

Section 3.0

Assessment of Development Review Components

3.0 ASSESSMENT OF DEVELOPMENT REVIEW COMPONENTS

3.1 Transportation

This section presents an evaluation and summary of the transportation elements of the Project, including a comparison of the expected transportation impacts of the proposed Main Building Expansion (Project) and the approved 2008 Main Building Vertical Addition. Included is an analysis of estimated trip generation characteristics for the Main Building Expansion and a qualitative description of on-site parking conditions, loading and service activities, pedestrian/bicycle amenities and other important transportation mitigation and improvement actions that will be provided in connection with the Main Building Expansion. The purposes of these analyses are to:

- ◆ Describe the transportation-related characteristics of the Main Building Expansion;
- ◆ Quantify the transportation impacts that will be generated by the Main Building Expansion and compare those impacts to the previously approved 2008 Main Building Vertical Addition;
- ◆ Develop a set of mitigation strategies and improvement measures that will help to lessen the transportation effects of the proposed Main Building Expansion and to provide improvements to the future transportation infrastructure in the LMA area; and
- ◆ Demonstrate that these transportation mitigation efforts will exceed the requirements of the BRA and the Boston Transportation Department (BTD) and will serve as exceptional public benefits as they relate to transportation issues.

Section 3.1.1 provides an overview of the Main Building Expansion and a summary of findings of the transportation analysis, including anticipated impacts and proposed mitigation. Sections 3.1.2 through 3.1.4 provide a more detailed discussion of estimated traffic generation of the Main Building Expansion and comparison of those estimates to the previously approved 2008 Main Building Vertical Addition. Section 3.1.6 of the chapter presents a detailed summary of transportation mitigation and improvement actions that Children's is committed to implementing in connection with the Main Building Expansion.

3.1.1 Project Change Description

The project change includes an expansion to the CHB Main Building along Binney Street. This Main Building Expansion would include approximately 112,000 square feet of hospital space (105,000 net new square feet) in a 14-story tower. This Main Building Expansion would replace the two-story 2008 Main Building Vertical Addition, which was approved as part of CHB's Institutional Master Plan in early 2008. The 2008 IMP proposed that the existing temporary building on Binney Street would have been demolished to accommodate construction logistics and lay-down space, allowing for the implementation

of the 2008 Main Building Vertical Addition. The Main Building Expansion also contemplates demolition of this same building; however, this cleared space would then serve as the site for the proposed 14-story expansion adjacent to the Main Building. From a transportation perspective, the Main Building Expansion would be similar to the approved 2008 Main Building Vertical Addition with no new parking proposed at the Core Campus, and no new drop-off area or entrances created in connection with the Project.

A summary of the proposed program for the Main Building Expansion as compared to the approved 2008 Main Building Vertical Addition is presented in Table 3-1.

Table 3-1 CHB Main Building Expansion Project Program

Project Actions	Approved 2008 Main Building Vertical Addition Program (SF)	Main Building Expansion Project Program (SF)
New Construction	60,375	112,000-
Demolish Temporary/Portable Buildings (Binney Street)	(-7,000)	(-7,000)
Total "Net New" Construction (in SF)	53,375	105,000
Parking Spaces	0	0

Source: Children's Hospital, Facilities and Planning.

To serve their patients and staff, Children's has developed and proactively maintained transportation infrastructure for safe and efficient access to and from its LMA campus. The existing Children's campus transportation infrastructure includes:

- ◆ A dedicated, off-street drop-off/pick-up area at its main entrance,
- ◆ Available on-campus self parking for patients and visitors,
- ◆ Available on-campus valet parking for patients and visitors,
- ◆ Limited on-campus and off-campus parking for Children's employees,
- ◆ An extensive Transportation Demand Management (TDM) program for its employees to encourage commuting to work by transit and other alternative forms of transportation,
- ◆ Covered and secured bicycle parking,
- ◆ A campus shuttle bus system serving employees,
- ◆ Ambulance activity in two dedicated areas, and
- ◆ Four loading and service areas.

The following characterize other future transportation conditions at and near the Project site once the proposed Main Building Expansion is completed:

- ◆ Public pedestrian access between the Main Entrance and Binney Street will remain under the new building. In order for the public to access the Main Building Expansion they will need to go through the Main Lobby.
- ◆ Currently, there is bicycle storage offered at Children's along the Binney Street frontage. This storage will be maintained on the CHB Core Campus with Project completion.
- ◆ Emergency/ambulance access to the Hospital will be maintained via Binney Street.

3.1.2 Trip Generation

To assess the impact of the proposed Main Building Expansion, trip generation estimates were based on standard Institute of Transportation Engineers (ITE) trip rates published in ITE's Trip Generation Manual (7th Edition). ITE's Land Use Code 610 Hospital was used to estimate the new trips generated by the Project. In total, Children's will be constructing approximately 112,000 SF, or 105,000 net-new SF, of hospital space which includes 30 "net new" beds.

Since the proposed Project is an expansion of an existing building that is situated within a large hospital campus setting, trip generation was estimated for the entire hospital campus with and without the expansion using the regression equation for the clinical component of the Project. The difference between these two values yields the "net-new trips" specifically associated with the expansion of the Main Building. Because most of the core building staff (i.e., security, janitorial, etc.) is already located within the campus, the proposed Project will not be generating as many trips as a new stand-alone facility.

It is important to recognize that patient trips occur throughout the day. While some patient trips occur during the peak hours, there is a steady flow of patient and visitor trips between 8:00 AM and 7:00 PM. The trip generation estimate (based on ITE) assumes a concentration of peak hour trips because the trip rates account for new employee trips when adjacent street traffic volumes are the highest. However, as mentioned previously, to minimize commuting by vehicle in the LMA, no new employee parking will be provided with this expansion, so the actual trip results are expected to be less than reported below.

Table 3-2 summarizes the total number of unadjusted (raw ITE) vehicle trips to be generated for an average weekday and during the morning and evening peak hours. Person trips, the number of persons in vehicles, are also provided. The peak-hour person trip estimate assumes 1.2 persons per vehicle based on the 2001 National Household Survey prepared by the U.S. Department of Transportation that estimates the average number of persons per vehicle by trip purpose. These trip results shown in Table 3-2 do not account for alternative modes of transportation.

Table 3-2 Trip Generation Results (Net-New Main Building ExpansionTrips)

	Unadjusted ITE Vehicle Trips (vehicles)	Person Trips* (persons)
Daily Total	1,052	1,262
AM Peak Hour		
Inbound	64	77
Outbound	32	38
AM Total	96	115
PM Peak Hour		
Inbound	25	30
Outbound	50	60
PM Total	75	90

*Number of persons in vehicles.

As shown in Table 3-2, the Project is anticipated to generate 1,052 daily unadjusted vehicle trips. According to ITE rates, the Project is expected to generate 96 and 75 unadjusted vehicle trips, respectively, during the morning and evening peak hours, respectively. Person trip generation is slightly higher since some vehicles will carry more than one person.

3.1.3 Mode Share and Vehicle Occupancy Rates

To account for alternative modes of transportation, mode splits were applied to the person trip results presented in Table 3-2. The auto mode split includes all vehicle based trips including taxis. Mode splits are based on BTD Guidelines applied to the area within the LMA and are shown in Table 3-3.

