CITY OF PORTLAND, MAINE
DEVELOPMENT REVIEW APPLICATION
PLANNING DEPARTMENT PROCESSING FORM

I. D. Number

Address:

Maine Medical Center
Applicant

Application Date

22 Bramhall St Prtd, ME 04102
Applicant's Mailing Address

Addition to Bean Bldg
Project Name/Description

Shapley Bullinch Richardson & Abbott
Consultant/Agent

22 Bramhall St
Address of Proposed Site

Elise R. Woodward, AIA 827-423-1700*
Applicant or Agent Daytime Telephone, Fax

Assessor's Reference: Chart-Block-Lot

Proposed Development (check all that apply): ___ New Building ___ Building Addition ___ Change of Use ___ Residential
___ Office ___ Retail ___ Manufacturing ___ Warehouse/Distribution ___ Other (specify) Hospital

68,000 s.f. Addition | +/- 11.5 | R-6
Proposed Building Square Feet or # of Units | Acreage of Site | Zoning

Check Review Required:

[X] Site Plan (major/minor)	[ ] Subdivision # of lots ____	[ ] PAD Review	[ ] 14-403 Streets Review
[ ] Flood Hazard	[ ] Shoreland	[ ] Historic Preservation	[ ] DEP Local Certification
[ ] Zoning Conditional Use (ZBA/PB)	[ ] Zoning Variance	[ ] Single-Family Minor	[ ] Other ____

Fees paid: site plan 300.00 subdivision ____

Approval Status: Reviewer R KNOWLAND

[ ] **Approved** [X] **Approved w/Conditions** listed below [ ] **Denied**

1. APPLICANT SHALL SPECIFY A DROP INLET STRUCTURE ON THE OUTLET OF
2. MANHOLE AS REFERENCED IN TONY LOMBARDO MEMO OF 3-12-97
3. SPECIFIC LOCATIONS OF EROSION AND SEDIMENTATION MEASURES SHALL BE SHOWN ON THE SITE PLAN.
4. EXTERIOR LIGHTING SUBJECT TO PLANNING DEPT. REVIEW AND APPROVAL

Approval Date 3/13/97 Approval Expiration ____ (date) Extension to ____ (date) [ ] Additional Sheets Attached

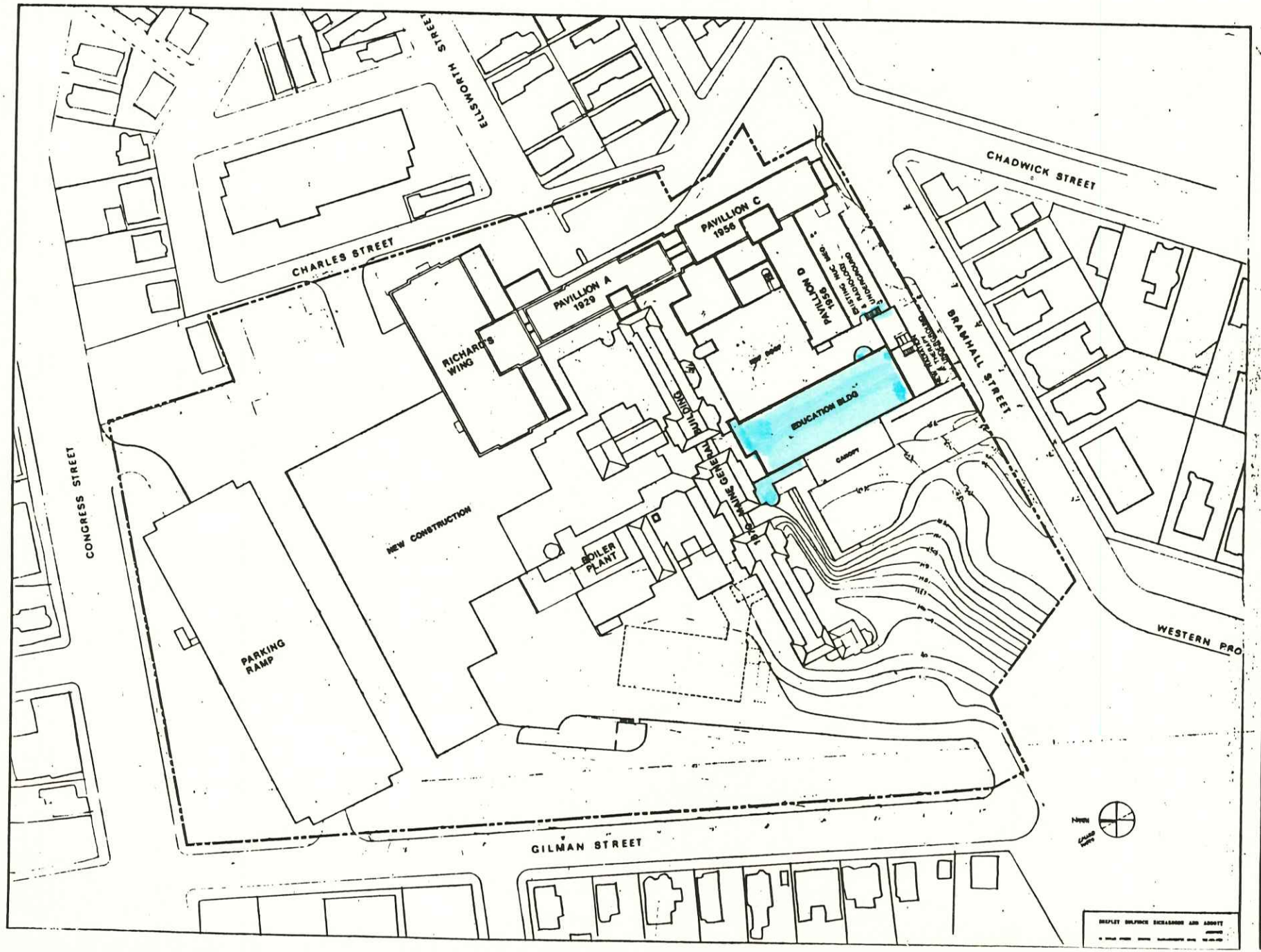
[X] Condition Compliance [signature] (signature) 3/13/97 (date)

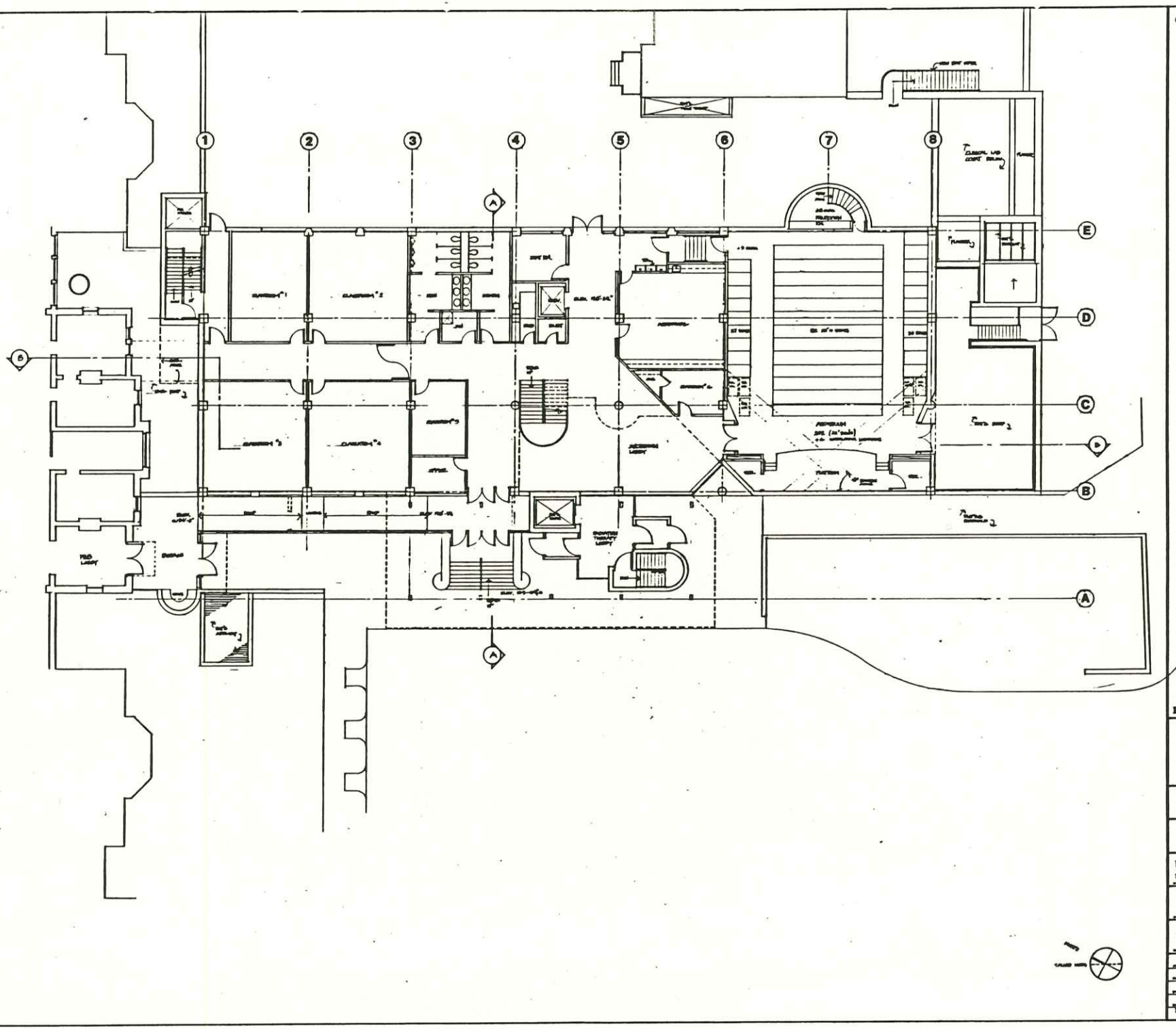
Performance Guarantee [X] Required* [ ] Not Required

* No building permit may be issued until a performance guarantee has been submitted as indicated below

[X] Performance Guarantee Accepted	11/12/96 (date)	$119,467 (amount)	10-1-99 (expiration date)
[X] Inspection Fee Paid	11/8/96 (date)	$2,070.94 (amount)	
Performance Guarantee Reduced	____ (date)	____ (remaining balance)	____ (signature)
Performance Guarantee Released	____ (date)	____ (signature)	
Defect Guarantee Submitted	____ (submitted date)	____ (amount)	____ (expiration date)
Defect Guarantee Released	____ (date)	____ (signature)	

Pink - Building Inspections Blue - Development Review Coordinator Green - Fire Yellow - Planning 2/9/95 Rev5 KT.DPUD


ELLSWORTH STREET
CHARLES STREET
CHADWICK STREET
PAVILLION C
1956
PAVILLION A
1929
RICHARD'S WING
PAVILLION D
1958
EXISTING MED. & SURGICAL UNDERGROUND
EDUCATION BLDG
BRAMHALL STREET
CONGRESS STREET
NEW CONSTRUCTION
BOILER PLANT
GENERAL MAINE
PARKING RAMP
GILMAN STREET
WESTERN PRO
MAINE MEDICAL CENTER
PROJECT TITLE
MAINE MEDICAL CENTER
EDUCATION BLDG
PORTLAND MAINE
PROJECT NO. 5189
DRAWN BY
CHECKED BY
DATE
SCALE
DRAWING TITLE
SITE PLAN
DRAWING NO.



GENERAL NOTES

REVISIONS

MAINE MEDICAL CENTER
PORTLAND, MAINE

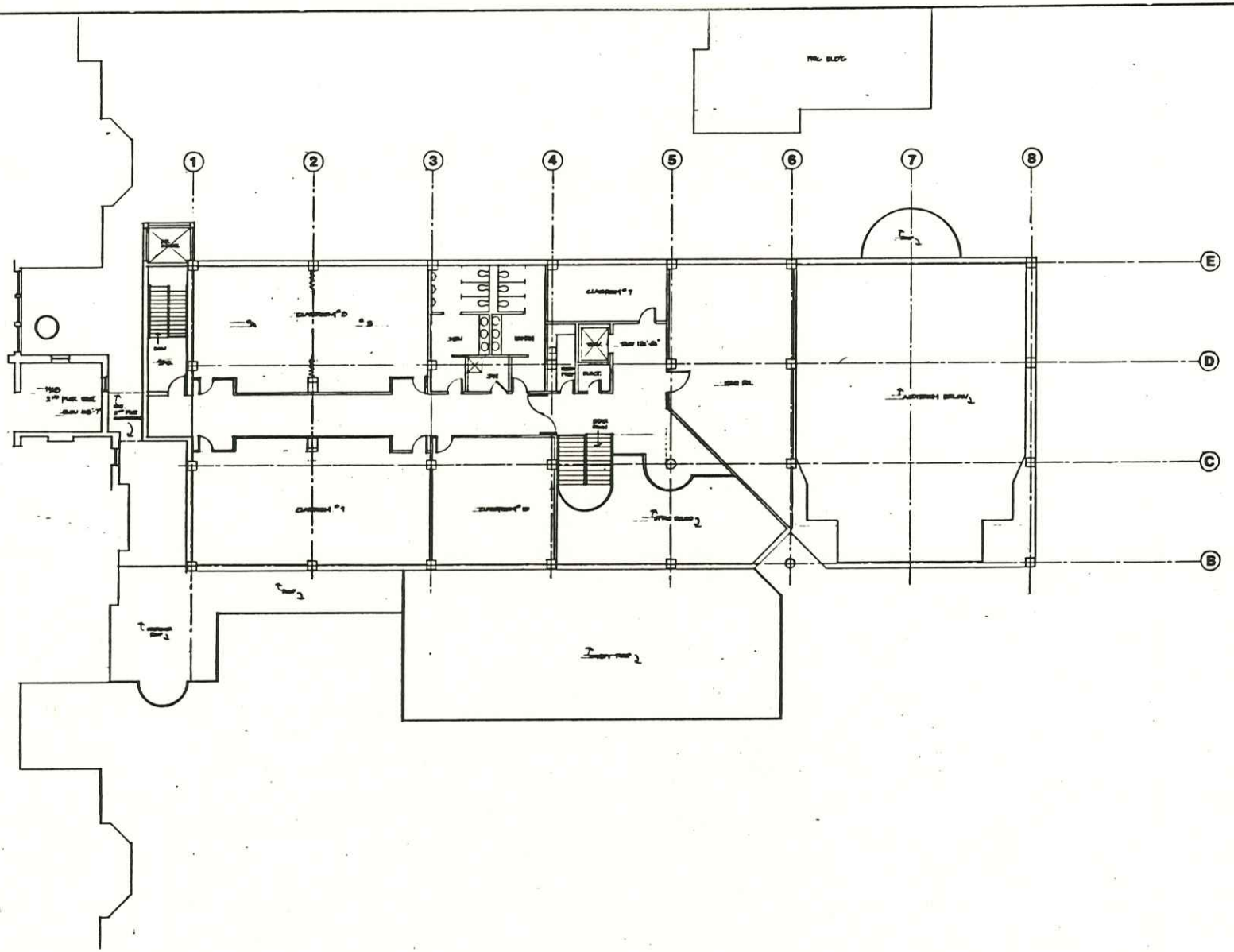
EDUCATION BLDG

FIRST FLOOR PLAN

3463

JAN 15 68

1/8" = 1'-0"



GENERAL NOTES

REVISIONS

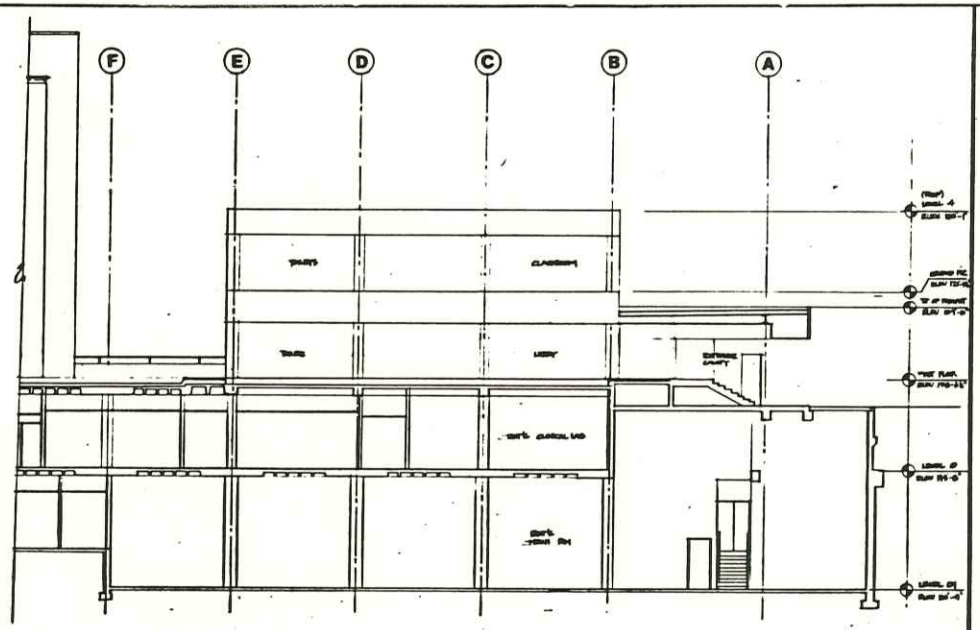
MAINE MEDICAL CENTER
PORTLAND, MAINE

EDUCATION BLDG

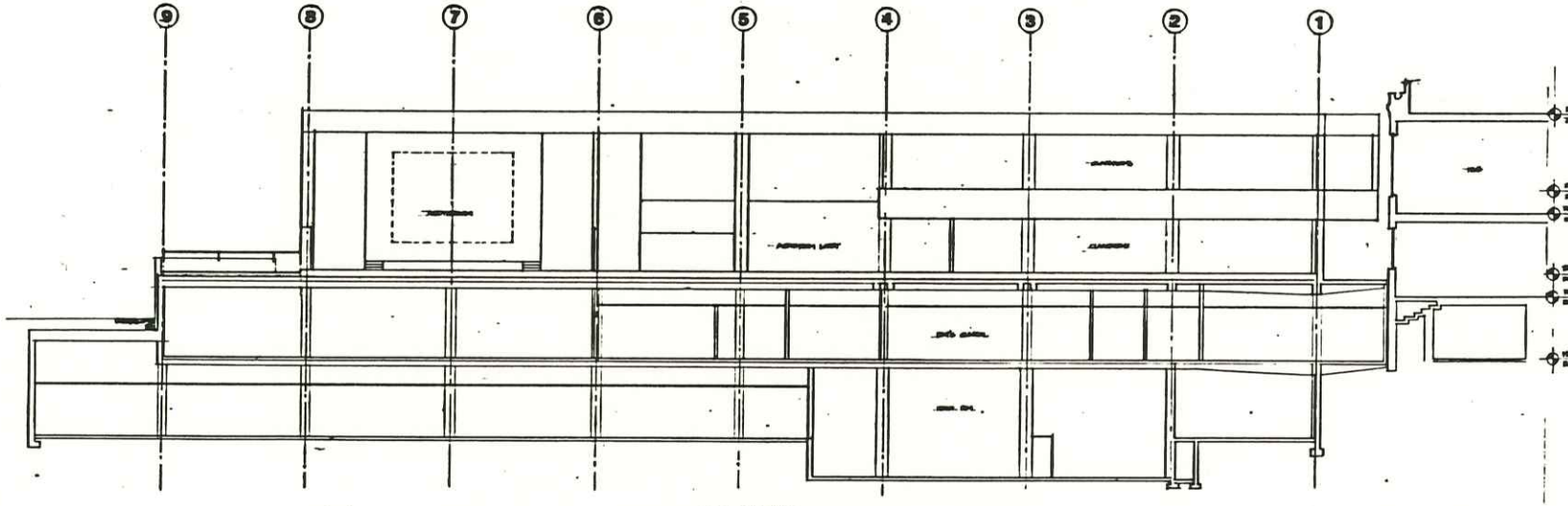
SECOND FLOOR PLAN

JAN 10,03

1/8"=1'-0"



SECTION A-A



SECTION B-B

GENERAL NOTES

REVISIONS

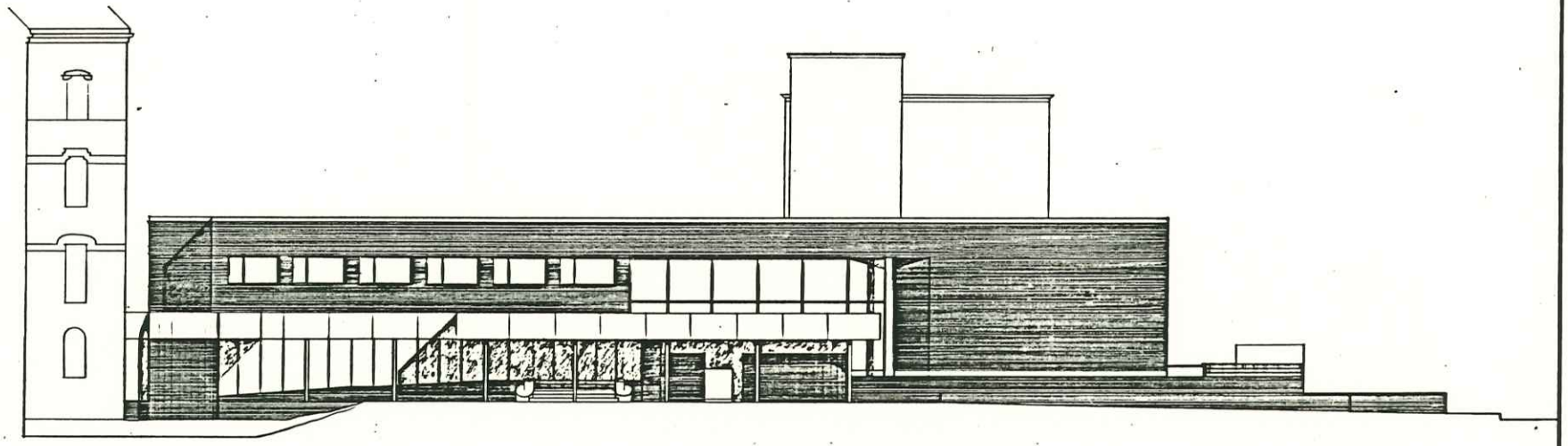
MAINE MEDICAL CENTER
PORTLAND, MAINE

EDUCATION BLDG

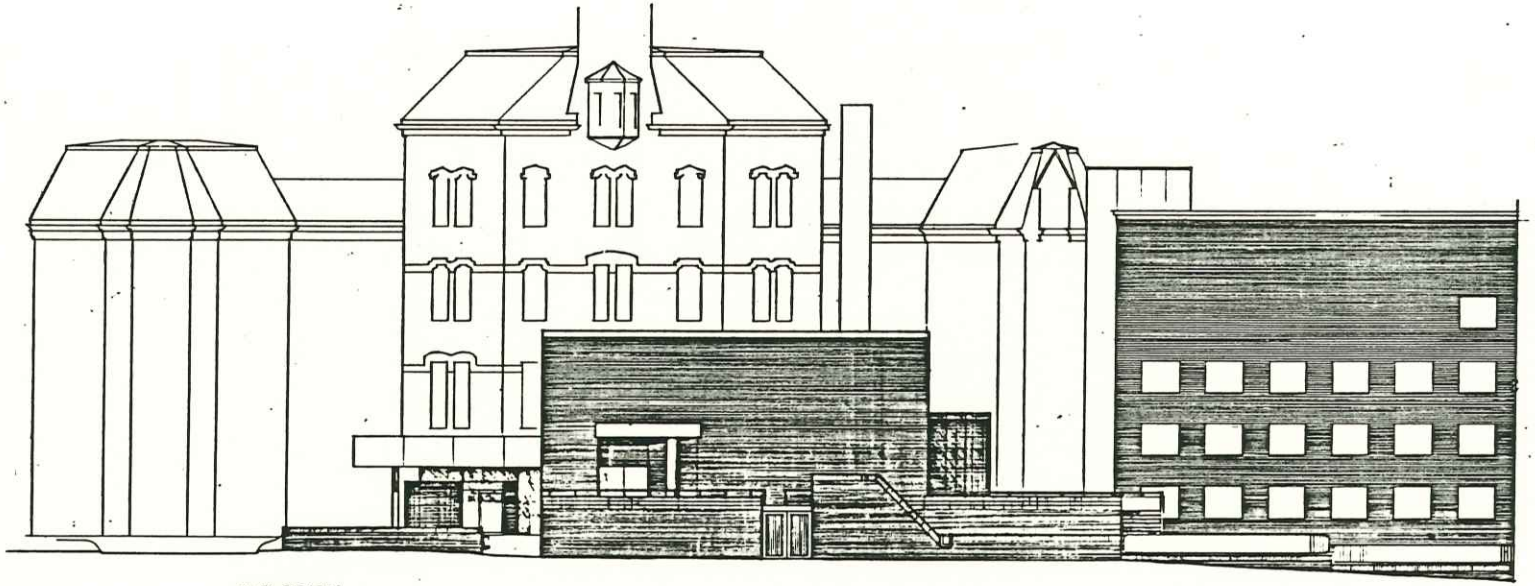
BUILDING SECTIONS

JAN 31, 89

1/8"=1'-0"



WEST ELEVATION



SOUTH ELEVATION

GENERAL NOTES

REVISIONS

MAINE MEDICAL CENTER
PORTLAND — MAINE

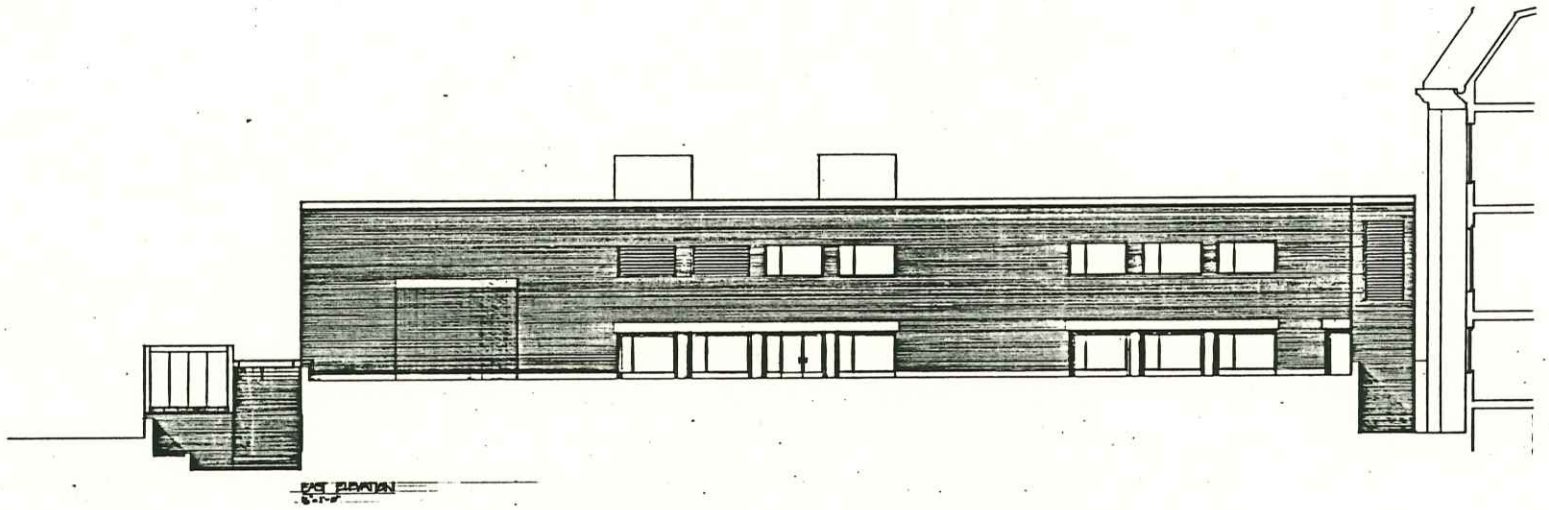
EDUCATION BUILDING

BUILDING ELEVATIONS

2185

25 JAN 88

1/8" = 1'-0"



EAST ELEVATION

GENERAL NOTES

REVISIONS

MAINE MEDICAL CENTER
PORTLAND MAINE

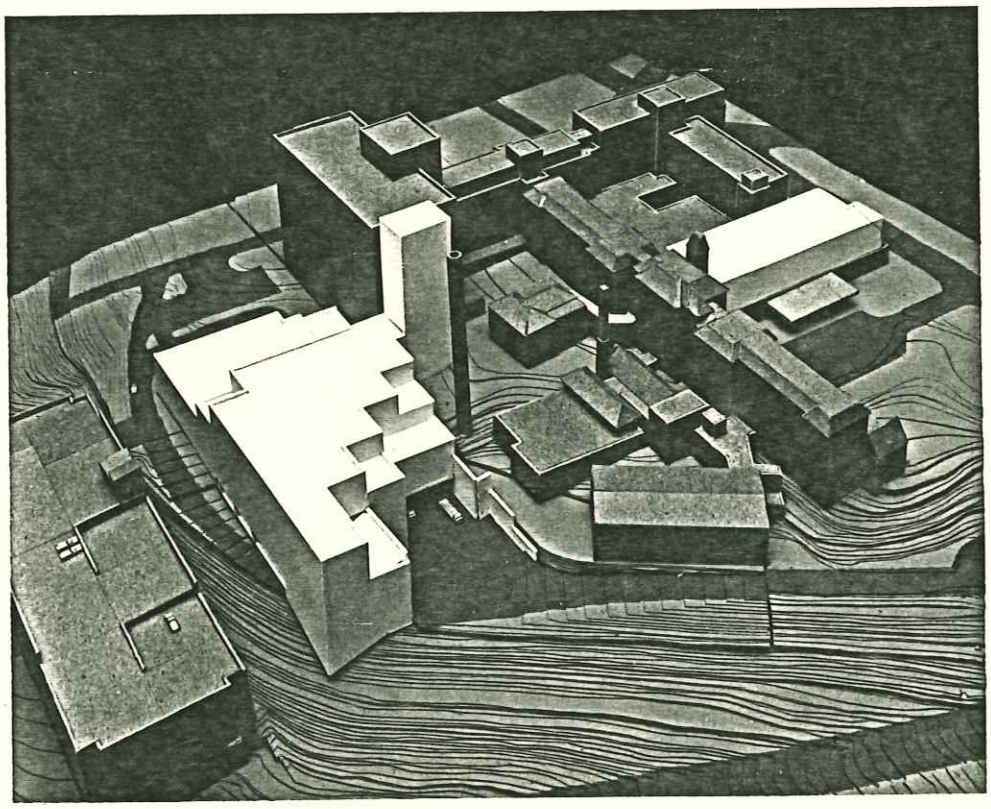
EDUCATION BLDG

BUILDING ELEVATIONS

2163

JAN 25, 67

1/8"-1'-0"



SHEPLEY BULFINCH RICHARDSON AND ABBOTT

MAINE MEDICAL CENTER

EDUCATION BUILDING

PROGRAM OF SPACES

12/9/82

No. of Rooms		Net Square Feet
(1)	Auditorium (includes storage, stage projection room)	3,200
(1)	Audio Visual Room	600
(5)	Classrooms - #2, #4, #5, #6, #10 (40 persons @15 sq. ft.) = 600 per room.	3,000
(2)	80 Person Classrooms #8, #9 (one can be divided into two 40 person classrooms)	2,400
(3)	14 Person Classrooms - #1, #3, #7 (14 persons @15 sq. ft.) = 210 sq' per room.	630
(1)	Office	100
(1)	Coat Room	140
(2)	Food Prep @ 70 sq. ft.	140
(1)	Auditorium Lobby (250 persons x 5 sq. ft.)	1,250
(2)	Janitor Closets @ 35 sq. ft.	70
(2)	Men Toilets @ 220 sq. ft.	440
(2)	Women Toilets @220 sq. ft.	440
	Total Net Sq. Ft.:	12,410
	Total Gross Sq. Ft.:	19,400

CITY OF PORTLAND

JOSEPH E. GRAY, JR.
DIRECTOR OF PLANNING & URBAN DEVELOPMENT

February 14, 1983

TO RESIDENTS AND PROPERTY OWNERS IN THE VICINITY OF MAINE MEDICAL CENTER

The Portland Planning Board will hold a public meeting on Tuesday evening, February 22, 1983. The meeting begins at 7:30 P.M. in Room 209, City Hall, Portland, Maine. This meeting replaces the meeting of February 8th that was postponed.

The Board will consider a proposal by Maine Medical Center for a 19,400 square foot addition to the existing Diagnostic Facility which is located on the Maine Medical Center complex along Bramhall Street. The proposed development will be a two story addition that is designed to fit directly on top of an existing two story building. The proposed addition will consolidate existing meeting rooms and classfooms within the hospital complex. The building will be constructed of brick. A depiction of the proposed structure in relationship to the Maine Medical Center complex is shown on the reverse side of this notice. The site plan will be reviewed for conformance with the Site Plan Ordinance.

Should you wish to review the plan in advance, it is available in the Portland Planning Department, Room 211, of City Hall. If you are unable to attend the public meeting of the Planning Board, please send your comments in writing to Joseph E. Gray, Director of Planning and Urban Development, City Hall, 389 Congress Street, Portland, Maine, 04101.

Sincerely,

Alexander Jaegerman

Alexander Jaegerman
Chief Planner

cc: Jean Gilpatrick, Chairman, City Planning Board
Joseph E. Gray, Jr., Director, Planning & Urban Development

CITY OF PORTLAND

JOSEPH E. GRAY, JR.
DIRECTOR OF PLANNING & URBAN DEVELOPMENT

February 1, 1983

TO RESIDENTS AND PROPERTY OWNERS IN THE VICINITY OF MAINE MEDICAL CENTER

The Portland Planning Board will hold a public hearing on Tuesday evening, February 8, 1983. The meeting begins at 7:30 P.M., in Room 209, City Hall, Portland, Maine.

The Board will consider a proposal by Maine Medical Center for a 19,400 square foot addition to the existing Diagnostic Facility which is located on the Maine Medical Center complex along Bramhall Street. The proposed development will be a 2 story addition that is designed to fit directly on top of an existing 2 story building. The proposed addition will consolidate existing meeting rooms and classrooms within the hospital complex. The building will be constructed of brick. A depiction of the proposed structure in relationship to the Maine Medical Center complex is shown on the reverse side of this notice. The site plan will be reviewed for conformance with the Site Plan Ordinance.

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Sincerely,

Alexander Jaegerman

Alexander Jaegerman
Chief Planner

cc: Jean Gilpatrick, Chairman Planning Board
Joseph E. Gray, Jr. Director Planning & Urban Development

MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

December 15, 1982

Mr. Alexander Jaegerman
Chief Planner
Department of Planning and Urban Development
City Hall
389 Congress Street
Portland, Maine 04101

Dear Mr. Jaegerman:

Thanks for talking with me on the phone about our proposed classroom replacement addition to our existing Diagnostic Facility. As I mentioned to you, and as you may have been already aware, during the series of meetings we had with the Planning Board, both in the workshop sessions and public hearing, Don McDowell and I discussed our Phase I Project not only in terms of the problems its completion would solve, but also about the problems and deficiencies not solved by this new construction project.

One of the then unresolved dilemmas was how we were going to provide for classroom and education space which we would lose as a result of the expansion of adjacent or abutting departments into those classroom spaces.

The site plan we used in our presentations indicated a possibility of adding to the Diagnostic Facility, but it was clear that a case would have to be built for solving our problem, in this way, separate and distinct from the Phase I Project. Further, we knew at that time, on the basis of a decision by the Board of Trustees, that the financing for education space would have to come from private donations. On that basis, the Trustees have authorized proceeding with this building addition as a separate project. We have retained a consultant to assist in the development of a space program and design which reflects the education and classroom needs that were identified in our Long-Range Facilities Plan, filed a Letter of Intent to proceed with this project with the Bureau of Health Planning and Development of the Department of Human Services of the State of Maine, received at least one indication of willingness to provide a sizable contribution to this project by an out-of-state philanthropic foundation and have framed a Certificate of Need Application which we plan to file with the Department of Human Services.

We have identified a space program and schematic drawings for classroom replacement which we feel can be constructed within the budget established by the Board of Trustees. Fortunately, our needs for additional space can be,

we think, designed to fit perfectly on top of the Diagnostic Facility, and its location in terms of parking and the rest of the hospital will be nearly ideal.

While the location and use of the proposed education addition is consistent with the discussions we had with the Planning Board, I would appreciate your assistance in directing us with regard to review, again, with the Planning Board--perhaps in a workshop session--to be sure that they are comfortable with, and we are consistent with, the plans we discussed with them at an earlier date.

In the meantime, I have sought review and input from City Staff, including Sam Hoffses, Lt. Collins and Mr. Turner in Malcolm Ward's absence, on this project as we did with the development of our Phase I Project. Again, as you may know, we received invaluable assistance from City Staff during the development of our Phase I Project.

Because we have defined our program and proposed location and have established a budget and met other preplanning requirements associated with the filing of a Certificate of Need, we are going to proceed along those lines and indicate that we have begun our review process with the City. Obviously, we are hopeful that this addition can be handled expeditiously and that we will find support for what we perceive as a straightforward solution to what we initially felt to be a complex problem.

Thank you for your assistance in this. I look forward to working with you.

Sincerely yours,

Reynold R. Welch
Associate Vice President

RRW:JR

cc: Dr. Andrews
Mr. McDowell
Mr. Gray, Planning & Urban Development

SOUTHERN MAINE NEUROSURGICAL ASSOCIATES
Professional Association
932 CONGRESS STREET
PORTLAND, MAINE 04102

CARL A. BRINKMAN, M.D., F.A.C.S.
DONALD W. WILSON, M.D., F.A.C.S.
THOMAS F. MEHALIC, M.D., F.A.C.S.

(207) 774-5676

DIPLOMATES,
AMERICAN BOARD OF NEUROLOGICAL SURGERY

February 3, 1983

Mr. Joseph E. Gray, Director
Planning and Urban Development
City Hall
389 Congress Street
Portland, ME 04101

Dear Mr. Gray:

I have received your letter of February 1, 1983 and wish to inform you that I am in full support of the planned addition to the Diagnostic Facility of the Maine Medical Center on Bramhall Street.

Sincerely yours,

Donald W. Wilson, M.D.

DWW/cml

308

CITY OF PORTLAND, MAINE

SITE PLAN REVIEW

Processing Form

Maine Medical Center — Applicant

February 1, 1983 — Date

22 Bramhall Street — Mailing Address

22 Bramhall Street — Address of Proposed Site

education facility — Proposed Use of Site

Site Identifier(s) from Assessors Maps

/ — Acreage of Site / Ground Floor Coverage

R-6 — Zoning of Proposed Site

Site Location Review (DEP) Required: ( ) Yes ( ) No

Proposed Number of Floors 2

Board of Appeals Action Required: ( ) Yes ( ) No

Total Floor Area 19,500 sq ft.

Planning Board Action Required: ( ) Yes ( ) No

Other Comments: _____

Date Dept. Review Due: _____

PUBLIC WORKS DEPARTMENT REVIEW

February 1, 1983
(Date Received)

	TRAFFIC CIRCULATION	ACCESS	CURB CUTS	ROAD WIDTH	PARKING	SIGNALIZATION	TURNING MOVEMENTS	LIGHTING	CONFLICT WITH CITY CONSTRUCTION PROJECT	DRAINAGE	SOIL TYPES	SEWERS	CURBING	SIDEWALKS	OTHER	
APPROVED	N/A	Ped. In O.K.	Existing	Existing	Existing	N/A	N/A	N/A	N/A	Existing	N/A	Existing	No Change	No Change		
APPROVED CONDITIONALLY																CONDITIONS SPECIFIED BELOW
DISAPPROVED																REASONS SPECIFIED BELOW

REASONS: _____

(Attach Separate Sheet if Necessary)

William B. Goodwin February 1, 1983
SIGNATURE OF REVIEWING STAFF/DATE

PUBLIC WORKS DEPARTMENT COPY

SOUTHERN MAINE NEUROSURGICAL ASSOCIATES
Professional Association
932 CONGRESS STREET
PORTLAND, MAINE 04102

CARL A. BRINKMAN, M.D., F.A.C.S.
DONALD W. WILSON, M.D., F.A.C.S.
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DIPLOMATES,
AMERICAN BOARD OF NEUROLOGICAL SURGERY

February 3, 1983

Mr. Joseph E. Gray, Director
Planning and Urban Development
City Hall
389 Congress Street
Portland, ME 04101

Dear Mr. Gray:

I have received your letter of February 1, 1983 and wish to inform you that I am in full support of the planned addition to the Diagnostic Facility of the Maine Medical Center on Bramhall Street.

Sincerely yours,

Donald W. Wilson, M.D.

DWW/cml

Planning Report 6-83

PLANNING DEPARTMENT REPORT

MAINE MEDICAL CENTER

SITE PLAN REVIEW

Submitted to:

Portland Planning Board
February 8, 1983

I. INTRODUCTION

Maine Medical Center has requested site plan review for a 2 story addition to the existing Diagnostic Facility (Southern Maine Radiation Therapy building) which is located within the hospital complex along Bramhall Street. The proposed addition will consolidate existing meeting rooms and classrooms within the hospital. The project is located within the R-6 Residence Zone.

Over fifty notices were sent to area property owners.

II. PROPOSED DEVELOPMENT

The proposed development is a 19,400 square foot addition that will be constructed directly on top of an existing building (see attached plan). The building was constructed in 1974 with a structural capacity for 6 stories. The building is currently 2 stories high, 1½ stories of which are below grade. The finished roof level will be 35 feet above grade.

There will be no site changes since the proposed addition is integrated into the existing hospital buildings. The building will be constructed of brick.

III. STAFF REVIEW

The project has been reviewed by the staff for conformance with the review criteria of section 604.6 of the Site Plan Ordinance. Public Works, Fire Department and Building and Inspection Services have approved the site plan.

1. Traffic.

   Since the project represents a consolidation of existing facilities within the hospital there will be virtually no change in the existing parking or traffic demand. Pedestrian and vehicle circulation will remain unchanged. The Zoning Ordinance requirement of 38 spaces is being met by the recently approved parking garage.

2. Bulk, location, height of proposed structures, sewers, storm drains.

   The project is being built on the footprint of an existing building. The building is 35 feet above grade.
   Public Works has reviewed and approved sewer and storm drain concerns.

3. Landscaping

   None is proposed. There are no site changes.

4. Drainage

   Public Works has reviewed and approved drainage concerns.

5. Lighting

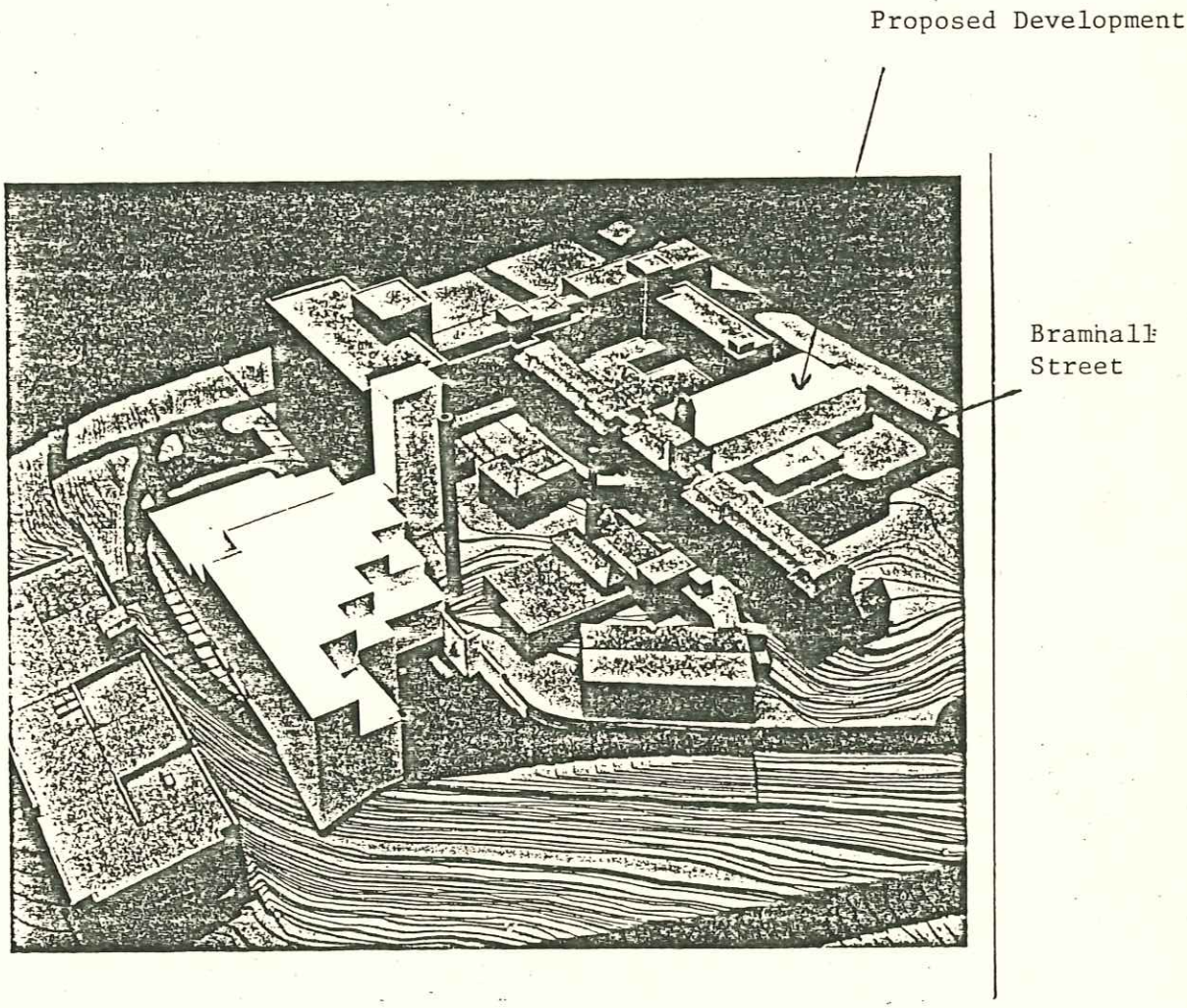
   No new lighting is proposed.

6. Fire

The Fire Department has reviewed and approved fire concerns.

7. City Project

The project will not conflict with a City project.


Proposed Development
Bramhall
Street

PORTLAND DESIGN TEAM

50 EXCHANGE STREET PORTLAND, MAINE 04101 207/775-1059
ARCHITECTURE INTERIOR DESIGN PLANNING

LYNDON D KECK, AIA
FRANK M LOCKER, AIA
DAVID C WEBSTER, AIA

February 21, 1983

Mr. Joseph Gray
Director of Planning &
Urban Development
City Hall
389 Congress Street
Portland, Maine

RE: Maine Medical Center Expansion

Dear Mr. Gray:

As a resident and property owner near the Maine Medical Center, I was notified of the Planning Board meeting on February 22. Unfortunately, I will be out of town and cannot attend. Here, however, are my concerns about the proposed expansion.

I live at 105 West Street, on the corner of Chadwick Street. The proposed expansion of the MMC will intensify an already serious problem in my neighborhood: traffic and parking.

Existing problems are:

1. Employees and patients at MMC glut our streets with their parked cars. Cars block my driveway daily. The one hour parking restriction was no doubt intended to control this problem; with it I get a lot of tickets for parking in front of my door.

2. Chadwick is a one-way street, with traffic going north towards MMC. It is poorly marked at the MMC end; cars regularly travel down Chadwick the wrong way. In addition to car accident problems, I am concerned for the safety of the children living near my intersection.

3. The parking lot entrance at the MMC end of Chadwick is often full, and access is limited to equal departures. Cars back up on Chadwick waiting in line. Drivers coming from the MMC end of Chadwick are consistent on one point: they regularly block the path of cars travelling north on Chadwick in the left hand lane. At times both lanes of Chadwick have been blocked for half an hour.

MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

February 1, 1983

Mr. P. Samuel Hoffses
Director of Building Inspection Services
City of Portland
City Hall
389 Congress Street
Portland, Maine 04101

Dear Mr. Hoffses:

Enclosed is a site plan application which is submitted in support of Maine Medical Center's proposal to construct an education facility on top of the existing New Diagnostic Facility. We understand that a building permit cannot be issued until our final site plan has been reviewed and acted upon favorably by appropriate city departments and the Planning Board.

During our site plan review process for the Center's Phase I Project (for which Planning Board approval was received on April 29, 1982), Mr. McDowell discussed and identified the proposed location for our classroom building. Although the need was supported, the Board of Trustees of Maine Medical Center determined that construction would be supported totally by donated funds and that a separate Certificate of Need would be filed. A Letter of Intent was filed with the Department of Human Services on October 1, 1982, followed by the submittal of a Certificate of Need Application (a copy of which is enclosed) on December 22, 1982.

Four copies of the drawings and documents are attached. We anticipate meeting with the Planning Board on February 8, 1983.

Please contact me if additional information is required.

Sincerely,

Reynold R. Welch
Associate Vice President

RRW:JR

cc: Mr. Joseph E. Gray
Mr. Donald L. McDowell

Enclosures

MAINE MEDICAL CENTER

List of Enclosures

604.4

Four copies of:

- Site Plan dated 1/25/83
- Floor Plans - first and second floors
- Building Sections
- Building Elevations
- Response to Section 604.4B2
- Statement of Ownership
- Expansion Capacity Letter--The Architects Collaborative

One copy of:

- Education Building Certificate of Need Application

604.4 B.2(a)

A description of the proposed uses to be located on site, including quality and type of residential units, if any;

Response:

Maine Medical Center proposes to address its classroom space needs through construction of a two-story education building on top of the New Diagnostic Facility. The deficiencies in education space have been well defined and understood through internal analysis and assessment by the Center's planning consultants and own staff. Conversion of existing key classrooms to patient care and support space is essential and is incorporated in the Center's Phase I Project. Maine Medical Center staff and consultants from the Phase I architectural firm of Shepley, Bulfinch, Richardson and Abbott considered alternatives for constructing or locating replacement classrooms. Alternatives ranged from establishing a free-standing facility on the campus to displacing the support service functions scheduled to occupy the existing Operating Suite, which is scheduled to be vacated in 1985. The campus provides limited opportunities for additional construction. Further, there is no location which could accept a free-standing education building that is adjacent to, or proximal to, the heart of the Center to facilitate ease of access to, and use of, the classrooms.

A New Diagnostic Facility (NDF) for the Departments of Radiology and Laboratory Medicine was completed in 1974. This facility was designed and structured for additional levels. Fortunately, our needs for additional educational space can be designed to fit perfectly on top of the NDF building and accommodate two additional levels at a future time.

It can be noted that this expansion does not change the footprint of the Center at all. The space program reflects the following:

Number of Rooms

1	Auditorium	approximately 250 seats
1	Audio/Visual Room	
10	Classrooms	approximately 400 seats
1	Office	
1	Coat Room	
2	Food Holding/Warming	
1	Auditorium Lobby	
2	Housekeeping Closets	
2	Men's Toilets	
2	Women's Toilets	

Mechanical room, circulation, elevator and shaft, vestibule, exit stairs

Total Gross Square Feet: 19,400

604.4 B.2(a) continued

As can be noted from the building sections, the addition will sit atop the existing two levels of the New Diagnostic Facility, one and one-half levels of which are below ground. Upon completion, the finished roof will be 35 feet above grade.

We believe that no zoning variances are required.

The impact of this project on Maine Medical Center's staffing is limited to the addition of two (2) full-time equivalents in Housekeeping Services.

604.4 B.2(b)

The total land area of the site and the total floor area and ground coverage of each proposed building and structure;

Response:

The hospital's site is reported as two elements consisting of the major lot (holding buildings under construction and existing) as 475,080 square feet and the Bramhall Parking Lot, 109,771 square feet, (total: 584,851 square feet). The ground coverage, including the building under construction is 166,250 square feet.

Total floor area (existing and under construction) is approximately 748,500 square feet (exclusive of parking garage).

The floor area of the education building expansion will add approximately 19,500 square feet. Therefore, total floor area would be approximately 768,000 square feet upon completion.

There will be no change in ground coverage.

604.4 B.2(c)

Easements.

Response:

No easements are necessary.

604.4 B.2(d)

Method for handling solid waste disposal.

Response:

We do not anticipate that the education building will generate any additional waste. For the most part, the classrooms are replacements for teaching spaces used for expansion of clinical services as part of the Phase I Project. However, Maine Medical Center installed a steam generating waste incinerator in November of 1981. Since that time, burnable, solid waste has been disposed of on site. When necessary, waste is handled by the Regional Waste System via commercial dumpster and hauler.

604.4 B.2(e)

The applicant's evaluation of the availability of off-site public facilities, including sewer, water, streets.

Response:

As noted in the statement of purpose, the education expansion is, to a large degree, replacement of classroom spaces lost in the Phase I Project. As a result, we do not expect a measurable increase in classroom use by other than existing Maine Medical Center staff and students. There will be a reduction in the use of sanitary facilities elsewhere in the hospital to offset the addition of sanitary facilities in the education building. Similarly, the building will not generate any measurable additional vehicle traffic or parking demand. However, the requirement for 39 additional spaces (one parking space per 500 square feet) can be met by virtue of the 435 spaces the parking garage expansion will provide compared to the 380 spaces that were estimated at the time of the Phase I Site Plan Application.

The Center's consulting engineers, Thompson Consultants, Inc., have addressed other aspects of this section as follows:

1. Sanitary Drainage

The sanitary drain from the existing NDF Building extends to Bramhall Street. The proposed addition will be added on top of the existing facilities with sanitary connecting to existing within. The increase in sanitary sewer loading is based on and estimated at average classroom occupancy = 300 people, average water usage 20 gallons/day/person (data taken from American Society of Plumbing Engineers Data Book).

300 People x 20 GPD/P = 6,000 GPD Total Estimated Usage

or

750 Gallons/Hour Over 8 Hours a Day

or

12.5 Gallons/Minute Average Flow

The people using this proposed facility are already using the existing facilities. It is the intent to shift them from one building to another. Overall, the sewage flow should not change.

2. Storm Drainage

The proposed addition is being built on the existing roof of the NDF Building. This roof is presently being drained in an existing storm drain. This addition will not increase the roof area in any manner and will not have an effect on the existing storm drainage system. There is a connector of 800 square feet proposed between the NDF and MGB Buildings. This connector is being installed over an existing paved area. The run-off from the existing paved area extends to existing catchbasins in the grass areas and parking lot. It is our intent to scupper the new roof and discharge the run-off same as existing.

3. Water Distribution

The existing water service into NDF Building shall be adequate to serve the addition being added to the roof. It is our proposal to extend piping within the existing building to the proposed addition. Existing water meters appear adequate. The increased water consumption for this addition is estimated at:

300 People x 20 GPD = 6,000 GPD Total Estimated Usage

or

750 Gallons/Hour Over 8 Hours a Day

or

12.5 Gallons/Minute Average Flow

4. Fire Protection

It is proposed that we extend the existing fire protection system in the NDF Building vertical to serve the sprinklers and fire standpipes in the proposed Education Facility. Fire pumps are provided within existing facilities to provide adequate water and pressure to meet NFPA requirements.

5. HVAC

Building will be heated, ventilated and air conditioned as required to satisfy the needs of the areas involved. Air conditioning will be provided by chilled water from a new chiller located in the NDF Mechanical Room. Chiller will have an air-cooled condenser mounted on the roof. Heating will be by hot water provided by a steam to hot water heat exchanger. Ventilation will be provided by air handling units with fresh air connections, cooling and heating coils.

6. Electrical

Electrical power and signal requirements for the classroom addition to the NDF Building will be obtained by extending from existing systems existing in the building.

A. New panelboards will be installed in electric closets on each of the two (2) new levels by extending feeders from the existing building electric distribution panels in the basement mechanical space.

B. Fire alarm, telephone, etc., will be installed as required by extending or adding to the existing system equipment.

C. Exterior lighting shall remain unchanged. Existing canopy and walkway lighting to remain as is.

D. Emergency (Life Safety and/or equipment branch) power will be obtained from existing normal/emergency distribution panels in Basement.

E. Fire alarm will be extended from existing Honeywell fire alarm system equipment serving the NDF Building.

7. General

The utilities surrounding this proposed project should not be effected by its construction. The people using the proposed facility are already using a similar facility within the existing complex. The requirements are being shifted from one building to another.

Thompson Consultants, Inc.
January 28, 1983

It can be seen that the impervious surface area does not change as a result of this vertical expansion.

604.4 B.2(f)

A description of any problems of drainage or topography or a representation that, in the opinion of the applicant, there are none.

Response:

In the opinion of the applicant, and as addressed in (e) above, we believe the project will not contribute any drainage problems.

604.4 B.2(g)

An estimate of the time period required for completion of the development.

Response:

The project schedule has been established around the State Certificate of Need process.

The applicant submitted its Certificate of Need Application in December 1982 and anticipates a construction start in July 1983. Completion of the construction is anticipated for June 1984.

604.4 D Land ownership and estimated cost of the development.

Response:

(attached)

THE ARCHITECTS COLLABORATIVE INC.

JEAN B. FLETCHER 1945 1965
WALTER GROPIUS 1945 1969
NORMAN FLETCHER
JOHN C. HARKNESS
SARAH P. HARKNESS
LOUIS A. McMILLEN

RICHARD BROOKER
ALEX CVIJANOVIĆ
HERBERT GALLAGHER
WILLIAM J. GEDDIS
ROLAND KLUVER
PETER W. MORTON
H. MORSE PAYNE
ERNEST L. BIRDSALL TREASURER

HOWARD ELKUS
ALLISON GOODWIN
BASIL HASSAN
JOHN HAYES
JOSEPH HOSKINS
LEONARD NOTKIN
RICHARD SABIN
DAVID SHEFFIELD

OAZI B. AHMED
ROBERT BARNES
KENDALL P. BATES
SERGE CVIJANOVIĆ
ROYSTON DALEY
ROBERT DeWOLFE
GREGORY DOWNES
GAIL FLYNN
GERALD FOSTER
THOMAS LARSON
RALPH MONTGOMERY
PERRY NEUBAUER
IGOR G. PLATOUNOFF
RICHARD PUFFER
WALTER ROSENFELD
JOHN J. SCOTT
EDMUND SUMMERSBY
KENNETH TAYLOR
MALCOLM TICKNOR
ROBERT TURNER
ROBERT WILSON
LAURENCE ZUELKE

September 12, 1977

Maine Medical Center
22 Beamhall Street
Portland, ME 04102

Attn: Mr. Donald Bail

Re: Provisions for Future Building Above NDF

Dear Don:

With reference to our recent telephone conversation, following are the design concepts incorporated in the New Diagnostic Facility to accommodate a building above it in the future:

1. Columns and footings on column lines B, C, D and E extending from column line 2 to 9, can carry a future six-story building. Allowance has been made for an 8'-0" overhang on column lines B and C. Existing stairs, provided in the proper locations for the future building, will have to be extended with the high-rise building.

2. The roof slab of the New Diagnostic Facility has been designed to support paving material for a future lobby and plaza on the ground floor.

3. Gross area of the proposed building would be approximately 9,000 square feet on the ground floor and 13,000 square feet each from levels 2 through 6, with a total of 74,000 gross square feet.

4. A shaft is provided for two future elevators.

5. Double beams will permit a 10" wide shaft the entire length of each structural bay between column lines 2 and 8 for future plumbing risers.

6. Basic utilities, water, storm, sanitary, steam and domestic hot water lines have been sized to accommodate the future building. Piping will have to be extended within the building, at the time of design for any future construction.

7. Spaces have been reserved in the Basement Mechanical Room for future refrigeration equipment, space heating hot water converters and pumps.

8. Air intakes, exhausts, air handling equipment and cooling tower for the proposed building will have to be installed on its roof. Foundations and columns in the present building have been designed to support this future load.

46 BRATTLE STREET, CAMBRIDGE, MASSACHUSETTS 02138, U.S.A.
TELEPHONE: (617) 868-4200 TELEX: 921494 TACCAM CABLE: TACCAM U.S.A.

9. Spare conduits have been provided for future power lines, emergency power, fire alarm, clock, sound and telephone systems.

We would like to remind you that drawings of the Doctor's Office Building submitted in October 1971 were based on programs reviewed by the administrative and medical staff at that time. These drawings were schematic design documents and not construction documents. Should a decision be made to construct a six-story building at column lines B,C,D and E,a confirmed program and construction documents will be required for the same.

We hope that this letter answers your question as to what architectural and engineering services had been provided for the design of the proposed Doctor's Office Building prior to its deletion and as to what provisions have been incorporated in the New Diagnostic Facility for the future building. Please note that only those items have been provided in the present facility that either could not be installed or would have been excessively expensive to do so in the future.

Please call if you have any further questions.

Yours sincerely,

THE ARCHITECTS COLLABORATIVE Inc.

Qazi B. Ahmed

QBA:pfh

cc: R. Brooker
R. Welch

SOUTHERN MAINE NEUROSURGICAL ASSOCIATES
Professional Association
932 CONGRESS STREET
PORTLAND, MAINE 04102

CARL A. BRINKMAN, M.D., F.A.C.S.
DONALD W. WILSON, M.D., F.A.C.S.
THOMAS F. MEHALIC, M.D., F.A.C.S.

(207) 774-5676

DIPLOMATES,
AMERICAN BOARD OF NEUROLOGICAL SURGERY

February 3, 1983

Mr. Joseph E. Gray, Director
Planning and Urban Development
City Hall
389 Congress Street
Portland, ME 04101

Dear Mr. Gray:

I have received your letter of February 1, 1983 and wish to inform you that I am in full support of the planned addition to the Diagnostic Facility of the Maine Medical Center on Bramhall Street.

Sincerely yours,

Donald W. Wilson, M.D.

DWW/cml

CITY OF PORTLAND, MAINE
DEVELOPMENT REVIEW APPLICATION
PLANNING DEPARTMENT PROCESSING FORM

I. D. Number

Address:

Applicant

Application Date

Applicant's Mailing Address

Project Name/Description

Consultant/Agent

Address of Proposed Site

Applicant or Agent Daytime Telephone, Fax

Assessor's Reference: Chart-Block-Lot

Proposed Development (check all that apply): ___ New Building ___ Building Addition ___ Change of Use ___ Residential
___ Office ___ Retail ___ Manufacturing ___ Warehouse/Distribution ___ Other (specify) _____

6,000 s.f. Addition | +/- 11.5 | R-6

Proposed Building Square Feet or # of Units | Acreage of Site | Zoning

---

Check Review Required:

- ☐ Site Plan (major/minor)
- ☐ Subdivision # of lots _____
- ☐ PAD Review
- ☐ 14-403 Streets Review
- ☐ Flood Hazard
- ☐ Shoreland
- ☐ Historic Preservation
- ☐ DEP Local Certification
- ☐ Zoning Conditional Use (ZBA/PB)
- ☐ Zoning Variance
- ☐ Single-Family Minor
- ☐ Other _____

Fees paid: site plan _____ subdivision _____

Approval Status: Reviewer R. KNOWLAND

☐ **Approved** ☒ **Approved w/Conditions** listed below ☐ **Denied**

1. APPLICANT SHALL SPECIFY A DROP INLET STRUCTURE ON THE OUTSIDE OF
2. MANHOLE AS REFERENCED IN TONY LOMBARDI MEMO OF 3-12-97
3. SPECIFIC LOCATIONS OF EROSION AND SEDIMENTATION MEASURES SHALL BE SHOWN ON THE SITE PLAN.
4. EXTERIOR LIGHTING SUBJECT TO PLANNING DEPT. REVIEW AND APPROVAL

Approval Date 3/13/97 Approval Expiration _____ date Extension to _____ date ☐ Additional Sheets Attached

☒ Condition Compliance _____ signature 3/13/97 date

Performance Guarantee ☒ Required* ☐ Not Required

* No building permit may be issued until a performance guarantee has been submitted as indicated below

☒ Performance Guarantee Accepted	11/12/96 date	$119,467 amount	10-1-99 expiration date
☒ Inspection Fee Paid	11/8/96 date	$2,030.94 amount	
Performance Guarantee Reduced	_____ date	_____ remaining balance	_____ signature
Performance Guarantee Released	_____ date	_____ signature	
Defect Guarantee Submitted	_____ submitted date	_____ amount	_____ expiration date
Defect Guarantee Released	_____ date	_____ signature	

Pink - Building Inspections Blue - Development Review Coordinator Green - Fire Yellow - Planning 2/9/95 Rev5 KT.DPUD

CITY OF PORTLAND

DEPARTMENT OF PUBLIC WORKS
OPERATIONS / ENGINEERING SECTION
55 PORTLAND STREET
PORTLAND, MAINE 04101
(207) 874-8300 Telephone
(207) 874-8852 FAX Line

FAX TRANSMITTAL COVER PAGE

DATE: 3/12/97

SEND TO Rick Knowland

COMPANY/ORGANIZATION: Planning

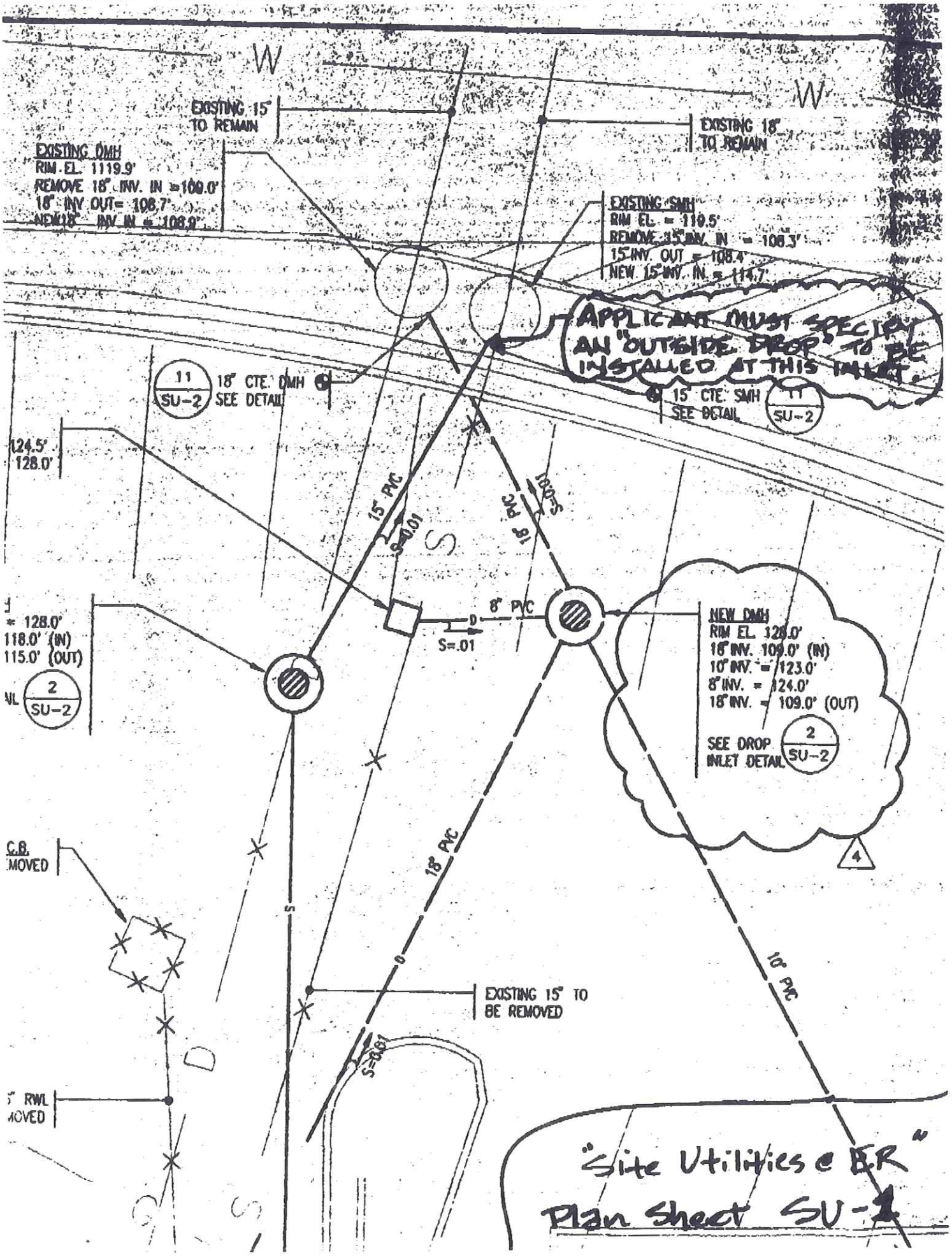
FAX NUMBER: 756-8258

FROM: Tony Lombardo

TELEPHONE/EXTENSION: (207) 874-8300 EXT. 8848

NUMBER OF PAGES INCLUDING COVER SHEET 2

OPTIONAL MESSAGE Applicant needs to specify a drop inlet structure on the outside of this manhole. Also, must specify on "Site Plan" erosion/sediment control measures.



"Site Utilities & ER"
Plan Sheet SU-1

Fleet Bank

Tracy L. Hawkins
Vice President
Corporate Banking

SITE PLAN/SUBDIVISIONS
PERFORMANCE GUARANTEE:
ESCROW ACCOUNT

(Account #8039128753)

October 31, 1996

Mr. Joseph E. Gray, Jr.,
Director of Planning and Urban Development
City of Portland
389 Congress Street
Portland, Maine 04101

Re: Application of Maine Medical Center for Capital Addition Site Improvements at 22 Bramhall Street, Portland, Maine

Dear Mr. Gray:

This will certify to you that Fleet Bank will hold the sum of $119,467.00 in an interest-bearing escrow account in the name of the City of Portland, established with the Bank. We will hold these funds as escrow agent for the benefit of the City of Portland on the following conditions:

1. These funds represent the estimated cost of installing site improvements as depicted on the site plan/subdivision plan and as approved by the Development Review Coordinator.

2. The City of Portland may draw against this escrow account by presentation of a draft in the event that Maine Medical Center fails to complete within twenty-four (24) months of this date the work stipulated in Paragraph 1. Said draft shall be accompanied by a written statement from the Director of Parks and Public Works or the Director of Planning and Urban Development that Maine Medical Center has failed to complete such work, with a listing of improvements still to be completed, and the estimated cost of completing said improvements still to be completed as determined by the Development Review Coordinator.

3. The City of Portland may draw against this escrow for a period not to exceed 90 days after the expiration of this two-year commitment.

4. After all work in the public right of way has been completed and inspected to the satisfaction of the Department of Public Works, including but not limited to the installation of granite curbing, sidewalk, curb cut and street trees, Fleet Bank shall be eligible to receive a reduction in its obligation hereunder equal to the estimated cost of improvements. In no case, however, shall the obligations of Fleet Bank hereunder be reduced to an amount which is less than the estimated cost of completing all prescribed improvements as determined by the Department of Public Works, as described above.

5. Maine Medical Center will notify the City of Portland for inspections.

6. All costs associated with establishing, maintaining, and disbursing funds from the escrow account shall be born by Maine Medical Center.

7. This escrow account expires on October 1, 1999, but may expire prior to this date when the City of Portland acknowledges in writing to Fleet Bank and Maine Medical Center that said work as outlined has been completed in accordance with City of Portland specifications.

Dated at Portland, Maine this 31st day of October 1996

Very truly yours,

Fleet Bank of Maine

By: Tracy L. Hawkins Date: 10/31/96
Title Vice President

Seen and Agreed to:

By: _____ Date: 11/6/96
Maine Medical Center

Approved pursuant to §14-501(a) of the Portland City Code:

By: _____ Date: 11/12/96
Director of Planning and
Urban Development

By: Natalie L Burns Date: 11/12/96
Corporation Counsel

By: _____ Date: _____
Finance Director

RECEIVED
11-8-96

L:392767 **MAINE MEDICAL CENTER • PORTLAND, MAINE** VNDR:1-165828 CHECK NO. 494569

DESCRIPTION	DATE OF INVOICE	INVOICE NUMBER	AMT. OF INVOICE	AMT. OF DISC.	DATE OF INVOICE	INVOICE NUMBER	AMT. OF INVOICE	AMT. OF DISC
	10/23/96	BEAN EXPAN	2030.94					
	TOTAL INVOICE	$2,030.94	TOTAL DISCOUNT	$0.00	TOTAL CHECK	$2,030.9		

MAINE MEDICAL CENTER

22 BRAMHALL ST. • PORTLAND, MAINE 04102

CHECK NO. 494569 52-36/112

OPERATING ACCOUNT

Fleet Bank
PORTLAND, MAINE

DATE OF CHECK
11/06/96

PAY TO THE ORDER OF

CITY OF PORTLAND

AMOUNT OF CHECK
$*****2,030.94

VOID AFTER 90 DAYS

Willis R. Lerm Jr.
VICE PRESIDENT FINANCE/TREASURER

Michael Filmanski
ASSOCIATE VICE PRESIDENT-FINANCE

⑈0494569⑈ ⑆011200365⑆ 00 679 329 0⑈

Jim Keeley 773-8499
MMC expansion
* Letter of Credit
submitted 4 mos ago.
→ Revised Site Plan (downstairs)
Structural steel/Permit
(Found. Permit previously issued)

FAX 773-6619

CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS
OPERATIONS/ENGINEERING - INSPECTIONS
MEMORANDUM

TO: Rick Knowland, Senior Planner
FROM: Tony Lombardo, Project Engineer
DATE: February 25, 1997
SUBJECT: Maine Medical Center - Additions and Renovations

The following comments were generated during Public Works/Engineering review of the plans submitted by Shepley, Belfinch, Richardson and Abbott and received on February 20, 1997:

- None of the proposed catch basins on Sheet SV-1 specify invert out elevations.
- This set of plans still does not reflect any of the revisions/additions requested in my memo dated October 17, 1996.

City of Portland
Planning Department

City Hall
389 Congress Street, 4th Floor
Portland, Maine 04101
FAX NUMBER: 756-8258

FAX TRANSMISSION COVER SHEET

To: Jim Keeley

From: Alex Jaegerman

Fax #: 773-6619

# of Pages: 2

Date: 2/18/97

RE: Maine Medical Ctr.
Pub Wks Conditions

CITY OF PORTLAND

Alexander Jaegerman, AICP
Chief Planner
Planning & Urban Development

389 Congress Street, Portland, Maine 04101 • (207) 874-8300, Ext. 8724
Fax [redacted]
756-8258

If you do not receive all of the pages, please call 874-8721.

CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS
OPERATIONS/ENGINEERING - INSPECTIONS
M E M O R A N D U M

TO: Rick Knowland, Senior Planner
FROM: Tony Lombardo, Project Engineer
DATE: October 17, 1996
SUBJECT: Maine Medical Center - Additions and Renovations

The following comments were generated during Public Works/Engineering review of the plans submitted by Shipley, Belfinch, Richardson and Abbott and received on October 3, 1996:

- Proposed storm drain pipe should be a minimum 10" diameter not 8:" as shown on sheet SU-1.

- Site Utilities Plan, drawing SU-1, should specify storm drain and sanitary pipe length and slopes for all pipes.

- Applicant needs to specify erosion and sedimentation control measures on the site plan and utility plan.

- On sheet SU-1, the proposed DMH located near Crescent Street specifies three (3) - 8" pipe inverts into the structure, however, the drawing shows 3 - 6" diameter pipes and (1) - 8:" diameter pipe entering the structure. This should be clarified. In addition, (3) storm drain pipes enter this structure along the same sidewall with no separation between pipes. This design is not possible with a 4' diameter manhole. Applicant must specify a larger structure in order to effectively utilize this design.

- Proposed catch basin along the northerly boundary does not specify invert elevation. The pipe outletting this basin has no length or slope specified.

- Applicant should specify construction detail on sheet SU-2 that depicts pipe connection into existing sewer manhole with proposed pipe. (Refer to City of Portland Technical and Design Guidelines).

- <u>Summary of Review Time:</u>

Site Visit	0.5 hrs.
Engineering Plan Review	<u>1.5 hrs.</u>
	2.0 hrs.

no crosswalk on
no sidewalk trip

DEPARTMENT OF PLANNING AND URBAN DEVELOPMENT

RICHARD KNOWLAND
SENIOR PLANNER

10/20/96

ELISE

ATTACHED ARE PUBLIC WORKS COMMENTS ON THE MAINE MEDICAL CENTER SITE PLAN. MORE COMMENTS WILL FOLLOW. UNFORTUNATELY IT WILL BE AT LEAST ANOTHER WEEK FOR ME TO GET ALL OF THE COMMENTS TO YOU SINCE I WILL BE ON VACATION. WILL FORWARD THEM AS SOON AS I CAN.

RK

CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS
OPERATIONS/ENGINEERING - INSPECTIONS
M E M O R A N D U M

TO: Rick Knowland, Senior Planner
FROM: Tony Lombardo, Project Engineer AJL
DATE: October 17, 1996
SUBJECT: Maine Medical Center - Additions and Renovations

The following comments were generated during Public Works/Engineering review of the plans submitted by Shipley, Belfinch, Richardson and Abbott and received on October 3, 1996:

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- <u>Summary of Review Time:</u>

Site Visit	0.5 hrs.
Engineering Plan Review	<u>1.5 hrs.</u>
	2.0 hrs.

City of Portland,Maine

Subdiv'n/SiteDevelopement
Maine Medical Center
October,3/96

Item	Quantity	Unit	Unit cost	Subtotal	Compl'd
1.Street/Walks					
a.Paving	1459	sq.yds	$ 14.90	$ 21,737.00	
b.Granite Curbing	600	lin.ft.	$ 27.76	$ 16,660.00	
c.Sidewalks	3316	sq.ft.	$ 2.24	$ 7,438.00	
2.Sanitary Sewer					
a.Manholes	20	vert.ft.	$ 260.00	$ 5,200.00	
b.Piping	118	lin. ft.	$ 4.76	$ 5,152.00	
c.Connections	3	each	$ 1,500.00	$ 4,500.00	
3.Storm Drainage					
a.Manholes	28	vert.ft.	$ 240.00	$ 6,720.00	
b.Catch Basins	12	vert.ft.	$ 180.00	$ 2,160.00	
c.6"/8" Piping	340	lin.ft.	$ 18.47	$ 6,280.00	
d.10"/18" Piping	160	lin.ft.	$ 32.00	$ 5,120.00	
e. Detention Basin	1	ea.	$ 3,500.00	$ 3,500.00	
4.Site Lighting	Allowance			$ 7,500.00	
5.Open Space Items	5	ea.	$ 500.00	$ 2,500.00	
6.Landscaping	Allowance			$ 25,000.00	

TOTAL $ 119,467

Rick,

Looks O.K. (Generous but O.K.)

Tony

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

40 BROAD STREET BOSTON MASSACHUSETTS 02109-4306 TEL 617-423-1700 FAX 617-451-2420

1 October 1996

Mr. Richard Knowland
City of Portland
Planning and Urban Development
389 Congress Street
Portland, Maine 04101

Subject: Maine Medical Center
Additions and Alterations to the Bean Building

Dear Mr. Knowland:

Attached are three sets of drawings which have been revised to reflect the conditions which were agreed to at the Planning Board hearing on July 23, 1996, and referenced in your letter to me dated August 12, 1996, for the above referenced project.

As we discussed by telephone on Friday, we are hopeful that you will be able to review these drawings at your Planning meeting on Thursday, and approve them so that Maine Medical Center may obtain a foundation permit. Information regarding the construction cost estimate for this work will be forwarded separately from McCarthy, the Construction Manager.

Thank you for your assistance with this project. Please contact me if you have questions or require clarifications.

Sincerely,

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

Elise Woodward

Élise F. Woodward

Enclosures

cc: Clarence LaLiberty, MMC
Robert Bremm, MMC
Michael Swan, MMC
W. E. Morrison, McCarthy
Paul E. Bell, SBRA

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

40 BROAD STREET BOSTON MASSACHUSETTS 02109-4306 TEL 617-423-1700 FAX 617-451-2420

19 July 1996

Mr. Richard Knowland
City of Portland
Planning and Urban Development
389 Congress Street
Portland, Maine 04101

Subject: Maine Medical Center
Additions and Alterations to the Bean Building

Dear Mr. Knowland:

Following are responses to your telephone comments, as well as to Tony Lombardo's written comments which we received this week regarding the above noted project.

The existing site lighting will be reused, or alternate heads will be installed for the existing pole fixtures. Cut sheets and photometrics of the proposed fixtures are attached.

At present, we cannot support the suggested change to Linden trees because Portland guidelines indicate that they are sensitive to salt while Red Oaks are not. The area where they will be planted will be used for snow piling. If the City requires a change, we will probably recommend Honey Locust. A sketch of an alternative planting location for these trees is attached. We also prefer to make no change in the size of the island between the two driveways.

We have recommended flush granite curbing because of the frequency of trips of the lithotripter van. Sloped curbing will be more difficult for the equipment to negotiate.

A crosswalk can be marked across the two driveways. If the project budget can support a change to concrete paving for the crosswalk, we will make that change. Also if the project budget will allow, the paving between the emergency drive and the flush granite paving at the vehicle drive may be changed to granite cobblestones or concrete paving to visually differentiate the separation of the drives.

The hours of valet parking will be Monday - Friday, 6 AM to 4 PM or as required.

A Site Utility Plan and Details were sent to you yesterday. Please refer to them for locations of existing and proposed structures and inverts. The sanitary and stormwater connections are re-connecting to the system which currently serves the facility.

The Casco trap which is desired will be provided.

New roof drains for the addition will tie into the existing roof drainage system. At the perimeter of the canopies, a gutter system will collect canopy run-off and discharge through downspouts to the building storm water system.

Construction details for all site features will be available before the start of construction.

Please contact me if you have further questions or require clarifications.

Sincerely,

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

Elise F. Woodward

Enclosures

cc: Clarence LaLiberty, MMC
Robert Bremm, MMC
Michael Swan, MMC
Paul E. Bell, SBRA

Tony Li comments

fix retaining wall

pavement around the

manhole build up

rip rap behind the rain water

gutter

Engineer Review and Site Inspection Fee Invoice Worksheet

Address: ME MEDICAL CENTER

Engineering Review

To be filled out by Development Review Coordinator and Public Works at time of application.

Planning

# of Hours Estimated: (Private Improvements)

Field Work _____

Memos/Corresp. _____

Review/Analysis _____

Meetings/phone calls _____

Total Hours _____ at _____ per hour

Review Fee (Private): $ _____

_____

Development Review Coordinator signature

Public Works

# of Hours Estimated: (Public Improvements)

Field Work _____

Memos/Corresp. 1.0

Review/Analysis 0.5

Meetings/phone calls 0.5

Total Hours 2.0 at $25.00 per hour

Review Fee (Public): $ 50.00

Public Works Engineer signature

Site Inspection

To be filled out by DRC and Public Works at time of Performance Guarantee approval.

