Table of Contents

1 Executive Summary

1.1 Introduction 1-1

1.2 Project Background 1-1
1.2.1 History 1-1
1.2.2 DFCI Today 1-2

1.3 Project Summary 1-3

1.4 Public Review 1-4

1.5 Summary of Benefits 1-5

1.6 Summary of Impacts 1-6
1.6.1 Transportation 1-6
1.6.2 Environmental Impacts 1-9
1.6.3 Construction 1-12
1.6.4 Sustainable Design 1-12
1.6.5 Infrastructure Systems 1-13
1.6.6 Interim Guidelines Consistency 1-13

1.7 Conclusion 1-14

2 General Information

2.1 Introduction 2-1

2.2 Development Information 2-1
2.2.1 Project Information and Development Team 2-1
2.2.2 DFCI Mission and Objectives 2-4
2.2.3 Mission-Driven Need for Space 2-7

2.3 Legal and Financial Information 2-8
2.3.1 Legal Judgments or Actions Pending 2-8
2.3.2 History of Tax Arrears on Property Owned in Boston by the Proponent 2-8
2.3.3 Project Site / Site Control / Easements 2-8
2.3.4 Disclosure of Beneficial Interests 2-8
2.3.5 Financial Information 2-9

2.4 Public Benefits 2-9
2.4.1 Introduction 2-9

	2.4.2	Estimated Linkage Payments	2-9
	2.4.3	Estimated Annual Property Taxes	2-9
	2.4.4	Construction Employment	2-9
	2.4.5	Permanent Employment	2-10
	2.4.6	Community-Based Cancer Control Initiatives	2-10
	2.4.7	Statewide Initiatives	2-14
	2.4.8	National Cancer Institute-Sponsored Activities	2-15
2.5	Center for Community-Based Research		2-16
2.6	United Way / Jimmy Fund Collaboration		2-17
2.7	Free Care		2-17
2.8	Services to Patients, Families and Communities		2-18
2.9	Career, Employment and Training Initiatives		2-18
	2.9.1	Workforce Development Programs	2-19
	2.9.2	Youth Programs	2-19
	2.9.3	Incumbent Worker Programs	2-20
2.10	Other Community Benefits		2-20
	2.10.1	Fenway and Mission Hill Neighborhoods	2-20
	2.10.2	Housing and Community	2-20
	2.10.3	Reducing Density / Promoting Economic Development	2-21
	2.10.4	Utility Upgrades	2-21
2.11	Regulatory Controls and Permits		2-22
	2.11.1	Existing Uses and Structures	2-22
	2.11.2	Future Zoning Controls	2-24
	2.11.3	Design Review	2-24
	2.11.4	Anticipated Permits	2-25
	2.11.5	Applicability of MEPA	2-26
2.12	Coordination with Abutters and Other Interested Parties		2-26

3 Project Description and Alternatives

3.1	Introduction		3-1
3.2	Project Location and Current Uses		3-1
3.3	Evolution of the Project since the IMPNF/PNF and ENF Filings		3-1
3.4	Detailed Project Description		3-2
	3.4.1	Building Program	3-3
	3.4.2	Connections to Existing Campus	3-5
	3.4.3	Building Design	3-6
	3.4.4	Pedestrian Circulation	3-7
	3.4.5	Site Improvements	3-7
	3.4.6	Access and Circulation	3-8
3.5	Project Schedule		3-9
3.6	Project Alternatives		3-9

3.6.1 Current Zoning 3-10
3.6.2 Interim Guidelines 3-10
3.6.3 Institutional Master Plan 3-10
3.6.4 No-Build 3-11

4 Urban Design

4.1 Introduction 4-1

4.2 The Center for Cancer Care 4-1
4.2.1 Gateway to Dana-Farber Cancer Institute 4-1
4.2.2 Connections to Existing Campus 4-2
4.2.3 Access and Service 4-3
4.2.4 Scale and Context 4-4
4.2.5 Building Character 4-5

4.3 Public Pedestrian Areas 4-6

4.4 Planning Context of the Project 4-7
4.4.1 Leased Space 4-8
4.4.2 Satellite Facilities 4-8

4.5 Conclusion 4-8

5 Transportation Access Plan Component

5.1 Introduction 5-1
5.1.1 Project Overview 5-2
5.1.2 Summary of Findings 5-4
5.1.3 Transportation Mitigation and Improvement Actions 5-8
5.1.4 Methodology 5-11
5.1.5 Study Area 5-12

5.2 Existing Conditions 5-13
5.2.1 Summary of Existing DFCI Transportation Infrastructure and Services 5-13
5.2.2 Study Area Intersections 5-20
5.2.3 Study Area Roadway and Intersection Conditions 5-27
5.2.4 Crash Analysis 5-28
5.2.5 Area-wide Parking 5-29
5.2.6 Pedestrians and Bicycles 5-31
5.2.7 Public Transportation 5-33
5.2.8 Helicopter Operations 5-38

5.3 Evaluation of Long-Term Transportation Impacts 5-39
5.3.1 Area Transportation Improvements 5-39
5.3.2 2016 No-Build Condition 5-44
5.3.3 2016 Build Condition 5-48

5.4 Transportation Operations Analysis 5-58
5.4.1 Intersection Level of Service (LOS) Operations 5-58
5.4.2 Pedestrian Analysis 5-92
5.4.3 Transit Analysis 5-94

5.5 Conclusion 5-98

6 Environmental Protection Component

6.1	Introduction		6-1
6.2	Wind Analysis		6-1
	6.2.1	Overview	6-1
	6.2.2	Methodology	6-2
	6.2.3	Pedestrian Wind Comfort Criteria	6-3
	6.2.4	Test Results	6-4
	6.2.5	Summary	6-6
6.3	Shadow Analysis		6-6
	6.3.1	Regulatory Context	6-6
	6.3.2	Methodology	6-6
	6.3.3	Spring Equinox (March 21)	6-7
	6.3.4	Summer Solstice (June 21)	6-8
	6.3.5	Fall Equinox (September 21)	6-8
	6.3.6	Winter Solstice (December 21)	6-8
	6.3.7	Conclusions	6-9
6.4	Daylight Analysis		6-9
	6.4.1	Regulatory Context	6-9
	6.4.2	Methodology	6-9
	6.4.3	Jimmy Fund Way	6-10
	6.4.4	Brookline Avenue	6-11
	6.4.5	Conclusions	6-11
6.5	Solar Glare Analysis		6-12
	6.5.1	Methodology	6-13
	6.5.2	Building Materials	6-14
	6.5.3	Reflective Glare Analysis	6-14
	6.5.4	Heat Loading on Nearby Buildings	6-17
	6.5.5	Conclusions	6-17
6.6	Noise Analysis		6-18
	6.6.1	Noise Impact Criteria	6-18
	6.6.2	Noise Background	6-19
	6.6.3	Noise Analysis Methodology	6-21
	6.6.4	Existing Conditions	6-22
	6.6.5	Project Impacts	6-23
	6.6.6	Results	6-24
	6.6.7	Construction Period Noise	6-25
6.7	Air Quality Analysis		6-27
	6.7.1	Background	6-27
	6.7.2	Air Quality Standards	6-27
	6.7.3	Modeling Methodology	6-28
	6.7.4	Existing Conditions	6-31
	6.7.5	Project Impacts	6-31
	6.7.6	Summary of Findings	6-33
6.8	Solid and Hazardous Waste		6-34

	6.8.1	Contaminated Soils	6-34
	6.8.2	Solid Waste Generation/Disposal/Recycling	6-35
	6.8.3	Hazardous Waste Generation/Disposal	6-35
6.9	Geotechnical and Groundwater Analysis		6-37
	6.9.1	Site and Subsurface Conditions	6-37
	6.9.2	Foundation Design	6-38
	6.9.3	Foundation Construction Impacts	6-38
	6.9.4	Impacts on Groundwater Levels	6-39
6.10	Flood Hazards/Wetlands		6-39
6.11	Construction Impacts		6-40
	6.11.1	Introduction	6-40
	6.11.2	Construction Schedule	6-40
	6.11.3	Coordination with Other Ongoing Construction Projects	6-40
	6.11.4	Construction Phasing	6-40
	6.11.5	Disposal and Recycling of Construction Debris	6-42
	6.11.6	Construction Worker Parking	6-43
	6.11.7	Truck Routes/Volumes	6-43
	6.11.8	Construction Air Quality	6-43
	6.11.9	Construction Noise	6-45
	6.11.10	Measures to Protect Water Quality During Construction	6-46
6.12	Rodent Control		6-47
6.13	Historic Resources		6-47

7 Infrastructure Systems

7.1	Introduction		7-1
7.2	Regulatory Framework		7-1
7.3	Infrastructure Systems		7-2
7.4	Stormwater Management, Water Quality and Wetlands		7-2
	7.4.1	Stormwater	7-2
	7.4.2	Muddy Water Restoration Project	7-3
	7.4.3	Consistency with DEP Stormwater Management Policy	7-4
	7.4.4	Laboratory Waste	7-6
7.5	Wastewater		7-6
7.6	Domestic Water Supply and Fire Protection		7-7
7.7	Energy Systems		7-7
7.8	Telecommunications		7-8
7.9	Protection of Utilities		7-8
7.10	Participation in LMA-Wide Planning Activities		7-8
7.11	Summary		7-8

8 Sustainable Design

8.1 Introduction 8-1

8.2 Site Sustainability 8-1

8.3 Water Conservation and Erosion Control 8-2

8.4 Energy 8-2

8.5 Waste Handling and Recycling 8-3

8.6 Environmental Quality 8-3

8.7 Products and Building Materials 8-4

8.8 Conclusion 8-5

9 Consistency with Interim Guidelines

9.1 Introduction 9-1

9.2 Overall Relationship to Interim Guidelines 9-1

9.3 Urban Design 9-2
9.3.1 Protection of Assets / Shadow Criteria 9-2
9.3.2 Height Zones 9-3
9.3.3 Setbacks and Stepbacks 9-4
9.3.4 Mix of Uses 9-5
9.3.5 Character 9-5

9.4 Transportation 9-6
9.4.1 Parking Ratios 9-6
9.4.2 Transportation Demand Management 9-7
9.4.3 Transportation Mitigation and Improvement Actions 9-7

9.5 Workforce Development 9-9
9.5.1 Employment Assessment 9-9
9.5.2 Existing DFCI Workforce Development & Training Initiatives 9-10
9.5.3 Future Employment 9-13
9.5.4 Future DFCI Workforce Development Activities 9-13

9.6 Conclusion 9-14

10 Mitigation

10.1 Project Mitigation 10-1
10.1.1 Transportation 10-1
10.1.2 Wind 10-6
10.1.3 Shadow 10-6
10.1.4 Daylight 10-6
10.1.5 Solar Glare 10-6
10.1.6 Noise 10-6
10.1.7 Air Quality 10-7
10.1.8 Solid and Hazardous Waste 10-8
10.1.9 Water Quality/Wastewater 10-10

	10.1.10	Groundwater	10-11
	10.1.11	Construction Impacts	10-12
	10.1.12	Rodent Control	10-15
	10.1.13	Sustainable Design	10-16
	10.1.14	Historic Resources	10-16
10.2	Section 61 Findings		10-16

11 Responses

Appendices

A Floor Plans and Elevations

B Pedestrian Wind Study

C Air Quality

D Noise

E Historic Resources

Transportation Appendix (Separate Volume) is available upon request

List of Figures

Figure 2-1	Existing Site Plan
Figure 2-2	Existing DFCI Land Parcels
Figure 2-3	Future DFCI Land Parcels
Figure 3-1	Center for Cancer Care Project Location
Figure 3-2	Level P2 Floor Plan
Figure 3-3	Level 1 Floor Plan
Figure 3-4	Level 2 Floor Plan
Figure 3-5	Level 3 Floor Plan
Figure 3-6	Levels 7-10 Clinical Floor Plan
Figure 3-7	Level 13 Floor Plan
Figure 3-8	North-South Section
Figure 3-9	East-West Section
Figure 3-10	Brookline Avenue Elevation
Figure 3-11	Jimmy Fund Way Elevation
Figure 3-12	Existing Area Building Height
Figure 3-13	Future Area Building Heights
Figure 3-14	Existing Floor Area Ratios
Figure 3-15	Future Floor Area Ratios
Figure 3-16	Center for Cancer Care P2-Dana L2 Tunnel Connection
Figure 4-1	Level 3 Future Campus Connections
Figure 4-2	Perspective from Joslin Place
Figure 4-3	Perspective from Brookline Avenue
Figure 4-4	Perspective from Brookline Avenue
Figure 4-5	Site Plan
Figure 4-6	Brookline Avenue Site Improvements
Figure 4-7	Jimmy Fund Way Site Improvements
Figure 4-8	DFCI Satellite Facilities
Figure 5-1	Proposed DFCI Transportation – Mitigation and Improvement Plan
Figure 5-2	Proposed DFCI Transportation – Mitigation and Improvement Plan
Figure 5-3	Project Study Area Roadways and Intersections
Figure 5-4	DFCI Campus Transportation Infrastructure
Figure 5-5	Average Daily Traffic Volumes
Figure 5-6	2006 Existing Condition – Morning Peak Hour Traffic Volumes

Figure 5-7	2006 Existing Condition – Evening Peak Hour Traffic Conditions
Figure 5-8	Summary of Nearby Off-Street Public Parking Facilities
Figure 5-9	Summary of On-Street Parking in the Study Area
Figure 5-10	Sidewalk and Crosswalk Inventory
Figure 5-11	Primary Pedestrian Circulation Routes
Figure 5-12	2006 Existing Condition – Morning Peak Hour Bicycle Volumes
Figure 5-13	2006 Existing Condition – Evening Peak Hour Bicycle Volumes
Figure 5-14	Bicycle Circulation and Amenities
Figure 5-15	2006 Existing Condition – Morning Peak Hour Pedestrian Volumes
Figure 5-16	2006 Existing Condition – Evening Peak Hour Pedestrian Volumes
Figure 5-17	Public Transportation
Figure 5-18	MASCO Shuttle Bus Services
Figure 5-19	LMA Helicopter Flight Routes
Figure 5-20	Future Transportation Improvements
Figure 5-21	Urban Ring Phase 1
Figure 5-22	Urban Ring Phase 2
Figure 5-23	Urban Ring Phase 3
Figure 5-24	Approved or Planned Development Projects
Figure 5-25	2016 No-Build Condition – Morning Peak Hour Traffic Volumes
Figure 5-26	2016 No-Build Condition – Evening Peak Hour Traffic Volumes
Figure 5-27	Trip Distribution – Inbound
Figure 5-28	Trip Distribution – Outbound
Figure 5-29	Project Generated Trips – Morning Peak Hour
Figure 5-30	Project Generated Trips – Evening Peak Hour
Figure 5-31	2016 Build Condition - Morning Peak Hour Traffic Volumes
Figure 5-32	2016 Build Condition – Evening Peak Hour Traffic Volumes
Figure 6-1	Directional Distribution of Winds
Figure 6-2	Directional Distribution of Winds
Figure 6-3	Directional Distribution of Winds
Figure 6-4	Annual Pedestrian Wind Conditions – Existing
Figure 6-5	Annual Pedestrian Wind Conditions – Build
Figure 6-6	Shadow Impact Analysis – March 21 – 9AM
Figure 6-7	Shadow Impact Analysis – March 21 – 12PM
Figure 6-8	Shadow Impact Analysis – March 21 – 3PM

Figure 6-9	Shadow Impact Analysis – June 21 – 9AM
Figure 6-10	Shadow Impact Analysis – June 21 – 12PM
Figure 6-11	Shadow Impact Analysis – June 21 – 3PM
Figure 6-12	Shadow Impact Analysis – June 21 – 6PM
Figure 6-13	Shadow Impact Analysis – September 21 – 9AM
Figure 6-14	Shadow Impact Analysis – September 21 – 12PM
Figure 6-15	Shadow Impact Analysis – September 21 – 3PM
Figure 6-16	Shadow Impact Analysis – September 21 – 6PM
Figure 6-17	Shadow Impact Analysis – December 21 – 9AM
Figure 6-18	Shadow Impact Analysis – December 21 – 12PM
Figure 6-19	Shadow Impact Analysis – December 21 – 3PM
Figure 6-20	BRA Daylighting Analysis – Center of Brookline Avenue
Figure 6-21	BRA Daylighting Analysis – Center of Jimmy Fund Way
Figure 6-22	Solar Glare Analysis – March 21 – 9AM
Figure 6-23	Solar Glare Analysis – March 21 – 12PM
Figure 6-24	Solar Glare Analysis – March 21 – 3PM
Figure 6-25	Solar Glare Analysis – June 21 – 9AM
Figure 6-26	Solar Glare Analysis – June 21 – 12PM
Figure 6-27	Solar Glare Analysis – June 21 – 3PM
Figure 6-28	Solar Glare Analysis – June 21 – 6PM
Figure 6-29	Solar Glare Analysis – September 21 – 9AM
Figure 6-30	Solar Glare Analysis – September 21 – 12PM
Figure 6-31	Solar Glare Analysis – September 21 – 3PM
Figure 6-32	Solar Glare Analysis – September 21 – 6PM
Figure 6-33	Solar Glare Analysis – December 21 – 9AM
Figure 6-34	Solar Glare Analysis – December 21 – 12PM
Figure 6-35	Solar Glare Analysis – December 21 – 3PM
Figure 6-36	Noise Receptor Locations
Figure 6-37	Microscale Study Area Intersections
Figure 6-38	Microscale Receptor Locations
Figure 7-1	Site Utilities
Figure 7-2	Site Utilities
Figure 7-3	Site Utilities
Figure A-1	P7 Floor Plan

Figure A-2	P6 Floor Plan
Figure A-3	P3 Floor Plan
Figure A-4	P2 Floor Plan
Figure A-5	P1 Floor Plan
Figure A-6	Level 1 Floor Plan
Figure A-7	Level 2 Floor Plan
Figure A-8	Level 3 Floor Plan
Figure A-9	Level 4 Floor Plan
Figure A-10	Level 5 Floor Plan
Figure A-11	Level 6 Floor Plan
Figure A-12	Levels 7-10 Clinical Floor Plan
Figure A-13	Level 11 Floor Plan
Figure A-14	Level 12 Floor Plan
Figure A-15	Level 13 Floor Plan
Figure A-16	Level 14 Floor Plan
Figure A-17	Level 15 Floor Plan
Figure A-18	North – South Section
Figure A-19	East – West Section
Figure A-20	Brookline Avenue Elevation
Figure A-21	Jimmy Fund Way Elevation

List of Tables

Table 2.1	Anticipated Permits	2-25
Table 3.1	Center for Cancer Care Program	3-4
Table 5.1	DFCI IMP Projects	5-3
Table 5-2	DFCI Parking Ratios	5-5
Table 5-3	Proposed DFCI Transportation Mitigation and Improvement Plan	5-9
Table 5-4	Existing Parking Spaces Inventory (February 2006)	5-15
Table 5-5	Existing DFCI On-Campus Parking Accumulation	5-16
Table 5-6	DFCI Loading and Service Operations (June 2005)	5-19
Table 5-7	Existing 2006 Daily Traffic Volume	5-28
Table 5-8	Vehicular Crash Summary (2003-2005)	5-29
Table 5-9	Existing Off-Street Parking Supply (Fall 2006)	5-30
Table 5-10	MBTA Bus Service	5-35

Table 5-11	Green Line Services	5-36
Table 5-12	LMA Traffic Growth Trends (1986 through 2006)	5-45
Table 5-13	DFCI IMP Projects	5-49
Table 5-14	Trip Generation Land Use Codes	5-51
Table 5-15	Trip Generation Results (Net-New Project Trips)	5-52
Table 5-16	Peak Hour Mode Split by Land Use Category	5-53
Table 5-17	Net-new Project Trip Generation	5-53
Table 5-18	Peak Hour Vehicle Trip Rate Comparison	5-54
Table 5-19	Trip Distribution Comparison	5-54
Table 5-20	Level of Service Criteria	5-59
Table 5-21	Existing (2006) Intersection LOS Summary – AM Peak Hours	5-60
Table 5-22	Existing (2006) Intersection LOS Summary – PM Peak Hours	5-64
Table 5-23	No-Build (2016) Intersection LOS Summary – AM Peak Hours	5-69
Table 5-24	No-Build (2016) Intersection LOS Summary – PM Peak Hours	5-73
Table 5-25	Build (2016) Intersection LOS Summary – AM Peak Hours	5-79
Table 5-26	Build (2016) Intersection LOS Summary – PM Peak Hours	5-83
Table 5-27	LOS Summary Comparison	5-88
Table 5-28	Pedestrian LOS Criteria at Signalized Intersections	5-92
Table 5-29	Pedestrian Delay LOS Summary	5-93
Table 5-30	MBTA Bus Route Peak Hour Utilization (2006 Existing Condition)	5-96
Table 5-31	MBTA Bus Route Peak Hour Utilization (2006 Existing Condition)	5-97
Table 6-1	BRA Mean Wind Criteria	6-4
Table 6-2	Azimuth and Altitude Data	6-7
Table 6-3	Results of BRADA Analysis	6-11
Table 6-4	Common Outdoor and Indoor Sound Levels	6-20
Table 6-5	Noise Receptor Locations	6-22
Table 6-6	Measured Existing Sound Levels (L90)	6-23
Table 6-7	Existing and Predicted Sound Levels, L90 (dBA)	6-25
Table 6-8	DEP Noise Criteria Comparison, L90 (dBA)	6-25
Table 6-9	Maximum 1-Hour CO Concentrations (Parts Per Million)	6-32
Table 6-10	Maximum 8-Hour CO Concentrations (Parts Per Million)	6-33
Table 7-1	Wastewater Net New Generation	7-6
Table 7-2	Hydrant Test Results	7-7

1

Executive Summary

1.1 Introduction

This chapter summarizes the significant project background, features and impacts presented in this Draft Project Impact Report/Draft Environmental Impact Report (DPIR/DEIR). It briefly relates the history of the Dana-Farber Cancer Institute, Inc. (DFCI), its current status as one of the top cancer centers in the nation, and its urgent need for growth. It presents highlights of the proposed building project described in this document, the Center for Cancer Care, and reviews both the public benefits and impacts to the City of Boston as a result of this project. The urban design strategies related in this DPIR/DEIR and the project context in relation to the surrounding physical environment, historic resources and infrastructure are also summarized.

1.2 Project Background

DFCI is a Harvard-affiliated, non-profit teaching hospital with a worldwide reputation for offering cancer patients the best treatment available today while developing tomorrow's cures through cutting-edge research. DFCI is a significant generator of clinical and healthcare-related activity and employment and brings approximately $168 million in research grant funding to Boston each year. It is a significant employer of Boston residents, and invests in community outreach and innovative service programs throughout the city and beyond.

1.2.1 History

DFCI was founded in 1947 by the late Sidney Farber, MD. Its original focus was to provide compassionate, state-of-the-art treatment to children with cancer, while simultaneously supporting research into the causes, treatments and cures of the future. In 1969, DFCI officially expanded its programs to include patients of all ages, and in 1974 the Institute became known as the Sidney Farber Cancer Center in honor of its founder. Acknowledging the support of the Charles A. Dana Foundation, the Institute incorporated under its present name in 1983.

In 1996, Dana-Farber Cancer Institute joined with Massachusetts General Hospital and Brigham and Women's Hospital to create Dana-Farber/Partners Cancer Care, a joint venture that offers adult cancer patients the combined strengths of three of the world's leading centers for cancer care and research.

The Dana-Farber/Harvard Cancer Center was formed in 1999, placing the Institute at the hub of cancer research and prevention within the Harvard medical community. Creating new links between Dana-Farber researchers and their colleagues at Harvard Medical School and other Harvard-affiliated hospitals, the program strengthened the Institute's efforts in cancer prevention by tapping the expertise of epidemiologists at the Harvard School of Public Health. In 2000, the Institute formalized its 50-year-plus affiliation with Children's Hospital with the creation of Dana-Farber/Children's Hospital Cancer Care (DF/CHCC), designed to enhance the quality and continuity of care at the two institutions.

1.2.2 DFCI Today

Today, DFCI continues its tradition of excellence and innovation with comprehensive outpatient clinical facilities serving adults and children, and world-class scientific and clinical research programs. DFCI is one of only 39 federally designated Comprehensive Cancer Centers and is also one of only 20 federally designated centers for AIDS research. For the fourth straight year, Dana-Farber Cancer Institute has been rated the top cancer hospital in New England and the fifth best in the nation by *US News and World Report* in the magazine's annual "America's Best Hospitals" guide. The Institute is located within the Longwood Medical and Academic Area (LMA) in Boston, on a small 3.3-acre campus. DFCI currently employs approximately 3,557 employees, of which over 1,100 are Boston residents.

DFCI's physical facilities require considerable improvement to maintain the current level of patient care and research and to continue at the forefront of new advances in the scientific and medical professions. DFCI's existing buildings are aging and were built to meet different healthcare standards and to accommodate smaller, less technologically sophisticated equipment. DFCI has invested significantly in renovating these facilities to adapt them to current clinical and research standards and new technologies. However, cramped floor-to-floor heights, mechanical space and systems capacity, and absence of large areas of structure-free floor space for new functions and equipment have made it difficult for DFCI to operate efficiently and respond nimbly to advances in the treatment and prevention of cancer.

Dana-Farber has also faced extraordinary growth in the numbers of patient visits, the length of their treatments, and services to cancer survivors, which have severely strained DFCI's facility resources. Although cancer mortality is declining, cancer incidence is expected to rise due to early detection and an aging population. Between 2002 and 2004, adult patient exam visits rose over 8 percent annually, while infusion treatments increased over 12% annually. Yearly pediatric exam visits rose nine percent, while infusion visits increased nearly 8%. With this trend, outpatient visits are expected to rise by 220 percent by 2017.

Because the Institute understands that the densely developed Longwood Medical and Academic Area (LMA) cannot sustain physical expansion at DFCI's rate of growth, it is committed to locating as many of its non-critical functions off-campus as possible. DFCI currently leases a total of over 409,000 gross square feet (GSF) of space, with more than 260,000 GSF relocated outside the LMA, which includes new facilities now under construction. Within the next year, DFCI expects to open new facilities in leased space at its new Harbor Campus location, 27 Dry Dock Avenue in South Boston, and in facilities at the Center for Life Sciences in the LMA. Since total projected research needs will exceed facility capacity by 2011, DFCI will continue to seek space for additional research facilities in leased space in or near the LMA. Administrative departments are expected to remain at off-site locations, although DFCI will try to consolidate these leased spaces at fewer sites. This sustainable approach to growth will allow DFCI to maintain its critical patient care and research functions within the LMA.

DFCI has a vision of care that extends beyond the Longwood Medical and Academic Area. With patient volume growing and patients sometimes having difficulty getting to Boston for treatment, the Institute recognizes a need to expand its sites of care by opening satellite clinics. These satellites offer patients the opportunity to receive world-class Dana-Farber care and resources with the convenience of access to their local community hospitals. DFCI has recently opened a highly successful satellite at Faulkner Hospital in Jamaica Plain, and plans to open several more in the next several years.

1.3 Project Summary

DFCI proposes to construct a new building on three adjacent parcels presently occupied by 454 Brookline Avenue, the Redstone Building, and a 30-space surface parking lot. This building will have connections to the Smith Building, which is located on two lots situated immediately to the south of 454 Brookline Avenue and the Redstone parcels. DFCI is in the process of consolidating the above-referenced five lots into a single lot, which will be the site of the existing Smith Building and the Center for Cancer Care. The outdated one and two-story buildings on the 454 Brookline Avenue and Redstone lots represent an under-utilized resource in a prime location. The proposed 13-story Center for Cancer Care at 450 Brookline Avenue will present a significant, visible public presence and sense of entry to the Institute campus. The building will provide approximately 275,000 GSF[1] of above-grade space that will accommodate clinical programs, patient and family services, clinical support space, new main lobby, retail space, and below-grade parking.

The Center for Cancer Care will be the first new clinical building to be constructed on the DFCI campus in 30 years. It is designed to provide ample, state-of-the-art facilities for leading-edge treatment of cancer and related diseases for an expanded

[1] GSF: Gross Square Feet, the total area measured to the exterior of the building and including all mechanical spaces, structure, and use spaces. This tally includes above-grade space but excludes rooftop mechanical support spaces. The zoning building area as defined by the BZC, which excludes all mechanical support spaces, underground parking, and storage areas is 257,500 SF.

patient population. It will create an enhanced healing environment with a strong patient-and-family-centered focus, improved patient safety, and support for safe staff practices. The project offers a critical opportunity to represent the Institute's forward-looking vision and to reorient many campus functions, patterns of movement and interactions. It will serve as the new entrance not only to the DFCI campus but also to the Dana-Farber/Brigham and Women's Cancer Center (DF/BWCC) and the DF/CHCC. The Center for Cancer Care will incorporate sustainable design features that underscore DFCI's commitment to creating a healthy environment for patients, staff and the community.

To enhance the collaboration between clinicians and researchers considered vital in the fight against cancer, the Center for Cancer Care will be connected on nine levels to the adjacent Smith Laboratories Building. The new entrance, accessible from both Brookline Avenue and Jimmy Fund Way, will feature a two-story lobby/atrium providing access to the third-level walkway system that links all of DFCI's buildings and connects with Children's and Brigham and Women's hospitals. The new entrance and significant institutional presence will reorient the public face of Dana-Farber to Brookline Avenue, away from the existing ineffectual entrance on Binney Street. Construction of a tunnel under Jimmy Fund Way is proposed to connect the Center for Cancer Care with clinical support facilities in the Dana Building and to facilitate service access between the Dana Building, Center for Cancer Care, Smith Laboratories Building, and the upgraded Smith loading dock.

1.4 Public Review

The Center for Cancer Care is subject to Large Project Review under Article 80B of the Boston Zoning Code. A Project Notification Form (IMPNF/PNF) was submitted to the Boston Redevelopment Authority (BRA) on March 21, 2006 to initiate Large Project Review. On May 30, 2006, the BRA issued a Scoping Determination outlining the issues to be studied in a Draft Project Impact Report/Environmental Impact Report (DPIR/DEIR). A copy of the BRA's scoping Determination is included in Chapter 11, Response to Comments.

DFCI also filed an Environmental Notification Form (ENF) with the Executive Office of Environmental Affairs / Massachusetts Environmental Protection Agency (MEPA) Office on April 14, 2006. The Secretary of Environmental Affairs issued a Certificate on the ENF on June 6, 2006. The Secretary's Certificate requires the preparation of a Draft Project Impact Report/ Environmental Impact Report (DPIR/DEIR). A copy of the Secretary of Environmental Affairs' Certificate is also included in this DPIR/DEIR in Chapter 11. In accordance with MEPA regulations and Article 80B, the two impact reviews are being coordinated and this DPIR/DEIR responds to both the MEPA Certificate and the BRA Scoping Determination.

1.5 Summary of Benefits

DFCI is and will continue to be a good neighbor and a significant contributor to community benefits. The proposed Center for Cancer Care will result in extensive public benefits for the City of Boston and its residents in addition to facilitating DFCI's ability to achieve its mission to eradicate cancer. Some of these benefits are summarized below:

- Housing Contribution Grant of approximately $1,239,525 and a Jobs Contribution Grant of approximately $247,275, depending upon the final square footage of the project
- Executing an amendment to the DFCI Payment in Lieu of Taxes (PILOT) agreement currently in place with the City of Boston
- Widening Jimmy Fund Way to add capacity (an extra westbound lane)
- Complete reconstruction of the Brookline Avenue / Jimmy Fund Way / Deaconess Road traffic signal system
- Consolidating above-grade and surface parking underground, in one efficiently operating facility
- Improving pedestrian flow and wayfinding on the campus and through the LMA, particularly along Jimmy Fund Way and Brookline Avenue
- Improving urban design visual and spatial conditions throughout the campus with enhanced entrances, landscaping, seating, pedestrian-scale lighting and other site upgrades
- Improving and reinforcing existing urban patterns that define the LMA
- Creating more generous open space outside and public program areas inside DFCI facilities
- Continuing to support the needs of the community through neighborhood health outreach programs like Boston's Mammography Van, the Patient Navigators Program and the Blum Family Resource Van
- Committing $2.5 million towards the construction of *Hope Lodge*, a new facility operated by the American Cancer Society that will provide housing for cancer patients and their families.
- Exploring expansion of DFCI's community outreach mission by partnering with Whittier Street Health Center to provide cancer control programs in the Roxbury community. Initiatives under discussion include cancer education, screening, and programs to assess eligibility for clinical trials.
- Continuing to move a significant volume of administrative, research, animal imaging, storage, materials management and support space out of the LMA
- Replacing sewer and drain lines under Jimmy Fund Way
- Continuing and expanding its proactive Transportation Demand Management (TDM) program

- Continuing membership in the Medical Academic and Scientific Community Organization (MASCO) CommuteWorks TMA and fully supporting MASCO's ongoing transportation initiatives
- Implementing an improved pick-up/drop-off and patient valet parking operations management plan to minimize traffic congestion
- Creating approximately 280-320 full-time construction jobs and 250 permanent jobs expected to include the full range of employment opportunities at DFCI
- Continuing to provide a wide variety of employee training programs through DFCI's Workforce Development Plan

A more detailed description of these benefits is included in Chapter 8, Community Benefits, in the Institutional Master Plan submitted simultaneously with this DPIR/DEIR.

1.6 Summary of Impacts

1.6.1 Transportation

The comprehensive transportation improvement and mitigation plan proposed by Dana-Farber Cancer Institute provides patients, visitors and staff traveling to the LMA an improved transportation infrastructure. The Center for Cancer Care will be set back significantly to create wide pedestrian sidewalks along both Brookline Avenue and Jimmy Fund Way and an additional left-turn lane from Jimmy Fund Way onto Brookline Avenue. As part of this project, DFCI will reconstruct the signals at the intersection of Brookline Avenue/Jimmy Fund Way/Deaconess Road to allow for a permitted left-turn for motorists traveling westbound on Brookline Avenue toward the DFCI campus. DFCI is committed to investigating and replacing existing traffic camera communications in the area and installing a new pan-tilt-zoom traffic monitoring camera at the Brookline Avenue/Jimmy Fund Way intersection.

DFCI will manage a creative underground drop-off and valet parking facility as a means of reducing traffic congestion on area streets, particularly along Jimmy Fund Way and Brookline Avenue. Valet parking operations management has been devised to help manage peak hour traffic flow adjacent to the site. Finally, DFCI will continue to expand its proactive transportation demand management program (TDM) for its employees, to encourage the use of transit and other alternative forms of transportation.

1.6.1.1 Parking and Parking Ratio Summary

Dana-Farber Cancer Institute currently controls a total of approximately 1,454 off-street parking spaces, with 340 spaces available for use by its patients and visitors, and 1,114 available for staff and physicians. About 498 (34 percent) of these spaces are located on the DFCI campus and another 316 (22 percent) are nearby on sites adjacent to or near DFCI facilities. Approximately 640 parking spaces (44 percent) are located off-site in remote parking facilities. The majority of employees that park off-site either walk or use shuttle buses to travel between the DFCI campus and these remote parking facilities.

At the end of the Center for Cancer Care project in 2011, and the conversion of its present above-grade parking facility in Dana Building to office space by 2013, DFCI will have constructed 290,049 square feet (SF) of net new space and 217 net new parking spaces, which complies with the LMA Interim Guidelines for construction of new on-site parking spaces (.75 new parking spaces per 1,000 SF of space). All new parking is intended to serve patients and visitors only, and to provide sufficient on-campus parking convenient to core patient services locations. None of this new parking is proposed to accommodate employees.

1.6.1.2 Traffic Impacts

The effects of the Center for Cancer Care, including detailed analysis of intersection level of service (LOS), were examined at twenty-one intersections specified by the Boston Transportation Department (BTD) during the study area's morning and evening peak commuter hours for 2006. Traffic analyses were also conducted for 2016, with consideration given to background growth, increases attributable to other approved projects, and employee and patient growth expected by DFCI over the next ten years. Roadway and intersection improvements proposed as part of the Center for Cancer Care project will have a positive impact by providing more efficient traffic flow along Brookline Avenue at Jimmy Fund Way, and associated signalization improvements will help manage traffic flow toward Binney Street. The Jimmy Fund Way westbound approach to Brookline Avenue will be widened to provide exclusive left- and right-turn lanes. This will help to manage queues at the intersection and allow the heavier right-turn movement to dissipate more efficiently. Proposed transportation improvements are discussed in detail in Chapter 5, Transportation.

1.6.1.3 Pedestrian Access

The impacts of the Center for Cancer Care project on pedestrians will be concentrated along a portion of Binney Street, Brookline Avenue, and Jimmy Fund Way, which will see improved pedestrian flow, campus connections and environmental quality. Existing and projected pedestrian conditions for these locations (and all study area intersections) were analyzed and are presented in detail in Chapter 5. On Brookline Avenue, the existing six-foot sidewalk will be replaced with a 30-foot wide sidewalk, planted with a double row of trees and populated with street furniture and other amenities. New wider sidewalks are proposed for phased implementation along both sides of Jimmy Fund Way and a portion of Binney Street, with new plantings, pavement treatments, lighting and pedestrian amenities. DFCI will also install countdown pedestrian signals in connection with the reconstruction of the Brookline Avenue/Jimmy Fund Way/Deaconess Road/Joslin Place intersection. Phase one of these upgrades will include sidewalk upgrades in the areas impacted by and immediately surrounding the Center for Cancer Care. Phase two will include work at the Smith Laboratories Building and Dana Building areas of the campus sidewalks.

1.6.1.4 Transportation Demand Management

Dana-Farber Cancer Institute is committed to continuing to offer a wide array of Transportation Demand Management (TDM) incentives to its employees as a means to reduce single-occupant driving and increase use of alternative forms of transportation to and from the Institute. DFCI actively supports efforts to reduce auto use by its employees. Actions employed by DFCI today towards this goal include the following:

- Employee Transportation Advisor
- Membership in MASCO's CommuteWorks TMA
- Full support of MASCO's other ongoing transportation initiatives
- 50 percent transit pass subsidy for employees
- Carpool assistance and incentives
- Bicycling/walking incentives and amenities
- Location-priced parking (i.e. offering competitive-rate parking on-campus and subsidized parking off-campus)
- Telecommuting and compressed workweeks, when feasible
- Promotional efforts

DFCI has committed to maintaining its employee transit subsidy at 50 percent in connection with the Center for Cancer Care project. DFCI will also continue to promote and improve its TDM program to benefit its employees and reduce traffic impacts on roadways and parking facilities within the LMA and nearby neighborhoods.

1.6.1.5 Public Transportation

The DFCI's Center for Cancer Care project will have only a modest incremental effect on transit operations in the area by 2016. The analysis contained in this DPIR/DEIR assumed that future DFCI employees, patients and visitors will have access to the many public transportation services offered by the MBTA, as well as the array of private shuttle and transportation services offered in the LMA through MASCO. In ten years, some existing public transportation services will be operating at or above capacity during peak periods, if services are not expanded to meet expected passenger demands. However, because there are so many public transportation options to and from the LMA, no single service appears to be unduly affected by increases in activities due to the Center for Cancer Care. Consequently, DFCI transit trips are expected to affect the transit system only minimally under future conditions.

1.6.2 Environmental Impacts

1.6.2.1 Historic Resources

Required consultation with the Boston Landmarks Commission and the Massachusetts Historical Commission was completed in April and May 2006. Because two buildings on the project site are over 50 years old and are proposed for demolition, DFCI submitted an Article 85 Demolition Delay application (Article 85, Chapter 665 of the Acts of 1956, as amended) in April 2006 to the Boston Landmarks Commission. A Project Notification Form was submitted concurrently to the Massachusetts Historical Commission as a requirement of 950 CMR 71.00; M.G.L., Chapter 9, Sections 26-27C as amended by St. 1988, c.254. This regulation requires the review of any project with state involvement (in this case, potential tax exempt bond financing from the MA Health and Educational Facilities Authority) by the Massachusetts Historical Commission. Both applications were submitted on April 20, 2006.

The Massachusetts Historical Commission and Boston Landmarks Commission responded with their comments on May 18 and April 28, 2006, respectively. The Massachusetts Historical Commission staff response noted that the project was unlikely to affect significant historic or archaeological resources. The Boston Landmarks Commission staff determined that the two buildings on the project site were not significant buildings under their significance criteria (Section 85-5.3 (a-e) of the Demolition Delay Ordinance.

1.6.2.2 Wind

The results of the pedestrian wind study indicate that wind conditions can be expected to be generally comfortable for their intended use at all entrances to the Center for Cancer Care and along adjacent sidewalks. However, wind conditions uncomfortable for walking were detected in a few areas, most notably the northern corner of the proposed Roof Garden. Conceptual wind control measures have been suggested to improve the wind conditions at the Roof Garden should this area be opened to the public. These are discussed in greater detail in Chapter 6, Environmental Protection Component.

1.6.2.3 Shadow

Shadow study analysis performed for the Center for Cancer Care provides insight into potential effects on the streets, sidewalks and open spaces in the project vicinity. For a large part of the year, the project will have a minimal effect on the surrounding area. Impacts are primarily to the immediate surrounding public ways and sidewalks, with fleeting shadow on Joslin Park in the afternoon during the winter solstice. As described in the discussion of compliance with Interim Guidelines included in Chapter 9, the project will comply with the BRA's LMA Guidelines shadow criteria, which require projects to cast less than one hour of new shadow on Joslin Park during the spring equinox.

1.6.2.4 Daylight

The Center for Cancer Care's anticipated effect on daylight was analyzed using the BRA's Daylight Analysis Program in accordance with Article 80 of the Zoning Code. Although this analysis reveals that daylight obstruction will increase as a result of the Center for Cancer Care development, the resulting conditions in the streets surrounding the site will be similar to those in the adjoining LMA.

1.6.2.5 Solar Glare

The potential for solar glare from the project was evaluated geometrically using solar altitude and azimuth angles. Solar glare analysis showed that the Center for Cancer Care will not result in adverse impacts because solar reflections will not face the vehicular traffic (unless accompanied by direct solar glare) and will be outside the cone of vision for pedestrians. The low exterior reflectivity of the glazing used on the building, coupled with sun shading devices on the façade, will disperse incoming light and significantly reduce the intensity of potential solar glare. The building's complex surfaces will not only help to mitigate solar glare, but will also eliminate major issues of reflective heat loading on nearby buildings.

1.6.2.6 Air Quality

A microscale analysis was conducted for the Center for Cancer Care project to determine the potential air quality impacts from projected flow around the project area. Carbon monoxide (CO) concentrations at identified intersections, plus impacts from garage ventilation systems, monitored background conditions and projected steam/energy conditions are projected to fall well under defined National Ambient Air Quality Standards (NAAQS) thresholds. The Center for Cancer Care is expected to comply with NAAQS for CP for all project-impacted intersections.

1.6.2.7 Solid and Hazardous Waste

As part of the scope of the initial geotechnical/subsurface investigation of the Center for Cancer Care site, composite samples of the existing fill deposit were compiled from several borings taken on-site. The only known historic source of soil contamination at the site, an underground fuel oil storage tank, was removed in 1996. Soil immediately adjacent to the storage tank was found to be contaminated and removed, and documentation confirming that there was no significant residual contamination was filed with the Massachusetts DEP.

The proposed Center for Cancer Care project will generate additional solid waste on DFCI's LMA campus, and proactive recycling measures will be employed to mitigate against this effect. Waste collection containers will be positioned at key points within the Center for Cancer Care and waste will be collected multiple times per day from patient observation rooms and transported to covered waste carts on each floor. Waste will then be transported to a centralized waste compactor in the Smith loading/service area during off-hours. Solid waste from patient areas, laboratories, the dining facility, and administrative offices will be contained, transported and disposed of in separate containers. Special care will be taken to separate general solid waste materials from recyclable waste. DFCI currently employs a comprehensive recycling program that includes paper, cardboard, wood pallets, batteries, plastic bottles, cans, Styrofoam containers and electronics. DFCI's recycling activities were recently cited by the EPA for high-quality achievement. DFCI will employ its system-wide recycling program in the new Center for Cancer Care facility.

Regulated medical waste will be stored in waste rooms with specifically designed leak-proof, labeled waste containers. These containers will be ferried to the Smith Laboratories Building loading/service area where they will be processed and disposed of as either rendered, non-infectious waste (solid waste) or "regulated medical waste."

Any chemical waste would be characterized for chemical composition, packaged, transported and disposed of in accordance with State and Federal requirements, utilizing a Massachusetts-licensed hazardous waste contractor.

DFCI expects that some low-level radioactive waste and infectious waste will be generated in the Center for Cancer Care and will need to be disposed of properly. Management of these types of waste is highly regulated for the safety of the public and the environment. Similar in nature to chemical waste, any low-level radioactive waste would be identified, packaged, transported and disposed of in accordance with State and Federal requirements, utilizing a Massachusetts-licensed hazardous waste/radioactive waste contractor.

1.6.2.8 Noise

Sound levels generated by mechanical equipment, motor vehicle traffic, building operations and emergency/back-up generators associated with the Center for Cancer Care were evaluated. The Center for Cancer Care project will comply with the City of Boston and DEP noise criteria because it will not generate sound levels that exceed the applicable land use criteria or significantly increase sound levels over existing levels. The project will not generate pure tone conditions because of the varied characteristics of nearby traffic noise, and will not exceed the City of Boston's construction noise criteria.

1.6.2.9 Geotechnical and Groundwater

The soil strata at the Center for Cancer Care site is composed of layers of miscellaneous fill, stiff to very stiff clay, fine to medium sand and very dense glacial till above the bedrock. Bedrock is located at depths varying between 73 and 125 feet, and it is anticipated that the bedrock surface may have some near vertical steps associated with widely spaced high-angle joints.

There are two different water levels at the site: a shallow perched water level above the clay stratum and a deeper water level in the sand, glacial till, and bedrock strata below. The new Center for Cancer Care is using a foundation design similar to that of the adjacent Smith Laboratories Building. The perimeter slurry walls will act as a cutoff for groundwater in the surrounding soil for both the temporary construction condition and the permanent condition. There will be a small amount of upward seepage from the underlying bedrock that will be collected by the drainage system located below the basement floor slab. The small amount of seepage flow from the bedrock into the under-slab drainage system is not expected to alter the groundwater levels outside the perimeter slurry walls.

The project design team has reviewed the issue of groundwater level impacts with the Boston Groundwater Trust and they are in agreement with the design team's assessment that the project design provides adequate protection against adverse impacts on groundwater levels. Refer to Section 6.9 in this DPIR/DEIR for a more detailed discussion of these conditions.

1.6.3 Construction

DFCI has collaborated with the Boston Transportation Department (BTD) to define construction-related concerns and to develop a comprehensive Construction Management Plan (CMP) for the project that complies with the City of Boston's Construction Management Program. The CMP includes detailed information regarding construction activities, materials to be used, staging areas, parking, truck routes, air quality and noise impacts and mitigation measures, and other subject matter as it relates to construction.

In particular, the CMP specifically demonstrates the actions that DFCI and their Construction Manager (Walsh Brothers, Inc.) intend to maintain public safety throughout the construction period. Techniques such as barricades, defined temporary walkways, signage, and other protective measures will be put in place. The CMP also highlights actions to be taken to accommodate worker parking, truck routes and staging, protection of utilities, and the control of noise and dust.

1.6.4 Sustainable Design

The Center for Cancer Care is being developed with a focus on optimal application of sustainable design features and operating procedures. The project has been registered with the United States Green Building Council (USGBC) and is targeting a

Silver Leadership in Energy and Environmental Design (LEED) rating. In addition, the building has been registered with the Green Guidelines for Healthcare Construction (GGHC), and this organization's rating system is being followed as a guideline for best practices design and construction.

The Center for Cancer Care will incorporate an extensive set of sustainable design features, including a green roof, bicycle storage and showers, and native, drought-tolerant plantings. DFCI is committed to reducing its consumption of water and energy, and has incorporated in the building design water-saving plumbing fixtures, mechanical condensate reuse, energy-saving equipment and daylighting features, and is considering a system for capturing and reusing rainwater. A building systems management system is also being planned to reduce unnecessary energy consumption on a campus-wide basis.

DFCI is a recognized leader in recycling and the elimination of hazardous materials and byproducts, including mercury, R-12 coolant and polyvinyl chloride. It has a strictly enforced interior and exterior air quality control and infection control program. The Center for Cancer Care will strive to achieve a new standard for healthy interior finishes and materials. These are representative examples of Dana-Farber's active participation in creating a healthy and sustainable future in the City of Boston.

1.6.5 Infrastructure Systems

Existing wastewater, domestic water, fire protection water, stormwater, steam, natural gas, electricity and telecommunications systems were identified by the project team. Initial investigations and consultations with the appropriate agencies and utility companies determined that existing infrastructure systems are adequately sized to accept the incremental increase in demand associated with the development and operation of the Center for Cancer Care.

In addition, proposed stormwater management and sustainable design strategies are expected to improve runoff water quality and reduce runoff volumes. The Center for Cancer Care project and its stormwater management and sustainable design strategies are consistent with the Muddy Water Restoration Project and DEP's Stormwater Management Policy.

1.6.6 Interim Guidelines Consistency

The Center for Cancer Care development is consistent with the planning principles laid out in the LMA Interim Guidelines issued by the BRA in February 2003. The Center for Cancer Care is designed as a signature building, creating a readily identifiable and impressive public presence for Dana-Farber, and reorienting the face of the Institute toward Brookline Avenue. The Center for Cancer Care incorporates a mix of uses, including public amenities, informational program space, food service and retail facilities. The massing and design of the building minimize negative impacts on adjacent buildings and open space, and interior and exterior circulation components of the project will improve pedestrian wayfinding and flow within the DFCI campus and the LMA.

Campus improvements developed as part of this project will create ample landscaped open space, including a wide pedestrian zone along Brookline Avenue, and will transform Jimmy Fund Way into the central exterior pedestrian artery of the campus. Street trees, informational signage and seating areas will create a pleasant human-scale environment around the Center for Cancer Care building and for the DFCI campus.

DFCI is developing the Center for Cancer Care within a larger institutional planning context of locating outside the LMA significant portions of program space which do not require close proximity to primary clinical and research activities. DFCI currently leases over 260,000 SF outside the LMA, and plans to continue to expand this leased space component in the future to accommodate growth in these programs.

The Center for Cancer Care development will also generate new employment opportunities for Boston residents, both in project construction and in on-going program operations accommodated in the building. DFCI workforce initiatives will provide substantial commitments to workforce development and training programs for local residents.

1.7 Conclusion

The Center for Cancer Care described in this Draft IPR/DEIR will allow Dana-Farber Cancer Institute to create a unified and distinct presence within the LMA, provide urgently needed state-of-the-art clinical facilities for the Institute's patient care, and substantially improve the urban design and public experience along Brookline Avenue, Jimmy Fund Way and Binney Street. The potential negative effects of this development on the City of Boston, the LMA and surrounding neighborhoods have been minimized by careful planning, creative transportation strategies, and an inclusive design process.

2

General Information

2.1 Introduction

This chapter summarizes Dana-Farber Cancer Institute's Center for Cancer Care development information, including general project information, a directory of the project team, DFCI's mission, and its mission-driven need for space. The chapter presents required legal and financial information, including the tax history of DFCI-owned property, information about the ownership of the site and easements, and a disclosure of beneficial interests. In addition, it details the public benefits proposed as part of this project, including estimated linkage payments, Payment-In-Lieu-of-Taxes (PILOT) agreement, construction employment, permanent employment, and DFCI's many community benefit contributions, both on-going and proposed. Finally, this chapter discusses the regulatory controls and permits pertaining to the proposed project, including zoning, design review, and anticipated permits.

2.2 Development Information

This DPIR/DEIR addresses the new Center for Cancer Care and related site improvements and connections to existing DFCI facilities. This project will provide much-needed space for growing institute clinical, clinical research and patient-support activities, and improve DFCI's physical campus and its relationship to the surrounding LMA community.

2.2.1 Project Information and Development Team

Proposed Project	Dana-Farber Cancer Institute's Center for Cancer Care
Address / Location	The site for the Center for Cancer Care is composed of two parcels of land, the first located at 462 Brookline Avenue, and the second located adjacent to the first at 454 Brookline Avenue.

Proponent	Dana-Farber Cancer Institute 44 Binney Street Boston, MA 02115 Edward J. Benz, Jr., MD, President Janet Porter, PhD, Executive Vice President and Chief Operating Officer Richard M. Shea, Jr., Vice President for Facilities Management Thomas Herring, Project Executive
Architect	Zimmer Gunsul Frasca Architects LLP 1800 K Street NW, Suite 200 Washington, DC 20006 (202) 380-3120 Robert J. Frasca, FAIA, Partner Margaret DeBolt, AIA, Partner
Associate Architect/ Planners	MDS/Miller Dyer Spears Inc. 99 Chauncy Street, 8th Floor Boston, MA 02111 (617) 338-5350 Myron Miller, AIA, Principal Donna Harris, AIA, Senior Associate
Construction Manager	Walsh Brothers, Inc. 210 Commercial Street Boston, MA 02109 (617) 878-4800 Richard Walsh, Vice President Joseph P. Breen, Associate Vice President
Legal Counsel	Dana-Farber Cancer Institute Office of General Counsel 44 Binney Street Boston, MA 02115 (617) 632-3606 Richard S. Boskey, Senior Vice President and General Counsel
	Goulston & Storrs 400 Atlantic Avenue Boston, MA 02110-3333 (617) 574-4139 Douglas M. Husid, Esq. Darren Baird, Esq.

Transportation, Civil and Environmental Consultants	VHB/Vanasse Hangen Brustlin, Inc. 99 High Street, 10th Floor Boston, MA 02110 (617) 728-7777 David A. Bohn, PE, Senior Principal Sean M. Manning, PE, PTOE, Senior Project Manager Howard Moshier, PE
Building Infrastructure: Mechanical, Electrical & Plumbing Engineers	Bard, Rao +Athanas (BR+A) 311 Arsenal Street Watertown, MA 02472 Kevin Sheehan, PE, Principal
Building Infrastructure: Structural Engineers	Simon Design Engineering, LLC 44 Washington Street, Suite 250 Wellesley, MA 02481 (781) 237-2226 Alan H. Simon, PE, Principal
Code and Life Safety Consultant	RW Sullivan Union Wharf, Unit 302 343 Commercial Street Boston, MA 02109 Paul Sullivan, PE, LEED, President
Geotechnical Consultant	GEI Consultants, Inc. 1021 Main Street Winchester, MA 01890-1970 (781) 721-4000 David Shields, PE
Materials Management Consultant	St. Onge Company 1400 Williams Road York, PA 17402 (717) 840-8182 Sean O'Neill, Principal
Owner Consultant on Sustainable Design	Green Roundtable 210 Bent St. Cambridge, MA 02141 Barbra Batshalom, Executive Director
Wind Tunnel Testing	RWDI 650 Woodlawn Road West Guelph, Ontario Canada, N1K 1B8

	(519) 823-1311 John Alberico, Principal
Survey Consultant	Harry R. Feldman, Inc. 112 Shawmut Avenue Boston, MA 02118 (617) 357-9740 Robert G. Applegate, PLS, Vice President
Commissioning	Synergy Consultants, Inc. Crescent Mill 54 Front Street, #7 Fall River, MA 02720 (401) 952-6444 Stephen Rizzo, President

2.2.2 DFCI Mission and Objectives

The stated mission of Dana-Farber Cancer Institute is to "provide expert, compassionate care to children and adults with cancer while advancing the understanding, diagnosis, treatment, cure and prevention of cancer and related diseases." A principal teaching affiliate of Harvard Medical School, Dana-Farber provides advanced training in cancer treatment and research for physicians and scientists. In addition, DFCI conducts community-based programs in cancer prevention, detection, and control throughout New England.

Since its founding in 1947 by the late Sidney Farber, MD, DFCI has been committed to offering cancer patients the best treatment available today, while developing tomorrow's cures through cutting edge research.

2.2.2.1 Patient Care

DFCI provides screening, prevention, diagnosis, and treatment for all types of cancer. Clinical services include stem cell/bone marrow transplantation, infusion (chemotherapy), pathology, radiology, radiation oncology, and surgery.

DFCI shares its clinical care responsibilities with several other Harvard-affiliated hospitals, giving patients access to a wide range of specialists.

Adult care is delivered through Dana-Farber/Brigham and Women's Cancer Care (DF/BWCC), a component of Dana-Farber/Partners Cancer Care, a joint program involving DFCI, BWH and MGH. Adult patients at DFCI are treated in specialized care centers, each devoted to a different type of disease. Physicians, physician's assistants/registered nurses and other providers from a variety of disciplines work in each treatment center, a team approach that makes it possible for many patients to see all of their specialists in a single visit. DFCI provides outpatient clinics and support facilities while inpatient treatment is provided at DFCI's clinical partners. The adult treatment centers include: breast and gynecologic, cutaneous, endocrine, gastrointestinal, genitourinary, head and neck, hematologic, neurologic, sarcoma, and thoracic.

DFCI and Children's Hospital Boston (CHB) have worked together for more than fifty years to provide care to children with cancer. In 2000, this history of collaboration was formalized by the creation of the Dana-Farber/Children's Hospital Cancer Care (DF/CHCC). This formation helps to create a seamless patient care experience for children whose illness requires the full spectrum of inpatient and outpatient hematology or oncology pediatric services. Outpatients are seen at DFCI's Jimmy Fund Clinic, while patients requiring hospitalization are treated at Children's Hospital Boston. Pediatric patients are served in one of the following treatment programs: brain tumor, histiocytosis, Hodgkin's and non-Hodgkin's lymphoma, leukemia, and solid tumors.

Since its founding, DFCI has sought to provide comprehensive cancer care. Caregivers at DFCI include social workers, nutritionists, pain specialists, and other support staff as well as physicians and nurses. The Institute offers a range of services that complement medicine-based therapy—programs addressing the emotional and psychological needs of both patients and families. As more and more people survive cancer, concerns about life after treatment have become increasingly important; and DFCI has developed new programs to counsel survivors about the health challenges they may face in the future.

2.2.2.2 Research

Dana-Farber Cancer Institute is unique in its focus on innovation linked to compassionate care. It is renowned for its discoveries and contributions to basic, translational, and clinical research. DFCI research spans a continuum that includes basic studies of normal and malignant cellular processes, work in model systems for translating new discoveries into better treatments and diagnostic techniques, prevention research in healthy at-risk populations, and clinical studies aimed at developing new therapies. DFCI receives funding for its research programs from the National Cancer Institute, the National Institute of Allergy and Infectious Diseases, private industry partners and individual private contributions.

DFCI's research activities are organized within six departments intended to facilitate scientific communication and collaboration among investigators at all levels. These include:

- Biostatistics and Computational Biology
- Cancer Biology
- Cancer Immunology and AIDS

- Medical Oncology
- Pediatric Oncology
- Radiation Oncology

In addition, DFCI has established 17 integrative centers that oversee collaborative activities, bringing together Investigators with diverse approaches to work on common problems in cancer science and to innovate in the design and delivery of services to patients and families living with cancer diagnoses.

2.2.2.3 Clinical Research

While scientific discovery is an integral piece of Dana-Farber's mission, the main focus of its research program is to move discoveries quickly into the clinics where they can benefit patients. As Dr. Sidney Farber said over 50 years ago, "Our research program begins and ends with the patient."

DFCI's hosts more than 400 adult and pediatric therapeutic clinical trials, in which many treatment methods of the future are tested. The clinical research mission is two-fold: to ensure that the patients who participate in these trials receive continuity of care with a high level of safety, and to obtain and process samples of tissue, blood, and urine according to complicated and demanding research protocols. DFCI's Clinical Research Center was created in 2003 to accommodate the special needs of patients and researchers participating in trials of drugs being tested for the first time in humans.

2.2.2.4 Technology Transfer

The scope of technology transfer between DFCI and the related healthcare innovation industry is vast compared to DFCI's small physical presence in Boston and the LMA. DFCI maintains partnerships with thirteen bio-pharma firms, and fourteen startup companies that have formed since 1991 based on DFCI technology. The revenue received by DFCI from the licensing growth of its technology innovations has steadily increased since the inception of the Institute's technology transfer program. This new venture activity not only contributes to local economic development, but is also viewed by the Institute as important for recruitment and retention of quality faculty.

2.2.2.5 Administrative Departments

Dana-Farber Cancer Institute has substantial administrative and support operations required to run its primary clinical and research missions. These include departments of materials management, information technology, communications, development, facilities, finance, and other management functions.

2.2.3 Mission-Driven Need for Space

The past decade has been a period of intense growth in most areas of research and clinical activities at DFCI. At the same time, advances in science have created new avenues for cancer research that require growth in research facilities.

In order to concentrate its clinical and research facilities on its main campus, Dana-Farber has been working to move those support and administrative functions determined to be non-critical off-site. It is expected that, as DFCI's research and clinical programs continue to grow, more administrative functions will need to be accommodated in additional off-site locations.

DFCI's physical facilities require considerable improvement to maintain the current level of patient care and research and to continue at the forefront of new advances in the scientific and medical professions. DFCI's existing buildings are aging, and were built to meet different standards and accommodate smaller, less technologically sophisticated equipment. There are limits to how much the spaces and infrastructure can be renovated in an attempt to adapt them to current clinical and research standards and new technology. The limited floor-to-floor heights, mechanical space and systems capacity, and the absence of large areas of structure-free floor space for new functions, equipment and ancillary spaces, have made it difficult for DFCI to operate efficiently or respond nimbly to the changes and advances in the treatment and prevention of cancer.

Not only is the existing type and allotment of space outdated and inadequate to new requirements, but the extraordinary growth in the numbers of patients, the length of their treatments, and services to cancer survivors have strained DFCI's facility resources to the limit. Although cancer mortality is declining, cancer incidence is expected to rise due to early detection and aging population. Between 2002 and 2004, adult patient exam visits rose over 8 percent annually, while infusion treatments increased over 12% annually. Yearly pediatric exam visits rose nine percent, while infusion visits increased nearly 8%. With this trend, outpatient visits are expected to rise by 220 percent by 2017.

Dana-Farber Cancer Institute is currently facing significant space constraints for research and clinical care: wet and dry labs are at capacity now and clinical space is expected to reach its maximum capacity within one to two years. Today, despite efforts to tighten and make more efficient use of existing space, to transfer as many administrative departments to offsite locations as possible, and to develop joint clinical space solutions with partner institutions, space to accommodate the growing clinical and research needs of the Institute is in critically short supply.

2.3 Legal and Financial Information

This section describes the current legal status of DFCI and the proposed development property, including tax information, site control/easements, zoning, and other information required by the BRA.

2.3.1 Legal Judgments or Actions Pending

There are no legal judgments or actions pending with respect to the project sites.

2.3.2 History of Tax Arrears on Property Owned in Boston by the Proponent

There are no known tax arrears on property owned by DFCI.

2.3.3 Project Site / Site Control / Easements

The location of the proposed project at 450 Brookline Avenue, across Jimmy Fund Way from the DFCI Dana and Mayer buildings and adjacent to the Smith Laboratories Building, offers the opportunity to connect to the DFCI campus both above and below ground. In addition, the prominent siting along Brookline Avenue provides DFCI the opportunity to create a new 'front door' to its campus and reorient its public space along a major Boston thoroughfare and Jimmy Fund Way.

The existing Center for Cancer Care site contains three adjacent parcels presently occupied by 454 Brookline Avenue, the Redstone Building, and a 30-space surface parking lot. The outdated, one-and-two-story buildings represent an under-utilized resource in a prime location. The proposed Center for Cancer Care site is shown in Figure 2-1 at the end of this chapter. The lots comprising the existing Center for Cancer Care Site shall be consolidated with two additional parcels on which is situated the Smith Laboratory Building, thereby creating a single lot measuring approximately 62,842 SF.

There is one easement located along the south edge of the two parcels comprising the site for the proposed Center for Cancer Care, in between the DFCI campus and the adjoining MATEP plant. This easement will not have an effect on development of the Center for Cancer Care building or on other DFCI projects described in the IMP, and will be maintained after completion of the Center for Cancer Care.

2.3.4 Disclosure of Beneficial Interests

The proponent will submit the disclosure of beneficial interest under separate cover to the Boston Redevelopment Authority.

2.3.5 Financial Information

The proponent will submit the project's financial information under separate cover to the Boston Redevelopment Authority.

2.4 Public Benefits

2.4.1 Introduction

Dana-Farber Cancer Institute is committed to educating the community about cancer through its collaborative work in local neighborhoods and through statewide public and professional education initiatives. DFCI has been an active partner in a wide range of programs and community events to provide services and help raise awareness about the importance of cancer prevention, outreach, screening, early detection, and research.

2.4.2 Estimated Linkage Payments

Article 80B of the Boston Zoning Code, Section 80B-7, Development Impact Project Exactions, requires developers of Development Impact Projects, such as the Center for Cancer Care, to make a Housing Contribution Grant to the Neighborhood Housing Trust or contribute to the creation of low and moderate income housing (the Housing Creating Option) or a combination thereof; and to make a Jobs Contribution Grant to the Neighborhoods Jobs Trust or utilize the grant to create a job training program for workers who will be employed at the project (the Jobs Creation Option). The BRA currently requires housing exaction payments of $7.87 for every zoning square foot above 100,000 SF devoted to development impact uses and job linkage payments of $1.57 per square foot above 100,000 SF.

Consistent with these requirements, DFCI will make a housing exaction payment for the Center for Cancer Care of approximately $1,239,525 and a jobs exaction payment of approximately $247,275, depending on final square footage calculations for the Center for Cancer Care.

2.4.3 Estimated Annual Property Taxes

DFCI currently has a Payment in Lieu of Taxes (PILOT) agreement with the City of Boston. DFCI anticipates executing an amendment to its PILOT agreement in relationship to this new Center for Cancer Care project.

2.4.4 Construction Employment

The construction of the new building and associated renovations to existing Dana-Farber facilities will contribute directly to the economy by providing numerous employment opportunities. It is estimated that approximately 280 – 320 tradespersons will be employed at peak during construction. A Boston Residents Construction Employment Plan will comply with the Boston Jobs Policy. The Plan will provide that DFCI will make reasonable good-faith efforts to have at least 50 percent of the total employee work hours performed by Boston residents, at least 25 percent of total employee work hours by minorities, and at least ten percent of the total employee work hours by women.

2.4.5 Permanent Employment

Based on its long-range employment projections and the program space staff and support requirements for the clinical program in the new Center for Cancer Care, DFCI estimates that this development will create approximately 250 new clinical and support jobs.

DFCI currently employs approximately 3,557 people, of which 246 are contract employees. DFCI is also a major employer of Boston residents, with about 32 percent of its total employee population residing in the city.

2.4.6 Community-Based Cancer Control Initiatives

DFCI is committed to educating the community about cancer through its collaborative work in local neighborhoods and through statewide public and professional education initiatives. DFCI is an active partner in a wide range of programs and community events to help raise awareness about the importance of cancer prevention, outreach, screening, early detection and research, and to reduce the burden of cancer in underserved communities.

2.4.6.1 Boston's Mammography Van

Since May 2002, DFCI and the City of Boston have collaborated to operate and support Boston's Mammography Van (the Van), the only mobile mammography van in the Commonwealth of Massachusetts. The Van provides critical breast cancer screening, health education, and follow-up tracking for underserved and uninsured women throughout the City of Boston, regardless of a patient's ability to pay.

As word has spread about the Van's success and accessibility, screening has steadily improved, increasing volume by approximately 10 percent each year. In its first four years of operation, the Van has provided more than 10,000 mammograms to more than 7,000 individual women in the Boston area. In 2005, it provided breast health education and mammography services to over 3,200 women in the Boston area, 80 percent of whom are uninsured or publicly insured and 90 percent of whom are of ethnic minority backgrounds. Priority populations include women who are uninsured, underserved, elderly, immigrant, non-English speaking, and of ethnic/racial minority backgrounds; priority neighborhoods in Boston include

Roxbury, Mattapan, Jamaica Plain, Dorchester, South End, Roslindale, and Hyde Park.

Each van screening day is the result of tremendous collaboration between DFCI, the Boston Public Health Commission, and one or more community partners within Boston. DFCI's community partners conduct extensive outreach, recruitment, promotion and planning for the van day. DFCI provides the clinical service and breast health education on the van day, and manages the patient registration, billing, reporting of results to provider and patient, and follow-up tracking as needed. Skilled, licensed technologists conduct mammography screenings on the van, and films are interpreted by Board-certified radiologists from DFCI, both clinicians with extensive experience dedicated to mammography. DFCI is responsible for the licensing, maintenance, staffing and all operational costs of the van.

In addition to its central purpose of providing breast cancer screening and education, Boston's Mammography Van serves as a point of entry into the healthcare system; the program helps connect women without a Primary Care Provider (PCP) to primary care at a facility of her choice. The re-screening rate of van patients - over 50 percent in 2005 - demonstrates that Boston's Mammography Van provides an effective way for women to continually monitor their health.

To supplement its cancer screening activities, the Van collaborates with DFCI's Women's Cancers Program to host a spring and fall series of free community workshops on the myths and facts about breast and gynecological cancer. In an effort to provide attendees with an immediate opportunity to translate their commitment into action, the Van visits the community site a couple of weeks after the workshop to provide mammogram services.

2.4.6.2 Breast and Cervical Screening Collaborative (The Collaborative)

In July 2006, the Breast and Cervical Screening Collaborative (The Collaborative) began its ninth year as a Women's Health Network (WHN) provider through the Massachusetts DPH. The WHN provides funding for breast and cervical health services for uninsured women. The Collaborative's goal is to reduce breast and cervical cancer mortality through early detection, focusing on reaching uninsured women who are medically underserved due to financial, linguistic, ethnic, and/or cultural barriers.

Through the program, eleven community health centers in the Greater Boston area, along with Dana-Farber Cancer Institute and Partners, work collaboratively to promote and enhance the early detection of breast and cervical cancer. DFCI provides significant supplemental funding to support the Collaborative's central administration, outreach and inreach activities, and additional fundraising efforts.

Since its inception, The Collaborative has provided health services to more than 6,000 women. During FY05, the BCSC provided screening services for nearly 1,800 women from diverse cultural, linguistic, and socioeconomic backgrounds and this year The Collaborative projects it will serve over 2,000 women. Women diagnosed with breast or cervical cancer through screening provided by The Collaborative are eligible for coverage by the MassHealth program during the course of their treatment.

2.4.6.3 Blum Family Education and Resource Van

DFCI commissioned the new Blum Family Education and Resource Van and launched the mobile unit program in October 2004. Committed to tackling the issues of health disparities in cancer incidence, morbidity, mortality, treatment, and quality of life, and the pressing need for more minority and medically underserved participants in clinical trials, the Blum Van enables DFCI to expand its mission and share its expertise with the larger community. The Blum Van offers a unique and innovative way to bring cancer education, prevention, and screening to people directly in the communities where they live, work, and play. It is equipped with state-of-the-art technology and has been designed to accommodate the multiple needs of the community, ranging from space for small groups to private space for individual needs.

The following is a selected list of initiatives that take place on the Blum Resource Van:

- Prostate cancer education and screening targeting African-American men and other men at elevated risk of the disease. Over the past two years alone, The Blum Van educated over 1200 men and screened 480 men.
- Sun protection awareness and skin cancer prevention and screening in collaboration with the Massachusetts Dermatological Nurses Association. Target sites include local beaches, parks, and community fairs.
- Outreach and education in the African-American community regarding sickle cell disease.
- Counseling and information programs on tobacco cessation, with a focus on tobacco use among adolescents.
- Nutrition and diet programs and cooking demonstrations.
- Education on the National Marrow Donor Program and the critical need to recruit potential donors from different racial and ethnic backgrounds.
- Education and workforce initiatives, including recruitment of students and residents of underserved communities and assistance with career paths in the healthcare professions. The Van provides mobile space for employment teams to host job fairs, career education, and recruitment interviews.

2.4.6.4 Whittier Street Health Center

As a new initiative to expand its community outreach, Dana-Farber Cancer Institute is exploring the possibility of developing new cancer control programs in partnership with the Whittier Street Health Center (WSHC). WSHC is planning a new and expanded health center that will be constructed as part of an urban renewal effort along Tremont Street in Roxbury. DFCI will plan to lease space in this facility, with the amount of space and lease terms to be determined, and which will be subject to institutional approvals. WSHC and DFCI will commence a planning process to generate possible implementation plans for utilizing the space in ways that best meet the needs of WSHC patients and the local community.

2.4.6.5 Dana-Farber/Brigham and Women's Cancer Center Patient Navigator Program

The Dana-Farber/Brigham and Women's Cancer Center (DFBWCC) Patient Navigator Program is part of the DFBWCC strategic initiative to reduce healthcare disparities among diverse populations. The program was established to address the needs of a target population of women at risk for or diagnosed with breast or cervical cancer, and who may enter the care system through either DFCI or the Brigham and Women's Hospital.

The goal of this program is to provide access and identify resources for women from diverse backgrounds, whose socio-economic status, limited English proficiency, disability status, or payment status (uninsured/underinsured) may be a potential barrier to care. The program, which began in May 2005, offers two Patient Navigators, bilingual in Spanish, who assist this patient population by identifying and accessing resources for them, providing education about the importance of follow-up care, and offering support through the healthcare continuum.

2.4.6.6 Boston Mayor's Task Force to Eliminate Health Disparities

The City of Boston launched the Mayor's Task Force to Eliminate Health Disparities in 2003 and mobilized leaders and organizations from the healthcare and public health communities to partner in citywide efforts. As an active member of the full Task Force and the Hospital Working Group, DFCI is involved in initiatives in data collection and measurement, workforce development, cultural competency, and community outreach. DFCI's involvement includes financial support for facilitation and evaluation of task force initiatives, ongoing participation as one of two hospitals sites piloting collection of expanded ethnicity data on patients, service as an internship site for minority Boston Public School students, and participation in the Boston REACH 2010 Breast and Cervical Cancer Coalition.

2.4.6.7 National Marrow Donor Program (NMDP)

The National Marrow Donor Program, whose mission is to recruit potential donors, has taken advantage of the available community collaborations and resources available at DFCI, e.g., the Blum Family Education and Resource Van. The Institute will continue to increase its minority population of potential donors in the Asian, Hispanic and American Indian communities with its continued campaigns and available resources. Aggressive recruitment efforts have allowed NMDP to give several bone marrow transplant recipients a second chance of life.

2.4.6.8 Community Education and Health Fairs

Dana-Farber Cancer Institute participates in numerous community events and distributes cancer prevention and screening information. Below is a partial list of events DFCI has supported and attended:

- Boston Race for the Cure
- Making Strides Against Breast Cancer
- Raise Your Racquet to Good Health – Breast and Prostate Health
- Men's Health Summit
- Mission Hill Walk for Health
- Mattapan Healthcare Revival
- Billboard and media campaign in local neighborhoods

2.4.7 Statewide Initiatives

DFCI plays a leadership role in efforts to increase awareness of cancer and other life-threatening diseases and facilitate access to diagnosis and treatment across cultural and socio-economic divides throughout the Commonwealth.

- **Massachusetts Comprehensive Cancer Control Coalition (MCCCC):** As a member of the Massachusetts Comprehensive Cancer Control Coalition and its Executive committee, DFCI worked with coalition members to develop a comprehensive cancer control plan funded by the Centers for Disease Control (CDC).
- **Colorectal Cancer Education:** DFCI is a member of the Massachusetts Colorectal Cancer Working Group, whose mission is to reduce colorectal cancer incidence, morbidity, and mortality in Massachusetts by increasing public and professional awareness of risk factors, prevention strategies, and the need for timely and appropriate screening.
- **Prostate Cancer Education and Screening:** DFCI is partnered with the Massachusetts Department of Public Health's (MDPH) Men's Health

Partnership Program to promote educational workshops on prostate health and screening with particular emphasis on reaching audiences of men of color.

- **Massachusetts Prostate Cancer Symposium:** Dana-Farber Cancer Institute is one of the lead sponsors of the annual statewide Prostate Cancer Symposium.
- **Skin Cancer Education:** DFCI supported initiatives of the Massachusetts Skin Cancer Prevention Collaborative (MSCPC) by developing a skin cancer education and screening program utilizing a new DFCI Blum Resource Van. The program takes place at parks and beaches and offers education on skin protective behaviors and screening opportunities in the van. DFCI has also partnered with dermatologists from the Brigham and Women's Hospital to create *The Skin Cancer and Sun Protection Awareness Program.* This joint venture is highly successful, screening 144 visitors over the course of 2005 in 24 outdoor events.

2.4.8 National Cancer Institute-Sponsored Activities

2.4.8.1 National Black Leadership Initiative on Cancer (NBLIC)

Dana-Farber Cancer Institute has been actively involved in the Greater Boston Chapter of the National Black Leadership Initiative on Cancer since its inception in the mid 1990's. NBLIC is a coalition of community-based organizations, health professionals, cancer survivors, and concerned individuals that works to mobilize and educate communities of Black and African descent in the fight against cancer.

DFCI and NBLIC continue their support of a prostate cancer support group for men of color in collaboration with the community group Prostate Health Education Network (PHEN). The goal of the group is to address the unique concerns of men of color as it pertains to newly diagnosed men and survivors of the disease. DFCI continues to provide financial and in-kind support for NBLIC's infrastructure to expand its board and membership and to firmly establish its community programming.

2.4.8.2 National Cancer Institute Collaborative Demonstration Project

Dana-Farber Cancer Institute and Whittier Street Health Center have formed a collaborative effort to increase cancer screening and early detection for breast, cervical, colorectal, and prostate cancers. Health care providers working at WSHC will receive evidence-based specialized training on how to incorporate information on the value of health behavior change and cancer screening into their routine clinical interactions. This specialized method of primary care health delivery will be evaluated and lessons learned will be disseminated to other health care providers.

2.5 Center for Community-Based Research

The Center for Community-Based Research (CCBR) at DFCI conducts research aimed at cancer prevention and control, with a particular emphasis on the development and evaluation of effective interventions designed to modify behaviors, policies and practices to reduce cancer risk and to provide increased access to and comprehension of cancer risk information. This research program has a special focus on reducing racial/ethnic and socio-economic disparities in cancer risk.

These interventions ideally are evaluated in randomized, controlled studies, with the intent that the tested models will ultimately be applied broadly through community and health organizations nationally. These public health approaches that target organizations or communities are an important complement to the clinical and basic research also being conducted at DFCI.

To test the effectiveness of community-based educational and policy interventions within defined populations, solid partnerships with community organizations are necessary. Community organizations act as collaborators in its research, providing both study populations, and shaping the interventions.

Another priority of CCBR is to place and mentor students from a range of academic levels and including many from racial and ethnic minorities. Examples of completed programs, ongoing studies and accomplishments are discussed below.

The projects include programs to encourage improved nutrition, weight-loss and smoking cessation among workers and ethnically diverse patients, to encourage cancer screening and prevention in various settings including low-income housing and the workplace.

A representative list of projects is given below.

- Cancer Prevention Through Small Businesses
- Cancer Prevention Delivered through Health Centers
- Cancer Prevention for Unionized Blue-Collar Workers
- Organized Labor and Tobacco Control Network.
- Tobacco Industry Targeting of Young Adults of Low-Socioeconomic Status: Lessons for Public Health
- Project Watch
- Massachusetts Cancer Prevention Community Research Network
- Health Promotion for Mobile Workers
- Physical and Social Hazards: Jobs, Race, Gender and Health
- Weight Control, Physical Activity and Cancer Risk Reduction Among Racially Diverse Obese Women in an Urban Community Setting, Pilot Project

- Colon Cancer Prevention through Low Income Housing
- Web-Based Smoking Intervention for Cancer Survivors
- Design about Making Prostate Cancer Screening
- Computer-Based Prostate Cancer Education in Worksites
- Prostate Cancer Screening Decision Aid for African-American Men
- Factors Associated with Follow-up of Abnormal Mammograms Among Low-Income Ethnic Minority Women
- Increasing Cancer Screening Through the Use of Small Media Interventions: Evaluation of Materials for Mammographic Abnormalities
- Smoking Cessation Intervention with Building Trade Unions
- Identifying Facilitators and Impediments to Adopting US Public Health Service Guidelines for Smoking Cessation Treatment Among Labor-Management Health and Welfare Funds
- Rest, Stress, and Physical Activity
- Determinants of Cancer Risk in Low-Income Housing
- Family-Responsive Workplace Policies and Practices in Small Business with Low-Wage and Racially/Ethnically Diverse Workforces
- Click to Connect Pilot
- Electronic Tools for Community-Based Weight Management

2.6 United Way/Jimmy Fund Collaboration

United Way/Jimmy Fund Collaboration awards funds to community-based organizations that provide culturally appropriate cancer prevention, education, and outreach services for at-risk populations in low-income communities.

2.7 Free Care

DFCI, in compliance with its mission, voluntarily provides free care to patients who lack financial resources and are deemed to be indigent. In addition, the Institute is required to participate in a statewide, uncompensated care pool. DFCI contributes to the pool based on a predetermined statewide formula. Direct charity care, based on cost, and amounts payable to the uncompensated care pool totaled $18.2 million in 2006.

2.8 Services to Patients, Families and Communities

DFCI offers a variety of services to patients, families, and the wider community ranging from support groups, workshops, seminars, and educational and referral resources. These services are facilitated and provided by social workers, nurses, and other DFCI staff and are designed to help people cope with the challenges that accompany a cancer diagnosis. Examples include:

Eleanor and Maxwell Blum Patient and Family Resource Center and Satellites: The Blum Patient and Family Resource Center, which was established in 1996, is located in the DFCI lobby and houses brochures, computers, videotapes, compact discs, and over 550 books in its loan library. The Blum Resource Center provides patients, families, and anyone from around the country and the world seeking services with the most current and useful educational materials available, as well as support, resources, and referrals. The Blum Resource Center and its 4 satellite resource rooms boast more than 10,000 visits annually.

Perini Family Survivors' Center: The Perini Family Survivors' Center was launched in 2004 to serve as an umbrella organization for survivorship activities. Overall, the Perini Program's research efforts are designed to reduce and eliminate harmful effects of treatments for past, current and future patients. The Center houses two clinical programs for cancer survivors: the David B Perini, Jr. Quality of Life Clinic and the Lance Armstrong Foundation (LAF) Adult Survivorship Clinic. The David B. Perini, Jr. Quality of Life Clinic is in its 14th year of operation as a multi-disciplinary pediatric survivorship program that works to meet the unique medical and psychosocial needs of childhood cancer survivors. Established in early 2005, the LAF Adult Survivorship Clinic serves the needs of adult cancer survivors. Modeled on the multidisciplinary approach of the Perini Clinic, the LAF Clinic provides patients with a complete assessment of their survivorship needs, with referrals to specialists as appropriate.

2.9 Career, Employment and Training Initiatives

Dana-Farber Cancer Institute participates in numerous workforce development initiatives—both within the Institute and in the Greater Boston community. These initiatives are designed to inform community members about employment opportunities at DFCI, to interest youths in careers in healthcare and science, and to provide training to current employees to encourage their career advancement.

DFCI plans to continue and expand its involvement in workforce development and training initiatives and is currently developing its Workforce Development Plan. In addition, DFCI is committed to hiring a full-time Workforce Development Manager to work closely with DFCI's management team (which includes a newly hired Vice President for Diversity), the Office of Jobs and Community Services, local neighborhood agencies, and community groups. Initiatives under consideration in that plan are discussed in Chapter 9.

2.9.1 Workforce Development Programs

DFCI's workforce is highly skilled, with most positions requiring post-secondary education, however, DFCI is committed to identifying and providing employment opportunities for community residents. Approximately 32 percent of DFCI employees are Boston residents. A summary of the job families is provided in Table 9-1.

Dana-Farber Cancer Institute participates in outreach to local residents through Roxbury Community College, Grace Baptist Church, The Latino Job Fair through El Mundo, Community Care day at the Hispanic Office of Planning and Evaluation and the annual Dana-Farber Open House and Job Fair.

2.9.2 Youth Programs

DFCI maintains educational partnerships with Boston area high schools and colleges to provide underrepresented students of color internship opportunities to explore and pursue careers in health and science. DFCI works closely with schools to place students who have a specific interest in health and science. The Boston Public Schools that have participated in this program are listed in Chapter 9.

During the 2004-05 academic year and summer 2005, more than 75 Boston Public Schools students from diverse backgrounds worked at DFCI in clinical, research, and administrative departments. A number of students participated through the Boston Mayor's Summer Jobs Program. Students had opportunities to receive CPR certification, participate in presentation skills and PowerPoint classes, engage in site visits at biotech companies, and attend educational seminars.

Dana-Farber participates in *Explorations*, a partnership among Boston-area healthcare institutions, Harvard Medical School, and Boston public schools. In this program, middle school students interested in science and math are paired with PhD's in the research community for a one-day job-shadow. Annually, approximately 200 students participate at various institutions.

DFCI also actively participates in school-to-work programs with the Boston Private Industry Council (PIC), in hands-on programs for students, and in career fairs specifically for Boston area youth. More information about these programs is provided in Section 9.5.2.1.

DFCI is currently in the midst of reviewing its school-based and community-based partnerships with a view toward taking its programming to an optimal level that will ensure that Boston youth and young adults have access to more meaningful internship opportunities and other educational experiences.

2.9.3 Incumbent Worker Programs

In addition to working with youth and young adults, Dana-Farber offers career development opportunities for its staff through the following programs:

- **Boston Healthcare and Research Training Institute:** comprehensive training and educational programs for entry-level and mid-level employees. Courses allow employees to build upon existing skills, while helping them to advance along career pathways.
- **Tuition Reimbursement** for full- and part-time DFCI staff
- **Bunker Hill Community College:** program in Medical Coding
- **English as a Second Language (ESL)**
- **DFCI-Sponsored Training:** classes in Spanish, medical terminology, and computer training.
- **Sponsorship of Boston Associates and Fellows through The Partnership:** collaboration with the Boston Chamber of Commerce to increase the number of people of color in leadership roles in the Boston community.
- **University of Massachusetts at Boston:** In 2004, Dana-Farber entered into a new affiliation with the University of Massachusetts at Boston (UMass). Eight UMass Boston nursing students from diverse backgrounds completed their community health rotation at DFCI during the fall of 2005.

2.10 Other Community Benefits

2.10.1 Fenway and Mission Hill Neighborhoods

Financial support is provided annually to community health centers and community development corporations in Boston's Fenway and Mission Hill neighborhoods. DFCI also participates in the Longwood Medical and Academic Area Forum to discuss ongoing community needs and concerns.

2.10.2 Housing and Community

Dana-Farber has committed $2.5 million towards the construction of *Hope Lodge*, a new facility located in Mission Hill that will be operated by the American Cancer Society to provide housing for patients and families.

DFCI provides support to housing programs for cancer patients and their families. Programs include the *Ronald McDonald House*, a home away from home for pediatric oncology patients at DFCI and Children's Hospital, Boston, the *Shannon McCormack House*, a residence for out-of-town cancer patients undergoing cancer treatment in the Longwood area and their families, and the *Hospitality Program*, which provides lodging for cancer patients and their families through its network of more than 180 volunteer hosts in the Greater Boston area.

DFCI participates in a variety of other community activities, including the *Annual Food Drive* sponsored by MASCO, which donates to the food bank operated by Action for Boston Community Development in Mission Hill, and the *Caps for Kids Program*, which provides knitted hats for Tobin Elementary School, BWH newborn intensive care, and various community centers.

2.10.3 Reducing Density / Promoting Economic Development

While in discussions over a new clinical and research building on Brookline Avenue, City officials made DFCI administrators aware of potential expansion space for research and other uses in South Boston's Marine Industrial Park. Included in the City's stated goals for the Longwood Medical and Academic Area are an interest in reducing overall density and traffic congestion, and identifying appropriate areas where the economic development benefits of LMA institutions can be redirected to other parts of the City.

As a result of these discussions, DFCI leased approximately 49,400 SF at 27 Dry Dock Avenue for a research imaging facility, wet bench laboratory space, Cryopreservation core facility (freezer farm), medical records, and materials-management facility. In addition to reducing density in the LMA, the relocation of the materials-management facility allows DFCI to better control truck deliveries to the main campus. It is anticipated that this development will create approximately 150 new jobs in this location, in addition to the approximately 250 permanent jobs anticipated as part of the Center for Cancer Care project.

During this same time period, DFCI signed a lease for approximately 51,000 SF of wet and dry lab research space in the Center for Life Sciences Boston, a new research building under construction on Blackfan Street in the LMA. Moving research space to a new building already approved for the LMA and developing the research and support space at 27 Dry Dock Avenue allowed DFCI to significantly reduce the size of the building it had originally proposed for the Brookline Avenue location.

2.10.4 Utility Upgrades

During negotiations with the Boston Water and Sewer Commission (BWSC) and Public Improvement Commissions (PIC), Dana-Farber Cancer Institute committed to replacing the sewer and drain lines under Jimmy Fund Way at its own expense.

2.11 Regulatory Controls and Permits

The following sub-section discusses the existing and future zoning for the proposed Center for Cancer Care, the regulatory process for this development, and the agencies and community groups participating with DFCI in the planning process.

2.11.1 Existing Uses and Structures

The proposed Center for Cancer Care is designed to create a new entrance and identifiable campus presence for DFCI. Its proposed location is on **two** adjacent lots currently owned by the Institute and presently containing two low-density buildings and a surface-level parking lot. DFCI proposes to demolish the existing structures, to consolidate the existing parcels with those associated with the Smith Laboratories Building, and relocate the parking underground.

2.11.1.1 Existing Zoning District Designation

As shown in Figures 2-1 and 2-2 at the end of this chapter, the site of the proposed Center for Cancer Care consists of three parcels of land, the first located at 462 Brookline Avenue and consisting of approximately 15,576 SF of land ("Parcel 1"), the second located at 454 Brookline Avenue and consisting of approximately 17,838 SF of land ("Parcel 2"), and the third located immediately to the south of 462 Brookline Avenue and the Redstone parcels, containing approximately 3,428 SF. As set forth in Section 1.3 and Section 2.3.3, the three parcels referenced above will be combined with the two lots that are situated under the Smith Building immediately to the south of the above-referenced parcels. Upon consolidation of these five lots, the Smith Building and The Center for Cancer Care will be situated on a single lot measuring approximately 64,842 SF.

Parcel 1 is located within the Dana-Farber Cancer Institute Institutional District (the "DFCI District"). Zoning of the DFCI District (including Parcel 1 but not Parcel 2) is governed by: (a) Article 73 of the Boston Zoning Code (the "Code"), which created the DFCI District; and (b) the Dana-Farber Cancer Institute Institutional Master Plan, 1993-2001 (the "DFCI IMP"), which has expired but which is still relevant to existing development within the DFCI District. Parcel 2 was acquired after creation of the DFCI District and is located within an L-1 (Local Business) zoning district under the Code and also within the Institutional Overlay District. In addition, the entire Site (including Parcel 1 and Parcel 2) is located within the Restricted Parking District.

The Site (see Figure 2-3), located within the Longwood Medical and Academic Area (the "LMA"), is also subject to the Longwood Medical and Academic Area Interim Guidelines, adopted by the BRA in February 2003 (the "Interim Guidelines"). The Interim Guidelines are used by the BRA in the implementation of its development review process as outlined in Article 80 of the Code. The BRA and the Boston Transportation Department (BTD) are in the process of developing a master plan for the LMA.

Article 73 was adopted by the Boston Zoning Commission (the "BZC") pursuant to Text Amendment No. 208 and the boundaries of the DFCI District were established by the BZC as of April 8, 1994. Since the current version of Article 73 was printed, Article 73 has been modified in minor respects to insert new use item definitions that apply across all neighborhood zoning articles.

2.11.1.2 Existing Uses

Under Article 73, all existing and proposed hospital and research related uses are allowed either as-of-right or as a conditional use in the DFCI District (including Parcel 1), including hospital, clinic, research and medical office uses. In addition, all other existing and likely future uses, including retail, restaurant, service, educational and general and professional office uses, are also allowed as-of-right. Uses that are allowed on Parcel 2 under the Code include (among others): most hospital and clinic uses; clinic or professional offices accessory to hospital uses; scientific research and teaching laboratories accessory to hospital uses; as an accessory use, the keeping of laboratory animals incidental to an institutional use; as an accessory use, incidental uses and services ordinarily found in connection with a lawful main use; local retail uses not open between 12 midnight and 6:00 AM.; restaurant uses; professional office uses; service uses not open between 12 midnight and 6:00 AM.; and, as an accessory use, the storage of flammable liquids and gases. Parking, including accessory parking (other than parking accessory to residential or hotel uses) is a conditional use that requires zoning relief on both Parcel 1 and Parcel 2. In addition, with respect to Parcel 2, under Section 10-1 of the Code, the accessory uses on a lot cannot, in the aggregate, occupy more than 25 percent of the floor area of the main buildings. To the extent that the Project will be used for a variety of functions which typically take place in a hospital or research institute and are classed as accessory uses under Article 8 of the Code, zoning relief with respect to this requirement will be necessary for the Project.

2.11.1.3 Existing Structures

The two existing structures on these sites are the Redstone Building and 454 Brookline Avenue. The one-story Redstone Building, the site of a former automobile garage, houses research animals and support space. The present building, dating from 1916 and expanded in 1921, has since been greatly altered. It needs to be demolished for construction of the proposed new DFCI facility at 450 Brookline Avenue.

Constructed in 1957, the two-story 454 Brookline Avenue structure and adjacent 30-space surface parking lot were purchased from Children's Hospital Boston by Dana-Farber in 1997. Prior to that time DFCI had leased space in the building for office uses. 454 Brookline has continued to be used for that purpose. 454 Brookline Avenue needs to be demolished along with the adjacent Redstone Building as the site of the proposed new building.

Required consultation with the Boston Landmarks Commission and the Massachusetts Historical Commission (MHC) was completed in April and May 2006. Because the two buildings on the site are over 50 years old and are proposed for demolition, in April 2006, DFCI submitted an Article 85 Demolition Delay application to the Boston Landmarks Commission and a Project Notification Form to the Massachusetts Historical Commission. The Massachusetts Historical Commission and the Boston Landmarks Commission responded with their comments on May 18 and April 28, respectively. The Boston Landmarks Commission staff determined that the two buildings on the project site were not significant buildings under their significance criteria. For more detailed information, refer to Appendix E, Historic Resources.

2.11.2 Future Zoning Controls

In order to achieve zoning compliance for the project, DFCI intends to submit an Institutional Master Plan for the DFCI District for approval by the BRA and adoption by the BZC. This process was initiated by the submittal of a Project Notification Form in March 2006. The Institutional Master Plan will add Parcel 2 to the DFCI District and describe all existing development and all proposed future projects in the DFCI District, including the Project. In addition, as the Center for Cancer Care is subject to Large Project Review under Article 80B of the Code, the DFCI is submitting this Draft Project Impact Report/Environmental Impact Report to the BRA with respect to the Project.

Pursuant to Article 80D of the Boston Zoning Code, upon approval of the Institutional Master Plan for the DFCI District by the BRA and its adoption by the BZC, existing uses or structures described in such plan will be deemed to be in compliance with the use, dimensional, parking and loading requirements of underlying zoning (including special purpose overlay districts), notwithstanding any provision of underlying zoning to the contrary and without the requirement of further zoning relief. Approval and adoption of such renewed and Institutional Master Plan will also constitute approval of the proposed projects described in such plan, including the Project.

2.11.3 Design Review

In parallel with preparation of this DPIR/DEIR, design of the Center for Cancer Care project has proceeded, with review in compliance with provisions of Article 80 of the Boston Zoning Code. This process has included repeated and responsive interaction with and design review by the BRA, the Boston Civic Design Commission, the appointed Impact Advisory Group for this project, and the LMA Forum for communication with the general public and individual meetings with local community groups.

2.11.4 Anticipated Permits

The following list discusses the approvals and permits anticipated from City of Boston officials and agencies and state and federal bodies, as well as these can be identified at the present time.

Table 2.1 Anticipated Permits

AGENCY	LICENSE / PERMIT / APPROVAL
Federal	
US Environmental Protection Agency	NPDES Permit (if applicable)
Federal Aviation Authority	Determination of no hazard due to height
State	
Massachusetts Historical Commission	Determination of no adverse effect
Massachusetts Department of Environmental Protection	Sewer Connection Permit, Asbestos Removal Notice
Massachusetts Environmental Policy Act	Environmental Notification Form Environmental Impact Report Section 61 Findings
Massachusetts Water Resources Authority	Sewer Use Discharge Permit Temporary Construction Site Dewatering Permit
City	
Boston Redevelopment Authority	Development Impact Project Plan / Article 80 Large Project Review Institutional Master Plan Review
Boston Air Pollution Control Commission	Compliance with Construction Noise Restrictions
Boston Civic Design Commission	Design Review
Boston Inspectional Services Department	Creation of Consolidated Lots, Demolition Permit, Foundation and Building Permit
Boston Transportation Department	Transportation Access Plan Agreement Construction Management Plan
Boston Water & Sewer Commission	Water and Sewer Connection Permits Construction De-watering Permit
Boston Fire Department	Site Access Plan and other permits
Boston Zoning Commission	Institutional Master Plan Approval
Inspectional Services Department	Demolition Permit, Building Permit, Occupancy Permit
Public Works Department	Curb cut permit

Public Safety Commission	Permit to erect and maintain parking garage
Public Improvements Commission	Permit to construct ancillary facilities in, over, or under public right of way, Street Occupancy Permit for Construction Period, Permit/Agreement for Earth Retention Systems, Tiebacks, & Support of Subsurface Conditions, Permanent Discontinuance of Public Rights in Subsurface Areas

2.11.5 Applicability of MEPA

In the Certificate of the Secretary of Environmental Affairs on the Environmental Notification Form, MEPA determined that the "project is subject to a mandatory EIR pursuant to Section 11.03(6)(a)(6) because it generates 3,000 or more new average daily trips." Since DFCI may seek financial assistance from the Massachusetts Health and Education Facilities Authority (HEFA), a State agency, MEPA jurisdiction extends to all significant environmental impacts.

Dana-Farber Cancer Institute filed an Environmental Notification Form (ENF) with the Executive Office of Environmental Affairs / MEPA Office on April 14, 2006, EOEA #13776. Public notice of the ENF was published in the April 26, 2006 Environmental Monitor to commence public review. The Secretary of Environmental Affairs issued the Certificate on the ENF on June 6, 2006. The Certificate requires preparation of an Environmental Impact Report (EIR).

A copy of the Secretary of Environmental Affairs' June 9, 2006 Certificate on the ENF is included in this DPIR/DEIR in Chapter 11.0, Response to Comments.

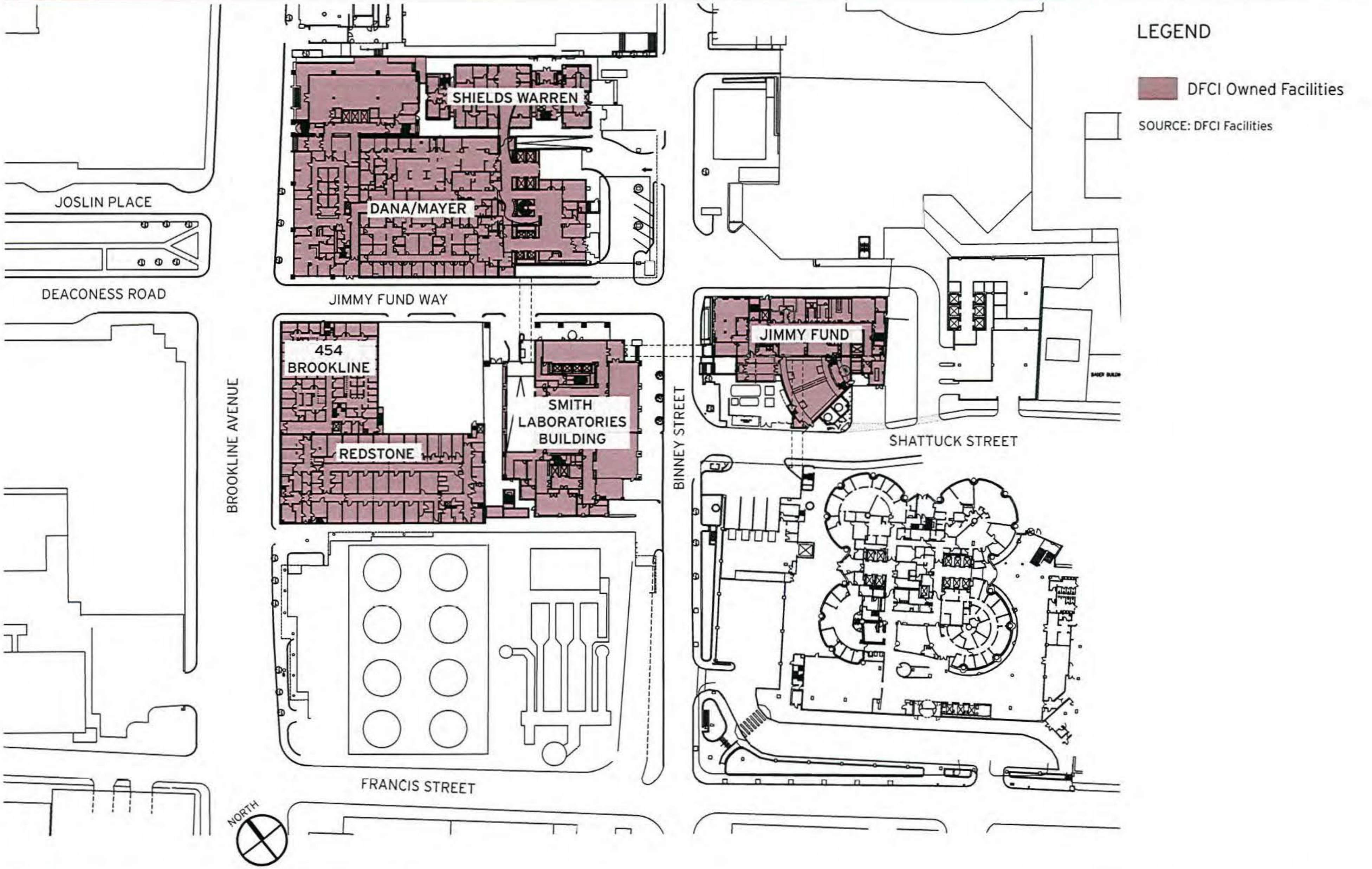
2.12 Coordination with Abutters and Other Interested Parties

DFCI will continue to seek the input of its neighbors, area residents, city agencies, and other interested parties while it develops its long-range plans for the future of its campus and specific plans for development of this Project. Over 60 meetings have been held with public agencies and officials, neighborhood groups, and abutters and other institutional organizations over the past two-and-a-half years to discuss the proposed IMP and the Project discussed in this DPIR/DEIR. Public and community organizations with which DFCI representatives have met include:

- Beth Israel/Deaconess Medical Center
- Boston Redevelopment Authority
- Boston Civic Design Commission
- Boston Transportation Department

- Brigham and Women's Hospital
- Children's Hospital, Boston
- Department of Public Works
- Public Improvements Commission
- Inspectional Services Department
- Boston Water and Sewer Commission
- MASCO
- Medical Area Total Energy Plant (MATEP)
- Impact Advisory Group
- LMA Forum
- Elected public officials and community representatives and residents

DFCI will continue to meet with interested parties and listen responsively to their suggestions and concerns as the IMP and DPIR/DEIR review and project design process progresses.



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Existing Site Plan

FIGURE 2-1

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Existing DFCI Land Parcels

FIGURE 2-2

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Future DFCI Land Parcels

FIGURE 2-3

3

Project Description and Alternatives

3.1 Introduction

Dana-Farber Cancer Institute proposes to build the Center for Cancer Care, with related site improvements and connections to existing DFCI buildings. Implementation of this project will enable DFCI to continue to provide comprehensive and compassionate care, and to advance the treatment and cure of cancer and other life-threatening diseases. This project will also greatly enhance DFCI's campus appearance and improve the vehicular and pedestrian environment of the LMA. The location of DFCI's proposed project is depicted in Figure 3-1.

3.2 Project Location and Current Uses

The project site is located on DFCI's main campus, at the intersection of Brookline Avenue and Jimmy Fund Way, in the LMA. A new structure will be built on a site currently consisting of two parcels of land with a combined site area of approximately 33,414 SF. The site is now occupied by two buildings – the one-story Redstone Animal Facility and the two-story 454 Brookline Avenue Building, as well as an adjacent 30-space parking lot. The project also includes renovation of space in the adjacent Smith Laboratories Building, and a combined pedestrian and service tunnel under Jimmy Fund Way to connect the new facility to the Dana Building.

The location of the Center for Cancer Care will allow both above and below ground connections to DFCI's existing campus and to nearby LMA institutions. The prominent location on Brookline Avenue offers an opportunity to create an architectural statement and a symbol of the Institute's forward-looking vision, reorient many campus functions, patterns of movement and interactions, and serve as the new entrance not only to the Dana-Farber campus but also to the Dana-Farber/Brigham and Women's Cancer Center (DF/BWCC) and the Dana-Farber/Children's Hospital Boston Cancer Center (DF/CHCC).

3.3 Evolution of the Project since the IMPNF/PNF and ENF Filings

Since the first informal meetings with the BRA, the DFCI Impact Advisory Group (now known as the Task Force) and other early participants in DFCI's planning and design process, significant modifications have been made to the proposed project.

These modifications have been made in part in reaction to comments and feedback provided and heeded before the submission of the IMPNF/PNF and ENF in March / April 2006. They reflect DFCI's commitment to a design process and product that is sensitive and appropriate to the character of the surrounding community and local neighborhood environment. Changes to the scope and approach of the IMP and DPIR/DEIR documents and content have also been made in response to the BRA Scoping Determination, MEPA Certificate, internal review and continued analysis of DFCI's facility and program needs and priorities, community concerns, and other government agency input.

DFCI has made significant changes to the Center for Cancer Care's design and program, including reducing the height of the proposed building from eighteen stories to thirteen stories above grade, reducing the overall building volume and adjusting the massing to lessen the shadow effects on the adjacent Joslin Park, increasing the sidewalk width on Brookline Avenue and Jimmy Fund Way and reducing the number of parking spaces.

When the project was initially conceived in 2004, it was designed to be a combined clinical and research facility to accommodate DFCI's projected space needs to 2010 and beyond. Since that time, Dana-Farber Cancer Institute has committed to substantial acquisition of leased space at several locations as part of its strategy for sustainable growth outside the congested LMA. These leased facilities include laboratory, animal imaging, and materials management facilities at the new DFCI Harbor Campus at 27 Dry Dock Avenue in the Marine Industrial Park in South Boston, wet and dry lab facilities at the Center for Life Sciences on Blackfan Street, and expanded administrative and support facilities at the DFCI North Campus in the Fenway and South Campus in Brookline Village. By relocating significant amounts of research, clinical administration and support space to these remote facilities, DFCI is able to devote the proposed Center for Cancer Care entirely to clinical and patient-family service program. Further details of changes made to the proposed Center for Cancer Care project in response to comments and input are outlined in Chapter 11, Responses to Comments.

3.4 Detailed Project Description

The Center for Cancer Care is designed to provide state-of-the-art facilities for leading-edge treatment of cancer and related diseases in an expanded patient population. It will accommodate enhanced healing environments with a strong patient-and-family focus, improved patient safety, and support for safe staff practices. It will also create a prominent and inviting main entrance to the Dana-Farber campus, and connect DFCI buildings and neighboring partner-institutions.

Significant features of the vision for the Center for Cancer Care include the following:

- Incorporate sustainable design features that create a healthy environment for patients, staff and the community

- Enhance the patient experience by creating welcoming, efficient and comfortable treatment and exam facilities
- Reinforce the "bench-to-bedside" mission of DFCI by building direct physical connections between the new clinical facilities in the Center for Cancer Care and the existing research lab facilities in the Smith Building
- Reach out to and educate the public by providing centrally located and easily accessible spaces for engagement, information and awareness

The program for the Center for Cancer Care has been developed by a team of physicians, nurses, senior administrators, technicians, researchers and specialist consultants to optimally respond to DFCI's patient care and research priorities. The Center for Cancer Care is designed to enhance the patient experience and reinforce important connections between clinical and research activities. In addition, the construction of the building is designed to maintain maximum flexibility for the implementation of future technology as new treatment methods and equipment continue to evolve rapidly. The clinical floors have been designed using modular sizes for patient space so that they can be converted from exam to chemotherapy infusion and respond with agility to the changing landscape of cancer care. The building support and information systems are designed to facilitate rapid transfer of information and collaboration between caregivers, researchers and other disciplines.

3.4.1 Building Program

The Center for Cancer Care is a clinical development with above-grade construction totaling approximately 275,000 GSF[1] plus approximately 215,000 GSF dedicated to underground parking and mechanical support space. The approximate area of each above-grade lower floor is 24,700 SF. The approximate area of each upper floor is 22,700 SF.

The lower floors of the building are dedicated to publicly oriented facilities, while upper floors will accommodate Dana-Farber Cancer Institute adult outpatient clinics, most of which will be relocated from the Dana Building, plus clinical offices and clinical research and support facilities. Above the fourth floor level, walkways will connect clinical floors 5 -10 of the Center for Cancer Care with research floors in the Smith Building. The fourth floor and a rooftop penthouse will house mechanical equipment. Table 3-1 describes the Center for Cancer Care program:

[1] GSF: Gross Square Feet, the total area measured to the exterior of the building and including all mechanical spaces, structure, and use spaces. This tally includes above-grade space but excludes rooftop mechanical support spaces. The zoning building area as defined by the BZC, which excludes all mechanical support spaces, underground parking, and storage areas is 257,500 SF.

Table 3.1: Center for Cancer Care Program

Uses	Zoning Gross Floor Area*
Adult Outpatient Clinical	133,300 GSF
Clinical Research Center	15,700 GSF
Clinical Administration	24,600 GSF
Patient and Family Services	24,400 GSF
Pharmacy	18,400 GSF
Food Service / Conference	25,100 GSF
Support / Common	16,000 GSF
TOTAL:	257,500 GSF

**Zoning Gross Square Feet as defined in the Boston Zoning Code. This definition excludes subgrade parking, basement areas devoted to uses accessory to the building operation, areas located elsewhere that house mechanical, electrical or plumbing equipment or storage space customarily housed in the basement.*

In total, the Center for Cancer Care will have thirteen stories above grade, including a mechanical floor at the fourth level but excluding the mechanical penthouse at the top of the building. In addition to the above-grade program spaces, the Center for Cancer Care will also accommodate seven levels of parking, with 460 (217 net new) spaces, below grade. This parking will be connected with adjacent parking levels in the Smith Building, consolidating all of DFCI's on-campus parking into a single integrated below-grade facility, and utilizing the existing Smith Building parking ramps. See Figure 3-2 at the end of this chapter for an image of parking level P2 that connects to the Smith Building parking and includes a new tunnel under Jimmy Fund Way to the Dana Building.

The ground floor of the Center for Cancer Care (Figure 3-3) will accommodate publicly oriented uses, including a main lobby for the DFCI campus, generous waiting and circulation areas, the Friends of Dana-Farber gift shop and other retail space, the Blum Resource Center for Patient Services, reception support facilities, and the DFCI Center for Patients and Families, with a visitor concierge service. The second floor (Figure 3-4) will contain centralized registration, phlebotomy, a take-home outpatient pharmacy, and the chapel and pastoral care facilities. The third floor (Figure 3-5) will provide an important interior link with the rest of the DFCI campus and the adjacent Brigham and Women's Hospital and Children's Hospital Boston, and will contain a healing garden, meeting and conference space, and the dining and kitchen facilities. These program spaces will be readily accessible to other important clinical, clinical support and patient care services throughout the connected third level of the DFCI campus.

The fourth floor level is entirely mechanical. Level five will primarily accommodate the Clinical Research Center and investigational pharmacy, and levels six through ten will house clinical program space, including ambulatory care, infusion, exam rooms, and other treatment facilities (see Figure 3-6 for clinical levels 7-10). Floors eleven through thirteen (Figure 3-7) are planned as a mix of clinical and clinical office space. See Figures 3-8 and 3-9 for north-south and east-west sections through the proposed Center for Cancer Care.

The maximum height of the building is thirteen floors, approximately 190 feet, measured to the top of the highest occupiable space from the average grade elevations of the abutting sidewalks on Jimmy Fund Way and Brookline Avenue. The roof will contain a mechanical penthouse measuring approximately 7,820 SF. The roof of the building above the thirteenth floor measures approximately 16,478 SF. As a result, the mechanical penthouse will cover approximately 47 percent of the roof. The location and coverage of the mechanical penthouse is depicted in Figure A-16 in appendix A, as the same may be refined as part of the final plan approval by the BRA. This element is shown in elevation in Figures 3-10 and 3-11 of this chapter.

After the Center for Cancer Care is constructed, the new Floor Area Ratio (FAR) for its lot will be approximately 7.68. The new aggregate FAR for the DFCI campus will be approximately 7.51. Building heights and FAR data before and after completion of this project are described respectively in Figures 3-12 through 3-15 at the end of this chapter.

3.4.2 Connections to Existing Campus

The Center for Cancer Care's seven levels of below-grade parking will connect to the adjacent Smith Building underground parking to provide a consolidated parking facility with direct elevator access to the Center for Cancer Care lobby and the public areas on the first three floors. A tunnel below Jimmy Fund Way will connect the sub-basement L2 level of the Dana Building with the valet parking and circulation at the P2 level of the Center for Cancer Care and the public parking levels below, to provide a connection to clinical support and service facilities remaining in the Dana Building. Figure 3-16 is a P2/L2 plan showing this connective tunnel.

At the first floor, the Center for Cancer Care support spaces will flow directly into the Smith Building, allowing for smooth circulation of service and ambulance access from the Smith Building receiving docks. At the second floor, the Center for Cancer Care and the Smith Building will connect to enable a future direct link between the centralized phlebotomy area in the Center for Cancer Care and a potential for the Institute's clinical and research labs planned for the Smith level 2. The third floor of the new building will be connected to the third floor bridge system through the Smith Building, which links all buildings of the Dana-Farber complex and also provides access to Brigham and Women's and Children's hospitals. This unified third level linked throughout the campus allows patients, visitors, and staff to easily navigate the publicly oriented program functions located at this level.

The Center for Cancer Care and the Smith Building will be connected at levels five through ten, accommodating the translational mission of DFCI by allowing direct flow between Center for Cancer Care clinical floors and Smith Building research laboratories. Informal gathering spaces in these connections are envisioned to facilitate research and clinical staff communication and interaction. See Figure 3-9 for an east-west section showing these connections.

Several simultaneous renovations and upgrades to surrounding buildings on DFCI's campus will be implemented to facilitate these connections:

- Expansion of campus loading and receiving facilities in the first floor of the Smith Building on Binney Street.
- Renovation of Smith Building Floors 1-3 to reconfigure space and uses to integrate continuously with the new building.
- Minor interior modifications of Smith Building research floors to facilitate connections to the Center for Cancer Care clinical floors on the upper levels.
- Minor renovation of existing underground parking levels in the Smith Building to function continuously with the new Center for Cancer Care parking.
- Minor renovation of program and circulation space on level L2 of the Dana Building to allow connection of the tunnel under Jimmy Fund Way to the P2 level of the Center for Cancer Care.

3.4.3 Building Design

The architectural massing and exterior treatment of the Center for Cancer Care are designed to create a notable public presence for DFCI and to indicate the building's function as the gateway to the DFCI campus. The exterior architectural design of the Center for Cancer Care is articulated as a set of distinctive masses, with contrasting surface materials and treatment patterns to break up the scale of the building volume and accentuate its vertical elements. The use of ample areas of glazing, warm-colored terra cotta, and metal accents gives the Center for Cancer Care an open and inviting feeling and creates a dramatic design statement.

At the base of this volume is a two-story glazed lobby at the corner of Brookline Avenue and Jimmy Fund Way that will welcome patients and visitors to the Institute. The entrance will be set back approximately 20 feet from the curb along Jimmy Fund Way with a generous glass canopy over the drop-off area. Along Brookline Avenue, the entrance will be setback approximately 25 feet from the curb line. Retail space will occupy the Brookline Avenue frontage and will be set back approximately 30 to 35 feet from the curb to create a gracious tree-lined pedestrian way. Figures 3-10 and 3-11 depict the Brookline Avenue and Jimmy Fund Way elevations respectively.

Above the entrance at the corner of Jimmy Fund Way and Brookline Avenue is a two-story Healing Garden, facing Joslin Park, which expresses the life-affirming mission of the Institute and adds to the building's humane and optimistic character. The dining facilities will overlook Brookline Avenue with large windows that will often remain illuminated after dark. Atop the three-story base, seven clinical levels rise above the mechanical floor to take advantage of views and natural light for patient and waiting spaces inside. Above this, two floors of clinical offices and program space step back from the clinical floors and transition to an articulated, illuminated building top. Further design of the building massing and character of the façade will be done in consultation with the BRA, LMA Forum, Impact Advisory Group Task Force and community advisory groups, as required in the Article 80 process.

Along Brookline Avenue, the cladding material at the first three stories is envisioned as terra cotta on a durable granite base, giving the building a warm hue and sense of human scale. Generous glazed openings at the lower floors will allow maximum light into the public spaces of the building and emit a soft glow in the evenings. The north and west facades will incorporate terra cotta sunscreen rods and/or translucent overhangs and glass screens to filter the natural daylight in the clinics and staff areas. South and east elevations facing the MATEP facility and Smith Building will be predominantly clad in terra cotta panels with a rhythm of punched window openings.

3.4.4 Pedestrian Circulation

An important element of the proposed new building's design is the internal pedestrian circulation system at the first three levels. Patients and visitors arriving at the campus will enter the Center for Cancer Care two-story lobby at grade level. They will proceed via prominent stairs and elevators to second-floor reception and patient-service areas and the third-floor dining, meeting and campus-wide circulation system, with connections to the surrounding institutions. Circulation paths from the main lobby and the garage to the program spaces, clinics and other service areas will be well-marked and direct.

3.4.5 Site Improvements

Public open space and amenities in the area surrounding the Dana-Farber Cancer Institute campus and the project site are limited. The Center for Cancer Care design strives to address these concerns by facilitating access while improving the quality of public space on the campus. The design of the new building enhances the pedestrian experience by creating a new campus entrance visible from Brookline Avenue, reducing pedestrian/vehicular conflicts, mitigating the negative visual impact of adjacent service areas, and improving the interface between private and public spaces.

The siting of the Center for Cancer Care will provide generous setbacks and wide sidewalks at the busy intersection of Brookline Avenue and Jimmy Fund Way that will emphasize the new main entrance on Brookline Avenue and vehicular entrance on Jimmy Fund Way. A widened sidewalk along Brookline Avenue, appropriate in scale to the significant new clinical facility, will accommodate the heavy foot traffic and retail uses along this busy thoroughfare. The broad setback along Jimmy Fund Way will create more spacious pedestrian, visual and vehicular flow within the campus.

The pavement at these widened and improved sidewalks will be selected for accessibility, durability, and aesthetic relationships to the new building and the surrounding architecture, to reinforce the connected totality of the campus outdoor space. Pavement selections will be reviewed with the BRA, Boston Department of Public Works and Public Improvements Commission.

New plantings will also enliven and soften the largely hardscaped environment of the DFCI campus. Street trees and smaller shrubbery will be planted along the Center for Cancer Care frontage on Brookline Avenue. Other plantings are planned for the repaved sidewalks along Jimmy Fund Way and Binney Street. Development of the landscape design will be coordinated with the BRA and other agencies. Refer to Figure 4-5 at the end of Chapter 4 for a visual depiction of these improvements.

3.4.6 Access and Circulation

The main pedestrian entrance to the Center for Cancer Care will be at the intersection of Brookline Avenue and Jimmy Fund Way. The primary vehicular drop-off for patients and visitors who plan to park at DFCI will be at the first underground parking level (P1). Motorists will have the opportunity to self-park or to use DFCI's valet parking service. A secondary drop-off for patients who are not planning to park at DFCI will be provided via an eastbound drop-off lane on Jimmy Fund Way intended to accommodate street-side patient drop-off, taxicabs, and accessible vans. Jimmy Fund Way will remain a two-way street, widened to provide an extra westbound lane for left-turn traffic in the area approaching Brookline Avenue. The existing covered drop-off at the Dana Building entrance on Binney Street will be taken out of service following completion of the Center for Cancer Care.

To encourage pedestrian movement around the DFCI campus, a pathway approximately fifteen feet wide will be maintained between the Center for Cancer Care Building and the adjacent MATEP facility, connecting Brookline Avenue to Binney Street. A rear entry to the main lobby and ground-floor patient-service areas will be located along this corridor. Surface treatments and improved pedestrian furnishings and lighting will enhance the public appeal of this pedestrian way.

Ambulance access will be provided at the Binney Street service areas of both the Dana and Smith buildings. DFCI currently plans two ambulance bays at the Dana Building to accommodate drop-off activity for the Jimmy Fund Pediatric Clinic, Imaging, Nuclear Medicine and Radiation Oncology departments and other clinical functions remaining in the Dana Building, as well as emergency use. The Center for Cancer Care will be served by one ambulance bay in the Smith Building. Design of these ambulance bays and the circulation routes to the clinical and clinical support facilities will provide adequate separation of patients from the noise, odors and activity of the loading and service functions.

Service access for the Dana-Farber Cancer Institute campus, including the added capacity requirements of the Center for Cancer Care, will utilize existing loading dock area in the Smith and Dana buildings on Binney Street. In order to accommodate the increased flow of materials through the Smith Building dock, DFCI intends to convert existing ground floor facilities to provide additional loading bays and support and staging space. Improved internal circulation corridors and a service tunnel under Jimmy Fund Way will facilitate service distribution to all DFCI buildings from these two primary delivery areas.

Retail space in the Center for Cancer Care will be serviced from the Smith Building loading bays via a service corridor along the ground level of the building. Retail deliveries on Brookline Avenue will be strictly prohibited. DFCI will strive to improve management of its loading bays, storage, waste handling and other loading/delivery functions to minimize the impacts of these activities on adjacent streets and at key entrances to the DFCI campus.

Creation of a centralized off-site DFCI materials management and receiving facility in the new Harbor Campus at 27 Dry Dock Avenue in South Boston is intended to facilitate management and control of the flow and timing of truck movements and deliveries to the Binney Street loading docks.

3.5 Project Schedule

Relocation of occupants of the existing Redstone and 454 Brookline Avenue buildings began in 2005 and these two buildings were fully vacated by the fall of 2006. The site preparation for the Center for Cancer Care project commenced during the fall of 2006 with demolition of the Redstone and 454 Brookline Avenue buildings and initiation of site enabling work. Site preparation for the Center for Cancer Care is expected to continue through the winter-spring of 2007, with construction to begin pending the completion of the Article 80 review process and MEPA approvals. The anticipated completion date for the Center for Cancer Care is early 2011, with inspectional approvals, commissioning, fit-out, and occupancy occurring by spring 2011.

Following occupancy of the new Center for Cancer Care Building, various renovation, retrofit and reuse projects in the existing DFCI buildings and related campus improvements are scheduled to begin in 2011 and continue through 2017.

3.6 Project Alternatives

A wide range of project alternatives were evaluated prior to the submission of the IMPNF/PNF and ENF, as well as in response to the MEPA Certificate and the BRA Scoping Determination once that document was reviewed. Significant changes and refinements to the design have resulted in a building which responds to the planning goals and concepts of the Interim Guidelines, addresses the feedback and comments from city and state agencies, and takes community input into account. In addition, Dana-Farber Cancer Institute responded to the challenges posed through the process of the design and development of a large project such as the Center for Cancer Care by developing its own architectural and urban design principles and goals in keeping with the Interim Guidelines. These internal design strategies allowed DFCI to make planning decisions resulting in an attractive and highly efficient facility that optimally relates to the surrounding environment.

Modifications implemented as a result of these considerations include: incorporation of significant sustainable design features such as the green roof proposed for areas of the building; a reduction in the overall building size and height (from eighteen stories to thirteen stories) resulting in reduced massing, fewer occupants, less parking and less traffic congestion; addition of the healing garden on the third level; and development of building shell and space design, mechanical systems and operating strategies which lessen the building's use of energy and water resources.

3.6.1 Current Zoning

The site for the Center for Cancer Care consists of five parcels of land, two of which are located under the Redstone Building located at 462 Brookline Avenue and two of which are located under the Smith Building. These four parcels are situated within the Dana-Farber Cancer Institute Institutional District. The fifth and final parcel is situated at 454 Brookline Avenue, which is located within the L-1 (Local Business) zoning district under the Zoning Code and within the Institutional Overlay District. All the parcels are located within the Restricted Parking District.

3.6.2 Interim Guidelines

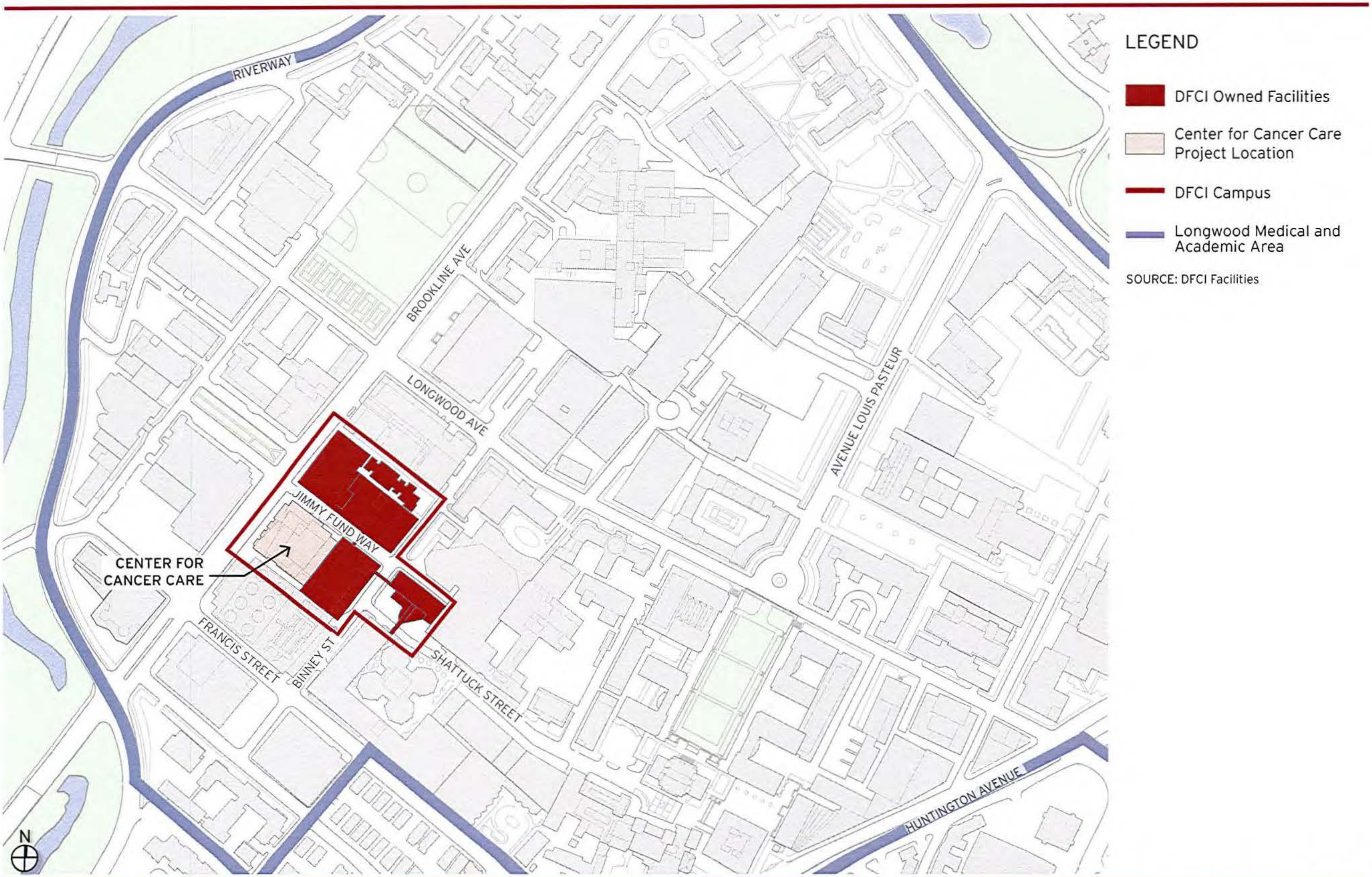
The proposed project is located within the boundaries of the area covered by the BRA's Longwood Medical and Academic Area Interim Guidelines, which provide guidance with regards to traffic and parking impacts, employment initiatives, desired densities, and urban design guidelines. The Center for Cancer Care Project as described in this document meets the larger intent, spirit and requirements of these guidelines.

3.6.3 Institutional Master Plan

The Center for Cancer Care will be an as-of-right project upon approval by the BRA of the simultaneously submitted Institutional Master Plan for the DFCI District and its adoption by the BZC.

3.6.4 No-Build

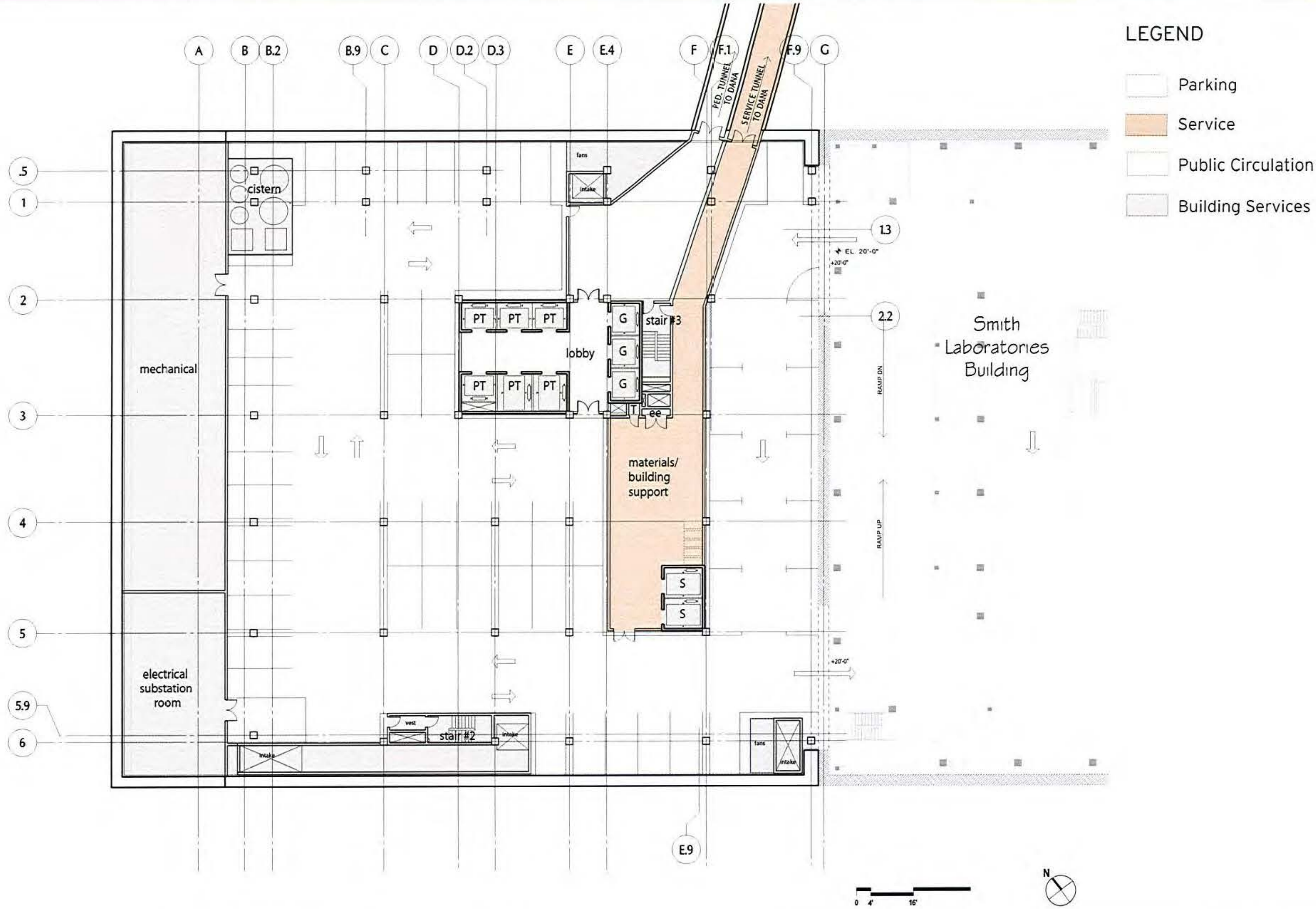
Dana-Farber Cancer Institute has evaluated a no-build alternative for the above-described projects and has determined that this option is untenable if the Institute is to continue to meet the growing patient population and remain a responsive and compassionate center for the effective treatment and research of cancer and other serious illnesses.



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Center for Cancer Care Project Location

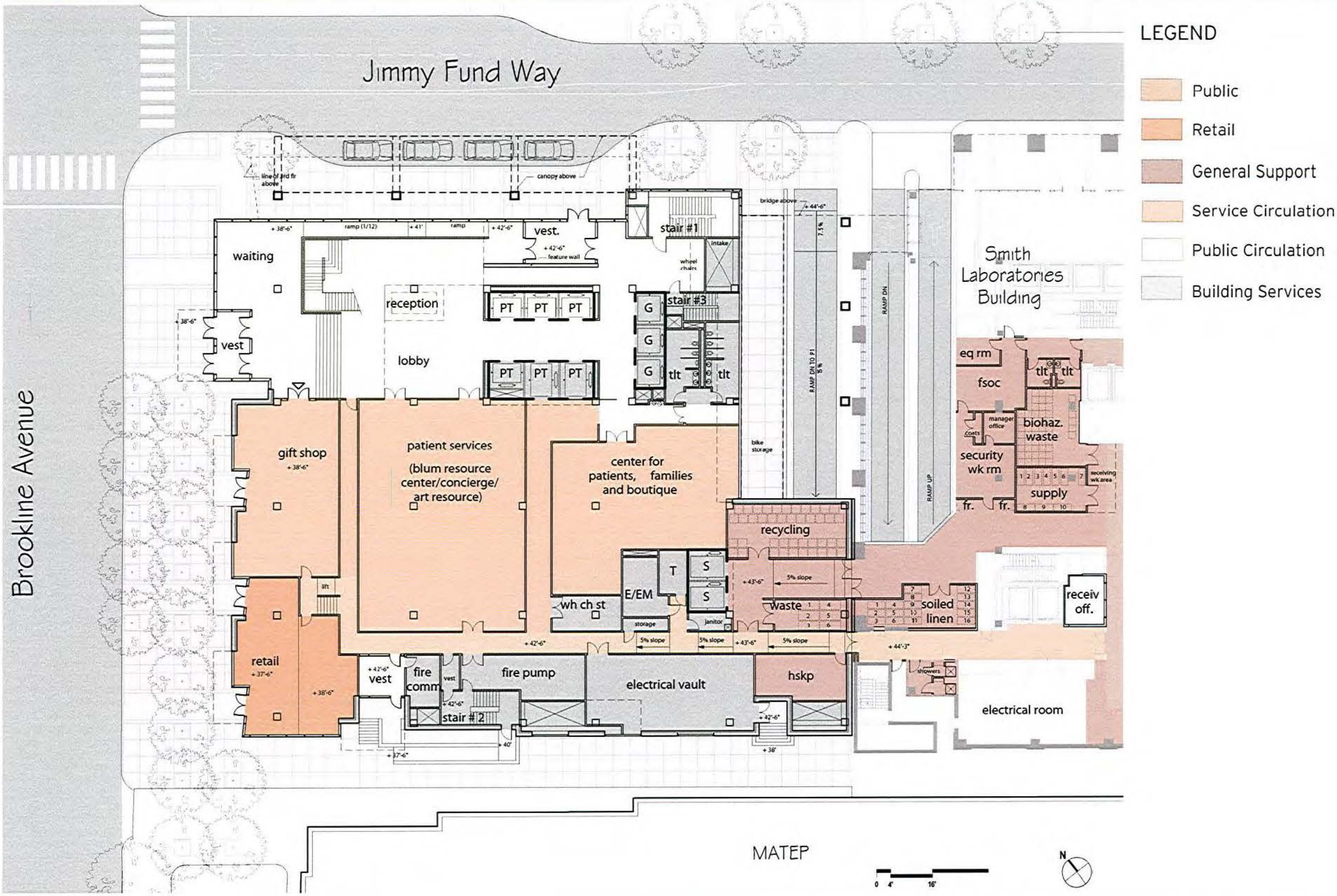
FIGURE 3-1



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level P2 Floor Plan

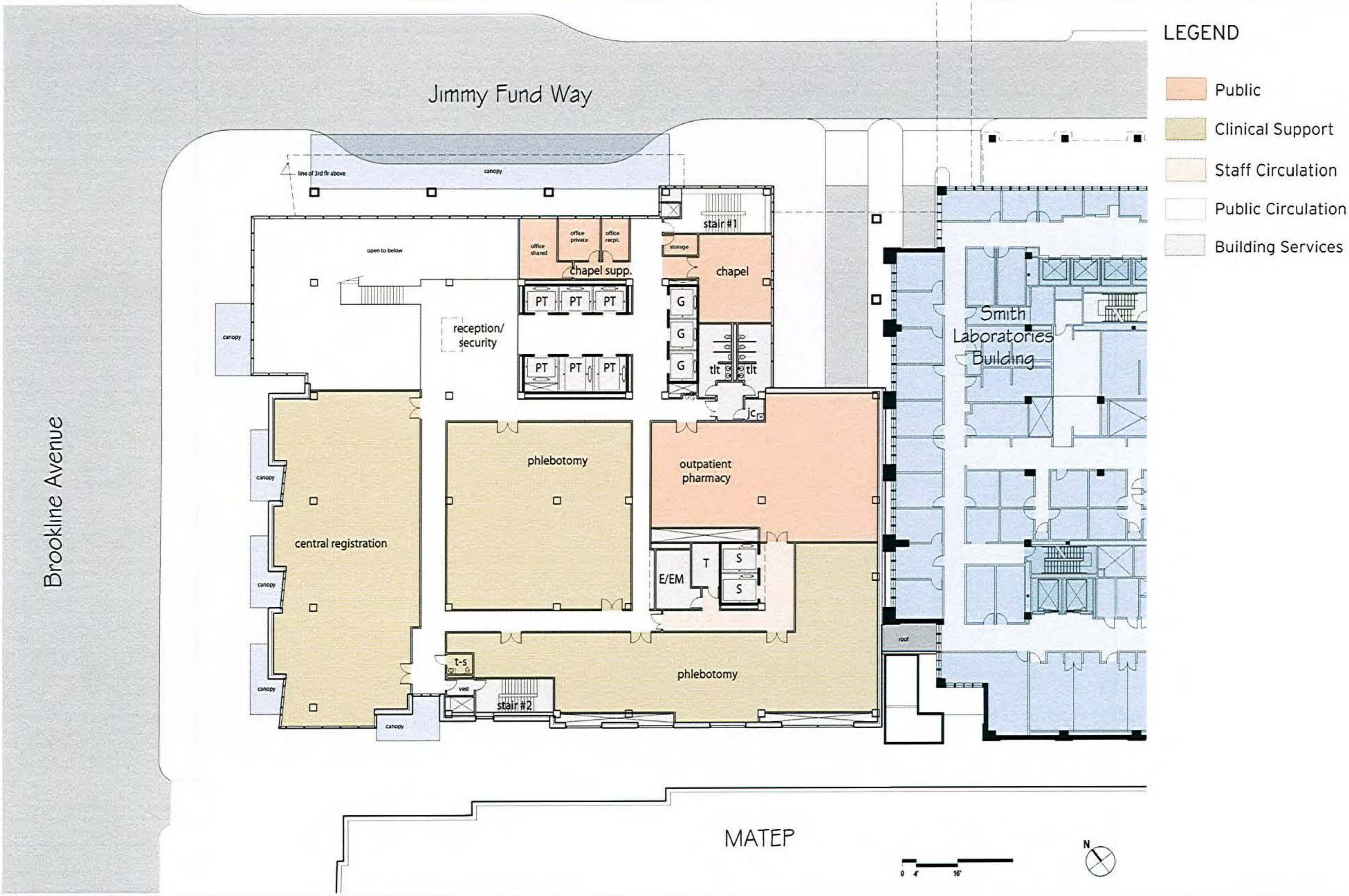
FIGURE 3-2



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 1 Floor Plan

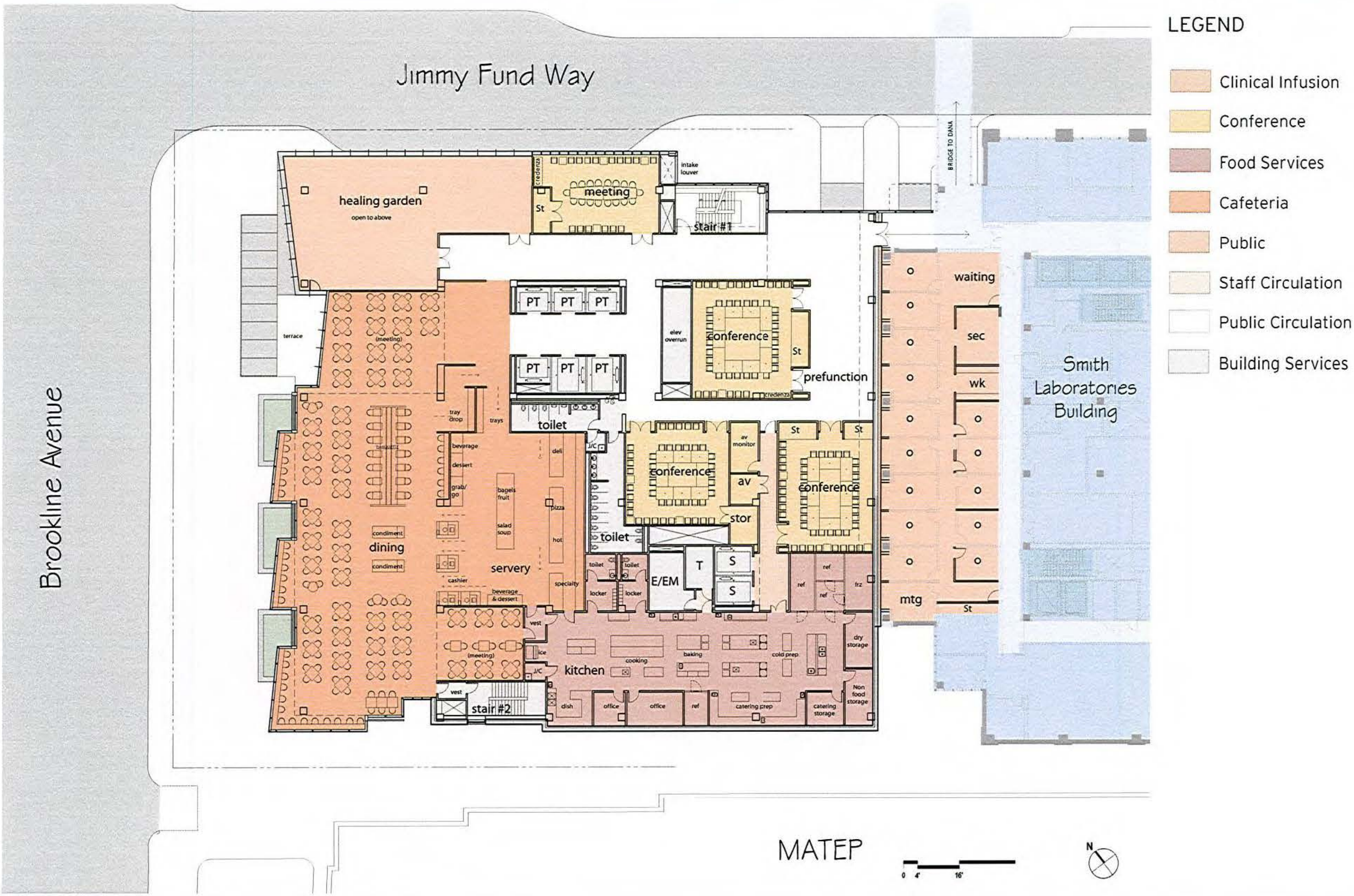
FIGURE 3-3



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 2 Floor Plan

FIGURE 3-4



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 3 Floor Plan

FIGURE 3-5

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Levels 7-10 Clinical Floor Plan

FIGURE 3-6

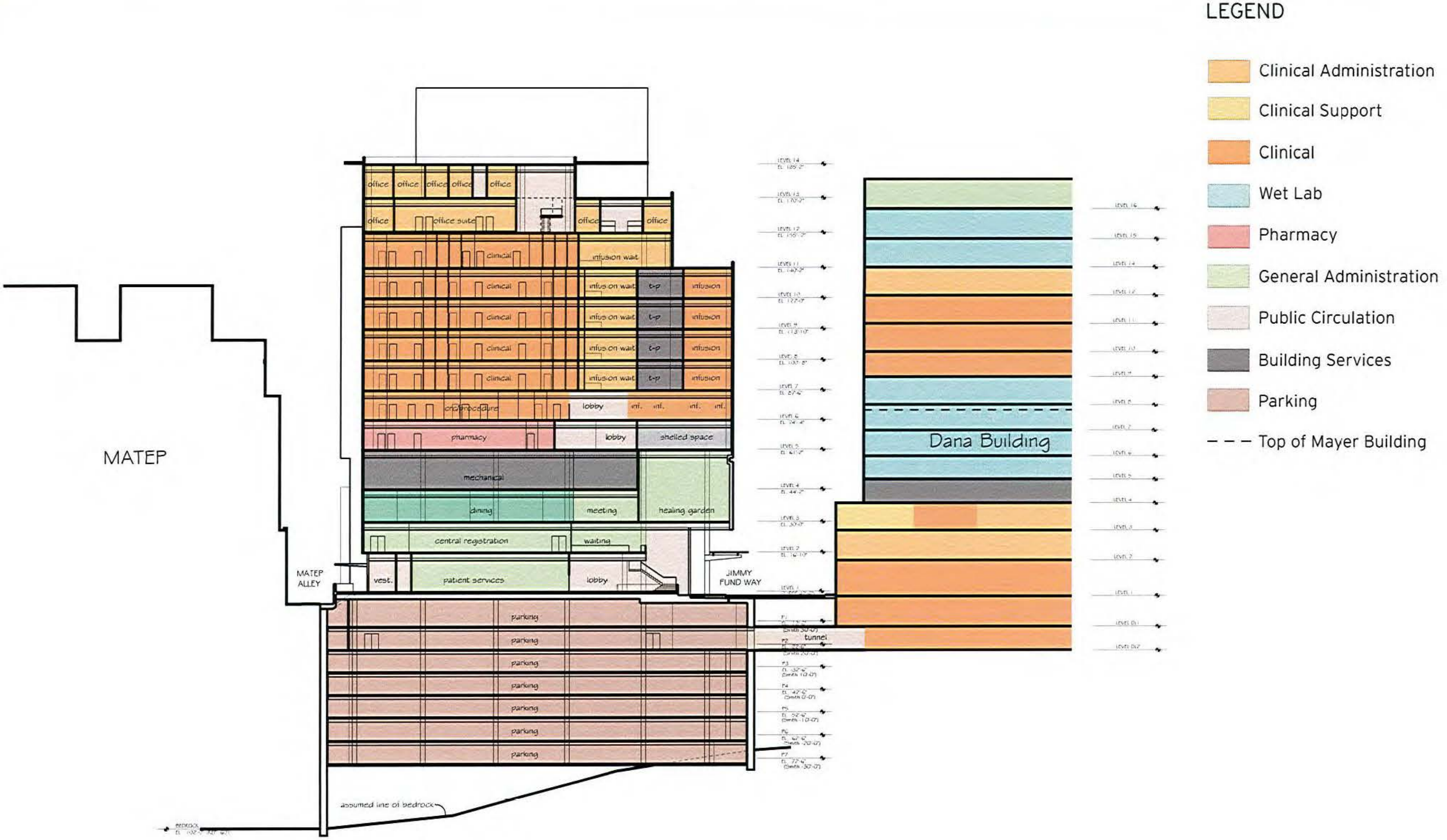
LEGEND

- Office
- Roof Garden
- Public Circulation
- Building Services

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 13 Floor Plan

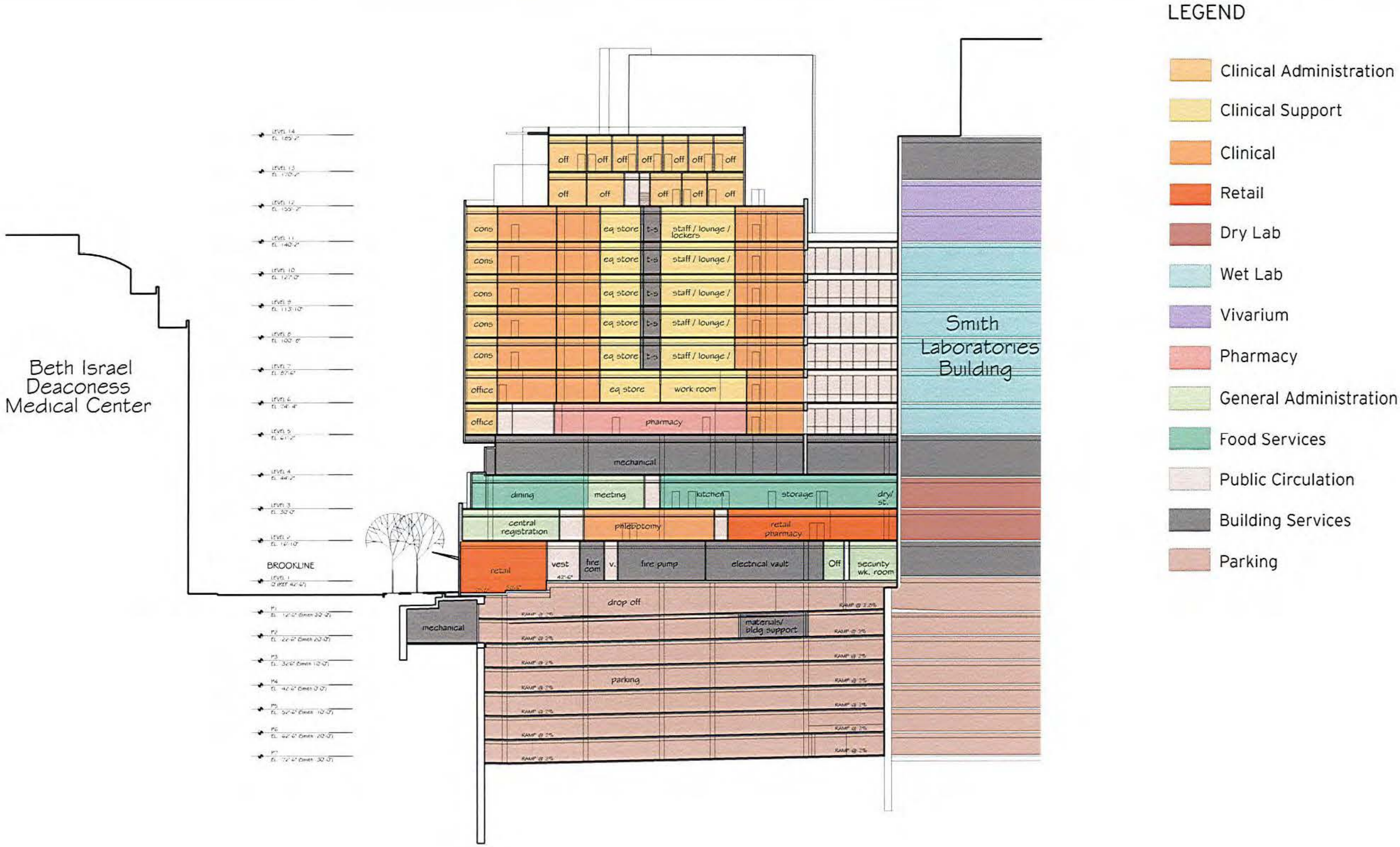
FIGURE 3-7



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

North - South Section

FIGURE 3-8



East - West Section

FIGURE 3-9

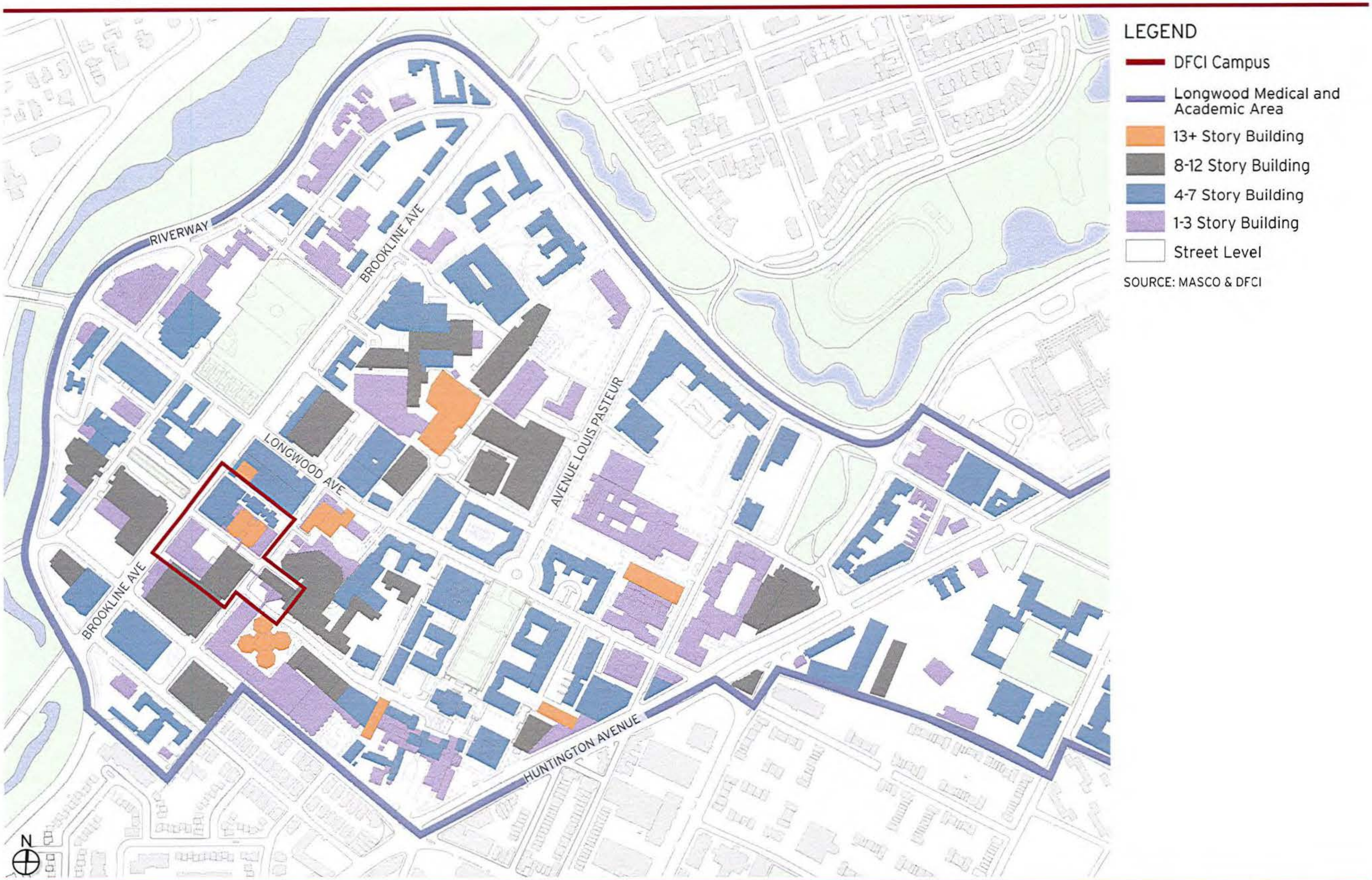
DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Brookline Avenue Elevation

FIGURE 3-10

Jimmy Fund Way Elevation

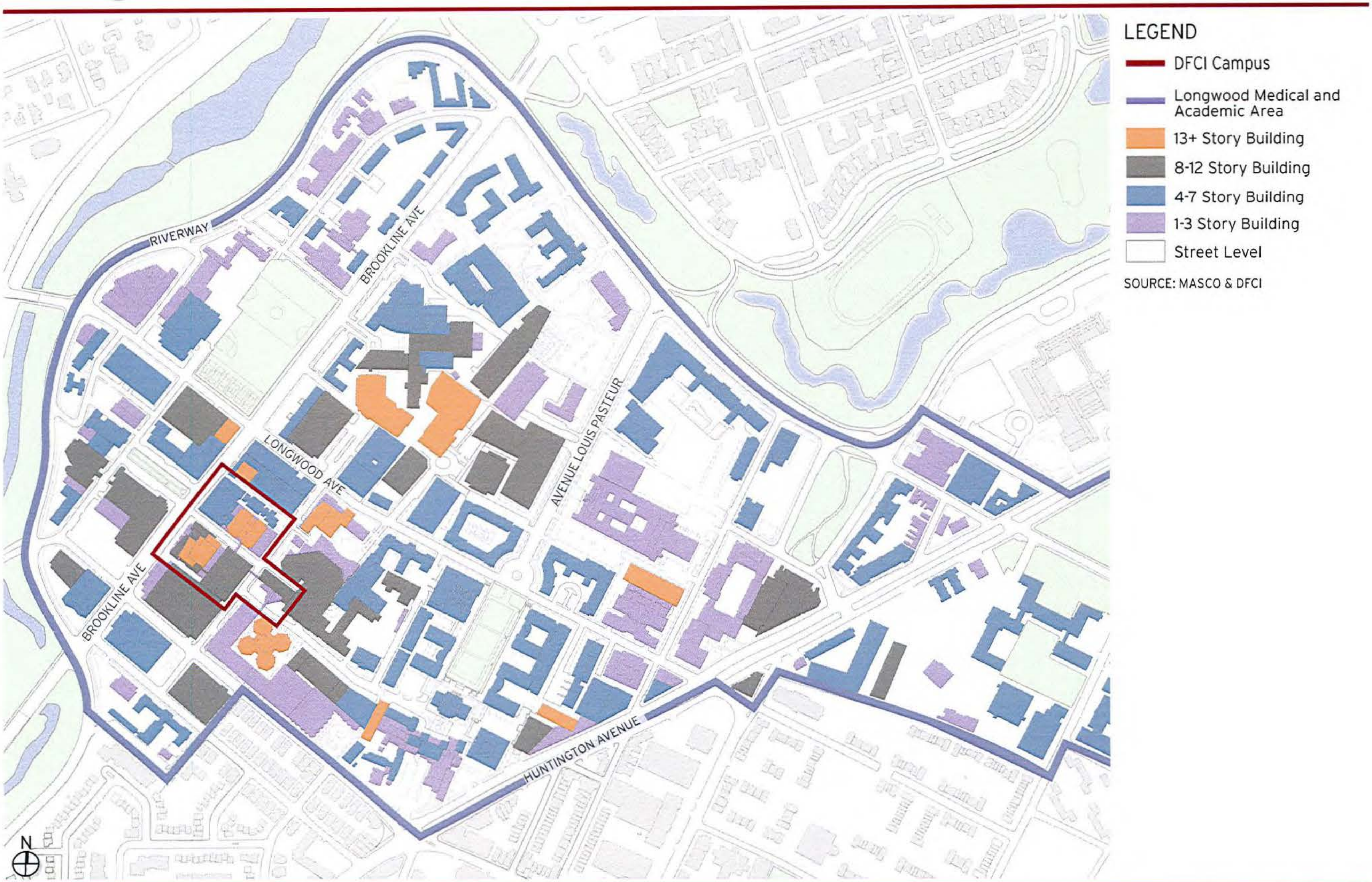
FIGURE 3-11



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Existing Area Building Heights

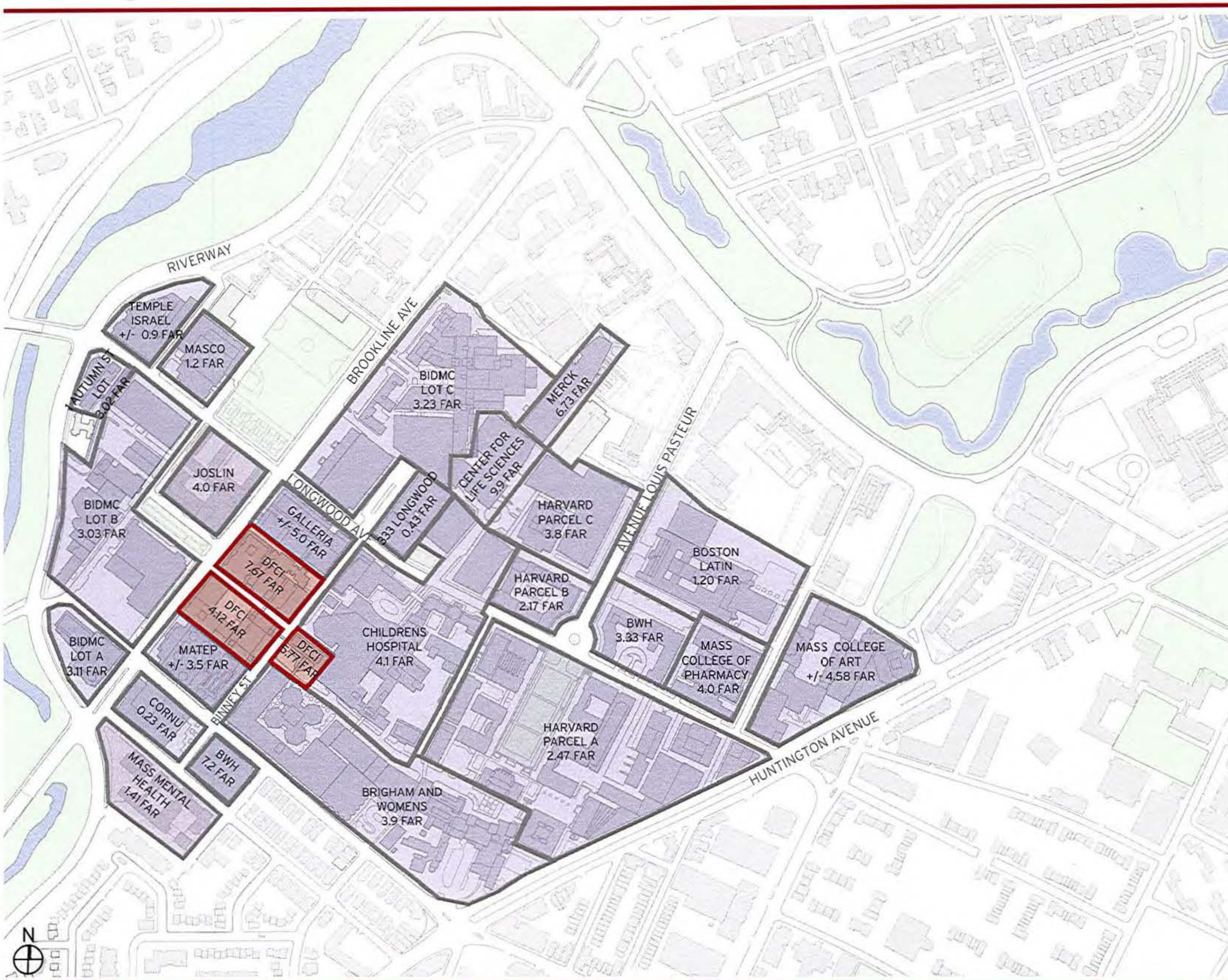
FIGURE 3-12



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Future Area Building Heights

FIGURE 3-13



LEGEND

DFCI Owned Facilities

All Others

FAR = Floor Area Ratio

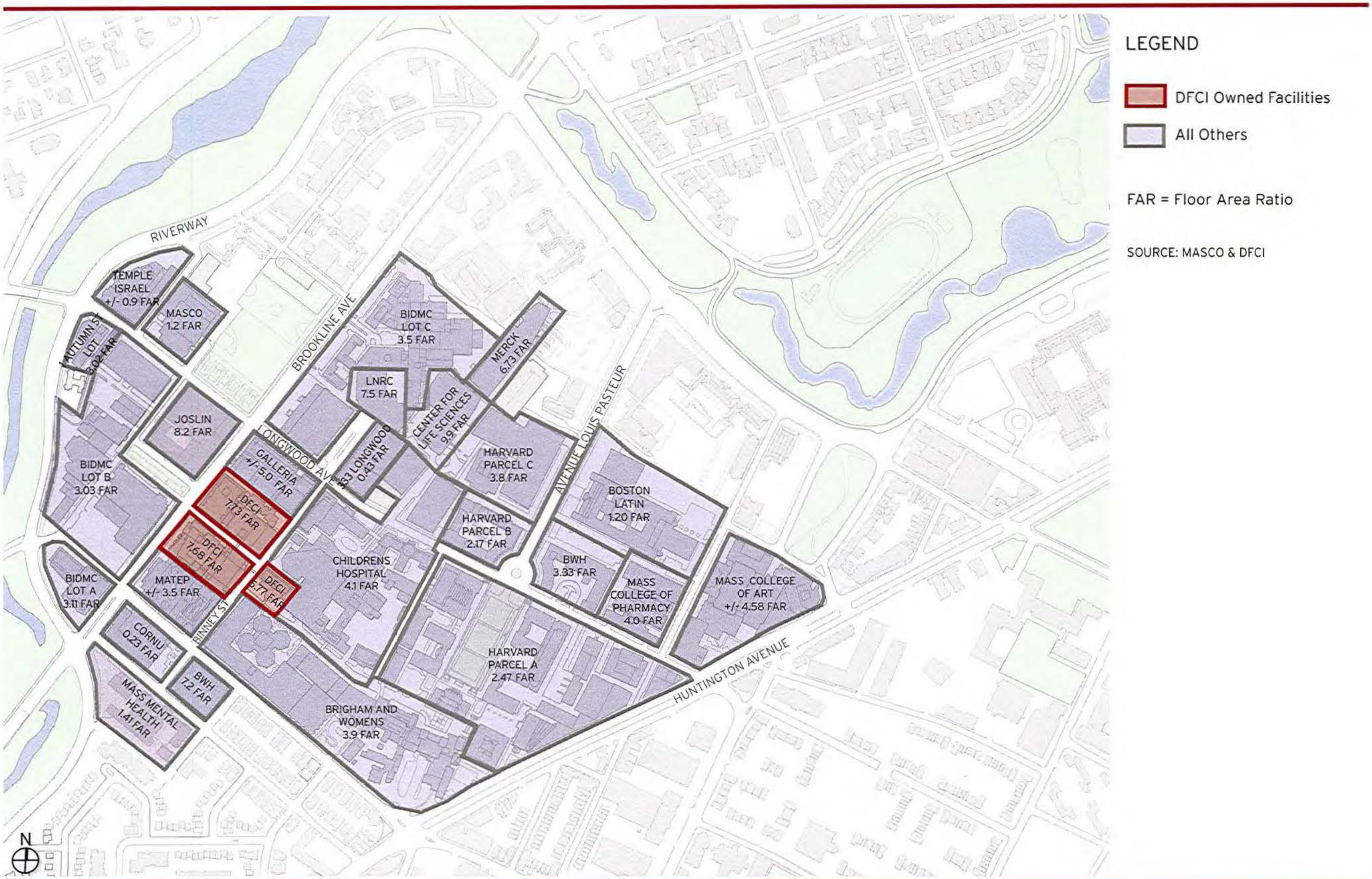
*NOTES
FAR reflect existing buildings as of 2006; projects in construction at the time or approved since are not included.

SOURCE: MASCO & DFCI

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Existing Floor Area Ratios

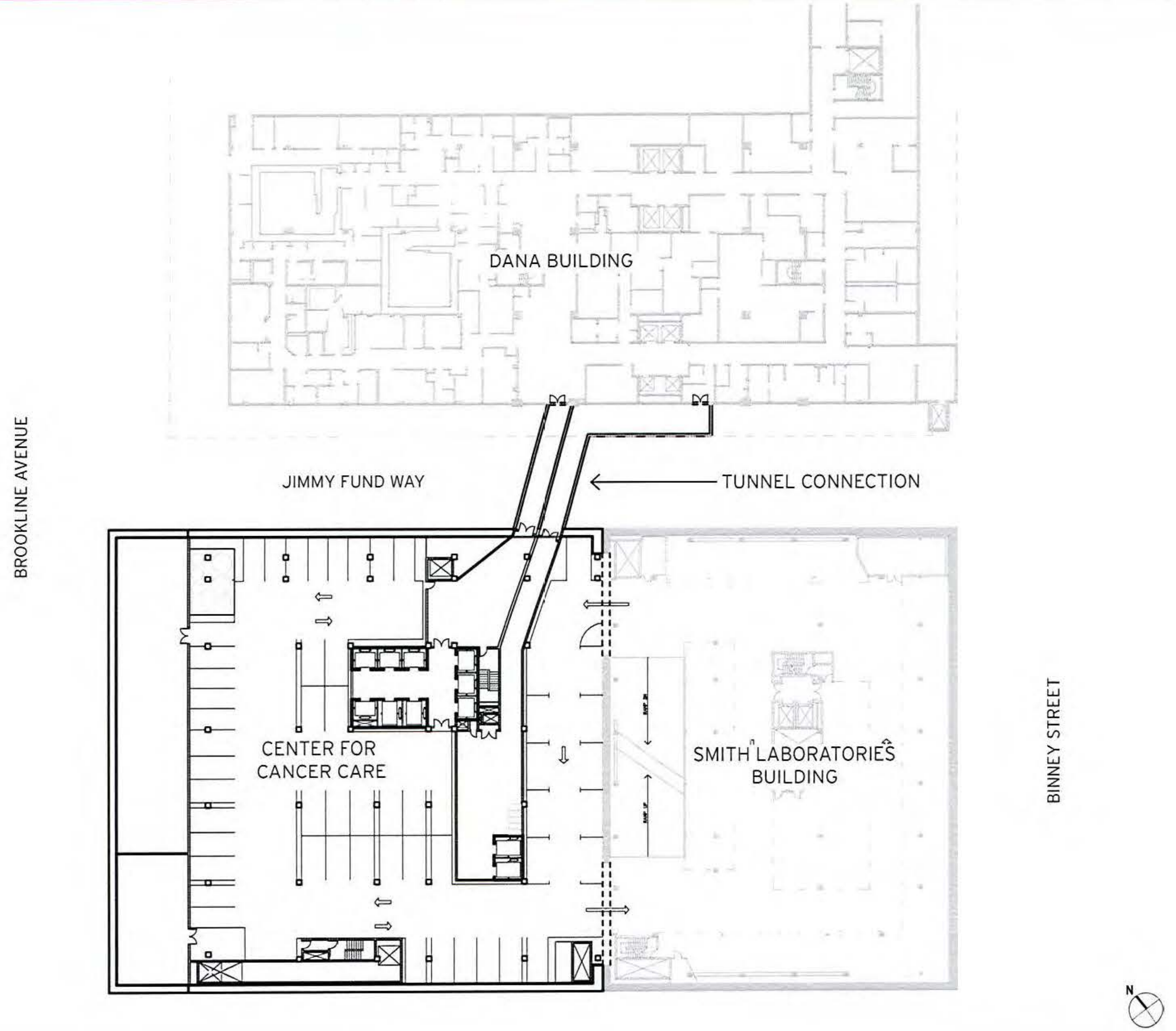
FIGURE 3-14



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Future Floor Area Ratios

FIGURE 3-15



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Center for Cancer Care P2 - Dana L2 Tunnel Connection

FIGURE 3-16

4

Urban Design

4.1 Introduction

The project discussed in this Draft PIR/EIR, the Center for Cancer Care, is grounded in Dana-Farber Cancer Institute's objectives to create an environment that accommodates patient-care needs and enhances the patient experience, facilitates access to DFCI's partner institutions for both patients and staff, enables interdisciplinary collaboration between clinicians and researchers, and supports the proliferating research avenues essential to scientific progress. This project has also been designed to sensitively and appropriately relate to the surrounding context of the LMA and its nearby neighbors.

4.2 The Center for Cancer Care

The Center for Cancer Care is designed to transition from the redesigned and animated streetscapes along Brookline Avenue and Jimmy Fund Way to the institutional activities within, and to reinforce and extend the unique urban qualities of the LMA. The Center for Cancer Care will reorient DFCI campus organization and announce the presence and purpose of the Institute by providing a centralized, recognizable threshold to the campus and facilitating direct connections to all Institute buildings as well as Brigham and Women's and Children's Hospitals. The extension of the third-floor circulation system through DFCI and the adjacent institutions will integrate and order the movement and experiences of patients, visitors and staff.

4.2.1 Gateway to Dana-Farber Cancer Institute

The existing DFCI campus comprises 3.3 acres, densely built with interconnected 5-to-15-story buildings. The one exception is the site of the proposed Center for Cancer Care, now occupied by one-and-two-story structures and an open parking lot. The campus is surrounded by fully-developed adjacent parcels of neighboring healthcare institution facilities, the retail-hotel-residential Longwood Galleria, and the MATEP power plant. DFCI facilities have grown incrementally for more than fifty years without coherent design coordination. They present a confusing and unimpressive architectural image and access pattern inconsistent with the Institute's reputation and the quality of service it provides.

Development of the Center for Cancer Care project will achieve the maximum feasible site-use capacity within the limits of good urban design practice. The goal of maximizing available usable space is being accomplished within the constraints of good facility layout and operation, respect for the scale of adjacent properties, minimization of negative impacts, and the viable limits of the area vehicular, transit and pedestrian systems.

The new Center for Cancer Care is sited on Brookline Avenue, the main artery of the LMA, to create a prominent, readily identifiable image and gateway for DFCI. This will reorient the public "front" of DFCI away from the unimpressive, hidden main entry to the Dana Building on Binney Street, a secondary service road filled with delivery vehicles, dumpsters and loading docks. The Center for Cancer Care's dramatic exterior design, with generous glazing and contemporary materials, will be highly visible from the north and south along Brookline Avenue and from the west across Joslin Park.

The entrance to the Center for Cancer Care will be the new main entry to the DFCI campus and will also serve as the primary entry point for the interconnected Dana-Farber/Brigham and Women's Cancer Center. An ample two-story lobby, accessed from Brookline Avenue and Jimmy Fund Way, will have a well-lit, transparent glazed façade to create a visible presence from the street. Warm-toned natural materials and easy access to public services and pedestrian circulation routes will create an inviting entrance. Jimmy Fund Way, along which are located the vehicular drop-off for the main entrance and access ramps to the underground parking, will be widened to provide an ample gateway and sense of entry to the campus.

4.2.2 Connections to Existing Campus

All DFCI buildings and the paths to BWH and CHB will be connected directly to the new main entrance lobby via the third-level pedestrian network. A tunnel under Jimmy Fund Way will connect the Center for Cancer Care with the Dana, Mayer and Shields Warren buildings, and consolidated underground parking will join the new Center for Cancer Care and Smith Laboratories Building. Access to all the routes will be identifiable immediately upon entry to the new lobby. The Dana Building entrance will be relocated to face Jimmy Fund Way, and use of the first three floors of the building will be reallocated to patient-service and direct-support activities that benefit from close access. Smith Building lab floors will connect directly to the Center for Cancer Care clinical floors via glazed corridors at the rear of the site, to encourage clinical-research relationships and personnel interaction. Loading and service functions will be consolidated and expanded along Binney Street, away from the main "public" face of the campus.

The third-level bridge system is already a critical pedestrian network for DFCI, linking the Jimmy Fund, Smith, Dana and Shields Warren buildings, and giving direct access to the BWH and CHB circulation systems. This network will connect directly to the Center for Cancer Care Building and new main entrance lobby, and will be enhanced with straighter routes, generous intersections, clearer orientation, and way-finding directions. The third-floor will be reinforced as a focus for "public" activities, as the location for the new cafeteria, conference rooms, and Healing Garden in the Center for Cancer Care, patient and family services and conference facilities in the Smith Building, and the Jimmy Fund Pediatric Clinic in the Dana Building. See Figure 4-1 for the level 3 plan showing these and other connections within the context of the DFCI campus and adjacent institutions.

4.2.3 Access and Service

The LMA has unique concerns with traffic congestion, competition between through-traffic and institutional access, and vehicular-pedestrian conflicts. Patient, visitor, emergency, staff and service access to the existing DFCI facilities is affected by this area-wide situation, with congestion and conflicts on Binney Street, Brookline Avenue and Jimmy Fund Way, and confusing routing to DFCI entrances, parking and loading docks.

By relocating the main campus entrance to the Center for Cancer Care, DFCI will reorganize the existing access and circulation pattern, separating primary public and vehicular access on Jimmy Fund Way from service and emergency access on Binney Street. Jimmy Fund Way will be widened to provide an additional westbound lane to facilitate egress and turning traffic onto Brookline Avenue. Signalization and operations of the Jimmy Fund Way/Brookline Avenue intersection will be improved to optimize flows for the new conditions. The drop-off area at the Center for Cancer Care and the expanded ramps to the consolidated underground parking will be designed for maximum efficiency and smooth access and egress. This project will clear the way for the Dana Building drop-off to be eliminated in the future, removing a traffic conflict and congestion point at the corner of Jimmy Fund Way and Binney Street.

All DFCI parking on the main campus will be consolidated in an underground seven-level garage extending under the Center for Cancer Care and Smith Building, with a total of about 715 spaces, including 460 new spaces added to the existing 255 in Smith. This will operate as a single contiguous facility, using the two existing Smith Building access ramps on Jimmy Fund Way plus one additional ramp constructed as part of the Center for Cancer Care. The garage will be designed for valet and self-parking operation, with a major drop-off and valet area on the P1 level. Dana Building parking decks will close when the new facility begins operation and be retrofitted for other functions.

DFCI is creating a centralized off-site materials management and receiving facility at 27 Dry Dock Avenue in South Boston. The enhanced service capacity will permit more efficient and cost-effective management of delivery volume and timing. Deliveries from 27 Dry Dock Avenue to the LMA will be coordinated and scheduled to reduce truck trips and traffic impacts at the DFCI loading docks in the LMA campus. The off-site materials management centralization is integral to service operation and distribution reconfiguration in the Smith and Dana buildings, and helps to provide the increased capacity to support expanded functional requirements of the growing DFCI complex.

The Smith Building and Dana Building loading docks will be expanded and reconfigured to serve the entire DFCI complex, including increased service created by addition of the Center for Cancer Care. The Smith Building service area will be extended by two additional loading dock bays, converted from the existing first floor area. Internal service support space will be reconfigured to improve materials flow, delivery capacity and distribution management, with good connections to the whole campus. The Dana loading dock will also be reconfigured, with support space added by reuse of part of the current Dana drop-off, for improved service capacity and operations management. Materials distribution will be enhanced by a new service tunnel under Jimmy Fund Way, allowing rationalization of delivery patterns at both loading docks and efficient distribution throughout the entire DFCI complex.

In the proposed configuration, there will be one ambulance bay in the Smith Building with direct access to the clinical floors of the Center for Cancer Care, and room for two ambulances at the Dana Building with direct access to the clinical facilities that will remain in this area of the campus.

4.2.4 Scale and Context

Building development by LMA institutions continues apace, increasing the scale and density of the area and replacing older lower-scale structures with larger contemporary facilities – particularly evident in the area immediately surrounding DFCI. Planning and design of the Center for Cancer Care consciously reflects the historic and evolving character of this built environment in the scale and massing of building elements and the design relationship of built volumes.

The proposed Center for Cancer Care development is designed to respond sensitively to the scale and density of the surrounding LMA. The building will be 186 feet from the entrance at Jimmy Fund Way to the top of the highest occupiable space, or approximately 190 feet above the average sidewalk grade of the abutting streets. This is less than the nearby proposed Boston Properties development at Joslin Diabetes Center, approved for the corner of Longwood Avenue and Brookline Avenue, but slightly higher than the Smith Building and the Dana Building directly across Jimmy Fund Way. The height of the Center for Cancer Care is gracefully offset by the setbacks, stepbacks and subdivision of the building massing. The three-story base of the building is set back along Brookline Avenue to match the general pattern of setbacks along the east side of the street. Above this the clinical tower sits as a set of articulated volumes on the unifying base. The façade of the Center for Cancer Care along Jimmy Fund Way is designed to align with the face of the adjacent Smith Laboratories Building.

In addition to its general scale and massing within the context of the LMA, the west façade of the Center for Cancer Care has been tailored to minimize its shadow impact on Joslin Park, directly opposite. The height of the building has been reduced from eighteen floors in the original plans to thirteen stories, the top level of the structure has been recessed on the west and north sides, and the northwest corner of the building has been eased to limit shadows cast on the park and their duration. See Appendix D at the end of this document for more information on shadow impacts.

4.2.5 Building Character

The Center for Cancer Care is designed to create a signature architectural image to project Dana-Farber Cancer Institute's prominent status in the national healthcare landscape. The building character will also positively impact its immediate context and the adjacent LMA through clarification and refinement of existing patterns of way-finding, improvement of pedestrian and vehicular access and movement, and consolidation of all campus parking underground.

The Center for Cancer Care design breaks the massing of the tower into smaller elements that diminish any sense of bulkiness and emphasize the verticality of the construction. The new tower is set back from the face of the Smith Building and is similar in massing to Smith but distinctive in exterior design, creating a related but varied complex of volumes and lively urban streetscape on the DFCI campus. Generous glazed areas are intermixed with warm-colored terra cotta finishes to yield an attractive, optimistic public face for the Institute. Spaces used for activities after dark will cast a warm glow, visible to the outside public. See Figures 4-2 through 4-4 at the end of this chapter for perspective renderings of the Center for Cancer Care in its urban context.

The Center for Cancer Care will simplify and improve way-finding to and through the DFCI complex by creating a prominent new main entrance at the corner of Brookline Avenue and Jimmy Fund Way, and providing visible and accessible routes from the main entrance lobby to all parts of the DFCI campus and its neighbor institutions. The Center for Cancer Care is the most important component in DFCI's strategy to establish a clear institutional identity through better master planning, coordinated upgrade of exterior architectural treatments on existing buildings, reorientation of entries, and reinforcement of the third-level pedestrian bridge system connecting all facilities.

The new building's main entrance and drop-off are designed to create improved access for patients and visitors arriving by car, public transportation or foot. This involves a primary drop-off and valet parking at the first underground level, with direct elevator access to all public floors of the building and to the third-floor pedestrian bridge system. There will also be an inset curb-side drop-off along Jimmy Fund Way for rapid drop-off and pick-up, with DFCI staff stationed as "ambassadors" to assist patients and visitors at this entry point. Doorways to the main entrance lobby will open to both Jimmy Fund Way and Brookline Avenue for optimal identification and access into the DFCI complex.

Furthermore, by consolidating all on-site parking for the DFCI campus in the underground levels of the combined Center for Cancer Care-Smith Building facility, the Center for Cancer Care removes the negative visual, environmental and operational impacts of existing on-grade and above-grade parking, and creates the opportunity to enclose and reuse the above-ground parking decks in the Dana Building for primary Institute functions.

4.3 Public Pedestrian Areas

The existing outdoor public environment of Dana-Farber Cancer Institute's campus provides little sense of a campus, meager pedestrian amenities, and minimal greenery. Narrow sidewalks abut harsh, closed, unwelcoming ground-level facades. Visibility of and orientation to building entrances, public destinations and neighboring institutions are poor.

The Center for Cancer Care design strives to address these concerns by facilitating access while improving the quality of outdoor public space on the campus. Construction of the Center for Cancer Care and related upgrade projects at existing buildings will create more spacious sidewalks and pedestrian areas along Brookline Avenue, Jimmy Fund Way and Binney Street, to accommodate access and circulation more comfortably. Near-and-long-distance views to the Center for Cancer Care, public entries and access to significant destinations will be enhanced. Public spaces will be designed with high-quality amenities, including paving and façade materials, street furniture, lighting and plantings, with buffer treatments to shield service and loading dock activity.

The siting of the Center for Cancer Care will provide generous setbacks and wide sidewalks at the busy intersection of Brookline Avenue and Jimmy Fund Way that will emphasize the new main campus entrance on Jimmy Fund Way. A widened sidewalk along Brookline Avenue, appropriate in scale to the significant new clinical facility, will accommodate the heavy foot traffic and retail uses along this busy thoroughfare. The broad setback along Jimmy Fund Way will create more spacious pedestrian, visual and vehicular flow within the campus.

The pavement at these widened and improved sidewalks will be selected for accessibility, durability, and aesthetic relationships to the new building and the improved facades of the Dana and Mayer buildings. Phase one of these upgrades will include sidewalk upgrades in the areas impacted by and immediately surrounding the Center for Cancer Care. Phase two will include work at the Smith Laboratories Building and Dana Building areas of the campus sidewalks. Pavement treatments will be designed to create a common sense of campus connection between DFCI buildings. Pavement selections will be reviewed with the BRA, Boston Department of Public Works, and Public Improvements Commission.

New plantings will also enliven and soften the largely hardscaped environment of the DFCI campus. Street trees and smaller shrubbery will be planted along the Center for Cancer Care frontage on Brookline Avenue. Other plantings are planned for phased implementation at the repaved sidewalks along Jimmy Fund Way and

Binney Street. Development of the landscape design will be coordinated with the BRA and other city agencies. See Figures 4-5 through 4-7 for plans of the improvements to Brookline Avenue and Jimmy Fund Way.

Urban design improvements to the DFCI campus will seek to provide a continuous sense of greenspace, connecting from Joslin Park along Brookline Avenue to the Riverway and along Jimmy Fund Way to the Shattuck Street Mall. The wide sidewalk in front of the Center for Cancer Care will allow ample tree-planting and seating areas along Brookline Avenue. Plantings will be added and enhanced at the Dana, Smith and Jimmy Fund buildings on Jimmy Fund Way and Binney Street, and the seating area at the corner of Binney and Shattuck streets will be improved.

4.4 Planning Context of the Project

Dana-Farber Cancer Institute has been based in the LMA since its founding, due to the essential and vigorous faculty, research and clinical relationships with Harvard Medical School, partners BWH and Children's Hospital Boston, and other LMA institutions. These primary functional relationships require direct face-to-face contact at DFCI and at the various nearby institutional sites. Over the past twenty years, DFCI clinical and research activities have grown in volume dramatically; and, as discussed above, this trend is predicted to continue for years to come. However, many administrative, support and some research functions do not need such immediate proximity; and DFCI has leased facilities outside the LMA and relocated such functions to the off-site locations.

DFCI is developing a system of satellite clinical facilities throughout the Eastern Massachusetts region, in coordination with other healthcare institutions, to provide cancer care services to complement the cutting-edge clinical and research activities housed at the main LMA campus. DFCI has relocated major administrative, materials management, and some research and support functions to off-site facilities in the Fenway, South Boston and Brookline. Future growth of clinical, research and support activity will be accommodated through continued development and expansion of remote facilities, serviced with shuttle, materials management, and network communications systems for seamless Institute-wide functionality.

As clinical and research relationships between Dana-Farber and its partners BWH and CHB have become more involved and interactive, coordinated facility planning has grown between the institutions. This is essential to achieve the most appropriate accommodation of changing future needs and effective communication and circulation networks among the institutions for staff, patients and visitors. Future facility issues that may be addressed by these shared processes include: joint use and/or development of specialized equipment and treatment suites; additional or replacement bridge and tunnel connections between DFCI and BWH and CHB; more effective coordination of circulation and wayfinding systems; and potential redevelopment of the Jimmy Fund Building site.

4.4.1 Leased Space

Anticipated construction activities on Dana-Farber's main campus will accommodate the Institute's anticipated growth in its clinical core programs over the next ten years. However, corresponding growth in basic science and clinical research programs and expansion of DFCI administrative and support activities cannot be accommodated within the LMA campus facilities. Therefore, DFCI has made major commitments to lease space at the Harbor Campus, the 10 Brookline Avenue, the Center for Life Sciences, and other sites, with a total of approximately 150,000 SF of newly acquired leased program space.

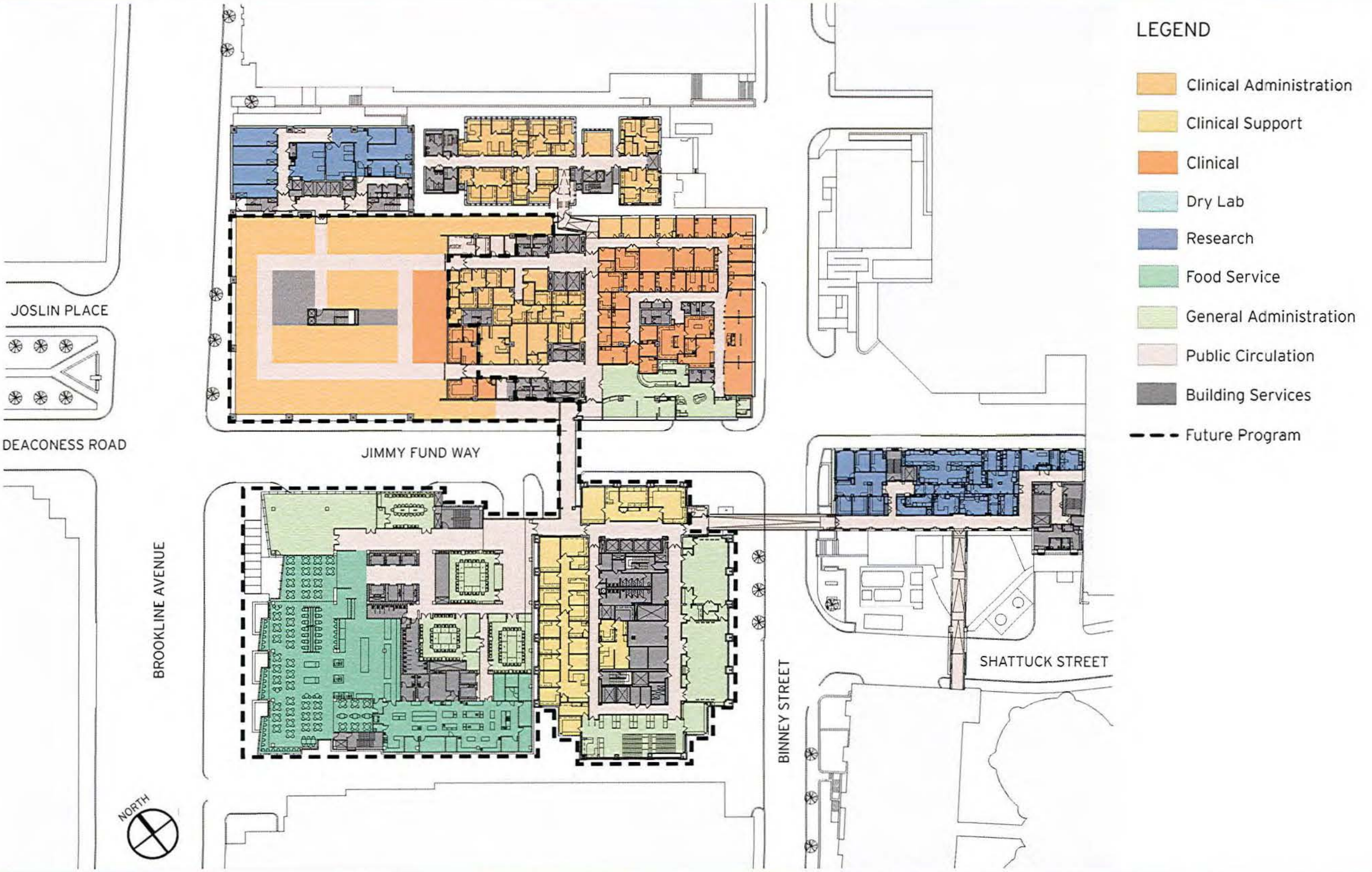
Because of the projected continuing growth in clinical and research program activities and visitor and staff volumes over the term of the IMP, DFCI anticipates the need to lease additional space. Some of this capacity will be within or adjacent to the LMA, in existing buildings or in developments that have already been approved or are currently under construction. Much of this capacity will be leased in space remote from the LMA. Only those clinical, research and support functions that require essential proximity and access convenience to the DFCI Main Campus and other LMA institutions will be located in leased facilities within or near the congested LMA environment.

4.4.2 Satellite Facilities

DFCI's need for future leased space will be in addition to its existing patient care partnerships with Children's Hospital and Brigham and Women's Hospital, as well as its newly opened satellite facility at Faulkner Hospital. DFCI also plans to expand its satellite relationships to patient care locations throughout metropolitan Boston and nearby areas of New England, potentially including sites at South Shore Hospital, Milford Regional Medical Center, and New Hampshire Oncology Hematology in Londonderry, New Hampshire. See Figure 4-8 at the end of this chapter for a regional view of DFCI's existing and planned satellite facilities. For more information about the planning context of the projects described in this document, see Chapters 2 and 4 of the IMP simultaneously submitted with this DPIR/DEIR.

4.5 Conclusion

The Center for Cancer Care project described above has been shaped by extensive and collaborative design review with the BRA, BCDC, the IAG, local communities and abutters, political leaders, and state and government agencies. It has been oriented and directed to goals expressed in the LMA Interim Guidelines, and will continue to evolve in a responsive and interactive process as the regulatory reviews continue.



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 3 Future Campus Connections

FIGURE 4-1

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Perspective from Joslin Place

FIGURE 4-2

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

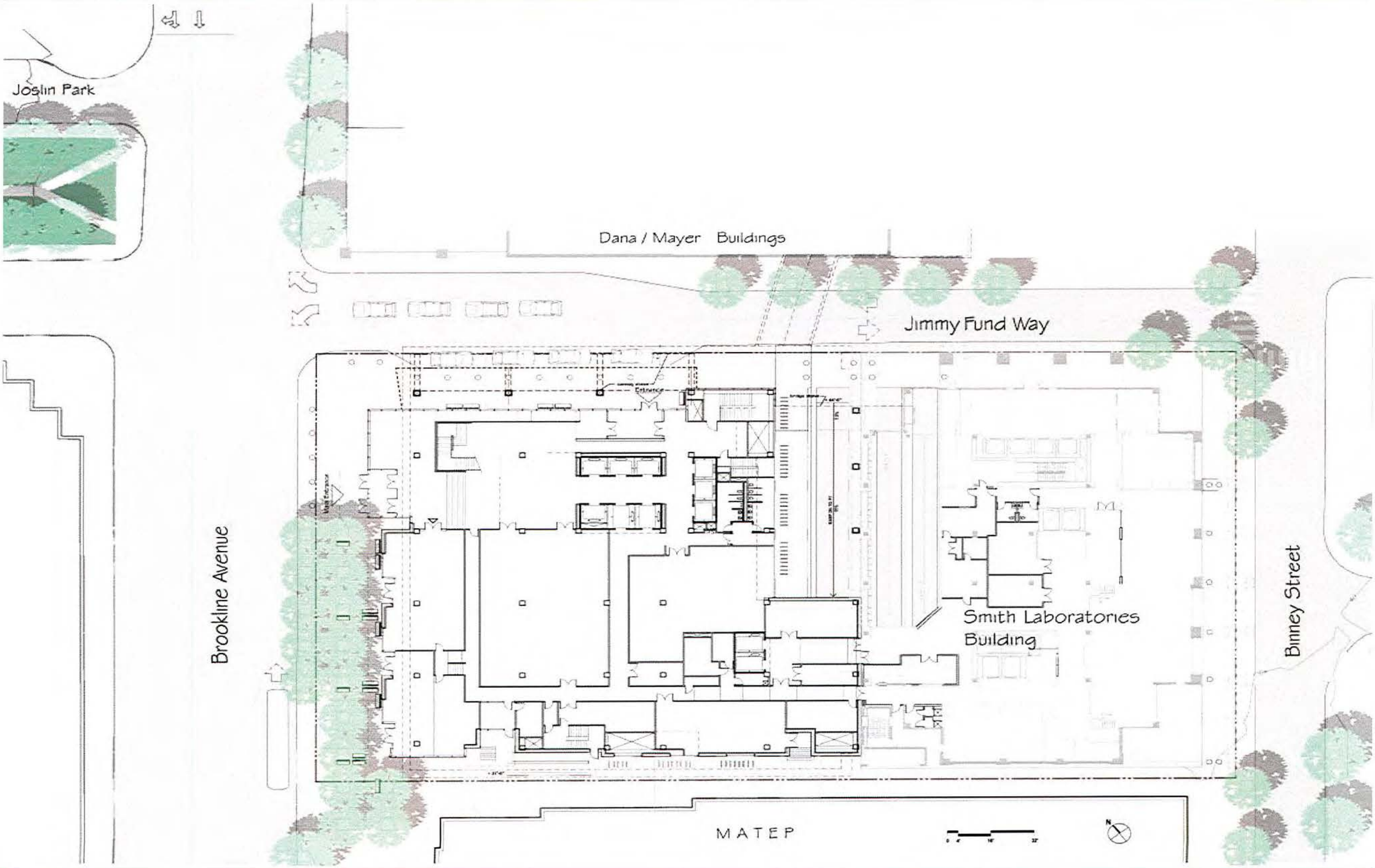
Perspective from Brookline Avenue

FIGURE 4-3

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

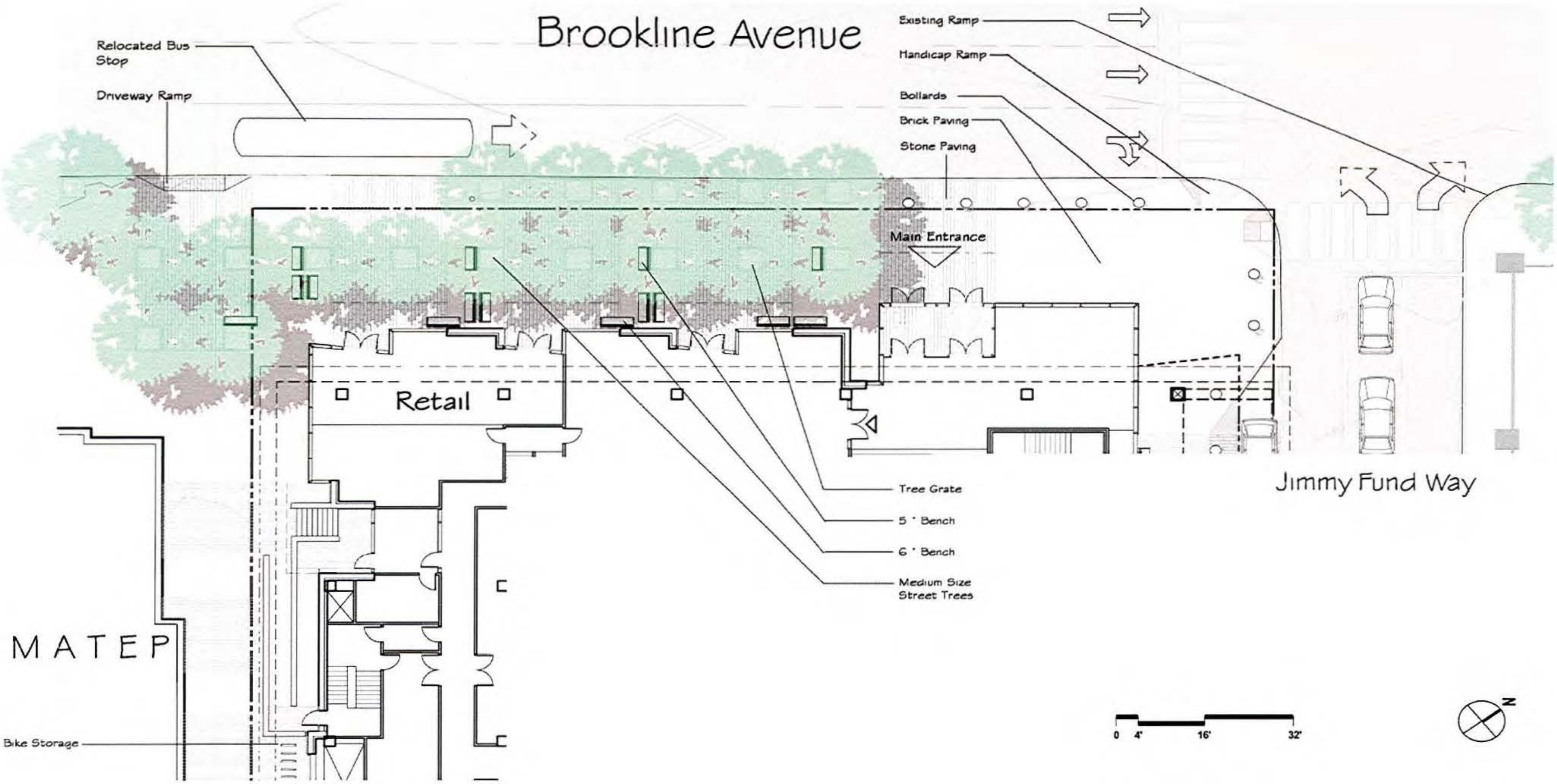
Perspective from Brookline Avenue

FIGURE 4-4



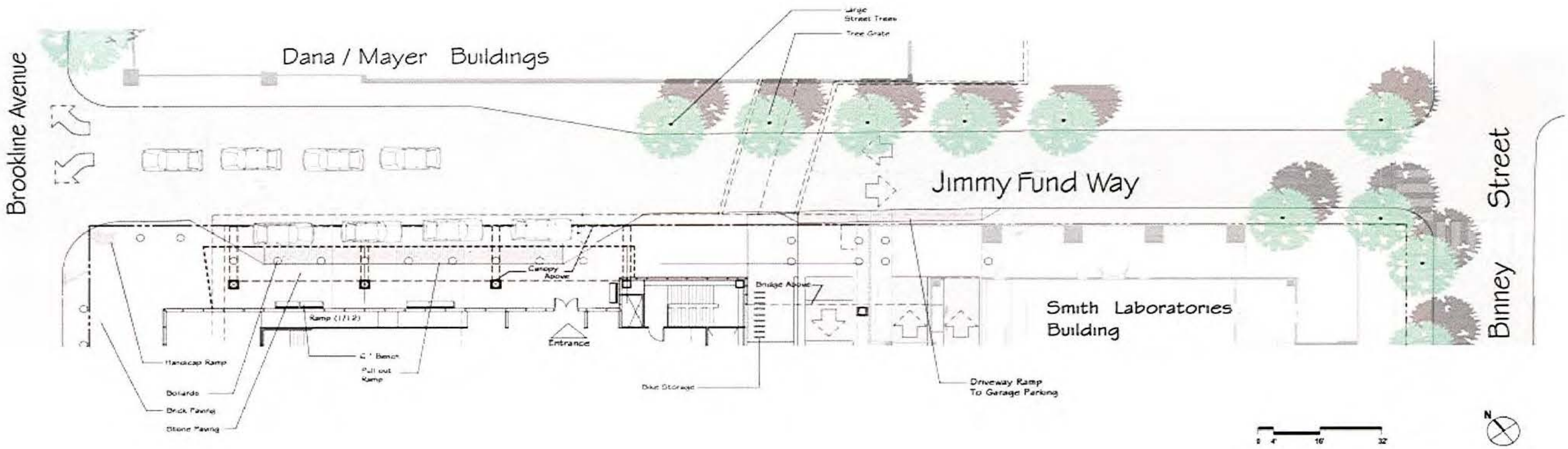
Site Plan

FIGURE 4-5



Brookline Avenue Site Improvements

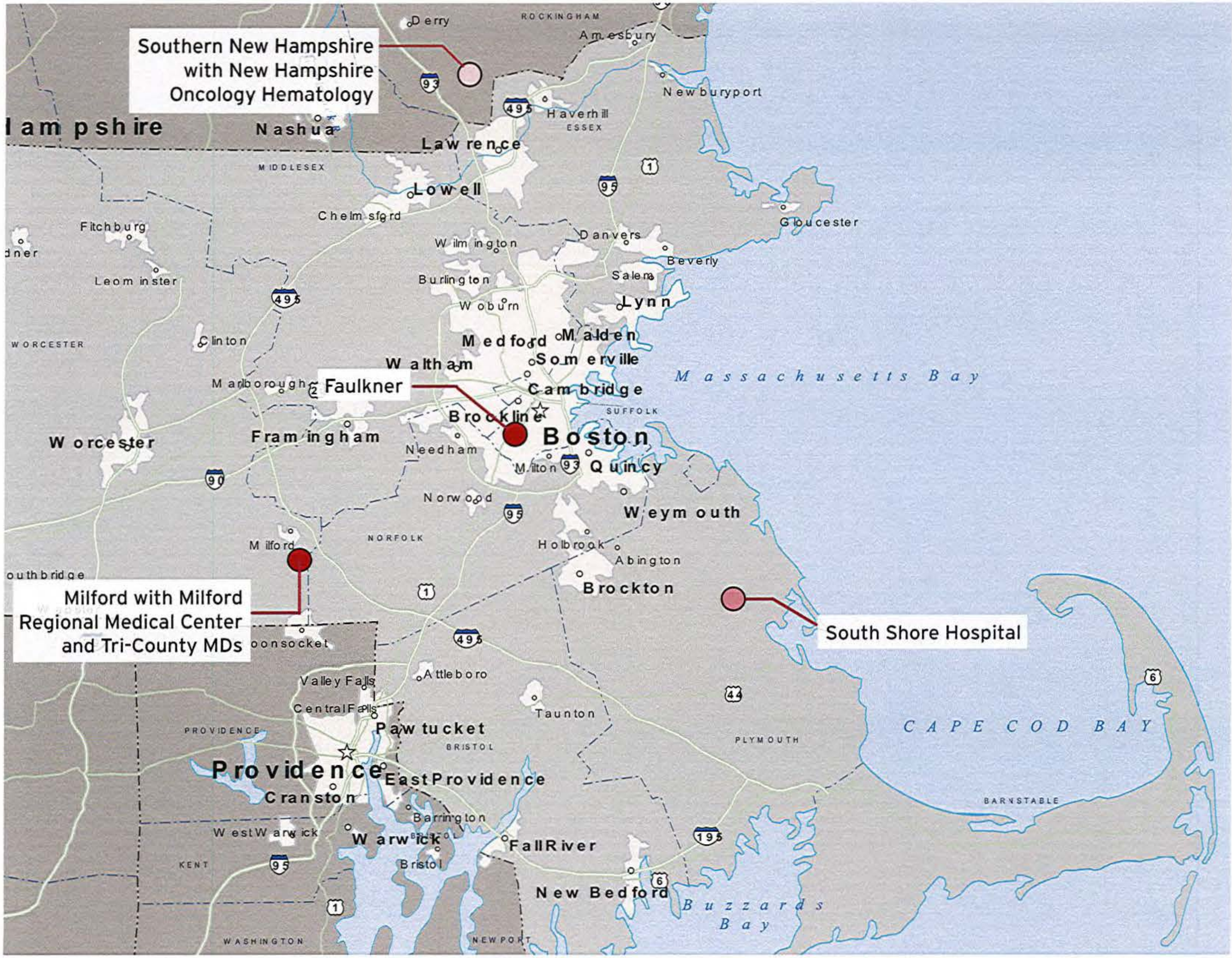
FIGURE 4-6



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Jimmy Fund Way Site Improvements

FIGURE 4-7



LEGEND

DFCI Satellite Facilities

- Focus in Year 1
- Focus in Year 2
- Potential Focus in Future Years

SOURCE: DFCI

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

DFCI Satellite Facilities

FIGURE 4-8

5

Transportation Access Plan Component

5.1 Introduction

This chapter presents an evaluation and summary of existing and future transportation infrastructure and operations of Dana-Farber Cancer Institute (DFCI). This transportation study has been developed in order to understand and mitigate the transportation impacts of projects that are proposed within the term of the DFCI Institutional Master Plan (IMP) and to develop appropriate transportation infrastructure improvements to the Longwood Medical and Academic Area (LMA) of Boston. This study also quantifies the anticipated transportation impacts of the proposed DFCI Center for Cancer Care project and serves as the transportation study for its Draft Project Impact Report/Environmental Impact Report (DPIR/DEIR), as required by Article 80B of the City of Boston Zoning Code and the Commonwealth of Massachusetts Environmental Policy Act (MEPA). This study specifically addresses the Scoping Determination that was issued by the Boston Redevelopment Authority (BRA) after its review of the Institutional Master Plan Notification Form/Project Notification Form (IMPNF/PNF) dated May 30, 2006 and the Secretary of Environmental Affairs in his Certificate for the Environmental Notification Form (ENF) dated June 9, 2006. This study also addresses the issues raised by the Boston Transportation Department (BTD) as part of its review of the IMPNF/PNF and as delineated in their comment letter dated May 15, 2006.

The Transportation Access Plan includes an analysis of the following:

- Vehicle traffic on study area roadways and intersections
- Parking conditions
- Loading and service activities
- Pedestrian and bicycle operations
- Helicopter activities
- Public transportation and private shuttle bus services

In addition, this chapter quantifies and assesses the transportation impacts that are expected at DFCI under future conditions, including the Center for Cancer Care project and other campus improvement projects that are proposed during the term of the IMP (as defined previously in Chapter 3).

The purposes of these analyses are to:

- Define and quantify existing transportation conditions in the project study area as defined by the BTD and MEPA
- Estimate the transportation impacts that will be generated under future conditions based on anticipated patient and employee employment growth, on-campus parking utilization, and with completion of the proposed DFCI IMP projects
- Develop a set of mitigation strategies and improvement measures which will help to lessen the transportation effects of future growth and to provide improvements to the transportation infrastructure in the LMA
- Demonstrate that these transportation mitigation efforts will exceed the requirements of the BRA Interim Guidelines and will serve as exceptional public benefits as they relate to transportation issues

The sections below provide an overview of DFCI's IMP projects and a summary of findings of the transportation analysis, including anticipated impacts, proposed mitigation, a discussion of the study methodology, and a description of the study area. Subsequent sections provide detailed discussions of existing and future conditions expected both with and without the proposed IMP projects. The final section of the chapter presents a detailed summary of transportation mitigation and improvement actions that DFCI is committed to implementing in connection with the project and within the term of their IMP.

5.1.1 Project Overview

DFCI currently contemplates two projects within the term of its IMP that will affect transportation in the LMA. Other projects identified in the IMP are not anticipated to affect the transportation infrastructure. The following projects are studied in this chapter:

- The Center for Cancer Care project includes construction of a single building project totaling approximately 257,500 zoning gross square feet (ZGSF) of space (as defined by the Boston Zoning Code) on a parcel of land along Jimmy fund Way in the LMA. Accounting for demolition planned at the site, the proposed project will create approximately 219,050 ZGSF of "net new" construction on the 450 Brookline Avenue site.
- Additionally, DFCI plans to renovate its existing Dana Building. These renovations will include the reconfiguration of an existing above-grade structured parking area and surface vehicular drop-off/pick-up area into approximately 71,000 SF of administrative/institutional space. The existing 213 parking spaces and vehicular drop-off area located within the existing Dana Building will be relocated within the new Center for Cancer Care facility.

The proposed Center for Cancer Care project will be located adjacent to the existing DFCI Smith Laboratories Building on Jimmy Fund Way. The new building is planned to accommodate much needed clinical and clinical space, but will also include some ground floor retail space, a campus dining area, and will serve as the campus' main entrance along Brookline Avenue. The building will provide public pedestrian access via entrances along both Brookline Avenue and Jimmy Fund Way. The building will also include provision of a new below-grade drop-off and valet parking area on level P1. The new building's below-grade parking area will be integrated into the existing Smith Building parking facility, creating one unified parking garage to support DFCI's core campus. All of DFCI's on-campus parking will be located within this garage upon completion of the project. The project will include construction of approximately 460 underground parking spaces. Of these parking spaces, 243 are replacement parking from the Dana Building and the existing surface parking lot located on the Center for Cancer Care site. The remaining 217 parking spaces are new on-site parking spaces. The amount of net new on-site parking equates to 0.75 parking spaces per 1,000 GSF of development, a ratio consistent with the Boston Transportation Department's (BTD) guidelines for construction of new on-site parking in support of development projects in the LMA.

The proposed DFCI IMP projects are presented in Table 5-1. A detailed discussion of the need for this project and the anticipated timing of its construction were presented previously in Chapter 3.

Table 5-1 DFCI IMP Projects

Project Actions	Building Size* (SF)	Parking
Demolish Brookline & Redstone Buildings	(-38,451)	(-30)
Construct Center for Cancer Care Project	257,500	460
Infill Dana Parking & Main Entrance Areas	71,000	(-213)
Total "Net New" Construction	290,049	217

Source: Dana-Farber Cancer Institute, Facilities and Planning.
** Zoning gross square footage.*

The following characterize future transportation conditions at the DFCI campus once the proposed IMP projects are completed:

- The existing Redstone Building, 454 Brookline Avenue Building, and adjacent 30-space surface parking lot on Jimmy Fund Way will be demolished to allow for new construction. These lost spaces will be relocated to the new below-grade parking facility within the Center for Cancer Care project.
- The Dana Building garage currently has 213 parking spaces. These spaces, along with the existing drop-off area for the building, will be taken out of service to allow for the design and implementation of approximately 71,000 ZGSF of infill space. These parking spaces will be relocated to the new parking garage at the Center for Cancer Care.
- The Smith Building garage has 255 parking spaces. Some existing spaces may need to be relocated or modified to accommodate access modifications within the expanded floor plate, but the gross number of available spaces is not expected to change as a result of the project.

- The Center for Cancer Care facility will include seven below-grade levels, which will accommodate up to 460 parking spaces, a dedicated patient and valet drop-off area, and some support and mechanical spaces.
- The Center for Cancer Care will be physically connected to the adjacent Smith Building on most levels.
- Loading and service activities for the proposed project will be handled from a modified Smith Building loading dock. The existing 3-bay dock will be expanded by 2 additional service bays to accommodate the additional amount of truck, delivery, and ambulance traffic that is expected with the proposed Center for Cancer Care building in place. The access for this loading and service area is via Binney Street. DFCI also plans to maintain some loading and service functions at its existing Dana loading facility on Binney Street.

Finally, DFCI also proposes the following small projects:

- Renovation of Smith Building floors 1-3,
- Minor interior modifications of Smith Building, and
- Renovation and reuse of vacated areas of the Dana Building.

A more detailed description of these projects is present in Chapter 3, Project Description and Alternatives.

5.1.2 Summary of Findings

The comprehensive transportation improvement and mitigation plan proposed by DFCI will provide an improved transportation infrastructure for patients, visitors, and employees traveling to the LMA. DFCI will proactively manage an underground drop-off and valet parking facility as a means to reduce traffic activity on area streets, particularly along Brookline Avenue. DFCI is also committed to reconstructing the intersection of Brookline Avenue/Jimmy Fund Way/Deaconess Road to allow for a safe and legal left-turn for motorists traveling westbound on Brookline Avenue toward the DFCI campus. DFCI will also set its new building back significantly to allow for the creation of wide pedestrian sidewalks along both Brookline Avenue and Jimmy Fund Way and to create an additional left-turn lane from Jimmy Fund Way onto Brookline Avenue. DFCI will investigate and repair existing traffic camera communications in the area and install a new pan-tilt-zoom traffic monitoring camera at the Brookline Avenue/Jimmy Fund Way intersection. The proposed parking complies with the LMA Interim Guidelines. Roadway improvements and enhanced valet parking operations management have been devised to help manage peak hour traffic flow adjacent to the site. Finally, DFCI will continue to expand its proactive transportation demand management measures (TDM) to its employees to encourage the use of transit and other alternative forms of transportation.

5.1.2.1 Parking Summary

DFCI currently controls approximately 1,454 total off-street parking spaces, with 340 parking spaces available for use by its patients and visitors, and 1,114 parking spaces available for staff and physicians. About 498 (34 percent) of these parking spaces are located on the DFCI campus and another 316 (22 percent) are nearby on sites adjacent to or near DFCI facilities. Approximately 640 parking spaces (44 percent) are located off-site in remote parking facilities. The majority of employees that park off-site either walk or use shuttle buses to travel between the DFCI campus and these remote parking facilities.

At the end of the term of the IMP, DFCI will have constructed 290,050 SF of net new space and 217 net new parking spaces, which complies with the LMA Interim Guidelines for construction of new on-site parking spaces (0.75 new parking spaces per 1,000 SF of space). New parking proposed within the IMP is intended to serve its patients and visitors only and to provide a sufficient on-campus patient parking supply that is conveniently located where core patient services are offered. No new parking is proposed to accommodate employees. When the proposed project is completed, it is expected that the overall parking supply on the DFCI campus will only increase by 217 parking spaces.

As shown below in Table 5-2, when the DFCI IMP projects are completed, DFCI's parking ratio within the LMA will decrease from to 0.94 to 0.89 spaces/ KSF.

Table 5-2 DFCI Parking Ratios

DFCI IMP Actions	DFCI Building Floor Area (SF)	DFCI-Controlled Parking Spaces in the LMA [1]	Parking Ratio (spaces/1,000 SF)
Existing Conditions	862,184	814	0.94
Net Change	290,050	217	0.75
Future Conditions	1,152,234	1,031	0.89

Source: Dana-Farber Cancer Institute Facilities and Management, and Parking/Security Departments.
Note: Parking ratios are based on both owned and leased building space and parking within the LMA.1/See Table 5-4 for a more detailed description of DFCI-controlled parking spaces in the LMA.

5.1.2.2 Traffic Impacts

The effects of the DFCI projects, including a detailed analysis of intersection level of service (LOS), were examined at twenty-one intersections specified by the BTD during the study area's morning and evening peak commuter hours for 2006 Existing Conditions. In addition, traffic analyses were also conducted for 2016, which consider background growth, growth attributable to other projects, and employee and patient growth expected by DFCI during the term of the IMP. In particular, roadway and intersection improvements that are proposed as part of the DFCI IMP projects will have a positive impact by providing more efficient traffic flow along Brookline Avenue and at its intersections with Jimmy Fund Way. The planned left-turn lane from Brookline Avenue to Jimmy Fund Way and associated signalization improvements will help manage traffic flow towards Binney Street and can be accommodated in a synchronized lead phase similar to what is provided at the nearby Brookline Avenue/Francis Street intersection. Further, the Jimmy Fund Way approach to Brookline Avenue will be widened to provide exclusive left- and right-turn lanes. This will help to manage queues at the intersection and allow for the heavier right-turn movement to dissipate more efficiently than its does under current conditions. Proposed transportation improvements are summarized in Table 5-3 and illustrated in Figures 5-1 and 5-2 at the end of this chapter. A detailed discussion of intersection levels of service and the traffic impacts is presented in Section 5.3, Evaluation of Long-Term Transportation Impacts.

5.1.2.3 Pedestrian Access

The effects of the DFCI IMP projects on pedestrians will be concentrated along Binney Street, Brookline Avenue, and Jimmy Fund Way. Existing and projected future pedestrian conditions for these locations (and all study area intersections) were analyzed in detail within this study. The planned pedestrian mitigation will help to significantly improve the LMA's pedestrian infrastructure through several proposed pedestrian-related improvements and connections on the campus, including new sidewalks along both sides of the entire length of Jimmy Fund Way and Binney Street adjacent to the Smith Building. On Brookline Avenue, the existing six-foot sidewalk will be replaced with a wider sidewalk that varies in width from 25 feet up to 35 feet. This section of sidewalk will also be landscaped. DFCI will also construct countdown pedestrian signals in connection with the reconstruction of the Brookline Avenue/Jimmy Fund Way/Deaconess Road/Joslin Place intersection.

5.1.2.4 Loading and Service

DFCI plans to modify its Smith Building loading dock to support the proposed Center for Cancer Care. The existing facility will be modified to include 2 additional service bays, resulting in a 5-bay dock that will service both the Smith Building and the new Center for Cancer Care building. DFCI also plans to maintain loading and service functions currently taking place at its existing Dana/Shields Warren loading facility on Binney Street. Finally, DFCI recently leased space at 27 Dry Dock Avenue in South Boston. This facility will house a new research laboratory as well as a significant off-site storage facility for DFCI. This will allow for the receiving of large orders off-site where they can then be broken down and shipped to the main LMA campus daily, utilizing "just in time" shipping techniques. This is an important and innovative commitment by DFCI as a means to reduce truck activity and queuing in the LMA, which can sometimes have a negative impact on traffic and pedestrian operations.

5.1.2.5 Transportation Demand Management

DFCI is committed to continuing to offer a wide array of TDM incentives as a means to reduce single occupant driving and increase use of alternative forms of transportation to access the workplace. DFCI actively supports efforts to reduce auto use for employees traveling to the hospital. Many actions to support this goal are actively employed by DFCI today, including the following:

- Employee Transportation Advisor.
- Membership in MASCO's CommuteWorks TMA.
- Full support of MASCO's other on-going transportation initiatives.
- 50 percent transit pass subsidy for employees.
- Carpool assistance and incentives.
- Bicycling/walking incentives and amenities.
- Location-priced parking (i.e.; offering competitive-rate parking on-campus and subsidized parking off-campus).
- Telecommuting and compressed workweeks, when feasible.
- Promotional efforts.

DFCI is committed to maintaining its employee transit subsidy of 50 percent in connection with the construction of the Center for Cancer Care project. DFCI will also 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.

5.1.2.6 Public Transportation

The DFCI IMP projects are projected to have only a modest incremental impact on transit operations in the area by 2016. The analysis assumed that future DFCI employees, patients, and visitors will have access to the many public transportation services offered by the MBTA, as well as the array of private shuttle and transportation demand management services that are offered in the LMA through MASCO. The analysis indicates that by 2016, some existing public transportation services will be operating at or above capacity during peak periods if services are not expanded to meet expected passenger demands.

Because there are so many public transportation options that provide service to and from the LMA, no single service appears to be unduly affected by anticipated increases in activities because of the DFCI IMP under future conditions. Consequently, DFCI transit trips are expected to affect the transit system only minimally under future conditions.

5.1.3 Transportation Mitigation and Improvement Actions

This section delineates the transportation improvements and mitigation plan developed by DFCI. The purpose of this transportation mitigation plan is to:

- Help alleviate transportation impacts generated by the DFCI IMP projects;
- Provide transportation infrastructure enhancements to the LMA, including improved pedestrian corridors, and public space amenities; and
- Exceed the requirements of the BRA's Interim Guidelines for the LMA relative to transportation improvements and mitigation.

