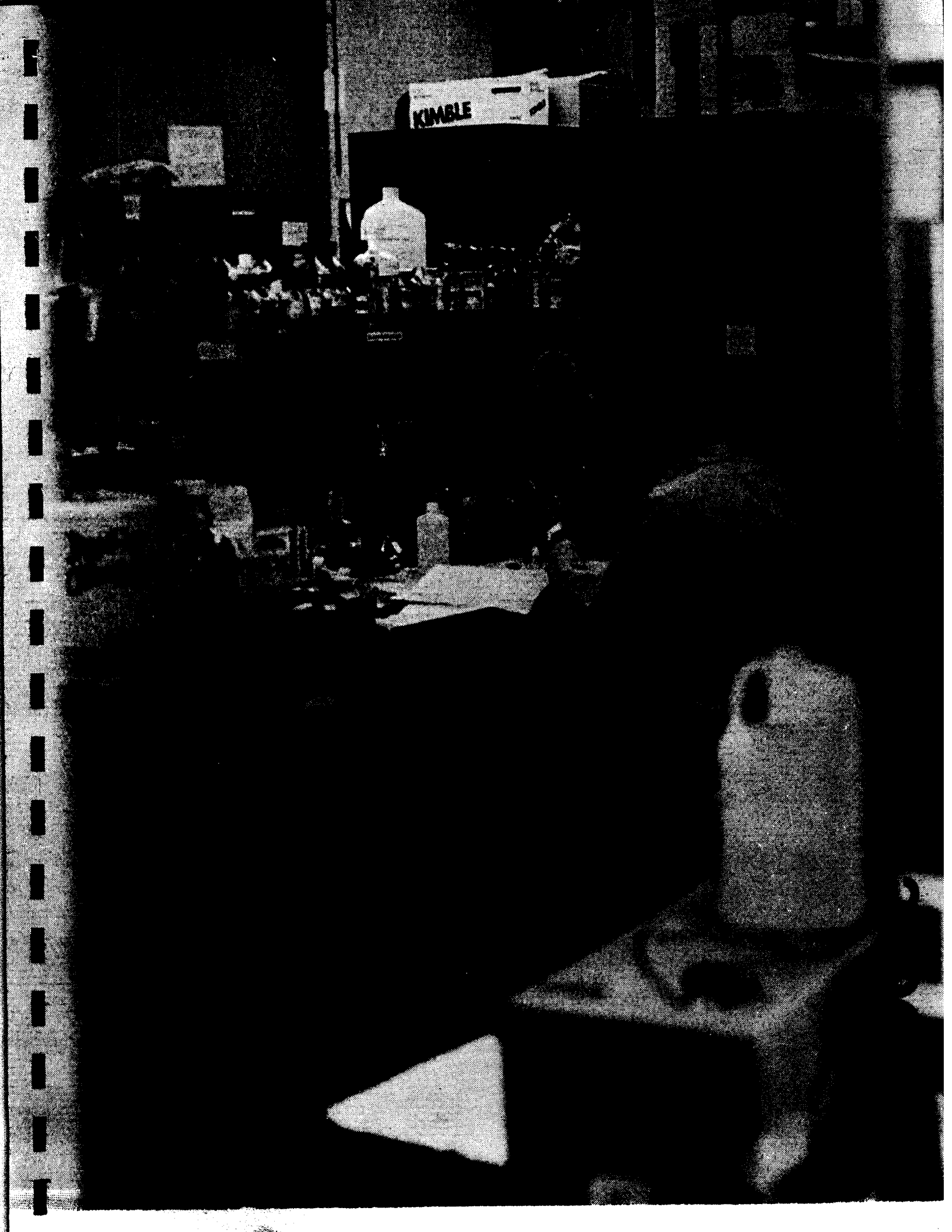
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LAURENCE ZUELKE

1 September 1976

Mr. Clinton Hewitt
Assistant Vice President
Physical Planning
University of Minnesota
340 Morrill Hall
Minneapolis, Minnesota 55455

Re: University of Minnesota
Health Sciences Expansion
JOML Remodeling
TAC Job No. 75026

Dear Mr. Hewitt:

In late March a draft of the Phase I Planning Report: Design Concept and Scheduling, Jackson-Owre-Millard-Lyon Complex Remodeling was submitted to you and other University participants in the planning process for review and comment. Those comments were compiled by the Health Sciences Planning Office and were transmitted to us through your office. We have attempted to resolve the major issues or conflicts identified by the participants and have incorporated them into the report. We are pleased to submit the finalized report for the record and hope that it will serve as the basis for future planning activities and decisions regarding the JOML complex.

This report represents an in-depth analysis of the scope of the Jackson-Owre Millard and Lyon Laboratories (JOML) remodeling program as first proposed under the "First Phase Development - 1973" of the University of Minnesota Health Sciences Planning Report (June 1968) and most recently by the Grant Application for Federal Assistance for Construction of Health and Education Facilities (17 March 1975).

It establishes, on the one hand, a conceptual framework for dealing with the complicated mechanical and electrical requirements of a Basic Sciences complex; and on the other, it establishes an approach to a design vocabulary that will allow not only a visual unity within the complex, but also a degree of standardization that will provide maximum flexibility in the future assignment or conversion of space for the various Basic Science departments.

Although the areas funded under the 1975 HEW Grant Application are the only areas dealt with in great specificity, the approaches established to deal with mechanical and electrical systems, code compliance and design vocabulary have been conceived with the eventual remodeling of the total complex in mind.

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Part I of the report entitled "Existing Conditions" provides a general description of the physical characteristics of the complex, while outlining the proposed allocation of space in the Basic Science departments subsequent to the departure of the School of Dentistry from the complex. Existing code deficiencies are also enumerated in this section.

"Planning Framework," Part II of the report, reaffirms the relationship of JOML to the Health Sciences Complex as a whole and outlines specific proposals to enhance this relationship.

Part III, "Design Concept," outlines the design approach to the remodeling project, indicating the integration of functional and aesthetic considerations to produce a unified project through a staged construction process. Within the work of each trade, careful analysis of existing services and conditions has been made to take advantage of existing facilities wherever possible. This section also deals with those steps necessary to correct the code deficiencies outlined in Part I.

Part IV of the report, "Construction Projects," an attempt has been made to identify those projects that can be foreseen in the near future. Although these projects do not represent the entire remodeling of the complex, it is anticipated that as they and other projects are undertaken and possibly incorporated into the remodeling process, the established parameters will continue to be followed.

Part V of the report, "1975 Grant Construction," presents a specified proposal for work to be undertaken under the 1975 Federal Construction Grant to the University for the remodeling of the JOML complex. In addition to the remodeling of 81,000 NSF of assignable space, major work is proposed to update mechanical systems and correct code deficiencies. This section presents not only a description of the proposed Grant work but also a tentative time and cost frame within which the work might be accomplished.

It should be noted relative to the cost figures presented herein that the scope of work outlined under the '75 Grant Construction' heading of this report was based on the University's Grant Application which indicated the construction value to be approximately 5.6 million dollars Subsequent re-evaluation of the total project costs by the Architects and the University, however, has made it clear that the initial project scope as shown in Part V of this report would cause a project deficit in excess of four hundred thousand dollars.

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Since the Schematic Design Phase of the project was completed concurrently with the Design Concept and Scheduling Phase, the scope of work presented in that phase was likewise based on a 5.6 million dollar construction figure. As a result neither the Phase I nor the Phase II Reports reflect the actual scope of work that will be realized in the '75 Grant Construction Project.

For the Design Development Phase the construction budget and project scope will be reduced to 5.2 million dollars to reflect this re-evaluation. It is, thus, the Phase II Report that will represent the actual scope of work to be undertaken in the '75 Grant Construction Project.

Finally, Part IV of the report, "Appendices," presents detailed information derived from careful examination of the complex and its proposed uses. It consists of the following reports:

A. Code Report
B. Elevator Report
C. Energy Conservation Report
D. Chilled Water Report
E. Ventilation Report
F. University's Fume Hood Report
G. University's Functional Space Program

Considerations relating to each of these reports have been incorporated into the planning for the remodeling of the JOML complex.

Although we expect modification to some of the particulars of this Report as the remodeling of the complex progresses and new projects are identified, we believe that it will serve well as the planning framework to which all foreseeable future work within the complex may be related.

Very truly yours,

John J. Scott

JJS:KVB

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ACKNOWLEDGEMENTS

The Architects Collaborative and Health Sciences Architects & Engineers gratefully acknowledge the following individuals who among many others, have provided their invaluable assistance, advice , and direction in the preparation of this Planning Report.

Dr. Alfred Barksdale
Dr. James Bodley
Mr. Gerald Bratt
Dr. Nelson Goldberg
Mr. Richard Hendricks
Mr. Gordon Herbst
Mr. Robert Hudalla
Mr. David Kerkow
Dr. James Koener
Mr. E. A. Kogl
Mr. Tom Kyle
Ms. Virginia Lewis
Ms. Muriel Lubanski
Dr. Patrick Manning
Mr. Paul Maupin
Ms. Julie McLean
Ms. Ruth Mercer
Mr. E. B. Merz
Mr. James Nelson
Dr. Richard Poppele
Dr. Donald Robertson
Dr. Andreas Rosenberg
Mr. G. L. Scheffler
Dr. F. E. Shideman
Mr. Dale Stroud
Mr. Bill Wik

GOALS AND TASKS

Goals

Since the Basic Sciences act as a foundation for all subsequent Health Sciences programs, the remodeling of the JOML complex and the resultant expansion of assignable area for these programs is of utmost importance to the Health Sciences Community as a whole. In planning the remodeling of the complex, it is essential that this relationship be respected and enhanced.

The planning effort must, in addition, provide for the maximum adaptation to change in the Basic Sciences programs, and the growth or decline of specific desciplines therein, while satisfying the immediate functional needs of the programs as presently constituted. Intercommunication between the Basic Sciences departments should also be encouraged by avoiding their physical separation within the complex and enhancing the physical unity of the complex with the rest of the Health Sciences facilities.

Finally, the mechanical systems, the life-safety systems and the energy consumption levels of the complex should be updated to meet contemporary standards wherever possible and practical within the budget parameters.

Tasks

To achieve these goals, this planning effort, Phase I, Design Concept and Scheduling, has been a multifaceted undertaking. The initial task was the documentation of existing conditions, recording not only the architectural characteristics of the complex but also the mechanical, electrical and conveyance systems found therein. A thorough code analysis was also undertaken at this time.

Having recorded the existing conditions, the University's Functional Space Program was developed and analyzed, and new and existing program space assignments were agreed upon by the various University representatives. From these requirements the overall space planning was accomplished, establishing circulation patterns and a basic design concept for the eventual remodeling of the entire complex. Modifications required for code complicance were also spelled out at this time.

Individual design and construction projects were then identified. Although these projects do not represent the complete remodeling of the complex, they do represent the immediate needs of the the users and the University. It is expected that additional projects will be identified as this work progresses and that they will be incorporated into the planning process as required.

Finally, it was a task of this Phase, based on the preliminary data assembled, to specifically outline a proposal for the work to be undertaken in the '75 Grant Construction Project. Not only were the program spaces to be remodeled identified but also the work involved in upgrading the building systems. The results of this effort include a construction schedule and an estimate of probable construction costs for the proposed work.

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GENERAL DESCRIPTION OF COMPLEX

The Basic Sciences complex, which consists of the Jackson-Owre-Millard-Lyon Laboratory buildings (JOML), houses five of the seven Basic Sciences Departments at the University of Minnesota: Anatomy, Biochemistry, Pathology, Parmacology, and Physiology. The Medical School Administration and the Department of Mortuary Science are also housed in the complex.

The buildings constitute a complex as follows:

BUILDING	BUILT	GROSS AREA	NET AREA	HEIGHT
Jackson Hall	1910	83,946	64,574	2 levels below grade 4 levels above grade
Jackson/Owre Addn.	1958	47,736	40,067	2 levels below grade 4 levels above grade
Owre Hall	1931	92,430	71,697	2 levels below grade 5 levels above grade
Millard Hall	1910	94 5 9	75,221	2 levels below grade 4 levels above grade
Lyon Labs	1952	47,411	40,996	2 levels below grade 4 levels above grade
		366,082	292,550	

Net assignable S.F. = 220,000

Approximately 60,000 SF of the complex was occupied by the School of Dentistry since the early 1900's with only minimal remodeling during that period. The buildings were thus obsolete before the Dental School vacated their spaces and in their present form are essentially unusable for the Basic Sciences.

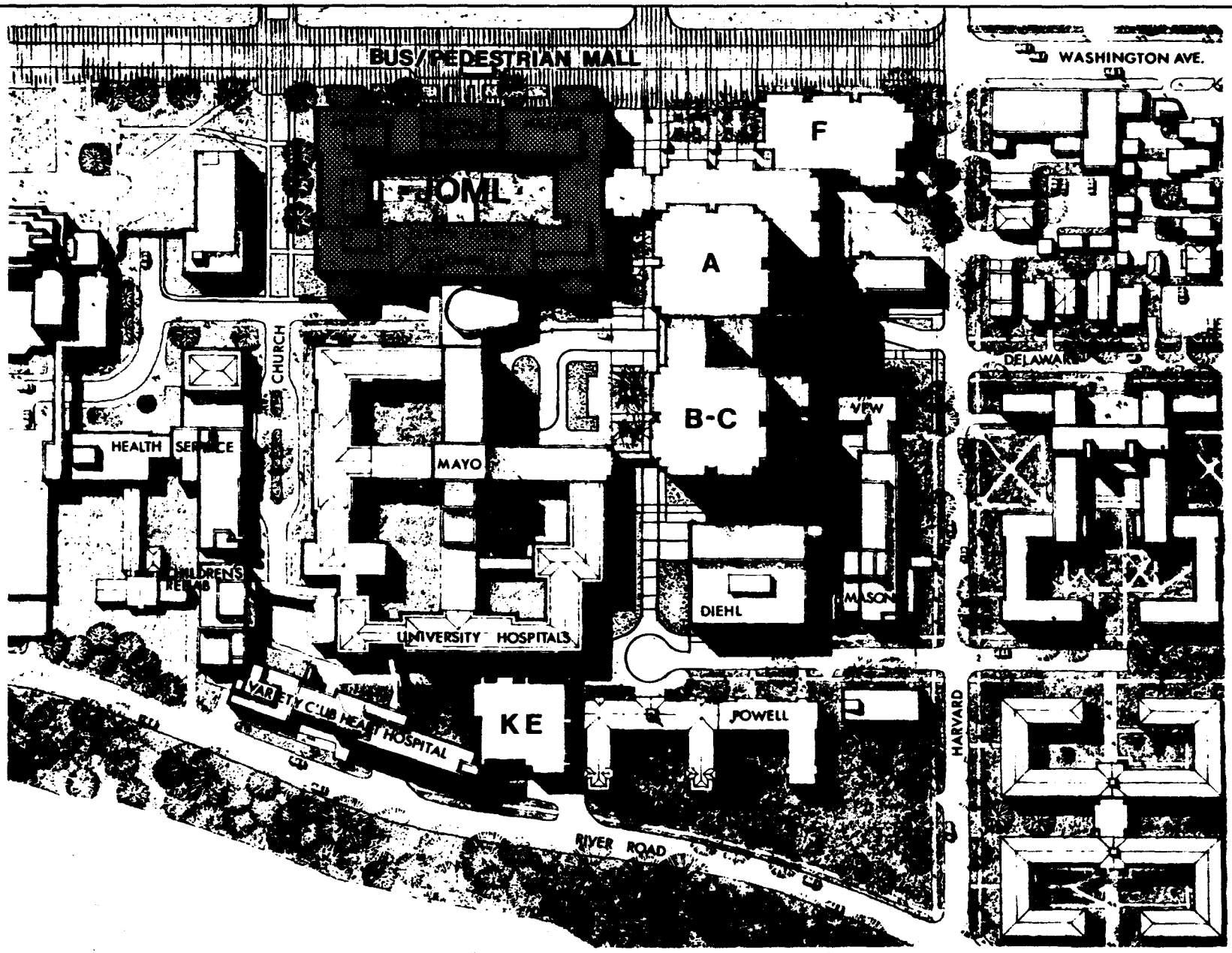
The vacated space was not lyon planned for the teaching of Dentistry, rather than the Basic Sciences, but also was designed to accommodate far fewer staff, students and support facilities than required today by the Basic Science Programs. The Basic Sciences presnetly require additional research-laboratory/office facilities with the appropriate ancillary support facilitities.

All five of the buildings are concrete-frame structures with face brick exterior walls. The majority of the fenestration consists of wood double-hung windows, while a few of the windows are of extruded aluminum. Interior partitions and ceilings are generally of finished gypsum plaster, with some metal partitions and some corridor ceilings treated with adhered acousitc tiles. Most floors are surfaced with vinyl asbestos tile, while some corridors are surfaced with terrazo or quarry tile.

The buildings are heated with steam or hot water radiation, generally located below the windows at the exterior walls. There is some exhaust ventilation in selected rooms which relys on infiltration and open windows for make-up air. Individual air conditioning units have been installed in some rooms to provide local air tempering. Generally the complex is severely dificient in environmental control devices and energy consumption rates by present day requirements and standards.

Egress pathways, stairways and elevators are deficient in any respects in relationship to today's life-safety standards and codes. In addition, the complex lacks proper fire warning and fire fighting equipment.

The following plans show the present configuration of spaces within the complex and the departments to which each area is assigned.



1-3

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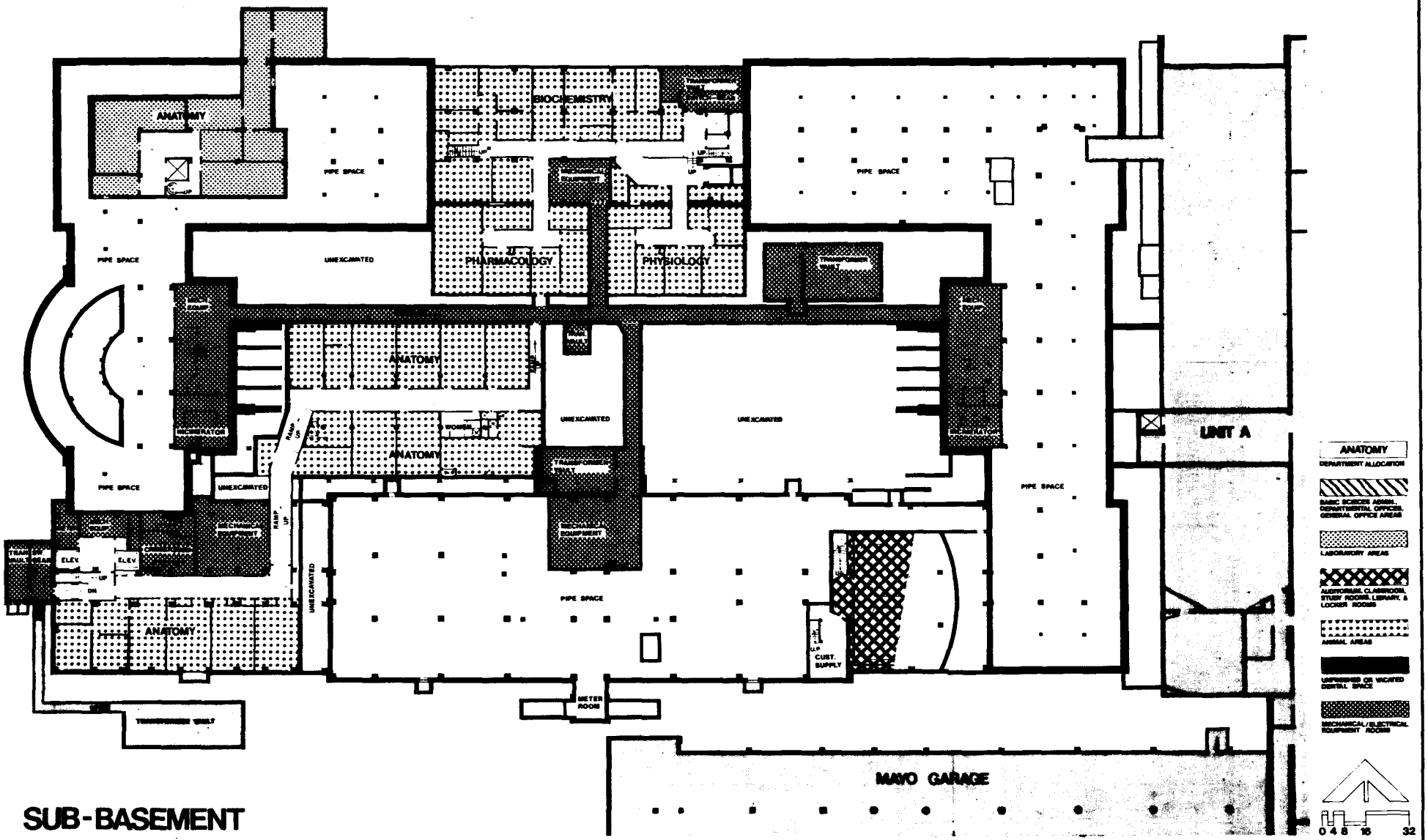
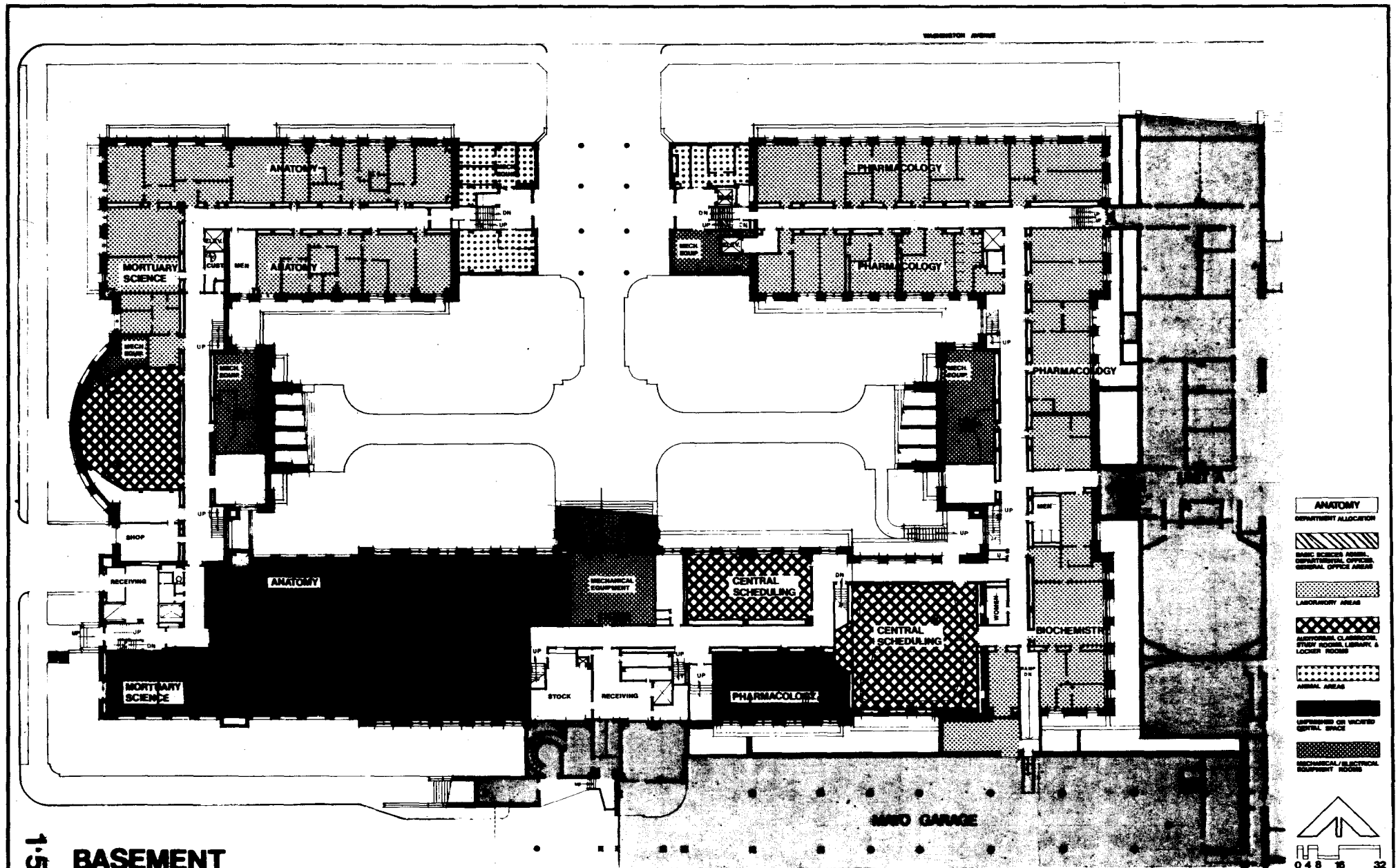
HEALTH SCIENCES



1.4 **SUB-BASEMENT**

UNIVERSITY OF MINNESOTA HEALTH SCIENCES EXPANSION MINNEAPOLIS MINNESOTA	THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. & THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.	JOMI	JACKSON OWRE MILLARD LYON COMPLEX REMODELING	EXISTING CONDITIONS



1-5 **BASEMENT**

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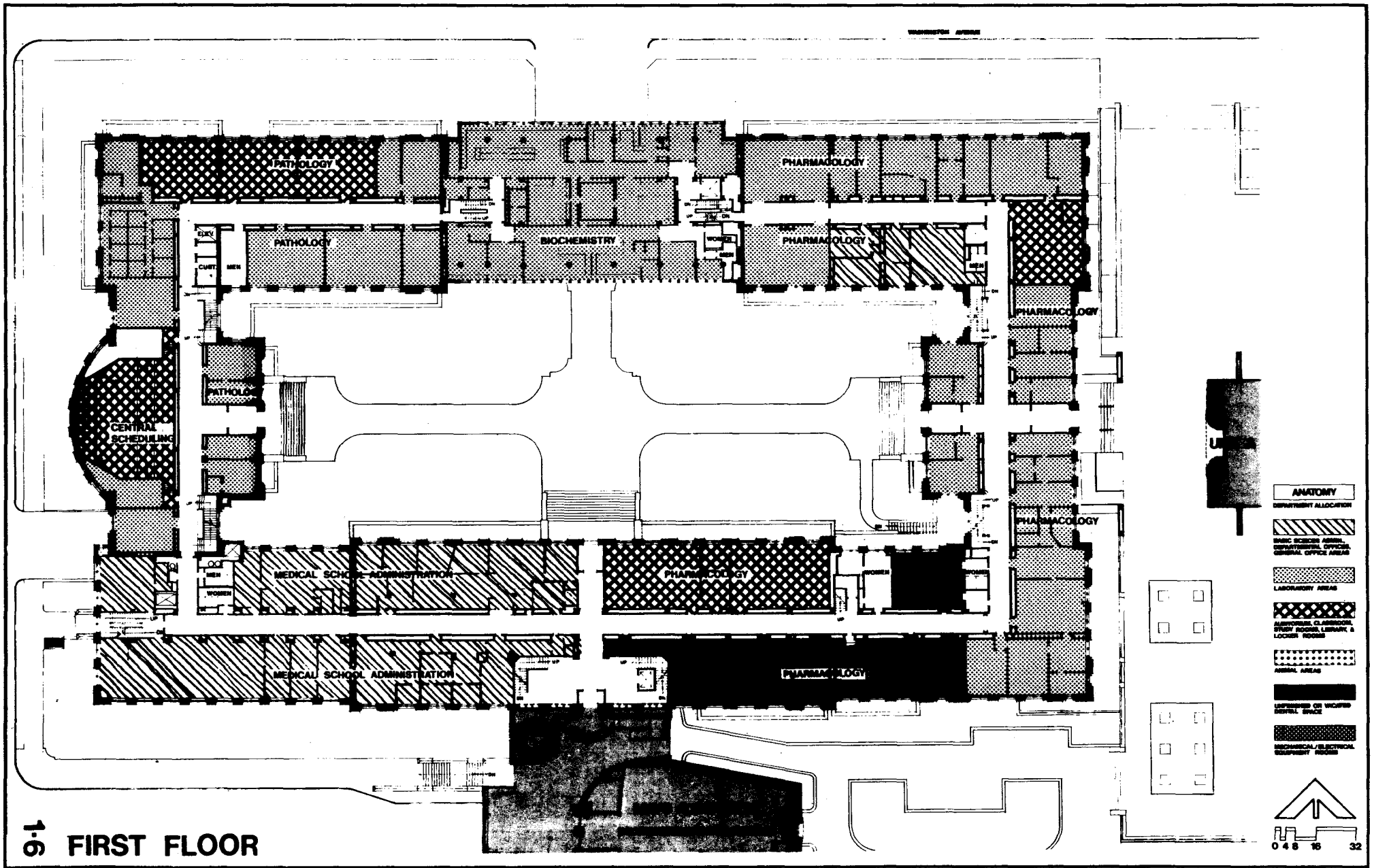
EXISTING CONDITIONS



1-6 FIRST FLOOR

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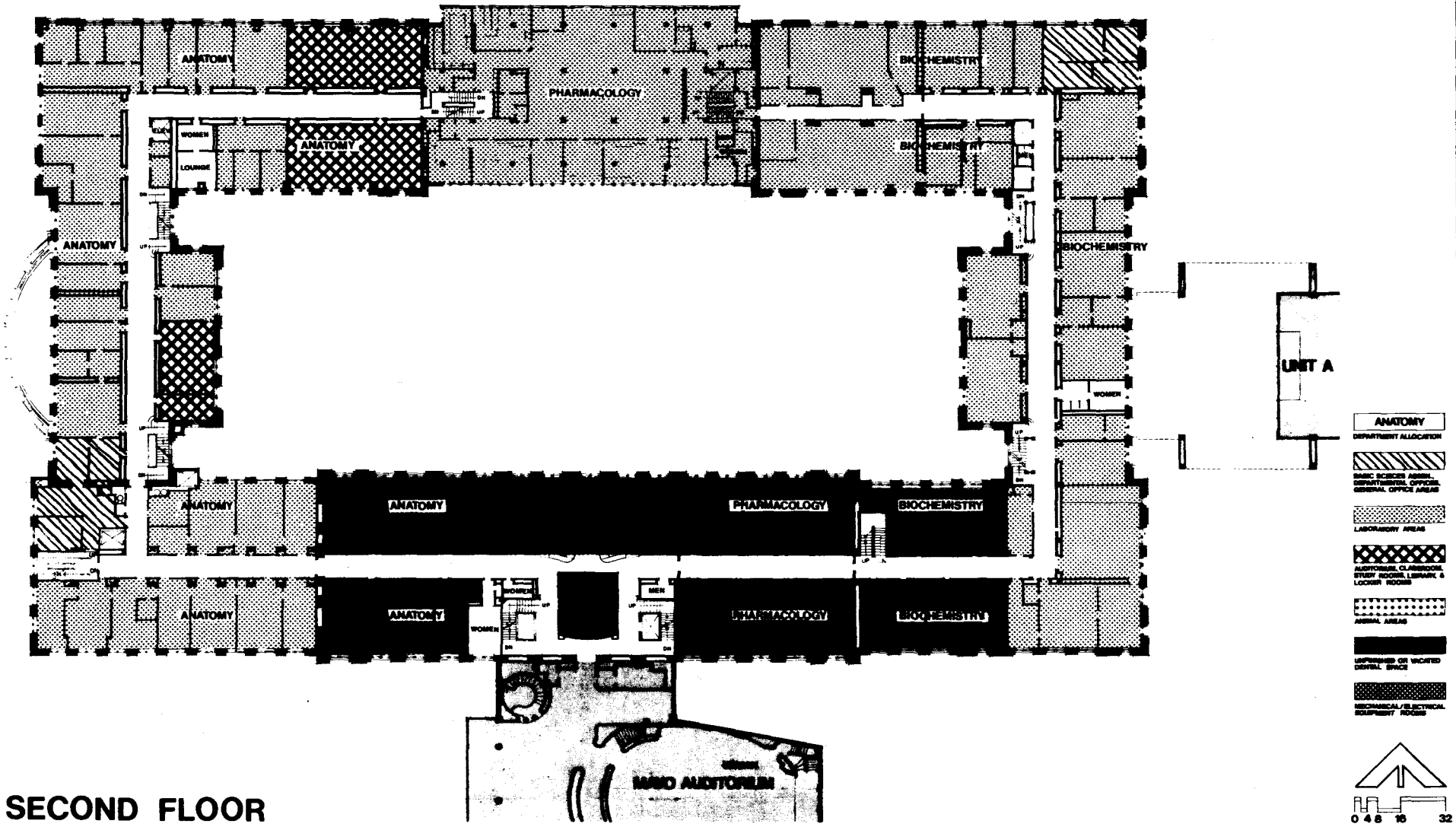
EXISTING CONDITIONS



1.7 SECOND FLOOR

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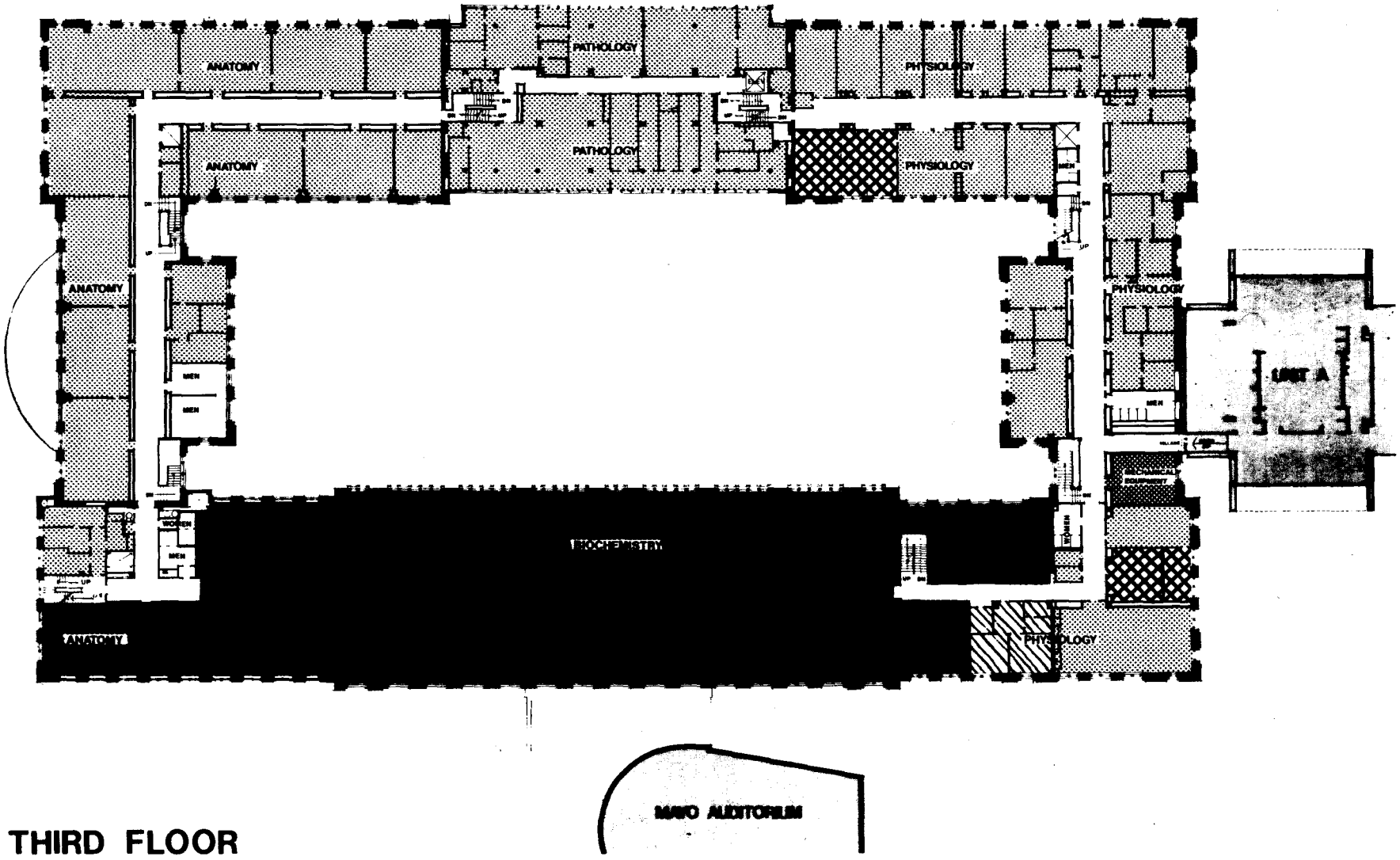
JACKSON CAMPE MILLARD LYON
COMPLEX REMODELING
ASSISTANT VICE PRESIDENT FOR PHYSICAL PLANNING
SPECIAL ASSISTANT
HEALTH SCIENCES PLANNING

EXISTING CONDITIONS



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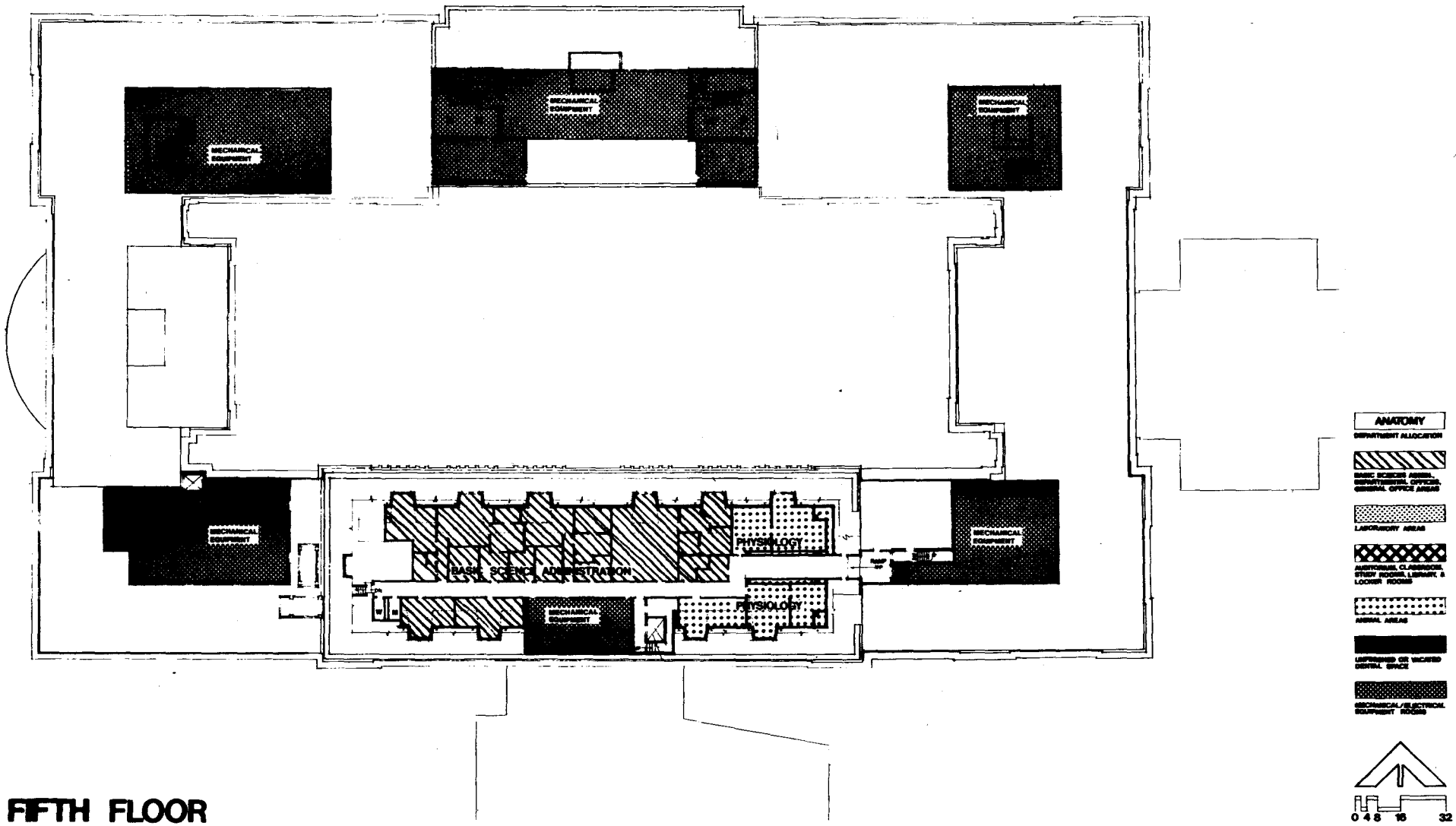
EXISTING CONDITIONS



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EXISTING CONDITIONS

CODE DEFICIENCIES

The following "Index of Common Code Deficiencies" outlines the areas in which the existing JCML Complex does not comply with Code requirements for new buildings.

Code Corrections in Part 3 relate to these Code deficiencies.

A more complete analysis of the Code deficiencies appears in Part 6 , Appendices.

INDEX OF COMMON CODE DEFICIENCIES

Numbers in the left hand margin are used to key the locations of the Code discrepancies on the floor plans entitled DEFICIENCIES which follow later in this section. **(*Indicates which deficiencies corrected under 75 Grant Construction.)**

Numbers at the beginning of paragraphs refer to the Project Code Investigation form found in Appendix A.

References in the right hand margin reflect the Uniform Building Code, the Life Safety Code, and the State Building Code.

7. CONSTRUCTION

Fourth and Fifth floors do not meet the requirements for Type 1 Construction.

7.1 FIRE RATINGS

(1)	Exterior non-bearing walls require additional fireproofing to achieve the required one-hour rating.	UBC Table 17A
(2)	Existing stair or mechanical shaft enclosure needs additional fireproofing to achieve the required two-hour construction.	UBC Table 17A
(3)	Stairs not enclosed - shaft requires a two-hour fire rated enclosure.	UBC Table 17A
(4)	Exposed structural steel columns require fireproofing to conform to three-hour construction.	UBC Table 17A
(5)	Roof construction requires fireproofing to conform to two-hour construction.	UBC Table 17A
(6)	Corridor walls do not conform to one-hour fire-rated construction.	UBC Table 17A

7.2 PARAPETS

(7)	Roof mounted equipment requiring periodic service mounted close to the roof edge does not have required guardrail.	UBC 1709 (a)

7.4 ATTIC AREA SUBDIVISION

(8) Due to combustible construction, the attic space in Owre Hall must be divided into areas not exceeding 3,000 square feet. — UBC 3205 (a)(b)

7.6 OCCUPANCY SEPARATION REQUIREMENTS

(9) Construction does not meet requirements for one-hour occupancy separation. — UBC Table 5b

8. ENVIRONMENTAL CONSIDERATIONS

8.3 SANITATION

(10) Plumbing fixtures do not conform to Code requirements for handicapped persons. — UBC 5503

10. EXIT REQUIREMENTS

10.3 MAXIMUM TRAVEL DISTANCE TO EXIT

(11) Travel distance in Sub-Basement and all floors of Millard and Owre Halls exceeds the 150' maximum. — UBC 3302 (d)

(12) Stairs do not continue uninterrupted to the ground floor. — UBC 3301 (c)

(13) Direct exit to the exterior required.

10.5 DEAD END CORRIDOR LIMIT

(14) Dead end corridors exceeding the 20' maximum occur in the Sub-Basement and on the Fourth Floor. — UBC 3304 (f)

10.6 MINIMUM CORRIDOR WIDTH (PRIMARY)

(15) A 50' corridor segment on the Second Floor, and a short segment on the Fourth Floor do not provide adequate exiting width. — UBC 3304 (b) LSC 9-1252

10.9 ROOM EXIT REQUIREMENTS

(16) Room requires additional exits due to occupant load. — UBC Table 33-A

10.10 HANDICAPPED EXIT REQUIREMENTS

(17) Obstruction does not permit use by handicapped persons. — UBC 5502 (d)

11. VERTICAL EXITWAYS

11.2 MINIMUM WIDTH

(18) Stair width does not meet Code requirements. — UBC 3305 (b)

11.6 ENCROACHMENTS

(19) Room doors open directly onto stair enclosures. — UBC 3308 (c)

(20) Door encroaches on minimum landing width. — UBC 3306 (d)

12. DOORS

12.2 AND 3. B AND C LABELED DOORS

(21) Door assembly does not have proper fire rating. — UBC 503 (c)

12.4 CORRIDOR REQUIREMENTS

(22) Corridor doors with louvers, oversize lites, and sidelights, and wood frames do not meet the minimum 20 minute fire-rating. — UBC 3304

14. ELEVATORS

GENERAL

(23) Elevator hoistway entrances and cab interiors do not meet the Code requirements for handicapped persons. See "Elevator Code Review" in Appendix for detailed elevator deficiencies. — UBC 5507

15. MECHANICAL (HEATING AND VENTILATING)

15.1 ROOM HEATING UNITS

Some of the room heating units have cast iron radiators, copper convectors and steel finned tube radiation on the same zone of control. — SBC 7615

15.2 VENTILATION RATES

Ventilation rates for some areas do not comply with Code requirements. — SBC 7702

15. MECHANICAL (FIRE CONTROL)

15.3 FIRE DAMPERS

Some ventilation ductwork passes through fire-rated walls or floors without fire dampers at points of penetration.

SBC 7736 8502

15.4 STANDPIPES

Wet standpipes, fire department standpipes, and hose cabinets are not provided at all locations required by Code.

UBC 3803 3804

15.5 AUTOMATIC FIRE EXTINGUISHING SYSTEMS

Sub-Basement and Basement rooms with inadequate openings do not have automatic fire extinguishing systems.

UBC 3802

15. MECHANICAL (ENERGY CONSERVATION)

15.6 BUILDING ENVELOPE

The thermal transmittance values for the roofs, the overall thermal transmittance values for the combined gross wall areas and the infiltration values for the windows and doors do not meet the energy conservation requirements of the State Building Code.

SBC 6006

15.7 VENTILATION SYSTEMS

Ventilation systems and controls do not comply with the energy conservation requirements of the State Building Code.

SBC 6007

16. ELECTRICAL

16.1 FIRE ALARM SYSTEM

The building has no general fire alarm system.

LSC 9-1641
LSC 6-3
NFPA 72A

16.2 HEAT AND SMOKE DETECTION SYSTEMS

Heat or smoke detectors and fan shutdown controls do not exist on air handling units.

SBC 103
UBC 3308C
UBC 4306

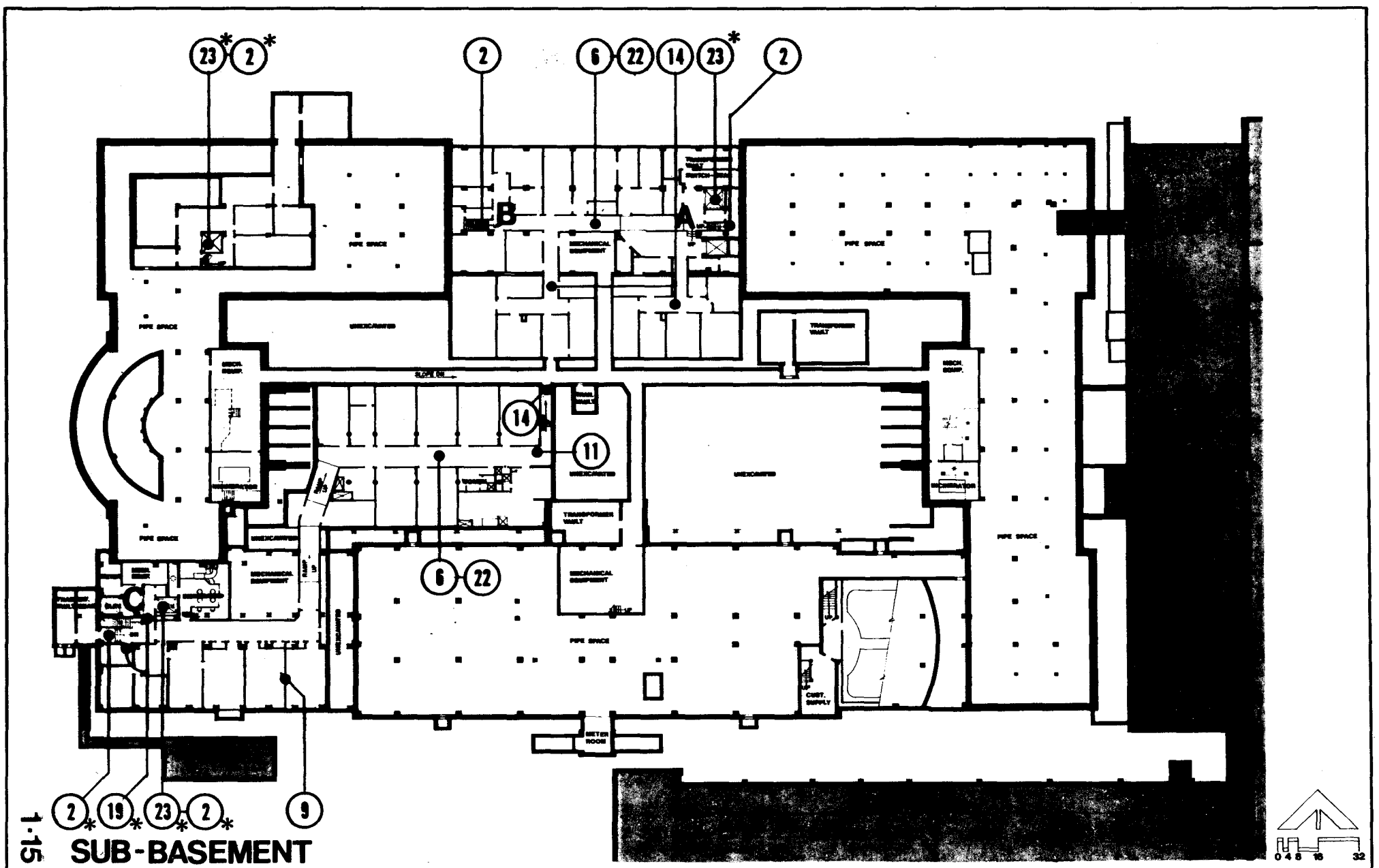
16.3 EMERGENCY POWER

The existing building emergency power systems do not comply with Code requirements. Emergency egress lighting does not exist and exit lighting is not on an approved emergency system.

LSC 5-10215
SBC 8806 (k)

16.4 POWER FACTOR CORRECTION

The existing motors or existing services do not employ power factor corrections.