Planning

☐ **Accept 1.7% of Private Improvements P.G.**
$ _____ (dollar amount)

# of Hours Estimated:

Field Work _____

Memos/Corresp. _____

Review/Analysis _____

Meetings/phone calls _____

Total Hours _____ at _____ per hour

Alternate Inspection Fee (Private): $ _____

_____

Development Review Coordinator signature

Public Works

☐ **Accept 1.7% of Public Improvements P.G.**
$ _____ (dollar amount)

# of Hours Estimated:

Field Work _____

Memos/Corresp. _____

Review/Analysis _____

Meetings/phone calls _____

Total Hours _____ at _____ per hour

Alternate Inspection Fee (Public): $ _____

_____

Public Works Engineer signature

CITY OF PORTLAND

DEPARTMENT OF PUBLIC WORKS
OPERATIONS / ENGINEERING SECTION
55 PORTLAND STREET
PORTLAND, MAINE 04101
(207) 874-8300 Telephone
(207) 874-8852 FAX Line

FAX TRANSMITTAL COVER PAGE

DATE: 2/25/97

SEND TO Rick Knowland

COMPANY/ORGANIZATION: Planning

FAX NUMBER: 756-8258

FROM: Tom Lambard

TELEPHONE/EXTENSION: (207) 874-8300 EXT. 8848

NUMBER OF PAGES INCLUDING COVER SHEET 3

OPTIONAL MESSAGE

There does not appear to be much difference between these types of uses but the dimensional requirements vary greatly. Why?

What is the difference between 14-137 (2)(b)(ii) and 14-137 (2)(c)?

Building Extensions on Non-Conforming Lots

The provisions we have outlined so far are still confusing and subject to debate. For example, what does the phrase "inside surface of peak of roof" mean? Is this the interior finish, bottom of structure or underside of roofing material? Additionally, I think we will still get undesirable expansions as people try to fit into these requirements. Can we consider something that is more direct, such as:

Existing non residential and residential buildings which are nonconforming as to any yard requirements may be enlarged within the existing footprint subject to the following provisions:

1. *For buildings nonconforming as to land area per dwelling as of July 19, 1988: The floor area of the expansion shall be limited to no more than 50 percent of the footprint. The additional floor area shall be created by the use of dormers, turrets or similar structures while preserving the existing roof configuration to the extent possible. Any expansion on nonconforming yard requirements shall provide a 5 foot ~~setback~~ STEP BACK*

2. *For buildings conforming as to land area per dwelling as of July 19, 1988: The floor area of the expansion shall be limited to no more than 80 percent of the footprint. The additional floor area shall be created by raising the existing roof configuration the minimum amount required for habitable space. Any expansion on nonconforming yard requirements shall provide a 5 foot ~~setback~~. STEP BACK*

Existing building expansions may occur only once during the lifetime of the structure.

Thanks for looking into these for me. I will try and call you this morning to answer any questions.

C:\WINWORD\PLANBRD\PB-M-04.DOC

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

40 BROAD STREET BOSTON MASSACHUSETTS 02109-4306 TEL 617-423-1700 FAX 617-451-2420

19 February 1997

Mr. Richard Knowland
City of Portland
Planning and Urban Development
389 Congress Street
Portland, Maine 04101

Subject: Maine Medical Center
Additions and Alterations to the Bean Building

Dear Mr. Knowland:

As you know, Maine Medical Center is now seeking to obtain the building permit for work on this project above the foundation elements which were previously permitted. The drawings enclosed with this letter are the final site plans illustrating the work at the Emergency Department entrance and ambulance drive for which site plan approval was granted.

Enclosed are three sets of drawings which have been revised to reflect the comments which we received from you and from Public Works dated October 17, 1996, for the above referenced project. Drawings L-1, L-2, L-3, SU-1 and SU-2 are drawings which were previously submitted to you.

Site work which has not been presented to you previously and which represents a revision to the original project is shown on Drawing L-4. Specifically, it shows (1) site work to return the site to its existing condition after a telephone room is built underground, and (2) work associated with the location of a new pad mounted electrical transformer and new primary switchgear within the hospital's existing drive along Charles Street. Two parking spaces will be lost due to this work. Please let me know if you would like to schedule a meeting to review this drawing.

Thank you for your assistance with this project. Please contact me if you have questions or require clarifications.

Sincerely,

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

Elise Woodward

Elise F. Woodward

Enclosures

cc: MMC: Messrs. Clarence LaLiberty, Robert Bremm and Henry Gillert
McCarthy: Mr. Tony Galietta
SBRA: Messrs. Paul E. Bell and David Willy

SHEPLEY BULFINCH RICHARDSON AND ABBOTT
ARCHITECTS
40 BROAD STREET BOSTON MASSACHUSETTS 02109-4306 617-423-1700

TRANSMITTAL FORM

TO City of Portland
389 Congrees Street
Portland, Maine 04101

ATTENTION Richard Knowland

PROJECT Maine Medical center

PROJECT NO. 3013
DATE 24 February 1997

WE TRANSMIT
- ☒ HEREWITH
- ☐ IN ACCORDANCE WITH YOUR REQUEST
- ☐ UNDER SEPARATE COVER
- ☒ via Federal Express

FOR YOUR
- ☐ APPROVAL
- ☐ REVIEW AND COMMENT
- ☒ USE
- ☐ DISTRIBUTION TO PARTIES
- ☐ RECORD
- ☐ _____

THE FOLLOWING:
- ☒ DRAWINGS
- ☐ SPECIFICATIONS
- ☐ CHANGE ORDER
- ☐ SHOP DRAWING PRINTS
- ☐ SHOP DRAWING REPRODUCIBLES
- ☐ SAMPLES
- ☐ PRODUCT LITERATURE
- ☐ _____

NO.	DATE	CODE	DESCRIPTION
1p	2/21/97		Su-1 Dwg.
1p	11/30/96		Su-2 Dwg

CODE (A) ACTION INDICATED ON ITEM TRANSMITTED
(B) NO ACTION REQUIRED
(C) FOR SIGNATURE AND RETURN TO S.B.R.A.
(D) SEE REMARKS BELOW

T Remarks Please disreguard the Su-1 & Su-2 dwg. that were previously sent to you.

COPIES TO MMC : Henry Gillert

( ) ACKNOWLEDGE RECEIPT OF ENCLOSURES
( ) RETURN ENCLOSURES TO S.B.R.A.
IF ENCLOSURES NOT AS NOTED, INFORM S.B.R.A. IMMEDIATELY.

BY _____
Jerome K. Harris

City of Portland
Planning Department

City Hall
389 Congress Street, 4th Floor
Portland, Maine 04101
FAX NUMBER: 756-8258

FAX TRANSMISSION COVER SHEET

To: ELISE WOODWARD

From: RICK KNOWLAND

Fax #: 617-451-2420

# of Pages: 2

Date: 2-25-97

RE: MMC

ATTACHED ARE COMMENTS FROM TONY LOMBARDO REGARDING THE LATEST SITE PLAN SUBMITTED TO THE CITY. ALSO IT IS NOT CLEAR HOW THE RAMPS OF THE SIDEWALKS MEET CITY SPECIFICATIONS REGARDING HANDICAP ACCESSIBILITY.

If you do not receive all of the pages, please call 874-8721.

From: Alex Jaegerman
To: KAS, JBM, WJB
Date: 7/30/96 4:17pm
Subject: Mrs Becker, Re: Crescent Street stormdrain, Ph: 839-8146

I'm getting alot of calls from Ms. Becker who owns the apartment house nearest the Maine Medical Center Emergency Room, on Crescent Street at Charles. Apparently when the Charles/Crescent intersection was reconfigured some years ago, the CB on crescent was converted to a manhole and a new CB was installed. There is a second manhole on Becker's property within a city easement. TAccording to Ms. Becker, that manhole is surcharging, and is highly eroded around from this affect. There is a stone wall that may be affected by this situation. She has been complaining for several years with allegedly no assistance from anyone in the city. I asked Tony Lombardo to look into the problem in the context of MMC's current site plan application, even though the problem was evidently created by the previous project. I haven't seen this myself. Can someone work with her to determine what if anything can or should be done to help relieve the surcharging and improve the conditions around the manhole? Could a flow restrictor be placed in the manhole on Crescent? Some street grading to reduce the stormwater going into that manhole? Etc. etc. She seems to be getting frustrated and agitated about the situation.

CC: RWK

DEPARTMENT OF PLANNING AND URBAN DEVELOPMENT

RICHARD KNOWLAND
SENIOR PLANNER

2/27/97

TONY

REVISED DRAWINGS FROM MAINE MEDICAL CENTER CAME YESTERDAY. COULD WE REVIEW THESE AT THURSDAYS STAFF MEETING?

RK

CITY OF PORTLAND, MAINE
MEMORANDUM

TO: Chair Hagge and Members of the Portland Planning Board

FROM: Richard Knowland, Senior Planner

DATE: June 25, 1996

RE: Maine Medical Center Expansion

Maine Medical Center (MMC) requests workshop review for a proposed expansion to their facility at 22 Bramhall Street. This project will not change the number of existing hospital beds although certain beds will be relocated within the facility. The project will require site plan and conditional use approval. As an amendment to a DEP site location project, the Board would also be reviewing it under the site location law.

The project includes the following elements:

- A two-story addition to the Bean Building is proposed with a total floor area of about 62,000 sq. ft. The Bean Building was originally designed to accommodate additional floors. One of the floors will be the Barbara Bush Children's Hospital. The addition will be under the height of the Richards Wing.

  On June 20th, the Board of Appeals granted a height variance for this project since the height exceeds the 45 foot height limit of the R-6 zone.

- A 6,000 sq. ft. addition will be built to the existing emergency department. This will result in a reorganization of the emergency entrance and parking lot area. A separate entrance and driveway will be provided for ambulances. Six ambulance parking spaces are shown on the plan. The main emergency driveway will be looped with a drop-off area. Thirteen parking spaces are indicated.

- A variety of internal renovations will take place in various departments. This is described in further detail on Attachment D-2.

The submission indicates that the amount of existing impervious surface will be reduced by 2000 sq. ft. with introduction of more grass and landscaping.

Under sec. 14-526(2)(b) of the site plan ordinance, the Board determines the appropriate parking requirement for new construction with floor area of 50,000 sq. ft. or greater. A parking analysis on the expansion has been submitted by DeLuca Hoffman Associates. The report indicates that the reorganization of the emergency department will result in a loss of 20 spaces from the existing 2,383 spaces control by MMC. MMC parking demand is estimated to be 2,158 spaces. With the new ambulatory care facility under construction on route one in Scarborough and relocation of lab employees to South Portland, an estimated 320 employees and patients will reduce the estimated parking demand by 244 spaces. The number of beds in the hospital is expected to decrease from 606 to 520 in 1999. The report concludes that the expansion "will have no negative impact on the parking demand nor significantly decrease the current supply." The report

also recommends that MMC increase their effort to involve people in the ride share program through the additional promotion.

Comments from William Bray, Deputy Director of Public Works, on the parking analysis are shown below:

- The reserved parking area for doctors at the Bramhall Street parking lot is under utilized. This was not factored in the report.
- A lot of on-street parking takes place in the vicinity of the hospital.
- The parking garage is under utilized.
- What is their mitigation plan for parking during construction?
- Only 13 spaces are shown for the emergency parking lot. Please explain how the valet service will work.

Attachments:

A. Vicinity Map/Existing Conditions
B. Site Plan
C. Building Elevations
D. Background
E. Parking Study

Dufresne-Henry, Inc.
A DVI Company
22 Free Street ◊ Portland, Maine 04101-3900 ◊ Tel.: 207 / 775 / 3211 ◊ Fax: 207 / 775 / 6434

December 22, 1997

Mr. Richard Knowland, Senior Planner
City of Portland
Planning and Urban Development
389 Congress Street
Portland, Maine 04101

RE: Maine Medical Center Office Building

Dear Rick:

Thank you for asking Dufresne-Henry to review the proposed Maine Medical Office Building and Parking Garage development project on Congress Street. As requested we have developed a budget to complete the review of this project. As we discussed earlier, the estimated review fee for this project is expected to total $1,200 including reimbursable expenses. As with past projects we will charge towards this fee on an hourly basis.

Our review of this project will focus primarily on the site development issues such as erosion control, storm water handling, and site improvements. We have allotted time within this budget for further review of the design documents and attendance at another review meeting and planning board meeting. Although not included in this budget estimate we can also provide periodic inspections during construction if requested.

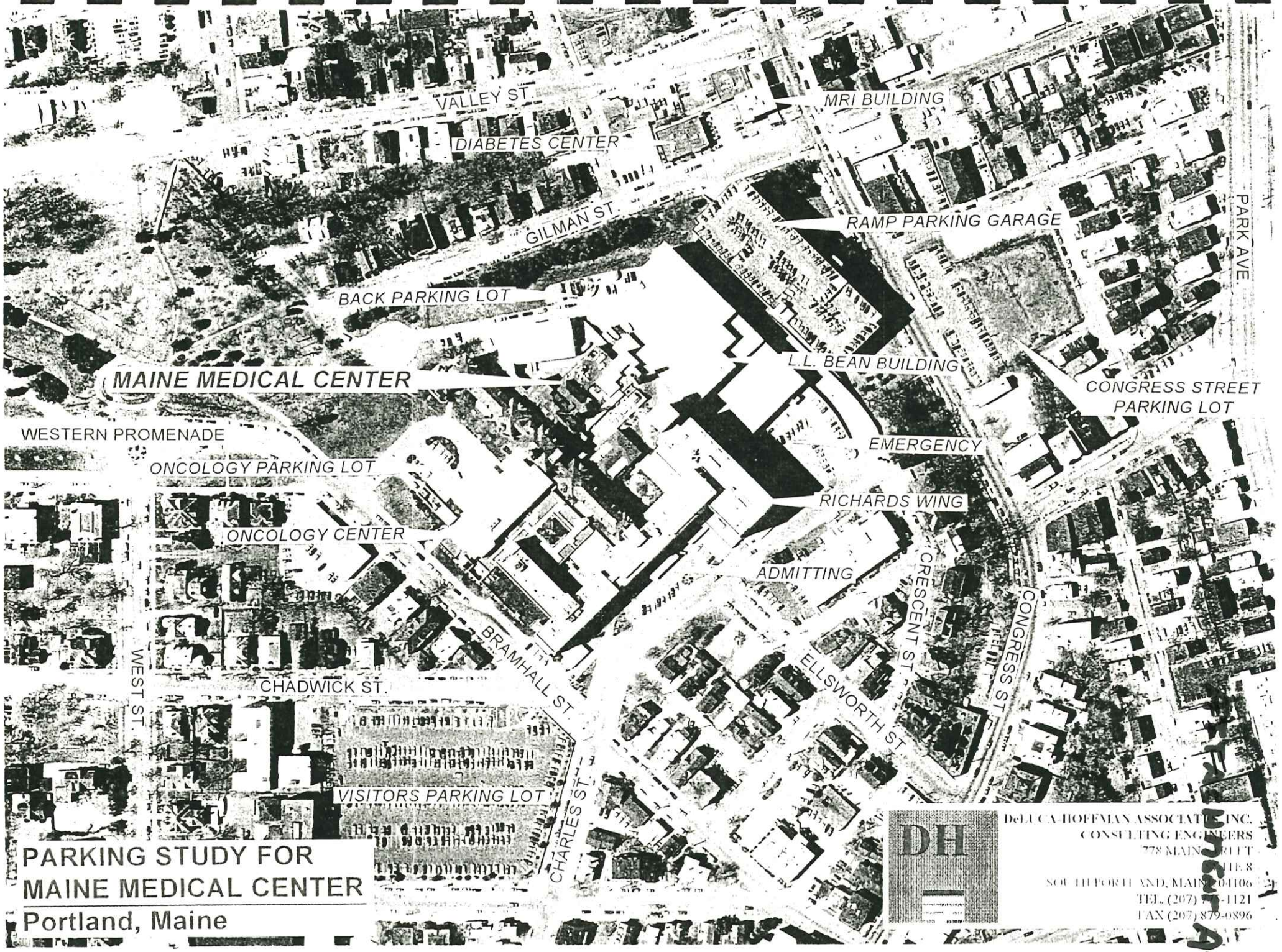
We are looking forward to working with you on this project.

Very truly yours,

DUFRESNE-HENRY, INC.

Jeffrey D. Preble, P.E.
Project Manager

File N:\civil\8160054\Knowlandltr4.wpd



PARKING STUDY FOR MAINE MEDICAL CENTER

Portland, Maine

DeLUCA HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS
778 MAIN STREET
SUITE 8
SOUTH PORTLAND, MAINE 04106
TEL. (207) 775-1121
FAX (207) 879-0896

EXHIBIT A-1

ATTACHMENT D-1

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

40 BROAD STREET BOSTON MASSACHUSETTS 02109-4306 TEL 617-423-1700 FAX 617-451-2420

10 June 1996

City of Portland
Planning Board
Planning and Urban Development
389 Congress Street
Portland, Maine 04101

Subject: Maine Medical Center
Additions and Alterations to the Bean Building

Gentlemen:

Maine Medical Center is seeking approval of its application to construct an addition to the Bean Building on the hospital campus in Portland, Maine, and to renovate portions of the existing facility.

Attached for your reference are the development review application, the application fee, seven sets of documents, including site plan, site survey, narrative statement, parking report, floor plans, building elevations, and a photograph of the proposed addition. Please do not hesitate to contact me if you require further information.

Sincerely,

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

Elise F. Woodward

Elise F. Woodward

Enclosures

cc: Clarence LaLiberty, MMC
Robert Bremm, MMC
Michael Swan, MMC
Paul E. Bell, SBRA

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

MAINE MEDICAL CENTER

DESCRIPTION OF PROPOSED PROJECT

The Owner and applicant is Maine Medical Center
22 Bramhall Street
Portland, Maine 04102.

In December 1995, Maine Medical Center filed a certificate of need application for implementation of its Master Facilities Plan. The proposed construction project will construct an addition to the Bean Building on the hospital campus in Portland, Maine, and will renovate portions of the existing facility. The approximate construction cost will be $26,000,000. Funding sources will be equity contributions, fundraising, and a tax exempt bond issue.

The principal elements of the MMC project are:

- A two-story addition to the Bean Building of approximately 62,000 square feet is proposed to relocate existing beds from the Pavilion Buildings to the new floors of the Bean Building. One floor will be used to house Medical/Surgical patients, including Oncology patients; the second floor will house Pediatric patients in The Barbara Bush Children's Hospital, "a hospital within a hospital."

- A 6000 square-foot addition to the Emergency Department will provide a new waiting space as well as new registration and triage facilities. Internal renovations to the existing Emergency Department will be undertaken to improve patient flow and to relocate CT scanning and ultrasound units from the Radiology Department.

- Internal renovations will be made to Pavilions C and D Inpatient Psychiatry, and for Outpatient Clinics in Adult Medicine, Pediatrics, Surgery, and Obstetrics/Gynecology, and for air conditioning.

- Internal renovations will be made to selected areas of the Richards Building to provide two isolation rooms with anterooms on each of six floors, and to relocate six acute care beds to the fourth floor.

- Expansion of the Mechanical space on Level 4 of the Bean Building.

Maine Medical Center is presently licensed for 648 patient beds. This project will not change the number of beds but will relocate beds within the facility as mentioned above.

The proposed addition to the Bean Building will not change the existing "footprint" of this building. When the Bean Building was designed in 1982, a new elevator core was constructed to serve the Bean Building and all floors of the existing Richards Building. No new elevator work is included with this proposed addition.

The structure of the Bean Building was originally designed to allow vertical expansion to a full building height to match the existing height of the Richards Building (Elevation 266'-7"). The present elevation of the highest roof of the Bean Building is 202'-7". The proposed two new floors will expand the Bean Building vertically 28 feet. At the completion of this construction, the new roof elevation of the Bean Building will be 230'-7". The existing Ground Floor elevation of

the Bean Building is 145'-10" (which corresponds to the Bramhall Street entrance level), and the elevation of the lowest floor is 115'-0" which exits at grade at the Loading Dock. The proposed height of the addition will be 84'-9" above the Ground Floor level and 115'-7" above the lowest floor elevation. The elevation of the portion of the Bean Building roof which faces the Emergency Department drive will remain unchanged.

The site work which will occur with this project will be adjacent to the new entrance addition to the Emergency Department. The entrance drive for patient drop-off to the Emergency Department and to the Ambulatory Surgery entrance will be reworked. Three bays for ambulances will serve the Emergency Department, as well as overflow parking for three ambulances. The addition will result in twenty parking spaces being deleted from the current configuration. The new site plan will allow traffic lanes for vehicles coming to drop off patients, and adequate space for turning for fire trucks and lithotripter van. Parking which will remain in this area will be handled as valet parking, as will additional parking required for vehicles approaching the Emergency Department and Ambulatory Surgery entrances.

SIGNAGE

A wall-mounted sign is proposed to be added to the wall of the Bean Building. A wall sign for Institutional uses in Residential Zones is allowed, and a sign construction permit is required (Table 1 Section 14-369.5).

ZONING

The hospital property, bounded by Bramhall, Gilman, Congress, and Charles Streets, lies within the R-6 Residential Zone. Institutional hospital use is a conditional use permitted by Section 14-137.2.g of the Zoning Ordinance. This project will not expand onto land other than the lot on which the principal use is located, nor will it cause any displacement or conversion of existing residential uses.

Dimensional Requirements - Section 14-139

Minimum Lot Size:	Two acres - The Maine Medical Center property includes approximately 11-1/2 acres.
Minimum Street Frontage:	Forty feet - The frontage on Bramhall Street is 587.62 feet.
Minimum yard dimensions:	Front year: Ten feet - The front yard setback on Bramhall Street is ten feet. The front yard setback on Charles Street is ten feet. The front yard setback on Congress Street is ten feet. The front yard setback on Gilman Street is ten feet. Rear yard: 20 feet - Not applicable. Side yard: 15 feet - Not applicable.

Maximum lot coverage:	50 percent for lots containing fewer than twenty dwelling units. The buildings owned by Maine Medical Center cover approximately 40 percent of the property.
	Minimum lot width: Fifty feet - The lot is 496.35 feet wide at its narrowest point on Congress Street..
	Maximum structure height: Forty-five feet. - The proposed structure exceeds forty-five feet. A variance will be sought.
Open space ratio:	Twenty percent for lots containing fewer than twenty dwelling units. - The open space ratio is approximately 35 percent.

Other Requirements - Section 14-145

Off-street Parking - The parking requirement is to be established by the Planning Board based upon the parking study submitted. (Division 20 - Sections 14-332.19, and 14-526.a.2.b).
Storage of vehicles - No unregistered motor vehicles will be stored on the premises.
Shoreland and flood plain management regulations. - No portion of this property is located in a shoreland zone.

SITE PLAN

This proposed project will be classified as major development in Section 14-522.

The proposed use of the site, that of the Maine Medical Center hospital, will not change with this development. The area adjacent to the entrance of the Emergency Department on the North side of the Richards Building will be redeveloped with this project. This portion of the site, which is completely paved, is presently used as the ambulatory and ambulance entrance to the Emergency Department.

The 6000 square foot addition will reduce the amount of paving and substitute a similar area of roof. The existing vehicular drives will be reorganized to allow ambulances to access the site separated from other vehicular traffic. The new curb cuts will be set to allow adequate turning radii for the fire trucks and the lithotripter van which access the site. A vehicular traffic lane will be maintained to allow traffic to flow past a drop-off lane at the Emergency Department entrance. A small area will be established with groundcover plantings or lawn.

Parking in this area of the site will be reduced by twenty spaces. The remaining parking spaces will be available for valet parking to serve users of the Emergency Department and the Ambulatory Surgery Department.

Appropriate erosion and sedimentation control devices will be placed during the construction period. The access to the entrances of the Emergency Department, and the Ambulatory Surgery Department will be maintained during the construction of this addition.

Site utility connections will be made to existing water, electric, gas, sewer, storm water systems. Storm water will be collected in catch basins, area drains, and trench drain connected to the existing storm water system. The new roof surface will have roof drains which will discharge into the subsurface storm water system. The total amount of impervious surfaces will be decreased by the area of the lawn and plantings (approximately 2,000 square feet). Therefore, this project will not increase runoff, nor impact the storm drainage system.

Maine Medical Center generates approximately 124 tons of unregulated (trash) solid waste per 100,000 sq.ft. annually and approximately 40,000 lbs. per month, 240. The total volume of biomedical waste generated is not expected to increase since patients beds are not being added but just relocated. The renovated space vacated will not generate measurable amounts of biomedical waste.

D-6

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Watershed Management
17 State House Station
Augusta, Maine 04333-0017
Telephone: 287-2111

FOR DEP USE

#L-_____
Fees Paid _____
Date Received_____

APPLICATION FOR PROJECT MODIFICATION

This form shall be used to request approval of minor changes to: (a) project design or operation; or (b) the conditions of a permit as previously approved by the Board or Department of Environmental Protection.

A processing fee of $100 (check payable to Treasurer, State of Maine) is required at the time of application submittal. Depending on the degree of review required, additional fees may be assessed. The Department will bill you if additional fees are needed.

If significant changes are proposed, then a complete new or amendment application may be required by the Department.

(Please type or print)

Name of Applicant: Maine Medical Center

Address: 22 Bramhall St., Portland, ME 04102

Telephone Number: (207) 871-0111

Name of Contact or Agent: Robert Bremm

Telephone: (207) 871-4115

LOCATION OF ACTIVITY

Name of Project: Bean Building Additions and Facility Alterations

Municipality or Township: Portland County: Cumberland

REQUIRED INFORMATION

1. Existing DEP permit number: 69-7981-05170
2. DEP Project Manager for previous application (if known): _____
3. Description of Proposed Change: See attached sheets.

(Attach additional sheet(s), if necessary.)

4. Provide all documentation necessary to support the proposed change. This documentation shall include, as appropriate, revised site plans, construction drawings and technical data. (If you are unsure of what information to include, please contact the original DEP project manager, or the Division of Land Resource Regulation for assistance.)

5. Does your proposal involve a significant expansion of the project, change the nature of the project, or modify any Department findings with respect to any licensing criteria? No. (If you are unsure how to answer this, please contact the original DEP project manager, or the Division of Land Resource Regulation in either Portland, Augusta, or Bangor for assistance.)

   If yes, you must provide public notice (see attached form). By signing this application, you certify that the completed notice has been sent by certified mail to abuttors and municipal officials; and has been published once in a newspaper circulated in the area where the project is located .

"I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete. I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

By: Elise F. Woodward DATE: 10 June 1996

SIGNATURE OF APPLICANT

Elise F. Woodward for

PRINT OR TYPED NAME

Shepley Bulfinch Richardson and Abbott Architects

TITLE

THE $100 APPLICATION FEE IS DUE AT THE TIME OF APPLICATION SUBMITTAL. THE APPLICATION WILL NOT BE PROCESSED UNTIL THIS FEE IS PAID.

ATTACHMENT E-1

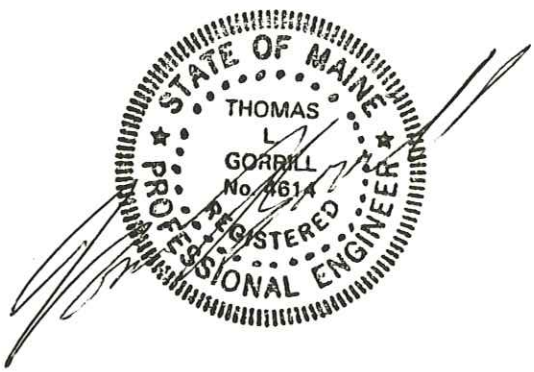
PARKING ANALYSIS FOR A PROPOSED EXPANSION TO THE BEAN BUILDING AT MAINE MEDICAL CENTER PORTLAND, MAINE

Prepared for

Maine Medical Center
22 Bramhall Street
Portland, Maine 04102

Prepared by

DeLuca-Hoffman Associates, Inc.
778 Main Street, Suite 8
South Portland, Maine 04106
(207) 775-1121



June 1996

PARKING ANALYSIS

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The following Executive Summary is prepared for the reader's convenience but is not intended to be a substitute for reading the full report.

DeLuca-Hoffman Associates, Inc. has been retained by Maine Medical Center (MMC) to complete a parking analysis for the hospital off Bramhall Street in Portland. Maine Medical Center is planning to add a fifth and sixth floor to the Bean Building and the total square footage of the addition will be approximately 67,560. The project is expected to be completed by the end of 1999. The purpose of this study is to evaluate the impact that this addition will have on the parking demand, to determine if the existing supply is adequate to meet this demand, and to make recommendations as required to increase the supply or manage the demand.

The following is a summary of the major findings of the parking study:

1. The existing parking supply for the hospital is approximately 2,383 spaces including the spaces in the Gateway garage which is owned by Maine Medical Center.

2. The proposed construction will reduce the number of available spaces by 20.

3. The proposed expansion to the hospital will not increase the number of beds at the facility. The purpose of the expansion is to reduce overcrowding at the site. The total licensed number of beds at Maine Medical Center is expected to be reduced from 606 to 520 by 1999.

4. As part of Maine Medical Center's effort to reduce overcrowding at the hospital, a total of approximately 240 patients and employees will be relocated to the new ambulatory care facility currently under construction on Route 1 in Scarborough. Another 80 employees will be relocated to the lab on John Roberts Road. The relocation of these 320 employees and patients will reduce the estimated parking demand by 244 spaces.

5. The current parking demand at MMC is estimated to be 2158 spaces. With the relocations of 320 employees and patients the estimated parking demand should be reduced to approximately 1914 spaces or 81% of the supply.

6. Maine Medical Center has adopted a parking demand management strategy in response to parking concerns in the area. MMC owns the Gateway Garage on Cumberland Avenue and currently shuttles approximately 200 people to and from MMC. In addition, MMC also has a ride share program to encourage people to carpool to work. This program includes a guaranteed ride home program. Preferential parking is offered to participants in the program as an incentive, however, the number of participants is limited. It is DeLuca-Hoffman Associates, Inc.'s recommendation that MMC increase their effort to involve people in the ride

share program through additional promotion. All employees should be encouraged to be entered into the ride share database.

Based upon these findings, it is the opinion of DeLuca-Hoffman Associates, Inc. that the planned addition to the Bean Building will have no negative impact on the parking demand nor significantly decrease the current supply. Further, with the relocation of employees and patients to the Scarborough and John Roberts Road facilities, and the expansion of the ride share program, the parking demand by MMC should be reduced significantly.

I. INTRODUCTION

Maine Medical Center (MMC) has adopted a Master Facilities Plan. This plan includes significant construction and renovation to ease overcrowding at the hospital. The construction components of the plan include the following:

- Construction of two floors on the Bean Building; one for medical/surgical beds and one for pediatric beds.
- New construction and renovation of the emergency department in order to expand treatment areas, improve patient flow, and relocate CT scanning and ultrasound units from the Radiology Department to this area.

This construction is planned to be completed by the end of 1999 and will add approximately 67,560 s.f. to the hospital. Approximately 20 parking spaces will be lost as a result of the project.

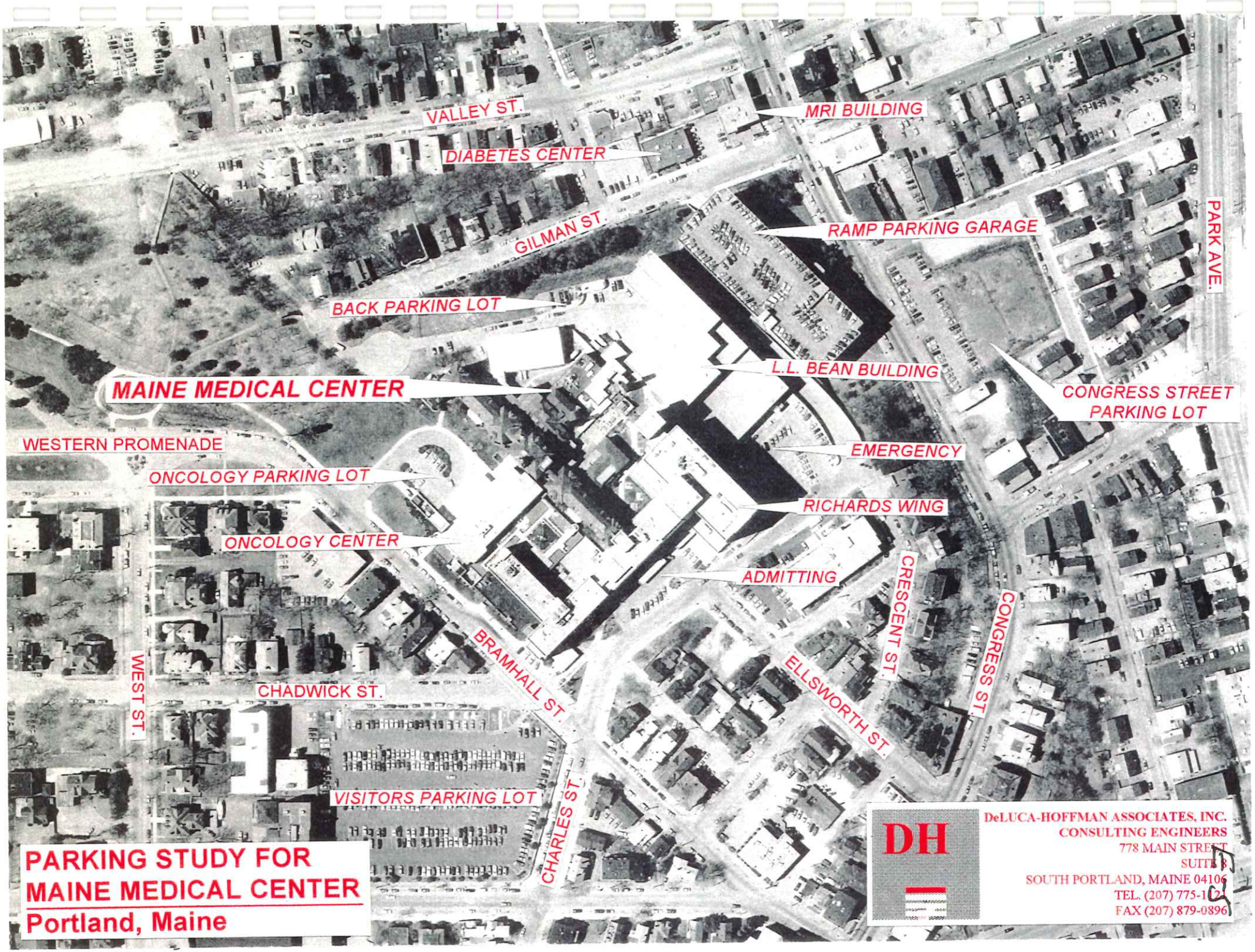
The City of Portland's principal traffic engineer has requested that MMC complete an evaluation of parking supply and demand in response to concerns voiced by residents of the Western Promenade over the availability of on-street parking. The purpose of this study is to evaluate the impact that this addition will have on the parking demand, to determine if the existing supply is adequate to meet this demand, and to make recommendations as required to increase the supply or manage the demand.

II. PARKING SUPPLY

Currently, based on data furnished by MMC, there are approximately 2,383 off-street parking spaces for the hospital. The locations of these spaces are shown on Figure 1 following this page and are summarized in Table 1 below:

TABLE 1

Location	Number of Available Spaces
Ramp Parking Garage	1,276
Congress Street, Parking Lot by Sportsman's Grill	52
Admitting	9
Visitors Parking Lot	315
MRI	11
In back of Gilman Street	15
Emergency	30
Oncology	10
Gateway Garage (Not Shown in Figure 1)	650
Diabetes Center	15
Total Available Spaces	2,383



PARKING STUDY FOR MAINE MEDICAL CENTER
Portland, Maine

DH
DeLUCA-HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS
778 MAIN STREET
SUITE
SOUTH PORTLAND, MAINE 04106
TEL. (207) 775-1
FAX (207) 879-0896

Approximately 20 spaces will be lost to accommodate the emergency room expansion which will reduce the off-street parking supply to 2,363 spaces.

The Gateway Garage listed as a source of parking in Table 1 above is located on Cumberland Street and is owned by MMC. The garage has approximately 650 spaces and currently 350 are reserved for MMC employees and the remaining 300 are currently open to the general public. These additional 300 spaces could be dedicated to MMC use if it becomes necessary. MMC purchased the garage in 1992 to relieve parking congestion and they operate a shuttle from the garage to the hospital.

III. PARKING DEMAND

DeLuca-Hoffman Associates, Inc. utilized information from MMC's certificate of need for the project which was filed with the State's Department of Human Resources and information on parking generation contained in professional publications to estimate the existing parking demand and the demand upon completion of the project.

- **Existing demand based upon the Institute of Transportation's (ITE) Publication, *Parking Generation, 2nd Edition:***

  Land Use Code 610 of this publication contains parking generation rates based upon 20 studies of hospitals around the nation in suburban areas. The facilities surveyed had between 124 and 1,450 beds with an average number of beds of 406. Based upon this data, a fitted curve equation was developed to forecast parking requirements on a weekday based upon the number of beds at the facility.

  Maine Medical Center is currently licensed for a total of 606 beds at their Bramhall Street Campus. Applying the fitted curve equation for 606 beds yields a parking requirement of 989 spaces. This appears to be low based on experience at MMC. The highest rate observed in the national study was 2.96 spaces per bed. Applying this rate to 606 beds yields 1,794 spaces required based on the existing bed count.

- **Existing demand based upon methodology contained in the 2nd edition of the *Dimensions of Parking* published by the *Urban Land Institute*.**

This publication states the following:

" A sound approach in the determination of parking requirements for industrial facilities, or for that matter, any type of facility with employees, is the following:

- *Multiply number of employees for the shift under consideration by 85 percent to account for normal absences that occur because of travel, illness, and vacations. The product is the average number of employees who would be present on a given day during a given shift.*
- *Multiply the number of employees by the percent arriving by automobile--after deducting the percent arriving by transit, by drop-off, or by walking--to determine the number of persons traveling by automobile.*
- *Divide the number of persons arriving by automobile by the average automobile occupancy factor to determine the parking requirements. Parking requirements determined in this manner represent those for given shift. Through a similar process, parking for a following shift can be determined and the impact of shift overlap on total parking requirements can thus be identified."*

MMC has the following shifts:

Shift	No. of Employees
1	2,735
2	489
3	524

The parking requirements have been determined based upon the ULI methodology as follows:

Step 1: Multiply number of employees by 0.85 to account for normal absences.

0.85 x 2,735 = 2,325

Step 2: Determine number of traveling by automobile.

The Portland Council of Governments provided DeLuca-Hoffman Associates, Inc. with 1990 census data for people who work in the vicinity of the hospital. (Traffic analysis zone 37). Eighty seven percent of the people in the zone work in the health service industry. The data showed that 92 percent use the automobile as their means of travel to work.

2,325 x 0.92 = 2,139 people travel to work by car

Step 3: Divide the number of persons arriving by automobile by the average automobile occupancy. The census data showed the average vehicle occupancy within the zone to be 1.08 people per car.

$$\frac{2,139}{1.08 \text{ people/car}} = 1,980 = \text{Staff parking demand}$$

The total parking demand for the visitors must be added to the estimated staff parking. The total visitor vehicles on site at any one time are estimated at 364, which is based upon the capacity of the visitors lot, admitting, and emergency lots. This yields a total demand for the hospital of 2,344.

The above analysis shows a total of 2,344 spaces are required for the day shift. For the purpose of estimating overlap in staff parking a similar methodology was applied to the evening shift to yield 354 spaces. The departure of the day shift and arrival of the evening shift is somewhat staggered. Therefore, DeLuca-Hoffman Associates, Inc. has assumed that 50 percent of the evening shift will overlap with the day shift yielding a peak parking demand of 2,521 spaces.

DeLuca-Hoffman Associates, Inc.'s estimate of the total demand has been calculated based upon an average of the two methodologies as follows:

Source	Estimated Parking Demand
ITE	1794
ULI	2521
Average	2158

The estimated demand of 2158 compares to 2363 spaces, or in other words demand is 91 percent of supply. Ideally the demand should be not more than 90 percent of the supply or 2127 vehicles. Thus, the hospital should attempt to reduce the demand by at least 31 spaces.

IV. FUTURE PARKING

The proposed expansion of the hospital will not increase the number of beds at the facility. The purpose of the expansion is to reduce overcrowding in the hospital. The total number of licensed beds at Maine Medical is expected to be reduced from 606 to 520 by 1999 reducing the parking demand to 1,540 using the ITE methodology. In addition, to further reduce overcrowding at the hospital, approximately 240 visitors and employees will be relocated to the new ambulatory care facility currently under construction on Route 1 in Scarborough. Another 80 employees will be relocated to the John Roberts Road. The relocation of these 320 employees and patients is anticipated to reduce the

parking demand to 2,289 applying the ULI methodology previously presented in this study. Averaging the ULI and ITE future parking demand estimates of 1,540 and 2,289 spaces respectively yields 1,914 spaces or 81 % of the supply.

V. PARKING DEMAND MANAGEMENT PROGRAMS

MMC has adopted a parking demand management strategy in response to parking concerns in the area. MMC owns the Gateway Garage and currently shuttles approximately 200 people to and from MMC. An additional 300 spaces are available which are currently being utilized by the general public. These could be dedicated to MMC use if it becomes necessary. In addition, MMC also has a ride share program to encourage people to carpool to work. This program includes a guaranteed ride home program. Preferential parking is offered to participants in the program as an incentive, however, participation in the program is low. DeLuca-Hoffman Associates, Inc. recommends that MMC increase their effort to involve people in the ride share program through additional promotion. The shifting of employees to Scarborough and the ride share program should significantly relieve parking congestion in many areas.

VI. CONCLUSION/RECOMMENDATIONS

Based upon the methodology presented in this report, DeLuca-Hoffman Associates, Inc. has made the following findings:

1. The existing parking supply for the hospital is approximately 2,383 spaces including the spaces in the Gateway garage which is owned by Maine Medical Center.

2. The proposed construction will reduce the number of available spaces by 20.

3. The proposed expansion to the hospital will not increase the number of beds at the facility. The purpose of the expansion is to reduce overcrowding at the site. The total licensed number of beds at Maine Medical Center is expected to be reduced from 606 to 520 by 1999.

4. As part of Maine Medical Center's effort to reduce overcrowding at the hospital, a total of approximately 240 patients and employees will be relocated to the new ambulatory care facility currently under construction on Route 1 in Scarborough. Another 80 employees will be relocated to the lab on John Roberts Road. The relocation of these 320 employees and patients will reduce the estimated parking demand by 244 spaces.

5. The current parking demand at MMC is estimated to be 2158 spaces. With the relocations of 320 employees and patients the estimated parking demand should be reduced to approximately 1914 spaces or 81% of the supply.

6. Maine Medical Center has adopted a parking demand management strategy in response to parking concerns in the area. MMC owns the Gateway Garage on Cumberland Avenue and currently shuttles approximately 200 people to and from MMC. In addition, MMC also has a ride share program to encourage people to carpool to work. This program includes a guaranteed ride home program. Preferential parking is offered to participants in the program as an incentive, however, the number of participants is limited. It is DeLuca-Hoffman Associates, Inc.'s recommendation that MMC increase their effort to involve people in the ride share program through additional promotion. All employees should be encouraged to be entered into the ride share database.

Based upon these findings, it is the opinion of DeLuca-Hoffman Associates, Inc. that the planned addition to the Bean Building will have no negative impact on the parking demand nor significantly decrease the current supply. Further, with the relocation of employees and patients to the Scarborough and John Roberts Road facilities, and the expansion of the ride share program, the parking demand by MMC should be reduced significantly.

ATTACHMENT F-1

DeLUCA HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS

778 MAIN STREET
SUITE 8
SOUTH PORTLAND, MAINE 04106
TEL. 207 775 1121
FAX 207 879 0896

- ROADWAY DESIGN
- ENVIRONMENTAL ENGINEERING
- TRAFFIC STUDIES AND MANAGEMENT
- PERMITTING
- AIRPORT ENGINEERING
- SITE PLANNING
- CONSTRUCTION ADMINISTRATION

July 11, 1996

Mr. William Bray
Deputy Public Works Director
55 Portland Street
Portland, Maine 04101

RE: Responses to Review Comments on Parking Analysis
Proposed Expansion to the Bean Building

Dear Bill:

Thank you for meeting with Michael Swan and myself on June 24 to discuss your review comments pertaining to the Parking Analysis for the Proposed Expansion to the Bean Building at Maine Medical Center - Portland, Maine prepared by this office. The following is a summary of your review comments and our responses:

1. *Comment: You indicated that the analysis did not consider that some of the spaces in the Bramhall Street lot are reserved for Doctors.*

   Response: As Mike Swan stated in our meeting, the reserved Doctors spaces were moved from the Bramhall Street lot to the parking garage at the corner of Gilman Street and Congress Street in response to your suggestion a few years ago. To provide room for these reserved spaces, some employee spaces were relocated to the Gateway garage. Thus, Doctors generally no longer park in the visitors lot. The exit and card reader for the Doctors still exist, primarily for nighttime use which is limited.

2. *Comment: You stated that on street parking was not considered in the analysis.*

   Response: The on-street parking supply was not considered in the parking analysis since we wanted to be sure the dedicated parking supply was adequate without the use of on street parking. While the analysis found the amount of dedicated parking is adequate, many employees park on street due to the proximity to the hospital. Also, there is no time limit on the parking garage side of Gilman Street and Congress Street. Maine Medical Center cannot control parking within the right-of-way. However, if on street parking was limited to a 2 hour time period in these areas it would be more difficult for hospital employees to utilize these spaces. The extent of on-street parking may be reduced when 240 employees/visitors begin using the Scarborough facility and 80 begin using John Roberts Road.

   The use of on street parking results in the gateway garage being under utilized. The Congress Street Garage and the Bramhall Street lot generally have a high occupancy rate. A breakdown of the use of the Bramhall lot are included in the Appendix to this letter as you requested.

3. *Comment: You questioned where the construction workers will park.*

   Response: MMC's bid documents will require that the contractor provide a remote parking site and shuttle the workers to and from the site. Costs associated with this remote lot and with the shuttle will be required to be included in the bid amount.

4. *Comment: The proposed project will result in a reduction in spaces at the Emergency Room from 30 to 10.*

   Response: Since 13 spaces is not adequate to meet the demand, MMC will institute a valet service and park the cars in the garage.

Based upon our meeting, it is our understanding that these responses addressed your concerns.

Should you have any further questions, please contact me.

Sincerely,

DeLUCA-HOFFMAN ASSOCIATES, INC.

Thomas L. Gorrill, P.E.
Vice President

TLG/ajm/JN1278/bry7-11

c: Michael Swan, MMC
Robert Bremm, MMC
RICK NOLAND

Maine Medical Center

Bramhall Parking Lot Survey April 1996

Reasons For Using The Lot

Bramhall Lot has 315 spaces

DATE	0700 Count	In Patient	Out Patient	Visitor	Sales	Contractor	Employee	Other	Totals
4/1	40	23	181	342	3	8	51	106	714
4/3	50	12	112	362	5	19	65	68	621
4/4	53	16	203	389	8	17	66	55	754
4/5	64	11	173	407	8	14	51	53	717
4/11	80	31	185	360	3	5	79	56	719
4/12	75	30	181	284	2	7	55	88	647

The lot was surveyed each day from 0700 - 1500

ATTACHMENT G-1

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

40 BROAD STREET BOSTON MASSACHUSETTS 02109-4306 TEL 617-423-1700 FAX 617-451-2420

19 July 1996

Mr. Richard Knowland
City of Portland
Planning and Urban Development
389 Congress Street
Portland, Maine 04101

Subject: Maine Medical Center
Additions and Alterations to the Bean Building

Dear Mr. Knowland:

Following are responses to your telephone comments, as well as to Tony Lombardo's written comments which we received this week regarding the above noted project.

The existing site lighting will be reused, or alternate heads will be installed for the existing pole fixtures. Cut sheets and photometrics of the proposed fixtures are attached.

At present, we cannot support the suggested change to Linden trees because Portland guidelines indicate that they are sensitive to salt while Red Oaks are not. The area where they will be planted will be used for snow piling. If the City requires a change, we will probably recommend Honey Locust. A sketch of an alternative planting location for these trees is attached. We also prefer to make no change in the size of the island between the two driveways.

We have recommended flush granite curbing because of the frequency of trips of the lithotripter van. Sloped curbing will be more difficult for the equipment to negotiate.

A crosswalk can be marked across the two driveways. If the project budget can support a change to concrete paving for the crosswalk, we will make that change. Also if the project budget will allow, the paving between the emergency drive and the flush granite paving at the vehicle drive may be changed to granite cobblestones or concrete paving to visually differentiate the separation of the drives.

The hours of valet parking will be Monday - Friday, 6 AM to 4 PM or as required.

A Site Utility Plan and Details were sent to you yesterday. Please refer to them for locations of existing and proposed structures and inverts. The sanitary and stormwater connections are re-connecting to the system which currently serves the facility.

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

The Casco trap which is desired will be provided.

New roof drains for the addition will tie into the existing roof drainage system. At the perimeter of the canopies, a gutter system will collect canopy run-off and discharge through downspouts to the building storm water system.

Construction details for all site features will be available before the start of construction.

Please contact me if you have further questions or require clarifications.

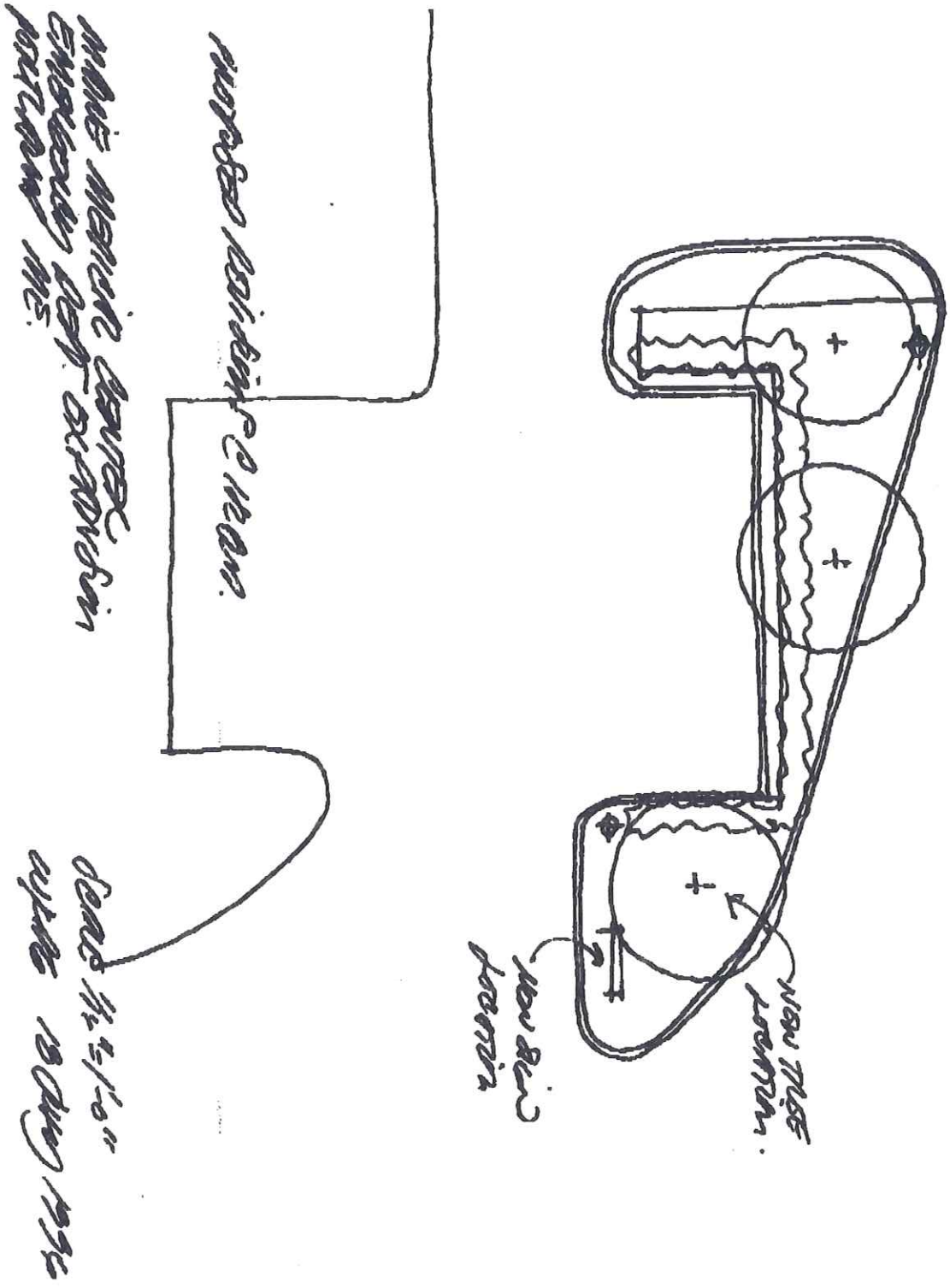
Sincerely,

SHEPLEY BULFINCH RICHARDSON AND ABBOTT

Elise F. Woodward

Enclosures

cc: Clarence LaLiberty, MMC
Robert Bremm, MMC
Michael Swan, MMC
Paul E. Bell, SBRA



ATTACHMENT H-1

CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS
OPERATIONS/ENGINEERING - INSPECTIONS
M E M O R A N D U M

TO: Jim Seymour, Development Review Coordinator
FROM: Tony Lombardo, Project Engineer
DATE: June 26, 1996
SUBJECT: Maine Medical Center - Additions and Alterations to the Bean Building

---

The plans and application dated June 10, 1996 and submitted by Shepley, Bulfinch, Richardson and Abbott were received at Portland Public Works on June 12, 1996. The following comments were generated during Engineering review:

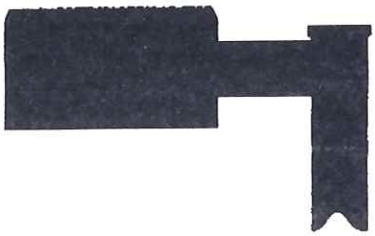
Stormwater:

- Applicant must show how all existing and proposed manholes and catch basins are connected. The following information should be provided:
  - Invert In Elevations
  - Invert Out Elevations
  - Pipes between structures (including pipe material, diameter, slope and length)
- The applicant should specify how the stormwater collection system on-site connects into the City of Portland storm drain in Charles Street . In addition, connection details should be provided and a Casco trap must be provided in the last structure on site, prior to connection into the City storm drain system.
- The applicant must show on the site plan all existing and proposed utility service and proposed and existing connections. Connection details must be provided for any connection into City sanitary or storm sewer.
- How will proposed roof drains connect into storm drain system?
- Applicant should specify locations of permanent and temporary erosion control measures and include details.

- Applicant needs to provide a "construction detail sheet" which includes details for all proposed site features (i.e. vertical curb detail, concrete sidewalk detail; new pavement sections, typical trench detail, Casco trap detail, etc.

ATTACHMENT I-1

FORM 10 EH/H Arm Mount



The Gardco Arm Mounted Square Form 10 products are sharp cutoff luminaires using high intensity discharge lamps up to 1000 watts. The EH units are manufactured from a mitered extruded aluminum and finished in an Architectural Class 1 anodizing. The H style luminaires are dieformed aluminum with a thermoset polyester finish. Both products accept 5 interchangeable, rotatable precision segmented optical systems.

Ordering

Example:

EH — 19 — 2 — 3 — 400MH — 120 — BRA — MF

PREFIX	SIZE	CONFIGURATION	PHOTOMETRIC DISTRIBUTIONS	WATTAGE	VOLTAGE	FINISH	OPTIONS
	14"		1 (Horizontal Lamp)		120		AD
	19"		3 (Horizontal Lamp)		208		CD
	26"		Q (Horizontal Lamp)		240		HF
			FM (Horizontal Lamp)		277		LF
			VS[1] (Vertical Lamp)		480		MF
							PC
							PCR
							POLY
							PTF

WATTAGE

70 HPS	250 HPS	750 HPS
100 HPS	250 MV	1000 HPS
100 MV	250 MH	1000 MV
100 MH[2]	400 HPS	1000 MH
150 HPS	400 MV	
175 MV	400 MH	
175 MH		
250 MV		
250 MH		

FINISH

BLA : Black Anodized[3]
BRA : Bronze Anodized[3]
NA : Natural Anodized[3]
BRP : Bronze Paint
BLP : Black Paint
SC : Special Color (Specify)

OPTIONS

AD : Amber Drop Diffuser (EH style only)
CD : Clear Drop Diffuser (EH style only)
HF : In-Head Fusing
LF : In-Line Fusing
MF : Mast Arm Filter (14" & 19" only)
PC : Receptacle and Photo Control[4]
PCR : Photo Control-Receptacle Only
POLY : Polycarbonate Sag Lens (Standard on VS)
PTF : Pole Top Fitter

NOTES

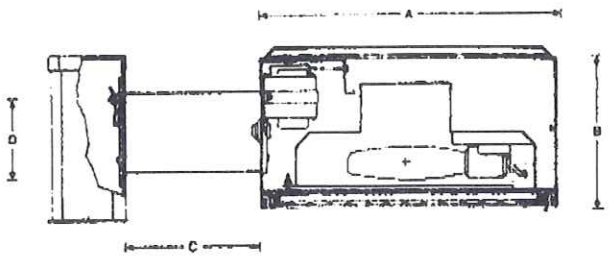
1. Furnished with Polycarbonate Sag Lens. 14" VS Units-Medium Base Only
2. Medium Base Lamp
3. EH and 26"H Units Only
4. Not Available in 480V

Gardco Lighting

Dimensional Drawings

EH Style	Size	A	B*	C	D	EPA'S Single Arm	EPA'S Twin 180°	EPA'S Quad	Approx. Wt. Single Fixture
	14"	14"	7"	6"	5"	1.1	2.3	2.9	30 lbs
		356mm	178mm	152mm	127mm				24.9 kgs
	19"	19"	10"	9"	5"	2.1	4.0	5.5	55 lbs
		483mm	254mm	229mm	127mm				26.9 kgs

H Style	Size	A	B*	C	D	EPA'S Single Arm	EPA'S Twin 180°	EPA'S Quad	Approx. Wt. Single Fixture
	14"	14"	7"	2"†	5"	1.1	2.3	2.9	30 lbs
		356mm	178mm	51mm†	127mm				13.6 kgs
	19"	19"	10"	2"†	5"	2.1	4.0	5.5	55 lbs
		483mm	254mm	51mm†	127mm				24.9 kgs
	26"	26"	12"	12"	8"	3.5	7.0	8.9	95 lbs
		660mm	305mm	305mm	203mm				43.1 kgs



* VS units with sag lens have overall heights of 8 3/4" (EH/H-14), 13 3/8" (EH/H-19) and 21" (H-26).
† 4-way units have arm lenghts of 6" (H-14) and 9" (H-19).
Note: C = Arm Length D = Arm Height

FORM 10
EH/H ARM MOUNT

SPECIFICATIONS

GENERAL: Each Gardco Square Form Ten Arm Mount is a sharp cutoff luminaire for high intensity discharge lamps. Units are designed with half cube proportions. Internal components are totally enclosed, rain tight, dust tight and corrosion resistant. No venting of optical system or electrical components is required or permitted. Luminaires are completely assembled with no disassembly required for installation. Lamping requires no lifting or hinging the luminaire housing, disturbing wiring or exposing uninsulated live parts.

HOUSING: Extruded housings (EH style) are offered in 14" and 19" sizes and are composed of precisely mitered anodized aluminum extrusions. Fabricated (H style) units are available in 14", 19" and 26" sizes and are one piece, multi-formed aluminum with an integral reinforcing spline and a single concealed joint. Tops are press-formed with a returned perimeter flange that interlocks with the housing sides. Pressure injected silicone provides a continuous weathertight seal at all miters and points of material transition.

ARM: Extruded aluminum arm is prewired and secured to fixture. Assembly is suitable for mounting to pole without requiring access to luminaire.

LENS: Mitered, extruded anodized aluminum door frame retains the optically clear, heat and impact resistant tempered flat glass in a sealed manner using hollow section, high compliance, memory retentive extruded silicone rubber. Concealed stainless steel latch and hinge permit easy toolless access to the luminaire.

OPTICAL SYSTEMS: The segmented Form Ten optical system is homogeneous sheet aluminum, electrochemically brightened, anodized and sealed. The segmented reflectors are set in faceted arc tube image duplicator patterns to achieve Types 1, 3, Q, FM and VS distributions (see pattern illustrations). The mogul lampholder is glazed porcelain with a nickel plated screw shell with lamp grip — all securely attached to the reflector assembly. 100MH units have medium base lampholder. All Metal Halide units in the 19" and 26" housings have lamp stabilizers ensuring precise arc tube positioning.

ELECTRICAL: Each high power factor ballast is the separate component type, capable of providing reliable lamp starting down to -20°F. The ballast is mounted on a unitized tray and secured within the luminaire, above the reflector system. High Pressure Sodium ballasts operate lamps within ANSI trapezoidal limits. Metal Halide and Mercury Vapor ballasts are medium regulation auto transformer providing ±10%(MH) and ±5%(MV) power regulation with a ±10% variation from rated input voltage.

Component-to-component wiring within the luminaire will carry no more than 80% of rated current and is listed by UL for use at 600 VAC at 150° or higher. Plug disconnects are listed by UL for use at 600 VAC, 15A or higher.

FINISH: Extruded housings (EH style) are standard with natural, bronze, or black Aluminum Association Architectural Class I anodized finish applied after fabrication. Special polyester finishes are available.

Formed housings (H style) are standard with a chromatic acid pretreatment and an epoxy undercoat. The finish coat is a thermosetting polyester baked at 450°F to achieve an H-2H hardness measure. 26" H style units are also offered with optional Architectural Class I anodized finish.

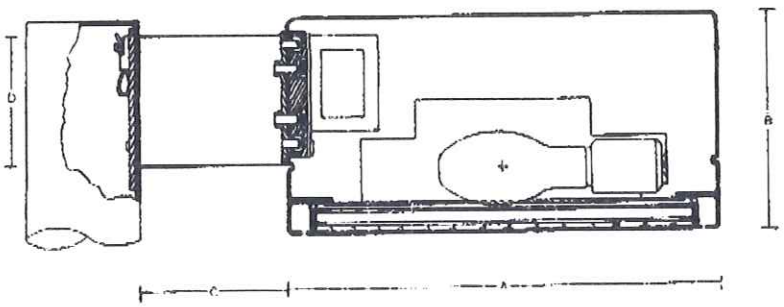
LABELS: All fixtures bear UL wet location and I.B.E.W. labels.

Gardco reserves the right to change materials or modify the design of its product without notification as part of the company's continuing product improvement program. Gardco's segmented reflector optical system has been awarded U.S. Patent #3746854.

DIMENSIONS

	SIZE	A	B[1]	C	D	EPA's Single Arm	Twin 180°	Quad	Approx. Weight Single Unit
EH STYLE	14"	14"	7"	6"	5"	1.1	2.3	2.9	30 lbs
	19"	19"	10"	9"	5"	2.1	4.0	5.5	55 lbs
H STYLE	14"	14"	7"	2"[2]	5"	1.1	2.3	2.9	30 lbs
	19"	19"	10"	2"[2]	5"	2.1	4.0	5.5	55 lbs
	26"	26"	12	12"	8"	3.5	7.0	8.9	95 lbs

1. VS units with sag lens have overall heights of 9 3/4" (EH/H-14), 13 3/8" (EH/H-19) and 21" (H-26).
2. 4-way units have arm lenghts of 6" (H-14) and 9" (H-19).



Please refer to pole data sheet for specifications and dimensional information. Do not pour anchor bolts without referring to anchor bolt template.

Gardco Lighting
2661 Alvarado Street
San Leandro, CA 94577
U.S. 800/227-0758
CA 510/357-6900
FAX 510/357-3088

THOMAS

79115-63 / 583

FORM 10

EH/H ARM MOUNT

GENERAL DESCRIPTION: The Gardco Arm Mounted Square Form 10 products are sharp cutoff luminaires using high intensity discharge lamps up to 1000 watts. The EH units are manufactured from a mitered extruded aluminum and finished in an Architectural Class I anodizing. The H style luminaires are dieformed aluminum with a thermoset polyester finish. Both products accept 5 interchangeable, rotatable precision segmented optical systems.

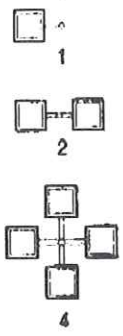
ORDERING

PREFIX	SIZE	CONFIGURATION	PHOTOMETRIC DISTRIBUTIONS	WATTAGE	VOLTAGE	FINISH	OPTIONS
EH	19"	2	3	400MH	120	BRA	MF

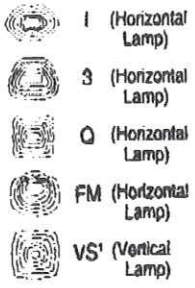
PREFIX

Extruded	EH	14"
Fabricated	H	14"
Extruded	EH	19"
Fabricated	H	19"
Fabricated	H	26"

CONFIGURATION



PHOTOMETRIC DISTRIBUTIONS



WATTAGE: See Table Below

VOLTAGE: 120, 208, 240, 277, 480

FINISH

BLA: Black Anodized [5]
BRA: Bronze Anodized [5]
NA: Natural Anodized [5]
BRP: Bronze Paint
BLP: Black Paint

OPTIONS

AD
CD
HF
LF
MF
PC
PCR
POLY

TYPE	PREFIX	SIZE	CONFIGURATION	DISTRIBUTIONS	WATTAGE	VOLTAGE	FINISH	OPTIONS

WATTAGE

Housing	14"	19"	26"
	100 HPS	250 HPS	1000 HPS
	100 MV	250 MV	1000 MV
	100 MH [2]	250 MH	1000 MH
	150HPS [3]	400 HPS	
	175 MV	400 MV	
	175 MH	400 MH	
	250 MV		
	250 MH		

OPTIONS

AD: Amber Drop Diffuser (EH style only)
CD: Clear Drop Diffuser (EH style only)
HF: In-Head Fusing
LF: In-Line Fusing
MF: Mast Arm Fitter (14" & 19" only)
PC: Receptacle and Photo Control [4]
PCR: Photo Control-Receptacle Only
POLY: Polycarbonate Sag Lens (Standard on VS) [6]

NOTES

1. Furnished with polycarbonate sag lens, VS not available with 14" mogul base units
2. Medium base lamp
3. 150 HPS ballast operates 55 volt lamp
4. Not available in 480V
5. EH and 26"H units only
6. 175W max on 14" units

Gardco Lighting®
2661 Alvarado Street
San Leandro, CA 94577
U.S. 800/227-0758
CA 510/357-6900
FAX 510/357-3088

THOMAS

FORM 10
BE, WE, BH, WH WALL MOUNT

SPECIFICATIONS

GENERAL: Each Gardco Square Form Ten Wall Mount is a sharp cutoff luminaire for high intensity discharge lamps. Direct mount (WE and WH) and arm mounted (BE and BH) styles are offered. Internal components are totally enclosed, rain tight, dust tight and corrosion resistant. No venting of optical system or electrical components is required or permitted. Luminaires are completely assembled with no disassembly required for installation. Lamping requires no lifting or hinging the luminaire housing, disturbing wiring or exposing uninsulated live parts.

HOUSING: Extruded housing (WE and BE styles) are composed of precisely mitered anodized aluminum extrusions. Fabricated (WH and BH styles) units are one piece, multi-formed aluminum with an integral reinforcing spline and a single concealed joint. Tops are press-formed with a returned perimeter flange that interlocks with the housing sides. Pressure injected silicone provides a continuous weathertight seal at all miters and points of material transition.

WALL BRACKETS: All models include hooking die cast aluminum wall bracket that conceals 10 gauge mounting plate. BE and BH series include extruded arm to extend unit from wall.

LENS: Mitered, extruded anodized aluminum door frame retains the optically clear, heat and impact resistant tempered flat glass in a sealed manner using hollow section, high compliance, memory retentive extruded silicone rubber. Concealed stainless steel latch and hinge permit easy toolless access to the luminaire.

OPTICAL SYSTEMS: The segmented Form Ten optical system is homogeneous sheet aluminum, electrochemically brightened, anodized and sealed. The segmented reflectors are set in faceted arc tube image duplicator patterns to achieve Types 1, 3 and FM distributions (see pattern illustrations). The mogul base lampholder is glazed porcelain with a nickel plated screw shell with lamp grip — all securely attached to the reflector assembly. 100MH units have medium base lampholder. All Metal Halide units in the 19" housings have lamp stabilizers ensuring precise arc tube positioning.

ELECTRICAL: Each high power factor ballast is the separate component type, capable of providing reliable lamp starting down to -20°F. The ballast is mounted on a unitized tray and secured within the luminaire, above the reflector system. High Pressure Sodium ballasts operate lamps within ANSI trapezoidal limits. Metal Halide and Mercury Vapor ballasts are medium regulation auto transformer providing ±10% (MH) and ±5% (MV) rated input voltage. Component-to-component wiring within and is listed by UL for use at 600 VAC at 150° or higher. Plug disconnects are listed by UL for use at 600 VAC, 15A or higher.

FINISH: Extruded housings (WE and BE styles) are standard with natural, bronze, or black Aluminum Association architectural Class I anodized finish applied after fabrication. Special color polyurethane finishes are available.

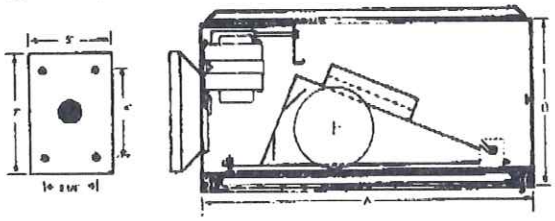
Formed housings (WH and BH styles) are standard with a chromate acid pretreatment and an epoxy undercoat. The finish coat is a thermosetting polyester baked at 450°F to achieve an H-2H hardness measure.

LABELS: All fixtures bear UL wet location and I.B.E.W. labels.

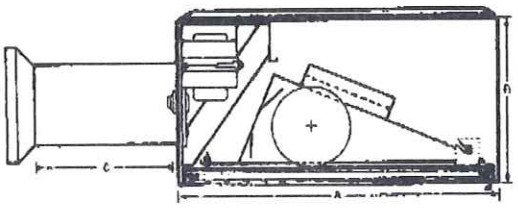
Gardco reserves the right to change materials or modify the design of its product without notification as part of the company's continuing product improvement program. Gardco's segmented reflector optical system has been awarded U.S. Patent #3746854.

DIMENSIONS

WE, WH STYLE	SIZE	A	B
	14"	14"	7"
	19"	19"	10"



BE, BH STYLE	SIZE	A	B	C
	14"	14"	7"	6"
	19"	19"	10"	9"



Gardco Lighting®
2661 Alvarado Street
San Leandro, CA 94577
U.S. 800/227-0758
CA 510/357-6900
FAX 510/357-3088

THOMAS

I-5

P. 9 OF FAX TO MR. KNOWLAND

FORM 10

BE, WE, BH, WH WALL MOUNT

GENERAL DESCRIPTION: The Gardco Wall Mounted Form 10 products are sharp cutoff luminaires for high intensity discharge lamps up to 400 watts. BE and WE units are manufactured from mitered extruded aluminum and finished in an Architectural Class I anodizing. The BH and WH luminaires are dieformed aluminum with a thermoset polyester finish. Both products feature 3 interchangeable precision segmented optical systems.

BE, BH

WE, WH

ORDERING

MOUNTING	HOUSING	SIZE	CONFIGURATION	PHOTOMETRIC DISTRIBUTIONS	WATTAGE	VOLTAGE	FINISH	OPTIONS
B	E	19"	1	FM	400MH	120	BRA	PCR
Arm Mount B No Arm W	Extruded E Fabricated H	14" 19"	1	1 3 FM	See Table Below	120 208 240 277 480	BLA: Black Anodized [4] BRA: Bronze Anodized [4] NA: Natural Anodized [4] BRP: Bronze Paint BLP: Black Paint	AD CD HF PC PCR POLY

TYPE	MOUNTING	HOUSING	SIZE	CONFIGURATION	DISTRIBUTIONS	WATTAGE	VOLTAGE	FINISH	OPTIONS
				1					
				1					
				1					
				1					
				1					
				1					

WATTAGE

Housing	14"	19"
	100 HPS	250 HPS
	100 MV	250 MV
	100 MH [1]	250 MH
	150HPS [2]	400 HPS
	175 MV	400 MV
	175 MH	400 MH
	250 MV	
	250 MH	

OPTIONS

AD: Amber Drop Diffuser (WE, BE style only)
CD: Clear Drop Diffuser (WE, BE style only)
HF: In-Head Fusing
HS: Houseside Shield-Types 1 & 3
PC: Receptacle and Photo Control [3]
PCR: Photo Control-Receptacle Only
POLY: Polycarbonate Sag Lens [5]

NOTES

1. Medium base lamp
2. 150 HPS ballast operates 55 volt lamp
3. Not available in 480V
4. WE or BE units only
5. 175W max on 14' units

Gardco Lighting
2661 Alvarado Street
San Leandro, CA 94577
U.S. 800/227-0758
CA 510/357-6900
FAX 510/357-3088

THOMAS

ATTACHMENT J

Fleet Bank

Bradford A. Hunter
Senior Vice President
Corporate Banking

July 1, 1996

Mr. John E. Heye
Vice President for Finance
Maine Medical Center
22 Bramhall Street
Portland, Maine 04102-3175

RE: Maine Medical Center proposed expansion project

Dear John,

As Senior Vice President of Corporate Banking for Fleet Bank of Maine, I am writing in response to the City of Portland's requirement to show that Maine Medical Center has the financial viability to embark on the proposed project. Specifically, we believe that Maine Medical Center has the financial and technical capacity to undertake and complete the development of this project which consists of the following principal elements:

-A two story addition to the Bean Building of approximately 62,000 square feet to relocate existing beds from the Pavilion Buildings to the new floors of the Bean Building. One floor will be used to house Medical/Surgical patients, including Oncology patients; the second floor will house Pediatric patients in The Barbara Bush Children's Hospital.
-A 6000 square foot addition to the Emergency Department will provide a new waiting space as well as new registration and triage facilities.
-Internal renovations will be made to Pavilions C and D Inpatient Psychiatry, and for Outpatient Clinics in Adult Medicine, Pediatrics, Surgery, and Obstetrics/ Gynecology, and for air conditioning.
-Internal renovations to selected areas of the Richards Building.
-Expansion of the Mechanical space on Level 4 of the Bean Building.

After reviewing the planned development, in our opinion, we would seriously consider financing the project when approved. Our relationship with Maine Medical Center is highly valued, and we look forward to having the opportunity to aid in the financing of this worthy project.

Sincerely,

Fleet Bank of Maine
Mail Stop: ME PM P05B, Two Portland Square, P.O. Box 1280, Portland, ME 04104 207-874-5106 / Fax 207-874-5167
A Member of Fleet Financial Group, Inc.

CITY OF PORTLAND
Planning and Urban Development Department

MEMORANDUM

TO: Sam Hoffses, Chief of Inspection Services

FROM: Richard Knowland, Senior Planner RK

DATE: October 7, 1996

RE: Maine Medical Center

Maine Medical Center has requested that they be issued a foundation permit for an addition for their expanded emergency department. A building permit can be issued for this provided it is only for a foundation permit. No other site or building improvements should be allowed until we forward our site plan approval sheet.

cc: Joseph E. Gray, Jr., Director of Planning and Urban Development
Alexander Jaegerman, Chief Planner

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CITY OF PORTLAND
Planning and Urban Development Department

MEMORANDUM

TO: Richard Knowland, Senior Planner

FROM: Tony Lombardo, Project Engineer

DATE: February 26, 1997

SUBJECT: Maine Medical Center - Bean Building Additions and Renovations

The following comments were generated during Public Works/Engineering review of sheets SU-1 and SU-2, received on February 26, 1997:

- Storm sewer and sanitary sewer system should specify pipe lengths.
- Near the Charles Street entrance, the applicant proposes an 8 inch dia. drain pipe connecting into a 6 inch dia. drain line. Pipes connecting in this manner should be the same diameter.
- Applicant still does not specify any erosion/sediment control measures on the plans.
- Applicant should specify invert out elevation from the new trench drain.
- The proposed D.M.H. near Crescent Street is over 19 feet deep. The elevation difference between the 10 inch and 8 inch invert in and the 18 inch invert out elevations is 15 feet. Applicant must provide drop structures to accommodate elevation change.
- The applicant proposes a greater than 7 feet elevation drop between the invert in and invert out in the existing S.M.H near Crescent Street. Applicant must provide inside or outside drop structure to accommodate elevation difference.

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Planning & Urban Development

Joseph E. Gray Jr.
Director

CITY OF PORTLAND

August 15, 1996

Ms. Linda Kokemuller
Maine Department of Environmental Protection
312 Canco Road
Portland, ME 04102

Re: Maine Medical Center Site Location Law Permit Revision

Dear Linda:

This letter is to inform you that the Portland Planning Board has approved a development proposal for Maine Medical Center. This approval was done under the Site Location Law as a revision to a previous DEP Site Location Permit approval. Enclosed are the pertinent correspondence and reports regarding this project.

1. Notification of Final Action Notification

2. Planning Board Approval letter

3. Planning Staff Report to Planning Board with Reduced Site Plans

4. Planning Staff Memo to Planning Board

Should you have any questions on this application, please call me.

Sincerely,

Richard Knowland

Richard Knowland
Senior Planner

cc: Joseph E. Gray, Jr., Director of Planning and Urban Development
Alexander Jaegerman, Chief Planner

O:\PLAN\DEVREV\PROJECTS\22BRAMHL\LETTERS\KOKEMUL.JMD

CITY OF PORTLAND, MAINE

PLANNING BOARD

August 12, 1996

Ms. Elise Woodward
Shepley Bulfinch Richardson and Abbott
40 Broad Street
Boston, MA 02109-4306

RE: Maine Medical Center Expansion, 22 Bramhall Street

Dear Ms. Woodward:

On July 23, 1996, the Portland Planning Board voted 4-0 (Hagge, Cole, DeCourcey absent) on the following motions regarding a proposed expansion of Maine Medical Center involving a two story addition to the Bean Building, an addition to the Emergency Department and reorganization of the Emergency Department parking lot.

1. That the plan is in conformance with the Conditional Use Standards of the Land Use Code.

2. That the plan is in conformance with Site Plan Ordinance of the Land Use Code and the DEP Site Location Law subject to the following conditions:

    i. That the site plan be revised reflecting the comments of Public Works (memo dated 6/26/96).

    ii. That the site plan be revised reflecting crosswalks along the two emergency driveways adjacent to Charles Street for Planning staff review and approval.

    iii. That the lighting plan be reviewed and approved by Planning staff.

The approval is based on the submitted site plan and the findings related to site plan review standards as contained in Planning Report # 39-96, which is attached.

Please note the following provisions and requirements for all site plan approvals:

PLANNING REPORT #39-96

MAINE MEDICAL CENTER EXPANSION

BRAMHALL AND CHARLES STREET

CONDITIONAL USE AND SITE PLAN REVIEW

MAINE MEDICAL CENTER, APPLICANT

Submitted to:

Portland Planning Board
Portland, Maine

July 23, 1996

I. INTRODUCTION

Maine Medical Center (MMC) requests approval for a proposed expansion to their facility at 22 Bramhall Street. This project will not change the number of existing hospital beds although certain beds will be relocated within the facility. The project will require site plan and conditional use approval. As an amendment to a DEP site location project, the Board will also be reviewing it under the site location law. An existing condition plan, site plan, building elevations and background information are shown as Attachments A, B, C and D.

529 notices were sent to area residents.

II. FINDINGS

Zoning:	R-6
Land Area:	11.5 acres
Building Height:	85 feet (two story addition from ground floor level)
New Floor Area:	68,000 sq. ft.

The project includes the following elements:

- A two-story addition to the Bean Building is proposed with a total floor area of about 62,000 sq. ft. The Bean Building was originally designed to accommodate additional floors. One of the floors will be the Barbara Bush Children's Hospital. The addition will be under the height of the Richards Wing.

  On June 20th, the Board of Appeals granted a height variance for this project since the height exceeds the 45 foot height limit of the R-6 zone.

- A 6,000 sq. ft. addition will be built to the existing emergency department off Charles Street. This will result in a reorganization of the emergency entrance driveway and parking lot area. A separate entrance and driveway will be provided for ambulances. Six ambulance parking spaces are shown on the plan. The main emergency driveway will be looped with a drop-off area. Thirteen parking spaces are indicated. These are the only changes to the footprint of the site.

- A variety of internal renovations will take place in various departments. This is described in further detail on Attachment D-2.

The submission indicates that the amount of existing impervious surface will be reduced by 2000 sq. ft. with introduction of more grass and landscaping.

The proposed two story addition is in keeping with the existing masonry materials and design character of the Bean Building (see Attachment C-1.) The westerly elevation is capped by two precast concrete bands and a series of large windows along the facade. The projecting facade creates shadow lines that provide visual interest and lessens the perceived mass of the building.

III. DEVELOPMENT REVIEW

The proposed development has been reviewed for conformance with the conditional use and site plan review standards.

A. Conditional Use

Sec. 14-137(2)

i. In the case of expansion onto land of existing such uses other than the lot on which the principal use is located, it shall be demonstrated that the proposed use cannot reasonably be accommodated on the existing site through more efficient utilization of land or buildings, and will not cause significant physical encroachment into established residential areas.

The proposed development is located on the lot of the principal use. The expansion utilizes land and buildings in an efficient manner and will not encroach into established residential areas.

ii. The proposed use will not cause significant displacement or conversion of residential uses existing as of June 1, 1983, or thereafter.

No residential uses will be displaced or converted by this project.

iii. In the case of a use or use expansion which constitutes a combination of the above-listed uses with capacity for concurrent operations, the applicable minimum lot sizes shall be cumulative.

Not applicable.

Sec. 474(c)(2)

a. There are unique or distinctive characteristics or effects associated with the proposed conditional use.

The proposed use generates activities that are no different from the existing hospital related activities taking place on the site.

b. There will be an adverse impact upon the health, safety, or welfare of the public or the surrounding area.

There are no known health or safety issues associated with this project.

c. Such impact differs substantially from the impact which would normally occur from such a use in that zone.

The impact of the proposed project will not differ substantially from other hospital uses. The existing hospital emergency entrance will merely be reorganized under this proposal.

B. SITE PLAN

1/2. Traffic

Traffic related improvements involve reorganization of the emergency entrance driveway and parking lot area off Charles Street. A separate entrance and driveway will be provided for ambulances. Six ambulance parking spaces are shown on the plan. The main emergency driveway will be looped with a drop-off area. Thirteen parking spaces are indicated.

Under sec. 14-526(2)(b) of the site plan ordinance, the Board determines the appropriate parking requirement for new construction when it exceeds 50,000 sq. ft. A parking analysis on the expansion has been submitted by DeLuca Hoffman Associates see Attachment E. The report indicates that the reorganization of the emergency department will result in a loss of 20 spaces from the existing 2,383 spaces controlled by MMC. MMC parking demand is estimated to be 2,158 spaces.