DFCI 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, parking management strategies to limit the construction of new parking spaces to 0.75 parking spaces per 1,000 ZGSF of development guideline established by the LMA Interim Guidelines, implement an improved pick-up/drop-off and patient valet parking operations management plan, and carefully coordinate construction management actions related to the forthcoming IMP projects. DFCI believes that these transportation mitigation actions will lessen the impacts of their proposed development plans and, when complete, will help improve the LMA's existing transportation infrastructure.

This transportation mitigation plan includes several elements:

- Roadway and traffic operations improvements.
- Parking consolidation and management strategies.
- Transportation demand management enhancements.
- Sustainability.
- Pedestrian access and open space improvements.
- Construction management.
- Participation in and partial funding of several system-wide transportation improvement studies for the LMA.

Many of these mitigation elements will improve the LMA transportation infrastructure in addition to addressing potential impacts of the DFCI IMP projects. Table 5-3 lists each transportation mitigation element that is proposed by DFCI and provides a summary of the following:

- Description of the proposed action.
- Interim Guideline criterion that is met by that action.
- Summary of the purpose and benefit of that action.
- Implementation responsibility.

Additionally, Figures 5-1 and 5-2 illustrate the physical location of the various transportation improvements that are proposed.

Table 5-3: Proposed Dana-Farber Cancer Institute Transportation Mitigation and Improvement Plan

	Mitigation Element	Description	Purpose/Benefit	Implementation Timing
		Traffic Management Plan		
1	Patient Drop-off on Jimmy Fund Way	Provide an off-street drop-off along Jimmy Fund Way – which will be made available for first-time DFCI patients, chair cars, active taxis, and ambulances only.	Minimize street-side traffic conditions along JFW and Brookline Avenue	C of O Center for Cancer Care Project
2	Below-Grade Drop-off on P1.	Implement a drop-off on P1 of the new Center for Cancer Care.	Improve patient experience at DFCI. Provide simplified wayfinding to desired points in the DFCI campus.	C of O Center for Cancer Care Project
3	Loading and Service Improvements	Reconfigure the DFCI Smith Loading Dock to include two additional loading bays.	Improve off-street loading conditions, eliminate potential illegal loading along Brookline Avenue.	C of O Center for Cancer Care Project
4	Off-Site Materials Management Actions	Implement an off-site Materials Management Center at 27 Dry Dock Avenue in South Boston.	Allows for "just in time" delivery techniques, which will reduce truck trip frequency and dock utilization times.	Early 2007
		Local Street Network / System-wide Transportation Improvements		
5	Brookline Ave/Jimmy Fund Way/Deaconess Rd Signal Improvements	Modify the existing traffic signal operations to accommodate a protected left-turn movement from Brookline Avenue to Jimmy Fund Way. Modifications will include provision of a new traffic controller, mast arms, signal posts, pedestrian signals, crosswalks, and signage.	Will improve patient wayfinding and safety in the area.	C of O Center for Cancer Care Project
6	Brookline Ave/Jimmy Fund Way/Deaconess Rd Pedestrian Improvements	Modify corner radii at the intersection, install ADA-compliant accessible ramps, and include countdown pedestrian indications in the new signal design.	Improve pedestrian safety.	C of O Center for Cancer Care Project
7	Widen Jimmy Fund Way	Widen Jimmy Fund Way to include two approach lanes at its intersection with Brookline Avenue.	Will decrease traffic queues on JFW and provide an improved traffic flow along both JFW and Binney Street.	C of O Center for Cancer Care Project
8	Area Sidewalk Improvements	Reconstruct widened sidewalks along Brookline Avenue and Jimmy Fund Way adjacent to the project site.	Improve pedestrian access, safety, and urban design of the area.	C of O Center for Cancer Care Project
9	PTZ Camera Installation	Install an interconnected pan-tilt-zoom traffic monitoring camera at the intersection of Brookline Avenue/Jimmy Fund Way/Deaconess Road.	Improve traffic and incident management system for the City of Boston.	C of O Center for Cancer Care

Table 5-3 (Continued): Proposed Dana-Farber Cancer Institute Transportation Mitigation and Improvement Plan

	Mitigation Element	Description	Purpose/Benefit	Implementation Timing
	Urban Design			
10	Center for Cancer Care Pedestrian Plaza	Provide significant public space at the entrance to the Center for Cancer Care at the intersection of Brookline Avenue/Jimmy Fund Way.	Provide public space enhancement that complements open space at Joslin Park	C of O Center for Cancer Care
11	Jimmy Fund Way Urban Design Improvements	Provide street trees and other hardscape amenities along Jimmy Fund Way.	Provide public space enhancement to the DFCI campus.	In connection with future Dana Building Infill
	Parking Ratios			
12	Limit new on-site parking to be constructed as part of the IMP	DFCI IMP projects will include construction of 217 parking spaces for 290,050 SF of development.	Resultant parking ratio will be less than 0.75 spaces per 1,000 SF, complying with the LMA Interim Guidelines.	C of O Center for Cancer Care
13	Convert employee parking to patient parking	Convert existing employee parking spaces to patient parking spaces.	Maintain quality patient care/customer service. Reduce peak hour traffic volumes. Minimize need to construct new on-campus parking spaces.	As needed during the term of the IMP
14	Employee Parking Pricing	Evaluate and charge market rates for monthly employee parking.	Encourage shift employee mode share from auto to transit. Will help to curb parking demands.	Short-term
	Transportation Demand Management Plan			
15	Maintain proactive relationship in MASCO's CommuteWorks TMA	Maintain access to wide array of TDM programs and amenities that seek to encourage the use of transit as a regular means of commuting.	Encourage shift in employee mode share from auto to transit.	Ongoing
16	Maintain high percentage employee transit subsidy	Maintain employee/tenant transit subsidy at 50 percent.	Encourage shift in employee mode share from auto to transit.	Increased by DFCI November 2005
17	Zip Car Provision	Coordinate with ZipCar to add a parking space for this shared-car service at the Center for Cancer Care.	Encourage shift in employee mode share from auto to transit.	C of O Center for Cancer Care
18	Loading Dock Manager	Oversee loading operations.	Control delivery schedule to maintain dock efficiency and reduce truck queuing.	C of O Center for Cancer Care
Sustainability				
19	Allocate preferential parking spaces for hybrid vehicles	Allocate preferential parking spaces for hybrid and other alternatively-fueled vehicles.	Encourage the use of alternatively fueled vehicles.	C of O Center for Cancer Care
Construction Management				
20	Prepare Construction Management Plan	Prepare and submit a detailed Construction Management Plan (CMP) for the Center for Cancer Care project	Minimize construction impacts.	Completed

5.1.4 Methodology

The transportation analysis presented in this chapter conforms to the BTD "Transportation Access Plans Guidelines" (2001), and is responsive to the Scoping Determination issued by the BRA and the BTD. It is also responsive to MEPA's Certificate on the ENF, which has required the transportation study for the Draft EIR follow the BTD Scoping Determination. The study was conducted in two distinct stages. The first stage (Existing Conditions) involved a survey and compilation of existing transportation conditions within the study area (defined below) including:

- An inventory of the transportation infrastructure within the defined project study area;
- Transportation characteristics of the DFCI campus, including access, egress, parking for patients, visitors, employees, and physicians, loading activities, shuttle bus activities, and ambulance activities;
- Geometric and operational characteristics of study area roadways and intersections;
- Existing traffic control at study area intersections (i.e., traffic signalization, stop signs, one-way streets, etc.);
- Area off-street and on-street parking supply;
- Pedestrian activity on the DFCI campus, along study area roadways, and at study area intersections;
- Bicycle activity and accommodations;
- Public transportation options within the study area, including bus, trolley, commuter rail, and private shuttle bus options, existing peak hour demands, and existing capacity by specific transit service type; and
- LMA helicopter activities.

In the second stage of the study (Evaluation of Long-Term Transportation Impacts), future transportation conditions were projected within the study area. The future no-build condition includes an assessment of future transportation impacts related to projected DFCI patient and employment growth, as well as background growth on area roadways and transit services, planned transportation infrastructure improvements, and growth related to other proposed projects within the study area (without consideration of the DFCI IMP projects). The future build condition assesses the no-build condition plus the DFCI IMP projects and supporting transportation infrastructure constructed as proposed. Roadway, pedestrian, and transit capacity for morning and evening peak commuter periods were studied and are summarized for the following conditions:

- 2006 Existing Condition
- 2016 No-Build Condition
- 2016 Build Condition

Specific travel demand forecasts for the DFCI campus and the DFCI IMP projects were assessed along with future transportation demands due to background traffic growth and to traffic and pedestrian growth from other planned or approved LMA projects. The year 2016 was selected as the horizon year for the purposes of quantifying and assessing future transportation impacts generated by the project by the end of DFCI's 10-year IMP term. This horizon year also complies with MEPA's request to analyze a study year at least five years after the initial opening of the Center for Cancer Care project.

This section in addition, quantifies the proposed mitigation and improvement actions (presented previously) to address project-related pedestrian, parking, traffic, and public transportation impacts that have been identified. The proposed improvement actions serve as the basis for the forthcoming preparation of a Transportation Access Plan Agreement (TAPA) to be developed and executed by the hospital and the BTD as well as Section 61 Findings as required by MEPA.

5.1.5 Study Area

The existing DFCI campus is located on Brookline Avenue in the LMA. DFCI is located south of Brookline Avenue, west of Longwood Avenue and east of Francis Street. Binney Street and Shattuck Street intersect in the middle of the DFCI campus.

The project study area includes 21 intersections that have been specifically defined within the BTD Scoping Determination and the MEPA Certificate for the project. These intersections, illustrated in Figure 5-3, are listed below.

1. Brookline Avenue/Longwood Avenue
2. Brookline Avenue/Joslin Road
3. Brookline Avenue/Deaconess Road/Jimmy Fund Way
4. Brookline Avenue/Francis Street
5. Brookline Avenue/Fenwood Road
6. Brookline Avenue/Riverway
7. Binney Street/Longwood Avenue
8. Binney Street/Jimmy Fund Way/Children's Way
9. Binney Street/Francis Street
10. Binney Street/Fenwood Road
11. Longwood Avenue/Blackfan Circle/Children's Hospital
12. Longwood Avenue/Avenue Louis Pasteur
13. Huntington Avenue/Francis Street/Calumet Street/Tremont Street (Brigham Circle)
14. Longwood Avenue/Huntington Avenue
15. Longwood Avenue/Pilgrim Road
16. Longwood Avenue/Riverway
17. Pilgrim Road/Deaconess Road/Joslin Place
18. Brookline Avenue/Fenway
19. Brookline Avenue/Park Drive/Boylston Street
20. Park Drive/Riverway/Fenway
21. Beacon Street/Park Drive (Audubon Circle)

These study area intersections were evaluated in detail using standard traffic engineering analysis techniques following BTD guidelines to identify incremental impacts of future traffic growth and site-generated traffic.

5.2 Existing Conditions

Existing transportation conditions in the study area, including roadway geometry, traffic control at study area intersections, peak hour traffic and pedestrian flows, transit availability, parking supply and utilization, and loading and service activities are described within this section of the Transportation Access Plan Component. The initial parts of this section specifically describe existing access characteristics of the DFCI campus. Subsequent sections describe and quantify transportation characteristics of the entire study area as required the BRA within their Scoping Determination for the IMP/DPIR and by MEPA in their Certificate requiring the preparation of a Draft EIR.

5.2.1 Summary of Existing DFCI Transportation Infrastructure and Services

DFCI is one of the world's premier cancer treatment centers. The mission of DFCI is to provide expert, compassionate care to children and adults with cancer while advancing the understanding, diagnosis, treatment, cure, and prevention of cancer and related diseases. DFCI employs approximately 3,557 people at its LMA campus of which approximately 32 percent are Boston residents.

DFCI actively manages a highly developed transportation infrastructure to provide safe and efficient access to and from its LMA campus for visiting patients, access by ambulances, its employees, and for service and delivery operations. The existing DFCI campus transportation infrastructure includes:

- A covered drop-off/pick-up area,
- Available on-campus self parking for patients and visitors,
- A combination of on-campus and off-campus and remote parking for DFCI 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 and patients,
- Ambulance activity at the dedicated drop-off area, and
- Consolidated loading and service operations.

Figure 5-4 serves as a transportation map for DFCI, identifying the specific locations of these various services on its LMA campus. Each of these components of the DFCI transportation infrastructure is described in detail in the following sections.

5.2.1.1 DFCI Parking System

DFCI provides a range of options to patients and visitors driving to its main LMA campus, including a pick-up/drop-off area and self-parking. The primary pick-up/drop-off area is located at the Dana Building on Binney Street – which is DFCI's current main patient entrance. Patients may also choose to self-park at the Dana Building garage or the Smith Building garage.

DFCI currently has 498 on-campus spaces and controls/leases an additional 316 parking spaces nearby 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 the LMA, approximately 340 spaces are used by patients while the remaining 474 are used by employees.

In addition to spaces within the LMA, DFCI leases an additional 640 spaces for employees in remote parking facilities outside of the LMA. Most of the off-site parking is utilized by employees who either walk or use shuttle buses to travel between the campus and the remote parking facilities. Table 5-4 provides a summary of parking locations and user groups for the current DFCI parking supply.

Employee Parking Management

Of DFCI's 1,114 employee parking spaces, 474 spaces (43 percent) are located in the LMA and 640 spaces (57 percent) are at remote locations. Only 158 employee spaces are provided on the DFCI campus itself. Shuttle buses operated by MASCO or Partners connect the remote parking locations to the main DFCI campus.

All on-site and nearby employee parking spaces are priced competitively with other area facilities in the LMA at $86.09 per week. Remote employee parking spaces cost $27.69 per week. DFCI charges competitive rates to its employees for the use of on-site parking to reduce the number of employee vehicles entering the LMA each day and make more nearby spaces available to patients and visitors.

Table 5-4 Existing Parking Space Inventory (February 2006)

Parking Facility	Current Number of Parking Spaces			Owned/ Leased
LMA Parking	Total	Patient/ Visitor	Employee	
Smith Building Garage	255	106	149	Owned
Dana Building Garage	213	208	5	Owned
454 Brookline Avenue Lot	30	26	4	Owned
ServiCenter Garage	60	0	60	Leased
375 Longwood Avenue Garage	250	0	250	Leased
Harvard Institutes of Medicine	6	0	6	Leased
Total LMA Parking Spaces	**814**	**340**	**474**	
Off-Campus Parking	Total	Patient/ Visitor	Employee	
10 Brookline Place	118	0	118	Leased
1309 Beacon Street	34	0	34	Leased
Burlington Avenue/ Overland Street	45	0	45	Leased
Longwood Towers	95	0	95	Leased
Chestnut Hill	24	0	24	Leased
Crosstown Garage	150	0	150	Leased
Kenmore Lot	64	0	64	Leased
Lansdowne Garage	35	0	35	Leased
Ipswich Street	23	0	23	Leased
Wentworth Lot	52	0	52	Leased
Total Off-Campus Parking Spaces	**640**	**0**	**640**	
Grand Total DFCI Parking Spaces	**1,454**	**340**	**1,114**	

Source: Dana-Farber Cancer Institute, Parking and Security.

Patient/Visitor Parking Management

Patient and visitor parking is located at the Dana Building garage at 44 Binney Street and in the Smith Building garage. DFCI offers a special discounted parking rate for patients: a maximum of $8. This parking rate was recently increased from $6 in October 2006. Patients must show their garage ticket and patient I.D. card at the cashier booth when leaving to receive the discounted rate.

The Dana Building Garage is open 24 hours a day, 7 days a week. The Smith garage is open 6:00 AM – 10:00 PM, Monday through Friday only. A security officer and a garage attendant are stationed at the Dana entrance for patients requiring wheelchairs, assistance getting into the building, or assisted (valet) parking. Attendants are available weekdays during regular clinic hours.

Existing DFCI Peak Parking Accumulation

Table 5-5 shows average weekday peak parking accumulation for the entire DFCI on-campus parking system. The parking facilities are currently at capacity between mid-morning and mid-afternoon on weekdays.

Table 5-5 Existing DFCI On-campus Parking Accumulation

Location	Parking	Demand			Surplus/
	Supply	Employee	Transient	Total	(Deficit)
Smith Building Garage	255	128	153	281	(-26)
Dana Building Garage	213	6	192	198	15
454 Brookline Avenue Lot	30	0	37	37	(-7)
DFCI Total	498	134	382	516	(-18)

Source: DFCI Parking and Security.

The table shows that under existing conditions, the DFCI's parking system is just under the required capacity to meet typical weekday parking demands under current conditions. To accommodate this unmet demand, vehicles are parked tandem in the Dana Building garage and controlled by valet.

5.2.1.2 DFCI Employee Transportation Demand Management Program

DFCI actively supports efforts to reduce auto use for employees traveling to the LMA. Many actions to support this goal are actively employed by DFCI, including the following:

- **Employee transportation advisor.** DFCI employs an Employee Transportation Advisor (ETA) who provides information and implements Transportation Demand Management (TDM) measures at DFCI, assisted by MASCO's CommuteWorks TMA.
- **Employee transit pass subsidy.** Approximately 1,375 DFCI employees (approximately 40 percent) regularly purchase monthly MBTA passes and choose public transportation as their primary mode to work. DFCI offers a transit pass subsidy of 50 percent, up to the legal limit of $110 per employee per month. The cost of passes is deducted on a pre-tax basis resulting in additional savings to employees.

- **Carpooling assistance.** Ridematching services are available to employees through MASCO's CommuteWorks TMA. DFCI estimates that approximately 41 of their employees are registered with CommuteWorks. Additional employees may have informal/unregistered carpools.
- **Location-priced parking.** DFCI employs a parking rate structure to discourage on-campus parking. As of October 2006, off-campus parkers pay $27.69 per week while on-campus parkers pay $83.09 per week.
- **Shuttle bus services.** Both DFCI and MASCO operate shuttle services in the LMA. DFCI contracts shuttle services through Partners HealthCare for shuttling people between the main campus, the North Campus at Overland, the South Campus at 10 Brookline Place, 1309 Beacon Street, and Harbor Campus at 27 Drydock Avenue. DFCI jointly operates a shuttle to North Station with Children's Hospital Boston and Beth Israel Deaconess Medical Center. MASCO runs nine bus routes that provide service within one half mile of the DFCI campus.
- **Bicycling incentives and amenities.** DFCI participates in CommuteWorks' Commute Fit Program that provides rewards to employees who bicycle, walk, or rollerblade to work, based on the miles they log. On average, 175 employees bike to work. DFCI provides sheltered bike racks on campus. 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.
- **Flexible work hours.** DFCI provides for flexible work hours, compressed workweek and telecommuting programs, etc. for positions when feasible.
- **Information dissemination.** DFCI promotes all forms of alternative transportation through a variety of employee newsletters, information kiosks, websites, e-mail, and special events.
- **Active CommuteWorks member.** DFCI has been an active member of the CommuteWorks Transportation Management Association (TMA) since its 1989 founding. CommuteWorks, operated by MASCO, offers an array of ongoing programs and periodically offers special limited-time incentive programs for employees and students of member institutions to try new modes. DFCI's role includes implementing and monitoring CommuteWorks programs; posting and distributing announcements; holding promotional events for employees to encourage alternative modes of transportation; and providing transit schedules and other information to facilitate alternative transportation.

DFCI 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.

5.2.1.3 DFCI Shuttle Bus System

Dana-Farber Cancer Institute operates four distinct shuttle bus routes that connect its main LMA campus to other satellite campuses outside the LMA, including the following:

- **The Dana-Farber's South Route** operates between the DFCI's main campus and the South Campus at 10 Brookline Place. The shuttle is used by employees traveling between the campuses, and for courier services. The shuttle runs every 30 minutes from 7:10AM to 6:40PM on weekdays only. There are no other stops on this route.

- **The Dana-Farber's North Route** operates between the DFCI's main campus and the North Campus administrative/research offices at 21/27 Burlington Avenue. The shuttle is used by employees traveling between the campuses, and for courier services. The shuttle runs every 30 minutes from 7:05AM to 6:40PM on weekdays only. There are no other stops on this route.

- **1309 Beacon Street Shuttle** operates between DFCI's and its facilities at 1309 Beacon Street.

- **DFCI's Harbor Campus Shuttle** runs 2 morning and 2 afternoon shuttles between its main campus and 27 Dry Dock Avenue.

5.2.1.4 DFCI Ambulance Operations

Ambulances arriving at DFCI arrive at the Dana Building via Binney Street. Because DFCI does not provide emergency care services, no ambulances arrive under siren. DFCI is served by over a half dozen ambulance services, most of which provide non-emergency patient transport. Non-emergency trips may be made to or from other cities, towns and states and tend to be synchronized with clinical treatment schedules.

5.2.1.5 DFCI Loading and Service Operations

Loading and Service activities take place at five locations on the DFCI campus:

- Smith Building loading dock on Binney Street.
- Dana Building ambulance bay/loading area on Binney Street.
- Dana Building loading dock on Binney Street.
- Jimmy Fund Building loading area on Shattuck Street.
- Redstone Building loading area on Brookline Avenue.

Loading activities were observed on the DFCI campus Monday thru Wednesday between 5:30 AM and 3:00 PM in June 2005. Observations included monitoring all deliveries including vendor, truck size, time of delivery, and duration of the delivery. Delivery vehicle queuing on Binney Street was also monitored. The highest delivery activity occurred on Tuesday, June 21, 2005. Peak-day results are shown in Table 5-6.

Table 5-6 DFCI Loading and Service Operations (June 2005)

Time of Day	Smith Building	Dana Building Ambulance	Dana Building Loading Dock	Jimmy Fund Building	Redstone Building	Total
5:00-6:00 AM	1	0	2	0	0	3
6:00-7:00 AM	2	0	1	0	1	4
7:00-8:00 AM	5	2	3	1	0	11
8:00-9:00 AM	2	2	4	0	0	8
9:00-10:00 AM	3	1	6	1	0	11
10:00-11:00 AM	3	0	6	1	0	10
11:00-12:00 PM	7	2	6	0	0	15
12:00-1:00 PM	3	0	1	0	0	4
1:00-2:00 PM	2	2	1	0	0	5
2:00-3:00 PM	1	0	0	0	0	1
Total	29	9	30	3	1	72

As shown in Table 5-6, DFCI receives over 70 deliveries daily. The majority of loading activity is at the Smith Building and the Dana Building between the hours of 7:00 AM and 12:00 PM. Deliveries decline considerably after noon. Approximately 56 percent are box type trucks, 37 percent are smaller vehicles such as delivery vans, and only seven percent of the trucks are tractor-trailer type trucks.

DFCI truck queuing occasionally occurred with one or two vehicles parked along Binney Street. More often than not, this appeared to be the case because the delivery duration was short, and although discouraged by DFCI, it was more convenient for the driver rather than because the loading docks were being fully utilized at the time. However, general truck queuing (when all LMA institutions are considered together) is a continuing issue along Binney Street. In addition to DFCI's loading docks other area institutions and the Longwood Galleria all handle a substantial amount of truck deliveries at their own delivery facilities along or near Binney Street. As many as seven parked trucks were observed on Binney Street at the same time during the observations. This truck queuing has noticeable impacts to traffic flow, pedestrian and bicycle activities, and the movement of goods between the various institutions along this corridor.

The Receiving Department at DFCI accepts all outside deliveries brought to the DFCI campus. Generally the Dana dock is staffed by four or five people. The Smith Building dock has one employee who manages all deliveries for the Smith Building. The other buildings are not staffed by the Receiving Department.

Trash and recyclables are collected at intermediate storage locations on each floor at each DFCI building. Consolidation of the waste is then made by custodial services that then transport the waste to either the Dana or Smith dock dumpsters.

5.2.1.6 DFCI Bicycle Accommodations

DFCI provides 16 bicycle racks on campus with a capacity for 192 bicycles. Bicycle racks are located in a securely caged area between the 454 Brookline Avenue parking lot and the Smith Laboratory Building. 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.

Approximately 175 DFCI employees (5 percent) bicycle to work during the spring - fall months. Of these, 55 employees continue to bicycle to work during the winter. For those commuters who bicycle to work, DFCI provides rewards through the Commute Fit program as commuters build up their mileage. DFCI employees also participate in the CommuteWorks' BikeWeek Commuter Challenge.

5.2.2 Study Area Intersections

The study area, previously illustrated in Figure 5-3, includes 21 intersections in the study area which provides a basis for determining to what extent, if any, project traffic is likely to affect the wider transportation network. These intersections are described below, including general physical characteristics, geometric conditions, pedestrian facilities and traffic control measures:

1. **Brookline Avenue/Longwood Avenue**
   The intersection of Longwood Avenue and Brookline Avenue is a four-legged signalized intersection with an exclusive pedestrian phase. The Longwood Avenue northbound approach accommodates an exclusive left-turn lane, a through lane, and an exclusive right-turn lane. The Longwood Avenue southbound approach provides an exclusive left-turn lane, and a shared through/right-turn lane. The Brookline Avenue eastbound approach provides an exclusive left-turn lane, a through lane and a shared through/right-turn lane. There is no on-street parking or loading permitted along any of the approaches, however, loading and delivery vehicles occasionally stop along both sides of Brookline Avenue south of Longwood Avenue. Sidewalks and crosswalks are provided at all four intersection approaches.

2. **Brookline Avenue/Deaconess Road/Jimmy Fund Way**
   The intersection of Brookline Avenue, Deaconess Road and Jimmy Fund Way is a four-legged intersection that operates under three-phase traffic signal control, including an exclusive pedestrian phase when the push-button is activated. The Brookline Avenue east and westbound approach provides two general purpose travel lanes with turns prohibited onto Deaconess Road due to one-way southbound operations. Jimmy Fund Way

and Deaconess Road both operate with one general approach lane. An MBTA bus stop is located at the eastbound approach on Brookline Avenue serving bus routes 60 and 65. An additional MBTA bus stop is located at the Brookline Avenue westbound approach which also serves bus routes 60 and 65, and various LMA shuttles. Metered parking is provided along the north side of Brookline Avenue west of Deaconess Road. Crosswalks are provided along all intersection approaches.

3. **Brookline Avenue/Joslin Place**

The three-way intersection of Brookline Avenue and Joslin Place is approximately 50 feet away from the Brookline Avenue/Deaconess Road/Jimmy Fund Way intersection. The Brookline Avenue east and westbound approach provides two general purpose travel lanes. Joslin Place provides one-way northbound access and forms a pair with Deaconess Road. A left-turn lane to access Joslin Place is provided on Brookline Avenue in the eastbound direction between Deaconess Road and Joslin Place. No parking is provided on Brookline Avenue at the intersection. A crosswalk is provided across Joslin Place.

4. **Brookline Avenue/Francis Street**

The intersection of Francis Street and Brookline Avenue is a four-legged intersection that operates under four-phase traffic signal control, including a westbound lead phase and an exclusive pedestrian phase. The Francis Street northbound approach provides a shared left-turn/through lane and a shared through/right-turn lane. The Francis Street southbound approach provides a single general purpose travel lane. The Brookline Avenue eastbound approach provides a shared left-turn/through lane and a shared through/right-turn lane. The Brookline Avenue westbound approach provides an exclusive left-turn lane, an exclusive through lane, and a shared through/right-turn lane. Peak hour restricted parking is permitted along the south side of Brookline Avenue west of the intersection. MBTA bus stops for routes 60 and 65 are located on Brookline Avenue on both the eastbound and westbound departures from the intersection. The traffic signal's actuated pedestrian phase provides for exclusive pedestrian movement at the intersection. Sidewalks and crosswalks are provided at all four intersection approaches.

5. **Brookline Avenue/Fenwood Road**

The intersection of Brookline Avenue and Fenwood Road northbound is a three-legged unsignalized intersection. Brookline Avenue is physically separated from the intersection by a concrete median, thus prohibiting left-turns onto and from Fenwood Road. The Fenwood Road northbound approach provides a single lane exclusively for right turns. The Brookline Avenue eastbound approach provides an exclusive through lane and a shared through/right-turn lane. Sidewalks are provided along all intersection approaches and a crosswalk is provided across Fenwood Road.

6. **Brookline Avenue/Riverway**

The intersection of Brookline Avenue and the Riverway is a four-legged intersection that operates under four-phase traffic signal control, including a westbound lead phase and an exclusive pedestrian phase. The Riverway provides two lanes on each approach, one for shared left-turn/through and one for shared through/right-turn movement southbound and exclusive right-turn movement northbound. Since the northbound exclusive right-turn lane is signed before the intersection, and there are no pavement markings, this exclusive right-turn lane is sometimes used as a shared through/right-turn lane. Brookline Avenue provides three lanes on each approach, one exclusive left-turn lane, one exclusive through lane, and one shared through/right-turn lane. There is no on-street parking permitted along any of the approaches. Sidewalks are provided along both sides of Brookline Avenue and along the east side of the Riverway. Unpaved paths follow the Riverway on its west side. Crosswalks are provided across all four intersection approaches.

7. **Binney Street/Longwood Avenue**

The intersection of Longwood Avenue and Binney Street is a four-legged, signalized intersection that operates under three-phase traffic signal control, including an exclusive pedestrian phase. The Longwood Avenue northbound and southbound approaches provide two general-purpose travel lanes. The Binney Street eastbound approach has a single general-purpose lane while the westbound approach provides a shared left-turn/through lane and exclusive right-turn lane. Sidewalks and crosswalks are provided at all four intersection approaches. On-street parking is not permitted at any of the approaches; however, there is an MBTA bus stop located at the northbound approach in front of 333 Longwood Avenue which services bus routes 8, 47, CT2, CT3, and 10.

8. **Binney Street/ Jimmy Fund Way/Children's Way**

The intersection of Binney Street and Jimmy Fund Way is a four-legged, unsignalized intersection with stop-sign control on all four approaches. Binney Street provides a general-purpose travel lane on the east and west approaches. Traveling northbound, the Children's Way provides one general-purpose travel lane. The southbound Jimmy Fund Way also provides one general-purpose travel lane. Sidewalks and crosswalks are provided along all intersection approaches.

9. **Binney Street/Francis Street**

The intersection of Binney Street and Francis Street is a four-legged, unsignalized intersection which is currently affected by adjacent construction at 70 Francis Street. The construction site is located southwest of the intersection and has caused the closure of the eastbound approach. Current conditions provide stop-control on the Binney Street westbound approach. Binney Street provides a general-purpose travel lane in the westbound direction. Francis Street provides a general-purpose travel lane in either direction. Sidewalks are provided along all intersection approaches except for adjacent to the construction site along Binney Street and Francis Street. Crosswalks are only provided on Francis Street north of the intersection and on Binney Street east of the intersection. No parking is provided near the intersection.

10. **Binney Street/Fenwood Road**

The intersection of Binney Street and Fenwood Road is a three-legged, unsignalized intersection with stop-sign control on the Binney Street westbound approach. Due to construction located southeast of the intersection at 70 Francis Street, the Fenwood Road northbound approach is closed making the street one-way southbound south of the intersection. In addition, the Binney Street departure is closed in the eastbound direction due to construction work. The Binney Street westbound approach provides a shared right-turn/left-turn lane. The southbound Fenwood Road approach provides a through lane. Sidewalks are provided along all intersection approaches except along the construction site on Binney Street and Fenwood Road. Crosswalks are provided across Fenwood Road north of the intersection and across the Binney Street approach. Parking is prohibited at all of the approaches and restricted to permitted construction vehicles only at the Fenwood Road southbound approach.

11. **Longwood Avenue/Blackfan Circle/Children's Hospital Boston Entrance**

This four-legged intersection operates under a three-phase traffic signal control, including an exclusive pedestrian phase. Longwood Avenue provides two general purpose travel lanes southbound and a single travel lane northbound. Blackfan Circle eastbound (which is the driveway for CHB) provides a single general purpose lane. Traveling westbound, Blackfan Circle provides an exclusive left turn lane and a shared through/right-turn lane. Sidewalks and crosswalks are provided along all four intersection approaches. There is a bus stop on the east side of Longwood Avenue south of the intersection which provides service to bus routes CT2, 47, 8, and 19.

12. **Longwood Avenue/Avenue Louis Pasteur**

The intersection of Longwood Avenue and Avenue Louis Pasteur is a three legged, unsignalized intersection with stop-sign control on the Avenue Louis Pasteur approach. Longwood Avenue southbound provides a through and a shared left-turn/through lane. Traveling northbound, Longwood Avenue provides one shared through/right-turn lane. The Avenue Louis Pasteur approach (westbound) provides exclusive left and right turn lanes on the north side of the existing traffic island (known as Oscar Tugo Circle). Sidewalks and crosswalks are provided along all three intersection approaches. Parking is not provided near this intersection. An MBTA bus stop is located at the Avenue Louis Pasteur approach serving bus routes 8, 19, 47, and the CT2 and various shuttle services.

13. **Francis Street/Huntington Avenue/Calumet Street/Tremont Street (Brigham Circle)**

The intersection of Huntington Avenue and Francis Street, commonly known as Brigham Circle, is a five-legged intersection that operates under four-phase traffic signal control, which includes a lead phase for Tremont Street northbound left-turn and an exclusive pedestrian phase. The Huntington Avenue eastbound approach provides two general-purpose travel lanes while the westbound approach provides an exclusive left-turn lane, a through lane and a shared through/right-turn lane. The MBTA's Green Line (E Line) also operates within the median of Huntington Avenue. The Tremont Street northbound provides one general-purpose lane while the Francis Street southbound approach provides two general-purpose travel lanes. Calumet Street approaches the intersection with a channelized right-turn only lane to Tremont Street. A bus stop is located on both sides of Huntington Avenue to the east of the intersection which provides service to bus route 39 and on both sides of the Tremont Street which provides service to bus route 66. Parallel parking is provided along both sides of Huntington Avenue west of the intersection, the west side of Francis Street, the east side of Tremont Street and the northwest side of Calumet Street. Sidewalks and crosswalks are provided at all intersection approaches.

14. **Longwood Avenue/Huntington Avenue**

The intersection of Longwood Avenue and Huntington Avenue is a four-legged intersection that operates under three-phase traffic signal control, which includes a lead phase for Huntington Avenue east and westbound left-turns. The Huntington Avenue eastbound and westbound approaches provide an exclusive left-turn lane, a through lane, and a shared through/right-turn lane. The MBTA's Green Line (E Line) also operates within the median of Huntington Avenue. Longwood Avenue provides one general purpose lane northbound. Southbound, it provides two general-purpose travel lanes. Unregulated parking is provided on the east side of the Longwood Avenue northbound approach. A bus stop is located on the westbound approach of Huntington Avenue, just east of Longwood Avenue which services MBTA bus routes 39 and CT2. Sidewalks and crosswalks are provided along all four intersection approaches.

15. **Longwood Avenue/Pilgrim Road**

The intersection of Longwood Avenue and Pilgrim Road includes the entrance to the MASCO Garage, creating a four-legged unsignalized intersection. Pilgrim Road is a one-way westbound departure from the intersection. The MASCO driveway carries two-way traffic. Longwood Avenue provides an exclusive left-turn lane and a shared through/right-turn lane in each direction. Sidewalks and crosswalks are provided along all intersection approaches.

16. **Longwood Avenue/Riverway**

The intersection of Longwood Avenue and the Riverway is a four-legged intersection that operates under three-phase traffic signal control. In addition to phases for all Riverway traffic and for all Longwood Avenue traffic, a phase allows for protected left turns from Riverway eastbound and right turns from Longwood Avenue southbound. Pedestrian movements across Longwood Avenue are concurrent with the Riverway traffic phase. Pedestrian movements across the Riverway are concurrent with the eastbound Riverway protected left turn phase and are made via a diagonal crosswalk. The Longwood Avenue northbound approach provides an exclusive left-turn lane and a shared through/right-turn lane. The Longwood Avenue southbound approach provides a shared left-turn/through lane and an exclusive right-turn lane. The Riverway eastbound approach provides an exclusive left-turn lane, a through lane, and a shared through/right-turn lane. The Riverway westbound approach provides two through lanes (left turns from this approach are prohibited) and an exclusive right-turn lane. There is no on-street parking permitted along any of the intersection approaches. Sidewalks are provided along all intersection approaches except along the north side of the Riverway. Crosswalks run across the north, east, south legs of the intersection. A fourth crosswalk runs diagonally from the northeast corner to the southwest corner of the intersection.

17. **Pilgrim Road/Deaconess Road/Joslin Place**

Pilgrim Road intersects Deaconess Road in a three-legged unsignalized intersection. Pilgrim Road intersects Joslin Place in an adjacent three-legged unsignalized intersection. As a one-way pair, Deaconess Road and Joslin Place are considered a single two-way roadway divided by a wide median for traffic analysis purposes. Joslin Place approaches Pilgrim Road as a one-way northbound roadway with stop-control in the northbound direction. Deaconess Road departs Pilgrim Road as a one-way southbound roadway. East of Joslin Place, Pilgrim Road is two-way, providing a single general-purpose travel lane in each direction. West of Joslin Place, including its intersection with Deaconess Road, Pilgrim Road is one-way westbound and provides a single general-purpose travel lane. Short-term parking is provided along the east sides of both Joslin Place and Deaconess Road. There is no parking along Pilgrim Road at this intersection. A pedestrian path runs through the narrow park that divides Joslin Place from Deaconess Way. Sidewalks and crosswalks are provided at all intersection approaches.

18. **Brookline Avenue/Fenway**

The intersection of Brookline Avenue/Fenway/Riverway is a five-legged intersection. The intersection operates with a three-phase traffic signal control, coordinated with the adjacent intersection of Brookline Avenue, Park Drive and Boylston Street. The signal phasing includes a concurrent pedestrian movement and an exclusive pedestrian phase that is push-button activated. Brookline Avenue approaches from the east with two exclusive through lanes. The eastbound approach contains two exclusive through lanes and a shared through/right-turn lane. These expand to four lanes on the east side of the intersection, to provide queue storage for the adjacent intersection at Park Drive and Boylston Street. A bus stop is located on both sides of Brookline Avenue west of the intersection which provides service to bus routes 8, 19, 47, 60 and 65. The Fenway southbound approach consists of an exclusive left-turn lane, a shared through/left-turn lane, an exclusive through lane, and an exclusive right-turn lane. On the far side of the intersection, they continue as three lanes southbound on the Fenway. A jug handle departure is also located at the southeast region of this intersection which connects Brookline Avenue with Park Drive and provides vehicles access to Park Drive northbound. Sidewalks are provided along all approaches with the exception of the east side of the Fenway north of the intersection. Crosswalks are provided across all legs of the intersection with the exception of Brookline Avenue east of the intersection.

19. **Brookline Avenue/Park Drive/Boylston Street**
The intersection of Brookline Avenue, Park Drive, and Boylston Street is a five-legged intersection under three-phase traffic signal control, coordinated with the adjacent intersection of Brookline Avenue and the Fenway. The signal includes concurrent pedestrian movements. Brookline Avenue from the west consists of two exclusive through lanes, and two exclusive right-turn lanes (onto Boylston Street). The Brookline Avenue westbound approach has an exclusive right-turn lane and two through lanes. The Boylston Street northwest approach consists of one through lane and one general-purpose lane; however, the right lane is wide enough that many motorists utilize it as two lanes. Just before the signal, there is an unsignalized right-turn lane that allows vehicles to turn onto Brookline Avenue. Park Drive is one-way northbound and has four general-purpose travel lanes. Sidewalks are provided along Brookline Avenue, Boylston Street, and the east side of Park Drive, and pedestrian paths are provided within the Sears Rotary west of Park Drive. Crosswalks are provided across all legs with the exception of Brookline Avenue west of the intersection. On-street parking is prohibited at this intersection.

20. **Park Drive/Riverway/Fenway**
The intersection of the Fenway, Riverway and Park drive is a coordinated pair of signalized intersections north of Sears Rotary. The signal on the east, adjacent to Landmark Center, is two-phased with a concurrent pedestrian phase. Park Drive northbound contains two exclusive bear-left lanes and two exclusive through lanes while the Landmark Center driveway contains one exclusive through lane and an exclusive right-turn lane. There is no on-street parking adjacent to this intersection. Crosswalks and sidewalks are provided at all approaches. The second intersection of the pair, located to the west, is also two-phased with concurrent pedestrian phases. The Park Drive southbound approach is comprised of two exclusive through lanes and one exclusive right-turn lane. The Park Drive westbound approach contains two exclusive left-turn lanes and three exclusive through lanes. Sidewalks are provided near the intersection with the exception of the Park Drive departure south of the intersection. Crosswalks are located at each leg of the intersection with the exception of the Park Drive westbound through approach. On-street parking is only permitted on the southwestern curb of the Riverway.

21. **Beacon Street/Park Drive (Audubon Circle)**
The intersection of Beacon Street and Park Drive (also called Audubon Circle) is a four-way intersection under five-phase traffic signal control, including an actuated exclusive pedestrian phase. There are channelized, unsignalized right turns from all intersection approaches, with the exception of Brookline Avenue eastbound, which is controlled by the signal. In addition to the channelized right turns, Park Drive north and southbound

and Beacon Street westbound contain two general-purpose travel lanes, effectively a shared left-turn/through lane and an exclusive through lane. Beacon Street westbound provides three general-purpose travel lanes, effectively a shared left-turn/through lane and two exclusive through lanes. A bus stop is located on the west side of Park Drive north of the intersection which provides service to routes CT2 and 47. Metered parking is provided along both sides of each approach. Sidewalks are provided along all intersection approaches. Crosswalks are provided in all directions, crossing by way of the medians and the islands separating the channelized rights.

5.2.3 Study Area Roadway and Intersection Conditions

An extensive transportation data collection program was conducted as directed by the BTD Scoping Determination. This effort included conducting peak hour turning movement counts (TMCs) from 7:00-9:00 AM and 4:00-6:00 PM at all identified study area intersections. The turning movement counts included vehicles (passenger and heavy vehicles), pedestrians, and bicycles. The intersection turning movement counts were used to establish traffic networks for Existing (2006) conditions. From the turning movement counts, the study area's traffic peak hours were determined to be 7:30 to 8:30 AM and 4:30 to 5:30 PM for the morning and evening peaks, respectively.

In addition, 24-hour Automatic Traffic Recorder (ATR) counts were conducted at the following locations in June 2006:

- Brookline Avenue
- Binney Street
- Longwood Avenue
- Francis Street
- Fenwood Road
- Fenway
- Riverway
- Avenue Louis Pasteur
- Huntington Avenue

All counts were initially conducted during June 2006. The TMCs were compared with previous studies conducted within the past four years in the area. The June 2006 traffic volumes were slightly lower, especially along Brookline Avenue, when compared with previous studies in the study area. In order to investigate this difference, supplemental counts were again taken in September 2006 at select locations: TMCs were conducted at the intersections of Brookline Avenue/ Longwood Avenue and Brookline Avenue/Riverway; and an ATR was conducted on Brookline Avenue to the west of Longwood Avenue. A comparison of the resulting daily traffic volumes for each of the above listed roadways are summarized in Table 5-7 and illustrated in Figure 5-5.

Table 5-7 Existing 2006 Daily Traffic Volumes

Location	June 2006	September 2006
Brookline Avenue	25,033	26,993
Binney Street	4,728	-
Longwood Avenue	17,013	-
Francis Street	16,040	-
Fenwood Road	5,841	-
Fenway	8,886	-
Riverway	24,360	-
Avenue Louis Pasteur	6,933	-
Huntington Avenue	22,119	-

The daily volume recorded along Brookline Avenue was eight percent higher in September than in June. This percent variance also reflects the difference between the counts conducted in June of 2006 and the previous studies in the area. In order to account for the low traffic volumes counted in June, all of the movements associated with Brookline Avenue were increased by eight percent. In addition, traffic volumes at adjacent intersections were compared, adjusted and balanced for the entire network in order to account for TMCs occurring on different days.

Adjusted Existing (2006) peak hour traffic volumes are shown in Figures 5-6 and 5-7 for the AM and PM peaks, respectively. Detailed traffic count data sheets are provided in the Transportation Appendix.

5.2.4 Crash Analysis

Accident data was investigated for the study area. Data was obtained from the Massachusetts Highway Department (MassHighway) for the most recent three-year period available (2003 thru 2005) for the primary roads and intersections near the DFCI campus including: Brookline Avenue, Huntington Avenue, Longwood Avenue, Binney Street, and the Riverway. Crash results are summarized in Table 5-8. Detailed accident data are presented in the Transportation Appendix.

Table 5-8 Vehicular Crash Summary (2003 - 2005)

Location	Average Annual Crashes	Prominent Type of Collision
Brookline Avenue/Francis Street	11	Angle
Brookline Avenue/Joslin Place	3	Unknown
Brookline Avenue/Longwood Avenue	5	Angle
Brookline Avenue/Deaconess/Jimmy Fund Way	3	Rear-end
Brookline Avenue/Riverway	10	Angle
Huntington Avenue/Longwood Avenue	4	Sideswipe
Longwood Avenue/Avenue Louis Pasteur	1	Rear-end
Longwood Avenue/Pilgrim Road	1	Rear-end, Unknown
Longwood Avenue/Riverway	4	Angle
Sears Rotary (Brookline Avenue/Park Drive/Boylston Street/Fenway)	20	Angle
Binney Street/Francis Street	3	Angle, Rear-end
Binney Street/Longwood Avenue	1	Sideswipe
Brigham Circle (Huntington Avenue/Francis Street/Tremont Street/Calumet Street)	1	Rear-end

Source: Massachusetts Highway Department.

Of the reported accidents, most (59 percent) occurred during a weekday outside of the traditional peak hours of 7:00-9:00 AM and 4:00-6:00 PM. The majority of the reported incidents occurred during dry pavement conditions. The severity ranged from personal injury to exclusively property-damage. No fatalities were indicated by the data.

About half of the reported crashes were angle collisions while the remaining half was primarily rear-end or sideswipe collisions. Three crashes were head-on collisions of which two were reported on the Riverway and one at the Sears Rotary.

5.2.5 Area-wide Parking

This section identifies the parking supply and demand relationship for the study area, including both off-street and on-street parking. Several off-street parking facilities and a relatively small amount of on-street parking spaces are located within the study area. Parking space summaries are based on field observations made in September 2006.

5.2.5.1 Public Off-Street Parking Facilities

Off-street parking areas within a quarter-mile of the project site are provided in Table 5-9 and are shown in Figure 5-8. In total, there are 7,469 spaces provided in these facilities in addition to the on-campus spaces listed previously. Mid-day, there is generally little available parking at these facilities. The apparent supply is further reduced by the number of spaces reserved for specific institutions or specific users within those institutions. Most of the hospital-controlled spaces are for each institution's employees, patients and visitors. Many LMA institutions maintain long waiting lists of employees seeking reserved off-street parking.

Table 5-9 Existing Off-Street Parking Supply (Fall 2006)

Facility/Location Name	Spaces
MASCO/375 Longwood Avenue Garage	750
BIDMC/Carl J. Shapiro Clinical Center Garage	737
333 Longwood Avenue Garage	495
Children's Hospital Patient & Family Garage	643
BIDMC/Pilgrim Road Garage	750
Longwood Galleria Garage	103
Servicenter Garage	643
BIDMC/Lowery Garage	294
Mass Mental Health	212
Mission Park Garage	1,373
BWH/ASB II Garage	247
BWH/15 Francis Street Lot	57
BIDMC East Campus	604
HMS/New Research Building	561
Total	7,469

5.2.5.2 On-Street Parking

The majority of on-street parking in the area is metered parking and is regulated to a maximum of two-hours. There is also residential parking to the south of Brookline Avenue and west of the DFCI campus. On-street parking regulations nearby in the LMA are illustrated in Figure 5-9.

5.2.6 Pedestrians and Bicycles

In accordance with the Scoping Determination, pedestrian and bicycle activities were observed and recorded at each of the study area intersections during morning and evening peak hours. The following section discusses pedestrian facilities and details peak hour pedestrian flows in the study area.

5.2.6.1 Existing Pedestrian Facilities

As shown in Figure 5-10, pedestrian facilities in the study area include sidewalks that vary in width from six feet to fifteen feet wide, crosswalks at all major intersections, and access ramps for the disabled. The high level of pedestrian activity in the area has prompted changes in traffic signal design and operation in recent years to include exclusive pedestrian phasing, and all area signalized intersections are now equipped with pedestrian push-buttons. MASCO (Medical Academic and Scientific Community Organization, Inc.) and its member institutions have a program of continuing to study and re-evaluate pedestrian needs in the area. For DFCI employees that walk to work, DFCI provides incentives through the Commute Fit program as commuters build up their mileage. Primary pedestrian flow paths for the DFCI campus are depicted in Figure 5-11.

5.2.6.2 Bicycle Accommodations

Dana-Farber Cancer Institute provides 16 bicycle racks on campus with a capacity for 192 bicycles. Bicycle racks are currently located in a securely caged area between the 454 Brookline Avenue parking lot and the Smith Building.

Bicycle counts were conducted simultaneously with vehicle and pedestrian counts in June 2006. As illustrated in Figures 5-12 and 5-13, bicycle volumes are highest along Longwood Avenue and Brookline Avenue. The following bullets describe the major bicycle routes and volumes within the study area:

- During the morning peak hour, bicycle volumes were notably higher along Longwood Avenue in the southbound direction from the Riverway to Brookline Avenue and in the northbound direction from Huntington Avenue to Binney Street. On average, there were approximately 50 bicycles traveling southbound and approximately 40 bicycles traveling northbound along Longwood Avenue.
- During the evening peak period, bicycle volumes were highest along Longwood Avenue in the northbound direction from Brookline Avenue to the Riverway and moderate in both directions from Brookline Avenue to Huntington Avenue. In the northbound direction north of Brookline Avenue, an average of approximately 60 bicycles were observed while approximately 20 bicycles were observed traveling north and southbound along the southern portion of Longwood Avenue.

- Bicycle counts were higher in the eastbound direction along Brookline Avenue during the morning peak hour. Approximately 30 bicycles were observed traveling eastbound during this peak period.
- Bicycle volumes were moderate in both directions along Brookline Avenue during the evening peak period. Approximately 10 bicycles during the evening peak period were observed in each direction.
- In addition to the Longwood Avenue and Brookline Avenue corridors, bicycle volumes were also observed at Sears Rotary along the bicycle paths located throughout the Emerald Necklace Greenway. An average of 20 bicycles were observed entering the Sears Rotary at each approach during the morning peak period while approximately 25 bicycles entered Sears Rotary during the evening peak period.
- The highest number of bicycles approaching an intersection was observed at the Longwood Avenue/Riverway intersection with approximately 80 bicycles per hour.

Primary bicycle circulation and amenities for the DFCI campus are depicted in Figure 5-14.

5.2.6.3 Peak Hour Pedestrian Volumes

Pedestrian intersection crossing volumes were conducted concurrently with traffic volume counts. Peak hour results are presented in Figures 5-15 and 5-16. Major pedestrian crossing locations are highlighted and summarized in the following:

- As shown, the intersections of Brookline Avenue/Longwood Avenue, Longwood Avenue/Binney Street, Francis Street/Binney Street and Brigham Circle process approximately 1,000 or more pedestrian crossings during the morning peak hour.
- The intersections of Longwood Avenue/Pilgrim Road, Brookline Avenue/Longwood Avenue, Longwood Avenue/Binney Street, Longwood Avenue/Blackfan Circle, Longwood Avenue/Huntington Avenue, Brigham Circle and Francis Street/Binney Street process approximately 1,000 or more pedestrian crossings during the evening peak hour.
- The greatest number of pedestrians were observed crossing parallel to Longwood Avenue at Brookline Avenue and Binney Street. During the morning and evening peak period, approximately 1,200 pedestrians crossed Brookline Avenue along Longwood Avenue. Approximately 1,000 pedestrians crossed Binney Street parallel to Longwood Avenue during the morning peak hour while approximately 1,400 pedestrians crossed Binney Street along Longwood Avenue during the evening peak hour.
- Major pedestrian routes in the study area include both the Longwood Avenue and Francis Street corridors, which contain at minimum 500 or more parallel pedestrian crossings during both the morning and evening peak hour.

5.2.7 Public Transportation

DFCI is well served by the Massachusetts Bay Transportation Authority (MBTA) services. The Longwood Station on the D Line and the Brigham Circle Station on the E Line (both part of the Green Line) are both under a half mile distance from the DFCI campus. In addition, several bus routes provide service on Brookline Avenue. The closest inbound and outbound bus stops are adjacent to the DFCI campus at Jimmy Fund Way as shown in Figure 5-17.

5.2.7.1 MBTA Bus Route Service

Route CT2 The Crosstown 2 route provides weekday service between Sullivan Square in East Cambridge and Ruggles Station. It travels through Union and Kendall Squares, crosses the Charles River via the BU Bridge and continues through the LMA before terminating at Ruggles Station. It operates on 20-minute headways during peak hours, utilizing standard 40-foot MBTA buses. At Ruggles Station, passengers can connect to the Orange Line subway and the Needham, Franklin, Providence/Stoughton commuter rail line in addition to other MBTA buses. Within the LMA, the CT2 makes stops at Children's Hospital, the corner of Longwood Avenue and Huntington Avenue, and at BIDMC. The route operates from 5:55 AM to 7:38 PM.

Route CT3 The Crosstown 3 route provides weekday service between the LMA and Andrew Station in South Boston. The route also serves Ruggles Station and the Boston Medical Center. It operates on 20-minute headways during peak hours, utilizing standard 40-foot MBTA buses. Within the LMA, the CT3 makes stops near Vanderbilt Hall on Avenue Louis Pasteur, Children's Hospital, and BIDMC East. The route operates from 6:15 AM until 8:39 PM.

Route 8 provides service between the UMass Boston and Kenmore MBTA station. The route makes travels through the South Bay Center, Boston Medical Center, Dudley Square, Ruggles Station and the LMA. It operates on 12-minute headways during the morning peak and 20-minute headways during the evening peak. Within the LMA, Route 8 stops along Avenue Louis Pasteur, Longwood Avenue, and Brookline Avenue. The route runs from 5:15 AM to 1:30 AM on weekdays and from 6:30 AM to 1:30 AM on weekends.

Route 19 runs with 20-minutes headways between Fields Corner Station and Kenmore Station during the peak hours. During the daytime this route only provides services between Fields Corner Station and Ruggles Station. The route serves the LMA by way of Fenway to Avenue Louis Pasteur and then Longwood Avenue and Brookline Avenue on its way to Kenmore Station. This bus runs seven days a week with service between 5 AM and 10 PM Monday through Saturday and 9 AM to 7 PM on Sundays.

Route 39 serves as a connection between Forest Hills and Back Bay Station. The route runs north from Forest Hills along Centre Street and South Huntington Avenue, then turns northeast, running along Huntington Avenue south of the LMA. The route then serves the Back Bay and terminates at Back Bay Station. Buses run on 6-minute headways during the peaks and operate Monday to Saturday from 4:42 AM to 1:28 AM and on Sundays from 5:45 AM to 1:23 AM.

Route 47 provides service between Central Square and Broadway T Station. The route runs south from Central Square in Cambridge, crosses the Charles on the BU Bridge, and passes through the LMA (on Brookline Avenue, Longwood Avenue, and Avenue Louis Pasteur), before continuing east to Ruggles Station, Dudley Square, and the Boston Medical Center. It then heads north along Albany Street towards Broadway T Station in South Boston. It operates on approximately 20-minute headways during the peaks. The route runs from 5:15 AM to 1:31 AM on weekdays, from 5:00 AM to 1:42 AM on Saturdays and from 7:30 AM to 1:08 AM on Sundays.

Route 60 connects Chestnut Hill to Kenmore T Station. It operates on 22-minute headways during the morning peak and 24-minute headways during the evening peak. The route runs east from Chestnut Hill along Boylston Street (Route 9), makes several stops along Brookline Avenue in the LMA, and continues to its terminus at Kenmore Station. The route runs from 4:45 AM to 12:05 AM on weekdays, 4:45 AM to 12:51 AM on Saturdays and from 6:00 AM to 9:50 PM on Sundays.

Route 65 provides service from Brighton Center to Kenmore Station. It runs east along Washington Street to Brookline Village then turns onto Brookline Avenue, passing through the LMA before reaching Kenmore Station. It operates on approximately 15-minute headways during the morning peak and 25-minute headways during the evening peak. The route runs from 6:20 AM to 9:01 PM on weekdays and 6:45 AM to 6:35 PM on Saturdays. There is no Sunday service.

Route 66 serves as a connection between Harvard Square and Dudley Square. The route runs south from Harvard Square, crossing the Charles on the Larz Anderson Bridge, passes through Allston and Brighton on North Harvard Street, passes through Coolidge Corner in Brookline and continues south to Brookline Village. There, the route turns east along Huntington Avenue, stops at Brigham Circle near the LMA and then travels along Tremont Street to its terminus at Dudley Station. Buses run on 9-minute headways during peak hours. The route operates from 4:45 AM to 1:36 AM on weekdays, from 4:40 AM to 1:37 AM on Saturdays and from 5:50 AM to 1:30 AM on Sundays.

The MBTA *Ridership and Service Statistics, Tenth Edition 2006 Revised* provides daily bus boardings. Hourly or stop-based Ridership information in not currently available from the MBTA. A summary of bus services, shown in Table 5-10, include service frequency (headways) based on posted 2006 MBTA schedules.

Table 5-10 MBTA Bus Service

Route	Origin	Destination	Peak Hour Headways	Daily Boardings Inbound	Outbound	Total
CT2	Sullivan Station	Ruggles Station	20	842	794	1,636
CT3	Beth Israel Deaconess	Andrew Station	20	388	641	1,029
8	UMass/Harbor Point	Kenmore Station	20	2,547	2,492	5,039
19	Fields Corner Station	Kenmore Station or Ruggles Station	20	1,076	982	2,058
47	Central Square	Broadway Station	22	1,438	1,393	2,831
60	Chestnut Hill	Kenmore Station	24	686	665	1,351
65	Brighton Center	Kenmore Station	25	823	633	1,456
66	Harvard Square	Dudley Square Station	10	5,383	5,705	11,088

Source: Ridership and Service Statistics, Tenth Edition 2006 Revised

A comprehensive analysis of bus services is provided in Section 5.3.

5.2.7.2 MBTA Green Line Service

Green Line D Branch – The D (or Riverside) Branch of the Green Line runs on 5-minute headways during peak hours. During peak periods, the service employs train sets consisting variously of Boeing Light Rail Vehicles (LRVs), Kinki Sharyo Type 7 cars, and newer Breda Type 8 cars. The line runs above ground on a dedicated right-of-way from Riverside Station in Newton, serving multiple stations in Newton, Brookline, and Boston before turning north along the Riverway and joining the main below-grade Green Line east of Fenway Station. The main line continues through the Back Bay, Government Center, and North Station to its terminus at Lechmere Station. The LMA is served by the line's Longwood stop, located off of Chapel Street, a short walk from the DFCI campus. The D Branch runs from 4:56 AM to 12:45 AM weekdays.

Green Line E Branch – The E (or Heath Street) Branch of the Green Line runs on 7-minute headways during peak hours. During peak periods, the service employs two-car trainsets consisting variously of Boeing Light Rail Vehicles (LRVs), Kinki Sharyo Type 7 cars, and newer Breda Type 8 cars. The line originates at Heath Street Station and runs east at grade within the median of Huntington Avenue. South of Massachusetts Avenue, the line descends below grade to serve Symphony and Prudential stations before joining the main Green Line at Copley. The main line continues through the Back Bay, Government Center, and North Station to its terminus at Lechmere Station. The LMA is served by the line's LMA stop, located at the intersection of Longwood and Huntington Avenues, near the Massachusetts College of Art. The line also makes stops in the vicinity of the LMA at Brigham Circle and the Museum of Fine Arts. The E Branch runs from 5:01 AM to 12:45 AM weekdays.

The Green Line boardings provided by the MBTA's *Ridership and Service Statistics, Tenth Edition 2006 Revised* are shown in Table 5-11. Boardings by station are not currently available for surface stations according to the MBTA. The most recent data includes total surfacing boardings for the year 1995.

Table 5-11 Green Line Services

Route	Origin	Destination	Peak Hour Headways	Daily Surface Boardings		
				Inbound	Outbound	Total
D Branch	Riverside	Government Center	5 mins.	n/a	n/a	20,960
E Branch	Heath Street	Lechmere	7 mins	n/a	n/a	14,647

Source: Ridership and Service Statistics, Tenth Edition 2006 Revised

A comprehensive analysis of the MBTA Green Line services is provided in Section 5.4.3.

5.2.7.3 Other MBTA Services

Framingham/Worcester Commuter Rail Line – This commuter rail line runs from Boston's western suburbs, making stops in Natick, Wellesley, and Newton. Approximately half of the 40 daily trains originate or terminate at Worcester; the other half originate or terminate at Framingham. The line utilizes six- and seven-car trainsets with seated capacities ranging from 650 to 1,130 passengers, depending on whether single- or double-level cars are deployed. The line makes Boston stops at Yawkey Station, Back Bay Station, and South Station. The LMA is served by the line's Yawkey Station, located east of Fenway Park, approximately two-thirds of a mile from the LMA. Currently, only four outbound trains stop at the station in the late afternoon and early evening (4:38 PM, 5:13 PM, 5:38 PM, 6:28 PM, and 7:23 PM).

The Urban Ring – The MBTA is evaluating a new transit service that will connect the radial transit lines into a "ring" alignment outside the downtown Boston core. Two of the routes, known as CT2 and CT3, are currently provided as bus service. These routes are fully described later in this chapter.

5.2.7.4 MASCO Shuttle Services

The Fenway Shuttle serves as a connection between the Longwood Medical and Academic Area and parking facilities used by LMA employees to the north. The shuttle operates on 10-minute headways during peak periods and approximately 25-

minute headways the rest of the day. It only operates on weekdays. During the morning (5:30 AM – 10:15 AM) it travels along Brookline Avenue picking up passengers at the Lansdowne Garage, Fenway Garage, Ipswich Garage, Kenmore Lot and Harvard Vanguard and dropping them off at BIDMC-East, Joslin Park, 75 Francis Street., Binney Street shelter and Children's MBTA stop. In the evening (2:45 PM – 9:30 PM), passengers board at BIDMC West, 75 Francis St, Binney Street shelter, Shapiro Clinical Center, BIDMC East and alight at D'Angelo's, the corner of Brookline Avenue and Yawkey Way, Lansdowne Garage, Ipswich Garage, and Fenway Garage. The shuttle operates in both directions during midday service (10:15 AM to 2:45 PM).

The Wentworth Shuttle provides service between the Longwood Medical and Academic Area and a parking facility near Wentworth Institute of Technology. The shuttle operates on 10-minute headways during peak periods and approximately 25-minute headways the rest of the day. It only operates on weekdays. During the morning (5:30 AM – 10:15 AM) passengers board near the Wentworth lot and alight at Brigham Circle, 75 Francis Street, Bank of America/Brookline Avenue, Shapiro building, BIDMC East and Children's MBTA Stop. In the evening (2:30 PM – 8:55 PM), passengers board at Vanderbilt Hall, 333 Longwood Avenue, Joslin Park, 75 Francis Street and Brigham Circle and alight on Prentiss St, near the Wentworth lot. The shuttle operates in both directions during midday service (10:15 AM to 2:30 PM).

The Crosstown Shuttle serves as a connection between the Longwood Medical and Academic Area and the Crosstown garage on Massachusetts Avenue. The shuttle operates on 10-minute headways during peak periods and approximately 35-minute headways the rest of the day. It only operates on weekdays. During the morning (5:30 AM – 10:15 AM) passengers board at the Crosstown Garage and alight at Brigham Circle, 75 Francis Street, Bank of America/Brookline Avenue, BIDMC – Shapiro and BIDMC East. In the evening (2:05 PM – 8:55 PM), passengers board at Vanderbilt Hall, 333 Longwood Avenue, Joslin Park, 75 Francis Street and Brigham Circle and alight on at the Crosstown Garage. The shuttle operates in both directions during midday service (10:15 AM to 2:05 PM).

The M2 Shuttle serves as a connection between the Longwood Medical and Academic Area and MIT, Central Square, and Harvard Square. The shuttle generally operates on 10-minute headways during peak periods and approximately 30 to 60-minute headways the rest of the day on weekdays. During the school-year, the shuttle also operates hourly on Saturdays. In the inbound direction (to the LMA) stops are made at Vanderbilt Hall, Simmons/Emmanuel (by request), Museum School (by request), Mass Avenue and Commonwealth Avenue (by request), Mass Avenue and Beacon Street (by request), MIT, Central Square, Dana and Mass Avenue, Trowbridge and Mass Avenue and Harvard Yard. In the outbound directions stops are made at Harvard Yard, Putnam and Mass Avenue, Bay and Mass Avenue, Central Square, MIT, Mass Avenue and Beacon Street (by request), Kenmore Square (by request), Fenway Station (by request), Simmons/Emmanuel (by request), and Vanderbilt Hall. The Shuttle operates from 6:40 AM to 11:30 PM on weekdays and 8:00 AM to 10:30 PM on Saturdays.

The M6 Shuttle serves as a connection between the LMA and the Mishkan Tefila parking lot in Chestnut Hill. The shuttle operates on 5 to 15-minute headways during the morning peak and 10 to 15-minute headways during the evening peak. During the morning (5:40 AM – 9:30 AM) passengers board at the Mishkan Tefila parking lot and 850 Boylston (Chestnut Hill) and alight at 110 Francis Street, 75 Francis St, DFCI, Children's and BIDMC – Shapiro. In the evening (2:30 PM – 8:30 PM), pickups are made at the Shattuck Street Bus Shelter, Children's Hospital, DFCI, the corner of Brookline Avenue and Francis Street, 850 Boylston and the Mishkan Tefila parking lot.

The Ruggles Express provides continuous service between the MBTA's Ruggles Station and the LMA throughout the day, on 8-minute headways during peak hours and 10 to 30-minute headways during the rest of the day. At Ruggles, passengers can connect to the Orange Line subway and the Needham, Franklin, Attleboro/Providence and Stoughton Commuter Rail lines and other MBTA buses. The shuttle runs Monday through Friday from 5:30 AM to 8:45 PM. In the morning the shuttle stops at Ruggles MBTA Station, Simmons College (by request), Vanderbilt Hall, 333 Longwood Avenue, Joslin Park and the corner of Binney Street and Francis Street. In the evening, the shuttle stops at BIDMC West, the corner of Binney Street and Francis Street, Children's Hospital, Vanderbilt Hall, Simmons College and Ruggles MBTA Station.

The JFK/UMass Shuttle connects the LMA and the JFK/UMass MBTA station on the Red Line. The JFK/UMass Shuttle operates weekdays from 6:00 AM to 9:30 AM and from 3:20 PM to 8:05 PM. This shuttle operates approximately every 15 minutes in the morning peak period and approximately every 15-20 minutes in the evening. In the morning the shuttle stops at the JFK/UMass MBTA station, Andrew Square (by request), WIT MBTA stop (by request), Brigham Circle (by request), Vanderbilt Hall, 333 Longwood Avenue , Joslin Park and 75 Francis Street. In the evening stops are made at Vanderbilt Hall, 333 Longwood Avenue, Joslin Park, 75 Francis Street, Brigham Circle (by request), 610 Huntington Avenue (by request), Andrew Square (by request), and the JFK/UMass MBTA Station. There is no midday service.

The Landmark – Longwood Shuttle provides service between Landmark Center and Harvard School of Public Health. The shuttle operates weekdays between 9:00 AM and 5:05 PM every 20 minutes. The shuttle also stops at Vanderbilt Hall.

Figure 5-18 depicts the major MASCO shuttle routes serving the LMA.

5.2.8 Helicopter Operations

Boston MedFlight is responsible for the majority of helicopter operations in the LMA. MedFlight transports trauma patients who require immediate emergency care services to surrounding institutions with Emergency Departments.

During 2004, Boston MedFlight carried out 967 helicopter missions to the LMA. In 2005, total missions increased from 967 to 1,032 (or by approximately 6.7 percent). During 2006, helicopter missions increased by five missions resulting in a total of

1,037 missions. This level of activity equates to approximately 20 flight missions per week (or approximately three missions per day).

Figure 5-19, at the end of this chapter, identifies the location of recommended helicopter routes to and from the LMA as well as the location of existing helipad locations, and designated "No Fly Zones." Flight routes recommended by the Federal Aviation Administration (FAA) suggest that pilots should utilize the Emerald Necklace, Avenue Louis Pasteur, or Brookline Avenue to access LMA helipads. "No Fly Zones" have also been specifically designated in the area to direct helicopter missions away from residential areas to the greatest extent possible as a means to reduce unnecessary noise generation in these areas. Specific routes that are actually utilized are subject to the discretion of the MedFlight pilot. This ensures that safe conditions are maintained during the flight.

5.3 Evaluation of Long-Term Transportation Impacts

This section describes the context of the future transportation infrastructure that will serve the DFCI campus and the DFCI IMP projects. The first part of this section provides a summary of area transportation infrastructure improvements that are currently planned, are under design, or are under construction by the City of Boston, the Massachusetts Bay Transportation Authority (MBTA), MASCO, or other project proponents in the area. Subsequent sections provide a detailed summary of the development of both the future 2016 No-Build and 2016 Build Conditions, including morning and evening peak hour traffic activity, parking supply and demands, loading and service activities, future pedestrian and bicycle activities, future transit options, ambulance activities, and helicopter operations. The future 2016 No-Build and Build Conditions were developed and evaluated within this context to help identify additional roadway, pedestrian, and transit improvements that may be needed to mitigate identified transportation impacts generated by future DFCI campus growth and the DFCI IMP projects.

5.3.1 Area Transportation Improvements

The LMA is a thriving area of the City with a concentration of both pedestrian and vehicular traffic, and a unique need for many complimenting types of mass transit options. This section provides a summary of ongoing transportation infrastructure initiatives that are currently being put in place in connection with other nearby development projects, by MASCO, by the City of Boston, and by the MBTA.

5.3.1.1 Development-Related Improvements

Over the next several years, many important transportation improvement and mitigation actions are planned to be put in place to support transportation access to and from the LMA. This section lists those improvements that are expected to be constructed and fully operational in connection with other area development projects under the 2016 No-Build and 2016 Build Conditions. These improvements are also summarized graphically in Figure 5-20.

- **Blackfan Street Extension** will create a two-way connection from the existing terminus of Blackfan Circle to Avenue Louis Pasteur. This new roadway will help to reduce peak hour traffic flow along Longwood and Brookline Avenues and improve access to those facilities located along Blackfan Street. This improvement is being put in place in connection with Lyme Properties' Center for Life Sciences – Boston (CLSB) project; formerly known as the Blackfan Research Center project and is expected to be opened in early 2008.
- **Blackfan Street/Longwood Avenue Intersection** will also be improved in connection with the CLSB project. This improvement includes the designation of exclusive left-turn lanes and traffic signal reconstruction which are expected to improve traffic flow at this important location. This improvement is also expected to be operational by early 2008.
- **BIDMC East Campus Main Entrance/Brookline Avenue Intersection** will be improved in connection with Children's Hospital's Longwood Research Institute (LRI) project; formerly the Beth Israel Deaconess Medical Center's Longwood North Research Center project. This improvement includes the modification of Brookline Avenue to a 5-lane cross-section to allow for the creation of an exclusive left-turn lane into the BIDMC East Campus. This improvement is planned to be put in place in 2012.
- **BIDMC Binney Connector and South Service Road Improvements** include the creation of a two-way access open to public travel between the BIDMC East Campus Main entrance on Brookline Avenue and Binney Street and an additional one-way connection onward to Blackfan Street. These improvements will be put in place in connection with the BIDMC Institutional Master Plan (IMP) and Children's Hospital's LRI project and are expected to be put in place in 2012.
- **BIDMC Spur Road and North Service Road Improvements** includes the creation of a one-way vehicle access drive connecting Blackfan Street to Brookline Avenue through the rear of the BIDMC East Campus. This improvement will help to provide an additional means of egress from the LMA to Brookline Avenue and points east and will help to reduce afternoon peak hour traffic flow along Longwood Avenue and at the Brookline Avenue/Longwood Avenue intersection. This improvement will be put in place in connection with the CLSB and LRI projects.
- **Brookline Avenue/Francis Street Improvements** include the complete reconstruction of the existing traffic signal at the location in connection with Brigham and Women's Hospital's ongoing 70 Francis Street project. This improvement will be put in place in 2008.
- **Pilgrim Road Corridor Improvements** includes the modification of Pilgrim Road into a two-way street between Longwood Avenue and Joslin Place in connection with the implementation of the development projects proposed as part of Joslin Diabetes Center's IMP. This improvement will help to maintain

traffic flow and pedestrian safety along this corridor and will reduce traffic volume at the Brookline Avenue/Deaconess Road intersection.

- **Longwood Avenue/Brookline Avenue Improvements** includes the modification of existing corner radii at selected corners of this intersection to help provide for more efficient turning movements by trucks. This action will help to improve traffic flow efficiency and pedestrian safety at the intersection.

5.3.1.2 MASCO Initiatives

DFCI is a key and proactive member of MASCO, the area's leader in developing and promoting transportation and pedestrian improvements for the LMA. In 1995, MASCO developed "Access LMA," an action plan to improve access in and around the Longwood Medical and Academic Area. MASCO's objectives are to sustain and grow the delivery of high-quality education, patient care, and research activities. The following section summarizes major MASCO initiatives in the LMA that are aimed at providing a diverse and comprehensive array of alternative transportation services and programs for LMA employees.

- **Area Traffic Signal Improvements**, over the past three years, MASCO has undertaken an extensive evaluation and repair plan for many of the LMA's signalized intersections. The program has focused on identifying and delineating operational deficiencies and making corrections to signal timings and phasing, loop detectors, pedestrian push buttons, optical programming, and interconnect/communications issues. In 2005, MASCO improved signal conditions at several locations, including Longwood Avenue intersections with Blackfan Circle, Binney Street, Chapel Street, and Kent Street. MASCO also repaired an important master controller at Brookline Avenue and Francis Street, which controls operations at several important LMA locations when the BTD's main UTCS controller occasionally goes off-line. In 2007, MASCO plans to make similar repairs along the Ruggles Street and Melnea Cass Boulevard corridors as a means to improve traffic flow and pedestrian movements in and around the LMA.
- **Ultra-Low Sulfur Diesel Fuel (ULSD) Bus Program**, MASCO has taken a first-in-the-country stand to reduce pollution from the bus fleet servicing the LMA. MASCO's fleet of 17 shuttle buses carry over two million passengers annually, eliminating pollution from individual car trips by staff and visitors. In 2003, MASCO fitted all its buses with emissions technology that reduces particulate pollution by 90 percent. MASCO is the first private transit agency that EPA New England is aware of to voluntarily retrofit its bus fleet with particulate filters and ultra-low sulfur diesel fuel. In April 2004, MASCO received the 2004 EPA Environmental Merit Award for these efforts that have contributed to cleaner air and improved public health.
- **JFK/UMass Shuttle**, MASCO's newest shuttle bus service improves Red Line connections for LMA commuters from points south of downtown. MASCO continues to study the feasibility of adding shuttle bus routes to its already extensive network to provide alternative access choices for member institutions' employees.

- **Parking Meter Removal Program** along major LMA streets to facilitate more efficient vehicular flow. MASCO has successfully removed meters, added turn lanes, and reduced congestion along Longwood Avenue, as well as portions of Brookline Avenue and Francis Street.
- **Thermoplastic Pavement Marking Program** of key pedestrian crossings and of travel lanes. Thermoplastic marking have a longer life cycle than normal painted markings, and are more clearly visible during the evening and during inclement weather conditions.
- **Roadway Improvement Program**, including the installation of a traffic signal at the intersection of Riverway/Short Street; timing and phasing improvements at the Riverway/Longwood Avenue intersection; and signal timing and management adjustments throughout the LMA, including most recently at the Longwood Avenue/Brookline Avenue intersection. In 2002, MASCO completed the implementation of roadway and pedestrian safety improvements at the intersection of Longwood Avenue and Avenue Louis Pasteur (Oscar Tugo Circle).
- **LMA Sign Program**, which updates signs to clearly highlight institutional destinations and construction routes. This program is targeted at improving circulation in and around the LMA for patients, students and visitors, and reinforces the use of primary area roadways over local (often residential) streets.
- **Targeted Ticket and Towing Program**, under which a Boston Police officer is dispatched to ticket and tow illegally parked vehicles during peak traffic hours.
- **Pedestrian/Biking Incentive Program**, under which MASCO provides bike racks at strategic locations throughout the LMA.
- **MASCO Bus Shelters**, provided at the Francis Street/Binney Street intersection to better serve area employees on Francis Street.

5.3.1.3 City/State-Sponsored Traffic Improvements

The City of Boston proposes several mitigation programs that will positively impact the LMA, each of which is in the process of implementation. These include the Huntington Avenue Improvement Project and various other signal timing/phasing enhancements within the LMA. These improvements are described below.

Huntington Avenue Improvements

The City, MassHighway, and the MBTA have nearly completed reconstruction of the Huntington Avenue corridor as part of a major safety improvement/revitalization project. The reconstruction has improved operations at the Longwood Avenue/Huntington Avenue intersection, which serves as a primary gateway to the LMA from points south. Design improvements at this intersection include removal of parking along Huntington Avenue to provide exclusive left-turn lanes, and a coordinated signal system design that will enhance vehicle progression on Huntington Avenue. The project is expected to be complete by early 2007.

5.3.1.4 MBTA-Sponsored Transit Improvements

Currently, the MBTA provides circumferential transit services in the area via its existing Crosstown bus routes (CT2 and CT3). These existing routes are characterized as elements of Urban Ring Phase 1. Figure 5-17 (shown previously) illustrates the routes for these two bus services in the LMA. The MBTA is currently conducting long-term transit planning for improved circumferential transportation in the Urban Ring corridor (see Figures 5-21 to 5-23) in addition to the existing Crosstown routes. The Urban Ring project is expected to be implemented in three phases, described as follows:

Phase 1 of the Urban Ring project would expand current Crosstown bus routes by four routes and one Express Commuter route. The new CT routes would serve Franklin Park Zoo (CT7), Sullivan Square (CT8), JFK/UMass Station (CT10), and Fields Corner Station (CT11). Additionally, the existing CT2 would be extended to Sullivan Square. A new Express Commuter (EC) service was proposed in the Urban Ring Major Investment Study, however it has not been recommended for implementation due to low ridership projections. Figure 5-21 summarizes the routes for the five Phase 1 bus services that are proposed.

Phase 2 of the Urban Ring project could include the replacement of existing Crosstown bus routes with Urban Ring Bus Rapid Transit (BRT) services. Within the LMA, the proposed BRT would operate with three routes between the Sears Rotary, Oscar Tugo Circle, and onward to Ruggles Station. A summary of BRT operation within the LMA follows and is also depicted in Figure 5-22.

- BRT5 would operate from Oscar Tugo Circle, along Avenue Louis Pasteur, a BRT contra-flow lane along a possible Fenway through the Sears Rotary and on to a new Lechmere Station in Cambridge. BRT5 would make an additional stop at Emmanuel College.
- BRT6 would operate from Oscar Tugo Circle, along Longwood Avenue, Brookline Avenue and Fenway providing service to the UMass Boston Campus. On trips from UMass Boston to the LMA, BRT would also operate on a contra-flow bus lane along Fenway between Avenue Louis Pasteur and Brookline Avenue.
- BRT7 would operate from Oscar Tugo Circle along Avenue Louis Pasteur and the Fenway and on to Logan International Airport. BRT7 would also stop at Emmanuel College at Longwood Avenue at Blackfan Street.

It is envisioned that over the long-term, the proposed BRT5 would be replaced with light rail transit (LRT) or heavy-rail transit (HRT) under Phase 3 of the Urban Ring project, as shown in Figure 5-23, with BRT6 and BRT7 continuing to operate. The rail line would operate in a tunnel through the LMA. The tunnel would enter the LMA near Huntington Avenue and Longwood Avenue, continue underneath Longwood Avenue and north underneath Brookline Avenue. Two alternate alignments are possible between the LMA and Cambridge. The tunnel would either continue along Brookline Avenue to Kenmore Square (using LRT or HRT technology) or along Park Drive from the Sears Rotary (using LRT technology).

One rail station is proposed near Oscar Tugo Circle and another station would either be located at Park Drive and Boylston Street (Kenmore Square alignment) or between the existing Fenway and BU/St. Mary's stations on Park Drive (Park Drive alignment).

It is estimated that by 2025, the Urban Ring could potentially carry over 92,000 passengers through the LMA on a typical weekday.[1]

5.3.2 2016 No-Build Condition

The 2016 No-Build Condition was developed and analyzed to evaluate future transportation conditions in the study area without consideration of anticipated DFCI campus growth and the DFCI IMP projects.

This future analysis year represents a five-year horizon from the expected project completion year of 2011[2]. Under the 2016 No-Build Condition, anticipated increases in traffic activity are expected on study area roadways due to continued general area-wide traffic growth; approved developments in the area that are currently under construction; and other ongoing projects that have had, at a minimum, either a Project Notification Form (PNF) or an Institutional Master Plan Notification Form (IMPNF) filed on their behalf with the BRA, formally initiating the City of Boston Article 80 Development Review process for their respective project(s).

Traffic and pedestrian growth within a defined area is a function of expected land development, economic activity, and changes in demographics. A two-step process has been employed to estimate future traffic activity in the project study area under the 2016 No-Build Condition. Under Step 1 of this process, general area-wide traffic growth was estimated based on regional traffic growth trends along major study area roadways. The focus of this part of the analysis was to develop and apply an annualized growth rate that could be applied to existing condition peak hour traffic volumes to reasonably account for future through traffic growth in the area. Under Step 2, peak hour traffic generation estimates for specific developments that are either currently under construction, are approved, or are planned projects that have formally initiated the City of Boston Article 80 Development Review process were added to the resultant volumes produced under Step 1 to generate peak hour traffic volume estimates for the 2016 No-Build Condition. A more detailed discussion of the process employed to develop peak hour traffic volume estimates for the 2016 No-Build Condition is presented below.

1 92,220 is the total projected ridership through Segment 3, which includes parts of Cambridge.
2 The DFCI Center for Cancer Care project is expected to be complete in 2011.

5.3.2.1 Step 1 - Account for General Background Traffic Growth

As mentioned previously, Step 1 of this process was to estimate general area-wide traffic growth and determine an annualized growth rate that could be applied to existing condition peak hour traffic volumes to reasonably account for future through traffic growth in the project study area. Historical traffic count data collected along major corridors within the project study area were reviewed to understand how traffic volumes have changed over the past two decades within the LMA. In 1999, MASCO completed the *Longwood Medical and Academic Area 1999 Transportation Study Update*. One of the many goals of this report was to gain a better understanding of the trends and changes that have occurred within the LMA relative to traffic patterns and growth, LMA development, and the transportation system that serves the area. Table 5-12 provides a summary of traffic volume trends within the study area on major LMA roadways between 1986 and 2006.

Table 5-12 LMA Traffic Growth Trends (1986 through 2006)

Location	Peak Hour	Measured Volumes 1986 [1]	Measured Volumes 2006 [2]	Annualized % Increase
Longwood Avenue (east of Brookline Avenue)	AM Peak	920	1,070	0.9%
	PM Peak	980	1,310	1.4%
Brookline Avenue (south of Longwood Avenue)	AM Peak	1,565	1,765	0.6%
	PM Peak	1,745	1,850	0.3%

[1] *Longwood Medical and Academic Area 1999 Transportation Study Update, prepared for MASCO by Vanasse Hangen Brustlin, Inc., September 1999. Page 14-15, Tables 7 and 8.*
[2] *Based on manual turning movement counts conducted by Vanasse Hangen Brustlin, Inc. for DFCI, September 2006.*

As shown in Table 5-12, traffic along the major roadways that serve the LMA has grown steadily since the mid-1980s. Peak hour traffic along Longwood Avenue has grown at a rate of approximately 1 percent per year between 1986 and 2006. Along Brookline Avenue, peak hour traffic has grown at a rate of approximately one-half of one percent per year. During this same period, approximately 2.8 million SF of office, academic, research, laboratory, clinical, and ambulatory care space has been developed throughout the LMA.

Although a portion of the traffic growth realized within the LMA is directly attributable to the various new facilities that have been developed in the area during this period, a portion of this growth is also due to growth in traffic that is traveling through, but not destined to, the LMA. An additional study conducted within the LMA 1999 Transportation Study Update included a comprehensive survey of motorists traveling LMA roadways to understand their origins, destinations, trip purposes, and vehicle occupancies. This study concluded that, depending upon the particular roadway, traffic traveling through (but not generated by) the LMA accounted for between 40 percent to over 90 percent of peak hour traffic. In addition, the share of "through traffic" was determined to have increased from 1987 to 1999 on almost every roadway that was studied.

Based on the share of through traffic and the historical rate of traffic growth on LMA roadways through traffic and background traffic growth has been accounted for within the 2016 No-Build Condition utilizing an annual growth rate of 0.5 percent per year between 2006 and 2016. This rate has been used in support of several recently approved LMA development projects.

5.3.2.2 Step 2 - Incorporate Site-Specific Background Traffic Growth

There are currently thirteen approved or planned development projects that are expected to have an influence on future year peak hour traffic volumes on study area roadways and intersections. Many of these projects were identified within the Scoping Determination that was issued for the DFCI IMP as well as during subsequent consultation with the BTD. Except where specifically noted, their anticipated transportation impacts have been included within the analyses of the 2011 No-Build Condition. A description of each planned project and/or master plan is provided below. These projects are depicted in Figure 5-24, Approved or Planned Development Projects.

- **Brigham and Women's Hospital** is currently constructing its 70 Francis Street project. This development includes construction of 350,000 SF of state of the art clinical space on the block bounded by Francis Street, Binney Street, Vining Street, and Fenwood Road. The project will be physically connected to the BWH campus via a covered, temperature controlled pedestrian connection at Level 2 of the facility, connecting it to the BWH "Pike." The project does not include construction of any new parking spaces on campus and is expected to be complete in 2009.
- **Center for Life Sciences – Boston** is a world class laboratory and research facility that is currently being constructed by Lyme Properties on Blackfan Circle. When complete, this 18-story building will include 575,000 SF of space, 300 new parking spaces located below grade, and an additional 450 replacement parking spaces for BIDMC (which replace the existing 450-space Feldberg Parking Garage on the BIDMC East Campus). This project is expected to be complete in early 2008.
- **Simmons College** is currently constructing its new School of Management, below-grade parking facility, and Quad projects. When complete in 2008, these projects will add 66,500 SF of new academic space, a 715-space below grade parking facility (with 380 "net new" parking spaces), and removal of existing surface parking spaces and development of a new campus quadrangle that will include significant increases in landscaped areas and pedestrian connections between existing and new Simmons facilities.
- **Longwood Research Institute** is a 440,000 SF state-of-the-art research and laboratory facility that is planned to include 330 underground parking spaces. Construction of the LRI by Children's Hospital Boston is expected to commence following the completion of the Lyme CLSB project in 2008 with an expected opening in 2011. (Note: this project was formerly known as the Longwood North Research Center when it was originally approved.)

- **1330 Boylston Street** is a mixed-use redevelopment project comprised of 210 residential units, 25,000 SF of retail space, 85,000 SF of medical/office space and 293 below-grade parking spaces. Located at 1330 Boylston Street, this project commenced construction in fall of 2006.
- **Museum of Fine Arts** proposes a development project consisting of approximately 600,000 SF of renovation and 536,000 SF of additional space. The anticipated completion of construction is targeted for 2008 for the first 86,500 SF of construction (phase 1), while the remaining phases are dependent upon fundraising.
- **Northeastern University** currently proposes the construction of two residential buildings on the existing campus. The first project, Residence Hall I, will consist of 1,200 residential units, office space, retail space and a full service dining facility totaling 495,000 SF. The second development, Residence Hall K, will contain 600 residential units and approximately 200,000 SF of space. Since the development is shifting 1,800 students from off-campus to on-campus, the trip generation of the project is expected be negative. In the future, fewer vehicles will be traveling in the study area as a result of these two residential buildings. In order to remain conservative in this study, these negative Northeastern University trips were not applied to the No-Build network.
- **Emmanuel College Campus Development Plan** includes development of two research buildings (approximately 500,000 SF total and 474 new parking spaces total) on the College's endowment campus, and construction of new dormitory space and student activity space on its academic campus (approximately 163,000 total SF of space and 14 new parking spaces). The first of these two buildings, Building B, was constructed and occupied by Merck Research Laboratories in 2004. It is anticipated that the entire Emmanuel Campus expansion will be completed by 2008.
- **Simmons College Graduate Center.** Simmons College recently completed construction of a 60,000 SF graduate center addition to their existing campus along Avenue Louis Pasteur and the Fenway. The project will add fewer than 30 new vehicle trips to the LMA roadways during peak traffic hours.
- **Trilogy (formerly Fenway Mixed Use Project);** Located on a site between Boylston Street and Brookline Avenue in the nearby Fenway neighborhood, the Fenway Mixed-Use project will include residential units, retail space, and below-grade parking spaces. This project opened in 2006 and it is expected to be fully occupied by 2007.
- **Wentworth Institute of Technology Institutional Master Plan**. The Wentworth Institute of Technology is currently completing construction of a 600-bed residential dormitory on its existing Boston campus. The purpose of the project is to provide quality on-campus housing for some of its existing students who currently must secure their own off-campus housing. With completion of this project, Wentworth would possess 1,500 on-campus beds for its daytime student population of approximately 3,000 (or half of its total daytime students). No new parking will be constructed as part of this project. It is anticipated that this project will not have a noticeable impact on future peak hour traffic activity within the LMA.

- **Joslin Diabetes Center** is planning construction of a mixed-use development consisting of approximately 500,000 SF of research and residential space and 357 parking spaces at the corner of Brookline and Longwood Avenues on its LMA campus. This project is expected to be complete in 2010 or 2011.

5.3.2.3 2016 No-Build Condition Peak Hour Traffic Volumes

The 2016 No-Build Condition weekday morning and evening peak hour traffic volumes were developed by increasing the 2006 Existing Condition volumes to include general background traffic growth as previously described, and adding traffic volumes associated with the site-specific projects list in the previous section. Figures 5-25 and 5-26 present the 2016 No-Build Condition traffic volume networks for the morning and evening peak hours.

5.3.3 2016 Build Condition

The 2016 Build Condition was developed in order to evaluate future transportation conditions in the study area with the DFCI projects that are proposed. The 2016 study year represents the IMP horizon year (the end of the ten year IMP term). The Build Condition takes into account the changes and growth established as part of the 2016 No-Build Condition presented previously and also accounts for the changes that will occur with the proposed IMP project physically and in terms of transportation operations.

5.3.3.1 Proposed IMP Development Projects

DFCI plans to implement six projects over the course of the IMP. These projects were outlined previously in Chapter 3. Of these projects, the following two will affect transportation:

- The Center for Cancer Care project includes construction of a single building project totaling approximately 257,500 ZSF of space (as defined by the Boston Zoning Code) on a parcel of land along Jimmy fund Way in the LMA. Accounting for demolition planned at the site, the proposed project will create approximately 219,050 ZSF of "net new" construction on the 450 Brookline Avenue site.
- Additionally, DFCI plans to renovate its existing Dana Building. These renovations will include the reconfiguration of an existing above-grade structured parking area and surface vehicular drop-off/pick-up area into approximately 71,000 SF of administrative/institutional space. The existing 213 parking spaces and vehicular drop-off area located within the existing Dana Building will be relocated within the new Center for Cancer Care facility.

The proposed Center for Cancer Care project will be located west of the existing DFCI Smith Building on Jimmy Fund Way. The new building is planned to accommodate much needed clinical and clinical space, but will also include some ground floor retail space, a campus dining area, and will serve as the campus' main entrance along Brookline Avenue. The building will provide public pedestrian access via entrances along both Brookline Avenue and Jimmy Fund Way. The building will also include provision of a new below-grade drop-off and valet parking area on level P1. The new building's below-grade parking area will be integrated into the existing Smith Building parking facility, creating one unified parking garage to support DFCI's core campus. All of DFCI's on-campus parking will be located within this garage upon completion of the project. The project will include construction of approximately 460 underground parking spaces. Of these parking spaces, 243 are replacement parking from the Dana Building and the existing surface parking lot located on the Center for Cancer Care site. The remaining 217 parking spaces are new on-site parking spaces. The amount of net new on-site parking equates to 0.75 parking spaces per 1,000 GSF of new development, a ratio consistent with the Boston Transportation Department's (BTD) guidelines for construction of new on-site parking in support of development projects in the LMA.

A summary of the DFCI IMP Projects are presented in Table 5-13.

Table 5-13 DFCI IMP Projects

Project Actions	Approx. Building Size*	Parking
Demolish Brookline & Redstone Buildings	(-38,451)	(-30)
Construct 450 Brookline Avenue	257,500	460
Infill Dana Parking and Main Entrance Areas	71,000	(-213)
Total "Net New" Construction	**290,049**	**217**

Source: DFCI
** In zoning gross square feet.*

The following characterize future transportation at the DFCI campus once the proposed projects are completed:

- The existing Redstone Building, 454 Brookline Avenue Building, and adjacent 30-space surface parking lot on Jimmy Fund Way will be demolished to allow for new construction. These lost spaces will be relocated to the new below-grade parking facility within the Center for Cancer Care project.
- The Dana Building Garage currently has 213 parking spaces. These spaces, along with the existing drop-off area for the building, will be taken out of service to allow for the design and implementation of approximately 71,000 ZGSF of infill space. These parking spaces will be relocated to the new parking garage at the Center for Cancer Care.
- The Smith Building Garage has 255 parking spaces. Some existing spaces may need to be relocated or modified to accommodate access modifications within the expanded floor plate, but the gross number of available spaces is not expected to change as a result of the project.

- The Center for Cancer Care facility will include seven below-grade levels, which will accommodate up to 460 parking spaces, a dedicated patient and valet drop-off area, and some support and mechanical spaces.
- The Center for Cancer Care will be physically connected to the adjacent Smith Building on most levels.
- Loading and service activities for the proposed project will be handled from a modified Smith Building loading dock. The existing 3-bay dock will be expanded by 2 additional service bays to accommodate the additional amount of truck, delivery, and ambulance traffic that is expected with the proposed Center for Cancer Care building in place. The access for this loading and service area is via Binney Street. DFCI also plans to maintain some loading and service functions at its existing Dana loading facility on Binney Street.

The projects will primarily:

- Provide space for decompression and decanting. The new facilities will include a modern dining facility and a large entrance and atrium.
- Accommodate patient growth. While some new employment will be needed to support the patient growth, no new parking will be provided for employees on campus.

5.3.3.2 DFCI Roadway and Intersection Improvements

With completion of the IMP, the following changes to the public right-of-way are proposed:

- Formalize the left-turn from westbound Brookline Avenue to Jimmy Fund Way with a lead-left turn phase.
- Traffic signal modernization at Brookline Avenue/Jimmy Fund Way/Deaconess Road/Joslin Place intersection. This upgrade may include interconnection with adjacent intersections, countdown pedestrian signals, upgraded controller, new signal displays, and mast arms.
- Modification to the corner radii at the Brookline Avenue/Jimmy Fund Way intersection, make ramps ADA compliant where needed.
- Reconstruct sidewalks around perimeter of the Center for Cancer Care site, possibly with textured materials.
- Widen Jimmy Fund Way on DFCI property. Construct left-turn lane from Jimmy Fund Way northbound to Brookline Avenue.
- Provide a curbside drop-off/pick-up area on Jimmy Fund Way to be used primarily by chair cars and actively managed.
- Reconstruct Jimmy Fund Way between Brookline Avenue and Binney Streets and install appropriate streetscape materials.
- Install new pavement markings and signs on Brookline Avenue, Jimmy Fund Way, and Binney Street in close proximity of the project as needed.

These improvements were illustrated previously in Figure 5-2. All improvements will be subject to review by the BTD. DFCI will seek the Public Improvement Commission (PIC) review for any changes that affect the public right-of-way.

5.3.3.3 DFCI Expansion

Extraordinary growth in the numbers of patients, the length of their treatments, and external services to cancer survivors have strained DFCI's facility resources to the limit. Although cancer mortality is declining, cancer incidence is rising due to early detection and an aging population. At the same time, important technological breakthroughs and medical advances are spurring incredible and sustained growth in the research and understanding of cancer and other serious diseases. As DFCI implements its bench-to-bedside approach, the size and importance of clinical programs continues to expand. This growth in clinical program, research needs, and translational clinical research has lead to a concomitant increase in the administrative and support operations which these primary functions require.

In order to concentrate its clinical and research facilities on its main LMA campus, Dana-Farber has been relocating off-site support and administrative functions determined to be non-critical with respect to their location, and, where appropriate, certain research and research-support functions have been moved far beyond the LMA and its surroundings. DFCI has currently transferred over 339,700 SF of its facilities off-campus, with 225,200 SF relocated outside the LMA. DFCI will continue the current practice of leasing additional space in nearby and distant locations for program functions which do not require immediate physical adjacency.

5.3.3.4 Trip Generation

To assess the impact of the proposed project, trip estimates were based on standard Institute of Transportation Engineers (ITE) trip rates published in ITE's Trip Generation manual (7th Edition). The appropriate ITE land use codes are shown below in Table 5-14.

Table 5-14
Trip Generation Land Use Codes

Use Components	Building Size (Net-New SF)	ITE Land Use Code (LUC)
Retail	6,500 SF	LUC 820
Clinical	258,549 SF	LUC 610
Office	25,000 SF	LUC 710

Source: ITE Trip Generation, 7th Edition

Since the proposed projects are an expansion of the existing campus, trip generation was estimated for the entire DFCI campus with and without the projects using the trip rate equation for the clinical component of the project. These two estimates allowed for a "net-new" estimate of the traffic associated with the proposed projects.

Because most the core building staff (i.e., security, janitorial, etc.) is already on the campus, the proposed project will not be generating as many trips as a new stand-alone facility. In addition, a 25 percent internal capture rate was included for the retail component of the project. This capture rate accounts for trips that are internal to DFCI and are not new trips to the retail component of the site.

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 so the trip results are expected to be less than reported below.

Table 5-15 summarizes the total number of unadjusted (raw ITE) vehicle trips to be generated for an average weekday and during the 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 do not account for alternative modes of transportation.

Table 5-15
Trip Generation Results (Net-New Project Trips)

	Unadjusted ITE Vehicle Trips	Person Trips
Daily Total	3,072	3,687
AM Peak Hour		
Inbound	195	234
Outbound	84	101
Total	279	335
PM Peak Hour		
Inbound	76	91
Outbound	163	196
Total	239	287

Based on construction of 290,049 net-new SF.

As shown the project is anticipated to generate 3,072 daily unadjusted vehicle trips. The projects are expected to generate 279 and 239 unadjusted vehicle trips respectively during the morning and evening peak hours. Person trip generation is slightly higher since some vehicles will carry more than one person.

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 5-15. The auto mode split includes all vehicle based trips including taxis. Mode splits for the area are based on Boston Transportation Department's (BTD) Guidelines and are shown in Table 5-16.

Table 5-16 Peak Hour Mode Split by Land Use Category

Mode	Retail	Office	Clinical / Hospital
Automobile	50%	47 %	42 %
Public Transit	28%	33 %	31 %
Walk/Bike/Other	22%	20 %	26 %

Source: BTD Guidelines, Zone 5

Results of the vehicle trip generation estimate are shown in Table 5-17. Again a 1.2 persons per vehicle occupancy rate was assumed in the estimate.

Table 5-17 Net-new Project Trip Generation

Time Period/Direction	Walk/Bike/Other	Transit	Vehicle
Daily			
Inbound	573	385	738
Outbound	573	385	738
Total	1,146	770	1,476
AM Peak Hour			
Inbound	58	73	84
Outbound	26	31	36
Total	84	104	120
PM Peak Hour			
Inbound	23	28	33
Outbound	48	61	71
Total	71	89	104

Source: ITE Trip Generation, 7th Edition

As shown in Table 5-17, the projects are anticipated to generate 84 inbound and 36 outbound vehicle trips during the morning peak hour. In addition to these trips, the project will generate approximately 58 inbound and 26 outbound walk and bike trips. During the evening peak hour, the project will generate 33 inbound and 71 outbound vehicle trips. Walk and bike trips will total approximately 23 inbound 48 outbound trips at this time.

A comparison of existing vehicle trip rates at DFCI suggested that trip rates at the campus are less than those achieved using the ITE trip rates and applying the BTD mode share. Existing trip rates were based on traffic counts taken in June 2005. These counts accounted for garage activity as well as all drop-off/pick-up activity, shuttle services, and taxis. These rates do not account for parking at other area facilities or on-street. Table 5-18 provides a comparison of the actual DFCI vehicle trip rate at the campus to the adjusted ITE trip rates being used for traffic analysis purposes.

Table 5-18 Peak Hour Vehicle Trip Rate Comparison

	DFCI Trip Rate (per KSF)*	ITE Adjusted Vehicle Rate (per KSF)
AM Peak	0.31	0.96
Entering	0.23	0.67
Exiting	0.07	0.29
PM Peak	0.26	0.82
Entering	0.13	0.26
Exiting	0.13	0.56

* *Based on 2005 vehicle counts.*

For a conservative analysis, ITE trip rate estimates provided in Table 5-18 have been used in the transportation analysis.

5.3.3.5 Trip Distribution

Zip code data provided by DFCI was used to determine a distribution pattern for peak hour trips to and from the campus. The greatest concentration of trips, 30 percent, comes from within Boston proper. These trips were assigned to the most convenient local corridor. The remaining trips are from other parts of Massachusetts and some travel from New Hampshire and Rhode Island.

Table 5-19 shows a comparison of the BTD Area 5 trip distribution and the trip distribution resulting from DFCI zip code data. The results of the comparison indicate the local traffic from both distributions is quite similar. For regional trips however, the BTD trip distribution only accounts for surrounding communities (i.e., Brookline, Cambridge, and Newton) and underestimates the percentage of trips coming from other counties that travel on the Massachusetts Turnpike (I-90) and on the Expressway (I-93). For this reason, the BTD data shows a higher percentage utilizing Route 9 than the DFCI data.

Table 5-19 Trip Distribution Comparison

Route	BTD Distribution	DFCI Zip Code Distribution
Storrow Drive (to/from east)	20 %	18 %
Storrow Drive (to/from west)	10 %	13 %

I-90 to Huntington Avenue	-	6 %
Boylston Street	5 %	5 %
Brookline Avenue (to/from east)	-	2 %
Melnea Cass Boulevard	21 %	16 %
Longwood Avenue (from north)	3 %	10 %
Riverway	7 %	10 %
Route 9	29 %	14 %
Tremont Street/Francis Street	5 %	6 %
Total	100 %	100%

This DFCI trip distribution provided in Table 5-19 was used for the transportation analysis since it more accurately reflects the DFCI campus. The resulting DFCI trip distribution for inbound and outbound traffic is illustrated in Figures 5-27 and 5-28.

The trip distribution takes into account the new Blackfan Street connection established between Avenue Louis Pasteur and the existing Blackfan Circle as previously discussed in the No Build Condition. This new connection will accommodate vehicles traveling from I-93 via Melnea Cass Boulevard into the LMA. This movement is expected to alleviate some of the traffic demand on Longwood Avenue between Huntington Avenue and Blackfan Street.

The distribution also accommodates trips into the site using the proposed westbound left-turn on Jimmy Fund Way from Brookline Avenue at the intersection of Brookline Avenue/Jimmy Fund Way/ Deaconess Road. It is estimated that 26 percent of inbound DFCI trips will utilize this new connection to the DFCI campus.

5.3.3.6 2016 Build Condition Peak Hour Traffic Volumes

The 2016 Build Condition weekday morning and evening peak hour traffic volumes were developed by adding DFCI IMP project-generated trips (represented in Figures 5-29 and 5-30) to the 2016 No-Build Condition traffic networks (as presented previously in Figures 5-25 and 5-26). Figures 5-31 and 5-32 present the 2016 Build Condition traffic volume networks for the morning and evening peak hours.

5.3.3.7 Public Transportation

The proposed project will generate approximately 104 and 89 new transit trips during the morning and evening peak hours respectively (see Table 5-17). These trips will be distributed amongst the transit and bus lines in the area. Transit operations are discussed in Section 5.4.

DFCI will continue to promote public transportation for its employees by maintaining a 50 percent transit subsidy for new employees. Many patients are too sick to use public transportation however, for those that are able, DFCI will provide them with detailed information on public transportation in the area. This includes posting transit schedules and maps in the new building and online as well as with pre-registration materials.

5.3.3.8 Pedestrian and Bicycle Operations

The project will generate approximately 84 walk and bike trips during the morning peak hour and 71 trips during the evening peak hour. Approximately 5 percent of these trips will be by bicycle according to existing trends at the DFCI campus. The remaining trips will be walk trips. The impacts of these additional pedestrians on pedestrian operations are discussed later in Section 5.4.

DFCI will continue to promote walking and bicycling as alternative modes of travel for employees. Through the CommuteFit program, employees are rewarded based on the mileage they register. With the project, approximately 200 new bicycle spaces will be provided in a secure location to encourage bicycling to the campus.

5.3.3.9 Parking

The project will include construction of approximately 460 underground parking spaces. Of these parking spaces, 243 are replacement parking from the Dana Building and the existing surface parking lot located on the 450 Brookline Avenue site. The remaining 217 parking spaces are new on-site parking spaces. The amount of net new on-site parking equates to 0.75 parking spaces per 1,000 GSF of development, a ratio consistent with the Boston Transportation Department's (BTD) guidelines for construction of new on-site parking in support of development projects in the LMA.

5.3.3.10 Loading and Service

DFCI plans to modify its Smith Building loading dock to support the proposed Center for Cancer Care. The existing facility will be modified to include two additional service bays, resulting in a 5-bay dock that will service both the Smith Building and the new Center for Cancer Care building. DFCI also plans to maintain loading and service functions currently taking place at its existing Dana Building loading facility on Binney Street. Finally, DFCI recently leased space at 27 Dry Dock Avenue in South Boston. This facility will house a new research laboratory and support services, as well as a significant materials management facility for DFCI. This will allow for the receiving of large orders off-site where they can then be broken down and shipped to the man LMA campus daily, utilizing "just in time" shipping techniques. This is an important and innovative commitment by DFCI as a means to reduce truck activity and queuing in the LMA, which can sometimes have a negative impact on traffic operations and pedestrian flow.

5.3.3.11 Development of Mitigation Plan

This section delineates the transportation improvements and mitigation plan developed by DFCI. The purpose of this transportation mitigation plan is to:

- Help alleviate transportation impacts generated by the DFCI IMP projects;
- Provide transportation infrastructure enhancements to the LMA, including improved pedestrian corridors, and public space amenities; and
- Exceed the requirements of the BRA's Interim Guidelines for the LMA relative to transportation improvements and mitigation.

DFCI 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, parking management strategies to limit the construction of new parking spaces to 0.75 parking spaces per 1,000 SF of development guideline established by the LMA Interim Guidelines, implementation of an improved pick-up/drop-off and patient valet parking operations management plan, and carefully coordinated construction management actions related to the forthcoming IMP projects. DFCI believes that these transportation mitigation actions will lessen the impacts of their proposed development plans and, when complete, will help improve the LMA's existing transportation infrastructure.

This joint transportation mitigation plan includes several elements:

- Roadway and traffic operations improvements
- Parking consolidation and management strategies
- Transportation demand management enhancements
- Sustainability
- Pedestrian access and open space improvements
- Construction management
- Participation in and partial funding of several system-wide transportation improvement studies for the LMA

Many of these mitigation elements will improve the LMA transportation infrastructure in addition to addressing potential impacts of the DFCI IMP projects.

Table 5-3 lists each transportation mitigation element that is proposed by DFCI and provides a summary of the following:

- Description of the proposed action
- Interim Guideline criterion that is met by that action
- Summary of the purpose and benefit of that action
- Implementation responsibility

Additionally, Figures 5-1 and 5-2 illustrate the physical location of the various transportation improvements that are proposed.

DFCI, in addition to the above measures, will commit to the following:

- Restrict all new parking in the Center for Cancer Care to patients/visitors only.
- Extend MBTA pass subsidy to employees of new building.
- Include a car-sharing space in new Center for Cancer Care garage.
- Develop and implement loading management plan.
- Employee a full-time loading dock manager.
- Maintain proactive relationship in MASCO's CommuteWorks TMA.
- Provide new covered bicycle parking on the DFCI campus (up to 200 bicycle spaces).
- Improve/update campus signage.

5.3.3.12 Construction Management Plan

In November 2006, DFCI received approval for a Construction Management Plan (CMP) for the Center for Cancer Care project from the BTD that complies with the City of Boston's Construction Management Program. The CMP includes detailed information regarding construction activities, materials to be used, staging areas, parking, truck routes, air quality and noise impacts and mitigation measures, and other subject matter as it relates to construction. A detailed discussion of the Construction Management Plan (CMP) is provided in Chapter 6, Section 6.11.

5.4 Transportation Operations Analyses

This section presents the transportation operations analyses for vehicular, pedestrian, and public transit facilities in the study area. This operations analysis provides a summary of transportation capacities and overall operations as they relate to delay and congestion.

5.4.1 Intersection Level of Service (LOS) Operations

Vehicle Level of Service (LOS) designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS D is considered acceptable. LOS E indicates vehicles endure significant delay while LOS F suggests unacceptable delay for the average vehicle. LOS thresholds differ for signalized and un-signalized intersections. Longer delays at signalized intersections than at unsignalized intersections are perceived as acceptable.

Consistent with BTD's guidelines, Synchro 6 software was used to model LOS operations at the study area intersections. LOS is a qualitative measure of control delay at an intersection providing an index to the operational qualities of a roadway or intersection.

Table 5-20 below presents the level of service delay threshold criteria as defined in the 2000 Highway Capacity Manual (HCM).

Table 5-20 Level of Service Criteria

Level of Service	Unsignalized Intersection Control Delay (sec/veh)	Signalized Intersection Control Delay (sec/veh)
LOS A	0-10	≤ 10
LOS B	> 10-15	> 10-20
LOS C	> 15-25	> 20-35
LOS D	> 25-35	> 35-55
LOS E	> 35-50	> 55-80
LOS F	> 50	> 80

Source: 2000 HCM

Adjustments were made to the Synchro model to include characteristics of the study area such as heavy vehicles, bus operations, parking activity, pedestrian crossings, and bicycle activity. Defacto turns were coded into the Synchro model when the traffic model recognized that a shared lane had a high enough turning volume that the lane is used for turns only even though there may not be striping or signs posted at the intersection to designate such operations. Often this condition only occurs during one peak hour.

Synchro calculation sheets are presented in the Transportation Appendix. A summary of the results for each analysis scenario is presented in Tables 5-21 thru 5-26. A comparison of the results is presented in Tables 5-27. Overall weighted LOS and delay are only given by Synchro for signalized intersections.

Table 5-21 Existing (2006) Intersection LOS Summary - AM Peak Hour

Intersection	LOS	Delay (sec.)	V/C Ratio	95th % Queue (feet)
Signalized Intersections				
Brookline Avenue/Riverway	F	>80.0	>1.0	NA
EB Brookline left	F	>80.0	>1.0	#436
EB Brookline thru/right	D	37.1	0.74	262
WB Brookline left	F	>80.0	>1.0	m#372
WB Brookline thru/right	C	21.8	0.38	m111
NB Riverway left/thru/right	F	>80.0	>1.0	#825
SB Riverway left/thru/right	C	31.6	0.66	220
Brookline Avenue/Francis Street	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left/thru/right	B	11.4	0.74	m224
WB Brookline left	E	55.7	0.93	m#269
WB Brookline thru/right	A	4.1	0.25	m90
NB Francis left/thru/right	F	>80.0	>1.0	73
SB Francis left/thru/right	F	>80.0	>1.0	#317
Brookline Avenue/Deaconess Road/Jimmy Fund Way	**C**	**29.3**	**0.79**	NA
EB Brookline thru/right	A	7.7	0.67	m211
WB Brookline left/thru	B	14.1	0.44	m240
NB Jimmy Fund left/right	F	>80.0	>1.0	15
SB Deaconess left/thru/right	E	65.5	0.85	119
Brookline Avenue/Longwood Avenue	**F**	**>80.0**	**>1.0**	NA
EB Brookline left	F	>80.0	>1.0	m#130
EB Brookline thru/right	F	>80.0	>1.0	m#548
WB Brookline left	C	27.4	0.68	#165
WB Brookline thru/right	B	14.2	0.50	206
NB Longwood left	F	>80.0	>1.0	m#173
NB Longwood thru	D	48.0	0.68	m155
NB Longwood right	C	23.0	0.61	m0
SB Longwood left	F	>80.0	0.97	#153
SB Longwood thru/right	F	>80.0	0.94	#244
Riverway/Longwood Avenue	**E**	**73.6**	**>1.0**	**NA**
EB Riverway left	D	43.7	0.90	#358
EB Riverway thru/right	D	51.2	0.97	#396
WB Riverway left/thru	E	55.8	0.98	#296
WB Riverway right	C	22.3	0.19	10

NB Longwood left	D	37.6	0.34	33
NB Longwood thru/right	C	28.0	0.38	124
SB Longwood left/thru	F	>80.0	>1.0	#508
SB Longwood right	A	8.7	0.16	61
Binney Street/Longwood Avenue	**F**	**>80.0**	**0.81**	**NA**
EB Binney left/thru/right	F	>80.0	>1.0	#259
WB Binney left/thru	F	>80.0	0.97	#183
WB Binney right	D	47.2	0.67	36
NB Longwood left/thru/right	A	3.7	0.39	m39
SB Longwood left/thru/right	A	7.6	0.58	m121
Blackfan Circle/Children's Hospital/Longwood Avenue	C	**28.0**	**0.91**	**NA**
EB Children's left/thru/right	D	48.8	0.62	56
WB Blackfan left	D	40.9	0.31	36
WB Blackfan thru/right	D	49.0	0.65	68
NB Longwood left/thru/right	C	33.7	0.96	#573
SB Longwood left/thru/right	B	15.7	0.73	m186
Huntington Avenue/Longwood Avenue	**D**	**53.8**	**>1.0**	**NA**
EB Huntington left	F	>80.0	0.93	#218
EB Huntington thru/right	C	21.1	0.55	192
WB Huntington left	D	53.1	0.71	124
WB Huntington thru	C	31.5	0.79	364
WB Huntington right (defacto)	C	29.9	0.69	231
NB Longwood left/thru/right	E	57.8	0.92	281
SB Longwood left (defacto)	F	>80.0	>1.0	m#253
SB Longwood thru/right	D	37.4	0.52	195
Huntington Avenue/Tremont Street/Calumet Street/Francis Street	**F**	**>80.0**	**>1.0**	**NA**
EB Huntington left/thru/right	C	33.6	0.56	300
WB Huntington left	C	20.5	0.17	67
WB Huntington left/thru/right	C	26.9	0.48	251
NB Tremont left/thru/right	F	>80.0	>1.0	#1,078
SB Francis left/thru/right	E	63.9	0.79	206
NE Calumet right	E	62.3	0.03	19
Beacon Street/Park Drive	C	**29.7**	**0.66**	**NA**
EB Beacon left/thru	C	32.4	0.69	203
EB Beacon right	C	28.2	0.39	146
WB Beacon left/thru	C	31.4	0.78	194

WB Beacon right	A	0.0	0.02	0
NB Park left (defacto)	D	35.3	0.57	#133
NB Park thru	C	29.4	0.66	#300
NB Park right	A	0.0	0.03	0
SB Park left/thru	C	28.5	0.68	#322
SB Park right	A	0.0	0.02	0
Riverway/Park Drive at Sears Rotary	**B**	**19.9**	**0.36**	**NA**
WB Sears Rotary left	A	0.3	0.16	1
WB Sears Rotary thru	A	0.3	0.18	1
NB Park left	C	31.5	0.73	240
NB Park thru	C	25.6	0.42	142
SB Park thru	C	33.7	0.71	181
SB Park right	D	44.3	0.82	52
Brookline Avenue/Fenway at Sears Rotary	**E**	**79.0**	**>1.0**	**NA**
EB Brookline thru/right	C	20.3	0.57	223
WB Brookline thru	D	43.2	0.84	m#534
SB Fenway left	F	>80.0	>1.0	#806
SB Fenway left/thru	C	23.6	0.66	221
SB Fenway right	B	16.1	0.44	8
Brookline Avenue/Boylston Street/Park Drive	C	**29.5**	**0.76**	**NA**
EB Brookline thru	C	29.2	0.52	m106
EB Brookline right	B	13.4	0.75	m186
WB Brookline thru	C	26.6	0.38	98
WB Brookline right	C	31.9	0.50	136
NB Park left/thru/right	C	33.7	0.68	193
NB Park right	D	45.3	0.67	#184
NW Boylston thru/right	D	38.5	0.88	#344
NW Boylston right	D	47.4	0.87	#329
Unsignalized Intersections				
Brookline Avenue/Fenwood Road				
EB Brookline thru/right	A	0.0	0.45	0
WB Brookline thru	A	0.0	0.48	0
NB Fenwood right	E	41.1	0.44	51
Brookline Avenue/Joslin Place				
EB Brookline left	B	11.5	0.19	17
EB Brookline thru	A	0.0	0.34	0
WB Brookline thru/right	A	0.0	0.20	0

Binney Street/Fenwood Road				
WB Binney Street left/right	B	10.1	0.23	22
NB Fenwood Road thru/right – closed	Closed for Construction			
SB Fenwood Road thru/ (left – closed)	A	0.0	0.06	0
Binney Street/Francis Street				
EB Binney left/thru/right – closed	Closed for Construction			
WB Binney left/thru/right	F	NA	>1.0	NA
NB Francis left/thru/right	A	0.4	0.01	1
SB Francis left/thru/right	A	8.5	0.33	35
Binney Street/Jimmy Fund Way/Children's Way				
EB Binney left/thru/right	B	11.6	0.42	NA
WB Binney left/thru/right	A	9.9	0.30	NA
NB Children's Way left/thru/right	A	8.8	0.07	NA
SB Jimmy Fund Way left/thru/right	B	10.5	0.32	NA
Pilgrim Road/Deaconess				
WB Pilgrim left	A	7.7	0.10	8
WB Pilgrim thru	A	0.0	0.06	0
Pilgrim Road/Joslin Place				
WB Pilgrim thru	A	0.0	0.13	0
NB Joslin left	B	12.1	0.25	25
NB Joslin right	A	9.5	0.08	6
Pilgrim Road/Longwood Avenue				
WB Pilgrim left/thru/right	F	>50.0	>1.0	133
NB Longwood left	A	9.8	0.11	10
NB Longwood thru/right	A	0.0	0.17	0
SB Longwood left	B	12.6	0.21	20
SB Longwood thru/right	A	0.0	0.25	0
Avenue Louis Pasteur/Longwood Avenue				
WB Avenue Louis left	F	NA	>1.0	NA
WB Avenue Louis right	F	>50.0	0.99	211
NB Longwood thru/right	A	0.0	0.42	0
SB Longwood left	C	15.7	0.45	58
SB Longwood thru	A	0.0	0.18	0

~ Volume exceeds capacity, queue is theoretically infinite.
 # 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal.

Table 5-22 Existing (2006) Intersection LOS Summary - PM Peak Hour

Intersection	LOS	Delay (sec.)	V/C Ratio	95th % Queue (feet)
Signalized Intersections				
Brookline Avenue/Riverway	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left	F	>80.0	>1.0	#420
EB Brookline thru/right	D	40.6	0.64	257
WB Brookline left	F	>80.0	>1.0	m#643
WB Brookline thru/right	C	26.0	0.60	m255
NB Riverway left/thru/right	F	>80.0	>1.0	#870
SB Riverway left/thru/right	F	>80.0	>1.0	#786
Brookline Avenue/Francis Street	**E**	**74.9**	**>1.0**	**NA**
EB Brookline left/thru/right	F	>80.0	>1.0	#453
WB Brookline left	F	>80.0	>1.0	m#349
WB Brookline thru/right	B	15.4	0.53	m269
NB Francis left/thru/right	F	>80.0	>1.0	#266
SB Francis left/thru/right	E	61.6	0.84	136
Brookline Avenue/Deaconess Road/Jimmy Fund Way	**D**	**40.0**	**0.94**	**NA**
EB Brookline thru/right	A	9.1	0.69	m108
WB Brookline left/thru	C	25.1	0.77	m108
NB Jimmy Fund left/right	F	>80.0	>1.0	#320
SB Deaconess left/thru/right	D	41.3	0.68	124
Brookline Avenue/Longwood Avenue	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left	F	>80.0	>1.0	#144
EB Brookline thru/right	F	>80.0	>1.0	m#833
WB Brookline left	F	>80.0	>1.0	#256
WB Brookline thru/right	F	>80.0	>1.0	206
NB Longwood left	F	>80.0	>1.0	#439
NB Longwood thru	F	>80.0	>1.0	m#379
NB Longwood right	F	>80.0	>1.0	7
SB Longwood left	F	>80.0	>1.0	#89
SB Longwood thru/right	F	>80.0	>1.0	174
Riverway/Longwood Avenue	**F**	**>80.0**	**>1.0**	**NA**
EB Riverway left	C	28.2	0.75	#258
EB Riverway thru/right	C	24.5	0.62	225
WB Riverway left/thru	F	>80.0	>1.0	#510
WB Riverway right	C	33.5	0.79	108
NB Longwood left	F	>80.0	0.82	#100

NB Longwood thru/right	F	>80.0	>1.0	#479
SB Longwood left/thru	F	>80.0	>1.0	#471
SB Longwood right	B	14.1	0.45	193
Binney Street/Longwood Avenue	**F**	**>80.0**	**0.97**	**NA**
EB Binney left/thru/right	F	>80.0	>1.0	#340
WB Binney left/thru	F	>80.0	>1.0	#368
WB Binney right	D	46.9	0.64	24
NB Longwood left/thru/right	A	7.4	0.46	m108
SB Longwood left/thru/right	B	14.9	0.45	m47
Blackfan Circle/Children's Hospital/Longwood Avenue	**C**	**30.3**	**0.76**	**NA**
EB Children's left/thru/right	F	>80.0	0.97	#227
WB Blackfan left	D	43.3	0.45	93
WB Blackfan thru/right	D	42.8	0.50	79
NB Longwood left/thru/right	C	22.4	0.69	466
SB Longwood left/thru/right	A	8.4	0.43	m106
Huntington Avenue/Longwood Avenue	**D**	**42.8**	**0.88**	**NA**
EB Huntington left	D	40.4	0.31	54
EB Huntington thru/right	C	21.6	0.58	249
WB Huntington left	F	>80.0	0.96	#234
WB Huntington thru/right	C	26.9	0.76	327
NB Longwood left/thru/right	D	41.6	0.75	#239
SB Longwood left/thru/right	E	79.5	>1.0	#317
Huntington Avenue/Tremont Street/Calumet Street/Francis Street	**F**	**>80.0**	**>1.0**	**NA**
EB Huntington left/thru/right	D	50.7	0.90	#652
WB Huntington left	B	17.2	0.31	40
WB Huntington left/thru/right	C	28.8	0.76	308
NB Tremont left/thru/right	F	>80.0	>1.0	#695
SB Francis left/thru/right	F	>80.0	0.94	233
NE Calumet right	E	64.7	0.15	51
Beacon Street/Park Drive	**D**	**51.0**	**>1.0**	**NA**
EB Beacon left/thru	C	32.4	0.51	138
EB Beacon right	C	32.0	0.40	157
WB Beacon left/thru	D	51.8	0.97	#437
WB Beacon right	A	0.1	0.04	0
NB Park left (defacto)	F	>80.0	>1.0	#335
NB Park thru	D	41.6	0.83	#591

NB Park right	A	0.1	0.04	0
SB Park left/thru	C	29.1	0.62	#289
SB Park right	A	0.0	0.02	0
Riverway/Park Drive at Sears Rotary	**B**	**16.9**	**0.60**	**NA**
WB Sears Rotary left	A	4.4	0.21	31
WB Sears Rotary thru	A	4.6	0.40	71
NB Park left	C	21.9	0.80	m281
NB Park thru	B	16.4	0.49	m143
SB Park thru	C	21.5	0.50	136
SB Park right	D	39.9	0.88	258
Brookline Avenue/Fenway at Sears Rotary	**D**	**45.0**	**0.95**	**NA**
EB Brookline thru/right	C	24.6	0.67	#290
WB Brookline thru	C	33.1	0.72	m#374
SB Fenway left	F	>80.0	>1.0	#734
SB Fenway left/thru	C	25.4	0.71	295
SB Fenway right	B	18.2	0.25	22
Brookline Avenue/Boylston Street/Park Drive	**E**	**70.3**	**>1.0**	**NA**
EB Brookline thru	C	22.1	0.39	#118
EB Brookline right	B	14.0	0.78	m208
WB Brookline thru	C	23.4	0.34	107
WB Brookline right	F	>80.0	>1.0	#520
NB Park left/thru/right	D	42.2	0.88	#253
NB Park right	E	67.2	0.87	#234
NW Boylston thru/right	E	78.7	>1.0	#365
NW Boylston right	F	>80.0	>1.0	#435
Unsignalized Intersections				
Brookline Avenue/Fenwood Road				
EB Brookline thru/right	A	0.0	0.34	0
WB Brookline thru	A	0.0	0.87	0
NB Fenwood right	C	16.5	0.17	15
Brookline Avenue/Joslin Place				
EB Brookline left	B	11.6	0.16	14
EB Brookline thru	A	0.0	0.33	0
WB Brookline thru/right	A	0.0	0.20	0
Binney Street/Fenwood Road				
WB Binney Street left/right	A	9.3	0.12	10
NB Fenwood Road thru/right – closed	Closed for Construction			
SB Fenwood Road thru/ (left – closed)	**A**	0.0	0.04	0

Binney Street/Francis Street				
EB Binney left/thru/right – closed	Closed for Construction			
WB Binney left/thru/right	F	NA	>1.0	NA
NB Francis left/thru/right	A	0.1	0.0	0
SB Francis left/thru/right	B	12.2	0.36	39
Binney Street/Jimmy Fund Way/Children's Way				
EB Binney left/thru/right	B	12.2	0.47	NA
WB Binney left/thru/right	B	11.8	0.50	NA
NB Children's Way left/thru/right	A	9.1	0.08	NA
SB Jimmy Fund Way left/thru/right	A	9.6	0.17	NA
Pilgrim Road/Deaconess				
WB Pilgrim left	A	7.8	0.14	12
WB Pilgrim thru	A	0.0	0.05	0
Pilgrim Road/Joslin Place				
WB Pilgrim thru	A	0.0	0.17	0
NB Joslin left	B	12.1	0.14	12
NB Joslin right	A	9.7	0.08	6
Pilgrim Road/Longwood Avenue				
WB Pilgrim left/thru/right	F	NA	>1.0	NA
NB Longwood left	A	9.3	0.15	14
NB Longwood thru/right	A	0.0	0.29	0
SB Longwood left	C	21.8	0.16	15
SB Longwood thru/right	A	0.0	0.17	0
Avenue Louis Pasteur/Longwood Avenue				
WB Avenue Louis left	F	>50.0	>1.0	338
WB Avenue Louis right	F	>50.0	0.77	146
NB Longwood thru/right	A	0.0	0.24	0
SB Longwood left	B	11.7	0.26	26
SB Longwood thru	A	0.0	0.26	0

~ *Volume exceeds capacity, queue is theoretically infinite.*

95th percentile volume exceeds capacity, queue may be longer.

m *Volume for 95th percentile queue is metered by upstream signal.*

5.4.1.1 Existing (2006) Intersection LOS Summary AM Peak Hour

Many of the signalized intersections in the study area currently operate at LOS D or lower during the morning peak hour period. Lengthy vehicle queuing along several corridors of the study area has been observed through field observations. Brookline Avenue experiences queuing in the morning in the eastbound direction specifically at the Brookline Avenue and Riverway intersection and at the Brookline Avenue and Longwood Avenue intersection. In addition, the Longwood Avenue southbound direction approaching Brookline Avenue experiences extensive queues. Binney Street in the eastbound direction at the Longwood Avenue approach and in the westbound direction at the Francis Street approach also experiences long queues.

The intersection of Brookline Avenue/Deaconess Road/Jimmy Fund Way, adjacent to DFCI, currently operates at LOS C overall during the AM peak hour. The Jimmy Fund Way northbound approach experiences LOS F due to the one-lane capacity, while the Deaconess Road southbound approach experiences LOS E. Currently, the Brookline Avenue westbound left-turn is prohibited, however it is important to note that approximately 25 vehicles still make this turn during the peak hours.

The Sears Rotary experiences vehicles queuing at the Boylston Street northwest-bound approach and the Park Drive northbound and southbound approaches. The traffic congestion in the study area causes long delays for vehicles resulting in poor LOS at some of the intersections studied.

5.4.1.2 Existing (2006) Intersection LOS Summary PM Peak Hour

Similar to the morning peak period, the majority of the signalized intersections operate under LOS D or lower during the evening peak period. During the evening peak period, queues were observed along the Brookline Avenue corridor from Longwood Avenue to the Riverway in the east direction. Vehicles also queued along Longwood Avenue in the northbound direction before the intersection of Longwood Avenue and the Riverway. Binney Street experiences queuing in the eastbound direction at the intersection of Binney Street and Longwood Avenue and in the westbound direction at the intersection of Binney Street and Francis Street.

It is important to note that the Brookline Avenue storage lanes, located between the two intersections at the Sears Rotary in the westbound direction, fill to capacity which queues up traffic on the Brookline Avenue westbound and Boylston Street northwest-bound approaches. This intersection cannot process these vehicles traveling westbound in one cycle length. Additional field observations indicate that vehicles making permitted lefts are collecting in the middle of these two intersections and are clearing during the exclusive pedestrian phases at intersections that are operating over capacity. The intersection of Brookline Avenue and Longwood Avenue is an example of where this occurs. This intersection operates at an overall LOS F (and LOS F on every approach). Drivers are using the exclusive pedestrian phase to clear out of the intersection once their phase has already ended. The evening peak period traffic congestion causes several corridors in the study area to queue causing poor operation.

The intersection of Brookline Avenue/Deaconess Road/Jimmy Fund Way operates at LOS D during the PM peak hour. The Jimmy Fund Way northbound approach experiences delay and a LOS F while the Deaconess Road southbound approach experiences LOS D. Observation indicated that illegal left-turns on Jimmy Fund Way from the westbound Brookline Avenue approach clear the intersection during the all-exclusive pedestrian phase at times.

Table 5-23 No-Build (2016) Intersection LOS Summary - AM Peak Hour

Intersection	LOS	Delay (sec.)	V/C Ratio	95th % Queue (feet)
Signalized Intersections				
Brookline Avenue/Riverway	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left	F	>80.0	>1.0	#457
EB Brookline thru/right	D	42.2	0.84	#324
WB Brookline left	F	>80.0	>1.0	m#449
WB Brookline thru/right	C	23.4	0.44	m142
NB Riverway left/thru/right	F	>80.0	>1.0	#951
SB Riverway left/thru/right	C	32.5	0.70	234
Brookline Avenue/Francis Street	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left/thru/right	B	13.0	0.88	m#287
WB Brookline left	F	>80.0	>1.0	m#344
WB Brookline thru/right	A	4.7	0.29	m127
NB Francis left/thru/right	F	>80.0	>1.0	#104
SB Francis left/thru/right	F	>80.0	>1.0	#352
Brookline Avenue/Deaconess Road/Jimmy Fund Way	**D**	**35.2**	**0.91**	**NA**
EB Brookline thru/right	A	8.4	0.79	m570
WB Brookline left/thru	B	15.5	0.53	m288
NB Jimmy Fund left/right	F	>80.0	>1.0	17
SB Deaconess left/thru/right	F	>80.0	0.97	137
Brookline Avenue/Longwood Avenue	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left	F	>80.0	>1.0	m#117
EB Brookline thru/right	F	>80.0	>1.0	m#658
WB Brookline left	D	42.2	0.56	122
WB Brookline thru/right	B	16.3	0.63	282
NB Longwood left	F	>80.0	>1.0	m#185
NB Longwood thru	D	53.4	0.77	m171
NB Longwood right	B	14.5	0.39	m0
SB Longwood left	F	>80.0	>1.0	#205
SB Longwood thru/right	F	>80.0	>1.0	#331
Riverway/Longwood Avenue	**F**	**>80.0**	**>1.0**	**NA**
EB Riverway left	D	54.9	0.96	#391
EB Riverway thru/right	E	63.2	>1.0	#428
WB Riverway left/thru	D	43.0	0.92	276
WB Riverway right	C	22.4	0.20	14
NB Longwood left	D	38.4	0.36	34

NB Longwood thru/right	C	28.2	0.39	128
SB Longwood left/thru	F	>80.0	>1.0	#592
SB Longwood right	A	8.8	0.17	65
Binney Street/Longwood Avenue	**F**	**>80.0**	**0.75**	**NA**
EB Binney left/thru/right	F	>80.0	>1.0	#268
WB Binney left/thru	D	44.6	0.58	#114
WB Binney right	D	40.7	0.52	34
NB Longwood left/thru/right	A	4.3	0.36	51
SB Longwood left/thru/right	A	6.2	0.52	m51
Blackfan Circle/Children's Hospital/Longwood Avenue	**B**	**17.9**	**0.66**	**NA**
EB Children's left/thru/right	D	54.0	0.68	59
WB Blackfan left	D	42.0	0.37	40
WB Blackfan thru/right	D	48.3	0.64	65
NB Longwood left	B	10.2	0.37	m41
NB Longwood thru/right	B	12.7	0.66	m182
SB Longwood left	B	10.3	0.40	m39
SB Longwood thru/right	B	12.0	0.60	m230
Huntington Avenue/Longwood Avenue	**E**	**72.2**	**>1.0**	**NA**
EB Huntington left	F	>80.0	>1.0	#392
EB Huntington thru/right	C	21.9	0.59	210
WB Huntington left	E	56.1	0.75	#132
WB Huntington thru	D	38.6	0.88	426
WB Huntington right (defacto)	C	30.0	0.69	232
NB Longwood left/thru/right	E	57.5	0.92	278
SB Longwood left (defacto)	F	>80.0	>1.0	#233
SB Longwood thru/right	D	42.4	0.60	214
Huntington Avenue/Tremont Street/Calumet Street/Francis Street	**F**	**>80.0**	**>1.0**	**NA**
EB Huntington left/thru/right	D	47.2	0.81	490
WB Huntington left	C	21.2	0.22	74
WB Huntington left/thru/right	C	29.5	0.59	295
NB Tremont left/thru/right	F	>80.0	>1.0	#1156
SB Francis left/thru/right	E	75.1	0.89	232
NE Calumet right	E	62.3	0.03	19
Beacon Street/Park Drive	**D**	**41.5**	**0.77**	**NA**
EB Beacon left/thru	C	33.8	0.73	217
EB Beacon right	C	28.9	0.42	159

WB Beacon left/thru	C	25.1	0.71	193
WB Beacon right	A	0.0	0.02	0
NB Park left (defacto)	F	>80.0	0.98	#165
NB Park thru	D	37.1	0.75	#348
NB Park right	A	0.0	0.03	0
SB Park left/thru	E	63.6	>1.0	#451
SB Park right	A	0.0	0.02	0
Riverway/Park Drive at Sears Rotary	**B**	**19.5**	**0.37**	**NA**
WB Sears Rotary left	A	0.7	0.10	6
WB Sears Rotary thru	A	0.9	0.19	14
NB Park left	C	30.2	0.68	m224
NB Park thru	C	26.8	0.49	m172
SB Park thru	C	30.9	0.74	210
SB Park right	C	32.4	0.71	47
Brookline Avenue/Fenway at Sears Rotary	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline thru/right	C	20.6	0.59	#246
WB Brookline thru	D	51.8	0.94	m#587
SB Fenway left	F	>80.0	>1.0	#893
SB Fenway left/thru	B	19.8	0.64	179
SB Fenway right	B	10.0	0.51	0
Brookline Avenue/Boylston Street/Park Drive	**C**	**32.2**	**0.80**	**NA**
EB Brookline thru	C	29.0	0.54	m103
EB Brookline right	B	13.2	0.77	m180
WB Brookline thru	C	27.4	0.42	105
WB Brookline right	C	31.9	0.49	132
NB Park left/thru/right	C	34.6	0.72	203
NB Park right	D	47.6	0.70	#197
NW Boylston thru/right	D	45.2	0.94	#387
NW Boylston right	E	57.9	0.93	#370
Unsignalized Intersections				
Brookline Avenue/Fenwood Road				
EB Brookline thru/right	A	0.0	0.54	0
WB Brookline thru	A	0.0	0.56	0
NB Fenwood right	F	>50	>1.0	231
Brookline Avenue/Joslin Place				
EB Brookline left	B	13.4	0.30	31
EB Brookline thru	A	0.0	0.39	0
WB Brookline thru/right	A	0.0	0.33	0

Binney Street/Fenwood Road				
WB Binney Street left/right	C	15.9	0.44	55
NB Fenwood Road thru/right	A	0.0	0.23	0
SB Fenwood Road left/thru	A	2.3	0.03	2
Binney Street/Francis Street				
EB Binney left/thru/right	F	NA	NA	NA
WB Binney left/thru/right	F	NA	NA	NA
NB Francis left/thru/right	A	0.4	0.02	1
SB Francis left/thru/right	A	8.4	0.32	34
Binney Street/Jimmy Fund Way/Children's Way				
EB Binney left/thru/right	B	12.2	0.45	NA
WB Binney left/thru/right	B	10.4	0.34	NA
NB Children's Way left/thru/right	A	9.0	0.08	NA
SB Jimmy Fund Way left/thru/right	B	11.0	0.34	NA
Pilgrim Road/Deaconess				
WB Pilgrim left	A	7.8	0.12	10
WB Pilgrim thru	A	0.0	0.07	0
Pilgrim Road/Joslin Place				
WB Pilgrim thru	A	0.0	0.08	0
NB Joslin left	B	11.3	0.24	23
NB Joslin right	A	9.9	0.15	13
Pilgrim Road/Longwood Avenue				
EB Pilgrim left/thru/right	F	NA	>1.0	NA
WB Pilgrim left/thru/right	F	NA	>1.0	NA
NB Longwood left	C	15.0	0.36	41
NB Longwood thru/right	A	0.0	0.17	0
SB Longwood left	B	12.7	0.23	22
SB Longwood thru/right	A	0.0	0.28	0
Avenue Louis Pasteur/Longwood Avenue				
WB Avenue Louis left	F	NA	>1.0	NA
WB Avenue Louis right	F	>50.0	0.85	154
NB Longwood thru/right	A	0.0	0.44	0
SB Longwood left	C	15.7	0.43	55
SB Longwood thru	A	0.0	0.18	0

~ Volume exceeds capacity, queue is theoretically infinite.
 # 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal.

Table 5-24 No-Build (2016) Intersection LOS Summary - PM Peak Hour

Intersection	LOS	Delay (sec.)	V/C Ratio	95th % Queue (feet)
Signalized Intersections				
Brookline Avenue/Riverway	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left	F	>80.0	>1.0	#439
EB Brookline thru/right	D	42.4	0.69	283
WB Brookline left	F	>80.0	>1.0	m#907
WB Brookline thru/right	C	29.5	0.71	m323
NB Riverway left/thru/right	F	>80.0	>1.0	#946
SB Riverway left/thru/right	F	>80.0	>1.0	#836
Brookline Avenue/Francis Street	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left/thru/right	F	>80.0	>1.0	m#511
WB Brookline left	F	>80.0	>1.0	m#302
WB Brookline thru/right	B	18.7	0.69	m322
NB Francis left/thru/right	F	>80.0	>1.0	#316
SB Francis left/thru/right	F	>80.0	0.99	168
Brookline Avenue/Deaconess Road/Jimmy Fund Way	**E**	**59.9**	**>1.0**	**NA**
EB Brookline thru/right	A	9.8	0.76	m104
WB Brookline left/thru	D	35.4	0.97	m117
NB Jimmy Fund left/right	F	>80.0	>1.0	#380
SB Deaconess left/thru/right	E	58.0	0.87	157
Brookline Avenue/Longwood Avenue	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left	F	>80.0	>1.0	#156
EB Brookline thru/right	F	>80.0	>1.0	m#844
WB Brookline left	F	>80.0	>1.0	#256
WB Brookline thru/right	F	>80.0	>1.0	314
NB Longwood left	F	>80.0	>1.0	#409
NB Longwood thru	F	>80.0	>1.0	m#474
NB Longwood right	D	53.1	0.67	0
SB Longwood left	F	>80.0	>1.0	#233
SB Longwood thru/right	F	>80.0	>1.0	216
Riverway/Longwood Avenue	**F**	**>80.0**	**>1.0**	**NA**
EB Riverway left	D	41.5	0.79	#284
EB Riverway thru/right	C	25.2	0.66	240
WB Riverway left/thru	F	>80.0	>1.0	#552
WB Riverway right	D	36.9	0.83	123
NB Longwood left	F	>80.0	0.97	#111

NB Longwood thru/right	F	>80.0	>1.0	#584
SB Longwood left/thru	F	>80.0	>1.0	#555
SB Longwood right	B	14.5	0.47	205
Binney Street/Longwood Avenue	**F**	**>80.0**	**0.87**	**NA**
EB Binney left/thru/right	F	>80.0	>1.0	#339
WB Binney left/thru	F	>80.0	>1.0	#297
WB Binney right	D	41.5	0.43	22
NB Longwood left/thru/right	A	7.3	0.44	m83
SB Longwood left/thru/right	B	17.2	0.43	m40
Blackfan Circle/Children's Hospital/Longwood Avenue	**C**	**30.1**	**0.69**	**NA**
EB Children's left/thru/right	F	>80.0	0.95	220
WB Blackfan left	D	44.8	0.51	98
WB Blackfan thru/right	D	41.5	0.38	62
NB Longwood left	B	14.0	0.22	45
NB Longwood thru/right	B	18.5	0.56	339
SB Longwood left	A	5.5	0.12	m13
SB Longwood thru/right	B	12.8	0.59	m245
Huntington Avenue/Longwood Avenue	**D**	**54.0**	**0.94**	**NA**
EB Huntington left	D	42.6	0.51	79
EB Huntington thru/right	C	22.5	0.62	277
WB Huntington left	F	>80.0	>1.0	#250
WB Huntington thru/right	C	28.8	0.81	358
NB Longwood left/thru/right	E	68.6	0.93	#292
SB Longwood left/thru/right	F	>80.0	>1.0	#340
Huntington Avenue/Tremont Street/Calumet Street/Francis Street	**F**	**>80.0**	**>1.0**	**NA**
EB Huntington left/thru/right	F	>80.0	>1.0	#738
WB Huntington left	B	17.7	0.34	42
WB Huntington left/thru/right	D	40.9	0.92	386
NB Tremont left/thru/right	F	>80.0	>1.0	#785
SB Francis left/thru/right	F	>80.0	>1.0	#281
NE Calumet right	E	64.8	0.16	52
Beacon Street/Park Drive	**E**	**71.5**	**>1.0**	**NA**
EB Beacon left (defacto)	E	78.1	0.78	69
EB Beacon left/thru	C	31.6	0.46	176
EB Beacon right	C	32.7	0.43	171
WB Beacon left/thru	E	63.1	>1.0	#462

WB Beacon right	A	0.1	0.04	0
NB Park left (defacto)	F	>80.0	>1.0	#389
NB Park thru	D	49.6	0.90	#674
NB Park right	A	0.1	0.04	0
SB Park left/thru	C	34.3	0.76	#413
SB Park right	A	0.0	0.02	0
Riverway/Park Drive at Sears Rotary	**B**	**16.7**	**0.64**	**NA**
WB Sears Rotary left	A	4.4	0.18	24
WB Sears Rotary thru	A	4.8	0.44	74
NB Park left	C	21.8	0.80	m262
NB Park thru	B	17.0	0.53	m148
SB Park thru	C	20.9	0.55	164
SB Park right	D	37.1	0.88	282
Brookline Avenue/Fenway at Sears Rotary	**E**	**58.4**	**>1.0**	**NA**
EB Brookline thru/right	C	26.3	0.74	#365
WB Brookline thru	C	34.9	0.77	m#403
SB Fenway left	F	>80	>1.0	#852
SB Fenway left/thru	C	24.2	0.72	296
SB Fenway right	B	14.2	0.27	17
Brookline Avenue/Boylston Street/Park Drive	**E**	**74.8**	**>1.0**	**NA**
EB Brookline thru	C	22.7	0.41	m#116
EB Brookline right	B	15.2	0.85	m228
WB Brookline thru	C	23.6	0.35	112
WB Brookline right	F	>80.0	>1.0	#528
NB Park left/thru/right	D	49.1	0.94	#295
NB Park right	F	>80.0	0.94	#260
NW Boylston thru/right	F	>80.0	>1.0	#389
NW Boylston right	F	>80.0	>1.0	#440
Unsignalized Intersections				
Brookline Avenue/Fenwood Road				
EB Brookline thru/right	A	0.0	0.38	0
WB Brookline thru	A	0.0	>1.0	0
NB Fenwood right	C	17.7	0.19	17
Brookline Avenue/Joslin Place				
EB Brookline left	B	13.5	0.23	22
EB Brookline thru	A	0	0.36	0
WB Brookline thru/right	A	0	0.40	0
Binney Street/Fenwood Road				

WB Binney Street left/right	C	19.7	0.35	39
NB Fenwood Road thru/right	A	0.0	0.38	0
SB Fenwood Road thru	A	5.2	0.09	7
Binney Street/Francis Street				
EB Binney left/thru/right	F	NA	NA	NA
WB Binney left/thru/right	F	NA	NA	NA
NB Francis left/thru/right	A	0.10	0.0	0
SB Francis left/thru/right	B	13.9	0.39	44
Binney Street/Jimmy Fund Way/Children's Way				
EB Binney left/thru/right	B	13.0	0.50	NA
WB Binney left/thru/right	B	13.4	0.57	NA
NB Children's Way left/thru/right	A	9.4	0.09	NA
SB Jimmy Fund Way left/thru/right	A	10.0	0.19	NA
Pilgrim Road/Deaconess				
WB Pilgrim left	A	8.0	0.18	17
WB Pilgrim thru	A	0.0	0.05	0
Pilgrim Road/Joslin Place				
WB Pilgrim thru	A	0.0	0.21	0
NB Joslin left	B	12.9	0.16	14
NB Joslin right	A	9.8	0.10	8
Pilgrim Road/Longwood Avenue				
EB Pilgrim left/thru/right	F	NA	NA	NA
WB Pilgrim left/thru/right	F	NA	NA	NA
NB Longwood left	B	12.2	0.31	33
NB Longwood thru/right	A	0.0	0.34	0
SB Longwood left	C	23.3	0.18	16
SB Longwood thru/right	A	0.0	0.18	0
Avenue Louis Pasteur/Longwood Avenue				
WB Avenue Louis left	F	NA	>1.0	NA
WB Avenue Louis right	D	33.5	0.55	76
NB Longwood thru/right	A	0.0	0.25	0
SB Longwood left	B	11.9	0.27	27
SB Longwood thru	A	0.0	0.30	0

~ Volume exceeds capacity, queue is theoretically infinite.
 # 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal.

5.4.1.3 No-Build (2016) Intersection LOS Summary AM Peak Hour

Of the thirteen signalized intersections in the study area, seven are expected to remain at the same overall LOS from the Existing (2006) Condition to the No-Build (2016) Condition. The following analysis describes the expected changes regarding the traffic operations of the signalized intersections from the Existing (2006) Condition to the No-Build (2016) Condition during the morning peak hour.

During the No-Build Condition, the overall LOS is expected to lower from LOS C to LOS D at the intersection of Brookline Avenue/Deaconess Road/Jimmy Fund Way. This is due to additional traffic generated by the Joslin Diabetes Center project being added to the Deaconess Road southbound approach.

The intersection of Riverway/Longwood Avenue is expected to decrease from overall LOS E to LOS F. This will be caused by the addition of general traffic growth along the Riverway at the east and westbound approaches. However, traffic operations are expected to improve at the Blackfan Circle/Children's Hospital/Longwood Avenue intersection during the No-Build Condition. With the opening of the extension road between Avenue Louis Pasteur and Blackfan Circle, operations are expected to improve from overall LOS C to LOS B since traffic will be rerouted from the Longwood Avenue northbound approach. The Huntington Avenue/Longwood Avenue intersection is expected to lower from LOS D to LOS E during the No-Build Condition. The addition of traffic to the Huntington Avenue westbound approach will contribute to this change.

Overall traffic operations are expected to decline from LOS C to LOS D at the Beacon Street/Park Drive intersection due to increased traffic along Park Drive in the north and southbound directions.

The Brookline Avenue/Fenway intersection at Sears Rotary is expected to decrease from LOS E to LOS F due to an increase of traffic expected in 2016.

Unsignalized intersection traffic operations are also expected to change in the No-Build Condition. The Fenwood Road northbound approach is expected to decrease from LOS E to LOS F at the Brookline Avenue/Fenwood Road intersection due to a large increase of traffic. Since construction at 70 Francis Street currently prohibits northbound traffic at the Binney Street/Fenwood Road intersection, traffic will increase in the northbound direction along Fenwood Road in the future with the completion of the construction site and the reopening of the two-way street. In addition, the Binney Street westbound approach is expected to experience greater delay and a decrease from LOS B to LOS C due to the future northbound traffic along Fenwood Road. Finally, the unsignalized intersection of Pilgrim Road/Longwood Avenue is expected to experience a decrease from LOS A to LOS C at the Longwood Avenue northbound left movement due to an increase in traffic in the opposing southbound direction. Additionally, the opening of Pilgrim Road in the eastbound direction is expected to result in LOS F for the eastbound approach.

5.4.1.4 No-Build (2016) Intersection LOS Summary PM Peak Hour

Of the thirteen signalized intersections during the evening peak hour, nine are expected to remain at the same overall LOS from the Existing (2006) Condition to the No-Build (2016) Condition. Traffic operations are expected to decline from overall LOS E to LOS F at the Brookline Avenue/Francis Street intersection due to anticipated traffic growth in 2016. The overall LOS is expected to worsen from LOS D to LOS E at the intersection of Brookline Avenue/Deaconess Road/Jimmy Fund Way. This is due to additional traffic, attributed to growth and other approved projects, being added to the Deaconess Road southbound approach and Brookline Avenue westbound approach in the No-Build Condition. Overall traffic operations are expected to decline from LOS D to LOS E at the Beacon Street/Park Drive intersection due to increased traffic along Beacon Street in the westbound direction. The Brookline Avenue/Fenway intersection at Sears Rotary is expected to decrease from LOS D to LOS E due to an increase of traffic expected in 2016.

Traffic will increase significantly in the northbound direction along Fenwood Road in the future with the completion of the 70 Francis Street project and the reopening of the two-way street. Therefore, the Binney Street westbound approach is expected to experience greater delay and a decrease from LOS A to LOS C due to the future northbound traffic along Fenwood Road. The unsignalized intersection of Pilgrim Road/Longwood Avenue is expected to experience a decrease from LOS A to LOS B at the Longwood Avenue northbound left movement due to an increase in traffic in the opposing southbound direction. The future eastbound approach is also expected to operate at LOS F during the evening peak hour. Lastly, the Avenue Louis Pasteur westbound right movement is expected to improve from LOS F to LOS D due to the future condition of the Blackfan Circle to Avenue Louis Pasteur extension and the connection between Blackfan Circle and Brookline Avenue which will redistribute traffic through the future BIDMC campus roadway network.

Table 5-25 Build (2016) Intersection LOS Summary - AM Peak Hour

Intersection	LOS	Delay (sec.)	V/C Ratio	95th % Queue (feet)
Signalized Intersections				
Brookline Avenue/Riverway	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left	F	>80.0	>1.0	#457
EB Brookline thru/right	D	43.3	0.85	#334
WB Brookline left	F	>80.0	>1.0	m#457
WB Brookline thru/right	C	24.0	0.45	m152
NB Riverway left/thru/right	F	>80.0	>1.0	#956
SB Riverway left/thru/right	C	32.5	0.70	234
Brookline Avenue/Francis Street	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left/thru/right	B	13.1	0.89	m#342
WB Brookline left	F	>80	>1.0	m#348
WB Brookline thru/right	A	4.5	0.29	m126
NB Francis left/thru/right	F	>80.0	>1.0	#104
SB Francis left/thru/right	F	>80.0	>1.0	#352
Brookline Avenue/Deaconess Road/Jimmy Fund Way	**C**	**23.5**	**0.90**	**NA**
EB Brookline thru/right	B	12.3	0.89	#608
WB Brookline left/thru	C	21.6	0.71	m0
NB Jimmy Fund left	F	>80.0	0.95	#172
NB Jimmy Fund right	D	43.0	0.60	11
SB Deaconess left/thru/right	D	54.8	0.80	131
Brookline Avenue/Longwood Avenue	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left	F	>80.0	>1.0	#110
EB Brookline thru/right	F	>80.0	>1.0	#675
WB Brookline left	D	43.2	0.59	129
WB Brookline thru/right	B	16.6	0.64	291
NB Longwood left	F	>80.0	>1.0	m#185
NB Longwood thru	D	53.6	0.78	m170
NB Longwood right	B	14.9	0.39	m0
SB Longwood left	F	>80.0	>1.0	#206
SB Longwood thru/right	F	>80.0	>1.0	#348
Riverway/Longwood Avenue	**F**	**>80.0**	**>1.0**	**NA**
EB Riverway left	D	54.9	0.96	#391
EB Riverway thru/right	E	63.2	>1.0	#428
WB Riverway left/thru	D	43.0	0.92	276
WB Riverway right	C	22.4	0.20	14

NB Longwood left	D	38.4	0.36	34
NB Longwood thru/right	C	28.2	0.40	131
SB Longwood left/thru	F	>80.0	>1.0	#605
SB Longwood right	A	8.8	0.17	65
Binney Street/Longwood Avenue	**F**	**>80.0**	**0.79**	**NA**
EB Binney left/thru/right	F	>80.0	>1.0	#286
WB Binney left/thru	D	45.7	0.61	#123
WB Binney right	D	40.7	0.52	34
NB Longwood left/thru/right	A	4.4	0.40	55
SB Longwood left/thru/right	A	6.1	0.54	m51
Blackfan Circle/Children's Hospital/Longwood Avenue	**B**	**18.3**	**0.68**	**NA**
EB Children's left/thru/right	D	51.8	0.66	59
WB Blackfan left	D	41.3	0.35	40
WB Blackfan thru/right	D	48.9	0.66	69
NB Longwood left	B	10.5	0.37	m41
NB Longwood thru/right	B	13.5	0.68	m191
SB Longwood left	B	11.0	0.42	m38
SB Longwood thru/right	B	12.3	0.61	m229
Huntington Avenue/Longwood Avenue	**E**	**73.0**	**>1.0**	**NA**
EB Huntington left	F	>80.0	>1.0	#392
EB Huntington thru/right	C	21.9	0.59	210
WB Huntington left	E	56.1	0.75	#132
WB Huntington thru	D	38.6	0.88	426
WB Huntington right (defacto)	C	31.0	0.71	241
NB Longwood left/thru/right	E	57.5	0.92	278
SB Longwood left (defacto)	F	>80.0	>1.0	#239
SB Longwood thru/right	D	42.4	0.60	213
Huntington Avenue/Tremont Street/Calumet Street/Francis Street	**F**	**>80.0**	**>1.0**	**NA**
EB Huntington left/thru/right	D	48.3	0.82	#508
WB Huntington left	C	21.2	0.22	74
WB Huntington left/thru/right	C	29.3	0.59	295
NB Tremont left/thru/right	F	>80.0	>1.0	#1164
SB Francis left/thru/right	E	76.3	0.90	234
NE Calumet right	E	62.3	0.03	19
Beacon Street/Park Drive	**D**	**43.3**	**0.78**	**NA**
EB Beacon left/thru	C	33.8	0.73	217

EB Beacon right	C	28.9	0.42	159
WB Beacon left/thru	C	25.1	0.71	193
WB Beacon right	A	0.0	0.02	0
NB Park left (defacto)	F	>80.0	>1.0	#165
NB Park thru	D	37.6	0.76	#355
NB Park right	A	0.0	0.03	0
SB Park left/thru	E	68.5	>1.0	#461
SB Park right	A	0.0	0.02	0
Riverway/Park Drive at Sears Rotary	**B**	**19.5**	**0.38**	**NA**
WB Sears Rotary left	A	0.8	0.10	7
WB Sears Rotary thru	A	0.9	0.19	16
NB Park left	C	30.2	0.68	m223
NB Park thru	C	26.9	0.49	m172
SB Park thru	C	30.8	0.74	213
SB Park right	C	31.8	0.71	47
Brookline Avenue/Fenway at Sears Rotary	F	**>80.0**	**>1.0**	**NA**
EB Brookline thru/right	C	20.8	0.60	#257
WB Brookline thru	D	54.3	0.96	m#596
SB Fenway left	F	>80.0	>1.0	#893
SB Fenway left/thru	B	19.7	0.64	177
SB Fenway right	B	10.2	0.54	0
Brookline Avenue/Boylston Street/Park Drive	C	**33.1**	**0.81**	**NA**
EB Brookline thru	C	29.1	0.54	m104
EB Brookline right	B	13.3	0.78	m182
WB Brookline thru	C	27.4	0.42	106
WB Brookline right	C	31.9	0.49	132
NB Park left/thru/right	C	34.7	0.72	205
NB Park right	D	48.0	0.71	#198
NW Boylston thru/right	D	47.6	0.95	#395
NW Boylston right	E	61.0	0.95	#378
Unsignalized Intersections				
Brookline Avenue/Fenwood Road				
EB Brookline thru/right	A	0.0	0.54	0
WB Brookline thru	A	0.0	0.56	0
NB Fenwood right	F	>50.0	>1.0	236
Brookline Avenue/Joslin Place				
EB Brookline left	B	13.6	0.31	32
EB Brookline thru	A	0.0	0.39	0

WB Brookline thru/right	A	0.0	0.34	0
Binney Street/Fenwood Road				
WB Binney Street left/right	C	16.6	0.45	58
NB Fenwood Road thru/right	A	0.0	0.23	0
SB Fenwood Road left/thru	A	2.9	0.04	3
Binney Street/Francis Street				
EB Binney left/thru/right	F	NA	NA	NA
WB Binney left/thru/right	F	NA	NA	NA
NB Francis left/thru/right	A	0.4	0.02	1
SB Francis left/thru/right	A	8.8	0.33	36
Binney Street/Jimmy Fund Way/Children's Way				
EB Binney left/thru/right	B	13.5	0.50	NA
WB Binney left/thru/right	B	11.6	0.42	NA
NB Children's Way left/thru/right	A	9.3	0.08	NA
SB Jimmy Fund Way left/thru/right	B	12.0	0.39	NA
Pilgrim Road/Deaconess				
WB Pilgrim left	A	7.8	0.12	10
WB Pilgrim thru	A	0.0	0.07	0
Pilgrim Road/Joslin Place				
WB Pilgrim thru	A	0.0	0.08	0
NB Joslin left	B	11.3	0.24	23
NB Joslin right	A	9.9	0.15	13
Pilgrim Road/Longwood Avenue				
EB Pilgrim left/thru/right	F	NA	>1.0	NA
WB Pilgrim left/thru/right	F	NA	>1.0	NA
NB Longwood left	C	15.2	0.37	42
NB Longwood thru/right	A	0.0	0.18	0
SB Longwood left	B	12.8	0.23	22
SB Longwood thru/right	A	0.0	0.29	0
Avenue Louis Pasteur/Longwood Avenue				
WB Avenue Louis left	F	NA	>1.0	NA
WB Avenue Louis right	F	>50.0	0.90	171
NB Longwood thru/right	A	0.0	0.45	0
SB Longwood left	C	15.9	0.44	56
SB Longwood thru	A	0.0	0.19	0

~ Volume exceeds capacity, queue is theoretically infinite.
 # 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal.

Table 5-26 Build (2016) Intersection LOS Summary - PM Peak Hour

Intersection	LOS	Delay (sec.)	V/C Ratio	95th % Queue (feet)
Signalized Intersections				
Brookline Avenue/Riverway	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left	F	>80.0	>1.0	#439
EB Brookline thru/right	D	42.6	0.70	287
WB Brookline left	F	>80	>1.0	m#921
WB Brookline thru/right	C	29.7	0.72	m330
NB Riverway left/thru/right	F	>80.0	>1.0	#948
SB Riverway left/thru/right	F	>80.0	>1.0	#836
Brookline Avenue/Francis Street	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left/thru/right	F	>80.0	>1.0	#516
WB Brookline left	F	>80.0	>1.0	m#253
WB Brookline thru/right	B	17.1	0.70	m282
NB Francis left/thru/right	F	>80.0	>1.0	#316
SB Francis left/thru/right	F	>80.0	0.99	168
Brookline Avenue/Deaconess Road/Jimmy Fund Way	**E**	**61.0**	**>1.0**	**NA**
EB Brookline thru/right	B	12.7	0.84	m116
WB Brookline left/thru	F	>80.0	>1.0	m140
NB Jimmy Fund left	F	>80.0	>1.0	#376
NB Jimmy Fund right	C	33.5	0.41	33
SB Deaconess left/thru/right	D	43.6	0.75	149
Brookline Avenue/Longwood Avenue	**F**	**>80.0**	**>1.0**	**NA**
EB Brookline left	F	>80.0	>1.0	#166
EB Brookline thru/right	F	>80.0	>1.0	m#884
WB Brookline left	F	>80.0	>1.0	#263
WB Brookline thru/right	F	>80.0	>1.0	317
NB Longwood left	F	>80.0	>1.0	#407
NB Longwood thru	F	>80.0	>1.0	m#476
NB Longwood right	D	51.8	0.68	0
SB Longwood left	F	>80.0	>1.0	#233
SB Longwood thru/right	F	>80.0	>1.0	220
Riverway/Longwood Avenue	**F**	**>80.0**	**>1.0**	**NA**
EB Riverway left	D	41.5	0.79	#284
EB Riverway thru/right	C	25.2	0.66	240
WB Riverway left/thru	F	>80.0	>1.0	#552
WB Riverway right	D	36.9	0.83	123

NB Longwood left	F	>80.0	0.97	#111
NB Longwood thru/right	F	>80.0	>1.0	#595
SB Longwood left/thru	F	>80.0	>1.0	#561
SB Longwood right	B	14.5	0.47	205
Binney Street/Longwood Avenue	F	**>80.0**	**0.94**	**NA**
EB Binney left/thru/right	F	>80.0	>1.0	#383
WB Binney left/thru	F	>80.0	>1.0	#309
WB Binney right	D	41.5	0.43	22
NB Longwood left/thru/right	A	7.5	0.45	m87
SB Longwood left/thru/right	B	17.4	0.43	m38
Blackfan Circle/Children's Hospital/Longwood Avenue	C	**30.3**	**0.70**	**NA**
EB Children's left/thru/right	F	>80.0	0.95	221
WB Blackfan left	D	44.7	0.51	98
WB Blackfan thru/right	D	41.5	0.38	63
NB Longwood left	B	14.2	0.22	45
NB Longwood thru/right	B	18.7	0.56	343
SB Longwood left	A	5.9	0.13	m16
SB Longwood thru/right	B	13.2	0.60	m245
Huntington Avenue/Longwood Avenue	E	**55.9**	**0.95**	**NA**
EB Huntington left	D	42.6	0.51	79
EB Huntington thru/right	C	22.5	0.62	277
WB Huntington left	F	>80.0	>1.0	#250
WB Huntington thru/right	C	29.0	0.81	360
NB Longwood left/thru/right	E	71.9	0.94	#294
SB Longwood left/thru/right	F	>80	>1.0	#347
Huntington Avenue/Tremont Street/Calumet Street/Francis Street	F	**>80.0**	**>1.0**	**NA**
EB Huntington left/thru/right	F	>80.0	>1.0	#747
WB Huntington left	B	17.8	0.34	42
WB Huntington left/thru/right	D	41.0	0.92	386
NB Tremont left/thru/right	F	>80.0	>1.0	#791
SB Francis left/thru/right	F	>80.0	>1.0	#286
NE Calumet right	E	64.8	0.16	52
Beacon Street/Park Drive	E	**72.3**	**>1.0**	**NA**
EB Beacon left (defacto)	E	78.1	0.78	69
EB Beacon thru	C	31.6	0.46	176
EB Beacon right	C	32.7	0.43	171

WB Beacon left/thru	E	63.1	>1.0	#462
WB Beacon right	A	0.1	0.04	0
NB Park left (defacto)	F	>80.0	>1.0	#390
NB Park thru	D	51.9	0.92	#690
NB Park right	A	0.1	0.04	0
SB Park left/thru	C	35.0	0.77	#420
SB Park right	A	0.0	0.02	0
Riverway/Park Drive at Sears Rotary	**B**	**16.8**	**0.64**	**NA**
WB Sears Rotary left	A	4.4	0.18	24
WB Sears Rotary thru	A	4.8	0.44	74
NB Park left	C	21.9	0.80	m261
NB Park thru	B	17.2	0.53	m150
SB Park thru	C	21.0	0.56	165
SB Park right	D	37.1	0.88	282
Brookline Avenue/Fenway at Sears Rotary	**E**	**58.3**	**>1.0**	**NA**
EB Brookline thru/right	C	26.9	0.75	#387
WB Brookline thru	D	35.3	0.77	m#408
SB Fenway left	F	>80.0	>1.0	#851
SB Fenway left/thru	C	24.2	0.72	295
SB Fenway right	B	14.2	0.28	17
Brookline Avenue/Boylston Street/Park Drive	**E**	**75.6**	**>1.0**	**NA**
EB Brookline thru	C	23.0	0.41	m#118
EB Brookline right	B	15.7	0.86	m241
WB Brookline thru	C	23.6	0.35	112
WB Brookline right	F	>80.0	>1.0	#528
NB Park left/thru/right	D	50.1	0.95	#299
NB Park right	F	>80.0	0.95	#262
NW Boylston thru/right	F	>80.0	>1.0	#392
NW Boylston right	F	>80.0	>1.0	#440
Unsignalized Intersections				
Brookline Avenue/Fenwood Road				
EB Brookline thru/right	A	0.0	0.38	0
WB Brookline thru	A	0.0	>1.0	0
NB Fenwood right	C	17.8	0.19	17
Brookline Avenue/Joslin Place				
EB Brookline left	B	13.6	0.23	22
EB Brookline thru	A	0	0.37	0
WB Brookline thru/right	A	0	0.41	0

Binney Street/Fenwood Road				
WB Binney Street left/right	C	20.2	0.36	40
NB Fenwood Road thru/right	A	0.0	0.38	0
SB Fenwood Road thru	A	5.5	0.10	8
Binney Street/Francis Street				
EB Binney left/thru/right	F	NA	NA	NA
WB Binney left/thru/right	F	NA	NA	NA
NB Francis left/thru/right	A	0.1	0.0	0
SB Francis left/thru/right	B	14.4	0.40	46
Binney Street/Jimmy Fund Way/Children's Way				
EB Binney left/thru/right	B	14.1	0.54	NA
WB Binney left/thru/right	B	14.9	0.62	NA
NB Children's Way left/thru/right	A	9.6	0.09	NA
SB Jimmy Fund Way left/thru/right	B	10.8	0.25	NA
Pilgrim Road/Deaconess				
WB Pilgrim left	A	8.0	0.18	17
WB Pilgrim thru	A	0.0	0.05	0
Pilgrim Road/Joslin Place				
WB Pilgrim thru	A	0.0	0.21	0
NB Joslin left	B	12.9	0.16	14
NB Joslin right	A	9.8	0.10	8
Pilgrim Road/Longwood Avenue				
EB Pilgrim left/thru/right	F	NA	NA	NA
WB Pilgrim left/thru/right	F	NA	NA	NA
NB Longwood left	B	12.3	0.31	33
NB Longwood thru/right	A	0.0	0.34	0
SB Longwood left	C	23.6	0.19	17
SB Longwood thru/right	A	0.0	0.18	0
Avenue Louis Pasteur/Longwood Avenue				
WB Avenue Louis left	F	NA	>1.0	NA
WB Avenue Louis right	D	34.2	0.56	79
NB Longwood thru/right	A	0.0	0.25	0
SB Longwood left	B	12.0	0.28	29
SB Longwood thru	A	0.0	0.31	0

~ Volume exceeds capacity, queue is theoretically infinite.
# 95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal.

The DFCI IMP projects are expected to have a modest impact on the future study area intersections. The overall LOS is expected to change at one intersection during the morning peak hour and two intersections during the evening peak hour from the No-Build (2016) Condition to the Build (2016) Condition. The following analysis describes the major traffic operations that are expected to change due to the future Build Condition including the IMP projects and the future transportation mitigation and improvements that are anticipated to be integrated by 2016.

5.4.1.5 Build (2016) Intersection LOS Summary AM Peak Hour

During the morning peak hour, the only change in overall LOS is expected to occur at the Brookline Avenue/Deaconess Road/Jimmy Fund Way intersection with the proposed improvements. It is expected that overall operations will improve from LOS D to LOS C. The implementation of a seven-second lead phase in the westbound direction will efficiently accommodate this left-turn movement. It is expected to improve operations since vehicles are currently making this prohibited left-turn onto Jimmy Fund Way. Capacity is expected to increase in the northbound direction with the addition of a second lane at the Jimmy Fund Way northbound approach.

5.4.1.6 Build (2016) Intersection LOS Summary PM Peak Hour

During the evening peak hour, the overall LOS is expected to remain at LOS E at the Brookline Avenue/Deaconess Road/Jimmy Fund Way intersection. Despite that the overall LOS remains at E, traffic operations are expected to improve on both the Jimmy Fund Way and Deaconess Road approach due to the transportation improvements associated with the DFCI projects.

In addition, during the PM peak hour, it is expected that the intersection of Huntington Avenue/Longwood Avenue will experience a change in overall LOS from LOS D to LOS E. This will be caused by traffic growth attributed to the IMP projects. Finally, the southbound approach at the unsignalized intersection of Binney Street/Jimmy Fund Way is expected to drop from LOS A to LOS B during the Build Condition due to an increase of project related traffic departing DFCI via Jimmy Fund Way southbound.

Table 5-27 is a summary of the overall LOS comparing the Existing, No-Build, and Build conditions for both morning and evening peak hours.

Table 5-27 LOS Summary Comparison

Intersection	AM Peak Hour Operations			PM Peak Hour Operations		
	Existing	No-Build	Build	Existing	No-Build	Build
Signalized Intersections						
Brookline Avenue/Riverway	**F**	**F**	**F**	**F**	**F**	**F**
EB Brookline left	F	F	F	F	F	F
EB Brookline thru/right	D	D	D	D	D	D
WB Brookline left	F	F	F	F	F	F
WB Brookline thru/right	C	C	C	C	C	C
NB Riverway left/thru/right	F	F	F	F	F	F
SB Riverway left/thru/right	C	C	C	F	F	F
Brookline Avenue/Francis Street	**F**	**F**	**F**	**E**	**F**	**F**
EB Brookline left/thru/right	B	B	B	F	F	F
WB Brookline left	E	F	F	F	F	F
WB Brookline thru/right	A	A	A	B	B	B
NB Francis left/thru/right	F	F	F	F	F	F
SB Francis left/thru/right	F	F	F	E	F	F
Brookline Avenue/Deaconess Road/Jimmy Fund Way	C	**D**	**C**	**D**	**E**	**E**
EB Brookline thru/right	A	A	B	A	A	B
WB Brookline left/thru	B	B	C	C	D	F
NB Jimmy Fund left	NA	NA	F	NA	NA	F
NB Jimmy Fund right	F	F	D	F	F	C
SB Deaconess left/thru/right	E	F	D	D	E	D
Brookline Avenue/Longwood Avenue	**F**	**F**	**F**	**F**	**F**	**F**
EB Brookline left	F	F	F	F	F	F
EB Brookline thru/right	F	F	F	F	F	F
WB Brookline left	C	D	D	F	F	F
WB Brookline thru/right	B	B	B	F	F	F
NB Longwood left	F	F	F	F	F	F
NB Longwood thru	D	D	D	F	F	F
NB Longwood right	C	B	B	F	D	D
SB Longwood left	F	F	F	F	F	F
SB Longwood thru/right	F	F	F	F	F	F
Riverway/Longwood Avenue	**E**	**F**	**F**	**F**	**F**	**F**
EB Riverway left	D	D	D	C	D	D
EB Riverway thru/right	D	E	E	C	C	C
WB Riverway left/thru	E	D	D	F	F	F

WB Riverway right	C	C	C	C	D	D
NB Longwood left	D	D	D	F	F	F
NB Longwood thru/right	C	C	C	F	F	F
SB Longwood left/thru	F	F	F	F	F	F
SB Longwood right	A	A	A	B	B	B
Binney Street/Longwood Avenue	**F**	**F**	**F**	**F**	**F**	**F**
EB Binney left/thru/right	F	F	F	F	F	F
WB Binney left/thru	F	D	D	F	F	F
WB Binney right	D	D	D	D	D	D
NB Longwood left/thru/right	A	A	A	A	A	A
SB Longwood left/thru/right	A	A	A	B	B	B
Blackfan Circle/Children's Hospital/Longwood Avenue	**C**	**B**	**B**	**C**	**C**	**C**
EB Children's left/thru/right	D	D	D	F	F	F
WB Blackfan left	D	D	D	D	D	D
WB Blackfan thru/right	D	D	D	D	D	D
NB Longwood left	NA	B	B	NA	B	B
NB Longwood thru/right	C	B	B	C	B	B
SB Longwood left	NA	B	B	NA	A	A
SB Longwood thru/right	B	B	B	A	B	B
Huntington Avenue/Longwood Avenue	**D**	E	**E**	**D**	**D**	E
EB Huntington left	F	F	F	D	D	D
EB Huntington thru/right	C	C	C	C	C	C
WB Huntington left	D	E	E	F	F	F
WB Huntington thru	C	D	D	C	C	C
WB Huntington right (defacto)	C	C	C	NA	NA	NA
NB Longwood left/thru/right	E	E	E	D	E	E
SB Longwood left (defacto)	F	F	F	NA	NA	NA
SB Longwood thru/right	D	D	D	E	F	F
Huntington Avenue/Tremont Street/Calumet Street/Francis Street	**F**	**F**	**F**	**F**	**F**	**F**
EB Huntington left/thru/right	C	D	D	D	F	F
WB Huntington left	C	C	C	B	B	B
WB Huntington left/thru/right	C	C	C	C	D	D
NB Tremont left/thru/right	F	F	F	F	F	F
SB Francis left/thru/right	E	E	E	F	F	F
NE Calumet right	E	E	E	E	E	E
Beacon Street/Park Drive	C	**D**	D	**D**	**E**	**E**

EB Beacon left (defacto)	NA	NA	NA	NA	E	E
EB Beacon thru	C	C	C	C	C	C
EB Beacon right	C	C	C	C	C	C
WB Beacon left/thru	C	C	C	D	E	E
WB Beacon right	A	A	A	A	A	A
NB Park left (defacto)	D	F	F	F	F	F
NB Park thru	C	D	D	D	D	D
NB Park right	A	A	A	A	A	A
SB Park left/thru	C	E	E	C	C	C
SB Park right	A	A	A	A	A	A
Riverway/Park Drive at Sears Rotary	**B**	**B**	**B**	**B**	**B**	**B**
WB Sears Rotary left	A	A	A	A	A	A
WB Sears Rotary thru	A	A	A	A	A	A
NB Park left						
NB Park thru						
SB Park thru	C	C	C	C	C	C
SB Park right	D	C	C	D	D	D
Brookline Avenue/Fenway at Sears Rotary	**E**	**F**	**F**	**D**	**E**	**E**
EB Brookline thru/right	C	C	C	C	C	C
WB Brookline thru	D	D	D	C	C	D
SB Fenway left	F	F	F	F	F	F
SB Fenway left/thru	C	B	B	C	C	C
SB Fenway right	B	B	B	B	B	B
Brookline Avenue/Boylston Street/Park Drive	**C**	C	**C**	E	E	**E**
EB Brookline thru	C	C	C	C	C	C
EB Brookline right	B	B	B	B	B	B
WB Brookline thru	C	C	C	C	C	C
WB Brookline right	C	C	C	F	F	F
NB Park left/thru/right	C	C	C	D	D	D
NB Park right	D	D	D	E	F	F
NW Boylston thru/right	D	D	D	E	F	F
NW Boylston right	D	E	E	F	F	F
Unsignalized Intersections						
Brookline Avenue/Fenwood Road						
EB Brookline thru/right	A	A	A	A	A	A
WB Brookline thru	A	A	A	A	A	A
NB Fenwood right	E	F	F	C	C	C
Brookline Avenue/Joslin Place						

EB Brookline left	B	B	B	B	B	B
EB Brookline thru	A	A	A	A	A	A
WB Brookline thru/right	A	A	A	A	A	A
Binney Street/Fenwood Road						
WB Binney Street left/right	B	C	C	A	C	C
NB Fenwood Road thru/right	NA	A	A	NA	A	A
SB Fenwood Road left/thru	A	A	A	A	A	A
Binney Street/Francis Street						
EB Binney left/thru/right	NA	F	F	NA	F	F
WB Binney left/thru/right	F	F	F	F	F	F
NB Francis left/thru/right	A	A	A	A	A	A
SB Francis left/thru/right	A	A	A	B	B	B
Binney Street/Jimmy Fund Way/Children's Way						
EB Binney left/thru/right	B	B	B	B	B	B
WB Binney left/thru/right	A	B	B	B	B	B
NB Children's Way left/thru/right	A	A	A	A	A	A
SB Jimmy Fund Way left/thru/right	B	B	B	A	A	B
Pilgrim Road/Deaconess						
WB Pilgrim left	A	A	A	A	A	A
WB Pilgrim thru	A	A	A	A	A	A
Pilgrim Road/Joslin Place						
WB Pilgrim thru	A	A	A	A	A	A
NB Joslin left	B	B	B	B	B	B
NB Joslin right	A	A	A	A	A	A
Pilgrim Road/Longwood Avenue						
EB Pilgrim left/thru/right	F	F	F	F	F	F
WB Pilgrim left/thru/right	NA	F	F	NA	F	F
NB Longwood left	A	C	C	A	B	B
NB Longwood thru/right	A	A	A	A	A	A
SB Longwood left	B	B	B	C	C	C
SB Longwood thru/right	A	A	A	A	A	A
Avenue Louis Pasteur/Longwood Avenue						
WB Avenue Louis left	F	F	F	F	F	F
WB Avenue Louis right	F	F	F	F	D	D
NB Longwood thru/right	A	A	A	A	A	A
SB Longwood left	C	C	C	B	B	B
SB Longwood thru	A	A	A	A	A	A

5.4.2 Pedestrian Analysis

A quantitative assessment of pedestrian level of service was conducted for crosswalks at all study signalized area intersections. The LOS for pedestrians measures the delay experienced by the pedestrian while waiting to cross.

Table 5-28 outlines the delay criteria for pedestrian level of service at crosswalks based on the 2000 Highway Capacity Manual (HCM). Delay analyses were conducted for each signalized crosswalks within the project study area. The HCM does not apply to zebra striped crosswalks at unsignalized intersections since Massachusetts law requires vehicles to yield to pedestrians in a crosswalk. The HCM methodology takes into account the total walk time pedestrians endure during each signal cycle and the crossing distances. For this analysis crossing distances were estimated using the BRA's base map for the LMA. The volume of pedestrians is not considered in the LOS criteria for signalized intersections.

Table 5-28 Pedestrian LOS Criteria at Signalized Intersections

Level of Service	Signalized Intersection Pedestrian Delay (sec/ped)
LOS A	<10
LOS B	10-20
LOS C	21-30
LOS D	31-40
LOS E	41-60
LOS F	<60

Source: 2000 HCM

Table 5-29 provides a summary of findings for the morning and evening peak hours. Since this analysis does not reflect the volume of crossing pedestrians, the LOS remains constant under all analysis conditions because the signal phasing remains unchanged.

Table 5-29 Pedestrian Delay LOS Summary

Intersection	Crosswalk	AM Peak	PM Peak
Brookline Avenue/Riverway	North	D	E
	South	E	E
	East	D	E
	West	E	E
Brookline Avenue/Francis Street	North	D	E
	South	E	E
	East	E	F
	West	E	F
Brookline Avenue/Deaconess Road/Jimmy Fund Way	North	E	E
	South	E	E
	East	E	F
	West	E	F
Brookline Avenue/Longwood Avenue	North	D	E
	South	E	E
	East	E	E
	West	E	E
Riverway/Longwood Avenue	North	D	D
	South	D	D
	Diagonal	D	D
	East	D	D
Binney Street/Longwood Avenue	North	E	E
	South	E	E
	East	E	E
	West	D	E
Blackfan Circle/Children's Hospital/Longwood Avenue	North	E	E
	South	E	E
	East	E	E
	West	E	E
Huntington Avenue/Longwood Avenue	North	B	B
	South	C	C

	East	E	E
	West	E	E
Huntington Avenue/Tremont Street/Calumet Street/Francis Street	North	F	F
	South	F	F
	East	F	F
	West	F	F
	Southwest	A	E
Beacon Street/Park Drive	North	E	E
	South	E	E
	East	E	F
	West	E	F
Riverway/Park Drive at Sears Rotary	North	D	A
	East	A	D
Brookline Avenue/Fenway at Sears Rotary	North	D	D
	South	D	D
	East	D	D
	West	D	D
Brookline Avenue/Boylston Street/Park Drive	North	C	C
	South	A	A
	East (Brookline)	D	E
	East (Boylston)	B	A

Source: Results shown are based on 2000 HCM methodology.

As shown, pedestrians can encounter long delays at the majority of the study area intersections. At many of the locations, this delay is caused by pedestrians having to wait for an exclusive pedestrian walk phase. In the LMA it is a challenge to balance the pedestrian needs while continuing to process the volume of vehicles experienced. According to the HCM, "when pedestrians experience more than a 30-second delay, they become impatient, and engage in risk-taking behavior." Field observations noted that pedestrian often cross concurrently at intersections because they chose not to wait to for the exclusive walk phase. This behavior often has a negative effect on vehicle operations as vehicles must slow or stop to wait for the pedestrians to cross.

5.4.3 Transit Analysis

The first step in analyzing the public transit system availability near the LMA is to quantify the capacity of existing transit services. The following section presents the capacities of the various MBTA transit services in the area.

5.4.3.1 Bus System Capacity

Bus route capacity is a function of vehicle size and frequency of service. The peak hour capacities estimated in this table are based on a bus capacity of 60 passengers for a standard MBTA bus. The service rush-hour frequencies presented in Table 5-30 are based on the most current schedules as published in the 2006 System Map published by the MBTA.

The MBTA *Ridership and Service Statistics, Tenth Edition 2006 Revised* provides daily bus boardings. Hourly or stop-based ridership information in not available in recent MBTA publications. The most recent data provided in the MBTA Bus Route schedules and *Comprehensive Ridecheck Program (Winter 2000)* was used to obtain peak hour bus loads as shown in Table 5-30. This table also presents ridership and utilization (percent occupancy) data for the areas subway system.

Table 5-30 MBTA Bus Route Peak Hour Utilization (2006 Existing Condition)

Route and Direction		Peak Hour Freq (buses/ hour)	Hourly Capacity (pax)	Hourly Ridership*		V/C Ratio (Utilization)	
				AM Peak	PM Peak	AM Peak	PM Peak
CT2	Inbound	3	180	60	83	0.33	0.46
	Outbound	3	180	36	43	0.20	0.24
CT3	Inbound	3	180	20	69	0.11	0.38
	Outbound	3	180	122	26	0.68	0.14
8	Inbound	3	180	452	159	2.50	0.88
	Outbound	3	180	187	225	1.04	1.25
19	Inbound	3	180	156	41	0.87	0.23
	Outbound	3	180	72	103	0.40	0.57
39	Inbound	12	720	761	225	1.05	0.31
	Outbound	12	720	380	258	0.53	0.36
47	Inbound	2.7	162	106	143	0.65	0.88
	Outbound	2.7	162	99	143	0.61	0.88
60	Inbound	2.5	150	46	83	0.31	0.55
	Outbound	2.5	150	46	61	0.31	0.41
65	Inbound	2.4	144	238	39	1.65	0.22
	Outbound	2.4	144	33	88	0.23	0.61
66	Inbound	6	360	251	278	0.70	0.77
	Outbound	6	360	317	172	0.88	0.48

* *MBTA Bus Route schedules and Comprehensive Ridecheck Program (Winter 2000).*

As shown in Table 5-30, the existing bus service passenger loads are over the available capacity on the Route 8, 39, and 65 bus routes. This may not accurately reflect 2006 conditions since the hourly ridership was last provided by the MBTA in 2000. With the installation of the Charlie Card machines on local buses, the MBTA has the ability to monitor passenger loads and adjust schedules as needed to meet customer demands. It is anticipated that with expected growth in the LMA, including the proposed DFCI projects, the MBTA will adjust its bus operations to provide more frequent service if needed.

5.4.3.2 Green Line Capacity

Subway route capacity is a function of vehicle size and the frequency of service. The Green Line peak hour capacities for the D Line and E Line are based on a vehicle capacity of 100 passengers per car or 200 passengers per a two-car trainset. This assumes a conservative analysis since the D Line often provides three-car trains during the peak hours.

Consistent with the bus analysis, the subway service rush-hour frequencies presented in Table 5-31 are based on the most current schedules as published in the 2006 System Map published by the MBTA.

The MBTA Ridership and Service Statistics, Tenth Edition 2006 Revised does not provide hourly or stop-based ridership information. Therefore, the most recent data provided in the MBTA Bus Route schedules and Comprehensive Ridecheck Program (Winter 2000) was used to obtain peak hour loads as shown in Table 5-31. This table also presents the volume-to-capacity, or availability, of passenger loads for two closes subway lines.

Table 5-31 MBTA Bus Route Peak Hour Utilization (2006 Existing Condition)

Route and Direction	Frequency (trains/ hour)	Capacity (passengers/ hour)	Ridership*		V/C Ratio (Utilization)	
			AM Peak	PM Peak	AM Peak	PM Peak
D Line						
Inbound	12	2,400[1]	2,210	1,164	0.92	0.49
Outbound	22	2,400[1]	559	1,983	0.23	0.83
E Line						
Inbound	8.6	1,720[1]	869	1,392	0.51	0.81
Outbound	8.6	1,720[1]	355	387	0.21	0.23

Source:MBTA System Map (2006) and MBTA Green Line 15-Minute Total Boardings, Alightings, and Line Volumes (Spring, 1995).

1. Assumes two-car trainsets of Type 8 Breda cars (200 passengers per trainset). Older Type 7 two-car trainsets have capacities of 220 persons.

As shown in Table 5-31, there is adequate capacity on the D Line and E Line to accommodate the peak hour crunch loads. This analysis assumes that all trains arrive on schedule and that passengers are evenly distributed throughout the hour. In reality, passenger loads can vary and some trains become more congested than others. However, over the course of the hour, there is an adequate train capacity to meet the demand.

With the new Charlie Card tickets, the MBTA has the ability to monitor passenger loads and adjust schedules as needed to meet the customer demands. It is anticipated that with expected growth in the LMA area, including the proposed DFCI project, the MBTA will provide more frequent service and increase the frequency of three-car trainsets on the D Line as needed. With construction of the proposed Urban Ring project discussed previously in this chapter, new connections will be made within the MBTA system which will help to alleviate existing demands on major components of the public transportation system.

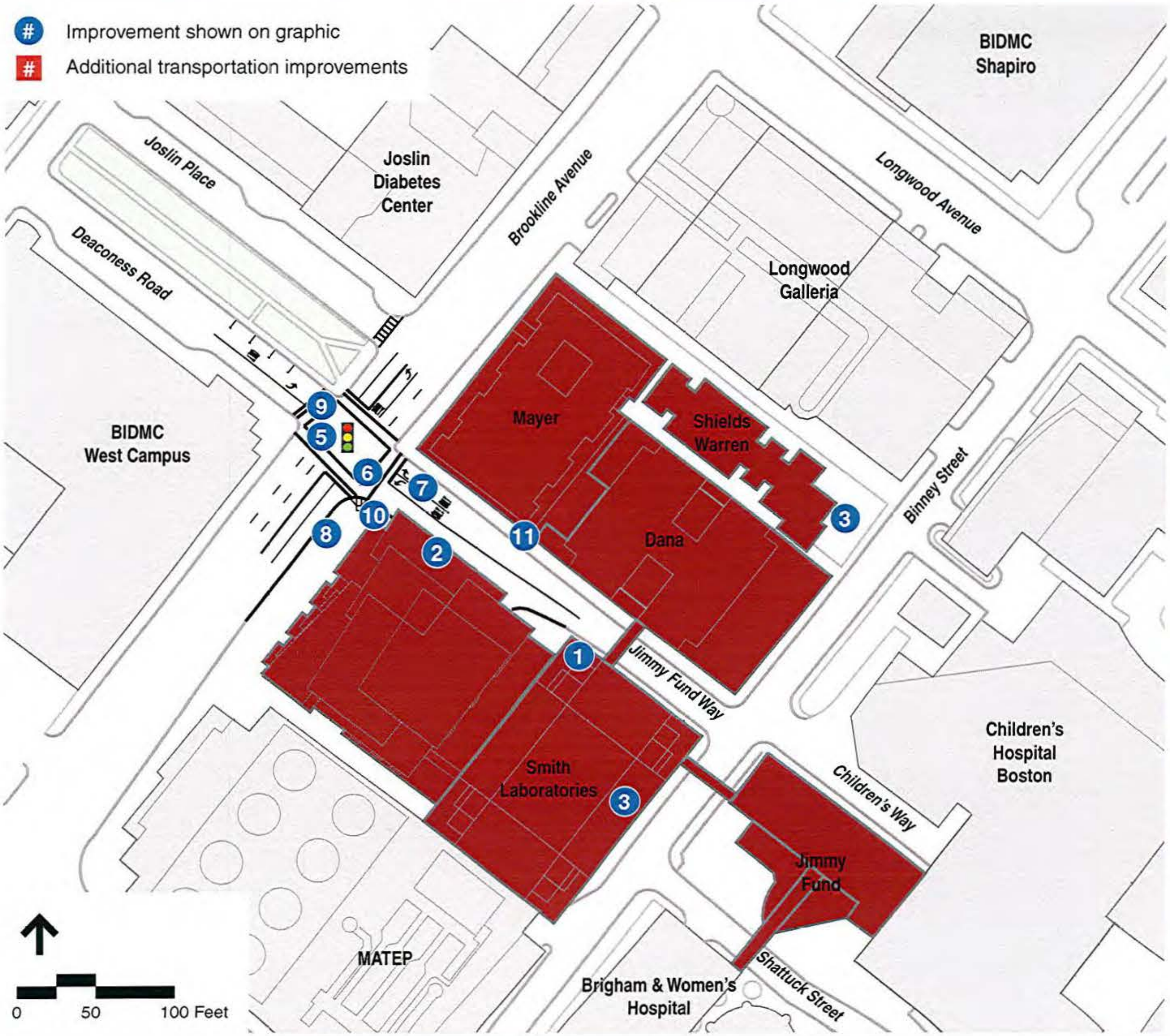
5.5 Conclusion

The primary finding of this transportation analysis is that the transportation improvement and mitigation plan proposed by DFCI will provide its patients and visitors with more convenient and direct access to the hospital. The proposed parking complies with the LMA Interim Guidelines. Roadway improvements and enhanced valet parking operations management have been devised to help manage peak hour traffic flow in the area. Finally, DFCI is not planning to increase its on-site employee parking spaces and will continue and expand its transportation demand management measures (TDM) to its employees to encourage the use of transit and other alternative forms of transportation.

The purpose of this transportation mitigation plan is to:

- Help alleviate transportation impacts generated by the DFCI IMP projects;
- Provide transportation infrastructure enhancements to the LMA, including intersection improvements and public space amenities; and
- Exceed the requirements of the BRA's Interim Guidelines for the LMA relative to transportation improvements and mitigation.

DFCI 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, parking management strategies to limit the construction of new parking spaces to 0.75 parking spaces per 1,000 SF of development guideline established by the LMA Interim Guidelines. DFCI believes that these transportation mitigation actions will lessen the impacts of their proposed development plans and, when complete, will help improve the LMA's existing transportation infrastructure.



Traffic Management Plan

1 Below-Grade Drop-off on P1 (Primary)
2 Patient Drop-off on Jimmy Fund Way (Secondary)
3 Loading and Service Improvements
4 Off-Site Materials Management Actions

Local Street Network / System-wide Transportation Improvements

5 Brookline Ave/Jimmy Fund Way/Deaconess Rd Signal Improvements
6 Brookline Ave/Jimmy Fund Way/Deaconess Rd Pedestrian Improvements
7 Widen Jimmy Fund Way
8 Area Sidewalk Improvements
9 PTZ Camera Installation

Urban Design

10 Center for Cancer Care Pedestrian Plaza
11 Jimmy Fund Way Urban Design Improvements

Parking Ratios

12 Limit new on-site parking to be constructed as part of the IMP
13 Convert employee parking to patient parking
14 Employee Parking Pricing

Transportation Demand Management Plan

15 Maintain proactive relationship in MASCO's CommuteWorks TMA
16 Maintain high percentage employee transit subsidy
17 Zip Car Provision
18 Loading Dock Manager

Sustainability

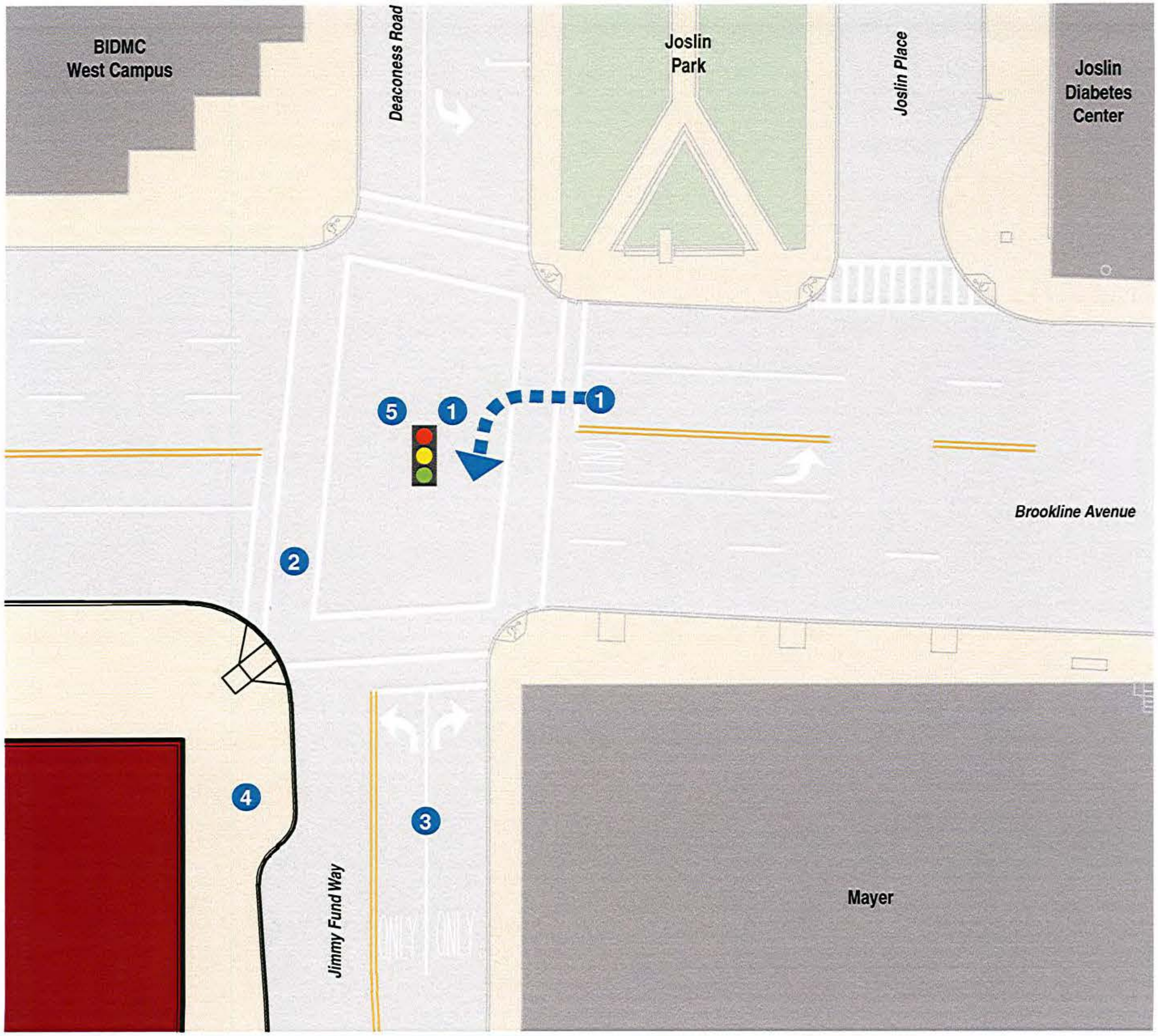
19 Provide preferential parking for hybrid vehicles

Construction Management

20 Prepare Construction Management Plan

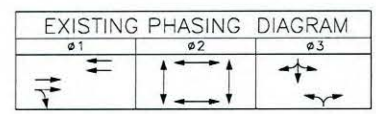
Proposed DFCI Transportation Mitigation and Improvement Plan

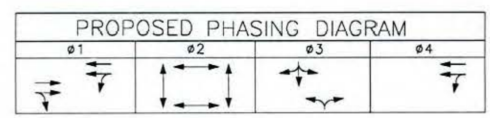
FIGURE 5-1

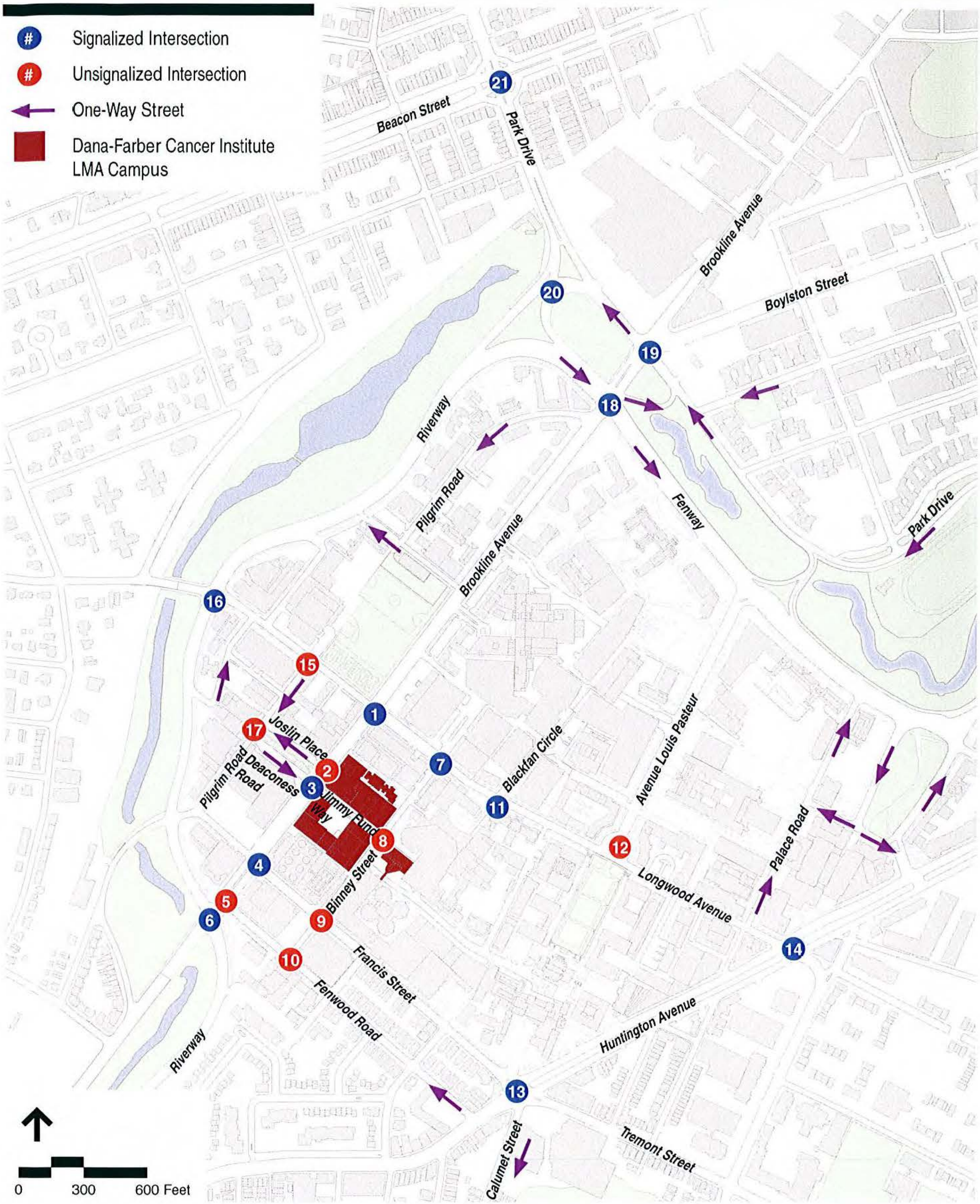


Local Street Network/Systemwide Transportation Improvements

1. Improve Brookline Avenue/Jimmy Fund Way/ Deaconess Road signal and provide protected left-turn movement from Brookline Avenue to Jimmy Fund Way.
2. Improve pedestrian facilities at Brookline Avenue/ Jimmy Fund Way/Deaconess Road.
3. Widen to two lanes at Jimmy Fund Way approach northwest bound.
4. Significantly widen and improve area sidewalks.
5. Install PTZ camera at intersection of Brookline Avenue/Jimmy Fund Way/Deaconess Road.