1.15

SUB-BASEMENT

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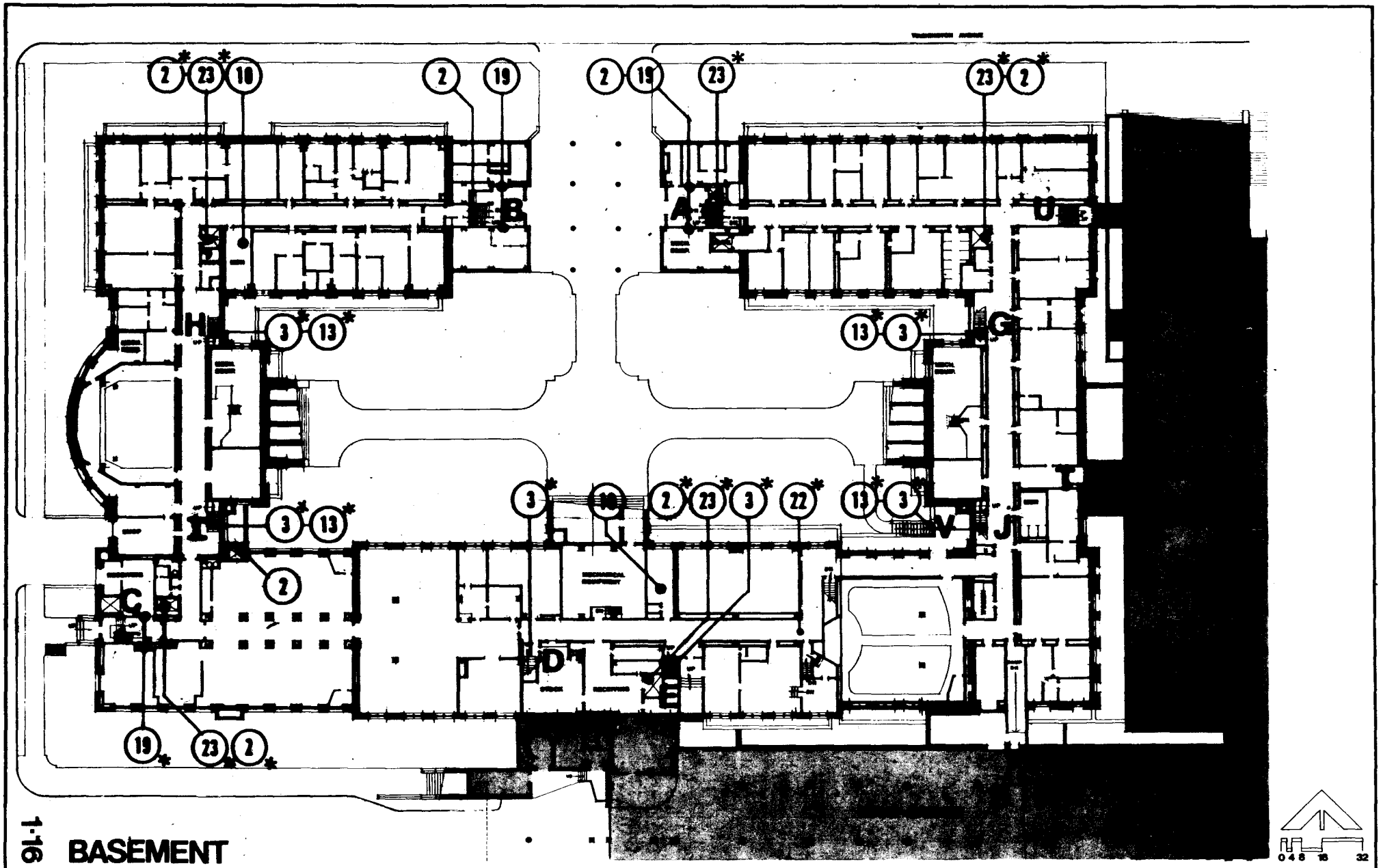
DEFICIENCIES



1.16 **BASEMENT**

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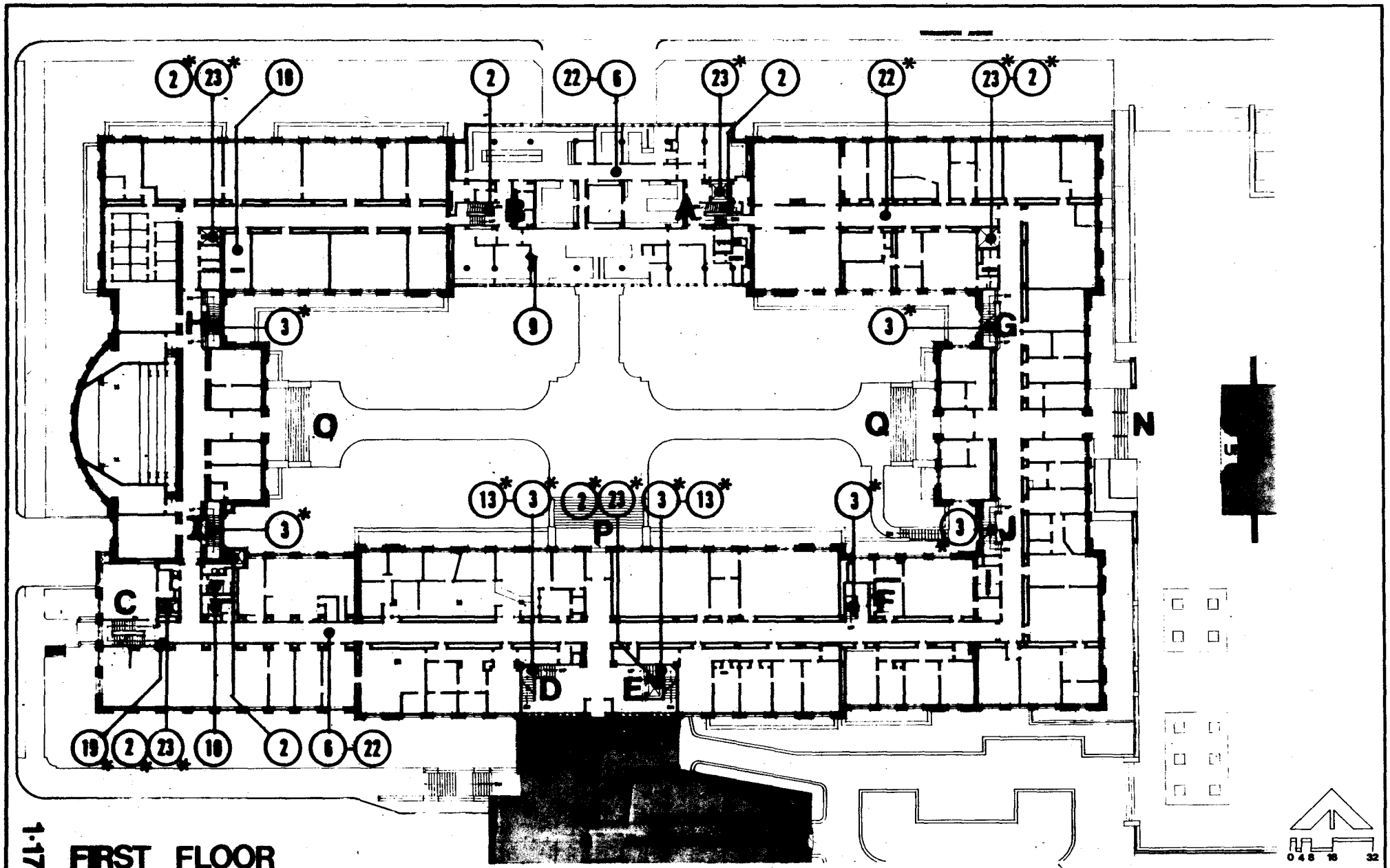

1.17 FIRST FLOOR

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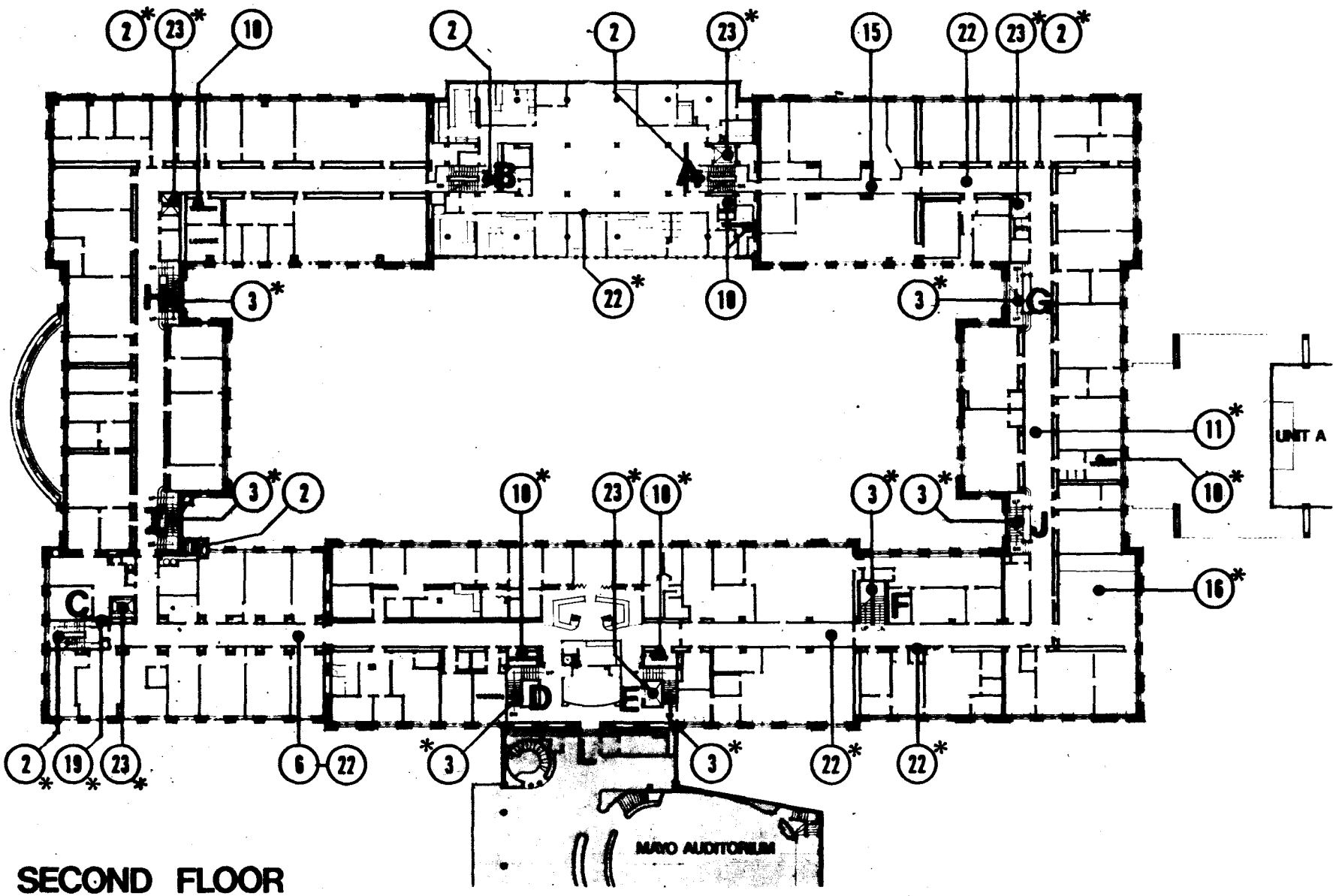
DEFICIENCIES



1.18 SECOND FLOOR

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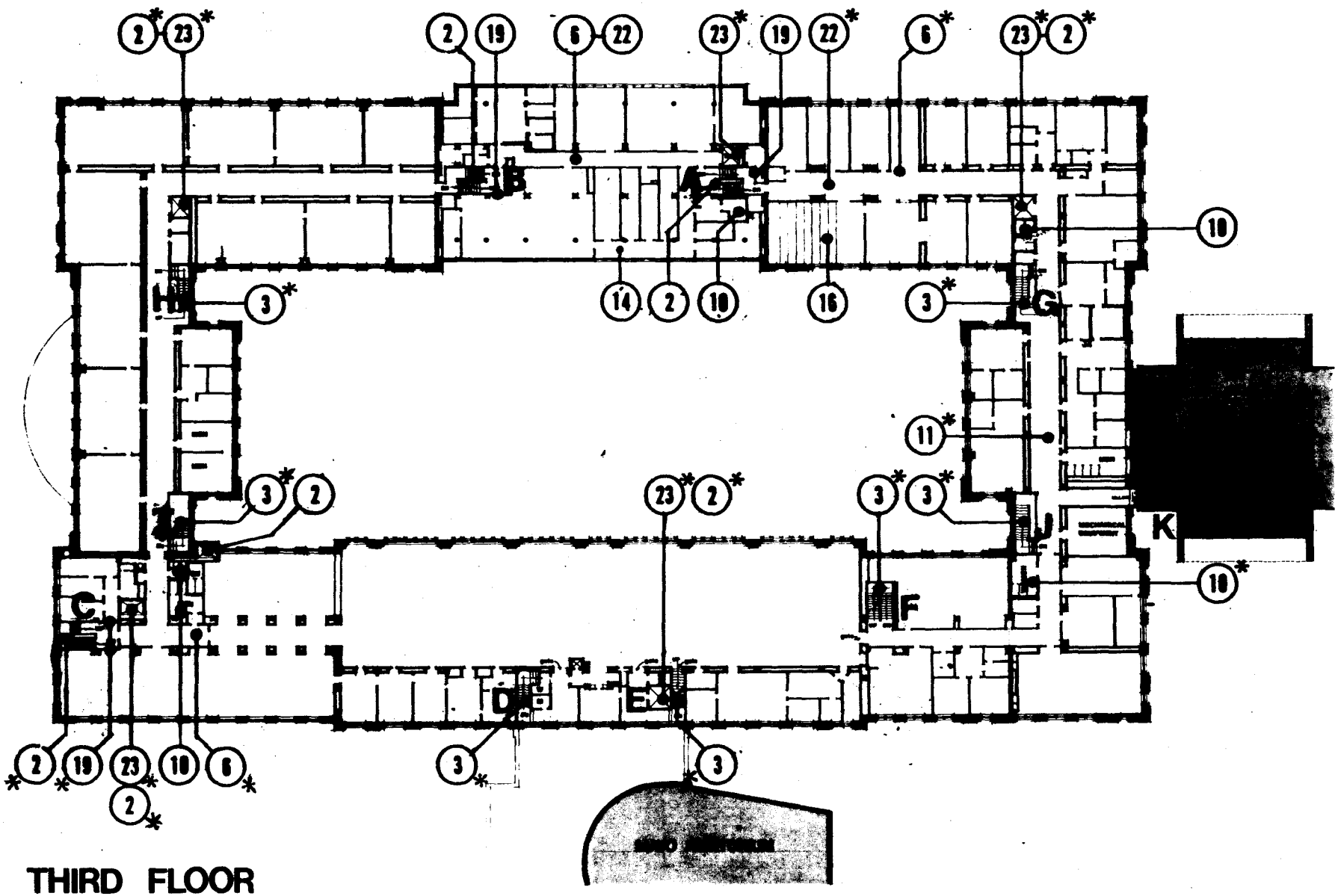

1-19

THIRD FLOOR

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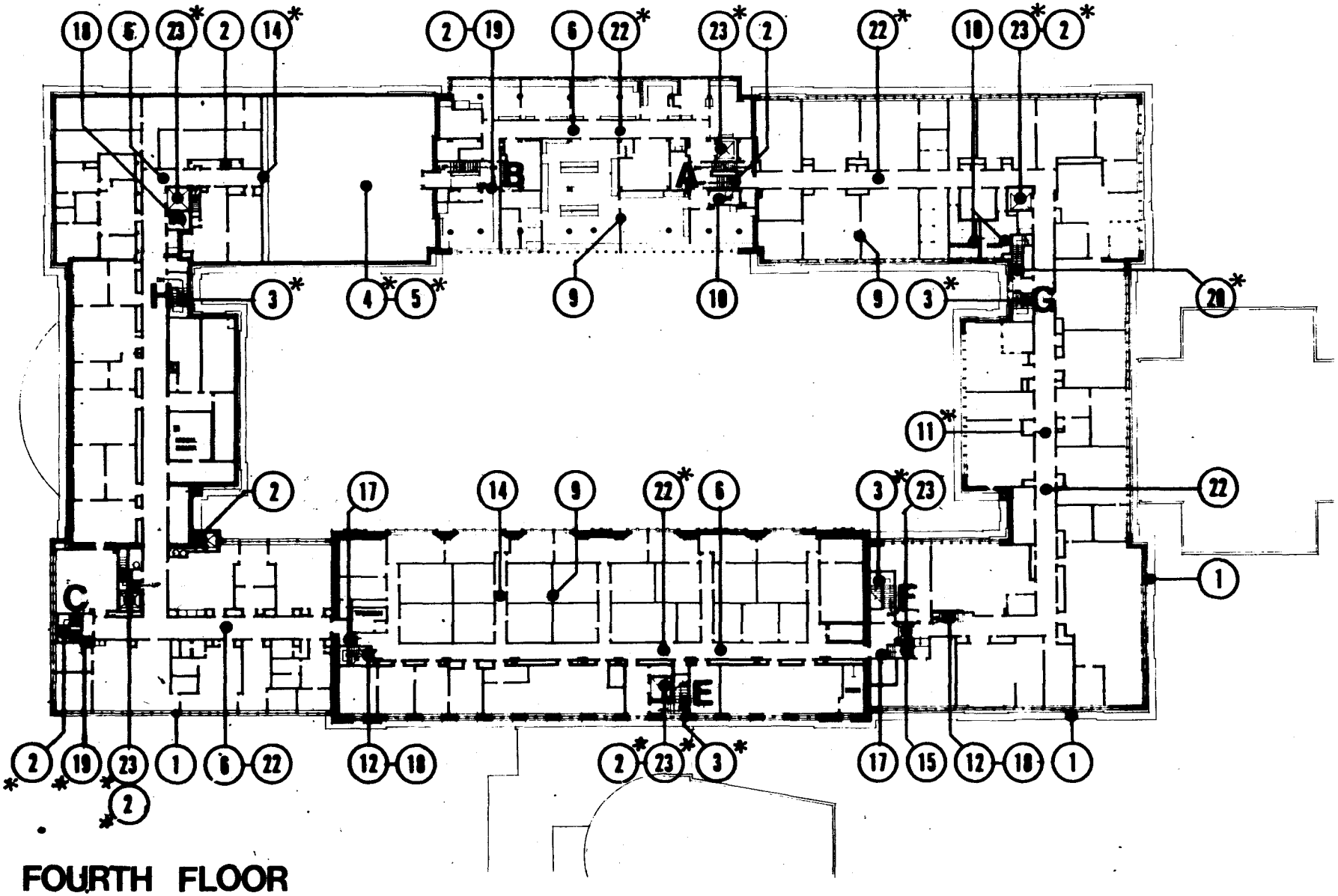

1·20 FOURTH FLOOR

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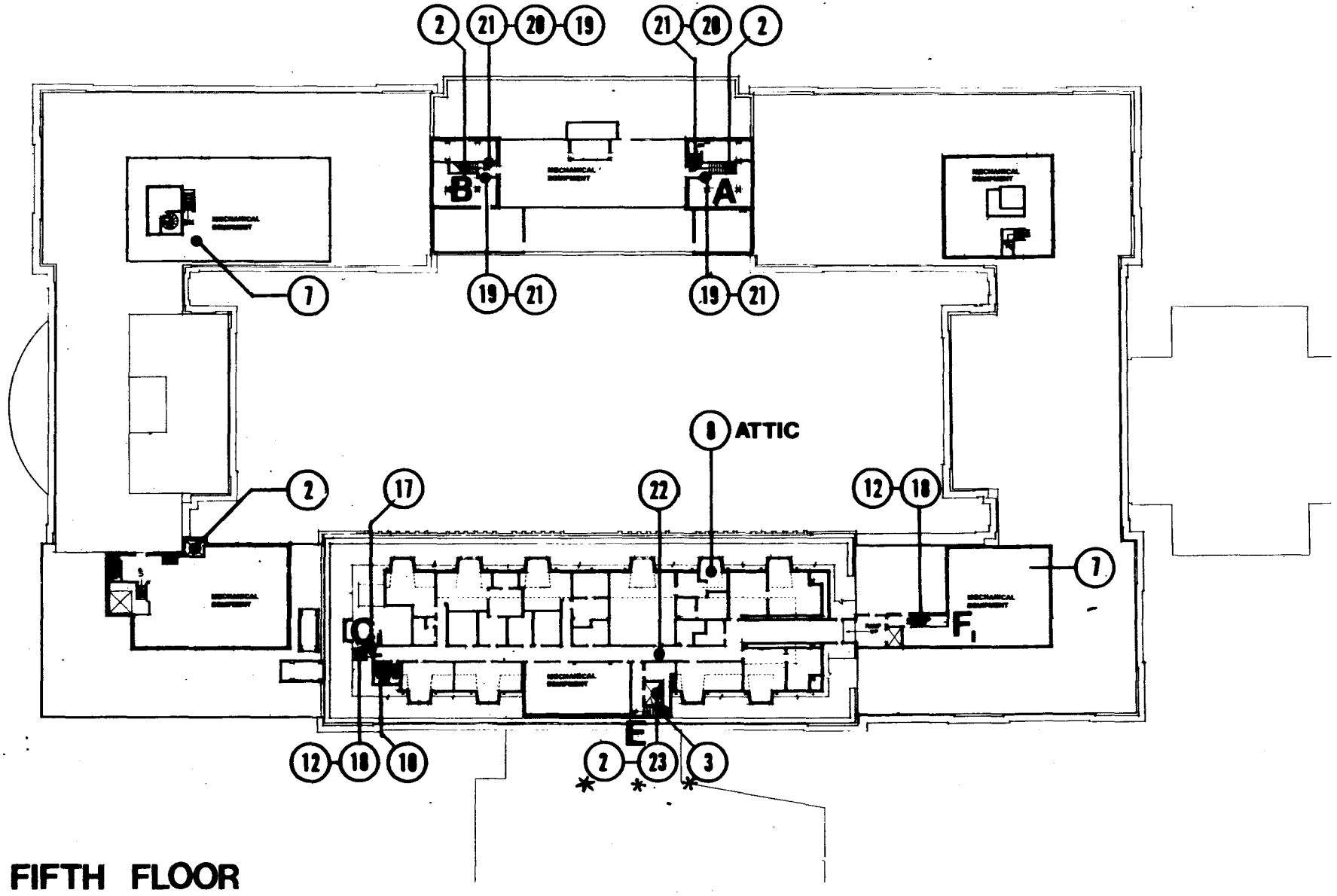

1.21 FIFTH FLOOR

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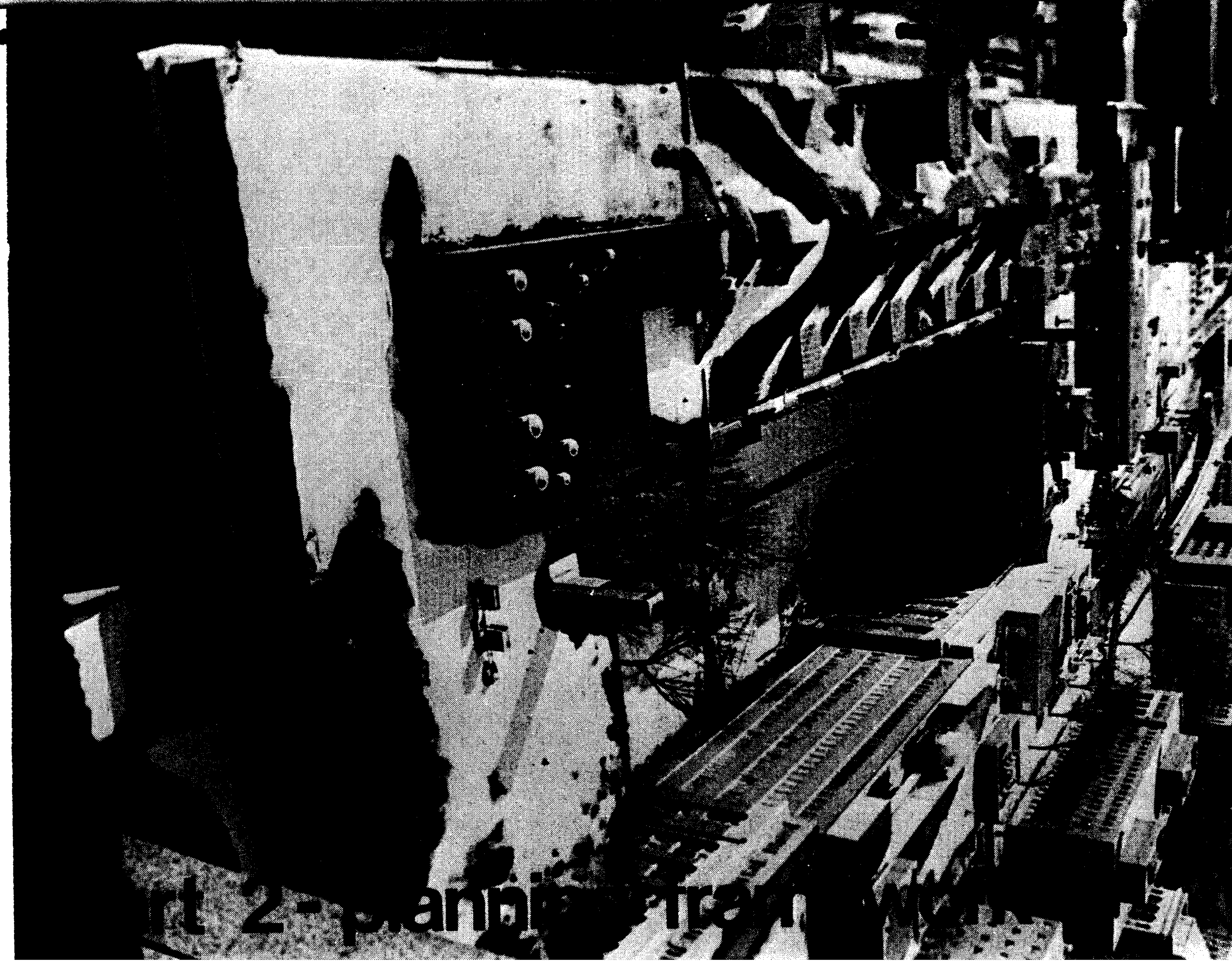

rt 2 - planning framework

EXTERNAL RELATIONSHIPS

SITING

The JOML Complex is on the northernmost edge of the Health Sciences. It is bounded to the north by Washington Avenue, to the west by Church Street, to the south by the University Hospitals, and to the east by Unit A and the Unit A plaza.

The proposed concept adds mechanical equipment room towers on the northeast, northwest, southeast and southwest corners of the JOML Complex.

In accordance with the Minneapolis Campus Long Range Development Plan PLANNING FRAMEWORK which assumes the closure of Washington Avenue to allow bus and pedestrian traffic only, the proposed concept indicates the upgrading of the sidewalks and bus waiting area along Washington Avenue. The suggested closure of Church Street and subsequent rerouting of traffic south of Coffman Memorial Union has the desirable affect of unifying JOML with surrounding campus buildings and separating major pedestrian and auto movement.

In the area of the southwest mechanical room tower addition a major bicycle parking area is proposed.

It is proposed that the courtyard be retained as a passive area and that the existing quality of the space be upgraded with the addition of plantings, seating, and fountain .

PEDESTRIAN CIRCULATION

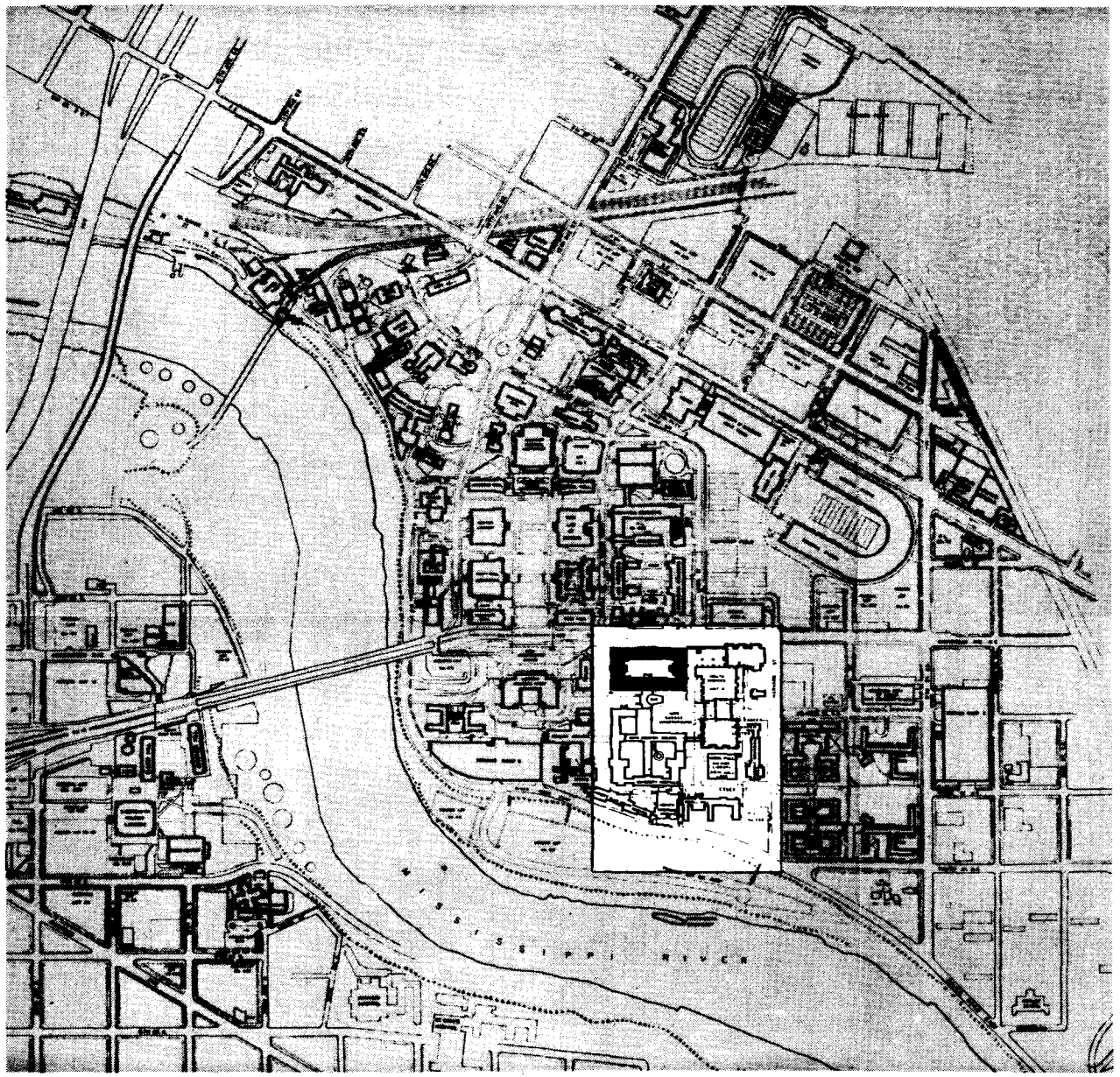
The JOML Complex is connected to the major underground pedestrian circulation corridor of the Health Sciences at the Basement of Millard Hall. A connection to the University Hospitals occurs at the First Floor of Owre Hall.

The JOML Complex suffers from the lack of a "Front Door" entrance. The proposed concept maintains the linkages to Unit A as they exist and upgrades the link to the University Hospitals. The creation of the "Front Door" at the Hospital's link relates directly to the major drop off area of the Hospital.

SERVICE

JOML is now serviced from five principal locations: Lyon Laboratory, Jackson/Owre Addition, Mayo Garage loading dock, Mayo Garage northeast corner loading area, and a service elevator connecting the First Floor of Millard Hall with the Health Sciences service corridor two levels below grade.

The proposed concept retains the Mayo garage loading dock and the Mayo garage northeast corner loading area for minor servicing. Major servicing will come to the JOML Complex through KE and the underground distribution system. The concept drawings indicate a future service corridor connection at the Sub-Basement of JOML in conjunction with the remodeling and expansion of animal facilities in the underground area of the courtyard.



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JOMI

JORDAN OWRE MILLARD LYON
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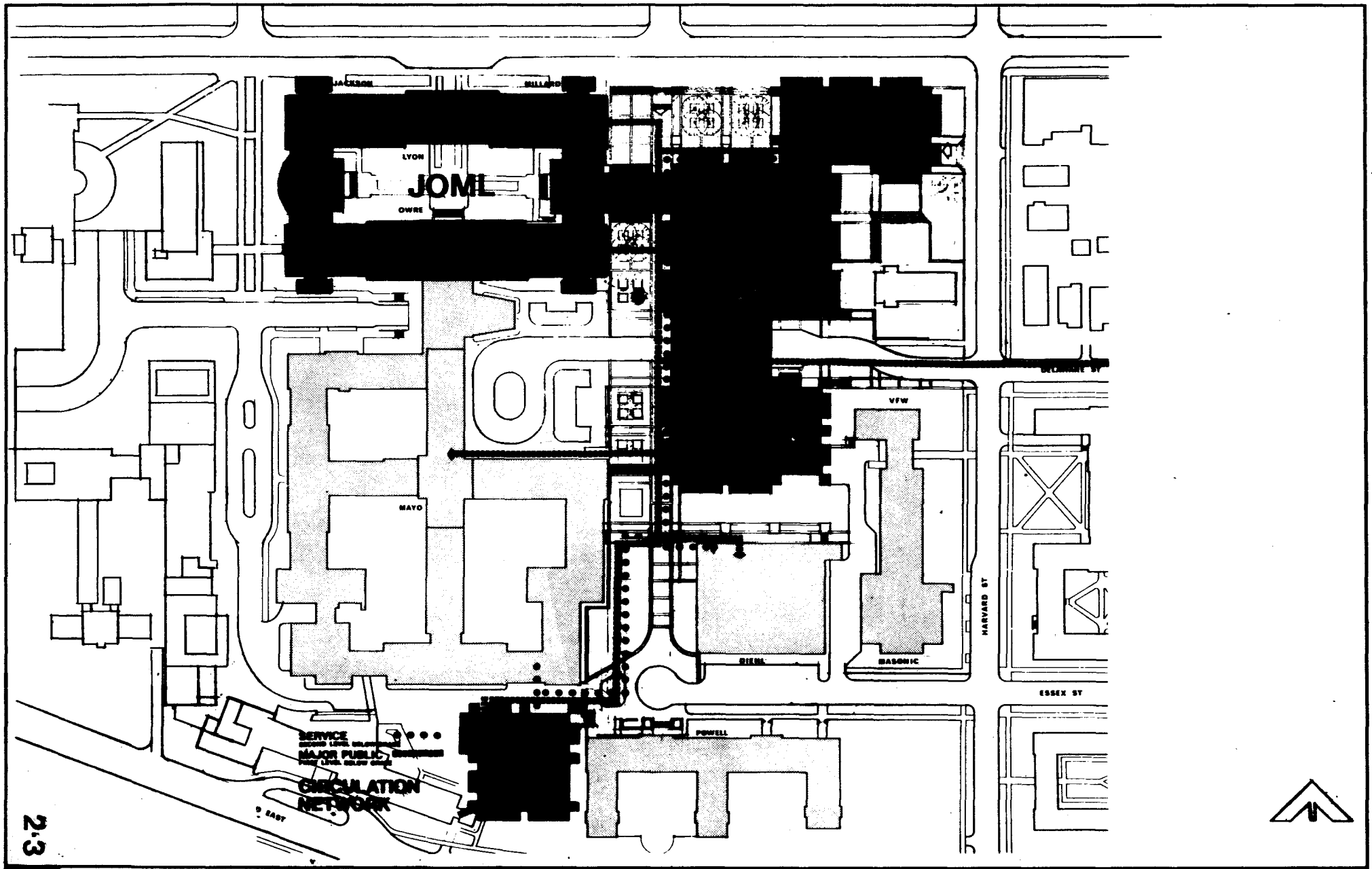
CAMPUS PLAN



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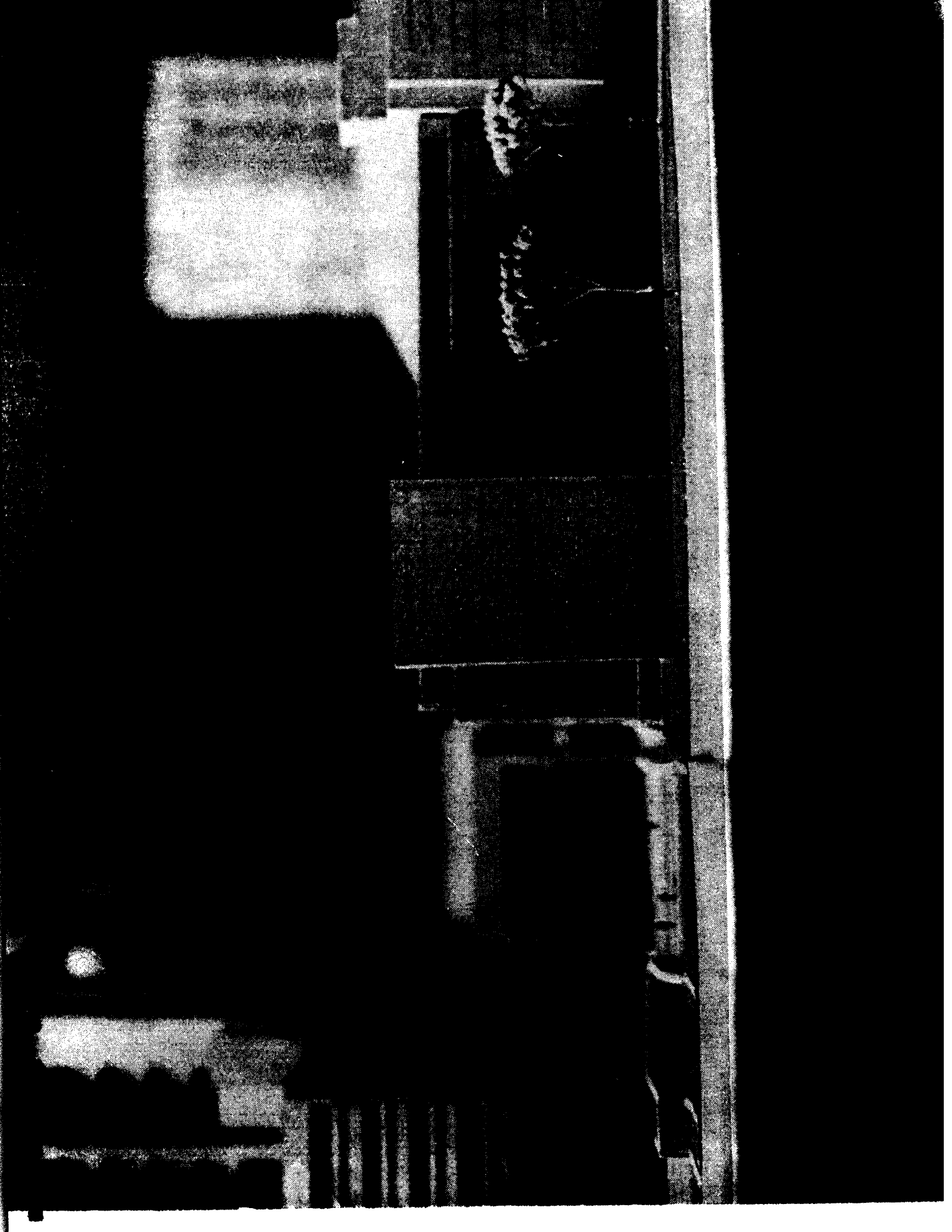
JOML

CIRCULATION NETWORK



DESCRIPTION OF DESIGN CONCEPT

The intent of this planning phase is to analyze the Jackson-Owre-Millard-Lyon complex (JOML) in order to develop a unified approach in establishing utility requirements and distribution networks; correct life safety deficiencies; determine program space allocation and interdepartmental relationships, and at the same time develop preliminary plans and a phasing sequence related to the remodeling of 81,000 square feet which is primarily vacated Dentristry space.

Due to the age of the buildings in the JOML Complex and the sophisticated service requirements of the Basic Sciences Programs, the correction of life safety deficiencies and the incorporation of contemporary mechanical and electrical distribution systems into the complex form the nucleous of the remodeling design concept. By their very nature both of these aspects of the remodeling work require a solution that is conceived on a complex-wide basis, even though they may be realized incrementally through a series of construction projects.

The conceptual basis for interdepartmental relationships has already been established by the present allocation of space within the complex. In order to encourage the interaction between the various Basic Sciences their interspersion within the complex will continue. The present space allocation to the departments will be modified in the near future as outlined in the University's Functional Space Program, Appendix G of this report. Future changes in space allocation must be anticipated, however, and the characterisitcs of the remodeled space must be designed to accommodate such changes.

CONCEPT - ARCHITECTURAL

Since the installation of contemporary mechanical and electrical equipment and networks are central to the remodeling effort being undertaken, the major architectural modfications to the complex are by necessity based on accommodating these installations in order to prevent the loss of assignable program space through the conversion of existing space to mechanical rooms and vertical distribution shafts, the proposed concept adds mechanical equipment room towers at the four external corners of the JOML Complex. With the construction of these towers, the floor area loss will range from 0 to 1,050 square feet, depending upon the method by which access is provided to the equipment rooms.

The towers concept provides for each quadrant of each floor to be served by separate air handling units. Not only does this provide a very fa orable method for phasing the remodeling of the complex but it also drastically reduces balancing problems and energy consumption through the decentalization of equipment to manageable zones. Both the towers themselves and the machanical equipment therein will be physically and acoustically separated from the complex buildings proper, thus minimizing noise and vibration both during construction and subsequent operation.

The horizontal air distribution duct system serving each quadrant of each floor makes only minimal intrusion on assignable space to get from each mechanical room to a nearby public corridor. With this minor exception all major trunk ducts will occur within the public corridors, allowing maintenance and future remodeling to occur with minimal disturbance to occupied assignable space.

Corridor installation of major trunk ducts, piping, and cable trays requires the removal of existing ceiling treatment and the installation of a new ceiling. Proposed is a fully accessible non-combustible metal ceiling for all corridors creating a unifying element in the corridor system. Continuous strip fluorescent fixtures in light cores at each side of the corridor provides general illumination. Accent lighting at special conditions highlights and gives definition to the circulation path. (See quadrant ceiling plan page 3-9.)

The internal public circulation corridor shall be maintained throughout the complex. In those areas where the corridor passes through existing spaces an enclosed corridor is proposed. Added corridor enclosures occur at the Basement of the Jackson-Owre Addition, the Third Floor of Owre Hall, the First and Third Floor of Lyon Laboratory, and the Sub-Basement animal rooms. Modulation of the corridor walls occurs at the elevators and stairs at Owre Hall, while the First Floor elevator lobby is enlarged and a new entrance face is provided to give the JOML Complex a "front door". An enclosed link below Lyon Laboratory completes the internal corridor at the Basement level creating a sound barrier from Washington Avenue and becomes a bus shelter serving MTC, inter-campus and shuttle buses.

The maintenance and extension of the existing public circulation corridors throughout the complex will bring the horizontal existing pathways up to present day life safety standards. Vertical exitways, however; will require additional work since no existing stair is in total compliance with current standards. Stairs A, B and C require minor corrections and Stairs D,E,F,G,H,I and J require major corrections. (See code deficiencies plans page 1-15.)

Stair D needs a shaft enclosure, extention to the fifth floor and direct access to the exterior. Proposed is a new stair in the existing stairwell. Stairs E and F are unnecessary and are proposed to be removed rather than corrected. Stairs G, H, I and J each require a shaft enclosure and direct access to the exterior. Proposed are magnetic hold-open corridor doors at each floor level with direct access to grade from the Basement level. Stair J maintains the use of an existing door and areawell stair, Stairs G and H require new exit doors and areawell stairs and Stair I requires a new horizontal passageway and exit door. With these modifications and the corrections to the elevator, fire-warning and fire-fighting devices outlined herein, the life safety standards of the complex would meet present day requirements.

Toilets in the existing JOML Complex are located in inconsistent and undefined locations. With the ever-changing program of the Basic Sciences, toilets which were in the past located for specific departmental requirements are now, too often, in inappropriate locations dividing internal departmental space and/or are remotely located. Several toilets should be abandoned. Fixtures in many cases need upgrading, handicapped facilities are needed, and piping and venting will need further investigation to determine adequacy.

The proposed concept indicates the phasing out of existing toilets and the creation of new toilets at the four inside corners. This consistent location, floor-to-floor, unifies the toilets of the Complex and reduces the space required, freeing up assignable space for departmental usage. It efficiently accommodates plumbing, provides for facilities for the handicapped and significantly reduces travel distance in many cases.

General space assignments have been used in this study to determine departmental zones and inter-departmental relationships. Each zone has then for planning purposes, been considered as remodelable assignable space. Spaces with unique mechanical or electrical requirements such as animal areas or equipment rooms have been so indicated and should remain as such in the future.

The remodeling of assignable program space will generally be planned on the basis of the requirements of the various departments to meet the immediate needs of their users. A remodeling "vacabulary" must be established, however; to make future changes in space assignment as simple as possible.

CONCEPT-MECHANICAL

The proposed mechanical design concept for the ultimate remodeling of the Jackson-Owre-Millard-Lyon building complex is to provide new ventilation equipment for the majority of the building complex areas in new equipment towers, to provide new chilled water generation capacity and circulating equipment for all areas, to provide new central heating equipment and distribution systems, and to reuse the existing plumbing risers and mains.

AIR SUPPLY SYSTEMS

With the exceptions listed below, the Basement Floor through Fourth Floor will be served by the new Supply Air Handling Systems to be located in the new mechanical equipment towers at the four corners of the JOML Building Complex. In general, each quadrant of each floor will be served by a separate supply unit. The exceptions to the mechanical equipment tower scheme are the following supply air systems and areas served:

The two Auditoriums on the Basement Floor level of Jackson and Owre Halls and the Owre Basement Classroom will remain on the existing supply units.

A separate supply air system will be installed to serve the new Animal Area on the Basement Level of Owre Hall.

The Fourth Floor of Owre will be served by the Third Floor supply units because of space limitations at the Fourth Floor Owre ceiling. A new auxiliary air supply system will be installed to provide tempered make-up air directly to many of the fume hoods in this area. This system will be located on the Fifth Floor.

Approximately one third of Lyon Fourth Floor and the east end of Jackson will be served by the Third Floor northwest tower unit because of space limitations.

Approximately two thirds of Lyon Fourth Floor and the west end of Millard will be served by the Third Floor northwest tower unit because of space limitations.

The Fourth Floor northwest tower unit will serve the animal area in the Fourth Floor of Jackson.

The Sub-Basement areas will be served by supply air systems as follows:

The existing Jackson-Owre Animal Area will be served by the existing supply air unit without modifications.

The existing Animal Area in the west courtyard will be served by the existing supply air unit upgraded to provide higher air change rates.

The existing Lyon Animal Area will be served by a new supply air unit located in a new equipment room to be located within that area.

The new Animal Area in the east courtyard will be served by a new supply air unit located in a new equipment room to be located within that area.

Supply ventilation air for the Jackson Corridor and Crematorium Spaces will be supplied from the northwest tower Basement Floor unit.

Combustion air for the crematory will be supplied from the air intake of the northwest tower unit.

The Fifth Floor of Owre will be served by the Third Floor southeast and southwest tower units.

Areas served by each air supply system are shown graphically on the mechanical design concept drawings and the capacities of the various zones are tabulated in Appendix E.

Generally main duct runs will be located in the ceilings of the corridors with a branch duct serving each space.

Space temperature control to laboratories, animal areas and other areas requiring constant air changes should be provided by terminal reheat coils controlled by individual space thermostats. Space temperature control to offices, classrooms, conference rooms and other areas not requiring constant air changes should be provided by variable air-volume terminal devices controlled by individual space thermostats.

All existing ventilation equipment should continue to serve as long as possible. A table of existing major air supply units and their ultimate disposition of each is included in Appendix E.

RETURN/RELIEF AIR SYSTEMS

Return air systems will be provided for all systems not requiring 100% outside air. Returns will be ducted and a return/relief fan will be provided for each system. Relief air from supply systems in the new Mechanical Equipment Towers will be relieved through the relief air shaft in the towers.

EXHAUST AIR SYSTEMS

GENERAL EXHAUST

General exhaust systems will be installed for lab areas requiring exhaust in addition to fume hood and canopy hood exhaust. A separate fan will be

installed for each supply unit (if required) and air will be exhausted through the exhaust air shafts in the towers.

TOILET EXHAUST

A new toilet exhaust system will be provided for each of the new toilet room stacks. Existing toilet exhaust systems should be removed as the toilet rooms are removed. **New exhaust fans should be located in existing equipment rooms on the roof.**

FUME HOOD EXHAUST

A fume hood exhaust fan will be provided for each new fume hood. (More than one hood could be exhausted by one fan if the hoods are in the same room, easily visible from other hoods on the same fan, and used for similar purposes). New equipment rooms for fume hood fans should be provided on the Fifth Floor of Owre Hall. New fume hood fans in other buildings in the complex should be located in existing equipment rooms **on the roof.**

MISCELLANEOUS EXHAUST SYSTEMS

Individual exhaust systems will be provided for miscellaneous areas as required. Examples are canopy hoods and dark rooms.

CHILLED WATER SYSTEM

Cooling to the air supply systems for space air conditioning will be provided by chilled water through a primary/secondary piping system. The primary supply and return mains will be located in the Sub-Basement level of the JOML building complex. Secondary pumps and piping loops will be supplied from the primary loop. The secondary loop zones are as follows:

Zone 1. Northeast mechanical equipment tower
Zone 2. Northwest mechanical equipment tower
Zone 3. Southeast mechanical equipment tower
Zone 4. Southwest mechanical equipment tower
Zone 5. Owre Hall basement animal area mechanical equipment room
Zone 6. Sub-basement east courtyard animal area mechanical equipment room
Zone 7. Owre Hall basement north mechanical equipment room
Zone 8. Jackson/Owre addition sub-basement mechanical equipment room
Zone 9. Jackson Hall auditorium mechanical equipment room
Zone 10. Lyon Laboratory sub-basement mechanical equipment room

Chilled water will be generated by steam absorption chillers. Approximately 60% of the required capacity will be provided by the first six chillers installed in the Unit A-B/C chiller plant. The remaining capacity will be provided either by future expansion of the Unit A-B/C plant or by the addition of a new chiller in the JOML building complex.

Additional results of the investigation of the chilled water system and a tabulation of estimated chilled water requirements are available in Appendix D.

The capacity provided from the Unit A-B/C plant will be supplied through a secondary loop from the A-B/C primary chilled water loop (not to be confused with the primary and secondary chilled water loops in the JOML Building complex).

Three optional locations are available for a new chiller and a cooling tower to be installed in the JOML building complex. The locations are as follows:

A chiller located in the existing north Jackson penthouse and cooling tower located on the roof outside that penthouse.

A chiller located in the east end at the Sub-Basement level of the courtyard and a cooling tower located on the roof of Millard Hall.

A chiller located in an extension of the lowest level of the northeast mechanical equipment tower and a cooling tower located on the roof of Millard Hall.

HEATING SYSTEM

STEAM SYSTEM

Steam will enter the building complex from the deep tunnels at Lyon Laboratory. Steam will be distributed to the two existing equipment rooms to supply the radiation convertors, and the four auxilary mechanical equipment rooms associated with the mechanical equipment towers. Steam pressure will be reduced to 15 psig for use in convertors and coils.

PERIMETER RADIATION SYSTEM

The heating system for the perimeter of the JOML complex will be forced hot water circulating through a piped system and connected to room finned tube radiation. The Jackson Hall and Jackson-Owre buildings already have this type of heating system so only room controls need be added.

Each of the three remaining buildings shall have their existing steam heating system changed to forced hot water. Existing cast iron radiators shall be changed to finned tube radiation. New steam to water convertors, circulating pumps, controls, etc. shall be located in the basement mechanical rooms of each building.

Each system will have the horizontal supply main installed in Sub-Basement pipe space connected to new supply risers at locations of existing steam sypply risers extending up to the top floor. The return risers will start at the basement floor, with new return risers at locations of existing condensate return risers, extend up to the Third Floor ceiling collecting all risers and finally drop down in a pipe chase to Sub-Basement equipment room.

Finned tube radiation will be provided in allareas requiring heat. Existing finned tube if in good condition may be reused. Radiation will connect to supply and return risers on either side of radiation. Each piece of radiation will be controlled by an automatic valve having a remote room thermostat or by a self-contained valve stat. The temperature of the hot water supplied to the room radiation will be controlled at the equipment room convertor to vary in proportion to the outside temperatures.

TERMINAL REHEAT SYSTEM

Room temperature control for laboratories and other areas requiring constant air changes will be rpovided by a terminal reheat system. Four separate reheat systems will be provided; one associated with each new mechanical equipment tower. Capacity for all reheat coils in each respective quadrant of the building will be in the associated reheat system.

Supply and return risers will be located in the mechanical equipment towers. Supply and return mains for each floor will follow the ductwork with distribution piping generally located in the corridors.

PLUMBING

The concept of the plumbing system is reuse of the existing risers with the addition of runouts to new fixtures where they occur. All existing risers will be retained whether or not they are used in the remodeling work. They can also serve future remodeling. Abandoned horizontal piping will be removed back to the risers.

The concept drawings show the locations of existing plumbing risers with a one or two letter identification. A chart of the identification letters is included with a list of the services included in each riser.

SANITARY AND ACID WASTE AND VENT SYSTEMS

The existing sanitary and acid waste and vent systems should be adequate to serve the ultimate plumbing requirements of the building proper. Risers are extensive and evenly distributed. Acid waste and vent risers do not appear on the concept drawings to be abundant but indications are that many of those risers shown as waste or soil stacks are actually acid wastes. Holes for access to the piping in the plumbing chases will be cut during the design development stage of each remodeling project for further verification of acid waste and vent riser locations. In areas where acid waste and vent risers are required but non-existent they will be installed.

New sanitary sewer waste and vent risers will be provided for the new toilet batteries in each quadrant of the building.

DOMESTIC WATER SYSTEMS

The existing domestic water distribution systems should be adequate to serve the ultimate usage of the building proper. New cold and hot water riser should be provided to serve the new toilet facilities in each quadrant of the building.

The occupancy of the building complex will not ultimately increase and hot water generating capacity should be sufficient.

LABORATORY AND MEDICAL GAS SYSTEMS

The existing air, gas, deionized water and vacuum systems are extensive throughout the building complex. These systems will be extended to serve the ultimate usage. The capacities of the air compressors and vacuum pumps should be reviewed relative to the new load requirements. The existing medical respiratory gas piping systems (oxygen and nitrous oxide) are localized. If additional areas require these gases, new localized systems will be provided.

CONCEPT-ELECTRICAL

The electrical concept adds capacities to existing vaults, switchboards and subdistribution systems in addition to new switchboards, feeders, and panel boards to serve mechanical equipment room towers. The proposed electrical concept also adds a fire alarm system, emergency generator, and emergency illumination to bring the building up to present day codes. Raceway systems will be included to allow a flexible system of distribution for low voltage communication systems such as telephone, television, and intercommunications.

POWER DISTRIBUTION SYSTEMS

The Jackson-Owre portion of the complex is served by transformers in an existing high voltage vault in the Jackson-Owre building. With the addition of the mechanical towers these transformers would become overloaded and will therefore, be replaced with larger transformers. The Jackson-Owre main switchboard is inadequate in space to serve the new feeders required and will be replaced. The replacement of the switchboard is accompanied by the expansion of the switchboard room. A new riser will be extended from the new switchboard with electrical panels at each floor to serve new motor and southwest mechanical tower loads.

The Jackson Hall switchboard is presently fed from the Jackson-Owre main switchboard.

The switchboard and the feeder supplying the switchboard are not of adequate capacity to accept the additional loads of the northwest mechanical tower. Feeder capacity will be increased by paralleling existing conduit and wire with additional conduit and wire. A new switchboard will be installed replacing the existing switchboard. A new feeder will be extended from the new switchboard to serve a new riser within the northwest mechanical tower. Panelboards will be tapped from the riser at each floor of the tower for loads at each floor.

The Owre Hall switchboard is served from the Owre Hall transformer vault. The transformers and switchgear within the vault are of sufficient size and no changes are necessary. The main switchboard, although adequate in current carrying capacity, is an outdated switchboard, inefficient in space. The switchboard is located between two columns and allows no room for expansion. There are no spaces for larger feeder circuit breakers and would need to be replaced when circuit space is necessary.

There are two main switchboards in Millard Hall, both being served from a single transformer in the Millard-Lyon transformer vault. The transformer is properly sized to carry the load of the lighting switchboard and will remain in this capacity only. The transformer vault will be enlarged to the east to allow the installation of primary switchgear and a new transformer which will supply a new service feeder and power switchboard. Feeders will be extended from this switchboard to risers in each of the northeast and southeast mechanical towers. Again panels will be tapped from the risers on each floor providing branch circuit protection for loads on each floor.

The Lyon Laboratory switchboard is a two section switchboard served from a transformer located in the Millard-Lyon vault. The switchboard is heavily loaded on the power section, and no space is available to add larger frame circuit breakers. No significant load is expected to be added to this board and there is no immediate need to replace the board.

All emergency panelboards in the complex are tapped ahead of the main disconnect switch in each building. An emergency generator will be installed in a generator room next to the mechanical equipment room in the Mayo garage. Distribution feeders would extend to each emergency panel where automatic transfer switches would be installed. Failure of a utility, transformers, or a switchboard would initiate emergency power to the emergency panel.

LIGHTING SYSTEMS

The corridor lighting will be installed in coordination with a new dropped ceiling. The lighting will consist of fluorescent strips mounted in a ceiling cove near the wall. The lights would be centrally switched and would be circuited to allow one-half level switching.
Classroom will be lighted to 70 foot candles and laboratory spaces will be lighted to a level of 100 foot candles where fixtures are replaced. Replacement will be considered on the basis of existing fixture age or condition, protected ballasts or unprotected ballasts, light level existing and ceiling requirement. Where new fixtures are installed one-half level switching will be provided.

Office spaces will be lighted to a level of 50 foot candles where fixtures are replaced. Replacement consideration will be the same as classrooms. One-half level switching will be provided where fixtures are replaced.

Emergency lighting will be provided in stairwells, corridors, lecture rooms, and exits. Light fixtures matching normal systems will be connected to emergency panels to provide night or security lighting and emergency lighting.

SIGNAL SYSTEMS

The existing telephone cabinet and raceways are overloaded and segmented. Installation of interconnecting telephone systems requires excessive cable and installation time. The main service enters the complex from deep tunnels in Lyon Laboratory. A new service will be extended from Mayo telephone center to a new telephone equipment room in the basement level of Owre Hall. Trunk lines and branch lines will be distributed horizontally on each floor in open cable tray above the dropped corridor ceiling. Conduit risers and sleeves will connect vertically between telephone equipment closets at six points in the complex. Individual telephone outlets will be connected by conduit to the corridor ceiling space.

Audio visual systems such as closed circuit television and intercommunications will share the corridor cable tray with the telephone systems. Separate conduit risers, however, will be installed at four points in the complex from floor to floor to allow for vertical distribution. Room 176 is designated as an audio visual control room and will contain all close circuit television head end equipment.

FIRE ALARM SYSTEM

At the present time the JCML complex contains only isolated fire alarm stations for volatile storage rooms, and no master system exists in the building. The electrical concept adds a complete multiplexed fire alarm system to the complex. System components will be:

Manual stations at exits.

Automatic stations in high hazard areas.

Heat or smoke detection in air handling units with fan shutdown and separate duct smoke alarm.

Smoke detector and door holders at fire doors.

