMR 9.00), with the exception of the Newell Boathouse. It is anticipated that given the very conceptual nascent nature of the Newell Boathouse project, additional review under MEPA, the Wetlands Protection Act, and c.91 will likely be required. The DEIR included a graphic depicting the limit of c.91 jurisdiction in Allston in the vicinity of the Ten-Year Plan projects.

Stormwater

The Ten-Year Plan will result in a minor reduction in impervious areas compared to existing conditions (0.6 acres within the 178-acre project area). The DEIR included a conceptual discussion of how the project will comply with BWSC and MassDEP Stormwater standards. The DEIR stated that site plans submitted as part of the BWSC Site Plan Application process will demonstrate that individual projects will treat the first one-inch of stormwater runoff and use Best Management Practices (BMPs) such as grassed swales, deep-sump hooded catch basins, particle separators, infiltration facilities. The DEIR also listed a series of green infrastructure stormwater management measures that will be investigated for implementation on a project-by-project basis. These include: vegetated bioretention areas/rain gardens, green roofs, permeable pavers in plaza areas, porous asphalt in roadway/parking spaces, pervious concrete walkways, and rainwater harvesting systems. The DEIR concluded that for the purposes of compliance with MassDEP's Stormwater Management Regulations, the project should be classified as a redevelopment project because impervious areas are not increased.

The DEIR provided a graphic depicting the location existing storm drain infrastructure that will receive stormwater flows generated by the project, including outfalls to the Charles River. The DEIR delineated sub-watershed boundaries and drainage areas within the project area. The drainage analysis included in the DEIR compared the drainage characteristics of the seven new construction projects identified in the Ten-Year Plan under existing and proposed conditions, including paved areas, roof areas, and pervious areas/green space. The summary table included in the DEIR identified the water quality volume required to be treated in accordance with BWSC requirements (the first inch), and the approximate area required for one-foot deep bioretention area/rain gardens to treat and infiltrate this volume of runoff.

Peak rates and total runoff volumes were also calculated for the Ten-Year Plan project areas during the 2-, 10-, 25- and 100-year, 24-hour rainfall events. Cumulatively, the projects will reduce peak rates by approximately 18 percent and reduce runoff volumes by 30 to 40 percent. Two projects (Athletics Department, Basketball Venue and Institutional/Mixed Use Facility and the HBS Faculty and Administrative Offices Building) will create localized increases to peak rate and total volumes of stormwater runoff.

Harvard used the BWSC drain model (an U.S. EPA Stormwater Management Model, or SWMM model) to assess the capacity of the BWSC collector drains in the project area. As part of the Science Project, Harvard discussed a future phase of work whereby the newly constructed 72-inch drain line around the perimeter of the Science Project site would be extended down Western Avenue to a new outfall to be constructed in the Charles River. The DEIR presented the results of the SWMM model to evaluate the effectiveness of this extension in relationship to the reduced size of the IMP and Ten-Year Plan projects. The DEIR concluded that extension of a 72-inch drain through campus to the Charles River will not reduce flooding in the upstream neighborhoods due to existing capacity issues within the upstream neighborhoods and is therefore not required to mitigate stormwater flows generated by Harvard's projects. The DEIR concluded that the extension of the drain line to the Charles River in conjunction with the Ten-Year Plan projects is not warranted. Harvard will plan and size the proposed Greenway to accommodate a variety of public and private infrastructure, including preserving a corridor for the construction of a drain line, if and when it is needed. The DEIR also noted that the existing 36-to 42-inch drainage system through the HBS (Shephard Brook) has sufficient capacity to

control peak rates of runoff during a 10-year, 24-hour storm under existing and proposed conditions.

The DEIR concluded that no stormwater system upgrades are necessary to accommodate predicted increased flow rates or volumes and that the Ten-Year Plan projects will not result in a new loss of stormwater treatment capacity.

The DEIR confirmed that the Ten-Year Plan projects will be required to meet the Total Maximum Daily Load (TMDL) for phosphorous and bacteria established for the Lower Charles River Watershed by MassDEP. Harvard intends to meet the TMDL to reduce phosphorous to the Charles River by 65 percent by treating the first inch of runoff from the impervious areas of developed sites with stormwater management controls such as bioretention, porous pavements, and other infiltration devices in accordance with BWSC guidelines. The DEIR did not describe how the project will meet the bacteria TMDL. The DEIR described typical components of an Operation and Maintenance plan for proposed BMPs including pervious concrete/permeable pavers/porous asphalt, rainwater harvesting, bioretention areas/rain gardens, and green roofs.

Groundwater

The DEIR confirmed that there are no existing groundwater resources within the project area and the project area is not located within the City of Boston's Groundwater Conservation Overlay District. Groundwater monitoring measurements indicate a varying depth to groundwater that ranges from a few feet below ground surface to 10 to 15 feet below ground surface.

Groundwater in localized portions of the project area have been impacted by releases of oil and hazardous material to the environment. Construction activities will be conducted in accordance with BWSC BMPs and Harvard Health and Safety Mitigation Standards. Construction dewatering will be conducted in accordance with MWRA, MassDEP, U.S. EPA, DCR, and BWSC requirements, with permits sought from appropriate authorities as applicable.

Greenhouse Gas Emissions

As directed in the Certificate on the NPC and consistent with the SRP, the DEIR included a modified GHG analysis. This included a discussion of the University's energy supply and demand, the University's approach to renewable energy evaluation, potential influence on tenant space and sustainability measures, and mobile source emissions impacts.

The DEIR described the three main Harvard-owned energy utility systems – steam, chilled water, and electricity. Steam is provided from Harvard's Blackstone Plant. The Plant has adequate production capacity for all projects in the Ten-Year Plan, but will need to extend its distribution system. A new production facility will need to be constructed along with an associated distribution system will be required for chilled water. Finally, a new interconnecting station with NSTAR will need to be constructed for the electric microgrid to power the chilled water plant and several of the proposed buildings. Harvard purchases both electricity and natural gas from local distribution companies (e.g., NSTAR and National Grid) and provides service to facilities through direct connections to the utility or through a Harvard-owned distribution

network. The DEIR noted the advantages of connecting buildings to the University's central utility systems and this was established as the default design assumption. However, in some instances a new building may be constructed out of sequence to the distribution expansion and local-building level production equipment will be used. In this case, provisions will be made to incorporate future connections to the district system when it becomes available.

The DEIR noted that in support of the near-term projects, including the Science Project, Harvard anticipates installing a new energy facility. This facility, located in the new science building on Western Avenue, will generate chilled water (for space conditioning and possibly process needs), hot water through steam or hot water heat exchangers (for space conditioning and domestic hot water heating), and contain a 13.8 kV electrical distribution substation (for distributing electric power). The facility will be supplied with high-pressure steam from the Blackstone Plant, requiring steam and condensate distribution piping/infrastructure to be extended from the One Western Avenue/Genzyme area to the new energy facility. While distribution infrastructure is expected to be located primarily on Harvard property, there will likely be instances where public ways will be crossed. The current schedule for these utility crossings is in the 2016 time frame.

The DEIR estimated the potential Allston Campus energy demand based upon the proposed program of the overall master plan, building use/type and general assumptions about energy use intensity (EUI). These estimates depict density estimated by energy type (heating, cooling and electricity) which can be used at a planning level to determine peak loads for the design and sizing of equipment.

On-site renewable energy sources, such as solar photovoltaics (PV), solar hot water (SHW), wind, ground source heat pumps, as well as combined heat and power (CHP) were described at a general planning level in the DEIR. The DEIR noted Harvard's use of PV, SHW and ground source heat pumps elsewhere on its campuses. Harvard is a Licensed Retail Supplier of electricity in Massachusetts and has certain requirements under the Renewable Portfolio Standard (RPS). Harvard's current obligation is 15.1 percent, an amount that is scheduled to increase one percent per year through 2020. The DEIR indicated that these renewable sources will be evaluated on a case-by-case basis for each Ten-Year Plan project. The DEIR also noted that it may not be economical to connect some buildings in the Ten-Year Plan to the Blackstone-based district energy system. These projects will be evaluated on a case-by-case basis for potential building-specific CHP units during their design.

The DEIR described Harvard's Green Building Standards, which apply to all capital projects, including Harvard-owned projects in Allston. One piece of these standards is that all new construction and major renovations must meet the LEED-NCv3 Gold certification requirements. The DEIR highlighted key LEED certification requirements projects are expected to meet. The DEIR summarized a wide range of strategies related to energy use, water, materials, and waste management that have been employed or could be employed to meet the Green Building Standards. Some of these strategies have been used elsewhere on campus and will be evaluated for feasibility on a project-specific basis in Allston. The DEIR also indicated that Harvard will continue to aggressively pursue water reduction and compost opportunities -

beyond those already implemented on its campuses - to fully comply with the MassDEP commercial food waste ban to take effect on July 1, 2014.

The DEIR also included a detailed stationary source GHG analysis for the Chao Center in compliance with the MEPA GHG Policy (the Policy). The Policy requires projects to quantify carbon dioxide (CO_2) emissions and identify measures to avoid, minimize or mitigate such emissions. The analysis quantifies the direct and indirect CO_2 emissions associated with the project's energy use (stationary sources) and transportation-related emissions (mobile sources). The GHG analysis evaluated CO_2 emissions for two scenarios as required by the Policy including 1) a Base Case compliant with ASHRAE 90.1-2007, Appendix G and 2) a Preferred Alternative (i.e., the Design Case) compliant with the Stretch Energy Code (SCI).[2] The analysis used the eQUEST v.3.64 modeling software to perform the GHG analysis.

The City of Boston has adopted the Stretch Code subsequent to its designation as a Green Community under the provisions of the *Green Communities Act of 2008*. Therefore, the project will be required to meet the applicable version of the Stretch Code in effect at the time of construction. The Stretch Code increases the energy efficiency code requirements for new construction (both residential and commercial) and for major residential renovations or additions in municipalities that adopt it. The current Stretch Code (SCI) includes a requirement for projects to achieve a 20 percent better energy efficiency than the State's base energy code by either meeting the standard of 20 percent better than ASHRAE 90.1-2007 Appendix G, or by using a prescriptive energy code. The project design is targeting a LEED Gold Certification and will also comply with Harvard's own sustainability requirements.

Direct stationary source CO_2 emissions included those emissions from the facility itself, such as boilers, heaters, and internal combustion engines. Indirect stationary source CO_2 emissions were derived from the consumption of electricity, heat or other cooling from off-site sources, such as electrical utility or district heating and cooling systems. Indirect mobile CO_2 emissions included those emissions associated with vehicle use by employees, vendors, customers and others.

The DEIR included a summary of modeling inputs (e.g., R-values, U-values, efficiencies, lighting power density, etc.) for energy efficiency measures modeled such as equipment, walls, ceilings, windows, lighting, HVAC units, etc. for both the Base Case and Preferred Alternative based upon the 100 percent schematic design documents. The DEIR described design mitigation measures modeled in the GHG analysis and proposed for adoption by Harvard to meet the Stretch Energy Code requirements.

[2] The current Stretch Energy Code (SCI) requires energy efficiencies of 20 percent better than American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1-2007. The SCI requires modeling of base and proposed cases based on the methodology as is defined in ASHRAE 90.1-2007-Appendix G. The Board of Building Regulations and Standards (BBRS) recently adopted International Energy Conservation Code (IECC) 2012, which will be fully effective on July 1, 2014. Accordingly, a revised Stretch Code (SCII) is expected to be proposed by the BBRS. SCII is anticipated to require energy use in new large buildings to be 12 to 15 percent below the baseline of IECC 2012 (ASHRAE 90.1-2010). The Proponent intends to obtain building permits before July 2014 using the current Massachusetts Building Code (8th edition) and as afforded by the GHG Policy, has selected the current Building Code (and related SCI) for the Base Case in the analysis.

Key energy efficiency measures include:

- A high performance envelope with additional roof insulation, wall insulation, and low-e IGU glazing units with argon gas;
- A low energy lighting system with a target of 30 percent lighting power density reduction over ASHRAE 90.1-2007 plus the incorporation of daylight and vacancy controls;
- Use of energy recovery on exhaust/ventilation air;
- Use of water-based distributed HVAC systems where possible (e.g., chilled beams) and perimeter radiation;
- Use of variable flow air and water system with both night setback and temperature reset;
- Selection of energy star equipment for the kitchen and office appliances where possible and meets program requirements; and
- Exploration of the feasibility of incorporating on-site renewable energy systems.

The DEIR also described a series of GHG reduction measures to be pursued by Harvard that were not quantifiable in the modeling process. These include, but are not limited to:

- Low-flow and high-efficiency plumbing fixtures;
- Rainwater and condensate harvesting for reuse in toilet flushing and irrigation;
- Enhanced commissioning services for building energy-related systems;
- Purchase of green power renewable energy credits (RECs) to provide a minimum of 35 percent of the building's electricity from renewable sources for the first two years of building operation; and
- Diversion of as much demolition debris and construction waste from area landfills as possible.

The DEIR discussed energy efficiency strategies that were evaluated but not incorporated into the Chao Center's schematic design. These include the use of an on-site ground source heat pump system, an on-site condensing boiler system, and installation of a 1,000-sf photovoltaic (PV) system capable of generating 12,000 kWh of electricity. While incorporation of PV is still being considered, the other evaluated on-site systems were not selected due to poor return on investment and the significant additional space requirement that is unavailable.

The Chao Center will be serviced by several utilities: electricity and natural gas for the kitchen program, campus chilled water, and campus steam. In addition, part of the domestic hot water (DHW) requirement will be provided by solar hot water collectors installed elsewhere on campus at a neighboring building (Baker Hall). The GHG analysis calculated related emissions for each building energy end-use and respective energy source. Lighting, fans, pumps, chilled water and appliances were assigned a conversion factor for grid-supplied electricity and heating energy (steam) was based on emissions factors for natural gas (and a small amount of No.6 oil) at Harvard's Blackstone Plant.

The GHG analysis for the Chao Center concluded that the Preferred Alternative will exceed the SCI requirement to reduce energy demand by greater than 20 percent (modeling

revealed a 37 percent reduction). The Preferred Alternative will reduce project-related stationary source emissions by 288 tons per year (tpy) from the Base Case total emissions of 914 tpy to a Preferred Alternative total of 626 tpy, or a 31.5 percent reduction. The GHG analysis also presented results associated with a Mitigation Alternative that included ground source heat pumps. While this alternative achieves greater energy cost savings (43 percent) than the Preferred Alternative, an increase in electricity use to power the ground source heat pumps only resulted in a minor benefit to reductions of GHG emissions (623 tpy).

The DEIR included information about Baker Hall renovations regarding existing building energy systems and proposed improvements to improve energy efficiency. According to the DEIR, Baker Hall's major energy loads are associated with domestic hot water, HVAC, plug loads and lighting. Heating, cooling and domestic hot water heating are provided from Harvard's central plant system. In 2013, Baker Hall consumed 2.4 million kBtu of electricity and 5.5 million kBtu of steam. The proposed renovations will upgrade the energy performance of each of the major energy consuming systems to meet the prescriptive requirements of the current Massachusetts Energy Code (2009 IECC). While the SCI does not apply to this renovation, energy modeling indicates that the building will exceed current stretch code requirements. The DEIR noted that renovation will include upgrades to reduce domestic hot water demand, higher-efficiency windows and insulation, new fan coils with ECM motors, new control valves, new higher-efficiency motors for pumps and fans, use of mechanical ventilation and heat recovery, installation of a modern Energy Management System, and reduced lighting power densities.

The DEIR provided a specific discussion on how Harvard works with tenants to encourage their use of, and integration with, Harvard's sustainability guidelines. For commercial tenants Harvard has established Tenant Fit-Out Requirements based on the Harvard Green Building Guidelines and the LEED Green Interior Design and Construction Guidelines. Harvard University tenants are required to meet established targets, while non-Harvard clients are strongly encouraged to consider these performance targets when preparing space for occupancy. Harvard also uses Tenant Occupancy Recommendations incorporated into the Service Level Agreement for University Tenants (non-Harvard clients are encouraged to adopt the recommendations) to implement measures that conserve energy, reduce waste, and contribute to a healthy work environment. Harvard, in partnership with the Office for Sustainability, encourages residential tenants to adopt and implement energy reduction measures through an occupant engagement program. This includes energy efficiency education during orientations and move-ins, Energy Saving Checklists in welcome packet and tenant guides, energy challenges, and energy audits. The DEIR noted that third-party tenants who develop on Harvard-owned land subject to long-term leases will be required to sign agreements that include similar language committing the project to a high level of sustainability as those agreed upon by the developer of the Barry's Corner Residential and Retail Commons Project. This project attached design guidelines to the ground lease requiring the project to comply with the City of Boston's Article 37 sustainability initiative and Harvard's Green Building Standards (achieve at leastLEED Gold Certification and participate in Level 1 Integrated Design).

Indirect mobile source emissions were analyzed using the U.S. EPA MOBILE 6.2 Mobile Source Emission Factor Model. Average vehicle idling times were based on delay times reported in the SYNCHRO intersection modeling output reports prepared as part of the traffic study. Existing 2012 study area CO_2 emissions were estimated at 25,837.7 tpy, while 2022 No-

Build study area CO_2 emissions were estimated at 29,631.5 tpy. Mobile source analysis traffic (volumes, delays, speeds) and emission factor data were developed for the adjusted: i) 2022 No-Build Case, ii) 2022 Build Case, and iii) 2022 Mitigated Build Case. The 2022 Mitigated Build Case includes traffic signal timing and phasing improvements but no physical roadway modifications. No credit was taken for the anticipated reduction in trips and vehicle miles traveled due to the proposed TDM program. Under the 2022 Build Case, the project will contribute an estimated 1,045 tpy of CO_2. The indirect mobile emissions analysis estimated that under the 2022 Mitigated Build Case, CO_2 emissions attributable to the project subsequent to the implementation of the proposed traffic mitigation measures would be reduced by 224 tpy, for a project total contribution of 821 tpy, or a 21 percent overall reduction.

The DEIR also included an assessment of direct mobile source emissions from fleet vehicles associated with the Ten-Year Plan projects. According to the DEIR, Harvard currently has fleet vehicles serving its campus in Allston for building and grounds maintenance, mail, recycling, and campus security. Many of these vehicles already include GHG reduction attributes either through the use of biodiesel, hybrid, or electric vehicles. Harvard does not anticipate increasing its vehicle fleet to address campus expansion, with the exception of the new proposed shuttle bus route. In 2016, Harvard will establish a new shuttle route between Barry's Corner and Harvard Square. The DEIR presented assumptions about service frequency and length, estimating a total of 89,000 VMT per year at a minimum. The DEIR evaluated potential GHG emissions associated with this shuttle route using standard diesel buses and B20 biodiesel. Use of B20 biodiesel buses would reduce CO_2 emissions from 2,258 tpy to 1,834 tpy, a reduction of 424 tpy.

The DEIR also noted that Harvard will adopt climate change adaptation procedural guidelines and climate change resilience strategies for the development of the Allston campus. According to the DEIR, Harvard intends to conduct a detailed Allston campus-wide vulnerability assessment and adaptation plan, and ensure that all new development is resilient to the impacts of climate change.

Historic and Archaeological Resources

The DEIR identified and described each property within or adjacent to the Allston Campus listed in the State and National Registers of Historic Places and/or included in the Inventory of Historic and Archaeological Assets of the Commonwealth (the Inventory). The following properties are located in the State and National Registers of Historic Places:

- Charles River Reservation Parkways/Soldiers Field Road - Boston;
- Charles River Basin Historic District – Boston and Cambridge;
- Harvard Stadium – Boston;
- Newell Boathouse – Boston; and
- 1767 Milestone – Boston.

Two properties are included in the Inventory: 1) the Harvard Business School – Athletic Fields Area and 2) the David L. Barrett School.

As part of the Ten-Year Plan, Harvard intends to renovate and construct an addition to Harvard Stadium (listed in the State and National Registers) and replace Kresge and Burden Hall, which are part of the HBS-Athletic Facilities Area included in the Inventory. The larger project area is adjacent to the Charles River Basin Historic District. The DEIR provided a preliminary discussion of each of the Ten-Year Plan projects relative to their potential to impact historic resources. The DEIR included a commitment by Harvard to work cooperatively with the Massachusetts Historical Commission (MHC) and the Boston Landmarks Commission (BLC), as required, to ensure that potential impacts to historic resources are considered and appropriately mitigated. Harvard will file Project Notification Forms (PNFs) with the MHC for each individual project that may impact historic resources and for which there is any associated State Financial Assistance or licensing in accordance with M.G.L. c.9, ss.26-27C and 950 CMR 71.00. For projects that involve demolition of structures that are 50 years or older, an Article 85 application will be filed with the BLC in accordance with the City of Boston's Demolition Delay Ordinance. A PNF was submitted to the MHC for the demolition of Kresge Hall and the construction of the Chao Center in August 2013. The consultation process in accordance with State Register Review (950 CMR 71.00) is ongoing.

As part of previous master planning processes, Harvard retained the Public Archaeology Lab, Inc. (PAL) to undertake an archaeological sensitivity assessment. The DEIR provided a summary of the sensitivity assessment for Ten-Year Plan projects. All of the project sites are in areas sensitized as "moderate" with the caveat that this sensitivity is mostly in open area and some courtyards. Three of the Ten-Year Plan projects are proposed in open areas – the HBS Faculty and Administration Office Building at Ohiri Field, the Hotel and Conference Center in an area that is currently a surface parking lot, and a new batting cage in the existing athletic fields. The DEIR indicated that Harvard intends to undertake additional archaeological review, consistent with PAL recommendations, as more detail on the ground-disturbing nature of each project is available.

Hazardous Waste

The project area contains properties currently or historically subject to the provisions of the Massachusetts Contingency Plan (MCP) (310 CMR 40.0000). The DEIR included a list of the Release Tracking Numbers (RTNs) associated with the Ten-Year Plan and listed their current status and responsible party per the MCP. The DEIR contained a map identifying known contamination sites in the project area. CSX Transportation Corporation (CSXT) is completing a Phase II Comprehensive Site Assessment under the MCP for the property located south of Western Avenue at an approximate street address of 100 Western Avenue. The Disposal Boundary Site extends further south of the IMP boundary. Contamination had been found in both soil and groundwater at the Disposal Site.

The DEIR described the potential for additional regulated sites to be encountered during construction, noting that this area of Allston was filled with "urban fill" consisting of coal, ash, debris and other materials. Urban fill, along with the past industrial use of the property, may result in the discovery of compounds regulated under the MCP above reportable concentrations. The DEIR also identified current sources of contamination to groundwater in the IMP Area from upgradient sources. To mitigate potential soil and groundwater contamination impacts, Harvard

construction projects take into account the likely need for urban fill disposal, construction dewatering treatment, building design changes, and underdrain groundwater treatment. Harvard will conduct pre-characterization studies prior to the start of construction to assess potential remediation requirements. As determined by Harvard's Licensed Site Professional (LSP) remediation is implemented to achieve a condition of No-Significant Risk. Potential construction techniques to achieve this status may include the use of vapor barriers and sub-slab depressurization systems, treatment of both construction dewatering and permanent building dewatering before discharge, and locating stormwater infiltration basins away from areas of known groundwater contamination.

Construction Period

Harvard will develop an Institutional Construction Management Plan (ICMP) to coordinate the preparation and implementation of the individual project CMPs. The DEIR identified a number of principles and approaches to construction management that will guide the CMPs and construction period mitigation. These include communication; construction work hours; public safety, staging and access; construction worker transportation; construction truck routes and deliveries; construction employment; environmental mitigation; stormwater management; air quality; noise; construction waste; protection of utilities; and rodent control.

As part of the IMP process, Harvard identified a location (the Construction Support Area (CSA) for a potential centralized area for construction-related uses, including truck layover, materials storage, worker parking, and temporary support structures. In addition to the CSA, some construction staging and material laydown may occur within each of the specific project sites and at remote facilities. The main route for construction truck access will be via the Massachusetts Turnpike to the Soldiers Field Road access road to Western Avenue. Trucks will be prohibited from using local neighborhood streets to arrive or depart from the site.

The project will comply with MassDEP's Solid Waste and Air Pollution Control regulations, pursuant to M.G.L. c.40, §54. Construction work will comply with the City of Boston's Noise Ordinance. Harvard requires contractors to meet Tier 3 and Tier 4 emissions standards for non-road construction equipment. If specific equipment does not meet those standards, the contractor is required to retrofit the equipment using after-engine emissions controls such as oxidation catalysts or diesel particulate filters to meet the standard. Harvard requires contractors to develop a Waste Management Plan identifying the types and volumes of construction and demolition material, and solid waste expected to be recycled, reused, and disposed during the course of the project; method(s) of collection and transportation of materials off-site; and the facilities where the materials will be process and/or disposed.

The DEIR generally described measures to be implemented for each project to mitigate construction-period stormwater impacts. For projects that will impact greater than one acre, a Stormwater Pollution Prevention Plan (SWPPP) will be prepared in accordance with NPDES Construction General Permit requirements. Erosion control measures, such as siltation control fencing, construction entrance/exit stations, and catch basin inserts will be used near soil stockpiles, on-site storage and staging areas, debris and recycling stockpiles, cut and fill slopes, and other stripped and graded areas.

SCOPE

General

The FEIR should follow Section 11.07 of the MEPA regulations for outline and content, as modified by this scope.

Project Description and Permitting

The FEIR should include a detailed description of the project and describe any changes to the project since the filing of the DEIR. The FEIR should include site plans (updated as warranted) for existing and post-development conditions at a legible scale (80-scale or larger) clearly identifying access roadways and internal driveways (and associated widths, lane configurations, etc.), transit connections (public and Harvard shuttle), pedestrian and bicycle accommodations, publically accessible open space, surface and structured parking, and stormwater, wastewater, and water supply infrastructure for each individual project site identified in the Ten-Year Plan. The DEIR provided minimal site-level information for the majority of projects within the Ten-Year Plan. The FEIR should provide more detailed site plans so that a determination can be made regarding the submission of a Project Commencement Notice (PCN) for certain components of the Ten Year Plan per the terms of the SRP. MEPA.1 MEPA.2 MEPA.3

The FEIR should also include updated conceptual plans at a legible scale for any proposed transportation improvements that clearly identify lane widths, expanded areas of pavement or removal of medians/open space, traffic signals, pedestrian, bicycle and transit accommodations, wetland resource areas and c.91 jurisdiction (if applicable), stormwater management infrastructure, and proposed easements or right-of-way acquisitions. This information is necessary to confirm that adequate area is available to ensure the viability of proposed infrastructure improvements and transportation mitigation measures. MEPA.4

The FEIR should include also a discussion of permitting requirements associated with the project and how the project will be constructed in accordance with applicable regulatory performance standards. MEPA.5

Land

The FEIR should include commitments by Harvard to meaningfully advance the establishment of the Greenway as a critical piece of the proposed open space network during the Ten-Year Plan. The FEIR should clarify what portions of the proposed Greenway will be constructed in conjunction with specific Ten-Year Plan projects and incorporate phased implementation of the Greenway into the mitigation commitments and draft Section 61 Findings for the project. The FEIR should include a commitment to utilize the Greenway as both a pedestrian and bicycle connection and as a stormwater management feature. MEPA.6

Transportation

The FEIR should include a revised and updated transportation study prepared in conformance with the *EEA/MassDOT Guidelines for EIS/EIR Traffic Impact Assessment*. The
MEPA.7 study area should be expanded as requested by DCR to include the following DCR parkways upstream (north and west) of the Eliot Bridge:

- Gerry's Landing Road;
- Fresh Pond Parkway;
- Soldiers Field Road; and
- Nonantum Road

Harvard should meet with DCR to discuss the recommended expansion of the
MEPA.8 transportation study area, proposed signal timing and coordination efforts at DCR-jurisdictional intersections, and the proposed use of DCR roadways for construction routes. Harvard should discuss the outcome of this coordination in the FEIR.

MEPA.9 The FEIR should include sufficiently detailed conceptual plans (preferably 80-scale) for any proposed roadway improvements (MassDOT, DCR, City of Cambridge or BTD) in order to verify the feasibility of constructing such improvements. The conceptual plans should show proposed lane widths and offsets, layout lines and jurisdictions, and the land uses (including access drives and loading areas) adjacent to areas where improvements are proposed. These conceptual plans should demonstrate that improvements are consistent with a Complete Streets design approach.

MEPA.10 The FEIR should demonstrate how students, faculty, staff and neighborhood residents would be able to safely cross Soldiers Field Road to the Charles River in the 2020 Build with Mitigation Condition. The FEIR should specifically discuss opportunities to create
MEPA.11 neighborhood gateways to the Charles River Reservation, including a signalized pedestrian crossing at Everett Street and Herter Park and construction of Longfellow Path. The FEIR should
MEPA.12 clarify during what stage of the Ten-Year Plan the Longfellow Path will be constructed, whether this connection to the River includes bicycle accommodations, and how users will make safe and efficient connections to the river itself on the opposite side of Soldiers Field Road from the terminus of Longfellow Path.

The DEIR indicated that Harvard has been working with the City of Boston and the Allston community to fund a program of significant community improvements, several of which
MEPA.13 would improve pedestrian and bicycle access to the Charles River. For informational purposes, the FEIR should describe what types of improvements are under consideration and how these may complement the bicycle and pedestrian improvements specifically presented to mitigate the impacts of the Ten-Year Plan.

MEPA.14 The FEIR should identify the amount of bicycle parking required to meet BTD requirements on a site-by-site basis and describe how bicycle parking will be provided in a comprehensive manner throughout the Allston Campus. The FEIR should include a commitment

to provide sheltered bicycle storage and employee facilities such as changing rooms and showers in each building.