With the new ambulatory care facility under construction on route one in Scarborough and relocation of lab employees to South Portland, an estimated 320 employees and patients will reduce the estimated parking demand by 244 spaces. The number of beds in the hospital is expected to decrease from 606 to 520 in 1999. The report concludes that the expansion "will have no negative impact on the parking demand nor significantly decrease the current supply." The report also recommends that MMC increase involvement in a ride share program through additional promotion.

The reorganization of the emergency entrance will result in a loss of 20 parking spaces. Only 13 spaces are shown for the emergency parking lot. Since 13 spaces is not adequate to meet the demand, MMC will institute a valet service and park the cars in the garage.

William Bray, Deputy Director of Public Works, has reviewed the parking plan and finds it acceptable. He had raised several questions concerning the report but these were satisfactorily addressed in a letter dated 7-11-96 from DeLuca Hoffman. (See Attachment F.)

The turning radii of both emergency entrances are wide in order to accommodate fire trucks and the lithotripter. As a result, pedestrians would find it difficult walking along the MMC street frontage of Charles Street. Planning staff has suggested that a crosswalk be established across both entrances in order to provide some level of pedestrian safety. The crosswalk could be painted or more preferably a stamped concrete crosswalk. A stamped crosswalk was provided for the Cozy Harbor project on St. John Street. The applicant has agreed to provide a painted sidewalk (see Attachment G).

We have also suggested that the paving between the ambulance parking lot and the flush granite curb by the public entrance (to the emergency department) be changed from black top to concrete in order to better differentiate the travel lane around the cul-de-sac.

3. Bulk, location of proposed buildings, proposed uses will not cause health or safety problems

The primary hospital expansion is taking place on top of the existing Bean Building. The emergency entrance improvements are a reorganization of the existing emergency entrance facility. The impacts of this project should not substantially differ from the impacts of the existing facility.

4. Bulk, location or height of proposed buildings minimizes any substantial diminution in the value or utility to neighboring structures

The proposed project minimizes any substantial diminution in the value or utility to neighboring structures. The proposed expansion will be constructed on the existing developed portions of MMC's property. The two story addition is in the middle of the MMC campus while the new emergency entrance represents a reorganization of the existing entrance.

5. Sewers, sanitary, storm drains, water, solid waste

The project will use existing water, sewer and storm drain utilities on site to service this expansion. Three catchbasins will be added to the emergency entrance area while an existing catchbasin will be eliminated. Although it is assumed that the stormwater collection system will connect into the city storm drain in Charles Street the plan does not specify such connections. Other engineering comments are shown on Attachment H.

6/7. Landscaping

honey locust
sumac ash

With the reorganization of the emergency entrance, an existing 36 foot long landscape planter adjacent to Charles Street will be eliminated. A new landscaped area will be created adjacent to the northerly ambulance parking spaces. Three Betula Jacquemonii trees (16-18 ft. high) and an unspecified number of Greenwaves (36 inches high, three feet on center) and Vince Minor interplanted with bulbs are proposed for this area. Adjacent to the southerly ambulance parking area, four Betula Jacquemonii will be planted as well as nine Arnold Sentinel (5'-6' high) and an unspecified number of Repondens (2 1/2' - 3' high.)

Jeff Tarling, City Arborist, has reviewed the plan. He recommends that the Lindens should be substituted for the Betula Jacquemonii and that an additional Linden be planted.

8. Soil and Drainage

Areas not covered by pavement will be landscaped. The amount of impervious surface on the site will be decreased by 2,000 sq. ft. Further information on erosion and sedimentation control measures has been requested (see Attachment H.)

9. Lighting

There are several existing shoebox lighting fixtures on the northerly side of the parking lot that will be retained. Existing light poles displaced by the new plan will be reused. The applicant indicates that a new shoe box fixture will be mounted on these poles (see Attachment I.) Since this information arrived on Friday, we were unable to review it.

10. Fire

The Fire Department has reviewed and approved the site plan. The plan has been modified to accommodate the turning radius of fire trucks. A portion of the curb along the cul-de-sac will be flush (to the ground) to allow fire trucks to exit through the ambulance driveway. Otherwise the turning radius of the cul-de-sac would be too tight for fire trucks to maneuver around.

11. Infrastructure

The proposed development is consistent with off-premises infrastructure existing or planned by the City.

12. Natural Resources

The proposed scheme is located on a previously developed site in an urban area. The proposed development shall have no known adverse impact upon the existing natural resources including groundwater, surface water, wetlands, unusual natural areas, wildlife and fisheries habitat.

13. Financial Capacity

Financial capacity information is shown on Attachment J.

IV. MOTIONS FOR THE BOARD TO CONSIDER

On the basis of plans and materials submitted by the applicant and on the basis of information contained in Planning Report #39-96, the Planning Board finds:

1. The proposed development is in conformance with the conditional use standards of Sec. 14-137 and Sec. 14-474. 4-0 Higgins, Cole, D

2. The site plan is in conformance with the Site Plan Ordinance of the Land Use Code. DGP Low and Site Location

Potential Conditions of Approval:

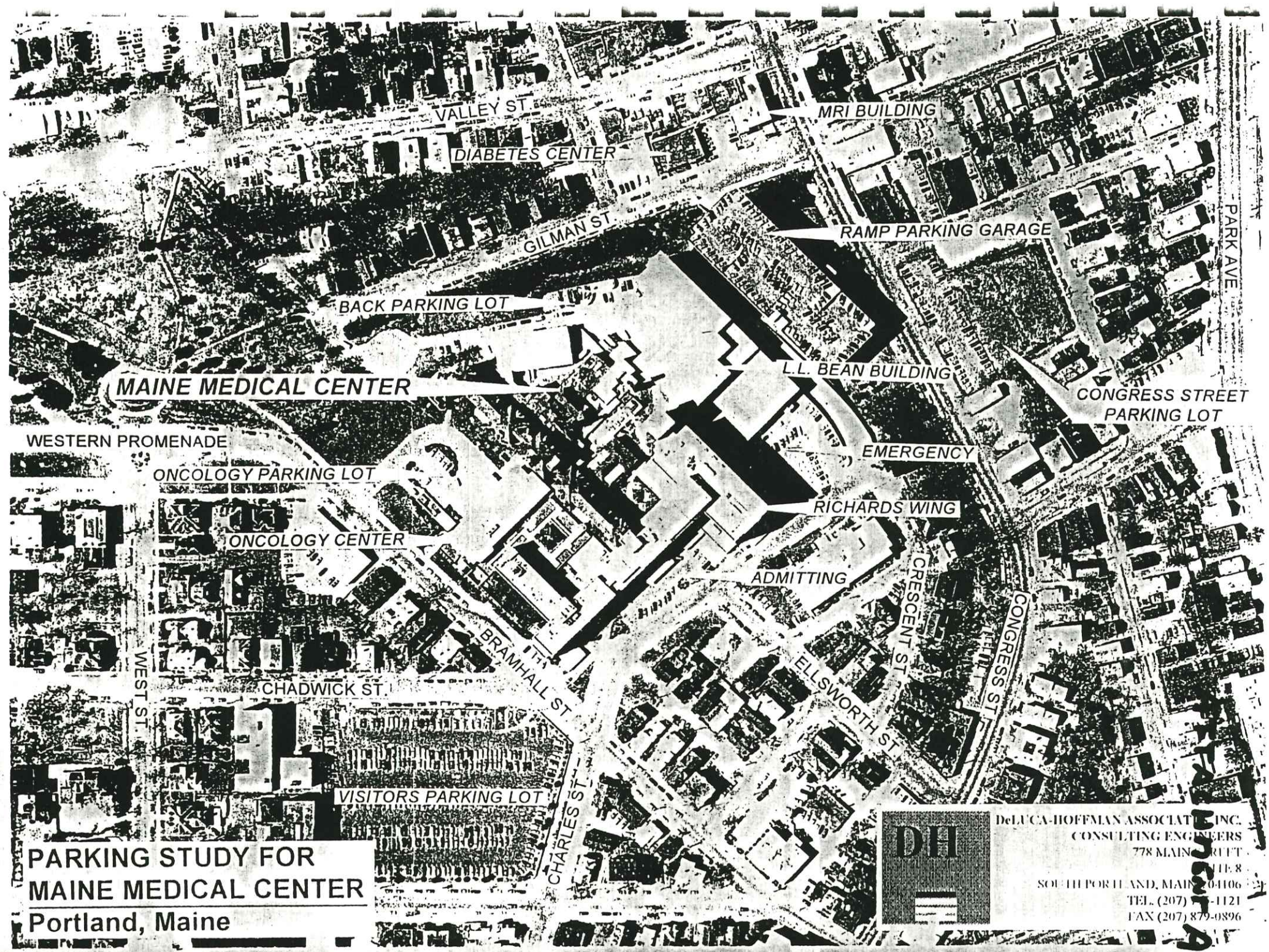
i. That the site plans be revised reflecting the comments of Public Works (see Attachment H) how connects into city system

ii. That the site plan be revised reflecting cross walks along the two emergency driveways adjacent to Charles Street for Planning Staff review and approval. elevation numbers to C.B construction datum

iii. That the lighting plan be reviewed and approved by Planning Staff.

Attachments:

A. Existing Conditions
B. Site Plan
C. Building Elevations
D. Background Information
E. Parking Analysis
F. Parking Analysis Update
G. Updated Information from MMC
H. Public Works Memo
I. Lighting
J. Financial Capacity Information



PARKING STUDY FOR MAINE MEDICAL CENTER

Portland, Maine

DeLUCA-HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS
778 MAIN STREET
SUITE 8
SOUTH PORTLAND, MAINE 04106
TEL. (207) 775-1121
FAX (207) 879-0896

A-1

McCarthy Fax Transmittal

To: RICHARD KANOWLAND

Fax Number 756-8258

From: TONY GALLETA

Re: MAINE MEDICAL CENTER Date 10/8/96

Number of pages faxed including this document 2

Please call sender @ 871-2447 if you do not receive all

++

Comments:

PER YOUR REQUEST, ATTACHED FIND ANOTHER COPY OF THE ESTIMATE SUBMITTED ON 10/4 FOR THE PURPOSE OF OBTAINING AS PERMIT TO BEGIN FOUNDATION WORK ON/ OCTOBER 15/96 (+ OR -)

— CONFIRMING OUR CONVERSATION ON 10/7/96, YOU ARE TO ISSUE AN IN-HOUSE MEMO AUTHORIZING THE ISSUANCE OF THE SELECTIVE PERMIT REFERENCED ABOVE

YOUR COOPERATION IS APPRECIATED

City of Portland
Planning Department

City Hall
389 Congress Street, 4th Floor
Portland, Maine 04101
FAX NUMBER: 756-8258

FAX TRANSMISSION COVER SHEET

To: ELIAS WOODWARD

Fax #: 617-451-2420

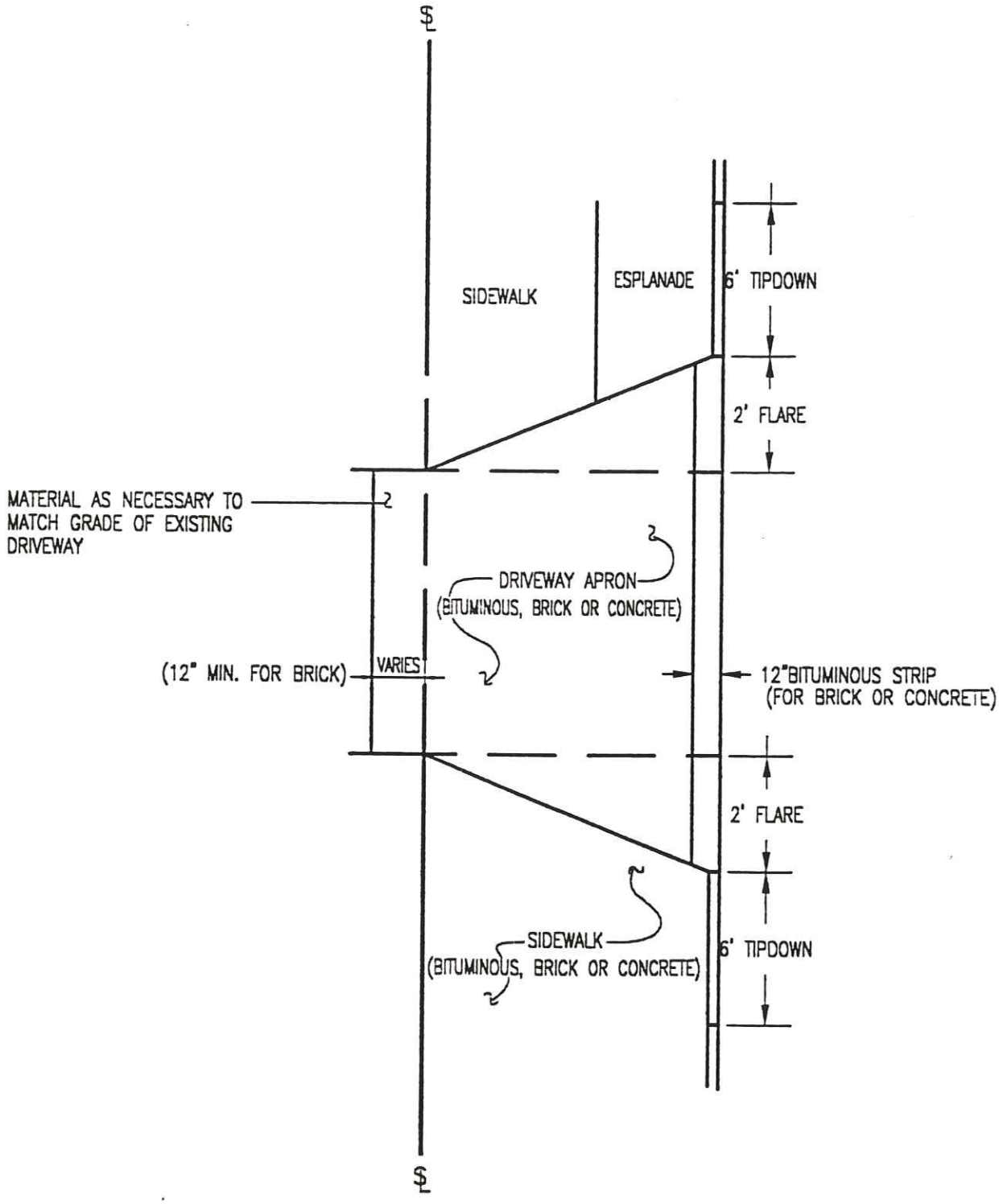
# of Pages: 2

From: R. KNOWLAND

Date: 1-7-97

RE: ATTACHED IN THE JPEG.

If you do not receive all of the pages, please call 874-8721.



NOT TO SCALE

FIGURE I - 9
SIDEWALK AND DRIVEWAY CONSTRUCTION

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Land Quality Control
State House Station 17
Augusta, Maine 04333
Tel: (207) 287-2111

FOR DEP USE

#L-_____
Date Received _____

NOTIFICATION OF FINAL ACTION ON APPLICATION
MUNICIPAL REVIEW OF DEVELOPMENT
(38 M.R.S.A. Section 489-A)

This form is to be used by a registered municipality to notify the Department upon the taking of final action by the municipal reviewing authority, pursuant to 38 M.R.S.A. Section 489-A. This form must be received by the Department within 40 working days of the final action. The municipality must also submit one copy of the record of review and basis of decision.

Municipality: CITY OF PORTLAND

Contact Person: RICHARD KNOWLAND, SENIOR PLANNER

Address and Phone: CITY HALL, PLANNING DEPT, 389 CONGRESS ST. PORTLAND, ME. 04101 874-8300 EXT 8725

Project Applicant: MAINE MEDICAL CENTER

Address and Phone: 22 BRAMHALL STREET, PORTLAND, ME. 04101 TEL. NO 871-0111 ROBERT BRAMM (CONTACT)

Title of Project: MAINE MEDICAL CENTER EXPANSION

Date of Final Action By Municipality: 7-23-96

Please submit as attachments to this form one copy of the record of review and basis of decision. This shall include any and all review comments by either municipal review staff, outside review agents, or consultants who performed a review of any part of the application, and the official record of the municipal proceedings and final action.

Town or City of: PORTLAND DATE: 8-13-96

By: Richard Knowland

Print Name: RICHARD KNOWLAND

and Title: SENIOR PLANNER

10/93

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Land Quality Control
State House Station 17
Augusta, Maine 04333
Tel: (207) 287-2111

FOR DEP USE

#L-_____

Date Received _____

NOTIFICATION OF FINAL ACTION ON APPLICATION
MUNICIPAL REVIEW OF DEVELOPMENT
(38 M.R.S.A. Section 489-A)

This form is to be used by a registered municipality to notify the Department upon the taking of final action by the municipal reviewing authority, pursuant to 38 M.R.S.A. Section 489-A. This form must be received by the Department within 40 working days of the final action. The municipality must also submit one copy of the record of review and basis of decision.

Municipality: CITY OF PORTLAND

Contact Person: RICHARD KNOWLAND, SENIOR PLANNER

Address and Phone: CITY HALL, PLANNING DEPT, 389 CONGRESS ST. PORTLAND, ME. 04101 874-8300 EXT 8725

Project Applicant: MAINE MEDICAL CENTER

Address and Phone: 22 BRAMHALL STREET, PORTLAND, ME. 04101 TEL. NO 871-0111 ROBERT BERMAN (CONTACT)

Title of Project: MAINE MEDICAL CENTER EXPANSION

Date of Final Action By Municipality: 7-23-96

Please submit as attachments to this form one copy of the record of review and basis of decision. This shall include any and all review comments by either municipal review staff, outside review agents, or consultants who performed a review of any part of the application, and the official record of the municipal proceedings and final action.

Town or City of: PORTLAND

DATE: 8-13-96

By: Richard Knowland

Print Name: RICHARD KNOWLAND

Title: SENIOR PLANNER

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Land Quality Control
State House Station 17
Augusta, Maine 04333
Tel: (207) 287-2111

FOR DEP USE

#L-_____
Date Received _____

NOTIFICATION OF APPLICATION ACCEPTANCE
MUNICIPAL REVIEW OF DEVELOPMENT
(38 M.R.S.A. Section 489-A)

This form is to be used by a registered municipality to notify the Department upon the acceptance of an application for review pursuant to 38 M.R.S.A. Section 489-A. This form must be received by the Department within 14 days of acceptance of an application. The municipality must also submit one copy of the project application and one copy of the record of review and action.

If the application which is the subject of this notice should subsequently be ammended during the review process, this form should also be used to submit notice to the Department of the amendment.

Municipality: CITY OF PORTLAND

Contact Person: RICHARD KNOWLAND, SENIOR PLANNER

Address and Phone: CITY HALL, PLANNING DEPT, 389 CONGRESS ST. PORTLAND, ME. 04101 874-8301 EXT 872

Project Applicant: MAINE MEDICAL CENTER

Address and Phone: 22 BRAMHALL STREET, PORTLAND, ME. 04101 871-0111 ROBERT BRAM. (CONTACT)

Title of Project: MAINE MEDICAL CENTER EXPANSION

Date Accepted as Complete By Municipality: 7-16-96

I. Type of Project for which permit is sought: (Check One)

____ Subdivision as described in section 482, subsection 5 of more than 20 acres but less than 100 acres;

____ Structure as described in section 482, subsection 6, paragraph B, in excess of 3 acres but less than 7 acres;

____ Excavation on more than 5 acres of land for borrow, topsoil, clay or silt, whether alone or in combination as described in section 482, subsection 2-B.

✓ AMENDMENT TO A PREVIOUSLY APPROVED DEP PROJECT UNDER SITE LOCATION OF DEVELOPMENT LAW

10/93

I. Description of Project. (Include number of units or lots, parcel size, footprint, etc.) 68,000 SQ.FT. BUILDING ADDITION ON THE EXISTING MAINE MEDICAL CENTER CAMPUS. SITE DEVELOPMENT INCLUDES A 6,000 SQ FT. ADDITION TO THE EMERGENCY DEPARTMENT AND A REORGANIZATION OF EMERGENCY DRIVEWAY AND PARKING AREA. A 62,000 SQ.FT. ADDITION IS PROPOSED ON TOP OF THE EXISTING BEAN BUILDING.

II. Submit as attachments to this form:

A. One copy of complete application filed with municipality (include site plans);

B. Identification of any outside review agents or consultants who will be performing reviews of any aspect of the application;
JAMES SEYMOUR, SEBAGO TECHNICS

C. One copy of the legal notices served by the municipality.

NOTE: APPLICANT IS ADVISED TO REVIEW THE NATURAL RESOURCES PROTECTION ACT 38 M.R.S.A. SECTIONS 480-A THROUGH 480-U (N.R.P.A.) TO ENSURE CONSISTENCY WITH THAT LAW. THE MUNICIPALITY'S DELEGATED REVIEW AUTHORITY PURSUANT TO 38 M.R.S.A. SECTION 489-A DOES NOT EXTEND TO THE N.R.P.A. IF AN N.R.P.A. PERMIT IS NECESSARY IT MUST BE OBTAINED FROM THE DEPARTMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

Town or City of: PORTLAND DATE: 7/22/96

By: Richard Knowland

Print Name: RICHARD KNOWLAND

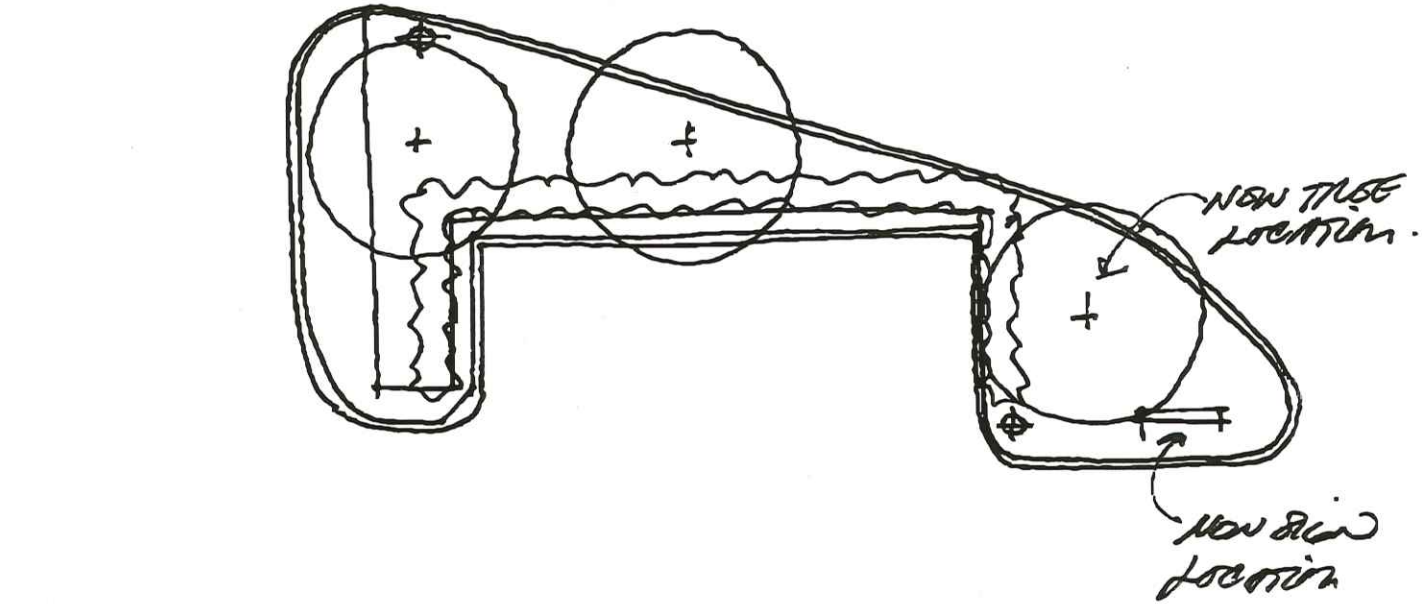
and Title: SENIOR PLANNER

City of Portland,Maine

Subdiv'n/SiteDevelopement
Maine Medical Center
October,3/96

Item	Quantity	Unit	Unit cost	Subtotal	Compl'd
1.Street/Walks					
a.Paving	1459	sq.yds	$ 14.90	$ 21,737.00	
b.Granite Curbing	600	lin.ft.	$ 27.76	$ 16,660.00	
c.Sidewalks	3316	sq.ft.	$ 2.24	$ 7,438.00	
2.Sanitary Sewer					
a.Manholes	20	vert.ft.	$ 260.00	$ 5,200.00	
b.Piping	116	lin. ft.	$ 4.76	$ 5,152.00	
c.Connections	3	each	$ 1,500.00	$ 4,500.00	
3.Storm Drainage					
a.Manholes	28	vert.ft.	$ 240.00	$ 6,720.00	
b.Catch Basins	12	vert.ft.	$ 180.00	$ 2,160.00	
c.6"/8" Piping	340	lin.ft.	$ 18.47	$ 6,280.00	
d.10"/18" Piping	160	lin.ft.	$ 32.00	$ 5,120.00	
e. Detention Basin	1	ea.	$ 3,500.00	$ 3,500.00	
4.Site Lighting	Allowance			$ 7,500.00	
5.Open Space Items	5	ea.	$ 500.00	$ 2,500.00	
6.Landscaping	Allowance			$ 25,000.00	

TOTAL $ 119,467



PROPOSED ADDITIONAL SLAB.

MAINE MEDICAL CENTER
EMERGENCY DEPT. EXPANSION
PORTLAND ME.

SCALE 1/4"=1'-0"
WMK 18 JULY 1996

LC
SBRA
McBro
5/26/82

CITY OF PORTLAND, MAINE
ZONING BOARD OF APPEALS

April 16, 1982

Maine Medical Center
22 Bramhall Street
Portland, Maine

cc to: Shepley Bullfinch
Richardson & Abbott
1 Court Street
Boston, Mass. 02108

RE - Appeal at 22-40 Bramhall Street

Dear Sir:

Following is the decision of the Board of Appeals regarding your petition to construct 82'7" addition to already existing building at the above named location. Please note that your appeal was granted.

Also, before your permit can be issued, you must pay the permit fee itself. Please make all check payable to the City of Portland.

Very truly yours,

Malcolm G. Ward
Zoning Enforcement Officer

MGW/t

MAINE MEDICAL CENTER
RECEIVED
APR 26 1982
ADMINISTRATION
PORTLAND, MAINE

CITY OF PORTLAND, MAINE
BOARD OF APPEALS

SPACE AND BULK VARIANCE APPEAL

I. Findings of Fact

A. Applicant Maine Medical Center

B. Property Location 22-40 Bramhall St. Cor. 330-336 Charles St.

C. Applicant's Interest in Property:

(x) Owner
( ) Tenant
( ) Other _____

D. Property Owner Maine Medical Center

E. Owner's Address 22 Bramhall St., Portland, Me.

F. Zone (Circle One):

R-1 R-2 R-3 R-5 (R-6) R-4

R-P B-1 B-2 B-3 A-B

I-P I-I I-2 I-2b I-3 I-3b I-4

RPZ W-1

G. Site Plan Approval required _____

H. Present Use of Property Hospital

I. Section(s) to Which Variance Related Sec. 602.7.B.5

J. Reasons Why Permit Cannot be Issued Because proposed addition will have an average height of 82'7" rather than the 65' maximum permitted in the R-6 Residential Zone in which this property is located.

K. Requested Variance Would Permit Proposed addition with an average height of 82'7" rather than the 65' maximum permitted under Sec. 602.7.B.5 of Zoning Ordinance in R-6 Residential Zone in which property is located.

L. Notice Sent to _____ Adjacent Property Owners

II. Appearances

A. Those Advocating Variance

CARL WELCH HOSPITAL ADMINISTRATION

B. Those Opposing Variance

KURT DECKER - GILMAN ST

(Attachments, As Necessary)

III. Exhibits (Any documents, photos, plans, further findings of fact, etc. presented to the Board as part of its records)

(A) LETTER TO ADDRESS ISSUES (B) ELEVATION PLAN

IV. Reasons for Decisions - Undue Hardship (The following checklist relates with the Board of Appeals hardship definitions for Space and Bulk variances as contained in Section 602.24C 3.b.(1) (a) through (e)

A. The parcel is exceptional due to physical characteristics or topographic features which amount to more than a mere inconvenience

(X) Yes/Agreement with statement

( ) No/Disagreement with statement

Reasons TIE INTO EXISTING BUILDING, SIDE OF A HILL,

B. If yes, the unique physical conditions: (Check One) Sec. 602.24C 3.b.(1) (b)

(X) Existed at the time of the enactment of the provision from which a variance is sought; or

( ) Were caused by natural forces; or

(X) Were the result of governmental action

C. Pertinent ordinance provision deprives owner of substantial use or enjoyment of property in the manner commonly enjoyed by owners of property subject to the same provisions (Sec. 602.24C 3.b. (1) (c)

(X) Yes/Agreement with statement

( ) No/Disagreement with statement

Reasons UNIQUE OPERATION (HOSPICE)

D. As evidenced by affirmative answers to either IV. A. or IV. C. above, the variance will not create a special privilege for the applicant. Sec. 602.24C 3.b. (1) (d)

(X) Yes/Agreement with statement

( ) No/Disagreement with statement

Reasons SAME AS ABOVE.

E. The variance will not adversely affect neighborhood property in the same zone and will not be detrimental to the general public health and safety Sec.602.24C 3.b. (1) (e)

(X) Yes/Agreement with statement

( ) No/Disagreement with statement

Reasons NO REASONS OTHERWISE, LACK OPPOSING PUBLIC INPUT

V. Specific Relief Granted

After a public hearing held on 4/15/82 the Board of Appeals finds that: (Check One)

(X) Approval - All of the conditions required by Sec. 602.24C 3.b.(1) exist with respect to this property, as evidenced by affirmative responses to all statements set forth in IV. A. through IV. E above, and that a space and bulk variance be granted in this case.

Conditions of Approval (If any)

( ) Disapproval - All conditions required by Sec.602.24C 3.b. (1) do not exist with respect to this property, as evidenced by one or more negative responses to statements set forth in IV. A. through IV. E. above, and that a space and bulk variance should not be granted in this case.

VI. Signatures of Board

Gail D. Zayac Chairman

Michael E. Westok

Thomas J. Murphy

Merrill A. Lobley

MAINE MEDICAL CENTER
FACILITIES PLAN
EXECUTIVE SUMMARY

The Maine Medical Center portion of the Maine Medical Center Foundation Master Facilities Plan includes the following major elements:

- construction of two floors on the Bean Building, one for pediatrics and one for medical/surgical patients;
- construction of space adjacent to and renovation of the emergency department for expansion of the ED and addition of CT scanning and ultrasound;
- relocation of psychiatry into a renovated floor of the Pavilions;
- expansion of the clinics into two renovated floors of the Pavilions;
- renovation of obstetrics to improve the experience for normal deliveries;
- improvement of the public spaces making them more warm and welcoming;
- air conditioning the Pavilions;
- relocation of the pharmacy to the subbasement of the Bean Building;
- relocation of the Blood Bank adjacent to the main laboratory.

New construction of 68,000 square feet and renovation of 63,000 square feet will be required. The project budget is currently estimated at $40 million. Shepley Bulfinch Richardson & Abbott, Boston, Massachusetts is serving as the project architect. Schematic design is 90% complete. A certificate of need is required and is anticipated to be approved in June 1996. Current plans are to begin construction in the Fall of 1996.

(120495.mfp)

June 23, 1996

Mr. Joseph E. Gray, Jr.
Director of Planning & Urban Development
City Hall, 389 Congress Street, Portland ME 04101

Dear Mr. Gray;

It may be high time for your Board and department to take an in-depth look at the expansion of medical facilities and offices in the established West Portland area, from State to the West Promenade and Congress to Danforth. Not a report to be filed away but a study with conclusions to be implimented, perhaps.

The expanding presence of Maine Medical Center (and to a lesser extent, Mercy Hospital) has a material impact on the very character of this residential neighborhood. These large medical facilities have attracted an increasing number of offices for doctors, research labs, etc. Truck and services traffic has increased, as has parking problems for residents. Most of Bramhall Street has been taken over by medical facilities and blocks of Vaughn, have seen fine brick houses converted... and who wants a view of MMC's giant parking lot?

Three doors from my residence on Pine Street a fine old carriage house has been converted into medical offices, with parking signs and handicap ramp. Directly behind me on West Street there are several medical complexes, with large parking lot. There are even medical offices on Cushman Street where parking is at a premium for residents.

The conversion of longtime family homes (and I'm not speaking of dilapidated frame tenements) into medical offices not only changes property use but the very life patterns of a community because they are closed nights and weekends..and certainly take no part in community projects or activities. Fact. May I suggest you put a colored flag to represent each medical business on your map of the above specified area. It may surprise you. This is not a large area to begin with. And when you add the State Street retirement buildings, you are in the ring with <u>two</u> 800 lb. gorillas.

I am a daily walker and thus see more of this neighborhood than most car drivers..the once-handsome brick sidewalks that are in dreadful condition now, and the problems presented by the unchecked medical spread. I'm sure that if I was planning some exterior alterations I would be held to certain standards by you. But what are the realities of the standards applied to a medical group or hospital?

Finally, MMC's plan for construction of a large two-story addition means more traffic, more satellite facilities, more noise and less residential focus. Mr. Jaegerman's notice concerns me when it says the "workshop" session June 25, 1996 will be "an opportunity for the applicant to present a plan" and while it's open to the public:"Public comments are not generally received at the workshop meeting." Curious, because that means the public has no chance at the beginning for input but must wait until following meetings when advanced plans are presented, and we..not the applicant..are at a great disadvantage. From experience I have seen the applicant often protest bitterly that he has already invested large sums of money in the project, etc., etc.and while he will make small concessions, he and the public were never on an even playing field to begin with.

Sincerely,

Frances M. Veeder

Frances M. Veeder
129 Pine Street #9
Portland ME 04102
207 828-0447

CITY OF PORTLAND, MAINE

BOARD OF APPEALS

June 10, 1996

Elise E. Woodward, AIA
Shepley Bulfinch Richardson and Abbott
40 Broad Street
Boston, Massachusetts 02109-4306

RE: 22 Bramhall Street
Maine Medical Center
Portland, Maine

Dear Ms. Woodward,

Receipt of your application for a Variance Appeal for the property located at 22 Bramhall Street, Portland, Maine is acknowledged.

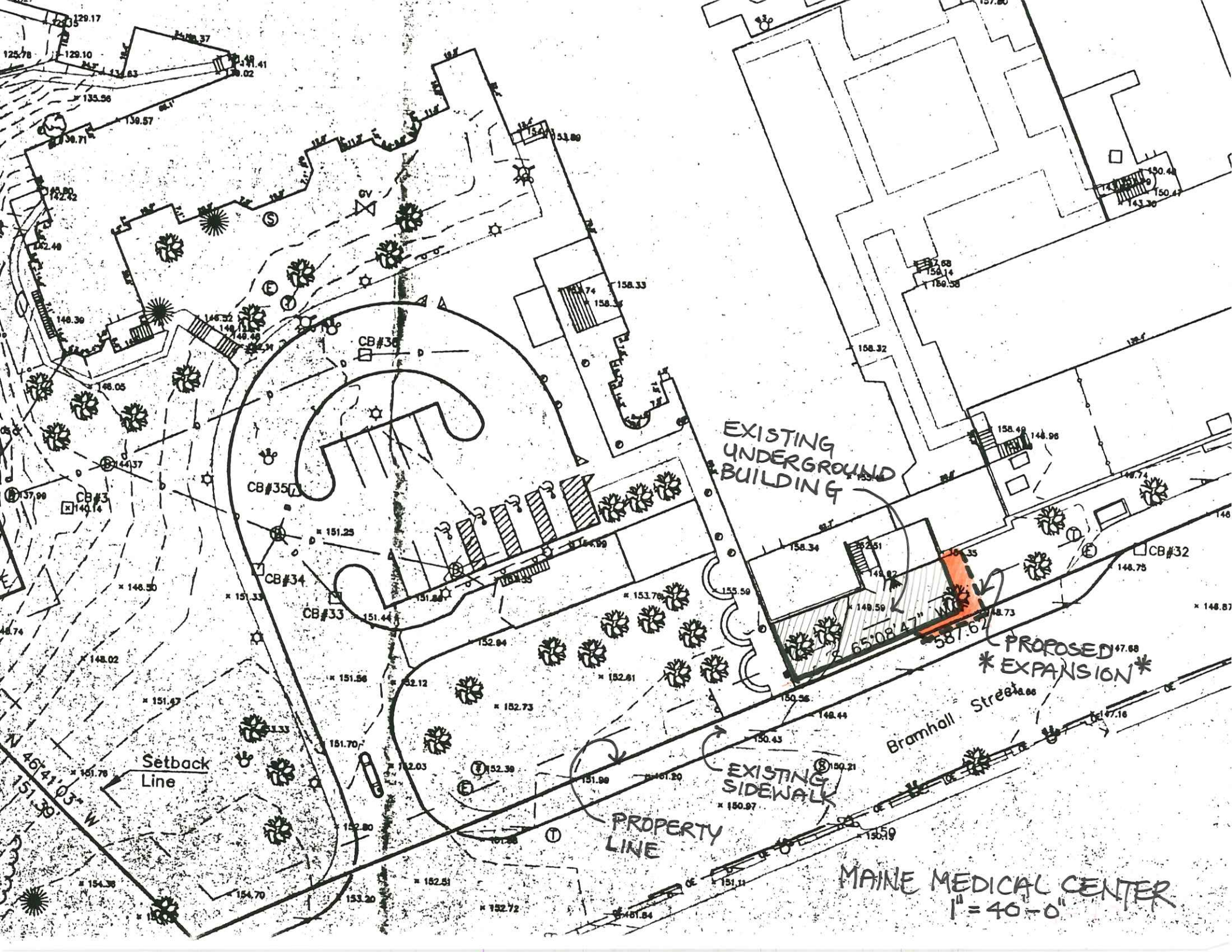
This appeal is scheduled for review before the Board of Appeals on Thursday, June 20, 1996 at 7:00 p.m., Room 209, City Hall, Portland, Maine. You must plan to attend to answer any questions which the Board members may have concerning this appeal.

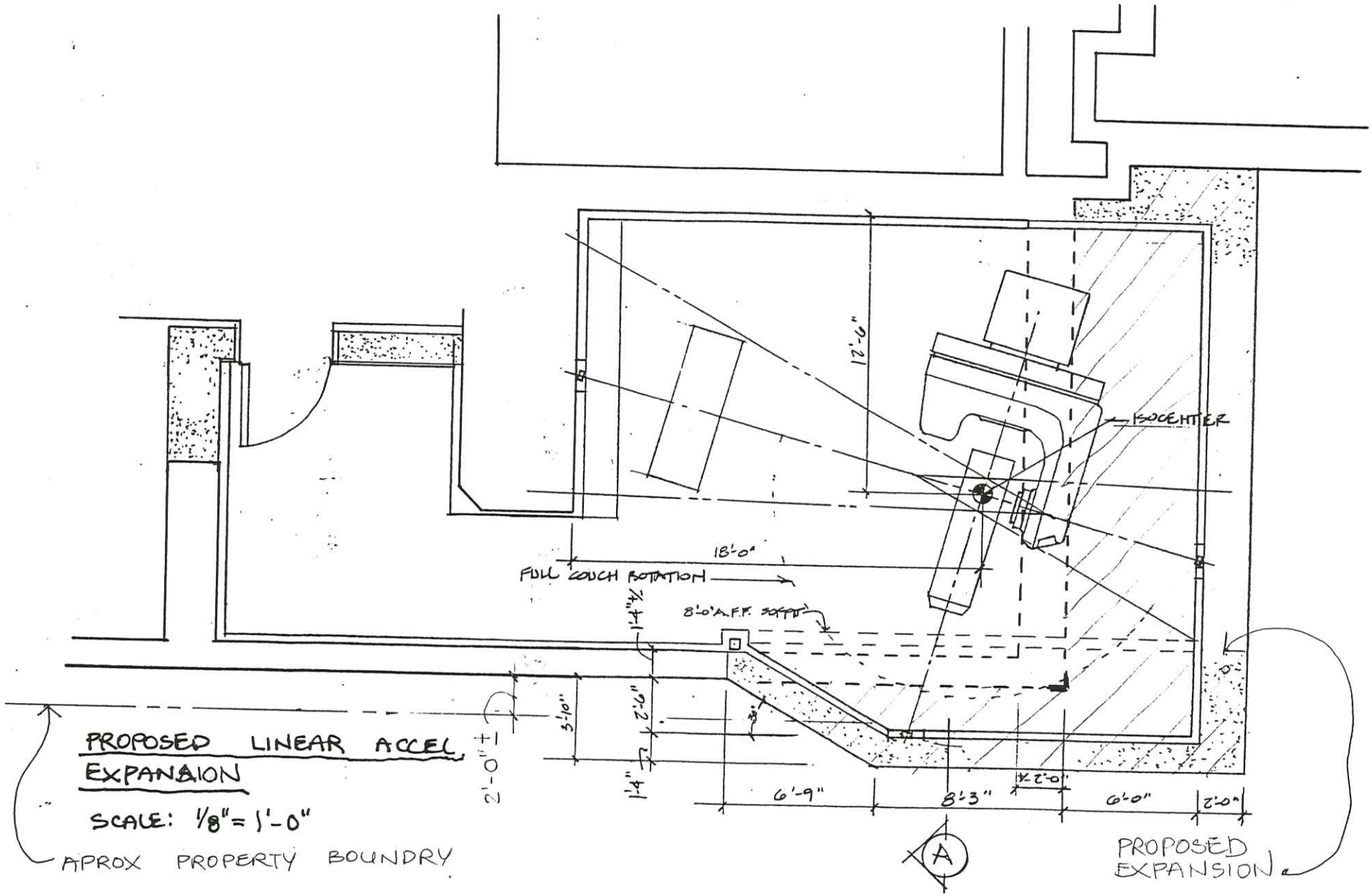
A copy of the June 20th agenda will be sent to you as soon as copies become available.

Sincerely,

Marge Schmuckal
Asst. Chief, Code Enforcement Division

cc: Matthew D. Manahan, Chairman
Joseph E. Gray, Dir, PUD
P. Samuel Hoffses, C, Code Enf Div
Charles Lane, Corp Counsel
A. Simpson, CEO
R. Bremm, Dir, Engr Svcs, ME Med

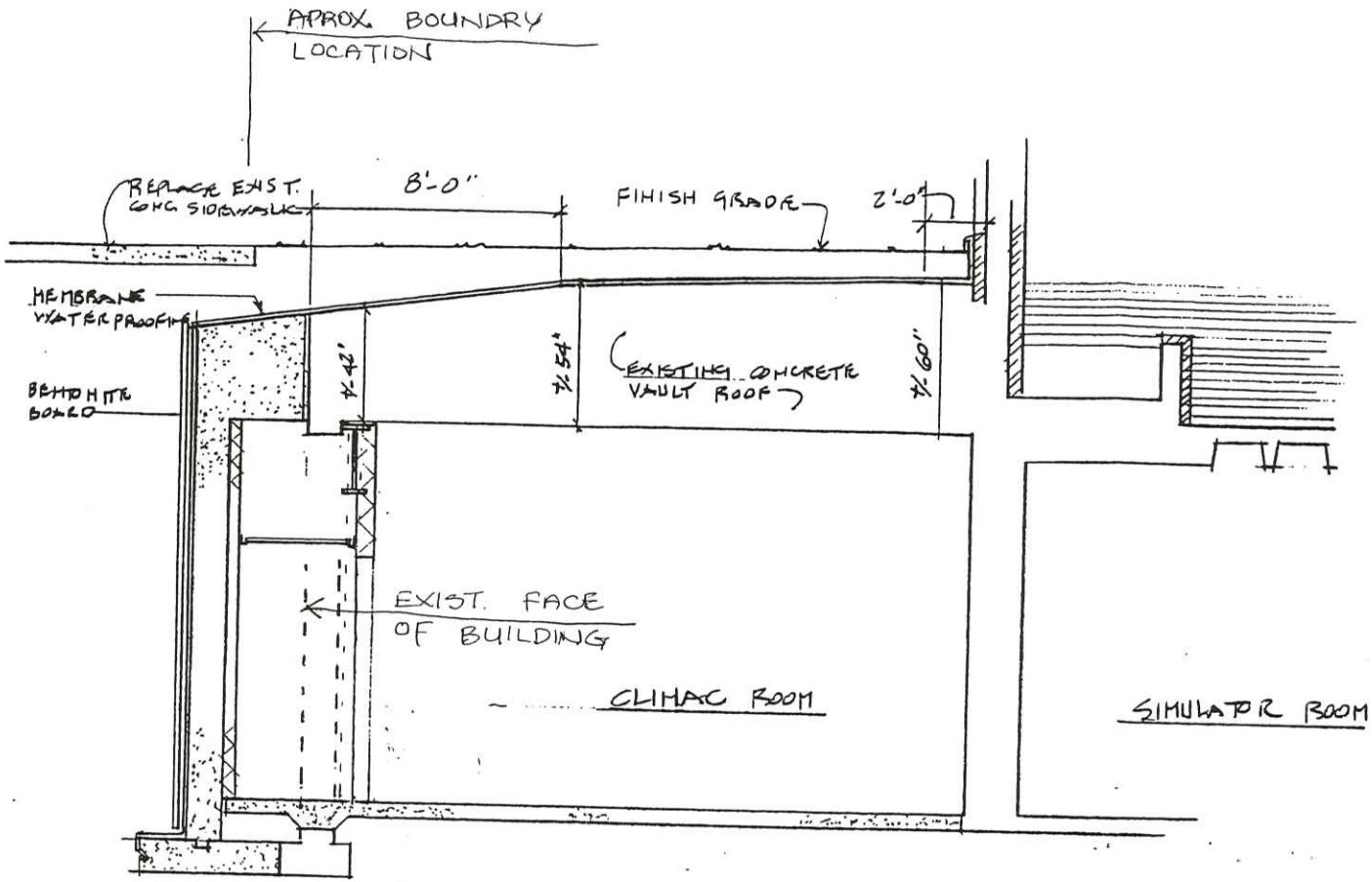

EXISTING UNDERGROUND BUILDING
PROPOSED * EXPANSION *
65°08'47"
587.62
Setback Line
N 46°41'03" W
151.38
PROPERTY LINE
EXISTING SIDEWALK
Bramhall Street
CB#36
CB#35
CB#34
CB#33
CB#32
CB#3
MAINE MEDICAL CENTER
1" = 40'-0"



PROPOSED LINEAR ACCEL EXPANSION

SCALE: 1/8" = 1'-0"

APROX PROPERTY BOUNDRY



CROSS SECTION
1/8"=1'-0"

A

MAINE MEDICAL CENTER

Richard Knowland
Senior Planner
Planning and Urban Development
389 Congress St.
Portland, Maine 04101

Dear Rick,

Please include the enclosed letter as part of our application. This should meet the financial viability requirement. Any questions about this or any other items please call. Thank you.

Sincerely,

Robert Bremm,
Director Engineering Services

RDB/lj

cc: Elise Woodward, SBRA

CITY OF PORTLAND, MAINE
SITE PLAN REVIEW
Processing Form

Maine Medical Center — Applicant
February 12, 1990 — Date

22 Bramhall St. Portland, Maine 04102 — Mailing Address
22 Bramhall St. — Address of Proposed Site

parking lot — Proposed Use of Site
54-I-1 — Site Identifier(s) from Assessors Maps

No change / 109,771 sq. ft. — Acreage of Site / Ground Floor Coverage
Zoning of Proposed Site

Site Location Review (DEP) Required: ( ) Yes ( ) No
Proposed Number of Floors _____

Board of Appeals Action Required: ( ) Yes ( ) No
Total Floor Area _____

Planning Board Action Required: ( ) Yes ( ) No

Other Comments: To change entrance to parking lot from Chadwick and Bramhall to most southerly corner of Chadwick St.

Date Dept. Review Due: _____

PLANNING DEPARTMENT REVIEW

_____ (Date Received)

☐ Major Development — Requires Planning Board Approval: Review Initiated

☐ Minor Development — Staff Review Below

	LOADING AREA	PARKING	CIRCULATION PATTERN	ACCESS	PEDESTRIAN WALKWAYS	SCREENING	LANDSCAPING	SPACE & BULK OF STRUCTURES	LIGHTING	CONFLICT WITH CITY PROJECTS	FINANCIAL CAPACITY	CHANGE IN SITE PLAN	
APPROVED	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	
APPROVED CONDITIONALLY			✓										CONDITIONS SPECIFIED BELOW
DISAPPROVED													REASONS SPECIFIED BELOW

REASONS: Approved pending City Council approval/adoption of necessary Traffic Schedule Amendments to reverse the traffic direction on Chadwick Street (prior to building permit)

(Attach Separate Sheet if Necessary)

_____
SIGNATURE OF REVIEWING STAFF/DATE

PLANNING DEPARTMENT COPY

CITY OF PORTLAND, MAINE
MEMORANDUM

TO: Sarah Green, Senior Planner

FROM: William J. Bray, Traffic Engineer

DATE: March 11, 1991

SUBJECT: Maine Medical Center - Bramhall Parking Lot Site Plan

The submitted site plan dated 3/4/91 meets with my approval. Please be sure to grant approval with the following condition:

- That the Portland City Council adopts the necessary Traffic Schedule Amendments to reverse the traffic direction on Chadwick Street.

Please inform the MMC staff that I would require them to notify each resident abutting the effected section of Chadwick Street prior to the City Council meeting.

WJB/sjr

Attachment 2

CITY OF PORTLAND

CONDITIONAL USE APPEAL

APPLICATION

Applicant's name and address: MAINE MEDICAL CENTER

22 Bramhall Street, Portland, Maine 04102

Applicant's interest in property (e.g., owner, purchaser, etc.):

LESSEE (SUBJECT TO PLANNING BOARD APPROVAL)

Owner's name and address (if different): MMC REALTY CORP.

22 Bramhall Street, Portland, Maine 04102

Address of property (or Assessor's chart, block and lot number):

325-327 Brackett Street 54-D-7

Zone: R-6 Present use: VACANT

Type of conditional use proposed: INSTITUTIONAL (ADMINISTRATIVE OFFICES)

Conditional use authorized by: Section 14-137(2)g

NOTE: If site plan approval is required, attach preliminary or final site plan.

The undersigned hereby makes application for a conditional use permit as above-described, and certifies that all information herein supplied by him is true and correct to the best of his knowledge and belief.

Dated: June 22, 1990

Donald L. McDowell

Signature of Applicant

Donald L. McDowell
Executive V. P. & Treasurer
Maine Medical Center

RECEIVED
JUN 22 1990
DEPT. OF BUILDING INSPECTIONS
CITY OF PORTLAND

RECEIVED
JUN 25 1990
DEPT. OF BUILDING INSPECTIONS
CITY OF PORTLAND

Section 14-474(c)(2):

(2) Standards: Upon a showing that a proposed use is a conditional use under this article, a conditional use permit shall be granted unless the board determines that:

a. There are unique or distinctive characteristics or effects associated with the proposed conditional use;

b. There will be an adverse impact upon the health, safety, or welfare of the public or the surrounding area; and

c. Such impact differs substantially from the impact which would normally occur from such a use in that zone.

MAINE MEDICAL CENTER

5-17-90

Richard,

Enclosed are revised copies of plans depicting our parking lot change request. Please let me know if there are any questions.

Thanks,

Mike Hanson

871-2944

MAINE MEDICAL CENTER

February 6, 1990

Mr. Joseph Gray
Director of Planning and Urban Development
Planning Office
City Hall
389 Congress Street
Portland, ME 04101

Dear Mr. Gray:

In 1982 Maine Medical Center made a proposal to the City of Portland to change the direction of Chadwick Street from a one way northbound street to a one way southbound street. The purpose of this proposal was to relieve congestion at the entrance of the hospital and to eliminate the unsafe condition of traffic turning into the Maine Medical parking lot, traveling in a southbound direction, in the face of Chadwick Street traffic which is traveling northbound.

In the past year we continued to experience very difficult problems at the entrance to our Bramhall parking lot. Patrons who wish to enter the lot line up on Bramhall Street delaying vehicle traffic on Bramhall and Chadwick Street. This situation also makes it more difficult for pedestrian traffic to cross safely from the parking lot to the main entrance of the hospital.

Since July of this year, Maine Medical has employed additional security guards to prevent traffic from waiting outside the lot on Bramhall Street. Traffic is routed to Chadwick Street where cars can wait in line outside the lot without interfering with traffic flow. In addition, valet parking has been provided in the lot to maximize the use of parking space and reduce the waiting period outside the lot when a line develops. These efforts have greatly reduced the traffic problem but are not acceptable long term solutions.

Maine Medical Center is requesting that we be allowed to change public access to our parking lot entrance from its current location to the most southern end of the lot on Chadwick Street. Physicians would still enter the lot from the physician entrance off Bramhall Street. In addition, we would request that the direction of traffic flow on Chadwick Street be changed from its current direction to a southerly direction which will allow traffic to turn left on Chadwick Street from Bramhall Street at the front of the hospital and gain access to the proposed entrance to the lot. The effect of these two changes is to allow patrons to line up outside the lot on Chadwick Street without interfering with traffic on Bramhall Street.

22 Bramhall Street, Portland, Maine 04102 (207) 871-0111

I have enclosed a site plan of our proposed change which may help in explaining our request. I have had a discussion with Mr. William Bray, City Traffic Engineer, expressing our desire to change the direction of traffic flow on Chadwick Street. He has indicated to us that he would lend his support to the concept.

With this letter I am submitting an application for site plan review by the Planning Board and have enclosed 7 copies of our site plan. Please let me know if you have any questions. Thank you for your assistance.

Sincerely,

Michael W. Swan
Associate Vice President
Administrative Services

MWS/ea

LETTER OF TRANSMITTAL

Maine Medical Center
Engineering Services
22 Bramhall Street
Portland, Maine 04102

(207)871-2447

TO PLANNING DEPT.
PORTLAND CITY HALL

DATE 9/29/88 | JOB NO. 88041

ATTENTION MAUREEN O'MEARA

RE MRI SITE REVIEW

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☒ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
6	9/29/88		HALEY & ALDRITCH PRELIMINARY EVALUATION

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☑ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS PLEASE INCLUDE THE ATTACHED IN SITE REVIEW PACKAGE OF 9/28/88.

FILE: MRI (88041)

SIGNED: Stephen L. Perry

Maureen

MAINE MEDICAL CENTER

January 30, 1989

Mr. Alexander Jaegerman, Chief Planner
City of Portland
389 Congress Street
Portland, ME 04101

Re: Application of Maine Medical Center for MRI Site Improvements at 22 Bramhall Street, Portland, Maine

Dear Mr. Jaegerman:

This will certify to you that Fleet Bank will hold the sum of $241,401.00 in an interest-bearing escrow account in the name of the City of Portland established with the Bank. We will hold these funds as escrow agent for the benefit of the City of Portland on the following conditions:

1. These funds represent the estimated cost of installing site improvements as depicted on the site plan and estimated on Attachment 1.

2. The City of Portland may draw against this escrow account by presentation of a draft in the event that Maine Medical Center fails to complete within eighteen (18) months of this date the work as stipulated in Paragraph 1. Said draft shall be accompanied by a written statement from the Director of Parks and Public Works or the Director of Planning and Urban Development that Maine Medical Center has failed to complete such work, with a listing of improvements still to be completed, and the estimated cost of completing said improvements still to be completed as determined by the Department of Public Works.

3. The City of Portland may draw against this escrow for a period not to exceed ninety (90) days after the expiration of this eighteen (18) month commitment; provided that Maine Medical Center will give the City written notice of the deadline of this escrow at least ninety (90) days prior thereto; otherwise drafts must be submitted no later than ninety (90) days following written notice whenever given thereafter.

4. After all work in the public right of way has been completed and inspected to the satisfaction of the Department of Public Works, including but not limited to the installation of granite curbing, sidewalk, curb cut and street trees, Fleet Bank shall be eligible to receive a reduction in its obligations hereunder equal to the estimated cost of improvements. In no case, however, shall the obligations of Fleet Bank hereunder be reduced to an amount which is less than the estimated cost of completing all prescribed improvements as determined by the Department of Public Works, as described above.

5. Maine Medical Center will notify the City of Portland for inspections.

6. All costs associated with establishing, maintaining and disbursing funds from the escrow account shall be borne by Maine Medical Center.

7. This escrow account expires ninety (90) days after the date for completion of public improvements, but may expire prior to this date when the City of Portland acknowledges in writing to Fleet Bank and Maine Medical Center that said work as outlined has been completed in accordance with the City of Portland specifications. All sums on deposit, together with interest accrued thereon, may be withdrawn by Maine Medical Center at any time after expiration of this escrow account.

Dated at Portland, Maine this 8th day of February, 1989.

Very truly yours,

Fleet Bank

By: Jean J. Wilkinson Date: February 6, 1989
Title Assistant Vice President - Trust Officer

Seen and Agreed to:

By: Donald L McDowell Date: 2/6/89
Donald L. McDowell, Executive Vice President and Treasurer

Approved pursuant to Section4-501(a) of the Portland City Code:

By: Joseph E. Gray Date: 2/8/89
Director of Planning and Urban Development

By: Natalie L. Burns Date: 2/8/89
Corporation Counsel

By: [signature] Date: 2/10/89
Finance Director

CITY OF PORTLAND, MAINE
M E M O R A N D U M

TO: Chairman and Members of the Planning Board

FROM: Maureen O'Meara, Senior Planner

DATE: October 11, 1988

SUBJECT: Maine Medical Center Magnetic Resonance Imaging (MRI) Facility

Maine Medical Center (MMC) is requesting review of an 8,225 sq. ft. magnetic resonance imaging (MRI) facility to be located predominantly underground in the vicinity of 22 Bramhall Street. The site area of the project is approximately 1 acre and zoned R-6 Residential. The plan constitutes an institutional expansion in a residential zone and requires a conditional use permit, as well as Site Plan Review. A vicinity map, site plan, and written statement from the applicant are included as Attachments 1, 2, and 3.

Magnetic Resonance Imaging is a diagnostic tool which often creates better images of the body than typical x-rays. A magnetic field is used to create the image and, therefore, shielding is needed for the magnet. MMC has chosen to locate the facility underground and will also be incorporating shielding into the design to allow the use of sensitive equipment, such as computers, within the MRI Facility itself. There is an existing MRI Facility on Congress Street and MMC has received a certificate of need from the state for installation of an MRI facility at the medical center.

Current access to the site is from Bramhall Street. MMC will be moving their access to one side and creating an access drive and separate horseshoe shaped entrance area. A service drive and elevator is proposed which would rise to the service during use and would be almost at ground level the remainder of the time.

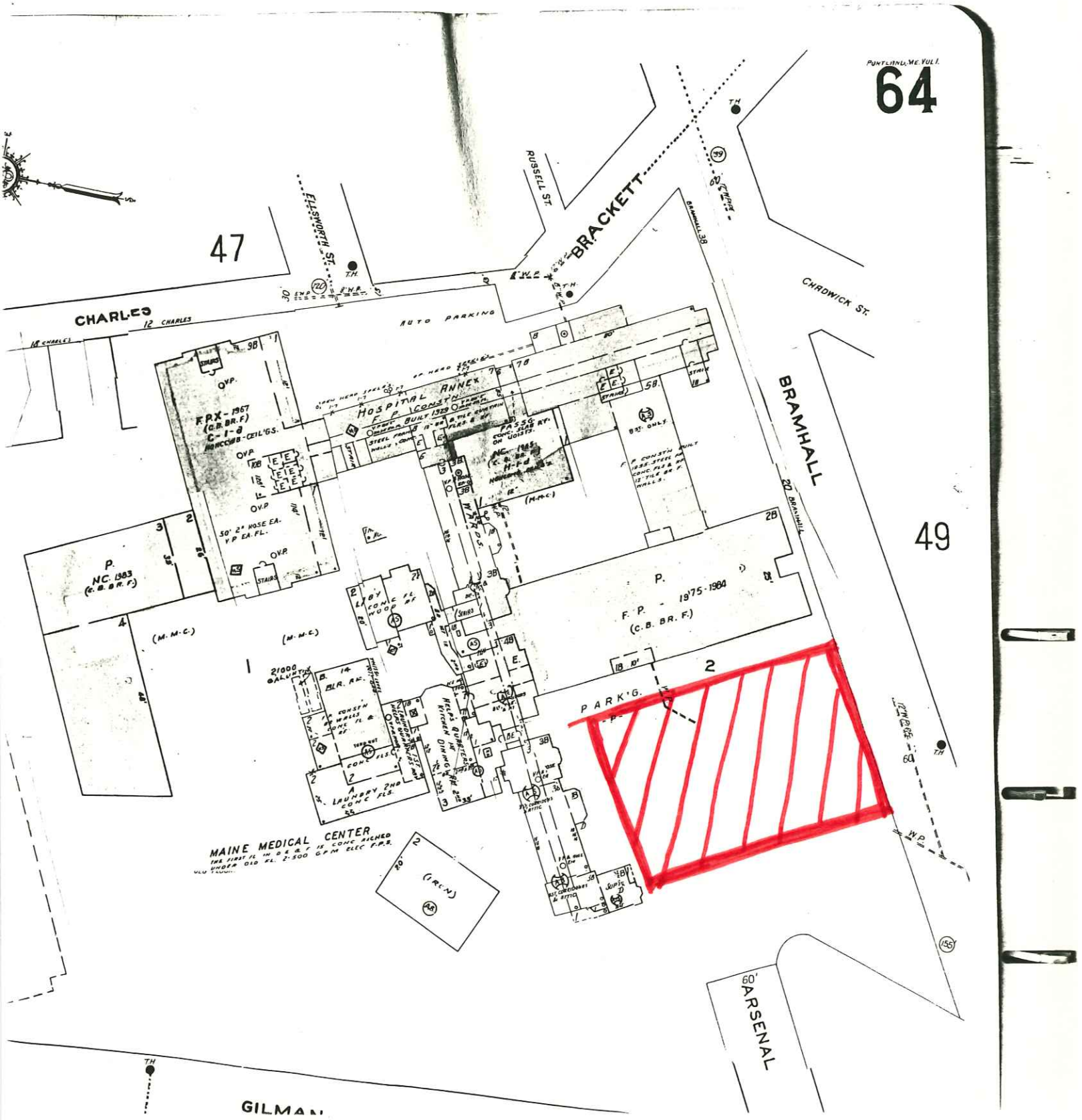
The only section of the facility that is visible is basically the mechanical equipment on the roof of the building. A brick wall is proposed which ranges from 4' to 7' in height. Inside the wall, shrubs will be planted to create a garden effect and screen the mechanicals. Staff suggests that all or part the brick wall may be replaced with a decorative fence which allows greater visibility for the landscaping and still meets the applicant's security needs. The acting arborist is also recommending a planting for the west side of the proposed driveway. An elevation is included as Attachment 4.

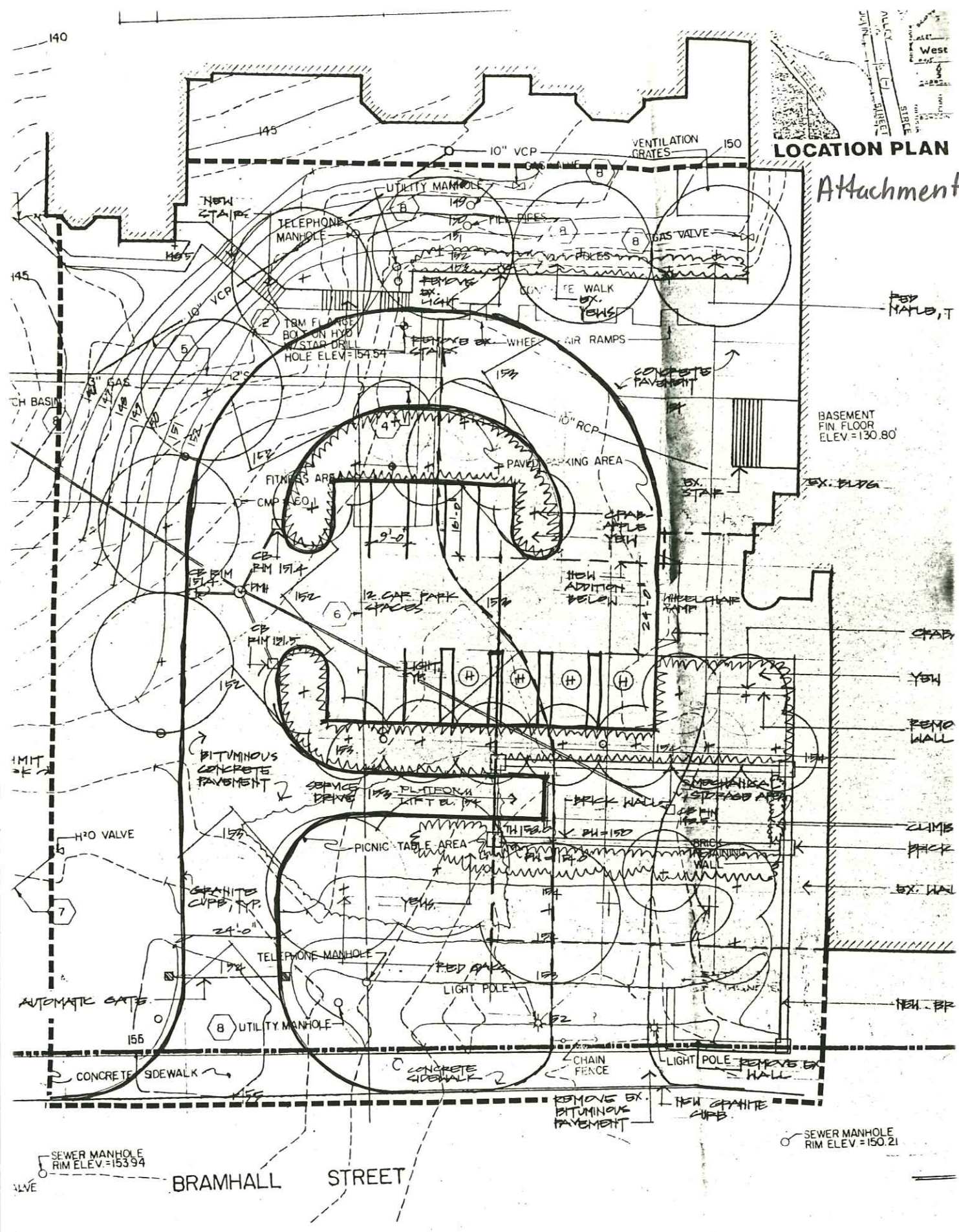
Issues raised in reviewing the plan include: (1) substituting a decorative fence for all or part of the brick wall and (2) landscaping the west side of the driveway.

Attachments:

1. Vicinity Map
2. Site Plan
3. Statement from the Applicant
4. Elevation

Attachment 1




LOCATION PLAN
Attachment 2
West
ALLEY
STREET
BRAMHALL STREET
10" VCP
VENTILATION GRATES
UTILITY MANHOLE
TELEPHONE MANHOLE
GAS VALVE
FILL PIPES
REMOVE EX. LIGHT
CONCRETE WALK
EX. YEWS
REMOVE EX. STAIR
WHEEL CHAIR RAMPS
TBM FLANGE BOLT ON HYD W/STAR DRILL HOLE ELEV=154.54
CONCRETE PAVEMENT
10" RCP
PAVED PARKING AREA
FITNESS AREA
CMP
CB RIM 151.4
CRAB APPLE YEW
NEW ADDITION BELOW
12 CAR PARK SPACES
CB RIM 151.5
WHEELCHAIR RAMP
EX. BLDG
BASEMENT FIN. FLOOR ELEV.=130.80'
EX. STAIR
LIGHT POLE
BITUMINOUS CONCRETE PAVEMENT
SERVICE DRIVE
PLATFORM LIFT EL. 154
BRICK WALL
MECHANICAL EQUIPMENT AREA
CB RIM 150.6
H2O VALVE
PICNIC TABLE AREA
BRICK RETAINING WALL
GRANITE CURB, TYP.
YEWS
24'-0"
TELEPHONE MANHOLE
RED OAKS
LIGHT POLE
AUTOMATIC GATE
UTILITY MANHOLE
CONCRETE SIDEWALK
CHAIN FENCE
LIGHT POLE REMOVE EX. WALL
REMOVE EX. BITUMINOUS PAVEMENT
NEW GRANITE CURB
SEWER MANHOLE RIM ELEV.=153.94
SEWER MANHOLE RIM ELEV.=150.21
HYD.
UTILITY POLE
CRAB
YEW
REMO WALL
CLIMB
BRICK
EX. WALL
NEW BR

Attachment 3

MAINE MEDICAL CENTER

Magnetic Resonance Imaging Facility
Site Plan Review
9/27/88

List of Enclosures

14-526

Six copies of:

14.526(B)(1)	Site Plan Site Elevation
14-526(B)(2)	Written Statement Project Schedule Enclosed

14-526(B)(2)(a) A description of the proposed uses to be located on the site.

Maine Medical Center operates a 598 bed acute care hospital facility at 22 Bramhall Street in Portland. This site of approximately 166,250 sq. ft. accommodates 5 major buildings totaling 475,080 sq. ft., dedicated to administrative, direct patient care, educational and limited research purposes.

729,000 sq Ft
Maine site

Maine Medical Center proposes the construction of a magnetic resonance imaging facility(MRI Facility) at the southerly corner of the site bounded by Bramhall Street and the Western Promenade. The proposed facility of approximately 8,000 sq. ft., will be located below grade directly adjacent and at the same level as the Radiation Therapy Facility.

Maine Medical Center has received a Certificate of Need from the Maine Department of Human Services to develop the first hospital based magnetic resonance capability in the state. Magnetic resonance imaging is a state of the art diagnostic modality which provides superior diagnostic information with minimal patient risk. Magnetic resonance imaging creates computer analyzed pictures of internal structures of the human body. Images are created by placing the patient in a highly homogeneous magnetic field, introducing controlled radio frequency signals, and analyzing the signals emitted by the body in response. No x-rays or other form of ionizing radiation are used.

To maintain the homogeneity of the magnetic field in the examination rooms and guard against extraneous radio frequency signals, the scanning room is designed to be radio frequency and magnetically shielded. Internal access to the scanning room will be carefully controlled by both architectural features and procedural safeguards.

It is anticipated that the MRI Facility will provide services to approximately 3,000 patients in its third full year of operation. Of these, an estimated 50% will be hospital in-patients and 50% out-patients. Of the approximately 1500 outpatients to be served, over half would have come to the Medical Center for other diagnostic tests without the presence of the MRI. Out-patient access will be either through the main Bramhall Street entrance to the Medical Center or via the Southern Maine Radiation Therapy Institute(SMRTI) elevator adjacent to the Dana Education Center. This elevator will take patients directly down to the MRI Facility level. Since the project will require extensive excavation at the present location of the SMRTI parking facility, construction of a new parking lot and access way is planned. The proposed parking lot will have twelve spaces rather than the present lot's ten; there will continue to be four handicapped parking spaces. Access to the revised lot will be from a curb cut approximately 100' southwest of the existing entry point, allowing design of a more attractive green space between the lot and the street(see landscape design drawing). The only above ground exposure of the proposed facility is a low brick wall surrounding a planted area containing,

at one end, mechanical equipment for the facility, recessed such that it would not be visible from adjacent properties, and access to a freight platform which emerges from the facility below. This "dumbwaiter" will facilitate a delivery, no more frequently than weekly, of cryogen cylinders to replace super cooling materials used by the MRI facility's magnets.

Based on preliminary observations by Haley & Aldrich following their 9/26 - 9/27 test borings within the construction site, the material to be excavated is typically glacial till and will involve no extraordinary excavation difficulties. Particularly, no blasting of ledge or special drainage difficulties are envisioned. A preliminary analysis will be available Thursday, September 29. The completed geotechnical report will be available Tuesday October 11.

14-526(B)(2)(b) The total land area of the site: major lot (holding existing hospital buildings) is 475,080 sq. ft.. The total ground coverage is currently 166,250 sq. ft..

The total area of the proposed new site (as shown) is 1 acre.

The total floor area of the proposed addition is 8225 sq. ft..

14-526(B)(2)(c) No easements or other burdens exist on the property.

14-256(B)(2)(d) Solid Waste Disposal:

Maine Medical Center installed a steam generating waste incinerator in November 1981. Since that time, burnable solid waste has been disposed of on site. A limited amount of waste is handled by the Regional Waste system via commercial dumpster and hauler. The incinerator will accommodate added solid waste generated by the expansion.

14-256(B)(2)(e) Availability of off-site facilities including sewer, water and streets:

Based upon experience, the existing systems are adequate. The total daily water flow is 250,000 gallons per day. Peak flow of sanitary sewer is 1.35 CFS. The proposed additions will add approximately 1.4% to current use based on proportional increase in square footage. The peak flow of storm sewage will be unaffected. The existing collection plane will be maintained as most of the structure is below grade and streets.

14-526(B)(2)(f) A description of any problems in drainage or topography or a representation that there are none:

The project will not contribute any drainage problems.

14-526(B)(2)(g) Estimated time period for completion:

The project will begin 2/89 and be complete 12/89; 9/88 projected schedule enclosed.

14-526 D Land ownership and estimated cost of development:

The property proposed to be developed is owned by Maine Medical Center, a not-for-profit acute care facility.

Mrs. Herbert S. Holmes is Chairman, Board of Trustees.

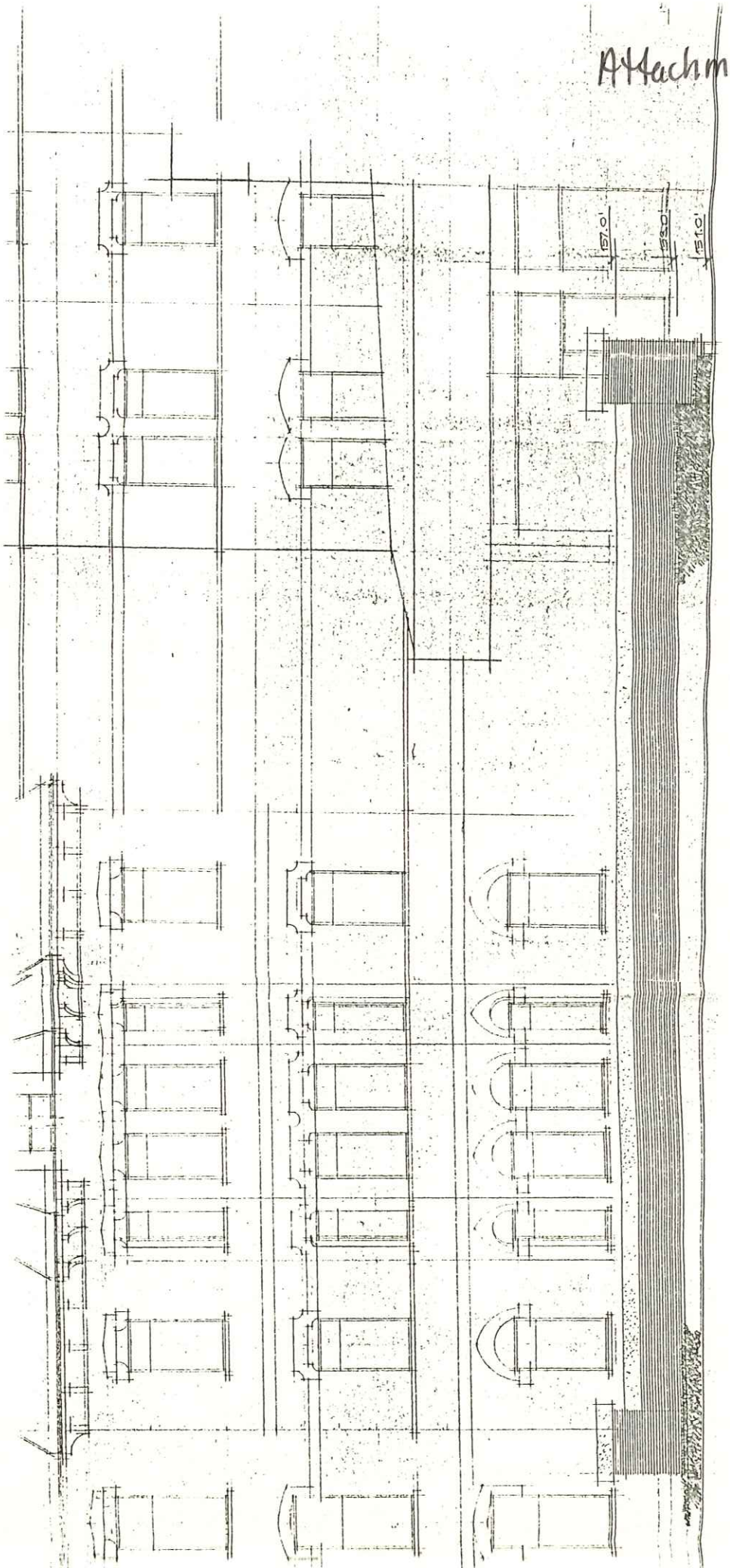
Edward C. Andrews, Jr., M.D. is President of the hospital.

The estimated construction cost is $2,631,310.

Michael J. Ryan
Associate Vice President

MJR/lj.944

Attachment 4



LETTER OF TRANSMITTAL

Planning Division
Department of Planning and Urban Development
Room 211 City Hall
389 Congress Street
Portland, Maine 04101

Date: 2/10/89
Staff Person: OMeara

Phone : (207)874-8300, ext. _____

To: Steve Harris
PW

Project Reference: Maine Med MRI

We are sending you:

- ✓ enclosed
- _____ under separate cover
- _____ available for pick-up

For Your:

- _____ information as requested
- _____ review and comment
- ✓ information and use
- _____ other: _____

Copies	Document Date	Description
1	2/10/89	Approved Plans

Remarks: _____

cc: _____

LETTER OF TRANSMITTAL

Planning Division
Department of Planning and Urban Development
Room 211 City Hall
389 Congress Street
Portland, Maine 04101

Date: 2/10/89
Staff Person: O'Meara

Phone : (207)874-8300, ext. _____

To: Paul Nichoff
PW

Project Reference: Maine Med MRI

We are sending you:

- ✓ enclosed
- _____ under separate cover
- _____ available for pick-up

For Your:

- _____ information as requested
- _____ review and comment
- ✓ information and use
- _____ other: _____

Copies	Document Date	Description
2	2/10/89	2 Approved Plans

Remarks:

cc: _____

LETTER OF TRANSMITTAL

Planning Division
Department of Planning and Urban Development
Room 211 City Hall
389 Congress Street
Portland, Maine 04101

Date: 2/8/89
Staff Person: O'Meara

Phone : (207)874-8300, ext. 8720

To: Duane Kline
Finance

Project Reference: Maine Med MRI

We are sending you:

- ✓ enclosed
- ____ under separate cover
- ____ available for pick-up

For Your:

- ____ information as requested
- ____ review and comment
- ✓ information and use
- ____ other: ____

Copies	Document Date	Description
1	1/30/89	Escrow Acct.

Remarks: Please send a signed copy to Planning. Thanks.

cc: ____

10-6-98

To: Noreen O'Meara.

From: Ben O'Reilly Jr.

Subject: M.R.T.

The forestry division has reviewed the above plan. The landscape design has been found to be satisfactory.

Though as small planting should be designed for the west entrance side on Bramhall Ave.

Haley & Aldrich, Inc.

Consulting
Geotechnical Engineers,
Geologists and
Hydrogeologists

622 Congress Street
P.O. Box 4076
Portland, ME 04101
207/772-7869

29 September 1988
File No. 80035

Maine Medical Center
22 Bramhall Street
Portland, Maine 04102

Attention: Mr. Steve Perry

Subject: Proposed MRI Facility
Maine Medical Center
Portland, Maine

Gentlemen:

This letter presents the results of our preliminary evaluation of the subsurface conditions and foundation requirements for the proposed MRI Facility at the Maine Medical Center in Portland, Maine.

In summary, it is our opinion that the site and subsurface conditions are generally suited for the proposed construction. We anticipate that the proposed building can be supported on conventional spread footings bearing on the undisturbed, naturally deposited sand. In addition, slab-on-grade construction may be used for the ground floor slab.

INTRODUCTION

To date, three test borings have been completed at the site. The final boring is presently underway. The borings were drilled to a depth of 41.5 ft. below ground surface. Borings were drilled by Northeast Diamond Drilling Co., Inc. of Union, Maine. Haley & Aldrich, Inc. (H&A) monitored the borings.

Offices
Cambridge, Massachusetts
Glastonbury, Connecticut
Bedford, New Hampshire

Affiliate
H&A of New York
Rochester, New York

Borings to date indicate the following general subsurface conditions:

Thickness (Ft.)	Description
0.4 to 0.7	Brown, silty, fine SAND; to sandy SILT, little roots -TOPSOIL-
10.4 to 15.9	Dense to very dense, brown, gravelly, coarse to fine SAND, trace to little silt -FILL-
Greater than 30.4	Dense to very dense, yellow-brown to gray-brown, silty, medium to fine SAND, trace to little gravel with cobbles and boulders

Groundwater was measured at a depth of approximately 27 ft. below ground surface in an observation well installed in a completed boring.

PRELIMINARY RECOMMENDATIONS FOR FOUNDATION DESIGN

It is understood that the proposed facility will consist of a 2-story below ground building having a plan area of approximately 7,500 sq. ft. The lowest ground floor will be approximately 20 ft. below ground surface.

Based on the subsurface explorations completed to date, it is our opinion that the proposed building may be supported on spread footings bearing on the undisturbed, naturally deposited sand.

It is our opinion that slab-on-grade construction may be used for the ground (lowest) floor slab.

Building walls which are restrained at the top should be designed as foundation walls with soil loading. Based on observed groundwater level at the site, it appears that the lowest floor level will be above the groundwater level. However, it is recommended that the building be designed for a perimeter foundation and under-slab drain system. The walls should be backfilled with free-draining structural fill.