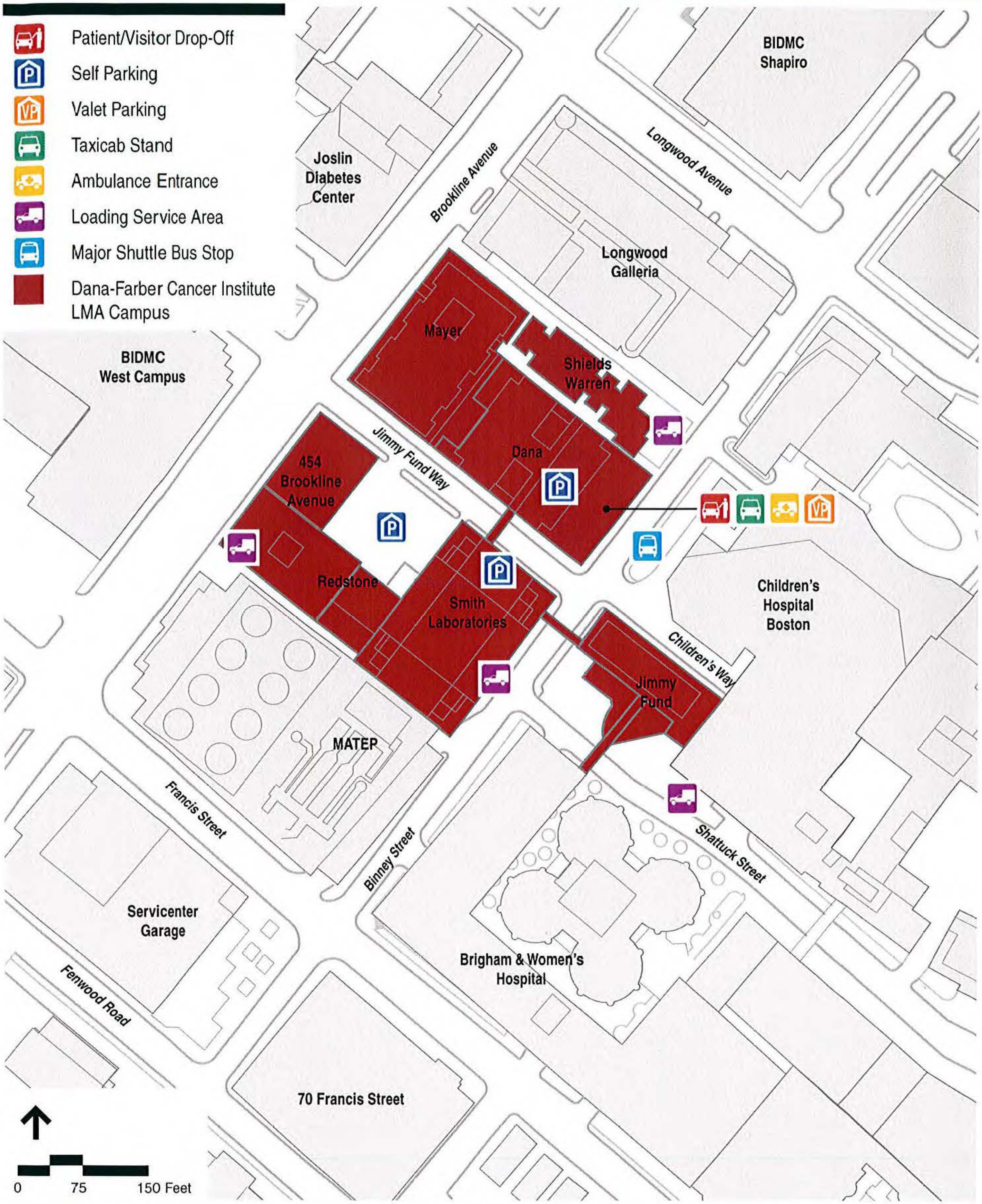




DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

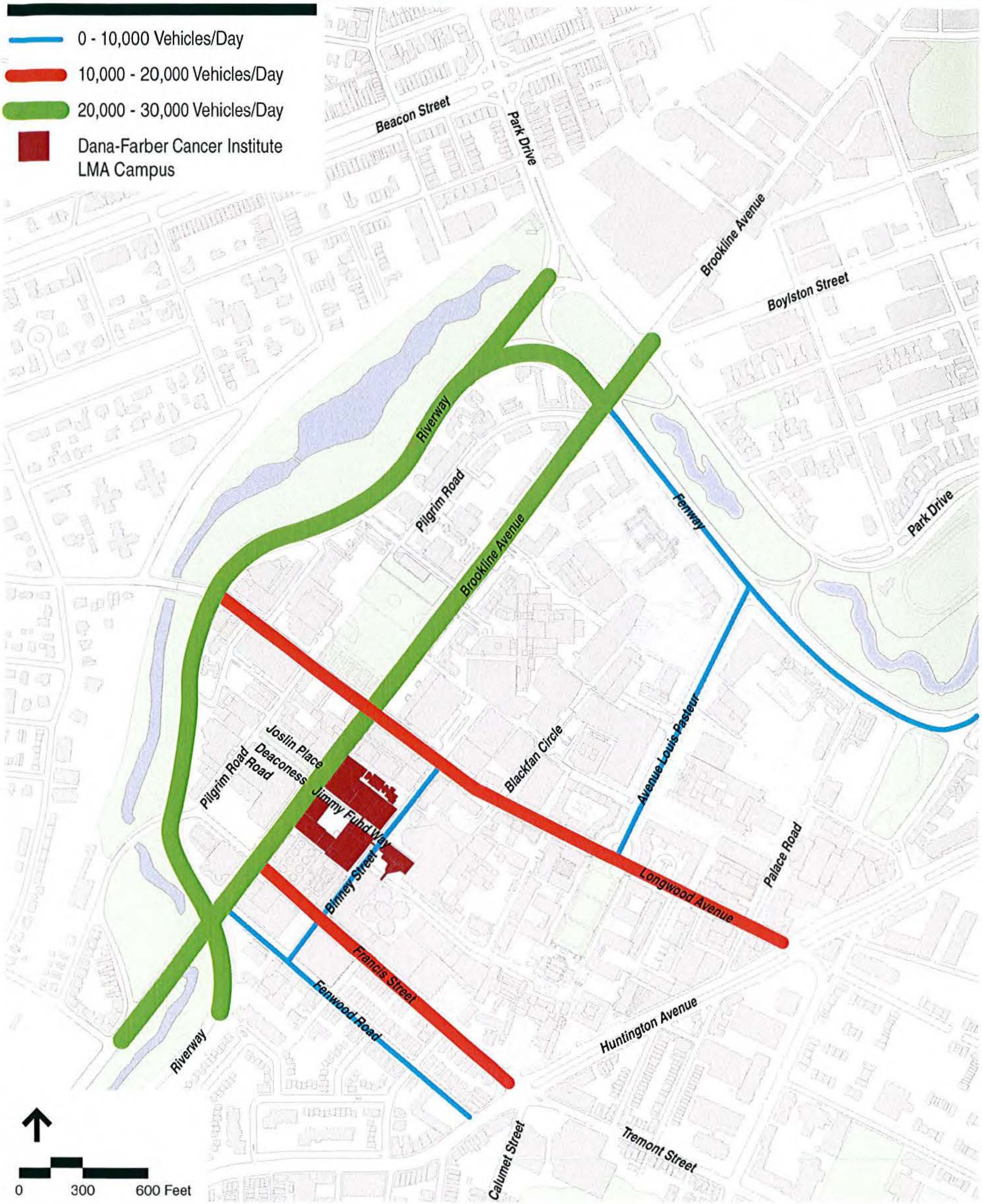
Project Study Area Roadways and Intersections

FIGURE 5-3



Dana-Farber Cancer Institute
Campus Transportation Infrastructure

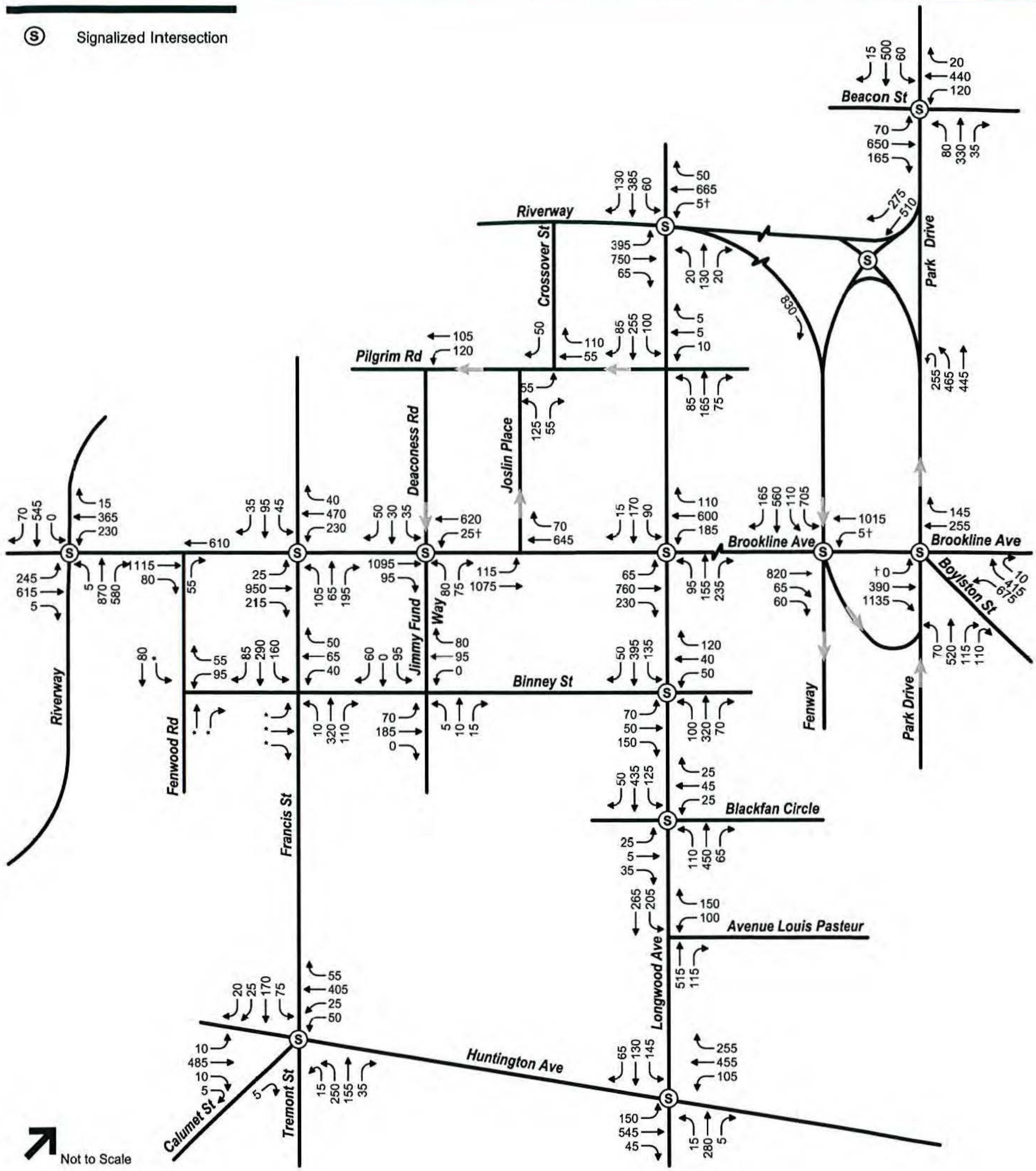
FIGURE 5-4



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Average Daily Traffic Volumes

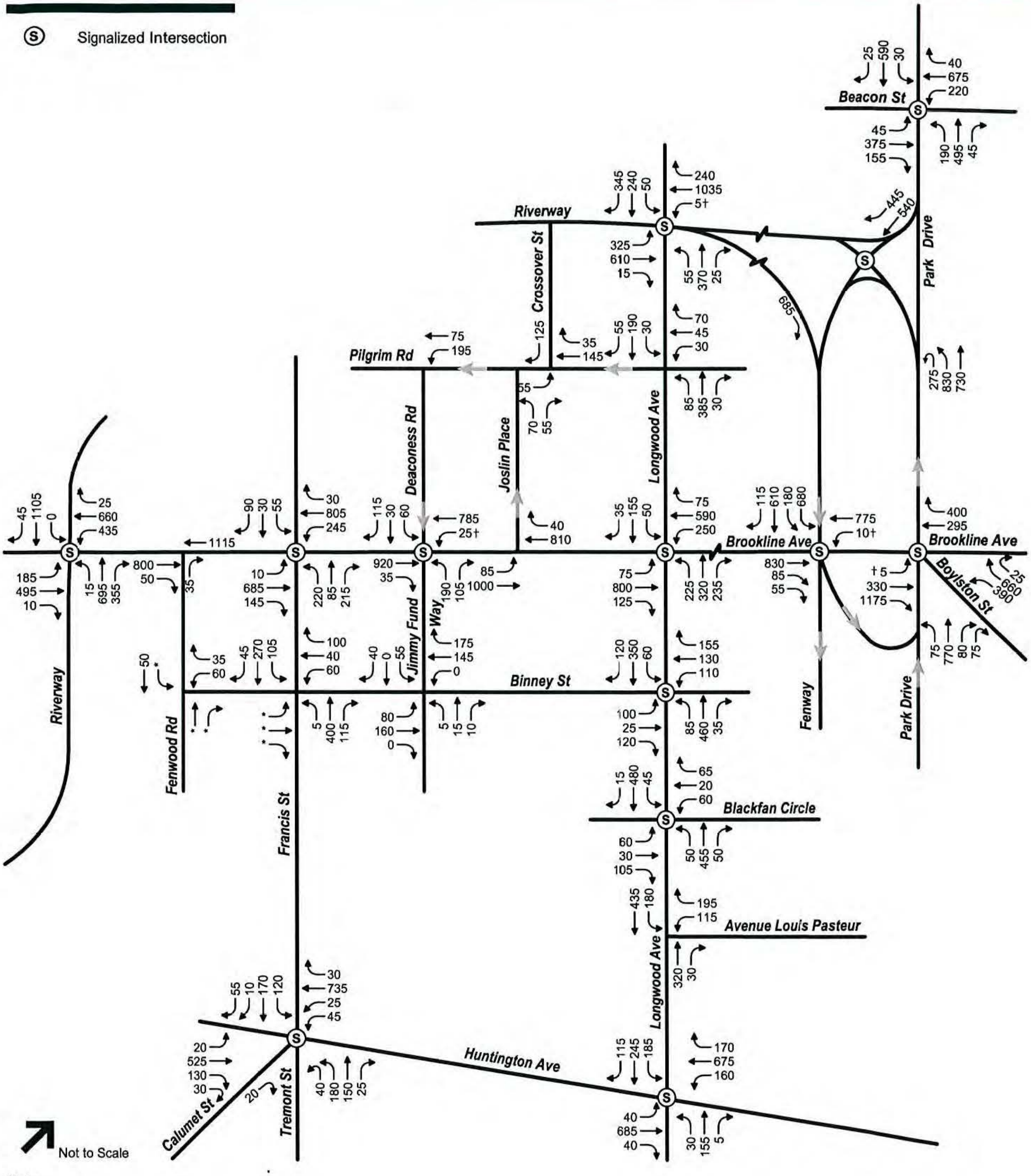
FIGURE 5-5



Notes:
† Left-turn prohibited
* Fenwood Road northbound lane south of Binney Street and Binney Street eastbound lane from Fenwood Road to Francis Street closed due to construction

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

2006 Existing Condition
Morning Peak Hour
Traffic Volumes
FIGURE 5-6



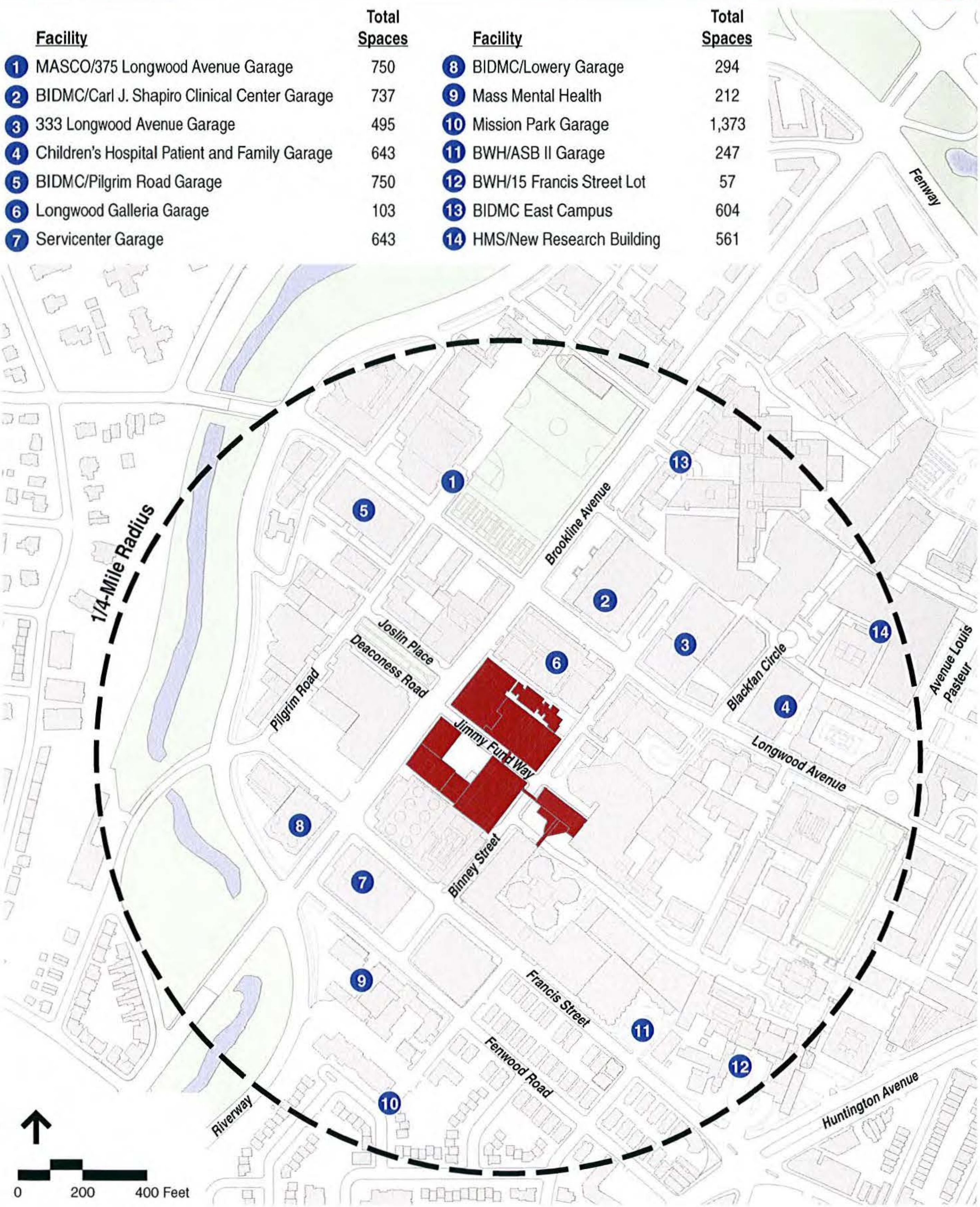
Notes:

† Left-turn prohibited

* Fenwood Road northbound lane south of Binney Street and Binney Street eastbound lane from Fenwood Road to Francis Street closed due to construction

2006 Existing Condition
Evening Peak Hour
Traffic Volumes
FIGURE 5-7

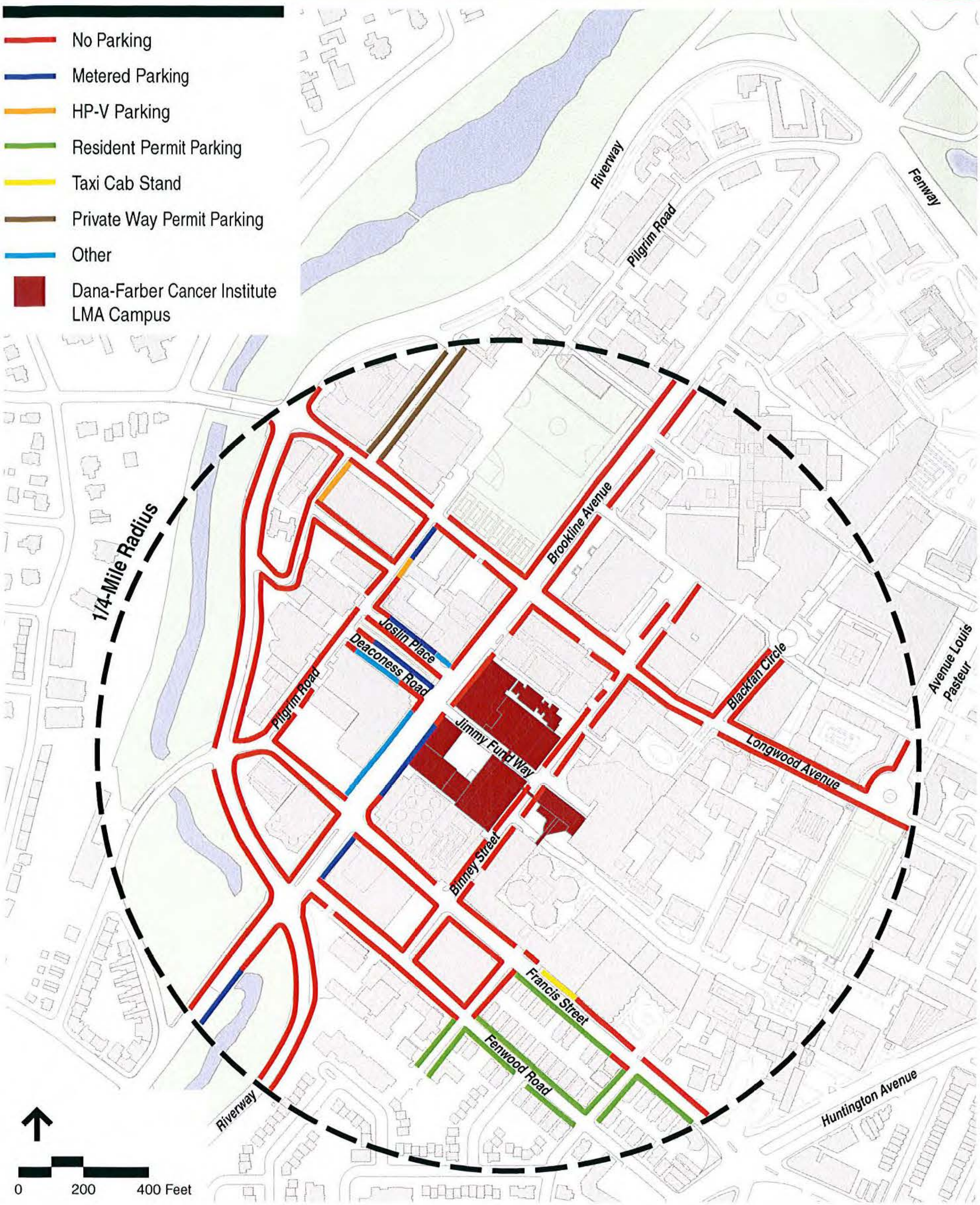
Facility	Total Spaces	Facility	Total Spaces
1 MASCO/375 Longwood Avenue Garage	750	8 BIDMC/Lowery Garage	294
2 BIDMC/Carl J. Shapiro Clinical Center Garage	737	9 Mass Mental Health	212
3 333 Longwood Avenue Garage	495	10 Mission Park Garage	1,373
4 Children's Hospital Patient and Family Garage	643	11 BWH/ASB II Garage	247
5 BIDMC/Pilgrim Road Garage	750	12 BWH/15 Francis Street Lot	57
6 Longwood Galleria Garage	103	13 BIDMC East Campus	604
7 Servicenter Garage	643	14 HMS/New Research Building	561



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Summary of Nearby Off-Street Public Parking Facilities

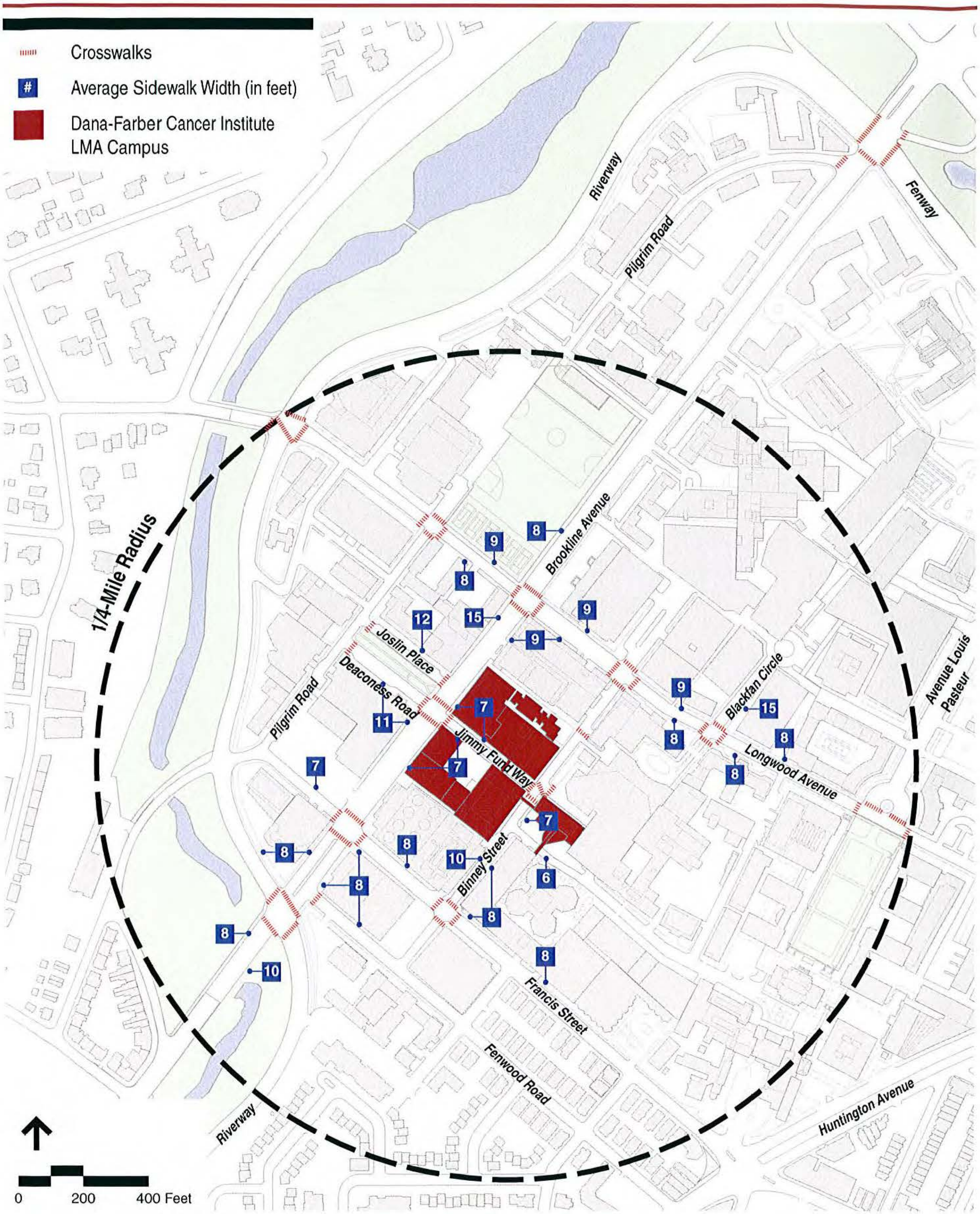
FIGURE 5-8



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Summary of On-Street Parking in the Study Area

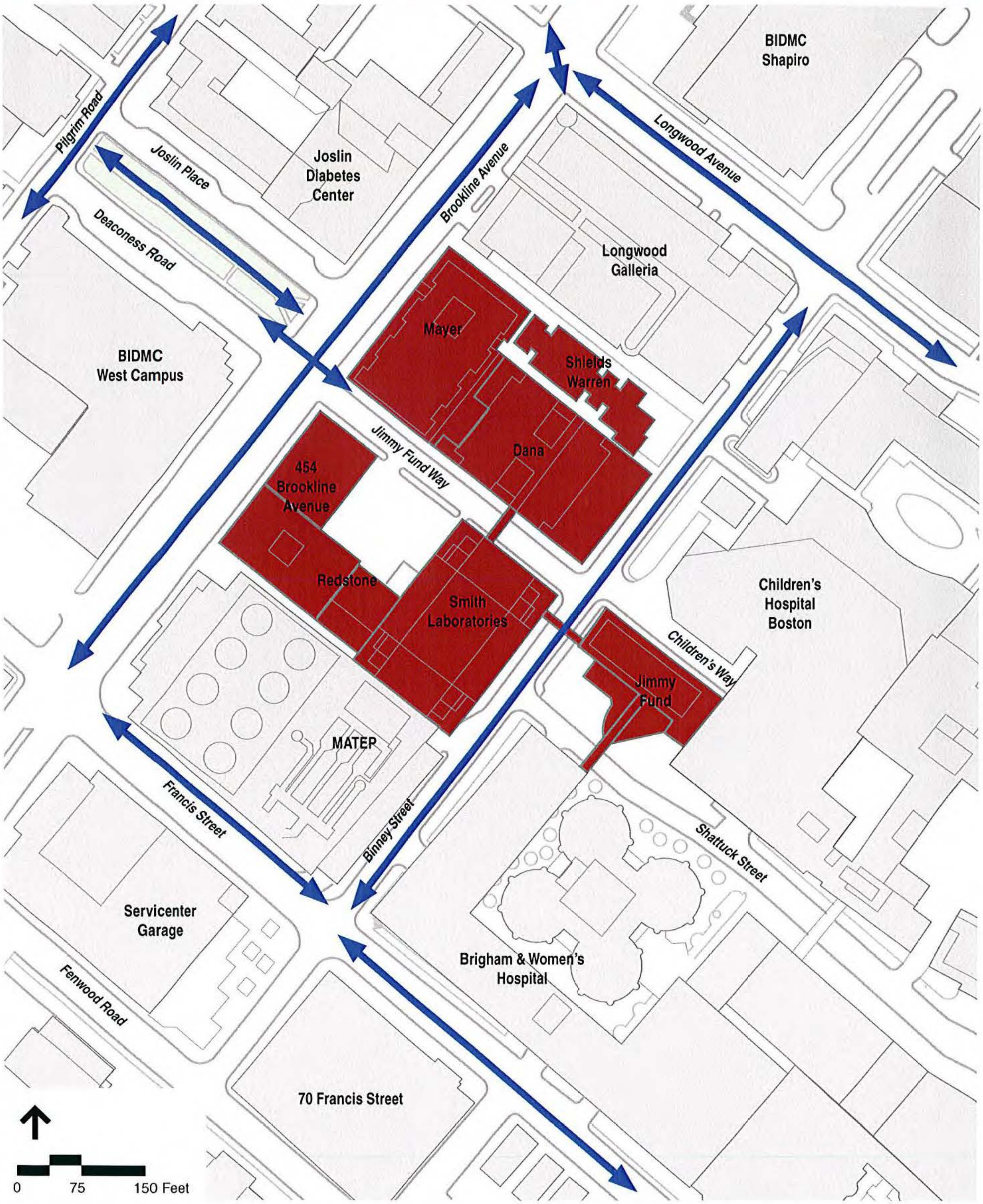
FIGURE 5-9



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Sidewalk and Crosswalk Inventory

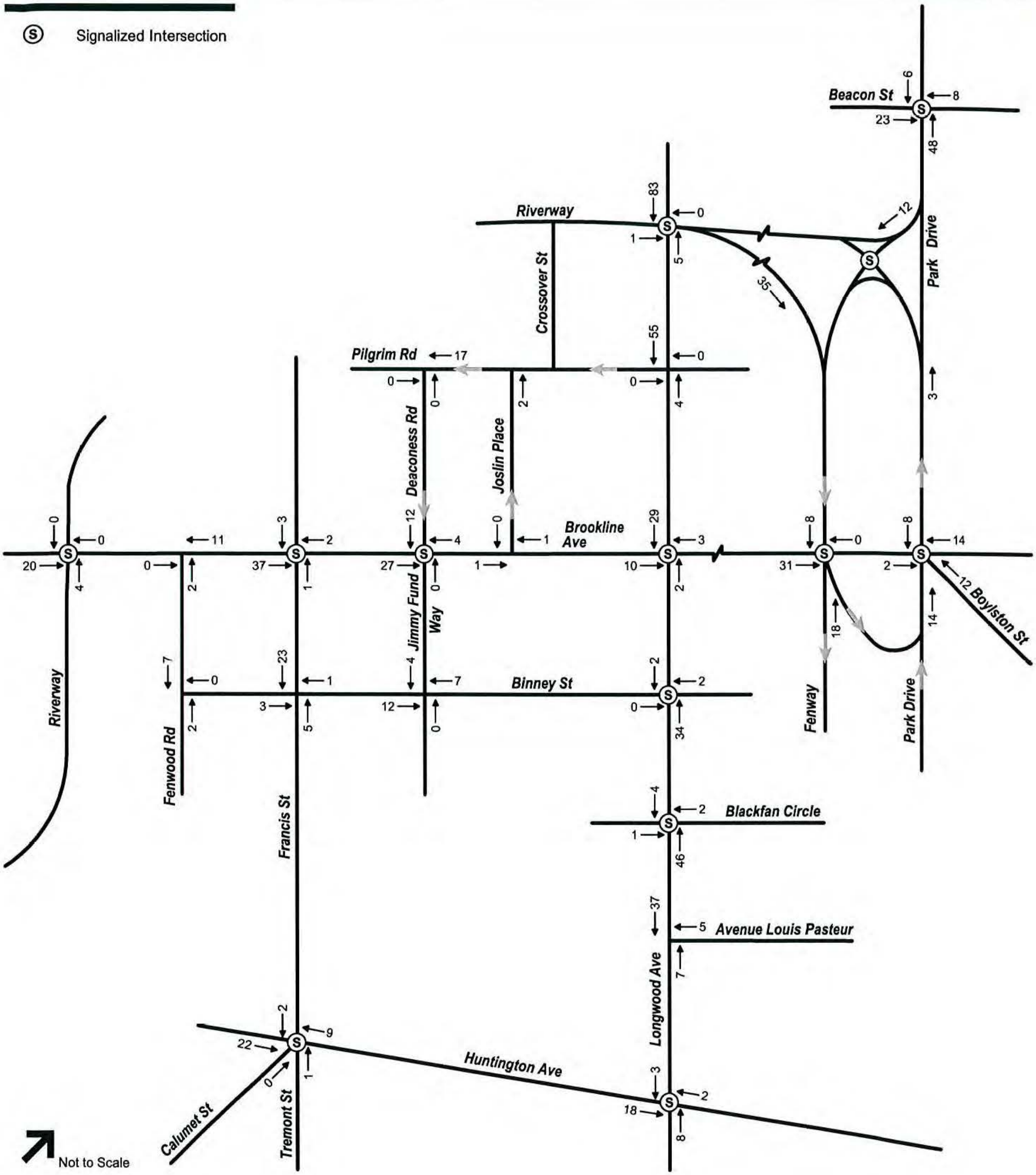
FIGURE 5-10



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

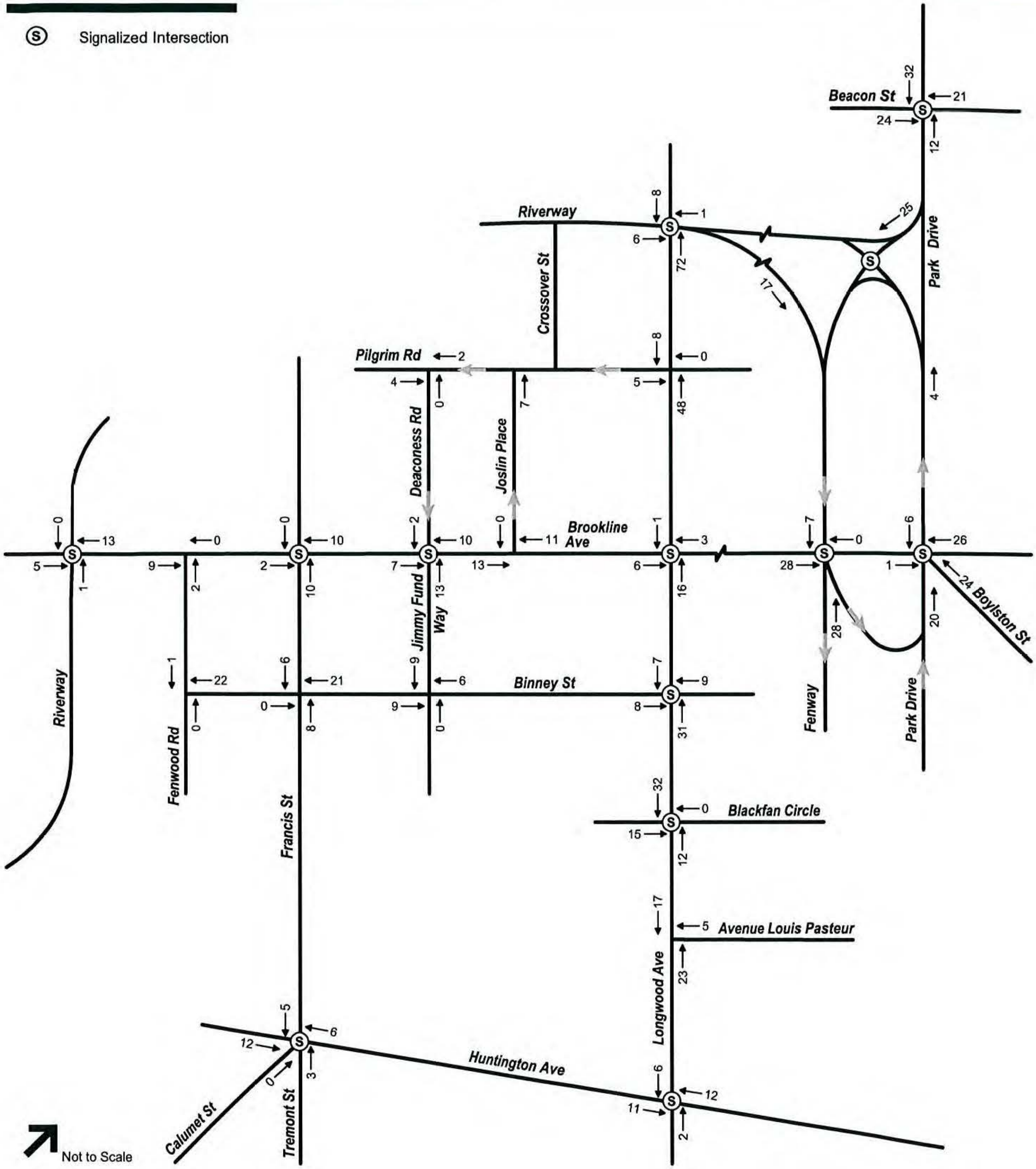
Primary Pedestrian Circulation Routes

FIGURE 5-11



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

2006 Existing Condition
Morning Peak Hour
Bicycle Volumes
FIGURE 5-12



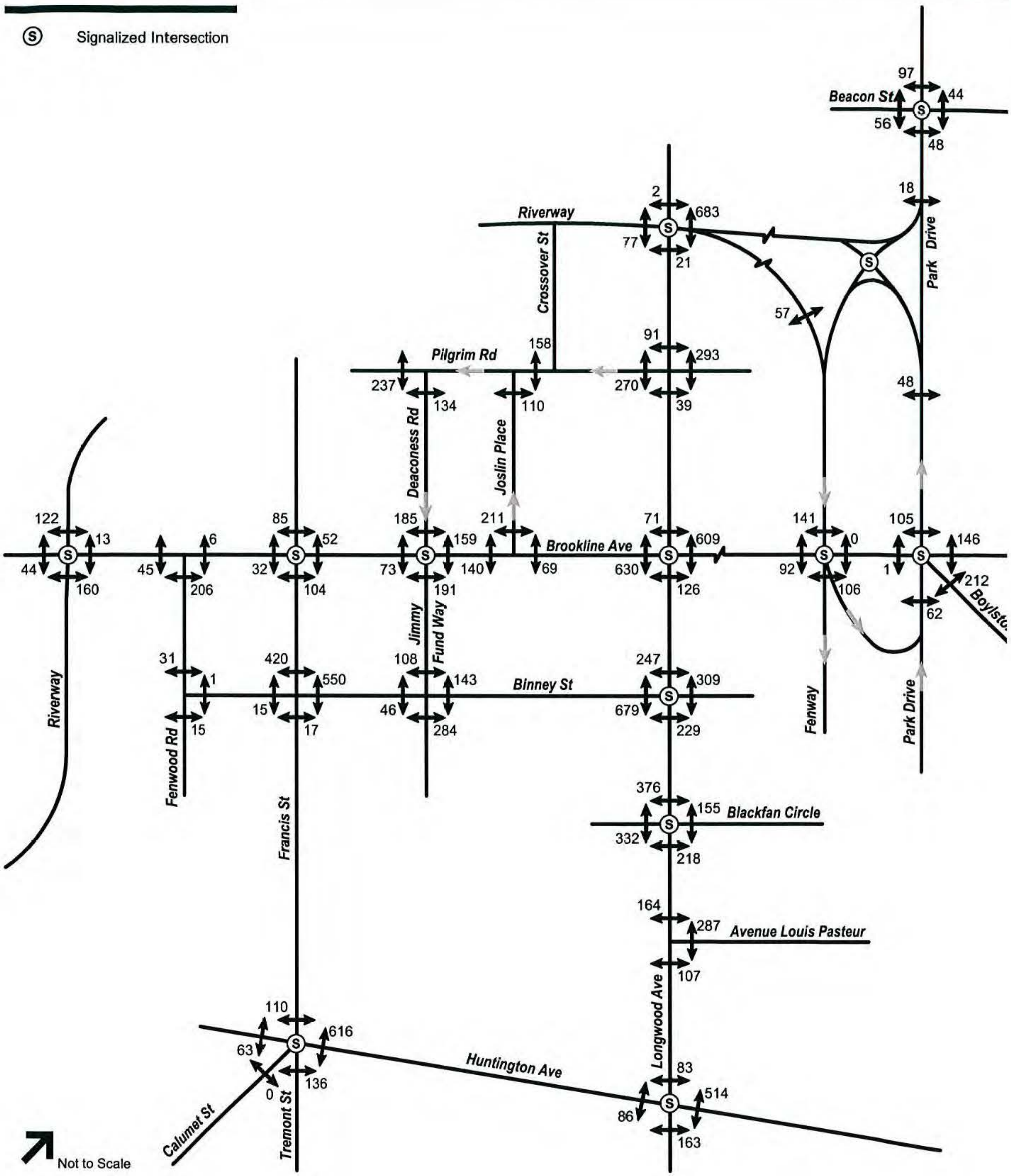
DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

2006 Existing Condition
Evening Peak Hour
Bicycle Volumes
FIGURE 5-13

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

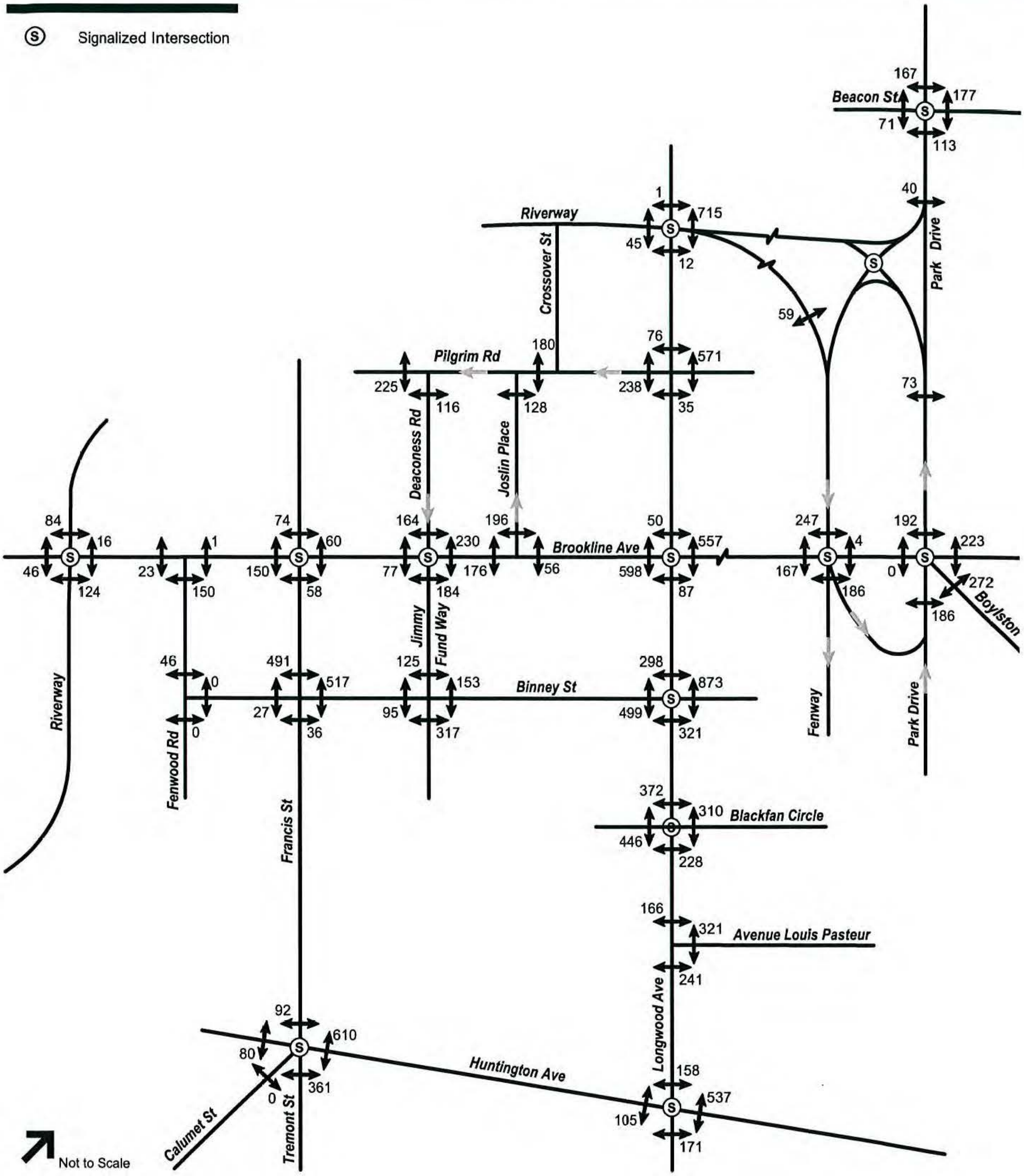
Bicycle Circulation and Amenities

FIGURE 5-14

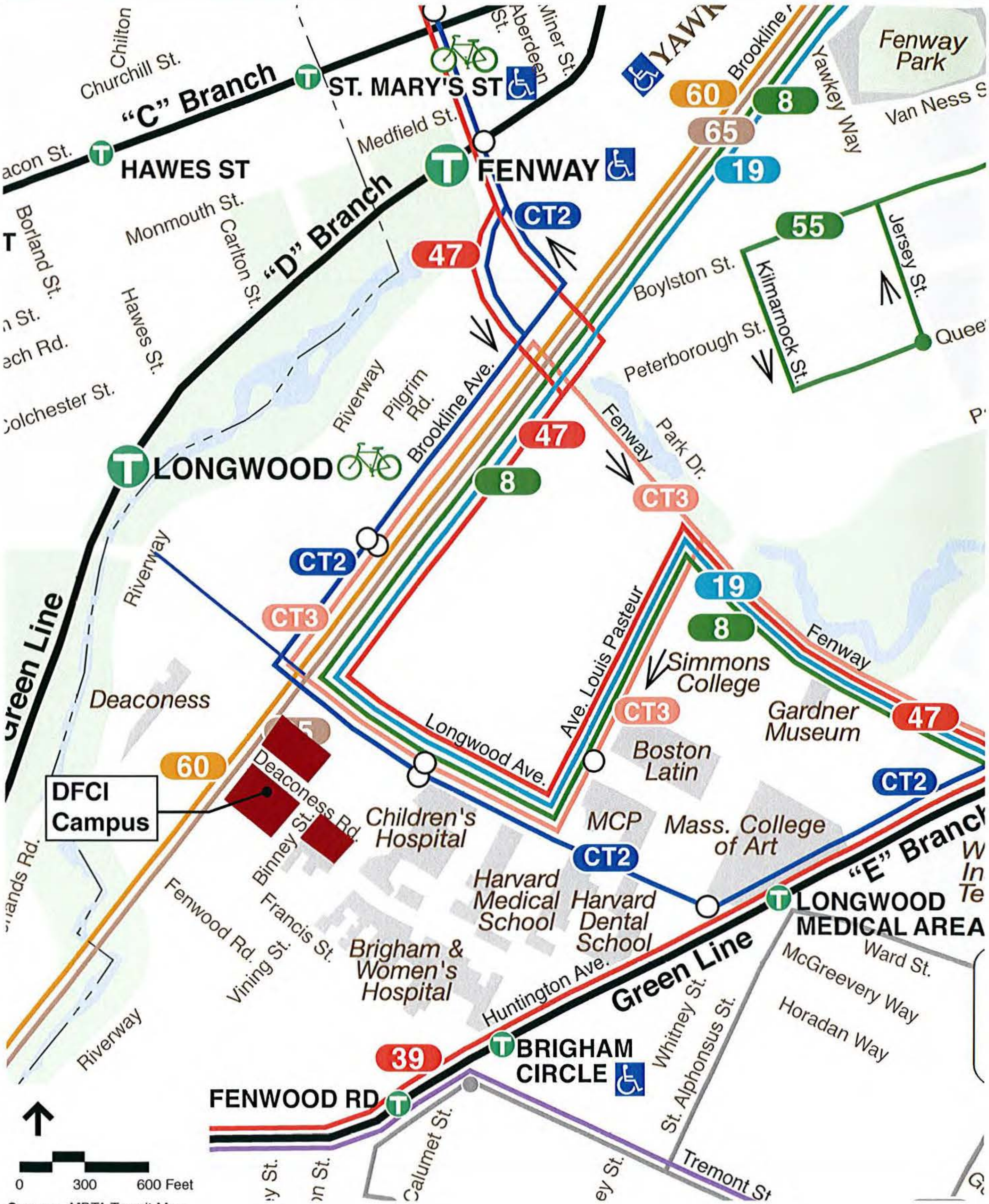


DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

2006 Existing Condition
Morning Peak Hour
Pedestrian Volumes
FIGURE 5-15



2006 Existing Condition
Evening Peak Hour
Pedestrian Volumes
FIGURE 5-16

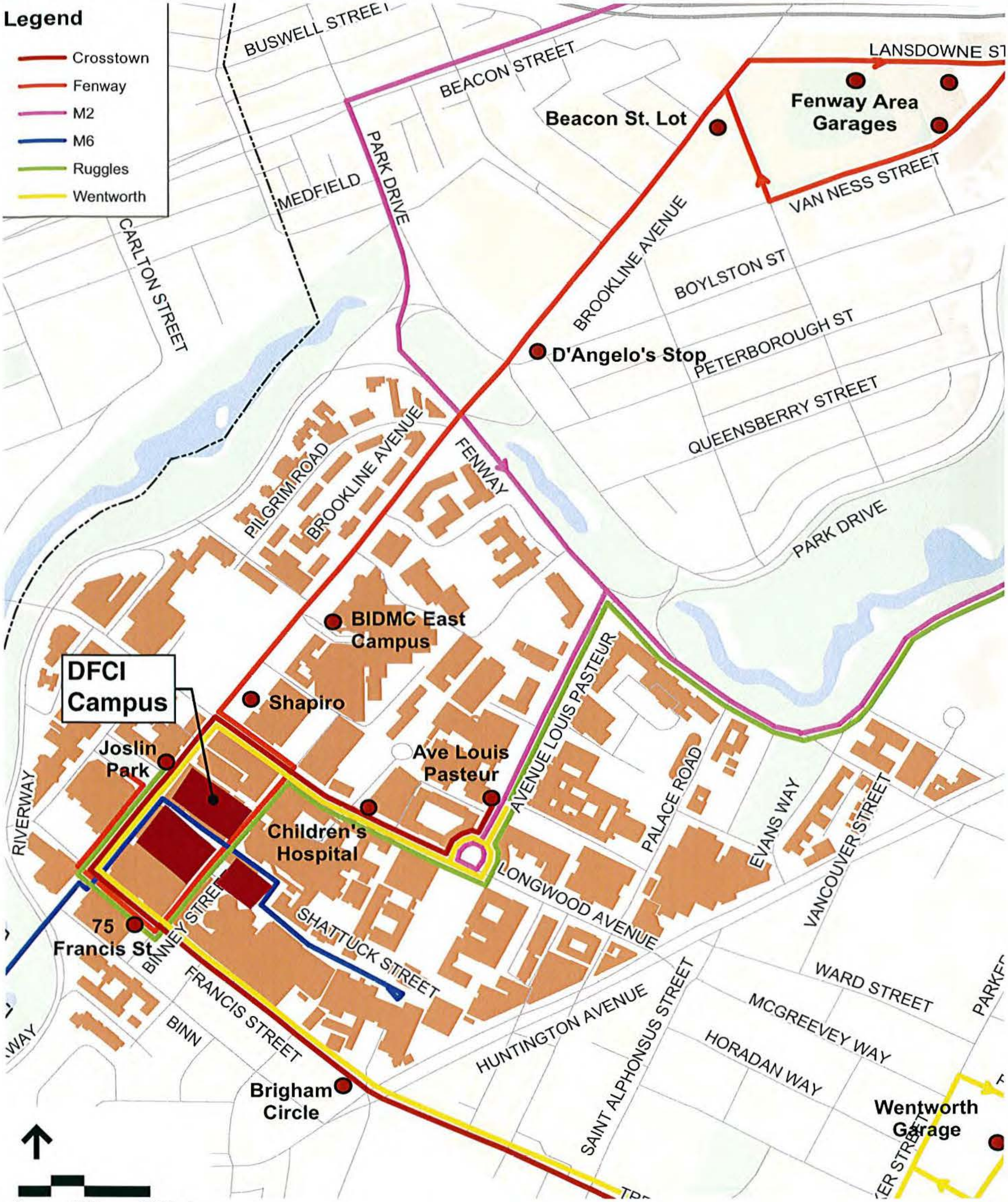


Source: MBTA Transit Map

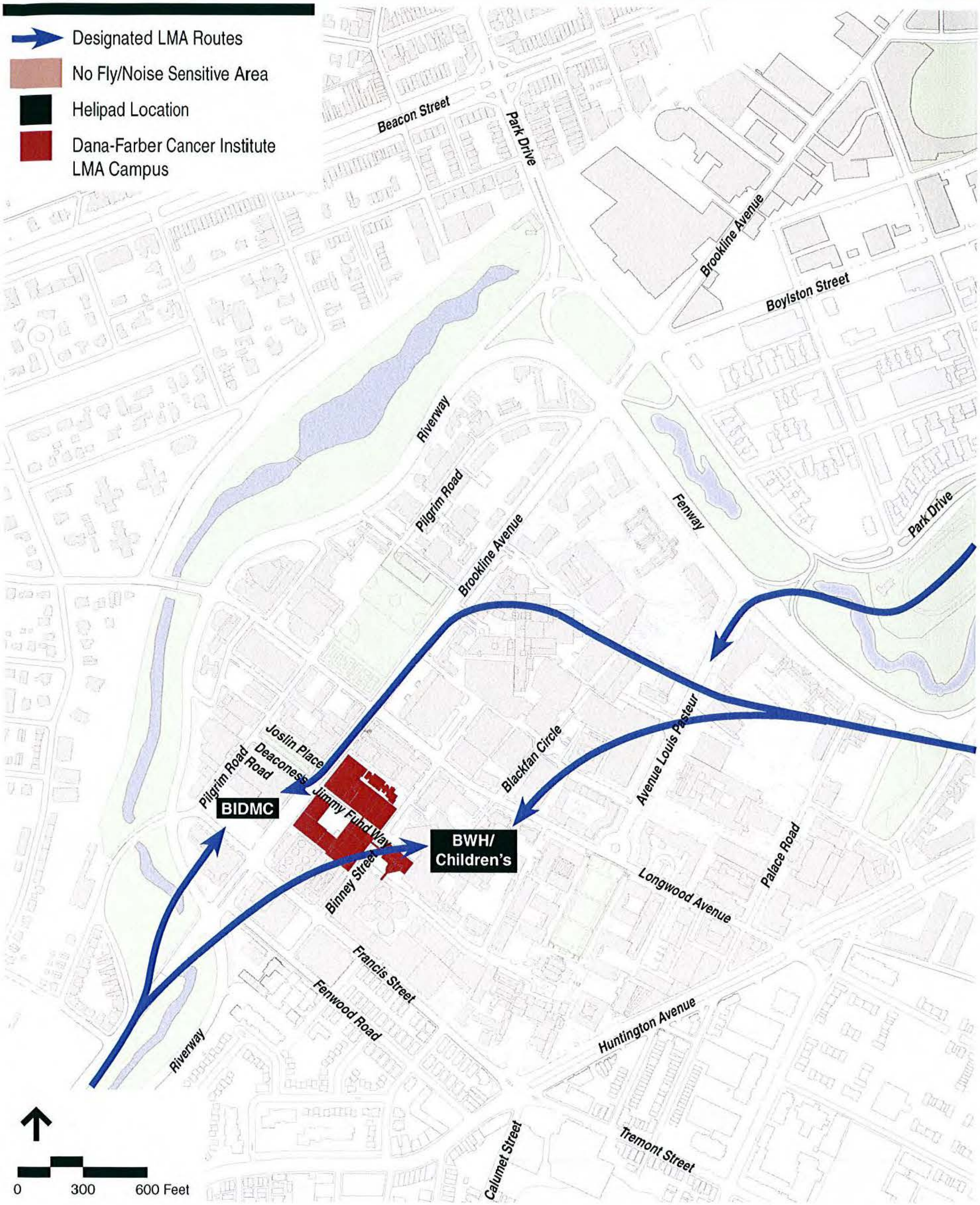
DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Public Transportation

FIGURE 5-17



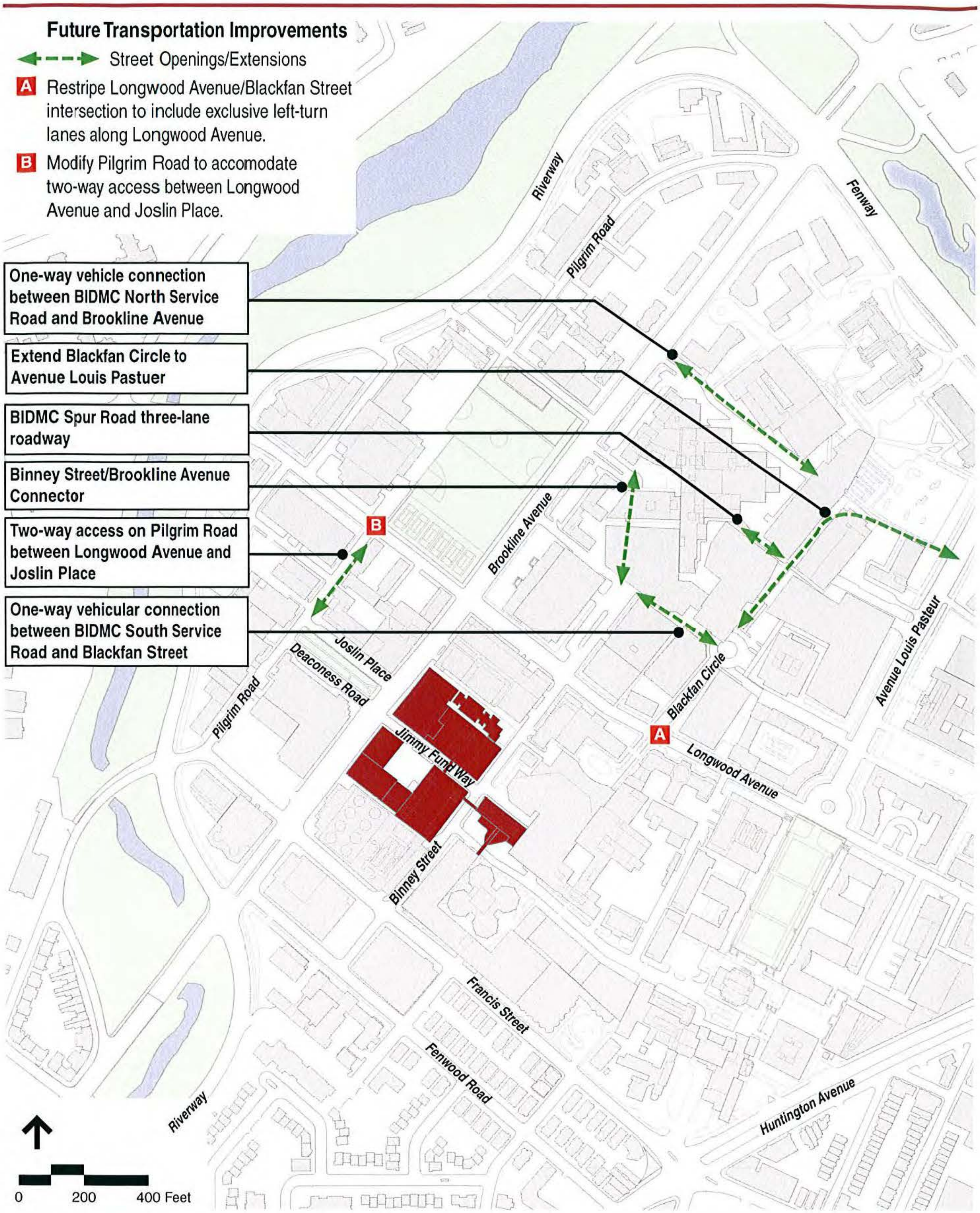
Note: Morning and evening routes vary slightly based on one-way street directions.



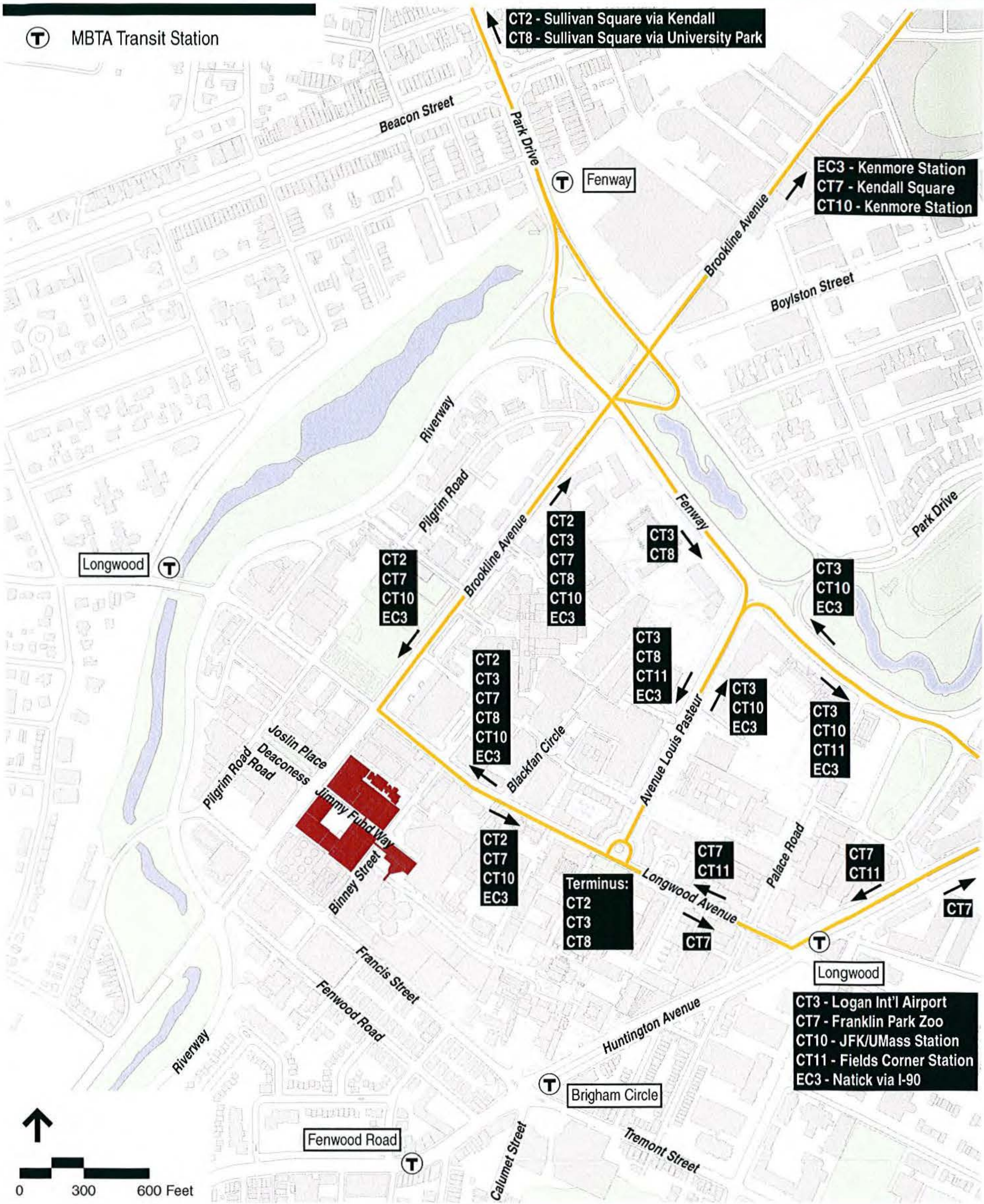
DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

LMA Helicopter Flight Routes

FIGURE 5-19



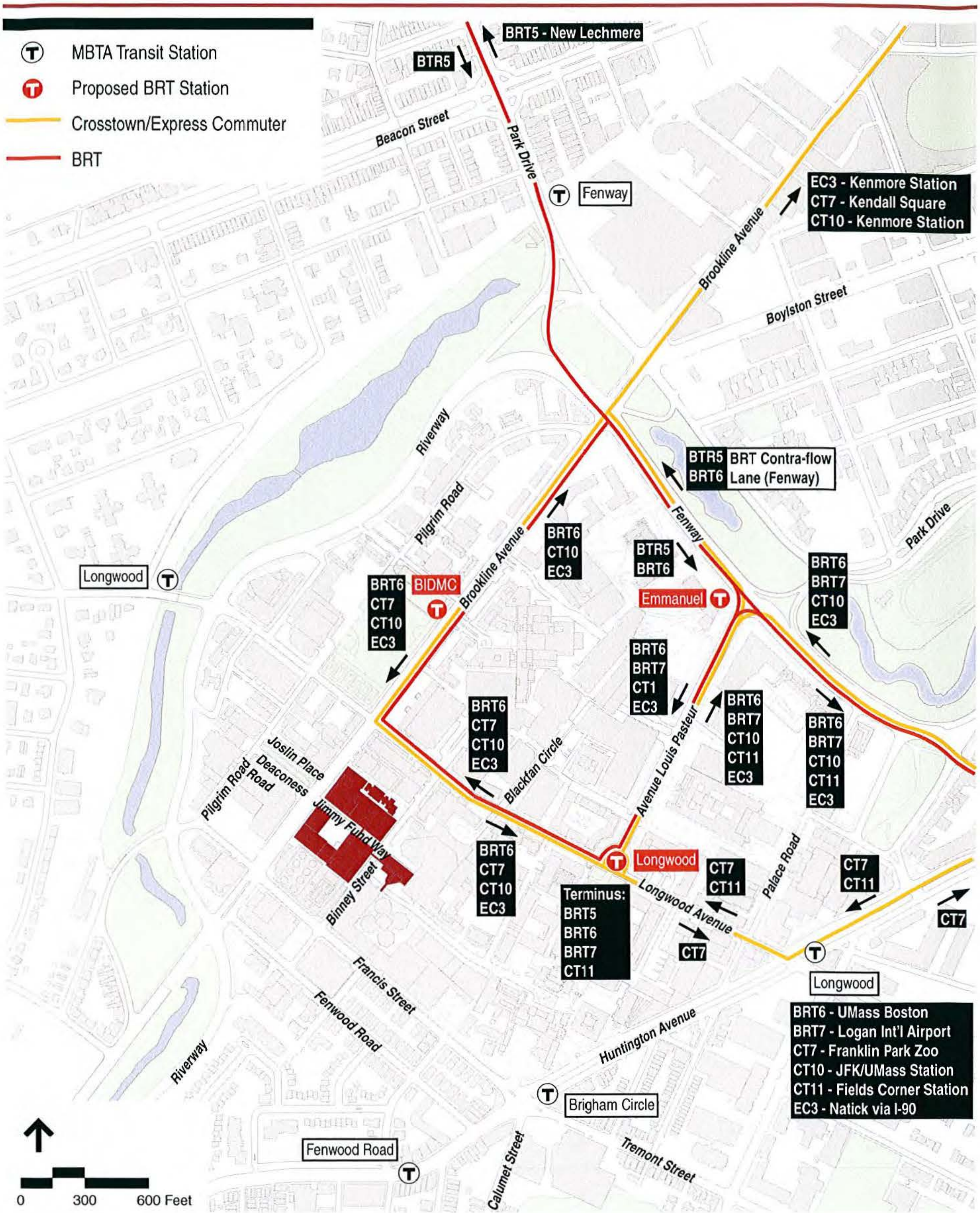
Future Transportation Improvements
Street Openings/Extensions
A Restripe Longwood Avenue/Blackfan Street intersection to include exclusive left-turn lanes along Longwood Avenue.
B Modify Pilgrim Road to accomodate two-way access between Longwood Avenue and Joslin Place.
One-way vehicle connection between BIDMC North Service Road and Brookline Avenue
Extend Blackfan Circle to Avenue Louis Pastuer
BIDMC Spur Road three-lane roadway
Binney Street/Brookline Avenue Connector
Two-way access on Pilgrim Road between Longwood Avenue and Joslin Place
One-way vehicular connection between BIDMC South Service Road and Blackfan Street
Riverway
Pilgrim Road
Fenway
Brookline Avenue
Joslin Place
Deaconess Road
Jimmy Fund Way
Blackfan Circle
Longwood Avenue
Avenue Louis Pasteur
Binney Street
Francis Street
Fenwood Road
Huntington Avenue
0
200
400 Feet



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Urban Ring Phase 1

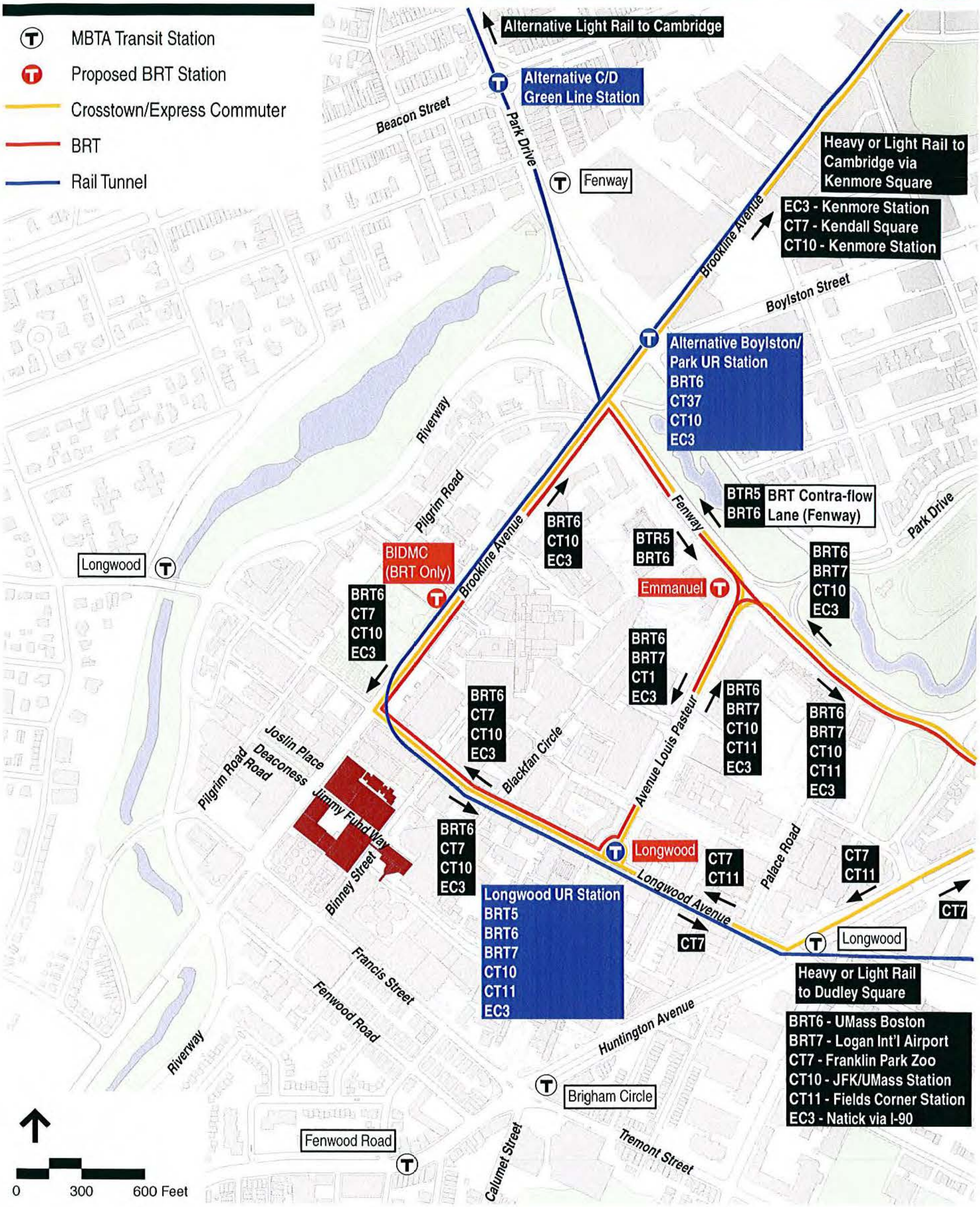
FIGURE 5-21

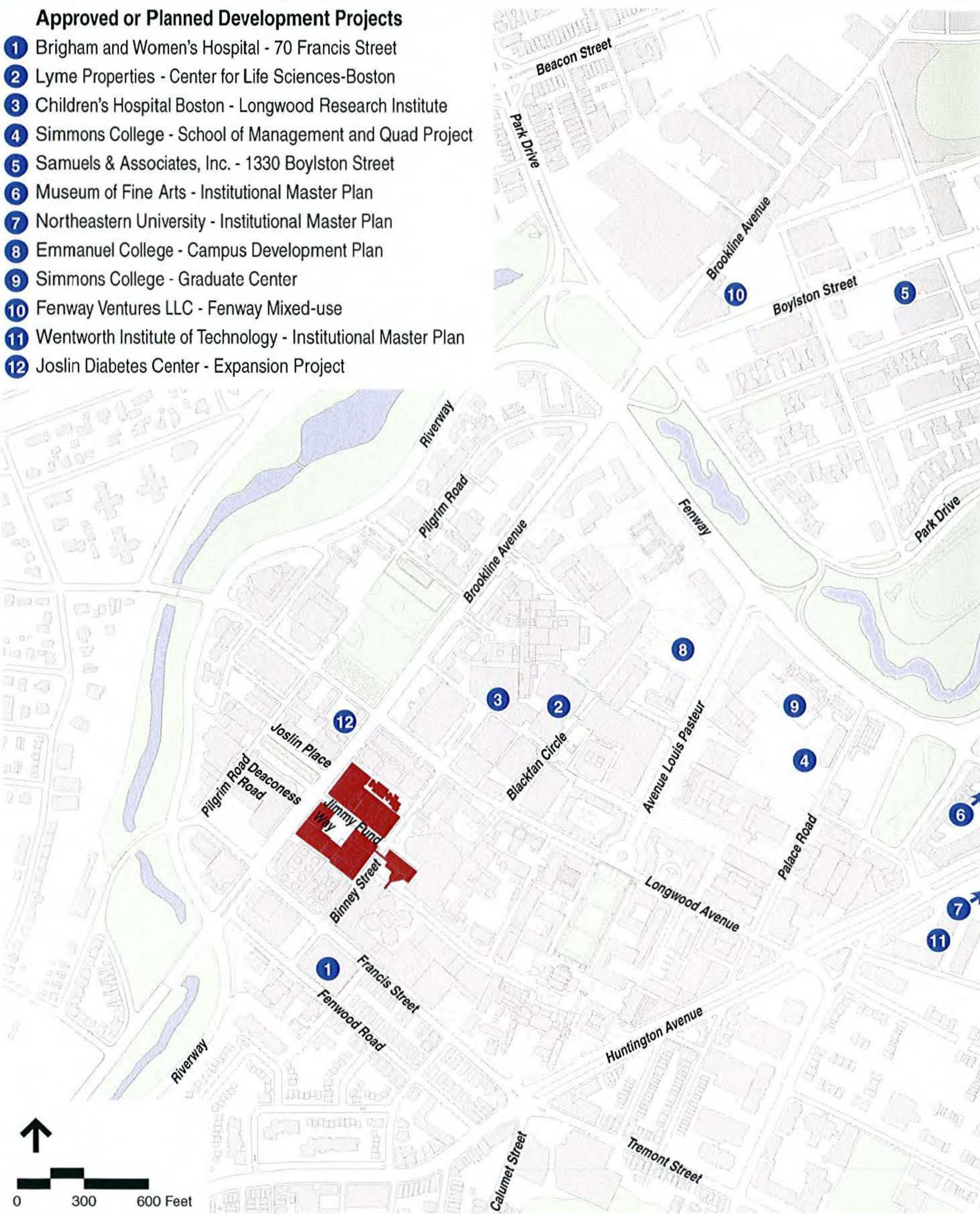


DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Urban Ring Phase 2

FIGURE 5-22

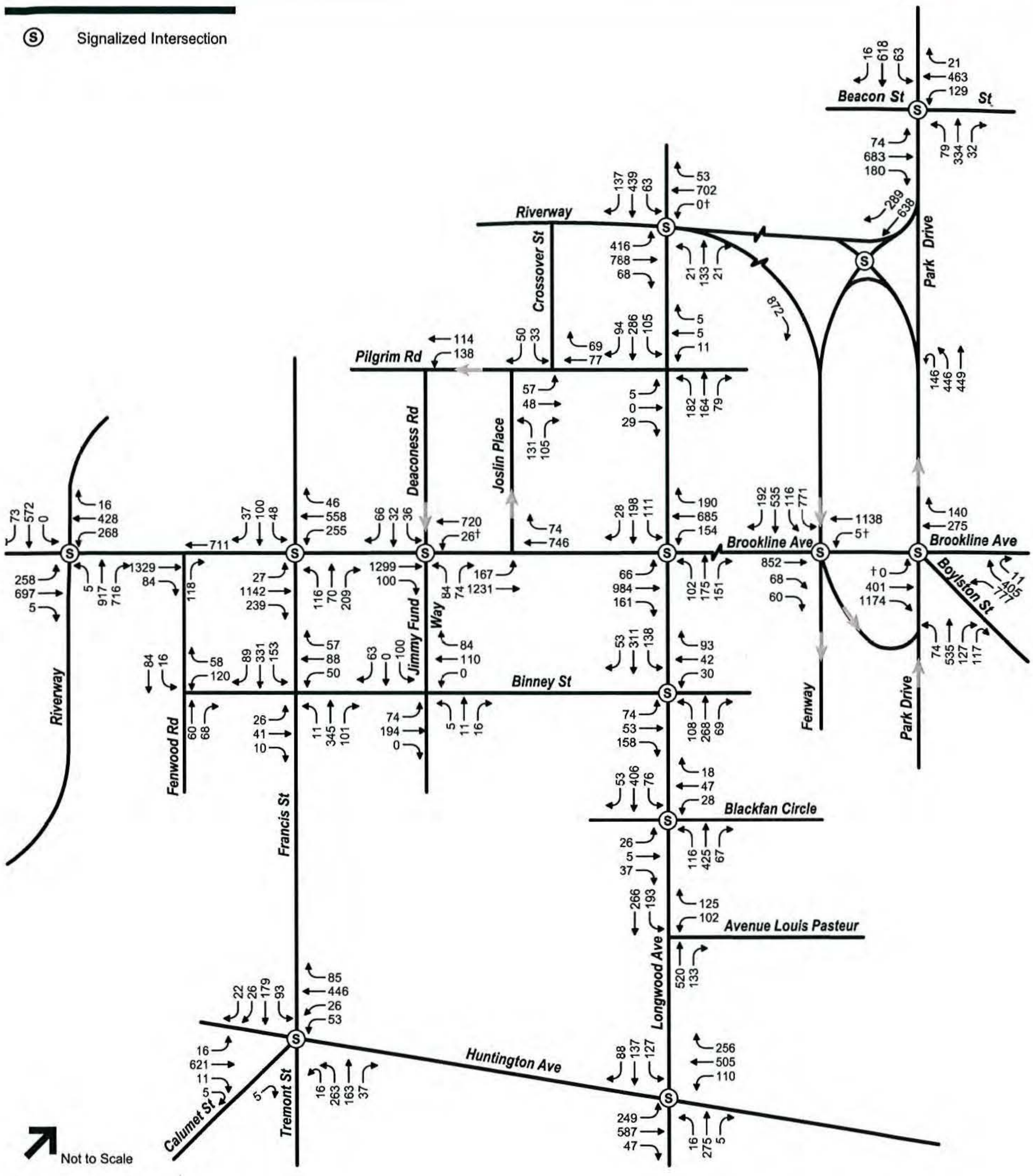

MBTA Transit Station
Proposed BRT Station
Crosstown/Express Commuter
BRT
Rail Tunnel
Alternative Light Rail to Cambridge
Alternative C/D Green Line Station
Beacon Street
Park Drive
Fenway
Heavy or Light Rail to Cambridge via Kenmore Square
EC3 - Kenmore Station
CT7 - Kendall Square
CT10 - Kenmore Station
Brookline Avenue
Boylston Street
Alternative Boylston/ Park UR Station
BRT6
CT37
CT10
EC3
Riverway
Pilgrim Road
BRT6
CT10
EC3
Fenway
BTR5
BRT6
BRT Contra-flow Lane (Fenway)
BTR5
BRT6
Park Drive
Longwood
BIDMC (BRT Only)
Brookline Avenue
Emmanuel
BRT6
BRT7
CT10
EC3
BRT6
CT7
CT10
EC3
BRT6
BRT7
CT1
EC3
BRT6
BRT7
CT10
CT11
EC3
BRT6
BRT7
CT10
CT11
EC3
BRT6
CT7
CT10
EC3
Blackfan Circle
Avenue Louis Pasteur
Joslin Place
Deaconess Road
Pilgrim Road
Jimmy Fund Way
Binney Street
BRT6
CT7
CT10
EC3
Longwood
CT7
CT11
Palace Road
CT7
CT11
CT7
Longwood UR Station
BRT5
BRT6
BRT7
CT10
CT11
EC3
Longwood Avenue
CT7
Longwood
Heavy or Light Rail to Dudley Square
BRT6 - UMass Boston
BRT7 - Logan Int'l Airport
CT7 - Franklin Park Zoo
CT10 - JFK/UMass Station
CT11 - Fields Corner Station
EC3 - Natick via I-90
Francis Street
Fenwood Road
Huntington Avenue
Riverway
Brigham Circle
Tremont Street
Calumet Street
Fenwood Road
0
300
600 Feet



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Approved or Planned Development Projects

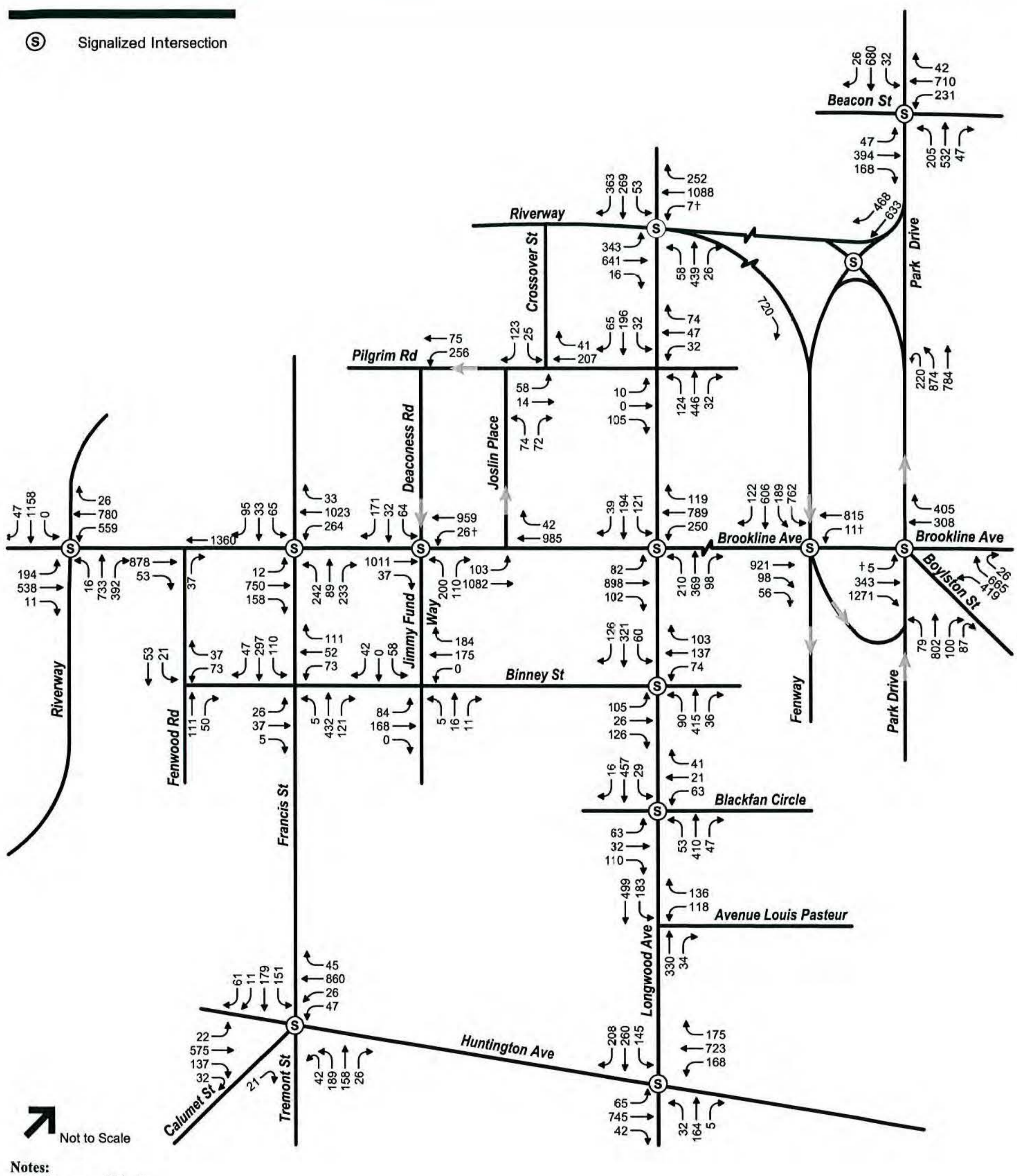
FIGURE 5-24



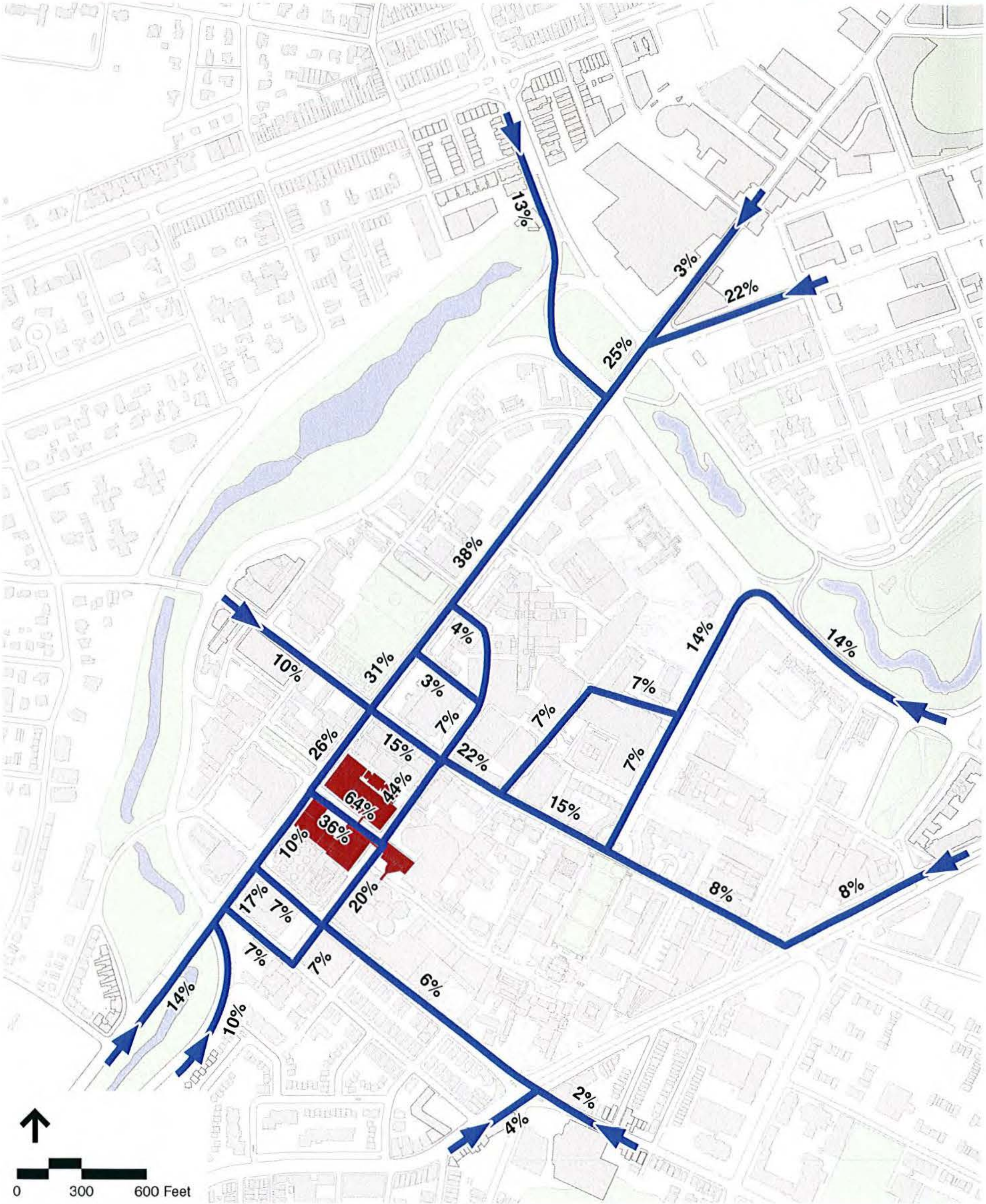
Notes:
† Left-turn prohibited

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

2016 No-Build Condition
Morning Peak Hour
Traffic Volumes
FIGURE 5-25



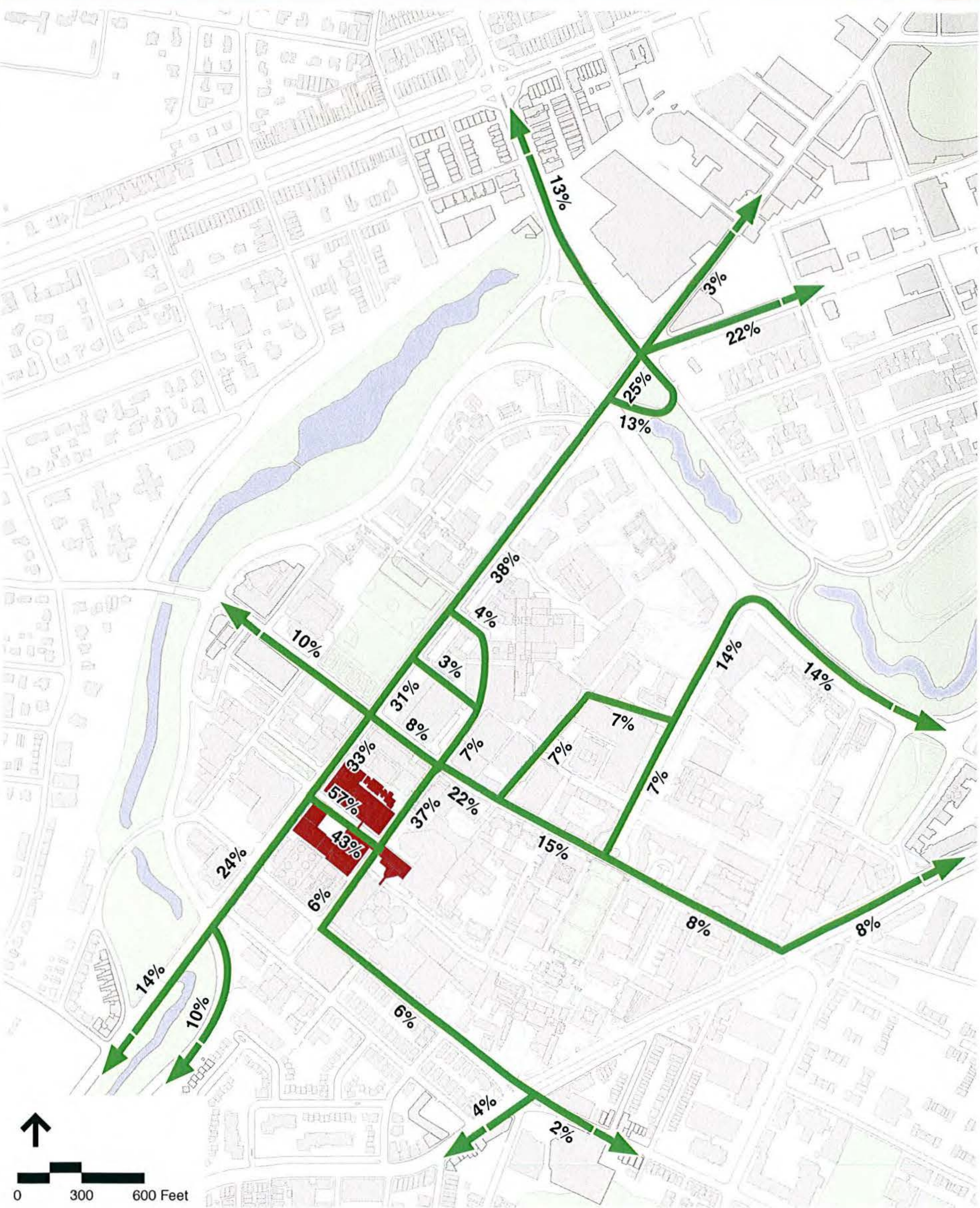
Notes:
† Left-turn prohibited



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Trip Distribution
Inbound

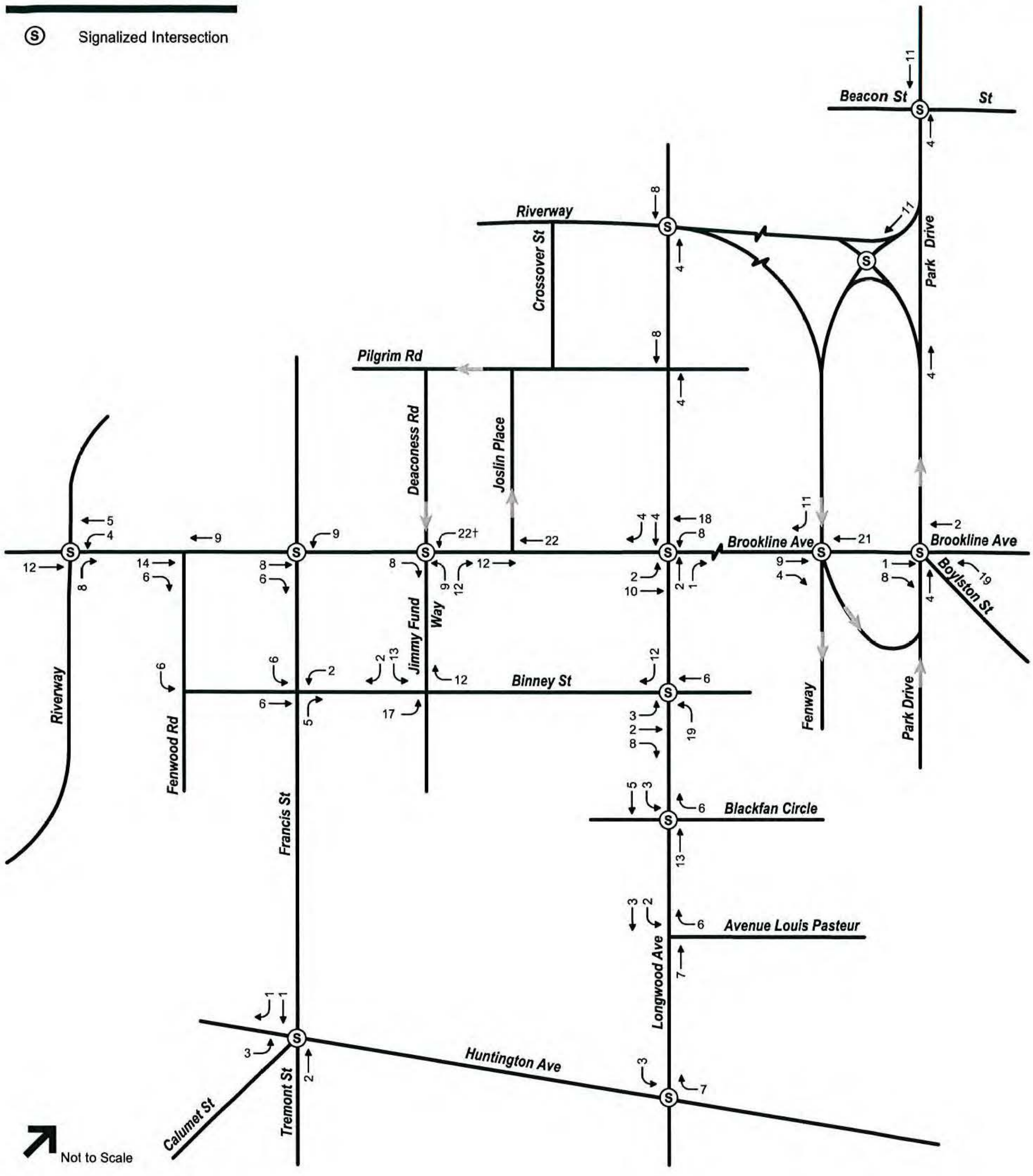
FIGURE 5-27



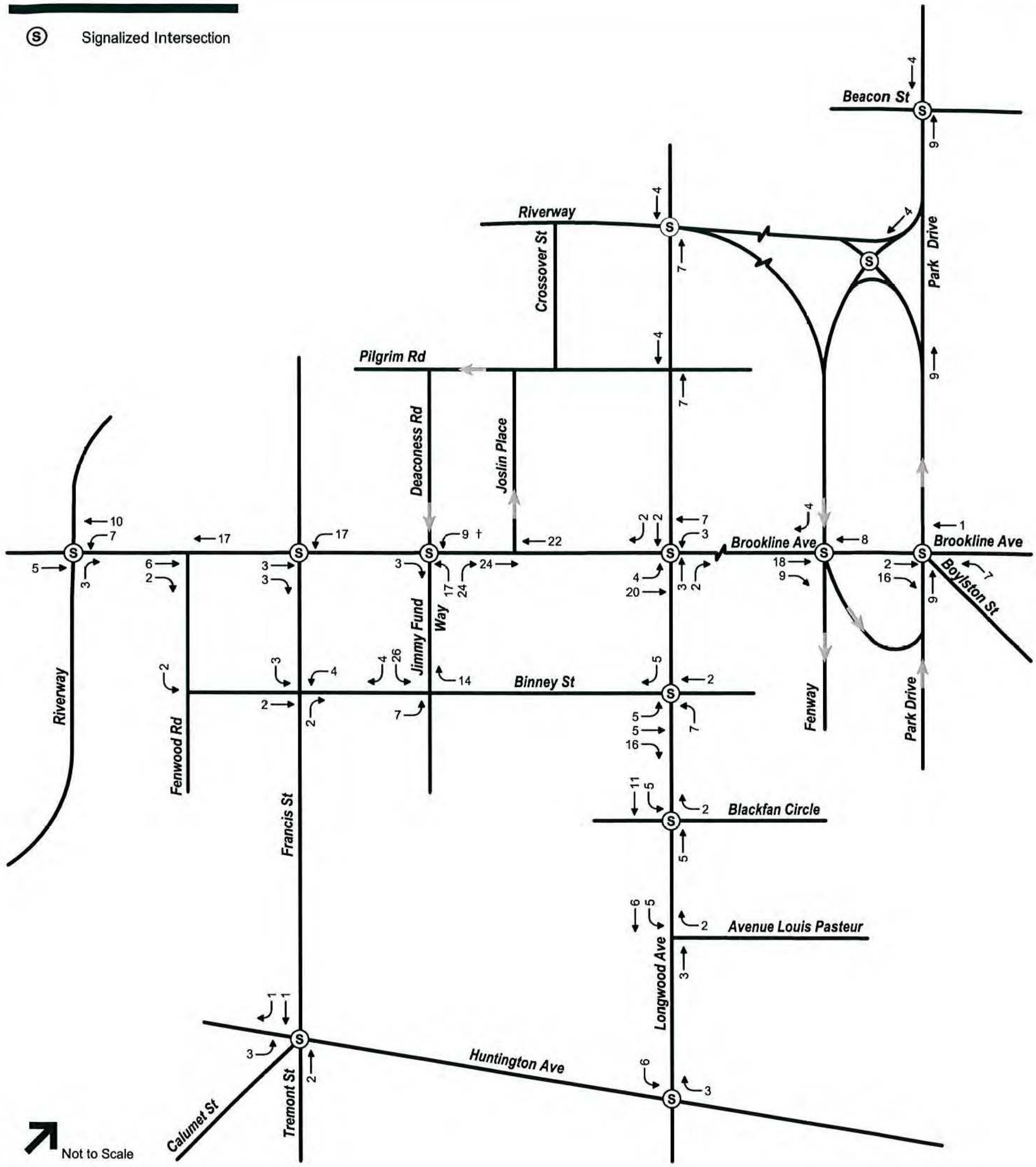
DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Trip Distribution
Outbound

FIGURE 5-28

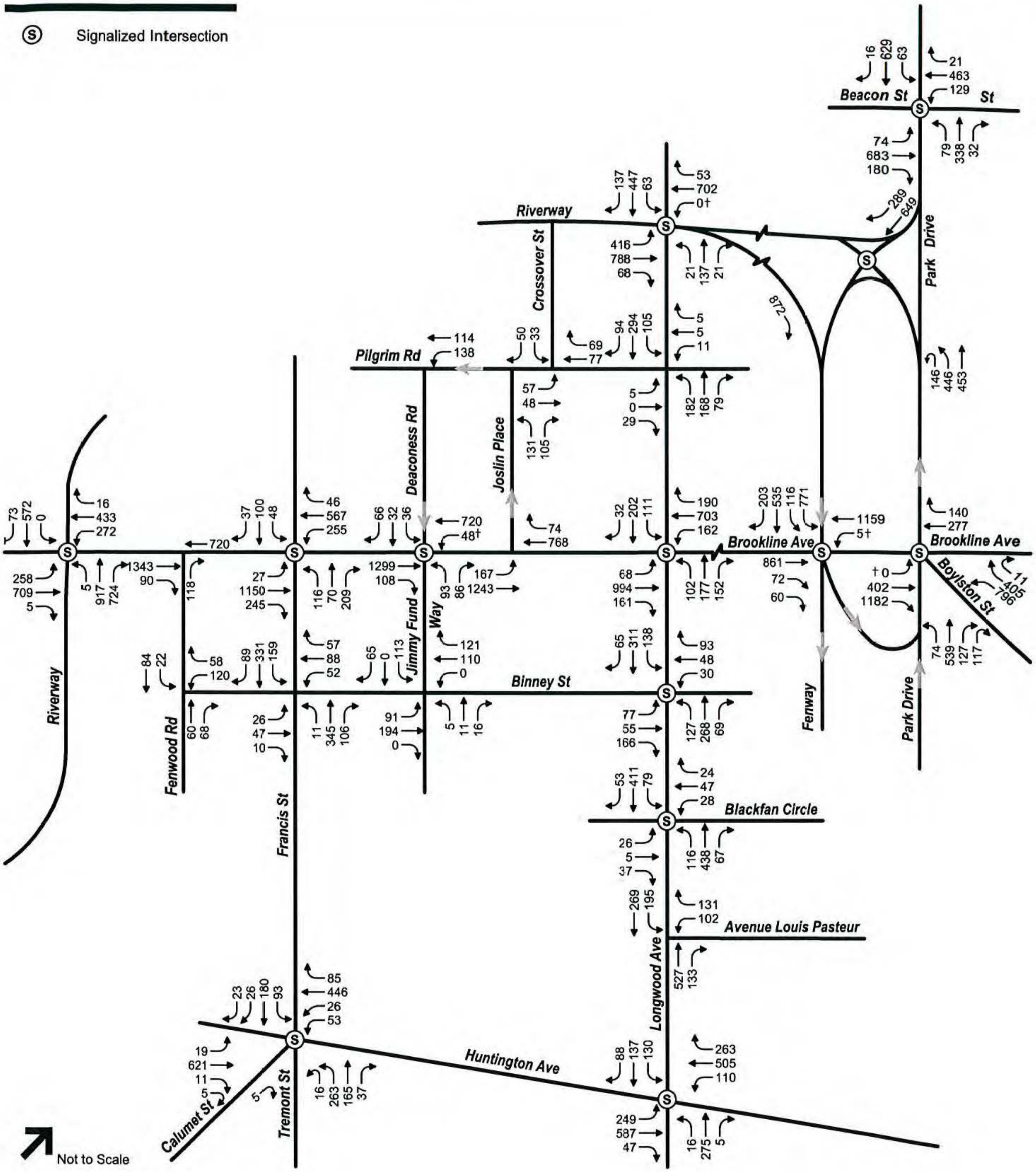


Notes:
† Left-turn prohibited

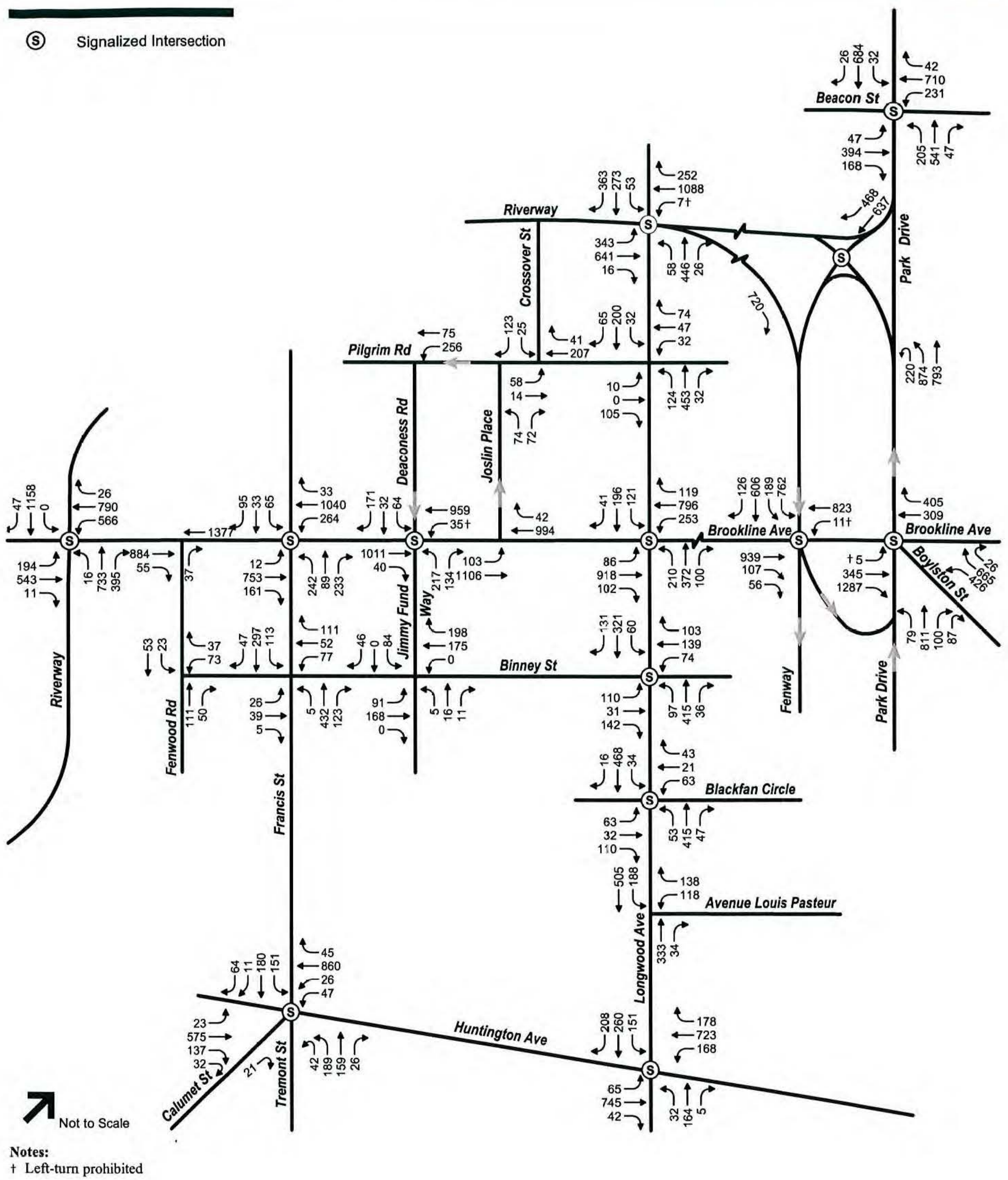


Notes:
† Left-turn prohibited

Ⓢ Signalized Intersection



Notes:
† Left-turn prohibited



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

2016 Build Condition
Evening Peak Hour
Traffic Volumes
FIGURE 5-32

6

Environmental Protection Component

6.1 Introduction

This chapter evaluates the environmental protection components of the Center for Cancer Care project. This chapter specifically addresses the Scoping Determination issued by the BRA after its review of the Institutional Master Plan Notification Form/Project Notification Form (IMPNF/PNF) dated May 30, 2006 and the Certificate of the Secretary of Environmental Affairs for the Environmental Notification Form (ENF) dated June 9, 2006. Included are analyses of wind, shadow, daylight, solar glare, noise, air quality, solid and hazardous waste, geotechnical and groundwater analysis, flood hazards and wetlands, construction impacts, rodent control, and cultural resources. Discussion of water quality is presented in Chapter 7, Infrastructure Analysis. Sustainable design elements are presented in detail in Chapter 8.

6.2 Wind Analysis

A wind study for the proposed Center for Cancer Care building was conducted by Rowan Williams Davies & Irwin Inc. (RWDI) and is summarized in this section to assess the effect of the proposed development on local wind conditions in pedestrian areas around the building site and provide recommendations for minimizing adverse effects, if any. The RWDI study and detailed results is provided in Appendix B. The study involved wind simulation on a 1:300 scale model of the proposed buildings and surroundings. The simulations were conducted in a boundary-layer wind tunnel to quantify local wind speed conditions and compare them to appropriate criteria for gauging wind comfort in pedestrian areas. The criteria recommended by the BRA were used in this study. Photographic images of the models are included in Appendix B.

6.2.1 Overview

Major buildings, especially those that rise above surrounding buildings, can cause increased local wind speeds at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface, and taller buildings intercept these faster winds and deflect them down to the pedestrian environment. Wind may also funnel through gaps between buildings and accelerate around corners of buildings, and this can cause increases in wind speed. Conversely, if a building is surrounded by others of equivalent height, it may be protected from prevailing upper-level winds, resulting in no significant changes to the local pedestrian-level wind environment. The most effective way to assess potential pedestrian-level wind impacts around a proposed new building is to conduct scale model tests in a wind tunnel.

Mitigating the effects of wind in planned outdoor activity areas is important since high winds can deter pedestrian use. For example, winds should be light or relatively light in areas where people will be sitting, such as outdoor cafés or playgrounds. For bus stops and other locations where people will be standing, somewhat higher winds can be tolerated. Frequently used sidewalks, where people are primarily walking, stronger winds are acceptable. For infrequently used areas, the wind comfort criteria can be relaxed even further. The actual effects of wind can range from pedestrian inconvenience, due to the blowing of dust or other loose materials in a moderate breeze, to severe difficulty walking due to gusting wind.

6.2.2 Methodology

Information concerning the site and surroundings were derived from site photographs, information on surrounding buildings supplied by the project's architect Zimmer Gunsul Frasca Architects, LLC (ZGF) and site plans and elevations of the proposed development provided by the design team. The following configurations were simulated:

- Existing (No-Build) Condition – includes existing buildings on and around the site as well as the completion of Brigham and Women's 70 Francis Street project; and
- Proposed (Build) Condition – includes the proposed Center for Cancer Care, all existing surroundings, and the future proposed Joslin Place building.

The wind simulations were conducted in an 8-footwide by 6-foot high boundary-layer wind tunnel, the smaller of two such wind tunnels at RWDI's laboratory in Guelph, Ontario, Canada. A 150 hp axial fan at the upwind end of the tunnel produces wind speeds in excess of 35 mph. During the test session, the scale model sits on a motorized turntable, embedded in the wind tunnel floor.

The scale model was equipped with 56 specially designed wind speed sensors that were connected to the wind tunnel's data acquisition system to record the mean and fluctuating components of wind speed at a full-scale height of 5 ft above grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 wind directions, in 10-degree increments, starting from true north. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the reference wind speed in the free stream above the model. The results were then combined with long-term meteorological data, recorded during the years 1945 to 2004 at Boston's Logan International Airport, in order to predict full-scale wind conditions. The analyses were performed separately for each of the four seasons and for the entire year.

Figures 6-1, 6-2 and 6-3 present "wind roses", summarizing the annual and seasonal wind climates in the Boston area, based on the data from Logan Airport. The left-hand wind roses, in Figures 6-1 and 6-2 are based on all observed wind readings for the given season, and the right-hand wind roses are based on strong winds for one percent of the time. The upper wind roses in Figure 6-1 for example, summarize the spring (March, April, and May) wind data. In general, the prevailing winds at this time of year are from the west-northwest, northwest, west, southwest and east. In the case of strong winds, however, the most common wind direction is northeast, west and west-northwest.

On an annual basis, the most common wind directions are those between southwest and northwest. Winds from the south-southwest and east are also relatively common. In the case of strong winds, northeast and west-northwest are the dominant wind directions.

This study involved state-of-the-art measurement and analysis techniques to predict wind conditions at the study site. Nevertheless, some uncertainty remains in predicting wind comfort, and this must be kept in mind. The sensation of comfort among individuals can be quite variable. Variations in age, individual health, clothing, and other human factors can change a particular response of an individual. The comfort limits used in this report represent an average for the total population. In addition, unforeseen changes in the project area, such as the construction or removal of buildings, can affect the conditions experienced at the site. Finally, the prediction of wind speeds is necessarily a statistical procedure. The wind speeds reported are for the frequency of occurrence stated (one percent of the time). Higher wind speeds will occur but on a less frequent basis.

The placement of wind measurement locations was based on the projected pedestrian usage of the site, and reviewed by ZGF and the BRA. The following summary of pedestrian wind conditions is based on the annual wind speeds, except where noted otherwise. Generally, wind conditions suitable for walking are appropriate for sidewalks, walkways and parking lots; wind speeds comfortable for standing are preferred for building entrances where pedestrians are more apt to linger; and lower wind speeds comfortable for sitting or standing are desired for outdoor amenity spaces.

6.2.3 Pedestrian Wind Comfort Criteria

The BRA has adopted standards for assessing the relative wind comfort of pedestrians. The BRA Wind Design Guidance criterion states that an effective gust velocity (hourly mean wind speed + 1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than one percent of the time. This set of criteria are used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded one percent of the time (i.e., the 99-percentile mean wind speed). They are presented as follows in Table 6-1.

Table 6-1 BRA Mean Wind Criteria*

Dangerous	> 27 mph
Uncomfortable for Walking	> 19 and ≤ 27 mph
Comfortable for Walking	> 15 and ≤ 19 mph
Comfortable for Standing	> 12 and ≤ 15 mph
Comfortable for Sitting	< 12 mph

* *Applicable to the hourly mean wind speed exceeded one percent of the time.*

The wind climate found in a typical downtown location in Boston is generally comfortable for the pedestrian use of sidewalks and thoroughfares and meets the BRA effective gust velocity criterion of 31 mph. However, without any mitigation measures; the general wind climate in Boston is likely to be frequently uncomfortable for more passive activities such as sitting.

6.2.4 Test Results

Figures 6-4 and 6-5 graphically depict the wind comfort conditions at each wind measurement location based on the annual winds for the Existing and Build conditions. Typically the summer and fall wind conditions tend to be more comfortable than the annual wind conditions, while the winter and spring wind conditions are less comfortable than the annual winds.

6.2.4.1 Existing Condition

On an annual basis, the mean and gust wind speeds for the Existing Condition are generally comfortable for sitting and standing. The intersection of Francis Street/Binney Street currently has mean wind speeds uncomfortable for walking (see Figure 6-4). These locations were also estimated to have unacceptable wind gust speeds, based on the BRA's effective gust criterion. These wind conditions were due mainly to the dominant northwesterly winds accelerating around the corners of buildings at these locations. No location was predicted to have dangerous wind conditions annually.

When seasonal results were analyzed, the following locations were predicted to have uncomfortable mean wind speeds in the winter:

- Jimmy Fund Way adjacent to the Dana Building;
- The intersection of Francis Street and Binney Street; and
- The corner of Pilgrim Road at Francis Street.

Additionally, wind conditions in excess of 27 MPH were detected at the corner of Binney Street and Francis Street in the winter. The corner of Pilgrim Road at Francis Street also failed the BRA's effective gust criterion during the winter.

6.2.4.2 Build Condition

The Build Condition analysis assumes the construction of the Center for Cancer Care and the Joslin Place project at the corner of Brookline Avenue and Longwood Avenue.

Brookline Avenue
On an annual basis, mean wind speeds will be comfortable for standing at the proposed Center for Cancer Care entrances on Brookline Avenue. Wind conditions along the sidewalks were suitable for walking or better. No unacceptable effective gust wind speeds were detected. Wind conditions at these locations are considered acceptable for their intended use.

Jimmy Fund Way
On an annual basis, the mean wind speeds at the proposed drop-off area on Jimmy Fund Way will be comfortable for sitting, while the remaining sidewalk were comfortable for walking or better. No dangerous or unacceptable effective gust wind speeds were detected in the model. However, during the winter, the northern corner of the Center for Cancer Care is predicted to have mean wind speeds marginally (20 mph) uncomfortable for walking. These wind conditions are considered acceptable for the expected usage of the area.

Binney Street
On an annual basis, wind conditions along Binney Street were generally comfortable for walking or better in the Build Configuration. As was detected in the Existing Condition, the intersection of Binney Street and Francis Street will be uncomfortable for walking on an annual basis, with unacceptable wind gust according to effective gust criterion. During the spring and fall, the mean wind speeds at this intersection were rated uncomfortable for walking, while dangerous mean wind speeds were detected in the winter. Mean wind speeds at the opposite corner (southwest side of the intersection) were also uncomfortable for walking in the winter.

Francis Street
Mean wind speeds, on an annual basis, along Francis Street and in the open space at Beth Israel Deaconess Medical Center's Emergency Department were generally comfortable for sitting or standing. Higher mean wind speeds uncomfortable for walking were detected at the intersection of Francis Street/Pilgrim Road in the spring and winter seasons, as well as on an annual basis. Additionally, unacceptable effective gust speeds were detected at the intersection in the winter.

Joslin Place and Deaconess Road

On an annual basis, mean wind speeds were comfortable for walking or better. No dangerous wind conditions were detected for all seasons and all locations passed the effective gust wind speed criterion.

6.2.5 Summary

Based on the results and our understanding of the usage of the on site pedestrian areas of the proposed development, wind conditions were comfortable for their intended use at all entrances and along sidewalks, on an annual basis.

6.3 Shadow Analysis

6.3.1 Regulatory Context

As required by Section 80B-2 of the City of Boston Zoning Code for Large Project review, DFCI has completed a shadow study to identify the potential new shadow impacts resulting from the project. This study has particular emphasis on sidewalks, parks and other public open spaces. As contemplated by Section 80B-2 (b) of the code, the shadow study for the project compares the Build and No-Build Conditions.

6.3.2 Methodology

The following shadow study has been prepared using methodologies consistent with accepted practices for such studies completed under Article 80 review. The analysis provides a comparison of the No-Build and Build Conditions. This is accomplished by using a three-dimensional model of the project area using data provided by the BRA, updated as necessary to include recently completed projects. Existing Conditions are considered equivalent to the No-Build Condition for the purposes of this study. The study was completed using standard sun altitude and azimuth data for each study date estimated to occur at latitude and longitude 42.355°N, 71.144°W, as summarized in Table 6-2.

Table 6-2 Azimuth and Altitude Data

Date	Local Time	Solar Position Altitude	Solar Position Azimuth
March 21	9:00 AM EST	33.0	125.7
	12:00 Noon EST	48.0	-176.9
	3:00 PM EST	30.5	-121.8
June 21	9:00 AM DST	39.9	93.5
	12:00 Noon DST	68.8	149.4
	3:00 PM DST	56.5	-113.7
	6:00 PM DST	23.9	-79.3
September 21	9:00 AM DST	25.9	115.3
	12:00 Noon DST	47.4	166.0
	3:00 PM DST	37.4	-132.9
	6:00 PM DST	7.3	-96.0
December 21	9:00 AM EST	14.2	141.9
	12:00 Noon DST	24.1	-175.6
	3:00 PM EST	10.0	-135.1

Times were adjusted for daylight savings time as appropriate. The Existing and Build Conditions were compared for the spring and fall equinoxes and the summer and winter solstices. Shadows were estimated for each study date at 9:00 AM, 12:00 noon, 3:00 PM, and 6:00 PM except for the Winter Solstice and vernal equinox, which does not include a study after 3:00 PM as the sunsets before 6:00 PM.

6.3.3 Spring Equinox (March 21)

The predicted shadow conditions for the Existing and Build Conditions at the Dana-Farber site during the spring (vernal) equinox are depicted in Figures 6-6 through 6-8. Net new shadows during the Vernal Equinox fall to the west, north, and east of the project site.

At 9:00 AM, new shadows are limited to a small sliver of net new shadow that will be cast onto Brookline Avenue and the sidewalks along Brookline Avenue near the intersection of Brookline Avenue and Jimmy Fund Way. By noon, shadows will be cast north of the project site onto the roadways and sidewalks at the intersection of Brookline Avenue and Jimmy Fund Way, including the adjacent sidewalks. Joslin Park will not be affected by the proposed project at this time. At 3:00 PM during the Vernal Equinox, new shadow from the proposed project will be limited to Jimmy Fund Way and the sidewalks on both sides. By 6:00 PM in the spring, the sun is low in the sky, and new shadows from the project will extend east. At this time of day, most of the surrounding area has already fallen into existing shadow. No new shadow is expected.

6.3.4 Summer Solstice (June 21)

The predicted shadow conditions for the Existing and Build Conditions at the Dana-Farber site during the summer solstice are depicted in Figures 6-9 thru 6-12.

At 9:00 AM, shadows will extend onto Brookline Avenue to the sidewalk on the opposite side of the street. By noon, shadows are cast north of the project site onto the sidewalk located adjacent to the project site on Brookline Avenue and onto Jimmy Fund Way. Only the southern sidewalk on Jimmy Fund Way would be in shadow at noon. At 3:00 PM, new shadow from the proposed project will be cast only onto Jimmy Fund Way and the sidewalks on both sides of the street. At 6:00 PM, new shadow is generally only cast onto the DFCI campus itself and part of Jimmy Fund Way.

6.3.5 Fall Equinox (September 21)

The predicted shadow conditions for the Existing and Build Conditions at the Dana-Farber site during the fall equinox are depicted in Figures 6-13 through 6-16.

Shadow impacts from DFCI – Center for Cancer Care are generally limited to the immediate vicinity of the project with only fleeting shadows on adjacent buildings. At 9:00 AM during the autumnal equinox, new shadows will be cast northwest onto Brookline Avenue, adjacent sidewalks, and a small portion of the BIDMC West Campus. By noon, the sun has risen higher in the sky, and the project will cast shorter shadows that fall to the north. Net new shadow will fall on the public ways and pedestrian sidewalks at the intersection of Brookline Avenue and Jimmy Find Way. There is no shadow impact to nearby Joslin Park at this time. By 3:00 PM, the sun has moved west in the sky, and new shadows will be cast northeast of the project site. New shadow will be cast across Jimmy Fund Way and its sidewalks, onto the Dana Building. By 6:00 PM in the fall, the sun is low in the sky, and new shadows from the project will extend east. At this time of day, most of the surrounding area has already fallen into existing shadow. The proposed project results in minimal net new shadows in the area during any of the fall equinox time periods studied.

6.3.6 Winter Solstice (December 21)

December 21st is the winter solstice and the shortest day of the year. The No-Build and Build Condition shadows are depicted on Figures 6-17 through 6-19.

The Winter Solstice creates the least favorable conditions for sunlight in New England. The sun angle during the winter is lower than in any other season causing the shadows to elongate creating considerable shadow in the area. At 9:00 AM, the morning sun will cast minimal new shadows from the project northwest across Brookline Avenue over several buildings and also over Deaconess Road. By noon, the sun will have moved and the shadows will fall north of the project and be shorter than during the morning hours. Net new shadow will extend northward across the intersection of Brookline Avenue and Jimmy Fund Way and onto the southeastern portion of Joslin Park. As the sun sinks lower in the sky, 3:00 PM shadows once again become elongated, falling northeast of the projects. However, no new shadows will extend northeast as there will be considerable amount of shadow being cast by adjacent buildings.

6.3.7 Conclusions

The shadow study analysis performed for the project describes potential impacts to the streets, sidewalks, and open spaces in the project's vicinity. Results indicate that for a large part of the year, the project will not cause substantial impacts to the surrounding area. In general, impacts are primarily to the immediate surrounding public ways and sidewalks with fleeting shadow on the Joslin Park in the afternoon during the Winter Solstice. In addition, as described in the discussion of compliance with the Interim Guidelines included in Chapter 9, the project complies with the BRA's LMA Interim Guidelines shadow criteria.

6.4 Daylight Analysis

The following section describes the project's anticipated effect on daylight obstruction at the site. The analysis was prepared using the BRA's Daylight Analysis Program and has been completed in accordance with the requirements of Article 80 of the City of Boston Zoning Code. The results of the analysis are presented in Table 6-3 and Figures 6-20 and 6-21.

6.4.1 Regulatory Context

Article 80, Section B(2)(c), Large Project Review – Environmental Component anticipates the potential need for a description of the percentage of sky plain obstructed in the No-Build and Build Conditions.

6.4.2 Methodology

The proposed project was analyzed using the BRA's Daylight Analysis Program (BRADA) to compare the Existing and Proposed Conditions. This section provides a description of the methodology used for the analysis.

6.4.2.1 BRADA Software

The BRADA[1] program was developed in 1985 by the Massachusetts Institute of Technology to estimate the pedestrian's view of the sky plain taking into account the massing and building materials used. The software approximates a pedestrian's view of a site based on input parameters such as: location of viewpoint, length and height of buildings and the relative reflectivity of the building facades. The model typically uses the midpoint of an adjacent right-of-way or sidewalk as the analysis viewpoint. Based on these data, the model calculates the perceived sky plain obstruction and provides a simple graphic depicting the analysis conditions.

The model inputs used for the study presented in this PNF are based on site observations and an Existing Conditions survey prepared by Harry R. Feldman, Inc. and schematic design plans prepared by ZGF, project architect. As described above, the BRADA software considers the relative reflectivity of building facades when calculating perceived daylight obstruction. Highly reflective materials are thought to reduce the perceived sky plain obstruction when compared to non-reflective materials. For the purposes of this study, the building facades are considered non-reflective, resulting in a conservative estimate of daylight obstruction.

6.4.2.2 Viewpoints

Two viewpoints were used for this daylight analysis:

- *Jimmy Fund Way* - located on the centerline of Jimmy Fund Way, centered on the façade of the proposed Dana-Farber Cancer Institute Center for Cancer Care.

- *Brookline Avenue* - located on the centerline of Brookline Avenue, centered on the façade of the proposed Dana-Farber Cancer Institute's Center for Cancer Care.

6.4.3 Jimmy Fund Way

6.4.3.1 Existing Condition

Under both the Existing and No-Build Conditions, the sky plain from the study point is dominated by the existing massing of the DFCI building. Under Existing Conditions, this view takes up approximately 23.4 percent of the sky plain when calculated by the BRADA program. Table 6-3 and Figure 6-20 provide the percentage of sky plain obstructed under the Existing Condition.

[1] Boston Redevelopment Authority Daylighting Analysis (BRADA) Software: Harvey Brian and Susan Stuebing, Massachusetts Institute of Technology, Cambridge, Massachusetts (1985).

6.4.3.2 Proposed Condition

The proposed project, as viewed from the Jimmy Fund Way study point is currently dominated by the existing DFCI building, which occupies approximately 23.4 percent of the sky plain. The proposed building will add an additional 13 stories to the sky plain, increasing the massing and appearance from the centerline of Jimmy Fund Way by an additional 36.4 percent of the sky plain resulting in a total obstruction of 59.8 percent as calculated by the BRADA model. Table 6-3 and Figure 6-20 summarizes the Existing and Proposed daylight conditions for the project.

6.4.4 Brookline Avenue

6.4.4.1 Existing Condition/No-Build Condition

Under the Existing and No-Build Conditions, the sky plain from the study point is dominated by the existing massing of the DFCI Dana and Mayer buildings. This view takes up approximately 21.9 percent of the sky plain when calculated by the BRADA program. Table 6-3 and Figure 6-21 provide the percentage of sky plain obstructed under Existing and No-Build Scenarios.

6.4.4.2 Proposed Condition

The proposed project, as viewed from the Brookline Avenue study point is currently dominated by the existing DFCl building, which occupies approximately 21.9 percent of the sky plain. The proposed building will add an additional 13 stories to the sky plain increasing the massing and appearance from the centerline of Brookline Avenue by an additional 56.5 percent of the sky plain resulting in a total obstruction of 78.4 percent as calculated by the BRADA model. Table 6-3 and Figure 6-21 summarizes the existing and proposed daylight conditions for the project.

Table 6-3 Results of BRADA[1] Analysis

	Daylight Obstruction (percent)		
Study Point	Existing	With Proposed Building	Net Change
Centerline of Jimmy Fund Way	23.4%	59.8%	36.4%
Centerline of Brookline Avenue	21.9%	78.4%	56.5%

1. Boston Redevelopment Authority Daylight Analysis Program.

6.4.5 Conclusions

The results of the daylight analysis reveal that daylight obstruction resulting from the development of the project will increase obstruction over Existing Conditions;

however the resulting conditions along the streets surrounding the site are similar to those in the surrounding LMA area.

6.5 Solar Glare Analysis

The Center for Cancer Care project consists of a 13-story building with an additional mechanical penthouse with numerous setbacks and overhangs. The exterior skin consists primarily of glazed curtain-wall on the Brookline Avenue and Jimmy Fund Way facades, which turns the corner and extends onto the other facades for a short distance. The remainder of the MATEP (south) and Smith (east) facades will consist primarily of panelized terra cotta or stone with punched openings.

The Center for Cancer Care will include bands of insulated, clear glass with a low-e coating on all facades of the building. Metal accent panels may also be glazed into the curtain-wall system. The glass will have an exterior reflectivity of approximately 11 percent. The terra cotta has a medium-toned hue and unglazed so while data is not available on its specific reflectivity; it is unlikely any glare will be produced by its surface. The stone cladding occurs primarily at the base of the building or on the lower levels of the south façade where direct sunlight at a low angle is uncommon. The facades incorporate sun-shading devices to control internal heat gain that will also reduce external reflectivity.

Although three types of sunscreens are used, horizontal blades of terra cotta (held off the building surface approximately six inches) will be the primary system employed. This terra cotta is the same material as used elsewhere in spandrels and blank walls and is essentially non-reflective. Another sunscreen device employed is vertical fins of tinted glass, which will also reduce the general reflectivity of the surface glazing and help to mitigate any glancing glare. The third device is an aluminum canopy at the top floor of the building. Utilizing perforated aluminum louvers to shade glazing of office areas, this canopy will also have the effect of reducing any potential for glare from those facades.

As presented in the following analysis, due to the variations in plane, angle and location of the facades of the building, glare is reflected in a variety of directions, and this diffusing effect will help ensure that there are no significant adverse impacts. The majority of reflected glare will be scattered across rooftops to the east and south of the project site. Impacts to pedestrians and drivers will be minimal. The Center for Cancer Care is also well shielded from direct sunlight on the east side by the Smith Laboratories Building, which is of comparable height and massing.

It is important to note that this analysis is conservative in that it assumes the exterior skin of the north and west facades and portions of the south and east facades are smooth specular and completely reflective glass. In reality, the exterior will be of varying materials and of a glass with an exterior reflectivity of only 11 percent, and as a result, impacts to the surrounding area will be far less than those depicted in the figures in this analysis.

6.5.1 Methodology

Reflected sunlight or solar glare, as it is generally referred to, may range from a nuisance to visual impairment at times or even discomfort if the source is very intense. Disability occurs when the eyes cannot adjust simultaneously to a bright light source and a darker background. An example of this is the momentary loss of clarity when a driver is faced with the bright headlights from an oncoming vehicle at night. Discomfort occurs when a relatively intense (compared to the surroundings) light is seen before the eye has had sufficient time to adapt. Squinting and physical avoidance are signs of discomfort.

Two general types of exterior building surfaces can be distinguished: (1) smooth specular (flat) and (2) diffuse porous. Those that have smooth specular surfaces reflect the sun's rays in a parallel fashion producing an image of the source at intensity equal to that of the source times the surface's reflectivity. The result is termed "spot glare." Surfaces that are porous will scatter or diffuse the sun's rays, and the result is termed "scattered glare." These surfaces will appear brighter, but they will actually have a lower intensity than if the surface were specular.

The potential for solar glare from the Center for Cancer Care's facades was evaluated using solar altitude and azimuth angles and simple geometry. Four representative seasonal periods were selected for analysis: the spring and autumnal (fall) equinoxes and the winter and summer solstices. Four times during the day were analyzed for each date, 9:00 AM, and 12:00 Noon, 3:00 PM and 6:00 PM (local time).

Light is reflected from a specular surface at the same angle that the light strikes the surface. The light's angle of reflectance can be determined if its angle of incidence is known. In the horizontal plane, the angle of incidence was determined by knowing the sun's azimuth angle and the orientation of the reflective surface. By projecting the sun's rays from the corners of a given facade facing the sunlight, the potential area affected by the solar glare can be determined. The distance that the reflected sunlight will extend is determined by projecting the sun's rays, using the appropriate altitude angle, from the top of the reflective surface. The reflected ray is then extended until it intersects ground level of adjacent structures.

Studies indicate that solar glare should be evaluated for the periods when reflective light is visible within the normal human viewing range. The normal human viewing range is defined as an angle 30 degrees above the horizontal, 45 degrees below the horizontal, and 65 degrees to the right or left of the forward line of sight. Therefore, reflected sunlight could be found to occur within the normal human viewing range when the sun's altitude angle is 30 degrees or less above the horizon and the reflected sunlight is 65 degrees to the right or left from a forward line of sight. In other words, if the solar glare is not facing the pedestrian or vehicular traffic, i.e., the glare is reflecting in the same direction as or runs perpendicular to the traffic, there are no impacts from solar glare. This cone of vision can be applied when evaluating impacts on traffic, as well as pedestrians.

In some cases, particularly in urban settings, adjacent buildings will intercept reflected light. The reflected light can either be completely blocked by a building or partially intercepted. For this project, with a glazing of only 11 percent external reflectance, the potential for solar heat buildup on adjacent buildings due to solar glare from this project is small. The analysis identifies possible conditions of glare on adjacent buildings, but the actual impacts are expected to be minor. Existing buildings also act to intercept incoming rays and this reduces the amount of sunlight actually striking the surface of the proposed Center for Cancer Care.

Lower solar altitude angles produces glare that is within the normal viewing range, however, this also causes the sun's light to pass through more atmosphere. This causes the solar intensity to be much lower than when the sun is at a high angle. Often times, low angle light cannot reach the street level to affect pedestrians and motorists. When it can reach street level, it is because of the nature of the glare and the existence of an open pathway such as a street or alleyway. In these instances, the building glare is often accompanied by direct glare from the sun itself, due to its low angle and alignment with the street or open space.

Distant glare has less effect on the eye, since it is out of the field of focus of a pedestrian or motorist. For this reason, in other glare studies in urban areas, impacts from glare are limited to 400 feet from the reflective surface. In order to be conservative, the results of this study are discussed to their full extent. The schematic diagrams show areas receiving solar reflection across the entire base map, however reflective glare outside 400 feet is considered insignificant due to the low solar intensity.

6.5.2 Building Materials

The Center for Cancer Care will include bands of clear, insulating, low-e glass panels alternating with terra-cotta bands, on all facades of the building. On the Jimmy Fund Way elevation and smaller portions of other elevations some of the glass curtain wall panels are replaced with metal panels. Large areas of the building on the east and south elevations are terra-cotta or stone with small or no windows.

However, in order to be conservative, and for the sake of simplicity, the analysis assumes the exterior skin of the north and west facades and glazed portions of the east and south facades is smooth, specular, and completely reflective.

6.5.3 Reflective Glare Analysis

The Center for Cancer Care's reflected glare areas are shown in the following figures and discussed in detail below for each of the periods evaluated. The technical data used in the analysis is included on each figure.

6.5.3.1 Spring Equinox (March 21)

Solar Glare analysis results for the Spring Equinox are illustrated in Figures 6-22 through 6-24. Sunlight coming from the east at 9:00 AM on the spring equinox is partially blocked by the Smith Laboratories Building immediately east of the Center for Cancer Care site. A very small amount of light will be reflected off the north façade of the Center for Cancer Care and onto Jimmy Fund Way, across Brookline Avenue and into Joslin Park, but this will be accompanied by direct solar glare coming down Jimmy Fund Way and over the Dana Building and the reflection will be of a far lower intensity.

During the spring midday period, the solar altitude angle becomes higher than 30 degrees, which eliminates the safety concerns associated with spot glare. At noon, sun will be reflected onto the roof of MATEP (the power plant to the south), and a portion of Brookline Avenue. No glare will be facing vehicular traffic.

At 3:00 PM an area of solar glare will be reflected onto the roof of the MATEP Building. Sunlight will also be reflected onto and across Brookline Avenue. Much of this reflection will be blocked or mitigated by the sun shade devices on the Brookline Avenue façade. This reflection will also be accompanied by direct solar glare coming down Brookline Avenue from the south. Any reflections from the project will be of a much lower intensity than the direct glare from the sun experienced by pedestrians and vehicles on Brookline Avenue.

At 6:00 PM the sun angle is too low to produce any glare (or shadows) in the area of the project site so a figure was not included in this report.

6.5.3.2 Summer Solstice (June 21)

Solar Glare analyses results for the Summer Solstice are illustrated in Figures 6-25 through 6-28. During the summer solstice, the solar rays strike the north, east and south facades of the building surface from an easterly direction. The solar angle is greater than 30 degrees, even at 9:00 AM. The relatively high altitude angle will make the extent of reflected light in the normal viewing range fairly short and limited primarily to a small portion of Jimmy Fund Way and a portion of the corner of Jimmy Fund Way and Brookline Avenue. Reflected light will reach the roof of the Smith Laboratories Building as well as a small portion of the Mayer Building across Jimmy Fund Way.

Midday sun angles have high solar altitude angle. Reflected glare will fall on the roof of MATEP and just barely onto Brookline Avenue. A small amount of sunlight will also be reflected onto Jimmy Fund Way.

At 3:00 PM the solar altitude is still higher than 30 degrees, limiting potential glare to Brookline Avenue where most reflections will fall. The sun shading devices on portions of this façade will further mitigate any impacts. Reflected sunlight will also fall on the roof of MATEP to the south.

At 6:00 PM the solar altitude is fairly low, however buildings on the west side of Brookline Avenue will block most of the sunlight from reaching the Center for Cancer Care. Most reflections will fall on the roof of MATEP, while some reflections from higher on the Center for Cancer Care will fall back on Brookline Avenue and Joslin Park. Sun screens will help to mitigate some of this reflection and impact should be very minor.

6.5.3.3 Autumn Equinox (September 21)

Solar Glare analyses results for the Autumn Equinox are illustrated in Figures 6-29 through 6-32. For the autumnal equinox, at 9:00 AM the reflective glare will be primarily in the space between the Center for Cancer Care and the Smith Laboratories Building to the southeast of the project site. There will be one small area of reflective glare on Jimmy Fund Way, extending across to Deaconess Road. However, this will be accompanied by direct solar glare on the same path.

At 12:00 noon, reflective glare will fall onto the roof of MATEP to the south, one small area will land across portions of Jimmy Fund Way and another will land on Brookline Avenue. Rays will not be facing vehicular or pedestrian traffic on Jimmy Fund Way, and, none of this glare will be within normal viewing range for pedestrians or vehicular traffic.

At 3:00 PM the solar angles are still above the normal viewing range. Reflective glare will fall from the taller portion of the building onto the lower roof of MATEP. A small amount of reflective glare will fall on Brookline Avenue either in the opposite direction of traffic or across Brookline and in the extreme end of Joslin Park. Again, any reflected light on Brookline Avenue will be accompanied by much brighter direct solar glare coming north down the axis of the street.

At 6:00 PM the sun angle is too low to produce any glare (or shadows) in the area of the project site, so a figure was not included in this report.

6.5.3.4 Winter Solstice (December 21)

Solar Glare analyses results for the Winter Solstice are illustrated in Figures 6-33 through 6-35. The winter period is generally of most concern for solar glare because the winter sun altitude angle is continuously below 30 degrees. On the winter solstice, the morning sun (9:00 AM) is very low and is positioned in the southeast portion of the sky. Reflected glare will be cast primarily to the northwest. A very narrow band of reflected sunlight will cross Brookline Avenue and reach the Beth Israel Deaconess Medical Center's West Campus. These rays will not be in the direction of normal vehicular or pedestrian traffic, and will be accompanied by direct solar glare.

By mid-day, the reflected rays will fall mainly to the immediate northeast of the project site. There are two small areas of reflected glare on Brookline Avenue; however, the glare will be out of the normal range of vision (more than 65 degrees to the right in the direction of traffic) and will not result in adverse impacts. Another area of reflected rays will fall on the lower roofs of the Center for Cancer Care and across Jimmy Fund Way where facades are not blocked by the Smith Laboratories Building.

By 3:00 PM, the extremely low solar altitude angle will result in the sunlight being reflected a relatively long distance, well out of the area considered significant. Within the study area, most of the reflected light will fall on the roof of the MATEP power plant. A portion of this reflection may reach the sidewalk and northbound lanes of Brookline Avenue, but will be well over 500 feet from the source and most likely will be blocked by the MATEP building.

6.5.4 Heat Loading on Nearby Buildings

As noted previously, the Center for Cancer Care will have little effect on the thermal heat gain of neighboring structures. The low reflectivity glass will not only mitigate solar glare but will also reduce the heat gain on nearby buildings by the same intensity. The narrow corridors between east and south adjacencies, also serve to limit the potential for reflected thermal energy. Due to the high sun angles during the brightest parts of the day, the reflected solar radiation will not be cast upon existing building walls but on rooftops of the lower levels of this project and adjacent buildings, further reducing the energy received through this path. At low sun angles, the thermal energy is far less due to the amount of atmosphere through which the light must travel, and is often blocked by adjacent structures before striking the project surfaces.

Heat loading from a reflective high-rise building is primarily a concern for other structures with glass facades (i.e. other high-rises). These buildings often use curtain wall construction and architectural glass surfaces, which expose the full surface of the building to radiation influences. Typical structural materials for existing nearby buildings include much less glazed surface, with the primary area covered by masonry or other dense material.

6.5.5 Conclusions

The analysis showed that the Center for Cancer Care will not result in adverse solar glare impacts because the solar reflection will not be facing the vehicular traffic (unless accompanied by direct solar glare), or will be outside the cone of vision for pedestrians.

The low exterior reflectivity of the glazing used on the Center for Cancer Care coupled with the sun shading devices on the façade will disperse incoming light and significantly reduce the intensity of potential solar glare. In addition, the analysis is conservative because it assumes the facades are highly reflective, when in fact they will not be. The complex surface of the building will help to mitigate solar glare and eliminate major issues of heat loading on nearby buildings.

Similar to the solar glare, only minor impacts are anticipated as a result of the use of low reflective glass and the design of the Center for Cancer Care.

6.6 Noise Analysis

The purpose of this noise analysis is to demonstrate that the Center for Cancer Care project satisfies the city and state noise impact criteria. This section presents a noise analysis that evaluates the future sound levels from mechanical equipment and building operations, including cooling towers, chillers, air handling units, and emergency generators. The noise analysis demonstrates that, once completed, the Center for Cancer Care will not result in a noticeable change in the existing sound levels. The following sections discuss the noise impact criteria, noise methodology, and results.

6.6.1 Noise Impact Criteria

The City of Boston and the Massachusetts Department of Environmental Protection (DEP) have developed noise impact criteria that establish noise thresholds deemed to result in adverse impacts. The noise analysis for DFCI used these criteria to evaluate whether the proposed development will generate sound levels that result in adverse impacts.

6.6.1.1 City of Boston Criteria

The City of Boston has established regulations for evaluating sound levels from proposed developments. These regulations establish maximum allowable sound levels based upon the land use of the proposed development. If the proposed development is located in a residential zoning district which includes either residential or institutional uses, the maximum noise level affecting residential uses shall not exceed the Residential Noise Standard. The Residential Land Use Noise standard is 60 dBA for daytime conditions (7:00 AM to 6:00 PM) and 50 dBA for Nighttime conditions (6:00 PM to 7:00 AM). The Business Land Use Noise Standard is 65 dBA for both daytime and nighttime conditions. These criteria are applicable to building facility noise sources, such as mechanical equipment, and do not apply to operation of any motor vehicle on any public way.

The City of Boston's regulations on construction sound levels state that operation of any construction devices, excluding impact devices, may not exceed 86 dBA during any time period.

6.6.1.2 Massachusetts DEP Criteria

DEP has established a policy (DEP Policy 90--001) for implementing its noise regulations (310 CMR 7.10). This policy states that a source of sound will be considered in violation of the Department's noise regulation under the following conditions:

- If the source increases the broad band sound level by more than 10 dBA above ambient (normally defined as L_{90} or the noise level exceeded 90 percent of the time during the hours of noise source operation); or
- If the source produces a "pure tone" condition.

The DEP noise regulations do not include any specific standards for construction period noise generation.

6.6.2 Noise Background

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work, or recreation. The individual human response to noise is subject to considerable variability since there are many emotional and physical factors that contribute to the differences in reaction to noise.

Sound (noise) is described in terms of loudness, frequency, and duration. Loudness is the sound pressure level measured on a logarithmic scale in units of decibels (dB). For community noise impact assessment, sound level frequency characteristics are based upon human hearing, using an A-weighted (dBA) frequency filter. The A-weighted filter is used because it approximates the way humans hear sound. Table 6-4 presents a list of common outdoor and indoor sound levels. The duration characteristics of sound account for the time-varying nature of sound sources.

Table 6-4 Common Outdoor and Indoor Sound Levels

Outdoor Sound Levels	Sound Pressure (μPa)*		Sound Level (dBA)**	Indoor Sound Levels
	3,324,555	-	110	Rock Band at 5 m
Jet Over-Flight at 300 m		-	105	
	2,000,000	-	100	Inside New York Subway Train
Gas Lawn Mower at 1 m		-	95	
	632,456	-	90	Food Blender at 1 m
Diesel Truck at 15 m		-	85	
Noisy Urban Area—Daytime	200,000	-	80	Garbage Disposal at 1 m
		-	75	Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	-	70	Vacuum Cleaner at 3 m
Suburban Commercial Area		-	65	Normal Speech at 1 m
	20,000	-	60	
Quiet Urban Area—Daytime		-	55	Quiet Conversation at 1 m
	6,325	-	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		-	45	
	2,000	-	40	Empty Theater or Library
Quiet Suburb—Nighttime		-	35	
	632	-	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime		-	25	Empty Concert Hall
Rustling Leaves	200	-	20	
		-	15	Broadcast and Recording Studios
	63	-	10	
		-	5	
Reference Pressure Level	20	-	0	Threshold of Hearing

Source: Highway Noise Fundamentals. Federal Highway Administration, September 1980.
**μPA – MicroPascals, which describe pressure. The pressure level is what sound level monitors measure.*
***dBA – A-weighted decibels, which describe pressure logarithmically with respect to 20 μPa (the reference pressure level).*

Sound level data can be presented in statistical terms to help describe the noise environment. A near infinite variation in sound levels (various intensities and temporal patterns) can be combined into the same value. The following is a list of other sound level descriptors:

- L_{max} is the maximum A-weighted sound level measured during the time period and,
- L_{90} is the A-weighted sound level that is exceeded for 90 percent of the time during the time period. The L_{90} is generally considered to be the background sound level since the L_{90} does not include transient noise events. During a 100-minute period, the L_{90} would be the sound level that was exceeded by other sound levels for 90 minutes of the 100-minute period.

The following general relationships exist between noise levels and human perception:

- A 1 or 2-dBA increase is not perceptible to the average person.
- A 3-dBA increase is a doubling of acoustic energy, but is just barely perceptible to the human ear.
- A 10-dBA increase is a tenfold increase in acoustic energy, but is perceived as a doubling in loudness to the average person.

6.6.3 Noise Analysis Methodology

The noise analysis evaluated mechanical equipment and building operation sound levels from the proposed project. The analysis included noise monitoring of existing sound levels and noise modeling of the project generated sound levels. The study area was evaluated and sensitive receptor locations were identified. The sound levels for rooftop mechanical equipment and building operations were calculated using manufacturer's reference sound levels, properties of sound propagation over distance, and the effects of building geometry. The total build sound levels were calculated by adding together the relevant noise sources using noise addition.

6.6.3.1 Receptor Location

The noise analysis included evaluation of the study area to identify receptor locations that have outdoor activities and that might be sensitive to noise generated by or related to the proposed development. The noise analysis identified six receptor locations in the vicinity of the proposed development. The receptor locations include the nearest residential area on Francis Street, surrounding institutional buildings, and the adjacent Medical Area Total Energy Plant (MATEP). Table 6-5 lists the noise receptor locations examined in this study.

Table 6-5 Noise Receptor Locations

Receptor	Location	Land Use

R1	Francis Street	Residential
R2	Dana-Farber Cancer Institute Mayer Building	Institutional
R3	Joslin Diabetes Center	Institutional
R4	Beth Israel Deaconess Medical Center – West Campus	Institutional
R5	MATEP	Business
R6	Dana-Farber Cancer Institute Smith Building	Institutional

The residential receptor location is in an area of predominately multi-family residential buildings. The six receptor locations, selected based on land use considerations, represent the most sensitive locations in the DFCI site vicinity. Figure 6-36 depicts the receptor locations used in the noise analysis.

6.6.4 Existing Conditions

The proposed project is located in an active urban area. The existing noise environment includes sound levels from heavily travel local roadways and the mechanical equipment of surrounding buildings.

The noise analysis developed existing sound levels for two time periods (daytime and nighttime) which correspond to the timeframes in the City of Boston's and the State's noise impact criteria using noise monitoring data. The noise monitoring program was conducted on a weekday afternoon and during late night periods (from 1:00 AM to 3:00 AM) in November of 2006 at two monitoring locations. The noise monitoring locations represented the nearest residential area and the nearest institutional building. The nearest residential monitoring location was located along Francis Street. The nearest institutional monitoring location was conducted between Joslin Place and Deaconess Road, which was assumed to represent the property line and the surrounding institutional buildings.

The sound levels were measured using a Type 1 sound analyzer (Larson-Davis model 824). The dominate noise sources during the daytime were motor vehicles from local roadways and mechanical equipment from adjacent buildings. The dominate noise sources during the nighttime were the mechanical equipment from adjacent buildings.

The L_{90} sound levels at the residential building on Francis Street (M1) were 63 dBA and 59 dBA during the daytime and nighttime periods, respectively. The L_{90} sound levels between Joslin Place and Deaconess Road (M2) were 65 dBA and 63 dBA during the daytime and nighttime periods, respectively. While these sound levels are typical for an active urban area, these existing sound levels exceed the City of Boston's noise criteria for residential land use of 60 dBA and 50 dBA for daytime and nighttime levels, respectively. Table 6-6 presents the measured existing sound level data. Figure 6-36 shows the monitoring locations.

Table 6-6 Measured Existing Sound Levels (L90)

Monitoring Number	Monitoring Location	A-Weighted Sound Level in Decibels (dBA)			
		Day Time Measured	Boston Impact Criteria	Night Time Measured	Boston Impact Criteria
M1	Francis Street	63	60	59	50
M2	Joslin Place/Deaconess Road	65	65	63	65

Source: Vanasse Hangen Brustlin, Inc.

6.6.5 Project Impacts

The noise analysis evaluated the future sound levels from the DFCI mechanical equipment and building operations, including cooling towers, chillers, air handling units, and emergency generators.

6.6.5.1 Mechanical Equipment

The noise analysis evaluated the mechanical equipment noise sources at the proposed project using manufacturers reference sound levels. The potential mechanical equipment noise sources for the building include the following:

- Three (3) 2,000 kW emergency generators located on the rooftop,
- Three (3) 1,300 ton cooling towers located on the rooftop,
- Two (2) 1,750 ton chillers located on the rooftop,
- Air handling units located on the 4th floor, 14th floor, and rooftop.

The rooftop mechanical equipments will be surrounded by screen walls and the emergency diesel generators will be located in acoustical enclosures. This equipment will be located on the roof such that roof will act as a noise barrier blocking the line of sight to the receptor locations. The air handling units will be located in the 4th and 14th floor mechanical room which will substantially reduce their sound levels.

The project will have three 2,000 kW emergency/back-up generators located on the roof of the building. In addition to the City of Boston's and the state's noise criteria, the emergency diesel generators must meet strict noise requirements under the air quality permitting process (310 CMR 7.00). When the details of the emergency diesel generators are developed, the proponent will submit the appropriate permit application to DEP including the noise mitigation measures (such as acoustic enclosures and exhaust silencers) necessary to meet the DEP noise criteria.

6.6.5.2 Building Operations

Building operations, such as loading dock activities, will be utilizing the existing loading docks located at the Smith Building. The Center for Cancer Care Project will expand the loading area at the Smith Building and consolidate loading activities at the site in a managed loading dock. DFCI will require that the deliveries be limited to peak traffic periods to minimize the sound levels. The building operations from the proposed project are not expected to have a noise impact.

6.6.6 Results

The noise analysis demonstrates that existing traffic and mechanical equipment are the dominant noise source for the existing and build conditions. The traffic noise from Brookline Avenue and mechanical equipment noise from adjacent facilities substantially contributes to the sound levels at all the receptor locations.

The City of Boston and DEP have different noise impact criteria. The City's ordinance establishes maximum Daytime and Nighttime sound level, for different land uses, that should not be exceeded. The State requires that the proposed project not increase sound levels by more than 10 dBA above existing sound levels.

The noise analysis demonstrates that the existing sound levels currently exceed the City's noise criteria. The Center for Cancer Care project will generate build sound levels that are below the existing sound levels. While every effort was made to reduce sound levels, the future sound levels at the study area receptor locations will continue to exceed the City's noise criteria with the proposed project.

With the proposed project, the study area receptors experience sound levels ranging from 63 dBA to 67 dBA during the daytime and from 60 dBA to 65 dBA during the night time. However, the results show that the proposed project will have insignificant increase in sound level. The increase in sound level is due to the rooftop mechanical equipments. Table 6-7 presents the existing, rooftop mechanical equipment only, and resulting project build sound levels.

DEP requires that the proposed project not increase sound level by more than 10 dBA above existing sound levels. The Build sound levels range from 63 dBA to 67 dBA during the daytime and from 60 dBA to 65 dBA during the night time. These sound levels are 0 to 3 dBA higher than the existing sound levels for all the receptor location except for MATEP, where the increase is expected to be 5 dBA. All of these increases are substantially below the DEP criteria of 10 dBA. It should be noted that, as discussed in Section 6.6.2, a 3 dBA increase is just barely perceptible to the human ear. Table 6-7 presents the existing, rooftop mechanical equipment only, and resulting project build sound levels. Table 6-8 presents the existing, the proposed project build conditions, and the potential increase in sound levels.

Table 6-7 Existing and Predicted Sound Levels, L_{90} (dBA)

Receptor Number	Receptor Location	Existing		Mechanical Equipment Only		Build	
		Day	Night	Day	Night	Day	Night
R1	Francis Street	63	59	52	52	63	60
R2	Dana-Farber Cancer Institute Mayer Building	65	63	61	62	67	65
R3	Joslin Diabetes Center	65	63	58	58	66	64
R4	Beth Israel Deaconess Medical Center – West Campus	65	63	60	61	66	65
R5	MATEP	63	59	62	62	66	64
R6	Dana-Farber Cancer Institute Smith Building	65	63	62	62	67	66

Source: Vanasse Hangen Brustlin, Inc.

Table 6-8 DEP Noise Criteria Comparison, L_{90} (dBA)

Receptor Number	Receptor Location	Existing		Build		Change in Sound Levels		DEP Criteria
		Day	Night	Day	Night	Day	Night	
R1	Francis Street	63	59	63	60	0	+1	10
R2	Dana-Farber Cancer Institute Mayer Building	65	63	67	65	+3	+2	10
R3	Joslin Diabetes Center	65	63	66	64	+1	+1	10
R4	Beth Israel Deaconess Medical Center – West Campus	65	63	66	65	+1	+2	10
R5	MATEP	63	59	66	64	+3	+5	10
R6	Dana-Farber Cancer Institute Smith Building	65	63	67	66	+2	+3	10

Source: Vanasse Hangen Brustlin, Inc.

6.6.7 Construction Period Noise

Construction period activities may temporarily increase nearby sound levels due to the intermittent use of heavy machinery during the construction of DFCI. The City of Boston noise control regulations consider construction sound levels to be an impact to residential land uses if the L_{10} is in excess of 75 dBA or the L_{max} is in excess of 86 dBA. Construction activities will occur primarily during normal weekday daytime hours (7:00 AM to 5:00 PM) and will comply with applicable City of Boston noise regulations.

The proposed Center for Cancer Care Project will generate typical sound levels from construction activities, including foundation construction, truck movements, heavy equipment operations, and general construction activities. Regulation 3 of the City of Boston Code, Ordinances, Title 7, Section 50, includes specific construction noise limits by land use. The relevant criterion for the project is based on residential or institutional land use. The construction noise at the property line for residential or institutional land use is limited to a maximum level of 86 dBA, with a limit of 75 dBA for the construction noise level exceeded 10 percent of the time (L_{10}). In addition, the City of Boston Code, Ordinances, Title 14, Chapter 11, Section 354 (titled "Unreasonable Noise") also applies to construction activities. This ordinance establishes a noise limit of 50 dBA for construction noise measured at residential lot lines between 6:00 PM and 7:00 AM. This ordinance effectively prohibits nighttime construction near residential areas.

Construction activity associated with the project may temporarily increase nearby sound levels due to the use of heavy machinery. Heavy machinery will be used intermittently throughout the proposed project's construction phases.

The proposed Center for Cancer Care Project will implement mitigation measures to reduce or minimize noise from construction activities and to maintain compliance with the City's noise ordinances. DFCI's Construction Management Program (CMP) specifically addresses noise impacts and mitigation. Specific mitigation measures include:

- Construction equipment will be required to have installed and properly operating appropriate noise muffler systems.
- The construction vehicles and equipment will be required to maintain their original engine noise control equipment.
- All exterior construction activities, such as site excavation/grading and new building construction will typically be limited to normal working hours and off hour work would be minimized, to the extent practicable.
- Appropriate traffic management techniques implemented during the construction period will mitigate roadway traffic noise impacts.
- Proper operation and maintenance, and prohibition of excessive idling of construction equipment engines, will be implemented as required by DEP regulation 310 CMR 7.11.
- The site will be surrounded by safety fencing to provide site security, as well as to mitigate construction noise and fugitive dust.
- Work hours and relevant noise generating activities will be reviewed further with the City of Boston to outline those construction activities which may occur prior to 7:00 AM and after 5:00 PM, Monday through Friday, as well as those activities which may occur during weekend hours.
- Quieter-type (manually adjustable or ambient-sensitive) backup alarms on construction vehicles will be required.
- Additional noise control options will be evaluated during the design process for effectiveness and feasibility.

- Appropriate operational specifications and performance standards will be incorporated into the construction contract documents.

6.7 Air Quality Analysis

The purpose of the air quality study is to demonstrate that the proposed Center for Cancer Care project satisfies the city, state, and federal air quality requirements. This section presents a microscale analysis that evaluated the carbon monoxide (CO) impacts from project related traffic and site-specific stationary sources. The microscale analysis evaluates CO concentrations at sensitive receptor locations. The analysis demonstrates that the proposed project will not interfere with the attainment or maintenance of the Massachusetts and National Ambient Air Quality Standards (NAAQS) for CO.

6.7.1 Background

The 1990 Clean Air Act Amendments (CAAA) and the Massachusetts State Implementation Plan (SIP) require that a proposed project not cause any new violation of the NAAQS for pollutants of concern, or increase the frequency or severity of any existing violations, or delay attainment of any NAAQS. The air quality study includes a localized (microscale) evaluation of mobile source pollutants. The microscale analysis evaluated CO concentrations from roadways and intersections.

The Massachusetts Department of Environmental Protection (DEP) has established guidelines that define the modeling and review criteria for air quality analysis prepared pursuant to the Massachusetts Environmental Policy Act (MEPA) process. The CAAA and the SIP require that a proposed project not:

- Cause any new violation of the NAAQS; or
- Increase the frequency or severity of any existing violations; or
- Delay attainment of any NAAQS.

6.7.2 Air Quality Standards

The U.S. Environmental Protection Agency (EPA) has set the NAAQS for CO to protect the public health. The Commonwealth of Massachusetts has adopted the same standards as those set by the EPA. The NAAQS for CO sets maximum concentrations of 35 parts per million (ppm) for a 1-hour period and 9 ppm for an 8-hour period, each not to be exceeded more than once per year.

The predominant source of pollution anticipated from most new developments is emissions from project-related motor vehicle traffic. CO is directly emitted by motor vehicles. CO impacts can be estimated by computer modeling CO concentrations which can then be compared to the NAAQS.

The Massachusetts Department of Environmental Protection (DEP) has developed guidelines to ensure that proposed projects satisfy the CAAA and Massachusetts State Implementation Plan (SIP) requirements. The DEP guidelines require that proposed projects located in CO non-attainment areas demonstrate that no violations of the NAAQS for CO will be created in areas where no violations currently exist, and that CO reductions will be achieved in areas where violations currently exist.

6.7.3 Modeling Methodology

The DEP guidelines require that the air quality study utilize traffic and emissions data for Existing (2006) and future (2016) No-Build and Build conditions. These data are incorporated into the EPA air quality models to generate emissions estimates that demonstrate whether or not the proposed project will have air quality impacts. Future conditions typically reflect a minimum five-year planning horizon based on traffic analyses for the proposed project; however, for this project a 10-year horizon was used. The future No-Build condition reflects future traffic volume in the project area which includes anticipated background traffic volume growth and traffic related to specific development projects that are expected to be completed. The future Build condition includes any net new traffic anticipated to result from the completion of the proposed Center for Cancer Care.

In addition to emissions from vehicular traffic along roadways and nearby intersections, the microscale analysis evaluated the emissions from the project's stationary sources, such as the parking garage and the proposed emergency generators. The emissions from the roadways and intersections were evaluated using a mobile source model. The parking garage and emergency generators were evaluated using a stationary source model. The microscale analysis combined the worst-case results from each model for specific receptor locations to demonstrate compliance with the NAAQS.

The microscale analysis utilized the traffic (volumes and speeds) and emission factor data for the Existing, No-Build, and Build conditions. These data were incorporated into air quality models to demonstrate that the project will meet the CAAA and SIP criteria. The microscale analysis calculated CO concentrations at congested intersections near the project site under Existing and Future conditions. A letter detailing the modeling procedures proposed for this air quality study was sent to the Boston Redevelopment Authority (BRA) on November 21, 2006 for their review. A copy of this letter is included in Appendix C.

6.7.3.1 Microscale Analysis

The objective of the microscale analysis was to evaluate the CO concentrations at congested intersections in the study area. The intersections in the study area were ranked based on traffic volumes and vehicle level of service. The following intersections (see Figure 6-37) were selected for analysis:

- Brookline Avenue at Francis Street
- Brookline Avenue at Riverway
- Longwood Avenue at Riverway
- Brookline Avenue at Boylston Street/Park Drive (Sear's Rotary)

The microscale analysis calculated maximum 1-hour and 8-hour CO concentrations in the project area during the peak CO season (winter). The EPA's computer model CAL3QHC[2] Version 2 was used to predict CO concentrations for the intersection. Receptor locations were selected near the congested intersection based upon areas where the public has access. The intersection receptors were placed at the edge of the roadway, but not closer than 10 feet (3 meters) from the nearest travel lane, as required by EPA. The results calculated at these receptor locations represent the highest concentrations at the intersection. Receptor locations farther away from the intersection will have lower concentrations because of the CO dispersion characteristics. The receptor locations that are along other roadways in the study area are also expected to have lower CO concentrations than the receptor locations at the intersection. The emission rates for vehicles traveling along these roadways are much lower than the emission rates for vehicles queuing at intersections. The receptor locations are presented in Figure 6-38.

The 1-hour CO concentrations were calculated directly using the EPA computer model, with evening peak hour traffic and emission data. The 8-hour CO concentrations were derived by applying a persistence factor of 0.70 to the 1-hour CO concentrations. This persistence factor was calculated from the DEP's most recent annual monitoring report.[3] It represents the average ratio of second highest 8-hour to second highest 1-hour CO readings at DEP's four Boston-area permanent monitoring stations in 2005.

6.7.3.2 Emission Rates

All the vehicle emission factors used in the microscale analysis were obtained using the EPA's MOBILE 6.2[4] emissions model. MOBILE 6.2 calculates CO emission factors from motor vehicles in grams per vehicle mile. The emission rates calculated in this study were adjusted to reflect Massachusetts specific conditions such as the state vehicle registration age distribution, the statewide Inspection and Maintenance (I/M) Program, and the Stage II Vapor Recovery System.[5] Emission factors for the

2 *User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*, US Environmental Protection Agency, Office of Air Quality Planning and Standards, Technical Support Division; Research Triangle Park, NC; EPA-454/R-92-006; November 1992.

3 2005 Annual *Report on Air Quality in New England*, US Environmental Protection Agency, Region I, North Chelmsford, MA; August 2006

4 *MOBILE6.2 (Mobile Source Emission Factor Model)*, The May 19, 2004 official release from US EPA, Office of Mobile Sources, Ann Arbor, MI.

5 *The Stage II Vapor Recovery System* is the process of collecting gasoline vapors form vehicles as they are refueled. This requires the use of a special gasoline nozzle at the fuel pump.

microscale analysis were determined using the DEP recommended temperatures for the winter (CO) season. The Appendix includes a detailed presentation of the MOBILE 6.2 input and output data.

6.7.3.3 Traffic Data

The air quality study utilized traffic data specifically developed for each analysis. The microscale analysis used the evening peak hour traffic conditions during the CO season (winter). Vehicle speeds were developed based upon traffic volumes, observed traffic flow characteristics, and roadway capacity. The traffic data used for this analysis were reported in Chapter 5, Transportation.

6.7.3.4 Stationary Source Analysis

The stationary source analysis calculated the worst-case CO concentrations from the parking garage exhaust and emergency generators. The project's parking garage will have 460 new parking spaces (715 total spaces) and its ventilation system will exhaust at the street level along the southern property line between the proposed project and the Medical Area Total Energy Plant (MATEP). Acoustical louvers will be provided for the exhaust vents and will be angled up to increase their dispersion. The project will include three proposed emergency generators that will be located on the 4th floor, 14th floor, and the roof of the building.

The EPA's air quality model (SCREEN3) was used to calculate the parking garage and emergency generator emissions at receptor locations surrounding the project. The SCREEN3 model is a simplified computer program that conservatively calculates concentrations from air emissions sources. The use of this model is appropriate for chemically stable gaseous pollutants, such as CO. The SCREEN3 model follows the EPA guidance for evaluating stationary source emissions. The results from SCREEN3 are maximum 1-hour concentrations. The inputs to the SCREEN3 model included emission rates, exhaust locations and elevations, exhaust flow rates, building dimensions, surrounding terrain, and adjacent land uses.

The results of the stationary source analysis were added to the microscale analysis to calculated worst-case total concentrations of CO, which were compared to the NAAQS. The input and output data are provided in the Air Quality Appendix.

The DFCI Center for Cancer Care will include a heating system and emergency generators. The DEP regulations require that emergency generators meet strict air quality and noise requirements under 310 CMR 7.00. When the details of the heating system and the emergency generators are developed, DFCI will submit the appropriate permit applications to DEP.

The DFCI has contacted the MATEP facility regarding the project's power needs. MATEP has indicated that it will be able to supply the necessary power within

MATEP's existing operating permit. No changes in the permitted operating conditions, which DEP has approved as meeting the NAAQS will be needed.

6.7.4 Existing Conditions

The CAAA resulted in the U.S. being categorized into attainment and non-attainment areas, with classifications based upon the severity of their respective air quality problems. The project is located in the Boston Metropolitan CO attainment area, which has been classified as a "Maintenance" area. A Maintenance area is an area that has had previously measured pollutant levels that exceed the NAAQS, but now, the current monitoring data demonstrates compliance with the NAAQS and has been redesignated to attainment. Projects that are located in CO non-attainment or Maintenance attainment areas are required to evaluate their impact on CO concentrations and the NAAQS. The Boston Metropolitan area had been a non-attainment area with CO concentrations greater than the NAAQS and was re-designated to attainment because it demonstrated that the CO concentrations were now lower than the NAAQS.

The microscale analysis demonstrated that the 1-hour CO concentrations for the Existing Condition range from 4.9 parts per million (ppm) to 7.2 ppm within the study area. The corresponding maximum 8-hour CO concentrations range between 3.4 ppm and 5.0 ppm. The 1-hour and 8-hour concentrations are below the CO NAAQS of 35 and 9 ppm, respectively. These results are consistent with the area's Maintenance classification. The existing microscale results are presented in Tables 6-5 and 6-6.

6.7.5 Project Impacts

The 2016 No-Build and Build estimates of project-related emissions are based upon changes in traffic and emission factor data. The traffic data include traffic volumes and traffic signal cycle timing. The emission factor data include the emission rates for the years of analysis and roadway speeds. In addition to these data changes, the 2016 Build Condition included emissions from the proposed parking garage and emergency generators.

The No-Build Condition CO concentrations range from 4.4 to 5.3 ppm. These results indicate that the No-Build Condition CO concentrations are lower than the existing CO concentrations. The future No-Build Condition VOC and NOx emissions are lower than the Existing Condition's emissions due to the implementation of emission control programs, such as the Federal Motor Vehicle Emission Control Program, the Stage II Vapor Recovery System, and the Massachusetts Vehicle Inspection and Maintenance program.

The Build Condition CO concentrations range from 8.1 to 9.2 ppm. The increases in CO concentrations are due to the increases in mobile sources, parking garage, and emergency generator emissions. The results of the microscale analysis demonstrate that with the Center for Cancer Care, the CO concentrations are below the NAAQS of 35 ppm and 9 ppm, respectively, for 1-hr and 8-hour values. The highest 2016 No-Build and Build conditions CO concentrations for each receptor location are presented in Tables 6-9 and 6-10.

Table 6-9 Maximum 1-Hour CO Concentrations (Parts Per Million)[1]

Receptor No. and Location[2,3]	2006 Existing	2016 No-Build	2016 Build
Brookline Avenue at Francis Street			
1. Northwest Corner – Beth Israel Deaconess	5.8	5.2	8.9
2. Southwest– Parking Garage	5.9	4.9	8.7
3. Southeast Corner – Dana-Farber Cancer Institute	5.6	4.8	8.5
4. Northeast Corner – Beth Israel Deaconess	6.4	5.2	8.9
Brookline Avenue at Riverway			
5. Northwest Corner – Open Space	6.1	5.2	9.0
6. Southwest Corner – Open Space	6.1	5.2	8.9
7. Southeast– Beth Israel Deaconess	7.2	5.7	9.2
8. Northeast – Parking Garage	6.3	5.3	9.0
Longwood Avenue at Riverway			
9. Northwest Corner – Open Space	5.1	4.4	8.1
10. Southwest Corner – Residential Building	5.6	4.7	8.3
11. Southeast Corner – Temple Israel	4.9	4.5	8.3
12. Northeast Corner – Open Space	5.3	4.6	8.3
Brookline Avenue at Boylston Avenue/Park Drive			
13. Northwest Corner – Park Space	5.7	5.1	8.8
14. Southwest Corner – Park Space	5.3	4.8	8.5
15. Southeast Corner – Gas Station	5.4	4.7	8.4
16. Northeast Corner (S of Brookline) – Mixed Use/Commercial	5.5	4.8	8.5
17. Northeast Corner (N of Brookline) – Landmark Center	5.0	4.6	8.3

1 *The concentrations are expressed in parts per million (ppm) and include a 1-hour background concentration of 3.0 ppm. The 1-hour NAAQS for CO is 35 ppm.*

2 *The air quality study assumes that if these intersections meet the NAAQS, then all other intersections, regardless of alternative, which will have lower volumes and better levels of service, can be assumed to also meet the NAAQS.*

3 *See Figure 6-38 for locations.*

Table 6-10 Maximum 8-Hour CO Concentrations (Parts Per Million)[1]

Receptor No. and Location[2,3]	2006 Existing	2016 No-Build	2016 Build
Brookline Avenue at Francis Street			
1. Northwest Corner – Beth Israel Deaconess	4.1	3.6	6.1
2. Southwest– Parking Garage	4.1	3.4	6.0
3. Southeast Corner – Dana Farber Cancer Institute	3.9	3.4	5.9
4. Northeast Corner – Beth Israel Deaconess	4.5	3.6	6.1
Brookline Avenue at Riverway			
5. Northwest Corner – Open Space	4.3	3.6	6.2
6. Southwest Corner – Open Space	4.3	3.6	6.1
7. Southeast– Beth Israel Deaconess	5.0	4.0	6.4
8. Northeast – Parking Garage	4.4	3.7	6.2
Longwood Avenue at Riverway			
9. Northwest Corner – Open Space	3.6	3.1	5.6
10. Southwest Corner – Residential Building	3.9	3.3	5.7
11. Southeast Corner – Temple Israel	3.4	3.2	5.7
12. Northeast Corner – Open Space	3.7	3.2	5.7
Brookline Avenue at Boylston Avenue/Park Drive			
13. Northwest Corner – Park Space	4.0	3.6	6.1
14. Southwest Corner – Park Space	3.7	3.4	5.9
15. Southeast Corner – Gas Station	3.8	3.3	5.8
16. Northeast Corner (S of Brookline) – Mixed Use/Commercial	3.9	3.4	5.9
17. Northeast Corner (N of Brookline) – Landmark Center	3.5	3.2	5.7

1 The concentrations are expressed in parts per million (ppm) and include an 8-hour background concentration of 2.1 ppm. The 8-hour NAAQS for CO is 9 ppm.
2 The air quality study assumes that if these intersections meet the NAAQS, then all other intersections, regardless of alternative, which will have lower volumes and better levels of service, can be assumed to also meet the NAAQS.
3 See Figure 6-38 for locations.

6.7.6 Summary of Findings

The air quality study demonstrates that the Center for Cancer Care project conforms to the CAAA and the SIP. The microscale analysis evaluated site-specific impacts from vehicles traveling through congested intersections in the study area, and impacts from the parking garage and proposed emergency generators. This analysis demonstrates that all existing and future CO concentrations will be below the NAAQS.

The air quality study demonstrates that proposed DFCI Center for Cancer Care project conforms to the CAAA and the SIP because:

- No new violation of the NAAQS will be created;
- No increase in the frequency or severity of any existing violations will occur; and
- No delay in attainment of any NAAQS will result.

6.8 Solid and Hazardous Waste

This section includes discussion of solid and hazardous waste as they relate to DFCI's Center for Cancer Care project. Included is discussion of contaminated soils that have been found on the site and measures to be taken by DFCI to mitigate these contaminants and dispose of them responsibly and in conformance with State and Federal requirements. This section also discusses solid waste generation, disposal and recycling, as well as hazardous waste generation and disposal as it specifically relates to the operation of the new Center for Cancer Care facility.

6.8.1 Contaminated Soils

A total of approximately 87,000 cubic yards of excess soil will be generated during construction that will require off-site disposal. About 4,000 cubic yards is miscellaneous urban fill that is generally located in the upper 5 feet of the site. The remainder of the soil is native clay, sand and glacial till.

The only known historic source of soil contamination at the site was an underground No. 2 fuel oil storage tank that was removed in 1996. The soil immediately adjacent to the storage tank was found to be contaminated by the fuel oil and the contaminated soil was removed during the tank removal. The cleanup was monitored by an environmental engineering firm and documentation confirming that there was no significant residual contamination was filed with the Massachusetts DEP.

Requirements for handling, testing and disposal of the excavated materials in accordance with applicable regulations are included in the project specifications. The soil that will be excavated is being pre-characterized for proper disposal, which includes chemical testing performed on samples obtained from borings and test pits. In the pre-characterization testing performed to date, no material has been encountered that requires disposal as hazardous waste, but the test results indicate that the urban fill is generally not suitable for unrestricted reuse. The urban fill will be taken to a regulated unlined landfill for use as landfill cover material. The pre-characterization testing performed on the native soils indicates that this material can be reused or disposed as unregulated material. The pre-characterization sampling and testing program will continue into construction as required to satisfy the testing requirements of the disposal facilities that receive the excavated soil.

6.8.2 Solid Waste Generation/Disposal/Recycling

The proposed Center for Cancer Care project will include generation of additional solid waste on DFCI's LMA campus and proactive recycling measures will also be employed on-site to reduce waste generation at DFCI.

6.8.2.1 General Solid Waste Generation and Disposal

Based on current waste generation at DFCI's LMA campus, the proposed Center for Cancer Care is expected to generate approximately 370 tons of solid waste per year. Solid waste is expected to include waste paper, cardboard, food waste, and Styrofoam/plastic. Waste collection containers will be positioned at key points within the Center for Cancer Care and will be collected multiple times per day from patient observation rooms and common areas and transported to covered waste carts on each floor. Waste will then be transported to a centralized waste compactor in the Smith Laboratories Building loading/service area during off-hours. Solid waste from patient areas, laboratories, the dining facility, and administrative offices will be contained, transported and disposed of in separate containers.

6.8.2.2 Recycling

A portion of the general waste described above in Section 6.8.2.1 will be recycled. DFCI's "Green Team" coordinates the effort to increase environmental awareness and reduce waste generation at DFCI. DFCI currently employs a proactive recycling program that includes paper, cardboard, wood pallets, batteries, Styrofoam containers, and electronics, such as computers, monitors, and cellular telephones. In 2005, approximately 51 tons of mixed paper, 43 tons of cardboard, and over 1.5 tons of electronic equipment were recycled. DFCI's recycling activities were recently cited by the EPA for its achievements and DFCI will employ its system-wide recycling program within the new Center for Cancer Care facility. Recycling initiatives in the Center for Cancer Care are also discussed in Chapter 8, Sustainable Design.

6.8.3 Hazardous Waste Generation/Disposal

Based on current waste generation at DFCI's LMA campus, the proposed Center for Cancer Care is expected to generate approximately 45 tons of medical/hazardous waste per year. Regulated medical waste will be stored in waste rooms with specifically designed leak proof, labeled waste containers. These containers will be ferried to the Smith loading/service area where they will be processed and disposed of as either rendered, non-infectious waste (solid waste) or "regulated medical waste."

6.8.3.1 Regulated Medical Waste Generation/Disposal

Regulated medical waste will be specifically lined, sealed and marked for incineration in the Smith loading/service area. These materials are regularly removed off-site by a licensed vendor. Waste determined to be bio-hazardous are removed in bio-hazardous totes and transported to a waste treatment area. Sharps waste is segregated from other waste and placed in rigid, puncture-resistant, leak-proof, and shatterproof biohazard sharps containers. Regulated medical waste is stored and disposed of separately in accordance with local, state, and federal regulations.

6.8.3.2 Chemical Waste Generation/Disposal

No appreciable amounts of chemical waste are anticipated to be produced within the Center for Cancer Care. If any are produced, they would likely fall under the classification of a very small quantity generator (vsqg). Any chemical waste would be characterized for chemical composition, packaged, transported and disposed of in accordance with State and Federal requirements utilizing a Massachusetts-licensed hazardous waste contractor.

6.8.3.3 Radioactive Waste Generation/Disposal

DFCI expects that some low-level radioactive waste and infectious waste will be generated in the Center for Cancer Care and will need to be disposed of properly. Management of these types of waste are highly regulated for the safety of the public and the environment. Similar in nature to chemical waste, any low-level radioactive waste would be identified, packaged, transported and disposed of in accordance with State and Federal requirements utilizing a Massachusetts-licensed hazardous waste/radioactive waste contractor.

6.8.3.4 Spill Control Measures

DFCI employs clearly-defined spill control/prevention procedures including the following:

- 24-hour on-call staff.
- Responder training procedures/requirements.
- On-site storage of supplies and equipment to handle small/manageable spills/incidents.
- On-call contingency plan with a licensed contractor to respond to and handle larger spills (if they occur).

6.9 Geotechnical and Groundwater Analysis

This section includes discussion of geotechnical and groundwater analysis as they relate to DFCI's Center for Cancer Care project. Included is discussion of site and subsurface conditions, foundation design, foundation construction impacts, and impacts to groundwater levels as a result of the proposed Center for Cancer Care.

6.9.1 Site and Subsurface Conditions

The site is currently occupied by the Redstone Building, the 454 Brookline Avenue Building, and a paved parking lot. The site is relatively flat, with a gentle downward slope from elevation 44 at the northeast corner to elevation 36 at the southwest corner, as referenced to Boston City Base datum (BCB). The eastern half of the site is underlain by permanent tieback anchors that support the west wall of the Smith Laboratories Building basement. Temporary tieback anchors that were used for temporary excavation support during the construction of the MATEP building extend into the southern portion of the site.

Subsurface analysis was based on data obtained from immediately adjacent sites and supplemented by additional soil borings taken in November-December 2004, as well as data from existing groundwater monitoring wells.

The soil strata documented by the data and borings include the following layers, starting at the ground surface. The top layer is composed of a layer of miscellaneous fill, which consists of coarse silty sand with gravel and occasional brick and asphalt fragments, with a depth of generally less than five feet. Beneath this layer is a stratum of stiff to very stiff clay varying from 45 to 76 feet in thickness. The sand and silt content of this stratum typically increases near the bottom, in a gradual transition to the underlying sand stratum. This layer of fine to medium sand and silty sand is dense to very dense, and ranges from eight to 23 feet in thickness. A layer of very dense glacial till, varying from three to 32 feet thick was encountered above the bedrock and is composed of widely graded sand and silt with varying amounts of gravel. Bedrock at the site is located at depths varying between 73 and 125 feet. It is typically a gray coarse-grained conglomerate, medium to hard, slightly to moderately weathered with widely spaced joints. Based upon observations of the bedrock surface during construction of the Smith Laboratories Building, it is anticipated that the bedrock surface may have some near vertical steps associated with widely spaced high-angle joints.

Groundwater observations of existing wells across the site indicate that there are two different water levels at the site: a shallow perched water level above the clay stratum and a deeper water level in the sand, glacial till, and bedrock strata below the clay stratum. The upper perched water levels above the clay vary between approximately Elevation +20 and +30. The piezometric level of the groundwater below the clay is about Elevation +10.

6.9.2 Foundation Design

The proposed Center for Cancer Care building will be a high-rise structure with an underground space that connects to the underground portion of the adjacent Smith Laboratories Building. The underground portion of the building will extend about 75 feet below the ground surface to Elevation -35. Many of the foundation design and construction issues for the new building are similar to the issues that were addressed for the Smith Laboratories Building.

The Center for Cancer Care will employ a vibration isolation design to isolate it from the vibrations generated by the adjacent MATEP power plant, similar to the isolation design that was employed for the adjacent Smith Laboratories Building. The Center for Cancer Care building superstructure will be designed as a freestanding structure founded on bedrock, located inside a deep basement excavation supported by concrete slurry walls with permanent tieback anchors that are anchored into bedrock. The slurry walls are cast-in-place concrete walls that serve as both temporary excavation support and the permanent basement walls. The slurry walls will be socketed into the bedrock for structural support and to provide a groundwater cutoff. The building superstructure is not connected to the anchored walls, isolating the superstructure from the ground vibrations in the soil.

The foundations for the building superstructure will consist of concrete piers and drilled shafts bearing on the bedrock. The base slab for the below-grade structure will be a slab-on-grade with an under-slab drainage system that connects to the existing under-slab drainage system in the Smith Laboratories Building.

A shallow tunnel will be constructed under Jimmy Fund Way to connect the new building to the existing Dana Building at 44 Binney Street. The roof of the tunnel will be located about 13 feet below the ground level and the base of the tunnel will be about 29 feet below ground level. The tunnel will be constructed by the cut-and-cover tunnel method using braced soldier piles and lagging for excavation support and temporary traffic decking to maintain traffic on Jimmy Fund Way.

6.9.3 Foundation Construction Impacts

Ground movement associated with foundation excavation and ground vibrations associated with construction activities may have some effect on adjacent buildings, primarily the MATEP building located adjacent to the construction site. The project design team has evaluated the potential impacts and incorporated measures to mitigate these impacts.

The slurry wall excavation support system has been designed to minimize ground movement outside the excavation and special measures have been included to minimize potential ground movement impacts resulting from installation of the tieback anchors. A comprehensive geotechnical monitoring program is being implemented to monitor the performance of the excavation support system as well as movements of the ground and structures in the vicinity of the excavation.

Vibrations due to construction activities will be monitored using seismographs and a maximum permissible vibration level of 1.0 inch per second (peak particle velocity) has been established. The greatest potential source of construction vibrations is the possible need for drop-chiseling to socket the slurry walls into the bedrock or advance the slurry walls through boulders in the soil. Vibrations from other potential sources are unlikely to approach the maximum vibration criterion. To mitigate the vibration impact from drop-chiseling a milling machine (called a hydro-mill) will be used to perform the slurry wall excavation in the bedrock and in the soils below the clay that contain boulders. This will minimize and possibly eliminate the need for drop-chiseling.

6.9.4 Impacts on Groundwater Levels

The perimeter slurry walls are designed to act as a cutoff for groundwater in the surrounding soil for both the temporary construction condition and the permanent condition. There will be a small amount of upward seepage from the underlying bedrock that will be collected by the drainage system located below the basement floor slab. The total flow measured in the adjacent Smith Laboratories Building under-slab drainage system is about 15 gpm and a similar flow is expected from the basement area of the new building. This water is pumped to a city storm drain that discharges into the Muddy River located about 500 to 1000 feet from the site. The small amount of seepage flow from the bedrock into the under-slab drainage system is not expected to alter the groundwater levels outside the perimeter slurry walls. Comparison of historic and current groundwater level measurements show that the under-slab drainage system in the existing Smith Laboratories Building has not altered the water levels outside the Smith Laboratories Building slurry walls.

The project design team has reviewed the issue of groundwater level impacts with the Boston Groundwater Trust and they are in agreement with the design team's assessment that the project design provides adequate protection against adverse impacts on groundwater levels.

6.10 Flood Hazards/Wetlands

The project is not located near any body of water or wetland nor is it located within a flood hazard district. Therefore, impacts on water quality are expected to be limited. Provisions for managing stormwater run-off are described in Chapter 7, Infrastructure.

6.11 Construction Impacts

6.11.1 Introduction

This section describes the anticipated methods and impacts of construction related to DFCI's Center for Cancer Care project. In November 2006, DFCI received approval for a Construction Management Plan (CMP) for the project from the BTD that complies with the City of Boston's Construction Management Program. The CMP includes detailed information regarding construction activities, materials to be used, staging areas, parking, truck routes, air quality and noise impacts and mitigation measures, and other subject matter as it relates to construction.

In particular, the CMP specifically demonstrates the actions that DFCI and the Construction Manager (Walsh Brothers, Inc.) intend to maintain public safety throughout the construction period. Techniques such as barricades, defined temporary walkways, signage, and other protective measures will be put in place. The CMP also highlights actions to be taken to accommodate worker parking, truck routes and staging, protection of utilities, and the control of noise and dust.

6.11.2 Construction Schedule

Following is a summary of construction milestone schedule dates for the project:

▪ Smith Loading Dock	July 2006 – December 2006
▪ Jimmy Fund Way Tunnel Construction	July 2007 –November 2007
▪ Demo./utility relocations/pre-trench	November 2006 – March 2007
▪ Slurry Wall/excavation/foundations	March 2007 – February 2008
▪ Steel Erection	February 2008 – December 2008
▪ Enclosure/fit-out/etc.	January 2009 – February 2011

6.11.3 Coordination with Other Ongoing Construction Projects

DFCI will coordinate with its neighbors, the City of Boston, and MASCO through their regular and ongoing construction coordination meetings to minimize potential scheduling and construction conflicts with other ongoing LMA construction projects. These efforts will also be used better understand community concerns and to make sure that any important concerns are identified and resolved.

6.11.4 Construction Phasing

Construction of the Center for Cancer Care has been summarized into three distinct phases:

- Demolition and Site Enabling
- Foundation Construction and Excavation
- Steel Erection/Building Construction

Each of these actions is discussed in greater detail below.

6.11.4.1 Demolition and Site Enabling

Under the initial phase of construction, the existing 454 Brookline Avenue and Redstone buildings will be remediated for asbestos and other materials, and subsequently demolished. The site will be cleared and prepared for foundation construction, which will include segregation of the site from adjacent public streets and sidewalks using fencing and jersey barriers. The parking lane along Brookline Avenue will be taken out of service during the construction period and a temporary sidewalk will be installed along the eastern edge of Brookline Avenue. Jimmy Fund Way has been narrowed and temporarily modified to a one-way street from Binney Street to Brookline Avenue. The site will be fitted with two delivery (laydown) areas. The Brookline Avenue laydown area will support nearly all deliveries to and removal of materials from the site. The only exception to this will be the delivery of structural steel, which will be delivered via the Jimmy Fund Way laydown area.

Additionally, the existing loading docks at the Smith building will be expanded to include an additional two loading docks. This will require the reconfiguration of some existing administrative space on the ground floor of Smith, and extension of a driveway curb cut along Binney Street to support the modified loading and service area.

6.11.4.2 Foundation Construction and Excavation

The design intent of the Project is that the proposed 450 Brookline Avenue building will be a high-rise structure with an underground space that connects to the underground portion of the adjacent Smith Laboratories Building. The underground portion of the building will extend about 75 feet below the ground surface to Elevation -35. Many of the foundation design and construction issues for the new building are similar to the issues that had to be addressed for the Smith Laboratories Building.

The Center for Cancer Care will employ a vibration isolation design to isolate it from the vibrations generated by the adjacent MATEP power plant, similar to the isolation design that was employed for the adjacent Smith Laboratories Building. The building superstructure will be designed as a free-standing structure founded on bedrock, located inside a deep basement excavation supported by concrete slurry walls with permanent tieback anchors that are anchored into bedrock. The slurry walls are cast-in-place concrete walls that serve as both temporary excavation support and the permanent basement walls. The slurry walls will be socketed into the bedrock for structural support and to provide a groundwater cutoff. The building superstructure is not connected to the anchored walls, isolating the superstructure from the ground vibrations in the soil.

The foundations for the building superstructure will consist of concrete piers and drilled shafts bearing on the bedrock. The base slab for the below-grade structure will be a slab-on-grade with an under-slab drainage system that connects to the existing under-slab drainage system in the Smith Laboratories Building.

A shallow tunnel will be constructed under Jimmy Fund Way to connect the new building to the existing building at 44 Binney Street. The roof of the tunnel will be located about 13 feet below the ground level and the base of the tunnel will be about 29 feet below ground level. The tunnel will be constructed by the cut-and-cover tunnel method using braced soldier piles and lagging for excavation support and temporary traffic decking as required to maintain traffic on Jimmy Fund Way.

6.11.4.3 Steel Erection/Building Construction

The building will be erected using a tower crane with laydown areas on both Brookline Avenue and Jimmy Fund Way. The construction loading dock and personnel hoist is expected to be constructed near the Brookline Avenue construction entrance.

Once the foundations for the building superstructure have been established, steel and concrete construction will begin from the lowest level of the excavated foundation and move vertically up through the footprint. Structural steel for the garage will be placed initial to the ground level with concrete slab placement occurring concurrently with superstructure construction.

The ground level contains structural steel and structural transfers. Once the structure is established, the ground level concrete deck will be poured. From that point, the remaining structure will be erected and the remaining concrete floors will be poured.

The site perimeter fence (established in the earliest phases of the project) will remain to allow for the rigging of the façade elements and building equipment as the project moves into its initial fit-out phase. To allow for construction of the final site surfaces and site improvements (expected towards the latter half of the construction schedule), the site perimeter fence may require modifications coordinated with the Boston Transportation Department.

6.11.5 Disposal and Recycling of Construction Debris

DFCI plans to proactively reprocess and recycle construction and building demolition waste to the greatest extent that is economically feasible. The project's disposal contract will include specific provisions for the segregation, reprocessing, reuse, and/or recycling of building materials and demolished debris. Those materials that cannot be recycled on-site will be transported in covered trucks to an approved solid waste facility per Massachusetts DEP's Regulations for Solid Waste Facilities. The construction debris recycling program will be implemented in conjunction with the Project's overall LEED certification strategy (currently establishes a 75 percent diversion rate; see Chapter 8).

6.11.6 Construction Worker Parking

The number of workers required during the construction will vary with an estimated average daily workforce of approximately 300 to 350 persons during the peak of construction. Because the workforce will arrive and depart prior to peak commuter traffic periods, these trips are not expected to have a large impact on the area's transportation system. Construction workers will arrive at the job site either via public transportation or by personal vehicles. No personal vehicles will be allowed to park at the project construction site or in the adjacent neighborhood. Since parking in the LMA is limited, public transportation will be encouraged. DFCI and its construction manager will work to identify off-site and shuttle bus parking opportunities for workers. Additionally, DFCI's CM has established an off-site marshalling and storage facility at the O.B. Hill facility in Allston to streamline deliveries and avoid queuing at the site.

6.11.7 Truck Routes/Volumes

Primary truck routing to the site will be from Route 9/Huntington Avenue to Brookline Avenue eastbound. Most trucks will enter the site on Brookline Avenue, however, steel deliveries are planned to be handled via a separate laydown location off of Jimmy Fund Way. No trucking will be allowed to approach the site from either Longwood Avenue or from Huntington Avenue. All subcontractors will be required to enforce these routes with their employees and suppliers/vendors. The project will participate in the LMA coordinated signage program overseen by MASCO.

Truck traffic will vary throughout the construction period, depending on the ongoing activity. It is expected that truck traffic will range on average between 10-15 trucks daily, spread evenly throughout the day, with an increase of 25-40 trips during larger concrete pours. Police details will be stationed at active site gates to coordinate traffic flow and assist in pedestrian direction. Mechanical street sweeping will be performed as required, full time during all heavy trucking periods (demolition, slurry wall, excavation, concrete pours, etc.). Gravel wash off areas will be maintained at all exits to limit mud tracking from the site.

6.11.8 Construction Air Quality

Air quality in the study area will not be substantially affected by project construction because of the temporary nature of site development construction and the confines of the construction area. Emissions from the operation of construction machinery (CO, oxides of nitrogen, particulate matter, sulfur oxides, and volatile organic compounds) are short-term and not expected to be significant.

The construction specifications will include measures to mitigate fugitive dust emissions. These measures will include wetting and stabilization to suppress dust generation, cleaning paved roadways, and scheduling construction activities to minimize the amount and duration of exposed earth.

Construction activities may generate dust, which will result in localized increase in airborne particle levels. Fugitive dust emissions from construction activities will depend on such factors as the properties of the emitting surfaces (e.g., moisture content and volume of spills), metrological and variables and construction practices employed. To reduce the emissions of fugitive dust and minimize impacts on the local environment, DFCI's CM and its subcontractors will adhere to a number of strictly enforced mitigation measures:

- Wetting agents will be used regularly to control and suppress dust that may come from the construction materials.
- All trucks for transportation of construction debris will be fully covered.
- Actual construction practices will be monitored to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized and to ensure that emissions of dust are limited.
- Mechanical sweeping will occur full-time during excavation and foundation activities.
- After those activities, sweeping will occur as needed.
- Wheel wash locations will be provided as necessary.
- All contractor and sub-contractor-operated diesel-powered non-road construction equipment with engine horsepower (HP) ratings of 60 HP and above, which is used on the project for a period in excess of 30 days, shall be retrofitted with Emission Control Devices in order to reduce diesel emissions.
- In addition, all motor vehicles and construction equipment shall comply with all pertinent City, State and Federal regulations covering exhaust emission control and safety.
- The reduction of emissions of volatile organic compounds (VOCs), carbon monoxide (CO), and particulate matter (PM) from diesel-powered equipment shall be accomplished by installing Retrofit Emission Control Devices.

The acceptable Retrofit Emission Control Devices for the project shall consist of oxidation catalysts that (1) are included on the Environmental Protection Agency (EPA) *Verified Retrofit Technology List;* and (2) are verified by EPA or certified by the manufacturer to provide a minimum emissions reduction of 42 percent for VOCs, 31 percent for CO and 20 percent for PM. Attainment of the required reduction in PM emissions can also be accomplished by using less polluting Clean Fuels (e.g. PuriNOx).

Construction shall not proceed until the CM has submitted a certified list of the non-road diesel–powered construction equipment that will be retrofitted with emission control devices. The list shall include:

- The equipment number, type, make and Contractor/Sub-Contractor.
- The emission control device make, model and EPA verification number.
- The CM shall also identify any vehicles that will use Clean Fuels.
- Equipment that has been retrofitted with an emission control device shall be stenciled or otherwise clearly marked as "Low Emission Equipment."

DFCI's CM will submit monthly reports, updating the same information state above, including the quantity of Clean Fuel utilized. The addition or deletion of non-road diesel equipment shall be indicated in the report.

In addition to installing the required emission control devices, the contractor will also use methods to control nuisance odors associated with diesel emissions from construction equipment including without limitation the following:

- Turning off diesel combustion engines on construction equipment not in active use, and on trucks that are idling while waiting to load or unload material for five minutes or more.
- Locating diesel equipment away from the general public and sensitive receptors (e. g., fresh air intakes, air conditioners and windows).
- Utilizing electronically-powered scissor/man lifts.

6.11.9 Construction Noise

Construction period activities may temporarily increase nearby sound levels due to the intermittent use of heavy machinery during the construction of the DFCI Center for Cancer Care. The area currently has significant ambient noise due to urban activities including traffic noise from Brookline Avenue, building mechanical equipment, and the adjacent MATEP plant. Construction activities will occur primarily during normal daytime hours (7:00 AM to 6:00 PM) except on Sunday, and will be required comply with applicable City of Boston noise regulations.

The proposed project will generate typical sound levels from construction activities, including demolition, foundation construction, truck movements, heavy equipment operations, and general construction activities. Regulation 3 of the City of Boston Code, Ordinances, Title 7, Section 50, includes specific construction noise limits by land use. The relevant criterion for the project is based on residential or institutional land use. The construction noise at the property line for residential or institutional land use is limited to a maximum level of 86 dBA, with a limit of 75 dBA for the construction, noise level exceeded 10 percent of the time (L10). In addition, the City of Boston Code, Ordinances, Title 14, Chapter 11, Section 354 (titled "Unreasonable Noise") also applies to construction activities. This ordinance establishes a noise limit of 50 dBA for construction noise measured at residential lot lines between 6:00 PM and 7:00 AM. This ordinance effectively prohibits nighttime construction near residential areas.

The proposed project will implement mitigation measures to reduce or minimize noise from construction activities and to maintain compliance with the City's noise ordinances. The City of Boston regulations do not apply to impact devices such as pile drivers and jackhammers. It is the goal of the construction team (Walsh Brothers, Inc.) to operate within the criteria set by the Boston Ordinance.

A Construction Management Plan (CMP) was developed with input from the Boston Transportation Department and approved in Fall 2006. The CMP addresses noise impacts and mitigation. Specific mitigation measures include:

- Scheduling work during daytime hours (7:00 AM to 6:00 PM except Sunday). There may be some instances when a second construction shift may be required. The Center for Cancer Care will be required to seek permits for these instances.
- Using appropriate mufflers on construction equipment to minimize noise.
- Maintaining muffler enclosure on continuously operating equipment, such as air compressors and welding generators.
- Provided ongoing maintenance of intake and exhaust mufflers.
- Replacing specific construction operations by less noisy ones where feasible and practical.
- Selecting the quietest practical items of equipment - e.g., electric instead of diesel powered equipment.
- Selecting equipment operations to keep average levels low, to synchronize noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels.
- Turning off idle equipment.

6.11.10 Measures to Protect Water Quality During Construction

The contractor, having filed a National Pollutant Discharge Elimination System (NPDES) permit for construction activities, is required to minimize stormwater runoff from the site. Construction runoff is to be treated and discharged in accordance with NPDES permits and is also required to protect adjacent catch basins from construction debris. Since the majority of the site will be mass-excavated, surface runoff is expected to be minimized. Any water extracted from the excavation will be treated in accordance with local, state and federal dewatering permit requirements.

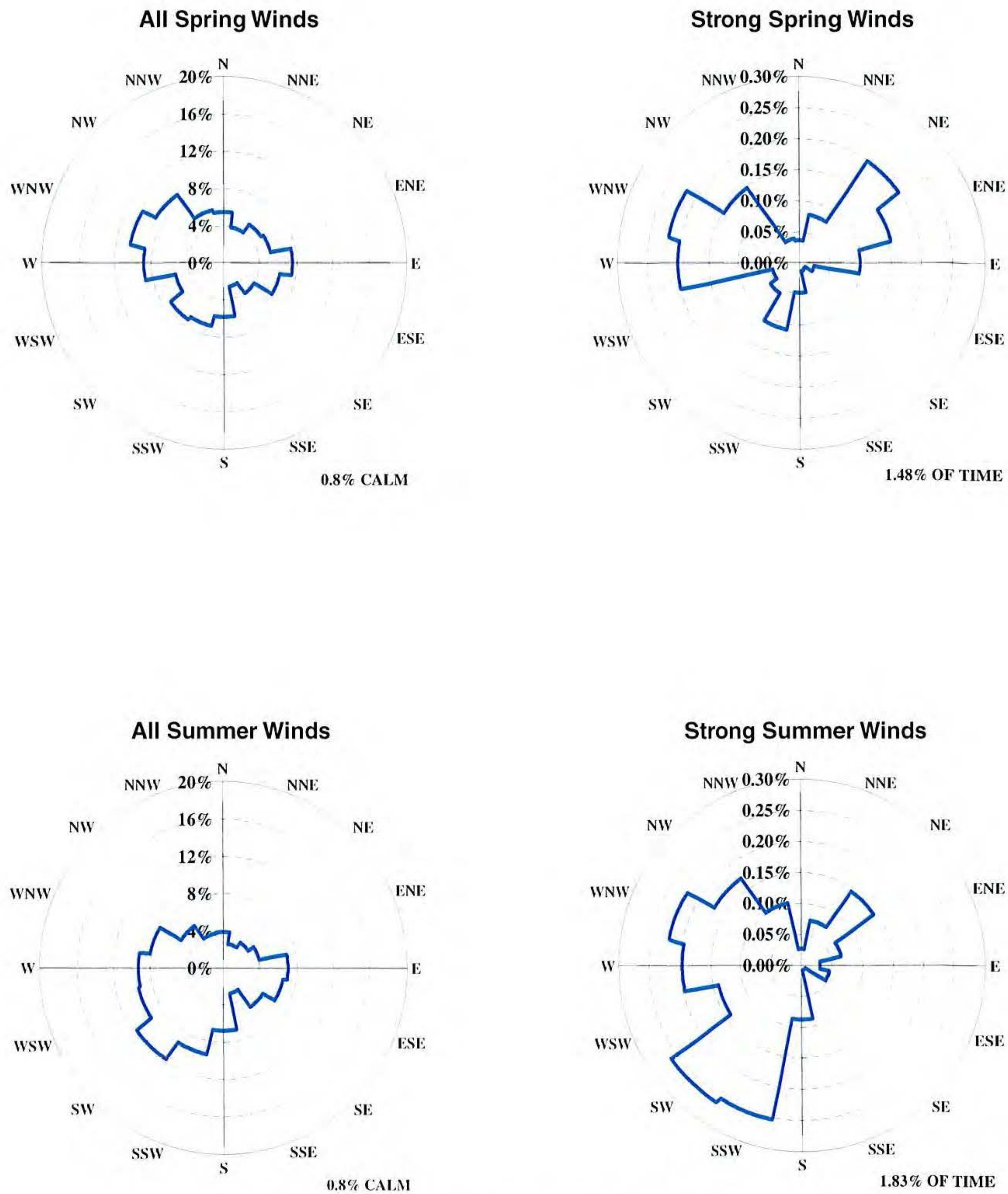
6.12 Rodent Control

DFCI is aware of the need to address the rodent issue in the City. In order to control potential rodent concerns, the City enforces the requirements established under the Massachusetts State Sanitary Code, Chapter 211, 105 CMR 410.550 and the State Building Code, Section 108.6. Policy Number 87-4 (City of Boston) established that preparation of a program for the extermination of rodents shall be required for issuance of permits for demolition, excavation, foundation, and basement rehabilitation. Accordingly, DFCI will prepare and adhere to an appropriate rodent control program.

6.13 Historic Resources

Required consultation with the Boston Landmarks Commission and the Massachusetts Historical Commission was completed in April and May 2006. Because two buildings on the project site are over 50 years old and are proposed for demolition, DFCI submitted an Article 85 Demolition Delay application (Article 85, Chapter 665 of the Acts of 1956, as amended) in April 2006 to the Boston Landmarks Commission. A Project Notification Form was submitted concurrently to the Massachusetts Historical Commission as a requirement of 950 CMR 71.00; M.G.L., Chapter 9, Sections 26-27C as amended by St. 1988, c.254. This regulation requires the review of any with state involvement (in this case, potential tax exempt bond financing from the MA Health and Educational Facilities Authority) by the Massachusetts Historical Commission. Both applications were submitted on April 20, 2006.

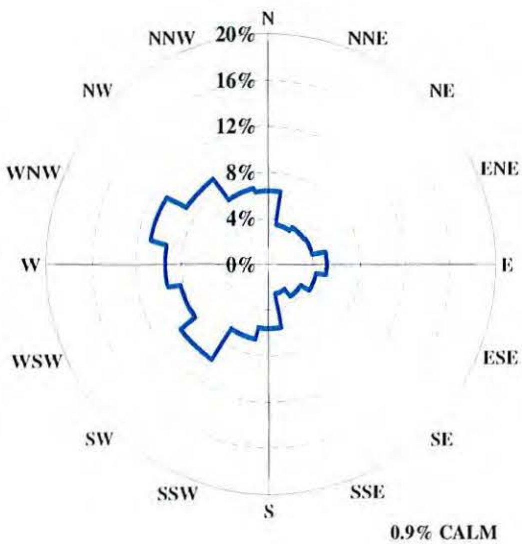
The Massachusetts Historical Commission and Boston Landmarks Commission responded with their comments on May 18 and April 28, 2006, respectively. The Massachusetts Historical Commission staff response noted that the project was unlikely to affect significant historic or archaeological resources. The Boston Landmarks Commission staff determined that the two buildings on the project site were not significant buildings under their significance criteria (Section 85-5.3 (a-e) of the Demolition Delay Ordinance. The detailed historic resources study that was completed in connection with the previous IMPNF/PNF filing, as well as copies of the response letters from these two agencies are enclosed in Appendix E.