The FEIR should discuss how the proposed pedestrian and bicycle network improvements and connections to the Charles River Reservation are consistent with the Charles River Basin Connectivity Study. The FEIR should demonstrate that the proposed bicycle and pedestrian improvements are consistent with the proposed design of MassDOT's bridge reconstruction projects. MEPA.15

The FEIR should update the parking study to indicate the location of on-street and private parking spaces within the IMP Area. MEPA.16 The FEIR should discuss why staff and faculty parking rates are lower than those for students, if subsidies are provided to staff and faculty, and how price restructuring may reduce overall parking demand on the Allston Campus. MEPA.17 The FEIR should discuss the relationship of the amount of overall parking provided within the Allston Campus and how this is consistent with the mode share assumptions used as part of the transportation study. MEPA.18

The FEIR should compare Harvard's mode share goals with those currently achieved on its Cambridge Campus and if different, explain why divergent goals are proposed for the Allston Campus. MEPA.19 The FEIR should address concerns raised by the City of Cambridge regarding implementation of expanded shuttle service between Harvard's Allston and Cambridge campuses. MEPA.20 As requested by MassDOT, the FEIR should clarify assumptions regarding the Harvard Shuttle (i.e., hours of operation, etc.) and specifically discuss how this service may be coordinated with other public transportation services in the study area. MEPA.21 The FEIR should discuss specific mitigation measures to offset increased demand on the MBTA bus system (particularly Route 66) through capacity enhancements or physical improvements. The FEIR should include a commitment to work with the MBTA to develop details and designs for physical improvements or enhancements to service operations.

The DEIR noted that a traffic signal warrant analysis will be conducted for "Academic Way" at Western Avenue intersection prior to installation to confirm that warrant(s) are fully met. MEPA.22 As signalization of this intersection is a key mitigation measure in the Ten-Year plan, the FEIR should confirm if this signal will still be installed if the traffic signal warrant is not met and how this may affect the overall operations of other study area intersections.

The FEIR should provide additional discussion of how the proposed installation of video detection equipment at the Cambridge Street at Franklin Street and Harvard Avenue intersection is designed to improve either operations or safety. MEPA.23

As noted by MassDOT, capacity and operational issues occur at several intersections along Soldiers Field Road and the river bridges under 2022 Build and 2022 No-Build Conditions. However, the analysis demonstrates that traffic associated with the Ten-Year Plan measurably degrades operations at these locations. MEPA.24 MassDOT has requested that as part of the FEIR, Harvard propose mitigation measures that may include a combination of geometric improvements, signal timing improvements, pavement marking and lane assignment adjustments, and specific TDM measures to avoid degradation of the existing condition. Harvard

MEPA.25 should continue to work with MassDOT, DCR and the City of Boston to ensure that the Ten-Year Plan project will not exacerbate existing congestion issues near the MassPike Exit 18 interchange.

The DEIR identified potential improvements to the Western Avenue and River Street Bridge intersections as part of the 2022 Build with Mitigation condition. These bridges and their adjacent intersections are currently slated for improvements by MassDOT in Summer 2014. These intersections generally will continue to operate at LOS E or F despite the proposed
MEPA.26 improvements. The FEIR should provide an update on how the proposed mitigation by Harvard at the Western Avenue at Soldiers Field Road westbound on-ramp (restoration of eastbound approach lane on Western Avenue with a No Turn on Red designation) may be incorporated into MassDOT's construction design.

The FEIR should discuss the potential adoption of additional TDM measures, as
MEPA.27 identified in the CRWA/MAPC, City of Cambridge and MassDOT comment letters, or if not selected, the FEIR should explain why a specific TDM measure was not deemed feasible. As noted by MassDOT, the evaluation of a TDM program should not be limited to the new travel demand associated with the Ten-Year Plan at the Allston Campus, but also consider University-wide TDM measures to maximize the potential use of healthy transportation modes. The FEIR should provide clear implementation commitments including funding for TDM measures deemed
MEPA.28 feasible and necessary to sustain and/or increase mode usage over time to ensure a balanced and functional transportation system in Allston. The FEIR should clarify which elements of the TDM program applies to which category of potential user (i.e., students, only faculty and staff, etc.).
MEPA.29 The FEIR should identify how many EV/LEV parking spaces will be established in conjunction with the Ten-Year Plan and how the amount of EV/LEV spaces will be determined by the
MEPA.30 University. The FEIR should also discuss University (or Hubway) criteria associated with expansion of Hubway services within the area.

The FEIR should include a draft Transportation Monitoring Plan to ensure that mode
MEPA.31 share goals are met. This monitoring program should address all modes and transit (SOV, bicycle, pedestrian, transit, Harvard Shuttle) and have measureable milestones to allow for an evaluation of mode share goal compliance and other transportation objectives. The Transportation Monitoring Plan should clearly identify mode share goals, strategies for achieveving these goals, components of a monitoring program (i.e., frequency, data sets, distribution, etc.), and contingency/mitigation measures if goals are not achieved. I strongly encourage Harvard to commit to publicly share the results of the monitoring program. Harvard should consider the recommendations made in the MassDOT and CRWA/MAPC letters when preparing this plan. The Transportation Monitoring Plan should include commitments to re-evaluate the expansion of the Harvard Shuttle to serve Harvard's Longwood Campus and/or the proposed MBTA commuter rail station near Everett Street (Boston Landing).

Water and Wastewater

As directed by MassDEP, Harvard should meet with MassDEP and the BWSC prior to
MEPA.32 submission of the FEIR to develop an I/I removal plan capable of meeting MassDEP's Policy on Managing Infiltration and Inflow in MWRA Community Sewer Systems (BRP 09-01) and with

BWSC policy and regulations. The FEIR should describe this plan and discuss its efficacy in mitigating the potential impacts of new project-related wastewater flows. It is possible that a significant I/I removal project may be identified, and that the related I/I exceeds the removal rate for early phase wastewater flows. The proposed I/I removal plan should specifically address how this situation will be managed to ensure Harvard meets its I/I removal obligations.

The BWSC comment letter disagrees with the findings in the DEIR that extension of the 72-inch drain line constructed as part of the Science project through campus (down Western Avenue to a new outfall at the Charles River) will not reduce flooding in the upstream neighborhoods due to existing capacity issues within the upstream neighborhoods. Recent analysis conducted by the BWSC using the SWMM model with updated information (improvements to the North Harvard Street drainage network) demonstrated that the extension of the North Harvard Street and Western Avenue storm drains would significantly reduce flooding. Harvard should meet with the BWSC to discuss the results of the BWSC analysis and provide an update in the FEIR that clarifies if this mitigation measure will be implemented as part of the Ten-Year Plan. MEPA.33

Wetlands, Waterways, and Tidelands

The FEIR should confirm that proposed off-site traffic or bicycle/pedestrian improvements will not impact areas within c.91 jurisdiction. Furthermore, the FEIR should provide additional detail regarding the renovation of Soldiers Field Park Housing. Given the large scale of the graphic included in the EENF it is difficult to discern if this project may require work within c.91 jurisdictional areas. The FEIR should describe the nature of these proposed renovations in greater detail to ascertain the potential applicability of c.91 licensing requirements for either work on the building itself or impacts during the construction period. I encourage the Proponent to consult directly with the MassDEP Waterways Program regarding this issue. If this project is located within c.91 jurisdictional areas, the FEIR should include graphics that overlay key c.91 jurisdictional criteria (e.g., Historic Mean High and Mean Low Water Marks, Ordinary High Water Marks, filled tidelands, landlocked tidelands, etc.) on top of conceptual plans depicting the areas of proposed construction. If applicable, the DEIR should include information demonstrating how each project alternative will be designed to meet the c.91 licensing criteria. MEPA.34 MEPA.35

Stormwater

The FEIR should include a master planning level stormwater analysis, including calculations, conceptual BMP designs, and hydrologic modeling data to assist in the evaluation of the proposed stormwater management system for compliance with MassDEP standards. The FEIR should include supporting data and site plans to demonstrate that sufficient space is available within each proposed drainage area to meet the rain garden/bioretention space requirements assumed in the drainage analysis. This analysis should confirm that the conceptual designs include sufficient measures capable of conveying and treating estimated stormwater flows generated by the project on both a cumulative and individual project site basis. Harvard has committed to provide detailed drainage studies for individual projects as part of the BWSC approval process. However, a conceptual level of information is required in the FEIR to ensure that appropriate BMPs are considered, sufficient area is available to implement a compliant MEPA.36 MEPA.37

drainage system, and to confirm that the stormwater management system is an integral part of
MEPA.38 overall design and not an after-thought. Critical to this analysis is a clear demonstration of how the proposed Greenway will interface with the adjoining drainage areas for the Ten-Year Plan projects.

Furthermore, the FEIR should address why peak rates of runoff and volumes are
MEPA.39 predicted to increase from existing conditions at the proposed Mixed Use/Basketball Facility and the HBS Faculty and Administrative Office project sites and whether additional mitigation measures are necessary to ensure compliance with MassDEP's Stormwater Management
MEPA.40 Regulations. The FEIR should describe how the proposed BMPs will facilitate Harvard's compliance with the pathogen TMDL established for this portion of the Charles River. The FEIR
MEPA.41 should include a commitment by Harvard to work collaboratively with DCR, MassDEP and the City of Boston during the advancement of stormwater system design to ensure that the potential impact of additional stormwater flows to the Charles River will meet applicable water quality standards.

MEPA.42 As requested by MassDEP, stormwater mitigation measures described in the DEIR should be amended to reflect the extensive use of LID BMPs. These commitments should provide sufficient detail to understand their extent of implementation (e.g., sizes of green roofs or rainwater harvesting systems, number and sizes bioretention areas/raingardens) in the context of the design volume of runoff to be captured and treated by each LID measure.

Greenhouse Gas Emissions

MEPA.43 The FEIR should include an updated GHG stationary source analysis prepared in accordance with the GHG Policy and consistent with the methodology used in the DEIR for the Chao Center. The FEIR should revise the GHG quantifications to reflect the most current ISO-
MEPA.44 NE average grid emission factor of 728 lbs/MWh. The FEIR should provide responses and supporting documentation to address the comments regarding the Chao Center submitted by the
MEPA.45 Department of Energy Resources (DOER). The FEIR should provide additional detail on the potential energy-use reductions associated with at PV system on the Chao Center (i.e., system size, percentage of overall energy demand, associated GHG reductions). The FEIR should
MEPA.46 quantify the amount of domestic hot water (DHW) that will be provided by the solar hot water collectors installed on Baker Hall, and how this service may be impacted by the future renovation of Baker Hall.

MEPA.47 The FEIR should continue to explore additional means to reduce project-related GHG emissions based upon suggestions provided in DOER and MassDEP comment letters in an effort to achieve additional GHG reduction measures beyond those calculated in the DEIR. The FEIR
MEPA.48 should provide a clear summary of GHG-reduction measures to be adopted as part of the Chao Center project, including a summary table of predicted energy use, GHG emissions in tons per year of CO_2 for stationary and mobile sources, and a commitment to provide a separate self-certification document.

In some instances, recommendations made by DOER should apply to all future GHG analyses submitted in accordance with the SRP. Harvard should make note of these suggestions

to ensure that future filings are sufficiently complete to allow for a meaningful assessment of GHG reduction measures.

The FEIR should also provide additional information on the overall energy infrastructure associated with the Harvard Allston Campus. I hereby incorporate by reference the comment letters submitted by DOER into the FEIR scope, as the information requested will provide a clear understanding of Harvard's existing and proposed energy infrastructure. The FEIR should also note any potential environmental impacts associated with expansion of energy infrastructure to the Allston Campus (i.e., river crossings, work in c.91 jurisdictional areas, construction period impacts, etc. MEPA.49 MEPA.50

Finally, the FEIR should provide describe how the University encourages non-Harvard tenants to adopt sustainable design and operational measures. While Harvard has clear requirements for Harvard tenants, it remains unclear what measures will be taken by the University to ensure that fit-out of non-Harvard tenant space will be consistent with modeled GHG emissions (mobile and stationary). MEPA.51

Climate Change Adaptation

The DEIR noted that Harvard proposes to adopt climate change adaptation procedural guidelines and climate change resilience strategies for the development of the Allston campus. The FEIR should provide additional information on climate change adaptation measures proposed by the University and include an update on the statute of the proposed vulnerability assessment. MEPA.52

I strongly encourage Harvard to consider the potential impacts to the project site associated with predicted sea level rise, increased frequency and intensity of precipitation events and extreme heat events on the Ten-Year Plan projects and associated infrastructure (including, but not limited to, stormwater management system design and sizing). To assist in the evaluation of climate change resiliency and adaptation measures the Proponent should review EOEEA's *Climate Change Adaptation Report* (September 2011) (http://www.mass.gov/eea/docs/eea/energy/cca/eca-climate-adaptation-report.pdf) and the Office of Coastal Zone Management's (CZM) December 2013 report entitled, "*Sea Level Rise: Understanding and Applying Trends and Future Scenarios for Analysis and Planning*" (http://www.mass.gov/eea/docs/czm/stormsmart/slr-guidance-2013.pdf). The City of Cambridge Office of Community Development has also undertaken studies of climate change impacts that may assist in Harvard's overall evaluation of climate change impacts. MEPA.53

The FEIR should discuss the potential impact of a severe future storm event that considered not only the impact of predicted sea level rise and higher storm tides on the series of downstream dams along the Charles, but increased stormwater runoff from the upstream Charles River basin and how the intersection of these two conditions may impact the Allston Campus. MEPA.54

The FEIR should demonstrate that the project includes ecosystem-based adaptation measures and proactive site design to promote climate change resiliency and adaptation. The FEIR should discuss how the design of building entry and exit points, roadways, public and MEPA.55 MEPA.56

MEPA.57 private on-site utilities, and first floor uses have considered potential climate change impacts. The FEIR should identify site elements designed to reduce the impact of extreme heat events and limit the potential impact of more frequent and intense storm precipitation. The Proponent should
MEPA.58 discuss how on-site renewable energy or district energy systems may provide added resiliency during periods of power loss during storm events. Storm response actions and resiliency
MEPA.59 measures should be incorporated into University housing and building occupancy information, leasing agreements or Tenant Manuals and be considered as part of guidance related to tenant fit-out of commercial space, particularly those located on the lower floors.

Historic and Archaeological Resources

Harvard has committed to file Project Notification Forms (PNFs) with the MHC for each individual project with the Ten-Year Plan as required by M.G.L c.9, ss. 26-27C and 950 CMR 71). The MHC comment letter noted specific concern regarding potential historic impacts associated with the Harvard Stadium Addition/Renovation project and the projects located within
MEPA.60 the HBS campus. The FEIR should describe how design of the Ten-Year Plan elements will consider the historic setting and characteristics of these historic assets and/or discuss how historic resources are integrated into Harvard design standards.

The DEIR noted the completion of an archaeological sensitivity assessment by PAL. The MHC comment letter indicates that it had previously recommended the completion of an archaeological reconnaissance survey (950 CMR 70) to identify specific project locations where significant historic or prehistoric archaeological resources are predicted, so that an intensive (locational) survey could be conducted in areas that are determined to be archaeologically sensitive. It is unclear from the DEIR or the MHC comment letter if the studies performed to date by PAL meet MHC criteria. The MHC has requested that an archaeological reconnaissance
MEPA.61 report be submitted to MHC for review and comment as soon as possible. Harvard and PAL should work with MHC to advance archaeological studies in the Ten-Year Plan area as necessary to meet applicable MHC regulations. The FEIR should provide an update on the status of archaeological investigations and identify if further study or potential mitigation may be required in compliance with 950 CMR 70).

Hazardous Waste

MEPA.62 The FEIR should provide an update on the status of the Phase II Comprehensive Site Assessment being undertaken by the CSX Transportation Corporation for the property at 100 Western Avenue (if action has been completed). The FEIR should also provide information
MEPA.63 regarding potential MCP-regulated actions or proposed site assessments at the proposed CSA.

Construction Period

The DEIR noted the expansion of the IMP area to include a Construction Staging Area
MEPA.64 (CSA). The FEIR should provide existing conditions data on the CSA (i.e., area, impervious area, stormwater management, hazardous materials, etc.) and describe how this area will be used
MEPA.65 to support on-going construction of the Ten-Year Plan. The FEIR should discuss how the CSA will be accessed by construction-related traffic, estimated construction-related traffic trips, and

how it relates to truck traffic routes and intersection operations identified in the DEIR. The FEIR should indicate if the CSA would be used for parking for construction workers and equipment. Finally, the FEIR should identify BMPs to be used by contractors in the CSA to ensure effective stormwater and hazardous materials management. MEPA.66 MEPA.67

The FEIR should provide additional information on the "North Allston Haul Road" proposed as a potential construction truck connection. The DEIR noted that this concept is under evaluation. The FEIR should identify its conceptual location, its potential benefits or conflicts with adjacent uses, and whether Harvard intends to implement this construction period mitigation measure. MEPA.68

The FEIR should generally describe how traffic-related construction period impacts will be mitigated, monitored and coordinated with other infrastructure projects, most notably those associated with the MassDOT ABP projects and the New Brighton Landing project, which includes major modifications to intersections just west of the IMP area. Potential triggers for remedial action based upon construction period monitoring result should also be provided in a conceptual manner. MEPA.69

The FEIR should provide a conceptual plan clarifying pedestrian and bicycle routes during each Ten-Year Plan project that demonstrates the maintenance of sufficient pedestrian and bicycle routes within and through the project area and neighborhood to key destinations such as MBTA bus stops, Harvard's Cambridge Campus, public parks and open space (including the Paul Dudley White Bike Path), and neighborhood uses along Western Avenue and North Harvard Street. MEPA.70

The DEIR should describe potential construction period dewatering requirements, discuss how dewatering will be conducted in a manner consistent with MWRA, MassDEP and/or BWSC regulations/guidelines, and identify any necessary permits. MEPA.71

Mitigation

The FEIR should include a separate chapter summarizing proposed mitigation measures. This chapter should also include draft Section 61 Findings for each State Agency that will issue permits for the project (i.e., MassDEP Sewer Connection, MWRA). The FEIR should contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation. While local roadway improvements may be memorialized in future TAPAs with the City of Boston, the FEIR should clearly indicate the implementation of mitigation measures based upon project phasing, either tying mitigation commitments to specific building projects, overall project square footage, or traffic/wastewater demand or thresholds, to ensure that measures are in place to mitigate the anticipated impact associated with each development phase. The FEIR should describe Harvard's contribution to specific infrastructure upgrades, if any, proposed by MassDOT, the MBTA, DCR, etc. in the IMP Area. The FEIR should include a conceptual long-range maintenance plan for proposed infrastructure improvements, including identification of responsible parties, to ensure adequate upkeep of these project-related improvements. MEPA.72 MEPA.73 MEPA.74

In accordance with the terms of the SRP established for this project, the Proponent will submit a GHG analysis for each individual project for approval by MEPA prior to the issuance of any State permits for such projects, unless this requirement is specifically waived by the Secretary. Each GHG analysis will require the submission of a self-certification document.

To ensure that all GHG emissions reduction measures adopted by the Proponent in the Preferred Alternative are actually constructed or performed, I require proponents to provide a self-certification to the MEPA Office indicating that all of the required mitigation measures, or their equivalent, have been completed. Specifically, I will require, as a condition of a Certificate approving an FEIR (or Supplemental FEIR if necessary), that following completion of
MEPA.75 construction the Proponent provide a certification to the MEPA Office signed by an appropriate professional (e.g., engineer, architect, transportation planner, general contractor) indicating that the all of the mitigation measures proposed in the FEIR have been incorporated into the project. Alternatively, the Proponent may certify that equivalent emissions reduction measures that collectively are designed to reduce GHG emissions by the same percentage as the measures outlined in the FEIR, based on the same modeling assumptions, have been adopted. The certification should be supported by plans that clearly illustrate where GHG mitigation measures have been incorporated. For those measures that are operational in nature (i.e. TDM) the Proponent should provide an updated plan identifying the measures, the schedule for implementation and how progress towards achieving the measures will be obtained. The commitment to provide this self-certification in the manner outlined above should be incorporated into the draft Section 61 Findings included in the FEIR.

Responses to Comments

MEPA.76 The FEIR should contain a copy of this Certificate and a copy of each comment letter received. In order to ensure that the issues raised by commenters are addressed, the FEIR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended to, and shall not be construed to, enlarge the scope of the FEIR beyond what has been expressly identified in this certificate.

Circulation

MEPA.77 The Proponent should circulate the FEIR to those parties who commented on the EENF, the NPC and/or the DEIR, to any State Agencies from which the Proponent will seek permits or approvals, and to any parties specified in section 11.16 of the MEPA regulations. A copy of the FEIR should be made available for review at the Allston branch of the Boston Public Library. To save paper and other resources, Harvard may circulate copies of the FEIR to commenters other than State Agencies in CD-ROM format, although Harvard should make available a reasonable number of hard copies, to accommodate those without convenient access to a computer to be distributed upon request on a first come, first served basis. Harvard should send a letter accompanying the CD-ROM indicating that hard copies are available upon request, noting
MEPA.78 relevant comment deadlines, and appropriate addresses for submission of comments. I recommend that the FEIR be posted in an online format on a Harvard University-related website. Preparation of the FEIR should also include participation in the public process program agreed
MEPA.79 upon by Harvard in the 2013 SRP.

February 14, 2014
Date

for Richard K. Sullivan Jr.

Comments received:

02/06/2014	Boston Water and Sewer Commission
02/07/2014	Department of Conservation and Recreation
02/07/2014	Richard C. Rossi, Cambridge City Manager
02/07/2014	Massachusetts Department of Transportation
02/07/2014	Stevan Goldin
02/07/2014	Massachusetts Historical Commission
02/07/2014	Massachusetts Water Resources Authority
02/07/2014	Charles River Watershed Association and the Metropolitan Area Planning Council (joint letter)
02/07/2014	Massachusetts Department of Environmental Protection - NERO
02/13/2014	Department of Energy Resources

RKS/HSJ/hsj

SECRETARY'S CERTIFICATE ON THE DRAFT EIR

MEPA.1 **Include a detailed description of the project and describe any changes to the project since the filing of the DEIR.**

Chapter 1, Project Description, includes an updated and current description of the IMP projects.

MEPA.2 **Include site plans for existing and post-development conditions at a legible scale (80-scale or larger) clearly identifying access roadways and internal driveways, transit connections (public and Harvard shuttle), pedestrian and bicycle accommodations, publically accessible open space, surface and structured parking, and stormwater, wastewater, and water supply infrastructure for each individual project site identified in the Ten-Year Plan.**

Chapter 1, Project Description, includes an updated and current description of the IMP projects. There are only two projects – the Chao Center and the renovation of Baker Hall – for which detailed design information is available and existing and proposed conditions site plans for those two projects are included in Chapter 1.

Through the Special Review Procedure, Harvard is required to file a Project Commencement Notice for each project in the IMP. As appropriate, each of the Project Commencement Notices will include site plans for existing and post-development conditions for each project.

MEPA.3 **Provide more detailed site plans so that a determination can be made regarding the submission of a Project Commencement Notice (PCN) for certain components of the Ten Year Plan per the terms of the SRP.**

Chapter 1, Project Description, includes detailed site plans for the two projects – the Chao Center and the renovation of Baker Hall – for which detailed design information is available.

MEPA.4 **Provide updated conceptual plans at a legible scale for any proposed transportation improvements that clearly identify lane widths, expanded areas of pavement or removal of medians/open space, traffic signals, pedestrian, bicycle and transit accommodations, wetland resource areas and c.91 jurisdiction, stormwater management infrastructure and proposed easements or rights-of-way acquisitions.**

The Ten-Year Plan includes four new streets: "South Campus Drive" (formerly identified as Smith Field Drive), "Ivy Lane" (formerly known as Grove Street), "Academic Way," and "Science Drive." The 2013 IMP organized these streets within the framework of the Long-term street typology that is shown in Figure 15 and, as shown in Figure 16, provided guidance for the future design of these roadways consistent with Boston's Complete Streets Guidelines. The FEIR is seeking approval for two projects – the Chao Center and

the Baker Hall Renovation – that do not require the construction of new streets. The design of the new streets will be coordinated with the City of Boston. Future Project Commencement Notices will provide additional information when more detail is available.

MEPA.5 **Include a discussion of permitting requirements associated with the project and how the project will be constructed in accordance with applicable regulatory performance standards.**

Chapter 1, Project Description, includes a list of the permits that will be required for the implementation of the IMP projects.

MEPA.6 **Include commitments to meaningfully advance the establishment of the Greenway as a critical piece of the proposed open space network during the Ten Year Plan. Clarify what portions of the proposed Greenway will be constructed in conjunction with specific Ten Year Plan projects and incorporate phased implementation of the Greenway into the mitigation commitments and draft Section 61 Findings. Include a commitment to utilize the Greenway as both a pedestrian and bicycle connection and as a stormwater management feature.**

The IMP includes the Greenway in the Long-Term Vision context rather than the Ten-Year Plan because the timeline for actual completion of the green space relies upon a number of factors, including the ability to access and have control of the entirety of the land. Before CSX Transportation (the current holder of the exclusive railroad easement encumbering the Allston Landing North area) may transfer control of this land to Harvard, CSX Transportation must complete agreed-upon environmental testing and remediation. This work is underway but a timeline for its completion is not finalized.

Harvard will work with the City of Boston to develop an implementation schedule for the Greenway. The Ten-Year Plan includes elements of the Greenway that are adjacent to the IMP projects.

More information on the Greenway, its implementation, and its features is presented in Chapter 1, Project Description.

MEPA.8 **Meet with DCR to discuss the recommended expansion of the transportation study area, proposed signal timing and coordination efforts at DCR-jurisdictional intersections, and the proposed use of DCR roadways for construction routes. Discuss the outcome of this coordination in the FEIR.**

As reported in Chapter 2, Harvard met with DCR on April 9, 2014, and the additional analysis that is described in Section 2.1 reflects the outcome of these discussions.

MEPA.9 **Include sufficiently detailed conceptual plans (preferable 80-scale) for any proposed roadway improvements in order to verify the feasibility of constructing such**

improvements. The conceptual plans should show proposed lane widths and offsets, layout lines and jurisdictions, and the land uses adjacent to areas where improvements are proposed. These conceptual plans should demonstrate that improvements are consistent with a Complete Streets design approach.

The University looked to Boston's Complete Streets Guidelines as the template to develop the IMP design guidelines. The IMP guidelines extend Boston's Complete Streets Guidelines to include campus streets as part of an integrated street network. Through the Special Review Procedure, Harvard is required to file a Project Commencement Notice for each project in the IMP. As appropriate, each Project Commencement Notice will include sufficiently detailed conceptual plans for the proposed roadway improvements.

MEPA.10 Demonstrate how students, faculty, staff and neighborhood residents would be able to safely cross Soldiers Field Road to the Charles River in the 2020 Build with Mitigation Condition.

Within the IMP Area, pedestrian crossings of Soldiers Field Road are provided at three locations: the intersection of North Harvard Street and the Anderson Bridge with the Soldiers Road ramps, the intersection of Western Avenue and the Western Avenue Bridge with the Soldiers Road ramps, and the Sinclair Weeks footbridge. Planned improvements by MassDOT to the Anderson Bridge and the Western Avenue Bridge will significantly improve pedestrian crossings by reducing crossings distances and modifying signal timing to create more frequent and longer crossing times.

Harvard is working with DCR to develop a scope of work to evaluate existing and potential future pedestrian crossings of Soldiers Field Road at Telford Street, Everett Street, and Smith Field. This study will address the existing pedestrian bridge at Telford Street as well as potential at-grade crossings, consistent with measures that were identified in the Charles River Basin Connectivity Study.

DCR is evaluating improvements to the Sinclair Weeks Bridge to address ADA requirements. Harvard will continue to work DCR on this effort.

MEPA.11 Discuss opportunities to create neighborhood gateways to the Charles River Reservation, including a signalized pedestrian crossing at Everett Street and Herter Park and construction of Longfellow Path.

The proposed pedestrian and bicycle network in the IMP establishes new connections between the neighborhood and the campus, providing access to the Charles River at existing gateway locations and setting the stage for additional future connections as envisioned in the Charles River Basin Connectivity Study.

Although beyond the scope of the FEIR, Harvard has also been working closely with the City of Boston and Allston community representatives to fund a program of significant community improvements, several of which would improve pedestrian and bicycle access to the Charles Riverfront, including the evaluation of improved crossings of Soldiers Field Road west of Barry's Corner.

MEPA.12 **Clarify during what stage of the Ten-Year Plan the Longfellow Path will be constructed, whether this connection to the River includes bicycle accommodations, and how users will make safe and efficient connections to the river itself on the opposite side of Soldiers Field Road from the terminus of Longfellow Path.**

The timing of Longfellow Path and the other elements mentioned in the comment letter will be coordinated with the study of crossings of Soldiers Field Road and the City of Boston's master planning process for Smith Field.

MEPA.13 **Describe what types of community improvements are under consideration and how these may complement the bicycle and pedestrian improvements specifically presented to mitigate the impacts of the Ten-Year Plan.**

Beyond those improvements already described, and as part of an overall package of public realm improvements, Harvard has committed to a public realm flexible fund in the amount of $5.3 million over ten years. The specific improvements will be determined through a process led by an Executive Committee made up of representatives from Harvard, the BRA, Task Force members, and possibly other City agencies.

MEPA.14 **Identify the amount of bicycle parking required to meet BTD requirements on a site-by-site basis and describe how bicycle parking will be provided in a comprehensive manner throughout the Allston Campus. Include a commitment to provide sheltered bicycle storage and employee facilities such as changing rooms and showers in each building.**

Chapter 2 presents the existing bicycle parking spaces that are provided in the Allston campus and the estimated new bicycle parking spaces that would be provided to support the IMP projects.

MEPA.15 **Discuss how the proposed pedestrian and bicycle network improvements and connections to the Charles River Reservation are consistent with the Charles River Basin Connectivity Study and the proposed design of MassDOT's bridge reconstruction projects.**

In order to coordinate Harvard's planning with that of DCR, the University has been working closely with DCR and MassDOT staff in the planning and reconstruction of the Charles River bridges in this area, including the reconstruction of the Anderson Bridge,

Weeks Bridge, Western Avenue Bridge and River Street Bridge. Harvard's emphasis has been on seeking ways to optimize pedestrian and bicycle functionality, amenity and safety throughout these improvements. Chapter 2 provides additional information about consistency of the IMP with these infrastructure improvement projects and the DCR Charles River Basin Connectivity Study.