Table 3-3 Mode Splits

Mode	Peak Hour	Weekday Daily
Public Transit	31%	21 %
Walk/Bike/Other	36%	46 %
Automobile	33%	33 %

Source: BTD Guidelines, Zone 5

Results of the vehicle trip generation estimate are shown in Table 3-4. Once more, an occupancy rate of 1.2 persons per vehicle was assumed in the estimate.

Table 3-4 Net-new Project Trip Generation

Time Period/Direction	Walk/Bike/Other	Transit	Vehicle
Daily			
Inbound	290	132	173
Outbound	290	132	173
Daily Total	580	234	346
AM Peak Hour			
Inbound	28	24	21
Outbound	14	12	10
AM Total	42	36	31
PM Peak Hour			
Inbound	11	9	8
Outbound	21	19	17
PM Total	32	28	25

Source: ITE Trip Generation, 7th Edition

The Project is anticipated to generate 31 and 25 vehicle trips, respectively, during the morning and evening peak commuter hours. As a conservative analysis these estimates include patients, visitors, and employees.

3.1.4 Trip Generation Comparison

The previously-approved 2008 Main Building Vertical Addition included 53,375 SF of net-new clinical space. However, for purposes of this analysis, a slightly larger building program of 57,200 net-new SF of clinical space was used for the transportation study.

The additional development program, currently proposed in connection with this NPC represents an additional 47,800 SF over the approved 2008 Main Building Vertical Addition.

Table 3-5 provides a comparison of the vehicle trip generation estimates for the Main Building Expansion to those estimates made in connection with the 2008 Main Building Vertical Addition.

Table 3-5 Net-new Project Vehicle Trip Generation

Time Period/Direction	Approved Project Main Building Vertical Addition*	NPC Main Building Expansion
Daily		
Inbound	95	173
Outbound	95	173
Daily Total	190	346
AM Peak Hour		
Inbound	12	21
Outbound	6	10
AM Total	18	31
PM Peak Hour		
Inbound	5	8
Outbound	10	17
PM Total	15	25

Source: ITE Trip Generation, 7th Edition

*IMP transportation analysis included 57,220 sf of net-new building space.

As shown in Table 3-5, the proposed Project will generate approximately 13 additional vehicle trips during the AM peak hour, and an additional 10 vehicle trips during the PM peak hour over the previously analyzed building program.

The transportation study that was prepared and submitted in support of the previously-approved 2008 Main Building Vertical Addition included a comprehensive and thorough analysis of the transportation impacts as required by the Article 80 development review and approval process. That study clearly articulated the transportation impacts of the previously approved project and delineated a comprehensive package of transportation mitigation and improvement actions to lessen the transportation effects of the main Building Vertical Addition and to provide improvements to the future transportation infrastructure in the LMA.

As shown in Table 3-5, the impact characteristics of the Main Building Expansion are generally similar to those impacts quantified as part of the review of the 2008 Main Building Vertical Addition. CHB is committed to support the proposed Main Building Expansion project to implement the array of transportation mitigation and improvement actions that were committed to under the previous review and approval process for the 2008 Main Building Vertical Addition.

3.1.5 *Parking Summary*

No new parking spaces are planned as part of Main Building Expansion project. The parking demands associated with the 30 “net new” beds included in the Project are expected to be accommodated within CHB’s existing hospital campus parking system.

Children’s offers its patients, visitors, physicians, and employees a multitude of options for parking. Currently, Children’s controls approximately 1,576 off-street parking spaces in the LMA. These parking spaces include 947 on-campus spaces within facilities owned by Children’s, and an additional 629 parking spaces leased by Children’s elsewhere within the LMA. Parking spaces are made available for patients/visitors and to serve staff and physicians that need to park on the campus. In addition to spaces within the LMA, Children’s uses an additional 1,009 spaces for employees in remote parking facilities outside of the LMA. Off-site spaces that are used by employees require shuttle services to the Core Campus by dedicated Children’s and/or MASCO-operated shuttle services.

Children’s currently has a parking management plan that provides valet services at the Main Building and screens patients at the Patient and Family Garage to ensure sufficient visitor parking. In addition, Children’s provides an extensive Transportation Demand Management (TDM) plan for employees to encourage alternative modes of transportation to the campus. As part of this plan, Children’s has introduced a parking rate structure that makes it advantageous for employees to park outside of the LMA and utilize shuttles to the campus.

3.1.6 *Development of Mitigation Plan*

This section provides an overview of the transportation improvements and mitigation plan developed by Children’s. The additional traffic generated by the Main Building Expansion Project will have minimal impacts to the transportation infrastructure. To offset these new trips, Children’s is committed to providing transportation improvements and mitigation actions to improve transportation for patients, visitors, and employees traveling to the LMA. Children’s will continue to proactively manage its drop-off and valet parking operation at its main entrance as a means to reduce traffic activity on area streets, particularly along Longwood Avenue.

Children’s is committed to implementing visitor TDM measures to encourage the use of alternative modes of transportation. In addition, Children’s will continue to expand its proactive TDM measures to its employees to encourage the use of transit and other alternative forms of transportation.

These actions will:

- ◆ Help manage parking activity generated by Children’s Hospital;
- ◆ Improve the pedestrian realm in the public right-of-way; and
- ◆ Improve public space amenities.

The Proponent has also made important mitigation commitments in the form of policies and management actions. Key commitments are to continue to establish and maintain a proactive TDM program and parking management strategies.

3.1.6.1 Children’s Employee Transportation Demand Management Program

Children’s seeks to minimize the impact of traffic on the area, while ensuring that patients and employees can also conveniently access the campus. To encourage this, Children’s utilizes a variety of TDM strategies, including:

- ◆ **CommuteWorks TMA.** Children’s is an active member of the CommuteWorks Transportation Management Association (TMA), which is operated by MASCO. CommuteWorks offers an array of ongoing programs (discussed further below) designed to encourage employees to choose alternative options for commuting.
- ◆ **Transit pass subsidies.** To encourage employees to choose public transportation as their primary mode to work, Children’s provides a 50 percent subsidy to the cost of T and commuter rail passes for employees. The cost of passes is deducted on a pre-tax basis, resulting in an additional cost savings to employees. As of March, 2009, almost 4,000 employees or associated personnel are enrolled in the pass program. The Hospital also has rolled out a new program, called “Three for Free”, to promote the use of public transportation rather than driving. Employees who give up their parking spots for three months will receive a free T or commuter rail pass for that period.
- ◆ **Carpool assistance.** Ridematching services are provided to employees through MASCO’s CommuteWorks. Through CommuteWorks’ preferential parking program, carpools registered with three or more people are guaranteed parking at nearby garages, while two-person carpools are guaranteed spaces at remote MASCO lots.
- ◆ **Emergency Ride Home.** CommuteWorks provides an Emergency Ride Home program for those employees not commuting by car. This program covers the cost of taxi or car rental vouchers up to five times a year (per person) for commuters who need to get home quickly due to personal emergencies.
- ◆ **Bicycling/walking incentives and amenities.** Children’s participates in CommuteWorks’ Commute Fit Program that provides rewards to employees who bicycle, walk, or rollerblade to work, based on the miles they log. Starting April 1, 2009, bicycle commuters will be provided with a \$20 monthly subsidy. The Hospital also provides several bike racks on campus, as well as a secure bike cage for employees. Employee

lockers and showers are available on-site. Recently installed bicycle racks on the MASCO M2 Cambridge-Longwood shuttle buses provide more range and modal flexibility for bicyclists and public transportation riders. Children's also participates in the annual Bike to Work Week, and was awarded the Bike Week Commuter Challenge in 2004 and 2005 for outstanding participation.