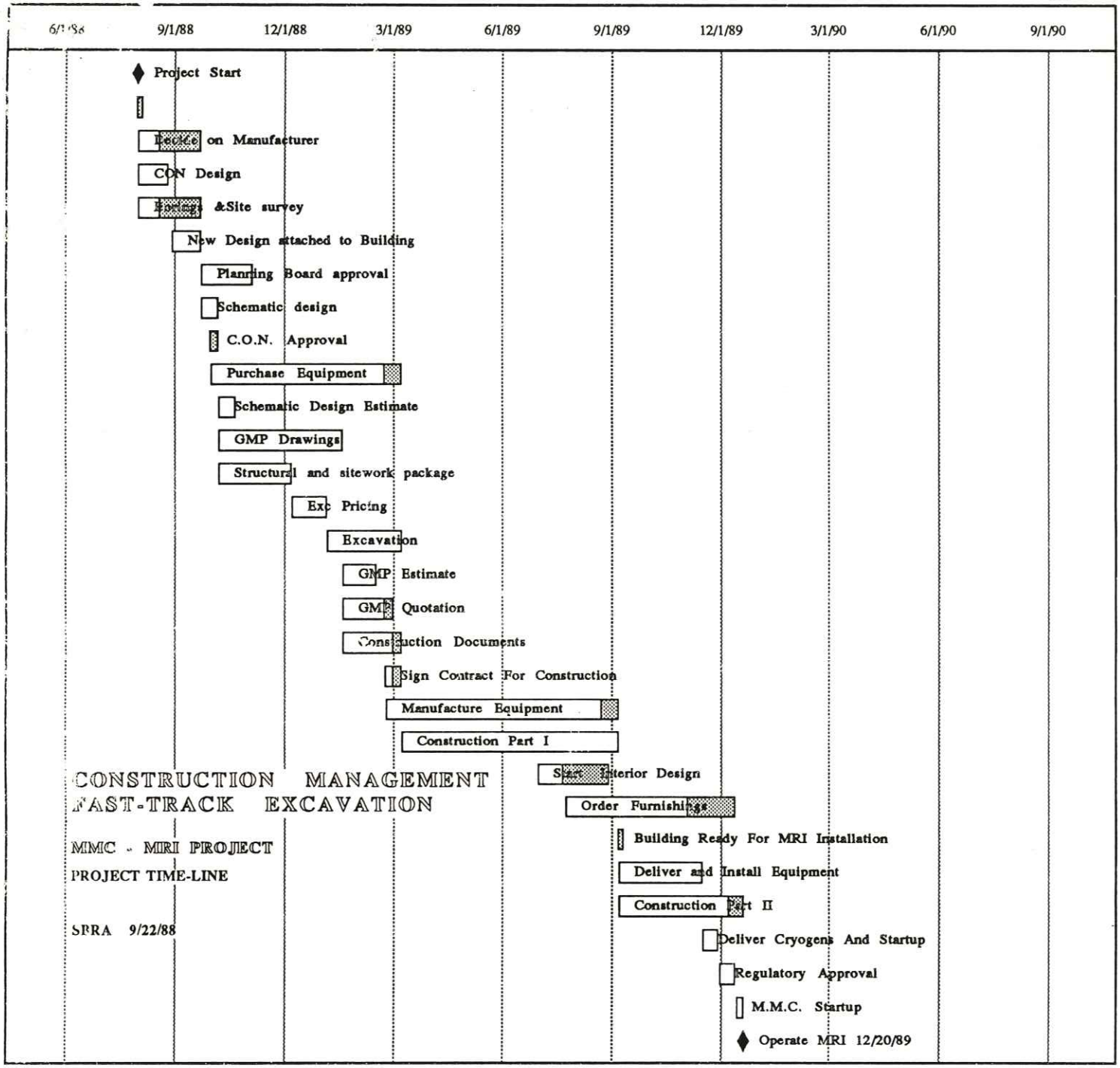
The drain system should include perforated pipes surrounded by crushed stone around the perimeter and below the slab. The system may be designed for gravity drainage, if available, or connected to a sump.

It is anticipated that the excavation for construction may be accomplished with open excavation with stable side slopes, if sufficient space is available. Due to space constraints or for convenience, it may be necessary to provide a laterally supported excavation, such as soldier piles and lagging with cross bracing or tiebacks.

If you have any questions or require additional information, please contact us.

Sincerely yours,
HALEY & ALDRICH, INC.

Kenneth L. Recker
Vice President


6/1/88
9/1/88
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3/1/89
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12/1/89
3/1/90
6/1/90
9/1/90
Project Start
Decide on Manufacturer
CON Design
&Site survey
New Design attached to Building
Planning Board approval
Schematic design
C.O.N. Approval
Purchase Equipment
Schematic Design Estimate
GMP Drawings
Structural and sitework package
Excavation
GMP Estimate
GMP Quotation
Construction Documents
Sign Contract For Construction
Manufacture Equipment
Construction Part I
Interior Design
Order Furnishings
Building Ready For MRI Installation
Deliver and Install Equipment
Construction Part II
Deliver Cryogens And Startup
Regulatory Approval
M.M.C. Startup
Operate MRI 12/20/89
CONSTRUCTION MANAGEMENT
FAST-TRACK EXCAVATION
MMC - MRI PROJECT
PROJECT TIME-LINE
SPRA 9/22/88

138 Neal Street,
Portland, Maine 04102
Nov. 26, 1988

Joseph E. Gray, Jr.
Director of Planning and Urban Development
Room 211, City Hall
389 Congress Street
Portland, Maine 04101

RE: Maine Medical Center, Magnetic Imaging Facility

Dear Mr. Gray,

As residents and property owners in the neighborhood of Maine Medical Center, we strongly oppose the above-named proposal.

The construction and presence of the facility would further encroach on what is otherwise a Residential zone, and would diminish rather than enhance or preserve the character and integrity of the entire Historic District. Possible consequences include the sacrifice of houses, some of them historic, and the displacement of their occupants; lowering of property values; worsening of the already serious parking and traffic problems resulting from the presence of the Medical Center in a Residential zone; and the potential hazard to the physical and mental health of neighbors. (Effects of electrical generating stations and high-tension lines have been documented.)

If the Maine Medical Center pursues this plan it will engender resentment and active opposition from residents of the Historic District and from everyone concerned with preserving the character and quality of life of the City of Portland.

Please keep us informed of further developments.

Yours truly,

Judith Steinhauer Sheila Paine

Judith Steinhauer and Sheila Paine

LETTER OF TRANSMITTAL

Maine Medical Center
Engineering Services
22 Bramhall Street
Portland, Maine 04102

(207)871-2447

TO Maureen O'Meara

Portland Planning Board

City Hall

DATE	JOB NO.
11/4/88	Project #88041

ATTENTION Maureen O'Meara

RE MRI Facility

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☒ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☒ Reports

COPIES	DATE	NO.	DESCRIPTION
6		ea	copies "Report on Subsurface & Foundation Investigation
			Proposed MRI Facility Maine Medical Center, Portland, Maine"
6		ea	copies of Sebago Technics Plan of existing conditions MRI
			Facility dated 9/16.

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS MAUREEN - THE QUALITY OF THE 'EXISTING CONDITIONS' SITE PLAN IS POOR; HOPEFULLY THE INFORMATION IS GOING TO BE USEFUL. SHEPLEY, BULFINCH (WAGDY ANIS) IS PREPARING A DRAWING SHOWING EXISTING AND DESCRIBING CONSTRUCTION PROTECTION, ETC. PLEASE CALL IF YOU HAVE ANY QUESTIONS. (871-2447)

COPY TO _____

SIGNED: Stephen L Perry

REPORT ON

SUBSURFACE AND FOUNDATION INVESTIGATION
PROPOSED MRI FACILITY
MAINE MEDICAL CENTER
PORTLAND, MAINE

Haley & Aldrich, Inc.

Consulting
Geotechnical Engineers,
Geologists and
Hydrogeologists

622 Congress Street
P.O. Box 4076
Portland, ME 04101
207/772-7869

2 November 1988
File No. 80035

Maine Medical Center
22 Bramhall Street
Portland, Maine 04102

Attention: Mr. Stephen L. Perry

Subject: Subsurface and Foundation Investigation
Proposed MRI Facility
Maine Medical Center
Portland, Maine

Gentlemen:

This report presents the results of our evaluation of the subsurface conditions and foundation requirements for the proposed Magnetic Resonance Imagery (MRI) Facility at Maine Medical Center in Portland, Maine. This work was performed in accordance with our proposal dated 15 July 1988.

In summary, we recommend that the building walls, columns and partitions be supported on conventional spread footing foundations bearing on undisturbed, naturally deposited soil or on compacted structural fill placed after removal of unsuitable soil. In addition, slab-on-grade construction may be used for the ground floor slab. Specific recommendations regarding foundation design and construction considerations are presented below.

I. INTRODUCTION

The proposed site is located on the north side of Bramhall Street, adjacent to the Dana Health Education Center. The proposed MRI building is bounded on the north by the parking area and lawn in front of the original hospital building; on the

Offices
Cambridge, Massachusetts
Glastonbury, Connecticut
Bedford, New Hampshire

Affiliate
H&A of New York
Rochester, New York

east by the Health Center; on the south by the entrance drive and Bramhall Street; and on the west by an existing landscaped area. Existing ground surface within the limits of the building varies from approximately El. 152 to El.153. Elevations used in this report are in feet and referenced to National Geodetic Vertical Datum.

Portions of the proposed building area were formerly occupied by two 2-1/2-story wood-framed buildings. Both active and abandoned utilities may be located below grade.

II. PROPOSED CONSTRUCTION

It is understood that the proposed MRI Facility will consist of a 1 to 2-story reinforced concrete structure constructed below grade. The building will be approximately 84 ft. by 96 ft. in plan dimension with the lowest ground floor varying from El. 126.8 to El. 130.8.

The completed structure will be backfilled with up to 10 ft. of soil overlying the roof. Columns will be spaced at approximately 28 ft. in on direction and 24 ft. in the other. Estimated column loads are on the order of of 450 to 550 tons. It is understood that the foundations will be designed for a possible future 2-1/2-story addition. The lowest floor level will be designed to accommodate up to two large magnets, weighing up to 20 tons, with shielding.

III. SUBSURFACE CONDITIONS

3-01. Previous Subsurface Explorations

Previous subsurface explorations in the vicinity of the proposed building consist of five test borings, M1, M1A, M2, M3 and M8, drilled by Northeast Soil Services during 8 to 30 September 1970. The borings were drilled to depths varying from 9.2 to 41.4 ft. below ground surface. The approximate locations are shown on Figure 2, Site and Subsurface Exploration Plan. Contractor's logs of borings are included in Appendix A. Table I summarizes the results of the borings.

The approximate locations were obtained from a plan titled "Site and Boring Plan", undated, prepared by Jordan Gorrill

Associates. Ground surface elevations at borings were estimated by interpolation from the plotted locations on the topographic plan.

3-02. Present Subsurface Explorations

During the period 26 through 29 September 1988, four test borings, B1 to B4, were drilled at the site at locations shown on Figure 2. The borings were drilled by Northeast Diamond Drilling Co., Inc. of Union, Maine, to a depth of 41.5 ft. below ground surface. Haley & Aldrich, Inc. monitored the borings. The contractor's logs of borings are included in Appendix B. Results of the borings are summarized in Table I.

Soil samples in each boring were generally taken at stratum changes or at vertical intervals not exceeding 5 ft. The standard penetration resistance ("N") was determined at each sample interval by counting the number of blows necessary to drive a standard split-spoon sampler (1-3/8 in. I.D., 2-in. O.D.) a distance of 12 in. into undisturbed soil under impact of a 140-lb. hammer falling freely through 30 in. with the number of blows required to advance the sampler 6 in. recorded. The "N" value is taken as the number of blows required to advance the spoon between the 6th and 18th in.

A groundwater observation well was installed in completed boring B1 to obtain information on groundwater levels at the site. Well installation details and measured water levels are presented in Appendix C.

Locations of borings were determined by Haley & Aldrich, Inc. by taping from existing building and site features. Ground surface elevations at borings were estimated by interpolation from the plotted locations on the topographic plan.

Logs of borings and related information depict subsurface conditions and water levels only at their specific locations and at the particular time designated on the logs. Soil conditions at other locations may differ from conditions occurring at these locations. Also, the passage of time may result in a change in groundwater conditions at the exploration locations.

3-03. Subsurface Conditions

The borings encountered three principal soil units at the site. The soil units are described below in order of increasing depth below ground surface:

Thickness (Ft.)	Description
4 to 17	Medium dense to very dense, brown to rusty brown, gravelly, coarse to fine SAND, trace silt and bricks with cobbles and pockets of clayey silt -FILL-
0 to 25.3	Very dense, light brown to brown, medium to fine SAND, little gravel, trace coarse sand and silt with cobbles and seams of sandy silt
Greater than 37	Medium dense to very dense, gray-brown, silty, fine SAND, little coarse to medium sand, trace gravel and clay with cobbles and boulders -GLACIAL TILL-

Groundwater was encountered in the borings at depths varying from 9.5 ft. to 39.3 ft. below ground surface, at the completion of each boring. Groundwater was measured at depths varying from 26.5 to 27.2 ft. below ground surface (equivalent elevation 125.6 to 124.9) in the observation well between 26 September and 6 October 1988. Measurements of water levels were made over a short period of time and may not represent the true groundwater level. In addition, groundwater levels can be expected to fluctuate with season, precipitation, temperature and construction activity in the area. Therefore, water levels during and after construction may differ from those measured in the borings and well.

IV. RECOMMENDATIONS FOR FOUNDATION DESIGN

4-01. Recommended Foundation Type and Design Criteria

It is recommended that the proposed building be supported on spread footings bearing on undisturbed, naturally deposited sand or on compacted structural fill placed after removal of unsuitable soils.

Footings may be proportioned for an allowable bearing pressure in lbs per sq. ft. equal to 3,300 multiplied by the least lateral dimension in feet, up to a maximum of 10,000 lbs per sq. ft. It is understood that this is consistent with the allowable bearing pressure used in the design of the Health Center. Footings should be designed to be at least 1.5 ft. wide.

Footings should be founded at least 4.5 ft. below the lowest adjacent ground surface exposed to freezing.

4-02. Ground Floor Slab

It is recommended that the ground floor be designed as an earth-supported slab-on-grade bearing on a minimum of 6 in. of crushed stone and 6 in. of structural fill or filter fabric supported on the undisturbed naturally deposited sand.

Water level readings indicate a groundwater level on the order of El. 125. This is close to the lowest floor level. It is recommended that a perimeter foundation and underslab drain be installed similar to that shown on Figure 2. The drain should be connected to the existing drain, if the existing system can accommodate the additional flow. It is anticipated that the additional flow may be on the order of 15 gal per min.

It is recommended that the crushed stone layer below the computer room floor be in contact with the crushed stone below the remainder of the floor in order to provide under slab drainage in the computer room.

4-03. Seismic Considerations

It is recommended that the facility be designed in accordance with the seismic requirements of the latest edition of the BOCA Basic Building Code. The site is located within Zone 2 and the soil profile coefficient, S, is equal to 1.0.

4-04. Lateral Foundation Loads

It is recommended that lateral loads due to possible earthquakes be resisted by bottom friction on footings. It is recommended that a coefficient of friction equal to 0.4 be used to estimate the ultimate frictional resistance available. If this is not sufficient to resist the lateral loads, we will evaluate the condition in more detail, to take into account other factors.

4-05. Lateral Soil Pressures

It is recommended that foundation walls which are restrained at the top and backfilled with structural fill be designed to resist a lateral earth pressure calculated on the basis of an equivalent fluid unit weight of 55 lbs. per cu. ft.

4-06. Backfill Materials

It is recommended that footings, foundation walls and areas below ground floor slabs be backfilled with compacted structural fill.

Compacted structural fill should consist of sandy gravel to gravelly sand free of organic material, loam, trash, snow, ice, frozen soil and other objectionable material, and should be well graded within the following limits:

Sieve Size	Percent Finer by Weight
6 in.	100
No. 4	30 to 90
No. 40	10 to 50
No. 200	0 to 8

In open areas, compacted structural fill should be placed in layers not exceeding eight in. in loose measure and compacted by self-propelled compaction equipment at approximately optimum moisture content to a dry density of at least 95 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557. In confined areas, the loose layer thickness should be reduced to six in. and the maximum particle size to 3 in., and compaction performed by hand-guided equipment.

Compacted structural fill on the outside of the foundation wall should extend laterally a minimum of 2 ft. from the wall. Backfill beyond these limits may consist of common fill. Common fill should consist of inorganic mineral soil that can be readily spread in layers not exceeding 10 in. in thickness and compacted to 90 percent of the maximum dry density as determined above.

The top 12 in. of backfill should consist of relatively impervious soils or topsoil in order to minimize the potential for surface water infiltration near the building.

V. CONSTRUCTION CONSIDERATIONS

5-01. General

The primary purpose of this section of the report is to comment on items related to excavation, dewatering, lateral support, foundation construction and related geotechnical aspects of foundation construction. It is written primarily for the

engineer having responsibility for preparation of plans and specifications. Since it identifies potential construction problems related to foundations and earthwork, it will also aid personnel who monitor the construction activity. Prospective contractors for this project must evaluate construction problems on the basis of their own knowledge and experience in the area, and on the basis of similar projects in other localities, taking into account their proposed construction methods, procedures, equipment and personnel.

5-02. Excavation, Dewatering and Lateral Support

A sloped open cut excavation is technically feasible for the subsurface conditions disclosed by the borings at this site. However, sufficient space must be available for construction of stable slopes (no steeper than 1 horizontal to 1 vertical). In addition, careful planning and execution of dewatering operations will be required in view of the depth of the excavation and the proximity to existing buildings.

Due to space limitations, or for general convenience, the contractor may elect to use a laterally supported excavation. The boring data indicate that it will be difficult to drive interlocking steel sheeting down to the proposed bottom of excavation and deeper, due to the dense nature, and presence of cobbles and boulders, of the soils. As a result, the contractor may consider the use of soldier beams and lagging. It is anticipated, however, that in order to avoid damage to and misalignment of the soldier beams, the holes for them may have to be preaugered full depth to place the beam tips below final excavation level. If installed in this manner, rather than being driven, the lower portion of each hole should be filled with concrete after setting and aligning the beam.

It is recommended that the contractor's proposed method for making and dewatering the excavation, whether open or braced cut, be designed by a registered professional engineer, and that the scheme be submitted to the owner's engineer for review and comment prior to installation.

Anticipated bearing levels adjacent to the Dana Center in the vicinity of existing footing B-8 will be approximately El. 123.2. The existing footing is bearing at approximately El. 127. Based on the density of the bearing soils and the proximity of excavation, it is anticipated that adequate support of the footing cannot be provided by sheeting and bracing. Therefore, it is recommended that the column and wall footings be underpinned within the limits of new construction.

Underpinning should extend to the anticipated excavation level and should be completed prior to excavation for new construction.

It is recommended that to best utilize the contractor's knowledge and expertise, the contract documents should specify underpinning of the footings and that the method of underpinning be selected by the contractor and submitted to the owner's engineer for review and comment prior to excavation in this area. Typical methods include pit underpinning and needling.

It is anticipated that groundwater will be encountered during excavation. It is our opinion that groundwater can be controlled by trenching and open pumping. All groundwater and runoff should be controlled by methods which preserve the undisturbed condition of the subgrade and permit construction in-the-dry. Sumps and pumps should be designed with adequate filters to prevent loss of fine grained soil.

5-03. Preparation of Bearing Surfaces

Footings will bear on silty sand or compacted structural fill. It is important that all bearing surfaces to support footings remain undisturbed prior to the time concrete or fill is placed. The following guidelines are recommended:

1. Complete final excavation to foundation level or subgrade with machines equipped with smooth-edge buckets.

2. Protect soil subgrades against freezing if exposed to freezing temperatures during construction.

3. Do not allow travel across footing bearing surfaces.

4. Recompact bearing surfaces with hand-guided vibratory compaction equipment if disturbed prior to placing concrete.

5-04. Construction Monitoring

The recommendations contained herein are based on the predictable behavior of a properly engineered and constructed foundation. Monitoring the foundation construction is required to enable the geotechnical engineer to keep in contact with procedures and techniques used during construction. Therefore, it is recommended that the following aspects of earthwork and foundation construction be monitored by personnel qualified by training and experience:

1. Installation of lateral support system, if used, and excavation to final grade.

2. Preparation of footing bearing surfaces.

3. Placement and compaction of structural fill beneath footings and floor slab and final backfilling.

4. Underpinning of existing footings.

Haley & Aldrich is available to perform these services.

VI. LIMITATIONS OF RECOMMENDATIONS

This report has been prepared for specific application to the subject project in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. In the event that any changes in the nature, design or location of the building are planned, the conclusions and recommendations contained in this report should not be considered valid, unless the changes are reviewed and the conclusions of this report modified or verified in writing.

The recommendations presented herein are based in part upon the data obtained from the referenced test borings. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

We request that we be provided the opportunity for a general review of final design and specifications in order to determine that our earthwork and foundation recommendations have been interpreted and implemented in the design and specifications as they were intended.

It has been a pleasure to work with you on this project. Please do not hesitate to contact us if you have any questions or require additional information.

Sincerely yours,
HALEY & ALDRICH, INC.

Kenneth L. Recker
Vice President

Enclosures:

Table I	- Summary of Borings
Figure 1	- Project Locus
Figure 2	- Site and Subsurface Exploration Plan
Appendix A	- Logs of Previous Borings
Appendix B	- Logs of Present Borings
Appendix C	- Observation Well Reports and Measured Water Levels

HALEY & ALDRICH, INC.

SUMMARY OF BORINGS
PROPOSED MRI FACILITY
MAINE MEDICAL CENTER
PORTLAND, MAINE

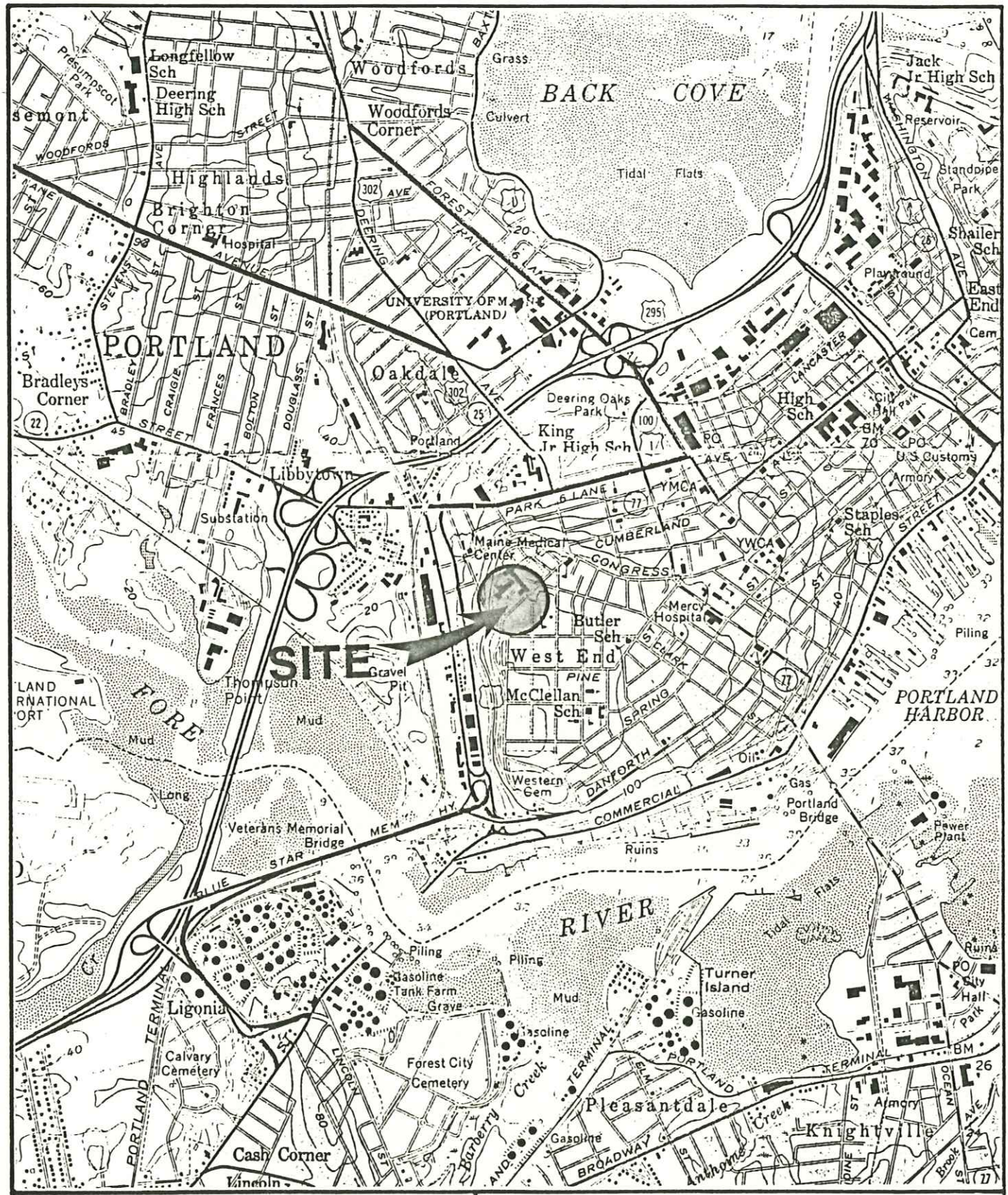
BORING NO.	DEPTH (FT.)	APPROXIMATE GROUND SURFACE ELEVATION (FT.)	DEPTH TO WATER (FT.)	STRATA THICKNESS (FT.)			APPROXIMATE ELEVATION NATURALLY DEPOSITED INORGANIC SOIL (FT.)
				FILL	SAND	GLACIAL TILL	
B1	41.5	152.1	27.4	13	13.3	15.2*	139.1
B2	41.5	152.6	--	16.2	25.3*	--	136.4
B3	41.5	153.1	39.3	11.1	7.4	23*	142
B4	41.5	153.1	39.2	17	13.5	11*	136.1
M1	9.2	150.4	--	9.2*	--	--	--
M1A	36.5	150.2	25	12	--	24.5*	138.2
M2	41.5	149.4	21	4.5	--	37*	144.9
M3	31.5	151.6	18	5	15.6	11*	146.6
M8	36.5	153.1	9.5	4	9	23.5*	149.1

NOTES:

1. ELEVATIONS REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM.
2. -- INDICATES STRATUM NOT ENCOUNTERED WITHIN DEPTH OF BORING.
3. * INDICATES DEPTH OF PENETRATION INTO STRATUM.

80035-00
TBL/3-4
NOVEMBER 1988

TABLE I



SITE COORDINATES: 43° 39' 07"N 70° 16' 32"W

U.S.G.S. QUADRANGLE: PORTLAND WEST, MAINE

Haley & Aldrich, Inc.
Consulting Geotechnical Engineers, Geologists and Hydrogeologists

PROPOSED MRI FACILITY
MAINE MEDICAL CENTER
PORTLAND, MAINE
PROJECT LOCUS

APPROX. SCALE 1:24,000

OCTOBER 1988

FILE NO. 80035

FIGURE 1

APPENDIX A

Logs of Previous Borings

MMC-NEW DIAGNOSTIC FACILITY

Northeast Soil Services

BORING LOG

Job # 890

LOCATION: Portland, Me. STRUCTURE: Me. Medical Hospital SHEET No. 1 OF: 1

BORING No. M-1 DATUM: BORING INSPECTOR: DATE 9-8-70

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	SAMPLER BLOWS	SAMPLER PENETRATION	BLOWS	PENETRATION	SAMPLE NO.*	HAMMER / REMARKS
								CASING SIZE 2½"
	0'0"	Top of ground						SPOON 2" O. D. 1 3/8" I. D.
		~~Brown gravely sand~~	34	12"				
			62	"				
		BROWN SLIGHTLY SILTY	34	"	39	6"	1D	
		GRAVELLY SAND	36	"	20 22	6"		
	9'2"	~ FIRM TO COMPACT ~	46	"				
			36	"	24 14	6" 6"	2D	GWT @ 5'2" DRY & CAVED IN 9-11-AM
			140	"	26	6"		
			900	"				
			1100	"				
	9'2"	BOULDER	1200	2"				
		Refusal						

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ⌅ Ground Water Surface

MMC-NEW DIAGNOSTIC FACILITY

Northeast Soil Services

BORING LOG

Job # 890

LOCATION: Portland, Me. STRUCTURE: Me. Medical Center SHEET No. 1 OF: 2

BORING No. M-1A DATUM: BORING INSPECTOR: DATE 9-17-70

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	SAMPLER BLOWS	SAMPLER PENETRATION	BLOWS	PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								CASING SIZE $2\frac{1}{2}$"
								SPOON 2" O. D. ~~1 3/8"~~ I. D.
150.2	0'0"	Top of ground						
	0'8"	Topsoil (Lawn)	8	12"				
		Brown ~~GRAVELLY~~ SILTY sand w/	30	"				
	3'4"	SCATTERED ROOTS & PART-	30	"	11 12	6" 6"	1D	
		ICLES OF LIME (FILL) COMPACT	53	"	18	6"		
		BROWN SLIGHTY SILTY	76	"				
		GRAVELLY SAND w/	44	"	14 16	6" 6"	2D	
		SCATTERED ROOTS & GRASS	179	"	25	6"		
	8'-0"	CONTAINS ROCKS & SMALL	160	"				
		BOULDERS	615	"				
		~ FIRM ~	645	"				
		~~w/Anxious~~	330	"	230 53	6" 6"	3D	
		(FILL)	195	"	67	6"		
			255	"				
		BROWN SLIGHTLY SILTY	40	"				
		GRAVELLY SAND w/ SCAT-	255	"				
		TERED THIN LAYERS OF	71	"	58 164	6" 6"	4D	
		SANDY SILT & SILTY SAND	162	"	120	6"		
	24'-6"		155	"				
		CONTAINS ROCK & SMALL	265	"				
		BOULDERS	490	"				
			77	"	30 84	6" 6"	5D	
		~ VERY COMPACT ~	306	"	75	6"		
			255	"				
			465	"				
	25'0"		130	"				GWT @ 25'0" Dry 9-17-70 AM

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ∓ Ground Water Surface

TEST BORINGS AND DATA

MMC-NEW DIAGNOSTIC FACILITY

Northeast Soil Services

Job # 890

BORING LOG

LOCATION: Portland, Me. STRUCTURE: Me. Medical Center SHEET No. 2 OF: 2

BORING No. M-1A DATUM: BORING INSPECTOR: DATE 9-17-70

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	SAMPLER BLOWS	SAMPLER PENETRATION	SAMPLER BLOWS	SAMPLER PENETRATION	SAMPLE NO.*	HAMMER / REMARKS
								HAMMER CASING 280 # AVG. FALL 17 ins. SAMPLER 140 # AVG. FALL 30 ins. REMARKS: CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.
	25'0"	Continued						
		~~Brown gravely sand~~	300	12"	55 65	6" 6"	6D	
			160	"	161	6"		
			660	"				
			160	"				
			540	"				
			180	"	44 84	6" 6"	7D	
			460	"	110	6"		
			160	"				
			305	"				
			190	"				
					26 44	6" 6"	8D	
	36'6"				105	6"		
		Bottom of exploration						

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

TEST BORINGS AND DATA

MMC-NEW DIAGNOSTIC FACILITY

Northeast Soil Services

BORING LOG

Job # 890

LOCATION: Portland, Me. STRUCTURE: Me. Medical Hospital SHEET No. 1 OF: 2

BORING No. M-2 DATUM: BORING INSPECTOR: DATE 9-10-70

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	2" SAMPLER BLOWS	2" SAMPLER PENETRATION	1 3/8" SAMPLER BLOWS	1 3/8" SAMPLER PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER CASING 280 # AVG. FALL 17 ins. SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS
149.4	0'0"	Top of ground						CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.
		Brown silty gravely sand	32	12"				
		Scattered Cobbles & Small	59	"				
	4'6"	Boulders	80	"	81 36	6" 6"	1D	
		Very Compact	100	"	42	6"		
			110	"				
		Brown Slightly Silty	50	"	16 27	6" 6"	2D	
		Gravelly Sand w/ Scat-	400	"	40	6"		
		tered Thin Layers Of	805	"				
		Sandy Silt & Silty Sand	1120	"				
			215	"				
		Contains Rocks & Small	50	"	23 66	6" 6"	3D	
	11'6"	Boulders	263	"	85	6"		
			428	"				
		Very Compact	105	"				
	37'0"		169	"				
			27	"	18 49	6" 6"	4D	
			273	"	72	6"		
			121	"				
			278	"				27'0" Dry 9-10-70 PM
			108	"				
			293	"	41 70	6" 6"	D	GWT @ 21'0" DRY & CAVED IN
			401	"	78	6"		Missed sample 9-11-70 PM
			721	"	73 140	6" 5"	5D	
			140	"				
	25'0"		530	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ⌯ Ground Water Surface

TEST BORINGS AND DATA

Northeast Soil Services

Job # 890

BORING LOG

LOCATION: Portland, Me. STRUCTURE: Me. Medical Hospital SHEET No. 2 OF: 2

BORING No. M-2 DATUM: BORING INSPECTOR: DATE 9-10-70

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	SAMPLER BLOWS	SAMPLER PENETRATION	2nd BLOWS	2nd PENETRATION	SAMPLE NO.*	HAMMER / REMARKS
	25'0"	Continued						CASING SIZE 2½"
		Brown gravely sand	180	12"	82 67	6" 6"	6D	SPOON 2" O. D. 1 3/8" I. D.
			540	"	67	6"		
			191	"				
			325	"				
			96	"				
			140	"	47 82	6" 6"	7D	
			95	"	63	6"		
	37'0"		221	"				
			322	"				
			400	"				
			200	"	34 71	6" 6"	8D	
			485	"	120	6"		
			520	"				
			281	"				
			465	"				
					34 48	6" 6"	9D	
	47'6"				72	6"		
		Bottom of exploration						

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

TEST BORINGS AND DATA

MMC-NEW DIAGNOSTIC FACILITY

Northeast Soil Services

BORING LOG

Job # 890

LOCATION: Portland, Me. STRUCTURE: Me Medical Center SHEET No. 1 OF: 2

BORING No. M-3 DATUM: BORING INSPECTOR: DATE 9-22-70

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	2" SAMPLER BLOWS	2" SAMPLER PENETRATION	BLOWS	PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								CASING SIZE 2½"
151.6	0'0"	Top of ground						SPOON 2" O. D. 1 3/8" I. D.
	0'8"	Topsoil (Lawn)	14	12"				
		~~Brown gravely sand~~	30	"				
			47	"	17 22	6" 6"	1D	
		Brown slightly Silty	125	"	25	6"		
		gravelly sand with	260	"				
		scattered thin Layers	148	"	115 50	6" 6"	2D	
		of sandy silt and	235	"	65	6"		
		silty sand	113	"				
			117	"				
		Contains rock &	265	"				
		small Boulders	117	"	27 86	6" 6"	3D	
			430	"	150	6"		
		~ Very Compact ~	127	"				
			260	"				
			80	"				
		~~w/boulders~~	240	"	33 54	6" 6"	4D	
			200	"	130	6"		
			95	"				
			260	"				GWT @ ~~1910" 9-21-70 PM~~
			170	"				18'-0" 9-23-70
	20'6"		100	"	24 18	6" 6"	5D	w/ CASING PULLED
		Brownish - Gray ~~Brown silty coarse sand~~	80	"	72	6"		
~~-237.0~~		Gravelly Clayey Silty Sand	62	"				
		~~Grayish-brown silty coarse~~	95	"				
		~~sand~~						
	27'0"	Compact to Very Compact	105	"				

* Designate Dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ⌯ Ground Water Surface

TEST BORINGS AND DATA

MMC-NEW DIAGNOSTIC FACILITY

Northeast Soil Services

Job # 890

BORING LOG

LOCATION: Portland, Me. STRUCTURE: Me. Medical Center SHEET No. 2 OF: 2

BORING No. M-3 DATUM: BORING INSPECTOR: DATE 9-22-70

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	SAMPLER BLOWS	SAMPLER PENETRATION	BLOWS	PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
	25'0"	Continued						CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.
		~~Grayish-brown silty~~	122	12"	14	6"	6D	w = 10.0 %
		~~coarse sand~~			24	6"		
			105	"	28	6"		
			84	"				
			96	"				
			99	"				
	31'0"				25	6"	7D	
					37	6"		
	31'6"	~~Grayish~~ gravely sand ~~Very Compact~~			82	6"		
		Bottom of exploration						

CASING 280 # AVG. FALL 17 ins.

SAMPLER 140 # AVG. FALL 30 ins.

REMARKS

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ∓ Ground Water Surface

TEST BORINGS AND DATA

MMC–NEW DIAGNOSTIC FACILITY

Northeast Soil Services

BORING LOG

Job # 890

LOCATION: Portland, Me. STRUCTURE: Me. Medical Hospital SHEET No. 1 OF: 2

BORING No. M-8 DATUM: BORING INSPECTOR: DATE 9-31-70

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	2" SAMPLER BLOWS	2" SAMPLER PENETRATION	1⅜" SAMPLER BLOWS	1⅜" SAMPLER PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								CASING 250 # AVG. FALL 17 ins.
								SAMPLER 140 # AVG. FALL 30 ins.
								CASING SIZE 2½"
153.1	0'0"	Top of ground						SPOON 2" O. D. 1 3/8" I. D.
	1'0"	Topsoil (lawn)	4	12"				GWT @ 9'6" 10-1-70 am
		Layered Brown gravely sand	5	"				w/ casing pulled
		Dark brown silty and Sand w/ Trace of Topsoil and Scattered roots (Fill) – Firm –	8	"	10	6"	1D	
	4'0"		11	"	11	6"		
			42	"	13	6"		
		Brown Slighty silty sandy Gravel (rock & boulders)	70	"	14	6"	2D	
			141	"	36	6"		
			320	"	63	6"		
			174	"				
			360	"				
			115	"	41	0"	3D	
			173	"	42	6"		
	13'0"		58	"	36	6"		
		Brownish Gray clayey gravely sand	98	"				
			105	"				
			45	"	18	6"	4D	
			48	"	20	6"		
			76	"	22	6"		
			190	"				
		– firm –	385	"				
			78	"	22	0"	5D	
			98	"	20	6"		
			215	"	25	6"		
			77	"				
	25'0"		58	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ∓ Ground Water Surface

TEST BORINGS AND DATA

MMC-NEW DIAGNOSTIC FACILITY

Northeast Soil Services

Job # 890

BORING LOG

LOCATION: Portland, Me. STRUCTURE: Me. Medical Hospital SHEET No. 2 OF: 2

BORING No. M-8 DATUM: BORING INSPECTOR: DATE 9-31-70

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	SAMPLER BLOWS	SAMPLER PENETRATION	BLOWS	PENETRATION	SAMPLE NO.*	HAMMER / REMARKS
	25'0"	Continued						CASING SIZE 2½"
		~~Gray clayey gravely sand~~	37	12"	7 11	9" 6"	6D	SPOON 2" O. D. 1 3/8" I. D.
			41	"	23	6"		CASING 280 # AVG. FALL 17 ins.
			57	"				SAMPLER 140 # AVG. FALL 30 ins.
		Dark grey	67	"				
		clayey gravelly	65	"				
		silty sand	35	"	11 11	9" 6"	7D	
			36	"	13	6"		
			28	"				
		~ firm ~	41	"				
			48	"				
					9 22	6" 6"	8D	
	36'6"				35	6"		
		Bottom of exploration						

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ⌯ Ground Water Surface

TEST BORINGS AND DATA

APPENDIX B

Logs of Present Borings

NORTHEAST DIAMOND DRILLING CO.

P. O. BOX 617 UNION, MAINE 04862

SHEET 1 OF 1
DATE 9-26-88
HOLE NO. B-1
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc.
PROJECT NAME Maine Medical Center
REPORT SENT TO Haley & Aldrich, Inc.
SAMPLES SENT TO Taken @ Site

ADDRESS Portland, Maine
LOCATION Portland, Maine
PROJ. NO.
OUR JOB NO. M8944(

GROUND WATER OBSERVATIONS
At _____ after ____ Hours
At _____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type	Augers	SS	
Size I.D.		2"	
Hammer Wt.		140	BIT
Hammer Fall		30	

	Date	Time
START	9-26-88	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	R. Gist	
INSPECTOR	S. Dixon	
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
		0-1'6"	SS	10	26	20			3" Topsoil W/ Grass & Roots	1	18	12
									light Brown Silty fine Topsoil trace Silt Augered to 3'			
5									Auger Refusal @ 3' Poss Power Line			

GROUND SURFACE TO 3' USED augers "CASING: THEN refusal

Sample Type
D: Dry C: Cored W: Washed
UP: Undisturbed Piston
TP: Test Pit A: Auger V: Vane Test
UT: Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50 +	Very Dense	15-30	V-Stiff
		30 +	Hard

SUMMARY:
Earth Boring 3'
Rock Coring
Samples 1

HOLE NO. B-1

NORTHEAST DIAMOND DRILLING CO.

P. O. BOX 617 UNION. MAINE 04862

SHEET 1 OF 1
DATE 9-26-88
HOLE NO. B-1-A
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc.
PROJECT NAME
REPORT SENT TO Haley & Aldrich, Inc.
SAMPLES SENT TO Taken @ Site

ADDRESS Portland, Maine
LOCATION Portland, Maine
PROJ. NO.
OUR JOB NO. M8944

GROUND WATER OBSERVATIONS
9-17-88
At 27'5" in augers after 14 Hours
At 26'8" in Well after 14 Hours
9-28-88

	CASING	SAMPLER	CORE BAR.
Type	Augers	SS	
Size I.D.		2"	
Hammer Wt.		140	BIT
Hammer Fall		30	

	Date	Time
START	9-26-88	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	R. Gist	
INSPECTOR	S. Dixon	
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
5		5'0"-6'6"	ss	5	11	27		6'	light Brown fine medium Sand Redish-Brown fine medium Sand trace silt	2	18	18
10		10'0"-11'0"	ss	92	100			13'	light Brown fine medium Sand Redish-Brown fine medium Sand trace Silt, some gravel	3	12	12
15		15'0"-16'0"	ss	24	85			15'	light Brown fine medium Sand trace silt	4	12	12
20		20'0"-21'6"	ss	56	127	140			light Brown Coarse to fine Sand little fine Gravel	5	18	18
25		25'0"-26'6"	ss	42	51	50		26'3"	light Brown Coarse to fine Sand Brown fine medium Sand trace Silt, little gravel	6	18	18
30		30'0"-31'6"	ss	21	61	18			Grayish-Brown fine Sand trace of Coarse to fine Gravel, little clay	7	18	18
35		35'0"-36'6"	ss	13	17	37			Grayish-Brown fine Sand trace of Coarse to fine Sand, little clay	8	18	18
		40'0"-41'0"	ss	8	14	19	(Bottom of Boring @ 41'6")		Gray Silty fine Sand trace of Coarse to fine Gravel some Clay	9	18	18

GROUND SURFACE TO 40' USED augers "CASING: THEN refusal

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50 +	Very Dense	15-30	V-Stiff
		30 +	Hard

SUMMARY:
Earth Boring 41'6"
Rock Coring
Samples 9

HOLE NO. B-1-A

TOWN PRESS - EAST PROVIDENCE — (401) 434-4086

NORTHEAST DIAMOND DRILLING CO., INC.

Date 9-27-88

Job # M8944

Hole # B-1

PVC Screen 10'

PVC Riser 25'0"

Sand 7 bags

Bentonite ½ pail

Time 2½ hrs

Stand Pipe 1 road box

Cap & Plug 2

Back-Fill

~~XXXXXXX~~ ½ cold patch

NORTHEAST DIAMOND DRILLING CO.

P. O. BOX 617 UNION, MAINE 04862

SHEET 1 OF 1
DATE 9-27-88
HOLE NO. B-2
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc. | ADDRESS Portland, Maine
PROJECT NAME Maine Medical Center | LOCATION Portland, Maine
REPORT SENT TO Haley & Aldrich, Inc. | PROJ. NO.
SAMPLES SENT TO Taken @ Site | OUR JOB NO. M8944[illegible]

GROUND WATER OBSERVATIONS
At _____ after _____ Hours
At _____ after _____ Hours

	CASING	SAMPLER	CORE BAR.
Type	Augers	SS	
Size I.D.		2"	
Hammer Wt.		140	BIT
Hammer Fall		30	

	Date	Time
START	9-27-88	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	R. Gist	
INSPECTOR	S. Dixon	
SOILS ENGR.		

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
		4"-1'7"	SS	28	30	65/4"			4" Hottop fine medium Sand some Gravel trace Silt	1	18	12
5		5'-6'6"	SS	27	29	14			Redish-Brown Coarse to medium Sand little fine sand trace Silt Auger Refusal @ 10'	2	18	12

GROUND SURFACE TO 10' USED auger "CASING: THEN _____ refusal

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A-Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring 10'
Rock Coring
Samples 2

HOLE NO. B-2

NORTHEAST DIAMOND DRILLING CO.

P. O. BOX 617 UNION, MAINE 04862

SHEET 1 OF 1
DATE 9-28-88
HOLE NO. B-2-A
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc.
ADDRESS Portland, Maine
PROJECT NAME Maine Medical Center
LOCATION Portland, Maine
REPORT SENT TO Haley & Aldrich, Inc.
PROJ. NO.
SAMPLES SENT TO Taken @ Site
OUR JOB NO. M8944

GROUND WATER OBSERVATIONS
At ______ after ______ Hours
Dry Hole
At ______ after ______ Hours

	CASING	SAMPLER	CORE BAR.
Type	Augers	SS	
Size I.D.		2"	
Hammer Wt.		140	BIT
Hammer Fall		30	

	Date	Time
START	9-28-88	a.m. p.m.
COMPLETE		a.m. p.m.

TOTAL HRS.
BORING FOREMAN R. Gist
INSPECTOR S. Dixon
SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
									Augered to 10' then Sample			
5												
10		10'0"-11'6'	SS	42	28	37			light Brown Gravely Coarse to fine Sand trace Silt	3	18	16
15		15'-15'	SS	50/0'					Cobbles in front of spoon	4	0	0
								16'3"				
20		20'-21'6"	SS	36	70	80			light Brown fine medium Sand little Coarse medium Gravel	5	18	18
25		25'-26'6'	SS	37	52	73			same as above	6	18	18
30		30'-31'6"	SS	40	54	80			same as above	7	18	18
35		35'-36'6"	SS	21	63	130			light Brown fine medium sand little Coarse medium Gravel	8	18	18
		40'-41'6"	SS	42	71	80			same as above	9	18	18
									Bottom of Boring @ 41'6"			

GROUND SURFACE TO 40' USED auger "CASING: THEN refusal

Sample Type
D: Dry C: Cored W: Washed
UP: Undisturbed Piston
TP: Test Pit A: Auger V: Vane Test
UT: Undisturbed Thinwall

Proportions Used	
trace	0 to 10%
little	10 to 20%
some	20 to 35%
and	35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30 + Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50 +	Very Dense	15-30	V-Stiff	

SUMMARY:
Earth Boring 41'6"
Rock Coring
Samples 9

HOLE NO. B-2-A

NORTHEAST DIAMOND DRILLING CO.

P. O. BOX 617 UNION, MAINE 04862

SHEET 1 OF 1
DATE 9-28-88
HOLE NO. B-3
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc. | ADDRESS Portland, Maine
PROJECT NAME Maine Medical Center | LOCATION Portland, Maine
REPORT SENT TO Haley & Aldrich, Inc. | PROJ. NO.
SAMPLES SENT TO Taken @ Site | OUR JOB NO. M8944(

GROUND WATER OBSERVATIONS
At 39'5" after Hours
in auger after drilling
At after Hours

	CASING	SAMPLER	CORE BAR.
Type	Augers	SS	
Size I.D.		2"	
Hammer Wt.		140	BIT
Hammer Fall		30	

	Date	Time
START	9-28-88	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	R. Gist	
INSPECTOR	S. Dixon	
SOILS ENGR.		

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
		0-1'6"	ss	3	4	44			8" Topsoil Grass & Roots	1	18	18
5		5'-6'6"	ss	6	31	43			Gravely Coarse to fine Sand Fill material	2	18	18
10		10'-11'6"	ss	40	61	51		11'1"	Gravely Coarse to fine Sand fill material	3	18	12
15		15'-16'6"	ss	25	63	120		18'6"	Brown silty, fine SAND, little medium sand, trace gravel	4	18	18
20		20'-21'6"	ss	8	12	13			light Gray till Silty fine medium Sand trace Clay, trace gravel, coarse sand	5	18	18
25		25'-26'6"	ss	12	13	18			same as above	6	18	18
30		30'6"-32'0"	ss	3	14	16			Color change to gray at 30' 6"	7	18	18
35		35'-36'6"	ss	10	18	11			same as above	8	18	18
		40'-41'6"	ss	4	6	21			same as above Bottom of Boring @ 41'6"	9	18	18

GROUND SURFACE TO 40' USED augers "CASING: THEN ss sample

Sample Type
D: Dry C: Cored W: Washed
UP: Undisturbed Piston
TP: Test Pit A: Auger V: Vane Test
UT: Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30 + Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50 +	Very Dense	15-30	V-Stiff	

SUMMARY:
Earth Boring 41'6"
Rock Coring
Samples 9

HOLE NO. B-3

NORTHEAST DIAMOND DRILLING CO.

P. O. BOX 617 UNION. MAINE 04862

SHEET 1 OF 1
DATE 9-29-88
HOLE NO. B-4
LINE & STA.
OFFSET
SURF. ELEV.

TO Haley & Aldrich, Inc. | ADDRESS Portland, Maine
PROJECT NAME Maine Medical Center | LOCATION Portland, Maine
REPORT SENT TO Haley & Aldrich, Inc. | PROJ. NO.
SAMPLES SENT TO Taken @ Site | OUR JOB NO. M8944-1

GROUND WATER OBSERVATIONS
At _____ after ____ Hours
At _____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type	Augers	SS	
Size I.D.		2"	
Hammer Wt.		140	BIT
Hammer Fall		30	

	Date	Time
START	9-29-88	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	R. Gist	
INSPECTOR	S. Dixon	
SOILS ENGR.		

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
		4"-1'10"	ss	28	48	47			4" Hottop Coarse to medium Gravel fill	1	18	18
5		5'-6'6"	ss	9	11	19			light Brown fine medium Sand trace silt pockets of clay	2	18	18
10		10'-11'6'	ss	12	13	13			light Brown medium fine Sand little pockets of Silty clay	3	18	18
15		15'-16'6"	ss	8	23	40			light Brown medium fine Sand trace Gravel trace silt	4	18	18
								17'0"	Fill to natural soil			
20		20'-21'6"	ss	37	66	100			light Brown fine medium Sand trace Gravel, little coarse sand, little to trace silt	5	18	16
25		25'-26'6'	ss	36	83	160			same as above	6	18	16
30		30'-31'6"	ss	50	50/0				Spoon Refusal 50 for 0" hit boulder	7	6	6
								30'6"				
35		35'-36'6"	ss	21	37	50			Gray till fine medium Sand Coarse gravel	8	18	18
		40'-41'6'	ss	12	16	23			same as above bottom of Boring @ 41'6"			

GROUND SURFACE TO 40'0" USED augers "CASING: THEN ss sample

Sample Type
D: Dry C: Cored W: Washed
UP: Undisturbed Piston
TP: Test Pit A: Auger V: Vane Test
UT: Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50 +	Very Dense	15-30	V-Stiff
		30 +	Hard

SUMMARY:
Earth Boring 41'6"
Rock Coring
Samples 9

HOLE NO. B-4

APPENDIX C

Observation Well Reports and Measured Water Levels

HALEY & ALDRICH, INC.
CONSULTING SOIL ENGINEERS

GROUND WATER OBSERVATION WELL REPORT

PROJECT: PROPOSED MRI FACILITY
LOCATION: PORTLAND, ME
CLIENT: MAINE MEDICAL CENTER
CONTRACTOR: NORTHEAST DIAMOND DRILLING, INC., UNION, ME
DRILLER: R. GIST INSPECTOR: S. DIXON
INSTALLATION DATE: 27 SEPTEMBER, 1988

FILE NO. 80035
WELL NO. B1-OW
BORING NO. B1
LOCATION SEE PLAN
SHEET 1 OF 2

SURVEY DATUM NGVD

GROUND ELEVATION Approx. 152.1

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

SUBSURFACE CONDITIONS:
- TOPSOIL — 0.4
- FILL — 3.0
- ICE CONTACT sands — 20.0
- GLACIAL TILL — 26.3
- 35.0 ft.

WELL MATERIALS:
- bentonite
- natural sand backfill — 13.0
- filtration sand

~~ELEVATION~~ OR STICKUP ABOVE/~~BELOW~~ GROUND SURFACE OF CASING OR ROADWAY BOX	ground surface
~~ELEVATION~~ OR STICKUP ~~ABOVE~~/BELOW GROUND SURFACE OF RISER PIPE.	0.2 ft.
THICKNESS OF SURFACE SEAL	3.0 ft.
TYPE OF SURFACE SEAL	bentonite
[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]	
TYPE OF CASING	steel road box
INSIDE DIAMETER OF CASING	3.5 in.
~~ELEVATION~~/DEPTH OF BOTTOM OF CASING	2.0 ft.
INSIDE DIAMETER OF RISER PIPE	1.5 in.
TYPE OF BACKFILL AROUND RISER	filtration sand
DIAMETER OF BOREHOLE	7 in.
ELEVATION/DEPTH OF BOTTOM OF RISER	25.0 ft.
TYPE OF POINT OR MANUFACTURER	SCH 40 PVC
SCREEN GAUGE OR SIZE OF OPENINGS	0.06 in
DIAMETER OF WELLPOINT	1.5 in.
TYPE OF BACKFILL AROUND POINT	filtration sand
~~ELEVATION~~/DEPTH OF BOTTOM OF POINT	35.0 ft.
~~ELEVATION~~/DEPTH OF BOTTOM OF BOREHOLE	40.0 ft.

[FIGURES REFER TO: EL. ___ DEPTH ✓]

[___ LENGTH OF CASING L_3] [25 ft. LENGTH OF RISER PIPE (L_1) + 10 ft. LENGTH OF POINT (L_2) = 35 ft PAY LENGTH]

H&A FORM 59 SEP. 72

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: RI-OW

ELEVATION SUBTRAHEND Approx. 152.1

FILE NO. 80035
PAGE NO. 2 OF 2

DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM ground surface	ELEVATION OF WATER	REMARKS	READ BY
9-28-88	0730	16 hrs.	26.7 ft.	125.4	INITIAL READING	S.R.D
9-28-88	1530	1 day	26.6 ft.	125.5		S.R.D
9-29-88	0745	2 days	26.5 ft.	125.6		S.R.D.
10-6-88	1445	9 days	27.2 ft.	124.9		S.R.D

H&A FORM JAN. 70 59A

CITY OF PORTLAND, MAINE
389 CONGRESS STREET
PORTLAND, MAINE 04101
(207) 874-8300

P. SAMUEL HOFFSES, CHIEF
INSPECTION SERVICES DIVISION

DEPARTMENT OF PLANNING & URBAN DEVELOPMENT

March 6, 1989

Allied Construction Company Incorporated
208 Fore Street
Portland, Maine 04101

Re: 22 Bramhall Street, Portland, Maine

Dear Sir:

Your application to construct a new addition has been reviewed and a permit is herewith issued subject to the following requirements:

Site Plan Review Requirements

Inspection Services	Approved	W. Giroux	March 3, 1989
Public Works	Approved	S. Harris	February 22, 1989
Planning Division	Approved	M. O'Meara	February 10, 1989
Fire Department	Approved	Lt. Collins	March 3, 1989

Building and Fire Code Requirements

1.) Heat detectors, rate of rise, to be installed in mechanical penthouse.
2.) Smoke detectors to be provided for the "Exam Room" which is shown on plan with no detection or extinquishing protection.
3.) All state laws regarding handicapped accessibility and useability must be adhered to.
4.) All concrete shall be protected from freezing.

If you have any questions regarding these requirements, please do not hesitate to contact this office.

Sincerely,

P. Samuel Hoffses
Chief, Inspection Services

cc: Lt. Collins, Fire Department
Ms. O'Meara, Planning
Mr. S. Harris, Public Works

SHEPLEY BULFINCH RICHARDSON AND ABBOTT
ARCHITECTS
40 BROAD STREET BOSTON MASSACHUSETTS 02109 617-423-1700

TRANSMITTAL FORM

TO City Hall
Room 211
389 Congress Street
Portland, ME 04101

ATTENTION Ms. Maureen O'Mara

PROJECT MAINE MEDICAL CENTER
MRI SUITE ADDITION

PROJECT NO. 2598

DATE 2.15.89

WE TRANSMIT
- ☑ HEREWITH
- ☐ IN ACCORDANCE WITH YOUR REQUEST
- ☐ UNDER SEPARATE COVER
- ☐ _____

FOR YOUR
- ☐ APPROVAL
- ☐ REVIEW AND COMMENT
- ☐ USE
- ☐ DISTRIBUTION TO PARTIES
- ☑ RECORD
- ☐ _____

THE FOLLOWING:
- ☑ DRAWINGS
- ☐ SPECIFICATIONS
- ☐ CHANGE ORDER
- ☐ SHOP DRAWING PRINTS
- ☐ SHOP DRAWING REPRODUCIBLES
- ☐ SAMPLES
- ☐ PRODUCT LITERATURE
- ☐ _____

NO.	DATE	CODE	DESCRIPTION
	2.15.89		DRAWING : MRI SUITE ADDITION EXTERIOR ELEVATIONS (6 COPIES)

CODE (A) ACTION INDICATED ON ITEM TRANSMITTED
(B) NO ACTION REQUIRED
(C) FOR SIGNATURE AND RETURN TO S.B.R.A.
(D) SEE REMARKS BELOW

REMARKS _____

COPIES TO _____

( ) ACKNOWLEDGE RECEIPT OF ENCLOSURES
( ) RETURN ENCLOSURES TO S.B.R.A.
IF ENCLOSURES NOT AS NOTED, INFORM S.B.R.A. IMMEDIATELY.

BY L. Rogozin

CITY OF PORTLAND, MAINE
55 PORTLAND STREET
PORTLAND, MAINE 04101
(207) 874-8300

PARKS & PUBLIC WORKS

GEORGE A. FLAHERTY
DIRECTOR

February 24, 1989

Maine Medical MRI Facility Preconstruction Meeting

On Wednesday, February 22nd, a preconstruction meeting was held at Parks/Public Works' Engineering Division.

The following issues were discussed.

1. Sumps will be included in all catch basins.
2. Casco traps will be installed in the last two catch basins (also, it was suggested that for MRI's benefit, casco traps should be installed in all catch basins)
3. All existing underground utilities will be checked and verified.
4. Wheelchair ramp to be installed on entrance sidewalk.
5. New curb to be installed to match existing reveal/old curb to be marked and stacked at Hamlin's Pit.
6. Pavement in Bramhall Street to be saw cut.
7. All utilites (drop manhole, catch basins, etc.) to be Portland standard spec.
8. Sheet piling considerations:
    a. Fence area
    b. Street opening permit
    c. Traffic considerations - need verification from Traffic Engineer
    d. Provision for 8" existing sewer lateral, may need to relocate.
9. Construction details to be submitted prior to utility construction.
10. As built prior to performance guarantee release.
11. Public improvements to be completed prior to issuance of certificate of occupancy.

PN/sc
attachment

Attendees

Bill Boothby	Acting City Engineer	874-8300, extension 8825
Paul Niehoff	Materials Engineer	874-8300, extension 8838
Steve Harris	Planning Engineer	874-8300, extension 8843
Pat Welch	Senior Tech	874-8300, extension 8833
Maureen O'Meara	Senior Planner	874-8300, extension 8726
Dale Pierson	Pierson Nurseries	282-7235
Harry Croll	Allied Construction	772-2888
Frank Wood	Allied Construction	772-2888
Steve Perry	MMC Engineering	871-2447

LETTER OF TRANSMITTAL

Planning Division
Department of Planning and Urban Development
Room 211 City Hall
389 Congress Street
Portland, Maine 04101

Date: 2/23/89
Staff Person: OMeara J

Phone : (207)874-8300, ext. _____

To: Sam Hoffses

Project Reference: MMC MRI

We are sending you:

_____ enclosed
_____ under separate cover
_____ available for pick-up

For Your:

_____ information as requested
_____ review and comment
_____ information and use
_____ other: _____

Copies	Document Date	Description
1	2/10/89	Elevations

Remarks: To be added to previously sent approved plans

cc: _____

LETTER OF TRANSMITTAL

Planning Division
Department of Planning and Urban Development
Room 211 City Hall
389 Congress Street
Portland, Maine 04101

Date: 2/23/89
Staff Person: D'Meara

Phone : (207)874-8300, ext. _____

To: Paul Nichoff

Project Reference: MMC MRI

We are sending you:

- ✓ enclosed
- _____ under separate cover
- _____ available for pick-up

For Your:

- _____ information as requested
- _____ review and comment
- ✓ information and use
- _____ other: _____

Copies	Document Date	Description
2	2/10/89	Elevations

Remarks: To be added to previously sent plans

cc: _____

LETTER OF TRANSMITTAL

Planning Division
Department of Planning and Urban Development
Room 211 City Hall
389 Congress Street
Portland, Maine 04101

Date: 2/23
Staff Person: O'Meara

Phone : (207)874-8300, ext. _____

To: Steve Harms
PW

Project Reference: MMC MRI

We are sending you:

- ✓ enclosed
- _____ under separate cover
- _____ available for pick-up

For Your:

- _____ information as requested
- _____ review and comment
- ✓ information and use
- _____ other: _____

Copies	Document Date	Description
1	2/10/89	Elevations

Remarks: To be added to previously sent approved plans

cc: _____
_____
_____
_____

New England Rehabilitation
Hospital of Portland

13 Charles Street/Portland, Maine 04102/(207) 775-4000
Advantage HEALTH CORPORATION

October 10, 1988

Joseph E. Gray, Jr.
Director of Planning and Urban Development
Rm. #211
City Hall
389 Congress Street
Portland, ME 04101

Dear Mr. Gray:

I am the Chief Executive Officer of the New England Rehabilitation Hospital of Portland, located at 13 Charles Street. Our facility would like to be on record as supporting Maine Medical Center's plan for locating a Magnetic Imaging Facility located on their property at 22 Bramhall Street.

We currently must send patients by ambulance to the available Magnetic Imaging Facility locally. This is an expensive financial burden for both the hospital and its patients, most of whom come from the Portland and Greater Portland areas. Because of the close proximity of our facility to Maine Medical Center, the approval of an on-site Magnetic Imaging Facility will allow us to make this service available to our patients without the necessity for a costly ambulance ride in most instances.

In these times of great concern over the cost of healthcare, your approval will not only allow Maine Medical Center to add a needed service, but will allow me to save money for some citizens of the City of Portland seeking rehabilitative care.

Cordially,

Gregg Stanley
Executive Vice President/Chief Executive Officer

GS/wg

cc: William Deal, M.D.
President, Maine Medical Center

MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

August 30, 1988

Alex Jaegerman, Chief Planner
Portland Planning Department
City of Portland
389 Congress Street
Portland, ME 04101

Dear Mr. Jaegerman:

Don McDowell and I enjoyed meeting with you and Maureen O'Meara last week. As you requested I have pulled together some articles that might clarify some of the terminology used around magnetic resonance imaging and focus on the major considerations in construction of an MR facility.

1. Attachment 1 is our certificate of need application for a magnetic resonance imaging center. I have flagged those sections of the application which provide some clinical background, though perhaps overly technical, and facility plans.

2. Attachment 2 is an article from a recent edition of the Journal of the American Medical Association summarizing the findings of a consensus conference on magnetic resonance imaging.

3. Attachment 3, "Magnetic Resonance Imaging Tissue Characteristics", P. Sprawls, Ph.D., outlines some of the relevant physics in MRI.

4. Attachment 4, "MRI Site Planning", G. R. Davis, provides a good glossary of MRI terms and key engineering and design issues.

We are pushing our architects to complete design as rapidly as possible. I look forward to contacting you and/or Ms. O'Meara to get together soon after Labor Day. Please don't hesitate to call me at 871-2724 should you have questions about this material or any other informational needs.

Sincerely,

Michael J. Ryan
Associate Vice President/
Clinical

MJR:sn

Attachments

cc: Ms. O'Meara

Attachment 1

PROJECT TITLE: Acquisition of a Magnetic Resonance Imaging Unit

SPONSOR: NAME: Maine Medical Center TELEPHONE 871-0111

ADDRESS: 22 Bramhall Street

Portland, Maine 04102

CONTACT PERSON: NAME: Michael J. Ryan TELEPHONE 871-2869

ADDRESS: 22 Bramhall Street

Portland, Maine 04102

Donald L McDowell DATE 11/30/87

SIGNATURE

Mr. Donald L. McDowell, Executive V.P. & Treasurer

NAME/TITLE (Typed)

Maine Medical Center

ORGANIZATION (Typed)

FOR PROPOSALS SUBJECT TO REVIEW UNDER BOTH THE MAINE CERTIFICATE OF NEED ACT AND SECTION 1122 OF THE U.S. SOCIAL SECURITY ACT, ONE OF THE FOLLOWING NOTICES MUST BE AND IS HEREBY GIVEN:

The sponsor waives its right to a review in accordance with the review timetable and procedures established pursuant to Section 1122 of the Social Security Act and agrees to the review period and procedures as required in accordance with the provisions of the Maine Certificate of Need Act. (Chapter 14, Section 3.C.1. of the CON Procedures Manual)

Donald L McDowell

SIGNATURE

The sponsor does not waive its right to a review in accordance with the review timetables and procedures established pursuant to Section 1122 of the Social Security Act. A separate set of Applications is being provided at this time, prepared in accordance with the Procedures Manual - Section 1122 of the Social Security Act, for separate review. (Chapter 14, Section 3.C.2. a-b of the CON Procedures Manual)

SIGNATURE

PROPOSED CAPITAL EXPENDITURES BUDGET

(CERTIFICATE OF NEED APPLICATION)

	Estimated Cost
Purchase of Land/Related fees	$
Purchase of Building(s)/Related Fees	
Land Surveys, Soil Tests, Borings	
Architects' Basic Fees (Original Design and Revisions)	275,000
Engineering Consultant Fees	
Plans and Specifications (Printing)	
Project Supervision (Architect or Other)	
Construction (including site and off-site work, general, plumbing, heating, air conditioning, ventilation, electrical, elevators, connecting utilities, etc.)	2,631,310
Contingency Fund	
Fixed Equipment (outside the construction contract) to be purchased directly by the applicant	2,580,000
Movable Equipment	126,356
Consultant Fees (feasibility, financial, management studies and surveys)	
Legal Fees	
Insurance (Premium) During Construction	
Permit Fees (State/Local)	
Interest During Construction	305,156
Federal Agency Finance/Service Fees (FHA/HUD, SBA, FmHA, etc.)	
TOTAL ESTIMATED CAPITAL EXPENDITURES	$ 5,917,822

A. DESCRIPTION: Describe the proposed expenditure or action together with the program of services which will be made possible or otherwise affected by the proposal.

1. Provide an itemized list of the capital costs to be incurred. Use the format shown on the preceding page. The list shall include all costs related to this project which will be capitalized in accordance with generally accepted accounting principles and might include, but not be limited to, the costs of land, land improvements, buildings, fixed equipment, movable equipment, furniture and fixtures, capitalized interest during construction and capitalized legal, accounting, engineering and architects' fees.

   See preceeding attached page.

2. Fully describe the program of services to be offered as a result of the proposal. If the proposal results in a modification of existing services offered by the applicant, such modifications (increases or decreases of services) should be disclosed and discussed.

The purpose of this Certificate of Need is to acquire a Magnetic Resonance Imaging unit at the Maine Medical Center. The Maine Medical Center has been evaluating the need and the demand for magnetic resonance imaging at this hospital for approximately two years. As a result of the review of the literature, site visits, and actual patient experiences, we feel certain that Magnetic Resonance Imaging has clinical efficacy and is the diagnostic modality of choice for a wide and ever-growing range of medical conditions.

Magnetic Resonance Imaging has become a necessary component of any up-to-date, tertiary care medical center. The clinical sections enclosed below document the scanner's usefulness in a wide variety of clinical settings including the central nervous system, chest, abdomen, pelvis, musculoskeletal, and cardiovascular systems and for pediatric patients. Also, the clinical sections include material on recent and future developments in MRI, illustrating the fact that the range of applications has expanded and will continue to expand based on progressive refinements in the technology.

This application is primarily intended to serve selected inpatients of the Maine Medical Center. We also believe that the scanner can serve inpatients from other hospitals. In addition, the scanner will provide services on an outpatient basis for patients unable to receive a scan at Maine Magnetic Imaging (MMI) because of MMI's scheduling backlog. We believe this application is vital to the continuing function of the hospital as the State's only full service, tertiary medical center.

We currently have an arrangement with Maine Magnetic Imaging which allows us to transport seriously ill inpatients to MMI. This is an interim, very much suboptimal arrangement. It in no way reflects a solution to our inpatient and outpatient needs.

Following is a discussion of the clinical basis for MRI and a discussion of MRI's clinical applications.

OVERVIEW

Magnetic Resonance Imaging (MRI) also known as Nuclear Magnetic Resonance (NMR), is a powerful diagnostic tool that utilizes radio-frequency energy and magnetic fields to perform cross-sectional imaging. Upon first inspection, MRI images closely resemble those produced with X-ray computerized tomography (CT). There are important differences, however, not the least of which is that MRI does not employ X-rays or other ionizing radiation. The radio-frequency waves used in MRI have no known deleterious effects upon biologic tissues, and this modality is safe even for pregnant patients. Also, MRI provides much better contrast resolution than CT, with up to a several thousandfold improvement in contrast resolution, with spatial resolution that closely rivals that of CT. MRI also is unimpeded by bone and allows for the direct acquisition of scans in multiple planes without having to place the patient in difficult or uncomfortable positions, or use post-acquisition reconstruction techniques that grossly degrade resolution. Overall, the potential resolving power of MR is far greater than CT, and this newer modality provides a far more sensitive examination for detecting disease in many parts of the body.

Magnetic Resonance is a physical process initially observed in the 1930's by Rabi, and further evaluated in the mid-1940's by Purcell and Bloch, who received a Nobel prize in 1951 for their work. Briefly, atomic nuclei that have unpaired protons or neutrons have magnetic properties and behave like small magnetic dipoles or bar magnets. These nuclei also have inherent spin, and when placed in a strong magnetic field will line up and precess or spin with the field. The spin frequency of any particular type of nucleus depends on its magnetic properties, as well as the strength of the applied magnetic field. When radio-frequency energy of a particular frequency (known as the Larmor or resonant frequency, and which matches the spin frequency of the nucleus being studied) is applied, the spinning nuclear dipoles are tipped away from alignment with the magnetic field, in this way absorbing energy. When the radio-frequency pulse is terminated, the spinning nuclei return to their original alignment with the applied magnetic field, and in doing so, emit energy, again in the form of radio frequency energy at the Larmor frequency. The intensity of these emitted radio-frequency waves will vary depending on the chemical environment and concentration of the target nuclei. These radio-frequency signals form the basis of magnetic resonance imaging in that they can be detected by very sensitive radio-frequency receiving coils, or antennae.

For the past three decades, MRI has been utilized in a laboratory setting for studying the composition of chemical solutions. In the early 1970's, the first applications of MRI to clinical medicine were developed by Damadian & Lauterbur, the latter being the first to propose that imaging could be performed with Magnetic Resonance. Crude images of humans were being performed by 1977, and in 1980 a group from Nottingham, England produced the first successful image of the human brain. By 1981, a group from the Hammersmith Hospital in London published the first high-quality images of the human brain. Since that time, there has been very rapid development in MRI technology, and there are currently at least

7 or 8 vendors that have developed MRI scanners capable of producing good clinical images. The vendors have continued to upgrade their equipment, and even in the past 12 months there have been many technological break-throughs in Magnetic Resonance Imaging, such that overall image quality (contrast resolution and spatial resolution), image acquisition time and flexibility, have improved significantly over the performance of scanners one year earlier.

MRI is a very powerful diagnostic tool that has already had a significant impact on medical practice. As discussed above, it is a much more sensitive imaging modality than CT. This relates to the fact that MRI does not, like CT, rely on a single parameter, such as tissue density, to differentiate one tissue from another, and healthy tissue from disease. Instead, MRI reflects the chemical environment of the tissue being studied, as well as the concentration of hydrogen nuclei or protons. The hydrogen nucleus is currently being used for clinical MRI because of its abundance and favorable magnetic properties. Other nuclei, such as sodium or phosphorus, may also prove useful for imaging or spectroscopy, which is equivalent to in vivo chemical analysis.

As a much more sensitive tool, MRI is a better patient evaluation procedure than CT or other imaging techniques. This is particularly true in the head and spine, but also in many of other parts of the body, including the abdomen, pelvis, chest, and musculoskeletal system. This means that MRI can spare the patient from having a sequence of less sensitive studies some of which may be invasive or require hospitalization, to exclude pathology that easily could be ruled out by a single test - MRI. This greater efficacy, compared with other techniques, means that MRI is the most cost-effective exam for many pathologies.

MRI is virtually non-invasive. Although contrast agents will be developed, these will not have the same toxicity as those used in CT, angiography and myelography. This relates to the fact that MRI contrast agents are effective not because they are imaged directly, but because of their effect on the magnetic environment of the tissues being studied. This effect can be achieved with a very small amount of contrast agent, which will have little or no toxicity. Also because MR has such superior inherent contrast resolution, the use of contrast enhancement agents will be much more restricted than with CT.

There are limitations to MRI that must be understood to assess its proper role in clinical practice. Currently, acquisition time of MRI studies is slow compared with CT, several minutes versus a few seconds for a single CT slice, though a single MRI acquisition does include multiple slices, usually 5 to 15. The slowness of acquisition does require considerable patient cooperation because patient motion, as with CT, will seriously degrade image quality. This means that very sick or uncooperative patients, particularly in the setting of acute trauma or intensive care, will still require CT services. Also, because of the large magnetic field, patients with cardiac pacemakers or cerebral aneurysm clips that might possibly move under the influence of the magnetic field, should not be imaged with MRI. In addition, much of the life support apparatus and anesthesia equipment currently in use are

generally not compatible with the MRI environment. For these reasons, as well as the fact that CT can often add specificity by identifying calcifications or acute blood not seen with MR, the two modalities should be considered complementary and not necessarily competitive.

Magnetic Resonance technology continues to evolve rapidly, particularly in the past year. To the basic spin echo techniques that have been used over the past 4 or 5 years, there have been added much faster gradient echo imaging, plus motion reduction software and flow imaging, the latter allowing for visualization of blood vessels in a format that resembles angiography though without use of any contrast. Newer techniques have expanded applications in the central nervous system and elsewhere, and allow for improved through-put for all applications. Squared-pulse techniques allow for near gapless multi-slice imaging with markedly improved image quality because of increased signal collection. These remarkable advances, including software and hardware modifications, have been added to Magnetic Resonance scanners without there being any appreciable change to the magnet itself, which is the most expensive component of the MRI system. This has kept the recent advances in MRI technology within a reasonable cost and, for the most part, has allowed for upgrading of the technology without wholesale obsolescence of units placed even 3 or 4 years ago. It appears that this further refinement of MRI technology will continue in the future, with continued broadening of applications based on system upgrades. The current, as well as future utility of MRI, is discussed in the sections on Clinical Applications which follow.

CLINICAL APPLICATIONS

Central Nervous System

MRI is clearly the most sensitive modality for imaging most central nervous sytem pathology. Because of the ability to vary imaging parameters, MRI has much greater sensitivity to differences in tissue composition and enhances the contrast between suspected pathology and background. Because most pathologic lesions are accompanied by an increase in tissue fluid, different pulse sequences can be selected to maximize the contrast between normal and pathologic tissues.

MRI has been recognized as a major advance in the diagnosis and evaluation of patients with white matter disease. The basic abnormality seen with MR is an increase in signal intensity. In patients with multiple sclerosis (MS), many more lesions are detected by MRI than by CT and MRI has proved to be helpful in establishing the diagnosis of MS in cases where the clinical diagnosis is not definite. MRI has made MS easier to diagnosis at an earlier stage and Edwards has shown a highly significant relationship between MRI and the severity of clincal disease.

MRI is more sensitive than CT in detecting and determining the extent of white matter disease, or leukoencephalopathy in an elderly population. MRI has clearly shown that parenchymal disease is far more common in elderly patients than suggested by CT. MR changes can be specific for a vascular dementia, as a primary degenerative dementia such as Alzheimer's disease will show a different distribution of abnormality. In addition, Drayer has shown that MRI can provide a sensitive method for mapping the normal and pathologic distribution of iron in the brain. A variety of nervous system degenerative disorders such as Parkinson's Disease show a characteristic up-take of iron. This effect, combined with the characteristic atrophic changes seen in a variety of these degenerative diseases make specific diagnoses possible, and correlate structural defects with functional deficits.

MRI offers unique advantages in the evaluation of cerebral ischemia. Because of ischemia's association with changes in water content, MRI can better detect subtle changes that are insufficient to alter X-ray attenuation and show up on a CT scan. The experimental model suggests that ischemia might be detected within one hour of onset. MRI is clearly the procedure of choice for the evaluation of vertebrobasilar disease with infarction. Small infarctions of the brain stem are now routinely visualized. MRI can better define chronic infarcts as well.

The critical issue central to the role of MRI in cerebral infarction is the ability to separate acute ischemia from hemorrhagic stroke due to hypertension, rupture of arteriovenous malformations or a bleed into a small tumor. Until MR is able to differentiate acute hemorrhage from bland infarct, it will not completely replace CT in their evaluation, as the treatment of these patients depends to a significant extent upon whether the infarct is bland or hemorrhagic. This should only be a problem in the most acute setting after which time the hemorrhagic focus becomes bright on all MRI parameters. Subacute and chronic hematomas are accurately identified with MRI. Similar findings have been seen with hemorrhagic cortical infarct. It has been suggested that signal heterogeneity combined with diminished hemosiderin deposition, delayed hematoma evolution, and persistant edema suggests malignancy as the cause of intracranial hematoma.

The single clinical setting in which CT is clearly better at depicting bleeding is that of acute subarachnoid hemorrhage. However, MRI may be of use in detecting the actual aneurysm in these cases. High spatial detail permits detection of flow void within the aneurysm, and increased signal intensity associated with thrombus (methemoglobin) within all or a portion of the aneurysm may also be seen. Location, morphology, and mixed signal intensity in a concentric lamellar arrangement are often specific for aneurysm. MR is equivalent and perhaps superior to contrast enhanced CT in demonstrating the racemose entanglement of arteries and veins that characterize vascular malformations. Cryptic vascular malformations are clearly evaluated by MRI. They are often indistinguishable from slowly growing tumors by CT but by MRI the mixed signal intensity on all sequences is relatively specific.

The diagnosis of major venous sinus thrombosis or occlusion can be made easily with MR because of the abnormal signal intensity that replaces the void of normally flowing blood, most commonly in the superior sagittal or sigmoid venous sinus.

For evaluation of acute trauma CT remains superior to MRI because of the practical problems of patient handling. However, MR often demonstrates coexisting acute and chronic hematomas or small hypothalamic and brain stem infarcts. MR was far superior to CT in detection and characterization of subacute injuries, including shearing injuries, hemorrhagic and non-hemorrhagic contusions and subdural hematoma. Also, the potential to diagnose carotid artery dissection in the acute phase with MRI will help to prevent embolic stroke. The thrombosed dissection can then be followed to complete resolution.

MR is extremely useful and far superior to CT in the diagnosis of acute spinal cord injury and also demonstrates potential in predicting neurologic recovery. In addition, MR clearly differentiates the various causes of post traumatic progessive myelopathy and eliminates the need for a delayed intrathecal contrast enhanced study. 20 to 30 percent of post traumatic quadraplegic patients show slow progression of neurologic impairment months to years after the acute episode. MR is able to differentiate between myelomalacia without cystic degeneration, multicystic degeneration which responds poorly to cervical decompression, and a uni-cystic degeneration which can be effectively treated surgically.

In the evaluation of tumors, MRI is clearly more sensitive than CT in detecting the tissue changes resulting from intracranial neoplasms. The superiority results not only from optimal anatomic delineation in multiple planes, but improved capability to detect altered tissue constituents before there is morphologic change. MRI can identify tumor volume not detected by CT. In addition, the interface between abnormality (tumor plus edema) and normality is depicted much more clearly by MR than CT and conversely MR shows normal brain tissue in areas considered suspicious by CT. This is particularly evident with lower grades of glioma and with tumors that tend to infiltrate adjacent edematous brain tissue such as oligodendrogliomas.

With the use of paramagnetic contrast agents such as gadolinium/DPTA, the delineation of tumor will be improved. This may be especially important for diagnosis of tumor recurrence or to differentiate tumor from scar tissue. Gadolinium shows some promise in being able to differentiate subacute from chronic ischemia. Also, gadolinium-DTPA should improve the ability of MR to detect extra axial lesions such as meningioma, delineate their extent, and characterize their benign vascular supply. Although CT with contrast enhancement affords easy recognition of meningiomas, multiplanar MR imaging allows the extent of the tumor mass to be delineated more completely and enables internal and peripheral vascularity, arterial encasement, and venous sinus invasion to be imaged noninvasively, findings not frequently available with CT. Paramagnetic contrast agent enhance these capabilities.

MR is more sensitive than CT for detecting intracranial abscesses and other infectious lesions. This is particularly important in patients with AIDS who frequently develop CNS infections. The cerebral atrophy which is associated with AIDS, and which is often accompanied by focal virus-laden lesions, is well depicted by MR.

MR is especially useful in the posterior fossa and at the cervical-cranial junction. Advantages include the lack of artifacts caused by bone, and the ability to obtain direct coronal and sagittal views. With the more recent ability to obtain thin sections, subtle brain stem abnormalities are now evident. There is maximum brain stem/CSF contrast that for the first time enables visualization of cranial nerves and nuclei. Subtle mass effects on CSF structures are much more clearly visualized by MR than CT.

Because high resolution images can demonstrate specific nerves in the internal auditory canal, MR is the study of choice for the diagnosis of acoustic neuroma (tumors of the VIIIth cranial nerve). MR is often more helpful than CT for characterization of neuromas, epidermoids, exophytic gliomas, and vascular lesions. The relationship of a vascular mass to adjacent neurological structures is more clearly defined with MR than CT. However, CT is more informative than MR for localizing and determining the extent of non-neoplastic masses when they produce bony erosion, for example with cholesteatoma of the middle ear.

In the region of the sella turcica and pituitary gland, MR is clearly superior to CT because of its ability to better define the peri- and supra-sellar anatomy, especially distortion of the optic chiasm, pituitary infundibulum, third ventricle, and carotid arteries. Vascular abnormalities such as aneurysms are easily excluded, which obviates the need for an angiogram in many of these patients. While MR and CT may be equal in detecting macroadenomas of the pituitary, MR imaging permits better delineation of lesions that are hypodense on CT. For example, craniopharyngiomas and hemorrhagic pituitary adenomas and those that contain fat can be more specifically characterized. Coronal MR views are free from bony artifacts and allow very precise delineation of lesions that arise from the hypothalamus and 3rd ventricle. While MR is less successful in detecting masses that do not enlarge the sella, the use of thin slices and paramagnetic contrast may improve the sensitivity of MR for microadenoma detection. CT is better in the evaluation of calcification.