MEPA.16 Update the parking study to indicate the location of on-street and private parking spaces within the IMP Area.

Chapter 2 presents the location of on-street and private parking spaces within the IMP Area.

MEPA.17 Discuss why staff and faculty parking rates are lower than those for students, if subsidies are provided to staff and faculty, and how price restructuring may reduce overall parking demand on the Allston Campus.

The permit fees that were reported in the DEIR for eligible staff and faculty reflected the FY14 unreserved commuter parking rate, which prohibits overnight parking, while the costs that were reported for students reflected the FY14 tenant parking rate that allows overnight parking. Additional information about Harvard's parking fees is provided in Chapter 2.

MEPA.18 Discuss the relationship of the overall parking provided within the Allston Campus and how this is consistent with the mode share assumptions used as part of the transportation study.

As described in Chapter 2, the traffic analysis used a mode share assumption for office commuters of 59 percent auto use that is based on BTD guidelines. This mode share is a conservative approach to identify potential traffic impacts. Parking for the IMP projects is not based on the auto mode shares used in the traffic analysis. As described in Chapter 2, the parking for institutional commuters is consistent with Harvard's mode share goal of 40 percent or less auto use by commuters to the IMP projects.

MEPA.19 Compare Harvard's mode share goals with those currently achieved on its Cambridge Campus and if different, explain why divergent goals are proposed for the Allston Campus.

As presented in Chapter 2, Harvard has set a mode share goal for the term of this IMP of under 40 percent of commuters travelling to the Allston campus by car, an aggressive target comparable to downtown Boston but one that recognizes the differences between Allston and Cambridge in terms of the commuting population and the level of transportation infrastructure as described in the DEIR. The current Cambridge goal for single occupancy vehicle commuting is 24.7 percent. As compared to Allston, the Cambridge campus has more transit service (i.e., Harvard station with Red Line and

eleven bus and four trolleybus routes) and is surrounded by dense residential neighborhoods within easy walking and biking distance.

MEPA.20 **Address concerns raised by the City of Cambridge regarding implementation of expanded shuttle service between Harvard's Allston and Cambridge Campuses. Clarify assumptions regarding the Harvard Shuttle and specifically discuss how this service may be coordinated with other public transportation services in the study area.**

Harvard is proposing to extend its existing Allston Express service to Barry's Corner and to add a new route, the Harvard Square Express between Harvard Square and Barry's Corner. Harvard anticipates that the extension of the Allston Express routes will require new stops on campus streets in Allston. Harvard anticipates that the Harvard Express route will use a planned new Barry's Corner shuttle stop on Academic Way and other existing shuttle bus stops, including one in Harvard Square. Harvard will review this plan with the City of Cambridge and revise it as appropriate. These services, which are free of charge, primarily provide connectivity between the Allston and Cambridge campuses, but also create opportunities for shuttle bus riders to transfer to MBTA services in Harvard Square.

MEPA.21 **Discuss specific mitigation measures to offset increased demand on the MBTA bus system (particularly Route 66) through capacity enhancements or physical improvements. Include a commitment to work with the MBTA to develop details and designs for physical improvements or enhancements to service operations.**

The transit ridership analysis indicates that the services, including the Route 66, have sufficient capacity to accommodate projected IMP transit trips. Harvard will continue to work with the MBTA to develop details and designs for physical improvements or enhancements to service operations as needed.

MEPA.22 **Confirm if the signal at "Academic Way" at Western Avenue intersection will still be installed if the traffic signal warrant is not met and how this may affect the overall operations of other study area intersections.**

Harvard anticipates that the signal at the intersection of "Academic Way" and Western Avenue will not be installed unless it meets a traffic signal warrant. Harvard anticipates that the potential impacts would be limited to the unsignalized "Academic Way" approaches, rather than other study area intersections.

MEPA.23 **Provide additional discussion of how the proposed installation of video detection equipment at the Cambridge Street at Franklin Street and Harvard Avenue intersection is designed to improve either operations or safety.**

The proposed video detection equipment will be connected to the City of Boston's Traffic Operation Center in City Hall. This equipment will allow BTD the ability to

monitor traffic conditions in real time, verify conditions, and adjust signal timing as necessary.

MEPA.24 **Propose mitigation measures that may include a combination of geometric improvements, signal timing improvements, pavement marking and lane assignment adjustments, and specific TDM measures to avoid degradation of the existing condition at the intersections along Soldiers Field Road and the river bridges that show capacity and operational issues under the 2022 Build and 2022 No-Build Conditions.**

Chapter 9, Mitigation, includes the proposed transportation mitigation measures.

MEPA.25 **Continue to work with MassDOT, DCR and the City of Boston to ensure that the Ten-Year Plan project will not exacerbate existing congestion issues near the MassPike Exit 18 interchange.**

MassDOT has recently initiated a process to reconfigure the MassPike in Allston, including modifications to the existing Allston interchange. Harvard will coordinate with MassDOT and others regarding the traffic generation of the Ten-Year plan and the operation of the interchange.

MEPA.26 **Provide an update on how the proposed mitigation by Harvard at the Western Avenue at Soldiers Field Road westbound on-ramp may be incorporated into MassDOT's construction design.**

MassDOT has removed the Western Avenue Bridge from the Accelerated Bridge Project. Harvard will coordinate with MassDOT to resolve the traffic operations at this intersection as the project advances in the future.

MEPA.27 **Discuss the potential adoption of additional TDM measures, as identified in the CRWA/MAPC, City of Cambridge and MassDOT comment letters, and if not selected explain why a specific TDM measure was not deemed feasible. The evaluation of a TDM program should not be limited to new travel demand associated with the Ten-Year Plan at the Allston Campus, but also consider University-wide TDM measures.**

The DEIR included a detailed description of Harvard's extensive University-wide TDM measures that are provided through its Commuter Choice program. These TDM measures address the TDM-related comments of the CRWA/MAPC and City of Cambridge comment letters. Chapter 2 of this FEIR provides additional information regarding the MassDOT's TDM comments.

MEPA.28 **Provide clear implementation commitments including funding for TDM measures deemed feasible and necessary to sustain and/or increase mode usage over time. Clarify which elements of the TDM program applies to which category of potential user.**

Chapter 2 provides information about the University's Transportation Demand Management program.

MEPA.29 **Identify how many EV/LEV parking spaces will be established in conjunction with the Ten-Year Plan and how the amount will be determined by the University.**

Chapter 2 Provides information about EV/LEV parking spaces.

MEPA.30 **Discuss University (or Hubway) criteria associated with expansion of Hubway services in the area.**

Chapter 2 provides information about Harvard's approach to accommodate future Hubway expansion.

MEPA.31 **Include a draft Transportation Monitoring Plan. It should address all modes of transit and have measurable milestones to allow for an evaluation of mode share goal compliance and other transportation objectives. It should identify mode share goals, strategies for achieving these goals, components of a monitoring program, and contingency/mitigation measures if goals are not achieved. It is encouraged that the results of the monitoring program be shared publicly. Consider the recommendations made in the MassDOT and CRWA/MAPC letters. Include commitments to re-evaluate the expansion of the Harvard Shuttle to serve Harvard's Longwood Campus and/or the proposed MBTA commuter rail station near Everett Street.**

Chapter 2 includes a draft Transportation monitoring program.

MEPA.32 **Meet with MassDEP and the BWSC prior to submission of the FEIR to develop an I/I removal plan. Describe this plan and discuss its efficacy in mitigating the potential impacts of new project-related wastewater flows. It is possible that a significant I/I removal project may be identified, and that the related I/I exceed the removal rate for early phase wastewater flows. Specifically address how this situation will be managed to ensure Harvard meets its I/I removal obligations.**

The University met with BWSC June 16, 2014 and consulted with MassDEP on August 19, 2014 to discuss the I/I removal plan and wastewater improvements needed. The I/I offset plan and approach is described in Chapter 4, Utilities. It is possible that a significant I/I removal project may be identified, and that the related I/I exceed the removal rate for early phase wastewater flows. BWSC has indicated that in the latter case, BWSC will allow Harvard to "bank" the removals to be applied against future

wastewater flows. This will be managed by correspondence between BWSC and Harvard University.

MEPA.33 Meet with the BWSC to discuss the results of the BWSC analysis of flooding and provide an update that clarifies if this mitigation measure will be implemented as part of the Ten-Year Plan.

Prior to the filing of the FEIR, Harvard met with the BWSC to discuss the flooding analysis. An update of the mitigation measures is provided in Chapter 4, Utilities.

MEPA.34 Confirm that proposed off-site traffic or bicycle/pedestrian improvements will not impact areas within c.91 jurisdiction.

Chapter 8, Other Environmental Issues, provides additional information on the proposed off-site transportation improvements and the Chapter 91 jurisdiction. The Ten-Year Plan does not anticipate any new construction or change in use related to traffic, bicycle or pedestrian improvements planned by the University within jurisdictional filled tidelands.

MEPA.35 Provide additional detail regarding the renovation of Soldiers Field Park Housing. Describe the nature of these proposed renovations in greater detail to ascertain the potential applicability of c.91 licensing requirements for either work on the building itself or impacts during the construction period. Consult directly with MassDEP Waterways Program. If the project is located within c.91 jurisdictional areas, include graphics that overlay key c.91 jurisdictional criteria on top of conceptual plans depicting the areas of proposed construction. If applicable, include information demonstrating how each project alternative will be designed to meet the c.91 licensing criteria.

As discussed in Chapter 8, Other Environmental Issues, the renovation of the Soldiers Field Park Housing has not been developed beyond a preliminary programming level and different options for the physical improvements are under consideration. As details become known, a PCN for that project will be filed and if areas subject to Chapter 91 jurisdiction are identified, additional coordination with DEP will take place.

MEPA.36 Include a master planning level stormwater analysis, including calculations, conceptual BMP designs, and hydrologic modeling data to assist in the evaluation of the proposed stormwater management system for compliance with MassDEP standards.

Section 4.2 in the FEIR describes the master planning level stormwater analysis. It provides a discussion of conceptual BMP designs and the hydrologic modeling for existing and proposed conditions. Appendix D provides the calculations.

MEPA.37 Include supporting data and site plans to demonstrate that sufficient space is available within each proposed drainage area to meet the rain garden/bioretention space

requirements assumed in the drainage analysis. Analysis should confirm that the conceptual designs include sufficient measures capable of conveying and treating estimated stormwater flows generated by the project on both a cumulative and individual project site basis.

The properties are going to be developed over a ten year period; therefore detailed site plans for each site have not been developed at this time. The master planning analysis estimates the area required for rain gardens/bioretention areas based on what is known at this time. During final design for each site, space requirements for rain gardens/ bioretention areas and other stormwater management measures will be confirmed and factored into the design. Stormwater mitigation measures to meet peak attenuation and water quality requirements include proprietary stormwater treatment devices and subsurface storage and infiltration. A similar approach using these measures and other stormwater management measures will be applied to each site as final design proceeds.

MEPA.38 **Include a conceptual level of information to ensure that appropriate BMPs are considered, sufficient area is available to implement a compliant drainage system, and to confirm that the stormwater management system is an integral part of overall design and not an after-thought. Demonstrate how the proposed Greenway will interface with the adjoining drainage areas for the Ten-Year Plan projects.**

Section 4.2 in the FEIR describes the BMPs that will be considered during final design of each site. Also, as described in Section 4.2, there is a commitment to fully integrate stormwater management measures into the final design of each parcel. The master planning analysis estimates the total areas needed to meet regulatory and agency stormwater management requirements. These preliminary space requirements will be refined and taken into consideration during final design. As the sites adjacent to the Greenway undergo final design, the stormwater management designs will tie into the Greenway to create a well-planned public space with sufficient area to implement a compliant drainage system.

MEPA.39 **Address why peak rates of runoff and volumes are predicted to increase from existing conditions at the proposed Mixed Use/Basketball Facility and the HBS Faculty and Administrative Office project sites and whether additional mitigation measures are necessary to ensure compliance with MassDEP's Stormwater Management Regulations.**

There is an increase in peak rates of runoff and volumes at these sites because there is an increase in the impervious area. The master planning approach demonstrates that taking the entire project area as a whole, there will be a decrease in the peak rates of runoff and volumes, even though individual sites may result in increases in peak rates of runoff and volumes.

MEPA.40 **Describe how the proposed BMPs will facilitate Harvard's compliance with the pathogen TMDL established for this portion of the Charles River.**

Several of the proposed BMPs in the master planning study provide filtration and infiltration of stormwater runoff. As stormwater passes through the filtration/ infiltration media, it will receive treatment for pathogens sufficient to ensure compliance with the applicable pathogen TMDL.

MEPA.41 **Include a commitment by Harvard to work collaboratively with DCR, MassDEP, and the City of Boston during the advancement of stormwater system design to ensure that the potential impact of additional stormwater flows to the Charles River will meet applicable water quality standards.**

Harvard has demonstrated this commitment in the past and will continue to work collaboratively with DCR, MassDEP, and the City of Boston on stormwater management-related issues.

MEPA.42 **Stormwater mitigation measures described in the DEIR should be amended to reflect the extensive use of LID BMPs. Provide sufficient detail to understand their extent of implementation (e.g., sizes of green roofs or rainwater harvesting systems, number and sizes of bioretention areas/raingardens) in the context of the design volume of runoff to be captured and treated by each LID measure.**

The DEIR identified several LID BMPs that will be considered at each site, including: rain gardens/bioretention areas, green roofs, permeable pavers in plaza areas, porous asphalt in roadway/parking spaces, pervious concrete walkways, and rainwater harvesting systems. The master planning analysis determined the space needed for BMPs on each site and these areas were incorporated into the proposed HydroCAD model (see Appendix D). Specific BMPs planned for each site will be detailed during the final design of each site. Additional hydraulic modeling will be performed at that time to verify the adequacy of the systems.

MEPA.43 **Include an updated GHG stationary source analysis prepared in accordance with the GHG Policy and consistent with the methodology used in the DEIR for the Chao Center. Revise the GHG quantifications to reflect the most current ISO-NE average grid emission factor of 728 lbs/MWh.**

Based on discussions with MEPA and DOER, the report has been revised to reflect the most current ISO-NE average grid emission factor of 719 lbs./MWh. An updated GHG analysis for the Chao Center project is included as Appendix E.

MEPA.44 **Provide responses and supporting documentation to address the comments regarding the Chao Center submitted by the DOER.**

An updated GHG analysis for the Chao Center project is included as Appendix E.

MEPA.45 **Provide additional detail on the potential energy-use reductions associated with a PV system on the Chao Center.**

The updated GHG analysis for the Chao Center included as Appendix E includes additional detail on the potential energy use reductions associated with PV.

MEPA.46 **Quantify the amount of domestic hot water that will be provided by the solar hot water collectors installed on Baker Hall, and how this service may be impacted by the future renovation of Baker Hall.**

The estimated average daily hot water demand for Baker Hall is 5,395 gallons. The solar thermal system proposed would provide 24.9% of the energy required to heat this daily hot water demand.

MEPA.47 **Continue to explore additional means to reduce project-related GHG emissions based upon suggestions provided in DOER and MassDEP comment letters in an effort to achieve additional GHG reduction measures beyond those calculated in the DEIR.**

An updated GHG analysis for the Chao Center project is included as Appendix E. Several additional mitigation measures have been incorporated since the DEIR, including chilled beams in office spaces and a 67 kW PV array.

MEPA.48 **Provide a clear summary of GHG reduction measures to be adopted as part of the Chao Center project, including a summary table of predicted energy use, GHG emissions in tons per year of CO_2 for stationary and mobile sources, and a commitment to provide a separate self-certification document.**

An updated GHG analysis for the Chao Center project is included as Appendix E. The summary of GHG reduction measures is included as *Table 3: Energy and CO2 Emissions (Short Tons)* in the report. Mobile sources are not included in this building energy model report because as a replacement project the Chao Center does not generate significant traffic impacts.

MEPA.49 **Provide additional information on the overall energy infrastructure associated with the Harvard Allston Campus. Incorporate all comment letters submitted by DOER into the scope.**

The overall energy infrastructure associated with the Harvard Allston Campus is described and presented in Chapter 5, Air Quality and Energy Systems.

MEPA.50 **Note any potential environmental impacts associated with expansion of energy infrastructure to the Allston Campus (river crossings, Chapter 91, etc.).**

The University does not anticipate any additional environmental impacts associated with expansion of energy infrastructure to the Allston Campus. As details of the

necessary expansion become available, the University will continue to work with the appropriate permitting agencies to evaluate impacts.

MEPA.51 Describe how the University encourages non-Harvard tenants to adopt sustainable design and operational measures.

As part of its commitment to promoting high performance building design and operation, Harvard has developed sustainability guidelines to help tenants in its commercial properties participate in creating greener buildings. There are two components to Harvard's sustainability guidelines for commercial tenants:

- Tenant Fit-Out Requirements is a stand-alone list of performance targets for products, designs, and installations based on the Harvard Green Building Guidelines and the LEED Green Interior Design and Construction Guidelines. These are one-time strategies best considered early in the design or fit-out process, and should be shared with design teams at the outset of a project. Projects by Harvard University tenants are required to meet these targets. Non-Harvard clients are strongly encouraged to consider these performance targets when preparing a space for occupancy.

- Tenant Occupancy Recommendations are post-fit-out strategies that conserve energy, reduce waste, and contribute to a healthy work environment, based on the LEED Green Building Operations and Maintenance Guidelines. These recommendations are incorporated into the Service Level Agreement for University tenants. Harvard also encourages commercial tenants to adopt these best practices upon occupancy. Sustainability guidelines developed for commercial properties do not supersede the Harvard or LEED standards; rather, they are intended to assist Harvard tenants in understanding and implementing those standards in their local properties.

MEPA.52 Provide additional information on climate change adaptation measures proposed by the University and include an update on the status of the proposed vulnerability assessment.

The University's approach to climate change adaptation and resiliency is described in Chapter 3, Climate Change Adaptation.

MEPA.53 Consider the potential impacts to the project site associated with predicted sea level rise, increased frequency and intensity of precipitation events, and extreme heat events on the Ten-Year Plan projects and associated infrastructure.

The University's approach to climate change adaptation and sea level rise is described in Chapter 3, Climate Change Adaptation.

MEPA.54 **Discuss the potential impact of a severe future storm event that considered not only the impact of predicted sea level rise and higher storm tides on the series of downstream dams along the Charles, but increased stormwater runoff from the upstream Charles River basin and how the intersection of these two conditions may impact the Allston Campus.**

The University's approach to climate change adaptation and sea level rise is described in Chapter 3, Climate Change Adaptation.

MEPA.55 **Demonstrate that the project includes ecosystem-based adaptation measures and proactive site design to promote climate change resiliency and adaptation.**

The University's approach to climate change adaptation and sea level rise is described in Chapter 3, Climate Change Adaptation.

MEPA.56 **Discuss how the design of building entry and exit points, roadways, public and private on-site utilities, and first floor uses have considered potential climate change impacts.**

The University's approach to climate change adaptation and sea level rise is described in Chapter 3, Climate Change Adaptation.

MEPA.57 **Identify site elements designed to reduce the impact of extreme heat events and limit the potential impact of more frequent and intense storm precipitation.**

The University's approach to climate change adaptation and sea level rise is described in Chapter 3, Climate Change Adaptation.

MEPA.58 **Discuss how on-site renewable energy or district energy systems may provide added resiliency during periods of power loss during storm events.**

The existing Blackstone combined heat and power (CHP) plant has four boilers with a total capacity of 700k pph supplying an existing load of approximately 300k pph, which equates to a greater than N+1 production capability. Each boiler has a dual fuel supply; normally fired from natural gas with backup of either ultra-low sulfur diesel (145k gallons on site) or number 6 oil (100k gallons on site). The plant has two water main supplies and a two line 13.8kV main-tie-main electric service backed up by a 2MW diesel generator. Internal plant electric distribution consists of fully redundant 2300v and 480v switchgear lineups. The outgoing steam has two distinct departure points from the plant, with three steam mains leaving via the Cambridge campus tunnel system and two steam mains going to Allston via Western Avenue. There is a steam cross connect between the two systems via the Weeks Bridge. The electric microgrid on the HBS/athletics campus is supplied by two 13.8kV circuits normally interconnected between the 5MW cogeneration supply and NSTAR, and the main distribution stations at Blackstone and in Allston have auto-transfer capability. All existing customer stations on the microgrid are supplied by a 13.8kV distribution system with a two line, source

selective configuration. The existing chilled water plant on the Allston campus is supplied by a fully redundant transformer lineup. Its cooling capacity of 4800 tons is supplying a peak load of 3700 tons.

The above systems have been designed to withstand many typical failure scenarios and can handle most single contingency (i.e., failure of one boiler, pipe, transformer, NSTAR circuit, Harvard circuit, water main, etc.) events. The Blackstone CHP plant's existing 5MW steam generator is load following, so its output varies based on the campus steam load and is at maximum in the winter and minimum (off) in the summer. When the 5MW generator is running, the interconnect at Blackstone is designed to island and ride through any total loss of utility supply. The initial islanding separates the Blackstone complex (plant and office buildings) from the grid and depending on the plant output, some portion (0% - 70%) of the existing Allston microgrid can be supplied after manual switching and coordination with NSTAR. If the 5MW generator was not running or if it trips offline, the 2MW diesel can blackstart the plant to commence steam production, which can then start the 5MW steam turbine (depending on load).

For the proposed systems, the current approach for the master plan is to create one or more new electric interconnecting points with NSTAR's system in Allston. This would be a different source from the existing Cambridge supply and allow for further redundancy through a potential cross connect between the existing and planned microgrids. The campus electric distribution station will be designed with redundant circuits and auto transfer and is planned to be located above future flooding levels. The new chilled water plant will be designed with redundancy and load growth capability and the area's source of heat is planned to be the existing Blackstone CHP plant (described above). The planned 7MW CHP expansion at Blackstone will add another layer of steam production (slated to be first run), be sourced from dual fuel supplies, be capable of islanding (with output to the Cambridge microgrid) and will also have the existing 2MW diesel for blackstarting.

While new on-site energy capabilities are unknown at this time, each project will review potential for installation and sizing. The University envisions integrating them into the microgrid in a similar fashion to the existing system, which has several rooftop PV and small scale wind systems.

MEPA.59 Incorporate storm response actions and resiliency measures into University housing and building occupancy information, leasing agreements or Tenant Manuals and consider them part of guidance related to tenant fit-out of commercial space, particularly those on the lower floors.

The University's approach to climate change adaptation and sea level rise is described in Chapter 3, Climate Change Adaptation. The analysis described in that chapter will

include Harvard-occupied buildings as well as commercial properties owned by the University.

MEPA.60 Describe how design of the Ten-Year Plan elements will consider the historic setting and characteristics of these historic assets and/or discuss how historic resources are integrated into Harvard design standards.

As described in the DEIR, the planning principles for the Ten-Year Plan recognize the importance of protecting the historic setting of the Allston campus. Included in the planning principles are:

- New development should continue the tradition of a campus that is as diverse architecturally as it is academically, allowing for varied scales and materials. Vertical elements and landmarks should be included to mark special functions and key focal points. Development should strengthen the qualities that make the campus unique and also reinforce patterns and traces of history, while simultaneously meeting contemporary needs.
- Plans should acknowledge the heritage of the area by incorporating historical references, maintaining view corridors, and featuring and preserving landmarks.

MEPA.61 Work with MHC to advance archaeological studies in the Ten-Year Plan area as necessary to meet applicable MHC regulations. Provide an update on the status of archaeological investigations and identify if further study or potential mitigation may be required.

The status of the archaeological studies is presented in Chapter 6, Historic Resources.

MEPA.62 Provide an update on the status of the Phase II Comprehensive Site Assessment being undertaken by the CSX Transportation Corporation for the property at 100 Western Avenue.

The Phase II Comprehensive Site Assessment Report was submitted to MassDEP on behalf of CSX Transportation on March 28, 2014. The Phase III Remedial Action Plan and Completion Statement report was submitted to MassDEP on behalf of CSX Transportation on March 28, 2014. The final Phase IV Remedy Implementation Plan was submitted on July 25, 2014.

MEPA.63 Provide information regarding potential MCP-regulated actions or proposed site assessments at the proposed Construction Staging Area (CSA).

With the exception of a very small part of the 115 Cambridge Street property (aka Sears lot) that is part of the CSX Allston Landing North MCP site mentioned under MEPA.62, there are no planned remedial actions or site assessments at the CSA at this time.

MEPA.64 **Provide existing conditions data on the CSA (i.e., area, impervious area, stormwater management, hazardous materials, etc.) and describe how this area will be used to support on-going construction of the Ten-Year Plan.**

Based on the site conditions and project needs, the two projects in the early phase of the IMP (namely the Chao Center and Baker Hall renovation) will mainly use their existing sites to accommodate construction staging and will not require the use of the CSA.

However, Harvard will continue to investigate the feasibility of the use of this area for other IMP projects. Harvard and its construction managers for each IMP project will work to ensure that staging activities minimize impacts to the neighborhood and that the staging activities are being coordinated with other construction activity in the immediate area. Access to the Construction Support Area will be addressed as applicable in the Construction Management Plan (CMP) for each IMP project.

In addition, Harvard will continue to work with CSX Transportation as part of the ongoing remediation work that CSX Transportation is undertaking to the north and east of the proposed CSA. This work will help dictate the access and egress points to the CSA.

MEPA.65 **Discuss how the CSA will be accessed by construction-related traffic, estimate construction-related traffic trips, and how it relates to truck traffic routes and intersection operations identified in the DEIR.**

See Response to Comment MEPA.64.

MEPA.66 **Indicate if the CSA would be used for parking for construction workers and equipment.**

See Response to Comment MEPA.64.

MEPA.67 **Identify BMPs to be used by contractors in the CSA to ensure effective stormwater and hazardous materials management.**

Contractors hired by Harvard will be required to comply with all Federal, State and local Best Management Practices for stormwater and hazardous materials management. Hazardous materials must be managed in accordance with applicable Federal and State laws and regulations.

In addition, please see Response to Comment MEPA.64.

MEPA.68 **Provide additional information on the "North Allston Haul Road" proposed as a potential construction truck connection. Identify its conceptual location, its potential benefits or conflicts with adjacent uses, and whether Harvard intends to implement this construction period mitigation measure.**

The potential North Allston Haul Road is a component of the Construction Support Area mentioned previously and is not required in the early stages of construction. As described, Harvard will continue to investigate the feasibility of the use of this area for other IMP projects and will report on this in subsequent Construction Management Plans filed with the City of Boston and Project Commencement Notices filed with the MEPA Office.

MEPA.69 **Generally describe how traffic-related construction period impacts will be mitigated, monitored and coordinated with other infrastructure projects, most notably those associated with the MassDOT ABP projects and the New Brighton Landing project. Potential triggers for remedial action based upon construction period monitoring results should also be provided in a conceptual manner.**

Through the City of Boston's Construction Management Plan process Harvard participates in regular and ongoing discussions with the City and neighborhood about the coordination of current and planned construction projects in the area. This process includes participation in regular meetings of a Construction Subcommittee of the Harvard-Allston Task Force.

For the MassDOT Accelerated Bridge Program projects in the study area Harvard has met with MassDOT on an ongoing basis to discuss issues such as design, construction logistics, and schedule. These discussions will continue as the bridge projects advance.

MEPA.70 **Provide a conceptual plan clarifying pedestrian and bicycle routes during each Ten-Year Plan project that demonstrates the maintenance of sufficient pedestrian and bicycle routes within and through the project area and neighborhood to key destinations such as MBTA bus stops, Harvard's Cambridge Campus, public parks and open space, and neighborhood uses along Western Avenue and North Harvard Street.**

One of the components of the institutional CMP guidelines is that Harvard and its construction managers for each IMP project will work to ensure that staging areas will be located to minimize impacts to pedestrian, bike, and vehicular flow in the neighborhood and that the staging areas will be coordinated with other construction activity in the immediate area. As the details of the timing of each IMP project become clarified, the access to the site and construction staging areas will be set forth in the CMP for each IMP project.

Through the Special Review Procedure, Harvard is required to file a Project Commencement Notice for each project in the IMP. The Project Commencement Notices will clarify pedestrian and bicycle routes during each Ten-Year Plan project that demonstrates the maintenance of sufficient pedestrian and bicycle routes within and through the project area and neighborhood to key destinations.

MEPA.71 **Describe potential construction period dewatering requirements, discuss how dewatering will be conducted in a manner consistent with MWRA, MassDEP and/or BWSC regulations/guidelines, and identify any necessary permits.**

Construction period dewatering activities are dependent on the specifics of each project and project site, and will be developed and coordinated with future development planning to avoid adverse impacts. Construction activities are conducted in accordance with the BWSC's Stormwater Best Management Practices: Guidance Document January 2013 as well as the Harvard Environmental Health and Safety and Mitigation standards.

Construction dewatering will be conducted in accordance with appropriate regulatory authorities including the Massachusetts Water Resources Authority, Massachusetts Department of Environmental Protection, United States Environmental Protection Agency, Massachusetts Department of Conservation and Recreation, and the BWSC and each specific project will be responsible for obtaining the appropriate dewatering permits as applicable.

MEPA.72 **Include a separate chapter summarizing proposed mitigation measures. This chapter should include draft Section 61 Findings for each State Agency that will issue permits for the project. Include clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and include a schedule for implementation. Clearly indicate the implementation of mitigation measures based on project phasing, either tying mitigation commitments to specific building projects, overall project square footage, or traffic/wastewater demand or thresholds, to ensure that measures are in place to mitigate the anticipated impact associated with each development phase.**

The mitigation measures for the IMP are described in Chapter 9, Mitigation. Chapter 9, Mitigation, also includes draft Section 61 Findings describing the mitigation measures associated with each State Agency that will issue permits for the project.