- ◆ **Location-priced parking.** Children's recognizes that there are still employees who will need or want to drive to work but to control congestion in the LMA, Children's encourages these staff members to carpool and to park off-site. To discourage parking on campus, the Hospital subsidizes the cost of off-site parking, giving those employees a 51 percent discount compared to those who park on campus.
- ◆ **Personalized commuting assistance.** Through CommuteWorks', Children's offers assistance for employees needing help identifying a new commute pattern/mode(s).
- ◆ **Zip-Car membership.** Through CommuteWorks, Children's employees are eligible for a reduced Zip-Car membership. There are currently 12 Zip-Cars located throughout the LMA including five in Brigham Circle, two in Longwood Towers, two at the 375 Longwood Garage, two at Landmark Center, and one at Simmons College. In February 2009, Children's agreed to park two Zip-Cars on site in the Patient Family Garage.
- ◆ **Telecommuting and compressed workweeks.** Children's has an informal policy of encouraging telecommuting and compressed workweeks for employees.
- ◆ **Promotional efforts.** To promote alternative transportation, Children's monitors CommuteWorks programs; posts and distributes announcements; holds promotional events for employees; and provides transit schedules and other information to facilitate alternative transportation.
- ◆ **Employee transportation advisor.** Children's employs an Employee Transportation Advisor (ETA) who provides information and implements TDM measures at Children's, assisted by MASCO's CommuteWorks TMA.
- ◆ **Shuttle bus services.** Both Children's and MASCO operate shuttle services in the LMA. Shuttle transportation is vital to the Hospital's strategy related to public transportation and off-site parking. Children's operates three shuttles between campus and off-campus parking lots, as well as three shuttles between campus and commuter rail stations. MASCO runs ten bus routes that provide service within one-half mile of the Children's campus.

Children's will continue to promote and improve its TDM program to benefit its employees and reduce traffic impacts to roadways and parking facilities within the LMA and nearby neighborhoods. In an effort to balance employee needs with the needs of the Hospital's neighbors' concerns about traffic congestion, Children's Hospital made some adjustments to the schedules of the shuttles that travel through the Fenway neighborhood, beginning in early December 2008. The Hospital's Office Shuttle switched to a schedule of 15 minute intervals from the existing schedule of 10 minute intervals, and it also services the

Hospital's lot at 819 Beacon Street during the midday rather than running a specific shuttle. The schedule reduction and the midday consolidation of the Beacon shuttle has resulted in 37 fewer runs per day, or approximately 9,000 fewer runs on an annualized basis in the Fenway/Kenmore area.

3.2 Environmental Protection Component

The environmental impacts of the proposed Project are similar in scale to the previously approved Main Building Vertical Addition.

3.2.1 Wind

The Main Building Expansion will have a height of approximately 173 feet to the top of the highest occupiable floor. The Proponent contracted RWDI, Inc. to do a quantitative (wind tunnel) study of the proposed Project. The results, based on the wind tunnel tests and RWDI's understanding of the pedestrian areas around the proposed development, showed wind conditions were comfortable for the intended use in each area. No dangerous mean wind speeds or unacceptable gusts occurred during any season. In general, most areas around the site exhibited little or no change from existing wind conditions, although marginally increased wind activity was observed in some areas due to the redirection of wind flows by the mass of the proposed development. A wind study is included in Appendix C.

3.2.2 Shadow

The shadows cast by the Project will be similar to those of the existing Main Building, however there will be additional new shadow on Binney Street. Due to the dense nature of the area, shadow from existing buildings reach Binney Street during the morning and noon-time hours of all seasons. It is anticipated that some of these shadows will be extended because of the new Project. It is not anticipated that the Project will cast shadow on any major public open spaces.

3.2.3 Daylight

The purpose of a daylight analysis is to estimate the extent to which a proposed project affects the amount of daylight reaching public streets in the immediate vicinity of a project site. Although the Main Building Expansion is anticipated to result in an increase of daylight obstruction over existing conditions, the proposed 14-story building is expected to result in daylight conditions similar to other projects located in the LMA, and particularly similar to daylight conditions resulting from other buildings along Binney Street.

3.2.4 *Solar Glare*

The Project is not planned to include the use of reflective glass or other reflective materials on the building facades that would cause adverse solar glare impacts. Should reflective glass or other reflective materials be proposed as the Project design advances, Children's will undertake a solar glare study if appropriate.

3.2.5 *Air Quality*

Potential long-term air quality impacts will be limited to emissions from Project-related mechanical equipment and pollutant emissions from vehicular traffic generated by the development of the Project. It is anticipated that the changes in traffic operations will be minimal and therefore no air quality analysis will be required. Construction period air quality impacts and mitigation are discussed below in Section 3.3.10.

3.2.6 *Water Quality/Wetlands*

The Project site is currently impervious under both existing and future conditions. Accordingly the Project will affect neither the pattern of, nor quantity of, stormwater discharging from the existing Main Building.

3.2.7 *Geotechnical/Groundwater*

3.2.7.1 *Subsurface Conditions*

Subsurface conditions were determined from available data collected from subsurface investigations conducted in connection with the design and development of several previous expansion projects for Children's Hospital in the vicinity of the site. In general, the site is overlain with miscellaneous fill that is approximately six to eight feet thick. The ground surface of the site varies from approximately El. 28 to about El. 35 Boston City Base (BCB) datum. The fill unit is underlain by marine deposits (clay, silt, sand), starting at approximately El. 23 BCB, with a thickness of approximately 47 to 50 feet. At approximately El. -25 BCB is the glacial till unit at approximately six to 26 feet thick. Bedrock is located at approximately El. -37 BCB.

Groundwater is anticipated at approximately El. 22 BCB. The Project proposes below-grade space that is below site groundwater levels, and therefore, preliminary information suggests an underdrain system and waterproofing of the below grade space would be utilized. The project site is not located within the Groundwater Conservation Overlay District but is adjacent to the district. Children's will contact the Boston Groundwater Trust to discuss the proposed Project and measures to protection groundwater during construction.

3.2.7.2 Hazardous Wastes On-site

The Project site is likely underlain by urban fill soils which typically contain low levels of contaminants such as petroleum hydrocarbons, PAHs and metals) which would require management during construction in accordance with applicable regulations. Additionally MCP reportable levels of PCB impacts soils may be located on portions of the site and require off-site disposal at a recycling facility. In the event that the site does contain soils regulated under the provisions of the MCP, soil materials will be treated and disposed of in compliance with applicable regulations.