In those patients with hydrocephalus, MR depicts flow related phenomena in the ventricular system and provides dynamic information regarding the possible level of obstruction. Because the flow void is present in the aqueduct of Sylvius in all patients without hydrocephalus, its absence is diagnostic of obstruction. MR also has greater ability to diagnose the cause of obstructive hydrocephalus because it can show small obstructing lesions that are not depicted by CT and because the mass effect of the distended supratentorial ventricles produces anatomic changes that are delineated by MR. Gammal et. al., claim that these findings can differentiate non-obstructive hydrocephalus from atrophy.

CNS lesions in neonates and infants are better evaluated with MR. The lack of ionizing radiation is particularly important as there is often the need for many follow up examinations. Because of the unique sensitivity of MRI to changes of maturation, delayed myelination as a result of ischemic insult is easily recognized and abnormal neurologic outcome predicted. In older children and young adults, MR scanning is the imaging technique of choice in the diagnosis of temporal lobe epilepsy because of MR's ability to image gliosis and subtle tumors. Coronal imaging by MR can detect unilateral temporal lobe atrophy, also associated with seizures.

Multiplanar imaging enables MRI to diagnose developmental abnormalities of the brain. Agenesis of the corpus collosum is easily visualized. Sagittal and coronal views are especially useful in delineating the relationship of fluid cavities to normal brain structures. The signal intensity of fluid within cystic structures depends on the protein content, so that it becomes easy to differentiate true CSF containing structures, which have less signal than proteinaceous cysts.

The Arnold-Chiari abnormality is shown much better on sagittal MR than on CT and sonography, allowing the precise delineation of posterior fossa structures and the degree of tonsillar ectopia. The commissures and recesses of the third ventricle can also be seen on the MR scan.

MRI is considered the technique of choice for evaluating suspected spinal dysraphism such as myelomeningocele. MR can determine the feasibility of surgery and in cases where MR and CT were compared, CT offered no new information. Although CT may in some instances give superior spatial delineation of cord and nerve root morphology, intrathecal contrast is required as is heavy sedation in younger patients. These are not required with MR.

Because of MR's unique ability to image flow, it is best suited to evaluate syringomyelia. While most syrinxes appear similar by CT, MR can detect pulsitile motion within the cavity and suggest syrinx progression. Because intramedullary cavities are usually indistinguishable from cord tumors as both show cord expansion with CT, MR is the only effective means to differentiate these other than intraoperative sonography. MR can easily differentiate demyelination from tumors and cysts. In addition, the communication of the cavities with the fourth ventricle can be ascertained. Also, successful decompression and followup of hydromyelic cavities may be seen with MR.

MR is superior to any other imaging modality in the evaluation of spinal cord pathology. Areas of cord compression are readily identified non-invasively on a single sagittal image. Because the normal high signal intensity of bone marrow is altered by any infiltrating process, tumor invasion can be separated from vertebral collapse secondary to bony demineralization. Retropulsed fragments with spinal cord compression are well shown. In patients with suspected osteomyelitis, MR can directly visualize the derangement of the intervertral disc and vertebral body and differentiate the cause of the extradural mass from tumor. Tumors and cysts within the spinal cord can easily be differentiated from tumors that are displacing the spinal cord from without.

MRI is more sensitive than CT to degeneration of the intervertebral disc, especially in the lumbar spine, because of the loss of water content in the degenerating disc. In this medical community MR is now clearly the study of first choice in the work up of disc herniation, and the neurosurgeons at our hospital will in the majority of cases operate based on MR images alone without the need for CT and myelography. MR spine images will continue to improve wth newer techniques. These produce images that are analogous to "myelographic" images with the spinal cord of relatively lower signal intensity relative to the bright CSF ie., a high contrast CSF - dural interface. Thinner, gapless sections eliminate partial volume averaging and oblique imaging with surface coils demonstrates the complex anatomy of the cervical neural foramina in various planes nonivasively.

Ear, Nose, and Throat (ENT):

MR provides better anatomic definition of soft tissues in the deep compartments of the neck and nasopharynx as a result of the high level of tissue contrast and lack of bone artifact. There is therefore excellent visualization of the numerous foramina and fissures of the skull base connecting the intracranial and extracranial compartment. Tumor extension directly through these anatomic routes can be visualized. Hypervascular tumors may have numerous "channel voids" caused by high flow vessels and enable their differentiation from the more bland appearing hypovascular neoplasms. Lymph nodes are more easily differentiated from muscle especially when surrounded by fat. At the skull base, CT will remain a complimentary study when there is extensive bony destruction. Because of the increased spatial and contrast resolution, imaging of the laryngeal structures is well suited to MRI. The high fatty content of the parotid gland and visualization of the facial nerve helps in surgical planning and clearly enables differentiation of extra- and intra-parotid masses.

Orbit:

With the use of surface coils, MR should become the primary imaging technique for evaluating orbital pathology. Information not available on CT includes a) identifying lesions in the orbital apex, superior orbital fissure and optic canal, b) differentiating inflammatory pseudotumor from malignancy in clinically similar patients, c) characterizing lesions containing hemorrhage or other paramagnetic material, d) defining the posterior extent of optic pathway glioma, and e) detecting abnormal flow in intraorbital vascular structures. MR is very specific for characterizing orbital pathology, for example retinoblastoma from Coat's disease, a disorder of abnormal vascular proliferation in the retina.

Pediatric Imaging:

MR is non-invasive and does not employ ionizing radiation. This is a particular advantage for pediatric imaging. Already its utility in defining a broad range of Pediatric diseases has been demonstrated. With advancing understanding of this modality, and the addition of further improvements such as fast scanning, and paramagnetic contrast agents, we can anticipate even greater utility.

The initial clinical usage of MR in pediatrics related to the central nervous system because the images were not degraded by cardiac or respiratory motion. In the brain, MR is able to detect abnormalities of myelination which makes it useful in evaluating premature infants with periventricular leukomalacia, which is the second-most common cause (after neonatal intracranial hemorrhage) of cerebral injury in premature infants. It is also useful in evaluating Pediatric patients with a number of other demyelinating diseases. MR has been demonstrated to be equal to or superior to CT in diagnosing intracranial tumors, especially those in the posterior fossa and brainstem, and developmental abnormalities of the brain and spinal cord, such as Arnold-Chiari II malformation, or syringomyelia. MRI has been demonstrated to be of significant value in imaging patients with tuberous sclerosis. In child abuse, MR appears to offer a definite advantage over CT in the detection of milder forms of injury, and may therefore play a key role in the initiation of protective intervention.

MR has been shown to be efficacious in the diagnosis of a variety of spinal cord lesions, such as tethered cord, post-traumatic lesions, and tumors. In many instances, MR replaces the more invasive and time-consuming alternatives, myelography and CT myelography.

Use of MR in the evaluation of pulmonary parenchymal disease was initially viewed with skepticism because the long scan times resulted in degradation of the images by respiratory motion. More recently, the experience has been promising, and in some cases, MR has provided diagnostic information unavailable by any other means. Detectable entities include a wide range of parenchymal lung diseases such as cystic adenomatoid malformation, lobar emhysema, lymphangectasia, sequestration, arteriovenous malformation, inflammatory disease, congestive heart failure, pulmonary infarction, and metastatic disease. MR is especially effective in demonstrating hilar lymph nodes and bronchiectasis in patients with cystic fibrosis. MR has proven usefulness in evaluating patients with mediastinal masses, especially those in the posterior mediastinum such as neuroblastoma, which may extend into the spinal canal.

Cardiac imaging holds much promise since the advent of EKG gating. As noted, MR is a multiplanar imaging modality capable of producing obliquely oriented images. This is of distinct advantage in imaging the heart which is a complex, asymmetric structure. Abnormal chamber enlargement, myocardial hypertrophy, septal defects, and abnormal vascular connections can all be identified. MR is an excellent means of identifying and delineating vascular rings. Other congenital anomalies of the aortic arch such as anomalous right subclavian artery and aortic coarctation can also be imaged.

MR is a sensitive and reliable method for imaging of abdominal and retroperitoneal masses in children. It appears to be equal to CT in the evaluation of retroperitoneal adenopathy in patients with lymphoma. Tissue characterization and better visualization of blood vessels may eventually prove to be a distinct advantage. It can accurately define displacement, encasement or invasion of major blood vessels by Wilms' tumor and neuroblastomas. It is superior to CT in detecting local spread of tumor in many cases. These features help to determine surgical resectability in staging. Benign lesions such as undescended testes, cystic teratomas, and congenital anomalies of the female internal genitalia can also be imaged well.

In the musculoskeletal system, MR has a myriad of applications. It is useful in evaluating the bone marrow of patients with leukemia or certain anemias. MR is equal to, and in some cases superior to, CT in detection of marrow and soft tissue involvement in patients with osteogenic sarcoma or Ewing's sarcoma. As in the abdomen, MR has some advantage over CT in identifying the relationship of tumor to blood vessels. MR is a valuable modality for the follow-up of patients after treatment of musculoskeletal tumors. Other applications include avascular necrosis and osteomyelitis.

Abdominal, Pelvic and Thoracic Applications:

MRI has already demonstrated its ability to make important and unique contributions in the diagnosis of diseases of the abdomen, pelvis and thorax. In certain areas it has the capacity to predict tissue as being either benign or malignant; superior contrast resolution allows more accurate lesion detection; multiplanar imaging offers an additional significant advantage over computed tomography for lesion analysis and surgical planning. A brief summary of the current uses for MR in body imaging follows.

MRI offers superior lesion detection of liver metastases as compared with nuclear medicine, CT or ultrasound. This is of critical importance in evaluating those patients who might be candidates for surgical resection of limited hepatic metastases. This improved detectability occurs without the need for intravenous contrast infusion and its attendant risks as is the case with CT.

MRI has a striking capacity to detect and tissue characterize the most common occuring benign liver tumor, the hemangioma. This also can be accomplished without the use of IV contrast agents.

Preliminary data published by the National Institutes of Health, and confirmed elsewhere, suggests that the signal appearance of adrenal metastases differs from benign adrenal tumors. This is a property unique to MRI and distinguishes it in an important way from CT which has been the major way to image the adrenal glands until recently.

Investigative work holds promise that MR imaging may help in distinguishing renal transplant rejection from other disorders of the transplanted kidney. This is a common problem and an important clinical issue in these patients. MR has been supplementary in the evaluation of lesions felt to be indeterminate by ultrasound and CT.

Intrabdominal hemmorhage has a nonspecific appearance on CT scans. Inflammatory processes and tumors are similar in their CT appearance. MR's unique ability to characterize tissue properties allows the accurate identification of intrabdominal bleeding and other processes. Multiplanar imaging acquisition, especially in coronal, sagittal and oblique planes without loss of image resolution offers a significant advantage over CT in the assessment of anatomic relationships that can be important in diagnosis as well as treatment planning - both surgical and by radiation therapy.

Vascular structures are dramatically visible without the need to administer IV contrast agents. MR is ideally suited for the assessment of the relationship of an abdominal aortic aneurysm to the renal arteries. This is routinely required by vascular surgeons and has necessitated the need for invasive angiographic procedures prior to the availability of MRI.

The patency of surgical vascular shunts can also be determined by MR. Angiography can be quite difficult and involved in this assessment, especially for spleno-renal shunts. MRI seems to offer a far less invasive means of evaluation.

MRI is unique as an imaging modality in being able to readily differentiate the internal anatomy of the uterus. The cervix, endometrium and myometrium are readily differentiated from one another. This offers a unique and clinically useful method of preoperatively staging cervical and endometrial cancer. Physical examination and CT can predict tumor extent beyond the confines of the uterus, but MR seems to have the ability to accurately assess tumors limited to the uterus.

The common uterine fibroid is readily seen by MR. In patients with unusual vaginal bleeding MR has been able to detect nonpalpable fibroids which were unseen by ultrasound.

The characterization of abnormal pelvic tissue as endometriosis is possible by MRI imaging. This relates to MR's unique ability to characterize blood by its signal properties.

Contrast resolving properties of MR allow a depiction of the prostate which is far superior to CT. Preliminary work indicates a role for MR in the assessment of extent of prostate cancer.

Rectal cancer staging by MR seems to be more accurate than CT. This is primarily related to improved contrast resolution in the perirectal fat.

The major current applications of MR in the thorax relate to the mediastinum. MR is helpful in the evaluation of the questionably abnormal pulmonary hilus as seen by X-ray and CT. It can easily differentiate the normal blood vessels in this region from non-vascular structures. It is particularly useful in studying patients who must not be given IV contrast materials, which is often necessary in CT scanning.

Musculoskeletal MRI:

MRI has proven beneficial in the study of a variety of musculo-skeletal disorders. These include: (1) osteonecrosis, (2) malignancy, including soft tissue and bone neoplasms, (3) infection, including soft tissue inflammatory processes and osteomyelitis, (4) trauma, including intra-articular and extra-articular abnormalities, (5) diseases of bone marrow, including aplastic anemia, Gaucher's, sickle cell anemia, etc., and (6) arthritis.

MRI has been employed successfully to evaluate patients with suspected osteonecrosis relating to the femoral head, distal femur, proximal tibia and carpal bones. Osteonecrosis is a serious medical problem in the United States today. Multiple etiologies exist, including collagen vascular diseases, alcoholism, pancreatitis, sickle cell disease, trauma, and steroid usage. MRI has led to improved diagnostic ability for osteonecrosis, in terms of both sensitivity and specificity, when compared to conventional imaging modalities; ie., plain films, computerized tomography and radioncuclide bone scintigraphy.

The detection of osteonecrosis early on by MR can lead to a significant decrease in morbidity and expense via earlier therapeutic intervention and possibly arrest of the process before bony collapse. In addition, MRI appears to be useful in monitoring therapeutic regimens in such patients. Given the multitude of causes for ostenonecrosis, it is anticipated that MRI will prove useful in a wide variety of patients, both in-house and out-patients.

MRI has an ever-increasing role in the diagnosis and therapy planning of patients with primary or secondary bone neoplasms and soft tissue malignancies. MRI has proven to be significantly better than computerized tomography, angiography, and radionuclide bone scintigraphy in determining extent of disease. With respect to bone tumors, intraosseous and extraosseous involvement is better delineated on MR images. MRI has proven superiority in demonstrating exquisite soft tissue contrast. This makes it ideal for imaging of soft tissue neoplasms, which have otherwise been difficult to evaluate. Additionally, MRI has shown the potential to monitor post-therapeutic changes, with signal changes becoming evident before a decrease in tumor size. The prominent role of MRI in such patients is, therefore, quite obvious and, in fact, MRI has become a necessity for state-of-the-art evaluation of bone and soft tissue tumors.

Infections of the musculoskeletal system are demonstrated clearly by MRI. Soft tissue abscesses, osteomyelitis, joint and tendon sheath effusions and cellulitis are well depicted, allowing the correct diagnosis of presence and extent of infection. MRI is as sensitive as radionuclide bone scintigraphy in demonstrating osteomyelitis and is more specific and more sensitive than other scintigraphic techniques in demonstrating soft tissue infections.

MRI has proven useful in diagnosing a variety of intra- and extra-articular post-traumatic abnormalities. Recent technologic advances have made high resolution MR imaging of the knee feasible, including the detection of ligamentous and meniscal injury. In addition, high resolution surface coil technology has permitted the evaluation of such joints as the wrist, elbow, shoulder, ankle and hip. A variety of abnormalities have been elucidated, including ligamentous, musculo-tendinous, and cartilage tears, joint effusions, tenosynovitis, and fractures. It has proven to be extremely valuable in preoperative planning in such patients, and its role should increase with ever-improving MR technology.

Diagnosis and monitoring of bone marrow diseases with radiographic methods have not been of great value, owing to the insensitivity of existing techniques. However, MR imaging has brought bone marrow disorders into the realm of the radiologist. The high fat content of marrow results in a high signal intensity, allowing noninvasive evaluation of the composition of bone marrow when fatty marrow is replaced by cells of another origin. This has been used successfully in patients with aplastic anemia, sickle cell anemia, Gaucher's disease and osteopetrosis. MR has proven to be a useful adjunct in monitoring therapy in such patients, and in differentiating acute from chronic processes; e.g. infarctions. Its role in such patients can only be expected to increase, as its ability to diagnose and follow such patients becomes established.

The last musculoskeletal area to be discussed is the role of MRI in articular disorders. In general, this involves either the use of MR arthrography with Gadolinium-DTPA, or MRI alone without contrast. Erosive changes have been imaged without the need for contrast medium. MR arthrography allows the diagnosis of less severe intra-articular cartilage abnormalities; eg. ulceration and denudation. Its potential in this area is still being explored, though it is anticipated that MRI will prove extremely valuable in patients with arthritic diseases. An important area of application is in patients with cervical spine disease, particularly those with cranio-cervical or atlanto-axial abnormalities, most commonly rheumatoid arthritis patients. MRI in this region has obviated the need for difficult and time-consuming plain films and CT-Myelography.

In summary, MRI of the musculo-skeletal system is superior to other diagnostic imaging modalities in a variety of disease processes. Its potential role in patients with arthritis is expanding and still being researched. It is anticipated that musculoskeletal applications would be second only to CNS-spine utilization.

Cardiac MRI:

Magnetic Resonance offers a new dimension in cardiac imaging. It is a technology that is still developing and expanding, but already has proven applicability and is the imaging modality of preference for some cardiac applications. Its advantages include: (1) inherent contrast differences between mediastinal tissues (fat, muscle, air and moving blood); (2) lack of ionizing radiation; (3) no need for adminstration of contrast agents to depict anatomy; (4) no attenuation of signal or limitation of view as in nuclear medicine and ultrasound; and (5) improved great vessel visualization.

With gating of the image acquisition to the electrocardiogram, the resolution has become excellent. Newer methods will allow for cinegraphic displays, such that wall motion, blood flow, and even some valvular motion, will be displayed. Many of these functions can be obtained with ultrasound or nuclear medicine at this time. However, there are instances when these studies are not definitive, and questions are unanswered. Magnetic Resonance will be able to complement these procedures and further clarify the pathology.

At the present time, there are proven applications for Magnetic Resonance in congenital heart diseases, evaluation of the pericardium and myocardium, and in evaluating the great vessels and luminal abnormalities.

New fast scanning techniques are now making ventricular wall motion evaluation with Magnetic Resonance a reliable technique. The multiple image planes and global picture available with Magnetic Resonance makes it extremely valuable in complex congenital heart disease. Without being invasive or using ionizing radiation, MRI gives a global anatomic picture that cardiac catheterization studies cannot provide. Because of its global image of the heart, post-op evaluation of corrected complex congenital heart disease is much more clearly evaluated. It is the imaging modality of choice for great vessel anomalies. This is particularly true of coarctation of the aorta, which many times cannot be evaluated with ultrasound, particularly in the adult.

The intrinsic contrast between mediastinal and subepicardial fat and the pericardium allows for visualization of pericardial diseases that has not been present before with angiography, C.T. scanning, or echocardiography. Magnetic Resonance will allow for evaluation of pericarditis, both acute and chronic, and also tumor invasion. Tumor invasion can be characterized, both as to extent in the mediastinum and into the myocardium. Pericardial effusions can be evaluated, not only in size, but also as to protein content and blood.

Myocardiopathies, both acute and chronic, can be evaluated, such that wall thickness and chamber size can be measured. Hypertrophic cardiomyopathies, inflammation and edema, as well as fibrosis, are visualized with Magnetic Resonance.

There are cases where echocardiography cannot define intracardiac filling defects, such as thrombi or cardiac tumors. Magnetic resonance has proven to be reliable in clarifying these lesions. Because of long acquisition time and expense, it is not the initial procedure of choice and will be used as a complementary procedure when other modalities are inconclusive.

Wall thinning due to previous infarcts is well demonstrated with Magnetic Resonance. Wall motion evaluation with the newer fast scanning cine techniques is becoming a reality. The inferior and posterior walls, which are difficult to see with echocardiography and nuclear medicine, may be best evaluated with Magnetic Resonance. Differentiating ischemic from infarcted myocardium is a topic that is receiving extensive study. A global picture of cardiac aneurysms can be obtained with Magnetic Resonance. It will complement the echocardiogram for demonstration of thrombus formation on the cardiac walls.

Magnetic Resonance is the procedure of choice for evaluating congenital vascular anomalies that are difficult to see with echocardiographic techniques due to lung interposition. In coarctation of the aorta it will obviate the need for catheterization to describe the anatomy. Aortic dissections and aneurysms, both in the chest and abdomen, are well suited to Magnetic Resonance. Flow, thrombus and luminal size, as well as wall thickness, can be seen in the multiple planes which are available with Magnetic Resonance Imaging.

Magnetic Resonance Imaging is a non-invasive technique that offers high resolution and provides new information and complementary information in many areas of cardiac and vascular abnormalities. Advances in technology are continuing. These technical advances can be incorporated into existing units and will further expand the applicability of Magnetic Resonance.

A complete Bibliography for the clinical application sections is enclosed in Appendix A.

Letters from specialists representing disciplines for which MRI has applicability are enclosed in Appendix B.

B. APPLICANT: Provide sufficient evidence to demonstrate that the applicant is fit, willing and able to provide the proposed services at the proper standard of care.

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1. Describe those personal or organizational characteristics possessed by the applicant that relate to provision of the proposed services at the proper standard of care.

The Maine Medical Center is a 598 bed community, referral, and teaching hospital, the only tertiary care hospital in the State of Maine. As the major referral center north of Boston the hospital serves a population base of over 1 million people and annually admits over 20,000 patients for an average daily occupancy of nearly 90 percent. In addition, emergency, clinical and diagnostic outpatient visits to Maine Medical Center number approximately 200,000 per year.

As a major teaching affiliate of the University of Vermont College of Medicine, Maine Medical Center offers over 35 ongoing educational programs which gives specialized training to nearly 120 as well as medical students each year and clinical training for more than 400 nursing students.

2. Discuss the circumstances leading to the applicant's decision to provide the proposed services.

MRI is fast becoming the diagnostic tool of choice for a wide range of conditions (described above). The clinicians at Maine Medical Center recognize the benefits and indications. A large number of clinicians have attended national meetings at which the uses of MRI have been highlighted. The literature too, confirms the value of MR to appropriate diagnosis and treatment.

The Certificate of Need granted the Maine Medical Center in 1986 only allowed for the performance of very urgent MRI studies on inpatients who were transferred to Maine Magnetic Imaging. It is estimated that at least one inpatient is scanned per day. This Certificate of Need attempts to address the significant portion of persons not now served because of the unavailability of MR services at the Maine Medical Center.

The schedule at Maine Magnetic Imaging has quickly filled. The schedule included 174 patients in January of 1987. In July of this year 325 patients were scanned in August, 342, September, 305, and October, 321. In recent months there have been over 300 patients awaiting scheduling. The schedule at MMI is now 7 a.m. - 11 p.m., M - F and three Saturdays each month.

3. Describe any special qualifications, authorities or competencies relating to the applicant's ability to provide the proposed services at the proper standard of care.

The radiologists at Maine Medical Center are well qualified based on their extensive experience with other diagnostic modalities and with their experience with MRI through Maine Magnetic Imaging. Curriculum Vitae for the radiologists are available if needed.

C. PUBLIC NEED: Provide sufficient evidence to demonstrate that there is a public need for the proposed services.

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1. The community or service area intended to be served by the proposal shall be adequately identified and accurately described.

The service area intended to be served by this proposal includes Maine Medical Center inpatients as defined in the utilization methodology below.

In addition to Maine Medical Center inpatients, the proposal will also serve inpatients from other hospitals located primarily in the following counties:

Androscoggin	Lincoln
Cumberland	Oxford
Kennebec	Sagadahoc
Knox	York

Thirdly, the proposal will serve Maine Medical Center and other outpatients.

2. To the fullest extent possible, a proposal shall be justified on the basis of meeting the unmet needs of the population within the community or service area proposed to be served. The applicant shall, to the greatest degree practical, supply information, preferably statistical in nature, which presents historical use patterns relative to the proposed program or services. Based upon the historical use patterns, the applicant shall provide a three-year projection of both future need and demand (utilization) for the proposal. All assumptions and sources of data shall be disclosed. The applicant shall attempt, if applicable, to reconcile or explain any differences between forecast need and demand.

The basic premise upon which this application is based is that there is a significant inpatient population at the Maine Medical Center which requires Magnetic Resonance. This proposal would meet the needs of this population. Using a standard methodology we have projected 1,339 inpatients in Year I of the application.

In addition, we also have projected inpatients from other hospitals who might require Magnetic Resonance. Using the same methodology we projected over 4,000 inpatient scans. We then made a conservative estimate that of this population, approximately 10% would be transferred to Maine Medical Center for MRI services, resulting in a figure of 421 additional scans.

The third factor that we considered in our projections is an estimate of outpatient utilization. Our experience, having visited many sites around the country is that no sites are doing more than 30% inpatient work, even hospital-based sites. We have projected a figure of 50% inpatient vs. outpatient scans for our site. This is a very conservative estimate in terms of what our experience has shown, yet this would bring our total to about 3,000 cases in the first year, a figure which would easily support an MR unit. Our figure of 3,000 scans per year is likely an underestimation because of the increased utilization in neurologic and especially non-neurologic areas.

We used 50% for outpatient utilization on the basis that there is already a closely associated scanner that is serving a portion of the outpatient need. In a sense we are completing the MR service availability in this community by adding an inpatient scanner to the outpatient unit already in place. In addition, the new scanner will likely have some differing characteristics that will make it superior for some regions of the body. This may lead to additional outpatient utilization for certain applications. MMI is currently operating at near capacity and there will be scheduling conflicts that will result in outpatients coming to the hospital as opposed to MMI.

Our projected utilization for Years I, II, and III total is as follows.

	YEAR I	YEAR II	YEAR III
MMC INPATIENTS:	1,339	1,473	1,620
OTHER HOSPITAL INPATIENTS:	421	463	509
OUTPATIENTS	1,339	1,473	1,620
TOTAL	3,099	3,409	3,749

Totals have been increased by 10% annually.

A description of the methodology follows as background to this Certificate of Need.

1. The MHA utilization model used in this CON is based on a determination of projected rates for current hospital discharge categories. Initially, a panel of Maine Medical Center physicians reviewed the diagnosis list obtained from the AHA for the projection of inpatient MRI utilization.

2. Once the diagnostic list was approved, utilization numbers for 1986 MMC discharges were obtained.

3. Rates for potential MRI utilization were determined by MMC radiologists for each of the diagnoses.

4. Projected MMC MRI procedures were than calculated. The data used and the resulting projections are shown in Appendix C.

5. Discharges were also obtained for these diagnoses, for patients from hospitals in the following counties: Androscoggin, Cumberland, Kennebec, Knox, Lincoln, Oxford, Sagadahoc, York. These counties were specifically chosen because our physicians felt that referrals would come from these hospitals. Projections were made for each diagnoses on this list. The discharges, utilization rates, and projections are also included in Appendix D.

It was felt that 10% of other hospital patients was an appropriate and conservative estimate of utilization of our MRI machinary. With the data obtained through the model, a 10% utilization figure would amount to 421 patients.

Outpatient numbers are difficult to project. In the site visits which MMC staff have made, outpatients could be as high as 85% of total volume for hospital-based MR sites. Because there is an MRI in Portland we have projected outpatient utilization as 50% of the total volume.

3. The need for the proposal shall be addressed from the perspective of the total community's or service area's point of view as well as the applicant's.

MRI is a service that MMC does not now provide. MMC is the largest hospital in the State of Maine and handles an intense inpatient caseload for which MRI would be a valuable diagnostic tool. The acquisition of an MRI would also have benefits to MMC outpatients from both local areas and more distant communities.

4. Describe the accessibility to the community or target population of the proposed project from the standpoint of geographic accessibility and availability of transportation.

MMC is accessible by major highways or avenues of transportation.

D. ECONOMIC FEASIBILITY: Provide sufficient evidence that the economic feasibility of the proposed services is demonstrated in terms of: Effect on the existing and projected operating budget of the applicant; the applicant's ability to establish and operate the facility or services in accordance with licensure regulations promulgated under pertinent state laws; and the projected impact on the facility's cost and rate and the total health care expenditures in the community and the State.

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1. Provide the proposed initial staffing plan, estimate of full-time equivalent units (hours, weeks, etc.) of work, anticipated rates of pay, gross payroll and fringe benefits, arriving at the total annual payroll cost applicable to the project. The initial staffing plan and estimates of full-time equivalent units of work shall be based upon and consistent with the projection of demand for the proposed program of services developed in response to question C(2).

MRI CON STAFFING:

Technical Staff - 5 Technologists

4 Staff RT
1 Chief RT

Other

Clerical
2 Receptionists
1 Transcriptionist
Transport
2 Transportation Aides
Housekeeping
2 Housekeeping Aides

Salaries

RT - 4 Staff @ $13.89/hr X 2080 ea =$115,565
1 Chief @ $15.97/hr X 2080 =$ 33,218
TOTAL +$148,783

Clerical
(2) Receptionists
@ 6.04/hr X 2080 ea = $25,126
(1) Transcriptionist
@ 7.69/hr X 2080 = $15,995

Transport
(2) Aides
@ 6.04/hr X 2080 ea = $25,126

Housekeeping
(2) Aides
@ $4.78/hr X 2080 ea = $19,884

Second Shift
4 People (2 RT, 1 Receptionist, 1 Transcriptionist)
@ $.501/hr X 2080 ea = $ 4,160

On Call - 88 hrs/wk @ 1.25 hr X 52 Wk = $5,720
9 holiday X 16 hrs ea X 1.25 = $ 180
TOTAL = $5,900

Hours of Operation:

On-site	7 a.m.	- 11 p.m.	M-F	(80 hrs)
On-call	11 a.m.	- 7 a.m.	M-F	
	7 a.m.	- 7 a.m.	S-M	(88 hrs)

Salaries for clerical & transport staff based on mid-point of pay range effective 10/88.

Salaries for technical staff based on information from Boston area hospitals effective 10/88. In general, salary range for MRI technologists appear to be 5% higher than range for CT technologists.

2. Project the total annual payroll costs for three years from the anticipated start of patient service operations. The projection shall be based upon and consistent with the projection of demand developed in response to C(2).

	YEAR I	YEAR II	YEAR III
RT			
4 staff	115,565	115,565	115,565
1 chief	33,218	33,218	33,218
2 receptionists	25,126	25,126	25,126
1 transcriptionist	15,995	15,995	15,995
2 transport Aides	25,126	25,126	25,126
2 housekeeping aides	19,884	19,884	19,884
Subtotal	234,914	234,914	234,914
Second shift differential	4,160	4,160	4,160
2 RT, 1 receptionist, 1 transcriptionist			
On call differential	5,900	5,900	5,900
TOTAL	244,974	244,974	244,974

1.2 209 from 4c

3. Provide evidence that sufficient, adequately trained staff can be obtained or recruited to operate the proposal if approved.

Sufficient adequately trained staff can be obtained from the metropolitan Portland and Boston areas.

4. Provide a three-year projection of operating and nonoperating expenses and revenues which, if applicable, disclose the impact of the proposal on the health care facility or health maintenance organization and its patient charge structure as a whole.

The three-year projection of operating and nonoperating expenses and revenues shall be based upon and consistent with the projection of demand developed in response to question C(2), the itemized list of capital costs to be incurred developed in response to question A(1) and the initial and subsequent staffing costs developed in response to question D(1) and (2). For proposed capital expenditures in excess of five million dollars, the applicant shall have a preliminary or full-scope financial feasibility study conducted by an independent certified public accountant for use in response to this question. All assumptions and sources of data used in preparing the financial projections shall be disclosed.

MRI PROJECTED FINANCIAL REQUIREMENT
Three Year Projection

	YEAR I	YEAR II	YEAR III
Depreciation- Movable Equipment	338,939	338,939	338,939
Debt Service - Construction	214,506	214,506	214,506
Operating Cost	469,098	469,098	469,098
Service Contract Scanner	0	140,000	140,000
Cryogen Contract	68,300	68,300	68,300
Equipment - non-capital	1,375		
TOTAL FINANCIAL REQUIREMENT	1,092,218	1,230,843	1,230,843

MRI CON EQUIPMENT COSTS:

	COST	USEFUL LIFE	DEPRECIATION S/L
MRI Scanner	2,580,000	8	322,500
Physiological Monitor	26,000	8	3,250
Video Camera	1,500	8	188
Apnea Monitor	7,292	7	1,042
Bar Code Reader (3)	7,500	7	1,071
Syse 50	1,275	5	255
Printer (4)	4,800	5	960
View Boxes	3,000	8	375
Dictaphone Unit (4)	2,400	5	480
Office Furniture	13,335	15	889
Kodak M6AN Processor	22,000	8	2,750
Fox 2400 Compactor	7,338	10	734
Windsor High-speed floor Machine	1,366	8	171
Other	28,550	89	4,274
Subtotal	126,356		16,439
Total Capital Equipment	2,706,356		338,939
Total Non-capital Equipment	1,375		
TOTAL	2,707,731		

MRI CON CONSTRUCTION COSTS:

	COST	USEFUL LIFE	DEPRECIATION
BUILDING			
Arch & Engineering	275,000		
Site & Utility Relocation	548,460		
Inside Construction	860,200		
Structural	664,400		
	2,348,060	40	58,702
FIXED EQUIP.			
HVAC	275,000	20	13,750
Plumbing	55,000	20	2,750
Heating System	18,700	20	935
Electrical	209,550	20	10,478
	558,250		27,913
Total	2,906,310		86,615
Capital Interest	305,156		8,975
Total Construction Cost including Capital Interest	3,211,466		95,590
Comp Life			34 Years

FINANCING COST

	2,906,310	
	X 80%	
Amount to be Financed	2,325,000	
Interest Rate	8.75%	
Amort. over	34 Years	(408 Payment)

	INTEREST	PRINCIPAL	TOTAL PAYMENT
YEAR I	202,983	11,523	214,506
YEAR II	201,933	12,573	214,506
YEAR III	200,787	13,719	214,506

MRI OPERATING EXPENSES:

Salaries	237,020	~~244,974~~
Fringe		51,444
Film		97,000
Other		33,180
Water		7,500
Electricity		35,000
TOTAL		~~469,098~~

5. Provide evidence that sufficient operational and/or capital financing will be available for the proposed capital expenditure. Include letters of commitment, if available, or expressions of interest in financing the proposal, from proposed capital sources. Anticipated rates and terms of borrowing shall be disclosed.

Financing will be available for the proposed project from a local bank at an anticipated 8.75 percent rate of interest.

6. Provide copies of audited financial statements and/or cost reports prepared for Title IVIII and/or XIX reimbursement for at least the last three fiscal years or for the period of time the institution has been in operation if less than three years.

Financial statements and cost reports are on file with the department.

7. Describe the methods by which you will evaluate the quality, effectiveness and cost/benefits of the proposal. What records will be kept to document the cost-effectiveness of the project, if approved, and how accessible will these documents be to planning agencies and interested public groups?

The Maine Medical Center has an ongoing quality assurance program that includes regular department and interdepartmental case reviews, morbidity and mortality reviews and program audits. The regular budget review process includes assessments of cost effectiveness. Information related to quality assurance and cost effectiveness will be available through the Department of Human Services, State Health Care Finance Commission, and appropriate public groups cosistent with hospital and state policies protecting the privacy of patients and the confidentiality of the patient/physician relationship.

8. Provide evidence or assurances that the proposed facility and service will meet licensure, Medicare and/or Medicaid certification requirements or other applicable certification or accreditation requirements.

The Maine Medical Center is fully accredited by the Joint Commission on the Accreditation of Hospitals, meets licensure and certification and is approved by the Council on Medical Education of the American Medical Association. Its policies and operation have been and are directed at meeting or exceeding the standards required to obtain those approvals, certifications, accreditations and licensures.

9. Provide evidence or assurances that the proposed facility will conform to applicable zoning requirements, environmental protection regulations, and other applicable municipal, state and federal ordinances, statutes and regulations.

The program as outlined in this application will have no impact upon zoning requirements, environmental protection regulations, or other municipal, state, or federal ordinances, statutes or regulations.

E. PLANNING PROCESS: Provide sufficient evidence to demonstrate that the proposed services are consistent with the orderly and economic development of health facilities and health resources for the State and are in accordance with standards, criteria or plans adopted and approved pursuant to the state health plan developed by the Department.

1. Describe the program and facility alternatives considered as possible responses to the demonstrated demand and present the rationale which led to their rejection, resulting in this proposed project.

The Maine Medical Center actively began planning for the current Certificate of Need in the spring of this year. A planning committee which has studied utilization projections, clinical literature, potential sites, equipment options and staffing has been meeting since that time. This study included presentations by Fonar, Siemans, General Electric Company, Diasonics and Picker International. These presentations were attended by radiologists, physicists, and administrative staff to evaluate the clinical effectiveness and cost associated with our own unit. In addition to these presentations, Maine Medical Center radiologists made site visits to the Fonar unit at U.C.L.A. Medical Center, the Siemans unit at Tufts New England Medical Center, the Diasonics unit at the Peninsula MRI Center and Huntington MRI of Pasadena in San Francisco, and the General Electric unit at the University of Pennsylvania in Philadelphia.

In addition to these site visits and presentations, the radiologists and technical staff of the Department compiled a comprehensive bibliography to document the usage of Magnetic Resonance in current applications as well as to help make projections of future uses.

The American Hospital Association utilization model for MRI was utilized to help us estimate the projected number of procedures which we could expect. Potential sites at the Maine Medical Center were also reviewed by this planning group.

The results of this activity yielded a decision to pursue an in-house super-conducting magnet in the range of 1 to 1.5 Telsa. We needed also to locate the magnet with sufficient space for magnet maintenance, cryogen handling, and future expansion. The plan and drawings enclosed are based on these features.

2. Describe the extent and nature of your consultation and joint planning with other facilities and service groups in the community or service area. Is there any conflict or potential duplication between the proposed project and the plans of other groups in the service area? Is the proposed project consistent with the long-range plans of the municipality or area? To the extent practicable, enclose correspondence to document the extent of your communication with other interested parties in the proposed service area.

There is no conflict or potential duplication between the proposed project and the plans of other groups in the service area. The project is consistent with the long-range plans of the municipality or area. Enclosed is correspondence from physicians which document the need for a Magnetic Resonance scanner at the Maine Medical Center. Of particular interest is the correspondence from Dr. W. Leschey, one of the pricipals of Maine Magnetic Imaging Incorporated. It is clear that even with an outpatient scanner in place in the Portland area there is a need for additional capability.

3. Describe the relationship between this proposal and applicable standards, criteria or plans contained in the state health plan.

The proposed project is consistent with the long range plans of the municipality and service area and is consistent with applicable standards in the state health plan.

F. LONG RANGE PLANNING: Provide copies of your long-range plans which extend beyond this proposal and indicate how this proposed project fits into or advances those long-range plans as well as your health services and capital requirements plans. It is understood that any approval of this project does not imply and future approval of any other components of your long-range plans.

A copy of the Maine Medical Center's long range plan is on file at the Office of Health Planning and Development.

G. DRAWINGS: The minimum requirement for construction/modernization/ renovation proposals is submission of two sets of schematic plans drawn to scale (preferably 1/8" = 1 foot), with all areas properly identified. (The Department may require the applicant to provide a complete set of legible drawings showing all construction, fixed equipment - including name and model as supplied by the manufacturers, and mechanical and electrical systems proposed to be installed or built.)

Drawings are enclosed.

Reprinted from JAMA• The Journal of the American Medical Association
April 8, 1988, Volume 259

Attachment 2

Consensus Conference

Magnetic Resonance Imaging

Magnetic resonance imaging (MRI) is a new and innovative technique that affords anatomic images in multiple planes and that may provide information about tissue characterization. The first magnetic resonance image was published in 1973 by Paul Lauterbur, PhD. Since that time, major technological advances, together with increasing clinical and investigative interests in the method, have been accompanied by the development of equipment that is now clinically applicable to man, with potentially great benefits in assessing pathophysiological states.

The magnetic resonance images are obtained by placing the patient or the area of interest within a powerful, highly uniform, static magnetic field. Magnetized protons (hydrogen nuclei) within the patient align like small magnets in this field. Radiofrequency pulses are then used to create an oscillating magnetic field perpendicular to the main field from which the nuclei absorb energy and move out of alignment with the static field in a state of excitation. As the nuclei return from excitation to the equilibrium state, a signal induced in the receiver coil of the instrument by the nuclear magnetization can then be transformed by a series of algorithms into diagnostic images. Images based on different tissue characteristics can be obtained by varying the number and the sequence of pulsed radiofrequency fields to take advantage of magnetic relaxation properties of the tissues.

Magnetic resonance images differ from those produced by x-rays: the latter are associated with absorption of x-ray energy while magnetic resonance images are based on proton density and proton relaxation dynamics. Proton characteristics vary according to the tissue under examination and reflect its physical and chemical properties.

To resolve issues regarding safety and efficacy, the Warren Grant Magnuson Clinical Center and the Office of Medical Applications of Research of the National Institutes of Health (NIH) convened a consensus conference about MRI Oct 26 through 28, 1987. The conference was cosponsored by the Division of Research Resources, the National Cancer Institute, the National Heart, Lung, and Blood Institute, the National Institute on Aging, and the National Institute of Neurological and Communicative Disorders and Stroke of the NIH; the Food and Drug Administration (FDA); and the National Institute of Mental Health.

At the NIH, the Consensus Development Conference brings together investigators in the biomedical sciences, clinical investigators, practicing physicians, and consumer and special interest groups to make a scientific assessment of technologies, including drugs, devices, and procedures, and to seek agreement on their safety and effectiveness.

During the first 1½ days of the meeting, a Consensus Development Panel and members of the audience heard evidence presented on the following questions:

1. Are there contraindications to or risks of MRI?
2. What are the technological advantages and limitations (disadvantages) of MRI?
3. What are the clinical indications for MRI and how does it compare with other diagnostic modalities?
4. What are the directions for future research in MRI?

Members of the panel included representatives of internal medicine, neurology, neurosurgery, radiation oncology, radiology, clinical epidemiology, surgery, the law, and the hospital community.

The invited speakers included physicists, biomedical scientists, reproductive scientists, and radiologists with extensive experience in MRI in all of the subspecialties of the field.

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1. Are There Contraindications to or Risks of MRI?— Magnetic resonance imaging is generally safe when used in accordance with the performance characteristics approved by the FDA. Risks are primarily related to the static and oscillating magnetic fields used in MRI. These fields are capable of producing adverse biologic effects at a sufficiently high exposure, but effects have not been observed at the levels currently employed in clinical practice.

The most important known risk is the projectile effect, which involves the forceful attraction of ferromagnetic objects to the magnet. Caution also must be exercised when there are ferromagnetic objects embedded in the patient, such as shrapnel, or implanted in the patient, such as pacemaker wires. Magnetic resonance imaging should not be performed on patients with cardiac pacemakers or aneurysm clips.

From the Office of Medical Applications of Research, National Institutes of Health, Bethesda, Md.

Reprint requests to Office of Medical Applications of Research, Bldg 1, Room 216 National Institutes of Health, Bethesda, MD 20892 (Michael J. Bernstein).

Biologic effects of static magnetic fields, such as electrocardiographic changes in T-wave amplitude and magnetohydrodynamic flow effects, are transient. In the short-term studies reported thus far, these do not seem to be hazardous at field strengths below 2 tesla. A preliminary case-control study of male workers exposed to magnetic fields has shown no trends indicating a dose-response effect, but the number of subjects was small and the follow-up period was short.

Rapidly changing gradient fields can induce electric currents in conductive tissues. Recent studies indicate no interference with cardiac function or nerve conduction at 2 to 7 tesla. The exposure levels approved by the FDA, which are below those that would induce neuromuscular stimulation, are believed to provide a wide margin of safety in this respect.

Heating may occur in tissues as a result of resistive loses due to circulating currents from radiofrequency coils. High-field scanners are more likely to cause measurable temperature elevations than are low-field devices. Although no adverse effects have been observed at FDA-approved absorption rates, care must be taken with patients whose heat loss mechanisms are impaired and with hyperpyrexic individuals. Pulse sequences should be modified to prevent excessive heat buildup, particularly in warm and humid environments.

Caution must be exercised in the MRI examination of infants, patients requiring monitoring and life-support systems, and patients who are pregnant. Although there is no evidence that magnetic and electric fields associated with MRI interfere with human development, in vitro studies and theoretical predictions raise the question of whether exposure might pose risks to the developing embryo and fetus. Therefore, MRI, as with all interventions in pregnancy, should be used during the first trimester only when there are clear medical indications and when it offers a definite advantage over other tests.

2. What Are the Technological Advantages and Limitations (Disadvantages) of MRI?—Magnetic resonance imaging provides information that differs from other imaging modalities. Its major technological advantage is that it can characterize and discriminate between tissues using their physical and biochemical properties (water, iron, fat, and extravascular blood and its breakdown products). Blood flow, cerebrospinal fluid flow, and contraction and relaxation of organs, both physiological and pathological, can be evaluated. Because calcium emits no signal on spin echo images, tissues surrounded by bone, such as the contents of the posterior fossa and the spine, can be imaged, and beam-hardening artifacts are avoided. Magnetic resonance imaging produces sectional images of equivalent resolution in any projection without moving the patient. The ability to obtain images in multiple planes adds to its versatility and diagnostic utility and offers special advantages for planning radiation and/or surgical treatment. Excellent delineation of anatomic structures results from inherent high levels of contrast resolution.

Paramagnetic and superparamagnetic contrast agents, which seem to be relatively nontoxic, will soon be available in the United States. These agents should permit evaluation of the integrity of the blood-brain barrier, the reticuloendothelial system, and the extracellular space.

Acquisition of the magnetic resonance image does not use ionizing radiation, nor does it require iodinated contrast agents. Because it requires little patient preparation and is noninvasive, patient acceptability is high.

The relatively slow scan acquisition time results in artifacts due to biologic (physiological) motion, eg, cardiac, vascular, and cerebrospinal fluid pulsation, respiratory excursion, and gastrointestinal tract peristalsis. Technological advances now evolving, such as cine MRI, improved surface coils, respiratory, cardiac, and peripheral gating, chemical shift imaging, and fast scanning (gradient-refocused images), may resolve many of these problems. Some patients, particularly those who are acutely ill, cannot cooperate, and movement artifacts result. Patient throughput is slow compared with that of other imaging modalities.

Because of the small bore of the magnet, some patients experience claustrophobia and have difficulty cooperating during the study. Some obese patients cannot be examined.

The strong static magnetic field, which interferes with the proper function of the usual life-support equipment, and the small bore of the magnet make it difficult or impossible to examine some critically ill patients. Patients with pacemakers and ferromagnetic appliances cannot be studied. Magnetic resonance imaging units require careful siting and shielding.

While the appearance of calcium as a signal void provides some advantages, it also limits the ability to detect pathological calcification in soft tissues and tumors, and pathological changes in cortical bone are poorly depicted using routine spin echo techniques. Other imaging sequences may permit visualization of some of these lesions.

At present, contrast agents to enhance the magnetic resonance images are not approved for general use in the United States. Greater technological expertise is required for use of MRI than for use of most other imaging modalities. These factors limit the present application of MRI.

Equipment for MRI is expensive to purchase, maintain, and operate; hardware and software are still being developed.

3. What Are the Clinical Indications for MRI and How Does MRI Compare With Other Diagnostic Modalities?—Magnetic resonance imaging is an evolving technology that in most instances has been evaluated by small descriptive studies rather than by large, carefully designed, prospective studies. Some of our judgments about the role of MRI relative to other imaging modalities are based on less rigorously designed studies than are desirable. For those clinical situations in which MRI can potentially replace other procedures, especially invasive ones, these judgments should be verified by additional prospective studies. Furthermore, when other new, costly, or invasive imaging modalities are introduced in the future, considerable attention should be paid initially to the types of clinical problems that should be studied first, to the need for single or multi-institutional studies, to the timing of the evaluations, to the requirements for interpretive expertise, and to the potential sources of funding for such evaluations. A consensus conference might be a suitable vehicle for such deliberations.

The panel took the position that the diagnostic capability of MRI relative to that of its competing modalities was the most important end point to be assessed at this time. An experimental approach that optimizes the attainment of diagnostic information cannot readily provide simultaneous information on the effect of MRI on other indexes such as patient treat-

ment and patient outcomes. Finally, the panel focused on clinical efficacy and not on cost considerations.

THE BRAIN

Brain Tumors

Magnetic resonance imaging is a superb method of studying brain tumors because of excellent contrast resolution, easy multiplanar imaging, and the absence of artifacts. Magnetic resonance imaging and computed tomography (CT) are roughly equivalent for detection of most brain tumors. Because of the absence of bone artifacts, as seen on CT, MRI is superior at the vertex, in the posterior fossa, near the walls of the middle fossa, at the base of the skull, and in the orbit. Computed tomography is superior to MRI for detection of meningioma but requires contrast enhancement. The performance of MRI will be improved further by the use of contrast-enhancing agents.

Gliomas and Metastases.—Supratentorial gliomas and metastases are detected by either MRI or CT. Secondary effects of the tumor, such as herniation, hydrocephalus, and volume displacement of adjacent tissues, are displayed well with both CT and MRI, although more anatomic information is available with multiplanar MRI. Tumor boundaries in gliomas and metastases may be obscured by extensive edema. Contrast-enhanced CT currently is better than unenhanced MRI for defining the gross margin between tumor and edematous brain. Neither method is definitive in establishing a tissue diagnosis. Calcification is better seen with CT. Contrast-enhanced CT better demonstrates subarachnoid spread from malignant tumors than does MRI. Magnetic resonance imaging is especially effective in the demonstration of intratentorial tumors.

Meningiomas.—The characteristic hyperdense appearance of these tumors on contrast-enhanced scans and the hyperostosis of underlying bone allows superior detection by CT. Magnetic resonance imaging may provide more information than CT does about the effect of the tumor on adjacent structures.

Acoustic Neuromas.—Magnetic resonance imaging demonstrates smaller tumors better than does CT without the need for intrathecal air or contrast material, but larger tumors are well visualized by both CT and MRI.

Pituitary Tumors.—Both MRI and contrast-enhanced CT are effective in defining pituitary tumors, but MRI may provide more information about the precise extent of the lesions and their effect on adjacent structures. Early studies suggest that MRI may be superior for detection of intrasellar microadenomas. Magnetic resonance imaging seems to be somewhat better in the diagnosis of some other suprasellar tumors, primarily because of its multiplanar capabilities and the absence of bone artifacts.

Reexamination.—The factors that dictate the use of MRI or CT as the original detection tool also apply to follow-up studies.

Nonneoplastic Disease

Any insult to the structural integrity of the brain associated with alteration in water content or myelin can be reflected in abnormal signal intensity on MRI. Thus, MRI is sensitive to the detection of a wide variety of nonneoplastic processes affecting the brain. In many instances, the sensitivity of MRI exceeds that of CT.

Ischemia.—Within a few hours after vascular occlusion, detection and localization of cerebral infarction are possible with MRI while CT (even with contrast enhancement) often yields equivocal or negative results in the first 24 to 48 hours. In the subacute and chronic stages of stroke, MRI and CT provide equivalent information.

Hemorrhage.—Within the first 24 to 48 hours, acute intracranial hemorrhage, whether subarachnoid, intraparenchymal, or subdural, is not easily detected with MRI but is more reliably demonstrated by CT. The subacute hematoma (age, ten to 20 days) is readily detected by MRI but it may be much less conspicuous on CT. Thus, the two modalities have complementary roles in detection of hemorrhage—CT is more sensitive in acute hemorrhage while MRI is more sensitive in subacute hemorrhage. Unenhanced CT is often the preferred initial study in patients with stroke because of the clinical need to determine the presence of hemorrhage.

Arteriovenous Malformations.—Magnetic resonance imaging is sensitive to flowing blood and has proved to be particularly effective in the detection and localization of vascular malformations, including some "cryptic" malformations not evident on cerebral arteriography. Arteriography remains necessary for the pretherapeutic assessment of symptomatic malformations.

Trauma

In head trauma, MRI has proved to be useful in the detection of all types of intracranial hemorrhage, including hemorrhagic contusions and shearing injuries. During the first one to three days after injury, however, CT is preferable not only because examination time is shorter but also because hemorrhage at this time is more reliably demonstrated by CT.

Disorders of Myelination

Diseases associated with demyelination or dysmyelination are readily detected with MRI. Magnetic resonance imaging is recognized as the preferred and most sensitive imaging technique for the diagnosis of multiple sclerosis, but MRI alone cannot establish a definite diagnosis of multiple sclerosis in the absence of strong clinical findings. Magnetic resonance imaging also exhibits greater sensitivity in the detection of radiation injury to the brain than does CT. However, in the follow-up of patients after radiation therapy or chemotherapy for malignant intracranial neoplasm, neither MRI nor CT permits differentiation of late radiation injury from recurrent tumor.

Dementia

The diagnosis of dementia requires a clinical, neurological evaluation. In the assessment of dementia, either CT or MRI can be used to demonstrate remediable lesions. Magnetic resonance imaging demonstrates more lesions than does CT in patients with multi-infarct dementia. In older individuals, often without dementia, however, MRI also demonstrates high signal areas in white matter on T2-weighted images of uncertain clinical significance.

Infection

Magnetic resonance imaging demonstrates areas of cerebritis and abscess formation in a manner similar to that of CT. White-matter edema associated with inflammation is readily detected by MRI and may allow earlier initiation of specific

treatment in certain illnesses such as herpes simplex encephalitis.

HEAD AND NECK

In the detection, localization, and treatment planning of head and neck tumors, MRI offers an advantage over CT due to its multiplanar capabilities, tissue characterization potential, and the absence of bone and teeth artifacts. Magnetic resonance imaging affords ready distinction of vessels from lymph nodes and also depicts the contents of the orbit.

THE SPINE

Surface coils constitute an integral part of the MRI examination of the spine.

Tumors

Magnetic resonance imaging of the spinal canal has the advantage over myelography of direct, noninvasive visualization of the spinal cord rather than merely outlining its margins. Magnetic resonance imaging is capable of demonstrating the entire spinal cord and of differentiating solid from cystic intramedullary tumors. Indications for myelography have decreased considerably, and it may become obsolete in the future with the wider availability of high-quality MRI. An example of this is the use of MRI for the diagnosis and localization of acute spinal cord compression. Intradural extramedullary tumors are best demonstrated by MRI or myelography.

Syringomyelia

Magnetic resonance imaging is the diagnostic method of choice for syringomyelia and is considered to be superior to both myelography and CT.

Degenerative Disk Disease

Magnetic resonance imaging is equivalent to CT myelography in the evaluation of herniated disk at the cervical and thoracic levels and is as good as or better than myelography. At the lumbar level, MRI is better than or equal to CT and is more accurate than myelography. In spinal stenosis, MRI and CT are roughly equivalent in diagnostic information and are less invasive than myelography. Computed tomographic myelography provides the greatest diagnostic accuracy for cervical radiculopathy because of hypertrophic degenerative changes.

Trauma

When the patient's condition allows, MRI demonstrates the altered relationship between vertebral bodies, disks, spinal cord, and nerve roots. It is less applicable to the study of spinal stability and the integrity of articular facets than is CT or conventional radiography.

Congenital Disorders

Spinal cord abnormalities associated with congenital spinal dysraphism are most advantageously studied by MRI.

Infection

Magnetic resonance imaging and radionuclide scans are more sensitive than CT for the early detection of osteomyelitis.

The great accuracy of both MRI and CT in defining spinal anatomic changes poses a particular challenge to clinicians. Correlative clinical studies to relate these changes with patients' symptoms and outcome of therapy are urgently needed.

THE CARDIOVASCULAR SYSTEM

Magnetic resonance imaging is particularly valuable as a technique for imaging the heart and great vessels because flowing blood produces a unique signal. Therefore, no contrast medium is required to define the cardiac chambers and the lumen and the location of the great vessels. Cardiac evaluation requires either electrocardiographic gated MRI or cine MRI.

Ischemic Heart Disease

At the present time, MRI has limited usefulness in evaluating ischemic heart disease. It cannot substitute for coronary arteriography in defining coronary artery anatomy. It apparently can delineate infarcted myocardium and adjacent residual viable myocardium. With paramagnetic contrast media, it may be possible to define regions of acute ischemia. Gated MRI can be used to delineate scarring caused by previous infarction, ventricular aneurysm, and chamber thrombi.

Cardiomyopathies

Gated MRI defines the endocardial and epicardial surfaces, making it possible to determine mural and septal thickness, ventricular volume, and performance. Two-dimensional echocardiography and radionuclide techniques provide information similar to that provided by MRI.

Valvular Heart Disease

The recent development of cine MRI, which permits rapid dynamic imaging, makes it possible to evaluate ventricular performance and to estimate the severity of valvular regurgitation. The relative values of two-dimensional and Doppler echocardiography, other noninvasive methods, and the cine MRI technique have yet to be determined.

Pericardial Disease

Gated MRI is being used to evaluate pericardial disease, but echocardiography remains the procedure of choice because of its lower cost, its portability, and its availability.

Intracardiac and Paracardiac Masses

Magnetic resonance imaging depicts the pericardium, the cardiac chambers and walls, and the great vessels in the mediastinum. For imaging of intracardiac and paracardiac masses, MRI seems to be superior to CT, although echocardiography remains the primary screening procedure for intracardiac masses.

Congenital Heart Disease

Magnetic resonance imaging, through definition of the cardiac chambers, the great vessels, and flow patterns, represents an important noninvasive diagnostic imaging method in congenital heart disease. Because of the relatively long times required for MRI, electrocardiographic gating or cine MRI is important to optimize its value. Gated MRI is capable of defining many malformations of the cardiac chambers and the great vessels, such as transposition and pulmonary atresia. Two-dimensional and pulsed Doppler echocardiography continue to be the primary initial screening techniques and pro-

vide information about pressure and flow in addition to information about cardiac anatomy.

Aorta

While CT has served as a screening method in aortic dissection, the anatomic findings required for surgery have been determined primarily by angiography. Magnetic resonance imaging permits visualization of the aortic root and detects intramural hemorrhage, wall separation, and intimal flap. It may improve the screening of suspected cases, but it is uncertain that it will obviate the need for contrast angiography. It permits the distinction between aortic dissection and aneurysm of the thoracic and abdominal aorta. Computed tomographic scanning has been accurate in delineating aortic size, change in aneurysm dimensions, and aortic aneurysmal bleeding. Magnetic resonance imaging has a similar potential.

THORAX

Staging of Bronchogenic Carcinoma

Magnetic resonance imaging is comparable with CT in diagnosing mediastinal adenopathy. The current interpretive criteria for MRI (as based on node size) are derived from and are identical to those used for CT. Magnetic resonance imaging is superior to unenhanced CT, however, in evaluating hilar masses and is equivalent to enhanced CT. Because CT can evaluate the mediastinum and the upper abdomen as well as the lungs and abdomen as part of one examination, it is currently the method of choice for staging bronchogenic carcinoma.

Evaluation of Mediastinal Masses

Because of its multiplanar imaging potential, MRI provides information for determining the anatomic relationship between mediastinal masses and the great vessels that is not always available with CT.

Evaluation of Parenchymal or Hilar Masses

Computed tomography is used for the detection of pulmonary nodules. In solitary pulmonary nodules, CT is preferred to MRI for assessing benignity. Because of the ability of MRI to visualize flowing blood, it is preferred to unenhanced CT for determining whether hilar or parenchymal masses are solid or vascular.

LIVER

Magnetic resonance imaging is equivalent to contrast-enhanced CT in the detection of metastases of the liver from carcinoma. The use of iodinated contrast agents may be avoided with MRI. Cysts and hemangiomas, two common benign lesions, are relatively well characterized by MRI.

PANCREAS AND SPLEEN

For evaluting lesions of the pancreas and spleen, CT is superior to MRI.

KIDNEY

Renal Masses

In detecting renal masses, MRI is apparently equivalent to CT, with specific limitations noted later herein. Cysts and angiomyolipomas can be characterized as with CT, and complicated cysts containing hemorrhage can be identified.

Benign tumors can be visualized but not reliably distinguished from malignant neoplasms. Malignant tumors are identified and staged as with CT, but the limited ability of MRI to detect calcifications and define small tumors is a drawback. Magnetic resonance imaging is useful for demonstrating vascular invasion.

Thus, MRI may be used in selected cases when CT examination is equivocal or when iodinated contrast material is contraindicated.

Renal Transplants

The normal corticomedullary junction of the kidney is demonstrated with MRI. When the junction is not visualized, the diagnosis of graft rejection can be suggested. Although MRI is useful, Doppler ultrasound seems to be more sensitive and specific.

ADRENAL GLAND

Magnetic resonance imaging is equal to high-resolution CT in visualizing the normal gland and in detecting lesions such as hyperplasia, adenoma, aldosteronoma, pheochromocytoma, and primary carcinoma as well as metastases. Pheochromocytomas have an MRI intensity pattern that seems to be characteristic. Furthermore, the diagnosis can be made without using contrast agents, to which patients sometimes react. Other lesions cannot be reliably characterized.

FEMALE PELVIS

The uses of MRI in gynecologic disease are in the early stages of investigation, but the ability of the examination to depict anatomy in three orthogonal planes affords a potentially useful method of staging tumors and selecting and planning the treatment to be employed. Magnetic resonance imaging is not a screening modality and does not permit specific tissue diagnoses.

The application of MRI in high-risk obstetrical practice requires further exploration.

Carcinoma of Endometrium

Magnetic resonance imaging shows promise as a means of staging compared with physical examination or CT. The choice of therapy may depend on tumor volume, site, and depth of myometrial invasion, all of which frequently can be demonstrated by MRI.

Carcinoma of the Cervix

The value of MRI in staging cervical carcinoma lies in its ability to demonstrate the tumor directly, to calculate its volume, and to evaluate extension to adjacent organs accurately. Although useful for staging in selected cases, it has no apparent advantage over CT in the detection of lymph node metastases.

In both endometrial and cervical carcinoma, the capacity of MRI to depict concomitant pelvic lesions adds to its value.

MALE PELVIS

Prostate

While it does not permit reliable differentiation of prostatic carcinoma from benign prostatic hypertrophy, MRI represents a promising method for staging the extent of carcinomatous spread outside the capsule of the prostate gland and seems to be equivalent to CT in this regard.

Metastases to regional lymph nodes seem to be detected by MRI and CT with equal efficacy.

Bladder

In staging bladder carcinoma, MRI cannot distinguish mucosal lesions from those with superficial muscular invasion but it is effective in staging tumors that have invaded the deep muscle layers, the perivesical fat, and adjacent organs and lymph nodes. While no large prospective studies comparing MRI with CT are available, preliminary data indicate that tumor staging with MRI is as accurate as that with CT.

Scrotum

In the scrotum, MRI permits distinction of intratesticular from extratesticular lesions. It seems to have no diagnostic advantage over ultrasound, except when examining the painful scrotum.

Rectum

The staging of rectal neoplasms as well as the differentiation of recurrent tumor from fibrosis in the rectal wall represent problems that require further study.

MUSCULOSKELETAL SYSTEM

Surface coils are essential for adequate examination of many areas in the musculoskeletal system.

Joints

Magnetic resonance imaging demonstrates the articular cartilages as well as adjacent muscles and tendons. Because it is noninvasive, MRI may be preferable to arthrography and arthroscopy in the study of the knee. It is also useful for evaluation of the temporomandibular joint. The use of MRI in the examination of other joints requires further evaluation.

Marrow Space

Magnetic resonance imaging reflects changes in the marrow space by primary tumors and infection. The local extent of primary bone tumors can be staged best by MRI. Metastatic tumors can be demonstrated with MRI, which apparently is more sensitive than radionuclide bone scanning.

Aseptic Necrosis of Bone

Magnetic resonance imaging is superior to radionuclide imaging in the detection of the early changes. Preliminary data suggest that MRI is better than CT.

Soft-Tissue Tumors

Magnetic resonance imaging provides important information regarding muscle, nerve, and vessel invasion or entrapment in malignant soft-tissue tumors. A postoperative baseline MRI study can be helpful when the possibility of recurrence must subsequently be evaluated.

Trauma

Because of the excellent contrast resolution of soft tissues, MRI demonstrates muscle and ligament tears and hematomas well. This may be useful in following the evolution of these lesions.

CONTRAST MEDIA FOR MRI

Contrast agents currently are being evaluated in laboratory and clinical studies. These agents, by altering inherent tissue response to magnetic fields, offer the promise of even greater sensitivity for detection and improved lesion characterization. They fall into two classes: (1) paramagnetic materials, which have diagnostic properties similar to those of iodinated radiographic contrast agents, and (2) superparamagnetic materials, which have a wide area of effect and are even more potent. Gadolinium diethylenetriaminepentaacetic acid seems to be safer than iodinated contrast media.

Intravenous infusion of gadolinium diethylenetriaminepenta-acetic acid demonstrates breakdown of the blood-brain barrier on T1-weighted MRI studies, and such images permit improved definition of gross margins of tumor, abscess, or infarct. Outside the brain, the use of contrast-enhanced MRI may identify areas of altered circulation due to inflammation, other soft-tissue injury, or neoplastic spread.

4. What Are the Directions for Future Research in MRI?—The role of MRI in the treatment of the patient needs to be defined. What does it replace in existing diagnostic algorithms? To what is it complementary? For example, will the need for CT, ultrasound, and arteriography decrease? How does the information provided affect diagnosis, staging, therapy, and patient outcome? The answers to these questions will require well-designed and well-conducted studies comparing the efficacy of MRI with that of existing diagnostic techniques.

Positron emission tomography can spatially image metabolic processes. To what extent is MRI capable of fulfilling a similar function with regards to pH, blood flow, blood volume, and the metabolism of oxygen and glucose? Similarly, positron emission tomography has been used to study neurotransmitters and their receptors; can MRI be applied for this purpose not only to the central nervous system but also to different membrane receptors in other organs?

Diagnostic imaging is concerned with detection, localization, and tissue characterization. Magnetic resonance imaging has been shown to be effective for all three but offers special promise for tissue characterization. Future potential for MRI includes nonproton imaging, for example, phosphorus and sodium. The combination of imaging with localized in vivo spectroscopy may yield fundamental information regarding the metabolic status of a particular organ or lesion. For example, phosphorus metabolite concentration may be measurable as a reflection of the state of oxygenation of the myocardium or of tumors. In vitro spectroscopy offers a method for examining biologic material of various types, for example, tissue fluids, pathological specimens, and cells in culture.

Further exploration of the applications of MRI to the vascular system is required. It seems to have promise as a means of assessing peripheral venous disease noninvasively.

Although considerable development of equipment for MRI has occurred, there seem to be opportunities for enhancing both hardware and software. Improving the techniques of MRI includes the selection of the appropriate energy of the magnet, optimization of the magnetic field strength in use, the fabrication of efficient surface coils, the evaluation of new pulse sequences, and the development of computer software leading to the richer use of the available data.

Gadolinium diethylenetriaminepenta-acetic acid has promise as a contrast agent for MRI. There should be an active search for and an evaluation of other classes of contrast agents that are applicable to MRI. Paramagnetic-labeled pharmaceuticals and monoclonal antibodies offer new opportunities for acquiring anatomic, physiological, and pharmacologic information. For example, there are disorders characterized by qualitatively or quantitatively abnormal receptor sites that would lend themselves to study using these agents.

It seems that MRI is a safe modality for imaging. Nevertheless, there must be continuing investigation of its secondary effects, such as local heating of tissues. This is necessary as

higher field strengths and rapid imaging techniques are more widely used. There is a need for long-term studies of the potential somatic and genetic effects of MRI. These should consider not only the patient but also those individuals who are exposed occupationally.

CONCLUSION

Magnetic resonance imaging is an innovative technique that provides images of the body in many different planes; it represents an extraordinary addition to our diagnostic armamentarium. The images generated vary according to, and reflect the physical and chemical properties of, the tissues examined. Magnetic resonance imaging is noninvasive, seems to be relatively innocuous in clinical application, and involves no exposure to ionizing radiation.

Even in the short period of its use, it has proved to be unusually rewarding in the detection, localization, and assessment of the extent and character of disease in the central nervous, musculoskeletal, and cardiovascular systems. In the brain, for example, it has a proved capacity to define some tumors and the plaques of multiple sclerosis provided by no other technique. It is a competing imaging method in the evaluation of many other organs. Additional prospective studies comparing MRI with other diagnostic methods are essential in those areas in which the method has shown promise but in which its precise role has not yet been defined. The Consensus Development Conference does not purport to include all of the applications of MRI to the pediatric patient, a subject that will require separate consideration.

Although MRI can be used without contrast media, the information it generates can be augmented by contrast agents now being introduced.

The full potential of MRI has not been reached, and continuing refinement of equipment, contrast agents, and software may be anticipated.

As higher magnet strengths and rapid imaging sequences are investigated, further study of the long-term biologic effects of magnetic fields is required.

Members of the Consensus Development Panel were Herbert L. Abrams, MD, MA, Conference and Panel Chairperson, Professor of Radiology, Stanford (Calif) University School of Medicine, Philip H. Cook Professor Emeritus of Radiology, Harvard Medical School, Boston, Clinical Professor of Radiology, University of California School of Medicine at San Francisco; Alfred S. Berne, MD, Director, Department of Medical Imaging, Crouse Irving Memorial Hospital, Syracuse, NY; Gerald D. Dodd, MD, Professor and Head, Division of Diagnostic Imaging, University of Texas M. D. Anderson Hospital, Houston; Harold T. Dodge, MD, Professor of Medicine, University of Washington School of Medicine, Seattle; Sid Gilman, MD, Professor and Chairman, Department of Neurology, University of Michigan, Ann Arbor; Samuel Hellman, MD, Physician-in-Chief, Memorial Sloan-Kettering Cancer Center, New York; Charles A. Hufnagel, MD, Professor of Surgery, Uniformed Services University of the Health Sciences Medical School, Emeritus Professor of Surgery, Georgetown University School of Medicine, Washington, DC; Stephen A. Kieffer, MD, Professor and Chairman, Department of Radiology, State University of New York Health Science Center, Syracuse, NY; John A. Kirkpatrick, Jr, MD, Radiologist-in-Chief, Professor of Radiology, Harvard Medical School, Children's Hospital, Boston; Don M. Long, MD, PhD, Professor and Chairman, Department of Neurosurgery, The Johns Hopkins University School of Medicine, Baltimore; James J. McCort, MD, Immediate Past President, Radiological Society of North America, Chairman, Department of Radiology, Santa Clara Valley Medical Center, San Jose, Calif; Barbara J. McNeil, MD, PhD, Professor of Radiology and Clinical Epidemiology, Harvard Medical School, Brigham and Women's Hospital, Boston; Maxwell J. Mehlman, JD, Associate Professor and Director, Law-Medicine Center, Case Western Reserve University, Cleveland; Constance F. Row, President, Calvert Memorial Hospital, Prince Frederick, Md; J. Sanford Schwartz, MD, Associate Professor of Medicine, Senior Fellow, Leonard Davis Institute of Health Economics, University of Pennsylvania, Philadelphia.

Members of the Planning Committee were John L. Doppman, MD, Planning Committee Chairperson, Director of Radiology, Clinical Center, National Institutes of Health, Bethesda, Md; Herbert L. Abrams, MD, MA, Panel and Conference Chairperson, Professor of Radiology, Stanford (Calif) University School of Medicine, Philip H. Cook Professor Emeritus of Radiology, Harvard Medical School, Boston, Clinical Professor of Radiology, University of California School of Medicine at San Francisco; Edwin D. Becker, PhD, Associate Director for Research Services, Office of the Director, National Institutes of Health, Bethesda, Md; Charles L. Coulter, PhD, Head, Biophysics Section, Biomedical Research Technology Program, Division of Research Resources, National Institutes of Health, Bethesda, Md; Giovanni Di Chiro, MD, Chief, Neuroimaging Section, Division of Intramural Research, National Institute of Neurological and Communicative Disorders and Stroke, National Institutes of Health, Bethesda, Md; Andrew J. Dwyer, MD, Director, Clinical MRI, Department of Radiology, Clinical Center, National Institutes of Health, Bethesda, Md; Jerry M. Elliott, Program Analyst, Office of Medical Applications of Research, National Institutes of Health, Bethesda, Md; Robert P. Friedland, MD, Chief, Brain Aging and Dementia Section, Laboratory of Neurosciences, National Institute on Aging, National Institutes of Health, Bethesda, Md; Victor M. Haughton, MD, Professor, Department of Radiology, Chief, Neuroradiology Research, Medical College of Wisconsin, Milwaukee; D. I. Hoult, DPhil, MA, Physical Scientist, Biomedical Engineering and Instrumentation Branch, Division of Research Services, National Institutes of Health, Bethesda, Md; Gordon Johnson, MD, Acting Director, Office of Health Affairs, Center for Devices and Radiological Health, Food and Drug Administration, Silver Spring, Md; Stephen H. Koslow, PhD, Chief, Neuroscience Research Branch, National Institute of Mental Health, Rockville, Md; Paul C. Lauterbur, PhD, Professor, Medical Information Science and Chemistry, University of Illinois at Urbana-Champaign; Alexander R. Margulis, MD, Professor and Chairman, Department of Radiology, University of California at San Francisco; Martin Rose, MD, Former Chief Medical Officer, Office of Medical Applications of Research, National Institutes of Health, Bethesda, Md; Francis F. Ruzicka, MD, Chief, Diagnostic Imaging Research Branch, Radiation Research Program, Division of Cancer Treatment, National Cancer Institute, National Institutes of Health, Bethesda, Md; Michael J. Bernstein, Director of Communications, Office of Medical Applications of Research, National Institutes of Health, Bethesda, Md; Colleen Henrichsen, Deputy Chief, Clinical Center Communications, National Institutes of Health, Bethesda, Md.

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Attachment 3

Magnetic Resonance Imaging Tissue Characteristics

Perry Sprawls, Ph.D.

Each medical imaging modality creates images which show specific characteristics of the tissue within the human body. Density is the primary tissue characteristic displayed in x-ray images. Ultrasound imaging relies on the ability of tissue structures to reflect sound and produces echoes. Nuclear imaging shows the ability of a tissue or organ to take up and concentrate a radioactive material. Magnetic resonance imaging (MRI) looks at tissue characteristics which are distinctly different from those viewed by the other modalities. In general practice MRI is limited to viewing a single chemical element in the body. However, it can look at this one element from several different perspectives which gives it a high sensitivity for detecting various tissue conditions.

Chemical Elements

With present-day MRI technology we are limited to viewing only one of the many different chemical elements which make up the bulk of human tissue — hydrogen. There are two requirements that a chemical element must meet in order to be visible in a magnetic resonance image. The first is that it contain magnetic nuclei. The second, that it be present in the tissue with a reasonably high concentration.

A nucleus can be either magnetic or non-magnetic depending on its composition (number of neutrons and protons). Most chemical elements have some forms (isotopes) which consist of magnetic nuclei and some forms which do not. Here lies part of the problem in imaging a wide range of chemical elements.

The form of hydrogen which occurs with a high abundance in tissue and body fluids also has a magnetic nucleus. Its nucleus is a single proton. That is why our current MRI techniques are often referred to as proton imaging.

The most abundant forms of carbon and oxygen do not have magnetic nuclei and are therefore invisible to the magnetic resonance imaging process. These elements do have some isotopic forms which are magnetic, but their concentrations are too low for practical imaging procedures.

The form of sodium, phosphorus, and potassium which occurs in tissue is magnetic but the problem is that the normal concentration of these elements is very low. Systems have been developed for sodium imaging but because of the low concentration the image quality is much less than what can be obtained in proton (hydrogen) imaging.

Hydrogen is unique in that its most common nuclear form is magnetic and it occurs with very high concentratiton in tissues and body fluids.

Image Types

An MR system can be set to produce three basic types of proton images which look at different tissue characteristics. The three tissue characteristics are 1) proton density, 2) T1 and 3) T2. These last two characteristics are magnetic relaxation times which are observed during the imaging process.

When the patient is placed in the magnet some of the magnetic nuclei (protons) line up with the magnetic field produced by the magnet. This is generally along the major axis (head to foot) running through the patient's body. When the magnetic nuclei become aligned in a specific direction the tissue becomes temporarily magnetized in that direction.

The normal and stable direction for tissue magnetization is longitudinal (parallel) with respect to the magnetic field.

During the imaging procedure radiofrequency (RF) pulses are used to flip the tissue magnetization into a direction which is transverse with respect to the magnetic field. A principle characteristic of transverse tissue magnetization is that it is unstable and quickly dissipates.

The process of forcing the tissue magnetization from the longitudinal to the transverse direction with RF pulses is known as *excitation*. The process in which tissue dissipates its unstable transverse magnetization and regains its stable longitudinal magnetization is known as *relaxation*. A key factor in MR imaging is that different types of tissue go through the relaxation process at different rates. The time that is takes a specific tissue to regain a major portion (actually 63%) of its longitudinal magnetization is known as T1. The time required for a specific tissue to lose most of its transverse magnetization is known as T2. Different types of tissue, both normal and pathologic, have different relaxation times (*i.e.*, T1 and T2 values). This particular tissue characteristic can be seen in images and is a very sensitive discriminator among different tissue conditions.

The MR imaging system can be adjusted to produce an image which is weighted to emphasize one of the three basic tissue characteristics 1) proton density, 2) T1, and 3) T2. Each of the three image types is useful for showing different tissue conditions.

Proton Density

A proton density weighted image shows the relative proton (hydrogen) density or concentration in the various tissues. Proton density weighted images often show good contrast between normal tissues such as the gray and white brain matter but are relative insensitive when it comes to distinguishing between normal and pathologic tissue.

T1 and T2 Weighted Images

The vast majority of clinical images for the visualization of diseased tissue are the T1 and T2 weighted images. The usefulness of MRI as a diagnostic tool is based on the fact that many disease processes alter the magnetic relaxation times (T1 and T2) of tissue. Tumors generally have longer relaxation times than the surrounding normal tissue. Most fluids have very long relaxation times which is a very useful property for imaging many parts of the CNS. Fatty tissue has relatively short relaxation times which makes it easy to distinguish from other tissue types.

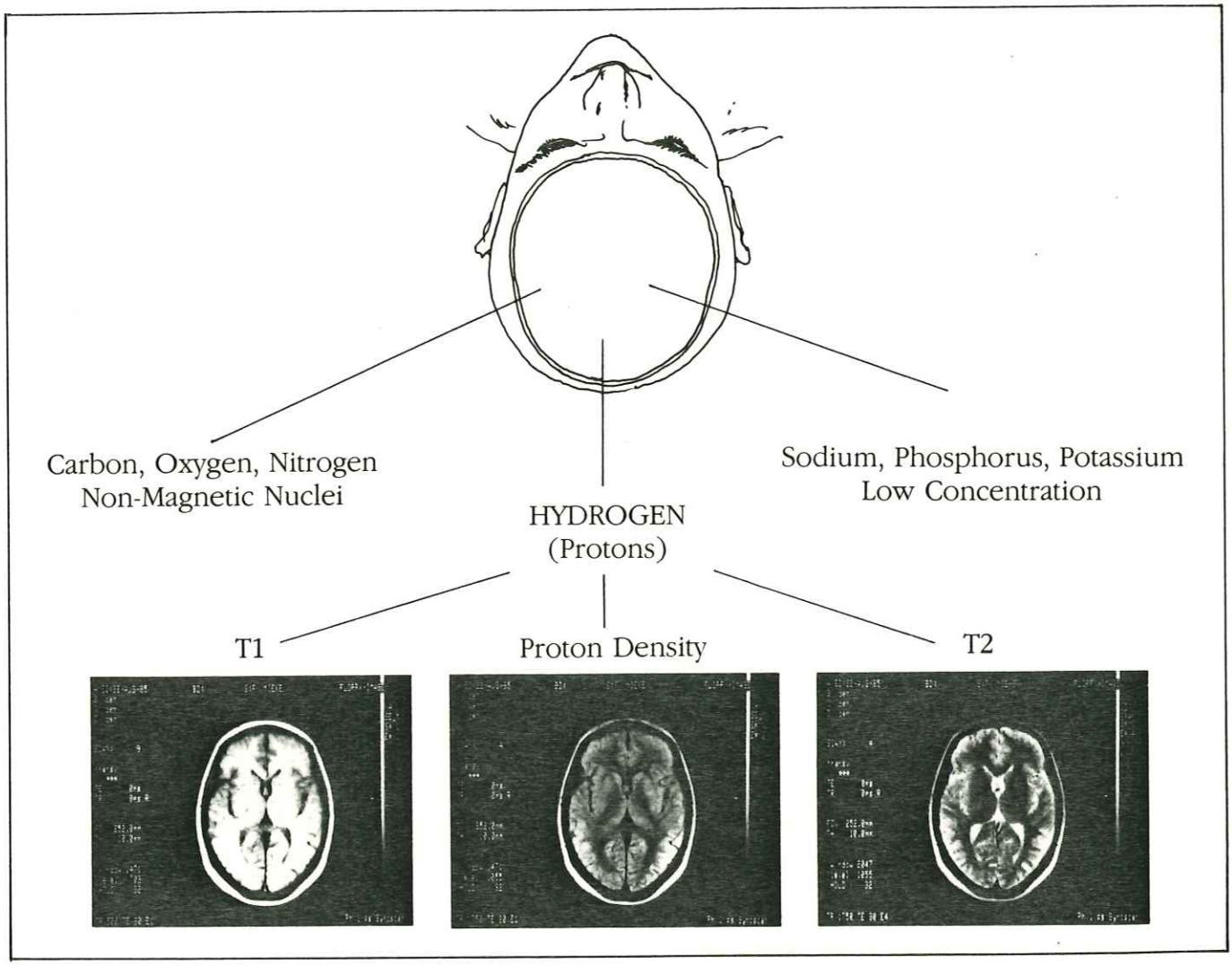
Many clinical examinations will consist of both T1 and T2 weighted images.

Flow Imaging

MRI can image flowing fluid (blood and CSF) *without* the injection of a contrast material. The brightness of the blood in an image is often related to flow velocity and can be used as a diagnostic sign.

Summary

The process of magnetic resonance can be used to create images which surpass other modalities in distinguishing among various types of normal and pathologic tissue. This is because the magnetic properties of tissue are very sensitive to changes produced by disease.



Attachment 4

MRI SITE PLANNING
Part I

by Gary R. Davis

MRI has moved from experimental through research and development to its present day status as an accepted imaging modality. During its evolution, the procedures and requirements for providing an acceptable environment for the magnet have passed from the hands of the research physicist, radiologist, and architect, down to the hands of the contractor, all within a short period of time with minimal amount of reference material or instruction available to the owner or contractor. Magnetic shielding, RF shielding, interface panels, cryogen quench vents, and other intimidating requirements have caused the contractors to add dollars to their bids in order to cover contingencies they fear and have little, or no knowledge about.