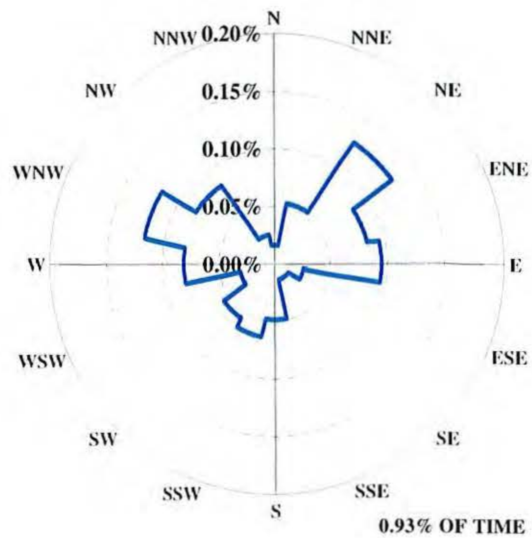
Direction Distribution (%) of Winds (Blowing from)
Boston Logan International Airport, Massachusetts
(1945-2004)

Source: RWDI

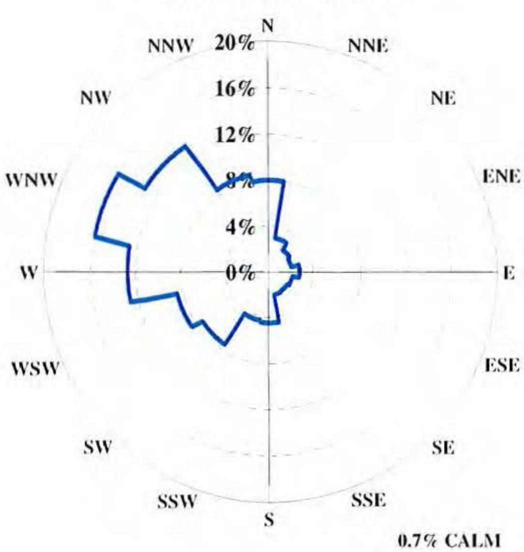
All Fall Winds



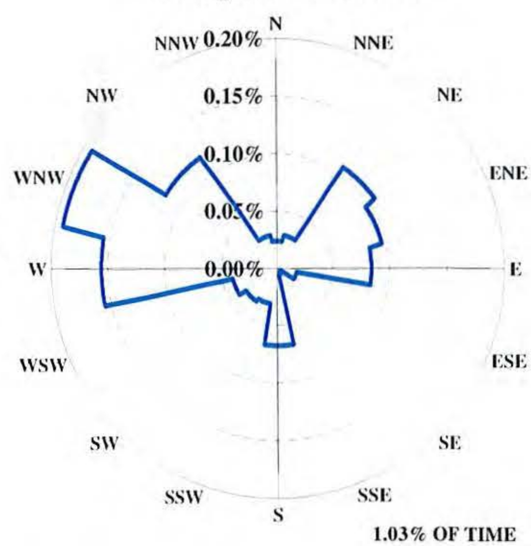
Strong Fall Winds



All Winter Winds



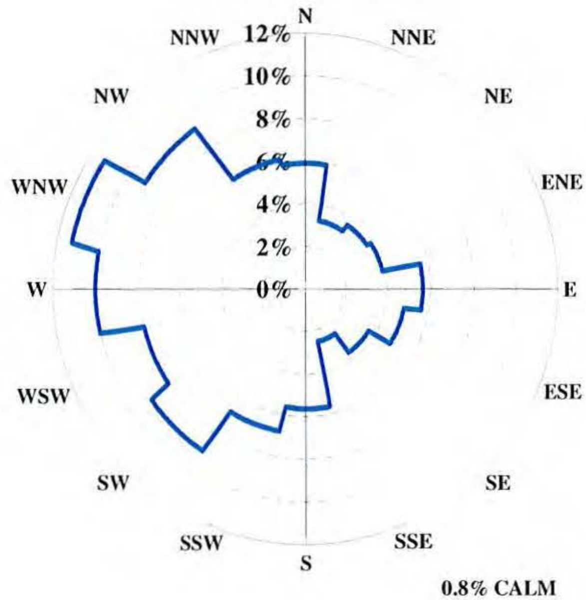
Strong Winter Winds



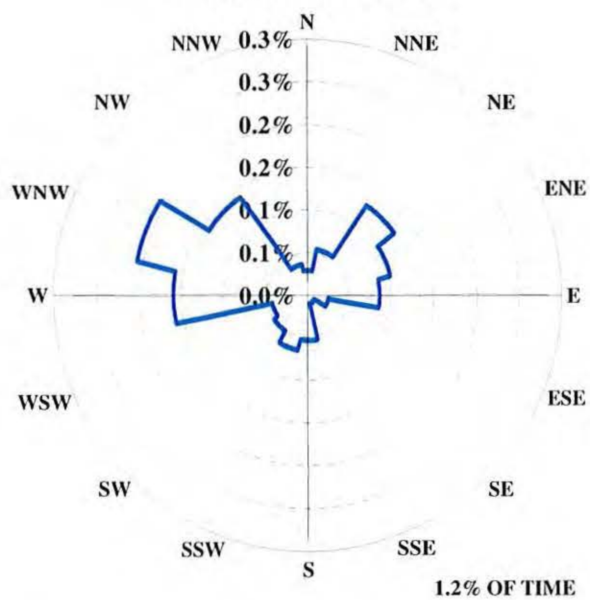
Direction Distribution (%) of Winds (Blowing from)
Boston Logan International Airport, Massachusetts
(1945-2004)

Source: RWDI

All Annual Winds

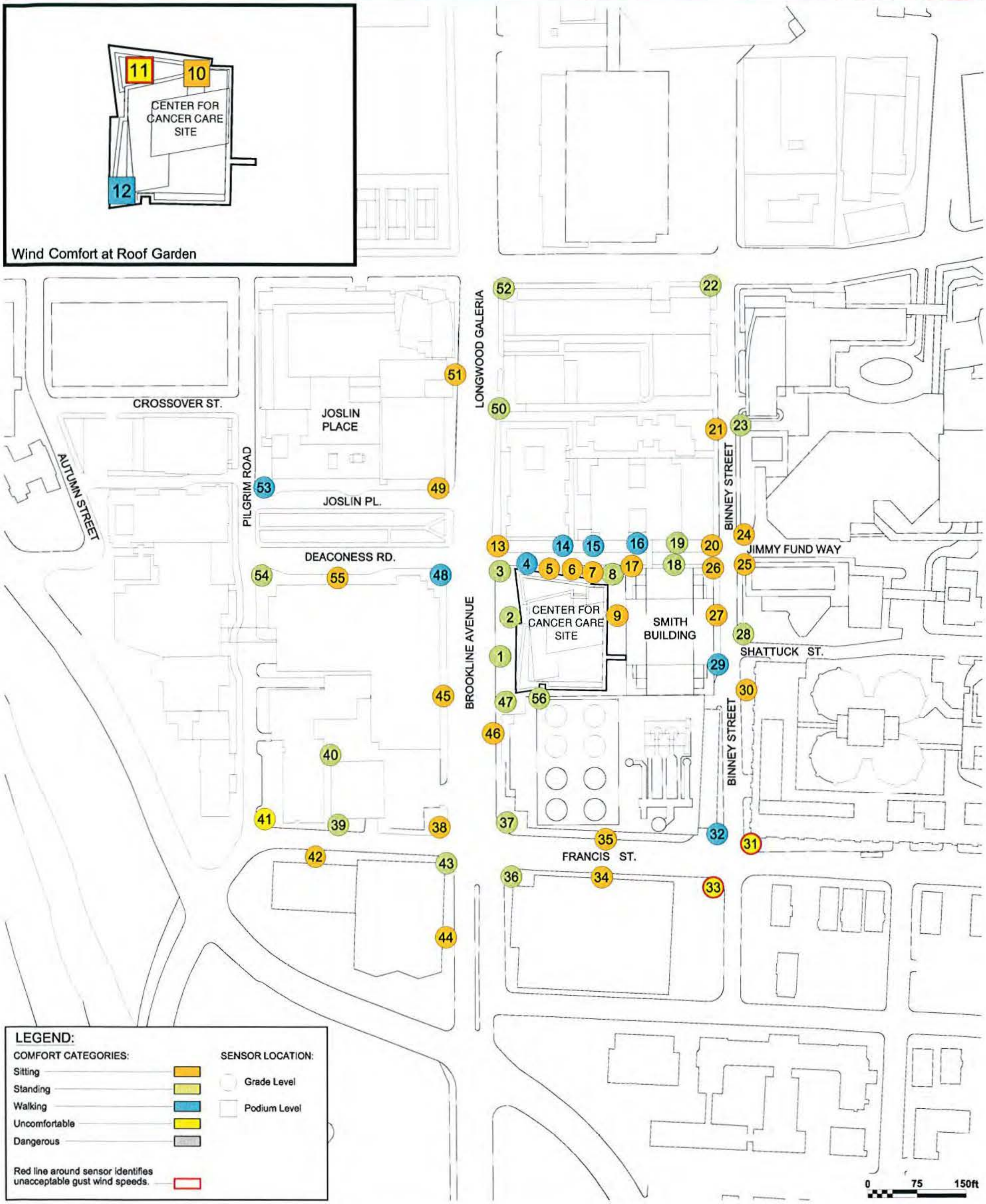


Strong Annual Winds



Direction Distribution (%) of Winds (Blowing from)
Boston Logan International Airport, Massachusetts
(1945-2004)

Source: RWDI



Source: RWDI

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

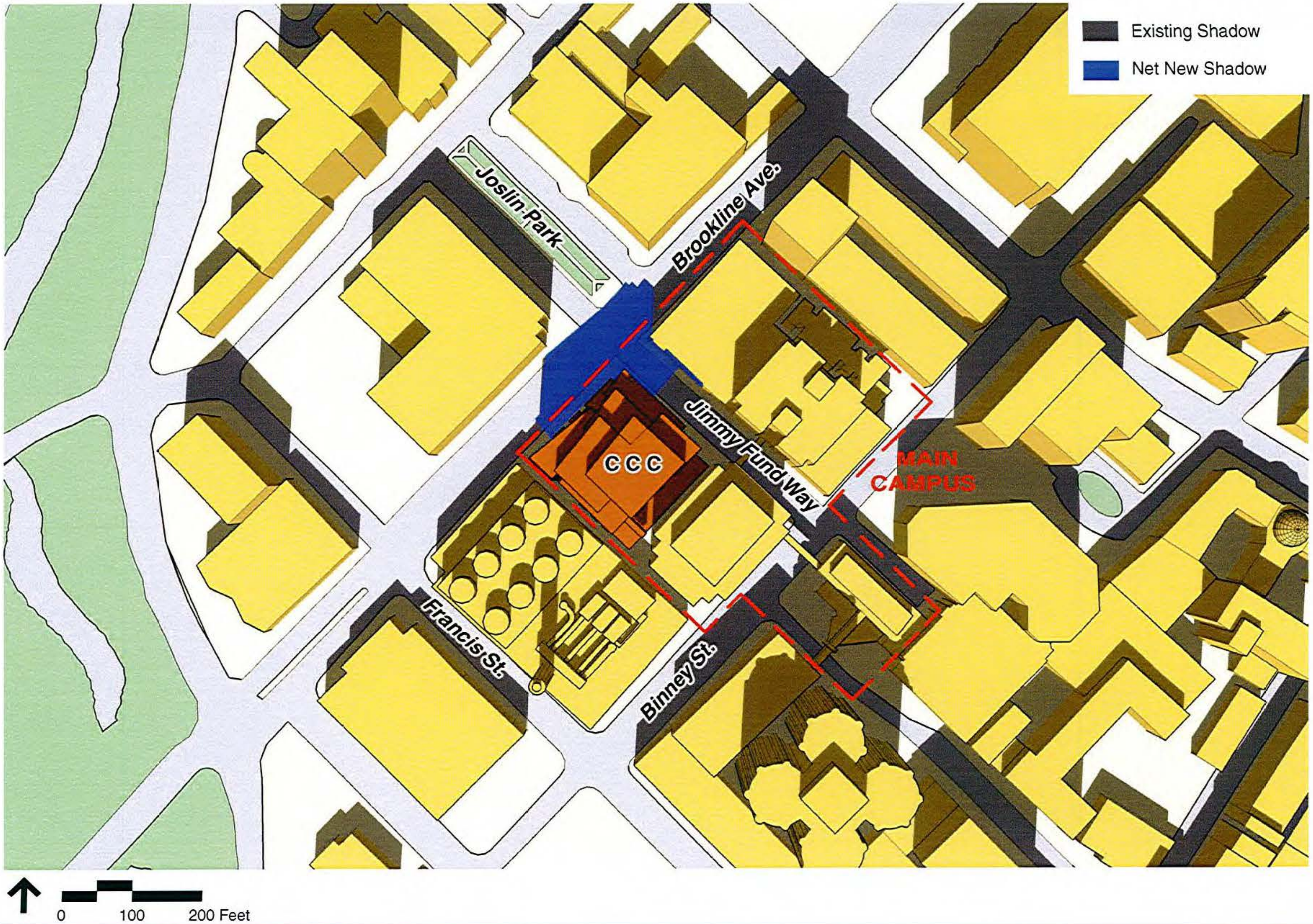
Annual Pedestrian Wind Conditions
Build Condition

FIGURE 6-5

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
March 21st 9AM

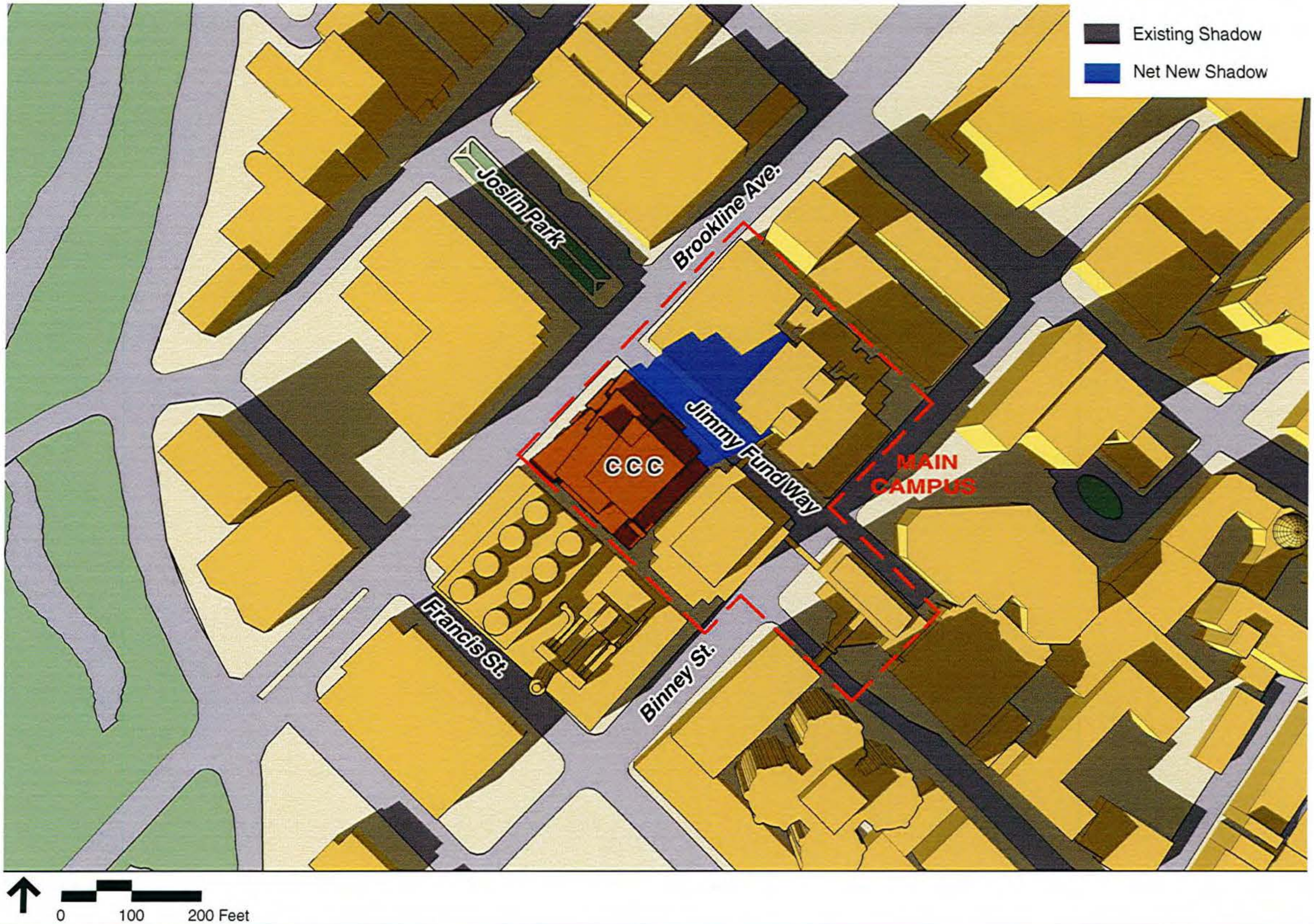
FIGURE 6-6



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
March 21st 12PM

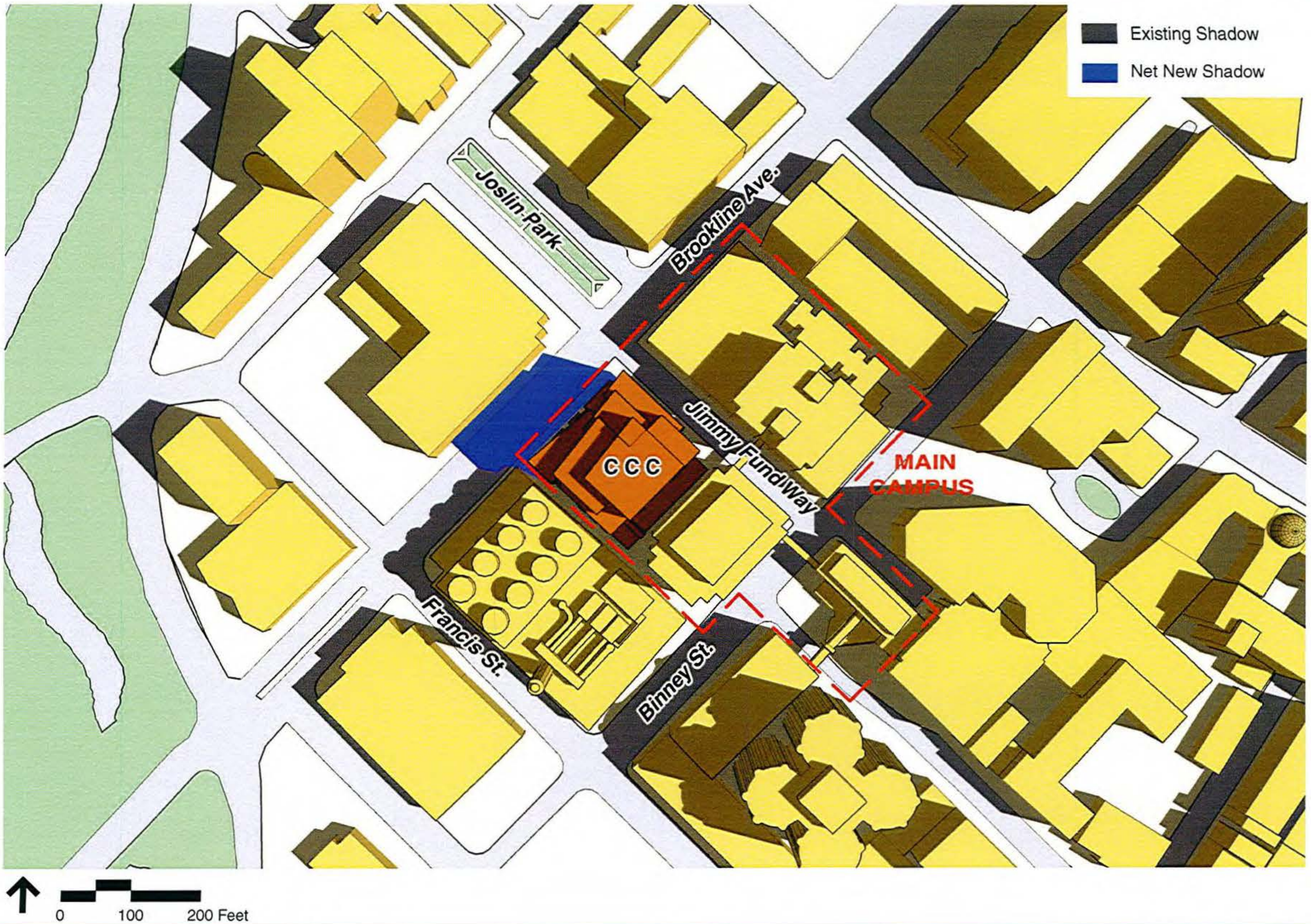
FIGURE 6-7



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
March 21st 3PM

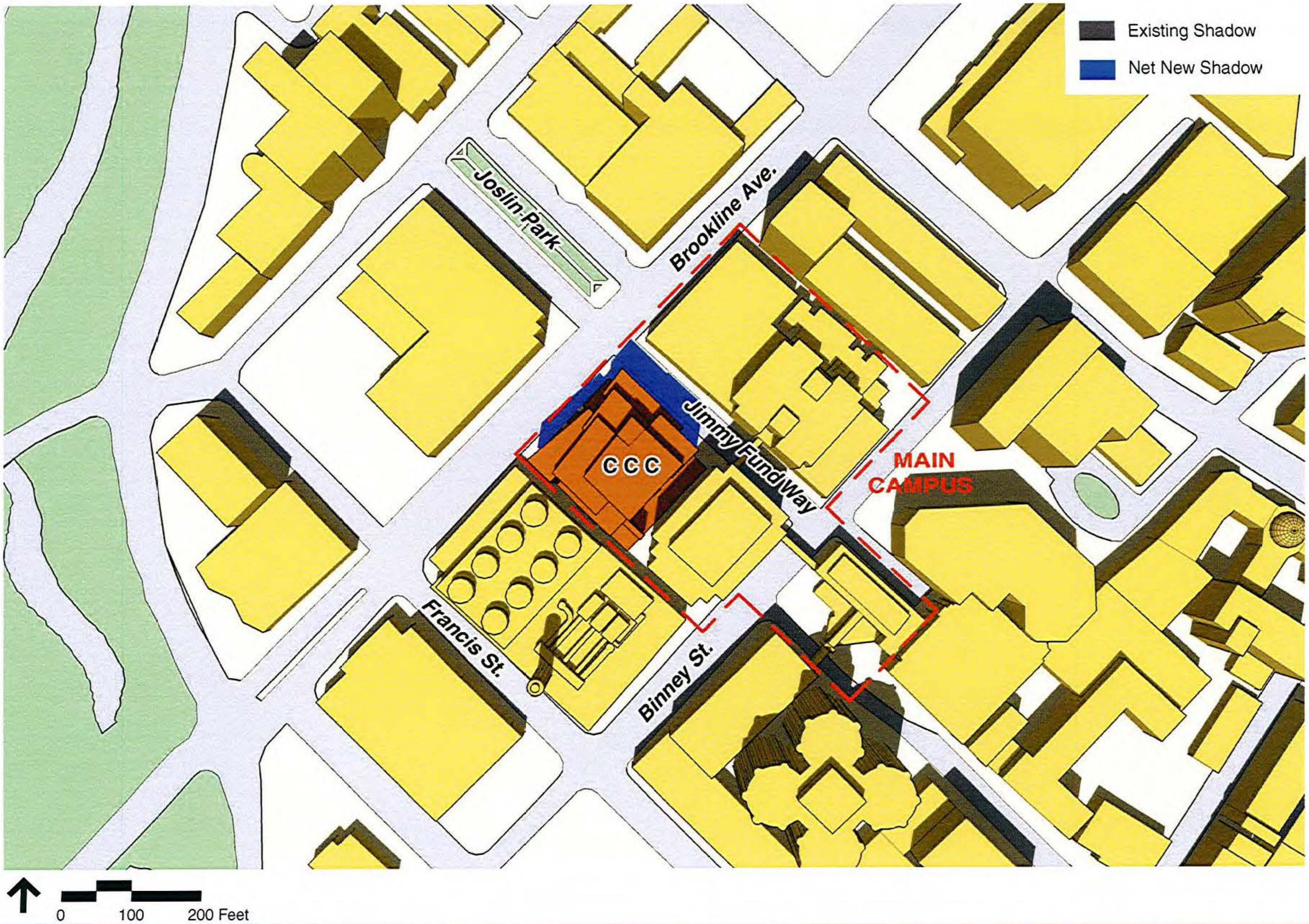
FIGURE 6-8



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
June 21st 9AM

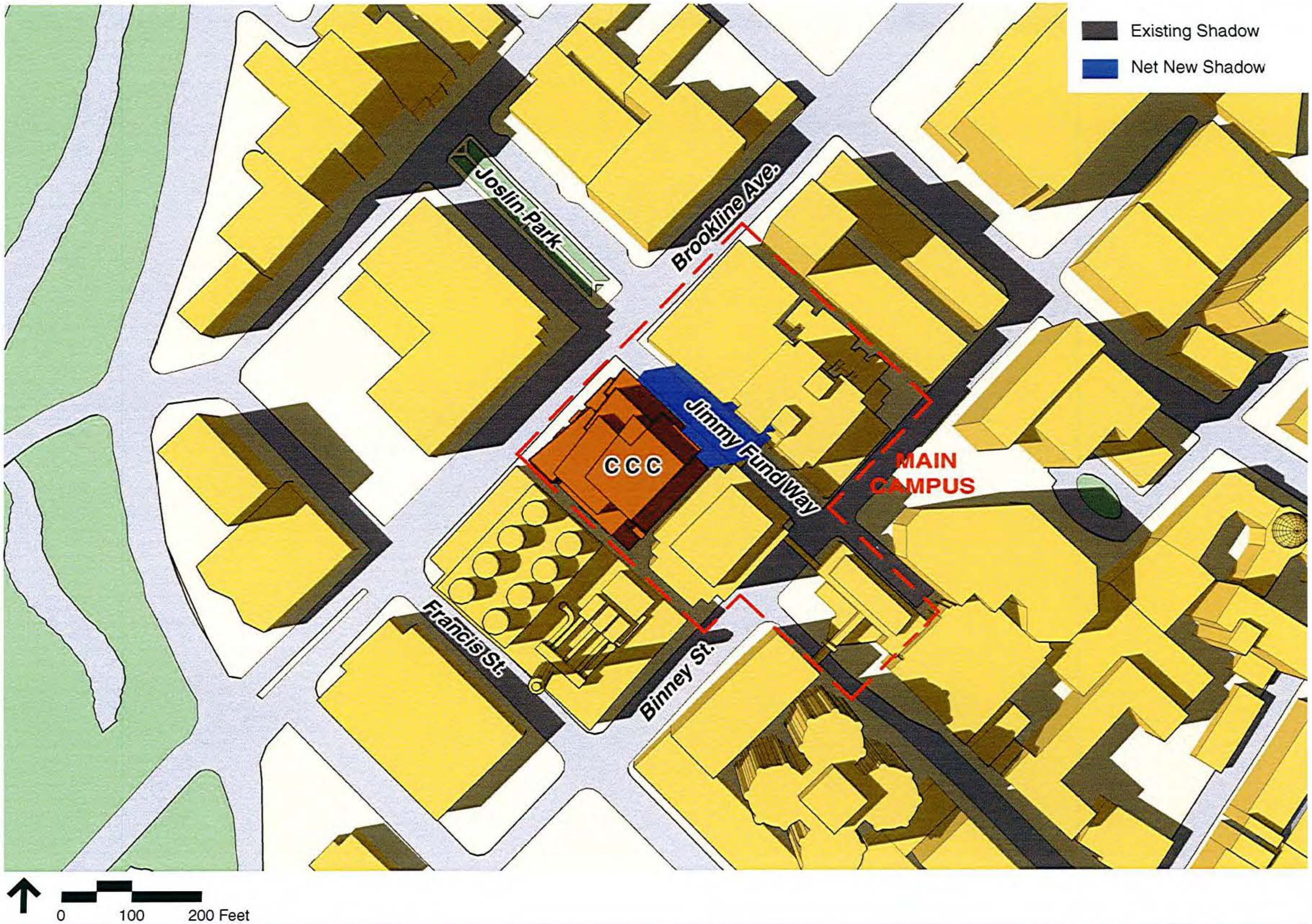
FIGURE 6-9



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
June 21st 12PM

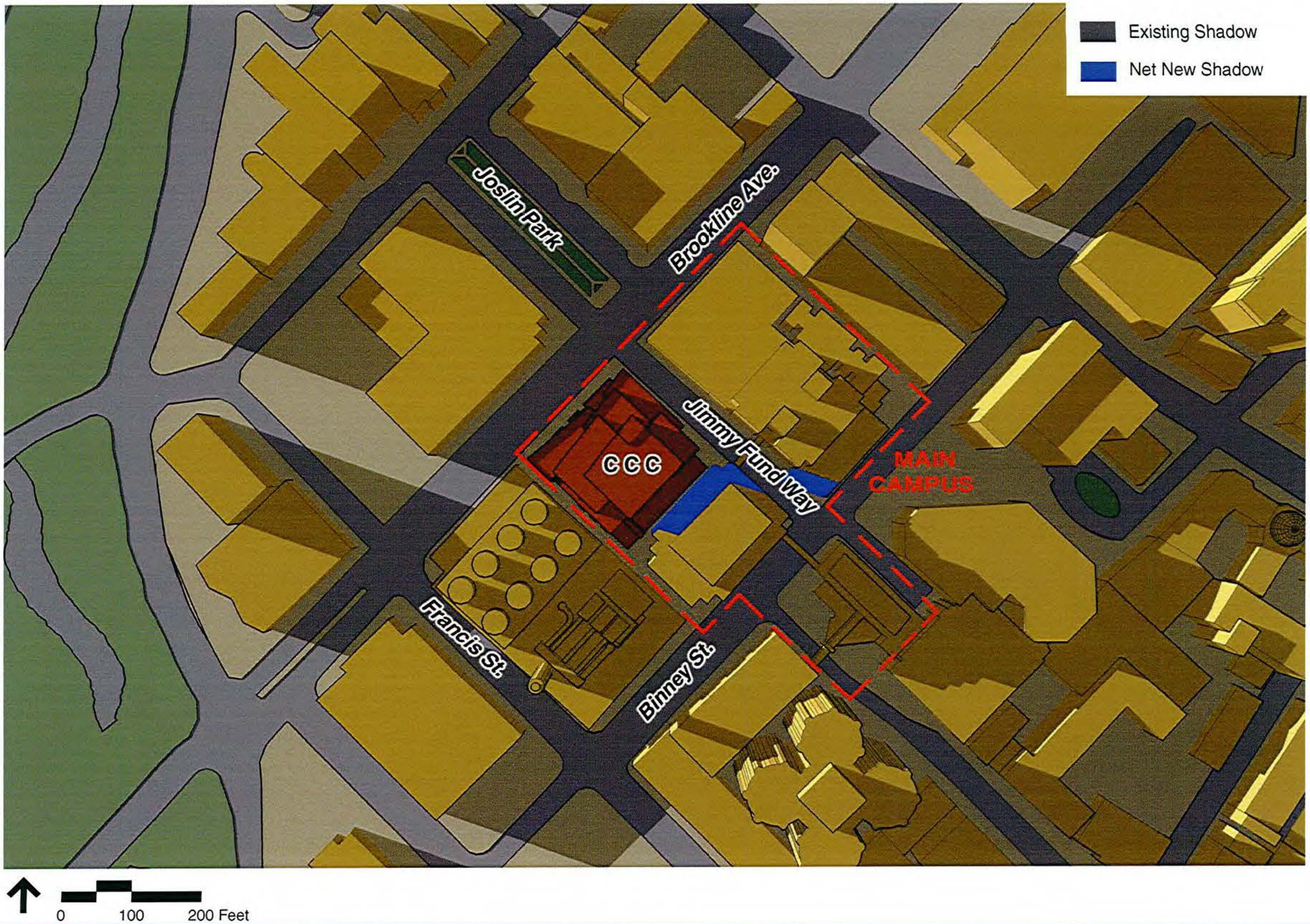
FIGURE 6-10



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
June 21st 3PM

FIGURE 6-11



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

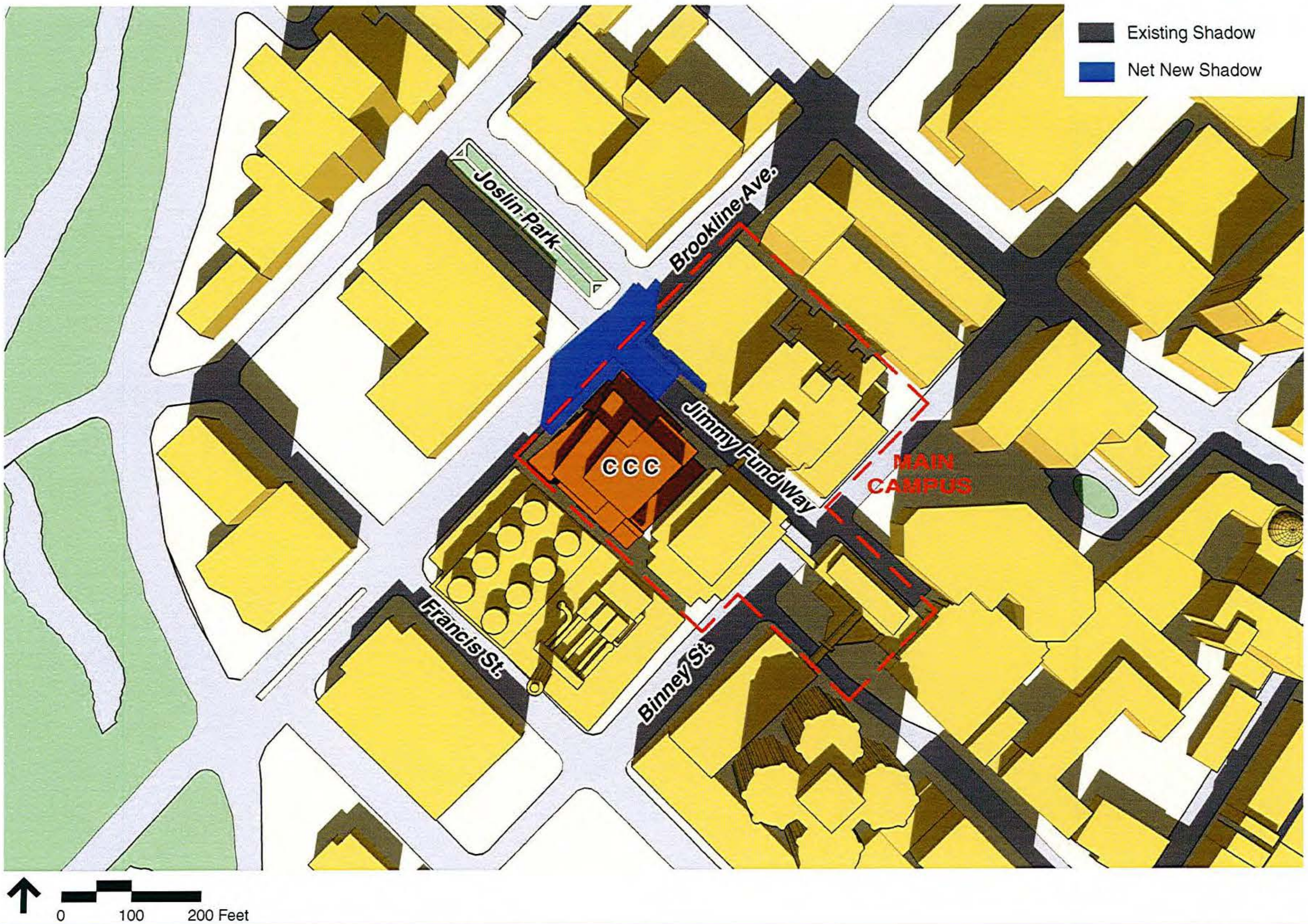
Shadow Impact Analysis
June 21st 6PM

FIGURE 6-12

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
September 21st 9AM

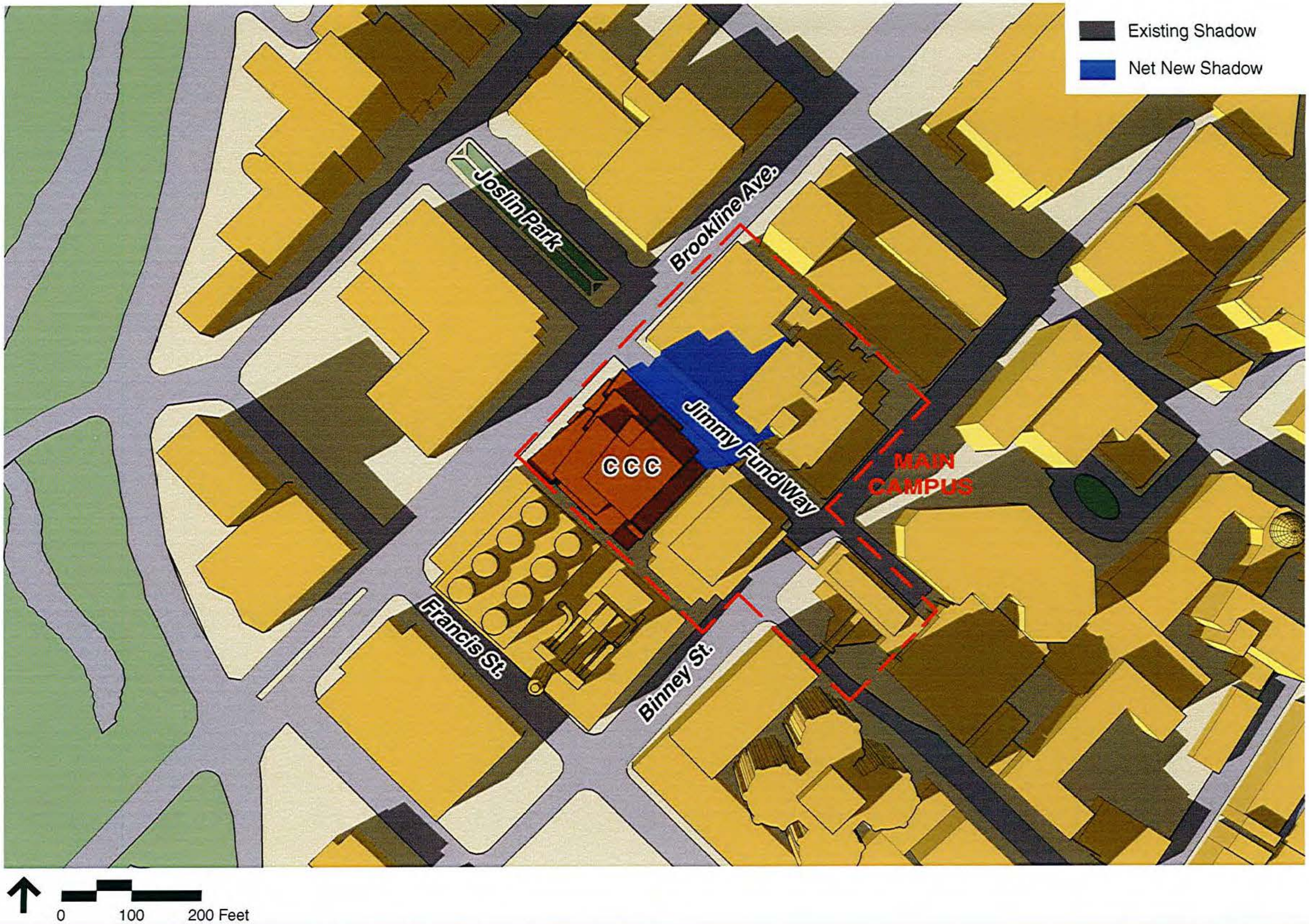
FIGURE 6-13



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
September 21st 12PM

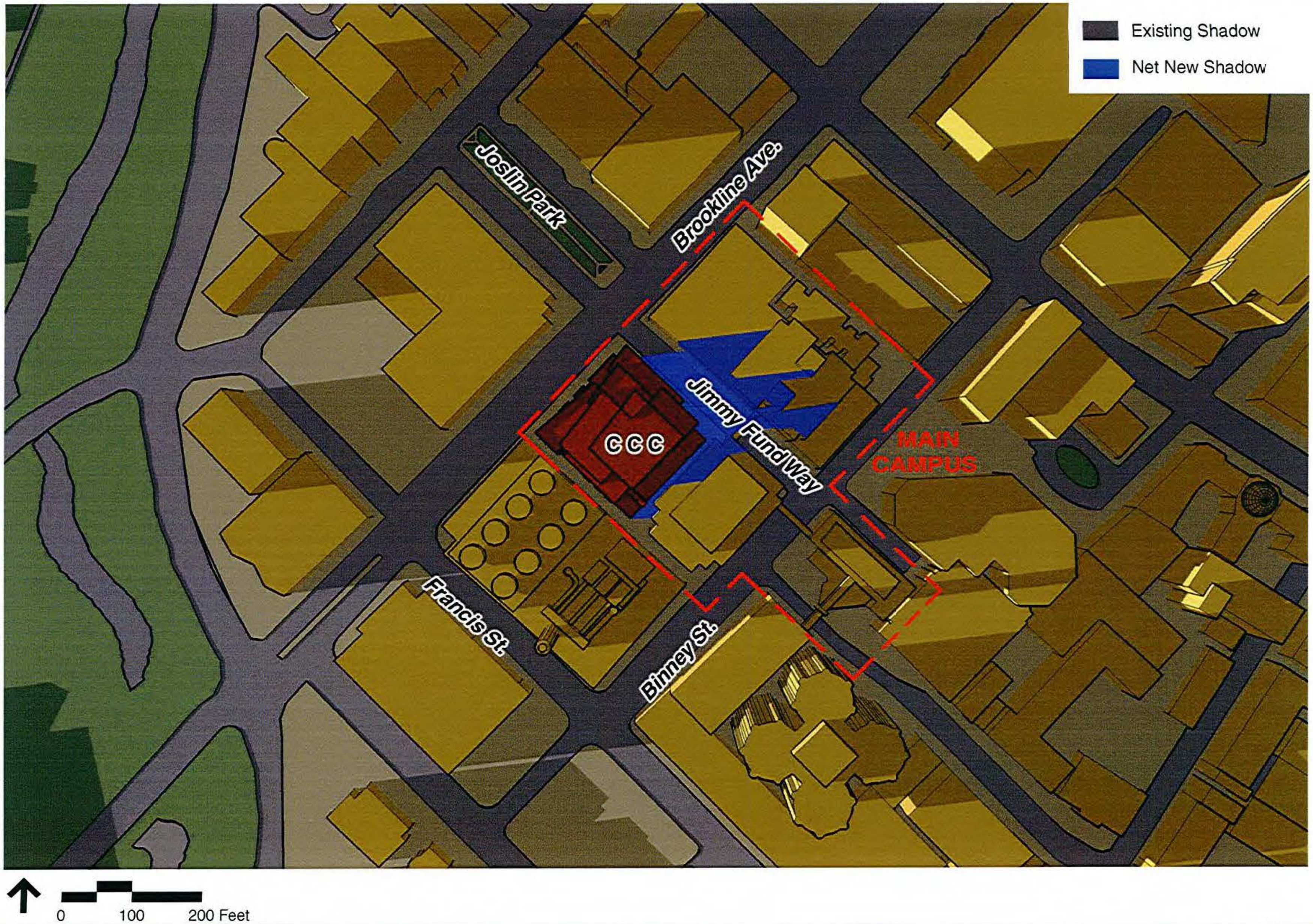
FIGURE 6-14



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
September 21st 3PM

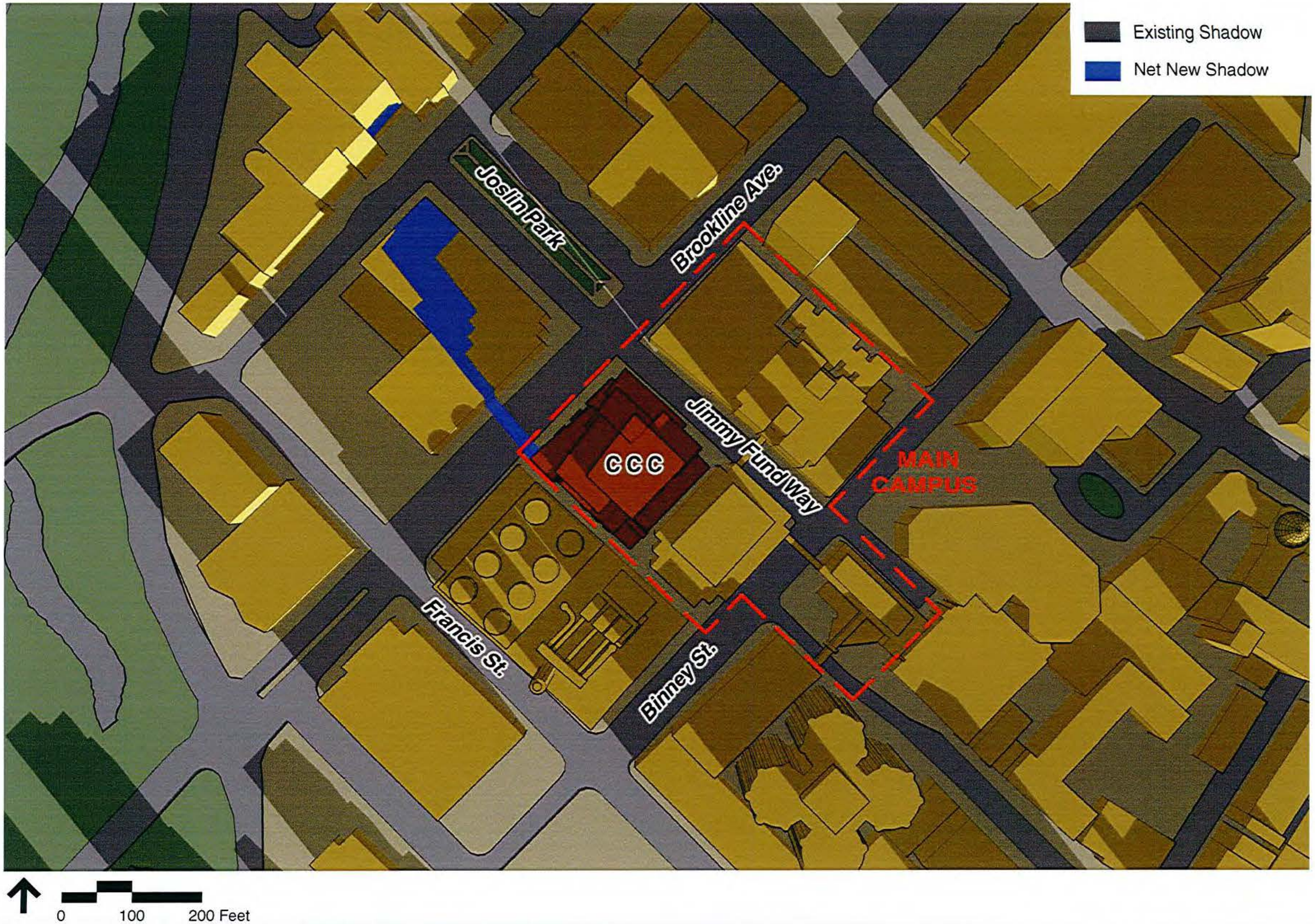
FIGURE 6-15



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
September 21st 6PM

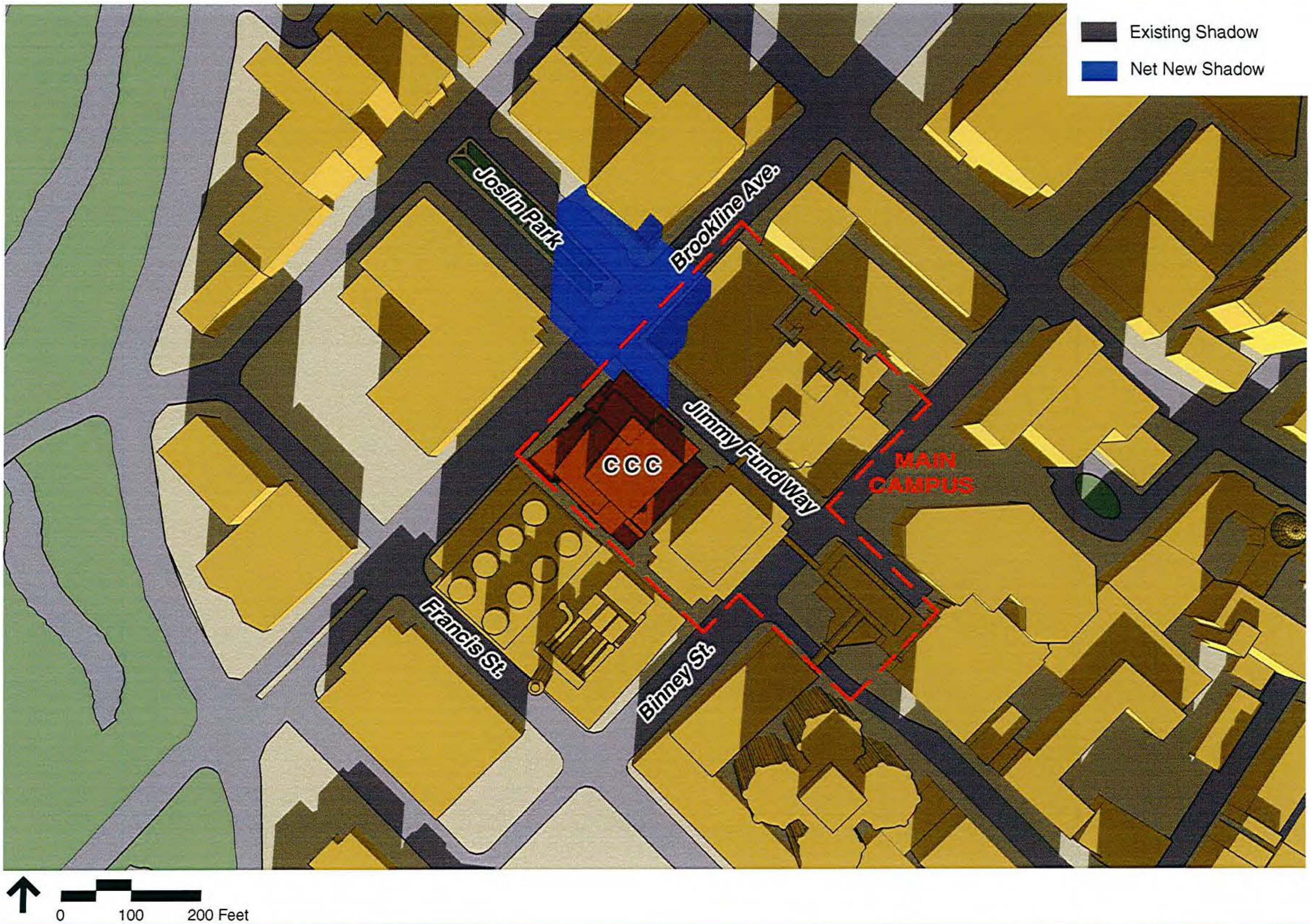
FIGURE 6-16



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
December 21st 9AM

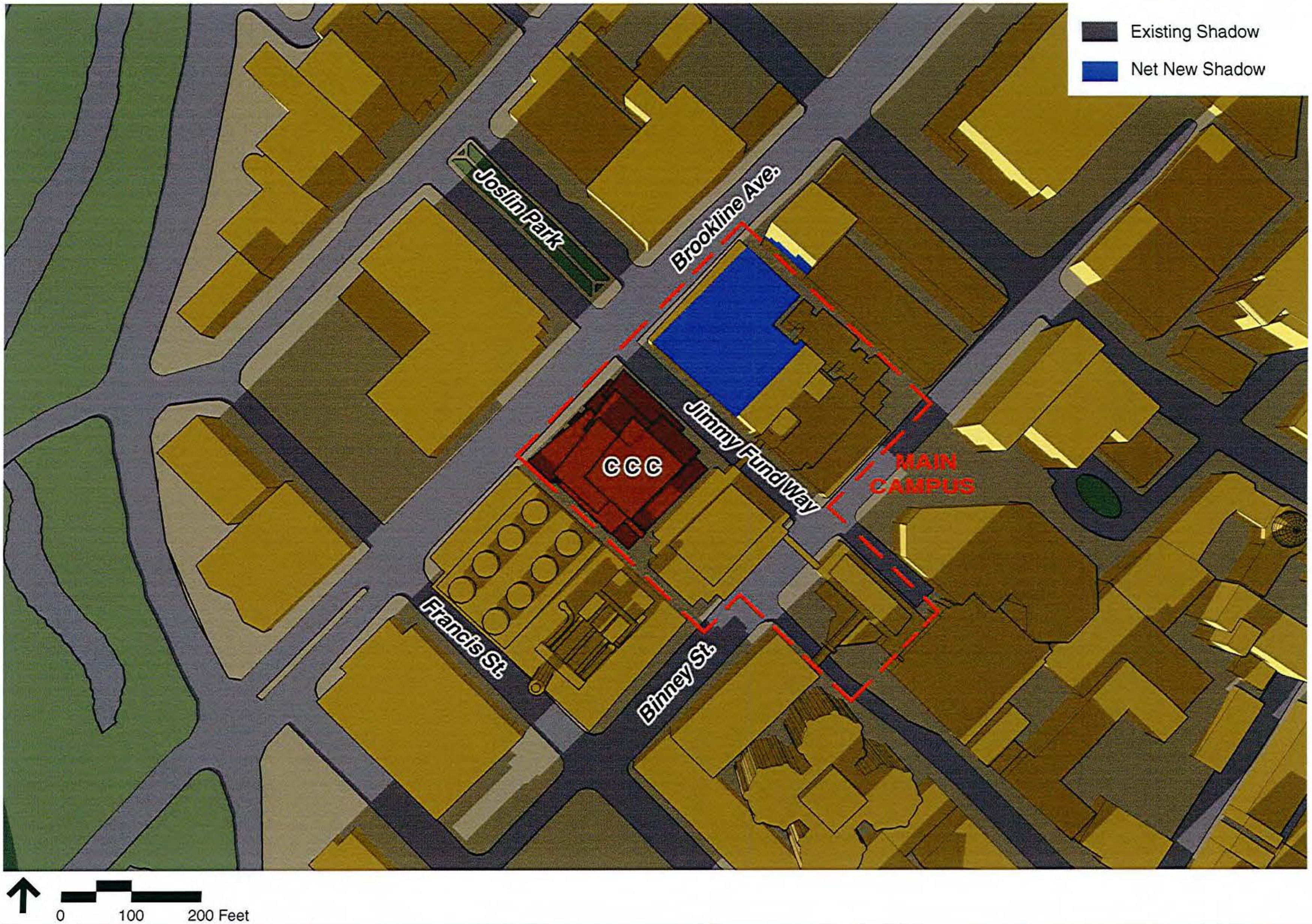
FIGURE 6-17



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
December 21st 12PM

FIGURE 6-18



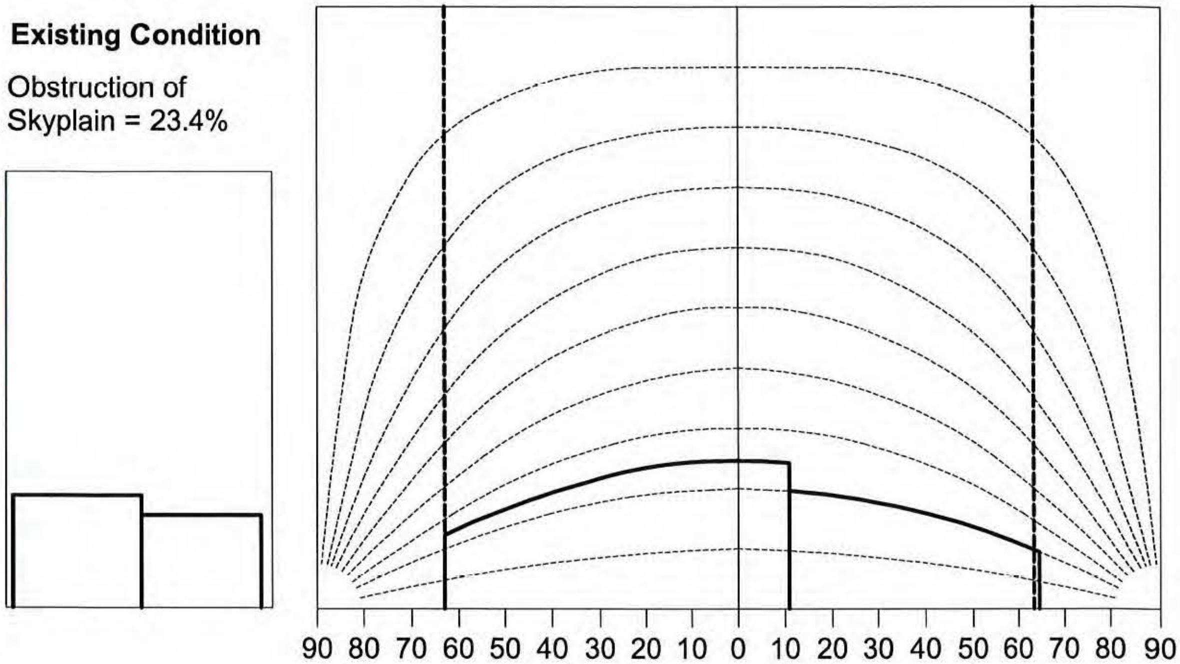
DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Shadow Impact Analysis
December 21st 3PM

FIGURE 6-19

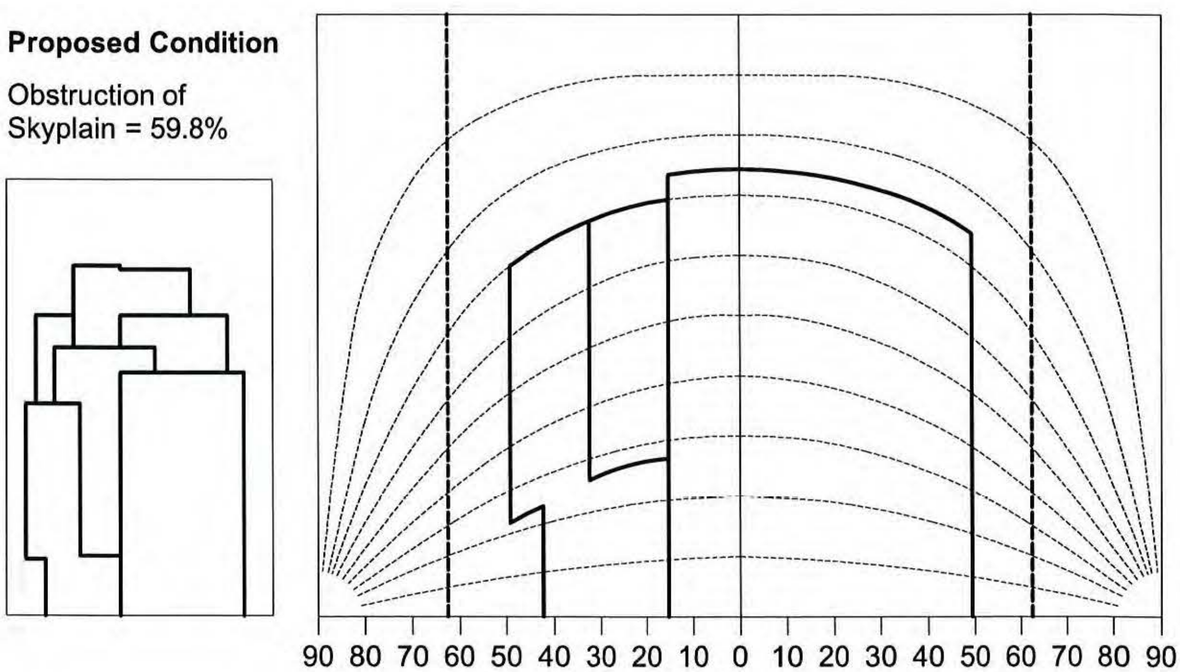
Existing Condition

Obstruction of Skyplain = 23.4%



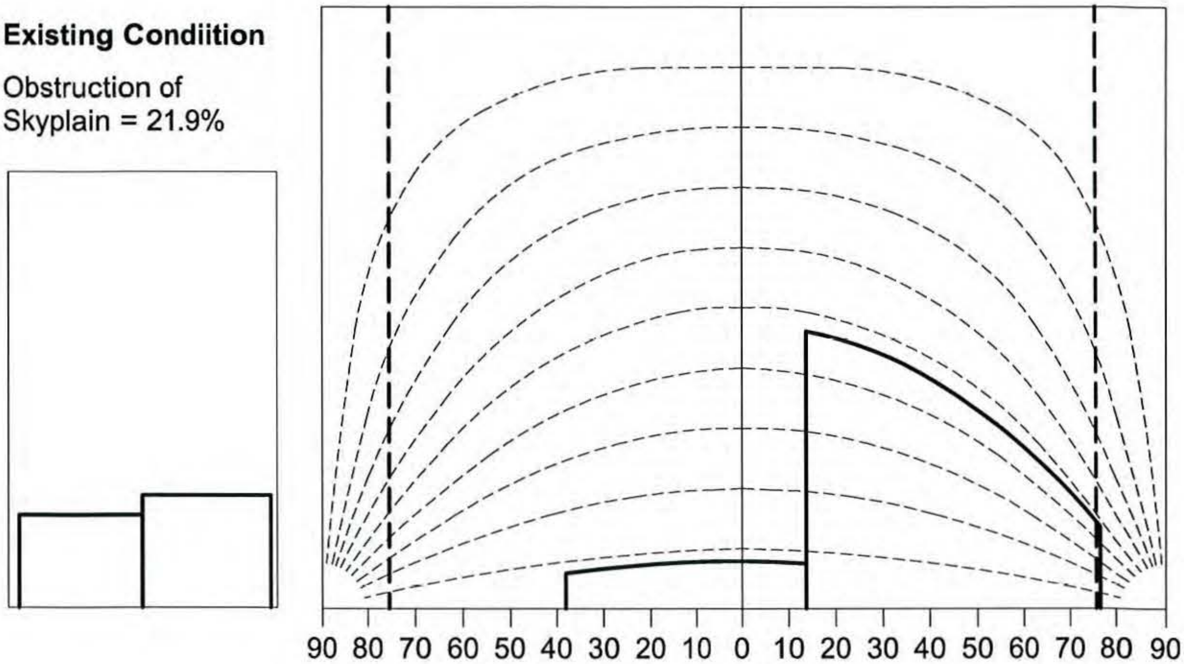
Proposed Condition

Obstruction of Skyplain = 59.8%



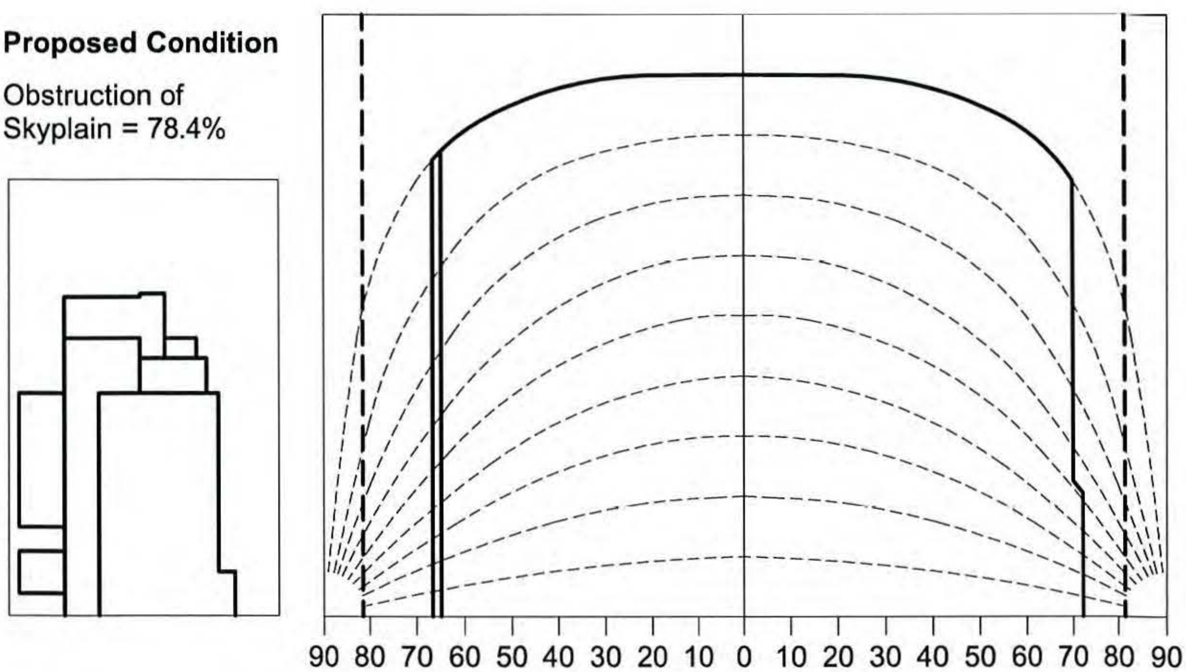
Existing Condiition

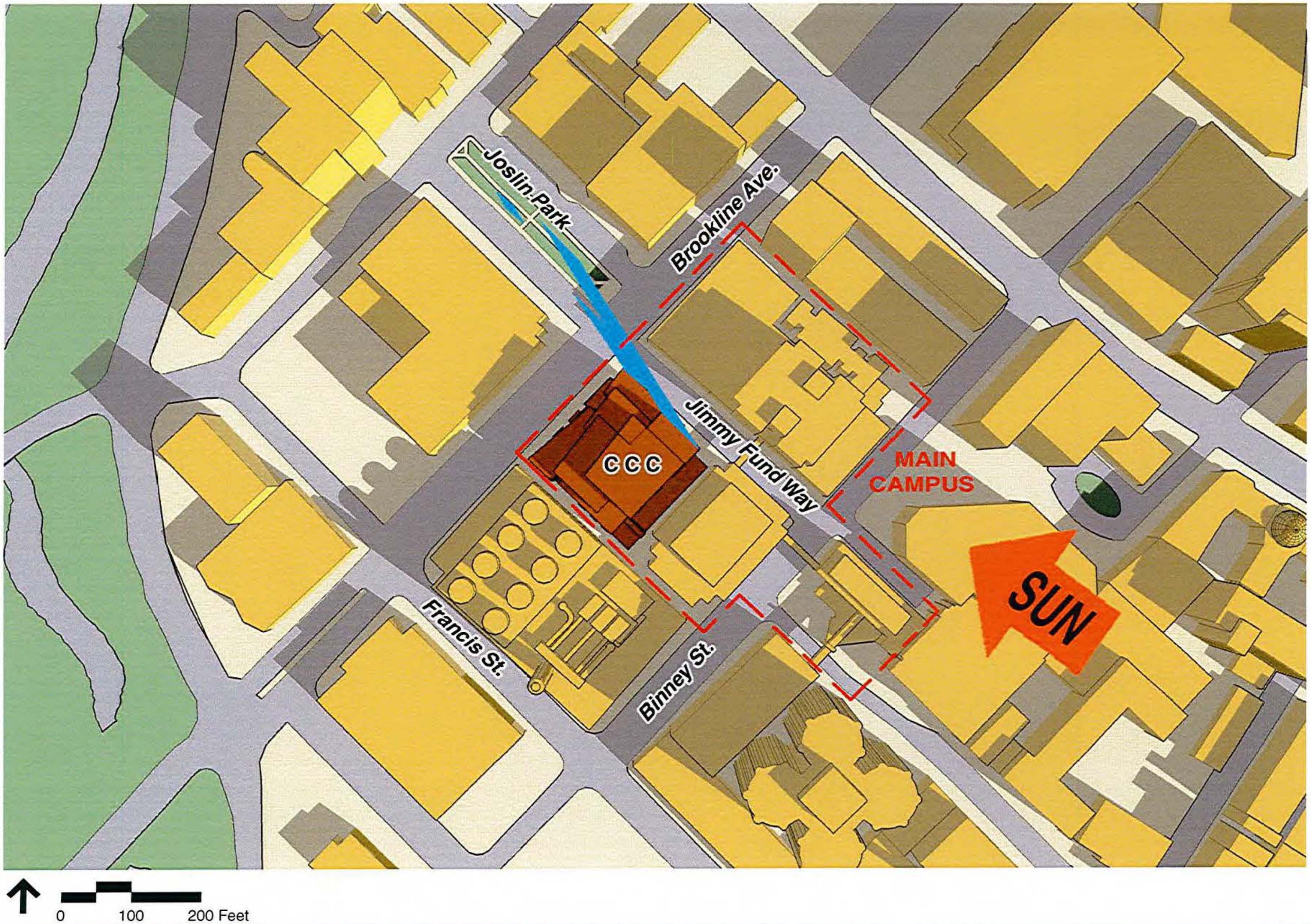
Obstruction of
Skyplain = 21.9%



Proposed Condition

Obstruction of
Skyplain = 78.4%

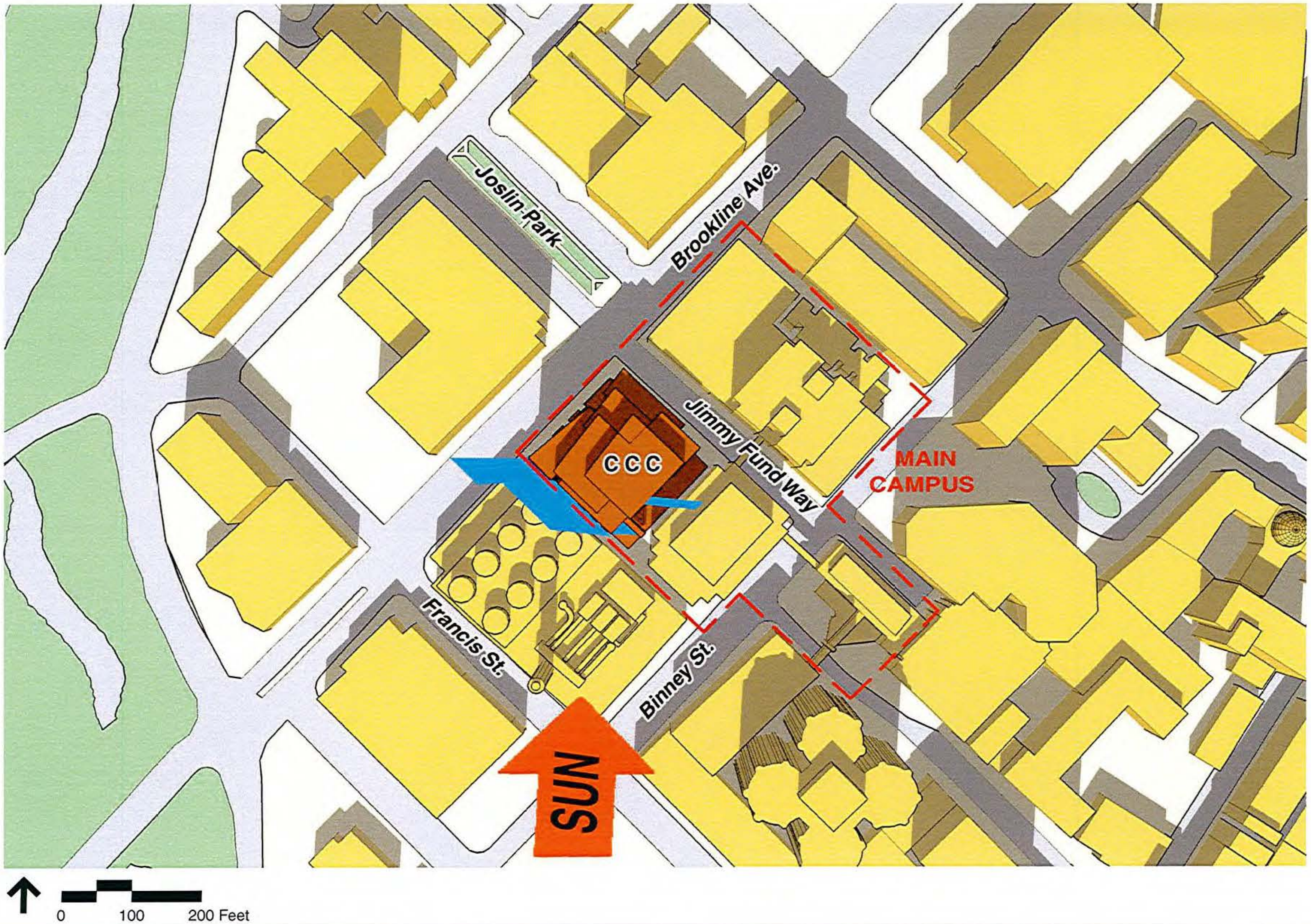




DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
March 21st 9AM

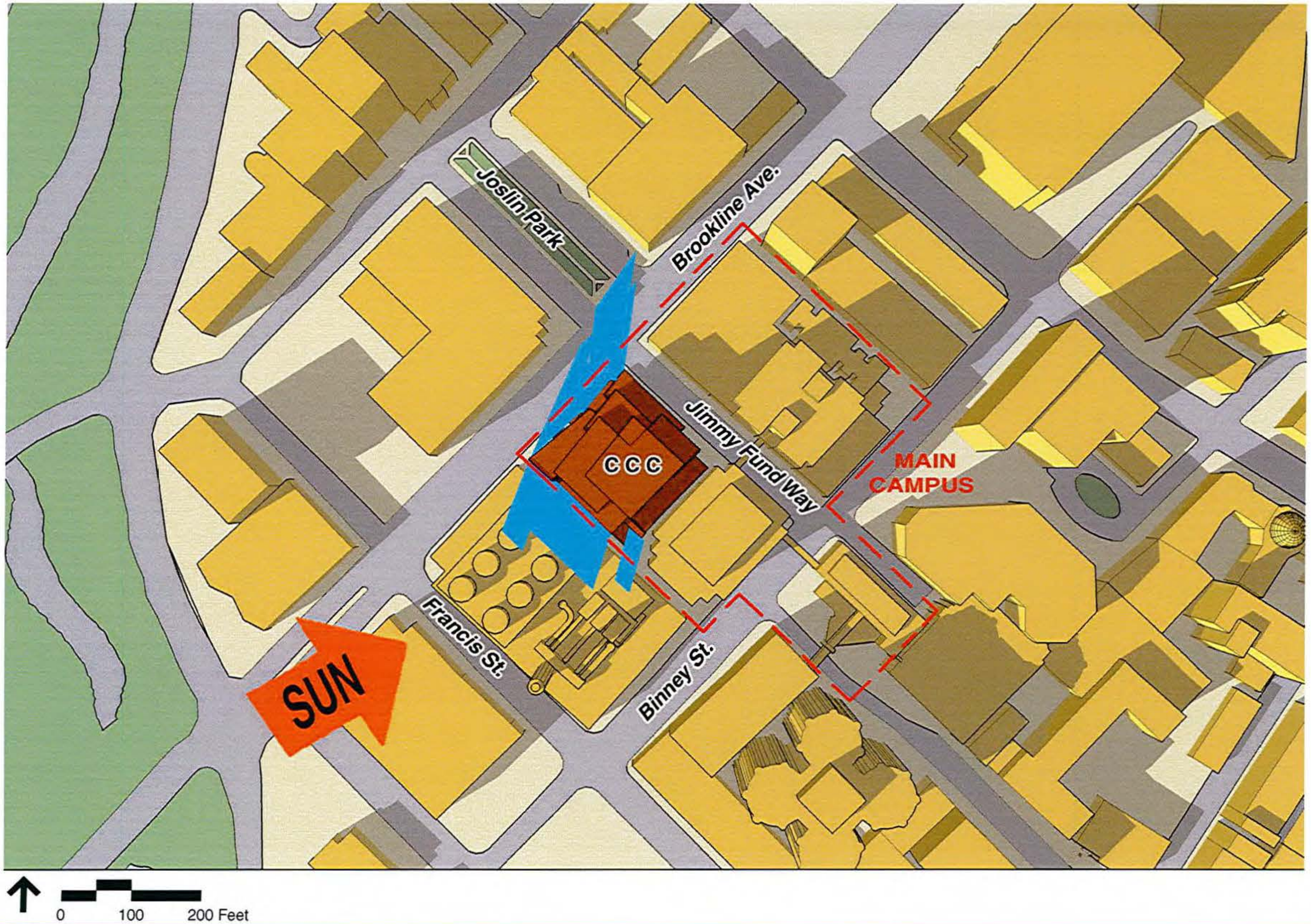
FIGURE 6-22



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

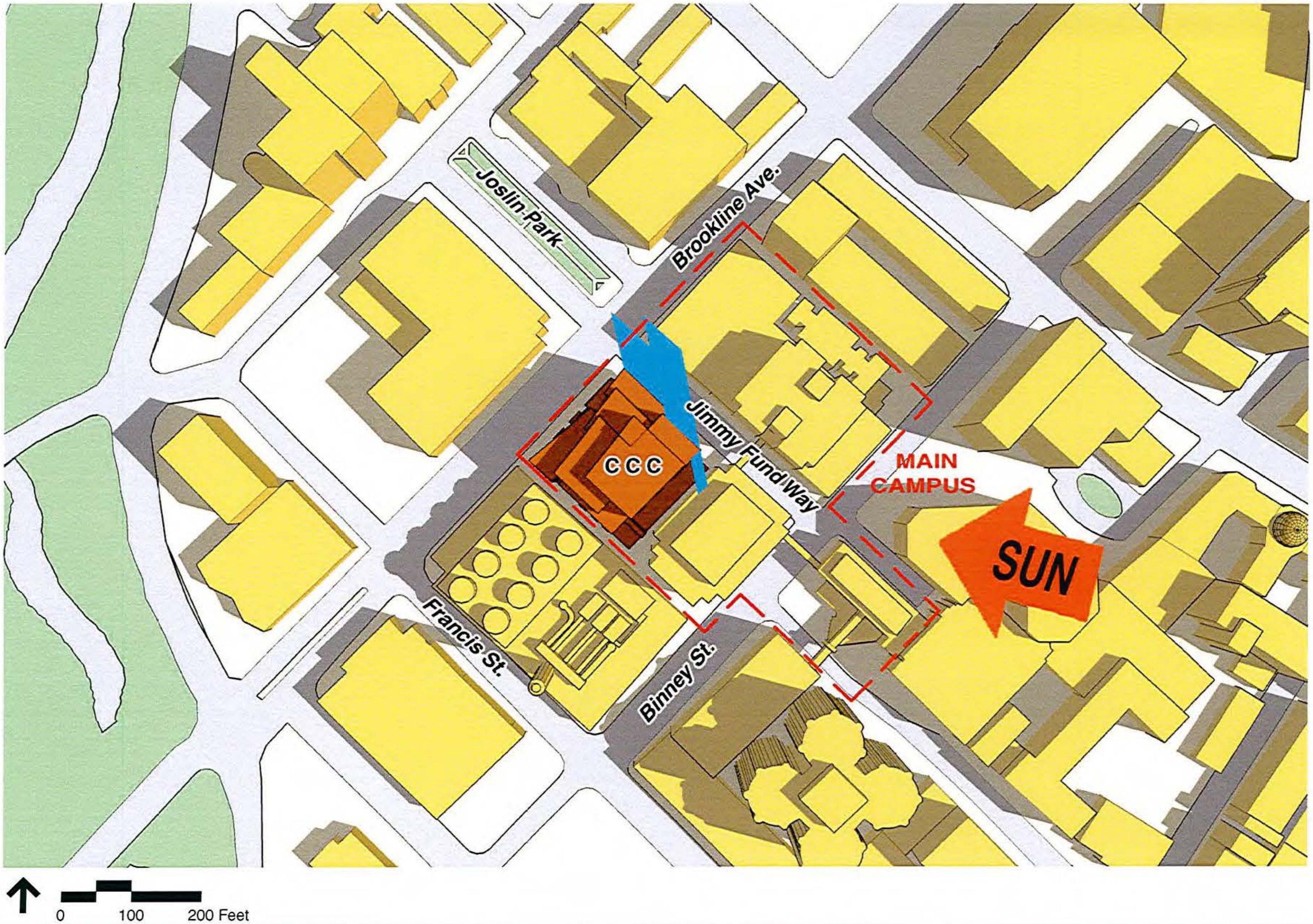
Solar Glare Analysis
March 21st 12PM

FIGURE 6-23



Solar Glare Analysis
March 21st 3PM

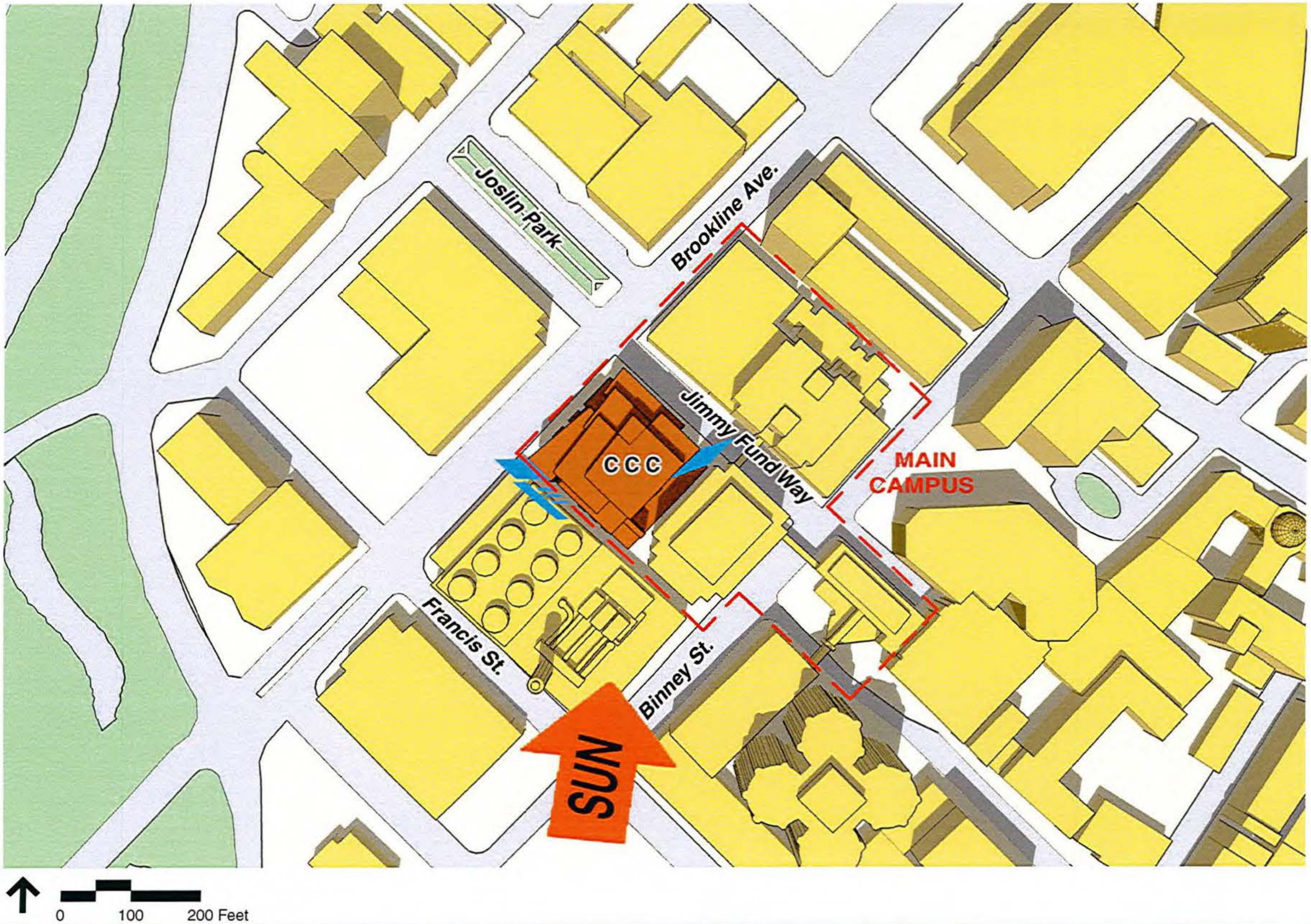
FIGURE 6-24



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
June 21st 9AM

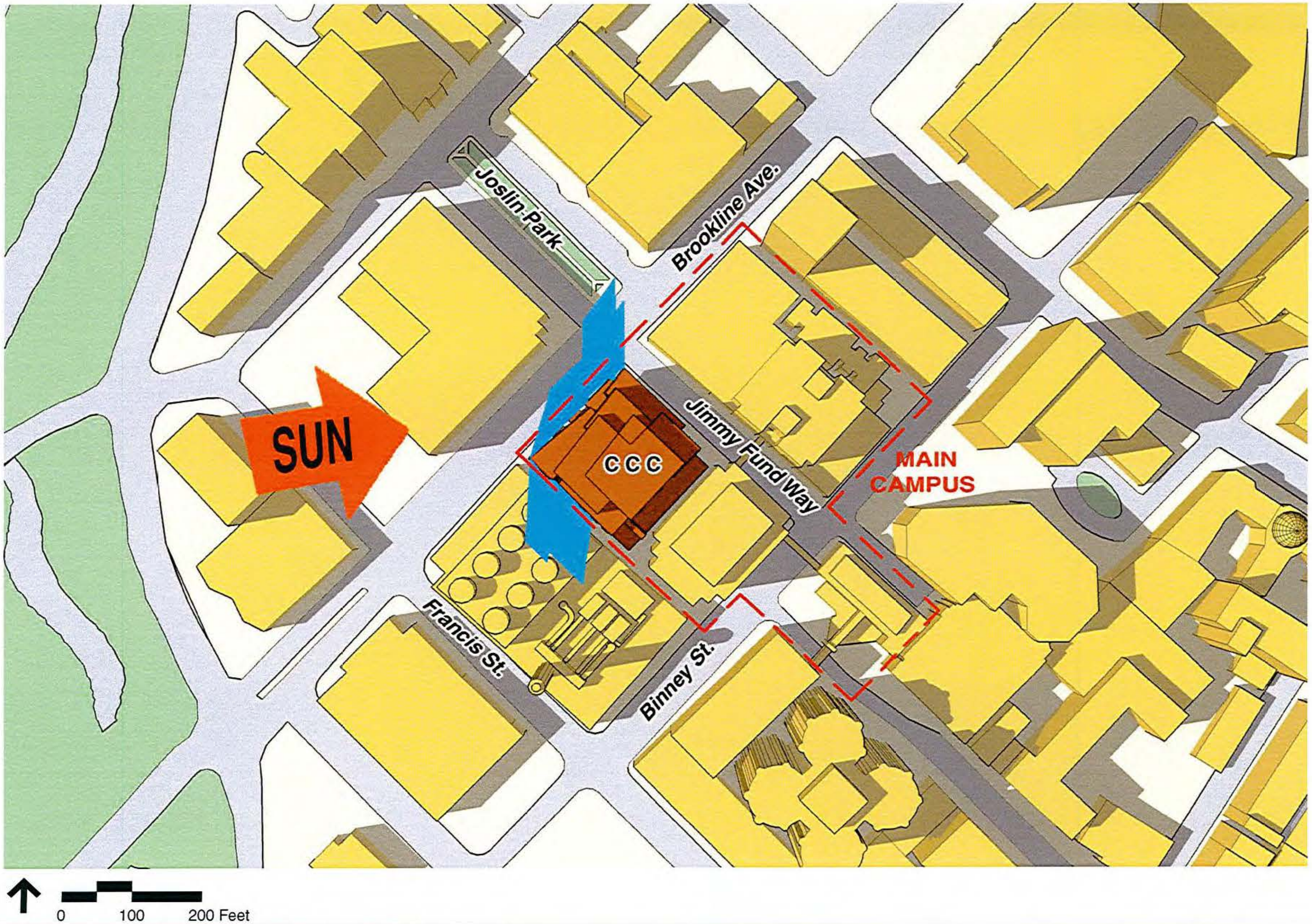
FIGURE 6-25



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
June 21st 12PM

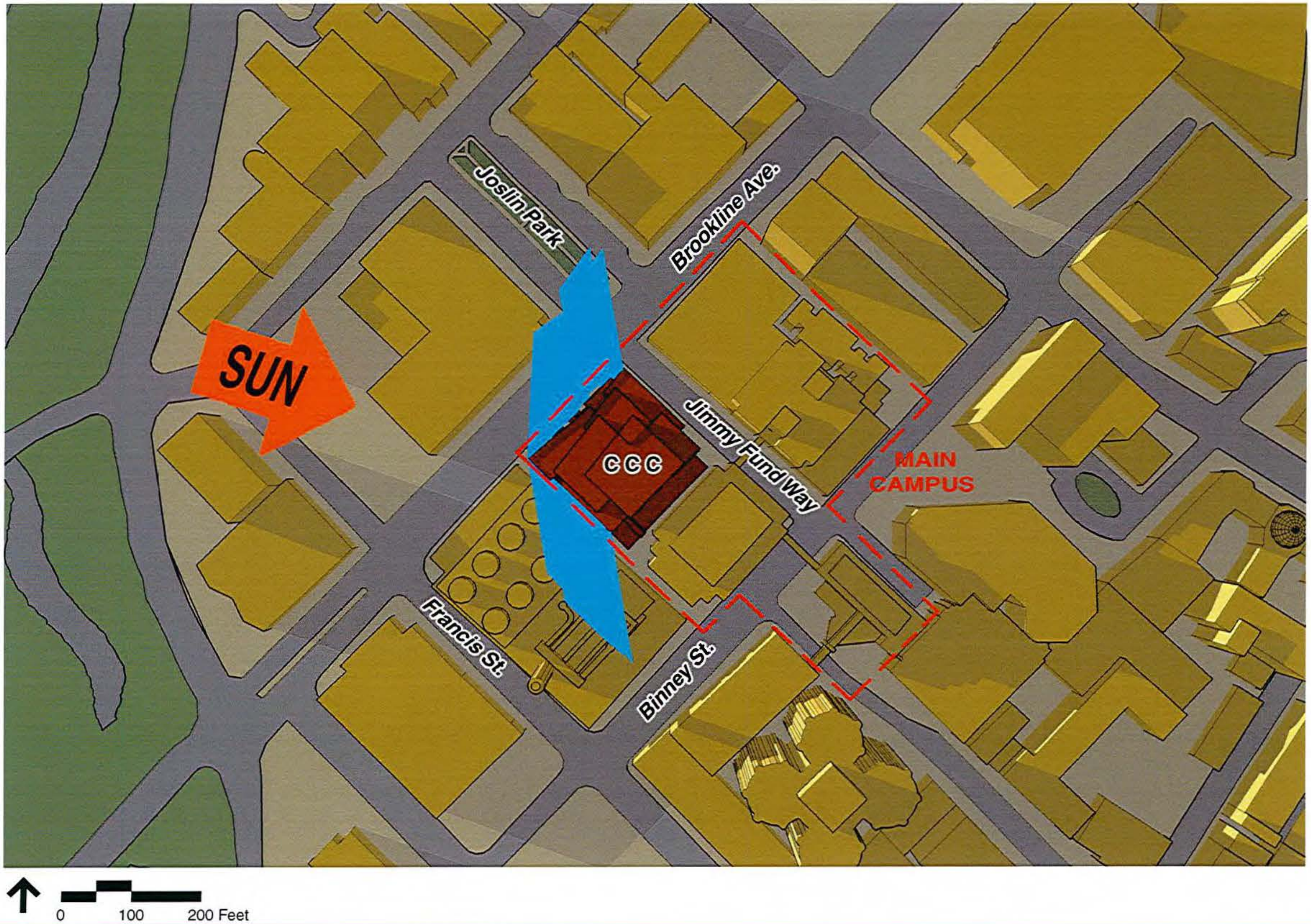
FIGURE 6-26



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
June 21st 3PM

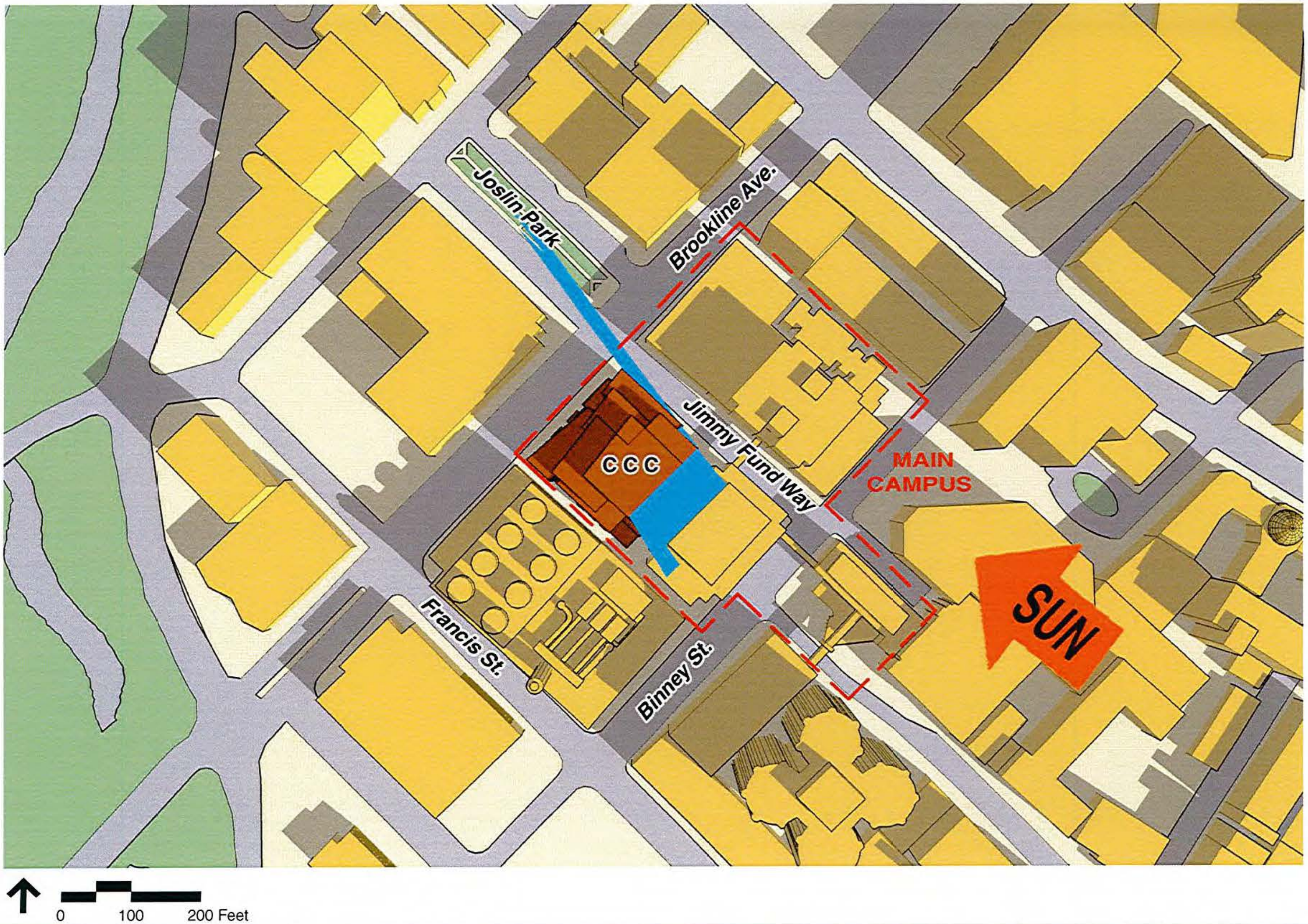
FIGURE 6-27



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
June 21st 6PM

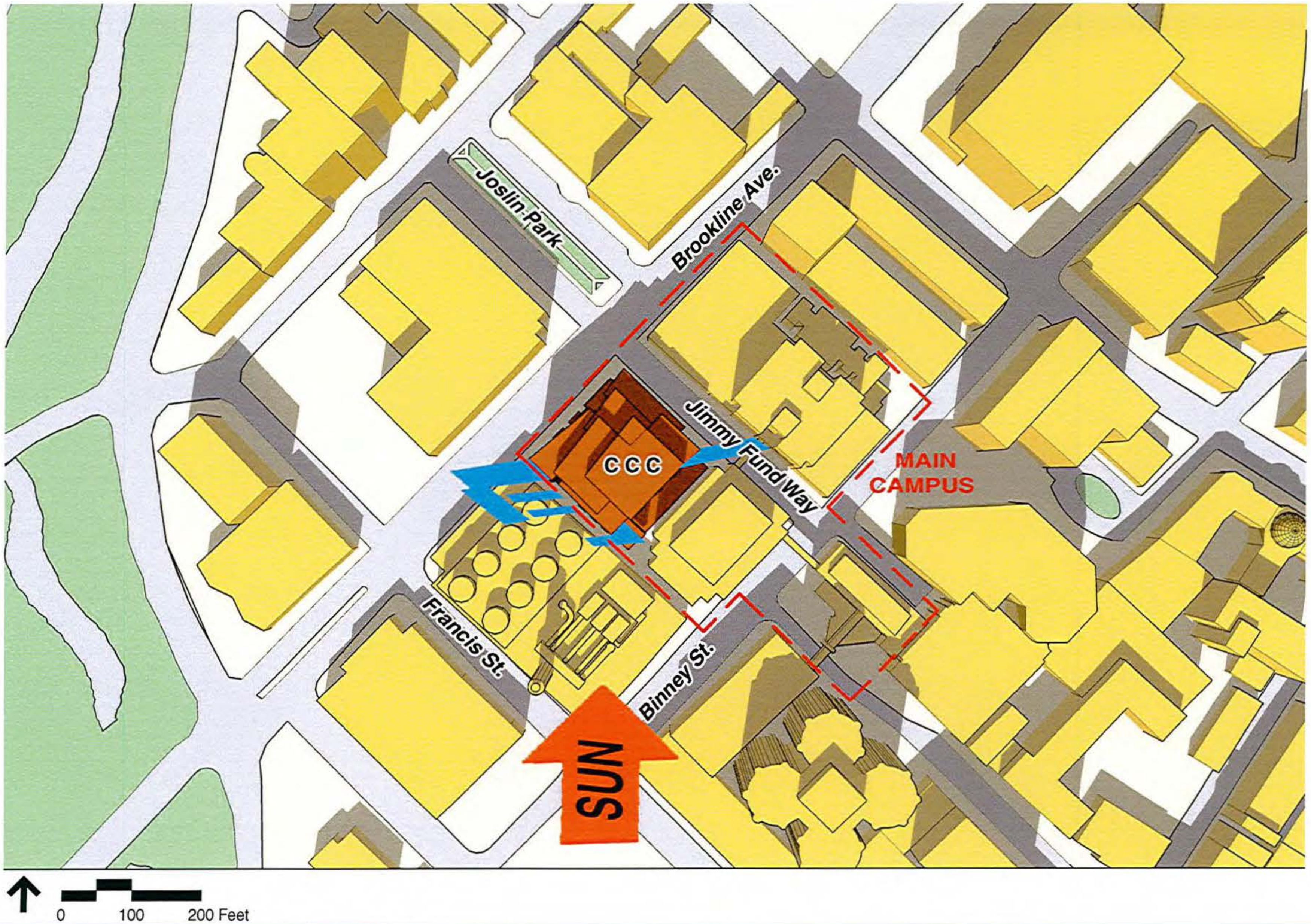
FIGURE 6-28



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
September 21st 9AM

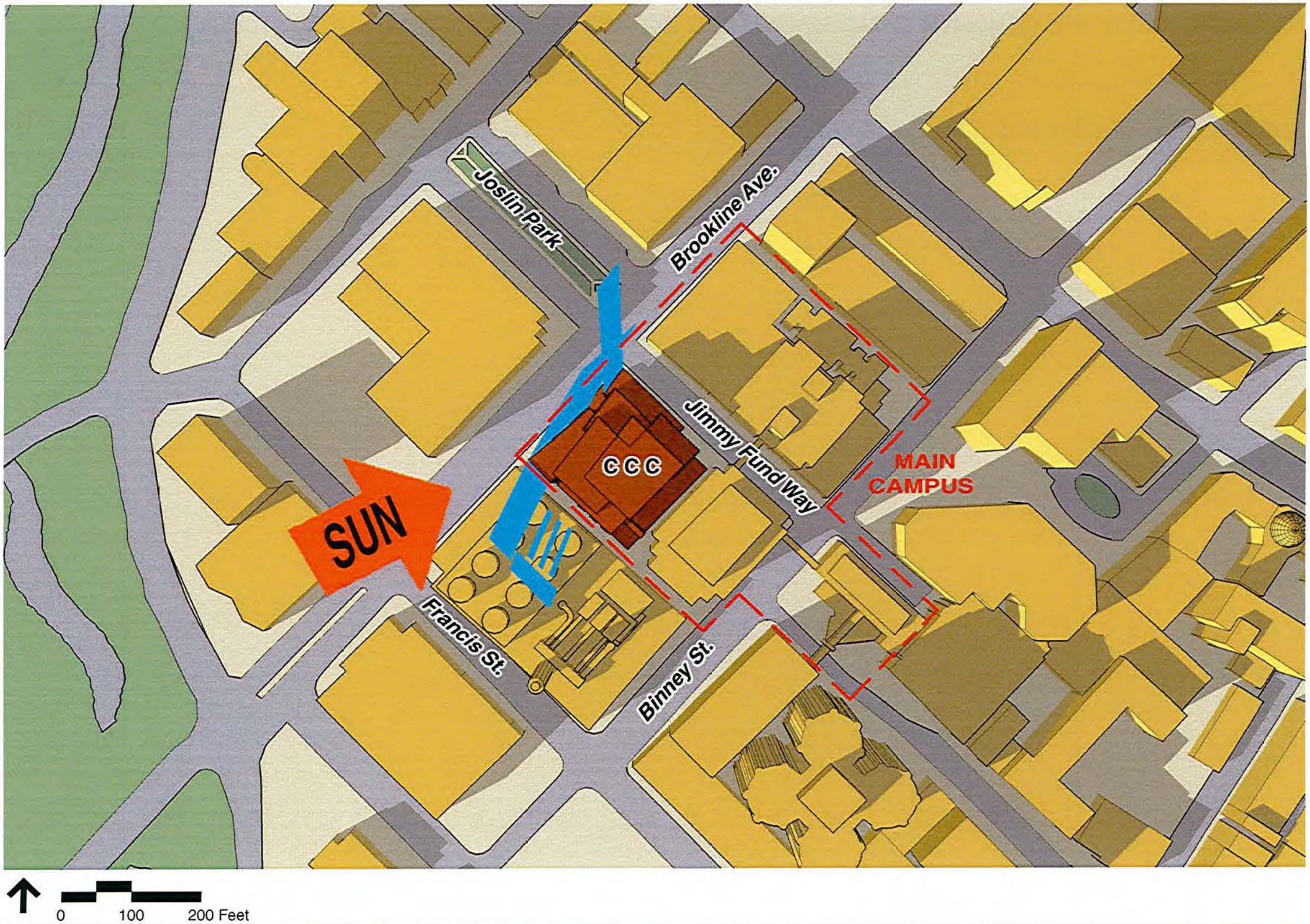
FIGURE 6-29



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
September 21st 12PM

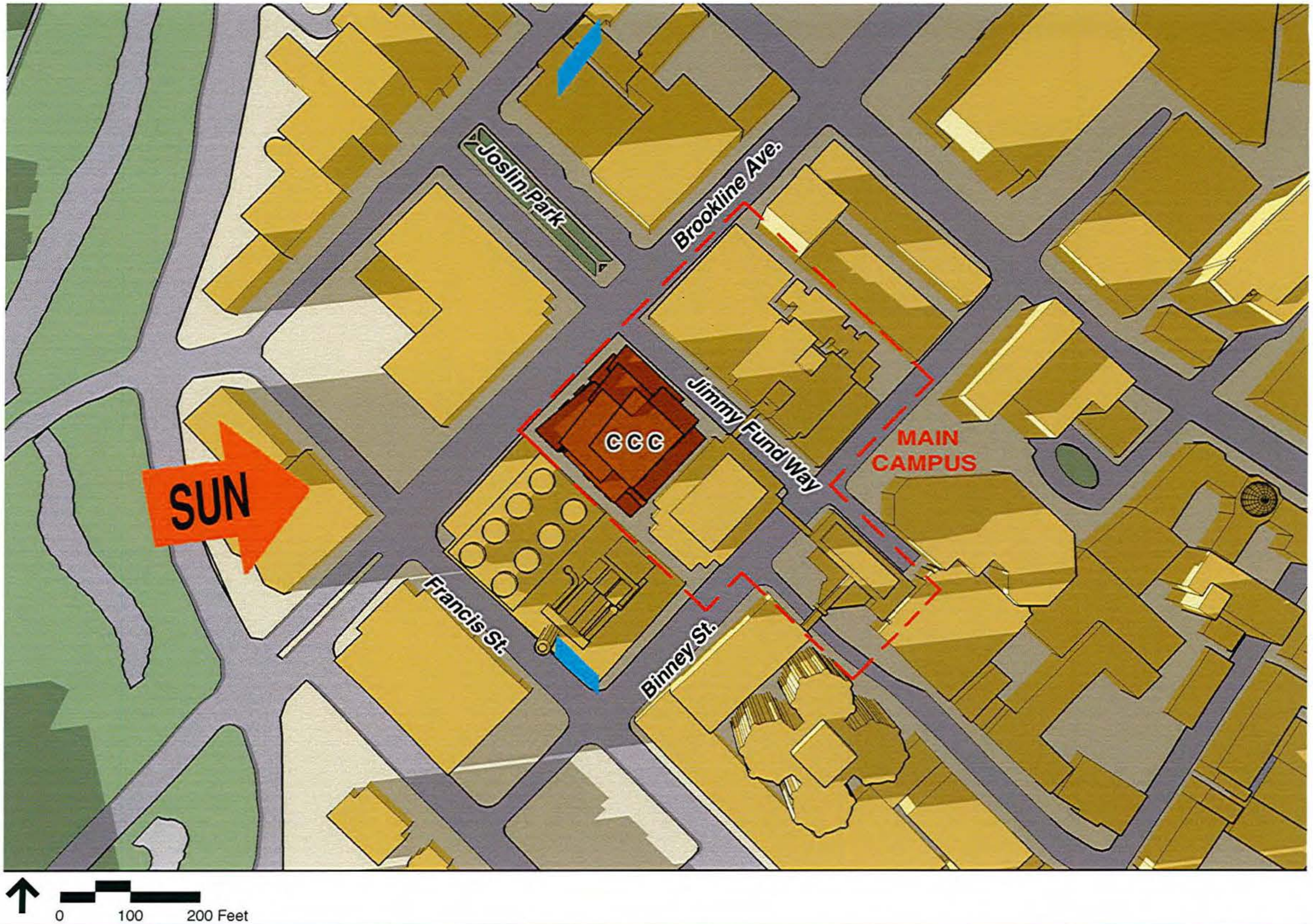
FIGURE 6-30



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
September 21st 3PM

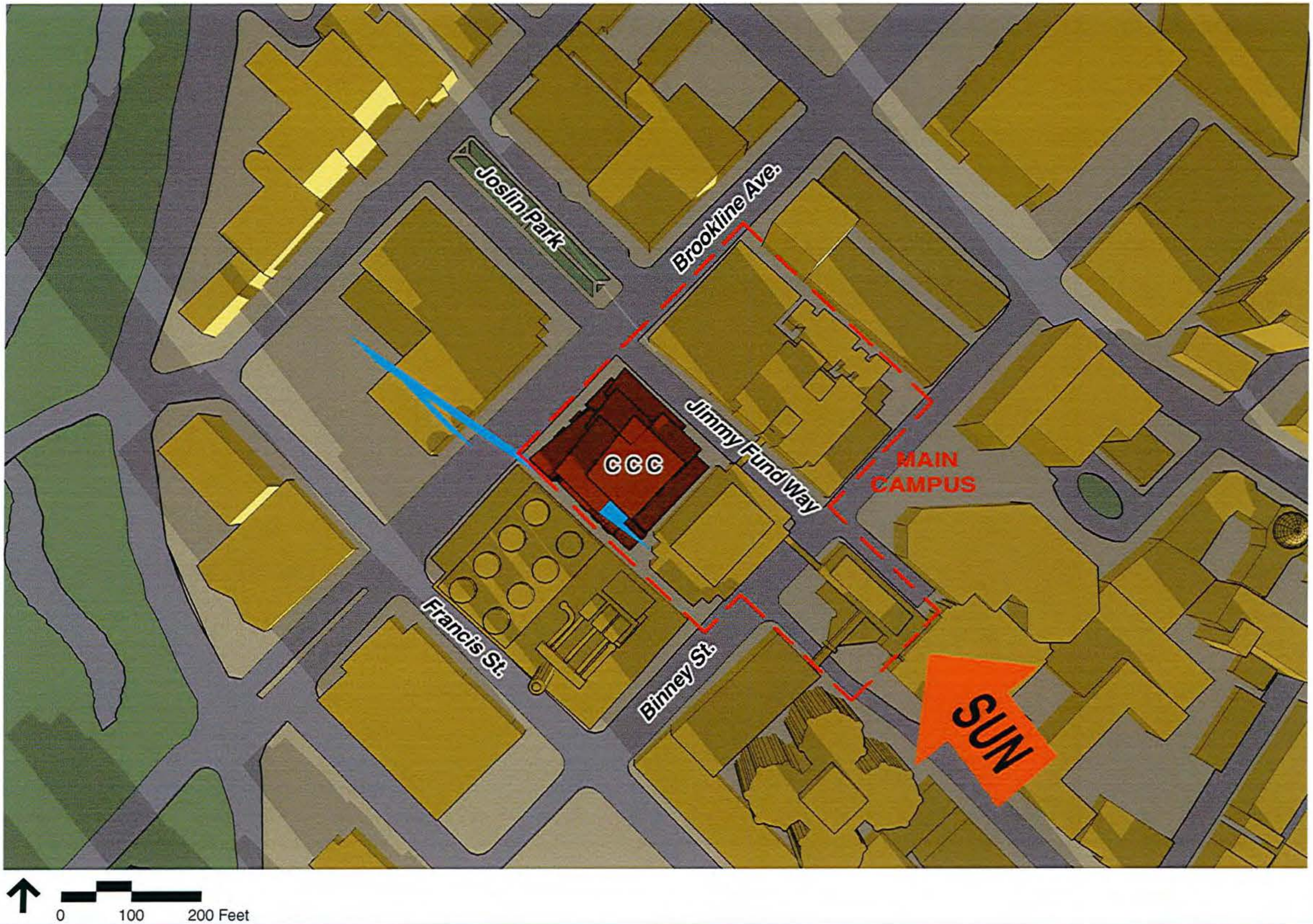
FIGURE 6-31



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
September 21st 6PM

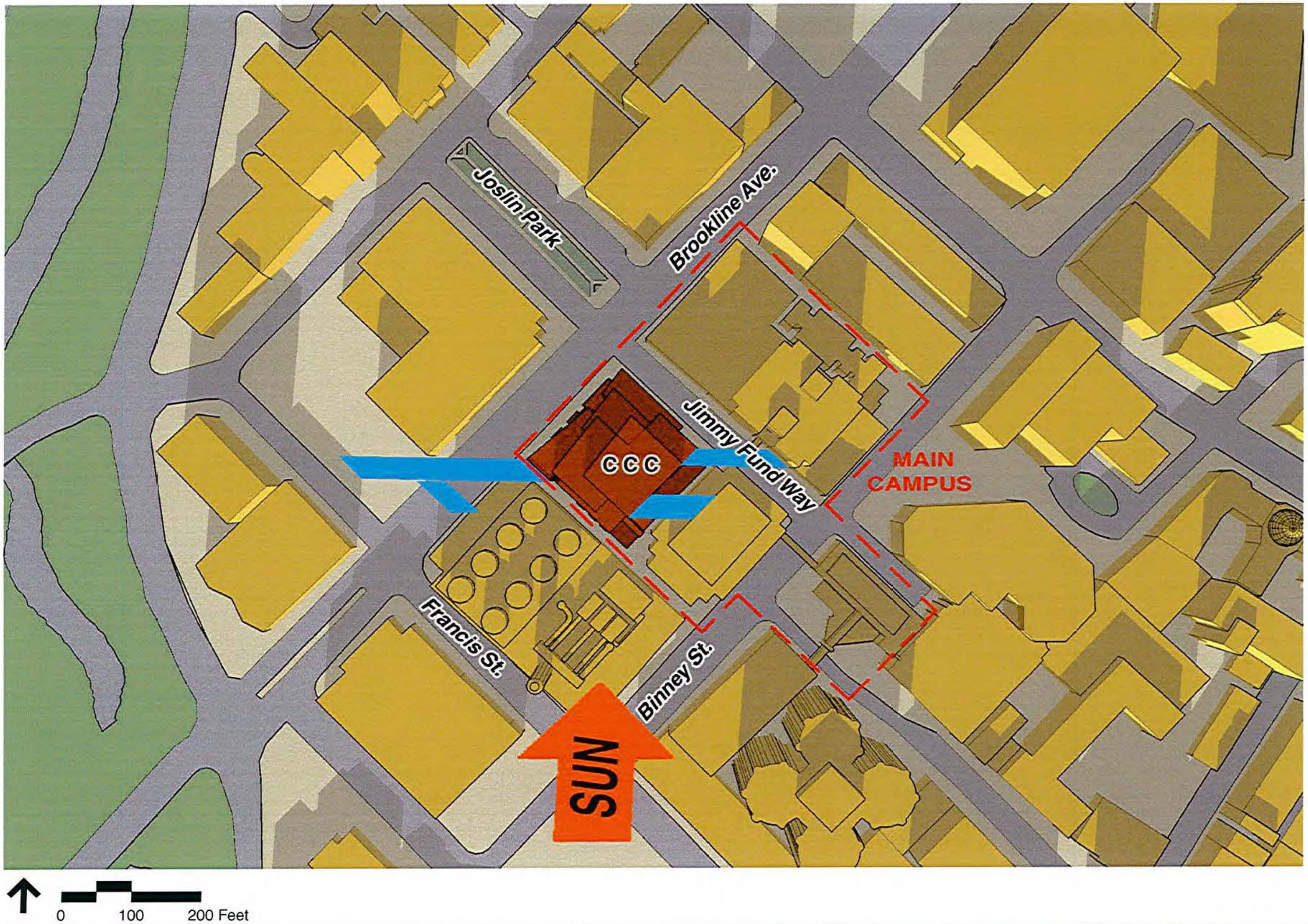
FIGURE 6-32



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
December 21st 9AM

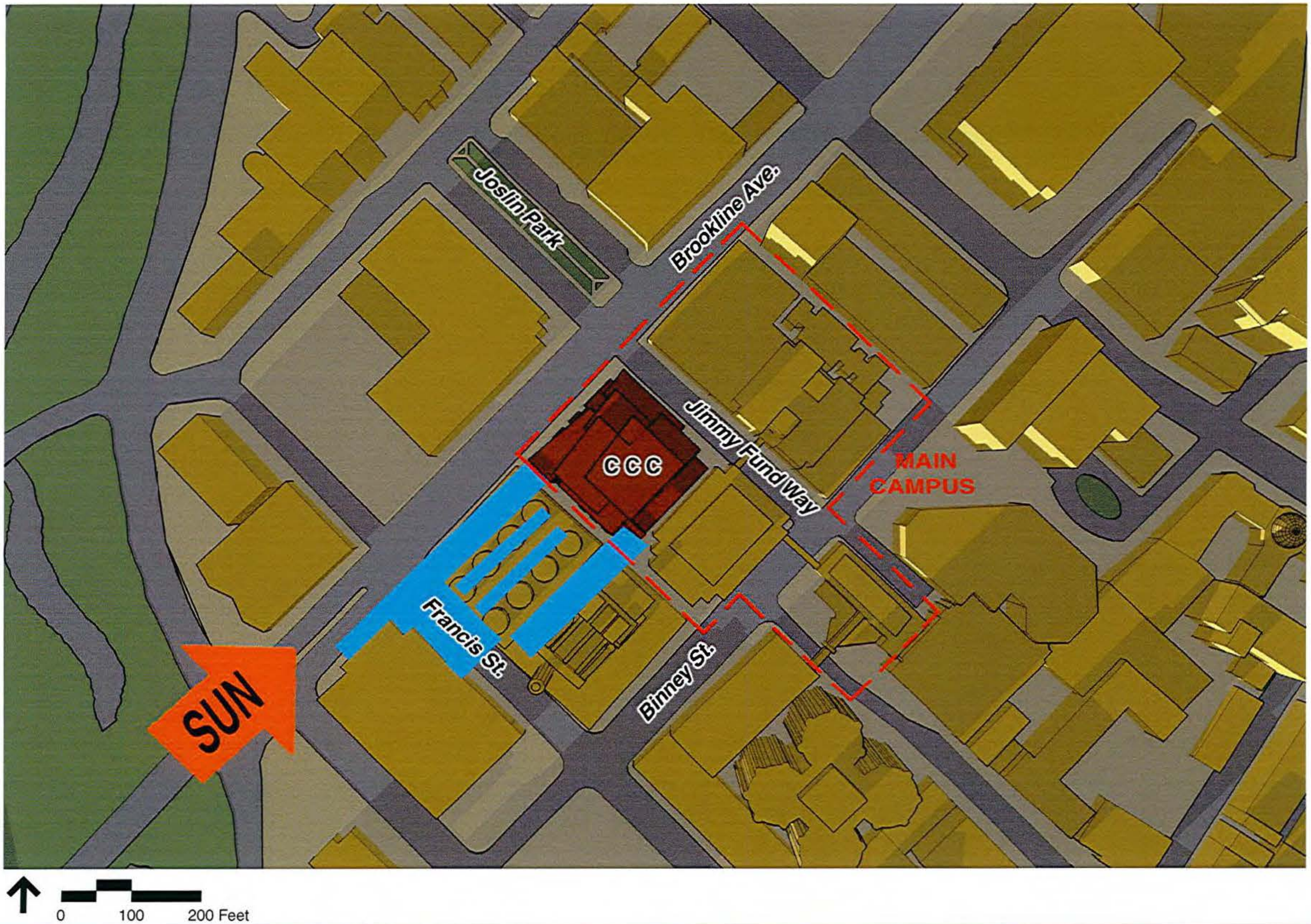
FIGURE 6-33



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
December 21st 12PM

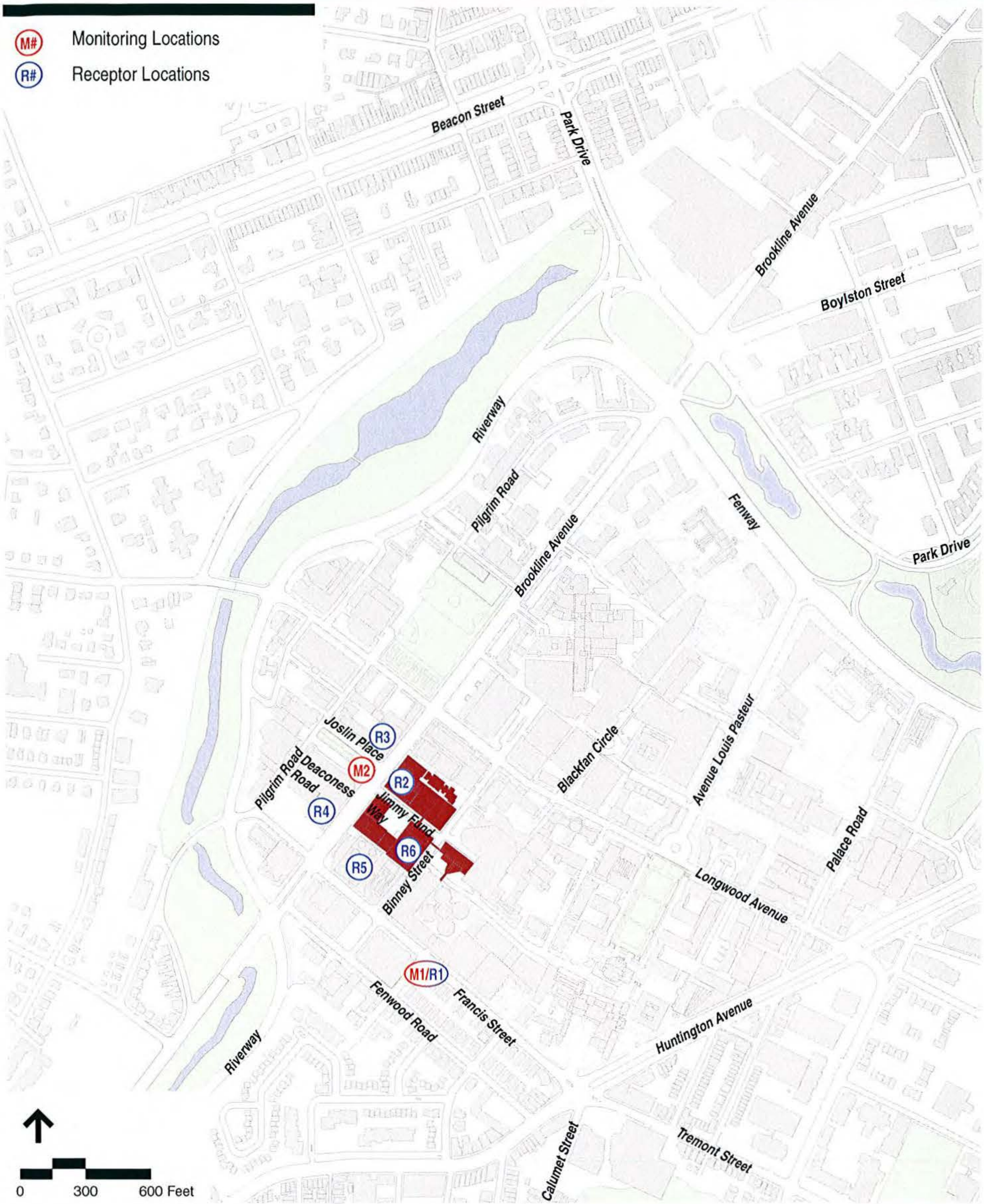
FIGURE 6-34



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Solar Glare Analysis
December 21st 3PM

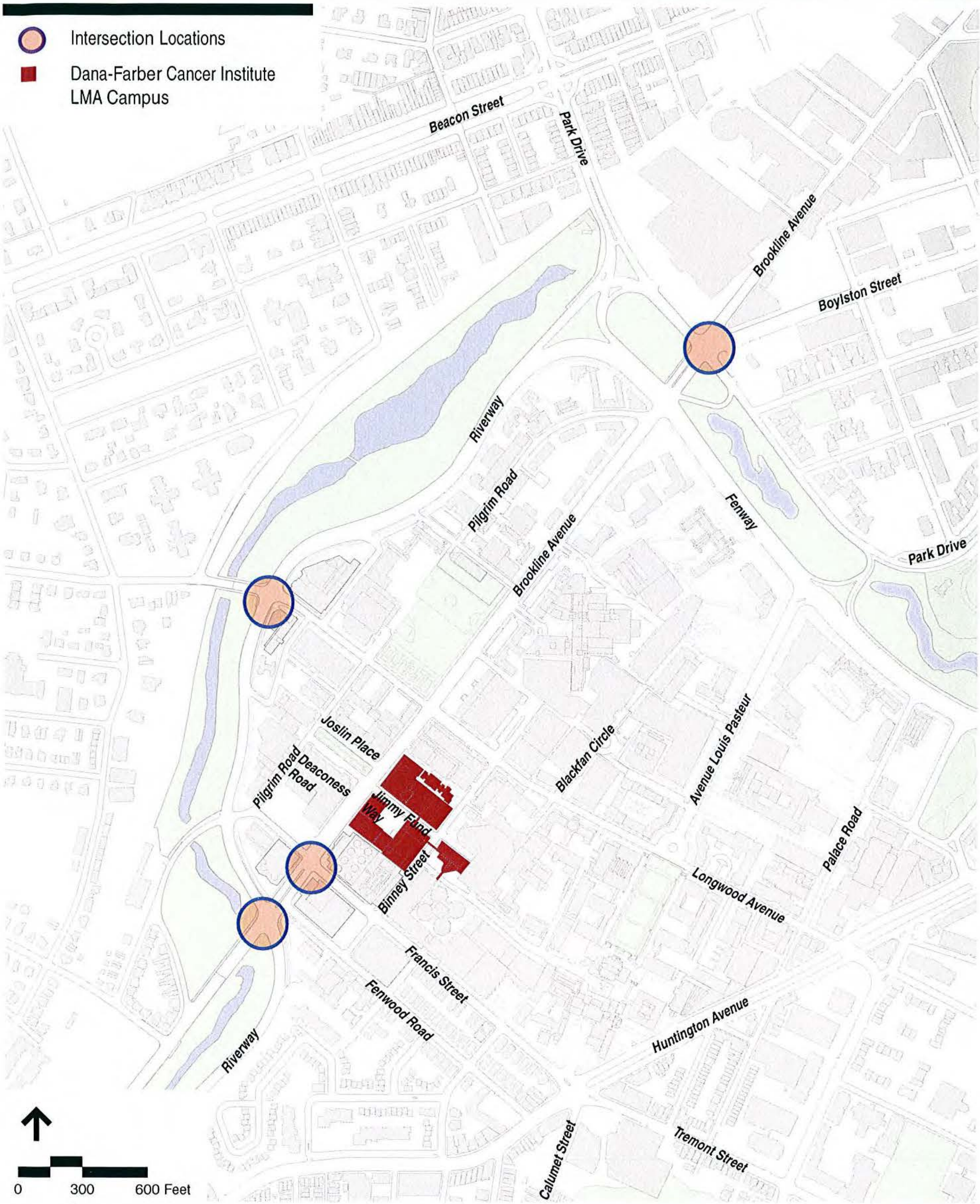
FIGURE 6-35



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Noise Receptor Locations

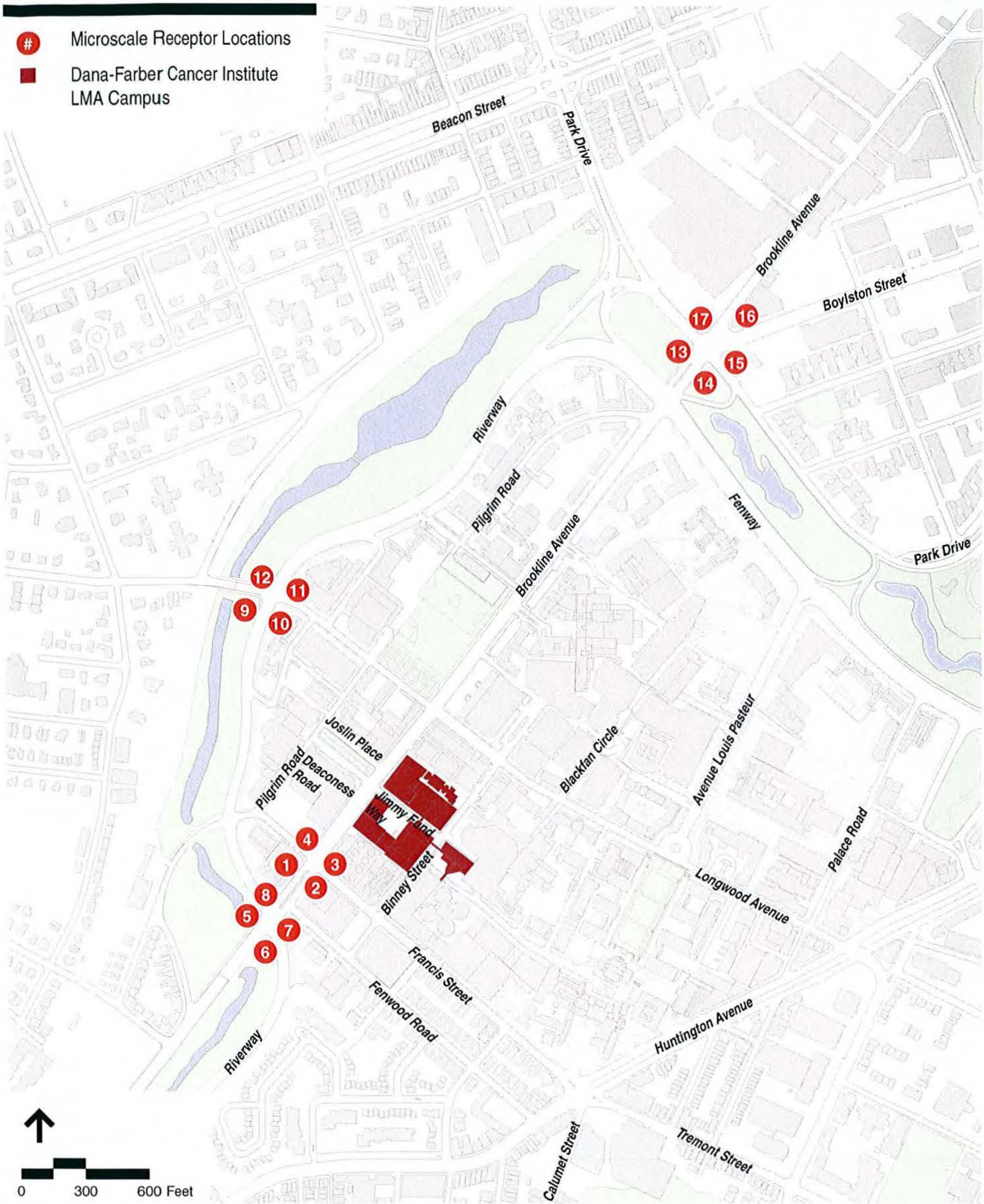
FIGURE 6-36



DANA-FARBER CANCER INSTITUTE CENTER FOR CANCER CARE
DPIR/DEIR

Microscale Study Area Intersections

FIGURE 6-37



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Microscale Receptor Locations

FIGURE 6-38

7

Infrastructure Systems

7.1 Introduction

This chapter evaluates the infrastructure systems that will support DFCI's Center for Cancer Care Project. The following utilities are evaluated herein:

- Wastewater
- Domestic water and fire protection
- Stormwater management
- Steam
- Natural gas
- Electricity
- Telecommunications
- Participation in LMA-wide planning activities

The final design process for the Center for Cancer Care will adhere to applicable protocols and design standards, so that the proposed building 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 the Boston Water and Sewer Commission (BWSC), private utility companies, and on-site infrastructure systems. There will be close coordination among these entities and with the project engineers and architects during subsequent reviews and design efforts.

7.2 Regulatory Framework

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

- In the City of Boston, the BWSC is responsible for water, sewer, and stormwater systems. A sewer connection permit from the Massachusetts Department of Environmental Protection (DEP) will also be required. In addition, the Boston Fire Department will review the project with respect to fire protection measures such as fire department connections and standpipes.
- The energy systems (steam, gas and electric) design will be coordinated with the respective system's owners.
- New utility connections will be authorized by the City of Boston Public Works Department through the street opening permit process, as required.

7.3 Infrastructure Systems

New domestic water, sewer, electricity, gas, and drainage services will be installed in both Brookline Avenue and Jimmy Fund Way. Steam service will be installed in the private alley between the proposed building and the adjacent Medical Area Total Energy Plant (MATEP). Accordingly, DFCI may seek individual permits/connections from BWSC and other utility companies, corresponding to the different elements of the development of the program.

7.4 Stormwater Management, Water Quality and Wetlands

The purpose of this section is to discuss the Center for Cancer Care's effects on water quality, stormwater quality and surrounding wetlands.

7.4.1 Stormwater

The proposed project will not result in significant changes in drainage patterns, as stormwater runoff discharges to the existing 12-inch BWSC drains in Brookline Avenue and Jimmy Fund Way under both existing and future conditions. Existing storm drain locations are shown on Figure 7-1.

The project is expected to reduce stormwater runoff volumes. The existing site surface is primarily impervious, consisting of roof area, a parking lot, and sidewalk areas. The Project currently includes a combination of green roofs and/or cisterns to reduce stormwater runoff volumes and decrease the runoff rate. The green roofs will encompass up to 18,000 SF and the cistern would be sized to hold up to approximately 17,000 gallons of collected rainwater. The green roofs and/or cisterns are being designed in conjunction with the project's overall LEED strategy. The green roofs and/or cisterns are currently targeted to reduce the 2-year storm event volume by approximately 25 percent.

The project will not increase pollutants, including sediments, discharged into surface waters or local groundwater via the BWSC storm drainage system. Also, the Center for Cancer Care includes the replacement of surface parking areas with new roof areas, which is expected to improve drainage water quality by reducing the stormwater pollutant load inherent to surface parking operations.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) indicates the FEMA Flood Zone Designations for the site area (City of Boston, Community-Panel Number 250286 0009 C, April 1, 1982). The map for the proposed project sites show the sites located in a Zone C, Area of Minimal Flooding. There are no wetlands on or adjacent to the DFCI campus.

As a commitment to both the goal of improving the water quality of local bodies of water and public education, DFCI will install plaques that bear the warning "Don't Dump – Drains to Charles River" at all proposed and adjacent catch basins. Oil traps will also be provided for all parking areas below grade, with any discharge from these traps directed into the sanitary sewer and not the storm sewer.

7.4.1.1 Construction Stormwater Management

Construction activities related to proposed project are not expected to produce significant changes in either the pattern of, or rate of, stormwater runoff from the site. Construction period stormwater management controls will be established in compliance with BWSC standards, and the project will not result in introduction of any peak flows, pollutants, or sediments that would potentially impact the receiving waters of the local BWSC stormwater drainage system. Potential runoff during construction will be controlled by measures developed in accordance with the policies and approvals of the BWSC and other appropriate oversight agencies.

7.4.2 Muddy Water Restoration Project

The Muddy River Restoration Project is a component of the Emerald Necklace Master Plan[1] and its objectives are to:

- Improve flood control;
- Improve water quality;
- Enhance aquatic/riparian habitat;
- Rehabilitate landscape and historic resources; and
- Implement Best Management Practices (BMPs).

A discussion of these objectives and how the Project interacts with them appears below.

Flood control strategies recommended in the Muddy River Restoration Project do not extend to the DFCI campus. Correspondingly, the Project has no effect on the ability to implement the restoration project's proposed structural flood control strategies.

[1] Phase 1 Muddy River Flood Control, Water Quality, and Habitat Enhancement, and Historic Preservation Project, Final Environmental Impact Report, February 2003

The improvement in runoff water quality from the DFCI project site, achieved through the removal of the existing parking lot drainage (replaced with cleaner roof runoff), is consistent with the goals of the Muddy River Restoration Project. In addition, all proposed sanitary and stormwater infrastructure will be separated, which is also consistent with the Muddy River project.

The restoration of landscape and historic resources will be unaffected by the project.

A program of Best Management Practices will be developed in conjunction with the BWSC Site Plan approval process for the project. The BMPs employed for the individual projects will contribute to an improvement in runoff water quality from the Muddy River watershed.

7.4.3 Consistency with DEP Stormwater Management Policy

This section discusses the compliance of the project with the Department of Environmental Protection's (DEP) Stormwater Management Policy Standards. There are nine standards and each standard is addressed individually herein.

7.4.3.1 Standard #1: Untreated Stormwater

Existing catch basins and proposed catch basins (if required) with hoods and sumps will collect sidewalk runoff and sediments and help control floatables. Interior garage runoff will be conveyed through an oil and gas separator and transmitted to the sanitary sewer system as required by building code. Roof runoff will be captured and the captured roof runoff will be reused within the building. The remaining roof runoff will be discharged to BWSC storm drains.

7.4.3.2 Standard #2: Post-Development Peak Discharge Rates

The peak discharge rate will be reduced by a combination of green roofs and a cistern as discussed in Section 7.4.1. The goal of the Center for Cancer Care's stormwater management program is a 25 percent reduction in the 2-year storm event volume.

7.4.3.3 Standard #3: Recharge to Groundwater

Because of the size, density and surface characteristics of the site, under both existing and future conditions groundwater recharge conditions will remain unchanged.

7.4.3.4 Standard #4: 80 Percent Total Suspended Solids Removal

The existing site contains a parking lot with no TSS treatment. By removing this parking lot and replacing it with cleaner roof area, the amount of TSS is expected to decrease significantly. Roof area runoff does not require treatment.

7.4.3.5 Standard #5: Higher Potential Pollutant Loads

The Project site does not contain land uses with higher potential pollutant loads.

7.4.3.6 Standard #6: Protection of Critical Areas

The Project site does not contain any critical areas as defined by the DEP.

7.4.3.7 Standard #7: Redevelopment Projects

The proposed Project does not increase impervious area and the Project meets the Stormwater Management Standards to the maximum extent practicable, which is required to meet Standard #7.

7.4.3.8 Standard #8: Erosion/Sediment Controls

The Project's construction documents will include measures and specifications regarding erosion and sediment controls and barriers (e.g., silt fence, catch basin sacks). Construction dewatering discharges will be appropriately controlled and discharged in accordance with National Pollutant Discharge Elimination System (NPDES) and state dewatering standards. Further discussions regarding construction controls are included earlier in this chapter and in the below section.

7.4.3.9 Standard #9: Operation/Maintenance Plan

An Operation and Maintenance plan will be developed for both construction and post-development, which will include system ownership information, parties responsible for operation and maintenance, and inspection and maintenance schedules. Routine maintenance includes catch basin cleaning, stormwater control cleaning, and removal of debris from outlets. Pedestrian and vehicular access ways will be swept appropriately to control sand applied during winter months.

Measures aimed at minimizing the disposition of site soils to off-site areas, primarily the surrounding streets and existing drainage collection systems, will be a part of the City's required Construction Management Plan. In addition, DFCI is in the process of applying for appropriate permits for construction activity and dewatering. DFCI and its contractors will seek to contain sediment, pollutants, and any other construction-related materials within the site. Stabilized construction exits will be installed at each access point of the work areas to minimize off-site transport of soil by construction vehicles. These exits will remain in place until site areas have been stabilized. DFCI's contractors will use BMPs during construction, including installing silt sacks on catch basins.

7.4.4 Laboratory Waste

At this stage in the building design, no wet research laboratory space is planned. Should laboratory work be required for the proposed clinical space, lab waste shall be treated and discharged separately into a sanitary sewer and shall meet applicable Massachusetts Water Resource Authority (MWRA) regulations.

7.5 Wastewater

Sewage generated by the Project will discharge to the 15-inch Boston Water and Sewer Commission (BWSC) sewer in Brookline Avenue and a 10-inch sewer in Jimmy Fund Way. Existing sanitary sewer locations are shown on Figure 7-1. These sewers flow west to the Brookline Sewer where it is intercepted by the MWRA line feeding the Ward Street Headworks. From there the sewer flows to the Columbus Park Headworks via the Boston Main Drain and finally to the MWRA Deer Island Waste Water Treatment Plant for disposal. The design of new service connections will be reviewed by BWSC under its Site Plan Review and Approval process.

Based upon a sewage generation rate of 200 gallons per day ("gpd") per 1,000 SF for clinical/research facilities, 75 gpd per 1,000 SF for retail/support/office space, and 50 gpd per seat for food service space, the Center for Cancer Care will generate an average daily sewer flow of approximately 56,190 gpd. Of the estimated 56,190 gpd, approximately 53,300 gpd represents net new sewage flow. Table 7-1 shows the sewage generation flows, by use:

Table 7-1 Wastewater Net New Generation

Use	Square Feet (SF)	Rate	Total
Clinical/Clinical Research (Proposed)	188,500	200 gpd/1000 SF	37,700 gpd
Retail/Support/Office (Proposed)	46,500	75 gpd/1000 SF	3,490 gpd
Food Service (Proposed)	22,500 (300 seats)	50 gpd/seat	15,000 gpd
Existing (To be removed)	-38,500	75 gpd/1000 SF	-2,890 gpd
Net New Sewage Flow			53,300 gpd

7.6 Domestic Water Supply and Fire Protection

The BWSC will provide potable water to the project site via existing water mains in Jimmy Fund Way (8-inch) and Brookline Avenue (12-inch). Existing water main locations are shown on Figure 7-1. Separate connections for fire protection will be made to each of these mains as well. Table 7-2 presents the results of a recent hydrant flow test:

Table 7-2 Hydrant Test Results

Date	Test Location	Static Pressure	Residual Pressure	Total Flow[2]	Flow @ 20psi[2]
November 21, 2005	Brookline Avenue	60 psi[3]	54 psi	3,734 gpm[4]	10,401 gpm

Estimated water consumption is based upon estimated sewage generation with an added factor of 10 percent for consumption, system losses, and other usage. The average daily water use is estimated to be approximately 61,810 gpd, of which approximately 58,630 gpd represents net new water demand. Based upon the hydrant test results, BWSC's water system is adequate to supply the Center for Cancer Care project.

7.7 Energy Systems

Preliminary estimates of energy demands are as follows:

- Steam - 40,000 lb/hr
- Electricity - 4,000 kW
- Natural Gas - 15,000 btu/hr
- Chilled Water - 3,000 tons

Steam service from the adjacent MATEP power plant is currently expected to provide the energy to meet the Project's heating and hot water demand. Steam and chilled water demands and services will be coordinated with MATEP. Natural gas demands and availability will be coordinated with Keyspan, which has natural gas mains in both Brookline Avenue and Jimmy Fund Way. Existing energy system locations are shown on Figures 7-2 and 7-3.

---

[2] Flow calculation by BWSC
[3] psi – pounds per square inch
[4] gpm – gallons per minute

7.8 Telecommunications

Telecommunication services (such as Verizon and Comcast) are expected to be fed to the new building internally through the adjacent Smith Laboratories Building. If these services are not fed internally, new connections will be made as coordinated with the corresponding utility company.

7.9 Protection of Utilities

Existing public and private infrastructure located within the public right-of-way will be protected during construction. The installation of proposed utilities within the public way will be in accordance with BWSC, Boston Public Works, the Dig-Safe Program, and governing utility company requirements. 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, and drain facilities will be reviewed by the BWSC as part of its Site Plan Review process.

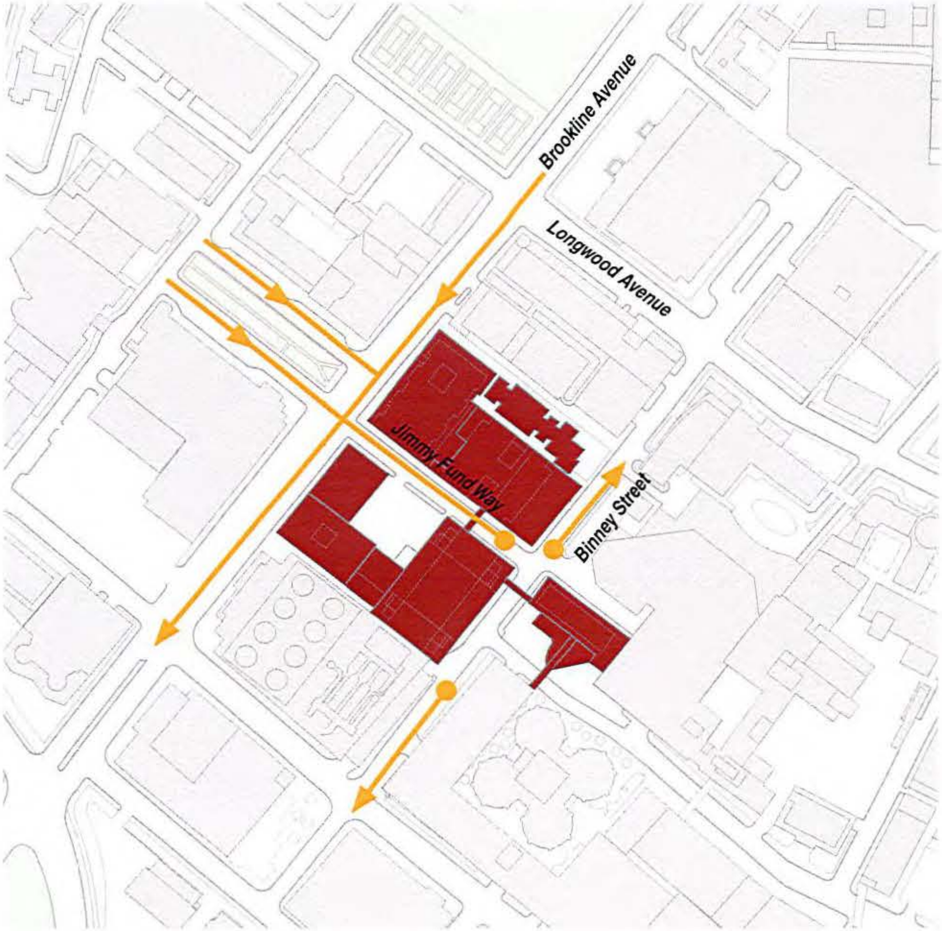
7.10 Participation in LMA-Wide Planning Activities

The Medical Academic and Scientific Community Organization, Inc. (MASCO) is a charitable corporation established in 1972 by its member institutions to plan, develop and enhance the LMA for the benefit of the general public and its members, and to create and implement programs that assist the institutions and individuals in the LMA. MASCO's mission is to pursue programs that promote a sense of community among its members and create and deliver services more effectively provided on a shared basis.

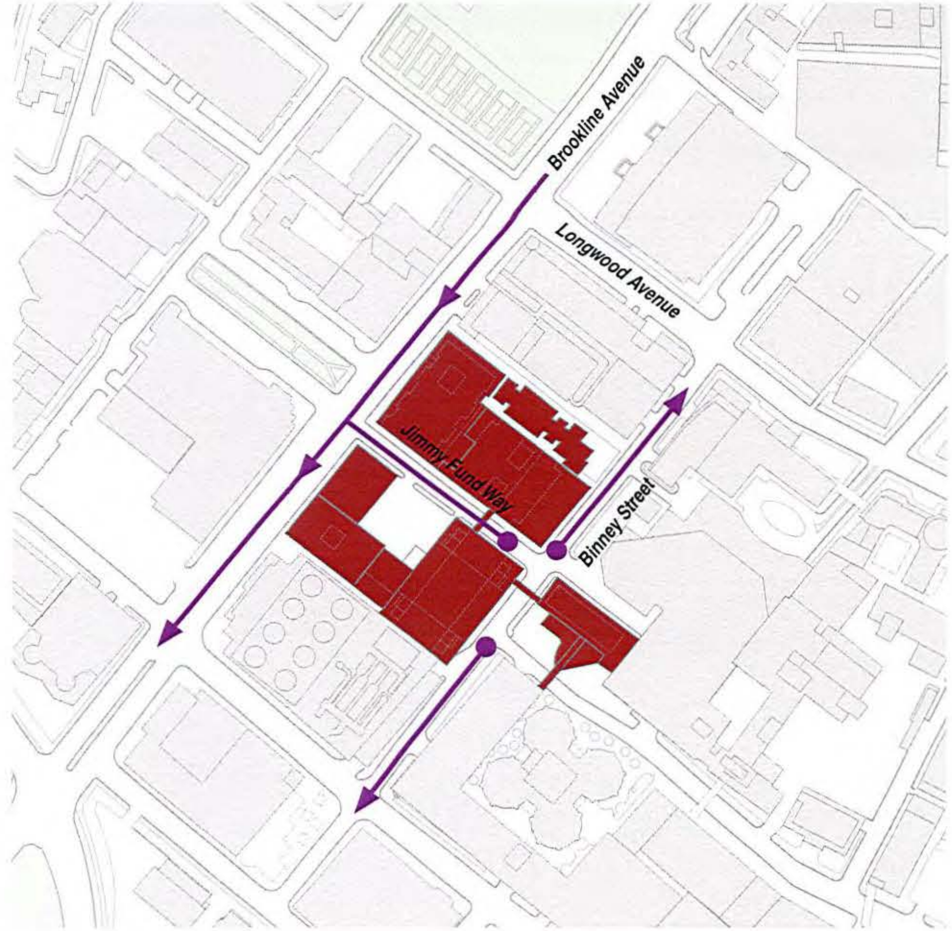
DFCI is an active participant in numerous committees that coordinate infrastructure and support activities to the benefit of DFCI and other LMA institutions. The major support committees consist of the Board and Supporting Management Committees, Energy, Information Technology, Security, Transportation, Parking, Emergency Preparedness, Facility Planning, Construction Coordination, Materials Management, Workforce Development, Long-Range Planning, and Childcare.

7.11 Summary

Existing wastewater, domestic water, fire protection water, stormwater, steam, natural gas, electricity and telecommunications systems were identified by the project team. Initial investigations and consultations with the appropriate agencies and utility companies have determined that existing infrastructure systems are adequately sized to accept the incremental increase in demand associated with the development and operation of the proposed Center for Cancer Care. In addition, the proposed stormwater management and sustainable design strategies are expected to improve runoff water quality and reduce runoff volumes.



Existing Sanitary Sewer

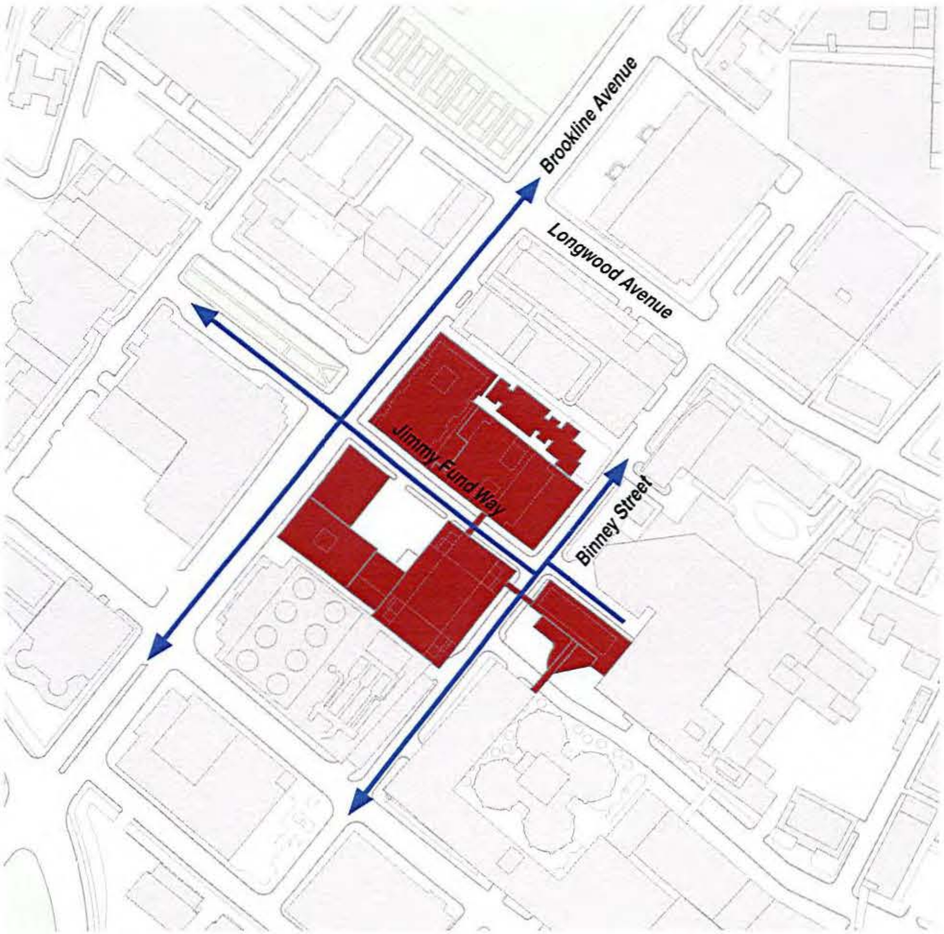


Existing Storm Water

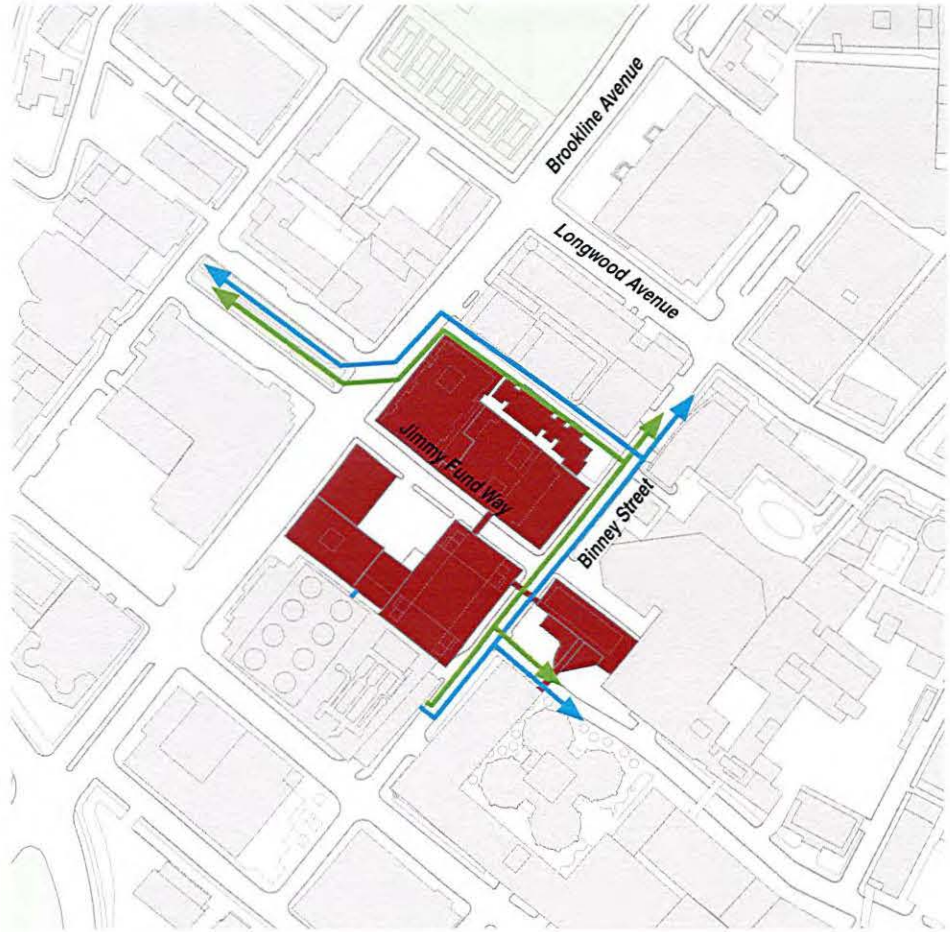
DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Site Utilities

FIGURE 7-1



Existing Potable Water

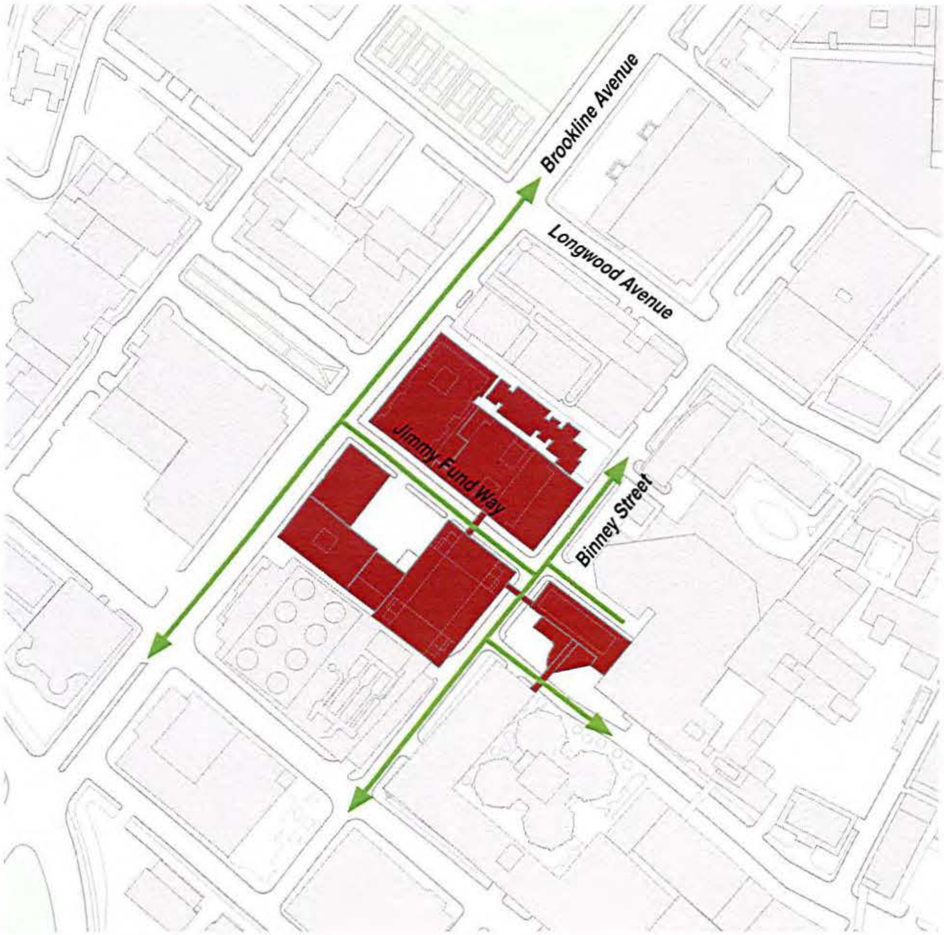


Existing Chilled Water and Steam

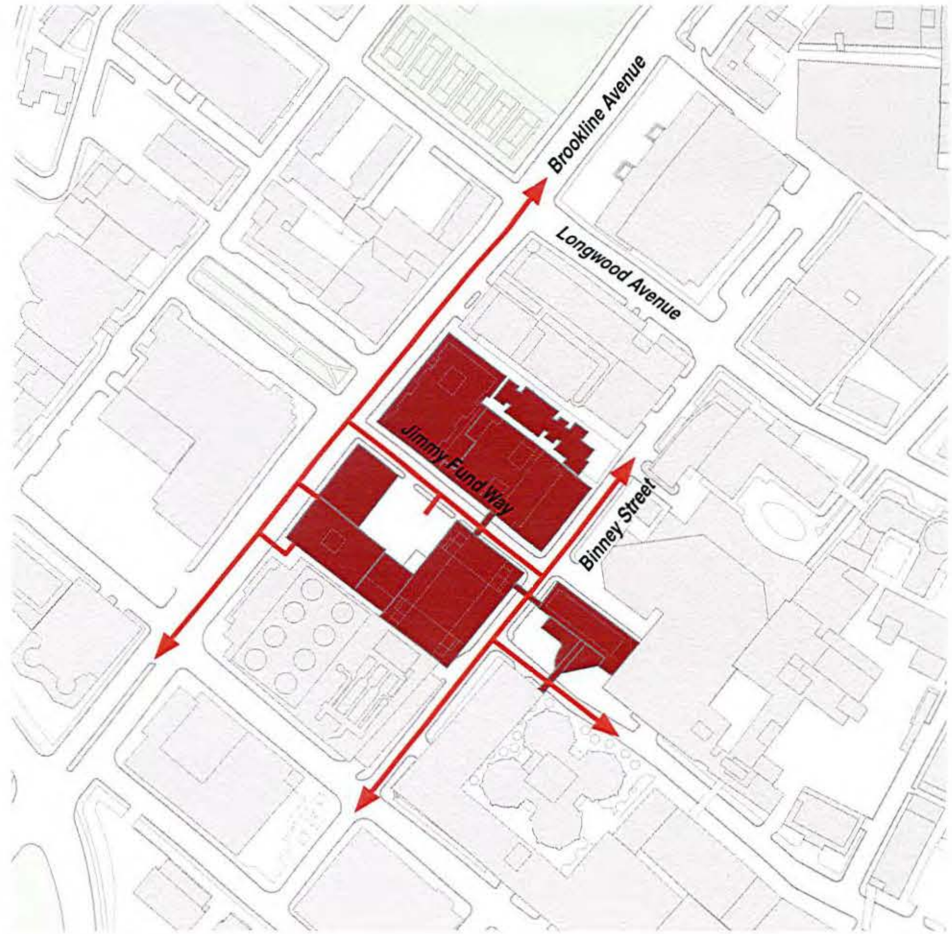
Chilled Water
Steam

Site Utilities

FIGURE 7-2



Existing Natural Gas



Existing Electrical

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR/DEIR

Site Utilities

FIGURE 7-3

8

Sustainable Design

8.1 Introduction

As a responsible provider of healthcare services and research into the causes and prevention of cancer, Dana-Farber Cancer Institute is committed to creating a healthful and health-sustaining development. Research results from multiple studies show a significant correlation between sustainable design concepts such as daylighting, effective ventilation, healthy interior finish materials, occupant control over ambient conditions, contact with nature, and access to views with physical, psycho-social, and neuro-cognitive well-being. In addition, careful use of natural resources and minimization of polluting systems contribute to a more healthy and sustainable.

8.2 Site Sustainability

The Center for Cancer Care is being developed with a focus on optimal application of sustainable design features and operating procedures. The project has been registered with the United States Green Building Council (USGBC) since September and is targeting a Silver Leadership in Energy and Environmental Design (LEED) rating. In addition, the Center for Cancer Care has been registered with the Green Guidelines for Healthcare Construction (GGHC) rating system to further best practices in green construction specific to healthcare facilities.

To minimize the number of private vehicles commuting to the campus, bicycle storage and showering and changing facilities will be available at the Center for Cancer Care and nearby to accommodate at least five percent of the full-time occupants. The Center for Cancer Care will also incorporate a green roof to be planted with native, drought-tolerant plants. This will provide landscaped open space and natural habitat currently not found on the site, decrease both the rate of storm water runoff and reduce the heat island effect from the current roof and paving conditions. The green roof will help reduce energy use by reducing heat gain and loss. Although DFCI has had little opportunity for planting within its campus in the past, the development of the Center for Cancer Care provides new avenues for native and adaptive planting strategies. In addition to planting native plants on the Center for Cancer Care's green roof, DFCI plans to landscape at the ground level with street trees.

DFCI will be able to reduce the heat island effect on its campus by placing parking underground and employing high-albedo pavement along Jimmy Fund Way. DFCI is also researching the feasibility of using locally manufactured products to reduce the need for pollution-causing transport and is seeking to minimize light pollution by employing city-specified outdoor lighting and reducing the glare of specified interior lighting. For a summary of the Center for Cancer Care's targeted sustainable features, refer to the LEED checklist included at the end of this chapter.

8.3 Water Conservation and Erosion Control

Dana-Farber Cancer Institute is committed to responsibly conserving and utilizing the potable water resources. The Institute's central intent for its water-efficient practices in both landscape and building water consumption is to reduce demand on local water supplies and the load on local sewage and treatment facilities, and to minimize the need to take water out of its natural cycle. DFCI has committed to reducing its water consumption overall on its campus by 20 percent.

In its new Center for Cancer Care development, DFCI has incorporated important water conservation features into the design. These features include a design to capture rainwater and air handling unit (AHU) condensate. The feasibility of installing a below-grade cistern at the Center for Cancer Care to store this water and use it to reduce potable water demand from landscaping, equipment cooling, and toilets is being evaluated. The design also specifies low-flow and ultra low-flow plumbing fixtures, including water closets, urinals, and showers.

Dana-Farber Cancer Institute's landscaping design for its new building and campus improvements reduces water use by minimizing impervious surfaces, using native/drought resistant plantings on roof areas and in other landscaped areas, and eliminating turf grass. DFCI has committed to placing "Don't Dump: Drains to the Charles River" plaques at each of its storm drain locations throughout the campus, and adopted an erosion and sedimentation control plan that is based on the 2003 EPA Construction General Permit.

8.4 Energy

Because medical institutions like DFCI are intensive users of high-demand, sophisticated equipment, they are also significant energy consumers. DFCI takes very seriously its responsibility to wisely steward its energy consumption and use of environmental resources.

The Center for Cancer Care project has been designed to comply with the mandatory and prescriptive requirements of Mass Energy Code 2007, which is based on ASHRAE/IESNA 90.1-2004. Strategies for energy reduction under consideration include optimization of the curtainwall and lighting design, and incorporating heat recovery in the HVAC systems. DFCI is using an Eco-Tect model and other energy modeling programs to optimize the building skin's thermal properties and daylighting potential. Lighting is being designed to maximize energy efficiency while providing occupants with appropriate light levels. DFCI plans for the Center for Cancer Care's chilled water to be provided by new, non-CFC equipment that will be added to MATEP's existing system. The new equipment will be sized so that the minimum capacity is at least equal to the project's maximum demand. DFCI is also considering increased medical equipment efficiencies for its new facility. The new building design incorporates strategies to maintain desired thermal comfort and adaptive comfort controls to suit both individual needs and those of groups in shared spaces.

The Center for Cancer Care design also incorporates energy-saving techniques such as uniform ambient illumination, pendant-mounted systems combined with high reflectance ceiling surfaces and finishes, and maximized daylighting, including toplighting, lighting from high on the window wall, and integrated daylighting sensors. There will also be a comprehensive Building Management System that ties the Center for Cancer Care to the rest of the campus and allows holistic energy-efficiency monitoring. This system will control all utilities, temperature, lighting, and sun control.

8.5 Waste Handling and Recycling

DFCI is a leader in responsible, thorough, and creative institute-wide recycling, and has been recognized for its outstanding accomplishments in this area by government and non-government agencies.

The Center for Cancer Care will utilize many strategies to lessen the impact of the proposed new construction on the environment. One strategy is proper waste management during the demolition and construction of the Center for Cancer Care. Throughout these phases, the construction manager will be responsible for diverting at least 75 percent of all construction, demolition, and land clearing waste away from landfills or incinerators. Given the current recycling resources and capabilities in the Greater Boston area, this is both an economical and practical goal for the Center for Cancer Care. The construction manager routinely achieves 95 percent construction waste diversion. These proactive source-reduction measures will allow DFCI to maximize recycling and resource management during the construction of the Center for Cancer Care.

8.6 Environmental Quality

As a leader in the fight against cancer and environmental hazards that can cause cancer or other serious diseases, DFCI implements extensive environmental quality controls, from management of indoor air quality throughout its campus to dedicated efforts to improve and protect outdoor air quality and control and mitigate against the risks of infection and the spread of viruses.

DFCI designed the Center for Cancer Care mechanical system to comply with ASHRAE 62.1-2004 for increased ventilation, and will employ Minimum Efficiency Reporting Value (MERV) filters at its fresh air intakes. Grills have been incorporated at all entryways directly connected to the outdoors to control the level of particulates carried into the building.

For the Center for Cancer Care, DFCI has put together a program to ensure that there are no airborne contaminants produced or released during demolition or construction. This program was developed in collaboration with DFCI's Environmental Health and Safety (EH&S) and Infection Control Program, the construction manager and a contract sampling company. The program will be used to monitor the effectiveness of work-area isolation techniques. A set of samples have been taken to determine baseline measurements for fungal spore counts, viable fungal counts and airborne particulate counts. During critical times of the demolition and construction, samples will be taken from eleven different site locations. In addition, real-time 24-hour airborne particulate sampling will also be conducted. DFCI has set a level of particulates that will automatically prompt an investigation of work conditions and methods by the construction manager, and has also established a slightly higher level which will trigger a total stoppage of work until the problem can be identified and remediated. For continuous compliance, the outside contractor will also audit and provide reports on the engineering controls as well as the work practices as they apply to construction containment. The construction manager will also require emissions control devices or clean fuel alternatives for most construction vehicles.

In addition, DFCI has a network of carbon monoxide sensors in the existing garage areas in the campus which will be extended to its new underground parking following the construction of the Center for Cancer Care.

8.7 Products and Building Materials

DFCI prefers environmentally safe products and its choice of materials reflects this. Environmental Services products are reviewed by the DFCI Environmental Health and Safety Department, and the lowest toxicity materials are used. This priority is reflected in the day-to-day products DFCI uses to clean and maintain its spaces and systems, as well as in the standards it maintains for finish materials and building supplies.

DFCI's Center for Cancer Care will eliminate chlorinated polyethylene (CPE), chlorinated polyvinyl chloride (CPVC), chlorosulfonated polyethylene (CSPE), neoprene, and polyvinyl chloride (PVC) from exterior and structural materials and the mechanical and electrical systems. These toxins will also be reduced in interior finish materials throughout the new facility. The building's design also eliminates mercury from mechanical and electric system switches and relays, eliminates lead in wiring, solder, and roofing, eliminates leaded cadmium in interior paints, and will use no cement from kilns fired with hazardous waste. In addition to incorporating these healthful products into the design and initial building construction, the clinical and clinical support floors of the Center for Cancer Care will feature modular planning and fit-out to allow flexible use of space with minimum future retrofit construction and resultant production of construction waste.

8.8 Conclusion

Dana-Farber Cancer Institute is committed to proactively improving the health of its campus and its environment, wisely recycling and eliminating unnecessary waste, minimizing the use of natural resources within its facility, and, in general, maintaining as small an energy footprint as possible by implementing current technology and sustainable practices. DFCI is proud of its history of ecologically and environmentally sensitive achievements and is dedicated to continuing leadership in this important area.

33	LEED Points Targeted
16 / 8	LEED Points Questionable or needing further review
12	LEED Points Not Possible or Not Targeted
18	Additional GGHC/LABS21 Points Targeted
16 / 2	Additional GGHC/LABS21 Points Questionable or needing further review
8	Additional GGHC/LABS21 Points Not Possible or Not Targeted

Total LEED Rating System Possible Points 69

Total LEED Points Available to this Project 57

Certified 26 to 32, **Silver** 33 to 38, **Gold** 39 to 51, **Platinum** 52 and over

Y	?	?	N			
				Integrated Design		
Y				GGHC p1	Integrated Design	
Y				GGHC p2	Environmental Health Mission Statement & Program	
9	1	4	0	**Sustainable Sites**	**Possible LEED Points**	14
Y				Prereq 1	Construction Activity Pollution Prevention	
1				Credit 1	Site Selection	1
1				Credit 2	Development Density & Community Connectivity	1
		1		Credit 3	Brownfield Redevelopment	1
1				Credit 4.1	Alternative Transportation - Public Transportation Access	1
1				Credit 4.2	Alternative Transportation - Bicycle Storage & Changing Room	1
1				Credit 4.3	Alternative Transportation - Low Emitting & Fuel Efficient Vehicles	1
1				Credit 4.4	Alternative Transportation - Parking Capacity	1
		1		Credit 5.1	Site Development - Protect or Restore Habitat	1
	1			Credit 5.2	Site Development - Maximize Open Space	1
1				Credit 6.1	Stormwater Design - Quantity Control	1
		1		Credit 6.2	Stormwater Design - Quality Control	1
1				Credit 7.1	Heat Island Effect - Non-Roof	1
1				Credit 7.2	Heat Island Effect - Roof	1
		1		Credit 8	Light Pollution Reduction	1
	1			GGHC c3.2	Brownfield Redevelopment - Residential Remediation Level	1
1				GGHC c9	Connection to the Natural World - Places of Respite	1
		1		GGHC c10.	Community Contaminant Prevention - Airborne Releases	1
1				GGHC c10.:	Community Contaminant Prevention - Leaks & Spills	1
1				LABS21 c9.	Safety and Risk Management - Air Effluent	1
2	2	1	0	**Water Efficiency**	**Possible LEED Points**	5
1				Credit 1	Water Efficient Landscaping - reduce by 50%	1
	1			Credit 1.2	Water Efficient Landscaping - no potable use or no irrigation	1
		1		Credit 2	Innovative Wastewater Technologies	1
1				Credit 3.1	Water Use Reduction - 20% Reduction	1
	1			Credit 3.2	Water Use Reduction - 30% Reduction	1
Y				GGHC p1	Potable Water Use for Equipment Cooling	
	1			GGHC c4.1	Process Water Use - Measurement and Verification	1
		1		GGHC c4.2	Process Water Use - Low or No Water Use Building Equipment	1
5	2	3	7	**Energy and Atmosphere**	**Possible LEED Points**	17
Y				Prereq 1	Fundamental Commissioning of the Building Energy Systems	
Y				Prereq 2	Minimum Energy Performance	
Y				Prereq 3	Fundamental Refrigerant Management	
1				Credit 1.1	Optimize Energy Performance - 10.5% reduction	1
1				Credit 1.2	Optimize Energy Performance - 14% reduction	1
1				Credit 1.3	Optimize Energy Performance - 17.5% reduction	1
	1			Credit 1.4	Optimize Energy Performance - 21% reduction	1
		1		Credit 1.5	Optimize Energy Performance - 24.5% reduction	1
		1		Credit 1.6	Optimize Energy Performance - 28% reduction	1
			1	Credit 1.7	Optimize Energy Performance - 31.5% reduction	1
			1	Credit 1.8	Optimize Energy Performance - 35% reduction	1
			1	Credit 1.9	Optimize Energy Performance - 38.5% reduction	1
			1	Credit 1.10	Optimize Energy Performance - 42% reduction	1
			1	Credit 2.1	On-Site Renewable Energy - 2.5%	1
			1	Credit 2.2	On-Site Renewable Energy - 7.5%	1
			1	Credit 2.3	On-Site Renewable Energy - 12.5%	1
1				Credit 3	Enhanced Commissioning	1
	1			Credit 4	Enhanced Refrigerant Management	1
1				Credit 5	Measurement and Verification	1
		1		Credit 6	Green Power	1
	1			GGHC c4	Refrigerant Selection	1
			1	GGHC c6.1	Energy Supply Efficiency - 10% reduction	1
			1	GGHC c6.2	Energy Supply Efficiency - 15% reduction	1
			1	GGHC c6.3	Energy Supply Efficiency - 17% reduction	1
			1	GGHC c6.4	Energy Supply Efficiency - 18% reduction	1
	1			GGHC c7	Medical Equipment Efficiency	1
			1	LABS21 c7.	Energy Supply Efficiency - 20% reduction	1
			1	LABS21 c7.	Energy Supply Efficiency - 30% reduction	1
			1	LABS21 c7.	Energy Supply Efficiency - 40% reduction	1
			1	LABS21 c7.	Energy Supply Efficiency - 50% reduction	1

33	LEED Points Targeted	
16 / 8	LEED Points Questionable or needing further review	
12	LEED Points Not Possible or Not Targeted	
18	Additional GGHC/LABS21 Points Targeted	
16 / 2	Additional GGHC/LABS21 Points Questionable or needing further review	
8	Additional GGHC/LABS21 Points Not Possible or Not Targeted	
	Total LEED Rating System Possible Points	69
	Total LEED Points Available to this Project	57

Certified 26 to 32, **Silver** 33 to 38, **Gold** 39 to 51, **Platinum** 52 and over

Y	?	?	N			
5	3	0	5	**Materials and Resources**	**Possible LEED Points**	**13**
Y				Prereq 1	**Storage and Collection of Recyclables**	
			1	Credit 1.1	**Building Reuse** - Maintain 75% of Existing Walls, Floors & Roof	1
			1	Credit 1.2	**Building Reuse** - Maintain 95% of Existing Walls, Floors & Roof	1
			1	Credit 1.3	**Building Reuse** - Maintain 50% of Interior Non-Structural Elements	1
1				Credit 2.1	**Construction Waste Management** - Divert 50% from Disposal	1
	1			Credit 2.2	**Construction Waste Management** - Divert 75% from Disposal	1
			1	Credit 3.1	**Materials Reuse** - 5%	1
			1	Credit 3.2	**Materials Reuse** - 10%	1
1				Credit 4.1	**Recycled Content** - 10% (post-consumer + 1/2 pre-consumer)	1
1				Credit 4.2	**Recycled Content** - 20% (post-consumer + 1/2 pre-consumer)	1
1				Credit 5.1	**Regional Materials** - 10% Extracted, Processed & Manufactured Regionally	1
	1			Credit 5.2	**Regional Materials** - 20% Extracted, Processed & Manufactured Regionally	1
	1			Credit 6	**Rapidly Renewable Materials** - 2.5%	1
1				Credit 7	**Certified Wood**	1
Y				GGHC p2	**Mercury Elimination**	
1				GGHC c2.3	**Construction Practices** - Site & Materials Management	1
1				GGHC c2.4	**Construction Practices** - Utility & Emissions Control	1
	1			GGHC c8.1	**PBT Elimination** - Dioxins	1
1				GGHC c8.2	**PBT Elimination** - Mercury Use in Equipment	1
	1			GGHC c8.3	**PBT Elimination** - Lead & Cadmium	1
	1			GGHC c9.1	**Furniture & Medical Furnishings** - Resource Reuse	1
	1			GGHC c9.2	**Furniture & Medical Furnishings** - Materials	1
	1			GGHC c9.3	**Furniture & Medical Furnishings** - Manufacturing, Transportation, & Recycling	1
1				GGHC c10	**Copper Reduction**	1
1				GGHC c11.	**Resource Reuse** - Design for Flexibility	1
	1			GGHC c11.:	**Resource Reuse** - Minimize Materials	1
10	5	0	0	**Indoor Environmental Quality**	**Possible LEED Points**	**15**
Y				Prereq 1	**Minimum IAQ performance**	
Y				Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	
1				Credit 1	**Outdoor Air Delivery Monitoring**	1
	1			Credit 2	**Increased Ventilation**	1
1				Credit 3.1	**Construction IAQ Management Plan** - During Construction	1
1				Credit 3.2	**Construction IAQ Management Plan** - Before Occupancy	1
1				Credit 4.1	**Low-emitting materials** - adhesives and sealants	1
1				Credit 4.2	**Low-emitting materials** - paints and coatings	1
1				Credit 4.3	**Low-emitting materials** - carpet systems	1
	1			Credit 4.4	**Low-emitting materials** - composite wood and agrifiber products	1
1				Credit 5	**Indoor Chemical and Pollutant Source Control**	1
	1			Credit 6.1	**Controllability of Systems** - lighting	1
1				Credit 6.2	**Controllability of Systems** - thermal comfort	1
1				Credit 7.1	**Thermal Comfort** - design	1
1				Credit 7.2	**Thermal Comfort** - verification	1
	1			Credit 8.1	**Daylight and Views** - daylight 75% of spaces	1
	1			Credit 8.2	**Daylight and Views** - views for 90% of spaces	1
Y				GGHC p2	**Asbestos Removal or Encapsulation**	
1				GGHC c4.1	**Low-emitting materials** - Interior adhesives and sealants	1
1				GGHC c4.2	**Low-emitting materials** - Wall & Ceiling Systems	1
1				GGHC c4.3	**Low-emitting materials** - Flooring Systems	1
	1			GGHC c4.4	**Low-emitting materials** - Composite Wood & Insulation	1
	1			GGHC c4.5	**Low-emitting materials** - Furniture & Medical Furnishings	1
1				GGHC c4.6	**Low-emitting materials** - Exterior Applied Products	1
1				GGHC c5.1	**Chemical and Pollutant Source Control** - Outdoor	1
	1			GGHC c5.2	**Chemical and Pollutant Source Control** - Indoor	1
1				GGHC c8.1	**Daylight & Views** - Daylight for Occupied Spaces: 34-48% flr w/in 15'	1
1				GGHC c8.1	**Daylight & Views** - Daylight for Occupied Spaces: 38-56% flr w/in 15'	1
1				GGHC c8.1	**Daylight & Views** - Daylight for Occupied Spaces: 42-64% flr w/in 15'	1
	1			GGHC c8.1	**Daylight & Views** - Daylight for Occupied Spaces: 90% access to daylight	1
1				GGHC c8.1	**Daylight & Views** - Daylight for Occupied Spaces: 2% DF for 75% of staff	1
	1			GGHC c8.2	**Daylight & Views** - Building Orientation	1
	1			GGHC c8.3	**Daylight & Views** - Views for Occupied Spaces	1
1				GGHC c9	**Acoustic Environment**	1

33	LEED Points Targeted	
16 / 8	LEED Points Questionable or needing further review	
12	LEED Points Not Possible or Not Targeted	
18	Additional GGHC/LABS21 Points Targeted	
16 / 2	Additional GGHC/LABS21 Points Questionable or needing further review	
8	Additional GGHC/LABS21 Points Not Possible or Not Targeted	

Total LEED Rating System Possible Points 69
Total LEED Points Available to this Project 57

Certified 26 to 32, **Silver** 33 to 38, **Gold** 39 to 51, **Platinum** 52 and over

Y	?	?	N			
2	**3**	**0**	**0**	**Innovation and Design Process Points**	**Possible LEED Points**	**5**
1				Credit 1.1	Innovation in Design - Active Educational Component	1
	1			Credit 1.2	Innovation in Design - Green Housekeeping	1
	1			Credit 1.3	Innovation in Design - Recycled Content 30% (post-cons. + 1/2 pre-cons.)	1
	1			Credit 1.4	Innovation in Design - 100% parking undercover	1
1				Credit 2	LEED Accredited Professional - Isabelle Arnold	1

Alternatives:
Development Density - Exemplary Performance;
Site Development - Urban Open Space - 40%;
Alternative Transportation - Exemplary Performance;
Water Use Reduction - 40% Reduction;
Medical Equipment Efficiency (GGHC);
Low-emitting materials - Exterior Applied Products (GGHC)

9

Consistency with Interim Guidelines

9.1 Introduction

This chapter discusses the Dana-Farber Cancer Institute's compliance with the Interim Guidelines for the LMA, as adopted by the BRA in February 2003. Included in this chapter are analyses of Urban Design features, the Transportation issues and impacts on the LMA, and the DFCI Workforce Development Plan, as required by the Interim Guidelines.

9.2 Overall Relationship to Interim Guidelines

The BRA and the Office of Jobs and Community Services (OJCS), in conjunction with the Boston Transportation Department (BTD), initiated a master planning process for the LMA in the fall of 2002. The BRA adopted Interim Guidelines in February 2003 to inform the review of proposed projects and Institutional Master Plans pursuant to Article 80 of the Boston Zoning Code, prior to completion of the LMA master plan. The DFCI IMP responds to these guidelines and conforms to the urban design and institutional goals that they seek to implement. The overall planning and design of the Center for Cancer Care reflect the purposes and concepts of these guidelines.

- The Center for Cancer Care is designed as a signature building, creating an impressive public presence for DFCI, oriented to the major thoroughfare of Brookline Avenue. The project provides a new main entrance to the Institute and incorporates a mix of uses, including public services, information, food service and retail facilities on the first three levels. The design minimizes any negative impacts on adjacent land uses and open space, and improves the pedestrian flows to, through and around the DFCI campus.
- Improvements to the DFCI Campus as part of the Center for Cancer Care project will enhance the pedestrian experience and provide a better sense of place. These upgrades will enable DFCI to create landscaped public pedestrian space on its campus, connected to the surrounding LMA greenspace, and turn Jimmy Fund Way into the pedestrian focus of the complex. Proposed site improvements to be implemented over the term of DFCI's IMP will enhance

institutional identity, place-making and way-finding, and provide increased campus visibility along Jimmy Fund Way and Brookline Avenue.

- DFCI will continue its practice of locating outside the LMA those functions that do not require critical adjacency to clinical and research activities sited in the core campus. This off-site locating may include certain types of clinical, clinical and research support, administrative and general support functions. To accommodate these needs, DFCI will expand into additional remote leased space, as it already done at the South Campus, North Campus and Harbor Campus, with over 261,000 SF currently under lease outside the LMA.
- The proposed Center for Cancer Care will generate new employment opportunities for Boston residents, both in project construction and in on-going operation of the programs to be housed. DFCI workforce initiatives, as described later in this chapter, provide substantial commitments to workforce development and training programs.

9.3 Urban Design

The Urban Design section of the Interim Guidelines establishes a set of principles and criteria for planning and design of projects in the LMA. The guidelines identify the physical assets of the LMA, outline dimensional objectives for designated zones, including height and setbacks, and describe public benefits that may be provided by project proponents and institutions in order to achieve building heights greater than the specified base criteria.

9.3.1 Protection of Assets / Shadow Criteria

The guidelines establish a principle of protecting the physical assets of the LMA, and include restrictions on new shadow impacts on City of Boston parks. The Interim Guidelines state that:

> "...no project will be approved if it casts any new shadow for more than one hour on March 21st on the Emerald Necklace, Joslin Park or Evans Way Park."

The location of the DFCI campus and particularly the site of the Center for Cancer Care development to the south and east of Joslin Park raises issues concerning design consistency with and the approach to these shadow criteria.

Shadow studies for build and no-build conditions of the Center for Cancer Care have been conducted for the spring and fall equinoxes and the summer and winter solstices. Shadows were estimated for each study date at 9:00 AM, 12:00 noon, 3:00 AM, and 6:00 PM, except for the winter solstice and vernal equinox, which do not include studies after 3:00 because the sun sets before 6:00.

On the vernal equinox, net new shadows will fall to the west, north, and east of the Center for Cancer Care. During the summer solstice, shadow conditions are generally limited to the sidewalks around the Center for Cancer Care and on the opposite side of Brookline Avenue. During the fall equinox, shadow impacts from the Center for Cancer Care will be limited to the building's immediate vicinity with only fleeting shadows on adjacent buildings. For both equinoxes and the summer solstice, no net new shadow will be cast on Joslin Park. The winter solstice creates the least favorable conditions for sunlight in New England. The low angle of the sun during the winter months will elongate the shadows produced by the Center for Cancer Care and surrounding buildings. Net new shadow will fall briefly on Joslin Park in the afternoon on December 21st. Detailed plans and descriptions of these shadow study results are found in Section 6.3.

The Center for Cancer Care's massing has been carefully designed to minimize shadow impacts on the surrounding LMA, particularly on Joslin Park. The shadow conditions projected for the Center for Cancer Care will not cause substantial impacts to the surrounding area for a large part of the year. Impacts will generally be to the immediate surrounding public ways and sidewalks with fleeting shadow on Joslin Park in the afternoon on December 21st. This project complies with the BRA's LMA Interim Guidelines because it does not cast net new shadow on Joslin Park at all during the Spring Equinox.

9.3.2 Height Zones

The Interim Guidelines specify building height limits in the LMA for three separate zones. The entire DFCI campus falls within a height zone that limits the base height of buildings to 150 feet, with a potential maximum height of 205 feet.

The proposed Center for Cancer Care development is consistent with these guidelines. The maximum height of the building will be 190' to the top of the highest occupiable space from the average abutting grade. The increase over the allowed base height for this zone is justified because DFCI will provide the following Exceptional Public Benefits:

- **Relocating Appropriate Uses.** Dana-Farber Cancer Institute is committed to relocate to other parts of the city, outside the LMA, those functions that do not require critical adjacency to clinical and research activities in the core campus. These include various clinical, clinical and research support, administrative and general support functions. DFCI currently leases over 261,000 SF of space outside the LMA for such purposes and will continue and expand this practice for appropriate uses.
- **Workforce Development.** DFCI is preparing a Workforce Development Plan, in coordination with the BRA and the Office of Jobs and Community Services, as discussed later in this chapter.
- **Open Space and Streetscape.** The Center for Cancer Care project includes creation of ample new landscaped public open space along Brookline Avenue, enhancing the pedestrian environment along this major thoroughfare, and connecting the DFCI campus entrance to the LMA greenspaces in Joslin Park

and the Emerald Necklace. The Center for Cancer Care project also includes improvements to the pedestrian streetscape environment along Jimmy Fund Way, Binney Street and the pedestrian way next to MATEP, with upgraded paving materials, lighting, plantings, graphics and street furnishings. Over the term of the IMP, similar streetscape enhancements will continue to be implemented along Jimmy Fund Way and Binney Street at the Dana, Mayer and Jimmy Fund buildings.

- **Public Realm Improvements.** The first three floors of the Center for Cancer Care will be designed as public-oriented environments. They accommodate the main entrance to the DFCI campus, patient and family reception and services, public information, a resource center on cancer oncology and support services, retail space, food service and conference facilities, the chapel, pastoral care and a healing garden. The two-story lobby will create an open, welcoming place to invite visitors into these public spaces, with visible accessible circulation to all service areas on the three levels.
- **Public Transportation.** DFCI will implement a comprehensive traffic management plan, including a creative solution for drop-off below grade and away from traffic, improvements to loading and services, and relocation of central receiving and materials management activities outside the LMA This will provide significant relief from traffic congestion in the LMA surrounding the campus. In addition, local street network improvements such as signal upgrades and camera installations, together with a reduction in DFCI's overall parking ratio and a continuing commitment to subsidized and facilitated alternatives to employee driving in the LMA, will benefit its neighbors and the city.
- **Sustainable Design.** The Center for Cancer Care is being developed with a focus on optimal application of sustainable design features and operating procedures. The project has been registered with the United States Green Building Council (USGBC) and is targeting a Silver Leadership in Energy and Environmental Design (LEED) rating. In addition, the Green Guidelines for Healthcare Construction (GGHC) rating system is being followed as a guideline to further best practices in green construction specific to healthcare facilities.

9.3.3 Setbacks and Stepbacks

The Interim Guidelines specify criteria for setbacks and stepbacks of new buildings in the LMA, stating that: "Setbacks from curb shall match the most appropriate prevailing setbacks; and building mass above the prevailing streetwall (potential maximum of 75') must be either 75' from the setback line, or not be visible at street level from the back of the opposite sidewalk." For the site of the Center for Cancer Care development, there is no stepback line designated on the maps in the Interim Guidelines.

The proposed Center for Cancer Care design is generally consistent with these setback and stepback provisions. The building is set back along Brookline Avenue to match the general pattern of setbacks along the east side of the street, as defined by the ServiceCenter Garage, MATEP and Mayer buildings. The façade of the Center for Cancer Care along Jimmy Fund Way is designed to align with the face of the adjacent Smith Laboratories Building.

9.3.4 Mix of Uses

The Interim Guidelines require that new developments "improve the character, security, and vitality of the LMA by increasing the mix of housing, supporting retail, recreation, and community facilities in the institutional projects. The ground floors of buildings shall include retail use or other uses that engage the public."

The proposed Center for Cancer Care meets these criteria by dedicating the first three floors to publicly active and accessible DFCI programs including public information, patient and family reception and services, a resource center on cancer oncology and support services, food service, dining and conference facilities, the chapel, pastoral care and a healing garden. These program-spaces will be accessible to the public and visible from the exterior, the main entrance and the open, inviting two-story lobby area. The ground floor along Brookline Avenue will be dedicated to retail space, directly accessible from the public sidewalk. These amenities will be designed to make patients, visitors and the larger public feel welcomed, oriented and engaged in the DFCI campus and its clinical and research activities.

9.3.5 Character

The Interim Guidelines state that: "New projects should build on and reinforce the distinctive physical, historic, and architectural characteristics of each of the institutions within the LMA" through measures concerning way-finding, access and circulation, preservation of significant buildings, and appropriate width and spacing of tall elements. The proposed Center for Cancer Care achieves this goal by:

- Simplification and improvement of way-finding to and through the DFCI complex by creating a prominent new main entrance in the Center for Cancer Care at the corner of Brookline Avenue and Jimmy Fund Way, providing visible and accessible routes from the main entrance lobby to all parts of the DFCI campus and its neighbor institutions, and establishing a clear institutional identity through better master planning, coordinated upgrade of exterior architectural treatments on existing buildings, reorientation of entries, and reinforcement of the third-level pedestrian bridge system connecting all facilities.
- Improved access for patients and visitors arriving by car, public transportation or foot, through design of the new main entrance and drop-off in the Center for Cancer Care. This involves a primary drop-off and valet parking at the first underground level, with direct elevator access to all public floors of the building and to the third-floor pedestrian bridge system. There is also an inset curb-side drop-off along Jimmy Fund Way for rapid drop-off and pick-up,

with DFCI staff stationed as "ambassadors" to assist patients and visitors at this entry point. Doorways to the main entrance lobby open to both Jimmy Fund Way and Brookline Avenue for optimal identification and access into the DFCI complex.

- Consolidation of all on-site parking for the DFCI campus in the underground levels of the combined Center for Cancer Care-Smith Building facility. This removes the negative visual, environmental and operational impacts of existing on-grade and above-grade parking, and creates the opportunity to enclose and reuse the above-ground parking decks in the Dana Building for primary Institute functions.
- Design of the proposed Center for Cancer Care as a signature architectural project, befitting the stature of the Dana-Farber Cancer Institute. The design breaks the massing of the tower into smaller elements that diminish any sense of bulkiness and emphasize the verticality of the construction. The new tower is set back from the face of the Smith Building by about 35 feet. The Center for Cancer Care is similar in massing to the Smith Building but distinctive in exterior design, creating a related but varied complex of volumes and lively urban streetscape on the DFCI campus.

9.4 Transportation

The LMA Interim Guidelines specify five transportation-related subjects that must be addressed by every project in the LMA. These five topics include:

- Parking ratios
- Transportation Demand Management
- Traffic Management
- Local Street Network
- System-Wide Transportation Projects

Dana-Farber Cancer Institute provides responses and actions on these issues as described below. These efforts are intended to improve local vehicular circulation, reduce congested conditions and improve pedestrian access in and around the LMA.

9.4.1 Parking Ratios

DFCI currently controls approximately 1,454 total off-street parking spaces, with 340 parking spaces available for use by its off-site either walk or use shuttle buses to travel between the DFCI campus and these remote parking facilities.

At the end of the term of the IMP submitted simultaneously with this DPIR/DEIR, DFCI will have constructed 290,049 ZGSF of net new space and 217 net new parking spaces, which complies with the LMA Interim Guidelines for construction of new on-site parking spaces (.75 new parking spaces per 1,000 zoning gross SF of space). New parking that is proposed within the IMP is intended to serve its patients and visitors only, and to provide a sufficient on-campus patient parking supply that is convenient to where core patient services are offered. No new parking is proposed to accommodate employees. When the Center for Cancer Care is completed, it is expected that the overall parking supply on the DFCI Campus will increase by only 217 parking spaces.

When the Center for Cancer Care is completed, DFCI's parking ratio within the LMA will decrease from to 0.94 to 0.89 spaces per 1000 ZGSF.

9.4.2 Transportation Demand Management

Dana-Farber Cancer Institute is committed to continuing to offer a wide array of Transportation Demand Management (TDM) incentives as a means to reduce single occupant driving and increase use of alternative forms of transportation to access the workplace. DFCI actively supports efforts to reduce auto use for employees traveling to the hospital. Many actions to support this goal are actively employed by DFCI today, including the following:

- Employee Transportation Advisor
- Membership in MASCO's CommuteWorks TMA
- Full support of MASCO's other on-going transportation initiatives
- 50 percent transit pass subsidy for employees
- Carpool assistance and incentives
- Bicycling/walking incentives and amenities
- Location-priced parking (i.e.; offering competitive-rate parking on-campus and subsidized parking off-campus)
- Telecommuting and compressed workweeks, when feasible.
- Promotional efforts

DFCI 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.

9.4.3 Transportation Mitigation and Improvement Actions

This section delineates the transportation improvements and mitigation plan developed by DFCI. The purpose of this transportation mitigation plan is to:

- Help alleviate transportation impacts generated by the Center for Cancer Care;
- Provide transportation infrastructure enhancements to the LMA, including improved pedestrian corridors, and public space amenities; and

- Exceed the requirements of the BRA's Interim Guidelines for the LMA relative to transportation improvements and mitigation.

Dana-Farber Cancer Institute has also made important mitigation commitments in the form of policies and management actions. Key commitments are: continuing to establish and maintain a proactive TDM program; parking management strategies to limit the construction of new parking spaces to 0.75 parking spaces per 1,000 SF of development, as per the guideline established by the LMA Interim Guidelines; implementation of an improved pick-up/drop-off and patient valet parking operations management plan; and careful coordination construction management actions related to the forthcoming Center for Cancer Care. DFCI believes that these transportation mitigation actions will lessen the impacts of their proposed development plans and, when complete, will help improve the LMA's existing transportation infrastructure.

This joint transportation mitigation plan includes several elements:

- Roadway and traffic operations improvements
- Parking consolidation and management strategies
- Transportation demand management enhancements
- Sustainability
- Pedestrian access and open space improvements
- Construction management
- Participation in and partial funding of several system-wide transportation improvement studies for the LMA

Many of these mitigation elements will improve the LMA transportation infrastructure in addition to addressing potential impacts of the Center for Cancer Care. Table 10-1 in Chapter 10, Mitigation, lists each transportation mitigation element that is proposed by DFCI and provides a summary of the following:

- Description of the proposed action
- Interim Guideline criterion that is met by that action
- Summary of the purpose and benefit of that action
- Implementation responsibility

Additionally, Figures 5-1 and 5-2 (presented previously in Chapter 5, Transportation) illustrate the physical location of the various transportation improvements that are proposed

9.5 Workforce Development

The Interim Guidelines require institutions or developers contemplating development to present to BRA and the Office of Jobs and Community Services (OJCS) workforce development staff, as part of the development review process, an assessment of current and projected workforce needs, and to work with BRA/OJCS staff to formulate a workforce development plan to address those needs.

DFCI is preparing a workforce development plan in consultation with the BRA and OJCS that outlines existing and proposed future workforce development initiatives.

To advance our workforce development program, Dana-Farber Cancer Institute is committed to hiring a full-time Workforce Development Manager to work closely with DFCI's management team (which includes a newly hired Vice President for Diversity), the Office of Jobs and Community Service, local neighborhood agencies and community groups. The responsibilities of this leadership position include building upon our current Workforce Development programs, skills/needs assessment, community outreach specific to workforce development, enhancing school partnerships, identifying opportunities for DFCI's incumbent workforce, and establishing career ladders.

Some of the major elements of DFCI's existing and proposed initiatives are summarized below.

9.5.1 Employment Assessment

DFCI is a major institutional employer of Boston residents. With a workforce of approximately 3,557 employees at its facilities in the Boston area, current data indicates that approximately 32 percent, or 1,123, are Boston residents. These employees work in the full range of positions available at the Institute. Included in these totals are 246 workers who are employees of outside vendors that provide services at DFCI. The existing workforce is summarized by job family in Table 9.1.

Over the next ten years, DFCI expects its workforce to grow at an annualized rate of approximately 6.2 percent (refer to Table 3-2 in Chapter 3). This level of growth would result in approximately 3,800 new positions being created by 2017. Of this total, 250 clinical and support positions are anticipated as a result of the new Center for Cancer Care. Another 150 research and support positions would be created by activities that have been in the LMA but are now shifted to DFCI's Harbor Campus in South Boston.

Table 9.1 DFCI Boston Resident Employees by Job Families

Job Family	Number of Boston Resident Employees	Number of Boston Residents Contract Workers	Total DFCI & Contract Workers	Percent of Boston Resident Workers	Number of DFCI Employees	Percent of DFCI Employees
Service	4	86	90	49.72%	181	5.09%
Unskilled	24		24	38.10%	63	1.77%
Semi-skilled	9		9	47.37%	19	0.53%
Skilled	4		4	12.90%	31	0.87%
Student/ Intern	93		93	49.73%	187	5.26%
Clerical	200		200	43.29%	462	12.99%
Technician	70		70	38.46%	182	5.12%
Professional	550	7	557	28.00%	2,034	57.18%
Manager	76		76	19.10%	398	11.19%
Totals	**1,030**	**93**	**1,123**	**32%**	**3,557**	**100.00%**

9.5.2 Existing DFCI Workforce Development & Training Initiatives

Although DFCI's workforce is highly skilled, with most positions requiring post-secondary education, DFCI is committed to identifying and providing employment opportunities for community residents and is targeting the development of career ladders and internal advancement for positions that include administrative assistants, clinical coordinators, and patient coordinators.

Dana-Farber Cancer Institute participates in job outreach to local residents through Roxbury Community College, Grace Baptist Church, The Latino Job Fair through El Mundo, Community Care day at the Hispanic Office of Planning, Sociedad Latina, Jewish Vocational Services, YMCA Training Institute, and Roxbury Multi-Service Center.

9.5.2.1 Youth Programs

DFCI also seeks to encourage interest in healthcare and science-related fields among Boston students as well as offering programs for current workers to advance within DFCI positions.

DFCI maintains educational partnerships with Boston area high schools and colleges to provide underrepresented students of color internship opportunities to explore and pursue careers in health and science. DFCI works closely with the following schools to place students who have a specific interest in health and science.

Educational Partnerships

- Boston Latin School Science Mentorship Program
- Fenway High School
- Madison Park Technical Vocational High School – Allied Health and Human Services Academy

During the 2004-05 academic year and summer 2005, more than 75 Boston Public Schools students from diverse backgrounds worked at DFCI in clinical, research, and administrative departments. A number of students participated through the Boston Mayor's Summer Jobs Program. Students had opportunities to receive CPR certification, participate in presentation skills and PowerPoint classes, engage in site visits at biotech companies, and attend educational seminars. In addition to the schools noted above, students hailed from the following Boston Public Schools:

- Boston Arts Academy
- Boston Latin Academy
- Boston Leadership Academy
- Brighton High School
- Charlestown High School
- Community Academy of Science and Health
- Health Careers Academy
- John D. O'Bryant School of Math and Science
- Muriel Snowden International School
- West Roxbury High School

Dana-Farber also participates in Explorations, a partnership among Boston-area healthcare institutions, Harvard Medical School, and Boston public schools. In this program, middle school students interested in science and math are paired with PhD's in the research community for a one-day job-shadow. Annually, approximately 200 students participate at various institutions.

Another successful program has been our Continuing Umbrella of Research Experiences (CURE), which introduces high school students from underrepresented minority populations to the world of cancer research, in real research settings.

DFCI actively participates in school-to-work programs with the Boston Private Industry Council (PIC). PIC programs include:

- Classroom at the Workplace – DFCI provides paid internships for high school students who had not passed one or both sections of the statewide test MCAS. Students work up to 40 hours per week with two hours of classroom instruction per day. Each summer, DFCI provides internships to 4-8 students.
- Groundhog Job Shadow Day – Students shadow DFCI employees to learn about their job responsibilities, as well as the skills and training needed for their position.

DFCI also participates in hands-on programs for students that include:

- Biomedical Science Career Program (BSCP)
- Summer Science Enrichment Program for Women

In addition, DFCI participated in career fairs specifically for Boston area youth:

- Mission Hill Youth Forum
- Fenway High Career Day
- The Partnership 2006 Career Connection Conference

9.5.2.2 Incumbent Worker Programs

In addition to working with youth and young adults, Dana-Farber offers career development opportunities for its staff through the following programs:

- *Boston Healthcare and Research Training Institute*: comprehensive training and educational programs for entry and mid-level employees. Courses allow employees to build upon existing skills, while helping them to advance along career pathways.
- *Tuition Reimbursement* for DFCI full- and part-time staff
- *Bunker Hill Community College*: program in Medical Coding
- *English as a Second Language (ESL)*
- *DFCI-Sponsored Training*: classes in Spanish, medical terminology, and computer training.
- *Sponsorship of Boston Associates and Fellows through The Partnership*: collaboration with the Boston Chamber of Commerce increase the number of people of color in leadership roles in the Boston community.
- *University of Massachusetts at Boston:* In 2004, Dana-Farber entered into a new affiliation with the University of Massachusetts at Boston (UMass). Eight UMass Boston nursing students from diverse backgrounds completed their community health rotation at DFCI during the fall of 2005.

9.5.3 Future Employment

Construction of the Center for Cancer Care, the Dana Infill Project, the Dana/Mayer Façade Improvements, and the planned campus improvements will contribute directly to the local economy by providing numerous employment opportunities. Approximately 280-320 full-time construction jobs are anticipated as a result of these projects. A Boston Residents Construction Employment Plan will be submitted in accordance with the Boston Jobs Policy. The Plan will provide that the proponent will make reasonable good-faith efforts to have at least fifty percent of the total employee work hours be by Boston residents, at least 25 percent of total employee work hours be by minorities and at least ten percent of the total employee work hours be by women.

DFCI current employs approximately 1,123 Boston residents as part of a diverse work force of 3557 full-time and part-time employees. Development of the Center for Cancer Care described in this document is expected to generate approximately 250 permanent new jobs, including medical, technical, and support positions.

9.5.4 Future DFCI Workforce Development Activities

DFCI is preparing a Workforce Development Plan in consultation with the BRA and the Office for Jobs and Community Services, with the following goals in mind: increasing the percentage of community residents, diversifying our workforce, and becoming a leader at exposing careers in health and science. Initiatives under consideration include the following:

Increasing the Community Pipeline:

- Develop a robust partnership with community-based organizations, such as Hispanic Office of Planning and Evaluation in Jamaica Plain. This will strengthen our community pipeline by establishing closer relationships.
- Utilizing DFCI vans, establish mobile job fairs and career information sessions.
- Facilitate career development presentations/seminars at community-based organization and provide career consultation.
- Establish a comprehensive volunteer program, "Volunteers for Health Careers," in which DFCI employees in clinical positions provide information about their careers to youth, incumbent workers, and/or community residents through activities such as presentations, job shadows, internships, and mentoring.
- Increase participation in career development classes at DFCI for incumbent workers.
- Hold an annual Health Day for the community in which both health information and career information would be showcased.

Investing in Education and Training for Our Incumbent Workforce

- Develop targeted outreach for contract employees in the areas of health career exposure and educational opportunities provided through the Research and Training Institute and the DFCI training department.
- Support and celebrate incumbent employees who are successfully developing their careers.
- Provide individual career counseling and group career development seminars through the Harvard Medical School Center for Workforce Learning and Performance.
- Act as primary liaison with the Boston Research and Training Institute. Track and support employees who are moving along an educational plan from basic skills to pre-college classes to enrollment in college. Work with the Employment and Compensation Team to enhance career ladders.

Health Care Exposure through Youth Programs

- Develop a scholarship program for a few outstanding Boston Public School graduates each year who have successfully participated in DFCI programs and who have been accepted into a college health professions program.
- Collaborate with the Massachusetts State Science and Engineering Fair to create a linkage between DFCI scientists and researchers and students in the Boston area
- Partner with the United Way of Mass Bay's after-school Science, Math and Technology Initiative.
- Team with local middle schools to create excitement around science. DFCI researchers "go back" to the classroom to work with teachers and students for hands on clinical activities.
- Participate with MASCO and the John D. O'Bryant Schools of Mathematics and Science with the LMA Gateway Project, which is designed to enhance the teaching experience for the inner city youth interested in careers in medicine and science

9.6 Conclusion

The above discussion of consistency with the LMA Interim Guidelines shows that the Center for Cancer Care and the related projects discussed in the IMP are consistent with the guidelines. Any minor exceptions are justified as acceptable due to provision of Exceptional Public Benefits as part of Dana-Farber Cancer Institute programs. Overall, the IMP and the proposed DFCI projects fundamentally meet the spirit and the overarching urban design and development purposes of the LMA Interim Guidelines, as adopted by the BRA.

10

Mitigation and Section 61 Findings

10.1 Project Mitigation

The mitigation proposed by DFCI and summarized within this chapter is comprehensive and addresses expected impacts of the Center for Cancer Care project as described within this Draft PIR/EIR. The mitigation has been developed in response to the BRA Scoping Determination and MEPA Certificate, the BRA's LMA Interim Guidelines, and comments received during DFCI's ongoing public review process over the past year.

10.1.1 Transportation

This section describes the transportation improvements and mitigation plan developed by Dana-Farber Cancer Institute. The purpose of the transportation mitigation plan is to:

- Help alleviate transportation impacts generated by the DFCI IMP projects
- Provide transportation infrastructure enhancements to the LMA, including improved pedestrian corridors, and public space amenities
- Exceed the requirements of the BRA's Interim Guidelines for the LMA relative to transportation

DFCI 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 Transportation Demand Management program, parking management strategies to limit the construction of new parking spaces to the 0.75 parking spaces per 1,000 SF of development guideline established by the LMA Interim Guidelines, implementation of an improved pick-up/drop-off and patient valet parking operations management plan, and carefully coordinated construction management actions related to the forthcoming IMP projects. DFCI believes that these transportation mitigation actions will lessen the impacts of their proposed development plans and, when complete, will help improve the LMA's existing transportation infrastructure. This transportation mitigation plan includes several elements:

- Roadway and traffic operations improvements
- Transit enhancements

- Parking consolidation and management strategies
- Transportation demand management enhancements
- Sustainability
- Pedestrian access and open space improvements
- Construction management
- Participation in and partial funding of several system-wide transportation improvement studies for the LMA

Many of these mitigation elements will improve the LMA transportation infrastructure in addition to addressing potential impacts of the DFCI IMP projects. Table 10-1 lists each transportation mitigation element that is proposed by DFCI and provides a summary of the following:

- Description of the proposed action
- Summary of the purpose and benefit of that action
- Implementation responsibility

Table 10-1: Proposed Dana-Farber Cancer Institute Transportation Mitigation and Improvement Plan

	Mitigation Element	Description	Purpose/Benefit	Implementation Timing
Traffic Management Plan				
1	Patient Drop-off on Jimmy Fund Way	Provide a minimized off-street drop-off along Jimmy Fund Way – which will be made available for first-time DFCI patients, chair cars, taxis and ambulances only.	Minimize streetside traffic conditions along JFW and Brookline Avenue	C of O for the Center for Cancer Care
2	Below-Grade Drop-off on P1.	Implement a cutting-edge drop-off on P1 of the new Center for Cancer Care.	Improve patient experience at DFCI. Provide simplified wayfinding to desired points in the DFCI campus.	C of O for the Center for Cancer Care
3	Loading and Service Improvements	Reconfigure the DFCI Smith Loading Dock to include 2 additional loading bays.	Improve off-street loading conditions, eliminate potential illegal loading along Brookline Avenue.	C of O for the Center for Cancer Care
4	Off-Site Materials Management Actions	Implement an off-site Materials Management Center in 27 Dry Dock Avenue.	Allows for "just in time" delivery techniques, which will reduce trucks trip frequency and dock utilization times.	Early 2007
Local Street Network / Systemwide Transportation Improvements				
5	Brookline Ave/Jimmy Fund Way/Deaconess Rd Signal Improvements	Modify the existing traffic signal operations to accommodate a protected left-turn movement from Brookline Avenue to Jimmy Fund Way. Modifications will include provision of a new traffic controller, mast arms, signal posts, pedestrian signals, crosswalks, and signage.	Will improve patient wayfinding and safety in the area.	C of O for the Center for Cancer Care
6	Brookline Ave/Jimmy Fund Way/Deaconess Rd Pedestrian Improvements	Modify corner radii at the intersection, install ADA-compliant accessible ramps, and include countdown pedestrian indications in the new signal design.	Improve pedestrian safety.	C of O for the Center for Cancer Care
7	Widen Jimmy Fund Way	Widen Jimmy Fund Way to include two approach lanes at its intersection with Brookline Avenue.	Will decrease traffic queues on JFW and provide an improved traffic flow along both JFW and Binney Street.	C of O for the Center for Cancer Care
8	Area Sidewalk Improvements	Reconstruct wide sidewalks along Brookline Avenue and Jimmy Fund Way adjacent to the project site.	Improve pedestrian access, safety, and urban design of the area.	C of O for the Center for Cancer Care

Table 10-1 (Continued): Proposed Dana-Farber Cancer Institute Transportation Mitigation and Improvement Plan

	Mitigation Element	Description	Purpose/Benefit	Implementation Timing
9	PTZ Camera Installation	Install an internet-connected Pan-Tilt-Zoom traffic monitoring camera at the intersection of Brookline Avenue/Jimmy Fund Way	Improve traffic and incident management system for the City of Boston.	C of O for the Center for Cancer Care
Urban Design				
10	Center for Cancer Care Pedestrian Plaza	Provide significant public space at the entrance to the Center for Cancer Care at the intersection of Brookline Avenue/Jimmy Fund Way.	Provide public space enhancement that complements open space at Joslin Park	C of O for the Center for Cancer Care
11	Jimmy Fund Way Urban Design Improvements	Provide widened sidewalks, street trees and other hardscape amenities along JFW.	Provide public space enhancement to the DFCI campus	In connection with future Dana Building Infill project
Parking Ratios				
12	Limit new on-site parking to be constructed as part of the IMP	DFCI IMP projects will include construction of 217 parking spaces for 290,049 SF of development.	Resultant parking ratio for the DFCI IMP will be 0.75 spaces per 1,000 s.f., that complies with the ratio that has been established by the BTD within the LMA Interim Guidelines.	C of O for the Center for Cancer Care
13	Convert employee parking to patient parking	Convert existing employee parking spaces to patient parking spaces.	Maintain quality patient care/customer service. Reduce peak hour traffic volumes. Minimize need to construct new on-campus parking spaces.	As needed during the term of the IMP
14	Employee Parking Pricing	Evaluate and charge market rates for monthly employee parking.	Encourage shift employee mode share from auto to transit. Will help to curb parking demands.	Immediate
Transportation Demand Management Plan				
15	Maintain proactive relationship in MASCO's CommuteWorks TMA	Maintain access to wide array of TDM programs and amenities that seek to encourage the use of transit as a regular means of commuting.	Encourage shift in employee mode share from auto to transit.	Ongoing
16	Maintain high percentage employee transit subsidy	Maintain employee/tenant transit subsidy at 50 percent.	Encourage shift in employee mode share from auto to transit.	Increased November 2005

Table 10-1 (Continued): Proposed Dana-Farber Cancer Institute Transportation Mitigation and Improvement Plan

	Mitigation Element	Description	Purpose/Benefit	Implementation Timing
17	Zip Car Provision	Coordinate with ZipCar to add a parking space for this shared-car service in the Center for Cancer Care.	Encourage shift in employee mode share from auto to transit.	C of O for the Center for Cancer Care
Sustainability				
18	Provide preferential parking for hybrid vehicles	Allocate preferential parking spaces for hybrid and other alternatively-fueled vehicles.	Encourage the use of alternatively fueled vehicles.	C of O for the Center for Cancer Care
Construction Management				
19	Prepare Construction Management Plan	Prepare and submit a detailed Construction Management Plan (CMP) for the Center for Cancer Care project	Minimize construction impacts.	Completed

10.1.2 Wind

Mitigation is being considered for the Center for Cancer Care project to limit wind impacts where reasonable and economically feasible.

10.1.3 Shadow

The shadow study analysis performed for the project describes potential impacts to the streets, sidewalks, and open spaces in the project's vicinity. Results indicate that for a large part of the year, the project will not cause substantial impacts to the surrounding area. In general, impacts are primarily to the immediate surrounding public ways and sidewalks with fleeting shadow on the Joslin Park in the afternoon during the Winter Solstice. In addition, as described in the discussion of compliance with the Interim Guidelines included in Chapter 9, the project complies with the BRA's LMA Interim Guidelines shadow criteria.

10.1.4 Daylight

The results of the daylight analysis reveal that daylight obstruction resulting from the development of the project will increase obstruction over existing conditions; however the resulting conditions along the streets surrounding the site are similar to those in the surrounding LMA area.

10.1.5 Solar Glare

The solar glare analysis showed that the Center for Cancer Care will not result in adverse solar glare impacts because the solar reflection will not be facing the vehicular traffic (unless accompanied by direct solar glare), or will be outside the cone of vision for pedestrians.

The low exterior reflectivity of the glazing used on the Center for Cancer Care coupled with the sun shading devices on the façade will disperse incoming light and significantly reduce the intensity of potential solar glare. In addition, the analysis is conservative because it assumes the facades are highly reflective, when in fact they will not be. The complex surface of the building will help to mitigate solar glare and eliminate major issues of heat loading on nearby buildings.

Similar to the solar glare, only minor impacts are anticipated as a result of the use of low reflective glass and the design of the Center for Cancer Care.

10.1.6 Noise

The noise analysis demonstrates that existing traffic and mechanical equipment are the dominant noise source for the existing and build conditions. The traffic noise from Brookline Avenue and mechanical equipment noise from adjacent facilities substantially contributes to the sound levels at all the receptor locations.

The City of Boston and DEP have different noise impact criteria. The City's ordinance establishes maximum daytime and nighttime sound levels for different land uses that should not be exceeded. The State requires that the proposed project not increase sound levels by more than 10 dBA above existing levels.

The noise analysis demonstrates that the existing sound levels currently exceed the City's noise criteria. The Center for Cancer Care project will generate build sound levels that are below the existing sound levels. While every effort was made to reduce sound levels, the future sound levels at the study area receptor locations will continue to exceed the City's noise criteria with the proposed project.

With the proposed project, the study area receptors experience sound levels ranging from 63 dBA to 67 dBA during the daytime and from 60 dBA to 65 dBA during the night time. However, the results show that the proposed project will have insignificant increase in sound level. The increase in sound level is due to the rooftop mechanical equipments.

DEP requires that the proposed project not increase sound level by more than 10 dBA above existing sound levels. The anticipated sound levels are 0 to 3 dBA higher than the existing sound levels for all the receptor locations except for MATEP, where the increase is expected to be 5 dBA. All of these increases are substantially below the DEP criteria of 10 dBA. It should be noted that, as discussed in section 6.6.2, a 3 dBA increase is just barely perceptible to the human ear.

10.1.7 Air Quality

The air quality study demonstrates that the Center for Cancer Care project conforms to the CAAA and the SIP. The microscale analysis evaluated site-specific impacts from vehicles traveling through congested intersections in the study area, and impacts from the parking garage and proposed emergency generators. This analysis demonstrates that all existing and future CO concentrations will be below the NAAQS.

The air quality study demonstrates that proposed Center for Cancer Care conforms to the CAAA and the SIP because:

- No new violation of the NAAQS will be created
- No increase in the frequency or severity of any existing violations will occur
- No delay in attainment of any NAAQS will result

10.1.8 Solid and Hazardous Waste

The proposed Center for Cancer Care project will include generation of additional solid waste on DFCI's LMA campus and proactive recycling measures will also be employed on-site to reduce waste generation at DFCI.

10.1.8.1 General Solid Waste Generation and Disposal

Based on current waste generation at DFCI's LMA campus, the proposed Center for Cancer Care is expected to generate approximately 370 tons of solid waste per year. Solid waste is expected to include waste paper, cardboard, food waste, and styrofoam/plastic. Waste collection containers will be positioned at key points within the Center for Cancer Care and will be collected multiple times per day from patient observation rooms and common areas and transported to covered waste carts on each floor. Waste will then be transported to a centralized waste compactor in the Smith Laboratories Building loading/service area during off-hours. Solid waste from patient areas, laboratories, the dining facility, and administrative offices will be contained, transported and disposed of in separate containers.

10.1.8.2 Recycling

A portion of the general waste described above in Section 6.8.2.1 will be recycled. DFCI's "Green Team" coordinates the effort to increase environmental awareness and reduce waste generation at DFCI. DFCI currently employs a proactive recycling program that includes paper, cardboard, wood pallets, batteries, Styrofoam containers, and electronics, such as computers, monitors, and cellular telephones. In 2005, approximately 51 tons of mixed paper, 43 tons of cardboard, and over 1.5 tons of electronic equipment were recycled. DFCI's recycling activities were recently cited by the EPA for its achievements and DFCI will employ its system-wide recycling program within the new Center for Cancer Care facility. Recycling initiatives in the Center for Cancer Care are also discussed in Chapter 8, Sustainable Design.

10.1.8.3 Hazardous Waste Generation/Disposal

Based on current waste generation at DFCI's LMA campus, the proposed Center for Cancer Care is expected to generate approximately 45 tons of medical/hazardous waste per year. Regulated medical waste will be stored in waste rooms with specifically designed leak proof, labeled waste containers. These containers will be ferried to the Smith loading/service area where they will be processed and disposed of as either rendered, non-infectious waste (solid waste) or "regulated medical waste."

10.1.8.4 Regulated Medical Waste Generation/Disposal

Regulated medical waste will be specifically lined, sealed and marked for incineration in the Smith loading/service area. These materials are regularly removed off-site by a licensed vendor. Waste determined to be bio-hazardous are removed in bio-hazardous totes and transported to a waste treatment area. Sharps waste is segregated from other waste and placed in rigid, puncture-resistant, leak-proof, and shatterproof biohazard sharps containers. Regulated medical waste is stored and disposed of separately in accordance with local, state, and federal regulations.

10.1.8.5 Chemical Waste Generation/Disposal

No appreciable amounts of chemical waste are anticipated to be produced within the Center for Cancer Care. If any are produced, they would likely fall under the classification of a very small quantity generator (vsqg). Any chemical waste would be characterized for chemical composition, packaged, transported and disposed of in accordance with State and Federal requirements utilizing a Massachusetts-licensed hazardous waste contractor.

10.1.8.6 Radioactive Waste Generation/Disposal

DFCI expects that some low-level radioactive waste and infectious waste will be generated in the Center for Cancer Care and will need to be disposed of properly. Management of these types of waste are highly regulated for the safety of the public and the environment. Similar in nature to chemical waste, any low-level radioactive waste would be identified, packaged, transported and disposed of in accordance with State and Federal requirements utilizing a Massachusetts-licensed hazardous waste/radioactive waste contractor.

10.1.8.7 Spill Control Measures

DFCI employs clearly-defined spill control/prevention procedures including the following:

- 24-hour on-call staff.
- Responder training procedures/requirements.
- On-site storage of supplies and equipment to handle small/manageable spills/incidents.
- On-call contingency plan with a licensed contractor to respond to and handle larger spills (if they occur).

10.1.9 Water Quality/Wastewater

10.1.9.1 Construction Stormwater Quality

Construction activities related to proposed project are not expected to produce significant changes in either the pattern or rate of stormwater runoff from the site. Construction period stormwater management controls will be established in compliance with BWSC standards, and the project will not result in introduction of any peak flows, pollutants, or sediments that would potentially impact the receiving waters of the local BWSC stormwater drainage system. Potential runoff during construction will be controlled by measures developed in accordance with the policies and approvals of the BWSC and other appropriate oversight agencies.

10.1.9.1 Consistency with DEP Stormwater Policy

This section discusses the compliance of the project with the Department of Environmental Protection's (DEP) Stormwater Management Policy Standards. There are nine standards and each standard is addressed individually herein.

Standard #1: Untreated Stormwater
Existing catch basins and proposed catch basins (if required) with hoods and sumps will collect sidewalk runoff and sediments and help control floatables. Interior garage runoff will be conveyed through an oil and gas separator and transmitted to the sanitary sewer system as required by building code. Roof runoff will be captured and the captured roof runoff will be reused within the building. The remaining roof runoff will be discharged to BWSC storm drains. DFCI has committed to placing "Don't Dump: Drains to the Charles River" plaques at each of its storm drain locations throughout the campus.

Standard #2: Post-Development Peak Discharge Rates
The peak discharge rate will be reduced by a combination of green roofs and a cistern as discussed in Section 7.4.1. The goal of the Center for Cancer Care's stormwater management program is a 25 percent reduction in the 2-year storm event volume.

Standard #3: Recharge to Groundwater
Because of the size, density and surface characteristics of the site, under both existing and future conditions groundwater recharge conditions will remain unchanged.

Standard #4: 80 Percent Total Suspended Solids Removal
The existing site contains a parking lot with no TSS treatment. By removing this parking lot and replacing it with cleaner roof area, the amount of TSS is expected to decrease significantly. Roof area runoff does not require treatment.

Standard #5: Higher Potential Pollutant Loads
The Project site does not contain land uses with higher potential pollutant loads.

Standard #6: Protection of Critical Areas
The Project site does not contain any critical areas as defined by the DEP.

Standard #7: Redevelopment Projects
The proposed Project does not increase impervious area and the Project meets the Stormwater Management Standards to the maximum extent practicable, which is required to meet Standard #7.

Standard #8: Erosion/Sediment Controls
The Project's construction documents will include measures and specifications regarding erosion and sediment controls and barriers (e.g., silt fence, catch basin sacks). Construction dewatering discharges will be appropriately controlled and discharged in accordance with National Pollutant Discharge Elimination System (NPDES) and state dewatering standards. Further discussions regarding construction controls are included earlier in this chapter and in the below section.

Standard #9: Operation/Maintenance Plan
An operation and maintenance plan will be developed for both construction and post-development, which will include system ownership information, parties responsible for operation and maintenance, and inspection and maintenance schedules. Routine maintenance includes catch basin cleaning, stormwater control cleaning, and removal of debris from outlets. Pedestrian and vehicular access ways will be swept appropriately to control sand applied during winter months.

Measures aimed at minimizing the disposition of site soils to off-site areas, primarily the surrounding streets and existing drainage collection systems, will be a part of the City's required Construction Management Plan. In addition, DFCI is in the process of applying for appropriate permits for construction activity and dewatering. DFCI and its contractors will seek to contain sediment, pollutants, and any other construction-related materials within the site. Stabilized construction exits will be installed at each access point of the work areas to minimize off-site transport of soil by construction vehicles. These exits will remain in place until site areas have been stabilized. DFCI's contractors will use BMPs during construction, including installing silt sacks on catch basins.

10.1.10 Groundwater

The project design team has reviewed the issue of groundwater level impacts with the Boston Groundwater Trust and they are in agreement with the design team's assessment that the project design provides adequate protection against adverse impacts on groundwater levels.

10.1.11 Construction Impacts

10.1.11.1 Disposal and Recycling of Construction Debris

DFCI plans to proactively reprocess and recycle construction and building demolition waste to the greatest extent that is economically feasible. The project's disposal contract will include specific provisions for the segregation, reprocessing, reuse, and/or recycling of building materials and demolished debris. Those materials that cannot be recycled on-site will be transported in covered trucks to an approved solid waste facility per Massachusetts DEP's Regulations for Solid Waste Facilities. The construction debris recycling program will be implemented in conjunction with the Project's overall LEED certification strategy (currently establishes a 75 percent diversion rate; see Chapter 8).

10.1.11.2 Construction Worker Parking

The number of workers required during the construction will vary with an estimated average daily workforce of approximately 300 to 350 persons during the peak of construction. Because the workforce will arrive and depart prior to peak commuter traffic periods, these trips are not expected to have a large impact on the area's transportation system. Construction workers will arrive at the job site either via public transportation or by personal vehicles. No personal vehicles will be allowed to park at the project construction site or in the adjacent neighborhood. Since parking in the LMA is limited, public transportation will be encouraged. DFCI and its construction manager will work to identify off-site and shuttle bus parking opportunities for workers. Additionally, DFCI's CM has established an off-site marshalling and storage facility at the O.B. Hill facility in Allston to streamline deliveries and avoid queuing at the site.

10.1.11.3 Truck Routes/Volumes

Primary truck routing to the site will be from Route 9/Huntington Avenue to Brookline Avenue eastbound. Most trucks will enter the site on Brookline Avenue, however, steel deliveries are planned to be handled via a separate laydown location off of Jimmy Fund Way. No trucking will be allowed to approach the site from either Longwood Avenue or from Huntington Avenue. All subcontractors will be required to enforce these routes with their employees and suppliers/vendors. The project will participate in the LMA coordinated signage program overseen by MASCO.

Truck traffic will vary throughout the construction period, depending on the ongoing activity. It is expected that truck traffic will range on average between 10-15 trucks daily, spread evenly throughout the day, with an increase of 25-40 trips during larger concrete pours. Police details will be stationed at active site gates to coordinate traffic flow and assist in pedestrian direction. Mechanical street sweeping will be performed as required, full time during all heavy trucking periods (demolition, slurry wall, excavation, concrete pours, etc.). Gravel wash off areas will be maintained at all exits to limit mud tracking from the site.

10.1.11.4 Construction Air Quality

Air quality in the study area will not be substantially affected by project construction because of the temporary nature of site development construction and the confines of the construction area. Emissions from the operation of construction machinery (CO, oxides of nitrogen, particulate matter, sulfur oxides, and volatile organic compounds) are short-term and not expected to be significant.

The construction specifications will include measures to mitigate fugitive dust emissions. These measures will include wetting and stabilization to suppress dust generation, cleaning paved roadways, and scheduling construction activities to minimize the amount and duration of exposed earth.

Construction activities may generate dust, which will result in localized increase in airborne particle levels. Fugitive dust emissions from construction activities will depend on such factors as the properties of the emitting surfaces (e.g., moisture content and volume of spills), metrological and variables and construction practices employed. To reduce the emissions of fugitive dust and minimize impacts on the local environment, DFCI's CM and its subcontractors will adhere to a number of strictly enforced mitigation measures:

- Wetting agents will be used regularly to control and suppress dust that may come from the construction materials.
- All trucks for transportation of construction debris will be fully covered.
- Actual construction practices will be monitored to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized and to ensure that emissions of dust are limited.
- Mechanical sweeping will occur full-time during excavation and foundation activities.
- After those activities, sweeping will occur as needed.
- Wheel wash locations will be provided as necessary.
- All contractor and sub-contractor-operated diesel-powered non-road construction equipment with engine horsepower (HP) ratings of 60 HP and above, which is used on the project for a period in excess of 30 days, shall be retrofitted with Emission Control Devices in order to reduce diesel emissions.
- In addition, all motor vehicles and construction equipment shall comply with all pertinent City, State and Federal regulations covering exhaust emission control and safety.

- The reduction of emissions of volatile organic compounds (VOCs), carbon monoxide (CO), and particulate matter (PM) from diesel-powered equipment shall be accomplished by installing Retrofit Emission Control Devices.

The acceptable Retrofit Emission Control Devices for the project shall consist of oxidation catalysts that (1) are included on the Environmental Protection Agency (EPA) *Verified Retrofit Technology List;* and (2) are verified by EPA or certified by the manufacturer to provide a minimum emissions reduction of 42 percent for VOCs, 31 percent for CO and 20 percent for PM. Attainment of the required reduction in PM emissions can also be accomplished by using less polluting Clean Fuels (e.g. PuriNOx).

Construction shall not proceed until the CM has submitted a certified list of the non-road diesel–powered construction equipment that will be retrofitted with emission control devices. The list shall include:

- The equipment number, type, make and Contractor/Sub-Contractor.
- The emission control device make, model and EPA verification number.
- The CM shall also identify any vehicles that will use Clean Fuels.
- Equipment that has been retrofitted with an emission control device shall be stenciled or otherwise clearly marked as "Low Emission Equipment."

DFCI's CM will submit monthly reports, updating the same information state above, including the quantity of Clean Fuel utilized. The addition or deletion of non-road diesel equipment shall be indicated in the report.

In addition to installing the required emission control devices, the contractor will also use methods to control nuisance odors associated with diesel emissions from construction equipment including without limitation the following:

- Turning off diesel combustion engines on construction equipment not in active use, and on trucks that are idling while waiting to load or unload material for five minutes or more.
- Locating diesel equipment away from the general public and sensitive receptors (e. g., fresh air intakes, air conditioners and windows).
- Utilizing electronically-powered scissor/man lifts.

10.1.11.5 Construction Noise

The proposed project will implement mitigation measures to reduce or minimize noise from construction activities and to maintain compliance with the City's noise ordinances. The City of Boston regulations do not apply to impact devices such as pile drivers and jackhammers. It is the goal of the construction team (Walsh Brothers, Inc.) to operate within the criteria set by the Boston Ordinance.

A Construction Management Plan (CMP) was developed with input from the Boston Transportation Department and approved in Fall 2006. The CMP addresses noise impacts and mitigation. Specific mitigation measures include:

- Scheduling work during daytime hours (7:00 AM to 6:00 PM except Sunday). There may be some instances when a second construction shift may be required. The Center for Cancer Care will be required to seek permits for these instances.
- Using appropriate mufflers on construction equipment to minimize noise.
- Maintaining muffler enclosure on continuously operating equipment, such as air compressors and welding generators.
- Provided ongoing maintenance of intake and exhaust mufflers.
- Replacing specific construction operations by less noisy ones where feasible and practical.
- Selecting the quietest practical items of equipment - e.g., electric instead of diesel powered equipment.
- Selecting equipment operations to keep average levels low, to synchronize noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels.
- Turning off idle equipment.

10.1.11.6 Measures to Protect Water Quality During Construction

The contractor, having filed a National Pollutant Discharge Elimination System (NPDES) permit for construction activities, is required to minimize stormwater runoff from the site. Construction runoff is to be treated and discharged in accordance with NPDES permits and is also required to protect adjacent catch basins from construction debris. Since the majority of the site will be mass-excavated, surface runoff is expected to be minimized. Any water extracted from the excavation will be treated in accordance with local, state and federal dewatering permit requirements.

10.1.12 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 in compliance with City requirements.

10.1.13 Sustainable Design

The Center for Cancer Care is targeting a Silver Leadership in Energy and Environmental Design rating and is registered with the Green Guidelines for Healthcare Construction. Sustainable features will include a green roof, native, drought-resistant plantings, sunscreen devices and natural daylighting, energy and water-conserving building systems, and healthy interior finishes.

10.1.14 Historic Resources

Required consultation with the Boston Landmarks Commission and the Massachusetts Historical Commission was completed in April and May 2006. Because two buildings on the project site are over 50 years old and are proposed for demolition, DFCI submitted an Article 85 Demolition Delay application (Article 85, Chapter 665 of the Acts of 1956, as amended) in April 2006 to the Boston Landmarks Commission. A Project Notification Form was submitted concurrently to the Massachusetts Historical Commission as a requirement of 950 CMR 71.00; M.G.L., Chapter 9, Sections 26-27C as amended by St. 1988, c.254. This regulation requires the review of any with state involvement (in this case, potential tax exempt bond financing from the MA Health and Educational Facilities Authority) by the Massachusetts Historical Commission. Both applications were submitted on April 20, 2006.

The Massachusetts Historical Commission and Boston Landmarks Commission responded with their comments on May 18 and April 28, 2006, respectively. The Massachusetts Historical Commission staff response noted that the project was unlikely to affect significant historic or archaeological resources. The Boston Landmarks Commission staff determined that the two buildings on the project site were not significant buildings under their significance criteria (Section 85-5.3 (a-e) of the Demolition Delay Ordinance. The detailed historic resources study that was completed in connection with the previous IMPNF/PNF filing, as well as copies of the response letters from these two agencies are enclosed in Appendix E.

10.2 Section 61 Findings

The Secretary's Certificate on the ENF requires that Section 61 Findings be prepared for all required state permits. M.G.L. c. 30, s. 61 requires that "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 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, as required by M.G.L. c. 30, s. 62A.

State permits and agency actions that are required for the Center for Cancer Care project are summarized in Table 10-2:

Table 10-2: Anticipated State Permits/Actions

AGENCY	LICENSE / PERMIT / APPROVAL
Massachusetts Historical Commission	Determination of no adverse effect
Massachusetts Department of Environmental Protection	Sewer Connection Permit, Asbestos Removal Notice(if Required)
Massachusetts Environmental Policy Act	Environmental Notification Form Environmental Impact Report (if required)
Massachusetts Water Resources Authority	Sewer Use Discharge Permit (if required) Temporary Construction Site Dewatering Permit

SECTION 61 FINDINGS

Project Name:	Center for Cancer Care Project
Project Location:	Boston
Project Proponent:	Dana-Farber Cancer Institute
EOEA Number:	13776
Date Noticed in Monitor:	April 15, 2006

The potential environmental impacts of the Center for Cancer Care project have been quantified in the ENF and the Draft PIR/EIR which are incorporated by reference into this Section 61 Finding. Throughout the planning and environmental review processes, DFCI has continued to develop and improve measures to mitigate impacts of the project. With the mitigation proposed and carried out in cooperation with state agencies, the [agency] finds that there are no significant unmitigated impacts.

DFCI recognizes that the identification of effective mitigation and implementation of those mitigation elements throughout the life of the project, is central to its responsibilities under the Massachusetts Environmental Policy Act (MEPA).

Now, therefore, [agency], having reviewed the MEPA filings for the Center for Cancer Care project, the mitigastion elements that have already been implemented, and those further mitigation elements set forth within this Draft PIR/EIR, finds pursuant to M.G.L. C. 30, S. 61 that with the implementation of these measures, all practicable and feasible means and measures will have been taken to avoid or minimize potential damage from the projects to the environment.

____

[agency]

____

By

____

Date

RESPONSE TO COMMENTS

This section specifically addresses the individual comments within each comment letter received on the Environmental Notification Form and the IMPNF/PNF during the BRA and MEPA comment periods for the project. Each comment is numbered and summarized to correspond with the comment numbers assigned. A copy of the complete comment can be found within the designated comment letter, followed by the responses to the specific letter.

BRA Scoping Determination and PNF Comment Letters

1. Boston Redevelopment Authority Institutional Master Plan and Proposed Project Scoping Determinations for Dana-Farber Cancer Institute, May 30, 2006;

2. Boston Redevelopment Authority Scoping Determination for Dana-Farber Cancer Institute IMP

3. Boston Redevelopment Authority Scoping Determination for The Dana-Farber Cancer Institute

4. Boston Transportation Department, May 11, 2005;

5. Boston City Council, May 16, 2006;

6. Boston Public Health Commission, May 11, 2006;

7. Office of Jobs and Community Services, May 11, 2006;

8. Assessing Department, Boston City Hall, May 8, 2006;

9. Boston Water and Sewer Commission, April 26, 2006;

10. Boston Redevelopment Authority, April 3, 2006;

11. Boston Public Health Commission, May 15, 2006;

12. Dana-Farber Cancer Institute, May 16, 2006.

13. Mission Hill Neighborhood Housing Services, May 11, 2006;

14. Roxbury Tenants of Harvard, May 11, 2006;

15. Boston Redevelopment Authority, May 10, 2006;

16. Medical Academic and Science Community Organization (MASCO), May 5, 2006;

17. Sarah Hamilton, MASCO, April 12, 2006;

18. David Welch, April 24, 2006;

19. Charles River Watershed Association, May 11, 2006;

20. Fenway CDC, May 9, 2006;

21. Joslin Diabetes Center, April 14, 2006;

22. Kate Weldon, April 14, 2006; and

23. Dana-Farber Cancer Institute PNF/IMP amendment, April 7, 2006;

MEPA Certificate and ENF Comment Letters

24. Certificate of the Secretary of Environmental Affairs on the Environmental Notification Form, June 9, 2006

25. Massachusetts Executive Office of Environmental Affairs, May 16, 2006;

26. Boston Water and Sewer Commission, May 17, 2006;

27. Boston Water and Sewer Commission, May 19, 2006;

28. Charles River Watershed Association, May 11, 2006;

29. Charles River Watershed Association;

30. Massachusetts Environmental Protection Act, May 15, 2006; and

31. Dana-Farber Cancer Institute, May 16, 2006.

Response to Comment

BRA Scoping Determination Comment Letters

Boston Redevelopment Authority

Boston's Planning & Economic Development Office

Thomas M. Menino, Mayor
Clarence J. Jones, Chairman
Mark Maloney, Director

One City Hall Square
Boston, MA 02201-1007
Tel 617 722 4300
Fax 617 248 1937

May 30, 2006

Mr. Richard Shea
Vice President for Facilities Management
Dana-Farber Cancer Institute
44 Binney Street
Boston, MA 02115

Dear Mr. Shea:

Re: Dana Farber Cancer Institute:
<u>Institutional Master Plan and Proposed Project Scoping Determinations</u>

Please find enclosed the Scoping Determinations for the Dana Farber Cancer Institute ("DFCI") Institutional Master Plan and Proposed Project. The Scoping Determinations describe information required by the Boston Redevelopment Authority (the "BRA") in response to the Institutional Master Plan Amendment/Project Notification Form ("IMPNF/PNF") which was submitted under Article 80 of the Boston Zoning Code on March 27, 2006. Additional information may be required during the course of the review of the DFCI proposals.

We look forward to working with you and the community to achieve approval of an Institutional Master Plan and Project that is appropriate to the location and meets the needs of the DFCI.

If you have any questions regarding the Scoping Determinations or the review process, please contact Sonal Gandhi at (617) 918-4314.

Sincerely,

Sonal Gandhi

BOSTON REDEVELOPMENT AUTHORITY

SCOPING DETERMINATION

FOR

DANA FARBER CANCER INSTITUTE
INSTITUTIONAL MASTER PLAN

PREAMBLE

The Dana Farber Cancer Institute ("DFCI") campus is located in the Longwood Medical and Academic Area ("LMA") of Boston which is situated three miles from downtown and is adjacent to Mission Hill and Fenway residential neighborhoods. The DFCI campus is bounded by Brookline Avenue on the west, Binney Street on the east, the MATEP power place in the south and the Longwood Galleria on the north. The LMA is one of the country's most respected centers of medical and academic institutions, encompassing approximately 210 acres and over 14 million square feet of building floor area. Over 53,000 people either work or study in the LMA (approximately 37,000 employees and approximately 15,000 students) on a typical weekday, and employment figures are projected to grow by 25% within the next decade.

As stated in Section 80D-1 of the Boston Zoning Code (the "Code"), "the purpose of Institutional Master Plan Review is to provide for the well-planned development of Institutional Uses in order to enhance their public service and economic development role in the surrounding neighborhoods." Under the Code, an Institutional Master Plan ('IMP") has a dual purpose of meeting the needs of the institution and relating the campus to its context in a positive way. In preparing its IMP and Draft Project Impact Report ("DPIR"), the DFCI will need

not only to demonstrate an understanding of its future facilities needs but also the context of its campus; identification of all owned, leased and planned space, land uses, physical characterisitics, planned changes, resident desires, and applicable public policy. The BRA also seeks to enhance DFCI's presence in the City of 1.1
Boston as an important conomic development entity and employer. Care should be taken to respond to the concerns outlined below:

1. The LMA is a dense institutional environment. However, institutions 1.2
located in the LMA will continue to need to grow if they are to remain an important and healthy sector of the Boston economy. It is important to the City that this growth be accommodated in sustainable ways to lessen the cumulative effects of development and to allow the LMA to remain a viable and accessible center for medial care and education. The LMA has reached a point in its history where transportation infrastructure serving the area is challenged with respect to accommodating additional growth. The BRA seeks to understand the long-term plans of institutions in the LMA, so that necessary growth by institutions can be allowed on a fair and equitable basis. Therefore, the BRA requires 10 year IMPs of all institutions. Institutions will be required to provide updates to the BRA on the status of their IMP and any projects and commitments therein every 2 years on the anniversary of their approval by the Boston Zoning Commission.

2. Attractive residential neighborhoods are viewed by the BRA as being vital 1.3
to the long-term success of Boston. The LMA sits within the context of the Fenway and Mission Hill neighborhood. Impacts from institutional project construction, operations and expansion must have minimal negative impacts on the neighborhoods and the DFCI should take appropriate steps to ensure this.

3. The Mayor has appointed a Task Force to assist and advise the BRA on the DFCI's IMP and Proposed Project. The DFCI is requested to provide 2 year regular updates to Task Force members in addition to the BRA. 14

SUBMISSION REQUIREMENTS

FOR

THE DANA FARBER CANCER INSTITUTE
INSTITUTIONAL MASTER PLAN

The Boston Redevelopment Authority ("BRA") is issuing this Scoping Determination pursuant to Section 80D-1 of the Boston Zoning Code (the "Code"). On March 27, 2006, the Dana Farber Cancer Institute ("DFCI") filed an Institutional Master Plan Amendment ("IMPA") with the BRA. Notice of the receipt by the BRA of the IMPA was published in the Boston Herald on March 27, 2006 initiating a public comment period ending on April 27, 2006. At the request of the DFCI Task Force, the DFCI extended the comment period out to May 11, 2006. In conjunction with the submission of the IMPA, the DFCI also submitted a PNF which seeks Large Project Review, under Section 80B of the Code, for the project to be located at the corner of Brookline Avenue and Jimmy Fund Way at 450 Brookline Avenue (the "Proposed Project"). A separate Scoping Determination for the Proposed Project is being issued contemporaneously with the Scoping Determination for the IMP. The DFCI has modified the IMPA/PNF to seek approval of a new IMP for DFCI's campus instead of an amendment to DFCI's current IMP, which has expired. After the issuance of this Scoping Determination, the DFCI will submit for review a ten-year Institutional Master Plan for its campus instead of an amendment to its current IMP.

Pursuant to Section 80D-4.3c of the Code, a scoping session was held on April 12, 2006 with the City's public agencies and to which members of the Task Force were invited and attended. A Task Force meeting, where the proposed IMP and Proposed Project were reviewed and discussed, was held on April 10, 2006. DFCI presented its mission, strategic plan and need for additional space at the LMA Forum on November 28, 2006, followed by a presentation on its proposed

IMPA and Proposed Project at the LMA Forum on March 27, 2006. Following the scoping session and based on the BRA's review of public comments and comments from the City's public agencies, the BRA hereby issues its Scoping Determination pursuant to Section 80D-4.3 of the Code. Comments from the City's public agencies and the public, found in Appendix 1, 2, and 3 respectively, are incorporated as a part of this Scoping Determination.

The Scoping Determination sets forth those elements specified in Section 80D-3 of the Code that are required to be included in the DFCI IMP. The Scoping Determination requests information required by the BRA for its review of the proposed IMP in connection with the following:

1. Approval of the DFCI IMP pursuant to Article 80 and other applicable sections of the Code;
2. Recommendation to the Zoning Commission for approval of the DFCI IMP.

The DFCI's IMP should be documented in a report of appropriate dimensions 15
and in presentation materials which support the full review of the IMP. Twenty-five copies of the full IMP should be submitted to the BRA. An additional fifty copies should be available for distribution to the Task Force members, LMA Forum participants, community groups and other interested parties in support of the public review process. The IMP should be a stand-alone document submitted to the BRA. The IMP should reference and/or include information from the Draft Project Impact Report ("DPIR"), to also be submitted to the BRA in meeting the requirements of Large Project Review for the Proposed Project. The IMP document should include this Scoping Determination and text, maps, plans, and other graphic materials sufficient to clearly communicate the various elements of the IMP. The IMP should include the following elements: 16

I. DFCI MISSION AND GOALS

The mission of the DFCI as it relates to its LMA campus ("Campus") should be 17
described. In this case, Campus refers to the area in or near the LMA where the DFCI occupies or proposes to occupy buildings, whether owned or leased, that are in such proximity that they share a common impact area and therefore should be the subject of the proposed IMP. The description should articulate the larger, as well as local aspects of the mission. Services to the local community are of particular interest. The population served by the DFCI and the major programs conducted need to be described. Changes expected in the type or size of the mission components, particularly as they relate to the Proposed Project, should be highlighted. The longer term goals and the expected growth in the number of patients and research needs, at least ten years into the future, should be described. A statement of how the IMP will advance the mission and goals of the DFCI should be included.

II. PROGRAM NEEDS AND OBJECTIVES 18

Specific program needs and objectives for the Campus to be addressed in the IMP should be defined in sufficient detail. A description of the analysis which was undertaken to identify the needs and objectives should be summarized. Included in the description should be current and future trends that are impacting the DFCI and shaping program objectives. Projection of changes in the patient population, employee population, new or expanded programs, research including National Institute of Health ("NIH") grants, parking, DFCI enterprises and spin-off companies and other activities that require space on the Campus and in and outside of the City of Boston in the next 5 to 10 years should be included.

A. Compliance with the Longwood Medical and Academic Area Interim Guidelines

The BRA has formulated a set of Interim Guidelines to govern proposed projects 19
in the LMA. These Guidelines have been established to ensure that projects apply good planning principles in the areas of transportation, urban design, and

workforce development. They describe the physical character of the LMA and outline mutually beneficial public benefits that can be provided by project proponents to achieve project heights that are greater than those specified in the Guidelines. Development projects within the LMA must demonstrate compliance with guidelines for building height and setbacks, street networks, building character, environmental impacts, and transportation and workforce development. Included in this section should be an outline of how the IMP complies with the Interim Guidelines.

III. PHYSICAL NEEDS AND OBJECTIVES

A. Campus

A summary analysis of the Campus should be provided using sufficient text and 1.10
visual materials. The important physical characteristics and conditions should be mapped and described including buildings, building height and floor area ratio ("FAR"), open space, landscape, pedestrian and vehicular circulation, historic resources, groundwater and other important features. Land use, patterns of use, functional areas, building clustes, landmarks or other historic resources, vistas, open space, view corridors and other environmental features should be delineated and studied. The analysis should identify the existing strengths of the Campus to be enhanced and the need of the Campus to be addressed in the IMP.

B. Facilties

An inventory and description of the buildings, facilities, and other structures 1.11
occupied on the Campus and beyond should be provided as required by Section 80D-3.2 of the Code. An updated illustrative Campus plan should be prepared showing the location of each facility. For each building the following information should be provided: total gross floor area, occupancy or use by gross floor area, height in stories and in feet, FAR (for each lot), year built and ownership. Information on parking facilities should include the total number of parking spaces and a breakdown of the number of spaces allocated by used category.

Appropriate description of other types of facilities and their use such as infrastructure systems, recreational fields, and places of assembly should be provided.

An analysis of the existing facilities in light of the identified program needs and 1.12
objectives should be undertaken and documented. Specific facility objectives which are addressed in the IMP should be set out. This section should conclude with a summary of the DFCI's need for additional facilities described by use and floor area projected on an annual basis over the ten-year period of the IMP.

IV. CAMPUS CONTEXT

The immediate area of the Campus around the DFCI should be inventoried, 1.13
analyzed and summarized in the IMP. The analysis should include land use, building height and FARs, historic resources, open space, student and employee population, public facilities and a ten-year projection of future growth. The 1.14
capacity and condition of the infrastructure system that serves the Campus should be documented. The impact of the DFCI and its proposed expansion on 1.15
the surrounding area should be discussed. Area residents and businesses should be consulted and their views regarding the IMP should be described. From this analysis, guidelines should be defined that will shape the IMP so that the DFCI will relate positively to the area around it.

V. MASTER PLAN

A. Concept Plan

At least one brief alternative concept plan should be prepared and analyzed for 1.16
the DFCI with particular attention to areas of the Campus which interface with adjacent neighborhoods, other institutional access ways, public streets, and historic resources. This analysis should address the question of the amount and types of services and facilities to be located on and off the Campus. An analysis 1.17
providing the rationale for locating uses on-site in the LMA should be provided. Alternate off-site locations outside the LMA for uses that are determined not essential to be located in the LMA should be identified and a strategy for moving

these uses off-site should be delineated. Elements of the concept plan should include the following:

1. Definition and description of planning objectives;
2. Illustration and description of a campus development plan;
3. Design concepts which are used should be clarified;
4. Articulation of subareas of the Campus based on use, density, and/or physical features;
5. Definition of design principles which will serve as guidelines for the development of the Campus; and
6. Identification of the pedestrian circulation system and its objectives and guidelines.

The alternative analysis should lead to an explanation of why the proposed plan as defined in the IMP was chosen.

B. Development Program

A description of all the significant physical changes proposed for the 10 year IMP 1.18
time period should be provided at the level of definition required by Section 80D-3.4 of the Code. Included here should be information on the renovation of existing facilities, leased space both on and off the Campus, urban design improvements, and any potential future projects identified in the IMPA. For those 1.19
locations which are to gain zoning rights through the IMP, the information required is defined in Section 80D-3.4 of the Code. The impacts of each proposal on the Campus should be discussed at a level of definition appropriate to the IMP and mindful that large projects shall undergo Article 80 Large Project Review when they are implemented. The demolition of any building over 50 1.20
years old is subject to the provision of Article 85 of the Zoning Code (Demolition Delay).

1. Buildings 1.21

The information required for each new or recycled building project proposed includes the following:

(a) site location and approximate building footprint;

(b) square feet of total gross floor are and principal subuses;

(c) gross floor feet of space that is demolished or occupancy terminated;

(d) floor area ration (FAR) for each lot;

(e) building height in approximate feet and stories;

(f) number of parking spaces;

(g) current zoning of site;

(h) total project cost;

(i) estimated development impact project payments; and

(j) estimated month and year of construction start and completion.

2. Campus Improvements 1.22

Information required for campus improvement projects include the following:

(a) description;

(b) location;

(c) estimated cost; and

(d) estimated month and year of construction start and completion.

3. Campus Expansion 1.23

If the DFCI has any expansion proposed through lease or purchase, the following information must be provided for each expansion location:

(a) location;

(b) gross floor area in square feet broken down by uses proposed by DFCI;

(c) lease period;

(d) current use;

(e) current owners;

(f) current zoning;

(g) current property assessment and property taxes paid to the city;

(h) current occupants to be dislocated;

(i) description of proposed improvements;

(j) estimated cost; and

(k) acquisition and improvement schedule.

4. Development Program Context 1.24

A series of context drawings should be prepared showing phase-by-phase the proposed developments in their larger surroundings for the Campus, including:

(a) building heights map;

(b) an open space plan; and

(c) an isometric (3-D) drawing showing the general building massing of all buildings in the area.

A study model of the larger neighborhood at a scale of 1"=40'-0" showing the proposed phases in context should be provided. 1.24.1

C. Transportation Plan

The scope of the transportation component of the IMP is included in Appendix 1.

D. Community Benefits Plan

1. Training and Employment Initiatives

Provide a detailed description of the DFCI's current workforce and project future employment needs concerning the IMP and Proposed Project and any other proposals. There is particular interest in learning about that part of the workforce that is drawn from the adjacent neighborhoods and about programs to recruit, train and promote this population. The scope of the workforce development component of the IMP is included in Appendix 1. 1.25

2. Taxes

In the context of the IMP process, the DFCI should meet with the City's Assessing Department to address the concerns expressed in the Assessing Department memo found in Appendix 1. 1.26

3. Other benefits

The DFCI should identify current and future proposed community benefits as well as any other benefits that minimize or mitigate detrimental and adverse impacts on the local community from the DFCI and the Proposed Project. 1.27

E. URBAN DESIGN SCOPE

The Project Notification Form thoughtfully and thoroughly addresses the urban design issues associated with the IMP and Proposed Project and the building design promises to be an important positive contribution to the character of the Dana-Farber campus, Brookline Avenue and the LMA. As the architectural work proceeds the proponents shall consider the following issues. 1.28

1. Existing Campus 1.28.1
   The modifications to existing buildings and landscapes indicated in Figures 1-7 and 1-8 indicate a substantial improvement in the appearance and functioning of the campus. The proponents shall include in the Project Impact Reports more specificity about the Jimmy Fund Way and Binney Street elevations of the Dana Building and a more detailed site plan showing the proposed street level changes in and around all the Dana-Farber buildings and landscapes.

2. Adjacent Streets 1.28.2
   The Interim LMA Guidelines intend to improve the appearance of Brookline Avenue and to reinforce the differences in the character of the street north and south of Longwood Avenue. The northern part on both sides of the street has 'front yard' setbacks from the public sidewalk – the portions used for parking will be converted to green spaces as the Beth Israel Deaconess , Simmons, and Emmanuel College campuses evolve – while the southern portion has street walls on both sides that can become more continuous over time. The proposed project sets back the street level wall from the back of the public sidewalk and projects portions of the upper floors closer to the lot line. The relationships to the existing buildings bear careful study so that the project can include both a more generous sidewalk and a strong reinforcement of the street wall. The elevations of the various portions of the ground floor at the lobby, gift shop

and retail space should be the same as the sidewalk to strengthen the relationship between the building and the street.

On Jimmy Fund Way the sidewalk should offer pedestrians a continuous path and a clear view between Brookline Avenue and Binney Street without protruding building elements or pinched portions. Where the sidewalk is interrupted by curb cuts for access to parking and service spaces the driveways should be visible from far away and should not be hidden behind parts of the building.

3. Building Entrance 1.28.3
The proposed campus entrance at the corner of the building at Brookline Avenue and Jimmy Fund Way is a dramatic improvement compared with the existing condition. While arcaded spaces are in some instances effective ways of emphasizing building entrances, in Boston especially on the north sides of buildings, and even when they are two stories in height, arcades are gloomy places. The design of the entrance should bear no similarity to the dark, recessed existing entrance, so the lobby should not be set back from the face of the upper floors any more than is absolutely necessary to accommodate the required pedestrian movement and the building façade should be inflected to allow light to reach the street level façade.

4. Sustainability 1.28.4
Comments in the PNF suggest intentions toward sustainable building design. The city of Boston strongly supports such intentions and encourages the proponents to investigate double-wall, rain-screen, green roof and all other energy-efficient building techniques and materials.