3.2.7.3 Building Foundations

Preliminary information suggests six-foot diameter drilled shafts bearing at the top of the rock for support of the proposed Project will be utilized. Drilled shafts are considered the most feasible foundation system considering the configuration of the adjacent foundation systems and the structure's sensitivity to settlement, based on the proposed Project use. The lowest level floor slab of the proposed Project can likely be constructed as slab-on-grade following sub-grade preparation. Appropriate measures will be taken to ensure that construction of the Main Building Expansion will not impact the foundation systems of the Main Building and other building foundations in the vicinity of the Project site.

3.2.8 *Solid and Hazardous Waste*

The Project will generate solid waste typical of institutional hospital uses. All waste will be segregated at the point of origin into separate streams. Solid waste is expected to include wastepaper, styrofoam, cardboard, glass bottles and food. The Project will also generate biomedical and infectious wastes typical of medical facilities. Management of hazardous waste is highly regulated for the safety of the public, the environment and the hospital community. Children's has an existing hazardous waste collection program, which will be used to handle and dispose of all wastes generated by existing and proposed hospital facilities in accordance with applicable laws and regulations.

3.2.9 *Noise*

During operations, neither the Project's mechanical equipment nor traffic noise associated with the Project is expected to result in a perceptible change in noise levels. The proposed Project includes mechanical levels on floors four and five which will serve to reduce noise impacts associated with placing all mechanical equipment in a rooftop penthouse. Some mechanicals for the Project will be located in a penthouse and will be screened to reduce ambient noise levels.

Construction period noise impacts and mitigation are discussed below in Section 3.3.10.

3.2.10 Construction

A Construction Management Plan in compliance with the City's Construction Management Program will be submitted to the Boston Transportation Department.

Short-term minor air quality impacts from fugitive dust may be expected during excavation and later construction. Mitigation measures such as the use of wetting agents where needed and removal of spoils from the site using covered trucks will be utilized.

Noise impacts will be controlled during construction through the use of mufflers on heavy outdoor equipment, as appropriate, exterior construction hour restrictions, and other measures.

Construction methodologies that ensure public safety and protect nearby businesses will be employed. Techniques such as barricades, walkways, and signage will be used. Construction management and scheduling will minimize impacts on the surrounding environment. This will include plans for construction worker commuting and parking, routing plans for trucking and deliveries, and control of noise and dust.

The proposed construction staging plan will be designed to isolate the construction while providing safe access for pedestrians and automobiles during normal day-to-day activity and emergencies. A detailed construction plan will be included in the Traffic Maintenance Plan in compliance with the City's Construction Management Program.

3.2.11 Rodent Control

A rodent extermination certificate will be filed with the 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 for the proposed Project, 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.

3.2.12 Wildlife Habitat

The site is within a fully developed urban area and, as such, the proposed Project will not impact wildlife habitats as shown on the National Heritage and Endangered Species Priority Habitats of Rare Species and Estimated Habitats of Rare Wildlife.

3.2.13 Sustainable Design

Children's is committed to achieving the new criteria regarding sustainability as set forth by the state of Massachusetts Department of Health. As per the first two prerequisites of the Green Guide for Healthcare, Children's is initiating the integrated design process by determining the goals, health mission statements, and program for sustainable design.

Energy conservation measures will be an integral part of the proposed project. The building will employ energy and water efficient features for mechanical, electrical, architectural, and structural systems, assemblies and materials where possible. Mechanical and HVAC systems will be installed to the current industry standards and full cooperation with the local utility providers will be maintained during design and construction.

Children's will achieve all of the prerequisites and 50 percent of the possible 97 credits of the Construction section of the Green Guide for Healthcare as is necessary for compliance with the State of Massachusetts Department of Health Determination of Need (DoN) regulations. This is the percentage needed to achieve a certifiable "silver level" green building. The Green Guide for Healthcare (GGHC) is sponsored by the American Society of Healthcare Engineering (ASHE) and is based on the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. By modification of some of the LEED credits and addition of new ones, the GGHC is designed specifically to provide the Healthcare sector with a self-certifying metric that designers, owners, operators can use to evaluate their progress towards achieving high performance healing environments. A copy of the preliminary GGHC checklist for the Main Building Expansion is provided in Appendix D. The Project will also meet the requirements of Article 37 of the Boston Zoning Code.

The policies described in the following paragraphs are a preliminary consideration of credits that will be implemented to the extent appropriate for this Project. Credits shown in italics are still under review by CHB for possible incorporation.

3.2.13.1 Potential Sustainable Design Measures for Main Building Expansion

Integrated Design

- ◆ *ID Prereq.1 – Integrated Design Process: Children's and the Design team will establish and implement a multi-stakeholder collaborative goal setting and design process.*
- ◆ *ID Prereq.2 - Health Mission Statement and Program: Children's will incorporate a health mission statement in the Project's design intent document that includes goals to safeguard the health of building occupants, the local community, and the global environment while creating a high performance healing environment for the building's patients, caregivers and staff.*

Sustainable Sites

- ◆ **SS Prereq.1 – Construction Activity Pollution Prevention:** The Construction Manager will create and implement an erosion and sedimentation Control Plan for all construction activities as well as a Site access and Utilization Plan to minimize site disruption.

- ◆ SS Credit 1 - Site Selection: The Construction Manager will provide a site plan showing existing conditions and the impact of proposed construction. The Civil Engineer will verify that the Project site meets the credit goals.
- ◆ SS Credit 2 – Development Density & Community Connectivity: The Project scope of work is on a previously developed site, an urban area with existing infrastructure, and therefore will qualify for this credit. Site plan and density calculation will be provided.
- ◆ SS Credit 4.1 - Alternative Transportation; Public Transportation Access: Children’s shuttle bus system, MBTA transit routes and existing access points from the Hospital will be shown on scaled area drawings or transit maps exhibiting the distances between the proposed building location and those existing access points.
- ◆ SS Credit 4.2 - Alternative Transportation; Bicycle Storage and Changing Rooms: Children’s will provide site drawing and documents highlighting bicycle storage and changing and shower facilities as well as the calculations demonstrating compliance with the Credit goals.
- ◆ *SS Credit 4.3 - Children’s will provide preferred parking for low-emitting and fuel efficient vehicles for 5% of the total vehicle parking capacity of the site.*
- ◆ SS Credit 4.4 - Parking capacity: Children’s will issue the existing parking plan and FTE building occupancy numbers.
- ◆ *SS Credit 7.2 - Heat Island effect; Roof: Children’s will document use of roofing material in proposed building which will have a solar reflectance Index of equal to or less than 78 for a minimum of 75% of the roof.*
- ◆ SS Credit 8 – Light Pollution Reduction: The Project design will assure that the interior and exterior lighting does not trespass from the building and site. Window shades will be provided at all exterior windows to ensure patient privacy and reduce light transmission from interior spaces. The light levels will be analyzed to adhere to the light levels set out by those criteria.
- ◆ *SS Credit 10.1 - Community Contaminant Prevention; Airborne Releases: The mechanical engineer of record for the proposed building will provide documentation verifying that the California South Coast Air Quality District standards for products of combustion will be met.*
- ◆ SS Credit 10.2 - Community Contaminant Prevention; Leaks and Spills: The plumbing and mechanical engineers of record for the proposed building will provide documentation of on site fuel storage systems verifying compliance with the credit goals as well as a plan indicating the location of all storage facilities and a narrative describing secondary containment provisions verifying compliance with the credit goals.