The objective of this article is to acquaint you with the requirements for locating and building a complete and productive environment for MRI. In order to be sure we are all starting out at the same point, we'll begin with a short discussion about magnetic imaging equipment, then move on to electromagnetic shielding, better known as RF or radio frequency shielding. This is essentially the process of locking radio waves out of the MRI suite. We'll also cover magnetic shielding, the protection of the environment from the high-field scanners, and the protection of the magnet from influences in close proximity to the examination suite. In next month's issue of *AR,*

Mr. Davis provides consulting services for architects, professional medical groups and other seeking direction on design, development and implementation of Magnetic Resonance Imaging, magnetic shielding, and other related RF principles. He is associated with the George Washington University School of Engineering and Applied Science in teaching planning and operation of Magnetic Resonance Imaging facilities. Mr. Davis was educated at Rochester Institute of Technology and attended Johnson College for Architecture.

we'll tie these thoughts together with the process of planning and construction.

Let us begin by defining some of the terms that will be used in this article:

The word *FIELD* refers to Electromagnetic Flux Density, which in this case refers to the "pull" of the magnetic field. The power of a magnetic field is measured in two kinds of units: big units and small units. The big unit is known as a Tesla and the small unit as a Gauss. In the MRI business you will likely hear the term kiloGauss, which is 1000 Gauss, and Tesla, which is 10,000 Gauss. As a point of comparison, the earth's natural magnetic field, the force that makes the compass needle point to the north, is about one-half Gauss. The power of a one-Tesla magnet generates a magnetic flux density of about 20,000 times that of the earth's magnetic field.

LOW-FIELD magnets are usually restrictive, permanent, or hybrid. These systems are generally capable of 0.1 Tesla to approximately 0.4 Tesla.

MID-FIELD is where a good portion of the medical imaging is accomplished today — 0.5 T to 1.0 Tesla magnets imaging at 0.35 T to 0.6 T. These magnets make up more than 25% of the units already installed, and they are almost always the cryogenic electromagnetic type.

HIGH-FIELD refers to the 1 T, 1.5 T, 2 T, and even as high as 4.7 T magnets. Magnets rated higher than 2 T are primarily used in research applications involving spectroscopy. These high field magnets are almost always the cryogenic electromagnetic type.

THROUGH-PUT refers to the number of patients you can examine per day.

Let me turn your attention to the various types of MRI scanning devices. All of them incorporate some kind of powerful magnet, a three-axis series of gradient magnets, a radio transmitter, a radio receiver, and a very sophisticated computer dedicated to image array processing. The basic differences are the nature of the powerful magnet.

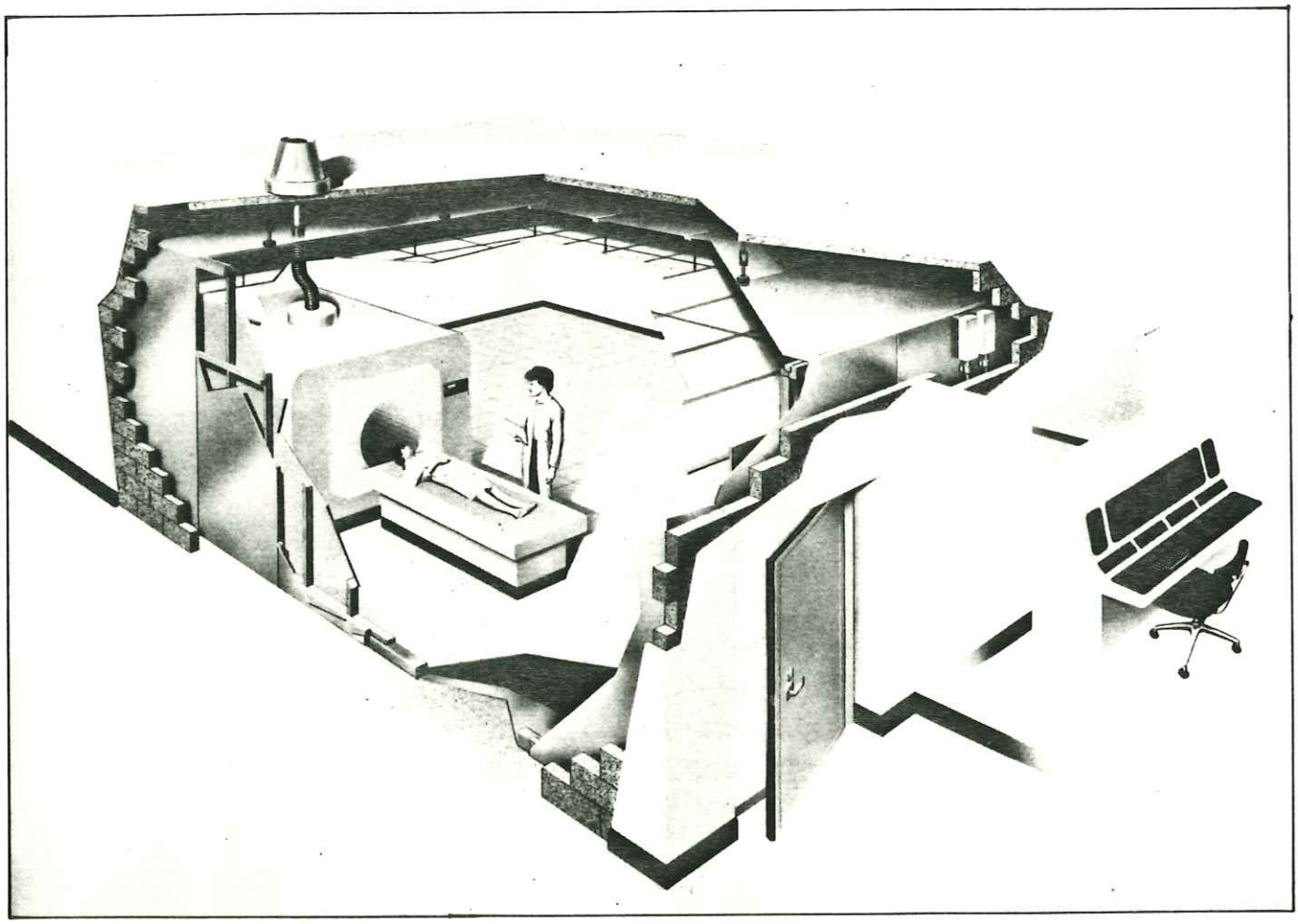
A static magnetic field can be created in one of three ways:

A *RESISTIVE* electromagnetic system consists of heavy copper coils carrying a high current. The term resistive refers to the fact that the wire resists the flow of electricity, therefore producing heat. Resistive magnets are limited to the low field variety because the amount of electricity needed to create a high field magnet would quickly heat the wires to their melting point.

A *PERMANENT* magnet system is made from modular alloy or ceramic which is permanently magnetized. The field strength of the medical systems generally range from 0.1 Tesla to 0.3 Tesla.

The *SUPERCONDUCTIVE* system works on the principle that certain alloys and metals lose their electrical resistance when exposed to extremely low temperatures. In superconductive high field magnets, the object is to reduce the resistance factor as much as possible in order to permit less electricity to do more work. This is achieved by cooling the magnet's winding with a liquefied gas. Hence the term *Cryogen* comes into focus.

In the case of MRI scanners, the cryogen involved is the coldest substance man can make: liquid Helium at −450°F. In a cryo-



genic MRI magnet, a coil of Niobium Titanium wire about 9–10 miles long is wound around a drum that is bathed in liquid Helium, and enclosed in an outer jacket of liquid Nitrogen which insulates the Helium from the outside environment. At −450F., the resistance factor in the wire approaches zero. This means that once an electric current is induced into the coil of wire, the source of electricity can be turned off, and the current in the coil will keep circulating on its own and create the magnetic field for years — as long as the low temperature is maintained.

The advantages of resistive magnets are that they are relatively light and inexpensive, they don't require cryogen care and maintenance, and they can generally fit into small areas. The disadvantages are that in order to keep the field stable, the magnet has to be powered continuously, which is costly. The size of the magnetic field is limited by power consumption.

Permanent magnets are very heavy, often weighing about 100 tons. On the positive side, the major cost of running a permanent magnet is careful temperature regulation, and the fringe field is almost negligible. The uniformity of the magnetic field is comparable to that of resistive type magnets.

A superconductive magnet can produce a magnetic field at no electrical cost so long as the magnet's winding remains bathed in liquid Helium (*i.e.*, around −450°F.). The expense in using this system comes from the cryogens required to keep the magnet cool.

The *HYBRID SYSTEM* is a combination of permanent, resistive, and/or cryogenic systems. These systems are generally low field (0.1 T to 0.3 T). Their small size and minimum fringe field generally allows these to be installed with less construction costs.

Technology is changing fast, which is why facilities have to be designed with the flexibility to accommodate changing requirements for space utilization, traffic flow, and most importantly, expansion. For example, teaching centers are facilities with specialized design requirements. Generally these sites get used and abused by just about everyone, and should be designed with a large rotating staff in mind. There should be plenty of room for standing personnel in the control room. The control area should be well isolated from the patient traffic pattern. Larger patient viewing windows, more seating area, and more film storage area are usually required.

Form follows function, and the functions are changing fast. About 80 percent of the MRI systems now in operation fall into the category of cryogenic mid- or high-field magnet in a "for profit" imaging center. Let's take a look at the different aspects of site planning and selection.

PERMITS AND ZONING. You might know exactly where you would like to build it, but can you put it there? Many a project has been halted by this problem. Some permit issuing officials still worry that if the magnet doesn't pull the hubcaps off passing cars, then, at the worst, the "cryogen bomb" might level the neighborhood someday. Because the process of information exchange can take a lot of time, it should begin early. Don't make any assumptions until you've received the building permit. Have it in your hands *before* you start the physical building program.

ENVIRONMENTAL CONSIDERATIONS. Those of you in the construction profession know about weather — how rain and cold can stop a project in its tracks and delay the opening day for months.

LAND COST. Does the land cost warrant the purchase or the lease? Some locations may be ideal, but the price could be out of your budget. What then? Do you go for a larger budget, or search for an alternative? The major consideration is time. There's never enough time to handle the surprises you can encounter. Plan for them up front, *and* allow for the time to handle them. One good way to avoid surprises is

to deal with the fundamental issues well in advance of site planning.

LOCATION WITHIN THE MEDICAL COMMUNITY. As with all real estate decisions, the primary issue in most situations is location, location, location. Most sites want to be in the "pill hill" traffic pattern as a convenience to patients.

SHIELDING REQUIREMENTS. Unless your site is on a lonely island, RF shielding is almost always required for MRI sites. It isn't a question of *if* RF energy will affect your image, it's a question of *when.*

RF shielding is NOT well understood by most doctors, architects and contractors. Consequently, it's sometimes placed on the back burner and treated like any other building material that does not require applications engineering. This is not the case.

If you're planning on a high-field magnet, magnetic shielding is another problem that needs your attention. The important issues are (1) does your magnet really require shielding, and if it does, (2) can you design around the magnetic field problems at your site?

MRI ALONE OR A MULTI-MODALITY CENTER. Are you building a stand-alone MRI site, or will it encompass other modalities now, or in the future? The impact of this decision extends from the parking spaces needed, future electrical service, patient and staff flow, and many more considerations.

PLANS FOR FUTURE EXPANSION. Are you planning to start small and then expand as your practice or population grows? This future impact needs to be defined early in the planning stage.

MOBILE AND MODULAR MRI SITES. Mobile, semi-mobile, and modular MRI facilities are very well suited to some medical building requirements. They can be temporary solutions to the time problems you're going to face, and they can get you into business quickly, allowing more time to plan and build your permanent facilities.

When a mobile facility is used as a temporary home for your equipment, it can provide important marketing advantages. When the MRI services can get out into your neighboring communities, local physicians will have a better opportunity to see the benefits of MRI first hand. Later, when the equipment settles in a permanent home, these physicians will be more likely to refer patients in spite of a possible distance factor.

Modular buildings are the latest alternative in MRI construction. Today you can lease the equipment, the personnel, and the entire building. Modular buildings can put you into business in a relatively short time. You just pick your floor plan and pour a concrete slab. There may be an important tax advantage to this approach.

For those that require only a temporary facility, disposable buildings designed for approximately two years of use are available for a low price.

NEIGHBORS. It would be advisable to check the professions of your neighbors, or possible future neighbors, to prevent a conflict of liabilities. Examples of concerns are: disturbance of an audio/hearing testing lab located adjacent to the site, which could be caused by the gradient "thump"; disturbing magnetic media at a nearby computer store; affecting automated office equipment that uses microchips or microprocessor-based equipment. You must also consider what you might do to your neighbors if you are planning for a mid-field system with the idea in mind to upgrade to a high-field system.

STRUCTURAL SUPPORT. Until now, in the cases of new construction, we've been assuming the magnet will be on the ground floor. However, this isn't always true. For a site with the magnet on a floor other than the ground slab, a thorough structural analysis is in order, as the load bearing characteristics are vital in defining whether the site is safe.

If magnetic shielding is required, you have to support both the magnet and the magnetic shielding. The average cryogenic mid-field magnet weighs about 14–16 thousand pounds. The weight of magnetic shielding can be calculated by using 40 pounds per one square foot at one-inch thickness. Add about 10% of the total weight for the required support structure. In many cases, you could be looking at 30–100 tons.

ADEQUATE ELECTRICAL SUPPLY. Make sure there is enough power for the equipment and your facility requirements. Every MRI system, as well as CT system, should have a power conditioning system dedicated to the equipment. While this is a requirement with *some* MRI companies, it should be adopted by ALL the manufacturers. The cost of such a unit compared to the overall project cost is minor, but when you have downtime, because transient voltages have knocked out your computers, you're losing revenue and discouraging the physicians in your referral base.

To put this into a frame of reality that administrators can relate to — after you've signed a dozen service repair tickets for "intermittent" problems, you'll then begin to suspect the service engineer, then the software, then you ask, "Why did I ever buy this stuff in the first place?" In most cases, what you've experienced results from power fluctuations or transients that knock out your microchips, or start their degradation process. By using a power conditioning system and transient voltage protection, you've established a baseline of clean power, and almost always a reduction in service costs.

HEIGHT REQUIREMENTS. The height requirement should be measured from the top of the magnet unit and not from the floor. This may be different from what you've been hearing — that the MRI companies want ceiling heights of 11, 12, 13, or even 14 feet. That's a lot of extra space to pay for! Most cryogenic magnets require 2½ to 3½ feet above the magnet's turret (or top of the magnet). This allows for clearance for the insertion of the cryogen transfer tube that transfers the liquid Helium and Nitrogen from the portable dewars into the magnet.

The magnet has a "boil-off rate" that uses some of the cryogens, and they must be replaced. Also, there is an electronic probe used to power the magnet up-to-field and down-from-field. Both the transfer tube and electronic probe are inserted at the top of most magnets in use today. However, new magnets are coming out with lower

insertion areas in order to eliminate the need for extra high ceilings.

The top hat (or vaulted ceiling) is one way to achieve the clearance required above the magnet, and its effect will save money on the RF room, as well as on interior finishing. Additionally, the top hat can be used as a skylight, and as a delivery point for the magnet.

DELIVERY COORDINATION. Scheduling is everyone's problem, from the brick mason to the MRI manufacturer. No one seems to be excluded. Once an acceptable schedule has been established for the delivery of the magnet, other building trades will have to be adjusted to fit the installation time schedule. The magnet can be shipped to the site early and placed on an RF pad on the floor. This allows the contractor to continue with his work schedule, and the RF enclosure portion of the project to be continued when they were originally scheduled. It must not be overlooked, that if the magnet is delivered on the ground, it must be ensured the floor will support the magnet's live load from the outside delivery point, through the corridors, and into the scan room.

COST OF DEMOLITION & RECONSTRUCTION. Will it pay to renovate, or will it be cheaper to knock it ALL down and start fresh? In some cases, the latter is the most practical choice.

WHAT DOES AN MRI SITE COST? Specifically, from a low of about $150,000 to a high in excess of $1 million, excluding the cost of the land and equipment.

Research and development sites usually have a low budget for construction and are usually funded by grants. The next step up would most likely be where the low bidder is carrying the job on a fairly tight budget, and looking to change orders for his profit.

Hospital funded projects fall in the middle of the chart as the result of close attention to price value relationships tied to cost control policies on one hand, and marketing potentials on the other. Hospitals want a low cost, but not so low as to create a negative impression on referring physicians and their patients. The hospital environment has to be pleasant but not opulent. Many hospital projects are proceeding on a "not to exceed" pricing standard, or a "turnkey" operation.

Independent privately financed projects are usually more aggressive about timing, and are willing to pay a premium to assure that high quality construction will be completed on time. In such cases, the earlier the cash flow can be established, the more comfortable the investors will be.

Lastly, at the high end of the scale, we find the large budget projects. These tend to be conceived as showplaces that are designed to gain attention in the marketplace and meet high corporate standards for quality for a variety of reasons.

An additional factor for consideration is whether it is low, mid-, or high-field. If it's mid- or high-field, what about the 5 Gauss line? Will you give up square footage to accommodate the FDA requirement, or will you add magnetic shielding? Is there a financial trade-off? What will the location allow you to do in the future?

Most MRI installations today tend to be hospitals and private investor projects. Whatever the budget level, the problem of shielding remains the same. Each of the MRI manufacturers have a set of standards for the RF environments required by their scanners. These standards essentially say that any electromagnetic energy inside the examination suite must be well below the RF levels used to acquire image data from the patients. WHENEVER THIS STANDARD IS VIOLATED, THE ACCURACY AND OVERALL QUALITY OF THE IMAGES CANNOT BE ASSURED.

RADIO FREQUENCY SHIELDING. MR Imaging equipment has to perform in what can only be called a hostile environment. Wherever the MRI site, there is bound to be a high level of radio wave energy in the air and in the ground. It comes from microwave communication links, cellular car phones, radio stations, citizens band ra-

dios, and various commercial radio communications systems. It is always present at different intensities and with a variety of different frequencies depending on the local environment.

The RF shielding system must be designed to meet two basic criteria: (1) the standards of the MRI manufacturer, and (2) the electromagnetic characteristics at the site. As a rule, manufacturers require any outside radio signals in the range of 1 to 100 MHz be attenuated by 100 dB.

In addition to this high level of electronic performance, the RF enclosures must be designed to last with no loss of performance, and the RF construction design shouldn't get in the way of architectural planners. The RF enclosure should essentially be invisible. It should have flexibility designed into it so the examination suite is aesthetically pleasing as well as functional. You should be able to apply interior finishes and electrical boxes in a conventional manner that doesn't require additional expense or special attachment devices. Skylights, geodesic shape, large viewing windows to the outside environment — all are possible. A skylight can create a pleasant and natural environment in the examination suite. It's good practice to give the patient a warm, inviting atmosphere rather than one that's cold and sterile.

The RF enclosure is nothing more than a large copper box that either reflects or absorbs radio waves and conducts them into the ground through a single grounding point where they are then neutralized. The problem with the "copper box" analogy is that it's complicated. People, wires, air, and liquid gases have to move, or be moved in and out of the examination suite on a regular basis. The problem for the shielding supplier is the design of a high performance system that can be installed easily, yet allow all the required access function such as doors, air vents, electric lines, control cables, etc.

The shielding supplier must also be able to assure that the RF enclosure will perform as specified from the date of completion through the life of the facility and the associated imaging equipment. To accomplish this, the RF enclosure company uses a test known as military specification 285, or more commonly, mil spec 285. The procedure is very exacting in how the enclosure is to be tested, and how to calculate the results. In all cases, the shielding system should be tested by an RF company that has RF engineers on its staff, and is recognized in the industry as competent.

Sometimes the MRI shielding companies and their procedures are less than adequate. The impact on the physician, if the RF room hasn't passed a certified test by a reliable RF enclosure company, is disruption of images by RF problems. Again, it's not a question of it, but *when* the RF integrity of the scan room will be violated.

When should you test? Right after the copper RF enclosure is installed, it should be tested for the baseline reading, and to ensure the enclosure meets requirements by the MR manufacturer. The test should be witnessed by a representative of the MR company and by the purchaser's representative. An additional test, after application of the interior by the contractor, is an option chosen as insurance against damage caused inadvertantly during construction. Some choose to test the copper RF enclosure after the MRI equipment has been installed in order to establish the actual equipment operating baseline.

Magnetic shielding is a completely different subject. It can actually involve one of two things: It may be a sponge, or it may be a shield. As a sponge, it will absorb the magnetic field and retain a specified amount of the field, so predetermined Gauss levels can be met. As a shield, it protects the magnet from seeing or being influenced by iron-laden magnetic items in the nearby environment, such as passing cars, elevators, etc. The amount of magnetic shielding is usually determined by the manufacturer so it coincides with the equipment's shimming capabilities.

Shimming is the act of convincing the magnet that what is there is not really there, or, making it think the disturbing factors in the magnetic environment are not really there. This is accomplished through a combination of hardware and software applications developed by the MR manufacturer. These specs simply tell the magnet that the lump of steel doesn't exist, and to correct its image so that it's nice and round.

There are times when magnetic influences are so strong they cannot be turned out. In these cases, they have to be magnetically shielded. Shielding of a magnet almost always should be symmetrical — what's done on one side should be done on the other. Depending upon the shimming capabilities of the MRI manufacturer, there may be cases where the shielding may not be exactly symmetrical. The equipment representative can explain in detail.

CONSIDERATIONS FOR MAGNETIC SHIELDING. Magnetic shielding is a two-way proposition with the high-field magnet because it can help avoid a number of nasty problems. It protects the scanner from outside magnetic influences such as (a) elevators, (b) vehicles, (c) motors, and (d) stretchers. It serves to protect nearby equipment and operations such as (a) computers, (b) video terminals, (c) pacemakers, (d) neighboring business, and (e) floors above and below.

MAGNETIC SHIELDING FACTORS. The most fundamental questions that must be answered are: (1) what type of shielding does your magnet need? and (2) do you need to contain the field or adjust and rehsape it?

Do you need partial shielding on two, three, four, or five sides, or do you need full magnetic shielding on all six sides? Your situation may call for structural support in order to handle the increased loading of the floor.

If you are going to utilize massive shielding, you must support it somehow! The rule of thumb is: The weight of the support structure is about 10% of the weight of the shielding. We're talking tons of steel which can range from 2 to as much as 100 tons depending upon the thickness of the steel. With steel shielding, you should be interested to know that steel runs 20–40 cents a pound. The cost stems from the labor needed to install it — if you install one 2″ plate of steel, you pay for one installation, if you install eight 2″ plates, you pay for eight installations. Study the various ways to install the shielding in order to keep the costs down.

Other things to look into would be your ability to integrate the steel into the site. Can you get the steel in, and will the building hold it? If your magnetic shielding is bolted together (and if it's annealed steel — it should be) you will probably have better working conditions than if you try to weld it.

In most projects, bolting the steel is preferred to welding. With the use of bolting, you don't have to get into the hazards of welding. Welding gives off fumes which can stop the surrounding building trades from working. You'd also have the Fire Marshall and insurance considerations involved at this point. The lengthy process of welding also impacts the construction schedule. MRI companies are now requesting annealed steel for their magnetic shielding. If the MRI system has to move to a new location, or, if you expand the capabilities of your system, you can remove or remodel your bolted magnetic shielding while a welded system may only offer the challenge of logistics. This can have tremendous impact on the landlord or the leasing company.

In the next issue of *Administrative Radiology,* we will continue our coverage of planning for an MRI site with the concerns of the actual construction tasks. □

Parks & Public Works

George A. Flaherty
Director

CITY OF PORTLAND

August 7, 1991

Maine Medical Center
22 Bramhall Street
Portland, Maine 04102

Attention: Mr. Michael W. Swan,
Associate Vice President
Administrative Services

RE: Directional Change - Chadwick Street

Dear Mike:

This is to inform you that the Portland City Council on Monday, August 5, 1991, approved an amendment to the City's Traffic Schedule which reverses the direction of travel on Chadwick Street. With this official action by the City Council, MMC can now apply for the necessary permits to modify the Bramhall Street parking lot. Please continue to apprise me of progress on this project so that the necessary traffic changes can be scheduled and implemented prior to completion of the project.

Thank you for working so cooperatively with the City on this project.

Very truly yours,

William J. Bray
Traffic Engineer

WJB/sjr

pc: Joe Gray, Director of Planning/Urban Development
Sarah Greene, Senior Planner

55 Portland Street · Portland, Maine 04101 · (207) 874-8493

Planning & Urban Development

Joseph E. Gray Jr.
Director

March 18, 1991

CITY OF PORTLAND

Mike Swan
Maine Medical Center
22 Bramhall St.
Portland, ME 04102

Re: Bramhall St. Parking Lot

Dear Mr. Swan:

On March 18, 1991 the Portland Planning Authority granted minor site plan approval for a change in the entrance to the Maine Medical Center parking lot from Chadwick and Bramhall Streets to the most southerly corner of Chadwick Street. This is a conditional approval, pending City Council adoption of necessary Traffic Schedule Amendments to reverse the traffic direction on Chadwick Street. The City Council approval must be received prior to the issuance of a building permit. In order to start the City Council review process, William Bray, the City Taffic Engineer, should be contacted.

The approval is based on the submitted site plan. If you need to make any modifications to the approved site plan, you must submit a revised site plan for staff review and approval. The site plan approval will be deemed to have expired unless work in the development has commenced within one (1) year of the approval or within a time period agreed upon in writing by the City and the applicant. Any request to extend site plan approval must be received in written form, prior to original site plan approval expiration. A performance guarantee in a form acceptable to the City of Portland, and an inspection fee equal to 1.7% of the performance guarantee will have to be posted before a building permit can be issued. A defect bond, consisting of 10% of the performance guarantee, must be posted before the performance guarantee will be released.

If there are any questions, please contact the Planning Staff.

Sincerely,

Joseph E. Gray, Jr.
Director of Planning and Urban Development

cc: Alexander Jaegerman, Chief Planner
Sarah Greene, Senior Planner
P. Samuel Hoffses, Chief of Building Inspections
Bruce Ringrose, City Engineer
William Boothby, Principal Engineer
Stephen Harris, Planning Engineer
William Bray, Traffic Engineer
Jeff Tarling, City Arborist
Benjamin H. O'Reilly, Jr., Superintendent of Parks and Islands
Approval Letter File

MMMC
MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

April 5, 1983

Mr. Joseph E. Gray, Jr.
Director of Planning and Urban Development
City of Portland
City Hall
389 Congress Street
Portland, Maine 04101

Dear Mr. Gray: Re: Amended Site Plan

Since the time that the Planning Board approved the site plan for Maine Medical Center's Phase I Project, we have reviewed further the parking and traffic flow in the area between the rear of the Richards Building, the parking garage and Charles Street. We believe that through the acquisition of one piece of property we can significantly improve entrance and parking plan previously approved. Further, we can, with this plan, provide for a discrete entrance for emergency vehicles, a separate entrance for private vehicles dropping off or picking up patients at either the Emergency Department or Ambulatory Surgery Unit entrance and a discrete entrance to the parking garage and service and deliveries area. We believe this provides a significant improvement over the plan which we presented previously.

We have an option to purchase the property at 26 Charles Street, and we would develop the garage access and service road on that property.

We have discussed this plan on several occasions with Mr. Kurt Becker, 37 Crescent Street, who would become our closest neighbor when we proceed with this plan. We have discussed with him screening of his property, curb and other protections. We have met with members of the City's Planning Staff and other City departments, including Public Works and Fire Prevention.

The enclosed plan reflects the majority of work that the hospital would propose to undertake in support of this revised plan. However, there are some details which can best be determined through continued discussion with appropriate City Planning Staff members and Mr. Becker. These include final locations of trees and shrubs, the exact makeup of a protective rail in front of Mr. Becker's house, the exact location of the relocated catch basins.

Further, Maine Medical Center will contact the owners of what is currently known as National Medical Care about revising the radius of the corner of Crescent and Charles Streets if this plan is approved.

MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

April 19, 1983

Mr. Richard Knowland
Planner
Planning Department
City Hall
389 Congress Street
Portland, Maine 04101

Dear Rick:

Just a note of thanks for your assistance with the revised site plan. I will be in touch with you in the near future with regard to those things which we left in an incomplete stage; specifically, location of certain parts of the landscaping and the type and location of the bumper rail. It seems to me that we should try to do this with Mr. Becker.

Sincerely yours,

Reynold R. Welch
Associate Vice President

RRW:JR

cc: Mr. Becker

The Center is prepared to carry out the curb and catch basin work associated with these changes and to maintain the planters and/or protective rail referenced above.

As a result of the planning both with City Staff and our neighborhood, we believe that this proposal has Mr. Becker's support and that we have addressed his concerns, and we believe we have addressed the preferences and requirements of the City.

We would appreciate the opportunity to present this plan to the Planning Board.

Thank you for your help.

Sincerely yours,

Ren Welch

Reynold R. Welch
Associate Vice President

RRW:JR

cc: Mr. McDowell

I believe a reasonable solution is as follows:

A. Entrance and exit to Bramhall Lot should be on Vaughan Street.

B. Parking should continue to be restricted, but 'resident only' parking should be allowed.

C. The Medical Center should cooperate with the doctors with offices on Chadwick to allow their patients use of the Bramhall Lot.

D. Chadwick Street should remain one way north. Traffic will be lessened with the relocation of the Lot entrance.

I know from the public meeting my wife and I attended that many area residents are concerned about the parking and traffic problems. I look forward to hearing from you on these issues.

Very truly yours,

Frank M. Locker
105 West Street

FML/cr

cc: Joseph E. Gray, Jr.
Jean Gilpatrick
John Barker

Mr. William Bray April 19, 1982

the Western Promenade as a one-way street westbound and the elimination of parking (5 spaces) on the north side of Brackett Street.

We believe that these actions will greatly improve the parking and traffic conditions around the Medical Center, and we pledge our cooperation with the City of Portland to continue joint planning to develop additional opportunities to eliminate problems in the neighborhood. If you should need any additional information, do not hesitate to call me.

Sincerely,

Donald L. McDowell
Executive Vice President
and Treasurer

DM:ja

cc: Samuel Hoffses
President Andrews
Mr. Welch
Mr. Lieberman

PORTLAND DESIGN TEAM

50 EXCHANGE STREET PORTLAND, MAINE 04101 207/775-1059
ARCHITECTURE INTERIOR DESIGN PLANNING

LYNDON D KECK, AIA
FRANK M LOCKER, AIA
DAVID C WEBSTER, AIA

February 21, 1983

Mr. Joseph Gray
Director of Planning &
Urban Development
City Hall
389 Congress Street
Portland, Maine

RE: Maine Medical Center Expansion

Dear Mr. Gray:

As a resident and property owner near the Maine Medical Center, I was notified of the Planning Board meeting on February 22. Unfortunately, I will be out of town and cannot attend. Here, however, are my concerns about the proposed expansion.

I live at 105 West Street, on the corner of Chadwick Street. The proposed expansion of the MMC will intensify an already serious problem in my neighborhood: traffic and parking.

Existing problems are:

1. Employees and patients at MMC glut our streets with their parked cars. Cars block my driveway daily. The one hour parking restriction was no doubt intended to control this problem; with it I get a lot of tickets for parking in front of my door.

2. Chadwick is a one-way street, with traffic going north towards MMC. It is poorly marked at the MMC end; cars regularly travel down Chadwick the wrong way. In addition to car accident problems, I am concerned for the safety of the children living near my intersection.

3. The parking lot entrance at the MMC end of Chadwick is often full, and access is limited to equal departures. Cars back up on Chadwick waiting in line. Drivers coming from the MMC end of Chadwick are consistent on one point: they regularly block the path of cars travelling north on Chadwick in the left hand lane. At times both lanes of Chadwick have been blocked for half an hour.

I feel these steps must be taken to solve or minimize these problems:

1. Designate 'resident only' parking areas along portions of the streets.

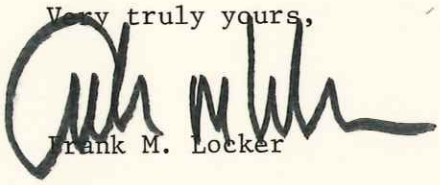
2. Ticket and tow cars blocking driveways.

3. Improved signage and control at the north end of Chadwick to eliminate wrong way traffic.

4. Relocation, redesign and/or improved control of MMC parking lot entrance.

If the existing problems of Chadwick Street are not addressed and solved, I cannot support any expansion of the Maine Medical Center.

Very truly yours,



Frank M. Locker

105 West Street

PORTLAND DESIGN TEAM

50 EXCHANGE STREET PORTLAND, MAINE 04101 207/775-1059
ARCHITECTURE INTERIOR DESIGN PLANNING

LYNDON D KECK, AIA
FRANK M LOCKER, AIA
DAVID C WEBSTER, AIA

April 20, 1983

Mr. Reynold R. Welch
Associate Vice-President
Maine Medical Center
Portland, Maine 04102

Dear Mr. Welch:

Thank you for your letter of March 22. My wife and I appreciate the concern you and your consultants are trying to show for the neighborhood around the Medical Center. I am sure the addition to the parking garage and reassignment of the Bramhall Lot will do much to relieve the present traffic problems.

I have concern, however, over the last three points in your letter.

1. Enforcement of on-street parking regulations: the problem is not that the regulations are not enforced; it is that they are not the right regulations. The one hour limitation does not work around the hospital because occasional hospital users and visitors will always continue to be the violators, even if you succeed in getting your employees to use the garage. Many people would rather risk getting a ticket than pay to park.

2. Relocate entrance to southern end of Bramhall Lot and

3. Redesignation of Chadwick Street to one-way south are part of the same issue. (2.) cannot be done without (3.). Chadwick Street is the wrong street on which to locate the entrance. Vaughan Street is wider and is a direct connection to both Congress and Danforth.

If (2.) and (3.) are done and the exit is adjacent to the entrance, the following will happen:

A. The traffic count on Chadwick will increase because <u>all</u> users of the Bramhall Lot will exit via Chadwick.

B. There will be an increase in the number of trucks using Chadwick. (A tractor-trailer truck, presumably from a hospital delivery, drove southbound on Chadwick Street the other day.)

recommendations, and we will detail here our commitment to implement them. Specifically, we:

1. will redesign the Bramhall parking lot to ensure the maximum number of spaces are made available,

2. will, when the project is complete, redesignate the use of the Bramhall lot to accomodate
   - short-term patient and visitors (approximately 230)
   - employees working at McGeachey Hall (approximately 30)
   - attending physicians (approximately 30),

3. will reassign all other employees to parking in the expanded parking garage,

4. will develop patient/visitor parking in the expanded garage for those using hospital facilities close to the garage,

5. will adjust the fee schedule for the Bramhall lot to discourage long-term parking (more than four hours),

6. will consider additional fee schedule adjustments to encourage use of the Bramhall lot should it be under-utilized after completion of the project,

7. will consider policies to discourage non-hospital use of the Bramhall lot (the recommendation concerns us as we feel the parking problem in the area to be such that the use of the Bramhall lot by non-hospital related parkers will be effective in reducing on-street parking. However, if hospital patients and visitors are unable to find space in the Bramhall lot, we will develop a system to restrict use.),

8. will, as we currently do, cooperate fully with the Portland Police Department in efforts to enforce on-street parking regulations,

9. request the designation of Chadwick Street as a one-way street southbound (we feel this change to be most important to relieve congestion at the entrance of the hospital and the Bramhall parking lot. While we are not certain how the neighbors might be impacted by this recommendation, we feel that the congestion at the corner of Bramhall and Chadwick is a problem to those on Chadwick Street.),

10. will relocate the entrance to the Bramhall lot (conditional upon #9 above) to the southern end of the lot, consolidating, if possible, the physician and visitor entrances,

11. request the designation of Bramhall between Vaughan Street and

MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

April 19, 1982

Mr. William Bray, Traffic Engineer
Department of Public Works
82 Hanover Street
Portland, Maine 04101

Dear Bill:

Enclosed is a copy of the Recommended Traffic and Parking Master Plan for Maine Medical Center prepared by Vanesse/Hangen Associates of Boston. As you know, we employed Vanesse/Hangen to conduct a comprehensive review of our traffic and parking situation, both current and projected through the completion of our expansion and renovation project. At the present time, the Medical Center meets the City Code requirements for parking spaces, and our plans included additional parking that would exceed the code requirements, but we all agreed that a study should be made to determine the actual demand and develop a strategy to most effectively utilize the off-street parking supply. We also agreed that the growth of the Medical Center would be slight in terms of additional traffic generated, but we felt a study of the traffic patterns might prove helpful in correcting current problems as well as forestall future congestion.

Therefore, we asked Vanesse/Hangen to work with the Medical Center staff and your office to:

- determine the current and future parking demands of the Maine Medical Center and make recommendations for the management of off-street parking spaces,

- study the present and future traffic around the Medical Center and make recommendations for the most efficient system to best utilize the adjacent roadways.

We hope that the recommendations made in the attached report are responsive not only to the needs of the Medical Center, but also to the needs of the neighborhood. We fully understand the impact of the Medical Center on those living nearby, and we hope that our plans will improve conditions in the area. Your participation in meetings with the consultants and Medical Center staff has been most helpful in identifying community problems, and we trust that such joint planning will continue to ensure the best possible traffic and parking system for all.

The Master Plan prepared by Vanesse/Hangen has made a number of

WINTON SCOTT ARCHITECT
165 Commercial Street
PORTLAND, MAINE 04111
(207) 774-4811

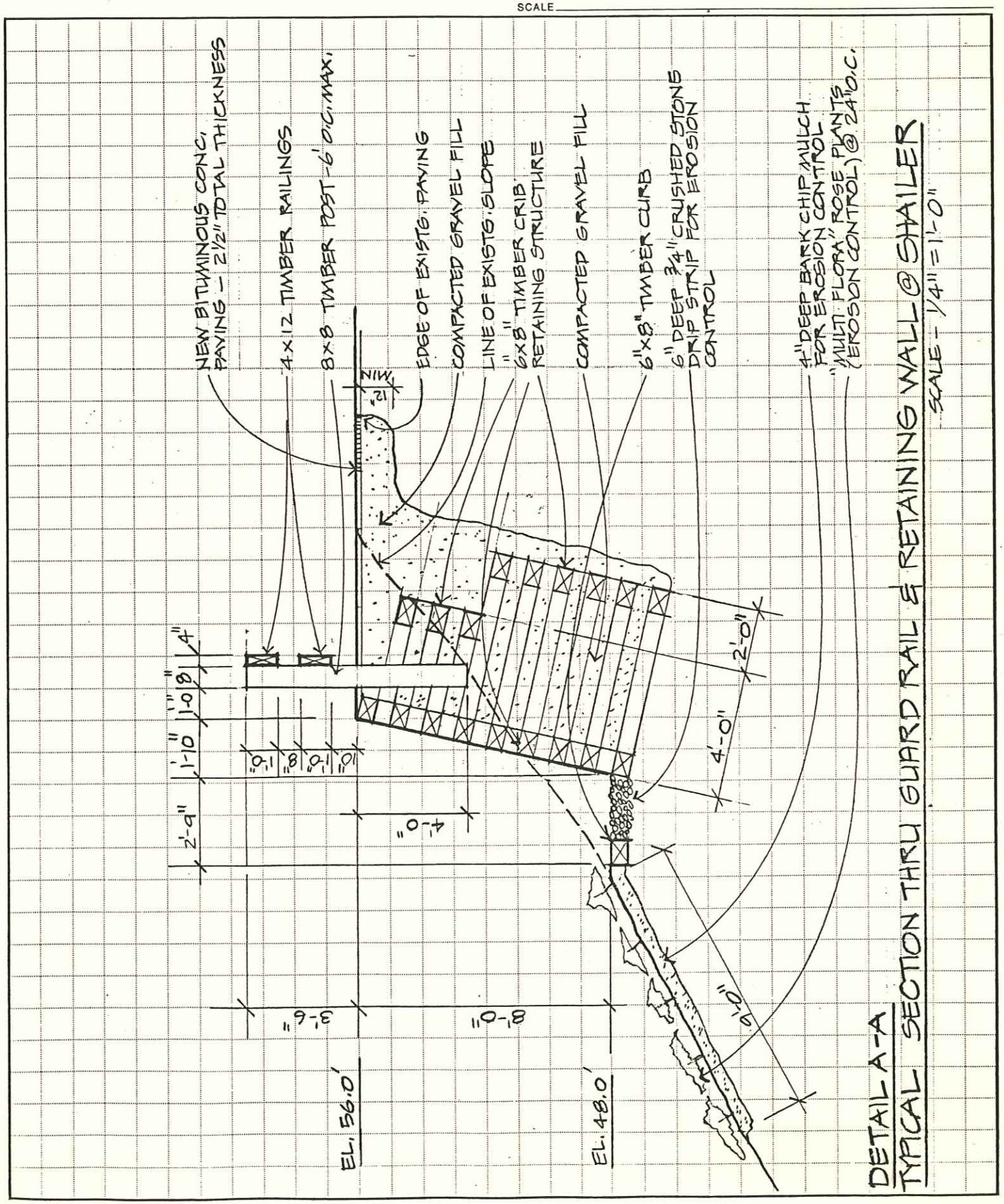
JOB SHAILER SCHOOL HOUSING

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE 2.2.83

CHECKED BY _____ DATE _____

SCALE _____



DETAIL A-A
TYPICAL SECTION THRU GUARD RAIL & RETAINING WALL @ SHAILER
SCALE – 1/4" = 1'-0"

WINTON SCOTT ARCHITECT
165 Commercial Street
PORTLAND, MAINE 04111
(207) 774-4811

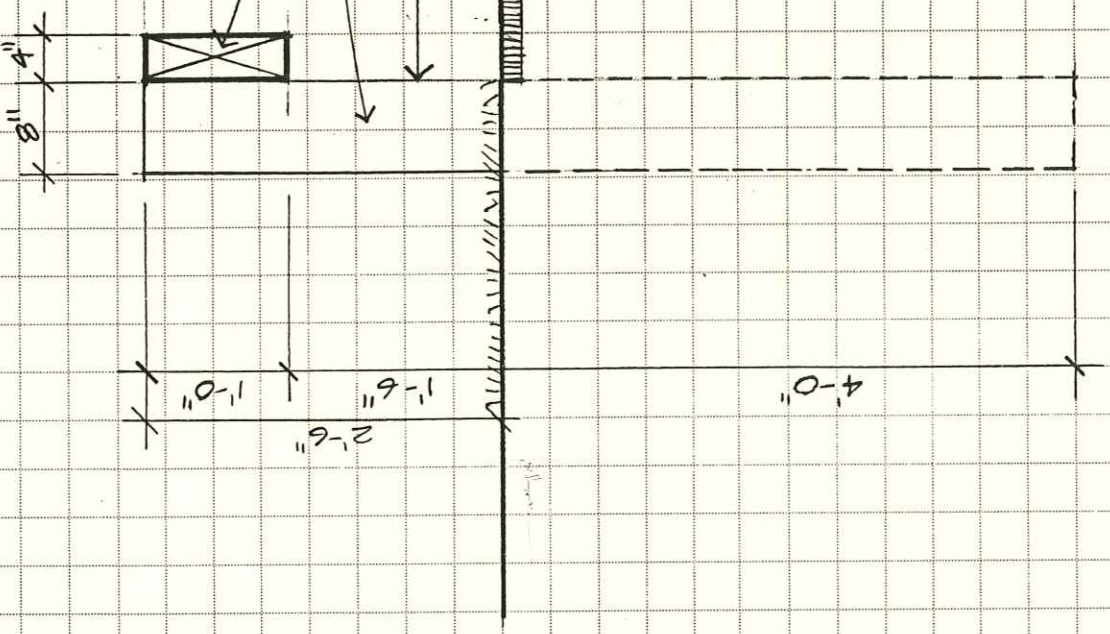
JOB SHAILER SCHOOL HOUSING

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE 2.2.83

CHECKED BY _____ DATE _____

SCALE _____



DETAIL B-B
SECTION THRU LOW GUARD RAIL @ SHAILER
SCALE 3/4" = 1'-0"

MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

April 5, 1983

Mr. Joseph E. Gray, Jr.
Director of Planning and Urban Development
City of Portland
City Hall
389 Congress Street
Portland, Maine 04101

Dear Mr. Gray: Re: Amended Site Plan

Since the time that the Planning Board approved the site plan for Maine Medical Center's Phase I Project, we have reviewed further the parking and traffic flow in the area between the rear of the Richards Building, the parking garage and Charles Street. We believe that through the acquisition of one piece of property we can significantly improve entrance and parking plan previously approved. Further, we can, with this plan, provide for a discrete entrance for emergency vehicles, a separate entrance for private vehicles dropping off or picking up patients at either the Emergency Department or Ambulatory Surgery Unit entrance and a discrete entrance to the parking garage and service and deliveries area. We believe this provides a significant improvement over the plan which we presented previously.

We have an option to purchase the property at 26 Charles Street, and we would develop the garage access and service road on that property.

We have discussed this plan on several occasions with Mr. Kurt Becker, 37 Crescent Street, who would become our closest neighbor when we proceed with this plan. We have discussed with him screening of his property, curb and other protections. We have met with members of the City's Planning Staff and other City departments, including Public Works and Fire Prevention.

The enclosed plan reflects the majority of work that the hospital would propose to undertake in support of this revised plan. However, there are some details which can best be determined through continued discussion with appropriate City Planning Staff members and Mr. Becker. These include final locations of trees and shrubs, the exact makeup of a protective rail in front of Mr. Becker's house, the exact location of the relocated catch basins.

Further, Maine Medical Center will contact the owners of what is currently known as National Medical Care about revising the radius of the corner of Crescent and Charles Streets if this plan is approved.

The Center is prepared to carry out the curb and catch basin work associated with these changes and to maintain the planters and/or protective rail referenced above.

As a result of the planning both with City Staff and our neighborhood, we believe that this proposal has Mr. Becker's support and that we have addressed his concerns, and we believe we have addressed the preferences and requirements of the City.

We would appreciate the opportunity to present this plan to the Planning Board.

Thank you for your help.

Sincerely yours,

Ren Welch

Reynold R. Welch
Associate Vice President

RRW:JR

cc: Mr. McDowell

MMMC
MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

April 5, 1983

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Director of Planning and Urban Development
City of Portland
City Hall
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Planning Report #17-83

PLANNING DEPARTMENT REPORT

MAINE MEDICAL CENTER DRIVEWAY

ENTRANCES ON CHARLES STREET

Submitted to:
Portland Planning Board
April 12, 1983

I. INTRODUCTION

Maine Medical Center has requested site plan review for several changes to the hospital emergency and parking garage entrances off Charles Street. The Planning Board originally approved a major expansion to the hospital on April 27, 1982. Since that time, Maine Medical Center has had the opportunity to acquire a parcel adjacent to their property which now makes these entrance improvements possible. Seventy notices were sent to area property owners.

II. PROPOSED DEVELOPMENT

The proposed plan will provide 3 separate entrances off Charles Street for ambulances, emergency drop-offs for nonambulance vehicles and the parking garage and service/delivery entrance. The previously approved plan had a shared entrance for all emergency related dropoffs. With the creation of 2 separate emergency entrances, the design and layout of the original emergency receiving and parking area has changed. As a result, the parking garage and service driveway has been shifted toward the intersection of Charles and Crescent Streets. The relocated parking garage driveway will be constructed on the footprint of an existing multi-family building (26 Charles St.) which would be razed by the applicant. This building is in the process of being acquired by MMC. To avoid the possibility of outbound vehicles from MMC using Crescent Street, the entrance and the curb lines of the street has been curved to orient vehicular turning movements up Charles Street. This avoids the creation of a T intersection which would likely increase traffic on Crescent Street. The change in the curb line has created the potential for a small buffer area adjacent to the nearest dwelling (37 Crescent Street owned by Mr. Kurt Becker). The hospital has proposed a variety of landscaping and guard rail structures to provide screening and a protective barrier from on coming vehicles.

In addition, the intersection of Charles and Crescent Streets (easterly side) will be modified to provide a smoother turning radius. This curve improvement will disrupt a small section (about 6 feet) of a sidewalk at this intersection. As a result, a small strip of land should be acquired from the National Medical Center to continue the sidewalk. Maine Medical Center has agreed to be responsible for acquisition and construction costs associated with that improvement.

III. STAFF REVIEW

The site plan has been reviewed by staff for compliance with the review criteria set forth in section 604.6 of the Site Plan Ordinance. The site plan has been reveiwed and approved by Public Works, Fire Department and Building and Inspection Services.

1. Traffic

The City Traffic Engineer, William Bray has reviewed and approved traffic related concerns for the project. As mentioned previously, the parking garage entrance and street curb line will be curved in such a manner as to discourage exiting vehicles from using Crescent Street. A right hand turn only sign will be posted at the driveway to reinforce the continuation of Charles Street as the outbound route.

As part of this project, Maine Medical Center has agreed to widen Charles Street from 20 to 24 feet adjacent to the emergency entrance and the parking garage driveway. The widening of Charles Street has been a long term goal of the hospital since the present width of the street is less than desirable. Maine Medical Center has agreed to pay for the widening of the road, as well as related paving, curbing, catch basin and sidewalk construction expenses.

2. Landscaping

The applicant has proposed to plant 7 trees (size ranging from 12 to 18 feet high) to stabilize the slope near the parking garage and service driveway. Existing vegetation will also be conserved on the slope. Disrupted areas along the slope will be planted with grass to prevent soil erosion.

Maine Medical Center (see attached letter) has requested that final landscaping plans and the design of a protective rail be the subject of further discussions with staff and the abutting property owner. The City Arborist has been consulted with regard to the proposed plantings.

3. Drainage and Soil

Public Works has reviewed and approved soil and drainage concerns.

4. Lighting

Exterior lighting remains unchanged from the original site plan. The fixtures will be nonglaring.

5. Fire

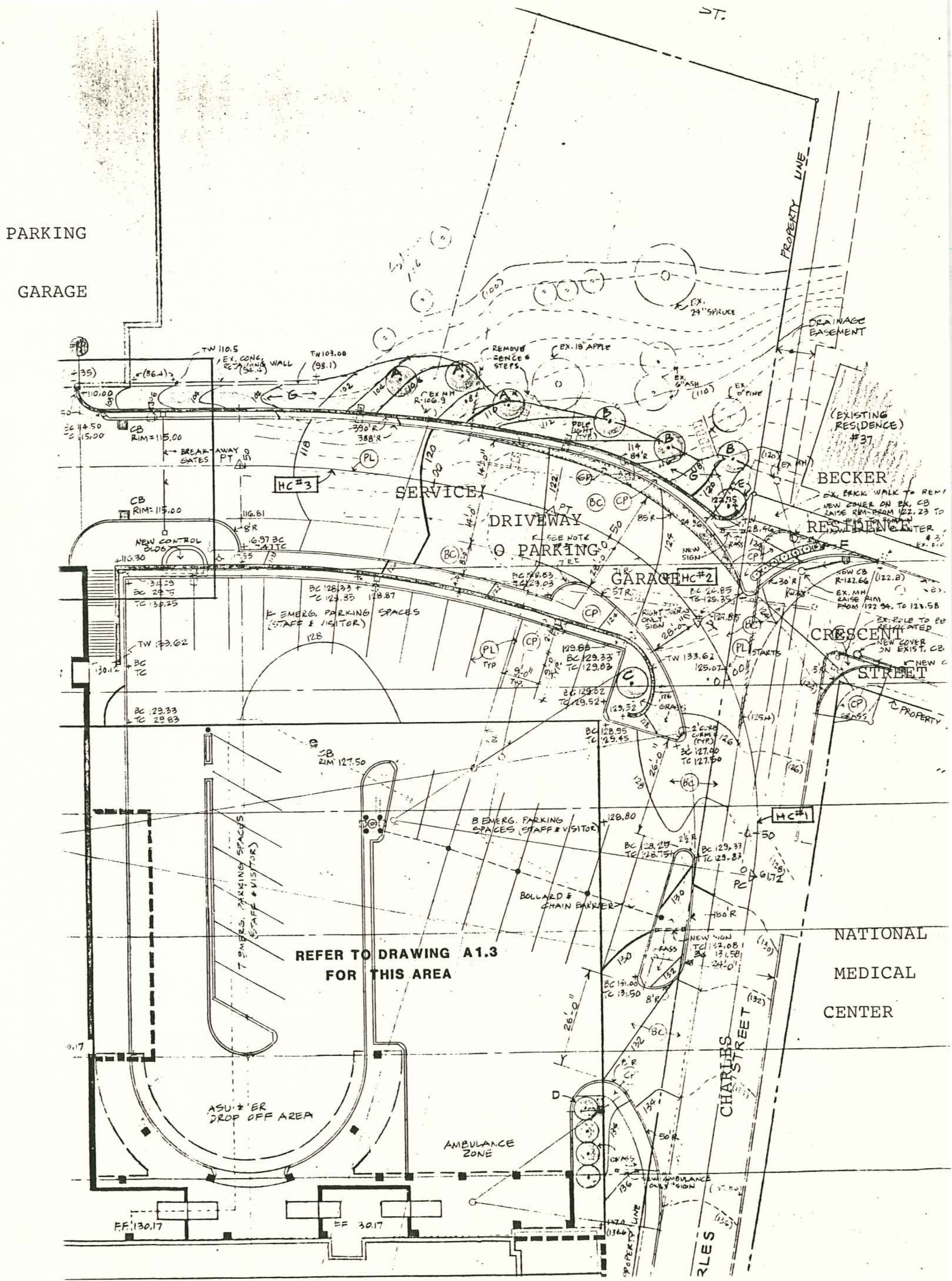
The Fire Department has reviewed and approved fire related concerns.

6. City Projects

The proposed development will not interfere with a City construction project. All the improvements proposed by the applicant within the right-of-way will be paid for by the applicant including a sidewalk near the National Medical Center property.

IV. ISSUES

1. Maine Medical Center has requested that final landscaping plans and the design of a protective rail be the subject of further discussion with staff and the abutting property owner. Should the Planning Board approve the site plan conditional upon these final details being approved administratively, staff would see no particular obstacle in completing the final review.


PARKING
GARAGE
PROPERTY LINE
DRAINAGE EASEMENT
EX. 24" SPRUCE
EX. 18" APPLE
EX. 6" ASH
(EXISTING RESIDENCE) #37
BECKER
RESIDENCE
SERVICE
DRIVEWAY
O PARKING
GARAGE
HC#3
HC#2
HC#1
NEW CONTROL BLDG
BREAK-AWAY GATES
EMERG. PARKING SPACES (STAFF & VISITOR)
8 EMERG. PARKING SPACES (STAFF & VISITOR)
7 EMERG. PARKING SPACES (STAFF & VISITOR)
BOLLARD & CHAIN BARRIER
CRESCENT
STREET
NATIONAL
MEDICAL
CENTER
CHARLES STREET
REFER TO DRAWING A1.3
FOR THIS AREA
ASU & ER DROP OFF AREA
AMBULANCE ZONE
NEW AMBULANCE ONLY SIGN
F.F. 130.17
FF 30.17
PROPERTY LINE

MMMC
MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

April 5, 1983

Mr. Joseph E. Gray, Jr.
Director of Planning and Urban Development
City of Portland
City Hall
389 Congress Street
Portland, Maine 04101

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We have an option to purchase the property at 26 Charles Street, and we would develop the garage access and service road on that property.

We have discussed this plan on several occasions with Mr. Kurt Becker, 37 Crescent Street, who would become our closest neighbor when we proceed with this plan. We have discussed with him screening of his property, curb and other protections. We have met with members of the City's Planning Staff and other City departments, including Public Works and Fire Prevention.

The enclosed plan reflects the majority of work that the hospital would propose to undertake in support of this revised plan. However, there are some details which can best be determined through continued discussion with appropriate City Planning Staff members and Mr. Becker. These include final locations of trees and shrubs, the exact makeup of a protective rail in front of Mr. Becker's house, the exact location of the relocated catch basins.

Further, Maine Medical Center will contact the owners of what is currently known as National Medical Care about revising the radius of the corner of Crescent and Charles Streets if this plan is approved.

The Center is prepared to carry out the curb and catch basin work associated with these changes and to maintain the planters and/or protective rail referenced above.

As a result of the planning both with City Staff and our neighborhood, we believe that this proposal has Mr. Becker's support and that we have addressed his concerns, and we believe we have addressed the preferences and requirements of the City.

We would appreciate the opportunity to present this plan to the Planning Board.

Thank you for your help.

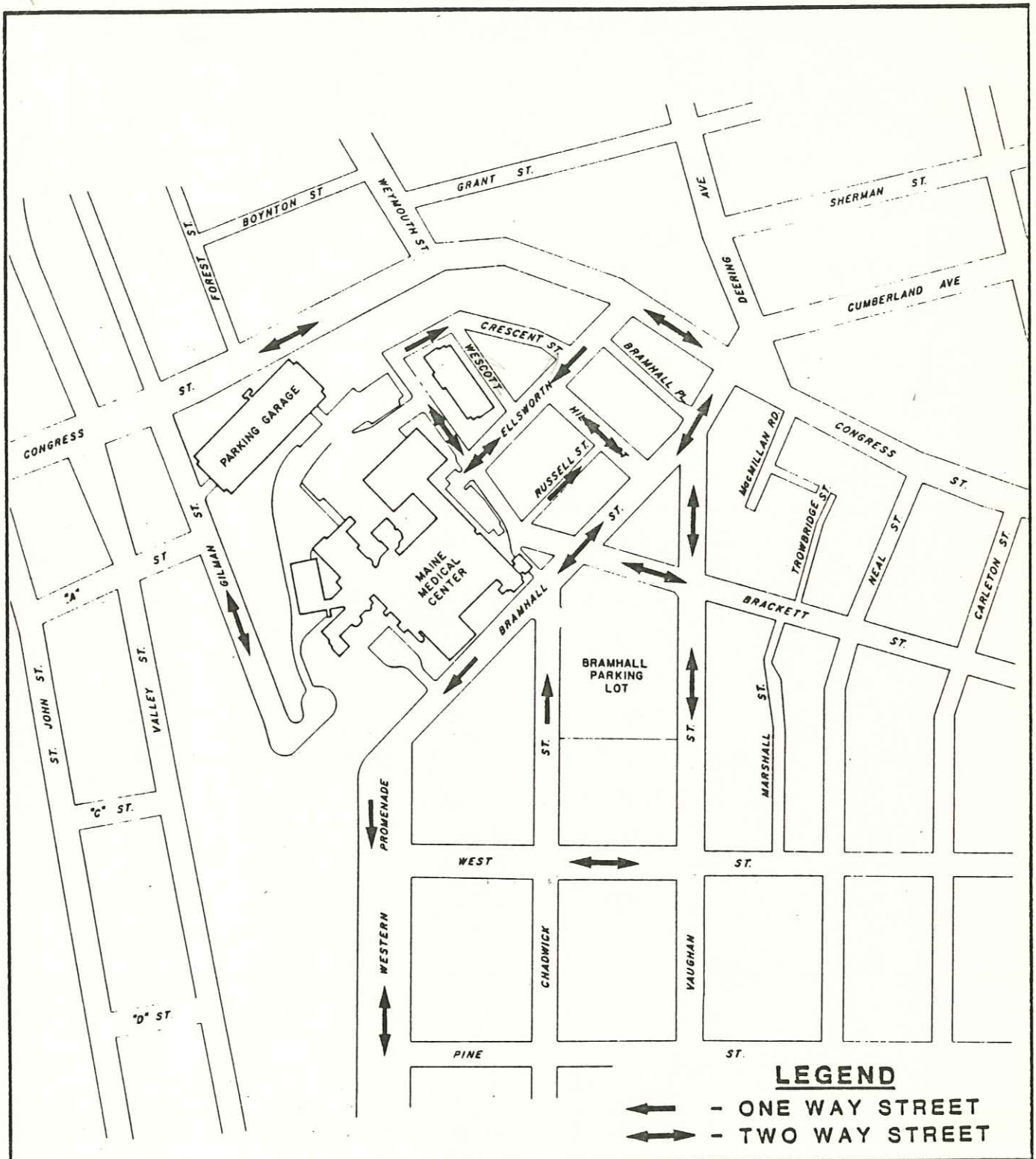
Sincerely yours,

Ren Welch

Reynold R. Welch
Associate Vice President

RRW:JR

cc: Mr. McDowell



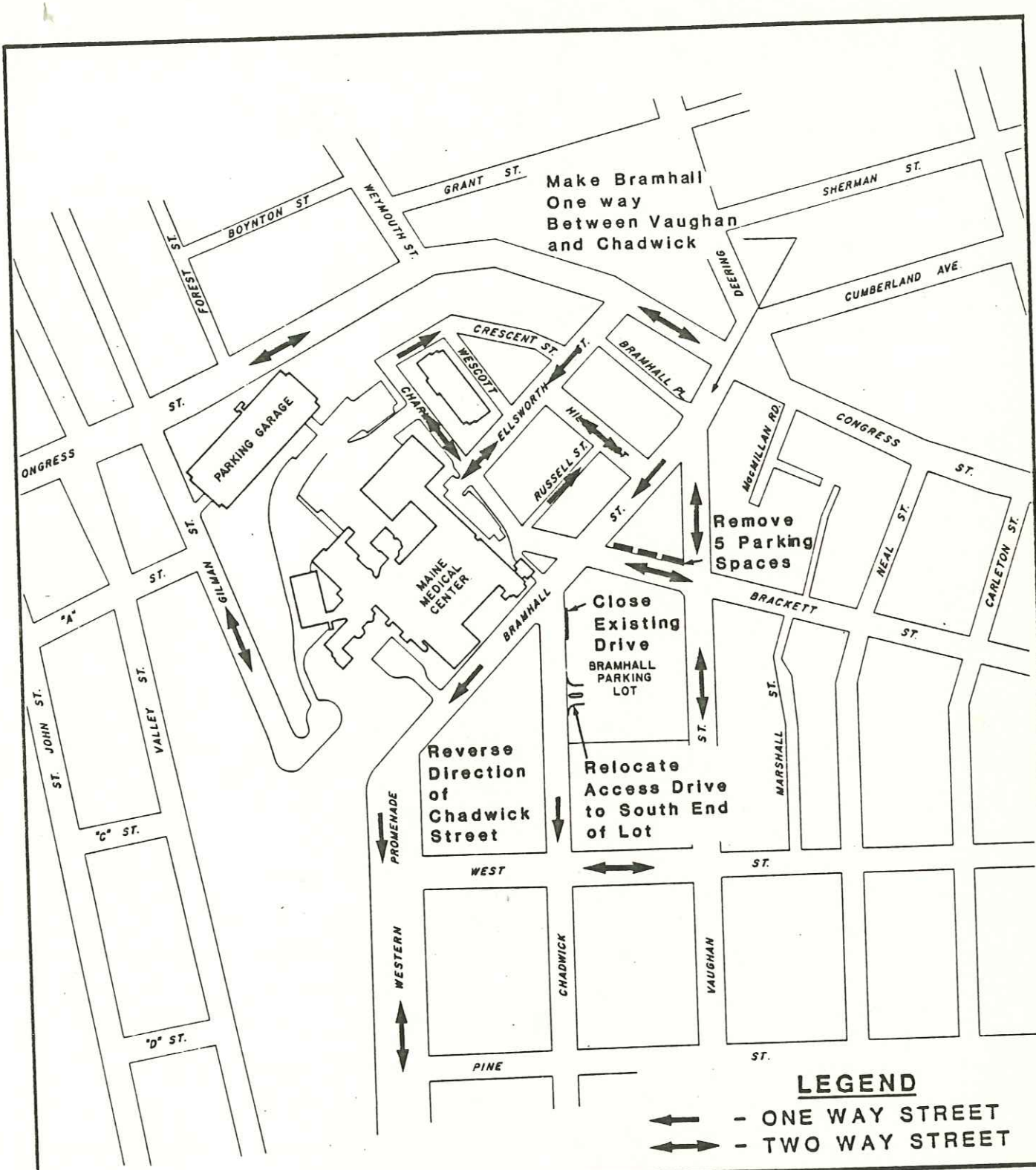
Maine Medical Center

Traffic Impact and Parking Plan

Existing Roadway Circulation System

Vanasse/Hangen Associates
Boston, MA

FIG. 3



Maine Medical Center

Traffic Impact and Parking Plan

Proposed Roadway Circulation System

Vanasse/Hangen Associates
Boston, MA

FIG. 13

MMMC
MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

April 5, 1983

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Director of Planning and Urban Development
City of Portland
City Hall
389 Congress Street
Portland, Maine 04101

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Further, Maine Medical Center will contact the owners of what is currently known as National Medical Care about revising the radius of the corner of Crescent and Charles Streets if this plan is approved.

MAINE MEDICAL CENTER • PORTLAND, MAINE 04102

Rick Rabe ✓
Copies sent to
Planning Board

March 22, 1983

Mr. Frank M. Locker
Portland Design Team
50 Exchange Street
Portland, Maine 04101

Dear Mr. Locker:

I have received a copy of your February 21, 1983 letter to Joe Gray expressing concerns about traffic and parking at and around Maine Medical Center.

We have the same concerns, and more, that you have expressed, and we feel that we have addressed them as part of the planning for our expansion.

As part of our site plan approval process, we worked with Mr. Bray, City Traffic Engineer, to identify the City's primary concerns and the parking required by code. We then hired Vanasse/Hangen Associates, consultants in traffic and parking, to work with us and the City to conduct a comprehensive review of our traffic and parking situation, current and projected through our expansion and renovation project.

In a letter to Mr. Bray, sent upon completion of the study, the Center outlined the steps it would take to address the problems identified in the study and by the City. The recommendations covered management of off-street parking spaces and "the most efficient system to best utilize the adjacent roadways."

Sharing with you some of the commitments made by us will, I believe, convey our intent to address problems that have been identified.

- Addition of 430 parking spaces to the parking garage
- Redesign of the Bramhall Parking Lot to ensure the maximum number of spaces
- Upon completion of our project, redesignation of the use of the Bramhall Lot to accommodate short-term visitors and patients

- Reassign all other employees to parking in the expanded garage
- Adjust fee schedule for Bramhall Lot to discourage long-term parking (more than four hours)
- As is currently the case, cooperate fully with the Portland Police Department in efforts to enforce on-street parking regulations
- Relocate the entrance to the Bramhall Lot to the southern end of the lot
- Request the designation of Chadwick Street as a one-way street southbound. (We believe this change to be most important to relieve congestion at the entrance of the hospital and the Bramhall Parking Lot. While we are not certain how the neighbors might be impacted by this recommendation, we feel that the congestion at the corner of Bramhall and Chadwick is a problem to those on Chadwick Street.)

While there were other recommendations, the letter to Mr. Bray concluded as follows: "We believe that these actions will greatly improve the parking and traffic conditions around the Medical Center, and we pledge our cooperation with the City of Portland to continue joint planning to develop additional opportunities to eliminate problems in the neighborhood."

Mr. Locker, we have said publicly at hearings before the Portland Planning Board, open neighborhood meetings at the Center and in other forums that we understand the impact of the Medical Center on those living nearby. We hope that the recommendations and commitments made with respect to traffic and parking are responsive not only to the needs of the hospital, but also to the needs of the neighborhood.

Sincerely yours,

Reynold R. Welch
Associate Vice President

RRW:JR

cc: Joseph E. Gray, Jr., Director, Planning and Urban Development
Jean Gilpatrick, Chairman, Planning Board
John Barker, Vice Chairman, Planning Board

City of Portland, Maine

IN THE CITY COUNCIL

AMENDMENT TO PORTLAND CITY CODE
SECTIONS 14-158(7) AND 14-49
RE: RECREATION AND OPEN SPACE ZONE

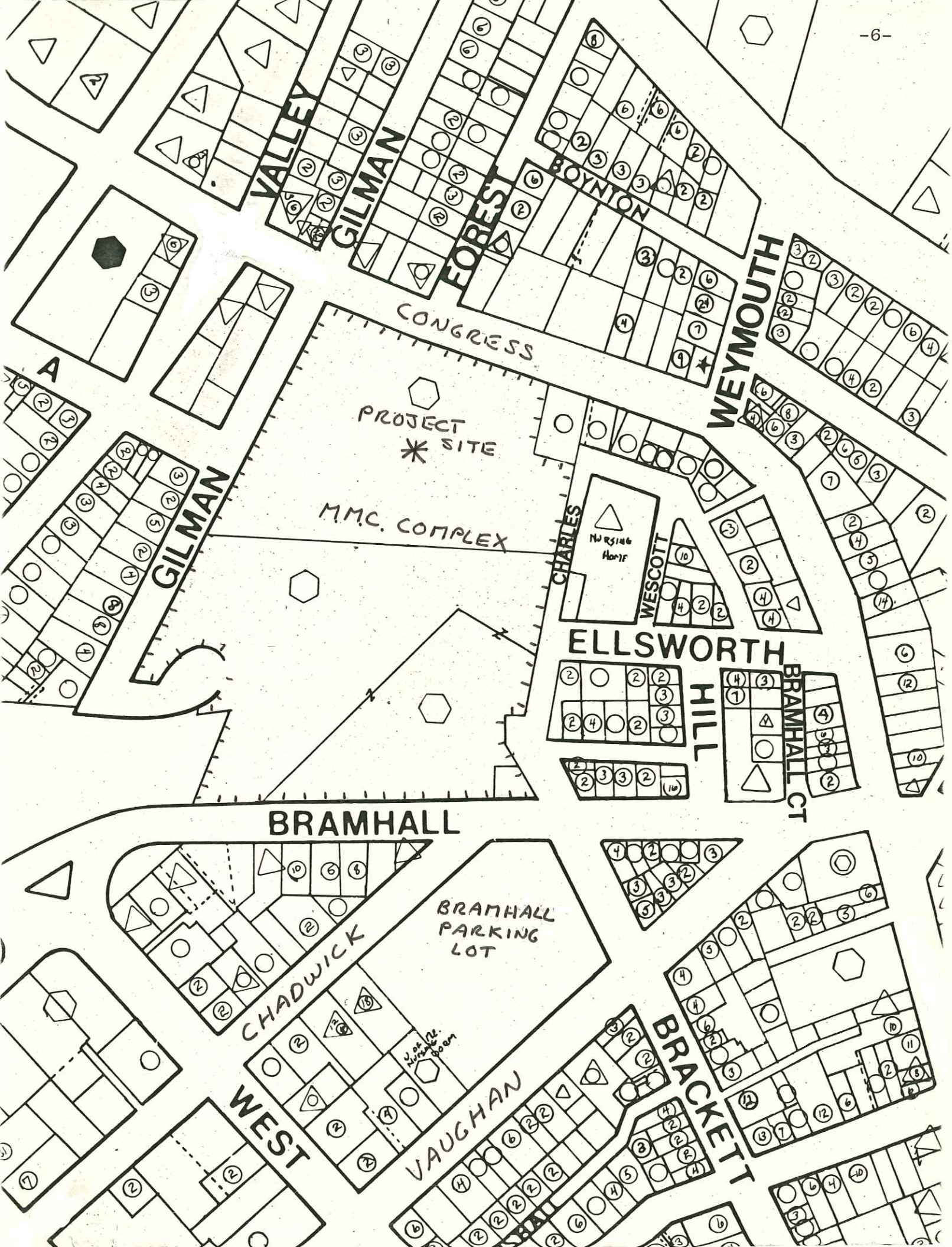
Ordered,

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF PORTLAND, MAINE, IN THE CITY COUNCIL ASSEMBLED, AS FOLLOWS:

THAT, Section 14-158 of the Portland City Code (R-OS Zone), be amended by deleting the crossed out portions and adding the underlined portions, as follows:

1. By amending Section 14-158(7) as follows:

7) Off-street parking shall conform to the requirements of Division 20 of this Article where applicable. Otherwise, off-street parking adequate to serve projected employee and visitor needs shall be provided. Parking needs projections provided by the applicant or the Planning Department ~~should~~ may be considered in the review. Required parking for uses in the Recreation and Open Space Zone shall be located on the same lot with the principal building or use, or within a radius of 1,500 feet from any point on the property line of such use. Evidence of availability and access to such parking shall be required.


VALLEY
GILMAN
FOREST
BOYNTON
WEYMOUTH
CONGRESS
A
PROJECT SITE
M.M.C. COMPLEX
GILMAN
CHARLES
NURSING HOME
WESCOTT
ELLSWORTH
HILL
BRAMHALL CT
BRAMHALL
BRAMHALL PARKING LOT
CHADWICK
WEST
VAUGHAN
BRACKETT

CITY OF PORTLAND, MAINE
MEMORANDUM

TO: Richard Knowland, Planner **DATE:** 4/22/82

FROM: Ellen Klain, Energy Coordinator

SUBJECT: MMC Addition - Energy Conservation Plans

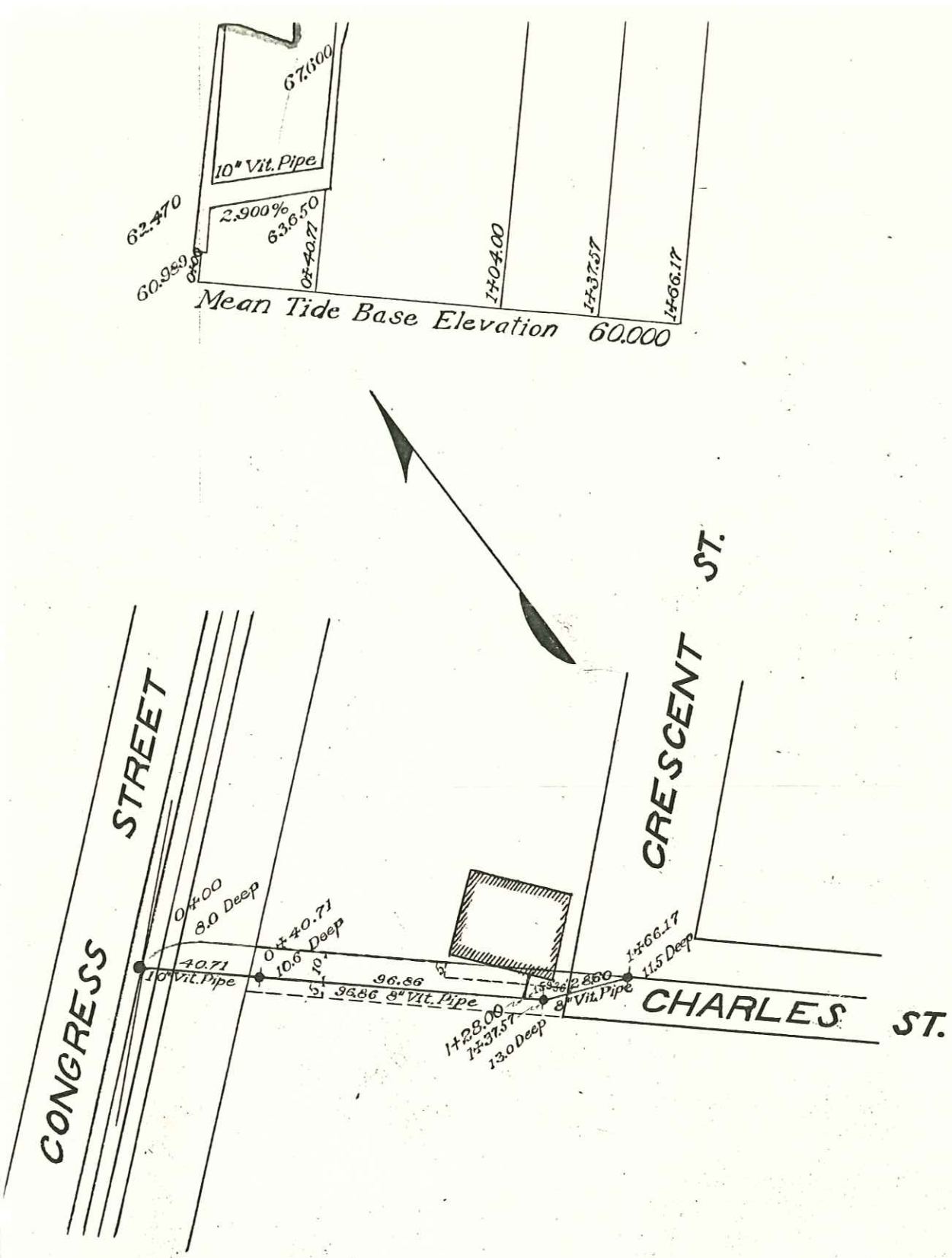
In reviewing the plans for MMC's new addition, the list of energy consideratons are very impressive. If followed through, the energy conservation efforts made on this large project would be a commendable effort by MMC.

Along with the measures included, I strongly recommend R-19 insulation in the walls, R-38 in the ceiling, R-A in the basement foundation, thermopane windows and sufficient weatherstripping and caulking throughout.

I am impressed with their proposed use of heat recovery systems and air handling systems.

Another area of consideration is the use of their waste to be burned as a fuel. With the volume of waste they generate, is it cost feasible for them to purchase equipment to burn the waste as a fuel source?

I would like to be informed of any more detailed energy systems information concerning the MMC addition and results of the suggestions I have made here.



NOV. 1923

PROFENNO CONTRACTOR

SHED BY WINSLOW & CO

EWER #1715.11 DAY LABOR

Ernst & Whinney

Two Monument Square
Portland, Maine 04101

207/773-3894

Board of Trustees
Maine Medical Center
Portland, Maine

Ladies and Gentlemen:

We have completed our preliminary financial feasibility study of Maine Medical Center's construction and renovation plans. Maine Medical Center ("the Medical Center") is a 525-bed not-for-profit, acute care hospital located in Portland, Maine.

This report has been prepared at the request of and for the exclusive use of the management of the Medical Center, the Maine Health Systems Agency, the Maine Bureau of Health Planning and Development, and others directly involved in assisting management during the planning process for the proposed construction and renovation project. This report should not be used to obtain debt or equity financing nor should it be relied upon by others. This report contains forecasted financial statements based upon certain management assumptions which were not independently evaluated by us and, accordingly, we are not expressing an opinion as to the reasonableness of the assumptions at this time. It is expected that during our subsequent full-scope feasibility study we will independently evaluate management's assumptions and render an opinion as to their reasonableness.

The Medical Center's construction and renovation plans call for the construction of a four story wing plus mechanical space on the north side of the existing facilities. New construction, which will add approximately 198,000 square feet to existing facilities, will house new operating and recovery rooms, special care beds, labor and delivery suites, neonatal intensive care, central supply and other ancillary and support areas. Renovations will be made to approximately 100,000 square feet of existing space. The Medical Center's bed complement is planned to increase from 525 to 598 beds. In addition, three levels will be added to the existing eight-level parking garage.

The project is assumed to be financed with the proceeds from a tax-exempt revenue bond of $84,785,000 issued through the Maine Health and Higher Educational Facilities Authority and a Medical Center contribution of $7,000,000 consisting of unrestricted Medical Center funds and the proceeds from a community fund drive. The Medical Center's equity contribution, the fund drive proceeds and the proceeds of the bond issue will be used to pay the cost of the project, refinance existing long-term debt, pay the issuance costs, and make deposits into trusteed funds as required by the various bond documents.

Our preliminary financial feasibility study was undertaken to evaluate the ability of the Medical Center to meet the debt service requirements of the $84,785,000 proposed Maine Health and Higher Educational Facilities Authority Revenue Bonds, as well as the operating expenses, working capital requirements and other capital needs during the seven years ending September 30, 1988. The scope of our study included a limited review of management's analyses of the future utilization of services which may be provided by the Medical Center; an analysis of forecasted revenues, expenses and cash flow that may be generated to meet the cash requirements of operations, interest and principal payments on the proposed bonds, and other needs; and an examination of other factors having a bearing on the Medical Center's financial operations.

An estimate of future utilization of Medical Center services was supplied by management at the Medical Center and was based on historical patient admission trends applied to the annual population projections for the Medical Center's defined service area for each year in the seven year period ending September 30, 1988. These estimates were not independently evaluated by us. The objective of management's analyses was to develop a forecast of inpatient days, admissions, and ancillary service utilizations for each year of operations through the year ending September 30, 1988. Management's analyses project patient admissions increasing from 21,000 in fiscal 1981 to 23,160 in fiscal 1988. Outpatient visits have been forecasted based on the historical ratios and trends of such visits applied to the population forecasts for the Medical Center's service area.

Revenues are based on Medical Center management's forecasts of facility utilization developed in their demand analyses as applied to the Medical Center's existing rate structure. The current charges have been adjusted as required to meet the financial needs of the Medical Center throughout the forecast period. Reimbursement is based upon the current reimbursement practices of third-party payors. If the third-party payors and/or their contract terms currently in effect are changed at a future date, the forecasted revenues may also be affected.

There are a number of regulations now in effect which have particular significance to the operations of hospitals. We have applied appropriate tests to determine the impact, if any, which these regulations may have on the Medical Center's operating results. A description of these regulations and tests is contained in the section entitled "Assumptions and Analyses Related to the Financial Statement Forecasts."

Legislation at all levels of government has affected, and may continue to affect, revenues and costs of hospitals. There are a number of proposals which may or may not be passed and which could be modified at later dates. It is not possible to determine, at this time, if any of these proposals may have an effect on future hospital operations.

Forecasted expenses for salaries and wages were developed from departmental staffing requirements considering the expanded and rearranged facilities and management's forecast of increases in departmental units of service. Average salary and wage rates are forecasted to increase from the existing rates by an average of 10.0% in each of the fiscal years through 1988. The costs associated with departmental non-salary expenses on a per unit of service basis is forecasted to increase at an average annual rate of 9.0%. These forecasted increases have been based upon the historical experience of the Medical Center adjusted for known and anticipated changes.

The section entitled "Assumptions and Analyses Related to the Financial Statement Forecasts" sets forth the assumptions on which the accompanying financial statement forecasts are based. These assumptions are an integral part of and essential to an understanding of the financial statement forecasts.

The accompanying preliminary statements of forecasted revenues and expenses, cash flow, and changes in fund balances for each of the seven years ending September 30, 1988, and the balance sheets as of the end of each of these fiscal years, reflect the forecasted operating results, cash flow, and changes in fund balances and financial condition of Maine Medical Center after giving effect to the assumptions set forth following the financial forecasts. The accompanying financial statement forecasts indicate that sufficient revenues and cash flow could be generated to meet the debt service requirements of the proposed $84,785,000 Bond Issue, the operating expenses and working capital needs of the Medical Center, and other financial requirements of the Medical Center as identified in the study during the period of the forecast.

If actual interest rates, principal payments, and funding requirements are different from those assumed in this preliminary financial feasibility study, the amount of the bond issue and debt service requirements could require adjustment. If such rates, principal payments and funding requirements are lower than those assumed in this study, then such adjustments should not adversely affect the actual results when compared to the accompanying preliminary financial statement forecasts.

The preliminary financial statement forecasts were developed in accordance with the accounting policies that management contemplates using throughout the forecast period.

The preliminary debt service coverage ratio based on the preliminary financial statement forecasts and utilizing the Medical Center's net income available for debt service as it is expected to be defined in the Medical Center's bond documents, is presented below. The debt service coverage ratio is presented for the forecast years ending September 30, 1987 and September 30, 1988, the first two years in which the full amount of principal and interest is payable to the bondholders from the Medical Center's cash.