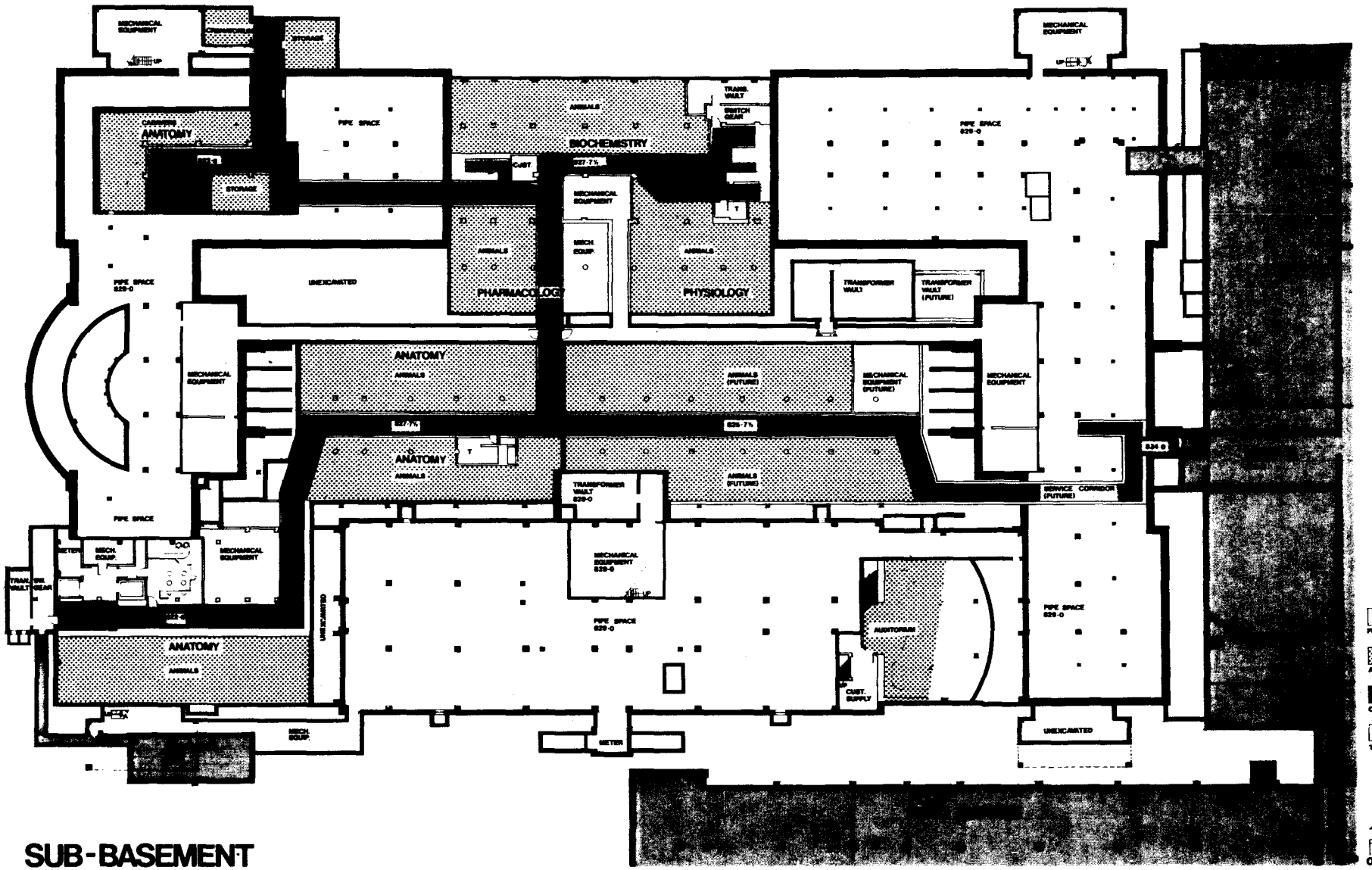
Smoke detection at passenger elevator doors.

Automatic heat detection in stairwells and elevator shafts.

General alarm horns.

Annunciation.

The main fire alarm equipment will be located in the Millard switchboard room with remote annunciation at the Lyon Laboratory outside entrance.



3.11

SUB-BASEMENT

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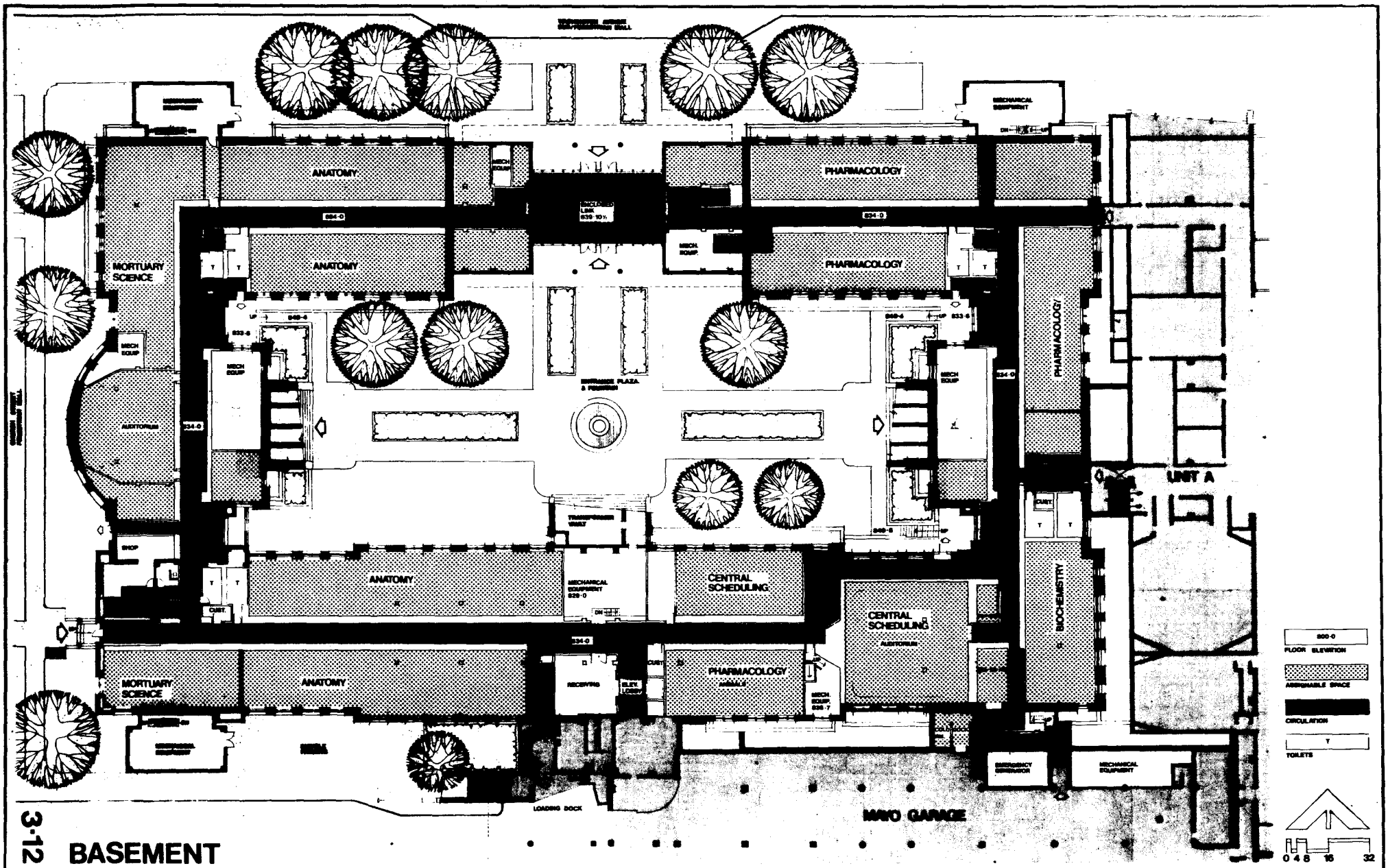
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - ARCHITECTURAL



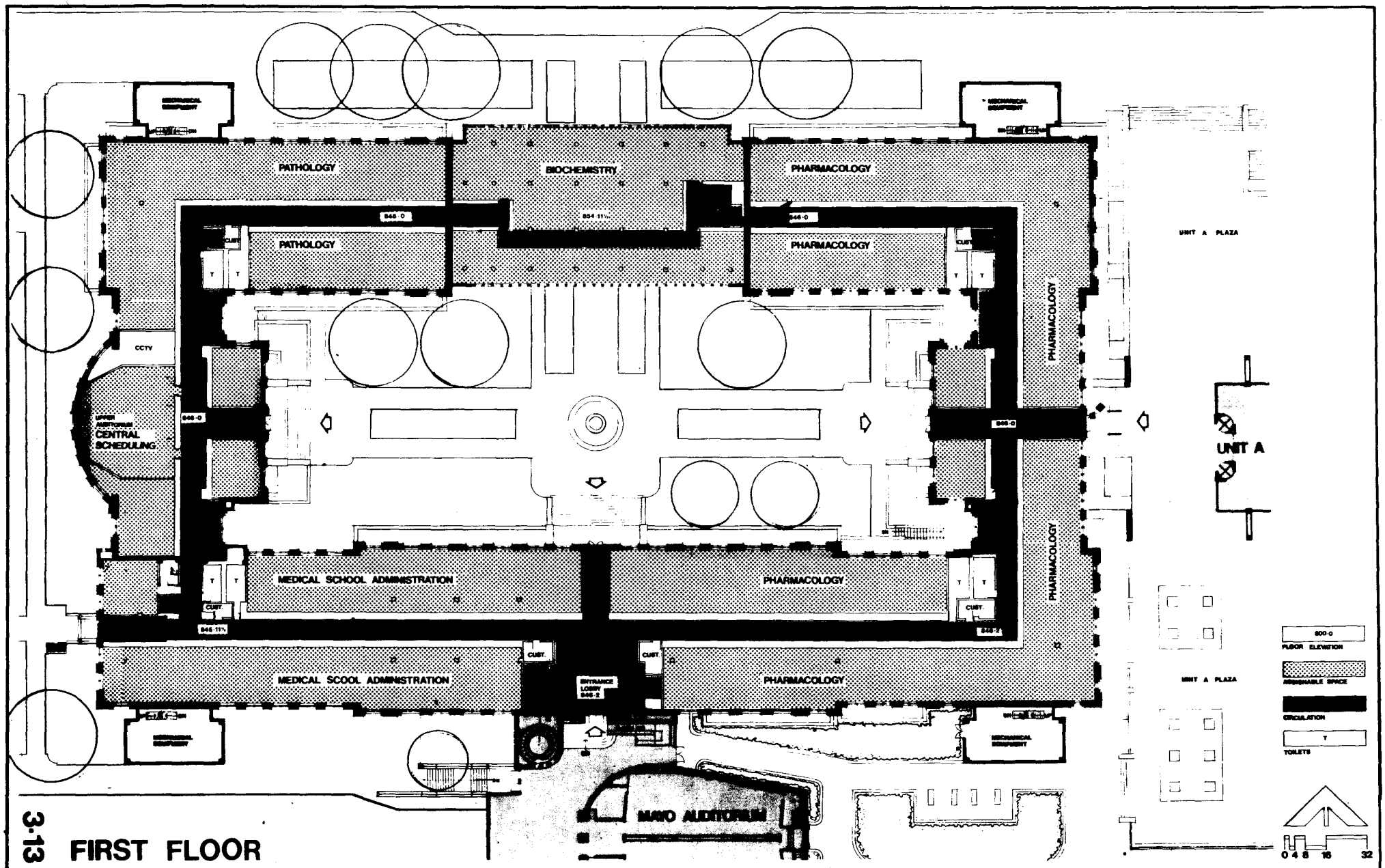
3.12 **BASEMENT**

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - ARCHITECTURAL



3-13 **FIRST FLOOR**

UNIVERSITY OF MINNESOTA HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

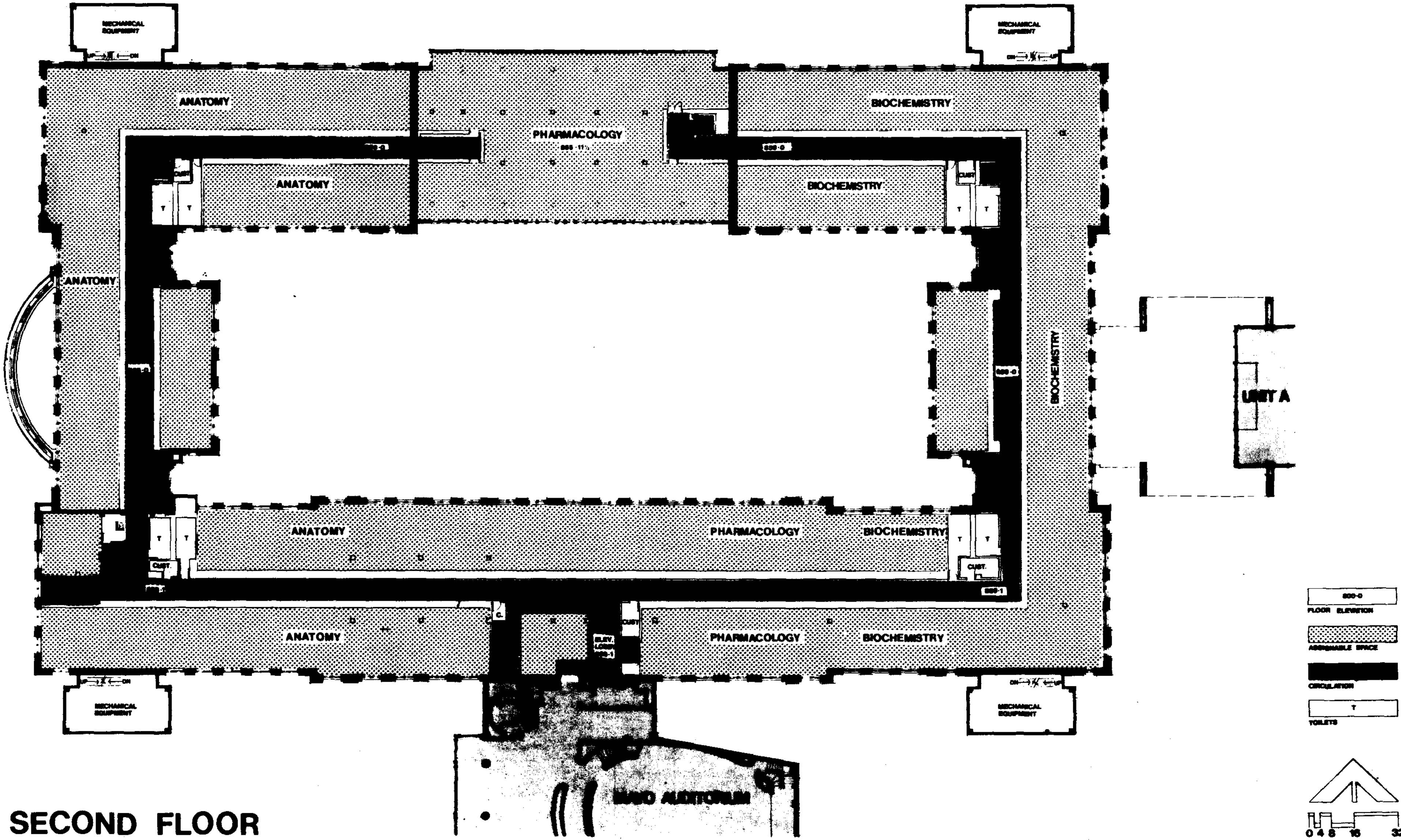
THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. & THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

THE CERNY ASSOCIATES, INC. MINNEAPOLIS MINNESOTA
HAMMEL, GREEN & ABRAHAMSON, INC ST PAUL MINNESOTA
BETTER LEACH & LYNDSTROM INC MINNEAPOLIS MINNESOTA

JOMIL

JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - ARCHITECTURAL



3-14

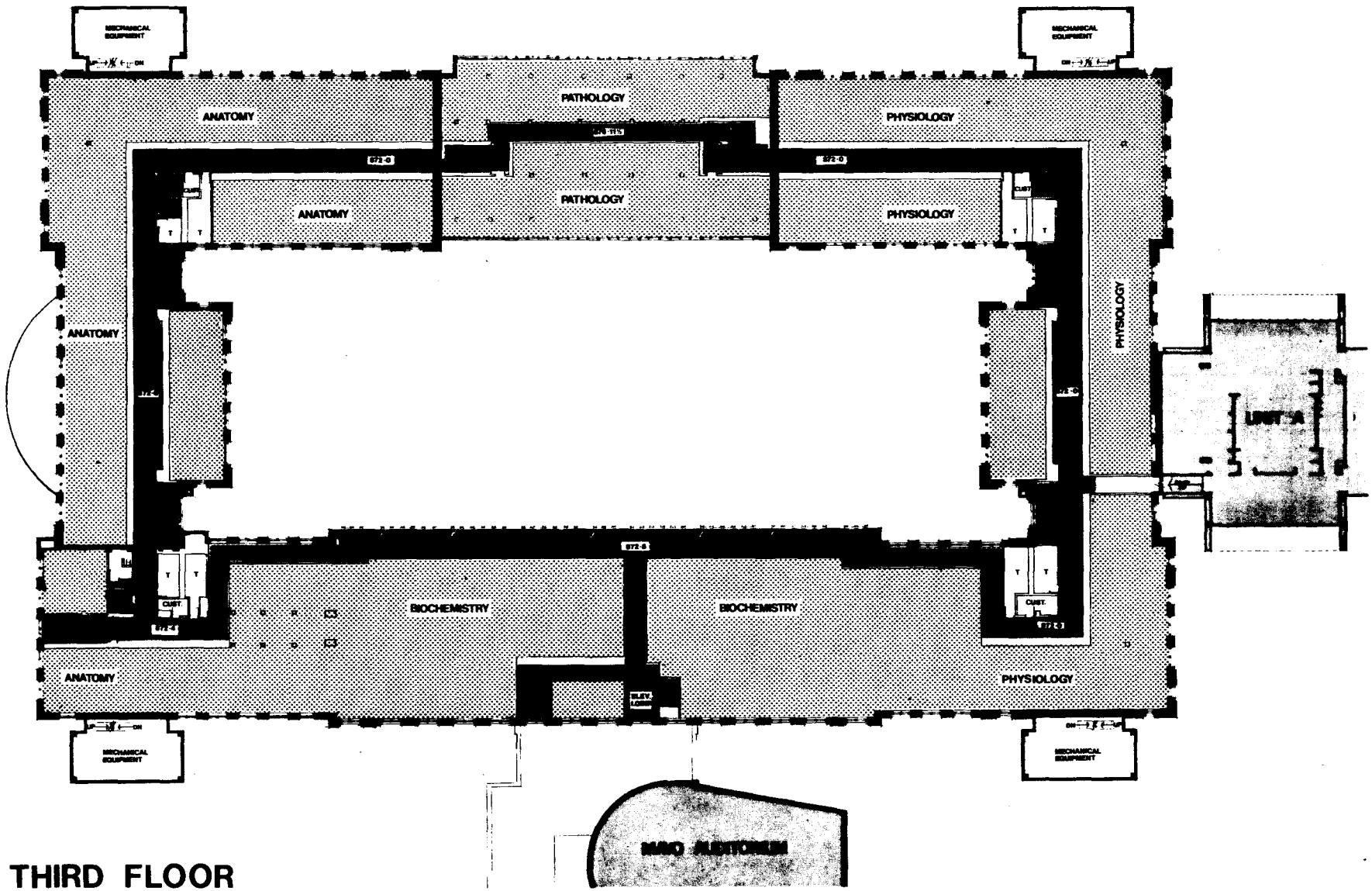
SECOND FLOOR

UNIVERSITY OF MINNESOTA HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. & THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOML — JACKSON OWRE MILLARD LYON COMPLEX REMODELING

CONCEPT - ARCHITECTURAL



3.15

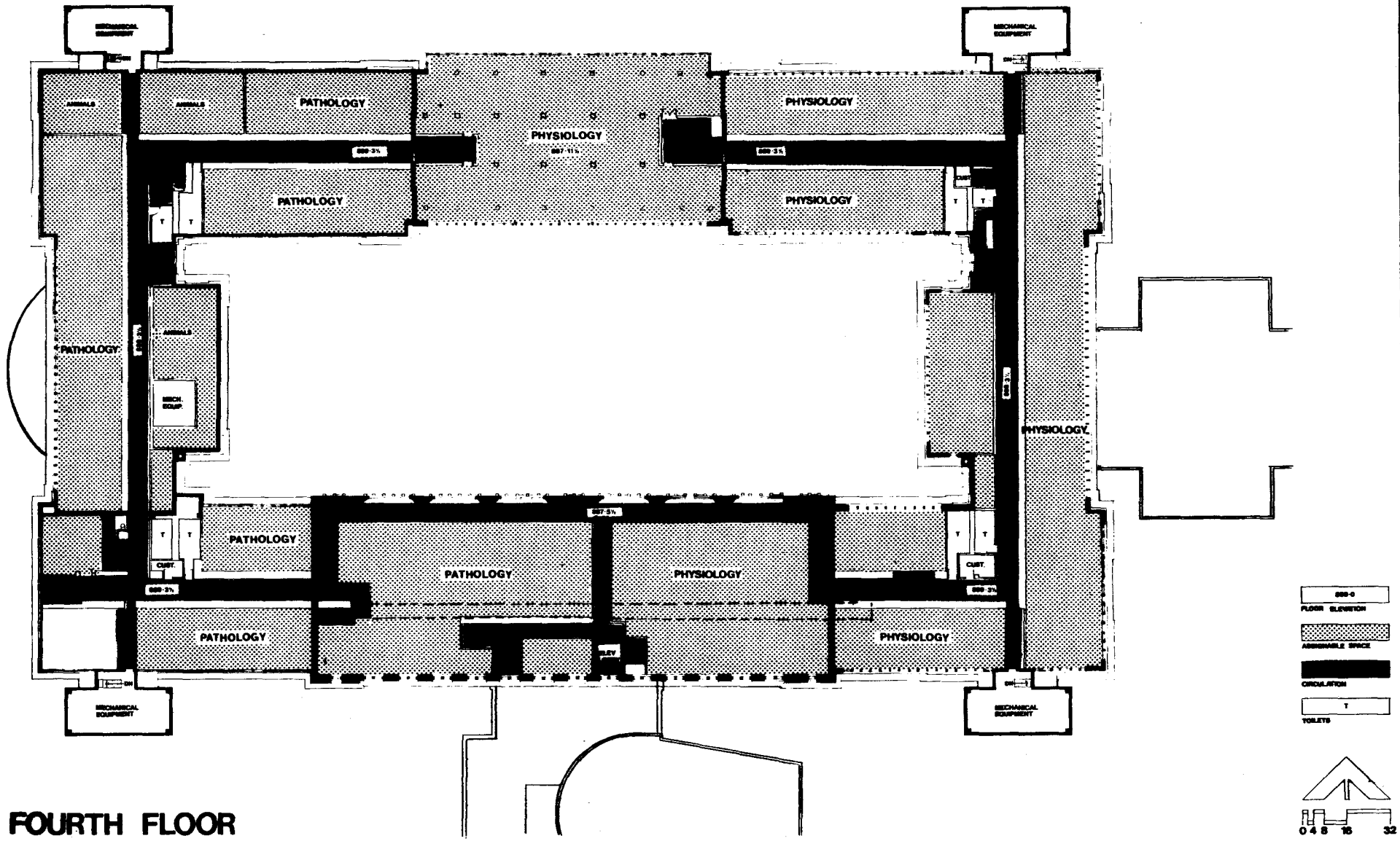
THIRD FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOMIL
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - ARCHITECTURAL



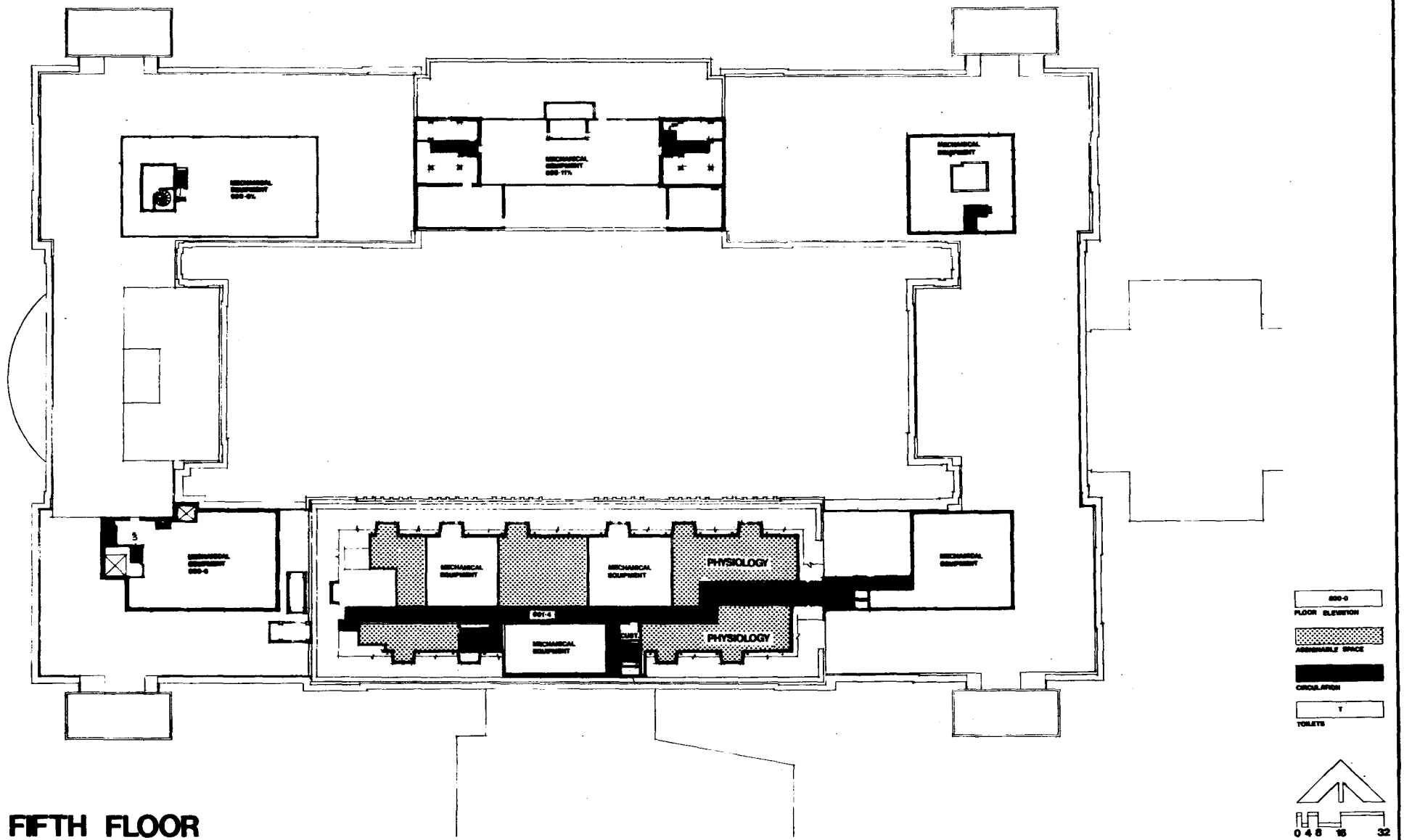
3.16 FOURTH FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOVIL
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - ARCHITECTURAL



3.17

FIFTH FLOOR

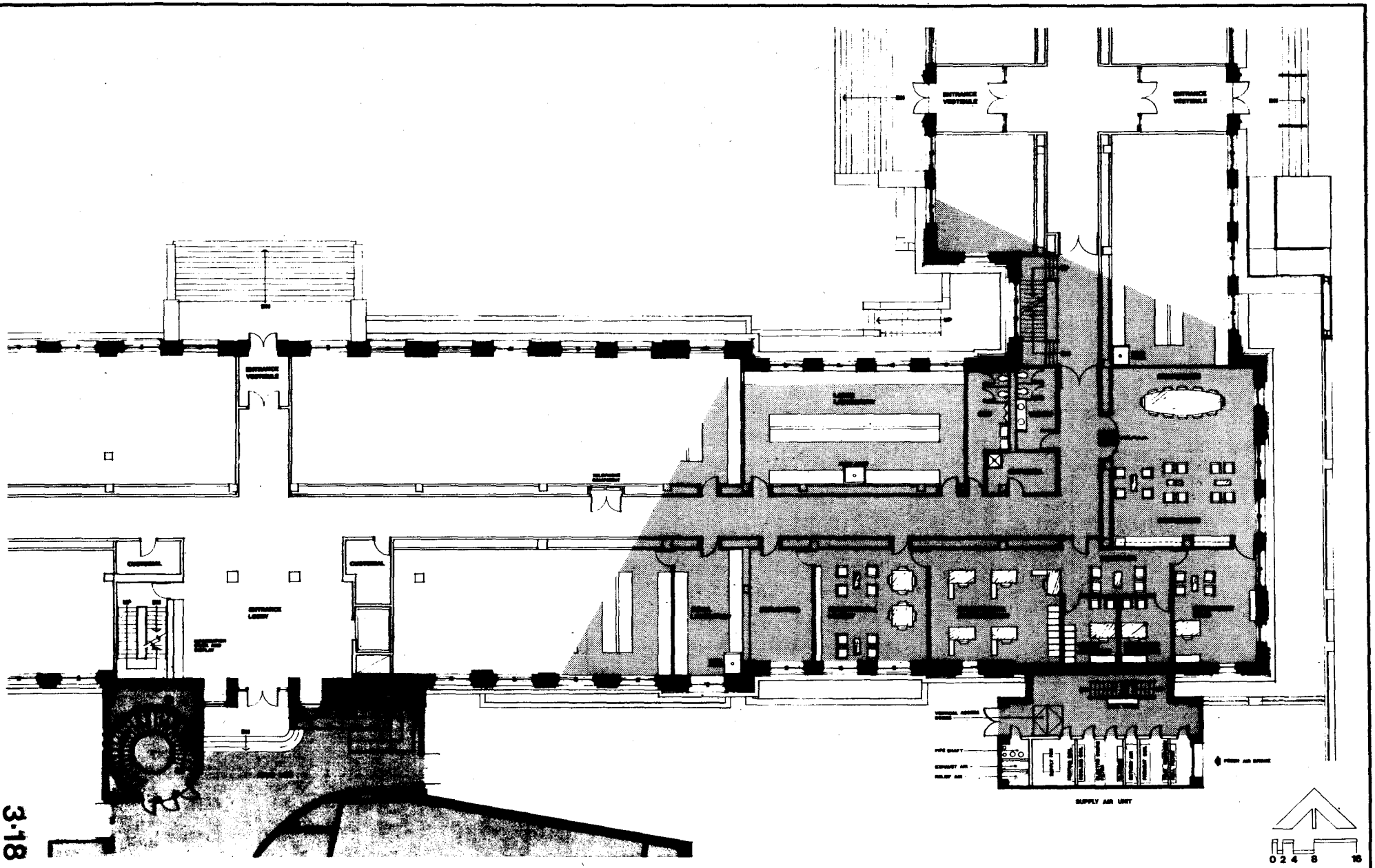
UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOMI

JACKSON GIBBS MILLARD LYON
OSMUN RINGELING

CONCEPT - ARCHITECTURAL



3.18

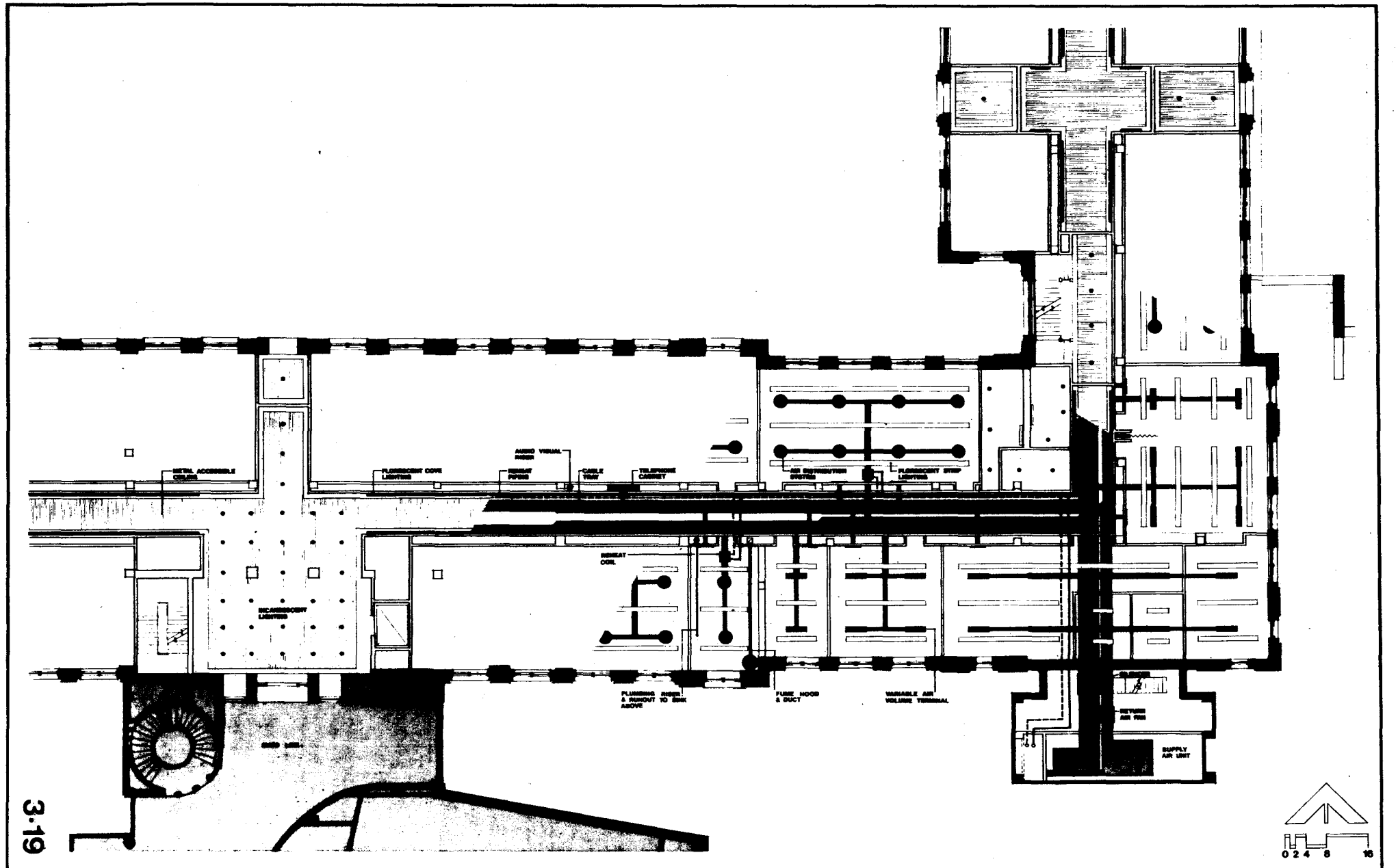
UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

THE CERNY ASSOCIATES, INC
HASSEL, GREEN & ABRAHAMSON, INC
SETTER, LEACH & LINDSTROM, INC

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

QUADRANT PLAN



3.19

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

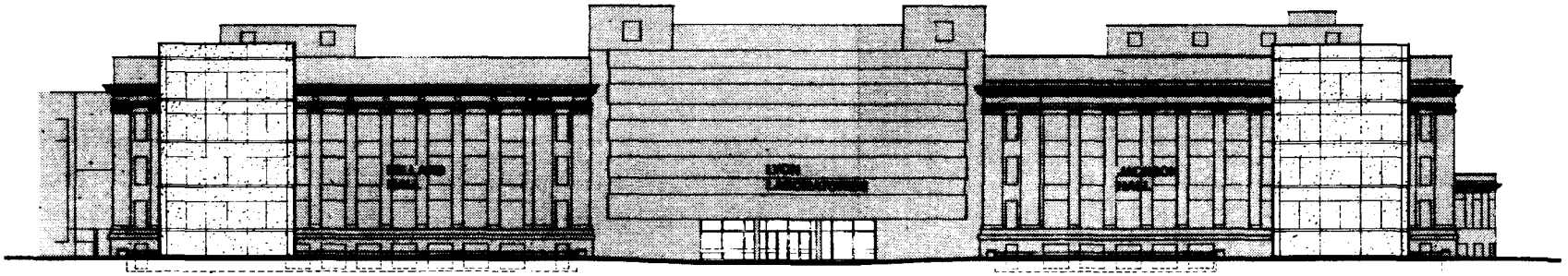
THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

THE CERNY ASSOCIATES, INC. MINNEAPOLIS, MINNESOTA
HAMMEL, GREEN & ABRAHAMSON, INC ST PAUL, MINNESOTA
SETTER, LEACH & LINDSTROM, INC MINNEAPOLIS, MINNESOTA

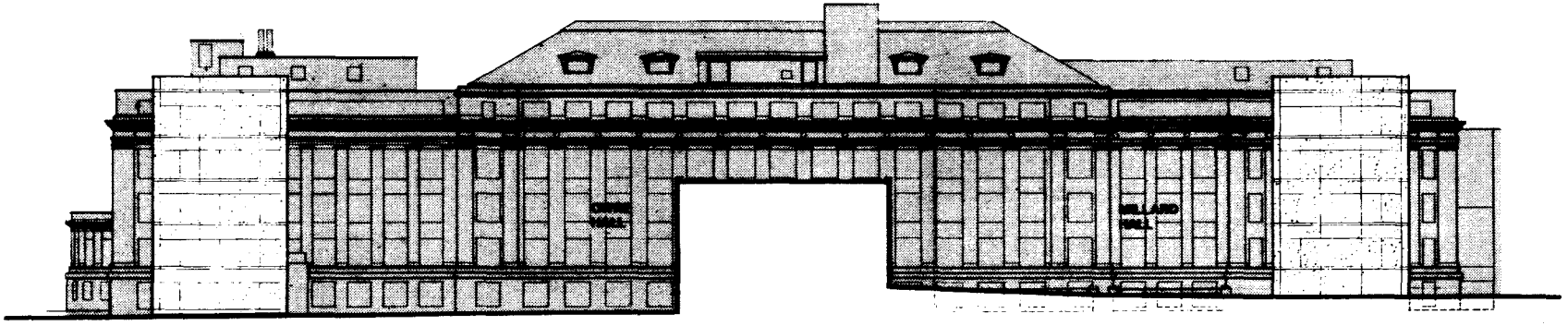
JOML

JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

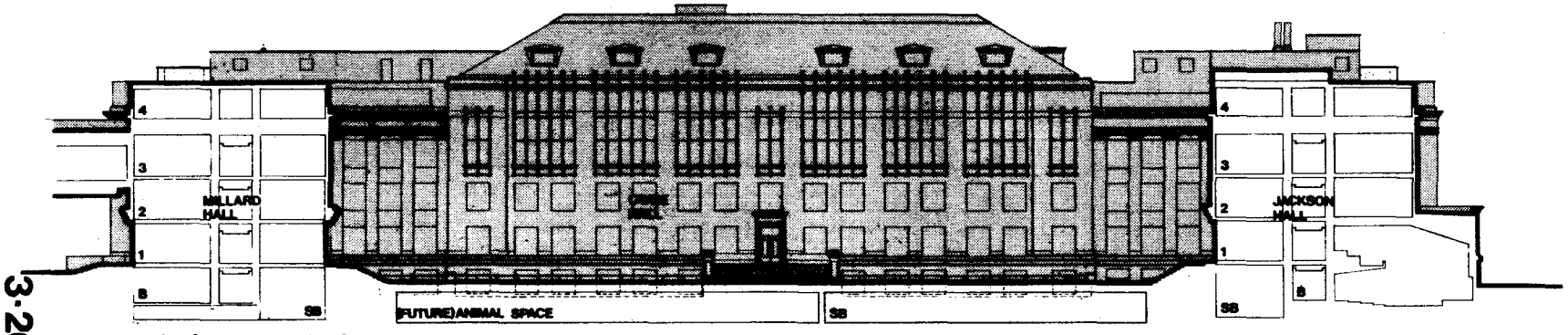
QUADRANT CEILING PLAN



NORTH ELEVATION



SOUTH ELEVATION



EAST/WEST SECTION-ELEVATION

3.20

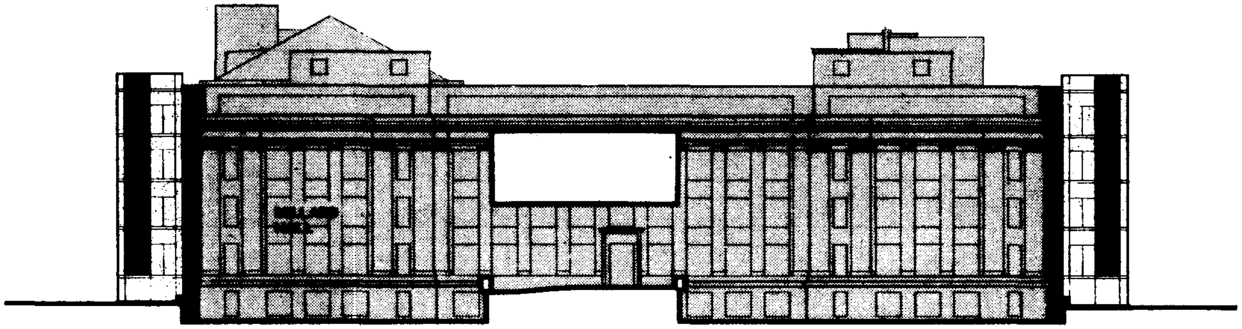
UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

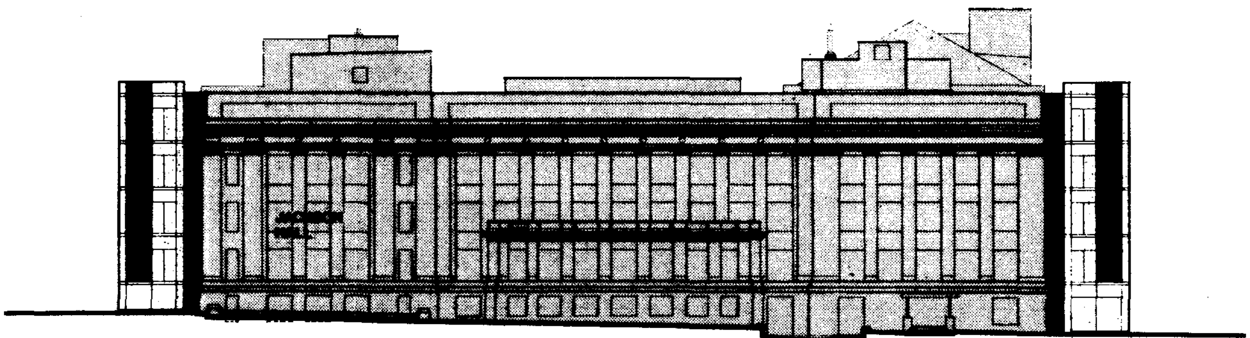
JOML

JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

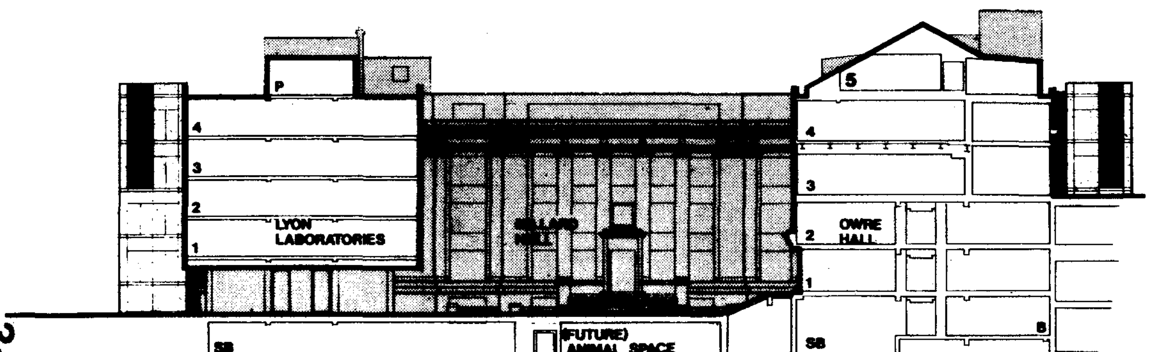
ELEVATIONS



EAST ELEVATION

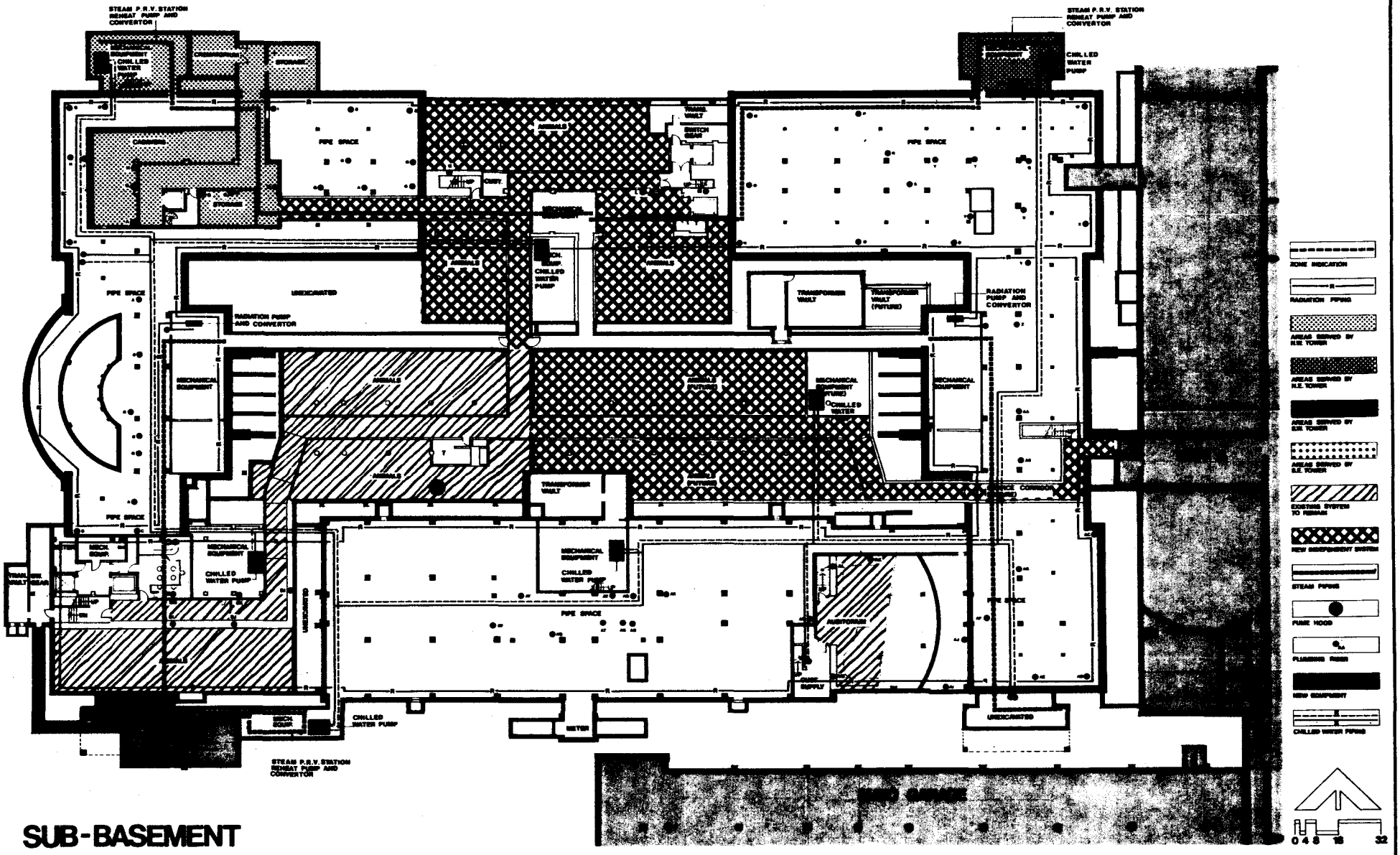


WEST ELEVATION



NORTH/SOUTH SECTION–ELEVATION

UNIVERSITY OF MINNESOTA HEALTH SCIENCES EXPANSION MINNEAPOLIS MINNESOTA	THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. & THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC. THE CERNY ASSOCIATES, INC. — MINNEAPOLIS, MINNESOTA HAMMEL, GREEN & ABRAHAMSON, INC — ST. PAUL, MINNESOTA SETTER, LEACH & LINDSTROM, INC — MINNEAPOLIS, MINNESOTA	JOML JACKSON OWRE MILLARD LYON COMPLEX REMODELING	ELEVATIONS



3.22

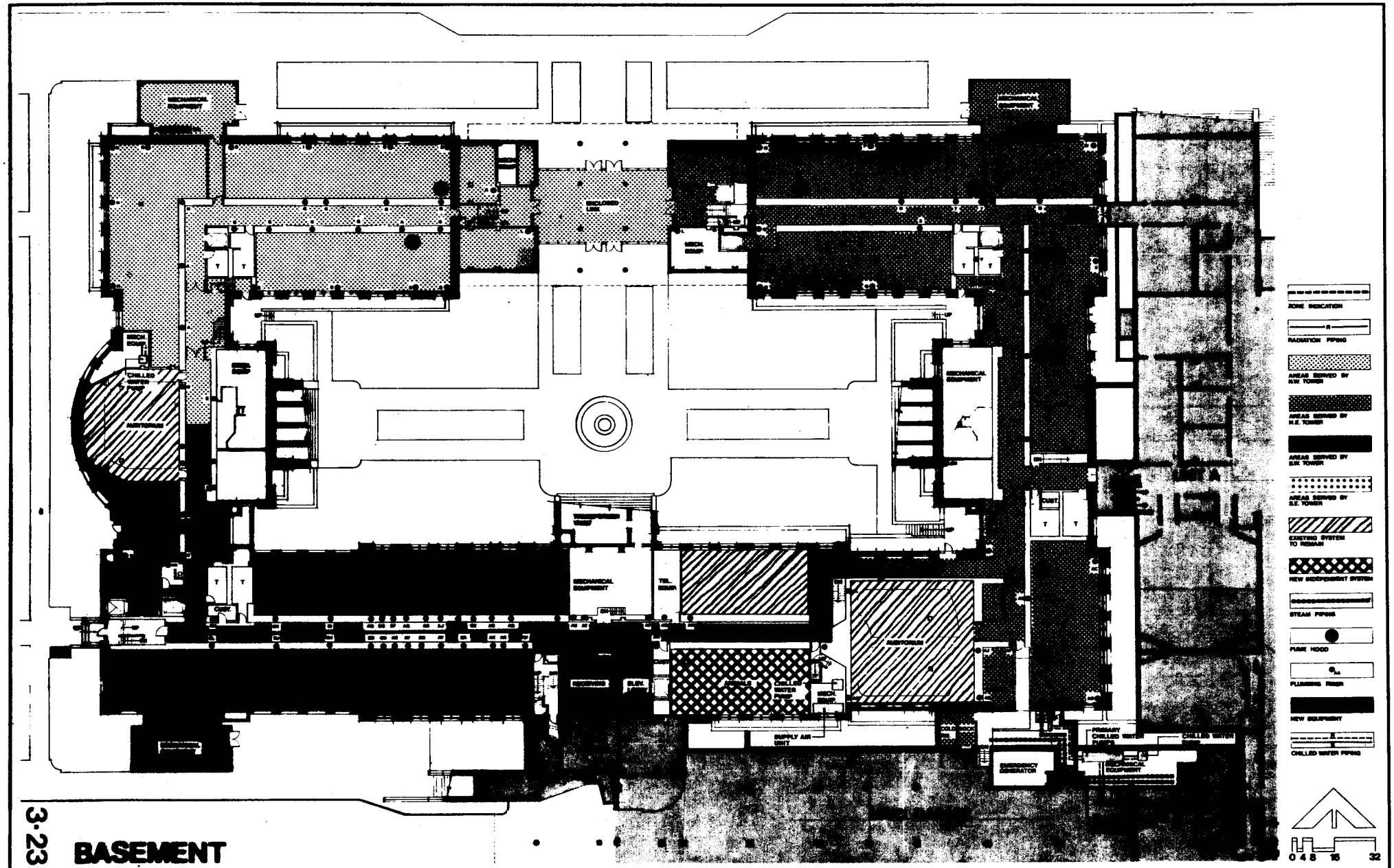
SUB-BASEMENT

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - MECHANICAL



3.23

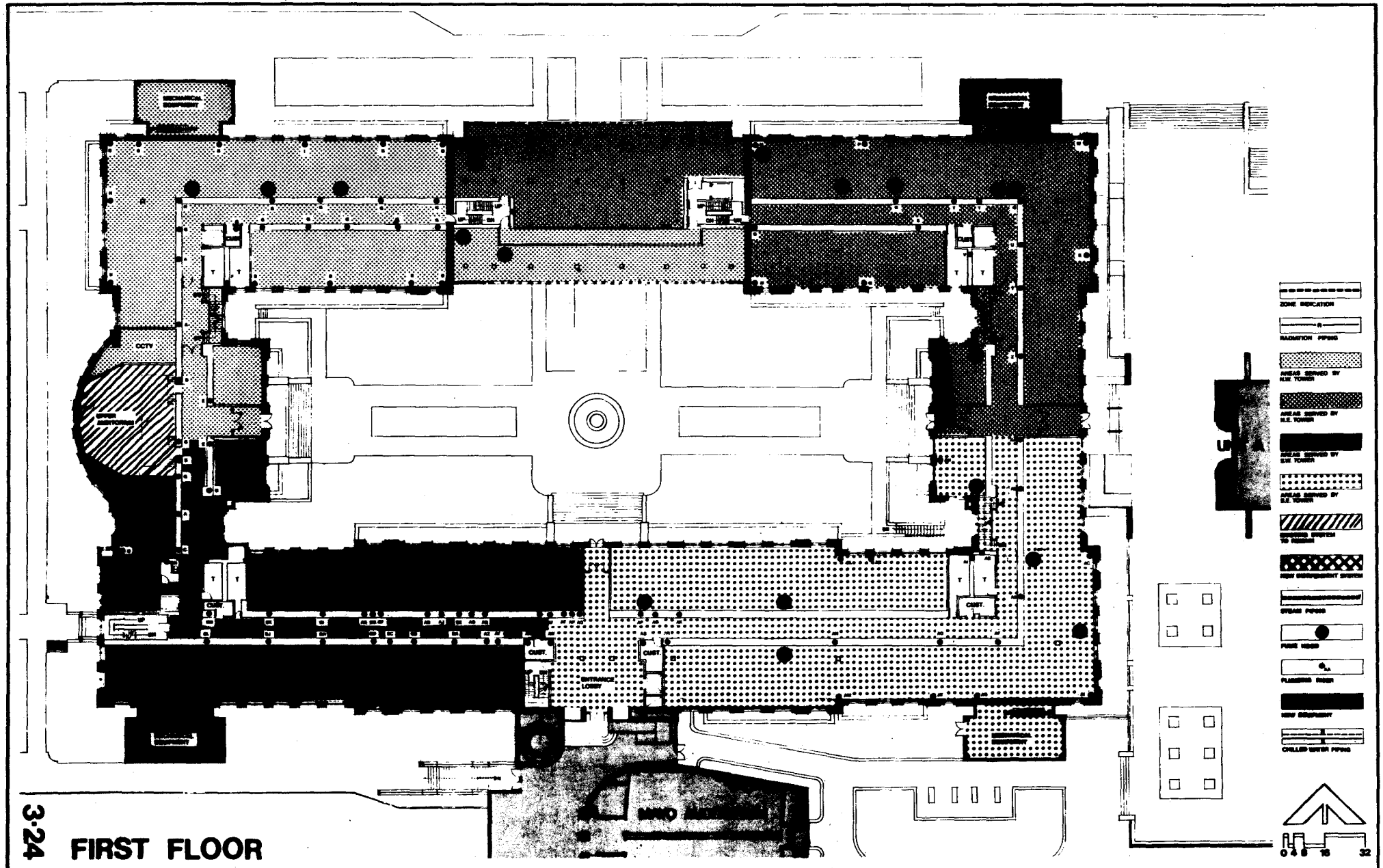
BASEMENT

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - MECHANICAL



3.24

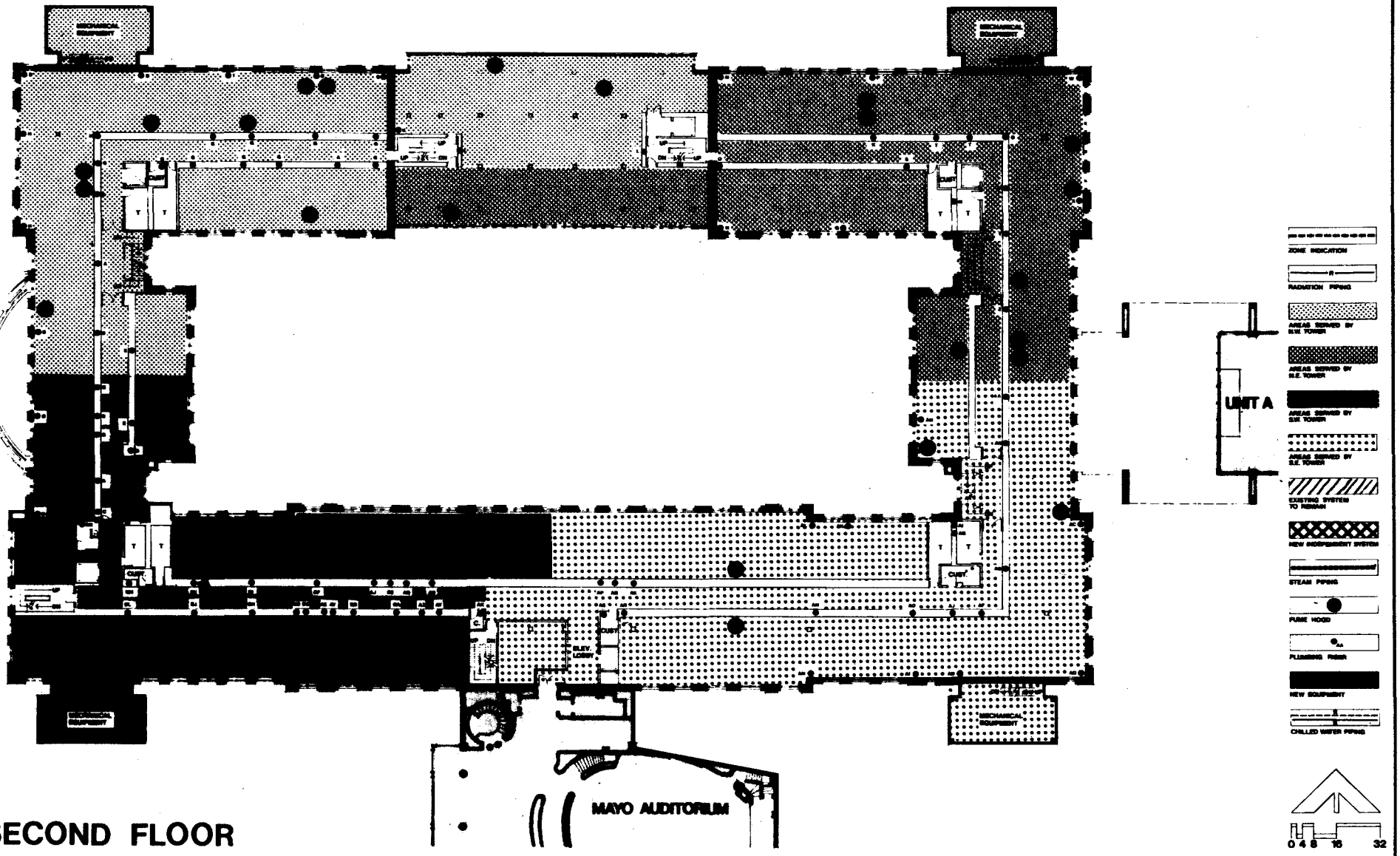
FIRST FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - MECHANICAL