Water Efficiency

- ◆ WE Prereq. 1 - Water Efficiency Potable Water use for Medical Equipment Cooling: Children's will compile documentation of technologies employed to eliminate once-through use of potable water for all medical equipment cooling purposes.
- ◆ *WE Credit 2.1 - Potable Water Use Reduction: Measurement & Verification: Children's will compile a Measurement & Verification Plan with a summary schedule of the instrumentation and controls for the required monitoring categories, highlighting the Input/Output data points to be collected.*
- ◆ WE Credit 2.2 - Potable Water Use Reduction: Domestic Water: Children's will equip all urinals, and hand wash sinks with sensor operators.
- ◆ WE Credit 2.3 - Potable Water Use Reduction: Domestic Water: Children's will use low-flow fixtures or control fixture flows to achieve the maximum gpm water flows for lavatories, urinals, and toilets as allowed for this credit.
- ◆ WE Credit 2.4 - Potable Water Use Reduction: Process Water and Building System Equipment: Children's will reduce the cooling tower blowdown rate by at least 20%.
- ◆ *WE Credit 2.5 - Potable Water Use Reduction: Process Water and Building System Equipment: Children's will provide a system to capture air handling system condensate for use in non-potable applications such as cooling tower makeup or irrigation and will reuse cooling tower and boiler blowdown water for other suitable purposes depending on the chemical properties.*

Energy and Atmosphere

- ◆ EA Prereq. 1 - Fundamental Commissioning of the Building Energy Systems: Commissioning will be conducted by the Children's commissioning agent.
- ◆ EA Prereq. 2 - Minimum Energy Performance: The Project will comply with the minimum requirements set out the by ASHRAE 90.1-2004.
- ◆ EA Prereq. 3 - Fundamental Refrigerant Management: The Project will not use CFC-based refrigerants.
- ◆ EA Credit 1 - Optimize Energy Performance: The Project will enhance the buildings energy use, beyond that of that which is stated in ASHRAE 90.1, through building energy modeling.
- ◆ EA Credit 3 - Enhanced Commissioning: Enhanced Commissioning will be conducted by Children's commissioning agent.

- ◆ *EA Credit 4 - Enhanced Refrigerant Management: The building shall utilize natural gas for cooling the Project versus CFC based refrigerants.*
- ◆ *EA Credit 5 - Measurement and Verification: Children's will prepare a measurement and verification plan; include a summary schedule of the instrumentation and controls for the required monitoring categories while highlighting the I/O data points to be collected, and will document the monitoring system, including the cut sheets of sensors and the data collection system.*
- ◆ *EA Credit 7 - Equipment Efficiency: Children's will reduce energy consumption by using efficient medical and other equipment.*

Materials and Resources:

- ◆ *MR Prereq. 1 - Storage and Collection of Recyclables: The Project will provide for the storage and collection of recyclables, which will be demonstrated in floor plans.*
- ◆ *MR Prereq. 2 - Mercury Elimination: Children's will eliminate mercury –containing building products and reduce mercury discharge through product substitution and capture.*
- ◆ *MR Credit 2.1 - Construction Waste Management: Divert from Disposal: Divert 50% from disposal; the Construction Manager will devise a plan for disposal.*
- ◆ *MR Credit 2.2 - Construction Waste Management: Divert from Disposal: Divert 75% from disposal; the Construction Manager will devise a plan for disposal.*
- ◆ *MR Credit 2.3 - Construction Practices; Site and Materials Management: The Construction Manager will implement the construction practices environmental management system for construction and pre-occupancy phases of the building.*
- ◆ *MR Credit 2.4 - Construction Practices; Utility and Emissions Control: The Construction Manager will implement a plan to reduce utility, vehicle, and other emissions during the construction phase.*
- ◆ *MR Credit 3.1 - Sustainability Sourced Materials: Children's will choose 10% of the total value of all building materials used in the Project (on a dollar basis) that achieve at least one of the following sustainability criteria: contains 70% of salvaged materials and 50% rapidly renewable materials.*
- ◆ *MR Credit 4.1 - PBT Elimination; Dioxins: Children's will comply with the reduction of release of Dioxins associated with the life cycle of building materials.*
- ◆ *MR Credit 4.2 - PBT Elimination; Mercury: Children's will comply with the reduction of release of Mercury associated with the life cycle of building materials.*

- ◆ MR Credit 4.3 - PBT Elimination; Lead & Cadmium: Children's will comply with the reduction of release of Lead and Cadmium associated with the life cycle of building materials.
- ◆ MR Credit 5.1 - Furniture & Medical Furnishings; Resource Reuse: Children's will specify salvaged, refurbished, or used furniture and medical furnishings for a minimum 20% of the total furniture and medical furnishings products.
- ◆ MR Credit 5.2 - Furniture & Medical Furnishings: Materials: Children's will specify 40% of furniture and medical furnishings by cost that complies with a minimum of two of the following: 1.) No PBTs in material manufacture; 2.) comply with European Union RoHS and 3.) All wood components from FSC Certified Wood.
- ◆ MR Credit 5.3 – Furniture and Medical Furnishings: Manufacturing, Transportation and Recycling: Children's will specify 40% of furniture and medical furnishings based on cost that complies with a minimum of two of the following: 1.) Locally and /or regionally sourced. 2.) Transported with a minimum of packaging. 3.) Has "end of life" destination.
- ◆ MR Credit 6 - Copper Reduction: Children's will comply with the Elimination of copper as well as the compliance of solder joints to be compliant with ASTM B813 and use of B813 flux for reduction of copper pipe corrosion.
- ◆ MR Credit 7.1 - Resource Use: Design for Flexibility: Children's will increase flexibility and ease of adaptive reuse over the life of the structure by employing three or more of the eight possible design/planning strategies listed in the GGHC.

Environmental Quality

- ◆ EQ Prereq. 1 - Minimum IAQ Performance: Project Contract Documents will outline procedures for compliance with ASHRAE 62.1-2004
- ◆ EQ Prereq. 2 - Environmental Tobacco Smoke (ETS) Control: Smoking is constrained to designated outdoor smoking zones on Children's property. Children's will provide a plan of these areas. The Institution is committed to the intent of this prerequisite. However, the constrained site creates challenges for compliance meeting the letter of it and further examination will be needed for determining acceptable solution.
- ◆ EQ Prereq. 3 - Hazardous Material Removal or Encapsulation: Children's will establish a program for the discovery, testing, and mitigation of asbestos, mercury, lead, mold; identify applicable regulatory requirements, and obtain survey records that identify known contamination in the building and on the site.
- ◆ EQ Credit 1 - Outdoor Delivery Monitoring: Children's will provide outdoor airflow measuring stations in the ductwork that serves the proposed new building.