MEPA.73 **Describe Harvard's contribution to specific infrastructure upgrades, if any, proposed by MassDOT, the MBTA, DCR, etc. in the IMP area.**

Harvard has collaborated with the City of Boston to design and implement new bike facilities in Allston, including bike lanes on North Harvard Street and the cycle track on Western Avenue. Harvard continues to coordinate with state transportation agencies on a variety of projects, providing available survey information, traffic data, access to Harvard property to enable construction, and financial support. Harvard coordinates with MassDOT on the Accelerated Bridge projects and the proposed realignment of the Allston interchange and with the MBTA on the Key Bus Route Improvement Program, including consolidating stops and relocating bus shelters. In addition, the Harvard Business School has provided significant funding to DCR to support improvements to the John Weeks Bridge.

MEPA.74 **Include a conceptual long-range maintenance plan for proposed infrastructure improvements, including identification of responsible parties, to ensure adequate upkeep of these project-related improvements.**

The maintenance plan for specific infrastructure improvements will be reviewed and negotiated as part of the permitting process for each improvement. Generally speaking, infrastructure improvements within the IMP Area will be constructed and maintained by Harvard. This includes publicly accessible open spaces such as the recently open Grove in Barry's Corner as well as campus roadways that will be open to public travel, such as Academic Way.

Consistent with recent experience, off-site improvements will be negotiated on a case-by-case basis. For example, as part of the recently signed IMP Cooperation Agreement Harvard agreed to extend its commitment for the maintenance of the City-owned Ray Mellone Park through 2026.

MEPA.75 **Following completion of construction, provide a certification to the MEPA Office signed by an appropriate professional indicating that all of the mitigation measures or their equivalent proposed in the FEIR have been incorporated into the project. Commit to providing this in the draft Section 61 Findings.**

As requested, following completion of construction of each IMP project, Harvard will provide a certification to the MEPA Office signed by an appropriate professional indicating that all of the mitigation measures or their equivalent proposed in the FEIR have been incorporated into the project.

MEPA.76 **Include a copy of this Certificate and a copy of each comment letter received. Include direct responses to comments to the extent that they are within MEPA jurisdiction.**

This Appendix A provides copies of each comment letter and responses to each of the comments within MEPA's jurisdiction that were submitted in response to the DEIR.

MEPA.79 **Circulate the FEIR to those parties who commented on the EENF, the NPC and/or the DEIR, to any State Agencies from which the Proponent will seek permits or approvals, and to any parties specified in section 11.16 of the MEPA regulations. A copy should be made available at the Allston branch of the Boston Public Library.**

This FEIR is being circulated in accordance with the MEPA Certificate.

MEPA.80 **Post the FEIR in an online format on a Harvard University-related website.**

The FEIR has been posted on a Harvard website at evp.harvard.edu.

MEPA.81 Preparation of the FEIR should also include participation on the public process program agreed upon by Harvard in the 2013 SRP.

As described in the SRP Certificate, Harvard met and coordinated with the City of Cambridge, DCR, Metropolitan Area Planning Council, Charles River Watershed Association, and the MWRA during the preparation of this FEIR.

dcr
Massachusetts

February 7, 2014

Secretary Richard K. Sullivan, Jr.
Executive Office of Energy and Environmental Affairs
Attn: Holly Johnson, MEPA Office
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Re: EOEEA #14069, Harvard University Allston Campus Draft Environmental Impact Report

Dear Secretary Sullivan:

The Department of Conservation and Recreation ("DCR" or "Department") is pleased to submit the following comments on the Draft Environmental Impact Report ("DEIR") submitted by Harvard University (the "Proponent") for its Allston Campus Ten-Year Institutional Master Plan ("IMP") project (the "Project").

The DEIR expands the level of detail on various aspects of the Proponent's ten-year IMP from the Proponent's April 2013 Notice of Project Change ("NPC"). As stated in the DEIR, the current scope of the Project includes a series of seven new projects that will develop 1.4 million square feet (an increase of 400,000 square feet from the Notice of Project Change) and renovate 500,000 square feet within one academic and one student housing building. New construction includes replacement of academic and administrative spaces for the Harvard Business School; new and renovated athletic facilities; and a new hotel / conference center.

DCR has care, custody, and control of parkways in the vicinity of lands contemplated for development in the Master Plan, including Soldiers Field Road in Boston and Memorial Drive in Cambridge. The Project is located in close proximity to DCR's Charles River Reservation, located across Soldiers Field Road.

The Department submits the following comments on the DEIR.

Open Space
DCR is supportive of Harvard's conceptual plan to develop a system of open spaces within the Allston Project Area. This system will not only benefit the Harvard community, but it will also benefit the surrounding neighborhood. DCR notes that safe and convenient access for all between the Harvard-Allston campus, its proposed open space system and the DCR's Charles River Reservation is of paramount importance to the Department. As the DEIR notes, DCR is funding and managing modifications of the John W. Weeks Footbridge over the Charles River. These improvements will provide accessibility by replacing the stairs with ramps and providing handrails on the steeper sections of the bridge. DCR notes that an opportunity exists to provide a fully accessible connection between the Proponent's Allston and Cambridge campuses by making similar improvements to the Sinclair Weeks

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Executive Office of Energy & Environmental Affairs

John P. Murray, Commissioner
Department of Conservation & Recreation

Bridge over Soldiers Field Road. In its FEIR, DCR requests that the Proponent demonstrate how students, the Proponent's workforce, and the neighborhood can safely cross Soldiers Field Road to the Charles River. DCR is available for consultation on this request. DCR.1

DCR also looks forward to working with Harvard to make improvements both to the site and to the existing pedestrian and bicycle circulation system in connection with the planned Newell Boathouse project. DCR.2

Stormwater

DCR requests that the Proponent continue to coordinate stormwater system design with DCR Stormwater staff, including assessing and evaluating the impact of additional stormwater flows into the Charles River to make sure water quality standards are met. DCR.3

Transportation

Trip distribution data indicates a significant portion of Harvard affiliated traffic (19%) approaches the Eliot Bridge from the Cambridge side (see Figure 15, Appendix B – Transportation), yet there are no intersections in the Study Area on the Cambridge side. During the MEPA review, DCR requests that the Proponent include an analysis of other locations in its traffic study. Of particular concern to the Department are the DCR parkways upstream (north and west) of the Eliot Bridge: Gerry's Landing Road, Fresh Pond Parkway, Soldiers Field Road and Nonantum Road. DCR.4

In the Traffic appendix, various proposed traffic improvements are proposed, including coordination of signal timing modifications at particular intersections, including those under DCR jurisdiction. DCR notes that coordination with the Department is critical to the successful implementation of these recommendations. Accordingly, DCR requests that the Proponent provide information on these proposals to the Department in advance of the FEIR so that any modifications to the proposed mitigation program can be included in the FEIR. DCR also notes that any proposed changes by Harvard to the Anderson Bridge Rehabilitation project (#14702) and River Street and Western Avenue Bridges Rehabilitation Project (#15029) that impact DCR roadways should be coordinated with the Department, in addition to MassDOT. DCR.5

DCR further requests that, prior to filing the FEIR, the Proponent consult with the Department regarding any potential use of DCR parkways for construction routes. DCR also requests that the FEIR show proposed construction routes. DCR.6

DCR requests that the Proponent coordinate pedestrian and bicycle network connections to the Charles River Reservation with the Department, and ensure these recommendations are consistent with the Charles River Basin Connectivity Study (http://www.mass.gov/eea/agencies/dcr/massparks/region-boston/charles-river-basin.html; see index on right of this web page). DCR.7

Conclusion

As individual projects come on line through the Project Commencement Notice ("PCN") process, DCR looks forward to working with Harvard in greater detail to address issues of mutual concern, including the proposal for improvements to the Newell Boathouse. DCR looks forward to meeting with Harvard and to participating in the public review process as outlined in the Public Process section of the Secretary's November 20, 2013 SRP Certificate.

Thank you for the opportunity to comment on the DEIR. If you have questions or need further information please contact Rick Corsi at (617) 626-1431 or richard.corsi@state.ma.us.

Sincerely,

John P. Murray
Commissioner

cc: Katie Lapp, Will Donham (Harvard University)

DEPARTMENT OF CONSERVATION AND RECREATION

DCR.1 **Demonstrate how students, the Proponent's workforce, and the neighborhood can safely cross Soldiers Field Road to the Charles River.**

As described in Chapter 1, Project Description, Harvard has agreed to undertake a study of crossings of Soldiers Field Road in order to promote access between the campus, the neighborhood, and the Charles River Reservation. This study is being coordinated with DCR.

DCR.2 **Work with DCR to make improvements both to the site and to the existing pedestrian and bicycle circulation system in connection with the planned Newell Boathouse project.**

The Newell Boathouse is in very preliminary stages of planning and programming and design information is not yet available. The project was included in the IMP and the DEIR for completeness as it is intended to be developed within the ten year term of the IMP. As design information is available, Harvard will work with DCR on issues related to the site and the surrounding circulation system.

DCR.3 **Continue to coordinate stormwater system design with DCR Stormwater staff, including assessing and evaluating the impact of additional stormwater flows into the Charles River to make sure water quality standards are met.**

During the preparation of the DEIR, Harvard and its consultant team met with DCR stormwater staff to coordinate stormwater management initiatives and projects that may impact the Charles River Basin. As was presented in the DEIR, peak rates and volumes of stormwater runoff will be reduced in the Ten-Year Plan.

DCR.4 **Include an analysis of other locations in the traffic study. Particularly DCR parkways upstream of the Eliot Bridge: Gerry's Landing Road, Fresh Pond Parkway, Soldiers Field Road and Nonantum Road.**

Chapter 2 provides information about the potential traffic impacts of IMP-related traffic on DCR parkways upstream of the Eliot Bridge.

DCR.5 **Provide information on proposed traffic improvements at intersections under DCR jurisdiction in advance of the FEIR. Any proposed changes to the Anderson Bridge Rehabilitation project and River Street and Western Avenue Bridges Rehabilitation project that impact DCR roadways should be coordinated with the DCR in addition to MassDOT.**

Harvard met with DCR on April 9, 2014 to review the traffic study and proposed traffic improvements. The DEIR identified proposed improvements to signal timing at the Eliot Bridge, Anderson Bridge, and River Street Bridge and the restoration of the two lane

eastbound approach on Western Avenue to Soldiers Field Road. Harvard will continue to coordinate with DCR and MassDOT regarding these proposals.

DCR.6 Consult with DCR regarding any potential use of DCR parkways for construction routes. Show proposed construction routes in the FEIR.

Harvard met with DCR on April 9, 2014 to review the continued use of the Soldiers Field Road service roads between the Western Avenue and River Street Bridges as part of the construction route. Chapter 7, Construction Period Impacts, includes a graphic illustrating these routes.

DCR.7 Coordinate pedestrian and bicycle network connections to the Charles River Reservation with DCR, and ensure these recommendations are consistent with the Charles River Basin Connectivity Study

Harvard will coordinate with DCR to ensure that pedestrian and bicycle network improvements are consistent with the Charles River Basin Connectivity Study.

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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DEVAL L. PATRICK
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RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

February 7, 2014

Richard K. Sullivan, Secretary
Executive Office of
Energy & Environmental Affairs
100 Cambridge Street
Boston MA, 02114

Attn: MEPA Unit

RE: Boston
Harvard University – Allston
Campus 10-year Master Plan
Western Avenue and vicinity
Harvard University – Allston
Campus 10-year Master Plan
EEA # 14069

Dear Secretary Sullivan:

The Department of Environmental Protection has reviewed the Draft Environmental Impact Report (DEIR) submitted by Harvard University, through the Allston Development Group, for a Harvard's Ten-Year Institutional Master Plan for Harvard University's Allston Campus redevelopment, which consists of about 1.4 million square feet of new development in seven projects and renovation of about 500,000 sf of space in two buildings on about a 189 acre site in Boston (EEA# 14069). Several small projects for Harvard Athletics, a batting cage, renovation of the Newell Boat House, and relocation of Harvard's wrestling program also are included.

The new facilities proposed include three academic buildings, two faculty/administration buildings, expansion and renovation of Harvard Stadium, a basketball and institutional mixed use building, a hotel, and a conference center. Renovations will be made to an academic building and a graduate student residential building. The parking also will increase by 178 spaces for a total of 3,830 spaces, which reflects a reduction from the 20-year Master Plan project. MassDEP provides the following comments.

Greenhouse Gas Emissions

The greenhouse gas emissions (GHG) analysis requirements for this project have been established in the Secretary's amended scope for the DEIR (NPC Certificate, May 10, 2013) and the Special Review Procedure (SRP) Certificate (November 20, 2013), which indicate that a GHG emissions analysis is required when the proponent submits a Project Commencement Notice (PCN). Only projects identified in the Master Plan FEIR Certificate require a PCN. The project specific GHG filing and review process raises the question whether the cumulative GHG impacts for the Master Plan will be analyzed for review before most of the project is built out. If

that is a possibility, it would be helpful to have an approximate schedule for future GHG analyses to help clarify how the GHG emissions analyses will be submitted. In addition, it would be helpful for the FEIR to provide a Section 61 Finding that makes commitments to GHG emissions reductions that are sufficient to attain or exceed the energy efficiency standards that will be applicable to each building, when it is in design and permitting. The Section 61 Finding also should consider economies of scale that may be available to reduce energy demand for multiple buildings within the proposed expansion of the university campus (e.g., the combined heat and power system). Although the DEIR provides general information about the Blackstone Station energy facility, it is requested that the FEIR explain which Master Plan buildings would be supplied power by cogeneration. DEP.1 DEP.2 DEP.3 DEP.4

The DEIR includes only a GHG analysis for the Chao Building, although the energy efficient designs for the Baker Building renovation are described briefly. Given that the energy efficiency for the building is known, why wasn't a GHG analysis also done for the Baker Building? The mitigation commitments made to reduce emissions for the Chao Center mitigation build design and the Baker Building should be included in the Section 61 Finding. In addition, MassDEP requests clarification of the plans for a review of a GHG analysis for the Science Center, in view of the proponent's commitment in the EENF to provide an analysis. If possible, the Science Center GHG analysis should be included in the FEIR and mitigation commitments incorporated into the Section 61 Finding. DEP.5 DEP.6 DEP.7

It is clear from the sustainability initiatives undertaken by Harvard University, that the proponent is highly committed to reducing the carbon footprint of the University. It is highly commendable that 23 percent of the University's electricity is generated from renewable or alternative energy sources. Harvard also has the distinction of the most LEED certifications of all higher education institutions. Apparently, Harvard applies their own Green Building Standards to advance energy efficiencies, and these standards will help to ensure that the projects in the Master Plan continue to incorporate innovative designs. As noted in the DEIR (page 110), these energy efficiencies also have yielded millions of dollars in savings each year.

The DEIR has not considered the buildings' energy management systems (BEMs) in terms of building performance data tracking, analysis, and strategies that will be deployed to maintain building efficiencies. BEMs are emerging as essential tools for demonstrating and maintaining energy efficiencies. The results from a building performance data analysis also provides a means of communicating that mitigation commitments have been fulfilled in the self-certification to MEPA. DEP.8

The Draft Section 61 Finding for GHG emissions reduction mitigation includes "encouraging commercial tenants to adopt energy efficiency measures." The term encouragement has not been defined, but implementation could take many forms. The FEIR should provide enough detail to engender confidence that tenants will pursue energy efficiency in the fit-out of the buildings. Guidance on developing a lease that benefits both the lessor and lessee is available at the Green Lease Library, which can be accessed using the following web link: http://www.greenleaselibrary.com/. The proponent also is encouraged to provide financial tools for the tenants to comprehend the economic effects of implementing the energy efficient design options available. Tenants may be more favorably inclined to select equipment and DEP.9

materials that support the proponent's energy efficiency goals with an understanding of the lease-term savings, and not just the upfront capital costs of various designs.

Wastewater

Wastewater from the project discharges to the Charles River Valley Sewer and the South Charles Relief Sewer. These interceptors discharge to the Cottage Farm Pump Station and Combined Sewer Overflow Treatment Facility on the Charles River. Cottage Farm wastewater flow is conveyed through the Ward Street Pump Station and Columbus Park headworks before discharging to the Deer Island Treatment Facility, when sufficient capacity exists in the system. The DEIR has demonstrated an understanding of the infiltration and inflow (I/I) removal requirements for the facilities in the 10-year Master Plan (page 125). Harvard University is proposing to remove four gallons of inflow for every gallon of wastewater added, based on Title 5 flow rates, in phases during the project's construction. In the event that a significant I/I removal opportunity is identified, and the I/I exceeds the removal rate for early phase wastewater flows, the proponent should be flexible in terms of I/I removal. To that end, the proponent should consult with the Boston Water and Sewer Commission (BWSC) and MassDEP, in order to
DEP.10 develop an I/I removal plan in the FEIR that would accommodate wastewater system improvements needed within the project's service area.

Stormwater

The proponent is commended for proposing to use low impact development (LID) best management practices (BMPs), including bioretention basin/raingardens, green roofs, permeable pavers and porous pavement, and rainwater harvesting to manage stormwater. Imperviousness on the 178 acre project site also will be reduced by 0.6 acres. However, this is only a 3.4×10^{-3} percent reduction in area, which would not be expected to yield a significant reduction in the
DEP.11 volume of stormwater to be managed. To ensure that these LID measures are credited, the Section 61 Finding for stormwater should be amended to include commitments for the stormwater BMPs in sufficient detail to understand them; For example, the sizes of the green roof and rainwater harvesting system, the area of pervious/porous materials, and number and sizes of bioretention areas/raingardens should be provided in context with the volume of runoff that would be captured and treated by the LID measure.

In order to evaluate the adequacy of the stormwater management system for compliance
DEP.12 with the Stormwater Management regulations and standards, detailed drainage plans, calculations, BMP designs, and hydrologic modeling information would be needed in the FEIR. The DEIR provides preliminary information only.

The DEIR indicates that the project would comply with the total maximum daily load for phosphorus in the Charles River by reducing 65 percent of the phosphorus from the site runoff. Specifically, the plan is to capture 1.5 acre feet of runoff for treatment and infiltration through a bioretention basin/raingarden. Although not explained in the DEIR, bioretention basins have been identified as stormwater best management practices, which have the potential to remove the requisite phosphorus load, when designed properly.

Solid Waste Recycling and Massachusetts Contingency Plan/M.G.L. c.21E

The solid waste impact discussion has addressed the proposed management of the organic/food waste adequately. However, the section on construction and demolition (C&D) waste should acknowledge both the MassDEP recycling regulations, 310 CMR 16.000 and solid waste management regulations, pursuant to 310 CMR 19.000, as applicable. In addition, the Massachusetts Contingency Plan (MCP/21E) section should mention proper transport and off-site management/disposal of excavate material in accordance with applicable regulations including, without limitation, 310 CMR 19.000, and 310 CMR 30.000 as applicable. DEP.13 DEP.14

The MassDEP appreciates the opportunity to comment on this proposed project. Please contact Kevin.Brander@state.ma.us, at (978) 694-3236 for wastewater issues and John.Carrigan@state.ma.us , at (978) 694-3299 for solid waste related questions. If you have any general questions regarding these comments, please contact Nancy.Baker@state.ma.us , MEPA Review Coordinator at (978) 694-3338.

Sincerely,

John D. Viola
Deputy Regional Director

cc: Brona Simon, Massachusetts Historical Commission
Jerome Grafe, MassDEP-Boston
Eric Worrall
Kevin Brander, John Carrigan, Heidi Davis, MassDEP-NERO
Marianne Connolly, MWRA
John E. Sullivan, P.E., BWSC

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP.1 **If possible, have an approximate schedule for future GHG analyses to help clarify how the GHG emissions analyses will be submitted.**

As described in the DEIR and MEPA SRP Certificate, the GHG analyses for each individual project will be prepared at a time at which detailed design information is available for each project. Chapter 1, Project Description, includes a table depicting the approximate timing of each of the building projects in the IMP.

DEP.2 **Provide a Section 61 Finding that makes commitments to GHG emissions reductions that are sufficient to attain or exceed the energy efficiency standards that will be applicable to each building.**

Chapter 9, Mitigation, describe the commitments that the University is making towards GHG reduction. In addition, in its building permit applications, Harvard must demonstrate compliance with the building code, including the then-applicable energy conservation section.

DEP.3 **Section 61 Finding should consider economies of scale that may be available to reduce energy demand for multiple buildings within the proposed expansion of the university campus.**

Chapter 5, Air Quality and Energy Systems, and Chapter 9, Mitigation, describe the University's approach to providing energy to new buildings in the IMP Area through the expansion of its district energy systems.

DEP.4 **Explain which Master Plan buildings would be supplied power by cogeneration.**

Please refer to the Chapter 5, Air Quality and Energy Systems, for information/details on Allston buildings served/envisioned to be served by Harvard's existing microgrid. Since the existing microgrid is interconnected with the Blackstone CHP facility, the buildings served receive power that is a mix of external grid supply and power generated through the cogeneration process at Blackstone (specifically through the 5 mega-watt backpressure steam turbine generator). Please note that while the electric output of the proposed 7 mega-watt combustion turbine project will be directed to another behind-the-meter Harvard campus microgrid for operational optimization reasons, the heat-energy requirements of the master plan buildings are expected to be provided by the Blackstone CHP facility, and as such the benefits of cogeneration will be realized.

DEP.5 **Explain why a GHG analysis was not done for the Baker Building.**

Based on guidance sought during the preparation of the DEIR, the MEPA Office directed that smaller renovation projects such as Baker Hall could describe the existing and proposed energy performance and systems rather than conduct a GHG analysis.

DEP.6 **Include mitigation commitments to reduce emissions for the Chao Center mitigation build design and the Baker Building in the Section 61 Finding.**

The GHG mitigation measures for the Chao Center are described in Chapter 9, Mitigation, and Appendix E.

DEP.7 **Clarify plans for a review of a GHG analysis for the Science Center. If possible, the Science Center GHG analysis should be included in the FEIR and mitigation commitments incorporated in the Section 61 Finding.**

The Science project remains under a reprogramming and redesign effort. As the design details of that project become further developed, Harvard will work with the MEPA Office to determine what, if any, additional permitting is required. This analysis will include GHG impacts as one of the areas of study.

DEP.8 **Consider a building performance data analysis as a means of communicating that mitigation commitments have been fulfilled in the self-certification to MEPA.**

The MEPA self-certification is submitted shortly after building completion. Performance data analysis requires months, and preferably more than a year, of data collection. Performance data analysis is also highly weather-dependent and would not necessarily be comparable to modeled energy use analysis, which is based on a set of nominal meteorological conditions.

DEP.9 **Provide enough detail to engender confidence that tenants will pursue energy efficiency in the fit-out of the buildings.**

DEP.9b **Consider providing financial tools for the tenants to comprehend the economic effects of implementing the energy efficient design options available.**

Please see Response to Comment MEPA.51.

DEP.10 **Consult with BWSC and MassDEP to develop an I/I removal plan that would accommodate wastewater system improvements needed within the project's service area.**

The University met with BWSC June 16, 2014 and consulted with MassDEP on August 19, 2014 to discuss the I/I removal plan and wastewater improvements needed. The I/I offset plan and approach is described in Chapter 4, Utilities.

DEP.11 **Amend the Section 61 Finding for stormwater to include commitments for the stormwater BMPs in sufficient detail to understand them.**

The text in the Section 61 Finding has been revised in the FEIR to indicate that, as each site goes into final design, detailed stormwater management calculations will be provided to demonstrate compliance with regulatory requirements.

DEP.12 **Include detailed drainage plans, calculations, BMP designs, and hydrologic modeling information.**

For the FEIR, a master planning analysis was undertaken to demonstrate overall compliance with stormwater management requirements. Section 4.2 in the FEIR provides this analysis, including a discussion of conceptual BMP designs and the hydrologic modeling. Appendix D provides the calculations. Specific BMPs planned for each site will be detailed during the final design of each site. Additional hydraulic modeling will be performed at that time to verify the adequacy of the system. These calculations will be submitted to the appropriate agencies for review at that time.

DEP.13 **Acknowledge both the MassDEP recycling regulations, 310 CMR 16.00 and solid waste management regulations, pursuant to 310 CMR 19.00 in the section on construction and demolition.**

Harvard's standard specifications required for construction and demolition waste management reference both 310 CMR 16.00 and 310 CMR 19.00.

DEP.14 **Mention proper transport and off-site management/disposal of excavate material in accordance with applicable regulations including, without limitation, 310 CMR 19.00 and 310 CMR 30.00 in the Massachusetts Contingency Plan section.**

Harvard's standard specifications required for excavated soil and materials management reference 310 CMR 19.00, 310 CMR 30.00, and 310 CMR 40.0000.

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The DOER commends the proponent on both the quantity and quality of the information included in the energy and GHG related sections of the DEIR.

Due to the extended time frame over which this project will be completed, it has been granted a special review procedure, whereby the overall plan related to buildings, site and distributed energy sources and mitigation programs are provided in this DEIR, while the modeling and quantification of both energy usage and GHG emissions in accordance with the MEPA GHG Policy and Protocol (Policy) for each individual building or other source will be submitted separately for review as the as-proposed design reaches the point where meaningful modeling results can be obtained.

In order to assist the DOER in reviewing both the individual buildings as well as the existing and as planned energy infrastructure for the Alston Campus, the DOER requests that the proponent provide the following information in the next submittal:

Diagrammatic maps of the distributed energy systems, both existing and as planned for the future, showing the buildings served and all of the sources and interconnecting infrastructure (piping and major electrical feeders), for steam, condensate return, chilled water and electricity. The diagrammatic map should clearly indicate which services are, or will be, generated either fully or partially by CHP. DOER.1

A list of all DE sources and their nominal capacities. DOER.2

A table of the buildings and/or other facilities to be submitted in the special review with following energy supply information for each building: DOER.3

- Connection with the Distributed Energy system: For each service (Electricity, Steam, Chilled Water)
- The source of the energy (e.g. existing Blackstone, future 7 MW CHP plant , new energy facility, existing grid fed chilled water plant , etc.)
- Identification of any building energy conversion systems that will be independent of the Distributed Energy infrastructure (e.g. boilers, chillers, facility dedicated behind the meter CHP systems)

A tabulation of the principal mitigation measures (e.g. Reduction of lighting power density, demand controlled ventilation, energy recovery ventilation, fume hood volume control, air or water source etc.) by area usage type (e.g. Classroom, wet lab, public assembly, food service, dormitories, etc.) that are included in the Green Building Program . DOER.4

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DOER.5 Provide clarification of the following regarding the planned "new energy facility"

- The capacity of the as-proposed plant (MMBTUH Hot Water and Tons Chilled Water)
- The percentage of the electricity required for the chillers will be supplied by the as-proposed 7 MW CHP plant?.
- If an evaluation of a CHP powered plant using the by-product heat to generate chilled water with absorption chillers was performed. If not, explain the reason. If so, provide the principal findings and conclusions.

DOER.6 Provide a summary level assessment of the degree of energy resiliency that existing and as planned energy supply system provides to the as-proposed project, and include a discussion of how this may be improved as needed. In particular discuss which of the generating resources would be able to black start and operate in an island mode and to what extent the Harvard Micro-grid could support island mode generation while isolated from the utility grid.

DOER.7 The DOER appreciates that some of the information provided may at this point in time represent the best available estimate and will probably evolve over time during the detailed planning process. For this reason, the information requested above, should be updated each time a new submittal is prepared under the provisions of the special review procedure.

<u>Distributed Energy Emission Factors:</u>

MEPA requested that the DOER back check the net source emission factor of 0.0661 MTDCE/MMBTU of steam generated by the Blackstone CHP facility, as this is an important factor in the quantification of GHG emissions for all buildings that are supplied from this source.

Based on the description of the methodology for deriving the emission factor as shown on page 149 of the DEIR the DOER performed the check as follows using the following data supplied by Harvard:

- A tabulation of annual fuel consumption, electricity and steam generated for the Blackstone plant.
- The eGrid emission factor of 0.00038 MTDCE/kWh grid supplied electricity.

This information and the value as stated of 0.0661 was used to calculate the related MTDCE for the fuel blend consumed by the Blackstone plant, and this was compared with what would be expected.

The expression for deriving the plant fuel emission factor was:
$MTCO2/MMBTU_F$ =
$MTCO2/MMBTU_S$ +((kWh*3.413*MTCO2/kWh)/$MMBTU_S$))/($MMBTU_F$/$MMBTU_S$)

Subscripts: S= Steam; F = Fuel

Data as supplied by Harvard and reduction as used .

Net Steam MTCDE/MMBTU	MMBTU elec (kWhe* 3.413)	MTDCE/kWh Grid	MTDCE elec.	MMBTU Fuel	MMBTU Steam	MMBTU Fuel/ MMBTU Steam
0.0661	27083	0.000382	10	968599	798453	1.213

This calculation resulted in a value of 0.0545 MTDCE for the blended fuel which is equivalent to 111.5 lbs CO2 per MMBTU. As 98% of the fuel consumed was natural gas, this value is -5% of the emission factor in English units of 117 lbs/MMBTU natural gas as is currently used in MEPA submittals. Accordingly the DOER concludes that the MTDCE/MMBTU steam as shown in the DEIR is supported by this back check.

The MTCDE/MMBTU steam is forecasted to decrease to 0.059. Provide supporting details. DOER.8

PV Solar:

The DOER urges that all of the planned building be evaluated for the incorporation of PV system and that the results of this evaluation be included in the submittals for each of the separate buildings. In addition that all of the buildings that have available space for a future PV system be designed as solar ready, in that the roofs are designed to support the additional live loads and that the building be provided with spare conduits and space for related electrical gear such as inverters and added switch gear as needed. The submittals should provide updated information on the capacity of the installed and planned PV and demonstrate that the proponent is meeting the obligation as a distribution company to install renewable energy capacity. DOER.9 DOER.10

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Section 61:

DOER.11 This section of the FEIR should list all of the energy and related GHG mitigation measures and resulting reductions . This section should be cumulatively updated for each submittal.