3.25 SECOND FLOOR

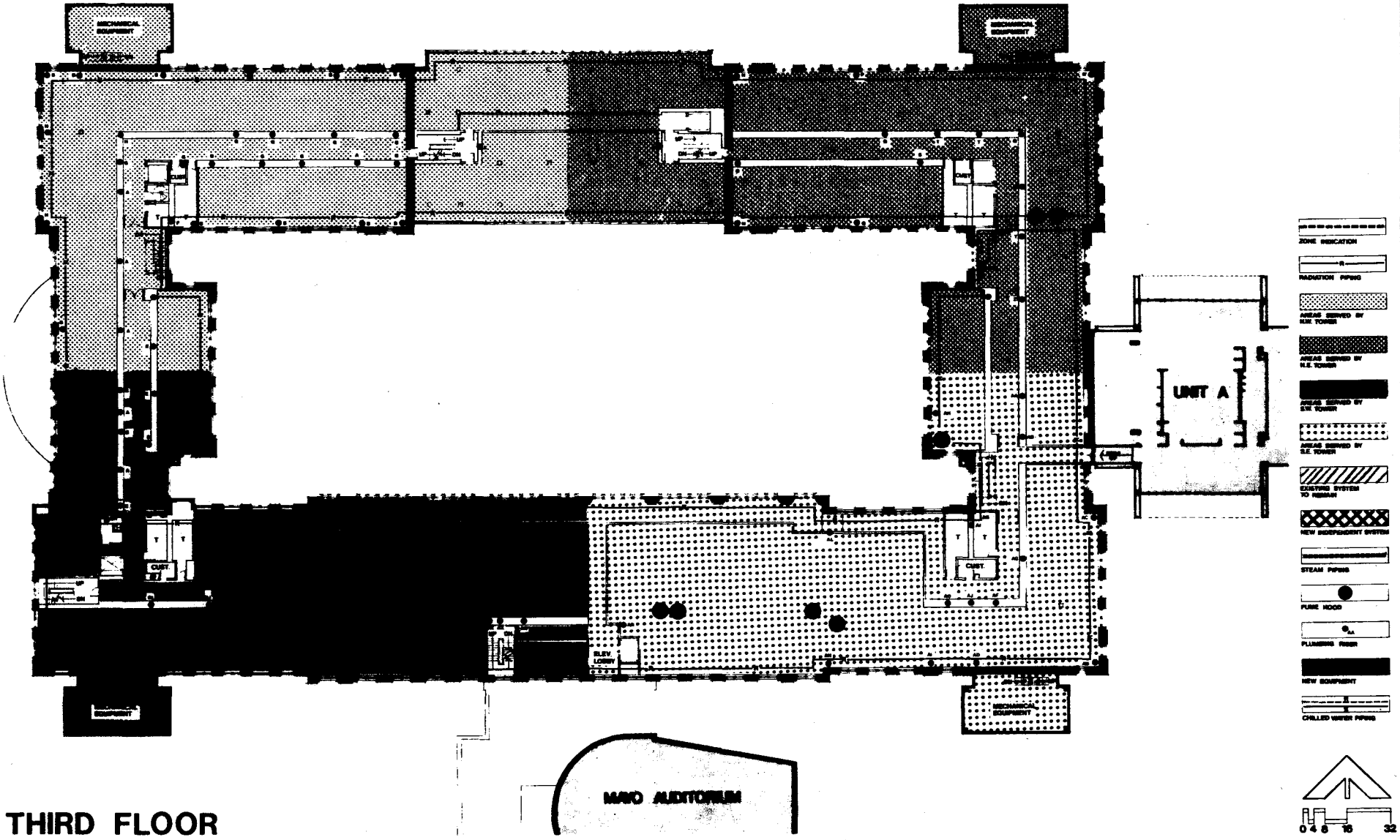
UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.
THE CERNY ASSOCIATES, INC. MINNEAPOLIS MINNESOTA
HAMMEL, GREEN & ABRAHAMSON, INC ST. PAUL MINNESOTA
SETTER, LEACH & LINDSTROM, INC MINNEAPOLIS MINNESOTA

JOMIL
CLINTON H. HEWITT
EUGENE J. JOSA
PAUL J. QUAYE

JACKSON OWRE MILLARD LYON
COMPLEX REMODELING
ASSISTANT VICE PRESIDENT FOR PHYSICAL PLANNING
SPECIAL ASSISTANT
HEALTH SERVICES PLANNING

CONCEPT - MECHANICAL



3.26

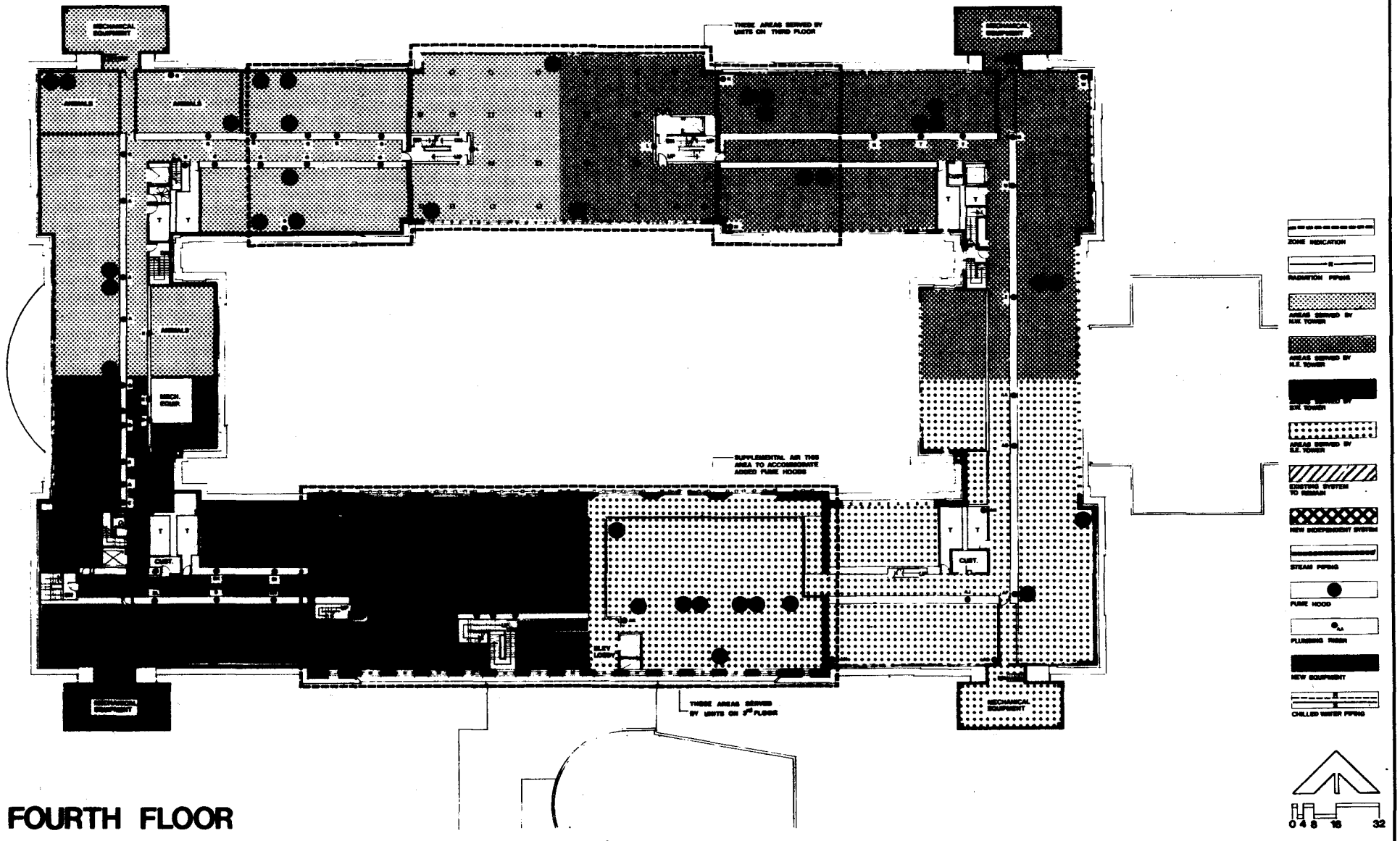
THIRD FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOMI
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - MECHANICAL



3.27

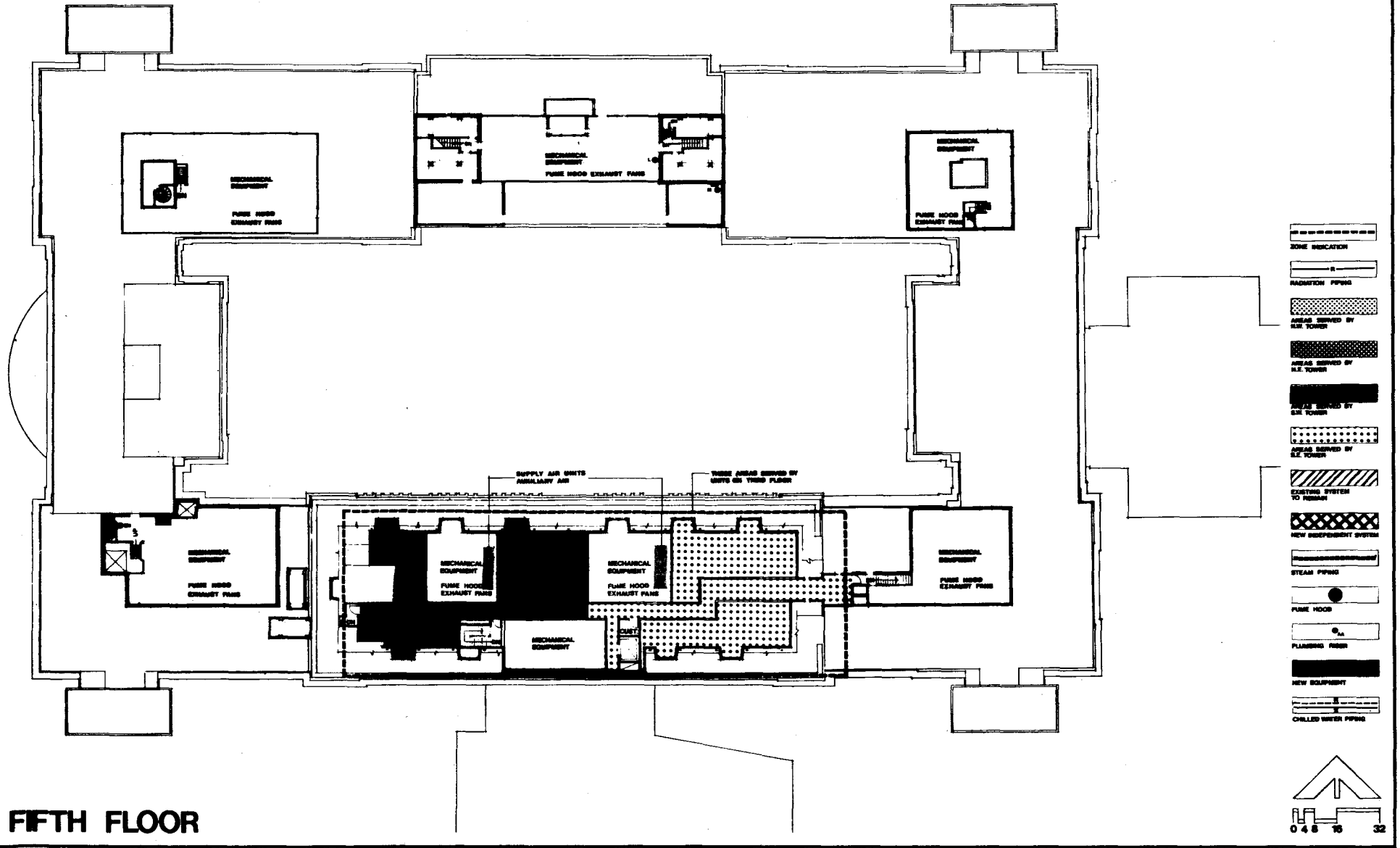
FOURTH FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOML

CONCEPT - MECHANICAL



3.28

FIFTH FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERING, INC.

JOMI

ANDERSON ZWIRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - MECHANICAL

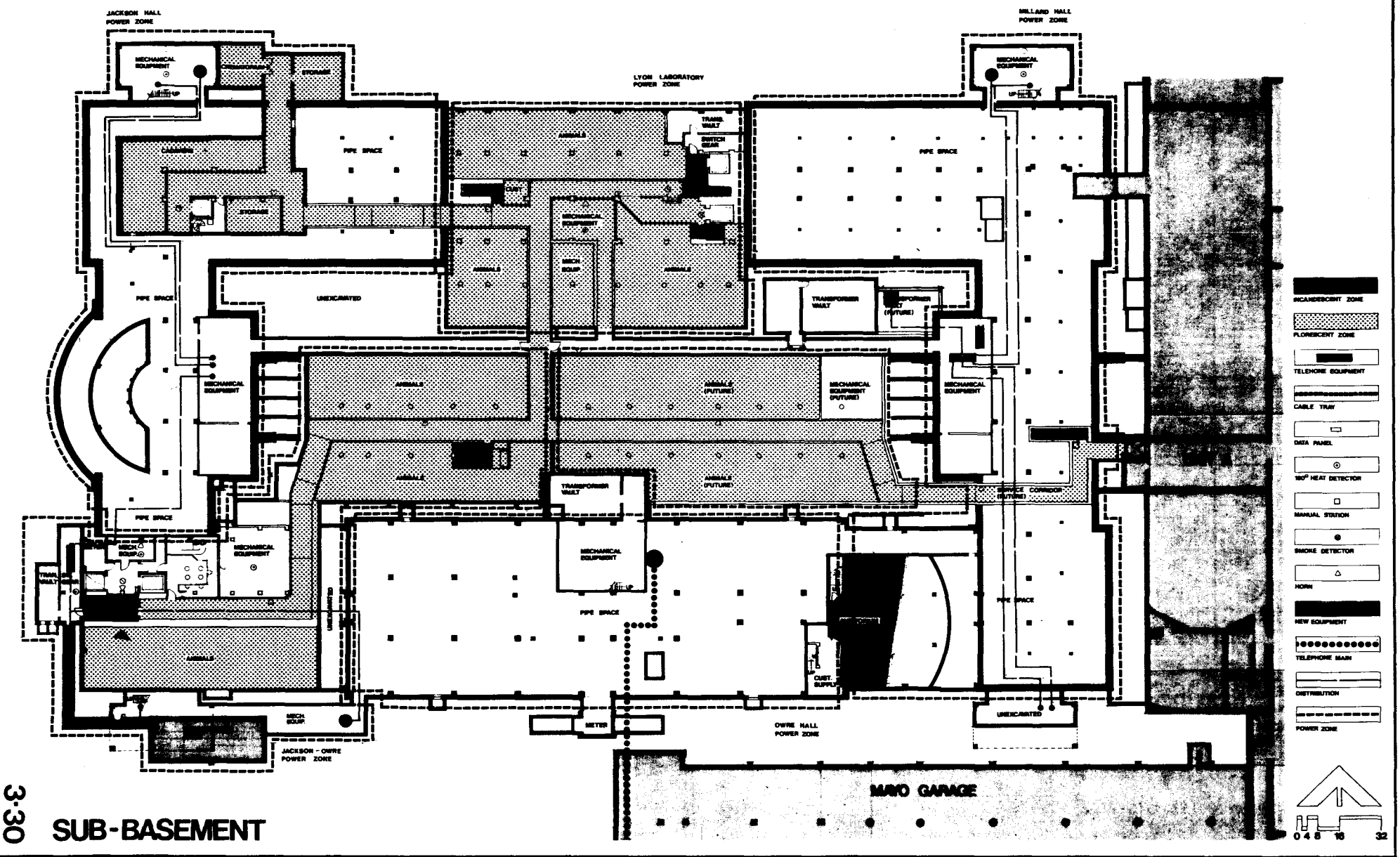
PLUMBING RISERS

Refer to the Concept-Mechanical Drawings for the locations of the Riser Symbols. This chart indicates the services available in each existing plumbing riser. These services are available to fixtures and equipment in the area of each riser.

Additional existing risers require relocation. New risers may also be required to augment the existing ones to satisfy programmatic needs.

RISER SYMBOL	WASTE	VENT	ACID WASTE	ACID VENT	COLD WATER	HOT WATER	CIRC. HOT WATER	DEIONIZED WATER	GAS	COMPRESSED AIR
A			●	●	●	●		●	●	●
B	●	●			●	●		●	●	●
C			●	●	●	●				
D	●	●			●	●				
E	●				●	●				
F	●	●			●	●				
G			●	●	●	●		●	●	●
H	●	●			●	●		●	●	●
I	●	●			●	●		●	●	●
J			●	●	●	●		●	●	●
K	●	●			●	●	●			
L			●	●	●	●	●		●	●
M	●	●			●	●	●			
N	●				●				●	
O	●				●	●	●			
P	●				●				●	
Q	●				●	●	●		●	
R	●				●	●	●		●	●
S	●		●	●	●	●	●			
T	●		●		●	●	●		●	
U	●		●	●	●	●				
V	●				●	●	●		●	
W	●				●	●	●		●	●
X	●				●	●	●		●	●
Y	●				●	●				
Z	●				●	●	●		●	●
AA	●				●	●	●		●	●
AB	●		●		●	●	●		●	
AC	●				●	●	●		●	
AD			●		●				●	
AE	●				●	●	●			
AF	●				●	●	●			
AG	●		●		●	●	●		●	

RISER SYMBOL	WASTE	VENT	ACID WASTE	ACID VENT	COLD WATER	HOT WATER	CIRC. HOT WATER	DISTILLED WATER	GAS	COMPRESSED AIR
AH	●		●		●	●	●		●	
AI	●				●	●	●		●	●
AJ	●		●		●	●	●			
AK	●				●	●	●			
AL	●				●	●	●		●	●
AM	●	●			●	●	●		●	●
AN	●				●	●	●		●	●
AO	●				●				●	●
AP	●	●	●		●	●	●		●	●
AQ	●	●			●	●	●			
AR	●				●	●	●		●	●
AS	●				●				●	●
AT			●	●	●	●	●			
AU	●	●			●				●	●
AV	●				●	●	●		●	●
AW	●				●				●	●
AX	●				●	●	●			
AY	●				●				●	●
AZ	●				●	●	●		●	●
BA	●		●		●	●	●			
BB	●				●	●	●		●	●
BC	●		●		●	●	●			
BD	●								●	●
BE	●				●					
BF	●				●					
BG	●				●				●	●
BH			●	●	●	●	●		●	●
BI			●	●	●	●	●		●	●
BJ			●	●	●	●	●		●	●
BK			●	●	●	●	●		●	●
BL			●	●	●	●	●		●	●
BM	●	●			●	●	●			
BN	●	●			●	●	●		●	●



3-30

SUB-BASEMENT

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

THE CERNY ASSOCIATES, INC. MINNEAPOLIS MINNESOTA
HASKELL, GREEN & ABRAHAMSON, INC ST. PAUL, MINNESOTA
BETTER, LEACH & LINDSTROM, INC MINNEAPOLIS MINNESOTA

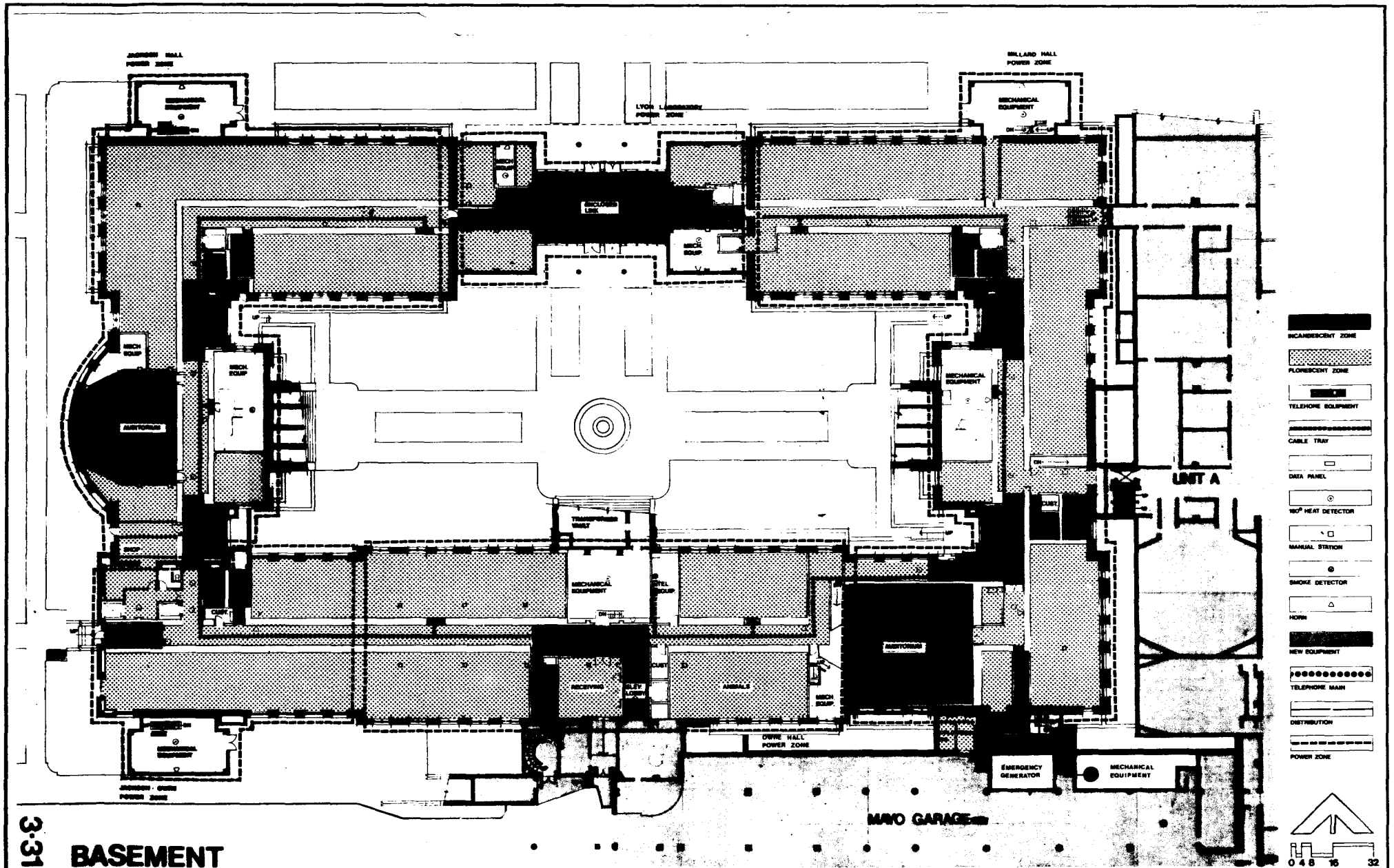
JOML

JACKSON OWRE MILLARD LYON COMPLEX REMODELING

CLAYTON R. HEWITT
EUGENE A. SIMON
PAUL J. SIMON

ASSISTANT VICE PRESIDENT FOR PHYSICAL PLANNING
ARCHITECTURAL ASSISTANT
HEALTH SCIENCES PLANNING

CONCEPT - ELECTRICAL



3.31 **BASEMENT**

UNIVERSITY OF MINNESOTA HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. & THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

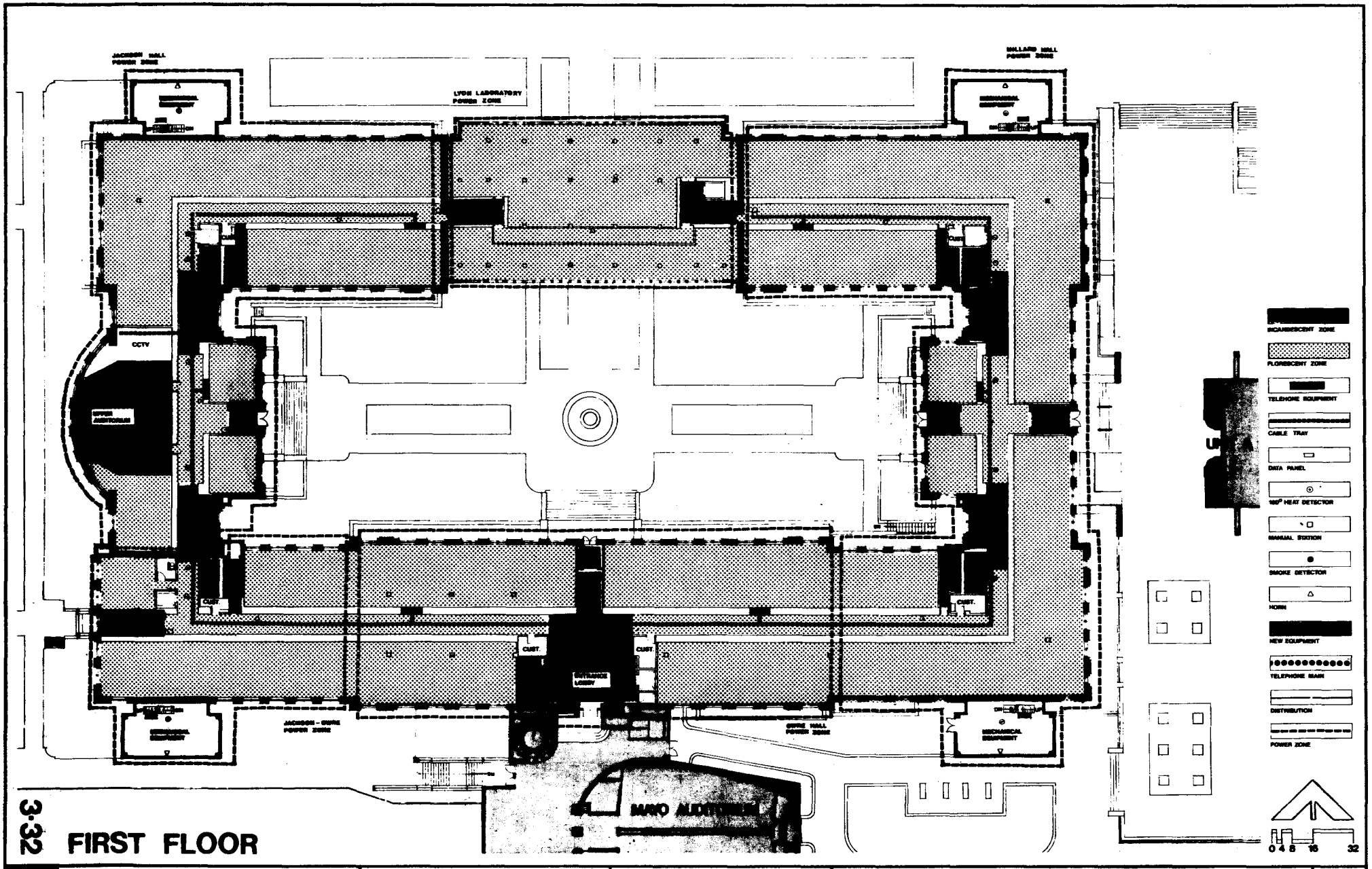
THE CERNY ASSOCIATES, INC. MINNEAPOLIS MINNESOTA
HARWELL HAMEN & HAMMOND INC ST PAUL MINNESOTA
BETTER LEACH & LINDSTROM INC MINNEAPOLIS MINNESOTA

JOML

JACKSON OWRE MILLARD LYON COMPLEX REMODELING

CLINTON V. HEWITT, ASSISTANT VICE PRESIDENT FOR PHYSICAL PLANNING
EUGENE J. KOHN, SPECIAL ASSISTANT
PAUL J. QUAM, HEALTH SCIENCES PLANNER

CONCEPT - ELECTRICAL



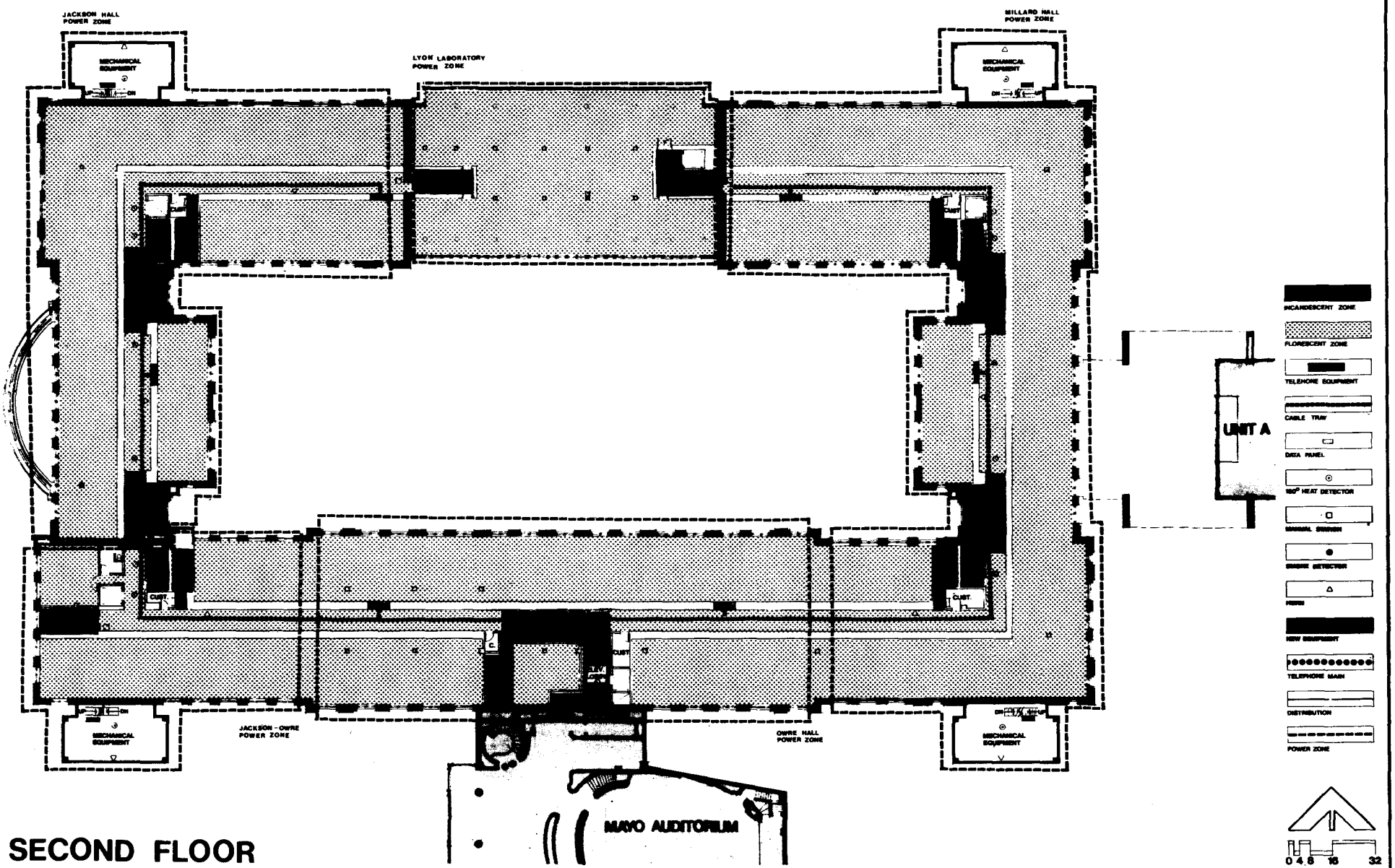
3.32 **FIRST FLOOR**

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOML
JACKSON OWRE MILLARD LYON COMPLEX REMODELING

CONCEPT - ELECTRICAL



3.33

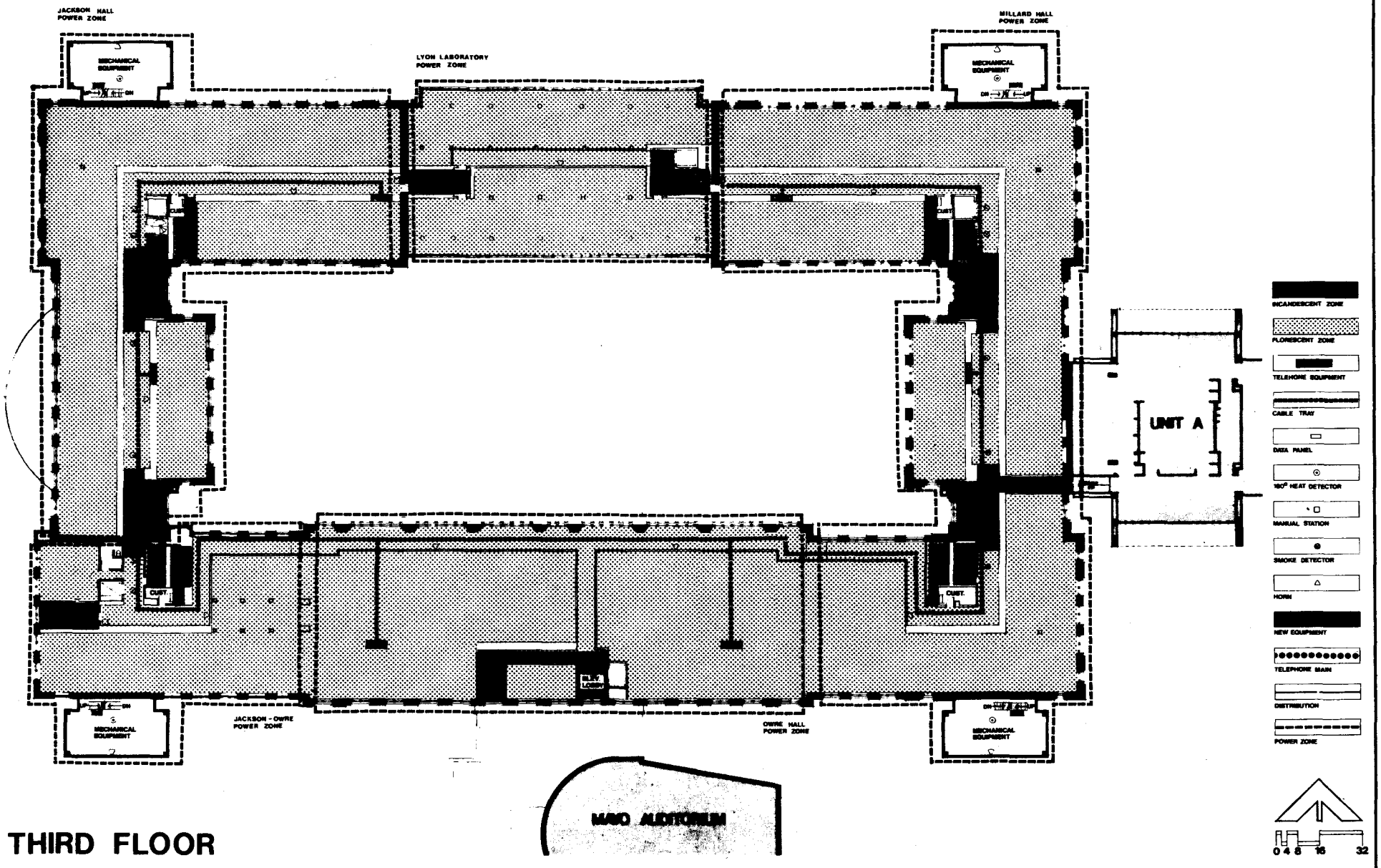
SECOND FLOOR

UNIVERSITY OF MINNESOTA HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.
MINNEAPOLIS, MINNESOTA

JOML
JACKSON OWRE MILLARD LYON COMPLEX REMODELING

CONCEPT - ELECTRICAL



3·34

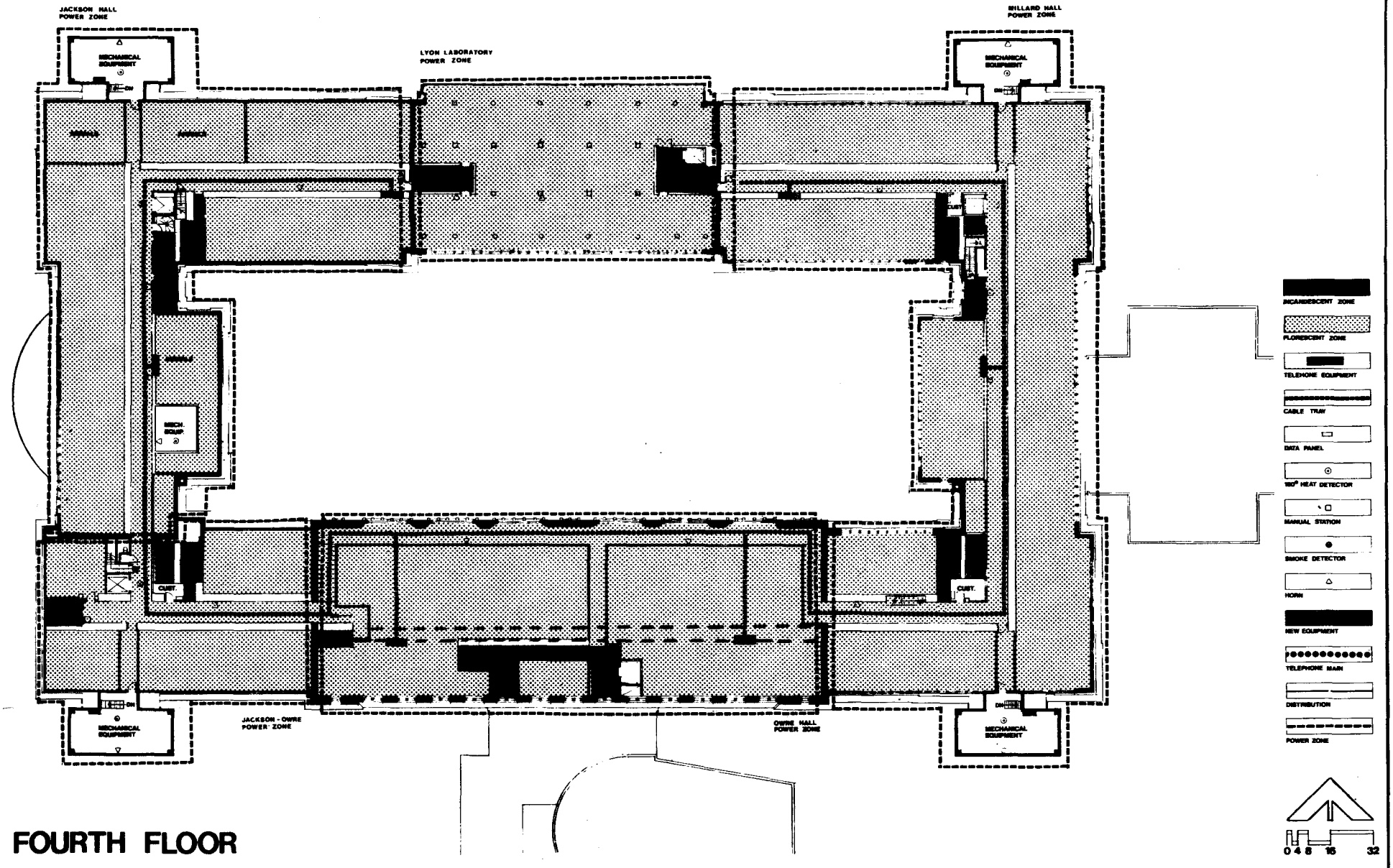
THIRD FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.
THE CERNY ASSOCIATES, INC. MINNEAPOLIS MINNESOTA
HASSEL GREEN & ABRAMSON, INC. ST. PAUL, MINNESOTA
BETTER, LEACH & LINDSTROM, INC. MINNEAPOLIS, MINNESOTA

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CONCEPT - ELECTRICAL



3.35

FOURTH FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
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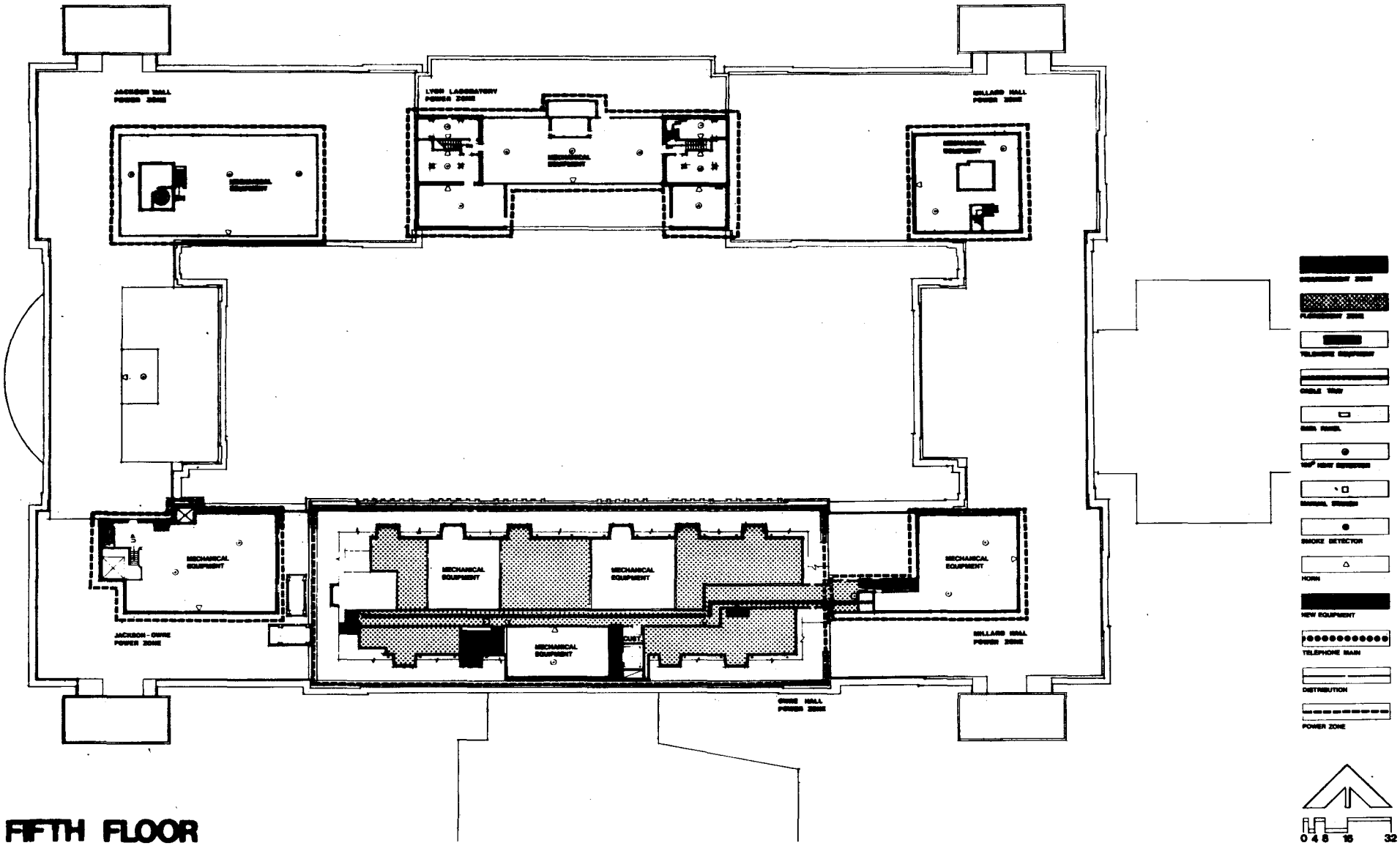
JOMEL
CLAYTON A. HEWITT
EUGENE A. JOMEL
PAUL A. SHAPIRO

JACKSON OWRE MILLARD LYON
COMPLEX REMODELING
ASSISTANT VICE PRESIDENT FOR PHYSICAL PLANNING
SPECIAL ASSISTANT
HEALTH SCIENCES PLANNING

CONCEPT - ELECTRICAL



3.36

FIFTH FLOOR

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JACKSON OWRE MILLARD MCH COMPLEX REMODELING

CONCEPT - ELECTRICAL

CODE CORRECTIONS

The following "INDEX OF COMMON CODE CORRECTIONS" outlines the changes required to correct the problems previously described in Part I of this Report.

A more complete analysis of the Code Corrections appears in Part 6 - Appendices.

Actual implementation of Code Corrections will be on a project by project basis as determined by the Building Official.

INDEX OF COMMON CODE CORRECTIONS

Numbers in the left hand margin are used to key the locations of the Code Corrections on the floor plans entitled CORRECTIONS which follow later in this section. The numbering system directly relates to the system employed in Part I of this Report.

Numbers at the beginning of paragraphs refer to the Project Code Investigation forms found in Appendix A.

SUB-BASEMENT

7. CONSTRUCTION

7.1 FIRE-RATINGS

(2) Apply additional fireproofing to stair, elevator, or mechanical shaft walls to bring shaft up to two hour fire-rated construction.

(6) Apply additional fireproofing to unplastered 4" clay tile corridor walls to bring walls in compliance with one hour fire-rated construction.

(6) Provide "C" labeled doors on either side of mechanical tunnel.

10. EXIT REQUIREMENTS

10.5 DEAD END CORRIDOR LIMIT

(14) Remove existing animal holding room S87 and extend corridor from Jackson-Owre to Lyon Laboratory to provide a continuous exiting system.

(14) Remodel Lyon Laboratory to delete "dead-end" corridors.

11. VERTICAL EXITWAYS

11.6 ENCROACHMENTS

(19) Close door openings between Stair "C" and adjacent rooms.

12. DOORS

2.2 AND 3. B AND C LABELED DOORS

(22) Remove louvered corridor doors and replace with 20 minute solid core wood doors.

BASEMENT

7. CONSTRUCTION

7.1 FIRE RATINGS

(2) Apply additional fireproofing to stair, elevator or mechanical shafts to conform to the required two hour fire-rated construction.

(3) Existing "open stairs" G, H, I, J to remain. Update to Code Compliance as follows:

Apply additional fireproofing to existing walls.

Provide 1-1/2 hour "B" labeled doors across corridor to enclose stair in a two hour fire-rated enclosure.

Provide a conforming exit passage directly to the exterior.

Close door openings between adjacent rooms and stair enclosure. Provide new access to these rooms beyond the stair enclosure.

(3) Remove existing Stair D. Provide new stair in a two hour fire-rated enclosure with a direct exit to the exterior.

(6) At Stair "B", provide a one hour corridor wall separating the adjacent Mechanical Room and Store Room from the building exit.

8. ENVIRONMENTAL CONSIDERATIONS

8.3 SANITATION

(10) Remove existing toilet rooms. Provide new toilet facilities to accommodate handicapped persons.

10. EXIT REQUIREMENTS

10.3 MAXIMUM TRAVEL DISTANCE TO AN EXIT

(12) Remove existing Stair "E" (not required as an exit or communicating stair.

Close opening to corridor with one hour fire-rated construction.

Provide a new two hour fire-rated floor ceiling assembly.

Open space to adjacent labs.

(13) Remove the side exit from the Auditorium in the southeast corner of Millard Hall to provide a continuous exit from the southwest corner.

(17) At entry from Mayo Garage:

Delete existing swing door and provide a new "B" labeled door.

Relocate loading dock.

Provide new ramps to accommodate handicapped persons.

11. VERTICAL EXITWAYS

11.6 ENCROACHMENTS

(19) Relocate door and frame between Stair "C" and adjacent Locker and Receiving Rooms. Close opening with two hour fire-rated construction.

(19) At Stair "B", remove doors and frames opening into exitway from adjacent rooms. Close openings with two hour fire-rated construction. Relocate doors to exterior wall.

12. DOORS

12.4 CORRIDOR REQUIREMENTS

(22) Remove louvered corridor doors, doors with wood frames, and replace with assemblies having a 20 minute fire-rating.

FLOORS ONE THROUGH FOUR

7. CONSTRUCTION

7.1 FIRE RATINGS

(1) Provide fireproofing to interior face of the insulated metal panel wall on the Fourth Floor to conform to the required one hour fire-rated construction.

(2) Apply additional fireproofing to stair, elevator or mechanical shafts to conform to the required two hour fire-rated construction.

(3) Existing "open stairs" G, H, I, J to remain. Update stairs to Code Compliance as follows:

Apply additional fireproofing to existing enclosure walls as required.

Provide 1-1/2 hour "B" labeled doors across corridor to enclose stair in a two hour fire-rated enclosure.

Close door openings between adjacent rooms and stair enclosure. Provide new access to these rooms beyond the stair enclosure.

(3) Remove existing Stair "D". Provide new stair in a two hour fire-rated enclosure.

(4) Fireproof structural steel columns in Room 496 and in the Fourth Floor exterior wall. Fireproofing to conform to three hour fire-rated construction.

(5) Provide fireproofing to the non-rated roof construction of the 1968 Jackson Hall addition to conform to two hour construction.

(6) The 4" clay tile corridor walls in Jackson-Owre and Lyon Laboratory must receive a 5/8" coat of plaster on each face to conform to the required one hour fire-rated construction.

8. ENVIRONMENTAL CONSIDERATIONS

8.3 SANITATION

(10) Remove existing toilet rooms. Provide new toilet facilities to accommodate handicapped persons.

10. EXIT REQUIREMENTS

10.3 MAXIMUM TRAVEL DISTANCE TO EXIT

(12) Remove existing Stairs "E" and "F". (Not required as an exit or communicating stair).

Close opening to corridor with one hour fire-rated construction.

Provide new two hour fire-rated floor-ceiling assembly.

Open space into adjacent labs.

10.5 DEAD END CORRIDOR LIMIT

(14) (6) Provide a one hour fire-rated enclosure through Room 496 to connect Jackson and Lyon Laboratory with a qualifying corridor. This will eliminate an existing "dead-end" corridor.

10.6 MINIMUM CORRIDOR WIDTH (PRIMARY)

(15) Relocate walls in narrow corridor on the Second Floor of Millard Hall. Increase corridor width to 6'-0".

10.9 ROOM EXIT REQUIREMENTS

(16) Provide an additional exit at the large lecture classrooms on the Second and Third Floors.

10.10 HANDICAPPED EXIT REQUIREMENTS

(17) Remove the existing steps of each end of the Fourth Floor corridor of Owre Hall and replace with a ramp to accommodate handicapped persons.

11. VERTICAL EXITWAYS

11.6 ENCROACHMENTS

(19) Remove doors opening into Stairs A, B and C from adjacent rooms and close openings with two hour fire-rated construction. Relocate doors in corridor beyond the stair enclosure.

12. DOORS

12.4 CORRIDOR REQUIREMENTS

(22) Replace non-conforming corridor doors (doors with louvers, oversize sidelights, wood frames, etc.) and replace with door assemblies having a 20 minute fire-rating.

14. ELEVATORS

GENERAL

(23) Refer to "Elevator Code Review" included in Part 6.

FIFTH FLOOR

7. CONSTRUCTION

7.1 FIRE RATINGS

(2) Apply additional fireproofing to the duct or elevator shaft to conform to the required two hour fire-rated construction.

7.2 PARAPETS

(7) Provide a guardrail at the roof edge of the Jackson Hall penthouse roof to protect service personnel working on the air cooled condensing units.

7.4 ATTIC AREA SUBDIVISION

(8) Divide the attic space of Owre into areas not exceeding 3,000 square feet with either 3/8" plywood or 1/2" gypsumboard. Divider to extend from the ceiling to the roof.

10. EXIT REQUIREMENTS

10.3 MAXIMUM TRAVEL DISTANCE TO EXIT

(12) (18) Stairs C and F do not continue to the exterior in a fire-rated enclosure. Their width is less than the 44" minimum. We recommend extending new Stair "D" to this floor to relieve the load on these existing stairs and to locate an exit within 150 feet of every point on the floor.

The anticipated occupancy load does not appear to present an exiting problem on this floor.

10.10 HANDICAPPED EXIT REQUIREMENTS

(17) Remove the single step at the entrance to Stair "C". Add one additional riser to the stair and relocate the stairway door as required to maintain a minimum landing width.

12. DOORS

12.2 AND 3. B AND C LABEL DOORS

(21) Replace existing non-rated door openings at Stairs A and B with assemblies bearing a 1-1/2 hour "B" label.