- ◆ EQ Credit 3.1 - Construction EQ Management Plan; During Construction: Children's will develop and implement an Environmental Quality (EQ) Management plan for the construction and preoccupancy phases of the building.
- ◆ EQ Credit 3.2 – Construction EQ Management Plan; Before Occupancy: Children's will develop and implement an Indoor Air Quality (IAQ) management plan for the pre-occupancy phase.
- ◆ EQ Credit 4.1 - Low-emitting Materials; Interior Adhesives and Sealants: The Project will meet the minimum standards set in the architect's specifications and Children's Standards for the Project.
- ◆ EQ Credit 4.2 - Low-emitting Materials; Wall and Ceiling Finishes: The Project will meet the VOC limits of South Coast Air Quality Management District; Rule1113, Architectural Coatings.
- ◆ EQ Credit 4.3 - Low-emitting Materials; Flooring Systems: The project will meet the minimum standards set in the architect's specifications and Children's Standards for the project.
- ◆ EQ Credit 4.4 - Low-emitting Materials; Composite Wood and Insulation: The Project will meet the minimum standards as set in the specifications and Children's standards for the Project.
- ◆ EQ Credit 4.5 - Low-emitting materials: Furniture and Medical Furnishings: Children's will select a minimum of 40% (cost) of all furniture and medical furnishings (including mattresses, foams, panel fabrics and other textiles) that contain no more than one of the four following materials: 1.) Polybromated diphenyl ethers. 2.) Teflon, Stainmaster. 3.) Urea formaldehyde. 4.) Phthalate plasticizers.
- ◆ EQ Credit 4.6 – Low-emitting Materials; Exterior Applied Products: The Project will meet the minimum standards as set in the specifications and Children's standards for the Project.
- ◆ EQ Credit 5.1 - Chemical & Pollutant Source Control: Outdoor: Children's will comply with the GGHC list of requirements to minimize pollutant contamination of regularly occupied areas due to exterior factors.
- ◆ EQ Credit 5.2 - Chemical & Pollutant Source Control: Indoor: Children's will comply with the GGHC list of requirements for minimizing cross-examination of regularly occupied spaces.
- ◆ EQ Credit 6.1 - Controllability of Systems; Lighting: Children's will provide lighting control plans indicating compliance with the goals of this credit.

- ◆ EQ Credit 6.2 - Controllability of Systems; Thermal Comfort: This core and shell will provide for individual controls in each occupiable room. Children's will be in Compliance with ASHRAE 55-2004 for thermal comfort.
- ◆ *EQ Credit 7: - Thermal Comfort; Design: The Project will comply with ASHRAE 55-2004, and will provide for the assessment of thermal comfort over time.*
- ◆ EQ Credit 8.1d - Daylight and Views: Daylight for Occupied Spaces: Children's will provide a window configuration to ensure that both patients have a visual connection to the outdoors, even when cubicle curtains are closed and provide a window direct to the outdoors from 75% of regularly occupied staff work spaces and non-inpatient room spaces.
- ◆ EQ Credit 8.1e - Daylight and Views: In addition to Credit 8.1d, Children's will provide a window direct to the outdoors from 90% of the regularly occupied staff work spaces and non- in patient room spaces.
- ◆ EQ Credit 8.3 - Daylight and Views: Lighting and Circadian Rhythm: Children's will establish electric lighting and daylighting systems and controls for patient areas and staff work areas based upon principles of circadian rhythms.
- ◆ EQ Credit 9 - Acoustic Environment: Exterior Noise, Acoustical Finishes & Room Noise Levels: Children's will use the 3 sections of the 2006 AIA/AHA Draft Interim Sound and Vibration Design Guidelines for Hospital and Healthcare Facilities: 1.) Minimize the impact of the site exterior noise on the building occupants and on the surrounding community. 2.) Acoustical Finishes and Detail. 3.) Room Noise Levels.
- ◆ EQ Credit 9.2 - Acoustic Environment: Sound Isolation, Paging & Call Systems, and Building Vibration: In addition to EQ credit 9.1, Children's will use the 2 out of 3 sections of the 2006 AIA/AHA Draft Interim Sound and Vibration Design Guidelines for Hospital and Healthcare Facilities: 1.) Sound isolation performance of construction-speech privacy goal. 2.) Paging and call systems, clinical alarms, masking systems and sound reinforcement. 3.) Building Vibration.

Innovation and Design Process

- ◆ IN Credit 1.1 - Project air handling equipment will be sized with lower velocities to reduce the energy (pressure drop) for the components, and to reduce fan energy consumption for the useful life of the product.
- ◆ IN Credit 1.2 - Fan Wall technology will be incorporated into the design to significantly reduce fan energy consumption for the useful life of the Project. This concept allows for greater efficiency throughout the year.

- ◆ IN Credit 1.3 - Cooling plant shall utilize current technology to reduce hospital reliance on chemicals for cooling water use.
- ◆ *IN Credit 2 - Children's will initiate a research project to document absenteeism, health care cost, employee retention and other health, quality of care and productivity measures of enhanced building performance.*

3.3 Urban Design

In addition to providing the maximum number of inpatient beds and requisite support, the Main Building Expansion offers the opportunity to mediate architecturally between the existing Main Building and the Enders Building and to create a more formal and lively presence for Children's Hospital on Binney Street.

To that end, the Binney Street facade of the first two levels of the Main Building Expansion will align with those facades of the adjacent Enders Building and Jimmy Fund Building, creating a visual "street wall" on Binney Street. The Main Building Expansion's first two levels will serve as a base for the glass- and metal-paneled bed tower. Above these levels, the building may be cantilevered to the edge of the sidewalk curb and maximize square footage while simultaneously providing a dynamic view of Children's Hospital from Longwood Avenue and Shattuck Street. At grade level, the area will be enlivened through a continuous glass canopy and the creative placement of windows in the Main Building Expansion for displays of archive or gallery presentations.

Viewed from the front turn-around driveway at the Main Building entrance, the proposed bed tower of the Main Building Expansion will provide a mediating element between the Enders Building and Main Building with their distinctly different architectural styles, using a palette of glass and metal panels in such a manner to compliment both buildings.

The Main Building and the Main Building Expansion will be connected by a glass corridor that crosses a fifteen-foot light well. Filled with a large mobile and other colorful, light-reflecting artwork, the light well brings space, light, and color to an otherwise densely organized site while creating a communal heart. The light well will offer lively views both to visitors and patients in the lounges and playrooms on every floor in the Main Building Expansion and to patients in rooms in the existing Main Building, while ensuring their privacy. A view of the Main Building Expansion from the front turn-around driveway will provide a glimpse of the mobile in the light well through the activity-filled glass corridor which will serve as an element of interest for patients, staff and visitors entering the hospital.

The Project team will work collaboratively with the BRA design staff and Boston Civic Design Commission (BCDC) during the review process on urban design issues including the relationship of the Main Building Expansion to the sidewalk and Binney Street and the provision of pedestrian amenities including sidewalk width and vitality.

3.4 Historic and Archaeological Resources

None of the buildings owned by Children's is listed in the State and National Registers of Historic Places. Two properties owned by Children's are included in the *Inventory of Historic and Archaeological Assets of the Commonwealth* maintained by the Massachusetts Historical Commission (MHC):

- ◆ Hunnewell Building / Formerly Known as Children's Hospital Administration Building (300 Longwood Avenue)
- ◆ Wolbach Building / Formerly Known as Thomas M. Rotch Jr. Memorial Hospital For Infants

Nine historic resources listed in the State and National Registers of Historic Places are in the vicinity of the Children's campus, defined here as within a half-mile radius of the campus:

- ◆ Olmsted Park System;
- ◆ Isabella Stewart Gardner Museum;
- ◆ Massachusetts School of Art;
- ◆ Massachusetts Mental Health Center;
- ◆ Mission Hill Triangle District;
- ◆ Timothy Hoxie House
- ◆ Edward H. Haskell Home for Nurses;
- ◆ Mission Church Complex; and
- ◆ 1767 Mile Marker (Huntington Avenue).