Submission Requirements

The following submission requirements apply to any project subject to Large Project Review as well as PDA Development Plans. Certain PDAs and IMPs will require more generalized and broader information establishing a framework within which the proposed projects will be set. As these plans establish the equivalent of a zoning district, this additional material is key in evaluating not only the impacts of proposed projects within the PDA, but also how those plan areas fit within the context of the city. 1.29

1. Written description of program elements and space allocation (in square feet) for each element, as well as project totals 1.29.1

2. Neighborhood plan, elevations and sections at an appropriate scale (1":100' or larger as determined by the BRA) showing relationships of the proposed project to the neighborhood's: 1.29.2

a. massing
b. building height
c. scaling elements
d. open space
e major topographic features
f. pedestrian and vehicular circulation
g. land use

3. Color or black and white 8"x10" photographs of the site and neighborhood 1.29.3

4. Sketches and diagrams to clarify design issues and massing options 1.29.4

5. Eye-level perspective (reproducible line or other approved drawings) showing the proposal (including main entries and public passages/areas) in the context of the surrounding area. Views should display a particular emphasis on important viewing areas such as key intersections or public parks/attractions. Long-ranged (distanced) views of the proposed project should also be studied to assess the impact on the skyline or other view lines. At least one bird's-eye perspective should also be included. All perspectives should show (in separate comparative sketches) both the build and no-build conditions. The BRA should approve the view locations before analysis is begun. View studies should be cognizant of light and shadow, massing and bulk. 1.29.5

6. Additional aerial or skyline views of the project, if and as requested 1.29.6

7. Site sections at 1":20' or larger (or other scale approved by the BRA) showing relationships to adjacent buildings and spaces 1.29.7

8. Site plan(s) at an appropriate scale (1":20' or larger, or as approved by the BRA) showing: 1.29.8
   a. general relationships of proposed and existing adjacent buildings and open spaces
   b. open spaces defined by buildings on adjacent parcels and across streets
   c. general location of pedestrian ways, driveways, parking, service areas, streets, and major landscape features
   d. pedestrian, handicapped, vehicular and service access and flow through the parcel and to adjacent area.

   e. survey information, such as existing elevations, benchmarks, and utilities
   f. phasing possibilities

g. construction limits

9. Model made of bass wood at a 1"=10' scale minimum with the surrounding context with the proposed projects and existing conditions extending to a minimum three-block radius beyond each development Parcel 1.29.9

10. A massing model of the proposal in a digital 3D Max format. The digital model must illustrate the proposal and its immediate surrounding blocks in sufficient detail using texture mapping. The digital specifications of the model must be made in coordination with the BRA Urban Design Department to fit the BRA's city-wide digital model 1.29.10

11. Study model at 1":16' or 1":20' showing preliminary concept of setbacks, cornice lines, fenestration, facade composition, etc. 1.29.11

12. Drawings at an appropriate scale (e.g., 1":8', 1":16', or as determined by BRA) describing architectural massing, facade design and proposed materials including: 1.29.12
    a. building and site improvement plans
    b. neighborhood elevations, sections, and/or plans showing the development in the context of the surrounding area
    c. sections showing organization of functions and spaces, and relationships to adjacent spaces and structures
    d. preliminary building plans showing ground floor and typical upper floor(s)
    e. phasing, if any, of the proposed project

13. A written and/or graphic description of the building materials and its texture, color, and general fenestration patterns 1.29.13

14. U.S. Green Building Council LEED Project Checklist/Scorecard 1.29.14

15. Electronic files describing the site and proposed project at Representation Levels one and two ("Streetscape" and "Massing") as described in the document *Boston "Smart Model": Two-Dimensional Mapping Standards* (Appendix 3) 1.29.15

16. Full responses, which may be in the formats listed above, to any urban design-related issues raised in preliminary reviews or specifically included in the BRA scoping determination, preliminary adequacy determination, or other document requesting additional information leading up to BRA Board action, inclusive of material required for BCDC review 1.29.16

17. Proposed schedule for submission of all design or development-related materials 1.29.17

In addition, all IMP and PDA Master Plan submissions (for areas comprising more than a single site/structure) shall include the following, again in printed and duplicable digital format, and revised as required during the review process for later reference: 1.30

18. A completed Institutional Assessment Form 1.30.1

19. A comprehensive Plan Area map, clearly indicating bounds and all site locations and approximate building footprints 1.30.2

20. Such Plan Area map, modified to show (a) existing and (b) proposed zoning restrictions 1.30.3

21. For IMPs, a table and map listing all buildings owned or leased by the institution, both on and off the campus, and indicating 1.30.4
    a. total area including area below grade
    b. uses and area devoted to each use
    c. height in feet and number of floors, including floors below grade
    d. age
    e. condition
    f. proposed action (rehabilitation, demolition, replacement, or other) during the term of the IMP
    g. proposed uses with area devoted to each use

22. Uses (specifying the principal sub uses of each land area, building, or structure) 1.30.5

23. Square feet of gross floor area within Plan Area 1.30.6

24. Square feet of gross floor area eliminated from existing buildings through demolition of existing facilities 1.30.7

25. Floor area ratios, individually and in total 1.30.8

26. Building heights within Plan Area 1.30.9

27. Parking areas or facilities, both existing and to be modified or provided in connection with proposed projects 1.30.10

28. A series of neighborhood plans (to the extent not covered in item #2 above) at a scale of 1":100' showing existing and proposed building 1.30.11

heights, building uses, pedestrian circulation, and vehicular circulation of cars, service vehicles, and buses, shuttles, or ambulances; the area to be included in the plans shall extend not less than 1,500 feet in all directions from the proposed project site except as specifically agreed upon otherwise by the BRA.

29. Diagrammatic sections through the neighborhood (to the extent not covered in item #2 above) cutting north-south and east-west at the scale and distance indicated above 1.30.12

30. True-scale three-dimensional graphic representations of the area indicated above either as aerial perspective or isometric views showing all buildings, streets, parks, and natural features 1.30.13

31. A study model at a scale of 1":40' showing the proposal in the context of other buildings extending 500 feet in all directions from the project site or as determined by the BRA. If the Plan Area is within the area of the BRA's Downtown 1":40' Model, see #11 above 1.30.14

F. PUBLIC NOTICE

The DFCI will be responsible for preparing and publishing in one or more newspapers of general circulation in the City of Boston a Public Notice of the submission of the IMP to the BRA as required by Section 80A-2. This Notice shall be published within five (5) days after the receipt of the IMP by the BRA. Public comments shall be transmitted to the BRA within sixty (60) days of the publication of this Notice, unless a time extension has been granted by the BRA in accordance with the provisions of Article 80 or to coordinate the Hospital's IMP review with any required Large Project Review. 1.31

Following publication of the Notice, the DFCI shall submit to the BRA a copy of the published Notice together with the date of publication.

SCOPING DETERMINATION

FOR

THE DANA FARBER CANCER INSTITUTE
PROPOSED PROJECT: 450 BROOKLINE AVENUE

The Boston Redevelopment Authority ("BRA") is issuing this Scoping Determination pursuant to Section 80B-5 of the Boston Zoning Code (the "Code") in response to a Project Notification Form ("PNF") which the Dana Farber Cancer Institute ("DFCI") filed on March 27, 2006 for the 450 Brookline Avenue project (the "Proposed Project"). Notice of the receipt by the BRA of the PNF ("Notice") was published in the Boston Herald on March 27, 2006 initiating a public comment period that ended on April 27, 2006. At the request of the DFCI Task Force, the DFCI extended the comment period out to May 11, 2006. In conjunction with the submission of the PNF, the DFCI also submitted an Institutional Master Plan Amendment ("IMPA") under Section 80D of the Code. A separate Scoping Determination for the IMPA is being issued contemporaneously with the Scoping Determination for the PNF. The Notice and the PNF were sent to all public agencies of the City pursuant to Section 80A-2 of the Code and the DFCI Task Force and distributed to LMA Forum participants. Written comments in response to the Notice and the PNF that were received by the BRA prior to the end of the public comment period are included in the Appendices of this Scoping Determination. The DFCI has modified the IMPA/PNF to seek approval of a new IMP for DFCI's campus instead of an amendment to DFCI's current IMP, which has expired. After the issuance of this Scoping Determination, the DFCI will submit for review a ten-year Institutional Master Plan for its campus instead of an amendment to its current IMP. The Scoping Determination requests information that the BRA required for its review of the Proposed Project in connection with the following:

(a) Certification of Compliance and approval of the Proposed Project pursuant to Article 80, Section 80B of the Code; and

(b) Certification of Consistency with the DFCI Institutional Master Plan pursuant to Article 80, Section 80D-10 of the Code.

The BRA is reviewing the Proposed Project pursuant to multiple sections of the Code. The Proposed Project is being reviewed pursuant to Article 80, Section 80B, Large Project Review, and Section 80D, Institutional Master Plan Review which set out comprehensive procedures for project review and requires the BRA to examine the urban design, transportation, environmental, and other impacts of proposed projects. The DFCI is required to prepare and submit to the BRA a Draft Project Impact Report ("DPIR") that meets the requirements of the Scoping 21
Determination by detailing the Proposed Project's expected impacts and proposing measures to mitigate, limit, ot minimize such impacts. The DPIR shall contain the information necessary to meet the specifications of Section 80B-3 (Scope of Review; Content of Reports) and Section 80B-A (Standards for Large Project Review Approval) as required by the Scoping Determination.

The BRA has formulated a set of Interim Guidelines to govern proposed projects 22
in the LMA. These Guidelines have been established to ensure that projects apply good planning principles in the areas of transportation, urban design, and workforce development. They describe the physical character of the LMA and outline mutually beneficial public benefits that can be provided by project proponents to achieve project heights that are greater than those specified in the Guidelines. Development projects within the LMA must demonstrate compliance with guidelines for building height and setbacks, street networks, building character, environmental impacts, and transportation and workforce development. The DPIR shall outline of how the Proposed Project complies with the Interim Guidelines.

Subsequent to the end of the forty-five (45) day public comment period for the DPIR, the BRA will issue a Preliminary Adequacy Determination ("PAD") that indicated the additional steps necessary for the DFCI to complete in order to satisfy the requirements of the Scoping Determination and all applicable sections of Article 80 of the Code. If the BRA finds that the DPIR adequately describes the Proposed Project's impacts and, if appropriate, proposes satisfactory measures to mitigate, limit or minimize such impacts, the PAD will announce such a determination and that the requirements for the filing and review of a Final Project Impact Report ("FPIR") are waived pursuant to Section 80B-5.4(c)(iv) of the Code. Before reaching said findings, the BRA shall hold a public hearing pursuant to Article 80 of the Code. Sections 80B-6 and 80D-10 require the Director of the BRA to issue a Certification of Compliance and a Certification of Consistency, respectively, before the Commissioner of Inspectional Services can issue any building permit for the Proposed Project.

PROJECT SITE

The Project Site is located in DFCI's main campus, at the intersection of Brookline Avenue and Jimmy Fund Way, in the Longwood Medical and Academic Area ("LMA"). The 450 Brookline Avenue project (the "Proposed Project") will be built on a site currently consisting of two parcels of land with a combined site area of approximately 33,414 square feet. The Project Site is currently occupied by two buildings – the one-story Redstone Animal Facility and the two-story 454 Brookline Avenue building along with an adjacent 30-space surface parking lot. The one and two story buildings on the Project site have a combined FAR of 1.0

PROPOSED PROJECT

The Dana Farber Cancer Institute ("DFCI") proposes to construct a new building, referred to as the 450 Brookline Avenue project, (the "Proposed Project") on the Project Site. The Proposed Project is a 13-story facility, with approximately 275,000 gross square feet of above-grade space that will accommodate clinical

and clinical research space, patient services, administrative functions, street-level lobby and new main entrance, retail space, and approximately 200,000 gross square feet dedicated to below-grade parking. A new two-story lobby/atrium entrance, accessible from both Brookline Avenue and Jimmy Fund Way will connect the Proposed Project with the existing elevated walkway system that links DFCI's buildings with those at Children's Hospital and Brigham and Women's Hospital. The new entrance at the Proposed Project will reorient the public face of DFCI to Brookline Avenue and away from the present front entrance on Binney Street. Construction of a tunnel under Jimmy Fund Way is proposed to connect the Proposed Project with clinical support facilities in the Dana Building and to facilitate service access between the Dana Building, the Proposed Project, the Smith Laboratories Building and upgraded loading docks in the Smith and Dana buildings. The maximum height of the Proposed Project is proposed to be 185'-5" to the top of the highest occupiable floor.
Presently, the DFCI has three parking resources on its property that total 498 spaces: the Smith garage with 255 spaces, the Dana garage with 213 spaces, and the 454 Brookline avenue surface parking lot with 30 spaces. The Proposed Project will add approximately 212 net new spaces.

I. DEVELOPMENT REVIEW REQUIREMENTS – ARTICLE 80

SUBMISSION REQUIREMENTS

In addition to full-size scale drawings, 30 copies of a bound report containing all 23
submission materials reduced to size 8-1/2"x11", except where otherwise specified, are required. The report should be printed on both sides of the page. In addition, an adequate number of copies must be available for community review. A copy of this Scoping Determination must be included in the report submitted for review.

A. GENERAL INFORMATION

1. Application Information 2.4

a. Development Team

(1) Names

(a) Developer (including description of development entity and type of corporation)

(b) Attorney

(c) Project consultants and architect

(2) Business address, telephone number and email for each

(3) Designated contact for each

b. Legal Information 2.5

(1) Legal judgements or actions pending concerning the Proposed Project

(2) History of tax arrears on property owned in Boston by the Applicant

(3) Evidence of site control over the Project Site, including current ownership and purchase options of all parcels in the Proposed Project, all restrictive covenants and contractual restrictions affecting the Proponent's righ or ability to accomplish the Proposed Project, and the nature of the agreements for securing parcels not owned by the Proponent.

(4) Nature and extent of any and all public easements into, through or surrounding the Project Site.

c. Disclosure of Beneficial Interests

Disclosure of Beneficial Interests in the Proposed Project must be provided pursuant to Section 80B-8 of the Code. 2.6

2. Financial Information

Financial Information and development pro forma should be submitted for all components of the Proposed Project (See Appendix for required financial information, which may be submitted under separate cover). 2.7

3. Project Area 2.8

a. An area map identifying the location of the Proposed Project

b. Description of metes and bounds of Project Site or certified survey of Project Site

4. Public Benefits 2.9

a. Development Impact Project Contribution and Jobs Contribution specifying amount of housing linkage and jobs linkage contributions.

b. Estimated annual property taxes for each parcel, and estimated total property taxes during all construction and phased development years and after full occupancy.

c. Anticipated employment levels including the following:

(1) Estimated number of construction jobs

(2) Estimated number of permanent jobs

d. Current activities and programs which benefit adjacent neighborhoods and the city at large, such as: child care programs, scholarships, internships, elderly services, education and job training programs, etc.

e. Other public benefits, if any, to be provided.

5. Regulatory Controls and Permits 2.10

a. Existing zoning requirements, zoning computation forms, and any anticipated requests for zoning relief should be explained. 2.10.1

b. Anticipated permits required from other local, state, and federal entities with a proposed application schedule should be noted. 2.10.2

c. A statement on the applicability of the Massachusetts Environmental Policy Act ('MEPA") should be provided. If the Proposed Project is subject to MEAP, all required documentation should be provided to the BRA, including but not limited to, copies of the Environmental Notification Form, decisions of the Secretary of Environmental Affairs, and the proposed schedule for coordination with BRA procedure. 2.10.3

6. Community Groups 2.11

a. Names and addresses of Project Site area owners, abutters, and any community of business groups which, in the opinion of the Proponent, may be substantially interested in or affected by the Proposed Project and the steps the Proponent is undertaking to address any concerns thereof. 2.11.1

b. A list of meetings held and proposed with interested parties, including public agencies, abutters, and community and business groups. 2.11.2

B. PROJECT DESCRIPTION AND ALTERNATIVES

1. Project Description

The DPIR shall contain a full description of the Proposed Project and its components, including its size, physical characteristics, development schedule, costs, and proposed uses. This section of the DPIR also shall present analysis of he development context of the Proposed Project. Appropriate site and building plans to illustrate clearly the Proposed Project shall be required. 2.12

2. Project Alternatives

A description of any alternatives to the Proposed Project, including the No-Build alternative (not carrying out the Proposed Project) and any alternative development proposals that were considered, shall be presented and the primary differences among the alternatives, particularly 2.13

as they may affect environmental conditions, shall be discussed. The No-Build alternative shall establish the future baseline conditions to which the effects of the Proposed Project are to be compared.

C. TRANSPORTATION COMPONENT

A Transportation Access Plan shall be prepared as defined by the Boston Transportation Department in the Transportation component scope as outlined in Appendix 1. 2.14

D. ENVIRONMENTAL PROTECTION COMPONENT

The following is the required scope for the Environmental Protection Component of the DPIR. As applicable, the analyses shall be required for any alternative(s) required to be studied by this Scoping Determination as well s for the Proponent's preferred alternative. 2.15

Wind

A quantitative (wind tunnel) analysis of the potential pedestrian level wind impacts shall be required for the DPIR. This analysis shall determine potential pedestrian level winds adjacent to and in the vicinity of the project site and shall identify any areas where wind velocities are expected to exceed acceptable levels, including the Authority's guideline of an effective gust velocity of 31 mph not to be exceeded more than 1% of the time. 2.15.1

Particular attention shall be given to public and other areas of pedestrian use, including, but not limited to, the entrances to the project building(s) and existing and proposed buildings, sidewalks and walkways in the vicinity of and adjacent to the Proposed Project, and all existing and proposed plazas, park areas (e.g., Joslin Park), and other open space areas within and in the vicinity of the proposed development.

The wind impact analysis shall evaluate the following conditions: 2.16

1. No-Build - the existing condition of the site and environs to establish the baseline condition. 2.16.1

2. Future Preferred Build Condition - the proposed development as described in the Expanded Environmental Notification Form/Project Notification Form. 2.16.2

3. Alternative Build Condition(s) - any alternative development concept(s) to the Preferred Build Condition required to be studied. 2.16.3

The wind tunnel testing shall be conducted in accordance with the following guidelines and criteria: 2.17

- Data shall be presented for both the existing (no-build) and for the future build scenario(s) (see above). 2.17.1

- The analysis shall include the mean velocity exceeded 1% of the time and the effective gust velocity exceeded 1% of the time. The effective gust velocity shall be computed as the hourly average velocity plus 1.5 x root mean square variation about the average. An alternative velocity analysis (e.g., equivalent average) may be presented with the approval of the Authority. 2.17.2

- Wind direction shall include the sixteen compass points. Data shall include the percent or probability of occurrence from each direction on seasonal and annual bases. 2.17.3

- Results of the wind tunnel testing shall be presented in miles per hour (mph). 2.17.4

- Velocities shall be measured at a scale equivalent to an average height of 4.5-5 feet. 2.17.5

- The model scale shall be such that it matches the simulated earth's boundary and shall include all buildings within at least 1,600 feet of the project site. All buildings taller than 25 stories and within 2,400 feet of the project site should be placed at the appropriate location upstream of the project site during the test. The model shall include all buildings recently completed, under construction, and planned within 1,500-2,000 feet of the project site. Prior to testing, the model shall be reviewed by the Authority. Photographs of the area model shall be included in the written report. 2.17.6

- The written report shall include an analysis which compares mean and effective gust velocities on annual and seasonal bases, for no-build and build conditions, and shall provide a descriptive analysis of the wind environment and impacts for each sensor point, including such items as the source of the winds, direction, seasonal variations, etc., as applicable. The report shall also include an analysis of the suitability of the locations for various activities (e.g., walking, sitting, standing, driving etc.) as appropriate, in accordance with recognized criteria (Melbourne comfort categories, or equivalent). 2.17.7

- The report also shall include a description of the testing methodology and the model, and a description of the procedure used to calculate the wind velocities (including data reduction and wind climate data). Detailed technical 2.17.8

information and data may be included in a technical appendix but should be summarized in the main report.

- The pedestrian level wind impact analysis report shall include, at a minimum, the following maps and tables: 2.17.9

  - Maps indicating the location of the wind impact sensors, for the existing (no-build) condition and future build scenario(s). 2.17.9.1

  - Maps indicating mean and effective gust wind speeds at each sensor location, for the existing (no-build) condition and each future build scenario, on an annual basis and seasonally. Dangerous and unacceptable locations shall be highlighted. 2.17.9.2

  - Maps indicating the suitability of each sensor location for various pedestrian-related activities (comfort categories), for the existing (no-build) condition and each future build scenario, on an annual basis and seasonally. To facilitate comparison, comfort categories may be distinguished through color coding or other appropriate means. In any case, dangerous and unacceptable conditions shall be highlighted. 2.17.9.3

  - Tables indicating mean and effective gust wind speeds and the comfort category at each sensor location, for the existing (no build) condition and for each future build scenario, on an annual basis and seasonally. 2.17.9.4

  - Tables indicating the percentage of wind from each of the sixteen compass points at each sensor location, for the existing (no-build) condition and for each future build scenario, on an annual basis and seasonally. 2.17.9.5

For areas where wind speeds are projected to exceed acceptable levels, measures to reduce wind speeds and to mitigate potential adverse impact shall be identified and tested in the wind tunnel. 2.17.9.6

<u>Shadow</u>

A shadow analysis shall be required for existing and build conditions for the hours 9:00 a.m., 12:00 noon, and 3:00 p.m. for the vernal equinox, summer solstice, autumnal equinox, and winter solstice and for 6:00 p.m. during the summer and autumn. It should be noted that due to time differences (daylight savings vs. standard), the autumnal equinox shadows would <u>not</u> be the same as the vernal equinox shadows and therefore separate shadow studies are required for the vernal and autumnal equinoxes. 2.18

The shadow impact analysis must include net new shadow as well as existing shadow and must clearly show the incremental impact of the proposed new 2.19

building. For purposes of clarity, new shadow should be shown in a dark, contrasting tone distinguishable from existing shadow. The shadow impact study area shall include, at a minimum, the entire area to be encompassed by the maximum shadow expected to be produced by the Proposed Project (i.e., at the winter solstice). The build condition(s) shall include all buildings under construction and any proposed buildings anticipated to be completed prior to completion of the Proposed Project. Shadow from all existing buildings within the shadow impact study area shall be shown. A North arrow shall be provided on all figures. Shadows shall be determined by using the applicable Boston Azimuth and Altitude data as provided in Exhibit 1 (Sun Altitude/Azimuth Table, Boston, Massachusetts) below.

Particular attention shall be given to existing or proposed public open spaces (e.g., Joslin Park and the Emerald Necklace) and pedestrian areas, including, but not limited to, the existing and proposed sidewalks and pedestrian walkways within, adjacent to, and in the vicinity of the Proposed Project and the existing and proposed plazas, park areas, and other open space areas within and in the vicinity of the proposed development, and any other public and private open space areas that potentially could be affected by project-generated shadows. 2.20

The DPIR must include a full discussion of compliance with the LMA Interim Guidelines shadow criteria. Any new shadow that will be cast on the Emerald Necklace should be mitigated. The DPIR should adequately address this potential impact. Design or other mitigation measures to minimize or avoid any adverse shadow impacts shall be identified. 2.21

The above shadow analysis shall be required for any alternative required to be studied by the Scoping Determination as well as the preferred development option. 2.22

SUN ALTITUDE/AZIMUTH TABLE – Exhibit 1

Boston, Massachusetts

Latitude: N42.36 Longitude: W71.06

	Altitude	Azimuth	Time
21 March Standard			
9:00 a.m.	33.0	125.7	
12:00 Noon	48.0	-176.9	
3:00 p.m.	30.5	-121.8	

21 June
Daylight Savings

9:00 a.m.	39.9	93.5
12:00 Noon	68.8	149.4
3:00 p.m.	56.5	-113.7
6:00 p.m.	23.9	- 79.3

21 September
Daylight Savings

9:00 a.m.	25.9	115.3
12:00 Noon	47.4	166.0
3:00 p.m.	37.4	-132.9
6:00 p.m.	7.3	- 96.0

21 December
Standard

9:00 a.m.	14.2	141.9
12:00 Noon	24.1	-175.6
3:00 p.m.	10.0	-135.1

Source: Autocad/MassGIS

Daylight

A daylight analysis for both build and no-build conditions should be conducted by 2.23
measuring the percentage of skydome that is obstructed by the Proposed Project building and evaluating the net change in obstruction. If alternative massing studies are requested as part of the Article 80 development review process, daylight analysis of such alternatives shall also be conducted for comparison. The study should treat the following elements as controls for data comparison: existing conditions, the context of the area, and the as-of-right background zoning envelope. The areas of interest include viewpoints along Brookline Avenue and Jimmy Fund Way. Daylight analyses should be taken for each new 2.24
major building façade, or grouping thereof within the limits of the Boston Redevelopment Authority Daylight Analysis (BRADA) program, fronting these public or quasi-public ways. The midpoint of each roadway or public accessway should be taken as the study point. The BRADA program must be used for this analysis.

Solar Glare

If the design of the Proposed Project incorporates substantial glass-facades, an evaluation of potential solar glare impacts shall be required. 2.25

This analysis shall measure potential reflective glare from the building onto potentially affected streets and roadways, and nearby public open spaces in order to determine the potential for visual impairment or discomfort due to reflective spot glare for pedestrians/students and motorists. Mitigation measures to eliminate any adverse reflective glare shall be identified. Technical data used for the analysis shall be included. 2.25.1

The solar glare analysis also shall examine the potential for solar heat buildup in any nearby buildings receiving reflective sunlight from the Proposed Project. In some cases, this condition can result in overheating or the receiving structure or incapacitation of its air conditioning system. Mitigation measures shall be described for any identified negative impacts on nearby buildings. 2.25.2

Air Quality

The DPIR shall describe the existing and projected future air quality in the project vicinity and shall evaluate ambient levels to determine conformance with the National Ambient Air Quality Standards (NAAQS). Particular attention shall be given to mitigation measures to ensure compliance with air quality standards. 2.26

A future air quality (carbon monoxide) analysis shall be required for any intersection (including the proposed garage entrances/exits) where level of service (LOS) is expected to deteriorate to D and the Proposed Project causes a 10 percent increase in traffic or where the level of service is E or F and the Proposed Project contributes to a reduction of LOS. 2.27

The study shall analyze the existing conditions, future No-Build and future Build conditions only. The methodology and parameters of the traffic-related air quality analysis shall be approved in advance by the Boston Redevelopment Authority and the Massachusetts Department of Environmental Protection. The results of the air quality analysis shall be compared to the Massachusetts State Implementation Plan to determine project compliance with the Plan. Mitigation measures to eliminate or avoid any violation of air quality standards shall be described. 2.28

An indirect source air quality analysis of the operation of the parking garage shall be prepared to determine potential air quality impacts on nearby sensitive receptors and compliance with air quality standards. Garage emissions should be estimated using appropriate U.S. EPA guidance. The EPA SCREEN3 model should be used to calculate maximum CO impacts from the garage at the various sensitive receptors. 2.29

A description of the project's heating and mechanical systems and of the parking 2.30
garage ventilation system, including location of intake and exhaust vents and
specifications, and an analysis of the impact on pedestrian level air quality and
on any sensitive receptors from operation of the heating, mechanical, and
exhaust systems, including the building's emergency generator, shall be
required.

In addition, please provide a detailed stationary source analysis of the adjacent 2.31
50 MW power plant and whether or not the expanded capacity will necessitate
modifying existing air permits to account for an increase in boiler size, hours of
operation, fuel use and emissions (e.g., CO, NO_2 , $PM_{10,}$ non-criteria pollutant
emissions). A detailed inventory of the emissions from the exhaust plume (type 2.32
and quantity of pollutants) from the power plant and any existing and/or proposed
plant modifications and or expansion should be provided. As stated above,
measures to avoid any violation of air quality standards and potential impacts on
the project itself shall be described.

Solid and Hazardous Wastes

The presence of any contaminated soil or groundwater and any underground or 2.33
aboveground storage tanks at the project site shall be evaluated and remediation
measures to ensure their safe removal and disposal shall be described in the
DPIR. As applicable, the DPIR should summarize, in detail, the results of any 2.34
studies or findings, including types and concentrations of contaminants
encountered and shall include appropriate tables and maps. The reports shall be
made available to the BRA.

If asbestos, asbestos-containing materials, lead paint or other hazardous 2.35
compounds (e.g., PCBs) are identified during demolition, renovation or removal
activities, the handling and disposal must be in compliance with Massachusetts
Department of Environmental Protection, the Boston Public Health Commission
and the Inspectional Services Department guidelines and requirements.

The DPIR shall quantify and describe the generation, storage, and disposal of all 2.36
solid and hazardous wastes from the construction and operation of the Proposed
Project. In addition, measures to promote the reduction of waste generation and 2.37
recycling, particularly for paper, plastics, glass, metals, and other recyclable
products, and compliance with the City's recycling program, shall be described in
the DPIR.

Noise

The DPIR shall establish the existing noise levels at the project site and vicinity 2.38
and shall calculate future noise levels after project completion based on
appropriate modeling and shall demonstrate compliance with applicable Federal,

State, and City of Boston noise criteria and regulations. The noise evaluation 2.39
shall include the effect of noise generated by the area's traffic, and other noise
sources. Future noise levels shall include the noise generated by the Proposed 2.40
Project's mechanical equipment, including emergency generators. Measures to
minimize and eliminate adverse noise impacts on nearby sensitive receptors, 2.41
including the project itself, from traffic noise and mechanical systems shall be
described.

Flood Hazard Zones/Wetlands

Compliance with Boston and Federal flood hazard regulations, including 2.42
requirements regarding construction within flood zones must be addressed in the
DPIR. The potential impact of the Proposed Project on existing wetlands and 2.43
wetland resource areas must also be described, including a demonstration of
compliance with the Massachusetts Wetlands Protection Act (MWPA), as
applicable. Maps detailing the site in relation to applicable buffer zones shall be
provided.

Water Quality and Resources

The DPIR shall include a description of the project's site drainage system how it 2.44
will connect to the Boston Water and Sewer Commission (BWSC) system.
Parking garage drainage and measures to prevent adverse water quality impacts 2.45
to the Muddy River also shall be described in detail.

Stormwater Management

The DPIR shall contain an evaluation of the project site's existing and future 2.46
stormwater drainage and stormwater management practices. The DPIR shall
fully illustrate existing and future drainage patterns from the project site and shall
describe and quantify existing and future stormwater runoff from the site and the
Proposed Project's impacts on site drainage.

The Proposed Project's stormwater management system, including best 2.47
management practices to be implemented, measures proposed to control and
treat stormwater runoff and to maximize on-site retention of stormwater,
measures to prevent groundwater contamination, and compliance with the
Commonwealth's Stormwater Management Policies, also shall be described.
The DPIR shall describe the project area's stormwater drainage system to which 2.48
the project will connect, including the location of stormwater drainage facilities
and ultimate points of discharge.

If the Proposed Project involves the disturbance of land of one acre or more, a 2.49
National Pollution Discharge Elimination System (NPDES) General Permit for
Construction from the U.S. Environmental Protection Agency and the
Massachusetts Department of Environmental Protection will be required. If an

NPDES permit is required, a stormwater pollution prevention plan must be 2.50
prepared prior to the commencement of any construction-related activities.

Geotechnical Impact/Groundwater

An analysis of existing sub-soil conditions at the project site, groundwater levels, 2.51
potential for ground movement and settlement during excavation and foundation
construction, and potential impact on adjacent buildings, utility lines, and the
roadways shall be required. This analysis shall also include a description of the
foundation construction methodology, the amount and method of excavation, and
measures to prevent any adverse effects on adjacent buildings, utility lines,
roadways and the Muddy River.

The Proposed Project is one block from the boundary of the new Groundwater 2.52
Conservation Overlay District (Longwood Avenue). Measures to ensure that
groundwater levels will be maintained and will not be lowered during or after
construction shall be described in detail. Installation of observation monitoring
wells, preferable on public land, may be required if existing wells are not already
present. Identification of existing wells and well installation should be made in 2.53
consultation with the Boston Groundwater Trust (the "Trust"). In addition,
monitoring data must be provided to the BRA and the Trust from 6 months prior 2.54
to construction until one year after construction (frequency to be determined in
consultation with the BRA). If dewatering is necessary during construction, a 2.55
replenishment system must be installed and levels maintained. Upon completion 2.56
of construction, monitoring wells will need to be assigned to the Trust by the
developer with an agreement granting the Trust access if wells are on private
property. A description of the recharging system or recirculation program must 2.57
be provided.

Levels reported shall be based on Boston City Base (BCB). 2.58

Contact information for the Trust:

Boston Groundwater Trust
234 Clarendon Street
Boston, MA 02116

Attention: Elliott Laffer, Executive Director
617-859-8439

In addition, a vibration monitoring plan must be provided that ensures potential 2.59
vibration impacts from project construction on adjacent buildings and
infrastructure will be mitigated.

Construction Impacts

A construction impact analysis shall include a description and evaluation of the following: 2.60

(a) potential dust and pollutant emissions and mitigation measures to control these emissions, including participation in the Commonwealth's Clean Construction Initiative. 2.60.1

(b) potential noise generation and mitigation measures to minimize increases in noise levels. 2.60.2

(c) location of construction staging areas and construction worker parking; measures to encourage carpooling and/or public transportation use by construction workers. 2.60.3

(d) construction schedule, including hours of construction activity. 2.60.4

(e) access routes for construction trucks and anticipated volume of construction truck traffic. 2.60.5

(f) construction methodology (including foundation construction), amount and method of excavation required, disposal of the excavate, description of foundation support, maintenance of groundwater levels, and measures to prevent any adverse effects or damage to adjacent structures and infrastructure. 2.60.6

(g) Method of demolition of existing buildings on the site and disposal of the demolition waste. 2.60.7

(h) potential for the recycling of construction and demolition debris, including asphalt from the existing parking lot. 2.60.8

(i) identification of best management practices to control erosion and to prevent the discharge of sediments and contaminated groundwater or stormwater runoff into the City's drainage system and into the adjacent river and harbor waters during the construction period. 2.60.9

(j) coordination of project construction activities with other major construction projects being undertaken in the project vicinity at the same time, including scheduling and phasing of individual construction activities. 2.60.10

(k) impact of project construction on rodent populations and description of the proposed rodent control program, including frequency of application and compliance with applicable City and State regulatory requirements. 2.60.11

(l) measures to protect the public safety. 2.60.12

Sustainable Design

A new development project presents opportunities for sustainable design and
construction to prevent damage to the environment, consistent with the goals of
Executive Order 385 and the Green Guidelines for Healthcare Construction. The 2.61
DPIR shall fully describe (including a LEED checklist) appropriate
environmentally protective technologies and practices that will be incorporated
into the design and operation of the proposed development and the Proponent's
commitment to include such measures. The Proponent is encouraged to achieve 2.62
LEED certifiable status. Measures shall include, but not be limited to, the
following: 2.63

- Participation in the U.S. Environmental Protection Agency's Energy Star/Green Lights program and adoption of the Leadership in Energy and Environmental Design (LEED) standards for the project. 2.63.1

- Optimize natural day lighting, passive solar gain, and natural cooling, specify energy efficient HVAC and lighting systems, appliances, and other equipment, and solar preheating of makeup air. 2.63.2

- Favor building materials and purchases of supplies that are non-toxic, made from recycled materials, and made with low embodied energy. 2.63.3

- Application of cool roofing material for energy conservation, including reduction in cooling energy use. 2.63.4

- Build easily accessible recycling system infrastructure into the project's design. 2.63.5

- Incorporate additional opportunities to conserve water beyond water-saving technologies required by law. 2.63.6

- Make the building design adaptable for the future inclusion of innovative energy and environmental technologies as they develop over time. 2.63.7

- Conduct annual audits of energy consumption, waste streams, and the use of renewable technologies. 2.63.8

In addition, Proposed Project should include significant green features such as 2.64
native landscaping, increased water and energy efficiency, improved indoor air
quality, green roof systems, and renewable energy technologies to the extent
possible. The DPIR should describe commitments to the following: 2.65

- Sustainable Sites (public transportation access, bicycle storage, alternative fueled vehicles, stormwater management, green roofing, light pollution reduction) 2.65.1
- Water Efficiency (water use reduction, water efficient landscaping, innovative wastewater technologies) 2.65.2
- Energy & Atmosphere (energy performance, CFC reduction in HVAC&R equipment, renewable energy) 2.65.3
- Materials & Resources (Recycle content, construction waste management, local/regional materials) 2.65.4
- Indoor Environmental Quality (Environmental tobacco smoke control, ventilation effectiveness, low emitting materials (adhesives & sealants, paints, carpets, composite wood), daylight and views) 2.65.5
- Innovation & Design Process (innovation in design) 2.65.6

Building Materials Resource Center

Building demolition and/or renovation activities (existing structures) may offer an opportunity for recycling, reprocessing or donation of construction and building materials (e.g., glass, brick, stone, interior furnishing) to the Building Materials Resource Center (BMRC). The Proponent is encouraged to contact the BMRC at the following address regarding disposal and/or acquisition of materials that may be appropriate for use: 2.66 2.66.1

Building Materials Resource Center
100 Terrace Street
Roxbury, MA 02120
617-442-8917

Additional comments by the City of Boston Environment Department are attached to this Scoping Determination in Appendix 1 and are incorporated herein by reference and made a part thereof.

D. URBAN DESIGN COMPONENT

The Project Notification Form thoughtfully and thoroughly addresses the urban design issues associated with the IMP and Proposed Project and the building design promises to be an important positive contribution to the character of the Dana-Farber campus, Brookline Avenue and the LMA. As the architectural work proceeds the proponents shall consider the following issues.

1. Existing Campus
The modifications to existing buildings and landscapes indicated in Figures 1-7 and 1-8 indicate a substantial improvement in the appearance and functioning of the campus. The proponents shall 2.66.2

include in the Project Impact Reports more specificity about the Jimmy Fund Way and Binney Street elevations of the Dana Building and a more detailed site plan showing the proposed street level changes in and around all the Dana-Farber buildings and landscapes.

2. Adjacent Streets

The Interim LMA Guidelines intend to improve the appearance of Brookline Avenue and to reinforce the differences in the character of the street north and south of Longwood Avenue. The northern part on both sides of the street has 'front yard' setbacks from the public sidewalk – the portions used for parking will be converted to green spaces as the Beth Israel Deaconess , Simmons, and Emmanuel College campuses evolve – while the southern portion has street walls on both sides that can become more continuous over time. The proposed project sets back the street level wall from the back of the public sidewalk and projects portions of the upper floors closer to the lot line. The relationships to the existing buildings bear careful study so that the project can include both a more generous sidewalk and a strong reinforcement of the street wall. The elevations of the various portions of the ground floor at the lobby, gift shop and retail space should be the same as the sidewalk to strengthen the relationship between the building and the street. 2.67

On Jimmy Fund Way the sidewalk should offer pedestrians a continuous path and a clear view between Brookline Avenue and Binney Street without protruding building elements or pinched portions. Where the sidewalk is interrupted by curb cuts for access to parking and service spaces the driveways should be visible from far away and should not be hidden behind parts of the building. 2.68

3. Building Entrance

The proposed campus entrance at the corner of the building at Brookline Avenue and Jimmy Fund Way is a dramatic improvement compared with the existing condition. While arcaded spaces are in some instances effective ways of emphasizing building entrances, in Boston especially on the north sides of buildings, and even when they are two stories in height, arcades are gloomy places. The design of the entrance should bear no similarity to the dark, recessed existing entrance, so the lobby should not be set back from the face of the upper floors any more than is absolutely necessary to accommodate the required pedestrian movement and the building façade should be inflected to allow light to reach the street level façade. 2.69

4. Sustainability
   Comments in the PNF suggest intentions toward sustainable building design. The city of Boston strongly supports such intentions and encourages the proponents to investigate double-wall, rain-screen, green roof and all other energy-efficient building techniques and materials. 2.70

Submission Requirements

The following submission requirements apply to any project subject to Large Project Review as well as PDA Development Plans. Certain PDAs and IMPs will require more generalized and broader information establishing a framework within which the proposed projects will be set. As these plans establish the equivalent of a zoning district, this additional material is key in evaluating not only the impacts of proposed projects within the PDA, but also how those plan areas fit within the context of the city. 2.71

Phase I Submission: 2.71.1

1. Written description of program elements and space allocation (in square feet) for each element, as well as project totals

2. Neighborhood plan, elevations and sections at an appropriate scale (1":100' or larger as determined by the BRA) showing relationships of the proposed project to the neighborhood's: 2.71.2
   a. massing
   b. building height
   c. scaling elements
   d. open space
   e major topographic features
   f. pedestrian and vehicular circulation
   g. land use

3. Color or black and white 8"x10" photographs of the site and neighborhood 2.71.3

4. Sketches and diagrams to clarify design issues and massing options

5. Eye-level perspective (reproducible line or other approved drawings) showing the proposal (including main entries and public passages/areas) in the context of the surrounding area. Views should display a particular emphasis on important viewing areas 2.71.4

such as key intersections or public parks/attractions. Long-ranged (distanced) views of the proposed project should also be studied to assess the impact on the skyline or other view lines. At least one bird's-eye perspective should also be included. All perspectives should show (in separate comparative sketches) both the build and no-build conditions. The BRA should approve the view locations before analysis is begun. View studies should be cognizant of light and shadow, massing and bulk.

6. Additional aerial or skyline views of the project, if and as requested 2.71.6

7. Site sections at 1":20' or larger (or other scale approved by the BRA) showing relationships to adjacent buildings and spaces 2.71.7

8. Site plan(s) at an appropriate scale (1":20' or larger, or as approved by the BRA) showing: 2.71.8
   a. general relationships of proposed and existing adjacent buildings and open spaces
   b. open spaces defined by buildings on adjacent parcels and across streets
   c. general location of pedestrian ways, driveways, parking, service areas, streets, and major landscape features
   d. pedestrian, handicapped, vehicular and service access and flow through the parcel and to adjacent area.

   e. survey information, such as existing elevations, benchmarks, and utilities
   f. phasing possibilities
   g. construction limits

9. Model made of bass wood at a 1"=10' scale minimum with the surrounding context with the proposed projects and existing conditions extending to a minimum three-block radius beyond each development 2.71.9
   Parcel

10. A massing model of the proposal in a digital 3D Max format. The digital model must illustrate the proposal and its immediate surrounding blocks in sufficient detail using texture mapping. The digital specifications of the model must be made in coordination with the BRA Urban Design Department to fit the BRA's city-wide digital model 2.71.10

11. Study model at 1":16' or 1":20' showing preliminary concept of setbacks, cornice lines, fenestration, facade composition, etc. 2.71.11

12. Drawings at an appropriate scale (e.g., 1":8', 1":16', or as determined by BRA) describing architectural massing, facade design and proposed materials including: 2.71.12
    a. building and site improvement plans
    b. neighborhood elevations, sections, and/or plans showing the development in the context of the surrounding area
    c. sections showing organization of functions and spaces, and relationships to adjacent spaces and structures
    d. preliminary building plans showing ground floor and typical upper floor(s)
    e. phasing, if any, of the proposed project

13. A written and/or graphic description of the building materials and its texture, color, and general fenestration patterns 2.71.13

14. U.S. Green Building Council LEED Project Checklist/Scorecard 2.71.14

15. Electronic files describing the site and proposed project at Representation Levels one and two ("Streetscape" and "Massing") as described in the document *Boston "Smart Model": Two-Dimensional Mapping Standards* (Appendix 3) 2.71.15

16. Full responses, which may be in the formats listed above, to any urban design-related issues raised in preliminary reviews or specifically included in the BRA scoping determination, preliminary adequacy determination, or other document requesting additional information leading up to BRA Board action, inclusive of material required for BCDC review 2.71.16

17. Proposed schedule for submission of all design or development-related materials. 2.71.17

<u>Phase II Submission: Design Development</u> (At this stage, all relevant PDA or IMP Plan material has been submitted and approved; the building design progresses in this and the following phases.) 2.72

1. Revised written description of project 2.72.1
2. Revised site sections 2.72.2
3. Revised site plan showing: 2.72.3
    a. relationship of the proposed building and open space to existing adjacent buildings, open spaces, streets, and buildings and open spaces across streets
    b. proposed site improvements and amenities including paving, landscaping, lighting and street furniture
    c. building and site dimensions, including setbacks and other dimensions subject to zoning requirements

d. any site improvements or areas proposed to be developed by some other party (including identification of responsible party)

e. proposed site grading, including typical existing and proposed grades at parcel lines

4. Dimensional drawings at an appropriate scale (e.g., 1":8') developed from approved schematic design drawings which reflect the impact of proposed structural and mechanical systems on the appearance of exterior facades, interior public spaces, and roofscape including: 2.72.4
   a. building plans and elevations
   b. preliminary structural drawings
   c. preliminary mechanical drawings
   d. sections
   e. elevations showing the project in the context of the surrounding area as required by the Authority to illustrate relationships or character, scale and materials
5. Large-scale (e.g., 3/4":1') typical exterior wall sections, elevations, and details sufficient to describe specific architectural components and methods of their assembly 2.72.5
6. Outline specifications of all materials for site improvements, exterior facades, roofscape, and interior public spaces 2.72.6
7. A study model at an appropriate scale (e.g., 1":8', 1":16', or as determined after review of schematic design) showing refinements of façade design. 2.72.7
8. Eye-level perspective drawings showing the revised project in the context of the surrounding area 2.72.8
9. Preliminary samples of all proposed exterior materials (see Appendix 4) 2.72.9
10. Complete photo documentation (35 mm color slides) of above components including major changes from initial submission to project approval, if and as requested by the BRA. 2.72.10
11. U.S. Green Building Council LEED Project Checklist/Scorecard 2.72.11

All above information may be additionally requested in either booklet or suitable electronic form.

<u>Phase III Submission: Contract Documents</u> (At this stage, a project has likely received approval and is seeking building permits from ISD.) 2.73

1. Final written description of project, including final program breakdown 2.73.1
2. A site plan showing all site development and landscape details for lighting, paving, planting, street furniture, utilities, grading, drainage, access, service, and parking 2.73.2

3. Complete architectural and engineering drawings and specifications. One set for BRA reference; additional sets or cover sheets as required for stamped approvals prior to submission to ISD 2.73.3
4. A complete list of exterior building and site materials and plantings, including a materials sample board if and as requested (see Appendix 4) 2.73.4
5. Eye-level perspective drawings or presentation model that accurately represents the project, and a rendered site plan showing all adjacent existing and proposed structures, streets, sidewalks, pathways, and site improvements 2.73.5
6. Site and building plan at 1":100' for Authority's use in updating its 1":100' photogrammetric map sheets, if and as requested 2.73.6
7. Revised basswood models of final project design suitable for placement, if and as appropriate, in the applicable BRA model bases 2.73.7
8. A massing model of the proposal in a digital 3D Max format. The digital model must illustrate the proposal and its immediate surrounding blocks in sufficient detail using texture mapping. The digital specifications of the model must be made in coordination with the BRA Urban Design Department to fit the BRA's city-wide digital model 2.73.8
9. Electronic files describing the site at Representation Levels three and four ("Building Envelope" and "Photo-realistic") as described in the document *Boston "Smart Model": Two-Dimensional Mapping Standards*. This should include the site, if topology has been altered 2.73.9
10. U.S. Green Building Council LEED Project Checklist/Scorecard 2.73.10
11. Complete photo documentation (35 mm color slides) of above components including major changes from initial submission to project approval, if and as requested by the BRA. 2.73.11

All above information may be requested in electronic form suitable to the BRA for purposes of reference and information. All above information may be requested in booklet form for limited distribution or reference.

<u>Phase IV Submission: Construction Inspection</u> (Phase IV occurs throughout the construction period.) 2.74

1. All contract addenda, proposed change orders, and other modifications and revisions of approved contract documents that affect site improvements, exterior facades, roofscape (inclusive of HVAC equipment and mechanical or access penthouses), and interior public spaces submitted to the Authority for review and approval prior to effectuation 2.74.1

2. Shop drawings of architectural components which differ from or were not fully described in the contract documents 2.74.2
3. Information or modifications requested as a condition of approval by the BRA 2.74.3
4. A signage plan or specific signage or building identification proposals 2.74.4
5. A lighting plan or any specific site or building facade lighting proposals, inclusive of any off-site lighting of buildings or monuments undertaken in conjunction with the project 2.74.5
6. Mock-up panels: Full-size assemblies (at the project site) of significant exterior materials, inclusive of proposed details of construction (joint materials including grout or caulking, window frames, mullions, and panning, glass and spandrel panels, masonry or other patterning) and including all feasible facade conditions. Drawings of proposed mock-up panels shall be submitted to the BRA for review and approval prior to erection. Approval of all materials, including both site and building materials, shall not be deemed final until after this mock-up panel review has been completed by the BRA (see Appendix 4) 2.74.6
7. Viewing of any additional models or mock-ups promulgated by the developer for marketing or other purposes 2.74.7

E. PUBLIC NOTICE

The Applicant will be responsible for preparing and publishing in one or more newspapers of general circulation in the City of Boston a Public Notice of the submission of the DPIR to the BRA as required bu Section 80A-2. This Notice shall be published within five (5) days after the receipt of the DPIR. Public comments shall be transmitted to the BRA within forty-five (45) days of the publication of this Notice. 2.75

Following publication of the Notice, the Proponent shall submit to the BRA a copy of the published Notice together with the date of publication.

BOSTON
TRANSPORTATION
DEPARTMENT

ONE CITY HALL PLAZA/ROOM 721
BOSTON, MASSACHUSETTS 02201
(617) 635-4680/FAX (617) 635-4295

May 11, 2005

Sonal Gandhi, Senior Manager
Boston Redevelopment Authority
City Hall, 9th Floor
Boston, MA 02201

Dear Sonal:

Thank you for the opportunity to comment on the Dana-Farber Cancer Institute Project Notification Form / Institutional Master Plan Amendment (PNF/IMPA). Dana-Farber proposes a new building development at the corner of Brookline Avenue and Jimmy Fund Way (450 Brookline Avenue). The site currently holds the Redstone building (15,520 GSF), 454 Brookline Avenue building (18,271 GSF) and a 30 -space surface parking lot. Dana-Farber proposes to demolish these buildings and construct a 275,000 GSF clinical and research building with 455 underground parking spaces (212 net new spaces). The building will also contain ground floor retail.

Additionally, the IMPA proposes to renovate the Dana building by reconfiguring an existing above-grade structured parking area and surface vehicular drop-off/pick-up area into administrative space (71,000 GSF). The existing 213 parking spaces and drop-off/pick-up area will be relocated below the new 450 Brookline Avenue building. In total, Dana-Farber will consolidate their parking into a 710-space underground parking garage below the 450 Brookline Avenue and Smith buildings.

Dana-Farber has 862,184 GSF and 498 parking spaces at its main facilities in the LMA (0.57 spaces/1,000 square feet). Dana-Farber also currently leases space and parking within the LMA. In total, Dana-Farber currently has 969,490 GSF and 814 parking spaces owned or leased in the LMA (0.83 spaces/1,000 square feet).

To supplement its space needs and its employee and patient parking demand (over 160,000 patient visits per year), Dana-Farber leases 181,705 GSF and utilizes an additional 640 parking spaces outside of the LMA (mostly MASCO parking lots). In total, Dana-Farber has approximately 1.2 million square fee (owned and leased) and controls 1,454 parking spaces within and outside the LMA (1.12 spaces/1,000 square feet).

Dana-Farber is similar to other institutions in the LMA that have a space and parking demand which exceeds what they have in the LMA. It explains a key issue of the LMA today – space and parking shortfalls has pushed Dana-Farber and other LMA institutions into adjacent neighborhoods, such as the Fenway, Mission Hill and Roxbury. One example is Dana-Farber is utilizing 150 parking spaces in the Crosstown Garage. 3.1

THOMAS M. MENINO, Mayor

Another issue with Dana-Farber is that despite its high employee transit mode share, 77% of its 1,454 parking spaces are used for employee parking, which leaves only 23% (340 spaces) for 3.2 patients. This demonstrates the critical need for more transit in the LMA in order to reduce employee parking demand, free-up parking for patients and reduce parking spillover into adjacent neighborhoods.

The PNF/IMPA estimated that the Project will generate 848 net new daily vehicle trips, including 51 vehicle trips in the AM peak hour and 59 vehicle trips in the PM peak hour. The Draft Project Impact Report (DPIR) should provide a detailed trip generation analysis. To be conservative, the 3.3 trip generation analysis should be based on 312,209 square feet (i.e. 275,000 GSF for the 450 Brookline Avenue building, minus 33,791 GSF to be demolished at 454 Brookline Avenue and Redstone buildings), plus 71,000 GSF new administrative space in the Dana Building.

A key issue is traffic circulation at the Brookline Avenue/Jimmy Fund Way intersection. Left-turns from Brookline Avenue westbound onto Jimmy Fund Way are prohibited today. Any changes will 3.4 impact traffic flow for the entire Brookline Avenue corridor and must be studied in detail. The DPIR should study at least three alternative designs for a complete reconstruction of the Brookline Avenue/Joslin Place/Deaconess Road/Jimmy Fund Way intersection. Binney Street should be reviewed in detail from Longwood Avenue to Fenwood Road. BTD's Scope will include the full-list of intersections and roadways that will need to be analyzed to determine the impacts from this Master Plan Amendment and Project.

As discussed above, parking is a major issue. The DPIR should include a detailed study of Dana-Farber's parking supply and demand, including parking utilization and turnover rates. Table 2.1 in 3.5 the PNF/IMPA should include the total number of parking spaces for each building and number used by Dana-Farber. Likewise, Table 4.2 in the PNF/IMPA should include the building's square footage and clarify the total number of parking spaces at each building and the number of spaces utilized by Dana-Farber. The DPIR should include a map of all parking facilities utilized as well as 3.5.1 shuttle bus and walking routes.

Trucks illegally parking on Brookline Avenue are a problem today. Dana-Farber's loading and 3.6 service plan shall be documented in detail and meet BTD's Off-Street Loading Guidelines.

Lastly and most important, transit information should be documented in detail in the DPIR. This 3.7 should include a breakdown of employee transit use by service, station/stops and times (i.e Yawkey and Ruggles stations, subway lines, bus routes and stops, etc.).

Thank you again for the opportunity to comment on the Dana-Farber PNF/IMPNF. Attached is BTD's full Scope of Work for Dana-Farber. BTD looks forward to working with the BRA, Dana-Farber and community on this Master Plan.

Sincerely,

Adam Shulman

Adam Shulman, AICP
Transportation Planner, BTD Policy and Planning

Cc: Vineet Gupta, Director of Policy and Planning
John DeBenedictis, Director of Engineering

BOSTON TRANSPORTATION DEPARTMENT
TRANSPORTATION ACCESS PLAN SCOPE

DANA-FARBER CANCER INSTITUTE
PROJECT NOTIFICATION FORM / INSTITUTIONAL MASTER PLAN AMENDMENT

MAY 15, 2006

SCOPE OF WORK

The developer must evaluate the transportation impacts associated with the proposed Project and Master Plan Amendment. The results of this evaluation will be documented in an Access Plan prepared for submission to the Boston Transportation Department (BTD). The report will include the following: 3.8

- An existing study of area traffic, transit, pedestrian, bicycling, parking and loading conditions. 3.8.1
- An evaluation of the project's long-term impacts (10 years) and study area traffic, transit, pedestrian, and bicycling activities, as well as parking and loading demand. 3.8.2
- An evaluation of the Project's short-term traffic impacts, related to construction activity, including truck routes and noise impacts. 3.8.3
- Identification of appropriate measures to mitigate the plan's impacts, including but not limited to, long-term project impact monitoring, roadway/intersection improvements, reduction in parking spaces, intelligent transportation technology and transportation demand management. 3.8.4

STUDY AREA

The following intersections are important to the master plan and are considered to constitute the study area for the transportation component of the master plan. 3.9

a. Brookline Avenue/Longwood Avenue
b. Brookline Avenue/Joslin Road Deaconess Road
c. Brookline Avenue/Francis Street
d. Brookline Avenue Fenwood Road
e. Brookline Avenue/Riverway
f. Binney Street/Longwood Avenue
g. Binney Street/Deaconess Road
h. Binney Street/Francis Street
i. Binney Street/Fenwood Road
j. Longwood Avenue/Blackfan Street
k. Longwood Avenue/Avenue Louis Pasteur
l. Longwood Avenue/Huntington Avenue
m. Longwood Avenue Pilgrim Road
n. Longwood Avenue/Riverway
o. Pilgrim Road/Joslin Road
p. Pilgrim Road/Deaconess Road

q. Francis Street/Huntington Avenue
r. Brookline Avenue/Fenway
s. Brookline Avenue/Park Drive
t. Park Drive/Riverway/Fenway
u. Audubon Circle

DEFINITION OF TASKS

Task 1. Description of Existing Transportation Conditions

The Existing Conditions component will present data on the various transportation systems within the study area. Information on parking, shuttles, bikes, pedestrians, transit, loading, levels of service, available capacity, queue lengths, and other analysis appropriate to identify any current deficiencies will be provided. 3.10

1.1 Traffic. Collect daily and peak traffic volume data. (Data collected in the past three years from other studies may be used). Present daily traffic volumes for key roadway corridors within the study area including Brookline Avenue, Binney Street, Longwood Avenue, Francis Street, Fenwood Road, Fenway, Riverway, Avenue Louis Pasteur, Huntington Avenue. Provide a map showing ADT and Peak hour volumes for each major road in the LMA. Include line thickness to illustrate traffic volumes. Develop base traffic networks for the study area representing existing morning and evening peak hour conditions. Provide intersection capacity analysis for study area intersections for morning and evening peak hours. 3.11 3.11.1

Existing capacity analysis shall be presented on level of service and queuing lengths at all study area intersections in terms of vehicles, bicycles and pedestrians. Analysis shall reflect peak period characteristics including buses and shuttles stopping, parked cars, heavy vehicles, double parking maneuvers, bicycles, number of pedestrians, grade, and loading activities. 3.11.2

In addition, determine vehicular trip generation and mode split characteristics of Dana Farber's employees and patients/visitors. If this information is unavailable, begin a survey to collect such information. Provide BTD recent ridesharing surveys. 3.11.3

1.2 Parking. Define Dana-Farber's parking supply. Inventory and identify on-street and off-street parking spaces, including associated parking regulations and restrictions. Provide on-street and off-street parking ratio's based on total main facilities in the LMA gross square footage, total facilities in the LMA, and facilities outside of the LMA. Identify available public and commercial spaces within ¼ mile from Dana-Farber in an excel spreadsheet and associated map. 3.12

Provide a detailed inventory of on- and off-street parking facilities controlled, leased, operated or managed by Dana-Farber. Include the facility location, distance from site, number of spaces, fees, turnover rates, user type, and level of utilization by time of day. The proponent shall present data for daytime peak, daytime off-peak (e.g. 3:00 PM), and overnight. Describe in detail, parking policies and fee schedule. Discuss how Dana-Farber relays its parking policies and procedures to employees, patients and visitors. This information will provide a comprehensive review of the current parking conditions. 3.12.1 3.12.2 3.12.3

The proponent shall discuss any current leasing arrangements with MASCO and any other parking contracts. 3.12.4

1.3 Transit. Dana-Farber is situated to maximize use of public transit services. The institution is located near the MBTA's Green Line, and is serviced by MASCO bus shuttles. 3.13 Document the operating characteristics of the area's Massachusetts Bay Transportation Authority (MBTA) services ("T" and buses) and other transit services (MASCO shuttles). Discuss what the college's existing subsidy programs, shuttle service systems, carpool, and vanpool services are. 3.13.1 Include origin and destination data, and parking locations for each service. Transit ridership data should be presented for faculty, patients and visitors, including type of service used, and morning and evening peak hours. 3.13.2 Analyze the future need for such services based on historical data and trends. If data is not available, begin a program to start collecting such data. Bus stops and shuttle services will be analyzed for potential consolidation.

1.4 Pedestrians. Describe pedestrian conditions along major pedestrian corridors and pathways, including pedestrian barriers and deficiencies, within and adjacent to the institute. Pedestrian counts should be provided for all study area intersections. 3.14

Map pedestrian circulation and identify major pedestrian corridors based on the above counts with existing numbers labeled. Indicate intersections that have countdown pedestrian signals. 3.14.1

1.5 Bicycles. Conduct bicycle counts at study area intersections. Describe bicycle usage at Dana Farber, define and illustrate primary bicycle routes, and inventory the supply and location of bicycle amenities. 3.15 Discuss existing policies to encourage and promote safe bicycling. 3.15.1

1.6 Loading and Service. Identify all major loading and service routes and locations. Document level of loading and service activity and quantify trip generation of trucks (truck types, number of trucks per day or per week, frequency, origin and destination, routes), as well as regulations and prohibitions on loading and service, and schedule. Explain dispatch and loading procedures in detail. 3.16

1.7 Site-Plan. Provide a detailed site plan of Dana-Farber showing major vehicular, parking, loading/service, transit, pedestrian, and bicycle facilities and access routes. A detailed survey plan of the parcels shall be provided including but not limited to; property lines, sidewalks, right of way, utilities, curb cuts, widths, radii, signs, poles, striping and markings. The 1:20 scale site plan should also illustrate building footprints, driveways parking and loading areas, and adjacent street policy/curb usage. 3.17

1.8 Transportation Programs. Describe all transportation-related programs provided, including current and ongoing measures to reduce vehicle trips to and from Dana-Farber. 3.18

Task 2. Evaluation of Long-Term Transportation Impacts

Describe the proposed master plan based on a ten year horizon period. Include a summary of project details that will have impacts on the transportation system. 3.19 Create a matrix comparing existing conditions to proposed conditions regarding land use, square footage, number of employees and patients, Floor Area Ratio (FAR), parking spaces, and parking ratios. Indicate projected schedule (timetable) for construction of the various projects and describe arrangements for relocation of any uses that are temporarily displaced by construction.

Establish "No-Build" transportation conditions based on approved/planned developments, programmed transportation improvements and anticipated "background growth" within the study area. No-Build transportation conditions will establish future transportation conditions in the study area without considering future development by Dana-Farber. The proponent shall work with BTD on establishing a comprehensive future traffic conditions network that includes all known projects in the LMA area. 3.20

Estimate traffic impacts of the proposed master plan in detail. Assign generated trips to the No-Build conditions to develop Full-Build conditions for the horizon year. Analyze the impacts of new or displaced trips generated by the plan. Discuss existing intersection level of service with future Full-Build expected level of service. Compare Full-Build conditions with existing conditions and the No-Build scenario to determine potential future impacts and cumulative traffic impacts. 3.21

Dana-Farber's strategies for mitigating circulation impacts associated with master plan, in the context with other on-going projects and transportation related plans, will be a key element of the analysis. 3.22

2.1 Trip Generation. Review current and proposed development to develop future trip generation characteristics. Estimate trips associated by vehicle, transit, bicycle and walk trips based on an updated modal split survey and BTD's trip generation standards. 3.22.1

2.2 Trip Distribution. Conduct a zip code and mode share survey of Dana-Farber employees. Compare and contrast the findings with the BTD zonal data for Area 5. 3.22.2

2.3 Conditions to be Analyzed. In addition to existing conditions, analyze the following future conditions to determine morning and evening peak hour levels of service at the study area intersections: 3.22.3

a. No-Build, 10-year horizon (with projects anticipated to be completed and a background growth rate included). 3.22.3.1

b. Project Generated Trips. In addition to the other synchro networks (Existing, No-Build, Full-Build Conditions), provide BTD the AM and PM synchro files with Project generated trips only. 3.22.3.2

c. Full-Build10-year horizons (with the addition of project-related impacts). 3.22.3.3

2.4 Background Development Projects. Any approved or proposed development projects to be included in the No-Build evaluation shall be approved by BTD staff prior to the analysis. 3.22.4

2.5 Evaluation of Transportation Impacts. New trips expected to be attracted under the master plan will be added to demands carried by the existing roadway system plus new trips from background projects. Develop and analyze daily morning and evening peak hours for all travel modes, and qualitatively analyze the differences. 3.22.5

2.5.1 Traffic Impacts. Analyze study area intersections for volume-to-capacity ratio (v/c), level of service (LOS), delay calculations, and queue lengths. Caution must be used to represent peak hour operating conditions, such as, reduced lane geometry due to double parking, loading and bus stopping. The Syncrho network must be calibrated to reflect field conditions. Provide BTD the calibration backup data in the technical appendix. 3.22.5.1

2.5.2 Transit Impacts. Describe the usage of public transportation, and the impact of the plan on transit services. 3.22.5.2

2.5.3 Pedestrian and Bicycle Impacts. Present pedestrian and bicycle volumes generated by the master plan. Project future volumes and pedestrian operations for the locations and crossings identified in Section 1.4. Indicate impacts of new pedestrian trips on pedestrian operations and amenities. Identify impacts of new bicycle trips on street network and bicycle amenities. Finally, identify bike and pedestrian paths and corridors across and through the campus on the site plan. 3.22.5.3

2.5.4 Loading and Service. Estimate truck and service vehicle traffic to Dana-Farber. In addition, evaluate access and egress for emergency vehicles, shuttle services, and any other institutional amenity provided, such as buses. Analyze what amenities and services will be necessary in the future. Illustrate truck routes to and from the campus. Provide 1:20 scale maps depicting truck turning movements. 3.22.5.4

2.6 *Parking Impacts*. Estimate the demand for parking generated by the master plan. Identify parking supply and demand for faculty, staff employees, visitors, and describe parking operations in detail. 3.22.6

2.6.1 Develop future parking demands generated by the master plan based on traffic volumes projected in Section 2.1 above. Identify these parking demands by user type (faculty, staff and patients). 3.22.6.1

2.6.2 Identify parking spaces that will be removed or displaced as part of the development plan. In addition, identify new on-site or off-site parking areas that will replace displaced spaces. Identify any proposed on-site parking facilities designed to eliminate existing off-site parking spaces. Finally, provide proposed future off-street and on-street parking ratios. 3.22.6.2

2.6.3 Provide a proposed management plan for campus parking facilities. Present parking policies and rates for employees and patients. 3.22.6.3

2.6.4 Provide a plan of all parking facilities, including layout and access. 3.22.6.4

Task 3. Evaluation of Short-Term Impacts (Construction Period)

Identify a typical approach to minimize construction impacts during building phases of the development plan. These may include: mode of arrival for construction workers; parking provisions for construction workers and construction materials deliveries; anticipated frequency, times and routes of truck movements and construction materials deliveries; temporary storage of construction equipment and material; and the need for full or partial street closures or street 3.23

occupancy during construction. As required, Dana-Farber will submit to the BTD a Construction Management Plan (CMP) prior to issuance of a Building Permit and construction.

Task 4. Development of Mitigation Program

Propose a plan to manage transportation impacts resultant from the master plan build-out analysis. Provide a site plan showing new amenities and circulation patterns. Develop programs or strategies to reduce potential transportation impacts. These may include the following: 3.24

- Transportation Demand Management strategies.
- Measures to minimize vehicle-trip generation.
- Roadway/infrastructure improvements.
  Analyze at least three alternative geometric and/or traffic signal operational changes to the Brookline/Deaconess Road/Joslin Road intersection.
- Transit improvements.
- Bicycle improvements.
- Parking management improvements.
- Pedestrian improvements.
- Intelligent transportation systems.
- Long-term project impact monitoring.

Some of these issues will have been treated in the section on transportation-related programs. Reference should be made to these programs.

Include a time schedule and cost estimates for proposed mitigation and transportation improvements. 3.25

MICHAEL P. ROSS
BOSTON CITY COUNCIL

May 16, 2006

Sonal Gandhi, Project Manager
Boston Redevelopment Authority
One City Hall Plaza
Boston, MA 02201

Dear Ms. Gandhi:

I am writing today to comment on the Project Notification From/Institutional Master Plan
Amendment filed by the Dana-Farber Cancer Institute in March of 2006. I would like to
take this opportunity to share both my overall support as well as some concerns regarding 4.1
this project since both the Mission Hill and Fenway communities will be directly
impacted.

I am pleased that Dana-Farber has moved some of its current uses off-site by leasing 4.2
space outside of LMA Campus, and also that the Institute has chosen to lease space in
existing buildings within the LMA. These efforts combined have produced a project that
is smaller in both height and overall massing than the previous proposal.

I am also pleased that this proposal provides for a real "front door" entrance to the 4.3
hospital that will create a new identity for Dana-Farber. What they have presently is not
adequate. The widened sidewalks will also make for a safer and more pleasant 4.4
experience for pedestrians. I am hoping that Dana-Farber will also take this effort one
step further and work to improve the pedestrian environment all along the stretch of
Brooline Avenue that abuts the Institute.

However, there are some community concerns that I must also share at this time. One of 4.5
these is that, although I am in support of creating a more inviting pedestrian environment
on Brookline Avenue, I am also concerned about competition between whatever retail
will be going in on the first floor and our newly emerging commercial district in Brigham
Circle. Specifically, I am concerned that restaurants that may be moving into this new
space will take away business form those in the Mission Hill neighborhood. Instead, I
hope that Dana-Farber will consider cafeterias for employees and using outside catering
for any additional food service needs. I have also heard concerns from residents about 4.6
the impact that shifting the main entrance from Binney Street to Jimmy Fund Way will

DISTRICT 8
BOSTON CITY HALL, ONE CITY HALL PLAZA, BOSTON, MASSACHUSETTS 02201
(617) 635-4225 FAX: (617) 635-4203 MICHAEL.ROSS@CI.BOSTON.MA.US

have Brookline Avenue and the intersection of Joslin Place, Deaconess Road and Jimmy Fund Way. I ask that a detailed traffic study of this intersection be conducted and presented to the City and the IAG for further analysis.

In closing, I support the Dana-Farber Cancer Institute's Master Plan Amendment, but would like specific responses to the above raised issues. Thank you for taking the time to review these comments. I am looking forward to working with both Dana-Farber and the affected communities through the completion of this project. 4.7

Best regards,

Michael P. Ross
Boston City Council

District 8
Boston City Hall, One City Hall Plaza, Boston, Massachusetts 02201
(617) 635-4225 Fax: (617) 635-4203 michael.ross@ci.boston.ma.us

Memo

Date: 5/11/2006

To: Sonal Gandhi

Cc: John Auerbach, Kristin Golden

From: Maia BrodyField

RE: Boston Public Health Commission Comments on Dana Farber Cancer Institute's Project Notification Form/Institutional Master Plan

---

The Boston Public Health Commission has engaged in many successful collaborations with DFCI and its Community Benefits Office. DFCI has been an active participant in the Mayor's Task Force to Eliminate Health Disparities and has been a long time collaborator in the Mayor's Crusade Against Cancer. The Prostate Cancer Education and Screening Program is currently a recipient of a Patient Education grant under the BPHC's Disparities Project and DFCI also operates the Mammography Van on behalf of the City of Boston. These efforts actively contribute to the goal of eliminating racial and ethnic disparities in cancer.

Given our many rewarding partnerships with DFCI in the past, the BPHC has identified several areas that offer potential opportunities to expand on those collaborations:

- The BPHC's funding of the Prostate Cancer Screening and Education Program has enabled the program to increase their collaborations with Boston community based 5.1 organizations in order to better access Boston men of color. Through this collaboration, as well as through existing relationships around breast and cervical cancer, BPHC has observed the benefits of the patient navigator model employed by Dana Farber. BPHC encourages DFCI to expand this promising practice throughout all of their outpatient programs.

- The BPHC recognizes the importance of reducing congestion in the Longwood 5.2 Medical Area and applaud DFCI's efforts to address this issue. However, as part of DFCI's plan to open a satellite oncology unit at the Faulkner Hospital, the BPHC strongly encourages a well thought out plan to address issues of transportation for the many residents of Boston who do not have access to a car. The BPHC would like to see assurances that critical outpatient services will not be removed from the LMA, thereby decreasing access to cutting edge medical services and research for residents of Boston. In addition, BPHC would like DFCI to consider increasing their 5.3 outreach and advertising to Boston residents who are underserved.

- Part of the Mayor's plan to reduce racial and ethnic disparities in health care is to 5.4 diversify the health care workforce. As was indicated by the community input, DFCI has additional opportunities to support the Fenway and Mission Hill neighborhood organizations in their efforts to develop workforce opportunities for local residents and the BPHC would strongly endorse such partnerships.

- In addition, as a large employer in Boston, DFCI is poised to make a significant impact on assuring access for underserved patients by increasing the percentage of linguistic minorities employed in the health care setting at all levels including senior leadership/management. 5.5

- The Boston Public Health Commission also recognizes the many youth programs and educational partnerships with Boston high schools as models that would be well suited to further development. In particular, BPHC would support any efforts DFCI plans to expand the programs to the middle school level. 5.6

- There are other emerging programs and persistent public health needs for which the Boston Public Health Commission would welcome the opportunity to work with DFCI. The Boston Public Health Commission is about to embark on a new initiative to provide needle disposal options to residents of the City of Boston through kiosks stationed around the city and we will need partners who will be willing to consider serving as sites for this pilot program. 5.7

OFFICE OF JOBS AND COMMUNITY SERVICES

A division of BOSTON REDEVELOPMENT AUTHORITY

City of Boston
Thomas M. Menino, *Mayor*
Constance Doty, *Director*
Mark Maloney, *Chief Economic Development Officer*

43 Hawkins Street
Boston, MA 02114
Tel. 617-918-5200
Fax 617-918-5299

May 11, 2006

Mark Maloney
Director
Boston Redevelopment Authority
Boston City Hall, 9th Floor
Boston, MA 02201

Dear Mr. Maloney:

Thank you for the opportunity to comment on the Dana-Farber Cancer Institute's proposed Institutional Master Plan Amendment. The Office of Jobs and Community Services (JCS) held a preliminary meeting with Dana-Farber on September 9, 2005 to discuss workforce development matters related to this project, and looks forward to continuing that discussion.

As the City's workforce development agency, JCS is particularly interested in Dana-Farber's efforts to expose Boston Public School students to careers in health care and the sciences, and its work to increase the number of Boston residents employed by the institution and its contractors. We applaud the Dana-Farber's existing relationships with Boston Latin School, Fenway High School, and Madison Park Technical Vocational High School, and would encourage Dana Farber to maintain and, if possible, expand those initiatives. It is worth noting that the recent restructuring of large high schools into small, theme-based academies has resulted in no less than seven such academies with a health focus, so there may be other opportunities for partnership as well. 6.1

While Dana-Farber contracts out much of the entry-level work which has traditionally provided the first rung on the ladder for many Boston residents, we are interested in exploring ways the institution might work with its contractors to increase the access of neighborhood residents to those jobs, and then help such workers progress in their careers through the provision of education and training opportunities. 6.2

The Interim Guidelines require Dana-Farber to submit a Workforce Development Plan to the Office of Jobs and Community Services outlining the institution's projected workforce needs and detailing the measures to be taken to meet those needs. While the Project Notification document contains valuable information about current workforce development activities, it does not constitute a future Workforce Development Plan as envisioned in the Interim Guidelines. We look forward to reviewing such a plan, and to working with Dana-Farber to better meet the needs of the institution and the residents of Boston. 6.3

Sincerely,

Conny Doty

Conny Doty, Director
Jobs and Community Services

cc: Sonal Gandhi
Ken Barnes

ASSESSING DEPARTMENT
Boston City Hall, Room 301, Boston, MA 02201

TO: Sonal Gandhi, Project Manager
FROM: Matt Englander, Tax Policy Unit
DATE: May 8, 2006
RE: Dana Farber Comments for IMP Scoping Determination

Boston-area residents are very fortunate to have some of the best medical facilities, colleges & universities, museums, and other cultural attractions in their backyard. This is true for the Dana Farber Cancer Institute, one of the finest cancer-research and treatment facilities in the U.S. The fact remains, however, that as organizations like DFCI expand so too does the percentage of tax exempt land in Boston (currently at 52% exempt). Residential and commercial taxpayers must cover the costs to provide essential city services to exempt properties. As DFCI seeks to expand and enhance their campus, I ask that they consider the impact on taxpayers by increasing your Payment-in-lieu-of-tax (PILOT) contribution. 7.1

With anticipated new construction at 450 Brookline Avenue as well as other campus enhancements on the horizon, the Assessing Department asks that representatives from DFCI meet with the Tax Policy Unit to discuss an increased PILOT contribution. The contribution will depend on the size and usage of the facility, and should be agreed upon prior to the issuing of the Certificate of Occupancy. 7.2

Should you or DFCI have any questions related to this consideration please contact me at (617) 635-4797.

Boston Water and Sewer Commission

980 Harrison Avenue
Boston, MA 02119-2540
617-989-7000

April 26, 2006

Ms. Sonal Gandhi
Senior Manager
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Re: IMPA/PNF for Dana-Farber Cancer Institute – Biomedical Research Facility

Dear Ms. Gandhi:

The Boston Water and Sewer Commission has reviewed the Institutional Master Plan Amendment (IMPA)/Project Notification Form (PNF) for the Dana-Farber Cancer Institute (DFCI). Development on the Dana-Farber campus is governed by the DFCI Institutional Master Plan (IMP), which was submitted to the BRA in August 1993. CFCI's IMP included the construction of the currently proposed biomedical research facility as well as a number of follow-on renovation projects. The IMP was subsequently approved by the BRA and the Boston Zoning Commission and went into effect on April 8, 1994.

The project site for the proposed biomedical research facility is located at the corner of Brookline Avenue and Jimmy Fund Way, at 450 Brookline Avenue. The site is presently occupied by two buildings – 454 Brookline Avenue and the Redstone Building, as well as a 30-space surface parking lot. These structures will be demolished to accommodate construction of the new 175,000 square foot building designed for clinical, clinical research, patient services, administrative and retail purposes. The proposed project includes the construction of approximately 455 underground parking spaces and construction of a tunnel below Jimmy Fund Way. It is anticipated that the tunnel under Jimmy Fund Way will be located 15 feet below the street level to avoid interference with existing and future utilities.

Several modifications to existing buildings on the CFCI's campus are included as part of this project, including:

- Potential expansion of campus loading and receiving facilities at the Smith Building on Binney Street

- Renovation of Smith Building floors 1-3 to reconfigure space and use to integrate continuously with the new building

- Minor interior modifications of the Smith Building to facilitate connections to the new building at most levels, including underground parking

Water demand for the new facility is estimated at approximately 56,550 gallons per day. The site is served by an 8-inch water main on Jimmy Fund Way and a 12-inch water main on Brookline Avenue. Proposed locations for new water service connections are not identified in the IMPA/PNF. 8.1

Sanitary sewage generation for the new facility is estimated at 51,410 gallons per day. Sanitary sewer service is proposed to be provided via a 15-inch sanitary sewer on Brookline Avenue and a 10-inch sanitary sewer located on Jimmy Fund Way.

The proposed project is not expected to result in significant changes to existing drainage patterns or water quality, since the existing site surface is primarily impervious. The IMPA/PNF states that the Draft Project Impact Report will evaluate the potential impact of the proposed development on the water quality of the nearby Muddy River, including both construction-related impacts and stormwater drainage. Stormwater management measures, including best management practices in compliance with the Commonwealth's Stormwater Management Policies, and the control of pollutant discharges from roadways and parking facilities will be described. A description of the projects area's stormwater drainage system, including location of stormwater drainage facilities and points of discharge will be included. 8.2

The Commission has the following comments regarding the proposed project:

General

1. For the proposed construction the proponent must submit a site plan and a General Service Application to the Commission. The site plan must show the location of existing public and private water mains, sanitary sewers and storm drains which serve the project site, as well as the location of proposed service connections. 8.3

2. With the site plan, the proponent must provide detailed and updated estimates for water demand, sanitary sewer flows and stormwater runoff generation for the proposed project. The amount of potable water required for landscape irrigation if any, must be quantified and provided separately. 8.4

3. Any new or relocated water, sewer and drainage facilities required for the project must be designed and constructed at the proponent's expense in accordance with the Commission's Water Distribution System and Sewer Use Regulations and Requirements for Site Plans. 8.5

4. The proponent is responsible for ensuring that the construction of the tunnel under Jimmy Fund Way does not negatively impact the Commission's water, sewer or storm drainage systems or any service connections to adjacent buildings. With the site plan, the proponent must submit to the Commission plans showing the location of the tunnel relative to existing and proposed water, sewer and storm drain utilities. The plans must identify specific measures that will be implemented to prevent damage or obstruction of the water, sewer or storm drain utilities during construction. 8.6

5. To assure compliance with the Commission's requirements, the proponent should submit the site plan and General Service Application to the Commission for review when project design is 50 percent complete. 8.7

6. Before demolition of 454 Brookline Avenue and the Redstone Building commences, existing water, sewer and storm drain connections must be cut and capped in accordance with Commission standards. The proponent must complete a Termination Verification Approval Form for a Demolition Permit, available from the Commission. The completed form must be submitted to the City of Boston's Inspectional Services Department before a Demolition Permit will be issued. 8.8

Sewage/Drainage

7. The site plan must show in detail how drainage from the new building's roof and from other impervious areas will be managed. Roof runoff and other stormwater runoff must be conveyed separately from sanitary waste at all times. 8.9

8. The Department of Environmental Protection, in cooperation with the Massachusetts Water Resources Authority and its member communities, are implementing a coordinated approach to control flow in the MWRA regional wastewater system, particularly the removal of extraneous clean water (e.g. infiltration/inflow (I/I)) in the system. In this regard, DEP has routinely required proponents proposing to add significant new wastewater flows to assist in the I/I reduction effort to ensure that the additional wastewater flows are offset by the removal of I/I. Currently, DEP is typically using a minimum of 4:1 ratio for I/I removal to new wastewater flow added. The Commission supports the DEP/MWRA policy, and will require the proponent to develop a consistent inflow reduction plan. 8.10

9. Oil traps are required on all drains discharging from all new and existing enclosed parking garages. Discharges from garage drains must be directed to a building sewer and not to a building storm drain. The requirements for oil traps are provided in the Commission's Requirements for Site Plans. 8.11

10. Grease traps are required in all new and existing cafeteria or kitchen facilities in accordance with the Commission's Sewer Use Regulations. The proponent is advised to consult with Mr. Richard Fowler, Deputy Superintendent of Field Operations prior to preparing plans for grease traps. 8.11.1

11. The proponent should note Article V of the Commission's Sewer Use Regulations as it pertains to medical and laboratory facilities. 8.12

12. The proponent must fully investigate methods for retaining stormwater on site before the Commission will consider a request to discharge stormwater to the Commission's system. Under no circumstances will stormwater be allowed to discharge to a sanitary sewer. A feasibility assessment for retaining stormwater on site must be submitted with the site plan. 8.13

13. In conjunction with the site plan and General Service Application, the proponent will be required to submit a Stormwater Pollution Prevention Plan. The plan must: 8.14

   - Identify specific best management measures for controlling erosion and preventing the discharge of sediment, contaminated stormwater or construction debris to the Commission's drainage system when construction is underway. 8.14.1

   - Include a site map which shows, at a minimum, existing drainage patterns and areas used for storage or treatment of contaminated soils, groundwater or stormwater, and the location of major control or treatment structures to be utilized during construction. 8.14.2

   - Specifically identify how the project will comply with the Department of Environmental Protection's Performance Standards for Stormwater Management both during construction and after construction is complete. 8.14.3

14. The discharge of dewatering drainage to a sanitary sewer is prohibited by the Commission. The proponent is advised that the discharge of any dewatering drainage to the storm drainage system requires a Drainage Discharge Permit from the Commission and an NPDES Permit issued by the Environmental Protection Agency (EPA). 8.15

15. The proponent is advised that a Drainage Discharge Permit is also required for the long-term (permanent) discharge to the drainage of infiltrated groundwater collected via an underdrain system, such as those that are commonly installed in below-grade parking garages. 8.16

16. Developers of projects involving disturbances of land of one acre or more are required to obtain an NPDES General Permit for Construction from the EPA. The proponent is responsible for determining if such a permit is required and for obtaining the permit. If such a permit is required, a copy of the Notice of Intent and any pollution prevention plan prepared pursuant to the permit should be provided to the Commission prior to the commencement of construction. 8.17

17. The Commission requests that the proponent install a permanent casting stating: "Don't Dump: Drains to the Charles River" next to any new catch basin installed as part of this project. The proponent may contact the Commission's Operations Division for information regarding the purchase of the castings. 8.18

Water

18. The Commission utilizes a Fixed Radio Meter Reading System to obtain water meter readings. For new water meters, the Commission will provide a Meter Transmitter Unit (MTU) and connect the device to the meter. For information regarding the installation of MTUs, the proponent should contact the Commission's Meter Installation Department. 8.19

19. The proponent should explore opportunities for implementing water conservation measures in addition to those required by the State Plumbing Code. In particular the proponent should consider outdoor landscaping which requires minimal use of water to maintain. If the proponent plans to install in-ground sprinkler systems, the Commission recommends that timers, soil moisture indicators and rainfall sensors be installed. The use of sensor-operated faucets and toilets in common areas of buildings should also be considered. 8.20 8.21

Thank you for the opportunity to comment on this project.

Yours truly,

John P. Sullivan, P.E.
Chief Engineer

JPS/as

cc: J. Walser, BRA
M. Zlody, Boston Env. Dept.
P. Laroque, BWSC
E. Benz, President DFCI
R. Shea Vice President for Facilities Management DFCI

Boston

Sonal Gandhi
Senior Manager
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201-1007

April 3, 2006

Dear Ms. Gandhi:

Regarding the Project Notification Form for the Dana Farber Cancer Institute project submitted to the BRA in Marach 2006 the Boston Fire Department requires the following issues addressed by a qualified individual.

1. Emergency vehicle site access to the new buildings as well as existing buildings that might be affected. 9.1
2. Impact on availability and accessibility of hydrant locations for new buildings as well as for any existing buildings that might be impacted. 9.2
3. Impact on availability and accessibility to siamese connection locations for new buildings as well as for any existing buildings that might be impacted. 9.3
4. Impact that a transformer vault fire or explosion will have on the fire safety of the building. Particularly as it relates to the location of the vault. 9.4
5. Need for Boston Fire Department permit requirements as outlined in the Boston Fire Prevention Code, the Massachusetts Fire Prevention Regulations (527 CMR), and the Massachusetts Fire Prevention Laws (MGL CH148). 9.5
6. For projects involving air-supported structures, it is critical that the impact of the design has on fire safety relative to the interaction of the area underneath the structure to the structure as well as to the interaction of the structure to the area underneath the structure. 9.6
7. Due to the increasing popularity of private wireless communication services, it has become increasingly difficult and costly for the Fire Department to locate our emergency communications equipment at appropriate sites. At the same time, the need for antenna sites has grown as development continues in downtown/Back Bay. 9.7 We would appreciate it if the BRA, as part of its development review process for high-rise towers, could assist the Fire Department in obtaining rooftop access for our communications equipment as a public benefit too meet this critical public safety need. 9.8

These items should be analyzed for all phases of the construction as well as the final design stage. This project will need permits from the Boston Fire Department as well as the Inspectional Services Department.

Respectfully,

Peter A Laizza

Peter A. Laizza
Fire Marshal

Pjm
Cc: Paul Donga, FPE, Plans Unit, BFD

PUBLIC HEALTH COMMISSION 1799 BOSTON

May 15, 2006

Stephen R. Pritchard, Secretary of Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
Attention: Deirdre Buckley, MEPA Office

Re: Dana Farber Cancer Institute, 450 Brookline Avenue
Environmental Notification Form & Project Notification Form/Institutional Master Plan Amendment
EOEA #13776

Dear Secretary Pritchard:

The Boston Public Health Commission would like to submit this letter in support of comments provided by the City of Boston Environment Department. The Department has submitted their response to the Environmental Notification Form (ENF) & Project Notification Form/ Institutional Master Plan Amendment (PNF/IMP Amendment). We would like to offer the following comments.

PROJECT

Dana Farber Cancer Institute (DFCI) proposes to construct seven levels of below-grade parking for 455 vehicles beneath a 13-story, 185 foot (plus mechanical penthouse) building on two adjacent parcels at Brookline Avenue and Jimmy Fund Way in the Longwood Medical and Academic Area (LMA). Zoning relief will be required for height, floor area ratio (FAR), yard dimension requirements and the number of loading bays. DFCI expects that relief for these and other project elements will not be necessary as it plans to file and have approved an IMP Amendment. Project uses will be clinical and clinical research space, patient services, administration and retail.

The site is in a restricted parking district and zoning relief will be required. The parking garage for the subject project will be continuous with the Smith Building parking garage. The project will add 848 vehicle trips per day for a total of 3,144 generated by DFCI. Loading and receiving facilities at the Smith Building may be expanded, floors one to three reconfigured to integrate with new construction and most other levels modified to connect with new construction.

DFCI is considering as mitigation over a five-to-seven year time frame:

- Widening sidewalks on Jimmy Fund Way;
- Infilling some vehicular drop-offs to provide bicycle parking and other, unspecified uses;
- Improving the façade of floors one through three of the Dana Building;
- Installing graphic panels, banners and lighting on Jimmy Fund Way;
- Improving the sidewalk at the Smith Building to buffer pedestrians from loading activities;
- Enhancing exterior seating at the Jimmy Fund Building and improving the screening of mechanical equipment and oxygen tanks; and
- Making lighting and pavement improvements at pedestrian passageways between the DFCI, the Longwood Galleria and the Medical Area Total Energy Plant (MATEP).

DFCI belongs to Commute Works and provides as part of a Transportation Demand Management (TDM) program:

- The posting and distribution of transportation information through employee newsletters, information kiosks, websites, e-mails and special promotional events;
- A 40 percent (PNF/IMP Amendment) or 50 percent (ENF) transit subsidy of up to \$100/month, paid on a pre-tax basis, for 950 employees who regularly purchase transit passes;
- A Ride Matching program;
- A guaranteed ride home;
- A Pool-Aide program;
- Preferential parking in nearby garages for carpools of three or more persons;
- Guaranteed parking in more distant lots for carpools of two persons;
- A Commute Fit program;
- Sheltered bicycle racks;
- Shower and lockers;
- On-campus parking rates of \$76.15 per week; and
- Off-campus parking rates of \$24.23 per week.

A Construction Management Plan (CMP) will include outlining all measures to mitigate short-term construction air quality impacts. Construction workers will be encouraged to take transit; contractors will be required to devise access plans. The CMP needs to be reviewed upon its submission.

INSTITUTIONAL MASTER PLAN AMENDMENT

DFCI's most recent IMP (1993-2001), went into effect on April 8, 1994, 16 years ago. It expired five years ago and has not been renewed. Rather than develop a new IMP application, DFCI intends to submit an amendment of the expired plan for BRA and Boston Zoning Commission approval.

Since 1994, DFCI has constructed the Smith Building and purchased 454 Brookline Avenue and the Shields Warren Building. Exterior building connections with other medical institutions and the development of clinical and research arrangements with those institutions have been part of DFCI's expansion.

DFCI owns and occupies seven buildings and leases space at 375 Longwood Avenue and the Longwood Galleria in the LMA. Additional space is leased in the West Fenway/Kenmore area, Brookline Village, MIT, Harvard Medical School and Harvard Institutes of Medicine. It plans to lease space at the Center for Life Sciences and, in 2007, at the Marine Industrial Park (MIP).

Upon completion of new construction, DFCI will relocate the entrance of the Dana Building to Jimmy Fund Way, reconfigure the Dana Building lobby and vehicular drop-off, renovate parking levels two and three of the Dana Building for non-parking uses, and renovate and relocate uses within the Dana and Mayer buildings.

Future projects may include:

- A bridge connecting the Smith and Amory buildings at their third levels;
- Replacement of the Jimmy Fund Building;
- Connecting the Dana Building and Children's Hospital on their third levels.

Likely future occupancies are retail, restaurant, service, education and general and professional offices.

RESPONSE

The following is summary of responses from BPHC. These are in agreement with those submitted by the Boston Environment Department.

- DFCI's plan is to submit an amendment to the IMP that expired five years ago. The justification for proposing an amendment of the expired plan is unclear. A new IMP would provide more comprehensive review of the project and its elements. 10.1
- DFCI's efforts to conform to energy codes are appreciated but would be enhanced if the project could include the use of Green Roof Technologies. The present reports related to the Green Roof Technology are promising and any increase in use of those technologies in the City of Boston is highly recommended. Additional energy saving steps such as use of solar energy for lighting and maximum use of day light for interior need to be considered wherever possible. 10.2 10.3
- The City of Boston has many projects and policies to reduce idling time for all vehicles in Boston. Educational material and signage have been distributed to encourage reduction in idling by private or public fleets. The Code of Massachusetts Regulation and similar regulations limit the idling time to 5 minutes. DFCI is recommended to include informative language and material in their contract specification to address this issue during the construction period as well as post occupancy. This measure will also assure enhancement to indoor air quality at the buildings with loading areas. 10.4
- DFCI is requested to utilize all steps to prevent intrusion of any air pollutants to any ventilation system when there is a loading area for building. One such measure may include not placing air-intake units in close proximity to loading areas or heavy traffic streets. 10.5
- The BPHC as a member of the Boston Air Pollution Control Commission is recommending installation of CO direct reading and recording monitoring devices inside parking buildings and alarms at the exit to alert pedestrian crossing the traffic from all 10.6

new parking facilities. This will be addressed during the request for parking permits since the project is located in a parking freeze area. These need to be fully considered during review of the Transportation Access Plan Agreement.

- The additional parking spaces may seem necessary however, DFCI needs to provide justification for the proposed level of increase. The present traffic level in the area would not benefit from addition of over 848 vehicle trips per day for a total of 3,144 generated by DFCI. DFCI could consider use of alternative methods to reduce the foreseen need for parking spaces. Those may include utilizing service such as Zip Cars for staff and clients. 10.7
- The proposed street improvements [listed in page two of this document, above] are necessary. The BPHC supports the following and request an increased focus on: 10.8
    - o Widening sidewalks to improve walking and safety conditions on Jimmy Fund Way and at the Smith Building; 10.8.1
    - o Design alteration for loading areas to assure pedestrians safety on side walks near those areas; 10.8.2
    - o Improvements that will encourage use of bikes and increase in parking space for bicycles. 10.8.3

Thank you for the opportunity to offer comment. If you have any questions regarding this matter, please contact me at (617) 534-5965.

Sincerely,

Leon Bethune
Director
Environmental Health Office

Cc: Mark Maloney, Director
Boston Redevelopment Authority
Boston City Hall, Room 925
Boston, MA 02201
Attention: Sonal Gandhi

May 16, 2006

Stephen R. Pritchard, Secretary of Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
Attention: Deirdre Buckley, MEPA Office

Mark Maloney, Director
Boston Redevelopment Authority
Boston City Hall, Room 925
Boston, MA 02201
Attention: Sonal Gandhi

Re: Dana-Farber Cancer Institute 450 Brookline Avenue
Environmental Notification Form & Project Notification Form/Institutional Master Plan Amendment
EOEA #13776

Dear Secretary Pritchard and Director Maloney:

The City of Boston Environment Department has reviewed the Environmental Notification Form (ENF) & Project Notification Form/Institutional Master Plan Amendment (PNF/IMP Amendment) and offers the following comments.

PROJECT

The proponent, Dana-Farber Cancer Institute (Dana-Farber), proposes to construct seven levels of below-grade parking for 455 vehicles beneath a 13-story, 185 foot-no less than 250 foot (plus mechanical penthouse) building on two adjacent parcels at Brookline Avenue and Jimmy Fund Way in the Longwood Medical and Academic Area (LMA). The project does not meet zoning requirements for height, floor area ratio (FAR), yard dimension requirements and the number of loading bays. Dana-Farber expects that relief for these and other project elements will not be necessary as it plans to file and have approved an IMP Amendment. Project uses will be clinical and clinical research space, patient services, administration and retail.

The project site is presently occupied by a 30-space surface parking lot and two buildings that will be demolished. The proposed building will be connected to the existing Smith Research Laboratories Building on what is described as most floors. Dana-Farber also plans to make a connection via a tunnel under Jimmy Fund Way to the Dana Building. Dana-Farber's buildings are already connected by elevated walkways to Children's Hospital.

Loading and receiving facilities at the Smith Building may be expanded, floors one to three reconfigured to integrate with new construction and most other levels modified to connect with new construction.

Dana-Farber is considering as mitigation over a five-to-seven year time frame:

- widening sidewalks on Jimmy Fund Way;
- infilling some vehicular drop-offs to provide bicycle parking and other, unspecified uses;
- improving the façade of floors one through three of the Dana Building;
- installing graphic panels, banners and lighting on Jimmy Fund Way;
- improving the sidewalk at the Smith Building to buffer pedestrians from loading activities;
- enhancing exterior seating at the Jimmy Fund Building and improving the screening of mechanical equipment and oxygen tanks; and
- making lighting and pavement improvements at pedestrian passageways between Dana-Farber, the Longwood Galleria and Medical Area Total Energy Plant (MATEP).

The project will comply with the state Energy Code and mechanical and HVAC systems will be industry standards. Energy- and water-conserving features and other sustainable systems and materials will be used where possible.

Dana-Farber's operational solid waste recycling program covers water paper, cardboard, glass bottles and similar materials, wood pallets, plastic waste, batteries, foam containers, computers, monitors and cell phones.

Historic resources, those listed on the State and National Registers of Historic Places, those determined eligible for listing and those on the Massachusetts Historical Commission's (MHC) *Inventory of Historic and Archaeological Assets of the Commonwealth* within 1/8 of a mile of the project are listed in the PNF/IMP Amendment.

Upon completion of the project, Dana-Farber will control about 1,666 off-street parking spaces (212 net new), a ratio of .94 per 1,000 square feet (SF) of building floor area.

The site is in a restricted parking district and zoning relief will be required. The parking garage for the subject project will be continuous with the Smith Building parking garage. The project will add 848 vehicle trips per day for a total of 3,144 generated by Dana-Farber.

Dan-Farber belongs to CommuteWorks and provides as part of a Transportation Demand Management (TDM) program:

- the posting and distribution of transportation information through employee newsletters, information kiosks, websites, e-mails and special, promotional events;
- a 40 percent (PNF/IMP Amendment) or 50 percent (ENF) transit subsidy up to a $100/month maximum, paid on a pre-tax basis, for the 950 of 3,267 employees who regularly purchase transit passes;
- ridematching;
- a guaranteed ride home;
- Pool-Aide;
- preferential parking in nearby garages for carpools of three or more persons;
- guaranteed parking in more distant lots for carpools of two persons;
- Commute Fit;
- sheltered bicycle racks;
- shower and lockers;
- on-campus parking rates of $76.15 per week ($15.23/day for a five day week); and
- off-campus parking rates of $24.23 per week ($4.85/day for a five day week).

Dana-Farber has an informal policy of allowing telecommuting and working a compressed work week.

A Construction Management Plan (CMP) will include outlining all measures to mitigate short-term construction air quality impacts.

Construction workers will be encouraged to take transit; contractors will be required to devise access plans.

The ENF indicates that construction is expected to commence in 2006 and be complete in 2011.

INSTITUTIONAL MASTER PLAN AMENDMENT

Dana-Farber's most recent IMP, for the years 1993-2001, went into effect on April 8, 1994. It expired five years ago. Dana-Farber is now seeking approval for what it identifies as an Amendment.

Since 1994, Dana-Farber has constructed the Smith Building and purchased 454 Brookline Avenue and the Shields Warren Building. Exterior connections with other medical institutions and clinical and research arrangements with those institutions have been part of Dana-Farber's expansion.

Dana-Farber owns and occupies seven buildings and leases space at 375 Longwood Ave. and the Longwood Galleria in the LMA. Additional space is leased in the West Fenway/Kenmore area, Brookline Village, MIT, Harvard Medical School and Harvard Institutes of Medicine. It plans to lease space at the Center for Life Sciences and, in 2007, at the Marine Industrial Park (MIP).

Upon completion of new construction, Dana-Farber will relocate the entrance of the Dana Building to Jimmy Fund Way, reconfigure the Dana Building lobby and vehicular drop-off, renovate parking levels two and three of the Dana Building for non-parking uses, renovations and relocations of uses within the Dana and Mayer buildings.

Future projects may include:

- a bridge connecting the Smith and Amory Buildings at their third levels;
- replacement of the Jimmy Fund Building;
- connecting the Dana Building and Children's Hospital on their third levels.

Likely future uses are retail, restaurant, service, education and general and professional office uses.

Of the 1,454 off-street parking spaces currently controlled by Dana-Farber, 1,114 spaces are for staff and 340 for patients and visitors. The PNF/IMP Amendment states that the parking ratio will be .74 for 1,000 gross square feet of development after the future projects are complete.

RESPONSE

Dana-Farber's most recent IMP was approved 12 years ago and expired in 2001. As Dana-Farber is similar in relevant characteristics to other LMA institutions, it would not seem to meet the criteria for exemption. In addition, the IMP Amendment does not demonstrate eligibility for the 205 foot height based upon exceptional public benefits as compared to like institutions in the LMA. The benefits exceeding those of other LMA institutions should be described. 11.1

A full IMP, not an Amendment or "revival," should be required as a matter of course and is particularly important in this dense area with ever-expanding uses and extreme traffic congestion. An IMP should be used to inform both the public and the planning study for the LMA that is presently on hiatus. 11.2

Much of the PNF/IMP Amendment focuses on the proposed project, giving limited attention to the scope of IMP issues. A standard IMP would include a broad plan for uses, transportation, and environmental protection during an IMP term. 11.3

An IMP should identify: 11.4

- the present number of full-time employees in all categories - staff, researches, physicians, etc. Numbers should no be reported full-time equivalents (FTE). FTE is not a useful measure as it fails to provide actual employee numbers within worker categories (full-time, part-time, contract and *per diem*) and by facility and prevents an accurate picture of present and predicted employee vehicle trips and mode splits. 11.4.1
- the present number of part-time employees; 11.4.2
- the present number of contract employees; 11.4.3
- the number of *per diem* employees; 11.4.4
- the expected increase in each category for the term of the new IMP; 11.4.5
- the number of employees presently working on-campus and the number working off-campus; 11.4.6

- the square footage and use of new off-campus space that will be occupied in the Center for Life Sciences, the MIP and other off-campus areas during the term of the IMP; 11.4.7
- the current annual number of visitors; 11.4.8
- the number of visitors expected for each year during the term of the IMP; 11.4.9
- the number of employees who carpool/vanpool; 11.4.10
- the number of carpool/vanpool vehicles that receive preferential parking; 11.4.11
- the mode splits for each category of employee; 11.4.12
- the number of on- and off-campus bicycle racks, their capacities and locations; 11.4.13
- vehicle occupancy rates for employees who drive to work; 11.4.14
- the eligibility criteria for transit pass subsidies and other TDM measures; 11.4.15
- the level of subsidy represented by the parking rates charged for on- and off-campus parking based upon the $4.85/day off-campus rate and $15.23/day on-campus rate; and 11.4.16
- all additional information gathered by the Dana-Farber and/or MASCO through surveys of other means regarding the commuting habits of employees. 11.4.17

The IMP should specifically discuss why 76.5 percent of parking spaces are devoted to employees, why only 29 percent of employees use transit on a regular basis and propose a plan to decrease employee vehicle use and increase transit and high-occupancy vehicle commuting. 11.5 We ask that Dana-Farber add to a TDM plan payroll deduction for the purchase of bicycles and accessories, the formalization of a Flextime and Telecommuting program and the initiation of Zipcar's Z2B program so that employee workday vehicle trips do not require that an employee commute in a car. 11.6

The DPIR identify a time-line for parking space removal. 11.7

We agree that the proposed project presents many opportunities to include sustainable elements in the design. 11.8 This department has been impressed with the perspective and recommendations of Green Guide for Health Care™ (http://www.gghc.org). As GGHC notes on it's Web site, "Healthcare facilities present both a challenge and opportunity in the development and implementation of sustainable design, construction and operations practices. Issues such as 24/7 operations, energy and water use intensity, chemical use, infection control requirements and formidable regulatory requirements can pose significant obstacles to the implementation of currently accepted sustainability protocols. Furthermore, it is appropriate that guidelines customized for the healthcare sector reflect the fundamental organizational mission to protect and enhance individual and community health, and acknowledge the intrinsic relationship between the built environment and ecological health. As the healthcare sector develops a design language for high performance healing environments, it has the opportunity to highlight the associated health-based benefits. This in turn can inspire the broader adoption of health based design principles in other building sectors."

An example of a sustainable element would be a planted or "green" roofing systems. 11.9 Such a system would reduce heat gain on buildings, lower cooling costs, extend the life of roofing membranes by blocking UV rays, provide added thermal and noise insulation, slow stormwater runoff and can be aesthetically pleasing. This department recommends investigating how the use of green roof systems can benefit the project. Information about green roofs and about the conference can be obtained from www.greenroofs.org or from this office.

The DPIR should identify and describe any hazardous waste conditions at the site. 11.10

A discrete section highlighting the sustainability commitments Dana-Farber has made for the project and under the IMP should be provided. 11.11

An Environmental Protection Plan would address both construction and operating periods that includes open space protection and maintenance; stormwater quality and management; erosion and sedimentation control plans; air quality protection; solid waste management; infrastructure systems; a pedestrian circulation analysis including at-grade circulation; view corridor analyses (significant for Dana-Farber's plans given the planned number of pedestrian bridges), and urban design guidelines. 11.12

This department commends Dana-Farber on its comprehensive solid waste recycling plan. 11.13

Exterior lighting should meet safety needs while not contributing to light pollution. Fixtures should be shielded and downward directed. We recommend as a resource, the Campaign for Dark Skies and their "Solutions and Problems: Good and bad lighting" information which can be accessed at 'http://www.star.le.ac.uk/~dbl/cfds/goodvbad.htm?6O'. 11.14

We ask that "No Idling" signage be posted in parking garages, drop-off/pick-up areas and loading areas and that CO meters in parking garages be direct-read with audible and visual alarms. 11.15

Stormwater is a primary contributor to the condition of receiving water bodies. The Boston Water and Sewer Commission (BWSC) spends an average of $630,000.00 annually removing materials from catch basins. This cost does not include labor and general operating and maintenance costs. We ask that the proponent help to educate the public and further improve the water quality of local water bodies by agreeing to the permanent installation of plaques that bear the warning, "Don't Dump - Drains to Charles River." The plaques are designed for installation at any new catch basins or at stormdrains around which work will be done during construction. Information on obtaining the plaques is available from the Operations Division at the BWSC (617-989-7000). We ask for a commitment to installation for the project under review and for all projects that follow during the IMP term. 11.16

Staff of the Boston Landmarks Commission agrees that the project building will have little effect on the identified historic resources. It is, however, customary to provide a list and map of resources within ¼ mile of the project site. The DPIR and IMP should provide in discrete sections an expanded list and map using the *Inventory of Historic and Archaeological Assets of the Commonwealth* to identify and map historic and archaeological resources within ¼ mile of the campus. The IMP should identify the potential effects on resources that may result from proposed projects. 11.17

Missing from PNF/IMP Amendment Table 1.5, Anticipated Permits, is the filing of an application with the Boston Landmarks Commission (BLC) pursuant to Article 85 of the Boston Zoning Code (Demolition Delay). The demolition of the existing structures at 450 Brookline Avenue will require Article 85 review. For questions concerning the Article 85 application process please contact Richard Cecconi, Staff Architect, at 617-635-3850. 11.18

The number of levels that will connect with the Smith Building is described as "most." We ask that the specific number be identified. 11.19

The DPIR should include wind and shadow studies to determine this building's impact on the pedestrian environment and open spaces. Shadow studies should be conducted for the standard four dates per year as limiting a study to one day per year does not provide adequate information for an appropriate review. Shadow diagrams should include a north arrow; street names; the identification of doorways, bus stops, open space and areas where pedestrians are likely to congregate; clear delineation of shadow on both rooftops and facades; clear distinctions between existing shadow and new shadow. High contrast colors and highlighted areas of overlap are most helpful. Figures depicting no build and build wind monitoring locations should be of a scale consistent with that used for shadow diagrams so that the cumulative effect of wind and shadow can be determined. 11.20

BLC staff agrees with BRA Urban Design staff that projects in the City should be constructed with traditional building materials and techniques rather than synthetic composite materials. Simulated materials such as exterior insulated finish systems (EIFS), and glass fiber reinforced concrete (GFRC) are inconsistent with Boston architecture and are unlikely to withstand decades of the City's freeze-and-thaw climate. 11.21

The BLC requests that dated cornerstones be incorporated into all new construction. This element will allow those who are attentive to and value the architecture of the City to appreciate the historical context in which structures were conceived. 11.22

City of Boston Code Ordinance 16-26.4 allows construction from 7:00 a.m. to 6:00 p.m., Monday through Friday unless a permit, issued on a week-by-week basis, is granted by the City of Boston Inspectional Services Department (ISD). This department receives frequent complaints about noise generated at construction sites before 7:00 a.m. Complaints show that contractors often allow workers on site before that time. Noise is frequently related to the run-up of diesel equipment and the preparation and movement of tools and materials. No sound-generating activity is allowed to occur at the site prior to 7:00 a.m. 11.23

Construction-period noise subject to regulation by the Boston Air Pollution Control Commission (APCC), part of this department. The proponent must ensure compliance with the construction-related limits as outlined in the Regulations for the Control of Noise in the City of Boston. 11.24

If chemical cleaning or abrasive blasting will be a part of renovation or other projects executed during the IMP term, a permit must first be obtained from the Boston Air Pollution Control Commission (APCC), located in this office. 11.25

Regular vacuum cleaning of streets and sidewalks in the project area should be employed to ensure that they remain free streets of dust and debris. 11.26

For the recycling of demolition waste and construction debris (for the current and future projects) we recommend talking with Mark Lennon of The Institution Recycling Network (IRN) at 1-866-229-1962. IRN can divert up to 95 percent of waste from a job site with the exception materials classified as hazardous. They have identified end markets for: 11.27

- furniture and furnishings;
- formed concrete, including rebar;
- brick and block;
- asphalt pavement;
- dimensional lumber and plywood;
- engineered wood products;
- treated wood;
- ceramics (sinks, toilets);
- mixed construction debris;
- ferrous scrap;
- non-ferrous scrap;
- gypsum wallboard;
- commercial (membrane), metal and slate roofing material;
- asphalt roof shingles;
- wood and metal doors and windows; and
- universal waste (batteries, fluorescent lamps, ballasts).

Construction vehicles are a substantial source of air pollutants. According to the Massachusetts Department of Environmental Protection (DEP), they contribute about 33 percent of mobile source particulate matter (PM) and ten percent of all nitrogen oxide (NO_x) pollution in the northeast. More than 90 percent of diesel engine particulate emissions are highly respirable and carry toxins deep into the lung, exacerbating human respiratory ailments. 11.28

The DEP's Clean Air Construction Initiative (CACI) is designed to reduce air quality degradation caused by emissions of carbon monoxide (CO), volatile organic compounds (VOC), NO_x and air toxins from heavy-duty, diesel-powered construction equipment. Oxidation catalysts and catalyzed particulate filters reduce toxic emissions of formaldehyde, benzene, acrolein and 1-3 butadiene by as much as 70 percent. The CACI offers contractors a cost-effective way to decrease localized adverse impacts and reduce dust and odor complaints from project abutters and regulatory agencies. Experience with a pilot project that retrofitted 83 pieces of equipment working on the Central 11.29

Artery/Tunnel (CA/T) project showed that:

- Vehicles did not experience significant power loss.
- There are no additional operation and maintenance (O & M) or fuel costs.
- Engine manufacturers continue to honor vehicle warranties.

More information on the CACI can be obtained from Steven G. Lipman, P.E. of DEP at 617-292-5698.

In addition, we urge the proponent to require that contractors use low-sulfur diesel fuel (500 ppm) in off-road construction equipment. 11.30

The City of Boston's is seeking to minimize the number of motor vehicles that enter Boston each day, currently 600,000, and to protect parking city residents. Encouraging construction workers not to drive to work does not result in the desired outcome. As part of this effort, we request that a comprehensive Transportation Demand Management (TDM) plan be established for all construction workers. Such a plan should include: 11.31

- Providing secure, on-site storage so that workers do not have to transport tools and equipment each day.
- Offering pre-tax payroll deduction for Massachusetts Bay Transportation Authority (MBTA) transit pass purchase.
- Providing a ride-matching service.
- Posting transit schedules in a prominent area.

Thank you for the opportunity to offer comment. We look forward to a DPIR and IMP.

Sincerely,

Bryan Glascock
Director

DanaFarber2006.doc.DBG:MTZ.mtz/0605050607

MISSION HILL
NEIGHBORHOOD HOUSING SERVICES

Phone (617) 566-6565
Fax (617) 566-1440

May 11, 2006

Sonal Gandhi
Senior Manager Economic Development
Boston Redevelopment Authority
Boston City Hall
Boston, MA 02201

RE: Dana Farber Cancer Institute: Institutional Master Plan Amendment
Project Notification Form - 450 Brookline Avenue

Dear Ms Gandhi:

Mission Hill Neighborhood Housing Services wishes to offer the following comments regarding the proposed Dana Farber Cancer Institute clinical and research building at 450 Brookline Avenue. We look forward to working with the City and Dana Farber as this project moves through the review and approval process to address the impacts of this project and to maximize the project's benefits to Mission Hill residents.

PROGRAM AND DESIGN:

- We are pleased that the proposed building has been reduced in the size, height, and program from 12.1
  the previous project by leasing space outside the LMA campus and leasing existing LMA research space. We feel this building with a focus and goal of creating a new identity and entrance for Dana Farber on Brookline Avenue is appropriate. The widen sidewalks will improve the pedestrian experience and safety. The proposed ground floor retail space should be programmed to meet the immediate needs of Dana Farber's employees and visitors and should not compete with existing
  retail business in the Mission Hill commercial district. Programs should be implemented to 12.2
  encourage Dana Farber employees and visitors to shop in the Mission Hill commercial district. The
  new expanded sidewalk created along Brookline Avenue should be developed with seating and 12.3
  amenities that will make this space useable for Danna Farber's employees, visitors, and the public.

IMPACTS:

Traffic

- Shifting the main entrance to Dana Farber from Binney to Jimmy Fund Way will have a major 12.4
  impact on Brookline Avenue and the intersection of Joslin Place, Deaconess Road and Jimmy Fund Way. As presented in PNF it appears that all vehicle traffic will enter the proposed building from Brookline Avenue. The Project should do a detailed analysis of this intersection, study the traffic patterns, trips, volume, etc., and present options to the City and to the project's IAG that will mitigate the impacts from this proposal.

Environmental

- The site for 450 Brookline Avenue is currently occupied by a two-story building and a parking lot. 12.5
  Since the proposed project will occupy the entire site and is a thirteen-story building all potential environmental impacts should be studied, impacts identified, and solutions proposed. Special attention should be given to shadows from the proposed building that may extend across Brookline Avenue and to Joslin Park.

Construction

- Construction of the proposed building will have a major impact on the immediate and surrounding community. Since the proposed building will occupy almost the entire project site additional construction constraints and challenges will create greater impacts on the community. To address these ongoing construction and community issues Dana Farber should form a Community Construction Mitigation Task Force representative of the immediate and surrounding residential community. This Task Force should be formed to review and assist with the creation of the project's Construction Mitigation Plan. The Plan should include specific solutions to address the impact from construction vehicle deliveries, truck staging and lay-down areas, noise and dust, construction worker parking, etc. The Plan should address the issues of pedestrian safety during construction and identify any street and sidewalk takings during construction. This Task Force should meet periodically during the construction of the project to monitor the Plan and report impacts and deficiencies. 12.6

COMMUNITY BENEFITS:

Housing

- With the dramatic increase in existing rental housing being occupied by students from local colleges and institutions the need for additional affordable family style housing in Mission Hill has never been greater. To assist with meeting this need for more affordable housing in Mission Hill the housing linkage payments for this project should be allocated to the impacted neighborhood of Mission Hill. Housing funds should be disbursed as housing creation agreements to designated projects in Mission Hill. Mission Hill Neighborhood Housing Services would like to discuss potential projects with Dana Farber and the City. 12.7

Workforce Development

- Mission Hill has a number of well established community-based organizations that provide needed workforce and career development programs. These organizations have formed the Mission Hill Jobs Collaborative with the goal of working together with local institutions. To support the successful workforce development programs of the Mission Hill Jobs Collaborative the job linkage payments for this project should be provided to these organizations. In addition Dana Farber's existing career development and education training initiatives should be focused and directed to the Mission Hill neighborhood, schools, community-based organizations, and agencies. Dana Farber should identify the various skill levels of the new jobs created by this project and the number of Mission Hill residents to be hired at the various skill levels. Dana Farber should periodically report the results of their employee training programs through their Workforce Development Plan. Dana Farber should establish annual hiring goals for Mission Hill residents. Mission Hill Neighborhood Housing Services would like to request that Dana Farber and the City meet with the Mission Hill Jobs Collaborative to discuss program funding, services, and increased workforce results. 12.8

We thank you in advance for your consideration of our comments and requests. Again, we look forward to working with the City and Dana Farber as this project moves forward.

Sincerely,

James Hoffman
Executive Director

cc: Mayor Thomas Menino
Director Mark Maloney
Nikko Mendoza, Mayor's Office
Representative Jeffrey Sanchez
Councilor Michael Ross

ROXBURY TENANTS OF HARVARD ASSOC., INC

Robert & Theresa Parks
Community Building

****

MISSION PARK

May 11, 2006

Sonal Gandhi
Boston Redevelopment Authority
One City Hall Plaza
Boston, MA 02201

Re: Dana Farber Cancer Institute Institutional Master Plan Amendment
Project Notification Form – 450 Brookline Avenue

Dear Ms. Gandhi:

Roxbury Tenants of Harvard is the only neighborhood directly abutting the Longwood Medical Area, and as such bears a disproportionate burden of traffic, noise and air pollution, and continued loss of green space due to institutional expansion. The Dana Farber expansion can not help but contribute to this burden. 13.1

COMMUNITY IMPACTS

We ask that as project proceeds, DFCI work to address the following neighborhood concerns.

- ***Rodent control***: increased rodent activity in the neighborhood is inevitable during any significant construction project. We ask that in addition to the required rodent control program, DFCI perform additional treatments if an increase in activity is seen in RTH buildings. 13.2
- ***Traffic:*** traffic back-ups on Brookline Avenue and Binny Street have the potential to spill over onto Francis Street and Fenwood Road. We ask that specific measures, including signage and Boston Police Details, be implemented to allow these streets to maintain traffic flow at all times. 13.3
- ***Parking:*** the PNF identifies that no on-site parking will be provided for construction workers; contractors are responsible for devising access plans that de-emphasize auto use. We ask that DFCI, BTD and BPD work together to ensure that resident parking restrictions on Francis Street, Fenwood Road, and St. Albans Road are enforced. 13.4
- ***Noise pollution:*** noise and vibration carry into the neighborhood from as far away as Brookline Avenue. We ask that construction activities producing noise and vibration be kept to the daytime hours whenever possible; and that the neighborhood be notified in advance when this work is performed between the hours of 7pm and 7am. 13.5

COMMUNITY BENEFITS

The lack of affordable housing in the Mission Hill area continues to be a serious problem. 13.6
As you know, over the last three decades RTH has created over 900 units of affordable housing for low and moderate income people. In order to help meet the need for more affordable housing in this community, we ask that the linkage payments for this project be directed to the most directly impacted area of Mission Hill. To that end, RTH would like to begin negotiations with the Dana Farber and the City of Boston to discuss development of affordable housing on a parcel owned by RTH located at 761-775 Huntington Avenue.

Sincerely,

ROXBURY TENANTS OF HARVARD

Girma Belay
Executive Director

Cc: RTH Board of Directors
Mayor Thomas Menino
Representative Jeffrey Sanchez
Councilor Michael Ross

May 10, 2006
Ms. Sonal Gandhi
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201
Re: Comments on PNF/IMPA Dana-Farber Cancer Institute
To: My fellow neighbors:

The Dana-Farber Cancer Institute (DFCI) has served many residents of the Commonwealth, Boston and Mission Hill. It has been there to provide and care for the sick and to research the potential for cures and prevention of one of the leading causes of mortality for human kind. To continue this mission, critical decisions have been made regarding the need to expand space in the heart of the Longwood Medical Area (LMA). Being a resident of one of the abutting neighborhoods I have been asked to comment on the proposed Project Notification Form/ Institutional Master Plan Amendment. I am writing this letter as a local resident of Mission Hill and President of the Mission Hill Health Movement.

I am encouraged by the proposed two story healing garden facing Joslin Park and hope
that DFCI continue to look for ways to support this and other green passive spaces. I 14.1
would like DFCI to consider expanding the pathway bridges to accommodate some
amount of space for observation, plantings and break activity. I also ask that the 14.2
proponents incorporate as much sustainable design as possible and try to be a leader in
the LMA for LEED certification attainment. The Joslin Diabetes Center Draft
PIR/IMP/EIR has outlined many potential solutions to LEED certification. Parking
design should encourage the use of smaller vehicles, electric vehicles, motorcycles, 14.3
scooters and bicycles.

It is also noteworthy to ask that the proponents look at the Final Environmental Impact 14.4
Report of the City of Boston, Town of Brookline Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project EOEA #11865. It is not sufficient to say that the project "are within a fully developed urban area and will not impact wildlife habitats." The Muddy River should be one of the recipients to the growth of the LMA through such organizations as the Emerald Necklace Conservancy, Friends of the Muddy River and the Charles River Watershed Association.

The proposed project of 275,000 square feet and 455 underground parking spaces at 14.5
450 Brookline Avenue is in line with many similar projects proposed or underway in the LMA. The intersection of Brookline Avenue and Frances Street is already quite congested with Brigham and Women's Hospital, Center for Life Sciences and Joslin Diabetes Center expansion and construction activities. The proposed project will not create new challenges for many of the neighborhood intersections. I strongly encourage as part of this proposal for DFCI to specifically request that MASCO, BTD and DFCI's human resources department and internal logistics develop standards for reducing vehicular traffic. **Alternative approaches must be developed to alleviate congestion for neighbors, patients, suppliers and employees.**

- Specifically local walk to work programs must be developed and local residents employed and/or employees encouraged to live in the neighborhood. 14.5.1

- Local Walking routes should be evaluated for year round accessibility and usability, and security. 14.5.2

- Bicycle routes should be mapped out evaluated for safety and incentives should be in place for employees to engage them. Employee showers and change rooms should be part of the expansion plan for this project. 14.5.3

- MBTA routes should be evaluated for effectiveness, alternatives and timeliness. Employee incentives should be increased to the point of a balance in increased parking for patients and decreased vehicular traffic by employees. 14.5.4

- Collaboration with other hospital vans and shuttle buses should be developed with a one-pass type system. I.e. the MASCO-CARD, which would enable a member institution employee access to other institution transportation and parking alternatives. 14.5.5

- I believe that if traffic flow standards are not reached the LMA institutions should be mandated by the BTD to fund police details or other solutions to expedite traffic flow and accommodate pedestrian safety. 14.5.6

- Telecommute options should be explored and state of the art communication equipment, conference centers should be developed to reduce the need for physical visits, but still enable the transfer of vital information. 14.5.7

The finished result of this and many of the abutting projects is going to be more pollution on the local neighborhood. **I challenge DFCI and MASCO to continually evaluate its fleet of vehicles and suppliers and look at alternative fuels or systems that will reduce pollution levels for all.** In addition local incentives for pollution reduction could be created through the Boston Building Materials Coop which could encourage local residents and property owners to upgrade heating equipment and reduce energy costs by green technology with financial incentives provided by LMA expansion projects. Many pollution sources could be eliminated such as older vehicles, older furnaces, #2 fuel oil burning equipment, two-stroke lawn equipment, and diesel vehicles including delivery and service ambulances. 14.6

It is time that the City requests the LMA to develop a baseline standard to measure the impact of large developments and increased traffic flow. **I propose that MASCO or the City of Boston develop or expand an air quality testing protocol similar to the EPA Monitoring program.** In Dudley Square the EPA has had a site operating for at least 5 years (**http://www.airbeat.org/**). MASCO member institutions could fund and monitor some simple PM2.5 and Ozone data equipment placed at strategic locations such as the Farragut School, the Tobin Middle School and the Windsor School and develop a base 14.7

line pollution level. It would then be up to the development proponents to fund projects that would allow their expansion while maintaining or reducing emission levels.

- At a minimum for this project such environmental air quality background air monitoring testing should begin before construction, during construction and be reevaluated after completion of the project. 14.7.1

The Harvard School of Public Health, Wentworth Institution of Technology and Northeastern University and private environmental firms have the ability and the knowledge to monitor such data. Institutional employees and local residents all breathe the same air, fight the same traffic and face the same hazards while walking the streets. We need to acknowledge the problem and find solutions before asthma and lung cancer rates increase. 14.8

Another potential community benefit outlined in the PNF/IMPA is job creation. **This training and notification of possible employment opportunities should begin right now.** Potential employment opportunities should be outlined by DFCI and local residents should begin seeking the training they will need to qualify for employment from janitor to J.D. These opportunities should be collaborated with Roxbury Community College, Wentworth Institute of Technology, Northestern, Boston Public Schools and other local non-profit education providers to develop and ongoing training / commitment to workforce development and career preparation. 14.9

In conjunction with job creation comes local education. DFCI should continue their important mission of cancer prevention by further funding and implementing the great programs already in place such as; the Breast and Cervical Screening collaborative, Boston Mammography Van, Prostate Cancer Outreach and Screening and DFCI Patient Navigators among others outlined in the PNF/IMPA. **I also encourage DFCI to open the doors of the facility once a year for a neighborhood night where local residents can come in and learn about programs available to them**, potential career tracts, prevention guidelines and where residents can share concerns about quality of life issues and concerns. 14.10 14.11

Many of these ideas are more than one development should address, but that has been the concern of many of my neighbors, we are asked to comment on one great institution at a time. It is hard to deny the fact that each medical institution serves noble causes. It is also undeniable that the cumulative effect of multiple developments in our neighborhood has some potentially dangerous environmental and social impacts. We all appreciate the many community benefits that each project potentially offers, but we are now asking for the City and institutional collaborative representatives to look deep into the future and address some of the quality of life issues that we have brought to your attention. **I will forgo the bureaucracy of creating a new Master Plan, under the agreement that local institutions consider to begin to fund and find solutions to our complex neighborhood issues in return.** 14.12 14.13

Together we can create job growth, healthy communities and stimulating academic environments that will make Boston a healthy city to live and work.

To Our health,

Harrison Lee
Mission Hill resident
President of the Mission Hill Health Movement
www.mhhm.org
missionhillhealth@yahoo.com
1534 Tremont Street
Boston, MA 02120
617-504-5297

MASCO™
MEDICAL ACADEMIC AND SCIENTIFIC COMMUNITY ORGANIZATION, INC. *People / Places / Plans / Future*

May 5, 2006

Ms. Sonal Gandhi
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

RE: Comments on Dana Farber Cancer Institute Institutional Master Plan Amendment/Project Notification Form

Dear Ms. Gandhi:

I submit comments herewith, regarding the Dana Farber Cancer (DFCI) Institute's Institutional Master Plan and Project Notification Form (IMP/PNF), as a member of the DFCI Impact Advisory Group/Task Force. The proposed project will provide critically needed clinical space to one of Boston's, New England's, and the country's premiere centers for cancer care. This institution has not developed new space for close to a decade, while at the same time, demand for clinical care at the Institute has more than tripled. DFCI has taken many steps to maximize the use of its Longwood Medical and Academic Area (LMA) campus for functions that must take place on-site, moving a wide variety of other administrative, research, and support activities to off-site locations. On-site, its innovative partnership with Brigham and Women's Hospital (BWH) to provide DFCI's inpatient beds at the BWH, and serve BWH's oncology outpatients on the DFCI's campus, has lead to greater efficiencies of cancer care delivery to patients.

DFCI proposes to remove two small buildings from underutilized parcels which have a prominent location on Brookline Avenue. The proposed replacement building appears to be a handsome, appropriately scaled complex, which will significantly improve the urban design of the area, with generous sidewalks, open spaces and finally, a main entrance to the Institute that will be legible to the public. Their proposal includes what look to be some very smart ideas for traffic management and building operations, including a small curbside drop-off area on Jimmy Fund Way for patients and visitors; a full-scale valet parking operation in a modestly sized below-grade garage; and, added lane capacity to Jimmy Fund Way. The existing and proposed pedestrian bridges, underground connection between the proposed project and Dana Building, and connectivity between floors of the proposed building and Smith Building may also have transportation benefits by eliminating multiple, on-street, drop-off locations and consolidating delivery areas. 15.1 15.2

375 Longwood Avenue / Boston, MA 02215-5328 / Tel:617.632.2310 Fax: 617.632.2750

I look forward to seeing their plans and impacts more fully developed and described in their Draft Project Impact Report (DPIR) as follows:

1) Provide information about current campus loading activities at Shields Warren building by time of day, type of truck and type of delivery, as well as this level of detailed information about campus-wide delivery changes in the future including just-in-time deliveries, and the expanded loading docks on Binney Street at the Smith Building, to serve the needs of 450 Brookline Avenue. Identify potential impacts on traffic. 15.3

2) Provide more information about how the Jimmy Fund Way curbside drop off will function and how it will be managed to not affect traffic on Brookline Avenue. 15.4

3) Provide information about the traffic impacts of the garage on the area, and analysis of proposed mitigation including a potential left-turn on Brookline Avenue outbound and an additional lane on Jimmy Fund Way westbound, as well as other measures proposed to mitigate the traffic impacts of their project including Transportation Demand Management measures. 15.5

4) Provide information on the transportation network benefits, related to proposed pedestrian bridges and connection under Jimmy Fund Way in terms of reduced street impacts for drop-off and loading activities and impacts on the pedestrian environment. 15.6

5) Identify how jobs have grown at DFCI in the past five years, what is the job growth anticipated with this master plan, and specifically with the proposed project? Describe some of the workforce development initiatives that DFCI has in place now or is contemplating. 15.7

6) Provide shadow and wind studies that identify the impacts, if any, of the new building on the LMA's open space and pedestrian environment. 15.8

7) Provide a more developed site plan that shows how additional trees, greenery and pedestrian oriented seating could be planned around their site on Brookline Avenue and Jimmy Fund Way, in particular, to make this a show piece for the LMA. 15.9

MASCO

MEDICAL ACADEMIC AND SCIENTIFIC COMMUNITY ORGANIZATION, INC. *People / Places / Plans / Future*

MASCO is a non-profit organization established in 1972 by its member institutions, including Dana Farber Cancer Institute, to plan, develop and enhance the LMA to attract patients, students, employees and visitors by improving the accessibility and attractiveness of the LMA.

Thank you for this opportunity to comment on the DFCI's IMP/PNF.

Sincerely,

Sarah J. Hamilton

Sarah J. Hamilton
Vice President, Area Planning and Development

375 Longwood Avenue / Boston, MA 02215-5328 / Tel:617.632.2310 Fax: 617 632 2759

Gandhi, Sonal

From: Sarah Hamilton [SHAMILTON@masco.harvard.edu]

Sent: Wednesday, April 12, 2006 8:51 AM

To: Gandhi, Sonal

Subject: Comments for DFCI Scoping Session

Hi Sonal,
Since I could only make it to a part of the scoping session for the DFCI project, in lieu of being rude and leaving, I wanted to submit some comments as an IAG member to be included in the scoping:

1. Provide information about current campus loading activities at Shields Warren building by time of day, type of truck and type of delivery, as well as this level of detailed information about campus wide delivery changes in the future including just-in-time deliveries, and the expanded loading docks on Binney Street at the Smith Building, to serve the needs of 450 Brookline Avenue. Identify potential impacts on traffic. 16.1

2. Provide more information about how the Jimmy Fund way curbside drop off will function and how it will be managed to not affect traffic on Brookline Avenue. 16.2

3. Provide information about the traffic impacts of the garage on the area, and analysis of proposed mitigation including potential left-turn on Brookline Avenue outbound and additional lane on Jimmy Fund Way westbound, as well as other measures proposed. 16.3

4. Identify how jobs have grown at DFCI in the past five years, what is the job growth anticipated with this master plan, and specifically with the proposed project ? 16.4

5. Provide shadow and wind studies. 16.5

Sincerely,

Sarah Hamilton
Vice President, Area Planning & Development
MASCO
375 Longwood Ave.
Boston, MA 02215-5328
ph: 617-632-2776
fx: 617-632-2779
shamilton@masco.harvard.edu

Sincerely,

Sarah Hamilton
Vice President, Area Planning & Development
MASCO
375 Longwood Ave.
Boston, MA 02215-5328
ph: 617-632-2776

Gandhi, Sonal

From: David Welch [baptoid@msn.com]

Sent: Monday, April 24, 2006 9:24 AM

To: Gandhi, Sonal

Subject: Dana-Farber Cancer Institute Project

Sonal: I like this project! I believe it makes best use of an underutilized and unattractive parcel. I 17.1
also feel the design "fits in" with the rest of the LMA buildings. However I have the following
concerns:
I would like to see the VHB proposal for mitigating the traffic problem on Brookline Ave. in front 17.2
of BI/Deac and Joslin.
I would like to see as much "greenery" as possible added to the two street sides of the project. 17.3
If there is a community benefits component generated by this project, I would like consideration
given to endowing Puddingstone Park on Mission Hill. We do not need more housing, we need 17.4
upkeep on the open space that is left.(My opinion) 17.5

Dave Welch
1575 Tremont St.Apt.403
Boston, Ma 02120

CRWA

Charles River Watershed Association

Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Attn: Sonal Gandhi

May 11, 2006

Dear Ms. Gandhi:

RE: Dana Farber Cancer Institute PNF/ IMP Amendment

Charles River Watershed Association has reviewed the Project Notification Form/ Institutional Master Plan Amendment for the above referenced project. There are several project elements that we believe need further analysis and discussion in the Draft Project Impact Report (DPIR) and should be included in the BRA's Scoping Determination for the IMP Amendment in order to ensure that all environmental impacts have been minimized and mitigated. We hope these comments will assist the BRA and Dana Farber Cancer Institute as the planning process moves forward.

Stormwater Management

It is our understanding that the stormwater from this site drains, via the Boston Water and Sewer Commission's municipal storm drain system, into either the Muddy River conduit 18.1
and out to the Charles River; or, during larger storm events, into the Muddy River Fens and then out to the Charles River via Charlesgate. In either case, stormwater from the site enters and impacts the Muddy River and its drainage network.

As you are undoubtedly aware, there are significant and long-standing flooding and water quality problems in the Muddy River. The US Army Corps of Engineers is currently in the process of designing a dredging and environmental restoration project for the entire Muddy River that is estimated to cost well over $60 million. The Muddy River Restoration project is needed to reduce significant flood hazards, to improve water quality, to restore degraded habitat, and to remove sediments that have accumulated in the Muddy River. Most of these problems are a direct result of stormwater discharges into the Muddy River.

Any redevelopment that is proposed in areas that drain directly into the Muddy River system, therefore, needs to focus carefully on stormwater management issues, and should maximize opportunities to reduce peak storm flows, minimize imperviousness, maximize infiltration and capture sediments. The significant expenditure that will be made by the federal and state government, as well as by the City of Boston, to dredge and restore the Muddy River must be protected to the maximum extent possible.

The PNF/ IMP Amendment document mentions that the DRIP will evaluate the project impact on the Muddy River but does not make any reference to putting together a stormwater management program to ensure that every effort will been made to protect the River from flooding and water quality impairments. It is our hope that the DPIR will study various alternatives to enhance stormwater management on the site so as to demonstrate how improvements will be made over the existing conditions. 18.2

We feel that the Article 80 Project Impact Review is the appropriate process for a full analysis of the stormwater management program. The DPIR should include specific, detailed information and alternatives analyses of stormwater management on the site. Stormwater management should aim to maximize infiltration, slow runoff from the site, maximize the use of vegetation, capture rooftop runoff for irrigation, and minimize sediment and nutrient loading. We suggest that the DPIR include more documentation about the proposed stormwater management program including: 18.3

1 Detailed information about the final design of the proposed stormwater management infrastructure including the location and design of drains, catch basins, water quality structures, and infiltration structures; 18.3.1
2 Detailed information about any surface stormwater management features such as swales, vegetative filter strips, rain gardens, permeable pavement or vegetated storage areas; 18.3.2
3 An assessment of the opportunities to reduce even further the peak flows and volume of stormwater runoff, including estimates of the impacts in a one-year storm; 18.3.3
4 An assessment of how the site could meet DEP's stormwater management policy in its entirety, not just "to the maximum extent practicable;" 18.3.4
5 A plan to minimize the primary pollutants of concern for the Muddy River, sediments and nutrients; 18.3.5
6 A maintenance plan for the stormwater management plan. 18.3.6

<u>Groundwater</u>

This project is proposed to have a 7 level underground parking garage and a system of tunnels connecting the adjoining campus buildings. While there are many significant aesthetic benefits to underground parking, there are important environmental issues both during and post- construction that need to be addressed. The location of this project in an area of historic fill, and the ongoing problems throughout many areas of the City with groundwater levels, make it all the more important that this aspect of the project be designed with the utmost care and in anticipation of any potential impacts. 18.4

The project needs to be designed to minimize groundwater impacts from the project, and the proponent should commit to working closely with abutters and the Boston Groundwater Trust to ensure that there are no alterations to groundwater levels as a result of the project. Since the LMA in on the border of the City's "Groundwater Overlay District", similar recharge standards need to be applied to all redevelopment projects within the LMA. Investigations should also include the potential seasonal changes in groundwater levels, as well as potential effects on groundwater flow. In some areas of Boston, construction of sub-surface projects such as tunnels, underpasses and even some building foundations have altered groundwater flow patterns, resulting over time in changes to ambient groundwater levels. Groundwater flows are extremely slow so alterations may occur over years. 18.5

The DPIR and the Scoping Determination for the IMP Amendment should include an assessment of groundwater flow directions, as well as a determination of whether those directional flows change seasonally. If the project shows any potential for altering flows, either slowing or reducing flows into the Muddy River, or conversely reducing flows back into the ground during periods of high groundwater, or causing any groundwater "mounding," the DPIR should document a mitigation plan for any such alterations. In addition, the DPIR should specify what source of water would be used should groundwater recharging be necessary during or after construction. 18.6

Given that the parking structure will underlay much of the project, opportunities for on-site infiltration of stormwater may be minimal. If so, the DPIR should evaluate the possibility of seeking off-site locations for groundwater recharge and stormwater infiltration. Finally, a detailed plan for the treatment and disposal of water from dewatering activities should be included in the DPIR. 18.7

Impacts to the Emerald Necklace

The project will increase not only the vehicular traffic in the area, but also the number of pedestrians, and will likely increase the use of the Emerald Necklace Parks, including the Fenway. This park system is already heavily used, and is in need of significant capital and operations improvements. 18.8

We suggest that Dana Farber Cancer Institute work with the BRA, the Boston Park and Recreation Commission, the Medical Academic and Scientific Community Organization (MASCO), the Fenway Alliance, and the Emerald Necklace Conservancy to develop a program to support the improvement of maintenance and management of the park system to mitigate this increased use and to provide support for the community-wide effort that is underway to bring this park system up to an acceptable community standard. This contribution could be made as a linkage payment (as a part of the public benefits package) or through the implementation of a specific capital improvement project for improving access to and maintenance of the park or for environmental restoration projects in the LMA as a whole.

Sustainable Site and Building Design

While there is some discussion on measures for energy conservation and sustainable design in the PNF and IMP Amendment document, there are no specifics provided on what kinds of best management practices and technologies will be incorporated at the building, the individual site and the overall campus level. The Scoping Determination for the IMP Amendment and the DPIR need to explicitly define what the project aims to achieve in terms of standards for environmental sustainability on the three levels mention above as well as how the project will determine indicators for sustainability. While the LEED system provides one metrics for incorporating green building standards and requirements, if the proponent feels that given the programmatic constraints of the building LEED might not be an appropriate system to follow, the Green Guide for Health Care might provide a more suitable framework. 18.9

In addition to fulfilling requirements related to stormwater management on site, the green building standards should be adopted for wastewater reuse for flushing toilets etc. (through double plumbing the building) as well as capturing, filtering and storing roof run-off. CRWA would encourage the proponents to consider a green roof for not only the new 454 Brookline Ave. building but also as a retrofit for all other buildings on its campus. Given that there is such a dearth of green / open space in the LMA as a whole, green roofs would not only provide cleaner roof runoff and reduce the urban heat island effect in the LMA but also provide an aesthetically pleasing amenity for the building occupants as well as habitat for birds and insects. 18.10

This project offers a huge potential to expand the purview of green practices from individual building scale to looking a "greening of infrastructure" at an overall neighborhood level. Through retrofitting the entire campus area with Low Impact Development (LID) best management practices, the proponent can achieve a much larger impact than the cumulative impact of a collection of individual green buildings. 18.11

We appreciate the opportunity to provide comment on this project through the Article 80 review process. Please feel free to contact me should you have any questions.

Sincerely,

Pallavi Kalia Mande
Urban Restoration Specialist

cc: Dana Farber Cancer Institute
Medical Academic and Scientific Community Organization
Boston Parks and Recreation Department
Boston Groundwater Trust

FENWAY CDC

May 9, 2006

Ms. Sonil Ghandi
Boston Redevelopment Authority
City Hall, 9th floor
One City Hall Square
Boston, MA 02201

Project Notification Form/
Institutional Master Plan Amendment
March, 2006

Dear Ms. Ghandi:

Thank you for the opportunity to review and comment on the Dana-Farber Cancer Institute (DFCI) Project Notification Form/Institutional Master Plan Amendment (PNF/IMPA).

Fenway CDC is a neighborhood-based membership organization devoted to enhancing the stability, sustainability and diversity of the Fenway neighborhood of Boston by providing opportunities for all Fenway residents, particularly those of limited means, to thrive in the community. We accomplish this by developing affordable housing, linking neighbors with jobs and training opportunities, providing services to families and elders, and organizing residents to have a strong voice in our community's future.

Fenway CDC has no objections to the proposed Center for Cancer Care at 454-462 Brookline Ave in Boston. DFCI's openness in sharing the details of the project history and design is appreciated. It is a major indicator of DFCI's efforts to be a good neighbor. We hope our comments provided below will facilitate the PNF/IMPA process. 19.1

- The need for a buffer system against vibrations generated by equipment in the Advance Energy Systems Total Energy Plant www.matep.com/history next door to the project site is explained on page 4-17 of the PNF/IMPA. The system is necessary to maintain the integrity of lab equipment and experiments that result therefrom. Installation has to be handled with precision during the initial construction of the foundation so that there is no backtracking to remedy errors. 19.2
- DFCI advocacy for improved mass transit to move increased numbers of staff and clients in and out of the area is appreciated. DFCI influence in the campaign to upgrade the Yawkey Way commuter rail station is crucial. This, in conjunction with strict adherence to the proposed parking ratios (table 4.5, p.4-12) will improve parking ratios and ultimately the overall traffic impact. 19.3

FENWAY
COMMUNITY
DEVELOPMENT
CORPORATION

73 Hemenway Street
Boston, Massachusetts
02115

Telephone
617 267-4637
Facsimile
617 267-8591

BUILDING
A BETTER FENWAY
SINCE 1973

- A shadow impact on the immediate area is acknowledged. Since all adjacent buildings are institutional properties and not on residential properties or park land they are not a significant concern for Fenway CDC. 19.4

- The new building should include "green" design and construction features, including those measured in the Leadership in Energy and Environmental Design (LEED) rating. DFCI can pursue this course of action in cooperation with Harvard Medical School's Green Campus Initiative. 19.5

- DFCI's financial support and participation in the Health Care and Research Training Institute (a project in which Fenway CDC is a partner) should continue and expand, particularly support for pre-employment training and placement of residents from the Fenway and other surrounding neighborhoods. This will not only provide good jobs with career advancement potential for community residents, it will also increase the number of DFCI employees who can walk to work. 19.6

- A portion of Housing Linkage as well as any "extraordinary" contribution to housing associated with the project should support the development of housing within walking distance of the LMAA. 19.7

Thank you for the Fenway Community Development Corporation.

Yours truly,

Richard Pendleton

Richard Pendleton, Board Member
Fenway Community Development Corporation

c.c. Richard Shea, Dana Farber
City Councilor Michael Ross

Joslin Diabetes Center *Conquering Diabetes in All of its Forms*

April 14, 2006

Sonal Gandhi
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Dear Sonal,

I'm writing to provide comment on the Dana-Farber Cancer Institute (DFCI) Project Notification Form and Institutional Master Plan Amendments.

As you know, the Joslin Diabetes Center is planning its own large building project, construction of which may overlap, to some extent, with Dana-Farber's proposed project. Despite the short-term inconveniences that may be experienced with these, and other building projects underway in the Longwood Medical Area (LMA), the Joslin Diabetes Center is strongly supportive of the Dana-Farber project. 20.1

The Dana-Farber is world-renowned for their clinical care and research activities. Together with Dana-Farber's Longwood Medical Area institutional neighbors, the Dana-Farber is an essential element to ensuring the continued growth, increased reputation and heightened viability of the City of Boston. This project will allow Dana-Farber to generate even more jobs; bring more business into the City in the form of patient visits; and enhance the City of Boston's reputation as the world's leader in academics, research, and medicine. 20.2

This project is essential to ensure that Dana Farber can continue to function in an organized and efficient fashion. By building at the proposed 450 Brookline Avenue site, Dana-Farber can effectively integrate to it's existing campus, leveraging utilization of already existing common features of its current campus, such as loading docks and other supports, while providing more a prominent, easier to locate, and a more architecturally appealing presence on Brookline Avenue. In addition, this project provides an enhanced ability for patients and employees to move from institution to institution resulting in better, more highly integrated patient care and research. 20.3

The City of Boston has achieved its recognition as the world's leader in academics, medicine, and medial research in part due to the presence of organizations like the Dana-Farber. Further growth is essential to preserve that reputation and there is no more appropriate location for that growth than at the proposed location in the heart of the LMA. It is our opinion that the City of Boston and the communities that surround the LMA receive innumerable benefits from the continued presence and expansion of the Dana Farber. While this growth presents challenges for us all to find more and better ways to deal with the lesser issues associated with growth such as parking, transportation, and the inconveniences associated with large building projects, we should not lose sight of the significant benefits that projects such as these bring to the area, the local communities, the city and state. 20.4

The Joslin Diabetes Center unequivocally supports this project.

Sincerely,

Robert C Calway

Robert C. Calway,
Chief Project and Planning Officer

Affiliated with Harvard Medical School

Gandhi, Sonal

From: Kate Weldon LeBlanc [kate530us@yahoo.com]
Sent: Friday, April 14, 2006 10:42 AM
To: Gandhi, Sonal
Subject: Comments on the Dana-Farber PNF

Good morning Sonal,

I am a lifelong resident of Mission Hill and also currently work at Children's Hospital
Boston. I just wanted to write to briefly express my support for the Dana Farber. I know
they recently filed a project notification form for their building project. They have
made a strong case for their need to update and expand their physical space to make it 21.1
more accessible for patients and staff alike. I also am grateful that they seem to be 21.2
very mindful of making the project a visually appealing contribution to the area. I have
full confidence that they will take efforts to minimize negative effects on the LMA and 21.3
surrounding neighborhoods, and will invest in appropriate mitigation to support our
community.

On a personal level, my father was given the highest quality, compassionate care at the 21.4
Dana-Farber in the late 1980s when he battled lymphoma. I have always been grateful for
the care he received there, and also enormously proud that this world-class institution is
one of our "neighbors".

Thank you for accepting my written comments.

Best,
Kate Weldon LeBlanc
14 Eldora Street
Roxbury, MA 02120

---

81 Lawn Street
Roxbury, Ma. 02120
April 7, 2006

Sonal Gandhi, Senior Project Manager
RA
Boston, MA. 02201

Re: Dana- Farber Cancer Institute PNF/IMP amendment

More than 12 years have passed since the previous IMP, what is expired cannot be "revived", a new Master Plan should be submitted. Expecting that this "amendment" to a document submitted in 1994 can substitute for a full IMP is wishful thinking. The mandated public review process for thoughtful planning for growth shouldn't be sidestepped. 22.1 In 1993, the City's Environment Dept. strongly encouraged DFCI to aim for at least a 10 % employee walking/cycling mode share and recommended no more than one net new parking space per 3000 square feet of new building space - a much stronger stance than the "Interim Guidelines" maximum .75 per 1000 gsf. If the goal in fact is for LMA institutions to achieve a .75 ratio campus wide, then the city must be vigilant to restrict new parking to an even lower ratio. Otherwise, the predicted future conditions inevitably surpass the target [for example, BWH- .95, DFCI- .90, and that is only after the Dana Building parking is vacated]. 22.2

A critical Master Plan requirement is a timetable for proposed projects that includes the estimated month and year of construction start and the construction completion for each project. The description of phasing, page 3-3, " DFCI plans to consolidate main campus parking in the new building by closing the Dana building garage…within the terms of this amended IMP, but sometime after the completion and occupancy of 450 Brookline " is shamelessly vague. If the Dana Building infill project (pages 1-5 and 1-6), is projected to begin 5-7 years after the Center for Cancer Care is completed (expected date 2011); the 213 spaces will not be taken out of service until 2016 at the earliest. 22.3

#1 concern- new LMA parking facilities - combined impacts from each new development contribute significantly to traffic congestion, each proposal can't be looked at in isolation. Garage queues and drop off driveway queues must be kept off the street because of impact on roadway operations specifically the bus service on Brookline Avenue. 22.4

Do the "Interim Guidelines" trump previous strategies to limit excess parking? Is the "restricted parking" district zoning effective? More information should be provided on the request for conditional zoning approvals - the significance of "restricted parking district" and requirement that accessory uses cannot occupy more than 25 % of parcel 2. 22.5

Parking supply- despite the general obfuscation the facts indicate an excessive number of new spaces although lack of information make it nearly impossible to evaluate. For example, what is the ratio of new parking and expected new employees at 450 Brookline? Does the inventory include spaces leased to others (BWH parking in Smith garage)? 22.6

Where is the information on parking demand and expected users- employee or outpatient? Employee mode splits should be detailed and expected demand described for peak periods and all work shifts, what are the goals for carpool share? What are the existing percentage shares for each mode? Employees arriving by automobile at the Crosstown Garage or Longwood Towers for example, should not be counted as walk/ transit, all traffic ntering the urban core is relevant because of air quality impacts. Staff mode shares should be compared to other LMA institutions. 22.7 Have the goals of the 1994 TAPA been achieved? 22.8

Data from the required monitoring reports submitted to BTD on the efforts to achieve the "Commuter Mobility Objectives"- 45% or fewer employees in SOVs, should be included in the IMP. 22.9

The new facility will add 425 spaces to the existing 814 on campus. How many of these are designated for employees and how many for patients and visitors? According to the tables on page 4-8, of the current 814 on campus, 474 are for staff and 340 for patients. The IMP should describe the actual parking supply for each year of the Master Plan, approvals shouldn't be based on "potential" scenarios (page 4-10). 22.10
Parking rates should be structured to encourage short-term patient/visitor (less than 3 hrs) over long term parking, priority must be directed towards convenient patient parking. Could patients and visitors as well as staff utilize the DFCI shuttles from Brookline Place? The 30-minute frequency is comparable to the public bus schedules. 22.11

Other concerns include the impacts on ground water, shadows on nearby open space and historic resources and the relationship between the new construction and the MATEP facility (whether the air quality at street level will change). 22.12

Sincerely,
Alison Pultinas

cc: City Councilor Michael Ross
Bryan Glascock/Acting Director Environment Dept.

MEMORANDUM

TO: Sonal Gandhi

FROM: John Walser

DATE: April 19, 2006

SUBJECT: Dana Farber Cancer Institute (DFCI): Institutional Master Plan Amendment/ Project Notification Form (IMPANF) – Large Project Review

The Proposed Project involves the construction of a new thirteen-story, approximately 275,000 gross square foot facility at 450 Brookline Avenue that will include clinical and research space, patient services, administrative functions, street-level lobby and new main entrance, retail space, and a below-grade parking garage to accommodate 212 net new parking spaces. The Proposed Project is located at the intersection of Brookline and Jimmy Fund Way in the Longwood Medical Area (LMA) of Boston and just outside the boundary of the new Groundwater Conservation Overlay District. The site currently consists of two parcels of land with a combined site area of approximately 33,414 square feet that is occupied by two buildings.

I have reviewed the IMPANF dated March, 2006 and submit the following Scoping Determination for the Environmental Protection Component of the IMP/Draft Project Impact Report (DPIR). As applicable, the analyses shall be required for the project proponent's preferred alternative as well as for any other alternative(s) that may be required to be studied by this Scoping Determination.

Wind

A quantitative (wind tunnel) analysis of the potential pedestrian level wind impacts shall be required 23.1
for the DPIR. This analysis shall determine potential pedestrian level winds adjacent to and in the vicinity of the project site and shall identify any areas where wind velocities are expected to exceed acceptable levels, including the Authority's guideline of an effective gust velocity of 31 mph not to be exceeded more than 1% of the time.

Particular attention shall be given to public and other areas of pedestrian use, including, but not limited 23.1.1
to, the entrances to the project building(s) and existing and proposed buildings, sidewalks and walkways in the vicinity of and adjacent to the Proposed Project, and all existing and proposed plazas, park areas (e.g., Joslin Park), and other open space areas within and in the vicinity of the proposed development.

The wind impact analysis shall evaluate the following conditions: 23.2

1. No-Build - the existing condition of the site and environs to establish the baseline condition. 23.2.1

2. Future Preferred Build Condition - the proposed development as described in the Expanded Environmental Notification Form/Project Notification Form. 23.2.2

3. Alternative Build Condition(s) - any alternative development concept(s) to the Preferred Build Condition required to be studied. 23.2.3

The wind tunnel testing shall be conducted in accordance with the following guidelines and criteria: 23.3

- Data shall be presented for both the existing (no-build) and for the future build scenario(s) (see above). 23.3.1

- The analysis shall include the mean velocity exceeded 1% of the time and the effective gust velocity exceeded 1% of the time. The effective gust velocity shall be computed as the hourly average velocity plus 1.5 x root mean square variation about the average. An alternative velocity analysis (e.g., equivalent average) may be presented with the approval of the Authority. 23.3.2

- Wind direction shall include the sixteen compass points. Data shall include the percent or probability of occurrence from each direction on seasonal and annual bases. 23.3.3

- Results of the wind tunnel testing shall be presented in miles per hour (mph). 23.3.4

- Velocities shall be measured at a scale equivalent to an average height of 4.5-5 feet. 23.3.5

- The model scale shall be such that it matches the simulated earth's boundary and shall include all buildings within at least 1,600 feet of the project site. All buildings taller than 25 stories and within 2,400 feet of the project site should be placed at the appropriate location upstream of the project site during the test. The model shall include all buildings recently completed, under construction, and planned within 1,500-2,000 feet of the project site. Prior to testing, the model shall be reviewed by the Authority. Photographs of the area model shall be included in the written report. 23.3.6

- The written report shall include an analysis which compares mean and effective gust velocities on annual and seasonal bases, for no-build and build conditions, and shall provide a descriptive analysis of the wind environment and impacts for each sensor point, including such items as the source of the winds, direction, seasonal variations, etc., as applicable. The report shall also include an analysis of the suitability of the locations for various activities (e.g., walking, sitting, standing, driving etc.) as appropriate, in accordance with recognized criteria (Melbourne comfort categories, or equivalent). 23.3.7

- The report also shall include a description of the testing methodology and the model, and a description of the procedure used to calculate the wind velocities (including data reduction and wind climate data). Detailed technical information and data may be included in a technical appendix but should be summarized in the main report. 23.3.8

- The pedestrian level wind impact analysis report shall include, at a minimum, the following maps and tables: 23.3.9

- Maps indicating the location of the wind impact sensors, for the existing (no-build) condition and future build scenario(s). 23.3.9.1

- Maps indicating mean and effective gust wind speeds at each sensor location, for the existing (no-build) condition and each future build scenario, on an annual basis and seasonally. Dangerous and unacceptable locations shall be highlighted. 23.3.9.2

- Maps indicating the suitability of each sensor location for various pedestrian-related activities (comfort categories), for the existing (no-build) condition and each future build scenario, on an annual basis and seasonally. To facilitate comparison, comfort categories may be distinguished through color coding or other appropriate means. In any case, dangerous and unacceptable conditions shall be highlighted. 23.3.9.3

- Tables indicating mean and effective gust wind speeds and the comfort category at each sensor location, for the existing (no build) condition and for each future build scenario, on an annual basis and seasonally. 23.3.9.4

- Tables indicating the percentage of wind from each of the sixteen compass points at each sensor location, for the existing (no-build) condition and for each future build scenario, on an annual basis and seasonally. 23.3.9.5

For areas where wind speeds are projected to exceed acceptable levels, measures to reduce wind speeds and to mitigate potential adverse impact shall be identified and tested in the wind tunnel. 23.4

<u>Shadow</u>

A shadow analysis shall be required for existing and build conditions for the hours 9:00 a.m., 12:00 noon, and 3:00 p.m. for the vernal equinox, summer solstice, autumnal equinox, and winter solstice and for 6:00 p.m. during the summer and autumn. It should be noted that due to time differences (daylight savings vs. standard), the autumnal equinox shadows would <u>not</u> be the same as the vernal equinox shadows and therefore separate shadow studies are required for the vernal and autumnal equinoxes. 23.5

The shadow impact analysis must include net new shadow as well as existing shadow and must clearly show the incremental impact of the proposed new building. For purposes of clarity, new shadow should be shown in a dark, contrasting tone distinguishable from existing shadow. The shadow impact study area shall include, at a minimum, the entire area to be encompassed by the maximum shadow expected to be produced by the Proposed Project (<u>i.e.</u>, at the winter solstice). The build condition(s) shall include all buildings under construction and any proposed buildings anticipated to be completed prior to completion of the Proposed Project. Shadow from all existing buildings within the shadow impact study area shall be shown. A North arrow shall be provided on all figures. Shadows shall be determined by using the applicable Boston Azimuth and Altitude data as provided in Exhibit 1 (Sun Altitude/Azimuth Table, Boston, Massachusetts) below. 23.6

Particular attention shall be given to existing or proposed public open spaces (e.g., Joslin Park and the Emerald Necklace) and pedestrian areas, including, but not limited to, the existing and proposed 23.7

sidewalks and pedestrian walkways within, adjacent to, and in the vicinity of the Proposed Project and the existing and proposed plazas, park areas, and other open space areas within and in the vicinity of the proposed development, and any other public and private open space areas that potentially could be affected by project-generated shadows.

The DPIR must include a full discussion of compliance with the LMA Interim Guidelines shadow criteria. Any new shadow that will be cast on the Emerald Necklace should be mitigated. The DPIR should adequately address this potential impact. Design or other mitigation measures to minimize or avoid any adverse shadow impacts shall be identified. 23.8

The above shadow analysis shall be required for any alternative required to be studied by the Scoping Determination as well as the preferred development option. 23.9

SUN ALTITUDE/AZIMUTH TABLE – Exhibit 1

Boston, Massachusetts

Latitude: N42.36 Longitude: W71.06

	Altitude	Azimuth	Time
21 March			Standard
9:00 a.m.	33.0	125.7	
12:00 Noon	48.0	-176.9	
3:00 p.m.	30.5	-121.8	
21 June			Daylight Savings
9:00 a.m.	39.9	93.5	
12:00 Noon	68.8	149.4	
3:00 p.m.	56.5	-113.7	
6:00 p.m.	23.9	- 79.3	
21 September			Daylight Savings
9:00 a.m.	25.9	115.3	
12:00 Noon	47.4	166.0	
3:00 p.m.	37.4	-132.9	
6:00 p.m.	7.3	- 96.0	
21 December			Standard

9:00 a.m.	14.2	141.9
12:00 Noon	24.1	-175.6
3:00 p.m.	10.0	-135.1

Source: Autocad/MassGIS

Daylight

A daylight analysis for both build and no-build conditions should be conducted by measuring the percentage of skydome that is obstructed by the Proposed Project building and evaluating the net change in obstruction. If alternative massing studies are requested as part of the Article 80 development review process, daylight analysis of such alternatives shall also be conducted for comparison. The study should treat the following elements as controls for data comparison: existing conditions, the context of the area, and the as-of-right background zoning envelope. The areas of interest include viewpoints along Brookline Avenue and Jimmy Fund Way. Daylight analyses should be taken for each new major building façade, or grouping thereof within the limits of the Boston Redevelopment Authority Daylight Analysis (BRADA) program, fronting these public or quasi-public ways. The midpoint of each roadway or public accessway should be taken as the study point. The BRADA program must be used for this analysis. 23.10 23.10.1

Solar Glare

If the design of the Proposed Project incorporates substantial glass-facades, an evaluation of potential solar glare impacts shall be required. 23.11

This analysis shall measure potential reflective glare from the building onto potentially affected streets and roadways, and nearby public open spaces in order to determine the potential for visual impairment or discomfort due to reflective spot glare for pedestrians/students and motorists. Mitigation measures to eliminate any adverse reflective glare shall be identified. Technical data used for the analysis shall be included. 23.12 23.13

The solar glare analysis also shall examine the potential for solar heat buildup in any nearby buildings receiving reflective sunlight from the Proposed Project. In some cases, this condition can result in overheating or the receiving structure or incapacitation of its air conditioning system. Mitigation measures shall be described for any identified negative impacts on nearby buildings. 23.14

Air Quality

The DPIR shall describe the existing and projected future air quality in the project vicinity and shall evaluate ambient levels to determine conformance with the National Ambient Air Quality Standards (NAAQS). Particular attention shall be given to mitigation measures to ensure compliance with air quality standards. 23.15

A future air quality (carbon monoxide) analysis shall be required for any intersection (including the proposed garage entrances/exits) where level of service (LOS) is expected to deteriorate to D and the 23.16

Proposed Project causes a 10 percent increase in traffic or where the level of service is E or F and the Proposed Project contributes to a reduction of LOS.

The study shall analyze the existing conditions, future No-Build and future Build conditions only. The 23.17
methodology and parameters of the traffic-related air quality analysis shall be approved in advance by the Boston Redevelopment Authority and the Massachusetts Department of Environmental Protection. The results of the air quality analysis shall be compared to the Massachusetts State Implementation Plan to determine project compliance with the Plan. Mitigation measures to eliminate or avoid any violation of air quality standards shall be described.

An indirect source air quality analysis of the operation of the parking garage shall be prepared to 23.18
determine potential air quality impacts on nearby sensitive receptors and compliance with air quality standards. Garage emissions should be estimated using appropriate U.S. EPA guidance. The EPA SCREEN3 model should be used to calculate maximum CO impacts from the garage at the various sensitive receptors.

A description of the project's heating and mechanical systems and of the parking garage ventilation 23.19
system, including location of intake and exhaust vents and specifications, and an analysis of the impact on pedestrian level air quality and on any sensitive receptors from operation of the heating, mechanical, and exhaust systems, including the building's emergency generator, shall be required.

In addition, please provide a detailed stationary source analysis of the adjacent 50 MW power plant 23.20
and whether or not the expanded capacity will necessitate modifying existing air permits to account for an increase in boiler size, hours of operation, fuel use and emissions (e.g., CO, NO_2, PM_{10}, non-criteria pollutant emissions). A detailed inventory of the emissions from the exhaust plume (type and 23.21
quantity of pollutants) from the power plant and any existing and/or proposed plant modifications and or expansion should be provided. As stated above, measures to avoid any violation of air quality standards and potential impacts on the project itself shall be described.

Solid and Hazardous Wastes

The presence of any contaminated soil or groundwater and any underground or aboveground storage 23.22
tanks at the project site shall be evaluated and remediation measures to ensure their safe removal and disposal shall be described in the DPIR. As applicable, the DPIR should summarize, in detail, the results of any studies or findings, including types and concentrations of contaminants encountered and shall include appropriate tables and maps. The reports shall be made available to the BRA.

If asbestos, asbestos–containing materials, lead paint or other hazardous compounds (e.g., PCBs) are 23.23
identified during demolition, renovation or removal activities, the handling and disposal must be in compliance with Massachusetts Department of Environmental Protection, the Boston Public Health Commission and the Inspectional Services Department guidelines and requirements.

The DPIR shall quantify and describe the generation, storage, and disposal of all solid and hazardous 23.24
wastes from the construction and operation of the Proposed Project. In addition, measures to promote the reduction of waste generation and recycling, particularly for paper, plastics, glass, metals, and

other recyclable products, and compliance with the City's recycling program, shall be described in the DPIR.

Noise

The DPIR shall establish the existing noise levels at the project site and vicinity and shall calculate 23.25
future noise levels after project completion based on appropriate modeling and shall demonstrate
compliance with applicable Federal, State, and City of Boston noise criteria and regulations. The noise
evaluation shall include the effect of noise generated by the area's traffic, and other noise sources.
Future noise levels shall include the noise generated by the Proposed Project's mechanical equipment,
including emergency generators. Measures to minimize and eliminate adverse noise impacts on 23.26
nearby sensitive receptors, including the project itself, from traffic noise and mechanical systems shall
be described.

Flood Hazard Zones/Wetlands

Compliance with Boston and Federal flood hazard regulations, including requirements regarding 23.27
construction within flood zones must be addressed in the DPIR. The potential impact of the Proposed
Project on existing wetlands and wetland resource areas must also be described, including a
demonstration of compliance with the Massachusetts Wetlands Protection Act (MWPA), as applicable.
Maps detailing the site in relation to applicable buffer zones shall be provided.

Water Quality and Resources

The DPIR shall include a description of the project's site drainage system how it will connect to the 23.28
Boston Water and Sewer Commission (BWSC) system. Parking garage drainage and measures to
prevent adverse water quality impacts to the Muddy River also shall be described in detail.

Stormwater Management

The DPIR shall contain an evaluation of the project site's existing and future stormwater drainage and 23.29
stormwater management practices. The DPIR shall fully illustrate existing and future drainage
patterns from the project site and shall describe and quantify existing and future stormwater runoff
from the site and the Proposed Project's impacts on site drainage.

The Proposed Project's stormwater management system, including best management practices to be 23.30
implemented, measures proposed to control and treat stormwater runoff and to maximize on-site
retention of stormwater, measures to prevent groundwater contamination, and compliance with the
Commonwealth's Stormwater Management Policies, also shall be described. The DPIR shall describe 23.31
the project area's stormwater drainage system to which the project will connect, including the location
of stormwater drainage facilities and ultimate points of discharge.

If the Proposed Project involves the disturbance of land of one acre or more, a National Pollution 23.32
Discharge Elimination System (NPDES) General Permit for Construction from the U.S. Environmental
Protection Agency and the Massachusetts Department of Environmental Protection will be required. If

an NPDES permit is required, a stormwater pollution prevention plan must be prepared prior to the commencement of any construction-related activities.

Geotechnical Impact/Groundwater

An analysis of existing sub-soil conditions at the project site, groundwater levels, potential for ground 23.33
movement and settlement during excavation and foundation construction, and potential impact on adjacent buildings, utility lines, and the roadways shall be required. This analysis shall also include a description of the foundation construction methodology, the amount and method of excavation, and measures to prevent any adverse effects on adjacent buildings, utility lines, roadways and the Muddy River.

The Proposed Project is one block from the boundary of the new Groundwater Conservation Overlay 23.34
District (Longwood Avenue). Measures to ensure that groundwater levels will be maintained and will not be lowered during or after construction shall be described in detail. Installation of observation monitoring wells, preferable on public land, may be required if existing wells are not already present. Identification of existing wells and well installation should be made in consultation with the Boston Groundwater Trust (the "Trust"). In addition, monitoring data must be provided to the BRA and the Trust from 6 months prior to construction until one year after construction (frequency to be determined
in consultation with the BRA). If dewatering is necessary during construction, a replenishment system 23.35
must be installed and levels maintained. Upon completion of construction, monitoring wells will need
to be assigned to the Trust by the developer with an agreement granting the Trust access if wells are on 23.36
private property. A description of the recharging system or recirculation program must be provided.

Levels reported shall be based on Boston City Base (BCB). 23.37

Contact information for the Trust:

Boston Groundwater Trust
234 Clarendon Street
Boston, MA 02116

Attention: Elliott Laffer, Executive Director
617-859-8439

In addition, a vibration monitoring plan must be provided that ensures potential vibration impacts from 23.38
project construction on adjacent buildings and infrastructure will be mitigated.

Construction Impacts

A construction impact analysis shall include a description and evaluation of the following: 23.39

(a) potential dust and pollutant emissions and mitigation measures to control these emissions, including participation in the Commonwealth's Clean Construction Initiative. 23.39.1

(b) potential noise generation and mitigation measures to minimize increases in noise levels. 23.39.2

(c) location of construction staging areas and construction worker parking; measures to encourage carpooling and/or public transportation use by construction workers. 23.39.3

(d) construction schedule, including hours of construction activity. 23.39.4

(e) access routes for construction trucks and anticipated volume of construction truck traffic. 23.39.5

(f) construction methodology (including foundation construction), amount and method of excavation required, disposal of the excavate, description of foundation support, maintenance 23.39.6 of groundwater levels, and measures to prevent any adverse effects or damage to adjacent structures and infrastructure.

(g) Method of demolition of existing buildings on the site and disposal of the demolition waste. 23.39.7

(h) potential for the recycling of construction and demolition debris, including asphalt from the existing parking lot. 23.39.8

(i) identification of best management practices to control erosion and to prevent the discharge of sediments and contaminated groundwater or stormwater runoff into the City's drainage system and into the adjacent river and harbor waters during the construction period. 23.39.9

(j) coordination of project construction activities with other major construction projects being undertaken in the project vicinity at the same time, including scheduling and phasing of individual construction activities. 23.39.10

(k) impact of project construction on rodent populations and description of the proposed rodent control program, including frequency of application and compliance with applicable City and State regulatory requirements. 23.39.11

(l) measures to protect the public safety. 23.39.12

Sustainable Design

A new development project presents opportunities for sustainable design and construction to prevent damage to the environment, consistent with the goals of Executive Order 385 and the Green Guidelines for Healthcare Construction. The DPIR shall fully describe (including a LEED checklist) appropriate environmentally protective technologies and practices that will be incorporated into the design and operation of the proposed development and the Proponent's commitment to include such measures. The Proponent is encouraged to achieve LEED certifiable status. Measures shall include, but not be limited to, the following: 23.40 23.41

- Participation in the U.S. Environmental Protection Agency's Energy Star/Green Lights program and adoption of the Leadership in Energy and Environmental Design (LEED) standards for the project. 23.41.1

- Optimize natural day lighting, passive solar gain, and natural cooling, specify energy efficient HVAC and lighting systems, appliances, and other equipment, and solar preheating of makeup air. 23.41.2

- Favor building materials and purchases of supplies that are non-toxic, made from recycled materials, and made with low embodied energy. 23.41.3

- Application of cool roofing material for energy conservation, including reduction in cooling energy use. 23.41.4

- Build easily accessible recycling system infrastructure into the project's design. 23.41.5

- Incorporate additional opportunities to conserve water beyond water-saving technologies required by law. 23.41.6

- Make the building design adaptable for the future inclusion of innovative energy and environmental technologies as they develop over time. 23.41.7

- Conduct annual audits of energy consumption, waste streams, and the use of renewable technologies. 23.41.8

In addition, Proposed Project should include significant green features such as native landscaping, increased water and energy efficiency, improved indoor air quality, green roof systems, and renewable energy technologies to the extent possible. The DPIR should describe commitments to the following: 23.42

- Sustainable Sites (public transportation access, bicycle storage, alternative fueled vehicles, stormwater management, green roofing, light pollution reduction) 23.42.1
- Water Efficiency (water use reduction, water efficient landscaping, innovative wastewater technologies) 23.42.2
- Energy & Atmosphere (energy performance, CFC reduction in HVAC&R equipment, renewable energy) 23.42.3
- Materials & Resources (Recycle content, construction waste management, local/regional materials) 23.42.4
- Indoor Environmental Quality (Environmental tobacco smoke control, ventilation effectiveness, low emitting materials (adhesives & sealants, paints, carpets, composite wood), daylight and views) 23.42.5
- Innovation & Design Process (innovation in design) 23.42.6

Building Materials Resource Center

Building demolition and/or renovation activities (existing structures) may offer an opportunity for recycling, reprocessing or donation of construction and building materials (e.g., glass, brick, stone, interior furnishing) to the Building Materials Resource Center (BMRC). The Proponent is encouraged to contact the BMRC at the following address regarding disposal and/or acquisition of materials that may be appropriate for use: 23.43

Building Materials Resource Center
100 Terrace Street
Roxbury, MA 02120
617-442-8917

MEPA Comment Letters

The Commonwealth of Massachusetts

Executive Office of Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114-2524

MITT ROMNEY
GOVERNOR

KERRY HEALEY
LIEUTENANT GOVERNOR

STEPHEN R. PRITCHARD
SECRETARY

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

June 9, 2006

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME	: Dana-Farber Cancer Institute 450 Brookline Avenue Project
PROJECT MUNICIPALITY	: Boston
PROJECT WATERSHED	: Charles River
EOEA NUMBER	: 13776
PROJECT PROPONENT	: Dana-Farber Cancer Institute
DATE NOTICED IN MONITOR	: April 26, 2006

Pursuant to the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and Section 11.06 of the MEPA regulations (301 CMR 11.00), I hereby determine that this project **requires** the preparation of an Environmental Impact Report (EIR). M1.1

As described in the Environmental Notification Form (ENF), the project consists of the construction of a new building by the Dana Farber Cancer Institute (DFCI) on two adjacent parcels presently occupied by 454 Brookline Avenue, the Redstone Building and a 30-space surface parking lot. The proposed building is a 13-story, 275,000 square foot (sf) space for clinical research, patient services, administrative functions, a street-level lobby and new main entrance, retail space and below grade parking. The project includes 212 net-new parking spaces with access/egress via the existing Jimmy Fund Way. The project includes modifications to existing buildings. The Smith Building will be modified to improve loading and receiving facilities and to facilitate connections to the new building at most levels including the underground parking garage. Parking located within the Dana building will be moved to the new garage and these floors will be reconstructed for use by DFCI.[1]

---

[1] This increase in square footage is included in the ENF estimates for gross square footage and traffic generation.

The project avoids many of the environmental impacts associated with development by reusing an existing site in a densely populated area with good access to neighborhoods and mass transit. To avoid, minimize and mitigate impacts associated with the project, the proponent has proposed to improve its existing Transportation Demand Management (TDM) program and incorporate street and sidewalk improvements into the project to improve pedestrian and vehicular access (including loading/unloading) on its campus.

The project is undergoing MEPA review pursuant to Section 11.03 (6)(a)(6) because it requires a state permit and will generate more than 3,000 new average daily trips (adt).[2] The project requires a Sewer Connection Permit from the Department of Environmental Protection (DEP) and review by the Massachusetts Historical Commission (MHC). In addition, the project is undergoing Article 80 Review by the Boston Redevelopment Authority (BRA) and will require multiple permits and approvals from the City of Boston including approval of a Construction Management Plan and a Transportation Access Plan Agreement (TAPA).[3] Because the proponent may seek financial assistance from the Commonwealth through the Massachusetts Health and Educational Facilities Authority (HEFA), MEPA jurisdiction is broad in scope and extends to all aspects of the project that may cause significant Damage to the Environment.

Because the project is subject to Article 80 review, the planning for this project would be best served by a coordinated review and the submission of a single set of documents to satisfy the requirements of both MEPA (Section 11.09 (4)(c)) and the BRA (Section 80-6). The proponent should coordinate this joint review process with both agencies.

SCOPE

The EIR should follow Section 11.07 of the MEPA regulations for outline and content, as modified by the Article 80 requirements and this scope.

<u>Project Description</u>

The EIR should include a thorough description of the project and all project elements and construction phases. The EIR should include an existing conditions plan illustrating resources and abutting land uses for the entire project area and DFCI campus and a proposed conditions plan (or plans) illustrating proposed elevations, structures, access roads, stormwater management systems and sewage connections. The EIR should include a circulation plan illustrating how cars, trucks, pedestrians and cyclists will be accommodated within the campus.

M1.2
M1.3
M1.4
M1.5

[2] I note that the ENF form indicated the project would generate an additional 1,613 adt; however, this analysis did not use accurate rates for the hospital portion of the project (Land Use Code 610). A revised analysis provided by the proponent included accurate rates but altered the square footage of the project for various elements. The analysis may not accurately reflect trip generation associated with the project and the project is likely to generate trips in excess of the 3,000 adt threshold.

[3] A Scoping Determination for the project and an Institutional Master Plan (IMP) was issued by the BRA on May 30, 2006.

Project Permitting and Consistency

The EIR should briefly describe each state permit required for the project and should demonstrate that the project meets applicable performance standards. In accordance with section 11.01 (3)(a) of the MEPA regulations, the EIR should discuss the consistency of the project with any applicable local or regional land use plans. M1.5 M1.6

Alternatives Analysis

In addition to the No-Build Alternative and the Preferred Alternative, the EIR should discuss alternative building configurations on the site that might result in fewer impacts, particularly on traffic, including an alternative that is consistent with existing zoning and does not require zoning relief. The EIR should include a comparative analysis that clearly shows the difference between the environmental impacts associated with each alternative. M1.7 M1.8

I encourage the proponent to evaluate sustainable design alternatives such as Low Impact Development (LID) techniques in site design, building design and stormwater management plans. LID techniques incorporate stormwater best management practices (BMPs) and can reduce impacts to land and water resources. LID tools appropriate for this project include landscaping to provide stormwater retention, water conservation and use of pervious surfaces. For more information on LID, visit http://www.mass.gov/envir/lid/. Other LID resources include the national LID manual (Low Impact Development Design Strategies: An Integrated Design Approach), which can be found on the EPA website at: http://www.epa.gov/owow/nps/lid/. M1.9

Transportation

Without adequate mitigation, the project has the potential to generate significant traffic impacts. The EIR must include a traffic study that accurately assesses project impacts and identifies effective mitigation. I am incorporating by reference the traffic study scope required by the BRA and the Boston Transportation Department (BTD) which is detailed within the City's Scoping Determination (Appendix 1). The Scope requires an extensive evaluation of existing and future conditions, requires assessment of conditions for traffic, pedestrians and cyclists and requires the development of appropriate mitigation including long-term project impact monitoring, roadway/intersection improvements, reduction in parking spaces, intelligent transportation technology and transportation demand management (TDM). The study area includes the following intersections: M1.10 M1.11

- Brookline Avenue/Longwood Avenue
- Brookline Avenue/Joslin Road Deaconess Road
- Brookline Avenue/Francis Street
- Brookline Avenue Fenwood Road
- Brookline Avenue/Riverway
- Binney Street/Longwood Avenue
- Binney Street/Deaconess Road
- Binney Street/Francis Street

- Binney Street/Fenwood Road
- Longwood Avenue/Blackfan Street
- Longwood Avenue/Avenue Louis Pasteur
- Longwood Avenue/Huntington Avenue
- Longwood Avenue Pilgrim Road
- Longwood Avenue/Riverway
- Pilgrim Road/Joslin Road
- Pilgrim Road/Deaconess Road
- Francis Street/Huntington Avenue
- Brookline Avenue/Fenway
- Brookline Avenue/Park Drive
- Park Drive/Riverway/Fenway
- Audubon Circle

The EIR should provide an overview of the proponent's existing TDM program and identify measures to increase its effectiveness including consideration of an increase in transit subsidies. M1.12 The proponent should coordinate with the Boston and Brookline officials and the Medical Area Service Corporation (MASCO) regarding ongoing efforts to coordinate traffic, transit and parking in the LMA. M1.13 The EIR should discuss how the project can contribute to these efforts. It should identify and assess existing and future transit capacity in the area (including the Urban Ring EOEA #12565) and identify measures the proponent will consider to support transit. M1.14 Also, it should identify improvements to support pedestrian and bicycle access and safety. M1.15

The project includes construction of 212 parking spaces. The EIR should assess parking supply and demand including parking utilization and turnover rates. M1.16 It should identify the parking ratio, discuss its consistency with zoning requirements and justify the amount of parking proposed. The EIR should evaluate measures to further minimize parking at the site. M1.17

<u>Drainage</u>

The EIR should include a section on stormwater that demonstrates that source controls, pollution prevention measures, erosion and sedimentation controls and the drainage system will comply with the DEP Stormwater Management Policy and standards for water quality and quantity both during construction and post-development. M1.18 The EIR should include an operations and management plan to ensure the long-term effectiveness of the stormwater system. M1.19

This project provides an important opportunity to minimize impacts from the existing facilities. Commentors have highlighted the importance of drainage improvements to reduce impacts to the Muddy River. M1.20 Restoration of the Muddy River (EOEA #11065) and improvements to water quality are a shared goal of the Commonwealth and the City of Boston. While stormwater volume will not increase (because this site is already completely impervious) the site could be re-designed to provide limited storage and infiltration and improve water quality discharging to the Muddy River. Incorporation of landscaping into the sidewalk design and a green roof into the building design could support these goals. M1.21 In addition, the proponent should consider incorporation of water conservation measures (beyond requirements of the state building code) into the building design. M1.22

Wastewater

Wastewater will continue to be discharged into the Boston Water and Sewer Commission (BWSC) sewer system, which flows into the Massachusetts Water Resources Authority (MWRA) system and ultimately to the Deer Island Wastewater Treatment Facility. The EIR should wastewater flows and identify the proponent's commitment to the removal of extraneous clean water (e.g., infiltration/ inflow (I/I)) in the system to ensure that additional flows are offset by the removal of I/I. DEP is using a minimum 4:1 ratio for I/I removal to new wastewater flow added and BWSC has indicated that the proponent will be required to develop an inflow reduction plan consistent with this policy. M1.23

Cultural Resources

The project site is located near the Olmsted Park System National Register Historic District (the Emerald Necklace) and several other historic structures. As noted previously, the project is subject to review by MHC. The EIR should include plans that clearly identify the Historic District and other historic structures in the area and describe project impacts on these sites. It should provide perspective views of the project form key vantage points. In addition, the EIR should identify potential impacts to open space from new shadow and changes in groundwater flows. M1.24 M1.25

Construction Period Impacts

The EIR should include a discussion of construction phasing, evaluate potential impacts associated with construction activities, and propose feasible measures to avoid or eliminate these impacts. The proponent should implement measures to alleviate dust, noise and odor associated with construction activities. Because this project is located within Longwood Medical Area (LMA), a dense urban area with many sensitive receptors, I strongly urge the proponent to participate in the DEP Diesel Retrofit Program to minimize diesel emissions from construction equipment. Measures to address these impacts include the installation of after-engine emission controls such as oxidation catalysts or diesel particulate filters and/or requirements for use of on-road low-sulfur diesel (LSD) fuel in off-road construction equipment. I encourage the proponent to consult with DEP for assistance in implementing this program. In addition, DEP has noted that demolition activities must comply with both Solid Waste and Air Pollution Control regulations (M.G.L. Chapter 40, Section 54). M1.26 M1.27 M1.28 M1.29 M1.30

Mitigation

The EIR should include a separate chapter on mitigation measures. It should include a Draft Section 61 Finding for all state permits that includes a clear commitment to mitigation, an estimate of the individual costs of the proposed mitigation, and the identification of the parties responsible for implementing the mitigation. A schedule for the implementation of mitigation, based on the construction phases of the project, should also be included. M1.31 M1.32 M1.33

Response to Comments

The EIR should contain a copy of this Certificate and a copy of each comment received. M1.34
The EIR should respond to the comments received, to the extent that the comments are within MEPA jurisdiction. The EIR should present additional narrative and/or technical analysis as necessary to respond to the concerns raised.

Circulation

The EIR should be circulated in compliance with Section 11.16 of the MEPA regulations M1.35
and copies should be sent to any state agencies from which the proponent will seek permits or approvals, to the list of "comments received" below, and to City of Boston officials. A copy of M1.36
the EIR should be made available for review at the Boston Public Library.

June 9, 2006
Date

Stephen R. Pritchard

Comments received:

5/16/06	Department of Environmental Protection NERO
5/17/06	Boston Water and Sewer Commission
5/15/06	Boston Public Health Commission
5/17/06	Charles River Watershed Association (CRWA)
5/15/06	Alison Pultinas

SRP/CDB/cdb

DB

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE

205B Lowell Street, Wilmington, MA 01887 • (978) 694-3200

MITT ROMNEY
Governor

KERRY HEALEY
Lieutenant Governor

STEPHEN R. PRITCHARD
Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

May 16, 2006

Stephen R. Pritchard, Secretary
Executive Office of
Environmental Affairs
100 Cambridge Street
Boston MA, 02114

RE: Boston
Dana Farber Cancer Institute
450 Brookline Avenue
EOEA # 13776

RECEIVED
MAY 18 2006
MEPA

Attn: MEPA Unit

Dear Secretary Pritchard:

The Massachusetts Department of Environmental Protection Northeast Regional Office (MassDEP-NERO) has reviewed the Environmental Notification Form (ENF) submitted by Dana-Farber Cancer Institute to demolish the existing Redstone building and parking, in order to construct a 13 story building with 275,000 square foot building and 455 parking spaces for outpatient clinical space and clinical research facilities on a 0.77-acre site in Boston (EOEA #13776). The Department provides the following comments.

Wastewater

The ENF indicates that there is sufficient capacity in the existing collection system to accommodate the estimated 48,520 gpd of new wastewater flow from the Dana Farber Cancer Institute 450 Brookline Avenue Project. Total wastewater flow is estimated at 51,410 gpd, when existing flow is added. Wastewater generated by the project will discharge into the Boston Water and Sewer Commission (BWSC) sewer system, which flows into the MWRA system and ultimately to the Deer Island Wastewater Treatment Facility.

As MEPA is aware, DEP, in cooperation with MWRA and its member communities (including Boston), are implementing a coordinated approach to flow control in the MWRA regional wastewater system, particularly the removal of extraneous clean water (e.g., infiltration/inflow (I/I)) in the system. In this regard, DEP has been routinely requiring proponents proposing to add significant new wastewater flow (such as the Dana Farber Cancer Institute 450 Brookline Avenue Project) to assist in the I/I reduction effort to ensure that the additional wastewater flows are offset by the removal of I/I. M2-1

Currently, MassDEP is using a minimum 4:1 ratio for I/I removal to new wastewater flow added. This ratio may be increased if specific flow constrictions/overflows already exist in the sewershed to which the new flow is added. The proponent should therefore work with the BWSC, and consult with MassDEP on this issue. Assuming that documentation is provided to confirm existing wastewater flows and that a 4:1 ratio is utilized, the proponent will need to remove, or cause to be removed, *194,080 gpd of I/I.*

Construction Period Air Quality

Participation in the MassDEP Diesel Retrofit Program is a way to mitigate adverse construction period impacts from diesel emissions. MassDEP believes it is appropriate and necessary to mitigate the construction-period impacts of diesel emissions to the maximum extent feasible. Diesel emissions contain fine particulates that have been found to exacerbate a number of heath conditions, such as asthma and respiratory ailments. Fine particulate matter also contributes to lung damage and has been identified as a likely carcinogen. M2.2

MassDEP recommends that the project proponent work with its staff to implement construction-period diesel emission mitigation, which could include the installation of after-engine emission controls such as oxidation catalysts or diesel particulate filters. Additional information is available on the MassDEP website: http://www.mass.gov/dep/water/wastewater/diesel.pdf. In addition, MassDEP recommends that the project proponent require its contractor(s) to use on-road low-sulfur diesel (LSD) fuel in their off-road construction equipment. On-road LSD fuel has a sulfur content of approximately 500 parts per million (ppm) in contrast to lower grade off-road diesel fuel which has a sulfur content of 3,000 ppm. The use of LSD fuel, in conjunction with after-engine emission controls, can reduce particulate matter by an additional 25 percent beyond that obtainable with after-engine controls only. M2.3 M2.4

Recycling Issues

The project includes demolition and reconstruction, which will generate a significant amount of construction and demolition (C&D) waste. Although the ENF has not made a commitment to recycling construction debris (p.5-90), MassDEP encourages the project proponent to incorporate C&D recycling activities as a sustainable measure for the project. M2.5

The project proponent is advised that demolition activities must comply with both Solid Waste and Air Pollution Control regulations, pursuant to M.G.L. Chapter 40, Section 54, which provides: M2.6

> "Every city or town shall require, as a condition of issuing a building permit or license for the demolition, renovation, rehabilitation or other alteration of a building or structure, that the debris resulting from such demolition, renovation, rehabilitation or alteration be disposed of in a properly licensed solid waste disposal facility, as defined by Section one hundred and fifty A of Chapter one hundred and eleven. Any such permit or license shall indicate the location of the facility at which the debris is to be disposed. If for any reason, the debris will not be disposed as indicated, the permittee or licensee shall

notify the issuing authority as to the location where the debris will be disposed. The issuing authority shall amend the permit or license to so indicate."

For purposes of implementing the requirements of M.G.L. Chapter 40, Section 54, MassDEP considers an asphalt, brick, and concrete (ABC) rubble processing or recycling facility, pursuant to the provisions of section (3) of 310 CMR 16.05 Site Assignment Regulations for Solid Waste Management Facilities, to be conditionally exempt from the site assignment requirements if the ABC rubble at such facilities is separated at the point of generation from other solid waste materials. Under 310 CMR 16.05(3), ABC can be crushed on-site with just a 30-day notification to MassDEP. However, the asphalt is limited to weathered bituminous concrete (no roofing asphalt) and the brick and concrete must be uncoated or not impregnated with materials such as roofing epoxy. If the brick and concrete are not clean, e.g., coated and/or impregnated, the material is defined as construction and demolition (C&D) waste and requires either a Beneficial Use Determination (BUD) or a Site Assignment and permit before it can be crushed. M2.7

Pursuant to the requirements of 310 CMR 7.02 of the Air Pollution Control Regulations, if the ABC crushing activities are projected to result in the emission of one ton or more of particulate matter to the ambient air per year and/or if the crushing equipment employs a diesel oil fired engine with an energy input capacity of three million or more British thermal units per hour for either mechanical or electrical power which will remain on-site for twelve or more months, then a plan application must be submitted to MassDEP for written Approval prior to installation and operation of the crushing equipment. M2.8

In addition, since it appears that significant portions of the demolition project contain asbestos, the project proponent is advised that asbestos and asbestos-containing waste material are a special waste as defined in the Solid Waste Management regulations (310 CMR 19.061). Asbestos removal notification on permit form ANF 001 and building demolition notification on permit form AQ06 must be submitted to MassDEP at least 10 working days prior to initiating work. Except for vinyl asbestos tile (VAT) and asphaltic-asbestos felt and shingles, the disposal of asbestos containing materials within the Commonwealth must be at a facility specifically approved by MassDEP (310 CMR 19.061). No asbestos containing material including VAT, and/or asphaltic-asbestos felts or shingles may be disposed at a facility operating as a recycling facility, (310 CMR 16.05). The disposal of the asbestos containing materials outside the jurisdictional boundaries of the Commonwealth must comply with all the applicable laws and regulations of the state receiving the material. M2.9

The demolition activity also must conform to current Massachusetts Air Pollution Control Regulations governing nuisance conditions at 310 CMR 7.01, 7.09 and 7.10. As such, the proponent should propose measures to alleviate dust, noise, and odor nuisance conditions, which may occur during the demolition. MassDEP must be notified in writing, at least 10 days in advance of removing any asbestos. MassDEP also must be notified in writing, at least 10 days prior to any demolition work. The removal of asbestos from the buildings must adhere to the special safeguards defined in the Air Pollution Control Regulations (310 CMR 7.15 (2)). M2.10 M2.11

Facilitating future waste reduction and recycling and integrating recycled materials into the project are necessary to minimize or mitigate the long-term solid waste impacts of this type of development. The Commonwealth's waste diversion strategy is part of an integrated solid waste management plan, contained in The Solid Waste Master Plan that places a priority on source reduction and recycling. Efforts to reduce waste generation and promote recycling have yielded significant environmental and economic benefits to Massachusetts' residents, businesses and municipal governments over the last ten years. Waste diversion will become even more important in the future as the key means to conserve the state's declining supply of disposal capacity and stabilize waste disposal costs. M2.120

As the lead state agencies responsible for helping the Commonwealth achieve its waste diversion goals, DEP and EOEA have strongly supported voluntary initiatives by the private sector to institutionalize source reduction and recycling into their operations. Adapting the design, infrastructure, and contractual requirements necessary to incorporate reduction, recycling and recycled products into existing large-scale developments has presented significant challenges to recycling proponents. Integrating those components into developments such as the Dana Farber Cancer Institute 450 Brookline Avenue Project at the planning and design stage enable the project's management and occupants to establish and maintain effective waste diversion programs. For example, facilities with minimal obstructions to trash receptacles and easy access to main recycling areas and trash chutes allow for implementation of recycling programs and have been proven to reduce cleaning costs by 20 percent to 50 percent. Other designs that provide sufficient space and electrical services will support consolidating and compacting recyclable material and truck access for recycling material collection.

By incorporating recycling and source reduction into the design, the proponents would have the opportunity to join a national movement toward sustainable design. Sustainable design was endorsed in 1993 by the American Institute of Architects with the signing of its *Declaration of Interdependence for a Sustainable Future*. The project proponent should be aware there are several organizations that provide additional information and technical assistance, including WasteCap, the Chelsea Center for Recycling and Economic Development, and MassRecycle. M2.13

Hazardous Material

The Department has record of hazardous material releases occurring in the vicinity of the project site at 454 Brookline Avenue: Release Tracking Numbers 3-0013899. The project proponent is advised that removing contaminated soil, pumping contaminated groundwater, or working in contaminated media must be done under the provisions of MGL c.21E/21C and OSHA. To avoid delay of the project and the potential for administrative penalties, the proponent will need to obtain necessary permits under these provisions beforehand. Appropriate soil and groundwater tests should be conducted well in advance of the start of construction and professional environmental consulting services should be readily available to provide the contractor the technical guidance required to facilitate any necessary permits. M2.14

Air Quality

The project proponent is advised that pre-installation approval from the MassDEP Division of Air Quality Control is needed if the project will include the installation of any Fuel Utilization Facility that emits air contaminants (e.g., furnaces, fuel burning equipment, boiler(s)) sized above M2.15

the de minimus threshold levels in 310 CMR 7.02. In addition, if the building is to be equipped with emergency generators, additional review by the Department may be required depending on the size of the generator units. An emergency generator with an energy input capacity of less than 3 million BTU per hour is exempt from the requirements of 310 CMR 7.02. An emergency generator with an energy input capacity of more than 10 million BTU per hour requires pre-installation approval from the Department. A generator with a capacity between 3 million and 10 million BTU per hour must either follow the work practices in 310 CMR 7.03 or receive pre-installation approval under 310 CMR 7.02. M2.16

The MassDEP Northeast Regional Office appreciates the opportunity to comment on this proposed project. Please contact Jack Zajac at (978) 694-3240 for further information on the wastewater issues. If you have any general questions regarding these comments, please contact Nancy Baker, MEPA Review Coordinator at (978) 694-3338.

Sincerely,

John D. Viola
Deputy Regional Director

cc: Brona Simon, Massachusetts Historical Commission
Kevin Brander, Jack Zajac, MassDEP-NERO
John E. Sullivan, BWSC
Marianne Connolly, MWRA

Boston Water and Sewer Commission

980 Harrison Avenue
Boston, MA 02119-2540
617-989-7000

May 17, 2006

Secretary Stephen R. Pritchard
Executive Office of Environmental Affairs
Attn: MEPA Office
Deirdre Buckley – EOEA #13776
100 Cambridge Street, 9th Floor
Boston, MA 02114

Re: ENF Dana-Farber Cancer Institute – Biomedical Research Facility

Dear Secretary Pritchard:

The Boston Water and Sewer Commission has reviewed the Environmental Notification Form (ENF) for the Dana-Farber Cancer Institute (DFCI). The project site for the proposed biomedical research facility is located at the corner of Brookline Avenue and Jimmy Fund Way, at 450 Brookline Avenue. The site is presently occupied by two buildings – 454 Brookline Avenue and the Redstone Building, as well as a 30-space surface parking lot. These structures will be demolished to accommodate construction of the new 275,000 square foot building designed for clinical, clinical research, patient services, administrative and retail purposes. The proposed project includes the construction of approximately 455 underground parking spaces and construction of a tunnel below Jimmy Fund Way. It is anticipated that the tunnel under Jimmy Fund Way will be located 15 feet below the street level to avoid interference with existing and future utilities.

Several modifications to existing buildings on the CFCI's campus are included as part of this project, including:

- Potential expansion of campus loading and receiving facilities at the Smith Building on Binney Street
- Renovation of Smith Building floors 1-3 to reconfigure space and use to integrate continuously with the new building
- Minor interior modifications of the Smith Building to facilitate connections to the new building at most levels, including underground parking

Water demand for the new facility is estimated at approximately 59,730 gallons per day. The site is served by an 8-inch water main on Jimmy Fund Way and a 12-inch water main on

Brookline Avenue. Proposed locations for new water service connections are not identified in the IMPA/PNF.

Sanitary sewage generation for the new facility is estimated at 51,410 gallons per day. Sanitary sewer service is proposed to be provided via a 15-inch sanitary sewer on Brookline Avenue and a 10-inch sanitary sewer located on Jimmy Fund Way.

The proposed project is not expected to result in significant changes to existing drainage patterns or water quality, since the existing site surface is primarily impervious.

The Commission has the following comments regarding the proposed project:

General

1. For the proposed construction the proponent must submit a site plan and a General Service Application to the Commission. The site plan must show the location of existing public and private water mains, sanitary sewers and storm drains which serve the project site, as well as the location of proposed service connections. M3.1

2. With the site plan, the proponent must provide detailed and updated estimates for water demand, sanitary sewer flows and stormwater runoff generation for the proposed project. The amount of potable water required for landscape irrigation if any, must be quantified and provided separately. M3.2

3. Any new or relocated water, sewer and drainage facilities required for the project must be designed and constructed at the proponent's expense in accordance with the Commission's Water Distribution System and Sewer Use Regulations and Requirements for Site Plans. M3.3

4. The proponent is responsible for ensuring that the construction of the tunnel under Jimmy Fund Way does not negatively impact the Commission's water, sewer or storm drainage systems or any service connections to adjacent buildings. With the site plan, the proponent must submit to the Commission plans showing the location of the tunnel relative to existing and proposed water, sewer and storm drain utilities. The plans must identify specific measures that will be implemented to prevent damage or obstruction of the water, sewer or storm drain utilities during construction. M3.4

5. To assure compliance with the Commission's requirements, the proponent should submit the site plan and General Service Application to the Commission for review when project design is 50 percent complete. M3.5

6. Before demolition of 454 Brookline Avenue and the Redstone Building commences, existing water, sewer and storm drain connections must be cut and capped in accordance with Commission standards. The proponent must complete a Termination Verification Approval Form for a Demolition Permit, available from the Commission. The completed form must be submitted to the City of Boston's Inspectional Services Department before a Demolition Permit will be issued. M3.6

Sewage/Drainage

7. Oil traps are required on all drains discharging from all new and existing enclosed parking garages. Discharges from garage drains must be directed to a building sewer and not to a building storm drain. The requirements for oil traps are provided in the Commission's Requirements for Site Plans. M3.7

8. Grease traps are required in all new and existing cafeteria or kitchen facilities in accordance with the Commission's Sewer Use Regulations. The proponent is advised to consult with Mr. Richard Fowler, Deputy Superintendent of Field Operations prior to preparing plans for grease traps. M3.8

9. The proponent should note Article V of the Commission's Sewer Use Regulations as it pertains to medical and laboratory facilities. M3.9

10. The Department of Environmental Protection, in cooperation with the Massachusetts Water Resources Authority and its member communities, are implementing a coordinated approach to control flow in the MWRA regional wastewater system, particularly the removal of extraneous clean water (e.g. infiltration/inflow (I/I)) in the system. In this regard, DEP has routinely required proponents proposing to add significant new wastewater flows to assist in the I/I reduction effort to ensure that the additional wastewater flows are offset by the removal of I/I. Currently, DEP is typically using a minimum of 4:1 ratio for I/I removal to new wastewater flow added. The Commission supports the DEP/MWRA policy, and will require the proponent to develop a consistent inflow reduction plan. M3.10

11. The site plan must show in detail how drainage from the new building's roof and from other impervious areas will be managed. Roof runoff and other stormwater runoff must be conveyed separately from sanitary waste at all times. M3.11

12. The proponent must fully investigate methods for retaining stormwater on site before the Commission will consider a request to discharge stormwater to the Commission's system. M3.12

Under no circumstances will stormwater be allowed to discharge to a sanitary sewer. A feasibility assessment for retaining stormwater on site must be submitted with the site plan.

13. In conjunction with the site plan and General Service Application, the proponent will be required to submit a Stormwater Pollution Prevention Plan. The plan must: M3.13

- Identify specific best management measures for controlling erosion and preventing the discharge of sediment, contaminated stormwater or construction debris to the Commission's drainage system when construction is underway. M3.13.1

- Include a site map which shows, at a minimum, existing drainage patterns and areas used for storage or treatment of contaminated soils, groundwater or stormwater, and the location of major control or treatment structures to be utilized during construction. M3.13.2

- Specifically identify how the project will comply with the Department of Environmental Protection's Performance Standards for Stormwater Management both during construction and after construction is complete. M3.13.3

14. The discharge of dewatering drainage to a sanitary sewer is prohibited by the Commission. The proponent is advised that the discharge of any dewatering drainage to the storm drainage system requires a Drainage Discharge Permit from the Commission and an NPDES Permit issued by the Environmental Protection Agency (EPA). M3.14

15. The proponent is advised that a Drainage Discharge Permit is also required for the long-term (permanent) discharge to the drainage of infiltrated groundwater collected via an underdrain system, such as those that are commonly installed in below-grade parking garages. M3.15

16. Developers of projects involving disturbances of land of one acre or more are required to obtain an NPDES General Permit for Construction from the EPA. The proponent is responsible for determining if such a permit is required and for obtaining the permit. If such a permit is required, a copy of the Notice of Intent and any pollution prevention plan prepared pursuant to the permit should be provided to the Commission prior to the commencement of construction. M3.16

17. The Commission requests that the proponent install a permanent casting stating: "Don't Dump: Drains to the Charles River" next to any new catch basin installed as part of this project. The proponent may contact the Commission's Operations Division for information regarding the purchase of the castings. M3.17

Water

18. The Commission utilizes a Fixed Radio Meter Reading System to obtain water meter readings. For new water meters, the Commission will provide a Meter Transmitter Unit (MTU) and connect the device to the meter. For information regarding the installation of MTUs, the proponent should contact the Commission's Meter Installation Department. M3.18

19. The proponent should explore opportunities for implementing water conservation measures in addition to those required by the State Plumbing Code. In particular the proponent should consider outdoor landscaping which requires minimal use of water to maintain. If the proponent plans to install in-ground sprinkler systems, the Commission recommends that timers, soil moisture indicators and rainfall sensors be installed. The use of sensor-operated faucets and toilets in common areas of buildings should also be considered. M3.19

Thank you for the opportunity to comment on this project.

Yours truly,

John P. Sullivan, P.E.
Chief Engineer

JPS/as

cc: J. Walser, BRA
M. Zlody, Boston Env. Dept.
P. Laroque, BWSC
E. Benz, President DFCI
R. Shea Vice President for Facilities Management DFCI

CRWA

Charles River Watershed Association

Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Attn: Sonal Gandhi

May 11, 2006

Dear Ms. Gandhi:

RE: Dana Farber Cancer Institute PNF/ IMP Amendment

Charles River Watershed Association has reviewed the Project Notification Form/ Institutional Master Plan Amendment for the above referenced project. There are several project elements that we believe need further analysis and discussion in the Draft Project Impact Report (DPIR) and should be included in the BRA's Scoping Determination for the IMP Amendment in order to ensure that all environmental impacts have been minimized and mitigated. We hope these comments will assist the BRA and Dana Farber Cancer Institute as the planning process moves forward.

Stormwater Management

It is our understanding that the stormwater from this site drains, via the Boston Water and Sewer Commission's municipal storm drain system, into either the Muddy River conduit and out to the Charles River; or, during larger storm events, into the Muddy River Fens and then out to the Charles River via Charlesgate. In either case, stormwater from the site enters and impacts the Muddy River and its drainage network.

As you are undoubtedly aware, there are significant and long-standing flooding and water quality problems in the Muddy River. The US Army Corps of Engineers is currently in the process of designing a dredging and environmental restoration project for the entire Muddy River that is estimated to cost well over $60 million. The Muddy River Restoration project is needed to reduce significant flood hazards, to improve water quality, to restore degraded habitat, and to remove sediments that have accumulated in the Muddy River. Most of these problems are a direct result of stormwater discharges into the Muddy River.

Any redevelopment that is proposed in areas that drain directly into the Muddy River system, therefore, needs to focus carefully on stormwater management issues, and should maximize opportunities to reduce peak storm flows, minimize imperviousness, maximize infiltration and capture sediments. The significant expenditure that will be made by the federal and state government, as well as by the City of Boston, to dredge and restore the Muddy River must be protected to the maximum extent possible.

The PNF/ IMP Amendment document mentions that the DRIP will evaluate the project impact on the Muddy River but does not make any reference to putting together a stormwater management program to ensure that every effort will been made to protect the River from flooding and water quality impairments. It is our hope that the DPIR will study various alternatives to enhance stormwater management on the site so as to demonstrate how improvements will be made over the existing conditions.

We feel that the Article 80 Project Impact Review is the appropriate process for a full analysis of the stormwater management program. The DPIR should include specific, detailed information and alternatives analyses of stormwater management on the site. Stormwater management should aim to maximize infiltration, slow runoff from the site, maximize the use of vegetation, capture rooftop runoff for irrigation, and minimize sediment and nutrient loading. We suggest that the DPIR include more documentation about the proposed stormwater management program including:

1. Detailed information about the final design of the proposed stormwater management infrastructure including the location and design of drains, catch basins, water quality structures, and infiltration structures;
2. Detailed information about any surface stormwater management features such as swales, vegetative filter strips, rain gardens, permeable pavement or vegetated storage areas;
3. An assessment of the opportunities to reduce even further the peak flows and volume of stormwater runoff, including estimates of the impacts in a one-year storm;
4. An assessment of how the site could meet DEP's stormwater management policy in its entirety, not just "to the maximum extent practicable;"
5. A plan to minimize the primary pollutants of concern for the Muddy River, sediments and nutrients;
6. A maintenance plan for the stormwater management plan.

<u>Groundwater</u>

This project is proposed to have a 7 level underground parking garage and a system of tunnels connecting the adjoining campus buildings. While there are many significant aesthetic benefits to underground parking, there are important environmental issues both during and post- construction that need to be addressed. The location of this project in an area of historic fill, and the ongoing problems throughout many areas of the City with groundwater levels, make it all the more important that this aspect of the project be designed with the utmost care and in anticipation of any potential impacts.

The project needs to be designed to minimize groundwater impacts from the project, and the proponent should commit to working closely with abutters and the Boston Groundwater Trust to ensure that there are no alterations to groundwater levels as a result of the project. Since the LMA in on the border of the City's "Groundwater Overlay District", similar recharge standards need to be applied to all redevelopment projects within the LMA. Investigations should also include the potential seasonal changes in groundwater levels, as well as potential effects on groundwater flow. In some areas of Boston, construction of sub-surface projects such as tunnels, underpasses and even some building foundations have altered groundwater flow patterns, resulting over time in changes to ambient groundwater levels. Groundwater flows are extremely slow so alterations may occur over years.

The DPIR and the Scoping Determination for the IMP Amendment should include an assessment of groundwater flow directions, as well as a determination of whether those directional flows change seasonally. If the project shows any potential for altering flows, either slowing or reducing flows into the Muddy River, or conversely reducing flows back into the ground during periods of high groundwater, or causing any groundwater "mounding," the DPIR should document a mitigation plan for any such alterations. In addition, the DPIR should specify what source of water would be used should groundwater recharging be necessary during or after construction.

Given that the parking structure will underlay much of the project, opportunities for on-site infiltration of stormwater may be minimal. If so, the DPIR should evaluate the possibility of seeking off-site locations for groundwater recharge and stormwater infiltration. Finally, a detailed plan for the treatment and disposal of water from dewatering activities should be included in the DPIR.

Impacts to the Emerald Necklace

The project will increase not only the vehicular traffic in the area, but also the number of pedestrians, and will likely increase the use of the Emerald Necklace Parks, including the Fenway. This park system is already heavily used, and is in need of significant capital and operations improvements.

We suggest that Dana Farber Cancer Institute work with the BRA, the Boston Park and Recreation Commission, the Medical Academic and Scientific Community Organization (MASCO), the Fenway Alliance, and the Emerald Necklace Conservancy to develop a program to support the improvement of maintenance and management of the park system to mitigate this increased use and to provide support for the community-wide effort that is underway to bring this park system up to an acceptable community standard. This contribution could be made as a linkage payment (as a part of the public benefits package) or through the implementation of a specific capital improvement project for improving access to and maintenance of the park or for environmental restoration projects in the LMA as a whole.

Sustainable Site and Building Design

While there is some discussion on measures for energy conservation and sustainable design in the PNF and IMP Amendment document, there are no specifics provided on what kinds of best management practices and technologies will be incorporated at the building, the individual site and the overall campus level. The Scoping Determination for the IMP Amendment and the DPIR need to explicitly define what the project aims to achieve in terms of standards for environmental sustainability on the three levels mention above as well as how the project will determine indicators for sustainability. While the LEED system provides one metrics for incorporating green building standards and requirements, if the proponent feels that given the programmatic constraints of the building LEED might not be an appropriate system to follow, the Green Guide for Health Care might provide a more suitable framework.

In addition to fulfilling requirements related to stormwater management on site, the green building standards should be adopted for wastewater reuse for flushing toilets etc. (through double plumbing the building) as well as capturing, filtering and storing roof run-off. CRWA would encourage the proponents to consider a green roof for not only the new 454 Brookline Ave. building but also as a retrofit for all other buildings on its campus. Given that there is such a dearth of green / open space in the LMA as a whole, green roofs would not only provide cleaner roof runoff and reduce the urban heat island effect in the LMA but also provide an aesthetically pleasing amenity for the building occupants as well as habitat for birds and insects.

This project offers a huge potential to expand the purview of green practices from individual building scale to looking a "greening of infrastructure" at an overall neighborhood level. Through retrofitting the entire campus area with Low Impact Development (LID) best management practices, the proponent can achieve a much larger impact than the cumulative impact of a collection of individual green buildings.

We appreciate the opportunity to provide comment on this project through the Article 80 review process. Please feel free to contact me should you have any questions.

Sincerely,

Pallavi Kalia Mande

Pallavi Kalia Mande
Urban Restoration Specialist

cc: Dana Farber Cancer Institute
Medical Academic and Scientific Community Organization
Boston Parks and Recreation Department
Boston Groundwater Trust

CRWA
Charles River Watershed Association

Stephen R. Pritchard, Secretary
Executive Office of Environmental Affairs
MEPA Unit
251 Causeway Street, Suite 900
Boston, MA 02114

Attn: Deirdre Buckley

Re: Environmental Notification Form (ENF), Dana-Farber Cancer Institute, EOEA # 13776

Dear Secretary Pritchard:

Charles River Watershed Association has reviewed the ENF for the above referenced project and we provide these comments for your consideration through the MEPA program.

As you know, this project is also undergoing review by the Boston Redevelopment Authority under the Article 80 review process, and will require the preparation of both a Development Impact Project Plan and an amendment to the Institutional Master Plan (IMP). Since there will be significant refinement of project design as these processes evolve, and there are several important environmental issues that have not been adequately addressed in the ENF, **we suggest that you require the completion of an Environmental Impact Report for this project.** M4.1

Our comments are focused on environmental issues that have been addressed in only a limited way in the ENF, but are of significant importance to Executive Office of Environmental Affairs and the neighboring communities around the proposed development: the project's potential impacts to the Emerald necklace and the Muddy River; and water resource management. M4.2

<u>Project Context</u>

The location of the site for the proposed development, in the Longwood Medical and Academic Area (LMA), is one of the most rapidly changing areas of the City of Boston, and indeed in the entire region. In the past several years, numerous redevelopment projects have been completed, or are under construction or in the review phase. The expanded development in the LMA is leading to numerous cumulative environmental strains that are poorly addressed by site-specific planning and design review processes. Assessing M4.3 cumulative impacts, and identifying appropriate mitigation, is an important function of the MEPA review process.

The proposed development is indeed on a parcel that is "under-utilized," and we recognize M4.4 the proposed redevelopment as an opportunity to provide benefits to DFCI, to the economic development of the area, and to the local environment, which has been heavily impacted by urban development. However, there has not to date been enough examination of the opportunities for reducing project impacts, and mitigating remaining impacts.

<u>Impacts to the Emerald Necklace</u>
The LMA is surrounded on three sides by the Muddy River and its park and parkway system, known as the Emerald Necklace. Designed by Frederick Law Olmsted, this historic park system provides much needed open space in an area of the City that is generally underserved by public open space. The Riverway section of the Emerald Necklace is in effect the front garden of the LMA, and is steps away from the proposed development site. Most workers and visitors to the LMA arrive by traveling along or through the park system, which greatly enhances the LMA and provides relief from the high density, hardscape environment.

The project will increase not only the vehicular traffic in the area, but also the number of pedestrians, and will increase the use of the Emerald Necklace Parks, including the Riverway and Fenway. This park system is already heavily used, and is in need of significant capital and operations improvements. M4.5 The EIR should include an analysis of project impacts to the Emerald necklace, including parkways, and a proposed mitigation plan to ensure that park system does not deteriorate further with ever increasing use.

<u>Stormwater Management</u>
Stormwater drainage from the site flows, via the Boston Water and Sewer Commission's M4.6 municipal storm drain system, into the Muddy River, contributing to the impairments of this tributary to the Charles River. Restoration of the Muddy River is a priority for many stakeholders, including the Executive Office of Environmental Affairs, and major efforts at the local, state and federal level are underway to implement the Muddy River Restoration Project.

The successful restoration of the Muddy River cannot be done solely with end-of-pipe approaches, however. Source controls are needed throughout the Muddy River watershed, and redevelopment provides the best opportunity to implement better stormwater management. The ENF provides little analysis of stormwater volumes and quality; M4.7 presents no alternatives analysis for approaches to managing stormwater runoff; and presents a recommended plan that adopts almost none of the available technologies and techniques for urban stormwater management.

We strongly urge you to require an assessment of the opportunities for improved M4.8 stormwater management, with an emphasis on examining opportunities for recharge, green roof technologies, and other methods to improve water quality and, especially important, reduce the volume of runoff to the Muddy river. Specifically, we suggest:

1 Detailed information about the final design of the proposed stormwater management infrastructure including the location and design of drains, catch basins, water quality structures, and infiltration structures; M4.8.1
2 Detailed information about any surface stormwater management features such as green roof technology, stormwater planters, rain gardens, permeable pavement or vegetated storage areas; M4.8.2
3 An assessment of the opportunities to reduce even further the peak flows and volume of stormwater runoff, including estimates of the impacts in a one-year storm; M4.8.3
4 An assessment of how the site could meet DEP's stormwater management policy in its entirety, not just "to the maximum extent practicable;" M4.8.4
5 A plan to minimize the primary pollutants of concern for the Muddy River, sediments and nutrients; M4.8.5
6 A maintenance plan for the stormwater management plan. M4.8.6

<u>Groundwater</u>

This project is proposed to have a 7 level underground parking garage and a system of tunnels connecting the adjoining campus buildings. While there are many significant aesthetic benefits to underground parking, there are important environmental issues both during and post- construction that need to be addressed. The location of this project in an area of historic fill, and the ongoing problems throughout many areas of the City with groundwater levels, make it all the more important that this aspect of the project be designed with the utmost care and in anticipation of any potential impacts. M4.9

The EIR should include a thorough analysis of the potential impacts to groundwater, both during and after construction of this project. This effort should be coordinated closely with the Boston Groundwater Trust to ensure that there are no alterations to groundwater levels as a result of the project. The LMA is on the border of the City's "Groundwater Overlay District," and groundwater remains a potential source of baseflows to the Muddy River, so any changes to groundwater patterns in the area need careful review and planning. Investigations should include potential seasonal changes in groundwater levels, as well as potential effects on groundwater flow. In some areas of Boston, construction of sub-surface projects such as tunnels, underpasses and even some building foundations have altered groundwater flow patterns, resulting over time in changes to ambient groundwater levels. Groundwater flows are extremely slow so alterations may occur over years. M4.10

If the analysis shows there is potential for altering flows, either slowing or reducing flows into the Muddy River, or conversely reducing flows back into the ground during periods of high groundwater, or causing any groundwater "mounding," the EIR should document a mitigation plan for any such alterations. In addition, the EIR should specify what source of water would be used should groundwater recharging be necessary during or after construction. M4.11 M4.12

Given that the parking structure will underlay much of the project, opportunities for on-site infiltration of stormwater may be minimal. If so, the EIR should evaluate the possibility of seeking off-site locations for groundwater recharge and stormwater infiltration. Finally, a detailed plan for the treatment and disposal of water from dewatering activities should be included in the EIR. M4.13 M4.14

We appreciate the opportunity to provide comment on this project through the MEPA review process. Please feel free to contact me should you have any questions.

Sincerely,

Pallavi Kalia Mande

Pallavi Kalia Mande
Urban Restoration Specialist

cc: Dana Farber Cancer Institute
Medical Academic and Scientific Community Organization
Boston Parks and Recreation Department
Boston Groundwater Trust

Buckley, Deirdre (ENV)

From: DPultinasboston@aol.com
Sent: Monday, May 15, 2006 8:39 PM
To: Buckley, Deirdre (ENV)
Subject: MEPA #13776
Attachments: Dana Farber ENF comments.doc

81 Lawn Street
Roxbury, Ma. 02120
May 15,2006

Deirdre Buckley, Analyst
MEPA Office, Suite 900
EOEA
100 Cambridge Street
Boston 02114

Re: MEPA # 13776, Dana- Farber Cancer Institute ENF

Dear Ms. Buckley,

My comments on the submitted project are primarily focused on the transportation impacts; over 6,000 estimated vehicle trips are not trivial. According to recent data Mission Hill has one of the highest asthma rates in the state. M5.1 Proximity of the site to the Muddy River and Olmsted Park is also critical given the potential storm water runoff impacts. With new construction there is the opportunity to improve conditions for ground water recharge; 100% impervious is not satisfactory. M5.2

More than 12 years have passed since the previous IMP, what is expired cannot be "revived"; a new Master Plan should be required. Expecting that this "amendment" to a document submitted in 1993 can substitute for a full IMP is wishful thinking. According to the PNF submitted to the BRA, the last annual update was submitted in July 1998, nearly 8 years ago. The mandated public review process for thoughtful planning for growth shouldn't be sidestepped. M5.3

In 1993, the City's Environment Dept. strongly encouraged DFCI to aim for at least a 10 % employee walking/cycling mode share and recommended no more than one net new parking space per 3000 square feet of new building space - a much stronger stance than the "Interim Guidelines" maximum .75 per 1000 gsf. If the goal in fact is for LMA institutions to achieve a .75 ratio campus wide, then the city must be vigilant to restrict new parking to an even lower ratio. Otherwise, the predicted future conditions inevitably surpass the target [for example, BWH- .95, DFCI- .90, and that is only after the Dana Building parking is vacated]. M5.4

A critical Master Plan requirement is a timetable for proposed projects that includes the estimated month and year of construction start and expected completion for each project. M5.5 The description of phasing, page 3-3, " DFCI plans to consolidate main campus parking in the new building by closing the Dana building garage...within the terms of this amended IMP, but sometime after the completion and occupancy of 450 Brookline " is shamelessly vague. If the Dana Building infill project (pages 1-5 and 1-6), is projected to begin 5-7 years after the Center for Cancer Care is completed (expected date 2011); the 213 spaces will not be taken out of service until 2016 at the earliest.

#1 concern- new LMA parking facilities - combined impacts from each new development contribute significantly to traffic congestion, each proposal can't be looked at in isolation. M5.6 Garage queues and drop off driveway queues must be kept off the street because of impact on roadway operations specifically the bus service on Brookline Avenue..

Do the "Interim Guidelines" trump previous strategies to limit excess parking? Is the "restricted parking" district zoning effective? M5.7 More information should be provided on the request for conditional zoning approvals - the significance of "restricted parking district" and requirement that accessory uses cannot occupy more than 25 % of parcel 2.

Parking supply- despite the general obfuscation, the facts indicate an excessive number of new spaces although lack of information makes it nearly impossible to evaluate. For example, what is the ratio of new M5.7.1 parking and expected new employees at 450 Brookline? Does the inventory include spaces leased to others (BWH parking in Smith garage)?

Where is the information on parking demand and expected users- employee or outpatient? Employee mode splits should be detailed and expected demand described for peak periods and all work shifts, what M5.8 are the goals for carpool share? What are the existing percentage shares for each mode? Employees M5.9 arriving by automobile at the Crosstown Garage or Longwood Towers for example, should not be counted as walk/ transit, all traffic entering the urban core is relevant because of air quality impacts. Staff mode M5.10 shares should be compared to other LMA institutions. Have the goals of the 1994 TAPA been achieved? Data from the required monitoring reports submitted to BTD on the efforts to achieve the "Commuter M5.11 Mobility Objectives"- 45% or fewer employees in SOVs, should be included in the IMP.

The new facility will add 425 spaces to the existing 814 on campus. How many of these are designated for employees and how many for patients and visitors? According to the tables on page 4-8, of the current M5.12 814 on campus, 474 are for staff and 340 for patients. The IMP should describe the actual parking supply for each year of the Master Plan; approvals shouldn't be based on "potential" scenarios (page 4-10). M5.13

Parking rates should be structured to encourage short-term patient/visitor (less than 3 hrs) over long term parking, priority must be directed towards convenient patient parking. Could patients and visitors as well M5.14 as staff utilize the DFCI shuttles from Brookline Place? The 30-minute frequency is comparable to the public bus schedules. 950 employees purchase T passes, is there campus specific data (South, North, LMA or other) and what are the total #s of employees; how many are Boston residents? The PNF indicated that T passes are subsidized at 40%, however the ENF mentions 50%, which is correct? M5.15

Other concerns include the impacts on ground water, shadows on nearby open space and historic resources and the relationship between the new construction and the MATEP facility (whether the air M5.16 quality at street level will change). Another question - wouldn't the demolition of two buildings (c.1957 and 1916) trigger solid waste and possibly hazardous debris if there is asbestos on site? The ENF does not M5.17 indicate a request for state permits related to the demolitions.