12.4 CORRIDOR REQUIREMENTS

(21) Replace louvered corridor doors with door assemblies having a 20 minute fire-rating.

14. ELEVATORS

GENERAL

(23) Refer to "Elevator Code Review" included in Part 6.

15. MECHANICAL (HEATING AND VENTILATING)

15.1 ROOM HEATING UNITS

Remove all cast iron radiators and convectors and replace them with finned tube radiation units.

15.2 VENTILATION RATES

Install mechanical ventilation equipment to provide all spaces with ventilation to meet code requirements.

15. MECHANICAL (FIRE CONTROL)

15.3 FIRE DAMPERS

Install fire dampers in all existing ducts penetrating fire-rated walls.

15.4 STANDPIPES

Install additional wet standpipes, fire department standpipes and hose cabinets so that all portions of the building are serviced as required by the Code.

15.5 AUTOMATIC FIRE EXTINGUISHING SYSTEMS

Install automatic fire-extinguishing systems in the Sub-Basement and Basement areas without 20 square feet of opening in each 50 lineal foot of wall.

15. MECHANICAL (ENERGY CONSERVATION)

15.6 BUILDING ENVELOPE

Increase wall and roof insulation and replace windows with new windows or panels to meet the energy conservation requirements of the State Building Code on a total envelope basis.

15.7 VENTILATING SYSTEMS

Revise ventilation systems and controls to comply with the energy conservation requirements of the State Building Code.

16. ELECTRICAL

16.1 FIRE ALARM SYSTEM

Install a complete fire alarm system in the complex.

16.2 HEAT AND SMOKE DETECTION SYSTEMS

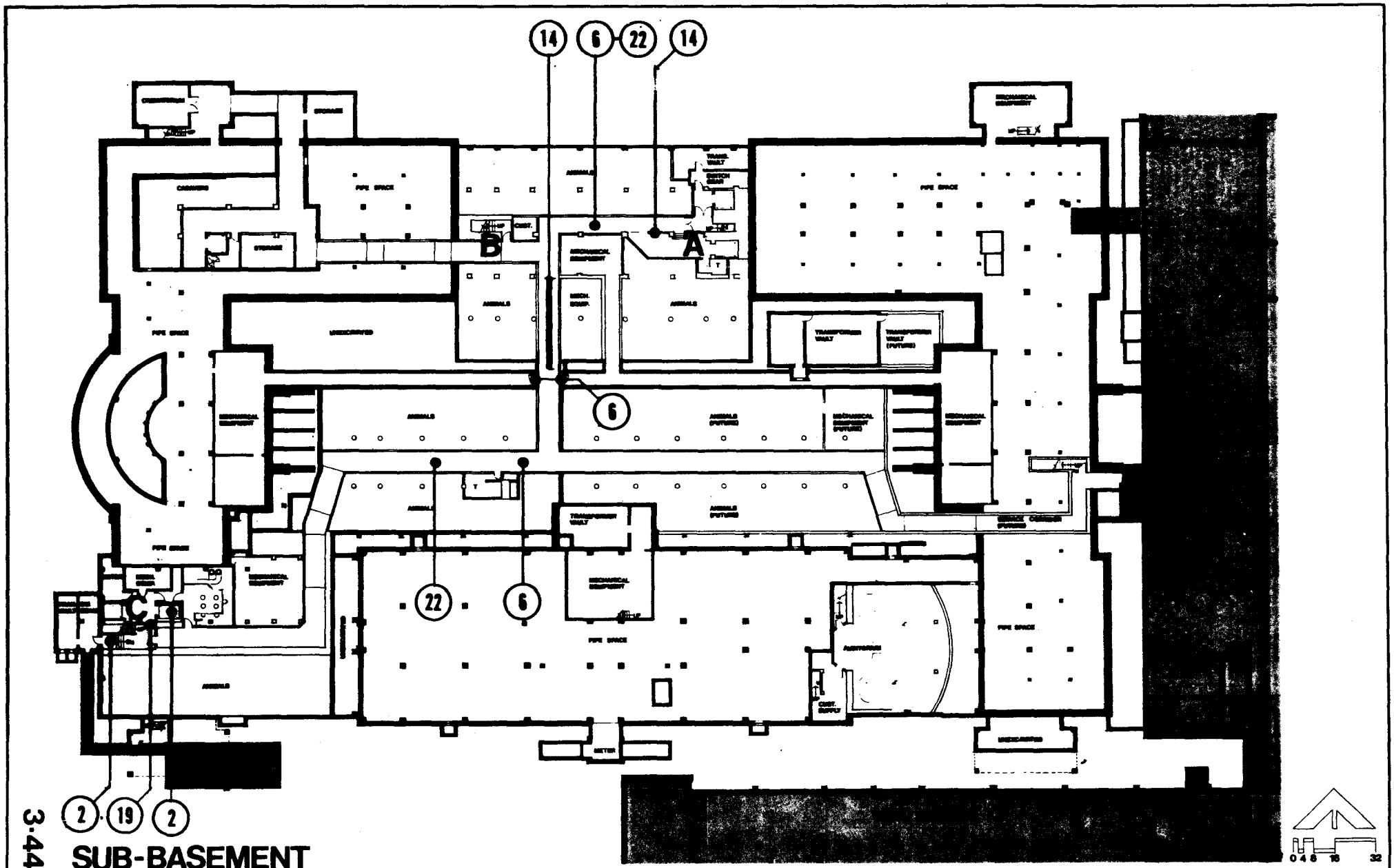
Install in each remaining air handling unit a heat or smoke detector in the supply and return ducts with fan shutdown capabilities.

16.3 EMERGENCY POWER

Install an emergency generator in the complex with automatic transfer to serve all existing emergency panels.

16.4 POWER FACTOR CORRECTION

Provide power factor correction for the existing motors.



3.44 SUB-BASEMENT

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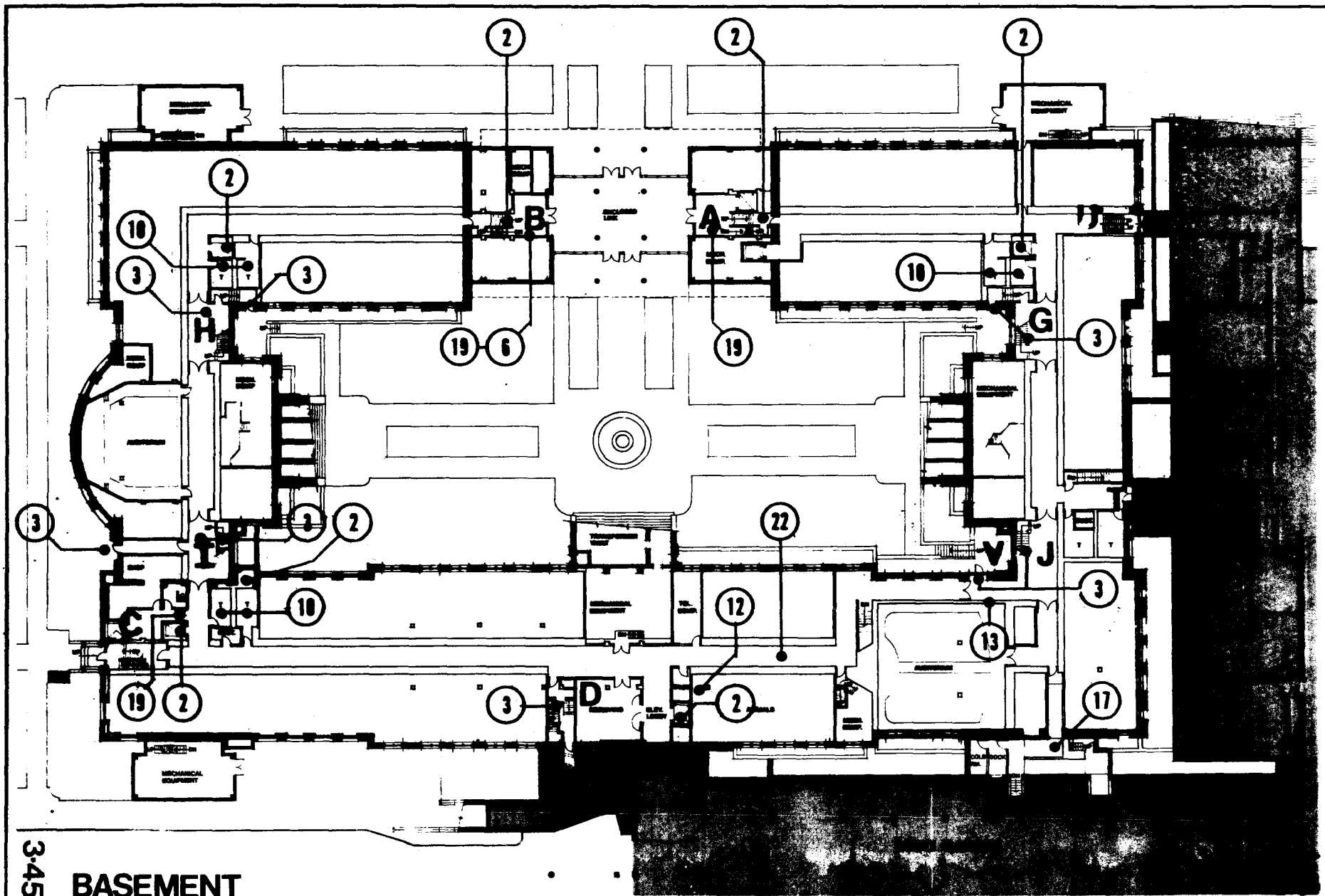
JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

CORRECTIONS



3-45

BASEMENT

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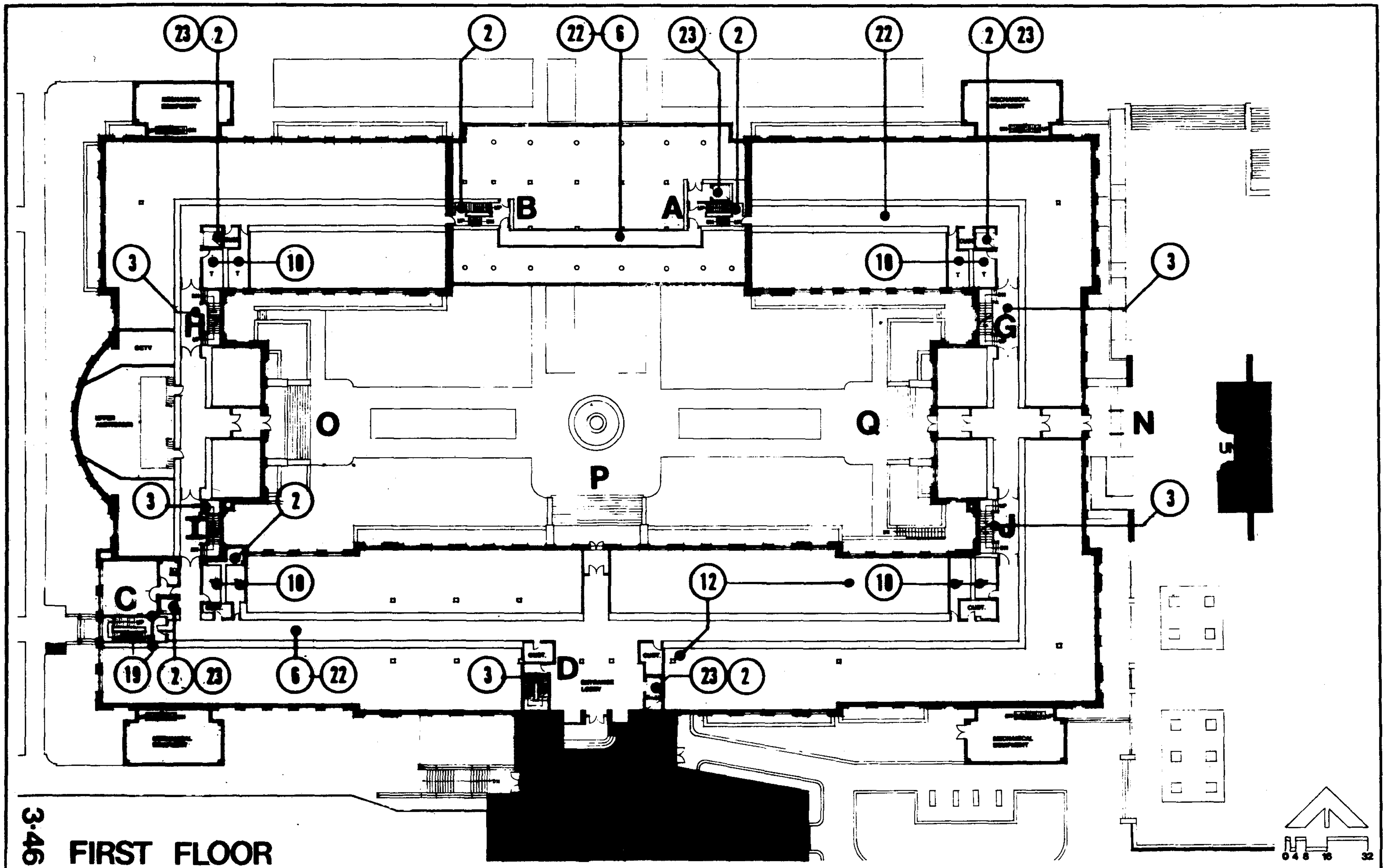
COMPLEX REMODELING

CORRECTIONS



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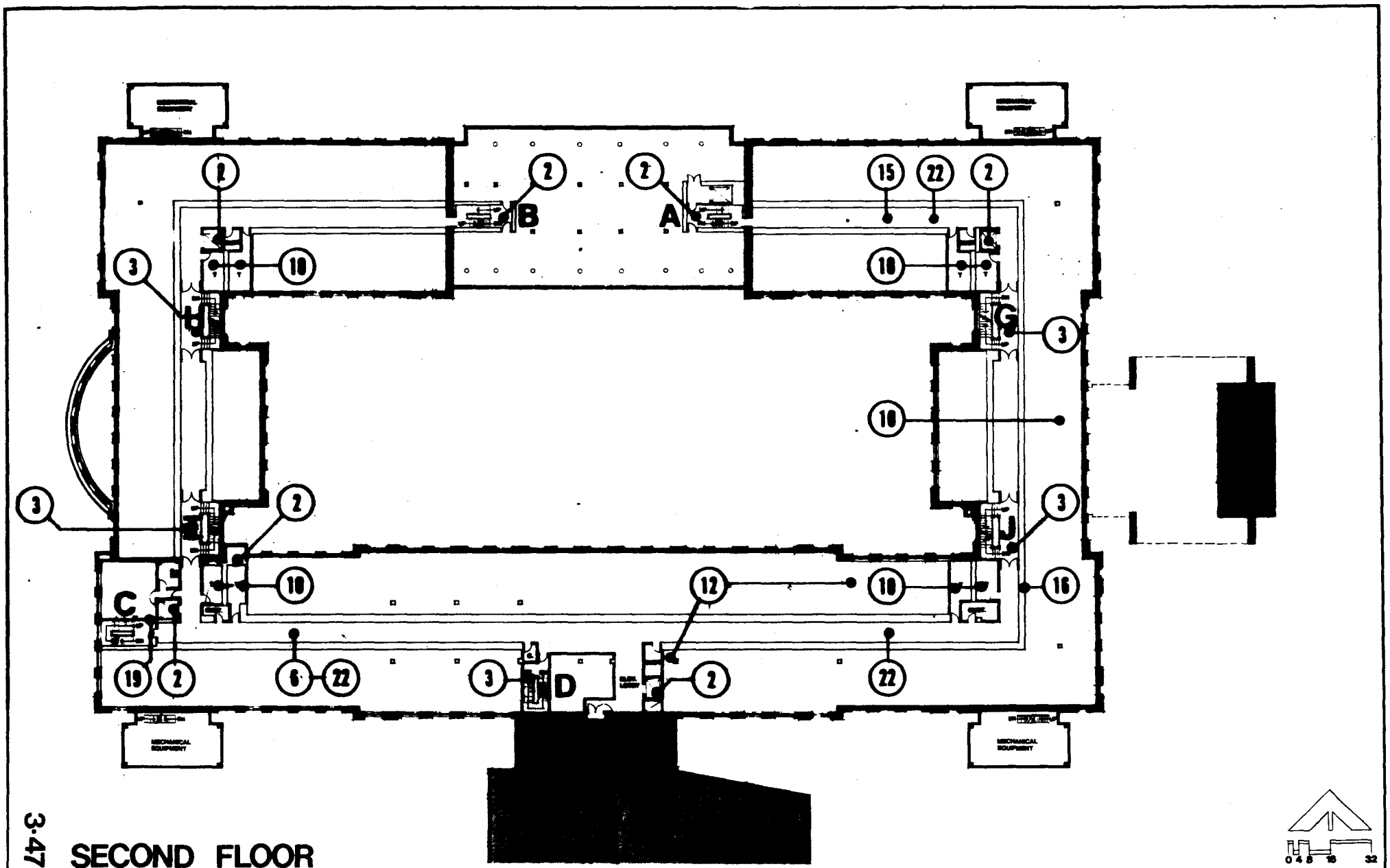
FIRST FLOOR

UNIVERSITY OF MINNESOTA HEALTH SCIENCES EXPANSION MINNEAPOLIS MINNESOTA	THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. & THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC. THE CERNY ASSOCIATES, INC. — MINNEAPOLIS, MINNESOTA HAMMEL, GREEN & ABRAHAMSON, INC — ST. PAUL, MINNESOTA SETTER, LEACH & LINDSTROM, INC — MINNEAPOLIS, MINNESOTA	JOML	JACKSON OWRE MILLARD LYON COMPLEX REMODELING ASSISTANT VICE PRESIDENT FOR PHYSICAL PLANNING SPECIAL ASSISTANT HEALTH SCIENCES PLANNING	**CORRECTIONS**



3.47 SECOND FLOOR

0 4 8 16 32

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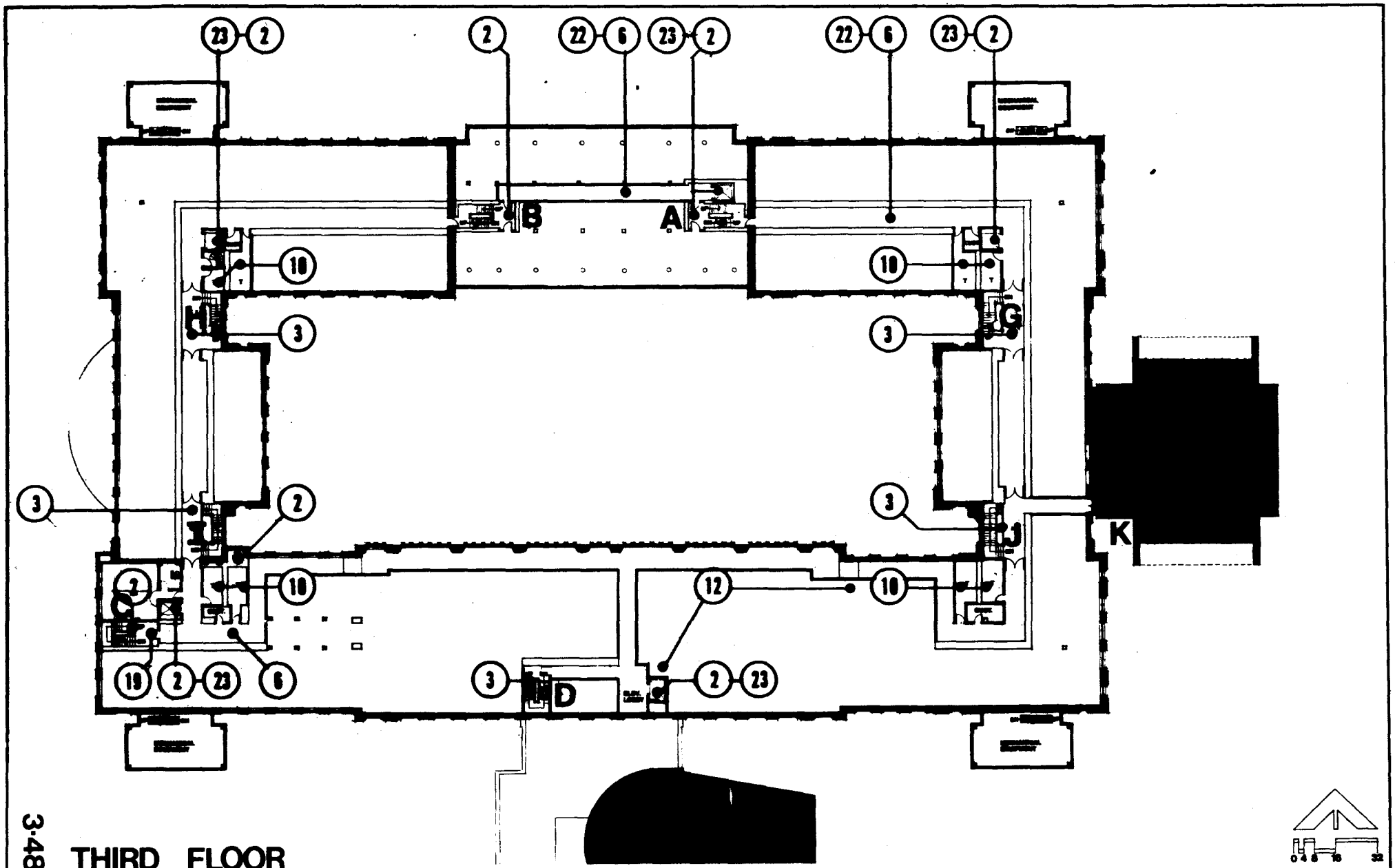
CORRECTIONS



3-48

THIRD FLOOR

0 4 8 16 32

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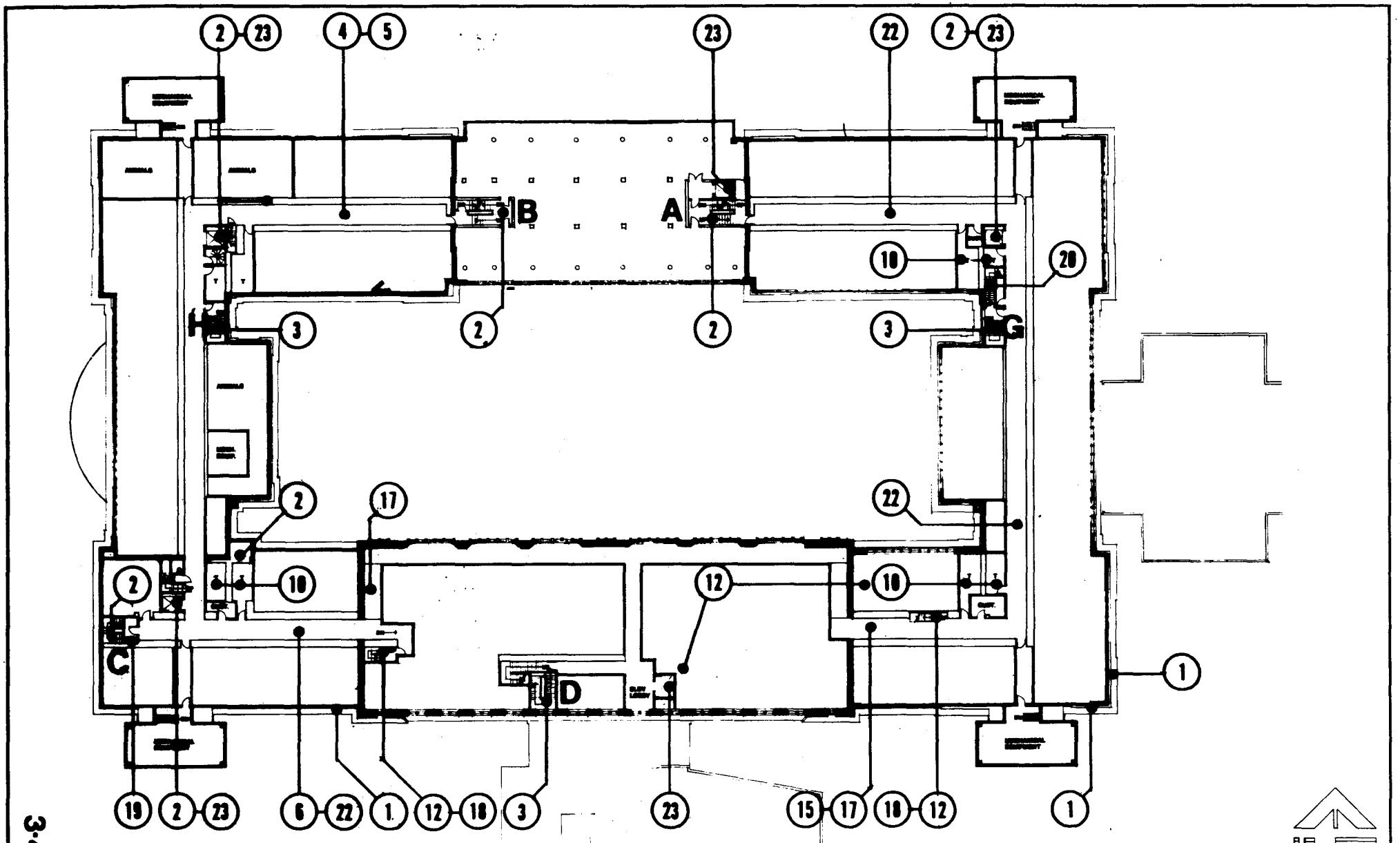

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FOURTH FLOOR

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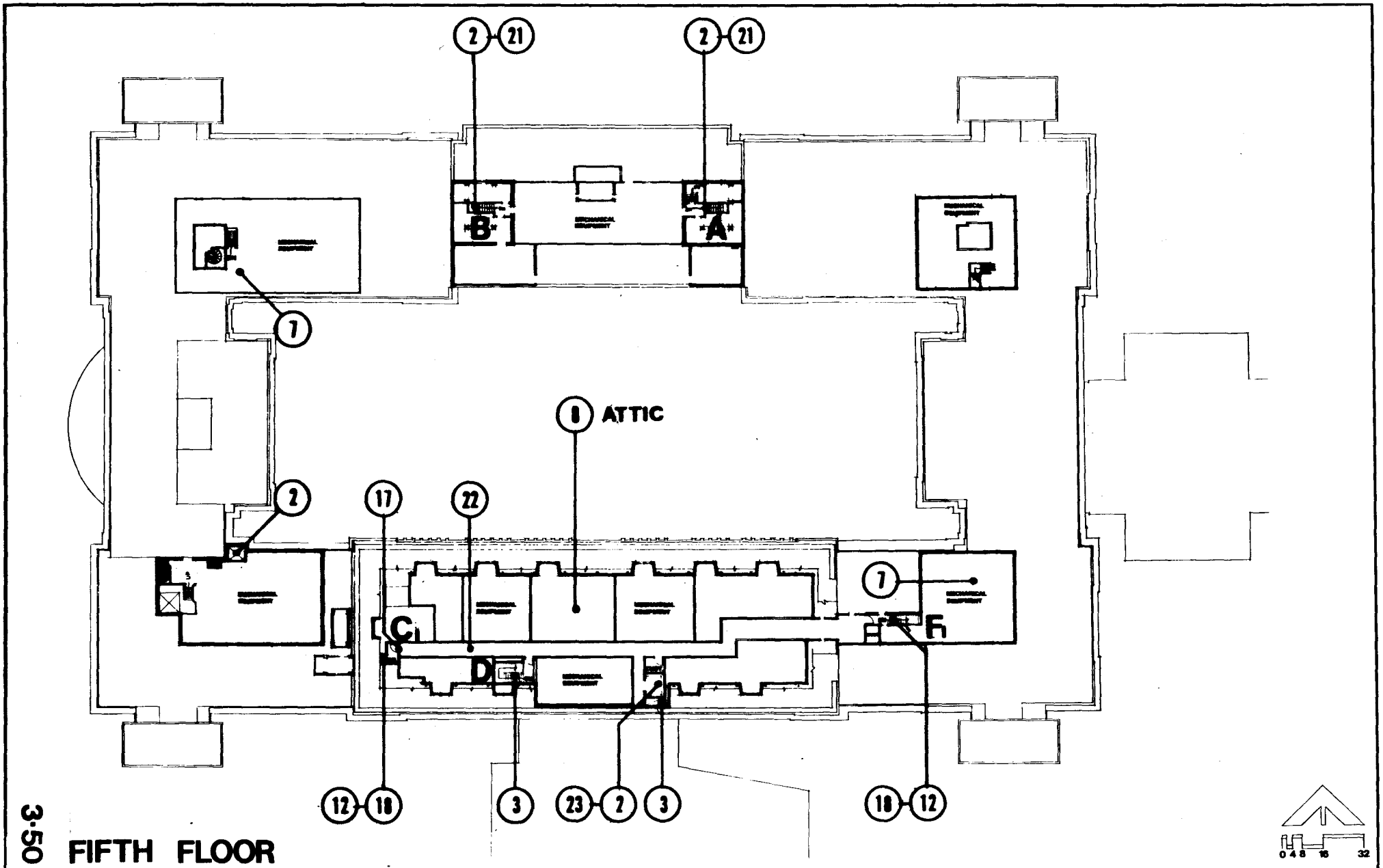
CLINTON H. HEWITT — ASSISTANT VICE PRESIDENT FOR PHYSICAL PLANNING
DWAYNE A. KING — SPECIAL ASSISTANT
PAUL A. SIMPSON — HEALTH SCIENCES PLANNER

CORRECTIONS



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FIFTH FLOOR

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COMPLEX REMODELING

CORRECTIONS

GENERAL DESCRIPTION OF PROJECTS

CONSTRUCTION PROJECTS

Renovation of the JOML complex at this time is composed of a major area of work related to a Federal grant along with several minor remodeling projects. Funding available for various minor remodelings are in different stages of acquisition and will require future scheduling of construction. The following is a brief synopsis of these construction projects.

FUNDED PROJECTS. Three projects have funds already available and project impact and scheduling has been incorporated into the planning document.

75 GRANT CONSTRUCTION. Designated as the major unit of work, the remodeling consists of renovating 81,000 square feet of assignable space, much of this vacated Dental School space. In addition, other non-assignable space associated with the 81,000 square feet will be reconditioned. Occupying various buildings and floors of the complex, the space will be converted or reconditioned into laboratories, support spaces, offices and conference areas. The following Part 5 of this Report will further define the scope of this work.

SURGICAL PATHOLOGY RENOVATION PROJECT. Located on the First Floor of Jackson Hall and is comprised of constructing a new faculty office and three new laboratories with its needed air conditioning. This project should be completed by November 1976 to allow for vacation of their present space when the 75 GRANT CONSTRUCTION work begins.

MORTUARY SCIENCE RENOVATION PROJECT. Located in the Basement of Jackson Owre Hall and is comprised of constructing a new faculty office and three new demonstration rooms. The project is to be completed by October 1976 as student classes have already been scheduled.

NON-FUNDED PROJECTS. Various projects, although not funded or approved at this time, have been informally considered in preparing the planning document.

ANIMAL ROOMS RENOVATION PROJECT. Consists of generally upgrading existing space in Sub-Basement of Lyon Laboratory and providing adequate mechanical ventilation of these animal quarters to comply with new Federal guidelines.

MEDICAL SCHOOL ADMINISTRATION AIR CONDITIONING PROJECT. These recently partially remodeled spaces on First Floor of Owre and the Jackson-Owre Addition consist of offices and conference areas which require central air conditioning to complete their remodeling.

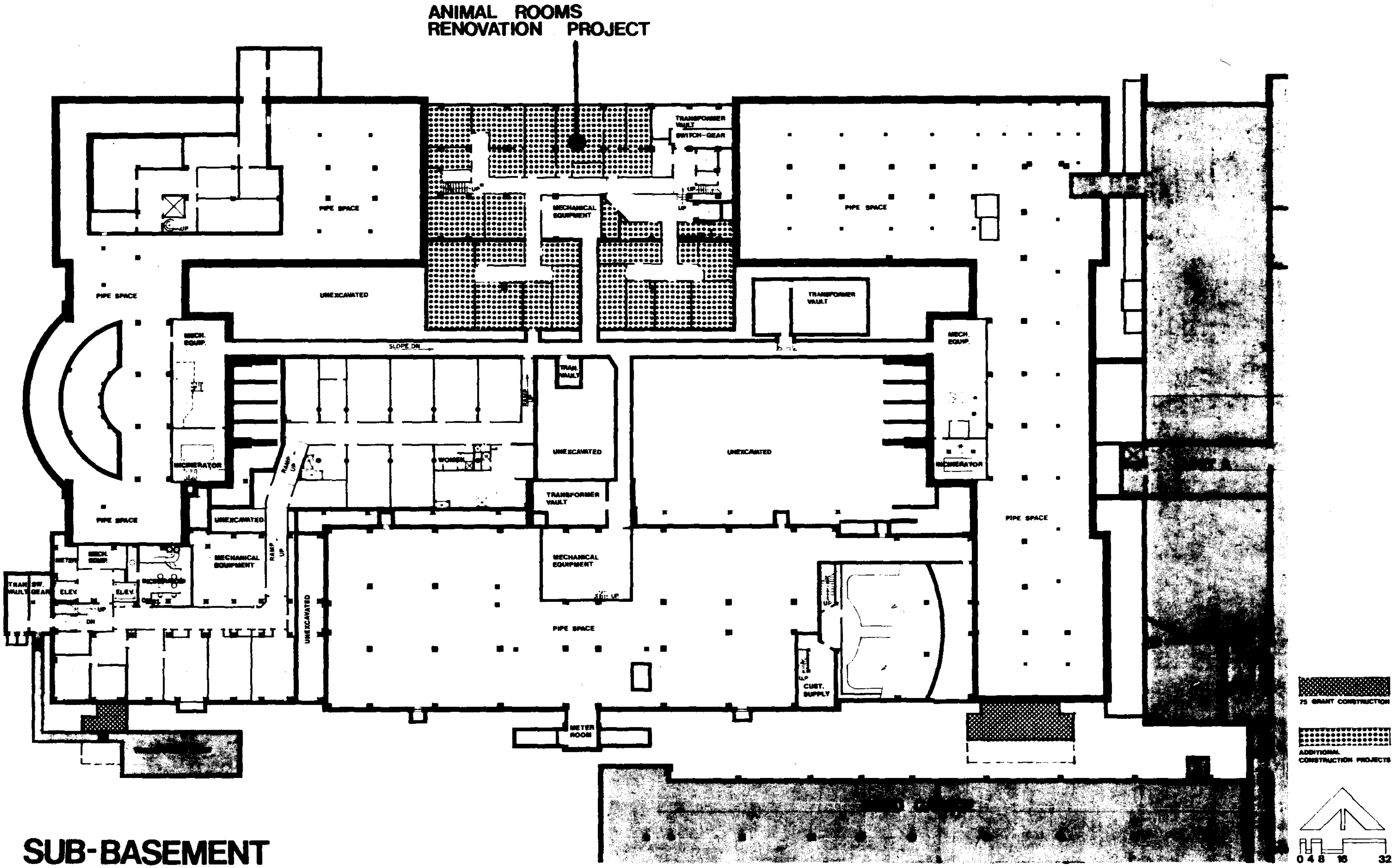
LANDSCAPE COURTYARD RENOVATION PROJECT. Provides a more usable landscaped courtyard space and identifiable entrance to the JOML complex by landscaping the exterior courtyard and adjacent spaces.

BIOCHEMISTRY DEPARTMENT RENOVATION PROJECT. Located on Second Floor of Millard Hall the project is an extension of work planned under the 75 GRANT CONSTRUCTION project. Purpose is to complete the new Modular Laboratories concept for the Biochemistry Department by providing additional two laboratories, and other shared facilities.

PATHOLOGY DEPARTMENT AIR CONDITIONING PROJECT. Consists of providing air conditioning to laboratories and offices on the Fourth Floor of Jackson and Jackson-Owre Halls which area is outside of the present remodeling scope.

ENERGY CONSERVATION PROJECT. Consists of upgrading the building with respect to the new energy code by replacing window units to reduce air infiltration and heat loss, adding insulation to the exterior wall, and other conservative items. An energy report is incorporated into Appendix C.

ADDITIONAL PROJECTS. The previous identifiable projects are not the only projects needed to recondition the entire facility. As additional work comes to light it will be incorporated as new work in accordance with University directives.



4-3

SUB-BASEMENT

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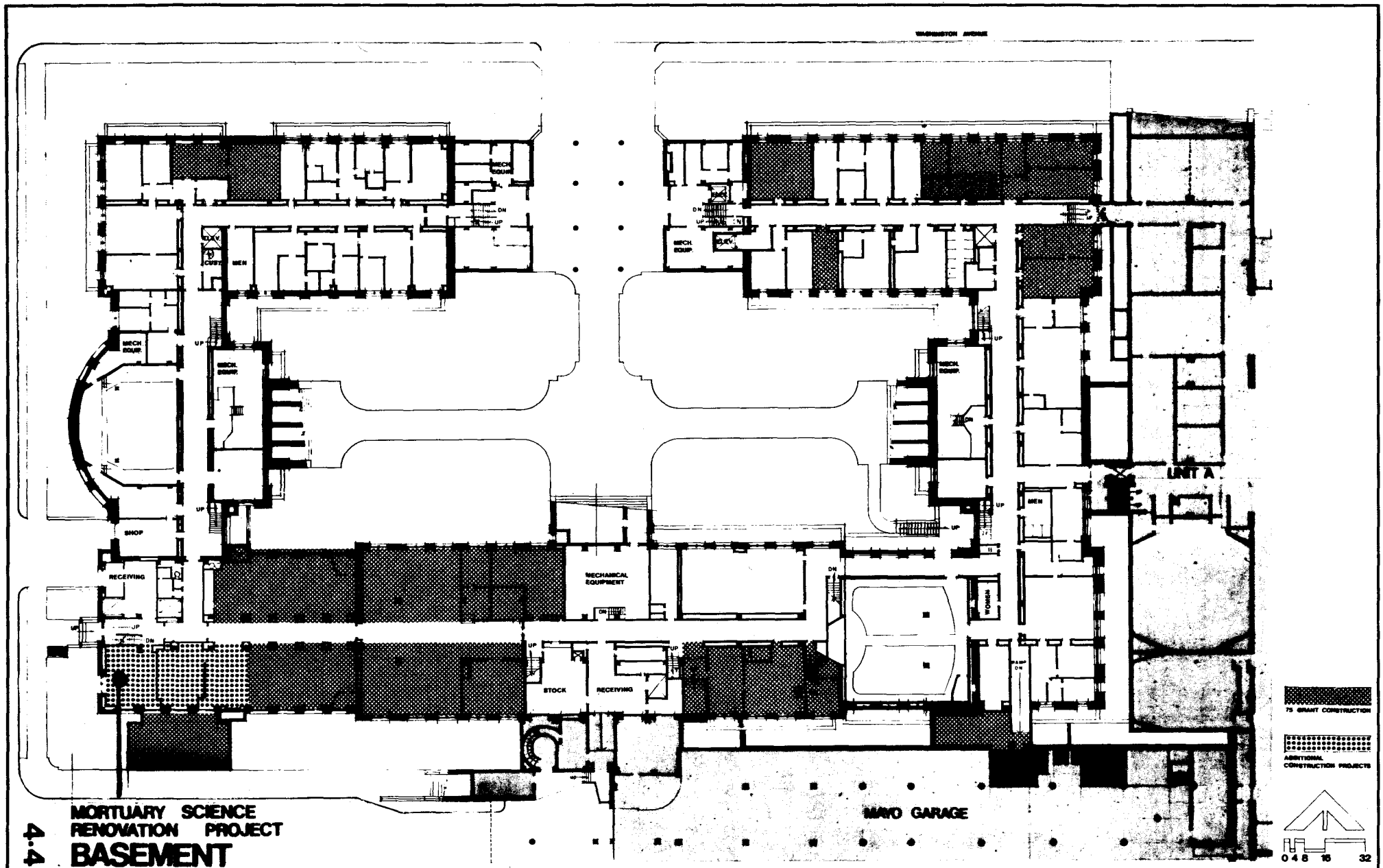
EUGENE A. KOSL — SPECIAL ASSISTANT
PAUL J. SHAPIN — HEALTH SCIENCES PLANNING

CONSTRUCTION PROJECTS



4.4 MORTUARY SCIENCE RENOVATION PROJECT BASEMENT

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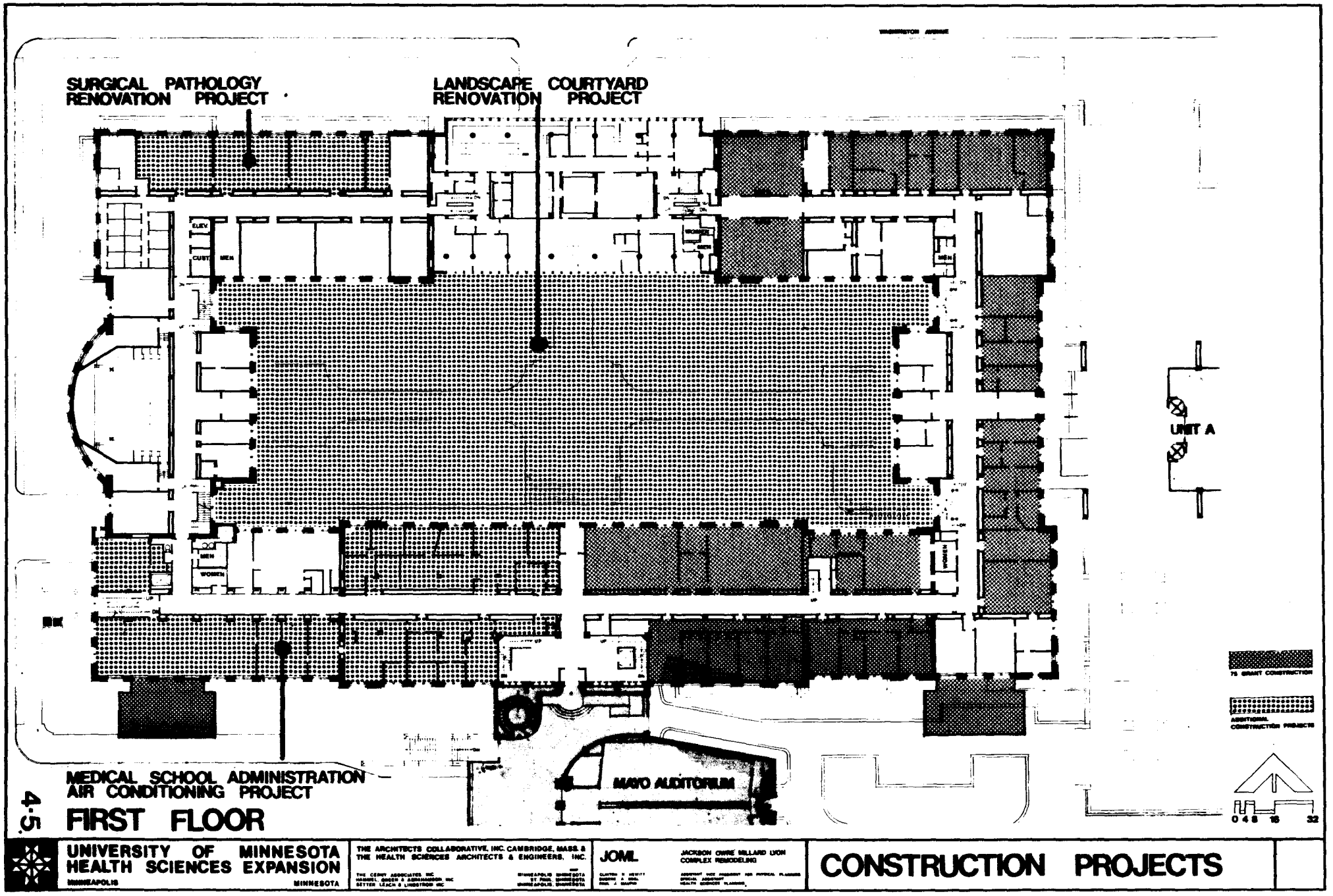
CONSTRUCTION PROJECTS


SURGICAL PATHOLOGY RENOVATION PROJECT
LANDSCAPE COURTYARD RENOVATION PROJECT
UNIT A
MAYO AUDITORIUM
MEDICAL SCHOOL ADMINISTRATION AIR CONDITIONING PROJECT
FIRST FLOOR
4-5
UNIVERSITY OF MINNESOTA
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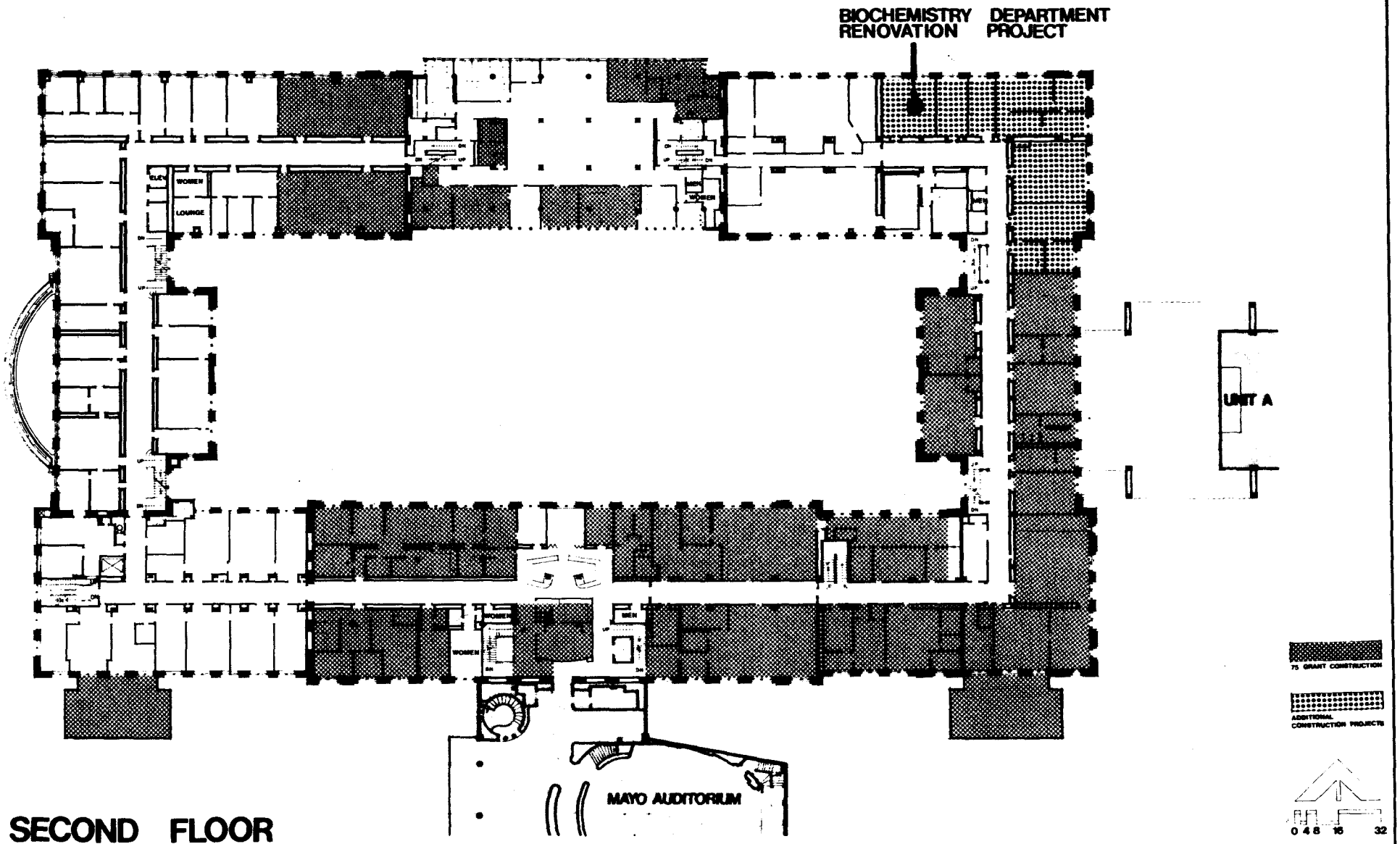
CONSTRUCTION PROJECTS



4.6 SECOND FLOOR

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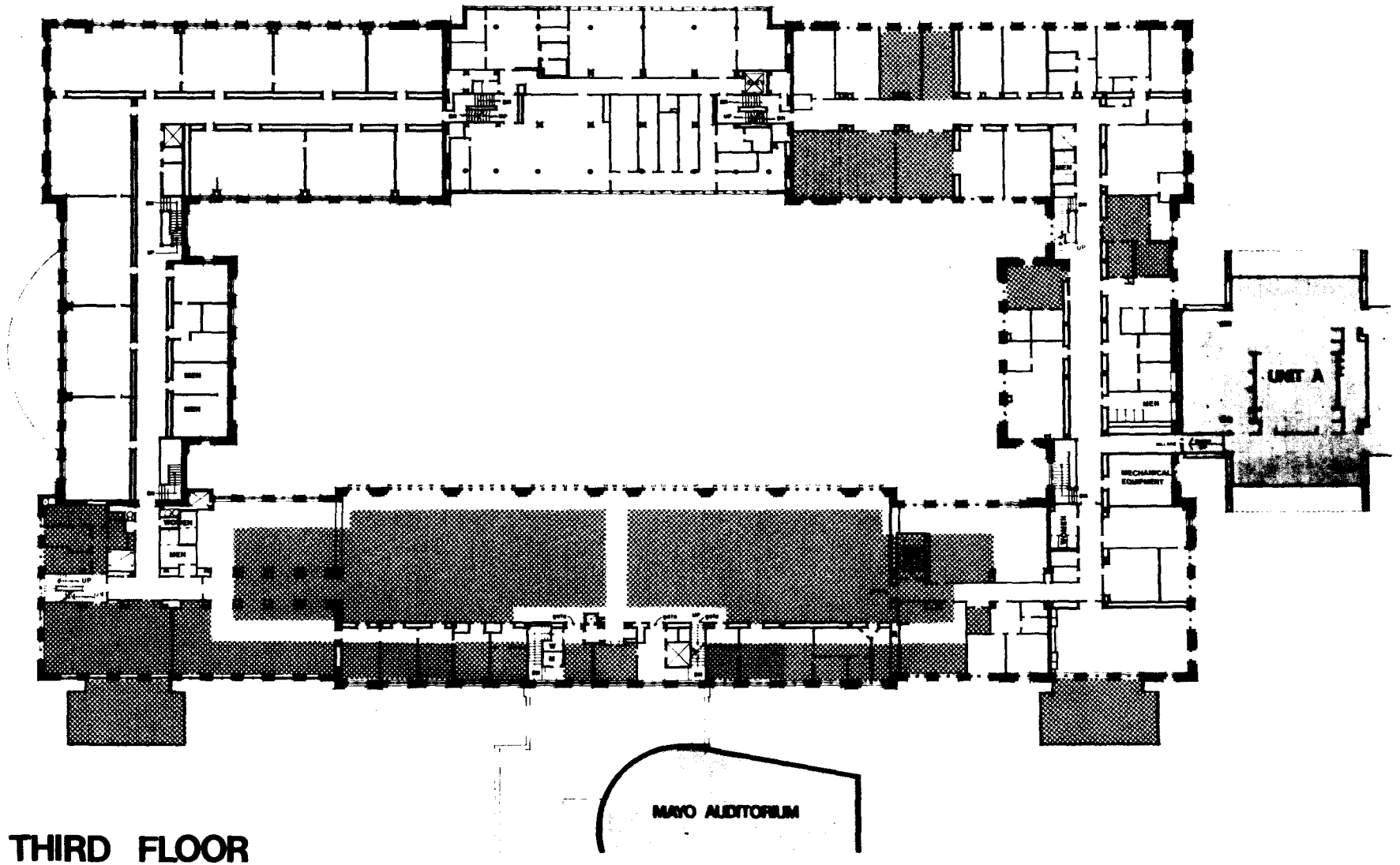
CONSTRUCTION PROJECTS



4.7

THIRD FLOOR

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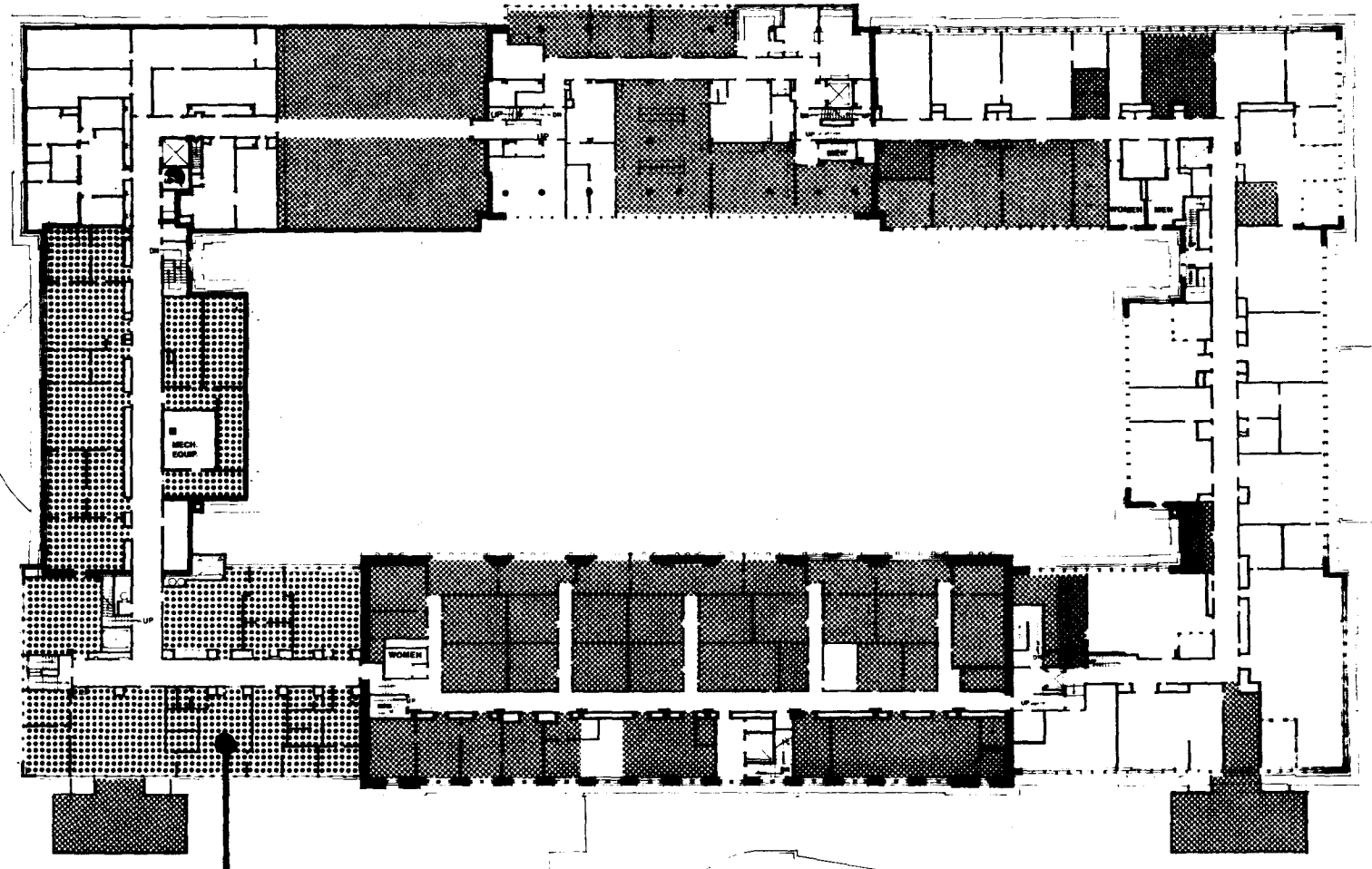
CONSTRUCTION PROJECTS