Chao Center:

The DOER commends the proponent on the number, quality and degree of energy design measures to be incorporated in the as-proposed building. The comments below address several concerns with the details of the modelling process as well as some guidance for the future submittals.

DOER.12 The FEIR and all future submission of individual building should include a summary of the building HVAC systems, including any service that is being supplied by any of the campus district energy systems.

DOER.13 All side calculations (such the adjustment to the heating efficiency in this submittal) should be shown in full.

Benchmark EUI:

DOER.14 In order to assess the credibility of the base case EUI, it is helpful to be able to compare it with a benchmark for a buildings located in the same climate zone which share a similar composite usage. The DOER encourages the proponent to develop an area weighted EUI based on the information contained in Table C10 of the EIA 2003 CBECS for commercial spaces and Table US4 in the EIA 2005 RECS. It would be very helpful to include this information in each submittal.

Grid Emission Factor:

DOER.15 The MEPA GHG Protocol and Protocol (Policy) requires that the most current ISO-NE average grid emission factor be used. The current factor is 728 lbs /MWH. Revise the GHG quantification in the FEIR accordingly.

DOER.16 As required in the Policy, a copy of the project eQUEST modeling files is to be submitted to the DOER. Please submit via a USB 2.0 or better flash drive.

Appendx 1:

Model Inputs:

Distributed Energy:
To comply with the MA Building Stretch Energy code (SC), the building energy usage must be modeled in compliance with ASHRAE 90.1 Appendix G (energy only). In the case of distributed (purchased) energy Appendix G stipulates that the same source used in the as-proposed case must also be used in the base case. In the case of the Chao building this will apply to both the steam and the chilled water. Revise accordingly in the FEIR. DOER.17

Energy Recovery Ventilation: Provide the % effectiveness for the enthalpy wheel. DOER.18

Occupancy Schedule: Provide a reference to the schedules as shown in the ASHRAE 90.1 User's Manual used in the model, or if these were not used, provide the schedule used. DOER.19

Modeling Outputs:
In order for the DOER to readily check the values in the Annual Site Energy Summary Tables , include in the FEIR and all future submittals copies of the eQUEST the monthly end use reports for at least the base case and the as-proposed (cumulative energy efficiency) cases. If the EE measures are iterated parametrically, the DOER would like to see these summarized as well. DOER.20

DEPARTMENT OF ENERGY RESOURCES

DOER.1 **Include diagrammatic maps of the distributed energy systems, both existing and as planned for the future, showing the buildings served and all of the sources and interconnecting infrastructure, for steam, condensate return, chilled water and electricity. Clearly indicate on the map which services are, or will be, generated either fully or partially by CHP.**

Please refer to Chapter 5, Air Quality and Energy Systems for more information, including the "Existing and Anticipated Energy Supply Arrangements" chart and supply diagrams.

DOER.2 **Include a list of all distributed energy sources and their nominal capacities.**

Please refer to Chapter 5, Air Quality and Energy Systems, for information and details on capacities of distributed energy sources. Note: The Allston campus also has a number of small to moderate scale renewable (e.g. solar PV, wind) and CHP systems (e.g. natural gas fired automotive engine derivative) installations which are not included in the referenced material.

DOER.3 **Include a table of the buildings and/or other facilities to be submitted in the special review with the following energy supply information for each building:**

- **Connection with the Distributed Energy system: For each service (Electricity, Steam, Chilled Water)**
- **The source of the energy (e.g. existing Blackstone, future 7 MW CHP plant , new energy facility, existing grid fed chilled water plant , etc.)**
- **Identification of any building energy conversion systems that will be independent of the Distributed Energy infrastructure (e.g. boilers, chillers, facility dedicated behind the meter CHP systems)**

Please refer to Chapter 5, Air Quality and Energy Systems, for more information, including the "Existing and Anticipated Energy Supply Arrangements" chart and supply diagrams. The identification of any future independent building energy conversion systems beyond what is indicated in Chapter 5, Air Quality and Energy Systems will occur as specific programming and needs assessment activities are performed as each project advances.

DOER.4 **Include a tabulation of the principal mitigation measures (e.g. Reduction of lighting power density, demand controlled ventilation, energy recovery ventilation, fume hood volume control, air or water source etc.) by area usage type (e.g. Classroom, wet lab, public assembly, food service, dormitories, etc.) that are included in the Green Building Program.**

Harvard's Green Building Standards set comprehensive performance standards, rather than prescriptive mitigation measures, as the principal basis for achieving sustainable construction on campus. Harvard's standards focus on requiring processes such as integrated design charrettes, life cycle costing of key energy conservation measures, enhanced commissioning, and measurement and verification procedures that enable design, construction and operations teams working with Harvard to achieve high level energy reductions for the University's facilities. With the rapid pace of change in both knowledge and technology in sustainable design, Harvard decided it was better to regulate the process rather than prescribe specific systems or technologies.

While Harvard cannot definitively state which technologies or measures will be included in future construction, it is important to understand that all of the measures described above have been widely incorporated in the University's recent capital projects. Across 49 LEED-CI certified projects on the Allston and Cambridge campus, Harvard has achieved an average lighting power reduction of over 25% contributing to nearly 200 kW in lighting power reductions compared to code baselines. Demand control ventilation paired with energy recovery systems have been widely adopted in new construction projects, and in multiple instances retrofitted to the University's existing facilities. Variable volume fume hoods have also been used in both new construction and renovation lab projects, and when safety permits, the University further works to reduce the airflow across the face of the fume hoods below the standard 100 linear feet per minute with extensive coordination between University engineers, controls technicians, and environmental health and safety professionals.

DOER.5 **Provide clarification of the following regarding the planned "new energy facility"**

- **The capacity of the as-proposed plant (MMBTUH Hot Water and Tons Chilled Water)**

  The proposed new district chilled water plant and heat conversion equipment are envisioned to be sized to allow for future expansion, with equipment and the distribution network to be installed in phases/increments and expanded over time. Alternatives analysis and design work is ongoing and, as such, specific design and capacities have yet to be finalized.

- **The percentage of the electricity required for the chillers will be supplied by the as-proposed 7 MW CHP plant**

  None of the electricity required for the envisioned chillers to be located in the Science building will be supplied by the proposed combustion turbine generator project. As previously discussed, the electric output of the proposed 7 mega-watt combustion turbine project will be directed to another behind-the-meter Harvard campus microgrid for operational optimization reasons.

- **If an evaluation of a CHP powered plant using the by-product heat to generate chilled water with absorption chillers was performed. If not, explain the reason. If so, provide the principal findings and conclusions.**

  Specific evaluations of utilizing absorption chillers in the proposed district facility in Allston have not been made at this time. One of Harvard's existing district chilled water plants (in Cambridge) has been designed to accept the installation of absorption chillers, should Harvard determine this would be beneficial in the future.

DOER.6 **Provide a summary level assessment of the degree of energy resiliency that existing and as planned energy supply system provides to the as-proposed project, and include a discussion of how this may be improved as needed. In particular, discuss which of the generating resources would be able to black start and operate in an island mode and to what extent the Harvard Micro-grid could support island mode generation while isolated from the utility grid.**

The existing Blackstone CHP plant has four boilers with a total capacity of 700k pph supplying an existing load of approximately 300k pph, which equates to a greater than N+1 production capability. Each boiler has a dual fuel supply; normally fired from natural gas with backup of either ultra-low sulfur diesel (145k gallons on site) or number 6 oil (100k gallons on site). The plant has two water main supplies and a two line 13.8kV main-tie-main electric service backed up by a 2MW diesel generator. Internal plant electric distribution consists of fully redundant 2300v and 480v switchgear lineups. The outgoing steam has two distinct departure points from the plant, with three steam mains leaving via the Cambridge campus tunnel system and two steam mains going to Allston via Western Avenue. There is a steam cross connect between the two systems via the Weeks Bridge. The electric microgrid on the HBS/Athletics campus is supplied by two 13.8kV circuits normally interconnected between the 5MW cogeneration supply and NSTAR, and the main distribution stations at Blackstone and in Allston have auto-transfer capability. All existing customer stations on the microgrid are supplied by a 13.8kV distribution system with a two line, source selective configuration. The existing chilled water plant on the Allston campus is supplied by a fully redundant transformer lineup. Its cooling capacity of 4800 tons is supplying a peak load of 3700 tons.

The above systems have been designed to withstand many typical failure scenarios and can handle most single contingency (i.e., failure of one boiler, pipe, transformer, NSTAR circuit, Harvard circuit, water main, etc.) events. The Blackstone CHP plant's existing 5MW steam generator is load following, so its output varies based on the campus steam load and is at maximum in the winter and minimum (off) in the summer. When the 5MW generator is running, the interconnect at Blackstone is designed to island and ride through any total loss of utility supply. The initial islanding separates the Blackstone complex (plant and office buildings) from the grid and depending on the plant output, some portion (0% - 70%) of the existing Allston microgrid can be supplied after manual switching and coordination with NSTAR. If the 5MW generator was not running or if it trips offline, the 2MW diesel can blackstart the plant to commence steam production, which can then start the 5MW steam turbine (depending on load).

For the proposed systems, the current plan is to create one or more new electric interconnecting points with NSTAR's system in Allston. This would be a different source from the existing Cambridge supply and allow for further redundancy through a potential cross connect between the existing and planned microgrids. The campus electric distribution station will be designed with redundant circuits and auto transfer and is planned to be located above future flooding levels. The new chilled water plant will be designed with redundancy and load growth capability and the area's source of heat is planned to be the existing Blackstone CHP plant (described above). The planned 7MW CHP expansion at Blackstone will add another layer of steam production (slated to be first run), be sourced from dual fuel supplies, be capable of islanding (with output to the Cambridge microgrid) and will also have the existing 2MW diesel for blackstarting.

DOER.7 The information requested above should be updated each time a new submittal is prepared under the provisions of the special review procedure.

To the extent that new information on the University's energy supply is revised, it will be updated as part of Project Commencement Notifications for specific projects.

DOER.8 Provide supporting details of the forecasted decreased in carbon intensity of steam.

The following table shows actual calendar year 2013 data for the Blackstone CHP Plant, in both MMBTUs and MTCDEs. Inputs are natural gas, number 6 oil, and number 2 oil. Outputs are net units of steam and net electric production (plant consumption has been deducted). For carbon intensity, net electric production is treated as a credit.

BLACKSTONE CHP PLANT DATA						
Calendar Year	TOTAL NATURAL GAS MMBtu	TOTAL NO. 6 OIL MMBtu	TOTAL NO. 2 OIL MMBtu	NET ELECTRIC PRODUCED MMBtu	NET STEAM DELIVERED MMBtu	CHP EFFICIENCY
2013	1,069,701	12,723	113	38,626	834,343	80.6%
Calendar Year	TOTAL NATURAL GAS MTCDE	TOTAL NO. 6 OIL MTCDE	TOTAL NO. 2 OIL MTCDE	NET ELECTRIC PRODUCED MTCDE	NET STEAM DELIVERED MMBtu	GHG Intensity MTCDE/MMBTU
2013	56,760	956	8	3,716	834,343	0.0647
New CTG*	63,571	1,071	9	21,320	834,343	0.0519

*The forecasted values for operation with the new CTG assumes a 12% increase in fuel consumption for equivalent steam output and an additional 54 million kWH net production (on top of the existing 11 million). Electric intensity is based on latest eGrid number of 722 lbs. CO2/MWH. Actual performance can be expected to vary based on heating load, which is primarily driven by weather. Assumptions used are conservative and not absolute best case.

DOER.9 **Include an evaluation for the incorporation of PV system in the submittals for each of the separate buildings.**

The updated GHG analysis for the Chao Center included as Appendix E includes additional detail on the potential energy use reductions associated with PV.

DOER.10 **Provide in the submittals updated information on the capacity of the installed and planned PV and demonstrate that the proponent is meeting the obligation as a distribution company to install renewable energy capacity.**

Harvard's subsidiary company, Harvard Dedicated Energy Limited (HDEL), is licensed as a *competitive supplier* in Massachusetts, and is not a distribution company. As a competitive supplier Harvard needs to comply with Massachusetts' Renewable Portfolio Standard (RPS), which requires a certain amount of renewable energy certificates (RECs) to be purchased on an annual basis. If a supplier doesn't purchase any RECs, or purchases an insufficient amount of RECs, then a fee is paid base on the Alternative Compliance Payment (ACP) rates then in effect. When Harvard installs PV on its campus, it will typically have the associated RECs certified and then use them to meet a portion of its RPS requirements.

DOER.11 **List in the Section 61 Findings all of the energy and related GHG mitigation measures and resulting reductions. This section should be cumulatively updated for each submittal.**

The energy and related GHG mitigation measures are described in Chapter 9, Mitigation.

DOER.12 **In the FEIR and all future submissions of individual buildings, include a summary of the building HVAC systems, including any service that is being supplied by any of the campus district energy systems.**

The updated GHG analysis for the Chao Center included as Appendix E has been revised in accordance with the comment.

DOER.13 **Show all side calculations in full.**

The updated GHG analysis for the Chao Center included as Appendix E has been revised in accordance with the comment.

DOER.14 **Develop an area weighted EUI based on the information contained in Table C10 of the EIA 2003 CBECS for commercial spaces and Table US4 in the EIA 2005 RECS. It would be very helpful to include this information in each submittal.**

As detailed in the updated GHG analysis for the Chao Center included as Appendix E, taking an area-weighted of the EUIs from the Table C10 for Education and Food Service, the combined EUI is 141.5 kBtu/ft^2-year. The Chao Center calculated EUI is 90.6 kBtu/ft^2-year, a 36% reduction.

DOER.15 **Revise the GHG quantification to use the most current ISO-NE average grid emission factor, which is 728 lbs/MWH.**

Based on discussions with MEPA and DOER, the report has been revised to reflect the most current ISO-NE average grid emission factor of 719 lbs./MWh.

DOER.16 **Submit to the DOER via a USB 2.0 or better flash drive a copy of the project eQUEST modeling files.**

The eQUEST modeling files for the Chao Center project are being submitted on a flash drive to DOER.

DOER.17 **To comply with the MA Building Stretch Energy code (SC), the building energy usage must be modeled in compliance with ASHRAE 90.1 Appendix G (energy only). In the case of distributed (purchased) energy, Appendix G stipulates that the same source used in the as-proposed case must also be used in the base case. In the case of the Chao building, this will apply to both the steam and the chilled water. Revise accordingly in the FEIR.**

The updated GHG analysis for the Chao Center included as Appendix E has been revised in accordance with the comment.

DOER.18 **Provide the percent effectiveness for the enthalpy wheel.**

The updated GHG analysis for the Chao Center included as Appendix E includes a discussion of the enthalpy wheel. Within the report, please refer to sub-appendix D: HVAC System Parameters.

DOER.19 **Provide a reference to the schedules as shown in the ASHRAE 90.1 User's Manual used in the model, or if these were not used, provide the schedule used.**

The schedules used for this analysis are based on the anticipated program for the building and were developed with the Harvard Business School building operations staff. A space-by-space description of the schedules is included in the revised report.

DOER.20 **Include in the FEIR and all future submittals copies of the eQUEST monthly end use reports for at least the base case and the as-proposed (cumulative energy efficiency) cases. If the EE measures are iterated parametrically, summarize these as well.**

The updated GHG analysis for the Chao Center included as Appendix E has been revised in accordance with the comment. Note, however, that future buildings may or may not be modeled using eQUEST depending on the preferences and practices of the individual design teams. Thus these tables may not always be available.

Deval L. Patrick, Governor
Richard A. Davey, Secretary & CEO

massDOT
Massachusetts Department of Transportation

February 7, 2014

Richard K. Sullivan, Jr., Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114-2150

RE: Boston- Harvard Institutional Master Plan – DEIR (EEA #14069)

ATTN: MEPA Unit
Holly Johnson

Dear Secretary Sullivan:

On behalf of the Massachusetts Department of Transportation, I am submitting comments regarding the proposed Harvard Institutional Master Plan in Boston, as prepared by the Office of Transportation Planning. If you have any questions regarding these comments, please call J. Lionel Lucien, P.E., Manager of the Public/Private Development Unit, at (857) 368-8862.

Sincerely,

Clinton Bench
Deputy Director
Office of Transportation Planning

CB/jll

Ten Park Plaza, Suite 4160, Boston, MA 02116
Tel: 857-368-4636, TDD: 857-368-0655
www.mass.gov/massdot

cc: Francis A. DePaola, P.E., Administrator, Highway Division
Patricia Leavenworth, P.E., Chief Engineer, Highway Division
Walter Heller, P.E., District 6 Highway Director
Neil Boudreau, State Traffic Engineer
MassRIDES
PPDU Files

Deval L. Patrick, Governor
Richard A. Davey, Secretary & CEO

massDOT
Massachusetts Department of Transportation

MEMORANDUM

TO: Clinton Bench, Deputy Executive Director

FROM: Lionel Lucien, Manager, Public/Private Development Unit
Office of Transportation Planning

DATE: February 7, 2014

SUBJECT: Harvard University Institutional Master Plan DEIR-(EEA# 14069)

The Public/Private Development Unit (PPDU) has reviewed the Draft Environmental Impact Report (DEIR) for Harvard University's Ten-Year Institutional Master Plan (IMP). The plan comprises nine projects (seven new construction and two renovations), which the University plans to complete – along with associated infrastructure and open space improvements – over the next decade. The program would consist of 1.4 million square feet of new construction space and approximately 500,000 square feet of renovated space. The overall IMP would include the elimination of some non-institutional parking spaces and the creation of additional institutional and non-institutional parking spaces, resulting in a net increase of 155 parking spaces. The IMP proposal would include the creation of several new private streets around Barry's Corner, as the intersection of Western Avenue/North Harvard Street in Allston is known.

The area affected by the overall master planning effort includes campus paths and streets, both existing and proposed, under the jurisdiction of the University, and a network of existing streets in the nearby residential neighborhoods under the jurisdiction of the City of Boston. The Department of Conservation and Recreation (DCR) also oversees parkways (Soldiers Field Road) and pedestrian bridges within the study area, including the John Weeks Pedestrian Bridge over the Charles River. The Massachusetts Department of Transportation (MassDOT) has jurisdiction over many facilities in the study area, including the Massachusetts Turnpike (MassPike), the roadway bridges over the Charles River (Eliot Bridge, Anderson Memorial Bridge, Western Avenue Bridge, River Street Bridge), and the Cambridge Street Bridge and adjacent pedestrian bridge over the MassPike.

The DEIR includes a transportation study prepared in conformance with EOEEA/MassDOT Guidelines for Transportation Impact Assessments. The study includes a comprehensive evaluation of the IMP transportation impacts based on a thorough evaluation of existing conditions, future No-Build conditions, and future Build conditions. The DEIR has identified a package of mitigation consisting of highway, transit, pedestrian, and bicycle improvements. MassDOT offers the following comments that should be addressed in the FEIR.

Trip Generation

The DEIR has estimated the projected impacts of pending development in the neighborhood, as well as the projected impacts of the proposed program expansions planned in the IMP. Four of the proposed new buildings/uses in the IMP are anticipated to generate new peak hour traffic:

- The Harvard Business School Faculty and Administrative Office Building;
- The Mixed-Use Facility and Basketball Venue;
- The Gateway Project; and
- The Hotel and Conference Center.

The remaining projects are either renovation or building replacement projects and would not add any significant traffic to the roadway network. Trip generation was calculated using Institute of Transportation Engineers (ITE) trip generation and Harvard empirical data. Vehicle occupancy rates and mode share assumptions were based on published Boston Transportation Department (BTD) data for this area of Allston. The ten-year plan projects are anticipated to generate 7,410 new daily vehicle trips, with 725 new vehicle trips during the weekday morning peak hour and 785 vehicle trips during the weekday evening peak hour. Not all of these trips will be new to the study area. The Science Project and the 114 Western Avenue project (both are IMP projects) were previously approved and account for some of these trips and were included in the No-Build conditions analysis. When adjusted accordingly, the remaining ten year projects would generate 5,360 net vehicle trips, including 415 weekday morning peak hour trips and 510 weekday evening peak hour trips.

Trip distribution was assigned according to each individual land use using either demographic data by zip code or Harvard empirical data. Level of service analyses were conducted for 2012 Existing, 2022 No-Build, and 2022 Build conditions.

The Western Avenue/Everett Street intersection is expected to experience additional delays during the 2022 Build condition when compared to the No-Build condition, resulting in congestion. Exclusive pedestrian phasing and high traffic volumes negatively impact queues and delays at this intersection.

Queues on the Soldiers Field off-ramps are projected to be contained within the available storage under most scenarios. One exception occurs during the evening peak hour when operations are projected to degrade under Build conditions at the intersection of Anderson Memorial Bridge at the Soldiers Field westbound MassPike off-ramp. Operations also degrade under Build conditions at the Soldiers Field Road eastbound off-ramp at Western Avenue and on the Soldiers Field Road westbound off-ramp at River Street. Queues at these locations are expected to exceed available storage capacity during at least one peak hour.

Although MassDOT acknowledges that capacity issues exist with or without the IMP ten-year expansion, the traffic resulting from the IMP program measurably degrades operations at all of these locations. Therefore, the University should propose mitigation measures that may include a combination of geometric improvements, signal timing improvements, pavement marking and lane assignment adjustments, and specific TDM measures to avoid making the existing condition worse with the addition of traffic from the campus expansion. The University should continue to work with

DOT.1

MassDOT, DCR, and the City of Boston throughout their master planning process to ensure that additional campus development in Allston does not exacerbate existing congestion issues near the MassPike Exit 18 interchange. DOT.2

Transportation Impacts

MassPike

The MassPike is the regional highway link for North Allston and for the Harvard University Allston Campus, including the site of the proposed institutional expansion. The MassPike intersects the local roadway network at the interchange on Cambridge Street near Soldiers Field Road along the southern boundary of the IMP area. The impacts of this project to the MassPike Cambridge Street interchange ramp system is of concern to MassDOT due to frequent congestion problems at the three closely spaced intersections, which are characterized by difficult geometry and exceptionally high traffic volumes. Approximately 3,300 vehicles enter this interchange/system of intersections during the morning peak hour and 3,600 vehicles during the afternoon peak hour. This results in significant delays and congestion on the approaches to this interchange. As part of the River Street improvements project, MassDOT is evaluating conditions at this intersection to improve its functionality. The University should coordinate with MassDOT on the proposed improvements at this location. DOT.3

MassDOT Bridges

Four roadway bridges and one pedestrian bridge cross the Charles River in the vicinity of the IMP area. Three of the roadway bridges are included in MassDOT's Accelerated Bridges Program: one is under construction (the Anderson Memorial Bridge), and two more are soon to be under construction (Western Avenue Bridge and River Street Bridge). The fourth roadway bridge is the Eliot Bridge. The Anderson Memorial Bridge is the main connection between Harvard University's Cambridge campus and its expanding Allston campus. The fifth bridge over the river is the John Weeks Pedestrian Bridge.

MassDOT will add new five-foot wide bicycle lanes in both directions on the Anderson Bridge, reducing the bridge from a four-lane cross section to a three-lane cross section. The Western Avenue and River Street bridges currently operate as a one-way pair with three travel lanes, but will be modified to include one-way cycle tracks and enhanced pedestrian accommodations. The Western Avenue and River Street Bridges will each continue to carry three lanes of traffic after the modifications. The Cambridge Street Bridge over the MassPike will also be reconstructed from a two-way, six-lane configuration to two-way, four-lane configuration with cycle tracks in both travel directions.

The University should ensure that the proposed bicycle and pedestrian accommodations to mitigate the project's impacts are consistent with the proposed design of the bridge reconstruction projects. These should include accommodations for all users to include pedestrians, bicyclists, and public transit riders. DOT.4

Proposed Traffic Improvements

The project would include signal optimization and coordination of the Barry's Corner intersection with the proposed traffic signals at North Harvard Street/Academic Way to the north and Franklin Street/Kingsley Street to the south. Coordination at these locations would improve flow and manage queues along the North Harvard Street corridor. Queues would be maintained or improved in the Build with Mitigation condition.

At the intersection of Western Avenue/Everett Street, a "No Left Turn" restriction is proposed for the Western Avenue eastbound approach. This restriction is proposed in order to reduce queues on the Western Avenue eastbound approach and would result in a slight improvement in operations.

Additional signal timing optimization is proposed at the intersections of Soldiers Field Road/Eliot Bridge, Western Avenue/Hague Street/Batten Way, and North Harvard Street/Kingsley Street/Franklin Street.

Public Transportation

The existing Harvard shuttle bus service would be expanded to Barry's Corner, and service frequency between the Cambridge campus and the Allston campus would be increased. In the DEIR, the University also proposes to supplement the service with a second shuttle bus route between the campuses. The shuttle is anticipated to operate at 10-minute headways. Additional information on
DOT.5 this shuttle service should be provided in the FEIR, including: the hours of operation, the number of passengers anticipated to use this service, and how it is coordinated with other public transportation services within the study area. This information should be included in the FEIR to determine if the expanded service is adequate to handle the increased demand anticipated as part of the Allston campus expansion.

Transit analysis was completed using 2012 employee zip code information from the Harvard Allston campus. Trips were distributed across various MBTA bus routes in the area. The ten-year plan projects are anticipated to generate approximately 2,160 net daily transit trips, with 165 transit trips during the AM peak hour and 190 trips during the PM peak hour. These transit trips were added to existing ridership volumes provided by the MBTA. The analysis indicates that the project will increase the volume to capacity ratios of key MBTA routes as a result of the ten year plan. As part of an MBTA initiative to improve efficiency, several bus stops along the Route 66 route (the highest-ridership route in the area) will be relocated or eliminated, which is expected to improve operating conditions slightly.

While the University is providing a parallel transit system to lighten the load of their increased demand on the MBTA system, the University has not committed to any mitigation of transit impacts through capacity enhancements or physical improvements (e.g. bus shelters, benches, information kiosks). In the FEIR, the University should commit to providing public transit amenities
DOT.6 of the highest quality throughout the Allston campus, and should continue to work with the MBTA develop details and designs for these amenities.

Bicycle and Pedestrian Accommodations

The DEIR includes a comprehensive inventory of both existing and long-term proposed pedestrian facilities within the IMP boundaries and the study area. The goal of the plan is to provide connections between the Allston and Cambridge campuses as well as to establish pedestrian-scale smaller blocks that connect with the surrounding fabric of the residential neighborhoods in Allston.

The DEIR also includes a bicycle LOS analysis indicating that a majority of movements through signalized intersections operate at acceptable LOS, with the exception of several side streets and one movement at the intersection of Cambridge Street and Soldiers Field Road. The bicycle network is expanding vastly as a result of collaborations between the City of Boston and Harvard University. Bicycle lanes have been installed on North Harvard Street from Soldiers Field Road to Cambridge Street and on Western Avenue from Barry's Corner to Soldiers Field Road. The City has also designated Franklin Street as a bike boulevard.

The long term vision for the bicycle system in the IMP area includes building on this recent investment to include a new north-south bicycle link from Cambridge Street to Soldiers Field Road. Stadium Way and Longfellow Path provide the opportunity to create another north-south connection. The University will continue to advocate for and cooperate with the City in advancing this vision. In addition, the University will provide covered off-street bicycle parking at each new building, convenient to building entrances.

All roadways on the Allston campus – existing and new, public and private, should be designed and built to be consistent with a Complete Streets design approach that provides adequate and safe accommodation for all roadway users, including pedestrians, bicyclists, and public transit riders. Guidance on Complete Streets design guidelines is included in the MassDOT Project Development and Design Guide, as well as the City of Boston Complete Streets design guide. DOT.7

Beacon Park Yard

MassDOT also notes the presence of Beacon Park Yard immediately to the south of the study area. Beacon Park Yard, which is owned by Harvard University, has been used for railroad-related activities for more than a century, and continues to be a strategic rail asset for eastern Massachusetts. The control and use of Beacon Park Yard will change in coming years, as CSX Corporation – which has had a permanent easement for freight rail operations in the yard – completes the withdrawal of its rail and freight operations and associated environmental remediation. After CSX's departure from Beacon Park Yard, Harvard University will assume control and responsibility for the majority of the land within the Yard.

This shift in the control and use of Beacon Park Yard represents an enormous opportunity both for Harvard University and for the greater Boston area, but the ongoing rail needs must not be forgotten in the planning for the future of Beacon Park Yard. MassDOT looks forward to continuing to work with Harvard University to come to a mutually agreeable resolution that will allow Beacon Park Yard to be appropriately redeveloped while also preserving space for railroad infrastructure and vehicles. DOT.8

Transportation Demand Management (TDM)

The project site is located in a dense, urban environment, with a robust system of public transit and bike/pedestrian accommodations. Currently, 80 percent of Harvard employees at the Cambridge/Allston campuses commute by transit, bicycling, and walking. To reinforce this behavior and ensure that the employees in the new development area at least meet this standard, the University has committed to providing the following TDM measures:

- Providing a 50 percent subsidy for MBTA monthly passes;
- Pre-tax savings on the purchase of private transit passes and commuter checks;
- On-line monthly MBTA pass sales;
- Provision of bicycle parking at all new projects, including secure, weather-protected interior bicycle parking for building tenants and ample exterior parking convenient to building entrances for visitors;
- Provision of enhanced Harvard shuttle services between the main campus and the expanding Allston campus;
- Bicycling services, including safe cycling classes and repair clinics;
- Provision of a ridesharing program;
- Provision of walking and bicycle maps;
- Links on University websites to references and resources for transportation options;
- $50 discounted annual membership to Hubway bike sharing program;
- Discounted bicycle helmets for all who are affiliated with the University;
- Harvard affiliates bike registration program;
- Participation in Bicycle Benefit Act, providing bicyclists with up to $240/year for bicycling expenses;
- Discounted and preferential carpool and vanpool parking in the largest garages and several surface parking lots;
- A 50 percent discount on annual parking permits for carpoolers if they carpool with one other employee, and a 75 percent discount off the cost of parking permits if they travel with two or more other employees;
- Carpool partner matching and registration;
- A guaranteed emergency ride home for any employee that uses a non-single-occupancy-vehicle travel mode who experiences an unanticipated issue requiring a significant change in travel plans;
- Zimride, on online ride-sharing program that helps Harvard affiliates locate other people with similar commuting patterns or travel needs;
- RelayRides program to match people who are willing to lend or borrow vehicles from one another;
- Discounted annual ZipCar membership ($25/year) to employees;
- Parking for 28 ZipCars, including five in Allston;
- Approximately 26 preferred parking spaces for low emission vehicles at ten locations at the Cambridge and Allston campuses;
- Two electric vehicle charging stations on the Allston campus at 125 Western Avenue.