	Year Ending September 30 1987	1988
DEBT SERVICE COVERAGE		
(In thousands of dollars)		
Excess of revenues over expenses	$10,106	$13,052
Add:		
Depreciation	6,413	6,435
Interest	12,673	12,621
Amortization of financing expenses	118	117
EXCESS OF REVENUES OVER EXPENSES BEFORE DEPRECIATION, INTEREST AND AMORTIZATION OF FINANCING EXPENSES (A)	$29,310	$32,225
Principal payments on proposed tax-exempt revenue bonds	$ 345	$ 395
Interest payments on proposed tax-exempt revenue bonds	12,673	12,621
TOTAL PRINCIPAL AND INTEREST REQUIREMENTS (B)	$13,018	$13,016
DEBT SERVICE COVERAGE (A÷B)	2.3times	2.5times

The preceding debt service coverage ratios should be considered in conjunction with this entire report to understand the Medical Center's financial requirements and the assumptions upon which the preliminary financial statement forecasts are based.

The accompanying preliminary financial statement forecasts are based on assumptions of future events which have been provided by, or have been reviewed with and approved by Medical Center management which in turn are based on present circumstances and information currently available. Due to the limited scope of this engagement, management's assumptions were not independently evaluated by us. Therefore, we are not in a position to express an opinion as to the reasonableness of these assumptions. The forecasts may be affected favorably or unfavorably by many factors such as changes in management's plans, revenues, costs, employee relations, taxes, governmental controls, availability and cost of malpractice insurance, interest rates, general economic conditions and limitations on reimbursements from third-party payors as described more fully in the assumptions following the preliminary forecasted financial statements, among others and, accordingly, there is no assurance that the forecasts as presented herein will be achieved.

The terms of our engagement are such that we have no obligation to update this report or to revise the preliminary forecasted financial results because of events and/or transactions occurring subsequent to the date of this report.

Ernst & Whinney

Portland, Maine
February 22, 1982

604.4 B.2

Introduction:

Maine Medical Center's Phase I Project constitutes a major development in terms of the Portland Site Plan Ordinance. The following written statement is in response to Section 604.4 B.2

604.4 B.2 (a) - Description (attached)

604.4 B.2(a)

(a) A description of the proposed uses to be located on site, including quantity and type of residential units, if any;

Response:

Since the needs of the institution through 1990, as described in the Center's Long-Range Facility Master Plan, required funds beyond the institution's financial capability, it was decided that only the most urgent problems identified through 1985 could be addressed. Those urgent needs are:

- Operating Rooms, Ambulatory Surgery and Recovery Room
- Additional medical/surgical, Neonatal Intensive Care, Special Care and obstetrical beds
- Labor and Delivery Suite
- Additional parking (as required by City Codes)
- Improved support services - clinical and basic
- Correction of mechanical and code deficiencies
- Improved access and flow of patients, staff and supplies

On June 25, 1981, the Board of Trustees of the Medical Center reviewed a conceptual plan to meet these urgent needs and authorized the employment of architects, construction managers, financial feasibility consultants and investment bankers to implement the project. By October, interviews had been conducted and consultants selected as follows:

Architects: Shepley, Bulfinch, Richardson and Abbott - Boston

Construction Manager: McBRO - St. Louis

Financial Feasibility: Ernst & Whinney - Portland

Underwriter: Goldman, Sachs & Co. - New York

Since early October 1981 the staff of the Medical Center has been working with the various consultants to develop the material and drawings included in the application. Every effort was made during development of the plans to reduce costs by (1) locating the new construction in an area that allowed existing functions to continue, (2) reducing the number of "shifts" of functions in renovated space, (3) adapting building systems to the most economical approach and (4) planning to use construction techniques to speed construction, thereby saving interest and the cost of inflation.

It should be recognized that areas to be developed in new construction are more firmly defined while areas to be placed in renovated space have not been established definitively. Since renovations will not be accomplished for over two years, it is thought that final designing decisions should be delayed to accommodate minor changes. In summary, the following components make up the project:

New Construction

1st Level	Mechanical Space Central Storeroom Food Preparation and Storage Blood Bank Central Supply
2nd Level	Operating Suite Ambulatory Surgery Unit Recovery Room
3rd Level	Special Care and Burn Unit O.R. Support Dialysis Unit
4th Level	Labor and Delivery Neonatal Intensive Care Unit
5th Level	Mechanical

Renovation

Basement ESB	Housekeeping Lockers Storage
Basement Power Plant	Animal Holding
Basement NDF	Radiology
Ground - Annex C	Animal O.R.
Ground - MGB	Medical Records Storage
Ground - Pavilion and '56 Wing	Admissions, Coffee Shop, Gift Shop Pharmacy
Ground - Richards	Food Service
1st Floor - MGB	Medical Records Offices
2nd Floor - Pavilion	Normal Nursery
2nd Floor - Richards	OB Nursing Unit

4th Floor - MGB	Pulmonary Expansion Rehab Support
4th Floor - Pavilion	Rehab Therapy
4th Floor - '56 Wing	Nursing Unit
5th Floor - MGB	Offices and On Call Space
5th Floor - Pavilion	Computer Repair Bed Repair Storage Audio Visual
5th Floor - '56 Wing	Classrooms
5th Floor - Richards	Add to Nursing Unit
6th Floor - Richards	Nursing Unit
7th Floor - Pavilion	Mechanical
9th Floor - Richards	CICU Cardiac Progressive Care
Parking Garage	Add three levels (approximately 380 spaces)

Code Corrections

Legend: ESB - Engineering Services Building

NDF - New Diagnostic Facility

MGB - Maine General Building

604.4 B.2 (b) The total land area of the site and the total floor area and ground coverage of each proposed building and structure;

Response:

The site is reported as two elements consisting of the major lot (holding existing hospital buildings) 475,080 square feet and the Bramhall parking lot 109,771 square feet (584,851 square feet). The ground coverage of the existing buildings is approximately 124,250 square feet, and the ground coverage of the new building is 44,200 square feet for a total of 166,250 square feet.

The total floor area of existing buildings is approximately 550,328 square feet, and the total floor area of the new building will be 182,250 square feet for a total of 732,578 square feet (exclusive of parking garage).

604.4 B.2 (c) Easements.

Response:

It is not planned that any easements will be placed on the property being developed.

604.4 B.2 (d) Method for handling solid waste disposal;

Response:

Maine Medical Center installed a steam generating waste incinerator in November 1981. Since that time, burnable solid waste has been disposed of on site. A limited amount of waste is handled by the Regional Waste system via commercial dumpster and hauler. The incinerator will accommodate added solid waste generated by the expansion.

604.4 B.2 (e) The applicant's evaluation of the availability of off-site public facilities, including sewer, water and streets.

Response:

The Center's experience is that the existing facilities are adequate. It has been projected that, at project completion, total daily flow of water will be 75,000 gallons per day; that peak flow for the sanitary sewer will be 1.35 cubic feet per second, and that the peak flow for the storm sewer will be unchanged from the existing flow. Currently, rain water is picked

up at the parking level. The new building will collect water at roof drains. While the collection plane is changed, the area of collection is not.

604.4 B.2 (f) A description of any problems of drainage or topography or a representation that, in the opinion of the applicant, there are none.

Response:

In the opinion of the applicant, the project will not contribute any drainage problems.

604.4 B.2 (g) An estimate of the time period required for completion of the development.

Response:

The project schedule has been established around the Certificate of Need process. The applicant submitted its Certificate of Need Application on March 1, 1982 and anticipates a construction start in September 1982. Completion of the new construction phase is anticipated at February 1985 and the renovation phase at March 1986. A copy of the Design and Construction Schedule is appended to this application.

604.4 D Land ownership and estimated cost of the development.

Response:

(attached)

604.4 D

Statement of Ownership and Cost of Development

The property proposed to be developed is owned by Maine Medical Center, a not-for-profit acute care facility.

James L. Moody, Jr. is Chairman, Board of Trustees.

Edward C. Andrews, Jr., M.D. is President of the hospital.

The estimated construction cost, exclusive of fees, is $45,963,000.

Donald L. McDowell

Donald L. McDowell
Executive Vice President
and Treasurer

Addendum:

The applicant believes that requirements for final site plan review and compliance with Chapter 604, Site Plan Ordinance, have been provided to the best of its ability.

From meetings with City of Portland Planning Staff and a workshop session with the Planning Board, it is clear that there have been concerns for traffic, parking, fire access and drainage.

Review of a preliminary site plan with Lt. Collins led to a significant change in the shape and relationship of the new construction to the rear of existing buildings. With respect to drainage, the plane of water collection will change, but we believe the area will not. The Center has every intent of complying with parking code requirements through the addition of three (3) levels to the existing parking ramp. The Center has also retained Vanasse Hangen Associates, Parking and Traffic Consultants, to assist in assuring requirements are met and that the City's concerns are addressed. Mr. Bray has been instrumental in providing guidance in this regard.

The data from the consultant's study will be available for joint review by Mr. Bray and Maine Medical Center on March 18, 1982.

Me. Med (70)

83

TO RESIDENTS AND PROPERTY OWNERS IN THE VICINITY OF CHARLES AND CRESCENT STREETS

The Portland Planning Board will hold a public hearing on Tuesday evening, April 12, 1983. The meeting begins at 7:30 P.M. in Room 209, City Hall, Portland, Maine.

The Board will consider a proposal by Maine Medical Center to modify entrances to their facility on the lower end of Charles Street. The improvements include separate entrances for ambulances and emergency related drop-offs by other vehicles. The entrance to the parking garage will be shifted near the intersection of Charles and Crescent Streets. Under this proposal, a residence (at 26 Charles Street) adjacent to the Maine Medical Center property would be razed. The site plan will be reviewed for conformance with the Site Plan Ordinance.

Should you wish to review the plans in advance, they are available in the Portland Planning Department, Room 211 of City Hall. If you are unable to attend the public meeting of the Planning Board, please send your comments in writing to Joseph E. Gray, Director of Planning and Urban Development, City Hall, 389 Congress Street, Portland, Maine 04101.

Sincerely,

Alexander Jaegerman

Alexander Jaegerman,
Chief Planner

cc: Jean Gilpatrick, Chairman, Planning Board
Joseph E. Gray, Jr., Director Planning & Urban Development

CITY OF PORTLAND

JOSEPH E. GRAY, JR.
DIRECTOR OF PLANNING & URBAN DEVELOPMENT

April 4, 1983

TO RESIDENTS AND PROPERTY OWNERS IN THE VICINITY OF CHARLES AND CRESCENT STREETS

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Sincerely,

Alexander Jaegerman

Alexander Jaegerman,
Chief Planner

cc: Jean Gilpatrick, Chairman, Planning Board
Joseph E. Gray, Jr., Director Planning & Urban Development

FRANK LETOURNEAU [illegible]
BLAIR HODGSON [illegible]

PARKING
SCHOOL FOR THE BLIND
DRAINAGE

service entrances
trade show traffic for trucks
concession stand space

National Guard
drainage system

drainage Frank letter have someone from
Public Works call him

Park [illegible] card system

November 2, 1983

Mr. William Bray
Traffic Engineer
Department of Public Works
82 Hanover Street
Portland, Maine 04101

Dear Bill:

As you are well aware, we have been pressing quite hard to complete our agreed upon Bramhall Parking Lot entrance relocation this fall. The letter I received from Fred Morin, of Hunter-Ballew, makes it pretty clear, however, that we really are not in the position we wanted to be in order to make this happen. While we did receive agreement from the Planning Department in the person of Alex Jaegerman that the relocation had been granted as part of the site plan approval process, some other factors have entered the picture to slow us down. I believe Fred's letter accurately and clearly covers these. With your understanding, we will make every effort to have ourselves in a position to pursue this in the spring.

Thanks for your continuing counsel.

Sincerely yours,

Reynold R. Welch
Associate Vice President

RRW:JR

cc: Mr. McDowell
Mr. Jaegerman
Mr. Morin

Enclosure

Hunter-Ballew Associates
ENGINEERING • PLANNING • SURVEYING

5 Fundy Road
Falmouth, Maine 04105
207/781-4721

PRINCIPALS
Robert E. Hunter
Robert L. Ballew
Ralph P. Norris
Barry A. Patrie
Herbert R. Doten

October 26, 1983

Mr. Reynold Welch
Associate Vice President
Maine Medical Center
22 Bramhall Street
Portland, Maine 04102

Subject: Improvements to the Bramhall Parking Lot

Dear Mr. Welch:

On Friday afternoon, the 21st of this month, you telephoned this office to inform me that you had recently received approval from the City of Portland Planning Department to proceed with construction of the subject job. This was the third and final approval that you had been seeking. The other two approvals, one from the City Traffic Engineer and the other from the City Building Inspection Office, had been verbally received on the 17th of this month.

With these approvals in order, you asked that our firm contact three local contractors in an effort to obtain bids for the construction phase, and ascertain whether these contractors could perform and complete this work by November 15th of this year, November 15th being the usual time paving plants close for the season.

You and I came to an agreement that the following contractors would be contacted for bids: R.J. Grondin & Sons of Gorham, ME, White Bros., Inc. of Westbrook, ME, and E. J. Asselyn of Scarborough, ME.

On Monday, October 24th, I telephoned each of the contractors. I briefly described the work involved in relocating the parking lot entrance/exit which includes installation of new curb, remove and reset curb, earthwork, paving; roadwork and sidewalk, relocation of parking lot building and gates, installation of vehicle detector loops and related electrical wiring and conduits, removal of chain link fence, and installation of new 16 ft. wide gate. I also explained that the project would have to be complete and in operation by November 15th of this year.

Each of the contractors said that they are definitely interested in performing the work, but that it is highly improbable that the work could be

Hunter-Ballew Associates
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completed in such a short period of time. Reasons cited for the difficulty in finishing the job by November 15th are;

1. If the three contractors were given plans on Monday afternoon, Oct. 24th, it would take two or three days before they could get an estimate done and a bid back to us. By the time a contractor is selected and a contract is signed, the earliest the curb could be ordered would be Friday, Oct. 28th. Some of the curb required is new circular cut curb which could take two to two and a half weeks for delivery. Two weeks from Oct. 28th is Nov. 11th, which is a holiday, therefore, curb may not be received until Nov. 14th or later.

2. Concern was voiced over construction being inhibited by vehicular traffic and parking in the area, since the parking lot must remain in operation.

A couple of other factors that should be pointed out that make completion of the project by Nov. 15th improbable are; 1) The vehicle detector loops that were ordered some time ago by Mr. Burnham have not been received yet and a delivery date is unknown at this time, 2) Maine Medical Center is switching their telephone service from New England Telephone and Telegraph to Northern Telecom. This switchover requires installation of new telephone cable and conduit from MMC to McGeachey Hall with a service line to the parking lot booth. The new cable will be installed through the same areas of the proposed work for the subject job. According to a Northern Telecom representative, their installation may start within the next three to four weeks. This leads us to coordination issues that have not been resolved with respect to Northern Telecom's work and the subject job, such as, A) If the parking lot booth were relocated prior to Northern Telecom's installation, would New England Telephone line have to be run to the booth until Northern Telecom is operational?, B) If the subject job is constructed before Northern Telecom's installation it would be preferable to install conduits under the paved areas of this project in order that Northern Telecom could run their cables without excavating newly installed pavement. It would be more preferable to have the power and telephone installed at the same time, in the same trench, in order to prevent excavation of the same area twice and disruption of the parking lot operation a second time.

Since Northern Telecom is still in the process of interviewing and receiving bids from contractors for installation of their work, it appears that a week or two could pass before these issues could be resolved and incorporated into the subject job.

In conclusion, based on the uncertainty of the contractors' ability to complete the project by November 15th, the unresolved issues of telephone and

Hunter-Ballew Associates
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power coordination and the question of a delivery date for the loop detectors, it is our recommendation, if acceptable to Maine Medical Center, to postpone the construction phase of the subject job until the spring of 1984.

As an added note, the contractors that were contacted said they would still be interested in this project if it were postponed until spring.

If you have any comments or questions, please call.

Sincerely,

HUNTER-BALLEW ASSOCIATES

Frederick E. Morin

FEM/dcs
JN: 830540

MAINE MEDICAL CENTER
PORTLAND, MAINE
PARKING AND TRAFFIC MASTER PLAN

APRIL, 1982

PREPARED BY
VANASSE/HANGEN ASSOCIATES, INC.
CONSULTING ENGINEERS AND PLANNERS
184 HIGH STREET
BOSTON, MASSACHUSETTS 02110
(617) 482-1870

TABLE OF CONTENTS

As stated previously, this report summarizes the results of the analyses of alternatives available to the hospital to solve the traffic and parking problems at Maine Medical Center. Based on these analyses, a set of recommended improvements are presented.

II. EXISTING CONDITIONS

A. HOSPITAL CHARACTERISTICS

The Maine Medical Center is a 525 bed facility located on Bramhall Street on the western end of the Portland Peninsula. The site location presented in Figure 1 shows that the hospital is bounded by Bramhall, Gilman, Congress and Charles Streets. The hospital employs the equivalent of 2,600 full-time employees. On a typical day, there are approximately 2,413 employees working the day, evening or night shifts at the hospital, split as follows:

Shift	Number of Employees
Day	1,800
Evening	386
Night	227
Total	2,413

Primary visiting hours for adult units are 12:00 noon to 2:00 PM and 6:00 PM to 8:00 PM Monday through Friday. Exceptions include Pediatrics, Special Care, Cardiac Intensive Care, Psychiatry and Maternity, all of which have different visiting hours from those stated above.

The hospital also operates a Nursing School Tuesday through Thursday, offering day and evening classes. There are 14 instructors and approximately 50 students. In addition, on a typical day, there are approximately 35-55 volunteers working at the hospital.

Maine Medical Center

Traffic Impact and Parking Plan

Site Location Map

Vanasse / Hangen Associates
Boston, MA

100 0 100 200
SCALE IN FEET

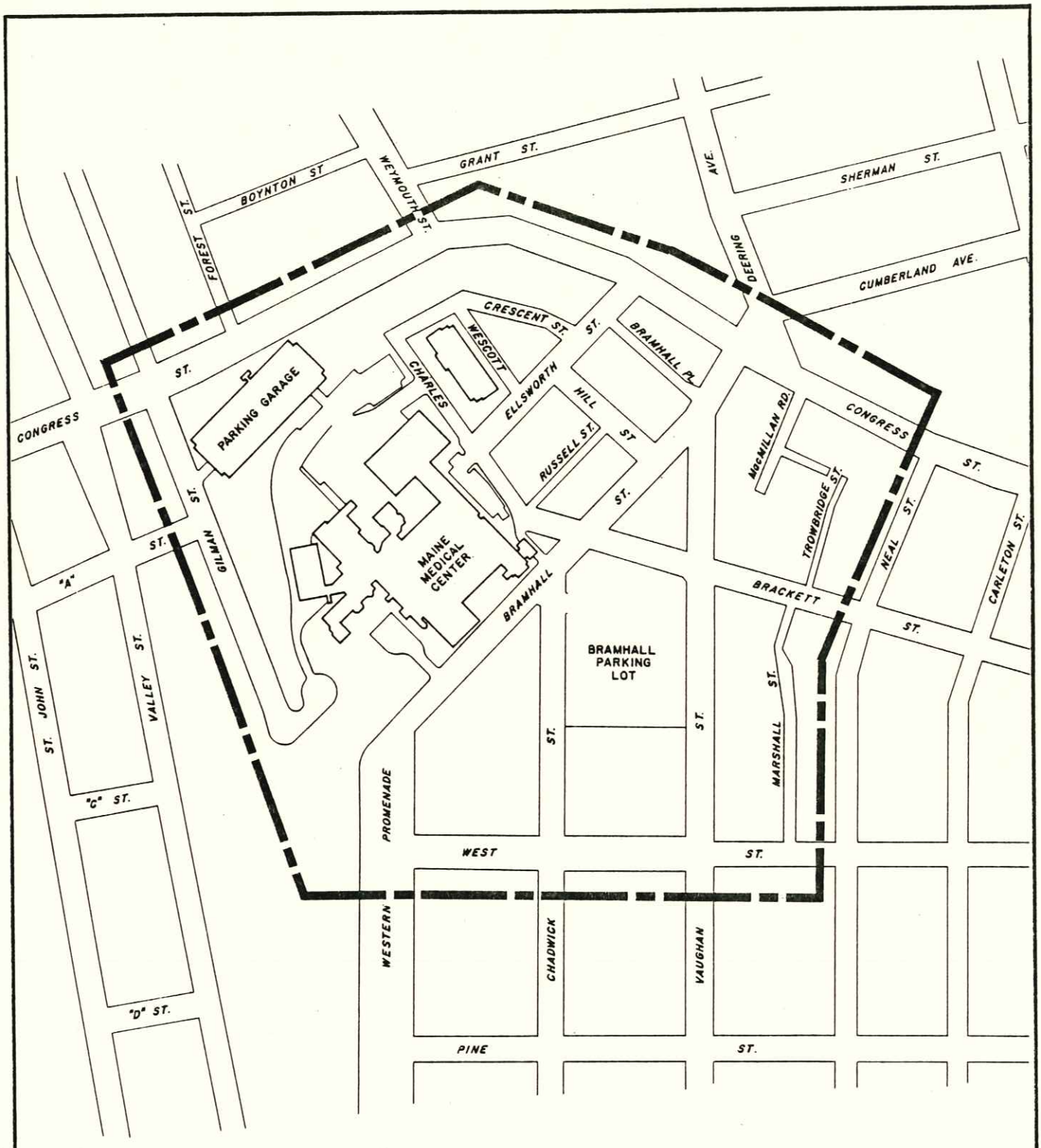
FIG. 1

B. DATA COLLECTION SUMMARY

As part of the study, a highly detailed data collection procedure was organized for the hospital study area which is shown in Figure 2. The field survey included the collection of traffic volume data, parking accumulation and turnover data, and a transportation survey of all persons entering the Maine Medical Center complex over the course of a day. A copy of the survey and specific results are presented in the Appendix. Additional data was collected including roadway geometrics, traffic control devices, truck activity, posted traffic and parking regulations, and a sign inventory. The result of this extensive data collection procedure was the development of a thorough understanding of how the local street system operates and how the existing supply of parking at Maine Medical Center is being used.

C. TRANSPORTATION SYSTEM

Congress Street is the major arterial roadway which provides regional access to Maine Medical Center. Congress Street is a 39-foot wide, bi-directional roadway which runs in an east-west direction between Westbrook and Downtown Portland. Direct access is provided to the main hospital entrance from Congress Street and access to the lower levels of the parking garage is available from Gilman Street. Figure 3 identifies the existing traffic circulation system in the study area.



Maine Medical Center

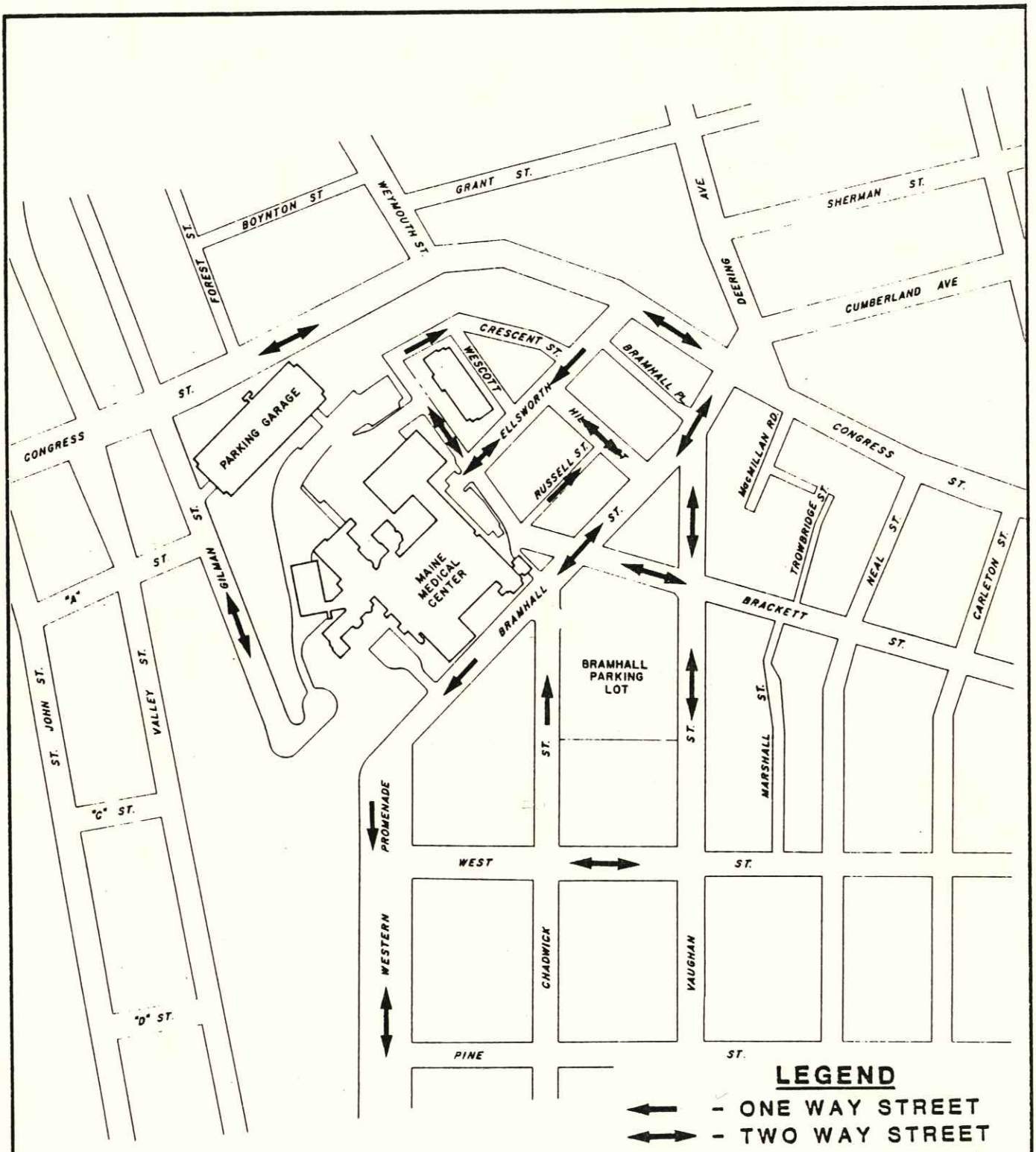
Traffic Impact and Parking Plan

Study Area Boundary

Vanasse / Hangen Associates
Boston, MA

100 0 100 200
SCALE IN FEET

FIG. 2



Maine Medical Center

Traffic Impact and Parking Plan

Existing Roadway Circulation System

Vanasse / Hangen Associates
Boston, MA

100 0 100 200
SCALE IN FEET

FIG. 3

All the intersections in the study area are under stop sign control except for the intersection of Bramhall Street and Congress Street, which is signalized. Three of the intersections are posted as four-way stops including the Bramhall Street/Brackett Street and the Brackett Street/Vaughan Street intersection.

Bramhall Street serves as the primary access to the hospital and runs in a north-south direction between the Western Promenade and Congress Street. Bramhall Street is a 31-foot wide roadway which operates as a one-way street between Chadwick Street and the Western Promenade. The street operates as a two-way street between Congress Street and Chadwick Street. Parking is allowed on both sides of Bramhall Street except directly in front of the hospital and near the Congress Street intersection.

Charles Street provides all access to the rear of the hospital including the emergency room parking lot, the truck loading area and the parking garage. Charles Street is approximately 20 feet wide and is located on a 5± percent grade between Ellsworth Street and the parking lot entrance. No parking is allowed on either side of Charles Street. The main entrance to the hospital lobby is from Charles Street as is access to the hospital's admitting parking lot.

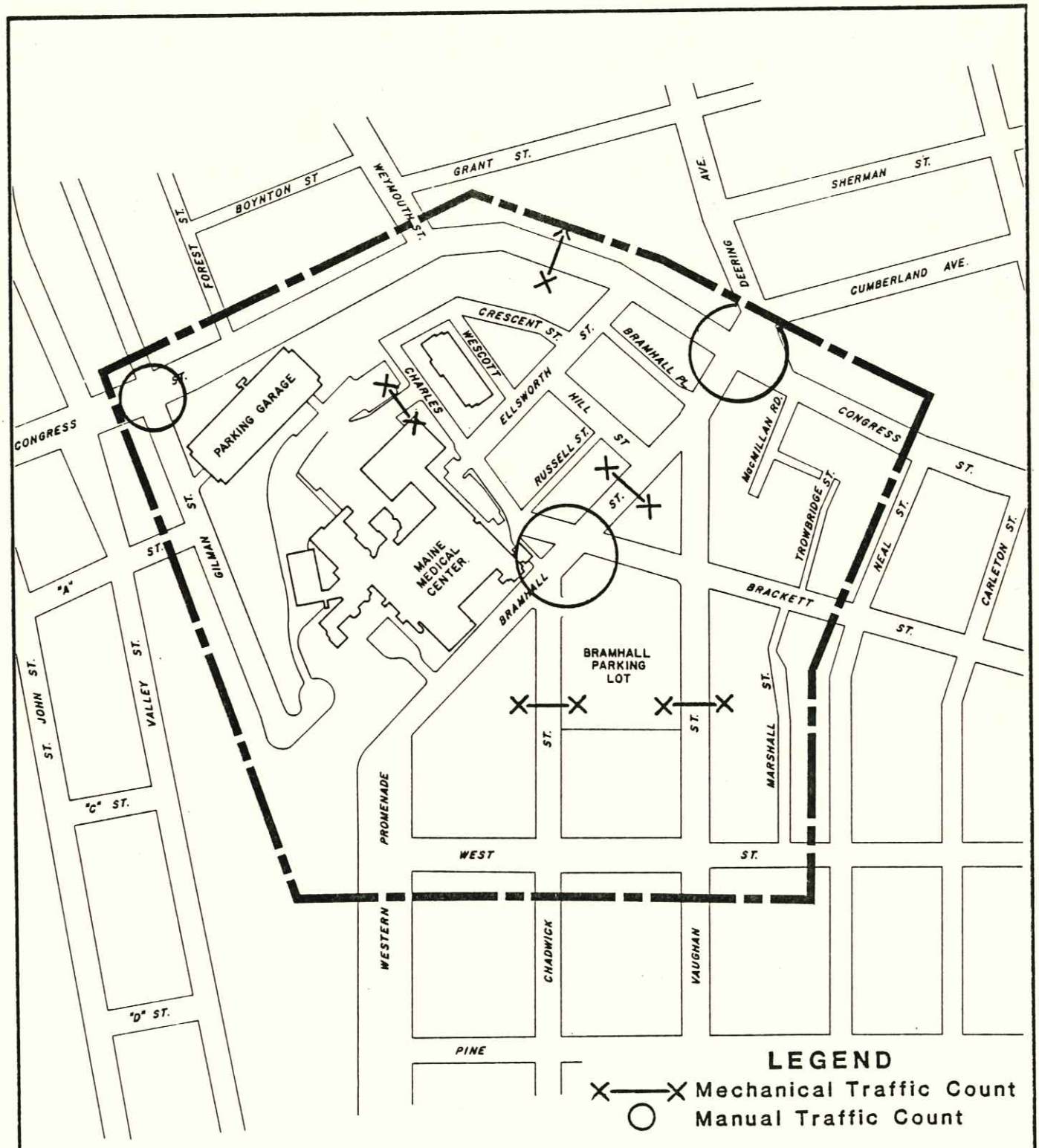
Access to the Bramhall parking lot is from Chadwick Street. The entrance to the Bramhall lot is somewhat confusing since drivers must drive southbound on Chadwick Street to enter this lot.

This movement is directly opposite the one-way flow of traffic on Chadwick Street which is posted one-way northbound. Parking is allowed on both sides of Chadwick Street except near the Bramhall Parking lot entrance. One other access roadway serves the hospital -- Ellsworth Street. This street serves as the main access point for emergency vehicles approaching from Congress Street. The northern end of Ellsworth Street is posted one-way southbound to facilitate emergency traffic.

D. EXISTING TRAFFIC VOLUMES

In order to quantify the magnitude and distribution of traffic by time of day, existing traffic volumes were counted manually and mechanically at several locations in the study area. These locations are shown on Figure 4. Twenty-four (24) hour mechanical counts were conducted on Congress, Bramhall, Chadwick and Vaughan Streets, as well as at the entrance to the parking garage from Charles Street. Morning (6:00-9:00 AM) and afternoon (2:00-6:00 PM) peak period turning movement counts were obtained at the following intersections: Congress Street/Gilman Street, Chadwick Street/ Brackett Street/ Bramhall Street; and Congress Street/Bramhall Street.

The results of the counts indicate two clearly visible peaks which occur between 7:00-8:00 AM and between 4:00-5:00 PM. These peak hours coincide with the primary shift reporting and departure times at the hospital. Figure 5 was developed to show the hourly



Maine Medical Center

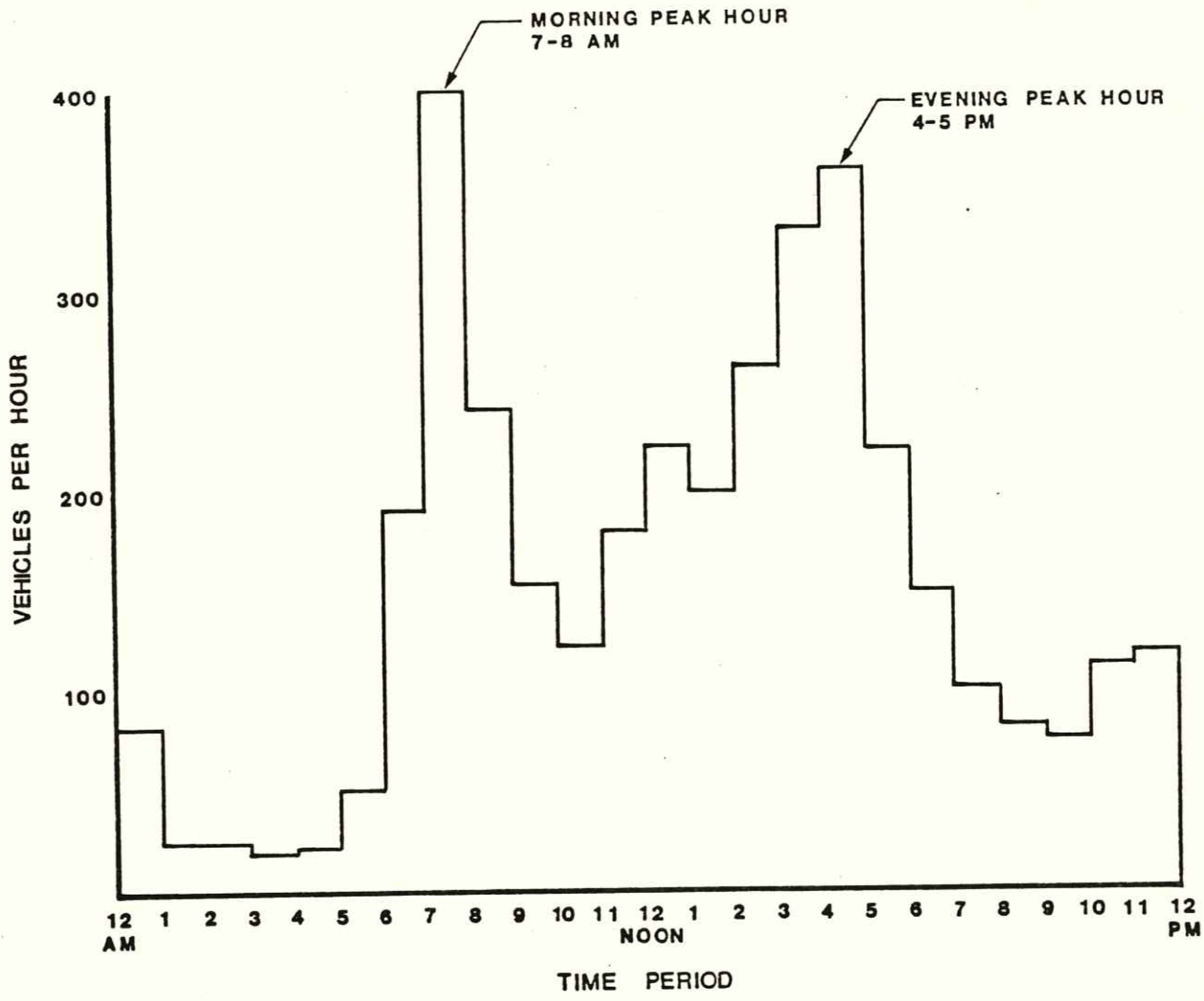
Traffic Impact and Parking Plan

Traffic Count Locations

Vanasse/Hangen Associates
Boston, MA

100 0 100 200
SCALE IN FEET

FIG. 4



Maine Medical Center **Traffic Impact and Parking Plan**	**Hourly Variation in Traffic Flow at Rear Parking Entrance**	Vanasse / Hangen Associates Boston, MA **FIG. 5**

fluctuation of traffic using the Charles Street access to the rear of the hospital. One can clearly see the peak hours and also the fact that after the afternoon peak, traffic drops off significantly.

Table 1 and Figure 6 summarize the results of the traffic counts for all locations counted. In general, the counts show that following Congress Street in importance is Bramhall Street. Charles Street and Vaughan Street which functions as a five-way street.

Based on the results of the traffic count observations, it is estimated that on a daily basis, the hospital generates approxiately 6,000 daily vehicle-trips. This volume would be split evenly with 3,000 vehicles arriving and the same 3,000 vehicles departing from the hospital daily.

The following table summarizes the estimated existing daily and peak hour traffic generated by the hospital.

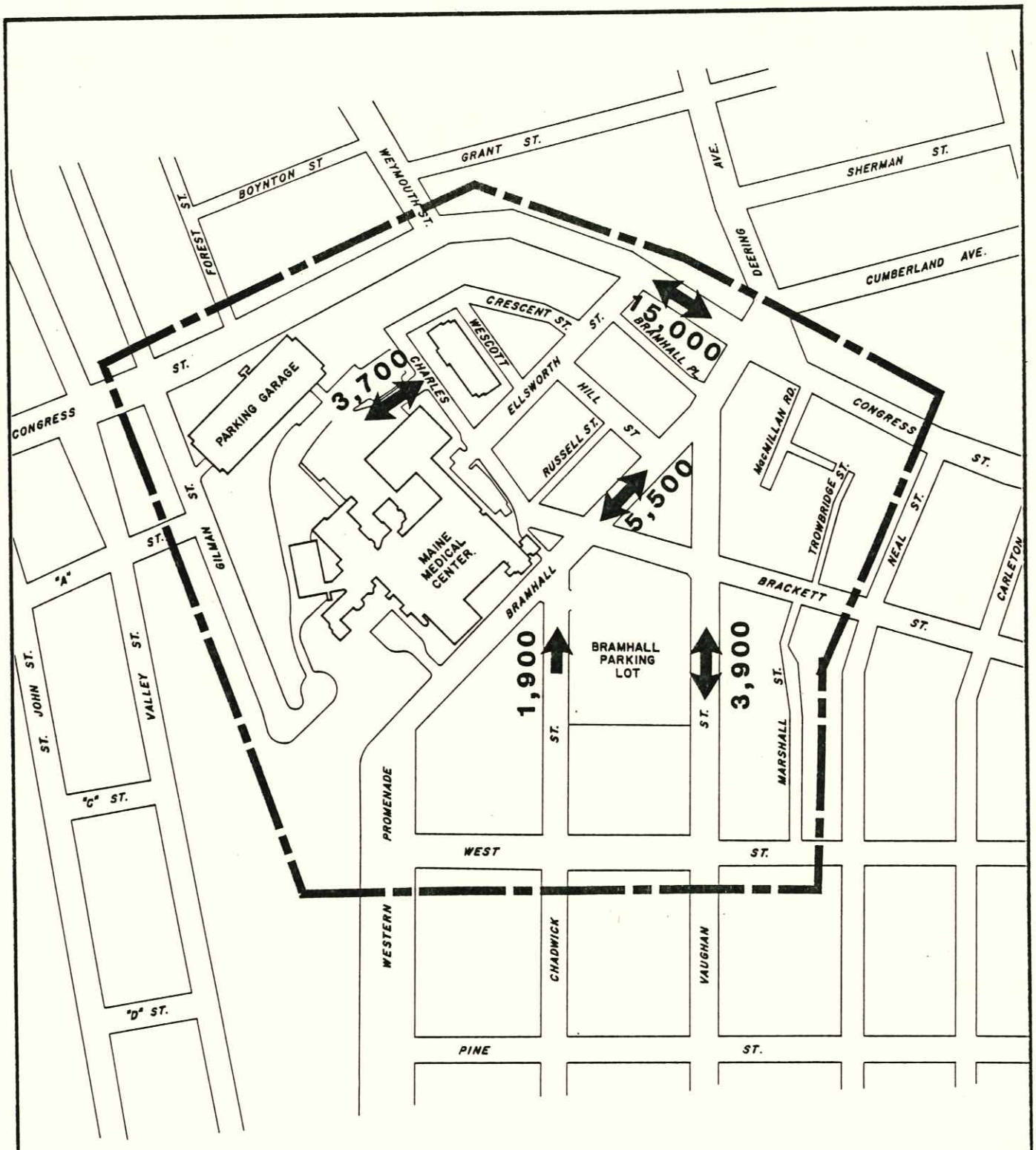
TRIP GENERATION SUMMARY

	Vehicle Trips In	Vehicle Trips Out	Total
Daily	3,000	3,000	6,000
AM Peak	620	130	750
PM Peak	280	620	900

TABLE 1
TRAFFIC VOLUME SUMMARY

	ADT[1]	AM Peak Hour[2]	K Factor[3]	PM Peak Hour[4]	K Factor
Bramhall Street east of Brackett Street	5,526	330	6.0%	425	7.7%
Chadwick Street south of Bramhall Street	1,891	82	4.3%	173	9.1%
Vaughan Street south of Brackett Street	3,943	184	4.7%	344	8.7%
Congress Street east of Gilman Street	15,035[5]	739	4.9%	1,042	6.9%
Emergency lot driveway	3,745	401	10.7%	358	9.6%

1/ ADT = Average Daily Traffic.
2/ AM Peak Hour - 7:00-8:00 AM.
3/ K = percent of daily flow during the peak hour.
4/ PM Peak hour = 4:00-5:00 PM.
5/ Congress Street ADT is estimated.



Maine Medical Center

Traffic Impact and Parking Plan

Existing Daily Traffic Volumes

Vanasse / Hangen Associates
Boston, MA

100 0 100 200
SCALE IN FEET

FIG. 6

E. TRUCK DELIVERIES

The loading area for all trucks serving the hospital is located at the rear of the building. It is accessed through the Charles Street entrance. Upon leaving the site, trucks exit via Gilman Street.

Information provided by the hospital for truck deliveries during the four-day period, February 15 to February 18, 1982, indicates that during the four-day period, the hospital received 147 deliveries. This amounts to an average of approximately 37 truck deliveries per day. Table 2 summarizes the deliveries to the site by type of delivery. In addition, the hospital receives heating oil approximately 15 times per month in the winter.

TABLE 2
SUMMARY OF TRUCK DELIVERIES

Type	Frequency
Food service	14/day
Medical supplies	10/day
General deliveries	13/day
Fuel oil	15/month

F. TRANSIT

The Maine Medical Center is primarily served by one Greater Portland Transit District but route (The Metro). Route 17 (Pine Street) operates on Congress and Bramhall Streets and serves the area between downtown and the Maine Medical Center.

The route terminates at Monument Square and City Hall in downtown Portland. Route 17 provides regularly scheduled service at 30-minute headways Monday through Saturday. Service is available between 6:40 AM and 5:50 PM on weekdays and between 8:05 AM and 5:20 PM on Saturdays. The hospital is primarily served by one bus stop located adjacent to the main entrance on Bramhall Street.

G. PARKING SUPPLY

Three surveys were conducted to understand the existing parking situation at Maine Medical Center. The surveys, conducted during February, 1982, included: 1) a parking supply inventory; 2) a parking use survey; and 3) a transportation and parking survey questionnaire administered to all people entering or existing the hospital over the course of a day. The results of the inventory and survey are briefly described below.

The inventories identified a total of 1,585 parking spaces available in the study area. This includes both off-street hospital parking as well as curbside public parking. A total of 1,299 off-street parking spaces are currently available on hospital property. These spaces are in the following locations:

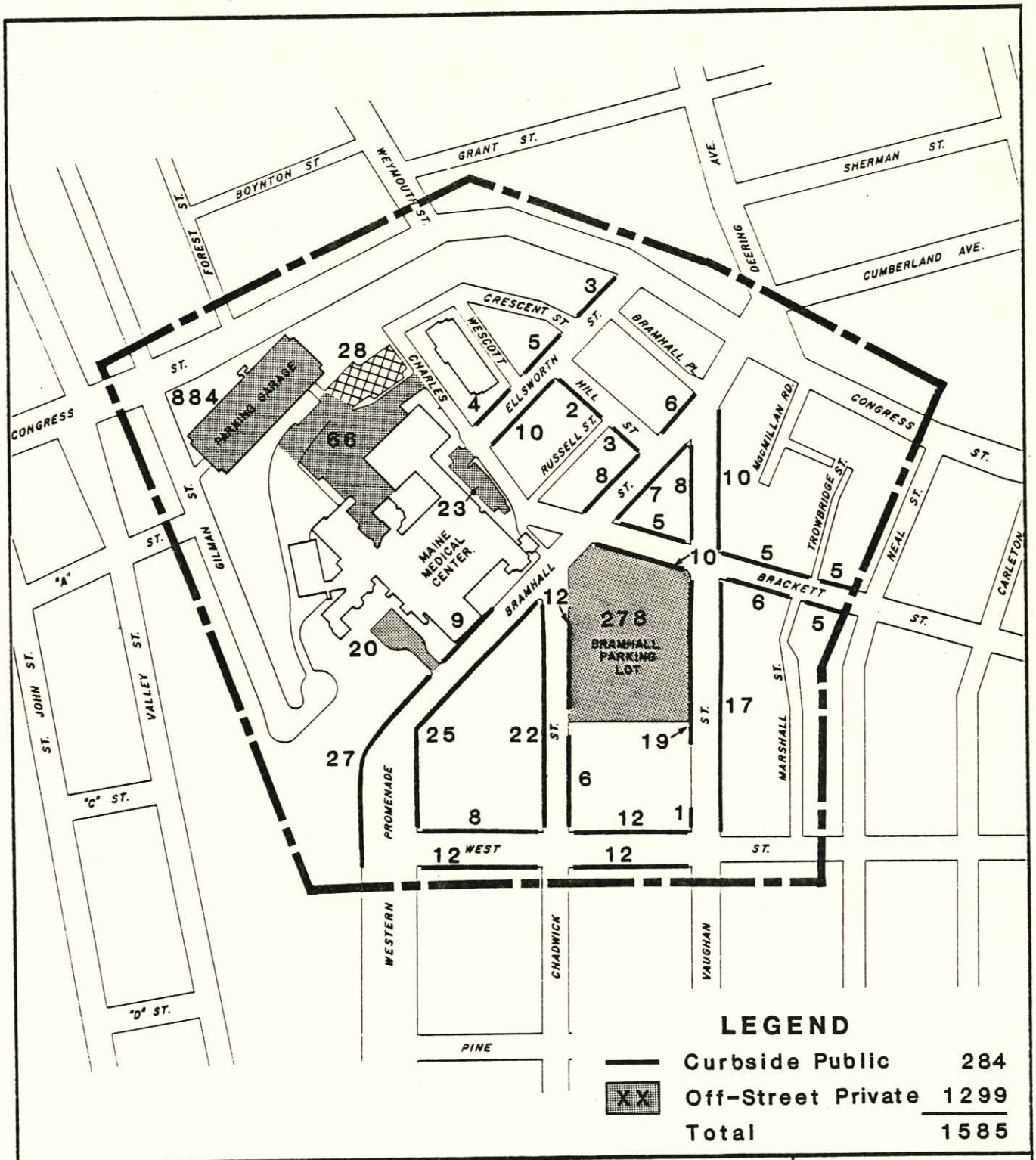
EXISTING PARKING SUPPLY SUMMARY

Garage	884
Bramhall Lot	278
Rear Lot	66
Emergency Lot	28
Admitting Lot	23
Radiology Lot	20
Total	1,299

During the day, visitors are not allowed to park in the garage which is reserved for employees. The Bramhall lot, located at the corner of Brackett Street and Bramhall Street, is also separated into two lots. The smaller section provides 40 parking spaces for attending physician use while the remaining 238 spaces are shared by visitors and employees. Approximately 100 visitor spaces are available in this lot and employees use the remainder. Figure 7 identifies all parking areas within the area surveyed and Figure 8 identifies the posted parking restrictions on the neighborhood streets.

Existing Parking Characteristics

A parking accumulation/turnover study was conducted in the area surrounding the hospital. During the survey, license plates of all vehicles parked in the study area were observed on an hourly basis to determine space usage and parking duration of each vehicle. A total of 1,502 parking spaces including both off-street hospital supplied spaces and public streets surrounding the hospital were observed for a 14 hour period on February 25, 1982. On this particular day, a declared snow emergency was in effect and approximately 78 parking spaces within the study area were not available. The streets where parking was restricted included a portion of Bramhall Street, Brackett Street, West Street and Ellsworth Street. February 25th was primarily chosen since it was a payday, which is typically a peak use day at the hospital.



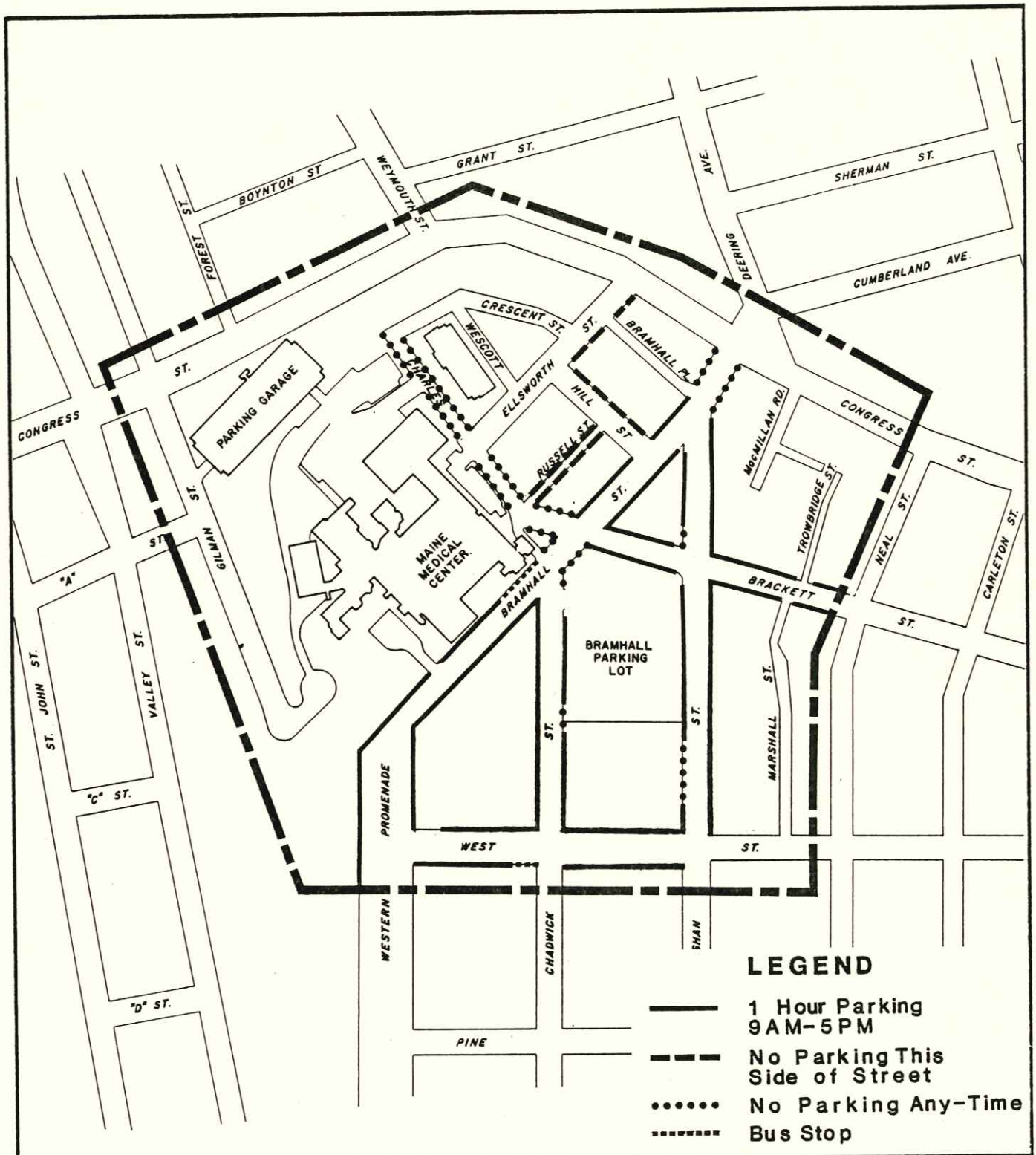
Maine Medical Center

Traffic Impact and Parking Plan

Legal Parking Supply

Vanasse/Hangen Associates
Boston, MA

FIG. 7



Maine Medical Center

Traffic Impact and Parking Plan

Posted Parking Restrictions

Vanasse/Hangen Associates
Boston, MA

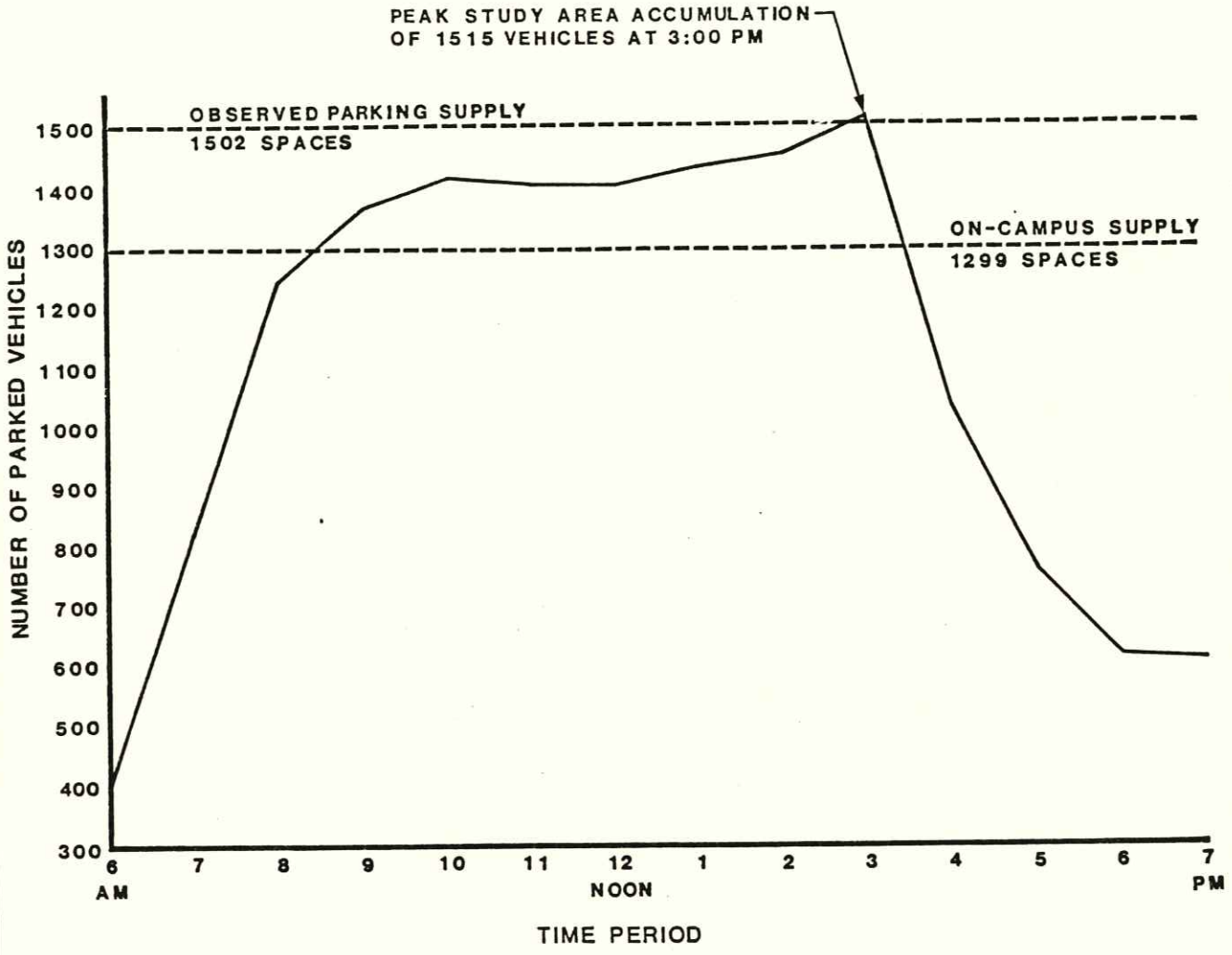
100 0 100 200
SCALE IN FEET

FIG. 8

A total of 3,577 different vehicles were observed in the study area over the course of the 14-hour survey. Figure 9 shows parking accumulation characteristics observed in the study area over the course of a day. The peak parking demand in the study area was observed to be for 1,515 parking spaces at 3:00 PM. This figure includes all hospital parking as well as parking on the neighborhood streets by area residents, patients and employees of area medical offices. The peak use time of 3:00 PM coincides with shift change time at Maine Medical Center and again, is typical of the peak parking needs at hospitals. Figure 10 shows parking accumulation only in the hospital parking facilities. At 3:00 PM, the hospital lots and garage were observed to be full and operating above capacity at that time.

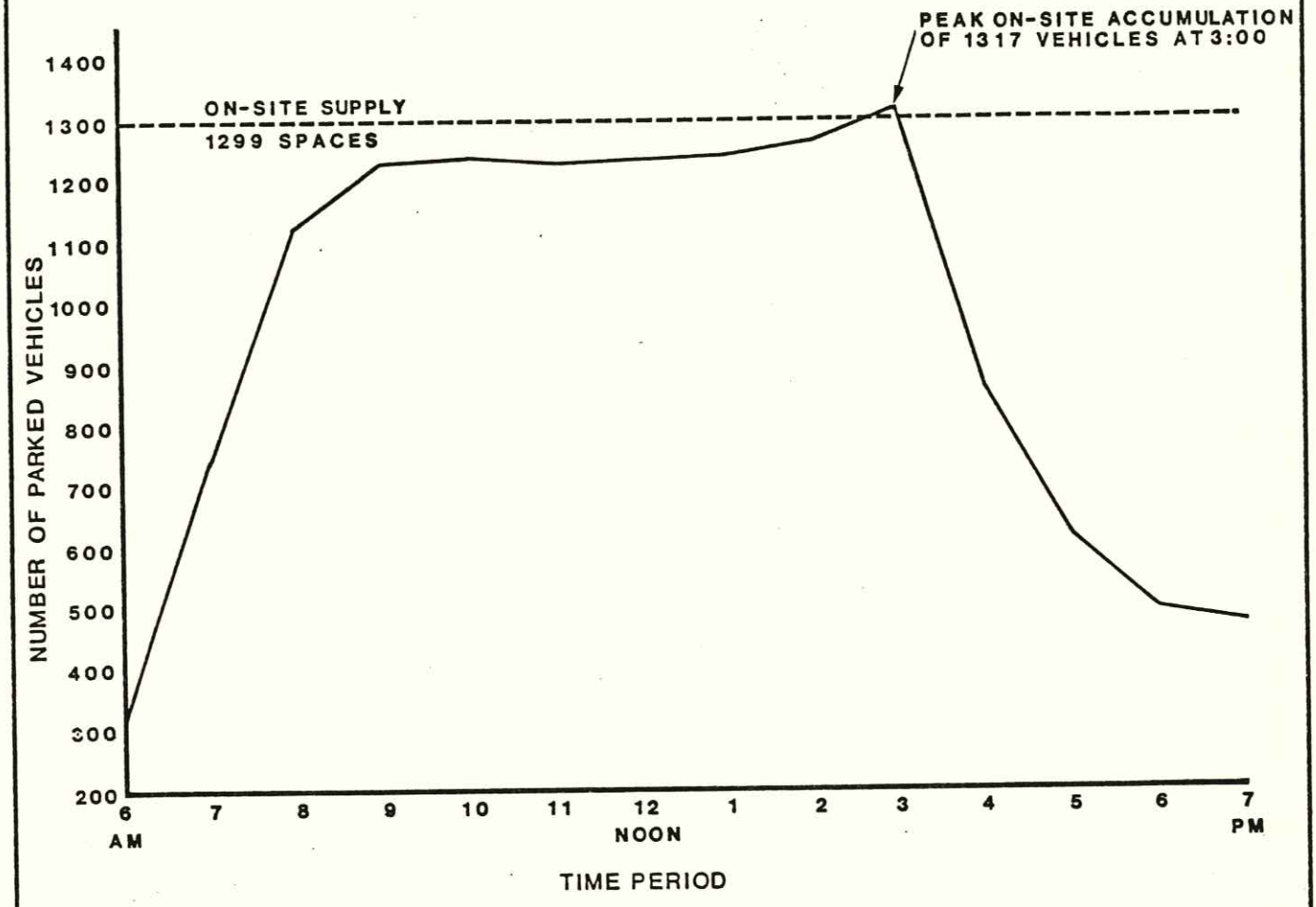
Figure 11 indicates the extent of parking observed in the study area at the peak time of the day. The figures clearly shows that with the exception of the two smallest parking facilities (Admitting and Radiology), all of the hospital parking lots operated above capacity. This is possible because of vehicles parking in fire lanes, aisles, unmarked spaces, etc. within the garage and parking lots. The figure also shows that the farther away from the hospital a particular street is, the less likely it is to be used for hospital parking.

The following graphic, Figure 12, indicates average observed parking duration in each facility. The garage shows a long average stay of 7.2 hours indicating its primary use by employees. The



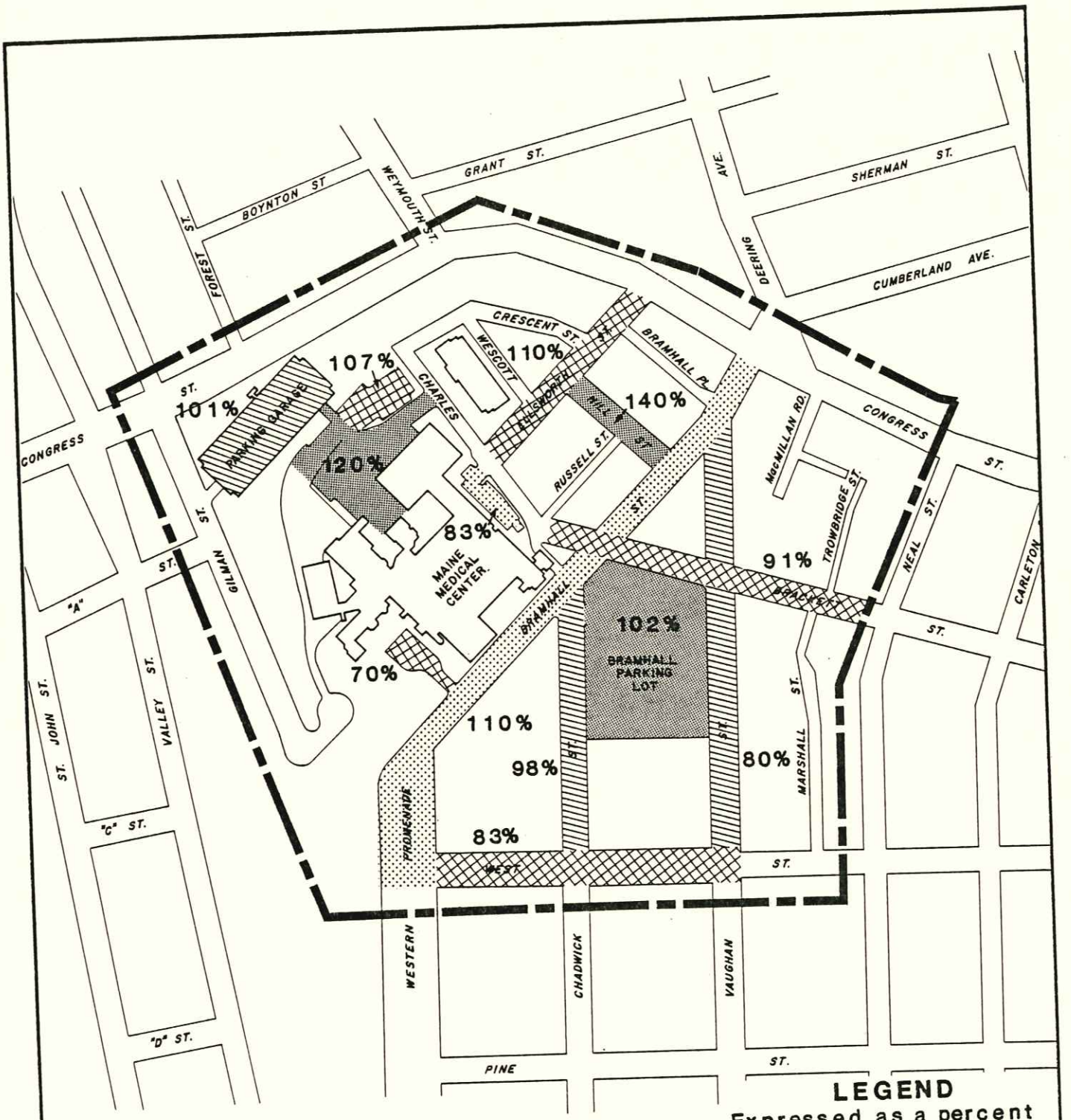
NOTE: INCLUDES ALL SPACES SURVEYED

Maine Medical Center Traffic Impact and Parking Plan	**Existing Study Area Parking Accumulation**	Vanasse/Hangen Associates Boston, MA **FIG. 9**



NOTE: INCLUDES ONLY ON-CAMPUS SPACES

Maine Medical Center **Traffic Impact and Parking Plan**	**Existing On-Site Parking Accumulation**	Vanasse/Hangen Associates Boston, MA **FIG. 10**



LEGEND
Expressed as a percent of legal parking supply.

Maine Medical Center

Traffic Impact and Parking Plan

Peak Parking Space Occupancy At 3:00 PM

Vanasse/Hangen Associates
Boston, MA

100 0 100 200
SCALE IN FEET

FIG. 11

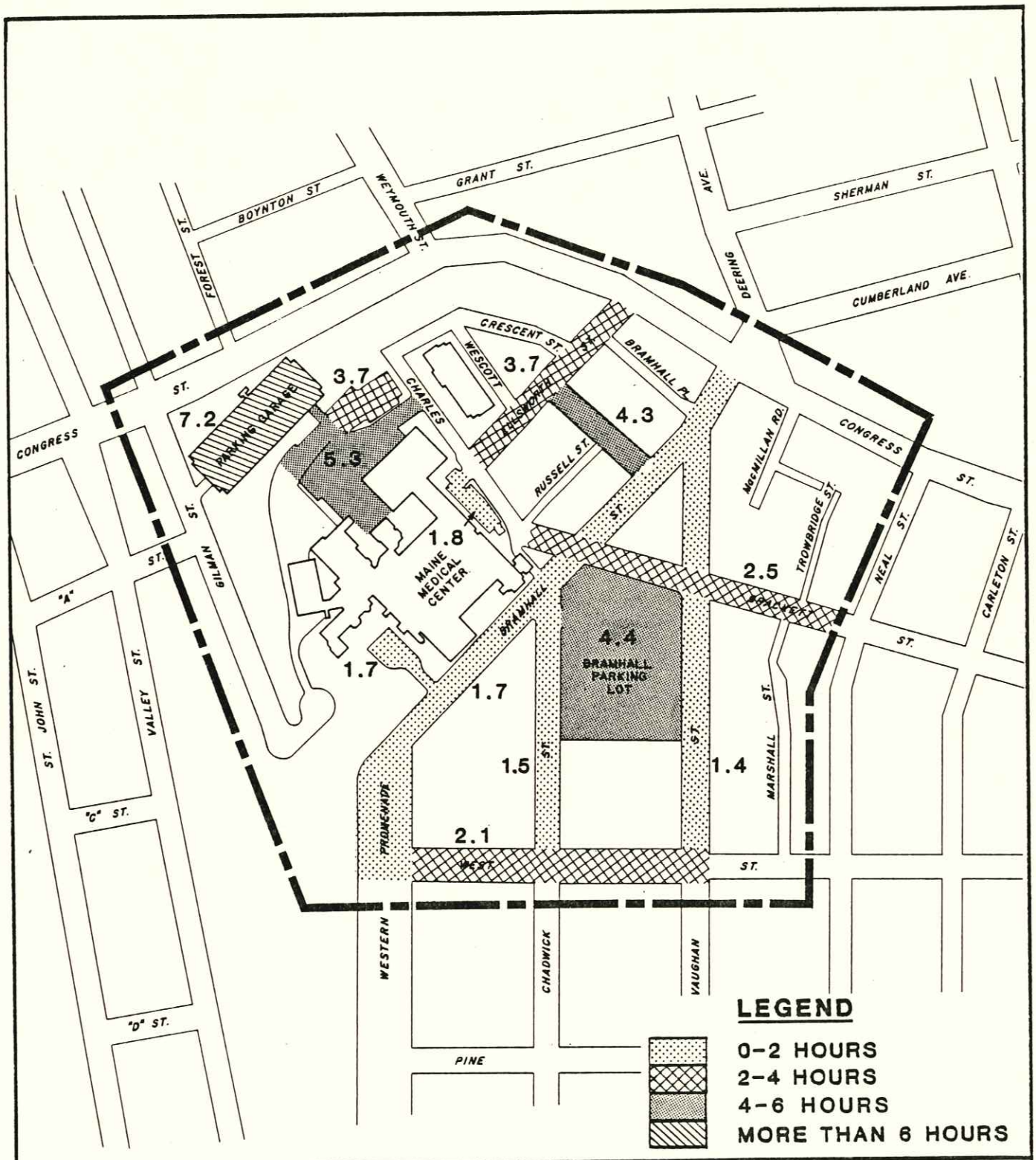
Bramhall lot shows a shorter average duration, indicating higher visitor usage of this lot. For the most part, on-street parking is relatively short-term with most observed durations under two hours.

On a daily basis, a total of 1,071 different vehicles were observed parking on-street in the study area. We estimate that approximately 400 of these daily vehicles are hospital related. At the peak time of the day (shift change), approximately 100 hospital related vehicles were observed parking on-street indicating a shortage of hospital parking. By analyzing the survey questionnaire, it was determined that the largest portion of hospital related on-street parking on the neighborhood streets is by visitors, out patients, and physicians. This is particularly true on Bramhall Street, Western Promenade, Chadwick Street, and Vaughan Street.

In summary, based on the combined results of the accumulation/turnover study and the survey questionnaire, it is estimated that the overall peak parking demand created solely by Maine Medical Center is approximately 1,400 vehicles. This demand can be broken down by user category as follows:

PARKING DEMAND BY USER CATEGORY

Employees	1,100
Patients	50
Visitors	100
Doctors	50
Other	100
TOTAL	1,400



Maine Medical Center

Traffic Impact and Parking Plan

Average Parking Duration (Hour)

Vanasse/Hangen Associates
Boston, MA

100 0 100 200
SCALE IN FEET

FIG. 12

This means that there is currently a peak period (i.e., shift change time) shortage of approximately 100 parking spaces at Maine Medical Center.

The shortage of parking at the hospital is a contributor to the on-street parking problem as are the numerous medical office buildings in the neighborhood.

III. FUTURE DEVELOPMENT IMPACTS

A. FUTURE HOSPITAL IMPROVEMENTS

The hospital expansion consists primarily of the construction of an addition which will contain 73 new patient rooms. This will bring the total size of the hospital to 598 patient beds. In addition to the expansion of hospital medical facilities, an expansion of the existing parking garage is planned. The new construction will consist of a 425 parking space addition which will be constructed over the existing garage.

A new roadway will also be constructed between the new wing and the parking garage. This construction will require a relocation of the cashier's booth on Charles Street. The new roadway will serve as primary access to the parking garage and the three planned loading docks.

B. FUTURE PARKING SUPPLY

Since the new hospital wing and circumferential roadway will be located on a portion of the existing rear parking lot, future parking supply will be different from the current supply. Overall, a total future parking supply of 1,640 parking spaces will be available. These spaces will be available in the following locations:

FUTURE PARKING SUPPLY SUMMARY

Garage	1,309
Bramhall Lot	278
Emergency Lot	10
Admitting	23
Radiology	20
TOTAL	1,640 spaces

The largest changes are the planned addition of 425 spaces to the garage and the removal of the existing 66 space rear lot. The other major change is the reduction in size of the emergency lot from 28 spaces now to 10 spaces in the future.

C. FUTURE PARKING DEMAND

Based on existing parking demand rates at the hospital (2.7 parking spaces required per patient bed), it is estimated that peak parking demands created by the hospital expansion will increase by approximately 200 new parking spaces. This new demand must be added to the existing observed demand, creating a total future need for approximately 1,600 parking spaces.

D. FUTURE PARKING SUPPLY/DEMAND COMPARISON

The previous sections of this memorandum identified a future peak period parking need for 1,600 parking spaces at peak. Current plans call for a supply of 1,640 parking spaces. It is our opinion that the planned parking supply will be able to meet projected needs.

Based on the increased parking needs as a result of the expansion project, the following breakdown of peak parking needs by user group is estimated:

FUTURE PEAK PARKING NEEDS BY USER CATEGORY

Employees	1,250	
Patients	60	
Visitors	115	
Doctors	60	
Other	115	
TOTAL	1,600	spaces

Clearly, the largest increase in parking demand will be due to the additional employees which will be required to staff the hospital addition. It is also clear that sufficient off-street parking will be provided to meet projected peak parking demands.

E. TRAFFIC IMPACT OF THE EXPANSION

In addition to increased parking demand, there will be increases in traffic due to the proposed hospital expansion. In order to estimate increased traffic volumes, daily and peak hour traffic currently generated by the hospital was observed. Following this, the increased traffic was estimated as a function of the planned hospital growth. The result of the current plan is a 14 percent increase in the size of the hospital (525 to 598 beds). This same increase was applied to the existing traffic, resulting in the following increased trip generation.

PROJECTED TRAFFIC INCREASES

	Vehicle Trips In	Vehicle Trips Out	Total Vehicle Trips
Daily	420	420	840
AM Peak	85	20	115
PM Peak	33	93	126

It is expected that this new traffic would access the parking garage from the Charles Street entrance. This will happen since it is unlikely that many drivers will enter from Gilman Street and circulate through the entire structure to find a parking space at the top. As stated previously, all of the 425 new parking spaces will be located on top of the existing structure. Since the majority of the new traffic will enter from Charles Street, three possible approach streets are available: Bramhall, Brackett and Chadwick Street. The new arrivals will likely follow existing patterns. Assuming that the roadway circulation system is unchanged, the following daily traffic increases would result.

TRAFFIC INCREASES

Location	Existing Daily Traffic Volumes	Daily Vehicle Trip Increase	Projected Traffic Volume	Percent Increase
Bramhall Street	5,500	+378	5,880	7%
Brackett Street	3,300	+210	3,510	6%
Chadwick Street	1,900	+105	2,00	6%

These increases are small in terms of daily traffic. Additionally, the peak hour increases will be similar and will not create any new capacity deficiencies in the study area.

Truck traffic is not expected to increase significantly as a result of the expansion.

IV. ANALYSIS OF ALTERNATIVES

The previous sections of this report identified a future peak period parking need of 1,600 parking spaces. Current plans call for a supply of 1,640 parking spaces. It is our opinion that the planned parking supply will be able to meet projected needs. Consequently the primary objective of the study is to identify options available to Maine Medical Center to improve management of its parking supply and site access/circulation system. These options are detailed in the following sections of this report.

A. PARKING MANAGEMENT OPTIONS

Since the hospital will be providing a sufficient supply of off-street parking in Maine Medical Center, the key issue becomes how to effectively manage the parking supply to insure that it is used correctly. This is important since effective parking management will help to minimize both the number and duration of on-street parkers. Of particular concern is how to reduce short-term, on-street parking which is generated primarily by visitors, out patients, and physicians.

A whole range of parking management options have been studied in order to define the best and most effective plan for Maine Medical Center. Each option studied is described briefly in the following sections of this report. The options center around the Bramhall Parking Lot since it serves as the major short-term parking supply and is the most visible parking supply in the neighborhood.

1. Modifications to Bramhall Lot

The Bramhall lot currently contains 278 parking spaces and serves visitors, physicians, and employees. Because of its highly visible location at the Main entrance to the hospital, this lot is heavily used throughout the day. Several changes to this lot are contemplated in anticipation of the expansion program at Maine Medical Center.

The Bramhall lot is divided into two sections; one section for physicians, the other for visitors and employees. With the current pavement markings, the physicans portion of the lot contains 41 spaces while the visitor and employees lot is striped to hold 237 vehicles. With the new construction on top of the garage, it will be possible to relocate the staff physicians who are parking all day in the reserved spaces to the garage. The hospital administration indicates that approximately 10 parking spaces would be affected by this change, reducing the physicians need to 30 reserved spaces in the lot.

In addition, there are currently approximately 135 parking spaces in this lot which are used by hospital employees. These parking spaces are located along the east side of the lot near Vaughan Street. With the construction of the additional 425 spaces on top of the garage, it will be possible to relocate approximtely 105 employees who are currently parking in the Bramhall lot to the garage. Approximately 30 spaces would be reserved for employees

who work in McGeachy Hall. These two changes will make 115 more short-term spaces available for visitor parking in the Bramhall lot.

The third change to the Bramhall lot concerns the physical layout of spaces within the lot. At present, the layout of spaces within the lot is somewhat inefficient due to the two separate access roadways. One roadway serves the physicians lot while the other serves the visitor/employee parking. If the two access roadways are combined and the lot is restriped to the most efficient configuration possible, a net gain of 10-20 parking spaces can be realized (depending on the stall size used).

Because of the prominent location of this lot, it is also used by non-hospital users throughout the day. We estimate that between 100 and 150 of the vehicles parked in this lot some time during the day belong to non-hospital related users. It is important that the hospital do everything possible to prevent this. One method would be the implementation of a validation system where visitors or out patients at the hospital obtain a validation to leave the lot. Those without the validation would be charged a higher fee for parking than is currently charged. This idea of a pricing policy would likely discourage non-hospital users from parking in this lot. The pricing of parking in this lot could also be modified to prevent long-term parking in the lot by non-hospital users. A maximum daiy charge of $5.00 to $6.00 per day would serve to discourage non-hospital users.

In summary, the Bramhall lot is an important parking resource at the hospital. With implementation of access and circulation changes, it will be possible to increase the usage of this lot by relocating the majority of the employees now using the lot and the physicians who park there long-term to the garage. Also, redesigning the lot will result in a net increase of 10-20 parking spaces in the Bramhall lot. Of the total 290 possible spaces, 30 would be reserved for physicians, 30 would be used by McGeachy Hall employees and the remaining 230± spaces would be available for short-term visitor use. Physician and employee spaces remaining should be reserved by signing and enforced by the lot attendant. Employees and physicians using the lot should also be issued a distinctive parking sticker to gain access to the lot. Any other employees choosing to park here would pay the full visitor parking rate.

2. Free One-Hour Visitors Parking

One method which could be effective in reducing on-street visitors parking would be for the hospital to provide free one-hour visitor parking in the Bramhall lot. When faced with the choice of parking on-street for free or paying to park in the Bramhall lot, many short-term parkers at the hospital choose to park on-street. Visitors pay $0.35/hour currently, with a maximum charge of $3.50/day. The hospital also issues a parking "relief pass" to certain patient visitors who have relatives in the hospital for a long stay. There are approximately 50 relief passes in use at any one

time and they allow long-term visitors to pay only $0.05/hour for parking. By providing the first hour free, the Bramhall lot becomes as attractive as the closest on-street spaces. Further, the relocation of most employees out of this lot will help insure the success of this plan since more visitors spaces will be made available.

3. Valet Parking In Bramhall Lot

It has been proposed that a system of valet parking be instituted in the Bramhall parking lot. Because this lot is used primarily by visitors, it experiences a higher turnover rate than the other major hospital parking facilities. This is because visitors tend to have shorter but more frequent stays at the hospital. The short-term nature of parking in this lot does not lend itself to valet parking. Valet parking is typically used in smaller lots which provide parking for longer durations. Further, it would be necessary for the hospital to hire additional personnel to operate the lot. Valet parking for a lot this size will result in an inconvenience to visitors and extra cost to the hospital. Also many drivers prefer not to have their automobiles parked for them and would likely park on street, even if free one-hour parking was provided.

For all the reasons listed above, valet parking in the Bramhall lot does not appear feasible.

4. Assignment of Parking Spaces in Garage

The hospital now restricts parking in the parking garage to employees only. With the planned addition of 425 spaces, it will be possible to allow certain non-employee groups to park in this structure, even with the relocation of the employees who are now parking in the Bramhall lot. The total new demand of 200 parking spaces includes all categories of hospital users including physicians, employees, visitors, and patients. It may be possible to identify distinct user groups other than employees who could be allowed to park in the garage. Specific target groups include ambulatory care patients and long term visitors with relatives in the special care or cardiac care units. These assignments will help further by reducing long-term parking in the Brahmall lot.

5. Modify Visiting Hours

It has been suggested that a modification of patient visiting hours could reduce peak parking demand. Typically community and suburban hospitals have restricted visitors to between 4:00 and 8:00 PM so that their parking demand would not add to those of employees at shift change.

In the case of Maine Medical Center, however, this is not a feasible alternative. Changes of that nature have worked at much smaller hosptials but because of MMC's prominence as the largest hospital in the state, a restriction of this nature would be unworkable. Many of MMC's patients are referals from distant

locations within the state and because of the travel distances involved, a restriction of this nature would be both unworkable and unenforceable. At present, visitiors are not allowed in the adult units between 2:00 and 6:00 PM. However, because of the size of the hospital and its unique characteristics, we recommend that no changes in the current hospital visiting hour policy be made.

6. Increased Enforcement of On-Street Parking Regulations

While the hospital will be making a number of changes and improvements to its parking system, there will still be some on-street parking as long as it is considered legal. Many of the parking spaces on the neighborhood streets are currently posted for one hour parking between 9:00 AM and 5:00 PM. The City of Portland Police Department oversees enforcement of the posted parking regulations through ticketing.

It is important that the City continue to enforce the posted regulations after the parking improvements at the hospital. Without strict enforcement of the posted parking regulations the on-street parking problem will continue and will likely worsen. It is also important for the MMC administration to continue to cooperate fully with the Portland Police Department regarding this issue.