FOURTH FLOOR PATHOLOGY
AIR CONDITIONING PROJECT

75 GRANT CONSTRUCTION

ADDITIONAL CONSTRUCTION PROJECTS

0 4 8 16 32

4-8

FOURTH FLOOR

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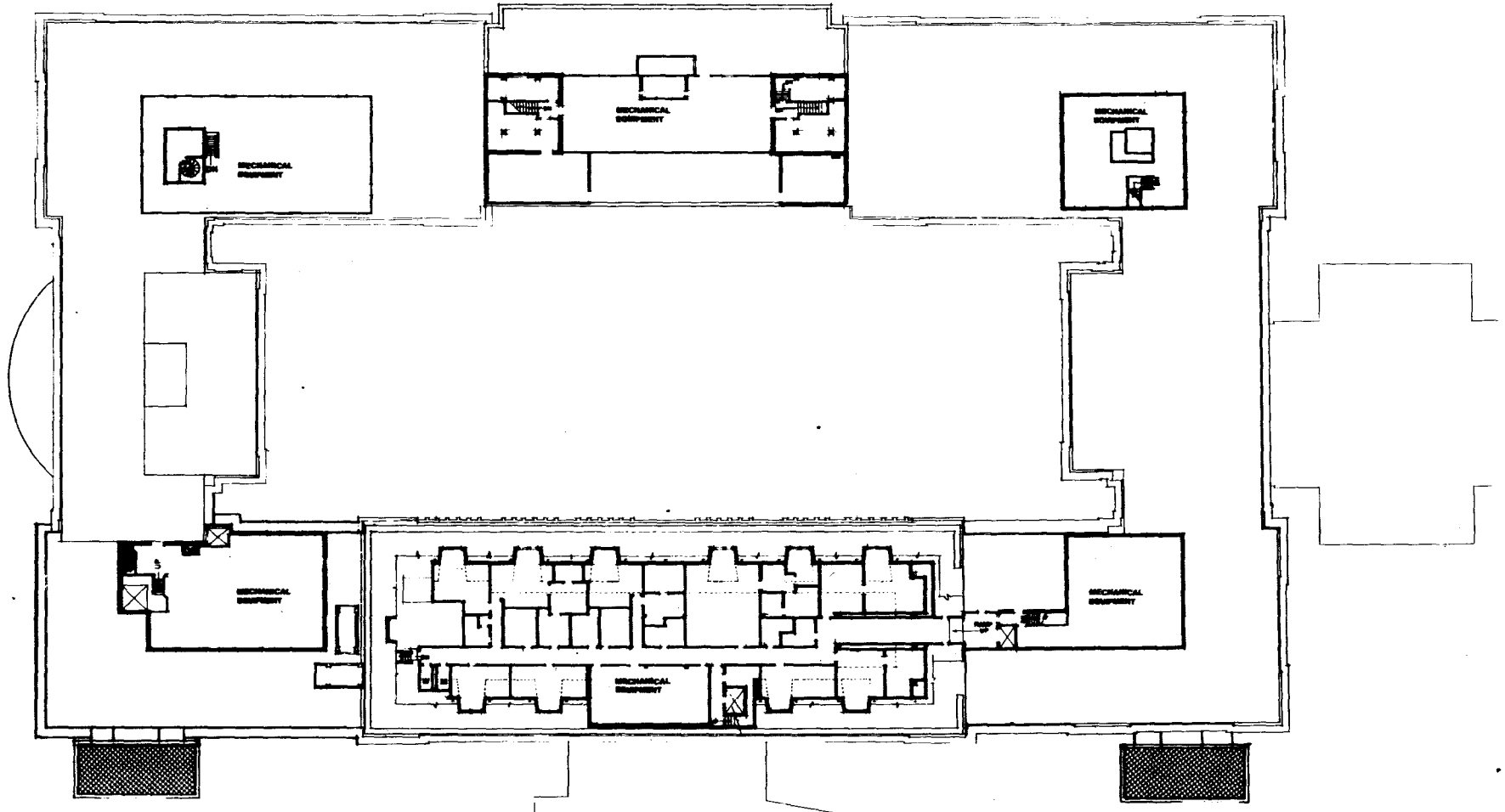
EUGENE A. HOAG
PAUL J. SMITH

ASSISTANT VICE PRESIDENT FOR PHYSICAL PLANNING
SPECIAL ASSISTANT
HEALTH SCIENCES PLANNING

CONSTRUCTION PROJECTS



4-9 FIFTH FLOOR

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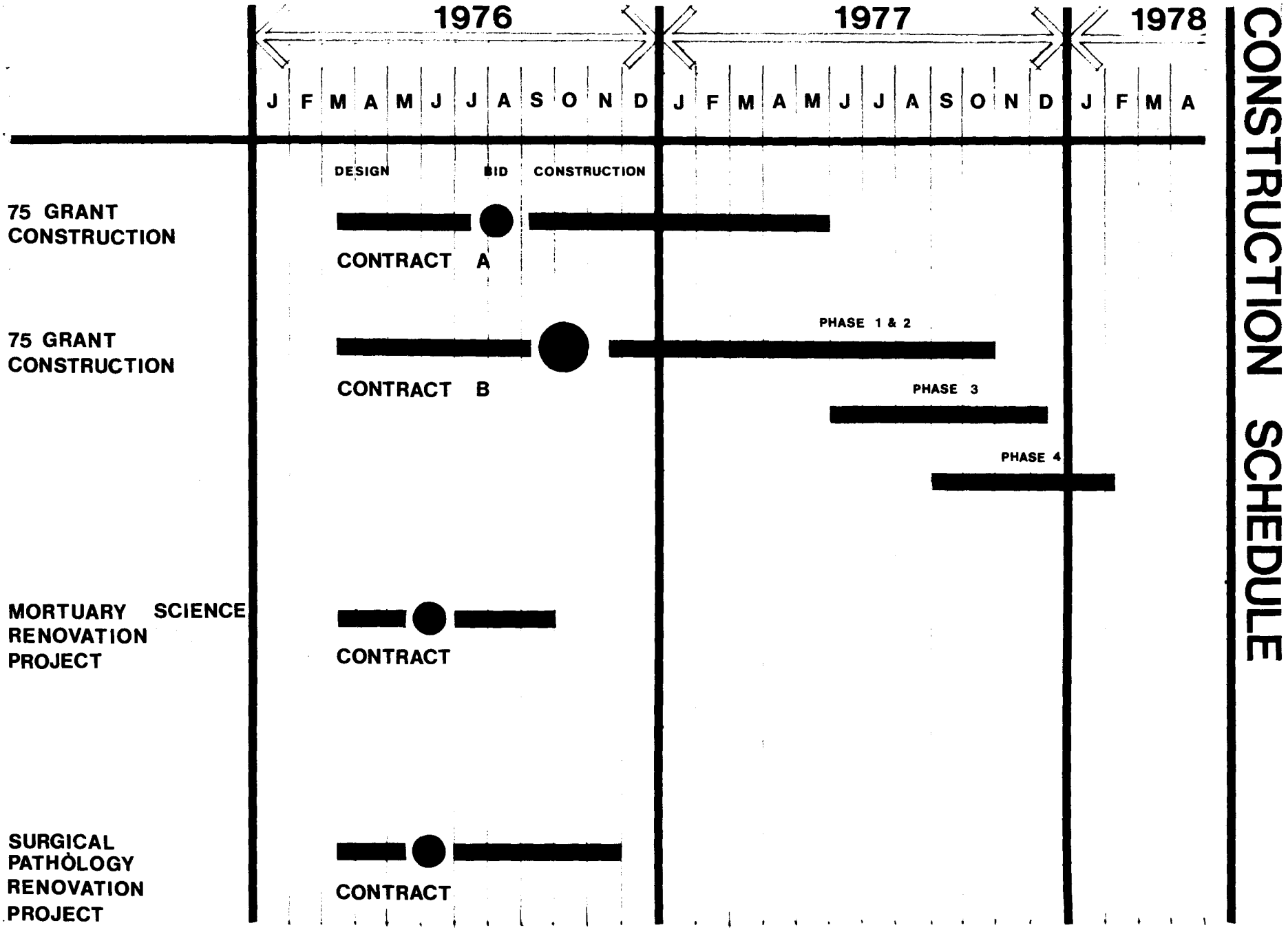
THE CERNY ASSOCIATES INC MINNEAPOLIS MINNESOTA
HARGREAVES GREEVE & ABRAHAMSSON INC ST PAUL MINNESOTA
SETTER LEACH & LINDSTROM INC MINNEAPOLIS MINNESOTA

JOML
CLINTON H. HEWITT
EUGENE J. KOHL
PAUL J. QUADY

JACKSON OWRE MILLARD LYON
COMPLEX REMODELING
ASSOCIATE VICE PRESIDENT FOR PHYSICAL PLANNING
SPECIAL ASSISTANT
HEALTH SERVICES PLANNING

CONSTRUCTION PROJECTS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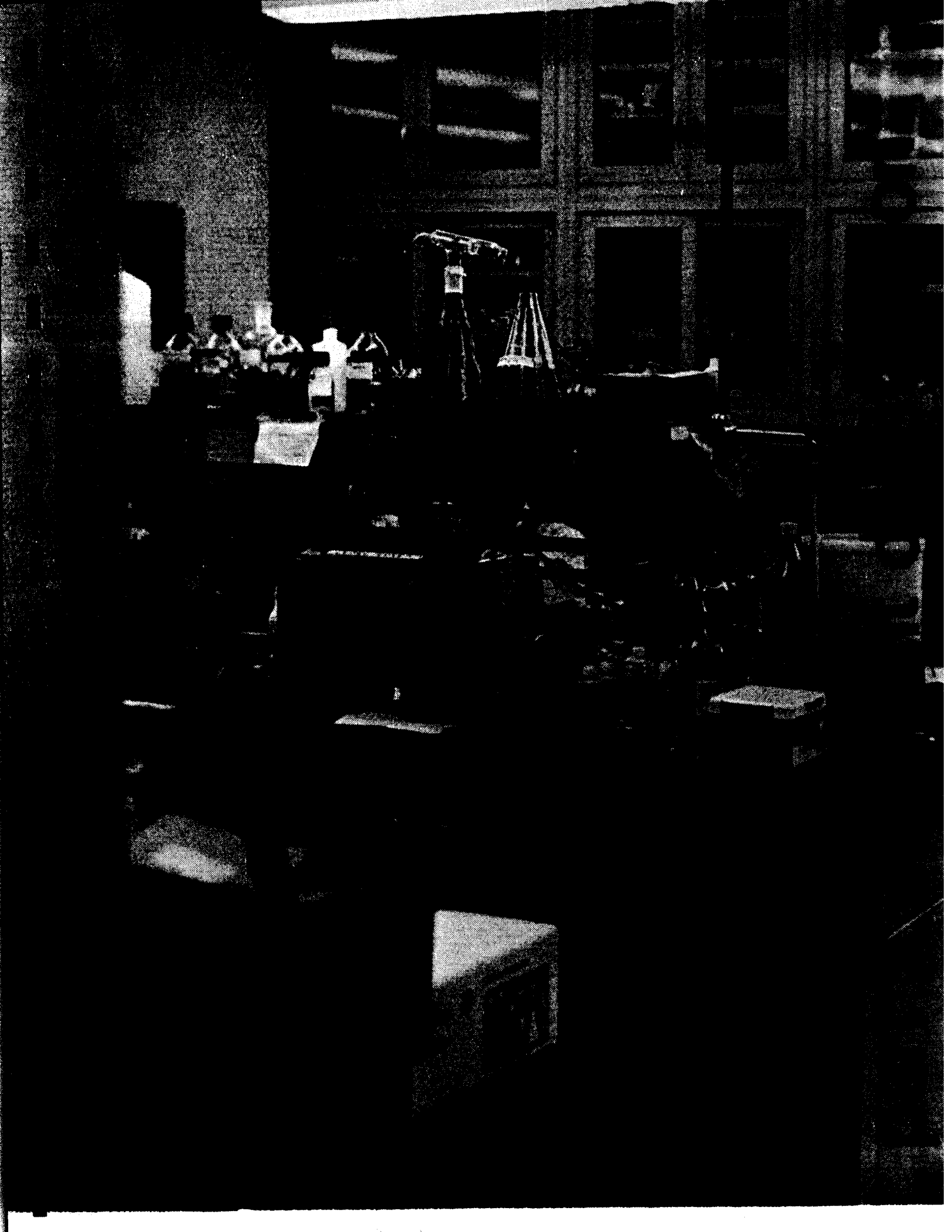
CONSTRUCTION SCHEDULE
DESIGN
BID
CONSTRUCTION
75 GRANT CONSTRUCTION
CONTRACT A
75 GRANT CONSTRUCTION
CONTRACT B
PHASE 1 & 2
PHASE 3
PHASE 4
MORTUARY SCIENCE RENOVATION PROJECT
CONTRACT
SURGICAL PATHOLOGY RENOVATION PROJECT
CONTRACT



GENERAL DESCRIPTION OF GRANT WORK

Work in this Project is the first major implementation of the Design Concept previously described in PART 3 of this Report.

The Work is to be performed so that it will satisfy the needs of various Basic Sciences disciplines as expressed in the University's Functional Space Program. See Appendix F.

The scope of work is shown graphically on the following floor plan drawings entitled 75 GRANT CONSTRUCTION.

The work is anticipated to occur in two major prime construction contracts. The first contract described as Contract A will consist of the general construction of the Mechanical Equipment Towers at the southeast and southwest corners of the JOML Complex. This contract will have an Advertisement for Bids in July of 1976 thereby fulfilling the Federal Requirement. The subsequent Contract B consisting of the remainder of the project will be advertised in the late summer of 1976. This latter contract will have several phases to accommodate interim space demands of teaching and research. See the following section on Contracts and Phasing for a more detailed analysis of these considerations.

The Construction and Non-Building costs are within the limits of the Project budget as expressed in the Grant Application, i.e., $7,499,488. Refer to the following section on Cost Analysis for a description of cost assumptions and the cost estimate. The extent and degree of renovation is illustrated graphically on the following floor plans entitled REMODELING COSTS.

SCOPE OF WORK

The scope of work will consist primarily of the following items:

UNASSIGNABLE SPACES

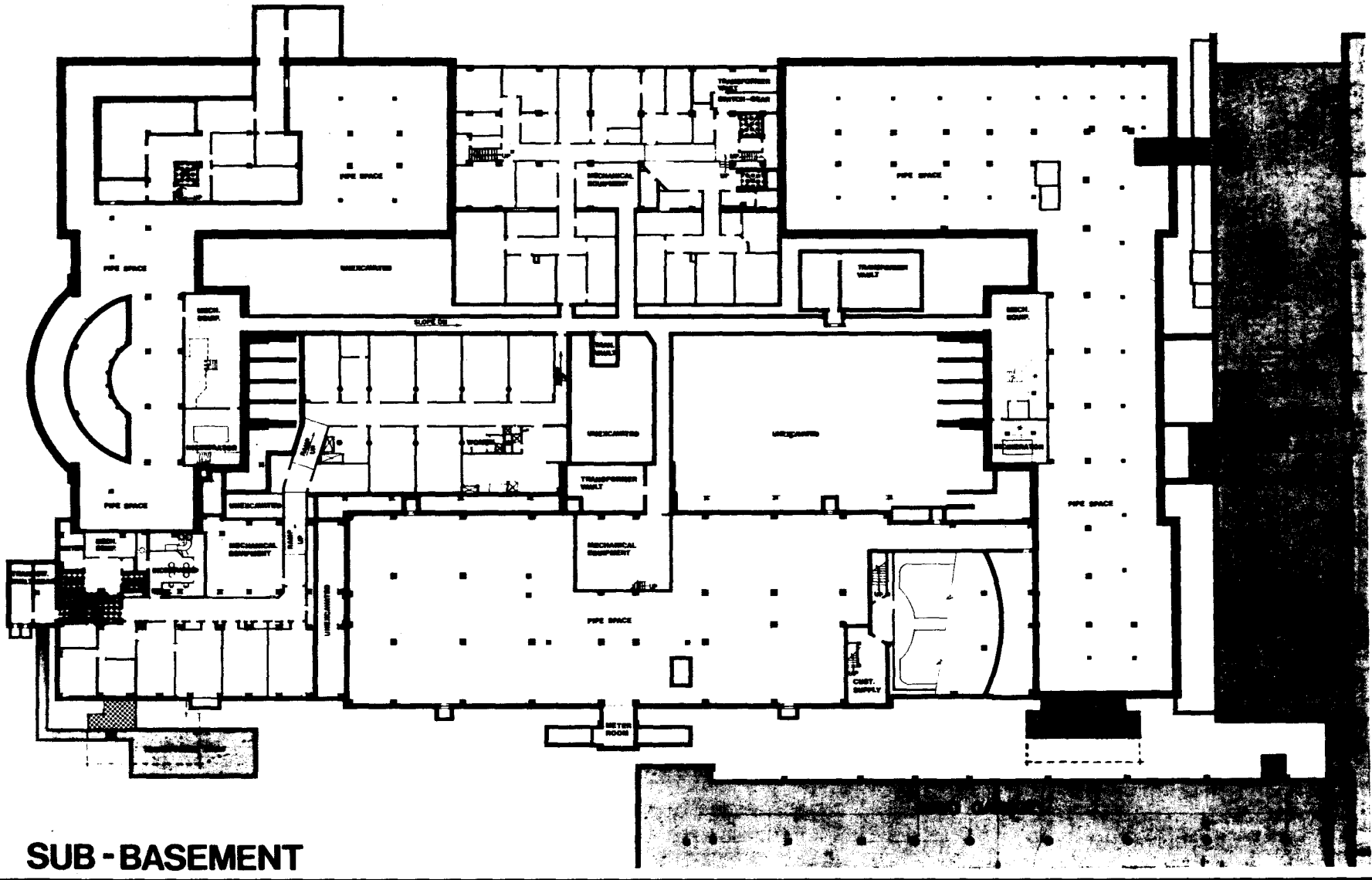
The scope of work will include remodeling, renovation, removal, and/or replacement of stairways, elevators, corridors, and toilets in the areas directly related to the 81,000 NSF area of project assignable space as well as the construction of interior and exterior mechanical equipment rooms to serve these same areas.

DISTRIBUTION SYSTEMS

The distribution systems of corridor ductwork, fire protection, chilled water piping, steam piping, signal systems, power systems, emergency systems, and primary power systems will generally be provided for only the areas associated with the 81,000 NSF assignable area and the related gross area of the project. It is noted that placement and sizing of systems will account for ultimate demand.

ASSIGNABLE SPACES

The major element of work will be the remodeling of 81,000 NSF of assignable space in various areas of the Complex. Approximately 60,000 SF is vacated Dentistry space while the remaining 21,000 SF is obsolete previously assigned departmental space. The majority of the space is to be research laboratories, teaching laboratories, office space and support areas.



5.2 **SUB-BASEMENT**

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
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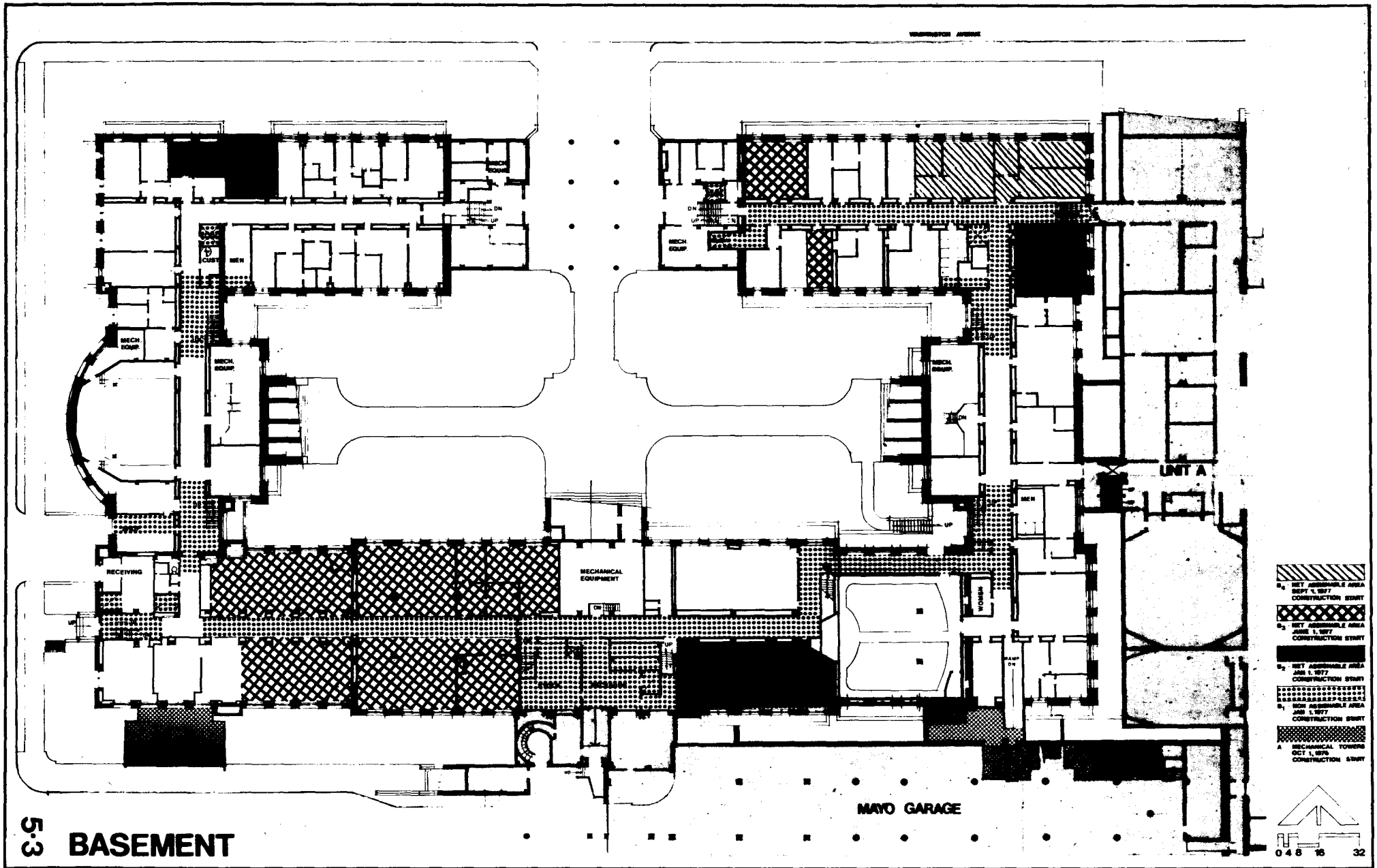
BETTER, LEACH & LINDSTROM INC MINNEAPOLIS MINNESOTA

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

75 GRANT CONSTRUCTION



5.3 **BASEMENT**

UNIVERSITY OF MINNESOTA HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. & THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.
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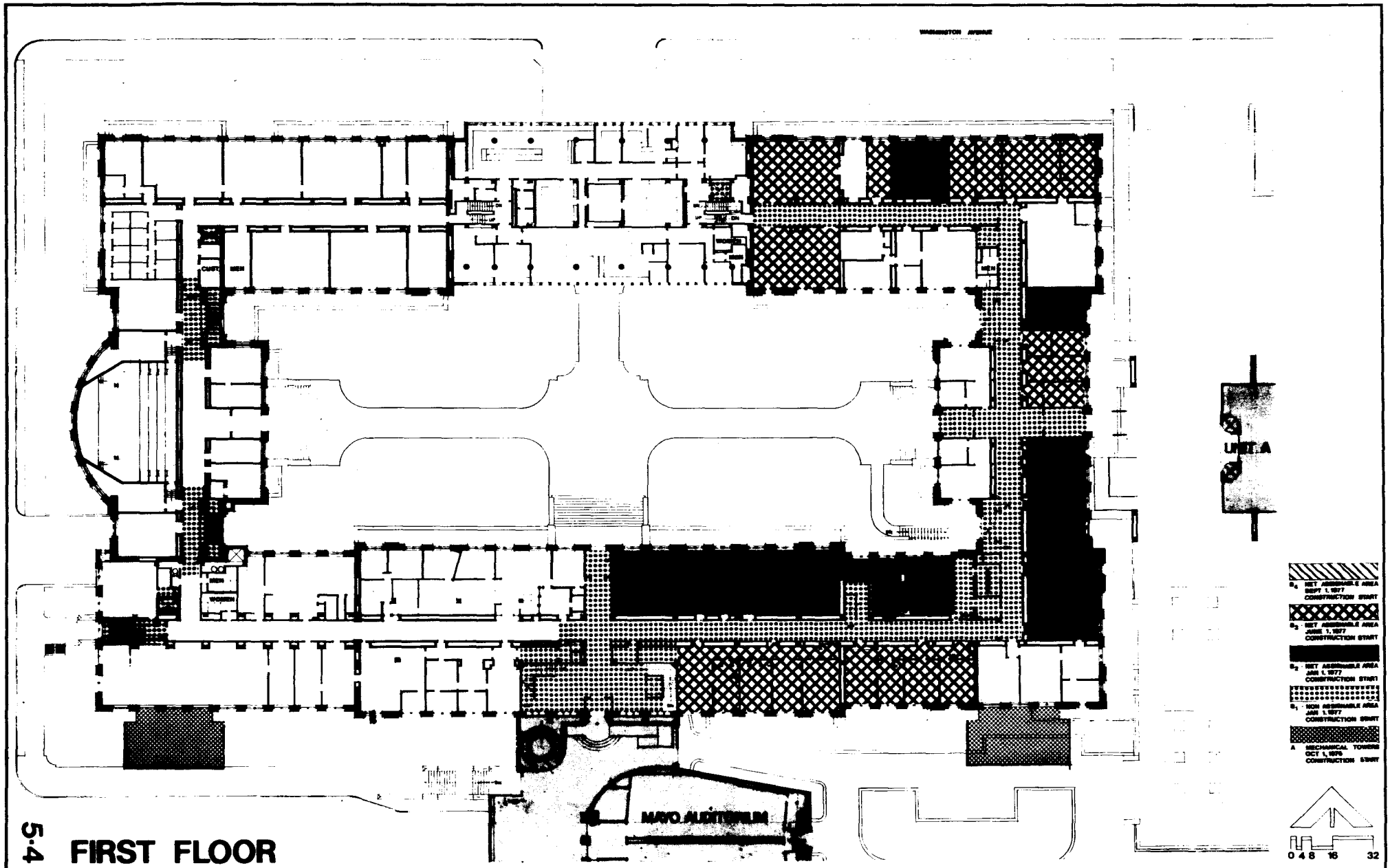
SETTER LEACH & LINDSTROM INC MINNEAPOLIS MINNESOTA

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

75 GRANT CONSTRUCTION



5.4

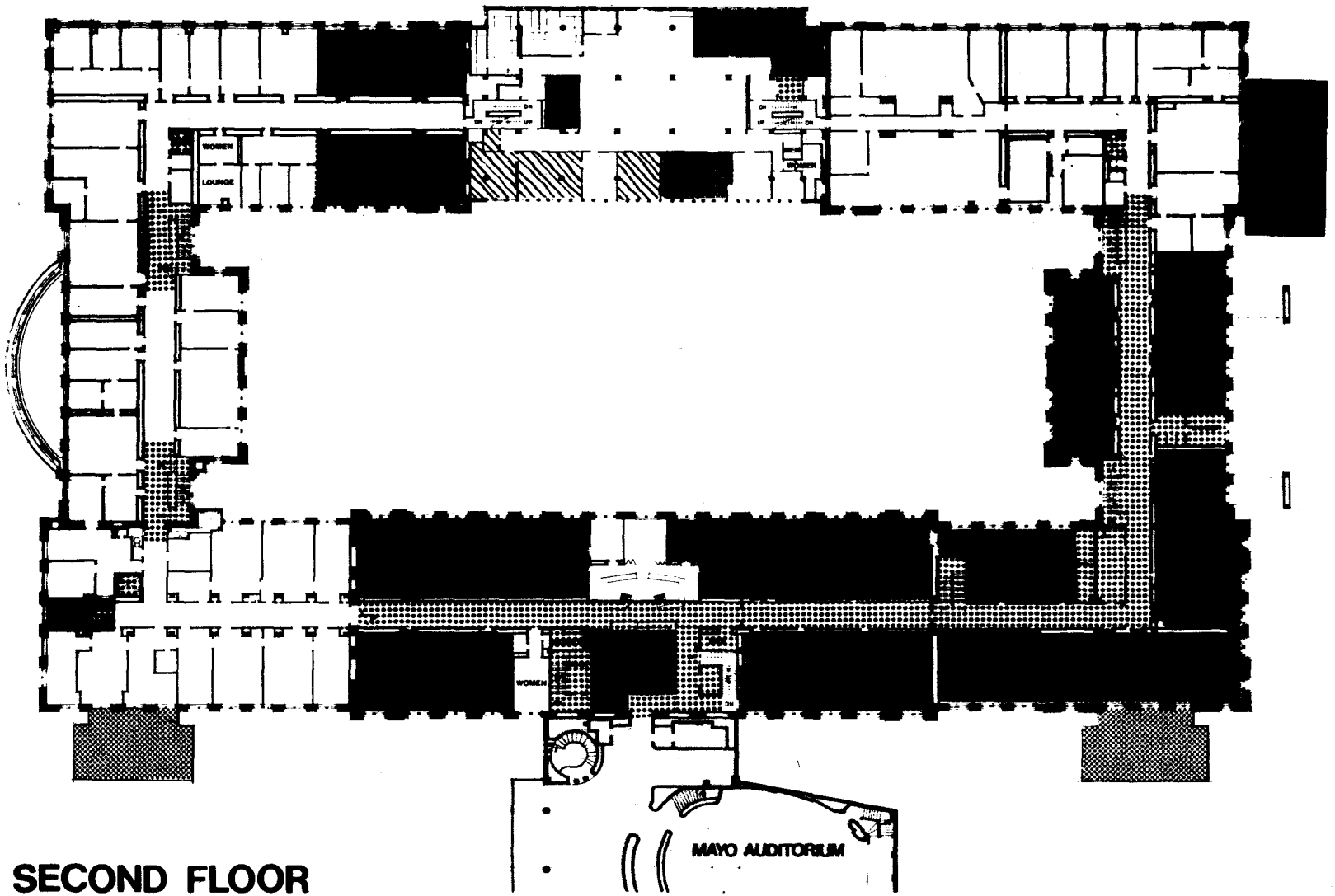
FIRST FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOMI
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

75 GRANT CONSTRUCTION



UNIT A

5.5

SECOND FLOOR

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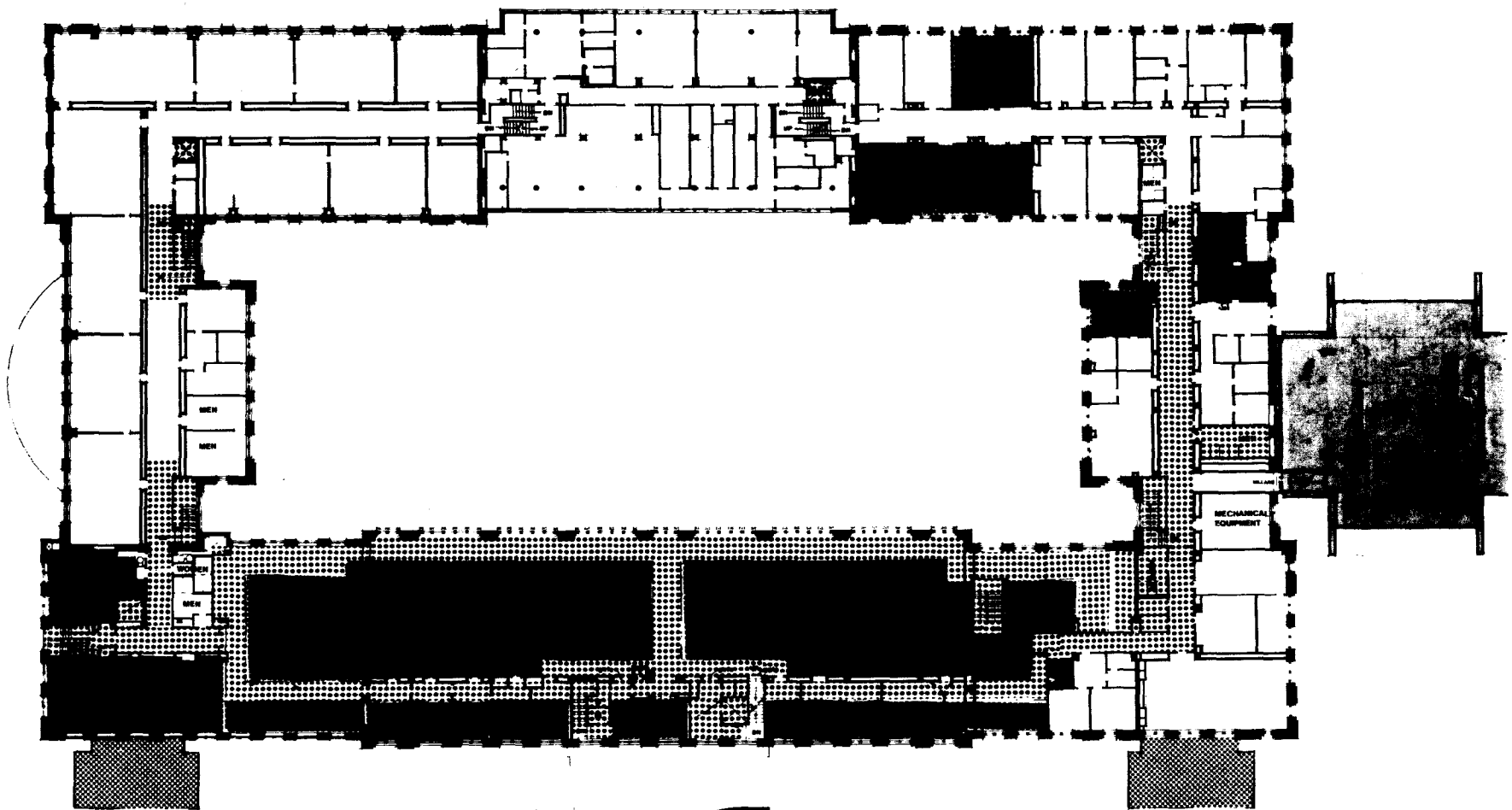
UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

75 GRANT CONSTRUCTION



5.6 THIRD FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOMI
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

75 GRANT CONSTRUCTION

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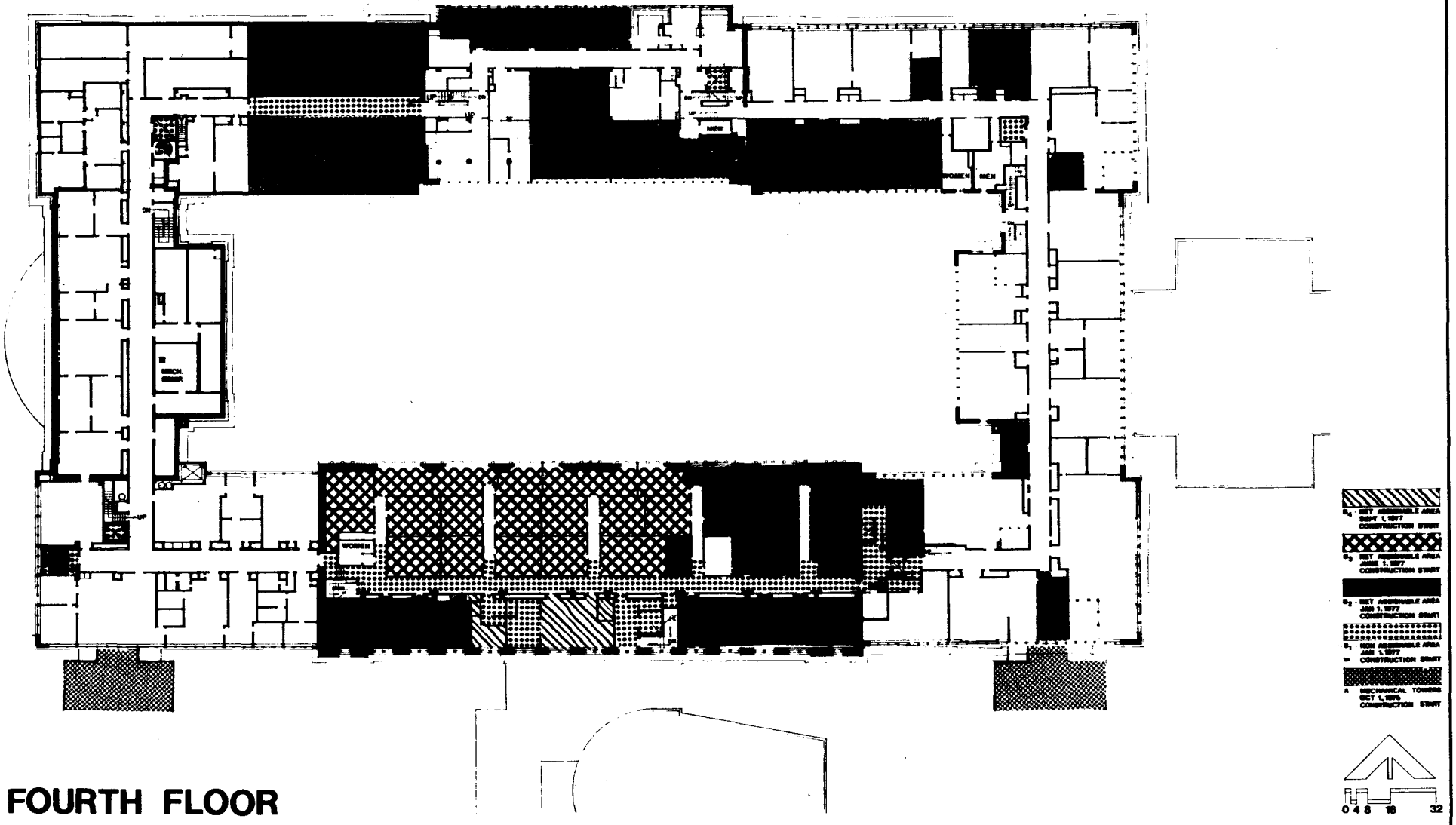

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FOURTH FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

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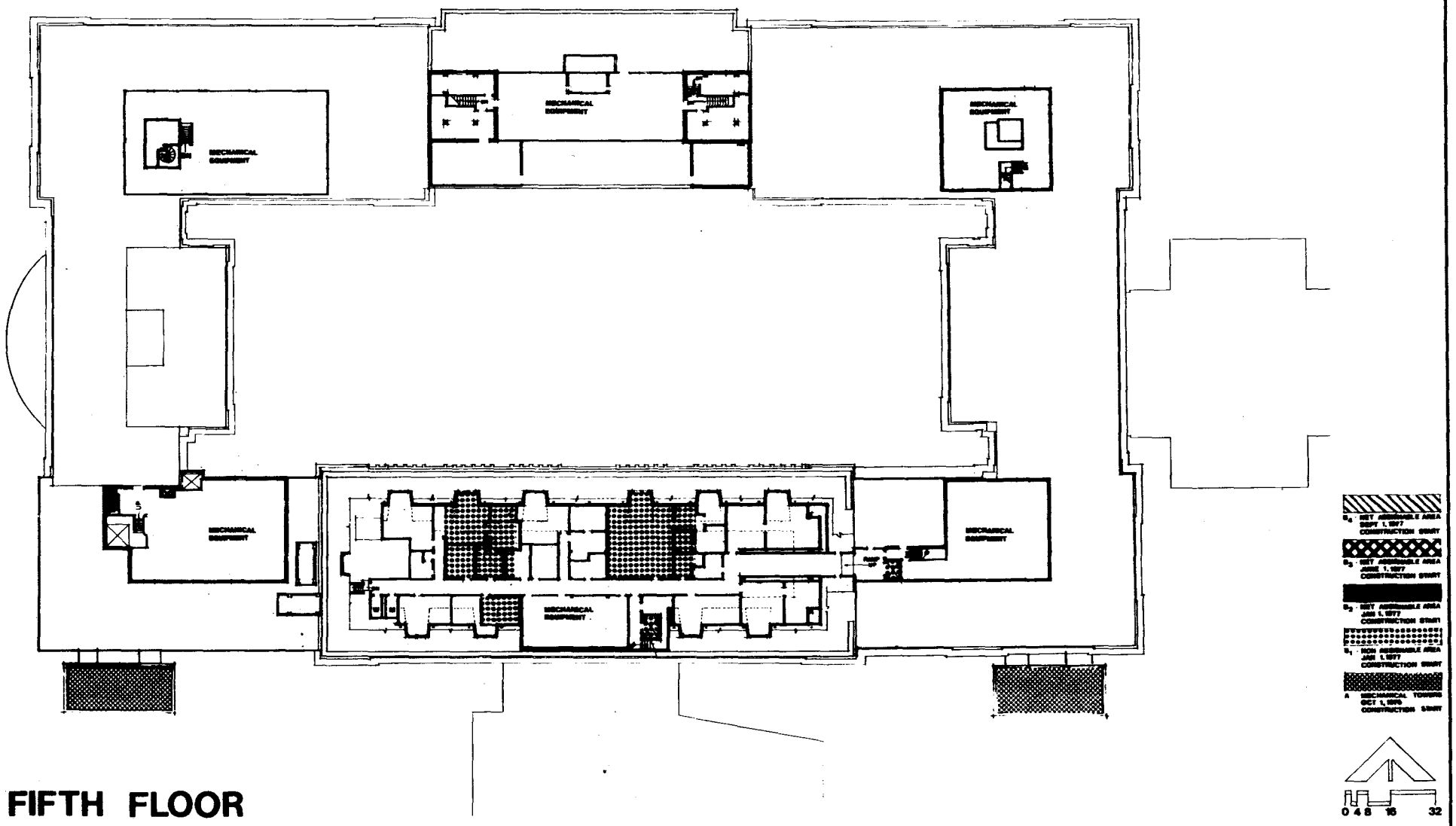
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

75 GRANT CONSTRUCTION



5.8

FIFTH FLOOR

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HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

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JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

75 GRANT CONSTRUCTION

CONTRACTS AND PHASING

CONTRACTS

The work of the 75 GRANT CONSTRUCTION project will occur in two major construction contracts as follows:

CONTRACT A

Construction of the General Construction portion of the Southeast and Southwest Mechanical Equipment Towers will constitute the scope of Contract A. The Towers will house air handling units provided as part of Contract B. It is noted that construction of the Northeast and Northwest Mechanical Equipment Towers will occur as part of future construction projects.

CONTRACT B

Construction of the interior remodeling work and the equipping of the Mechanical Equipment Towers provided under Contract A described above will constitute the work of Contract B. Construction under Contract B will be accomplished under 4 major phases to allow for the creation of finished space in the presently unoccupied portions of the building thereby allowing present tenants to move into those areas which then frees other areas for renovation.

PHASE B1

Phase B1 is the non-assignable areas of the project and includes the work described in the following paragraphs.

Stairways which do not meet the requirements of the Code are to be removed and/or upgraded in the general areas of the complex relating to the assignable space remodeling. Removal and/or upgrading of stairs outside the area of major project work will occur as parts of future construction contracts.

The elevators of the building will be upgraded and/or removed in order to correct those deficiencies judged "very important" priorities by the Elevator Consulting Engineers. Refer to Appendix B for the Elevator Report. Also the walls of the elevator shafts will receive additional fireproofing where appropriate in order to provide the required two-hour shaft enclosure.

Corridors will be renovated to meet the requirements of Code only in the areas related to major project work. The following floor plans entitled 75 GRANT CONSTRUCTION show the extent of this work. Renovation of the remaining corridors of the Complex will occur as part of future construction projects.

Toilets will be remodeled and reconstructed when they occur within the general area of major project work. Renovation of toilets outside this area will occur as parts of future construction contracts.

Phase B1 will also include the major Mechanical, Elevator, and Electrical work of the project. The extent of this work is generally that which is sufficient to serve the assignable areas of the 75 GRANT CONSTRUCTION project.

PHASE B2

The majority of this work is the renovation of the 60,000 S.F. of assignable area vacated by the School of Dentistry. A certain portion of this work will be near completion in June of 1977 thereby allowing movement of occupants from the spaces scheduled for renovation under Phase B3

PHASE B3

Construction of nearly 18,000 S.F. of assignable area will be started in June 1977. Much of this area, not being used during the summer of 1977, must be completed by fall of 1977 for scheduled teaching use.

PHASE B4

Construction of nearly 2,500 S.F. of assignable area will start in September of 1977 and will account for the final portion of work done under Contract B.

As the construction schedule in Part 4 of this Report indicates, certain areas of work will be overlapping under the four phases of Contract B as well as overlapping the work of Contract A. The final determination of scope and schedule is of course subject to further consideration as the problems of construction and User needs becomes further defined.

COST ASSUMPTIONS

Preparing a cost estimate in the early stages of the planning process requires that the assumptions upon which an estimate is based be defined so that consistent interpretation occurs. The following assumptions have been made in preparing the statement of Probable Costs.

SITE ACCESS. Contractors will have access to the site and various portions of the building, which may cause occupants to endure certain hardships.

SCHEDULE. All costs were based on the Construction Schedule in Part 4 of this Report and any deviations in this schedule may alter the cost.

CONTRACTS AND PHASING. All costs were based on the construction contracts indicated and their corresponding phasing sequence. Additions to the contracts may alter the scope of work and cost.

BUILDING CODES. Code correction work will be done only in the 81,000 square foot 75 GRANT CONSTRUCTION areas and corresponding non-assignable areas at this time. Code interpretations by Building Officials may alter the scope of work and cost.

AIR CONDITIONING. Only assignable space within the 81,000 square foot 75 GRANT CONSTRUCTION will be air conditioned along with any associated non-assignable space.

ASSIGNABLE AREA RENOVATION. All areas within the 81,000 square foot 75 GRANT CONSTRUCTION were put into one of five categories or types of reconstruction. Cost consultants then provided a cost figure for each category as follows:

CATEGORY 1

Indicates same use; resurface countertops - refinish casework, paint walls and ceilings, no new services.

CATEGORY 2

Indicates same use; resurface countertops - refinish casework, paint walls and ceilings, install few new services and sinks.

CATEGORY 3

Indicates same use; remove and/or install countertops and casework, paint walls and ceilings, install additional new services and sinks, no special features.

CATEGORY 4

Indicates similar use; minor wall removal and installation, floor or ceiling changes, remove and/or install major amount casework, paint walls and ceilings, install whole new services and sinks, few special features.

CATEGORY 5

Indicates change in use; major wall removal and installation, major floor or ceiling changes, remove and/or install major amount casework, paint walls and ceilings, install whole new services and sinks, many special features, extensive mechanical - electrical demolition and installation.

NON BUILDING COST DATA. Data for the non building costs was taken and/or interpolated from data supplied by University of Minnesota personnel.

ENERGY CONSERVATION. No corrective work on the exterior fenestration or insulation of walls will be done at this time.

FUTURE ESTIMATES. The Probable Costs estimate will be revised and updated as the schematic design, design development and construction documents phases are completed.

Using these assumptions, plans, and cost figures, the following statement of PROBABLE COSTS was prepared.

PROBABLE COSTS

I. CONSTRUCTION

a.	Unassignable Spaces (Related to Assignable)	
1.	Stairways	90,860
2.	Elevators	41,500
3.	Corridors	384,000
4.	Toilets	85,430
5.	Fan Room Towers (2 Towers)	449,230
6.	Interior Equipment Rooms	123,300
		$1,174,320
b.	Distribution Systems (Related to Assignable)	
1.	Corridor Ductwork	180,000
2.	Fire Protection	40,500
3.	Chilled Water Piping	252,280
4.	Steam Piping	78,400
5.	Signal Systems	67,500
6.	Power Systems	180,000
7.	Emergency Systems	45,000
8.	Fume Hoods (Exclusive of 81,000 s.f.)	0
		$ 843,680
c.	Assignable Spaces	
1.	Category 1 3,955 s.f. x $ 5.85/s.f.	23,140
2.	Category 2 8,496 s.f. x $13.05/s.f.	110,880
3.	Category 3 8,628 s.f. x $28.80/s.f.	248,490
4.	Category 4 15,317 s.f. x $40.00/s.f.	612,680
5.	Category 5 41,380 s.f. x $50.00/s.f.	2,085,550
6.	Cold Rooms 2,469 s.f. x (N.I.C.)	0
7.	Stair/Mech. 755 s.f. (Under other areas)	0
	81,000 s.f.	$3,080,740
d.	Bidding Contingency	
1.	(10% of Construction Estimate)	$ 509,870
	Total Construction Cost	$5,608,610
	(Construction Monies from Grant $5,639,500)	

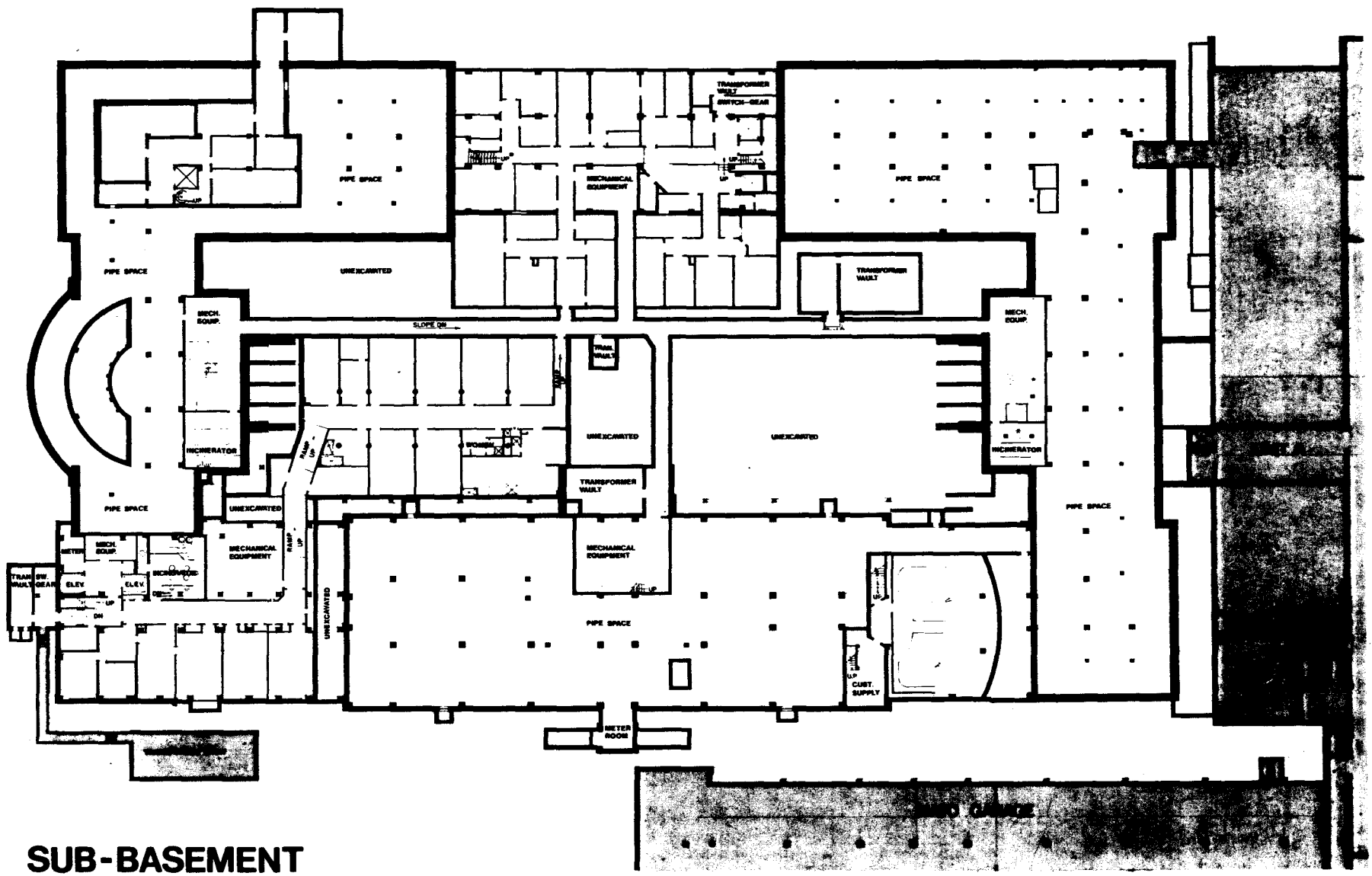
II. PROFESSIONAL SERVICES

a.	A/E Fees	
1.	A/E Basic Services (Contract A)	37,500
2.	A/E Basic Services (Contract B)	535,860
3.	A/E Master Planning/Additional Services/ Reimbursable Expenses Including Consultants.	223,040
		$ 796,400

b. Consultants	
1. Special Consultants	5,000
2. Scheduling Consultant	0
3. Cost Consultant (Special from U/M)	0
4. Testing and Balancing	10,000
	$ 15,000
c. U of M In-House	
1. Supervision (1.25% x Const. Cost)	70,100
2. Misc. Engineering	8,000
3. Site Survey	1,500
4. Activation and Incedentals	10,000
5. Health Sciences Planning Office (1.25% x Const. Cost)	70,110
6. Landscaping Design Fees	Inc. Elsewhere
7. Furnishings and Group I & II Equipment Fees	Inc. Elsewhere
8. Graphics & Signage Fees	Inc. Elsewhere
	$ 159,720
III. SPECIAL CHARGES	
a. Sitework (Landscaping Allowances)	26,350
b. Utilities	4,000
c. SAC Charge	4,250
d. Permits (.002 x Const. Cost)	11,220
e. Control Center Wiring	40,000
f. Chilled Water Systems	100,000
g. Construction Contingency (5% x Const. Cost)	280,430
h. Materials Testing	5,000
	$ 471,250
IV. FURNISHINGS AND EQUIPMENT	
a. Group I Equipment not in Base Contract	
1. New Cold Rooms $125/s.f. 1500 s.f.	187,500
2. Remodeled Cold Rooms $ 60/s.f. 920 s.f.	55,200
b. Group II Equipment	
1. Furnishings and Equipment	717,300
2. Graphics and Signage	20,000
	$ 980,000
PROJECT COST (PRIOR TO COST REDUCTIONS)	$8,030,980
V. COST REDUCTION ITEMS	
TYPE I COST - Prorated cost paid by Future Remodeling	
a. Surgical Pathology Renovation	$ (35,007)
b. Mortuary Science Renovation	$ (20,999)
	$ (56,006)
TOTAL PROJECT COST	$7,974,974

VI. FUNDS AVAILABLE

1. HEW Grant Commitment	2,362,338
2. 1973 Legislature Appropriation	200,000
3. 1976 Legislature Request	4,937,150
TOTAL FUNDS AVAILABLE	$7,499,488
DEFICIT	($ 475,486)