Sincerely,
Alison Pultinas

cc: City Councilor Felix Arroyo
City Councilor Stephen Murphy
City Councilor Sam Yoon

May 16, 2006

Stephen R. Pritchard, Secretary of Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
Attention: Deirdre Buckley, MEPA Office

Mark Maloney, Director
Boston Redevelopment Authority
Boston City Hall, Room 925
Boston, MA 02201
Attention: Sonal Gandhi

Re: Dana-Farber Cancer Institute, 450 Brookline Avenue
Environmental Notification Form & Project Notification Form/Institutional Master Plan Amendment
EOEA #13776

Dear Secretary Pritchard and Director Maloney:

The City of Boston Environment Department has reviewed the Environmental Notification Form (ENF) & Project Notification Form/Institutional Master Plan Amendment (PNF/IMP Amendment) and offers the following comments.

PROJECT

The proponent, Dana-Farber Cancer Institute (Dana-Farber), proposes to construct seven levels of below-grade parking for 455 vehicles beneath a 13-story, 185 foot-no less than 250 foot (plus mechanical penthouse) building on two adjacent parcels at Brookline Avenue and Jimmy Fund Way in the Longwood Medical and Academic Area (LMA). The project does not meet zoning requirements for height, floor area ratio (FAR), yard dimension requirements and the number of loading bays. Dana-Farber expects that relief for these and other project elements will not be necessary as it plans to file and have approved an IMP Amendment. Project uses will be clinical and clinical research space, patient services, administration and retail.

The project site is presently occupied by a 30-space surface parking lot and two buildings that will be demolished. The proposed building will be connected to the existing Smith Research Laboratories Building on what is described as most floors. Dana-Farber also plans to make a connection via a tunnel under Jimmy Fund Way to the Dana Building. Dana-Farber's buildings are already connected by elevated walkways to Children's Hospital.

Loading and receiving facilities at the Smith Building may be expanded, floors one to three reconfigured to integrate with new construction and most other levels modified to connect with new construction.

Dana-Farber is considering as mitigation over a five-to-seven year time frame:

- widening sidewalks on Jimmy Fund Way;
- infilling some vehicular drop-offs to provide bicycle parking and other, unspecified uses;
- improving the façade of floors one through three of the Dana Building;
- installing graphic panels, banners and lighting on Jimmy Fund Way;
- improving the sidewalk at the Smith Building to buffer pedestrians from loading activities;
- enhancing exterior seating at the Jimmy Fund Building and improving the screening of mechanical equipment and oxygen tanks; and
- making lighting and pavement improvements at pedestrian passageways between Dana-Farber, the Longwood Galleria and Medical Area Total Energy Plant (MATEP).

The project will comply with the state Energy Code and mechanical and HVAC systems will be industry standards. Energy- and water-conserving features and other sustainable systems and materials will be used where possible.

Dana-Farber's operational solid waste recycling program covers water paper, cardboard, glass bottles and similar materials, wood pallets, plastic waste, batteries, foam containers, computers, monitors and cell phones.

Historic resources, those listed on the State and National Registers of Historic Places, those determined eligible for listing and those on the Massachusetts Historical Commission's (MHC) *Inventory of Historic and Archaeological Assets of the Commonwealth* within 1/8 of a mile of the project are listed in the PNF/IMP Amendment.

Upon completion of the project, Dana-Farber will control about 1,666 off-street parking spaces (212 net new), a ratio of .94 per 1,000 square feet (SF) of building floor area.

The site is in a restricted parking district and zoning relief will be required. The parking garage for the subject project will be continuous with the Smith Building parking garage. The project will add 848 vehicle trips per day for a total of 3,144 generated by Dana-Farber.

Dan-Farber belongs to CommuteWorks and provides as part of a Transportation Demand Management (TDM) program:

- the posting and distribution of transportation information through employee newsletters, information kiosks, websites, e-mails and special, promotional events;
- a 40 percent (PNF/IMP Amendment) or 50 percent (ENF) transit subsidy up to a $100/month maximum, paid on a pre-tax basis, for the 950 of 3,267 employees who regularly purchase transit passes;
- ridematching;
- a guaranteed ride home;
- Pool-Aide;
- preferential parking in nearby garages for carpools of three or more persons;
- guaranteed parking in more distant lots for carpools of two persons;
- Commute Fit;
- sheltered bicycle racks;
- shower and lockers;
- on-campus parking rates of $76.15 per week ($15.23/day for a five day week); and
- off-campus parking rates of $24.23 per week ($4.85/day for a five day week).

Dana-Farber has an informal policy of allowing telecommuting and working a compressed work week.

A Construction Management Plan (CMP) will include outlining all measures to mitigate short-term construction air quality impacts.

Construction workers will be encouraged to take transit; contractors will be required to devise access plans.

The ENF indicates that construction is expected to commence in 2006 and be complete in 2011.

<u>INSTITUTIONAL MASTER PLAN AMENDMENT</u>

Dana-Farber's most recent IMP, for the years 1993-2001, went into effect on April 8, 1994. It expired five years ago. Dana-Farber is now seeking approval for what it identifies as an Amendment.

Since 1994, Dana-Farber has constructed the Smith Building and purchased 454 Brookline Avenue and the Shields Warren Building. Exterior connections with other medical institutions and clinical and research arrangements with those institutions have been part of Dana-Farber's expansion.

Dana-Farber owns and occupies seven buildings and leases space at 375 Longwood Ave. and the Longwood Galleria in the LMA. Additional space is leased in the West Fenway/Kenmore area, Brookline Village, MIT, Harvard Medical School and Harvard Institutes of Medicine. It plans to lease space at the Center for Life Sciences and, in 2007, at the Marine Industrial Park (MIP).

Upon completion of new construction, Dana-Farber will relocate the entrance of the Dana Building to Jimmy Fund Way, reconfigure the Dana Building lobby and vehicular drop-off, renovate parking levels two and three of the Dana Building for non-parking uses, renovations and relocations of uses within the Dana and Mayer buildings.

Future projects may include:

- a bridge connecting the Smith and Amory Buildings at their third levels;
- replacement of the Jimmy Fund Building;
- connecting the Dana Building and Children's Hospital on their third levels.

Likely future uses are retail, restaurant, service, education and general and professional office uses.

Of the 1,454 off-street parking spaces currently controlled by Dana-Farber, 1,114 spaces are for staff and 340 for patients and visitors. The PNF/IMP Amendment states that the parking ratio will be .74 for 1,000 gross square feet of development after the future projects are complete.

RESPONSE

Dana-Farber's most recent IMP was approved 12 years ago and expired in 2001. As Dana-Farber is similar in relevant characteristics to other LMA institutions, it would not seem to meet the criteria for exemption. In addition, the IMP Amendment does not demonstrate eligibility for the 205 foot height based upon exceptional public benefits as compared to like institutions in the LMA. The benefits exceeding those of other LMA institutions should be described.

A full IMP, not an Amendment or "revival," should be required as a matter of course and is particularly important in this dense area with ever-expanding uses and extreme traffic congestion. An IMP should be used to inform both the public and the planning study for the LMA that is presently on hiatus.

Much of the PNF/IMP Amendment focuses on the proposed project, giving limited attention to the scope of IMP issues. A standard IMP would include a broad plan for uses, transportation, and environmental protection during an IMP term.

An IMP should identify:

- the present number of full-time employees in all categories - staff, researches, physicians, etc. Numbers should no be reported full-time equivalents (FTE). FTE is not a useful measure as it fails to provide actual employee numbers within worker categories (full-time, part-time, contract and *per diem*) and by facility and prevents an accurate picture of present and predicted employee vehicle trips and mode splits.
- the present number of part-time employees;
- the present number of contract employees;
- the number of *per diem* employees;
- the expected increase in each category for the term of the new IMP;
- the number of employees presently working on-campus and the number working off-campus;

- the square footage and use of new off-campus space that will be occupied in the Center for Life Sciences, the MIP and other off-campus areas during the term of the IMP;
- the current annual number of visitors;
- the number of visitors expected for each year during the term of the IMP;
- the number of employees who carpool/vanpool;
- the number of carpool/vanpool vehicles that receive preferential parking;
- the mode splits for each category of employee;
- the number of on- and off-campus bicycle racks, their capacities and locations;
- vehicle occupancy rates for employees who drive to work;
- the eligibility criteria for transit pass subsidies and other TDM measures;
- the level of subsidy represented by the parking rates charged for on- and off-campus parking based upon the $4.85/day off-campus rate and $15.23/day on-campus rate; and
- all additional information gathered by the Dana-Farber and/or MASCO through surveys of other means regarding the commuting habits of employees.

The IMP should specifically discuss why 76.5 percent of parking spaces are devoted to employees, why only 29 percent of employees use transit on a regular basis and propose a plan to decrease employee vehicle use and increase transit and high-occupancy vehicle commuting. We ask that Dana-Farber add to a TDM plan payroll deduction for the purchase of bicycles and accessories, the formalization of a Flextime and Telecommuting program and the initiation of Zipcar's Z2B program so that employee workday vehicle trips do not require that an employee commute in a car.

The DPIR identify a time-line for parking space removal.

We agree that the proposed project presents many opportunities to include sustainable elements in the design. This department has been impressed with the perspective and recommendations of Green Guide for Health Care™ (http://www.gghc.org). As GGHC notes on it's Web site, "Healthcare facilities present both a challenge and opportunity in the development and implementation of sustainable design, construction and operations practices. Issues such as 24/7 operations, energy and water use intensity, chemical use, infection control requirements and formidable regulatory requirements can pose significant obstacles to the implementation of currently accepted sustainability protocols. Furthermore, it is appropriate that guidelines customized for the healthcare sector reflect the fundamental organizational mission to protect and enhance individual and community health, and acknowledge the intrinsic relationship between the built environment and ecological health. As the healthcare sector develops a design language for high performance healing environments, it has the opportunity to highlight the associated health-based benefits. This in turn can inspire the broader adoption of health based design principles in other building sectors."

An example of a sustainable element would be a planted or "green" roofing systems. Such a system would reduce heat gain on buildings, lower cooling costs, extend the life of roofing membranes by blocking UV rays, provide added thermal and noise insulation, slow stormwater runoff and can be aesthetically pleasing. This department recommends investigating how the use of green roof systems can benefit the project. Information about green roofs and about the conference can be obtained from www.greenroofs.org or from this office.

The DPIR should identify and describe any hazardous waste conditions at the site.

A discrete section highlighting the sustainability commitments Dana-Farber has made for the project and under the IMP should be provided.

An Environmental Protection Plan would address both construction and operating periods that includes open space protection and maintenance; stormwater quality and management; erosion and sedimentation control plans; air quality protection; solid waste management; infrastructure systems; a pedestrian circulation analysis including at-grade circulation; view corridor analyses (significant for Dana-Farber's plans given the planned number of pedestrian bridges), and urban design guidelines.

This department commends Dana-Farber on its comprehensive solid waste recycling plan.

Exterior lighting should meet safety needs while not contributing to light pollution. Fixtures should be shielded and downward directed. We recommend as a resource, the Campaign for Dark Skies and their "Solutions and Problems: Good and bad lighting" information which can be accessed at 'http://www.star.le.ac.uk/~dbl/cfds/goodvbad.htm?60'.

We ask that "No Idling" signage be posted in parking garages, drop-off/pick-up areas and loading areas and that CO meters in parking garages be direct-read with audible and visual alarms.

Stormwater is a primary contributor to the condition of receiving water bodies. The Boston Water and Sewer Commission (BWSC) spends an average of $630,000.00 annually removing materials from catch basins. This cost does not include labor and general operating and maintenance costs. We ask that the proponent help to educate the public and further improve the water quality of local water bodies by agreeing to the permanent installation of plaques that bear the warning, "Don't Dump - Drains to Charles River." The plaques are designed for installation at any new catch basins or at stormdrains around which work will be done during construction. Information on obtaining the plaques is available from the Operations Division at the BWSC (617-989-7000). We ask for a commitment to installation for the project under review and for all projects that follow during the IMP term.

Staff of the Boston Landmarks Commission agrees that the project building will have little effect on the identified historic resources. It is, however, customary to provide a list and map of resources within ¼ mile of the project site. The DPIR and IMP should provide in discrete sections an expanded list and map using the *Inventory of Historic and Archaeological Assets of the Commonwealth* to identify and map historic and archaeological resources within ¼ mile of the campus. The IMP should identify the potential effects on resources that may result from proposed projects.

Missing from PNF/IMP Amendment Table 1.5, Anticipated Permits, is the filing of an application with the Boston Landmarks Commission (BLC) pursuant to Article 85 of the Boston Zoning Code (Demolition Delay). The demolition of the existing structures at 450 Brookline Avenue will require Article 85 review. For questions concerning the Article 85 application process please contact Richard Cecconi, Staff Architect, at 617-635-3850.

The number of levels that will connect with the Smith Building is described as "most." We ask that the specific number be identified.

The DPIR should include wind and shadow studies to determine this building's impact on the pedestrian environment and open spaces. Shadow studies should be conducted for the standard four dates per year as limiting a study to one day per year does not provide adequate information for an appropriate review. Shadow diagrams should include a north arrow; street names; the identification of doorways, bus stops, open space and areas where pedestrians are likely to congregate; clear delineation of shadow on both rooftops and facades; clear distinctions between existing shadow and new shadow. High contrast colors and highlighted areas of overlap are most helpful. Figures depicting no build and build wind monitoring locations should be of a scale consistent with that used for shadow diagrams so that the cumulative effect of wind and shadow can be determined.

BLC staff agrees with BRA Urban Design staff that projects in the City should be constructed with traditional building materials and techniques rather than synthetic composite materials. Simulated materials such as exterior insulated finish systems (EIFS), and glass fiber reinforced concrete (GFRC) are inconsistent with Boston architecture and are unlikely to withstand decades of the City's freeze-and-thaw climate.

The BLC requests that dated cornerstones be incorporated into all new construction. This element will allow those who are attentive to and value the architecture of the City to appreciate the historical context in which structures were conceived.

City of Boston Code Ordinance 16-26.4 allows construction from 7:00 a.m. to 6:00 p.m., Monday through Friday unless a permit, issued on a week-by-week basis, is granted by the City of Boston Inspectional Services Department (ISD). This department receives frequent complaints about noise generated at construction sites before 7:00 a.m. Complaints show that contractors often allow workers on site before that time. Noise is frequently related to the run-up of diesel equipment and the preparation and movement of tools and materials. No sound-generating activity is allowed to occur at the site prior to 7:00 a.m.

Construction-period noise subject to regulation by the Boston Air Pollution Control Commission (APCC), part of this department. The proponent must ensure compliance with the construction-related limits as outlined in the Regulations for the Control of Noise in the City of Boston.

If chemical cleaning or abrasive blasting will be a part of renovation or other projects executed during the IMP term, a permit must first be obtained from the Boston Air Pollution Control Commission (APCC), located in this office.

Regular vacuum cleaning of streets and sidewalks in the project area should be employed to ensure that they remain free streets of dust and debris..

For the recycling of demolition waste and construction debris (for the current and future projects) we recommend talking with Mark Lennon of The Institution Recycling Network (IRN) at 1-866-229-1962. IRN can divert up to 95 percent of waste from a job site with the exception materials classified as hazardous. They have identified end markets for:

- furniture and furnishings;
- formed concrete, including rebar;
- brick and block;
- asphalt pavement;
- dimensional lumber and plywood;
- engineered wood products;
- treated wood;
- ceramics (sinks, toilets);
- mixed construction debris;
- ferrous scrap;
- non-ferrous scrap;
- gypsum wallboard;
- commercial (membrane), metal and slate roofing material;
- asphalt roof shingles;
- wood and metal doors and windows; and
- universal waste (batteries, fluorescent lamps, ballasts).

Construction vehicles are a substantial source of air pollutants. According to the Massachusetts Department of Environmental Protection (DEP), they contribute about 33 percent of mobile source particulate matter (PM) and ten percent of all nitrogen oxide (NO_x) pollution in the northeast. More than 90 percent of diesel engine particulate emissions are highly respirable and carry toxins deep into the lung, exacerbating human respiratory ailments.

The DEP's Clean Air Construction Initiative (CACI) is designed to reduce air quality degradation caused by emissions of carbon monoxide (CO), volatile organic compounds (VOC), NO_x and air toxins from heavy-duty, diesel-powered construction equipment. Oxidation catalysts and catalyzed particulate filters reduce toxic emissions of formaldehyde, benzene, acrolein and 1-3 butadiene by as much as 70 percent. The CACI offers contractors a cost-effective way to decrease localized adverse impacts and reduce dust and odor complaints from project abutters and regulatory agencies. Experience with a pilot project that retrofitted 83 pieces of equipment working on the Central

Artery/Tunnel (CA/T) project showed that:

- Vehicles did not experience significant power loss.
- There are no additional operation and maintenance (O & M) or fuel costs.
- Engine manufacturers continue to honor vehicle warranties.

More information on the CACI can be obtained from Steven G. Lipman, P.E. of DEP at 617-292-5698.

In addition, we urge the proponent to require that contractors use low-sulfur diesel fuel (500 ppm) in off-road construction equipment.

The City of Boston's is seeking to minimize the number of motor vehicles that enter Boston each day, currently 600,000, and to protect parking city residents. Encouraging construction workers not to drive to work does not result in the desired outcome. As part of this effort, we request that a comprehensive Transportation Demand Management (TDM) plan be established for all construction workers. Such a plan should include:

- Providing secure, on-site storage so that workers do not have to transport tools and equipment each day.
- Offering pre-tax payroll deduction for Massachusetts Bay Transportation Authority (MBTA) transit pass purchase.
- Providing a ride-matching service.
- Posting transit schedules in a prominent area.

Thank you for the opportunity to offer comment. We look forward to a DPIR and IMP.

Sincerely,

Bryan Glascock
Director

DanaFarber2006.doc.DBG:MTZ.mtz/0605050607

Responses to Comments

IMPNF Response to Comments

#	Letter	Comment	Response
1.1	BRA	In preparing its IMP and Draft Project Impact Report ("DPIR), the DFCI will need not only to demonstrate an understanding of its future facilities needs but also the context of its campus; identification of all owned, leased and planned space, land uses, physical characteristics, planned changes, resident desires, and applicable public policy.	**DFCI's IMP and DPIR/DEIR provide a complete summary of these requested items.**
1.1.1	BRA	The BRA also seeks to enhance DFCI's presence in the City of Boston as an important economic development entity and employer. Care should be taken to respond to the concerns outlined below:	**See Response to Comments 1.2, 1.3 and 1.4.**
1.2	BRA	1. The LMA is a dense institutional environment. However, institutions located in the LMA will continue to need to grow if they are to remain an important and healthy sector of the Boston economy. It is important to the City that this growth be accommodated in sustainable ways to lessen the cumulative effects of development and to allow the LMA to remain a viable and accessible center for medial care and education. The LMA has reached a point in its history where transportation infrastructure sewing the area is challenged with respect to accommodeting additional growth. The BRA seeks to understand the long-ten plans of institutions in the LMA, so that necessary growth by institutions can be allowed on a fair and equitable basis. Therefore, the BRA requires 10 year IMPS of all institutions. Institutions will be required to provide updates to the BRA on the status of their IMP and any projects and commitments therein every 2 years on the anniversary of their approval by the Boston Zoning Commission.	**DFCI agrees with the City's concerns as described. DFCI respectfully submits this IMP and Draft PIR to the BRA and commits to developing and submitting an update every 2 years on the anniversary of their approval by the Boston Zoning Commission.**
1.3	BRA	2. Attractive residential neighborhoods are viewed by the BRA as being vital to the long-term success of Boston. The LMA sits within the context of the Fenway and Mission Hill neighborhood. Impacts from institutional project construction, operations and expansion must have minimal negative impacts on the neighborhoods and the DFCI should take appropriate steps to ensure this.	**DFCI's submission complies with the BRA's requirements as set forth in Comment 1.5. Efforts have been made to reduce growth in the LMA by relocating many services outside the area, most notably to 27 Drydock**
1.4	BRA	3. The Mayor has appointed a Task Force to assist and advise the BRA on the DFCI's IMP and Proposed Project. The DFCI is requested to provide 2 year regular updates to Task Force members in addition to the BRA.	**DFCI is committed to developing and submitting an update every 2 years on the anniversary of their approval by the Boston Zoning Commission.**
1.5	BRA	The DFCI's IMP should be documented in a report of appropriate dimensions and in presentation materials which support the full review of the IMP. Twenty five copies of the full IMP should be submitted to the BRA. An additional fifty copies should be available for distribution to the Task Force members, LMA Forum participants, community groups and other interested parties in support of the public review process. The IMP should be a stand-alone document submitted to the BRA. The IMP should reference and/or include information from the Draft Project Impact Report ("DPIR"), to also be submitted to the BRA in meeting the requirements of Large Project Review for the Proposed Project. The IMP document should include this Scoping Determination and text, maps, plans, and other graphic materials sufficient to clearly communicate the various elements of the IMP.	**DFCI's submission complies with the BRA's requirements as set forth in Comment 1.5.**
1.6	BRA	The IMP should include the following elements:	**DFCI's IMP and DPIR include key elements as required within the BRA's Scoping Determination dated May 30, 2006.**
1.7	BRA	I. DFCI MISSION AND GOALS The mission of the DFCI as it relates to its LMA campus ("Campus") should be described. In this case, Campus refers to the area in or near the LMA where the DFCI occupies or proposes to occupy buildings, whether owned or leased, that are in such proximity that they share a common impact area and therefore should be the subject of the proposed IMP. The description should articulate the larger, as well as local aspects of the mission. Services to the local community are of particular interest. The population served by the DFCI and the major programs conducted need to be described. Changes expected in the type or size of the mission components, particularly as they relate to the Proposed Project, should be highlighted. The longer term goals and the expected growth in the number of be highlighted. The longer term goals and the expected growth in the number of described. A statement of how the IMP will advance the mission and goals of the DFCI should be included.	**DFCI's mission and goals are presented in detail in Chapter 1.0, Introduction and Chapter 3.0, Future Needs of the IMP.**
1.8	BRA	II. PROGRAM NEEDS AND OBJECTIVES Specific program needs and objectives for the Campus to be addressed in the IMP should be defined in sufficient detail. A description of the analysis which was undertaken to identify the needs and objectives should be summarized. Included in the description should be current and future trends that are impacting the DFCI and shaping program objectives. Projection of changes in the patient population, employee population, new or expanded programs, research including National Institute of Health ("NIH") grants, parking, DFCI enterprises and spin-off companies and other activities that require space on the Campus and in and outside of the City of Boston in the next 5 to 10 years should be included.	**DFCI's program needs and objectives are presented in detail in Chapter 1.0, Introduction and Chapter 3.0, Future Needs of the IMP.**
1.9	BRA	A. Compliance with the Longwood Medical and Academic Area Interim Guidelines. The BRA has formulated a set of Interim Guidelines to govern proposed projects in the LMA. These Guidelines have been established to ensure that projects apply good planning principles in the areas of transportation, urban design, and workforce development. They describe the physical character of the LMA and outline mutually beneficial public benefits that can be provided by project proponents to achieve project heights that are greater than those specified in the Guidelines. Development projects within the LMA must demonstrate compliance with guidelines for building height and setbacks, street networks, building character, environmental impacts, and transportation and workforce development. Included in this section should be an outline of how the IMP complies with the Interim Guidelines.	**DFCI's compliance with the LMA Interim Guidelines are presented in detail in Chapter 9.0 of both the IMP and the DPIR/DEIR.**
1.10	BRA	III. PHYSICAL NEEDS AND OBJECTIVES. A. Campus A summary analysis of the Campus should be provided using sufficient text and visual materials. The important physical characteristics and conditions should be mapped and described including buildings, building height and floor area ratio ("FAR"), open space, landscape, pedestrian and vehicular circulation, historic resources, groundwater and other important features. Land use, patterns of use, functional areas, building clusters, landmarks or other historic resources, vistas, open space, view corridors and other environmental features should be delineated and studied. The analysis should identify the existing strengths of the Campus to be enhanced and the need of the Campus to be addressed in the IMP.	**DFCI's existing campus conditions are presented in detail in Chapter 2.0, Existing Campus of the IMP.**

IMPNF Response to Comments

#	Letter	Comment	Response
1.11	BRA	6. Faculties. An inventory and description of the buildings, facilities, and other structures occupied on the Campus and beyond should be provided as required by Section 80D-3.2 of the Code. An updated illustrative Campus plan should be prepared showing the location of each facility. For each building the following information should be provided: total gross floor area, occupancy or use by gross floor area, height in stories and in feet, FAR (for each lot), year built and ownership. Information on parking facilities should include the total number of parking spaces and a breakdown of the number of spaces allocated by used category. Appropriate description of other types of facilities and their use such as infrastructure systems, recreational fields, and places of assembly should be provided.	**DFCI's existing campus conditions are presented in detail in Chapter 2.0, Existing Campus of the IMP.**
1.12	BRA	An analysis of the existing facilities in light of the identified program needs and objectives should be undertaken and documented. Specific facility objectives which are addressed in the IMP should be set out. This section should conclude with a summary of the DFCI's need for additional facilities described by use and floor area projected on an annual basis over the ten-year period of the IMP.	**DFCI's existing campus conditions and future needs are presented in detail in Chapter 2.0, Existing Campus and Chapter 3.0, Future Needs of the IMP.**
1.13	BRA	The immediate area of the Campus around the DFCI should be inventoried, analyzed and summarized in the IMP. The analysis should include land use, building height and FARs, historic resources, open space, student and employee papulation, public facilities and a ten-year projection of future growth.	**DFCI's existing campus conditions and future needs are presented in detail in Chapter 2.0, Existing Campus and Chapter 3.0, Future Needs of the IMP.**
1.14	BRA	The capacity and condition of the infrastructure system that serves the Campus should be documented.	**DFCI's and the surrounding area's infrastructure conditions are presented in detail in Chapter 6.0, Infrastructure of the IMP.**
1.15	BRA	The impact of the DFCI and its proposed expansion on the surrounding area should be discussed. Area residents and businesses should be consulted and their views regarding the IMP should be described. From this analysis, guidelines should be defined that will shape the IMP so that the DFCI will relate positively to the area around it.	**DFCI's existing campus conditions and future needs are presented in detail in Chapter 2.0, Existing Campus and Chapter 3.0, Future Needs of the IMP.**
1.16	BRA	At least one brief alternative concept plan should be prepared and analyzed for the DFCI with particular attention to areas of the campus which interface with adjacent neighborhoods, other institutional access ways, public streets, and historic resources. This analysis should address the question of the amount and types of services and facilities to be located on and off the Campus.	**A discussion of project alternatives is presented in Chapter 3, Project Description of the DPIR/DEIR.**
1.17	BRA	An analysis providing the rationale for locating uses on-site in the LMA should be provided. Alternate off-site locations outside the LMA for uses that are determined not essential to be located in the LMA should be identified and a strategy for moving these uses off-site should be delineated. Elements of the concept plan should include the following: 1. Definition and description of planning objectives; 2. Illustration and description of a campus development plan; 3. Design concepts which are used should be clarified; 4. Articulation of subareas of the Campus based on use, density, and/or physical features; 5. Definition of design principles which will serve as guidelines for the development of the Campus; and 6 Identification of the pedestrian circulation system and its objectives and guidelines. The alternative analysis should lead to an explanation of why the proposed plan as defined in the IMP was chosen.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.18	BRA	A description of all the significant physical changes proposed for the 10 year IMP time period should be provided at the level of definition required by Section 80D- 3.4 of the Code. Included here should be information on the renovation of existing facilities, leased space both on and off the Campus, urban design improvements, and any potential future projects identified in the IMPA.	**DFCI's existing campus conditions and future needs are presented in detail in Chapter 2.0, Existing Campus and Chapter 3.0, Future Needs of the IMP.**
1.19	BRA	For those locations which are to gain zoning rights through the IMP, the information required is defined in Section 80D-3.4 of the Code. The impacts of each proposal on the Campus should be discussed at a level of definition appropriate to the IMP and mindful that large projects shall undergo Article 80 Large Project Review when they are implemented.	**DFCI's existing campus conditions and future needs are presented in detail in Chapter 2.0, Existing Campus and Chapter 3.0, Future Needs of the IMP.**
1.20	BRA	The demolition of any building over 50 years old is subject to the provision of Article 85 of the Zoning Code (Demolition Delay).	**DFCI has complied with Article 85 provisions for its existing 454 Brookline Avenue and Redstone buildings.**
1.21	BRA	1. Buildings: The information required for each new or recycled building project proposed includes the following: (a) site location and approximate building footprint; (b) square feet of total gross floor are and principal subuses; (c) gross floor feet of space that is demolished or occupancy terminated; (d) floor area ration (FAR) for each lot; (e) building height in approximate feet and stories; (f) number of parking spaces; (g) current zoning of site; (h) total project cost; (i) estimated development impact project payments; and (j) estimated month and year of construction start and completion.	**A summary DFCI's proposed projects is presented in Chapter 4.0 of the IMP, Proposed IMP Projects.**
1.22	BRA	2. Campus Improvements: Information required for campus improvement projects include the following: (a) description; (b) location; (c) estimated cost; and (d) estimated month and year of construction start and completion.	**A summary DFCI's proposed projects is presented in Chapter 4.0 of the IMP, Proposed IMP Projects.**
1.23	BRA	3. Campus Expansion: If the DFCI has any expansion proposed through lease or purchase, the following information must be provided for each expansion location: a) location; (b) gross floor area in square feet broken down by uses proposed by DFCI; (c) lease period; (d) current use; (e) current owners; (f) current zoning; (g) current property assessment and property taxes paid to the city; (h) current occupants to be dislocated; (i) description of proposed improvements; (j) estimated cost; and (k) acquisition and improvement schedule.	**A summary DFCI's proposed projects is presented in Chapter 4.0 of the IMP, Proposed IMP Projects.**
1.24	BRA	4. Development Program Context: A series of context drawings should be prepared showing phase-by-phase the proposed developments in their larger surroundings for the Campus, including: (a) building heights map; (b) an open space plan; and (c) an isometric (3-D) drawing showing the general building massing of all buildings in the area.	**A summary DFCI's proposed projects is presented in Chapter 4.0 of the IMP, Proposed IMP Projects.**
1.24.1	BRA	A study model of the larger neighborhood at a scale of In=40'-0 showing the proposed phases in context should be provided.	**DFCI has developed a study area model and has shared this feature several times with the BRA, the Task Force, and at LMA Forum meetings with the surrounding community.**
1.25	BRA	Provide a detailed description of the DFCI's current workforce and project future employment needs concerning the IMP and Proposed Project and any other proposals. There is particular interest in learning about that part of the workforce that is drawn from the adjacent neighborhoods and about programs to recruit, train and promote this population. The scope of the workforce development component of the IMP is included in Appendix 1.	**DFCI's existing campus conditions and future needs are presented in detail in Chapter 2.0, Existing Campus and Chapter 3.0, Future Needs of the IMP.**
1.26	BRA	In the context of the IMP process, the DFCI should meet with the City's Assessing Department to address the concerns expressed in the Assessing Department memo found in Appendix 1.	**DFCI has met with the Assessing Department and will continue to do so to ensure that any questions or concerns that they have in connection with the IMP/DPIR filing are answered.**

IMPNF Response to Comments

#	Letter	Comment	Response
1.27	BRA	The DFCI should identify current and future proposed community benefits as well as any other benefits that minimize or mitigate detrimental end adverse impacts on the local community from the DFCI and the Proposed Project.	**A summary of proposed mitigation to be implemented in connection with the Center for Cancer Care project are presented in Chapter 10.0 of the DPIR/DEIR.**
1.28	BRA	The Project Notification Form thoughtfully and thoroughly addresses the urban design Issues associated with the IMP and Proposed Project and the building design promises to be an important positive contribution to the character of the Dana-Farber campus, Brookline Avenue and the LMA. As the architectural work proceeds the proponents shall consider the following issues.	**Comment noted.**
1.28.1	BRA	1. Existing Campus: The modifications to existing buildings and landscapes indicated in Figures 1-7 and 1-8 indicate a substantial improvement in the appearance and functioning of the campus. The proponents shall include in the Project Impact Reports more specificity ebout the Jimmy Fund Way and Binney Street elevations of the Dana Building and a more detailed site plan showing the proposed street level changes in and around all the Dana-Farber buildings and landscapes.	**A summary of urban design features to be implemented in connection with the Center for Cancer Care project are presented in Chapter 4.0 of the DPIR/DEIR.**
1.28.2	BRA	2. Adjacent Streets: The Interim LMA Guidelines intend to improve the appearance of Brookline Avenue and to reinforce the differences in the character of the street north and south of Longwood Avenue. The northern part on both sides of the street has 'front yard' setbacks from the public sidewalk – the portions used for parking will be converted to green spaces as the Beth Israel Deaconess, Simmons, and Emmenuel College campuses evolve - while the southern portion has street walls on both sides that can become more continuous over time. The proposed project sets back the street level wall from the back of the public sidewalk and projects portions of the upper floors closer to the lot line. The relationships to the existing buildings bear careful study so that the project can include both a more generous sidewalk and a strong reinforcement of the street wall. The elevations of the various portions of the ground floor at the lobby, gift shop and retail space should be the same as the sidewalk to strengthen the relationship between the building and the street	**A summary of urban design features to be implemented in connection with the Center for Cancer Care project are presented in Chapter 4.0 of the DPIR/DEIR.**
1.28.3	BRA	3. Building Entrance: The proposed campus entrance at the corner of the building at Brookline Avenue and Jimmy Fund Way is a dramatic improvement compared with the existing condition. While arcaded spaces are in some instances effective ways of emphesizing building entrances, in Boston especially on the north sides of buildings, and even when they are two stories in height, arcades are gloomy places. The design of the entrance should bear no similarity to the dark, recessed existing entranco, so the lobby should not be set back from the face of the upper floors any more than is absolutely necessary to accommodate the required pedestrian movement and the building facade should be inflected to allow light to reach the street level facade.	**Please see Chapter 3, Project Description and Chapter 4, Urban Design of the DPIR/DEIR for a discussion of these requested items.**
1.28.4	BRA	4. Sustainability: Comments in the PNF suggest intentions toward sustainable building design. The city of Boston strongly supports such intentions and encourages the proponents to investigate double-wall, rain-screen, green roof and all other energy-efficient building techniques and materials.	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for a discussion of these requested items.**
1.29	BRA	The following submission requirements apply to any project subject to Large Project Review as well as PDA Development Plans. Certain PDAs and IMPS will require more generalized and broader information establishing a framework within which the proposed projects will be set. As these plans establish the equivalent of a zoning district, this additional material is key in evaluating not only the impacts of proposed projects within the PDA, but also how those plan areas fit within the context of the city.	**Comment noted.**
1.29.1	BRA	1. Written description of program elements and space allocation (in square feet) for each element, as well as project totals	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.29.2	BRA	2. Neighborhood plan, elevations and sections at an appropriate scale (1":lOO' or larger as determined by the BRA) showing relationships of the proposed project to the neighborhood's: a. massing b. building height c. scaling elements d. open space e major topographic features f. pedestrian and vehicular circulation g. land use	**These items are presented in Chapter 3.0, Project Description of the DPIR/DEIR.**
1.29.3	BRA	3. Color or black and white 8"x10n photographs of the site and neighborhood	**These items are presented in Chapter 3.0, Project Description of the DPIR/DEIR.**
1.29.4	BRA	4. Sketches and diagrams to clarify design issues and massing options	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.29.5	BRA	5. Eye-level perspective (reproducible line or other approved drawings) showing the proposal (including main entries and public passages/areas) in the context of the surrounding area. Views should display a particular emphasis on important viewing areas such as key intersections or public parks/attractions. Long-ranged (distanced) views of the proposed project should also be studied to assess the impact on the skyline or other view lines. At least one bird's-eye perspective should also be included. All perspectives should show (in separate comparative sketches) both the build and no-build conditions. The BRA should approve the view locations before analysis is begun. View studies should be cognizant of light and shadow, massing and bulk.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.29.6	BRA	6. Additional aerial or skyline views of the project, if and as requested	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.29.7	BRA	7. Site sections at 1":20' or larger (or other scale approved by the BRA) showing relationships to adjacent buildings and spaces	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.29.8	BRA	8. Site plan(s) at an appropriate scale (lU:20' or larger, or as approved by the BRA) showing: a. general relationships of proposed and existing adjacent buildings and open spaces; b. open spaces defined by buildings on adjacent parcels and across streets; c. general location of pedestrian ways, driveways, parking, service areas, streets, and major landscape features; d, pedestrian, handicapped, vehicular and service access and flow through the parcel and to adjacent area; e. survey information, such as existing elevations, benchmarks, and utilities; f. phasing possibilities; g. construction limits	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.29.9	BRA	9. Model made of bass wood at a 1"=10' scale minimum with the surrounding context with the proposed projects and existing conditions extending to a minimum three-block radius beyond each development Parcel	**DFCI has developed a study area model and has shared this feature several times with the BRA, the Task Force, and at LMA Forum meetings with the surrounding community.**
1.29.10	BRA	10. A massing model of the proposal in a digital 3D Max format. The digital model must illustrate the proposal and its immediate surrounding blocks in sufficient detail using texture mapping. The digital specifications of the model must be made in coordination with the BRA Urban Design Department to fit the BRA'S city-wide digital model	**DFCI has developed a study area massing model and has shared this feature several times with the BRA, the Task Force, and at LMA Forum meetings with the surrounding community.**

IMPNF Response to Comments

#	Letter	Comment	Response
1.29.11	BRA	11. Study model at l":16' or 1":20' showing preliminary concept of setbacks, cornice lines, fenestration, facade composition, etc.	**DFCI has developed a study area model and has shared this feature several times with the BRA, the Task Force, and at LMA Forum meetings with the surrounding community.**
1.29.12	BRA	12. Drawings at an appropriate scale (e.g., 1":8', 1":16', or as determined by BRA) describing architectural massing, façade design and proposed materials including: a. building and site improvement plans; b. neighborhood elevations, sections, and/or plans showing the development in the context of the surrounding area; c, sections showing organization of functions and spaces, and relationships to adjacent spaces and structures; d. preliminary building plans showing ground floor and typical upper floor(s); e. phasing, if any, of the proposed project	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.29.13	BRA	13. A written and/or graphic description of the building materials and its texture, color, and general fenestration patterns	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.29.14	BRA	14. U.S. Green Building Council LEED Project Checklist/Scorecard	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for a discussion of these requested items.**
1.29.15	BRA	15. Electronic files describing the site and proposed project at Representation Levels one and two ("Streetscape" and "Massing") as described in the document Boston "Smart Model": Two- Dimensional Mapping Standards (Appendix 3)	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.29.16	BRA	16. Full responses, which may be in the formats listed above, to any urban design-related issues raised in preliminary reviews or specifically included in the BRA scoping determination, preliminary adequacy determination, or other document requesting additional information leading up to BRA Board action, inclusive of material required for BCDC review	**Comment Noted.**
1.29.17	BRA	17. Proposed schedule for submission of all design or development related materials	**Comment Noted.**
1.30	BRA	In addition, all IMP and PDA Master Plan submissions (for areas comprising more than a single site structure) shall include the following, again in printed and duplicable digital format, and revised as required during the review process for later reference:	**Comment Noted.**
1.30.1	BRA	1. A completed Institutional Assessment Form	**Comment Noted.**
1.30.2	BRA	2. A comprehensive Plan Area map, clearly indicating bounds and all site locations and approximate building footprints	**Comment Noted.**
1.30.3	BRA	3. Such Plan Area map, modified to show (a) existing and (b) proposed zoning restrictions	**Comment Noted.**
1.30.4	BRA	4. For IMPS, a table and map listing all buildings owned or leased by the institution, both on and off the campus, and indicating a. total area including area below grade; b. uses and area devoted to each use; c. height in feet and number of floors, including floors below grade; d. age; e. condition; f. proposed action (rehabilitation, demolition, replacement, or other) during the term of the IMP; g. proposed uses with area devoted to each use	**Comment Noted.**
1.30.5	BRA	5. Uses (specifying the principal sub uses of each land area, building, or structure)	**Comment Noted.**
1.30.6	BRA	6. Square feet of gross floor area within Plan Area	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.30.7	BRA	7. Square feet of gross floor area eliminated from existing buildings through demolition of existing facilities	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.30.8	BRA	8. Floor area ratios, individually and in total	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.30.9	BRA	9. Building heights within Plan Area	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.30.10	BRA	10. Parking areas or facilities, both existing and to be modified or provided in connection with proposed projects	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.30.11	BRA	11. A series of neighborhood plans (to the extent not covered in item #2 above) at a scale of 1":100' showing existing and proposed building heights, building uses, pedestrian circulation, and vehicular circulation of cars, service vehicles, and buses, shuttles, or ambulances; the area to be included in the plans shall extend not less than 1,500 feet in all directions from the proposed project site except as specifically agreed upon otherwise by the BRA.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.30.12	BRA	12. Diagrammatic sections through the neighborhood (to the extent not covered in item #2 above) cutting north-south and east-west at the scale and distance indicated above	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.30.13	BRA	13. True-scale three-dimensional graphic representations of the area indicated above either as aerial perspective or isometric views showing all buildings, streets, parks, and natural features	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
1.30.14	BRA	14. A study model at a scale of 1":40' showing the proposal in the context of other buildings extending 500 feet in all directions from the project site or as determined by the BRA. If the Plan Area is within the area of the BRA'S Downtown IU:40' Model, see #11 above	**DFCI has developed a study area model and has shared this feature several times with the BRA, the Task Force, and at LMA Forum meetings with the surrounding community.**
1.31	BRA	The DFCI will be responsible for preparing and publishing in one or more newspapers of general circulation in the City of Boston a Public Notice of the submission of the IMP to the BRA as required by Section 80A-2. This Notice shall be published within five (5) days after the receipt of the IMP by the BRA. Public comments shall be transmitted to the BRA within sixty (60) days of the publication of this Notice, unless a time extension has been granted by the BRA in accordance with the provisions of Article 80 or to coordinate the Hospital's IMP review with any required Large Project Review. Following publication of the Notice, the DFCI shall submit to the BRA a copy of the published Notice together with the date of publication.	**Comment Noted.**

IMPNF Response to Comments

#	Letter	Comment	Response
2.1	BRA	The DFCI is required to prepare and submit to the BRA a Draft Project Impact Report ("DPIR") that meets the requirements of the Scoping Determination by detailing the Proposed Project's expected impacts and proposing measures to mitigate, limit, to minimize such impacts. The DPIR shall contain the information necessary to meet the specifications of Section 80B-3 (Scope of Review; Content of Reports) and Section 80B-A (Standards for Large Project Review Approval) as required by the Scoping Determination.	**Comment Noted.**
2.2	BRA	The BRA has formulated a set of Interim Guidelines to govern proposed projects in the LMA. These Guidelines have been established to ensure that projects apply good planning principles in the areas of transportation, urban design, and workforce development. They describe the physical character of the LMA and outline mutually beneficial public benefits that can be provided by project proponents to achieve project heights that are greater then those specified in the Guidelines. Development projects within the LMA must demonstrate compliance with guidelines for building height and setbacks, street networks, building character, environmental impacts, and transportation and workforce development. The DPIR shall outline of how the Proposed Project complies with the Interim Guidelines. Subsequent to the end of the forty-five (45) day public comment period for the DPIR, the BRA will issue a Preliminary Adequacy Determination ("PAD") that indicated the additional steps necessary for the DFCI to complete in order to satisfy the requirements of the Scoping Determination and all applicable sections of Article 80 of the Code. If the BRA finds that the DPIR adequately describes the Prop	**Please see Chapter 9, Interim Guidelines of the DPIR/DEIR for a discussion of these requested items.**
2.3	BRA	In addition to full-size scale drawings, 30 copies of a bound report containing all submission materials reduced to size 8-1/2"x11", except where otherwise specified, are required. The report should be printed on both sides of the page.	**DFCI will submit its IMP and DPIR/DEIR filings in accordance with these required provisions.**
2.4	BRA	In addition, an adequate number of copies must be available for community review. A copy of this Scoping Determination must be included in the report submitted for review. A. GENERAL INFORMATION 1. Application Information; a. Development Team (1) Names (a) Developer (including description of development entity and type of corporation) (b) Attorney (c) Project consultants and architect (2) Business address, telephone number and email for each (3) Designated contact for each	**DFCI will submit its IMP and DPIR/DEIR filings in accordance with these required provisions.**
2.5	BRA	b. Legal Information (I) Legal judgments or actions pending concerning the Proposed Project (2) History of tax arrears on property owned in Boston by the Applicant (3) Evidence of site control over the Project Site, including current ownership and purchase options of all parcels in the Proposed Project, all restrictive covenants and contractual restrictions affecting the Proponent's right or ability to accomplish the Proposed Project, and the nature of the agreements for securing parcels not owned by the Proponent. (4) Nature and extent of any and all public easements into, through or surrounding the Project Site.	**DFCI will submit its IMP and DPIR/DEIR filings in accordance with these required provisions.**
2.6	BRA	c. Disclosure of Beneficial Interests Disclosure of Beneficial Interests in the Proposed Project must be provided pursuant to Section 80B-8 of the Code.	**DFCI will submit its IMP and DPIR/DEIR filings in accordance with these required provisions.**
2.7	BRA	2. Financial Information: Financial Information and development pro forma should be submitted for all components of the Proposed Project (See Appendix for required financial information, which may be submitted under separate cover).	**DFCI will submit its IMP and DPIR/DEIR filings in accordance with these required provisions.**
2.8	BRA	3. Project Area: a. An area map identifying the location of the Proposed Project b. Description of metes and bounds of Project Site or certified survey of Project Site	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.9	BRA	4. Public Benefits: a. Development Impact Project Contribution and Jobs Contribution specifying amount of housing linkage and jobs linkage contributions. b. Estimated annual property taxes for each parcel, and estimated total property taxes during all construction and phased development years and after full occupancy. c. Anticipated employment levels including the following: (1) Estimated number of construction jobs (2) Estimated number of permanent jobs; d. Current activities and programs which benefit adjacent neighborhoods and the city at large, such as: child care programs, scholarships, internships, elderly services, education and job training programs, etc. e. Other public benefits, if any, to be provided.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
2.10	BRA	5. Regulatory Controls and Permits	**Please see Chapter 2, General Information of the DPIR/DEIR for a discussion of these requested items.**
2.10.1	BRA	a. Existing zoning requirements, zoning computation forms, and any anticipated requests for zoning relief should be explained.	**Please see Chapter 2, General Information of the DPIR/DEIR for a discussion of these requested items.**
2.10.2	BRA	b. Anticipated permits required from other local, state, and federal entities with a proposed application schedule should be noted.	**Please see Chapter 2, General Information of the DPIR/DEIR for a discussion of these requested items.**
2.10.3	BRA	c. A statement on the applicability of the Massachusetts Environmental Policy Act ('MEPA) should be provided. If the Proposed Project is subject to MEAP, all required documentation should be provided to the BRA, including but not limited to, copies of the Environmental Notification Form, decisions of the Secretary of Environmental Affairs, and the proposed schedule for coordination with BRA procedure.	**Comment Noted.**
2.11	BRA	6. Community Groups	**Comment Noted.**
2.11.1	BRA	a. Names and addresses of Project Site area owners, abutters, and any community of business groups which, in the opinion of the Proponent, may be substantially interested in or affected by the Proposed Project and the steps the Proponent is undertaking to address any concerns thereof.	**Please see Chapter 2, General Information of the DPIR/DEIR for a discussion of these requested items.**
2.11.2	BRA	b. A list of meetings held and proposed with interested parties, including public agencies, abutters, and community and business groups.	**Please see Chapter 2, General Information of the DPIR/DEIR for a discussion of these requested items.**
2.12	BRA	The DPIR shall contain a full description of the Proposed Project and its components, including its size, physical characteristics, development schedule, costs, and proposed uses. This section of the DPIR also shall present analysis of he development context of the Proposed Project. Appropriate site and building plans to illustrate clearly the Proposed Project shall be required.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.13	BRA	2. Project Alternatives A description of any alternatives to the Proposed Project, including the No- Build alternative (not carrying out the Proposed Project) and any alternative development proposals that were considered shall be presented and the primary differences among the alternatives, particularly as they may affect environmental conditions, shall be discussed. The No- Build alternative shall establish the future baseline conditions to which the effects of the Proposed Project are to be compared.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**

IMPNF Response to Comments

#	Letter	Comment	Response
2.14	BRA	C. TRANSPORTATION COMPONENT: A Transportation Access Plan shall be prepared as defined by the Boston Transportation Department in the Transportation component scope es outlined in Appendix 1.	**DFCI has prepared a comprehensive Transportation Plan Component. It is included as Chapter 5.0 of the DPIR/DEIR. An abbreviated version of the Transportation Study is included in Chapter 5.0 of the IMP for reference purposes.**
2.15	BRA	D. ENVIRONMENTAL PROTECTION COMPONENT: The following is the required scope for the Environmental Protection Component of the DPIR. As applicable, the analyses shall be required for any alternative(s) required to be studied by this Scoping Determination as well s for the Proponent's preferred alternative.	**DFCI has prepared a comprehensive Environmental Protection Component. It is included as Chapter 6.0 of the DPIR/DEIR.**
2.15.1	BRA	A quantitative (wind tunnel) analysis of the potential pedestrian level wind impacts shall be required for the DPIR. This analysis shall determine potential pedestrian level winds adjacent to and in the vicinity of the project site and shall identify any areas where wind velocities are expected to exceed acceptable levels, including the Authority's guideline of an effective gust velocity of 31 mph not to be exceeded more than 1 % of the time. Particular attention shall be given to public and other areas of pedestrian use, including, but not limited to, the entrances to the project building(s) and existing and proposed buildings, sidewalks and walkways in the vicinity of and adjacent to the Proposed Project, and all existing and proposed plazas, park areas (e.g., Joslin Park), and other open space areas within and in the vicinity of the proposed development.	**Wind impacts have been studied in detail. The results of those studies are summarized in Section 6.2 of the DPIR/DEIR.**
2.16	BRA	The wind impact analysis shall evaluate the following conditions:	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.16.1	BRA	1. No-Build -the existing condition of the site and environs to establish the baseline condition.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.16.2	BRA	2. Future Preferred Build Condition -the proposed development as described in the Expanded Environmental Notification Form/Project Notification Form.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.16.3	BRA	3. Alternative Build Condition(s) - any alternative development concept(s) to the Preferred Build Condition required to be studied.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17	BRA	The wind tunnel testing shall be conducted in accordance with the following guidelines and criteria:	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.1	BRA	Data shall be presented for both the existing (no-build) and for the future build scenario(s) (see above).	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.2	BRA	The analysis shall include the mean velocity exceeded 1 % of the time and the effective gust velocity exceeded 1 % of the time. The effective gust velocity shall be computed as the hourly average velocity plus 1.5 x root mean square variation about the average. An alternative velocity analysis (e.g., equivalent average) may be presented with the approval of the Authority.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.3	BRA	Wind direction shall include the sixteen compass points. Data shall include the percent or probability of occurrence from each direction on seasonal and annual bases.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.4	BRA	Results of the wind tunnel testing shall be presented in miles per hour (mph).	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.5	BRA	Velocities shall be measured at a scale equivalent to an average height of 4.5-5 feet.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.6	BRA	The model scale shall be such that it matches the simulated earth's boundary and shall include all buildings within at least 1,600 feet of the project site. All buildings taller than 25 stories and within 2,400 feet of the project site should be placed at the appropriate location upstream of the project site during the test. The model shell include all buildings recently completed, under construction, and planned within 1,500-2,000 feet of the project site. Prior to testing, the model shall be reviewed by the Authority. Photographs of the area model shall be included in the written report.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.7	BRA	The written report shall include an analysis which compares mean and effective gust velocities on annual and seasonal bases, for no-build and build conditions, and shall provide a descriptive analysis of the wind environment and impacts for each sensor point, including such items as the source of the winds, direction, seasonal variations, etc., es applicable. The report shell also include an analysis of the suitability of the locations for various activities (e.g., walking, sitting, standing, driving etc.) as appropriate, in accordance with recognized criteria (Melbourne comfort categories, or equivalent).	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.8	BRA	The report also shall include a description of the testing methodology and the model, and a description of the procedure used to calculate the wind velocities (including data reduction end wind climate data). Detailed technical information and data may be included in a technical appendix but should be summarized in the main report.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.9	BRA	The pedestrian level wind impact analysis report shall include, at a minimum, the following maps and tables:	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.9.1	BRA	- Maps indicating the location of the wind impact sensors, for the existing (no-build) condition and future build scenario(s).	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.9.2	BRA	- Maps indicating mean and effective gust wind speeds at each sensor location, for the existing (no-build) condition and each future build scenario, on an annual basis and seasonally. Dangerous and unacceptable locations shall be highlighted.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.9.3	BRA	- Maps indicating the suitability of each sensor location for various pedestrian-related activities (comfort categories), for the existing (no-build) condition and each future build scenario, on an annual basis and seasonally. To facilitate comparison, comfort categories may be distinguished through color coding or other appropriate means. In any case, dangerous and unacceptable conditions shall be highlighted.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.9.4	BRA	- Tables indicating mean and effective gust wind speeds and the comfort category at each sensor location, for the existing (no build) condition and for each future build scenario, on an annual basis and seasonally.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.17.9.5	BRA	- Tables indicating the percentage of wind from each of the sixteen compass points at each sensor location, for the existing (no-build) condition and for each future build scenario, on an annual basis and seasonally.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**

IMPNF Response to Comments

#	Letter	Comment	Response
2.17.9.6	BRA	For areas where wind speeds are projected to exceed acceptable levels, measures to reduce wind speeds and to mitigate potential adverse impact shall be identified and tested in the wind tunnel.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
2.18	BRA	A shadow analysis shall be required for existing and build conditions for the hours 9:00 am., 12:00 noon, and 3:00 p.m. for the vernal equinox, summer solstice, autumnal equinox, and winter solstice and for 6:00 p.m. during the summer and autumn. It should be noted that due to time differences (daylight savings vs. standard), the autumnal equinox shadows would not be the same as the vernal equinox shadows and therefore separate shadow studies are required for the vernal and autumnal equinoxes.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
2.19	BRA	The shadow impact analysis must include net new shadow as well as existing shadow and must clearly show the incremental impact of the proposed new building. For purposes of clarity, new shadow should be shown in a dark, contrasting tone distinguishable from existing shadow. The shadow impact study area shall include, at a minimum, the entire area to be encompassed by the maximum shadow expected to be produced by the Proposed Project (&, at the winter solstice). The build condition(s) shall include all buildings under construction and any proposed buildings anticipated to be completed prior to completion of the Proposed Project. Shadow from all existing buildings within the shadow impact study area shall be shown. A North arrow shall be provided on all figures. Shadows shall be determined by using the applicable Boston Azimuth and Altitude data as provided in Exhibit 1 (Sun Altitude/Azimuth Table, Boston, Massachusetts) below.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
2.20	BRA	Particular attention shall be given to existing or proposed public open spaces (e.g., Josh Park and the Emerald Necklace) and pedestrian areas, including, but not limited to, the existing and proposed sidewalks and pedestrian walkways within, adjacent to, and in the vicinity of the Proposed Project and the existing and proposed plazas, park areas, and other open space areas within and in the vicinity of the proposed development, and any other public and private open space areas that potentially could be affected by project-generated shadows.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
2.21	BRA	The DPIR must include a full discussion of compliance with the LMA Interim Guidelines shadow criteria. Any new shadow that will be cast on the Emerald Necklace should be mitigated. The DPIR should adequately address this potential impact. Design or other mitigation measures to minimize or avoid any adverse shadow impacts shall be identified.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
2.22	BRA	The above shadow analysis shall be required for any alternative required to be studied by the Scoping Determination as well as the preferred development option. (SEE Exhibit 1 in Comment Letter)	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
2.23	BRA	A daylight analysis for both build and no-build conditions should be conducted by measuring the percentage of skydome that is obstructed by the Proposed Project building and evaluating the net change in obstruction. If alternative massing studies are requested as part of the Article 80 development review process, daylight analysis of such alternatives shall also be conducted for comparison. The study should treat the following elements as controls for data comparison: existing conditions, the context of the area, and the as-of-right background zoning envelope. The areas of interest include viewpoints along Brookline Avenue and Jimmy Fund Way.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
2.24	BRA	Daylight analyses should be taken for each new major building facade, or grouping thereof within the limits of the Boston Redevelopment Authority Daylight Analysis (BRADA) program, fronting these public or quasi-public ways. The midpoint of each roadway or public accessway should be taken as the study point. The BRADA program must be used for this analysis.	**Please refer to Section 6.4 of the DPIR/DEIR for a comprehensive summary of daylight analyses.**
2.25	BRA	If the design of the Proposed Project incorporates substantial glass-facades, an evaluation of potential solar glare impacts shall be required.	**Please refer to Section 6.5 of the DPIR/DEIR for a comprehensive summary of solar glare analyses.**
2.25.1	BRA	This analysis shall measure potential reflective glare from the building onto potentially affected streets and roadways, and nearby public open spaces in order to determine the potential for visual impairment or discomfort due to reflective spot glare for pedestrians/students and motorists. Mitigation measures to eliminate any adverse reflective glare shall be identified. Technical data used for the analysis shall be included.	**Please refer to Section 6.5 of the DPIR/DEIR for a comprehensive summary of solar glare analyses.**
2.25.2	BRA	The solar glare analysis also shall examine the potential for solar heat buildup in any nearby buildings receiving reflective sunlight from the Proposed Project. In some cases, this condition can result in overheating or the receiving structure or incapacitation of its air conditioning system. Mitigation measures shall be described for any identified negative impacts on nearby buildings.	**Please refer to Section 6.5 of the DPIR/DEIR for a comprehensive summary of solar glare analyses.**
2.26	BRA	The DPIR shall describe the existing and projected future air quality in the project vicinity and shall evaluate ambient levels to determine conformance with the National Ambient Air Quality Standards (NAAQS). Particular attention shall be given to mitigation measures to ensure compliance with air quality standards.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
2.27	BRA	A future air quality (carbon monoxide) analysis shall be required for any intersection (including the proposed garage entrances exits) where level of service (LOS) is expected to deteriorate to D and the Proposed Project causes a 10 percent increase in traffic or where the level of service is E or F and the Proposed Project contributes to a reduction of LOS.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
2.28	BRA	The study shall analyze the existing conditions, future No-Build and future Build conditions only. The methodology and parameters of the traffic-related air quality analysis shall be approved in advance by the Boston Redevelopment Authority and the Massachusetts Department of Environmental Protection. The results of the air quality analysis shall be compared to the Massachusetts State Implementation Plan to determine project compliance with the Plan. Mitigation measures to eliminate or avoid any violation of air quality standards shall be described.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
2.29	BRA	An indirect source air quality analysis of the operation of the parking garage shall be prepared to determine potential air quality impacts on nearby sensitive receptors and compliance with air quality standards. Garage emissions should be estimated using appropriate US. EPA guidance. The EPA SCREEN3 model should be used to calculate maximum CO impacts from the garage at the various sensitive receptors.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
2.30	BRA	A description of the project's heating and mechanical systems and of the parking garage ventilation system, including location of intake and exhaust vents and specifications, and an analysis of the impact on pedestrian level air quality and on any sensitive receptors from operation of the heating, mechanical, and exhaust systems, including the building's emergency generator, shall be required.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
2.31	BRA	In addition, please provide a detailed stationary source analysis of the adjacent 50 MW power plant and whether or not the expanded capacity will necessitate modifying existing air permits to account for an increase in boiler size, hours of operation, fuel use and emissions (e.g., CO, NO_2, PM_{10}, non-criteria pollutant emissions).	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**

IMPNF Response to Comments

#	Letter	Comment	Response
2.32	BRA	A detailed inventory of the emissions from the exhaust plume (type and quantity of pollutants) from the power plant and any existing and/or proposed plant modifications and or expansion should be provided. As stated above, measures to avoid any violation of air quality standards and potential impacts on the project itself shall be described.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
2.33	BRA	The presence of any contaminated soil or groundwater and any underground or aboveground storage tanks at the project site shall be evaluated and remediation measures to ensure their safe removal and disposal shall be described in the DPIR.	**Please refer to Section 6.8 of the DPIR/DEIR for a summary of solid and hazardous waste.**
2.34	BRA	As applicable, the DPIR should summarize, in detail, the results of any studies or findings, including types and concentrations of contaminants encountered and shall include appropriate tables and maps. The reports shall be made available to the BRA.	**Please refer to Section 6.8 of the DPIR/DEIR for a summary of solid and hazardous waste.**
2.35	BRA	If asbestos, asbestos-containing materials, lead paint or other hazardous compounds (e.g., PCBs) are identified during demolition, renovation or removal activities, the handling and disposal must be in compliance with Massachusetts Department of Environmental Protection, the Boston Public Health Commission and the Inspectional Services Department guidelines and requirements.	**Please refer to Section 6.8 of the DPIR/DEIR for a summary of solid and hazardous waste.**
2.36	BRA	The DPIR shall quantify and describe the generation, storage, and disposal of all solid and hazardous wastes from the construction and operation of the Proposed Project. In addition, measures to promote the reduction of waste generation and recycling, particularly for paper, plastics, glass, metals, and other recyclable products, and compliance with the City's recycling program, shall be described in the DPIR.	**Please refer to Section 6.8 of the DPIR/DEIR for a summary of solid and hazardous waste.**
2.37	BRA	In addition, measures to promote the reduction of waste generation and recycling, particularly for paper, plastics, glass, metals, and other recyclable products, and compliance with the City's recycling program, shall be described in the DPIR.	**Please refer to Section 6.8 of the DPIR/DEIR for a summary of solid and hazardous waste.**
2.38	BRA	The DPIR shall establish the existing noise levels at the project site and vicinity and shall calculate future noise levels after project completion based on appropriate modeling and shall demonstrate compliance with applicable Federal, State, and City of Boston noise criteria and regulations.	**Please refer to Section 6.6 of the DPIR/DEIR for a summary of noise analyses.**
2.39	BRA	The noise evaluation shall include the effect of noise generated by the area's traffic, and other noise sources.	**Please refer to Section 6.6 of the DPIR/DEIR for a summary of noise analyses.**
2.40	BRA	Future noise levels shall include the noise generated by the Proposed Project's mechanical equipment, including emergency generators.	**Please refer to Section 6.6 of the DPIR/DEIR for a summary of noise analyses.**
2.41	BRA	Measures to minimize and eliminate adverse noise impacts on nearby sensitive receptors, including the project itself, from traffic noise and mechanical systems shall be described.	**Please refer to Section 6.6 of the DPIR/DEIR for a summary of noise analyses.**
2.42	BRA	Compliance with Boston and Federal flood hazard regulations, including requirements regarding construction within flood zones must be addressed in the DPIR.	**Please see Chapter 6.0, Environmental Protection Component of the DPIR/DEIR for a discussion of these requested items.**
2.43	BRA	The potential impact of the Proposed Project on existing wetlands and wetland resource areas must also be described, including a demonstration of compliance with the Massachusetts Wetlands Protection Act (MWPA), as applicable. Maps detailing the site in relation to applicable buffer zones shall be provided.	**The site is not in a delineated wetland or in the buffer of a delineated wetland and is not subject to the DEP's Wetlands Protection Act.**
2.44	BRA	The DPIR shall include a description of the project's site drainage system how it will connect to the Boston Water and Sewer Commission (BWSC) system.	**Please refer to Chapter 7.0, Infrastructure Systems of the DPIR/DEIR.**
2.45	BRA	Parking garage drainage and measures to prevent adverse water quality impacts to the Muddy River also shall be described in detail.	**Please refer to Chapter 7.0, Infrastructure Systems of the DPIR/DEIR.**
2.46	BRA	The DPIR shall contain an evaluation of the project site's existing and future stormwater drainage and stormwater management practices.	**Please refer to Chapter 7.0, Infrastructure Systems of the DPIR/DEIR.**
2.47	BRA	The DPIR shall fully illustrate existing and future drainage patterns from the project site and shall describe and quantify existing and future stormwater runoff from the site and the	**Please refer to Chapter 7.0, Infrastructure Systems of the DPIR/DEIR.**
2.48	BRA	The Proposed Project's stormwater management system, including best management practices to be implemented, measures proposed to control and treat stormwater runoff and to maximize on-site retention of stormwater, measures to prevent groundwater contamination, and compliance with the Commonwealth's Stormwater Management Policies, also shall be described.	**Please refer to Chapter 7.0, Infrastructure Systems of the DPIR/DEIR.**
2.49	BRA	The DPIR shall describe the project area's stormwater drainage system to which the project will connect, including the location of stormwater drainage facilities and ultimate points of discharge.	**Please refer to Chapter 7.0, Infrastructure Systems of the DPIR/DEIR.**
2.50	BRA	If the Proposed Project involves the disturbance of land of one acre or more, a National Pollution Discharge Elimination System (NPDES) General Permit for Construction from the US. Environmental Protection Agency and the Massachusetts Department of Environmental Protection will be required. If an NPDES permit is required, a stormwater pollution prevention plan must be prepared prior to the commencement of any construction-related activities.	**Please refer to Chapter 7.0, Infrastructure Systems of the DPIR/DEIR.**
2.51	BRA	An analysis of existing sub-soil conditions at the project site, groundwater levels, potential for ground movement and settlement during excavation and foundation construction, and potential impact on adjacent buildings, utility lines, and the roadways shall be required. This analysis shall also include a description of the foundation construction methodology, the amount and method of excavation, and measures to prevent any adverse effects on adjacent buildings, utility lines, roadways and the Muddy River.	**Please see Chapter 6.0, Environmental Protection Component of the DPIR/DEIR for a discussion of these requested items.**
2.52	BRA	The Proposed Project is one block from the boundary of the new Groundwater Conservation Overlay District (Longwood Avenue). Measures to ensure that groundwater levels will be maintained and will not be lowered during or after construction shall be described in detail. Installation of observation monitoring walls, preferable on public land, may be required if existing wells are not already present.	**Please see Chapter 6.0, Environmental Protection Component of the DPIR/DEIR for a discussion of these requested items.**
2.53	BRA	Identification of existing wells and well installation should be made in consultation with the Boston Groundwater Trust (the "Trust").	**Please see Chapter 6.0, Environmental Protection Component of the DPIR/DEIR for a discussion of these requested items.**
2.54	BRA	In addition, monitoring data must be provided to the BRA and the Trust from 6 months prior to construction until one year after construction (frequency to be determined in consultation with the BRA).	**Please see Chapter 6.0, Environmental Protection Component of the DPIR/DEIR for a discussion of these requested items.**
2.55	BRA	If dewatering is necessary during construction, a replenishment system must be installed and levels maintained.	**Please see Chapter 6.0, Environmental Protection Component of the DPIR/DEIR for a discussion of these requested items.**

IMPNF Response to Comments

#	Letter	Comment	Response
2.56	BRA	Upon completion of construction, monitoring wells will need to be assigned to the Trust by the developer with an agreement granting the Trust access if wells are on private property.	**Please see Chapter 6.0, Environmental Protection Component of the DPIR/DEIR for a discussion of these requested items.**
2.57	BRA	A description of the recharging system or recirculation program must be provided.	**Please see Chapter 6.0, Environmental Protection Component of the DPIR/DEIR for a discussion of these requested items.**
2.58	BRA	Levels reported shall be based on Boston City Base (BCB). Contact information for the Trust: Boston Groundwater Trust 234 Clarendon Street Boston, MA 02116 Attention: Elliott Laffer, Executive Director 617-859-8439	**Please see Chapter 6.0, Environmental Protection Component of the DPIR/DEIR for a discussion of these requested items.**
2.59	BRA	In addition, a vibration monitoring plan must be provided that ensures potential vibration impacts from project construction on adjacent buildings end infrastructure will be mitigated.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60	BRA	A construction impact analysis shall include a description and evaluation of the following:	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.1	BRA	potential dust and pollutant emissions and mitigation measures to control these emissions, including participation in the Commonwealth's Clean Construction Initiative.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.2	BRA	potential noise generation and mitigation measures to minimize increases in noise levels.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.3	BRA	location of construction staging areas and construction worker parking; measures to encourage carpooling and/or public transportation use by construction workers.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.4	BRA	construction schedule, including hours of construction activity.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.5	BRA	access routes for construction trucks and anticipated volume of construction truck traffic.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.6	BRA	construction methodology (including foundation construction), amount and method of excavation required, disposal of the excavate, description of foundation support, maintenance of groundwater levels, and measures to prevent any adverse effects or damage to adjacent structures and infrastructure.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.7	BRA	Method of demolition of existing buildings on the site and disposal of the demolition waste.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.8	BRA	potential for the recycling of construction and demolition debris, including asphalt from the existing parking lot.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.9	BRA	identification of best management practices to control erosion and to prevent the discharge of sediments and contaminated groundwater or stormwater runoff into the City's drainage system and into the adjacent river and harbor waters during the construction period.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.10	BRA	coordination of project construction activities with other major construction projects being undertaken in the project vicinity at the same time, including scheduling and phasing of individual construction activities.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.11	BRA	impact of project construction on rodent populations and description of the proposed rodent control program, including frequency of application and compliance with applicable City and State regulatory requirements.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.60.12	BRA	measures to protect the public safety.	**Please refer to Section 6.11 of the DPIR/DEIR for a detailed description of construction conditions and related mitigation actions to minimize adverse construction impacts of the project.**
2.61	BRA	A new development project presents opportunities for sustainable design and construction to prevent damage to the environment, consistent with the goals of Executive Order 385 and the Green Guidelines for Healthcare Construction. The DPIR shall fully describe (including a LEED checklist) appropriate environmentally protective technologies and practices that will be incorporated into the design and operation of the proposed development and the Proponent's commitment to include such measures.	**DFCI is committed to developing a sustainable project that is consistent with Green Guidelines for Healthcare Construction. A detailed discussion of sustainable design objectives is presented in Chapter 8.0, Sustainable Design of the DPIR/DEIR.**
2.62	BRA	The Proponent is encouraged to achieve LEED certifiable status	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.63	BRA	Measures shall include, but not be limited to, the following:	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.63.1	BRA	Participation in the U.S. Environmental Protection Agency's Energy Star/Green Lights program and adoption of the Leadership in Energy and Environmental Design (LEED) standards for the project.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.63.2	BRA	Optimize natural day lighting, passive solar gain, and natural cooling, specify energy efficient HVAC and lighting systems, appliances, and other equipment, and solar preheating of makeup air.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**

IMPNF Response to Comments

#	Letter	Comment	Response
2.63.3	BRA	Favor building materials and purchases of supplies that are non-toxic, made from recycled materials, and made with low embodied energy.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.63.4	BRA	Application of cool roofing material for energy conservation, including reduction in cooling energy use.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.63.5	BRA	Build easily accessible recycling system infrastructure into the project's design.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.63.6	BRA	Incorporate additional opportunities to conserve water beyond water-saving technologies required by law.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.63.7	BRA	Make the building design adaptable for the future inclusion of innovative energy and environmental technologies as they develop over time.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.63.8	BRA	Conduct annual audits of energy consumption, waste streams, and the use of renewable technologies.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.64	BRA	In addition, Proposed Project should include significant green features such as native landscaping, increased water and energy efficiency, improved indoor air quality, green roof systems, and renewable energy technologies to the extent possible.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.65	BRA	The DPIR should describe commitments to the following:	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.65.1	BRA	Sustainable Sites (public transportation access, bicycle storage, alternative fueled vehicles, stormwater management, green roofing, light pollution reduction)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.65.2	BRA	Water Efficiency (water use reduction, water efficient landscaping, innovative wastewater technologies)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.65.3	BRA	Energy & Atmosphere (energy performance, CFC reduction in HVAC&R equipment, renewable energy)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.65.4	BRA	Materials & Resources (Recycle content, construction waste management, local/regional materials)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.65.5	BRA	Indoor Environmental Quality (Environmental tobacco smoke control, ventilation effectiveness, low emitting materials (adhesives & sealants, paints, carpets, composite wood), daylight and views)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.65.6	BRA	Innovation & Design Process (innovation in design)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.66	BRA	Building demolition and/or renovation activities (existing structures) may offer an opportunity for recycling, reprocessing or donation of construction and building materials (e.g., glass, brick, stone, interior furnishing) to the Building Materials Resource Center (BMRC).	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.66.1	BRA	The Proponent is encouraged to contact the BMRC at the following address regarding disposal and/or acquisition of materials that may be appropriate for use: Building Materials Resource Center 100 Terrace Street Roxbury, MA 02120 617-442-8917	**Comment noted. Thank you.**
2.66.2	BRA	The proponents shall include in the Project Impact Reports more specificity about the Jimmy Fund Way and Binney Street elevations of the Dana Building and a more detailed site plan showing the proposed street level changes in and around all the Dana-Farber buildings and landscapes.	**Please refer to Chapter 3.0 of the DPIR/DEIR for a detailed description of the project.**
2.67	BRA	The Interim LMA Guidelines intend to improve the appearance of Brookline Avenue and to reinforce the differences in the character of the street north and south of Longwood Avenue. The northern part on both sides of the street has 'front yard' setbacks from the public sidewalk - the portions used for parking will be converted to green spaces as the Beth Israel Deaconess , Simmons, and Emmanuel College campuses evolve - while the southern portion has street walls on both sides that can become more continuous over time. The proposed project sets back the street level wall from the back of the public sidewalk and projects portions of the upper floors closer to the lot line. The relationships to the existing buildings bear careful study so that the project can include both a more generous sidewalk and a strong reinforcement of the street wall. The elevations of the various portions of the ground floor at the lobby, gift shop and retail space should be the same as the sidewalk to strengthen the relationship between the building and the street	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for a discussion of these requested Items.**
2.68	BRA	On Jimmy Fund Way the sidewalk should offer pedestrians a continuous path and a clear view between Brookline Avenue and Binney Street without protruding building elements or pinched portions. Where the sidewalk is interrupted by curb cuts for access to parking and service spaces the driveways should be visible from far away and should not be hidden behind parts of the building.	**DFCI and its project team have worked to achieve the objectives described within Comment 2.68.**
2.69	BRA	The proposed campus entrance at the corner of the building at Brookline Avenue and Jimmy Fund Way is a dramatic improvement compared with the existing condition. While arcaded spaces are in some instances effective ways of emphasizing building entrances, in Boston especially on the north sides of buildings, and even when they are two stories in height, arcades are gloomy places. The design of the entrance should bear no similarity to the dark, recessed existing entrance, so the lobby should not be set back from the face of the upper floors any more than is absolutely necessary to accommodate the required pedestrian movement and the building facade should be inflected to allow light to reach the street level facade.	**DFCI and its project team have worked to achieve the objectives described within Comment 2.69.**
2.70	BRA	Comments in the PNF suggest intentions toward sustainable building design. The city of Boston strongly supports such intentions and encourages the proponents to investigate doublewall, rain-screen, green roof and all other energy-efficient building techniques and materials.	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for a discussion of these requested Items.**
2.71	BRA	The following submission requirements apply to any project subject to Large Project Review as well as PDA Development Plans. Certain PDAs and IMPS will require more generalized and broader information establishing a framework within which the proposed projects will be set. As these plans establish the equivalent of a zoning district, this additional material is key in evaluating not only the impacts of proposed projects within the PDA, but also how those plan areas fit within the context of the city.	**Comment Noted.**
2.71.1	BRA	Phase I Submission: 1. Written description of program elements and space allocation (in square feet) for each element, as well as project totals	**Comment Noted.**

IMPNF Response to Comments

#	Letter	Comment	Response
2.71.2	BRA	2. Neighborhood plan, elevations and sections at an appropriate scale (1":100' or larger as determined by the BRA) showing relationships of the proposed project to the neighborhood's: a. massing; b. building height; c. scaling elements; d. open space; e. major topographic features; f. pedestrian and vehicular circulation; g. land use	**Comment Noted.**
2.71.3	BRA	3. Color or black and white 8"x10" photographs of the site and neighborhood	**Comment Noted.**
2.71.4	BRA	4. Sketches and diagrams to clarify design issues and massing options	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.71.5	BRA	5. Eye-level perspective (reproducible line or other approved drawings) showing the proposal (including main entries and public passages/areas) in the context of the surrounding area. Views should display a particular emphasis on important viewing areas such as key intersections or public perks/attractions. Long-ranged (distanced) views of the proposed project should also be studied to assess the impact on the skyline or other view lines. At least one bird's-eye perspective should also be included. All perspectives should show (in separate comperative sketches) both the build and no-build conditions. The BRA should approve the view locations before analysis is begun. View studies should be cognizant of light and shadow, massing and bulk.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.71.6	BRA	6. Additional aerial or skyline views of the project, if and as requested	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.71.7	BRA	7. Site sections at 1":20' or larger (or other scale approved by the BRA) showing relationships to adjacent buildings and spaces	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.71.8	BRA	8. Site plan(s) at an appropriate scale (1":20' or larger, or as approved by the BRA) showing: a. general relationships of proposed and existing adjacent buildings and open spaces; b. open spaces defined by buildings on adjacent parcels and across streets; c. general location of pedestrian ways, driveways, parking, service areas, streets, and major landscape features; d. pedestrian, handicapped, vehicular and service access and flow through the parcel and to adjacent area; e. survey information, such as existing elevations, benchmarks, and utilities; f. phasing possibilities; g. construction limits	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.71.9	BRA	9. Model made of bass wood at a 1"=10' scale minimum with the surrounding context with the proposed projects and existing conditions extending to a minimum three-block radius beyond each development Parcel	**DFCI has developed a study area model and has shared this feature several times with the BRA, the Task Force, and at LMA Forum meetings with the surrounding community.**
2.71.10	BRA	10. A massing model of the proposal in a digital 3D Max format. The digital model must illustrate the proposal and its immediate surrounding blocks in sufficient detail using texture mapping. The digital specifications of the model must be made in coordination with the BRA Urban Design Department to fit the BRA'S city-wide digital model	**DFCI has developed a study area massing model and has shared this feature several times with the BRA, the Task Force, and at LMA Forum meetings with the surrounding community.**
2.71.11	BRA	11. Study model at 1":16' or 1":20' showing preliminary concept of setbacks, cornice lines, fenestration, facade composition, etc.	**DFCI has developed a study area model and has shared this feature several times with the BRA, the Task Force, and at LMA Forum meetings with the surrounding community.**
2.71.12	BRA	12. Drawings at an appropriate scale (e.g., 1":8', 1":16', or as determined by BRA) describing architectural massing, façade design and proposed materials including: a. building and site improvement plans; b. neighborhood elevations, sections, and/or plans showing the development in the context of the surrounding area; c. sections showing organization of functions and spaces, and relationships to adjacent spaces and structures; d. preliminary building plans showing ground floor and typical upper floor(s); e. phasing, if any, of the proposed project	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.71.13	BRA	13. A written and/or graphic description of the building materials and its texture, color, and general fenestration patterns	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.71.14	BRA	14. U.S. Green Building Council LEED Project Checklist/Scorecard	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for a discussion of these requested items.**
2.71.15	BRA	15. Electronic files describing the site and proposed project at Representation Levels one and two ("Streetscape" and "Massing") as described in the document Boston "Smart Model": Two-Dimensional Mapping Standards (Appendix 3)	**Comment Noted.**
2.71.16	BRA	16. Full responses, which may be in the formats listed above, to any urban design-related issues raised in preliminary reviews or specifically included in the BRA scoping determination, preliminary adequacy determination, or other document requesting additional information leading up to BRA Board action, inclusive of material required for BCDC review	**Comment Noted.**
2.71.17	BRA	17. Proposed schedule for submission of all design or development-related materials.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.72	BRA	Phase II Submission: Design Development (At this stage, all relevant PDA or IMP Plan material has been submitted and approved; the building design progresses in this and the following phases.)	**Comment Noted.**
2.72.1	BRA	1. Revised written description of project	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.72.2	BRA	2. Revised site sections	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.72.3	BRA	3. Revised site plan showing: a. relationship of the proposed building and open space to existing adjacent buildings, open spaces, streets, and buildings and open spaces across streets; b. proposed site improvements and amenities including paving, landscaping, lighting and street furniture; c. building and site dimensions, including setbacks and other dimensions subject to zoning requirements; d. any site improvements or areas proposed to be developed by some other party (including identification of responsible party); e. proposed site grading, including typical existing and proposed grades at parcel lines	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.72.4	BRA	4. Dimensional drawings at an appropriate scale (e.g., 1":8') developed from approved schematic design drawings which reflect the impact of proposed structural and mechanical systems on the appearance of exterior facades, interior public spaces, and roofscape including: a. building plans and elevations; b. preliminary structural drawings; c. preliminary mechanical drawings; d. sections; e. elevations showing the project in the context of the surrounding area as required by the Authority to illustrate relationships or character, scale and materials	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**

IMPNF Response to Comments

#	Letter	Comment	Response
2.72.5	BRA	5. Large-scale (e.g., ¾":1') typical exterior wall sections, elevations, and details sufficient to describe specific architectural components and methods of their assembly	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.72.6	BRA	6. Outline specifications of all materials for site improvements, exterior facades, roofscape, and interior public spaces	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.72.7	BRA	7. A study model at an appropriate scale (e.g., 1":8', 1":16', or as determined after review of schematic design) showing refinements of facade design.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.72.8	BRA	8. Eye-level perspective drawings showing the revised project in the context of the surrounding area	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.72.9	BRA	9. Preliminary samples of all proposed exterior materials (see Appendix 4)	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.72.10	BRA	10. Complete photo documentation (35 mm color slides) of above components including major changes from initial submission to project approval, if and as requested by the BRA.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.72.11	BRA	11. US. Green Building Council LEED Project Checklist/Scorecard; All above information may be additionally requested in either booklet or suitable electronic form.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.73	BRA	Phase III Submission: Contract Documents (At this stage, a project has likely received approval and is seeking building permits from ISD.)	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.73.1	BRA	1. Final written description of project, including final program breakdown	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.73.2	BRA	2. A site plan showing all site development and landscape details for lighting, paving, planting, street furniture, utilities, grading, drainage, access, service, and parking	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.73.3	BRA	3. Complete architectural and engineering drawings and specifications. One set for BRA reference; additional sets or cover sheets as required for stamped approvals prior to submission to ISD	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.73.4	BRA	4. A complete list of exterior building and site materials and plantings, including a materials sample board if and as requested (see Appendix 4)	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.73.5	BRA	5. Eye-level perspective drawings or presentation model that accurately represents the project, and a rendered site plan showing all adjacent existing and proposed structures, streets, sidewalks, pathways, and site improvements	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.73.6	BRA	6. Site and building plan at 1":100' for Authority's use in updating its 1":100' photogrammetric map sheets, if and as requested	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.73.7	BRA	7. Revised basswood models of final project design suitable for placement, if and as appropriate, in the applicable BRA model bases	**DFCI has developed a study area model and has shared this feature several times with the BRA, the Task Force, and at LMA Forum meetings with the surrounding community.**
2.73.8	BRA	8. A massing model of the proposal in a digital 3D Max format. The digital model must illustrate the proposal and its immediate surrounding blocks in sufficient detail using texture mapping. The digital specifications of the model must be made in coordination with the BRA Urban Design Department to fit the BRA'S city-wide digital model	**DFCI has developed a study area model and has shared this feature several times with the BRA, the Task Force, and at LMA Forum meetings with the surrounding community.**
2.73.9	BRA	9. Electronic files describing the site at Representation Levels three and four ("Building Envelope" and "Photo-realistic") as described in the document Boston "Smart Model": Two-Dimensional Mapping Standards. This should include the site, if topology has been altered	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.73.10	BRA	10. U.S. Green Building Council LEED Project Checklist/Scorecard	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project.**
2.73.11	BRA	11. Complete photo documentation (35 mm color slides) of above components including major changes from initial submission to project approval, if and as requested by the BRA. All above information may be requested in electronic form suitable to the BRA for purposes of reference and information. All above information may be requested in booklet form for limited distribution or reference.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
2.74	BRA	Phase IV Submission: Construction inspection (Phase IV occurs throughout the construction period.)	**Comment Noted.**
2.74.1	BRA	1. All contract addenda, proposed change orders, and other modifications and revisions of approved contract documents that affect site improvements, exterior facades, roofscape (inclusive of HVAC equipment and mechanical or access penthouses), and interior public spaces submitted to the Authority for review and approval prior to effectuation	**Comment Noted. Thank you.**
2.74.2	BRA	2. Shop drawings of architectural components which differ from or were not fully described in the contract documents	**Comment Noted. Thank you.**
2.74.3	BRA	3. Information or modifications requested as a condition of approval by the BRA	**Comment Noted. Thank you.**
2.74.4	BRA	4. A signage plan or specific signage or building identification proposals	**Comment Noted. Thank you.**
2.74.5	BRA	5. A lighting plan or any specific site or building facade lighting proposals, inclusive of any off-site lighting of buildings or monuments undertaken in conjunction with the project	**Comment Noted. Thank you.**
2.74.6	BRA	6. Mock-up panels: Full-size assemblies (at the project site) of significant exterior materials, inclusive of proposed details of construction (joint materials including grout or caulking, window frames, mullions, and panning, glass and spandrel panels, masonry or other patterning) and including all feasible facade conditions. Drawings of proposed mock-up panels shall be submitted to the BRA for review and approval prior to erection. Approval of all materials, including both site and building materials, shall not be deemed final until after this mock-up panel review has been completed by the BRA (see Appendix 4)	**Comment Noted. Thank you.**
2.74.7	BRA	7. Viewing of any additional models or mock-ups promulgated by the developer for marketing or other purposes	**Comment Noted. Thank you.**

IMPNF Response to Comments

#	Letter	Comment	Response
2.75	BRA	E. PUBLIC NOTICE The Applicant will be responsible for preparing and publishing in one or more newspapers of general circulation in the City of Boston a Public Notice of the submission of the DPIR to the BRA as required by Section 80A-2. This Notice shall be published within five (5) days after the receipt of the DPIR. Public comments shall be transmitted to the BRA within forty-five (45) days of the publication of this Notice. Following publication of the Notice, the Proponent shall submit to the BRA a copy of the published Notice together with the date of publication.	**Comment Noted. Thank you.**
3.1	BTD	Dana-Farber is similar to other institutions in the LMA that have a space and parking demand which exceeds what they have in the LMA. It explains a key issue of the LMA today - space and parking shortfalls has pushed Dana-Farber and other LMA institutions into adjacent neighborhoods, such as the Fenway, Mission Hill and Roxbury. One example is Dana-Farber is utilizing 150 parking spaces in the Crosstown Garage.	**Comment Noted.**
3.2	BTD	Another issue with Dana-Farber is that despite its high employee transit mode share, 77% of its 1,454 parking spaces are used for employee parking, which leaves only 23% (340 spaces) for patients. This demonstrates the critical need for more transit in the LMA in order to reduce employee parking demand, free-up parking for patients and reduce parking spillover into adjacent neighborhoods.	**DFCI agrees, and takes every measure to actively encourage the use of alternative forms of transportation to access its main campus in the LMA.**
3.3	BTD	The PNF/IMPA estimated that the Project will generate 848 net new daily vehicle trips, including 51 vehicle trips in the AM peak hour and 59 vehicle trips in the PM peak hour. The Draft Project Impact Report (DPIR) should provide a detailed trip generation analysis. To be conservative, the trip generation analysis should be based on 312,209 square feet (i.e. 275,000 GSF for the 450 Brookline Avenue building, minus 33,791 GSF to be demolished at 454 Brookline Avenue and Redstone buildings), plus 71,000 GSF new administrative space in the Dana Building.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.4	BTD	A key issue is traffic circulation at the Brookline Avenue Jimmy Fund Way intersection. Left-turns from Brookline Avenue westbound onto Jimmy Fund Way are prohibited today. Any changes will impact traffic flow for the entire Brookline Avenue corridor and must be studied in detail. The DPIR should study at least three alternative designs for a complete reconstruction of the Brookline Avenue/Joslin Place/Deaconess Road/Jimmy Fund Way intersection. Binney Street should be reviewed in detail from Longwood Avenue to Fenwood Road. BTD's Scope will include the full-list of intersections and roadways that will need to be analyzed to determine the impacts from this Master Plan Amendment and Project.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.5	BTD	As discussed above, parking is a major issue. The DPIR should include a detailed study of Dana- Farber's parking supply and demand, including parking utilization and turnover rates. Table 2.1 in the PNF/IMPA should include the total number of parking spaces for each building and number used by Dana-Farber. Likewise, Table 4.2 in the PNF/IMPA should include the building's square footage and clarify the total number of parking spaces at each building and the number of spaces utilized by Dana-Farber.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.5.1	BTD	The DPIR should include a map of all parking facilities utilized as well as shuttle bus and walking routes.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.6	BTD	Trucks illegally parking on Brookline Avenue are a problem today. Dana-Farber's loading and service plan shall be documented in detail and meet BTD's Off-Street Loading Guidelines.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.7	BTD	Lastly and most important, transit information should be documented in detail in the DPIR. This should include a breakdown of employee transit use by service, station/stops and times (i.e Yawkey and Ruggles stations, subway lines, bus routes and stops, etc.).	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.8	BTD	The developer must evaluate the transportation impacts associated with the proposed Project and Master Plan Amendment. The results of this evaluation will be documented in an Access	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.8.1	BTD	Plan prepared for submission to the Boston Transportation Department (BTD). The report will include the following:	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.8.2	BTD	An existing study of area traffic, transit, pedestrian, bicycling, parking and loading conditions. . An evaluation of the project's long-term impacts (10 years) and study area traffic, transit, pedestrian, and bicycling activities, as well as parking and loading demand	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.8.3	BTD	An evaluation of the Project's short-term traffic impacts, related to construction activity, including truck routes and noise impacts.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.8.4	BTD	Identification of appropriate measures to mitigate the plan's impacts, including but not limited to, long-term project impact monitoring, roadway/intersection improvements, reduction in parking spaces, intelligent transportation technology and transportation demand management.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.9	BTD	The following intersections are important to the master plan and are considered to constitute the study area for the transportation component of the master plan. Brookline Avenue/Longwood Avenue; Brookline Avenue/Joslin Road Deaconess Road; Brookline Avenue/Francis Street; Brookline Avenue/Fenwood Road; Brookline Avenue/Riverway; Binney Street/Longwood Avenue; Binney Street/Deaconess Road; Binney Street/Francis Street; Binney Street/Fenwood Road; Longwood Avenue/Blackfan Street; Longwood Avenue/Avenue Louis Pasteur; Longwood Avenue/Huntington Avenue; Longwood Avenue/Pilgrim Road; Longwood Avenue/Riverway; Pilgrim Road/Joslin Road; Pilgrim Road/Deaconess Road; Francis Street/Huntington Avenue; Brookline Avenue/Fenway; Brookline Avenue/Park Drive; Park Drive/Riverway/Fenway; Audubon Circle	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.10	BTD	The Existing Conditions component will present data on the various transportation systems within the study area. Information on parking, shuttles, bikes, pedestrians, transit, loading, levels of service, available capacity, queue lengths, and other analysis appropriate to identify any current deficiencies will be provided.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**

IMPNF Response to Comments

#	Letter	Comment	Response
3.11	BTD	Traffic. Collect daily and peak traffic volume data. (Data collected in the past three years from other studies may be used). Present daily traffic volumes for key roadway corridors within the study area including Brookline Avenue, Binney Street, Longwood Avenue, Francis Street. Fenwood Road, Fenway, Riverway, Avenue Louis Pasteur, Huntington Avenue. Provide a map showing ADT and Peak hour volumes for each major road in the LMA. Include line thickness to illustrate traffic volumes.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.11.1	BTD	Develop base traffic networks for the study area representing existing morning and evening peak hour conditions. Provide intersection capacity analysis for study area intersections for morning and evening peak hours.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.11.2	BTD	Existing capacity analysis shall be presented on level of service and queuing lengths at all study area intersections in terms of vehicles, bicycles and pedestrians. Analysis shall reflect peak period characteristics including buses and shuttles stopping, parked cars, heavy vehicles, double parking maneuvers, bicycles, number of pedestrians, grade, and loading activities.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.11.3	BTD	In addition, determine vehicular trip generation and mode split characteristics of Dana Farber's employees and patients/visitors. If this information is unavailable, begin a survey to collect such information. Provide BTD recent ridesharing surveys.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.12	BTD	Define Dana-Farber's parking supply. Inventory and identify on-street and off-street parking spaces, including associated parking regulations and restrictions. Provide on-street and off-street parking ratio's based on total main facilities in the LMA gross square footage, total facilities in the LMA, and facilities outside of the LMA. Identify available public and commercial spaces within ¼ mile from Dana-Farber in an excel spreadsheet and associated map.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.12.1	BTD	Provide a detailed inventory of on- and off-street parking facilities controlled, leased, operated or managed by Dana-Farber. Include the facility location, distance from site, number of spaces, fees, turnover rates, user type, and level of utilization by time of day.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.12.2	BTD	The proponent shall present data for daytime peak, daytime off-peak (e.g. 300 PM), and overnight,	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.12.3	BTD	Describe in detail, parking policies and fee schedule.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.12.4	BTD	Discuss how Dana-Farber relays its parking policies and procedures to employees, patients and visitors. This information will provide a comprehensive review of the current parking conditions. The proponent shall present data for daytime peak, daytime off-peak (e.g. 300 PM), and overnight.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.13	BTD	Dana-Farber is situated to maximize use of public transit services. The institution is located near the MBTA's Green Line, and is serviced by MASCO bus shuttles. Document the operating characteristics of the area's Massachusetts Bay Transportation Authority (MBTA) services ("T" and buses) and other transit services (MASCO shuttles).	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.13.1	BTD	Discuss what the college's existing subsidy programs, shuttle service systems, carpool, and vanpool services are. Include origin and destination data, and parking locations for each service.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.13.2	BTD	Transit ridership data should be presented for faculty, patients and visitors, including type of service used, and morning and evening peak hours. Analyze the future need for such services based on historical data and trends. If data is not available, begin a program to start collecting such data. Bus stops and shuttle services will be analyzed for potential consolidation.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.14	BTD	Describe pedestrian conditions along major pedestrian corridors and pathways, including pedestrian barriers and deficiencies, within and adjacent to the institute. Pedestrian counts should be provided for all study area intersections.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.14.1	BTD	Map pedestrian circulation and identify major pedestrian corridors based on the above counts with existing numbers labeled. Indicate intersections that have countdown pedestrian signals.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.15	BTD	Conduct bicycle counts at study area intersections. Describe bicycle usage at Dana Farber, define and illustrate primary bicycle routes, and inventory the supply and location of bicycle amenities.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.15.1	BTD	Discuss existing policies to encourage and promote safe bicycling.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.16	BTD	Identify all major loading and service routes and locations. Document level of loading and service activity and quantify trip generation of trucks (truck types, number of trucks per day or per week, frequency, origin and destination, routes), as well as regulations and prohibitions on loading and service, and schedule. Explain dispatch and loading procedures in detail.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.17	BTD	Provide a detailed site plan of Dana-Farber showing major vehicular, parking, loading/service, transit, pedestrian, and bicycle facilities and access routes. A detailed survey plan of the parcels shall be provided including but not limited to; property lines, sidewalks, right of way, utilities, curb cuts, widths, radii, signs, poles. striping and markings. The 1:20 scale site plan should also illustrate building footprints, driveways parking and loading areas, and adjacent street policy curb usage.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.18	BTD	Describe all transportation-related programs provided, including current and ongoing measures to reduce vehicle trips to and from Dana-Farber.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**

IMPNF Response to Comments

#	Letter	Comment	Response
3.19	BTD	Describe the proposed master plan based on a ten year horizon period. Include a summery of project details that will have impacts on the transportation system Create a matrix compering existing conditions to proposed conditions regarding land use, square footage, number of employees and patients, Floor Area Ratio (FAR), parking spaces, and parking ratios. Indicate projected schedule (timetable) for construction of the various projects and describe arrangements for relocation of any uses that are temporarily displaced by construction.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.2	BTD	Establish "No-Build" transportation conditions based on approved/planned developments, programmed transportation improvements and anticipated "background growth" within the study area. No-Build transportation conditions will establish future transportation conditions in the study area without considering future development by Dana-Farber. The proponent shall work with BTD on establishing a comprehensive future traffic conditions network that includes all known projects in the LMA area.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.21	BTD	Estimate traffic impacts of the proposed master plan in detail. Assign generated trips to the No-Build conditions to develop Full-Build conditions for the horizon year. Analyze the impacts of new or displaced trips generated by the plan. Discuss existing intersection level of service with future Full-Build expected level of service. Compare Full-Build conditions with existing conditions and the No-Build scenario to determine potential future impacts and cumulative traffic impacts.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22	BTD	Dana-Farber's strategies for mitigating circulation impacts associated with master plan, in the context with other on-going projects and transportation related plans, will be a key element of the analysis.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.1	BTD	Trip Generation. Review current and proposed development to develop future trip generation characteristics. Estimate trips associated by vehicle, transit, bicycle and walk trips based on an updated modal split survey and BTD's trip generation standards.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.2	BTD	Trip Distribution. Conduct a zip code and mode share survey of Dana-Farber employees. Compare and contrast the findings with the BTD zonal data for Area 5	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.3	BTD	Conditions to be Analyzed. In addition to existing conditions, analyze the following future conditions to determine morning and evening peak hour levels of service at the study area intersections:	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.3.1	BTD	a. No-Build, 10-year horizon (with projects anticipated to be completed and a background growth rate included).	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.3.2	BTD	b. Project Generated Trips. In addition to the other synchro networks (Existing, No-Build, Full-Build Conditions), provide BTD the AM and PM synchro files with Project generated trips only.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.3.3	BTD	c. Full-Build-year horizons (with the addition of project-related impacts)	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.4	BTD	Background Development Projects. Any approved or proposed development projects to be included in the No-Build evaluation shall be approved by BTD staff prior to the analysis.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.5	BTD	Evaluation of Transportation Impacts. New trips expected to be attracted under the master plan will be added to demands carried by the existing roadway system plus new trips from background projects. Develop and analyze daily morning and e v m q peak hours for all travel modes, and qualitatively analyze the differences.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.5.1	BTD	Traffic Impacts. Analyze study area intersections for volume-to-capacity ratio (v/c), level of service (LOS), delay calculations, and queue lengths. Caution must be used to represent peak hour operating conditions, such as, reduced lane geometry due to double parking, loading and bus stopping. The Synchro network must be calibrated to reflect field conditions. Provide BTD the calibration backup data in the technical appendix.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.5.2	BTD	Transit Impacts. Describe the usage of public transportation, and the impact of the plan on transit services.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.5.3	BTD	Pedestrian and Bicycle Impacts. Present pedestrian and bicycle volumes generated by the master plan. Project future volumes and pedestrian operations for the locations and crossings identified in Section 1.4. Indicate impacts of new pedestrian trips on pedestrian operations and amenities. Identify impacts of new bicycle trips on street network and bicycle amenities. Finally, identify bike and pedestrian paths and corridors across and through the campus on the site plan.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.5.4	BTD	Loading and Service. Estimate truck and service vehicle traffic to Dana-Farber.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.5.5	BTD	In addition, evaluate access and egress for emergency vehicles, shuttle services, and any other institutional amenity provided, such as buses. Analyze what amenities and services will be necessary in the future. Illustrate truck routes to and from the campus. Provide 1 :20 scale maps depicting truck turning movements.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.6	BTD	Parking Impacts. Estimate the demand for parking generated by the master plan. Identify parking supply and demand for faculty, staff employees, visitors, and describe parking operations in detail.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**

IMPNF Response to Comments

#	Letter	Comment	Response
3.22.6 .1	BTD	Develop future parking demands generated by the master plan based on traffic volumes projected in Section 2.1 above. Identify these parking demands by user type (faculty, staff and patients).	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.6 .2	BTD	Identify parking spaces that will be removed or displaced as part of the development plan. In addition, identify new on-site or off-site parking areas that will replace displaced spaces. Identify any proposed on-site parking facilities designed to eliminate existing off-site parking spaces. Finally, provide proposed future off-street and on-street parking ratios.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.6 .3	BTD	Provide a proposed management plan for campus parking facilities. Present parking policies and rates for employees and patients.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.22.6 .4	BTD	Provide a plan of all parking facilities, including layout and access	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.23	BTD	Identify a typical approach to minimize construction impacts during building phases of the development plan. These may include: mode of arrival for construction workers; parking provisions for construction workers and construction materials deliveries; anticipated frequency, times and routes of truck movements and construction materials deliveries; temporary storage of construction equipment and material; and the need for full or partial street closures or street occupancy during construction. As required, Dana-Farber will submit to the BTD a Construction Management Plan (CMP) prior to issuance of a Building Permit and construction.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of construction methods that will be employed in connection with the project.**
3.24	BTD	Propose a plan to manage transportation impacts resultant from the master plan build-out analysis. Provide a site plan showing new amenities and circulation patterns. Develop programs or strategies to reduce potential transportation impacts. These may include the following: Transportation Demand Management strategies; Measures to minimize vehicle-trip generation; Roadway/infrastructure improvements; Analyze at least three alternative geometric and/or traffic signal operational changes to the Brookline/Deaconess Road/Joslin Road intersection; Transit improvements; Bicycle improvements; Parking management improvements; Pedestrian improvements; Intelligent transportation systems; Long-term project impact monitoring. Some of these issues will have been treated in the section on transportation-related programs. Reference should be made to these programs.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
3.25	BTD	Include a time schedule and cost estimates for proposed mitigation and transportation improvements	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
4.1	Michael Ross (City Council))	I would like to take this opportunity to share both my overall support as well as some concerns regarding this project since both the Mission Hill and Fenway communities will be directly impacted.	**Thank you for your support.**
4.2	Michael Ross (City Council))	I am pleased that Dana-Farber has moved some of its current uses off-site by leasing space outside of LMA Campus, and also that the Institute has chosen to lease space in existing buildings within the LMA. These efforts combined have produced a project that is smaller in both height and overall massing than the previous proposal.	**Comment Noted, thank you.**
4.3	Michael Ross (City Council))	I am also pleased that this proposal provides for a real "front door" entrance to the hospital that will create a new identity for Dana-Farber. What they have presently is not adequate. The widened sidewalks will also make for a safer and more pleasant experience for pedestrians.	**Comment Noted, thank you.**
4.4	Michael Ross (City Council))	I am hoping that Dana-Farber will also take this effort one step further and work to improve the pedestrian environment all along the stretch of Brooline Avenue that abuts the Institute.	**DFCI has pulled the edge of the Center for Cancer care back, significantly. This will allow for the creation of a sidewalk that is, in some locations, over 30 feet wide.**
4.5	Michael Ross (City Council))	However, there are some community concerns that I must also share at this time. One of these is that, although I am in support of creating a more inviting pedestrian environment on Brookline Avenue, I am also concerned about competition between whatever retail will be going in on the first floor and our newly emerging commercial district in Brigham Circle. Specifically, I am concerned that restaurants that may be moving into this new space will take away business form those in the Mission Hill neighborhood. Instead, I hope that Dana-Farber will consider cafeterias for employees and using outside catering for any additional food service needs.	**The retail to be implemented along Brookline Avenue is intended to be small and support oriented. It will include the "Friends of DFCI" gift shop and an additional small, support-type retailer.**
4.6	Michael Ross (City Council))	I have also heard concerns from residents about the impact that shifting the main entrance from Binney Street to Jimmy Fund Way will have Brookline Avenue and the intersection of Joslin Place, Deaconess Road and Jimmy Fund Wey. I ask that a detailed traffic study of this intersection be conducted and presented to the City and the IAG for further analysis.	**DFCI intends to invest significant resources to improve this intersection to allow for increased traffic flow efficiency and pedestrian safety provisions. Please see Chapter 5.0 of the DPIR/DEIR for more details regarding specific actions to be taken at this location in connection with th4e Center for Cancer Care project.**
4.7	Michael Ross (City Council))	In closing, I support the Dana-Farber Cancer Institute's Master Plan Amendment, but would like specific responses to the above raised issues. Thank you for taking the time to review these comments. I am looking forward to working with both Dana-Farber and the affected communities through the completion of this project.	**Thank you for your insightful comments.**
5.1	Maia Brodyfield	The BPHC's funding of the Prostate Cancer Screening and Education Program has enabled the program to increase their collaborations with Boston community based organizations in order to better access Boston men of color. Through this collaboration, as well as through existing relationships around breast and cervical cancer, BPHC has observed the benefits of the patient navigator model employed by Dana Farber. BPHC encourages DFCI to expand this promising practice throughout all of their outpatient programs.	**Thank you for your support.**

IMPNF Response to Comments

#	Letter	Comment	Response
5.2	Maia Brodyfield	The BPHC recognizes the importance of reducing congestion in the Longwood Medical Area and applaud DFCI's efforts to address this issue. However, as part of DFCI's plan to open a satellite oncology unit at the Faulkner Hospital, the BPHC strongly encourages a well thought out plan to address issues of transportation for the many residents of Boston who do not have access to a car. The BPHC would like to see assurances that critical outpatient services will not be removed from the LMA, thereby decreasing access to cutting edge medical services and research for residents of Boston.	**DFCI plans to relocate a portion of its patient services to off-site locations as a strategy to better serve the region. Critical outpatient care services will continue to be provided from its main campus in the LMA.**
5.3	Maia Brodyfield	In addition, BPHC would like DFCI to consider increasing their outreach and advertising to Boston residents who are underserved.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
5.4	Maia Brodyfield	Part of the Mayor's plan to reduce racial and ethnic disparities in health care is to diversify the health care workforce. As was indicated by the community input, DFCI has additional opportunities to support the Fenway and Mission Hill neighborhood organizations in their efforts to develop workforce opportunities for local residents and the BPHC would strongly endorse such partnerships.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
5.5	Maia Brodyfield	In addition, as a large employer in Boston, DFCI is poised to make a significant impact on assuring access for underserved patients by increasing the percentage of linguistic minorities employed in the health care setting at all levels including senior leadership/management.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
5.6	Maia Brodyfield	The Boston Public Health Commission also recognizes the many youth programs and educational partnerships with Boston high schools as models that would be well suited to further development. In particular, BPHC would support any efforts DFCI plans to expand the programs to the middle school level.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
5.7	Maia Brodyfield	There are other emerging programs and persistent public health needs for which the Boston Public Health Commission would welcome the opportunity to work with DFCI. The Boston Public Health Commission is about to embark on a new initiative to provide needle disposal options to residents of the City of Boston through kiosks stationed around the city and we will need partners who will be willing to consider sewing as sites for this pilot program.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
6.1	Office of Jobs and Comm. Services	As the City's workforce development agency, JCS is particularly interested in Dana-Farber's efforts to expose Boston Public School students to careers in health care and the sciences, and its work to increase the number of Boston residents employed by the institution and its contractors. We applaud the Dana-Farber's existing relationships with Boston Latin School, Fenway High School, and Madison Park Technical Vocational High School, and would encourage Dana Farber to maintain and, if possible, expand those initiatives. It is worth noting that the recent restructuring of large high schools into small, theme-based academies has resulted in no less than seven such academies with a health focus, so there may be other opportunities for partnership as well.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
6.2	Office of Jobs and Comm. Services	While Dana-Farber contracts out much of the entry-level work which has traditionally provided the first rung on the ladder for many Boston residents, we are interested in exploring ways the institution might work with its contractors to increase the access of neighborhood residents to those jobs, and then help such workers progress in their careers through the provision of education and training opportunities.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
6.3	Office of Jobs and Comm. Services	The Interim Guidelines require Dana-Farber to submit a Workforce Development Plan to the Office of Jobs and Community Services outlining the institution's projected workforce needs and detailing the measures to be taken to meet those needs. While the Project Notification document contains valuable information about current workforce development activities, it does not constitute a future Workforce Development Plan as envisioned in the Interim Guidelines. We look forward to reviewing such a plan, and to working with Dana-Farber to better meet the needs of the institution and the residents of Boston.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
7.1	Assessing Dept	The fact remains, however, that as organizations like DFCI expand so too does the percentage of tax exempt land in Boston (currently at 52% exempt). Residential and commercial taxpayers must cover the costs to provide essential city services to exempt properties. As DFCI seeks to expand and enhance their campus, I ask that they consider the impact on taxpayers by increasing your Payment-in-lieu-of-tax (PILOT) contribution.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
7.2	Assessing Dept	With anticipated new construction at 450 Brookline Avenue as well as other campus enhancements on the horizon, the Assessing Department asks that representatives from DFCI meet with the Tax Policy Unit to discuss an increased PILOT contribution. The contribution will depend on the size and usage of the facility, and should be agreed upon prior to the issuing of the Certificate of Occupancy.	**DFCI intends to meet with the Assessing Department's Tax Policy Unit to discuss future PILOT contributions to the City.**
8.1	BWSC	Proposed locations for new water service connections are not identified in the IMPAIPNF.	**A site plan will be submitted to BWSC for review and approval showing the final locations. At this time, it is anticipated that connections will be located on both Jimmy Fund Way and Brookline Avenue.**
8.2	BWSC	The IMPA/PNF states that the Draft Project Impact Report will evaluate the potential impact of the proposed development on the water quality of the nearby Muddy River, including both construction-related impacts and stormwater drainage.	**Please refer to Chapter 7 for a discussion on Stormwater Management.**
8.3	BWSC	For the proposed construction the proponent must submit a site plan and a General Service Application to the Commission. The site plan must show the location of existing public and private water mains, sanitary sewers and storm drains which serve the project site, as well as the location of proposed service connections.	**A site plan will be submitted to BWSC for review and approval.**
8.4	BWSC	With the site plan, the proponent must provide detailed and updated estimates for water demand, sanitary sewer flows and stormwater runoff generation for the proposed project. The amount of potable water required for landscape irrigation if any, must be quantified and provided separately.	**A site plan will be submitted to BWSC for review and approval.**
8.5	BWSC	Any new or relocated water, sewer and drainage facilities required for the project must be designed and constructed at the proponent's expense in accordance with the Commission's Water Distribution System and Sewer Use Regulations and Requirements for Site Plans.	**Comment noted. Information will be presented in the Site Plan Approval package.**
8.6	BWSC	The proponent is responsible for ensuring that the construction of the tunnel under Jimmy Fund Way does not negatively impact the Commission's water, sewer or storm drainage systems or any service connections to adjacent buildings. With the site plan, the proponent must submit to the Commission plans showing the location of the tunnel relative to existing and proposed water, sewer and storm drain utilities. The plans must identify specific measures that will be implemented to prevent damage or obstruction of the water, sewer or storm drain utilities during construction.	**Comment noted. Project consultant's have met with BWSC to discuss tunnel-related efforts.**

IMPNF Response to Comments

#	Letter	Comment	Response
8.7	BWSC	To assure compliance with the Commission's requirements, the proponent should submit the site plan and General Service Application to the Commission for review when project design is 50 percent complete.	**Comment noted. Information will be presented in the Site Plan Approval package.**
8.8	BWSC	Before demolition of 454 Brookline Avenue and the Redstone Building commences, existing water, sewer and storm drain connections must be cut and capped in accordance with Commission standards. The proponent must complete a Termination Verification Approval Form for a Demolition Permit, available from the Commission. The completed form must be submitted to the City of Boston's Inspectional Services Department before a Demolition Permit will be issued.	**A cut and cap plan has been reviewed and approved by BWSC. It is anticipated that the capping will be completed at the time of DPIR/DEIR filing.**
8.9	BWSC	The site plan must show in detail how drainage from the new building's roof and from other impervious areas will be managed. Roof runoff and other stormwater runoff must be conveyed seperately from sanitary waste at all times.	**This information will be submitted in conjunction with the Site Plan Approval package. Sanitary waste will be conveyed separately from roof runoff and other stormwater runoff.**
8.10	BWSC	The Department of Environmental Protection, in cooperation with the Massachusetts Water Resources Authority and its member communities, are implementing a coordinated approach to control flow in the MWRA regional wastewater system, particularly the removal of extraneous clean water (e.g. infiltration/inflow (I/I)) in the system. In this regard, DEP has routinely required proponents proposing to add significant new wastewater flows to assist in the I/I reduction effort to ensure that the additional wastewater flows are offset by the removal of I/I. Currently, DEP is typically using a minimum of 4:1 ratio for I/I removal to new wastewater flow added. The Commission supports the DEP/MWRA policy, and will require the proponent to develop a consistent inflow reduction plan.	**Comment noted. The proponent will work with BWSC to develop a plan to address this comment. The program developed with BWSC will be presented to DEP in conjunction with the DEP Sewer Connection permit application.**
8.11	BWSC	Oil traps are required on all drains discharging from all new and existing enclosed parking garages. Discharges from garage drains must be directed to a building sewer and not to a building storm drain. The requirements for oil traps are provided in the Commission's Requirements for Site Plans.	**Comment noted. Information will be presented in the Site Plan Approval package.**
8.11.1	BWSC	Grease traps are required in all new and existing cafeteria or kitchen facilities in accordance with the Commission's Sewer Use Regulations. The proponent is advised to consult with Mr. Richard Fowler, Deputy Superintendent of Field Operations prior to preparing plans for grease haps.	**Comment noted. Information will be presented in the Site Plan Approval package.**
8.12	BWSC	The proponent should note Article V of the Commission's Sewer Use Regulations as it pertains to medical and laboratory facilities.	**Comment noted. Information will be presented in the Site Plan Approval package.**
8.13	BWSC	The proponent must fully investigate methods for retaining stormwater on site before the Commission will consider a request to discharge stormwater to the Commission's system. Under no circumstances will stormwater be allowed to discharge to a sanitary sewer. A feasibility assessment for retaining stormwater on site must be submitted with the site plan.	**Comment noted. Information will be presented in the Site Plan Approval package.**
8.14	BWSC	In conjunction with the site plan and General Service Application, the proponent will be required to submit a Stormwater Pollution Prevention Plan. The plan must:	**Comment noted. Information will be presented in the Site Plan Approval package.**
8.14.1	BWSC	Identify specific best management measures for controlling erosion and preventing the discharge of sediment, contaminated stormwater or construction debris to the Commission's drainage system when construction is underway.	**Please refer to Chapter 7 for a discussion on Stormwater Management.**
8.14.2	BWSC	Include a site map which shows, at a minimum, existing drainage patterns and areas used for storage or treatment of contaminated soils, groundwater or stormwater, and the location of major control or treatment structures to be utilized during construction.	**The proponent has submitted a dewatering application to BWSC and EPA indicating discharge to the storm drainage system.**
8.14.3	BWSC	Specifically identify how the project will comply with the Department of Environmental Protection's Performance Standards for Stormwater Management both during construction and after construction is complete.	**Comment noted. Information will be presented in the Site Plan Approval package.**
8.15	BWSC	The discharge of dewatering drainage to a sanitary sewer is prohibited by the Commission. The proponent is advised that the discharge of any dewatering drainage to the storm drainage system requires a Drainage Discharge Permit from the Commission and an NPDES Permit issued by the Environmental Protection Agency (EPA).	**The proponent has submitted a dewatering application to BWSC and EPA indicating discharge to the storm drainage system.**
8.16	BWSC	The proponent is advised that a Drainage Discharge Permit is also required for the long-term (permanent) discharge to the drainage of infiltrated groundwater collected via an underdrain system, such as those that are commonly installed in below-grade parking garages.	**Comment noted.**
8.17	BWSC	Developers of projects involving disturbances of land of one acre or more are required to obtain an NPDES General Permit for Construction from the EPA. The proponent is responsible for determining if such a permit is required and for obtaining the permit. If such a permit is required, a copy of the Notice of Intent and any pollution prevention plan prepared pursuant to the permit should be provided to the Commission prior to the commencement of construction.	**The construction manager has filed for the NPDES General Permit for Construction.**
8.18	BWSC	The Commission requests that the proponent install a permanent casting stating: "Don't Dump: Drains to the Charles River" next to any new catch basin installed as part of this project. The proponent may contact the Commission's Operations Division for information regarding the purchase of the castings.	**Castings will be provided. Information will be presented in the Site Plan Approval package.**
8.19	BWSC	The Commission utilizes a Fixed Radio Meter Reading System to obtain water meter readings. For new water meters, the Commission will provide a Meter Transmitter Unit (MTU) and connect the device to the meter. For information regarding the installation of MTUs, the proponent should contact the Commission's Meter Installation Department.	**Comment noted.**
8.2	BWSC	The proponent should explore opportunities for implementing water conservation measures in addition to those required by the State Plumbing Code. In particular the proponent should consider outdoor landscaping which requires minimal use of water to maintain. If the proponent plans to install in-ground sprinkler systems, the Commission recommends that timers, soil moisture indicators and rainfall sensors be installed.	**Please refer to Chapter 8 for a discussion of water conservation measures.**
8.21	BWSC	The use of sensor-operated faucets and toilets in common areas of buildings should also be considered.	**Please refer to Chapter 8 for a discussion of water conservation measures.**
9.1	Fire Marshall	Emergency vehicle site access to the new buildings as well as existing buildings that might be affected.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**

IMPNF Response to Comments

#	Letter	Comment	Response
9.2	Fire Marshall	Impact on availability and accessibility of hydrant locations for new buildings as well as for any existing buildings that might be impacted.	**Hydrant locations will be coordinated with the design of the fire connection to the proposed building. Proposed hydrant locations will be presented to BWSC and BFD for review and approval.**
9.3	Fire Marshall	Impact on availability and accessibility to siamese connection locations for new buildings as well as for any existing buildings that might be impacted.	**Hydrant locations will be coordinated with the design of the fire connection to the proposed building. Proposed hydrant locations will be presented to BWSC and BFD for review and approval.**
9.4	Fire Marshall	Impact that a transformer vault fire or explosion will have on the fire safety of the building.	**Transformer rooms and associated fire protection systems will be designed to minimize any impacts due to fires and/or explosions.**
9.5	Fire Marshall	Particularly as it relates to the location of the vault.	**Transformer rooms and associated fire protection systems will be designed to minimize any impacts due to fires and/or explosions.**
9.6	Fire Marshall	Need for Boston Fire Department permit requirements as outlined in the Boston Fire Prevention Code, the Massachusetts Fire Prevention Regulations (527 CMR), and the Massachusetts Fire Prevention Laws (MGL CH148).	**DFCI will seek a Flammables Storage License.**
9.7	Fire Marshall	For projects involving air-supported structures, it is critical that the impact of the design has on fire safety relative to the interaction of the area underneath the structure to the structure as well as to the interaction of the structure to the area underneath the structure.	**The project has numerous above-grade connections to the existing Smith Building. To the extent that these connections may be considered air-supported, the building will comply with the applicable sections of the Massachusetts Building Code.**
9.8	Fire Marshall	Due to the increasing popularity of private wireless communication services, it has become increasingly difficult and costly for the Fire Department to locate our emergency communications equipment at appropriate sites. At the same time, the need for antenna sites has grown as development continues in downtown/Back Bay. We would appreciate it if the BRA, as part of its development review process for high-rise towers, could assist the Fire Department in obtaining rooftop access for our communications equipment as a public benefit too meet this critical public safety need.	**DFCI will work with the BFD/BRA regarding rooftop access as requested.**
9.9	Fire Marshall	These items should be analyzed for all phases of the construction as well as the final design stage. This project will need permits from the Boston Fire Department as well as the Inspectional Services Department.	**Comment noted. DFCI and its contractors have already initiated required permitting efforts.**
10.1	Boston Public Health Commission	DFCI's plan is to submit an amendment to the IMP that expired five years ago. The justification for proposing an amendment of the expired plan is unclear. A new IMP would provide more comprehensive review of the project and its elements.	**DFCI is submitting an new IMP to the BRA for its review and approval.**
10.2	Boston Public Health Commission	DFCI's efforts to conform to energy codes are appreciated but would be enhanced if the project could include the use of Green Roof Technologies. The present reports related to the Green Roof Technology are promising and any increase in use of those technologies in the City of Boston is highly recommended.	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for further discussion.**
10.3	Boston Public Health Commission	Additional energy saving steps such as use of solar energy for lighting and maximum use of day light for interior need to be considered wherever possible.	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for further discussion.**
10.4	Boston Public Health Commission	The City of Boston has many projects and policies to reduce idling time for all vehicles in Boston. Educational material and signage have been distributed to encourage reduction in idling by private or public fleets. The Code of Massachusetts Regulation and similar regulations limit the idling time to 5 minutos. DFCI is recommended to include informative language and material in their contract specification to address this issue during the construction period as well as post occupancy. This measure will also assure enhancement to indoor air quality at the buildings with loading areas.	**DFCI agrees with this comment and discourages unnecessary idling at its facilities.**
10.5	Boston Public Health Commission	DFCI is requested to utilize all steps 10 prevent intrusion of any air pollutants to any ventilation system when there is a loading area for building. One such measure may include not placing air-intake units in close proximity to loading areas or heavy traffic streets.	**Comment noted.**
10.6	Boston Public Health Commission	The BPHC as a member of the Boston Air Pollution Control Commission is recommending installation of CO direct reading and recording monitoring devices inside parking buildings and alarms at the exit to a h pedestrians crossing the traffic from all new parking facilities. This will be addressed during the request for parking permits since the project is located in a parking freeze area. These need to be fully considered during review of the Transportation Access Plan Agreement.	**DFCI intends to install CO monitoring devices in connection with the Center for Cancer Care project.**
10.7	Boston Public Health Commission	The additional parking spaces may seem necessary however, DFCI needs to provide justification for the proposed level of increase. The present traffic level in the area would not benefit from addition of over 848 vehicle trips per day for a total of 3,144 generated by DFCI. DFCI could consider use of alternative methods to reduce the foreseen need for parking spaces. Those may include utilizing service such as Zip Cars for staff and clients.	**New parking spaces are to be allocated exclusively to patients - who generally only arrive to receive cancer treatments via automobile.**
10.8	Boston Public Health Commission	The proposed street improvements [listed in page two of this document, above are necessary. The BPHC supports the following and request an increased focus on:	**Comment Noted.**
10.8.1	Boston Public Health Commission	Widening sidewalks to improve walking and safety conditions on Jimmy Fund Way and at the Smith Building;	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**

IMPNF Response to Comments

#	Letter	Comment	Response
10.8.2	Boston Public Health Commission	Design alteration for loading areas to assure pedestrians safety on side walks near those areas;	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
10.8.3	Boston Public Health Commission	Improvements that will encourage use of bikes and increase in parking space for bicycles.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
11.1	Boston Env. Dept	Dana-Farber's most recent IMP was approved 12 years ago and expired in 2001. As Dana-Farber is similar in relevant characteristics to other LMA institutions, it would not seem to meet the criteria for exemption. In addition, the IMP Amendment does not demonstrate eligibility for the 205 foot height based upon exceptional public benefits as compared t o like institutions in the LMA. The benefits exceeding those of other LMA institutions should be described.	**Please refer to Chapter 9.0 of the IMPR for a detailed description of DFCI's compliance with the LMA Interim Guidelines.**
11.2	Boston Env. Dept	A full IMP, not an Amendment or "revival," should be required as a matter of course and is particularly important in this dense area with ever-expanding uses and extreme traffic congestion. An IMP should be used to inform both the public and the planning study for the LMA that is presently on hiatus.	**DFCI is submitting an new IMP to the BRA for its review and approval.**
11.3	Boston Env. Dept	Much of the PNF/IMP Amendment focuses on the proposed project, giving limited attention to the scope of IMP issues. A standard IMP would include a broad plan for uses, transportation, and environmental protection during an IMP term.	**DFCI is submitting an new IMP to the BRA for its review and approval.**
11.4	Boston Env. Dept	An IMP should identify:	**Comment noted.**
11.4.1	Boston Env. Dept	the present number of full-time employees in all categories - staff, researchers, physicians, etc. Numbers should no be reported full-time equivalents (FTE). FTE is not a useful measure as it fails to provide actual employee numbers within worker categories (full-time, part-time, contract and per diem) and by facility and prevents an accurate picture of present and predicted employee vehicle trips and mode splits.	**Please see Chapter 3, Existing Campus of the IMP for a discussion of these requested items.**
11.4.2	Boston Env. Dept	the present number of part-time employees;	**Please see Chapter 3, Existing Campus of the IMP for a discussion of these requested items.**
11.4.3	Boston Env. Dept	the present number of contract employees;	**Please see Chapter 3, Existing Campus of the IMP for a discussion of these requested items.**
11.4.4	Boston Env. Dept	the number of per diem employees;	**Please see Chapter 3, Existing Campus of the IMP for a discussion of these requested items.**
11.4.5	Boston Env. Dept	the expected increase in each category for the term of the new IMP;	**Please see Chapter 3, Existing Campus of the IMP for a discussion of these requested items.**
11.4.6	Boston Env. Dept	the number of employees presently working on-campus and the number working offcampus:	**Please see Chapter 3, Existing Campus of the IMP for a discussion of these requested items.**
11.4.7	Boston Env. Dept	the square footage and use of new off -campus space that will be occupied in the	**Please see Chapter 3, Existing Campus of the IMP for a discussion of these requested items.**
11.4.8	Boston Env. Dept	Center for Life Sciences, the MIP and other off-campus areas during the term of the IMP;	**Please see Chapter 3, Existing Campus of the IMP for a discussion of these requested items.**
11.4.9	Boston Env. Dept	the current annual number of visitors;	**Please see Chapter 3, Existing Campus of the IMP for a discussion of these requested items.**
11.4.10	Boston Env. Dept	the number of visitors expected for each year during the term of the IMP;	**Please see Chapter 3, Existing Campus of the IMP for a discussion of these requested items.**
11.4.11	Boston Env. Dept	the number of employees who carpool/vanpool;	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
11.4.12	Boston Env. Dept	the number of carpool/vanpool vehicles that receive preferential parking;	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
11.4.13	Boston Env. Dept	the mode splits for each category of employee;	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
11.4.14	Boston Env. Dept	the number of on- and off-campus bicycle racks, their capacities and locations;	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
11.4.15	Boston Env. Dept	vehicle occupancy rates for employees who drive to work;	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**

IMPNF Response to Comments

#	Letter	Comment	Response
11.4.16	Boston Env. Dept	the eligibility criteria for transit pass subsidies and other TDM measures;	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
11.4.17	Boston Env. Dept	the level of subsidy represented by the parking rates charged for on- and off-campus parking based upon the $4.85/day off-campus rate and $15.23/day on-campus rate;	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
11.5	Boston Env. Dept	and all additional information gathered by the Dana-Farber and/or MASCO through surveys of other means regarding the commuting habits of employees.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
11.6	Boston Env. Dept	The IMP should specifically discuss why 76.5 percent of parking spaces are devoted to employees, why only 29 percent of employees use transit on a regular basis and propose a plan to decrease employee vehicle use and increase transit and high-occupancy vehicle commuting. We ask that Dane-Farber add to a TDM plan payroll deduction for the purchase of bicycles and accessories, the formalization of a Flextime and Telecommuting program and the initiation of Zipcar's Z2B program so that employee workday vehicle trips do not require that an employee commute in a car.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
11.7	Boston Env. Dept	The DPIR identify a time-line for parking space removal	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
11.8	Boston Env. Dept	We agree that the proposed project presents many opportunities to include sustainable elements in the design. This department has been impressed with the perspective and recommendations of Green Guide for Health Carem (htt~://www.qqhc.orq). As GGHC notes on it's Web site, "Healthcare facilities present both a challenge and opportunity in the development and implementation of sustainable design, construction and operations practices. Issues such as 24/7 operations, energy and water use intensity, chemical use, infection control requirements and formidable regulatory requirements con pose significant obstacles to the implementation of currently accepted sustainability protocols. Furthermore, it is appropriate that guidelines customized for the healthcare sector reflect the fundamental organizational mission to protect and enhance individual and community health, and acknowledge the intrinsic relationship between the built environment and ecological health. As the healthcare sector develops a design language for high performance healing environments, it has the opportunity to highlight the associated health-based benefits. This in turn can inspire the broader adoption of hea	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for further discussion.**
11.9	Boston Env. Dept	An example of a sustainable element would be a planted or "green" roofing systems. Such a system would reduce heat gain on buildings, lower cooling costs, extend the life of roofing membranes by blocking UV rays, provide added thermal and noise insulation, slow stormwater runoff and can be easthetically pleasing. This department recommends investigating how the use of green roof systems can benefit the project. Information about green roofs and about the conference can be obtained from www.greenroofs.org or from this off ice.	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for further discussion.**
11.10	Boston Env. Dept	The DPIR should identify and describe any hazardous waste conditions at the site.	**Please see Chapter 6, Environmental Protection Component.**
11.11	Boston Env. Dept	A discrete section highlighting the sustainability commitments Dana-Farber has made for the project and under the IMP should be provided.	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for further discussion.**
11.12	Boston Env. Dept	An Environmental Protection Plan would address both construction and operating periods that includes open space protection and maintenance; stormwater quality and management; erosion and sedimentation control plans; air quality protection; solid waste management; infrastructure systems; a pedestrian circulation analysis including at-grade circulation; view corridor analyses (significant for Dana-Farber's plans given the planned number of pedestrian bridges), and urban design guidelines.	**Please see Chapter 6, Environmental Protection Component.**
11.13	Boston Env. Dept	This department commends Dana-Farber on its comprehensive solid waste recycling plan.	**Thank you for your support.**
11.14	Boston Env. Dept	Exterior lighting should meet safety needs while not contributing to light pollution. Fixtures should be shielded and downward directed. We recommend as a resource, the Campaign for Dark Skies and their "Solutions and Problems: Good and bad lighting" information which can be accessed at 'http://www.star.le.ac.uk/~dbl/cfds/goodvbad,htm?60'.	**Comment noted. As part of the sustainable design initiatives and required coordination with the City of Boston, DFCI will work to minimize unnecessary lighting.**
11.15	Boston Env. Dept	We ask that "No Idling" signage be posted in parking garages, drop-off/pick-up areas and loading areas and that CO meters in parking garages be direct-read with audible and visual alarms.	**DFCI will post no idling signs in its parking garages and other key access areas.**
11.16	Boston Env. Dept	Stormwater is a primary contributor t o the condition of receiving water bodies. The Boston Water and Sewer Commission (BWSC) spends an average of $630,000.00 annually removing materials from catch basins. This cost does not include labor and general operating and maintenance costs. We ask that the proponent help t o educata the public and further improve the water quality of local water bodies by agreeing t o the permanent installation of plaques that bear the warning, "Don't Dump - Drains to Charles River." The plaques are designed for installation at any new catch basins or at stormdrains around which work will be done during construction. Information on obtaining the plaques is available from the Operations Division at the BWSC (617-989-7000). We ask for a commitment to installation for the project under review and f o r all projects that follow during the IMP term.	**Castings will be provided.**
11.17	Boston Env. Dept	Staff of the Boston Landmarks Commission agrees that the project building will have little effect on the identified historic resources. It is, however, customary to provide a list and map of resources within + mile of the project site. The DPIR and IMP should provide in discrete sections an expanded list and map using the Inventory of Historic and Archaeological Assets of the Commonwealth to identify and map historic and archaeological resources within 1/4 mile of the campus. The IMP should identify the potential effects on resources that may result from proposed projects.	**This image was presented in the previous IMPNF/PNF filing in March 2006.**

IMPNF Response to Comments

#	Letter	Comment	Response
11.18	Boston Env. Dept	Missing from PNF/IMP Amendment Table 1.5, Anticipated Permits, is the filing of an application with the Boston Landmarks Commission (BLC) pursuant to Article 85 of the Boston Zoning Code (Demolition - Delay). The demolition of the existing structures at 450 Brookline Avenue will require Article 85 review. For questions concerning the Article 85 application process please contact Richard Cecconi, Staff Architect, at 617-635-3850.	**DFCI applied for this permit and received approval in Spring 2006.**
11.19	Boston Env. Dept	The number of levels that will connect with the Smith Building is described as "most." We ask that the specific number be identified.	**Please refer to DPIR stacking sections and floor plans outlining the extent of connections to the Smith Laboratories Building.**
11.20	Boston Env. Dept	The DPIR should include wind and shadow studies to determine this building's impact on the pedestrian environment and open spaces. Shadow studies should be conducted for the standard four dates per year as limiting a study to one day per year does not provide adequate information for an appropriate review. Shadow diagrams should include a north arrow; street names; the identification of doorways, bus stops, open space and areas where pedestrians are likely to congregate; clear delineation of shadow on both rooftops and facades; clear distinctions between existing shadow and new shadow. High contrast colors and highlighted areas of overlap are most helpful. Figures depicting no build and build wind monitoring locations should be of a scale consistent with that used for shadow diagrams so that the cumulative effect of wind and shadow can be determined.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of shadow studies that were studied in connection with the project.**
11.21	Boston Env. Dept	BLC staff agrees with BRA Urban Design staff that projects in the City should be constructed with traditional building materials and techniques rather than synthetic composite materials. Simulated materials such as exterior insulated finish systems (EIFS), and glass fiber reinforced concrete (GFRC) are inconsistent with Boston architecture and are unlikely to withstand decades of the City's freeze-and-thaw climate.	**Comment noted.**
11.22	Boston Env. Dept	The BLC requests that dated cornerstones be incorporated into all new construction. This element will allow those who are attentive to and value the architecture of the City to appreciate the historical context in which structures were conceived.	**The new Center for Cancer Care facility will be fitted with a dated cornerstone as requested by the Boston Environment Department.**
11.23	Boston Env. Dept	City of Boston Code Ordinance 16-26.4 allows construction from 7:00 a.m. to 6:00 p.m., Monday through Friday unless a permit, issued on a week-by-week basis, is granted by the City of Boston Inspectional Services Department (ISD). This department receives frequent complaints about noise generated at construction sites before 7:00 a.m. Complaints show that contractors often allow workers on site before that time. Noise is frequently related to the run-up of diesel equipment and the preperation and movement of tools and materials. No sound-generating activity is allowed to occur at the site prior to 7:00 a.m.	**DFCI's Construction Management Plan denotes allowable times for construction on-site that complies with Boston Code Ordinance 16-26.4.**
11.24	Boston Env. Dept	Construction-period noise subject to regulation by the Boston Air Pollution Control Commission (APCC), part of this department. The proponent must ensure compliance with the construction-related limits as outlined in the Regulations for the Control of Noise in the City of Boston.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of construction methods that will be employed in connection with the project to minimize adverse impacts.**
11.25	Boston Env. Dept	If chemical cleaning or abrasive blasting will be a part of renovation or other projects executed during the IMP term a permit must first be obtained from the Boston Air Pollution Control Commission (APCC), located in this office.	**Comment noted.**
11.26	Boston Env. Dept	Regular vacuum cleaning of streets and sidewalks in the project area should be employed to ensure that they remain free streets of dust and debris.	**DFCI will conduct regular street and sidewalk cleaning in connection with the project.**
11.27	Boston Env. Dept	For the recycling of demolition waste and construction debris (for the current and future projects) we recommend talking with Mark Lennon of The Institution Recycling Network (IRN) at 1-866-229-1962. IRN can divert up to 95 percent of waste from a job site with the exception materials classified as hazardous. They have identified end markets for: furniture and furnishings; formed concrete, including rebar; brick and block; asphalt pavement; dimensional lumber and plywood; engineered wood products: treated wood: ceramics (sinks, toilets); mixed construction debris; ferrous scrap; non-ferrous scrap: gypsum wall board; commercial (membrane), metal and slate roofing material; asphalt roof shingles; wood and metal doors and windows: and universal waste (batteries, fluorescent lamps, ballasts).	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of recycling methods that will be employed in connection with the project to minimize adverse impacts.**
11.28	Boston Env. Dept	Construction vehicles are a substantial source of air pollutants. According to the Massachusetts Department of Environmental Protection (DEP), they contribute about 33 percent of mobile source particulate matter (PM) and ten percent of all nitrogen oxide (NO,) pollution in the northeast. More than 90 percent of diesel engine particulate emissions are highly respirable and carry toxins deep into the lung, exacerbating human respiratory ailments.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of construction methods that will be employed in connection with the project to minimize adverse impacts.**
11.29	Boston Env. Dept	The DEP's Clean Air Construction Initiative (CACI) is designed to reduce air quality degradation caused by emissions of carbon monoxide (CO), volatile organic compounds (VOC), NO, and air toxins from heavy-duty, diesel-powered construction equipment. Oxidation catalysts and catalyzed particulate filters reduce toxic emissions of formaldehyde, benzene, acrolein and 1-3 butadiene by as much as 70 percent. The CACI offers contractors a cost-effective way to decrease localized adverse impacts and reduce dust and odor complaints from project abutters and regulatory agencies. Experience with a pilot project that retrofitted 83 pieces of equipment working on the Central Artery/Tunnel (CA/T) project showed that: Vehicles did not experience significant power loss; There are no additional operation and maintenance (0 & M) or fuel costs; Engine manufacturers continue to honor vehicle warranties; More information on the CACI can be obtained from Steven Lipman, P.E. of DEP at 617-292-5698.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of construction methods that will be employed in connection with the project to minimize adverse impacts.**
11.30	Boston Env. Dept	In addition, we urge the proponent to require that contractors use low-sulfur diesel fuel (500 ppm) in off-road construction equipment.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of construction methods that will be employed in connection with the project to minimize adverse impacts.**
11.31	Boston Env. Dept	The City of Boston's is seeking t o minimize the number o f motor vehicles that enter Boston each day, currently 600,000, and to protect parking city residents. Encouraging construction workers not to drive to work does not result in the desired outcome. As part of this effort, we request that a comprehensive Transportation Demand Management (TDM) plan be established for all construction workers. Such a plan should include: Providing secure, on-site storage so that workers do not have to transport tools and equipment each day; Offering pre-tax payroll doduction for Massachusetts Bay Transportation Authority (MBTA) transit pass purchase; Providing a ride-matching service; Posting transit schedules in a prominent area.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of construction methods that will be employed in connection with the project to minimize adverse impacts.**

IMPNF Response to Comments

#	Letter	Comment	Response
12.1	Mission Hill NHS	We are pleased that the proposed building has been reduced in the size, height, and program from the previous project by leasing space outside the LMA campus and leasing existing LMA research space. We feel this building with a focus and goal of creating a new identity and entranco for Dana Farber on Brookline Avenue is appropriate. The widen sidewalks will improve the pedestrian experience and safety. The proposed ground floor retail space should be programmed to meet the immediate needs of Dana Farber's employees and visitors and should not compete with existing retail business in the Mission Hill commercial district.	**These items are presented in Chapter 3.0, Project Description of the DPIR/DEIR.**
12.2	Mission Hill NHS	Programs should he implemented to encourage Dana Farber employees and visitors to shop in the Mission Hill commercial district.	**Comment Noted.**
12.3	Mission Hill NHS	The new expanded sidewalk created along Brookline Avenue should he developed with seating and amenities chat will make this space useable for Danna Farber's employees, visitors, and the public.	**These items are presented in Chapter 3.0, Project Description of the DPIR/DEIR.**
12.4	Mission Hill NHS	Shifting the main entrance to Dana Farber from Binney to Jimmy Fund Way will have a major impact on Brookline Avenue and the intersection of Joslin Place, Deaconess Road and Jimmy Fund Way. As presented in PNF it appears that all vehicle traffic will enter the proposed building from Brookline Avenue. The Project should do a detailed analysis of this intersection, study the traffic patterns, trips, volume, etc., and present options to the City and to the project's IAG that will mitigate the impacts from this proposal.	**These items are presented in Chapter 3.0, Project Description of the DPIR/DEIR.**
12.5	Mission Hill NHS	The site for 450 Brookline Avenue is currently occupied by a two-story building and a parking lot. Since the proposed project will occupy the entire site end is a thirteen-story building all potential environmental impacts should be studied, impacts identified, and solutions proposed. Special attention should he given to shadows from the proposed building that may extend across Brookline Avenue and to Joslin Park.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
12.6	Mission Hill NHS	Construction of the proposed building will have a major impact on the immediate and surrounding community. Since the proposed building will occupy almost the entire project site additional construction constraints and challenges will create greater impacts on the community. To address these ongoing construction and community issues Dana Farber should form a Community Construction Mitigation Task Force representative of the immediate end surrounding residential community. This Task Force should be formed to review and assist with the creation of the project's Construction Mitigation Plan. The Plan should include specific solutions to address the impact from construction vehicle deliveries, truck staging and lay-down areas, noise and dust, construction worker parking, etc. The Plan should address the issues of pedestrian safety during construction and identify any street and sidewalk takings during construction. This Task Force should meet periodically during the construction of the project to monitor the Plan and report impacts and deficiencies.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of construction methods that will be employed in connection with the project to minimize adverse impacts.**
12.7	Mission Hill NHS	With the dramatic increase in existing rental housing being occupied by students h m local colleges and institutions the need for additional affordable family style housing in Mission Hill has never been greater. To assist with meeting this need for more affordable housing in Mission Hill the housing linkage payments for this project should be allocated to the impacted neighborhood of Mission Hill. Housing funds should be disbursed as housing creation agreements to designated projects in Mission Hill. Mission Hill Neighborhood Housing Services would like to discuss potential projects with Dana Farber and the City.	**Comment noted. DFCI is open to meeting with nay community group to understand how they can better serve the area.**
12.8	Mission Hill NHS	Mission Hill has a number of well established community-based organizations that provide needed workforce and career development programs. These organizations have formed the Mission Hill Jobs Collaborative with the goal of working together with local institutions. To support the successful workforce development programs of the Mission Hill Jobs Collaborative the job linkage payments for this project should be provided to these organizations. In addition Dana Farber's existing career development and education training initiatives should be focused and directed to the Mission Hill neighborhood, schools, community-based organizations, and agencies. Dana Farber should identify the various skill levels of the new jobs created by this project and the number of Mission Hill residents to be hired at the various skill levels. Dana Farber should periodically report the results of their employee training programs through their Workforce Development Plan. Dana Farber should establish annual hiring goals for Mission Hill residents. Mission Hill Neighborhood Housing Services would like to request that Dana Farber and the City meet with the Mission Hill Jobs Collaborative to discuss program fu	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
13.1	Roxbury Tenants	Roxbury Tenants of Harvard is the only neighborhood directly abutting the Longwood Medical Area, and as such bears a disproportionate burden of traffic, noise and air pollution, and continued loss of green space due to institutional expansion. The Dana Farber expansion can not help but contribute to this burden.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
13.2	Roxbury Tenants	Increased rodent activity in the neighborhood is inevitable during any significant construction project. We ask that in addition to the required rodent control program, DFCI perform additional treatments if an increase in activity is seen in RTH buildings.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
13.3	Roxbury Tenants	Traffic back-ups on Brookline Avenue and Binney Street have the potential to spill over onto Francis Street and Fenwood Road. We ask that specific measures, including signage and Boston Police Details, be implemented to allow these streets to maintain traffic flow at all times.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
13.4	Roxbury Tenants	The PNF identifies that no on-site parking will be provided for construction workers; contractors are responsible for devising access plans that de-emphasize auto use. We ask that DFCI, BTD and BPD work together to ensure that resident parking restrictions on Francis Street, Fenwood Road, and St. Albans Road are enforced.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
13.5	Roxbury Tenants	Noise and vibration carry into the neighborhood from as far away as Brookline Avenue. We ask that construction activities producing noise and vibration be kept to the daytime hours whenever possible; and that the neighborhood be notified in advance when this work is performed between the hours of 7pm and 7am.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of construction methods that will be employed in connection with the project to minimize adverse impacts.**
13.6	Roxbury Tenants	The lack of affordable housing in the Mission Hill area continues to be a serious problem. As you know, over the last three decades RTH has created over 900 units of affordable housing for low and moderate income people. In order to help meet the need for more affordable housing in this community, we ask that the linkege payments for this project be directed to the most directly impacted area of Mission Hill. To that end, RTH would like to begin negotiations with the Dana Farber and the City of Boston to discuss development of affordable housing on a parcel owned by RTH located at 761-775 Huntington Avenue.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**

IMPNF Response to Comments

#	Letter	Comment	Response
14.1	Harrison Lee MHH	I am encouraged by the proposed two story healing garden facing Joslin Park and hope that DFCI continue to look for ways to support this and other green passive spaces. I would like DFCI to consider expanding the pathway bridges to accommodate some amount of space for observation, plantings and break activity.	**DFCI will evaluate opportunites to accommodate these requests where resonably feasible.**
14.2	Harrison Lee MHH	I also ask that the proponents incorporate as much sustainable design as possible and try to be a leader in the LMA for LEED certification attainment. The Joslin Diabetes Center Draft PNF/IMP/EIR has outlined many potential solutions to LEED certification.	**Please refer to Chapter 8, Sustainable Design.**
14.3	Harrison Lee MHH	Parking design should encourage the use of smaller vehicles, electric vehicles, motorcycles, scooters and bicycles.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
14.4	Harrison Lee MHH	It is also noteworthy to ask that the proponents look at the Final Environmental Impact Report of the City of Boston, Town of Brookline Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement, and Historic Preservation Project EOEA #11865. It is not sufficient to say that the project "are within a fully developed urban area and will not impact wildlife habitats." The Muddy River should be one of the recipients to the growth of the LMA through such organizations as the Emerald Necklace Conservancy, Friends of the Muddy River and the Charles River Watershed Association.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested Items.**
14.5	Harrison Lee MHH	The proposed project of 275,000 square feet and 455 underground parking spaces at 450 Brookline Avenue is in line with many similar projects proposed or underway in the LMA. The intersection of Brookline Avenue and Frances Street is already quite congested with Brigham and Women's Hospital, Center for Life Sciences and Joslin Diabetes Center expansion and construction activities. The proposed project will not create new challenges for many of the neighborhood intersections. I strongly encourage as part of this proposal for DFCI to specifically request that MASCO, BTD and DFCI's human resources department and internal logistics develop standards for reducing vehicular traffic. Alternative approaches must be developed to alleviate congestion for neighbors, patients, suppliers and employees.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
14.5.1	Harrison Lee MHH	Specifically local walk to work programs must be developed and local residents employed and/or employees encouraged to live in the neighborhood.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested Items.**
14.5.2	Harrison Lee MHH	Local Walking routes should be evaluated for year round accessibility and usability, and security.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
14.5.3	Harrison Lee MHH	Bicycle routes should be mapped out evaluated for safety and incentives should be in place for employees to engage them. Employee showers and chenge rooms should be part of the expansion plan for this project.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
14.5.4	Harrison Lee MHH	MBTA routes should be evaluated for effectiveness, alternatives and timeliness. Employee incentives should be increased to the point of a balance in increased parking for patients and decreased vehicular traffic by employees.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
14.5.5	Harrison Lee MHH	Collaboration with other hospital vans and shuttle buses should be developed with a one-pass type system. I.e. the MASCO-CARD, which would enable a member institution employee access to other institution transportation and parking alternatives.	**Please refer to Chapters 5.0 and 7.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
14.5.6	Harrison Lee MHH	I believe that if traffic flow standards are not reached the LMA institutions should be mandated by the BTD to fund police details or other solutions to expedite traffic flow and accommodate pedestrian safety.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
14.5.7	Harrison Lee MHH	Telecommute options should be explored and state of the art communication equipment, conference centers should be developed to reduce the need for physical visits, but still enable the transfer of vital information.	**comment noted.**
14.6	Harrison Lee MHH	The finished result of this and many of the abutting projects is going to be more pollution on the local neighborhood. I challenge DFCI and MASCO to continually evaluate its fleet of vehicles end suppliers and look at alternative fuels or systems that will reduce pollution levels for all. In addition local incentives for pollution reduction could be created through the Boston Building Materials Coop which could encourage local residents and property owners to upgrade heating equipment and reduce energy costs by green technology with financial incentives provided by LMA expansion projects. Many pollution sources could be eliminated such as older vehicles, older furnaces, #2 fuel oil burning equipment, two-stroke lawn equipment, and diesel vehicles including delivery and service ambulances.	**DFCI continually evaluated its fleet of shuttle and delivery vehicles as well as its utilities systems to understand if there are more efficient and environmentally responsible ways to fulfill these needs. As such, the proposed Center for Cancer Care is being planned to include many sustainable design initiatives with the goal to achieve a LEED "Silver" status.**
14.7	Harrison Lee MHH	It is time that the City requests the LMA to develop a baseline standard to measure the impact of large developments and increased traffic flow. I propose that MASCO or the City of Boston develop or expand an air quality testing protocol similar to the EPA Monitoring program in Dudley Square the EPA has had a site operating for at least 5 years (http://www.airbeat.org/). MASCO member institutions could fund and monitor some simple PM2.5 and Ozone data equipment placed at strategic locations such as the Farragat School, the Tobin Middle School and the Windsor School end develop a base line pollution level. It would then be up to the development proponents to fund projects that would allow their expansion while maintaining or reducing emission levels.	**Comment noted.**
14.7.1	Harrison Lee MHH	At a minimum for this project such environmental air quality background air monitoring testing should begin before construction, during construction and be reevaluated after completion of the project.	**Comment noted.**
14.8	Harrison Lee MHH	The Harvard School of Public Health, Wentworth Institution of Technology and Northeastern University and private environmental firms have the ability and the knowledge to monitor such deta. Institutionel employees and local residents all breathe the same air, fight the same traffic and face the same hazards while walking the streets. We need to acknowledge the problem and find solutions before asthma and lung cancer rates increase.	**Comment noted.**

IMPNF Response to Comments

#	Letter	Comment	Response
14.9	Harrison Lee MHH	Another potential community benefit outlined in the PNF/IMPA is job creation. This training and notification of possible employment opportunities should begin right now. Potential employment opportunities should be outlined by DFCI and local residents should begin seeking the training they will need to qualify for employment from janitor to J.D. These opportunities should be collaborated with Roxbury Community College, Wentworth Institute of Technology, Northeastern, Boston Public Schools and other local non-profit education providers to develop and ongoing training I commitment to workforce development and career preparation.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
14.10	Harrison Lee MHH	In conjunction with job creation comes local education. DFCI should continue their important mission of cancer prevention by further funding and implementing the great programs already in place such as; the Breast and Cervical Screening collaborative, Boston Mammography Van, Prostate Cancer Outreach and Screening and DFCI Patient Navigators among others outlined in the PNF/IMPA.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
14.11	Harrison Lee MHH	I also encourage DFCI to open the doors of the facility once a year for a neighborhood night where local residents can come in and learn about programs available to them, potential career tracts, prevention guidelines and where residents can share concerns about quality of life issues and concerns.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
14.12	Harrison Lee MHH	Many of these ideas are more than one development should address, but that has been the concern of many of my neighbors, we are asked to comment on one great institution at a time. It is hard to deny the fact that each medical institution serves noble causes. It is also undeniable that the cumulative effect of multiple developments in our neighborhood has some potentially dangerous environmental and social impacts. We all appreciate the many community benefits that each project potentially offers, but we are now asking for the City and institutional collaborative representatives to look deep into the future and address some of the quality of life issues that we have brought to your attention.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
14.13	Harrison Lee MHH	I will forgo the bureaucracy of creating a new Master Plan, under the agreement that local institutions consider to begin to fund and find solutions to our complex neighborhood issues in return.	**comment noted.**
15.1	MASCO	DFCI proposes to remove two small buildings from underutilized parcels which have a prominent location on Brookline Avenue. The proposed replacement building appears to be a handsome, appropriately scaled complex, which will significantly improve the urban design of the area, with generous sidewalks, open spaces and finally, a main entrance to the Institute that will be legible to the public. Their proposal includes what look to be some very smart ideas for traffic management and building operations, including a small curbside drop-off area on Jimmy Fund Way for patients and visitors; a full-scale valet parking operation in a modestly sized below-grade garage; and, added lane capacity to Jimmy Fund Way.	**comment noted.**
15.2	MASCO	The existing and proposed pedestrian bridges, underground connection between the proposed project and Dana Building, and connectivity between floors of the proposed building and Smith Building may also have transportation benefits by eliminating multiple, on-street, drop-off locations and consolidating delivery areas.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
15.3	MASCO	Provide information about current campus loading activities at Shields Warren building by time of day, type of truck and type of delivery, as well as this level of detailed information about campus wide delivery changes in the future including just-in-time deliveries, and the expanded loading docks on Binney Street at the Smith Building, to serve the needs of 450 Brookline Avenue. Identify potential impacts on traffic.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
15.4	MASCO	Provide more information about how the Jimmy Fund Way curbside drop off will function and how it will be managed to not affect traffic on Brookline Avenue.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
15.5	MASCO	Provide information about the traffic impacts of the garage on the area, and analysis of proposed mitigation including a potential left turn on Brookline Avenue outbound and an additional lane on Jimmy Fund Way westbound, as well as other measures proposed to mitigate the traffic impacts of their project including Transportation	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
15.6	MASCO	Provide information on the transportation network benefits, related to proposed pedestrian bridges and connection under Jimmy Fund Way in terms of reduced street impacts for drop-off and loading activities and impacts on the pedestrian environment.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
15.7	MASCO	Identify how jobs have grown at DFCI in the past five years, what is the job growth anticipated with this master plan, and specifically with the proposed project? Describe some of the workforce development initiatives that DFCI has in place now or is contemplating.	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
15.8	MASCO	Provide shadow and wind studies that identify the impacts, if any, of the new building on the LMA's open space and pedestrian environment.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a comprehensive summary of shadow and wind analyses.**
15.9	MASCO	Provide a more developed site plan that shows how additional trees, greenery and pedestrian oriented seating could be planned around their site on Brookline Avenue and Jimmy Fund Way, in particular, to make this a show piece for the LMA.	**A summary of urban design features to be implemented in connection with the Center for Cancer Care project are presented in Chapter 4.0 of the DPIR/DEIR.**
16.1	Sarah Hamilton (MASCO)	Provide information about current campus loading activities at Shields Warren building by time of day, type of truck and type of delivery, as well as this level of detailed information about campus wide delivery changes in the future including just-in-time deliveries, and the expanded loading docks on Binney Street at the Smith Building, to serve the needs of 450 Brookline Avenue. Identify potential impacts on traffic.	**A summary of urban design features to be implemented in connection with the Center for Cancer Care project are presented in Chapter 4.0 of the DPIR/DEIR.**
16.2	Sarah Hamilton (MASCO)	Provide more information about how the Jimmy Fund Way curbside drop off will function and how it will be managed to not affect traffic on Brookline Avenue.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
16.3	Sarah Hamilton (MASCO)	Provide information about the traffic impacts of the garage on the area, and analysis of proposed mitigation including a potential leftturn on Brookline Avenue outbound and an additional lane on Jimmy Fund Way westbound, as well as other measures proposed.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**

IMPNF Response to Comments

#	Letter	Comment	Response
16.4	Sarah Hamilton (MASCO)	Identify how jobs have grown at DFCI in the past five years, what is the job growth anticipated with this master plan, and specifically with the proposed project?	**A summary of urban design features to be implemented in connection with the Center for Cancer Care project are presented in Chapter 4.0 of the DPIR/DEIR.**
16.5	Sarah Hamilton (MASCO)	Provide shadow and wind studies.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a comprehensive summary of shadow and wind analyses.**
17.1	David Welch	I like this project! I believe it makes best use of an underutilized and unattractive parcel. I also feel the design "fits in" with the rest of the LMA buildings.	**comment noted. Thank you.**
17.2	David Welch	I would like to see the VHB proposal for mitigating the traffic problem on Brookline Ave. in front of BI/Deac and Joslin.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
17.3	David Welch	I would like to see as much "greenery" as possible added to the two street sides of the project.	**A summary of urban design features to be implemented in connection with the Center for Cancer Care project are presented in Chapter 4.0 of the DPIR/DEIR.**
17.4	David Welch	If there is a community benefits component generated by this project, I would like consideration given to endowing Puddingstone Park on Mission Hill.	**DFCI will consider this request in the context of our evolving Community Benefits package that is being pulled together in connection with the filing of our IMP.**
17.5	David Welch	We do not need more housing, we need upkeep on the open space that is left. (My opinion)	**Please see Chapter 8, Community Benefits of the IMP for a discussion of these requested items.**
18.1	CWRA	It is our understanding that the stormwater from this site drains, via the Boston Water and Sewer Commission's municipal storm drain system, into either the Muddy River conduit and out to the Charles River; or, during larger storm events, into the Muddy River Fens and then out to the Charles River via Charlesgate. In either case, stormwater from the site enters and impacts the Muddy River and its drainage network. As you are undoubtadly aware, there are significant and long-standing flooding and water quality problems in the Muddy River. The US Army Corps of Engineers is currently in the process of designing a dredging and environmental restoration project for the entire Muddy River that is estimated to cost well over $60 million. The Muddy River Restoration project is needed to reduce significant flood hazards, to improve water quality, to restore degraded habitat, and to remove sediments that have accumulated in the Muddy River. Most of these problems are a direct result of stormwater discharges into the Muddy River. Any redevelopment that is proposed in areas that drain directly into the Muddy River system, therefore, needs to focus carefully on stormwater management issues	**Please refer to Chapter 7 for a discussion on Stormwater Management and Chapter 8 for related Sustainable Design Initiatives.**
18.2	CWRA	The PNF/IMP Amendment document mentions that the DPIR will evaluate the project impact on the Muddy River but does not make any reference to putting together a stormwater management program to ensure that every effort will been made to protect the River from flooding and water quality impairments. It is our hope that the DPIR will study various alternatives to enhance stormwater management on the site so as to demonstrate how improvements will be made over the existing conditions.	**Please refer to Chapter 7 for a discussion on Stormwater Management and Chapter 8 for related Sustainable Design Initiatives.**
18.3	CWRA	We feel that the Article 80 Project Impact Review is the appropriate process for a full analysis of the stormwater management program. The DPIR should include specific, detailed information and alternatives analyses of stormwater management on the site. Stormwater management should aim to maximize infiltration, slow runoff from the site, maximize the use of vegetation, capture rooftop runoff for irrigation, and minimize sediment and nutrient loading. We suggest that the DPIR include more documentation about the proposed stormwater management program including:	**Please refer to Chapter 7 for a discussion on Stormwater Management and Chapter 8 for related Sustainable Design Initiatives.**
18.3.1	CWRA	Detailed information about the final design of the proposed stormwater management infrastructure including the location and design of drains, catch basins, water quality structures, and infiltration structures;	**Please refer to Chapter 7 for a discussion on Stormwater Management and Chapter 8 for related Sustainable Design Initiatives.**
18.3.2	CWRA	Detailed information about any surface stormwater management features such as swales, vegetative filter strips, rain gardens, permeable pavement or vegetated storage areas;	**Please refer to Chapter 7 for a discussion on Stormwater Management and Chapter 8 for related Sustainable Design Initiatives.**
18.3.3	CWRA	An assessment of the opportunities to reduce even further the peak flows and volume of stormwater runoff, including estimates of the impacts in a one-year storm;	**Please refer to Chapter 7 for a discussion on Stormwater Management and Chapter 8 for related Sustainable Design Initiatives.**
18.3.4	CWRA	An assessment of how the site could meet DEP's stormwater management policy in its entirety, not just "to the maximum extent practicable;"	**Please refer to Chapter 7 for a discussion on Stormwater Management and Chapter 8 for related Sustainable Design Initiatives.**
18.3.5	CWRA	A plan to minimize the primary pollutants of concern for the Muddy River, sediments and nutrients;	**Please refer to Chapter 7 for a discussion on Stormwater Management and Chapter 8 for related Sustainable Design Initiatives.**
18.3.6	CWRA	A maintenance plan for the stormwater management plan.	**An operations and maintenance plan will be developed for use by DFCI following BWSC Site Plan Approval.**
18.4	CWRA	This project is proposed to have a 7 level underground parking garage and a system of tunnels connecting the adjoining campus buildings. While there are many significant aesthetic benefits to underground parking, there are important environmental issues both during and post- construction that need to be addressed. The location of this project in an area of historic fill, and the ongoing problems throughout many areas of the City with groundwater levels, make it all the more important that this aspect of the project be designed with the utmost care and in anticipation of any potential impacts.	**Please refer to Chapter 6 for a discussion about groundwater issues.**
18.5	CWRA	The project needs to be designed to minimize groundwater impacts from the project, and the proponent should commit to working closely with abutters and the Boston Groundwater Trust to ensure that there are no alterations to groundwater levels as a result of the project. Since the LMA in on the border of the City's "Groundwater Overlay District", similar recharge standards need to be applied to all redevelopment projects within the LMA. Investigations should also include the potential seasonal changes in groundwater levels, as well as potential effects on groundwater flow. In some areas of Boston, construction of subsurface projects such as tunnels, underpasses and even some building foundations have altered groundwater flow patterns, resulting over time in changes to ambient groundwater levels. Groundwater flows are extremely slow so alterations may occur over years.	**Please refer to Chapter 6 for a discussion about groundwater issues.**

IMPNF Response to Comments

#	Letter	Comment	Response
18.6	CWRA	The DPIR and the Scoping Determination for the IMP Amendment should include an assessment of groundwater flow directions, as well as a determination of whether those directional flows change seasonally. If the project shows any potential for altering flows, either slowing or reducing flows into the Muddy River, or conversely reducing flows back into the ground during periods of high groundwater, or causing any groundwater "mounding," the DPIR should document a mitigation plan for any such alterations. In addition, the DPIR should specify what source of water would be used should groundwater recharging be necessary during or after construction.	**Please refer to Chapter 6 for a discussion about groundwater issues.**
18.7	CWRA	Given that the parking structure will underlay much of the project, opportunities for onsite infiltration of stormwater may be minimal. If so, the DPIR should evaluate the possibility of seeking off-site locations for groundwater recharge and stormwater infiltration. Finally, a detailed plan for the treatment and disposal of water from dewatering activities should be included in the DPIR.	**Please refer to Chapter 6 for a discussion about groundwater issues.**
18.8	CWRA	The project will increase not only the vehicular traffic in the area, but also the number of pedestrians, and will likely increase the use of the Emerald Necklace Parks, including the Fenway. This park system is already heavily used, and is in need of significant capital and operations improvements. We suggest that Dana Farber Cancer Institute work with the BRA, the Boston Park and Recreation Commission, the Medical Academic and Scientific Community Organization (MASCO), the Fenway Alliance, and the Emerald Necklace Conservancy to develop a program to support the improvement of maintenance and management of the park system to mitigate this increased use and to provide support for the community-wide effort that is underway to bring this park system up to an acceptable community standard. This contribution could be made as a linkage payment (as a part of the public benefits package) or through the implementation of a specific capital improvement project for improving access to and maintenance of the park or for environmental restoration projects in the LMA as a whole.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
18.9	CWRA	While there is some discussion on measures for energy conservation and sustainable design in the PNF and IMP Amendment document, there are no specifics provided on what kinds of best management practices and technologies will be incorporated at the building, the individual site and the overall campus level. The Scoping Determination for the IMP Amendment and the DPIR need to explicitly define what the project aims to achieve in terms of standards for environmental sustainability on the three levels mention above as well as how the project will determine indicators for sustainability. While the LEED system provides one metrics for incorporating green building standards and requirements, if the proponent feels that given the programmatic constraints of the building LEED might not be an appropriate system to follow, the Green Guide for Health Care might provide a more suitable framework.	**Please refer to Chapter 8, Sustainable Design.**
18.10	CWRA	In addition to fulfilling requirements related to stormwater management on site, the green building standards should be adopted for wastewater reuse for flushing toilets etc. (through double plumbing the building) as well as capturing, filtering and storing roof run-off. CRWA would encourage the proponents to consider a green roof for not only the new 454 Brookline Ave. building but also as a retrofit for all other buildings on its campus. Given that there is such a dearth of green / open space in the LMA as a whole, green roofs would not only provide cleaner roof runoff and reduce the urban heat island effect in the LMA but also provide an aesthetically pleasing amenity for the building occupants as well as habitat for birds and insects.	**Please refer to Chapter 8, Sustainable Design.**
18.11	CWRA	This project offers a huge potential to expand the purview of green practices from individual building scale to looking a "greening of infrastructure" at an overall neighborhood Level. Through retrofitting the entire campus area with Low Impact Development (LID) best management practices, the proponent can achieve a much lager impact than the cumulative impact of a collection of individual green buildings.	**Please refer to Chapter 8, Sustainable Design.**
19.1	Fenway CDC	Fenway CDC has no objections to the proposed Center for Cancer Care at 454- 462 Brookline Ave in Boston. DFCI's openness in sharing the details of the project history and design is appreciated. It is a major indicator of DFCI's efforts to be a good neighbor. We hope our comments provided below will facilitate the PNF/IMPA process.	**Thank you for your support.**
19.2	Fenway CDC	The need for a buffer system against vibrations generated by equipment in the Advance Energy Systems Total Energy Plant www.matep.com/history next door to the project site is explained on page 4-1 7 of the PNF/IMPA. The system is necessary to maintain the integrity of lab equipment and experiments that result there from. Installation has to be handled with precision during the initial construction of the foundation so that there is no backtracking to remedy errors.	**comment noted.**
19.3	Fenway CDC	DFCI advocacy for improved mass transit to move increased numbers of staff and clients in and out of the area is appreciated. DFCI influence in the campaign to upgrade the Yawkey Way commuter rail station is crucial. This, in conjunction with strict adherence to the proposed parking ratios (table 4.5, p.4-12) will improve parking ratios and ultimately the overall traffic impact.	**comment noted.**
19.4	Fenway CDC	A shadow impact on the immediate area is acknowledged. Since all adjacent buildings are institutional properties and not on residential properties or park land they are not a significant concern for Fenway CDC.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
19.5	Fenway CDC	The new building should include "green' design and construction features, including those measured in the Leadership in Energy and Environmental Design (LEED) rating. DFCI can pursue this course of action in cooperation with Harvard Medical School's Green Campus Initiative.	**Please refer to Chapter 8, Sustainable Design.**
19.6	Fenway CDC	DFCI's financial support and participation in the Health Care and Research Training Institute (a project in which Fenway CDC is a partner) should continue and expand, particularly support for pre-employment training and placement of residents from the Fenway and other surrounding neighborhoods. This will not only provide good jobs with career advancement potential for community residents, it will also increase the number of DFCI employees who can walk to work.	**comment noted.**
19.7	Fenway CDC	A portion of Housing Linkage as well as any "extraordinary" contribution to housing associated with the project should support the development of housing within walking distance of the LMAA.	**comment noted.**
20.1	Joslin Diabetes Center	As you know, the Joslin Diabetes Center is planning its own large building project, construction of which may overlap, to some extent, with Dana-Farbers proposed project. Despite the short-term inconveniences that may be experienced with these, and other building projects underway in the Longwood Medical Area (LMA), the Joslin Diabetes Center is strongly supportive of the Dana-Farber project.	**Thank you for your support.**

IMPNF Response to Comments

#	Letter	Comment	Response
20.2	Joslin Diabetes Center	The Dana-Farber is world-renowned for their clinical care and research activities. Together with Dana-Farbers Longwood Medical Area institutional neighbors, the Dana-Farber is an essential element to ensuring the continued growth, increased reputation and heightened viability of the City of Boston. This project will allow Dana-Farber to generate even more jobs, bring more business into the City in the form of patient visits; and enhance the City of Boston's reputation as the world's leader in academies, research, and medicine.	**comment noted. Thank you.**
20.3	Joslin Diabetes Center	This project is essential to ensure that Dana Farber can continue to function in an organized and efficient fashion. By building at the proposed 450 Brookline Avenue site, Dana-Farber can effectively integrate to it's existing campus, leveraging utilization of already existing common features of its current campus, such as loading docks and other supports, while providing more a prominent, easier to locate, and a more architecturally appealing presence on Brookline Avenue. In addition, this project provides an enhanced ability for patients and employers to move from institution to institution resulting in better, more highly integrated patient care and research.	**comment noted. Thank you.**
20.4	Joslin Diabetes Center	The City of Boston has achieved its recognition as the world's leader in academics, medicine, and medial research in part due to the presence of organizations like the Dana-Farber. Further growth is essential to preserve that reputation and there is no more appropriate location for that growth than at the proposed location in the heart of the LMA. It is our opinion that the City of Boston and the communities that surround Me LMA receive innumerable benefits from the continued presence end expansion of the Dana Farber. While this growth presents challenges for us all to find more and better way6 to deal with the lesser issues associated with growth such as parking, transportation, and the inconveniences associated with large building projects, we should not lose sight of the significant benefits that projects such as these bring to the area, the local communities, the city and state.	**comment noted. Thank you.**
21.1	Kate Weldon LeBlanc	They have made a strong case for their need to update and expand their physical space to make more accessible for patients and staff alike.	**comment noted. Thank you.**
21.2	Kate Weldon LeBlanc	I also am grateful that they seem to be very mindful of making the project a visually appealing contribution to the area.	**comment noted. Thank you.**
21.3	Kate Weldon LeBlanc	I have full confidence that they will take efforts to minimize negative effects on the LMA and surrounding neighborhoods, and will invest in appropriate mitigation to support our community.	**comment noted. Thank you.**
21.4	Kate Weldon LeBlanc	On a personal level, my father was given the highest quality, compassionate care at the Dana-Farber in the late 1980s when he battled lymphoma. I have always been grateful for the care he received there, and also enormously proud that this world-class institution is one of our "neighbors".	**comment noted. Thank you.**
22.1	Alison Pultinas	More than 12 years have passed since the previous IMP, what is expired cannot be "revived", a new Master Plan should be submitted. Expecting that this "amendment" to a document submitted in 1994 can substitute for a full IMP is wishful thinking. The mandated public review process for thoughtful planning for growth shouldn't be sidestepped.	**DFCI is submitting a new IMP to the BRA for their review and approval.**
22.2	Alison Pultinas	In 1993, the City's Environment Dept. strongly encouraged DFCI to aim for at least a 10 % employee walking/cycling mode share and recommended no more than one net new parking space per 3000 square feet of new building space - a much stronger stance than the "Interim Guidelines" maximum .75 per 1000 gsf. If the goal in fact is for LMA institutions to achieve a .75 ratio campus wide, then the city must be vigilant to restrict new parking to an even lower ratio. Otherwise, the predicted future conditions inevitably surpass the target [for example, BWH- .95, DFCI- .90, and that is only after the Dana Building parking is vacated].	**comment noted.**
22.3	Alison Pultinas	A critical Master Plan requirement is a timetable for proposed projects that includes the estimated month and year of construction start and the construction completion for each project. The description of phasing, page 3-3, "DFCI plans to consolidate main campus parking in the new building by closing the Dana building garage...within the terms of this amended IMP, but sometime after the completion and occupancy of 450 Brookline " is shamelessly vague. If the Dana Building infill project (pages 1-5 and 1-6), is projected to begin 5-7 years after the Center for Cancer Care is completed (expected date 2011); the 213 spaces will not be taken out of service until 2016 at the earliest.	**These spaces will be taken out of service once the new, replace spaces are put in place and operational. This will likely occur in 2011.**
22.4	Alison Pultinas	#1 concern- new LMA parking facilities - combined impacts from each new development contribute significantly to traffic congestion, each proposal can't be looked at in isolation. Garage queues and drop off driveway queues must be kept off the street because of impact on roadway operations specifically the bus service on Brookline Avenue.	**comment noted.**
22.5	Alison Pultinas	Do the "Interim Guidelines" trump previous strategies to limit excess parking? Is the "restricted parking" district zoning effective? More information should be provided on the request for conditional zoning approvals - the significance of "restricted parking district" and requirement that accessory uses cannot occupy more than 25 % of parcel 2.	**comment noted.**
22.6	Alison Pultinas	Parking supply- despite the general obfuscation the facts indicate an excessive number of new spaces although lack of information make it nearly impossible to evaluate. For example, what is the ratio of new parking and expected new employees at 450 Brookline? Does the inventory include spaces leased to others (BWH parking in Smith garage)?	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
22.7	Alison Pultinas	Where is the information on parking demand and expected users- employee or outpatient? Employee mode splits should be detailed and expected demand described for peak periods and all work shifts, what are the goals for carpool share? What are the existing percentage shares for each mode? Employees arriving by automobile at the Crosstown Garage or Longwood Towers for example, should not be counted as walk/transit, all traffic entering the urban core is relevant because of air quality impacts. Staff mode shares should be compared to other LMA institutions.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
22.8	Alison Pultinas	Have the goals of the 1994 TAPA been achieved?	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
22.9	Alison Pultinas	Data from the required monitoring reports submitted to BTD on the efforts to achieve the "Commuter Mobility Objectives- 45% or fewer employees in SOVs, should be included in the IMP.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**

IMPNF Response to Comments

#	Letter	Comment	Response
22.10	Alison Pultinas	The new facility will add 425 spaces to the existing 814 on campus. How many of these are designated for employees and how many for patients and visitors? According to the tables on page 4-8, of the current 814 on campus, 474 are for staff and 340 for patients. The IMP should describe the actual parking supply for each year of the Master Plan, approvals shouldn't he based on "potential" scenarios (page 4-10).	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
22.11	Alison Pultinas	Parking rates should be structured to encourage short-term patient/visitor (less than 3 hrs) over long term parking, priority must be directed towards convenient patient parking. Could patients and visitors as well as staff utilize the DFCI shuttles from Brookline Place? The 30-minute frequency is comparable to the public bus schedules.	**DFCI already utilizes a parking rate structure that attempts to achieve this described effect.**
22.12	Alison Pultinas	Other concerns include the impacts on ground water, shadows on nearby open space and historic resources and the relationship between the new construction and the MATEP facility (whether the air quality at street level will change).	**Impacts to groundwater and historic resources are discussed in Section 6 of the DPIR/DEIR.**
23.1	John Walser	A quantitative (wind tunnel) analysis of the potential pedestrian level wind impacts shall be required for the DPIR. This analysis shall determine potential pedestrian level winds adjacent to and in the vicinity of the project site and shall identify any areas where wind velocities are expected to exceed acceptable levels, including the Authority's guideline of an effective gust velocity of 31 mph not to be exceeded more than 1 % of the time.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.1.1	John Walser	Particular attention shall be given to public and other areas of pedestrian use, including, but not limited to, the entrances to the project building(s) and existing and proposed buildings, sidewalks and walkways in the vicinity of and adjacent to the Proposed Project, and all existing and proposed plazas, park areas (e.g., Joslin Park), and other open space areas within and in the vicinity of the proposed development.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.2	John Walser	The wind impact analysis shall evaluate the following conditions:	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.2.1	John Walser	1. No-Build -the existing condition of the site and environs to establish the baseline condition.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.2.2	John Walser	2. Future Preferred Build Condition -the proposed development as described in the Expanded Environmental Notification Form/Project Notification Form.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.2.3	John Walser	3. Alternative Build Condition(s) - any alternative development concept(s) to the Preferred Build Condition required to be studied.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3	John Walser	The wind tunnel testing shall be conducted in accordance with the following guidelines and criteria:	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.1	John Walser	Data shall be presented for both the existing (no-build) and for the future build scenario(s) (see above).	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.2	John Walser	The analysis shall include the mean velocity exceeded 1 % of the time and the effective gust velocity exceeded 1 % of the time. The effective gust velocity shall be computed as the hourly average velocity plus 1.5 x root mean square variation about the average. An alternative velocity analysis (e.g., equivalent average) may be presented with the approval of the Authority.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.3	John Walser	Wind direction shall include the sixteen compass points. Data shall include the percent or probability of occurrence from each direction on seasonal and annual bases.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.4	John Walser	Results of the wind tunnel testing shall be presented in miles per hour (mph).	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.5	John Walser	Velocities shall be measured at a scale equivalent to an average height of 4.5-5 feet.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.6	John Walser	The model scale shall be such that it matches the simulated earth's boundary and shall include all buildings within at least 1,600 feet of the project site. All buildings taller than 25 stories and within 2,400 feet of the project site should be placed at the appropriate location upstream of the project site during the test. The model shall include all buildings recently completed, under construction, and planned within 1,500-2,000 feet of the project site. Prior to testing, the model shall be reviewed by the Authority. Photographs of the area model shall be included in the written report.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.7	John Walser	The written report shall include an analysis which compares mean and effective gust velocities on annual and seasonal bases, for no-build and build conditions, and shall provide a descriptive analysis of the wind environment and impacts for each sensor point, including such items as the source of the winds, direction, seasonal variations, etc., as applicable. The report shall also include an analysis of the suitability of the locations for various activities (e.g., walking, sitting, standing, driving etc.) as appropriate, in accordance with recognized criteria (Melbourne comfort categories, or equivalent).	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.8	John Walser	The report also shall include a description of the testing methodology and the model, and a description of the procedure used to calculate the wind velocities (including data reduction and wind climate data). Detailed technical information and data may be included in a technical appendix but should be summarized in the main report.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.9	John Walser	The pedestrian level wind impact analysis report shall include, at a minimum, the following maps and tables:	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.9.1	John Walser	- Maps indicating the location of the wind impact sensors, for the existing (no-build) condition and future build scenario(s).	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.9.2	John Walser	- Maps indicating mean and effective gust wind speeds at each sensor location, for the existing (no-build) condition and each future build scenario, on an annual basis and seasonally. Dangerous and unacceptable locations shall be highlighted.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.9.3	John Walser	- Maps indicating the suitability of each sensor location for various pedestrian-related activities (comfort categories), for the existing (no-build) condition and each future build scenario, on an annual basis and seasonally. To facilitate comparison, comfort categories may be distinguished through color coding or other appropriate means. In any case, dangerous and unacceptable conditions shall be highlighted.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.3.9.4	John Walser	- Tables indicating mean and effective gust wind speeds and the comfort category at each sensor location, for the existing (no build) condition and for each future build scenario, on an annual basis and seasonally.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**

IMPNF Response to Comments

#	Letter	Comment	Response
23.3.9.5	John Walser	- Tables indicating the percentage of wind from each of the sixteen compass points at each sensor location, for the existing (no-build) condition and for each future build scenario, on an annual basis and seasonally.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.4	John Walser	For areas where wind speeds are projected to exceed acceptable levels, measures to reduce wind speeds and to mitigate potential adverse impact shall be identified and tested in the wind tunnel.	**Please refer to Section 6.2 of the DPIR/DEIR for a comprehensive summary of wind analyses.**
23.5	John Walser	A shadow analysis shall be required for existing and build conditions for the hours 9:00 am., 12:00 noon, and 3:00 p.m. for the vernal equinox, summer solstice, autumnal equinox, and winter solstice and for 6:00 p.m. during the summer and autumn. It should be noted that due to time differences (daylight savings vs. standard), the autumnal equinox shadows would not be the same as the vernal equinox shadows and therefore separate shadow studies are required for the vernal and autumnal equinoxes.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
23.6	John Walser	The shadow impact analysis must include net new shadow as well as existing shadow and must clearly show the incremental impact of the proposed new building. For purposes of clarity, new shadow should be shown in a dark, contrasting tone distinguishable from existing shadow. The shadow impact study area shall include, at a minimum, the entire area to be encompassed by the maximum shadow expected to be produced by the Proposed Project (&, at the winter solstice). The build condition(s) shall include all buildings under construction and any proposed buildings anticipated to be completed prior to completion of the Proposed Project. Shadow from all existing buildings within the shadow impact study area shall be shown. A North arrow shall be provided on all figures. Shadows shall be determined by using the applicable Boston Azimuth and Altitude data as provided in Exhibit 1 (Sun Altitude/Azimuth Table, Boston, Massachusetts) below.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
23.7	John Walser	Particular attention shall be given to existing or proposed public open spaces (e.g., Josh Park and the Emerald Necklace) and pedestrian areas, including, but not limited to, the existing end proposed sidewalks and pedestrian walkways within, adjacent to, and in the vicinity of the Proposed Project and the existing and proposed plazas, park areas, and other open space areas within and in the vicinity of the proposed development, and any other public and private open space areas that potentially could be affected by project-generated shadows.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
23.8	John Walser	The DPIR must include a full discussion of compliance with the LMA Interim Guidelines shadow criteria. Any new shadow that will be cast on the Emerald Necklace should be mitigated. The DPIR should adequately address this potential impact. Design or other mitigation measures to minimize or avoid any adverse shadow impacts shall be identified.	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
23.9	John Walser	The above shadow analysis shall be required for any alternative required to be studied by the Scoping Determination as well as the preferred development option. (SEE Exhibit 1 in Comment Letter)	**Please refer to Section 6.3 of the DPIR/DEIR for a comprehensive summary of shadow analyses.**
23.10	John Walser	A daylight analysis for both build and no-build conditions should be conducted by measuring the percentage of skydome that is obstructed by the Proposed Project building end evaluating the net change in obstruction. If alternative massing studies are requested as part of the Article 80 development review process, daylight analysis of such alternatives shall also be conducted for comparison. The study should treat the following elements es controls for data comparison: existing conditions, the context of the area, and the as-of-right background zoning envelope. The areas of interest include viewpoints along Brookline Avenue and Jimmy Fund Way.	**Please refer to Section 6.4 of the DPIR/DEIR for a comprehensive summary of daylight analyses.**
23.10.1	John Walser	Daylight analyses should be taken for each new major building facade, or grouping thereof within the limits of the Boston Redevelopment Authority Daylight Analysis (BRADA) program, fronting these public or quasi-public ways. The midpoint of each roadway or public accessway should be taken as the study point. The BRADA program must be used for this analysis.	**Please refer to Section 6.4 of the DPIR/DEIR for a comprehensive summary of daylight analyses.**
23.11	John Walser	If the design of the Proposed Project incorporates substantial glass-facades, an evaluation of potential solar glare impacts shall be required.	**Please refer to Section 6.4 of the DPIR/DEIR for a comprehensive summary of daylight analyses.**
23.12	John Walser	This analysis shall measure potential reflective glare from the building onto potentially affected streets and roadways, and nearby public open spaces in order to determine the potential for visual impairment or discomfort due to reflective spot glare for pedestrians/students and motorists. Mitigation measures to eliminate any adverse reflective glare shall be identified. Technical data used for the analysis shall be included.	**Please refer to Section 6.5 of the DPIR/DEIR for a comprehensive summary of solar glare analyses.**
23.13	John Walser	The solar glare analysis also shall examine the potential for solar heat buildup in any nearby buildings receiving reflective sunlight from the Proposed Project. In some cases, this condition can result in overheating or the receiving structure or incapacitation of its air conditioning system.	**Please refer to Section 6.5 of the DPIR/DEIR for a comprehensive summary of solar glare analyses.**
23.14	John Walser	Mitigation measures shall be described for any identified negative impacts on nearby buildings.	**Please refer to Section 6.5 of the DPIR/DEIR for a comprehensive summary of solar glare analyses.**
23.15	John Walser	The DPIR shall describe the existing and projected future air quality in the project vicinity and shall evaluate ambient levels to determine conformance with the National Ambient Air Quality Standards (NAAQS). Particular attention shall be given to mitigation measures to ensure compliance with air quality standards.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
23.16	John Walser	A future air quality (carbon monoxide) analysis shall be required for any intersection (including the proposed garage entrancestexits) where level of service (LOS) is expected to deteriorate to D and the Proposed Project causes a 10 percent increase in traffic or where the level of service is E or F and the Proposed Project contributes to a reduction of LOS.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
23.17	John Walser	The study shall analyze the existing conditions, future No-Build and future Build conditions only. The methodology and parameters of the traffic-related air quality analysis shall be approved in advance by the Boston Redevelopment Authority and the Massachusetts Department of Environmental Protection. The results of the air quality analysis shall be compared to the Massachusetts State Implementation Plan to determine project compliance with the Plan. Mitigation measures to eliminate or avoid any violation of air quality standards shall be described.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
23.18	John Walser	An indirect source air quality analysis of the operation of the parking garage shall be prepared to determine potential air quality impacts on nearby sensitive receptors and compliance with air quality standards. Garage emissions should be estimated using appropriate US. EPA guidance. The EPA SCREEN3 model should be used to calculate maximum CO impacts from the garage at the various sensitive receptors.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**

IMPNF Response to Comments

#	Letter	Comment	Response
23.19	John Walser	A description of the project's heating and mechanical systems and of the parking garage ventilation system, including location of intake and exhaust vents and specifications, and an analysis of the impact on pedestrian level air quality and on any sensitive receptors from operation of the heating, mechanical, and exhaust systems, including the building's emergency generator, shall be required.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
23.20	John Walser	In addition, please provide a detailed stationary source analysis of the adjacent 50 MW power plant and whether or not the expanded capacity will necessitate modifying existing air permits to account for an increase in boiler size, hours of operation, fuel use and emissions (e.g., CO, NO2 , PM10, non-criteria pollutant emissions).	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
23.21	John Walser	A detailed inventory of the emissions from the exhaust plume (type and quantity of pollutants) from the power plant and any existing and/or proposed plant modifications and or expansion should be provided. As stated above, measures to avoid any violation of air quality standards and potential impacts on the project itself shall be described.	**Please refer to Section 6.7 of the DPIR/DEIR for a comprehensive summary of air quality analyses.**
23.22	John Walser	The presence of any contaminated soil or groundwater and any underground or aboveground storage tanks at the project site shall be evaluated and remediation measures to ensure their safe removal and disposal shall be described in the DPIR. As applicable, the DPIR should summarize, in detail, the results of any studies or findings, including types and concentrations of contaminants encountered and shall include appropriate tables and maps. The reports shall be made available to the BRA.	**Please refer to Chapter 6 for a discussion on site soils.**
23.23	John Walser	If asbestos, asbestos-containing materials, lead paint or other hazardous compounds (e.g., PCBs) are identified during demolition, renovation or removal activities, the handling and disposal must be in compliance with Massachusetts Department of Environmental Protection, the Boston Public Health Commission and the Inspectional Services Department guidelines and requirements.	**DFCI has already remediated the site in compliance with City of Boston and Commonwealth of Massachusetts regulations.**
23.24	John Walser	The DPIR shall quantify and describe the generation, storage, and disposal of all solid and hazardous wastes from the construction and operation of the Proposed Project. In addition, measures to promote the reduction of weste generation and recycling, particularly for paper, plastics, glass, metals, and other recyclable products, and compliance with the City's recycling program, shall be described in the DPIR.	**Please refer to Chapter 6 for a discussion of hazardous waste handling..**
23.25	John Walser	The DPIR shall establish the existing noise levels at the project site and vicinity and shall calculate future noise levels after project completion based on appropriate modeling and shall demonstrate compliance with applicable Federal, State, and City of Boston noise criteria and regulations. The noise evaluation shall include the effect of noise generated by the area's traffic, and other noise sources. Future noise levels shell include the noise generated by the Proposed Project's mechanical equipment, including emergency generators.	**Please refer to Chapter 6 for a discussion of noise analyses conducted in support of the project.**
23.26	John Walser	Measures to minimize and eliminate adverse noise impacts on nearby sensitive receptors, including the project itself, from traffic noise and mechanical systems shall be described.	**The project will be designed to minimized noise impacts to the extent practicable. Traffic noise will be significantly mitigated through the below-grade managed pick-up and drop-off area.**
23.27	John Walser	Compliance with Boston and Federal flood hazard regulations, including requirements regarding construction within flood zones must be addressed in the DPIR. The potential impact of the Proposed Project on existing wetlands and wetland resource areas must also be described, including a demonstration of compliance with the Massachusetts Wetlands Protection Act (MWPA), as applicable. Maps detailing the site in relation to applicable buffer zones shall be provided.	**The project is neither within or adjacent to a flood zone.**
23.28	John Walser	The DPIR shall include a description of the project's site drainage system how it will connect to the Boston Water and Sewer Commission (BWSC) system. Parking garage drainage and measures to prevent adverse water quality impacts to the Muddy River also shall be described in detail.	**Please see Chapter 7 for a discussion about stormwater management.**
23.29	John Walser	The DPIR shall contain an evaluation of the project site's existing and future stormwater drainage and stormwater management practices. The DPIR shall fully illustrate existing and future dreinage patterns from the project site and shall describe and quantify existing and future stormwater runoff from the site and the Proposed Project's impacts on site drainage.	**Please see Chapter 7 for a discussion about stormwater management.**
23.30	John Walser	The Proposed Project's stormwater management system, including best management practices to be implemented, measures proposed to control and treat stormwater runoff and to maximize on-site retention of stormwater, measures to prevent groundwater contamination, and compliance with the Commonwealth's Stormwater Management Policies, also shall be described.	**Please see Chapter 7 for a discussion about stormwater management.**
23.31	John Walser	The DPIR shall describe the project area's stormwater drainage system to which the project will connect, including the location of stormwater drainage facilities and ultimate points of discharge.	**Please see Chapter 7 for a discussion about stormwater management.**
23.32	John Walser	If the Proposed Project involves the disturbance of land of one acre or more, a National Pollution Discharge Elimination System (NPDES) General Permit for Construction from the US. Environmental Protection Agency and the Massachusetts Department of Environmental Protection will be required. If an NPDES permit is required, a stormwater pollution prevention plan must be prepared prior to the commencement of any construction-related activities.	**An NPDES permit application has been filed**
23.33	John Walser	An analysis of existing sub-soil conditions at the project site, groundwater levels, potential for ground movement and settlement during excavation and foundation construction, and potential impact on adjacent buildings, utility lines, and the roadways shall be required. This analysis shall also include a description of the foundation construction methodology, the amount and method of excavation, and measures to prevent any adverse effects on adjacent buildings, utility lines, roadways and the Muddy River.	**Please refer to Chapter 6 for a discussion on subsurface conditions and groundwater.**
23.34	John Walser	The Proposed Project is one block from the boundary of the new Groundwater Conservation Overlay District (Longwood Avenue). Measures to ensure that groundwater levels will be maintained and will not be lowered during or after construction shall be described in detail. Installation of observation monitoring wells, preferable on public land, may be required if existing wells are not already present. Identification of existing wells and wall installation should be made in consultation with the Boston Groundwater Trust (the "Trust"). In addition, monitoring data must be provided to the BRA and the Trust from 6 months prior to construction until one year after construction (frequency to be determined in consultation with the BRA).	**Please refer to Chapter 6 for a discussion on groundwater including coordination with the Boston Groundwater Trust.**
23.35	John Walser	If dewatering is necessary during construction, a replenishment system must be installed and levels maintained.	**Please refer to Chapter 6 for a discussion on groundwater including coordination with the Boston Groundwater Trust.**

IMPNF Response to Comments

#	Letter	Comment	Response
23.36	John Walser	Upon completion of construction, monitoring wells will need to be assigned to the Trust by the developer with an agreement granting the Trust access if wells are on private property. A description of the recharging system or recirculation program must be provided.	**Please refer to Chapter 6 for a discussion on groundwater including coordination with the Boston Groundwater Trust.**
23.37	John Walser	Levels reported shall be based on Boston City Base (BCB). Contact information for the Trust: Boston Groundwater Trust 234 Clarendon Street Boston, MA 02116 Attention: Elliott Laffer, Executive Director 617-859-8439	**Please refer to Chapter 6 for a discussion on groundwater including coordination with the Boston Groundwater Trust.**
23.38	John Walser	In addition, a vibration monitoring plan must be provided that ensures potential vibration impacts from project construction on adjacent buildings and infrastructure will be mitigated.	**The perimeter slurry wall has been designed to mitigate vibration impacts from adjacent vibration generators. This same slurry wall will minimize vibrations generated from the project. A vibration monitoring effort has been initiated.**
23.39	John Walser	A construction impact analysis shall include a description and evaluation of the following:	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.1	John Walser	potential dust and pollutant emissions and mitigation measures to control these emissions, including participation in the Commonwealth's Clean Construction Initiative.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.2	John Walser	potential noise generation and mitigation measures to minimize increases in noise levels.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.3	John Walser	location of construction staging areas and construction worker parking; measures to encourage carpooling and/or public transportation use by construction workers.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.4	John Walser	construction schedule, including hours of construction activity.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.5	John Walser	access routes for construction trucks and anticipated volume of construction truck traffic.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.6	John Walser	construction methodology (including foundation construction), amount and method of excavation required, disposal of the excavate, description of foundation support, maintenance of groundwater levels, and measures to prevent any adverse effects or damage to adjacent structures and infrastructure.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.7	John Walser	Method of demolition of existing buildings on the site and disposal of the demolition waste.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.8	John Walser	potential for the recycling of construction and demolition debris, including asphalt from the existing parking lot.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.9	John Walser	identification of best management practices to control erosion and to prevent the discharge of sediments and contaminated groundwater or stormwater runoff into the City's drainage system and into the adjacent river and harbor waters during the construction period.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.10	John Walser	coordination of project construction activities with other major construction projects being undertaken in the project vicinity at the same time, including scheduling and phasing of individual construction activities.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.11	John Walser	impact of project construction on rodent populations and description of the proposed rodent control program, including frequency of application and compliance with applicable City and State regulatory requirements.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.39.12	John Walser	measures to protect the public safety.	**Please refer to Chapter 6 for a discussion of construction methods to be employed in connection with the project.**
23.40	John Walser	A new development project presents opportunities for sustainable design and construction to prevent damage to the environment, consistent with the goals of Executive Order 385 and the Green Guidelines for Healthcare Construction. The DPIR shall fully describe (including a LEED checklist) appropriate environmentally protective technologies and practices that will be incorporated into the design and operation of the proposed development and the Proponent's commitment to include such measures.	**DFCI is committed to developing a sustainable project that is consistent with Green Guidelines for Healthcare Construction. A detailed discussion of sustainable design objectives is presented in Chapter 8.0, Sustainable Design of the DPIR/DEIR.**
23.41	John Walser	The Proponent is encouraged to achieve LEED certifiable status. Measures shall include, but not be limited to, the following:	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.41.1	John Walser	Participation in the U.S. Environmental Protection Agency's Energy Star/Green Lights program and adoption of the Leadership In Energy and Environmental Design (LEED) standards for the project.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.41.2	John Walser	Optimize natural day lighting, passive solar gain, and natural cooling, specify energy efficient HVAC and lighting systems, appliances, and other equipment, and solar preheating of makeup air.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.41.3	John Walser	Favor building materials and purchases of supplies that are non-toxic, made from recycled materials, and made with low embodied energy.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.41.4	John Walser	Application of cool roofing material for energy conservation, including reduction in cooling energy use.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.41.5	John Walser	Build easily accessible recycling system infrastructure into the project's design.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.41.6	John Walser	Incorporate additional opportunities to conserve water beyond water-saving technologies required by law.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.41.7	John Walser	Make the building design adaptable for the future inclusion of innovative energy and environmental technologies as they develop over time.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.41.8	John Walser	Conduct annual audits of energy consumption, waste streams, and the use of renewable technologies.	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**

IMPNF Response to Comments

#	Letter	Comment	Response
23.42	John Walser	In addition, Proposed Project should include significant green features such as native landscaping, increased water and energy efficiency, improved indoor air quality, green roof systems, and renewable energy technologies to the extent possible. The DPIR should describe commitments to the following:	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.42.1	John Walser	Sustainable Sites (public transportation access, bicycle storage, alternative fueled vehicles, stormwater management, green roofing, light pollution reduction)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.42.2	John Walser	Water Efficiency (water use reduction, water efficient landscaping, innovative wastewater technologies)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.42.3	John Walser	Energy & Atmosphere (energy performance, CFC reduction in HVAC&R equipment, renewable energy)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.42.4	John Walser	Materials & Resources (Recycle content, construction waste management, local/regional materials)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.42.5	John Walser	Indoor Environmental Quality (Environmental tobacco smoke control, ventilation effectiveness, low emitting materials (adhesives & sealants, paints, carpets, composite wood), daylight and views)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.42.6	John Walser	Innovation & Design Process (innovation in design)	**Please refer to Chapter 8.0 of the DPIR/DEIR for a detailed description of sustainable design objectives of the project..**
23.43	John Walser	Building demolition and/or renovation activities (existing structures) may offer an opportunity for recycling, reprocessing or donation of construction and building materiels (e.g., glass, brick, stone, interior furnishing) to the Building Materials Resource Center (BMRC). The Proponent is encouraged to contact the BMRC at the following address regarding disposal and/or acquisition of materials that may be appropriate for use: Building Materials Resource Center 100 Terrace Street Roxbury, MA 02120 617-442-8917	**Comment Noted. Thank you.**

ENF Response to Comments

#	Letter	Comment	Response
M1.1	EOEA	Pursuant to the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and Section 11.06 of the MEPA regulations (301 CMR 11.00), I hereby determine that this project requires the preparation of an Environmental Impact Report (EIR).	**DFCI respectfully submits this DPIR/DEIR to MEPA for their continued review of the proposed Center for Cancer Care project.**
M1.2	EOEA	The EIR should include a thorough description of the project and all project elements and construction phases.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
M1.3	EOEA	The EIR should include an existing conditions plan illustrating resources and abutting land uses for the entire project area and DFCI campus and a proposed conditions plan (or plans) illustrating proposed elevations, structures, access roads, stormwater management systems and sewage connections.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
M1.4	EOEA	The EIR should include a circulation plan illustrating how cars, trucks, pedestrians and cyclists will be accommodated within the campus.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
M1.5	EOEA	The EIR should briefly describe each state permit required for the project and should demonstrate that the project meets applicable performance standards.	**A summary of proposed mitigation to be implemented in connection with the Center for Cancer Care project are presented in Chapter 10.0 of the DPIR/DEIR.**
M1.6	EOEA	In accordance with section 11.01 (3)(a) of the MEPA regulations, the EIR should discuss the consistency of the project with any applicable local or regional land use plans.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
M1.7	EOEA	In addition to the No-Build Alterative and the Preferred Alternative, the EIR should discuss alternative building configurations on the site that migh result in fewer impacts, particularly on traffic, including an alternative that is consistent with existing zoning and does not require zoning relief.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
M1.8	EOEA	The EIR should include a comparative analysis that clearly shows the difference between the environmental impacts associated with each alternative.	**Please see Chapter 3, Project Description of the DPIR/DEIR for a discussion of these requested items.**
M1.9	EOEA	I encourage the proponent to evaluate sustainable design alternatives such as Low Impact Development (LID) techniques in site design, building design and stormwater management plans. LID techniques incorporate stormwater best management practices (BMPs) and can reduce impacts to land and water resources. LID tools appropriate for this project include landscaping to provide stormwater retention, water conservation and use of pervious surfaces. For more information on LID, visit http://www.mass.gov/envir/lid/. Other LID resources include the national LID manual (Low Impact Development Design Strategies: An Integrated Design Approach), which can be found on the EPA website at: http://www.epa.eov/owow/nps/lid	**Please see Chapter 8, Sustainable Design of the DPIR/DEIR for a discussion of these requested items.**
M1.10	EOEA	Without adequate mitigation, the project has the potential to generate significant traffic impacts. The EIR must include a traffic study that accurately assesses project impacts and identifies effective mitigation. I am incorporating by reference the traffic study scope required by the BRA and the Boston Transportation Department (BTD) which is detailed within the City's Scoping Determination (Appendix 1).	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M1.11	EOEA	The Scope requires an extensive evaluation of existing and future conditions, requires assessment of conditions for traffic, pedestrians and cyclists and requires the development of appropriate mitigation including long-term project impact monitoring, roadway/intersection improvements reduction in parking spaces, intelligent transportation technology and transportation demand management (TDM). The study area includes the following intersections: Brookline Avenue/Longwood Avenue; Brookline Avenue/Joslin Road Deaconess Road; Brookline Avenue/Francis Street; Brookline Avenue/Fenwood Road; Brookline Avenue/Riverway; Binney Street/Longwood Avenue; Binney Street/Deaconess Road; Binney Street/Francis Street; Binney Street/Fenwood Road/Longwood Avenue/Blackfan Street; Longwood Avenue/Avenue Louis Pasteur; Longwood Avenue/Huntington Avenue; Longwood Avenue/Pilgrim Road; Longwood Avenue/Riverway; Pilgrim Road/Joslin Road; Pilgrim Road/Deaconess Road; Francis Street/Huntington Avenue; Brookline Avenue/Fenway; Brookline Avenue/Park Drive; Park Drive/Riverway/Fenway; Audubon Circle	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M1.12	EOEA	The EIR should provide an overview of the proponent's existing TDM program and identify measures to increase its effectiveness including consideration of an increase in transit subsidies.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M1.13	EOEA	The proponent should coordinate with the Boston and Brookline officials and the Medical Area Service Corporation (MASCO) regarding ongoing efforts to coordinate traffic, transit and parking in the LMA.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M1.14	EOEA	The EIR should discuss how the project can contribute to these efforts. It should identify and assess existing and future transit capacity in the area (including the Urban Ring EOEA #12565) and identify measures the proponent will consider to support transit.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M1.15	EOEA	Also, it should identify improvements to support pedestrian and bicycle access and safety.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M1.16	EOEA	The project includes construction of 212 parking spaces. The EIR should assess parking supply and demand including parking utilization and turnover rates. It should identify the parking ratio, discuss its consistency with zoning requirements and justify the amount of proposed.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M1.17	EOEA	The EIR should evaluate measures to further minimize parking at the site.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M1.18	EOEA	The EIR should include a section on stormwater that demonstrates that source controls, pollution prevention measures, erosion and sedimentation controls and the drainage system will comply with the DEP Stormwater Management Policy and standards for water quality and quantity both during construction and post-development.	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with the DEP Stormwater Management Policy.**
M1.19	EOEA	The EIR should include an operations and management plan to ensure the long-term effectiveness of the stormwater system.	**An operations and maintenance plan will be developed for use by DFCI following BWSC Site Plan Approval.**
M1.20	EOEA	This project provides an important opportunity to minimize impacts from the existing facilities. Commentors have highlighted the importance of drainage improvements to reduce impacts to the Muddy River. Restoration of the Muddy River (EOEA #11065) and improvements to water quality are a shared goal of the Commonwealth and the City of Boston. While stormwater volume will not increase (because this site is already completely impervious) the site could be re-designed to provide limited storage and infiltration and improve water quality discharging to the Muddy River.	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with Muddy River Improvement Project's objectives.**
M1.21	EOEA	Incorporation of landscaping into the sidewalk design and a green roof into the building design could support these goals.	**Please refer to Chapter 8 for a description of green roof objectives.**

ENF Response to Comments

#	Letter	Comment	Response
M1.22	EOEA	In addition, the proponent should consider incorporation of water conservation measures (beyond requirements of the state building code) into the building design.	**Please refer to Chapter 8 for a description of water conservation strategies.**
M1.23	EOEA	Wastewater will continue to be discharged into the Boston Water and Sewer Commission (BWSC) sewer system, which flows into the Massachusetts Water Resources Authority (MWRA) system and ultimately to the Deer Island Wastewater Treatment Facility. The EIR should wastewater flows and identify the proponent's commitment to the removal of extraneous clean water (e.g., infiltration/ inflow (I/I)) in the system to ensure that additional flows are offset by the removal of I/I. DEP is using a minimum 4: 1 ratio for I/I removal to new wastewater flow added and BWSC has indicated that the proponent will be required to develop an inflow reduction plan consistent with this policy.	**Comment noted. The proponent will work with BWSC to develop a plan to address this comment. The program developed with BWSC will be presented to DEP in conjunction with the DEP Sewer Connection permit application.**
M1.24	EOEA	The project site is located near the Olmsted Park System National Register Historic District (the Emerald Necklace) and several other historic structures. As noted previously, the project is subject to review by MHC. The EIR should include plans that clearly identify the Historic District and other historic structures in the area and describe project impacts on these sites. It should provide perspective views of the project form key vantage points.	**See Chapter 6 for a discussion of historic resources and approvals obtained from MHC and the Boston Landmarks Commission.**
M1.25	EOEA	In addition, the EIR should identify potential impacts to open space from new shadow and changes in groundwater flows.	**See Chapter 6 for discussions of both topics.**
M1.26	EOEA	The EIR should include a discussion of construction phasing, evaluate potential impacts associated with construction activities, and propose feasible measures to avoid or eliminate these impacts.	**Chapter 6 includes a section discussing construction management.**
M1.27	EOEA	The proponent should implement measures to alleviate dust, noise and odor associated with construction activities. Because this project is located within Longwood Medical Area (LMA), a dense urban area with many sensitive receptors, I strongly urge the proponent to participate in the DEP Diesel Retrofit Program to minimize diesel emissions from construction equipment.	**Chapter 6 includes a section discussing construction management (including retrofitting).**
M1.28	EOEA	Measures to address these impacts include the installation of after-engine emission controls such as oxidation catalysts or diesel particulate filters and/or requirements for use of onroad low-sulfur diesel (LSD) fuel in off-road construction equipment.	**Chapter 6 includes a section discussing construction management (including retrofitting).**
M1.29	EOEA	I encourage the proponent to consult with DEP for assistance in implementing this program.	**Comment noted.**
M1.30	EOEA	In addition, DEP has noted that demolition activities must comply with both Solid Waste and Air Pollution Control regulations (M.G.L. Chapter 40, Section 54).	**Comment noted.**
M1.31	EOEA	The EIR should include a separate chapter on mitigation measures.	**A summary of proposed mitigation to be implemented in connection with the Center for Cancer Care project are presented in Chapter 10.0 of the DPIR/DEIR.**
M1.32	EOEA	It should include a Draft Section 61 Finding for all state permits that includes a clear commitment to mitigation, an estimate of the individual costs of the proposed mitigation, and the identification of the parties responsible for implementing the mitigation.	**A summary of proposed mitigation to be implemented in connection with the Center for Cancer Care project are presented in Chapter 10.0 of the DPIR/DEIR.**
M1.33	EOEA	A schedule for the implementation of mitigation, based on the construction phases of the project, should also be included.	**Please refer to Chapter 6.0 of the DPIR/DEIR for a detailed description of construction methods that will be employed in connection with the project.**
M1.34	EOEA	The EIR should contain a copy of this Certificate and a copy of each comment received. The EIR should respond to the comments received, to the extent that the comments are within MEPA jurisdiction. The EIR should present additional narrative and/or technical analysis as necessary to respond to the concerns raised.	**These materials are included within the DPIR/DEIR submission.**
M1.35	EOEA	The EIR should be circulated in compliance with Section 11.16 of the MEPA regulations 35 and copies should be sent to any state agencies from which the proponent will seek permits or approvals, to the list of "comments received" below, and to City of Boston officials.	**comment noted.**
M1.36	EOEA	A copy of the EIR should be made available for review at the Boston Public Library.	**comment noted.**
M2.1	DEP	As MEPA is aware, DEP, in cooperation with MWRA and its member communities (including Boston), are implementing a coordinated approach to flow control in the MWRA regional wastewater system, particularly the removal of extraneous clean water (e.g., infiltration/inflow (I/I) in the system. In this regard, DEP has been routinely requiring proponents proposing to add significant new wastewater flow (such as the Dana Farber Cancer Institute 450 Brookline Avenue Project) to assist in the ID reduction effort to ensure that the additional wastewater flows are offset by the removal of I/I. Currently, MassDEP is using a minimum 4:1 ratio for I/I removal to new wastewater flow added. This ratio may be increased if specific flow constrictions/overflows already exist in the sewershed to which the new flow is added. The proponent should therefore work with the BWSC, and consult with MassDEP on this issue. Assuming that documentation is provided to confirm existing wastewater flows and that a 4:1 ratio is utilized, the proponent will need to remove, or cause to be removed, 194,080 gpd of 10.	**Comment noted. The proponent will work with BWSC to develop a plan to address this comment. The program developed with BWSC will be presented to DEP in conjunction with the DEP Sewer Connection permit application.**
M2.2	DEP	Participation in the MassDEP Diesel Retrofit Program is a way to mitigate adverse construction period impacts from diesel emissions. MassDEP believes it is appropriate and necessary to mitigate the construction-period impacts of diesel emissions to the maximum extent feasible. Diesel emissions contain fine particulates that have been found to exacerbate a number of heath conditions, such as asthma and respiratory ailments. Fine particulate matter also contributes to lung damage and has been identified as a likely carcinogen.	**Chapter 6 includes a section discussing construction management (including retrofitting).**
M2.3	DEP	MassDEP recommends that the project proponent work with its staff to implement construction-period diesel emission mitigation, which could include the installation of after-engine emission controls such as oxidation catalysts or diesel particulate filters. Additional information is available on the MassDEP website: http://waur.mass.gov/dep/water/wastewater/diesel.pdf.	**Chapter 6 includes a section discussing construction management (including retrofitting).**
M2.4	DEP	In addition, MassDEP recommends that the project proponent require its contractor(s) to use on-road low-sulfur diesel (LSD) fuel in their off-road construction equipment. On-road LSD fuel has a sulfur content of approximately 500 parts per million (ppm) in contrast to lower grade off-road diesel fuel which has a sulfur content of 3,000 ppm. The use of LSD fuel, in conjunction with after-engine emission controls, can reduce particulate matter by an additional 25 percent beyond that obtainable with after-engine controls only.	**Chapter 6 includes a section discussing construction management (including retrofitting).**
M2.5	DEP	The project includes demolition and reconstruction, which will generate a significant amount of construction and demolition (C&D) waste. Although the ENF has not made a commitment to recycling construction debris (p.5-90), MassDEP encourages the project proponent to incorporate C&D recycling activities as a sustainable measure for the project.	**Chapter 6 includes a section discussing construction debris management and recycling.**

ENF Response to Comments

#	Letter	Comment	Response
M2.6	DEP	The project proponent is advised that demolition activities must comply with both Solid Waste and Air Pollution Control regulations, pursuant to M.G.L. Chapter 40, Section 54, which provides: "Every city or town shall require, as a condition of issuing a building permit or license for the demolition, renovation, rehabilitation or other alteration of a building or structure, that the debris resulting from such demolition, renovation, rehabilitation or alteration be disposed of in a properly licensed solid waste disposal facility, as defined by Section one hundred and fifty A of Chapter one hundred and eleven. Any such permit or license shall indicate the location of the facility at which the debris is to be disposed. If for any reason, the debris will not be disposed as indicated, the permittee or licensee shall notify the issuing authority as to the location where the debris will be disposed. The issuing authority shall amend the permit or license to so indicate."	**Chapter 6 includes a section discussing construction debris management and recycling.**
M2.7	DEP	For purposes of implementing the requirements of M.G.L. Chapter 40, Section 54, MassDEP considers an asphalt, brick, and concrete (ABC) rubble processing or recycling facility, pursuant to the provisions of section (3) of 310 CMR 16.05 Site Assignment Regulations for Solid Waste Management Facilities, to be conditionally exempt from the site assignment requirements if the ABC rubble at such facilities is separated at the point of generation from other solid waste materials. Under 310 CMR 16.05(3), ABC can be crushed on-site with just a 30-day notification to MassDEP. However, the asphalt is limited to weathered bituminous concrete (no roofing asphalt) and the brick and concrete must be uncoated or not impregnated with materials such as roofing epoxy. If the brick and concrete are not clean, e.g., coated and/or impregnated, the material is defined as construction and demolition (C&D) waste and requires either a Beneficial Use Determination (BUD) or a Site Assignment and permit before it can be crushed.	**Comment noted.**
M2.8	DEP	Pursuant to the requirements of 3 10 CMR 7.02 of the Air Pollution Control Regulations, if the ABC crushing activities are projected to result in the emission of one ton or more of particulate matter to the ambient air per year and/or if the crushing equipment employs a diesel oil fired engine with an energy input capacity of three million or more British thermal units per hour for either mechanical or electrical power which will remain on-site for twelve or more months, then a plan application must be submitted to MassDEP for written Approval prior to installation and operation of the crushing equipment.	**Comment noted.**
M2.9	DEP	In addition, since it appears that significant portions of the demolition project contain asbestos, the project proponent is advised that asbestos and asbestos-containing waste material are a special waste as defined in the Solid Waste Management regulations (310 CMR 19.061). Asbestos removal notification on permit form ANF 001 and building demolition notification on permit form AQ06 must be submitted to MassDEP at least 10 working days prior to initiating work. Except for vinyl asbestos tile (VAT) and asphaltic-asbestos felt and shingles, the disposal of asbestos containing materials within the Commonwealth must be at a facility specifically approved by MassDEP (310 CMR 19.061). No asbestos containing material including VAT, and/or asphaltic-asbestos felts or shingles may be disposed at a facility operating as a recycling facility, (310 CMR 16.05). The disposal of the asbestos containing materials outside the jurisdictional boundaries of the Commonwealth must comply with all the applicable laws and regulations of the state receiving the material.	**Comment noted.**
M2.10	DEP	The demolition activity also must conform to current Massachusetts Air Pollution Control Regulations governing nuisance conditions at 310 CMR 7.01, 7.09 and 7.10. As such, the proponent should propose measures to alleviate dust, noise, and odor nuisance conditions, which may occur during the demolition. MassDEP must be notified in writing, at least 10 days in advance of removing any asbestos.	**Comment noted.**
M2.11	DEP	MassDEP also must be notified in writing, at least 10 days prior to any demolition work. The removal of asbestos from the buildings must adhere to the special safeguards defined in the Air Pollution Control Regulations (310 CMR 7.15 (2)).	**Comment noted.**
M2.12	DEP	Facilitating future waste reduction and recycling and integrating recycled materials into the project are necessary to minimize or mitigate the long-term solid waste impacts of this type of development. The Commonwealth's waste diversion strategy is part of an integrated solid waste management plan, contained in The Solid Waste Master Plan that places a priority on source reduction and recycling. Efforts to reduce waste generation and promote recycling have yielded significant environmental and economic benefits to Massachusetts' residents, businesses and municipal governments over the last ten years. Waste diversion will become even more important in the future as the key means to conserve the state's declining supply of disposal capacity and stabilize waste disposal costs. As the lead state agencies responsible for helping the Commonwealth achieve its waste diversion goals, DEP and EOEA have strongly supported voluntary initiatives by the private sector to institutionalize source reduction and recycling into their operations. Adapting the design, infrastructure, and contractual requirements necessary to incorporate reduction, recycling and recycled products into existing large-scale developments has presented significant challenges to recycling pr	**Please refer to the IMP and DPIR/DEIR for detailed discussions regarding sustainable design including recycling initiatives.**
M2.13	DEP	By incorporating recycling and source reduction into the design, the proponents would have the opportunity to join a national movement toward sustainable design. Sustainable design was endorsed in 1993 by the American Institute of Architects with the signing of its Declaration of Interdependence for a Sustainable Future. The project proponent should be aware there are several organizations that provide additional information and technical assistance, including Wastecap, the Chelsea Center for Recycling and Economic Development, and MassRecycle.	**Please refer to the IMP and DPIR/DEIR for detailed discussions regarding sustainable design.**
M2.14	DEP	The Department has record of hazardous material releases occurring in the vicinity of the project site at 454 Brookline Avenue: Release Tracking Numbers 3-0013899. The project proponent is advised that removing contaminated soil, pumping contaminated groundwater, or working in contaminated media must be done under the provisions of MGL c.21E/21C and OSHA. To avoid delay of the project and the potential for administrative penalties, the proponent will need to obtain necessary permits under these provisions beforehand. Appropriate soil and groundwater tests should be conducted well in advance of the start of construction and professional environmental consulting services should be readily available to provide the contractor the technical guidance required to facilitate any necessary permits.	**See Chapter 6 for a discussion of soils and groundwater management.**
M2.15	DEP	The project proponent is advised that pre-installation approval 6mm the MassDEP Division of Air Quality Control is needed if the project will include the installation of any Fuel Utilization Facility that emits air contaminants (e.g., furnaces, fuel burning equipment, boiler(s)) sized above the de minimus threshold levels in 310 CMR 7.02.	**Comment noted.**

ENF Response to Comments

#	Letter	Comment	Response
M2.16	DEP	In addition, if the building is to be equipped with emergency generators, additional review by the Department may be required depending on the size of the generator units. An emergency generator with an energy input capacity of less than 3 million BTU per hour is exempt from the requirements of 310 CMR 7.02. An emergency generator with an energy input capacity of more than 10 million BTU per hour requires pre-installation approval from the Department. A generator with a capacity between 3 million and 10 million BTU per hour must either follow the work practices in 310 CMR 7.03 or receive pre-installation approval under 310 CMR 7.02.	**Comment noted.**
M3.1	BWSC	For the proposed construction the proponent must submit a site plan and a General Service Application to the Commission. The site plan must show the location of existing public and private water mains, sanitary sewers and storm drains which serve the project site, as well as the location of proposed service connections.	**A site plan will be submitted to BWSC for review and approval.**
M3.2	BWSC	With the site plan, the proponent must provide detailed and updated estimates for water demand, sanitary sewer flows and stormwater runoff generation for the proposed project. The amount of potable water required for landscape irrigation if any, must be quantified and provided separately.	**This information will be submitted in conjunction with the Site Plan Approval package.**
M3.3	BWSC	Any new or relocated water, sewer and drainage facilities required for the project must be designed and constructed at the proponent's expense in accordance with the commission's - Water Distribution System and Sewer Use Regulations and Requirements for Site Plans.	**Comment noted.**
M3.4	BWSC	The proponent is responsible for ensuring that the construction of the tunnel under Jimmy Fund Way does not negatively impact the Commission's water, sewer or storm drainage, systems or any service connections to adjacent buildings. With the site plan, the proponent must submit to the Commission plans showing the location of the tunnel relative to existing and proposed water, sewer and storm drain utilities. The plans must identify specific measures that will be implemented to prevent damage or obstruction of the water, sewer or storm drain utilities during construction.	**Comment noted. Project consultant's have met with BWSC to discuss tunnel-related efforts.**
M3.5	BWSC	To assure compliance with the Commission's requirements, the proponent should submit the site plan and General Service Application to the Commission for review when project design is 50 percent complete.	**A site plan will be submitted to BWSC for review and approval.**
M3.6	BWSC	Before demolition of 454 Brookline Avenue and the Redstone Building commences, existing water, sewer and storm drain connections must be cut and capped in accordance with Commission standards. The proponent must complete a Termination Verification Approval I Form for a Demolition Permit, available from the Commission. The completed form must be submitted to the City of Boston's Inspectional Services Department before a Demolition Permit will be issued.	**A cut and cap plan has been reviewed and approved by BWSC. It is anticipated that the capping will be completed at the time of DPIR/DEIR filing.**
M3.7	BWSC	Oil traps are required on all drains discharging from all new and existing enclosed parking garages. Discharges from garage drains must be directed to a building sewer and not to a building storm drain. The requirements for oil traps are provided in the Commission's Requirements for Site Plans.	**Comment noted. Information will be presented in the Site Plan Approval package.**
M3.8	BWSC	Grease traps are required in all new and existing cafeteria or kitchen facilities in accordance - with the Commission's Sewer Use Regulations. The proponent is advised to consult with Mr. Richard Fowler, Deputy Superintendent of Field Operations prior to preparing plans for grease traps.	**Comment noted. Information will be presented in the Site Plan Approval package.**
M3.9	BWSC	The proponent should note Article V of the Commission's Sewer Use Regulations as it pertains to medical and laboratory facilities.	**Comment noted.**
M3.10	BWSC	The Department of Environmental Protection, in cooperation with the Massachusetts Water Resources Authority and its member communities, are implementing a coordinated approach I to control flow in the MWRA regional wastewater system, particularly the removal of extraneous clean water (e.g. infiltration/inflow (I/I)) in the system. In this regard, DEP has routinely required proponents proposing to add significant new wastewater flows to assist in the I/I reduction effort to ensure that the additional wastewater flows are offset by the removal of I/I. Currently, DEP is typically using a minimum of 4:I ratio for I/I removal to new wastewater flow added. The Commission supports the DEPIMWRA policy, and will require the proponent to develop a consistent inflow reduction plan.	**Comment noted. The proponent will work with BWSC to develop a plan to address this comment. The program developed with BWSC will be presented to DEP in conjunction with the DEP Sewer Connection permit application.**
M3.11	BWSC	The site plan must show in detail how drainage from the new building's roof and from other impervious areas will be managed. Roof runoff and other stormwater runoff must be conveyed separately from sanitary waste at all times.	**This information will be submitted in conjunction with the Site Plan Approval package. Sanitary waste will be conveyed separately from roof runoff and other stormwater runoff.**
M3.12	BWSC	The proponent must fully investigate methods for retaining stormwater on site before the Commission will consider a request to discharge stormwater to the Commission's system. Under no circumstances will stormwater be allowed to discharge to a sanitary sewer. A feasibility assessment for retaining stormwater on site must be submitted with the site plan.	**Information will be presented in the Site Plan Approval package.**
M3.13	BWSC	In conjunction with the site plan and General Service Application, the proponent will be required to submit a Stormwater Pollution Prevention Plan The plan must:	**Information will be presented in the Site Plan Approval package.**
M3.13 .1	BWSC	Identify specific best management measures for controlling erosion and preventing the discharge of sediment, contaminated stormwater or construction debris to the Commission's drainage system when construction is underway.	**Information will be presented in the Site Plan Approval package.**
M3.13 .2	BWSC	Include a site map which shows, at a minimum, existing drainage patterns and areas used for storage or treatment of contaminated soils, groundwater or stormwater, and the location of major control or treatment structures to be utilized during construction.	**Information will be presented in the Site Plan Approval package.**
M3.13 .3	BWSC	Specifically identify how the project will comply with the Department of Environmental Protection's Performance Standards for Stormwater Management both during construction and after construction is complete.	**Please refer to Chapter 7 for a discussion on Stormwater Management.**
M3.14	BWSC	The discharge of dewatering drainage to a sanitary sewer is prohibited by the Commission. The proponent is advised that the discharge of any dewatering drainage to the storm drainage system requires a Drainage Discharge Permit from the Commission and an NPDES Permit issued by the Environmental Protection Agency (EPA).	**The proponent has submitted a dewatering application to BWSC and EPA indicating discharge to the storm drainage system.**
M3.15	BWSC	The proponent is advised that a Drainage Discharge Permit is also required for the long-term - (permanent) discharge to the drainage of infiltrated groundwater collected via an underdrain - system, such as those that are commonly installed in below-grade parking garages.	**Comment noted.**