- Supporting ride-matching/carpooling through the active promotion of NuRide, the Commonwealth's web-based trip planning and ride-matching system that allows users to earn rewards for taking greener trips.

The IMP DEIR includes a comprehensive TDM program. However, this TDM program is geared mostly toward the proposed new uses on the Allston campus, whereas the IMP is in fact a 10-year master planning document for the campus as a whole. Therefore, the IMP TDM program should address not only the new travel demand, but should review campus-wide, systemic travel issues. Given the large scale of the master planning area, the significant anticipated growth, and the nature of the travel to and from the campus, the FEIR should ensure that the Allston campus as a whole has been reviewed and that the University is maximizing the potential for use of healthy transportation modes. DOT.9

In the FEIR, the University should also add commitments for the following TDM measures: DOT.10

- Designation of an on-site Transportation Coordinator charged with planning, implementing, and communicating the Allston campus TDM program.
- Installation of additional electric vehicle charging stations. The University should conduct a literature review of best practices, identify the number of electric vehicle charging stations that would provide an appropriate ratio for the Allston campus as a whole, and commit to installing that number of electric vehicle charging stations.
- Subsidization of additional Hubway bikeshare stations. The Hubway bike share system offers the potential for carrying a significant proportion of Allston campus – Cambridge campus travel demand, and reducing demand and crowding on Harvard shuttles and MBTA buses at the same time that it provides opportunities for healthy and active travel. The University should conduct an analysis of usage and demand for the existing Allston and Cambridge Hubway stations, identify the number of additional stations required to satisfy existing and future IMP demand, and commit to subsidizing those stations, as well as additional stations as demand warrants in the future.
- The University should conduct periodic surveys of supply and usage of the bicycle parking supply, both interior and exterior, throughout it Allston campus, including at existing buildings. The University should commit to adding secure, weather-protected interior bicycle parking and exterior bicycle parking throughout its Allston campus in order to satisfy maximum bicycle demand.

<u>Traffic Monitoring</u>

The University will be submitting a monitoring program in coordination with the Boston Transportation Department. This monitoring program would include an ongoing transportation and parking analysis program. Specifically, this monitoring program should include details on transit use, bicycling, and walking as well as an evaluation of the effectiveness of the TDM measures implemented. DOT.11

The proponent is encouraged to work with the Public/Private Development Unit and the MassDOT District 4 Office during the preparation of the FEIR. If you have any questions regarding these comments, please contact me at (857) 368-8862 or Derek Valentine at (857) 368-8885.

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION

DOT.1 **Propose mitigation measures that may include a combination of geometric improvements, signal timing improvements, pavement marking and lane assignment adjustments, and specific TDM measures to avoid making the existing condition worse at the Soldiers Field Road off-ramps.**

Chapter 2 presents the proposed transportation mitigation measures.

DOT.2 **Continue to work with MassDOT, DCR, and the City of Boston throughout their master planning process to ensure that additional campus development in Allston does not exacerbate existing congestion issues near the MassPike Exit 18 interchange.**

Harvard will continue to work with MassDOT, DCR, and the City of Boston regarding the operation of intersections near the MassPike Exit 18 interchange.

DOT.3 **Coordinate with MassDOT on the proposed improvements to the MassPike Cambridge Street interchange ramp system.**

Harvard will continue to coordinate with MassDOT on the proposed improvements to the MassPike Cambridge Street interchange ramp system.

DOT.4 **Ensure that the proposed bicycle and pedestrian accommodations to mitigate the project's impacts are consistent with the proposed design of the bridge reconstruction projects. These should include accommodations for all users to include pedestrians, bicyclists, and public transit riders.**

The proposed bicycle and pedestrian enhancements in the Anderson Bridge and Western Avenue Bridge designs complement the collaborative efforts that were completed by Harvard and the City of Boston to implement bike lanes on North Harvard Street and the bike lane/cycle track configuration on Western Avenue. The proposed bicycle and pedestrian system improvements identified in the Ten-Year Plan reflect Harvard's commitments to these modes as integral elements of the plan for the campus plan rather than mitigation for traffic impacts.

DOT.5 **Additional information on the shuttle service should include: the hours of operation, the number of passengers anticipated to use this service, and how it is coordinated with other public transportation services within the study area. Use this information to determine if the expanded service is adequate to handle the increased demand anticipated as part of the Allston campus expansion.**

The DEIR evaluated the Harvard Square Express and concluded that the service would have "volume-to-capacity ratios of approximately 0.44 and 0.31 in the peak direction during the morning and evening peak hours, respectively." Harvard has not determined the specific hours of operation for the Harvard Square shuttle bus, but anticipates that it

will provide weekday morning , mid-day, and evening service, as well as service on weekends. This service, which is free of charge, primarily provides connectivity between the Allston and Cambridge campuses, but also creates opportunities for shuttle bus riders to transfer to MBTA services in Harvard Square.

DOT.6 **Commit to providing public transit amenities of the highest quality throughout the Allston campus, and continue to work with the MBTA to develop details and designs for these amenities.**

Harvard has worked with the City of Boston and the MBTA to provide access to Harvard property for the location of bus shelters as part of the City of Boston street furniture program. Harvard will continue to work with the City of Boston and the MBTA to enhance public transit amenities. In addition, the IMP includes a pedestrian network that will support access to these stop locations.

DOT.7 **All roadways on the Allston campus - existing and new, public and private, should be designed and built to be consistent with a Complete Streets design approach that provides adequate and safe accommodation for all roadway users, including pedestrians, bicyclists, and public transit riders.**

As indicated in the DEIR, the proposed roadways will be designed to be consistent with Boston's Complete Streets Guidelines. In addition, Harvard extended this approach to its campus streets, which were not included as a category within the Guidelines.

DOT.8 **Continue to work with MassDOT to come to a mutually agreeable resolution that will allow Beacon Park Yard to be appropriately redeveloped while also preserving space for railroad infrastructure and vehicles.**

Harvard is working with MassDOT regarding a proposed realignment of the MassPike that would include these elements.

DOT.9 **Ensure that the TDM program for the Allston campus as a whole has been reviewed and that the University is maximizing the potential for use of healthy transportation modes.**

The robust TDM program that was described in the DEIR is Harvard's existing TDM program that applies to existing uses in Allston and Cambridge and will be extended to include the proposed projects in the Ten-Year Plan.

DOT.10 Add commitments for the following TDM measures:

- **Designation of an on-site Transportation Coordinator charged with planning, implementing, and communicating the Allston campus TDM program.**
- **Installation of additional electric vehicle charging stations. Conduct a literature review of best practices, identify the number of electric vehicle charging stations that would provide an appropriate ratio for the Allston campus as a whole, and commit to installing that number of electric vehicle charging stations.**
- **Subsidization of additional Hubway bikeshare stations. Conduct an analysis of usage and demand for the existing Allston and Cambridge Hubway stations, identify the number of additional stations required to satisfy existing and future IMP demand, and commit to subsidizing those stations, as well as additional stations as demand warrants in the future.**
- **Conduct periodic surveys of supply and usage of the bicycle parking supply, both interior and exterior, throughout it Allston campus, including at existing buildings. Commit to adding secure, weather-protected interior bicycle parking and exterior bicycle parking throughout its Allston campus in order to satisfy maximum bicycle demand.**

Staff in Harvard's Commuter Choice Staff program, which currently administer the program for participants in Allston and Cambridge, fulfill the function of Transportation Coordinator in Allston.

Harvard currently has twelve electric charging stations in Allston with two more to be added in the Fall of 2014. Chapter 2 describes the literature search that was conducted of Best Management Practices, and its implications for the Allston campus.

Harvard has been an early supporter of the Hubway bike share system. Harvard sponsors five Hubway stations in Allston and the Longwood Medical Area and six stations in Cambridge. Harvard also provides a discounted annual Hubway membership to Harvard affiliates. Harvard will continue to work regularly with the Hubway program to monitor the use of Hubway stations and expand the number of docks or stations, as necessary as future demand warrants.

Harvard regularly monitors the use of its bike parking areas and upgrades facilities as necessary. Chapter 2 describes the anticipated number of new bike parking spaces that would be added to the bike parking supply in Allston. These spaces would include weather protected parking and will be evaluated further and implemented as part of the individual IMP projects.

DOT.11 **Include in the transportation monitoring program details on transit use, bicycling, and walking as well as an evaluation of the effectiveness of the TDM measures implemented.**

The proposed monitoring program is described in Chapter 2.

The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

February 7, 2014

Secretary Richard K. Sullivan, Jr.
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114-2524

Attn.: Holly Johnson, MEPA Office

RE: Harvard University 10-Year Master Plan, Boston (Allston Campus)
MHC# RC.39858; **EEA# 14069**

Dear Secretary Bowles:

Staff of the Massachusetts Historical Commission (MHC) have reviewed the Draft Environmental Impact Report (DEIR) regarding the proposed 10-year institutional master plan for the development of Harvard University's Allston campus and have the following comments.

The MHC had previously recommended that an archaeological reconnaissance survey (950 CMR 70) be completed for the Allston campus planning area. The goal of the reconnaissance survey is to identify specific project locations where significant historic or prehistoric archaeological resources are predicted, so that an intensive (locational) survey could be conducted in the project areas that are determined to be archaeologically sensitive.

Review of MHC's files indicates that MHC has no record of the completion of an archaeological reconnaissance survey. An archaeological reconnaissance report has not yet been submitted to the MHC for review. Thus, because the MHC does not have an archaeological reconnaissance report (see 950 CMR 70.14), the MHC is unable to evaluate the information provided in Section 6.2 (page 168) and Section 9.0 (page 187) regarding archaeological sensitivity and archaeological survey needs. The MHC requests that an archaeological reconnaissance report be submitted to MHC for review and comment as soon as possible. MHC.1

Review of MHC's files indicates that a PNF has been filed with this office for the demolition of Kresge Hall for the construction of the Ruth Mulan Chu Chao Center.

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www.sec.state.ma.us/mhc

MHC.2 However, PNF's have not yet been submitted to the MHC for the other 10 projects that are noted in section 6.0 (pages 164-167). The MHC is particularly concerned about Harvard Stadium, which is National Historic Landmark and is listed in the National and State Registers of Historic Places and the other projects that are located within the Harvard Business School, which is included in the MHC's Inventory of Historic and Archaeological Assets of the Commonwealth and is considered eligible for listing in the National Register.

MHC.3 The planning process for the Allston Campus should consider the need to protect historic and archaeological properties from adverse effects. Consideration of historic settings and characteristics should be made in order to establish compatible designs for new buildings that are sensitive to the historic resources. Such consideration should be made in determining the quantity of new buildings (density), and their size, scale, massing, and materials.

These comments are offered to assist in compliance with Massachusetts General Laws, Chapter 9, Sec. 26-27C, as amended by Chapter 254 of the Acts of 1988 (950 CMR 71) and MEPA (301 CMR 11). If you have any questions, please feel free to contact me.

Sincerely,

Brona Simon

Brona Simon
Executive Director
State Historic Preservation Officer
State Archaeologist
Massachusetts Historical Commission

xc: Will Donham, Harvard University Planning & Project Management
Patrice Kish, DCR
Ellen Lipsey, BLC
Gene Autler, BRA
Phil Weinberg, DEP
Ben Lynch, DEP
Marianne Connolly, MWRA
Taya Dixon, Epsilon
Deborah Cox, PAL

MASSACHUSETTS HISTORICAL COMMISSION

MHC.1 **Submit to the MHC an archaeological reconnaissance report as soon as possible.**

Chapter 6, Historic Resources, describes the status of the archaeological resources analysis.

MHC.2 **A PNF has been filed for the demolition of Kresge Hall, but PNFs have not yet been submitted to the MHC for the other 10 projects that are noted in section 6.0.**

As described in the DEIR, PNFs will be filed for each individual project that may impact historic resources and for which there is any associated state body funding or licensing. The MHC PNFs will be filed at a point at which there is enough design information to make such a filing.

MHC.3 **Consider the need to protect historic and archaeological properties from adverse effects. Consideration of historic settings and characteristics should be made in order to establish compatible designs for new buildings that are sensitive to the historic resources. Consideration should be made in determining the quantity of new buildings (density), and their size, scale, massing, and materials.**

As described in the DEIR, the planning principles for the Ten-Year Plan recognize the importance of protecting the historic setting of the Allston campus. Included in the planning principles are:

- New development should continue the tradition of a campus that is as diverse architecturally as it is academically, allowing for varied scales and materials. Vertical elements and landmarks should be included to mark special functions and key focal points. Development should strengthen the qualities that make the campus unique and also reinforce patterns and traces of history, while simultaneously meeting contemporary needs.
- Plans should acknowledge the heritage of the area by incorporating historical references, maintaining view corridors, and featuring and preserving landmarks.

MASSACHUSETTS WATER RESOURCES AUTHORITY
Charlestown Navy Yard
100 First Avenue, Building 39
Boston, MA 02129

Frederick A. Laskey
Executive Director

Telephone: (617) 242-6000
Fax: (617) 788-4899
TTY: (617) 788-4971

February 7, 2014

Richard Sullivan, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge St, Suite 900
Attn: MEPA Office, Holly Johnson
Boston, MA 02114

Subject: EOEEA #14069 – Harvard University's Campus, Allston, MA
Draft Environmental Impact Report

Dear Secretary Sullivan:

The Massachusetts Water Resources Authority (MWRA) appreciates the opportunity to comment on the Draft Environmental Impact Report (DEIR) for Harvard's University's Campus in Allston filed by Harvard University (the "Proponent"). The overall program presented now is based on planning and refinement of the projects within Harvard's Institutional Master Plan (IMP). The overall projects described in the DEIR consist of 1.4 million square feet of new construction and 500,000 square feet of renovation of existing buildings. The final IMP approved by the Boston Zoning Commission amended the zoning map to add approximately 34 acres of land to the Harvard University Overlay Area (the" IMP Area") bringing the total Harvard landholdings in the IMP to 189 acres.

MWRA's comments raised in response to the Proponent's Notice of Project Change (NPC) filed in April 2013 focused on stormwater and sanitary sewer systems, infiltration and Inflow (I/I removal), the need for Section 8 (m) permits, and a suggestion to meet with MWRA staff to assure that water and wastewater infrastructure issues are addressed thoroughly through the environmental review process. The Proponent met with MWRA staff in December of 2013 to discuss these issues prior to finalizing the DEIR.

Stormwater Drainage and Sanitary Sewer Systems

In response to MWRA's comments regarding impacts to MWRA's sewer system and combined sewer overflows (CSOs) to the Charles River in wet weather, the Proponent states in the DEIR that, under dry weather conditions and most wet weather conditions, the Boston Water and Sewer Commission (BWSC) and MWRA systems have sufficient capacity to convey the sanitary flows from the nine proposed Allston Campus projects to the Ward Street Headworks and eventually to the Deer Island Wastewater Treatment Facility. The Proponent describes in Section 4.1 of the DEIR that under more extreme wet weather conditions when combined sewer overflows occur in the MWRA system, the contribution of any new wastewater could increase the volume of CSO discharge. The DEIR states that Harvard's Institutional Master Plan (IMP) and the project associated with campus development must comply with the mitigation requirements of BWSC and Mass DEP that any new wastewater flows be offset by reducing Infiltration and Inflow (I/I) into sewer systems. The mitigation goals require that for

every gallon of flow that is being put into the system as part of the new development, four gallons of I/I must be removed. MWRA requests that the Final Impact Report include a description of the I/I offset plan and its efficacy in mitigating the potential impacts of the Allston Campus's new wastewater flows. MWRA.1

TRAC Permitting

In response to MWRA's comments regarding prohibition of groundwater discharge to the sanitary system and the Proponent's need to secure a USEPA-NPDES General Permit for stormwater discharges for construction activities, the Proponent acknowledges to meet the requirements when design documents are prepared for each project.

Section 8 (m) Permitting

Section 8 (m) of Chapter 372 of the Acts of 1984, MWRA's Enabling Legislation, enables the MWRA to issue permits to build, construct, excavate, or cross within or near an easement or other property interest held by the MWRA, with the goal of protecting Authority-owned infrastructure. MWRA owns and maintains large water and wastewater infrastructure within the project area. The Proponent has been working with staff from both MWRA's Water and Wastewater Permitting Groups since 2006 and is aware of the need to obtain MWRA 8(m) permits.

MWRA will continue to work with the Proponent and/or their consultants to identify where 8 (m) permits will be required. As stated in earlier comment letters, we suggest that the Proponent contact Mr. Ralph Francesconi within MWRA's Water Permitting Group at (617) 350-5827 or Mr. Kevin McKenna at (617) 350-5956 within the MWRA's Wastewater Permitting Group for permitting guidance.

Should you have any questions or need additional information on these comments please feel to contact me at (617) 788-1165.

Sincerely,

Marianne Connolly

Marianne Connolly,
Senior Program Manager,
Environmental Review & Compliance

cc: David Kubiak, MWRA Engineering & Construction
Kattia Thomas, TRAC
Ralph Francesconi, Water Permitting
Kevin McKenna, Waste Water Permitting

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MASSACHUSETTS WATER RESOURCES AUTHORITY

MWRA.1 Include a description of the I/I offset plan and its efficacy in mitigating the potential impacts of the Allston Campus's new wastewater flows.

The I/I plan and approach is described in Chapter 4, Utilities.

Boston Water and Sewer Commission

980 Harrison Avenue
Boston, MA 02119-2540
617-989-7000

February 6, 2014

Secretary Richard K. Sullivan, Jr.
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
Holly Johnson, EEA No. 14069
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Draft Environmental Impact Report
Harvard University's Institutional Master Plan

Dear Secretary Sullivan:

The Boston Water and Sewer Commission (BWSC, the Commission) has reviewed the Draft Environmental Impact Report (DEIR) for Harvard University's Institutional Master Plan. The DEIR presents Harvard's Ten-Year Institutional Master Plan (IMP) for its campus in Allston. The Ten-Year Plan comprises nine projects (seven new construction and two renovation). In addition, the Ten-Year Plan includes additional small projects that may be undertaken by Harvard Athletics that are included for completeness. The University plans to undertake these projects and associated infrastructure and open space improvements over the next decade.

The Commission has commented on the IMP several times in recent years. In November, 2012, the (Commission) submitted comments to the Boston Redevelopment Authority (BRA) regarding the Project Notification Form for Harvard's new IMP. In April, 2013, the Commission submitted comments to MEPA regarding the Notice of Project Change (NPC) for the IMP. In September, 2013, the Commission submitted additional comments to the BRA regarding the IMP for Harvard University. The Commission comments regarding Harvard's IMP were generally the same in all those letters. Most of the Commission's comments were addressed by Harvard in the various documents it submitted to the BRA or MEPA, or they will be addressed during review of site plans for individual projects submitted by Harvard to the Commission in the future. For those reasons the Commission's usual comments are not reiterated herein.

However, for the record, the Commission submits the following additional comments regarding Harvard University's Institutional Master Plan:

1. Within the IMP Area, the ten-year plan includes demolition of existing buildings, including some older high water using and wastewater generating buildings such as Burden Hall and Kresge Hall. According to Harvard, the reduction in water use and wastewater generation by demolishing older less efficient buildings will help off-set the

water and wastewater requirements of the new, more efficient Harvard building space being proposed for the IMP's ten-year term. Also proposed is a significant amount of renovation that will also result in reduced water and wastewater requirements as older fixtures are replaced with new more efficient fixtures. Overall, it is estimated that the development described in the IMP will result in a net increase in average annual water demand of approximately 146,908 gallons per day (gpd) and 133,553 gpd of wastewater generation. Harvard proposes to offset the increase in wastewater generation from its ten-year plan by removing infiltration and inflow (I/I) in the area at a ratio of 4 gallons I/I removed per gallon of wastewater generated. With each future site plan for individual projects Harvard University will be required to refine these figures and identify specifically how the I/I mitigation will be accomplished.

BWSC.1

2. The DEIR includes estimates of water demand and sewage generation for the various elements of the development plan and details are provided regarding the capacities of the water distribution and sewer systems serving the proposed development. Estimates of stormwater runoff and treatment volumes also are included. The Commission will review the estimates and analyses in detail with the proponent as site plans for individual projects progress.

3. In 2007, and several times since, University representatives and the Commission met to discuss plans for the new Science Complex project and the University's short and long-term expansion plans. In the course of the discussions, the University agreed that in return for being allowed to proceed in the short term with the construction of the Science Center and construction of a new 72-inch drain on the Science Center site, it would later construct a new storm drain (66-inches to 72-inches in size) to convey flows from the Commission's upstream North Harvard Street storm drain network to the new 72-inch drain on the Science Complex site. These plans are shown on an undated plan provided by the University to the Commission around 2009. At that time, the Commission agreed to proceed with improvements within the North Harvard Street drainage network to relieve flooding in the upstream neighborhoods.

   Also as part of the agreement between the Commission and Harvard University, in order to accommodate upstream flows, the University agreed to construct a new 72-inch storm drain down Western Avenue to a new outfall to be constructed on the Charles River. The University would then disconnect the 72-inch storm drain on the Science Center site from the Shepard Brook drain and redirect the flows to the new Western Avenue drain. The Commission is in receipt of plans from the University for the Western Avenue drain dated 2007.

   Construction of Harvard's Science Complex and the on-site 72 inch storm drain has since been completed, and the Commission has completed the agreed to improvements in the North Harvard Street drainage network, including installation of a 72-inch stub intended to connect the proposed North Harvard Street drain. However, construction of the proposed North Harvard Street and Western Avenue storm drains by Harvard University has yet to commence.

In the DEIR it is stated that Harvard utilized the Commission's SWMM model to evaluate the effectiveness of the proposed North Harvard Street and Western Avenue storm drains. Based on its analysis the University claims that extending the proposed drains through the campus to the Charles River will not reduce flooding in the upstream neighborhoods, due to existing capacity issues in the upstream neighborhoods. The Commission disagrees with this finding. The Commission recently conducted an analysis of the drainage system using the SWMM model, which was updated to include the recent improvements to the North Harvard Street drainage network. The model demonstrated that with the extension of the proposed North Harvard Street and Western Avenue storm drains by Harvard, flooding was significantly reduced.

Construction of the proposed North Harvard Street and Western Avenue drains was agreed to by Harvard University. The proposed drains are essential to relieving flooding the drainage network. The issue of the proposed storm drains must be addressed by the University before the Commission will approve any future development plans on the campus. BWSC.2

4. In the DEIR Harvard commits to incorporation of green infrastructure as the means for achieving the phosphorus reductions required by the Total Maximum Daily Load (TMDL) for Nutrients established for the Lower Charles River Watershed by the Massachusetts Department of Environmental Protection, and complying with the City of Boston's Complete Streets Initiative. With each site plan submitted to the Commission for individual projects, Harvard will be required to specifically identify how the phosphorus reductions and the goals of the Complete Streets Initiative will be accomplished. BWSC.3 Also, Harvard will be required to develop a maintenance plan for the proposed green infrastructure. BWSC.4

Thank you for the opportunity to comment on this project.

Yours truly,

John P. Sullivan, P.E.
Chief Engineer

JPS/as

C: K. Lapp, Executive Vice President, Harvard University
G. Roach, CDM Smith
M. Zlody, Boston Environment Department
P. Larocque, BWSC

BOSTON WATER AND SEWER COMMISSION

BWSC.1 **With each future site plan for individual projects Harvard University will be required to refine the water and wastewater generation figures and identify specifically how the I/I mitigation will be accomplished.**

Harvard University will refine water and wastewater generation figures for the site plan review submittal for each IMP project and at that time, describe how the I/I mitigation will be accomplished. The general I/I offset plan and approach is described in Chapter 4, Utilities.

BWSC.2 **Address the issue of the proposed North Harvard Street and Western Avenue storm drains.**

The issue of the discrepancy in the stormwater modeling is discussed in Chapter 4, Utilities.

Discussions with BWSC on the 72-inch drain are ongoing. This evaluation now includes the area to the north of Ray Mellone Park where an existing 36-inch drain collapsed earlier this summer. The pipe has been repaired by BWSC and Harvard will continue to work with BWSC to evaluate the drainage needs of this area over the term of the IMP. Harvard has planned and sized the Greenway to accommodate a variety of public and private infrastructure, including preserving a corridor for the construction of a drain line if and when it is needed.

BWSC.3 **With each site plan submitted, specifically identify how the phosphorus reductions and the goals of the Complete Streets Initiative will be accomplished.**

Phosphorous reductions will be met by using infiltrative/filtering BMPs, such as rain gardens/bioretention areas and porous pavements, and using proprietary particle separator devices. At the master planning level, space requirements for rain gardens/bioretention to meet the treatment requirements have been identified for each site. As sites go to final design, the choice and sizing of treatment BMPs will be refined and incorporated into hydrologic models to demonstrate compliance with the requirements.

BWSC.4 **Develop a maintenance plan for the proposed green infrastructure.**

The maintenance plan for the proposed green infrastructure is provided in Section 4.2 of the FEIR.

Feb. 7, 2014

Secretary Richard K. Sullivan
Executive Office of Energy & Environmental Affairs
Attn: MEPA Office, EEA No. 14069
100 Cambridge Street, suite 900
Boston, MA 02114

Re: Comments on Draft DEIR Notice of Project Change
EEA No. 14069; Harvard University Campus in Allston

Dear Secretary Sullivan:

The City of Cambridge submits the following comments on the Draft Environmental Impact Report (DEIR) regarding changes to Harvard's Allston Campus Plan. While the changes proposed in this document scale back development in many way and reduce impacts in the shorter time frame proposed, Harvard should be leading the way in demonstrating the highest standards of sustainability in all manner of its development and mitigation in both the short-term and longer term, as well as keeping in mind more significant steps to keep the Allston campus a model of innovation in how it functions and relates to the communities of Allston and Cambridge.

The City requests that the Secretary condition the EIR to address the following issues:

Transportation Connections

- The connection of the new Allston campus to the main campus in Cambridge will continue to be a vital link to both students and employees and should be focused on increasing the strength of sustainable transportation. Harvard should complete a comprehensive review of its transportation connections to Cambridge and work with the City of Cambridge to review how those connections function now and in the future, and if additional steps can be taken to strengthen them in both the short and long terms. CAM.1
- As a general principle, networks work only as well when they function reliably. With so many people relying on foot, bicycle and transit, Harvard should dedicate resources to regular maintenance of the facilities, for example, including a commitment to clear snow from multi-use paths and transit stops. CAM.2

Bicycle Network and Planning

- Harvard should have a plan for bicycle facilities that work for all ages and ranges of cycling abilities both within the Allston campus and on all connecting roadways to

CAM.3 Allston and Cambridge. Special consideration of separated facilities should be given on all streets that are not local, low speed streets, where other bicycle facilities might be appropriate.

CAM.4
- The plan for bicycle paths access needs to be integrated to the same extent throughout the entire campus as the pedestrian plan. Bicyclists need to be able to travel safely and seamlessly among and between the campus buildings and the plan should incorporate both multi-use paths and separated bicycle and pedestrian paths as appropriate.

CAM.5
- Even after the DCR makes Weeks Foot Bridge accessible, cyclists will still not be able to get over Storrow Drive. Harvard should make the pedestrian bridge over Storrow Drive accessible between the Weeks Foot Bridge and Harvards' North Allston Campus. Not making this improvement leave a missing link in the bicycle network between the Cambridge and Allston Campuses.

CAM.6
- Harvard should commit to adding additional Hubway stations in North Allston over and above the existing, and as part of new buildings coming on line so that they are immediately available to students and employees and the stage is set for these options the moment a building is open. The DEIR statement that these will be added only "as demand requires" is too vague and unpredictable.

CAM.7
- A comprehensive plan for bicycle parking needs to be provided, with details regarding the number of spaces and committing to high quality bicycle parking. Bicycle parking should be state-of-the-art, with secure covered bicycle parking and easy access (for example, as was created at the Harvard Law School site), and with long-term spaces as well as short-term spaces. We suggest that performance standards for bicycle parking follow Cambridge's zoning requirements, which were adopted in 2013 and represent state-of-the-art practice: http://www.cambridgema.gov/CDD/Projects/Planning/bicycleparkingzoning.aspx

Multi-Use Paths and Greenway

CAM.8
- Any new or upgraded bicycling and walking paths in the proposed Greenway must meet best practice design guidance: there should be separate dedicated walking and cycling paths, ideally each 10-12' in width; if the path is a shared-use path, the minimum for this kind of facility should be 14' wide.

CAM.9
- The creation of the Greenway should be tied to a schedule of implementation, in accordance with phased permitting of the project.

Dr. Paul Dudley Bicycle Path

CAM.10
- As part of this project, Harvard should invest in improvements to the Dr. Paul Dudley White Bicycle Pat in the areas on both sides of the river where people can be expected to be accessing the new development; the geographical limits would be approximately those shown in the project area (the Elliot Bridge – River Street Bridge). The required improvements should be to reconstruct the paths, increasing the width to 12-14' or creating separate bicycle and pedestrian paths and improving path crossings of intersections, with generous consideration given to path users in signal phasing.