5.16

SUB-BASEMENT

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

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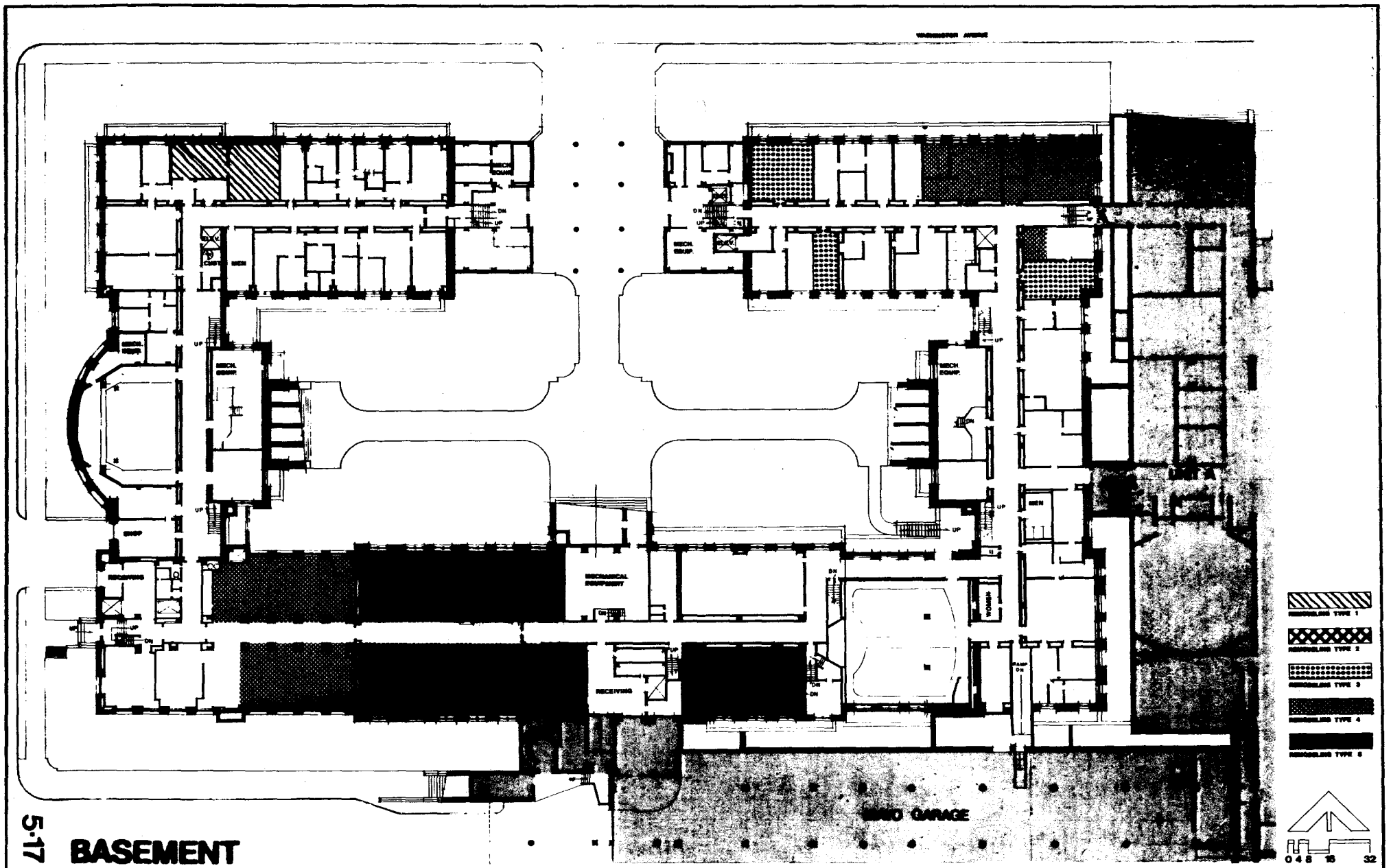
HASSEL, GREEN & ABRAHAMSON, INC. — ST. PAUL, MINNESOTA
SETTER, LEACH & LINDSTROM, INC. — MINNEAPOLIS, MINNESOTA

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

REMODELING COSTS



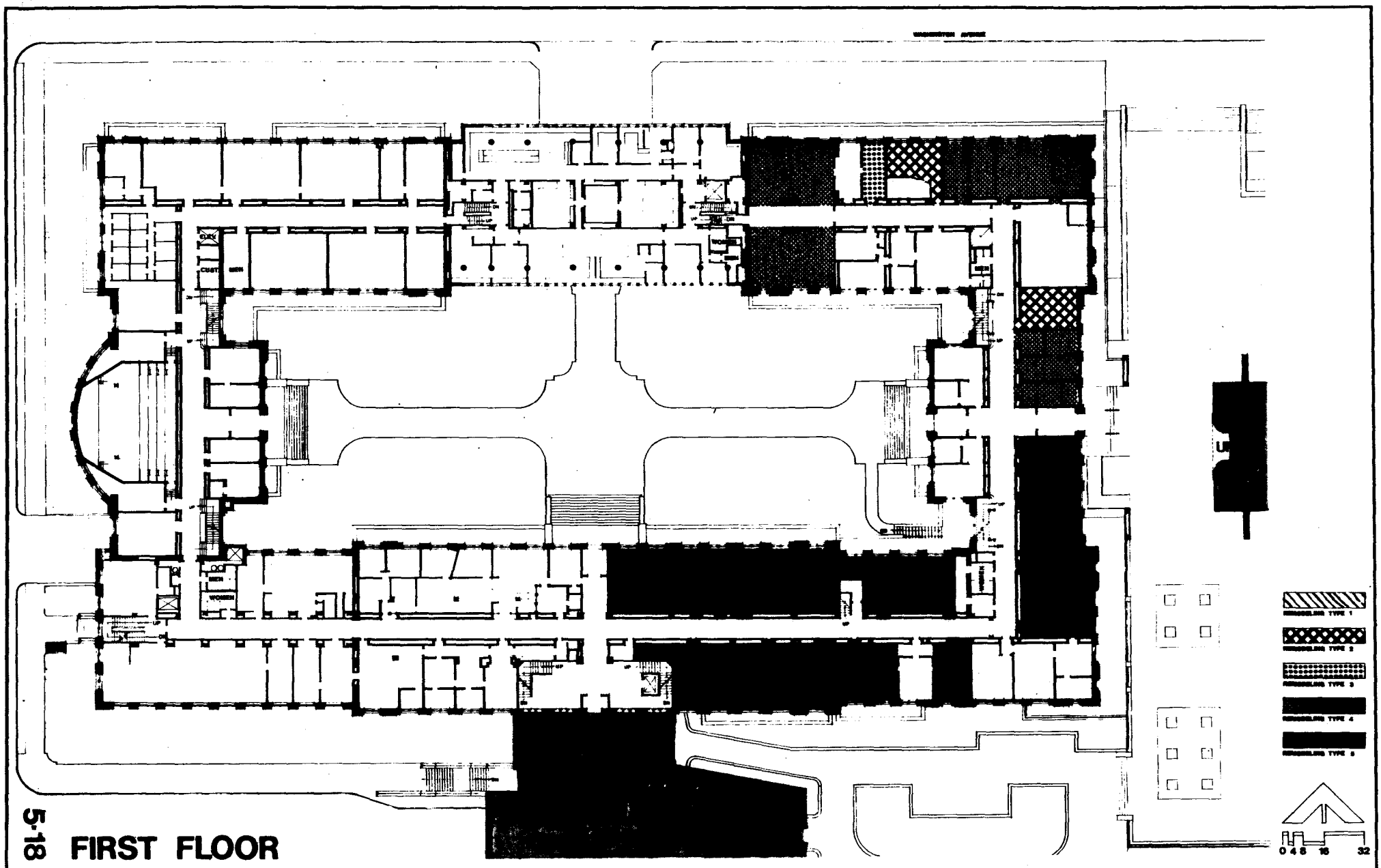
5.17 **BASEMENT**

UNIVERSITY OF MINNESOTA HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

REMODELING COSTS



5.18 **FIRST FLOOR**

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
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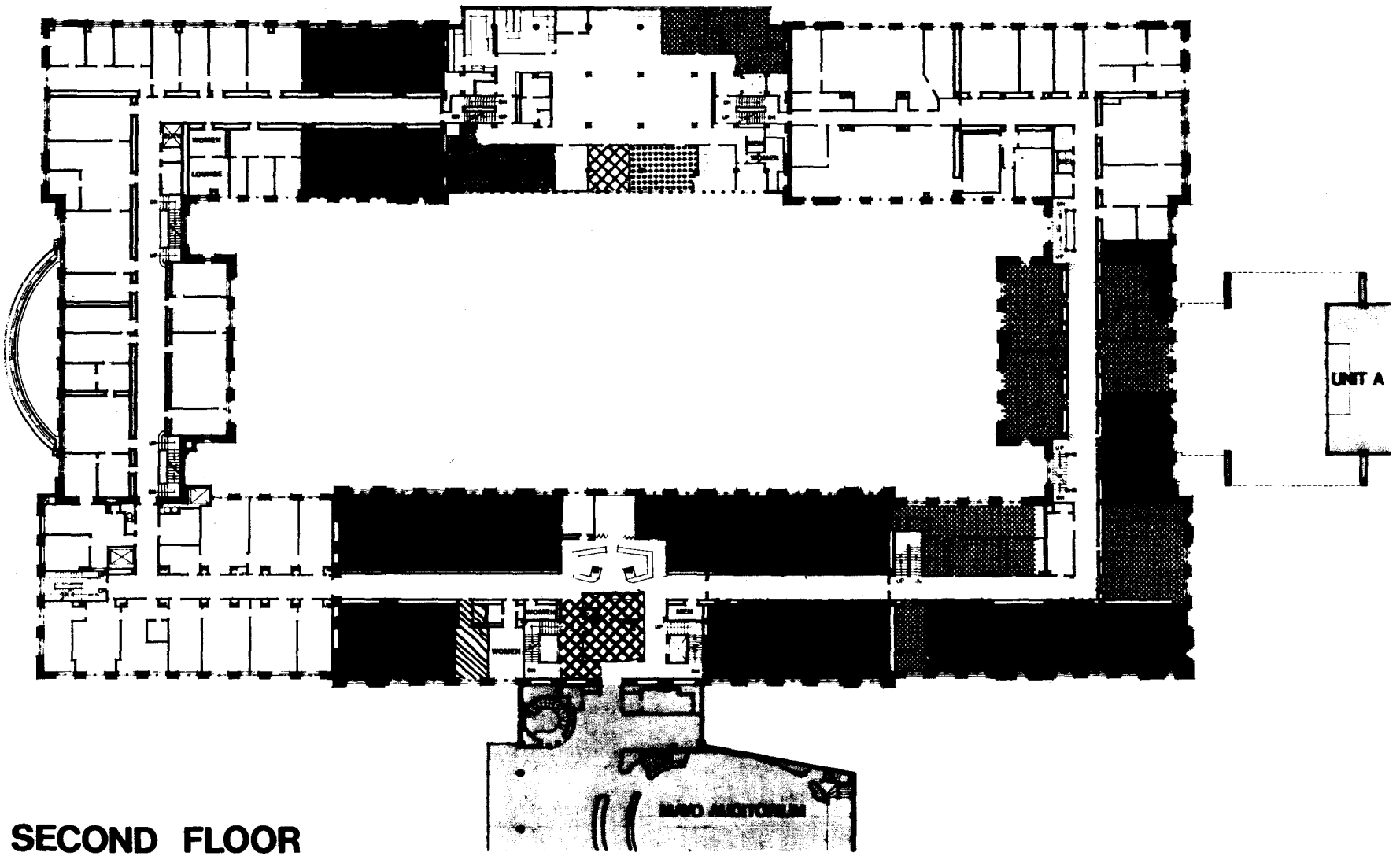
JOML

JACKSON GIBBS MILLARD LYON
COMPLEX REMODELING

REMODELING COSTS



5.19

SECOND FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
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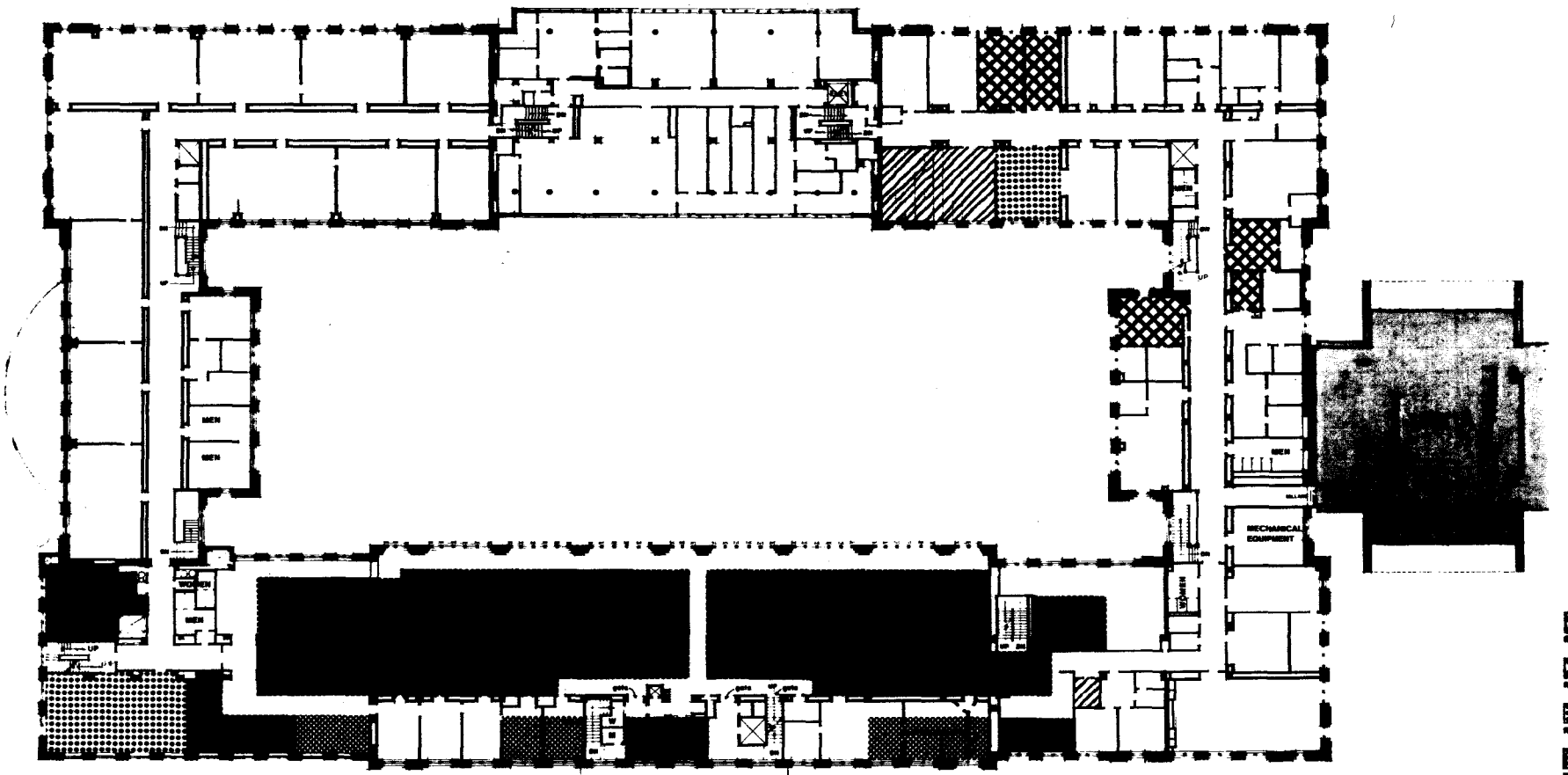
HAGENAH, SWEET & HEMMINGSEN, INC. ST. PAUL, MINNESOTA
BETTER, LEACH & LINDSTROM, INC. MINNEAPOLIS, MINNESOTA

JOMIL

JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

REMODELING COSTS



5.20

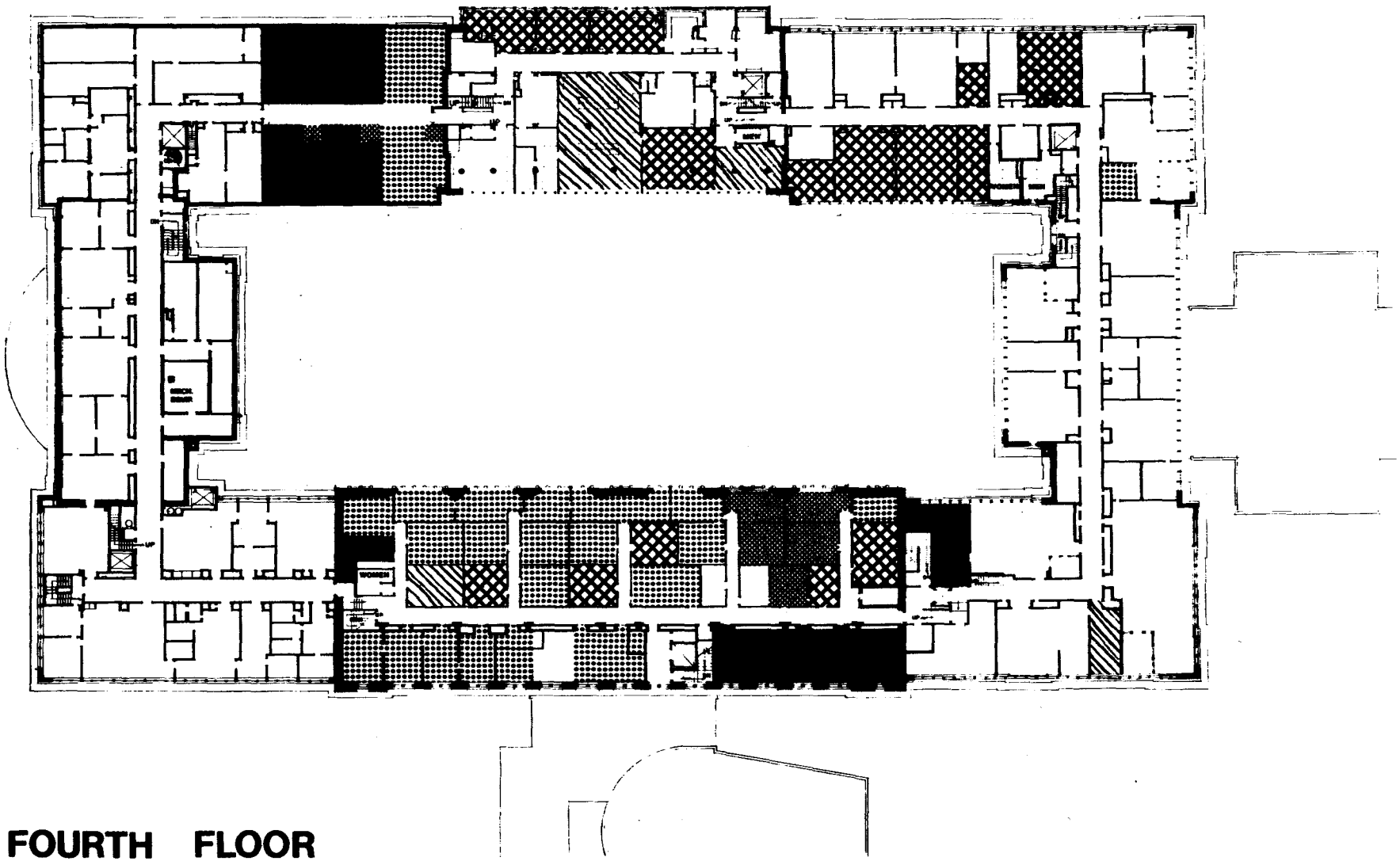
THIRD FLOOR

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.
THE CERNY ASSOCIATES, INC. MINNEAPOLIS, MINNESOTA
HAINES, GINSBY & ABRAHAMSON, INC. ST. PAUL, MINNESOTA
BETTER, LEACH & LINDSTROM, INC. MINNEAPOLIS, MINNESOTA

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

REMODELING COSTS



5.21

FOURTH FLOOR

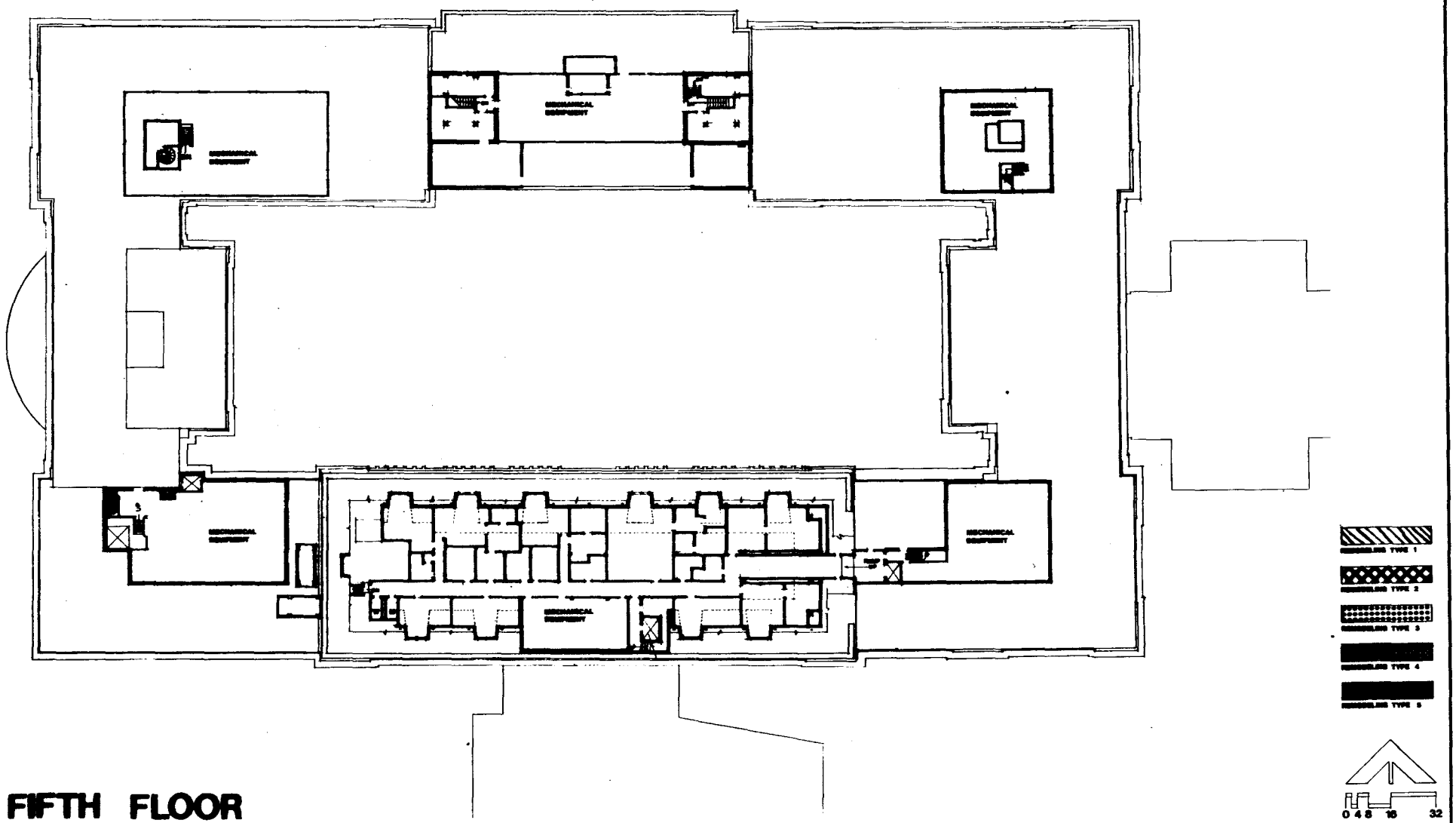
UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.

JOMI

JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

REMODELING COSTS



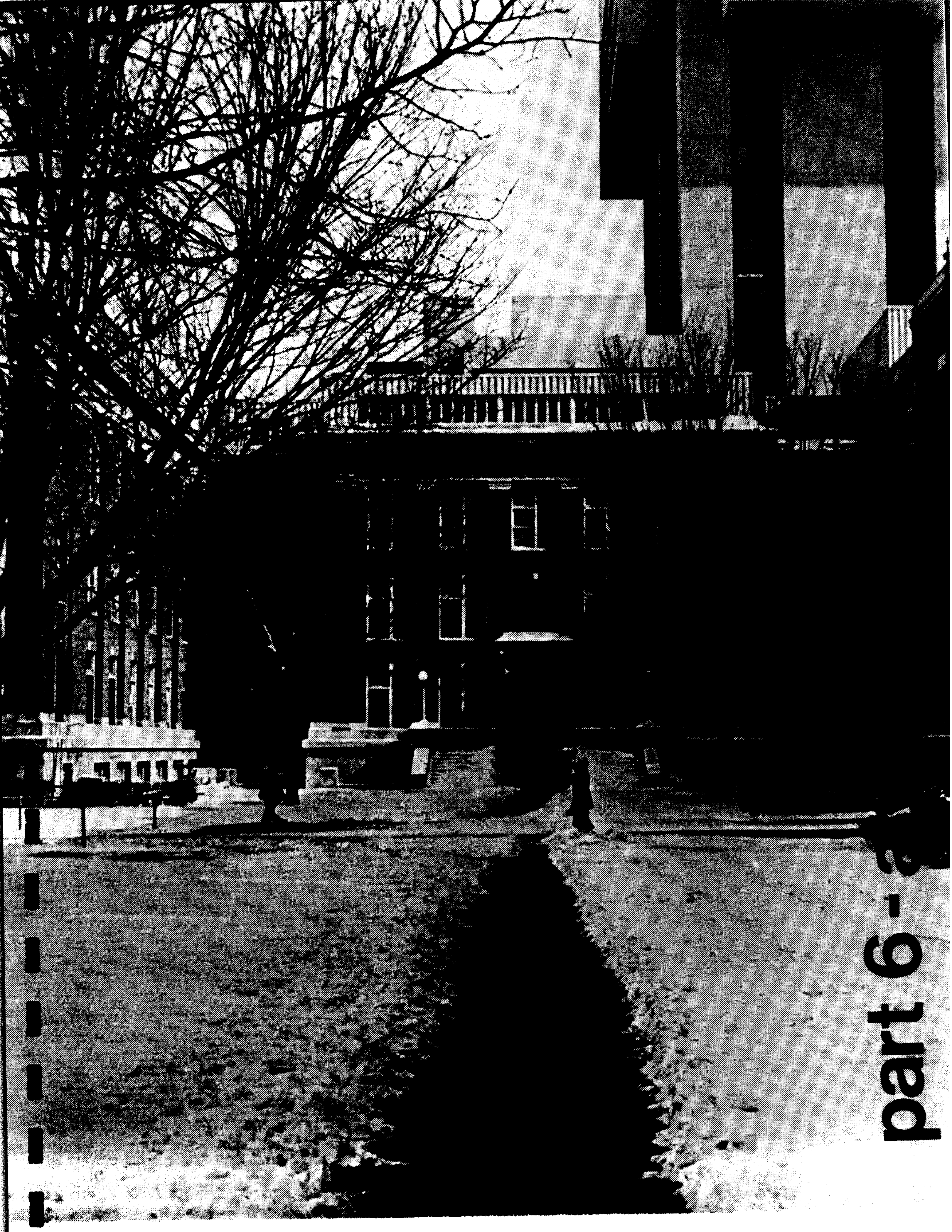
5.22 **FIFTH FLOOR**

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.
THE CERNY ASSOCIATES INC. MINNEAPOLIS, MINNESOTA
MAGNELL, SINGER & KENNEDY INC ST. PAUL, MINNESOTA
MITTEN, LEACH & LINDSTROM INC MINNEAPOLIS, MINNESOTA

JOML
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

REMODELING COSTS


part 6 -

APPENDIX A
CODE REPORT

Code Deficiencies in Part I and Code Corrections in Part 3 relate to this Appendix.

The Code Analysis which follows outlines major code problems and responds to the problems with recommended solutions.

All code considerations have been made as though JOML were to be new construction. Interpretations accounting for the fact that the building is indeed existing must be made by the Building Official. Further, the timing of the implementation of Code Corrections must also be made by the Building Official.

In the preparation of the Code Report, applicable Codes were reviewed, drawings of the existing buildings analyzed, and periodic visits to the site were made.

The applicable Codes include the Uniform Building Code, the Life Safety Code, the newly adopted Chapter 55 of the U.B.C. (which sets forth requirements relating to handicapped persons), and the State Building Code.

On site inspection included investigation of:

Stairs

Type, quantity, and location of plumbing fixtures, drinking fountains, etc.

Fume hood locations

Ventilation system

Plumbing risers and hose cabinets

Panelboards and circuit breakers

Transformer vaults

CODE ANALYSIS

Numbers at the beginning of paragraphs refer to the Project Code Investigation Form included in this Appendix.

4. BUILDING CLASSIFICATION

4.4 ALLOWABLE CONSTRUCTION TYPES

PROBLEM

Except as noted below, the construction of the Sub-Basement through the Third Floor conforms to Type 1 construction. The Fourth and Fifth Floors conform to Type 4-N construction.

The Uniform Building Code does not permit a horizontal fire separation. Therefore, the Fourth and Fifth Floors must receive additional fireproofing to change the present Type 4-N construction to Type 1 construction to comply with UBC Table 17-A.

Some elevator shafts, stair shafts and corridors do not conform to Type 1 construction.

RECOMMENDATIONS

Sub-Basement Through Third Floor

Four or six inch non-labeled masonry or the units at shafts are to receive additional fireproofing to achieve required two hour fire-rated construction.

Corridor walls at Jackson-Owre and Lyon Laboratory need additional fireproofing to conform to one hour fire-rated construction. This can be accomplished by applying 5/8" gypsum plaster to each face.

Replace unrated corridor doors and frames with assemblies bearing a 20 minute label. Provide fire dampers at duct and ventilation openings in corridor walls.

Fourth and Fifth Floors

The exterior metal wall panels and curtainwall along the east and south walls facing Unit "A" and Mayo Auditorium will require additional fireproofing to conform to Type 1 construction (see UBC Section 1803(a)3.)

Provide three hour fireproofing for all structural framing.

Provide fireproofing at corridors and shafts as noted above.

Provide two hour assemblies for presently non-rated roof construction for the 1968 Jackson Hall Addition.

7. CONSTRUCTION

7.1 FIRE RATINGS

The following data indicates existing and required fire ratings for various elements of construction. It is recommended that additional fireproofing be provided to account for those areas where deficiencies exist.

Description	Exist. Const.	Req. of Type 1 Const.
Exterior Bearing Walls		
Millard Hall	4	4
Jackson Hall	4	4
Jackson-Owre Addition	4	4
Lyon Laboratory	4	4
Exterior Non-Bearing Walls		
Lyon Laboratory	4	4
Fourth and Fifth Floor Additions	N	4
Interior Bearing Walls		
In sub-basement only	3	3
Permanent Partitions		
Millard and Jackson Hall	1	1
Jackson-Owre	N	1
Lyon Laboratory	N	1
Fourth and Fifth Floor Additions	N	1
Shafts		
Millard and Jackson Hall	1	2
Jackson-Owre	1	2
Lyon Laboratory	1 & 2	2
Fourth and Fifth Floor Additions	1	2
Structural Framing (columns, girders, beams)		
Millard and Jackson Halls	3	3
Jackson-Owre Addition	3	3
Lyon Laboratory Through Fourth Floor	3	3
Fourth and Fifth Floor Additions	1 & N	3

Description	Exist. Const.	Req. of Type 1 Const.
Floor Construction		
Entire complex (except for Fan Room floors of Millard, Jackson, Jackson-Owre and Fourth Floor revisions to Owre) has concrete pan and joist or concrete joist with tile infill construction.	2	2
Fan Room floor construction noted above	2/N	2
Fourth Floor revisions to Owre - steel framing (fireproofed) with concrete deck.	2	2
Roof Construction		
Owre Hall (May 1931)	N.R.	2
Lyon Laboratory (March 1952)	N.R./2	2
Millard (February 1957, January 1958)	2	2
Jackson (August 1957, August 1968)	N.R./2	2
Jackson-Owre (November 1958)	2	2
Exterior Doors and Windows	No rating required	
Corridors		
Demountable partitions on Fourth Floor Owre do not conform to one hour requirements	1	1

7.2 PARAPETS

PROBLEM

Roof mounted equipment (which requires periodic inspection, service and maintenance in accordance with Mechanical Code SBC 7101 through SBC 8810) located less than six feet of clearance from the edge of the roof or similar hazards require a suitable rail or guard not less than 42" in height.

RECOMMENDATIONS

Provide suitable rails or guard for all roof mounted equipment located less than six feet from the roof edge or similar hazard.

7.4 ATTIC AREA SEPARATION AND VENTILATION (OWRE HALL)

PROBLEM

The entire Fifth Floor of Owre Hall requires a one hour fire-rated barrier to separate these spaces from the combustible construction in the attic space above.

The present open access ladder must be enclosed.

Due to combustible construction, the attic space must be divided into areas not exceeding 3,000 sq. ft.

RECOMMENDATIONS

Provide a one hour fire-rated ceiling assembly between the attic and and Fifth Floor spaces.

Locate the access ladders in an enclosed "hallway" with access from the corridor.

Provide fire-rated door assemblies between corridor and ladder enclosure.

Replace present vertical ladder with a ships ladder having a maximum slope of 60°.

Divide attic space into areas not exceeding 3,000 sq. ft. by partitions extending from the ceiling to the roof. Where the entire attic is equipped with an approved automatic fire-extinguishing system, the attic space may be divided into areas not to exceed 9,000 sq. ft.

Provide attic ventilation. The net free ventilating areas shall be not less than 1/150 of the area of the space ventilated.

7.6 OCCUPANCY SEPARATION REQUIREMENTS

PROBLEM

The JOML Complex requires fire-rated door assemblies at all openings leading to the Mayo Auditorium and Garage.

RECOMMENDATIONS

Replace the existing glass doors and frames between the JOML Complex and the Mayo Auditorium with one hour fire-rated door assemblies.

Replace heavy fire door at entrance to the Mayo Garage with a one hour fire-rated door assembly that will accommodate handicapped persons.

10. EXIT REQUIREMENTS

10.3 NUMBER OF EXITS AND TRAVEL DISTANCE TO EXITS

PROBLEM

The existing stairs provide sufficient exit capacity but most of them do not meet the Code requirements. The travel distance to a qualifying exit exceeds the 150' maximum in the Sub-Basement and on the Basement, Second through Fifth Floors of Owre and Millard Halls.

RECOMMENDATIONS

Exits Required to Maintain the Maximum Travel Distance

Retain enclosed Stairs A and B in Lyon Laboratory and Stair C in the Jackson-Owre Addition.

Enclose and remodel Stair D in Owre Hall and provide a direct exit to the exterior.

Provide a two hour fire-resistant enclosure around open Stair G in Millard Hall with a direct exit to the exterior.

Provide a two hour fire-rated horizontal exitway from two stairs serving the Fifth Floor to the adjacent enclosed stairs in Millard Hall and Jackson-Owre Hall. Increase the width of these stairs to 44".

Communicating Stairs

Provide a two hour fire-resistant enclosure around open Stairs H, I and J with direct exits to the exterior.

Non-Essential Stairs

Remove Stairs E and F and enclose shafts with fire-resistant construction.

10.5 DEAD END CORRIDORS

PROBLEM

The dead end corridors at the Sub-Basement and Fourth Floor exceed the 20'-0" length permitted by Code.

RECOMMENDATIONS

Provide fire-rated door assemblies across dead end corridors to reduce their length to 20'-0" or less.

10.6 CORRIDOR WIDTH

PROBLEM

Portions of the existing corridors on the Second and Fourth Floors of Millard Hall do not have the width required by Code.

EXPLANATION

A 50'-0" segment of the Second Floor corridor east of Lyon Laboratory has a width of only 3'-11".

A short segment of the Fourth Floor corridor near the east end of Owre Hall has a width of only 4'-3".

RECOMMENDATIONS

The 3'-11" corridor east of Lyon Laboratory restricts the horizontal exit from Millard Hall to the stair in Lyon Laboratory and should therefore be increased to the 6'-0" width required by the Life Safety Code.

The 4'-3" corridor restricts the horizontal exit system from Millard Hall to the stair in Owre Hall and presents a major obstacle to handicapped persons. We recommend the adjacent elevator be removed (see Elevator Report), the corridor width increased and a ramp be provided between Millard and Owre Halls.

10.9 ROOM EXIT REQUIREMENTS

PROBLEM

The two existing classrooms at the First Floor of Owre Hall, the Second Floor classroom near the southwest corner of Millard Hall and a Third Floor classroom east of Lyon Laboratory require an additional exit if present functions remain as the occupant loads exceed 50.

RECOMMENDATIONS

Provide one additional exit for the First and Second Floor classrooms noted above. The addition of an exit from the Third Floor classroom does not appear feasible.

Furnish panic hardware on all exit doors from rooms having as occupant load of 100 or more.

10.10 HANDICAPPED EXIT REQUIREMENTS

Handicapped persons can exit from all portions of the building to the outside through the exits to Unit 'A', Mayo Auditorium and Lyon Laboratory.

Any point in the building will be within 150'-0" of any stair conforming to the Code requirements.

11. VERTICAL EXITWAYS

11.2, 11.5, 11.6, 11.8, 11.9, 11.12 VERTICAL EXITWAYS

PROBLEM

The ten existing stairs do not have fire-rated enclosures meeting the requirements of Section 3308d of the Uniform Building Code. The enclosure walls of Stair A and B in Lyon Laboratory and Stair C in Jackson-Owre do not qualify as "two hour" enclosures.

Stairs C_1 and F_1 in Owre and Millard Halls (serving the Fifth Floor only) do not have the required width.

Doors that swing onto landings sometimes encroach on proper landing widths.

Stairs A and B in Lyon Laboratory and Stair C in Jackson-Owre Hall have room doors opening directly into stair enclosures.

Some stairs have risers greater than 7" (maximum recommended for handicapped persons), treads with projecting nosings and landings narrower than permitted.

RECOMMENDATIONS

Provide approved fire enclosures and door assemblies for all stairs scheduled to remain.

All stairs and landings shall have a minimum width of 44".

Remove room doors that open into stair enclosures and relocate beyond enclosure. Close opening with two hour fire-resistive construction.

For new stairs, provide risers with a maximum height of 7" and without projecting nosings.

12. DOORS

12.2 AND 12.3 "B" AND "C" LABEL DOORS

PROBLEM

In general, doors in exit corridor walls, occupancy separation walls, and vertical shaft walls do not bear fire test labels.

NOTE: Doors opening into Stairs A, B and C have 1-1/2 hour (B) fire test labels.

RECOMMENDATIONS

Protect all exit corridors with a tight fitting smoke barrier and fire assembly having a fire-rating of not less than 20 minutes as required by Code. Restrict glass in doors to size permitted for three quarter hour fire doors.

Provide 1-1/2 fire-rated door assemblies at all stairs and vertical shafts.

Provide panic hardware for all exits from assembly areas with an occupant load of 100 or more.

12.4, 12.5, 12.8, 12.9, 12.10, 12.11, 12.12 CORRIDOR REQUIREMENTS, VISION PANELS, SIDELIGHT/TRANSOM REQUIREMENTS, HARDWARE REQUIREMENTS

PROBLEM

Several doors have vision panels larger than permitted by Code.

Some corridor doors have over size glass sidelight and transom panels.

Many of the corridor doors have operable transom panels.

Many doors do not have door closures.

Some exit doors do not have panic hardware.

Some toilet rooms have a 4" to 6" step at the room entrance door. This exceeds the 1" change in floor level permitted by Code. (UBC 3303h).

RECOMMENDATIONS

Corridor doors shall not have vision panels exceeding 1269 square inches; sidelights or transom panels shall not exceed 500 square inches per panel.

All corridors shall have a minimum clear width of 6'-0" as required by Life Safety Code (9-1252).

Exterior exit doors shall have required panic hardware, and closures as required by Code.

Change in floor elevations on either side of the door opening shall not exceed 1" as permitted by Code.

Replace existing corridor doors and frame assemblies with assemblies bearing a twenty-minute fire test label.

Provide fire dampers for all ventilating grilles or ducts penetrating fire-rated barriers.

14. ELEVATORS

14.1, 14.4, 14.5 ELEVATORS

Refer to Appendix B, Elevator Report

15. MECHANICAL (HEATING AND VENTILATING)

15.1 ROOM HEATING UNITS

PROBLEM

Some of the room heating units have cast iron radiators, copper convectors and steel finned tube radiation on the same zone of control.

RECOMMENDATION

The perimeter radiation system described in the concept section of the report should be installed. This system would provide for all perimeter heating in occupied spaces to be done by a pumped hot water system with finned tube perimeter radiation units and individual room controls.

15.2 VENTILATION RATES

PROBLEM

Ventilation rates for many areas of the building do not comply with Code requirements.

RECOMMENDATION

The ventilation systems described in the concept section of the report should be installed to provide adequate ventilation capacity. All areas should be ventilated from the new systems at the rates required by code.

15. MECHANICAL (FIRE CONTROL)

15.3 FIRE DAMPERS

PROBLEM

Some ventilation ductwork passes through fire-rated walls or floors without fire dampers at the points of penetration.

RECOMMENDATION

Fire dampers should be installed in all existing ducts where those ducts penetrate fire rated walls.

15.4 STANDPIPES

PROBLEM

Wet standpipes, fire department standpipes and hose cabinets are not provided at all locations required by Code.

RECOMMENDATION

Standpipes and hose cabinets should be added where necessary to make all areas within the required distance

15.5 AUTOMATIC FIRE EXTINGUISHING SYSTEMS

PROBLEM

Sub-Basement and Basement rooms without at least 20 square feet of opening entirely above the adjoining ground level in each 50 lineal feet or fraction thereof of exterior wall on at least one side of the building do not have automatic fire extinguishing systems.

RECOMMENDATION

Install sprinkler systems in the Sub-Basement and Basement areas not having the required openings.

15. MECHANICAL (ENERGY CONSERVATION)

15.6 BUILDING ENVELOPE

PROBLEM

The thermal transmittance values for the roofs, the overall thermal transmittance values for the combined gross wall areas and the infiltration values for the windows and doors do not meet the energy conservation requirements of the State Building Code.

RECOMMENDATION

Based on the preliminary findings of this report (see Appendix C), a detailed evaluation of the ultimate building envelope should be made to determine the improvements to the roof, walls, windows and doors to attain the thermal transmittance values required by the State Building Code. These values should then be used as a basis for a computerized evaluation of equivalent annual energy consumption with various forms of energy conservation under the provisions of SBC 6012. From these computerized evaluations, a final determination of building envelope improvements should be made.

15.7 VENTILATION SYSTEMS

PROBLEM

Ventilation systems and controls do not comply with the energy conservation requirements of the State Building Code.

RECOMMENDATION

Replace and revise ventilation systems and controls as described in the concept portion of this report to comply with the State Building Code.

16. ELECTRICAL

16.1 FIRE ALARM SYSTEMS

PROBLEM

The existing building has no general fire alarm system which is necessary to meet the requirements of NFPA 101-9-1641 and NFPA 101-6-3 and OSHA.

RECOMMENDATION

A complete fire alarm system should be installed throughout the complex.

16.2 HEAT AND SMOKE DETECTION SYSTEMS

PROBLEM

Heat and smoke detection systems and fan shut downs do not exist on air handling units to meet the requirements of State Code SBC-103.

No fire doors with holders and smoke detection now exist at the stairwells to meet UBC 33086 and UBC-4306.

RECOMMENDATIONS

Provide duct heat and smoke detection and fan shut down systems connected to the general fire alarm system to provide duct smoke alarm and zone annunciation.

Equip new stairway isolation doors with door holders to be released by the fire alarm system on general alarm. Install smoke detectors at each stairway door which release the holders and give general alarm.

16.3 EMERGENCY POWER

PROBLEM

The existing exit sign lighting in the complex is served by circuit breaker panels tapped ahead of the main switchboard disconnect. Life Safety Code 101-5-10215, and 5-11121 requires an emergency source automatically operating in the event of utility failure.

LSC 101-5-10215 requires emergency exit illumination. At the present time no emergency illumination exists in the complex.

Elevator power sources are not served by an emergency source required by State Code SBC-8806K.

RECOMMENDATIONS

Install an emergency generator to provide power to exit signs, exit illumination, elevator loads and proposed fire alarm system.

16.4 POWER FACTOR CORRECTION

PROBLEM

The existing motors or the existing services do not employ Power Factor corrections. The energy conservation requirements of Section 6010 of the State Building Code require power factor correction to be applied to the power distribution system to correct the power factor to 90% or above.

RECOMMENDATIONS

Install capacitors on all new motors, 5 HP and above to correct power factors to above 90%. On existing motors, apply capacitors at motor control centers or major distribution boards.

PROJECT CODE INVESTIGATION

PROJECT: **JOML COMPLEX - REMODELING**

LOCATION: **UNIVERSITY OF MINNESOTA**

1. APPLICABLE GOVERNING STANDARDS		EDITION DATES
1.1) ZONING	N.A.	
1.2) MUNICIPAL	U/M Minneapolis, Minnesota	
1.3) STATE	State Building Code U.B.C. as Amended (1973 Edition)	
1.4) FIRE MARSHAL		
1.5) HEALTH DEPARTMENT	N.A.	
1.6) SPECIAL STATE REGULATIONS		
1.7) SPECIAL FEDERAL REGULATIONS	Department of Health Education and Welfare USA "Design of Barrier-Free Facilities" Life Safety Code.	

COMMENTS:

PROJECT:

PRELIMINARY APPROVALS			PHONE NUMBER
2.1) ZONING:	AGENCY:	N.A.	
	ADDRESS:		
	PERSON(S):		
2.2) MUNICIPAL:	AGENCY:	University of Minnesota	
	ADDRESS:	Minneapolis, Minnesota	
	PERSON(S):	Mr. E. A. Kogl 340 Morrill Hall	373-4522
2.3) STATE:	AGENCY:		
	ADDRESS:		
	PERSON(S):		
2.4) FEDERAL:	AGENCY	Department of H.E.W. Facilities Engineering and Construction	
	ADDRESS:	300 South Wacker Drive - 33rd Floor Chicago, Illinois 60606	
	PERSON(S):	Melvin H. Fisher, P.E.; Regional Engineer Sal A. Cannella, R.E.; Chief, Design and Engineering Samuel R. Curiale, P.E.; General Engineer	

COMMENTS:

PROJECT:

3. ZONING REQUIREMENTS		ZONING REFERENCE
3.1) FIRE DISTRICT:	Fire District #3	373-3167
3.2) PROPERTY ZONE:	N.A.	
3.3) MAXIMUM SITE COVERAGE:	Existing building	
3.4) YARD REQUIREMENTS, FRONT:	Existing	
BACK:	Existing	
SIDE:	Existing	
3.5) BUILDING HEIGHT LIMITATIONS:	Existing building	
3.6) OFF-STREET PARKING:	None	
3.7) OFF-STREET LOADING:	Yes	
3.8) OUTSIDE STORAGE:	None	
3.9) FIRE APPARATUS ACCESS:	Yes	
3.10) OTHER REQUIREMENTS:		

COMMENTS:

PROJECT:

			CODE REFERENCE
1.	BUILDING CLASSIFICATION	E-2 occupancy for laboratories not required if each is provided with 1-hour fire resistive occupancy separation (See UBC Section 1001)	
	4.1) BASIC OCCUPANCY CLASSIFICATION	F-2 See Chapters 6 through 15, Section "01" each chapter for definitions	UBC Table 5A and UBC 1101
	4.2) OCCUPANCY SUB-CLASSIFICATIONS	F-1 (Mayo Garage) may be some work as adjacent building B-3 (Assembly Areas) (See Section 503 for mixed occupancy restrictions) C - (Educational exist. Unit A), B2 Mayo Aud.)	UBC Table 5A and UBC 701
	4.3) STREET FRONTAGE	(Public Street) Sections "03" Chapters 6 through 15	UBC 703
	4.4) ALLOWABLE CONSTRUCTION TYPE(S)	Type 1 (existing building)	

	TYPE # 1		TYPE #		CODE REFERENCE
	AREA	HEIGHT	AREA	HEIGHT	UBC Table 5C for areas UBC Table 5D for height
BASIC LIMIT	UBC Table 5C Unlimited	Table 5D			
INCREASE FOR FIRE ZONE	N.A.				
INCREASE FOR SEPARATION	N.A.				
INCREASE FOR FIRE SPRINKLERS	N.A.	507			
MAX. ALLOWABLE AREA, ONE STORY	Unlimited				
MAX. ALLOWABLE AREA, MULTI-STORY	Unlimited				

4.5)	SPECIAL PROVISIONS:	See UBC Chapter 16 for Fire Zone Restrictions for an Existing Building

COMMENTS:

PROJECT:

5. FUTURE CHANGES		CODE REFERENCE
5.1) CHANGE OF OCCUPANCY	UBC Section 306 UBC Section 502 (Exception: for Existing Buildings)	
5.2) VERTICAL EXPANSION	None	
a. NUMBER OF FLOORS	None	
b. TYPE OF OCCUPANCY	None	
5.3) HORIZONTAL EXPANSION	Mechanical equipment towers	
a. FIRE SEPARATION REQUIRED		
b. TYPE OF WALL REQUIRED	1 hour (exterior non-bearing)	UBC 1803 (a) 3
6. EXISTING BUILDING CONSIDERATIONS - See SBC 103 in Amendment Jan. 14, '75	(Alterations more than 50 per cent)	
6.1) CODE DEFICIENCIES:	See Part 3 - "Code Deficiencies" and Part 6 - "Code Report"	
6.2) REQUIREMENTS FOR ACCEPTANCE:	See Part 3 Code Corrections	
6.3) AGENCY REQUIRING UPDATING:	State and Federal Applicable Codes	

COMMENTS:

PROJECT:

7. CONSTRUCTION			CODE REFERENCE
7.1) FIRE RATINGS	EXTERIOR BEARING WALL	N.A.	UBC 17-A
	EXTERIOR NON-BEARING WALL	Unprotected non-combust. 1-hour	UBC 1803(a)
	INTERIOR BEARING WALL	3-hours Type 1 construction	UBC Table 17-A
	PERMANENT PARTITIONS	1 hour	UBC Table 17-A
	SHAFTS	2 hour	UBC Table 17-A
	COLUMNS	3 hour	UBC Table 17-A
	*TRUSSES, GIRDERS, BEAMS	3 hour	UBC Table 17-A
	FLOOR CONSTRUCTION	2 hour	UBC Table 17-A
	ROOF CONSTRUCTION	2 hour	UBC Table 17-A
	EXTERIOR DOORS AND WINDOWS	No rating require.	UBC 1803(b)
	INNER COURT WALLS	Same as exterior walls	UBC(c)
	CORRIDORS	1 hour	UBC 3304 3304(g)
	RESEARCH LABORATORY WALLS	1 hour	UBC 1001
	*PRIMARY MEMBERS ONLY-SEE UBC 1702		
7.2) PARAPETS	Not required due to exception "3" - unprotected openings in exterior wall.		UBC 1709(a)
7.3) UNIT LIVE LOADS	Existing structure would appear to be sufficient for the program requirements.		UBC Chap.23 for building loads
7.4) ATTIC AREA SUBDIVISION	Verify existing Attic Area Construction.		UBC 3205(a) 3205(b)
7.5) AREA SEPARATION REQUIREMENTS	Existing one building without area separation.		505(d)
7.6) OCCUPANCY SEPARATION REQUIREMENTS B3 and F2 No separation	F-2 and F-1 1 hour separation F-2 and B-2 1 hour separation F-2 and C 1 hour separation		UBC 5-B

COMMENTS:

PROJECT:

8. ENVIROMENTAL CONSIDERATIONS					CODE REFERENCE
8.1) LIGHT:	See Chapter 6 through 15, Sec. "05" of Occupancy Under Consideration.				
8.2) VENTILATION:	See Chapter 6 through 15, Sec. "05" of Occupancy Under Consideration				
8.3) SANITATION: See Chapter 6 through 15, Sec. "05" of Occupancy Under Consideration. Minnesota Plumbing Code 1973 Table 127(b) (1) See Attached.		WATER CLOSET	URINAL	LAVATORY	UBC 1711(a) Handicap Requirements may have to be verified
	PUBLIC, MALE				
	PUBLIC, FEMALE				
	EMPLOYEE, MALE				
	EMPLOYEE, FEMALE				
8.4) DRINKING FOUNTAINS:	One Drinking Fountain for 75 Persons. (State Plumbing Code Table 127(b) (1) UBC Sec. 1712				
8.5) SPECIAL REQUIREMENTS:	See Chapter 55 of the Uniform Building Code, "Facilities for the Handicapped". New location of Drinking Fountains to be verified with mech. engrs. Department of Health Education and Welfare U.S.A. Design of Barrier-Free facilities. Eyewash and safety showers.				

COMMENTS:

PROJECT:

9. OCCUPANCY LOAD AND EXIT WIDTH

)R OR REA	OCCUPANCY	SQUARE FEET	SQ. FT./ PERSON	NO. OF PERSONS	NO. OF PERSONS CONTRIBUTED FROM OTHER AREAS	TOTAL NO.OF PERSONS	REQUIRED EXIT WIDTH	
5th Floor	F2 - Office/Lab.	6,611	100	66		102	2.4'	Min. 2 exits required
	Mechanical	10,868	300	36				One from each room.
4th Floor	F2 - Office/Lab.	59,196	100	591	1/2 of 5th Fl.	642	12.9'	Min. 3 exits
3rd Floor	F2 - Office/Lab.	58,391	100	584)	1/4 of 5th Fl. 1/2 of 4th Fl.	959	19.2'	Min. 3 exits
	B3 - Assembly	805	15	54) 1638				
2nd Floor	F2 - Office/Lab.	56,232	100	562)	1/4 of 4th Fl. 1/2 of 3rd Fl.	1,226	24.5'	Min. 4 exits
	B3 - Assembly	2,964	15	197) 759				
1st Floor	F2 - Office/Lab.	54,977	100	550)	1/4 of 3rd Fl. 1/2 of 2nd Fl.	1,365	(Stair) 27.3'	Min. 4 exits
	B3 - Assembly	4,219	15	281) 831	1/2 of Basement	1,758	(Doors) 35.2'	
Base. Floor	Office/Lab.	52,272	100	523)		786	(Stair) 13.7'	Min. 3 exits
	Assembly	3,968	15	263) 786				

COMMENTS:

PROJECT:

10. EXIT REQUIREMENTS			CODE REFERENCE
10.1)	NUMBER OF EXITS/EACH FLOOR OR AREA:	2 exits above first floor. 2 stairway min. for mezzanine over 2,000 sq. ft. 3 exits - occupant load of 500 to 999-1,000 occupant or more, 4 exits	UBC 3302(a)
10.2)	NUMBER OF EXITS FOR TOTAL BUILDING:	Same as 10.1 (four minimum)	UBC 3302(a)
10.3)	MAXIMUM TRAVEL DISTANCE TO EXIT a. UNSPRINKLERED b. SPRINKLERED c. OTHER	150 feet 200 feet (increase 100 feet when last 150 feet is within a corridor, complying with UBC 3304(g))	UBC 3302(d)
10.4)	MAXIMUM TRAVEL DISTANCE TO MINIMUM PROTECTION a. UNSPRINKLERED b. SPRINKLERED c. OTHER	Required in Sub-basement	UBC 3317 (c)
10.5)	DEAD END CORRIDOR LIMIT	20 feet	
10.6)	MINIMUM CORRIDOR WIDTH: PRIMARY:	44" 7'-0" in height See UBC 3304(d) for projections. Exceptions for door fully opened.	UBC 3304(b) UBC 3304(c)
10.7)	HORIZONTAL EXIT REQUIREMENTS	1-1/2 hour doors	UBC 3307(b)
10.8)	MINIMUM FIRE AREA/FLOOR	3 sq.ft./person	UBC 3307(c)
10.9)	ROOM EXIT REQUIREMENTS	See Table 33A	
10.10)	HANDICAPPED EXIT REQUIREMENTS	Ramps or elevators required to all areas except mechanical rooms - see also UBC 5502*	

COMMENTS: *Special provisions for handicapped persons.