ENF Response to Comments

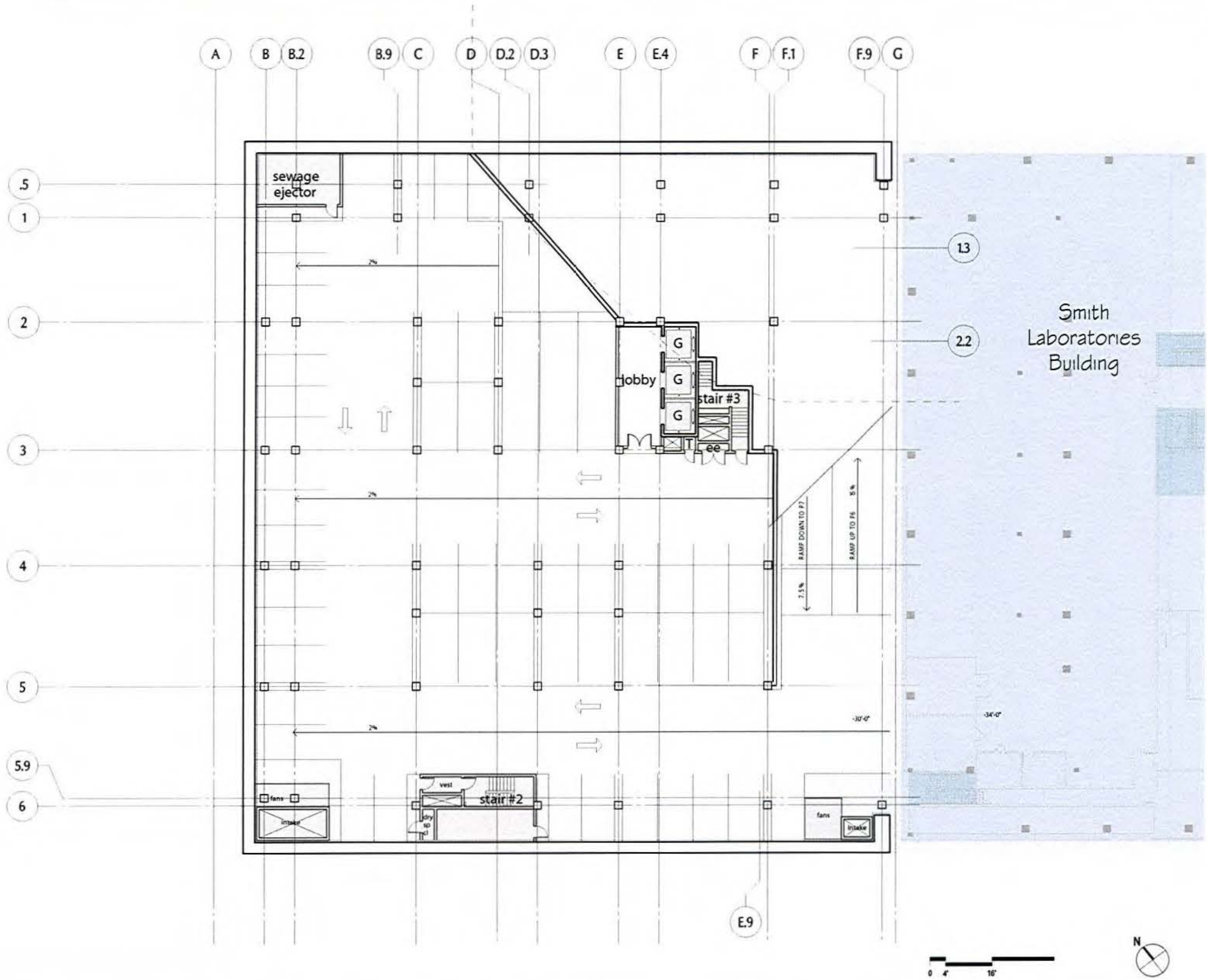
#	Letter	Comment	Response
M3.16	BWSC	Developers of projects involving disturbances of land of one acre or more are required to obtain an NPDES General Permit for Construction from the EPA. The proponent is responsible for determining if such a permit is required and for obtaining the permit. If such I a permit is required, a copy of the Notice of Intent and any pollution prevention plan prepared pursuant to the permit should be provided to the Commission prior to the commencement of construction.	**The construction manager has filed for the NPDES General Permit for Construction.**
M3.17	BWSC	The Commission requests that the proponent install a permanent casting stating: "Don't Dump: Drains to the Charles River" next to any new catch basin installed as part of this project. The proponent may contact the Commission's Operations Division for information regarding the purchase of the castings.	**Castings will be provided. Information will be presented in the Site Plan Approval package.**
M3.18	BWSC	The Commission utilizes a Fixed Radio Meter Reading System to obtain water meter readings. For new water meters, the Commission will provide a Meter Transmitter Unit (MTU) and connect the device to the meter. For information regarding the installation of MTUs, the proponent should contact the Commission's Meter Installation Department.	**Comment noted.**
M3.19	BWSC	The proponent should explore opportunities for implementing water conservation measures in addition to those required by the State Plumbing Code. In particular the proponent should consider outdoor landscaping which requires minimal use of water to maintain. If the proponent plans to install in-ground sprinkler systems, the Commission recommends that timers, soil moisture indicators and rainfall sensors be installed. The use of sensor-operated faucets and toilets in common areas of buildings should also be considered.	**Please refer to Chapter 8 for a discussion of water conservation measures.**
M4.1	CWRA	Since there will be significant refinement of project design as these processes evolve, and there are several important environmental issues that have not been adequately addressed in the ENF, **we suggest that you require the completion of an Environmental - Impact Report for this project.**	**Comment noted.**
M4.2	CWRA	Our comments are focused on environmental issues that have been addressed in only a limited way in the ENF, but are of significant importance to Executive Office of Environmental Affairs and the neighboring communities around the proposed development: the project's potential impacts to the Emerald necklace and the Muddy River; and water resource management.	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with the Muddy River project.**
M4.3	CWRA	Assessing cumulative impacts, and identifying appropriate mitigation, is an important function of the MEPA review process.	**Comment noted.**
M4.4	CWRA	The proposed development is indeed on a parcel that is "under-utilized," and we recognize the proposed redevelopment as an opportunity to provide benefits to DFCI, to the I economic development of the area, and to the local environment, which has been heavily impacted by urban development. However, there has not to date been enough examination of the opportunities for reducing project impacts, and mitigating remaining impacts.	**Please refer to Chapter 8 for Sustainable Design measures.**
M4.5	CWRA	The EIR should include an analysis of project impacts to the Emerald necklace, including parkways, and a proposed mitigation plan to ensure that park system does not deteriorate further with ever increasing use.	**Comment noted.**
M4.6	CWRA	Stormwater drainage from the site flows, via the Boston Water and Sewer Commission's municipal storm drain system, into the Muddy River, contributing to the impairments of this tributary to the Charles River. Restoration of the Muddy River is a priority for many stakeholders, including the Executive Office of Environmental Affairs, and major efforts at the local, state and federal level are underway to implement the Muddy River Restoration Project.	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with the DEP Stormwater Management Policy. Also please refer to Chapter 8 for Sustainable Design measures.**
M4.7	CWRA	The successful restoration of the Muddy River cannot be done solely with end-of-pipe approaches, however. Source controls are needed throughout the Muddy River watershed, and redevelopment provides the best opportunity to implement better stormwater management. The ENF provides little analysis of stormwater volumes and quality; presents no alternatives analysis for approaches to managing stormwater runoff; and - presents a recommended plan that adopts almost none of the available technologies and techniques for urban stormwater management.	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with the DEP Stormwater Management Policy. Also please refer to Chapter 8 for Sustainable Design measures.**
M4.8	CWRA	We strongly urge you to require an assessment of the opportunities for improved I stormwater management, with an emphasis on examining opportunities for recharge, green - roof technologies, and other methods to improve water quality and, especially important, reduce the volume of runoff to the Muddy river. Specifically, we suggest:	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with the DEP Stormwater Management Policy. Also please refer to Chapter 8 for Sustainable Design measures.**
M4.8.1	CWRA	Detailed information about the final design of the proposed stormwater management infrastructure including the location and design of drains, catch basins, water quality structures, and infiltration structures;	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with the DEP Stormwater Management Policy.**
M4.8.2	CWRA	Detailed information about any surface stormwater management features such as green roof technology, stormwater planters, rain gardens, permeable pavement or vegetated storage areas;	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with the DEP Stormwater Management Policy. Also please refer to Chapter 8 for Sustainable Design measures.**
M4.8.3	CWRA	An assessment of the opportunities to reduce even further the peak flows and volume of stormwater runoff, including estimates of the impacts in a one-year storm;	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with the DEP Stormwater Management Policy.**
M4.8.4	CWRA	An assessment of how the site could meet DEP's stormwater management policy in its entirety, not just "to the maximum extent practicable;"	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with the DEP Stormwater Management Policy.**
M4.8.5	CWRA	A plan to minimize the primary pollutants of concern for the Muddy River, sediments and nutrients;	**Please refer to Chapter 7 of the DPIR/DEIR for a discussion of stormwater management and consistency with the DEP Stormwater Management Policy.**
M4.8.6	CWRA	A maintenance plan for the stormwater management plan.	**An operations and maintenance plan will be developed for use by DFCI following BWSC Site Plan Approval.**
M4.9	CWRA	The location of this project in an area of historic fill, and the ongoing problems throughout many areas of the City with groundwater levels, make it all the more important that this aspect of the project be designed with the utmost care and in anticipation of any potential impacts.	**Chapter 6 includes a discussion about groundwater issues.**

ENF Response to Comments

#	Letter	Comment	Response
M4.10	CWRA	The EIR should include a thorough analysis of the potential impacts to groundwater, both during and after construction of this project. This effort should be coordinated closely with the Boston Groundwater Trust to ensure that there are no alterations to groundwater levels as a result of the project. The LMA is on the border of the City's "Groundwater Overlay District," and groundwater remains a potential source of baseflows to the Muddy River, so any changes to groundwater patterns in the area need careful review and planning.	**Chapter 6 includes a discussion about groundwater issues.**
M4.11	CWRA	Investigations should include potential seasonal changes in groundwater levels, as well as potential effects on groundwater flow. In some areas of Boston, construction of subsurface projects such as tunnels, underpasses and even some building foundations have altered groundwater flow patterns, resulting over time in changes to ambient groundwater levels. Groundwator flows are extremely slow so alterations may occur over years.	**Chapter 6 includes a discussion about groundwater issues.**
M4.12	CWRA	If the analysis shows there is potential for altering flows, either slowing or reducing flows into the Muddy River, or conversely reducing flows back into the ground during periods of high groundwater, or causing any groundwater "mounding," the EIR should document a mitigation plan for any such alterations.	**Chapter 6 includes a discussion about groundwater issues.**
M4.13	CWRA	In addition, the EIR should specify what source of water would be used should groundwater recharging be necessary during or after construction.	**Chapter 6 includes a discussion about groundwater issues. No water is expected to be required for groundwater recharging.**
M4.14	CWRA	Given that the parking structure will underlay much of the project, opportunities for on-site infiltration of stormwater may be minimal. If so, the EIR should evaluate the possibility of seeking off-site locations for groundwater recharge and stormwater infiltration. Finally, a detailed plan for the treatment and disposal of water from dewatering activities should be p included in the EIR.	**The proponent has met with representatives of the Boston Groundwater Trust and BWSC to discuss infiltration measures. Chapter 6 includes a discussion of groundwater issues.**
M5.1	Alison Pultinas	My comments on the submitted project are primarily focused on the transportation impacts; over 6,000 estimated vehicle trips are not trivial. According to recent data Mission Hill has one of the highest asthma rates in the state.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.2	Alison Pultinas	Proximity of the site to the Muddy River and Olmsted Park is also critical given the potential storm water runoff impacts. With new construction there is the opportunity to improve conditions for ground water recharge; 100% impervious is not satisfactory.	**Please refer to Chapter 7 for a discussion on Stormwater Management and Chapter 8 for a discussion about Sustainable Design.**
M5.3	Alison Pultinas	More than 12 years have passed since the previous IMP, what is expired cannot be "revived"; a new Master Plan should be required. Expecting that this "amendment" to a document submitted in 1993 can substitute for a full IMP is wishful thinking. According to the PNF submitted to the BRA, the last annual update was submitted in July 1998, nearly 8 years ago. The mandated public review process for thoughtful planning for growth shouldn't be sidestepped.	**Comment noted.**
M5.4	Alison Pultinas	In 1993, the City's Environment Dept. strongly encouraged DFCI to aim for at least a 10 % employee walking/cycling mode share and recommended no more than one net new parking space per 3000 square feet of new building space - a much stronger stance than the "Interim Guidelines" maximum .75 per 1000 gsf. If the goal in fact is for LMA institutions to achieve a .75 ratio campus wide, then the city must be vigilant to restrict new parking to an even lower ratio. Otherwise, the predicted future conditions inevitably surpass the target [for example, BWH- .95, DFCI- .90, and that is only after the Dana Building parking is vacated].	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.5	Alison Pultinas	A critical Master Plan requirement is a timetable for proposed projects that includes the estimated month and year of construction start and expected completion for each project. The description of phasing, page 3-3, " DFCI plans to consolidate main campus parking in the new building by closing the Dana building garage ... within the terms of this amended IMP, but sometime after the completion and occupancy of 450 Brookline " is shamelessly vague. If the Dana Building infill project (pages 1-5 and 1-6), is projected to begin 5-7 years after the Center for Cancer Care is completed (expected date 201 1); the 213 spaces will not be taken out of service until 2016 at the earliest.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.6	Alison Pultinas	#1 concern- new LMA parking facilities - combined impacts from each new development contribute significantly to traffic congestion, each proposal can't be looked at in isolation. Garage queues and drop off driveway queues must be kept off the street because of impact on roadway operations specifically the bus service on Brookline Avenue.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.7	Alison Pultinas	Do the "Interim Guidelines" trump previous strategies to limit excess parking? Is the "restricted parking" district zoning effective? More information should be provided on the request for conditional zoning approvals -the significance of "restricted parking district" and requirement that accessory uses cannot occupy more than 25 %of parcel 2.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.7.1	Alison Pultinas	Parking supply- despite the general obfuscation, the facts indicate an excessive number of new spaces although lack of information makes it nearly impossible to evaluate. For example, what is the ratio of new parking and expected new employees at 450 Brookline? Does the inventory include spaces leased to others (BWH parking in Smith garage)?	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.8	Alison Pultinas	Where is the information on parking demand and expected users- employee or outpatient? Employee mode splits should be detailed and expected demand described for peak periods and all work shifts, what are the goals for carpool share? What are the existing percentage shares for each mode?	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.9	Alison Pultinas	Employees arriving by automobile at the Crosstown Garage or Longwood Towers for example, should not be counted as walk/transit, all traffic entering the urban core is relevant because of air quality impacts. Staff mode shares should be compared to other LMAinstitutions	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.10	Alison Pultinas	Have the goals of the 1994 TAPA been achieved?	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.11	Alison Pultinas	Data from the required monitoring reports submitted to BTD on the efforts to achieve the "Commuter Mobility Objectives"- 45% or fewer employees in SOVs, should be included in the IMP.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.12	Alison Pultinas	The new facility will add 425 spaces to the existing 814 on campus. How many of these are designated for employees and how many for patients and visitors? According to the tables on page 4-8, of the current 814 on campus, 474 are for staff and 340 for patients.	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.13	Alison Pultinas	The IMP should describe the actual parking supply for each year of the Master Plan; approvals shouldn't be based on "potential" scenarios (page 4-10).	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**

ENF Response to Comments

#	Letter	Comment	Response
M5.14	Alison Pultinas	Parking rates should be structured to encourage short term patient/visitor (less than 3 hrs) over long term parking, priority must be directed towards convenient patient parking. Could patients and visitors as well as staff utilize the DFCI shuttles from Brookline Place? The 30-minute frequency is comparable to the public bus schedules. 950 employees purchase T passes, is there campus specific data (South, North, LMA or other) and what are the total #s of employees; how many are Boston residents?	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.15	Alison Pultinas	The PNF indicated that T passes are subsidized at 40%, however the EN3 mentions 50%, which is correct?	**Please refer to Chapter 5.0 of the DPIR/DEIR for a detailed description of transportation analyses that were studied in connection with the project.**
M5.16	Alison Pultinas	Other concerns include the impacts on ground water, shadows on nearby open space and historic resources and the relationship between the new construction and the MATEP facility (whether the air quality at street level will change).	**Impacts to groundwater and historic resources are discussed in Section 6 of the DPIR/DEIR.**
M5.17	Alison Pultinas	Another question - wouldn't the demolition of two buildings (c.1957 and 1916) trigger solid waste and possibly hazardous debris if there is asbestos on site? The ENF does not indicate a request for state permits related to the demolitions.	**The project has filed the necessary air quality permits with DEP to support demolition**



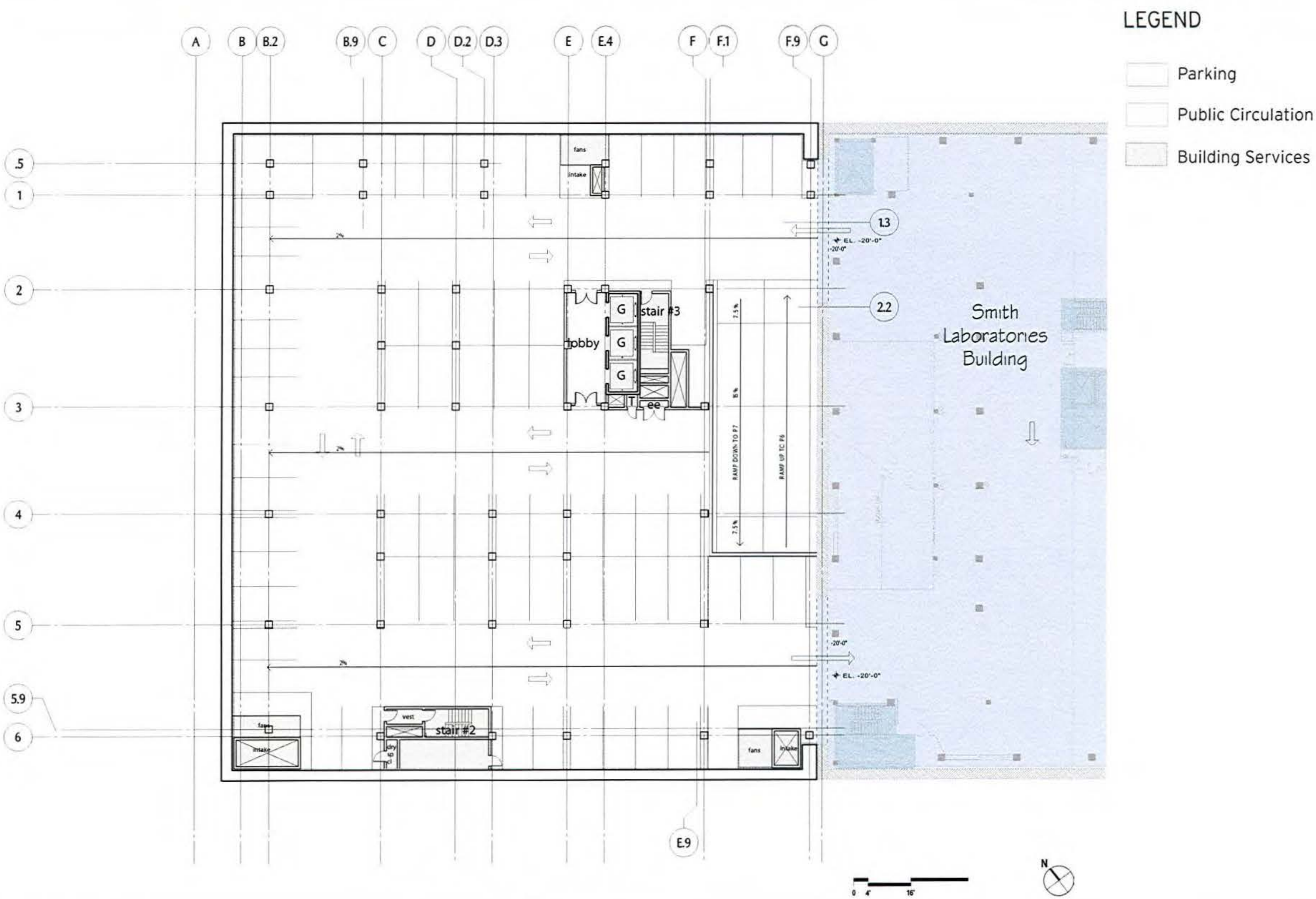
LEGEND

- Parking
- Public Circulation
- Building Services

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

P7 Floor Plan

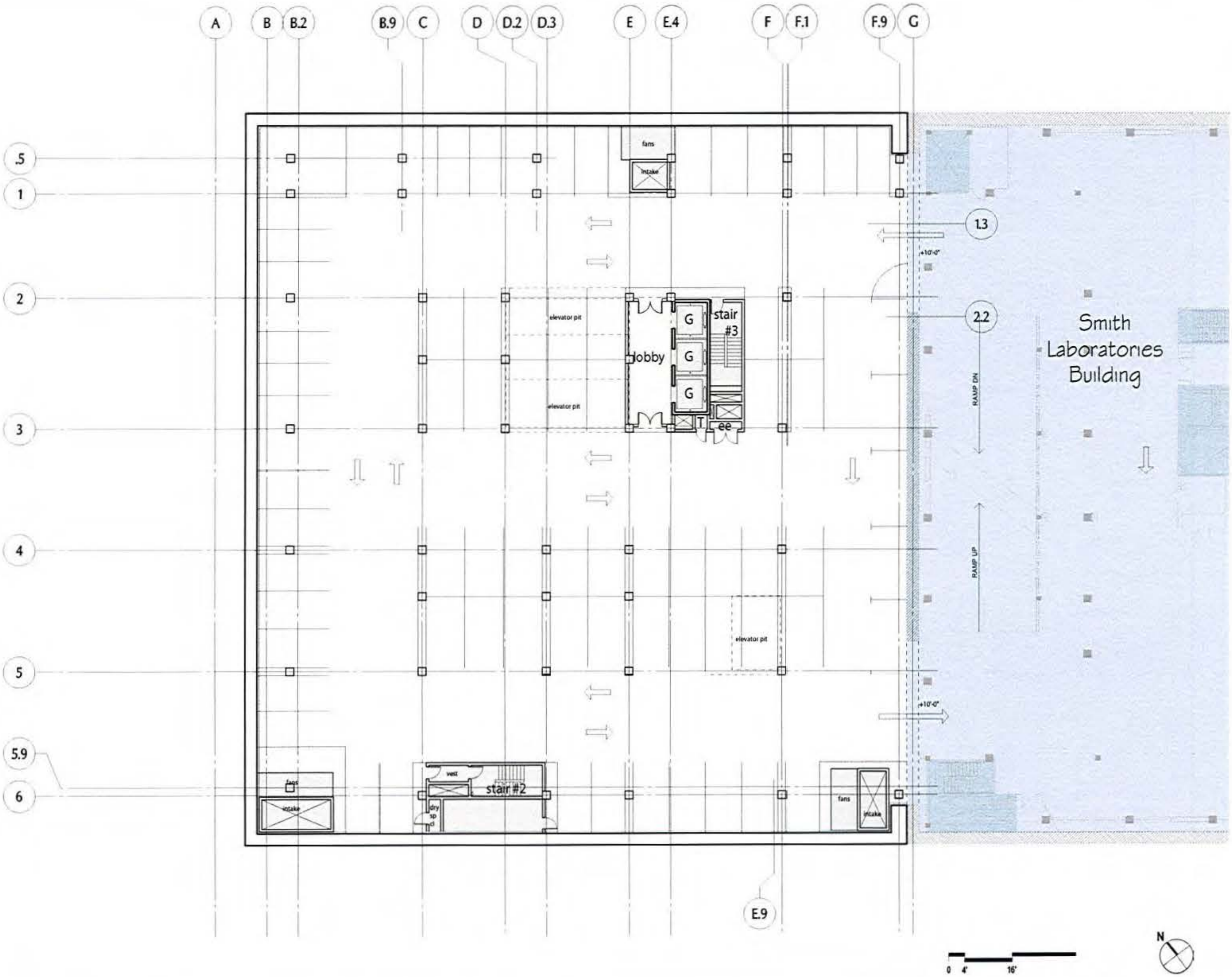
FIGURE A-1



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

P6 Floor Plan

FIGURE A-2



LEGEND

Parking

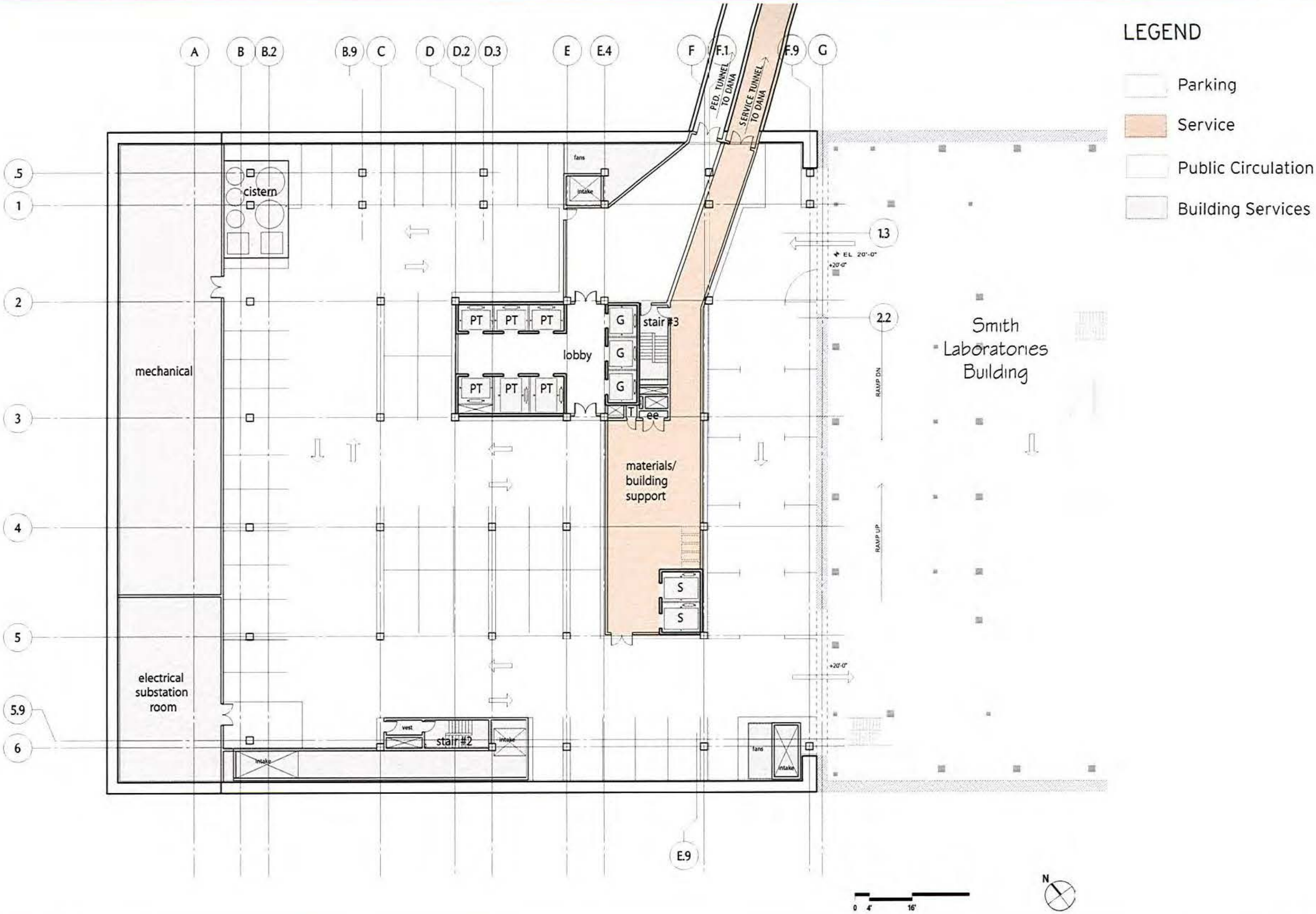
Public Circulation

Building Services

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

P3 Floor Plan

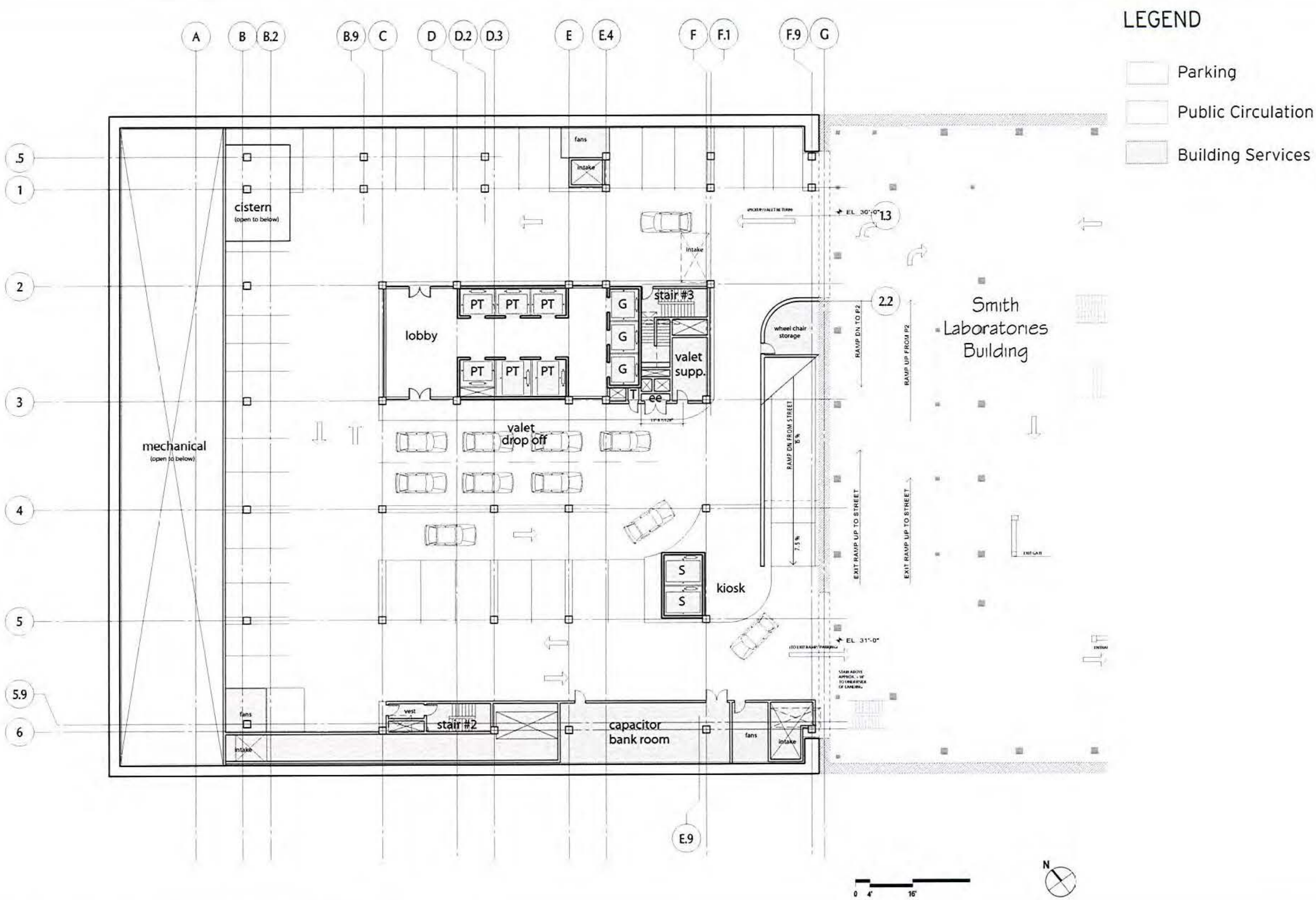
FIGURE A-3



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

P2 Floor Plan

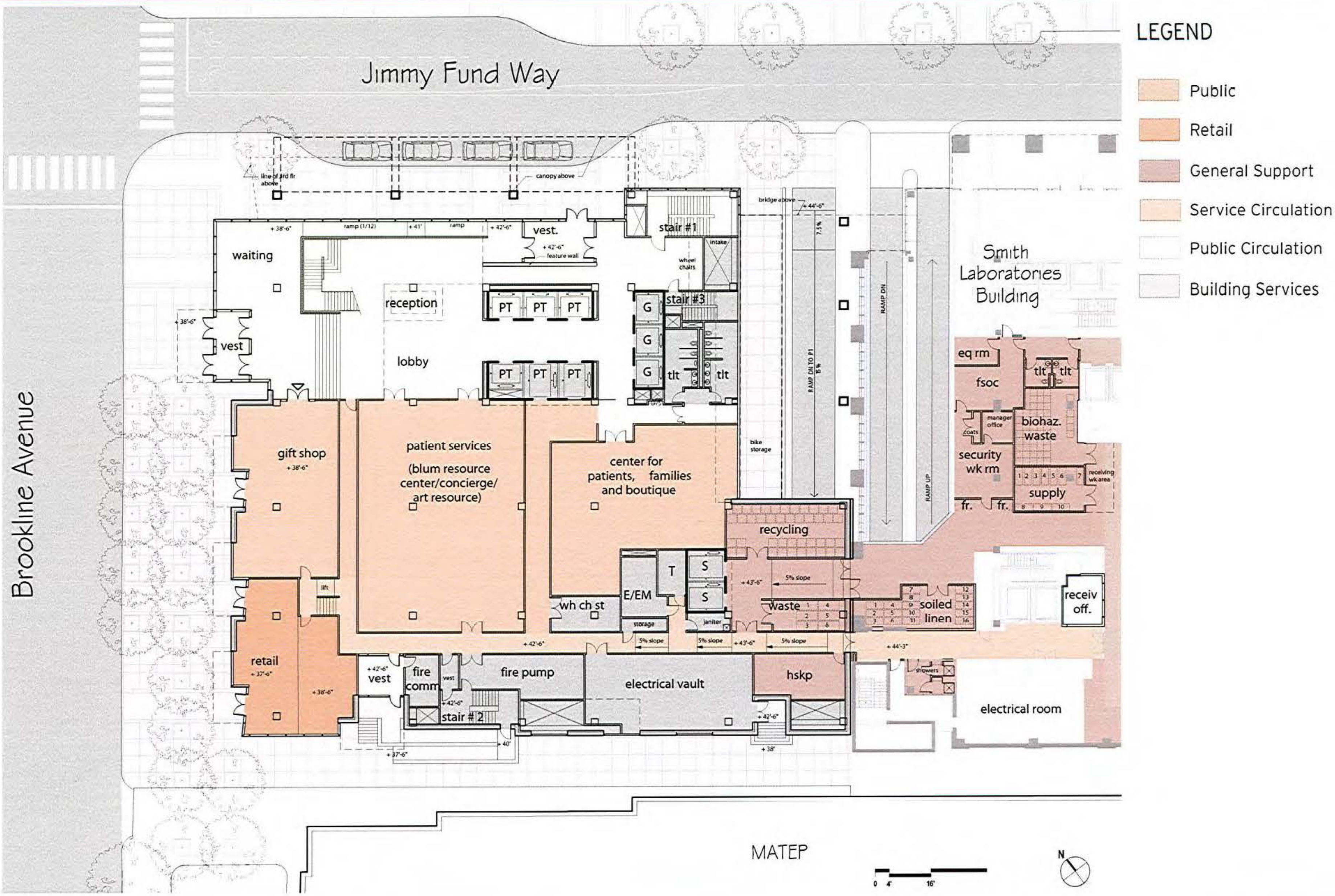
FIGURE A-4



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

P1 Floor Plan

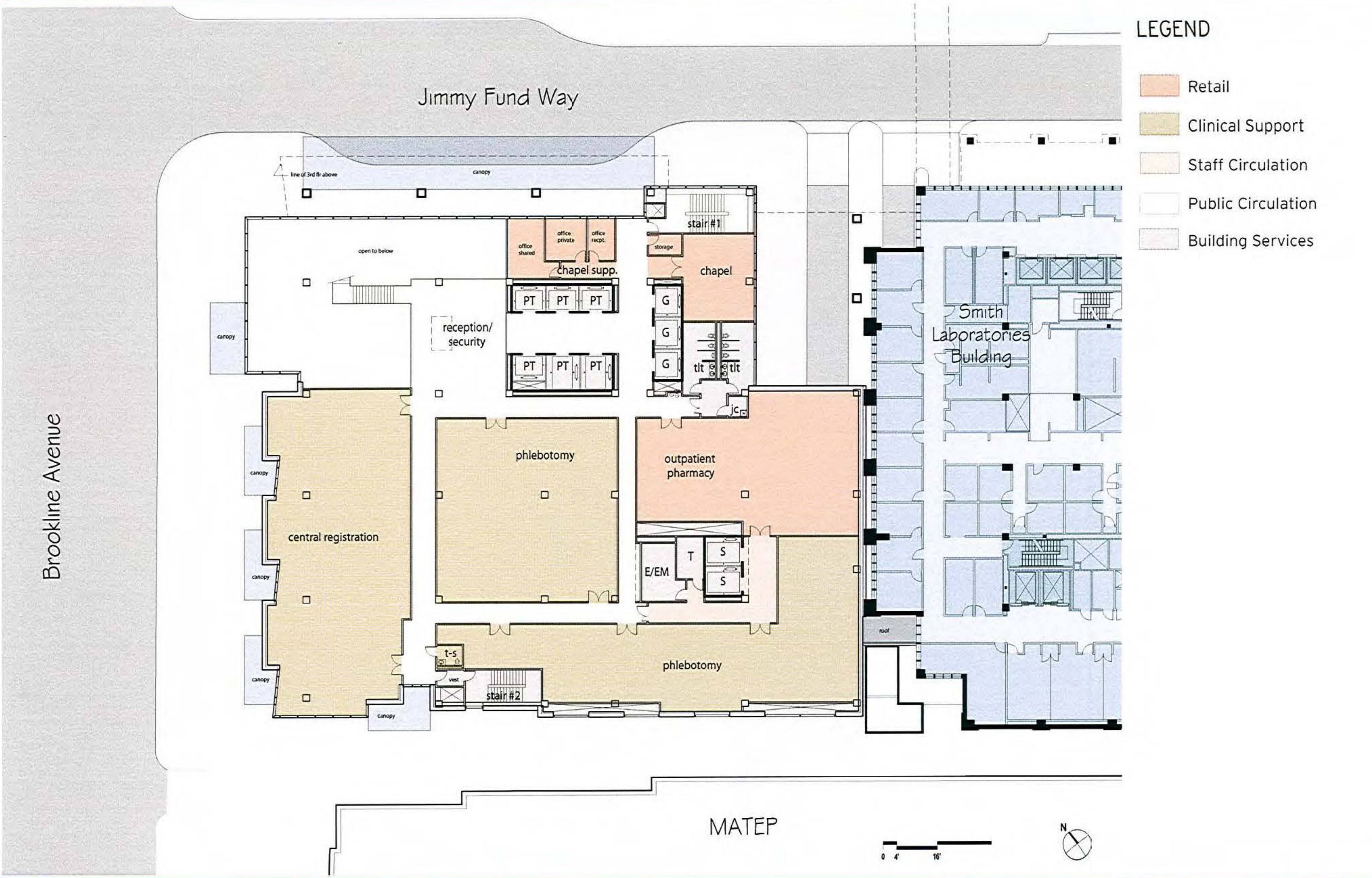
FIGURE A-5



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 1 Floor Plan

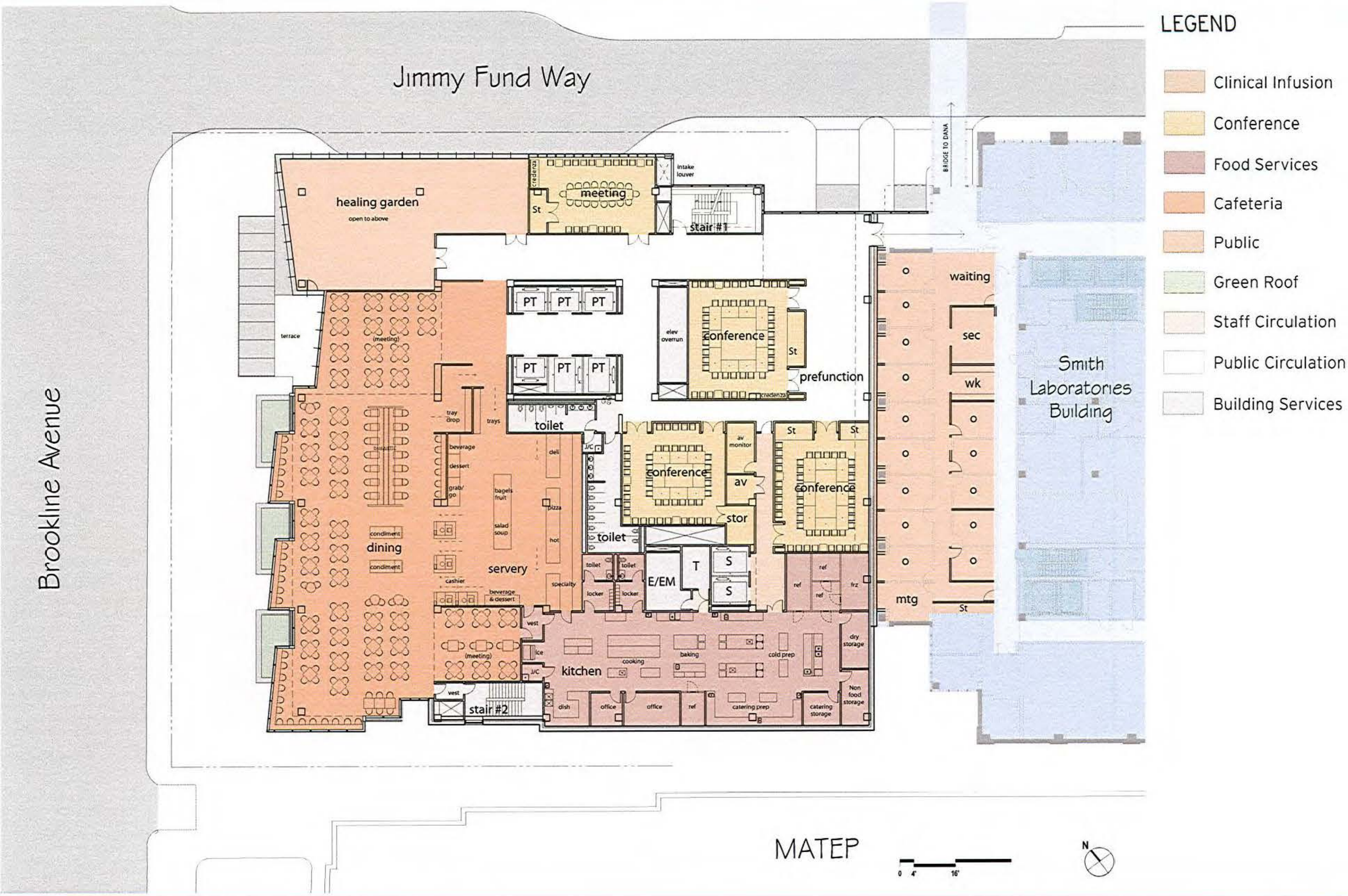
FIGURE A-6



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 2 Floor Plan

FIGURE A-7



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

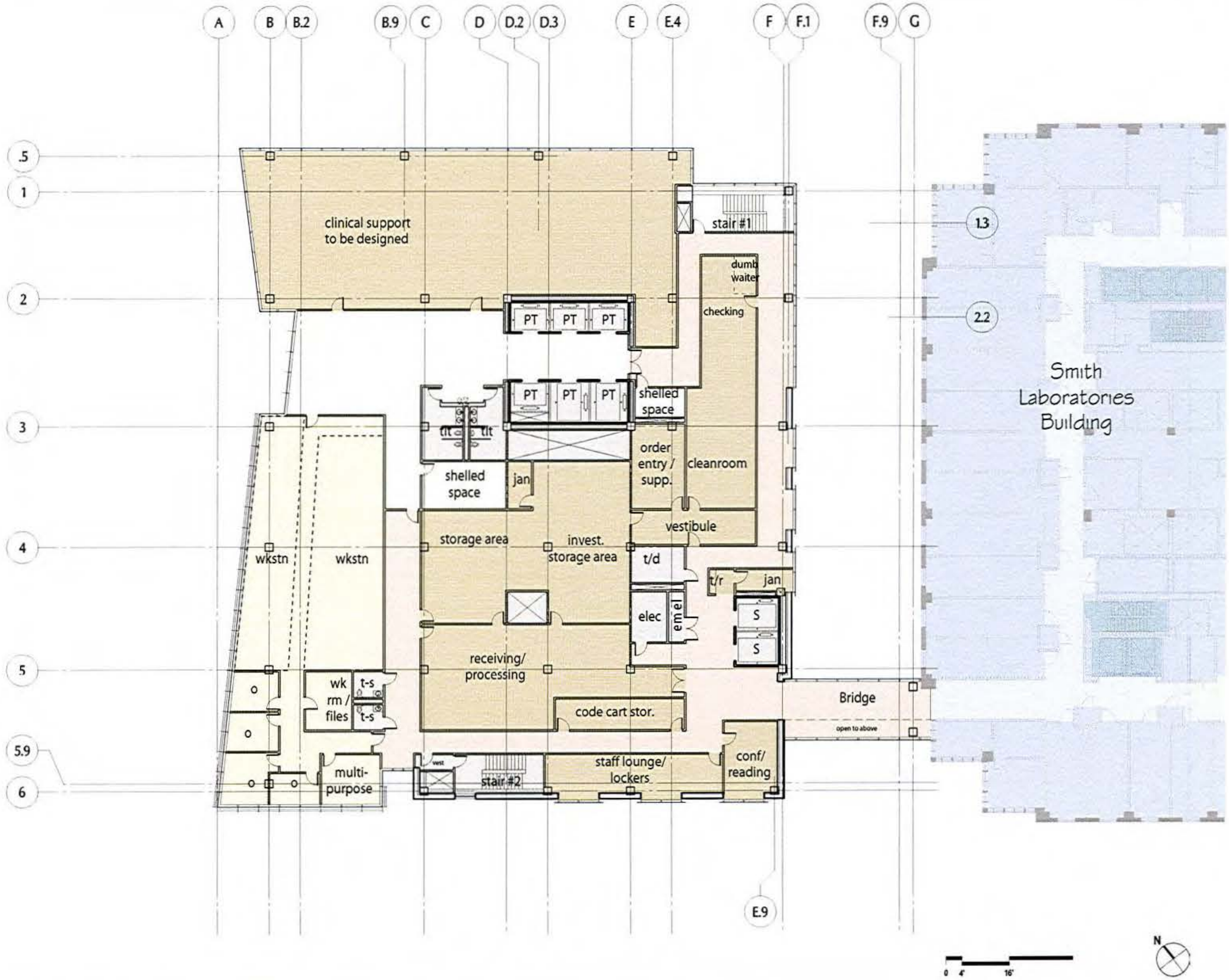
Level 3 Floor Plan

FIGURE A-8

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 4 Floor Plan

FIGURE A-9



LEGEND

- Office
- Clinical Support
- Staff Circulation
- Public Circulation
- Building Services

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 5 Floor Plan

FIGURE A-10

LEGEND

- Clinical Infusion
- Clinical Support
- Office
- Clinical
- Clinical Infusion Circulation
- Staff Circulation
- Public Circulation
- Building Services

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 6 Floor Plan

FIGURE A-11

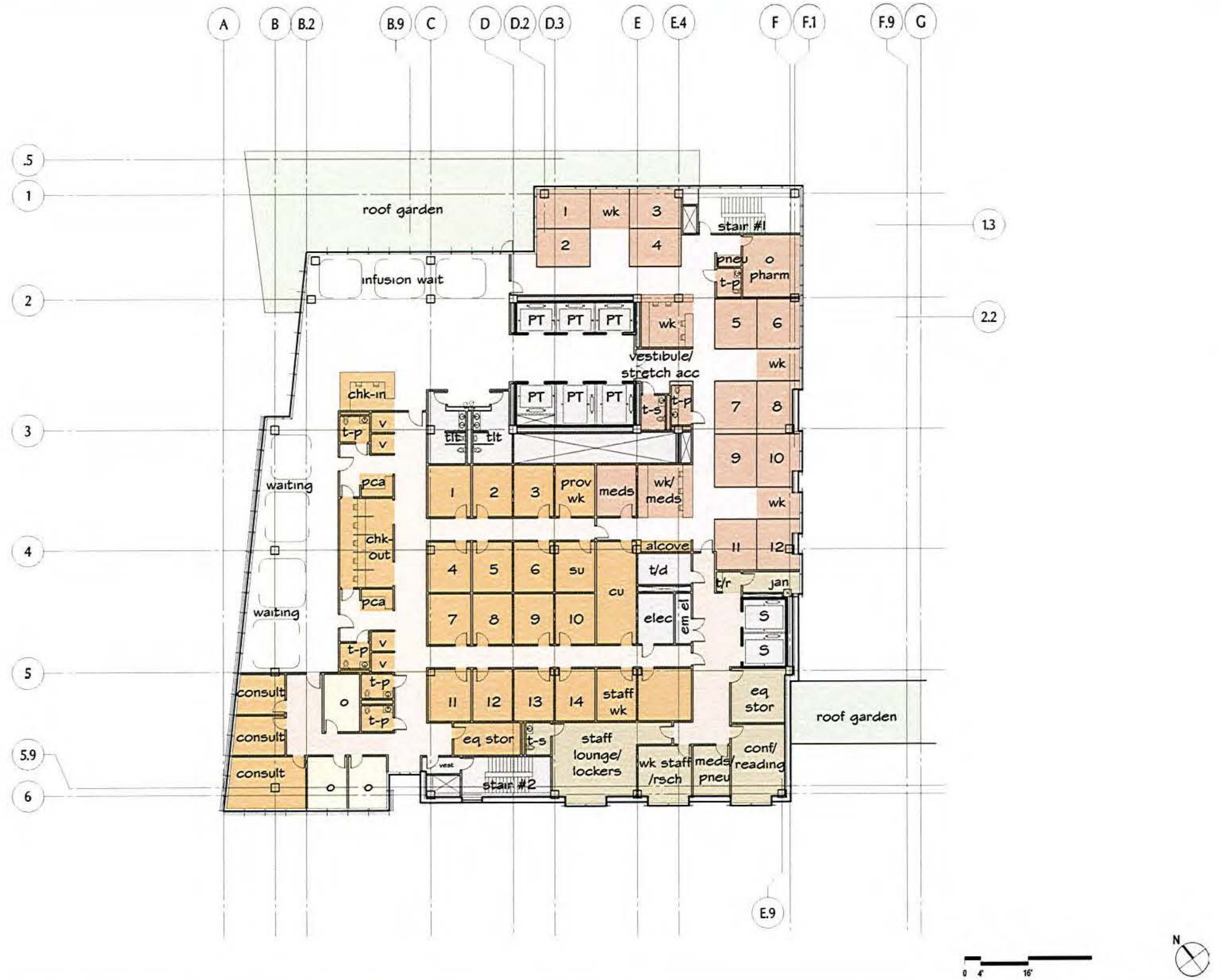
LEGEND

- Clinical Infusion
- Clinical Support
- Clinical
- Clinical Infusion Circulation
- Staff Circulation
- Public Circulation
- Building Services

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Levels 7-10 Clinical Floor Plan

FIGURE A-12



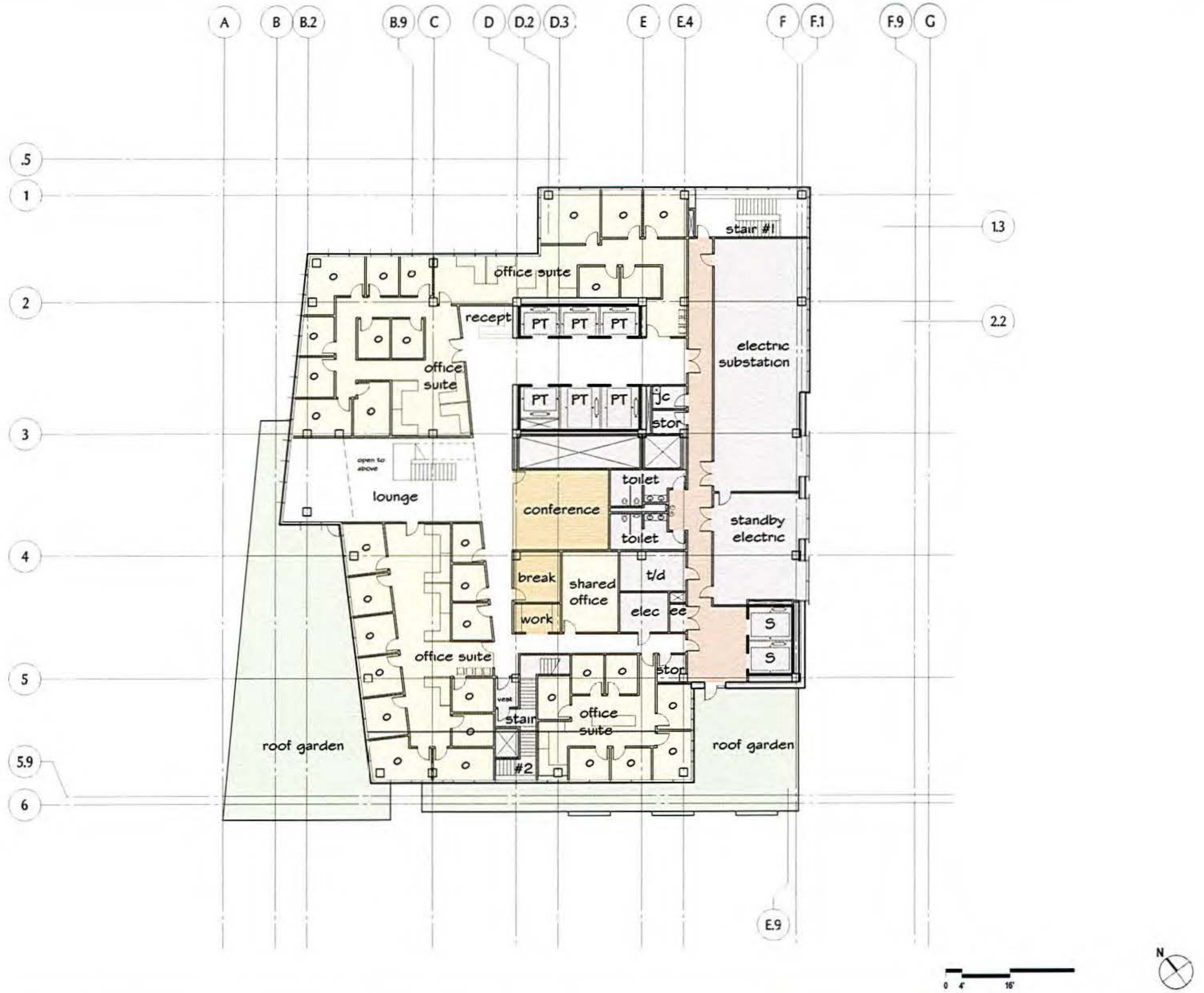
LEGEND

- Clinical Infusion
- Clinical Support
- Clinical
- Office
- Roof Garden
- Clinical Infusion Circulation
- Staff Circulation
- Public Circulation
- Building Services

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 11 Floor Plan

FIGURE A-13



LEGEND

Office

General Administration

Roof Garden

Service Circulation

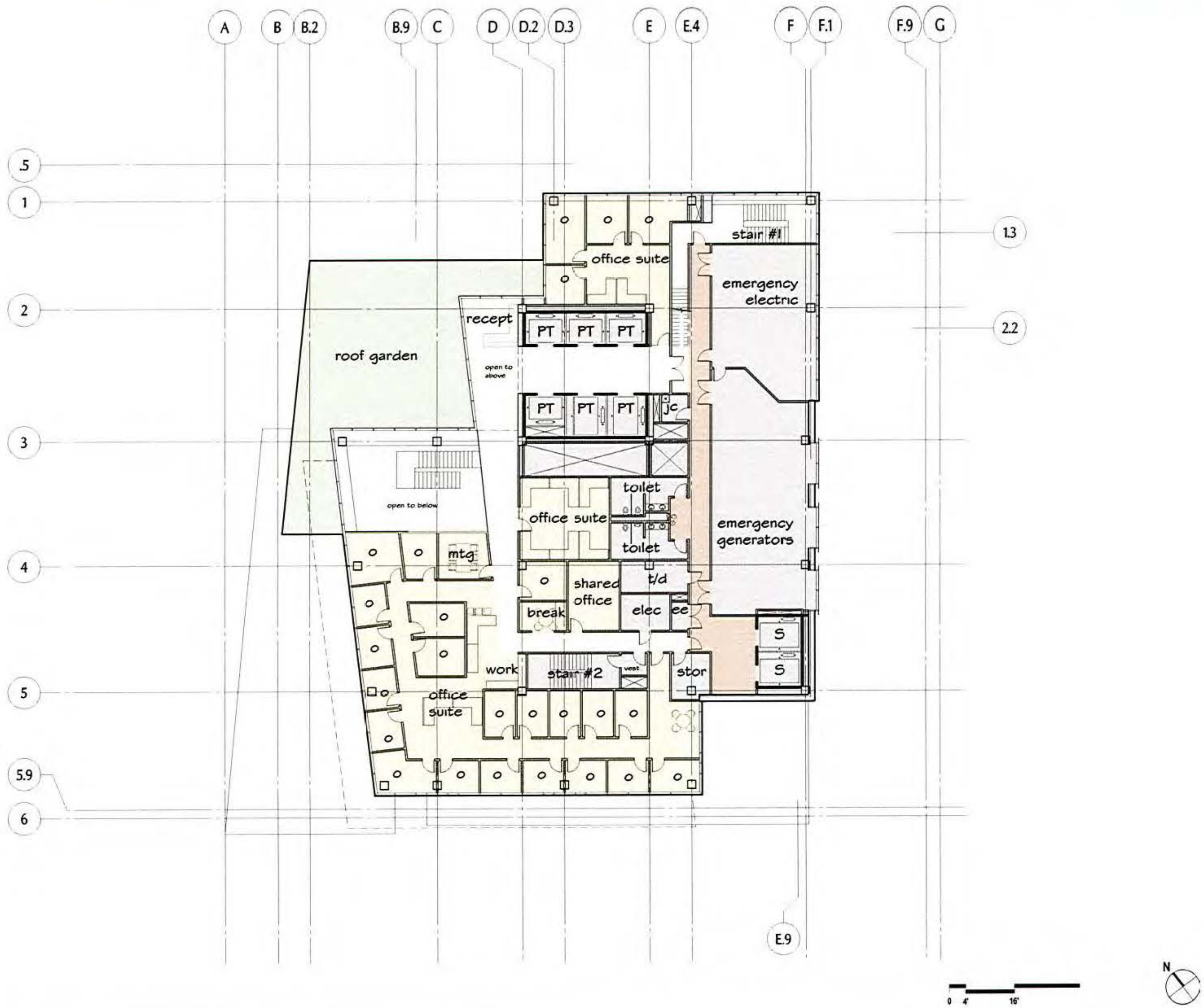
Public Circulation

Building Services

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 12 Floor Plan

FIGURE A-14



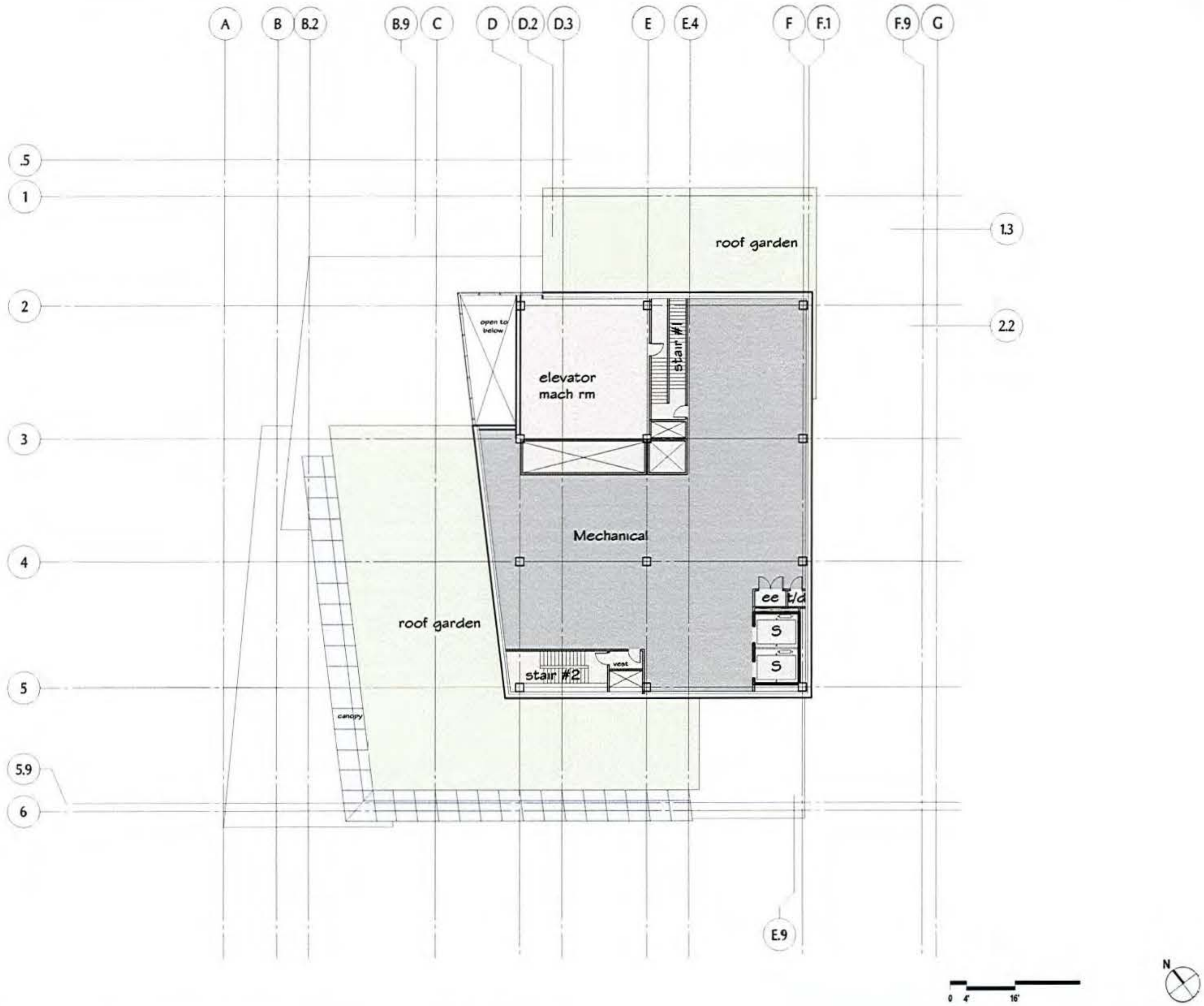
LEGEND

- Office
- Roof Garden
- Service Circulation
- Public Circulation
- Building Services

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 13 Floor Plan

FIGURE A-15



LEGEND

Roof Garden

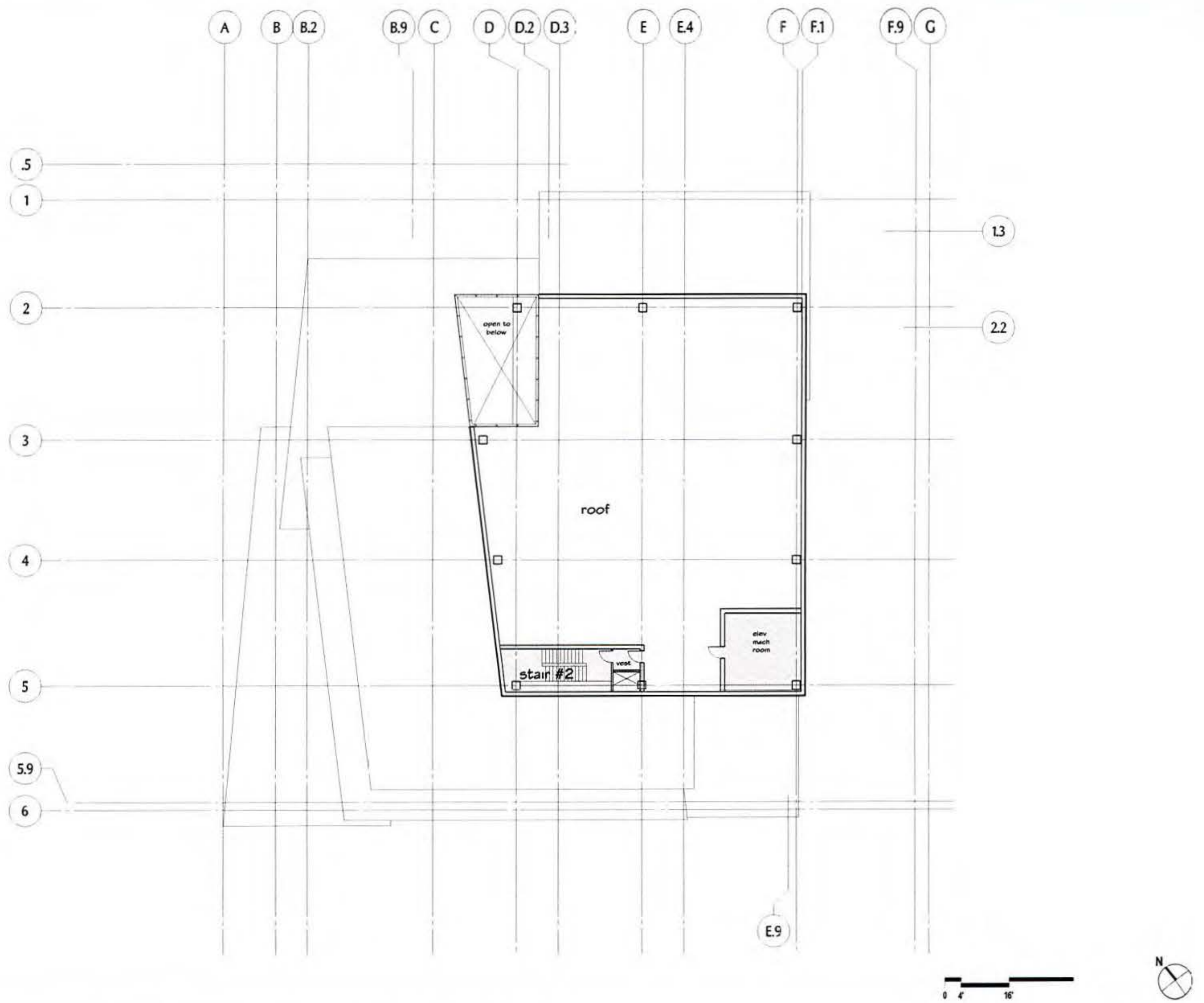
Building Services

Roof

DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Level 14 Floor Plan

FIGURE A-16

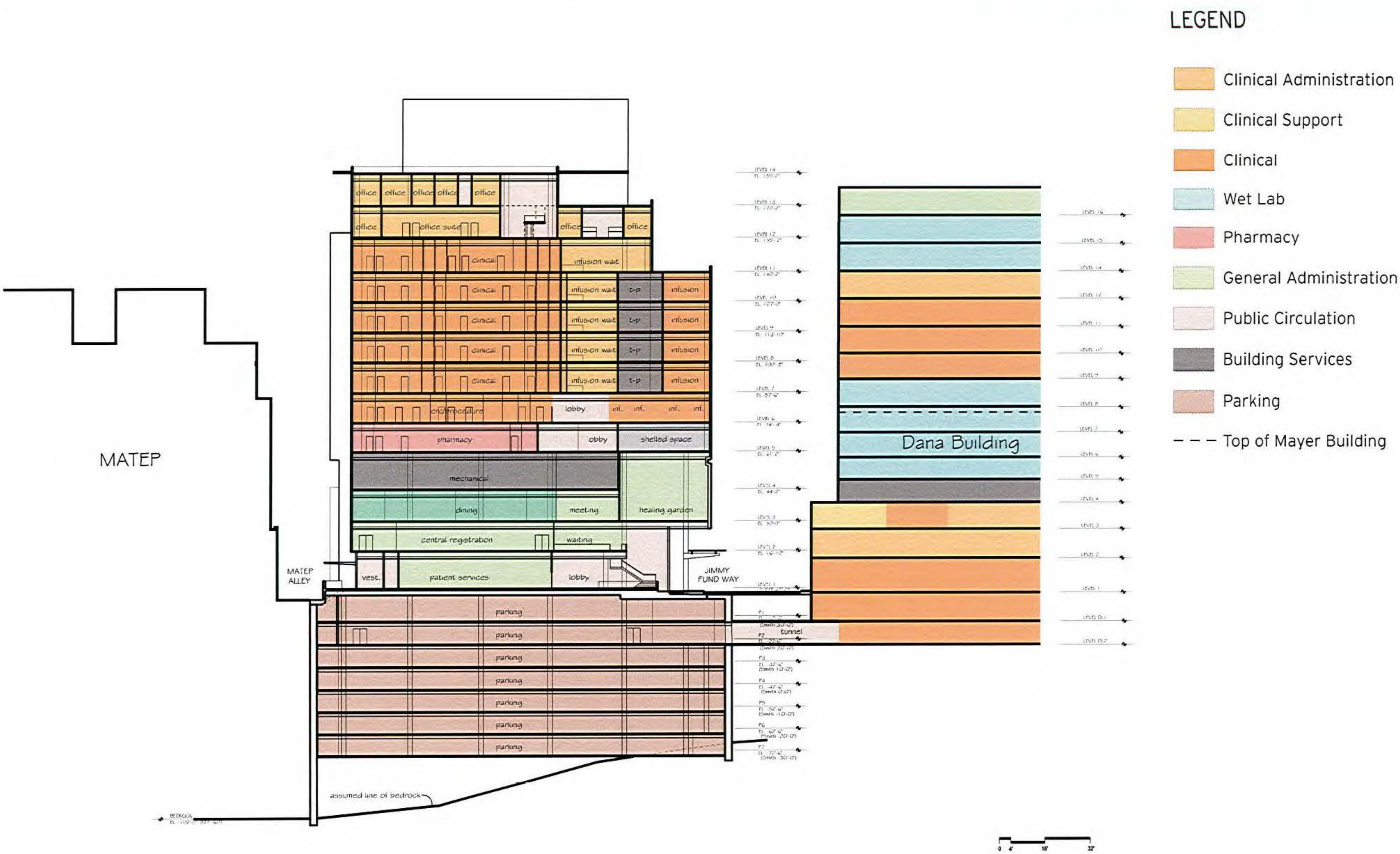


LEGEND

Building Services

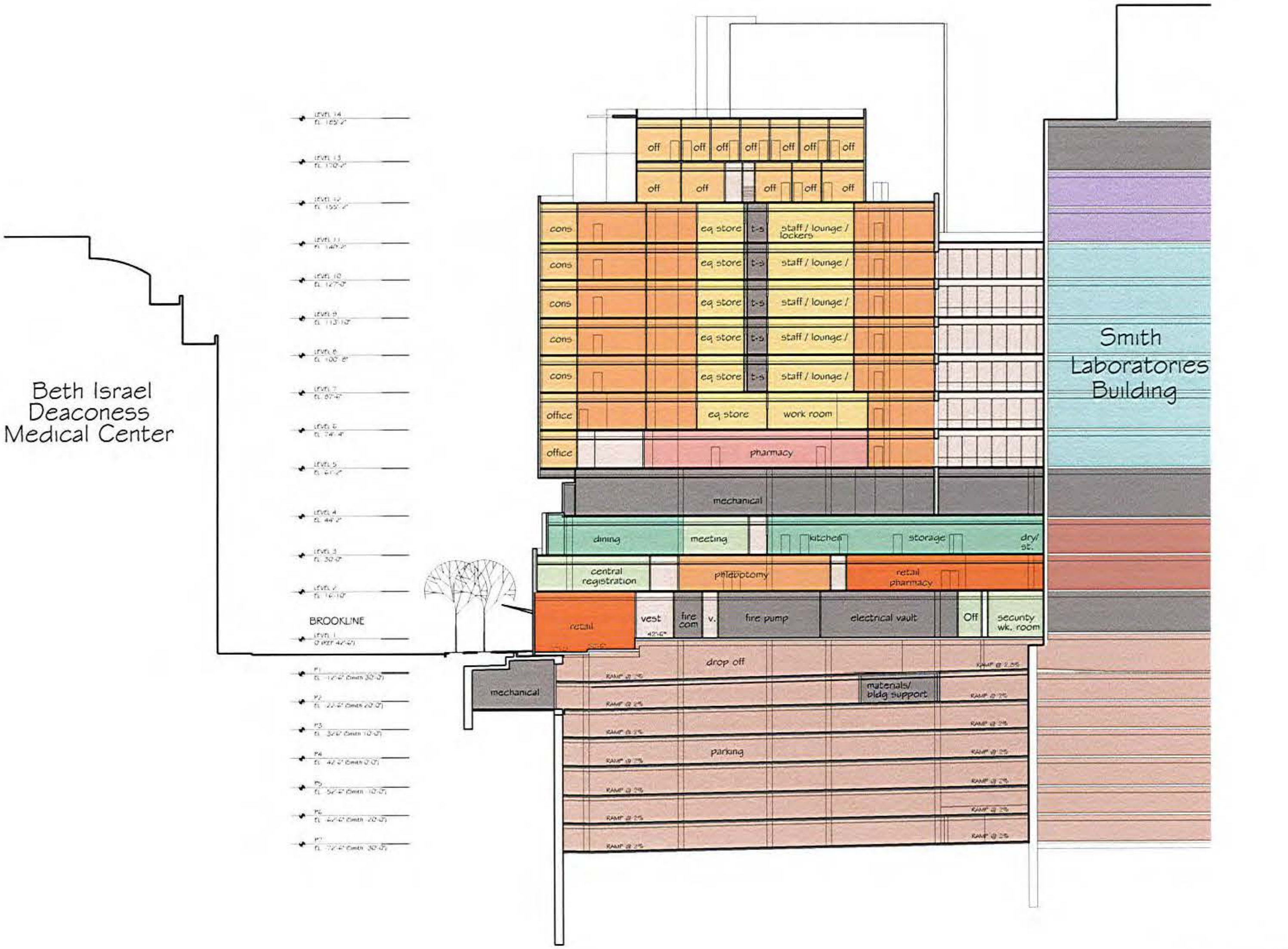
Level 15 Floor Plan

FIGURE A-17



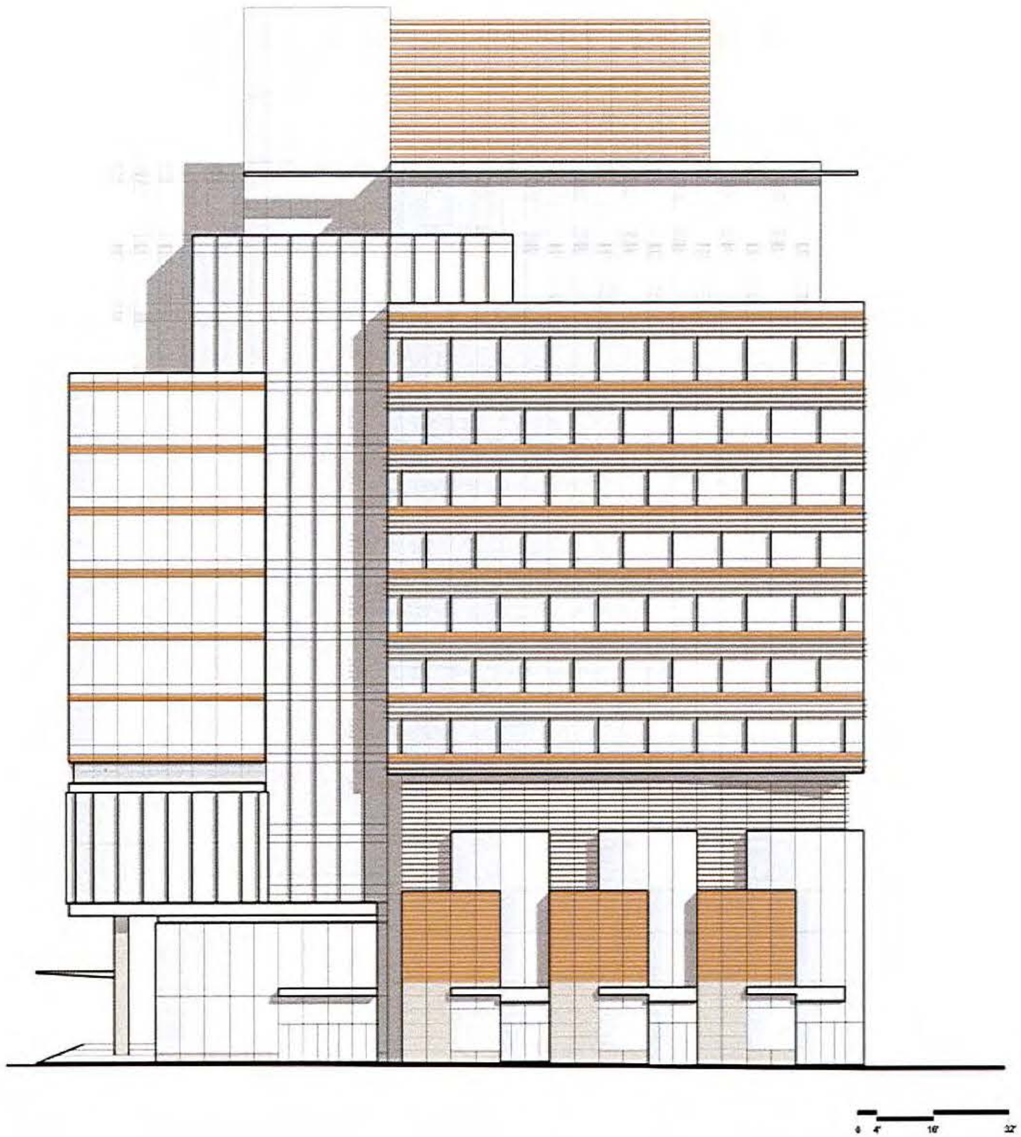
North - South Section

FIGURE A-18



LEGEND

- Clinical Administration
- Clinical Support
- Clinical
- Retail
- Dry Lab
- Wet Lab
- Vivarium
- Pharmacy
- General Administration
- Food Services
- Public Circulation
- Building Services
- Parking



DANA-FARBER CANCER INSTITUTE
CENTER FOR CANCER CARE
DPIR / DEIR

Brookline Avenue Elevation

FIGURE A-20

Jimmy Fund Way Elevation

FIGURE A-21

FINAL REPORT

PEDESTRIAN WIND STUDY
DANA-FARBER CENTER FOR CANCER CARE
BOSTON, MASSACHUSETTS

RWDI
CONSULTING ENGINEERS & SCIENTISTS

Project Number: 05-1438 **November 29, 2006**

SUBMITTED TO: **Jerry Foster**
Zimmer Gunsul Frasca Partnership

By e-mail:jfoster@zgf.com

SUBMITTED BY: **Rowan Williams Davies & Irwin Inc.**
Consulting Engineers & Scientists
650 Woodlawn Road West
Guelph, Ontario N1K 1B8

P: (519) 823-1311
F: (519) 823-1316

Project Coordinator: Godfrey Holder, B.Sc.
Project Manager: Monica Montefiore, M.Eng., P.Eng.
Project Director: Ray Sinclair, Ph.D., Principal

1. INTRODUCTION

A pedestrian wind study was conducted for the proposed Dana-Farber Center for Cancer Care located in Boston, Massachusetts. The objective of the study was to assess the effect of the proposed development on local wind conditions in pedestrian areas around the study site and suggest conceptual wind control measures for minimizing adverse effects.

The study involved wind simulations on a 1:300 scale model of the proposed building and surroundings. These simulations were then conducted in a boundary-layer wind tunnel, for the purpose of quantifying local wind speed conditions and comparing to appropriate criteria for gauging wind comfort in pedestrian areas. The criteria recommended by the Boston Redevelopment Authority (BRA) were used in this study. The present report describes the methods and presents the results of the wind tunnel simulations.

2. OVERVIEW

Major buildings, especially those that protrude above their surroundings, often cause increased local wind speeds at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface, and taller buildings intercept these faster winds and deflect them down to pedestrian level. The funnelling of wind through gaps between buildings and the acceleration of wind around corners of buildings may also cause increases in wind speed. Conversely, if a building is surrounded by others of equivalent height, it may be protected from the prevailing upper-level winds, resulting in no significant changes to the local pedestrian-level wind environment. The most effective way to assess potential pedestrian-level wind impacts around a proposed new building is to conduct scale model tests in a wind tunnel.

The consideration of wind in planning outdoor activity areas is important since high winds in an area tend to deter pedestrian use. For example, winds should be light or relatively light in areas where people would be sitting, such as outdoor cafes or playgrounds. For bus stops and other locations where people would be standing, somewhat higher winds can be tolerated. For frequently used sidewalks, where people are primarily walking, stronger winds are acceptable. For infrequently used areas, the wind comfort criteria can be relaxed even further. The actual effects of wind can range from pedestrian inconvenience due to the blowing of dust and other loose material in a moderate breeze, to severe difficulty with walking due to the wind forces on the pedestrian.

3. METHODOLOGY

Information concerning the site and surroundings was derived from: site photographs; information on surrounding buildings and on surrounding terrain supplied by the architect; site plans and elevations of the proposed development provided by the design team. The wind tunnel model was constructed using the information listed in Appendix A. The following configurations were simulated:

(A) No Build Configuration - includes all existing surrounding buildings (Figure 1a).

(B) Build Configuration - includes the proposed Dana-Farber Center For Cancer Care, all existing surroundings, and the future proposed Joslin building (Figure 1b).

The wind simulations were conducted in an 8ft wide by 6ft high boundary-layer wind tunnel, the smaller of two such wind tunnels at RWDI's laboratory in Guelph, Ontario, Canada. A 150 hp axial fan at the upwind end of the tunnel produces wind speeds in excess of 35 mph. Unwanted fan turbulence is removed by means of screens and honeycombs, and a realistic simulation of atmospheric turbulence is provided in the long working section, by means of spires at the upwind end and roughness blocks on the floor. The spires and roughness are selected to represent either open, suburban or urban terrain, depending on the site and the wind direction being tested. The working section is followed by the test section, where the scale model sits on a motorized turntable, embedded in the wind tunnel floor.

The scale model was equipped with 56 specially designed wind speed sensors that were connected to the wind tunnel's data acquisition system to record the mean and fluctuating components of wind speed at a full-scale height of 5 ft above grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 wind directions, in 10 degree increments, starting from true north. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the reference wind speed in the free stream above the model. The results were then combined with long-term meteorological data, recorded during the years 1945 to 2004 at Boston's Logan International Airport, in order to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year.

Figures 2a, 2b and 2c present "wind roses", summarizing the annual and seasonal wind climates in the Boston area, based on the data from Logan Airport. The left-hand wind roses, in Figures 2a and 2b, are based on all observed wind readings for the given season, and the right-hand wind roses are based on strong winds for one percent of the time. The upper wind roses in Figure 2a, for example, summarize the spring (March, April, and May) wind data. In general, the prevailing winds at this time of year are from the west-northwest, northwest, west, southwest and east. In the case of strong winds, however, the most common wind direction are northeast, west and west-northwest.

On an annual basis (Figure 2c), the most common wind directions are those between southwest and northwest. Winds from the south-southwest and east are also relatively common. In the case of strong winds, northeast and west-northwest are the dominant wind directions.

This study involved state-of-the-art measurement and analysis techniques to predict wind conditions at the study site. Nevertheless, some uncertainty remains in predicting wind comfort, and this must be kept in mind. For example, the sensation of comfort among individuals can be quite variable. Variations in age, individual health, clothing, and other human factors can change a particular response of an individual. The comfort limits used in this report represent an average for the total population. Also, unforeseen changes in the project area, such as the construction or removal of buildings, can affect the conditions experienced at the site. Finally, the prediction of wind speeds is necessarily a statistical procedure. The wind speeds reported are for the frequency of occurrence stated (one percent of the time). Higher wind speeds will occur but on a less frequent basis.

4. PEDESTRIAN WIND COMFORT CRITERIA

The BRA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BRA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed +1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than one percent of the time. The second set of criteria used by the BRA to determine the acceptability of specific locations is based on the work of Melbourne[1]. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded 1% of the time (i.e., the 99-percentile mean wind speed). They are as follows:

Table 1: BRA Mean Wind Criteria*

Dangerous Location	> 27 mph
Uncomfortable for Walking	>19 and ≤27 mph
Comfortable for Walking	>15 and ≤19 mph
Comfortable for Standing	>12 and ≤15 mph
Comfortable for Sitting	<12 mph
* Applicable to the hourly mean wind speed exceeded one percent of the time.	

The wind climate found in a typical downtown location in Boston is generally comfortable for the pedestrian use of sidewalks and thoroughfares and meets the BRA effective gust velocity criterion of 31 mph. However, without any mitigation measures, this wind climate is likely to be frequently uncomfortable for more passive activities such as sitting.

[1]Melbourne, W.H., 1978, "Criteria for Environmental Wind Conditions", Journal of Industrial Aerodynamics, 3 (1978) 241 - 249.

5. TEST RESULTS

Table 1 presents the mean and effective gust wind speeds for each season, as well as annually. Figures 3 and 4 graphically depict the wind comfort conditions at each wind measurement location based on the annual winds for the two configurations tested. Typically the summer and fall wind conditions tend to be more comfortable than the annual wind conditions, while the winter and spring wind conditions are less comfortable than the annual winds.

The placement of wind measurement locations was based on our experience and the understanding of pedestrian usage of the site, and reviewed by the Zimmer Gunsul Frasca Partnership and Boston Redevelopment Authority. The following summary of pedestrian wind conditions is based on the annual wind speeds, except where noted otherwise. Note that no data was available for Sensors 1, 2, 3, 4, 5, 10, 11, 12 and 56 in the No Build Configuration, as these sensors were located under the existing building or on the proposed building.

Generally, wind conditions suitable for walking are appropriate for sidewalks, walkways and parking lots; wind speeds comfortable for standing are preferred for building entrances where pedestrians are more apt to linger; and lower wind speeds comfortable for sitting or standing are desired for outdoor amenity spaces.

5.1 No Build Configuration

On an annual basis, the mean and gust wind speeds for the No Build Configuration were generally comfortable for sitting and standing. Locations 31, 33 and 41 were predicted to have mean wind speeds uncomfortable for walking (see Figure 3). Additionally, Locations 31 and 33 were predicted to have unacceptable wind gust speeds, based on the BRA's effective gust criterion. These wind conditions were due mainly to the dominant northwesterly winds accelerating around the corners of buildings at these locations. No location was predicted to have dangerous wind conditions annually.

When seasonal results in Table 1 were analysed, Locations 19, 31, 32, 33 and 41 were predicted to have uncomfortable mean wind speeds in the winter. Additionally, dangerous wind conditions were detected at Location 31, in the winter. Locations 31, 33 and 41 also failed the BRA's effective gust criterion during the winter.

5.2 Build Configuration

Brookline Avenue and Longwood Galeria (Locations 1, 2, 3, 13, 36, 37, 38, 43 through 52, 56)

On an annual basis, mean wind speeds comfortable for standing at entrances (Locations 1, 2, 3 and 56) were detected. Wind conditions along the sidewalks were suitable for walking or better. No unacceptable effective gust wind speeds were detected. Wind conditions at these locations are considered acceptable for their intended use.

Jimmy Fund Way (Locations 4 through 9, 14 through 19)

On an annual basis, the mean wind speeds at Locations 5, 6, and 7, in the drop-off area, were comfortable for sitting, while the remaining sidewalk were comfortable for walking or better. No dangerous or unacceptable effective gust wind speeds were detected. However, during the winter, Location 4 was predicted to have mean wind speeds marginally (20 mph) uncomfortable for walking (see Table 1). These wind conditions are considered acceptable for the expected usage of the area.

Roof Garden (Locations 10 through 12)

On an annual basis, wind conditions on the Roof Garden were comfortable for sitting at Location 10 and walking at Location 12, while uncomfortable wind conditions were recorded at Location 11 (see top of Figure 4). Higher wind speeds detected at Location 11 were due to exposure to strong northerly winds in the spring, fall and winter. With regards to the effective gust wind speeds, Location 11 failed the BRA's effective gust criterion during the spring and winter seasons, as well as annually (see Table 1). If improved wind conditions are desired at the Roof Garden, wind mitigation measures such as enlarge parapet walls (10ft), in conjunction with a large horizontal canopy/trellis, could be developed.

To assess the effectiveness of the proposed wind control measures, additional wind tunnel testing should be undertaken.

Binney Street (Locations 20 through 33)

On an annual basis, wind conditions along Binney Street were generally comfortable for walking or better in the Build Configuration. As was detected in the No Build configuration, Locations 31 and 33 were uncomfortable for walking on an annual basis, with unacceptable wind gust according to effective gust criterion.

As indicated in Table 1, the mean wind speeds at Location 31 were rated uncomfortable for walking in the spring and fall, while dangerous mean wind speeds were detected in the winter. Mean wind speeds at Location 33 were also uncomfortable for walking in the winter.

Francis Street (Locations 34, 35, 39 through 42)

Mean wind speeds, on an annual basis, along Francis Street and in the open park (Location 40) were generally comfortable for sitting or standing. Higher mean wind speeds uncomfortable for walking were detected at Location 41 (intersection of Francis Street and Pilgrim Road) in the spring and winter seasons, as well as on an annual basis. Additionally, unacceptable effective gust speeds were detected at Location 41 in the winter.

Joslin Place and Deaconess Road (Locations 53 through 55)

On an annual basis, mean wind speeds were comfortable for walking or better. No dangerous wind conditions were detected for all seasons and all locations passed the effective gust wind speed criterion.

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
1	A	Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
2	A	Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
3	A	Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
	B	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	13		Standing	20		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations
A - No Build
B - Build

Mean Wind Speed Criteria
Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria
Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria		Mean Wind Speed				Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
4	A	Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
	B	Spring	18		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	18		Walking	26		Acceptable
5	A	Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
	B	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	16		Acceptable
6	A	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	9		Sitting	15	-11%	Acceptable
		Winter	11		Sitting	17	-10%	Acceptable
		Annual	10		Sitting	16		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Bnild	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B - Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
7	A	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	12		Sitting	20		Acceptable
	B	Spring	8	-32%	Sitting	14	-29%	Acceptable
		Summer	7	-21%	Sitting	11	-26%	Acceptable
		Fall	8	-32%	Sitting	13	-31%	Acceptable
		Winter	9	-30%	Sitting	15	-31%	Acceptable
		Annual	8	-32%	Sitting	14	-29%	Acceptable
8	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	14	+17%	Standing	22	+16%	Acceptable
		Summer	11	+22%	Sitting	17	+21%	Acceptable
		Fall	13	+18%	Standing	20	+11%	Acceptable
		Winter	16	+23%	Walking	24	+20%	Acceptable
		Annual	14	+17%	Standing	22	+22%	Acceptable
9	A	Spring	10		Sitting	17		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	17		Acceptable
	B	Spring	7	-29%	Sitting	11	-34%	Acceptable
		Summer	5	-37%	Sitting	8	-32%	Acceptable
		Fall	6	-39%	Sitting	10	-37%	Acceptable
		Winter	7	-35%	Sitting	12	-32%	Acceptable
		Annual	7	-29%	Sitting	11	-34%	Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>
A - No Build
B - Bnild

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
10	A	Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
	B	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	17		Acceptable
11	A	Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
	B	Spring	24		Uncomfortable	33		Unacceptable
		Summer	19		Walking	25		Acceptable
		Fall	22		Uncomfortable	31		Acceptable
		Winter	27		Uncomfortable	37		Unacceptable
		Annual	24		Uncomfortable	33		Unacceptable
12	A	Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
		Sensor on Proposed Building - No Data Available						
	B	Spring	17		Walking	28		Acceptable
		Summer	15		Standing	24		Acceptable
		Fall	16		Walking	26		Acceptable
		Winter	18		Walking	28		Acceptable
		Annual	17		Walking	26		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations
A - No Build
B - Build

Mean Wind Speed Criteria	
Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria	
Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
13	A	Spring	14		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	13		Standing	18		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	12	-13%	Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11	-14%	Sitting	18		Acceptable
		Winter	13	-12%	Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
14	A	Spring	10		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	10		Sitting	17		Acceptable
	B	Spring	16	+60%	Walking	23	+35%	Acceptable
		Summer	13	+63%	Standing	18	+38%	Acceptable
		Fall	15	+50%	Standing	21	+31%	Acceptable
		Winter	18	+50%	Walking	26	+37%	Acceptable
		Annual	16	+60%	Walking	23	+35%	Acceptable
15	A	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	16	+45%	Walking	23	+35%	Acceptable
		Summer	13	+63%	Standing	19	+46%	Acceptable
		Fall	15	+50%	Standing	22	+38%	Acceptable
		Winter	18	+50%	Walking	26	+37%	Acceptable
		Annual	16	+45%	Walking	23	+35%	Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B - Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
16	A	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	18	+13%	Walking	25		Acceptable
		Summer	14	+17%	Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
17	A	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	12	-19%	Sitting	18	-21%	Acceptable
		Summer	9	-17%	Sitting	14	-17%	Acceptable
		Fall	11	-20%	Sitting	17	-18%	Acceptable
		Winter	13	-18%	Standing	20	-19%	Acceptable
		Annual	12	-19%	Sitting	18	-17%	Acceptable
18	A	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	15	-11%	Standing	22	-14%	Acceptable
		Summer	12		Sitting	17	-10%	Acceptable
		Fall	14	-12%	Standing	20	-16%	Acceptable
		Winter	17	-10%	Walking	24	-16%	Acceptable
		Annual	15	-11%	Standing	22	-14%	Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations
A - No Build
B - Build

Mean Wind Speed Criteria	
Comfortable for Sitting:	$\leq$ 12 mph
Comfortable for Standing:	> 12 and $\leq$ 15 mph
Comfortable for Walking:	> 15 and $\leq$ 19 mph
Uncomfortable for Walking:	> 19 and $\leq$ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria	
Acceptable:	$\leq$ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
19	A	Spring	19		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	19		Walking	27		Acceptable
	B	Spring	15	-20%	Standing	22	-18%	Acceptable
		Summer	11	-20%	Sitting	17	-14%	Acceptable
		Fall	14	-21%	Standing	20	-19%	Acceptable
		Winter	16	-26%	Walking	24	-22%	Acceptable
		Annual	15	-20%	Standing	21	-21%	Acceptable
20	A	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	10	-37%	Sitting	16	-29%	Acceptable
		Summer	8	-32%	Sitting	12	-32%	Acceptable
		Fall	9	-39%	Sitting	15	-31%	Acceptable
		Winter	11	-38%	Sitting	17	-34%	Acceptable
		Annual	10	-37%	Sitting	16	-29%	Acceptable
21	A	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	11	-20%	Sitting	18	-13%	Acceptable
		Summer	8	-19%	Sitting	13	-18%	Acceptable
		Fall	10	-22%	Sitting	17	-10%	Acceptable
		Winter	12	-19%	Sitting	20	-12%	Acceptable
		Annual	11	-14%	Sitting	18	-13%	Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B - Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
22	A	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	14	+17%	Standing	22	+10%	Acceptable
		Summer	10	+11%	Sitting	16		Acceptable
		Fall	13	+18%	Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	21	+11%	Acceptable
23	A	Spring	16		Walking	24		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	13	-18%	Standing	21	-12%	Acceptable
		Summer	10		Sitting	15	-11%	Acceptable
		Fall	12	-13%	Sitting	19	-13%	Acceptable
		Winter	14	-17%	Standing	22	-11%	Acceptable
		Annual	13	-12%	Standing	20	-12%	Acceptable
24	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	12	-13%	Sitting	18	-13%	Acceptable
		Summer	10		Sitting	15	-11%	Acceptable
		Fall	11	-14%	Sitting	17	-14%	Acceptable
		Winter	13	-18%	Standing	20	-16%	Acceptable
		Annual	12	-13%	Sitting	18	-13%	Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations
A - No Build
B - Build

Mean Wind Speed Criteria	
Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria	
Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
25	A	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
26	A	Spring	10		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	17		Acceptable
	B	Spring	11	+10%	Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	16		Acceptable
27	A	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	8	-10%	Sitting	13	-12%	Acceptable
		Summer	6	-13%	Sitting	10		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8	-10%	Sitting	13		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B - Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
28	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	11	+22%	Sitting	17	+21%	Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22	+10%	Acceptable
		Annual	13		Standing	20		Acceptable
29	A	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	17	+13%	Walking	24		Acceptable
		Summer	14	+27%	Standing	20	+18%	Acceptable
		Fall	16	+14%	Walking	23	+10%	Acceptable
		Winter	19	+12%	Walking	26		Acceptable
		Annual	17	+13%	Walking	24		Acceptable
30	A	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	9		Sitting	15		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	9		Sitting	15		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>
A - No Build
B - Build

<u>Mean Wind Speed Criteria</u>	
Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>	
Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
31	A	Spring	27		Uncomfortable	35		Unacceptable
		Summer	19		Walking	25		Acceptable
		Fall	25		Uncomfortable	32		Unacceptable
		Winter	30		Dangerous	39		Unacceptable
		Annual	27		Uncomfortable	35		Unacceptable
	B	Spring	27		Uncomfortable	34		Unacceptable
		Summer	19		Walking	25		Acceptable
		Fall	24		Uncomfortable	32		Unacceptable
		Winter	29		Dangerous	38		Unacceptable
		Annual	26		Uncomfortable	34		Unacceptable
32	A	Spring	19		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	19		Walking	26		Acceptable
	B	Spring	19		Walking	26		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	19		Walking	26		Acceptable
33	A	Spring	24		Uncomfortable	33		Unacceptable
		Summer	17		Walking	24		Acceptable
		Fall	22		Uncomfortable	31		Acceptable
		Winter	26		Uncomfortable	36		Unacceptable
		Annual	24		Uncomfortable	33		Unacceptable
	B	Spring	24		Uncomfortable	33		Unacceptable
		Summer	17		Walking	24		Acceptable
		Fall	22		Uncomfortable	31		Acceptable
		Winter	27		Uncomfortable	36		Unacceptable
		Annual	24		Uncomfortable	33		Unacceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations
A - No Build
B - Build

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
34	A	Spring	12		Sitting	18		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	13		Standing	19		Acceptable
		Summer	11	+10%	Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
35	A	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
36	A	Spring	14		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	22		Acceptable
		Winter	16		Walking	26		Acceptable
		Annual	14		Standing	23		Acceptable
	B	Spring	14		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	14		Standing	22		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations
A - No Build
B - Build

Mean Wind Speed Criteria
Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria
Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
37	A	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	22		Acceptable
38	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	12		Sitting	18		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
39	A	Spring	15		Standing	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	14		Standing	23		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	22		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	23		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B - Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
40	A	Spring	15		Standing	24		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	14		Standing	23		Acceptable
	B	Spring	14		Standing	23		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	13		Standing	22		Acceptable
		Winter	15		Standing	25		Acceptable
		Annual	14		Standing	23		Acceptable
41	A	Spring	21		Uncomfortable	29		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	23		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	29		Acceptable
	B	Spring	20		Uncomfortable	29		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	23		Uncomfortable	32		Unacceptable
		Annual	20		Uncomfortable	29		Acceptable
42	A	Spring	11		Sitting	19		Acceptable
		Summer	8		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	21		Acceptable
		Annual	11		Sitting	19		Acceptable
	B	Spring	11		Sitting	19		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations
A - No Build
B - Build

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
43	A	Spring	16		Walking	24		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	23		Acceptable
44	A	Spring	12		Sitting	18		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	11		Sitting	18		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
45	A	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10	+11%	Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations
A - No Build
B - Build

Mean Wind Speed Criteria
Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria
Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
46	A	Spring	12		Sitting	19		Acceptable
		Summer	8		Sitting	14		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	11		Sitting	17	-10%	Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16	-10%	Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17	-10%	Acceptable
47	A	Spring	8		Sitting	13		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	15	+88%	Standing	22	+69%	Acceptable
		Summer	12	+100%	Sitting	18	+80%	Acceptable
		Fall	13	+63%	Standing	20	+54%	Acceptable
		Winter	15	+67%	Standing	23	+64%	Acceptable
		Annual	14	+75%	Standing	21	+62%	Acceptable
48	A	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	16		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	18		Walking	28	+17%	Acceptable
		Annual	16		Walking	25		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>
A - No Build
B - Build

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
49	A	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	12		Sitting	18		Acceptable
		Summer	9	+13%	Sitting	13		Acceptable
		Fall	11	+10%	Sitting	17		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
50	A	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	16	+14%	Walking	23	+10%	Acceptable
		Summer	12	+20%	Sitting	18	+13%	Acceptable
		Fall	15	+15%	Standing	22	+10%	Acceptable
		Winter	16	+14%	Walking	25	+14%	Acceptable
		Annual	15	+15%	Standing	23	+10%	Acceptable
51	A	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	15		Acceptable
	B	Spring	12	+20%	Sitting	18	+13%	Acceptable
		Summer	9	+13%	Sitting	14	+17%	Acceptable
		Fall	11	+22%	Sitting	17	+13%	Acceptable
		Winter	12		Sitting	19	+12%	Acceptable
		Annual	11	+10%	Sitting	17	+13%	Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations
A - No Build
B - Build

Mean Wind Speed Criteria	
Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria	
Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
52	A	Spring	11		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	19		Acceptable
	B	Spring	15	+36%	Standing	23	+21%	Acceptable
		Summer	12	+33%	Sitting	18	+29%	Acceptable
		Fall	14	+40%	Standing	21	+17%	Acceptable
		Winter	15	+25%	Standing	24	+20%	Acceptable
		Annual	14	+27%	Standing	22	+16%	Acceptable
53	A	Spring	18		Walking	26		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	18		Walking	27		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	17		Walking	26		Acceptable
54	A	Spring	13		Standing	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	12		Sitting	20		Acceptable
	B	Spring	15	+15%	Standing	22	+10%	Acceptable
		Summer	11	+22%	Sitting	16		Acceptable
		Fall	14	+17%	Standing	21	+11%	Acceptable
		Winter	16	+23%	Walking	24		Acceptable
		Annual	14	+17%	Standing	22	+10%	Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations
A - No Build
B - Build

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

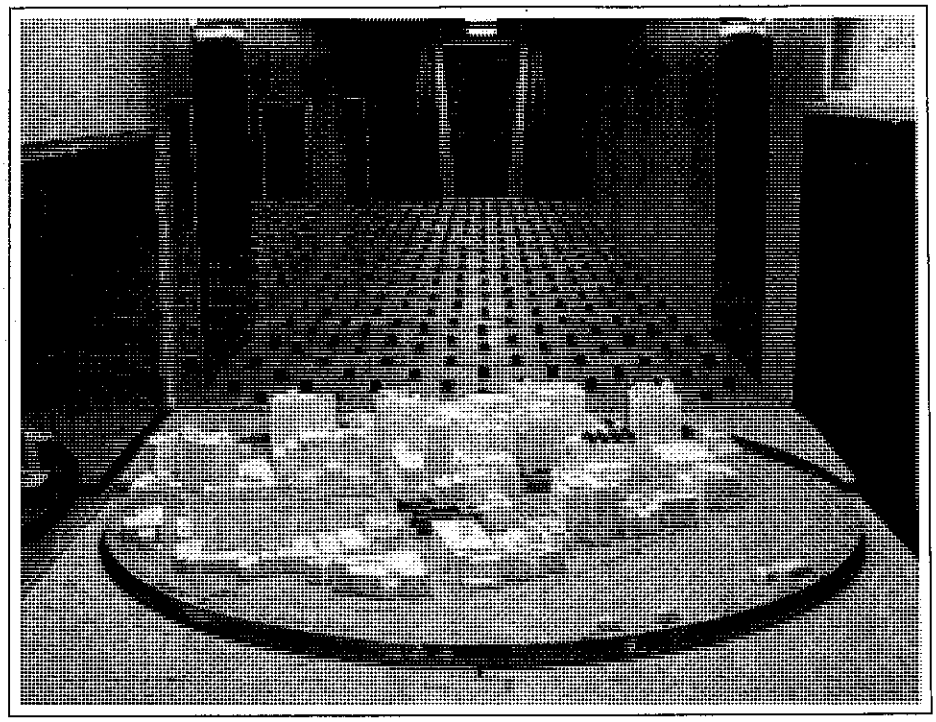
Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

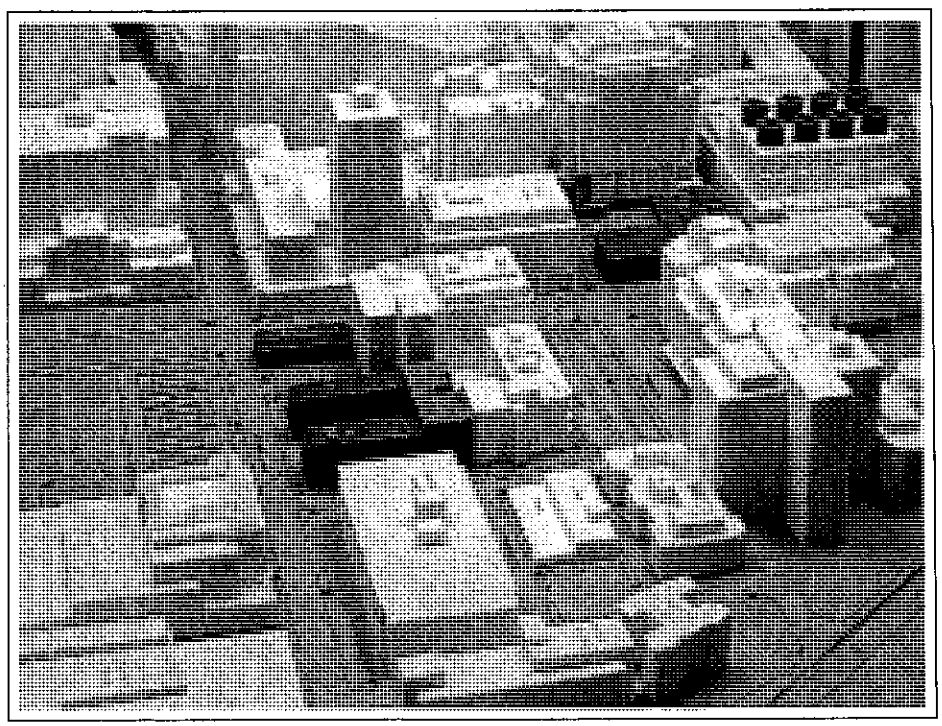
BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
55	A	Spring	13		Standing	20		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
56	A	Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
		Sensor under Existing Building - No Data Available						
	B	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	13		Standing	18		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance, and
2) %Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

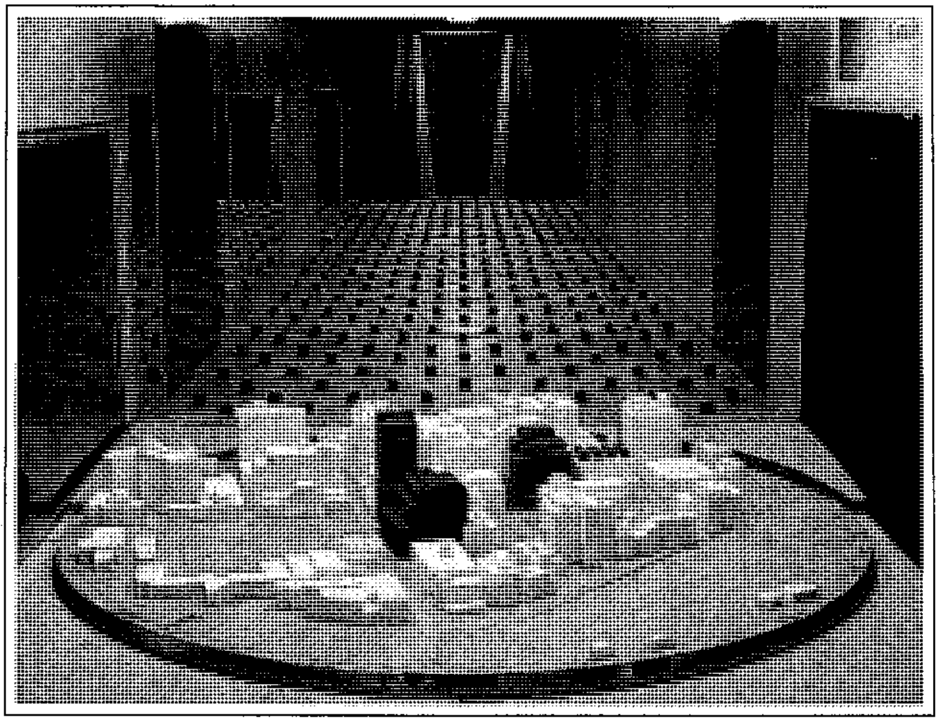
Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B - Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

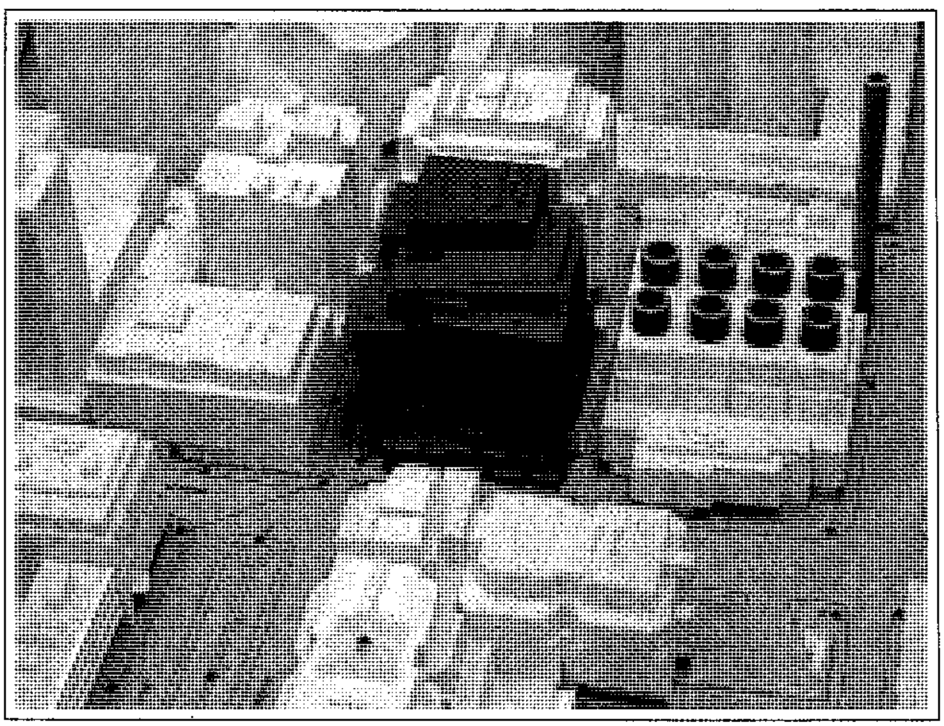
FIGURES



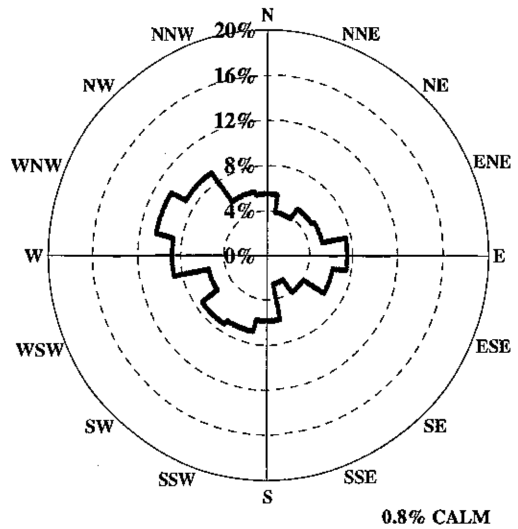


Wind Tunnel Study Model **No Build** Dana Farber Center for Cancer Care - Boston, Massachusetts Project #05-1438	Figure: 1a	Date: November 21, 2006	RWDI

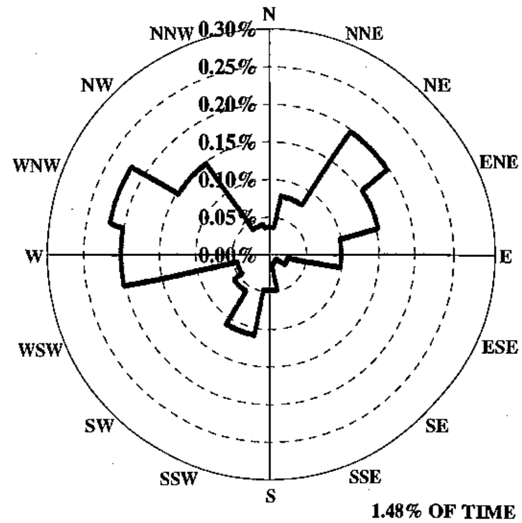




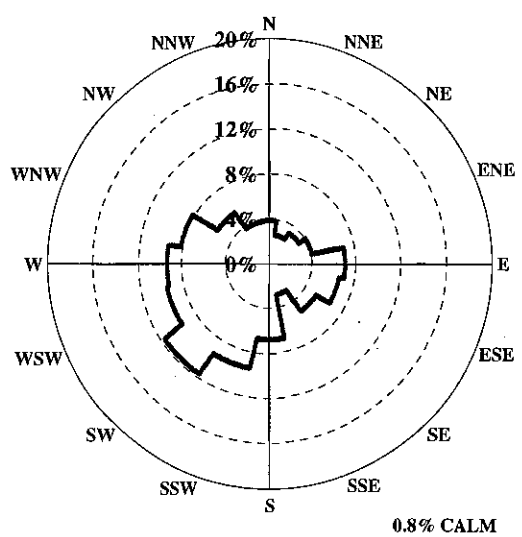
Wind Tunnel Study Model Build	Figure: 1b	RWDI
Dana Farber Center for Cancer Care - Boston, Massachusetts Project #05-1438	Date: November 21, 2006	



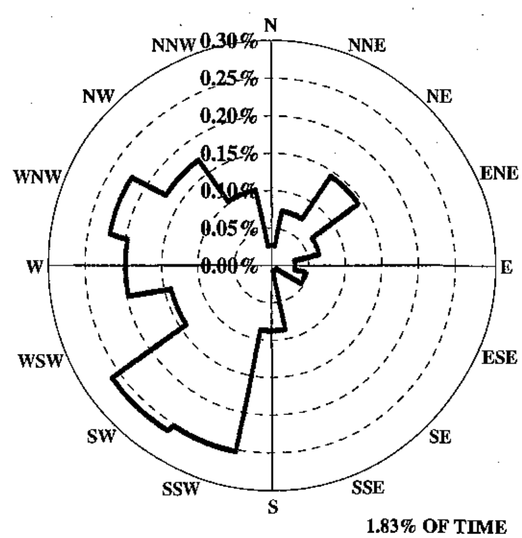
ALL SPRING WINDS



SPRING WINDS EXCEEDING 30 mph

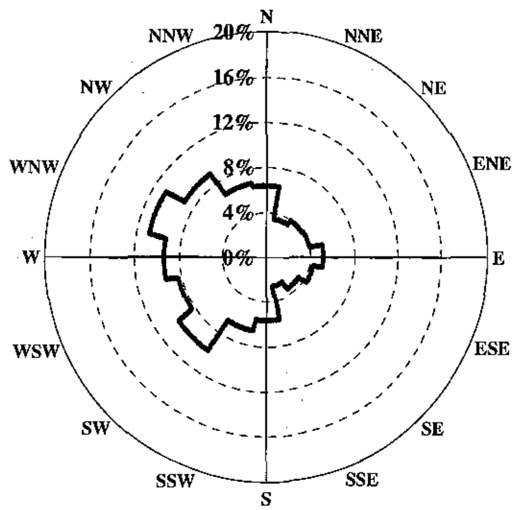


ALL SUMMER WINDS

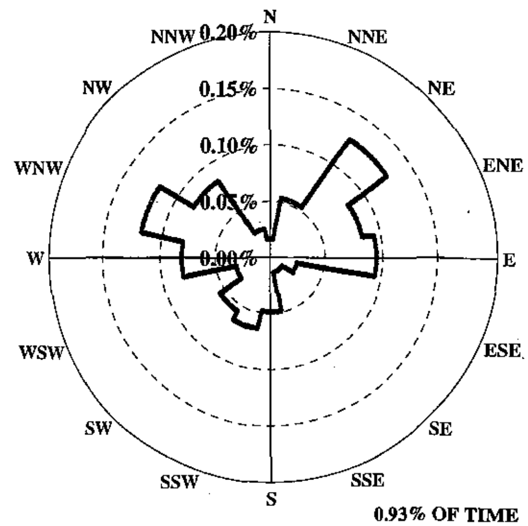


SUMMER WINDS EXCEEDING 25 mph

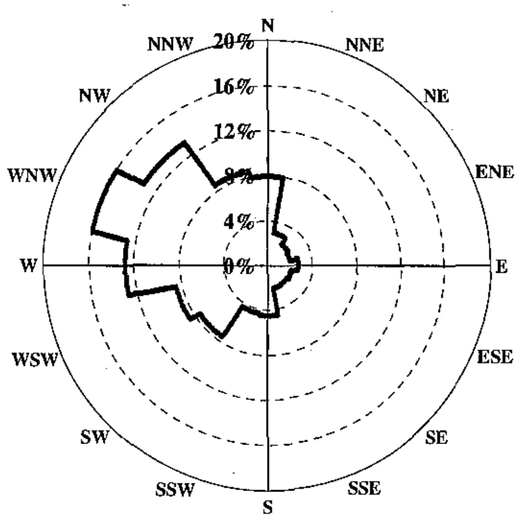
Directional Distribution (%) of Winds (Blowing From) **Station: Boston Logan International Airport, MA (1945 - 2004)** Dana-Farber Center for Cancer Care - Boston, MA Project #: 05-1438	Figure No. **2a** Date: November 29, 2006	RWDI



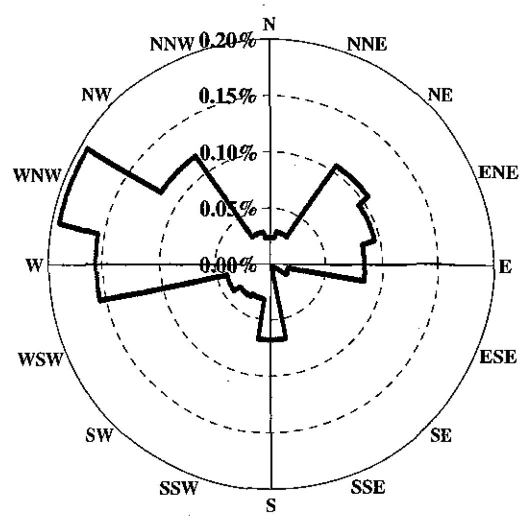
ALL FALL WINDS



FALL WINDS EXCEEDING 30 mph

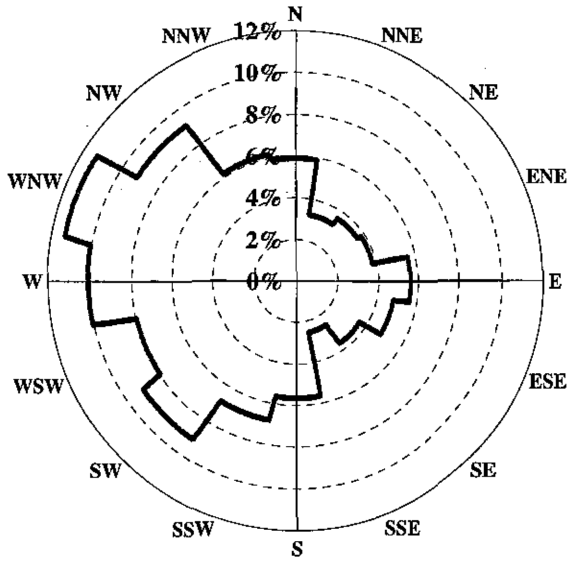


ALL WINTER WINDS

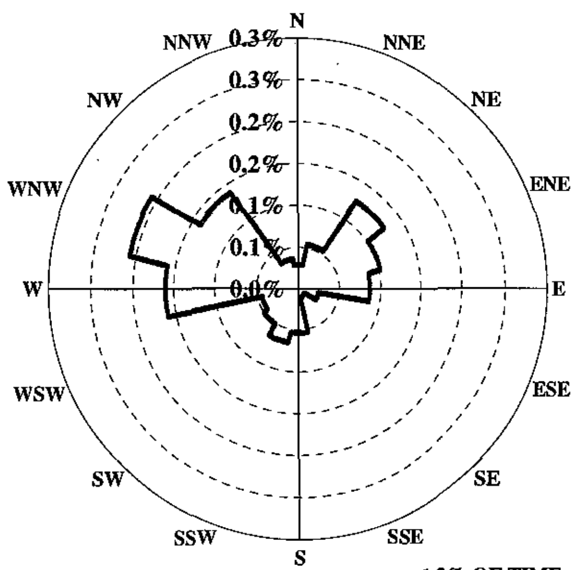


WINTER WINDS EXCEEDING 35 mph

Directional Distribution (%) of Winds (Blowing From) **Station: Boston Logan International Airport, MA (1945 - 2004)**	Figure No. **2b**	**RWDI**
Dana-Farber Center for Cancer Care - Boston, MA Project #: 05-1438	Date: November 29, 2006	

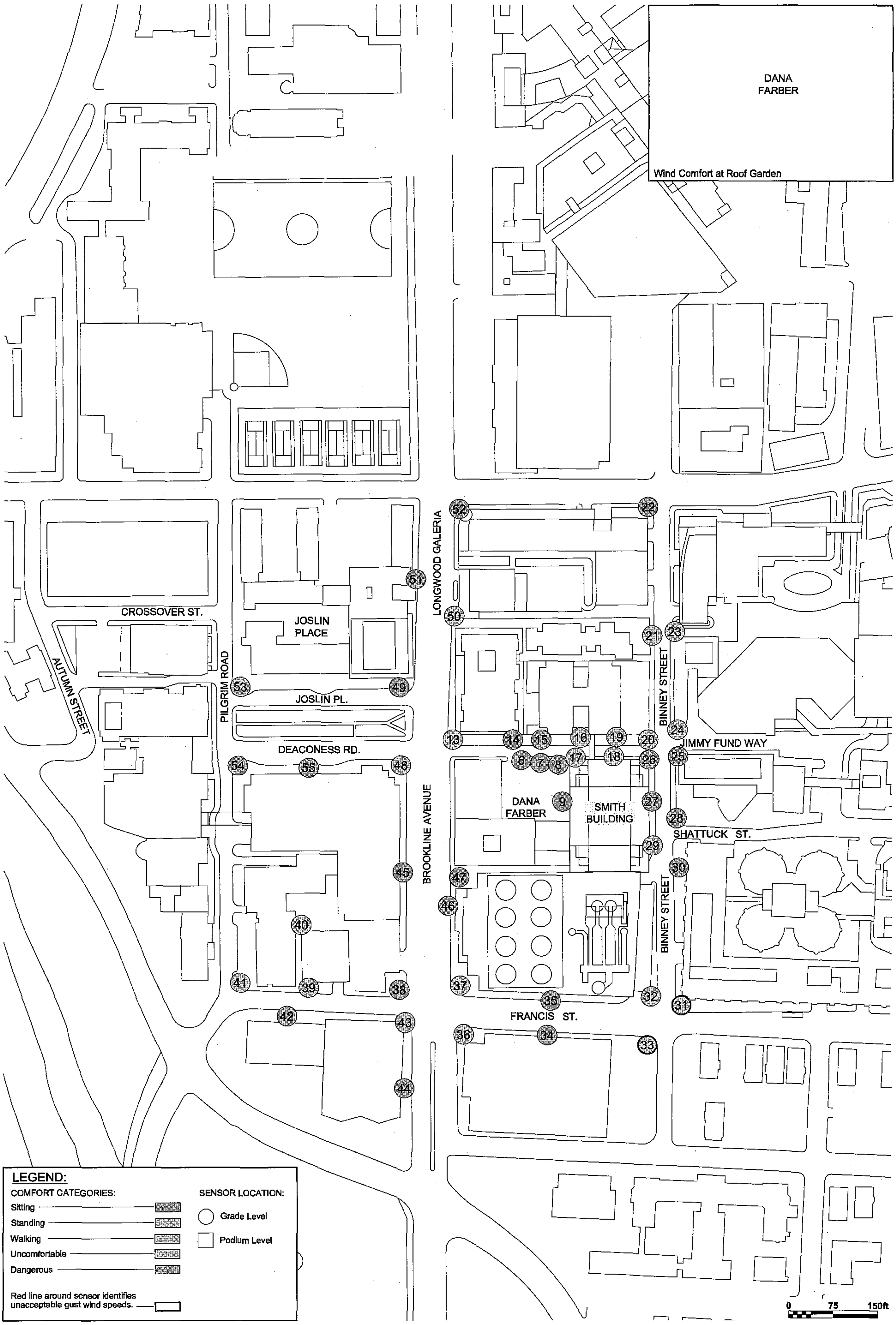


ALL ANNUAL WINDS



STRONG ANNUAL WINDS

Directional Distribution (%) of Winds (Blowing From) **Station: Boston Logan International Airport, MA (1945 - 2004)** Dana-Farber Center for Cancer Care - Boston, MA Project #: 05-1438	Figure No. **2c** Date: November 29, 2006	RWDI



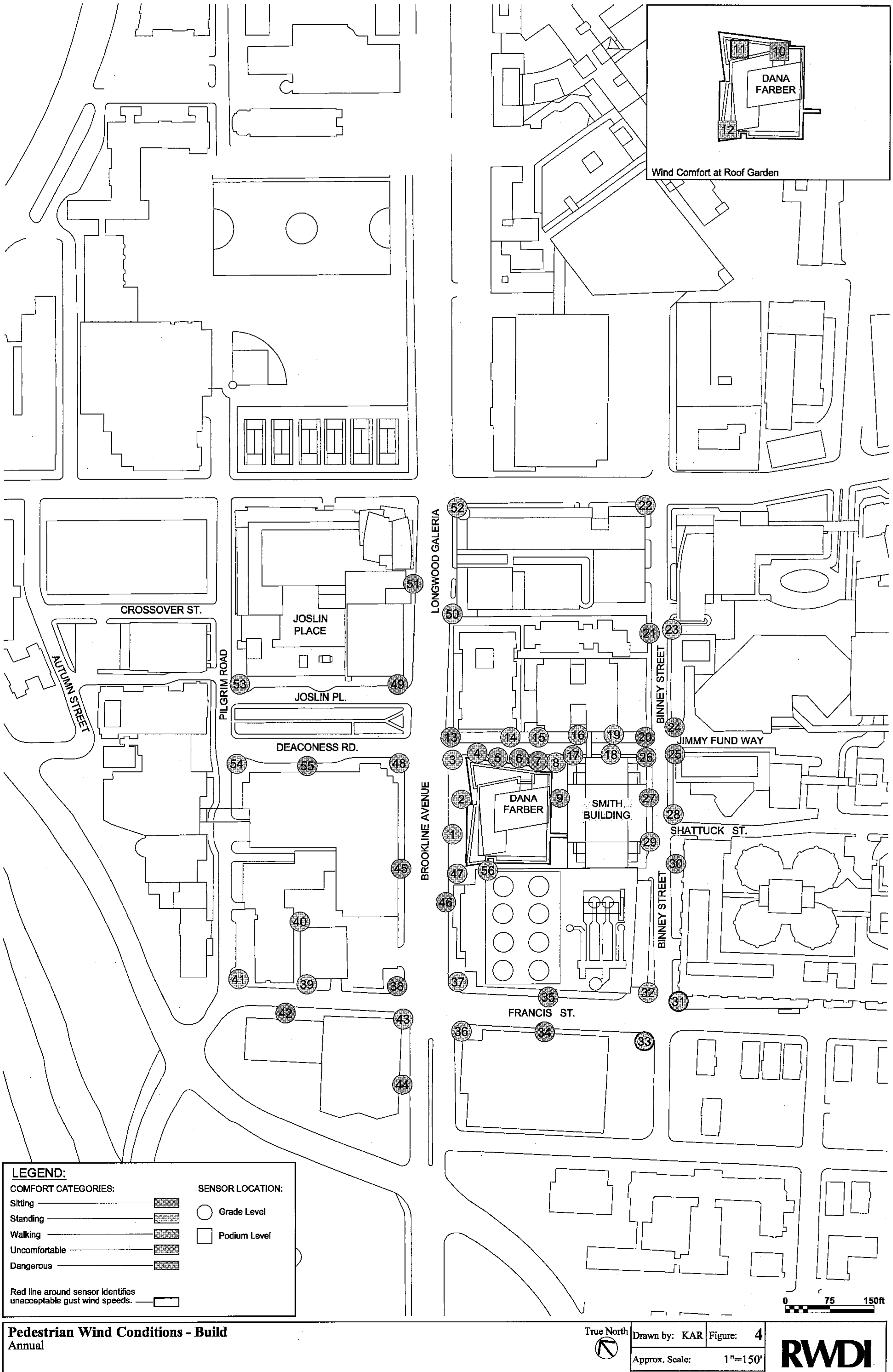
Pedestrian Wind Conditions - No Build

Annual

Dana-Farber Center for Cancer Care - Boston, Massachusetts

Project #05-1438

Drawn by: KAR	Figure: 3		RWDI
Approx. Scale:	1"=150'		
Date Revised:	Nov. 27, 2006		



Pedestrian Wind Conditions - Build
Annual

Dana-Farber Center for Cancer Care - Boston, Massachusetts

True North

Project #05-1438

Drawn by: KAR	Figure: 4		RWDI
Approx. Scale:	1"=150'		
Date Revised: Nov. 27, 2006			

APPENDIX A

Appendix A: List of Drawings and Information Used for Model Construction

The drawings and information listed below were received from Zimmer-Gunsul-Fransca Partnership and were used to construct the scale model of the proposed Dana-Farber Centre For Cancer Care development.

Drawing Title	File Name	Drawing/File Format	Date Drawn (Last Revision)	Date Received
Ground Level	FP-1	Auto CAD	Oct 23/06	Oct 24/06
Second Level	FP-2	Auto CAD	Oct 23/06	Oct 24/06
Third Level	FP-3	Auto CAD	Oct 23/06	Oct 24/06
Mechanical Level	FP-4	Auto CAD	Oct 23/06	Oct 24/06
Typical Clinical Level	FP-5-10	Auto CAD	Oct 23/06	Oct 24/06
11^{th} Level	FP-11	Auto CAD	Oct 23/06	Oct 24/06
12^{th} Floor	FP-12	Auto CAD	Oct 23/06	Oct 24/06
13^{th} Floor	FP-13	Auto CAD	Oct 23/06	Oct 24/06
Penthouse	FP-14	Auto CAD	Oct 23/06	Oct 24/06
Elevations N-S-E-W	elevations	Auto CAD	-	Oct 24/06
Sections E-W and N-S	sections	Auto CAD	-	Oct 24/06

AIR QUALITY APPENDIX

Protocol Letter

MOBILE 6.2 Input Files

MOBILE 6.2 Output Summary

Microscale Intersection Maps

CAL3QHC Input Files

Microscale Results Summary

Protocol Letter

November 21, 2006

Ref: 08984.01

Ms. Heather Campisano
Deputy Director for Development Review
One City Hall Square
Boston, Massachusetts 02201-1007

Re: Dana Farber Cancer Institute-Boston, MA
Air Quality Modeling Protocol

Dear Ms. Campisano:

I am writing to request your office's concurrence on the air quality study for the proposed Dana Farber Cancer Institute in Boston, Massachusetts. This protocol was developed in accordance with the Boston Redevelopment Authority's scoping determination letter dated May 30, 2006.

The air quality study will evaluate the mobile source emissions from the proposed project. It will include a microscale analysis that evaluates the carbon monoxide (CO) concentrations from project related traffic at nearby intersections. The intersections to be modeled were selected based upon an evaluation of the traffic data (Level-of-Service and traffic volumes). This evaluation indicated that the following intersections have the highest potential for local CO impacts from the proposed project:

- Brookline Avenue at Francis Street
- Brookline Avenue at Riverway
- Longwood Avenue at Riverway
- Brookline Avenue at Boylston Street/Park Drive

The intersections for the microscale analysis are presented in Figure 1.

The microscale analysis will use the Environmental Protection Agency's (EPA) CAL3QHC Version 2.4 computer model and will be based on the procedures outlined in the EPA's "Guideline For Modeling Carbon Monoxide From Roadway Intersections." The microscale analysis will analyze the year 2006 as existing and 2016 as the year of completion. It will include existing and future proposed roadway geometry, traffic signal timings, and peak-hour traffic volumes. This analysis will evaluate the CO concentrations during the CO season (winter) at sensitive receptors.

The emission factors used in the microscale analysis will be obtained from the EPA's MOBILE6.2 emissions model for use in the air quality study. MOBILE6.2 will be run using input files consistent with the current State Implementation Plan emission factors, which will reflect Massachusetts' specific emission control programs and registration distribution. The attached Tables 1 and 2 outline the MOBILE6.2 input file and the MOBILE6.2 I/M file used for this analysis. The attached microscale modeling parameters outline the CAL3QHC model inputs used in this analysis.

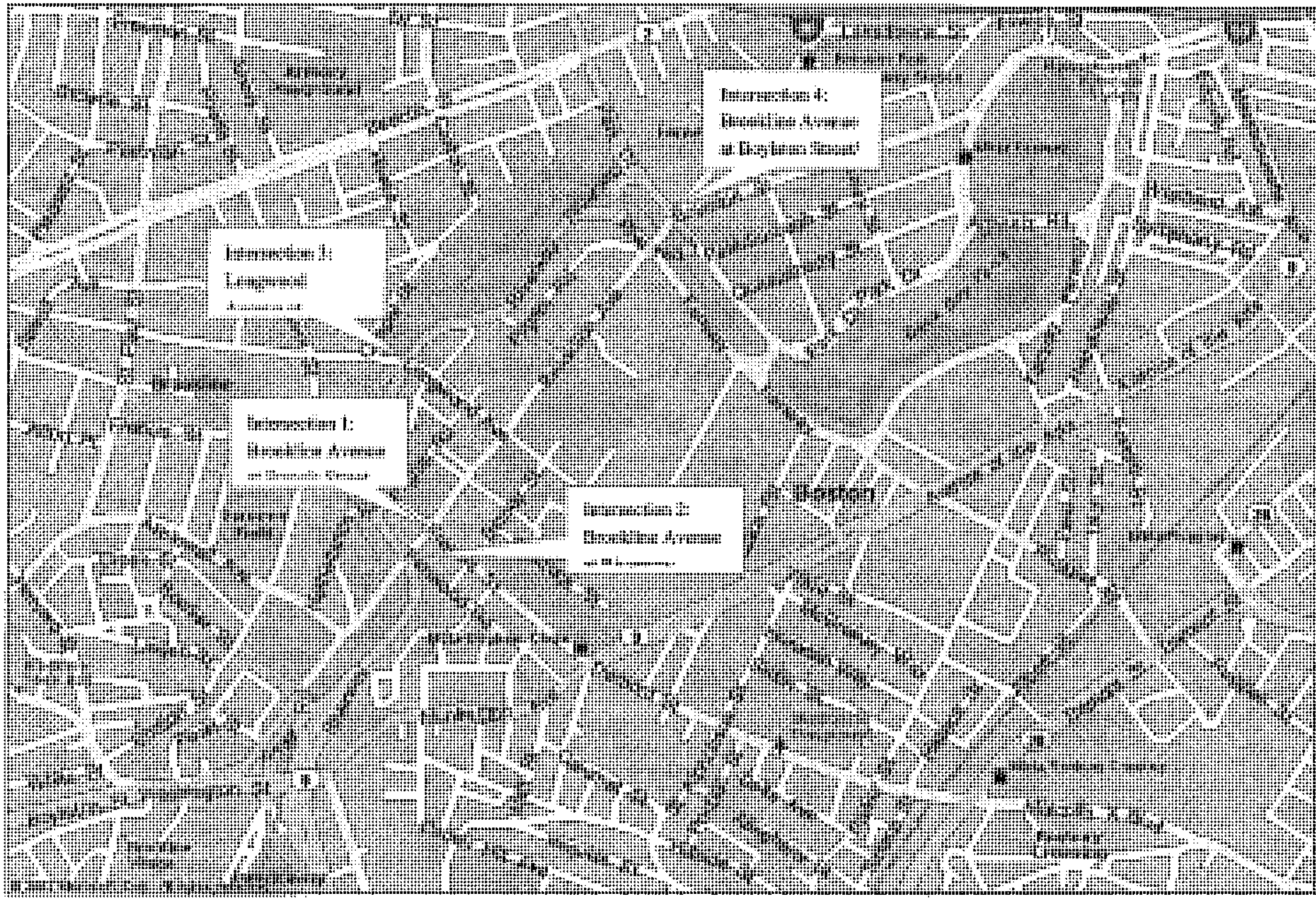
If you have any questions regarding the air quality analysis, please feel free to contact Ms. Sara Lewis or myself at (617) 924-1770. Your cooperation in this matter is greatly appreciated.

Very truly yours,

VANASSE HANGEN BRUSTLIN, INC.

Thomas F. Wholley
Director of Air Quality Services

Enclosures



Vanasse Hangen Brustlin, Inc.

Figure 1

Microscale Study Area

Table 1

Mobile 6.2 Input File	Commands	Description
* MA DEP Input File for Summer Ozone File originally prepared by Craig Woleader, dated Feb. 6, 2003 * Filename = MA_O6CO.inp		Input File Note Input File Note Input File Note
***************Header Section *************** MOBILE6 INPUT FILE POLLUTANTS: HC CO NOX REPORT FILE: 2006MACO.txt REPLACE RUN DATA	POLLUTANTS: REPORT FILE:	Hydrocarbons, Carbon Monoxide, Nitrogen Oxide Name of Output file
***************Run Section *************** > ********************* WINTER********************		Input File Note Echo to Output file
* Pollutant output format EXPRESS HC AS VOC:	EXPRESS HC AS VOC:	Expresses Hydrocarbons as Volatile Organic Compounds
* Mass. specific user inputs -- require external data file		Input File Note
REG DIST: MA_REG.D	REG DIST:	Massachusetts registration file
I/M DESC FILE: MA_ENHIM.D	I/M DESC FILE: **Note:** See Table 2 for details.	Massachusetts Enhanced I/M program inputs for 2000+ calendar year * **Note:** MA_ENHIM.D requires MA_CUTPT.D to run. MA_CUTPT.D includes generic I/M240 cutpoints for MA_ENHIM.D, not specific by vehicle model year.
STAGE II REFUELING: 91 3 84. 84.	STAGE II REFUELING:	This Stage II Program started in 1991, was phased in over 3 years and was 84% efficient for LDGVs, LDGTs, and HDGVs

Mobile 6.2 Input File	**Commands**	**Description**
* Inputs for LEV II		Input File Note
94+ LDG IMP: MA_LEV2.D	94+ LDG IMP:	94+ LDG IMPLEMENTATION FOR LEVII EXHAUST - LEV II in 2004 w/ ZEV
T2 EXH PHASE-IN: LEV2EXH.D	T2 EXH PHASE-IN:	Defines phase-in schedules to be modeled for the Tier 2 exhaust standards
T2 EVAP PHASE-IN: LEV2EVAP.D	T2 EVAP PHASE-IN:	Defines phase-in schedules to be modeled for the Tier 2 evaporative emission standards
T2 CERT: LEV2CERT.D	T2 CERT:	Specifies alternative Tier 2 50,000 mile certification standards and used to model effects of California's LEV II program.
* Meteorological inputs		Input File Note
MIN/MAX TEMP: 35. 45.	MIN/MAX TEMP:	Minimum and Maximum temperatures as set forth in the Massachusetts SIP
* Fuel Inputs		Input File Note
FUEL RVP: 13.5	FUEL RVP:	Specifies the fuel Reid Vapor Pressure (RVP) representing the average fuel volatility for the Massachusetts area
FUEL PROGRAM: 2 N	FUEL PROGRAM:	Models a reformulated gasoline (RFG) program for a northern region
***************Scenario Section ***************		Input File Note
***************Summer Freeway ***************		Input File Note
SCENARIO RECORD: MA Freeway 2.71 mph	SCENARIO RECORD:	Labels the individual scenarios
CALENDAR YEAR: 2006	CALENDAR YEAR:	Calendar year of scenario evaluated
EVALUATION MONTH: 1	EVALUATION MONTH:	Specifies January 1 as time period for evaluation

Mobile 6.2 Input File	Commands	Description
AVERAGE SPEED: 2.71 Freeway 92.0 0.0 0.0 8.0	AVERAGE SPEED:	Sets an average speed of 2.71 for the Freeway roadway classification (this is the minimum speed input for Freeways) and shows 92% of VMT on freeways and 8% of VMT on freeway ramps

NOTE: The scenario records for freeways continue in increments of 1 MPH to a maximum of 60.7 MPH. For arterials, the scenario records begin at a minimum of 2.5 MPH and continue in increments of 1 MPH to a maximum of 65 MPH

Table 2

Mobile 6.2 I/M File	Commands	Description
> Mass. Enhanced I/M program inputs for 2000+ calendar year, filename = MA_ENHIM.D		Echo to Output file
File originally prepared by Craig Woleader, dated Feb. 6, 2003		Input File Note
*************** I/M Program #1 ***************		
> IM240 Exhaust I/M program for Light Duty pre-1996 MY vehicles <=10,0000 lb GVWR		Echo to Output file
* I/M Effectiveness Set to 0.85/0.87/0.85 for HC/CO/NOx to Reflect MA31		Input File Note
* I/M Grace Period Set to 5 (i.e. exempt 5 newest model years) to Reflect New Vehicle Exemption and LEP		Input File Note

Mobile 6.2 I/M File	**Commands**	**Description**
I/M PROGRAM: 1 2000 2050 2 TRC IM240	I/M PROGRAM:	This I/M program started in 2000 and ends in 2050, is a biennial program, and is a test and repair program with an IM240 inspection test type
I/M CUTPOINTS: 1 MA_CUTPT.D	I/M CUTPOINTS:	This command directs MOBILE 6 to look for the appropriate I/M cutpoints in the external file "MA_CUTPT.D"
I/M MODEL YEARS: 1 1984 1995	I/M MODEL YEARS:	This I/M program tests model years 1984 through 1995
I/M VEHICLES: 1 22222 21111111 1	I/M VEHICLES:	This command calculates I/M benefits for light-duty gasoline vehicles (cars and light-duty trucks) as well as the class HDGV2B
I/M STRINGENCY: 1 20.0	I/M STRINGENCY:	This command sets the stringency rate (the expected exhaust inspection failure rate for pre-1981 model year vehicles) at 20 percent.
I/M COMPLIANCE: 1 96.0	I/M COMPLIANCE:	This command sets the compliance (the percentage of vehicles in the fleet that complete the I/M program and receive either a certificate of compliance or waiver) at 96 percent.
I/M WAIVER RATES: 1 0.0 1.0	I/M WAIVER RATES:	This command sets the waiver rate at 0.0 percent for pre-1981 model years and 1.0 percent for 1981 and later model years
I/M EFFECTIVENESS: 1 0.85 0.87 0.85	I/M EFFECTIVENESS:	This command sets the effectiveness values for HC, CO, and NOx at 0.85, 0.87 and 0.85 respectively
I/M GRACE PERIOD: 1 5	I/M GRACE PERIOD:	This command sets the age at which vehicles first become subject to I/M testing at 5 years old.
*************** I/M Program #2 ***************		
> Two-Speed Idle Exhaust I/M program for Heavy Duty vehicles >10,000 lb GVWR		Echo to Output file
* I/M Grace Period Set to 5 (i.e. exempt 5 newest model years) to Reflect New Vehicle Exemption and LEP		Input File Note
I/M PROGRAM: 2 2000 2050 2 TRC 2500/IDLE	I/M PROGRAM:	This I/M program started in 2000 and ends in 2050, is a biennial program, and is a test and repair program with a 2500/IDLE inspection test type
I/M MODEL YEARS: 2 1984 2050	I/M MODEL YEARS:	This I/M program tests model years 1984 through 2050

Mobile 6.2 I/M File	Commands	Description
I/M VEHICLES: 2 11111 12222222 2	I/M VEHICLES:	This command calculates I/M benefits for gasoline buses and heavy-duty gasoline vehicle classes with the exception of the HDGV2B class
I/M STRINGENCY: 2 20.0	I/M STRINGENCY:	This command sets the stringency rate (the expected exhaust inspection failure rate for pre-1981 model year vehicles) at 20 percent.
I/M COMPLIANCE: 2 96.0	I/M COMPLIANCE:	This command sets the compliance (the percentage of vehicles in the fleet that complete the I/M program and receive either a certificate of compliance or waiver) at 96 percent.
I/M WAIVER RATES: 2 0.0 1.0	I/M WAIVER RATES:	This command sets the waiver rate at 0.0 percent for pre-1981 model years and 1.0 percent for 1981 and later model years
I/M GRACE PERIOD: 2 5	I/M GRACE PERIOD:	This command sets the age at which vehicles first become subject to I/M testing at 5 years old.
*************** I/M Program #3 ***************		
> OBD Exhaust I/M program for Light Duty MY 1996+ vehicles <=10,000 lb GVWR		Echo to Output file
* I/M Grace Period Set to 5 (i.e. exempt 5 newest model years) to Reflect New Vehicle Exemption and LEP		Input File Note
I/M PROGRAM: 3 2003 2050 2 TRC OBD I/M	I/M PROGRAM:	This I/M program started in 2003 and ends in 2050, is a biennial program, and is a test and repair program with an OBD I/M inspection test type
I/M MODEL YEARS: 3 1996 2050	I/M MODEL YEARS:	This I/M program tests model years 1996 through 2050
I/M VEHICLES: 3 22222 21111111 1	I/M VEHICLES:	This command calculates I/M benefits for light-duty gasoline vehicles (cars and light-duty trucks) as well as the class HDGV2B
I/M STRINGENCY: 3 20.0	I/M STRINGENCY:	This command sets the stringency rate (the expected exhaust inspection failure rate for pre-1981 model year vehicles) at 20 percent.
I/M COMPLIANCE: 3 96.0	I/M COMPLIANCE:	This command sets the compliance (the percentage of vehicles in the fleet that complete the I/M program and receive either a certificate of compliance or waiver) at 96 percent.

Mobile 6.2 I/M File	Commands	Description
I/M WAIVER RATES: 3 0.0 1.0	I/M WAIVER RATES:	This command sets the waiver rate at 0.0 percent for pre-1981 model years and 1.0 percent for 1981 and later model years
I/M GRACE PERIOD: 3 5	I/M GRACE PERIOD:	This command sets the age at which vehicles first become subject to I/M testing at 5 years old.
*************** I/M Program #4 ***************		
> Gas Cap Evap I/M program for Light Duty pre-1996 MY vehicles <=8,500 lb GVWR		Echo to Output file
* I/M Grace Period Set to 5 (i.e. exempt 5 newest model years) to Reflect New Vehicle Exemption and LEP		Input File Note
I/M PROGRAM: 4 2000 2050 2 TRC GC	I/M PROGRAM:	This I/M program started in 2000 and ends in 2050, is a biennial program, and is a test and repair program with a GC inspection test type
I/M MODEL YEARS: 4 1984 1995	I/M MODEL YEARS:	This I/M program tests model years 1984 through 1995
I/M VEHICLES: 4 22222 11111111 1	I/M VEHICLES:	This command calculates I/M benefits for light-duty gasoline vehicles (cars and light-duty trucks)
I/M STRINGENCY: 4 20.0	I/M STRINGENCY:	This command sets the stringency rate (the expected exhaust inspection failure rate for pre-1981 model year vehicles) at 20 percent.
I/M COMPLIANCE: 4 96.0	I/M COMPLIANCE:	This command sets the compliance (the percentage of vehicles in the fleet that complete the I/M program and receive either a certificate of compliance or waiver) at 96 percent.
I/M WAIVER RATES: 4 0.0 1.0	I/M WAIVER RATES:	This command sets the waiver rate at 0.0 percent for pre-1981 model years and 1.0 percent for 1981 and later model years
I/M GRACE PERIOD: 4 5	I/M GRACE PERIOD:	This command sets the age at which vehicles first become subject to I/M testing at 5 years old.
*************** I/M Program #5 ***************		
> Gas Cap Evap I/M program for all MY Heavy Duty vehicles >8,500 lb GVWR		Echo to Output file

Mobile 6.2 I/M File	Commands	Description
* I/M Grace Period Set to 5 (i.e. exempt 5 newest model years) to Reflect New Vehicle Exemption and LEP		Input File Note
I/M PROGRAM: 5 2000 2050 2 TRC GC	I/M PROGRAM:	This I/M program started in 2000 and ends in 2050, is a biennial program, and is a test and repair program with a GC inspection test type
I/M MODEL YEARS: 5 1984 2050	I/M MODEL YEARS:	This I/M program tests model years 1984 through 2050
I/M VEHICLES: 5 11111 22222222 2	I/M VEHICLES:	This command calculates I/M benefits for gasoline buses and heavy-duty gasoline vehicle classes
I/M STRINGENCY: 5 20.0	I/M STRINGENCY:	This command sets the stringency rate (the expected exhaust inspection failure rate for pre-1981 model year vehicles) at 20 percent.
I/M COMPLIANCE: 5 96.0	I/M COMPLIANCE:	This command sets the compliance (the percentage of vehicles in the fleet that complete the I/M program and receive either a certificate of compliance or waiver) at 96 percent.
I/M WAIVER RATES: 5 0.0 1.0	I/M WAIVER RATES:	This command sets the waiver rate at 0.0 percent for pre-1981 model years and 1.0 percent for 1981 and later model years
I/M GRACE PERIOD: 5 5	I/M GRACE PERIOD:	This command sets the age at which vehicles first become subject to I/M testing at 5 years old.
*************** I/M Program #6 ***************		
> OBD + Gas Cap Evap I/M program for MY 1996 - 2003 Light Duty vehicles <=8,500 lb GVWR		Echo to Output file
* DEP will perform separate gas cap fct. test on all light-duty OBD-equipped vehicles up until MY 2004		Input File Note
* I/M Grace Period Set to 5 (i.e. exempt 5 newest model years) to Reflect New Vehicle Exemption and LEP		Input File Note
I/M PROGRAM: 6 2003 2050 2 TRC EVAP OBD & GC	I/M PROGRAM:	This I/M program started in 2003 and ends in 2050, is a biennial program, and is a test and repair program with an EVAP OBD & GC inspection test type
I/M MODEL YEARS: 6 1996 2003	I/M MODEL YEARS:	This I/M program tests model years 1996 through 2003

Mobile 6.2 I/M File	Commands	Description
I/M VEHICLES: 6 22222 11111111 1	I/M VEHICLES:	This command calculates I/M benefits for light-duty gasoline vehicles (cars and light-duty trucks)
I/M STRINGENCY: 6 20.0	I/M STRINGENCY:	This command sets the stringency rate (the expected exhaust inspection failure rate for pre-1981 model year vehicles) at 20 percent.
I/M COMPLIANCE: 6 96.0	I/M COMPLIANCE:	This command sets the compliance (the percentage of vehicles in the fleet that complete the I/M program and receive either a certificate of compliance or waiver) at 96 percent.
I/M WAIVER RATES: 6 0.0 1.0	I/M WAIVER RATES:	This command sets the waiver rate at 0.0 percent for pre-1981 model years and 1.0 percent for 1981 and later model years
I/M GRACE PERIOD: 6 5	I/M GRACE PERIOD:	This command sets the age at which vehicles first become subject to I/M testing at 5 years old.
*************** I/M Program #7 ***************		
> OBD Evap I/M program for MY 2004+		Echo to Output file
* Note: MY 2004+ vehicles will not be tested until 2009 with 5 model year exemption in effect		Input File Note
* I/M Grace Period Set to 5 (i.e. exempt 5 newest model years) to Reflect New Vehicle Exemption and LEP		Input File Note
I/M PROGRAM: 7 2003 2050 2 TRC EVAP OBD	I/M PROGRAM:	This I/M program started in 2003 and ends in 2050, is a biennial program, and is a test and repair program with an EVAP OBD inspection test type
I/M MODEL YEARS: 7 2004 2050	I/M MODEL YEARS:	This I/M program tests model years 2004 through 2050
I/M VEHICLES: 7 22222 11111111 1	I/M VEHICLES:	This command calculates I/M benefits for light-duty gasoline vehicles (cars and light-duty trucks)
I/M STRINGENCY: 7 20.0	I/M STRINGENCY:	This command sets the stringency rate (the expected exhaust inspection failure rate for pre-1981 model year vehicles) at 20 percent.
I/M COMPLIANCE: 7 96.0	I/M COMPLIANCE:	This command sets the compliance (the percentage of vehicles in the fleet that complete the I/M program and receive either a certificate of compliance or waiver) at 96 percent.

Mobile 6.2 I/M File

I/M WAIVER RATES: 7 0.0 1.0

I/M GRACE PERIOD: 7 5

Commands	Description
I/M WAIVER RATES:	This command sets the waiver rate at 0.0 percent for pre-1981 model years and 1.0 percent for 1981 and later model years
I/M GRACE PERIOD:	This command sets the age at which vehicles first become subject to I/M testing at 5 years old.

MICROSCALE MODELING PARAMETERS

Idle Emission Factor

The Idling Emission Factor was developed using MOBILE 6.2 with the settings as indicated for the microscale free-flow analysis, except with the speed set at 2.5 miles per hour. The resulting gram per vehicle-mile factor was converted to grams per vehicle per hour by multiplying by 2.5 miles per hour.

CAL3QHC Inputs

Averaging Time	60 Minutes
Surface Roughness	175 cm (office)
Settling and Deposition velocity	0 cm/second
Windspeed	1 meter/second
Range of Wind Directions	10° increments from 0° to 360°
Stability Class	Use Class "D"
Mixing Height	1000 meters
Source Height	0.33 meters
Background Concentration	1-hour 3ppm; 8-hour 2.1ppm

Eight Hour Persistence Factor

Second Highest Carbon Monoxide Readings (ppm)
(2005 Monitoring Data)

Boston Monitoring Sites	One Hour	Eight Hour	Persistence Factor
Kenmore Square	2.0	1.5	0.75**!Undefined Bookmark, DIVIDE**
Harrison Avenue	3.6	2.3	0.64

The Average Persistence Factor is **0.70**

MOBILE 6.2 Input Files

2006MACO.inp

```
* Calendar Year 2003 Generic MOBILE6 input file for Mesoscale Build/No-Build Analyses
* Filename MA03OZ.INP created by Craig Woleader, MADEP 617-348-4046, craig.woleader@state.ma.us
*
***************     Header Section     ***************
MOBILE6 INPUT FILE
*
POLLUTANTS          : HC CO NOX
DATABASE OUTPUT     :
WITH FIELDNAMES     :
AGGREGATED OUTPUT   :
EMISSIONS TABLE     : MA06CO.tb1 REPLACE
REPORT FILE         : MA06CO.txt REPLACE
*
RUN DATA
***************     Run Section #1     ***************

> ***************************************************
> ******************** WINTER **********************
> ***************************************************

* Pollutant output format
EXPRESS HC AS VOC   :

* Mass. specific user inputs -- require external data file
REG DIST            : MA_REG03.D
I/M DESC FILE       : MA_IM03.D

ANTI-TAMP PROG      :
00 84 50 11111 12222222 2 12 098. 22112122

STAGE II REFUELING :
91 3 84. 84.

* Inputs for LEV II
94+ LDG IMP         : MA_LEV2.D
T2 EXH PHASE-IN     : LEV2EXH.D
T2 EVAP PHASE-IN    : LEV2EVAP.D
T2 CERT             : LEV2CERT.D

* Meteorological inputs
MIN/MAX TEMP        : 35. 45.

* Fuel inputs
FUEL RVP            : 13.5
FUEL PROGRAM        : 2 N

***************     Scenario Section     ***************

SCENARIO RECORD     : MA Freeway 2.71 mph (= minimum allowed freeway speed)
CALENDAR YEAR       : 2006
EVALUATION MONTH    : 1
AVERAGE SPEED       : 2.71 Freeway 92.0 0.0 0.0 8.0

SCENARIO RECORD     : MA Freeway 3.0 mph
CALENDAR YEAR       : 2006
EVALUATION MONTH    : 1
AVERAGE SPEED       : 3.0 Freeway 92.0 0.0 0.0 8.0

SCENARIO RECORD     : MA Freeway 4.0 mph
CALENDAR YEAR       : 2006
EVALUATION MONTH    : 1
AVERAGE SPEED       : 4.0 Freeway 92.0 0.0 0.0 8.0

SCENARIO RECORD     : MA Freeway 5.0 mph
CALENDAR YEAR       : 2006
EVALUATION MONTH    : 1
AVERAGE SPEED       : 5.0 Freeway 92.0 0.0 0.0 8.0
```

….through….

```
SCENARIO RECORD     : MA Arterial 65.0 mph (= maximum allowed arterial speed)
CALENDAR YEAR       : 2006
EVALUATION MONTH    : 1
AVERAGE SPEED       : 65.0 Arterial 0.0 100.0 0.0 0.0

***************     End of This Run     ***************
END OF RUN
```

2016MACO.inp

```
* Calendar Year 2003 Generic MOBILE6 input file for Mesoscale Build/No-Build Analyses
* Filename MA03OZ.INP created by Craig Woleader, MADEP 617-348-4046, craig.woleader@state.ma.us
*
***************     Header Section     ***************
MOBILE6 INPUT FILE
*
POLLUTANTS           : HC CO NOX
DATABASE OUTPUT      :
WITH FIELDNAMES      :
AGGREGATED OUTPUT    :
EMISSIONS TABLE      : MA16CO.tbl REPLACE
REPORT FILE          : MA16CO.txt REPLACE
*
RUN DATA
***************     Run Section #1     ***************

> ****************************************************
> ******************** WINTER **********************
> ****************************************************

* Pollutant output format
EXPRESS HC AS VOC  :

* Mass. specific user inputs -- require external data file
REG DIST             : MA_REG03.D
I/M DESC FILE        : MA_IM03.D

ANTI-TAMP PROG       :
00 84 50 11111 12222222 2 12 098. 22112122

STAGE II REFUELING :
91 3 84. 84.

* Inputs for LEV II
94+ LDG IMP          : MA_LEV2.D
T2 EXH PHASE-IN      : LEV2EXH.D
T2 EVAP PHASE-IN     : LEV2EVAP.D
T2 CERT              : LEV2CERT.D

* Meteorological inputs
MIN/MAX TEMP         : 35. 45.

* Fuel inputs
FUEL RVP             : 13.5
FUEL PROGRAM         : 2 N

***************     Scenario Section     ***************

SCENARIO RECORD      : MA Freeway 2.71 mph (= minimum allowed freeway speed)
CALENDAR YEAR        : 2016
EVALUATION MONTH     : 1
AVERAGE SPEED        : 2.71 Freeway 92.0 0.0 0.0 8.0

SCENARIO RECORD      : MA Freeway 3.0 mph
CALENDAR YEAR        : 2016
EVALUATION MONTH     : 1
AVERAGE SPEED        : 3.0 Freeway 92.0 0.0 0.0 8.0

SCENARIO RECORD      : MA Freeway 4.0 mph
CALENDAR YEAR        : 2016
EVALUATION MONTH     : 1
AVERAGE SPEED        : 4.0 Freeway 92.0 0.0 0.0 8.0

SCENARIO RECORD      : MA Freeway 5.0 mph
CALENDAR YEAR        : 2016
EVALUATION MONTH     : 1
AVERAGE SPEED        : 5.0 Freeway 92.0 0.0 0.0 8.0
```

….through….

```
SCENARIO RECORD      : MA Arterial 65.0 mph (= maximum allowed arterial speed)
CALENDAR YEAR        : 2016
EVALUATION MONTH     : 1
AVERAGE SPEED        : 65.0 Arterial 0.0 100.0 0.0 0.0

***************     End of This Run     ***************
END OF RUN
```

MOBILE 6.2 Output Summary

2006 MA Winter
Mobile 6.2 Emission Factors

Arterial		Freeway	
Vehicle Speed (mph)	Carbon Monoxide Emission Factor (g/veh-mile)	Vehicle Speed (mph)	Carbon Monoxide Emission Factor (g/veh-mile)
2.5	34.60	2.5	33.22
3	30.73	3	31.15
4	25.90	4	26.32
5	23.00	5	23.42
6	21.06	6	21.36
7	19.67	7	19.83
8	18.63	8	18.69
9	17.83	9	17.79
10	17.18	10	17.08
11	16.66	11	16.51
12	16.23	12	16.05
13	15.86	13	15.67
14	15.55	14	15.34
15	15.28	15	15.06
16	15.03	16	14.84
17	14.80	17	14.71
18	14.61	18	14.60
19	14.43	19	14.51
20	14.27	20	14.42
21	14.14	21	14.34
22	14.02	22	14.26
23	13.91	23	14.20
24	13.81	24	14.13
25	13.71	25	14.08
26	13.65	26	14.02
27	13.60	27	13.98
28	13.55	28	13.93
29	13.50	29	13.89
30	13.46	30	13.85
31	13.46	31	13.84
32	13.46	32	13.85
33	13.47	33	13.85
34	13.47	34	13.86
35	13.47	35	13.87
36	13.56	36	13.95
37	13.64	37	14.04
38	13.72	38	14.11
39	13.79	39	14.19
40	13.86	40	14.27
41	13.96	41	14.36
42	14.04	42	14.45
43	14.13	43	14.53
44	14.21	44	14.61
45	14.28	45	14.71
46	14.38	46	14.81
47	14.47	47	14.90
48	14.56	48	14.99
49	14.64	49	15.09
50	14.72	50	15.20
51	14.82	51	15.30
52	14.92	52	15.39
53	15.01	53	15.50
54	15.10	54	15.62
55	15.19	55	15.73
56	15.30	56	15.85
57	15.41	57	15.96
58	15.51	58	16.09
59	15.61	59	16.22
60	15.71	60	16.34
61	15.82	61	16.43
62	15.94	62	16.43
63	16.05	63	16.43
64	16.16	64	16.43
65	16.26	65	16.43

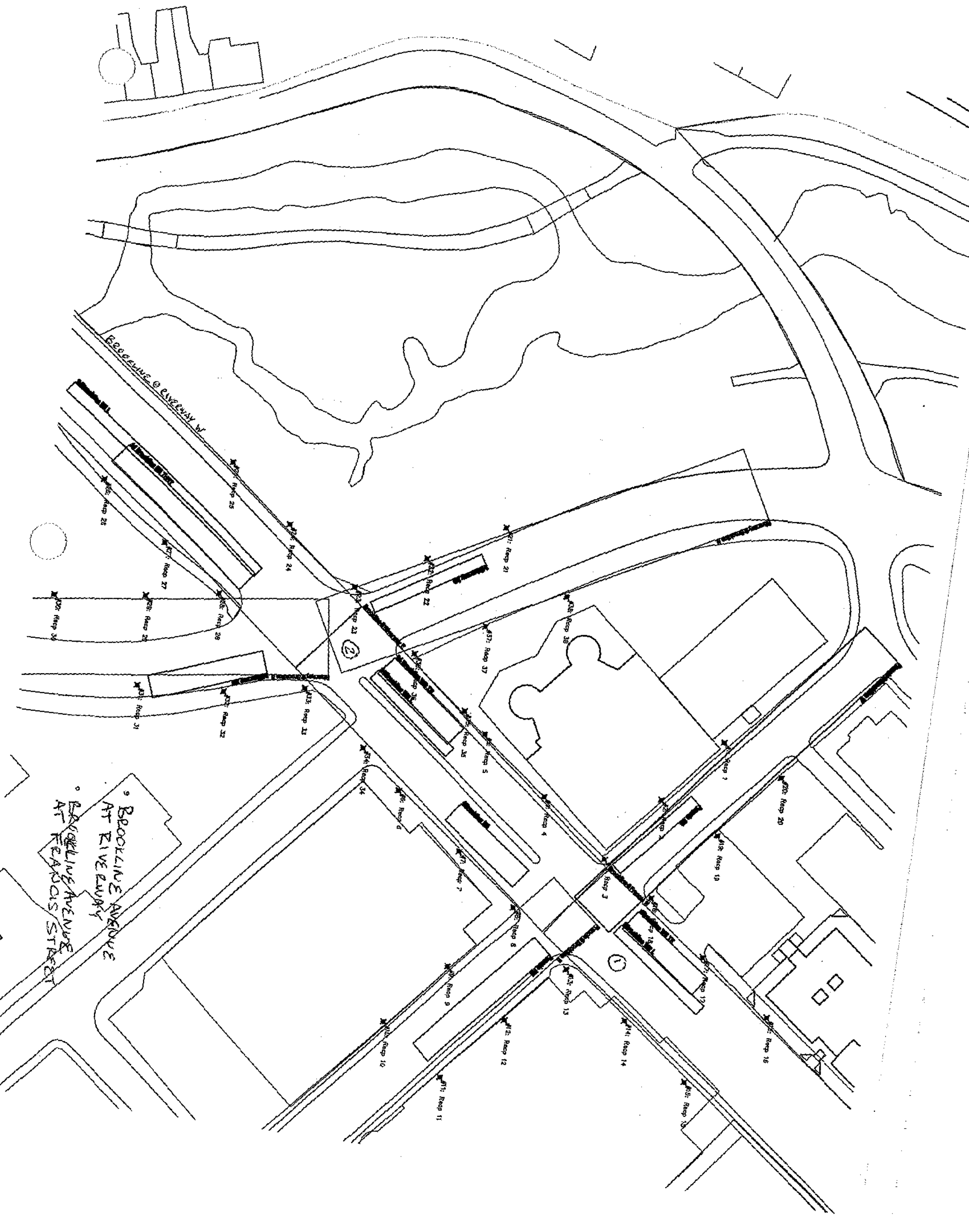
NOTE: Emission factors were calculated by MOBILE6.2 and represent a composite vehicle type during winter conditions.

2016 MA Winter
Mobile 6.2 Emission Factors

Arterial		Freeway	
Vehicle Speed (mph)	Carbon Monoxide Emission Factor (g/veh-mile)	Vehicle Speed (mph)	Carbon Monoxide Emission Factor (g/veh-mile)
2.5	21.16	2.5	20.30
3	18.93	3	19.11
4	16.16	4	16.33
5	14.49	5	14.67
6	13.35	6	13.46
7	12.54	7	12.56
8	11.94	8	11.88
9	11.46	9	11.35
10	11.09	10	10.93
11	10.77	11	10.59
12	10.52	12	10.32
13	10.30	13	10.09
14	10.11	14	9.89
15	9.95	15	9.72
16	9.80	16	9.59
17	9.67	17	9.52
18	9.55	18	9.46
19	9.45	19	9.41
20	9.35	20	9.36
21	9.27	21	9.31
22	9.20	22	9.27
23	9.14	23	9.24
24	9.08	24	9.20
25	9.02	25	9.17
26	8.99	26	9.14
27	8.96	27	9.12
28	8.93	28	9.09
29	8.90	29	9.07
30	8.88	30	9.05
31	8.88	31	9.04
32	8.88	32	9.05
33	8.89	33	9.05
34	8.89	34	9.06
35	8.90	35	9.06
36	8.95	36	9.12
37	9.01	37	9.18
38	9.06	38	9.23
39	9.11	39	9.28
40	9.16	40	9.33
41	9.22	41	9.39
42	9.27	42	9.45
43	9.33	43	9.51
44	9.38	44	9.56
45	9.43	45	9.63
46	9.49	46	9.69
47	9.55	47	9.75
48	9.61	48	9.81
49	9.67	49	9.87
50	9.72	50	9.94
51	9.79	51	10.00
52	9.85	52	10.07
53	9.91	53	10.14
54	9.97	54	10.22
55	10.02	55	10.29
56	10.10	56	10.36
57	10.17	57	10.44
58	10.23	58	10.53
59	10.30	59	10.61
60	10.36	60	10.69
61	10.44	61	10.74
62	10.51	62	10.74
63	10.59	63	10.74
64	10.66	64	10.74
65	10.72	65	10.74

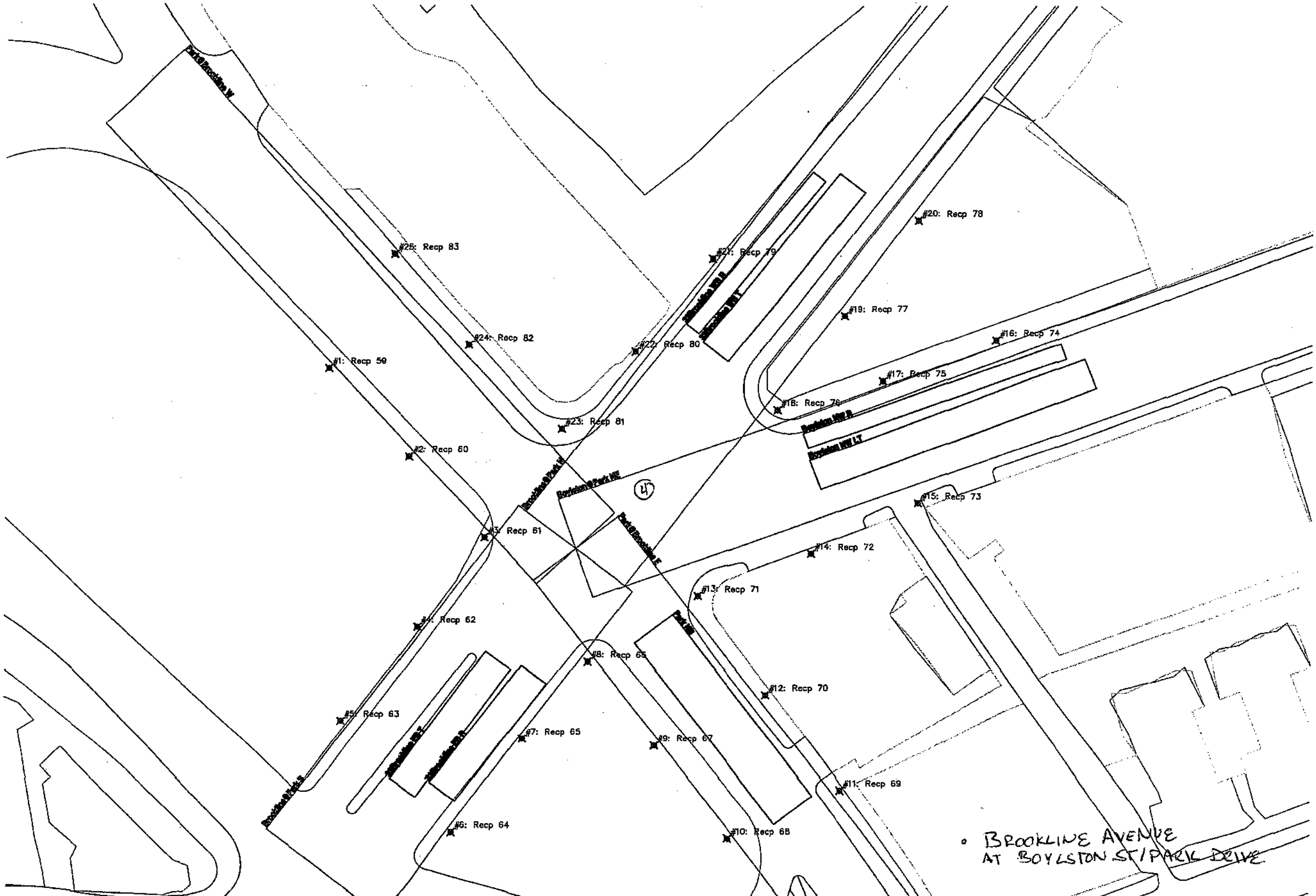
NOTE: Emission factors were calculated by MOBILE6.2 and represent a composite vehicle type during winter conditions.

Microscale Intersection Maps



BROOKLINE @ RIVERWAY W
BROOKLINE AVENUE AT RIVERWAY
BROOKLINE AVENUE AT FRANCIS STREET

RIVERWAY AT LONGWOOD
LONGWOOD AVENUE AT RIVERWAY
#39: Recp 39
#40: Recp 40
#41: Recp 41
#42: Recp 42
#43: Recp 43
#44: Recp 44
#45: Recp 45
#46: Recp 46
#47: Recp 47
#48: Recp 48
#49: Recp 49
#50: Recp 50
#51: Recp 51
#52: Recp 52
#53: Recp 53
#54: Recp 54
Recp 55
Recp 56
#57: Recp 57
#58: Recp 58
3



• BROOKLINE AVENUE
AT BOYLSTON ST/PARK DRIVE

CAL3QHC Input Files

06Ex.inp

```
'Dana Farber Cancer Institute'   60   175   0   0   58   0.3048   1   0
'Recp 1'   761643.9   2948176   0
'Recp 2'   761701.1   2948128   6
'Recp 3'   761759.1   2948087   6
'Recp 4'   761712.6   2948028   6
'Recp 5'   761666.3   2947970   6
'Recp 6'   761725.6   2947902   6
'Recp 7'   761770.7   2947962   6
'Recp 8'   761811.8   2948015   6
'Recp 9'   761870.4   2947966   6
'Recp 10'   761925.8   2947917   6
'Recp 11'   761966.1   2947973   6
'Recp 12'   761908.8   2948021   6
'Recp 13'   761858.3   2948068   6
'Recp 14'   761895   2948123   6
'Recp 15'   761940.1   2948182   6
'Recp 16'   761874.4   2948245   6
'Recp 17'   761831.3   2948183   6
'Recp 18'   761786.7   2948131   6
'Recp 19'   761725   2948181   6
'Recp 20'   761667.3   2948229   6
'Recp 21'   761486.4   2947963   6
'Recp 22'   761522.6   2947898   6
'Recp 23'   761555.9   2947840   6
'Recp 24'   761510.5   2947777   6
'Recp 25'   761464.4   2947718   6
'Recp 26'   761493.9   2947612   6
'Recp 27'   761541.4   2947670   6
'Recp 28'   761578.3   2947723   6
'Recp 29'   761589   2947660   6
'Recp 30'   761599.6   2947584   6
'Recp 31'   761667   2947664   6
'Recp 32'   761662.1   2947740   6
'Recp 33'   761649.3   2947810   6
'Recp 34'   761693.3   2947867   6
'Recp 35'   761648.7   2947949   6
'Recp 36'   761606.1   2947899   6
'Recp 37'   761573.9   2947957   6
'Recp 38'   761538.2   2948023   6
'Recp 39'   761414.9   2949281   6
'Recp 40'   761488.5   2949270   0
'Recp 41'   761558   2949257   6
'Recp 42'   761542.1   2949184   6
'Recp 43'   761517   2949113   6
'Recp 44'   761603.9   2949104   6
'Recp 45'   761631   2949173   6
'Recp 46'   761660.9   2949246   6
'Recp 47'   761724.8   2949203   6
'Recp 48'   761786.7   2949159   6
'Recp 49'   761816.6   2949217   6
'Recp 50'   761752.6   2949258   6
'Recp 51'   761699.1   2949301   6
'Recp 52'   761739.4   2949354   6
'Recp 53'   761786.7   2949413   6
'Recp 54'   761688.8   2949436   6
'Recp 55'   761644.3   2949375   6
'Recp 56'   761595.6   2949318   6
'Recp 57'   761528.9   2949329   6
'Recp 58'   761455.9   2949343   6
'Existing'   42   1   0   'C'
 2
'24Brookline EB L'   'AG'   761555.55   2947755.07   761417.91   2947572.81   1   10   1
120   91   3   185   86.5   1600   1   3
 2
'24 Brookline EB THRT'   'AG'   761564.87   2947746.64   761469.82   2947622.31   1   20   2
120   91   3   505   86.5   1600   1   3
 2
'24Brookline WB L'   'AG'   761628.62   2947867.65   761686.6   2947941.09   1   10   1
120   102   3   435   86.5   1600   1   3
 2
'24 Brookline WB TR'   'AG'   761619.64   2947876.63   761671.9   2947944.36   1   20   2
120   73   3   685   86.5   1600   1   3
 2
'24Riverway NB'   'AG'   761631.87   2947772.6   761666.98   2947675.5   1   20   2
120   81   3   1065   86.5   1600   1   3
 2
'24Riverway SB'   'AG'   761571.3   2947857.96   761516.59   2947946.9   1   10   1
120   81   3   1150   86.5   1600   1   3
 2
'6Brookline EB'   'AG'   761786.08   2948017.89   761737.08   2947951.8   1   20   2
120   75   3   840   86.5   1600   1   3
 2
'6Brookline WB L'   'AG'   761817.31   2948106.26   761876.93   2948187.04   1   10   1
120   107   3   245   86.5   1600   1   3
 2
'6Brookline WB TR'   'AG'   761808.33   2948116.05   761856.51   2948183.78   1   20   2
```

```
120   62   3   835   86.5   1600   1   3
 2
'Francis NB'   'AG'   761840.99   2948044.25   761947.16   2947952.86   1   20   2
120   81   3   520   86.5   1600   1   3
 2
'Francis SB'   'AG'   761765.86   2948098.1   761697.27   2948157.67   1   10   1
120   81   3   175   86.5   1600   1   3
 2
'30Riverway EB L'   'AG'   761619.06   2949243.01   761570.86   2949111.37   1   10   1
90   65   3   325   86.5   1600   1   3
 2
'30Riverway EB TR'   'AG'   761637.69   2949237.23   761588.21   2949108.81   1   20   2
90   55   3   625   86.5   1600   1   3
 2
'30Riverway WB LT'   'AG'   761653.83   2949335.85   761714.88   2949419.97   1   20   2
90   55   3   1040   86.5   1600   1   3
 2
'30Riverway WB R'   'AG'   761639.69   2949349.98   761691.1   2949416.76   1   10   1
90   55   3   240   86.5   1600   1   3
 2
'Longwood NB L'   'AG'   761684.04   2949274.54   761765.02   2949216.75   1   10   1
90   66   3   55   86.5   1600   1   3
 2
'Longwood NB TR'   'AG'   761693.68   2949286.1   761766.95   2949233.45   1   10   1
90   66   3   395   86.5   1600   1   3
 2
'Longwood SB LT'   'AG'   761560.65   2949288.67   761485.46   2949302.16   1   10   1
90   66   3   290   86.5   1600   1   3
 2
'Longwood SB R'   'AG'   761558.73   2949277.11   761485.46   2949289.95   1   10   1
90   41   3   345   86.5   1600   1   3
 2
'33Brookline EB T'   'AG'   763543.98   2950302.42   763484.17   2950220.06   1   20   2
90   58   3   335   86.5   1600   1   3
 2
'33Brookline EB R'   'AG'   763566.6   2950293.54   763509.22   2950217.63   1   20   2
90   31   3   1175   86.5   1600   1   3
 2
'33Brookline WB T'   'AG'   763679.03   2950499.74   763764.7   2950607.15   1   20   2
90   58   3   295   86.5   1600   1   3
 2
'33Brookline WB R'   'AG'   763664.49   2950514.28   763743.69   2950611.18   1   10   1
90   58   3   400   86.5   1600   1   3
 2
'Park NB '   'AG'   763641.47   2950323.2   763729.29   2950207.06   1   30   3
90   65   3   1000   86.5   1600   1   3
 2
'Boylston NW LT'   'AG'   763742.2   2950421.27   763913.97   2950485.79   1   20   2
90   62   3   390   86.5   1600   1   3
 2
'Boylston NW R'   'AG'   763735.74   2950443.21   763897.18   2950499.99   1   10   1
90   62   3   685   86.5   1600   1   3
 1
'Brookline@Park N'   'AG'   763592.3   2950374   764041.6   2950967   1130   13.46   1   78
 1
'Boylston@Park NE'   'AG'   763592.3   2950374   764291.1   2950624   2325   13.46   1   66
 1
'Park@Brookline E'   'AG'   763592.3   2950374   763817.3   2950081   1000   13.46   1   66
 1
'Brookline@Park S'   'AG'   763592.3   2950374   763434.9   2950166   2270   13.46   1   90
 1
'Park@Brookline W'   'AG'   763592.3   2950374   763320.8   2950668   1835   13.46   1   66
 1
'Riverway@Longwood N'   'AG'   761626.6   2949281   761823.6   2949528   1965   13.86   1   78
 1
'Longwood@Riverway E'   'AG'   761643.4   2949300   762039.1   2949012   710   13.46   1   54
 1
'Riverway@Longwood S'   'AG'   761626.6   2949281   761486.9   2948917   2385   13.86   1   78
 1
'Longwood@Riverway W'   'AG'   761626.6   2949281   761299.1   2949340   1570   13.46   1   54
 1
'Riverway@Brookline N'   'AG'   761602.3   2947824   761418.3   2948172   2055   13.86   1   66
 1
'Brookline@Riverway E'   'AG'   761602.3   2947824   761798.4   2948067   1970   13.46   1   78
 1
'Riverway@Brookline S'   'AG'   761602.3   2947824   761653.9   2947458   2615   13.86   1   66
 1
'Brookline@Riverway W'   'AG'   761602.3   2947824   761178.1   2947280   1410   13.46   1   78
 1
'Brookline@Francis N'   'AG'   761798.4   2948067   762070.7   2948440   2035   13.46   1   78
 1
'Francis@Brookline E'   'AG'   761798.4   2948067   762100.4   2947812   940   13.46   1   54
 1
'Francis@Brookline W'   'AG'   761807.9   2948083   761539.4   2948298   300   13.46   1   42
1   0   4   1000   3   'Y'   10   0   36
```

06Ex_a.inp

```
'Dana Farber Cancer Institute'   60   175   0   0   25   0.3048   1   0
'Recp 59'   763436.6   2950489   6
'Recp 60'   763487.3   2950433   6
'Recp 61'   763534.9   2950381   6
'Recp 62'   763493.1   2950324   6
'Recp 63'   763445.1   2950263   6
'Recp 64'   763514.8   2950192   6
'Recp 65'   763559.3   2950252   6
'Recp 66'   763600.2   2950302   6
'Recp 67'   763642   2950248   6
'Recp 68'   763688.1   2950189   6
'Recp 69'   763758.7   2950220   6
'Recp 70'   763711.6   2950281   6
'Recp 71'   763669   2950344   6
'Recp 72'   763739.5   2950371   6
'Recp 73'   763806.6   2950403   6
'Recp 74'   763854.8   2950507   6
'Recp 75'   763784.2   2950481   6
'Recp 76'   763718   2950463   6
'Recp 77'   763759.8   2950523   6
'Recp 78'   763805.9   2950583   6
'Recp 79'   763677.1   2950559   6
'Recp 80'   763629.2   2950500   6
'Recp 81'   763583   2950451   6
'Recp 82'   763524.7   2950504   6
'Recp 83'   763477.6   2950562   6
'Existing_a'   42   1   0   'C'
2
'24Brookline EB L'   'AG'   761555.55   2947755.07   761417.91   2947572.81   1   10   1
120   91   3   185   86.5   1600   1   3
 2
'24 Brookline EB THRT'   'AG'   761564.87   2947746.64   761469.82   2947622.31   1   20   2
120   91   3   505   86.5   1600   1   3
 2
'24Brookline WB L'   'AG'   761628.62   2947867.65   761686.6   2947941.09   1   10   1
120   102   3   435   86.5   1600   1   3
 2
'24 Brookline WB TR'   'AG'   761619.64   2947876.63   761671.9   2947944.36   1   20   2
120   73   3   685   86.5   1600   1   3
 2
'24Riverway NB'   'AG'   761631.87   2947772.6   761666.98   2947675.5   1   20   2
120   81   3   1065   86.5   1600   1   3
 2
'24Riverway SB'   'AG'   761571.3   2947857.96   761516.59   2947946.9   1   10   1
120   81   3   1150   86.5   1600   1   3
 2
'6Brookline EB'   'AG'   761786.08   2948017.89   761737.08   2947951.8   1   20   2
120   75   3   840   86.5   1600   1   3
 2
'6Brookline WB L'   'AG'   761817.31   2948106.26   761876.93   2948187.04   1   10   1
120   107   3   245   86.5   1600   1   3
 2
'6Brookline WB TR'   'AG'   761808.33   2948116.05   761856.51   2948183.78   1   20   2
120   62   3   835   86.5   1600   1   3
 2
'Francis NB'   'AG'   761840.99   2948044.25   761947.16   2947952.86   1   20   2
120   81   3   520   86.5   1600   1   3
 2
'Francis SB'   'AG'   761765.86   2948098.1   761697.27   2948157.67   1   10   1
120   81   3   175   86.5   1600   1   3
 2
'30Riverway EB L'   'AG'   761619.06   2949243.01   761570.86   2949111.37   1   10   1
90   65   3   325   86.5   1600   1   3
 2
'30Riverway EB TR'   'AG'   761637.69   2949237.23   761588.21   2949108.81   1   20   2
90   55   3   625   86.5   1600   1   3
 2
'30Riverway WB LT'   'AG'   761653.83   2949335.85   761714.88   2949419.97   1   20   2
90   55   3   1040   86.5   1600   1   3
 2
'30Riverway WB R'   'AG'   761639.69   2949349.98   761691.1   2949416.76   1   10   1
90   55   3   240   86.5   1600   1   3
 2
'Longwood NB L'   'AG'   761684.04   2949274.54   761765.02   2949216.75   1   10   1
90   66   3   55   86.5   1600   1   3
 2
'Longwood NB TR'   'AG'   761693.68   2949286.1   761766.95   2949233.45   1   10   1
90   66   3   395   86.5   1600   1   3
 2
'Longwood SB LT'   'AG'   761560.65   2949288.67   761485.46   2949302.16   1   10   1
90   66   3   290   86.5   1600   1   3
```

```
 2
'Longwood SB R'   'AG'   761558.73   2949277.11   761485.46   2949289.95   1   10   1
90   41   3   345   86.5   1600   1   3
 2
'33Brookline EB T'   'AG'   763543.98   2950302.42   763484.17   2950220.06   1   20   2
90   58   3   335   86.5   1600   1   3
 2
'33Brookline EB R'   'AG'   763566.6   2950293.54   763509.22   2950217.63   1   20   2
90   31   3   1175   86.5   1600   1   3
 2
'33Brookline WB T'   'AG'   763679.03   2950499.74   763764.7   2950607.15   1   20   2
90   58   3   295   86.5   1600   1   3
 2
'33Brookline WB R'   'AG'   763664.49   2950514.28   763743.69   2950611.18   1   10   1
90   58   3   400   86.5   1600   1   3
 2
'Park NB '   'AG'   763641.47   2950323.2   763729.29   2950207.06   1   30   3
90   65   3   1000   86.5   1600   1   3
 2
'Boylston NW LT'   'AG'   763742.2   2950421.27   763913.97   2950485.79   1   20   2
90   62   3   390   86.5   1600   1   3
 2
'Boylston NW R'   'AG'   763735.74   2950443.21   763897.18   2950499.99   1   10   1
90   62   3   685   86.5   1600   1   3
 1
'Brookline@Park N'   'AG'   763592.3   2950374   764041.6   2950967   1130   13.46   1   78
 1
'Boylston@Park NE'   'AG'   763592.3   2950374   764291.1   2950624   2325   13.46   1   66
 1
'Park@Brookline E'   'AG'   763592.3   2950374   763817.3   2950081   1000   13.46   1   66
 1
'Brookline@Park S'   'AG'   763592.3   2950374   763434.9   2950166   2270   13.46   1   90
 1
'Park@Brookline W'   'AG'   763592.3   2950374   763320.8   2950668   1835   13.46   1   66
 1
'Riverway@Longwood N'   'AG'   761626.6   2949281   761823.6   2949528   1965   13.86   1   78
 1
'Longwood@Riverway E'   'AG'   761643.4   2949300   762039.1   2949012   710   13.46   1   54
 1
'Riverway@Longwood S'   'AG'   761626.6   2949281   761486.9   2948917   2385   13.86   1   78
 1
'Longwood@Riverway W'   'AG'   761626.6   2949281   761299.1   2949340   1570   13.46   1   54
 1
'Riverway@Brookline N'   'AG'   761602.3   2947824   761418.3   2948172   2055   13.86   1   66
 1
'Brookline@Riverway E'   'AG'   761602.3   2947824   761798.4   2948067   1970   13.46   1   78
 1
'Riverway@Brookline S'   'AG'   761602.3   2947824   761653.9   2947458   2615   13.86   1   66
 1
'Brookline@Riverway W'   'AG'   761602.3   2947824   761178.1   2947280   1410   13.46   1   78
 1
'Brookline@Francis N'   'AG'   761798.4   2948067   762070.7   2948440   2035   13.46   1   78
 1
'Francis@Brookline E'   'AG'   761798.4   2948067   762100.4   2947812   940   13.46   1   54
 1
'Francis@Brookline W'   'AG'   761807.9   2948083   761539.4   2948298   300   13.46   1   42
1   0   4   1000   3   'Y'   10   0   36
```

16NB.inp

```
'Dana Farber Cancer Institute'   60   175   0   0   58   0.3048   1   0
'Recp 1'   761643.9   2948176   0
'Recp 2'   761701.1   2948128   6
'Recp 3'   761759.1   2948087   6
'Recp 4'   761712.6   2948028   6
'Recp 5'   761666.3   2947970   6
'Recp 6'   761725.6   2947902   6
'Recp 7'   761770.7   2947962   6
'Recp 8'   761811.8   2948015   6
'Recp 9'   761870.4   2947966   6
'Recp 10'   761925.8   2947917   6
'Recp 11'   761966.1   2947973   6
'Recp 12'   761908.8   2948021   6
'Recp 13'   761858.3   2948068   6
'Recp 14'   761895   2948123   6
'Recp 15'   761940.1   2948182   6
'Recp 16'   761874.4   2948245   6
'Recp 17'   761831.3   2948183   6
'Recp 18'   761786.7   2948131   6
'Recp 19'   761725   2948181   6
'Recp 20'   761667.3   2948229   6
'Recp 21'   761486.4   2947963   6
'Recp 22'   761522.6   2947898   6
'Recp 23'   761555.9   2947840   6
'Recp 24'   761510.5   2947777   6
'Recp 25'   761464.4   2947718   6
'Recp 26'   761493.9   2947612   6
'Recp 27'   761541.4   2947670   6
'Recp 28'   761578.3   2947723   6
'Recp 29'   761589   2947660   6
'Recp 30'   761599.6   2947584   6
'Recp 31'   761667   2947664   6
'Recp 32'   761662.1   2947740   6
'Recp 33'   761649.3   2947810   6
'Recp 34'   761693.3   2947867   6
'Recp 35'   761648.7   2947949   6
'Recp 36'   761606.1   2947899   6
'Recp 37'   761573.9   2947957   6
'Recp 38'   761538.2   2948023   6
'Recp 39'   761414.9   2949281   6
'Recp 40'   761488.5   2949270   0
'Recp 41'   761558   2949257   6
'Recp 42'   761542.1   2949184   6
'Recp 43'   761517   2949113   6
'Recp 44'   761603.9   2949104   6
'Recp 45'   761631   2949173   6
'Recp 46'   761660.9   2949246   6
'Recp 47'   761724.8   2949203   6
'Recp 48'   761786.7   2949159   6
'Recp 49'   761816.6   2949217   6
'Recp 50'   761752.6   2949258   6
'Recp 51'   761699.1   2949301   6
'Recp 52'   761739.4   2949354   6
'Recp 53'   761786.7   2949413   6
'Recp 54'   761688.8   2949436   6
'Recp 55'   761644.3   2949375   6
'Recp 56'   761595.6   2949318   6
'Recp 57'   761528.9   2949329   6
'Recp 58'   761455.9   2949343   6
'16NB'   42   1   0   'C'
 2
'24Brookline EB L'   'AG'   761555.55   2947755.07   761417.91   2947572.81   1   10   1
120   91   3   194   52.9   1600   1   3
 2
'24 Brookline EB THRT'   'AG'   761564.87   2947746.64   761469.82   2947622.31   1   20   2
120   91   3   549   52.9   1600   1   3
 2
'24Brookline WB L'   'AG'   761628.62   2947867.65   761686.6   2947941.09   1   10   1
120   102   3   559   52.9   1600   1   3
 2
'24 Brookline WB TR'   'AG'   761619.64   2947876.63   761671.9   2947944.36   1   20   2
120   73   3   806   52.9   1600   1   3
 2
'24Riverway NB'   'AG'   761631.87   2947772.6   761666.98   2947675.5   1   20   2
120   81   3   1141   52.9   1600   1   3
 2
'24Riverway SB'   'AG'   761571.3   2947857.96   761516.59   2947946.9   1   10   1
120   81   3   1205   52.9   1600   1   3
 2
'6Brookline EB'   'AG'   761786.08   2948017.89   761737.08   2947951.8   1   20   2
120   75   3   920   52.9   1600   1   3
 2
'6Brookline WB L'   'AG'   761817.31   2948106.26   761876.93   2948187.04   1   10   1
120   107   3   264   52.9   1600   1   3
 2
'6Brookline WB TR'   'AG'   761808.33   2948116.05   761856.51   2948183.78   1   20   2
```

```
120   62   3   1056   52.9   1600   1   3
 2
'Francis NB'   'AG'   761840.99   2948044.25   761947.16   2947952.86   1   20   2
120   81   3   564   52.9   1600   1   3
 2
'Francis SB'   'AG'   761765.86   2948098.1   761697.27   2948157.67   1   10   1
120   81   3   193   52.9   1600   1   3
 2
'30Riverway EB L'   'AG'   761619.06   2949243.01   761570.86   2949111.37   1   10   1
90   65   3   343   52.9   1600   1   3
 2
'30Riverway EB TR'   'AG'   761637.69   2949237.23   761588.21   2949108.81   1   20   2
90   55   3   657   52.9   1600   1   3
 2
'30Riverway WB LT'   'AG'   761653.83   2949335.85   761714.88   2949419.97   1   20   2
90   55   3   1095   52.9   1600   1   3
 2
'30Riverway WB R'   'AG'   761639.69   2949349.98   761691.1   2949416.76   1   10   1
90   55   3   252   52.9   1600   1   3
 2
'Longwood NB L'   'AG'   761684.04   2949274.54   761765.02   2949216.75   1   10   1
90   66   3   58   52.9   1600   1   3
 2
'Longwood NB TR'   'AG'   761693.68   2949286.1   761766.95   2949233.45   1   10   1
90   66   3   465   52.9   1600   1   3
 2
'Longwood SB LT'   'AG'   761560.65   2949288.67   761485.46   2949302.16   1   10   1
90   66   3   322   52.9   1600   1   3
 2
'Longwood SB R'   'AG'   761558.73   2949277.11   761485.46   2949289.95   1   10   1
90   41   3   363   52.9   1600   1   3
 2
'33Brookline EB T'   'AG'   763543.98   2950302.42   763484.17   2950220.06   1   20   2
90   58   3   348   52.9   1600   1   3
 2
'33Brookline EB R'   'AG'   763566.6   2950293.54   763509.22   2950217.63   1   20   2
90   31   3   1271   52.9   1600   1   3
 2
'33Brookline WB T'   'AG'   763679.03   2950499.74   763764.7   2950607.15   1   20   2
90   58   3   308   52.9   1600   1   3
 2
'33Brookline WB R'   'AG'   763664.49   2950514.28   763743.69   2950611.18   1   10   1
90   58   3   405   52.9   1600   1   3
 2
'Park NB '   'AG'   763641.47   2950323.2   763729.29   2950207.06   1   30   3
90   65   3   1068   52.9   1600   1   3
 2
'Boylston NW LT'   'AG'   763742.2   2950421.27   763913.97   2950485.79   1   20   2
90   62   3   419   52.9   1600   1   3
 2
'Boylston NW R'   'AG'   763735.74   2950443.21   763897.18   2950499.99   1   10   1
90   62   3   690   52.9   1600   1   3
 1
'Brookline@Park N'   'AG'   763592.3   2950374   764041.6   2950967   1182   8.88   1   78
 1
'Boylston@Park NE'   'AG'   763592.3   2950374   764291.1   2950624   2468   8.88   1   66
 1
'Park@Brookline E'   'AG'   763592.3   2950374   763817.3   2950081   1068   8.88   1   66
 1
'Brookline@Park S'   'AG'   763592.3   2950374   763434.9   2950166   2425   8.88   1   90
 1
'Park@Brookline W'   'AG'   763592.3   2950374   763320.8   2950668   1877   8.88   1   66
 1
'Riverway@Longwood N'   'AG'   761626.6   2949281   761823.6   2949528   2067   9.16   1   78
 1
'Longwood@Riverway E'   'AG'   761643.4   2949300   762039.1   2949012   815   8.88   1   54
 1
'Riverway@Longwood S'   'AG'   761626.6   2949281   761486.9   2948917   2509   9.16   1   78
 1
'Longwood@Riverway W'   'AG'   761626.6   2949281   761299.1   2949340   1719   8.88   1   54
 1
'Riverway@Brookline N'   'AG'   761602.3   2947824   761418.3   2948172   2158   8.88   1   66
 1
'Brookline@Riverway E'   'AG'   761602.3   2947824   761798.4   2948067   2295   8.88   1   78
 1
'Riverway@Brookline S'   'AG'   761602.3   2947824   761653.9   2947458   2869   9.16   1   66
 1
'Brookline@Riverway W'   'AG'   761602.3   2947824   761178.1   2947280   1586   8.88   1   78
 1
'Brookline@Francis N'   'AG'   761798.4   2948067   762070.7   2948440   2368   8.88   1   78
 1
'Francis@Brookline E'   'AG'   761798.4   2948067   762100.4   2947812   1019   8.88   1   54
 1
'Francis@Brookline W'   'AG'   761807.9   2948083   761539.4   2948298   327   8.88   1   42
1   0   4   1000   3   'Y'   10   0   36
```

16NB_a.inp

```
'Dana Farber Cancer Institute'   60   175   0   0   25   0.3048   1   0
'Recp 59'   763436.6   2950489   6
'Recp 60'   763487.3   2950433   6
'Recp 61'   763534.9   2950381   6
'Recp 62'   763493.1   2950324   6
'Recp 63'   763445.1   2950263   6
'Recp 64'   763514.8   2950192   6
'Recp 65'   763559.3   2950252   6
'Recp 66'   763600.2   2950302   6
'Recp 67'   763642   2950248   6
'Recp 68'   763688.1   2950189   6
'Recp 69'   763758.7   2950220   6
'Recp 70'   763711.6   2950281   6
'Recp 71'   763669   2950344   6
'Recp 72'   763739.5   2950371   6
'Recp 73'   763806.6   2950403   6
'Recp 74'   763854.8   2950507   6
'Recp 75'   763784.2   2950481   6
'Recp 76'   763718   2950463   6
'Recp 77'   763759.8   2950523   6
'Recp 78'   763805.9   2950583   6
'Recp 79'   763677.1   2950559   6
'Recp 80'   763629.2   2950500   6
'Recp 81'   763583   2950451   6
'Recp 82'   763524.7   2950504   6
'Recp 83'   763477.6   2950562   6
'16NB_a'   42   1   0   'C'
 2
'24Brookline EB L'   'AG'   761555.55   2947755.07   761417.91   2947572.81   1   10   1
120   91   3   194   52.9   1600   1   3
 2
'24 Brookline EB THRT'   'AG'   761564.87   2947746.64   761469.82   2947622.31   1   20   2
120   91   3   549   52.9   1600   1   3
 2
'24Brookline WB L'   'AG'   761628.62   2947867.65   761686.6   2947941.09   1   10   1
120   102   3   559   52.9   1600   1   3
 2
'24 Brookline WB TR'   'AG'   761619.64   2947876.63   761671.9   2947944.36   1   20   2
120   73   3   806   52.9   1600   1   3
 2
'24Riverway NB'   'AG'   761631.87   2947772.6   761666.98   2947675.5   1   20   2
120   81   3   1141   52.9   1600   1   3
 2
'24Riverway SB'   'AG'   761571.3   2947857.96   761516.59   2947946.9   1   10   1
120   81   3   1205   52.9   1600   1   3
 2
'6Brookline EB'   'AG'   761786.08   2948017.89   761737.08   2947951.8   1   20   2
120   75   3   920   52.9   1600   1   3
 2
'6Brookline WB L'   'AG'   761817.31   2948106.26   761876.93   2948187.04   1   10   1
120   107   3   264   52.9   1600   1   3
 2
'6Brookline WB TR'   'AG'   761808.33   2948116.05   761856.51   2948183.78   1   20   2
120   62   3   1056   52.9   1600   1   3
 2
'Francis NB'   'AG'   761840.99   2948044.25   761947.16   2947952.86   1   20   2
120   81   3   564   52.9   1600   1   3
 2
'Francis SB'   'AG'   761765.86   2948098.1   761697.27   2948157.67   1   10   1
120   81   3   193   52.9   1600   1   3
 2
'30Riverway EB L'   'AG'   761619.06   2949243.01   761570.86   2949111.37   1   10   1
90   65   3   343   52.9   1600   1   3
 2
'30Riverway EB TR'   'AG'   761637.69   2949237.23   761588.21   2949108.81   1   20   2
90   55   3   657   52.9   1600   1   3
 2
'30Riverway WB LT'   'AG'   761653.83   2949335.85   761714.88   2949419.97   1   20   2
90   55   3   1095   52.9   1600   1   3
 2
'30Riverway WB R'   'AG'   761639.69   2949349.98   761691.1   2949416.76   1   10   1
90   55   3   252   52.9   1600   1   3
 2
'Longwood NB L'   'AG'   761684.04   2949274.54   761765.02   2949216.75   1   10   1
90   66   3   58   52.9   1600   1   3
 2
'Longwood NB TR'   'AG'   761693.68   2949286.1   761766.95   2949233.45   1   10   1
90   66   3   465   52.9   1600   1   3
 2
'Longwood SB LT'   'AG'   761560.65   2949288.67   761485.46   2949302.16   1   10   1
```

```
 2
'6Brookline WB TR'   'AG'   761808.33   2948116.05   761856.51   2948183.78   1   20   2
120   62   3   1073   52.9   1600   1   3
 2
'Francis NB'   'AG'   761840.99   2948044.25   761947.16   2947952.86   1   20   2
120   81   3   564   52.9   1600   1   3
 2
'Francis SB'   'AG'   761765.86   2948098.1   761697.27   2948157.67   1   10   1
120   81   3   193   52.9   1600   1   3
 2
'30Riverway EB L'   'AG'   761619.06   2949243.01   761570.86   2949111.37   1   10   1
90   65   3   343   52.9   1600   1   3
 2
'30Riverway EB TR'   'AG'   761637.69   2949237.23   761588.21   2949108.81   1   20   2
90   55   3   657   52.9   1600   1   3
 2
'30Riverway WB LT'   'AG'   761653.83   2949335.85   761714.88   2949419.97   1   20   2
90   55   3   1095   52.9   1600   1   3
 2
'30Riverway WB R'   'AG'   761639.69   2949349.98   761691.1   2949416.76   1   10   1
90   55   3   252   52.9   1600   1   3
 2
'Longwood NB L'   'AG'   761684.04   2949274.54   761765.02   2949216.75   1   10   1
90   66   3   58   52.9   1600   1   3
 2
'Longwood NB TR'   'AG'   761693.68   2949286.1   761766.95   2949233.45   1   10   1
90   66   3   472   52.9   1600   1   3
 2
'Longwood SB LT'   'AG'   761560.65   2949288.67   761485.46   2949302.16   1   10   1
90   66   3   326   52.9   1600   1   3
 2
'Longwood SB R'   'AG'   761558.73   2949277.11   761485.46   2949289.95   1   10   1
90   41   3   363   52.9   1600   1   3
 2
'33Brookline EB T'   'AG'   763543.98   2950302.42   763484.17   2950220.06   1   20   2
90   58   3   350   52.9   1600   1   3
 2
'33Brookline EB R'   'AG'   763566.6   2950293.54   763509.22   2950217.63   1   20   2
90   31   3   1287   52.9   1600   1   3
 2
'33Brookline WB T'   'AG'   763679.03   2950499.74   763764.7   2950607.15   1   20   2
90   58   3   309   52.9   1600   1   3
 2
'33Brookline WB R'   'AG'   763664.49   2950514.28   763743.69   2950611.18   1   10   1
90   58   3   405   52.9   1600   1   3
 2
'Park NB '   'AG'   763641.47   2950323.2   763729.29   2950207.06   1   30   3
90   65   3   1077   52.9   1600   1   3
 2
'Boylston NW LT'   'AG'   763742.2   2950421.27   763913.97   2950485.79   1   20   2
90   62   3   426   52.9   1600   1   3
 2
'Boylston NW R'   'AG'   763735.74   2950443.21   763897.18   2950499.99   1   10   1
90   62   3   691   52.9   1600   1   3
 1
'Brookline@Park N'   'AG'   763592.3   2950374   764041.6   2950967   1185   8.88   1   78
 1
'Boylston@Park NE'   'AG'   763592.3   2950374   764291.1   2950624   2491   8.88   1   66
 1
'Park@Brookline E'   'AG'   763592.3   2950374   763817.3   2950081   1077   8.88   1   66
 1
'Brookline@Park S'   'AG'   763592.3   2950374   763434.9   2950166   2451   8.88   1   90
 1
'Park@Brookline W'   'AG'   763592.3   2950374   763320.8   2950668   1886   8.88   1   66
 1
'Riverway@Longwood N'   'AG'   761626.6   2949281   761823.6   2949528   2067   9.16   1   78
 1
'Longwood@Riverway E'   'AG'   761643.4   2949300   762039.1   2949012   826   8.88   1   54
 1
'Riverway@Longwood S'   'AG'   761626.6   2949281   761486.9   2948917   2509   9.16   1   78
 1
'Longwood@Riverway W'   'AG'   761626.6   2949281   761299.1   2949340   1730   8.88   1   54
 1
'Riverway@Brookline N'   'AG'   761602.3   2947824   761418.3   2948172   2158   8.88   1   66
 1
'Brookline@Riverway E'   'AG'   761602.3   2947824   761798.4   2948067   2320   8.88   1   78
 1
'Riverway@Brookline S'   'AG'   761602.3   2947824   761653.9   2947458   2879   9.16   1   66
 1
'Brookline@Riverway W'   'AG'   761602.3   2947824   761178.1   2947280   1601   8.88   1   78
 1
'Brookline@Francis N'   'AG'   761798.4   2948067   762070.7   2948440   2388   8.88   1   78
 1
'Francis@Brookline E'   'AG'   761798.4   2948067   762100.4   2947812   1022   8.88   1   54
 1
'Francis@Brookline W'   'AG'   761807.9   2948083   761539.4   2948298   327   8.88   1   42
1   0   4   1000   3   'Y'   10   0   36
```

16Bld_a.inp

```
'Dana Farber Cancer Institute'   60   175   0   0   25   0.3048   1   0
'Recp 59'   763436.6   2950489   6
'Recp 60'   763487.3   2950433   6
'Recp 61'   763534.9   2950381   6
'Recp 62'   763493.1   2950324   6
'Recp 63'   763445.1   2950263   6
'Recp 64'   763514.8   2950192   6
'Recp 65'   763559.3   2950252   6
'Recp 66'   763600.2   2950302   6
'Recp 67'   763642   2950248   6
'Recp 68'   763688.1   2950189   6
'Recp 69'   763758.7   2950220   6
'Recp 70'   763711.6   2950281   6
'Recp 71'   763669   2950344   6
'Recp 72'   763739.5   2950371   6
'Recp 73'   763806.6   2950403   6
'Recp 74'   763854.8   2950507   6
'Recp 75'   763784.2   2950481   6
'Recp 76'   763718   2950463   6
'Recp 77'   763759.8   2950523   6
'Recp 78'   763805.9   2950583   6
'Recp 79'   763677.1   2950559   6
'Recp 80'   763629.2   2950500   6
'Recp 81'   763583   2950451   6
'Recp 82'   763524.7   2950504   6
'Recp 83'   763477.6   2950562   6
'16Build'   42   1   0   'C'
 2
'24Brookline EB L'   'AG'   761555.55   2947755.07   761417.91   2947572.81   1   10   1
120   91   3   194   52.9   1600   1   3
 2
'24 Brookline EB THRT'   'AG'   761564.87   2947746.64   761469.82   2947622.31   1   20   2
120   91   3   554   52.9   1600   1   3
 2
'24Brookline WB L'   'AG'   761628.62   2947867.65   761686.6   2947941.09   1   10   1
120   102   3   566   52.9   1600   1   3
 2
'24 Brookline WB TR'   'AG'   761619.64   2947876.63   761671.9   2947944.36   1   20   2
120   73   3   816   52.9   1600   1   3
 2
'24Riverway NB'   'AG'   761631.87   2947772.6   761666.98   2947675.5   1   20   2
120   81   3   1144   52.9   1600   1   3
 2
'24Riverway SB'   'AG'   761571.3   2947857.96   761516.59   2947946.9   1   10   1
120   81   3   1205   52.9   1600   1   3
 2
'6Brookline EB'   'AG'   761786.08   2948017.89   761737.08   2947951.8   1   20   2
120   75   3   926   52.9   1600   1   3
 2
'6Brookline WB L'   'AG'   761817.31   2948106.26   761876.93   2948187.04   1   10   1
120   107   3   264   52.9   1600   1   3
 2
'6Brookline WB TR'   'AG'   761808.33   2948116.05   761856.51   2948183.78   1   20   2
120   62   3   1073   52.9   1600   1   3
 2
'Francis NB'   'AG'   761840.99   2948044.25   761947.16   2947952.86   1   20   2
120   81   3   564   52.9   1600   1   3
 2
'Francis SB'   'AG'   761765.86   2948098.1   761697.27   2948157.67   1   10   1
120   81   3   193   52.9   1600   1   3
 2
'30Riverway EB L'   'AG'   761619.06   2949243.01   761570.86   2949111.37   1   10   1
90   65   3   343   52.9   1600   1   3
 2
'30Riverway EB TR'   'AG'   761637.69   2949237.23   761588.21   2949108.81   1   20   2
90   55   3   657   52.9   1600   1   3
 2
'30Riverway WB LT'   'AG'   761653.83   2949335.85   761714.88   2949419.97   1   20   2
90   55   3   1095   52.9   1600   1   3
 2
'30Riverway WB R'   'AG'   761639.69   2949349.98   761691.1   2949416.76   1   10   1
90   55   3   252   52.9   1600   1   3
 2
'Longwood NB L'   'AG'   761684.04   2949274.54   761765.02   2949216.75   1   10   1
90   66   3   58   52.9   1600   1   3
 2
'Longwood NB TR'   'AG'   761693.68   2949286.1   761766.95   2949233.45   1   10   1
90   66   3   472   52.9   1600   1   3
 2
```

```
'Longwood SB LT'   'AG'   761560.65   2949288.67   761485.46   2949302.16   1   10   1
90   66   3   326   52.9   1600   1   3
 2
'Longwood SB R'   'AG'   761558.73   2949277.11   761485.46   2949289.95   1   10   1
90   41   3   363   52.9   1600   1   3
 2
'33Brookline EB T'   'AG'   763543.98   2950302.42   763484.17   2950220.06   1   20   2
90   58   3   350   52.9   1600   1   3
 2
'33Brookline EB R'   'AG'   763566.6   2950293.54   763509.22   2950217.63   1   20   2
90   31   3   1287   52.9   1600   1   3
 2
'33Brookline WB T'   'AG'   763679.03   2950499.74   763764.7   2950607.15   1   20   2
90   58   3   309   52.9   1600   1   3
 2
'33Brookline WB R'   'AG'   763664.49   2950514.28   763743.69   2950611.18   1   10   1
90   58   3   405   52.9   1600   1   3
 2
'Park NB '   'AG'   763641.47   2950323.2   763729.29   2950207.06   1   30   3
90   65   3   1077   52.9   1600   1   3
 2
'Boylston NW LT'   'AG'   763742.2   2950421.27   763913.97   2950485.79   1   20   2
90   62   3   426   52.9   1600   1   3
 2
'Boylston NW R'   'AG'   763735.74   2950443.21   763897.18   2950499.99   1   10   1
90   62   3   691   52.9   1600   1   3
 1
'Brookline@Park N'   'AG'   763592.3   2950374   764041.6   2950967   1185   8.88   1   78
 1
'Boylston@Park NE'   'AG'   763592.3   2950374   764291.1   2950624   2491   8.88   1   66
 1
'Park@Brookline E'   'AG'   763592.3   2950374   763817.3   2950081   1077   8.88   1   66
 1
'Brookline@Park S'   'AG'   763592.3   2950374   763434.9   2950166   2451   8.88   1   90
 1
'Park@Brookline W'   'AG'   763592.3   2950374   763320.8   2950668   1886   8.88   1   66
 1
'Riverway@Longwood N'   'AG'   761626.6   2949281   761823.6   2949528   2067   9.16   1   78
 1
'Longwood@Riverway E'   'AG'   761643.4   2949300   762039.1   2949012   826   8.88   1   54
 1
'Riverway@Longwood S'   'AG'   761626.6   2949281   761486.9   2948917   2509   9.16   1   78
 1
'Longwood@Riverway W'   'AG'   761626.6   2949281   761299.1   2949340   1730   8.88   1   54
 1
'Riverway@Brookline N'   'AG'   761602.3   2947824   761418.3   2948172   2158   8.88   1   66
 1
'Brookline@Riverway E'   'AG'   761602.3   2947824   761798.4   2948067   2320   8.88   1   78
 1
'Riverway@Brookline S'   'AG'   761602.3   2947824   761653.9   2947458   2879   9.16   1   66
 1
'Brookline@Riverway W'   'AG'   761602.3   2947824   761178.1   2947280   1601   8.88   1   78
 1
'Brookline@Francis N'   'AG'   761798.4   2948067   762070.7   2948440   2388   8.88   1   78
 1
'Francis@Brookline E'   'AG'   761798.4   2948067   762100.4   2947812   1022   8.88   1   54
 1
'Francis@Brookline W'   'AG'   761807.9   2948083   761539.4   2948298   327   8.88   1   42
1   0   4   1000   3   'Y'   10   0   36
```

Microscale Results Summary

1 Hour CO Results

Highest values for specific receptors are in bold

Receptor Location Ref	Figure	Intersection/Receptors	2006 Existing	2016 No-Build	2016 Build	3.7 2016 Build with Garage & Generator
		Brookline Avenue at Francis Street				
		Recp 1	4.1	3.9	3.9	7.6
Northwest	Beth Israel	Recp 2	4.6	4.2	4.2	7.9
Quadrant	Deaconess	Recp 3	5.8	4.8	4.8	8.5
		Recp 4	5.8	5.2	5.2	8.9
		Recp 5	6.3	5.3	5.3	9.0
		Recp 6	5.8	4.9	4.9	8.6
Southwest	Parking	Recp 7	5.9	4.9	4.9	8.6
Quadrant	Garage	Recp 8	5.9	4.9	5.0	8.7
		Recp 9	4.9	4.3	4.3	8.0
		Recp 10	4.8	4.2	4.2	7.9
		Recp 11	4.9	4.3	4.3	8.0
		Recp 12	5.4	4.6	4.6	8.3
Southeast	Dana Farber	Recp 13	5.6	4.8	4.8	8.5
Quadrant	Cancer Institute	Recp 14	5.3	4.6	4.6	8.3
		Recp 15	5.1	4.5	4.6	8.3
		Recp 16	6.4	5.2	5.2	8.9
		Recp 17	6.0	4.9	4.9	8.6
Northeast	Beth Israel	Recp 18	5.6	4.8	4.8	8.5
Quadrant	Deaconess	Recp 19	4.5	4.3	4.3	8.0
		Recp 20	4.1	3.8	3.8	7.5
		Brookline Avenue at Riverway				
		Recp 21	5.2	4.5	4.5	8.2
Northwest	Open	Recp 22	5.5	4.6	4.7	8.4
Quadrant	Space	Recp 23	6.1	5.2	5.3	9.0
		Recp 24	5.4	4.6	4.6	8.3
		Recp 25	4.9	4.4	4.4	8.1
		Recp 26	5.7	4.9	4.9	8.6
Southwest	Open	Recp 27	5.7	4.9	4.9	8.6
Quadrant	Space	Recp 28	6.1	5.2	5.2	8.9
		Recp 29	5.7	4.9	4.9	8.6
		Recp 30	5.5	4.8	4.8	8.5
		Recp 31	7.2	5.7	5.5	9.2
	Beth Israel	Recp 32	5.7	4.9	4.9	8.6
Southeast	Deaconess	Recp 33	5.4	4.8	4.8	8.5
Quadrant		Recp 34	6.1	5.2	5.2	8.9
		Recp 7	5.9	4.9	4.9	8.6
		Recp 35	6.2	5.1	5.1	8.8
		Recp 36	5.8	5.0	5.0	8.7
Northeast	Parking	Recp 37	5.5	4.6	4.7	8.4
Quadrant	Garage	Recp 38	5.2	4.6	4.6	8.3
		Recp 5	6.3	5.3	5.3	9.0
		Longwood Avenue at Riverway				
		Recp 39	4.6	4.2	4.2	7.9
Northwest	Open	Recp 40	4.9	4.4	4.4	8.1
Quadrant	Space	Recp 41	5.0	4.3	4.3	8.0
		Recp 42	4.8	4.5	4.4	8.1
		Recp 43	5.1	4.4	4.4	8.1
		Recp 44	5.3	4.6	4.5	8.2
Southwest	Apartment	Recp 45	5.6	4.7	4.6	8.3
Quadrant	Building	Recp 46	5.4	4.6	4.6	8.3
		Recp 47	4.2	3.8	3.9	7.6
		Recp 48	4.1	3.7	3.7	7.4
		Recp 49	4.4	4.2	4.2	7.9
		Recp 50	4.9	4.5	4.6	8.3
Southeast	Temple	Recp 51	5.0	4.4	4.4	8.1
Quadrant	Israel	Recp 52	4.6	4.1	4.1	7.8
		Recp 53	4.8	4.1	4.1	7.8
		Recp 54	5.3	4.6	4.6	8.3
		Recp 55	5.3	4.5	4.5	8.2
Northeast	Open	Recp 56	5.3	4.5	4.4	8.1
Quadrant	Space	Recp 57	4.9	4.4	4.4	8.1
		Recp 58	4.9	4.3	4.3	8.0
		Brookline Avenue at Boylston Avenue/Park Drive				
		Recp 59	4.7	4.3	4.3	8.0
Northwest	Park	Recp 60	4.8	4.4	4.4	8.1
Quadrant	Space	Recp 61	5.7	5.1	5.1	8.6
		Recp 62	5.2	4.7	4.7	8.4
		Recp 63	5.3	4.7	4.7	8.4
		Recp 64	5.3	4.8	4.8	8.5
Southwest	Park	Recp 65	5.0	4.6	4.6	8.3
Quadrant	Space	Recp 66	5.1	4.5	4.6	8.3
		Recp 67	5.2	4.5	4.5	8.2
		Recp 68	5.1	4.5	4.5	8.2
		Recp 69	5.5	4.6	4.7	8.4
		Recp 70	5.4	4.7	4.7	8.4
Southeast	Mobile Exxon	Recp 71	4.9	4.3	4.4	8.1
Quadrant	Gas Station	Recp 72	4.7	4.3	4.3	8.0
		Recp 73	5.0	4.4	4.4	8.1
		Recp 74	5.4	4.8	4.8	8.5
Northeast	Mixed Use	Recp 75	5.5	4.8	4.8	8.5
Quadrant	Commercial	Recp 76	5.3	4.7	4.7	8.4
(S of Brookline)		Recp 77	4.7	4.4	4.4	8.1
		Recp 78	4.6	4.3	4.3	8.0
		Recp 79	5.0	4.5	4.5	8.2
Northeast	Landmark	Recp 80	4.6	4.2	4.2	7.9
Quadrant	Center	Recp 81	5.0	4.6	4.6	8.3
(N of Brookline)		Recp 82	4.7	4.4	4.4	8.1
		Recp 83	4.4	4.1	4.1	7.8

8 Hour CO Results

Highest values for specific receptors are in bold

Figure Ref	Receptor Locatior	Intersection/Receptors	2006 Existing	2016 No-Build	2016 Build	2.5 2016 Build with Garage & Generator
		Brookline Avenue at Francis Street				
	Boston Police Headquaters	Recp 1	2.9	2.7	2.7	5.2
Northwest		Recp 2	3.2	2.9	2.9	5.4
Quadrant		Recp 3	4.1	3.4	3.4	5.9
		Recp 4	4.1	3.6	3.6	6.1
		Recp 5	4.4	3.7	3.7	6.2
		Recp 6	4.1	3.4	3.4	5.9
Southwest		Recp 7	4.1	3.4	3.4	5.9
Quadrant		Recp 8	4.1	3.4	3.5	6.0
		Recp 9	3.4	3.0	3.0	5.5
		Recp 10	3.4	2.9	2.9	5.4
		Recp 11	3.4	3.0	3.0	5.5
		Recp 12	3.8	3.2	3.2	5.7
Southeast		Recp 13	3.9	3.4	3.4	5.9
Quadrant		Recp 14	3.7	3.2	3.2	5.7
		Recp 15	3.6	3.2	3.2	5.7
		Recp 16	4.5	3.6	3.6	6.1
		Recp 17	4.2	3.4	3.4	5.9
Northeast		Recp 18	3.9	3.4	3.4	5.9
Quadrant		Recp 19	3.2	3.0	3.0	5.5
		Recp 20	2.9	2.7	2.7	5.2
		Brookline Avenue at Riverway				
		Recp 21	3.6	3.2	3.2	5.7
Northwest		Recp 22	3.9	3.2	3.3	5.8
Quadrant		Recp 23	4.3	3.6	3.7	6.2
		Recp 24	3.8	3.2	3.2	5.7
		Recp 25	3.4	3.1	3.1	5.6
		Recp 26	4.0	3.4	3.4	5.9
Southwest		Recp 27	4.0	3.4	3.4	5.9
Quadrant		Recp 28	4.3	3.6	3.6	6.1
		Recp 29	4.0	3.4	3.4	5.9
		Recp 30	3.9	3.4	3.4	5.9
		Recp 31	5.0	4.0	3.9	6.4
		Recp 32	4.0	3.4	3.4	5.9
Southeast		Recp 33	3.8	3.4	3.4	5.9
Quadrant		Recp 34	4.3	3.6	3.6	6.1
		Recp 7	4.1	3.4	3.4	5.9
		Recp 35	4.3	3.6	3.6	6.1
		Recp 36	4.1	3.5	3.5	6.0
Northeast		Recp 37	3.9	3.2	3.3	5.8
Quadrant		Recp 38	3.6	3.2	3.2	5.7
		Recp 5	4.4	3.7	3.7	6.2
		Longwood Avenue at Riverway				
		Recp 39	3.2	2.9	2.9	5.4
Northwest		Recp 40	3.4	3.1	3.1	5.6
Quadrant		Recp 41	3.5	3.0	3.0	5.5
		Recp 42	3.4	3.2	3.1	5.6
		Recp 43	3.6	3.1	3.1	5.6
		Recp 44	3.7	3.2	3.2	5.7
Southwest		Recp 45	3.9	3.3	3.2	5.7
Quadrant		Recp 46	3.8	3.2	3.2	5.7
		Recp 47	2.9	2.7	2.7	5.2
		Recp 48	2.9	2.6	2.6	5.1
		Recp 49	3.1	2.9	2.9	5.4
		Recp 50	3.4	3.2	3.2	5.7
Southeast		Recp 51	3.5	3.1	3.1	5.6
Quadrant		Recp 52	3.2	2.9	2.9	5.4
		Recp 53	3.4	2.9	2.9	5.4
		Recp 54	3.7	3.2	3.2	5.7
		Recp 55	3.7	3.2	3.2	5.7
Northeast		Recp 56	3.7	3.2	3.1	5.6
Quadrant		Recp 57	3.4	3.1	3.1	5.6
		Recp 58	3.4	3.0	3.0	5.5
		Brookline Avenue at Boylston Avenue/Park Drive				
		Recp 59	3.3	3.0	3.0	5.5
Northwest		Recp 60	3.4	3.1	3.1	5.6
Quadrant		Recp 61	4.0	3.6	3.6	6.1
		Recp 62	3.6	3.3	3.3	5.8
		Recp 63	3.7	3.3	3.3	5.8
		Recp 64	3.7	3.4	3.4	5.9
Southwest		Recp 65	3.5	3.2	3.2	5.7
Quadrant		Recp 66	3.6	3.2	3.2	5.7
		Recp 67	3.6	3.2	3.2	5.7
		Recp 68	3.6	3.2	3.2	5.7
		Recp 69	3.9	3.2	3.3	5.8
		Recp 70	3.8	3.3	3.3	5.8
Southeast		Recp 71	3.4	3.0	3.1	5.6
Quadrant		Recp 72	3.3	3.0	3.0	5.5
		Recp 73	3.5	3.1	3.1	5.6
		Recp 74	3.8	3.4	3.4	5.9
Northeast		Recp 75	3.9	3.4	3.4	5.9
Quadrant		Recp 76	3.7	3.3	3.3	5.8
(S of Brookline)		Recp 77	3.3	3.1	3.1	5.6
		Recp 78	3.2	3.0	3.0	5.5
		Recp 79	3.5	3.2	3.2	5.7
Northeast		Recp 80	3.2	2.9	2.9	5.4
Quadrant		Recp 81	3.5	3.2	3.2	5.7
(N of Brookline)		Recp 82	3.3	3.1	3.1	5.6
		Recp 83	3.1	2.9	2.9	5.4

NOISE APPENDIX

- Noise Monitoring Data Sheets
- Noise Monitoring Summary
- Sound Level Calculations

Noise Monitoring Data Sheets

[redacted]

Vanasse Hangen Brustlin, Inc.