Transit Improvements

- Transit will be an important component to an overall transportation plan that reduces single occupant vehicle trips to the campus. Among the measures that Harvard has proposed to achieve this is to enhance its existing shuttle bus system including provide a new service between Harvard Square and Allston. We are concerned about how such a service might impact the road conditions in Cambridge. Harvard should prepare a detailed plan for the expanded shuttle services that provides for adequate numbers of stops, including in Harvard Square, and routes to accommodate the needed headways and meet its transit goals. This plan should be reviewed and coordinated with the Cambridge Traffic, Parking, & Transportation Department and the Environmental & Transportation Planning Division/Community Development Department. Any transit plans must take into account street design that is already established for prioritizing bicycle and pedestrian facilities and no plan should be proposed that degrades the conditions for bicycling and walking. Harvard will need to commit to the possibility that it will need to rebuild street sections in order to ensure safe passage and stops along its route. CAM.11
- Regarding the MBTA's Route 66 bus, given that it is already experiencing capacity issues and delays during peak traffic periods, Harvard should immediately engage with the MBTA service planning process to ensure that adequate service will be provided. CAM.12
- Harvard Shuttles should be more seamlessly with the MBTA buses and permit ridership to the public beyond the Allston neighborhood residents. CAM.13
- Bus priority signals or bus queue jumps for MBTA and Harvard Shuttle buses should be evaluated and only proposed if conditions for cyclists can be demonstrated to be enhanced or not preclude future enhancements. CAM.14
- It is not clear if Harvard Shuttles will get stuck in traffic. If so, means to separate shuttles and other forms of public transportation should be evaluated. Should there be a new bridge for buses, bikes and pedestrians across the Charles River? CAM.15
- All shuttle bus stops should have real-time arrival times at the stop, in addition to the Shuttle Tracker on cell phones, because not everyone has a cell phone. CAM.16

Transportation Demand Management and Mode Share

- Harvard is proposing a SOV mode share goal of under 40% which is low and will not provide the incentive needed to promote more sustainable modes of travel to campus. It seems that a much more aggressive goal is achievable given that Harvard already has lower than a 20% SOV mode share in Longwood and Allston, and a 13% SOV mode share in Cambridge (2013). This goal should be lowered to be more in line with current mode share splits, and transportation options be strengthened as need be to meet that goal. CAM.17
    - Reference: on pg. 112 the following is stated:

In 2012, 14 percent of Cambridge/Allston employees and 15 percent of Longwood employees drove to work alone. 78 percent of Longwood employees and 80 percent of Cambridge/Allston employees commuted by transit, bicycle or walking.

- Mode share for walking and bicycling must be separated, not lumped together. CAM.18
- The current bicycle mode share for Harvard in Cambridge is over 15%. The goal for the Allston project for a 10-year time frame should be at least 20%.

CAM.19 • Additional details should be given to describe how the proposed mobility hubs will function and if any physical improvements will be needed to maximize their convenience and use.

Parking:

CAM.20 • Parking should not be subsidized because it encourages driving over more sustainable forms of travel such as transit, bicycling and walking. Parking fees for staff is $133/month for unreserved spaces and $142/month for reserved spaces. The study did not compare that to market rate parking fees for the area, which is should to make sure staff parking fees are not below market rate. This seems apparent since student parking fees are $250-$266/month. It is not clear why staff parking is subsidized.

CAM.21 • Please review parking demand today or in the future, with a mode share goal. The study talked about a 0.75 parking ratio, but didn't discuss how that ratio relates to actual parking demand. How many employees and students are expected? What is their mode share goal and how does that relate to the parking demand?

CAM.22 • There was no discussion of shared parking between users that have peak parking demands at different times of day. This is an important way to reduce the space and land required for parking and not overbuild (as well as save money since automobile parking is expensive).

Traffic Analysis:

CAM.23 • Please provide copy of Harvard's North Allston Area Synchro files so we can coordinate with our own work on signals on the Cambridge side of the River.

Implementation of Mitigation Measures

CAM.24 • When major project permits are issued, they are usually accompanied by requirements to implement mitigation measures at specified times, e.g., with a building or occupancy permit. Having the mitigation measures implemented commensurate with the construction is vital to ensuring the success of the plan. It is a key element of any approval of this project that relevant mitigation and necessary infrastructure improvements and changes be in place before a building opens, so each building or phase should have a required mitigation measure tied to it.

The City appreciates this opportunity to comment. If there are any questions, please contact Susanne Rasmussen, Director of Environmental and Transportation Planning at 617-349-4607.

Very truly yours,

Richard C. Rossi
City Manager

CITY OF CAMBRIDGE

CAM.1 **Complete a comprehensive review of transportation connections to Cambridge and work with the City of Cambridge to review how those connections function now and in the future, and if additional steps can be taken to strengthen them in both the short and long terms.**

Harvard met with the City of Cambridge on June 18, 2014 and reviewed the transportation connections between the Allston Campus and Cambridge. The river crossings, particularly the Anderson and Weeks Bridges, provide the key connections between the Cambridge and the Allston campus. Harvard completed a detailed analysis of the transportation system serving the IMP area, which includes these connections, and described a multimodal approach of recently completed actions, ongoing efforts and potential future actions, including:

- Collaboration with the City of Boston to implement bike lanes on North Harvard Street and Western Avenue, including the Western Avenue cycle track.
- Coordination with MassDOT to ensure that the designs of the Anderson Bridge, Western Avenue Bridge and River Street include new bike lanes and improved pedestrian crossings.
- Coordination with the City of Cambridge regarding the implementation of bike lanes on JFK Street between Memorial Drive and Eliot Street.
- Coordination with DCR to implement accessibility improvements on the John Weeks Bridge and to plan for accessibility improvements on the Sinclair Weeks Bridge.
- Coordination with the MBTA to consolidate bus stops on North Harvard Street and Western Avenue, enhancing service quality and operations of the Route 66, 70/70A, and 86.
- New and enhanced shuttle bus services between the campuses as part of the IMP.
- Sponsorship of Hubway stations in Allston and Cambridge.
- Signal timing modifications to signals along Soldiers Field Road to address background and IMP-related traffic impacts.

As appropriate, Harvard will review the status of these actions as part of future Article 80 and MEPA Special Review Procedure filings.

CAM.2 **Dedicate resources to regular maintenance of the facilities, for example, including a commitment to clear snow from multi-use paths and transit stops.**

Harvard provides snow removal for multiuse paths within its campus and clears sidewalks adjacent to its property.

CAM.3 **Consider separated facilities on all streets that are not local, low speed streets, where other bicycle facilities might be appropriate.**

Harvard has collaborated with the City of Boston to implement a cycle track on Western Avenue. Harvard proposes to work with the City of Boston to upgrade bicycle facilities on Western Avenue as IMP projects are constructed along this corridor. The IMP includes other types of bicycle facilities consistent with Boston's Bike Plan and its Complete Streets Guidelines.

CAM.4 **Integrate the plan for bicycle paths access to the same extent throughout the campus as the pedestrian plan. Incorporate both multi-use paths and separated bicycle and pedestrian paths as appropriate.**

Harvard prioritizes pedestrian use on the paths within its campus. The DEIR identified appropriate locations for bicycle paths, providing a comprehensive bicycle network that integrates campus paths with local and regional bike facilities and respects the needs of pedestrians.

CAM.5 **Make the pedestrian bridge over Storrow Drive accessible between the Weeks Foot Bridge and Harvard's North Allston Campus.**

Harvard will continue to coordinate with DCR regarding potential improvements to the Sinclair Weeks Bridge over Soldiers Field Road.

CAM.6 **Commit to adding additional Hubway stations in North Allston over and above the existing, and as part of new buildings coming on line so that they are immediately available to students and employees and the stage is set for these options the moment a building is open.**

As part of the review of future IMP projects, Harvard will work with Hubway to evaluate the need for additional Hubway stations and will incorporate the additional stations or the expansion of existing stations, as warranted in these projects.

CAM.7 **Provide a comprehensive plan for bicycle parking needs. Bicycle parking should be state-of-the-art, with secure covered bicycle parking and easy access (for example, as was created at the Harvard Law School site), and with long-term spaces as well as short-term spaces. Suggested that performance standards for bicycle parking follow Cambridge's zoning requirements.**

Chapter 2 provides information about bicycle parking. Harvard will develop and implement parking based on the City of Boston guidelines.

CAM.8 **Any new or upgraded bicycling and walking paths in the proposed Greenway must meet best practice design guidance: there should be separate dedicated walking and cycling paths, ideally each 10-12' in width; if the path is a shared-use path, the minimum for this kind of facility should be 14' wide.**

Harvard will work with the City of Boston to develop the paths in the Greenway.

CAM.9 **Tie the creation of the Greenway to a schedule of implementation in accordance with phased permitting of the project.**

Harvard will work with the City of Boston to develop an implementation schedule for the Greenway. The Ten-Year Plan includes elements of the Greenway that are adjacent to the IMP projects.

The IMP includes the Greenway in the Long-Term Vision context rather than the Ten-Year Plan because the timeline for actual completion of the green space relies upon a number of factors, including the ability to access and have control of the entirety of the land. Before CSX Transportation (the current holder of the exclusive railroad easement encumbering the Allston Landing North area) may transfer control of this land to Harvard, CSX Transportation must complete agreed-upon environmental testing and remediation. This work is underway but a timeline for its completion is not finalized.

More information on the Greenway, its implementation, and its features is presented in Chapter 1, Project Description.

CAM.10 **Invest in improvements to the Dr. Paul Dudley White Bicycle Path in the areas on both sides of the river where people can be expected to be accessing the new development; the geographical limits would be approximately those shown in the project area (the Eliot Bridge – River Street Bridge). The required improvements should be to reconstruct the paths, increasing the width to 12-14' or creating separate bicycle and pedestrian paths and improving path crossings of intersections, with generous consideration given to path users in signal phasing.**

Harvard has proposed to upgrade the cycle track along Western Avenue as part of the Ten-Year Plan. These improvements will build on past collaboration with the City of Boston, MassDOT and DCR to develop and support bicycle improvements to North

Harvard Street, Western Avenue and the bridges over the Charles River. The focus of these improvements is to enhance connectivity between Boston and Cambridge and to provide a better bicycle distribution network to and from regional facilities like the river paths. Harvard believes that this approach is consistent with the scope and needs of the Ten-Year plan.

CAM.11 **Prepare a detailed plan for the expanded shuttle services that provides for adequate numbers of stops, including in Harvard Square, and routes to accommodate the needed headways and meet its transit goals. Review and coordinate plan with the Cambridge Traffic, Parking, & Transportation Department and the Environmental & Transportation Planning Division/Community Development Department. Take into account street design that is already established for prioritizing bicycle and pedestrian facilities and no plan should be proposed that degrades the conditions for bicycling and walking. Commit to the possibility that there may be a need to rebuild street sections in order to ensure safe passage and stops along its route.**

The proposed extension of the Allston Express service alters this route in Allston by continuing along Western Avenue to a new stop on Academic Way between Western Avenue and North Harvard Street. The I-Lab stop may need to be relocated, otherwise this route will continue to use existing stops and travel along the same streets in Cambridge.

The new Harvard Square Express will operate on North Harvard and JFK Street. Harvard anticipates that this route would use existing stops along those streets and a new stop on or near Academic Way in Barry's Corner. However, it may be desirable to create a new stop within Harvard Square to address traffic operations. Harvard will meet with the City of Cambridge to review and coordinate the route plan and discuss the need for other potential improvements.

CAM.12 **Engage with the MBTA service planning process to ensure that adequate service will be provided on the Route 66 bus.**

The DEIR indicated that the additional trips on the Route 66 bus would not adversely affect service. Harvard has worked with the MBTA to consolidate and relocate Route 66 bus stops along North Harvard Street (next to its campus) in a manner that improves service along this section of the corridor.

CAM.13 **Harvard Shuttles should be more seamless with the MBTA buses and permit ridership to the public beyond the Allston neighborhood residents.**

Harvard currently allows Allston residents - and will allow residents and employees of the Barry's Corner Residential and Retail Commons - to use the shuttle. Harvard will monitor this recent policy change to determine whether further modifications are warranted.

CAM.14 **Evaluate bus priority signals or bus queue jumps for MBTA and Harvard Shuttle buses and only propose these tools if conditions for cyclists can be demonstrated to be enhanced or not preclude future enhancements.**

Harvard believes that the current roadway network with the planned and under construction improvements is sufficient to meet the needs of the shuttle bus operations described in the DEIR.

CAM.15 **Evaluate means to separate shuttles and other forms of public transportation if the shuttles will get stuck in traffic. Should there be a new bridge for buses, bikes and pedestrians across the Charles River?**

Harvard believes that the current roadway network with the planned and under construction improvements is sufficient to meet the needs of the shuttle bus operations described in the DEIR.

CAM.16 **All shuttle bus stops should have real-time arrival times at the stop, in addition to the Shuttle Tracker on cell phones, because not everyone has a cell phone.**

Harvard is investigating the use of real-time arrival boards at key shuttle bus stop locations, particularly as they relate to the location Mobility Hubs.

CAM.17 **The SOV mode share goal should be lowered to be more in line with current mode share splits, and transportation options be strengthened to meet that goal.**

Harvard has set a mode share goal for the term of this IMP of under 40 percent of commuters travelling to the Allston campus by car, an aggressive target comparable to downtown Boston but one that recognizes the differences between Allston and Cambridge in terms of the commuting population and the level of transportation infrastructure as described in the DEIR.

CAM.18 **Separate mode share for walking and bicycling. The goal for bicycle mode share should be at least 20%.**

. Harvard has set a mode share goal for the term of the IMP of under 40 percent of commuters travelling to the Allston campus by car. Chapter 2 describes a comprehensive, multimodal program to monitor the status of this goal and the related TDM measures to achieve this goal.

CAM.19 **Describe how the proposed mobility hubs will function and if any physical improvements will be needed to maximize their convenience and use.**

Mobility Hubs will provide an organizational structure for a variety of multimodal services that facilitate the use of non-auto modes and environmentally sensitive vehicles. Mobility Hubs could include a combination of, but not necessarily all of, the

following elements: MBTA bus stops, Harvard shuttle bus stops, carsharing services (e.g., ZipCar), bike sharing services (e.g., Hubway), electric charging stations, and taxi stands. Individual travelers are most likely to use one of the individual modes, but some transfers between modes are also anticipated. Pedestrian connectivity, therefore, is also an important element of the Mobility Hub concept.

While the approach would seek to co-locate as many of these elements as possible next to each other, it is not as dependent on having a tight cluster of options at a single point as much as it is on bringing these elements within close proximity to each other in a clearly defined and easily accessible zone. Any of these elements may require specific physical improvements and the individual Mobility Hubs may also require identifier and informational signage.

Many of these elements are already in place in Allston. The DEIR identified five locations that were organized around pedestrian, bicycle, transit and shuttle routes. Harvard will work through the Allston TMA and with the City of Boston to determine an appropriate branding strategy that would establish the appropriate framework to implement and expand the Mobility Hub network to other locations, including implementation by entities other than Harvard.

CAM.20 Parking should not be subsidized for staff.

Chapter 2 provides more detailed information about parking fees and permits.

CAM.21 Review parking demand today or in the future, with a mode share goal.

Chapter 2 discusses the IMP parking supply and its relationship to Harvard's mode share goal.

CAM.22 Discuss shared parking between users that have peak parking demands at different times of day.

Harvard believes that shared use parking provides an approach to accommodate the evening and weekend parking demand for events at Harvard facilities in Allston. This approach is currently used for athletic events and HBS activities. In addition, Harvard makes parking available to residents with BTD-issued Resident Parking Permits to park in its facilities during City-declared snow emergencies.

Harvard does not anticipate that the proposed retail/active ground floor uses will generate significant parking demand that would require a shared parking approach. However, Harvard could make these off-street spaces available if the new short-term on-street parking spaces in Barry's Corner are not sufficient to meet the parking demand of the retail/active ground floor uses at night or on weekends (when commuters are not using the off-street spaces).

The residential parking demand of Harvard affiliates does not lend itself to a shared parking approach because it is relatively static in nature. While the demand for this parking is low compared to typical residential uses, there is little turnover of these spaces throughout the day, since few affiliates living in Harvard residential units commute by auto.

CAM.23 Provide copy of Harvard's North Allston Area Synchro files.

Harvard met with the City of Cambridge On June 18, 2014 and transmitted copies of the SYNCHRO files to them.

CAM.24 Relevant mitigation and necessary infrastructure improvements and changes should be in place before a building opens, so each building or phase should have a required mitigation measure tied to it.

MEPA has established a Special Review Procedure for future review of the IMP projects. As required under Article 80 of the Boston Zoning Code, Harvard will also submit projects to the BRA for review and, as directed by the City, will prepare Transportation Access Plan Agreements that will identify specific mitigation commitments as they relate to specific projects.

February 7, 2014

Richard K. Sullivan, Secretary
Executive Office of Energy & Environmental Affairs
Attention: MEPA Office
Holly Johnson, MEPA #14069
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: Harvard University's Campus in Allston, MEPA #14069 – Draft Environmental Impact Report (DEIR)

Dear Secretary Sullivan:

The Charles River Watershed Association (CRWA) and the Metropolitan Area Planning Council (MAPC) have reviewed the Draft Environmental Impact Report (DEIR) filed by Harvard University (Proponent) and submit the following joint comments as part of the MEPA review process. Our comments reflect our organizations' perspectives on the regional and cumulative impacts of Harvard's expanding campus in Allston.

The DEIR presents Harvard's Ten-Year Institutional Master Plan (IMP) for its campus in Allston. Specifically, the Ten-Year Plan comprises nine projects (seven new construction and two renovation) along with associated infrastructure and open space improvements which the University plans to undertake over the next decade. The overall project program consists of 1.4 million square feet of new construction and 500,000 square feet of renovated space. According to the proposed Ten-Year Plan, approximately 7,760 vehicle trips, 2,160 transit trips, and 4,970 walk/bike trips will be generated on an average weekday. The parking supply is proposed to be 3,807 spaces, a modest increase from the existing parking supply of 3,652 spaces.

As described in the Special Review Procedure[1] (SRP), the Proponent will file a DEIR and a Final Environmental Impact Report (FEIR) for the Ten-Year Master Plan. For projects outlined in the Draft and FEIR, Project Commencement Notice (PCN) will be submitted by the Proponent. The SRP also requires Harvard to provide an Interim Update to MEPA proximate to the five-year anniversary of the Certificate of Adequacy on the FEIR.

The following are our detailed comments about key issues in the DEIR, including implementation of mitigation measures, open space, stormwater, and transportation, which should be addressed in the FEIR:

[1] Certificate of the Secretary of Energy and Environmental Affairs Establishing a Special Review Procedure, November 20, 2013.

Implementation of Mitigation Measures

While we are pleased to see that the DEIR includes the Long-Term Vision that provides some context for planning beyond the ten year time frame, we continue to be concerned that there is no clear vehicle for ensuring that key mitigation measures are not deferred until after the Ten-Year Plan. Due to the provisional nature of the Long-Term Vision, we are also concerned that there is no mechanism to ensure that the mitigation commitments are in fact implemented within the ten year timeframe, especially considering the fact that many of the impacts will begin to occur during this period of time.

We therefore recommend that, consistent with the Secretary's Certificate on the NPC, the FEIR should clearly indicate the implementation of mitigation measures based on project phasing, either tying mitigation commitments to specific building projects, overall project square footage, or traffic/ wastewater demand or thresholds, to ensure that measures are in place to mitigate the anticipated impacts associated with each development phase.[2] For example, Table 3 - *Ten-Year Plan Phasing* in the DEIR depicts the approximate timing of the building projects and the open space, infrastructure, and roadway improvements that will accompany them. However this table is vague and it is not possible to discern which improvements are associated with which project. CRWA.1

We respectfully ask the Secretary to insist that the FEIR provide a much more detailed explanation of when and how the mitigation commitments will be carried out, and how they will be associated with individual developments in the Ten-Year Plan. The table of mitigation measures included in the Section 61 Findings[3] does not address the directive in the Secretary's Certificate that the EIR contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation[4]. The FEIR needs to address this directive in a more comprehensive manner. CRWA.2

Finally, as per the Secretary's Certificate, the FEIR should include a discussion of how proposed mitigation measures for the Ten-Year Plan will be integrated into the existing neighborhood infrastructure (i.e., transportation amenities, wastewater and stormwater management)[5]. CRWA.3

Infrastructure Investments

The IMP should indicate the level of the Proponent's contribution, if any, to specific infrastructure upgrades. It should also include plan for the long-range maintenance and upkeep of infrastructure improvements (e.g., utility upgrades and extensions, new and existing roadways, and transit improvements. Finally, the IMP should include an explanation of how the Proponent will coordinate these contributions with the BRA, MassDOT, MBTA, DCR, other public agencies, as well as private utility providers. CRWA.4

Open Space Connections between the Neighborhood and the Charles River

Harvard has included the creation of a ten-acre Greenway as part of its Long-Term Vision. The proposed greenway integrates stormwater management, open space connectivity, sustainability and urban design in a compelling way, and would in concept provide valuable public open space connections between the Allston neighborhood and the Charles River. However, there is currently no binding commitment to

[2] NPC Certificate pg. 22
[3] DEIR Pg. 193
[4] NPC Certificate pg. 22
[5] Ibid

implementation of the Greenway over a specific timeframe. The DEIR mentions that "proposed alignment of the Greenway defines a continuously varied landscape space that will support below-grade storm and sewer lines; it will allow sufficient wet/dry above grade capacity for stormwater conveyance, storage, and treatment capacity for the long-term build out"[6]. However, the opportunity for implementing a comprehensive stormwater management approach in the near term is precluded by the fact that the development of the Greenway is pushed out beyond the Ten-Year Plan's timeframe. The current Ten-Year Plan does not include larger-scale infrastructure improvements and mitigation that is consistent with the amount of development being proposed in the IMP.

CRWA.5 Given the scale of development being proposed as part of the Ten-Year Plan, it is critical that some of the infrastructure improvements that are currently part of the Long-Term Vision be phased in with the projects being developed as part of the Ten-Year Plan. We therefore recommend that the Section 61 Findings include at a minimum a binding commitment for a phased implementation of the Greenway.

CRWA.6 The Greenway should be designed as an integral part of the stormwater management for the entire engineered sub-watershed and not be relegated to a concept which might be implemented at some point in the distant future. We recommend that the infrastructural skeleton for the Greenway be phased in with the projects being implemented in the Ten-Year Plan's timeframe, even if the final landscaping and programming is completed later in concert with development of the Enterprise Research Campus. The design of Rena Park as well as the open spaces adjoining the Science Center and the Hotel and Conference Center provides a perfect opportunity to design the infrastructure skeleton of the Greenway in the near term.

CRWA.7 Finally, we note the Long Term Land Use Plan includes the siting of a building at the parcel that currently serves as a parking lot at the Genzyme site, adjacent to Soldiers Field Road and the Charles River. This site should logically be preserved as open space and be incorporated into the Greenway, providing continuous public access to the Charles River Parklands, preserving visual connections to the Charles River, and functioning to treat and store stormwater runoff prior to discharge to the Charles. Because the IMP anticipates development within the ten year time frame of the hotel and conference center on the parcel to the west of this parcel (project 7 of the ten year project list), we suggest the Secretary require in the FEIR a more detailed alternatives analysis and mitigation plan for the hotel and conference center that includes an assessment of the eastern portion of the Greenway, including this portion of the Genzyme site.

Stormwater Management

Harvard's stormwater management plan for the IMP area shows a strong commitment to improving stormwater management. However, by focusing stormwater management on a site scale, and failing to utilize the potential of neighborhood-scale design solutions such as the Greenway to manage stormwater, Harvard is missing potential measures that are only available at larger scale. While the detailed drainage analysis provided in the IMP for the different drainage areas[7] is useful to understand how Harvard plans to engineer the individual IMP projects, it is not clear how the drainage areas encompassing the Greenway (i. e., DA 21, 22, 23,24,25) interface with the adjoining drainage areas within the IMP area (i. e., P-23,24,25,26,27,28,29). This further reinforces our understanding that the Greenway is currently not being conceptualized as a comprehensive stormwater management system for the larger neighborhood area it has the potential to serve.

[6] DEIR Pg. 19
[7] DEIR Pg. 130

Harvard has indicated they will comply with all Boston Water and Sewer Commission (BWSC) drainage and stormwater management requirements, will meet the Massachusetts Stormwater Standards, and will comply with the Charles River Nutrient TMDL.[8] The DEIR mentions that the seven Ten-Year Plan new construction projects will meet the Charles River TMDL for phosphorous and bacteria[9], however the drainage analysis does not document how the projects would meet the Pathogen TMDL. The FEIR should include further documentation on the how the projects will comply with the Pathogen TMDL. CRWA.8

It is also unclear how and where the 1.5 acres of bio-retention areas/rain gardens will be incorporated to treat the total water quality volume estimated for the Ten–Year Plan.[10] Although there are broad, "lumped" estimates about the amount of land area that will be required to construct green infrastructure to manage stormwater, there is a lack of sufficient detail to determine how these requirements will be met. Nevertheless, there are two proposed drainage areas – P-08a and P12b – that are estimated to have higher peak flows and higher runoff volume following construction. These sites must comply with the standards at the site scale, and the proposed post-construction treatment approaches do not appear to do so. CRWA.9

Finally, we appreciate that Harvard has used the Cornell precipitation data rather than the TP-40 data. However, the Cornell data may not be representative of current local precipitation patterns, and certainly does not capture anticipated climate change impacts to rainfall at either the storm size or annual scale. Harvard's own sustainability and climate preparedness commitments indicate the university is assessing and planning for the impacts of climate change; certainly the stormwater infrastructure being designed for the Allston campus should anticipate climate change. Because the IMP will cover a ten year time frame, we suggest the FEIR analyze and design for runoff volumes from higher intensity and larger volume storms. CRWA.10

Interim Update

It should be noted that the SRP requires Harvard to provide an Interim Update to MEPA proximate to the five-year anniversary of the Certificate of Adequacy on the FEIR. The Interim Update will include an update on the status of area-wide infrastructure improvements and individual development projects within the Allston Campus area, a description of any significant changes to the Allston Campus Ten-Year Master Plan from that described in the FEIR, as well as an update of the status of all mitigation identified in the Section 61 Findings.

Mode Share Goal and Monitoring Program

In the DEIR, Harvard has committed to a mode share goal for the term of the IMP "of under 40% of commuters travelling to the Allston campus by car." While CRWA and MAPC are pleased that a mode share goal has been established, we ask that Harvard commit to a monitoring program that is similar to what has already been required for the Science Complex in the SRP. The language in the SRP for the Science Complex is included for reference: CRWA.11

> [P]rovide an assessment of cumulative impacts associated with projects completed to date and compare impacts to those disclosed in the FEIR. It will also update the status of all mitigation commitments identified in the Section 61 Findings for the Allston Campus and all individual projects to date and provide information in response to the requirement

[8] DEIR Pg. 129
[9] Ibid
[10] DEIR Pg. 129

that the Proponent monitor the effectiveness of TDM measures applied to achieve a 50% mode share for single occupancy vehicles for the Science Complex. If the results of the monitoring indicate that the 50% mode share target has not been achieved, the Proponent must commit to additional mitigation measures in the Interim Update.

The monitoring program must be designed to ensure specifically defined mode share goals (vehicular, bicycle, pedestrian, and public transit) are accomplished. Along with specific steps to achieve these goals, the Proponent should provide annual updates, publicly sharing the results. Mode share goals should be consistent with the Commonwealth's mode shift goal of tripling the share of travel in Massachusetts by bicycling, transit and walking.

The monitoring program should have measurable milestones and serve as a benchmark for progress in meeting the mode share goals and other transportation objectives, including changes in parking, local and regional traffic, and public transportation. It should outline contingency measures that will be undertaken if these benchmarks are not met. The intent of the monitoring program is to confirm that actual changes are consistent with forecasted changes. With a monitoring program, the actual impacts of a project can be determined and additional mitigation measures identified. Shortfalls in meeting mode share or other targets can be identified and remedied. We ask the Secretary to require that the Proponent respond to this request by preparing a transportation monitoring program that addresses exactly what the mode share goals are, the details of how they will be attained, a detailed monitoring program, and an explanation of contingency measures if goals are not achieved.

The monitoring program should include the following intersections which are forecast to operate at Level of Service (LOS) D, E or F during the morning or evening peak hours under 2022 Mitigated Build. If these intersections continue to degrade, the Proponent should be required to take additional steps to improve their performance:

	Weekday AM Peak	**Weekday PM Peak**
Intersection	**LOS**	**LOS**
Western Avenue & Everett Street	F	E
Soldiers Field Road & Everett Street	D	C
Western Avenue & North Harvard Street	D	E
Western Avenue & Batten Way	D	D
Soldiers Field Rd WB & Larz Anderson Bridge	D	E
Western Avenue & Soldiers Field Road EB	F	F
Western Avenue & Soldiers Field Road WB	D	F
Cambridge Street & I-90 On-Ramp	D	F
Cambridge Street & Soldiers Field Road EB	D	D
Cambridge Street & Soldiers Field Road WB	F	F
Cambridge Street & North Harvard Street	D	C
Cambridge Street & Franklin Street	C	F
Eliot Bridge & Soldiers Field Road	C	D
Gordon Rd & North Harvard Street	D	C
Western Avenue & Smith Field Drive	D	E

Construction Support Area
As part of the IMP process, the Proponent has identified a location for a potential centralized area for construction-related uses, south of Western Avenue. The Construction Support Area will include truck layover, materials storage, worker parking and temporary support structures. Comprising about 34 acres, the Construction Support Area changes the IMP boundary by adding 34 acres.