In addition, several properties included in the *Inventory* are located in the vicinity of the Children's Core Campus. The names and addresses of properties listed in the State and National Registers of Historic Places and properties included in the *Inventory* within a half-mile radius of the Children's Core Campus are listed in Table 3-6. Figure 3-1 depicts the locations of these properties. Impacts to historic resources are anticipated to be minimal and similar to those of the existing Main Building.

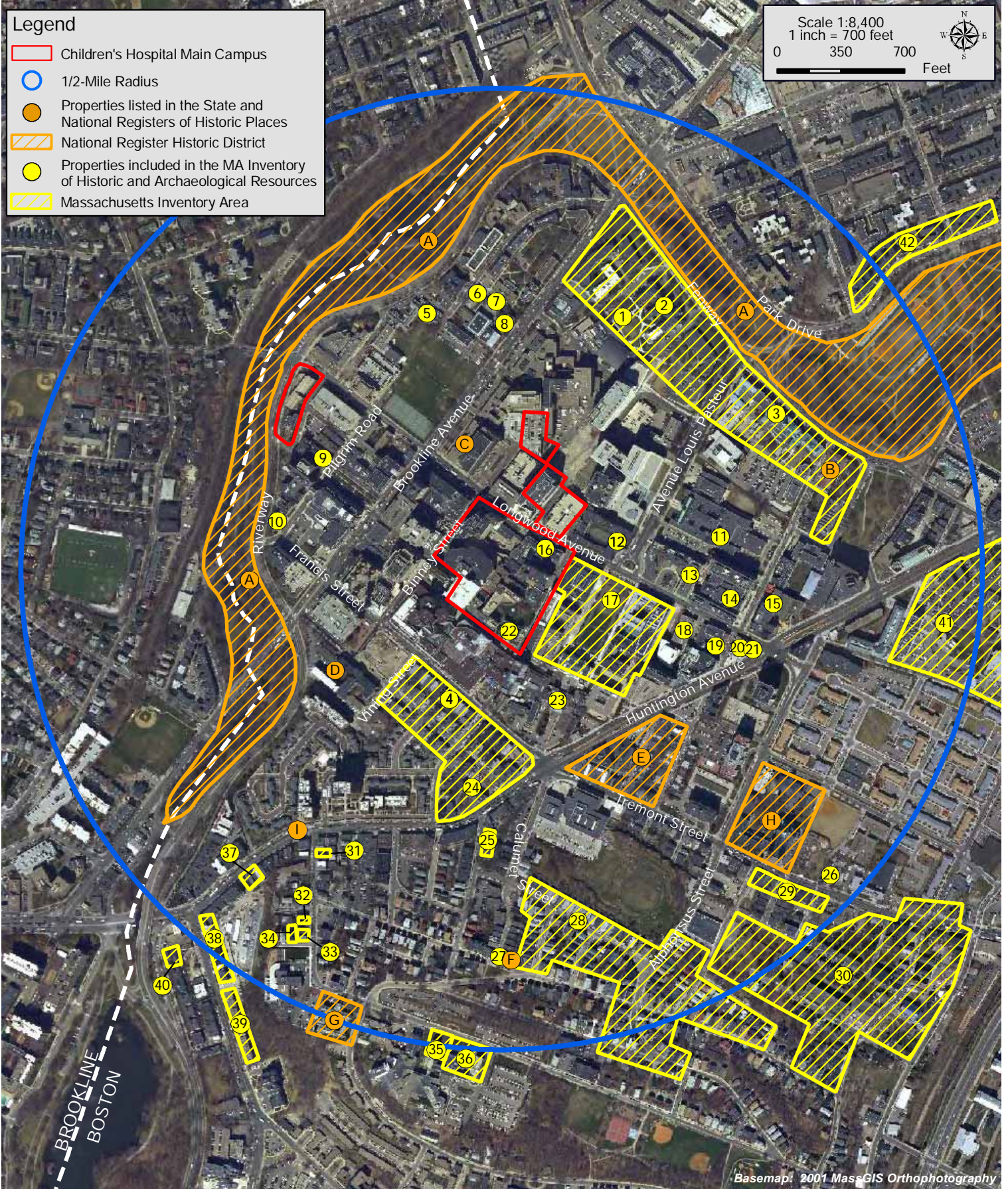


Figure 3-1
Historic Resources in Vicinity of Children's Hospital Campus

Table 3-6 Historic Resources Within and in the Vicinity of the Core Campus

No.	Name	Address
State and National Register-Listed Resources		
A	Olmsted Park System	Sections of the Back Bay Fens*, Emerald Necklace Parks*
B	Isabella Stewart Gardner Museum	280 The Fenway
C	Massachusetts School of Art	364 Brookline Avenue
D	Massachusetts Mental Health Center	74 Fenwood Road
E	Mission Hill Triangle District	Huntington Avenue, Smith, Worthington, Wigglesworth and Tremont streets
F	Timothy Hoxie House	135 Hillside Street
G	Edward H. Haskell Home for Nurses	220 Fisher Avenue
H	Mission Church Complex*	Tremont, St. Alphonsus, and Smith Streets
I	1767 Mile Stone	841 Huntington Avenue
Properties included in the <i>Inventory of Historic and Archaeological Resources of the Commonwealth</i>		
1	Southwest Fenway District	
2	Emmanuel College Main Building	400 The Fenway
3	Simmons College Main Building	300 The Fenway
4	Francis Street and Fenwood Road District	Francis Street and Fenwood Road
5	Winsor School	103 Pilgrim Road
6	Simmons College, North Hall	86 Pilgrim Road
7	Simmons College, Refectory	Behind Pilgrim Road
8	Simmons College, South Hall	321 Brookline Avenue
9	Former New England Deaconess Hospital Building	175 Pilgrim Road
10	Former Palmer Hospital Building	195 Pilgrim Road
11	Boston Public Latin School	78 Avenue Louis Pasteur
12	Vanderbilt Hall	245 Longwood Avenue
13	Boston Lying In Hospital	221 Longwood Avenue
14	Massachusetts College of Pharmacy	179 Longwood Avenue
15	Girl's Latin School and Normal School	Palace Road, Tetlow Street, Huntington Avenue
16	Hunnewell Building / Former Children's Hospital Administration Building**	300 Longwood Avenue
17	Harvard Medical School District	210, 220, 230, 240, 260 Longwood Avenue and 25 Shattuck Street
18	Harvard Dental School	188 Longwood Avenue
Properties included in the <i>Inventory of Historic and Archaeological Resources of the Commonwealth (Cont'd)</i>		
19	Former Angell Memorial Hospital	180 Longwood Avenue
20	Westcourt Apartment Block	164 Longwood Avenue
21	Carlton Apartment Block	160 Longwood Avenue
22	Wolbach Building/Former Thomas M. Rotch Jr. Memorial Hospital For Infants **	55 Shattuck Street
23	Peter Bent Brigham Hospital	721 Huntington Avenue/ 15 Francis Street
24	Farragut School	10 Fenwood Road
25	Thomas Maquire Apartment Houses	6-16 Wait Street
26	Boston Public Library Parker Hill Branch	1497 Tremont Street
27	Stone/Warren House	139 Hillside Street
28	Parker Hill/Mission Hill Triple Decker District	Calumet, Sachem, Oswald, St. Alphonsus, Hillside, Iroquois streets
29	Tremont Street District	Tremont Street
30	Parker Hill/Mission Hill North Slope District	Parker Tremont, Burney, Delle, Allegheny, Hillside, Terrace streets; Terrace Pl., Folsom Ave.