Transportation
Land Development
Environmental Services

VHB

101 Walnut Street
Post Office Box 9151
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Noise Monitoring Data

Notes Taken By: Q.Tat / R. Adams

Date: 11/28/06

Project No.: 08984.01

Location: Francis St / Vining St

Weather: ~30°F – Cloudy

Noise Monitor: Larson Davis 824

Time Start: 4:35 PM

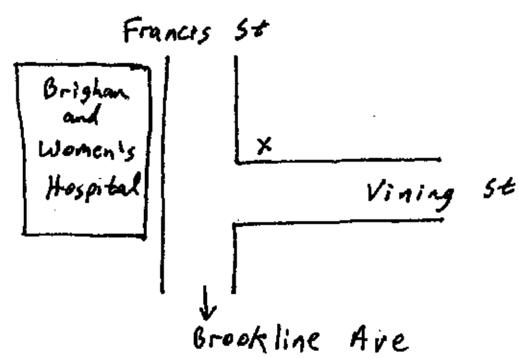
Duration: 20 Minutes

What was the name of the data run? Run 1

Results

Leq 68.8

Sketch



Traffic Data	Volumes	Speeds
Automobiles		
Medium Trucks		
Heavy Trucks		

Notes:

What was the angle of exposure to the highway?

Were there any objects blocking the highway noise sources? (Such as buildings or hills)

Were there other roadway or highway noise sources nearby?

Local Roadways – Francis St, Vining St

Were there significant other non-highway noise sources?

Mechanical Equipment (MATEP)

[redacted]

Vanasse Hangen Brustlin, Inc.

Transportation
Land Development
Environmental Services

VHB

101 Walnut Street
Post Office Box 9151
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Noise Monitoring Data

Notes Taken By: Q. Tat / R. Adams

Date: 11/28/06

Project No.: 08984.01

Location: Joslin Pl. / Deaconess Rd

Weather: ~30°F - Cloudy

Noise Monitor: Larson Davis 824

Time Start: 5:05 pm

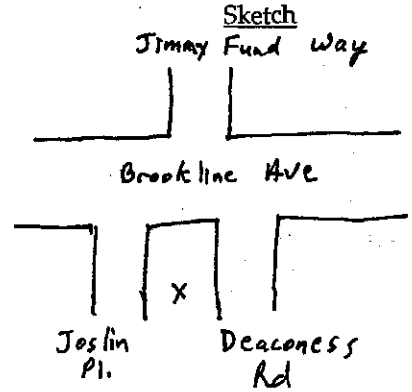
Duration: 20 Minutes

What was the name of the data run? Run 2

Results

Leq 68.0

Sketch



Traffic Data	Volumes	Speeds
Automobiles		
Medium Trucks		
Heavy Trucks		

Notes:

What was the angle of exposure to the highway?

Were there any objects blocking the highway noise sources? (Such as buildings or hills)

Were there other roadway or highway noise sources nearby?

Brookline Ave, Joslin Pl. / Deaconess Rd

Were there significant other non-highway noise sources?

Mechanical Equipment (MATEP)

[redacted]

Vanasse Hangen Brustlin, Inc.

Transportation
Land Development
Environmental Services

VHB

101 Walnut Street
Post Office Box 9151
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Noise Monitoring Data

Notes Taken By: Q. Tat / R. Adams

Date: 11/29/06

Project No.: 08984.01

Location: Francis St / Vining St

Weather: 20°F

Noise Monitor: Larson Davis 824

Time Start: 1:00 AM

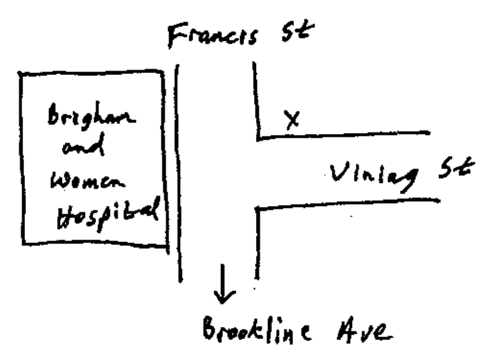
Duration: 15 Minutes

What was the name of the data run? Run 3

Results

Leq 61.5

Sketch



Traffic Data	Volumes	Speeds
Automobiles		
Medium Trucks		
Heavy Trucks		

Notes:

What was the angle of exposure to the highway? ______

Were there any objects blocking the highway noise sources? (Such as buildings or hills) ______

Were there other roadway or highway noise sources nearby? ______

Minor roadway noise from local streets

Were there significant other non-highway noise sources? ______

Mechanical Equipment from surrounding buildings

[redacted]

Vanasse Hangen Brustlin, Inc.

Transportation
Land Development
Environmental Services

VHB

101 Walnut Street
Post Office Box 9151
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Noise Monitoring Data

Notes Taken By: Q. TAT / R. Adams

Date: 11/29/06

Project No.: 08984.01

Location: Joslin Pl / Deaconess Rd

Weather: 20°C

Noise Monitor: Larson Davis 824

Time Start: 1:20 AM

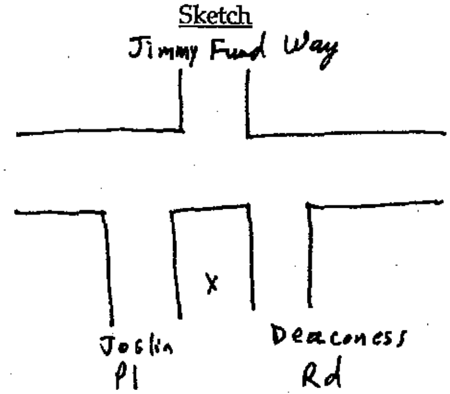
Duration: 15 Minutes

What was the name of the data run? Run 4

Results

Leq 64.1

Sketch



Traffic Data	Volumes	Speeds
Automobiles		
Medium Trucks		
Heavy Trucks		

Notes:

What was the angle of exposure to the highway?

Were there any objects blocking the highway noise sources? (Such as buildings or hills)

Were there other roadway or highway noise sources nearby?

Minor Roadway noise from local traffic

Were there significant other non-highway noise sources?

Mechanical Equipment from surrounding buildings - dominant source.

Noise Monitoring Summary

Dana Farber Cancer Institute
Noise Monitoring Data Summary
November 28-29, 2006

	A-weighted Sound Levels L90 (dBA)	
Location	**Daytime (4:30-5:30 PM)**	**Nighttime (1:00-2:00 AM)**
Francis Street/Vining Street	63	59
Joslin Place/Deaconess Road	65	63

Sound Level Calculations

Dana Farber Cancer Institute
Noise Analysis - Daytime Conditions
Sound Level Calculations

	REC1	REC2	REC3	REC4	REC5	REC6
Description	Francis Street	Mayer Building	Joslin Diabetes Center	Beth Israel West Campus	MATEP	Smith Building
Noise Monitoring Data [dBA]	63	65	65	65	63	65
Noise Source [dBA]	52	62	58	61	62	62
Calculated Noise Level [dBA]	63	67	66	66	65	67
Difference	0	2	1	1	3	2

Dana Farber Cancer Institute
Noise Analysis - Nighttime Conditions
Sound Level Calculations

	REC1	REC2	REC3	REC4	REC5	REC6
Description	Francis Street	Mayer Building	Joslin Diabetes Center	Beth Israel West Campus	MATEP	Smith Building
Noise Monitoring Data [dBA]	59	63	63	63	59	63
Noise Source [dBA]	52	62	58	61	62	62
Calculated Noise Level [dBA]	59	65	64	65	64	65
Difference	1	3	1	2	5	3

Historic Resources

1. Boston Landmarks Commission Application and Finding
2. Massachusetts Historical Commission and Findings
3. Historic Resources Section from the Dana-Farber Cancer Institute IMPNF/PNF Filing

Boston Landmarks Commission
Article 85 Review Application

450 Brookline Avenue

Center for Cancer Care

Boston
Massachusetts

Submitted by

Dana Farber Cancer Institute
Boston, Massachusetts

Boston Landmarks Commission
Article 85 Review Application

450 Brookline Avenue

Center for Cancer Care

Boston,
Massachusetts

Submitted by **Dana Farber Cancer Institute**
44 Binney Street
Boston, MA 02115

Prepared by ***VHB*/Vanasse Hangen Brustlin, Inc.**
Transportation, Land Development, Environmental Services
101 Walnut Street
P.O. Box 9151
Watertown, Massachusetts 02272
617 924 1770

April 2006

File: 4.4
Article 85

Boston
Landmarks
Commission

City of Boston
The Environment
Department

Boston City Hall/Room 805
Boston, Massachusetts 02201
617/635-3850

28 April 2006

Dana Farber Cancer Institute
44 Binney Street
Boston MA 02115

NOTICE OF DETERMINATION

Application #06.885D1112
Demolition of a two commercial buildings at 454 and464 Brookline Street Boston

Dear Sir or Madam :

The Boston Landmarks Commission staff have determined that the above-mentioned buildings are not significant buildings under the Criteria for determining significance in Section 85-5.3 (a-e) of the Demolition Delay Ordinance (Article 85, Chapter 665 of the Acts of 1956 as amended). No further review by the Boston Landmarks Commission under Article 85 is required. If you have any questions regarding this decision, please contact me at 617-635-3850.

Please bring this determination with you to Inspectional Services Department when applying for a demolition permit. Thank you for your cooperation in this matter.

Sincerely,

Richard A. Cecconi

Richard A. Cecconi
Staff Architect

cc: Commissioner of Inspectional Services
Boston Redevelopment Authority
Boston Civic Design Commission

Transportation
Land Development
Environmental
Services

VHB imagination | innovation | energy Creating results for our clients and benefits for our communities

April 20, 2006

Vanasse Hangen Brustlin, Inc.

Ms. Ellen Lipsey, Executive Director
Boston Landmarks Commission
Boston City Hall, Room 805
Boston, MA 02201

Re: Article 85 Review
450 Brookline Avenue – Center for Cancer Care
Dana-Farber Cancer Institute, Boston, MA

Dear Ms. Lipsey:

Enclosed is a completed Article 85 Review Application and supplementary materials describing the Dana-Farber Cancer Institute's proposed construction of a new research and patient care facility at the corner of Brookline Avenue and Jimmy Fund Way in the Longwood Medical Area. The new building, hereafter to be known as 450 Brookline Avenue, is proposed to be constructed on the present site of an administrative office building at 454 Brookline Avenue, the Redstone Research Laboratory building at 464 Brookline Avenue, and a 30-car surface parking area.

The building at 454 Brookline Avenue was constructed in 1923 as a single-story, public automobile garage. The building was renovated for use as medical offices in the mid 1950s, which included the addition of a second story and application of concrete and metal veneer on the major street elevations of building. DFCI purchased the building in 1994 for use as office space and substantially renovated the interior.

The Redstone Building at 464 Brookline Avenue was constructed in 1916 as a single-story, automobile garage. The Children's Cancer Research Foundation, the predecessor to the DFCI, purchased the building in 1957 for use as an animal cancer research facility. The building continues to be used for this purpose, housing a vivarium and support space.

The materials enclosed include all required documentation for Article 85 Review, as well as a brief history of both buildings proposed for demolition, pertinent Sanborn Maps, and pertinent building permits from the City of Boston Inspectional Services Department documenting the physical history of the structures. We request a written finding from the Boston Landmarks Commission determining whether the property will be subject to a demolition delay hearing.

Please note that the materials submitted illustrating the proposed building for the site have been submitted and are being reviewed by the Boston Redevelopment Authority under Article 80 of the Boston Zoning Code.

38 Chauncy Street
Suite 200
Boston, Massachusetts 02111-2301
617.728.7777 ■ FAX 617.728.7782
email: info@vhb.com
www.vhb.com

If you have any questions or require additional information, please contact me at (617) 728-7777.

Sincerely,

Howard Moshier

Howard F. Moshier, P.E.
Project Manager

Enclosures

cc: Massachusetts Historical Commission

BOSTONIA. CONDITA A.D. 1630.

Please hand
carry or mail to:
Boston City Hall, Room 805
Boston, MA 02201
DO NOT RETURN THIS FORM BY FAX
FAXED APPLICATIONS WILL BE REJECTED

APPLICATION
ARTICLE 85 REVIEW

For BLC Use Only
APPLICATION NO.:______
DATE RECEIVED:______
HEARING DATE:______

I. ADDRESS 454 and 464 Brookline Avenue, Boston, MA 02115 (Longwood Medical Area) (include neighborhood)

II. APPLICANT Dana-Farber Cancer Institute PHONE______

ADDRESS 44 Binney Street, Boston, MA ZIP CODE 02115
(include city or town)

PROPERTY OWNER Dana-Farber Cancer Institute PHONE______

ADDRESS 44 Binney Street, Boston, MA ZIP CODE 02115
(include city or town)

DOES THIS PROPOSED PROJECT REQURIE ZONING RELIEF? No

III. DESCRIPTION OF PROPOSED WORK: briefly summarize the scope of work. Additional pages may be attached, if necessary, to provide more detailed information, but **a brief outline of the proposed work must be given in the space provided below**. This description provides the basis for the official notice and subsequent decision, and it must clearly represent the entirety of the project.

he Dana-Farber Cancer Institute (DFCI) is proposing to construct a new building on the Dana-Farber main campus at the ersection of Brookline Avenue and Jimmy Fund Way, hereafter to be designated as 450 Brookline Avenue. A new ucture will be built on a site currently consisting of two parcels of land. The site currently holds the single-story edstone Building at 464 Brookline Avenue, a two-story building at 454 Brookline Avenue, and as mall 30-space surface king lot. DFCI proposes to demolish these structures and construct an 13-story building of approximately 275,000 GSF f above grade space with approximately 455 underground parking spaces. Included in the project are a tunnel below ımy Fund Way to connect patients and staff with the clinical facilities in the adjacent Dana Building and pedestrian dge connections to the adjacent Smith Laboratories Building. 450 Brookline Avenue will provide urgently needed utpatient clinical space as well a s state-of-the-art research laboratories necessary for Dana-Farber to accommodate panding clinical service volume and leading-edge research to understand and develop cures for various forms of cancer.

IV. DOCUMENTATION: Required documentation must be submitted with this application to receive a hearing date. **Failure to include adequate documentation will cause a delay in the review process and may result in a rejected application.** A list of required documentation has been provided with this packet.

V. NOTARIZED SIGNATURES **(both required) Unsigned or partially signed forms will be rejected.**

Applicant: Richard M. Shea Jr. Owner*/Landlord: Richard M. Shea Jr.

***(If building is a condominium or cooperative, the chairman must sign.)**

Notary DAVID S. EPPSTEIN My commission
David S. Eppstein expires July 31, 2009

History of 454 and 464 Brookline Avenue

The following information was compiled using City of Boston Inspectional Services Building Permit files for 454 Brookline Avenue and 464 Brookline Avenue and Sanborn Map Company fire insurance maps. Relevant building permits and Sanborn maps are included in the review materials following this section.

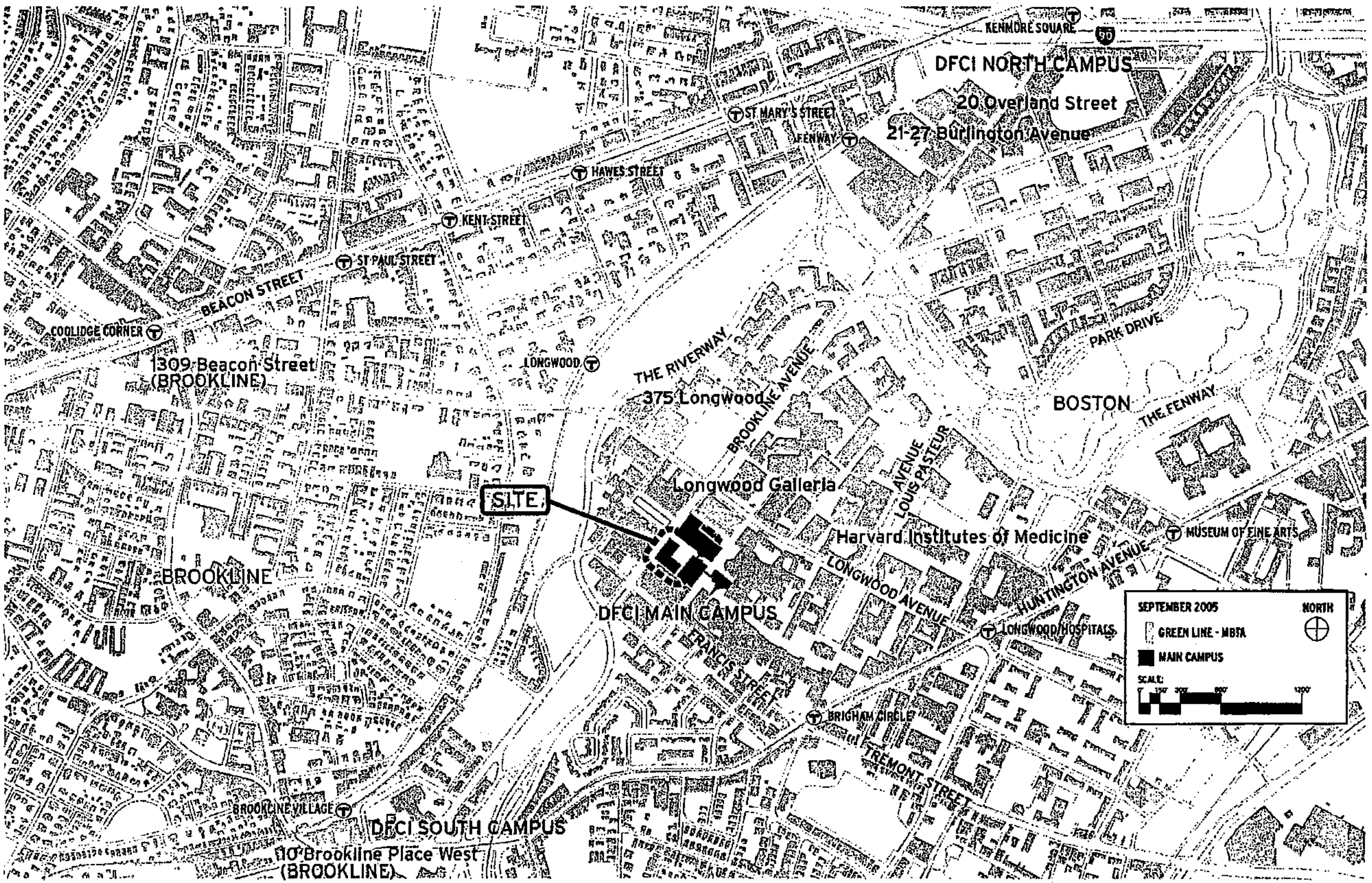
The building at **454 Brookline Avenue** was constructed in 1923 by a partnership called Dankar & Donohue as a single-story, public automobile garage. In 1954, a dwelling behind the building was demolished to create the present parking area. A partnership called the New Brookline Avenue Medical Building Inc. purchased the building in 1956 and renovated it for use as medical offices. Renovations included construction of a second story and a concrete and metal veneer on the exterior of the building. The Dana Farber Cancer Institute (DFCI) and the Children's Hospital Medical Center leased space in the building between the late 1950s and the early 1990s. In 1994, DFCI purchased the building from then owner Children's Hospital for use as office space. The building underwent substantial interior renovations after the 1994 purchase.

The **Redstone Building** at 464 Brookline Avenue was constructed in 1916 by a partnership named Rotman & Abrams as a single-story automobile garage.[1] Called the Brookline Avenue Garage, the building was variously used as a garage, auto sales room, and plumbing supply warehouse from the 1920s through the early 1950s. In 1957, the Children's Cancer Research Foundation, the predecessor to the DFCI, purchased the building for use as an animal research facility. The building continues to be used for this purpose, housing a vivarium and support space. The building underwent substantial interior renovations in 1977 and 1990.

[1] Currently addressed as 464 Brookline Avenue, the Redstone Building has historically been addressed as 462 and 462-464 Brookline Avenue.

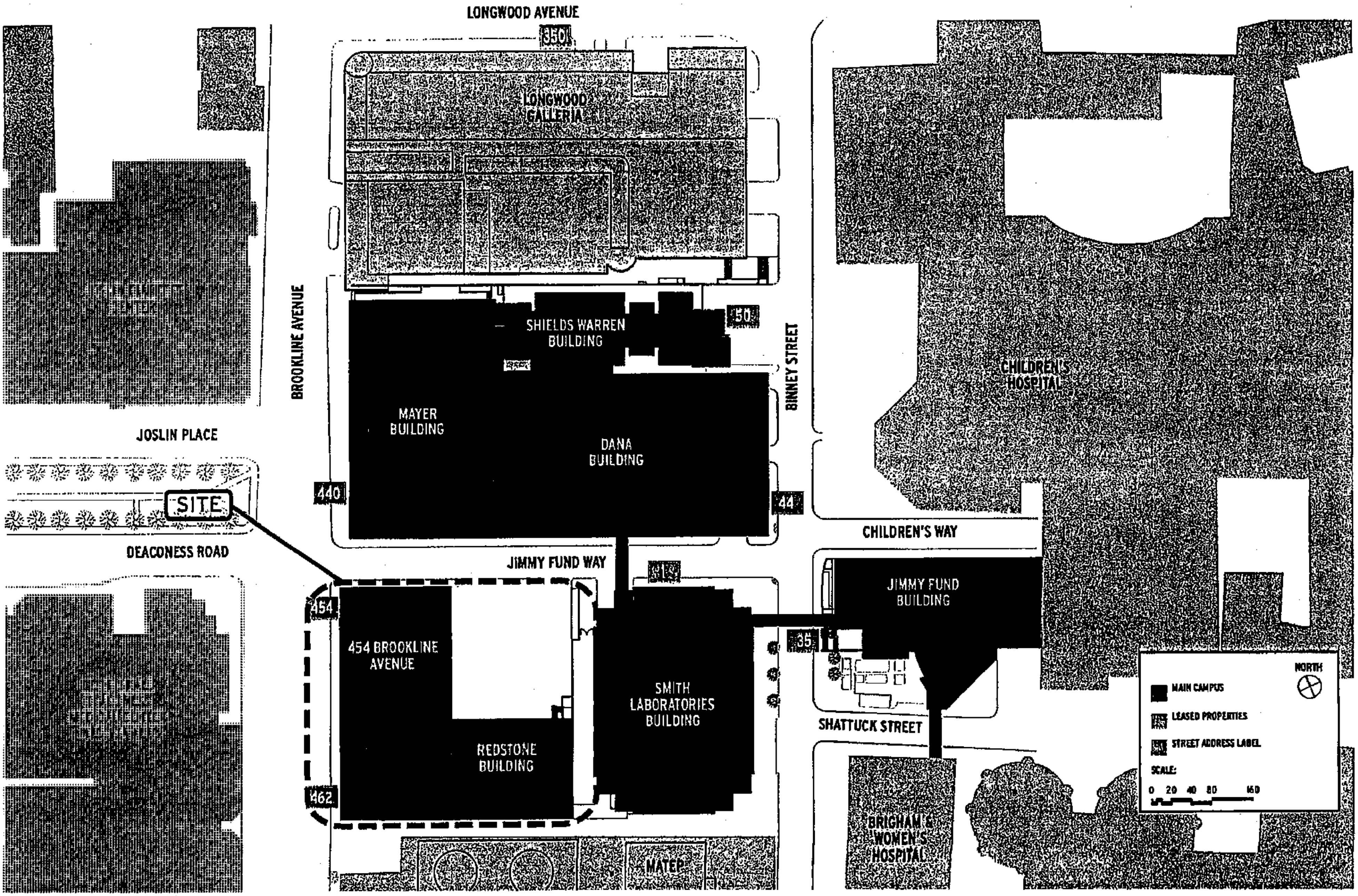
Relevant City of Boston Building Permits

454 Brookline Avenue



DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

PROJECT LOCUS



DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

EXISTING MAIN CAMPUS

History of 454 and 464 Brookline Avenue

The following information was compiled using City of Boston Inspectional Services Building Permit files for 454 Brookline Avenue and 464 Brookline Avenue and Sanborn Map Company fire insurance maps. Relevant building permits and Sanborn maps are included in the review materials following this section.

The building at **454 Brookline Avenue** was constructed in 1923 by a partnership called Dankar & Donohue as a single-story, public automobile garage. In 1954, a dwelling behind the building was demolished to create the present parking area. A partnership called the New Brookline Avenue Medical Building Inc. purchased the building in 1956 and renovated it for use as medical offices. Renovations included construction of a second story and a concrete and metal veneer on the exterior of the building. The Dana Farber Cancer Institute (DFCI) and the Children's Hospital Medical Center leased space in the building between the late 1950s and the early 1990s. In 1994, DFCI purchased the building from then owner Children's Hospital for use as office space. The building underwent substantial interior renovations after the 1994 purchase.

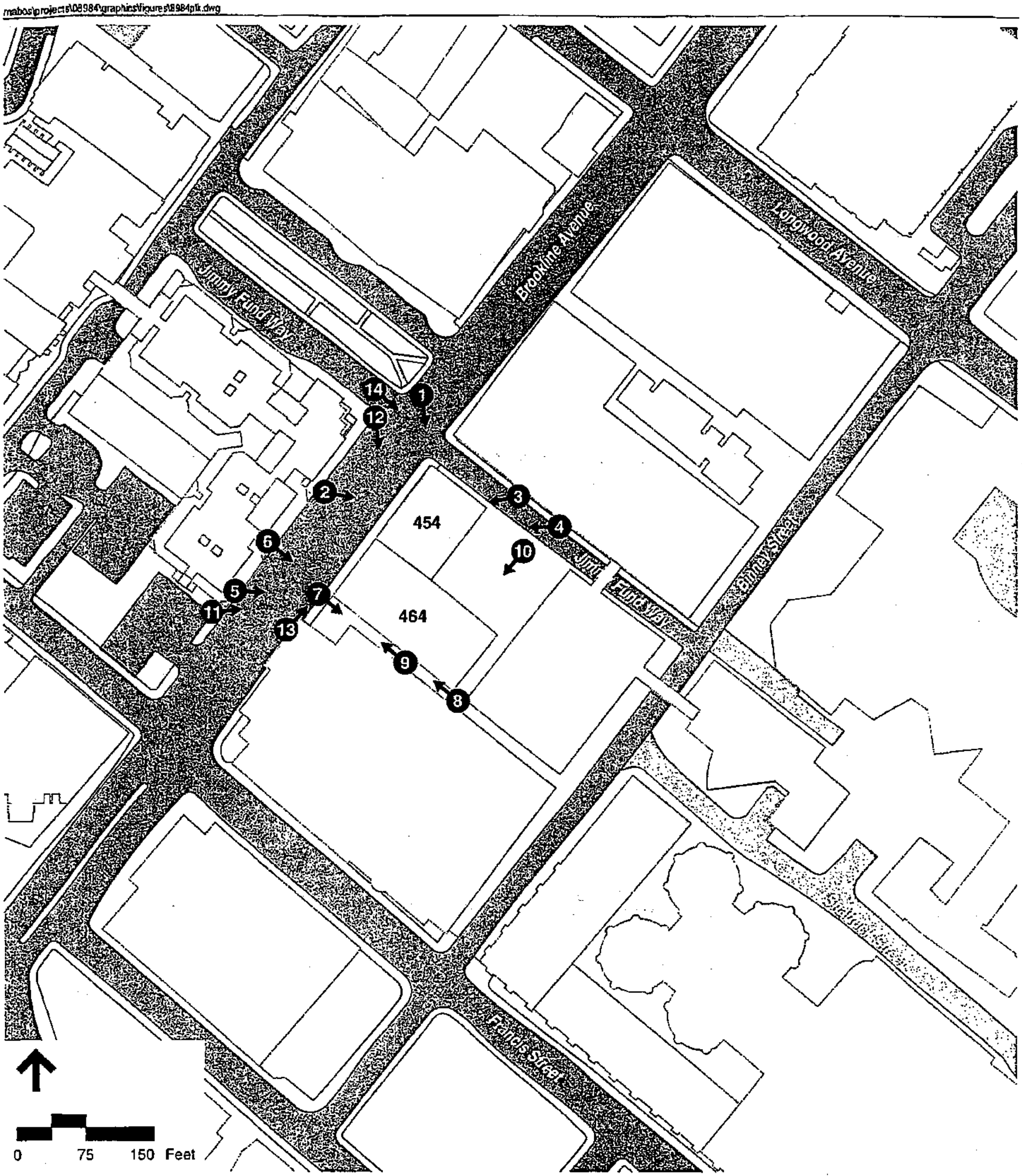
The **Redstone Building** at 464 Brookline Avenue was constructed in 1916 by a partnership named Rotman & Abrams as a single-story automobile garage.[1] Called the Brookline Avenue Garage, the building was variously used as a garage, auto sales room, and plumbing supply warehouse from the 1920s through the early 1950s. In 1957, the Children's Cancer Research Foundation, the predecessor to the DFCI, purchased the building for use as an animal research facility. The building continues to be used for this purpose, housing a vivarium and support space. The building underwent substantial interior renovations in 1977 and 1990.

[1] Currently addressed as 464 Brookline Avenue, the Redstone Building has historically been addressed as 462 and 462-464 Brookline Avenue.

Photographs and Photograph Key

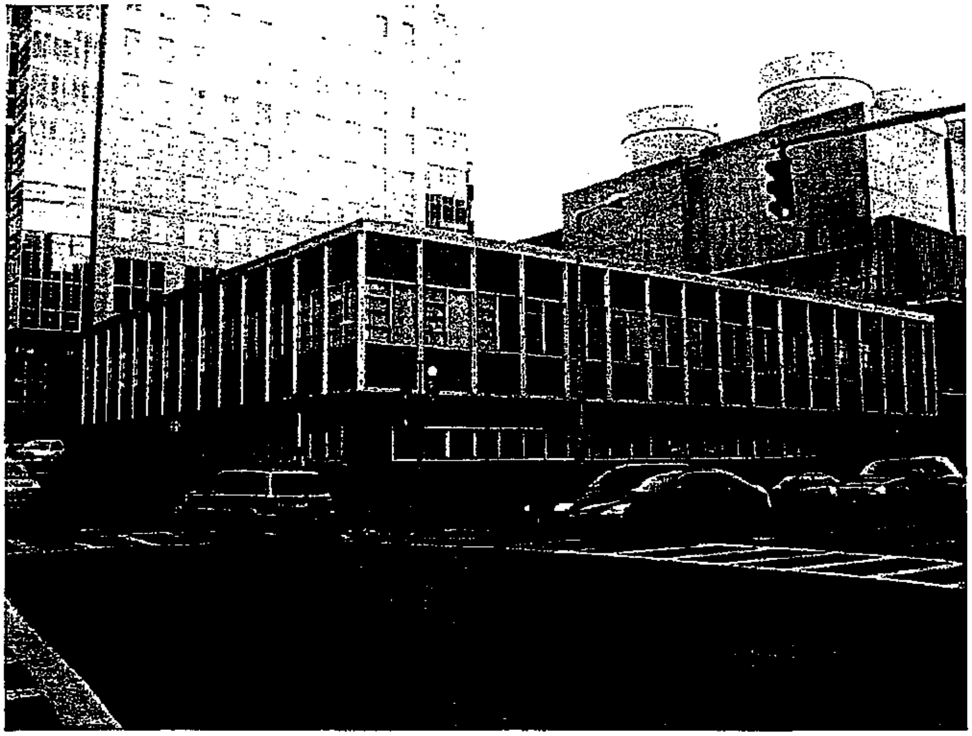
Photographs taken December 7, 2005

mabos\projects\08984\graphics\figures\8984plk.dwg



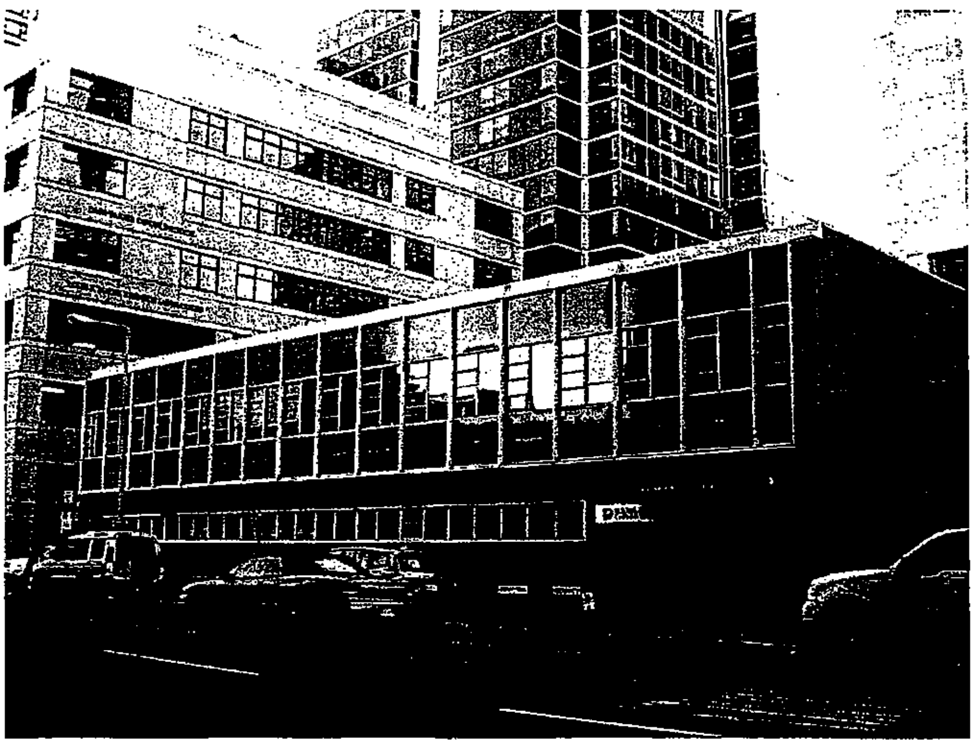
Photograph Location Key

Dana-Farber Cancer Institute
450 Brookline Avenue



1

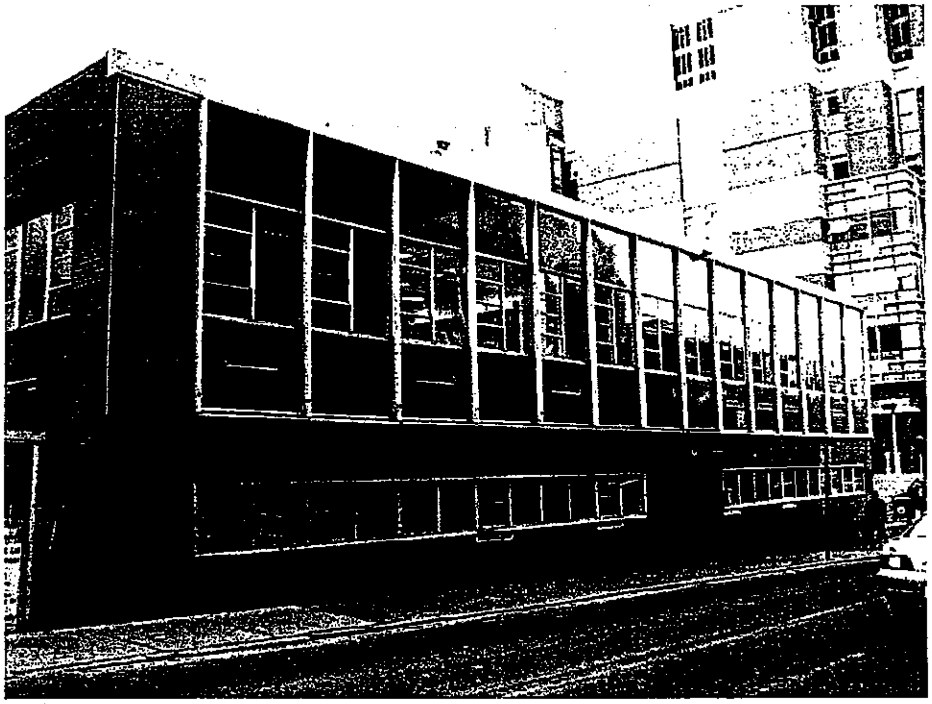
454 Brookline Avenue, north and west elevations from Brookline Avenue



2

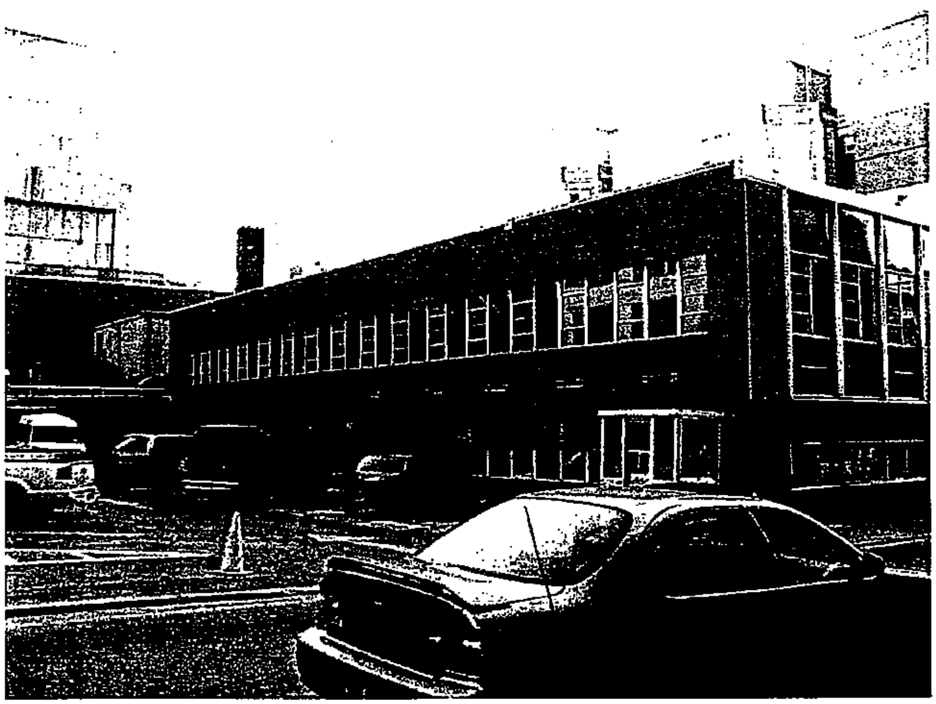
454 Brookline Avenue, west elevation from Brookline Avenue

3

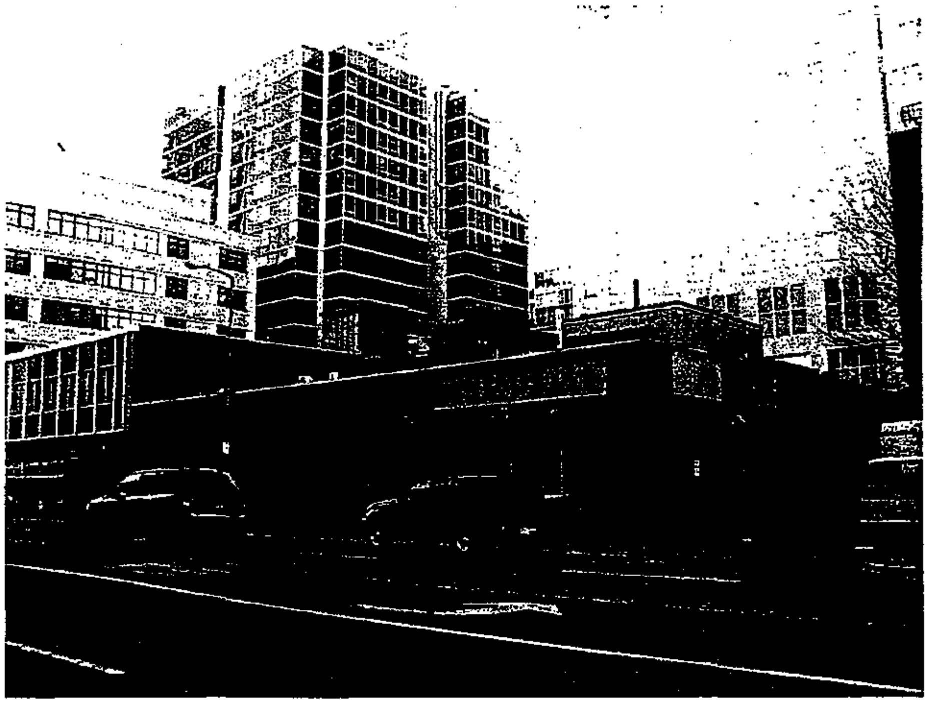


454 Brookline Avenue, north elevation from Jimmy Fund Way

4

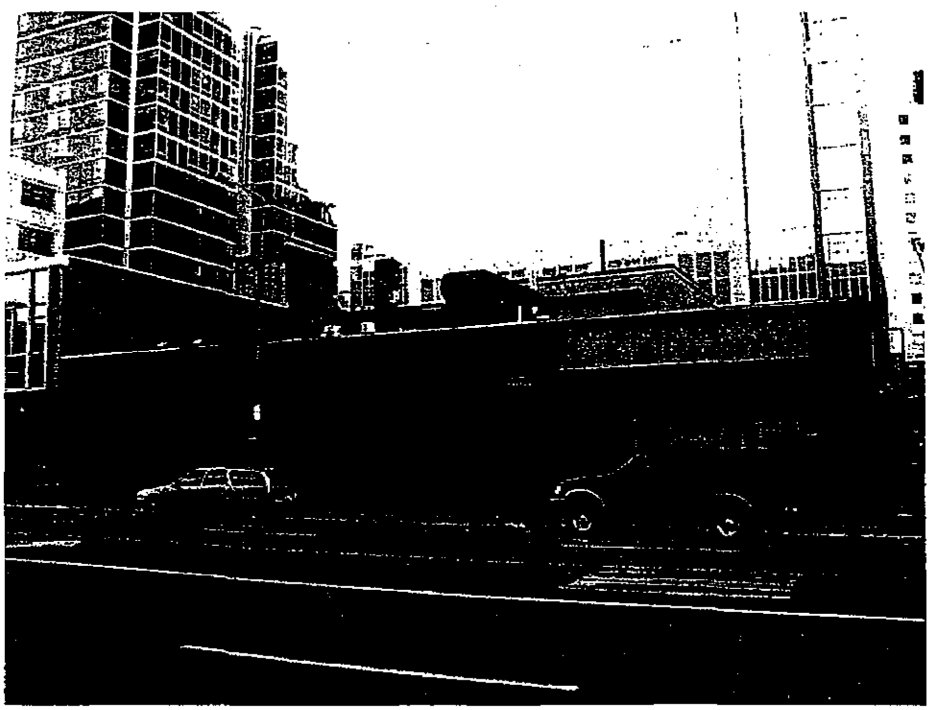


454 Brookline Avenue, east (rear) elevation from Jimmy Fund Way



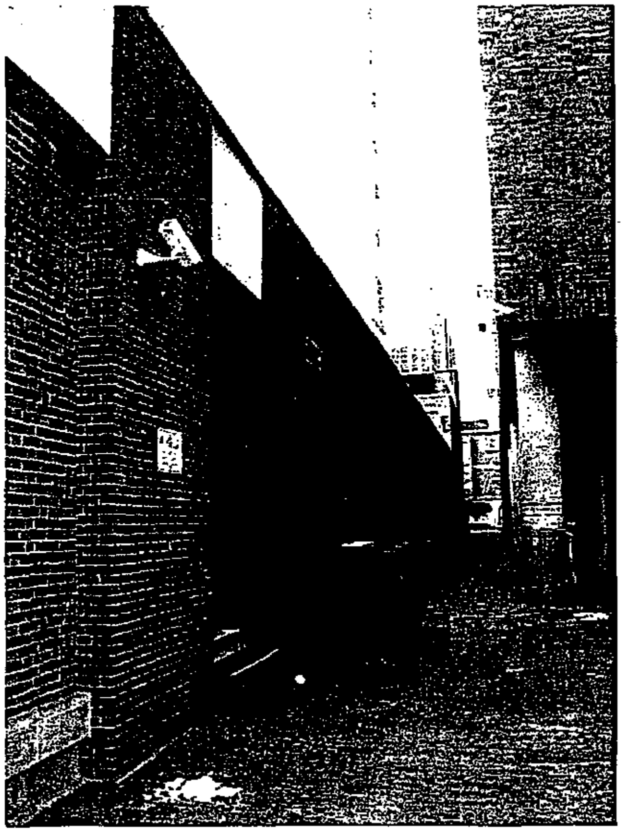
5

464 Brookline Avenue, west and south elevations from Brookline Avenue



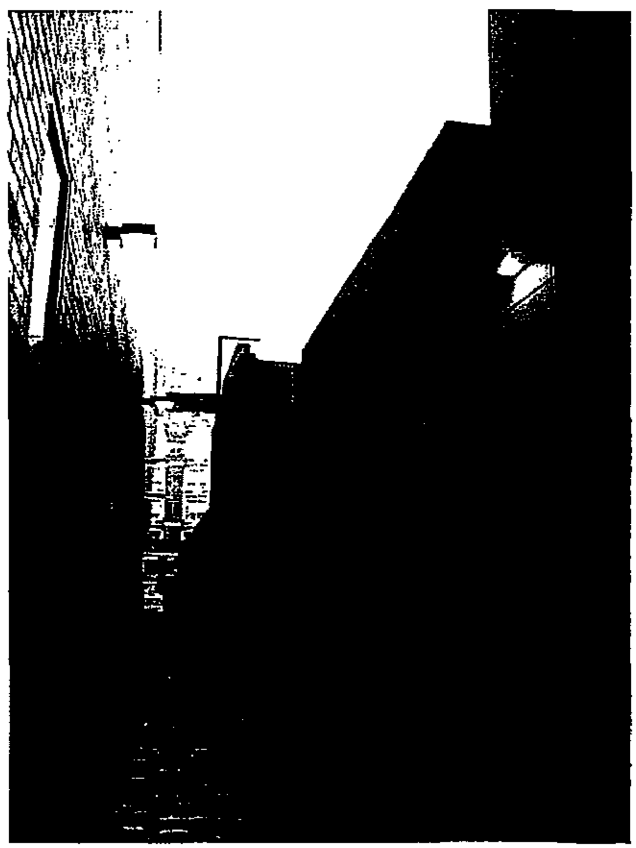
6

464 Brookline Avenue, west elevation (façade) from Brookline Avenue



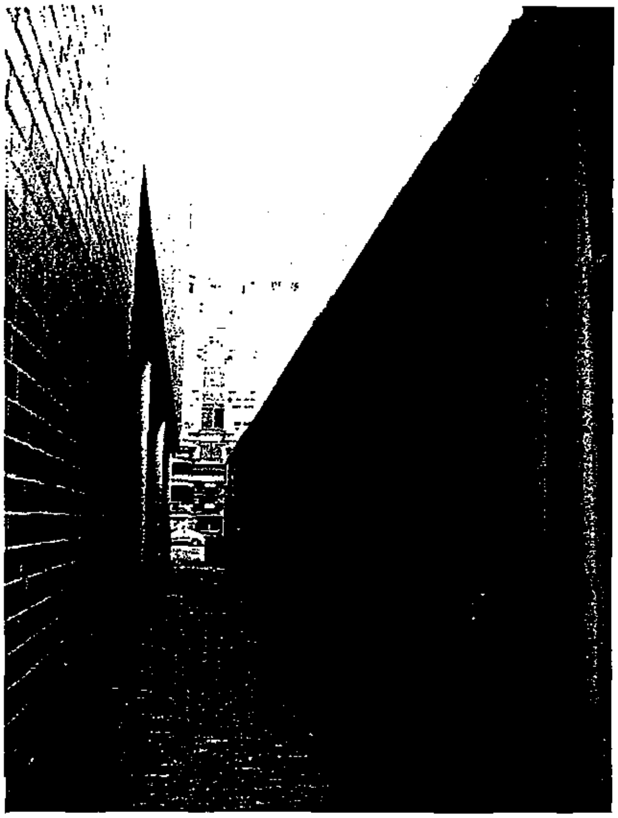
7

464 Brookline Avenue, south elevation from Brookline Avenue



8

464 Brookline Avenue, south elevation from Binney Street



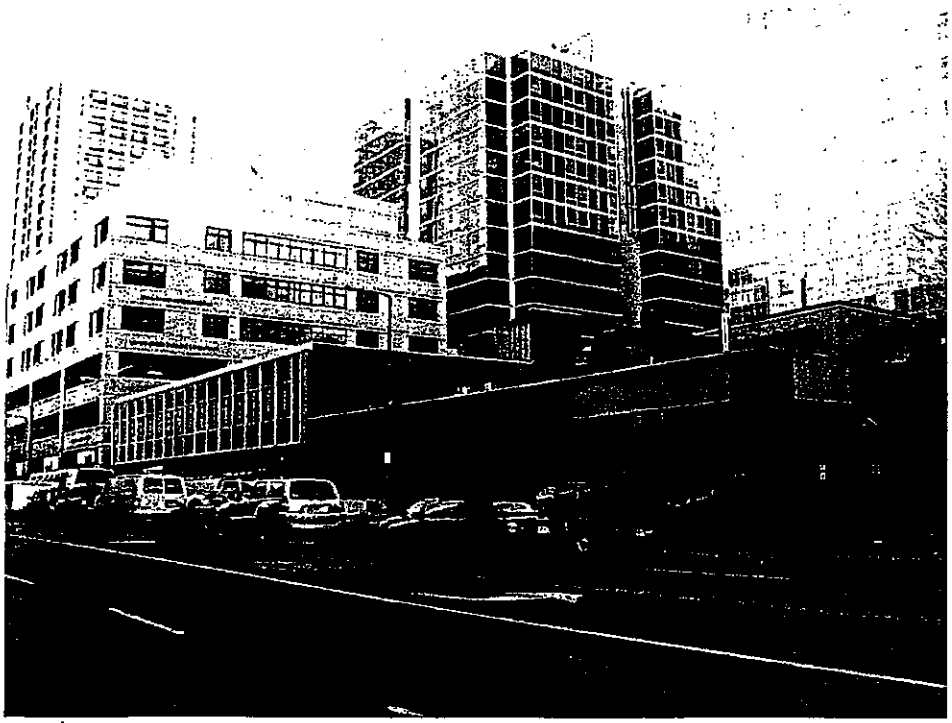
9

464 Brookline Avenue, south elevation (at right) from Binney Street

10

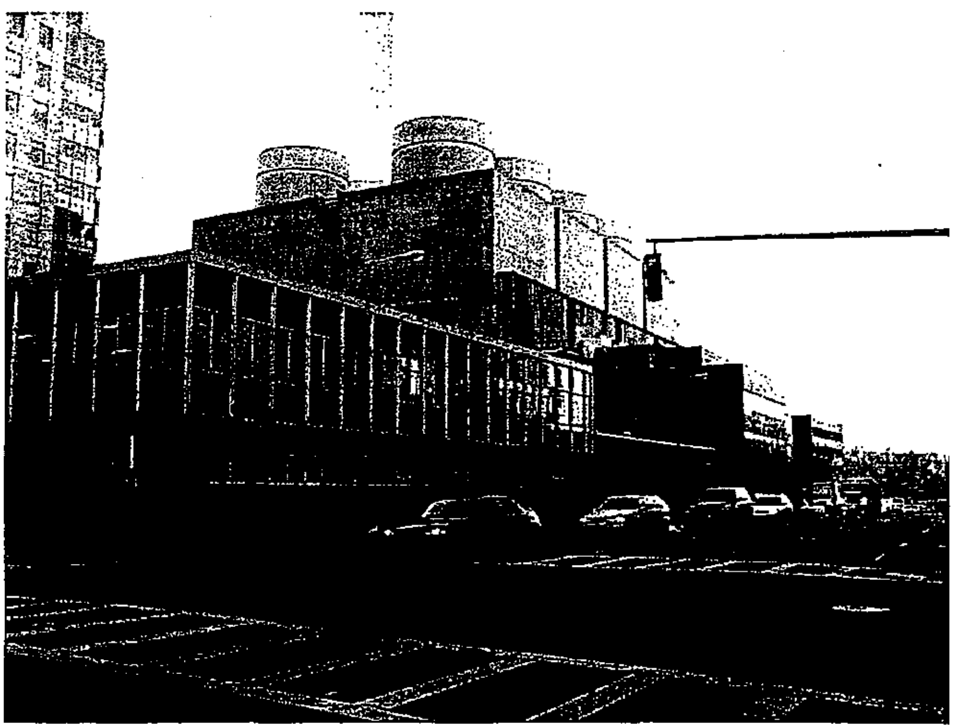
464 Brookline Avenue, north elevation (foreground with mechanicals) from Jimmy Fund Way

11



454 and 464 Brookline Avenue looking northeast along Brookline Avenue

12



454 and 464 Brookline Avenue looking southwest along Brookline Avenue

13

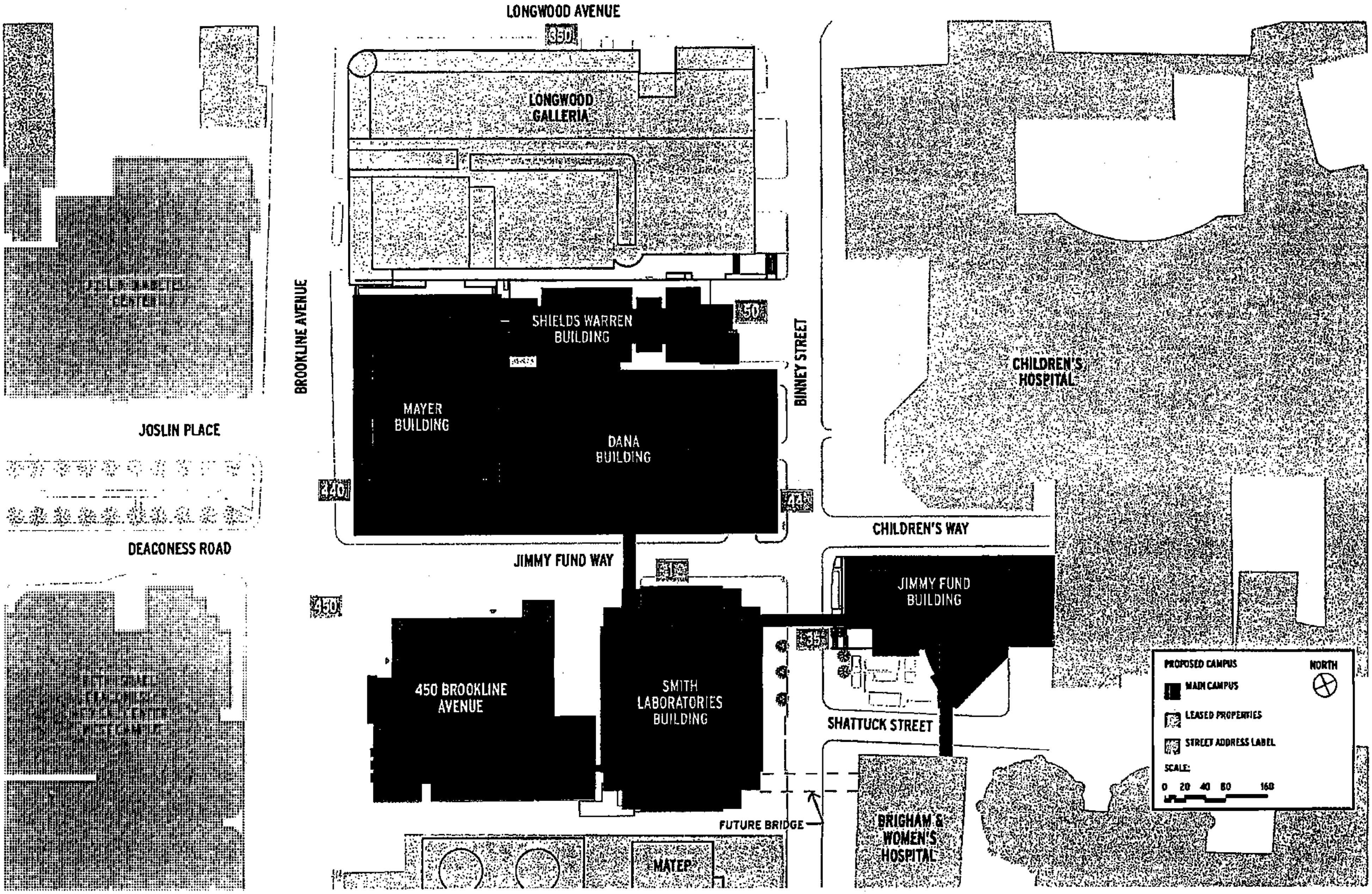
464 and 454 Brookline Avenue (at right) looking northeast along Brookline Avenue

14

454 Brookline Avenue looking east along Jimmy Fund Way

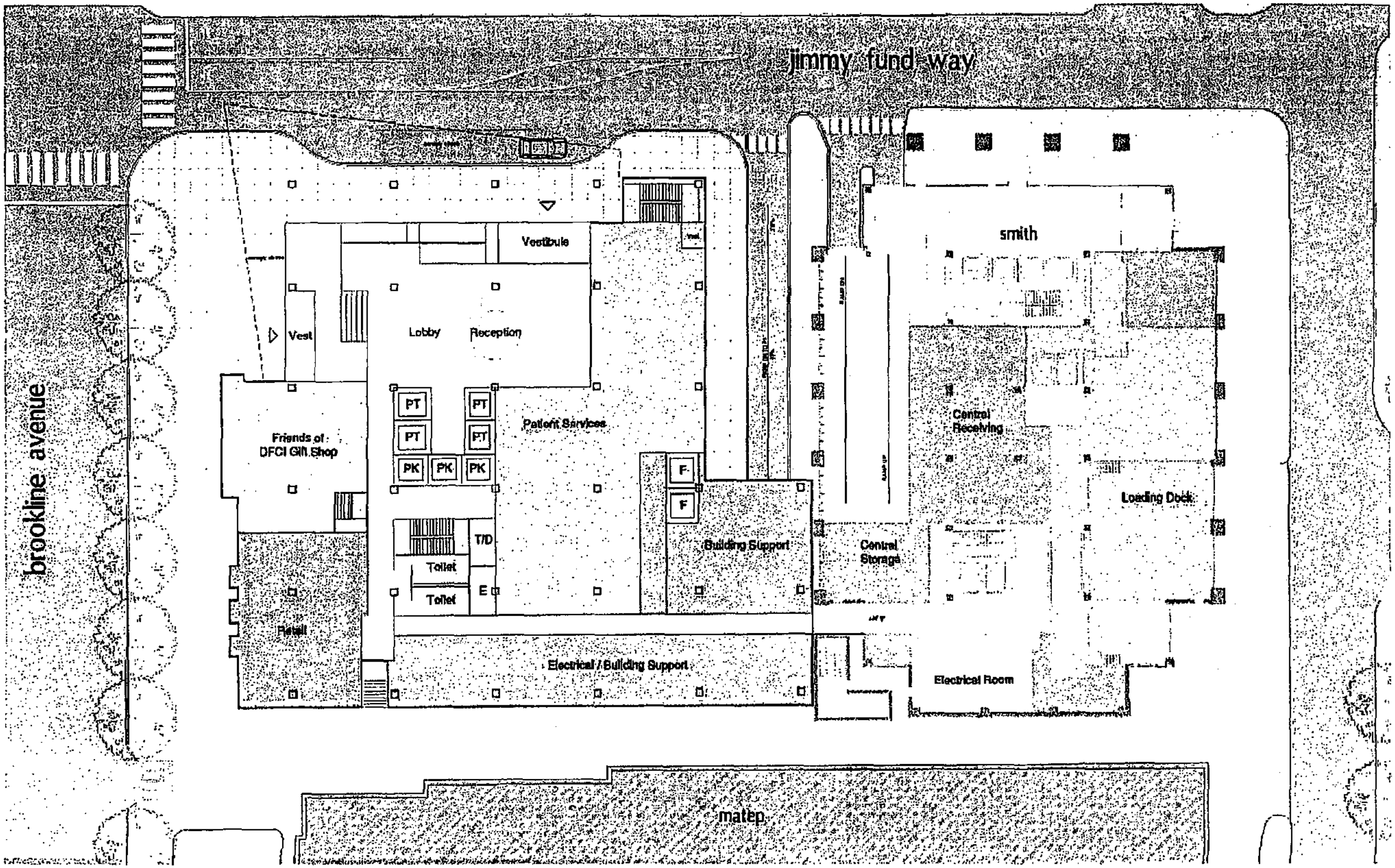
450 Brookline Avenue
Preliminary Plans and Elevations

Note: The materials illustrating the proposed building at 450 Brookline Avenue are preliminary and have not been reviewed by the Boston Redevelopment Authority under Article 80 of the Boston Zoning Code. A Project Notification Form with updated information on the proposed building was submitted to the BRA in March 2006.



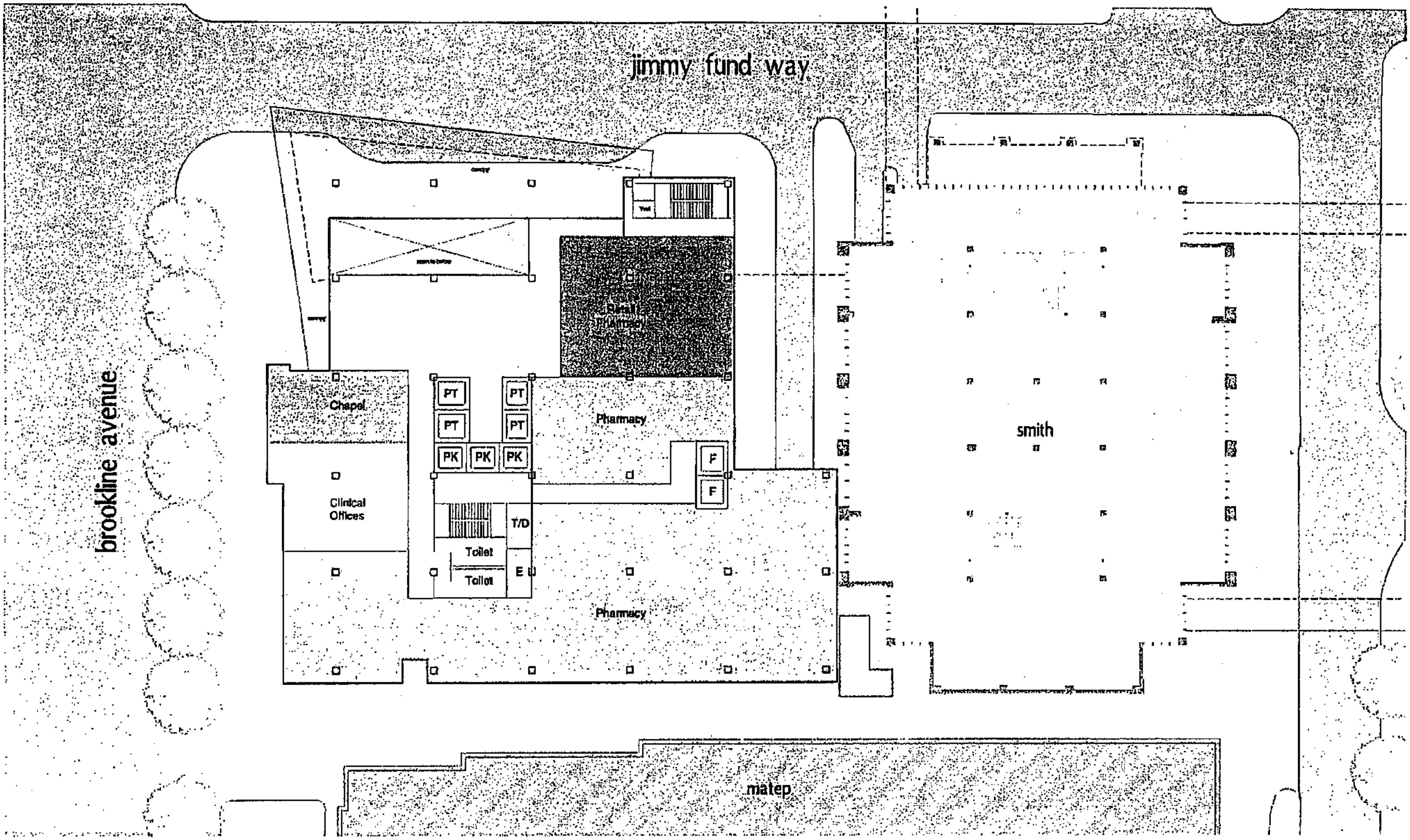
DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

PROPOSED CAMPUS



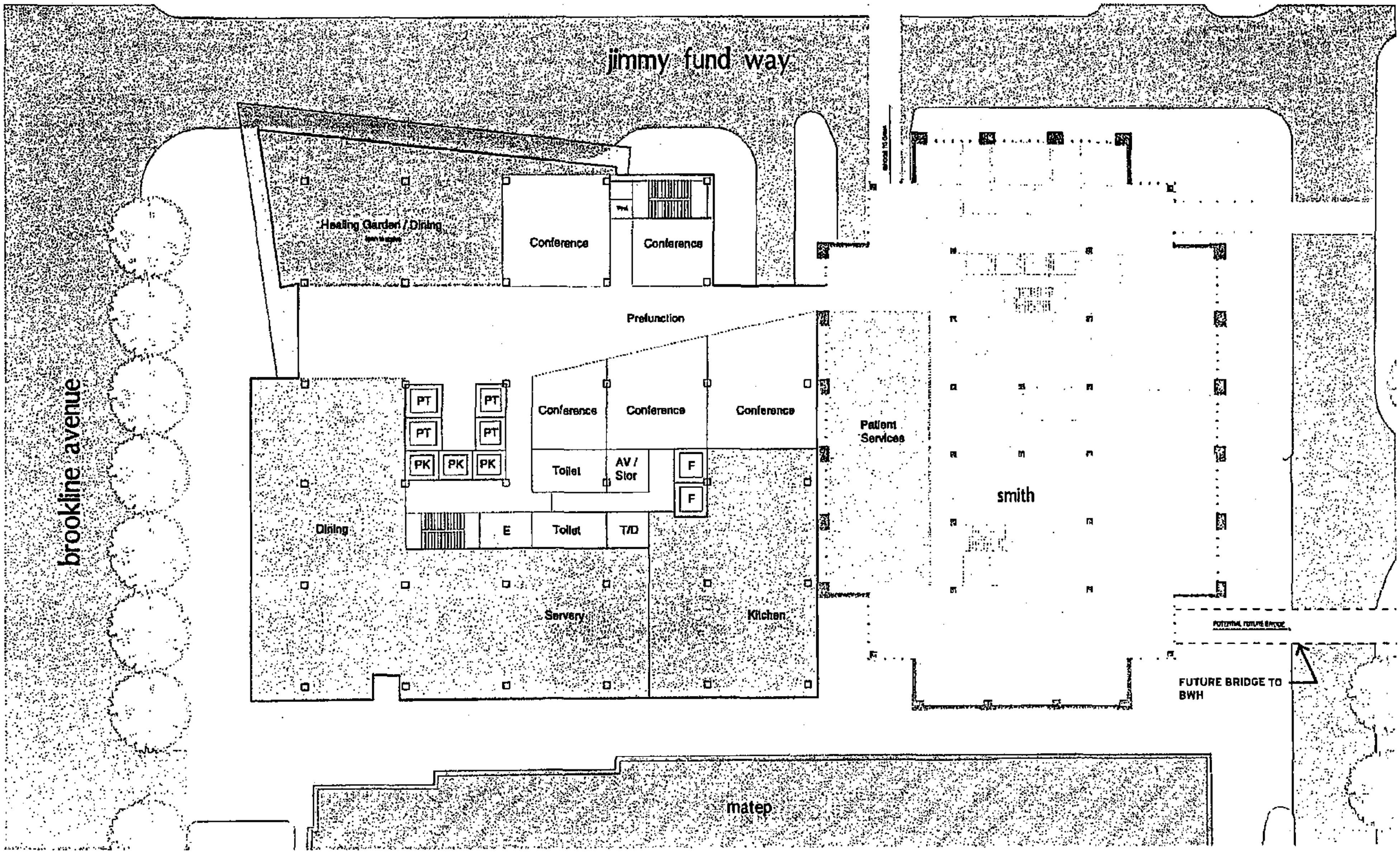
DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

GROUND FLOOR LEVEL



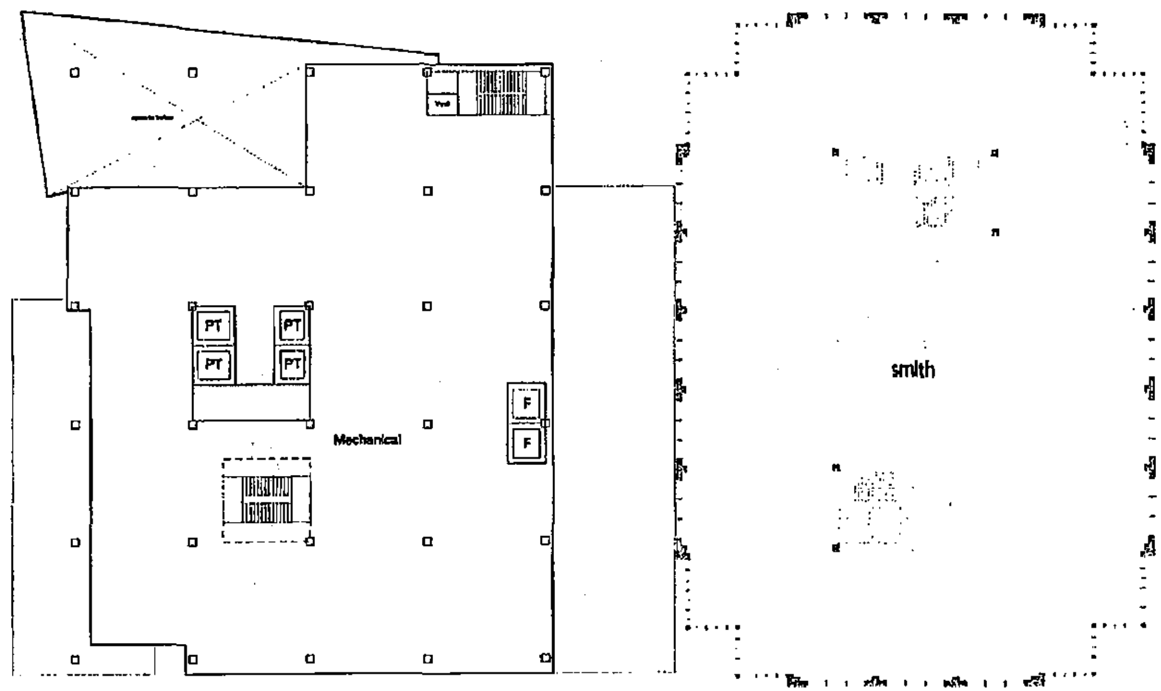
DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

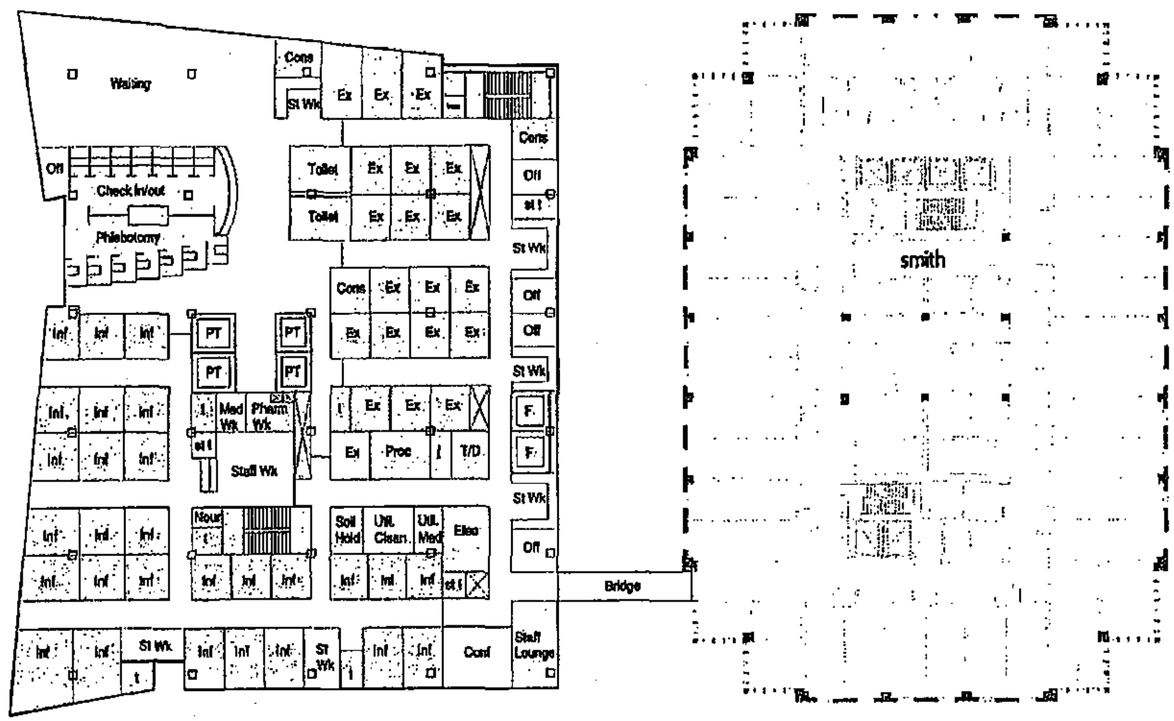
SECOND LEVEL



DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

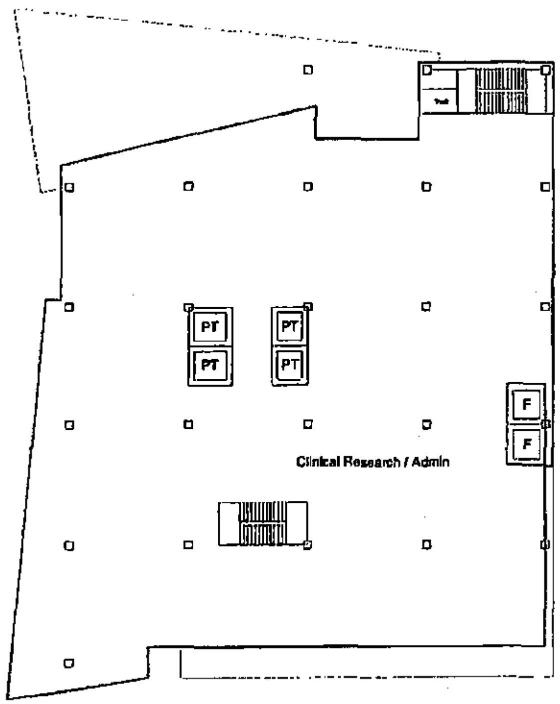
THIRD LEVEL


PT
PT
PT
PT
Mechanical
F
F
smith

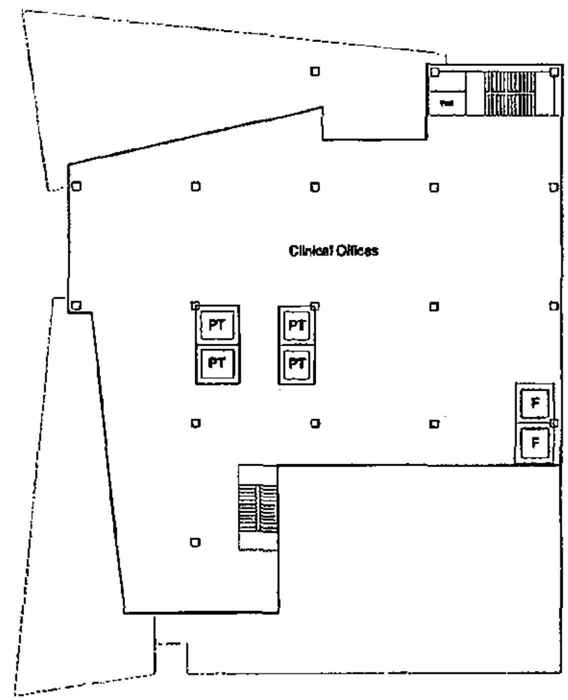


DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

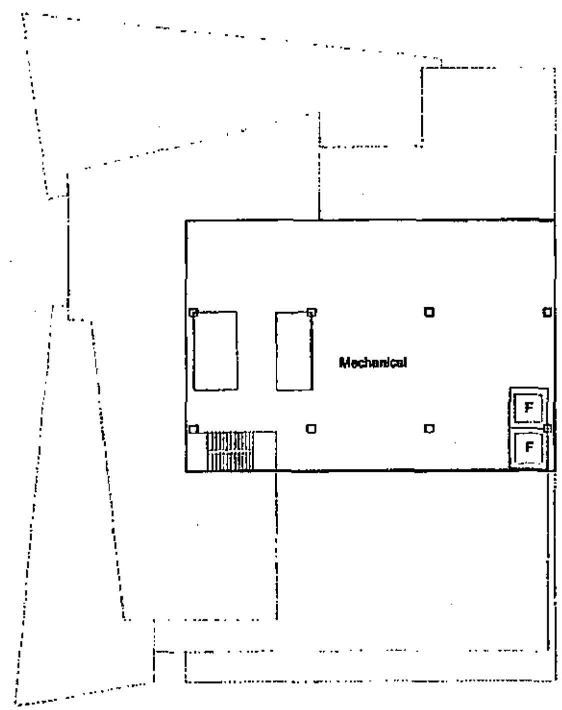
TYPICAL CLINIC FLOOR - LEVELS 5-10



11TH FLOOR

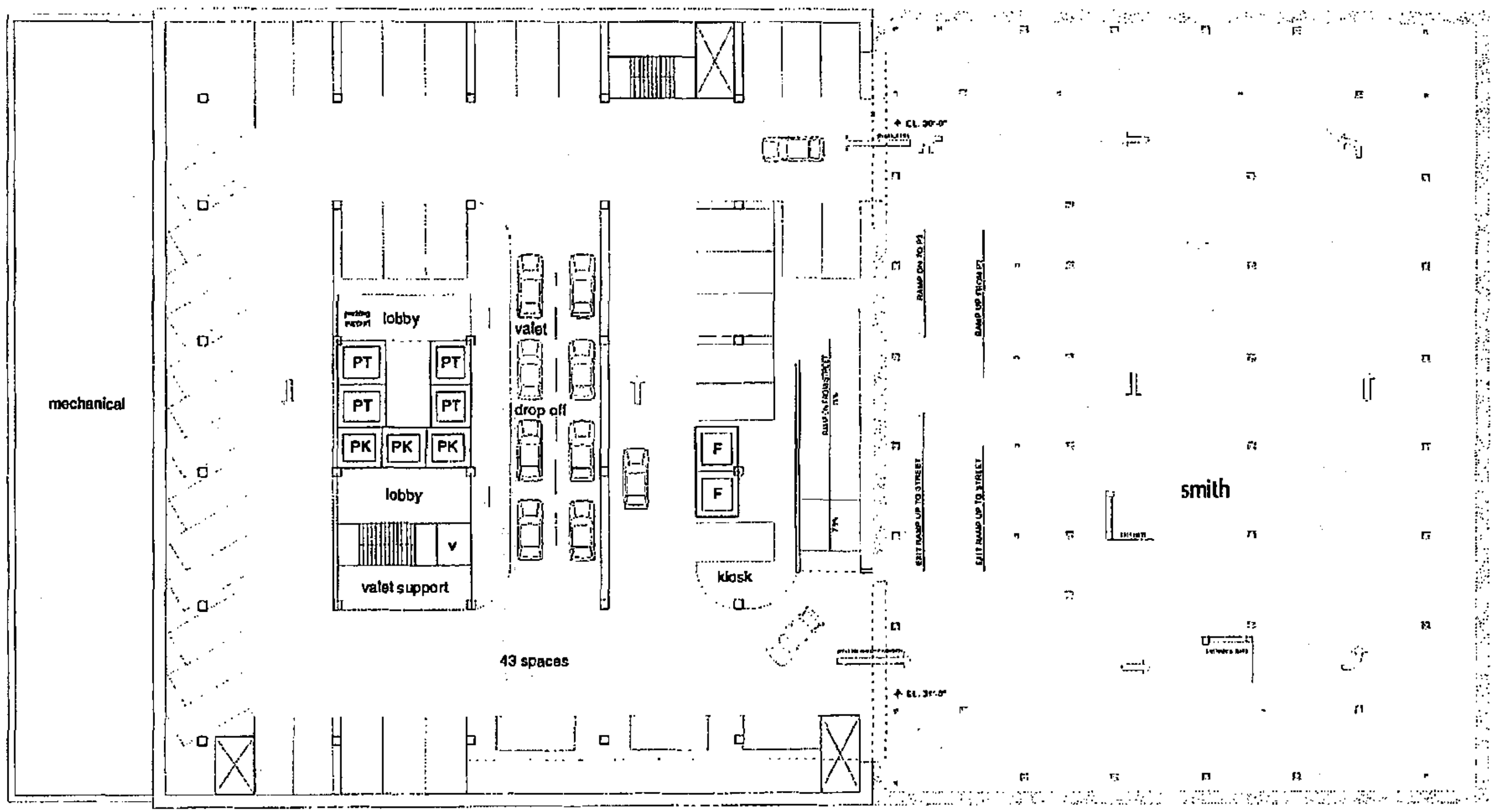


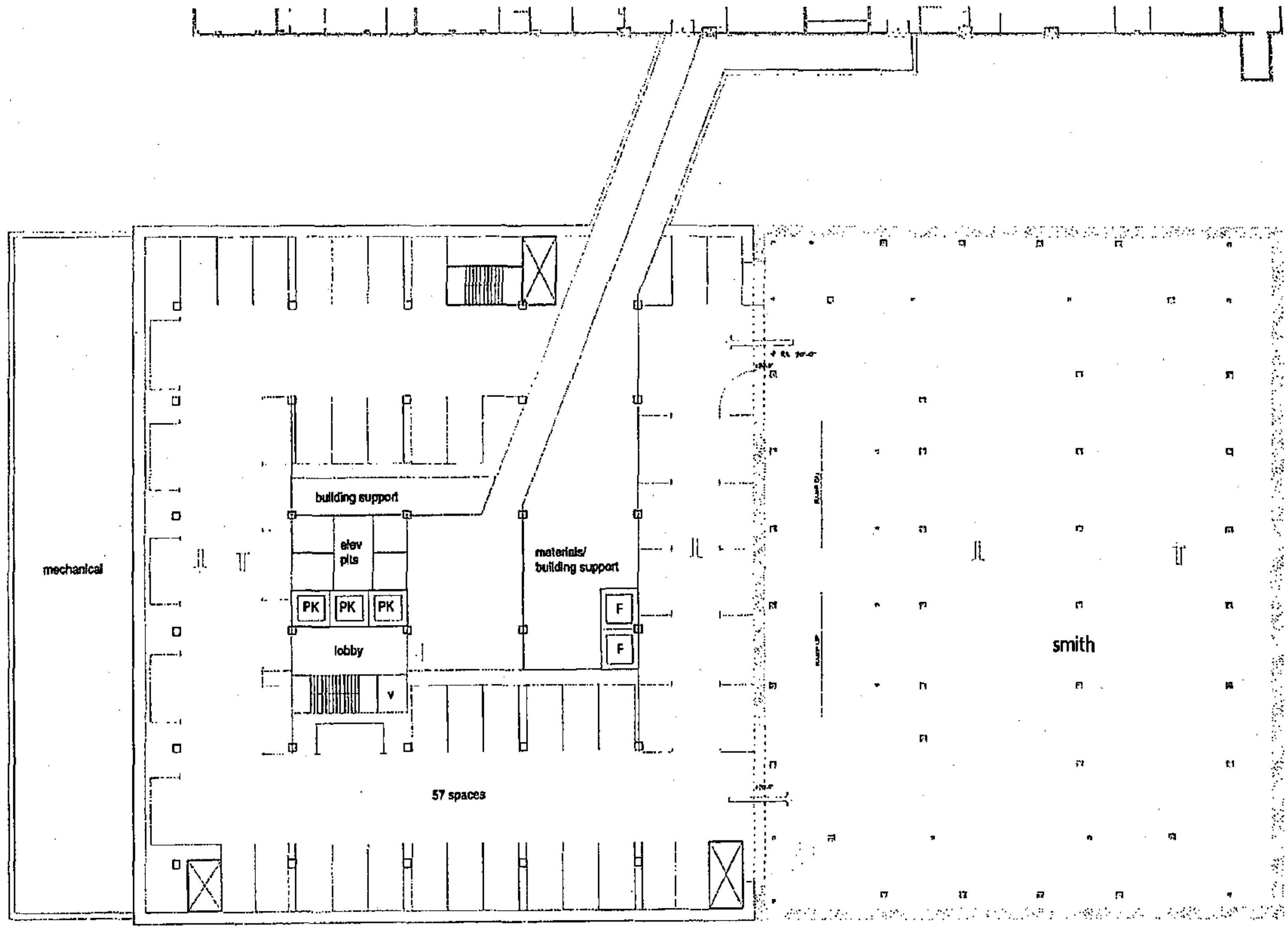
12-13 FLOORS



DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

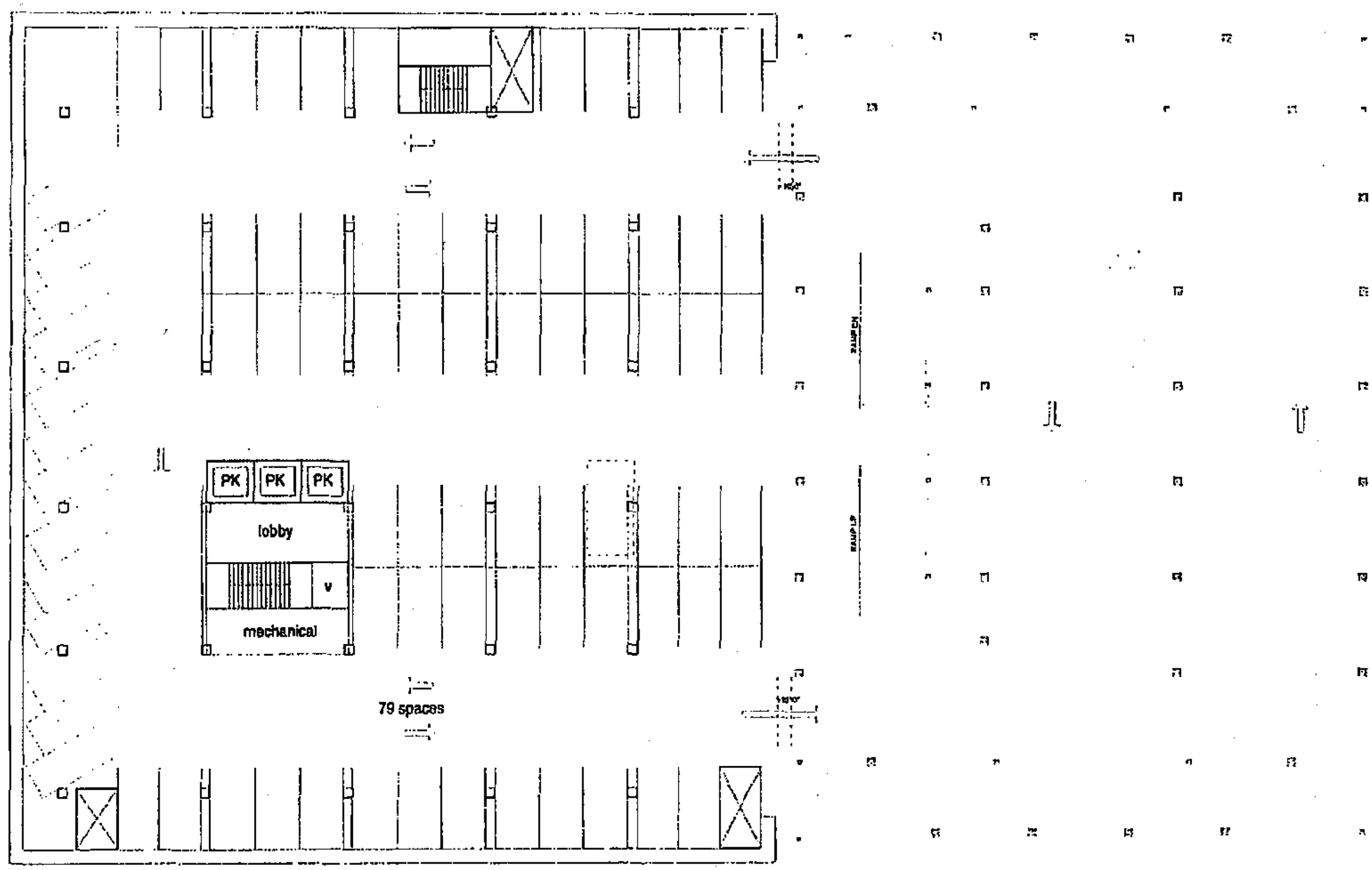
PENTHOUSE


mechanical
lobby
PT
PT
PT
PT
PK
PK
PK
lobby
V
valet support
valet
drop off
F
F
kiosk
43 spaces
smith



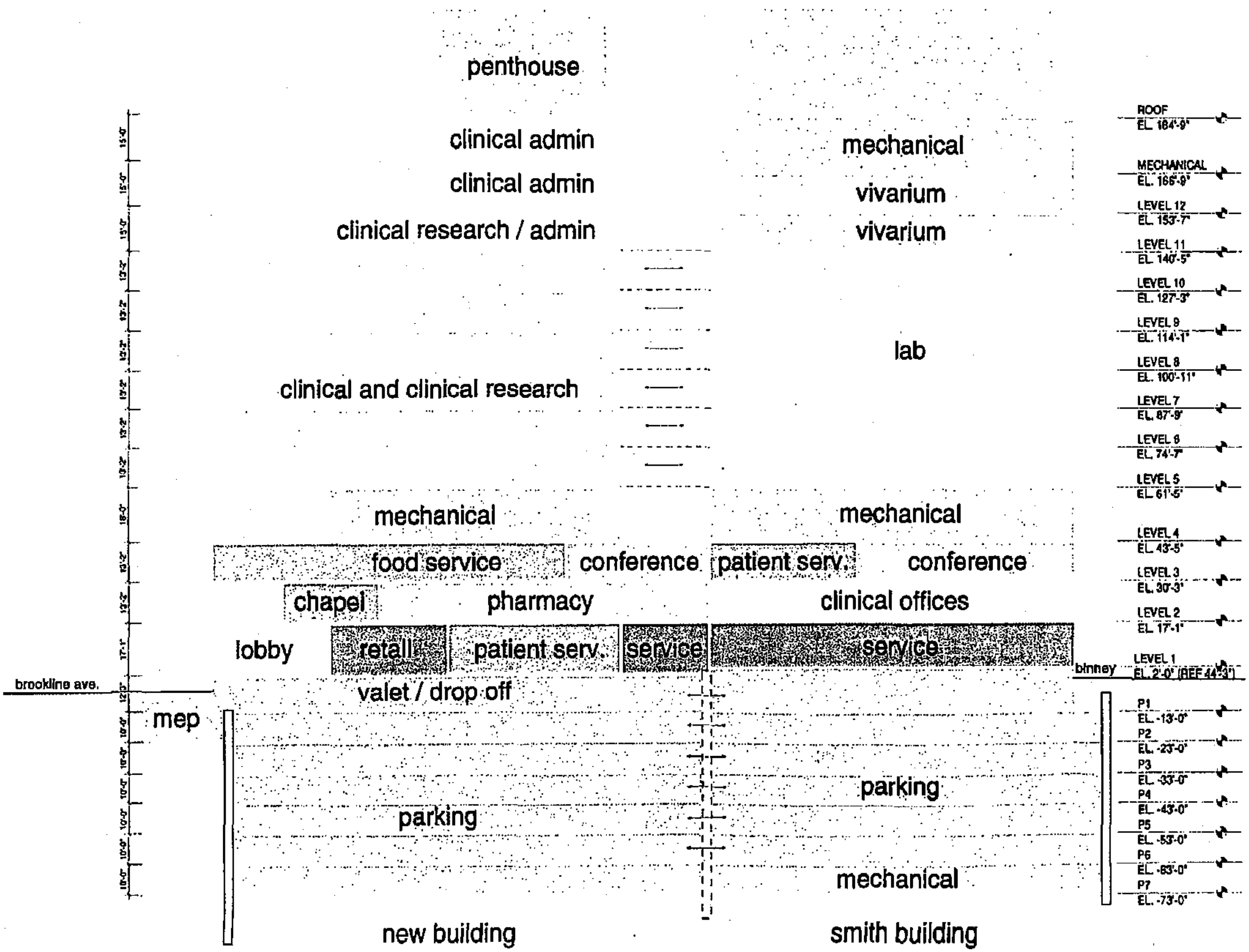
DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

PARKING LEVEL P2



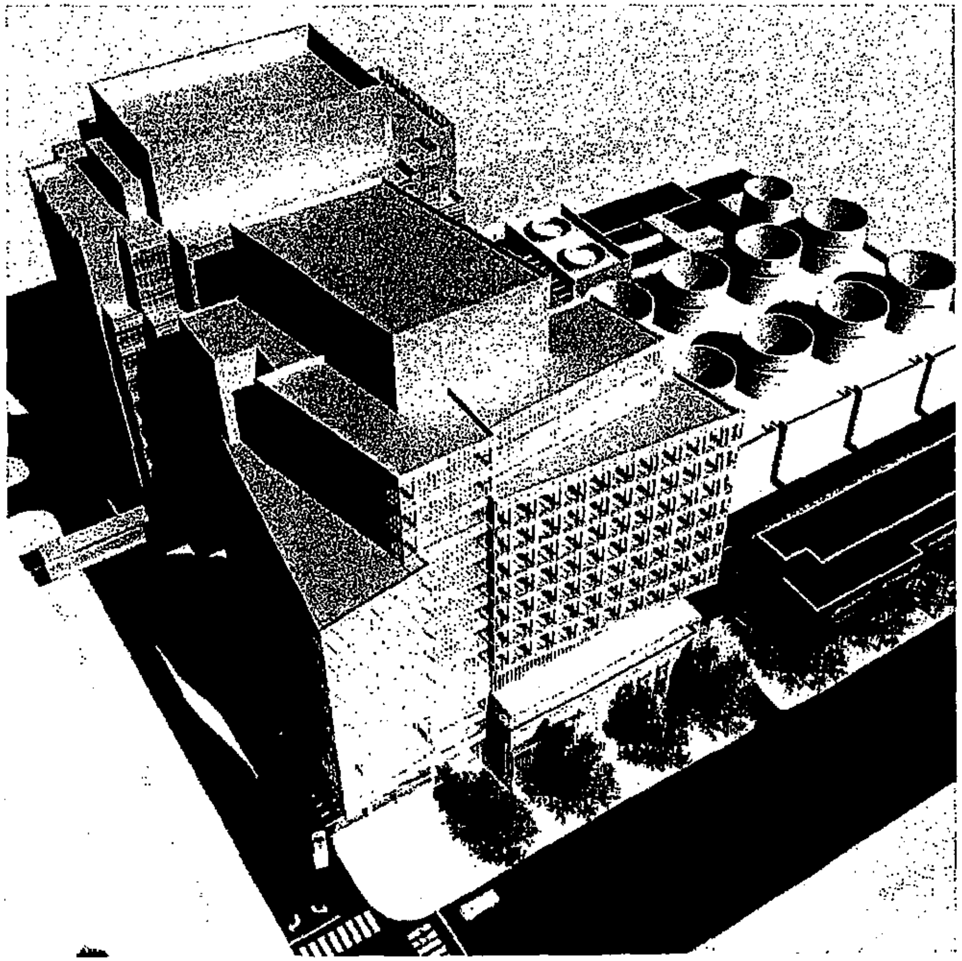
DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

TYPICAL PARKING LEVEL

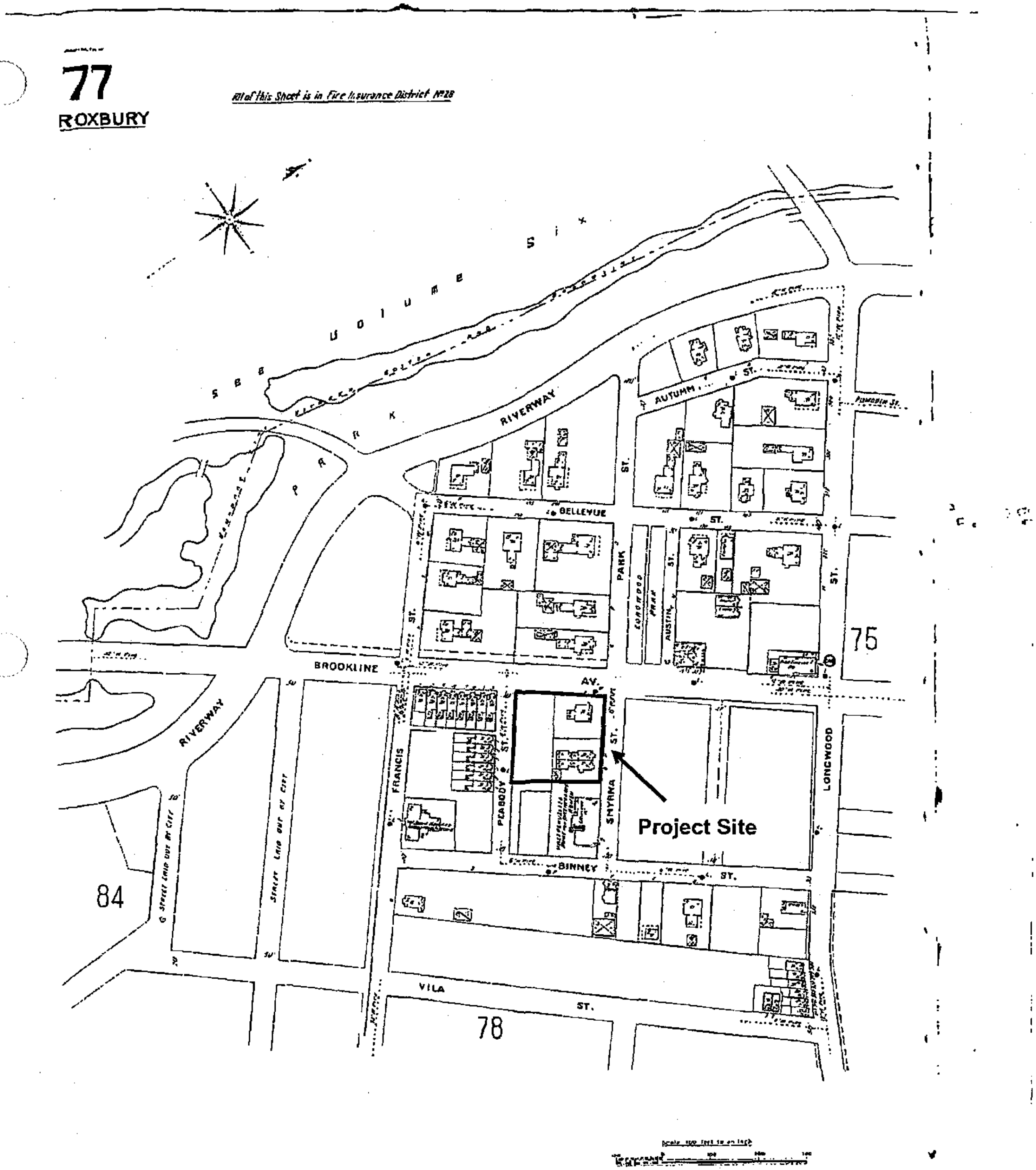


DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

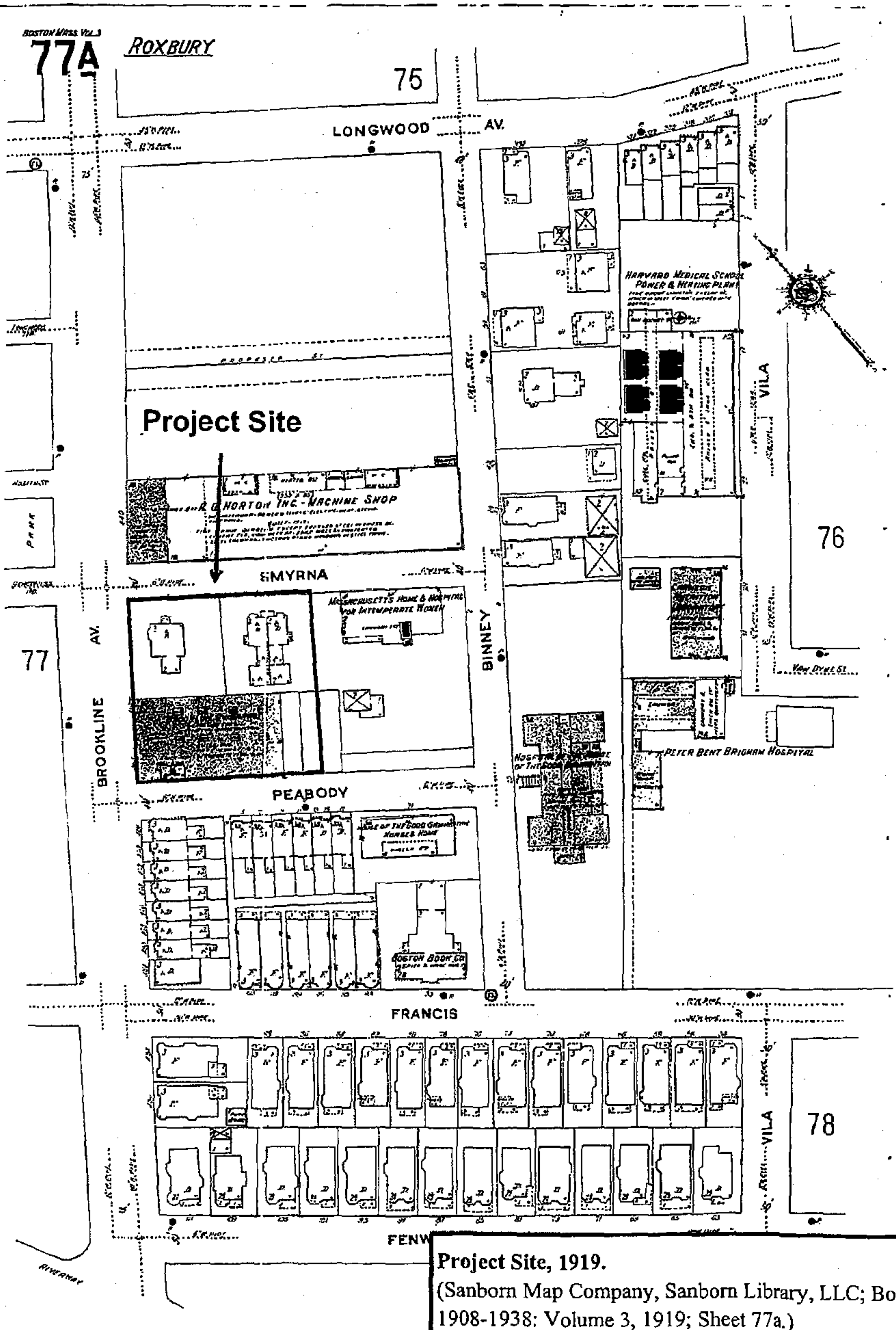
BUILDING STACKING SECTION



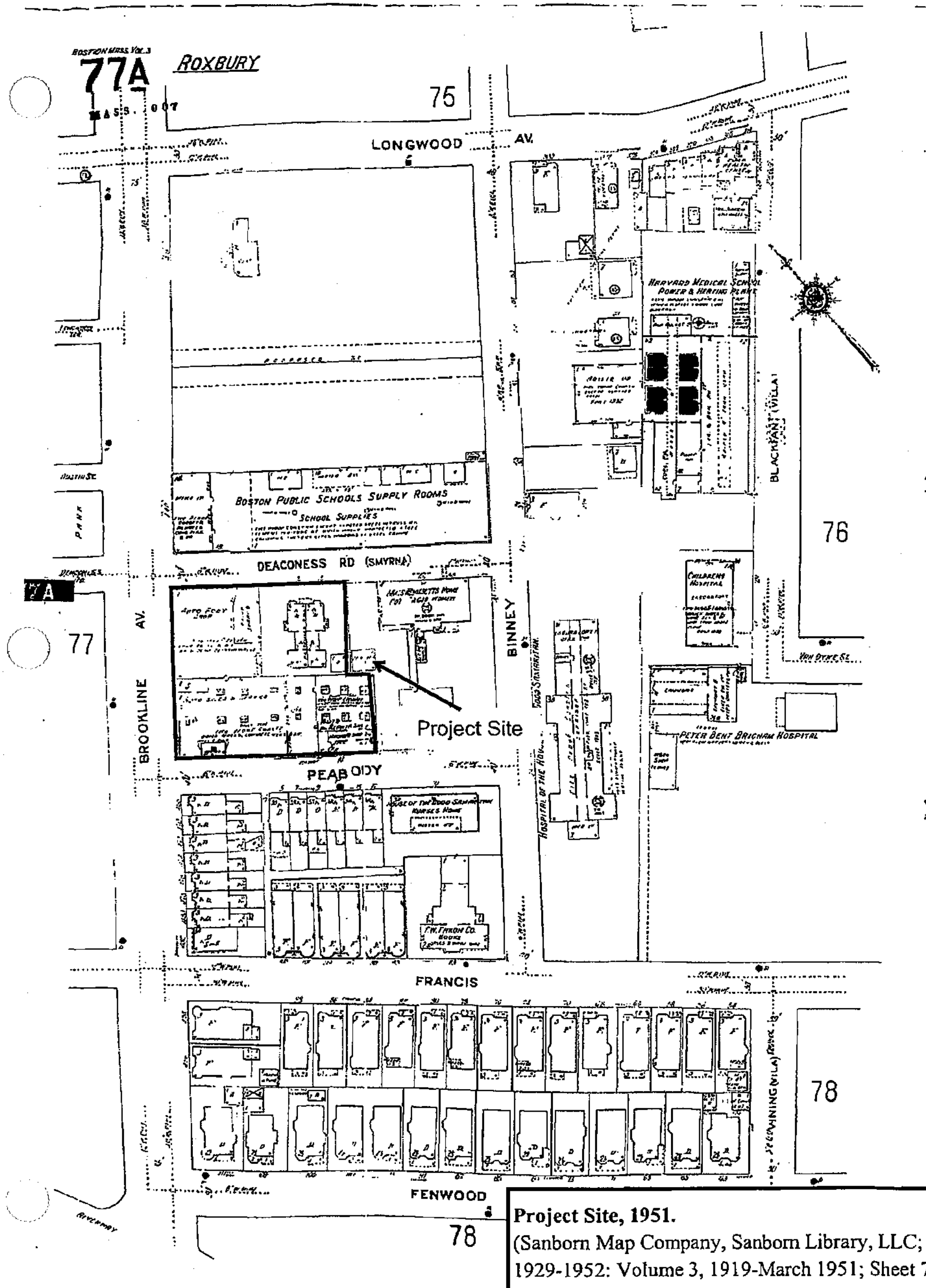
Sanborn Map Company
Fire Insurance Maps



Project Site, 1897.
(Sanborn Map Company, Sanborn Library, LLC; Boston 1895-1900: Volume 3, 1897; Sheet 77.)



Project Site, 1919.
(Sanborn Map Company, Sanborn Library, LLC; Boston 1908-1938: Volume 3, 1919; Sheet 77a.)



Project Site, 1951.
(Sanborn Map Company, Sanborn Library, LLC; Boston 1929-1952: Volume 3, 1919-March 1951; Sheet 77a.)

Relevant City of Boston Building Permits

454 Brookline Avenue

ARCEL #

Certified Street Numbers

462-464 Brookline Ave.

WD: 4

Street Numbering Inspector.

APPLICANT MUST USE TYPEWRITER IN FILLING IN THIS APPLICATION

JUN 30 10 06 AM '94

CITY OF BOSTON 003918

INSPECTIONAL SERVICES DEPARTMENT

Application to the Commissioner for Permit for Alterations, Repairs or Change of Occupancy

Location 462-464 Brookline Avenue District. Ward 4

Name of owner is? Dana-Farber Cancer Institute Address 44 Binney St., Boston, MA 02115

Name of architect or engineer is? Shepley Bulfinch Richardson & Abbott Lic. No.

Material of building is? brick Style of roof? flat Construction of roof? built up on concrete

Size of building, feet front? 84' ; feet rear? 84' ; feet deep? 204' ; No. of stories? 1

No. of feet in height from sidewalk to highest point of roof? 14' Material of foundation? concrete

Thickness of external walls? 1'-0" Party walls? N/A

LEGAL OCCUPANCY OR USE (Applicant is not to fill in this box)

Animal Cancer Research Laboratory DOC#3197/1989

Front stairs? N/A Back stairs? N/A Fire escape? N/A Con. balconies? N/A Any other?

Is building equipped with automatic sprinkler system? No

Type of construction? 1 Group occupancy? B

Building to be occupied for animal holding rooms and laboratories Animal Cancer Research Lab. after alteration

IF EXTENDED ON ANY SIDE OR VERTICALLY

Size of extension, No. of feet long? ; No. of feet wide? ; No. of feet high above sidewalk?

No. of stories high? ; style of roof? ; material of roofing?

Of what material will the extension be built? Foundation?

How will the extension be occupied? Type of Construction

GENERAL DESCRIPTION OF THE PROPOSED WORK AND ITS LOCATION.
(ALL STRUCTURAL, MECHANICAL, ELECTRICAL, ETC., SHALL BE INCLUDED)

MASS DEBRIS DISPOSAL LAW
MGL c40, S54, c584, S9, all S150A
Will work result in any debris?
Yes ☒ No ☐ Initials

Demolition of 1,480 s.f. of existing space and renovation of the area immediately adjacent to the demolition. The existing building dimensions of 84' x 204' will become 84' x 186' after the demolition and renovation. There will be no change in the building's use.

Per Plan

Plans Filed with Application

PERMIT MUST BE OBTAINED BEFORE BEGINNING WORK

GROUND WATER SURVEY
Repairs to: Exterior Wall: yes ☒ no ☐ , Foundation: yes ☒ no ☐ , Basement Area: yes ☒ no ☐

Estimated Cost. $266,635.

Location, ownership and detail must be correct, complete and legible.

Separate application required for every building.

Plans must be filed with this application.

Street Numbering Inspector.

Application for Permit to Build.

(FIRST CLASS BUILDING)

Boston, March 27 1923

To the BUILDING COMMISSIONER:

The undersigned applies for a permit to build, according to the following specifications:

Location, No. 454-458 Brookline Ave. Ward 14

Name of owner is? Danforth Donohue Address, 11 Peabody St.

Name of mechanic is? F. J. Van Etten Co. " 80 Boylston

Name of architect is? "

Material of building? Reinforced Concrete

Building to be occupied for? Garage - Public No. of Stores? —

How many families?

How near the line of the street? On street line Width of street? 50 ft.

Will the building be erected on solid or filled land? Solid If in block, how many? —

Size of lot, No. of feet front? 100 ft. ; feet rear? 100 ft. ; feet deep? 88 ft.

Size of building, No. of feet front? 100 No. of feet rear? 100 No. of feet deep? 88 ft.

No. of stories in height, above basement? 1 ; No. of feet in height from sidewalk to highest point of roof? 17-6

Material of foundation? Concrete If concrete, submit specifications. 1-2½-5 mix

Will foundation be laid on earth, rock or piles? Earth

Length of piles? Wood or concrete piles?

Number of rows?

Distance on centres?

Diameter top? Bottom?

Capped with stone or concrete?

Piles cut off at what grade? Grade of basement?

External walls, thickness? 1st, 20 Cols 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th,

Party walls, thickness? 1st 12 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th,

Are the walls solid or vaulted? No bearing walls Material? Brick curtain walls

What will be the materials of front? Concrete

Will the roof be flat, pitch, mansard or hip? Flat Material of roofing? Tar & gravel

What will be the material of cornice? Concrete

What will be means of access to roof?

Are there any hoistways or elevators? No How protected?

How is building heated? Steam Thickness of shell of flue? 4

Means of extinguishing fire? Fire extinguishers & sand in garage

Stairways enclosed in brick walls? None Thickness of such walls?

If the building is to be occupied as a Tenement House, give the following particulars:

Height of cellar? Height of basement?

Height of first story, second, third, fourth,

fifth, sixth, seventh, eighth, ninth, tenth,

Is the cellar or the basement to be occupied for habitation?

Distance from lot lines? Front, ; side, ; side, ; rear,

If there is a building already erected on the front or rear of lot, give height?

State how many ways of egress are to be provided,

Nature of egress?

Will the building comply with the requirements of statutes?

Estimated Cost.

$40,000

Signature of owner or authorized representative, F. J. Van Etten Co. by L. F. Walsh

Address, 80 Boylston

Plans submitted? Received by?

Deed submitted? Lib. Folio. Year

License No. 1265 Class A. B.

Signature Leo F. Walsh

Address 6 Woodville St.

PERMIT MUST BE OBTAINED BEFORE BEGINNING WORK.

INSPECTOR MU... AND CORRECT LOCATION
890
No.
CITY OF BOSTON BUILDING DEPT.

Application for Permit to Build.

FIRST CLASS BUILDING

Location.

No. 454-458 Brookline Av.

Ward 14

CONDITIONS

3/20/23 F. Carey

Referred to Inspector for examination

Boston, ... 192

To the Building Commissioner:

Sir,—I have examined the premises and find same as herein described.

Inspector.

Permit Granted

MAY 5 1923 192

Permit filled out by

Permit number

Plan number D-43

Filed with application

$ 40

FINAL REPORT.

.... 192

Has the work been completed in accordance with this application and plans filed and approved?

Law been violated? .... Doc. No. .... of 19

Nature of violation?

Violation removed when? 192

Estimated cost, etc., $

Building Inspector.

EXAMINATION OF PLANS.

Approved MAY -5 1923 192

W. H. Smith

Supervisor of Plans.

Examined

MAY 5 1923

By F. V. Carey O.K.

Show ... Symphony St.
Show on plot plan right to 6' ...
Sign must be placed in rear ...
to avoid pressure against wall.
Stirrup spacing in spandrels ?
Garage designed for 2nd floor
rear spandrel beams will not carry wall
New plan submitted ... showing ...

F. V. Carey

APR 25 1923

CORRECTIONS
TO BE MADE WITH RED INK
BEFORE PERMIT IS GRANTED

DATES WHEN EXAMINED.

VISITS	DATE	HOURS	REMARKS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

The ... application and on accompanying plans are true.

Commonwealth of Massachusetts ... Building ...

Subscribed and sworn to before ...

Justice of the Peace

My commission expires Sept ...

SYNOPSIS.

Location No. 454-458 Brookline Ave. Ward 14

Name of owner is? Dunbar & Donohue Address, 11 Peabody St.

Name of mechanic is? F. J. Van Elten " 80 Boylston

Name of architect is?

Material of building? Reinforced Concrete

Building to be occupied for? Garage Public No. of Stores? —

How many families?

How near the line of the street? On street line Width of street? 50 ft.

Will the building be erected on solid or filled land? Solid If in block, how many? —

Size of lot, No. of feet front? 100 ft.; feet rear? 100 ft.; feet deep? 88 ft.

Size of building, No. of feet front? 100 ft. No. of feet rear? 100 ft. No. of feet deep? 88 ft.

No. of stories in height above basement? 1; No. of feet in height from sidewalk to highest point of roof? 12-6

Material of foundation? Concrete If concrete, submit specifications. 1-2½-5 mix

Will foundation be laid on earth, rock or piles? Earth

Piles cut off at what grade? — Grade of basement? —

External walls, } thickness? { 1st 10 Cols 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th,
Party walls, } { 1st 12 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th,

Are the walls solid or vaulted? no bearing walls Material? Brick curtain walls.

What will be the materials of front? Concrete

Will the roof be flat, pitch, mansard or hip? flat Material of roofing? Tar & gravel

What will be the material of cornice? Concrete

What will be means of access to roof? —

Are there any hoistways or elevators? No How protected? —

Are stairways enclosed? None How? —

Estimated Cost,

$40,000 Signature of owner or authorized representative, F. J. Van Elten Co. J.F. Walsh

Address, 80 Boylston St.

License No. 2263 Class CGB

Signature J. F. Walsh

Address, 5 Wardwell St.

No. 896 MAR 28 1923

LOCATION

454-458 Brookline Avenue

Ward 14

REFERRED TO INSPECTOR

Boston, March 29, 1923

To the Building Commissioner:

Sir,— I have examined the premises and find same as herein described.

F. Carey, *Inspector.*

PERMIT ISSUED

FINAL REPORT

Oct 19, 1923

Has the work been completed in accordance with this application and plans filed and approved? Yes

Law been violated? Doc. No. of 19

Violation removed 19

F. Carey, *Inspector.*

PERMIT GRANTED MAY 5 1923

192

Plan Filed with application

Approved

Chief of Plan Division

DATES WHEN EXAMINED

VISITS	DATE	HOUR	REMARKS
1			A take down permit
2			will be needed for
3			the frame dwelling
4			now on the site.
5			F. Carey.
6			Bldgs are down
7			F V Carey
8			4-25-23
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

City of Boston—Building Department

901 CITY HALL ANNEX

LOCATION VERIFIED FROM ATLAS.

Clerk.

Doc. No. 0 582 Year 1923

MINOR ALTERATIONS, TAKE DOWNS, ROOFING, ETC., FOR IMMEDIATE ACTION

APPLICANT ANSWERS ONLY QUESTIONS BETWEEN BLACK LINES IN DUPLICATE

The undersigned hereby applies for a IMMEDIATE ACTION permit to Take down the following described building:

DATE April 4 / 23

Location? 454– 460 Brookline Ave & 1 Smyrna Ward 14

Name of Owner? Swift - McNutt Co Address 109 Atkinson St

Name of Mechanic? " " " Address " "

Approximate feet front? 30 Rear? 30 Deep? 40 Height? 30 Stories high? 3

Material of building? Wood Roof, flat or pitch? Mansard

Estimated Cost, of work to be done, $ 500 Building how occupied? Dwelling

Detail of proposed work

Take down Building

TAKE DOWN

[SIGN HERE] James B Duchesne
(Signature of Licensed Builder or Wrecker)

Swift-McNutt Co.
(Signature)

(Address) 109 Atkinson St

109 Atkinson St
(Address)

Lic. No. 361 Class E

Approved (date) 4/4/23

Permit granted APR -5 1923

By

By

Form 117. 10-24-22-3M.

5M.-7-'56.

CITY OF BOSTON—BUILDING DEPARTMENT

901 CITY HALL ANNEX

B D 3

DOC. NO. 03632 YEAR

SPECIAL FORM APPLICATION

FOR PERMIT FOR

Ordinary Repairs and Minor Alterations Not Involving Vital Structural Changes

This form NOT TO BE USED for ADDITIONS or CHANGE OF OCCUPANCY

The undersigned hereby applies to the Building Commissioner for a permit to alter / repair the following-described building:

DATE Aug. 28 1956

Street and No. 454 Brookline Ave. Fire Zone .... Ward 4

Name of Owner New Brookline Ave. Medical Bldg. Inc. Address 197 Friend St.

Type of Construction 1 Group Occupancy and Division ....

Size of building, feet front 100-11"; feet rear 100-10¾"; feet deep 210½"; No. of stories 2

How is building NOW occupied? Garage - Storage

Main stairs .... Back stairs .... Fire escapes .... Con. balconies .... Any other ....

Detail of proposed work

Commence operations including cutting and demolition

L-80

Estimated Cost, $ 500.—

The facts set forth above in this application and accompanying plans are a true statement made under penalty of perjury.

Elliot L. Canter Agent
(Signature of Owner or Authorized Agent)

(Address) 185 Corey Rd.

Elliot L. Canter
(Signature of Licensed Builder or Wrecker)

Canter Construction Co.
(Name of Contractor)

(Address) 185 Corey Rd.

Lic. No. 454 Class ABC

(Address) 185 Corey Rd. Boston 46

My license expires Nov. 15 1956

Approved (date) Aug. 28, 1956

By W. L. Little

Permit granted .... AUG 28 1956

By ....

SYNOPSIS

BD2A

Location, 454 Brookline Ave. District, Boston Ward 4

Name of owner is? New Brookline Ave Medical Bldg inc. Address, 197 Friend St.

Name of architect or engineer is? Sumner Schein " 271 Huntington Lic. No. 222

Material of building is? Conc. & Steel Style of roof? Flat Construction of roof? Steel & Concrete Gypsum Plank

ription Size of building, feet front? 100'-11"; feet rear? 100'-10¾"; feet deep? 87-10½" No. of stories? 1

Present Size of L, feet long? —; feet wide? —; feet high? —; No. of stories? —; roof? —

No. of feet in height from sidewalk of highest point of roof? 14' Material of foundation? Conc.

ding Thickness of external walls? 12" Party walls? 12" Physical value of building?

What was the building last used for? Garage

Front stairs? — Back stairs? — Fire escape? — Con. balconies? — Any other? Doors

Type of construction? I/Conc. Group occupancy? F-5 Number of employees? —

Building to be occupied for Medical Bldg. Offices after alteration

IF EXTENDED ON ANY SIDE.

Vertical Front 100'-11" Rear 100'-10¾" 87'-10½" Deep

Size of extension, No. of feet long? N/C; No. of feet wide? N/C; No. of feet high above sidewalk? 14'

cription No. of stories high? 2; style of roof? Flat; material of roofing? Steel & Gypsum Plank

Of what material will the extension be built? Masonry & Steel; Foundation? N/C

f If of brick, what will be the thickness of external walls? 12" inches; and party walls 12" inches.

ension How will the extension be occupied? Medical Bldg How connected with main building? Stairway

Distance from lot lines:—Front? N/C; right side? N/C; left side? N/C; rear? N/C

Area of lot covered after extension N/C 40 % Type of Construction I

GENERAL DESCRIPTION OF THE PROPOSED WORK AND ITS LOCATION

To add second floor as per plans filed herewith.

Estimated Cost? 100.000.—

Date, Aug. 28, 1956

Location, ownership and detail must be correct, comple

Duplicate application required.

Plans must be filed with this application when re

APPLICATION FOR PERMISSION TO USE

BOSTONIA CONDITA AD 1630.

4732 Boston, April 23

57-59 DEACONESS RD. WD.

To the INSPECTIONAL SERVICES COMMISSIONER:

The undersigned applies for permission to use premises:—

Location 454 Brookline Avenue and 57-59 Deaconess Road District Ro

Name of owner is? The Children's Medical Center Corporation A
Boston, Massachusetts

What were the premises last used for? The premises have been used f
cal office building also located at 454 Brookline Avenue
located on the lot was razed pursuant to a Take Down Permi

Premises to be occupied or used for parking for 30 cars accessory t
located at 454 Brookline Avenue

DETAIL OF PROPOSED USE OF PR

The building at 454 Brookline Avenue was converted to medi
permit granted October 19, 1956 pursuant to Application 14
of the building, the remainder of the lot has been used fo
medical office building use. An attendant restricts the u
employees or visitors to the medical office building.

Plan filed with application. The CHILDREN'S M

Signature of owner or authorized representative By John O.
Senior Vi

Address 55 Shattu

254.

2

Relevant City of Boston Building Permits

464 Brookline Avenue

THOMAS K. REYNOLDS, Chairman.
WILLIAM H. BESARICK, Secretary.
JOHN F. HICKEY.

BOARD OF EXAMINERS,

BUILDING DEPARTMENT.

(TENTH FLOOR),

CITY HALL ANNEX.

BOSTON, Dec. 16, 1916.

Mr. Morris Rotman,
20 Normady St., Roxbury, Mass.

Dear Sir:

The Board of Examiners hereby grants you a special license to take personal charge or control of the construction of first-class building, to be located at 462 Brookline Avenue, Cor Peabody St., Boston, Mass.

You will please present this notice at the office of the Building Commissioner, City Hall Annex.

Respectfully,

Wm H Besarick

Secretary of Board.

21

Form 53.

LOCATION, OWNERSHIP and DETAIL must be correct, complete and legible.

INSPECTOR'S SYNOPSIS OF

APPLICATION FOR PERMIT TO BUILD.

(1st CLASS BUILDING.)

BOSTON, November 27th, 1916

Location, No. 462 Brookline Ave corner Peabody St. Ward 14

Name of owner is ? Rotman & Abrams Address,

Name of mechanic is ? Morris Rotman License No. Special

Material of building ? Brick & concrete

Building to be occupied for ? Garage

How many families ?

Size of lot, No. of feet front ? 85 ; feet rear ? 85 ; feet deep ? 144'

Size of building, No. of feet front ? 85 No. of feet rear ? 85 No. of feet deep ? 140'

No. of stories in height, above basement ? 1 ; No. of feet in height from sidewalk to highest point of roof ? 15'6"

Material of foundation ? stone & concrete 1-2½-5 $35,000 00/100

Will foundation be laid on earth, rock or piles ? earth

Name of applicant ? Rotman & Abrams by H. A. Norcross

460 Brookline Av ... 24

Name of owner is ? Rotman and Abrams .... Address, ...

Name of mechanic is ? .... " ....

Name of architect is ? F. A. Norcross .... " 45 Cornhill

Material of building ? Brick and concrete

Building to be occupied for ? Garage .... No. of Stores ? ....

How many families ? ....

How near the line of the street ? Line .... Width of street ? 60

Will the building be erected on solid or filled land ? Solid .... If in block, how many ? ....

Size of lot, No. of feet front ? 85 ; feet rear ? 85 ; feet deep ? 144

Size of building, No. of feet front ? 85 No. of feet rear ? 85 No. of feet deep ? 140

No. of stories in height, above basement ? 1 ; No. of feet in height from sidewalk to highest point of roof ? 15½'

Material of foundation ? Stone and concrete .... If concrete, submit specifications. 1-2½-5

Will foundation be laid on earth, rock or piles ? Earth

Length of piles ? .... Wood or concrete piles ? ....

Number of rows ? ....

Distance on centres ? ....

Diameter top ? .... Bottom ? ....

Capped with stone or concrete ? ....

Piles cut off at what grade ? .... Grade of basement ? ....

External walls, thickness ? 1st, 12" 2d, ... 3d, ... 4th, ... 5th, ... 6th, ... 7th, ... 8th, ... 9th, ... 10th, ... 11th, ... 12th, ...

Party walls, 1st, ... 2d, ... 3d, ... 4th, ... 5th, ... 6th, ... 7th, ... 8th, ... 9th, ... 10th, ... 11th, ... 12th, ...

Are the walls solid or vaulted ? Solid .... Material ? Brick

What will be the materials of front ? Brick

Will the roof be flat, pitch, mansard or hip ? Flat .... Material of roofing ? Compo

What will be the material of cornice ? Brick

What will be means of access to roof ? Scuttle. .... Est. Cost. $35,000.

Are there any hoistways or elevators ? .... How protected ? ....

How is building heated ? .... Thickness of shell of flue ? ....

Means of extinguishing fire ? ....

Stairways enclosed in brick walls ? .... Thickness of such walls ? ....

EXAMINATION OF PLANS.

Approved.................................191

C. J. Stelz [?]
Chief of Plan Division.

Memo.

C. J. Stelz [?]
Chief of Plan Div.

Plans taken to amend

DEC 19 1916

Examined

DEC 26 1916

By W. W. Power

St. Conn't. etc.

BUILDING DEPT. DEC 29 1916

Examined

DEC 28 1916

By W. W. Power

Examined

DEC 28 1916

By W. W. Power

Examined

DEC 28 1916

By W. W. Power

? beam in chimney

Construction

St. Const. & Not warranted

Examined

Construction

DEC 14 1916

By W. W. Power

No. 8297 Rec'd NOV 28 1916

TRANSCRIPT OF APPLICATION FOR

Permit to Build 1st Class Building.

LOCATION.

No. 462

Brookline Avenue

Ward 14

CONDITIONS.

Dec. 2, 1916

F. Conroy.

IN BOARD OF APPEAL.

LICENSED BUILDER.

Name Maurice Rotman [?]

Class Special No.

Permit Granted DEC 29 1916

Plan No. 2396 On File 2-55

57A.

SYNOPSIS.

Location 462 Brookline ave Ward 14

Name of owner is? Rotmann Abraham Address, 462 Brookline ave

Name of mechanic is? James H Murphy " 13 Bond st

Name of architect is? James H Murphy " 13 Bond st

Description of Present Building.

Material of building is? Brick Style of roof? Flatt Material of roofing? Tar & Gravel

Size of building, feet front? 83; feet rear? 83; feet deep? 120; No. of stories? one

Size of L, feet long? —; feet wide? —; feet high? —; No. of stories? —; roof? —

No. of feet in height from sidewalk of highest point of roof? 19 Material of foundation? stone

Thickness of external walls? 12" Party walls? 8" Distance from line of street? [illegible] Width of street? 80

What was the building last used for? Garage How many families? — Number of stores? one

Nature of egress, front ~~stairs~~? Doors Back ~~stairs~~? Doors Fire escape? — Con. balconies? —

Size of lot front? 100; rear? 100; deep? 150

Building to be occupied for Garage and repairing autos after alteration

DETAIL OF PROPOSED WORK.

To Build a fireproof partition of plaster Blocks across the Building to make a repair shop in the rear. partition to have 2 metal ~~doors hung~~ covered wooden Doors opening into the Garage and hung on metal incline tracks to close automatic from own weight

Extended or Built Upon.

Size of extension, No. of feet long?; No. of feet wide?; No. of feet high above sidewalk?

No. of stories high?; style of roof?; material of roofing

Of what material will the extension be built? Foundation?

If of brick, what will be the thickness of external walls? inches; and party walls inches.

How will the extension be occupied? How connected with main building?

Distance from lot lines:— Front?; side?; side?; rear?

Estimated Cost,
$ 200.00

Signature of owner or authorized representative, James H. Murphy

Address, 13 Bond st Boston

License No. B & C Class 1774

Signature, James H Murphy

Address, 13 Bond st Boston

No. 1493   Rec'd APR 15 1919

LOCATION

462 Brookline Ave.

Ward 14

REFERRED TO INSPECTOR

PERMIT ISSUED

Boston, April 16 1919.

To the Building Commissioner:

Sir,—I have examined the premises and find same as herein described.

F. Conroy
Inspector.

FINAL REPORT

July 25 1919.

Has the work been completed in accordance with this application and plans filed and approved?

Yes

Law been violated ?......Doc. No..........of 191......

Violation removed.................191......

F. Conroy
Inspector.

PERMIT GRANTED

APR 21 1919 191

Approved..........
Chief of Plan Division.

DATES WHEN EXAMINED

VISITS	DATE	HOUR	REMARKS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

City of Boston—Building Department

901 CITY HALL ANNEX

LOCATION VERIFIED FROM ATLAS.

Clerk.

Doc. No. 0 582 Year 1923

MINOR ALTERATIONS, TAKE DOWNS, ROOFING, ETC., FOR IMMEDIATE ACTION

APPLICANT ANSWERS ONLY QUESTIONS BETWEEN BLACK LINES IN DUPLICATE

The undersigned hereby applies for a IMMEDIATE ACTION permit to Take down the following described building :

DATE April 4/23

Location ? 454-460 Brookline Ave & Smyrna Ward 14

Name of Owner ? Swift-McNutt Co Address 109 Atkinson St

Name of Mechanic ? " " " Address " "

Approximate feet front ? 30 Rear ? 30 Deep ? 40 Height ? 30 Stories high ? 3

Material of building ? Wood Roof, flat or pitch ? Mansard

Estimated Cost, of work to be done, $ 500 Building how occupied ? Dwelling

Detail of proposed work

Take down Building

TAKE DOWN

[SIGN HERE] James B Duchesne
(Signature of Licensed Builder or Wrecker)

(Address) 109 Atkinson St

Lic. No. 361 Class E

Swift-McNutt Co.
(Signature)

109 Atkinson St
(Address)

Approved (date) 4/4/23

By [signature]

Permit granted APR -5 1923

By

Form 117. 10-21-'22-3M.

BDL-5-'49.

CITY OF BOSTON—BUILDING DEPARTMENT 901 CITY HALL ANNEX

B D 17

DOC NO. 01130 YEAR

SPECIAL FORM APPLICATION FOR PERMIT FOR

S922 APR 26 1950

Ordinary Repairs and Minor Alterations Not Involving Vital Structural Changes

This form NOT TO BE USED for ADDITIONS or CHANGE OF OCCUPANCY

The undersigned hereby applies to the Building Commissioner for a permit to alter repair the following-described building:

DATE Apr 26 1950

Street and No. 462 Brookline Ave Fire Zone 1 Ward 4

Name of Owner [illegible] Address 462 Brookline Ave

Type of Construction Brick 1 Group Occupancy and Division F-5

Size of building, feet front ....; feet rear ....; feet deep ....; No. of stories 1

How is building NOW occupied? Garage

Main stairs .... Back stairs .... Fire escapes .... Con. balconies .... Any other ....

Detail of proposed work Construct concrete Block Wall Block 8x8x16) enclosure to be used as show room. Remove double hung windows (replace w/ plate) install door 3x7 in outside wall install overhead door in new wall These partitions to be non bearing.

L83

Estimated Cost $ 800

The facts set forth above in this application and accompanying plans are a true statement made under penalty of perjury.

William Bennett
(Signature of Owner or Authorized Agent) (Address) 16 Madison Ave Winthrop

William Bennett W. M. Bennett
(Signature of Licensed Builder or Wrecker) (Name of Contractor)

(Address) 16 Madison Ave Winthrop (Address) 16 Madison Ave Winthrop

Lic. No. 143 Class BC

My license expires 4-23 1950

Approved (date) 4/26/50 Permit granted APR 26 1950

By [signature] By

1M-2-'56.
Form BD 7

Location, ownership and detail must be correct, complete and legible.

Duplicate application required for every building.

Plans must be filed with this application when required.

APPLICATION FOR PERMISSION TO AMEND PLANS

Boston, MARCH 24, 1958

To the
BUILDING COMMISSIONER:

The undersigned applies for permission to amend plans on file of the following-described building:

Location 462 BROOKLINE AVE., BOSTON Ward 4 District

Name of owner is? CHILDREN'S CANCER RESEARCH FOUND., INC., Address 462 BROOKLINE AVE.

escrip- Name of Architect is? WILLIAM RISEMAN ASSOCIATES, ARCH. DESIGNERS, BOSTON
ABRAHAM WOOLF ASS. ENGR.

ion of Material of building is? BRICK Material of roofing? TAR & GRAVEL

uilding. What was the building last used for? GARAGE

Building to be occupied for ANIMAL CANCER RESEARCH LABORATORY

Progress of work to date 25%

DETAIL OF PROPOSED AMENDMENTS

NEW PENTHOUSE AS SHOWN ON PLANS.

SEE PLANS & COMPS.

Cost $ 2,000.00

Signature of owner or authorized representative, William J. Grozier for CHILDREN'S CANCER RESEARCH FOUND. INC.,

Address, 462 BROOKLINE AVE., BOSTON

SYNOPSIS

BD 2A

Description of Present Building

Location, 462 Brookline Ave District, Ward 4

Name of owner is? Children's Cancer Research Found. Inc Address, 462 Brookline Ave

Name of architect or engineer is? William Riseman 162 Newbury St. Boston Bldg. No.
Abraham Wolf 21 School St Boston

Material of building is? Brick Style of roof? Tar & Gravel Construction of roof? Concrete

Size of building, feet front? 81 ; feet rear? 81 ; feet deep? 145 ; No. of stories? 1

Size of L, feet long? ; feet wide? ; feet high? ; No. of stories? ; roof?

No. of feet in height from sidewalk of highest point of roof? 13'-0" Material of foundation? Concrete

Thickness of external walls? 12" Party walls? Physical value of building?

What was the building last used for? Garage

Front stairs? Back stairs? — Fire escape? — Con. balconies? — Any other? Doors

Type of construction? I Group occupancy? ~~E~~ D Number of employees?

Building to be occupied for Animal Cancer Research Laboratory after alteration

IF EXTENDED ON ANY SIDE.

Description of Extension

Size of extension, No. of feet long? ; No. of feet wide? ; No. of feet high above sidewalk?

No. of stories high? ; style of roof? ; material of roofing?

Of what material will the extension be built? ; Foundation?

If of brick, what will be the thickness of external walls? inches; and party walls inches

How will the extension be occupied? How connected with main building?

Distance from lot lines:—Front? ; right side? ; left side? ; rear?

Area of lot covered after extension % Type of Construction

GENERAL DESCRIPTION OF THE PROPOSED WORK AND ITS LOCATION

Install 4" Conc. block ~~and~~ Partitions, Metal furred, Wire lath and plaster hung ceiling, Metal Doors and frames. ~~The~~ Partitions shall be 10'-0" high. REDUCE SIZE OF EXISTING WINDOW OPN'S WITH MASONRY, INSTALL NEW LINTELS & NEW SASH. REMOVE PORTION OF EXISTING PARAPET & RECOVER WITH COPPER CAP. RESURFACE TWO EXT. WALLS WITH 4" BRICK BONDED WITH A HEADER EVERY 6TH COURSE. REMOVE EXISTING SKYLIGHTS & RECOVER WITH "PRECAST" "FLEXICORE" CONC. PLANK. RE-ROOF WITH T & GRAVEL & NEW FLASHING.

CHANGE OF OCCUPANCY FEE $5.00
~~USE OF PREMISES FEE $3.00~~
~~Separate application and~~ additional fee required for alterations.

Estimated Cost? 9,000.00

Date Nov. 4, 1957

The facts set forth above in this application and accompanying plans are a true statement to the best of my knowledge and belief.

William Riseman
(Signature of Owner or Authorized Agent) (Address) 162 Newbury St. Boston

Alexander O'Leary
(Signature of Licensed Builder)

William Riseman Assoc.
(Name of Contractor)

(Address) 29 Myrtle St Quincy (Address) 162 Newbury St.

Lic. No. 1982 Class B-C

My license expires Nov 1958 Boston, Mass.

2M.-7-'56.

Massachusetts Historical Commission
Project Notification Form

450 Brookline Avenue

Center for Cancer Care

Boston
Massachusetts

Submitted by: Dana-Farber Cancer Institute
Boston, Massachusetts

Massachusetts Historical Commission
Project Notification Form

450 Brookline Avenue

Center for Cancer Care

Boston,
Massachusetts

Prepared for: **Dana-Farber Cancer Institute**
44 Binney Street
Boston, MA 02115
(866) 408-3324

Prepared by: ***VHB*/Vanasse Hangen Brustlin, Inc.**
Transportation, Land Development, Environmental Services
101 Walnut Street
P.O. Box 9151
Watertown, Massachusetts 02272
617 924 1770

April 2006

RECEIVED

APR 2 2006

HIST. COMM

950 CMR: OFFICE OF THE SECRETARY OF THE COMMISSION

...omitted, it has ... determined ... project is unlikely to affect significant ... or archaeological resources.

5/18/06

M. Lattimore

... of Archaeological Review

APPENDIX A

MASSACHUSETTS HISTORICAL COMMISSION

Massachusetts Archives Building

220 Morrissey Boulevard

Boston, MA 02125

617-727-8470, Fax: 617-727-5128

xc: MEPA Unit, attn: Dierdre Buckley
Boston Landmarks Commission

PROJECT NOTIFICATION FORM

Project Name 450 Brookline Avenue

Location / Address 454 and 462 Brookline Avenue

City / Town Boston

Project Proponent

Name Dana-Farber Cancer Institute

Address 44 Binney Street

City / Town Boston

Telephone # (866) 408-3324

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name:	Type of License or Funding (specify)
MA Health and Educational Facilities Authority	Tax-Exempt Bond Financing

Project Description (narrative):

See Attached

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.

See Attached

Does the project include rehabilitation of any existing building? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation.

See Attached

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

See Attached

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

See Attached

What is the total acreage of the project area?

Woodland	0	acres	Productive Resources:		
Wetland	0	acres	Agriculture	0	acres
Floodplain	0	acres	Forestry	0	acres
Open space	0	acres	Mining/Extraction	0	acres
Developed	0.77	acres	Total Project Acreage	0.77	acres

What is the acreage of the proposed new construction? 0.77 acres

What is the present land use of the project area?

Institutional / Health Care

What has been the previous land use of the project area?

Institutional / Health Care

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of Person submiting this form: Howard Moshier Date: 4/21/06

Name: HOWARD F. MOSHIER ; VHB, INC.

Address: 38 CHAUNCY STREET

City / Town: BOSTON, MA 02111

Telephone: (617) 728-7777

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St.1988, c.254.

Transportation
Land Development
Environmental
Services

VHB imagination | innovation | energy Creating results for our clients and benefits for our communities

Vanasse Hangen Brustlin, Inc.

April 20, 2006

Ms. Brona Simon
Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, Massachusetts 02125

Re: Massachusetts Historical Commission Project Notification Form (PNF)
450 Brookline Avenue – Center for Cancer Care
Dana-Farber Cancer Institute, Boston, MA

Dear Ms. Simon:

Enclosed is a completed Project Notification Form (PNF) describing the Dana-Farber Cancer Institute's proposed construction of a new research and patient care facility at the corner of Brookline Avenue and Jimmy Fund Way in the Longwood Medical Area. The new building, hereafter to be known as 450 Brookline Avenue, Center for Cancer Care, is proposed to be constructed on the present site of an administrative office building at 454 Brookline Avenue, the Redstone Research Laboratory building at 464 Brookline Avenue, and a 30-car surface parking area.

The materials enclosed include all required documentation for your review, as well as a brief history of both buildings proposed for demolition, the extent of new construction, and plans describing the typical floor plans and massing of the new facility.

Please note that the materials submitted illustrating the proposed building for the site have been submitted and are being reviewed by the Boston Redevelopment Authority under Article 80 of the Boston Zoning Code.

If you have any questions or require additional information, please contact me at (617) 728-7777.

Sincerely,

Howard Moshier

Howard F. Moshier, P.E.
Project Manager

Enclosures

\\Mabos\projects\08984.00\reports\MHC PNF\DFCI MHC PNF Cover Letter.doc

38 Chauncy Street
Suite 200
Boston, Massachusetts 02111-2301
617.728.7777 • FAX 617.728.7782
email: info@vhb.com
www.vhb.com

APPENDIX A
MASSACHUSETTS HISTORICAL COMMISSION
Massachusetts Archives Building
220 Morrissey Boulevard
Boston, MA 02125
617-727-8470, Fax: 617-727-5128

PROJECT NOTIFICATION FORM

Project Name 450 Brookline Avenue

Location / Address 454 and 462 Brookline Avenue

City / Town Boston

Project Proponent

Name Dana-Farber Cancer Institute

Address 44 Binney Street

City / Town Boston

Telephone # (866) 408-3324

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name:	Type of License or Funding (specify)
MA Health and Educational Facilities Authority	Tax-Exempt Bond Financing

Project Description (narrative):

See Attached

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.

See Attached

Does the project include rehabilitation of any existing building? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation.

See Attached

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

See Attached

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

See Attached

What is the total acreage of the project area?

Woodland	0	acres	Productive Resources:		
Wetland	0	acres	Agriculture	0	acres
Floodplain	0	acres	Forestry	0	acres
Open space	0	acres	Mining/Extraction	0	acres
Developed	0.77	acres	Total Project Acreage	0.77	acres

What is the acreage of the proposed new construction? 0.77 acres

What is the present land use of the project area?

Institutional / Health Care

What has been the previous land use of the project area?

Institutional / Health Care

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of Person submiting this form Howard Moshier Date: 4/21/06

Name: HOWARD F. MOSHIER ; VHB, INC.

Address: 38 CHAUNCY STREET

City / Town: BOSTON, MA 02111

Telephone: (617) 728-7777

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St.1988, c.254.

450 Brookline Avenue
Dana-Farber Cancer Institute

This Project Notification Form has been prepared pursuant to M.G.L. Chapter 9, Section 26-27C, as amended by Chapter 254 of the Acts of 1988 (950 CMR 71.00).

Project Description

The Dana-Farber Cancer Institute (DFCI) is proposing to construct a new building on the Dana-Farber main campus at the intersection of Brookline Avenue and Jimmy Fund Way, hereafter to be designated as 450 Brookline Avenue (Figure 1). A new structure will be built on a site consisting of two parcels of land with a combined site area of approximately 33,414 SF (0.77 acres). The site currently holds the single-story Redstone Building at 464 Brookline Avenue, a two-story building at 454 Brookline Avenue, and a small 30-space surface parking lot. DFCI proposes to demolish these structures and construct an 13-story building of approximately 275,000 GSF above grade space with approximately 455 underground parking spaces. Included in the project are a tunnel below Jimmy Fund Way to connect patients and staff with the clinical facilities remaining in Dana Building and connections to the adjacent Smith Laboratories Building.

450 Brookline Avenue will provide urgently needed outpatient clinical space as well as state-of-the-art research laboratories necessary for Dana-Farber to accommodate expanding clinical service volume and leading-edge research to understand and develop cures for various forms of cancer. The location of the new building adjacent to Smith Research Building and across Jimmy Fund Way from the Dana and Mayer facilities provides Dana-Farber with the opportunity to more fully integrate the clinical and research functions of its main campus. Construction of 450 Brookline Avenue provides DFCI with an opportunity to consolidate its parking facilities on the main campus. Underground parking in the 450 Brookline Avenue will be continuous with existing Smith Building parking, creating a single, combined facility with a total parking capacity of about 1,026 spaces. Enclosed connecting corridors to 450 Brookline Avenue from the Smith Building will permit collaboration between scientists in both buildings. Tunnels under Jimmy Fund Way will permit patients direct access from the new parking garage to the clinical facilities remaining in Dana Building and will facilitate a separate service corridor between Dana Building and 450 Brookline Avenue.

Does the project include demolition? If so, specify the nature of demolition and describe the building(s) which are proposed for demolition.

Construction of 450 Brookline Avenue will involve the complete demolition of two buildings located at the corner of Brookline Avenue and Jimmy Fund Way: the

mabos\projects\08984\graphics\figures\08984usgs.mxd p1

Source: USGS Digital Raster Graphic, Boston, Massachusetts

Vanasse Hangen Brustlin, Inc.

Site Location Map

Figure 1

Redstone Building at 464 Brookline Avenue and the building at 454 Brookline Avenue.

The building at **454 Brookline Avenue** is situated at the corner of Brookline Avenue and Jimmy Fund Way. 454 Brookline Avenue was constructed in 1923 as a single-story public automobile garage. In 1954, a dwelling behind the building was demolished to create the present parking area. In 1956, a partnership called the New Brookline Avenue Medical Building Inc. purchased the building and renovated it for use as medical offices. Renovations included construction of a second story and the addition of concrete and metal veneer on the exterior of the building. The Dana Farber Cancer Institute leased space in the building, as did its future owner, the Children's Hospital Medical Center. DFCI purchased the building from the Children's Hospital in 1994 for use as office space and substantially renovated the interior.

As presently configured, 454 Brookline Avenue is a 2-story, 18,300 gross square foot, brick structure with a square plan and a flat roof. Primary entrances to the building are located at the center of the northeast elevation, off Jimmy Fund Way, and at the far west end of the northwest elevation on Brookline Avenue. Both entries are deeply recessed and are fitted with a single commercial door. The truncated first story of the building is clad in cast concrete facing on the major street elevations and is lit with long, continuous banks of square, fixed metal sash, some of which have been replaced with colored metal panels. The second story of the building is primarily clad in metal spandrel panels and is lit with a continuous bank of metal, combination fixed and awning sash windows. The rear (southeast) elevation of the building is fenestrated identically to the major street elevations, but has plain, brick walls. The parking area set behind (east of) the building at 454 Brookline Avenue has a raised grade and partially obscures the first story of 454 Brookline Avenue.

The **Redstone Building** at 464 Brookline Avenue is situated immediately west of 454 Brookline Avenue. The building was constructed in 1916 as a single-story automobile garage with a flat roof. The building was used as a garage through the late 1950s before being converted to a combination garage and plumbing supply warehouse in 1956. In 1957, the Children's Cancer Research Foundation, the predecessor to the DFCI, purchased the building as an animal cancer research facility. The approximately 20,100 gross square foot building continues to be used for this purpose, housing a vivarium and support space. The building underwent substantial interior renovations in 1977 and 1990.

As currently configured, the Redstone Building is a single-story, brick building with a flat roof. The main entrance to the building is situated on the west end of the façade (northwest elevation), fronting on Brookline Avenue. The entrance is recessed and fitted with double leaf commercial doors. A bank of full-height metal fixed sash windows with mirrored glass is set west of the entry. These windows are the only fenestration on the building. The exterior walls of the Redstone Building are brick, with limestone lintels set above the entry and window bank on the façade, and two additional lintels on the southwest elevation where two bays are slightly recessed. The raised parking area north of the Redstone Building obscures half the story height of the Redstone Building from Jimmy Fund Way. A sealed bay entrance is partially visible at the south end of the northeast elevation. The roof of the building contains a concrete block penthouse with a flat roof constructed in 1958, as well as large mechanical system components.

Does the project include rehabilitation of any existing building? If so, specify the nature of rehabilitation and describe the building(s) which are proposed for rehabilitation.

Several modifications to existing buildings on the campus are included in this project. These include:

- Potential expansion of campus loading and receiving facilities at the Smith Building on Binney Street
- Renovation of Smith Building floors 1-3 to reconfigure space and use to integrate continuously with the new building
- Minor interior modifications of Smith Building to facilitate connections to the new building at most levels, including underground parking

Once construction of the new building is completed, phased renovations necessary to retrofit existing space will occur. These are expected to include:

- Relocation of the existing Dana Building entrance to Jimmy Fund Way.
- Reconfiguration and reuse of the Dana Building lobby and vehicular drop-off area.
- Potential renovation of the Dana Building parking decks on levels 2 and 3 for use as clinical or administrative offices, dry labs, or patient support spaces.
- Expansion of Radiation Oncology department in the Dana Building level L2.
- Relocation and renovation of several clinical support departments including Nuclear Medicine within the Dana Building.
- Renovation and reuse of the vacated areas of the Dana, Mayer, and Smith buildings for research laboratory, patient service, clinical support and administrative functions

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

The Dana-Farber Cancer Institute proposes to construct a new, 13-story building on the adjacent parcels presently occupied by 454 Brookline Avenue, the Redstone Building, and a 30-car parking lot. The proposed building program will provide approximately 275,000 gross square feet (GSF) of space above grade that will accommodate research laboratories, clinical space, patient services, administrative functions, a street-level lobby and new main entrance, and retail space. 450 Brookline Avenue will complete development of the block bounded by Brookline Avenue, Jimmy Fund Way, Binney Street, and the property line of the Medical Area Total Energy Plant (MATEP) building. Although its design is in preliminary stages, DFCI expects that the new building will complement the existing street frontage on Brookline Avenue in both massing and use. Design concepts to date are described below and illustrated in the plans and renderings in Appendix A. The design of the building massing and façade will be done in consultation with Boston Redevelopment Authority, the LMA Forum, and community advisory groups as mandated by the Boston Zoning Code.

Structure, Massing, and Program

The proposed 450 Brookline Avenue building is envisioned as the new signature image and main entrance for the Dana-Farber Cancer Institute. The massing of the building along Brookline Avenue is organized around an entry oriented towards Joslin Park. At the base of this volume is a transparent two-story glazed lobby at the corner of Brookline Avenue and Jimmy Fund Way that will welcome patients and visitors to the Institute from. The lobby will be set back approximately 27 feet from Jimmy Fund Way with a generous glass canopy over the drop-off area. Along Brookline Avenue, the lobby will be set back approximately 47 feet. Beyond the lobby, retail space will be located along street and will be set back approximately 30 feet, providing a gracious tree-lined pedestrian way and an elevated terrace level at the lobby elevation for pedestrian interaction and seating.

Above the corner of Jimmy Fund Way and Brookline Avenue is a planned two-story Healing Garden oriented towards Joslin Park that will create a warm and optimistic image. The waiting areas of the clinical floors are stacked above the healing garden to take advantage of the city and Back Bay Fens views across Joslin Park. Dining areas are located on the third level of the base along Brookline Avenue. Above this thee-story base, six clinical level love above a mechanical setback taking advantage of the views and daylight. Above this are three floors of program space and clinical floors and transition to an articulated top. This articulation is emphasized along Brookline Avenue from the North and South, the major views as one approaches the site. The design of the building massing and character of the façade will be done in consultation with the Boston Redevelopment Authority, the LMA Forum, and community advisory groups as mandated by the Boston Zoning Code.

To encourage pedestrian movement around this area, a pathway approximately 15 feet wide will be maintained between the new building and the adjacent MATEP facility, connecting Brookline Avenue to Binney Street. An entry to the lobby and access to the elevated terrace along Brookline Avenue will be located along this pedestrian corridor.

450 Brookline Avenue will be set back 33 feet from the Smith Laboratories Building above the third floor. Bridge connections at most floors are envisioned above this level to accommodate the translational mission of the Institute by connecting the new clinical floors to the Smith research floors. Along Jimmy Fund Way, the third floor of the new building will be connected to the third floor bridge system through the Smith Laboratories building, which links all buildings of the Dana-Farber complex and Brigham and Women's and Children's Hospitals.

Building Materials

The material palette for 450 Brookline Avenue will be selected to create a warm and optimistic signature image for the institution, and provide for lasting durability and ease of maintenance. Along Brookline Avenue, the first three stories are envisioned as terra cotta, with a granite base for durability, giving the building a warm tone and elegant sense of scale for its size. Generous glazed openings along the base will allow maximum light deep into the public spaces of the building. The two-story lobby will be a completely transparent glazed curtain wall, creating an inviting entry. The elevations along Jimmy Fund Way and Brookline Avenue above the three-story base are predominantly envisioned as a transparent glass curtain-wall system with a terra cotta floor-line accent to allow maximum light into the healing areas by day, and a soft optimistic glow in the evenings. South and West facades will incorporate the use of terra cotta sunscreen rods and/or translucent overhangs to filter the light and bring the positive effects of natural daylighting to the clinics and staff areas. South and East elevations along the MATEP facility and Smith Laboratories Building would be predominantly clad in terra cotta panels with a rhythm of punched openings. An appropriate metal shingle accent is being investigated to complement the terra cotta and glass vocabulary.

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

The proposed site of 450 Brookline Avenue is on the main campus of the Dana-Farber Cancer Institute in the Longwood Medical Area (LMA). The LMA is characterized by large-scale modern institutional construction interspersed with earlier institutional, residential, and civic buildings, structures, and sites. The area of potential impact for the proposed project consists of the 1916 Redstone Animal Facility, the 1923 building at 454 Brookline Avenue, the 1995 Smith Laboratories Building at 1 Jimmy Fund Way, and 1972 Dana Building at 44 Binney Street. The Redstone Animal Facility and 454 Brookline Avenue are not listed on the State or National Registers of Historic Places and are not included in the Massachusetts Historical Commission's *Inventory of Historical and Archaeological Assets of the Commonwealth*. Both buildings have been substantially altered since construction, and neither is associated with any known events or persons important in local, state, or national history.

Several properties listed on or determined to be eligible for the National Register of Historic Places are located within one eighth of a mile of the project site, as are several resources included in the *Inventory of Historic and Archaeological Assets of the Commonwealth*. Table 1 below details these properties. The number or letter assigned to each property corresponds with the map in Figure 2.

Table 1. Historic Resources within the Vicinity of 450 Brookline Avenue

Properties Listed on the State and National Registers of Historic Places		Designation
A. Massachusetts Mental Health Center	74 Fenwood Road	NRDIS/NRMPS
B. Massachusetts School of Art	364 Brookline Avenue	NRIND
C. The Dutch House	20 Netherlands Road, Brookline	NRMRA/NRIND
D. Olmsted Park System/Emerald Necklace Parks	Riverway along the Muddy River	NRDIS/LL/PR

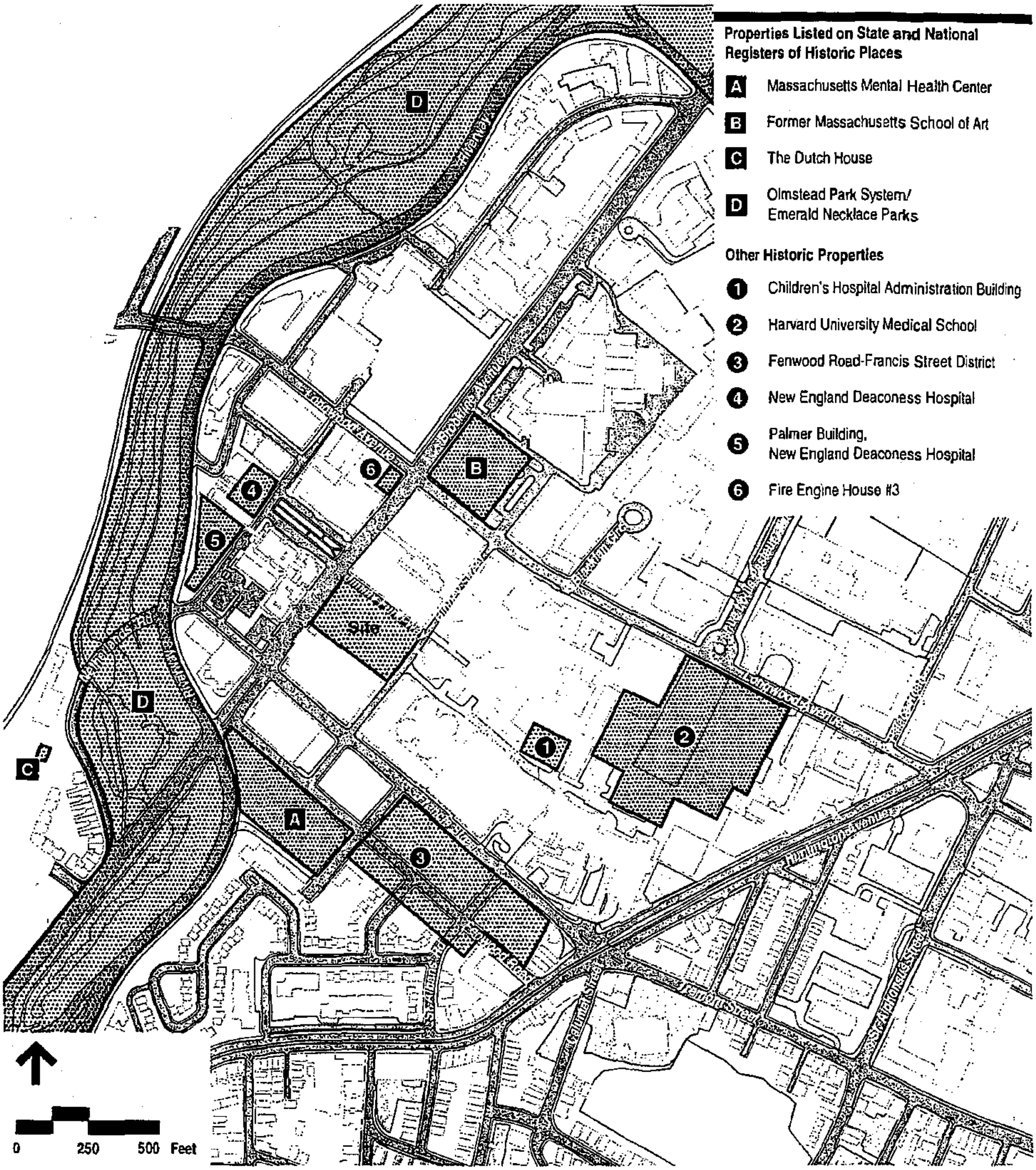
Properties and Districts Determined Eligible for the State and National Registers of Historic Places	
1. Children's Hospital Administration Building	300 Longwood Avenue
2. Harvard University Medical School	210-260 Longwood Avenue, 25 Shattuck Street
3. Fenwood Road-Francis Street District	Including 36, 40, 43, and 49 Fenwood Road; 30, 50, 56, and 58 Francis Street; and 5 St. Albans Rd.

Properties in the MHC's Inventory of Historic and Archaeological Assets of the Commonwealth	
4. New England Deaconess Hospital	175 Pilgrim Road
5. Palmer Building, New England Deaconess Hospital	195 Pilgrim Road
6. Fire Engine House No. 3	354 Longwood Avenue

NRDIS – National Register District; NRIND – Individually listed on the National Register; NRMPS – Listed as part of a Multiple Property Submission; NRMRA – Listed as part of a Multiple Resource Area; LL – Local landmark; PR – Property or portion of property is under a preservation restriction

A review of the MHC archaeological base maps revealed no recorded archaeological sites within one eighth of a mile of the project site.

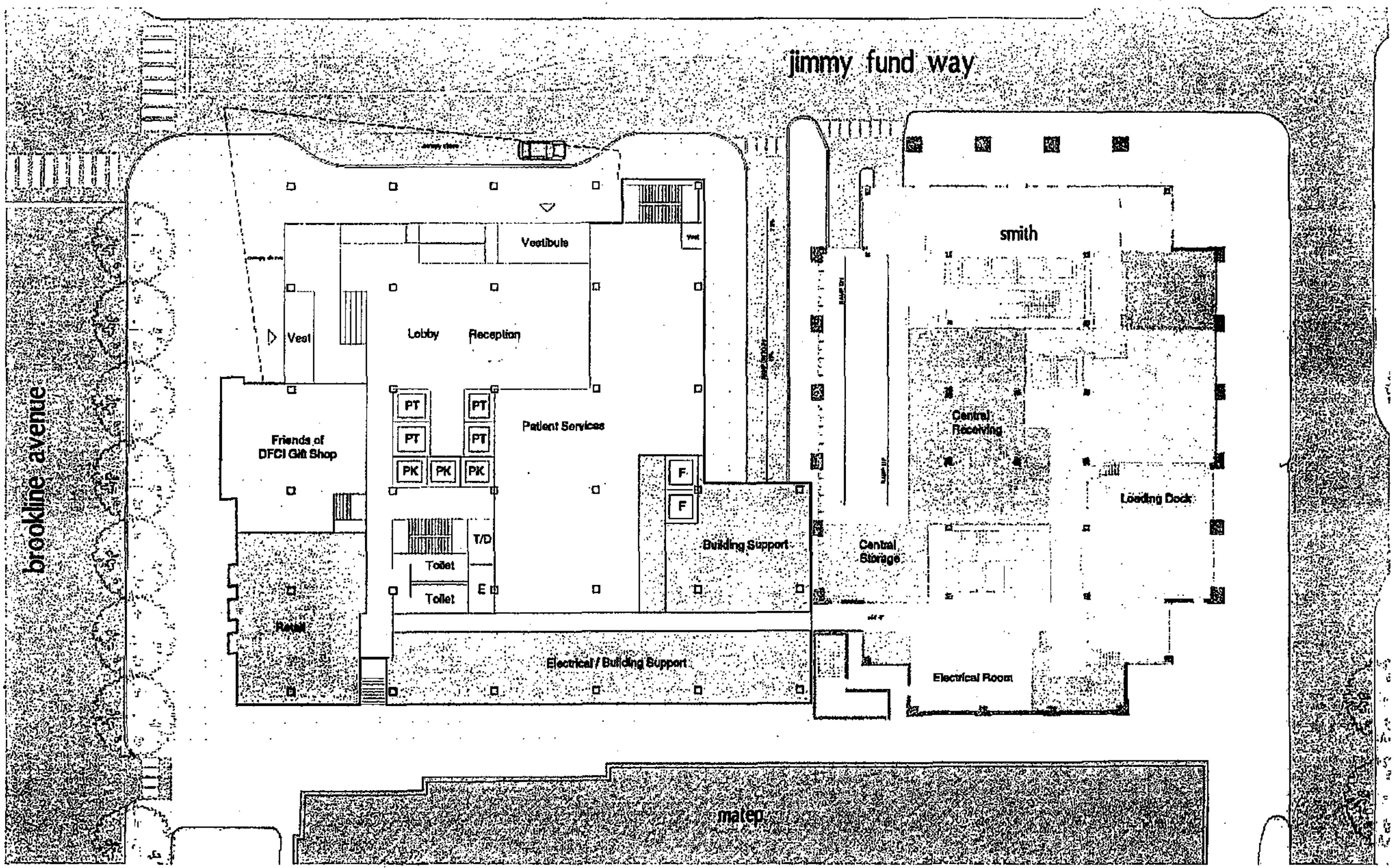
mabos\projects08984\graphics\figures\8984his.dwg



Historic Resources

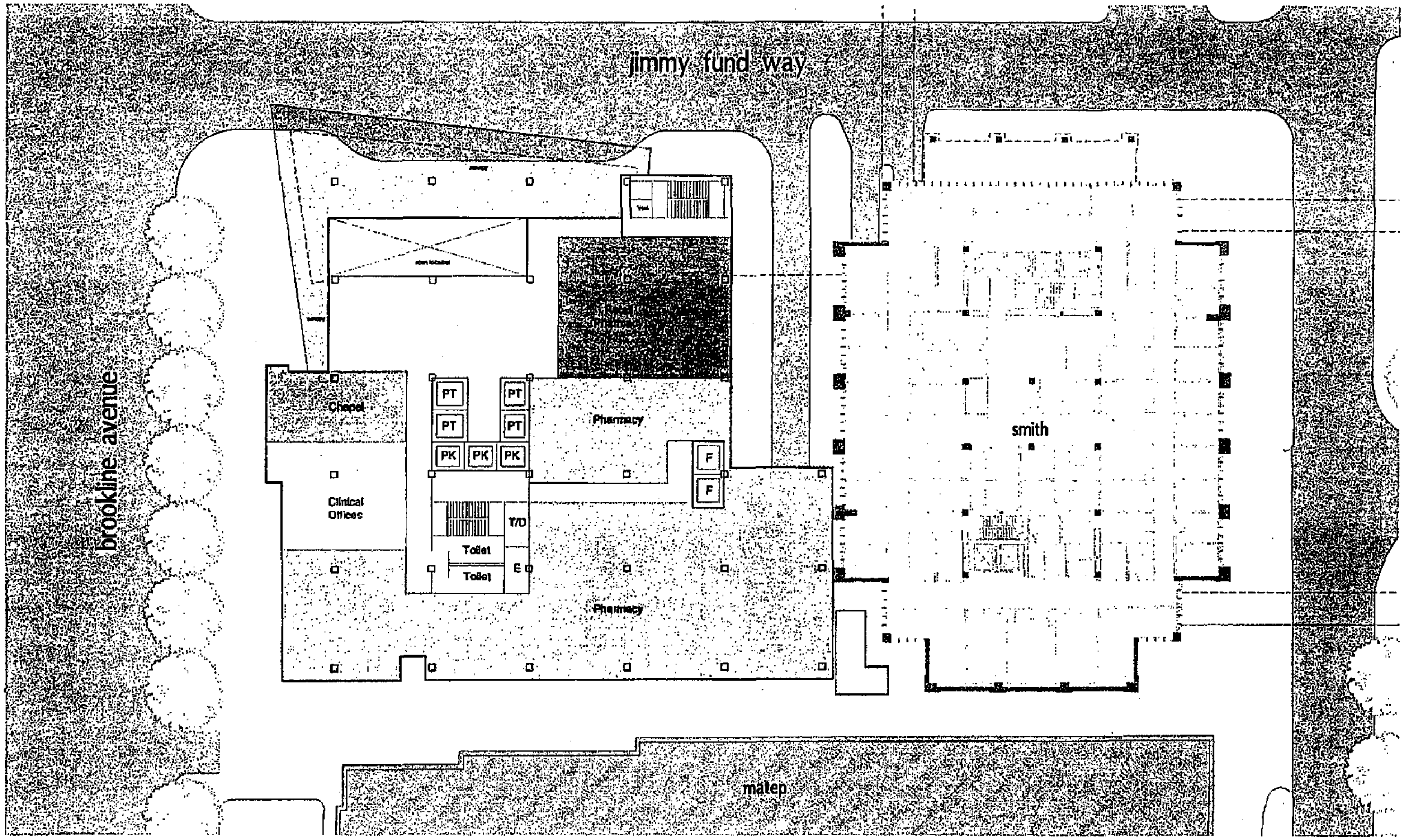
Figure 2

Appendix A
Plans and Renderings



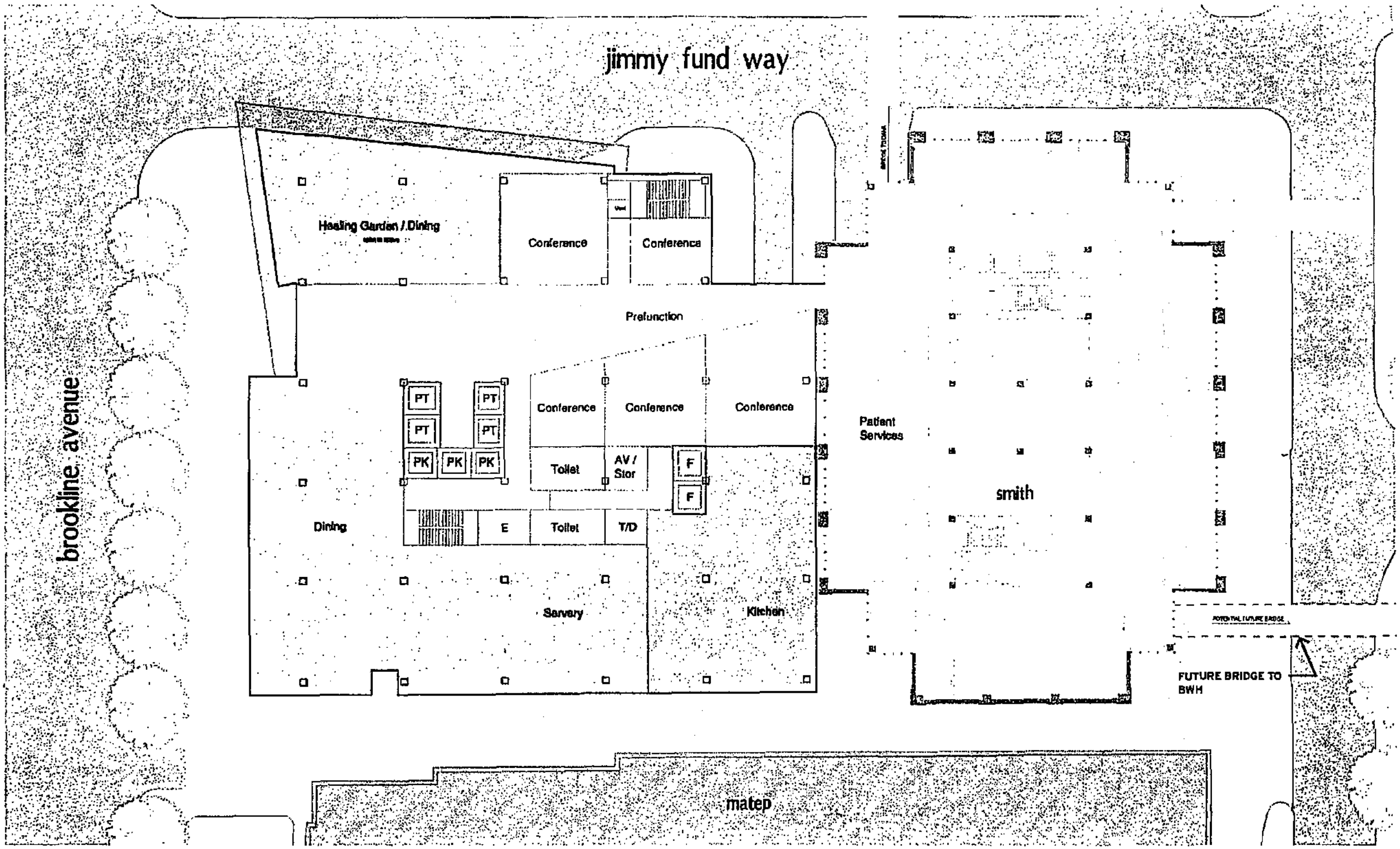
DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

GROUND FLOOR LEVEL



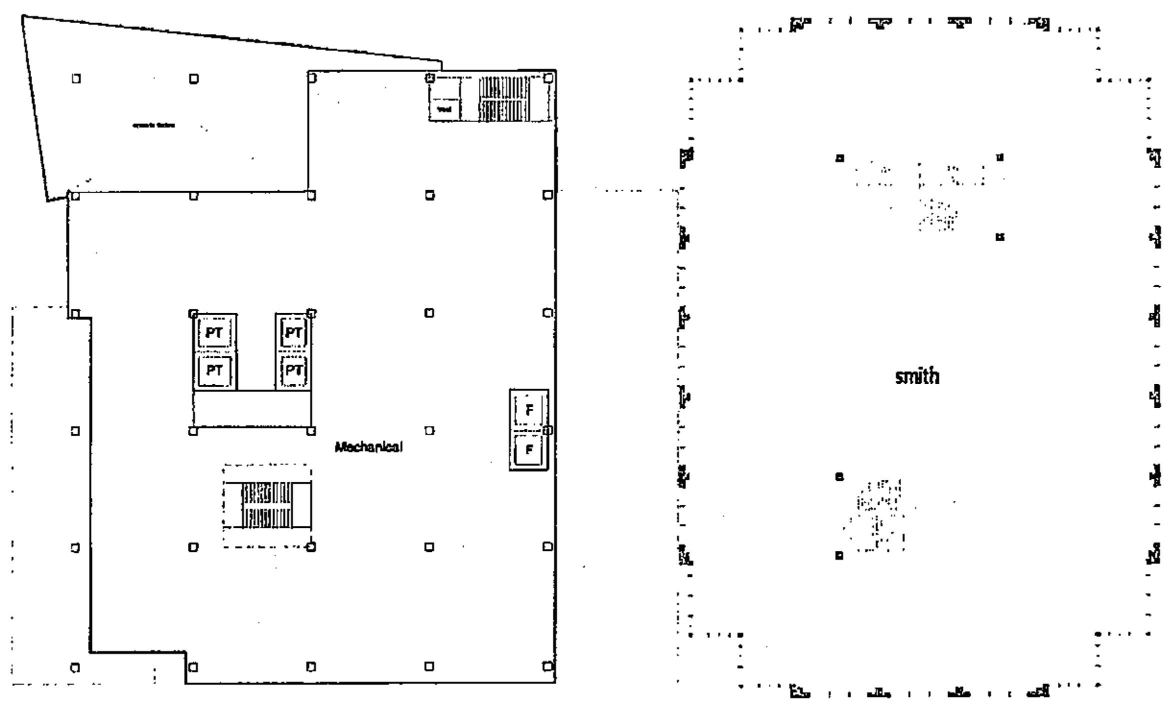
DANA-FARBER CANCER INSTITUTE
[illegible] BROOKLINE AVENUE

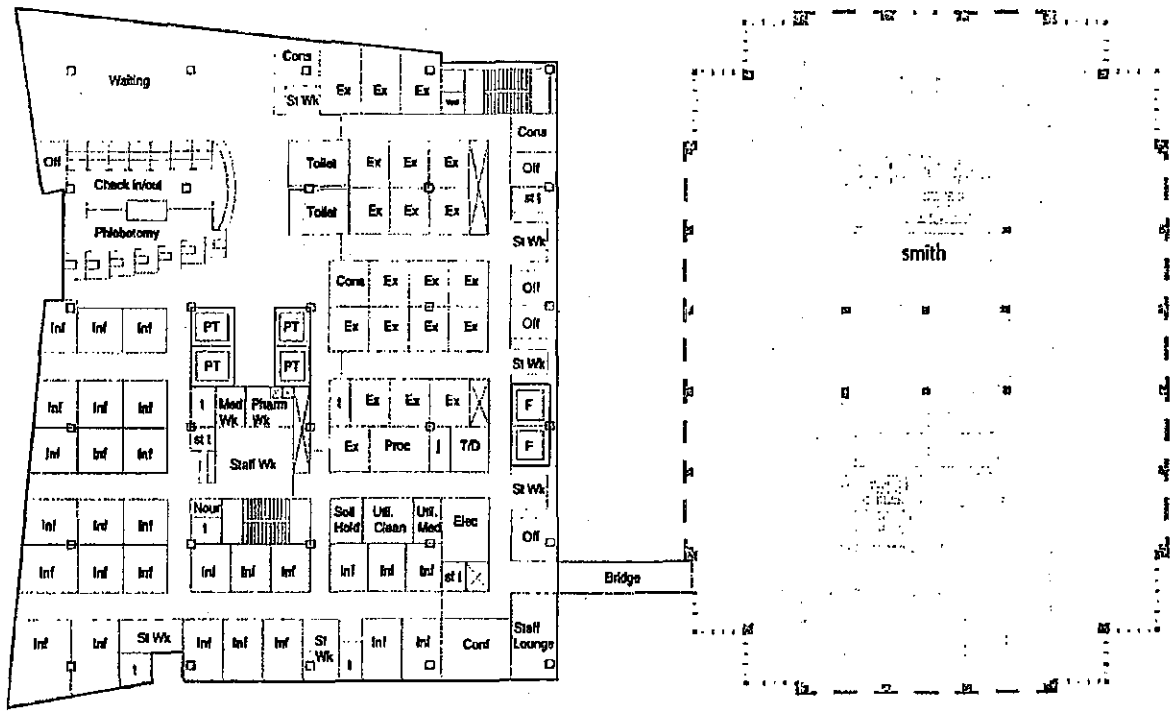
SECOND LEVEL



DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

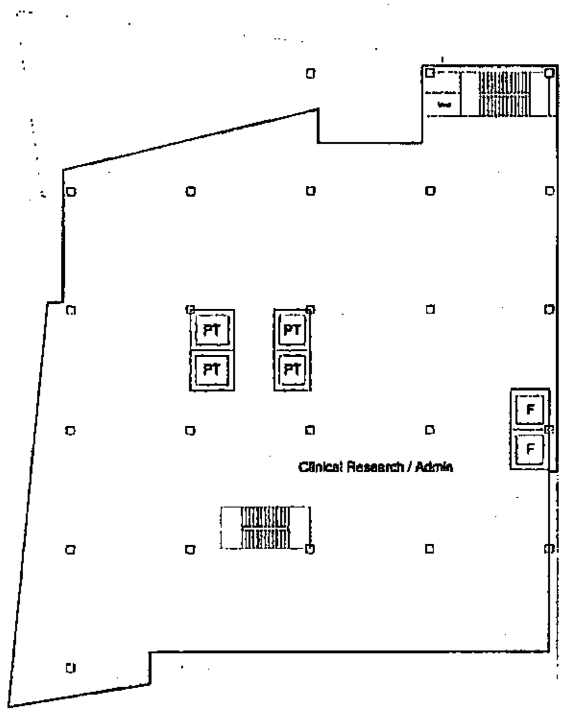
THIRD LEVEL


PT
PT
PT
PT
F
F
Mechanical
smith

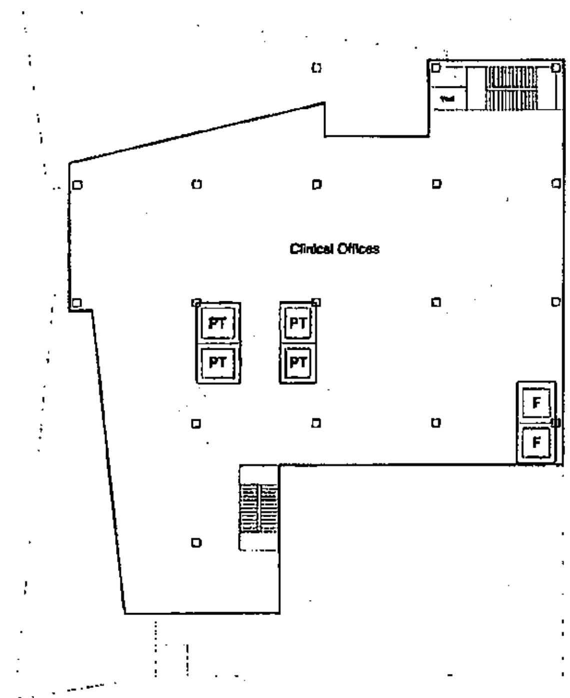


DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

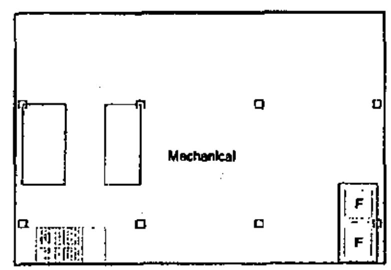
TYPICAL CLINIC FLOOR - LEVELS 5-10

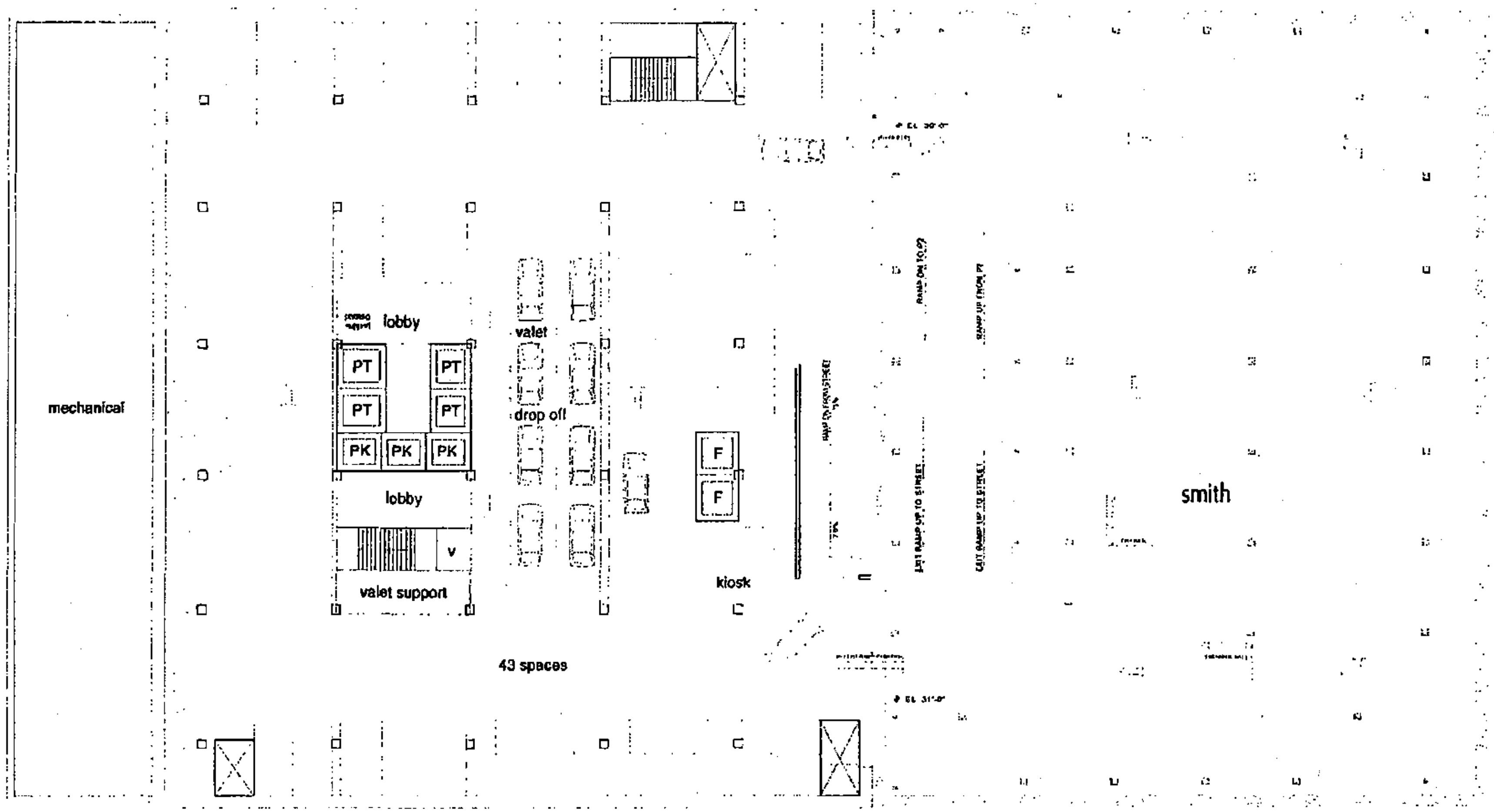


11TH FLOOR



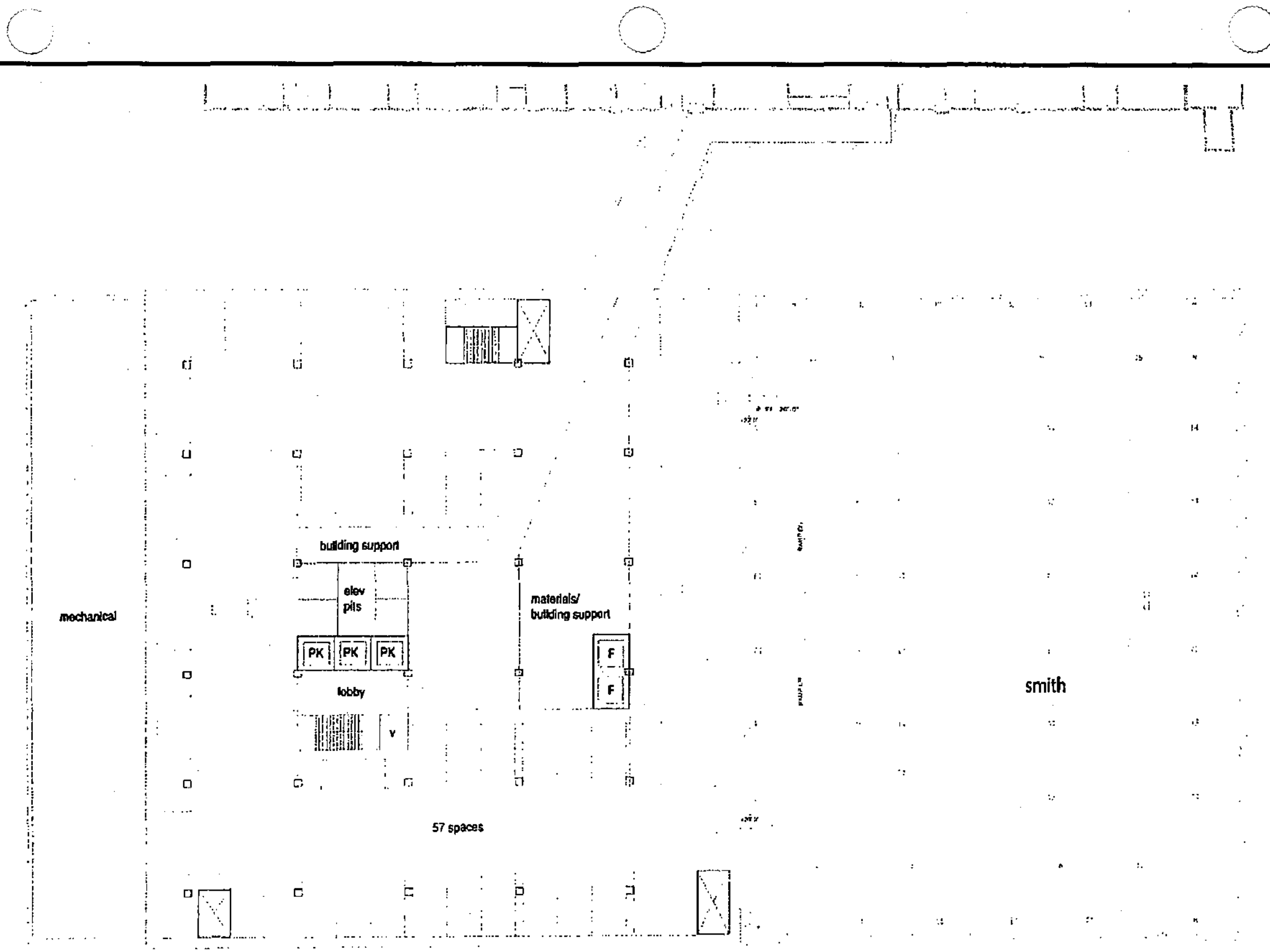
12-13 FLOORS


Mechanical
F
F

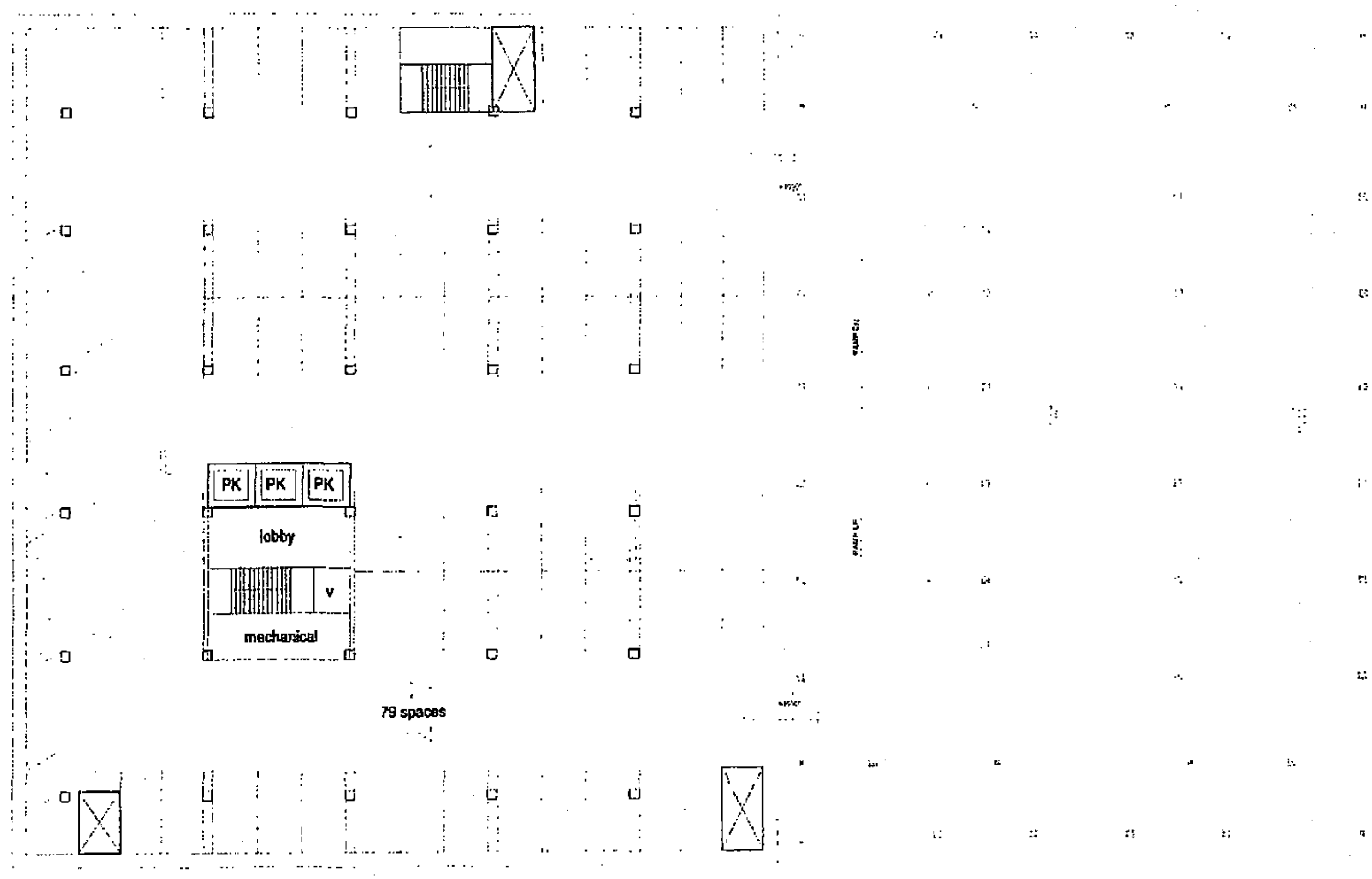


DANA-FARBER CANCER INSTITUTE
◯ BROOKLINE AVENUE

PARKING LEVEL P1

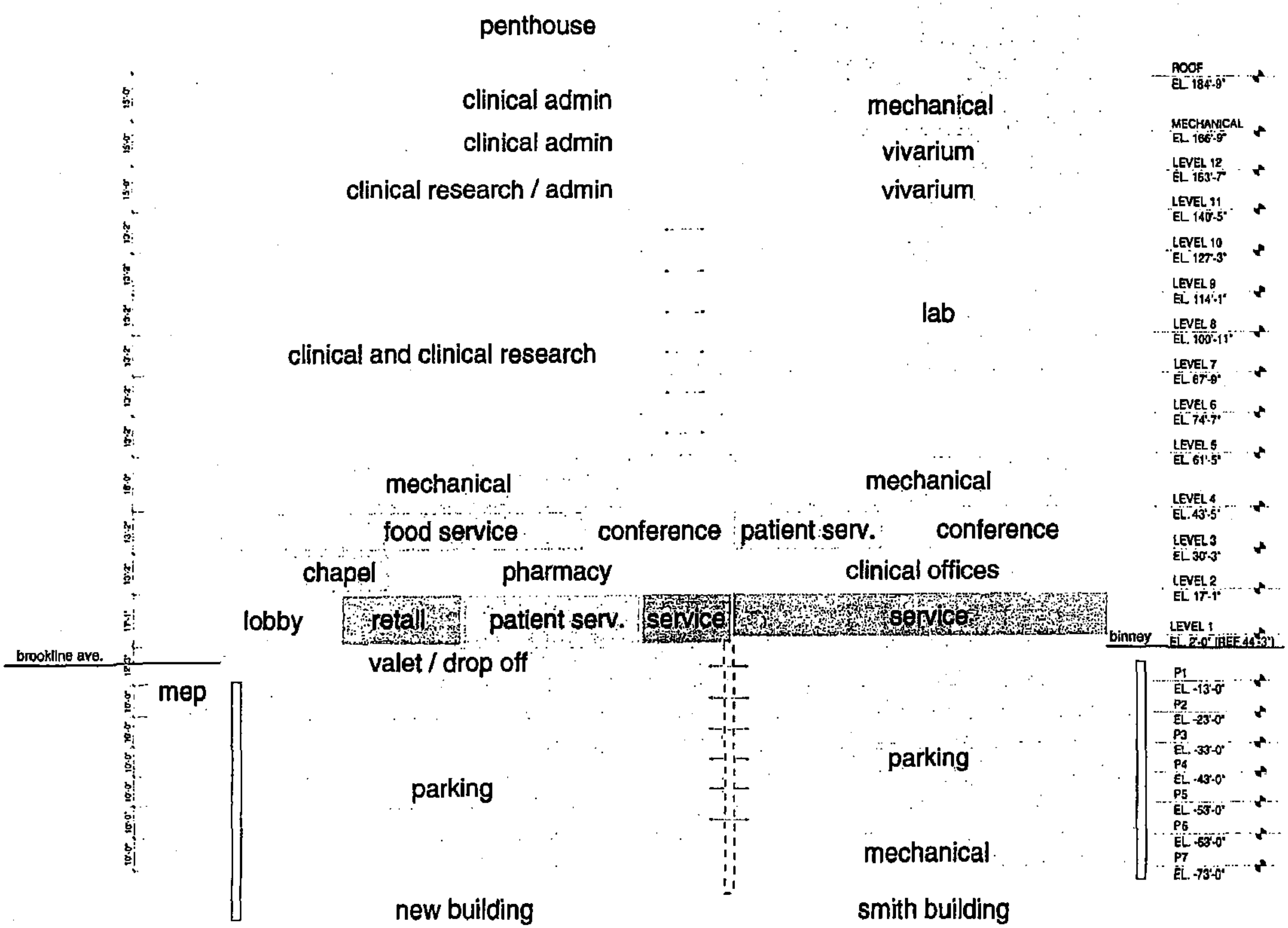


building support
elev
pits
materials/
building support
mechanical
PK
PK
PK
F
F
lobby
57 spaces
smith



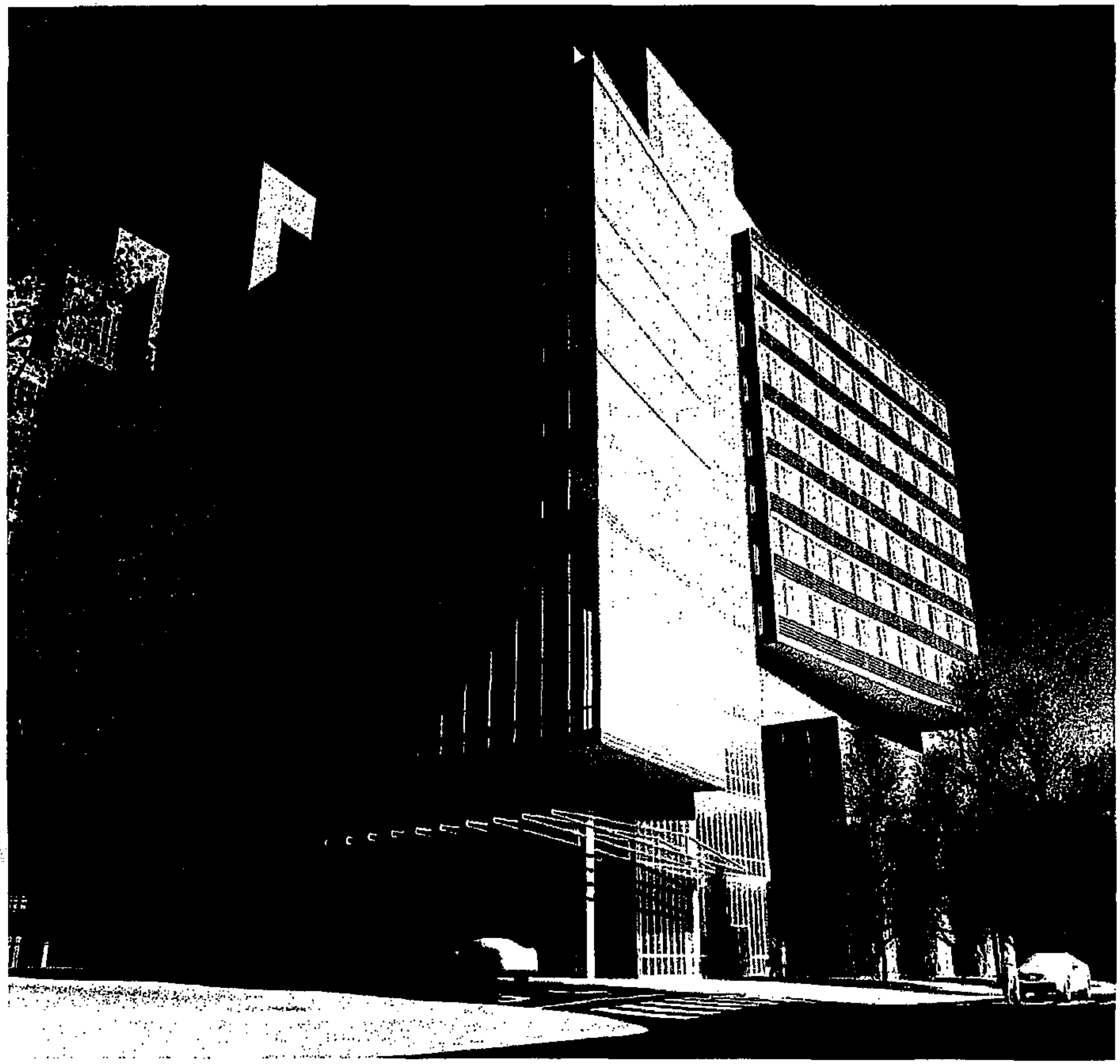
DANA-FARBER CANCER INSTITUTE
?50 BROOKLINE AVENUE

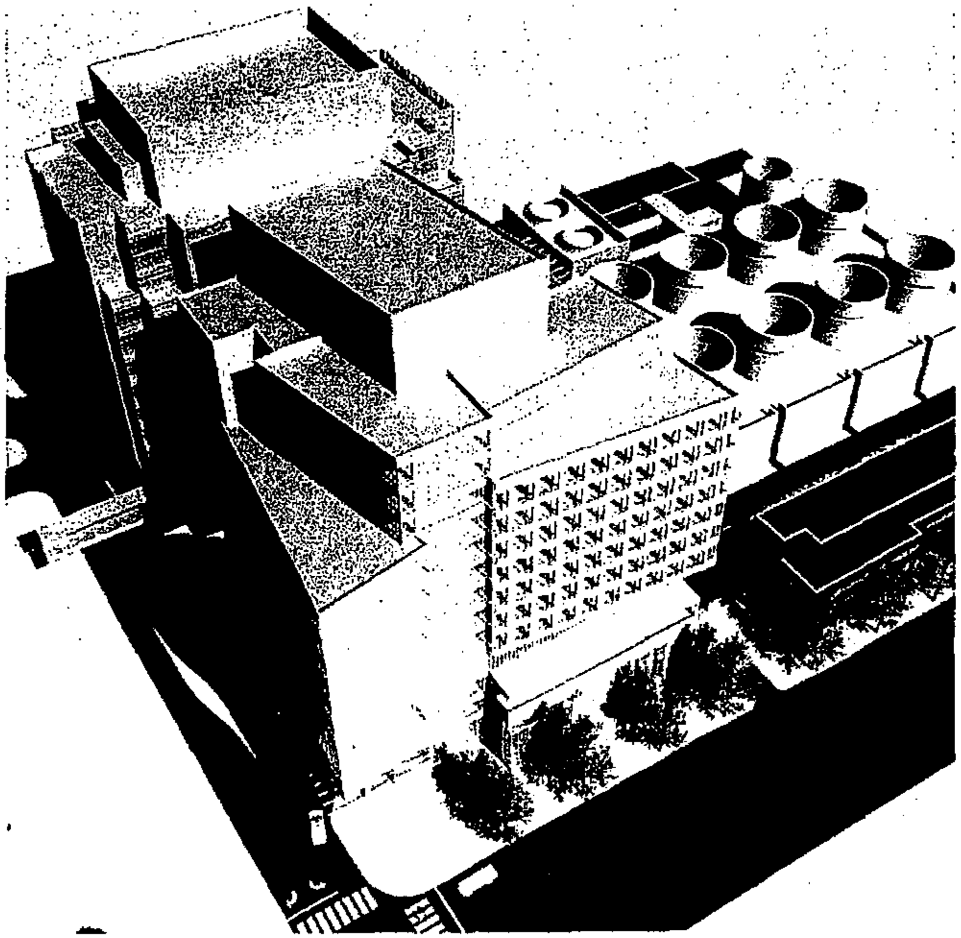
TYPICAL PARKING LEVEL



DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

BUILDING STACKING SECTION





DANA-FARBER CANCER INSTITUTE
450 BROOKLINE AVENUE

BUILDING MASSING STUDIES

4.4 Historic Resources

The proposed 450 Brookline Avenue project is located on the main campus of the Dana-Farber Cancer Institute in the LMA. The LMA is characterized by large-scale modern institutional construction interspersed with earlier institutional, residential, and civic buildings, structures, and sites. The 450 Brookline Avenue project involves construction of a new building on the site of the existing Redstone Animal Facility and 454 Brookline Avenue and an adjacent parking lot. The building at 454 Brookline Avenue is not historically significant. The project also includes construction of a new pedestrian bridge across Binney Street to connect the Smith Laboratories Building at 1 Jimmy Fund Way with the Amory Building of Brigham and Women's Hospital at 15 Francis Street. The 450 Brookline Avenue Building will be physically connected to the adjacent Smith Building on Levels 1 through 3 as well as all below-grade levels. An above grade pedestrian connection will be constructed between the 450 Brookline Avenue project and the existing Smith Building on Levels 5 through 13. The Smith building was constructed in 1995 and the Amory Building at Brigham & Women's Hospital was constructed in 1979. Neither is historically significant.

Several properties listed on or determined to be eligible for the National Register of Historic Places are located within one eighth of a mile of the project site, as are several resources included in the *Inventory of Historic and Archaeological Assets of the Commonwealth*. Table 4.6 below details these properties. The number or letter assigned to each property corresponds with the map in Figure 4-1 (Boston tax map with locations of listed, eligible, and surveyed properties).

Following the filing of this Project Notification Form, the proponent will file a Massachusetts Historical Commission Project Notification Form and a submittal to the City of Boston in accordance with Article 85 (Demolition Delay) to obtain a determination of no adverse effect.

A review of the MHC archaeological base maps revealed no recorded archaeological sites within one eighth of a mile of the project site.

Table 4.6 Historic Resources within the Site Vicinity

Properties Listed on the State and National Registers of Historic Places		Designation
A. Massachusetts Mental Health Center	74 Fenwood Road	NRDIS/NRMPS
B. Massachusetts School of Art	364 Brookline Avenue	NRIND
C. The Dutch House	20 Netherlands Road, Brookline	NRMRA/NRIND
D. Olmsted Park System/Emerald Necklace Parks	Riverway along the Muddy River	NRDIS/LL/PR
Properties and Districts Determined Eligible for the State and National Registers of Historic Places		
1. Children's Hospital Administration Building	300 Longwood Avenue	
2. Harvard University Medical School	210-260 Longwood Avenue, 25 Shattuck Street	
3. Fenwood Road-Francis Street District	Including 36, 40, 43, and 49 Fenwood Road; 30, 50, 56, and 58 Francis Street; and 5 St. Albans Rd.	
Properties in the MHC's Inventory of Historic and Archaeological Assets of the Commonwealth		
4. New England Deaconess Hospital	175 Pilgrim Road	
5. Palmer Building, New England Deaconess Hospital	195 Pilgrim Road	
6. Fire Engine House No. 3	354 Longwood Avenue	

NRDIS – National Register District; NRIND – Individually listed on the National Register; NRMPS – Listed as part of a Multiple Property Submission; NRMRA – Listed as part of a Multiple Resource Area; LL – Local landmark; PR – Property or portion of property is under a preservation restriction

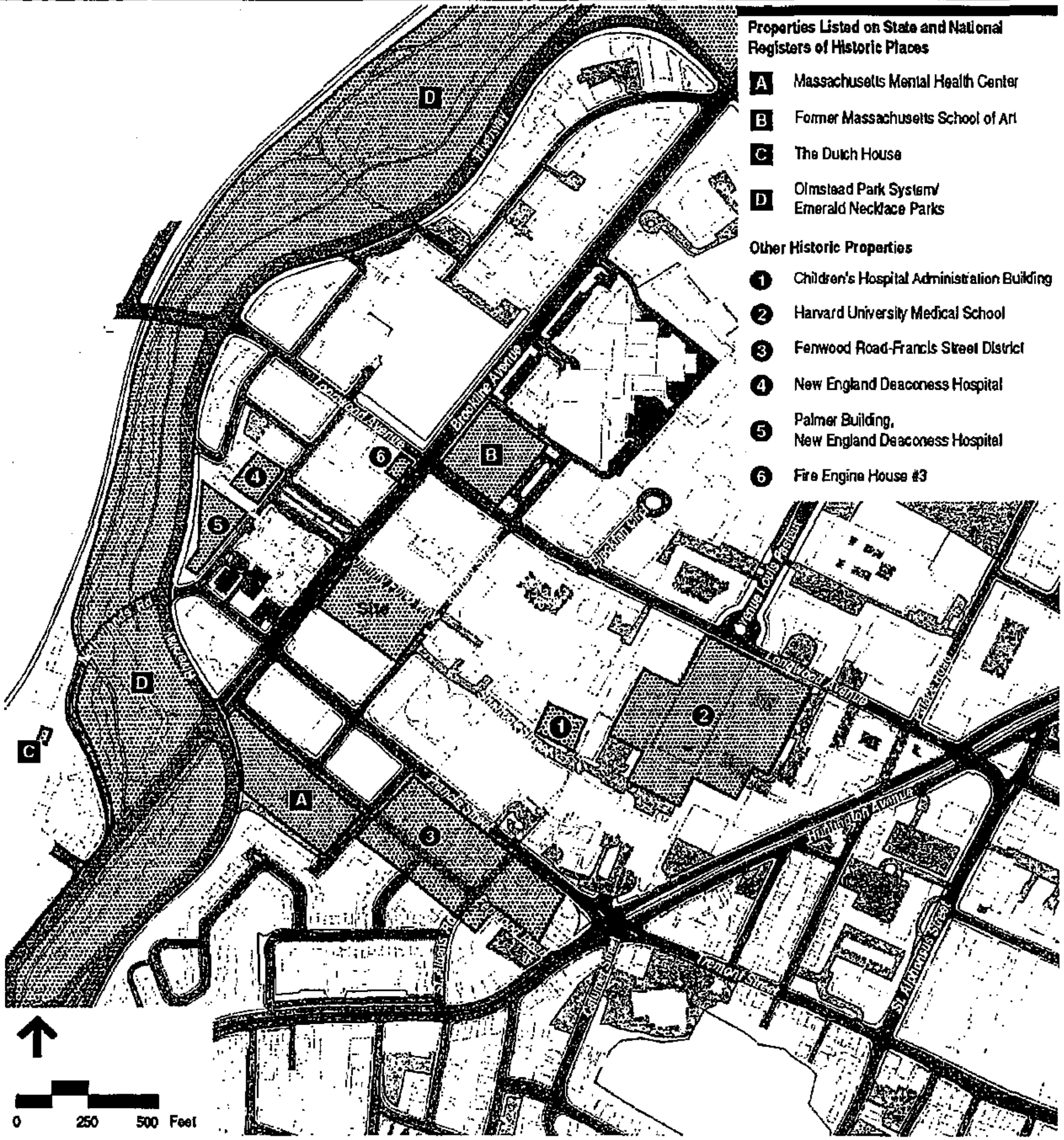
4.5 Infrastructure Systems

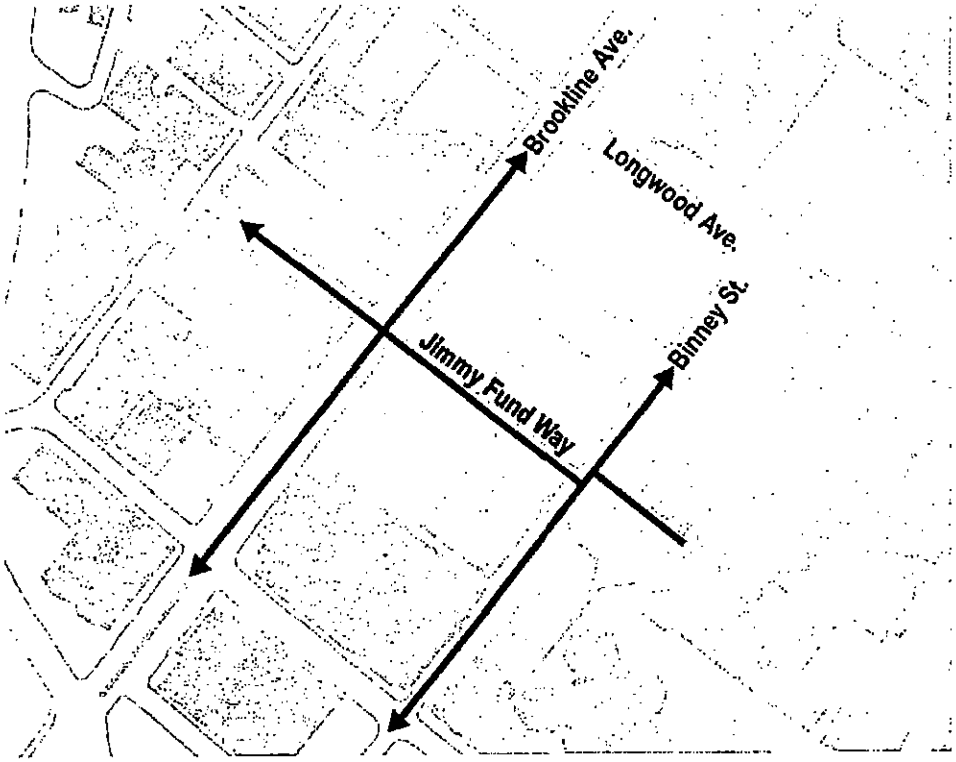
Existing domestic water, chilled water, steam, natural gas, electrical, sanitary sewer and storm water systems servicing DFCI's campus are shown in Figures 4-2 thru 4-4.

4.5.1 Wastewater Generation

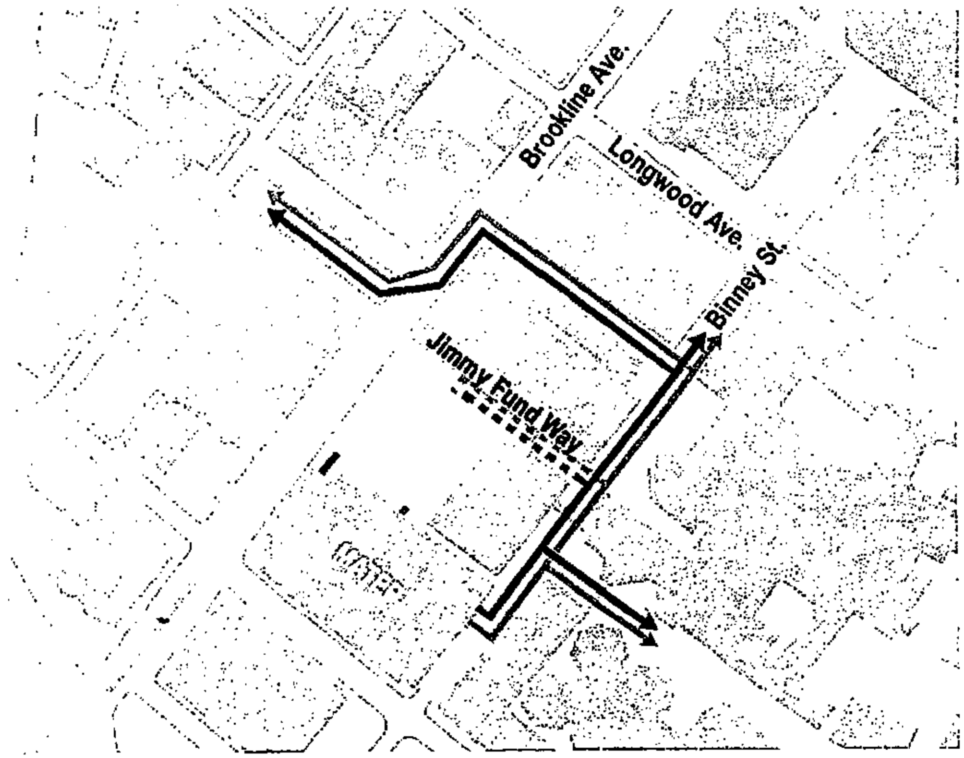
Sewage generated by the proposed 450 Brookline Avenue project will discharge to the 15-inch Boston Water and Sewer Commission (BWSC) sewer in Brookline Avenue and a 10-inch sewer in Jimmy Fund Way. This sewer flows west to the Brookline Sewer where it is intercepted by the Massachusetts Water Resource Authority's (MWRA) line feeding the Ward Street Headworks. From there the sewer flows to the Columbus Park Headworks via the Boston Main Drain and finally to the MWRA Deer Island Waste Water Treatment Plant for disposal.

Based upon a sewage generation rate of 200 gallons per day ("gpd") per 1,000 sf for clinical/research facilities, 75 gpd per 1,000 sf for retail/support/office space, and 50 gpd per seat for food service space, the 450 Brookline Avenue Project will generate an average daily sewer flow of approximately 54,300 gpd. Of the estimated 54,300 gpd, approximately 51,410 gpd represents net new sewage flow. Table 4.7 shows the sewage generation flows.


Properties Listed on State and National Registers of Historic Places
A Massachusetts Mental Health Center
B Former Massachusetts School of Art
C The Dutch House
D Olmstead Park System/ Emerald Necklace Parks
Other Historic Properties
1 Children's Hospital Administration Building
2 Harvard University Medical School
3 Fenwood Road-Francis Street District
4 New England Deaconess Hospital
5 Palmer Building, New England Deaconess Hospital
6 Fire Engine House #3
Brookline Avenue
Site
0 250 500 Feet



EXISTING POTABLE WATER

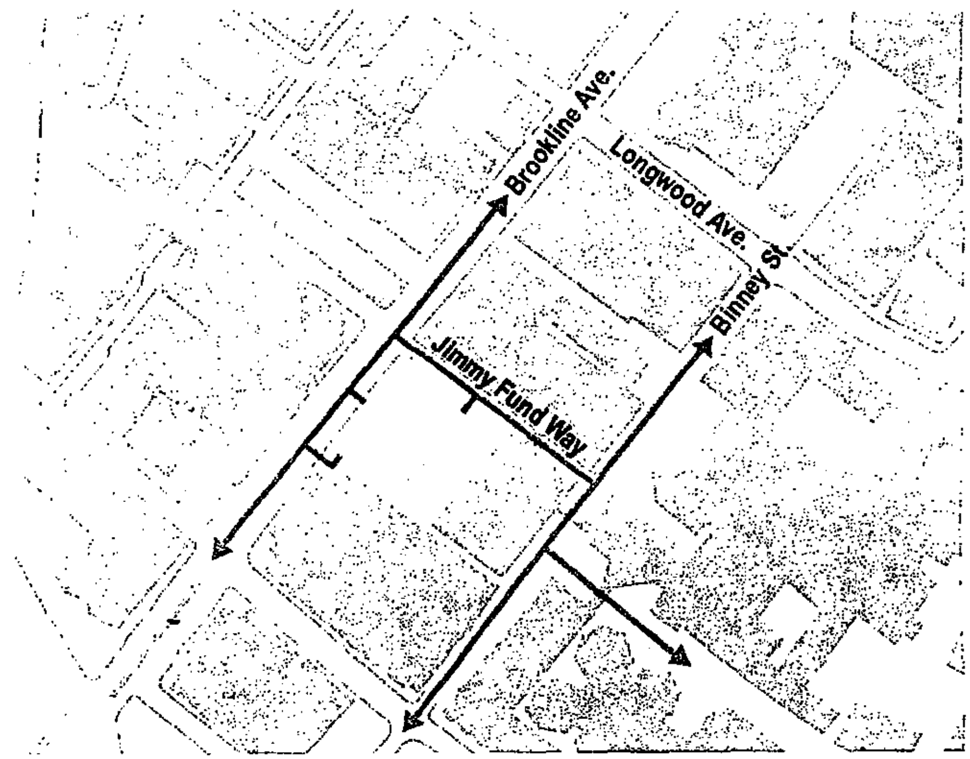


EXISTING CHILLED WATER AND STEAM
CHILLED WATER:
STEAM:

ALTERNATE FUTURE WATER AND STEAM
CHILLED WATER:
STEAM:

SITE UTILITIES
FIGURE 4-2

EXISTING NATURAL GAS



EXISTING ELECTRICAL

EXISTING SANITARY SEWER

EXISTING STORM WATER

Project Certification

This form has been submitted to the Boston Redevelopment Authority in accordance with the Boston Zoning Code, Article 80.

Richard M Shea Jr.

Signature of Proponent's Representative

Richard Shea
Dana-Farber Cancer Institute
44 Binney Street
Boston, MA 02115
(617) 632-6580

Date March 27, 2006

Myron Miller

Signature of Preparer

Myron Miller
Miller Dyer Spears, Inc.
286 Congress Street
Boston, MA 02110
(617) 338-5350

Date March 27, 2006