While Harvard has indicated that they will formalize these plans with the Boston Transportation Department through one or more Transportation Access Plan Agreements and Construction Management Plans, more information about the Construction Support Area needs to be included in the FEIR. Specifically, it is unclear whether the Construction Support Area was included in the transportation analysis. If not, than the transportation analysis needs to be amended. CRWA and MAPC have concerns regarding additional traffic that may be generated due to the Construction Support Area. As currently proposed, the main route for construction trucks accessing the site will be via the Massachusetts Turnpike to the Soldiers Field Road access road to Western Avenue, and they will depart using the same roadways. The DEIR has already indicated that Cambridge Street eastbound at the I-90 ramps and at the Soldiers Field Road eastbound ramp will either be at levels beyond operating capacity or approaching levels exceeding operating capacity during either the morning or evening peak hours. In addition, there should be a more comprehensive discussion of how traffic from Exit 18 on 1-90 affects roadways and intersections in this area, especially since there will be additional truck and vehicular traffic due to the presence of the Construction Support Area. CRWA.12 CRWA.13

Transportation Demand Management (TDM) Program
We applaud Harvard for outlining an extensive TDM program. A strong TDM program is an important tool in managing vehicular travel to and from the Allston campus. Elements of the TDM program we look forward to seeing Harvard maintain and enhance include:

- Participation in the monthly MBTA pass program.
- Discounted annual ZipCar membership and allocating spaces for ZipCar parking.
- Discounted annual membership in the Hubway bike sharing program, sponsoring area Hubway stations, and expansion of Hubway stations as demand increases.
- Participation in the Bicycle Benefit Act providing bicyclists up to $240/year for bicycle expenses.
- Discounted parking permits for carpoolers.
- Programs that advance ride-sharing (Zimride) and borrowing of vehicles (RelayRides).
- Provision of electric vehicle charging stations and allocation of preferred parking spaces for Low Emission Vehicles (LEV).
- Membership and participation in the A Better City Transportation Management Association (ABC-TMA).

Parking

<u>Classification and User Type</u>
While the DEIR does identify the number of existing parking spaces, their classification (Harvard permit-only, Allston Brighton Resident-only, unrestricted, etc.) is not indicated within the project area for either on-street or private lot spaces. It is important to note that this was requested in the Secretary's Certificate on the NPC. Although the DEIR indicates the number of spaces associated with each project,

CRWA.14 it does not specificity the anticipated users (i.e., employee, student, visitor). The FEIR needs to elaborate on both parking classification and user type.

Maximize Parking Spaces

CRWA.15 Harvard needs to make a concerted effort to maximize the use of existing parking spaces before adding new parking spaces. If it is determined that existing parking spaces can be utilized, then new spaces should not be added. While Harvard does include a shared parking approach for accommodating event-related parking demands, this method of maximizing parking spaces should be applied to all types of parking demands for the entire Allston Campus.

Transportation Analysis

CRWA.16 While the Proponent did include transportation analysis for the second five years of the Ten-Year Plan, why was the transportation analysis omitted for the first five years? The Secretary's Certificate on the NPC asked the Proponent to consider this analysis.

Shuttles

Shuttle System

CRWA.17 While the DEIR does describe shuttle routes and times, it is still unclear as to the forecasted daily ridership for each shuttle route (route between Barry's Corner and Harvard Square, Allston Express, and Harvard Square Express). This should be clarified in the FEIR.

Shuttle Service

We are pleased that the shuttle system will serve Harvard affiliates including students, staff and faculty as well as neighborhood residents.

Shuttle Tracker

Harvard has implemented a real-time vehicle location system and has recently developed a Shuttle Tracker iPhone App. The transit Visualization SystemTM (Shuttle Tracker) is available on desktop and mobile computers, handheld devices, and at strategically located displays. Shuttle Tracker helps reduce the potential wait times for shuttle passengers and increase their safety, and enables shuttle

CRWA.18 management to manage the transportation fleet with increased efficiency. We recommend that Harvard look at expanding this service to include MBTA buses, after consultation with the T.

Bicycles

We applaud Harvard's plans to strengthen pedestrian connections and expand the bicycle network as part of the Ten-Year Plan. However, we do have comments that pertain to bicycle parking, the Paul Dudley Bicycle Path, and Greenway Access.

Parking

CRWA.19 The FEIR should contain more detailed information on the number of proposed bicycle parking spaces for employees, students, and visitors for the nine projects that comprise the Ten-Year Plan. In addition to covered and uncovered bicycle parking, the FEIR needs to address the provision of bicycle storage accommodations, including a commitment to meet BTD guidelines for storage capacity and provide sheltered bicycle storage and employee facilities such as changing rooms and showers in each building.

Paul Dudley Bicycle Path

The Paul Dudley White Bicycle Path is substandard in width, typically 8 feet wide or less particularly between Western Ave and Eliot Street Bridge. Current standards call for a 10-12 foot wide path. With increased bicycle traffic in the region in large part due to Harvard expansion, we recommend that funds be allotted by Harvard to DCR as part of project mitigation to upgrade the path to meet design guidelines and accommodate the current use. CRWA.20

Greenway Access

It is important that Boston's Bicycle Network Plan and the bicycle networks proposed for the Allston campus are integrated and that a bicycle path is extended to and through the Greenway. Harvard should contact Boston Bikes to discuss integration. CRWA.21

Mobility Hubs

We strongly support the concept of Mobility Hubs, points of multimodal access in the IMP area where a range of transportation options (e.g., bus stops, bicycle parking, electronic vehicle charging, and car- and bicycle-share services) are located to provide for seamless transfers between modes as part of a larger interconnected network. These facilities do not require the construction of significant transportation infrastructure. We look forward to seeing how the five identified Mobility Hubs develop as the Ten-Year Plan is implemented.

Thank you for the opportunity to provide our input on this important process for the review of the Harvard University's Campus in Allston. Please feel free to contact Pallavi Mande, CRWA's Director of Blue Cities and Martin Pillsbury, MAPC's Environmental Planning Director should you have any questions.

Sincerely,

Robert L. Zimmerman, Jr.
Executive Director
Charles River Watershed Association

Marc D. Draisen
Executive Director
Metropolitan Area Planning Council

cc: Kairos Shen, Boston Redevelopment Authority
John Sullivan, Boston Water and Sewer Commission
Vineet Gupta, Boston Transportation Department
David Mohler, MassDOT
Susanne Rasmussen, City of Cambridge

CHARLES RIVER WATERSHED ASSOCIATION/METROPOLITAN AREA PLANNING COUNCIL

CRWA.1 **Clearly indicate the implementation of mitigation measures based on project phasing, either tying mitigation commitments to specific building projects, overall project square footage, or traffic/ wastewater demand or thresholds, to ensure that measures are in place to mitigate the anticipated impacts associated with each development phase.**

Chapter 9, Mitigation, lists the anticipated phasing of the Ten-Year Plan projects as well as open space, infrastructure, and roadway improvements that will be part of each phase. Chapter 9 also includes a menu of roadway and intersection improvements that will be part of the overall Ten-year Plan.

Each IMP project (other than the Chao Center and the Baker Hall renovation) will undergo additional project-specific permitting through the Project Commencement Notices required through MEPA's Special Review Procedure as well as under the applicable provisions of the BRA's Article 80 review process. As part of these reviews, Harvard will look at the cumulative impacts of the IMP projects, provide an update on the status of the overall mitigation measures, and evaluate the appropriateness of the required mitigation measures and benefits.

CRWA.2 **The table of mitigation measures included in the Section 61 Findings does not address the directive in the Secretary's Certificate that the EIR contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation. Address this directive in a more comprehensive manner.**

The community benefits and mitigation measures described in Chapter 9, Mitigation, represent significant area-wide commitments that have been made as part of the IMP. Based on discussions with the community and the BRA there was a desire to provide a broad range of benefits that was not tied to the timetable for development of specific IMP projects. Many of these benefits - such as the Public Realm Flexible Fund and the Harvard Allston Partnership Fund - involve committees that include neighborhood representation that assist in determining how and where these resources will be allocated.

That said, Chapter 9, Mitigation, provides an updated draft Section 61 Finding for each State Agency that will issue permits for the project, and also lists the anticipated phasing of the Ten-Year Plan projects as well as open space, infrastructure, and roadway improvements that will be part of each phase.

Chapter 9 also includes a summary of the community benefits program that was negotiated with the City of Boston, as well as other mitigation measures that will be implemented as part of the IMP projects.

CRWA.3 **Include a discussion of how proposed mitigation measures for the Ten-Year Plan will be integrated into the existing neighborhood infrastructure (i.e., transportation amenities, wastewater and stormwater management).**

Each IMP project (other than the Chao Center and the Baker Hall renovation) will undergo additional project-specific permitting through the Project Commencement Notices required through MEPA's Special Review Procedure as well as under the applicable provisions of the BRA's Article 80 review process. Given that the integration of specific mitigation measures is dependent on timing and other activities in the neighborhood, these project-specific filings will provide detail on how site improvements and mitigation measures will be implemented.

The proposed reductions in peak rates and volumes of stormwater runoff will reduce flow to neighborhood drains, consequently reducing flooding. In particular, the proposed Greenway will greatly improve stormwater management in this highly impervious commercial/industrial area of Allston.

CRWA.4 **The IMP should indicate the level of the Proponent's contribution, if any, to specific infrastructure upgrades. It should also include plan for the long-range maintenance and upkeep of infrastructure improvements (e.g., utility upgrades and extensions, new and existing roadways, and transit improvements). Include an explanation of how the Proponent will coordinate these contributions with the BRA, MassDOT, MBTA, DCR, other public agencies, as well as private utility providers.**

Given the preliminary state of design for the majority of the IMP projects, detailed cost estimates for infrastructure upgrades have not yet been prepared. The project-specific PCN filings with MEPA and Article 80 filings with the BRA will provide more detail on the required upgrades, as well as information on maintenance and coordination of costs.

However, generally speaking, infrastructure improvements within the IMP Area will be constructed and maintained by Harvard. This includes publicly accessible open spaces such as the recently open Grove in Barry's Corner as well as campus roadways that will be open to public travel, such as Academic Way.

CRWA.5 **Include in the Section 61 Findings, at a minimum, a binding commitment for a phased implementation of the Greenway.**

The IMP includes the Greenway in the Long-Term Vision context rather than the Ten-Year Plan because the timeline for actual completion of the green space relies upon a number of factors, including the ability to access and have control of the entirety of the land. Before CSX Transportation (the current holder of the exclusive railroad easement encumbering the Allston Landing North area) may transfer control of this land to Harvard, CSX Transportation must complete agreed-upon environmental testing and remediation. This work is underway but a timeline for its completion is not finalized.

Harvard will work with the City of Boston to develop an implementation schedule for the Greenway. The Ten-Year Plan includes elements of the Greenway that are adjacent to the IMP projects.

Harvard proposes that the segments that comprise the Greenway ideally should be created as buildings develop along the length of the Greenway. However, given the limitations in accessing the land, the only project which is likely to occur during the Ten-Year Plan is the Hotel and Conference Center. Development of this project will incorporate another piece into the Greenway connection.

More information on the Greenway, its implementation, and its features is presented in Chapter 1, Project Description.

CRWA.6 **The Greenway should be designed as an integral part of the stormwater management for the entire engineered sub-watershed and not be relegated to a concept which might be implemented at some point in the distant future. Consider phasing the infrastructural skeleton for the Greenway in with the projects being implemented in the Ten-Year Plan's timeframe, even if the final landscaping and programming is completed later in concert with development of the Enterprise Research Campus.**

More information on the Greenway, its implementation, and its features is presented in Chapter 1, Project Description.

As presented in the IMP, the land is reserved for the Greenway and planning has begun for the first piece of the connective green space located in the Rena Street corridor between Rena Street and the Science project. Harvard started a public process in 2013 to identify interim improvements in this area and has committed to begin construction of implementable improvements in 2014 for the area of land known as Rena Park. This will be an important first step in establishing the western edge of the Greenway.

In addition, in conjunction with the BRA and the Task Force, Harvard has committed to exploring strategies to implement elements of the proposed Greenway in at least an interim condition.

As mentioned previously, Harvard proposes that the segments that comprise the Greenway ideally should be created as buildings develop along the length of the Greenway. However, given the limitations in accessing the land, the only project which is likely to occur during the Ten-Year Plan is the Hotel and Conference Center. Development of this project will incorporate another piece into the Greenway connection.

CRWA.7 **The Long Term Land Use Plan includes the siting of a building at the parcel that currently serves as a parking lot at the Genzyme site, adjacent to Soldiers Field Road and the Charles River. This site should logically be preserved as open space and be incorporated into the Greenway.**

The site at the corner of Western Avenue and Soldiers Field Road is not part of the Ten-Year Plan. The Long-Term Vision was provided in the DEIR and IMP for context only and is not intended to represent specific land use proposals.

CRWA.8 **Include further documentation on the how the projects will comply with the Pathogen TMDL.**

Several of the proposed BMPs in the master planning study provide filtration and infiltration. As stormwater passes through the filtration/infiltration media, it will receive treatment for pathogens.

CRWA.9 **There are two proposed drainage areas – P-08a and P12b – that are estimated to have higher peak flows and higher runoff volume following construction. These sites must comply with the standards at the site scale, and the proposed post-construction treatment approaches do not appear to do so.**

There is an increase in peak rates of runoff and volumes at these sites because there is an increase in the impervious area. The master planning approach demonstrates that taking the entire project area as a whole, there will be a decrease in the peak rates of runoff and volumes to the Charles River, even though individual sites may result in increases in peak rates of runoff and volumes. Other sites will have decreases in peak rates of runoff and volumes, which will offset the increases. Because all the sites drain to the Charles River, the approach of viewing the entire project area holistically with regard to peak rates of runoff and volumes is acceptable and does not require each site to comply with the stormwater management requirements. This approach has been confirmed with BWSC and the DEP.

CRWA.10 **Analyze and design for runoff volumes from higher intensity and larger volume storms.**

The hydrologic analysis in the FEIR analyzes storms up to the 100-year, 24-hour rainfall. The precipitation data for standard storms used in the models were taken from Cornell University Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada (September 1993). For the 100-year 24-hour storm, the rainfall depth is 8.47-inches. Compared to rainfall depths in Technical Paper No. 40 (Rainfall Frequency Atlas of the United States), the rainfall depths from the Cornell University study are higher for storms greater than a 10-year 24-hour storm, and provide a more conservative evaluation and design of existing and proposed stormwater management facilities, as well as a factor of safety for potential climate change. The design storm for

each stormwater management facility is a function of the risk and safety factor needed in the design. For the design of large basins, or major facilities that control large drainage areas, the 25- to 100-year design storm using Cornell data is warranted and used in the Harvard drainage system analysis to provide protection against failure. For the design of a rain garden that collects runoff from a small area, the 90% storm design volume (1 inch of runoff) and peak 10-year storm rate of discharge are warranted. Local street drainage systems warrant 10-year storm designs.

CRWA.11 **Commit to a monitoring program that is similar to what has already been required for the Science Complex in the SRP. Design the monitoring program to ensure specifically defined mode share goals (vehicular, bicycle, pedestrian, and public transit) are accomplished. Along with specific steps to achieve these goals, provide annual updates, publicly sharing the results. Mode share goals should be consistent with the Commonwealth's mode shift goal of tripling the share of travel in Massachusetts by bicycling, transit and walking.**

Prepare a transportation monitoring program that addresses exactly what the mode share goals are, the details of how they will be attained, a detailed monitoring program, and an explanation of contingency measures if goals are not achieved.

Chapter 2 presents the transportation monitoring program. This program focusses on the proposed mode share goal, the approaches to monitor the status of this goal and the related TDM measures to achieve this goal.

CRWA.12 **Include more information about the Construction Support Area. Clarify if it was included in the transportation analysis and amend if not.**

The proposed Construction Support Area would be used to provide a staging and laydown area for various projects in the Ten-Year Plan, as well as a potential location for construction worker parking. Harvard does not anticipate activating the Construction Support Area unless access becomes possible through adjacent parcels that are currently controlled by CSX Transportation. Harvard will work with the City of Boston and the neighborhood to assess the future use and access of this site. As described in the DEIR, the traffic analysis included the traffic generated by the Ten-Year Plan projects upon their completion. Construction related traffic would be addresses as part of the Construction Management Plan for each project.

CRWA.13 **Include a more comprehensive discussion of how traffic from Exit 18 on I-90 affects roadways and intersections in this area, especially since there will be additional truck and vehicular traffic due to the presence of the Construction Support Area.**

The DEIR presented a detailed analysis of traffic operations at the intersection of the MassPike ramps with Cambridge Street. This analysis addresses traffic flows to and from the MassPike at all study area intersections for Existing 2022 No Build and 2022

Build conditions. Also, the proposed Construction Support Area will not add truck traffic to the area, instead, it will accommodate truck traffic that will move through the area as part of the construction of the projects in the Ten-Year Plan.

CRWA.14 Elaborate on both parking classification and user type.

Chapter 2 provides information about the parking supply and anticipated users of the proposed new parking spaces.

CRWA.15 Make a concerted effort to maximize the use of existing parking spaces before adding new parking spaces. If it is determined that existing parking spaces can be utilized, then new spaces should not be added. While Harvard does include a shared parking approach for accommodating event-related parking demands, this method of maximizing parking spaces should be applied to all types of parking demands for the entire Allston Campus.

Harvard believes that shared use parking provides an approach to accommodate the evening and weekend parking demand for events at Harvard facilities in Allston. This approach is currently used for athletic events and HBS activities. In addition, Harvard makes parking available to residents to park in its facilities during City-declared snow emergencies.

Harvard does not anticipate that the proposed retail/active ground floor uses will generate significant parking demand that would require a shared parking approach. However, in coordination with the City of Boston, Harvard could make these off-street spaces available if the new short-term on-street parking spaces in Barry's Corner are not sufficient to meet the parking demand of the retail/active ground floor uses at night or on weekends (when commuters are not using the off-street spaces).

The residential parking demand of Harvard affiliates does not lend itself to a shared parking approach because it is relatively static in nature (i.e., these vehicles are generally not used for commuting purposes). While the demand for this parking is low compared to typical residential uses, there is little turnover of these spaces throughout the day, since few affiliates living in Harvard residential units commute by auto.

CRWA.16 Where is the transportation analysis for the first five years?

The evaluation of build alternatives in the first five years of the Ten-Year Plan indicates that this timeframe is comparable in several key ways to the 2022 No Build scenario for the following reasons.

1. Many of the key transportation infrastructure improvements presented in the DEIR and evaluated as part of the 2022 No Build scenario will be completed in the next five years. As such, the 2022 No Build transportation network represents the conditions that would be expected to exist in 2017/2018.

2. The 2022 No Build scenario includes development projects that recently opened (i.e., SwissBakers, Charlesview Redevelopment, and 28 Travis Street) and other approved projects that are anticipated to be complete within the 2017/2018 timeframe, including the Science Project, New Brighton Landing, Barry's Corner Residential and Retail Commons Project, and Tata Hall.

3. The 2017/2018 timeframe corresponds to the Early Phase (2014-2018) in the phasing for the Ten-Year Plan. Projects during this timeframe include the Chao Center, Burden Replacement, Harvard Stadium Addition/Renovation and Baker Hall Renovation. These projects do not generate peak hour trips.

4. Two new roadways will be constructed during the 2017/18 timeframe. "South Campus Drive" and "Ivy Lane" have been evaluated and will be constructed as part of the Barry's Corner Residential and Retail Project.

Based on this evaluation, Harvard anticipates that the 2022 No Build scenario will generally reflect transportation conditions in the first five years of the Ten-Year Plan.

CRWA.17 Clarify the forecasted daily ridership for each shuttle route.

To assess the capacity of Harvard's shuttle bus system and the potential impacts of new ridership, the DEIR evaluated shuttle operations for the morning and afternoon peak commuting hours, rather than daily ridership estimates. As described in the DEIR, Harvard provided existing (2012) ridership data that was used as the basis of the analysis. Future transit/shuttle ridership was estimated using distribution patterns based on 2012 Harvard employee zip code data. The trips were assigned to the Allston Express and Harvard Square Express based on the frequency of service relative to other transit options.

CRWA.18 Look at expanding the transit Visualization System to include MBTA buses, after consultation with the MBTA.

Harvard will continue to explore options to enhance its TransLoc system, including opportunities to provide information about MBTA services.

CRWA.19 Include more detailed information on the number of proposed bicycle parking spaces for employees, students, and visitors for the nine projects that comprise the Ten-Year Plan. In addition to covered and uncovered bicycle parking, address the provision of bicycle storage accommodations, including a commitment to meet BTD guidelines for storage capacity and provide sheltered bicycle storage and employee facilities such as changing rooms and showers in each building.

Chapter 2 presents the existing bicycle parking spaces that are provided in the Allston campus and the estimated new bicycle parking spaces that would be provided to support the IMP projects.

CRWA.20 **Allot funds to DCR as part of the project mitigation to upgrade the Paul Dudley Bicycle Path to meet design guidelines and accommodate the current use.**

Harvard has proposed to upgrade the cycle track along Western Avenue as part of the Ten-Year Plan. These improvements will build on past collaboration with the City of Boston, MassDOT and DCR to develop and support bicycle improvements to North Harvard Street, Western Avenue and the bridges over the Charles River. The focus of these improvements is to enhance connectivity between Boston and Cambridge and to provide a better bicycle distribution network to and from regional facilities like the river paths. Harvard believes that this approach is consistent with the scope and needs of the Ten-Year plan.

CRWA.21 **Contact Boston Bikes to discuss integration of the bicycle networks proposed for the Allston campus to the Boston's Bicycle Network Plan.**

Harvard has collaborated with the City of Boston on the instillation of bike lanes on North Harvard Street and Western Avenue, including the City's first cycle track. Harvard will continue to coordinate with the City on future improvements to the bicycle network as described in the IMP.

From: Stevan Goldin [mailto:stevangoldin@gmail.com]
Sent: Friday, February 07, 2014 1:27 PM
To: Johnson, Holly (EEA)
Subject: Comments on Harvard University's Institutional Master Plan for Allston

Secretary Richard K. Sullivan, Jr.
Executive Office of Energy and Environmental Affairs
Holly.S.Johnson@State.MA.US

Attn: MEPA Office
Holly Johnson E.E.A. No 14069
100 Cambridge St., Suite 900
Boston, MA 02114

Re: Notice of Project Change
Harvard University's Institutional Master Plan for Allston

Dear Secretary Sullivan:

1. The Barry's Corner site is available only because in the 1960s residents of the neighborhood resisted the plans of the Boston Redevelopment Authority to demolish their homes and build a luxury apartment tower.

Due to the intervention of then Senators Edward Kennedy and William Saltonstall and Speaker of the House Thomas O'Neil evictions and demolitions that had been underway were halted, a "blue ribbon" panel to review the project was appointed, and a new plan to preserve the majority of existing homes and build additional moderate rental housing was agreed to. The Redevelopment Authority subsequently reneged on this agreement, citing a federal regulation prohibiting a resale of urban renewal property to former owners.

The application of this rule, designed to prevent corrupt windfall profits from publicly funded land write down costs was clearly not relevant. In an act of bad faith no waiver was asked for and the regulation was used as an excuse to block preservation of the neighborhood.

SG.1 As a matter of law, justice and equity former residents of Barry's Corner should be offered the opportunity to obtain apartments in the new development at affordable rates.

2. An historic brick silk mill building on Riverdale St. was demolished in the face of neighborhood efforts at preservation by a real estate company that was later revealed to be a Harvard "straw." An apology and substantial compensation is due for this appalling act of deception and vandalism.

SG.2 3. The soccer field along North Harvard St. adjacent to the Business School was where Harvard Chemistry Professor Louis Fieser tested the weapon napalm that he had developed. There should be an historical marker at this site to note this fact. Students walking to the Science Building would be given reason to reflect upon the purpose and consequences of their work.

SG.3 4. A "greener" project should include the wetland restoration described in the January 7, 2008 Boston Globe article by Jeremy Miller "Could Harvard's Expansion Restore Allston's Waterways."

SG.4 5. A "Green Project" should have Harvard working together with city, town and state agencies and community groups to further clean up the waters of the Charles River and provide more opportunities for public boating, and eventual fishing and swimming.

6. A “Green” project would go well beyond the timid transportation measures proposed.

SG.5

Harvard should work together with the City of Boston and Cambridge and the Town of Brookline and citizen groups to restore the streetcar line from Harvard Square to Brookline Village. It should likewise work to initially close Storrow Drive to autos on Sunday (as has been done for Memorial Drive in Cambridge) and eventually totally ban autos and convert the roadway to pedestrian, bicycle and trolley use.

7. Harvard Stadium is an extremely underutilized facility. It should be employed for more public concerts.

SG.6

8. Harvard University at one time had schools of Agriculture, Veterinary, and Forestry. These schools should be re-established at the Allston Campus as “Harvard A & M.”

SG.7

Harvard can take a cue from Yale, whose Forestry School has developed into a renowned environmental center. Here ***lux*** as well as ***veritas*** is in order.

Stevan Goldin
33 Rockport Road
Gloucester, MA
978-491-7099
Displaced Resident of Barry’s Corner
Harvard College Class of 1964

STEVAN GOLDIN

SG.1 **Former residents of Barry's Corner should be offered the opportunity to obtain apartments in the new development at affordable rates.**

Former residents of the Charlesview Apartments were offered housing in the newly constructed Charlesview Residences on Western Avenue.

SG.2 **The soccer field along North Harvard St. adjacent to the Business School was where Harvard Chemistry Professor Louis Fieser tested the weapon napalm that he had developed. There should be an historical marker at this site to note this fact.**

Such a marker is beyond the scope of this Ten-Year Plan and this environmental review process.

SG.3 **A "greener" project should include the wetland restoration described in the January 7, 2008 Boston Globe article by Jeremy Miller "Could Harvard's Expansion Restore Allston's Waterways."**

The approach to sustainability - including stormwater management - was discussed in detail in the DEIR. Additional information is presented in this FEIR in Chapter 4, Utilities.

SG.4 **A "Green Project" should have Harvard working together with city, town and state agencies and community groups to further clean up the waters of the Charles River and provide more opportunities for public boating, and eventual fishing and swimming.**

Harvard has continued to work with city and state agencies, as well as other interested parties, on issues related to stormwater management and improving the quality of runoff to the Charles River.

SG.5 **Work together with the City of Boston and Cambridge and the Town of Brookline and citizen groups to restore the streetcar line from Harvard Square to Brookline Village. Initially, close Storrow Drive to autos on Sunday (as has been done for Memorial Drive in Cambridge) and eventually totally ban autos and convert the roadway to pedestrian, bicycle and trolley use.**

Harvard has proposed a set of appropriate mitigation measures that address the future transportation needs and impacts of the Ten-Year Plan. The proposal for a streetcar line and elimination of traffic on Storrow Drive is beyond the scope of the Ten-Year Plan and the needs of its proposed projects.

SG.6 **Employ Harvard Stadium for more public concerts.**

The specific uses and activities proposed for the renovated Harvard Stadium will be described in the PCN for that project.

SG.7 Re-establish schools of Agriculture, Veterinary, and Forestry at the Allston Campus as Harvard A&M.

The scope of this Ten-Year Plan does not include establishing schools of Agriculture, Veterinary, and Forestry at the Allston Campus.

APPENDIX B: CIRCULATION LIST

Executive Office of Environmental Affairs
MEPA Office, EOEA #14069
Attn: Holly Johnson, MEPA Analyst
100 Cambridge Street, Suite 900
Boston, MA 02114

Department of Environmental Protection
Northeast Regional Office
Attn: MEPA Coordinator
205B Lowell Street
Wilmington, MA 01887

MassDOT
Public/Private Development Unit
Attn: MEPA Coordinator
10 Park Plaza
Boston, MA 02116

MassDOT
District #6
Attn: MEPA Coordinator
185 Kneeland Street
Boston, MA 02111

Massachusetts Historical Commission
Attn: Brona Simon
The Massachusetts Archives Building
220 Morrissey Boulevard
Boston, MA 02125

Massachusetts Department of Conservation and Recreation
Attn: Rick Corsi
251 Causeway Street
Boston, MA 02114

Division of Energy Resources
Attn: John Ballam
100 Cambridge Street, 10th floor
Boston, MA 02114

Massachusetts Bay Transit Authority
Attn: Andrew Brennan
10 Park Plaza, 6th Floor
Boston, MA 02216-3966

Massachusetts Water Resource Authority
Attn: Marianne Connolly
100 First Avenue
Charlestown Navy Yard
Boston, MA 02129

Metropolitan Area Planning Council
Attn: Marc Draisen
60 Temple Place
Boston, MA 02111

Boston Redevelopment Authority
Attn: Gerald Autler
1 City Hall Plaza, 9th Floor
Boston, MA 02201

Boston Environment Department
Attn: Brian Swett
1 City Hall Plaza, Room 805
Boston, MA 02201

Boston City Council
Attn: Mark Ciommo
1 City Hall Plaza, 5th Floor
Boston, MA 02201

Boston Water & Sewer Commission
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980 Harrison Avenue
Boston, MA 02119

Cambridge Department of Community Development
Attn: Susan Glazer
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Cambridge, MA. 02139

Cambridge City Manager
Attn: Richard C. Rossi
Cambridge City Hall
795 Massachusetts Ave.
Cambridge, MA 02139

Sal N. DiDomenico
State Senator
State House
Room 218
Boston, MA 02133

Kevin G. Honan
State Representative, 17th Suffolk
Commonwealth of Massachusetts
The General Court
State House
Boston, MA 02133-1053

Michael J. Moran
State Representative, 18th Suffolk
Commonwealth of Massachusetts
The General Court
State House
Boston, MA 02133-1053

Allston Brighton CDC
Attn: Carol Ridge Martinez
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Allston, MA 02134

Cambridge Bicycle Committee
Attn: Randy Stern
344 Broadway
Cambridge, MA 02139

Charles River Watershed Association
Attn: Kate Bowditch
190 Park Road
Weston, MA 02493

Conservation Law Foundation
Attn: John Kassel
62 Summer Street
Boston, MA 02110-1016

LivableStreets Alliance
Attn: Jacqueline Douglas
70 Pacific Street
Cambridge, MA 02139

MassBike Metro Boston Chapter
Attn: David Watson
171 Milk Street, Suite 33
Boston, MA 02109

WalkBoston
Attn: Wendy Landman
Old City Hall
45 School Street
Boston, MA 02108

Paula and Robert Alexander
226 North Harvard Street
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84 Franklin Street
Allston, MA 02134

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35 Windom Street
Allston, MA 02134

John Eskew
15 Athol Street
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