Table 3-6 Historic Resources Within and in the Vicinity of the Core Campus (Continued)

No.	Name	Address
31	Delia Gilligan Three Decker	10 Parker Hill Avenue
32	Gregory Lino Three Decker	37 Parker Hill Avenue
33	Phillip Kresser Three Decker	43 Parker Hill Avenue
34	Phillip Kresser Three Decker	1 Parker Hill Terrace
35	New England Baptist Hospital	101 Parker Hill Avenue
36	Robert Breck Brigham Hospital	125 Parker Hill Avenue
37	James M.W. Hall Apartment Houses	860-872 Huntington Avenue
38	William Blakemore Apartment Houses	16-50 South Huntington Avenue
39	Morris Wheeler Apartment Houses	49-75 South Huntington Avenue
40	Thomas Miskell Three Decker	39-41 South Huntington Avenue
41	Ruggles Street/Parker Street Area	Huntington, Ruggles and Parker Streets
42	Park Drive Area	1 Queensbury Street, 51-55, 61-69, 73-79, 107, 111, 117-121, 125-151 Park Drive

Key: *Property listed as a Boston City Landmark
 **Property located within the Children’s Core Campus

3.5 Infrastructure Systems

This section describes the Project’s interaction with existing domestic water, sanitary sewer, stormwater management, and energy and telecommunications systems. The Project’s final design will adhere to applicable protocols and design standards so that the Project is properly supported by and properly uses the existing utility infrastructure. Detailed design of the Project’s utility systems will proceed in conjunction with the design of the building and interior mechanical systems.

3.5.1 Regulatory Framework

This section, in addition to a description of existing and future infrastructure topics, discusses the regulatory framework of utility connection reviews and standards.

- ◆ In the City of Boston, the Boston Water and Sewer Commission (BWSC) is responsible for water, sewer, and stormwater systems. BWSC administers its reviews by a Site Plan Approval process.
- ◆ The Boston Fire Department (BFD) reviews projects with respect to fire protection measures such as fire department connections, standpipes and hydrants.
- ◆ Energy and telecommunication system connections are coordinated with the respective utility providers.
- ◆ New utility connections are authorized by the City of Boston Public Works Department through the street opening permit process.

3.5.2 Wastewater System

Sewage generated by the proposed Main Building Expansion Project will be directly to the existing sewer in Binney Street, where it will travel to the existing sewer in Longwood Avenue. Sanitary sewage discharged to this system is conveyed by BWSC and Massachusetts Water Resources Authority (MWRA) sewers to the MWRA Deer Island Wastewater Treatment Plant for treatment and disposal.

The proposed Project includes the creation of 30 “net new” patient beds and 72,000 net new SF of clinical space. Based upon a sewage generation rate of 200 gallons per day (gpd) per hospital bed and 200 gpd per 1,000 SF of clinical space, the project will generate a net new average daily sewer flow of approximately 20,400 gpd, as shown in Table 3-7.

Table 3-7 Wastewater Generation

Use	Program Use	Rate	Total
Patient Beds (“net new”)	30 Beds	200 GPD/Bed	6,000 GPD
Clinical Space	72,000 SF	200 GPD/1,000 SF	14,400 GPD
Total “Net New” Flow			20,400 GPD

3.5.3 Domestic and Fire Protection Water

Domestic and fire protection water will be provided through the existing Main Building infrastructure. According to BWSC record information, the Main Building is provided BWSC water via a looped system of 12-inch water mains in Longwood Avenue, Binney Street and internal campus water mains. The average daily water use is estimated to be approximately 22,440 gpd. Water demand is based upon estimated sewage generation with an added factor of 10 percent for consumption, system losses, and other usage.

The State Building Code requires the use of water-conserving fixtures. Water conservation measures such as low-flow toilets and restricted flow faucets will help reduce the domestic water demand on the existing water distribution system.

3.5.4 Stormwater Management

The Project site is impervious under both existing and future conditions. Accordingly the Project will affect neither the pattern of, nor quantity of, stormwater discharging from the existing Main Building. Also, it should be noted that the Project is not located within the Groundwater Conservation Overlay District (GCOD). Please see Section 3.3.7 for additional information on the Project site’s location relative to the GCOD.

3.5.5 Energy Systems

This section provides a qualitative summary of the energy systems that will support the proposed Main Building Expansion Project. The following utility systems are discussed in this section:

- ◆ Natural gas
- ◆ Electricity
- ◆ Telecommunications

In addition, consideration was given to the sustainable elements of the energy supply provision for the Project. The final design process for the Project will adhere to applicable protocols and design standards so that the proposed Project is properly supported by, and in turn properly uses the existing utility infrastructure. Detailed design of the Project's utility systems will proceed in conjunction with the design of the building and interior mechanical systems.

The systems discussed herein include those owned or managed by both CHB and private utility companies. There will be close coordination among these entities and with the Project engineers and architects during subsequent reviews and design efforts. The Project will connect to existing city and utility company systems in the adjacent public street (Binney Street). Based on initial investigations and consultations with the appropriate agencies and utility companies, existing infrastructure systems are available at the Project site and appear adequately sized to accept the incremental increase in demand associated with the development and operation of the Project.

Natural Gas Service

Natural gas service will be provided via proposed connections to the system on Binney Street. CHB will work with the respective utility provider on particulars as the Project design advances.

Electrical Service

Electrical service will be provided via proposed connections to the system on Binney Street. CHB will work with the respective utility provider on particulars as the Project design advances.

Telecommunications

CHB will select private telecommunications companies to provide telephone, cable and data services. Upon selection of a provider or providers, CHB will coordinate service connection locations and obtain appropriate approvals.

Protection of Utilities

Existing public and private infrastructure located within the public right-of-way will be protected, where required, during construction. The installation of proposed utilities within the public way will be in accordance with the BWSC, Boston Public Works Department, the Dig-Safe Program, and governing utility company requirements. All necessary permits will be obtained before the commencement of work. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer, or drain facilities will be reviewed by the BWSC as part of its Site Plan Review Process.

Sustainable Design/Energy Conservation

CHB is committed to sustainability and environmental responsibility. The base configuration of the proposed building will meet the Massachusetts Energy Code. Mechanical and HVAC systems will be installed to the current industry standards and full cooperation with the local utility providers will be maintained during design and construction. Additional information on sustainable design including compliance with Green Guide for Health Care is provided in Section 3.3.13.

Construction Coordination

CHB will continue to work and coordinate with the utility companies to assure the compliance and integrity of the Project.