PROJECT:

11. VERTICAL EXIT WAYS	STAIRS	CODE REFERENCE	RAMPS	CODE REFERENCE
11.1) CLASS REQUIRED (NFPA 101)	None		None	
11.2) MINIMUM WIDTH	Over 50 people = 44" 50 people or less= 36"	UBC 3305 (b)	Over 50 people = 44" 50 people or less	UBC 3306 (b)
11.3) MAXIMUM DISTANCE BETWEEN LANDINGS	12'-0" vertically	UBC 3305 (h)	Each 5' rise if slope is over 1:15	UBC 3306 (d)
11.4) CAPACITY/EXIT UNIT	One foot for 50 people	UBC 3302 (b)	One foot for 50 people	UBC 3302 (b)
11.5) WIDTH REQUIRED				
11.6) ENCROACHMENTS	Trim - 3-1/2" total Handrails - 3-1/2" each side	UBC 3305 (b)	Same as stair	UBC 3306 (b)
11.7) MINIMUM HEADROOM CLEARANCE	6'-6" (6'-8" NFPA 101)	UBC 3305 (o)	7'-0"	UBC 3304 (c)
11.8) MAXIMUM RISER	7-1/2" 7" for handicapped	3305 (c)		
11.9) MINIMUM TREAD	10"	3305 (c)		
11.10) MAXIMUM SLOPE			1:12 Handicapped) 1:8 Other	SFM UBC 5502 UBC 3306 (c)
11.11) SMOKE PROOF TOWER	Required when highest floor is 75'-0" above grade	3309 (b)		
11.12) MINIMUM LANDING SIZE	*Equal to width of stair	3305 (f)	5' top and intermediate 6' at bottom	3306 (d)

COMMENTS: *Landing shall not be reduced in width by more than 3-1/2 by a door when fully open.

PROJECT:

12. DOORS			CODE REFERENCE
12.1)	"A" LABEL REQUIRED	3 hour fire assembly in 3 hour occupancy separation 4 hour fire assembly in 4 hour occupancy separation others	UBC 503(c) 1, 2 3, 4 505 (d,i)
12.2)	"B" LABEL REQUIRED	1-1/2 hour in 2 hour occupancy separation 1 hour in 1 hour 1-1/2 hour in 2 hour area separation other	503 (c-3) UBC 503 (c-4) 505 (d-1)
12.3)	"C" LABEL REQUIRED	Varies	3304 (h) for corridors
12.4)	CORRIDOR REQUIREMENTS	20 minutes door in 1 hour corridor 1/4" wire glass set in steel frames	UBC 3304 (h) (b)
12.5)	VISION PANELS	3 hour door - none 1-1/2 hour or 1 hour door - 100 sq. in w/min. 4" dimension 3/4 hour door (steel, wood or plastic faced doors) 1,296 sq. in.	UBC 4306 (f) and (h
12.6)	SMOKE DOORS	N.A.	
12.7)	MAXIMUM DISTANCE BETWEEN SMOKE DOORS	300 ft.	
12.8)	SIDELIGHT/TRANSOM REQUIREMENTS	3/4 hour 84 sq. ft. (max. dim. 12') (fire window) 1/4" wire glass	UBC 4306 (g) and (h
12.9)	PANIC DEVICES REQUIRED	All exit doors	UBC 3303 (c) 3301 (c)
12.10)	CLOSURES REQUIRED	All labeled doors	UBC 4306 (e)
12.11)	HOLD-OPEN DEVICE REQUIRED		
12.12)	SPECIAL REQUIREMENTS FOR HANDICAPPED	See SBC 8901 Max. 1" threshold	UBC 3303 (h)

COMMENTS:

PROJECT:

13. INTERIOR FINISHES			CODE REFERENCE
13.1) FLAME SPREAD RATINGS (All Occupancies) Flame spread ratings are based on non-sprinkled classified occupancies. Note: Where approved full fire-extinguishing system protection is provided, the flame-spread classification rating may be reduced one classification, but in no case shall materials having a classification greater than Class III be used. (Table #42-B min. interior finish classification).	STAIRWAY	I	UBC Chart 42-B
	CORRIDOR	II	
	ROOMS	III	
	OTHER		
13.2) CEILING FINISHES	Same as in 13.1		
13.3) CARPET RATING REQUIRED	Not enough information		
14. ELEVATORS for Minnesota	ANSI A17-1, State Handicapped Code (SFM) and UBC 5507 State Building Code SBC Amendment Jan. 14, 1974		SFM 565 SBC 8806.2
14.1) MINIMUM SIZE OF PLATFORM	6'-4" x 4'-5" car in public building or 5'-4" if wheelchair use only		SFM 565 SBC 8806.2
14.2) PIT AND OVERTRAVEL REQUIREMENTS	PIT = 3'-0" min. overhead 2'-0" with piston in stop ring. and 3'-0" with car at top landing		SBC 8806.2
14.3) DOOR REQUIREMENTS	32"		SBC 8806.2 SFM 565 (b)
14.4) FIRE DEPARTMENT/EMERGENCY CONTROL OPERATION	Minnesota - one for Fire Department		SBC 8806.2
14.5) SHAFT VENTING	In elevators serving more than three floors		ANSI A17-1 Sec. 100.4
14.6) OTHER REQUIREMENTS			

COMMENTS:

PROJECT:

15. MECHANICAL (HEATING AND VENTILATING		CODE REFERENCE
15.1 Room Heating Units	Correct problems encountered.	SBC 7615
15.2 Ventilation Rates	Correct problems encountered.	SBC 7702
15. MECHANICAL (FIRE CONTROL)		
15.3 Fire Dampers	Correct problems encountered	SBC 7736/8502
15.4 Standpipes	Add standpipes, hose cabinets, Fire Dept. standpipes, hose cabinets as required by Univ. Code Officials.	UBC 3803, 380
15.5 Automatic Fire Extinguishing Systems	Add in Sub-bsmt. add in Bsmt. rooms w/o adequate openings to outside.	UBC 3801
15. MECHANICAL (ENERGY CONSERVATION)		
15.6 Building Envelope	Make complete analysis as per App. C.	SBC 6006, 601
15.7 Ventilation Systems	Upgrade central unit controls and eliminate reheat coils where possible.	
15.10 Portable Fire Extinguisher	Will be required	
a. Locations	Corridors and other public spaces, based upon the minimum Life Safety	requirements
b. Types	A, B and C Types	
c. Maximum travel distance	As required by Code	
d. Special Hazards	Safety showers and eye wash as required.	

COMMENTS:

PROJECT:

16. ELECTRICAL	CODE REFERENCE
16.1 Fire Alarm Systems	101-9-1641 101-6-3 OSHA-NFPA-72A
16.2 Heat and Smoke Detection Systems	SBC-103 UBC-3308c UBC-4306
16.3 Emergency Power	101-5-10215 SBC-6806k 101-1411 UBC-3312
16. ELECTRICAL (ENERGY CONSERVATION)	
16.5 Power Factor Correction	SBC-6010

COMMENTS:

APPENDIX B
ELEVATOR REPORT

The following Elevator Report is a review of the existing JOML elevators with respect to compliance with Code. It was prepared by LERCH, BATES & ASSOCIATES, INC. of Denver, Colorado.

Consideration of adequacy of service was outside of their scope of work. Such consideration should occur as a part of a subsequent design phase when programmatic and population data are developed and finalized.

TABLE OF CONTENTS

SECTION 1

DISCUSSION

A. STUDY OBJECTIVES AND LIMITATIONS

On November 25 and 26, 1975, we made an inspection of the 8 operating elevators within the Jackson-Owre-Millard-Lyon (JOML) Building Complex. The purpose was to identify features required by latest elevator codes for new installations which are not presently provided on these elevators.

We did not check aesthetic features that relate to architectural design, handicapped access and usage, comfort, convenience for use, etc. We did not check on the adequacy of construction of hoistways and machine spaces to meet building fire codes and structural requirements.

We restricted this study to elevator code requirements set forth in the American National Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks (ANSI A17.1-1971) and yearly Supplements thereto. This is the applicable code in the State of Minnesota (with minor local variations).

B. REPORT FORMAT

Hereafter we have listed some 20 areas in which existing elevators do not comply with code requirements for new installations. Section 2

describes each individual elevator briefly and notes the code deficiencies applicable to that elevator. Appendix A includes code references relating to each of the common items.

We should note that:

1. Code provisions outlined are not presently being required on existing elevators so compliance is not mandatory.

2. The elevator code includes many requirements relating to equipment design, strength of materials, factors of safety and methods of installation. To check all these items would require a very lengthy survey and study. We felt such a check was unnecessary. Rather, we suggest the periodic testing of primary safety devices - buffers, governors and the car safety serve to substantiate the adequacy of component design.

   As a part of any program to upgrade elevators with reference to code requirements, we recommend that the 5-year test of safety, buffers, etc., be conducted and tested equipment be appropriately tagged. Appendix B includes code information on the required tests.

3. Judgment should be exercised in selecting items for any planned program for code upgrading. Some items listed would be very

costly, possibly introduce problems in equipment use or maintenance and possibly be of limited utility or need in improving safety. Other items can be inexpensively and easily accomplished - and represent substantial improvement in safety.

In the listing hereafter, we have marked items according to our judgment as to their importance as follows:

* relatively unimportant (do if you want and have the money)

** important (try to find the money to accomplish)

*** very important (priority)

C. COMMON DEFICIENCIES LIST

The following is a listing of common deficiencies noted with a short description and comments as appropriate:

MACHINE ROOM

* 1. Entry Door

Access doors to elevator machine rooms must be self closing and self locking.

* 2. Enclosure

Elevator equipment must be separated from other mechanical equipment by an enclosure.

* 3. Access

Safe and convenient access must be provided for the elevator machine room. Vertical ladders are not applicable for elevation differences exceeding 3'-0".

HOISTWAY

* 4. Ledges

Projections of over 2" must be returned to the wall at an angle of not less than 75° with the horizontal.

* 5. Venting

A minimum of 3 sq. ft. of venting to outside air is required per elevator hoistway.

*** 6. Access Means

Provision must be made for gaining access at the top and bottom of each hoistway for maintenance and inspection. (We prefer hoistway access switches for this purpose because they allow a single maintenance man to easily and safely get on top of the car or into the pit.)

PITS

** 7. Illumination

Every pit must have a light with the switch accessible from the pit access door. (We also recommend a grounded utility outlet in each pit.)

*** 8. Stop Switch

There must be switch in each elevator pit to stop the car in case of emergency. The switch must be accessible from the pit access door.

*** 9. Pit Access

Ladder access must be provided for every pit over 4'-0" deep unless other means (door) is provided from pit level. (We recommend a pit access ladder for any elevator irrespective of pit depth.)

CAR

*** 10. Secured Car Top Exit

The emergency exit to the car top must be arranged so that it can be opened only from on top of the car and it must be hinged or attached in some permanent manner.

*** 11. Emergency Lighting

Every passenger elevator must have an alternate lighting source in case normal car lighting fails. (We recommend individual car, battery-operated units for existing elevators.)

** 12. Communication

Means for 2-way communication must be provided on every elevator.

*** 13. Car Top Operating Station

Controls for operating the elevator from on top of the car (for maintenance and inspection) must be provided on every elevator.

ENTRANCES

*** 14. Space

Swing hoistway doors must have no more than 3/4" between the inside door face and the edge of the landing sill. Distance between hoistway door and car door may not exceed 5-1/2" with swing hoistway doors. (If the space exceeds either dimension, filler pan or grille can be placed on the back of the hoistway door.)

** 15. Panel Design

Entrance door panels must be essentially flush across their surface.

* 16. Entrance Fire Testing

Hoistway entrances must bear fire test labels. (Testing is made of the entire entrance including interlocks, hangers, sills, etc. Compliance with this requirement would involve replacement of every hoistway entrance and the related material for operation and support. In our judgment, this would be prohibitively costly.)

*** 17. Door Protective Device

If door closing pressure exceeds 2-1/2 ft. lbs., a reopening device is required. (We recommend safety edges and light rays for all passenger elevators.)

OTHER

*** 18. Special Emergency Service

Every elevator serving 3 or more floors must be provided with key switch and smoke sensors connected to return the elevator nonstop to the exit level in the event of fire or other emergency. (We would recommend the return key switch. Smoke sensors are quite expensive and subject to misuse or accidental actuation. In sprinklered building, the sensors are not required by code.)

* 19. Floor Numbers

Numbers identifying each floor level shall be provided inside the hoistway in line with the car door.

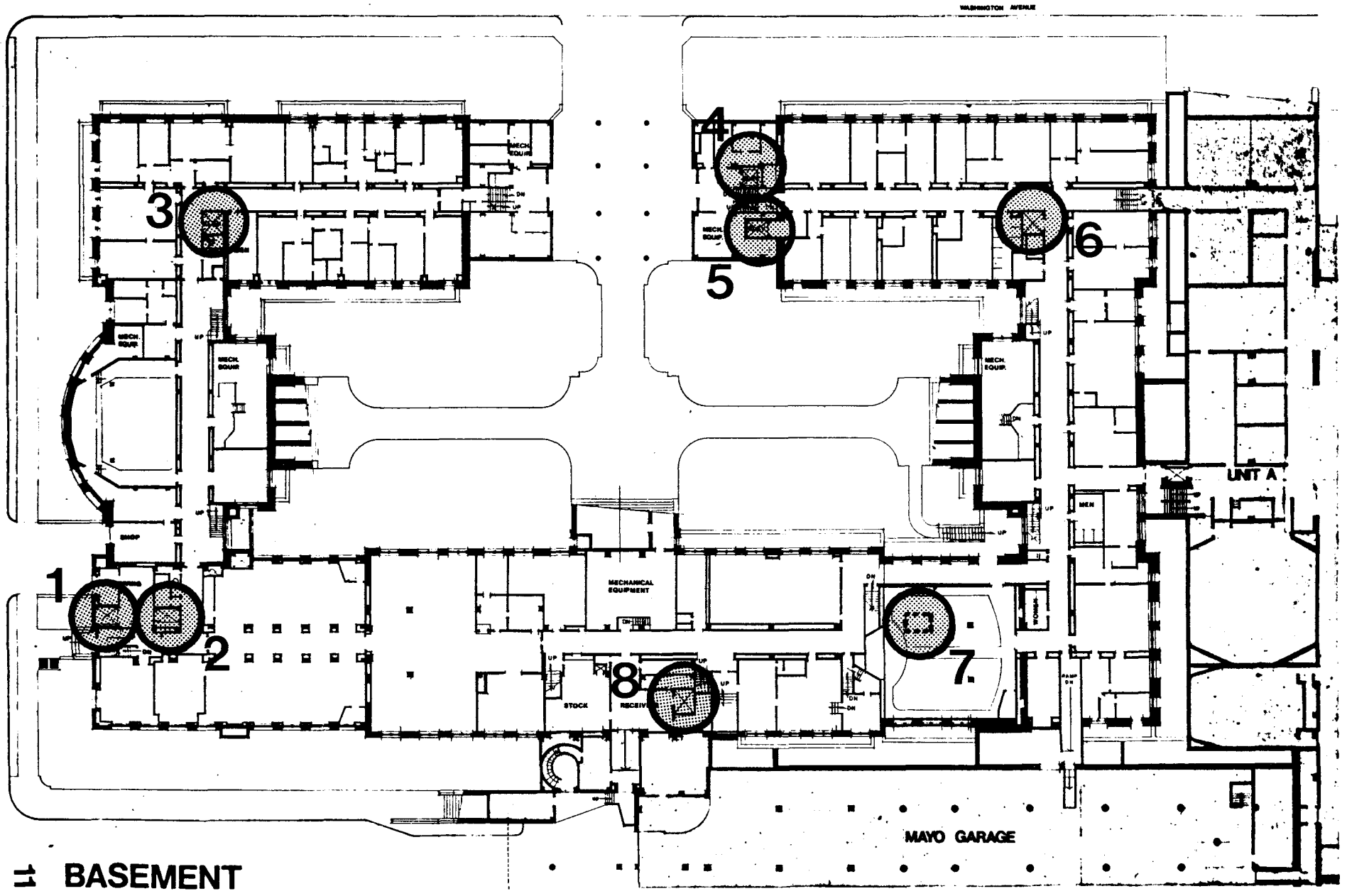
SECTION 2

DISCUSSION OF INDIVIDUAL ELEVATORS

A. GENERAL

The plan on the facing page identifies the elevators inspected. The numbering system used hereafter for each elevator is based on these designations. Facing each page hereafter is a short summary of the common deficiency list. Numbers for each elevator can be referenced from this list.

With the exception of No. 7, which is an antique, elevators in these buildings are well maintained and equipment is of relatively modern design.



11 BASEMENT

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
MINNEAPOLIS MINNESOTA

THE ARCHITECTS COLLABORATIVE, INC. CAMBRIDGE, MASS. &
THE HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.
MINNEAPOLIS MINNESOTA
ST. PAUL MINNESOTA
MINNEAPOLIS MINNESOTA

JOMI.
JACKSON OWRE MILLARD LYON
COMPLEX REMODELING

ELEVATORS

COMMON DEFICIENCIES

1. Machine room entry door not self closing and self locking.
2. Elevator equipment not properly enclosed.
3. Machine room access is not safe and convenient.
4. Ledges exist in the hoistway.
5. Hoistway is not vented.
6. Hoistway access switches not provided.
7. Pit light required.
8. Pit stop switch required.
9. Pit access ladder required.
10. Top exit not secured.
11. No car emergency lighting (required on passenger elevators only).
12. No 2-way communication means in car.
13. No car top operation station.
14. Excessive space - hoistway door face to sill edge.
15. Door panels not flush.
16. Hoistway entrances not fire labeled.
17. No car door safety edge.
18. Return switch for fire condition required.
19. No floor numbers in hoistway.

B. DESCRIPTION AND DEFICIENCIES

1. Elevator No. 1 (Freight)

PURPOSE:	ALLOWS FREIGHT MOVEMENT BETWEEN BASEMENT AND GROUND LEVELS
MANUFACTURER:	HELLER ELEVATOR COMPANY
DUTY:	4000# AT 30 F.P.M.
HOISTWAY DOORS:	VERTICAL BI-PARTING (MANUAL)
CAR DOORS:	2-SECTION VERTICAL-RISE GATE (MANUAL)
OPERATION:	AUTOMATIC PUSHBUTTON
COMMON DEFICIENCIES:	ITEMS 1, 2, 7, 9 AND 10
OTHER RECOMMENDED ITEMS:	ITEMS 11 AND 13 PROVIDE LIGHT ON CAR TOP

2. Elevator No. 2 (Passenger)

PURPOSE:	PASSENGER ACCESS FOR FLOORS B, G, 1 THROUGH 4
MANUFACTURER:	LAGERQUIST ELEVATOR COMPANY
DUTY:	4000# AT 200 F.P.M.
CAR AND HOISTWAY DOORS:	2 SPEED, SIDE OPENING (POWER)
OPERATION:	SELECTIVE COLLECTIVE
SIGNALS:	CAR AND HALL POSITION INDICATORS
DOOR PROTECTION:	CAR DOOR SAFETY EDGE
COMMON DEFICIENCIES:	ITEMS 1, 5, 7, 10, 11, 12, 16, 18 AND 19
OTHER RECOMMENDED ITEMS:	NONE

3. Elevator No. 3 (Passenger)

PURPOSE:	PASSENGER ACCESS FOR FLOORS B, G, 1 THROUGH 4 (KEY CONTROLLED HALL BUTTONS)
MANUFACTURER:	HAUGHTON ELEVATOR COMPANY
DUTY:	3500# AT 200 F.P.M.
CAR AND HOISTWAY DOORS:	2 SPEED, SIDE OPENING (POWER)
OPERATION:	SELECTIVE COLLECTIVE
SIGNALS:	CAR AND HALL POSITION INDICATORS
DOOR PROTECTION:	CAR DOOR SAFETY EDGE
COMMON DEFICIENCIES:	ITEMS 1, 5, 7, 9, 10, 11, 12, 16, 18 AND 19
OTHER RECOMMENDED ITEMS:	PATCH HOLES IN HOISTWAY WALLS

4. Elevator No. 4 (Passenger)

PURPOSE:	PASSENGER ACCESS FOR FLOORS B, G, L THROUGH 4
MANUFACTURER:	LEE HOFF ELEVATOR COMPANY
DUTY:	3000# AT 100 F.P.M.
CAR DOORS:	3 SPEED, SIDE OPENING (POWER)
HOISTWAY DOORS:	SWING (MANUAL)
OPERATION:	SELECTIVE COLLECTIVE
SIGNALS:	CAR POSITION INDICATOR ROTATING DIAL POSITION INDICATION IN HALL PUSHBUTTON FIXTURE
DOOR PROTECTION:	NONE
COMMON DEFICIENCIES:	ITEMS 1, 4, 5, 6, 7, 8, 11, 12, 13, 14*, 16, 17, 18 AND 19
OTHER RECOMMENDED ITEMS:	NONE

* this item should be checked - we overlooked it when inspecting

5. Elevator No. 5 (Freight)

PURPOSE:	FREIGHT MOVEMENT BETWEEN BASEMENT AND GROUND LEVELS
MANUFACTURER:	R & O ELEVATOR COMPANY
DUTY:	3000# AT 30 F.P.M.
CAR DOORS:	2-SECTION VERTICAL-RISE GATE (MANUAL)
HOISTWAY DOORS:	VERTICAL BI-PARTING DOORS (MANUAL)
OPERATION:	AUTOMATIC PUSHBUTTON
COMMON DEFICIENCIES:	ITEMS 1, 2, 3, 7, 8 AND 10
OTHER RECOMMENDED ITEMS:	ITEMS 9, 11 AND 13 PROVIDE LIGHT ON CAR TOP

6. Elevator No. 6 (Passenger)

PURPOSE:	PASSENGER ACCESS, GROUND THROUGH 4TH FLOORS
MANUFACTURER:	OTIS ELEVATOR COMPANY
DUTY:	4000# AT 100 F.P.M.
CAR DOORS:	2 SPEED (POWER)
HOISTWAY DOORS:	2 SPEED (POWER) EXCEPT AT 4TH FLOOR (SWING-MANUAL)
OPERATION:	SELECTIVE COLLECTIVE
SIGNALS:	CAR AND HALL POSITION INDICATORS
DOOR PROTECTION:	CAR DOOR SAFETY EDGE
COMMON DEFICIENCIES:	ITEMS 1, 5, 7, 8, 10, 11, 12, 13, 14, 16, 18 AND 19
OTHER RECOMMENDED ITEMS:	NONE

7. Elevator No. 7 (Freight)

PURPOSE:	PROVIDE BRIDGE BETWEEN 4 AND 5 LEVELS IN ABUTTING BUILDINGS
MANUFACTURER:	HELLER ELEVATOR COMPANY
DUTY:	1500# AT 25 F.P.M.
CAR DOORS:	COLLAPSING GATE
HOISTWAY DOORS:	SWING
OPERATION:	AUTOMATIC PUSHBUTTONS
SIGNALS:	NONE
DOOR PROTECTION:	NONE
COMMON DEFICIENCIES:	ELEVATOR DOES NOT MEET CODE IN ANY RESPECT - SHOULD BE REPLACED IF NECESSARY FOR BUILDING USE

8. Elevator No. 8 (Passenger)

PURPOSE:	PASSENGER ACCESS TO BUILDING FLOORS GROUND, 1 THROUGH 5
MANUFACTURER:	OTIS ELEVATOR COMPANY
DUTY:	2700# AT 200 F.P.M.
CAR AND HOISTWAY DOORS:	CENTER OPENING (POWER)
OPERATION:	SELECTIVE COLLECTIVE
SIGNALS:	CAR AND HOISTWAY POSITION INDICATORS
DOOR PROTECTION:	CAR DOOR SAFETY EDGE
COMMON DEFICIENCIES:	ITEMS 1, 4, 5, 6, 7, 8, 10, 11, 12, 15, 16, 18 AND 19
OTHER RECOMMENDED ITEMS:	PIPING FOR ELECTRICAL POWER FOR ELEVATOR GOES THROUGH THE HOISTWAY - THIS IS NOT ALLOWABLE BY CODE BUT WE DO NOT RECOMMEND ANY CHANGE

APPENDIX C
ENERGY CONSERVATION REPORT

The increasing scarcity of fuels and the tightening restraints on energy consumption by government agencies make energy conservation a primary consideration in the long range planning for the Jackson/Owre/Millard/Lyon building complex remodeling. This is primarily a research laboratory facility, and as such is exempt, to a great extent, from the 1975 Energy Conservation Amendments to the Minnesota State Building Code. The University policy to be followed in this document, however, is that the State Energy Code will be complied with except where laboratory procedures or other building functions require that the exemptions to the Code be taken.

Compliance with the State Building Code (SBC) can be accomplished by two different methods. The first is to meet the detailed requirements of the code established in SBC Sections 6006 through 6011 for the building exterior envelope; Heating Ventilating, and Air Conditioning (HVAC) systems; HVAC equipment; service water heating systems; electrical distribution systems and lighting systems. The second method is to substitute a design of building and energy-using service systems for which the total annual amount of those forms of building energy covered by SBC 6006 through SBC 6011 (expressed as equivalent Btu's or equivalent Kwh) is less than that for the building and systems designed according to SBC 6006 through SBC 6011.

The existing JOML Building Complex does not meet the detailed requirements of SBC 6006 through SBC 6011. The remodeling recommended in this report would involve changes to the HVAC systems, HVAC equipment, service water heating equipment, electrical distribution and lighting systems; and these systems could be improved to comply with the code. Changes to the building envelope would not be easily accomplished, however, and preliminary studies indicate that a large monetary investment would be required.

The data in Tables C-1 and C-2 show typical existing thermal transmittance characteristics of the existing building envelope. The State Building Code requirements set down in SBC 6006 and average existing values are summarized as follows:

	Therm.Trans. - BTU/sq.ft.-Hr.-^{o}F	
	Existing	SBC 6006
Ceiling/Roofs	.15	0.10
Combined Gross Wall (includes windows)	.54	0.22

The additional roof insulation (standard preformed roof insulation) which would be required to improve the existing roof values to meet the code requirement varies from approximately 1" to 2½".

To meet the code requirement for the combined gross wall area, even if the existing windows were replaced with new triple insulating glass with one-half inch air spaces and new frames, would require that an unrealistic thickness of insulation be added to the existing walls.

The information above shows that meeting the detailed code requirements for the building envelope is extremely difficult and preliminary estimates indicate that it is also prohibitively expensive. The second method of compliance with the code by the equivalent annual energy consumption method should, therefore, be considered.

Preliminary rough calculations indicate that the peak heating rate for outdoor ventilation air is approximately 8 times the amount of heat that could be saved by improvement of the combined gross wall thermal transmittance and roof transmittance to the code required values. This is an indication of the probability of saving, by alternate methods, an amount of energy equal to that which could be saved by building envelope improvements.

All of the preliminary results indicate that a detailed evaluation of the building envelope should be made to determine exact requirements for improvements to the roof, walls, windows, and doors to attain the thermal transmittance values required by the State Building Code. These values should then be used as a basis for a computerized evaluation of equivalent annual energy consumption with alternative forms of energy conservation under the provisions of SBC 6012. From these computerized evaluations a final determination of building envelope improvements and additional energy conservation methods to be used should be made.

The provisions of SBC 6012 allow alternate building and system designs which can be shown to reduce the total energy supplied to a similar building which would have followed the detailed requirements of SBC 6006 through SBC 6011. The analysis of the alternative designs must be done on an annual basis comparing energy consumption for the building design meeting the detailed requirement with the alternative design.

The following is a list of energy conservation methods. Where these methods go beyond code requirements they may be considered possible substitutions for use in the method described above.

ENVIRONMENTAL DESIGN CRITERIA

The environmental design criteria are in strict accordance with the State Building Code. The winter indoor conditions are 68°F and 20% relative humidity when the outdoor temperature is -19°F; and the summer indoor conditions are 78°F and 55% relative humidity when the outdoor conditions are 89°F dry bulb and 75°F wet bulb. These indoor & outdoor design criteria will require improved design only where the building users show that a procedural or storage condition necessitates the improvement.

SPACE TEMPERATURE CONTROL

Space temperature control will be achieved whenever possible by the use of variable-air-volume (V-A-V) terminal devices. The use of V-A-V terminals provides not only an economical means of space temperature control, but also requires minimum energy consumption by fan systems. V-A-V terminals connot be used where constant air changes are a requirement.

VENTILATION

Outside air ventilation quantities will be limited to the minimum rates allowed by the State Code except for areas where higher ventilation rates are required for specific laboratory or other special building functions. The building ventilation systems will be designed for cooling with outdoor air when outdoor air temperatures allow.

EQUIPMENT OPERATION

The zones supplied by individual supply air units will be small to allow operation of minimal equipment to supply one space and also to allow units to be shut down when spaces are not occupied.

A program should be implemented to provide shut-down of units when spaces are not occupied and to take advantages of the consequent energy savings.

FUME HOODS

Fume hoods should be operated to conserve maximum energy without causing hazards. Where large numbers of hoods are grouped, auxiliary air supply systems should be installed to provide tempered air in winter and unconditioned air in summer for exhaust requirements in excess of normal room ventilation requirements.

A safe supervised system should be provided to allow shutdown of those hoods not in use for long periods of time.

Storage space for volatile liquids should be provided to allow shutdown of fume hood fan systems which operate for ventilation of volatile storage only.

HEAT RECOVERY

Heat recovery should be provided on systems where the installation cost can be justified. Supply and exhaust air systems which run continually such as those serving animal areas will have heat recovery systems of either a thermal wheel or a run-around type.

As each space is remodeled the new systems installed and existing systems to remain should be evaluated for installation of heat recovery equipment. This evaluation should include all exhaust air including fume hood exhausts, steam condensate including flash steam vents, and plumbing wastes from equipment using large quantities of hot water.

PERIMETER RADIATION

The system of perimeter radiation recommended is a forced hot water system through finned tube units with individual space control. This system will eliminate heat wasted by unsatisfactory controls and system inertia. The system will react quickly to heating needs and will allow maximum use of solar heat gains available in winter.

TEMPERATURE CONTROL

Temperature controls shall be selected for maximum energy conservation. Heating and cooling temperatures of air and water system should be delivered at respective minimums and maximums to provide precise control without wasteful recooling or reheating. Controls on existing equipment should be evaluated and revised where economically justified.

INSULATION

The insulation for existing and new equipment, piping and ductwork will be provided to meet the latest requirements of the State Code.

The installation of insulation thickness greater then Code requirements should be evaluated and the extra insulation should be installed where economically justified.

MECHANICAL EQUIPMENT

Mechanical equipment will be selected for maximum efficiency. Evaluations should be made for equipment such as fans and pumps to determine if energy savings can be made through the use of variable volume equipment.

Equipment sizes will be carefully evaluated for selection of equipment at economical operating points. Where equipment is selected with reserve for future expansion, the use of multiple units will be considered for operation at maximum efficiency during periods of reduced capacity.

PLUMBING SYSTEMS

Plumbing systems should be designed for maximum conservation of energy. Hot water heating temperatures should be set as low as the usage of the system will allow without excessive need for storage and consequent heat loss because of increased surfaced areas.

Hot water outlets should be selected to eliminate waste. Timed delivery systems and flow limiting type equipment should be provided.

ELECTRICAL EQUIPMENT

Power factor correction will be applied at existing motors and new motors. Power factor correction will reduce the necessary current in the supply conductors and main electrical service and will thereby reduce I^2R losses.

LIGHTING SYSTEMS

All new lighting systems in the corridors, laboratories, classrooms and offices will be designed using lamp sources with efficiencies in excess of 55 lumens per watt. Only special accent lighting and display lighting will be lower efficiency lamps. All corridors, laboratories and classrooms will incorporate dual level switching to allow reduced lighting levels during peak load periods or times when task requirements are less. All new fixtures with the exception of corridor fixtures will have a coefficient of utilization greater than .55 when the room cavity ratio is 1. Corridor fixtures will have a coefficient of utilization of greater than .70.

TABLE C-1 U-VALUES ROOF

Building		Therm. Tran. Value Btu/sq.ft. - hr -°F
Jackson Hall-North		0.133
Jackson Hall-South wing		0.122
Jackson/Owre		0.122
Owre Hall		0.269
Millard Hall		0.122
Lyon Laboratory		0.150
	Average	0.153

TABLE C-2 U-VALUES WALLS

Wall* Section	Gross Wall Area Sq. Ft.	Window Area Sq. Ft.	Window as % of Gross Wall Area	Thermal Trans. Gross Wall	Thermal Trans. Window
I	659	287	43.6	0.45	0.93
II	747	296	39.7	0.51	0.98
III	662	291	43.8	0.51	0.94
IV	469	199	42.4	0.75	1.01
			Weighted Average	0.54	

* Wall Section I is a typical section of the south wall of Jackson/Owre Hall.
Wall Section II is a typical section of the south wall of Owre Hall.
Wall Section III is a typical section of the north wall of Millard Hall.
Wall Section IV is a typical section of the north wall of Lyon Laboratory.

TABLE C-3 WINDOW REPLACEMENT COST

TYPE	NUMBER OF WINDOW UNITS*	S.F./UNIT	COST/S.F.	COST/UNIT	SUBTOTAL
A	4	5.5	27.95	$ 153	$ 610
B	5	56	21.70	1,215	6,080
C	1	38	24.15	920	920
D	18	54	23.00	1,240	22,360
E	3	26	24.23	630	1,890
F	29	64	22.90	1,470	42,500
G	56	61	23.40	1,430	79,930
H	3	31	23.50	730	2,190
I	13	43	23.25	1,000	13,000
J	2	18	28.90	520	1,040
K	30	22	26.50	590	17,490
L	30	26	24.23	630	18,900
M	11	9.5	30.13	290	3,160
N	9	54	23.00	1,240	11,800
O	54	62	23.30	1,445	78,010
P	4	24	21.70	520	2,080
Q	249	10	30.00	300	74,700
R	257	61	23.40	1,430	366,840
S	67	31	24.20	750	50,260
T	16	95	22.63	2,150	34,400
U	5	40	24.25	970	34,400
V	248	15	32.00	480	119,040
					981,600

* All new windows would be double insulating tinted glass.

APPENDIX D
CHILLED WATER REPORT

The total estimated chilled water requirement for the Jackson/Owre/Millard/Lyon (JOML) Building Complex is 2050 tons as shown in Table D-1. The chilled water requirements were calculated from the estimated ventilation requirements shown in Table E-1 of Appendix E.

Chilled water sources as shown in the mechanical design concept description are the Unit A-B/C chiller plant and possibly a new chiller plant in the JOML Building Complex.

The capacity of the Unit A-B/C Central Chiller Plant is as follows:

3 chillers at 1100 tons (low pressure)	= 3300 tons
3 chillers at 976 tons (high pressure)	= 2928 tons
Total	6228 tons

The Calculated Design Chilled Water Tonnage Requirement of the Unit A-B/C Central Chiller Plant is as follows:

Unit A	3025 tons
Unit B/C	2190 tons (includes finishing of shell space)
Unit F	1064 tons
Total	6279 tons

As these calculations show, no excess capacity has been designed into the A-B/C chiller plant for use in the JOML Building Complex. However, in the "Report on Air Conditioning Systems for Health Sciences Buildings" prepared by the Engineering and Construction Department of Physical Planning and Development, University of Minnesota dated September 24, 1971, reference is made to an "experience factor" (representing the potential difference between design load calculations and actual load conditions) which might be applied to a large central plant in order to create a reserve capacity.

In the case of the Unit A-B/C central chiller plant the reserve capacity generated through the use of an experience factor totals 1245 tons (6228 tons x 20%).

University personnel have subsequently reaffirmed the availability of this reserve capacity and have directed that 1200 tons of the A-B/C reserve capacity be used in the JOML Building Complex.

The additional capacity to be installed as new capacity in the A-B/C plant or in a JOML plant is estimated to be 850 tons (2050 tons - 1200 tons.) Space is available and the structure has been reinforced at the Jackson Hall roof for a 650 ton chiller and cooling tower. The installation of any major equipment other than this on any roof in the JOML Building Complex would require a complete structural analysis.

TABLE D-1 ESTIMATED CHILLED WATER

ZONE	AREA SERVED	TONS	GPM*
1	N.E. Mech. Equip. Tower	490	980
2	N.W. Mech. Equip. Tower	470	940
3	S.E. Mech. Equip. Tower	350	700
4	S.W. Mech. Equip. Tower	400	800
5	E. Courtyard Animal Area	100	200
6	Owre Bsmt. Animal Area	25	50
7	Owre Bsmt. Aud. and Classroom	20	40
8	Jackson/Owre S-Bsmt. Equip. Room	80	160
9	Jackson Auditorium	15	30
10	Lyon S-Bsmt. Animal Area	100	200
	TOTAL	2050	4100

The tonnage calculations are based on the following conditions:

	TEMPERATURE °F DRY BULB	WET BULB
Outside Air	89	75
Inside Air	78	66.5 (55% R.H.)
Space Supply Air	58	57

*GPM quantities are based on a 12F degree temperature differential.

APPENDIX E
VENTILATION REPORT

Estimated capacities of the various ventilation zones in the Jackson/Owre/Millard/ Lyon Building Complex are shown on Table E-1. These capacities were determined from the space utilization data in the program for the 1975 GRANT CONSTRUCTION assuming that the functions of the remaining spaces would remain the same as they are. Ventilation rates are assumed to be the same as for similar spaces in Units A and B/C. Fume Hoods included in the analysis are those shown on the mechanical design concept drawings.

Existing major air supply units and the ultimate disposition of each are shown in Table E-2.

TABLE E-1 ESTIMATED VENTILATION

ZONE	AREA SERVED	SUPPLY CFM	%O.A
1	N.E. Mech. Equip. Tower	105,000	85
2	N.E. Mech. Equip. Tower	100,000	85
3	S.E. Mech. Equip. Tower	75,000	85
4	S.W. Mech. Equip. Tower	85,000	85
5	E. Courtyard Animal Area	20,000	100
6	Owre Bsmt. Animal Area	5,000	100
7	Owre Bsmt. Aud. and Classroom	8,000	10
8	Jackson/Owre S-Bsmt. Equip. Room	16,000	100
9	Jackson Auditorium	5,000	25
10	Lyon S-Bsmt. Animal Area	20,000	100

TABLE E-2 EXISTING SUPPLY AIR UNITS

BUILDING	UNIT IDENTIFICATION ROOM NO.	UNIT NO.	AREA SERVED	AREA USAGE	DISPOSITION OF UNIT
JACKSON	75		Corridors on Floors B,1,2,3	Corridors	See Note 1
JACKSON	74A		Jackson Auditorium	Auditorium	Unit to remain Cooling to be added.
JACKSON	475A		473, 475, 479, 479A, B, C, D	Animal Area	See Note 2
JACKSON	580		488, 488A Thru 488F, 490, 490A, 490B, 492 493, 495	Animal Area	See Note 2
JACKSON	501		378, 382	Laboratories	See Note 2
JACKSON/ OWRE	S61	S-1	J/O Sub-Basement, J/O Basement Classrooms	Animal Area,Classrooms	Unit to remain to serve Animal Area. Classroom to be supplied from a new Tower Unit.
JACKSON/ OWRE	S61	S-2	West Courtyard Animal Area	Animal Area	Unit to remain
JACKSON/ OWRE	S61	S-3	245,246,248,250,251, 254,256,256A,258, 258A	Laboratories, Offices	See Note 2
JACKSON/ OWRE	560		Fourth Floor Corridor	Corridor	See Note 1
OWRE	7	S-1	12,15,111,112, 112C,113	Classrooms,Auditorium	Unit to remain. First Floor Area to be served by new unit because of change of function.

BUILDING	UNIT IDENTIFICATION ROOM NO.	UNIT NO.	AREA SERVED	AREA USAGE	DISPOSITION OF UNIT
OWRE	7	S-2	1 Thru 5, 139,139B, C,E,G,H,210G,232	Laboratories, Offices Conference Room	See Note 2
OWRE	522	S-5	401A,401,402,403,405, 409,411,423,424,434, 435,444,453,454,464, 465,466	Laboratories, Offices	See Note 2
OWRE	522	S-6	422,426,428,429,430, 432,438,439,442,446, 448,450,452,456,458, 460,462	Laboratories, Offices	See Note 2
OWRE	Flr.5 West		515,517,519,519A Thru C,523,525A Thru C,529, 531,531A,531B,533, 535A Thru C	Laboratories, Offices	See Note 2
OWRE	Flr.5 East		512,512A,513,513A,516 532,536	Animal Areas	See Note 2
MILLARD	N.Pipe Space		Bsmt.Corridor-North	Corridor	See Note 1
MILLARD	346		Corridors on Floors B,1,2,3,4,307,326, 330	Corridor	See Note 1

BUILDING	UNIT IDENTIFICATION ROOM NO.	UNIT NO.	AREA SERVED	AREA USAGE	DISPOSITION OF UNIT
LYON	65	S-1	Sub-Basement	Animal Area	Unit to be replaced when area is remodeled. Unit capacity is insufficient to properly ventilate area.
LYON	570	S-2	162,163,165,167, 167A Thru C,170,171, 174,178,180,182,262 Thru 266,266A,272,274, 275,277,280 Thru 283, 462,464,466,467A,467B, 467D,467F,468,470,472, 474	Offices,Laboratories	See Note 3
LYON	570	S-3	168,176,267,267A,270, 463,467,471,471A	Offices,Laboratories	See Note 3
LYON	570	S-5	361,361A,375,375C Thru 375H	Laboratories,Animal Area	See Note 2
LYON	565	S-6	362,362A, Thru 362F,370,380,380A	Offices,Laboratories	See Note 2

NOTE 1: Unit should remain until all corridors served are ventilated by new units in Mechanical Equipment Towers. Corridors should ultimately be served by the units serving the occupied spaces in the same zone for proper air balance.

NOTE 2: Unit should remain until worn out or no longer serving adequately because of increased ventilation needs or some other space requirement. Replacement ventilation capacity should be provided in the new units in the Mechanical Equipment Towers.

NOTE 3: Unit to be replaced when area is remodeled and central air conditioning is desired.

APPENDIX F
UNIVERSITY'S FUME HOOD REPORT

The following is a list of existing fume hood deficiencies in the JOML Complex as per the letter of February 11, 1976, from Mr. G. L. Scheffler, Assistant Director, Department of Environmental Health and Safety, to Health Sciences Architects and Engineers. Those rooms which are outside of the 81,000 S.F. area of the 75 GRANT CONSTRUCTION have subsequently been identified with an asterisk (*).

Millard Hall

Room 22 - ventilation rate poor, less than 50 fpm, sash missing

Room 218 - ventilation rate poor, less than 50 fpm and no sash on hood

Room 221 - no sash on hood

Room 224* - this is a wood hood with low ventilation, must be replaced with new unit

Rooms 225*, 418 , and 450* - ventilation poor, less than 50 fpm

Owre Hall

Room 422 - ventilation rate is poor

Jackson-Owre

Room 251* - ventilation rate is poor, less than 50 fpm

Room 450* - hood needs sash, ventilation should be increased

Room 452* - two hoods need sashes, ventilation on one, with both sashes missing, needs to be increased

Room 464* - one hood needs sash

Jackson Hall

Room 284* - ventilation rate of both hoods poor, less than 50 fpm

Room 286* - ventilation rate poor, less than 50 fpm

Room 292 - ventilation rate poor, less than 50 fpm

Room 478* - sash missing on both hoods

Room 482* - sash missing on both hoods, ventilation not working on either hood, 0 face velocity

Lyon Laboratory

Room 468 - ventilation rate poor, less than 50 fpm

Shashes should be replaced as required. Ventilation rates should be increased to 100 fpm with sash in full open position for hoods noted. The only hood needing replacement is the wood unit in Room 224 Millard. All hoods are individually ducted to outside.

APPENDIX G
UNIVERSITY'S FUNTIONAL SPACE PROGRAM

The following is a list of room spaces and square footage within the JOML Complex as prepared by the University of Minnesota Health Sciences Planning Office.

JACKSON/OWRE/MILLARD/LYON COMPLEX

REVISED LISTING OF ROOMS TO BE RENOVATED IN THE COMPLEX -- MARCH 1976

SQUARE FOOTAGES BY FLOOR:

Floor Level	Sq. Ft. by Department		Sq. Ft. total per Floor
Basement Level	Anatomy	7,657	
	Pharmacology	4,680	12,337
First Floor	Pharmacology	13,261	13,261
Second Floor	Anatomy	6,199	
	Biochemistry	7,506	
	Pharmacology	6,099	19,804
Third Floor	Anatomy	1,686	
	Biochemistry	12,542	
	Physiology	3,002	17,230
Fourth Floor	Pathology	9,228	
	Physiology	9,140	18,368
	Total.....	81,000	Total.....81,000

SQUARE FOOTAGES BY DEPARTMENT:

ANATOMY	15,542
BIOCHEMISTRY	20,048
PATHOLOGY	9,228
PHARMACOLOGY	24,040
PHYSIOLOGY	12,142

UPDATED RENOVATION ROOM SCHEDULE

BY FLOOR AND BY ROOM

NUMBERS AND FUNCTIONS

BASEMENT LEVEL J.O.M.L.

ANATOMY:

Building Designation	Room Number	Square Feet	Function
J	88A	--	Cadaver Preparation
J	88B	--	Cadaver Storage
Department Sub-total -		783	
J/O (N.1/2)	54	1,463	Instructional Laboratory
J/O (S.1/2)	54	1,192	Instructional Laboratory
0 (N.1/2)	1	--	Instructional Laboratory
0	3	--	Storage
0	4	--	Storage
0	5	--	Demonstration Room
0	6	--	Demonstration Room
Department Sub-total -		2,363	
0 (S.1/2)	1	--	Instructional Laboratory
0	2	--	Instructional Laboratory
Department Sub-total -		1,856	

PHARMACOLOGY:

Building Designation	Room Number	Square Feet	Function
M	30	557	Laboratory
M	2	230	Laboratory
M	23	--	
M	23A	--	
M	23B	--	
M	23C	--	
M	24	--	
M	24A	--	Laboratory Module
Department Sub-total -		1,526	

PHARMACOLOGY:

Building Designation	Room Number	Square Feet	Function
M	(1/2) 22	200	Cold Room
M	(1/2) 22	162	Instrument Room
M	21	413	Laboratory
O	17	--	
O	18	--	
O	19	--	
O	19A	--	
O	20	--	
O	22	--	
O	22A	--	Animal Quarters
	Department Sub-total -	1,592	

PHARMACOLOGY:

Building Designation	Room Number	Square Feet	Function
0	111	--	
0	112	--	
0	112C	--	
0	113	--	
0	114	--	
0	115	--	
0	116	--	Laboratory Module
	Department Sub-total -	2,799	
0	117	630	Preparation
0	122	315	Instrument Room
0	123	315	Cold Room
0	124	--	
0	125	--	
0	126	--	
0	128	--	
0	129	--	
0	132	--	
0	135	--	
0	136	--	
0	137	--	
0	138	--	Laboratory Module
	Department Sub-total -	2,252	
M	101	900	Laboratory
M	(1/2) 118	289	Laboratory
M	(1/2) 118	--	
M	119	--	
M	121	--	
M	121A	--	
M	121B	--	
M	121C	--	
M	121D	--	
M	122	--	
M	122A	--	
M	128	--	Laboratory Module
	Department Sub-total -	1,751	
M	124	245	Office

PHARMACOLOGY:

Building Designation	Room Number	Square Feet	Function
M	126	--	
M	126A	--	
M	127	--	Duplication Storage
Department Sub-total -		454	
M	128	372	Reading Room
M	130	--	
M	130A	--	
M	131	--	
M	131A	--	
M	131B	--	Laboratory Module
Department Sub-total -		1,323	
M	132	489	Instrument Room
M	134	230	Laboratory
M	136	897	Laboratory

SECOND LEVEL J.O.M.L.

ANATOMY:

Building Designation	Room Number	Square Feet	Function
J	298	1,080	Laboratory Module
J	297	1,104	Laboratory Module
0	210	--	
0	210A	--	
0	210B	--	
0	210C	--	
0	210D	--	
0	210E	--	
0	210F	--	
0	210G	--	
0	210H	--	
0	210J	--	Tissue Culture Laboratory
	Department Sub-total -	2,079	
0	242	--	
0	242A	--	
0	242B	--	
0	242C	--	
0	242D	--	Laboratory
	Department Sub-total -	1,058	
0	239	259	Lounge
0	232	619	Offices

BIOCHEMISTRY:

Building Designation	Room Number	Square Feet	Function
M	206	--	
M	207	--	Laboratory Module
	Department Sub-total -	1,220	
M	(1/2)210	--	
M	212A	--	
M	(1/3)212	--	Laboratory Module
	Department Sub-total -	425	
M	(2/3)212	--	
M	212B	--	Department Head Office Suite
	Department Sub-total -	598	

BIOCHEMISTRY:

Building Designation	Room Number	Square Feet	Function
M	213	--	
M	(1/2)214	--	Conference Room
	Department Sub-total -	1,113	
M	(1/2)214	--	
M	215	--	
M	215A	--	Storage (Department)
	Department Sub-total -	425	
M	216	--	
M	216A	--	Office
	Department Sub-total -	242	
M	118	--	
M	119	--	
M	(2/3)221	--	
M	221A	--	Laboratory Module
	Department Sub-total -	1,035	
M	(1/3)221	200	Preparation Room
0	221A	--	
0	221B	--	
0	Stairwell	--	Darkroom
	Department Sub-total -	290	
0	(1/2)223	--	
0	(1/2)223A	--	Tissue Culture
	Department Sub-total -	392	
0	(1/2)223A	--	
0	224	--	Instrument Room
	Department Sub-total -	350	
0	(1/2)225	--	
0	225A	--	
0	225B	--	
0	225C	--	Administration Office Suite
	Department Sub-total -	426	
0	(1/2)225	--	
0	225E	--	
0	226	--	Library
	Department Sub-total -	534	
0	226A	--	
0	226B	--	Duplication Room
	Department Sub-total -	256	

PHARMACOLOGY:

Building Designation	Room Number	Square Feet	Function
O	216	--	
O	217	--	
O	219	--	
O	220	--	
O	220A	--	
O	221	--	Clinical Laboratory Suite
	Department Sub-total -	2,276	
O	227	--	
O	227A	--	
O	227B	--	
O	228	--	
O	229	--	
O	231	--	Clinical Laboratory Suite
	Department Sub-total -	1,767	
L	261	--	
L	263	--	
L	265	--	Laboratory
	Department Sub-total -	659	
L	267	--	
L	267A	--	Deep Cold Room
	Department Sub-total -	179	
L	275	218	Laboratory
L	277	313	Laboratory
L	274	--	
L	274A	--	
L	280	--	
L	280A	--	
L	282	--	Laboratory
	Department Sub-total -	687	

UPDATED RENOVATION ROOM SCHEDULE

BY FLOOR AND BY ROOM

NUMBERS AND FUNCTIONS

THIRD LEVEL J.O.M.L.

ANATOMY:

Building Designation	Room Number	Square Feet	Function
J/O	356	1,115	Resource Retrieval
J/O	364	--	
J/O	364A	--	
J/O	364B	--	
J/O	364C	--	
J/O	364D	--	Slide Preparation Room
Department Sub-total -		571	

BIOCHEMISTRY:

Building Designation	Room Number	Square Feet	Function
J/O (portion of)	350	1,059	Graduate Laboratory
J/O (portion of)	350	196	Glass Wash Room
J/O (portion of)	350	384	Instrument Room
J/O (portion of)	350	144	Office
J/O (portion of)	350	144	Office
0	302	--	
0	303	--	
0	304	--	Cold Room
Department Sub-total -		546	
0	305	168	Office
0	306A	182	Office
0	311	336	Preparation Room
0 (1/2)	314	--	
0	314A	--	Cold Room
Department Sub-total		440	
0 (1/2)	314	168	Office

BIOCHEMISTRY:

Building Designation	Room Number	Square Feet	Function
0	314B	168	Office
0	315A	--	
0	316	--	Office
	Department Sub-total -	182	
0	(1/2)364	210	Instrument Room
0	(1/3)361	350	Glass Wash Room
0	(1/3)361	--	
0	(1/3)364	--	
0	Stairwell	--	Graduate Laboratory
	Department Sub-total -	863	
0	(1/8)301	1,000	Faculty Laboratories
0	(1/8)301	1,000	Faculty Laboratories
0	(1/8)301	1,000	Faculty Laboratories
0	(1/8)301	988	Faculty Laboratories
0	(1/8)301	1,000	Faculty Laboratories
0	(1/8)301	1,000	Faculty Laboratories
0	(1/8)301	1,014	Faculty Laboratory

PHYSIOLOGY:

Building Designation	Room Number	Square Feet	Function
0	364A	77	Dark Room
M	307	851	Seminar Room
M	310	359	Storage
M	311	472	Conference Room
M	312	285	Storage
M	336	--	
M	336C	--	Computer Room
	Department Sub-total -	356	

PHYSIOLOGY:

Building Designation	Room Number	Square Feet	Function
M	336B	168	Aquatic Room
M	339	--	
M	339B	--	Laboratory
	Department Sub-total -	434	
M	342		Computor Room
M	342B		Computor Room

UPDATED RENOVATION ROOM SCHEDULE

BY FLOOR AND BY ROOM

NUMBERS AND FUNCTIONS

FOURTH LEVEL J.O.M.L.

PATHOLOGY:

Building Designation	Room Number	Square Feet	Function
J	(1/6)496	603	Laboratory
J	(1/6)496	603	Laboratory
J	(1/6)496	603	Laboratory
J	(1/6)496	413	Laboratory
J	(1/6)496	413	Laboratory
J	(1/6)496	413	Laboratory
J	(portion of)496	120	Office
J	(portion of)496	120	Office
J	(portion of)496	120	Office
0	401	--	Department Office Suite
0	401A	--	Department Office Suite
0	402	--	Department Office Suite
0	403	--	Department Office Suite
0	404	--	Department Office Suite
0	(1/4)405	--	Department Office Suite
	Department Sub-total -	1,190	
0	(3/4)405	484	Offices
0	435	153	Laboratory
0	436	232	Laboratory
0	438	120	Cold Room
0	439	252	Laboratory
0	442	232	Laboratory
0	444	306	Laboratory

PATHOLOGY:

Building Designation	Room Number	Square Feet	Function
0	446	232	Laboratory
0	448	236	Laboratory
0	450	236	Laboratory
0	452	232	Laboratory
0	453	153	Laboratory
0	454	178	Laboratory
0	456	207	Laboratory
0	458	210	Laboratory
0	460	283	Laboratory
0	462	279	Laboratory
0	464	189	Laboratory
0	465	238	Laboratory
0	466	--	
0	466A	--	Glass Washing
Department Sub-total -		178	

PHYSIOLOGY:

Building Designation	Room Number	Square Feet	Function
0	409	414	Study
0	411	622	Laboratory
0	411A	157	Office
0	420	98	Cold Room
0	422	368	Laboratory
0	423	153	Office
0	424	--	
0	426	--	Laboratory
Department Sub-total -		388	

PHYSIOLOGY:

Building Designation	Room Number	Square Feet	Function
O	428	143	Dark Room
O	429	193	Constant Humidity Room
O	432	--	
O	434	--	Laboratory
	Department Sub-total -	398	
O	461	406	Instrument Laboratory
M	401	190	Cold Room
M	405	446	Laboratory
M	405A	243	Office
M	409	446	Laboratory
M	411	271	Store Room
M	412	154	Office
M	418	553	Laboratory
M	424	125	Office
M	445	165	Cold Room
M	454	253	Store Room
L	464	--	
L	466	--	
L	468	--	Laboratory
	Department Sub-total -	973	
L	467	1,128	Laboratory
L	475	532	Laboratory
L	477	321	Laboratory