B. TRAFFIC CIRCULATION ALTERNATIVES

In addition to the parking situation, a second area of concern at Maine Medical Center is the traffic pattern on the neighborhood

streets, particularly at the two Bramhall Street intersections immediately adjacent to the hospital. The most obvious problem is the intersection of Chadwick Street and Bramhall Street. Another problem location is the Brackett Street/Bramhall Street intersection. A third problem which has been identified is the parking garage access from Charles Street. This roadway serves a primary entrance for vehicles desiring to park in the garage, ambulances, and all truck activity at the hospital. Because of the relatively narrow width and the grade on Charles Street, this access location can be classified as a problem area which should be improved.

1. Bramhall Street/Chadwick Street Intersection

There are three major problems with this intersection: 1) the volume of traffic which passes through the intersection, 2) the heavy pedestrian volumes which cross Bramhall Street between the parking lot and the main hospital building and 3) the confusion created by the entrance to the Bramhall lot from Chadwick Street.

Traffic volumes through this intersection are steady throughout the day since it carries all traffic destined for the Bramhall lot and the Radiology lot as well as neighborhood traffic headed for Chadwick Street, Bramhall Street, and Western Promenade. It also carries a substantial amount of traffic destined for the parking garage, the Emergency lot, and the Admitting lot. Chadwick Street is posted one way northbound towards Bramhall Street but it is necessary for all traffic entering the parking lot to travel against this flow of Chadwick Street traffic for a short distance.

This situation is especially confusing to drivers who are unfamiliar with area traffic patterns. The intersection is further complicated by the amount of pedestrian traffic which must cross at this intersection.

In order to solve the existing problems at this location, several changes were considered. The first change would reverse the direction of Chadwick Street to prevent conflicts at the Bramhall lot entrance. By reversing Chadwick Street, potential head-on collisions would be eliminated. This change would make it necessary for traffic desiring to reach Bramhall Street to use Vaughan Street.

The second major change considered that would reduce auto traffic at the Bramhall Street/Chadwick Street intersection would be to make the Bramhall lot drive on Chadwick Street an entrance only drive. A new exit only drive from the lot would be constructed on Vaughan Street. The major benefit of this proposal is that it would reduce the amount of traffic which currently passes through the Chadwick Street/Bramhall Street intersection. Two problems with this proposal are evident. First, it would be necessary for the hospital to hire additional personnel to operate the lot since the two driveways would be separated by approximately 250 feet. The second problem with this proposal is a design issue. The new access drive would have to be constructed on a substantial grade (approximately 10 percent) in order to connect the street with the level of the parking lot. This 4-5 foot grade differential is not

insurmountable, but clearly, a 10 percent grade is undesirable, especially during snowy and icy weather.

The third option considered the relocation of the existing Chadwick Street drive to the southern end of the parking lot. This relocation would be done in coordination with the proposal to make Chadwick Street one-way southbound. Several benefits can be realized from this change. The major improvement would be to eliminate congestion at the Bramhall Street intersection. Any cars waiting to enter the lot would wait on Chadwick Street rather than blocking the intersection. Another benefit of this change is that pedestrian crossings at the intersection would also be significantly improved since pedestrians wouldn't have to cross between waiting cars. This proposal, combined with the reversal of Chadwick Street, appears to offer the best solution to improve traffic flow at this intersection.

2. Bramhall Street/Brackett Street Intersection

The Bramhall Street/Brackett Street Intersection is currently under four-way stop control. (This means that there is a stop sign on each approach to the intersection). An analysis of this intersection was conducted to determine what improvements can be made to ease traffic flow. The analysis indicates that a traffic signal is not warranted at this location since traffic volumes are not high enough during the required eight hour period to satisfy MUTCD[1]/

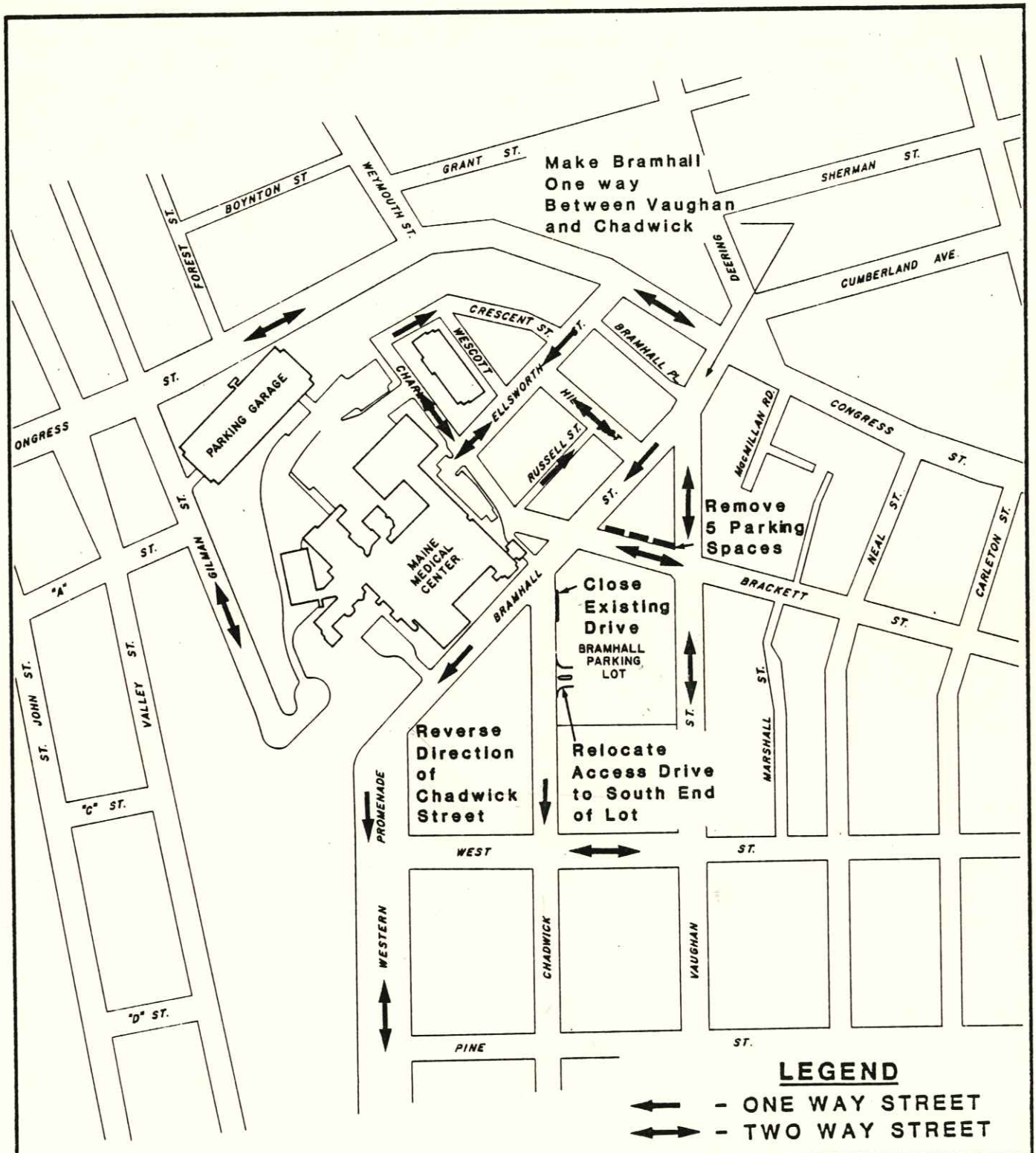
1/ MUTCD - Manual on Uniform Traffic Control Devices. Federal Highway Administration, U.S. Government Printing Office, 1978.

warrants. (Analysis sheets are presented in the Appendix.) The current four-way stop at this location is the most appropriate type of control in view of existing vehicular and pedestrian activity. However, significant improvements can be made at this location if circulation changes are made.

One technique commonly used in congested locations like this is to remove a conflicting movement from the intersection through the creation of one-way streets or turn restrictions. In this particular case, a clear improvement option would be to make Bramhall Street westbound one-way the entire length between Vaughan Street and the Western Promenade. Vehicles previously turning left from Charles Street eastbound to Bramhall Street northbound would be relocated one block to Vaughan Street. This change, combined with the other changes proposed for the study area, is shown in Figure 13. In order to accomplish this change, it will be necessary to remove five parking spaces on the north side of Brackett Street to accommodate the increased traffic on this roadway link. This change will also improve the existing Bramhall Street/Vaughan Street intersection which gets congested primarily at shift change. Further, this proposal will simplify traffic flow directly in front of the hospital and lead to a more uniform one-way signing of Bramhall Street.

3. Charles Street Access

The current access roadway to the rear of the hospital intersects Charles Street north of Ellsworth Street. At this location,



Maine Medical Center

Traffic Impact and Parking Plan

Proposed Roadway Circulation System

Vanasse/Hangen Associates
Boston, MA

100 0 100 200
SCALE IN FEET

FIG. 13

Charles Street is only 20-22 feet wide. This width is inadequate since the drive functions as a major access location to the parking garage and the truck loading areas. Therefore, we suggest that as a long-term goal, the hospital acquire adjacent property to allow the roadway to be widened. At this location, a 30-foot width is desirable to accommodate Charles Street roadway volumes.

V. RECOMMENDATIONS

This report identified a number of problems and their proposed solutions related to the traffic and parking problems at and around the Maine Medical Center. To briefly summarize the report, it was found that with the implementation of the recommendations herein both the parking and traffic systems at the hospital will be significantly improved. The adverse effects of the proposed expansion of the hospital can be minimized and specific existing problems can be addressed if the recommendations are followed. With the changes recommended, on-street parking will be reduced and traffic circulation will be improved.

The specific improvements recommended as a result of this study are:

- The 278-space Bramhall parking lot should be redesigned to make more efficient use of available space. A redesign effort could add 10-20 spaces to the supply.

- The Bramhall lot should be restricted to short-term visitor/patient parking. All employees should be relocated to the new spaces in the garage. The only exception to this will be employees of McGeachy Hall (30 spaces) and attending physicians (30 spaces). This change will make at least 230± spaces available for visitors and patients in a convenient accessible location.

- All employees should continue to be assigned to park in the garage. It may also be possible to allow designated patient groups to park in the garage including ambulatory care patients and long-term visitor parking.

- To discourage long-term parking, it is recommended that a graduated parking fee be implemented in the Bramhall lot. A suggested fee schedule would be $.35/hour for the first four hours and $1.00 per hour thereafter. Special relief passes should continue to be made available for visitors of patients whose stays are unexpectedly prolonged.

- If after construction of the garage and subsequent changes to the Bramhall lot, the Bramhall lot is underutilized, the hospital should consider providing free one-hour parking to visitors. This would encourage drivers to use hospital supplied parking facilities rather than parking on-street. This recommendation should only be implemented, if necessary, after completion and full operation of the expanded garage.

- The hospital should continue to discourage non-hospital related parking in the Bramhall lot to guarantee its continued availability for hospital users. If this becomes a problem, then a pricing policy/validation system which charges non-hospital users a premium to park in the lot may be necessary.

- We also recommend that the MMC administration cooperate fully with the Portland Police Department regarding continued enforcement of the posted parking regulations on the neighborhood streets.

Traffic

- It is recommended that the direction of Chadwick Street be reversed so that the street will operate as a one-way southbound street.

- The access/egress drive to the Bramhall lot should be relocated to the southern end of the lot on Chadwick Street. Further, the separate physician entrance should be consolidated with the visitor entrance to reduce the amount of space dedicated to circulation aisles. This will allow the parking spaces in the lot to be restriped to contain 290± spaces. This amounts to an increase of 10± spaces.

- The entire section of Bramhall Street between Vaughan Street and Western Promenade should be posted as a one-way street westbound to help eliminate congestion at the Brackett Street/ Bramhall Street intersection. In order to accommodate the additional traffic on Brackett Street, it will be necessary to remove five parking spaces on the north side of Brackett Street between Bramhall Street and Vaughan Street.

- As a long term goal, the hospital should consider acquiring additional property on Charles Street to improve the current situation. This acquisition would allow the hospital to widen Charles Street to improve accessibility to the parking garage and the truck loading facilities. A minimum 30 foot width would be desirable.

APPENDIX

- Transportation Survey Results
- Traffic Counts
- Signal Warrant Analysis

No.

MAINE MEDICAL CENTER
TRANSPORTATION AND PARKING SURVEY QUESTIONNAIRE

This survey is being conducted to determine the best way to effectively meet the transportation and parking requirements at the Maine Medical Center. Your cooperation is needed for the success of this Survey. We, therefore urge you to please fill out all applicable items listed below.

Please return this completed form to the collection boxes located at the entrances to the Hospital.

1. REASON FOR COMING TO THE HOSPITAL: (Check One) — 5 6

___Doctor	Non-Employee
___Dentist	___Out-Patient or Emergency Room Patient
___Intern/Resident	___Scheduled In-Patient
Employee	___Patient Visitor
___Nurse	___Business Visitor
___Support Medical	___Student at Hospital
___Non Medical	___Accompanied a patient
	___Other_____ Specify

2. HOW DID YOU ARRIVE AT THE HOSPITAL TODAY. (check only one) — 7

___Driver of a car that parks	___Taxi
___Passenger in car that parks	___Walk
___Dropped off by car	___Bicycle/Moped
___Bus	___Other_____ Specify

3. IF YOU ARE AN EMPLOYEE, WHAT SHIFT TIME ARE YOU SCHEDULED TO WORK TODAY? — 8 11 / 12 15

Time In: ___:___AM or PM (Circle One) Time out: ___:___AM or PM (Circle One)

IF YOU WERE THE DRIVER OF AN AUTO TO THE HOSPITAL TODAY, PLEASE ANSWER THE FOLLOWING QUESTIONS:

IF YOU WERE NOT THE DRIVER, YOU HAVE COMPLETED THE SURVEY

THANK YOU VERY MUCH.

4. HOW MANY PEOPLE WERE IN THE CAR INCLUDING YOURSELF? — 16

___One ___Two ___Three ___Four ___More than Four

5. AT WHAT TIME DID YOU ARRIVE AT THE HOSPITAL? (Specify Time) — 17 20

___:___AM or ___:___PM

6. AT WHAT TIME WILL YOU LEAVE THE HOSPITAL? (Estimate Time) — 21 24

___:___AM or ___:___PM

7. WHERE DID YOU PARK? (See map--other side) — 25 26

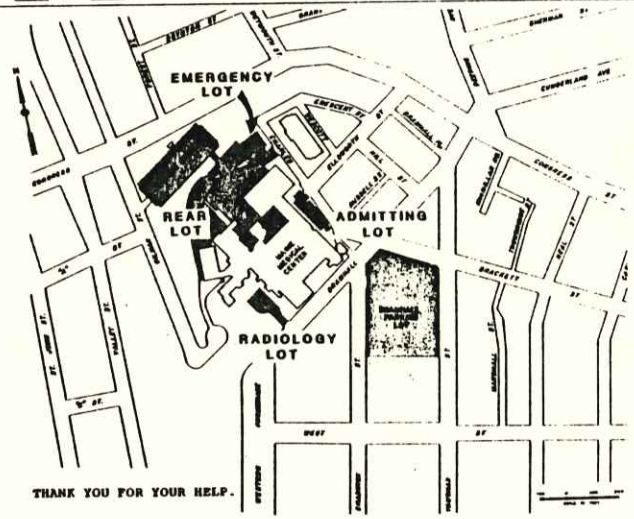
___Garage	___Western Promenade
___Admitting Parking Lot	___Brackett Street
___Bramhall Parking Lot	___Chadwick Street
___Emergency Room Parking Lot	___Vaughan Street
___Rear Parking Lot	___West Street
___Radiology Parking Lot	___Congress Street
___Bramhall Street	___Other_____ Fill In Street Name

8. IF YOU ARE AN EMPLOYEE, WOULD YOU BE WILLING TO PARK IN AN OFF STREET SECURED PARKING LOT AWAY FROM HOSPITAL GROUNDS, IF FREQUENT SHUTTLE BUS SERVICE WAS PROVIDED? — 27

___YES ___NO

9. IF YOU ARE AN EMPLOYEE, WOULD YOU BE WILLING TO USE SUCH A LOT DURING THE CONSTRUCTION/RENOVATION OF THE HOSPITAL? — 28

___YES ___NO



THANK YOU FOR YOUR HELP.

MAINE MEDICAL CENTER

TRANSPORTATION AND PARKING SURVEY

SUMMARY RESULTS OF
SURVEY CONDUCTED FEBRUARY 25, 1982

QUESTION 1. WHAT IS YOUR REASON FOR COMING TO HOSPITAL?

Status	Absolute Frequency	Relative Frequency (Percent)
Doctor	236	7.9%
Dentist	21	0.7
Intern/Resident	30	1.0
Nurse	448	14.9
Support medical	343	11.4
Non-Medical	405	13.5
Employee - not specified	154	5.1
Volunteer	49	1.6
Outpatient/ER patient	257	8.6
Scheduled inpatient	56	1.9
Patient visitor	550	18.3
Business visitor	112	3.7
Student at hospital	114	3.8
Accompanied a patient	90	3.0
Clergy	12	0.4
Other	123	4.2
Total	3,000	100.0%

MAINE MEDICAL CENTER
TRANSPORTATION AND PARKING SURVEY

SUMMARY OF RESULTS OF SURVEY
CONDUCTED FEBRUARY 25, 1982

QUESTION 2. HOW DID YOU ARRIVE AT THE HOSPITAL TODAY?

	Absolute Frequency	Relative Frequency (percent)
Automobile Driver	2,187	72.9%
Automobile Passenger	366	12.2%
Drop-Off	161	5.4%
Bus	56	1.9%
Taxi	13	0.4%
Walk	167	5.6%
Bicycle/Moped	10	0.3%
Other/Unknown	40	1.3%
TOTAL	3,000	100.0%

MAINE MEDICAL CENTER
TRANSPORTATION AND PARKING SURVEY

SUMMARY OF RESULTS OF SURVEY
CONDUCTED FEBRUARY 25, 1982

MODE OF ARRIVAL BY USER CATEGORY

	DRIVER	PASSENGER	DROP-OFF	BUS	TAXI	WALK	BICYCLE/ MOPED
DOCTOR	189	12	6	8	1	17	1
DENTIST	13	4	2	0	0	1	1
INTERN	18	0	1	0	0	9	0
EMPLOYEE	1,054	81	96	24	5	76	4
OUT-PATIENT	147	66	13	12	1	9	2
IN-PATIENT	29	13	7	1	1	3	0
PATIENT VISITOR	377	127	18	6	2	14	1
BUSINESS VISITOR	89	9	2	1	0	10	0
STUDENT	81	19	2	0	0	10	1
ACCOMPANIED A PATIENT	56	26	2	1	0	2	0
OTHER	96	7	8	2	2	9	0
TOTAL	2,149	364	157	55	12	160	10

MAINE MEDICAL CENTER
TRANSPORTATION AND PARKING SURVEY

SUMMARY OF RESULTS OF SURVEY
CONDUCTED FEBRUARY 25, 1982

QUESTION 3. IF YOU ARE AN EMPLOYEE, WHAT SHIFT TIME ARE YOU SCHEDULED TO WORK TODAY?

Time In[1/]		Time Out[2/]	
1:00 AM	1	12:30 AM	18
2:30 AM	1	1:00 AM	3
3:00 AM	1	1:30 AM	1
4:00 AM	1	3:30 AM	1
5:00 AM	2	4:30 AM	2
6:00 AM	21	5:00 AM	1
6:15 AM	1	5:30 AM	1
6:30 AM	28	6:30 AM	1
6:45 AM	23	6:45 AM	1
7:00 AM	266	7:00 AM	18
7:15 AM	7	7:15 AM	12
7:30 AM	179	7:30 AM	6
7:45 AM	9	7:45 AM	8
8:00 AM	314	8:00 AM	13
8:30 AM	65	8:15 AM	1
8:45 AM	4	9:00 AM	10
9:00 AM	21	10:00 AM	7
9:15 AM	1	10:30 AM	6
10:00 AM	3	11:00 AM	2
10:15 AM	2	11:30 AM	1
10:30 AM	2	12:00 NOON	38
11:00 AM	1	12:15 PM	2
11:15 AM	2	12:30 PM	11
12:00 NOON	12	1:00 PM	10
12:30 PM	3	1:15 PM	1
1:00 PM	7	2:00 PM	12
1:30 PM	1	2:30 PM	9
1:45 PM	1	3:00 PM	38
2:00 PM	23	3:15 PM	6
2:15 PM	1	3:30 PM	184
2:30 PM	10	3:45 PM	7
2:45 PM	2	4:00 PM	189
3:00 PM	136	4:15 PM	4
3:15 PM	1	4:30 PM	242
3:30 PM	38	4:45 PM	4
4:00 PM	33	5:00 PM	131
4:15 PM	1	5:15 PM	2
5:00 PM	1	5:30 PM	33
5:45 PM	1	5:45 PM	3
6:00 PM	3	6:00 PM	20
8:00 PM	1	6:30 PM	2
8:30 PM	1	7:00 PM	5
10:00 PM	2	7:15 PM	2
10:30 PM	2	7:30 PM	1
11:00 PM	27	7:45 PM	1
11:15 PM	16	8:00 PM	8
		8:30 PM	3

MAINE MEDICAL CENTER
TRANSPORTATION AND PARKING SURVEY

SUMMARY OF RESULTS OF SURVEY
CONDUCTED REBRUARY 25, 1982

Time In[1/]	
11:30 PM	5
11:45 PM	8
12:00 MID	5
NO ANSWER	54
TOTAL	1,350

Time Out[2/]	
9:00 PM	8
9:30 PM	1
10:00 PM	5
11:00 PM	22
11:30 PM	108
11:45 PM	1
12:00 MID	25
NO ANSWER	99
TOTAL	1,350

1/ Rounded to nearest 15 minutes.

MAINE MEDICAL CENTER
TRANSPORTATION AND PARKING SURVEY

SUMMARY OF RESULTS OF SURVEY
CONDUCTED FEBRUARY 25, 1982

QUESTION 4. HOW MANY PERSON WERE IN THE CAR INCLUDING YOURSELF?

	Absolute Frequency	Relative Frequency (percent)
One	1,586	72.5%
Two	385	17.6%
Three	110	5.0%
Four	35	1.6%
More than Four	8	0.4%
Unknown	63	2.9%
TOTAL	2,187	100.0%

NOTE: Questions 4-9 were for drivers only.

MAINE MEDICAL CENTER

TRANSPORTATION AND PARKING SURVEY

SUMMARY RESULTS OF
SURVEY CONDUCTED FEBRUARY 25, 1982

QUESTION 5. AT WHAT TIME DID YOU ARRIVE AT THE HOSPITAL?

Time[1/]		Time[1/]	
2:30 AM	1	2:00 PM	50
2:45 AM	2	2:15 PM	38
3:00 AM	1	2:30 PM	93
3:30 AM	1	2:45 PM	59
4:00 AM	2	3:00 PM	64
5:30 AM	2	3:15 PM	26
5:45 AM	2	3:30 PM	42
6:00 AM	20	3:45 PM	16
6:15 AM	16	4:00 PM	18
6:30 AM	69	4:15 PM	3
6:45 AM	135	4:30 PM	19
7:00 AM	121	4:45 PM	9
7:15 AM	96	5:00 PM	15
7:30 AM	87	5:15 PM	9
7:45 AM	159	5:30 PM	6
8:00 AM	144	5:45 PM	10
8:15 AM	51	6:00 PM	22
8:30 AM	57	6:15 PM	9
8:45 AM	34	6:30 PM	11
9:00 AM	43	6:45 PM	14
9:15 AM	15	7:00 PM	26
9:30 AM	16	7:15 PM	9
9:45 AM	15	7:30 PM	13
10:00 AM	35	7:45 PM	1
10:15 AM	15	8:00 PM	2
10:30 AM	19	8:45 PM	1
10:45 AM	12	10:00 PM	2
11:00 AM	36	10:30 PM	2
11:15 AM	10	10:45 PM	11
11:30 AM	32	11:00 PM	16
11:45 AM	22	11:15 PM	6
12:00 PM	28	11:30 PM	6
12:15 PM	20	11:45 PM	6
12:30 PM	36	12:00 MID.	4
12:45 PM	15	Unknown	44
1:00 PM	42		
1:15 PM	17	TOTAL	2,187
1:30 PM	37		
1:45 PM	31		

1/ Rounded to nearest 15 minutes.

NOTE: Questions 4-9 were for drivers only

MAINE MEDICAL CENTER

TRANSPORTATION AND PARKING SURVEY

SUMMARY RESULTS OF
SURVEY CONDUCTED FEBRUARY 25, 1982

QUESTION 5. AT WHAT TIME DID YOU ARRIVE AT THE HOSPITAL?

Time[1/]		Time	
2:30 AM	1	2:00 PM	50
2:45 AM	2	2:15 PM	38
3:00 AM	1	2:30 PM	93
3:30 AM	1	2:45 PM	59
4:00 AM	2	3:00 PM	64
5:30 AM	2	3:15 PM	26
5:45 AM	2	3:30 PM	42
6:00 AM	20	3:45 PM	16
6:15 AM	16	4:00 PM	18
6:30 AM	69	4:15 PM	3
6:45 AM	135	4:30 PM	19
7:00 AM	121	4:45 PM	9
7:15 AM	96	5:00 PM	15
7:30 AM	87	5:15 PM	9
7:45 AM	159	5:30 PM	6
8:00 AM	144	5:45 PM	10
8:15 AM	51	6:00 PM	22
8:30 AM	57	6:15 PM	9
8:45 AM	34	6:30 PM	11
9:00 AM	43	6:45 PM	14
9:15 AM	15	7:00 PM	26
9:30 AM	16	7:15 PM	9
9:45 AM	15	7:30 PM	13
10:00 AM	35	7:45 PM	1
10:15 AM	15	8:00 PM	2
10:30 AM	19	8:45 PM	1
10:45 AM	12	10:00 PM	2
11:00 AM	36	10:30 PM	2
11:15 AM	10	10:45 PM	11
11:30 AM	32	11:00 PM	16
11:45 AM	22	11:15 PM	6
12:00 PM	28	11:30 PM	6
12:15 PM	20	11:45 PM	6
12:30 PM	36	12:00 MID.	4
12:45 PM	15	Unknown	44
1:00 PM	42		
1:15 PM	17	TOTAL	2,187
1:30 PM	37		
1:45 PM	31		

1/ Rounded to nearest 15 minutes.

NOTE: Questions 4-9 were for drivers only

MAINE MEDICAL CENTER

TRANSPORTATION AND PARKING SURVEY

SUMMARY RESULTS OF

SURVEY CONDUCTED FEBRUARY 25, 1982

QUESTION 6. AT WHAT TIME WILL YOU LEAVE THE HOSPITAL?

Time[1/]	
12:15 AM	1
12:30 AM	10
12:45 AM	1
1:00 AM	3
1:15 AM	2
1:30 AM	1
2:45 AM	1
3:30 AM	1
6:30 AM	2
7:00 AM	10
7:15 AM	3
7:30 AM	11
7:45 AM	5
8:00 AM	24
8:15 AM	10
8:30 AM	12
8:45 AM	7
9:00 AM	27
9:15 AM	12
9:30 AM	19
9:45 AM	2
10:00 AM	45
10:15 AM	9
10:30 AM	24
10:45 AM	5
11:00 AM	32
11:15 AM	11
11:30 AM	27
11:45 AM	9
12:00 PM	73
12:15 PM	19
12:30 PM	24
12:45 PM	10
1:00 PM	40
1:15 PM	9
1:30 PM	33
1:45 PM	7
2:00 PM	81
2:15 PM	25
2:30 PM	44
2:45 PM	15
3:00 PM	84
3:15 PM	21
3:30 PM	156
3:45 PM	39
4:00 PM	197
4:15 PM	30
4:30 PM	183
4:45 PM	38
5:00 PM	123
5:15 PM	25
5:30 PM	60
5:45 PM	9
6:00 PM	53
6:15 PM	7
6:30 PM	16
6:45 PM	1
7:00 PM	33
7:15 PM	6
7:30 PM	15
7:45 PM	7
8:00 PM	64
8:15 PM	6
8:30 PM	12
8:45 PM	2
9:00 PM	20
9:15 PM	4
9:30 PM	4
9:45 PM	1
10:00 PM	10
10:30 PM	1
11:00 PM	21
11:15 PM	2
11:30 PM	70
11:45 PM	21
12:00 MID.	19
Unknown	111
TOTAL	2,187

1/ Rounded to nearest 15 minutes

NOTE: Questions 4-9 were for drivers only.

MAINE MEDICAL CENTER
TRANSPORTATION AND PARKING SURVEY

SUMMARY OF RESULTS OF SURVEY
CONDUCTED FEBRUARY 25, 1982

QUESTIONS 7. WHERE DID YOU PARK?

	Absolute Frequency	Relative Frequency (percent)
Garage	930	42.5%
Admitting Lot	58	2.7%
Bramhall Lot	356	16.3%
Emergency Lot	64	2.9%
Rear Lot	62	2.8%
Radiology Lot	8	0.4%
Bramhall Street	213	9.7%
Western Prom.	110	5.0%
Brackett Street	27	1.2%
Chadwick Street	139	6.4%
Vaughan Street	75	3.4%
West Street	32	1.5%
Ellsworth Street	10	0.5%
Hill Street	10	0.5%
Gilman Street	5	0.2%
Private Lots	15	0.7%
Other Locations	14	0.6%
Unknown	59	2.7%
TOTAL	2,187	100.0%

NOTE: Questions 4-9 were for drivers only.

MAINE MEDICAL CENTER
TRANSPORTATION AND PARKING SURVEY

SUMMARY OF RESULTS OF SURVEY
CONDUCTED FEBRUARY 25, 1982

QUESTION 8. IF YOU ARE AN EMPLOYEE, WOULD YOU BE WILLING TO PARK IN AN OFF STREET SECURED PARKING LOT AWAY FROM HOSPITAL GROUNDS, IF FREQUENT SHUTTLE BUS SERVICE WAS PROVIDED?

	Absolute Frequency	Relative Frequency (percent)
Yes	384	36.4%
No	614	58.3%
No Answer	56	5.3%
TOTAL	1,054	100.0%

NOTE: Questions 8-9 were only for employees who drove. A total of 1,054 employees responded to the survey saying they drove to the hospital.

MAINE MEDICAL CENTER
TRANSPORTATION AND PARKING SURVEY

SUMMARY OF RESULTS OF SURVEY
CONDUCTED FEBRUARY 25, 1982

QUESTION 9. IF YOU ARE AN EMPLOYEE, WOULD YOU BE WILLING TO USE SUCH A LOT DURING THE CONSTRUCTION/ RENOVATION OF THE HOSPITAL?

	Absolute Frequency	Relative Frequency (Percent)
Yes	658	62.4%
No	331	31.4%
No Answer	65	6.2%
TOTAL	1,054	100.0%

NOTE: Questions 8-9 were only for employees who drove. A total of 1,054 employees responded to the survey saying they drove to the hospital.

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: BG DATE: 3/2/82

CITY / TOWN: Portland STATE: Maine

LOCATION: Bramhall St. between Hill and Brackett Street

DIR. Total JOB No. 0211-10 SHEET 1 OF 3

TIME \ MONTH Feb. 82	Sun.	Mon.	Tue. 2/23	Wed. 2/24	Thu.	Fri.	Sat.	TOTAL
12 - 1 A.M.				55				55
1 - 2 A.M.				25				25
2 - 3 A.M.				12				12
3 - 4 A.M.				6				6
4 - 5 A.M.				12				12
5 - 6 A.M.				43				43
6 - 7 A.M.				245				245
7 - 8 A.M.				341				341
8 - 9 A.M.				265				265
9 -10 A.M.				320				320
10 -11 A.M.			348					348
11 -12 NOON			377					377
12 - 1 P.M.			367					367
1 - 2 P.M.			430					430
2 - 3 P.M.			463					463
3 - 4 P.M.			492					492
4 - 5 P.M.			493					493
5 - 6 P.M.			298					298
6 - 7 P.M.			252					252
7 - 8 P.M.			217					217
8 - 9 P.M.			187					187
9 -10 P.M.			77					77
10 -11 P.M.			92					92
11 - 12 MID.			109					109
TOTAL			4202	1324				5526

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday 5526

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: BG DATE: 3/2/82

CITY / TOWN: Portland STATE: Maine

LOCATION: Bramhall St. between Hill and Brackett Streets

DIR. Northbound JOB No. 0211-10 SHEET 2 OF 3

TIME \ MONTH Feb. 82	Sun.	Mon.	Tue. 2/23	Wed. 2/24	Thu.	Fri.	Sat.	TOTAL
12 - 1 A.M.				49				49
1 - 2 A.M.				15				15
2 - 3 A.M.				7				7
3 - 4 A.M.				4				4
4 - 5 A.M.				8				8
5 - 6 A.M.				16				16
6 - 7 A.M.				77				77
7 - 8 A.M.				123				123
8 - 9 A.M.				99				99
9 -10 A.M.				131				131
10 -11 A.M.			159					159
11 -12 NOON			179					179
12 - 1 P.M.			158					158
1 - 2 P.M.			217					217
2 - 3 P.M.			234					234
3 - 4 P.M.			269					269
4 - 5 P.M.			328					328
5 - 6 P.M.			175					175
6 - 7 P.M.			123					123
7 - 8 P.M.			145					145
8 - 9 P.M.			155					155
9 -10 P.M.			50					50
10 -11 P.M.			44					44
11 - 12 MID.			76					76
TOTAL			2312	529				2841

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday 2841

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: BG DATE: 3/2/82

CITY / TOWN: Portland STATE: Maine

LOCATION: Bramhall St. between Hill and Brackett Streets

DIR. Southbound JOB No. 0211-10 SHEET 3 OF 3

TIME \ MONTH Feb. 82	Sun.	Mon.	Tue. 2/23	Wed. 2/24	Thu.	Fri.	Sat.	TOTAL
12 - 1 A.M.				6				6
1 - 2 A.M.				10				10
2 - 3 A.M.				5				5
3 - 4 A.M.				2				2
4 - 5 A.M.				4				4
5 - 6 A.M.				27				27
6 - 7 A.M.				168				168
7 - 8 A.M.				218				218
8 - 9 A.M.				166				166
9 -10 A.M.				189				189
10 -11 A.M.			189					189
11 -12 NOON			198					198
12 - 1 P.M.			209					209
1 - 2 P.M.			213					213
2 - 3 P.M.			229					229
3 - 4 P.M.			223					223
4 - 5 P.M.			165					165
5 - 6 P.M.			123					123
6 - 7 P.M.			129					129
7 - 8 P.M.			72					72
8 - 9 P.M.			32					32
9 -10 P.M.			27					27
10 -11 P.M.			48					48
11 - 12 MID.			33					33
TOTAL			1890	795				2685

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday 2685

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: PD DATE: 2-23-82

CITY / TOWN: Portland STATE Maine

LOCATION: Vaughan St. Between West and Brackett Streets

DIR. Total JOB No. 0211-10 SHEET 1 OF 3

TIME \ MONTH FEB/82	Sun.	Mon.	Tue. 2/23	Wed. 2/24	Thu.	Fri.	Sat.	TOTAL
12 - 1 A.M.				17				17
1 - 2 A.M.				15				15
2 - 3 A.M.				8				8
3 - 4 A.M.				4				4
4 - 5 A.M.				3				3
5 - 6 A.M.				16				16
6 - 7 A.M.				96				96
7 - 8 A.M.				184				184
8 - 9 A.M.				243				243
9 -10 A.M.			201					201
10 -11 A.M.			250					250
11 -12 NOON			287					287
12 - 1 P.M.			326					326
1 - 2 P.M.			320					320
2 - 3 P.M.			386					386
3 - 4 P.M.			356					356
4 - 5 P.M.			344					344
5 - 6 P.M.			250					250
6 - 7 P.M.			188					188
7 - 8 P.M.			144					144
8 - 9 P.M.			102					102
9 -10 P.M.			85					85
10 -11 P.M.			65					65
11 - 12 MID.			53					53
TOTAL			3357	586				3943

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday 3943

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: PD DATE: 2-23-82

CITY / TOWN: Portland STATE: Maine

LOCATION: Vaughan St., between West and Bracket St.

DIR. N. Bound JOB No. 0211-10 SHEET 2 OF 3

TIME \ MONTH	Sun.	Mon.	Tue. 2/23	Wed. 2/24	Thu.	Fri.	Sat.	TOTAL
12 - 1 A.M.				11				11
1 - 2 A.M.				10				10
2 - 3 A.M.				7				7
3 - 4 A.M.				4				4
4 - 5 A.M.				1				1
5 - 6 A.M.				13				13
6 - 7 A.M.				68				68
7 - 8 A.M.				140				140
8 - 9 A.M.				155				155
9 -10 A.M.			128					128
10 -11 A.M.			127					127
11 -12 NOON			164					164
12 - 1 P.M.			179					179
1 - 2 P.M.			186					186
2 - 3 P.M.			228					228
3 - 4 P.M.			186					186
4 - 5 P.M.			201					201
5 - 6 P.M.			161					161
6 - 7 P.M.			139					139
7 - 8 P.M.			87					87
8 - 9 P.M.			68					68
9 -10 P.M.			52					52
10 -11 P.M.			44					44
11 - 12 MID.			28					28
TOTAL			1978	409				2387

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday 2,387

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: PD DATE: 2-23-82

CITY / TOWN: Portland STATE: Maine

LOCATION: Vaughan St. between West and Bracket St

DIR. S. Bound JOB No. 0211-10 SHEET 3 OF 3

TIME \ MONTH	Sun.	Mon.	Tue. 2/23	Wed. 2/24	Thu.	Fri.	Sat.	TOTAL
12 - 1 A.M.				6				6
1 - 2 A.M.				5				5
2 - 3 A.M.				1				1
3 - 4 A.M.				0				0
4 - 5 A.M.				2				2
5 - 6 A.M.				3				3
6 - 7 A.M.				28				28
7 - 8 A.M.				44				44
8 - 9 A.M.				88				88
9 -10 A.M.			73					73
10 -11 A.M.			123					123
11 -12 NOON			123					123
12 - 1 P.M.			147					147
1 - 2 P.M.			134					134
2 - 3 P.M.			158					158
3 - 4 P.M.			170					170
4 - 5 P.M.			143					143
5 - 6 P.M.			89					89
6 - 7 P.M.			49					49
7 - 8 P.M.			57					57
8 - 9 P.M.			34					34
9 -10 P.M.			33					33
10 -11 P.M.			21					21
11 - 12 MID.			25					25
TOTAL			1379	177				1556

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday 1,556

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: GMT DATE: 3/1/82

CITY / TOWN: Portland STATE: Maine

LOCATION: Chadwick St. between West and Bramhall Streets

DIR. Total JOB No. 0211-10 SHEET 1 OF 1

TIME \ MONTH Feb. 82	Sun.	Mon.	Tue. 2/23	Wed. 2/24	Thu.	Fri.	Sat.	TOTAL
12 - 1 A.M.				2				2
1 - 2 A.M.				1				1
2 - 3 A.M.				0				0
3 - 4 A.M.				2				2
4 - 5 A.M.				4				4
5 - 6 A.M.				23				23
6 - 7 A.M.				93				93
7 - 8 A.M.				86				86
8 - 9 A.M.				109				109
9 -10 A.M.			124					124
10 -11 A.M.			196					196
11 -12 NOON			152					152
12 - 1 P.M.			167					167
1 - 2 P.M.			210					210
2 - 3 P.M.			254					254
3 - 4 P.M.			142					142
4 - 5 P.M.			106					106
5 - 6 P.M.			42					42
6 - 7 P.M.			80					80
7 - 8 P.M.			36					36
8 - 9 P.M.			17					17
9 -10 P.M.			14					14
10 -11 P.M.			23					23
11 - 12 MID.			8					8
TOTAL			1571	320				1891

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday 1891

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: GMT DATE: 3/1/82

CITY / TOWN: Portland STATE Maine

LOCATION: Rear Parking Entrance from Charles Street

DIR. Lot Total JOB No. 0211-10 SHEET 1 OF 2

TIME \ MONTH Feb. 82	Sun.	Mon.	Tue.	Wed. 2/24	Thu. 2/25	Fri.	Sat.	TOTAL
12 - 1 A.M.					75			75
1 - 2 A.M.					23			23
2 - 3 A.M.					22			22
3 - 4 A.M.					16			16
4 - 5 A.M.					20			20
5 - 6 A.M.					46			46
6 - 7 A.M.					195			195
7 - 8 A.M.					399			399
8 - 9 A.M.					238			238
9 -10 A.M.					146			146
10 -11 A.M.					115			115
11 -12 NOON				177	144			321
12 - 1 P.M.				203	133			336
1 - 2 P.M.				191	189			380
2 - 3 P.M.				254				254
3 - 4 P.M.				322				322
4 - 5 P.M.				352				352
5 - 6 P.M.				217				217
6 - 7 P.M.				136				136
7 - 8 P.M.				97				97
8 - 9 P.M.				78				78
9 -10 P.M.				70				70
10 -11 P.M.				107				107
11 - 12 MID.				117				117
TOTAL				2321	1761			4082

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday 3,616

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: GMT DATE: 3/1/82

CITY / TOWN: Portland STATE: Maine

LOCATION: Ambulance Entrance from Charles Street

DIR. Ambul. Total JOB No. 0211-10 SHEET 2 OF 2

TIME \ MONTH Feb. 82	Sun.	Mon.	Tue.	Wed. 2/24	Thu. 2/25	Fri.	Sat.	TOTAL
12 - 1 A.M.					6			6
1 - 2 A.M.					3			3
2 - 3 A.M.					4			4
3 - 4 A.M.					4			4
4 - 5 A.M.					3			3
5 - 6 A.M.					4			4
6 - 7 A.M.					0			0
7 - 8 A.M.					2			2
8 - 9 A.M.					3			3
9 -10 A.M.					7			7
10 -11 A.M.					7			7
11 -12 NOON				2	0			2
12 - 1 P.M.				19	7			26
1 - 2 P.M.				9	16			25
2 - 3 P.M.				9				9
3 - 4 P.M.				10				10
4 - 5 P.M.				6				6
5 - 6 P.M.				3				3
6 - 7 P.M.				13				13
7 - 8 P.M.				3				3
8 - 9 P.M.				3				3
9 -10 P.M.				4				4
10 -11 P.M.				5				5
11 - 12 MID.				0				0
TOTAL				86	66			152

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday 129

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: EE DATE: 3/2/82

CITY / TOWN: Portland STATE: Maine

LOCATION: Congress St. 200' West of Ellsworth St.

DIR. Total JOB No. 0211-10 SHEET 1 OF 3

TIME \ MONTH Feb. 82	Sun.	Mon.	Tue.	Wed. 2/24	Thu. 2/25	Fri.	Sat.	TOTAL
12 - 1 A.M.					177			177
1 - 2 A.M.								
2 - 3 A.M.								
3 - 4 A.M.					HOSE			
4 - 5 A.M.					UP			
5 - 6 A.M.								
6 - 7 A.M.								
7 - 8 A.M.								
8 - 9 A.M.								
9 -10 A.M.								
10 -11 A.M.								
11 -12 NOON				912	888			1800
12 - 1 P.M.				993	951			1944
1 - 2 P.M.				941	917			1858
2 - 3 P.M.				1033	1022			2055
3 - 4 P.M.				1047	1096			2143
4 - 5 P.M.				1029	1145			2174
5 - 6 P.M.				814	880			1694
6 - 7 P.M.				730				730
7 - 8 P.M.				668				668
8 - 9 P.M.				479				479
9 -10 P.M.				401				401
10 -11 P.M.				417				417
11 - 12 MID.				244				244
TOTAL				9708	7076			16,784

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday _____

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: EE DATE: 3/2/82

CITY / TOWN: Portland STATE: Maine

LOCATION: Congress St. 200' West of Ellsworth St.

DIR. Eastbound JOB No. 0211-10 SHEET 2 OF 3

TIME \ MONTH Feb. 82	Sun.	Mon.	Tue.	Wed. 2/24	Thu. 2/25	Fri.	Sat.	TOTAL
12 - 1 A.M.					110			110
1 - 2 A.M.								
2 - 3 A.M.								
3 - 4 A.M.					HOSE			
4 - 5 A.M.					UP			
5 - 6 A.M.								
6 - 7 A.M.								
7 - 8 A.M.								
8 - 9 A.M.								
9 -10 A.M.								
10 -11 A.M.								
11 -12 NOON				550	530			1080
12 - 1 P.M.				616	549			1165
1 - 2 P.M.				594	583			1177
2 - 3 P.M.				620	579			1199
3 - 4 P.M.				594	633			1227
4 - 5 P.M.				550	669			1219
5 - 6 P.M.				478	497			975
6 - 7 P.M.				503				503
7 - 8 P.M.				468				468
8 - 9 P.M.				298				298
9 -10 P.M.				258				258
10 -11 P.M.				241				241
11 - 12 MID.				175				175
TOTAL				5945	4150			10,095

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday _____

MECHANICAL RECORDER COUNT RECORD

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

CALCULATED BY: EE DATE: 3/2/82

CITY / TOWN: Portland STATE: Maine

LOCATION: Congress St. 200' West of Ellsworth St.

DIR. Westbound JOB No. 0211-10 SHEET 3 OF 3

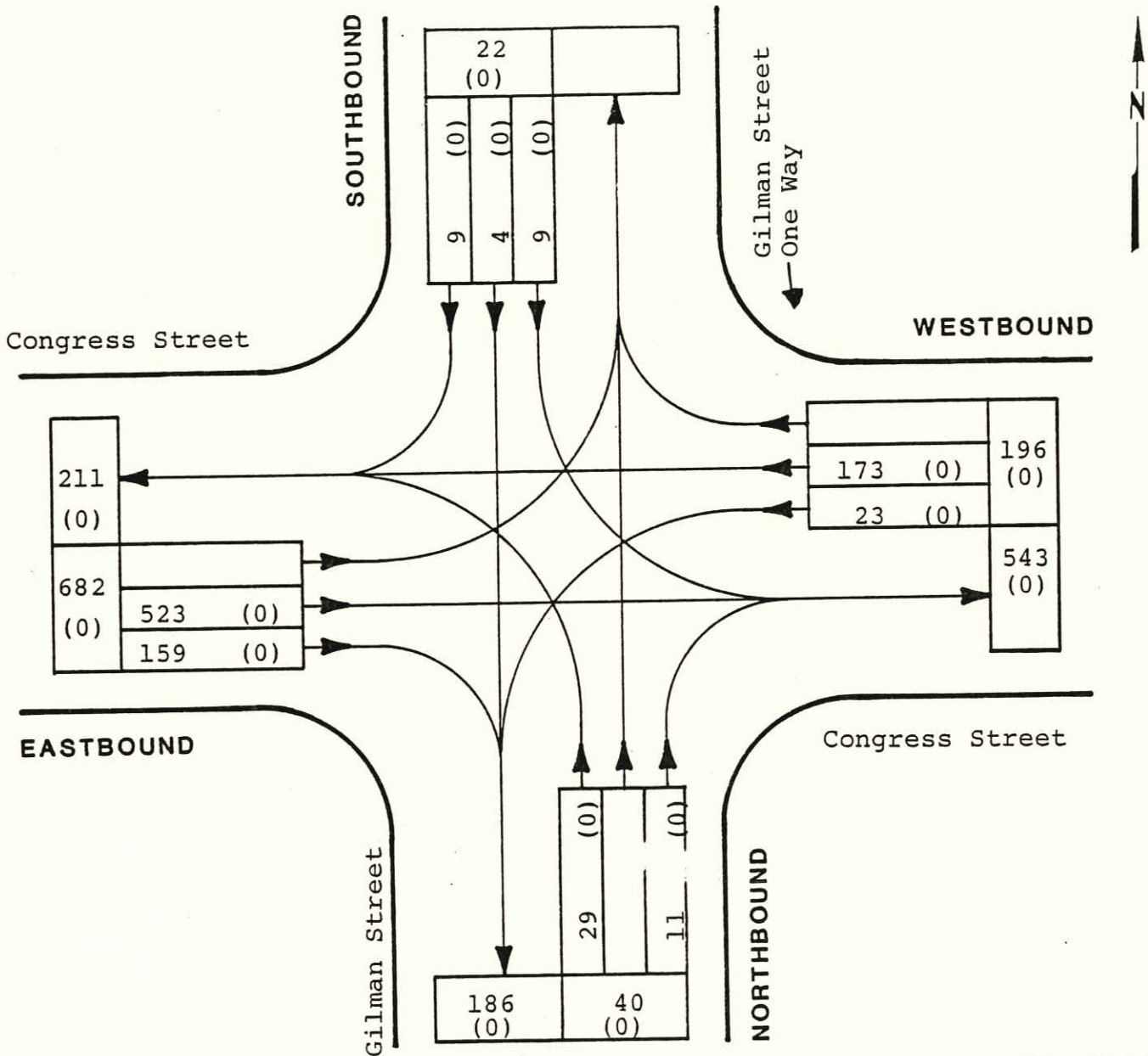
TIME \ MONTH Feb. 82	Sun.	Mon.	Tue.	Wed. 2/24	Thu. 2/25	Fri.	Sat.	TOTAL
12 - 1 A.M.					67			67
1 - 2 A.M.								
2 - 3 A.M.								
3 - 4 A.M.								
4 - 5 A.M.					HOSE			
5 - 6 A.M.					UP			
6 - 7 A.M.								
7 - 8 A.M.								
8 - 9 A.M.								
9 -10 A.M.								
10 -11 A.M.								
11 -12 NOON				362	358			720
12 - 1 P.M.				377	402			779
1 - 2 P.M.				347	334			681
2 - 3 P.M.				413	443			856
3 - 4 P.M.				453	463			916
4 - 5 P.M.				479	476			955
5 - 6 P.M.				336	383			719
6 - 7 P.M.				227				227
7 - 8 P.M.				200				200
8 - 9 P.M.				181				181
9 -10 P.M.				143				143
10 -11 P.M.				176				176
11 - 12 MID.				69				69
TOTAL				3763	2926			6689

Avg. Sat. _____ Avg. Sun. _____ Avg. Weekday _____

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

INTERSECTION TURNING MOVEMENT COUNT

CITY Portland, Maine DATE 2-24-82 DAY of WEEK Wednesday
INTERSECTION Congress St., at Gilman Street JOB No. 0211-10

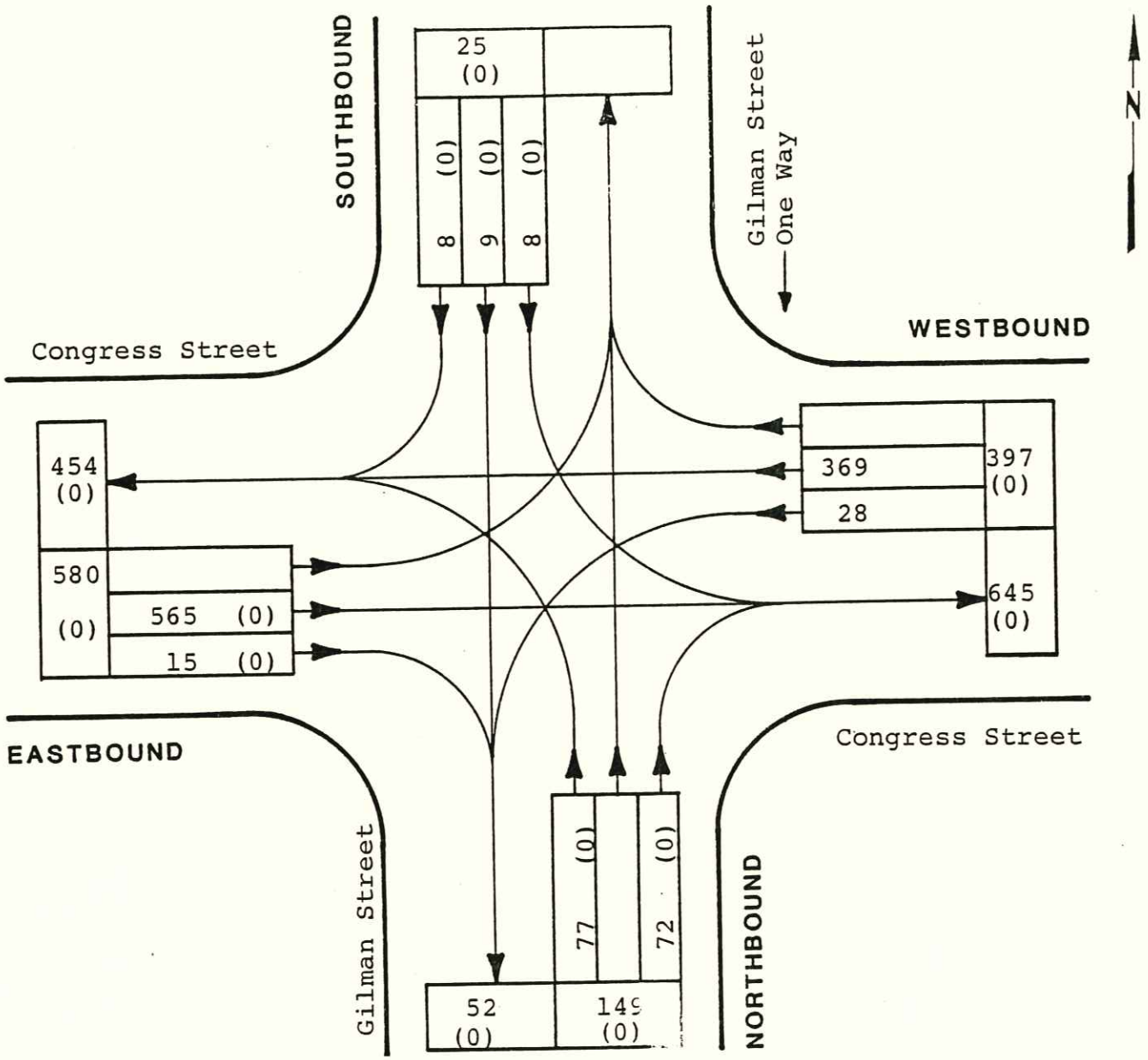


STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT
Gilman Street NB	40 (0)	4	7:15 a.m. to 8:15 a.m.
Gilman Street SB	22 (0)	2	
Congress Street EB	682 (0)	73	AM PEAK HOUR
Congress Street WB	196 (0)	21	
			VEHICLES COUNTED
			ALL VEHICLES XXX
			TRUCKS (XX)
TOTAL	940 (0)	100	PERCENT TRUCKS 0 %

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

INTERSECTION TURNING MOVEMENT COUNT

CITY Portland, Maine DATE 2-24-82 DAY of WEEK Wednesday
INTERSECTION Congress St., at Gilman Street JOB No. 0211-10

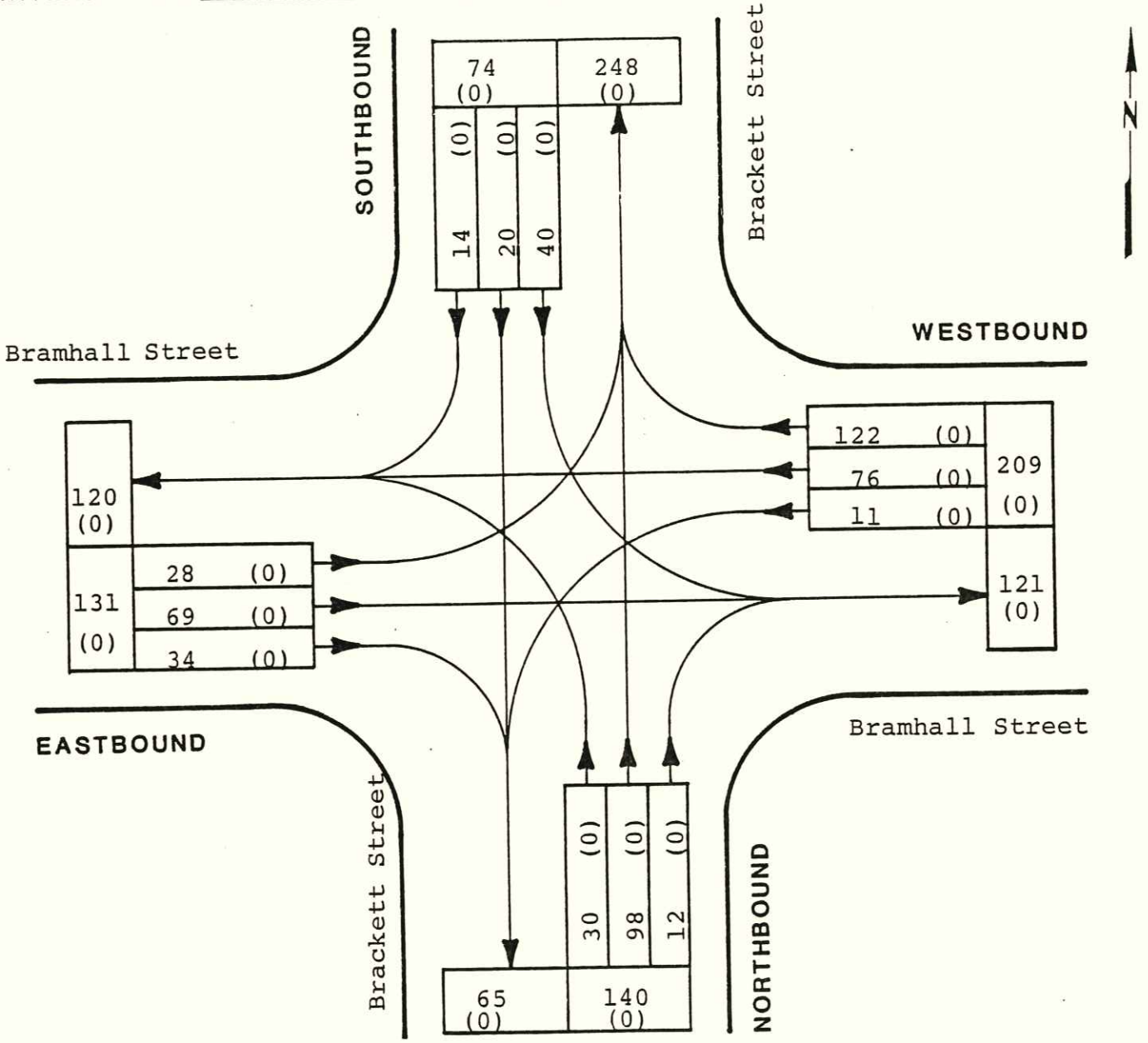


STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT
Gilman Street NB	149 (0)	13	3:45 p.m. to 4:45 p.m.
Gilman Street SB	25 (0)	3	
Congress Street EB	580 (0)	50	PM PEAK HOUR
Congress Street WB	397 (0)	34	
			VEHICLES COUNTED
			ALL VEHICLES XXX
			TRUCKS (XX)
TOTAL	1161 (0)	100	PERCENT TRUCKS %

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

INTERSECTION TURNING MOVEMENT COUNT

CITY Portland, Maine DATE 2-24-82 DAY of WEEK Wednesday
INTERSECTION Brackett Street at Bramhall Street JOB No. 0211-10

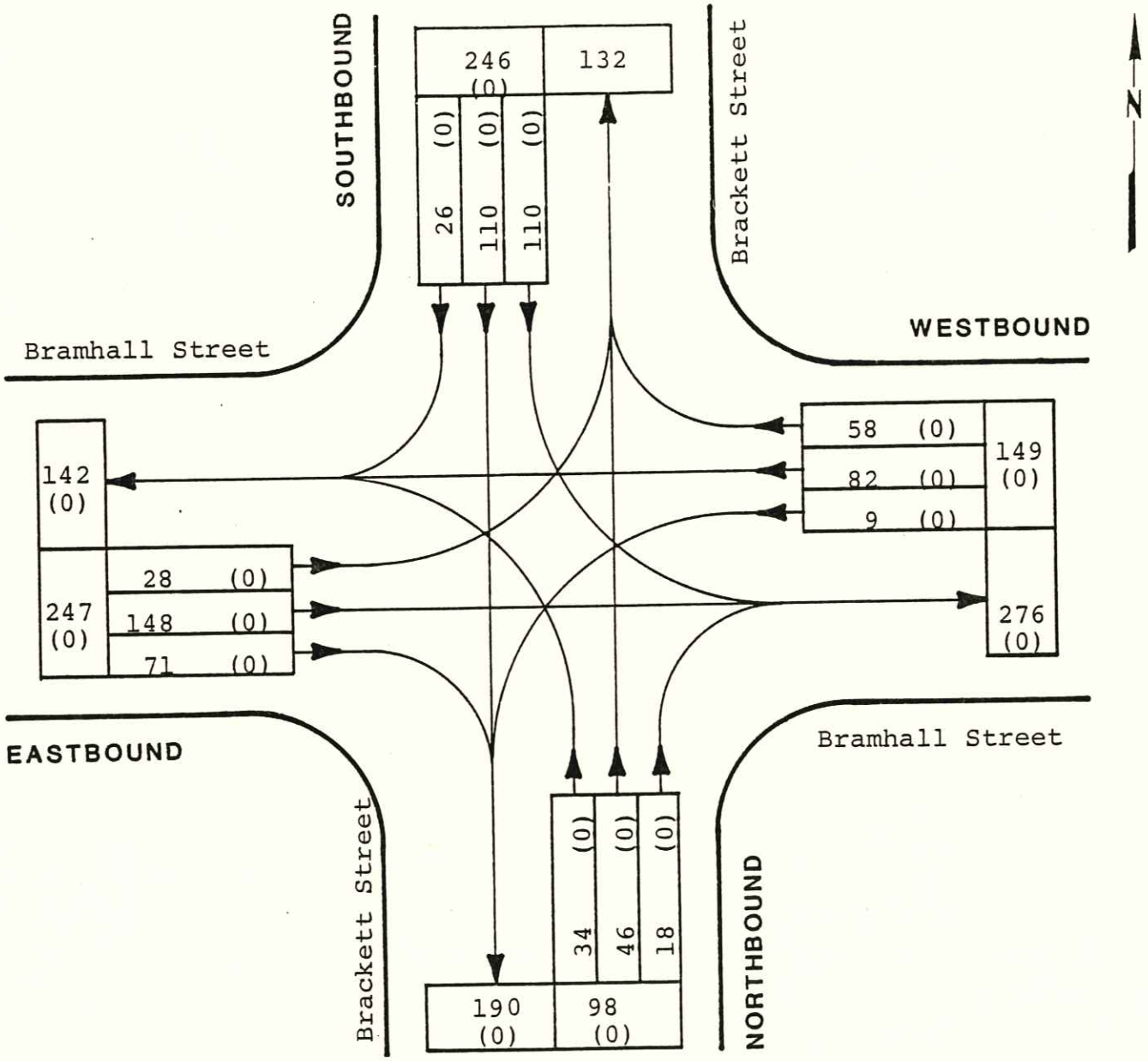


STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT
Brackett St., NB	140 (0)	25	7:15 a.m. to 8:15 a.m.
Brackett St., SB	74 (0)	13	
Bramhall St., EB	131 (0)	24	AM PEAK HOUR
Bramhall St., WB	209 (0)	38	
			VEHICLES COUNTED
			ALL VEHICLES XXX
			TRUCKS (XX)
TOTAL	554 (0)	100	PERCENT TRUCKS 0 %

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

INTERSECTION TURNING MOVEMENT COUNT

CITY Portland, Maine DATE 2-24-82 DAY of WEEK Tuesday
INTERSECTION Brackett Street at Bramhall Street JOB No. 0221-10

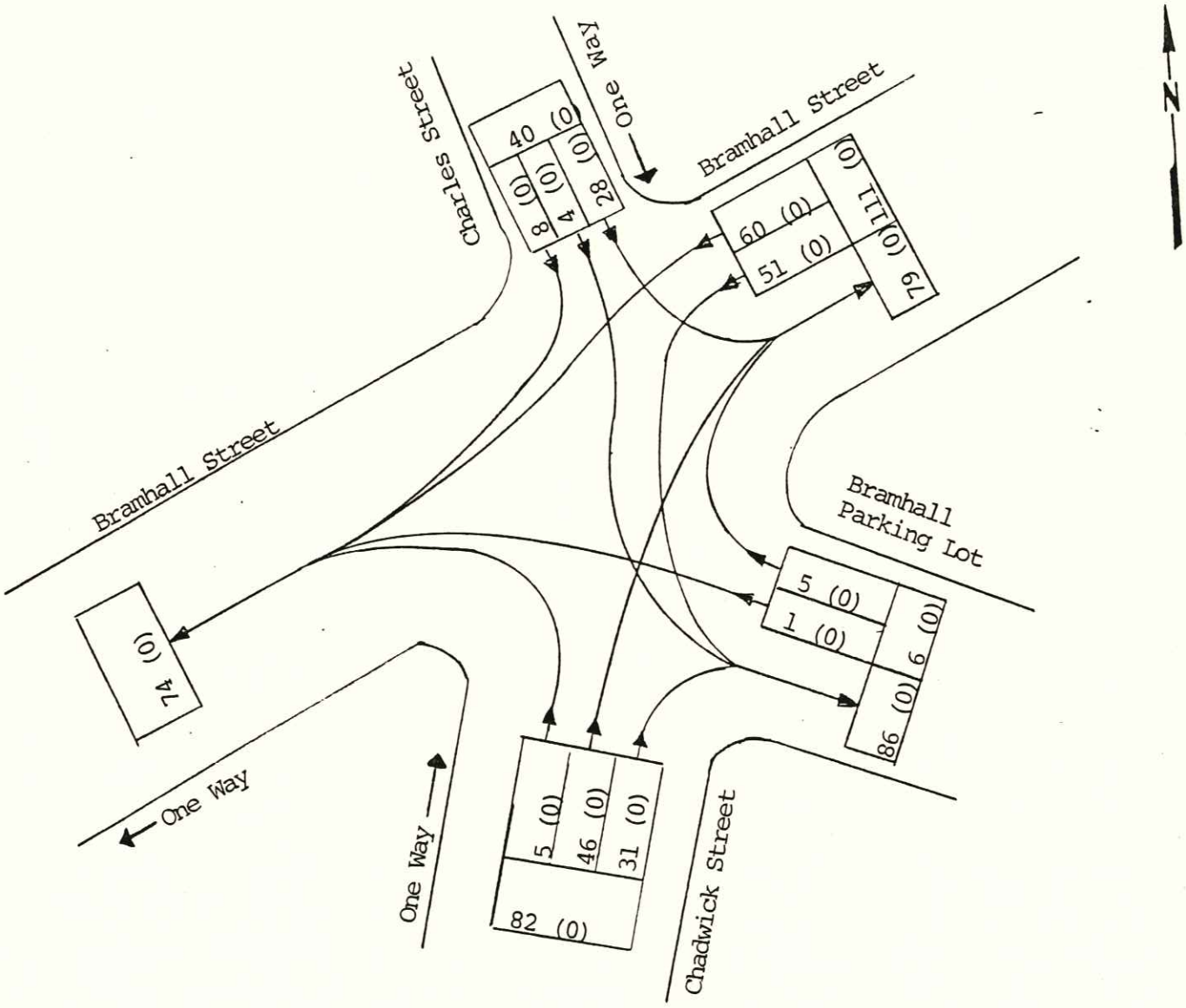


STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT
Brackett, NB	98 (0)	13	3:45 p.m. to 4:45 p.m.
Brackett, SB	246 (0)	33	
Bramhall, EB	247 (0)	33	PM PEAK HOUR
Bramhall, WB	149 (0)	21	
			VEHICLES COUNTED
			ALL VEHICLES XXX
			TRUCKS (XX)
TOTAL	740 (0)	100	PERCENT TRUCKS 0 %

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

INTERSECTION TURNING MOVEMENT COUNT

CITY Portland, Maine DATE 2/24/82 DAY of WEEK Wednesday
INTERSECTION Bramhall St. @ Charles & Chadwick Streets JOB No. 0211-10

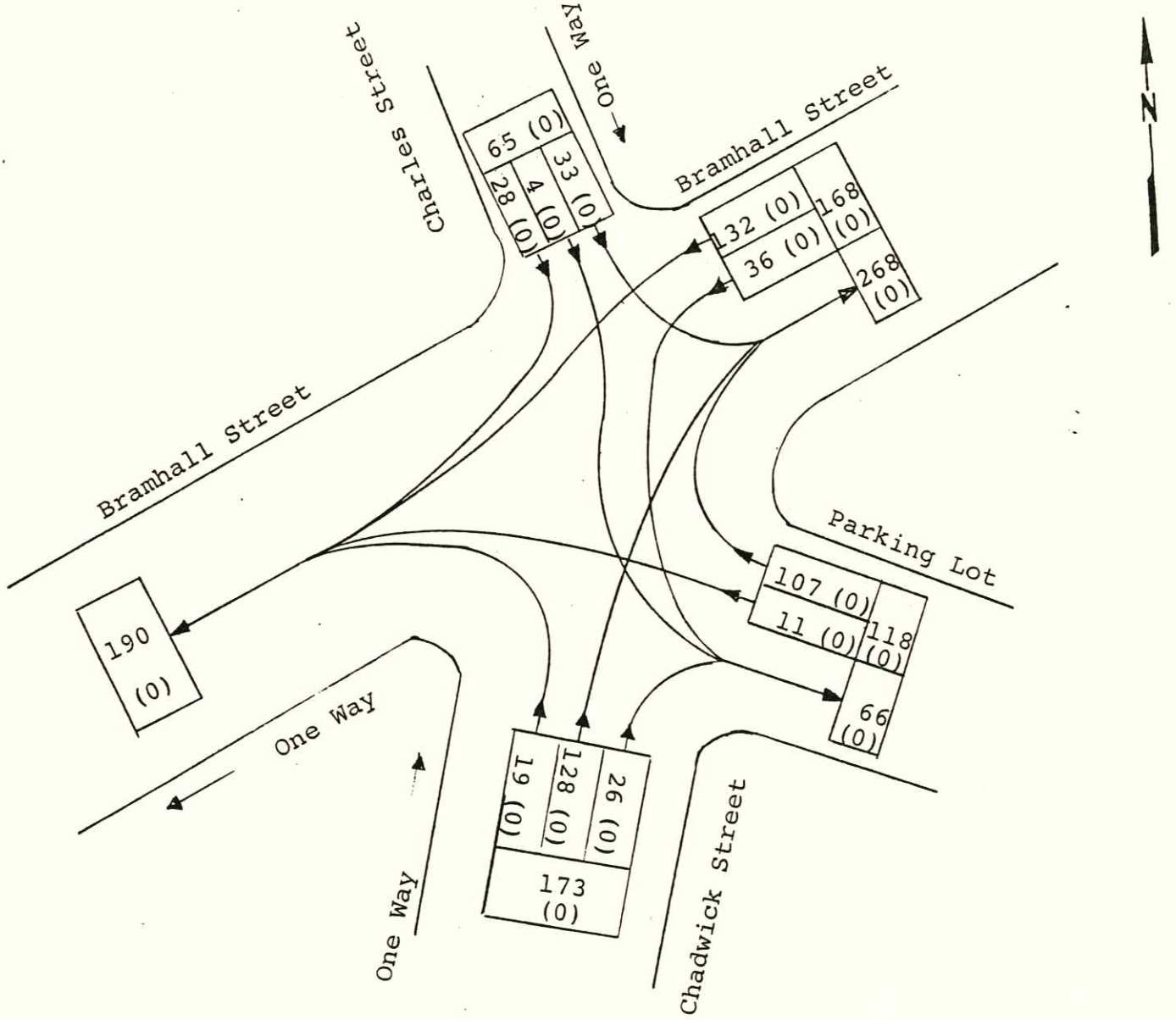


STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT
Bramhall Street WB	111 (0)	46	7:15 a.m. to 8:15 a.m.
Bramhall/Parking Lt WB	6 (0)	3	
Chadwick Street NB	82 (0)	34	AM PEAK HOUR
Charles Street SB	40 (0)	17	
			VEHICLES COUNTED
			ALL VEHICLES XXX
			TRUCKS (XX)
			PERCENT TRUCKS 0 %
TOTAL	239 (0)	100	

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

INTERSECTION TURNING MOVEMENT COUNT

CITY Portland, Maine DATE 2-23-82 DAY of WEEK Tuesday
INTERSECTION Bramhall St @ Charles and Chadwick Streets JOB No. 0211-10



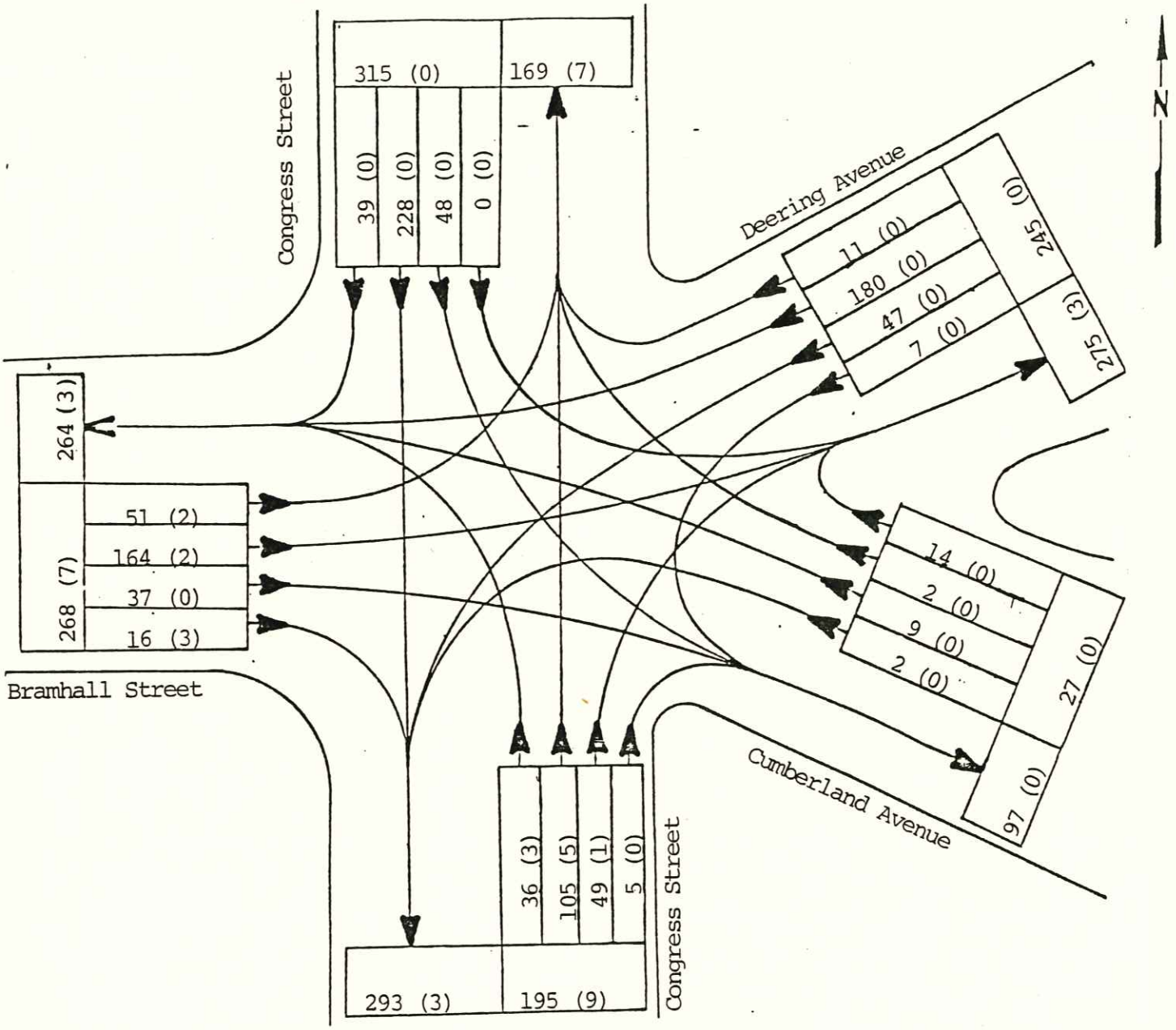
STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT
Bramhall Street WB	168 (0)	32	3:45 p.m. to 4:45 p.m.
Bramhall Parking WB	118 (0)	23	
Chadwick Street NB	173 (0)	33	PM PEAK HOUR
Charles Street SB	65 (0)	12	
			VEHICLES COUNTED
			ALL VEHICLES XXX
			TRUCKS (XX)
TOTAL	524 (0)	100	PERCENT TRUCKS 0 %

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

INTERSECTION TURNING MOVEMENT COUNT

CITY Portland, Maine DATE 2/24/82 DAY of WEEK Wednesday

INTERSECTION Congress Street at Bramhall Square JOB No. 0211-10



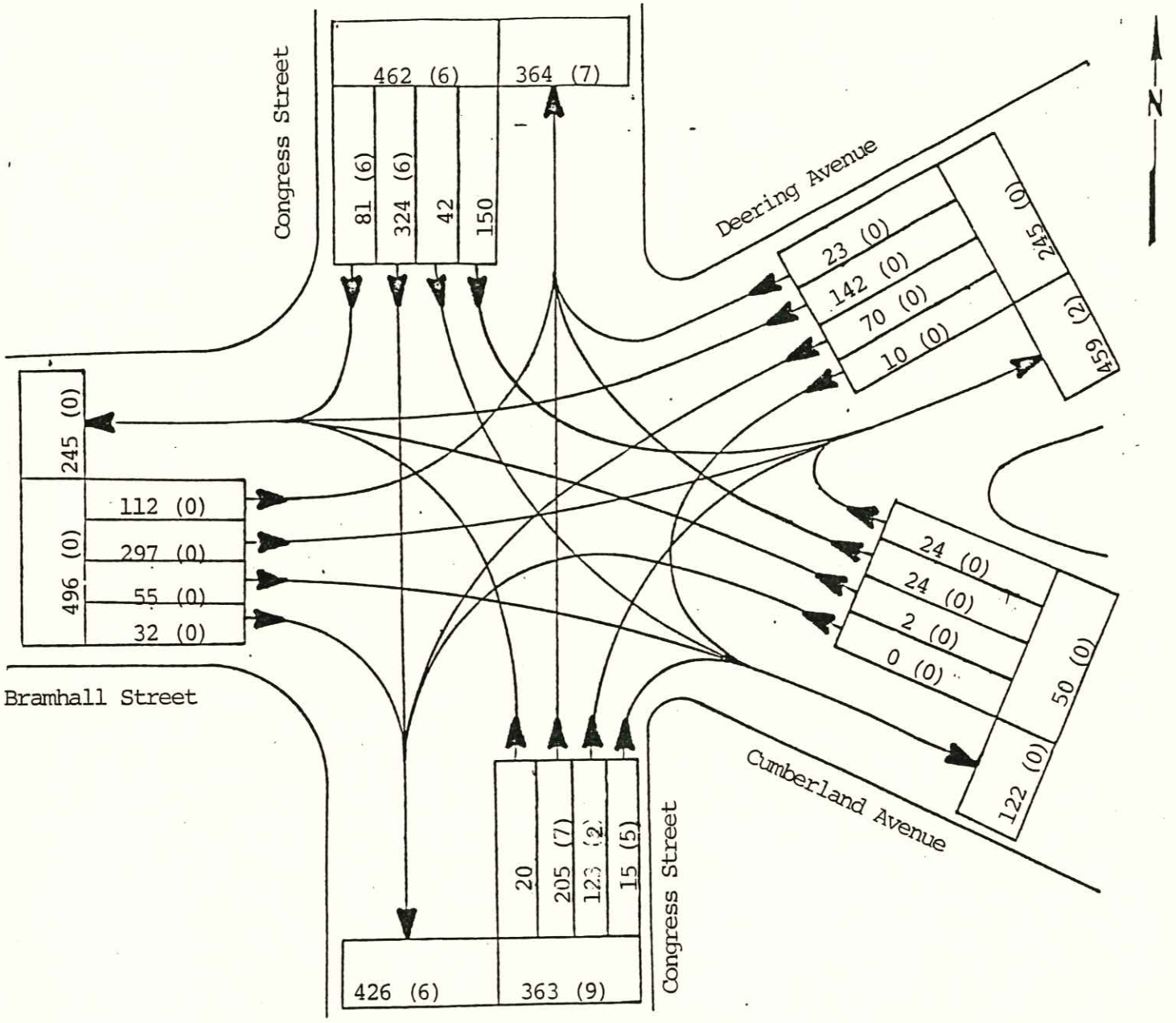
STREET		ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT
Congress St.	NB	195 (9)	19%	7:15 AM to 8:45 AM
Congress St.	SB	315 (0)	30%	
Bramhall St.	EB	268 (0)	25%	AM PEAK HOURS
Cumberland Ave.	WB	27 (0)	3%	
Deering Ave.	WB	245 (0)	23%	VEHICLES COUNTED
				ALL VEHICLES XXX
				TRUCKS (XX)
				PERCENT TRUCKS 1.5 %
TOTAL		1050 (16)	100%	

Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-0749

INTERSECTION TURNING MOVEMENT COUNT

CITY Portland, Maine DATE 2/24/82 DAY of WEEK Wednesday

INTERSECTION Congress Street @ Bramhall Square JOB No. 0211-10



STREET		ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT
Congress St.	NB	363 (9)	22%	
Congress St.	SB	462 (6)	29%	3:45 PM - 4:45 PM
Bramall Sq.	EB	496	31%	
Cumberland Ave.	WB	50 (0)	3%	PM PEAK HOUR
Deering Ave.	WB	245	15%	VEHICLES COUNTED
				ALL VEHICLES XXX
				TRUCKS (XX)
TOTAL		1616 (15)	100%	PERCENT TRUCKS %

TRAFFIC SIGNAL WARRANTS ANALYSIS
INTERSECTION OF BRAMHALL STREET/BRACKETT STREET
PORTLAND, MAINE

Approach Configuration

Bramhall Street EB - one lane - major approach
Bramhall Street WB - one lane - major approach
Brackett Street NB - one lane - minor approach
Brackett Street SB - one lane - minor approach

Required Approach Volumes for a minimum of eight hours

Warrant 1	Bramhall Street (total both approaches)	500 vph
	Brackett Street (highest approach volume)	150 vph
Warrant 2	Bramhall Street (total both approaches)	750 vph
	Brackett Street (highest approach volume)	75 vph

Volumes:	Existing traffic counted 2/24/82			Projected Volumes with Hospital Expansion		
Hour	Major Approach Bramhall St. (total both appoaches)	Minor Approach Brackett St. (highest vol. approach)	Warrant Satisfied	Major Approach Bramhall St. (total both approaches)	Minor Approach Brackett St. (highest vol. approach)	Warrant Satisifed
6-7 AM	243	116	-	282	131	-
7-8 AM	346	124	-	401	145	-
8-9 AM	232	110	-	271	135	-
9-10 AM						
10-11 AM						
11-12 Noon						
12-1 PM						
1-2 PM						
2-3 PM	364	121	-	380	132	-
3-4 PM	389	147	-	405	192	-
4-5 PM	384	252	-	405	336	-
5-6 PM	239	131	-	255	176	-

Based on this analysis, a signal is not warranted now and will not be warranted in the future after the hospital expansion.